

Tiger Conservation Plan

Sariska Tiger Reserve



Period 2014-15 to 2023-24

Forest Department, Rajasthan

F. No. 1-14/2011-NTCA (Part I)
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

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Dated: 31st December 2014

8/12/14
12/11/14
12/11/14
To
The Chief Wildlife Warden,
Government of Rajasthan,
Jaipur



Sub : Approval of Tiger Conservation Plan (TCP) for the Sariska Tiger Reserve – reg.

Reference : 1. Comments of this Authority communicated vide letter no. 1-9/2013-NTCA dated 10.7.13
2. Comments of this Authority on delineation of corridors vide letter no. 1-9/2013-NTCA dated 16.5.14

Sir,

The draft Tiger Conservation Plan (TCP) prepared by the State of Rajasthan for Sariska Tiger Reserve, **under sub-section (3) of section 38V of Wildlife (Protection) Act, 1972**, was submitted to this Authority requesting for approval under section 38O (1) (a) of the said Act.

After examination of the said TCP by the Expert Committee of the NTCA constituted for the purpose, observations of NTCA/ Experts were communicated to the Chief Wildlife Warden (Rajasthan) & the Field Director, Sariska Tiger Reserve, for their incorporation in the TCP.

In this context, I am directed to say that further to the compliance furnished by the State Government vide their letter no. *Kramank ef() anu0/Vasansheni/2014-15/2967* dated 29.10.14 and based on the recommendation of the technical committee, **approval of the NTCA is hereby granted for the TCP of Sariska Tiger Reserve for the period from 2014-15 to 2023-24, under section 38O (1) (a) of the Wildlife (Protection) Act, 1972**, subject to following conditions:

- a. No deviation shall be made from the prescriptions of the TCP, read with conditions stipulated here-in, without prior approval of the NTCA u/s 38O (1) (a) of Wildlife (Protection) Act, 1972.
- b. The approved TCP shall have a provision for mid-term review corresponding to the proposed period of the plan, for appropriate mid course alteration, if any, as required.
- c. The State Government shall comply with the guidelines and advisories issued by the NTCA/ Project Tiger from time to time and the commitments made in the tripartite Memorandum of Understanding (MoU).
- d. Since the core/ critical tiger habitat has the status of a National Park/ Wildlife Sanctuary, all provisions under Chapter IV of Wildlife (Protection) Act, 1972 would be applicable to such areas, in addition to sections 51 (1C), (1D) and 55 (ab), (ac).
- e. At no stage of implementation of various prescriptions of the TCP relating to the tiger reserve, shall overrule the provisions of:
 - i. The Wildlife (Protection) Act, 1972
 - ii. The Indian Forest Act, 1927
 - iii. The Biological Diversity Act, 2002
 - iv. The Environment (Protection) Act, 1986
 - v. The Forest (Conservation) Act, 1980
 - vi. The National Forest Policy, 1988

- vii. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
- viii. Directives issued from time to time by Honourable Supreme Court of India
- f. The NTCA reserves right to review, modify and withdraw this approval at any time, if any of the conditions of approval are violated.
- g. The following need to be ensured while executing forestry operations in the buffer area of the tiger reserve:
 - i. To ensure minimum 'patch disturbance' and minimum human-wildlife conflicts, forestry operations should be restricted only in those coupes which are due for the current year.
 - ii. Compliance of section 38V (2) of the Wildlife (Protection) Act, 1972 should be strictly ensured.
 - iii. No working or camping should be permitted in the area after sunset.
 - iv. Daily monitoring of the tiger movement, water points and cattle kill should be done and recorded.
- g. The Tourism activities should be strictly managed/ regulated as per the comprehensive guidelines issued by the NTCA under section 38O (c) of the Wildlife (Protection) Act, 1972 vide letter dated 15/10/2012.

Yours faithfully,

(Dr. H.S.Negi)

Inspector General of Forests (NTCA)

Copy to:

- 1. The Principal Secretary of Forests, Government of Rajasthan, Jaipur
- 2. Addl. Principal Chief Conservator of Forests (C), Kendriya Bhavan, 5th Floor, Sector-H, Aliganj, Lucknow-226024
- 3. The Inspector General of Forests (NTCA), Regional Office, Nagpur
- 4. The Field Director, Sariska Tiger Reserve, Rajasthan for necessary action and information please.

GOVERNMENT OF RAJASTHAN
FOREST DEPARTMENT
TIGER CONSERVATION PLAN
PERIOD 2014-15 TO 2023-24



Prepared by

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Tiger Conservation Plan **Executive Summary**

Man kind is a part of nature and life depends on the uninterrupted functioning of natural systems. Living in harmony with nature, gives man, the best opportunities for the development of his creativity & recreation.

Conservation issues, especially in India, are primarily socio-economic issues. Any strategy for long-term conservation has to be built around the socio-economic needs of the local community and with their concurrence. The challenge for the conservationist is to demonstrate that wilderness areas could yield immense benefits to society.

It is mandatory to have a Tiger Conservation Plan for each Tiger Reserve for ensuring the protection of tiger reserve and the livelihood & other interests of the people living in and around forests or tiger reserve. Tiger conservation includes management of “core” and “buffer” areas of a tiger reserve, the former being the critical or inviolate area and later, the peripheral area to foster co existence with local people for safeguarding the integrity of the core.

It is being increasingly realized that if we genuinely want to contribute to biological diversity conservation, there is a need to first resolve the socio-economic issues of the local people. The habitat of wild animals and plants will be conserved better if the local villagers stand with the forest guard and assist her/him in the protection of natural resources. Tiger being largest predator and at the apex of the ecological pyramid, indicates the health of ecosystem in which it lives. Conservation of Tiger thus effectively ensures the conservation of habitat and ecosystem. These two aspects are interwoven with each other, as far as, habitat areas are being protected strictly. The buffer area is being managed by coexistence concept.

A wide spectrum and rich population of wild life such as Sambar, Blue bull, Wild boar & Chital and the presence of the Leopard and the

Tiger living in the open dry deciduous thorn forests of Sariska is an example of a marvel of ecological adjustment, adoption and tolerance. Sariska is truly a natural wonder.

The topography of undulating plateau and wide valleys unique in the Aravalli system constitutes the major part of the Reserve of Sariska. Still, the hills maintain the Aravalli character of sharp hogback ridges. The forests are dry deciduous type and are dominated by Dhok (Anogeissus pendula) with the belts of Salar (Boswellia serrata) on steep dry slopes and Palash (Butea monosperma) in valleys. The landscape changes its color from green in the rains to copper brown to grey in winter and finally to drab grey in the summer. The Monotony of the grey tone is broken by the splash of reds by the "Flame of the forest" in March-April Sariska has characteristic fauna of dry zone, the deer and antelopes, Caracal, Jungle cat, Hyena, Jackal, Rattle, big cats and rich avifauna.

The 9th and 10th century ruins of Shiv Temple of Garh Rajore are contemporary of the Khajuraho archaeology. The 10 mtrs single piece stone statue of Mahavir is imagine. The mediaeval history of the Mughals and the Rajputs is preserved in the fort of Kankwari, whereas the Sariska palace is relics of the splendour of the rule of Maharajas.

The Tiger Conservation Plan consists of two parts. Part – I deals with the Core Area, it has twelve chapters. Part – II deals with Buffer Area having eight chapters.

The maps, tables & annexure to the plan have been given separately.

Date : 15.01.2015

**(R.S. Shekhawat)
Chief Conservator of Forests
& Field Director
Sariska Tiger Reserve
Alwar (Rajasthan)**

Acknowledgement

I am grateful to Dr.Rajesh Gopal IFS, Member Secretary, National Tiger Conservation Authority for his guidance and motivation to compile this Tiger conservation plan for Sariska Tiger Reserve.

I am grateful to Shri S N Singh IFS, Add. Principal Chief Conservator of Forests & Chief Wildlife Warden, Rajasthan for his kind guidance and support..

I am immensely grateful to shri P.S.Somasekhar, IFS, Chief Conservator of Forests Wildlife, Jaipur, who has given me opportunities to avail different platforms to shape this into a realistic model plan and also for the encouragement and valuable suggestions for bringing out this Plan in time.

I am thankful to Shri Manoj Parashar IFS, Deputy Conservator of Forests, Sariska Tiger Reserve and Shri Mukesh Sainit RFS, Deputy Conservator of forests, Relocation for their valuable support.

I wish to express my heartfelt thanks to the Shri Hemant Singh Naruka Forest Guard for helping in preparation of this plan.

Last, but certainly not the least, the services of the field officers and staff at various levels, who took pains to collect & send information from interior and inaccessible areas, cannot be forgotten.

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SARISKA TIGER RESERVE, RAJASTHAN, INDIA

1. INTRODUCTION OF THE AREA

1.1 Description of the Tiger Conservation Unit and significance of the area for tiger conservation.

The Project Tiger guidelines made it mandatory that every Tiger Reserve should be managed in accordance with a site specific management plan, which is the road map for managing a Tiger Reserve. Project Tiger thus became a role model for scientific management of protected areas in India. It laid down the concept of core-buffer zonation, prescribed interventions for protection, habitat improvement, field data collection relating to change in the composition of flora and fauna on account of protection, animal estimation and other aspects.

The existing management plan for Sariska Tiger Reserve (hereafter referred as STR). Consequent to the amendment to Wildlife (Protection) Act, 1972 in 2006, the National Tiger Conservation Authority, Ministry of Environment and Forest, Govt. Of India has issued detailed guidelines for preparation of Tiger Conservation Plan. Based on these guidelines, the Tiger Conservation Plan has been prepared for an area of 1213.33 sq. km which forms the core & Buffer of STR. Sariska was declared as the 9th Tiger Reserve in the country in view of need to conserving the habitat with the presence of Tigers. The tigers in this area would serve as source population. It needs to be consolidated and strengthened by suitable management interventions.

As per Section 38 V [4-II] of Wildlife (Protection) Amendment Act 2006 each tiger reserve is required to create a buffer or peripheral area, where a lesser degree of habitat protection is required to ensured the integrity of critical tiger habitat with adequate dispersal for the tiger. This area will promote the co-existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of local people.

National Tiger conservation Authority under MOEF, Government of India, in its guidelines, issued for preparation of Tiger conservation plan

has emphasized the concept of core – buffer zonation in every tiger reserve. The 2006 amendment in wildlife (protection) act 1972, for the first time, has defined “core” and “buffer” areas of a tiger reserve, the former being the critical or inviolate area and later, the peripheral area to foster co existence with local people for safeguarding the integrity of the core. Buffer zone of a tiger reserve may not have the status of national Park or sanctuary, however, the buffer area, as multiple use area, may encompass forest areas, apart from revenue lands, private holdings, villages, towns and other production sectors. Buffer areas with forest connectivity are imperative for tiger dynamics, since such areas foster sub adults, transients and old members of tiger population. The young adults replace the ageing males and females from the source population area. The buffer area absorbs the shock of bioatic pressures. The depletion of habitat in buffer areas would target the source population an eventually population get decimated. With this backdrop constitution of buffer areas peripheral to critical tiger habitat or core area is most important.

Since the tiger population is dwindling drastically in its entire distribution range and Sariska, which is the western most distribution limit of tigers, has seen its complete extinction of tigers once, over time, it has become even more necessary to monitor and study the relevant holistic, ecological and socio-economic aspects that will address important issues like population dynamics, demography, territory size, dispersal, food habits and response of introduced tigers to anthropogenic disturbances.

The Tiger Conservation Plan for Sariska Tiger Reserve has been prepared on the three cardinal principles:-

- Elimination of all kinds of exploitation and disturbance from the core Area, while rationalizing such activities in the buffer.
- Limiting the habitat management to repairing the damages inflicted on it by biotic pressure so as to resurrect the habitat in its natural form.
- Researching facts about habitats and wild fauna, while monitoring the changes in flora/fauna owing to Project Tiger initiatives. The report of the Task Force of the Indian Board for Wildlife (1983) on “Eliciting Public Support for Wildlife Conservation” also emphasized that the

Security of wildlife reserves should be ensured by constituting “buffer belts” surrounding core units. While the core should be free from all Human use, the buffer should allow restricted human use with a strong conservation bias.

This would require people to forego all use of forests in the core, while considerably curtailing such use in the buffer zone. In order to compensate for these restrictions, the productivity of the outer depleted area should be managed as a “multiple use surrounded” in terms of both agriculture and other related activities with viable alternatives. Therefore, such multiple use areas should be regarded as “special areas for eco-development”. The buffer zone/multiple use area is a delineated area around a Core Zone of a Tiger Reserve facilitates:

- i) Extension Buffering -Providing Habitat Supplement to the spillover population of wild animals from the core.
- ii) Social Buffering -Providing socio economic function to local people living in such areas so that their resource dependency on the core zone of tiger reserve is reduced.
- iii) The habitat conserved in the buffer zone also serves as a corridor for wild animals.

1.2 Legal provisions contained in the Wildlife (Protection) Act regarding Tiger Conservation Plan and brief description of their relevance in the Tiger Conservation Unit/ Landscape.

The Wildlife (Protection) Act, 1972 was amended in 2006, and a separate Chapter (IVB) has been added on the “National Tiger Conservation Authority”, which has replaced Project Tiger. This Chapter, interalia, has enabling provisions (Section 38V) for preparing a “Tiger Conservation Plan” for the proper management of a Tiger Reserve, which will also include staff development and deployment plan. The core or critical tiger habitat is required to be kept as inviolate for the purpose of Tiger conservation.

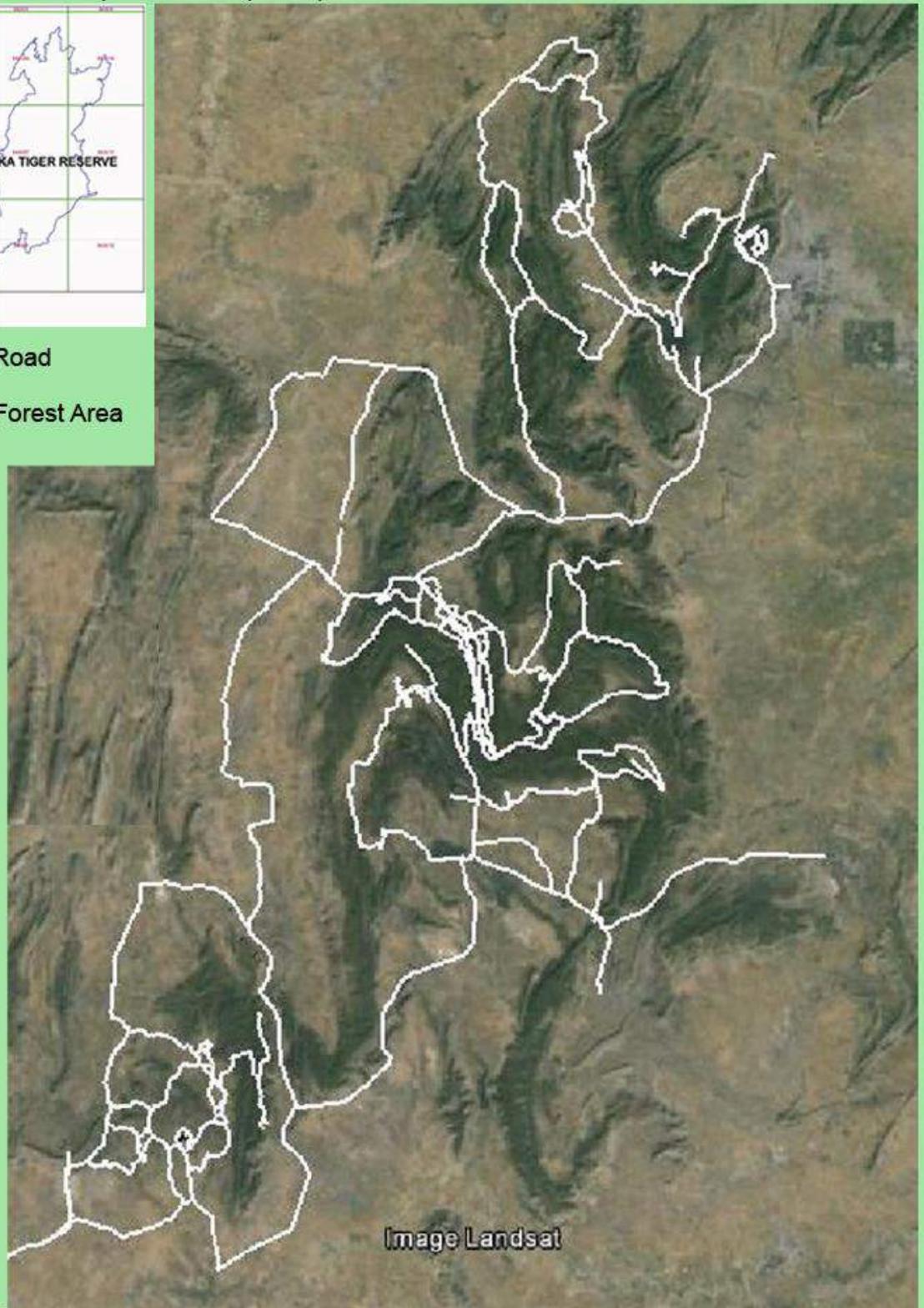
Map 1 -Landscape Map with Road Network – Core & Buffer



Legend

 Road

 Forest Area



Not to scale

The buffer or area peripheral to critical tiger habitat is required to ensure the integrity of the critical tiger habitat with adequate dispersal for tigers and to promote co-existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people. The adjoining landscape is required to act as corridor for movements of wild animals between core areas.

1.3 Delineation of Area into Core and Buffer.

A. Core area : The core area consists of Sariska National Park, Sariska Wildlife Sanctuary & adjoining forest areas (881.11 sq.km.). This area is presently under the administrative control of Dy. Conservator of Forests & Dy. Field Director Sariska, and under supervision of Conservator of Forests & Field Director, Sariska HQ. at Alwar.

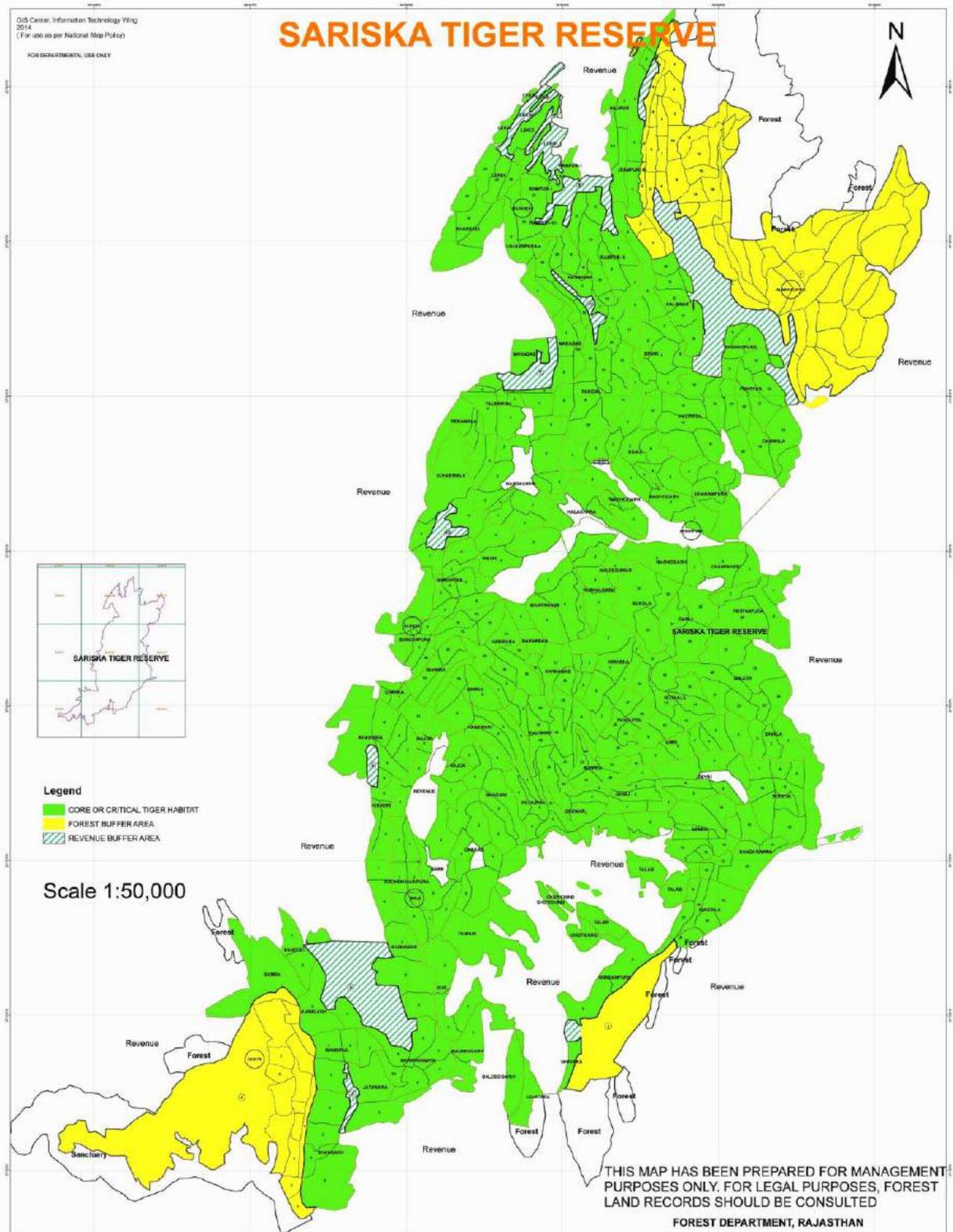
B. Buffer Area :

The forest area in patches adjoining to the core of STR has been declared as buffer of Sariska Tiger Reserve vide Government of Rajasthan notification dated 6 July, 2012, over an area of 322.22 sqkm published in Rajasthan Gazette on July 9, 2010 under provision of wildlife (protection) Act 1972 under section 38 V.

1.4 Approach to Tiger Conservation Planning:

Owing to Habitat fragmentation on account of biotic pressures and ecologically unsustainable land uses, coupled with poaching pressures, it is imperative in the context of Tiger conservation planning to have 1. consolidating and strengthening the “source population” in the Tiger Reserve and Protected Areas, 2. Managing “source sink dynamics” by restoring the habitat connectivity to facilitate dispersing Tigers to repopulate the core areas. The management plan is drafted keeping this strategy in view.

Map 2 - Beat Map – Buffer & Core (Sariska Tiger Reserve)



Tiger Conservation Plan

Part – I

Critical Tiger Habitat

Sariska Tiger Reserve

CHAPTER - 1

INTRODUCTION OF THE AREA

1.1 Name, Location, Constitution & Extent

1.1.1 Name

The name of the area is “**Sariska Tiger Reserve, Critical Tiger Habitat**”, which constitutes part of Sariska Tiger Reserve except Buffer area.

1.1.2 Location

The CTH of Sariska Tiger Reserve wholly lies in the district of Alwar of Rajasthan state and is located in the oldest range of Aravallis spreading over the tract starting from Mount Abu and culminating on Delhi ridge. The CTH lies on Delhi-Jaipur State Highway via Alwar, at a distance of 200 km from Delhi, 36 km from Alwar and 110 km from Jaipur.

The Core Area of STR lies between

Latitude 27^o 05' 45.6" to 27^o 38' 54.9" North

Longitude 76^o 14' 30.1" to 76^o 32' 44.5" East

1.1.3 Constitution

Prior to the formation of the state of Rajasthan, these forests were a part of Alwar princely state and were managed as hunting reserves.

After independence, these forests came under the control of Govt. of Rajasthan.

Declaration of Reserve Area - In exercise of the power of section 5 of the Rajasthan Wild Animals & Birds Protection Act 1955, this part of Sariska Hunting Reserve was declared as a reserve area vide Notification No. F.39(2)For./55 dated 07 November 1955 (Date of Publication 19 November 1955) (**Annexure - 3**)

The Boundaries of this Reserve Area are as follows :-

East - Kalighati - Tehla Road

West - Thanagazi, Amrakabas, Mala Duhar

North - Indok, Karna ka bas, Protected Zamindari Forests

South - Dabkan Reserve Forest

This Reserve area was extended under provisions of Section 5 of the Rajasthan Wild Animals & Birds Protection Act 1955 vide Amendment Notification No. F39(2)Rev.-A/54 dated 5 August 1958 (Date of Publication 18 September 1958) **(Annex. - 4)**

The Boundaries of this Extended Reserve Area are as follows :-

East - Dangarwada, Boretha, Thosra, Naya Gaon, Bhandodi, Baleta, Prathvipura, Imptipura, Chand Phari, Nirbhyapura and Dharampura village

West - Mundawara, Raikamala, Duharmala, Thanagazi, Amrakabas, Jodhavas, Shyampura, Raipuria, Gopalpura and Jaitpura village

North - Mundawara, Manavas village, Adamala reserve forest, Raika Guara and Kalikhol reserve forest

South - Silibawdi reserve forest, Kalwad village, Tilwari reserve forest, Dabkan, Ghewar, Chava ka bas, Murlipura, Nandu village and Tehla - Rajgarh Road

Part of this area was declared as Sariska National Park vide Preliminary Notification NO. F11(22)Raj-8/78 Jaipur Dated 27 August 1982 under Wild Life Protection Act 1972 (Central Act No. 53) section 35 (1).

The Boundaries of this Sariska National Park (Proposed) are as follows :-

North - Bara, Naharkhora jungle, Naldeshwar, Ghamodi, Bharathari, Karnakabas, Sariska, Raikamala, Duharmala, Talvriksh.

East - Nandu jungle, Boretha ki Phari, Devri Reserve forest, Siliberi Reserve forest, Nahar seti, Prathvipura ki phari, Protected area Bara.

West - Talvriksh, Pahari Raika Mala, Talgate, Udainath.

South - Udainath, Kanyavas village, Jungle Bhagani, Bhagani to Kalighati Road, Nandu Van khand.

The boundaries of Sariska National Park were further clarified vide Notification No. F11(22)Raj/8/78 dated 29.05.1985
(Annex. –5)

The 2006 amendment in the wildlife (protection) act 1972 for the first time has defined “core” and “buffer” areas of a tiger reserve, the former being the critical or inviolate area and later, the peripheral area to foster co-existence with local people for safeguarding the integrity of the core.

Under legal provisions mentioned above, the Sariska Tiger Reserve has identified the core or inviolate area from existing Sariska national park, Sariska Sanctuary and Sariska Tiger Reserve. A notification declaring an area of 881.11 sqkm as an inviolate area has already been issued by Govt.of Rajasthan. The Buffer area of Sariska Tiger Reserve has been declared by Government of Rajasthan vide notification dated 6 July, 2012, which has been published in Rajasthan Gazette on July 9, 2010 under provision of wildlife (protection) Act 1972 under section 38 V.

1 Total Forest Area 245.72 sq.km.

2. Revenue Buffer Area- 86.50 sq km.

Total Buffer Area 332.22 sq.km.

1.1.4 Extent (Area statement and Legal Status)

The total area of Sariska Tiger Reserve is 1203.33 sq.km. out of which the notified critical tiger habitat extentence over an area of 881.11 sq.km. which has been notified in the official gazette of the state vide Notification No. F3(34)Forest/2007 Dated December 28, 2007.(Annex -1)

The detail of area under CTH is as follows:-

R.F. 604.9750 Km²

P.F. 276.1374 Km²

Table 1 : Block wise area statement of critical tiger habitat

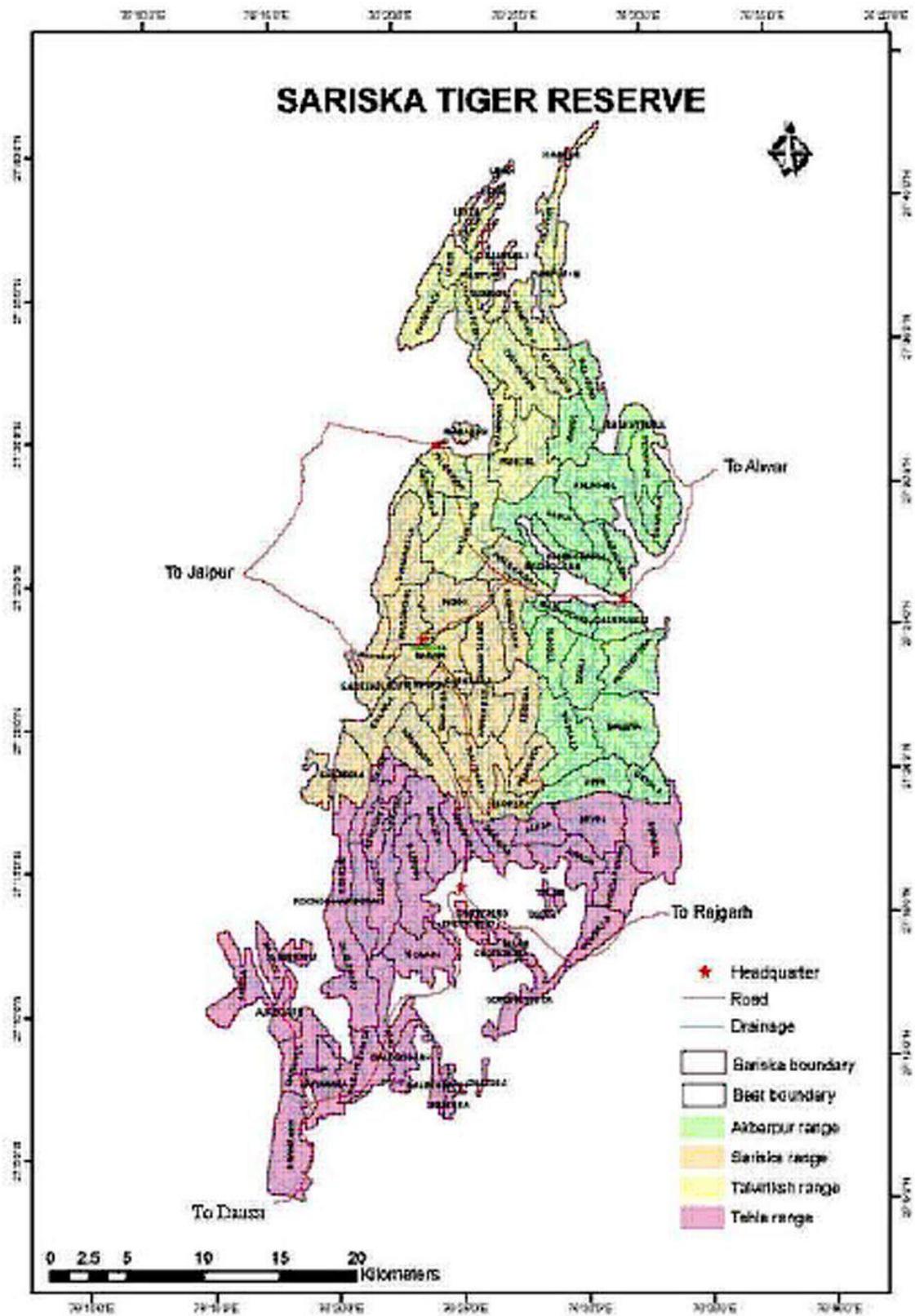
S.No.	Name of Forest Block	Reserve Forest / Protected Forest	Area in Hact.
1	2	3	4
1	Kushalgarh	Reserve Forest	1319.50
2	Kraska	Reserve Forest	1314.25
3	Jodhawas with Rajoor	Reserve Forest	1359.00
4	Kalighati	Reserve Forest	6902.00
5	Todi Nijran	Reserve Forest	230.00
6	Kankwari	Reserve Forest	3217.00
7	Kushalgarh	Protected Forest	227.91
8	Kraska	Protected Forest	1216.74
9	Indok	Protected Forest	1313.61
10	Kalachara	Protected Forest	219.92
11	Karnakabas	Protected Forest	323.20
12	Amrakabas	Protected Forest	216.30
13	Duharmala	Protected Forest	1673.86
14	Thanagazi	Protected Forest	235.07
15	Bhudiyawas	Protected Forest	129.12
16	Shyampura	Protected Forest	200.00
17	Raipura	Protected Forest	210.00
18	Silibawadi	Reserve Forest	2553.25
19	Ajabgarh	Reserve Forest	465.75
20	Bhangarh	Reserve Forest	1127.00
21	Narayaniji	Reserve Forest	1458.00
22	Dabkan	Reserve Forest	1492.75
23	Tehla with Bhagani	Reserve Forest	2482.50
24	Nandu	Reserve Forest	6944.50
25	Umri Devri	Reserve Forest	7469.75
26	Haripura	Reserve Forest	390.25
27	Choti Chind	Reserve Forest	42.25
28	Ajabgarh	Protected Forest	95.25
29	Piplai Main	Protected Forest	1391.88
30	Piplai 'A'	Protected Forest	34.75
31	Nadoli	Protected Forest	66.00

32	Khirat ka Bas	Protected Forest	118.79
33	Bhangarh	Protected Forest	462.35
34	Dhiroda	Protected Forest	421.05
35	Dhiroda	Protected Forest	610.90
36	Pawta	Protected Forest	61.37
37	Berwa Dungri	Protected Forest	605.89
38	Baldevgarh	Protected Forest	680.90
39	Tilwar	Protected Forest	770.29
40	Jaisinghpura	Protected Forest	926.45
41	Mallana	Protected Forest	381.76
42	Kalwar	Protected Forest	299.20
43	Dabkan	Protected Forest	506.40
44	Tehla	Protected Forest	174.59
45	Khariyawas	Protected Forest	218.50
46	Nandu	Protected Forest	822.55
47	Siliberi	Protected Forest	218.50
48	Rajore	Protected Forest	2426.93
49	Mitravat	Protected Forest	39.32
50	Kalavas	Protected Forest	83.59
51	Beenak	Reserve Forest	6225.75
52	Kalikhhol	Reserve Forest	3307.25
53	Prathvipura	Reserve Forest	329.00
54	Madhogarh	Reserve Forest	649.25
55	Siliberi	Reserve Forest	6870.00
56	Dhelawas	Protected Forest	64.77
57	Bhakatpura	Protected Forest	67.18
58	Kishanpura	Protected Forest	418.17
59	Sawadi	Protected Forest	104.72
60	Dhawala	Protected Forest	151.75
61	Gopalpura	Protected Forest	107.22
62	Dharampura	Protected Forest	325.07
63	Madhogarh	Protected Forest	2217.01
64	Prathvipura	Protected Forest	1081.82
65	Rampur	Reserve Forest	4244.75

66	Bani Tallvriksh	Reserve Forest	103.75
67	Nangalheri	Protected Forest	919.57
68	Berawas	Protected Forest	1354.49
69	Raikamala	Protected Forest	530.31
70	Manawas	Protected Forest	115.61
71	Tolawas	Protected Forest	210.09
72	Bilahat	Protected Forest	268.65
73	Basana	Protected Forest	42.12
74	Bisaalu	Protected Forest	179.59
75	Lekri	Protected Forest	140.57
76	Todiyabas	Protected Forest	32.36
77	Ghat	Protected Forest	174.65
78	Mundli	Protected Forest	33.24
79	Hazipur	Protected Forest	59.60
80	Rampur I	Protected Forest	151.27
81	Rampur II	Protected Forest	194.41
82	Rampur III	Protected Forest	40.46
83	Rampur IV	Protected Forest	710.86
84	Nathusar	Protected Forest	535.24
	Total		88111.24

The digitized maps of Core, Buffer and Corridore on map of 1:50,000 Survey of India toposheet with 4 corners marked with latitude & longitude as per directions of NTCA vide F.No.11-1/2013-NTCA dated 13th May 2013 are given as **Map 1 to Map 24**.

Map:3 Range Map - Sariska Tiger Reserve-CTH



1.1.5 Legal Status

Notified Areas Under Critical Tiger Habitat

The Core area of Sariska Tiger Reserve (881.1124 sq.kms) has been notified vide Government of Rajasthan *Notification No. F3(34)forest/2007 dated 28th December 2007.*

<u>Name of Area</u>	Name of Unit, Status and notification number
Critical Tiger Habitat - Core /Inviolat area notified vide Govt. of Rajasthan notification no. F3(34)Forest.2007 dated 28th Dec. 2007 Area : 881.1124 km²	1. Sariska Wild Life Sanctuary Notification No. F39(2)Rev.-A/54 dated 5 August 1958 (Area : 492 km ²)
	2. Sariska National Park (Proposed) Notification No F11(22)Raj-8/78 Jaipur Dated 27 August 1982 (Area : 400.14 km ²)
	3. Rest of the area of Sariska Tiger Reserve apart from National Park and Sanctuary. (Area : 383.1124 km ²)

Note :- 394.00 sq.km. of Sariska Wild Life Sanctuary is overlapping with area of Sariska National Park.

1.1.6 Settlement of Rights

District collector, Alwar vide letter no. P.39(2) Raj/73/6805-08 Dated 25.11.1975 (**Annexure -6**) issued proclamation under section 21 of Wildlife (Protection) Act 1972 describing boundaries of Sariska Wildlife Sanctuary notified vide no. P39(2) Revenue/A/54 Dated 5.8.1958 inviting claims.

SDM, Alwar (Authorised Officer) under provisions of Wild Life Protection Act 1972 – rule 21, vide order no. Rev./99/RA/1874-1923 dated 22/10/99 (**Annexure - 7**) decided the rights/claims of the villagers residing

in Sariska National Park and Wildlife Sanctuary as per orders of Hon'ble Supreme Court under Civil Writ Petition no. 337/95 dated 22.8.1997. The claims were decided as follows:-

1. Public Servants can enter for conducting Govt. duties.
2. Chief Wildlife Warden or authorized officer will permit entry.
3. The right of way entered in records prior to 25.11.75 inside sanctuary will continue.
4. The rights of religious places, drinking water places existing prior to 25.11.75 entered in revenue records will continue.
5. People having immovable property inside sanctuary will be permitted to enter.
6. Community and individual rights entered in revenue records prior to 25.11.1975 will continue.
7. Grazing will be permitted in areas allowed by Chief Wildlife Warden.
8. The right of relocating people of this area will lie with State Government but compensation would be paid for acquisition.
9. The application of rights will be in accordance with provisions of Wildlife (Protection) Act 1972 and the prohibitions by State Govt. will continue as such.

SDM, Alwar (Authorised Officer) under provisions of Wild Life Protection Act 1972 – rule 21, vide order no. Rev./99/RA/1824-73 dated 22/10/99 (**Annexure -8**) decided the rights/claims of the villagers residing in Sariska National Park as per orders of Hon'ble Supreme Court under Civil Writ Petition no. 337/95 dated 22.8.1997. The claims were decided as follows:-

- 1.Public Servants can enter for conducting Govt. duties.*
- 2.Chief Wildlife Warden or authorized officer will permit entry.*
- 3.The right of way entered in records prior to 27.08.1982 inside sanctuary will continue.*

4. The rights of religious places, drinking water places existing prior to 27.08.1982 entered in revenue records will continue.

The claim of Sariska Palace has been kept pending as the ownership has to be decided in case no. 127/85 in the court of additional collector no. 2 Alwar.

In addition to this the restrictions imposed by State Govt. in Sariska National Park under provisions of Wildlife (Protection) Act 1972 will continue.

1.2 Approach & Access

Nearest Railway Station Alwar (it is situated on the Delhi-Jaipur North Western Broadgauge Railway line)	Nearest Airport Sanganer (Jaipur) 110 Km Delhi 180 Km
Distance by Rail (upto Alwar) Delhi- 165 Km Agra- 165 Km Jaipur- 150 Km	Distance by Road from Sariska Jaipur- 110Km (via. Shapura) Agra - 200 Km Delhi- 200 Km (via. Bhiwadi) Ajmer- 240 Km

1.3 Statement of Significance

STR has been a famous tiger area for many centuries. The princely state of Alwar protected this area as a game reserve particularly for tiger hunting. This is isolated tiger habitat with nearest tiger population of Ranthambore Tiger Reserve and it is the northern-western most limit of tiger in India. The area has been famous for tiger sighting. It is a good habitat for wild cats specially for tigers. Importance of the reserve has increased even more after successfully re-introduction of tigers. Incidentally STR happens to be first reserve where re-introduction of tigers has been taken place in entire world.

Considering this the Sariska Tiger Reserve is an important source area for long term survival of tiger, besides maintaining other faunal and floral attributes.

The Sariska Tiger Reserve has its importance in the natural history of North West India. *Aravallis hills is one of the important habitats in the world for the conservation of highly endangered great cat "Tiger".*

The Reserve nestled in the Aravalli Mountain Ranges traverses through the Alwar & Jaipur districts and forms excellent mosaic of wildlife habitat in the form of dense forests, grasslands, open areas, rivers, streams and water bodies. The Reserve with dense Dhok (*Anogeisus pendula*) and Khair (*Accacia catechu*) forests is enriched with 420 species of plants. The varied topography, diverse habitat and climatic conditions provide habitat to a wide variety of wild animal species. The Reserve has a high ecological value being the catchment of River Rupa rail. The Reserve is also rich in cultural & historical heritage.

The main objective for the declaration of Sariska Tiger Reserve is *"To protect, restore, manage and maintain representative biodiversity of Aravalli hill Ranges along with ecological processes and conservation of wild gene pool with a focus on Tiger and to accommodate the viable population of tiger.*

The wetlands of STR are of great significance as they form important bird area (IBA) site for conservation of avian fauna, as it not only provide suitable habitat for the residential birds; but also provide wintering grounds for many migratory birds.

Forests of Sariska Tiger Reserve displays all the intricacies of natural ecosystem in the form of various ecosystem pyramids of different producer-consumer chains, geological history and river orientation, management of wild habitat and watershed development. Besides the highly endangered Re-introduced Indian Tiger, the reserve also harbors a wide range of faunal species some of which figure prominently in the IUCN Red List. These species include Panther, Chowsingha and Rusty spotted cat.

Tremendous scenic beauty of dense forest, a number of open meadows, picturesque beauty of historical monuments provide a real

feeling of the wilderness. Representative biological diversity of Western landscape including many rare and endangered flora of great medicinal, educational, scientific and conservation values are efficiently conserved in Sariska Tiger Reserve.

The Sariska Tiger Reserve is an isolated reserve with history of tiger extinction owing to poaching. There is tremendous human pressure on habitat resources, both within the core as well as buffer. The critical tiger habitat/core area of Sariska Tiger Reserve is home of six species of cats, two species of dog family, three species of mongoose & marsh crocodile. The Tiger is the flagship species. The forests of STR are of immense value as it is last intact home of 72 sq km densest forest in Rajasthan state with *Anogeiusus pendula* forest of climax type in Aravalli's, one of the oldest geological formation.

It is an important wild life tourism site. It is the nearest Tiger Reserve in vicinity of Delhi the national capital of India and also close to Jaipur, the State capital of Rajasthan. Nearly 2.0 lakh tourists visited this park in the year 2008-09. In the heart of the Sariska National Park, the famous fort of Kankwari is situated at a plateau of Aravalli system.

Apart from the fort of Kankwari a chain of forts are also located in the core area. These are Ajabgarh, Tehla, Madhogarh & Garh.

Sariska Tiger Reserve sustains a very good plant biodiversity. Many endemic and endangered plant species need protection and research to conserve this invaluable resource. It also offers varied subjects for promotion of nature education and wilderness experience.

Sariska Tiger Reserve which supported important tiger source population before 2005 needs to be developed again as an important tiger source area, besides maintaining other faunal/floral attributes. For the first time wild tigers were re-introduced in sariska tiger reserve in world in 2008 for recovery of tiger population as a collaborative project with Wildlife Institute of India under the guidance of National Tiger Conservation Authority New Delhi. Survival of tiger will be ensured by avoiding tremendous human pressure on habitat resources in CTH through voluntary relocation of villages on priority. Till such relocation, active

management for addressing resource substitution, human tiger interface issues and regulation of temple visitation/ road traffic.

The tiger reserve acts as a multiple catchment for the plains adjoining the sanctuary. Small streams originating from this catchment supply water to the wells in the plains and augment the water table. Without this catchment, lowland plains cannot remain productive. This area has immense value in conserving water and acts as a life line for the survival of the local people around. A few water reservoirs have also been constructed to harness the rain water flowing out of the reserve. These reservoirs maintain the water table of the area throughout the year. A few of such reservoirs are Karana ka bas, Kankwari, Mangalser, Maansarover, Siliberi, Selished etc.

Categorization of values in special domain

As narrated above, this tiger reserve is one of the very important sites that possess Global, National, Regional and local values. The categorization is as below.

Global value:	Tiger, Four horned antelope, Biodiversity Conservation
National:	Conservation of Endangered plant and animal species in Aravalli Eco system.
State:	Natural Heritage and aesthetic values, Preservation of densest 72 sq.km. forest area in state.
Regional:	Ruparel river system, Recharging underground water in peripheral area.
Local:	Tourism, Religious, Ecological & water.

Therefore the people and the Government are giving utmost importance to conserve and protect this tiger reserve for the benefit of the globe.

CHAPTER - 2

BACKGROUND INFORMATION AND ATTRIBUTES

2.1 Geology, Rock and Soil

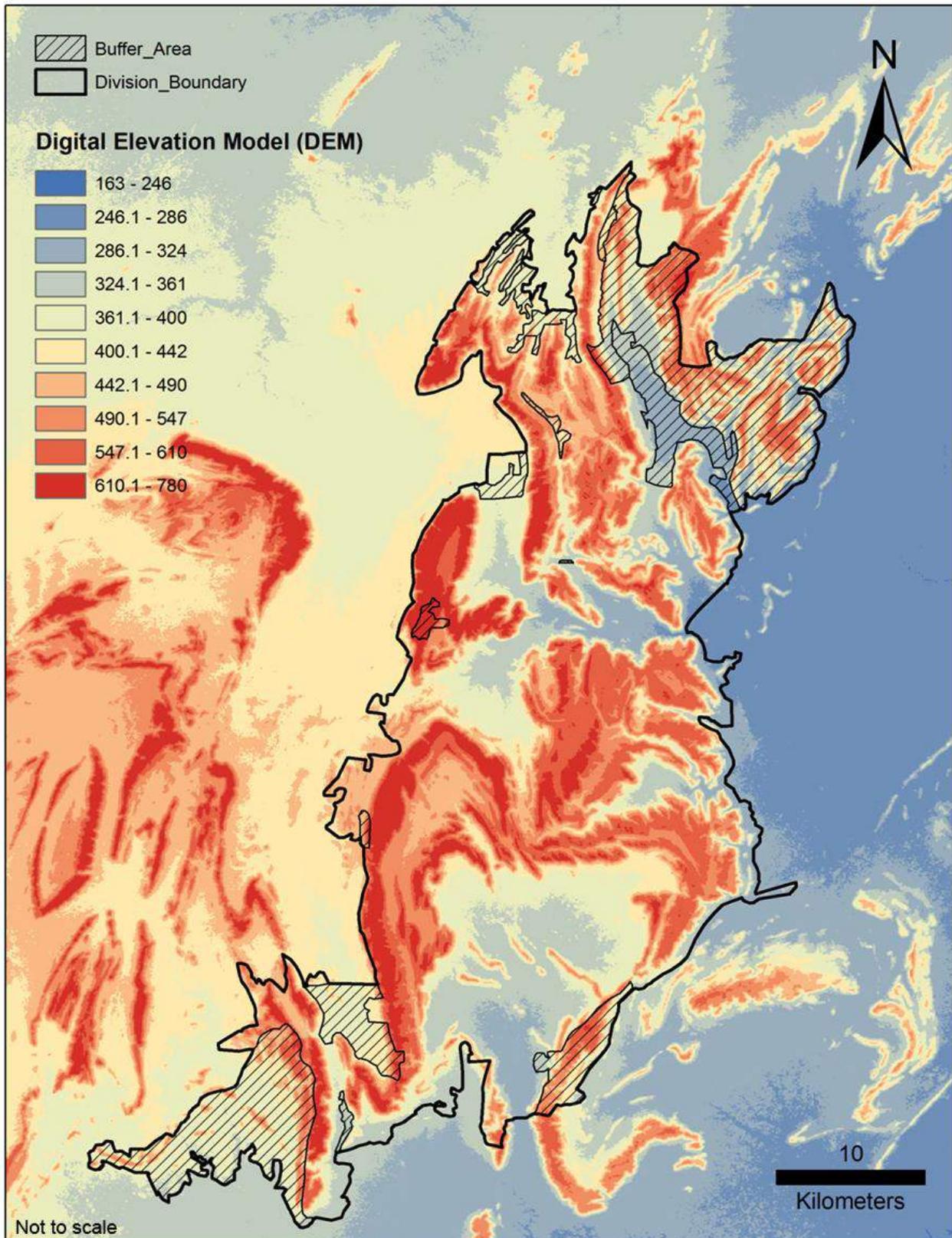
Major part of the area is occupied by rocks of Delhi system and Aravalli system comprising of quartzite's conglomerates, grits, Limestone, phyllites, granites and schists. Most of the high ridges are comprised of quartzite's, conglomerates and grits. The inter-linking valleys consist of lime stone, phyllites and schists. Evidences of lava conglomerates are also occasionally seen. Soil differs depending on the underlying rock. These ancient crystalline and metamorphic rocks with gneiss and schists etc. are generally covered by red sandy soils. Red soils are generally poor in nitrogen, Phosphorus and humus contents and are alkaline in nature. There are comparatively rich, fertile and dark colored soils in plains and river valleys. The soils resulting from the weathering of schistose rocks vary from sandy to heavy loam depending upon the amount of quartzite present in the parent rocks.

2.2 Hydrology and Water Sources

CLIMATE

The area is characterized by Sub-tropical dry climate with distinct cold (November-February), hot (March-June) and rainy (July-September) seasons. October is a transition period. The highest temperature (above 47⁰C) is recorded in May-June and the lowest (up to 2⁰C) in December-January. The diurnal variation of temperature is high. Frost is common in winter. Droughts are of common occurrence. Relative humidity on an average is 30-34%. Strong wind in summer is called 'loo'. The early south-west monsoon blow mainly from westerly and south-westerly directions. Thunder storms in May-September and dust storms during summer are common. Cold westerly waves from North-North-west direction blow during winter.

Map:4 Terrain Map - Sariska Tiger Reserve-CTH

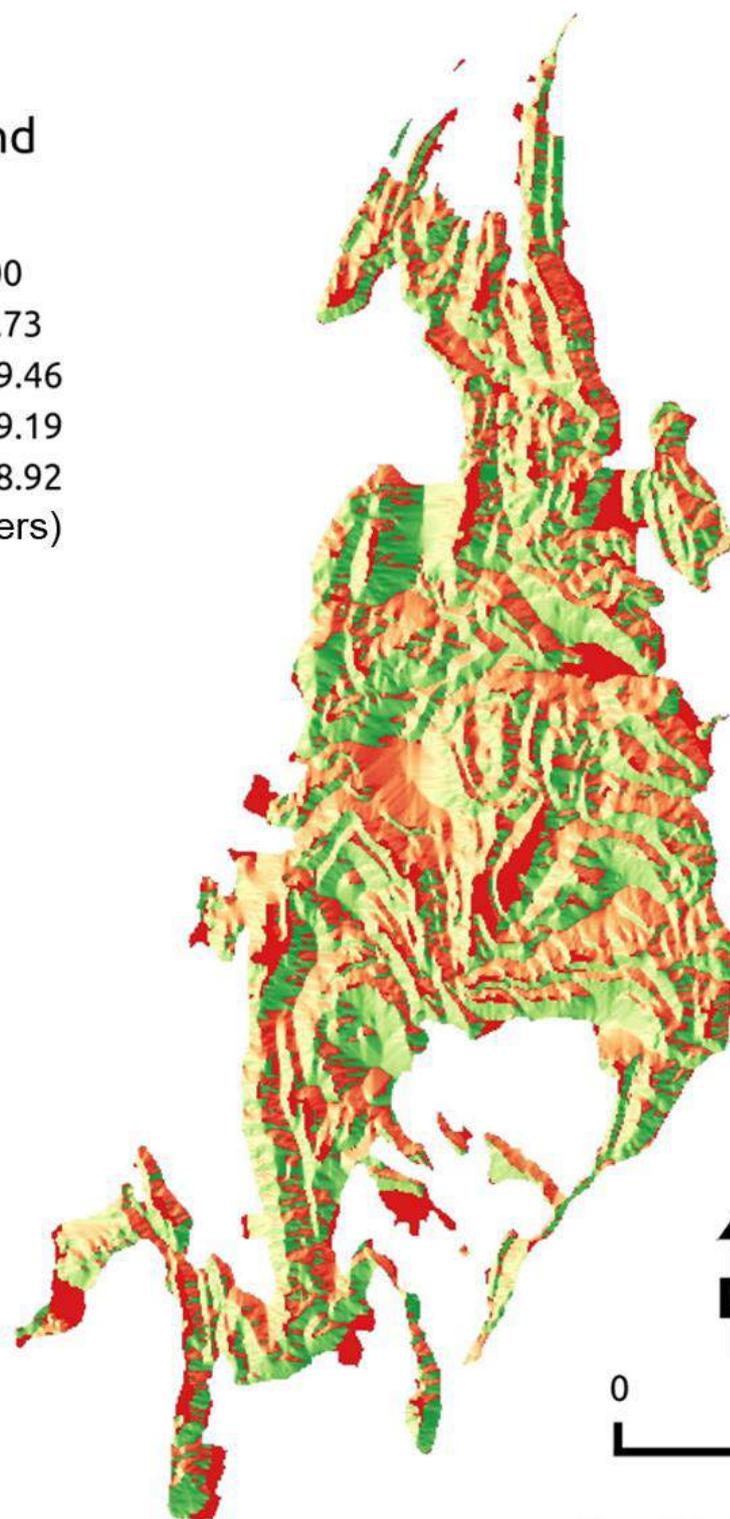


Map:5 Aspect Map – Sariska Tiger Reserve – CTH

Legend

Aspect

- 0.00
 - 89.73
 - 179.46
 - 269.19
 - 358.92
- (in meters)



Map by: Rajendra G Garawad, IFS

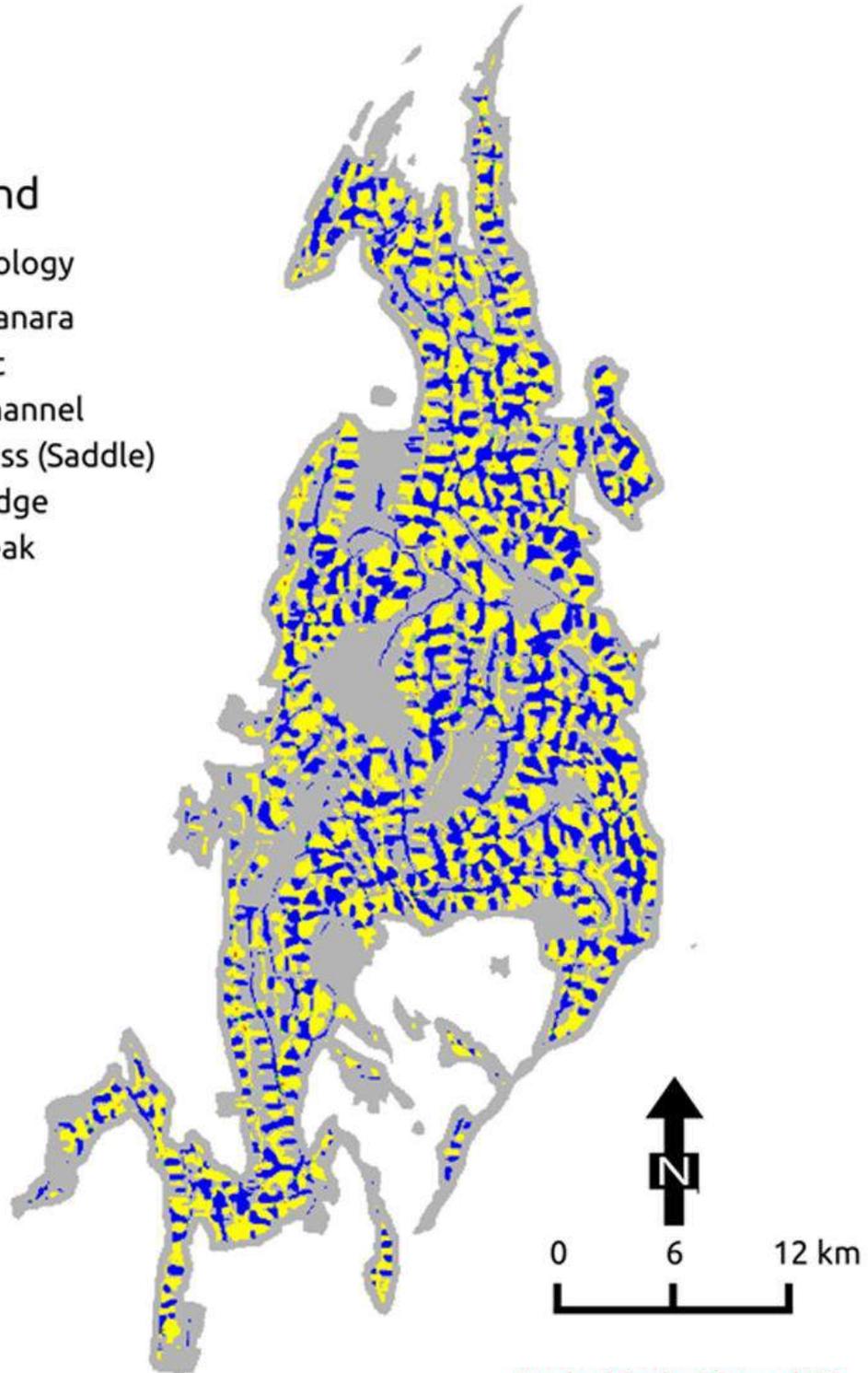
Not to scale

Map:6 Morphology Map – Sariska Tiger Reserve – CTH

Legend

Morphology

-  Planara
-  Pit
-  Channel
-  Pass (Saddle)
-  Ridge
-  Peak



Not to scale

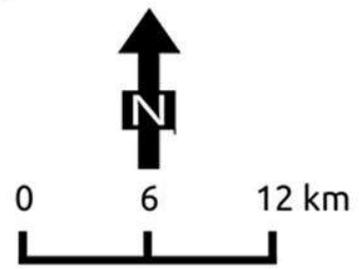
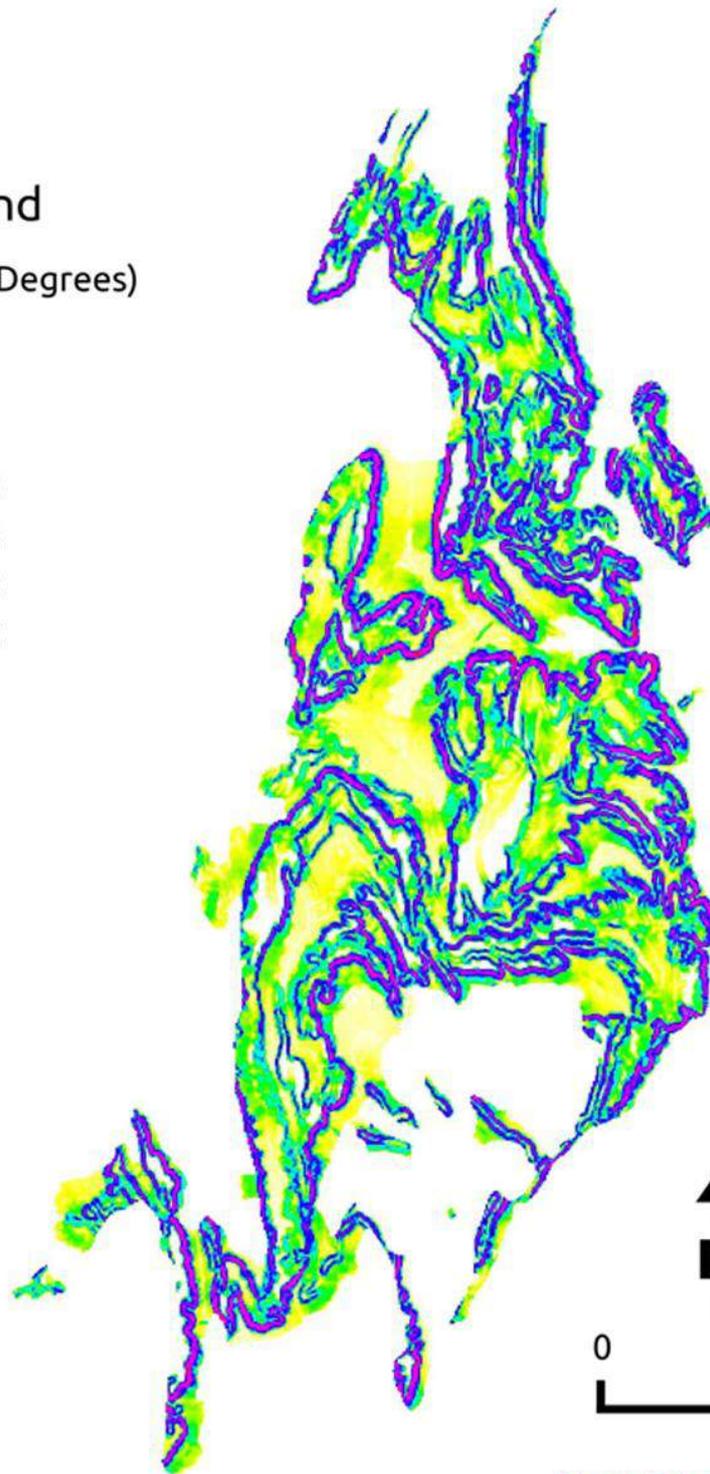
Map by: Rajendra G Garawad, IFS

Map:7 Slope Map – Sariska Tiger Reserve –CTH

Legend

Slope (Degrees)

-  0
-  2
-  5
-  10
-  15
-  30
-  50



Not to scale

Map by: Rajendra G Garawad, IFS

Rainfall pattern & distribution

The bulk of the precipitation is from SW monsoon and occurs during the months of July to September. The winter rains from NE monsoon are quite common. The average rainfall is 621 mm. The rainfall during the period from June-September constitutes about 92% of the annual rainfall. There is a large variation in rainfall from year to year. The distribution of rainfall is fairly erratic. From year 1971 to 2011 the lowest rain fall has been recorded as 199 mm in 2002, 290.4 mm in 1987 & 319 mm in 1974. The highest rain fall has been recorded as 1236 mm in 1996, 1097 mm in 1995 & 940.7 mm in 1985. Rain fall data from year 1971 to 2011 (**Annexure - 53**)

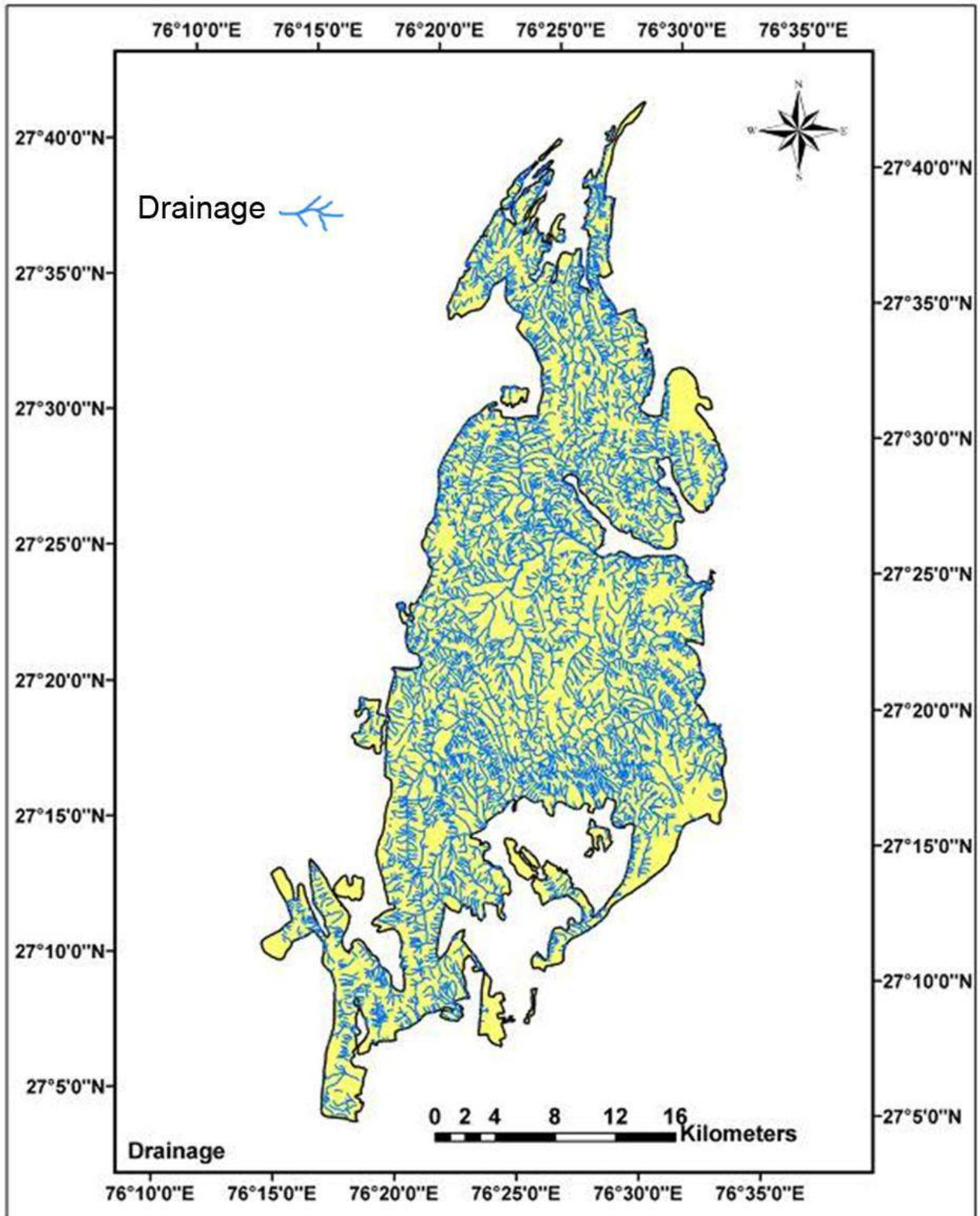
Temperature

During the summer months of March to June, the temperature is on a continuous rise. May and first half of June being the hottest months of the year. The maximum temperature in May & June rises up to 47°C. In the second half of June, normally pre-monsoon showers start which brings down the temperature by 3 to 5°C. After withdrawal of monsoon by the end of second week of September, days become hot. The nights become progressively cooler. After mid-November, both day and night temperature drops. During the winters January is the coldest month. The mean maximum temperature goes only as high as 40.5°C in summers and the mean minimum temperature may drop down to 6.9°C in winters. During the cold wave spells, the temperature drops further down. In the valley areas of the core like the Lahpur valley the temperature touches the freezing point. (**Annexure - 51**)

Humidity

The relative humidity is generally low in most parts of the year, it becomes as low as 10 to 15 percent during summer months. However during the rainy days the relative humidity goes over 60%.

Map:8 Drainage Map - Sariska Tiger Reserve-CTH



Not to scale

Wind

Winds are generally light to moderate. During the pre-monsoon period the northwesterly winds are comparatively strong with occasional dust storms. The northeasterly winds during winters are mild. In the summer season, hot winds blow from the direction between SW and NW, and are known as 'loo' & have a desiccating effect. Thunder storms occur during the period from May to September. Hail may also associate thunder storms. During the hot season, dust storms are also not uncommon. During the months from January to March low pressure waves, moving from the west, affect the area and the situation of 'cold waves' develop. The minimum mean wind velocity is 1.5 km per hour in December while maximum mean wind velocity is 6.5 km per hour in June. (**Annexure -52**)

Drainage

The drainage pattern of Critical Tiger Habitat of STR is given in **Map 8**. The Ruparel River runs through the middle of the Tiger Reserve in North South direction. The drainage from most areas of the northern portion of the Tiger Reserve including Bandipul stream flows into the Ruparel River, while the drainage of the southern part of the Tiger Reserve flows into the Mansarovar Lake. The Terrain map, Aspect map, Morphology map & Slope map for Critical Tiger Habitat of STR has been given as **Map 4 to 7**.

Drought and its periodicity

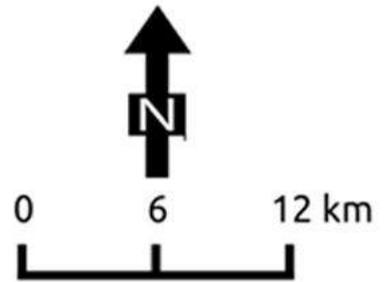
Droughts are of common occurrence in the region. During the drought period there is an acute shortage of fodder inside and outside the core as well as the Buffer areas. All the water holes tend to dry up very early and water becomes a limiting factor. It leads to severe conflict between park staff and the villagers. During the drought periods, the survival of wild life is at stake. Frosts are common in the month of December and January, in the valleys and depressions and adversely affect regeneration of Dhok.

Water Sources

The availability of water is not uniform throughout the year in the area of the STR. The terrain, topography and geology of the area influence the water regime by contributing towards runoff and recharging of the ground water.

Map:9 Basin Map – Sariska Tiger Reserve – CTH

Basins_34



Map by: Rajendra G Garawad, IFS

Not to scale

The water holding capacity of the area is very poor due to the geological formations. The availability of water increases in valleys, khoh, Riparian area and wet lands due to the exposed rocks, low soil depth and raised terrain. In the 'khohs' or nallahs some springs are live even in the hot season and such areas become nuclei of the wild life activity in summers. During monsoon season a number of streams flow out of the reserve. These streams dry up later and scattered pools of water in the dry streambeds serve as perennial water holes for wild animals. Some spectacular waterfalls can be seen during rains from the rock cliffs. The wetland areas of STR, i.e., Mangalsar, Silished lake, Ajabgarh Talab and Mansarovar support a variety of aquatic flora and fauna. In addition, these are favorite grounds of many bird species including migratory birds. Under project Tiger, some artificial water bodies have also been constructed by Forest Department to ensure water availability in the dry season.

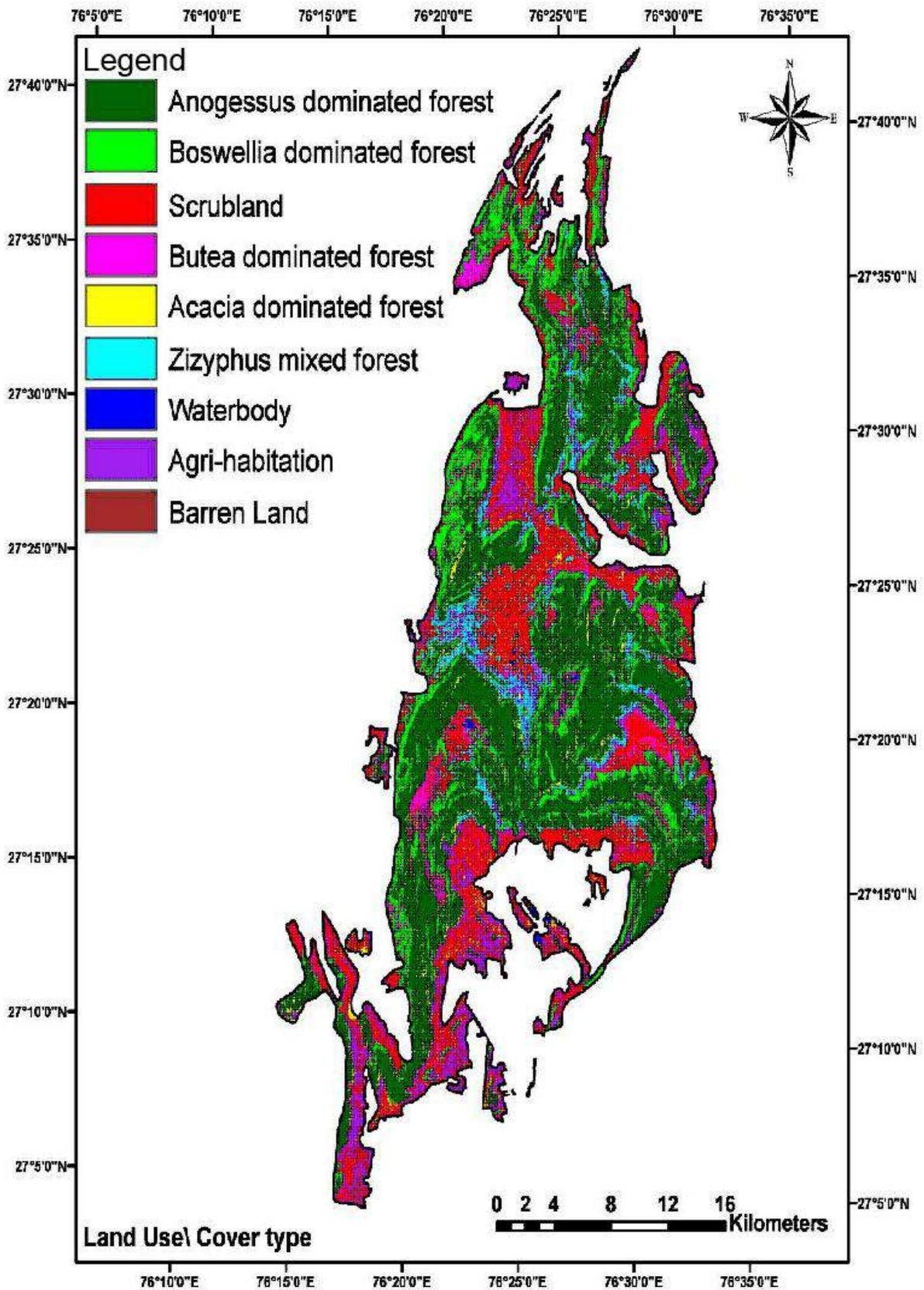
During monsoon, water is widespread and animals avoid humid and uncomfortable wetlands and they migrate to 'Plateau' and other higher altitudes which are comparatively dry and comfortable. After October - November, as the rains cease and water starts drying up, the animals in plateau and other higher altitudes start moving downwards to khoh and valleys and later to stream areas. During dry and hot months of May and June nearly all the animals are found near water holes. This seasonal variation in water availability helps in proper utilization of habitat throughout the year.

One major river is Ruparail that flows through the STR. It flows about 20-25 kms' distance through STR.

Since the water has always been a limiting factor in STR, it is essential that arrangement be made to make water available to the wild animals, in pinch periods, close to their feeding grounds.

*The water basin map of CTH of STR has been given as **Map 9**.*

Map:10 Forest Cover Map - Sariska Tiger Reserve-CTH



Not to scale

2.3 Vegetation Cover Types

The vegetation of Sariska corresponds to (1) Northern tropical dry deciduous forests (subgroups 5B; 5/E1 and 5/E2) and Northern Tropical Thorn forest (subgroup 6B) (Champion and Seth 1886). *Anogeissus pendula* is the dominant tree species covering over 90 per cent area of the forest. *Boswellia serrata* and *Lannea coromandelica* grow at rocky patches. *Acacia catechu* and bamboo are common in the valleys. Some valleys support *Butea monosperma* and *Zizyphus mauritiana*. *Dendrocalamus strictus* is extremely limited in distribution and is found along well-drained reaches of the streams and moist and cooler parts of the hills. *Albizia lebbek*, *Diospyros melanoxylon*, *Holoptelia integrifolia* and *Ficus sp.* are found in moist localities. (Sankar 1994).

Parmar (1985) and Rodgers (1985) have classified vegetation of Sariska as follows:

1. *Anogeissus pendula* forest
2. *Boswellia serrata* forest
3. *Acacia catechu* forest and
4. *Miscellaneous forest*, which can further be sub-divided into three categories viz.
 - 1) *Butea monosperma* forest
 - 2) Forest along nallas and
 - 3) Scrub land

Table 2: Vegetation and land cover classes in Sariska Tiger Reserve

Vegetation/ Landcover type	Percentage
<i>Anogeissus</i> dominated forest	35.431
Scrubland	19.071
<i>Boswellia</i> dominated forest	15.453
Agriculture/Habitation	9.341
<i>Butea</i> dominated forest	7.950

<i>Zizyphus</i> mixed forest	5.943
<i>Acacia</i> mixed forest	4.026
Barren land	2.582
Water body	0.203
Total	100

The Flora of Sariska Tiger Reserve is given in (**Annexure - 37**)

The Forest cover map of CTH of STR has been given as **Map 10**.

2.4 Wild Fauna, Habitat and Trophic Niches

The Sariska Tiger reserve holds a good diversity of wild mammals. As the name indicates, the principal predator is Tiger. Beside this there are a number of large carnivores including leopard (*Panthera pardus*) and Hyena (*Hyena hyaena*). Smaller carnivores include Caracal (*Caracal caracal*), Jungle cat (*Felis chaus*), Ratel (*Mellivora capensis*) etc. The list of wild animals is given in (**Annexure - 38**)

Since independence, the tiger has been steadily leaving Rajasthan, district by district – Pali in 1970, Mt. Abu in 1971, Jhunjhunu and Sikar in 1976, Kota and Chittor in 1980 (Soni 2002, Dang 2005). Transients have been seen in Bundi, Jamwa Ramgarh, Darrah and Ramgarh Vishadri in recent times. Till 2004, tiger flourished in the maximum parts in Sariska Tiger Reserve but, unluckily, massive poaching vanished this animal from STR. Efforts of Wild Life Institute of India and Tiger Conservation Authority, New Delhi have revived the glory of this sanctuary by translocation of three Tigers (one male & two females) from RTR. Translocation of two more tigers (one male & one female) is awaited. Thus today, in Rajasthan, tiger survives in only two National park/ Sanctuary – Ranthambore & Sariska. Actually Sariska can hold a good number of tiger population (Sankar *et al.* 2005). The availability of prey in Sariska is higher than some of the well known Tiger Reserves like Ranthambore NP, Panna TR, Satpura TR (Sankar *et al.* 2007). Presently Sariska is hosting a good leopard population i.e. 7 individual per 100 sq km. Sariska also provides a dense forest cover

better than any other forests in the semi arid zones of the country. Sariska hosted 10–16 tigers in core zone I till 2004. Wildlife Institute of India has recommended that, at present, Sariska can support at least 10–12 tigers in core zone I only (Sankar *et al* 2005).

The principal herbivores of the park are Nilgai (*Boselephous tragocamelus*), Sambar deer (*Cervus unicolor*), Spotted deer (*Axis axis*), Four-horned antelope (*Tetraceros quadricorns*) Wild pig (*Sus scrofa*). The density of nilgai and sambar deer is very high in the entire Sariska Tiger Reserve. Nilgai is commonly seen in open type of habitat near human habitation and sambar deer prefers plateaus to woodland and grassland. Spotted deer is most often seen in large herds, feeding on fallen *Zizyphus* fruits in association with common langur (*Presbytis entellus*). Which is most common primate followed by the Rhesus macaque (*Macaca mulatta*). Both of them are present in large groups near the temple complexes inside the park. The other smaller mammals are Small Indian civet (*Viverricula indica*), Rufous tailed hare (*Lepus nigricollis*), Common Mongoose (*Herpestes edwardsii*), Ruddy Mongoose (*Herpestes smithi*), Palm Civet (*Paradoxurus hermaphroditus*), Pangolin (*Manis crassicaudata*), Porcupine (*Hystrix indica*) etc.

Sariska also holds a variety of bird species including some winter migrants. It has very high density of peafowl as well as grey francolin. There are some unique birds in Sariska like white-rumped vulture, painted spurfowl, Aravalli red spurfowl, Indian Cuckoo, common sand grouse, Indian pitta, great horned owl etc. 211 bird species have been recorded in Sariska (Sankar *et al* 1993) of which 120 are resident, 73 are migrant and 18 are considered to be vagrants. The check list of birds is given in **(Annexure - 39)**

Sariska is a host of few species of fish as well. Though there is no perennial river or water stream (Ajith kumar and Sankar 1993) but there are a number of ephemeral streams and pools. Except for a few natural springs, water in these locations dries up in summer (Dang 2005). The common species found in water bodies in this

park are *Noemachilus botia*, *Labio boggut*, *Puntius sarana*, *Garra gotyla* and *Rasbora daniconius*.

The yearwise population of main Wildlife species in Sariska Tiger Reserve before disappearance of Tigers in 2005 & there after is as follows:

Table 3 : Wild life census data before 2005

S.No.	Species	1995	1999	2002	2003
1	Tiger	25+	25-28	26-28	25-28
2	Leopard	46	52-57	58-63	60-64
3	Caracal	12+	6-8	7-10	7-10
4	Jungle Cat	120+	115-135	130-145	140-150
5	Civet cat	20+	Present	present	present
6	Indian Palm civet	20+	Present	present	present
7	Ratel	50+	Present	present	present
8	Sambhar	4800+	6000-6300	6200-6500	6300-6550
9	Chital	2900+	3500-3700	3700-3900	3800
10	Blue bull	4300+	5100-5300	5400-5700	3950
11	Chinkara	7+	-	-	-
12	Chowsingha	20+	10-15	10-15	10-15
13	Wild Boar	2600+	3300-3600	3400-3600	3450-3650
14	Hyena	100+	110-120	120-135	125-140
15	Jackal	250+	350-375	400-450	425-475
16	Wild Dog	1	-	-	-
	Rehsus macaque	Very common	present	present	present
18	Common Langur	Very Common	present	present	present
19	Indian Porcupine	300+	360-375	415-440	425-450

Table 4 : Wild life census data After reintroduction of Tigers

S.No.	Species	2009	2010	2011	2012	2013
1	Tiger	03	05	05	05	09
2	Leopard	47	41	45	53	65
3	Caracal	present	present	present	present	present
4	Jungle Cat	170	117	237	202	204
5	Civet cat	present	present	present	present	
6	Indian Palm civet	present	present	present	present	
7	Ratel	present	present	present	present	
8	Sambhar	7196	6882	7918	9558	11265
9	Chital	4021	4621	7137	5429	6657
10	Blue bull	6018	7537	9965	12490	14868
11	Chinkara	-	--	--	--	--
12	Chowsingha	--	06	04	04	--
13	Wild Boar	5033	4297	5941	8559	10582
14	Hyena	296	318	444	368	393
15	Jackal	1521	1612	2578	2048	2157
16	Wild Dog	--	--	--	--	--
17	Rehsus macaque	present	present	5408	3453	670

18	Common Langur	8136	9414	15468	10622	10625
19	Indian Porcupine	512	present	680	648	717

THE LIMITING FACTORS

In Sariska Tiger Reserve voluntary relocation of large number of villages, is a challenge and till such relocation, active management for addressing resource substitution/human–tiger interface issues attains top priority. There is need for 24 x 7 monitoring of re-introduced tigers, keeping tacks of livestock depredation to prevent poisoning of tigers, intelligence gathering and vigil. The lord Hanuman temple is situated in heart of core area and regulation of temple visitation to avoid negative impact on wildlife is important. The regulation of vehicular traffic on routes passing through CTH of tiger reserve also attains priority. Retrofitting safeguards for mined areas honey combed in the periphery of CTH is required. Machanism for better coordination with district administration in the context of law and order. redressal of local grievances has to be institutionalized. Jamva Ramgarh wild sanctuary is to be developed as satellite habitat for ensuring long terms survival of tigers. There is need for continued implementation of the recovery strategy of NTCA–WII for tiger re-introduction. To ensure effective protection staff deployment in required number to meet protection challenges is must for this temporarily deployment of local work force in day to day works can be adopted. The strengthening of field protection by constituting special tiger protection force has to be done. There is need for reconciliation/settlement of boundaries using modern technology involving DGPS survey etc.

The availability of food and water mainly govern the status of wildlife and their seasonal movements. The main limiting factors are (1) Food (2) Water (3) Shelter (4) Breeding cover and (5) Human Settlement and pilgrims visitation.

(1) Food

Dhok is extremely palatable to all the herbivore species, and even the dry leaves are eaten by these animals during the dry season. Thus, well protected *Dhok* areas along with grasslands show good to very good density of ungulates. High density areas of ungulates become high density areas of predators as well. Food is not a limiting factor for ungulates in the core area of STR. During the dry season, animals migrate towards stream, valleys and lakes, and remain there up to the rains. After the rains, the higher areas and Dangs become green and humid, thus herbivores visit the higher regions.

The buffer areas are overgrazed by cattle and trees have been heavily lopped and pollarded. In such areas, wild ungulates, particularly sambar and chital are only few in number and visit there only during monsoon and early winter. Wild pig is found near agricultural fields along with nilgai. Food or the competition for food with livestock is a limiting factor for herbivores in buffer areas.

(2) Water

Despite good rainfall, water is scarce in STR, primarily due to the geological structure and the absence of inflow in the area. Except for a few waterholes in streambeds, and springs in the *Khohs* and hillsides, there is hardly any natural water source. Some water points have been artificially constructed but water still remains a limiting factor in STR.

(3) Shelter

Core area of STR, has good vegetation. Even during the hot and dry months, ample shelter is available in the *Khoh* and the riverine tracts. Animal density is high in these areas during summer. Other areas provide far less shelter. The fringe areas are degraded and do not provide proper shelter for wildlife. Most of the available natural shelter there, is occupied by cattle.

(4) Breeding Cover

In STR, breeding rate is high. The areas that are well-stocked with food and water show higher breeding success. The same cannot be said for fringe areas. Small mammals that use burrows for breeding have better success rates in fringe areas than larger animals, particularly sambar, chital, sloth bear, larger cats and langur. Ground birds have better breeding success than birds that nest in trees because they do not require much cover and their chicks can fend themselves soon after hatching. Chicks of tree nesting species remain dependent on their parents for a longer period and need a far more secured breeding environment.

(5) Human Settlement and pilgrims visitation.

There were 29 villages inside the CTH, out of these 3 villages completely relocated and 5 are partially relocated from CTH. At present 21 villages and their population is living in this area. Disturbance due to this population is also experienced. The list of villages situated on the periphery of CTH is given in **Annex-16**.

There are many famous temples likes Hanuman Temple (Pandupole), Bharathari, Neelkanth, Taalvraksh, Udainath, Parasarji, Narayani Mataji, which attracts lacs of pilgrim from all over north India. During Pandupole and Bharathari mela days number of pilgrims increase upto 8 to 10 lacs. This has adverse impact on wildlife in STR.

(6) Forest Fires

The forest fire is menace and threat to habitat of tiger reserve. The forest fire alerts are issued by forest survey of India. The list of forest fire incidences from year 2006 to 2013 is as follows:

Table 5 : Forest Fires in Sariska Tiger Reserve

S.no.	Date	District	SOI Topsheet	Latitude	Longitude
1.	15/05/2012	ALWAR	54A13	27 50 40 N	76 55 26 E

2.	07/05/2012	ALWAR	54A08	27 09 10 N	76 20 42 E
3.	07/05/2012	ALWAR	54A08	27 08 35 N	76 20 35 E
4.	27/01/2012	ALWAR	53D16	28 01 33 N	76 54 39 E
5.	18/05/2009	ALWAR	53D16	28 01 22 N	76 55 08 E
6.	29/04/2009	ALWAR	54A07	27 29 34 N	76 16 04 E
7.	28/04/2009	ALWAR	54A07	27 28 37 N	76 16 08 E
8.	13/03/2009	ALWAR	54A06	27 33 28 N	76 26 42 E
9.	04/03/2009	ALWAR	54A07	27 26 49 N	76 28 22 E
10.	12/12/2008	ALWAR	54A13	27 59 02 N	76 54 10 E
11.	22/04/2006	ALWAR	54A05	27 54 14 N	76 20 34 E

Every year firelines are cleared and timely action on fire occurrence is ensured.

2.5 Major conspicuous Changes in the Habitat Since Inception

The STR is one of the pioneer Project Tigers, which was started in the year 1978. When the Project Tiger was launched, there were 11 villages inside the present Sariska National Park (Prel. notified), out of which 2 villages Bhagani and Umri have been shifted in the year of 2008-09 and 2011-12 respectively. As a result a perceptible change has been observed in the habitat of vacated area. Earlier because of habitation, a lot of biotic pressure was there for fuelwood, fodder and timber. After the relocation of this village, the habitat has improved there to a great extent and this area has become permanent home of the tigers. There are 10 more villages which are still there in the Sariska National Park out of 29 villages located in CTH of STR, which are being shifted on priority basis. This will further improve the habitat and reduce the biotic interference in the core area. Out of these 10 villages, relocation of Kankwari, Devri, Dabli, Rotkyla, Kraska, Sukola and Haripursa have already been started. It is proposed to start relocation of, Lilunda, Kaniyawas and Kundalka villages will be taken up soon.

CHAPTER – 3

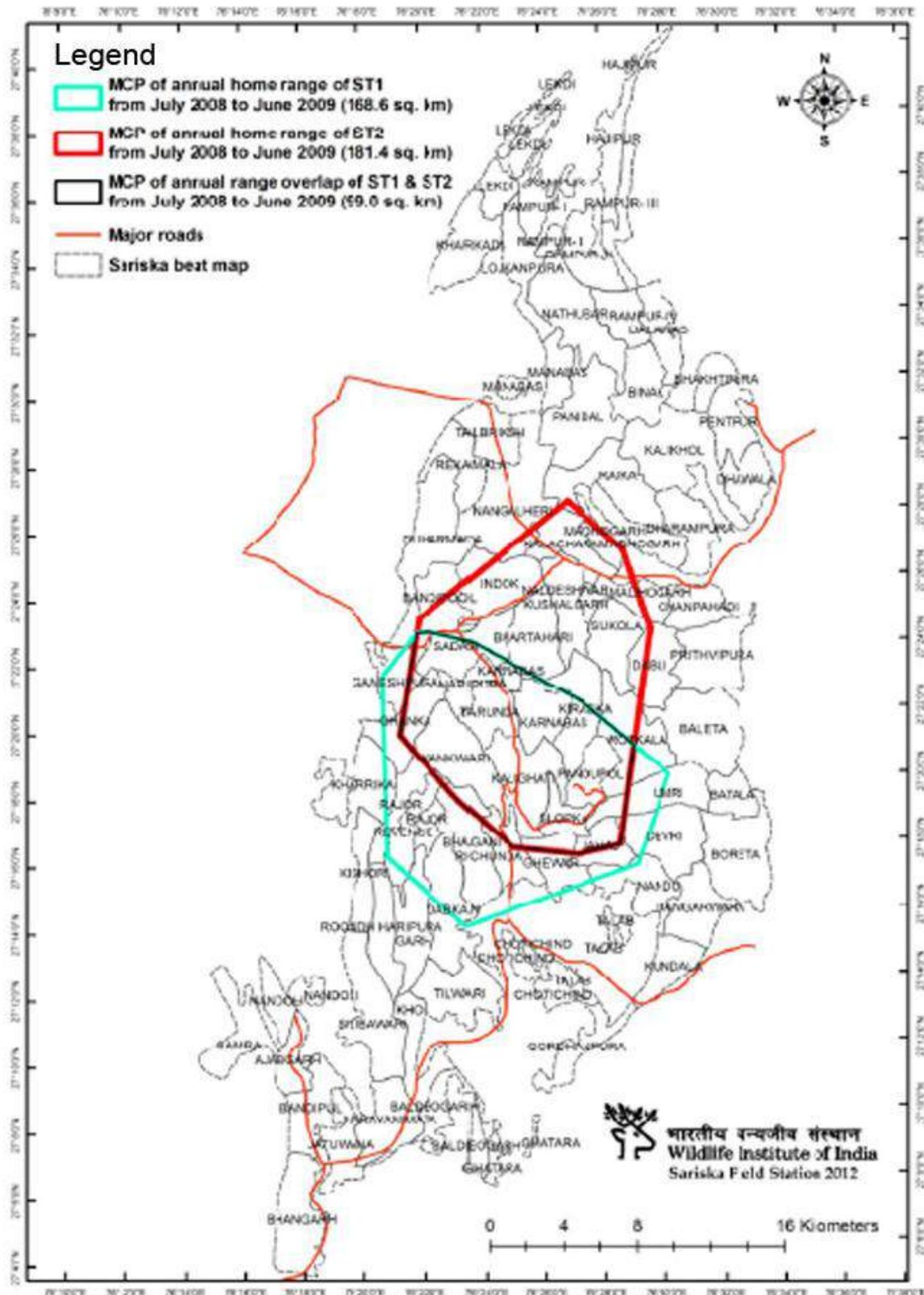
STATUS OF TIGER AND CO-PREDATORS

3.1 Distribution:-

Sariska was one of the most popular Tiger Reserve in the country as it is located nearest to National Capital. Till 2004, for viewing tigers lot of tourists used to visit Sariska, but unfortunately due to poaching last tiger was gunned down in 2004. Before 2004 in last one-decade tiger population had been decreasing due to poaching and habitat destruction. After tiger extermination in 2004, Sankar (2005) conducted study to search for the presence of any tiger signs. They did not come across any evidence of tiger in Sariska (Sankar 2005). The entire tiger habitat was taken over by leopards (Sankar 2005, 2007). During the study on tigers and its prey base in Sariska, Avinandan (2003) estimated the population of tigers in a study area of 45 km² (Sariska-Kalighati-Pandupole valley and adjoining hills) to be 5-7 individuals based on direct sightings and pugmarks. In total, 77 tiger scats were collected and analyzed for prey remains between November 2002 to May 2003. Based on the available secondary information (Anon., 2003, 2004), a distribution map of tiger for the year 2003 and 2004 was prepared for the entire Tiger Reserve (Maps 4 and 5). It is evident that the tiger distribution was confined only to the National Park area of the Tiger Reserve .

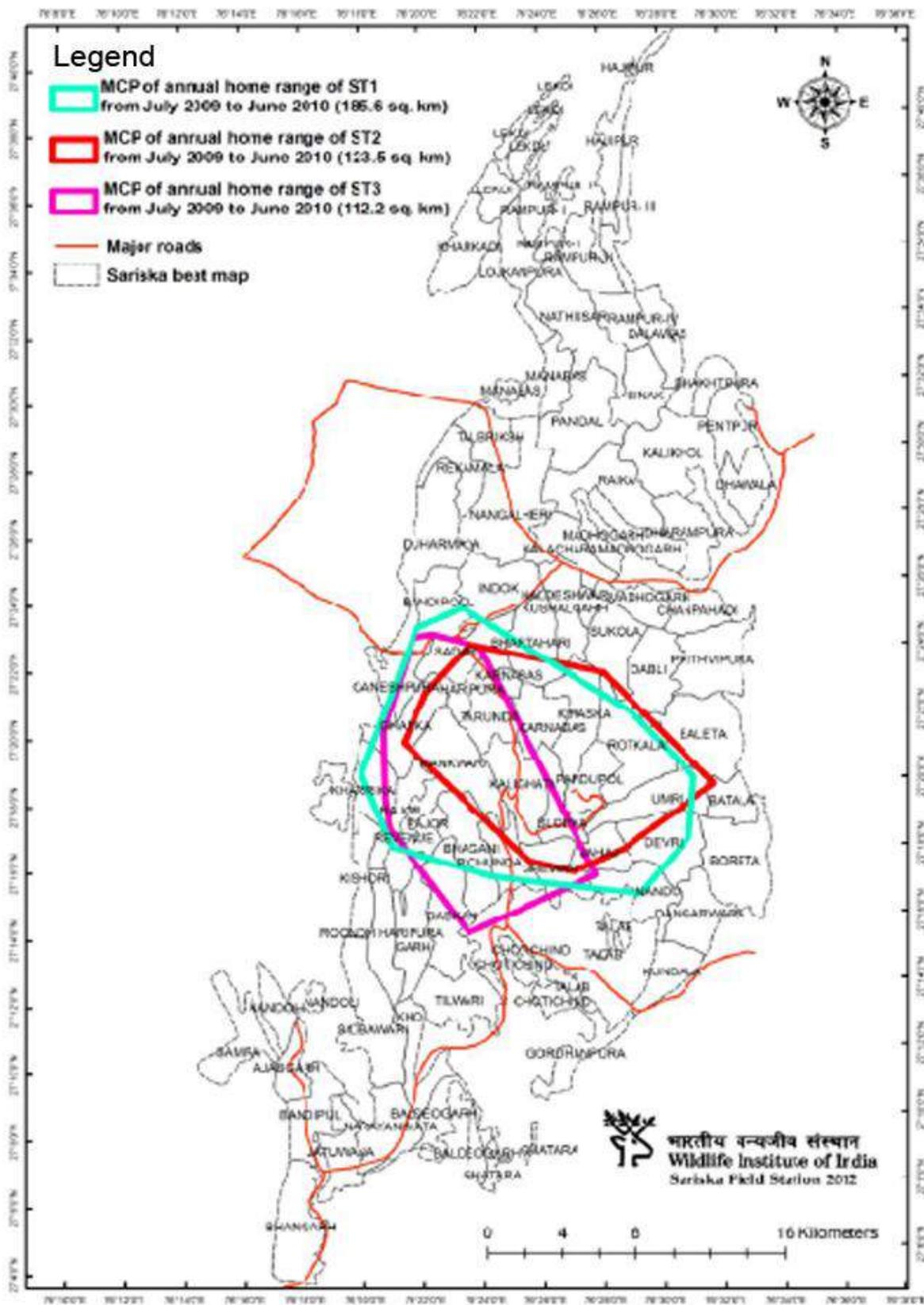
Since year 2008 tigers have been reintroduced in Sariska Tiger Reserve on dates 28th June 2008 (ST-1), 4th July 2008 (ST-2), 25th February 2009(ST-3), 20th July 2010(ST-4), 28th July 2010 (ST-5) and 23rd February 2011 (ST-6). ST-1 male tiger died on 14th November 2010 due to poisoning. Relative movements of all these seven tigers have been shown on **Map 11 to 15** from year 2008-09 to 2014.

Map-11 Annual Home range of ST1 and ST2 during 2008-09



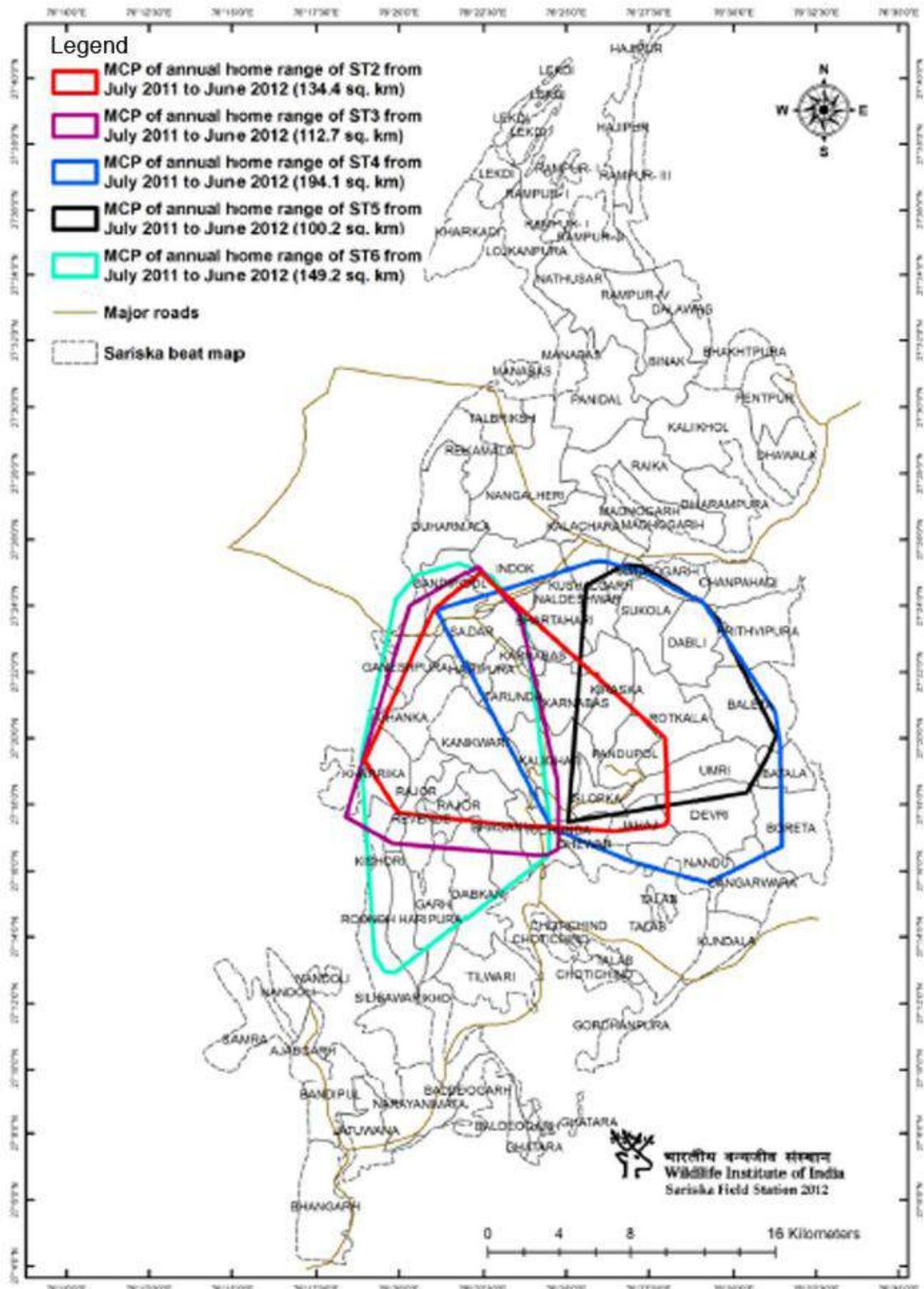
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Map-12 Annual Home range of reintroduced tigers in 2009 -10



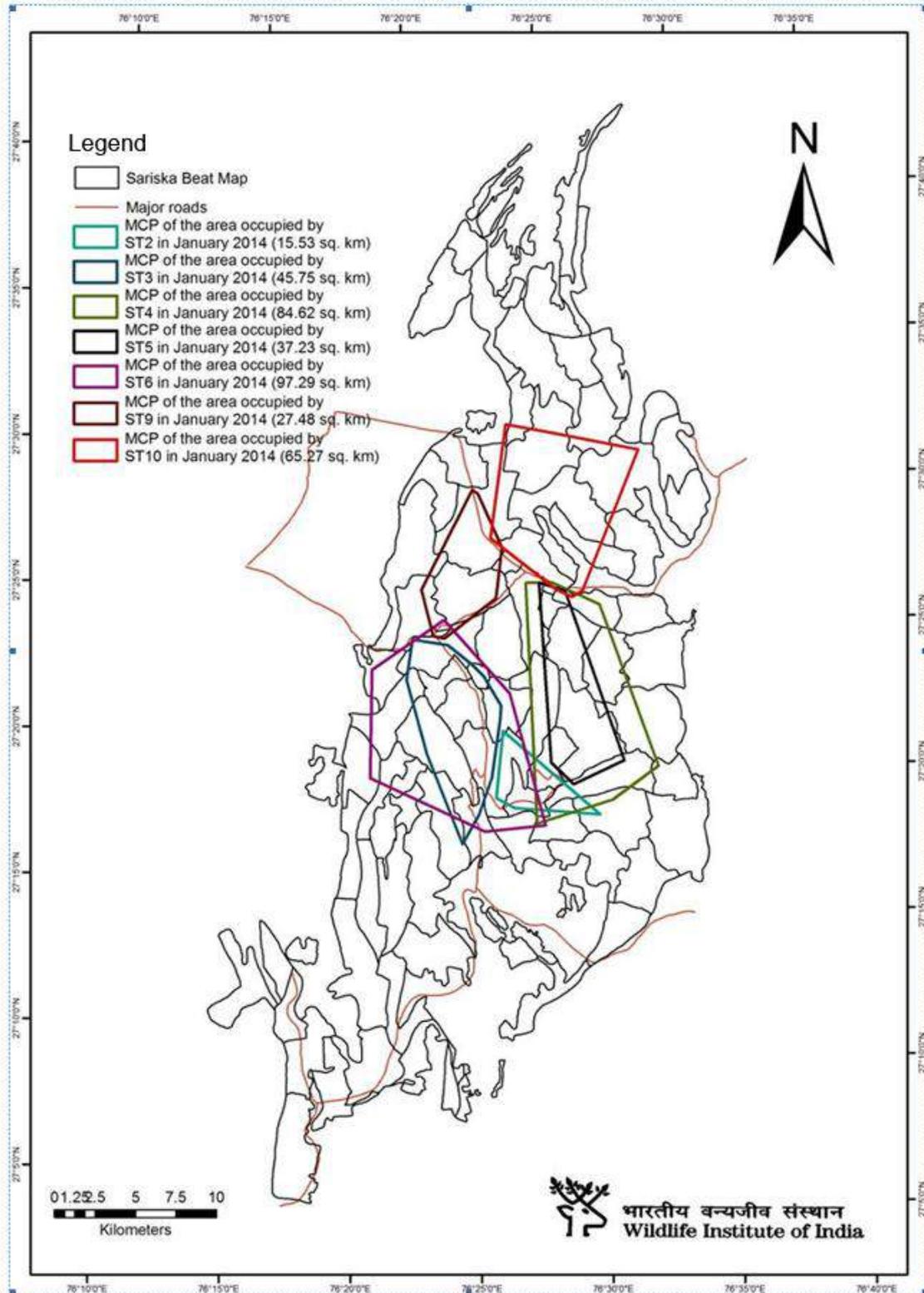
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Map-14 Annual Home ranges of reintroduced tigers in 2011–12



Not to scale

Map-15 MCP (ST2, ST3, ST4, ST5, ST6, ST9 and ST10) January 2014



Not to scale

Sankar *et al.* 2007 estimated the density and distribution of leopards and status of other lesser carnivores through camera trapping under mark-recapture framework. The density of leopard in core zone I of Sariska Tiger Reserve was found 7 individuals per 100 km², which is comparable with Satpura NP (7-10/100 km²), Rajaji NP (9.8/100 km²), Mera Poh (6/100 km²), Ngorongoro NP (7.5/100 km²), Kruger NP (5.1/100 km²) and Nairobi NP (10/100 km²) (Sankar *et al.* 2007, Edgaonkar 2007, Mondal 2006, Kawanishi and Sunquist 2004, Kruuk 1972, Pienaar 1969, Rudnai 1974). In this study, he tabulated the capture rate of different carnivore species at different locations in core zone I of Sariska Tiger Reserve. Caracal is one of the most elusive carnivores in Sariska Tiger Reserve. Sariska holds a good habitat and prey base for caracal (Mukherjee 1998). Sankar *et al.* (2007) prepared its distribution map based on secondary data.

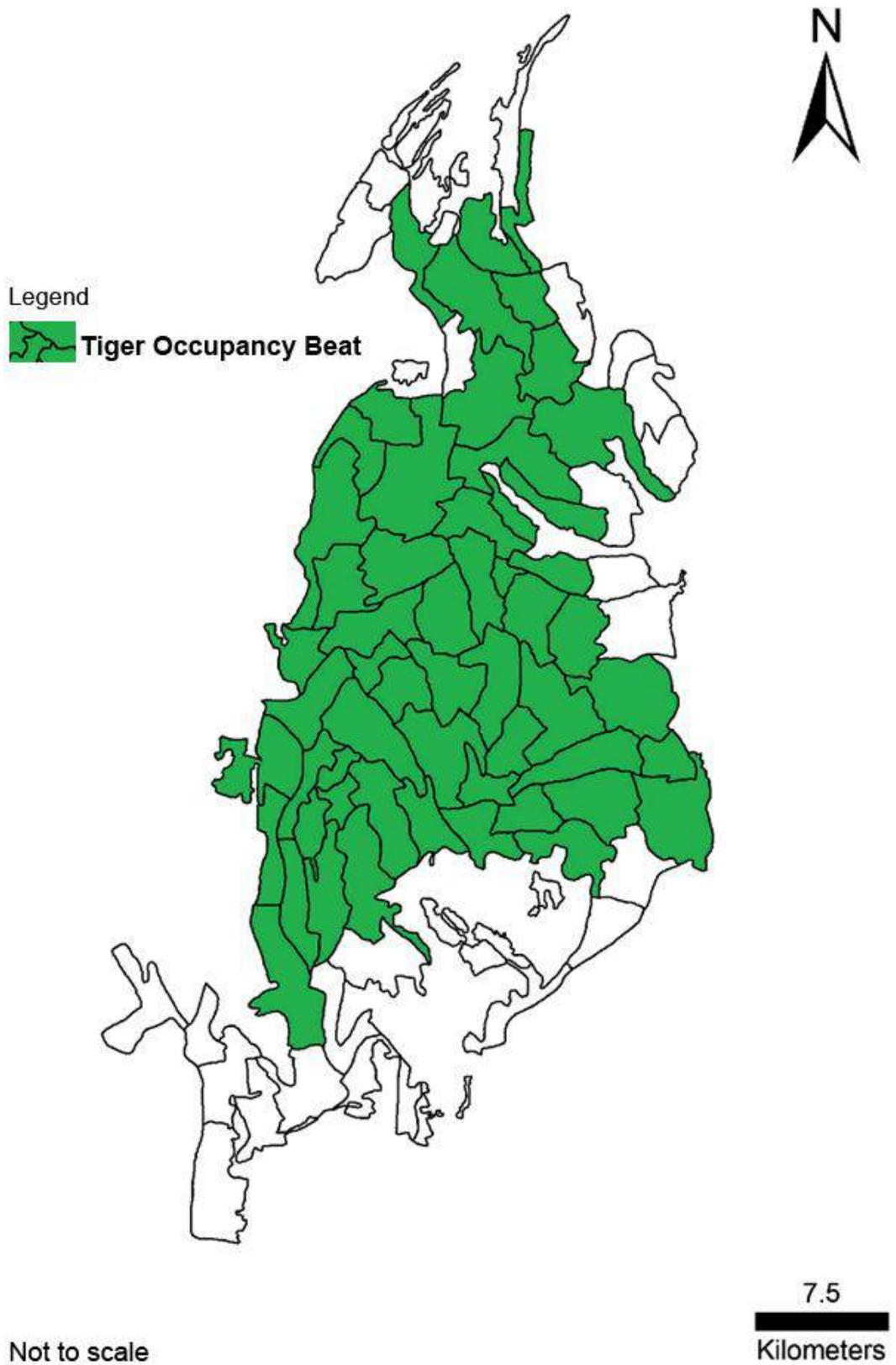
No tigers had been reported in Sariska Tiger Reserve after 2004, they got locally extinct owing to poaching. The census data reveals the presence of 24-28 tigers 10 years back. However, there was a sharp decline in 2004 census where it was estimated that the figure was 16-18. Till November 2004, all the Tigers were poached. As per the pugmark data of the beats, the tiger distribution was mostly in Core area in its last phase.

The co-predator sharing the habitat with Tiger, is the leopard, distributed throughout the Reserve.

3.2 Abundance Status

The number of tiger sightings reported by the tourists and forest staff from 1997 to July 2004 showed a declining trend since 1999, but the park management consistently reported the tiger population ranging between 24 to 27 . As there were no tiger cubs reported in Sariska since 2000, it is evident that tiger breeding had been affected since then. The Sariska National Park could possibly support 15 tigers (95% Confidence Interval: 10 to 21) based on tiger-prey equation developed by Karanth *et. al.* (2004) compared to the officially reported population of 26 tigers in 2003(Sankar *et al.* 2005, 2007).The tigers were largely distributed within the National Park area. After Re-introduction of tigers from year 2008 onwards, in 2014 there are 13 tigers including 7 translocated tigers (2 male + 7 female) and 6 cubs born in sariska. The tiger occupancy beats in CTH of STR as per January 2014 has been shown in **Map 16**.

Map-16 Tiger Occupancy Beats in Sariska Tiger Reserve-CTH (January,14)



3.3 Prey-Predator Relationships

PREY POPULATION ESTIMATION

Line transects were laid randomly in 101 beats of six ranges for prey population estimation. Each transect was walked for four times during 2nd – 5th May 2014. In total, 833.2 km was walked in all six ranges of Sariska Tiger Reserve.

Range	Effort (km)
Akbarpur	162.4
Talvriksh	104
Sariska	165.6
Tehla	154
Alwar-Buffer	123.6
Ajabgarh	123.6
Total Effort	833.2

Density of major ungulates and livestock in Sariska

Species	Density Estimates
Sambar	22.28(14.15 - 36.54)
Chital	15.69 (7.21-36.25)
Nilgai	49.18 (33.85 - 73.02)
Wild Pig	23.75 (14.88 - 38.11)
Livestock	108.30 (61.08 - 205.34)

RANGE: AKBARPUR

(DS: estimate of density of clusters, E(S): estimate of expected value of cluster size, D: estimate of density of animals)

SAMBAR					
Effort	:	162400.0			
# Samples	:	64			
Width	:	153.2089			
# Observations:		78			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	3.5252	0.68243	19.36	2.4073	5.1621
E(S)	3.3966	0.30454	8.97	2.8421	4.0592
D	11.974	2.5545	21.33	7.8847	18.183

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability	:	12.0			
Encounter rate	:	70.3			
Cluster size	:	17.7			

CHITAL					
Effort	:	162400.0			
# Samples	:	64			
Width	:	68.94400			
# Observations:		34			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	1.5405	0.62299	40.44	0.71140	3.3357
E(S)	12.069	2.2675	18.79	8.2587	17.637
D	18.592	8.2906	44.59	8.0030	43.191

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability	:	30.9			
Encounter rate	:	51.3			
Cluster size	:	17.8			
NILGAI					
Effort	:	162400.0			
# Samples	:	64			
Width	:	160.8693			
# Observations:		163			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	8.8557	1.6730	18.89	6.0962	12.864
E(S)	5.0735	0.36331	7.16	4.4052	5.8432
D	44.929	9.0774	20.20	30.200	66.843

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					

Component Percentages of Var(D)	
Detection probability	: 5.2
Encounter rate	: 82.3
Cluster size	: 12.6

WILD PIG					
Effort	:	162400.0			
# Samples	:	64			
Width	:	103.4160			
# Observations:		88			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	6.5635	1.2796	19.50	4.4685	9.6407
E(S)	7.2951	0.75611	10.36	5.9400	8.9593
D	47.881	10.572	22.08	31.086	73.749
Measurement Units					
Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					
Detection probability	:	8.6			
Encounter rate	:	69.4			
Cluster size	:	22.0			

LIVESTOCK					
Effort	:	162400.0			
# Samples	:	64			
Width	:	114.9067			
# Observations:		96			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	5.2970	1.1963	22.59	3.3990	8.2546
E(S)	19.288	2.2731	11.79	15.276	24.353
D	102.17	26.027	25.48	62.200	167.81
Measurement Units					
Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					
Detection probability	:	10.7			
Encounter rate	:	67.9			
Cluster size	:	21.4			

RANGE: TALVRIKSH

SAMBAR					
Effort	:	104000.0			
# samples	:	52			
Width	:	82.73280			
# observations:		27			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	

DS	2.2956	0.55791	24.30	1.4241	3.7006
E(S)	2.0354	0.23502	11.55	1.6059	2.5798
D	4.6726	1.2572	26.91	2.7645	7.8978

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability	:	37.2			
Encounter rate	:	44.4			
Cluster size	:	18.4			

CHITAL					
Effort	:	104000.0			
# samples	:	52			
Width	:	91.92534			
# observations:		9			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	1.2994	0.81828	62.97	0.36820	4.5858
E(S)	7.1673	1.4168	19.77	4.5112	11.387
D	9.3133	6.1470	66.00	2.5657	33.806

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability	:	69.5			
Encounter rate	:	21.5			
Cluster size	:	9.0			

WILD PIG					
Effort	:	104000.0			
# samples	:	52			
Width	:	114.9067			
# observations:		39			
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	5.7412	1.0478	18.25	4.0066	8.2269
E(S)	5.7479	1.0753	18.71	3.9473	8.3697
D	33.000	8.6245	26.13	19.819	54.946

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability	:	19.6			
Encounter rate	:	29.2			
Cluster size	:	51.2			

NILGAI	
Effort	: 104000.0
# samples	: 52
Width	: 153.2089

# observations: 126					
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	12.214	1.4170	11.60	9.7037	15.374
E(S)	5.7094	0.51844	9.08	4.7720	6.8311
D	69.736	10.274	14.73	52.218	93.132

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability : 13.3					
Encounter rate : 48.7					
Cluster size : 38.0					

LIVESTOCK					
Effort : 104000.0					
# samples : 52					
Width : 84.26489					
# observations: 51					
Model 1					
Half-normal key, $k(y) = \text{Exp}(-y^{**2}/(2*A(1)**2))$					
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	6.7537	1.3048	19.32	4.6130	9.8879
E(S)	10.621	1.3662	12.86	8.2105	13.739
D	71.732	16.649	23.21	45.581	112.89

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability : 14.7					
Encounter rate : 54.6					
Cluster size : 30.7					

RANGE: SARISKA

SAMBAR					
Effort : 165600.0					
# samples : 84					
Width : 120.2082					
# observations: 114					
Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	8.1755	0.99873	12.22	6.4259	10.401
E(S)	6.1760	0.46416	7.52	5.3226	7.1661
D	50.491	7.2419	14.34	38.111	66.893

Measurement Units					

Density: Numbers/Sq. kilometers					
ESW: meters					
Component Percentages of Var(D)					

Detection probability : 16.2					

Encounter rate	: 56.4
Cluster size	: 27.5

CHITAL

Effort : 165600.0
 # samples : 84
 Width : 57.98276
 # observations: 79

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	5.6627	1.7873	31.56	3.0752	10.427
E(S)	9.3976	0.61230	6.52	8.2553	10.698
D	53.215	17.150	32.23	28.562	99.147

Measurement Units

Density: Numbers/Sq. kilometers
 ESW: meters

Component Percentages of Var(D)

Detection probability : 76.4
 Encounter rate : 19.6
 Cluster size : 4.1

NILGAI

Effort : 165600.0
 # samples : 84
 Width : 92.63099
 # observations: 147

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	9.3213	1.6772	17.99	6.5565	13.252
E(S)	4.9101	0.34419	7.01	4.2756	5.6388
D	45.769	8.8380	19.31	31.404	66.705

Measurement Units

Density: Numbers/Sq. kilometers
 ESW: meters

Component Percentages of Var(D)

Detection probability : 66.2
 Encounter rate : 20.6
 Cluster size : 13.2

WILD PIG

Effort : 165600.0
 # samples : 84
 Width : 72.12489
 # observations: 47

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	2.9304	0.57664	19.68	1.9923	4.3101
E(S)	8.9467	0.97093	10.85	7.1947	11.125
D	26.217	5.8916	22.47	16.915	40.635

Measurement Units

Density: Numbers/Sq. kilometers
 ESW: meters

Component Percentages of Var(D)

Detection probability : 35.7

Encounter rate	:	41.0
Cluster size	:	23.3

LIVESTOCK

Effort : 165600.0
 # samples : 84
 Width : 84.85281
 # observations: 73

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	7.7365	1.6374	21.16	5.1133	11.705
E(S)	11.917	1.2721	10.67	9.6382	14.735
D	92.197	21.855	23.70	58.127	146.23

Measurement Units

Density: Numbers/Sq. kilometers
 ESW: meters
 Component Percentages of Var(D)

Detection probability : 20.2
 Encounter rate : 59.5
 Cluster size : 20.3

RANGE: TEHLA

SAMBAR

Effort : 154000.0
 # samples : 77
 Width : 120.2082
 # observations: 44

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	4.0374	0.84511	20.93	2.6792	6.0841
E(S)	5.3214	0.58919	11.07	4.2588	6.6493
D	21.485	5.0876	23.68	13.545	34.079

Measurement Units

Density: Numbers/Sq. kilometers
 ESW: meters
 Component Percentages of Var(D)

Detection probability : 26.9
 Encounter rate : 51.2
 Cluster size : 21.9

CHITAL

Effort : 154000.0
 # samples : 77
 Width : 70.71068
 # observations: 10

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	0.63381	0.31896	50.32	0.24461	1.6422
E(S)	15.187	4.3190	28.44	7.9835	28.891
D	9.6259	5.5640	57.80	3.2840	28.214

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 25.2
Encounter rate      : 50.6
Cluster size        : 24.2

```

NILGAI

```

Effort      : 154000.0
# samples   : 77
Width      : 226.2742
# observations: 195

```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	13.541	1.1728	8.66	11.419	16.056
E(S)	4.1814	0.25056	5.99	3.7157	4.7055
D	56.620	5.9632	10.53	46.055	69.607

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 33.7
Encounter rate      : 33.9
Cluster size        : 32.4

```

WILD PIG

```

Effort      : 154000.0
# samples   : 77
Width      : 226.2742
# observations: 61

```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	4.7781	0.84035	17.59	3.3831	6.7484
E(S)	4.2387	0.36366	8.58	3.5711	5.0310
D	20.253	3.9632	19.57	13.815	29.690

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 30.5
Encounter rate      : 50.3
Cluster size        : 19.2

```

LIVESTOCK

```

Effort      : 154000.0
# samples   : 77
Width      : 240.4163
# observations: 112

```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	7.7840	1.1345	14.58	5.8442	10.368
E(S)	11.750	1.1291	9.61	9.7165	14.208
D	91.459	15.967	17.46	65.009	128.67

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 22.2
Encounter rate      : 47.5
Cluster size        : 30.3

```

RANGE: ALWAR-BUFFER

SAMBAR

```

Effort      : 123600.0
# samples   : 44
Width       : 101.1179
# observations: 56

```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	10.162	3.1247	30.75	5.5498	18.609
E(S)	4.1995	0.62524	14.89	3.1209	5.6510
D	42.677	14.580	34.16	21.989	82.829

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 2.9
Encounter rate      : 78.1
Cluster size        : 19.0

```

NILGAI

```

Effort      : 123600.0
# samples   : 44
Width       : 45.96267
# observations: 103

```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	16.501	5.3943	32.69	8.7632	31.072
E(S)	3.0316	0.28860	9.52	2.5109	3.6601
D	50.024	17.032	34.05	25.945	96.451

```

-----
Measurement Units
-----
Density: Numbers/Sq. kilometers
      ESW: meters
Component Percentages of Var(D)
-----
Detection probability : 32.8
Encounter rate      : 59.3
Cluster size        : 7.8

```

WILD PIG

```

Effort      : 123600.0
# samples   : 44

```

Width : 45.96267
observations: 30

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	4.0066	1.2758	31.84	2.1557	7.4468
E(S)	2.4536	0.36855	15.02	1.8069	3.3319
D	9.8308	3.4612	35.21	4.9862	19.382

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters
Component Percentages of Var(D)

Detection probability : 26.0
Encounter rate : 55.8
Cluster size : 18.2

LIVESTOCK

Effort : 123600.0
samples : 44
Width : 35.23804
observations: 51

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	10.073	5.0043	49.68	3.9604	25.621
E(S)	18.664	4.0257	21.57	12.159	28.649
D	188.01	101.82	54.16	68.848	513.39

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters
Component Percentages of Var(D)

Detection probability : 34.5
Encounter rate : 49.7
Cluster size : 15.9

RANGE: DIGOTA

SAMBAR

Effort : 108000.0
samples : 54
Width : 45.96267
observations: 5

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	0.50370	0.35394	70.27	0.13243	1.9159
E(S)	4.8000	0.80000	16.67	3.0314	7.6003
D	2.4178	1.7461	72.22	0.62250	9.3906

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters
Component Percentages of Var(D)

Detection probability : 43.6
Encounter rate : 51.1
Cluster size : 5.3

CHITAL

Effort : 108000.0
samples : 54
Width : 22.98133
observations: 3

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	0.60436	0.43158	71.41	0.15118	2.4159
E(S)	5.6667	0.88192	15.56	2.9124	11.026
D	3.4247	2.5030	73.09	0.84320	13.909

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters
Component Percentages of Var(D)

Detection probability : 35.4
Encounter rate : 60.0
Cluster size : 4.5

NILGAI

Effort : 108000.0
samples : 54
Width : 72.77422
observations: 83

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	8.7766	2.0634	23.51	5.5440	13.894
E(S)	3.1911	0.25400	7.96	2.7244	3.7377
D	28.007	6.9517	24.82	17.272	45.413

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters
Component Percentages of Var(D)

Detection probability : 71.1
Encounter rate : 18.6
Cluster size : 10.3

WILD PIG

Effort : 108000.0
samples : 54
Width : 45.96267
observations: 17

Point Standard Percent Coef. 95% Percent

Parameter	Estimate	Error	of Variation	Confidence Interval	
DS	1.7123	0.58411	34.11	0.87316	3.3581
E(S)	3.1176	0.25556	8.20	2.6211	3.7083
D	5.3385	1.8729	35.08	2.6799	10.634

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters

Component Percentages of Var(D)

Detection probability : 61.2
Encounter rate : 33.4
Cluster size : 5.5

LIVESTOCK

Effort : 108000.0
samples : 54
Width : 71.24213
observations: 66

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	12.095	1.9941	16.49	8.7271	16.763
E(S)	8.6171	1.3724	15.93	6.2813	11.821
D	104.22	23.891	22.92	66.623	163.05

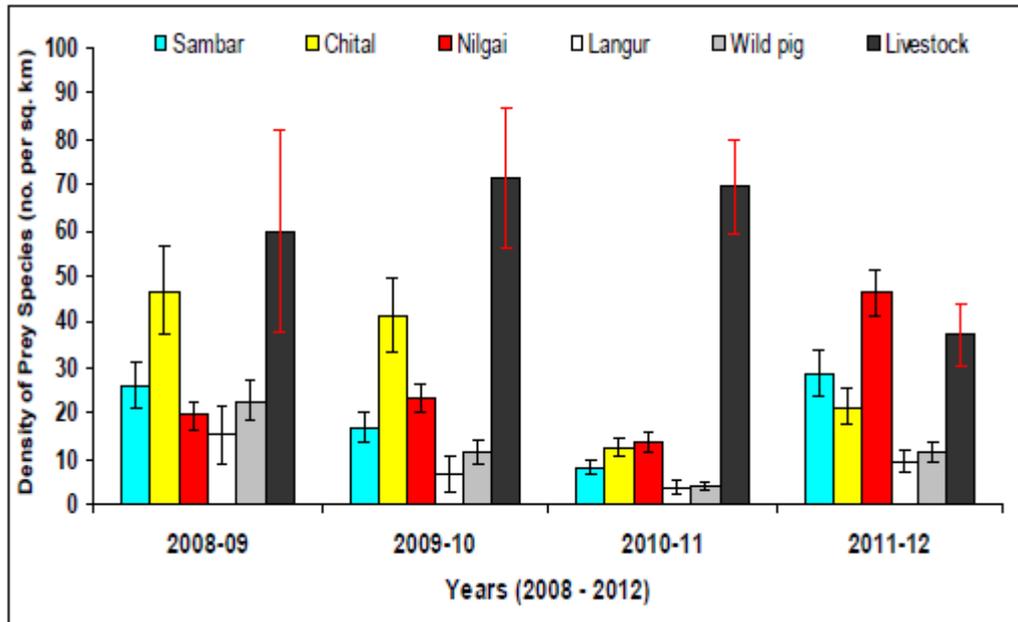
Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters

Component Percentages of Var(D)

Detection probability : 8.4
Encounter rate : 43.3
Cluster size : 48.3

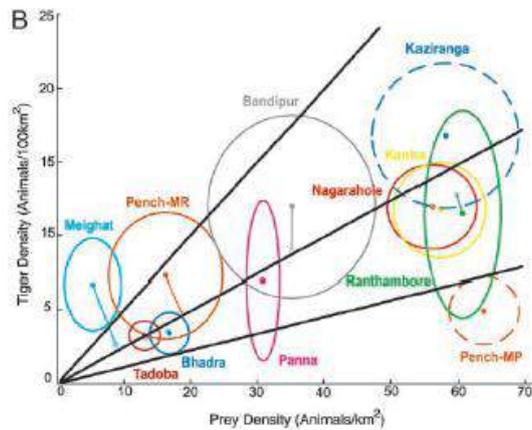
Bar Chart 1 –Showing percent occurrence of different prey species during 2008-09 to 2011-12 (Source - WII)



Prey Presence as a Determinant of Demographic Tiger Viability

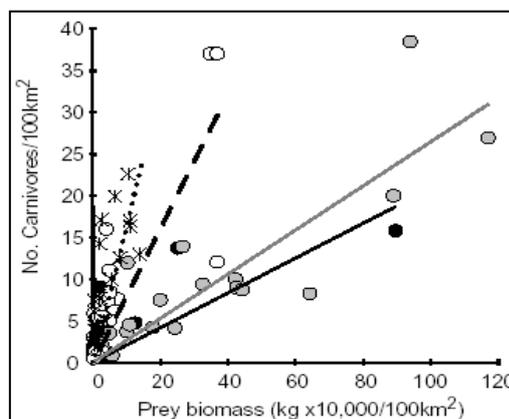
Tigers are adapted to a wide range of environment (Schaller 1967, Sunquist 1981, Seidensteicker & McDougal1993) through a social organization that permits behavioral plasticity. Earlier studies qualitatively described a positive co-relation between tiger and prey density. Karanth 1995 has demonstrated this co-relation in a high density tiger population in Nagarhole .Ungulate management is an integral component of predator (tiger and leopard) conservation. After the absence of tigers, leopard became main predator species. It preys upon the medium sized preys especially, female sambar and spotted deers. The number of sambars has increased due to the lack of predation by the tiger. But with the introduction of tigers, the balance in going to change now.

Graph – 1. Graph showing the relationship between prey and tiger abundance (Karanth *et. al.* 2004)



There is an overall correlation between body mass of a carnivore and the mass of their most common prey. In general, carnivores weighing 21.5 kg or less feed mostly on prey that is less than 45% of their own body mass and carnivores above this size feed mostly on prey that is more than 45% of their own body mass. This dichotomy is a consequence of mass-related energy requirements. As carnivore's mass increases, the total energy expenditure increases, and thus require more hunting time to obtain prey in order to balance the energy budget (Carbone *et al* 1999). The medium sized cats such as leopards (40–60 kg) feed on large prey-2 kg above their own mass and even larger.

Graph–2. Graph showing Carnivore density plotted against prey biomass density for different species of carnivores: solid circles and solid line – tiger, shaded circles and gray line- lion, open circles and dashed line – panther, asterix and dotted line – Canadian lynx (Carbone and Gittleman 1999)



Prey depletion lowers the tiger's encounter rates with prey. It is expected to result in lower hunting success, greater energy expenditure per kill, and increases foraging movements. These ecological consequences result in poorer nutrition, increased intraspecific competition at kills and reduced attention towards cubs. Therefore, prey depletion is likely to affect survival rates of tigers at all demographic stages. In Kaziranga this process is almost nullified owing to the absence of the factor of prey depletion and poaching. It is important to mention here that a hunt in Chitwan (Nepal) in 1935 - 36 produced 77 tigers; 3 years later 10 tigers were killed when the same area was hunted. Even in Sikhote- Alin State Biosphere Reserve(Russia) between 1963 - 1965 there were no tigers in the area and the first tiger appeared in 1966 and during the colonization phase, that followed (1966- 1993), records show tigers increased to 24-31 individuals.(*E.N.Smirnov & D.G.Miquelle*) Thus poaching is not as serious as prey depletion.

Study of Prey density in STR under taken by WII

Prey density has been estimated as part of "Monitoring of reintroduced tigers in Sariska Tiger Reserve, Rajasthan" during 2008-09 to 2011-12. According to the final technical report of the project, peafowl was the most abundant prey species throughout the study period in the study area. The density/ km² ± SE of peafowl varied from 125.20±15.30 / km² in 2008-09 to 103.10±13.10 / km² in 2009-10, 113.70±18.70 / km² in 2010-11 and 140.96±11.10 / km² in 2011-12. Amongst the wild prey species, chital was the most abundant (46.70±9.50 / km²) in 2008-09 followed by sambar (26.20±4.90 / km²), common langur (22.06±6.39 / km²), nilgai (19.50±3.30 / km²) and wild pig (15.40±4.40 / km²) (Bar Chart I). In 2009-10, chital (41.30±8.10 / km²) was the most abundant wild ungulate prey species followed by nilgai (23.30±3.40 / km²), sambar (16.80±3.20 / km²), common langur (11.60±3.90 / km²) and wild pig (6.80±2.80 / km²) (Bar Chart I). In 2010-11, nilgai (13.53±2.06 / km²) was the most abundant wild ungulate prey species followed by chital (12.55±2.14 / km²), sambar (8.27±1.44 / km²), common langur (4.30±1.50 / km²) and wild pig (4.06±1.03 / km²) (Bar Chart I). In 2011-12, nilgai (46.45±4.79 / km²) was the most abundant wild ungulate prey species followed by sambar (28.66±4.91 / km²), chital

($21.54 \pm 4.16 / \text{km}^2$), common langur ($11.56 \pm 2.16 / \text{km}^2$) and wild pig ($9.61 \pm 2.24 / \text{km}^2$) (Bar Chart I). Since there were ten villages inside the Sariska National Park area, the observed abundance of livestock was comparatively high in the study area. The density of domestic livestock in the study area was recorded as $59.90 \pm 22.30 / \text{km}^2$ in 2008-09, $71.40 \pm 15.30 / \text{km}^2$ in 2009-10, $69.70 \pm 10.30 / \text{km}^2$ in 2010-11 and $37.02 \pm 6.83 / \text{km}^2$ in 2011-12. In the intensive study area, the available prey biomass was calculated to be 20,868.28 kg/ km^2 in 2008-09; 21,711.80 kg/ km^2 in 2009-10; 17,161.53 kg/ km^2 in 2010-11 and 20,519.66 kg/ km^2 in 2011-12.

Based on the prey availability, carrying capacity of tigers in Sariska Tiger Reserve was calculated using Hayward's Formula (Hayward *et al.* 2007).

$$\begin{aligned}
 y &= -2.158 + 0.377x \\
 \log \text{ predation} &= - 2.158 + 0.377 (\log 20519.36) \\
 &= - 2.158 + 0.377 (4.3121) \\
 &= - 2.158 + 1.6256617 \\
 \text{Predator - antilog} &= - 0.5323383 \\
 &= 0.2935/\text{sq km} \\
 &= 29.35/100 \text{ sq km}
 \end{aligned}$$

Total biomass of available prey species was calculated and fitted into Hayward's formula to assess the carrying capacity of tigers in Sariska. Total biomass/ km^2 of available prey in Sariska was 20519.36. Based on the prey availability, Sariska can support 29.35 tigers/ 100 km^2 . Looking to the over all availability of habitat conditions, prey base and existing condition of human dominated ecological island CTH with patchy buffer corrective level carrying capacity of Tigers ranging from 40 to 50 will be maintained.

3.4 Assessment of Threats

Sariska Tiger Reserve is virtually an ecological island burdened with heavy pressures of human and cattle population. The economy and livelihood of local people depend, to a large extent, on the resources of STR.

The STR is comparatively a small area of forest. The isolated wild life population of STR is vulnerable to competition for food & water, health and inbreeding. The major threats to wild life can be narrated as under :-

3.4.1 Deterioration of Eco-system

The STR is a small area and is under tremendous pressure from all directions. The main cause of deterioration is excessive grazing by live stock in buffer zone as well as in some areas of core zone. The number of grazing cattle is very high and as a result the buffer areas of STR are fast reaching to a point of total degradation.

Illicit cutting and collection of fuel wood and timber is also taking its toll on the buffer areas. Mining is also disturbing the habitat in some of the areas. The noise, debris and vehicular disturbance is making the affected area unavailable for the wildlife, there by reducing the net area available for the wild life.

The presence of villages inside the Tiger Reserve. and the encroachments near the Tiger Reserve boundaries are also contributing to the habitat loss and reduction in net area available for the wild life.

All these factors are gradually shrinking the habitat and are also damaging the quality of habitat in the STR, which is a cause of grave concern for the management of STR

3.4.2 Genetic Factors

As mentioned earlier, the wildlife of STR is an isolated population. The destruction of corridors with surrounding forests is a grave concern for the survival of the reserve. For smaller mammals it is not very important because they can migrate to other areas or live on revenue lands but for larger mammals like Tiger, the migration to other areas has become impossible. It has created a situation in which there is a danger of inbreeding depression . This may lead to genetic deformities and other adverse consequences. This may also pose a serious threat to the viability of wildlife in a long run.

3.4.3 Proneness to communicable diseases from domestic cattle

Due to heavy grazing pressure on the areas of STR, the wild ungulates are in constant touch with domestic live stock. This continuous interaction, coupled with comparatively small and isolated wild animal

population, may lead to an outbreak of a fatal contagious disease like “Liver-Fluke” which may ultimately eliminate many of the wild species.

3.4.4 Habitat degradation due to loss of top soil and silting up of water holes / bodies

A unique feature of the STR is that there is no entry of water from outside. All the water flows from STR to the surrounding areas. Thus, whatever soil is washed away from the P.A., with run-off, is lost for ever. This factor coupled with the pressure of grazing and wood collection is gradually resulting in the permanent loss of soil from STR, especially the areas of Rampur, Tehla, Thanagazi and Akbarpur are much affected. This condition may result in change in the quality of vegetation and reduction of vegetation cover in long run, which will ultimately adversely affect the habitat quality and wild life population. The erosion of the top soil and silting of the existing water holes / bodies is a major concern. Due to siltation, the water availability to the wild animals during the pinch periods will decrease.

3.4.5 Alienation of the Local People

The STR has evolved through different stages. The ownership changed from princely state to Govt. Through this process of state, controlling the resources, the local people got alienated gradually over-a-period of time. The local population in the past had an access to forest with limited controls. After the promulgation of Forest Act and Wild Life Protection Act, the free access has been restricted. At the same time there has been growth in tourism in the Park. Tourists enjoy a lot of facilities and services, of course after paying the cost. This has given a notion that the Park has been created for the tourists and the locals have no claim.

- [i] Through the process of evolution of the STR, the local people gradually got alienated. Four villages were shifted from STR to the outside area, but the final results were not very encouraging.
- [ii] The access to the forest resources has been restricted through Rajasthan Forest Act and Wildlife Protection Act.
- [iii] There are restrictions on collection of minor forest produce and grazing.

[iv] Mere entry to the STR is restricted, whereas the tourists enjoy all comforts and benefits. There is a growing feeling that the park has been created for the tourists. The park no more holds promises for villagers.

[v] The wild animals cause damage to crops and their domestic cattle.

3.4.6 Spread of *Prosopis juliflora* and other abnoxious weeds

Prosopis juliflora had been a favorite species, in the past, in Rajasthan in afforestation activities to meet the fuelwood requirements. *Prosopis juliflora* plantations raised around the STR had posed serious problem to the Eco-system. It is fast spreading into the Sariska Tiger Reserve. Grazing by goat and sheep is facilitating the spread of this species. An estimated 5000 ha. area of the Tiger Reserve is infested with *Prosopis juliflora*. Unfortunately it was not tended in the past and thus it has gained bushy growth devoid of thick stem. It is also not a palatable species, therefore, it has not helped in reducing pressure on forests for the demand of fodder or small timber for agricultural implements. Apart from this weeds like *Adathoda vasica*, *Lantana camara*, *Parthenium spp.*, *Cassia tora* etc. are adversely affection the wildlife habitat.

3.4.7 Poaching threats

Sariska Tiger Reserve attained notoriety for mass illegal poaching till year 2004. In these years all tigers were poached. Some tiger articles were also recovered from poachers. Traditionally, Bawarias, Meo Banjaras, Meena and Bheel communities are associated with poaching. Farmers also employ Bawarias to protect their agricultural crops from the damage by wild animals. The pattern of poaching, found more prevalent, in these areas was poisoning of the carcass and capture by laying out traps.

A well-organised effort to identify and control poaching was lacking. Poaching cases also went unreported because of poor communication with the villagers and lack of an effective Secrete Information System.

3.4.8 State Highway (13 and 29A)

The State Highway (No. 13 and 29A) passes through the sanctuary. The traffic is heavy. On State Highway 13 approximately 2000 vehicles (Buses, Trucks, Mini Buses, Cars, Jeeps, Tractors, Two wheelers etc.) ply to and fro in 24 Hrs. duration causing disturbance by way of breaking the silence of the jungle. Hence the habitat is badly fragmented. The death of wild animals due to road accidents is also not uncommon. As per the Hon. Supreme Court decision the traffic barriers has been established at Kushalgarh, Bharatri Tiraha, Thankyou Board and Ghata-Bandrol for diverting commercial traffic on State highway -13 from Thankyou Board to Kushalgarh to Ghata-Bandrol –Narayanpur-Talvriksh-Kushalgarh by pass. During night time no traffic is allowed on State highway from Kushalgarh to Thankyou Board.

3.4.9 Illegal removal of NTFP

There is no serious problem of removal of NTFP. Illegal removal of *Butea monosperma* leaves from the periphery of the forest is of common occurrence. *Butea* leaves are used for thatching of huts, fodder and preparing 'Pattal-Dona'. Other items of use are Tendu leaves and Tendu fruits. Though stall feeding of cattle is not in practice in this area, illegal grass collection from STR is also resorted to, to a limited extent.

3.4.10 Encroachments & other Illegal activities

Though encroachment is not a major problem in the STR, adequate attention has not been paid to it. The maintenance of forest boundary and records is very poor. There are some cases of encroachment in the village Bandipul, Amrakabas, Kalikhol, Boretha, Tehla, Golakabas etc. The status of encroachments especially in rundh areas is not very clear because of incomplete revenue records so people take advantage. A detailed survey of the area is required to ascertain the extent of encroachments in these villages. The existing boundary pillars in remote villages in Sariska Tiger Reserve indicate that the boundary marks still have enough sanctity. There are some activities of illegal mining also. The fringe areas are specially

vulnerable to illegal mining since suitable mining areas are not available outside the reserve.

3.4.11. TOURISM PRESSURE

The majority of tourist pressure in STR lies in Sariska National Park zone. And day to day, as trend shows, the number of tourists is increasing. More over there is tourism pressure within the sanctum sanctoram also. The tourist traffic in the park is growing over the last few years. The last ten years' figures of tourists visiting the STR and the income are as follows-

Table 6 : Tourists traffic in Sariska Tiger Reserve.

No.	Years	Indians	Foreigners	Students	Total	Entry Fee Collected (Rs.)
1	2001-2002	40716	15289	2705	58710	56,06,771.00
2	2002-2003	36097	6824	4163	47084	33,61,705.00
3	2003-2004	32079	6897	3657	42633	34,42,251.00
4	2004-2005	39717	12546	5060	57323	52,54,025.00
5	2005-2006	16739	5999	1869	24607	24,80,495.00
6	2006-2007	21740	6428	2446	30614	28,19,301.00
7	2007-2008	23066	5378	3306	31750	26,98,238.00
8	2008-2009	31776	4524	2297	38597	29,08,750.00
9	2009-2010	35198	5187	3863	44248	32,89,790.00
10	2010-2011	34139	6169	3928	44236	69,46,925.00
11	2011-2012	28395	3737	2271	34403	82,30,125.00
12	2012-2013	20085	2138	840	23063	67,31,253.00
13	2013-2014	27805	2410	2146	32361	72,37,193.00

CHAPTER - 4

HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

4.1 Conservation History

The first Management Plan [1978-1979 to 1982-83] of Sariska was written by Padam Shree Kailash Sankhala for 800 sq.kms including 492 sq.kms of the notified Sariska Sanctuary area and 308 sq.kms of adjoining area of Alwar, Rajgarh and Sariska Forest Ranges. During the erstwhile princely State, all forests were under the exclusive authority of His Highness, Alwar. Sariska being a shooting reserve of the Maharaja, the forest areas of this tract were strictly preserved. Immediately after the formation of the State of Rajasthan, all the forest areas were leased to private contractors for charcoal and firewood.

A hunting reserve, during the reign of the Maharaja of Alwar – Sariska was an abode of British Royalty, Viceroys, and functionaries of the Government. There were shooting blocks kept for big game hunting, as a part of the management of the area. There was a separate 'Shikarkhana' and Shikar paltan to control and protect the area from poaching. Shooting was permitted till 1955. After independence, Sariska was declared as a Wild Life Reserve on 7th November, 1955, under the Rajasthan Wild animals and Birds Protection Act, 1951.

Sariska was included in the list of tiger reserves by Government of India in 1978 as the 11th Tiger reserve. In 1982, an area of 400.14 sq. kms has been preliminarily notified as Sariska National Park.

This period onwards, regulations on usage of resources were practiced from the management point of view. Departmental commercial felling of Dhok (*Anogeissus pendula*) and bamboo was stopped. Restrictions on grazing were strictly enforced as compared to earlier times.

In the first management plan, mention has been made about the relocation of two guadas, Kalighati and slopka in 1966-67 and village Karnakawas in 1975. The entire area on either side of the Sariska-

Kalighati road has shown remarkable habitat improvement leading to increased ungulate population and predator occupancy in the area. The emphasis on shifting of 4 villages, Kiraska, Deori, Kaniawas and Sukola Dabli from the Core Area was laid by Shri Sankhala.

The Plan by Shri Kailash Sankhala, mentions about the Core and Buffer Zones. Core zone to eliminate human disturbances and buffer zone of 320 sq.kms to absorb the impacts of human disturbing pressures and to maintain the seclusion of the Core Area. It also speaks about the Tourism zone and Interpretation facilities.

4.2 Habitat Management

The habitat improvement measures suggested in the operational management plan of 2004-2014, include eradication of obnoxious weeds and *Prosopis juliflora* and providing it free to the Eco-Development committees for utilisation as fuelwood. Very negligible work, in this regard, has been undertaken till now. Soil and Moisture Conservation activities are being undertaken in the Core as well as in the buffer areas to increase the moisture availability during the pinch period. A number of water bodies have also been created in the recent years and buffer areas have been taken up for plantation of local species.

4.3 Protection and Intelligence gathering

The Sariska crisis was an eye-opener to the wild life protectors that what a negligent protection system can do to a sanctuary.

Steps for reconstruction have been initiated by the Park Management to rebuild the Tiger Reserve and to provide a safe environment against any kind of poaching. One of the important aspects has been to strengthen the protection framework in Project Tiger Area.

The deployment of Home guards and Rajasthan Armed Constabulary (RAC) was done immediately in March' 2005 to strengthen the field surveillance. A network for secret information was developed in about 40 villages in order to identify the operational gangs of poachers around Sariska. The onerous task was to arrest those who were involved in the poaching in the last few years. The Sariska Park Management conducted more than 340 raids in different villages in and around the park

which resulted in the arrest of many poaching gangs along with seizure of traps, guns, explosives, wildlife parts (canines, bones, skin etc). More than 400 persons were interrogated for obtaining leads to reach to those who instigated the Bavaria tribesmen, to involve in the crime. The disclosures led the department to successfully crack 13 Tiger and 24 Panther poaching cases. Resulting in the arrest of 30 offenders from Alwar and adjoining districts viz. Jaipur, Dausa and Sikar. Till date 37 cases[13 tiger + 24 panther] have been lodged and trial/investigation is in progress. Complaints have been filed in 28 cases [8 Tigers + 20 panthers]. Total number of 139 wildlife poaching cases have been registered. In tiger poaching cases 18 offenders have been punished by respective courts for imprisonment of 3 to 5 years. In leopard poaching cases 16 offenders have been punished by respective courts.

4.3.1 Poaching Prone Areas

Range Sariska

Amra ka bas, Udainath, Ghanka, Bandipul, Sarunda, Ghamori, Naldeshwar, Naldi, Kiraska, Boh Jungle, Malajoharka, Slopka are the sensitive areas.

Range Tehla

Boretha, Kaimala, Jahaj, Bhensota, Bhagani, Haripura Rundh, Ajabgarh, Bandipul are sensitive to poaching.

Range Talvriksh

Raikamala, Loz Nathusar, Panidhal, Rampur are the sensitive areas for poaching.

Range Akbarpur

Nandwaj, siliberi, Narandi, Aaman, Rotkyala, Sukola, Dabli, Kalakari, Prithvipura, Peelikhar areas are highly susceptible to poaching.

4.3.2 Night Patrolling

Year 2006 marked the launching of a new “night foot patrolling system”, despite the lack of adequate young staff. The whole Tiger Reserve has been covered by 120 routes, decided on the basis of

revelations of the Poachers arrested after the Tiger crisis in Sariska. An attempt has been made to include the vulnerable areas with reference to poaching, remoteness and sensitivity, closeness to villages, prey and predator abundance.

Route Nos. have been allotted to each of the foot patrolling routes and every evening, the route no. on patrol for each range is asked on wireless by the control room and monitoring is done by the supervising officers i.e. Field Director, Dy.Field Director, Asst.Field Director, ACF (Research), RO(Flying Squad) & RO (Research), as per roster of supervising officers.

Table 7 : Foot Patrolling Routes

Sr. No.	Range	No. of Night Foot patrolling routes	Route No.
1	Sariska	39	1-39
2	Tehla	23	40-62
3	Akbarpur	23	63-85
4	Talvriksh	35	86-120

4.3.3 Operation Alert

As a step further, to add strength to the protection initiatives, an innovative approach by instituting “OPERATION ALERT”.

In this new system, the vulnerable areas within the Tiger Reserve, especially the tracks of the Tiger & leopard movements, are being covered.

The process

1. Dummy traps (made of wood) are placed in the interior forest areas on the tracks of movement of wildlife.
2. The dummy traps are placed secretly by the Asst. Field Director.
3. The Range officer is informed of the dummy trap, specifying the date and time, without actually mentioning the location.

4. A period of 7 days is allotted to ascertain the location of the dummy trap, within which it shall be retrieved by the local staff and deposited to the Headquarters with all details i.e., date, time and location from where retrieved, including the names of staff involved in the Operation Alert.

During interrogation, the poachers, have revealed the modus operandi of poaching. Logs/ bushes were placed on the tracks of animal movement leaving only a space of 2-3 ft. for safe passage. The Gap area was used for laying of traps, which ultimately led to the tiger's extermination. Based on the same logic, logs/ bushes are placed by the Park management, in interior areas and the staff is informed officially to ascertain the spot with all details. To involve the frontline staff in operation Alert, a system of rewarding the nakas/ chowkis has been devised.

4.3.4 Raids

The Sariska Park Management, in compliance to the suggestions given by the CBI, is conducting raids in different villages in and around the park. This has resulted in arrests of many poaching gangs along with seizures of traps, guns, explosives, wildlife parts (canines, bones, skin etc.)

The CBI, during the Tiger Crisis, suggested short and long term measures to strengthen protection initiatives in STR. In compliance to the suggestion, the Park Management has devised a system of raids to be conducted by the RO's of the respective areas where the 28 villages in and 132 around the Tiger Reserve are located.

4.3.5 Intelligence Networking

It is a key to prevent wildlife crime and any effort, to save wildlife, will not give results until the intelligence system is very strong. The Sariska crisis largely happened due to the lack of intelligence system. After the crisis, steps were taken to restore the protection system with developing the Intelligence network and secret fund is being utilised every year to nab poachers. The expected outcome is satisfactory.

4.3.6 Arms and Ammunition

In Sariska Tiger Reserve following weapons are available

S.No	Weapon Type	Remark
1)	12 Bore DB gun (SV 9300162)	Out of use
2)	12 Bore DB gun (SV 9300 221)	Out of use
3)	12 Bore DB gun (SV 9400937)	In use
4)	12 Bore DB gun (SV 9400856)	Out of use
5)	12 Bore Pump Action Gun(B 4065)	In use
6)	32 Bore Revolver (A 1423)	In use
7)	32 Bore Revolver (A 524)	In use

4.4 Tourism and Interpretation

During the initial years of formation of the Sariska Tiger Reserve, the tourism zone was included in the Core Area, mainly confined around the Sariska- Pandupole, 21 km, road. The system is still in practice and presently the tourism is permitted in the valley between Kalighati and Slopka with gypsies being allowed in the Core Zone. Carrying capacity has not been calculated for the Sariska Core Area resulting in no fixed no. of vehicles to be used for tourism. The problem is accentuated by the presence of State Highway 29 A through the Tourism Zone which is free for two days in a week to all vehicles. Consequently the carrying capacity theory finds little relevance in the tourism zone.

Tourist Classification

- (i) Visitors with tour groups
- (ii) Unescorted day visitors,
- (iii) Amateur photographers,
- (iv) Religious groups/Cultural travellers
- (v) School children
- (vi) Media

Interpretation and Conservation Education

The broad array of principles set forth by Freeman Tilden for interpretation are as follows:

- i) Interpretation should relate to the visitor;
- ii) Interpretation should include information
- iii) Interpretation is an art
- iv) Interpretation's chief aim is to provoke;
- v) Interpretation should be holistic;
- vi) Interpretation for children should be different than for adults

Present status of Interpretation

The Kailash Sankhla interpretation Centre at Sariska caters the needs of the people's curiousness for information . The Tiger , Birds, Mammals Kiosks, the galleries depicting information wildlife conservation through charts, models, wall painting, photographs, panels etc. Wildlife film show is organized in the Auditorium for visitors. The famous wildlife film ' Tiger Dynasty' based on translocation of tigers from Ranthambhore to Sariska Tiger Reserve is mainly shown to tourists.

A leaflet cum marker, to educate the visitors about the biodiversity of Sariska, with the basic concept of promoting 'biodiversity centric tourism' rather than 'tiger centric tourism', is being circulated to the visitors. DO's and Don'ts and a visitor's experience sharing form is also being circulated for obtaining feedback of the people. The caps having logo of Saiska Tiger Reserve are being sold at Interpretation Centre.

4.5 Research and Monitoring

Earliest in 1967, Vyas worked on the flora of North- East Rajasthan including Sariska. Then in 1985, P. J. Parmar studied the details of the flora of Sariska Tiger Reserve. He first classified the vegetation types in Sariska Tiger Reserve. According to Parmar 1985, there are 403 species of indigenous and naturalized plants available in Sariska belonging to 271 genera under 86 families. In his study, he included 4 species of Pteridophytes belonging to 3 genera and 3 families and one species of Gymnosperm. W. A. Rodgers also classified the vegetation types of Sariska Tiger Reserve during his field work in Sariska in 1984 and 1985.

He enlisted 155 species belonging to 118 genera under 45 families (Rodgers 1985).

Table 8 : Plant biodiversity (families, genera and species)

	Families	Genera	Species
Angiosperm			
Monocotyledons	13	59	90
Dicotyledons	69	208	308
Pteridophytes	3	3	4
Gymnosperm	1	1	1
Total	86	271	403

(Parmar 1985)

In 1990 Rodgers studied the importance of *Capparis sepiaria*, one of the most important fodder plants in Sariska. He determined the density of *Capparis sepiaria* in a total of 33 sample plots of 10m radius distributed randomly within the major vegetation zones and the estimated density was 284 ± 75 in core zone I of Sariska Tiger Reserve. He also estimated the browse volume and biomass of *Capparis sepiaria* in different vegetation types (Rodgers 1990). Algal spring is a perennial water point in Sariska and also one of the important water sources for wild animals in Sariska. In 1990, Rodgers studied the ecological importance of Algal spring. There is a stream coming down from the Algal spring. The stream side vegetation was surveyed by 30 X 10m plots laid along and on either side of the stream. He estimated the abundance parameters for woody plants in Algal spring as well as the species composition on hill slopes and ground layer around it. He classified all woody plants especially *Phoenix* in different girth classes and also quantified the fruiting and parameters of human disturbances like cutting, lopping in this area (Rodgers 1990).

In 2007, Sankar *et al.* studied vegetation extensively, throughout the entire Sariska Tiger Reserve. Vegetation types were classified and accordingly a vegetation map was prepared for the entire Sariska Tiger Reserve (Sankar *et al.* 2007). Maps of Sariska Tiger Reserve concerning

with terrain, slopes, drainage, aspects, hill shades, road network, location of forest huts, water holes, false color composition etc. were prepared in this study (Sankar *et al.* 2007) map – 7 shows vegetation types in STR.

4.5.1 Studies on Wild Animals

In early 90's V. B. Mathur studied the interaction between habitat composition, habitat quality, and abundance of wild ungulates in Sariska (Mathur 1991). He also studied the ecological impacts of livestock grazing on wild ungulates in Sariska (Mathur 1991).

Sankar (1993, 1994, 2005, 2007) studied many aspects of faunal diversity in Sariska Tiger Reserve. In 1993 Sankar studied the diversity of avifauna in Sariska and made one complete checklist. He recorded 211 species of birds, out of which 120 are resident, 73 are migrant visitors and 18 are considered to be vagrants (Sankar 1993a).

Ajith Kumar and K. Sankar (1993b) studied the diversity of Ichthyofauna in Sariska Wildlife Sanctuary. In his doctoral study, Mr. Shankar studied the ecology of three large sympatric herbivores (chital, sambar and nilgai) with special reference to management in Sariska Tiger Reserve. He explained densities, population and biomass as well as group size, antler condition and sex ratios of these three ungulates (Sankar 1994). He also studied food habits and feeding ecology of chital, sambar, nilgai and buffalo with interspecies dietary overlap. He also experimented the home range of all these three species in different seasons using radio-collar. Sankar clearly showed that the home range of ungulates depends upon the distance of water holes in summer (Sankar 1994). He also studied the habitat use and habitat preference of these three ungulates with the help of analysis of variance and multiple regression analysis (Sankar 1994). Sankar collected 164 tiger scats and 125 leopard scats during his doctoral study period 1988 to 1990 and analyzed for the prey remains. In his study he showed that chital and sambar were equally preferred by both tiger and leopard. Tigers' most preferred prey was chital (54.1%) followed by sambar (51.4%) and nilgai (16.4%) and in case of leopard it was rodents and insectivores (45.6%) followed by chital (20.8%) and sambar (20.0%).

An interesting study was conducted in Sariska in 1992 by Diwakar Sharma to study the effects of tree debarking and habitat use by the Indian porcupine (*Hystrix indica*). After an extensive ecological study across the park, involving the monitoring of 4000 trees, it was found that tree debarking was indeed prevalent (Sharma and Prasad 1992, Dang 2005). However, it was concluded that tree debarking did not cause any appreciable tree mortality and as such it did not warrant management intervention.

In 1998, Shomita Mukherjee studied habitat use by sympatric small carnivores in her doctoral study. She studied on three small carnivore species- golden jackal, jungle cat and caracal and she found that the visitation of jackal was higher than jungle cat in all habitat types except the dense scrub. Her results from track counts showed that jackal mostly used open scrub (32.2%) land in winter, whereas jungle cat showed greater use of dense scrub (20.4%) in winter (Mukherjee 1998). In summer, though dense scrub had higher visitation than other habitats but the difference was not significant. To study on the diets of jackal, caracal and jungle cat, she identified the potential prey species which were ground birds, rodents and hare. She found that rodents formed the major prey of these three predators occurring in more than 90% scats. Birds were the next most important prey occurring in 35% to 44% scats of all these three predators in all seasons (Mukherjee 1998). In winter 20% of jackal scats had seeds of *Zizyphus* fruits which were absent in felid scats. Consumption of vegetable matter was significantly higher in jackals than felids, whereas results from energetic predictions showed that felids depend to a larger extent on rodents than jackal (Mukherjee 1998). Although percentage frequency in scats and biomass consumption showed rodents to be equally important to all these three carnivores but energy calculations showed that rodents were more important as prey for the felids than for the jackal. Up to 70% of the daily metabolizable energy in felids was obtained from rodents, as compared to 45% in the jackal (Mukherje *et al.* 2004).

In 2003, Avinandan studied the food habits of tiger in Sariska Tiger Reserve. He also estimated the abundance of prey species in core zone I

of Sariska Tiger Reserve. Sambar was observed to be the principle prey species for tigers as inferred from the percentage occurrence of prey remains in scats (Avinandan 2003), though he found that chital was the most abundant wild ungulate species in Sariska. Chital was the least widespread of the three ungulate species available in Sariska as chital were largely encountered in the valleys interspersed between the hills and in areas of the plains, which had a high vegetation cover with least disturbance (Avinandan 2003, Sankar *et al.* 2007).

The following research papers has been published on Sariska tiger reserves on various subject has been incorporated in annexures of Tiger Conservation Plan for further reference –

1. Food habits of golden jackal (*Canis aureus*) and Striped hyaena (*Hyaena hyaena*) were investigated using scat analysis from November 2010 to June 2011 in STR by Pooja Chourisia & others (2012)
2. K Mondal and others (2012) studied Prey selection, food habits and dietary overlap between Leopard (*Panthera pardus*) and re-introduced tiger (*Panthera tigris*) in Sariska Tiger Reserve.
3. K Mondal and others (2011) studied Prey selection and food habits of Leopard (*Panthera pardus*) in Sariska Tiger Reserve.
4. Ghazala Shahabuddin and others (2006) Annotated checklist of birds of Sariska tiger reserve recording 183 species from March 2003 to June 2005.
5. K Shankar and others (1993) published check list of birds of Sariska Tiger Reserve recording 211 species from July 1988 to December 1999.
6. K Shankar (2012) published an article Sariska the reign of Tigers based on studies after re-introduction of tigers in year 2008.
7. Subhadeep Bhattacharyajee and others (2012) published study on Tale of travelling of tiger ST-6, which was re-introduced in STR after straying from RTR from KNP Bharatpur.

8. K Mondal & others (2012) published study on Response of Leopard to Re-introduced tigers in STR.
9. K Mondal & others published another study on Home range and resource selection of problem Leopards translocated to the forest habitat in STR.
10. Shilpi Gupta & others (2009) conducted study on Estimation of striped Hyaena population using camera traps in STR and estimating density as 15.1 + 6.2 Hyaena / 100 sq km.
11. D. Avinandan & others (2008) published study on Prey selection by tigers in STR.
12. S Gupta & others (2012) conducted study on Abundance and habitat suitability model for Ratel (*Mellivora capensis*) in STR estimating density of Ratel as 5.45 + 4.33 animals / 100 sq km in summers and 6.43 + 2.79 animals/ 100 sq km in winters.

4.5.2 Tiger Monitoring Protocol

Learning lessons from the past, the monitoring protocol has been activated and serious analysis of evidences, collected [direct & indirect], is being undertaken by the Park Management. Review meetings to sensitise the staff about the trend of evidences are being taken.

- A 40- column monitoring format is being followed for recording the important data related to prey, predator & habitat.
- The data is received by the Research Section and in-depth analysis is done and reported to Range officers.
- Data of no. of pugmark evidences is compiled fortnightly and is analysed every 6 months. Based on the trend, analysis is done to detect **early warning signal**, if any, and appropriate measures are undertaken.
- The data received at the Divisional Headquarters is compared as per seasons of previous year & also on the basis of census of previous year vis a vis current year's census.

- Field checking is done and comments are recorded in tracking register
- During the monsoon season more emphasis is laid to collect evidences like scats, kills, roar calls, scratches & scrapes, as pugmark evidences are reduced due to rains

4.6 Relocation of Villages

Relocation of some habitations located within the Sanctuary area was undertaken in 1960's. There were small and temporary camps referred to as 'guadas' which were shifted out between 1966-67 from Kalighati and Slopka to some of the existing villages. The use of relocation as PA's management tool, took a more organized form in 1976, when relocation of Karnakabas and Kiraska village took place. The land was identified and allocated for villagers at three different places namely Bandipul, Dulawa and Sirawas which were not far from Sariska. This was the initial attempt for full fledged relocation of villages during post-independence period. Several people who had been relocated, returned and resettled close to an existing village Kundalka where they established a separate hamlet named Naya Kundlka. Simultaneously relocation process was initiated to relocate Kiraska to the area Sirawas, not far from Sariska. But success could not be achieved because many of the villagers returned to their original places.

At the same time, the biotic pressure on the reserve had tremendously increased because of all dimensional growth of the villages inside the sanctuary. Continuous efforts for relocation of some of the villages, from the sanctuary area, have always been in the mangement agenda.

Prior to recent amendments in the Wild Life (protection) Act 1972, STR was classified in three core areas and remaining forest areas were under buffer zone. The core-1 was approximately 400 sq kms. with good vegetation and considered to be a sound habitat for the tiger and is proposed national park area. This area has 12 villages proposed for relocation since long time.

4.6.1 Need for village relocation :

Out of the 29 villages situated inside Critical Tiger Habitat of Sariska Tiger Reserve, 3 villages have already been relocated, 12 villages are being considered for relocation on priority basis. These villages are located deep inside the reserve and are a source of considerable disturbance to the natural ecosystem and more evidently to the wild animals. Most of the habitations, situated inside the core area, are not connected by road & are generally lacking in basic amenities which are available in other villages outside the sanctuary. No electricity, school, PHC or market is available there. Thus there is no scope of social and economic development. Beside this, they are resource users resulting in high degradation in core area. There also exists a threat of spreading of diseases from domestic cattle to wild ungulates due to sharing of water holes. Spread of weeds due to over grazing is another problem.

On one hand the people remain deprived of fruits of development aggravated by hardships, while on the other hand, the protected area suffers because of fragmentation and degradation of habitat by these people and their cattle. The number of cattle is rapidly increasing and also more number of new cattle are being added every year. Therefore, to improve the condition of the people and to provide a better undisturbed habitat for the wild animals. The total area of these villages, inside the core, is approximately 10 km². The literacy percentage is very less, among the people. The list of priority villages along with details of demographic data is mentioned as under:

Table 9 : List of priority Villages in CTH with Number of Families, Human & Cattle Population

Sl. No	Name of Village	Name of Block	Name of GP	No. of Family	Cattle Population	Human Population			
						SC	ST	Others	Total
1	Kankwari with Karahat, Peelapani, Kila neeche	Rajgarh	Rajor	170	3411	-	-	694	694
2	Kraska	Umrain	Madhogarh	200	3256	-	50	534	584

3	Haripura	Thanagazi	Bagdoli	74	885	-	-	225	225
4	Lilunda	Umrain	Madhogarh	33	862	-	-	80	80
5	Sukola	Umrain	Madhogarh	46	729	-	-	189	189
6	Dabli	Umrain	Madhogarh	126	994	-	-	400	400
7	Naya Kundalka	Umrain	Bhangdoli	38	646	-	-	191	191
8	Raikamala	Thanagazi	Duharmala	60	1541	-	-	350	350
9	Deori	Rajgarh	Talab	181	913	-	96	339	435
10	Kundalka with Sarunda	Umrain	Bhangdoli	64	543	-	-	255	255
11	Panidhal	Bansur	Madhogarh	8	211	-	-	94	94
12	Bera	Umrain	Akbarpur	17	419	-	-	66	66

Out of these villages, Dabli, Raikamala & Deori are revenue villages while others are situated on forest land.

The National Park in the Tiger Reserve forms the crucial natal area and a critical tiger habitat, hence it is imperative that this area is made inviolate and free from all kinds of human interference on priority.

4.6.2 Progress of Village Relocation

In the year 2003, a proposal was sent by state forest department for diversion of forest land for relocation purpose. Government of India. Vide letter no. 8-127/2003/FC/ dt. 30/04/05, issued approval of diversion of 222.67 ha forest land of Bardodh rundh in Alwar district for this purpose.

This forest land is situated at a distance of 75 kms. from Sariska. Joint visits with villagers were organized. The site is very close to Behror town. Kankwari and Bhagani villages were proposed to be relocated on this forest land.

The relocated village is very close to the tehsil and sub divisional head quarter Behror. The hospital facility, higher secondary school, veterinary hospital, bus stop and market facilities are also available at close proximity.

Laying and designing of the relocation site was carried out by a Town planner to arrive at a good plan. The land for constructing houses, agricultural plots, roads, community facilities like community hall, school, pasture land, milk collection centre etc. are earmarked. Land for house and agriculture had been allotted after mutual consent of villagers based on

lottery system. Plots of 6 bighas size for agriculture were handed over to individuals. The site was cleared first, as it was infested with *Prosopis juliflora* all over the area. Approach roads in the habitation area and other required infrastructure were constructed by forest department. Housing plot size has been kept 60' x 90' = 600 sq. yards.

After taking consent, village Bhagani had been completely relocated in 2007. The post relocation activities are under progress. 21 families of Bhagani village are now living at new site with all basic amenities provided and built during the process.

Land Use pattern for Rehabilitation

Land as per rehabilitation package (agriculture plots)	206.40 ha.
Land for Housing	3.07 ha.
Land for Road (including 1.31ha of Mathura pipe line)	8.23 ha.
Land for Pasture development	2.40 ha.
Land for community assets	0.925 ha.
Land for Green belt	1.145 ha.
Land for Temple premises	0.5 ha.
Total	222.67 ha.

Shifting of village Kankwari is under process. 132 families out of a total of 170 families have already been shifted. Due to nonavailability of sufficient land, efforts are being made to motivate people to opt Option I of revised package in which beneficiary can rehabilitate him self by purchasing land as per his convenience.

Shifting of village Umri has been completed. 31 families out of a total of 85, have been shifted under option I i.e. cash option (after purchase of land by them selves) and 54 families have moved under option II land package at Maujpur Rundh.

4.7 Administration and Organization

Initially Sariska Sanctuary was under Bharatpur Forest Division. A Range Officer use to manage this area. By the Order No. 2749-53 dt. 24.08.1978 of CWLW, Rajasthan, Sariska Game Sanctuary came under Wild Life

Warden, Sariska as a Seprate indentity of Sariska Tiger Reserve. Shri Jai Singh was the first Field Director of the Project Tiger Sariska in the rank of Dy. Conservator of Forests.

By order No. F.5(3)Pers./A-1/2003 dated 18.09.2003 of the Govt. of Rajasthan, the post of Field Director was upgraded from the level of Dy. Conservator of Forests to the Conservator of Forests and Sh. Deepak Bhatnagar, IFS was first Conservator as Field Director. To assist the Field Director there is one Deputy Conservator of Forest at Sariska.

The Tiger Reserve is administratively divided into 4 ranges – Sariska, Tehla, Akbarpur and Talvriksh covering 75 beats, for protection and monitoring of wildlife. The DCF is assisted by 4 ACFs , Asst. Field Director, ACF (Research), ACF (Corridor) and ACF (Relocation). There are 3 other ranges for Research, Flying Squad and Tourism for the better management of the Tiger Reserve. The present Staffing pattern for core area is given below:

Table 10 : Staff position (as on 1-04-2014)

Permanent Staff		
S.No.	Post	Number present
1	Conservator of Forests & Field Director	1
2	Dy. Conservator of Forests	2
3	Tecnical Assistant	1
4	Assistant Conservator of Forests	7
5	Research Officer	1
6	Ranger Grade-I	4
7	Ranger Grade –II	9
8	Forester	17
9	Asst. Forester	19
10	Forest Guards	96
11	Driver	7
12	AAO	1
13	O.A. (Office Assistant)	2
14	U.D.C.	4
15	L.D.C	6
16	Amin	1
17	Peons	8
18	Wireless Operator	1
	Total	187
	WORK CHARGED STAFF	89
	Grand Total	276

CHAPTER - 5

LAND USE PATTERN & CONSERVATION-MANAGEMENT ISSUES

5.1 Land use Classification-

Sariska Tiger Reserve having 881.11 sqkms. Core Area, has periphery of about 300 kms. The terrain of STR is hilly and inside the core area, hardly any plain land of considerable size is available. As a result the land use in the core area is mainly forest land with very good to poor tree or grass cover, with isolated blank areas.

Some plantations have been done in the degraded areas of sanctuary, in recent past, to develop the areas. The main species planted were Khair, Babul, Ber etc.

Land use pattern in the Core Area -

About 175 villages are situated in & around Sariska Tiger Reserve. Out of these, 29 villages are in Critical Tiger Habitat/ Core area and the rest 146 villages are in buffer area. About 2254 families live in the core area while about 12000 families live around the Critical Tiger area. The location of villages of core area has been shown in map – 8. The enclaved villages have very small land holdings with good to poor quality soils, where they grow “Millet, Wheat, Gram, Sorghum, Maize, Mustard etc. as per season and availability of water. In recent past, horticulture of Guava and cultivation of vegetables is gaining momentum, particularly on the western side.

Land use category Around STR

Agriculture	Fallow
Good tree cover	Moderate tree cover
Less tree cover	Forest blank
Scrub land	River sand
Marsh	Water body

Some land had been worked up under mining near Tehla and Pratapgarh (Alwar), but all such mines are closed now. But still areas near the villages are worked by the villagers to obtain stones for house building

purposes. The land other than the cultivated areas is utilized for grazing of cattle and other animals like goat, sheep, and camel.

There are some water reservoirs in and around the core area, These are: -

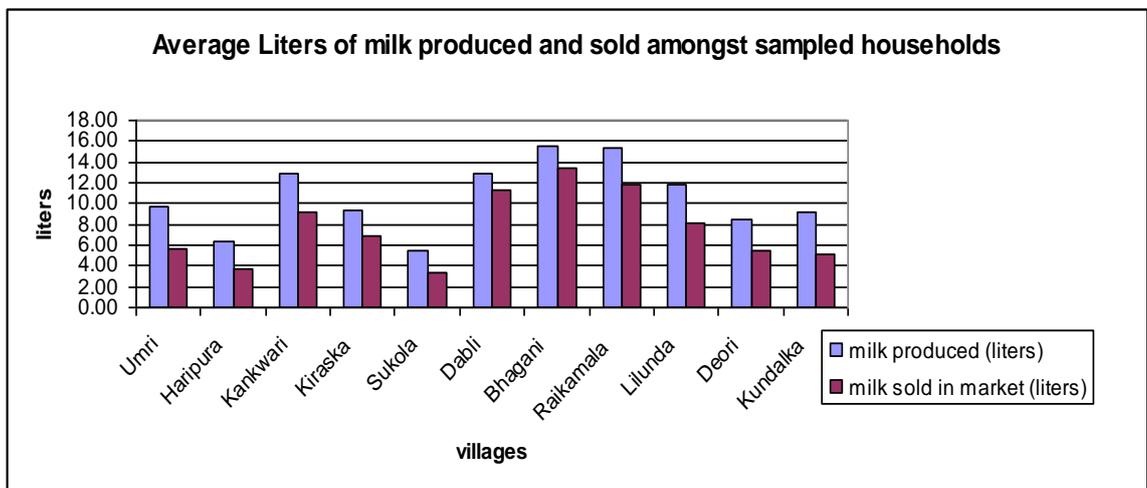
- (i) Mansarovar
- (ii) Mangalsar
- (iii) Ajabgarh
- (iv) Soma Sagar
- (v) Silisedh
- (vi) Jai Samand

5.2 Socio – Economic Profile of Villages

Villagers in Sariska Critical Tiger Habitat depend totally on forests for their livelihood. Traditionally a pastoralist community, their main source of income is selling milk and its products like “Mawa & Ghee”. The economy of villagers of Kankwari, Kiraska, Lilunda and Kundalka is totally dependent on animal husbandary, while villagers of Dabli, Sukola and Haripura also work as daily wage labourers in adjoining areas. More than 80% of the income of an average household still comes from the sell of milk, mawa & ghee, while 20% comes from their secondary occupations like daily laboures, drivers, farmers, govt. service etc. The villages like Dabli, Deori and Raikamala (located on the boundary of the reserve), being revenue villages have some agricultural land in core area, where they mainly grow wheat, corn, oat, mustard and gram. It is the monsoon period, when milk production is the highest, during which the people desire to save money for the entire year and also for the repayment of existing loans. It is reported that people usually sell their milk to a local dealer who is from their own village, who then sells it to the real market at Alwar, Tehla, Thanagazi & Bharathari tiraha. This middleman connects the local villagers to the larger market and earns a great deal out of it. The milk is sold at a rate of Rs. 15 to Rs. 18 per litre. From Kankwari, the milk is transported by jeep, owned by a local. People living in more inaccessible villages like Kiraska, Dabli, Sukola, Raikamala and Lilunda, largely sell

“ghee” and “mawa” made from their milk due to lack of roads on which vehicles can ply. Better cost of selling their product is obtained only by those who go to Alwar otherwise they just get a low price paid by the local dealer. The price of “mawa” varies from Rs. 50 to Rs 60 per kg. in these villages. Bhagani (now relocated) was reported having highest milk sell in market (Graph : 3) because of less number of houses and more number of cattle per household. Their economy literally subsists on the edge.

Graph : 3. Average liters of milk produced and sold among sampled household in core of the Sariska Tiger Reserve.



The livestock from the villages is taken out daily for grazing in the forest and the maximum distance covered by the livestock is 7.8 km and minimum is 3.6 km. The other anthropogenic disturbances caused by villagers are wood cutting, grass cutting, lopping and Non Wood Forest Products (NWFP) collection. 100% lopping and grass cutting was found in Kankwari, Bhagani, Raikamala and Lilunda while in Haripura and Kiraska 79% lopping and grass cutting was reported. The wood cutting was observed highest in Kankwari (41.5%) and lowest in Haripura (17%). The other factors like NWFP collection was found highest in Lilunda (85%) and lowest in Haripura (37%).

Anogeissus pendula is observed to be the most preferred tree species that is cut for fuel wood by the people in all villages. *Apluda mutica* grass is the only species collected by the people in all villages for stall feeding the buffaloes. Incidentally this grass grows only on hill slopes and

for collecting the same, people have to travel long distances from their respective villages. *Anogeissus pendula*, *Zizyphus mauritiana*, *Butea monosperma* are heavily lopped for stall feeding the buffaloes and goats in and around all villages. As a result, the *Zizyphus mauritiana*, which is an important fodder plant of wild ungulates, is not allowed to flower and fruit near Kiraska and Kankwari.

The observed overall anthropogenic pressure (from highest to lowest) in the 10 villages is in the order: Lilunda> Raikamala> Kankwari> Umri> Sukola> Kundalka> Deori> Dabli> Kiraska> Haripura (based on questionnaire survey).

5.3 Resource Dependence of Villages

The land holdings in these villages are small and the quality of cattle is also poor which results in poor economy of the people in general. The economy of the area is totally dependent on forest. There is no large or small industrial set up in the area. The other industrial option is mining, which is dependent on natural resources.

As the land use pattern indicates, the net area available for agriculture is small, owing to the terrain, water availability and soil conditions. This results in poor harvest and people are forced to take up other occupations like animal husbandry, mining and labour to support their economy. People also take illegal activities like collection of fire wood, small timber, building material and other NWFP. Primarily they do it during the season when they are free from agricultural works & other occupations.

People of the area keep a large number of cattle, goats, sheep and other animals, which cannot survive on their resources of agricultural land. The other lands have already been degraded due to heavy pressure of grazing and browsing, and cannot sustain the large number of animals. In the district, there are nearly 1300 animals per thousand hectares of land. Due to this heavy pressure of grazing the areas peripheral CTH areas have critically degraded, and recovery is also very difficult due to continuous pressure.

The poor economy of the area tends to make people more dependent on natural resources. Since the resources of other lands are already degraded and used up, the pressure lies on STR. This

dependency on the CTH is leading to degradation of the areas in many ways. Some of the implications on natural resource are listed below.

1. Live stock grazing

During rainy season, a large number of cattle enter in to the core zone of STR, particularly in Umri valley, Malajhodka, Kankwari valley, Raika–Panidhal and Kalikhol areas for grazing. The areas of the sanctuary which are open to local livestock grazing, suffer much, due to continuous pressure.

This grazing pressure leads to degradation of the area, lack of regeneration, loss of habitat and unavailability of the area for wild animals, due to presence of cattle. All these factors lead to shortage of food and cover to wild animals. This also results in poor wild life density in the affected areas, with a constant threat of disease transmission by livestock.

The cattle, that graze in the forest, remain in the vicinity of few remaining water holes in summers and make the water hole unavailable for the wild animals. This forced shortage of water seriously affects the health of wild animals. Good, shady patches with water are occupied by livestock during summer.

Beside this, the live stock grazing during rainy season, and for some time thereafter, create serious law and order situation in the core zone of S.T.R.

2. Agriculture

The land holdings in the STR are small and the soil is poor, in most of the areas. The ratio of cultivated and irrigated land is small, which cannot sustain the human and cattle population, throughout the year. The cropping pattern leave the people free for almost 6 months in a year. During this period of unemployment, people indulge in labour, grazing of the cattle, collection of fuelwood, collection of small timber and other activities which increase pressure on the CTH. This biotic pressure, results in biotic disturbance, degradation of habitat, and removal of biomass from the CTH. Small land holdings also increase the tendency of people to encroach upon suitable lands of the forest area, which depletes the actual area available for wildlife.

3. Mining

Mining is also a very important biotic factor, which affects the well being of the CTH.. In the buffer areas of STR, mining is mainly carried out for excavating marbal, masonry stone and for lime stone. Most of these mines are non functional, except a few, around Tehla and Pratapgarh area. Small scale quarrying by the villagers in STR, for acquiring building materials, still goes on.

These mines create a lot of disturbance by way of blasting, transportation of material, disposal of mining waste, accumulation of stone dust and presence of human in the area. A considerable area around such mines remain disturbed and no wild animal uses such areas. This leads to depletion of habitat and area available for wildlife.

4. Collection of fuelwood and small timber

The villagers of STR and near by villages are fully dependent on the resources of core area for fuelwood and small timber. The main reason of this is, absence of suitable tree species outside the CTH, because these areas are degraded, and tree species present in the agriculture areas, are not suitable for small timber purposes, and even if present, are not available in required quantity. The idea of planting timber species on agricultural lands is not prevalent in this area. This results in a heavy pressure on wooded areas of the CTH.

Unavailability of suitable trees outside the CTH, inadequacy of agricultural waste to meet the demand of fuel and a constant demand of fuelwood from the township, which also supports the income of fuelwood collectors, are the main factors which provoke the collection of fuelwood from the CTH.

5. Temples

There are several large and small temple sites inside the CTH to which, people have rights to visit. The biotic disturbance created by people visiting these temples is detrimental to the wildlife. The litter and other wastes damage the habitat and pose threat to the health of wild animals. It has been observed that polythene bags, food waste etc. are eaten by wild animals.

Moreover, these temples sites are situated in the pristine sites, which are very important for the wildlife in this dry zone. This affects the well being of the wild animals. Due to disturbance created by the devotees in the temple zone, these areas become unavailable for the wild life.

5.4 Human-Wildlife Conflicts

Delayed and inadequate compensation for crop damage, cattle killing and injuries to human by wild animals are matter of concern for long term survival of tiger and rare fauna. Crop raiding by Wild boars and Blue bulls is common. This leads to poaching of wild animals by enraged villagers and Bawarias, who are kept for crop protection.

Panthers and Tigers also come out of the CTH in search of food and water. They frequently visit the enclaved villages for cattle lifting. The incidents of live stock killing by panthers are common in peripheral areas. Some compensation for the animal killed, is paid, depending upon the type, condition, and age of the animal. This amount is very meagre and the procedure is long, which makes it unattractive to the villagers. Thus, cattle owners are tempted to kill the problematic wild animal by any mean.

The factor of suitable compensation and fast relief for damage caused by wild animals to crop, livestock and humans is very important for the well being of the CTH and some satisfactory system should immediately be worked out to reduce the negative impact of such incidences.

5.5 Assessment of Inputs of Line Agencies/Other Departments

The development works in forest areas are seriously affected due to necessity of taking approval from the central Govt. for activities such as roads, transmission lines and mining etc. under Forest Conservation Act. 1980. The villages do not have roads.

The maximum impact of the Forest Conservation Act.1980 has been felt on the mining activities in and around STR.

PART – B

PROPOSED MANAGEMENT

CHAPTER - 6

VISION, GOALS, OBJECTIVES AND PROBLEMS

6.1 Vision

Sariska Tiger Reserve has been covered under Level III Tiger Conservation Unit, categorised by Dinerstein et al 1997. It had lost all its tigers by 2004 and thus attracted the criticism of the world conservationists for losing a species so special in the arena of wildlife conservation.

The unique habitat of the dry deciduous and tropical forests makes it an abode of the biodiversity. Sariska is the western most limit of tiger distribution in India which needs to be preserved to maintain the ecological uniqueness of Aravalli ecosystem. It has got a very high ungulate population, especially sambar and chital, making it suitable for large predators.

Probability of long term survival of wild populations is determined by factors intrinsic to it (population size, reproductive success, demographic structure etc.) which is directly related to the extrinsic factors (trends in habitat fragmentation, human impact and local development). The Plan visualizes concentrated endeavors of controlling/ reducing extrinsic factors to augment the intrinsic factors.

Habitat degradation due to immense biotic pressure and biomass extraction by villages situated inside and outside the Tiger Reserve is great threat to the integrity of this protected area. Sariska Tiger Reserve is an 'island' with little connectivity to other wildlife areas. It is more or less isolated and has little connectivity only in the north with forests of Alwar Forest Division and in south with Jamwa Ramgarh Wildlife Sanctuary and Dausa Forest Division.

It would be an endeavour of the Park Management to relocate remaining 26 villages in the current Plan period as per the new relocation package of the NTCA, to nullify the disturbance in the Core Area and it is perceived to provide a disturbance –free “**core- natal area - one**” to the re-introduced tigers. Eco-development efforts by involving the primary stakeholders, for the protection of this PA, especially the Tiger will be top priority. Soil and Moisture conservation works will be taken up in the form of small and large structures to increase moisture regime so that the pinch period is managed by the catchment itself.

6.2 Management Goals:

- To restore/maintain/fostering suitable habitat conditions for the reintroduced tigers.
- To eliminate biotic disturbance from the Core Area and to minimize dependency of people on the resources of the CTH.

6.3 Management Objectives:

- Exclusive tiger agenda : fostering as a reproductive surplus area.
- Ensuring high prey productivity through protection.
- Preventing depression of tiger density from poaching.
- Ensuring low human disturbance through village relocation from source areas.
- Ensuring minimal human impact and remoteness through buffering.
- Fostering tiger population vis-à-vis the carrying capacity of the habitat.
- Using the existing carrying capacity for tiger as a basis for habitat interventions
- No go areas for development of any sort.
- Promoting the process of populating promising tiger habitats in the landscape with the reproductive surplus (by habitat connectivity with core critical habitat or by active management).
- Regulated tourism as per NTCA guidelines.

- to maintain biodiversity with special emphasis on a viable Tiger population vis-à-vis the carrying capacity of the reserve.
- to reduce the dependency of local communities on this natural resource.
- to enhance catchment capability and to increase moisture regime.
- to enhance the capacity of staff and supervising officers for effective management.
- to promote environmental awareness amongst the people and to enhance visitors' experience.

6.4 Problems in achieving objectives:

- Immense biotic pressure on the Tiger Reserve due to more than 150 villages within 2 km from the periphery
- Disturbance & pressure due to villages within the Tiger Reserve.
- Two state highways cutting across the Core area
- Pandupole Temple inviting lakhs of religious tourists in the Core Area every year.
- Difficult terrain and tough conditions for the staff.
- Aging staff.

6.5 Strength - Weaknesses - Opportunities - Limitations (SWOT) Analyses

Sariska Tiger Reserve is one of the most disturbed protected areas owing to several factors. The PA is open from all sides and entry to the sensitive areas is easy if the forests are not tracked or monitored effectively and systematically.

STRENGTH	<ol style="list-style-type: none"> 1 Sariska is the westernmost limit of tiger distribution in India and is the most near Tiger Reserve to the National Capital. 2 The Sariska Tiger Reserve, nestled in the oldest mountain ranges – “Aravallis”, is a repository of serene dense forests, wide valleys and sprawling
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	<p>plateaus. It is a natural grandeur housing over 404 plant species, 211 bird species in an area of 881 sq.kms.14 sq.kms. of most dense forest in Rajasthan has been reported only in Sariska (Forest Survey of India Report 2003)</p> <p>3 The Tiger Reserve has a unique assemblage of high ungulate population and due to absence of the Tiger for over four years, the ungulate population (mainly sambar) has increased a lot.</p> <p>4 The habitat in about 350 sq.kms. is compact with good vegetation of Dhok, Boswellia and Zizyphus species.</p>
WEAKNESSES	<ol style="list-style-type: none"> 1. Biotic disturbance due to the presence of 27 villages within STR and about 300 villages within 5 kms. of the boundary. 2. Heavy biomass extraction from the peripheral areas in the impact zone of villages and from the zone of influence of villages situated inside the Tiger Reserve. 3. Open from all sides resulting in probabilities of illegal entry of people and poachers from all sides. 4. The temple at Pandupol, in the heart of Sariska, is visited by about two lakh devotees/visitors every year and there is a surge of around 50,000 people during the Pandupole mela in July-August every year. 5. Two highways run through the park: state highway number 29A (that links Sariska to Dausa) and state highway number 13 (that links Alwar to Jaipur). About 3000 vehicles ply every day on state highway number 13. 6. No proper infrastructure (vehicles, Range

	<p>Office staff, telephone facility) for the foresters and Range Officers.</p> <ol style="list-style-type: none"> 7. “Dhabas” (Country restaurant) on revenue/non forest lands within the Tiger Reserve creating nexus with the local people for illicit felling of fuelwood. 8. Poor water retentivity in the Tiger Reserve owing to less number of large water bodies. 9. Lack of proper demarcation of the boundary leaving more than 50% of the area of the STR as unsurveyed or Roondh area, resulting in litigations and disputes. 10. No Interpretation facility for enriching visitors’ experience.
OPPORTUNITIES	<ol style="list-style-type: none"> 1. As an effort to revive Sariska, Tiger reintroduction has been accomplished -- the first attempt ever undertaken in the history of tiger conservation in the world. 2. Development of corridor connectivity with Jamva – Ramgarh sanctuary. 3. Protection measures and Intelligence gathering system can be strengthened to create an enabling atmosphere. 4. Improving Park-People Interface. 5. After relocation of Village - Bhagani and Umri, the process of Relocation of other villages (Kankwari, Kiraska, Dabli, Sukola, Devri, Haripura and Rotkela) has started with the new package of NTCA. 6. Regulation of Pandupole traffic systematically. 7. Establishment of State of Art, Nature Interpretation Centre at Sariska, Alwar, Tehla and Talvriksh to create and disseminate

	<p>awareness amongst the people.</p> <p>8. Involving people in the protection of the area by motivation through EDC's and local work force.</p> <p>9. Soil and moisture conservation works and creation of large water bodies to ensure water throughout the year.</p>
THREATS	<p>1. Due to a large no. of entry points, specially in the peripheral areas of Tehla and Baleta, illegal entry of suspected persons and poachers is a continuous threat.</p> <p>2. Due to high biomass extraction, habitat fragmentation is a big threat.</p> <p>3. Inadequate strength of the foresters and forest guards and aged staff reduces capabilities in the tough terrain .</p>

CHAPTER - 7

MANAGEMENT STRATEGIES

7.1 Delineation of Critical Tiger Habitat

Bio-geographic approach for conservation of wildlife and biodiversity (that significant representation of all ecosystem and bio-geographic regions, biomes etc in the protected area network) is essential. The main cause of decline of the tiger and other endangered fauna in human dominated landscape is competition and conflict with the growing human population and the demand of modern market driven lifestyles as well as the dominance of livestock in the traditional agrarian society of India. The land use pattern is incompatible between man and wildlife, as high density of both adversely affects either way.

The conservation of the flagship species i.e. the top predator of our eco-system ultimately conserves our entire eco-system and biodiversity.

Tiger is a territorial animal, which advertises its presence in an area and maintains a territory. There may be a partial overlap of the territories of two male tigers. However, increase in the degree of overlap may result in infighting. Several female territories do occur in an overlapping manner within the territory of a male tiger.

The tiger land tenure dynamics ensures presence of prime adults in a habitat, which act as source populations, being periodically replaced during old age by young adults from nearby forest areas.

The on-going study (Tiger its co predator, prey base and their habitat by NTCA and WII) and analysis of available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core areas) require an inviolate space of 800 -1200 sq km. Tiger being an “umbrella species”, this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat.

Based on the demographic parameters and life history traits of tigers population simulation models suggest that if a core area having territories of 20 breeding tigresses were made inviolate, the resultant tiger population with an adequate buffer (multiple use area with eco-sensitive land use) has a very low probability of extinction. Tigress's territories are determined by prey availability which in turn are dependent on the productivity of the area. The size of this inviolate area depends on the average territory size of tigresses. These range between 40 to 60 km² within most of the tiger areas in the sub-continent. Thus, for a population of 20 breeding tigresses we need an inviolate area of 800-1200 km². An ecological sensitised zone of 1000-3000 km² (buffer, Co-existence area, multiple use area) around this inviolate space is needed for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers. This buffer and the tiger population within it is essential to make the core of 20 breeding females viable for long term, since it sustains the dynamics of source and sink. Such a tiger reserve will sustain a population of 75-100 tigers.

7.2 Zone and Theme approaches to Management Strategies

7.2.1 Zone Plan in CTH/ Core

The CTH/ Core area shall be divided into the following zones :

- A) Zone Plan for Unique Habitat Management
- B) Zone Plan for Voluntary Village Relocation
- C) Zone Plan for Eco-tourism

The zones are overlapping and segregation has been described only for management purposes. The CTH/ Core area has already been notified by the Government of Rajasthan as per the provisions of Sec 38 V of the Wild Life (Protection) Act, 1972 amended upto 2006.

The Habitat Management zone shall include areas important for breeding of tigers, denning sites for wildlife, roosting and nesting sites, improvement of habitat in weed infested areas and the area obtained as wildlife habitat after relocation of villages, such areas will require

management interventions for improving the habitat conditions, with special emphasis on maintaining these areas as grasslands and to increase the prey base which will support predator population. In areas where water is a limiting factor, suitable water conservation measures will be adopted.

To provide inviolate space for breeding of tigers and ensuring long term survival of tiger relocation of villages is important in CTH, so though process of voluntary relocation the villages inside CTH will be shifted in time framework.

The Eco-tourism Zone in CTH/Core area is area permitted for tourism as per directions of Hon'ble Supreme Court and NTCA.

A) Zone Plan for Unique Habitat Management

The unique habitat management zone is area included in notified critical tiger habitat of Sariska Tiger Reserve. It includes forest area of 881.11 sq.kms. and non forest areas available in villages to be relocated.

The Habitat Management shall include areas vital for breeding of tigers, denning sites for tiger, panther, caracal etc, roosting and nesting sites for vultures, crocodiles and other bird species. The improvement of habitat in weed infested areas like Sariska valley, Umri valley etc is necessary for improving carrying capacity of herbivores and carnivores. The areas obtained as wildlife habitat after relocation of villages need habitat manipulation in form of grass seed sowing for grassland development. Such management interventions for improving the habitat conditions are essential for improving the carrying capacity of the habitat. Where water is a limiting factor, suitable water conservation measures will be adopted.

Objectives:

- i. To preserve habitat, ecosystem and species in undisturbed state with a view to create congenial habitat for tigresses to breed and litter.
- ii. To maintain natural demographic set up of the prey and predators.

- iii. To secure natural environment for scientific studies, environmental monitoring and education.

Threats:

- i. The CTH Area is presently inhabited by 26 villages.
- ii. The reintroduced tigresses have not littered except ST-2 and ST-10 due to high disturbance levels in CTH.
- iii. water is a limiting factor during droughts years and on Plautaus restricting seasonal distribution of wildlife and carrying capacity.
- iv. There are two State Highways (SH-13 & SH-29 A) passing through the core zone create disturbance.
- v. Pandupole Temple, Bharathari Temple, Narayani mata Temple, Parasharji Temple etc. are located in the Core Zone – invites large numbers of pilgrims.

Prescriptions:

- i. The intensive 24x7 monitoring of tigers by constituting dedicated parties will be done, For maintaining CTH area with minimum or no human interference voluntary village relocation along with active management will be done. Protection will be given top most priority. Removal of firewood and cattle grazing is serious problem in CTH which needs to be checked effectively. Even lopping of trees for fodder is serious problem. The encroachment on government lands in CTH which are not being presently mutated in name of forest Department is serious problem as habitat fragmentation is taking place due to encroachment for agriculture and housing .Due to lack of demarcation of forest boundaries the encroachments are common. The protection strategies have been narrated in the Theme Plan for protection.
- ii. The 'Strict Natural Zone' will serve as breeding abode for the flagship species. It will be significant to safeguard landscape features. The identified areas previously used for nursing the

cubs by tigresses will be identified and given protection and strict surveillance to ensure breeding of tigresses. Denning sites Narandi, Naharkhora, sulika nala, chopra have been revived by relocating Rotkyala village. Silber, Umri denning sites for tigresses have been revived by relocating Umri village, Due to relocation of Bhagani village some more denning site has been revived. Naldeshwar which is considered to be nursery of tigers will be revived by relocating Kraska, Sukola and Lilunda villages. Denning sites of tiger at Ghanka, Chanpapda, Maujnath will be revived by shifting Haripura village. The denning site Sarunda will be revived by shifting Sarunda, Rekamala & Duharmala village. The Bhensaki denning site will be revived by relocating Dabli village. ST2 has littered successfully as denning sites Pandupol, Chamraj, Naharkhora and Mahadeva are available in territory free from disturbance. Denning sites like Bandipul, Algawal, Bhensota, Zahaj, Kaimala etc will be revived through village relocation and ensuring effective protection.

- iii. Water is limiting factor in CTH area during drought years which are quite frequent. The problem is further compounded by erratic rainfall structure during season and deteriorating water regime in CTH area. The springs which in past used to flow upto march have started drying by December-January. Presently water is artificially being provided at 75 to 80 places in CTH. Ideally water should be naturally available in habitat uniformly in pinch period. Due to habitat degradation the water regime has considerably deteriorated at places resulting in greater runoff losses and less in situ arrest of water resulting in drying of streams. Efforts have to be made to conserve rainwater by arresting runoff by constructing traditional water harvesting structures like johdi, johad, Bandha and Talai at suitable places. Construction of large impounding structures or civil

works will be avoided in CTH. The details have been dealt in theme plan for water conservation.

- iv. The state highway 13 and 29A pass through CTH creating huge disturbance to wildlife. Suitable mitigating measures as per Hon'ble Supreme courts order will be taken up. Part of Tehla-Rajgarh road, Thanagazi-Dausa and Narayanpur-Kushalgarh road fall in CTH, suitable retrofitting measures will be adopted. This has been dealt in details in theme plan.
- v. The religious places in CTH cause huge disturbance specially during Mela days. As part of mitigation strategy apart for flying organized transport Standard Operating Procedure (SOP) will be followed which has been discussed in Theme Plans.

B) Zone Plan for Voluntary Village Relocation

The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wild Life (Protection) Act, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wild Life (Protection) Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement.

The study and the analysis of the available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core) require an inviolate space of 800 -1000 sq km. Tiger being an

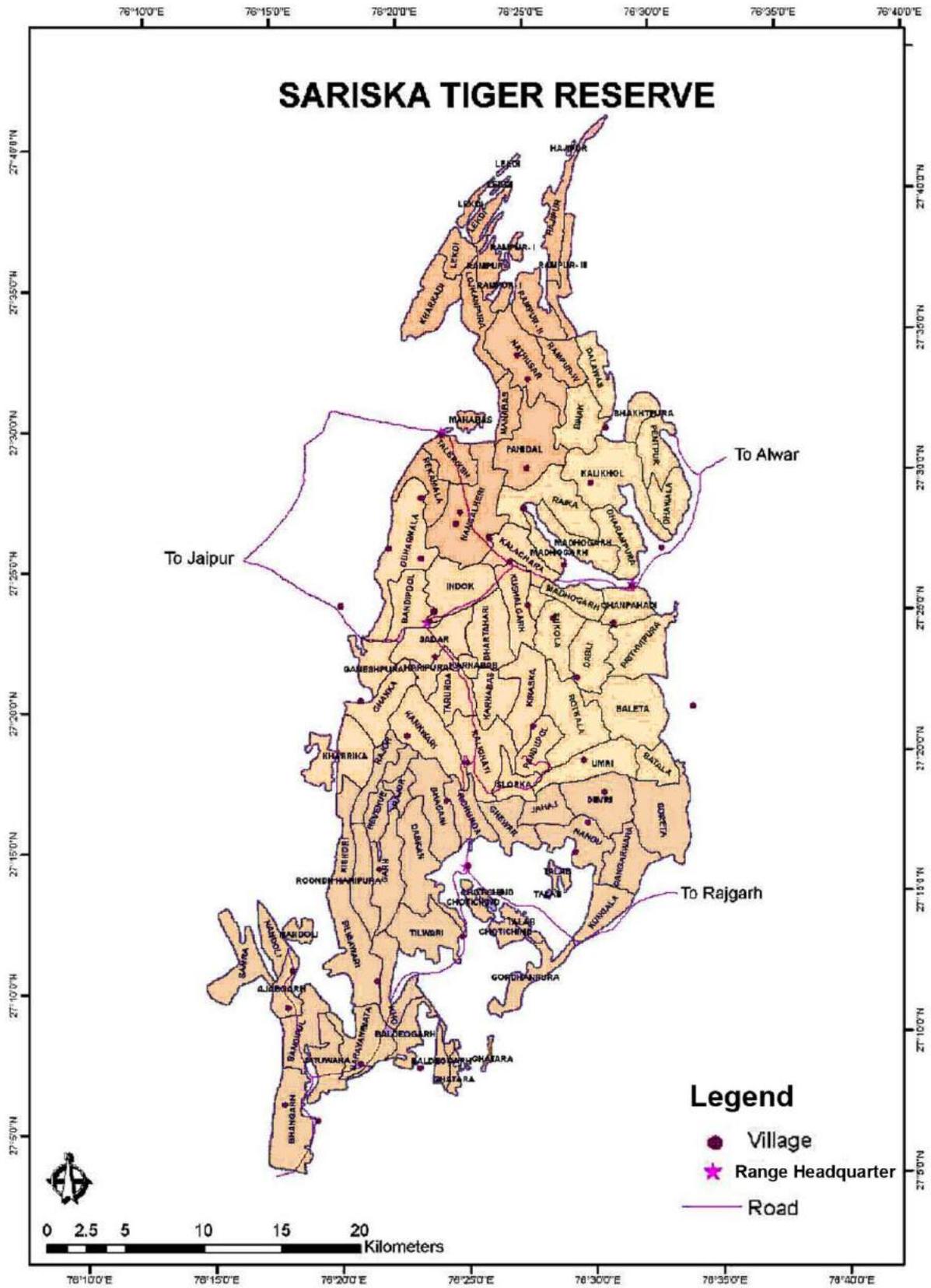
“umbrella species”, this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area/habitat. Thus, it becomes an ecological imperative to keep the core areas of tiger reserves inviolate for the survival of source populations of tiger and other wild animals.

Sariska Tiger Reserve is heavily burdened with the rights of people living in and around it. Some small villages lie deep inside, unconnected with the rest of the world and generally lack in facilities and amenities available to other villages. Because of the provisions of Wildlife Protection Act, 1972 and Forest Conservation Act 1980, the developmental activities could not be taken up in these villages. While the people living inside the sanctuary remain deprived of development, the reserve suffers because of the fragmentation and degradation of habitat caused by these people and their cattle; numbers of which are increasing every year. In today's scenario of depleting forest cover, these areas stand out as reserves of good forests and hence work as the lungs of the nation. To develop the status of villagers residing in villages situated inside the protected area and to develop fragmented habitat to a unified one, relocation is essential. However, as per section 18 A (read with section 36A) of the Wildlife (Protection) Act, 1972, till the rights of affected persons are finally settled, the State Government should make alternative arrangement for making available fuel, fodder and other forest produce to affected persons in terms of their rights as per record.

OBJECTIVES:

1. To conserve the habitat & create inviolate space for the long term survival of source population of tiger & other wild animals.
2. To create grassland areas on the vacated sides for wild ungulates and cover for other wild life.
3. To provide good living conditions to the residing villages through relocation.

Map:17 Village Map - Sariska Tiger Reserve-CTH



Not to scale

PROCESS OF RELOCATION

Relocation of villages involve resettlement and rehabilitation of the socio-economic life style of the villagers. It envisages :

- (1) Identification of villages for relocation and assigning priority.
- (2) To motivate people of selected villages to under take voluntary relocation.
- (3) Resettlement of displaced families through support for development of agricultural land and adequate compensation for property.
- (4) Socio-economic rehabilitation providing necessary infrastructure, e.g. approach road, drinking water facility, cattle ponds, fodder and fuelwood at the relocation site.

VOLUNTARY RELOCATION STRATEGY

The strategy is to hold series of village level meetings with villagers to discuss about the rehabilitation package and to convince them and clarify all of their doubts. Survey of movable and immovable property will be carried out with the help of District Collector. Proper land for rehabilitation preferably revenue land will be identified. If revenue land is not available, suitable forest land will be identified and will be got dereserved as per provisions of forest conservation act 1980. Detailed rehabilitation plan will be prepared and got approved before implementation. People will be involved at every stage of implementation.

NTCA GUIDELINES FOR VILLAGE RELOCATION

National Tiger Conservation Authority issued guidelines for voluntary village relocation in notified critical tiger habitats vide letter no. 15-4/2010-NTCA/ Part-III dated 28th November 2011. Hon'ble Supreme Court of India in Special Leave to Appeal (Civil) Petition no. 21339/2011 decided on 16.10.2010 has accepted guidelines issued by NTCA, Government of India vide notification dated 15.10.2012.

Based on the recommendations of a Professional Agency, a new package for village relocation/rehabilitation has been proposed, with the

following options/norms, which adequately covers the “National Rehabilitation and Resettlement Policy, 2007”, while taking into consideration the difficulties/imperatives involved in relocating people living in forest areas:

The proposed package has two options:

Option I –

Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation / relocation process by the Forest Department.

Option II –

Carrying out relocation / rehabilitation of village from protected area / tiger reserve by the Forest Department.

In case of option I, a monitoring process involving the District Magistrate would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

In case of option II, the following package (per family) is proposed, at the rate of Rs. 10 lakhs per family:

(a)	Agriculture land procurement (2 hectare) and development	35% of the total package
(b)	Settlement of rights	30% of the total package
(c)	Homestead land and house construction	20% of the total package
(d)	Incentive	5% of the total package
(e)	Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, tele-communication, community center, religious places of worship, burial/cremation ground)	10% of the total package

Rajasthan State Village Relocation Policy 2002

State Government has approved rehabilitation package vide its order dated 2nd November 2002. The objectives of the voluntary relocation as envisaged in the above package are :

- To develop an attractive relocation package
- To motivate people of selected villages to undertake voluntary relocation
- To implement the package for selected villages
- To dovetail other rural development schemes in the project on priority on proposed sites to further improve the package
- To generate opinion in other village inside Protected Areas for motivation to get relocated

The criterion for selection of villages will be:

- willingness of people
- Magnitude of effect of village on core area or proposed core area
- Availability of relocation site.

The **cut off date** for the package shall be that date on which actual Socio-Economic survey is carried out for the purpose of identification of persons to be relocated and their rights/assets.

definition of family:

- a. A "Family" shall mean karta, spouse(Husband/Wife) & minor children and other persons such as parents, dependent on the karta of the family.
- b. every son or unmarried daughter who has attained the age of 21 years or on before the cut off date, will be treated separate family.
- c. Every divorced or widowed daughter living independently or with the family prior to the cut off date will be treated as separate family.

Proposed package for voluntary relocation of villages:

AGRICULTURE LAND

Original land holding + 1 Ha. land shall be provided to each displaced family. Agriculture land will be allotted upto a minimum to member of each household 4 acres (1.6 hec) of unirrigated land or 2 acres (0.8 hec) irrigated land even to landless.

RESIDENTIAL PLOT

The displaced family will be given a residential plot of equal area free of cost as they were having in the deserted village with the minimum area of 5400 sq ft (60 ft x 90 ft). If a person wants to have additional area for keeping their livestock, or any other purpose, this will be given @ Rs 1.00 per sq ft subject to maximum total holding of area of 10800 sq ft.

COMPENSATION PER FAMILY

The total average estimated amount of individual compensation per family is Rs. 84000 and of community works per family is Rs. 16000. Thus the total average estimated cost of relocation per family is Rs. 1,00,000. (The cash package has been revised by Govt. of India)

SELECTION OF VILLAGES

To improve the condition of the CTH of Sariska Tiger Reserve and to provide inviolate space to tigers. In 1976, relocation of Karnakabas and Kiraska village took place. The land was identified and allocated for villagers at three different places namely Bandipul, Dulawa and Sirawas which were not far from Sariska. This was the initial attempt for full fledged relocation of villages during post-independence period. Several people who had been relocated, returned and resettled close to an existing village Kundalka where they established a separate hamlet named Naya Kundalka. Simultaneously relocation process was initiated to relocate Kiraska to the area Sirawas, not far from Sariska. But success could not be achieved because many of the villagers returned to their original places.

Village Bhagani has been shifted in 2008 and another village Umri has been shifted in 2011, Village Rotkyala has been shifted in 2012-13. Relocation of 6 villages namely Kankwari, Devri, Dabli, Sukola, Kraska and Haripura is in progress. Beside this, villages i.e. Raikamala, Guada Lilunda, Guada Naya Kundalka, Berawas, Nangalheri, Kalachhara, Kushalgarh, Madhogarh, Indok, Kundalka, Kanyawas, Mitravat, Garh-Rajor, Dabkan, Loz- Nathusar, Guada Raika, Guada Panidhal, Duharmala, Guada Bera are located inside the core area of Sariska Tiger Reserve. These villages create following disturbances in core area of Sariska Tiger Reserve:

- (1) The cattle belonging to these villages graze in the Core area and compete with the ungulates.
- (2) The core area, surrounding the villages, have become highly degraded, owing to meeting the demand of timber, fuelwood and fodder.
- (3) There is threat of spread of diseases from domestic cattle to wild ungulates.
- (4) Spread of weeds to the degraded areas.
- (5) Loss of habitat for wild animals.
- (6) Disturbance to the movement of animals to the adjoining areas.

The villagers are also facing problems because of :

- (1) Severe crop damage by the wild animals.
- (2) Constant cattle lifting by wild animals.
- (3) Because of Wildlife Protection Act 1972 and Forest Conservation Act 1980, very few development activities could be taken up in these villages.
- (4) The villages are situated deep inside the forest and thus not properly connected to outside world. There is less scope for the development.
- (5) Because of the poor connectivity, the villagers cannot get immediate medical relief when there is emergency.
- (6) Because of remoteness, very few teachers are willing to serve in the villages. The educational standard is very poor.
- (7) There is growing social problem, because of remoteness most of the youth (boys) are bachelors. “ Brides” are not available for the boys of these villages.

Prioritisation of villages for village relocation in Sariska Tiger Reserve

A time bound strategy for relocating the priority villages, vis-à-vis a spatial occupancy of reintroduced tigers is important. The strategy will be prepared and implemented with support from Project Tiger. The voluntary village relocation would be done with support of local administration to

ensure that all families relocate from selected villages and situation of partial relocation is avoided.

Year	Name of villages proposed for relocation	Reason of priority
2014-15	1. Devri 2. Dabli 3. Gu.Kankwari 4. Gu.Sukola 5. Gu.Kraska 6. Gu.Haripura	Form part of existing tiger territories. All villages in process of relocation.
2015-16	7. Kundalka- Gu.Sarunda 8. Raikamala 9. Gu. Lilunda 10. Kanyavas 11. Gu. Naya Kundalka 12. Gu. Panidhal 13. Gu. Bera	These villages form part of existing territories of tigers and needs to be relocated on priority.
2016-17	-	Completing relocation of above 13 villages.
2017-18	14. Mitrvat 15. Gu. Raika 16. Dabkan 17. Loz Nathusar 18. Duharmala	These villages will form part of territories of litters of existing tigers.
2018-19	-	Completing relocation of above villages.
2019-20	19. Indok 20. Rajore – Mandalvas 21. Madhogarh 22. Garh	These villages will form part of territories of litters of existing tigers.
2020-21	-	Completing relocation of above villages.
2021-22	23. Kushalgarh 24. Nangalheri 25. Kalachara 26. Beravas	These villages will form part of territories of litters of existing tigers.
2022-23	-	Completing relocation of above villages.
2023-24	-	Completing relocation of above villages.

The list of villages in CTH with GPS location is given in **Annexure-36**.

PROGRESS OF RELOCATION

There are 29 villages located inside the core area of Sariska Tiger Reserve (STR). According to the initial survey, approximately 2409

families are residing in the core area of STR. Out of these 29 villages of Critical Tiger Habitat of Sariska Tiger Reserve (STR), two villages namely Bhagani and Umri have already been relocated and 11 villages are considered on top priority for relocation. The first completely relocated village was Bhagani. All the 21 families of this village were relocated in financial year 2007-08 to new site of Bardodrundh, which is close to the Delhi-Jaipur highway. Similarly 95 families of Kankwari village were also relocated to Bardodrundh.

The families of village Umri who opted Option-II, were relocated to the new site of Mojpurrundh. Presently 54 families of Umri village are residing there after constructing the houses.

An area of 222.67 ha of forest land at Nangla Rundh(RF), Behror Tehsil of Alwar Forest Division was diverted by Government of India vide letter no. F.No.8-127/2003-FC Dated 23.08.2006 for relocation and rehabilitation of forest villages namely Bhagani and Kankwari outside proposed Sariska National Park (**Annexure 38**). Similarly an area of 181.97 ha. of forest land in Mojpur RF block of Alwar Forest Division was diverted by Government of India vide letter no. F.No.8-141/2006-FC Dated 29.07.2008 for relocation of forest villages from Sariska National Park (**Annexure 39**). Another Rundh Tijara has also been proposed for dereservation to Govt. of India and section in principle has been received vide Govt of India letter F.No. 8-11/2010-FC Dated 13th August 2010 for diversion of 350.00 ha area for relocation of Haripura village and remaining people of Kraska village. The final sanction is yet to be obtained.

Table 11 : Progress of Village Relocation (as on 31.12.2014)

S.N.	Name of village	No. of families	Consent given			Relocated families	Under progress	Remaining
			Opl	Opll	Total			
1	Bhagani	21	-	21	21	21	-	-
2	Umri	85	31	54	85	85	-	-
3	Dabli	126	125	-	125	111	14	-
4	Rotkyala	51	50	1	51	51	-	-
5	Sukola	46	14	-	14	14	-	-
6	Kankwari	170	39	95	134	132	2	36

7	Kraska	200	119	-	119	113	6	81
8	Haripura	74	9	-	9	7	2	65
9	Devri	181	60	23	83	63	20	98
	Total	953	447	194	641	597	44	312

Table 12 : Financial Progress of Village Relocation (as on 31.03.2014)

S.No.	Year	Fund Provided (in lacs)	Expenditure (in lacs)
1	2006-07	50.00	11.48
2	2007-08	50.00	21.62
3	2008-09	1768.15	335.50
4	2009-10	1432.65	604.18
5	2010-11	2667.14	1203.49
6	2011-12	1819.22	1148.23
7	2012-13	1750.167	1298.130
8	2013-14	391.07	347.47
9	2014-15	43.61	22.00

Consent Under FRA 2007 from Gram Sabha For Relocation

For the voluntary relocation of villages inside core area of Sariska Tiger Reserve, the consent under Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 would be taken in Gram Sabha as well as from individuals.

After obtaining the consent of Scheduled Tribes and Other Traditional Forest Dwellers inhabiting in the Critical Tiger Habitat of Sariska Tiger Reserve, in consultation with an independent ecological and social scientist familiar with the area, has come to a conclusion that other reasonable options of co-existence, are not available.

Table 13 : Consent Under FRA 2007 from Gram Sabha for villages

S.No.	Name of Village	Gram Sabha	Consent from Gram Sabha
1	UMRI	TALAB	YES
2	DEVRI	TALAB	YES
3	ROTKYALA	AKBARPUR	YES
4	DABLI	AKBARPUR	YES
5	KANKWARI	RAJORE	Individual consent
6	HARIPURA	BHANGDOLI	Individual consent
7	KRASKA	MADHOGARH	YES
8	KUNDALKA	BHANGDOLI	YES
9	SUKOLA	MADHOGARH	YES

10	REKAMALA	BAMANWAS KANKAD	YES
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Requirement of funds

Presently relocation process in 6 villages namely- Dabli, Sukola, Kraska, Kankwari, Haripura and Devri, is under progress. Fund required for relocation of the remaining families of these 6 villages is around 35.00 crores. Total Number of villages/ Guada in CTH was 29, therefore to relocate rest of 20 villages, a fund of about 365.00 crores is required. Thus total fund requirement to relocate rest of families in 26 villages is 400 crores. This calculation of requirement of fund is subject to the future revision of relocation package.

State level and District level village relocation committees

In pursuance of the National Tiger Conservation Authority suggestion contained in the guidelines circulated vide letter No.3-1/2003-PT dated 26.02.08 regarding "Format for preparation of Village Relocation Plan for Core/Critical Tiger Habitats" the State constituted the State Level Monitoring Committee under the chairmanship of Chief Secretary vide order No. F.6(1) AR /Gr.3/2003 Dated 8.02.2012 for looking into the relocation process of the Tiger Reserves of the State as below:

1	Chief Secretary	Chairman
2	Additional Chief Secretary, Forests	Member
3	Additional Chief Secretary, Panchayati Raj and Rural Development	Member
4	Additional Chief Secretary, Water Resources	Member
5	Principal Secretary, Public Works	Member
6	Principal Secretary, Medical and Health & Family Welfare	Member
7	Principal Secretary, Agriculture	Member
8	Principal Secretary, Primary Education	Member
9	Principal Secretary, Animal Husbandry	Member
10	Principal Secretary, Revenue	Member
11	Principal Secretary, Tribal Area Development	Member
12	Principal Secretary, Social Justice & Empowerment and Social Security	Member
13	Secretary, Energy	Member
14	Principal Chief Conservator of Forests, HoFF	Member

15	Nominated Non-official members of various Tiger Foundations of State	Member
16	PCCF & Chief Wildlife Warden	Member Secretary

Similarly the District Level Implementing Committee was also constituted under the chairmanship of District Collector vide order No. F.6(1) AR /Gr.3/2003 Dated 8.02.2012 (**Annexure - 45**) for looking into the relocation and rehabilitation process for the Tiger Reserves of Sariska and Ranthambhore as below:

1	District Collector	Chairman
2	Chief Executive Officer, Zila Parishad	Member
3	Deputy Conservator of Forests	Member
4	Executive Engineer, Irrigation	Member
5	Executive Engineer, Public Works	Member
6	Chief Medical & Health Officer	Member
7	Deputy Director, Agriculture	Member
8	District Education Officer	Member
9	Deputy Director, Animal Husbandry	Member
10	Executive Engineer, PHED	Member
11	District Officer, Social Justice & Empowerment and Social Security	Member
12	Executive Engineer, JVVNL	Member
13	Manager Concerned Lead Bank	Member
14	Chairman of the Eco Development Committees adjoining Tiger Reserves	Member
15	DCF/Deputy Director of Concerned Tiger Reserves	Member Secretary

Survey Committee for Conducting Family Survey in Relocation villages

The identification of families is done by the Survey Committee constituted by District Collector Alwar based on records like Ration card, Voter identity card, School marksheet/ Transfer certificate & Voter lists of village. The survey committee consists Tehsildar , Sarpanch and Patwari of concerned Tehsil, besides Range officer and Forester of concerned area.

Criteria For Cut-off Date

In the meeting of Pr. Secretary Forest Govt. of Rajasthan on 15.12.2009 cut off date was decided as 31.03.2008 for identification of families. Copy of proceeding issued by Conservator of Forest & Field Director, Sariska Tiger Reserve vide letter no. 3387-92 dated 23.12.09.

Welfare activities for relocated families

1. LPG connections are provided for relocated family on 50 % subsidy to ensure that the family do not face problem of firewood..
2. As per the order no. P12(16) Energy/ 04/ Part Dated 7.03.2008 of Energy Department, Government of Rajasthan, Agriculture/ Domestic connections for families relocated from National Park/ Sanctuaries are provided on priority basis. Superintending Engineer JVVNL letter dated 26 September 2012, for out of turn agriculture electric connections in peripheral areas & relocated families **(Annexure-42 & 43)**
3. Facilitation in preparing Rashan Cards, Voter ID, NREGS card etc for relocated families.
4. Drinking water facilities to be provided for families relocated under option-II.
5. *Pattas* (Land leases) to be timely provided for relocated families to get electricity connections, loan etc.

Incentives for Village relocation

For ensuring fast village relocation employment generating and other incentives can be thought of as Alwar being part of National Capital Region (NCR) the land prices has gone very high and relocation package is no more attractive. Almost all relocating families buy land and construct house which has become costly affair in cash package. Good agriculture land for land package is not available. So after consultation with relocating families some incentives can be tried like;

- 1 Allotment of masonry stone/ sand mining leases out of priority for the relocated families.
- 2 The provision to give govt. service to one family member of relocating family member can be made by state govt.
- 3 Allotment of shops and housing plots on priority to relocating families in near by cities and towns to ensure better livelihood opportunities.

Other issues related to village relocation

1. There should be an integrated cell at state level to identify revenue/forest lands for relocation purpose. District collector to be made responsible for identifying alternative revenue lands. Even Charagah land can be got diverted from state government as the programme has high conservation value for society as well as country.
2. There is a provision to evaluate assets of the relocating families and provide compensation for assets from state govt. for the evaluated assets. It has become now essential to pay compensation for assets to ensure speedy relocation process..
3. Alwar being in NCR , the rates of agriculture land are increasing. Resulting to this, families are not getting sufficient land for their livelihood. Therefore, the package needs to be revised .
4. State level circular should be issued for the post relocation facilities like, health centres, drinking water, domestic electricity connections etc. for relocated families. Agriculture connections should also be released timely for relocated families.
5. There should be separate fund to facilitate relocation programme. This fund can be utilised to engage NGOs to motivate villagers for relocation and to facilitate villagers to purchase land.
6. Due to paucity of fund and delay in release, relocation work is affected. Therefore, funds should also be released from CAMPA NPV for village relocation.
7. Surrendered lands by relocated families are yet to be mutated in favour of forest department, therefore clear-cut directions to be issued to district Collectors from state level.
8. Some of the Gram sabhas are not giving consent for relocation. Therefore, if some families are willing to relocate, individual consent for these families should be sufficient.

Monitoring of Village Relocation Programme

It is essential to monitor village relocation programme from time to time to ensure quality and quantity relocation of villages. Some of the issues are.

1. Conducting socio economic survey of villages proposed for relocation at the time of preparation of Village Relocation Plan so that base line information about socio economic condition is available. The study should also include how the villagers will be benefitted by relocation and at the same time how tiger reserve will be benefitted by relocation of village.
2. It has to be ensured that the benefits and information about package for Voluntary village relocation programme is properly known to people and package is delivered transparently.
3. The relocating families should be supported by hand holding so that they adjust fully at new site and for this support of reputed NGO can be sought for activities like SHG, Dairy improvement, microfinance, health awareness, sanitation, education etc.
4. Post relocation monitoring assessment should be done by assessing comparative improvement in socio economic condition, education, health and overall improvement in family condition.
5. The village relocation programme will be monitored at village level, Range level, Division level and Field Director level every month.

C) Zone Plan for Eco-tourism

Tourism in the form of Eco Tourism has a potential to enhance public awareness, education and wildlife conservation, while providing nature compatible local livelihoods and improves their income which can help to contribute directly to the protection of wildlife. The local community shall be made stakeholders and owners in the process. The Eco Tourism in the Tiger Reserves shall be planned with utmost care as the primary objective of the Tiger Reserve is to conserve Tiger source populations which acts as an umbrella for biodiversity conservation. Unplanned and unregulated tourism in the tiger reserves can destroy the habitat.

The guidelines framed by the NTCA duly considering Section 38-O (c) of the Wildlife (Protection) Act, 1972. (WLPA), the provisions of the Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, (FRA), Panchayat (Extension to Scheduled Areas) Act, 1996, (PESA) and Part IX of the Constitution of India, besides other laws in

force. These Guidelines are in consonance with the Guidelines of the Centrally Sponsored Scheme of Project Tiger shall be followed.

PRINCIPLES OF TOURISM IN AND AROUND TIGER RESERVE.

The following principles shall be followed regarding tourism in and around the Sariska Tiger Reserve:

- (a) adopt low-impact wildlife tourism which is protects ecological integrity of forest and wildlife areas, secure wildlife values of the destination and its surrounding areas;
- (b) develop mechanisms to generate revenues from wildlife tourism for the welfare and economic upliftment of local communities;
- (c) highlight the biodiversity richness, their values and their ecological services to people;
- (d) highlight the heritage value of India's wilderness and Tiger reserves;
- (e) build environmental, cultural awareness and respect;
- (f) facilitate the sustainability of tourism enterprises and activities;
- (g) provide livelihood opportunities to local communities;
- (h) promote sustainable use of indigenous materials for tourism activities;

LOCAL ADVISORY COMMITTEE:

Local Advisory Committee (hereinafter referred to as LAC) shall be constituted for each tiger reserve by the State Government. The LAC shall have the following functions, namely;

- a) To review the tourism strategy with respect to the tiger reserve and make recommendations to the State Government;
- b) To ensure computation of reserve specific carrying capacity and its implementation through periodic reviews;
- c) To ensure site specific norms on buildings and infrastructures in areas inside and close to tiger reserves, keeping in view the corridor value and ecological aesthetics;
- d) To advise local self Government and State Government on issues relating to development of tourism in and around tiger reserves;

- e) Monitor regularly (at least half yearly) all tourist facilities in and around tiger reserves vis-à-vis environmental clearance, area of coverage, ownership, type of constructions, number of employees, etc., for suggesting mitigation and retrofitting measures if needed;
- f) Monitor regularly activities of tour operators to ensure that they do not cause disturbance to animals while taking visitors into the tiger reserves;
- g) To encourage tourism industry to augment employment opportunities for members of local communities.
- h) Tourism activities in tiger reserves shall be under the overall guidance of the respective Tiger Conservation Foundations and the LACs.

Local Advisory Committee shall consists of;

- (a) Divisional Commissioner or an officer of equivalent rank to be nominated by the State Government – Chairperson;
- (b) Member/s of the State Legislature representing the area comprising of the concerned tiger reserve
- (c) District Collector/s
- (d) Tiger Reserve Field Director (Member Secretary)
- (e) Local Territorial Divisional Forest Officers
- (f) Honorary Wildlife Warden (if present)
- (g) Official of State Tourism Department
- (h) Official of the State Tribal Department
- (i) One Block Development Officer or Sub-Divisional Magistrate to be nominated by the State Government
- (j) Two Members of Local Panchayats to be nominated by the State Government.
- (k) One Wildlife scientist to be nominated by the State Government
- (l) One Social scientist to be nominated by the State Government
- (m) One representative of the tourism sector to be nominated by the State Government
- (n) Two local conservationists to be nominated by the State Government
- (o) Two representative from a local, registered Civil Society Institution to be nominated by the State Government

- (p) Provided that the Gram Sabhas and in case of North Eastern States, the traditional village councils shall be recognized as equivalent to Panchayat Members, wherever such councils exist.

ECO-TOURISM MANAGEMENT :

The Eco tourism in Sariska Tiger Reserve will be managed as per the guidelines of the NTCA as follows:

- (i) Identification (using landscape ecological principles and tools) and monitoring the ecologically sensitive areas surrounding tiger reserves, in order to ensure the ecological integrity of corridor and buffer areas, and prevent corridor encroachment;
- (ii) Assess the carrying capacity of the buffer area of tiger reserve, at three levels:
 - a) Physical carrying capacity (PCC) - is the maximum number of visitors that can physical fit into a defined space over a particular time.
 - b) Real carrying capacity (RCC) – is the maximum number of permissible visits to a site and
 - c) Effective and permissible carrying capacity (ECC) – is the maximum number of visitors that a site can sustain, given the management capacity available
- (iii) Set a ceiling level on number of visitors allowed to enter a tiger reserve at any given time, based on the carrying capacity of the habitat;
- (iv) Indicate the area open to tourism in the reserves to be designated as ‘eco-tourism zone’;
- (v) Ensure visitor entry into tiger reserves through vehicles registered with the tiger reserve management, accompanied by authorized guide;
- (vi) Develop a participatory community-based tourism strategy, in collaboration with local communities, to ensure long-term local community benefit-sharing, and promotion of activities run by local communities.
- (vii) Develop codes and standards for privately-operated tourist facilities located in the vicinity of core or critical tiger habitats, eco-sensitive zones or buffer areas, with a view to, inter alia, ensure benefit and income to local communities;

- (viii) Develop monitoring mechanisms to assess impact of tourism activities on the wildlife and its habitat so as to minimize them;
- (ix) Develop generic guidelines for environmentally acceptable and culturally appropriate practices, and for all new constructions;
- (x) Set up lists of Do's and Don'ts for visitors;
- (xi) Provide for subsidized visits of students while fostering educational extension activities.
- xii) The opportunities for stakeholders would include management of low cost accommodation for tourists, providing guide services, providing sale outlets, managing excursions, organizing ethnic dances and the like.
- xiii) The ecotourism principles like nature-based, ecological sustainability, scope of education and interpretation, benefits to local people etc. shall be followed.
- xv) Eco-tourism shall be seen as an instrument of economic and educational tool so that tourism does not pose threat to our wilderness areas and continues to benefit local communities economically.
- xvi) To empower local communities to manage Eco-Tourism and generate incentives for conservation through alternate and additional livelihood options.
- xvii) Trekking routes, camping sites will be identified and developed as part of tourism plan. These sites will be managed through eco-development committees.
- xviii) The infrastructure development around the protected areas will be strictly in accordance with the provisions made in the notification for eco-sensitive zone.
- xix) All facilities located within five kms. of a Protected Area must adhere to noise pollution rules under 'The Noise Pollution (Regulation and Control) Rules', 2000, and 'The Noise Pollution (Regulation and Control) (Amendment) Rules', 2010 issued by the Ministry of Environment and Forests.

Tourism Policy

The tourism in the core area will be based on the broad guidelines issued by National Tiger Conservation Authority, Government of India vide

letter dated 15.10.2012 and Government of Rajasthan ecotourism policy 2010 issued on 15 february 2010(Annexure)

The government of rajasthan under section 64 of WLP,1972 has made wild life (Protection) Rules, 2010 in which entry fee, Eco development serch charge,vehicle entry fee,camera fee, camping fee, has been prescribed.(Annexure)

The following guidelines shall be enforced:

- Tourism in the core area will remain at the current level if it is with in 20% of the total geographical area of the tiger reserve. In a phased manner the tourism in core area should be shifted on to the the buffer, so that there is enhanced protection in the buffer zone.
- There are two types of vehicles Gypsies and Canters for tourists. Gradually number of canters to be increased so that more tourists can visit tiger reserve at a time. Gypsies to be provided at a premium cost for keen nature loving tourists. This can reduce the pressure on the demand for Gypsies.
- The entry fee for the Gypsy should be rationalised based on opportunity cost with canters.
- Tiger reserve entry and exit timings to be regulated strictly so that there are no fatal accidents during odd hours, at the same time less disturbance to wildlife.
- Tourism to be promoted as an activity to promote awareness.

Government of Rajasthan vide notification No. F11(35)forest/1997 PT Dated 20.07.2010 has further amended rules under Wildlife (Protection) (Rajasthan) Rules 1977 prescribing entry fee for person vehicle and camera. **(Annexure - 48)**

PCCF and chief wildlife warden ,Rajasthan vide Letter No.17307 Dated 24.6.2011 has issued orders for regulating tourism in National park and sanctuaries in Rajasthan. **(Annexure - 49)**

Signages

Proper signages are essential for promoting nature tourism, avoiding disturbance to wildlife, ensure no littering and better visitor experience. For this:

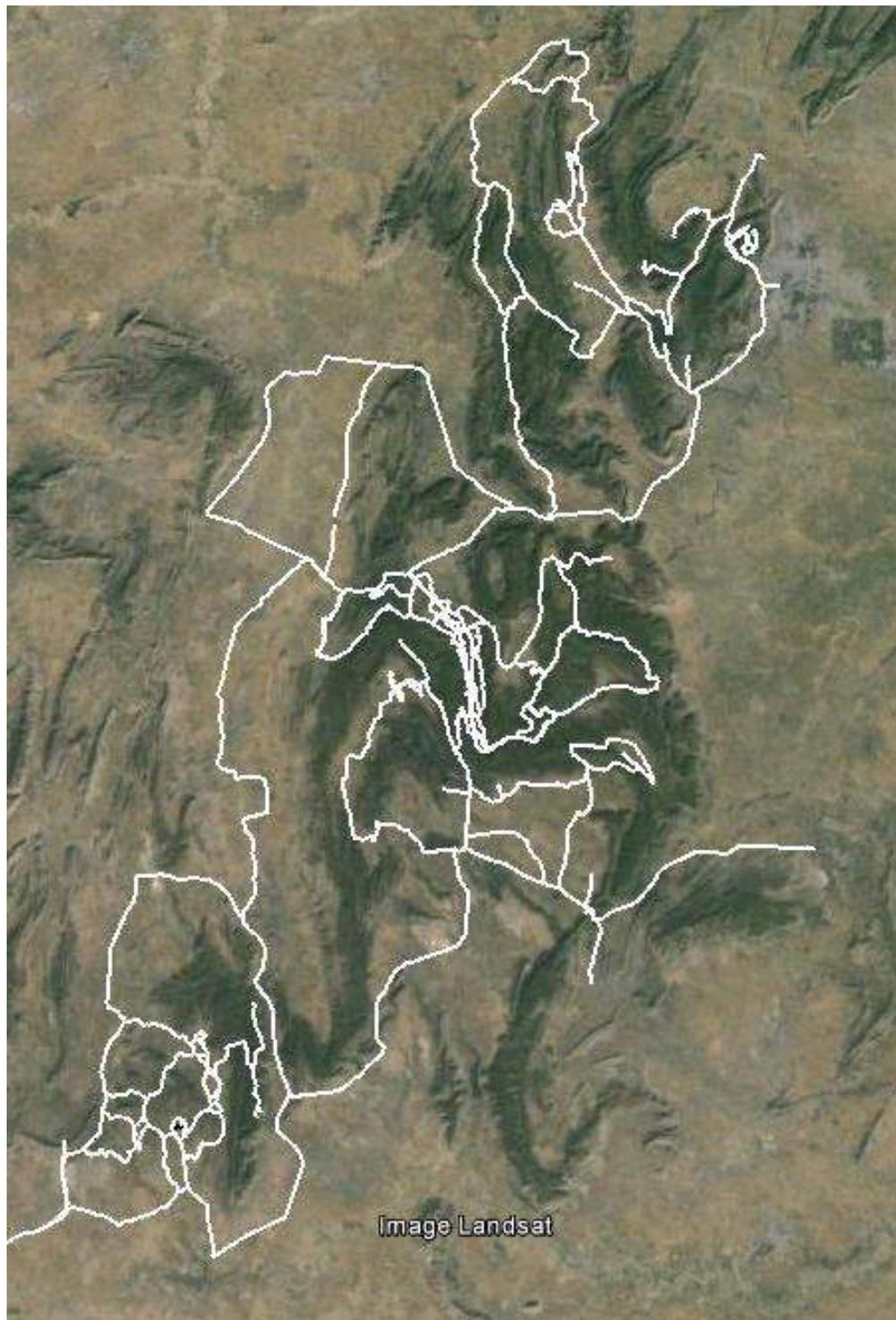
- (i) Proper signages will be fixed inside the forest area to give details of the flora, fauna, historical sites, details of medicinal plants, maps to show the track etc..
- (ii) Hoardings to be fixed on the highways to publicize the camping/safari facilities available in the area.
- (iii) Hoardings mentioning Do's & Dont's be placed at each camping site and at the commencement of the safari routes.

Publicity

Publicity material properly designed meeting local requirement adopting low cost technique and merging with local landscape will be adopted. The material will contain:

- (i) Colorful, informative brochures and folders to be brought out focusing on the Eco-tourism of each specific area. Maps and DO's & DON'Ts shall also be placed in it.
- (ii) Audio visual programmes for Sariska Tiger Reserve.
- (iii) Trees and shrubs can be labelled, Painting of birds /animals can be put in the areas where there is a chance to sight them.

Map 18 : Road Network - Sariska Tiger Reserve-CTH & Buffer



TOURISM ARRANGEMENTS

For tourism purposes, Gypsies and Canters are allowed to enter the forest roads in ecotourism zone which are driven by registered drivers. The registration is done by the Dy Field Director after approval from the Chief Wildlife Warden. These vehicles ply on roster basis. With reintroduction of tigers, the tourism has increased many fold, therefore, canters have to be promoted to carry more tourists as cheap facility, although Gypsies vis a vis Canters have their own advantages & disadvantages.

Nature Guides

Trained nature guides, registered by the Tiger Reserve management is compulsory with each tourist vehicle. In 1997, 20 Nature Guides were recruited, out of which 4 is still working. In 2007, 14 Nature Guides were recruited, out of which 11 is still working. In year 2012-13 recruitment of 30 Nature Guides has been done. Only trained nature guides should be permitted to escort tourists in Tiger Reserve

Government of Rajasthan vide order No. P11(90) Forest/2002 Dated 4 December 2006 has issued guidelines for selection and training of nature guides.

Nature guide will monitor following activities:

- * Brief visitors about all relevant regulations of Sariska Tiger Reserve.
- * Brief visitors about proper behavior during safari, in campsites, around wild animals, plants and with trees and with fires. Advise all travellers on the level of expectations of observing rare wildlife and plants by interpreting all aspects of the Eco-system.
- * Advise against collecting souvenirs from natural areas, such as, feathers, bones and shells,
- * Advise against purchasing specific crafts that are produced from threatened resources.

Booking of Tickets

Online booking of entry tickets will be done by Rajcomp Info Service limited (RISL).75% tickets will be online booked in advance,25% seats will be reserved for current booking. The tourist has to submit for booking of tickets. Each tourist will have to fill an Indemnity bond before entering into tiger reserve. The format for Indemnity Bond for Tourist is given in **Annexure 46**.

CARRYING CAPACITY

As per Hon'ble Supreme Court 's order and directions of National Tiger Conservation Authority not more than 20 % area of the CTH can be used for Tourism purposes. Area of CTH of Sariska Tiger Reserve is 881.11 sq.kms and Tourism area can not be more than 176.2 sq.kms. Accordingly tourism management in CTH has to be decided.

The carrying capacity has been calculated as 35 vehicles per trip as per guidelines of the NTCA.

$$\boxed{Cft = 2.75\%}$$

Real Carrying Capacity(RCC)

$$\begin{aligned} \mathbf{RCC} &= \mathbf{PCC} * \mathbf{(100 - Cfe) / 100} * \mathbf{(100 - Cfw) / 100} * \mathbf{(100 - Cft) / 100} \\ &= 860.59 * (100 - 70.13) / 100 * (100 - 44) / 100 * (100 - 2.75) / 100 \\ &= 860.59 * 0.30 * 0.56 * 0.97 \\ &= 43.8 \text{ or } 44 \text{ visits/day} \end{aligned}$$

$$\boxed{RCC = 140.24 \text{ visits/day}}$$

3. Effective Permissible Carrying Capacity (EPCC)

$$\mathbf{EPCC = RCC * MC}$$

RCC = Real Carrying Capacity **Assumptions**

- Vehicular movement is permitted only on forest roads, hence road length is more relevant than area
- 'Standing area' is not relevant, but closeness between vehicles is important

- There is a required distance of at least 300 m between two vehicles to avoid dust (two vehicles/km)
- Three hours are needed for a single visit
- The PA is open to tourists for 9 months in a year and 8 hours a day
- Linear road length for tourists = 200 km

1. Physical Carrying Capacity(PCC):
PCC is defined as follows

$$PCC = A * V/a * Rf$$

A = Length of forest road or Standing Area
V/a = Vehicles per km
Rf = Rotation Factor

$$Rf = \frac{\text{Total Hours for which park opens in a day}}{\text{Duration of a trip}}$$

$$Rf = 8/4 = 2$$

Thus, PCC = 156.47*2.75*2 = 860.59 visits/day

$$PCC = 860.59 \text{ visits/day}$$

2. Real Carrying Capacity(RCC):

PCC is limited by following factors:

- ❖ Road Erosion
- ❖ Disturbance to wildlife
- ❖ Temporary closing of sites

These factors are taken into account as follows :

- Road Erosion

Total Road Length = 156.47 km

Medium Erosion Risk road (A1) = 42.68 km

High Erosion Risk road(A2) = 34 Km

Low Erosion Risk road (A3) = 79.80 km

Weightage factor for Medium Erosion (f1) = 2

Weightage factor for High Erosion (f2) = 3

Weightage factor for Low Erosion (f3) = 1

$$M_1 = A1*f1 + A2*f2 = 42.68*2 + 34*3 = 187.36$$

$$M = A1*f1 + A2*f2 + A3*f3 = 42.68*2 + 34*3 + 79.80*1 = 267.16$$

$$Cfe = M1/M*100 = 187.36/267.16*100 = 70.13$$

$$Cfe = 70.13\%$$

- Disturbance to wildlife

Disturbance to Chital & Sambhar = 2 months

For Chital & Sambhar, $Cfw1 = \text{period of disturbance}/\text{total period} * 100 = 2/9 * 100 = 22.2\%$

Disturbance to Tiger = 2 months

For Tiger, $Cfw2 = \text{period of disturbance}/\text{total period} * 100 = 2/9 * 100 = 22.2\%$

$$Cfw = Cfw1 + Cfw2$$

$$Cfw = Cfw1 + Cfw2 = 22.2 + 22.2 = 44.4\% \text{ say } 44\%$$

$$Cfw = 44\%$$

➤ Temporary closing of sites

$$Cft = (1 \text{ limiting weeks}/\text{year})/36 \text{ weeks}/\text{year} * 100 = 2.75\%$$

MC = Managerial Capacity

Managerial Capacity denotes the administrative capacity to manage the tourism. The Administrative Capacity to manage the tourism is constrained to following factors :

- ❖ Staff is inadequate to manage the tourism
- ❖ The facilities for booking are inadequate
- ❖ There is no system of providing information to remote tourists
- ❖ The staff is not trained to manage tourism
- ❖ No Communication facility exists with tourism cell
- ❖ The educational qualification of the staff is inadequate
- ❖ Supervision in extensive area is difficult
- ❖ There is shortage of vehicles for supervision inside the park

$$MC = 50\%$$

$$\begin{aligned} EPCC &= RCC * MC = 140.24 * 0.50 \\ &= 70.12 \text{ or } 70 \text{ vehicles/day (app.)} \end{aligned}$$

$$EPCC = 70 \text{ vehicles/day}$$

Thus, Number of vehicles to be permitted per trip would be 35

Thus, Number of road kilometer per vehicles would be $156.47/35 = 4.47 \text{ km}$

Proposed kilometer per vehicles would be $156.47/70 = 2.24 \text{ km}$

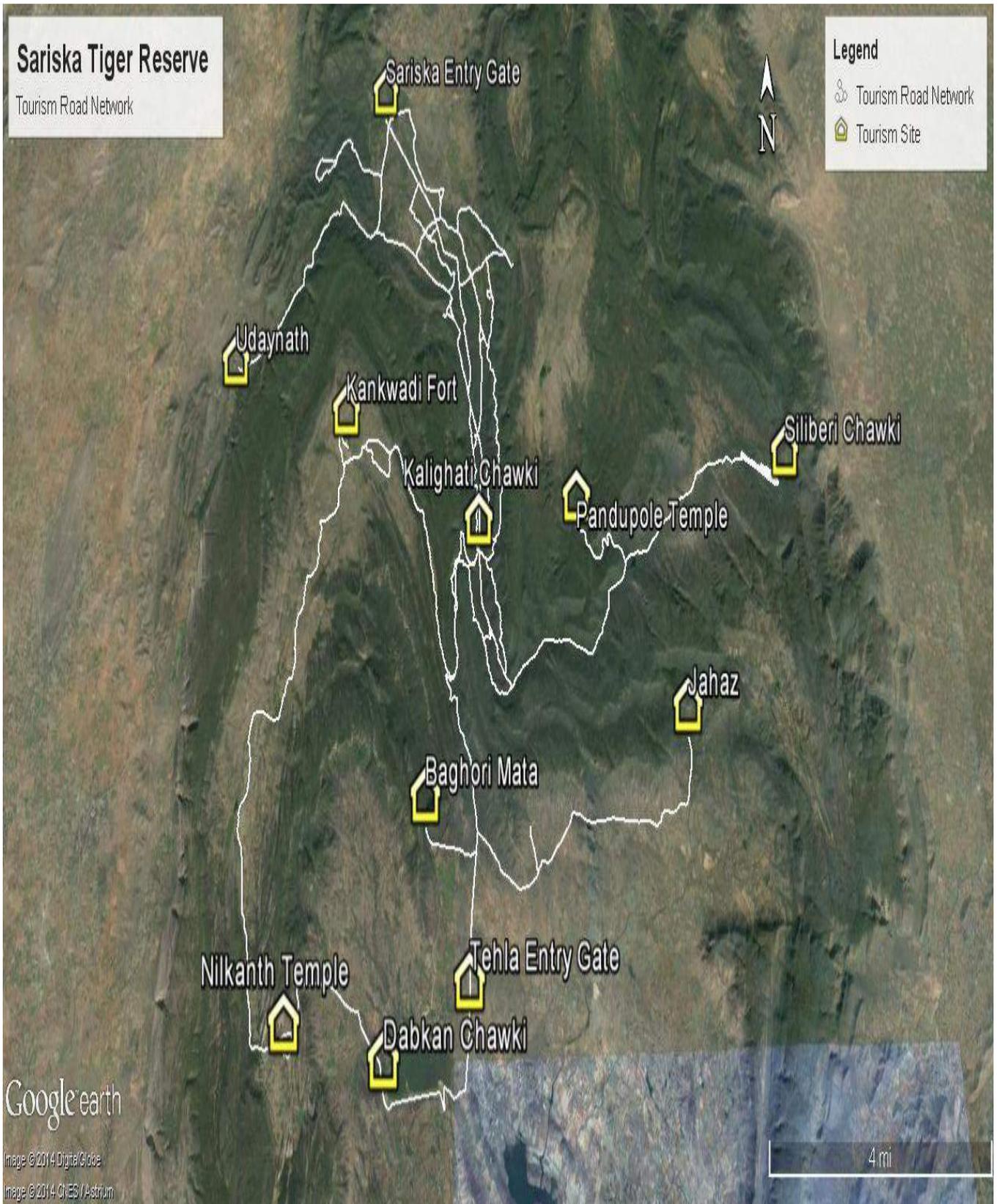
Table 14 : Tourism Area – Beat wise

RANGE NAME	BEAT NAME	AREA (sq. km)
AKBARPUR	UMRI	11.03
	BATALA	5.71
SARISKA	PANDUPOL	6.95
	SADAR	10.85
	SLOPKA	5.03
	TARUNDA	7.48
	KALIGHATI	14.36
	KANKWARI	14.31
	KARNABAS	9.83
	GHANKA	10.14
	HARIPURA	4.41
	TEHLA	TILWARI
SILIBAWARI		16.15
RAJOR		9.10
RICHUNDA		7.75
GARH		10.88
Total Area		155.83
Percentage of CTH		17.69

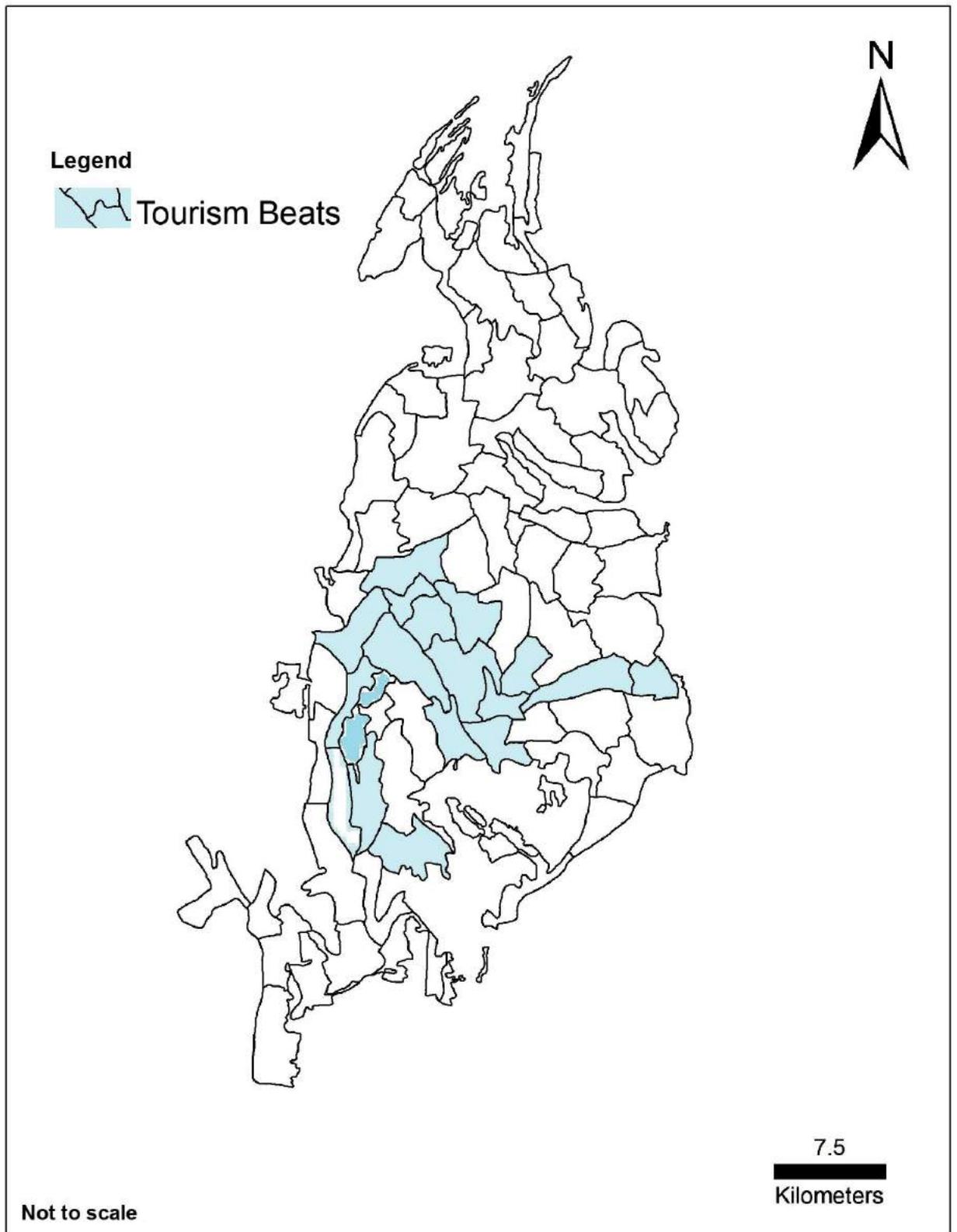
Table : 15 Tourism routes in Critical Tiger Habitat

S. No.	Tourism Zone	Type of Vehicle	Zone Number
1	Sariska - Ghanka tiryra – Tarunda – Brahmanath – Kalighati – Pandupol- Sariska	Canter/Gypsey	01
2	Sariska gate – Bharthari tibara – karnakabas – Jalebi chowk – Alqual – Naya pani – Geru ka tiryra – Kalighati – Pandupole –Sariska	Canter/Gypsey	02
3	Sariska gate – kalighati- kabri gate – Kankwari –Neelkanth Mahadev – Tehla-Sariska	Canter/Gypsey	03
4	Tehla gate – Chamari ka bera – kalighati – Pandupole - Tehla	Canter/Gypsey	04
5	Tehla-Kabri gate-Kankwari gate- Nilkanth Mahadev- Dabkan-Tehla	Canter/Gypsey	05

Map 19 : Tourism Routes Core area of Sariska Tiger Reserve



Map 20 : Beatwise tourism area (CTH)



In CTH of Sariska Tiger Reserve total area of 155.83 sq.kms(17.69% of CTH) will be used for tourism purposes. The tourism routes can be changed by management but in no case the tourism should be permitted in more than 20% area of CTH.

The carrying capacity will be decided for Sariska gate and Tehla gate. In no case vehicles more than carrying capacity will be permitted. 500 mt distance between two vehicles will be maintained. A distance of 30 mt will be maintained from wild animals during sighting,

Tourism Staffing

At present one range officer Tourism Reception, is looking after the tourism at Sariska Tiger Reserve. One Forester, 1 Receptionist, 10 forest guards/ cattle guards are assisting him at Interpretation center, Reception, Booking Centre, Sariska main Gate. Pilgrims who are going to Tourism Zone of Sariska Tiger Reserve are also being managed by same staff. For managing tourism in CTH , one Range Officer, two forester and ten forest guards. Extra manpower if required may be procured on contract from Foundation funds.

Interpretation Programme

Padam Shri Kailash Sankhala Interpretation Centre exists at Sariska which is the great attraction for generating awareness. This has been developed with a cost of Rs. 57.00 lacs, financial assistance from National Tiger Conservation Authority, New Delhi.

The purpose of the centre is to prepare the visitor for the right kind of experience in the reserve. It provides all relevant information about the reserve that a visitor might like to have. Two types of orientation is required by a visitor:

- a. Physical orientation of the reserve, with reference to where the visitor is, where to go, tour routes, traffic patterns, etc.
- b. Conceptual orientation such as the objectives of the reserve, the species of plants and animals found there, the ecological factors relevant to understanding their habits and habitats

(such as food chains, predator-prey relationship, adaptations of plants and animals, etc) and the importance of wildlife conservation. This can be imparted to the visitors through exhibits, audio-visual aids, various information leaflets etc.

Padamshree Kailash Sankhala Nature Interpretation Centre building was built in the year 1989-90. Till 2008-09, this building was used as conference hall. In year 2012 this building was renovated and Padam Shree Kailash Sankhala Interpretation Centre was opened for Tourist. This Interpretation Centre has exhibits giving information about Sariska Tiger Reserve, Wildlife Conservation in general, Information about birds, mammals, extinction of Tigers, bird migration path etc. The kiosks provide useful information about Tiger, prey animals, birds with their behavior. The Tiger song and movies also attraction to students. A hall have being constructed to conduct wildlife film show for 50-75 people. Presently, the film "*Tiger Dynasty*" and "*Reintroduction of Tigers in Sariska*" are being shown to Tourists. All tourists entering into Sariska Tiger Reserve are charged Interpretation Centre fee of Rs. 20 each through Sariska Tiger Conservation Foundation for maintenance of Interpretation Centre.

Padam Shree Kailash Sankhala Interpretation Centre with eco-friendly and interactive Interpretation has following facilities.

Exhibits

The Interpretation Centre has two exhibit galleries developed on the basis of specific communication objective. The following exhibit themes have been used.

- a) Exhibits depicting major fauna of the reserve such as tiger, leopard, cats etc.
- b) Exhibits showing mammals, birds, reptiles, amphibians, which form the fauna population of the reserve.
- c) Exhibits showing invertebrate animals such as insects, molluscs, etc., that are found in the reserve.
- d) Exhibits of common trees, plants flowers and other interesting botanical features peculiar to the reserve.
- e) Exhibits on food chain and food webs in the reserve.

- f) Exhibits on animal and plant adaptation relevant to the species of the reserve.
- g) Exhibits on endangered species protected in the reserve.
- h) Exhibits dealing with conservation issues such as damage to wildlife, forests, and ecosystems caused by man, the importance of conserving the fragile ecosystems, etc.
- i) Exhibits dealing with the objectives, activities, and conservation action plans of the reserve.
- j) Exhibits providing tips on do's and don'ts while visiting the reserve.

The above exhibits at the Interpretation Centre, properly designed and installed with relevant information contents, is serving as a useful pre-visit orientation for visitors. It will not only give them an idea and insight on what to look for and what to assimilate while in the reserve, but will also create an interest in identifying at least some of the species that they come across. The Interpretation Centre will also serve as a post-visit resource centre, where visitors could come back and check and verify their observations, on identification of species etc. with the exhibits.

Resource material for Conservation Education:

- a) A guide map showing various areas of the reserve to be visited, major flora and fauna to be observed at each location and the tour tracks or trails recommended to be followed.
- b) Interpretative materials in the form of orientation maps, information leaflets, checklists of species, picture post cards, etc., which will go a long way in assisting the visitors to take maximum advantage of their visit.
- c) Trail guides for nature trails will be prepared.
- d) Guided tours through well-informed guides. The nature guides will be encouraged to use the facilities of interpretation centre in conducting the tours of the visitors.
- e) Information guide on the natural and cultural heritage of Sariska and Alwar.
- f) The Interpretation Centre will also serve as an Environment Education facility for the local school and general public.

PUBLICITY THROUGH MEDIA AND FORUMS

The selection of a communication medium for publicity depends upon a number of factors which include the theme, the messages, the audience, the objectives and of course the availability of hardware, resources, expertise and time. In the context of STR, there is enormous variety in terms of messages and audience and therefore, there are possibilities of using a great variety of media and forums for effective communication and publicity. Some of these possibilities are enumerated below.

Print Medium : Poster, booklets, pamphlets, news letter, wall slogans.

Audio-visual : Slide-shows, video programmes, video magazine, wildlife films.

Exhibitions : Mobile as well as fixed at fairs, at forest department chowkies, in selected villages in school.

Mass media : News-papers, magazines, TV, radio.

Other media : Such as street plays, bhajan mandalis and other local forms of mass communication, audio cassettes of stories and songs, jatha, exposure tours, eco camps.

Forums: Interactive forums such as meetings, committees, seminars/workshops, eco-clubs, eco-adalats, demonstration/ resource centres, interpretation centers .

Other Interpretation Centers

New Interpretation center will be created at Tehla, Talvriksh and Ajabgarh. This will greatly help in building conservation environment in region. Existing Tehla fort, Ajabgarh fort and RTDC abandoned building at Talvriksh can be used for creating Interpretation Center.

Historical tourism sites in CTH-

Bhangarh fort is historical sites presently being maintained by State Archology Department is visited by many tourists. This site falls in CTH. Presently no fees is being charged from tourists entering CTH. So check barriers should be established and fee for entering Critical Tiger Habitat should be charged from tourists.

Historical sites like Kankwari Fort, Neelkanth Mahadev temple complex lie on tourism routes. The tourism should be regulated in such a manner tourist can see these historical sites. Efforts should be made to restore these historical sites by proper maintenance. Kankwari fort has been renovated by Amer Vikas Pradhikaran. Interpretation Center can also be created on these sites to educate people for nature conservation and create awareness for tiger.

7.2.2 Theme Plans

Management strategies sometimes can not be confined to a particular zone and they cut across two or more zones. Various themes, which are applicable for entire CTH of Sariska Tiger Reserve, have been developed as follows.

7.2.2.1 Theme plan for Stepping up protection (Security Plan) by addressing Human-Wildlife Interface

- (i) Theme Plan for control on cattle grazing
- (ii) Theme plan for control on Poaching.
- (iii) Theme plan for Fire Protection.
- (iv) Theme plan for Control on removal of Fuel wood and fodder.
- (v) Theme plan for Boundary demarcation and Removal of Encroachments.
- (vi) Theme plan for Bawarias & other nomadic hunting Tribes

- (vii) Theme Plan for retrofitting safeguards for roads, buildings, temples, transmission lines etc.
- (viii) Theme Plan for intensive patrolling (M-STriPES)
- (ix) Theme Plan for Human – Wildlife Conflict

7.2.2.2 Theme plan for Active management

- (i) Theme plan for intensive monitoring of reintroduction tigers.
- (ii) Theme plan to save species on verge of extinction and reviving historically extinct species..
- (iii) Theme plan for Eradication of weed species
- (iv) Theme plan for water conservation
- (v) Theme plan for development of breeding site
- (vi) Theme plan for Immunization of domestic livestock.
- (vii) Theme Plan for Reclamation of mined areas

7.2.2.3 Theme plan for Movement of Pilgrims & Wildlife Conservation Awareness

- (i) Theme plan for Movement of Pilgrims in CTH
- (ii) Theme plan for Nature Education

7.2.2.4 Theme plan for MIS & Staff development

- (i) Theme plan for Management of Information System
- (ii) Theme plan for Staff Development & Capacity Building

7.2.2.1 Theme Plan For Stepping up protection (Security Plan) by addressing human-Wildlife Interface

The theme plan for protection (Security Plan) will be for the entire Sariska Tiger Reserve (both core and buffer area).

The protection is one of the most important activities in the biodiversity conservation of the Reserve. It lays stress on defence against interference, damage or destruction of any kind by the human beings and the cattle including illicit felling, grazing, NTFP collection, poaching, encroachment and fire etc. However, the following factors militate against efforts of Tiger Reserve management in ensuring protection:

1. The Tiger Reserve is surrounded by large number of human habitations.
2. The poverty in the fringe areas coupled with the demand for the forest and wild animal products exerts a considerable pressure on the Tiger Reserve.
3. Inadequacy of skilled manpower resources.
4. Inadequate intelligence network for providing timely information about impending activities.
5. Difficulty in detection and prosecution of cases.
6. General lack of awareness, understanding and support from the fringe communities.
7. Hunting by local people.

Objectives

- 1) To maintain and conserve bio diversity by providing efficient protection
- 2) To maintain and conserve viable population of tiger and its prey species
- 3) To check illegal and unscientific harvesting of NTFP and fuel wood
- 4) To enhance capacity building of staff
- 5) To provide infrastructure for protection
- 6) To save the Sariska Tiger Reserve from all forms of biotic/ anthropogenic pressures in terms of –

- i) Cattle Grazing
- ii) Poaching
- iii) Fuel Wood and Fooder removal
- iv) Fire
- v) Encroachment & Mining
- vi) Boundary Demarcation & Mutation of forest land
- vii) Bawarias & other traditional hunters
- viii) Relocation of Villages

7) To develop human resource so as to utilise them in best possible way for protection.

8) Use of modern technology and equipment enabling effective protection.

Problems in achieving the objectives

1. Inadequate staff and infrastructure.
2. Patrolling is difficult in monsoon
3. Illicit felling and collection of NTFP
4. Inadequate co ordination and co operation with other law enforcement agencies and administration
5. Time consuming political process in management issues.
6. Improper boundary demarcation
7. Human settlements- 26 villages situated in the core zone.
8. Price tag attached to wildlife products in international market, Chain of people involved in wildlife trade outside jurisdiction of Tiger Reserve Management.
9. Lack of proper intelligence gathering network for Prevention of offences.
10. Lack of proper linkage and support of other law enforcement agencies.
11. Low motivational level of frontline staff and Officers.
12. Lack of adequate manpower.
13. Lack of proper equipment and other resources to deal situation
14. Lack of availability of financial resources.
15. Hostile attitude of local people and administration.

Protection Stragety

The overall patrolling strategy of the Sariska Tiger Reserve includes the following features:

- Staff / chowkies listed with duty allocation and route chart

- The teams are equipped with mobile wireless sets.
- The patrolling teams systematically cover the area allotted to them
- Special instructions/ provisions for squads
- Surveillance : hotels, tourist points, vehicles, bus stand, trains and other means of transportation on the fringe of the Tiger Reserve and nearby towns.
- Surveillance of traditional hunters
- Coordination with local police
- Sanctioning labourers for patrolling
- Networking
- Preparation of daily schedule
- Regular checking of market places
- Surprise checking of barriers
- Preparation of “crime maps” with periodic updating
- Monitoring cattle kill, human kill, injury incidences and crop raiding
- Monitoring issues relating to compensation
- Monitoring water points near habitation
- Preparation of crime gang dossiers at range level
- Preparation of individual crime dossiers
- Monitoring of habitual offenders
- Preparation of monthly Crime Map on 1:50,000 scale indicating location of each crime with date.
- Conveying progress to Field Director/ Dy. Director on a daily basis through wireless
- Deviating from routine schedule during emergencies
- Taking note of offences registered in local police station
- Using tape recorder/ camera etc. to record evidences
- Special monitoring of water holes near human habitation during the pinch period
- Surveillance of half eaten carcasses of livestock on account of carnivore depredation to be carried out to eliminate the possibilities of poisoning for retaliatory killing by local people.
- Continuous monitoring of the area where more than three incidents of livestock depredation are reported within a fortnight.
- Village level crime register to be maintained at the EDCs level to keep track of villagers involved in wildlife offences.
- Maintaining list of vehicles passing through manned barrier and surprise check by senior officer at such point every month.

Security Plan-

In Sariska tiger reserve following activities, *inter alia*, form part of the Security Plan :

- (a) Raising, arming and deployment of Special Tiger Protection Force.
- (b) Use of information technology in wildlife crime prevention.
- (c) Launching M-STrIPES for field patrolling and monitoring conservation status of Tiger Reserve.
- (d) Deployment of antipoaching squad with proper equipment.
- (e) Establishing and maintenance of existing patrolling camps/chowkies and deployment of local work force/ Home guard/Boader Homeguards/ RAC for patrolling.
- (f) Organising vehicular patrolling by constituting squads comprising of field staff/ local work force/ Home-guard/ Boader Homeguards/ RAC /ex-army personnel, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.
- (g) Establishing and maintenance of wireless network.
- (h) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses and possible hideouts of poachers.
- (i) Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility.
- (j) Deployment of local work force / ex-army personnel / home guards/ Boader Homeguards/RAC at sensitive places to enhance protection status of Tiger Reserve and ensure effective action against offenders.
- (k) Deployment of local work force for patrolling, surveillance of water holes, manning barriers ,secret information ,awareness generation.
- (l) Procurement of arms and ammunition.
- (m) Procurement/maintenance of Range level Antipoaching squads.
- (n) Rewards to informers.
- (o) Legal support for defending court cases.
- (p) Procurement of vehicles, boats and other equipment like field gear, night vision device etc.

Strengthening of infrastructure

The following activities, inter alia, would form part of reinforcing the infrastructure in Sariska Tiger Reserve

- a) Civil Works (staff quarters, family quarters, office improvement, patrolling camp, house keeping buildings, Interpretation Center, Barrier Checkpost, culverts). **(Annexure - 23)**
- b) Maintenance, creation and upgradation of forest road network. The List is given in **(Annexure - 13)**
- c) Maintenance and creation of wireless Network. **(Annexure - 22)**
- d) Maintenance and creation of fire watch system.
- e) Maintenance and creation of bridges, Water harvesting structures, anicuts.
- f) Maintenance, creation of firelines. The List is given in **(Annexure - 10)**
- g) Maintenance and creation of earthen ponds.
- h) Procurement, maintenance of vehicles (Gypsy, Jeep, Canter, Tractor etc.). **(Annexure - 21)**
- i) Habitat improvement work including grassland development ,weeds eradication ,drinking water etc.
- j) Procurement of hardware, software and Geographical Information System (GIS).
- k) Procurement of compass, range finder, Global Positioning System (GPS), camera traps.
- l) Procurement of satellite imageries for management planning.
- m) Map digitization facility for management planning.

Standard Operating Procedure (SOP) will be followed for Security Plan indicating the resources available, process of ensuring effective protection through law enforcement, detection of offences, apprehending

poachers, chasing cases in court of law and ensuring conviction of offenders.

Proper Supervisory checks at Range officer level, ACF level, DCF level and Field Director level will be ensured for protection of habitat, prey and reintroduced Tigers in Sariska tiger reserve.

Security auditing will be done for various protection measures adopted in Sariska tiger reserve to know efficacy of programme. The activities like secret information cover in and around tiger reserve, poaching threat, detection of offences, follow up of court cases, conviction rate etc would security audited from time to time at reserve level.

For effective protection strategy the Information regarding Beat, Naka & Range in STR is given in **(Annexure -15)**

MONSOON PATROLLING

Sariska Tiger Reserve becomes more vulnerable to illicit grazing and poaching during monsoon as large part of the park becomes inaccessible and mobility of staff is considerably impaired. To meet these challenges a special protection strategy for monsoon is required. Keeping the ground reality in mind, and to make optimum use of available resources to achieve best result towards protection of Sariska Tiger Reserve following strategy is made out for the monsoon season.

Strategy

A four-pronged strategy will be adopted which will be largely preventive in nature but can also be reactive if situations so demand. Deployment of Protection home-guards/local work force in all the anti-poaching/grazing camps.

- A. Strike force manned by Forest personnel.
- B. Prevention of grazing/ poaching through intensive awareness drives.
- C. Collection of intelligence secretly with the available experience, from the dossiers list and counter acting effectively and timely through available resources.

Monitoring of Patrolling

1. Daily monitoring

Every Range Officer of STR shall report to the concerned Asst. Conservator of Forests at 8:00 pm regarding the daily monitoring report of his range.

Asst. Conservator of Forests shall report to the concerned Divisional Forest Officers/ Deputy Director on receipt of the information.

Deputy Director/ Divisional Forest Officer shall report to the Field Director at 9:00pm every night regarding the daily monitoring report of the ranges within his jurisdiction.

2. Monthly monitoring

Mandatory monitoring duties to be performed every month at the level of executive field functionaries are outlined below:

Forest Guard

Apart from regular monitoring of the anti-poaching camps in his beat jurisdiction / areas allotted under his charge, each Forest Guard shall lead the patrolling team at least twice a week (8 times a month) with 25% night patrolling. The Forest Guard shall personally check and exhaustively review beat area under his jurisdiction, at least thrice a month and submit a report to the Forester.

Forester

Apart from regular monitoring of the anti-poaching chowkies in his section / areas allotted under his charge, each Forester shall lead the patrolling team at least once a week (4 times a month), of which 25% of the time shall be spent in night patrolling.

The Forester shall personally check and exhaustively review every chowky under his jurisdiction at least twice a month and submit a report to the RO.

Range Officer

Apart from regular monitoring of the anti-poaching camps in his range jurisdiction / areas allotted under his charge, each Range Officer shall lead the patrolling team at least twice a month, of which 25% of the time shall be spent on night patrolling.

The Range Officer shall personally check and exhaustively review every chowky under his jurisdiction at least once a month and submit a

report to the ACF, who in turn shall incorporate his observations and submit it to the Dy. Conservator of Forests. Night patrolling dates are to be fixed at random by the Range Officers in consultation with the ACFs. Dy. Conservator of Forests / ACFs can ask for surprise patrolling during any given day of the month.

Asst. Conservator of Forests

The ACF shall visit 50% of all chowkies in the division in a month and shall submit a report to the Dy. Conservator of Forests by 20th of every month. He will lead the patrolling duty twice a month, once during day and another during the night.

Dy. Conservator of Forests

The Divisional Forest Officer shall personally review 20% of the chowkies under his jurisdiction every month and submit a report to the Field Director.

SECURITY AUDITING

The Deputy Director/Field Director will conduct quarterly security audit and generate report. The audit will include review of offence case detection, fate of prosecution cases up to 5 years back, availability and adequacy of protection infrastructure, equipments etc. The annual report of security audit shall be placed before Steering Committee/ Governing Body of Foundation.

7.2.2.1 (i) THEME PLAN FOR CONTROL ON CATTLE GRAZING

The entire core area of Sariska Tiger Reserve would be gradually made free from cattle grazing. Special Operating Procedure (SOP) would be framed for facilitating front line staff to address this issue within time frame including village relocation, construction of pacca wall on periphery, developing alternate grazing facility, reducing number of cattle by breed improvement, promoting stall feeding, encouraging growing of fodder crops on farmlands rather than cash crops, promoting non cattle based livelihood options and strict enforcement of law for controlling illegal grazing.

Nearly 0.75 lac domestic animals including cattle, sheep, goat and camel exist in 26 villages inside CTH and villages situated on periphery of CTH. The CTH of Sariska due to ecological island condition have patchy buffer around core so many villages situated on periphery will continue to graze in peripheral CTH of Sariska tiger reserve till either alternative options are made available or grazing practice from free ranging to stall feeding is practiced. The period from July to October is critical since most of the domestic animals of nearby and far flung villages move into the CTH. The villagers graze their cattle in particular forest areas which they consider as "Kankad" of the village. The temporary cattle camps are called "Guwadas". The Guwadas slowly become permanent grazing camps. In CTH of Sariska both permanent and temporary Guwada exist. The temporary Guwada's are located on plateaus, where cattle camp remain mainly in rainy season and later till water is available (October-November). They carry the milk to the market and also prepare milk cake. The Alwar milk cake is very famous and most of it comes from Sariska forests. For preparation of milk cake lot of firewood brought from forest is consumed causing habitat degradation. The incidence of grazing reduces after Dipawali.

GRAZING PROBLEM IN CTH:

Plateau parts of Sariska Tiger Reserve are worst affected by illegal grazing during monsoon. Main reasons for illicit grazing in the Tiger Reserve is traditional dependence on cattle for livelihood and lack of alternative place for cattle grazing. In temporary Guwadas Villagers come in large numbers with cattle from many nearby villages and resort to violence. The permanent Guwada's during scarcity time resort to lopping and pollarding of trees for fodder. They resort to cattle grazing even during night time. No person escorts them and return to Guwada's on their own in morning and evening for milking. The milking calf are kept in village. If the cattle do not return for milking search party goes from village to look for cattle. Due to this the chances of cattle kill by tigers and Leopards become very high. The cattle specially buffaloes graze in groups during night time

and sometime even charge on tiger not allowing to make him kill. The huge cattle pressure deprives herbivores from forage.

Earlier the goat grazing was not practiced in Sanctuary area but gradually the goat rearing became highly profitable due to increased demand and price of meat. Villagers started keeping large number of goats and the problem has been further aggravated by soft loaning for goat rearing. It has now become industry and at the same time menace for Tiger Reserve. Due to goats the habitat is fast degrading as the browsing damage is far more than carrying capacity. The goats are directly competing with herbivores like Chital and Sambar.

The practice of lopping trees for leaf fodder is highly prevalent through out CTH and pose serious threat to habitat apart from disturbance caused to wildlife. The villagers lop Butea, Anogeissus and other leaf fodder trees during winter season to feed cattle.

Vulnerability for grazing in STR

Grazing Free areas	Grazing prone area	High Grazing prone area
<p>Sariska Range , Kalighati, Brahmnaath, Slopka, Bherughati, Phentakipal, Pandupole, Kundali</p> <p>Tehla Range Bhansota, Chamari ka Bera</p> <p>Akbarpur Range Umri ,Rotkyala Narandi</p>	<p>Sariska Range Karnkabas, Haripura, Kraska, Sarunda, Malajohdka, Bana, Phatiakhora</p> <p>Tehla Range Bhagani, Kaimala, Nandu, Devri, Guwada, Jahaj</p> <p>Akbarpur Range Sukola, Dabli, Siliberi,</p>	<p>Sariska Range Kankwari, Duharmala, Kushalgarh, Lilunda, Naldeshwar, Udainath, Bandipul, Duharmala.</p> <p>Tehla Range Dabkan, Rajor, Garh, Ghat</p> <p>Akbarpur Range Beenak, Dehlawas, Madhogarh, Raika</p> <p>Talvriksh Range Whole range</p> <p>Range Digota whole range</p>

Impact of illicit grazing

- ❖ The habitat of core area is getting degraded.
- ❖ There is every possibility of spread of communicable diseases in the wild animals from cattle.
- ❖ Illegal wood cutting is also resorted to by villagers along with the illegal grazing.
- ❖ There is every possibility that the villagers might resort to poisoning of Carcass of cattle, killed by big cats.
- ❖ The lopping of fodder trees cause serious damage to habitat specially to nesting and roosting species.

ACTION PLAN TO CONTROL ILLEGAL GRAZING

- A two prong approach of dialogue with the villagers along with sufficient deployment of man power for protection from grazing will be enforced.
- The encroachments in the village pastures & the revenue lands should be removed to develop into pastures through district administration and Panchayati Raj.
- The system of stall feeding will be promoted.
- Grazing will be regulated in CTH, till the villages are relocated. Once the village is relocated no cattle grazing will be permitted in the area. Local Range Officer and frontline staff will ensure that there is no illegal grazing at the relocation site. DCF and ACF should make regular inspections to ensure cattle grazing free areas. At village relocation site pasture development will be done by taking up ANR plantation in RFBP or CSS.
- For planning, detailed study of socio economic conditions of the graziers in peripheral villages, cattle population and alternative grazing lands / stall feeding would be carried out to ascertain the quantum of dependency on the Tiger Reserve and suggest ways and means to deal with free grazing in forest areas. Planning at micro level and on macro scale integrating it with Breed Improvement and Dairy project will help in solving the problem. A Standard Operating procedure (SOP) will be prepared and implemented to deal with this serious problem.
- Blocking of entry on the periphery of CTH by constructing 6 feet high

masonry wall. This will at the same time help in preventing crop degradation by wildlife.

- For villages situated in CTH, areas would be allotted for grazing for each village by Range officer concerned so that minimum disturbance to the habitat is caused. These areas can be fixed on rotational basis.

Strategies to contain the problem

1. ANTI GRAZING CAMPS ;

Anti grazing camps will be established at strategic places in the CTH to deal with the crises. The location of Anti grazing camp may coincide with Anti poaching camp. At each Anti grazing camp the increased strength is for a limited period i.e. specially during monsoon (15 June to 15 Nov). At each Anti grazing camp one forester, one assistant forester, 4-6 forest guards, 6-10 homeguards and 2-5 volunteers from EDC will be deployed. The frontline staff will be deployed by 15th June before commencement of rainy season. The deployed staff will be made familiar with the locality, and the problematic grazing areas. This will be done by organizing regular patrolling. One Pickup/Camper with driver will be deployed through out the season and vehicle will not be diverted elsewhere. Daily antigrazing patrol will be maintained in register with daily information to control room. A special Control room for Anti grazing will be established at Sariska which will run 24 by 7 in grazing season. For each Anti grazing party Shield, headwear, life jacket, lathi etc will be provided to deal with situation of stone throwing or any other assault. Range Officer, ACF and DCF shall inspect these camps atleast once a week.

Table 16 : List of Anti Grazing Camps

Name of Anti grazing camp	Strength
Karna ka bas	20
Kalighati	10
Kankwari	10
Duharmala	10

Raikamala	10
Malajhodka	20
Beenak	10
Nathusar	10
Raika	10
Devri	10
Siliberi	20
Kraska	20
Sukola	10
Rautkela	10

New Anti grazing camps can be established in CTH at appropriate places as per requirement from time to time to effectively control illegal grazing.

Every anti grazing camp will be provided with GPS, Case framing kit, Video camera to shoot series of incident at grazing site as evidence in court.

- 2 Anti grazing reserve parties will be constituted at Tehla, Akbarpur and Talvriksh range headquarters for back up support of antigrazing camps. Each reserve party will comprise of one ACF, one RO, two foresters, 6-10 forest guards and 10 homeguards. Reserve Party will be equipped with safety wear and arms & ammunition. Response time of Reserve Party should be minimum and should work as Strike Force.
- 3 A Strike force will be created at Sariska consisting of one ACF, two RO's, 5 Foresters, 20 Forest Guards and Police party/RAC/STPF. Local SHO and Tehsildar should accompany the force for meeting law and order situation. For this suitable orders should be got issued from District collector.
- 4 During Antigrazing Operations many times it becomes law and order situation, such sensitive areas have to be identified, to avoid loss to national wealth and property section 144 can be got imposed through District Collector. This is being done in Ranthambhore Tiger Reserve every year during grazing season.

- 5 Flag march should be organized in grazing prone areas to demonstrate presence of Strike Force.
- 6 Cattle impounding cages (Kanji House) will be developed at suitable places like Kalighati, Karna ka bas, Udainath, Kalakari, Richunda, Raika and other suitable places as per need.
- 7 Lot of damage is being caused to the forest by the goat graziers. The herdsmen lop trees heavily and sometimes cut green trees for grazing their goats. It needs strict protection measures to stop goat grazing in CTH like listing out the individuals owning goats. Goat grazing in CTH has to be discouraged and District Administration should be asked not to provide loans and other incentives for purchase of goats. Strict watch and ward alongwith prosecution of offenders is required. They should be encouraged to shift to other alternate employment. Carrying axe is totally banned in the Core area/CTH.
- 8 Village level meetings for mobilizing public support, in controlling the illegal grazing, should start in the month of May. Meeting at the district level with collector and S.P. and timely meetings at EDC level, has to be organized. All elected public representatives, EDC executive members, other related departments, revenue authorities and other prominent villagers will be invited in these meetings to elicit support for control over illegal grazing.
- 9 The forest roads, in the core area, are fair weather roads (FWRs). For effective protection during the grazing season, the entire CTH has to be made accessible by improving the road network.
- 10 Construction of Masonry Walls at the strategic locations will be taken up on priority basis. The boundary wall will function as physical barrier and movement of cattle.
- 11 CTH is declared under section 38 V(4)(i) with a objective to keep inviolate space for Tiger Conservation without affecting the rights of Forest dwellers. In Sariska Tiger Reserve Bhagani, Umri and Rotkyala village has been shifted. No cattle can graze in these areas. No one has right to graze cattle in Tarunda, Brahmnaath, Kundli, Kalighati, Geruka,

Kathaka, Slopka, Phenta ki pal, Panndupol, Boh, Rotkyala, Amankiberi, Narandi, Siliberi, Umri, Bana, Phatiyakhora, Malajohdka, Ghanka, Udainath, Bandipul etc forest areas. Illegal garzing is offence under section 29 of WLPA 1972.for destruction of habitat punishable under section 51.Arrest of offender, seizure of cattle,tools etc used in commission of offence.

7.2.2.1 (ii) THEME PLAN FOR CONTROL ON POACHING

Sariska Tiger Reserve was one of the sites in country for mass illegal poaching of tigers in the year 2002 to 2004. In 2005 all tigers were poached. Some tiger articles were also recovered from poachers. Traditionally, Bawarias, Meo & Banjaras communities were associated with poaching. Local farmers who employed Bawarias to protect their agricultural crops from the damage by wild animals indulged in poaching. The pattern of poaching, found more prevalent, in these areas was poisoning of the carcass and capture by laying traps. A well-organised effort to identify and control poaching was lacking. Poaching cases also went unreported because of poor communication with the villagers and lack of an effective secret information system.

The Sariska crisis was an eye-opener to the wild life protectors that what a negligent protection system can do to a sanctuary.

Steps for reconstruction have been initiated by the Tiger reserve Management to rebuild the Tiger Reserve and to provide a safe environment against poaching threat. One of the important aspects has been to strengthen the protection framework in Project Tiger Area.

The deployment of Home guards and Rajasthan Armed Constabulary (RAC) was done in March' 2005 to strengthen the field surveillance. A network for secret information was developed in peripheral villages in order to identify the gangs operating around Sariska Tiger Reserve. The difficult task was to arrest those who were involved in the poaching. The Sariska Tiger reserve Management conducted more than 340 raids in different villages in and around the Tiger reserve which

resulted in the arrest of many poaching gangs along with seizure of traps, guns, explosives, wildlife parts (canines, bones, skin etc). More than 400 persons were interrogated for obtaining leads to reach to those who instigated the Bawaria poachers. The disclosures led to successfully crack 14 Tiger and 27 Panther poaching cases resulting in the arrest of 45 offenders from Alwar and adjoining districts viz. Jaipur, Dausa and Sikar. 41 cases [14 tiger+27 panther] have been lodged and trial/investigation is in progress. Complaints have been filed in 34 cases [11 Tigers + 23 panthers]. CBI enquiry was conducted in four cases relating to tiger & leopard in year 2005. In tiger poaching cases 35 offenders have been punished by respective courts for imprisonment of 3 to 5 years. In leopard poaching cases 21 offenders have been punished by respective courts.

The list of Tiger & Panther cases along with offenders punished by Courts and offenders wanted (As per position on 01.05.2014) is given **(Annexure -29)**

CBI Cases

With the consent of State Government of Rajasthan, CBI took up investigations in Poaching of Tigers and Panthers in Sariska Tiger Reserve. For this of Rajasthan Home (Gr. 5) Department No F 14 (2) Home 5/2005 Jaipur dated 18th June 2005 transferred poaching cases to CBI and crime FIR no 11/91 dated 15-3-2005 , 45/91 dated 11-3-2005, 11/92 dated 15-5-2005, 11/93 dated 15-3-2005 and Kamla Market PS, New Delhi, FIR No 82/2005 dated 31-1-2005 were registered.

Extensive search of all the villages with the tiger Reserve area was done for recovery of steal traps, guns and other equipments used for killing wild animals. Searchs were also conducted in possible places where steal traps were manufactured. The incumbency profile of staff of Sariska Tiger Reserve was analysed and transfer of those who have stayed long and are suspected have developed vested interest.

**Table 17 : Tiger Cases transfer to CBI vide of Government of Rajasthan
Home (Gr. 5) Department No F 14 (2) Home 5/2005 Jaipur dated 18th June
2005**

S.No.	FIR Number/ Date/ Range/ Naka	Details of FIR	Detail of Punishment
1	47-91/05 dated 11-3-05, Sariska, Beat Ghanka	Poaching of Tigeress in beat Ghanka near Kalakunda anicut 9 months earlier, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 51	Case pending in CBI court
2	11/91/06 dated 15-3-2005, Range Tehla	Poaching of Tiger in Jungle Bigota, Khora anicut in year 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 51	Case pending in CBI court
3	11-92/05 dated 15.03.05 Range Flying Sariska	Poaching of Panther in Bada Boh Jungle Bigota in year 2002, case section 9, 27, 31, 39, 48A, 49 A, 49 B, 51	Case pending in CBI court
4	11-93/05 dated 15.03.05 Range Flying Sariska	Poaching of Panther in Karali ka daba, Jungle Bigota in year 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 51	Case pending in CBI court

Wildlife Crime Sensitive Areas

Identification of wildlife crime sensitive areas is must to plan proper anti-poaching strategy. Keeping this in view poaching sensitive areas based on the past record of poaching should be identified and delineated on map. This sensitive areas along with entry routes of poachers with GPS coordinates will help in precise anti poaching strategy planning. From past records areas prone to poaching in Sariska Tiger Reserve are as follows

a) Range Sariska

Amra ka bas, Udainath, Bandipul, Sarunda, Ghamori, Naldeshwar, Kiraska, Malajoharka are the sensitive areas. Amra ka bas, Kishori, Udainath are the entry points from where the vehicles can enter in Sariska Range.

b) Range Tehla

Boretha, Kaimala, Jahaj, Haripura Rundh, Ajabgarh, Bandipul are the areas prone to poaching.

c) Range Talvriksh

Raikamala, Loz Nathusar, Panidhal, Rampur are the sensitive areas for poaching.

d) Range Akbarpur

Nandwaj, Siliberi, Narandi, Aaman, Rotkyala, Sukola, Dabli, Kalakari, Prithvipura, Peelikhar areas are highly susceptible to poaching.

STRATEGY FOR CONTROLLING POACHING

IMPROVING STAFFING PATTERN

Effective protection of the wildlife reserve depends on the strength of the Staff. Apart from number, the capability of the staff is also required. Capability in terms of health, training and inclination. The forest guards are cutting edge for wildlife protection. They form the front line force. Trained persons can deal with the crime better. Wild Life management has emerged as a science and they have to learn the principles of biodiversity conservation, gene pool, eco-system, population dynamics, estimation of population etc.. It has become increasingly difficult to entrust them with tasks requiring certain level of training and education. The probability of error in execution of a scientific task is very high. Apart from this, additional pressure of communication with villagers so as to ensure their participation in protecting Tiger Reserve is there. The staff also lack regular training required to make them efficient to take coordinated action against poachers and the miscreants.

Every chowki will be equipped with one forester/Asst. forester, one forest guard for every beat and one beat assistant as cattle guard/home guard.

The staffing pattern will be designed to meet the special needs of the Tiger Reserves and will be regularly reviewed after every five years.

Special Tiger Protection force will be created through careful selection of personnel and training with police force. Women Forest Guards are being inducted to deal with women offenders.

MOBILITY

With change of time, the criminals have become equipped with fast moving vehicles, sophisticated weapons, mobile phones etc. The Tiger Reserve Management is not in a position to over power the criminals with the existing mobility. It would be helpful to provide gypsies to all Range Officers and Motor Cycles to all Foresters. Cycles will also be kept in Range Offices and Foresters' offices to be used as per the need of patrolling. It is also suggested to keep one tractor at each Range Office for patrolling in tough terrain and for clearing patrolling tracks.

CONTROL OVER USE OF FIRE ARMS AROUND CTH

A large number of people hold fire arms around CTH. There is a need of strict compliance of provision of section 34 of the Wildlife Protection Act 1972. The registration of weapons will be completed within stipulated time frame.

CONTROL OVER BLASTING ACTIVITIES

A large number of mines are operating close to the Tiger Reserve. The department has no control over these mines. Explosives are very frequently used in these mines legally or illegally. It creates confusion since the explosions can be used to suppress gunfire used for poaching. The mining activity also attracts communities as labour force, which resort to poaching. Therefore it is essential that no mining should be allowed within designated ecosensitive zone around STR.

FIRE ARMS TO FIELD STAFF

It is required that firearms are provided to all officers from the Field Director down to Foresters. Each patrolling party/Antipoaching camp/Antigrazing camp should be provided with firearms. The Government Order empowering forest officers to use firearms is grossly inadequate. As an example, the government order prohibits use of firearms in the night, whereas the most poaching takes place at night. Government orders should be got issued on lines of Assam forest department for use of fire arms.

RESTRICTIONS ON UNAUTHORISED MOVEMENT

A very large number of villagers tend to move in CTH as religious tourists to Pandupole and other Temples. Such movements are done in the pretext of grazing animals, wood gathering, worshipping etc. This unregulated entry provides opportunity to the poachers to enter the forest to commit wildlife crimes. This will be closely monitored, regulated and checked from time to time.

Raids

The forest staff should remain vigilant about the movement of the hunting communities and nomadic tribes specially Bawarias. The camps of the Bawarias should be searched from time to time and an eye should be kept on their activities. It should be ensured that no such camps are established in the vicinity of Tiger Reserve.

The CBI, during the Tiger Crisis, suggested short and long term measures to strengthen protection initiatives in STR. In compliance to the suggestion, the Tiger Reserve Management has devised a system of regular raids to be conducted by the Range officers in their respective areas.

A meeting of police officers and forest officers should be held time to time to exchange information about presence of probable poachers and arrest of wanted poachers.

Reward to informers

Suitable reward to informers should be paid and secret register will be kept without declaring names of the informers. The register should be in personal custody of Field Director/Deputy Director. The poachers generally have serious criminal behaviour. The traditional hunting communities and nomadic tribes have vast network throughout the country even through marriage alliances. Inquiries have shown that nomadic tribes from as far as Haryana and Delhi had hit Sariska Tiger Reserve for poaching. With this scenario, it becomes very essential that strong preventive action has to be taken to curb wildlife crimes. For getting accurate and timely information reward to informers is essential for which provision can be made in APO.

The Tiger Cell

International Trade and market forces are compelling the man to kill the innocent creatures of nature brutally to fulfill his greed. A good protection plan can ensure the well-being of wild-animals in the area. The ultimate aim or concern of a protection plan is prevention of wild life crime, that can be ensured by creating the fear of being caught among the poachers. A fear of being detected and a cost of imprisonment will ensure the protection of animals.

A Tiger Protection Cell at the Office of the Field Director shall be created for monitoring day to day activities of the Reserve. The DCF will co-ordinate the protection work that will include supervision of protection duties with respect to intelligence gathering, raids in villages, surprise checks etc. This cell will also prepare sensitive area maps delineating areas succumb to poaching and poaching prone habitations around the STR in the Districts of Alwar, Dausa and Jaipur. Crime cell will be established at Tiger Reserve level comprising of an ACF, a Data entry operator and one office staff. The wildlife crime data will be fed in Wildlife Crime Control Beureau, New Delhi website being maintend for wildlife crimes in India. The wildlife crime alerts issued by WCCB New Delhi will be taken into account by wildlife crime cell of tiger reserve management for effective control on poaching. The wildlife crime map of Alwar district and its surrounding will be prepared. Similarly wildlife crime map will also be prepared at range level. A good crime map should have all the information about roads, Vantage points and permanent / temporary camps that have been established by nomadic/ hunter tribes.

It is a key to prevent wildlife crime and any effort, to save wildlife, will not give results until the intelligence system is very strong. The Sariska crisis largely happened due to the lack of intelligence failure. After the crisis, steps were taken to restore the protection system with developing the Intelligence network and secret fund is being utilized every year to nab poachers. Efforts are being made to develop informers in each villages located in and around Tiger Reserve. In peripheral villages , it is important to develop informers so as to get timely information about presence of poachers. It is necessary to have secret information cover upto a distance

of 20-25 kms from the Tiger Reserve boundary. The informers have to be given incentive from time to time apart from providing mobile phones and recharge coupons. At times mobility also has to be provided to informers to gather required information. For this sufficient secret information fund has to be made available at disposal of Field Director/Dy. Field Director.

Special Tiger Protection Force (STPF)

The policy initiatives announced by the Finance Minister, Government of India in his budget speech of 29-2-2008 contains action points relating to Tiger Protection. A one time grant has been given to NTCA for raising arming, and deploying the STPF on 100% central assistance.

Each STPF company under option First of constituting STPF by Police, consists of 112 personnels headed by Deputy Commandant of the rank of the Deputy Superintendent of Police and three Sub-Inspectors.

The STPF would work under the supervision of Field Director, Sariska Tiger Reserve.

The total recurring cost is Rs. 3.625 crores per year, while the non-recurring cost would be 1.579 crores.

The STPF companies would receive special training from State Police department as well as Central Para Military Forces based on special syllabus for skill development, combating poaching, and enabling intelligence enforcement in forest terrain.

In the initial guidelines issued by NTCA, STPF was to be constituted by Police Personnels, but National Tiger Conservation Authority wide its letter no 15-5/2008-NTCA (Part-1) dated 11-8-2009 and dated 9-1-2013 has given second option for constituting Special Tiger Protection Force by recruitment of Forest Personnels. 30% of Special Tiger Guards (equivalent with the forest guards) would comprise of local forest dwelling people outsourced through an authorized service provider. Such outsourced staff would be entitled to the same salary and emoluments through the service providers, as regular forest guards of STPF. However, there should be

relaxation of educational qualification to provide scope for this arrangement.

The constitution of Special Tiger Protection Force in Sariska Tiger Reserve is must considering the endangered status of reintroduced Tigers and the need for urgently stepping up protection in sensitive areas. The Chief Wildlife Warden of Rajasthan vide letter no 612 dated 11.06.2012 has demanded constitution of STPF for Sariska Tiger Reserve on priority. The DIG, NTCA vide letter no 15-5/2008 (NTCA)(Part-I) dated 21.06.2012 has communicated that in view of the past history of Sariska Tiger Reserve deployment of STPF in Sariska is indeed required. The proposals for constituting STPF for Sariska reflecting the required funding support for raising, arming and deploying STPF may be submitted.

In Sariska Tiger Reserve, STPF would be formed based on second option, where recruitment of Forest Personnels will be done to ensure effective protection of Tiger Reserve. The STPF company would be constituted by recruiting 108 Special Tiger Guard would be equivalent rank of Forest Guards. The company will be comprise of 3 platoons, with each platoons under a Tiger Force Range Officer, assisted by 6 Tiger Force Foresters and 36 Special Tiger Guards. One Assistant Conservation of Forests would be overall incharge of the Tiger Protection Force, who will work under the supervision of Field Director.

Check posts

At present, the fixed entry points for vehicles are, Sariska main gate and Tehla gate, but villagers enter the sanctuary through other sides also like Nandu, Jahaj, Kalakari, Garh, NaLdeshwar, Bharathari, Udainath ,Siliberi, Bandipul, Raika Nathusar,Binak,Devra area. Border chowkies have to be strengthened..

To check the movement of poachers, road barriers and check points should be created. Following points require special attention:

Gola ka bas	asan
Ghat	Naya Gawn Bolka
Kalakeri	Beenak
Kalikhhol	Gurha

Four barrier check posts at Ghata Bandrol, Thankyou Board, Bharthari Tiraha and Kushalgarh have been created in pursuance of Honble Supreme courts order. These check posts have to be strengthened.

Specialized equipments

Like night vision equipments and cameras will strengthen the affectivity. Each range office should be provided with one night vision equipment and a camera. Metal detectors can be provided to each range to find presence of traps, guns etc during search operation.

Effective Foot Beat Patrol

For ensuring effective protection in Tiger Reserve, effective patrolling in all beats is necessary. For this in STR, the NTCA Phase IV Monitoring Protocol for beat tracking by use of GPS has been adopted and is being followed from August 2012. The data obtained from beats is compiled and useful information is generated by MsTriPs soft ware.

Night Patrolling

Vehicular night patrolling is done at Range level and Division level by Range officers and ACF's in poaching prone areas. The flying squad headquartered at Sariska is sent for night patrol based on information.

Operation Alert

As a step further, to add strength to the protection initiative, innovative approach by instituting "OPERATION ALERT".

Alerts have been issued by NTCA and WCCB from time to time highlighting presence and activities of poachers. Once the the alert is issued the field staff scan the entire area with respect to given information.

In vulnerable areas within the Tiger Reserve, especially during winters where the information about presence of poachers is received by Tiger Reserve Management, alert is issued and then specially constituted teams are deployed in the area to keep watch on the activities of suspicious persons and take necessary actions including areas.

Arrest of wanted offenders

A special drive to arrest wanted offenders in pending cases in Sariska Tiger Reserve to be continued to create fear in offenders connected with poaching of wild animals.

Anti Poaching Camps

To ensure effective control on poaching anti poaching camps will be established in areas which are sensitive to poaching. Each Anti poaching camp will be having adequate infrastructure along with mobility and arms. The Anti poaching camps at Rampur, Kalakeri, Siliberi, Bhakatpura, Rotkyala, Devri, Rajore, Parasarji, Udainath, Thanagazi, Raika and Kundla will be established. Anti poaching camps can be further developed at places which are sensitive poaching in future. Proper accomodation and other facilities will be made available to the front line staff posted in Anti poaching camps. In each Antipoaching camp 3-4 forest guards, 4-6 cattle guards/home guards and 2-3 EDC personnels will be posted on each Anti poaching camps headed by Forester. Anti poaching camp can coincide with Anti grazing camp & same staff will do both functions. These Antipoaching camps will be strengthened by providing adequate infrastructure and other facilities.

Peyment of Compensation for Cattle Kill

DCF in now authorised by CWLW to pay compensation. Availability of funds, round the year, has to be ensured from Sariska Tiger Conservation Foundation. Normally late CSS sanction is received for payment of compensation. As far as possible compensation should be paid, to the person concerned, with in 24 hours.

There is an urgent need to reduce the man animal conflict and for improvement of relationship between the Tiger Reserve Management personnel and the villagers.

Poaching is mostly done when the wild animals stray out to the agricultural fields. The Bawarias employed for crop protection are mostly involved in poaching. Villagers provide full protection to the Bawarias. There is strong link between crop depredation and poaching by Bawarias.

There is need to identify such sensitive areas, where crop raiding by animals is common. All Bawarias employed in the villages should be listed out. Meetings should be held regularly to wean away Bawarias. The cattle kill compensation cases should be paid as early as possible.

Forest Protection Roads

The existing forest routes would be maintained every year. The list of existing forest roads is given in **Annexure -13**. The new forest roads will be constructed for monitoring of tigers and control over illegal grazing on plateaus. A network of new roads is also essential for antipoaching & night patrolling in critical tiger habitat. The forest road would be constructed in such a manner so that the tiger reserve gets fortified from inside with good approach and constructing chowkies at strategic places

Forensic Investigation

The system and procedure of forensic investigation is not well settled and laid down. A lot of confusion prevails while sending the seized wildlife material for forensic analysis. The forensic experts at district level under control of SP should be utilized by making request and writing, alongwith vaternery officer during the postmortem examination. The Samples for finding cause of death may be sent to State Forensic Lab, Jaipur while for identification of species samples may be sent to Institutions like WII, IVRI Ijjatnagar and Hissar veterinary college. NTCA guidelines for Carcass disposal on death of tiger/leopard is given in **(Annexure - 58)**.

Follow Up Of Cases In Courts

There should be prescribed time frame for investigation and filing charge sheet in offence cases. Training should be given from time to time to frontline staff for properly framing wildlife cases with strong evidences and proper sequence of events. Confession statements of offenders and other evidences should be properly recorded before ACF under section 50(8) of WLPA, 1972. After filing chargesheet it should be ensured that all evidences are properly recorded before court.

Powers to get call detail and phone Interception

To keep watch on the activities of potential poachers around Tiger Reserve, powers to get call detail and phone interception like other agencies like Police, CBI etc. is urgently required to know about the movement of poachers. The power can be delegated to the Field Director/Dy. Field Director.

COORDINATION WITH OTHER ENFORCEMENT AGENCIES

(a) Coordination with Local Police

The police department in districts of Tiger Reserve has to sensitize for wildlife offences and trade involved. For issues like registering cases for unlicensed arms, raids and searches in villages, police has to be involved and taken into confidence. For better coordination with police at different levels, direction has to be issued by head of police department to subordinate officers working in districts where Tiger Reserve are located. The local SP can also be helpful in providing call details of potential offenders.

(b) Coordination with Forensic department

In case of occurrence of wildlife offence, the role of forensic units is important for collection of proper samples, timely submission of reports etc.

(c) Coordination with CBI and other intelligence agencies

It is important to have proper coordination with state intelligent agency like CID and National agency like CBI at Chief Wildlife Warden and Field Director level.

(d) Coordination with WCCB, TRAFFIC India and Others

The National agencies like Wildlife Crime Control and TRAFFIC India Bureau can help Tiger Reserve Management in Training of frontline staff, developing information network, creation of crime data cell, providing information regarding movement and activities of poachers. These organization can also help in creating wildlife friends around Tiger Reserve as part of information network and support to frontline staff.

STPF should be put in place (forest option), besides innovatively involving the local workforce in protection. The patrolling intensity, intelligence gathering system involving the frontline staff/ local workforce is required to keep track of traditional wandering gangs involved in poaching from nearby States of Haryana and Delhi . Due authorization for tracking telephonic conversation needs to be obtained as and when required, with exchange of sensitive information amongst the field personned through a dedicated control room.

7.2.2.1 (iii) Theme plan for Fire Protection

One of the important factor which commands profound effects on forest and wildlife, is fire. Forest fire has beneficial effect under control but has hazardous effect when it is wild. Fires usually do not kill a large number of animals but they do harm micro fauna and flora of the habitat. Fire destroys the organic matter, which contributes to the humus content of the substratum. Fire changes the abundance and composition of wildlife communities drastically, and a general ecological effect of fire is to reverse the natural plants succession. The fire also destroys the eggs of a number of ground-nesting birds and reptiles. The fire compels animal and bird population to abandon the habitat and migrate randomly in various directions, which may disturb the spatio-temporal utilization of a habitat. Many seeds and several plant species are completely destroyed by fire and their regeneration is affected adversely.

Specific fire protection scheme would certainly check spreading of fire, with a system of immediate detection of fire, speedy communication, quick arrival to the fire site, immediate action to extinguish the fire on war footing scale. One of the most important fire protection measures, is to get reciprocal commitments regarding control of forest fire through regular meetings with local people of the surrounding villages.

FUNDAMENTALS OF FOREST FIRE

It is necessary to understand and evaluate the causes of fire, which are many. The factors contributing to fire are heat, fuel and air. In a fire-control operation, one or more of these factors would need to be eliminated. The spread of fire depends upon fuel and weather. Heavy fuel like logs, stumps, and branch wood burn readily but slowly and throw off a large volume of heat, when dry. Light fuel such as dry grass, dead leaves etc. burn quickly, accelerate spread of fire and kindle heavier fuels. So far as weather is concerned, wind, moisture and temperature are important. Strong wind fans rapid spread of fire by augmenting supply of air. Wind is the least generally in the early morning. The moisture content of fuel is also an important consideration for fire-control. Under normal circumstances fire burns slowly in the night, because the damp air and moisture is absorbed by fuel. Air is drier during the day and causes rapid burning. It is thus easier to control fire in the night than during the day. It, however, does not imply that no serious effort should be made during the day to extinguish the fire. In fact, most fires are controlled during the day, due to various other considerations. Air temperature is another important consideration, as it not only affects fuel and air movement, but also the fire-fighters themselves.

CAUSES OF FOREST FIRE

Forest fire may be accidental or deliberate. Among accidental, fires may start as a result of carelessness on the part of smokers, picnickers, travellers, forest laborers, collectors of NTFP. Forest fires are at times intentionally set by graziers, for lush growth of grass, by poachers to drive out wild animals for hunting, by honey collectors to drive away honeybees, by antisocial elements on account of vandalism or to obliterate evidences of the forest offence committed by them. Fires are many a times set unaware by pilgrims along roads. Still others set fire to the forests through a die-hard superstition of propitiating a deity.

SOCIO-ECONOMIC IMPACT

Forest fires are recognized not only as a major constraint to production forestry but also as a principal factor causing degradation of the human environment. Some of the impacts of forest fires are tangible but are difficult to evaluate in monetary terms. Studies of dynamics of vegetation reveal, that the original species which propagate readily from seed, or coppice from the stump, would tend to reappear on a site after a forest fire. Thus highly flammable species would immediately revegetate and perpetuate a hazardous fuel-type. The other deleterious impact of forest fires is aggravation of surface and gully erosion. The area burnt upstream would tend to reduce the storage capacity of the reservoir downstream. It has been observed that site degradation on account of repeated forest fires causes, soil erosion and floods, which have an adverse effect on streams, lakes and man-made reservoirs.

FIRE PRONE AREAS

Based on the vulnerability to forest fire, dry deciduous forest, grasslands, scrubs and areas falling within the settlements areas falling under Sariska Tiger Reserve are highly fire prone.

FIRE CONTROL MEASURES:

The key factors in controlling the fire will be:

1. Timely and meticulous planning.
2. Effective utilisation of fund.
3. Proper gearing up of available machineries.

Following measures are laid down to guide in combating the situation to make Sariska Tiger Reserve free from fire.

1. Preparation of Fire Map:

The Range wise fire map in a convenient scale will be prepared with division of entire Range into High, Medium and Low fire prone zones with different colour coding (eg. Vermillion/pink/yellow) to different zones. The parameters for determination of proneness to fire will be nearness to habitation, forest type (microclimatic), passages through the forest and distance from water bodies etc. The Dy Director will submit a copy of the map to the Field Director latest by 31st January. After fire season is over

the Range Officer has to submit a report of success/failure with a map showing the incidents of fire. .

2. **Prevention of fire:**

The aim shall always be to prevent the forest fire from breaking. Following steps are to be taken to achieve this objective.

Creation of awareness: The message of the evils of forest fire and the duties of the villagers residing on the fringes and enjoying the usufructs shall be disseminated among the people.

Provision of incentives: The motto will be to prevent forest fire by motivating and winning the heart of the people through incentives. EDCs will be activated and incentives shall be given to the committees/villages showing active involvement in fire protection in their area.

Clearance of fire lines: All the forest roads, boundaries and footpaths passing through or touching the forest shall be taken as fire lines which shall be cleared of leaves and other inflammable materials. In case of forest road at least 3mt on either side shall be maintained clean and in case of live footpath a 6mt strip shall be cleaned which shall be maintained regularly. New fire line if required will be cleared in 3 mt width. New firelines will be created in forest areas of CTH which become vulnerable to forest fire in future.

Deployment of fire watchers: Sufficient numbers of fire watchers will be deployed on the fire lines those will patrol over the area to give information on incidences of fire to the nearest chowky.

Deployment of informers: In the villages informers are to be engaged to keep track of the poachers and pass on the information to the concerned forest officials in the field.

3. **Fire fighting:**

In order to combat the fire, fire fighting squad at the rate of one or more per Range will be formed depending on availability of fund. The squad will consist of 10 persons on daily wages under control of one regular staff, i.e, Forester or Forest Guard. The squad will be equipped

with vehicle, fire fighting tools and wireless handset. The squad will work round the clock and prevent fire in collaboration with the villagers to whom incentives have been given. They will also extinguish fire on receipt of information on outbreak of fire.

Detection of Forest Fires

Effective controlling of fire calls for prompt detection and reporting. Detection implies location of the fire and passing on the intelligence to the persons responsible for control. If detection is inefficient, the fire would engulf large areas by the time suppression forces reach the fire scene. No suppression is possible till the fire is detected. The interval of time between origin of fire to arrival of the suppression force would cover operations such as: detection, reporting, preparation and mobilization. It is imperative that fires are detected no sooner than they originate so that they can be controlled with ease, and the damage restricted to the utmost minimum. It is not feasible to keep the entire forest area under observation at all times or even during the fire season. Parameters such as: the value of the forest to be protected, the frequency of fire occurrence in the area, the nature of the fire and its concomitant adverse effect, facilities for transport and communication, financial resource, the strength of the suppression force and its availability, fire –fighting equipment available, help determine the “ priority areas” for observation and the detection-time standards.

The possible means of fire –detection include

- (i) voluntary detection and reporting by the general public ;
- (ii) ground patrolling;
- (iii) watchtower observation and
- (iv) remote – sensing (MODIS satellite information)

An efficient detection system should make use of all these methods, according to special needs of the area of risk.

4. Post-fire operations

In spite of all the precautions, if fire break out, immediate steps to be taken to extinguish it and the gutted area to be measured and mapped out, the loss to be assessed and the reasons for fire along with responsibility need to be fixed.

Safety

Fire-fighting is a hazardous task. Every precaution shall be taken to prevent injury to the fire-fighting crew. The fire-fighting crew shall be properly equipped with a first-aid kit. Fire-fighting crew shall be supplied with fire-resistant clothing. Fire-resistant cloth is now being made within the country at reasonable price.

5. Accountability:

The staff will be accountable for the fire in their area and necessary disciplinary action will be taken against them.

6. Monitoring and evaluation:

In order to monitor the programme, control rooms in the Division and Range Offices will function round the clock. In the STR headquarters a daily monitoring register has been kept where all the cases of fire incidence along with the action taken will be reported. After the fire season is over, the entire area is to be inspected by the concerned Dy Director and evaluate the works of the staff. Outstanding performance of any officer/ staff/ labourer/ village committees will get suitable recognition.

The Deputy Director will generate fire control Map indicating the fire burnt area every year and submit to the Field Director. The information generated will be utilized while planning fire protection for the ensuing year. Range officers will submit fire occurrence report to deputy director in the performat prescribed below.

Sl no & date	Range	Locality	Extent affected by fire in ha	Nature of damage	Loss if any	Whether fire has been put off	Remarks
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(iv) THEME PLAN FOR FUEL WOOD AND FODDER PROBLEM

As per provisions of WLPA, 1972 section 38 V (4)(i) core or critical tiger habitat areas of National Parks and Sanctuaries, where it has been established, on basis of scientific and objective criteria, that such areas conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers. With these provisions it has become imperative to

make CTH of Sariska inviolate. The reintroduced tigers ST3, ST5 have not breed due to human disturbances so it has become more essential to reduce biotic interferences in CTH through strict enforcement and providing better alternative options. The available of patchy buffer around CTH has further increased challenge for making CTH area inviolate.

The Sariska Tiger Reserve is surrounded by more than 150 villages and 4 townships located within 5 KM radius from the Tiger Reserve with a human population of about 2.5 lacs and a cattle population of 2.75 lacs. The conflict is intensifying further every year because of excessively higher population growth @ 4% per annum and the changing traditional lifestyles of the people. About one – fourth of this population directly depend for fuel and fodder resources on CTH forest area.

Though much of the dependence on tiger reserve resources is primarily for self consumption, a proportion of population in the towns and villages use the Tiger Reserve as a source of economic benefit by earning livelihood by sale of firewood.

The maximum consumption of wood is during winters. Tehla, Thanagazi, Malakhera, Rajgarh, Rampur, Bansoor highly depend on forest for firewood . Availability of firewood is low in the area and the people are resorting to pollarding and cutting of live green trees.

The villagers cut grass in forest areas of CTH in month of September- October and carry to their villages. Some villages cut grass & heap there itself in forest areas and carry it home when it dries up in month of January- February. The grass cutting is resorted mainly in Bana, Phatykhora, Malajhodka, Rotkyala, Boh forest areas. The practice needs to be stopped.

The local villagers also resort to lopping of leaves for fodder in month of November to March for feeding cattle. Almost all trees of Dhak & other palatable species around villages are lopped for fodder every year. Due to heavy lopping the habitat gets degraded. The practice need to be stopped. The goats graziers espicialy cary excess axe and lop tress in large numbers causing tremendous loss and distrurbance to tiger habitat.

The collection of fued wood and fodder is mainly done by women folk so through Eco Development Committees women should be educated

for not carrying axe in Critical Tiger Habitat and not to cut green trees. For this women forest guards and women home-guards can be involved for achieving objectives.

Suggested strategy

- Collection of village wise data to estimate the gap between demand and supply of fuel wood & fodder to plan accordingly to mitigate the gap.
- Large scale tree planting programme in the village community lands surrounding the STR has to be taken up. This can also be done on the marginal lands and agricultural bunds. This will reduce pressure of fuelwood and fodder on CTH.
- Illegal wood removal has to be stopped.
- No grazing in CTH is permitted as it has to be inviolate space to ensure long term survival of tigers. Till the villages are relocated, the grazing should be regulated. A system of rotational and deferred grazing should be adopted and in no case cattle will be permitted to camp inside forest areas of CTH and go more than one KM in the forest area from the village boundary. No one should be allowed to carry axe while collecting fuel wood or grazing cattle & goats. CWLW Rajasthan has already issued orders for not carrying axe in sanctuaries/National Parks & treating axe as a weapon.
- The protection network of the Tiger Reserve should be strengthened to counter the menace of illicit felling, lopping & pollarding of trees. Adequate infrastructure will be provided to control the menace.
- People's participation should be encouraged and more and more EDC's should be constituted and strengthened to reduce green fellings for fuel wood & fodder.
- Cattle drinking water facilities should be developed in the villages so that they do not share water hole with wild animals in forest areas.
- LPG connections should be released to villagers surrounding the Tiger Reserve at 50% subsidized cost to reduce pressure of fuel wood on CTH. The List of LPG connections provided on subsidy to peripheral villagers in Sariska tiger reserve is given in **(Annexure - 30)**
- The out of turn agriculture electric connection will be provided through EDC's for growing fodder as per Govt of Rajasthan circular to meet demand of fodder locally.
- The Schemes such as Biogas, Fuel efficient Crematoria, Solar lights, Solar cookers, Fuel efficient Chullhas, stall feeding, bread

improvement should be promoted with active participation of the Tiger Reserve staff.

- Integrated Dairy Development project with stall feeding should be initiated around the Tiger Reserve to reduce number of unproductive cattle and improve livelihood opportunities of local people.
- Soil conservation measures including cost effective methods to promote natural and artificial regeneration should be adopted and executed on project basis.
- The participation of villagers should be solicited in improving the Ecosystem.
- Training programme for villagers to be organized through EDC's for creating awareness about role of forest & wildlife in eco system. 'Kulhad bandi' to be promoted through local people involvement.
- The people who carry axe in forest or cut green trees for fuel wood & fodder should be exemplarily punished. From September to February special patrolling parties should be constituted at range level to check the menace.

7.2.2.1 (v) THEME PLAN FOR BOUNDARY DEMARCATION AND REMOVAL OF ENCROACHMENTS

Supreme court of India in SLP No 587/1992, Tarun Bharat Sangh v/s Union of India & others has issued interim orders for demarcation of boundary of Sariska tiger reserve. Many efforts has been made in this regard but still boundary demarcation is not clear. There are 68 mines located in the periphery of CTH of Sariska tiger reserve, so it becomes more important to clearly demarcate CTH boundaries on priority .Boundary demarcation and mutation in revenue records is essential to check illegal mining and encroachments in the CTH. The records of mutation should be complete so that allotment of land is not done by the Revenue authorities. The situation of boundary pillars is poor in Project Tiger area. Some of the pillars are missing. Boundaries of National park, Sanctuary vis-à-vis Critical Tiger Habitat are to be marked on map. 'Rundh's' are is not surveyed. These boundaries are to be marked according 'The Alwar Sattlement Report 1947. All villages inside the CTH are to be demarked on the revenue map and ground to take action against encroachers.

Table 18 : FOREST AREA AND AREA TO BE MUTATED (As on 31-03-14)

S.No.	Name of Block	Total Area (in hectare)	Area to be mutated (in hectare)
1	Kushalgarh	1319.50	1049.75
2	Kraska	1314.25	393.00
3	Jodhawas with Rajoor	1359.00	1250.35
4	Kalighati	6902.00	6875.80
5	Todi Nijran	230.00	230.00
6	Kankwari	3217.00	3217.00
7	Kushalgarh	227.91	-
8	Kraska	1216.74	-
9	Indok	1313.61	3.76
10	Kalachara	219.92	0.12
11	Karna ka bas	323.20	-
12	Amra ka bas	216.30	29.34
13	Duhar mala	1673.86	15.28
14	Thanagazi	235.07	5.50
15	Bhudyawas	129.12	-
16	Shyampura	200.00	-
17	Raipura	210.00	23.25
18	Silibawadi	2553.25	2163.00
19	Ajabgarh	465.75	465.75
20	Bhangarh	1127.00	1127.0
21	Narayaniji	1458.00	1458.0
22	Dabkan	1492.75	1415.75
23	Tehla with Bhagani	2482.50	2266.75
24	Nandu	6944.50	6805.75
25	Umri Devri	7469.75	6784.75
26	Haripura	390.25	390.25
27	Choti Chind	42.25	-
28	Ajabgarh	95.25	0.25
29	Piplai Main	1391.88	-
30	Piplai 'A'	34.75	-

31	Nadoli	66.00	-
32	Khirat ka Bas	118.79	4.0
33	Bhangarh	462.35	60.02
34	Dhiroda	421.05	297.61
35	Dhiroda	610.90	6.04
36	Pawta	61.37	-
37	Berwa Dungri	605.89	40.28
38	Beldevgarh	680.90	623.46
39	Tilwar	770.29	216.05
40	Jaisinghpura	926.45	690.94
41	Mallana	381.76	3.11
42	Kalwar	299.20	20.90
43	Dabkan	506.40	70.59
44	Tehla	174.59	45.96
45	Khariyawas	218.50	24.96
46	Nandu	822.55	372.25
47	Siliberi	218.50	20.48
48	Rajoor	2426.93	167.13
49	Mitravat	39.32	8.79
50	Kalavas	83.59	-
51	Beenak	6225.75	190.61
52	Kalikhhol	3307.25	3188.60
53	Prathvipura	329.00	214.73
54	Madhogarh	649.25	649.25
55	Siliberi	6870.00	6870.0
56	Dhelawas	64.77	24.58
57	Bhakatpura	67.18	-
58	Kishanpura	418.17	27.92
59	Sawadi	104.72	104.72
60	Dhawala	151.75	-
61	Gopalpura	107.22	1.0
62	Dharampura	325.07	-

63	Madhogarh	2217.01	-
64	Prathvipura	1081.82	-
65	Rampur	4244.75	3577.52
66	Bani Tallvriksh	103.75	-
67	Nangalheri	919.57	16.51
68	Berawas	1354.49	45.65
69	Raikamala	530.31	1.12
70	Manawas	115.61	12.66
71	Tolawas	210.09	0.06
72	Bilahat	268.65	-
73	Basana	42.12	0.25
74	Bisaalu	179.59	55.29
75	Lekri	140.57	-
76	Todiyabas	32.36	-
77	Ghat	174.65	-
78	Mundli	33.24	4.16
79	Hazipur	59.60	5.33
80	Rampur I	151.27	44.67
81	Rampur II	194.41	47.11
82	Rampur III	40.46	20.33
83	Rampur IV	710.86	252.87
84	Nathusar	535.24	-
	Total	88111.24	54388.16

STRATEGY FOR BOUNDARY DEMARCATION & MUTATION

Outer Boundary of the Tiger Reserve will be carefully checked and marked clearly on the map and ground. The boundary of villages inside CTH will also be demarcated so that villagers do not encroach on forest land, revenue land and charagah land. For this the record of khatadari lands in villages should be maintained at range level and action should be taken against encroachers with the help of revenue department for encroachment in revenue and charagah lands.

Pillars will be erected on priority basis. The entire forest land/government lands/charagah lands falling in CTH will be mutated in the revenue records in the name of Forest department.

Beat maps of the area will be prepared showing the compartment boundaries clearly with other important features. The beat guard will have these beat maps, all the time, so that he can inspect the boundaries falling in his area of control. The beat system is the basic unit for management and the boundary marks will be maintained regularly. Compartment plates will be fixed at suitable places to demarcate compartment boundaries. Beat guard will be responsible for maintenance of compartment boundaries. Similarly block boundaries will also be marked on ground and maintained.

DCF, ACFs, ROs will regularly check these boundaries during their routine inspection of the area.

Name of Block and number of pillar will be inscribed on the pillar and record will be maintained in the office.

The entire forest land record will be entered in the computer. Village wise copy of the recorded forest land (Jamabandi) will be obtained and updated in computer every year. The unmutated land including revenue land/Charagah falling in CTH should be mutated on name of forest department on priority basis to avoid further encroachment on such lands.

Liaison will be established with the Revenue authorities to carry out mutation of forest land. The revenue lands & Charagah land falling in CTH should be mutated in the name of tiger reserve by District Administration. For this already directions have been issued by Additional Chief Secretary Forest Rajasthan which needs to be complied at earliest. The lands which have been surrendered by villagers during village relocation should be immediately mutated in name of tiger reserve. Presently the Charagah lands are not being mutated by Revenue department, for this suitable directions from State Government got to be obtained. Proper record of the area mutated and area remaining unmutated will be maintained in the Division office in the computer as well as in files.

Out of 881.96 sq km forest area of CTH, 604.97 sq km is reserve forest area. 543.88 sq km of this reserve forest area is not mutated in the name of forest department. In reserve forests there are 19 rundh's which are unsurveyed areas. Orders for joint survey of these unsurveyed rundh's have been issued by District Collector Alwar. Presently maps of only 8 rundh's have been prepared. The area of rundh Beenak has been mutated name of forest department during settlement of samvat 2051. For 7 Rundh's as per direction of District Collector Alwar joint survey has been done by team comprising of revenue and forest officials. DCF sariska vide letter No. 3612 Dated 9.4.2014 has sent proposals to collector Alwar for mutation of these 7 rundh's which has been sent to State Government for approval. The details of area is as follows:

Table 19 : Rundh area in Sariska Tiger Reserve

S. No.	Name of Rundh	Name of revenue village in which Rundh area to be added	Name of Tehsil	Area in ha.
1	Rundh nandu	Nandu	Rajgharh	6885.47
2	Rundh Umri devri	Umri	Rajgharh	6531.00
3	Rundh Narayaniji	Barwa dungri	Rajgharh	1126.29
4	Rundh dabkan	Dabkan	Rajgharh	1432.33
5	Rundh kalighati	Thanagaji	Thanagaji	5637.27
6	Rundh silibawadi	Silibawdi	Thanagaji	3006.00
7	Rundh Ajabgharh	Ajabghadh	Thanagaji	557.88

Therefore this area of 25250.77 hac. of above Rundh's is to be mutated on name of forest department on priority. The joint survey of remaining 11 rundh's is to be done at earliest so that mutation is completed.

Efforts will be made to keep liaison with the revenue department not to change the status of the land within proposed eco-sensitive zone around CTH. Central Empowered Committee had given direction for demarcation, in compliance of these directions this work needs to be completed on priority.

Removal of Encroachments

Encroachment is a major problem in STR. The encroachment in the Core area is primarily for agriculture, housing and religious purposes. There are cases of encroachment in the village Gola ka bas, Tehla, Boretha, Prathvipura, Kalikhol, Amra ka bas etc. villages for agriculture purposes. Encroachments for housing and commercial purpose exist in Kushalgarh, Indok, Madhogarh etc. villages. Religious encroachment existings Bharathari, Parasarji, Pandupole, Udainath & other religious places. Survey of all such encroachments should be done and strong action should be taken as per the legal provisions to remove encroachments.

The area is vulnerable for encroachment because

1. The boundary demarcation is not clear as most of the boundary pillars are missing.
2. The field staff is not well versed with the boundaries. They pay very little attention.
3. No proper land record is being maintained at Range or naka level.
4. Adequate survey staff is not available for resolving the disputes.
5. The encroachment cases donot get due priority. The disposal of cases is very slow and ineffective.
6. Encroachment cases are not being dealt under section 34A of WLPA, 1972

STRATEGY FOR REMOVAL OF ENCROACHMENT

1. Identification of all encroachments in CTH and framing proper cases with solid evidences to be tried before competent officer/court for removal of all encroachments.
2. Patrolling of the boundaries of the CTH should be done regularly to check if there is any breach of the boundary line.
3. DCF, ACF and Ros should personally inspect boundary pillars from time to time, as per the norms, and the report thus obtained should be monitored.

4. All the broken or removed pillars have to be replaced immediately.
5. Land record and block details should be maintained at division, range and naka level.
6. Disposal of encroachment cases must be done as per Add. Chief Secretary, Forest circular dated 02-5-2012 given in **(Annexure - 40)**
7. Cases of encroachment on forest land/government land/ Charagah land inside Sanctuaries and National Park be framed under WLPA, 1972 section 34 A(a), in which ACF is authorized to evict any person, who unauthorisedly occupies Government land. Under section 34 A(b) DCF is authorized to remove any unauthorized structures, buildings, or constructions erected on any government land within any Sanctuary National Park and all things, tools and effects belonging to such person shall be confiscated after giving opportunity of hearing. Apart from this Delegation of Powers of Tehsildar to ACF under Land Revenue Act Section 260 to remove encroachments under section 91 in **(Annexure -41)**
8. In CTH the encroachment for commercial activities like Shops, Dhaba etc are common on highways and new encroachment are cropping up on private lands in CTH. Action has to be taken against such encroachment under section 34 of WLPA 1972. The List of Commercial Activities in Sariska Tiger Reserve is given in **(Annexure - 26)**.
9. The villages inside the core area also need to be demarcated in a time bound manner. A dedicated land settlement officer from the revenue department alongwith supporting staff is required to complete the task, assisted by the Forest Department.

7.2.2.1 (vi) THEME PLAN FOR BAWARIAS AND OTHER NOMADIC HUNTING TRIBES

There is need to launch a rehabilitation and development programme for the Bawarias and tribes involved in traditional hunting of wild animals, living around Sariska tiger reserve. The tribes and communities involved in traditional hunting of wild animals are : Bavariya, Bagariya, Bhopa, Nat, Sansi and Kanjar. Around 300 such families are required to be taken up under a welfare programme. The rehabilitation and welfare package should be evolved in a site specific, consultative manner with livelihood options, to include : wages for such people towards their skill development , providing agricultural land with irrigation facility, basic health care, housing and related community welfare inputs and basic education facilities.

EXISTING SITUATION:

In Alwar district, some nomadic tribal families constantly engrossed in wildlife poaching activities. Bawaria is one such major community. The Villagers employ Bawarias to protect their crop from raid of wild animals that come out from forests. The Bawarias use fire arms and shoot to scare and some time to kill them. The villagers fully support the Bawarias. Because of this, the wildlife offence cases are hardly reported and even if reported it is difficult to take action against them. When the department personnel go to villages to investigate such cases, the villagers oppose them violently. They confront with the staff. There is symbiotic relationship between the Villagers and Bawarias. The socio-economic condition of these hunting tribes is very poor. They are landless and have no permanent dwellings, hence rehabilitation of these tribes is very essential. These tribes can be easily influenced by money. Now a days some Bawariya families have adopted profession of keeping horses for marriage some have become members of musical band party, while some families work at mines as labourers. They also involve in protecting agriculture crops from wild animals & work as labourers in harvesting of crops.

In anthropological terminology, the Bawaria tribe is still in the hunting- gathering stage of development. Logically the strategy for their development is to get them settled in agriculture occupation.

The rehabilitation process has to be planned with careful thought about the needs of these people, their culture, education and the new skills that they will need in order to survive.

Strategies :

1. The Bawarias to be treated as threat to tiger conservation and are to be rehabilitated as per the approved package of rehabilitation of villagers from CTH to outside.
2. Education and livelihood development programme for Bawarias will be taken up with the help of local NGOs and Tribale Welfare Department.
3. Principal Secretary Forests vide letter No. PS/ESF/2011/58 Dated 31.05.2011 has written to District Collector Alwar regarding Bawaria community, a socially and economically disadvantaged sector of population and traditionally non to be hunters, residing in the areas adjoining to Sariska have failed to get appropriate priority under the social, economic development programmes probably because they have neither being enrolled as villagers nor have been identified as member of BPL families despite the fact that almost all of them are hand to mouth. In light of this direction of ACS Forest appropriate actions needs to taken up through district administration to bring these families to mainstream of development.
4. On CF & FD, STR's initiation District Collector Alwar vide letter No. Revenue/ 2011/6493 dated 20.07.2011 has written to Dy. Secretary (Law) Panchayati Raj Department Jaipur for approval of State Government for free allotment of land to Bawaria's section 158(2) of Panchayati Raj rules 1996 by Gram Panchayat as has already been given to Mongia's of Swaimadhampur district, another hunting tribes vide Panchayati Raj Department Jaipur Dy. Secretary (Law) Letter No. F139(10)PRD/LOW/ SWM/06/3 Dated 02.01.2007.

5. The revised guidelines of NTCA issued vide letter No. F3-1/ 2003-PT, February 2008, para 4.6 provides for rehabilitation package for traditional hunting tribes living around tiger reserves. The activities will be taken for Bawaria families residing around Sariska Tiger Reserve and efforts will be made to bring these people to mainstream of development to reduce future poaching threats.

7.2.2.1. (vii) THEME PLAN FOR RETROFITTING SAFEGUARDS FOR ROADS, BUILDINGS, TEMPLES, TRANSMISSION LINES ETC.

Two State Highway 13 and 29-A pass through Sariska Tiger Reserve. Hon'ble Supreme Court of India in IA No- 2068 in WP(C) No- 202/95 / Godhwarman Trimulpad vs Union of India and others in order dated 8-5-2009 has given direction regarding diversion of traffic in Sariska Tiger Reserve as follows:

1. Four Traffic Barriers will be erected and maintained by the forest Department at Kushalgarh, Bharathari Junction, near 'Thank you Board' and Ghata Bandrole for restricting the traffic within the core area of tiger reserve on State highway-13.
2. Diversion boards at Ghata Bandrole, Kushalgarh and Bharathari Junction will be installed by the PWD. In addition two direction boards indicating commencement of the sanctuary area will be installed by the PWD at Natni ka Baran and near 'Thank You Board' (km 204/0).
3. The Tehla-Sariska road (State Highway 29-A) which passes through the core area of Sanctuary will be closed to traffic. The existing road between Burja Tirya to Thanagazi via Kishori-Ajabgarh will be repaired/renovated and used as an alternative road.
4. Movement of the commercial vehicles on the State Highway No. 13 between Kushalgarh Tirayan (km. 196/0) to near 'Thank You Board' (km. 204/00) will be stopped and

5. During the night no movement of vehicles on the above stretch will be permitted. The traffic shall pass through bypass road.

The recommendations are acceptable to the state . I.A. is allowed subject of fulfillment of above recommendation by the State.

In compliance of Hon'ble Supreme Court order dated 8-5-2009 the traffic on State High way 29-A has been closed from Sariska to Tehla, part of the Tiger Reserve. On this road, only buses of Rajasthan State Transport Coporation are plying.Insted of long route buses only shuttle buses should be permitted till villages Haripura,Kankwari and Kraska are relocated.

As per Honble Supreme courts dicision Sariska gate-Tehla road and road leading to Pandupole should not be repaired and maintained as Gravel forest road for patrolling,park and temple visitation.Speed breakers to be made at every 500 mts to ensure safety of wild animals.

The Burja Tiryra to Thanagazi road is to be repaired and renovated by PWD. Speed breakers to be made at every 500 mts from Burja Tiraha to Kishori to ensure speed limit.

The traffic barriers have been establish at Ghata Bandrole, Thank You Board, Bharathari Tiryra and Kushalgarh to divert commercial vehicles via Talvriksh, Narayanpur and Ghata Bandrole.These barriers need to be strengthened by suitable infrastructure and facilities.

After fulfilling the compliance of the Hon'ble Supreme Court 's order, the road from Bharathari Tiryra to Thank You Board passing through Sariska Tiger Reserve has been renovated by PWD.

The Bypass road from Thanagazi to Talvriksh via Duhar, Taulawas, BhamanwasKankad to divert traffic from State Highway-13 passing through Sariska Tiger Reserve has been sanctioned with a cost of Rs. 2111.00 lacs. The construction of bypass road is in progress and is likely to completed by July 2014. Once this road is constructed all vehicles would be diverted through this by pass reducing complete disturbance in this portion of CTH of Sariska tiger reserve.

There is need for construction of network of roads all around Sariska Tiger Reserve, so that pressure of traffic on roads passing through Sariska Tiger Reserve gets reduced. The Highway from Alwar to Jaipur via Rajgarh, Sikandra and Dausa has helped in diverting lot of traffic to Jaipur. The construction of road from Natni ka Baran-Prithvipura-Baleta-Pratapura-Bolka-Naya gaon- Shrichandpura –Tehla will help in diverting traffic to Tehla.

The influx of pilgrims to the Pandupole temple and to Bharathari temple is considerable the access to Pandupole temple is also permitted during monsoon.

Effort will be made to ply RSRTC buses from Bharathari to Pandupole & Tehla to Pandupole on Tuesday, Saturday and Full Moon days to replace existing private vehicles which cause huge disturbance to wildlife. On Pandupole-Bharathari mela days district administration is already making arrangements of RSRTC bus transportation.

A master plan covering the transport, related regulations for temple visit, SOP to handle emergency situations will be followed.

A convoy system with token for vehicles while ensuring time gaps would be introduced with wireless monitoring at vantage points. The Sariska Tiger Conservation Foundation would be innovatively involved in this and 'dos and don'ts' as applicable to tiger reserve visitors would be enforced for pilgrims as well.

Feeding of wild animals, littering of the habitat will be strictly prohibited. Disposal of garbage will be properly done. Littering tiger habitat by pilgrims would be treated as offence under Wildlife Protection Act 1972. A patrolling party would be deployed for checking for speed limit of vehicles. Safeguards like speed breakers, appropriate signages for publicity will be adopted for avoiding damage to wildlife.

There is heavy traffic on Talvriksh-Kushalgarh – Alwar state highway passing through CTH .Speed breakers at every 500 mts along with suitable signages will be erected. The widening of road should only be permitted after seeking due permission and ensuring safety norms of wildlife by constructing long under passes, appropriate culverts and fence.

The road from Tehla- Rajgarh also partly fall in CTH ,suitable safety measures need to be adopted.

Some buildings like RTDC, Sariska Palace, DCF office, Forest Rest House etc fall in CTH, no new construction would be permitted.Sariska Palace being private property can be compensated by state government on voluntary surrender basis.Only entry on main road will be permitted,all other outlets to forest area will be closed.No garbage ,waste water be allowed to dump outside. RTDC Tigerden hotel will also ensure proper disposal of solid waste and sewerage disposal.Proper monitoring will be enforced by Tiger reserve management.All buildings in CTH will be painted with soothing heritage colour or green colour to completey merge with nature Even forest chowies and patrolling camps will follow same norms. No flood lights and overhead lights will be used on buildings to avoid disturbance to wildlife during night time.No use of loud speaker or sound polluting instrument will be permitted in CTH.

SOP for temple visitation and handling emergency situation

The temples located in CTH will be managed in such a way so as to create minimum disturbance to wildlife.No new construction would be permitted.Concerned Range Officer and DCF will keep complete watch on such pilgrim sites.No new person should be allowed to settle at religious places.Use of fire wood should not be permitted.Carrying and keeping plastic bags will be prohibited.Use of sound polluting instrument will be prohibited.Vehicle parking will be regulated through EDC/STCF. During Mela days Standard Operating Procedure will be followed as decided by Mela Magistrate in consultation with Field Director, strictly following wild life protection Act. During mela time the District Collector Alwar nominates Magistrates for Alwar, Rajgarh & Thanagazi tehsils. The elaborate directions are issued by District Collector in which line departments are involved in temple visitation. Any emergency situation during this period will be dealt by respective Mela Magistrates, with help of tiger reserve management.

Feeding of wild animals/littering the habitat/ disposing of garbage (habitat distruction) etc. by pilgrims in CTH will be treated as an offence under the Wildlife (Protection) Act, 1972.

A highway patrol would be deployed for checking the speed limit of vehicles and safeguards like speed breakers, besides due publicity.

Some electric lines, telephone lines are passing through CTH, these lines should be continuously monitored. Only tree pollarding should be permitted. Cutting of bushes and clearing of ground should be prohibited.

Minining leases were closed due to Hon'ble Supreme court's order in 1996 in CTH. The mining pits, mining overburden dumps, scattered rubbish make it very difficult to revive habitat. The only advantage has been the availability of water, as now water is available in some of these mining pits through out the year. During last 27 years after closure of these mines where ever soil was available on dumps thick growth of bushes have come up.

This mining affected areas after suitable interventions can be developed into home of wildlife once it is protected and suitably developed.

There are 68 mines in 1 km periphery of Critical Tiger Habitat which falls in proposed Eco-sensative Zone. These mines should be continuously monitored for safety of wild animals as these mining areas form corridor for wildlife movement. No new mining leases should be permitted in this area.

The list of mining leases located in 1 km periphery of CTH is given in **Annexure 28**.

7.2.2.1 (viii) Theme Plan for intensive patrolling & Ecological Status (M-STrIPES) implementation:

This system will be an integral part of security system being implemented in Sariska Tiger Reserve. Necessary budget arrangement will be made under different schemes for the implementation of the system.

Aims:

- Assist in Effective Patrolling & Protection
- Evaluate Status & Trends of Carnivores & Ungulates at Regular Intervals

- Monitor Habitat Change
- Evaluate Human Pressures
- Generate Reports to Provide Quantitative Information for Management Effectiveness Assessment and Decision Making

Applications:

- Monitoring population status, trends, and spatial occupancy
- Mapping of illegal activities and their trends
- Guiding Park Management for patrolling - spatially and intensity
- Mapping and trend analysis of human impacts
- Understanding interrelations between above parameters
- Export of data for in-depth analysis in desired format
- Entry, Analysis, Interpretation, and use of Phase I data at field level
- Ready reports at desired spatial & temporal scales and for evaluating management effectiveness and guiding decision and policy making.

Field Protocols & Equipment:

Patrol Data collection

- Routine / Anti-poaching / Investigation Patrol
- GPS Units (or PDA's) and Data Collection Forms
- Training of Tiger Reserve Staff in Data Collection and Software Entry

Field Protocols & Equipment:

Ecological (Phase I) Data collection

- Carnivore Sign Survey
- Ungulate Line Transect
- Human Pressure Assessment on Plots on Transects
- Ungulate Dung on Plots on Transects
- Habitat Status on Plots on Transects
- Fixed Location PIP's for Tigers (min. 5 in each beat monitored once a week)
- GPS Units (or PDA's) and Data Collection Forms

- Training of Tiger Reserve Staff in Data Collection and Software Entry

Implementation of M-STrIPES will help in informed decision making for management and protection for the protected area managers. The spatial output available to the managers at field level at monthly and quarterly basis will help strengthening management and protection.

Implementation of M-STrIPES:

- Beat will be traversed by the patrol party and sightings, evidences and incidences will be recorded as per proforma.
- Data formats will be prepared in vernacular language for data collection.
- Staff will be thoroughly trained in observation and data collection.
- Data sheet will be handedover at the Range Office for data entry in every 3 days / 7 days.
- Spatial maps will be generated along with different themes like carnivore sightings, herbivore presence, fire incidences, human presence, illegal felling etc.
- All these maps will be generated and viewed by Divisional Forest Officer / Dy. Director at an interval of 15 days / 1 month for the division. The same can be viewed for the Tiger Reserve by Conservator of Forests/Field Director. Abnormality/un-natural change in the trend in the observation have to be investigated thoroughly and decision taken accordingly.
- The same will be transmitted to Chief Wildlife Warden & National Tiger Conservation Authority for information.
- The decision on patrolling, protection measures and management issues can be addressed scientifically.
- The significant changes in respect of presence of carnivore, herbivore and habitat condition can be detected and necessary intervention can be taken up.

While on regular or targeted patrolling duties the personnel shall record the following information:

- 1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. wireless, torch, etc).
- 2) the date, time GPS coordinates of the beginning of the patrol recorded.
- 3) preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical Knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record from every 30 min or at major deviations from a straight line path.
- 4) the total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, elephant, boat, etc.
- 5) a record of all illegal activities is entered in the data sheet along with time, data and coordinate stamp.
- 6) A record of signs and sightings or highly endangered species while on patrol is also maintained by entering the GPS coordinate, date and time of the sighting/sign as well as recording a digital picture of the same if possible.

After the end of the patrol, the GPS track log is either downloaded on to a computer (in MSTRIPES program if applicable) or the datasheet with the recorded information deposited at the range Head Quarters.

The Phase IV monitoring as well as M-STrIPES monitoring protocol is being followed in STR to facilitate implementation of monitoring protocol by maintaining daily patrolling log on patrolling camps/chowki registers. Periodic reports are being generated and used for management purpose since august 2012. The patrolling intensity patrolling log, patrolling time locations is already being monitored through M-STrIPES. After every monthly report review meeting of the staff will be held for further improvement. .

The M-STrIPES monitoring protocol vis a vis the customization done for the tiger reserve is very useful for continuous monitoring of wildlife , habitat & its health. Fortnightly update on date entry, storage, retrieval needs to be maintained with outputs in form of reports/ maps relating to

protection & ecological aspects. These outputs if significant should be treated as Alerts. Sariska has a history of tiger extensation due to poaching. The source area is exposed and the buffer area as notified is small and would hardly have any buffering effect. Hence the tigers continue to remain vulnerable to several risks. Which interalia, include poaching, poisoning and road hits. So the patrolling intensity needs to be monitored through M-STriPES.

7.2.2.1 (ix) THEME PLAN FOR HUMAN - WILDLIFE CONFLICT

It is important to address Human-Wildlife conflict ensuring uniform, timely compensation for human deaths and injuries due to wild animals, livestock depredation by carnivores by wild ungulates on top priority. This would involve:

- (a) To reduce human-wildlife conflict relating to fuel-fooder collection.
- (b) To eliminate the human-wildlife conflict due to live stock and human depredation.
- (c) Creation of crop protection structures.
- (d) Procurement and deployment of traps, cages to catch problematic animals. procurement of tranquilizing equipments, rescue vehicles and drugs.
- (e) Payment of compensation for cattle lifting and death and injury of human beings due to wild animals.

THE PROBLEM:

The present STR has evolved through different stages. The owners have changed from princely state to Government for controlling the natural resources, the local people got alienated gradually over a period of time .The local population, in the past, had an access to forest with limited control. After the promulgation of Forest act and Wild Life Protection act, the free access has been restricted. At the same time there has been growth in the tourism in CTH. Many of the tourists are foreigners. They enjoy facilities and service after paying the cost. This has given a false

notion to the locals that the parks have been created for the foreigners and the locals have no claims.

Due to human wildlife conflict the people residing in and around STR have developed a hostile attitude. To reduce this wildlife human conflict has to be minimised and mechanism for quick payment of compensation has to be developed.

Compensation Rates

Government of Rajasthan vide order no F 11 (1)/forest/78 dated 1st March, 2011 has approved compensation for human casualties/injuries and cattle kills outside National Park and Sanctuaries at following rates.

(Annexure 44)

Human Beings

- | | |
|-------------------------|---------------|
| 1. In case of death | Rs. 2.00 lacs |
| 2. Permanent disability | Rs 1.00 lac |
| 3. Temporary disability | Rs 20000 |

Cattle kills

- | | |
|--------------------|-----------|
| 1 Buffalo and bull | Rs. 10000 |
| 2 Cow | Rs. 5000 |
| 3 Calf | Rs. 2000 |
| 4 Goat and Sheep | Rs. 1000 |
| 5 Camel | Rs. 10000 |
| 6 Donkey/Mule | Rs 1000 |

The details of Man-Carnivore Conflict Cattle Compensation Cases in STR is given in **(Annexure - 31)**

PROPOSED STRATEGY:-

As part of active management. proactive interventions with SOP for handling interface conflicts in a time bound manner will be followed. This would cover existing human settlements, infrastructure, if any.

A coordination mechanism would be institutionalized with district level administration for timely review in the context of law and order / redressal of local grievances etc.

The villagers will be encouraged to go for permanent fencing all along the forest boundary. Such pacca masonry boundaries have come up near village Rampur, Lekri, Richhunda, Siliberi, Kalakari, Chandpahari & Talvriksh Area. This has shown encouraging results. It will be quoted as

an example and the same will be promoted in other villages too. The activities proposed to reduce man wildlife conflict include -

1. The damage to domestic animals & human beings will be adequately & timely compensated.
2. The Cattle Compensation Scheme of Government of Rajasthan, to be strictly implemented.
3. The degraded areas on the periphery of the CTH will be developed.
4. The entry fee to the Tiger Reserve includes eco development surcharge. The money is being ploughed back through Sariska Tiger conservation Foundation. With the approval of the governing body, compensation for cattle kill inside Tiger Reserve is being paid from Sariska Tiger Conservation Foundation. Presently the Government provisions do not allow payment of compensation for cattle kill inside Tiger Reserve. Sariska losts its first reintroduced Tiger ST-1 on 14th November, 2010 due to poisoning of buffalo caracas.

Till the village relocation is completed in CTH, the existing villagers will be compensated for cattle kills made by carnivores with in 3 km of village/guawada from STCF funds.

5. Eco development works should be taken up in peripheral areas to reduce resource dependency and elicit support of local communities.
6. To reduce the dependence of fuel wood subsidized LPG connections are provided for peripheral villagers.
7. To increase fodder production in peripheral areas by providing electric connections for growing fodder agriculture fields on priority.
8. The field staff be motivated and trained to deal man-wildlife conflict issues in minimum possible time.
9. In case of straying of any wild animal outside tiger reserve, the tranquilisation equipments will be kept in readiness for rescue of wild animal. The Dy. Field Director will ensure proper training of staff for rescue operation and up keep of tranquilising equipment. A special dedicated vehicle with equipment will be kept in readiness to ensure timely action. The rescue operation of orphaned/straying animals will be taken up as per SOP issued by NTCA vide letter dated 10.07.2014.

7.2.2.2 Theme Plan for Active management

Sariska Tiger Reserve has the history of disappearance of tiger in the year 2005 due to poaching activities. Eight tigers were re-introduced in the area from 2008 to 2013. Tigress ST-2 has given birth to two cubs each in the year 2012 & 2014, which indicates that the tigers have successfully adopted the area.

Sariska due rich habitat diversity has been home of many endangered wildlife which later became extinct and Tiger was one of them. It has been home and former historical distribution range of Sloth bear, Black buck, Chinkara and Otters. Endangered species like Caracal, Four horned antelope and fishing cat are on verge of extinction. So serious insitu conservation efforts need to be made to save endangered species on verge of extinction and reintroduce some of historically existing species which are extinct now through active management. For reviving historically existing species a thorough scientific study will be conducted to ascertain feasibility and than programme will be impleted.

Caracal locally known as 'siyagosh' was once well distributed in Sariska wildlife sanctuary, but slowly due to habitat degradation and biotic inerferances the population has become very rare. Its presence has been rarely reported in camera traps and direct sighting in Karna ka bas and kalighati forest areas. Caracal needs undisturbed grassland habitats which will be available with relocation for Tiger Conservation. So with ongoing conservation measures Caracal population is expected to increase and there is no need for separate intervention.

Four horned antelope locally known as 'chowsinga' was also once well distributed and could be seen all parts of Saiska sanctuary. Presently Four horned antelope is reported in Narandi, Aaman ki beri and adjoining areas. The protection efforts for tiger conservation along with village relocation will greatly help in reviving Four horned antilopr in STR.

The disappearance of sloth bears in Sariska during early twentieth century exemplifies the threat that exists to isolated populations in many of parts of the country. Based on the past trends and experiences, it is sensible to presume that such losses and local extinctions in future will be

more frequent and we will have to undertake immediate reintroduction and restoration programs to save our natural heritage.

The core area is being used by the wildlife and the people living in and around the reserve. To inhibit the process of habitat destruction specific measures have to be taken to improve habitat of Tiger Reserve and make it suitable habitat for wildlife. For this habitat improvement by eradication of weeds and invasive species such as *Prosopis juliflora*, *Adathoda vasica*, *Lantana camra*, *Parthenium* spp. is required. After eradication of these invasive species sowing of suitable grass and tree fodder species will be done.

Improvement of moisture regime by construction of rain water harvesting structures has to be done. Availability of drinking water for wild animals has to be ensured throughout the year specially in pinch period. In Sariska Tiger Reserve during droughts water become severe limiting factor resulting into the death of many wild animals. To ensure availability of water schemes based on micro and macro water sheds has to be prepared and funding may be sought from CAMPA, NABARD or any other scheme.

In CTH of Sariska Tiger Reserve once the villages are relocated after removal of invasive species, sowing of suitable fodder species, suitable water harvesting and conservation works, these areas are likely to become suitable breeding sites for tiger and other wildlife

For development of grassland relocated village site and other suitable site for ungulates, construction of temporary enclosure by erecting iron posts and fixing chain link fence will be done. After removal of weeds, tillage of area with tractor, sowing of seed of suitable grass species like *Cenchrus Ciliaris*, *Cenchrus Setigerus* will be done. Planting of some fruit trees will be done. The area will be closed for 5 years for regeneration.

In the peripheral villages around CTH, there is a large number of livestock which will come in contact with wild animals specially herbivores transmitting diseases to wild animals. Regular immunization of cattle is essential to avoid such situation.

7.2.2.2.(i) Theme Plan for intensive monitoring of Reintroduction Tigers.

At present there are 7 female, 2 male and 4 cubs. Looking to the past history the re-introduced tigers need strong protection and monitoring protocol:

- (i) Telemetry :Every re-introduced tiger needs radio collaring so that the security of every tiger be ensured. Regular change and maintenance of transmitter and receiver parts is to be ensured.
- (ii) 24x7 surveillance : Every re-introduced tiger needs a dedicated team of two persons for its monitoring. The dedicated team will look after the well being of the tiger through telemetry and report its observation to the control room. This team apart from taking the signal will also record and collect various direct or indirect signs of the presence of tigers in the area i.e. direct sighting, kill, samples of scat, scratch marks etc. As per the records of the team, the movement pattern of the individual tiger will be recorded and if any deficiency is found in the security of the tiger will be reviewed.

Re-introductions have proved to be a valuable tool for the recovery of the species that have become either globally or locally extinct in the wild (Woodroffe, 1999). Reintroductions can also give us an insight into the reasons of disappearance of a species from the areas where they formerly occurred, but it requires to be genuinely experimented and properly monitored (Sutherland, 2004). Reintroduction is one such promising tool which has an important role to play in the carnivore restoration efforts. But reintroduction programmes are expensive and time consuming affair and corresponding success rates are low which makes it difficult to justify spending precious conservation money in favour of reintroductions as against other in situ conservation measures (Pullin, 2002). Therefore it becomes highly imperative that reintroduction is based on sound scientific principles and methodology so that the success rates are high and the efforts are fruitful enough. The reintroduction and recovery of the Florida Panther (*Puma concolor*) in Florida, USA during early 1980's,

reintroduction of African wild dog (*Lycaon pictus*) in Africa in 1990's are two such instances on large carnivores that enriched our knowledge about the science and management of carnivore reintroductions.

Re-introduction of tigers from Ranthambhore National Park to Sariska Tiger Reserve is based on report entitled "Assessment of Status of Tigers (*Panthera tigris*)" in Sariska Tiger Reserve, Rajasthan, Wildlife Institute of India, 2005 and subsequent 'Recovery Plan (Revised)' developed by Field Director, Sariska Tiger Reserve. Approval for the reintroduction of tigers in Sariska was taken in a meeting convened by National Tiger Conservation Authority (NTCA) on 12-03-08 under the chairmanship of Sh. V.P. Singh, Hon'ble Member of Parliament. The grant of permission to translocate tigers from Ranthambhore Tiger Reserve to Sariska tiger Reserve was accorded by the Ministry of Environment & Forests, Govt. of India vide its letter F.No. 1-4/2007WL-I(pt) dated 25-06-08. Accordingly, Wildlife Institute of India developed a detailed protocol and plan of operation for immobilization, radio-collaring and translocation of tigers from Ranthambhore to Sariska. A team from Wildlife Institute of India and Rajasthan Forest Department was deputed to conduct and facilitate above operation. A decision to translocate initial population of five tigers (two males and three females) from Ranthambhore Tiger Reserve (Ranthambhore) was made, with a supplementation of three tigers (one male and two females) in every two years for a period of six years.

Background

The disappearance of tigers in Sariska during 2004 exemplifies the threat that exists to isolated tiger populations in many of parts of the country (Sankar *et al.*, 2005). Based on the past trends and experiences, it is sensible to presume that such losses and local extinctions in future will be more frequent and we will have to undertake reintroduction and restoration programs to save our natural heritage. It is perhaps not an isolated situation, and the recent national scale assessment reported that tigers have gone locally extinct from 97 districts in the last 150 years (Qureshi *et al.*, 2006).

Reintroduction should establish self-sustaining populations with high reproductive fitness in the wild environment and ample genetic diversity

(Frankham *et al.*, 2002). The restocking is essential to maintain genetic and demographic viability of tiger population. The genetic stock of the tigers of Ranthambhore and Sariska Tiger Reserves may be assumed to be similar as both habitats are part of semi- arid tracts in Aravalli hills, therefore to maintain the uniqueness of genetic stock of tigers in semi arid tract the best choice will be Ranthambhore tigers. Adult tigers over two and half years of age is considered good for capture and re-introduction due to ideal medical fitness, as the body at this age has higher resistance to diseases, physical strength to take on the stress of relocation, fertility, response/behavior when confronted with human/tourist are the important features that make a final choice.

Since the tiger population is dwindling drastically in its entire distribution range and Sariska which is the western most distribution of tigers (Wikramanayaka *et al.*, 1999) has seen its complete extinction once, over time, it has grown even more necessary to monitor and study the relevant holistic, ecological and socio-economic aspects that will address important issues like population dynamics, demography, territory size, dispersal, food habits and response to anthropogenic disturbance of the introduced tigers.

Three tigers were reintroduced respectively during June-July 2008 (a male–ST1 and a female–ST2) and February 2009 (female–ST3) from Ranthambhore TR to Sariska TR. Another two tigers (male–ST4 and female – ST5) were reintroduced from Ranthambhore during July 2010. The first reintroduced tiger ST1 was found dead on 14th November 2010 at Rajore village (Kalakhet) in Sariska. Thereafter, another adult male tiger (ST6) which had strayed out from Ranthambhore and got settled in Keoladeo National Park, Bharatpur was translocated to Sariska in February 2011.

The capture and translocation of tigers

Young adults of approximately two and half years to four years were selected based on visual assessment and healthy body condition. Tigers were immobilized in early forenoon hours except one male which was immobilized in early afternoon because of the favourable conditions

due to clouds and ambient temperature being around 32°C. A mixture of Xylazine and Ketamine (500 mg + 400 mg, HBM) was used as 2.5 ml for females and 3.2-3.5 ml for males. The mixture provides synergistic effect and most appropriate where carnivores need to be sedated for longer time. In the present case, it was visualized that the immobilized animals may be required to be kept for 2-3 hrs under sedation considering the time from sedation and radio-collaring and to the transport at the helipad site. A water container and sprayer were kept available to manage possibility of animal body overheating due to sedation. A 250 kg container (length 5' 11", breadth 3' 6.5" and height 3' 10") was fabricated with non-slip wooden planks on the bottom and angle iron frames on sides and top for the transport of the animals. Two small windows were kept on the top of the container and also on two sides of the container for monitoring the animal during transportation and injection of medicaments if needed. Ventilation holes of 25 mm were created at regular intervals all over the container for proper ventilation. Care was taken to keep the container dark from inside so that the animal remains calm during the transport. A small truck was used to transport the tiger in its container from the site of immobilization to the helipad inside Ranthambhore. An Indian Air Force helicopter (M17) was used to transport the tiger from Ranthambhore to Sariska.

Table 20 : Details of the translocation of the reintroduced tigers

Tiger ID	Date of reintroduction (soft release)	Date of release in the wild
ST1 (Male)	28.06.2008 (By Air)	06.07.2008
ST2 (Female)	04.07.2008 (By Air)	08.07.2008
ST3 (Female)	25.02.2009 (By Air)	27.02.2009
ST4 (Male)	20.07.2010 (By road)	27.07.2010
ST5 (Female)	28.07.2010 (By Air)	01.08.2010
ST6 (Male)	23.02.2011 (By road)	28.02.2011
ST9 (Female)	22-02-2013 (By road)	28.02.2013
ST 10 (Female)	23-02-2013 (By road)	28.02.2013

The radio-collared tigers were monitored continuously round the clock by a team of researchers and foresters through ground tracking (VHF) using 'homing in' and 'triangulation' techniques (Deat *et al.*, 1980, Macdonald and Amlaner 1980, White and Garrot 1990). The satellite data up-linking in both the radio-collars stopped functioning by mid-September 2008. Thereafter the tigers were tracked only by VHF signals (ground tracking). In total, 437 locations for tiger, 463 locations for tigress-1 and 229 locations for tigress-2 were obtained using a Global Positioning System (GPS). These positions were later transferred in to Sariska map required for home range estimation. Minimum Convex Polygon (MCP) technique was used for home range calculation (Mohr 1947, Anderson 1982, Southwood 1996). The advantage of the MCP is that it is one of the oldest techniques for home range estimation, comparable between species globally and its inclusion as one or more methods of range calculation is therefore valuable.

All the re-introduced tigers are monitored periodically. All the radio locations are recorded of these individuals along with all the parameters already mentioned above. A total of 342, 759, 762, 612, 560 and 286 radio locations were recorded respectively of the first to sixth tigers (ST1 to ST6) in the period of the last one year (2010-2011). The annual home ranges of these tigers were calculated respectively as 152.4, 45.9 and 95.9 sq. km. for respectively ST1, ST2 and ST3. The MCP of area occupied by ST4, ST5 and ST6 till June 2011 were estimated as 204.7, 184.9 and 208.2 sq. km. These large home range sizes were attributed to their initial habitat exploration after reintroduction. Gradually it was found that all the first five tigers were well settled with in the best available habitats in Sariska. ST6 had only spent four months in Sariska so far. The monthly areas of utilization of these five tigers (ST2 to ST6) were estimated respectively around 40, 85, 140, 70 and 205 sq. km. Before the reintroduction of fourth and fifth tigers, the first tiger (ST1) was found to almost cover up the territories of second and third individual (ST2 & 3). ST4 was observed to utilize the south eastern part of Sariska and also the forests of Rajgarh range of Alwar territorial division situated beyond the south-eastern part of Sariska during August to November 2010, where as, ST5 had selected her

territory in the eastern hilly terrain of Sariska. After the death of ST1 in November 2010, ST4 was seen to move and utilize all the areas used by ST1 previously, covering the territories of all the three females (ST2, 3 & 5). Hence, the range of ST4 was increased to more than 200 sq. km. from 65 sq. km. After the translocation of new male tiger ST6 in February 2011, a division in range utilization was observed as ST6 was found to utilize the areas covered under ST3's territory. The range of ST4 was thus reduced from 205 to 107 sq. km at present covering territories of rest two females (ST2 & ST5).

Translocation of Two Orphaned Sub-Adult Tigresses (February 2013)

Approval for translocation of two sub-adult tigresses from Ranthambore to Sariska was obtained from NTCA. A team of Scientists from Wildlife Institute of India reached Ranthambore on 20th January, 2013 to carry out translocation of 2 identified sub-adult tigresses (cubs of T-5) to Sariska National Park. The plan of operation as provided by WII was discussed at length and the field level planning and preparedness was checked by the team. On 22 January the team reached the site Amaghati Chowki, during early hours of the morning. It was informed by the patrolling team that both the identified tigresses (Orphaned cubs of T-5) made a kill during early hours and were hiding in the *Prosopis juliflora* thicket. After making necessary preparations for darting the animals the team proceeded to the kill site on a vehicle. As none of the animals appeared initially, the darting vehicle was placed behind a thicket with clear vision on the kill. The animal (ST9) appeared from the thicket at about 0720 hrs. The animal was darted from a distance of 15 meters using a mixture of Medetomidine and ketamine employing Dan Inject equipment model JM at 0723 hrs. Though the animal showed signs of sedation; anaesthesia safe for handling was not achieved even after 20 minutes. Animal reacted to disturbance as manifested by ear twitching and sudden reaction. Supplemental dose of 200 mg of ketamine and 2 mg of medetomidine was remotely delivered at 0746 hrs. After ensuring adequate sedation safe for handling, the animal was approached, positioned and blindfolded. As the animal was amidst

thicket it was shifted on to a stretcher and brought out in the open area. The physiological parameters were checked and after ensuring stabilization, the animal was fitted with Telonics VHF/GPS/ARGOS radio-collar. Body measurements, animal weight and biological samples were taken following which the animal was crated in the transport container. Based on the records available with the Department and physical examination of the animal, the age was estimated as ≥ 2 years. The animal weighed 122 kgs. The crate was loaded onto a mini truck and minimal disturbance was ensured till the initiation of journey. The animal was revived from sedation using reversal drugs.

Though search for the second animal was made for almost two hours subsequently, no signs (direct/ indirect) of the other animal were noticed. The team decided to move the already crated animal to Sariska by road. The physiological parameters of the animal were monitored throughout the journey. The physiological parameters were within normal range and the journey from Ranthambore to Sariska took 6 hrs. The container was offloaded adjacent to the enclosure at Naya Pani in Sariska. The tigress was released at 1640 hrs. Soon after release the animal made a kill of wild pig inside the enclosure. The animal was left undisturbed and was intensively monitored by team comprising WII Researchers and forest officials of Sariska Tiger Reserve. The tigress in Sariska Tiger Reserve has been given a local ID of ST9.

On 23rd January the team again assembled at the site during early morning hours. The patrolling team reported that though the tigress had made a kill in the morning, it moved into the thicket on sight of human and vehicles. The darting team waited at the kill site for almost an hour but animal could not be located. The second patrolling team however provided information of animal sighting near a water spring. The darting team immediately rushed to the site. Animal was seen resting in the thicket and after sometime came on the road. The animal was immobilized using a mixture of Medetomidine and ketamine employing Dan Inject equipment model JM at 0804 hrs. The animal upon darting moved into the thicket and was left undisturbed for almost 15 minutes to ensure proper drug induction. The animal was approached after 20 minutes of darting and was found in perfect plane of anaesthesia safe for handling. The animal was shifted onto a stretcher and brought out after clearing vegetation into the open

area. The animal was fitted with a Telonics VHF/GPS/ARGOS radio-collar and body measurements, animal weight and biological samples were taken. The animal was of similar age as the earlier animal however weighed 133 kg. The animal was crated in the transport container and antidote for medetomidine was given. Animal revived within 6 minutes of antidote administration. The road journey was initiated and the journey from Ranthambore to Sariska took 6 hrs. The animal was intensively monitored inside the container during the entire journey. The transport container was offloaded adjacent to the enclosure II at Sariska. The animal was released into the enclosure in Sariska at 1536 hrs. The tigress in Sariska Tiger Reserve has been given a local ID of ST10. The monitoring team reported that the animal soon after release in the enclosure made a kill of a male Sambar (*Rusa unicolor*) inside the enclosure. The animal was left undisturbed and was intensively monitored by team comprising WII Researchers and forest officials of Sariska Tiger Reserve.

Both the animals were intensively monitored inside the enclosure till 28th January 2013 following which the gates of the enclosure were opened. The animal (ST9) moved out of the enclosure at 1730 hrs and ST10 at 1930 hrs.

Protocol for the Monitoring of Reintroduced Tigers

At present there are seven reintroduced tigers (2 male and 5 females) and 2 sub adult tigress born in Sariska Tiger Reserve which have separated and formed independent territories in February 2014 and 4 cubs born in Sariska (ST2- female, ST3–female, ST4–male, ST5–female, ST6–male, ST 7-female, ST8-female, ST9–female and ST10–female).

The 24 x 7 monitoring protocol using radio telemetry & field evidences in collaboration with WII is being done. Monthly update on the ranging pattern of individual tigers is maintained besides taking note of the status of radio collars, cattle kill, association of tigers etc. Timely replacement of radio collar is done to ensure monitoring of tigers.

- Monitoring teams will be deployed on fortnightly bases for ground tracking for each tiger on a daily basis.
- Each monitoring team will be comprised of one field staff and one field assistant from Wildlife Institute of India (WII).

- Each team will be supervised by an ACF / range officer of STR and also by the research scholar of WII.
- Monthly update on the ranging pattern of individual tigers should be maintained and sent to CWLW and NTCA.
- Taking note of the status of radio collars etc. for timely replacement.

Facilities and equipments:

- Motor bikes will be provided to each dedicated monitoring team.
- A multi channel radio-receiver, an antenna and a coax cable will be provided to each team.
- One GPS and a compass will also be provided to each team for recording locations.
- Data sheets for recording tiger locations, kills and scats will be given.
- The wages of the field assistants to be engaged with each team will be provided by WII.
- Sleeping bags, torch and winter cloths will also be provided to monitoring teams.
- A panel of forest staff for monitoring tiger from all ranges will be prepared. Task of monitoring will be given to each individual for 15 days after which another team will be deployed.

Responsibilities:

Each monitoring team will be assigned to receive signals from the radio-collars of the reintroduced tigers as well as to record pugmarks and direct sightings of all tigers and document information in required format.

- They will enter the GPS locations of tiger through signals, pugmarks, scent marks, scratch marks etc as well as record information of their kills. Scat samples will also be collected by field monitoring team. WII scholar will provide kits for collecting scat samples.
- Each team will have to inform the movements of tiger along with other information in required format on a daily basis to the wireless control station of STR and keep the record of the same. The wireless control station will intimate progress to concerned supervisory officer.

- Wireless control station will also provide information in writing to WII research scholar on a daily basis in required format.
- The supervising team will surveillance the activities of the monitoring teams and cross check the radio-signals and locations of the tigers.
- The maintenance and periodic change of batteries and occasional repair of the radio-telemetry equipments will be looked after by WII research scholar.
- Daily report on tigers' status (location, movement, kills and scats) will be reported to the concerned Range Officer and DCF of STR and, WII research scholar.
- Month wise reports will be prepared by WII Schlor and sent /submitted to the Field Director, Sariska, CWLW , Rajasthan Forest Department, Director WII and member secretary NTCA.

Team Name: **Format 1 - For recording tiger locations**

Sl. No	Date	Time	Beat	Range	Place	GPS location (Lat and Long)	Tiger ID	Observation	Habitat Type**	Terrain**	Remarks

* **Observation** = 1. Radio-signal / 2. Pugmark/ 3. Direct sighting / 4. Scat / 5. Scratch mark / 6. Scent mark

** **Habitat type** = 1. Anogeissus forest / 2. Boswellia forest / 3. Zizyphus forest / 4. Acacia forest / 5. Butea forest / 6. Riverine forest / 7. Scrubland. *** **Terrain type** = 1. Flat / 2. Gentle Slope / 3. Steep Slope.

Team Name: **Format 2 - For recording tiger kills by field monitoring team**

Sl. No	Date	Time	Beat	Range	Place	GPS location (Lat and Long)	Kill made by tiger (ID) / leopard	Species* Killed	Age**	Sex M / F	Habitat Type****	Terrain****	Remarks

* **Species killed** = 1. Sambar, 2. chital, 3. nilgai, 4. wild pig, 5. common langur, 6. peafowl, 7. porcupine, 8. hare, 9. cattle, 10. buffalo, 11. goat. ****Age** = 1. Adult / 2. sub adult / and 3. fawn or calf.

*** **Habitat type** = 1. Anogeissus forest / 2. Boswellia forest / 3. Zizyphus forest / 4. Acacia forest / 5. Butea forest / 6. Riverine forest / 7. Scrubland. **** **Terrain type** = 1. Flat / 2. Gentle Slope / 3. Steep Slope.

Team code: **Format 3 - For recording tiger scats by field monitoring team**

Sl. No	Date	Time	Beat	Range	Place	GPS location (Lat and Long)	Scat of Tiger (ID)	Scat Condition*	Habitat Type**	Terrain***	Remarks

than a week old) / 4. Very old (more than a month old)** **Habitat type** = 1. Anogeissus forest / 2. Boswellia forest / 3. Zizyphus forest / 4. Acacia forest / 5. Butea forest / 6. Riverine forest / 7. Scrubland. *** **Terrain type** = 1. Flat / 2. Gentle Slope / 3. Steep Slope.

7.2.2.2 (ii) Theme Plan to save species on verge of local extinction and reviving historically extinct species.

Sloth bears are usually dull black, with a long shaggy hair coat, especially over the shoulders. Hairs are long around the neck and the back of the head. Ears also have long hairs. Brown and gray hairs may be mixed in with the black coat. Occurrence of albinos bears has been reported in Central India (Akhtar, 2004; Bargali, 2004; Chauhan *et al.* 2003 and Bharos, 1988) and cinnamon and reddish individuals in Sri Lanka (Brander, 1982; Prater, 1980 and Phillips, 1984). Sloth bears have a distinct broad, white 'U' shaped chest blaze, and their muzzle is whitish. The snout is light coloured and mobile. They have long (6-8 cm), curved, ivory-colored front claws, which are used for digging. The front feet are turned inward. Sloth bears have very unique structural modifications that give them some unusual talents for feeding. They have a broad palate. The long snout is mobile. The lips are loose, protrusible, mobile and bare. They can close their nostrils at will and they are missing a pair of upper incisors.

Life expectancy

Sloth bears have lived up to 40 years in captivity (Ward and Kynaston, 1995).

Habits

Sloth bear is the only bear, which has adapted itself to both temperate and tropical conditions. Sloth bear is very tolerant to heat. During cool weather, it spends the day in dense vegetation or shallow caves or spaces between boulders in rocky outcrops. Bears use their strong and curved claws for digging up termite nests. Its loose lips and long snout, together with a concave palate, give the animal extra sucking power. This helps them to feed on termites and ants easily; nest is dug up by bear, dust and dirt is blown off, and occupants are sucked up with force. The noises made during the sucking can be heard from long distance. To prevent ingesting dust along with ants, bear pushes against the hole it digs, closing the flaps of its nose pad before sucking its meal. This is also responsible for the hoarse sucking snuffle it makes (Pillarsett, 1993). The sense of smell is well developed, but sight and hearing are relatively poor. Due to its poor eyesight and hearing, it is sometimes closely approached by humans. It may then attack in self-defense and inflict severe injuries or kill a person. Through vocalizations, bear produces roaring, howling, screaming and squealing sounds. Sloth bear does not hibernate.

Habitat use

Sloth bear inhabits a wide variety of habitats, but information on the habitat use pattern of sloth bear is available only from a few areas in India. Sloth bear is found in forested areas, grassland and in scrubland. It apparently favours drier forests and prefers areas with rocky outcrops. In North Bilaspur forest division, Chattishgarh, bears were mostly using Mix forest, followed by Sal (*Shorea robusta*) mix, Sal forest, Cultivated land, Scrub forest, Forest blank and Water bodies, but proportional utilisation to the availability by bears was high for the Sal mix forest, followed by Mix forest, Sal forest, Blank, Scrub land, Water bodies and Cultivated land (Akhtar, 2004; Akhtar *et al.*, 2000, 2002 and 2004b). Spaces between boulders in the rocky outcrops provide good sites for denning. Bear distribution and habitat use patterns were greatly impacted by increasing biotic pressure.

We found only 2.5% of the available habitats as least disturbed from biotic pressures, 46% area was highly affected and more than 27% area was highly disturbed and severely affected by biotic pressures. Concentration of bears was mostly in areas with high biotic pressures.

Activity pattern and home range

Sloth bear is nocturnal and crepuscular. In protected areas, namely, Kanha, Dudhwa and Panna National Parks, sloth bears were found active in day hours, whereas in disturbed and fragmented forests interspersed with habitations, bears are found nocturnal (Akhtar *et al.*, 2004b). A study on black bear showed that the nocturnal habit had apparently resulted from human-induced modifications to the environment (Ayres *et al.*, 1986 and Lariviere *et al.*, 1994). In North Bilaspur FD, sloth bears come out in the evening or after sunset, hunt for food all night, and retire in the morning (Bargali, 2004; Bargali *et al.*, 2004b and Chauhan *et al.*, 2003). They spent much more time in fallow land with scrub to fallow interspersed with agriculture and mixed forests. Bears left the dens earlier during summer and late in winters. Their activity and resting period averaged to 13 and 11 hours respectively. Movement of sloth bear in crop fields, villages and forests, and their activity pattern seem to be correlated with phenology of food plants, food availability and disturbance factors such as non-timber forest produce collection, livestock grazing and human activity. Activity of female bear appeared to be governed by pregnancy and cubing period. Desai *et al.* (1997) studied the den use and home ranging pattern of sloth bear in Mudumalai WS. The mean group size of sloth bear was 1.8 (n=112), and moving and feeding activities were greater in the mornings and evenings than middle of the day.

In North Bilaspur FD, male bears covered 22.40 km² and 19.90 km² of area whereas females covered 8.15 km² area, which is almost half of the male bears. Whereas, in Panna NP, sloth bears covered 30-120 km² of area (Yoganand, 2001 and Yoganand *et al.*, 2005). In Chitwan NP, mean annual home range sizes estimates were 9.4 km² and 14.4 km² for females and males respectively (Joshi *et al.*, 1995). The home range of mother with two cubs was estimated as 19.1 km² and two sub adults showed the home range of 5.54 km² (Laurie and Seidensticker, 1977).

Food habits

In India, sloth bear is dependent more on fruits than on termites and other insects, whereas in Chitwan NP, it has been reported to feed more on termites and insects mainly in grasslands than fruits (Schaller 1967; Johnsingh 1981; Iswariah 1984; Baskaran 1990; Gopal 1991; Gokula *et al.* 1995; Joshi *et al.*, 1995 and Redford, 1987). This was mainly due to longer fruiting season in southern side than northern parts.

In North Bilaspur FD, Chattishgarh, feeding ecology of sloth bear was studied by analyzing of 568 scats (Bargali, 2004; Bargali *et al.*, 2004a and Chauhan *et al.*, 2003). Twenty one species of plants, black ant, red ant, termites, bees and unknown animal matter (bone, hairs and tissue) constituted the bear diet. Both animal and plant matter constituted a part of its diet throughout the year. Annually, the frequency of occurrence of animal matter (78.5%) was almost same as the frequency of occurrence of plant matter (77.8%). *Ficus* species provided the major food item of bears during summer and winter seasons. In case of percent weight, plant matter was always high than the animal matter in all the seasons. But when feeding items were considered, animal matter was more frequent during monsoon (87%) and winter (81.8%) season, whereas during summer season, plant matter (90.6%) dominated the animal matter (65.1%). In percent weight, plant matter dominated the animal matter in all season. Sloth bears were found voracious feeder and try to eat as much as possible even though they defecate most of the part undigested (Bargali *et al.*, 2004a).

In Panna National Park, the annual diet of sloth bear contained 56% fruits, 29% ants and 10% termites of the total ingested biomass (Yoganand, 1998, 2001 and Yoganand *et al.*, 2005). Gopal (1991) observed that sloth bear in Bandhavgarh NP preferred more than 21 food items; out of which, 13 items were seasonal fruits. Gokula and Varadharajan (1991) and Gokula *et al.* (1995) conducted a study at Mundanthurai plateau of south India and analyzed 11 scats, which revealed 9 food items constituting the diet of sloth bear. In and around Mudumalai WS, fruits constituted more than 90% of the diet of sloth bears (Baskaran, 1990 and Baskaran *et al.*, 1997). The dry deciduous forests in this area had greater fruit abundance,

and thorn forests had very high abundance of termite mounds. Whereas in Royal Chitwan NP, sloth bear preferred feeding on termites (Joshi *et al.* 1995; Joshi *et al.*, 1997). During the wet season, sloth bears moved to upland sal forest, where fruit availability was less than that remained in the lowlands (Laurie and Seidensticker, 1977; Sunquist, 1982 and Joshi *et al.*, 1995). The shift to the uplands by some sloth bears appeared to facilitate foraging on termites, which was difficult in the flooded lowlands (Davidar, 1983).

Reproductive activity

In India, mating in sloth bear occurs mainly during May-July (Bargali, 2004 and Chauhan *et al.*, 2003). Occasionally breeding may occur in other months also. Similar breeding season has been reported for sloth bear by Gopal (1991), Jacobi (1975), Laurie and Seidensticker (1977), Iswariah (1984), Joshi (1996) and Puschmann *et al.* (1977). There was no distinct breeding season of sloth bear in Sri Lanka (Phillips, 1984). Norris (1969) reported breeding of sloth bear in winter and birth time in mid-summer and appearance of young cubs during August and September.

Status and distribution in Rajasthan

In Rajasthan, sloth bear is found in 3 national parks and 14 wildlife sanctuaries. Sloth bear is very common in Ranthambhore NP and Jawahar Sagar, Kela Devi, Kumbhalgarh, Mount Abu and Van Vihar wildlife sanctuaries. Sloth bear is occasionally seen in Darrah national park, and Bandh Baratha, Bhensrodgarh, National Chambal, Phulwari Ki Nal, Sawai Man Singh, Sitamata and Tadgarh Raoli wildlife sanctuaries. Sloth bear is reported as rare in Sariska national park, and Bassi and Ramgarh Vishdhari wildlife sanctuaries. The total protected area occupied by sloth bear in the Rajasthan state encompasses 5541.87 km.

Justification for reintroduction:

Sloth bear was definitely present in Sariska Tiger Reserve as still there is place name called "Rich-unda" means "Bear is there". Though the reason behind their disappearance from the area is not clearly known but high abundance of fruiting trees such as *Zizyphus*, *Phoenix*, *Diospyros*, *Ficus* etc and also large numbers of termite mounds in the reserve can very well sustain a good population of sloth bear. Even the map of past and present

geographic distribution range also supports Sariska forests to be a prospective site for the sloth bears. The reports of straying out of sloth bears in Kota and Mount Abu region due to shortage of fruiting trees and other food resources are increasing in an alarming rate. Therefore, translocation or reintroduction of sloth bears from those highly conflict areas to Sariska will help in their survival and breeding in future. Drastic decline in sloth bear population or the bear-human conflict is perhaps not an isolated situation.

Re-Introduction of Sloth Bears:

Re-introduction plan of sloth bear from Kota and Mount Abu areas to Sariska Tiger Reserve can also be a similar ambitious conservation project. Accordingly, a detailed protocol and plan of operation on immobilization, radio-collaring and translocation of sloth bear from Kota and Mount Abu areas to Sariska will have to be prepared with the help of Wildlife Institute of India & National Tiger Conservation Authority, New Delhi.

The numbers of animals to be translocated, design of enclosures, protocol for immobilization & transportation of sloth bear from source sites to Sariska Tiger Reserve will be finalized by Wildlife Institute of India and get necessary approvals from National Tiger Conservation Authority, New Delhi & Ministry of Environment & Forest.

One straying male Sloth bear reached near Malakheda about 10 km east of Sariska Tiger Reserve in April 2013, it was tranquilised and released in Kundli area. Since then it is continuously monitored as SB(1) and it has made big home range in Sariska and Tehla ranges. The results have been encouraging. The reintroduction programme will not only provide mate to lonely male bear but also greatly add to biodiversity value of STR.

Chinkara

Chinkara was widely distributed in Sariska landscape and were found in good numbers. Presence of Chinkara in Sariska Tiger Reserve has been reported upto year 1995 wildlife census. Thereafter no report of presence of Chinkara in Sariska Tiger Reserve is available however Chinkara has been reported from adjoining areas till 2000. The habitat of

Sariska Tiger Reserve is highly suitable for Chinkara. The presence of Pleatau like Kraska, Bana-Malajhodka provide excellent habitat for Chinkara. The valley in Umri, Sariska, Bhensota, Devri etc. are highly suitable for Chinkara.

Reintroduction of Chinkara can be taken up in Sariska Tiger Reserve by constructing rehabilitation enclosures in Umri and Sariska. Chinkara may be brought from zoo/wild. A minimum population of 25 to 30 animals in sex ratio of 1:5 would be suitable for reintroduction.

7.2.2.2. (iii) THEME PLAN FOR ERADICATION OF WEED SPECIES

In Sariska Tiger Reserve the weed infestation has arrested the carrying capacity of herbivores. The present carrying capacity of herbivores is sufficient for existing tiger and other carnivore population. So weed management in Sariska Tiger reserve can be used as tool for regulating and manipulating preybase as per management requirements.

The weed infestation has been mainly due to huge cattle pressure of villages inside CTH, adversely affecting preybase. The presence of weeds is maximum in periphery of 2 to 5 km from each village. The weed eradication would be taken up on priority at village relocation sites. No weed eradication should be done around existing villages as weeds are likely to come back fast making effort futile. Weed eradication also need to be done in present inviolate valleys like Kalighati, Umri, Bhagani, Narandi. No weed eradication should be taken up in peripheral areas of CTH as such weed infested areas arrest herbivore density thus avoiding man-wildlife conflict specially crop raiding and at the time thick weed cover on periphery makes impenetrable for cattle.

Some areas of Sariska Tiger Reserve are heavily infested with *Prosopis juliflora*, *Adhatoda vassica*, *Casia tora*, *Lantana camara* & other weed species. The dense growth of these species is degrading the natural habitat. This has resulted in reduced availability of fodder for the preybase. If the situation is not controlled, the weeds are likely to cover important feeding grounds of the herbivores, adversely affecting their

population. Eradication of *Prosopis juliflora* from highly infested zones can be done in a phased manner. Other weeds can be eradicated to enrich the areas with grasses of palatable species. Since the weeds cannot be eradicated in one year, it is a continuous process of uprooting weeds at least three years. The optimum utilization of *Prosopis juliflora*, *Adhatoda vassica*, *Cassia tora* and other uprooted weeds will be used for constructing brushwood check dams and controlled burning for species like *Cassia tora* and *Parthenium*.

Table 21 : PROPOSED AREAS FOR ERADICATION OF WEEDS

1	Tarunda	200
2	Kalighti	300
3	Narandi	100
4	Phenta ki pal	100
5	Rautkela	50
6	Nayapani	200
7	Ghanka	300
8	Umri	200
9	Bhagani	50
10	Sukola	200
11	Dabli	50
	TOTAL	1750

STRATEGY FOR ERADICATION OF INVASIVE SPECIES

1. Weed eradication will be taken up in CTH once the village is completely relocated so that cattle grazing is not promoted.
2. In inviolate valleys weed eradication will be taken continuously for 3 years so that seed is eliminated from the site and regeneration of weeds does not take place.
3. During weed eradication minimum disturbance should be caused to wildlife. Use of improvised instruments like monkey jack, machinery mounted plough and extractors can be done for uprooting weeds.
4. Suitable grass species will be sown in such weed cleared areas after soil working during the monsoon. The overall effort will be to restore the natural floral diversity suitable to the herbivore population like Chital, Sambar, Langur and other animals, which form the prey base of tiger, leopard and other carnivore species.

5. The weed eradicated area in pockets can be fenced with Chainlink in patches of 8-10 ha for grassland development and sowing of seeds of grass species to ensure success. The fence can be reused by shifting at other place.

7.2.2.2. (iv) THEME PLAN FOR WATER CONSERVATION

Sariska Tiger Reserve is situated in dry tropical zone receiving very less rainfall. It receives on an average 621 mm rain fall and the number of rainy months are only two. The summers are very harsh and intense because of which the little rain water that is collected in low lying areas gets evaporated very soon. Geomorphological features allow very less retention of water in the sub soil. Droughts are also frequent which make the water situation still worse. These features make the Protected Area devoid of water and makes the water as a limiting factor for the full potential growth of the Park. Shortage of water, results in the movement of wild animals out of the sanctuary in search of water and are likely to be killed in road accidents or are poached by the villagers. Therefore, higher priority needs to be accorded to water conservation works in the following Nallas.

The main object is to revive dried nallas and resunate the Sariska springs, which will help in due course of time for better vegetation, less evaporation of water resulting better management of wild life in the reserve.

There is a deep relationship between aquifers of subsurface and surface. The water harvesting structures will be created on such places where aquifers have fractures. It will help in keeping water for long time and will also help in revival of Sariska springs in due course of time. The structures should to be constructed with minimum use of construction material as a result the material component will be less than 5% of cost of structures to be constructed, in such a way that they merge to the natural environment. Traditional technology should be used for creation of such structures but the sites of constructing structure should be selected on scientific basis. The list of existing Anicuts/Talai is given **Annexure –11**.

Keeping in mind these aspects following three types of structure are proposed

(i) Johri - This is traditional water conservation structure made by digging earth. Only some stones and small quantity of cement is used at over flow out let. The approximate catchments area of johri is 5 hact. This has a impounding area about 1 hact. Depth of johri varies from 1mt to 1.5 mt depending on the local condition. This is the smallest structure and very safe with maximum earthen work. The earthen work is most suitable to the wild life areas.

Areas, like Bana, Malajohrka, Phatyakhora, Kraska, Rotkela, Dabli, Umri-Devri etc. are suitable for construction of earthen structures to conserve rainwater.

(ii) Johad- These are earthen structures having more capacity to retain the water than johri. Site of johad will be selected in a manner as it will have catchments area of about 25 hact. These structures are traditionally being constructed in the area. These are earthen structures in which less than 5% material, like cement, is used only for over flow structure. The johad site will be selected on aquifers keeping subsoil fractures in mind. The catchments area of johad will be about 25 hact and ponding area will be about 1 hact. The depth of johad will vary from 2.00 to 2.50 meter depending on local site conditions.

(iii) Bandha - Bandha are the traditional earthen structures created to retain the water by constructing earthen wall in slopy area. It will be created on Nalahs. The catchments area of these Bandha is about 100 hact and ponding area is about 2.5 hact. The depth will vary from 2 mt to 3 mt depending on the site.

The terrain of STR is hilly and undulating. Because of the unique geomorphological features, the depth of the soil is very shallow. Underneath the shallow soil, the earth has boulders hence the growth of vegetation is sparse. The intense grazing and cutting of trees for fuel wood in certain areas make vulnerable for soil erosion. Together with soil erosion, there is less of water conservation. Due to presence of number of

villages inside the CTH, these areas are under intense soil erosion. Drought like situation is very common in the plateau areas.

Strategies

No new big water impounding structures would be created and water harvesting structures will be created considering the availability of water in pinch period for wild animals and high prey pressure on the habitat in several pockets of Sariska Tiger Reserve. The existing water harvesting structures would be maintained. Water harvesting structure/anicuts will be taken up in areas where water is limiting factor. It will be done on selective basis according to hydrology status of the area. Mapping of water points would be taken up and mapped with the G.P.S. locations. The hydrology map of the area would be prepared apart from the forage/browse availability study in the habitat before augmenting water within the habitat. The strategy for water development would be as follows:

1. For effective water conservation integrated water development plans based on macro and micro water sheds will be prepared for checking land degradation, water and soil losses and thereby improving the habitat . Soil and water availability throughout year.
2. Government of Rajasthan, Department of Watershed development in collaboration with Remote Sensing Application Centre has prepared Watershed Atlas of Rajasthan. It provides uniform delineation, codification, prioritization of the watersheds that could be followed by all concerned with watershed approach as common basis.

Soil and moisture conservation including water harvesting structures, ‘V’ ditches with grass seed sowing, Contour dykes and loose stone check dams will be constructed. The traditional water harvesting structure like Johdi, Johad & Bandha will be constructed using local material with least disturbance.

Water conservation works are proposed at :

Range Sariska	Range Tehla
(1) Ghanka-Udainath-kharika	(1) Bhansota-Jahaj area
(2) Kraska-Lilunda area	(2) Devri-Kaimala area
(3) Bana-Phatya khora-Malajohdka	(3) Haripura rundh-Narayanmata area
(4) Duharmala-Sarunda	(4) Bhangarh
(5) Boh	(5) Rajore – Garh area

Range Talvriksh	Range Akbarpur
(1) Nangal Hedi	(1) Jaipal Mala - Raika
(2) Garwaji	(2) Chandalu Nala
(3) Panidhal - Devra	(3) Kalakari –Dabli area
(4) Nathusar - Loz	(4) Umri- Rotkela area
(5) Raikamala area	(5) Lilka Ghati – Binak area

With the relocation of villages in Critical Tiger Habitat, construction of water harvesting structures will be done based on requirement from time to time to ensure the availability of water for animals throughout the year.

To provide at least one water hole in every 5 sq. km. area , new water holes will be created looking to the requirement of water in different habitats and to ensure proper and even dispersal of animals as well as utilization of grasses in the whole area.

The existing water holes will be desilted regularly so that their water holding capacity is maintained.

In case of famine years the water holes will be regularly filled with water using pumps or by transporting water from else where, if required. The list of water holes with GPS location is given in **Annexure –16** .

Hand pumps will be installed near the existing chowkies. These will provide water for the staff as well as for the wild animals. Water troughs will be constructed near hand pumps for this purpose.

Deepening and maintenance of old wells will be carried out periodically (once in three years) to ensure sufficient water during the pinch period. Deepening and maintenance will be completed by the month of April / May.

Shallow wells with ramps will be constructed in nallas to ensure water for wild animals. These shallow wells have been found very appropriate to combat the severe water scarcity. Since these are natural source and the water is easily accessible to the animals, these are frequently used by them.

Water bodies were constructed with the help of Irrigation Department to ensure supply of water to wild animals. The List of Anicuts Constructed under NABARD in Sariska Tiger Reserve is given in **Annexure – 24.**

The livestock in the villages sharing the water holes should be immunized to avoid transmission of disease to wild animals.

7.2.2.2. (v) THEME PLAN FOR DEVELOPMENT OF BREEDING SITES

The Project Tiger concept envisages the core area as undisturbed sanctum sanctorum of the forest which provides safe breeding ground for the all kind of wild animals .The present disturbance level is too high in form of human and cattle disturbance.The villagers move into CTH to collect fire wood and graze cattle.The problem gets compounded due to practice of cattle grazing during night time which is difficult to check .The existing villages in CTH cause severe disturbance in 3-5 km peripheral forest area affecting adversely 50 to 60 sq km habitat area. They not only compete with herbivores for food but also restrict movement and habitat use pattern .The peripheral villages also cause disturbance by cattle grazing and wood cutting.The religious traffic to Pandupol, Bharathari, Narayanimata, Parasharji, Udainath, Chota Bharthari, Garbaji and many other places cause heavy disturbance during different parts of year.As a result very few inviolate areas are left for breeding of wild animals specially tigers.The whole CTH area of Talvriksh and Ajabgarh range is under disturbance.There is only about 15% inviolate forest area in Tehla range, 30% in Akbarpur and 30% in Sariska range. This inviolate area is likely to increase as and when more villages are relocated from CTH.

For ensuring breeding and long term survival of tiger creating undisturbed sites for tigers to breed is real challenge. ST2 tigress which has inviolate habitat in Kalighati, Kundli, Slopka, Phentaki pal, Bhensota, Pandupol areas has successfully breed in 2012 & 2014, giving birth to two cubs twice. The ST-10 tigress also could litter due to availibility of undisturbed denning site in Jaipal mala- Devra area.

The ST3 tigress which was reintroduced in 2009 has not yet breed due to high disturbance in habitat area and non availability of inviolate space.From DNA studies it has been revealed that after mating,the tigress has time and again shown initial pregnancy signs which gets terminated due to self abortion within 30-40 days.The experts have assigned biotic disturbance as main reason for non breeding.The traditional denning sites in ST3 territory like Ghanka, Udainath, Maujnath,

Kankwari are disturbed due to Kankwari and Haripura villages. The 75% of Kankwari village has been shifted and 36 families are not agreeing for voluntary relocation. Similarly in Haripura out of 74 families only 10 families have voluntarily chosen for relocation and 8 families have completely shifted. Apart from expediting village relocation programme by making it more attractive through additional incentives, strict enforcement measures are required to minimize disturbance levels.

The ST 5 tigress has also not yet breed after reintroduction in year 2010. The area had huge disturbance which has been greatly reduced by relocating Umri village in 2011 and Rautkela village in 2012.

STRATEGY:

- It is proposed to create atleast 50% of CTH area as undisturbed sites in next 5 year for ensuring breeding of tigers. Simultaneously buffer areas will be developed for diverting existing tourism pressures.
- The places selected as undisturbed sites will be declared out of bound for the tourists.
- Order from CWLW Rajasthan in this regard will be suitably got issued.
- Regular inspection of these undisturbed sites is warranted to ensure that no disturbance is being created.
- The breeding sites can be protected by small stone wall with sign of NO ENTRY at the gate

7.2.2.2. (vi) THEME PLAN FOR IMMUNIZATION OF DOMESTIC LIVE STOCK

The Sariska Tiger Reserve and the surrounding area is regularly visited by the cattle for grazing. At this time they come in contact with wild animals in the area. There is every chance that the communicable diseases from the cattle are transmitted to the wild animals. This will result in fatal diseases in the wild animals. The Hon'ble Supreme Court has also realized the gravity of the situation and has directed that all cattle or live

stock present within the 10 k.m. periphery of the Tiger Reserve should be immunized to check this menace. Regular outbreak of Foot and Mouth Disease in cattle is a cause of concern.

STRATEGY

Record of all the live stock within 5 km. periphery of the Tiger Reserve will be collected from Tehsil office and maintained at Range, Naka and Division level

Good liaison will be maintained with the District Animal Husbandry department to carry out regular immunization and deworming of this cattle. The list of Veterinary hospitals is given in **Annexure -12**.

The livestock in the villages sharing the water holes should be immunized to avoid transmission of disease to wild animals.

Cattle health camps will be organized by the Department in collaboration with Animal Husbandry Department to check health of animals and immunization.

Awareness programmes will be held in villages to impart knowledge of communicable diseases in cattle.

The immunization programme will be linked up with integrated cattle and dairy development programme.

A Schedule for vaccination in Sariska Tiger Reserve will be prepared after consultation with the District Veterinary Officer, Alwar.

Prevention is better than cure. To prevent any large scale outbreak of infestations and diseases that had happened previously, a parasitic infestation survey and control action plan is being proposed as follows.

Survey & control of Parasitic infestation

Wild animals are prone to diseases which may be bacterial, viral, fungal, protozoan or endoparasitic in nature. These diseases are transferable between wild animals & livestock.

In this area, herds of cattle and buffalo from villages are taken by the villagers to the adjoining forest area for grazing and return in the evening to the villages.

During the process of grazing some of the animals which are clinical cases or carrier animals contaminate the forest pasture and due to the

heavy shading in the forest area, the causative agents for diseases are likely to survive for long duration as compared to the grazing area in the village and it may cause infection to the wild animals.

Objectives

1. To find out the type of infestation in particular area.
2. To create awareness because some parasite are of zoonotic importance.
3. Eradication of infestation

Methodology

1. Survey will be carried out in which collection of faecal sample will be done.
2. After collection of sample, the stool sample will be tested in veterinary laboratory.
3. After testing the sample, the animals will be treated according to the infestation found in the stool sample.

7.2.2.2 (vii) Theme Plan for Reclamation of mined areas

Sariska Tiger Reserve is surrounded by mining areas comprising of mines & minerals. No mining activity is permitted inside the CTH area after the Hon'ble Supreme Court judgement. There are 68 mines operating within periphery of 1 km of CTH. Efforts will be made with the State Mining Deptt. for closures of all such mines in the interest of tiger conservation. There are many non operational mines in the periphery of Critical Tiger Habitat. Restoration of these non-operational mine areas would be done through involvement of line departments. Restoration of these sites has to be done in a time bound manner to avoid any risk to wild animals. A recovery strategy for such excavated sites would be formulated jointly with Mining & District administration. For existing 68 mines a recovery strategy would be formulated so as to address all related issues viz. working hours for mining areas, livelihood options for local people involved in mining activity etc. A MOU would be signed with the ongoing mine operators if possible even before the renewal of mining lease for appropriately restricting the ancillary activities to a minimum while prescribing working hours in the interest of wildlife.

7.2.2.3 Theme Plan for Movement of Pilgrims & Wildlife Conservation Awareness

7.2.2.3. (i) THEME PLAN FOR MOVEMENT OF PILGRIMS

The CTH of Sariska Tiger Reserve, apart from tigers and other wildlife, is also abode of regionally renowned deities.

The following temples are situated within the Tiger reserve.

1. Bharathari Temple
2. Hanuman Temple, Pandupole
3. Naldeshwar Mahadev
4. Udainathji
5. Neelkanth Mahadev
6. Naharsati Mata
7. Narayaniji Mata Temple
8. Sarsa Mata Temple
9. Ganga Mata Temple, Tallvriksh
10. Parasharji Temple
11. Garbaji Temple

Approximately 8-10 lakh people visit Bharathari Temple and 2-3 lakh people visit Pandupole temple every year. The number of pilgrims visiting these sacred places is increasing every year. Large number of people visiting these temples are putting adverse pressure on the Tiger Reserve. These places are not adequately equipped to withstand the pressures. There are no basic minimum facilities to cater the needs of these pilgrims. Proper management interventions are essential to reduce the negative impacts.

STRATEGY

- ❖ Adequate public facilities like toilets, washing places and dustbins should be developed for the pilgrim routes to reduce the litter inside the park.
- ❖ Carrying of plastic/ poly packs should be totally banned.
- ❖ The shopkeepers operating near the temples should be persuaded not to use the polythene bags for packing.
- ❖ Local people should be encouraged to develop and manage the tourist facilities outside the Tiger Reserve, as source of economic activity.

- ❖ The speed limit for the vehicles plying inside the Tiger Reserve should not be more than 20 kmph and the traffic should be managed as conveys.
- ❖ The annual melas of Pandupole and Bharathari attract lakhs of pilgrims in a short period of time i.e one week. These annual mela periods are most polluting. It is practically impossible to have regulatory systems in reducing the pollution. Special efforts and cleaning should be taken by district administration/Mela committee soon after the mela.
- ❖ These melas are great opportunities to disseminate the message of conservation. Display material and distribution material should be provided to the maximum number of pilgrims.
- ❖ An exhibition about the Tiger Reserve should be organized indicating the conservation values. Do's and don'ts as applicable to Sariska Tiger Reserve visitors will be enforced for pilgrims as well
- ❖ Feeding of wild animals/ littering the habitat/ disposed of garbage etc by pilgrims should be treated as an offence under the WLPA 1972.
- ❖ The sariska tiger conservation foundation will be involved in management and regulation of temple visitation.
- ❖ An alternate options of groups transport by plying buses will be adopted.
- ❖ A master plan covering the transport ,related regulations for temple visit, SOP to handle emergency situation will be prepared.

PILGRIM MOVEMENT TO BHARATHARI TEMPLE AND HANUMAN TEMPLE (Pandupole)

Approximately 2 to 3 lakh people visit Bharathari Temple and Pandupole Temple during the mela period and in all more than 8-10 lakhs people visit in a year. People visit Pandupole on Tuesdays, Saturdays and Full moon day. Entry of pilgrims is free of cost on these days. The vehicles registered in Alwar are allowed free entry while outside vehicles are charged entry fee on these days . On other days entry of vehicles for religious purposes is not permitted. The Hanuman Temple is situated in the heart of the Critical Tiger Habitat so the movement of pilgrims, thus, is very critical and is matter of great concern for the very survival of the

Sariska Tiger Reserve. The problems are mainly because of unregulated movement of vehicles and the pilgrims.

The strategy will be:

1. The pilgrims will be allowed to go to the Hanuman temple from sunrise to sunset only on Tuesdays, Saturdays and Full moon day. The present system of allowing personal vehicles upto Pandupole Temple on these days has to be replaced by Public Transport System. For this Rajasthan State Transport Corporation can be asked to ply buses from Bharathari to Pandupole via Sariska and Tehla to Pandupol on these days facilitating pilgrims. No personal vehicles should be allowed once the public transport system starts.
2. Private vehicles will be parked at Sariska and Bharathari at designated parking places managed by Eco development Committee/Sariska Tiger Conservation Foundation/Gram Panchyat. No pilgrim will be allowed to stay inside the Temple during the night time.
3. The shops near Bharathari Temple will be encouraged to use more and more eco -friendly materials. No plastic will be permitted.
4. At present no entry fees is being charged on Tuesdays & Saturdays from the pilgrims' entering the CTH. This can be a great source of revenue and a tool for regulating the traffic if a nominal fees is charged from vehicles registered in Alwar District. A fee of Rs. 10.00 for two-wheelers and Rs. 50.00 for four wheeler vehicles is proposed to be charged after getting required sanction from state government. The revenue thus generated can be used for maintaining the cleanliness, pilgrim roads and the basic amenities for the pilgrims.
5. On Tuesdays, Saturdays and Full moon Days , extra staff will be deployed for regulating the religious traffic.
- 6 A standard operating procedure{SOP} will be in place to meet emergencies like flood in Pandupol valley,vehicular accident,injury by wild animal etc.

In CTH of Sariska Tiger Reserve,the religious/ pilgrim places of worship will be part of religious Toursim .

7.2.2.3. (ii) THEME PLAN FOR NATURE EDUCATION

Extension work has been the most neglected area of the Wildlife wing. It is, therefore, very essential to have a proper extension network to promote education and awareness towards Wildlife protection and conservation at Sariska Tiger Reserve. For this purpose the following specific activities will be undertaken during the plan period.

- **Documentation:** Efforts will be made to prepare, develop and disseminate publications, pamphlets, posters and any other relevant publicity material. Setting up a library and related documentation facilities will be done.
- **Organizing film show,** exhibitions, Chaupals, Puppet shows, etc.: The extension units will organize film/ video shows, puppet show, chaupals exhibitions, etc., both for rural and urban populace. Extension service will also be extended to school and educational institutions.
- **Experience sharing** workshop & Exchange visits: In order to ensure bi-directional feedback, the Extension units will be responsible for organizing exchange programmes and workshops for all categories of Wildlife Wing Personnel, Extension workers, Eco-development Committee members, Local Self Government representatives etc. In the normal course, exchange visits will be followed by a workshop where sharing of field experience and cross fertilization of ideas will take place.
- **Use of mass media :** The importance and capabilities of mass media as a tool for extension is well acknowledged. So as to achieve maximum publicity, TV programmes, radio talks, Press release, etc., will be handled by these units.
- **Organization of Nature Education Awareness camps** will be taken up by help of NGO's through Sariska Tiger Conservation Foundation in order to educate school going children in peripheral villages. In these camps various participatory and competitive activities like quiz,

essay writing, painting, posters, etc, will be organized. In year 2012-13, Nature Awareness Camps were organized in 25 schools for 1000 children around Sariska Tiger Reserve through Sariska Tiger Conservation Foundation involving Tarun Bharat Sangh. A series of activities were taken in these identified schools through school administration. From each school selected 40 students were taken for three days Nature Camp. Students were taken to Sariska Tiger Reserve and shown Interpretation Centre and field visit to Tiger Reserve was organized. Provision of Rs. 1000 was made of each children from STCF for organizing Nature Camp. In 2013-14, nature education programme in 20 schools for 800 children has been targeted through local NGO. Such programmes would be taken up every year to sensitise local people for nature conservation.

- ***Sensitization of Politicians, Public servants, Media personnel etc.*** : The need to sensitize Politicians, Public Servants and media persons about the needs, requirements and performance of the Wildlife wing of the State Forest Department is of paramount importance . They need to know, appreciate and, when necessary, critically analyze the wildlife conservation activities. For this purpose, the extension units will activate this very vital target audience by preparing reading material, reference, training and will also organize field visits from time to time so that interaction with field functionaries, locals & other departmental staff will take place and first hand knowledge of the methodology adopted will be disseminated.

7.2.2.4 Theme plan for MIS & Staff development

7.2.2.4. (i) THEME PLAN FOR MANAGEMENT INFORMATION SYSTEM

In the age of information, none can deny that the efficiency of an organization depends upon its Management Information System (MIS). It not only helps managers at various levels in the organization but also helps in dissemination of information to the society. Sariska Tiger Reserve does not have well defined MIS. As a result the functioning of the organization suffers and ad hoc decisions rule over sound management practices.

Existing problems related to MIS

- ❖ Retrieval of information is slow
- ❖ Repetitive processing of information manually
- ❖ Delays in transfer of information
- ❖ Erratic flow of information
- ❖ Lack of standard formats
- ❖ Non compliance of the schedules

Areas requiring special attention

- ❖ General Periodical returns
- ❖ Forest & wildlife protection including monitoring of Forest & Wildlife offences & court cases related to crimes
- ❖ Settlement and demarcation including monitoring of Encroachment cases
- ❖ Personnel Information System including deployment of staff
- ❖ GIS based Resource Inventory including wildlife estimations and inventory of development works
- ❖ Management Plan and perspective planning
- ❖ Annual Plan of operation, budgeting and monitoring & Evaluation
- ❖ Inventories related to resources such as vehicles, arms, wireless network and other equipments.
- ❖ Wildlife tourism and Ecotourism activities
- ❖ Welfare Activities

- ❖ Research and documentation
- ❖ Environment education and awareness programmes
- ❖ Inventory of information related to villages in & around project tiger area
- ❖ Information relating to registration of arms in adjoining areas, in accordance with the Wildlife Protection Act, 1972
- ❖ Information relating to immunization of domestic cattle in & around STR in accordance with the Wildlife Protection Act, 1972
- ❖ Information relating to licenses issued under Wildlife Protection Act, 1972

Prescriptions for Management Information System

- ❖ Information needs at different levels will be identified
- ❖ The data sources will be identified
- ❖ Standardized formats for collecting and recording data will be finalized
- ❖ A communication network for information transfer and feedback will be identified
- ❖ Periodicity of data input and transmission of information will be standardized
- ❖ Formats for report publications will be finalized as per the needs of different levels
- ❖ Naka, Range and divisional notebooks are not being maintained presently. These will be strictly revived. It is the responsibility of the forester, R.O. and DCF respectively for maintaining and updating the records. Any deviation and lapses will be viewed seriously.
- ❖ At each Naka level, *village information records* of all the villages under their jurisdiction will be maintained. The records will be checked by R.O.s once in 6 months and by concerned ACF at least once in a year.

- ❖ The crime records of serious wildlife offences/ offenders will be maintained at Range and Division level.
- ❖ Computer based GIS framework will be used for inventory and management purposes including monitoring and evaluation.
- ❖ Computer software will be prepared for handling data in an efficient manner with adequate provisions for data security. An effort will be made to evolve a system most suited to existing traditional pattern of data collection and compilation.
- ❖ Division office will act as focal point for data entry and for producing reports since in current scenario, it may not be feasible to provide computers at lower levels.
- ❖ Additional post of data entry operator will be required at Division and Range office.
- ❖ The efficacy of the MIS will be periodically reviewed and the system will be updated as per the requirement.
- ❖ The Internet links will be established between the STR Office and other organizations including Wildlife Wing of others states and Government of India for speedy exchange of information. For this a separate web site for SariskaTiger Reserve will be created.

While designing the MIS the following aspects will be taken into consideration:

- ❖ The basic character of the data, collected in the field by the staff, remains the same as far as possible
- ❖ Minimum codification or rearrangement of input data has to be done to enable the data to be processed through computers.
- ❖ Repetition of items of input information will be avoided completely.
- ❖ The format of output data, as far as possible, will be kept as existing today to avoid any confusion at decision level.

- ❖ The formats for transfer of information from the lowest to highest level will be so designed that it helps in decision making and in processing the data, its compilation and subsequent analysis, resulting in saving of precious time and ensuring better efficiency.
- ❖ The staff at all levels will be able to collect the input data easily, with some reorientation and training suited to his level.
- ❖ The programme will be introduced in a phased manner and improved according to the need.

Studies and issue-based consultancies may be awarded for designing MIS, keeping in view, various kinds of information catering to the need of multiple users.

STAFF DEPLOYMENT

The organizational set up and the staff position have been given in Chapter 4. The Sariska Tiger Reserve is under the overall control of the Field Director, Sariska Tiger Reserve and Chief Conservator of Forests, Jaipur. Presently only one Division is having territorial jurisdiction over the tiger reserve. The Deputy Director, Sariska Tiger Reserve who sits at Sariska, looks after protection and management of core and buffer area of 1203 km². It is proposed to form two territorial divisions at Sariska and Alwar for effective management of Core & Buffer. The draft restructuring proposal is given in chapter 11 (11.4).

Responsibility

The duties and responsibilities of each category of Officers have amply been enshrined in the Rajasthan Forest Department Code. Hence there is no necessity of repeating the same here. In the light of Wildlife (Protection) Act, 1972, the responsibility as mentioned below will be reposed on the Officers concerned to facilitate smooth administrations. All the Officers from the level of Range Officer and above need to be posted who have been specially trained on Wildlife management.

The Assistant Conservator of Forests under the Deputy Director are Wildlife Warden to carry on the provisions of Wildlife (Protection) Act,

1972. The power of Investigation u/s 50 (8) of the Act has been deligated upto ACF's.

The Range Officer working within the tiger reserve have been given the responsibility of enquiry into the cases booked u/s 50 of Wildlife (Protection) Act, 1972.

The Forester in charge of a Section inside the tiger reserve will be responsible for detection and preliminary enquiry of all cases.

The Forest Guard will protect the Forest, detect the cases and draw FIR only. He will be responsible for all illicit felling, poaching and encroachment of forestland if not noticed and FIRs drawn.

Staff Amenities

1. Field Equipment :-

Necessary camp and field equipment for the protection of staff shall be provided. The other necessary equipment helpful in carrying out field work e.g. water bottles, measuring tapes, compass, pedometers, field forms and diaries, small axe, fire arms, GPS, Compass, Camera, Plaster of paris etc shall be provided as and when needed.

2. Uniforms and protective gears :-

Timely supply of good quality uniforms as per provisions shall be ensured every year along with other items such as caps, belts, boots, hunter shoes, winter wears, raincoats etc. Protective gears like wooden canes etc shall also be provided.

3. Incentives and awards :-

At present Project Tiger allowance is paid to various categories of staff & allowance paid for personnel deputed in naxal prone areas.

Apart from monetary incentives, incentives or awards for meritorious work shall be given for motivation. Nominations for excellent work to various awards like State Forestry Award, Rajiv Gandhi wildlife award, Amrita Devi Vishnoi award etc shall be made for deserving persons.

4. Health checkups / Insurance :-

Regular health camps shall be organised for health checkups of staff through NGO's like Wildlife Conservation Trust Mumbai & other hospitals. This will ensure better health and will in turn result into better output from staff & will have great value.

Possibilities of Health insurance for staff & protection assistants living in interior areas shall be explored with insurance company.

5. Mess Allowance

Mess allowance will be given to front line staff as per provisions of NTCA @ Rs.860 per month.

FUND RAISING STRATEGIES

At present, the funds are entirely from the Central and State Governments, mainly the following sources.

Name of the scheme	Funding Agency
CSP- Project Tiger	Govt of India, 50% recurring fund by State Govt, 100% non-recurring by Govt. of India
Finance Commission Grant	State Govt
State Plan (Wildlife Protection & Conservation)	-Do-
CAMPA	State CAMPA
NABARD	State Govt.

With the formation of Sariska Tiger Conservation Foundation more options will be explored to raise funds from national and international donor agencies like Ford Foundation, UNEP, NGOs like WWF and as part of CSR from Corporots.

As per the Section 38X (2) of Wildlife (Protection) Act, 1972 one of the objective of formation of Tiger Conservation Foundation is to augment

7.2.2.4. (ii) THEME PLAN FOR STAFF DEVELOPMENT AND CAPACITY BUILDING

This would involve

- (a) Capacity building and training of frontline staff.
- (b) Providing project allowance, mess allowance and special incentives.
- (c) Specialized training in the use of Geographical Information System (GIS), antipoaching operations.
- (d) Specialized training in wildlife jurisprudence and wildlife forensics.
- (e) Study tours for appraisal of good practices in other reserves.
- (f) Dissemination workshops.
- (g) Specialized training in park interpretation.
- (h) Specialized training in management planning.

The above inputs are extremely important for enhancing the skill of field staff. Several instances of poaching occur for want of specialized training in crime detection and related skills.

Training of different cadres of staff in basic course of wild life management and other related disciplines is essential for scientific management of the project tiger area. The officers at the rank of Range Officers and above are regularly transferred out. Similarly, forest staff at the rank of forester is also occasionally transferred. Thus, the system does not have a continuity of trained staff.

Wildlife management has emerged as a science. The staff is expected to digest the most advance Scientific principles of “ biodiversity conservation”, “gene pool”, “Eco-system”, “population dynamics”, “estimation of population”, “monitoring of tigers” etc. It has become increasingly difficult to entrust them with tasks requiring certain level of training and education. The probability of error in execution of a task is very high. Apart from this the staff has also been burdened with additional pressure of communicating with villagers so as to ensure their participation in protecting Sariska Tiger Reserve. The staff also lacks regular training required to keep them fit for coordinated action against poachers and other miscreants.

Basic skill development for field staff is of paramount importance. It is being felt that there is inadequacy of training at all levels. Most of the

Staff of Sariska Tiger Reserve is not trained in the matter of Wildlife Protection, Conservation and other related subjects of Wildlife Management. Specialized training of the staff is essential to tone up their skills from time to time.

It is proposed to carry out regular training programmes in the field as well as at reputed specialized institutes of the country. The training course can be of short or long duration depending upon the course contents.

Likely areas of training are as follows:-

- Field botany
- Avi- fauna
- Population dynamics
- Major ungulate population variations
- Regeneration of various species
- Wildlife Law enforcement
- Forestry laws
- Nature interpretation and ecotourism
- Animal health and nutrition
- Advanced techniques of wildlife management
- Techniques of carrying out wildlife estimations/census
- Techniques of ecodevelopment
- Phase-IV Monitoring
- Camera Trapping

These are some of the topics (Suggestive not exhaustive) on which the training must be organized.

The Institutes where these trainings can to be organized are:-

- (1) Wildlife Institute of India, Dehradun
- (2) Forestry Training Institute, Jaipur
- (3) Indian Institute of Forestry Management, Bhopal
- (4) Indira Gandhi National Forest Academy, Dehradun
- (5) Central Arid Zone Research Institute, Jodhpur
- (6) Forestry traing institute, Alwar

Short term training courses should also be held at the field level to impart basic skills to the field staff.

CHAPTER - 8

RESEARCH, MONITORING AND TRAINING

8.1 Research Priorities

The National Wildlife Action Plan has recommended establishment of a representative network of protected areas in order to conserve country's rich and varied biodiversity. To manage dynamic Tiger Reserve, with a degree of efficiency and safety, the management needs scientific data. Research and monitoring are the two indispensable arms, which support and strengthen Tiger Reserve management. Developing and using information base is an essential step in deciding the Tiger Reserve management goals and objectives. It is expected that findings of a well organized, rigorous scientific research will help the Tiger Reserve Management in the following aspects : -

- ❖ Enhance benchmark knowledge
- ❖ Improve decision making
- ❖ Enhance ecological and cultural integrity of Tiger Reserve
Reduce overall management cost & enhance benefits
- ❖ Improve sustainability
- ❖ Increase public awareness and people's participation

Monitoring and research activities are integral components of the adaptive management framework, which involves managers and researchers working together. Thus, instead of thinking about research and monitoring as separate entities, research can be viewed as a particular form of monitoring. Thus, the artificial distinction between managers doing monitoring and researchers doing research can be eliminated, and both can be considered scientists in the sense of searching for reliable knowledge.

Emphasis will be laid on different tools and methods for forest and wildlife inventories, habitat assessment, vegetation management,

endangered species management, management of forest insects, epidemics, wildlife habitat relationships, fires, recreations, visitors' management, ecological monitoring and some significant research especially on the predator and prey relationship in the park.

8.2 Research Projects

Sariska Tiger reserve is a very good place for research works and implementation of research oriented priorities in every aspect of nature. As a critical wildlife habitat, Sariska needs some detailed study. As per need, one research cell will be established at Sariska headquarter equipped with all lab facilities like microscopes, refrigerators, computers etc.. Following aspects can be covered under research projects:

1. Studies on plant communities and regeneration status.
2. Effect of fire and fire risk assessment.
3. Study on the assessment of tourism pressure, its impact, wildlife values and local economy.
4. Ecological study on weeds and exotics and possible methods for their control.
5. Socio-economic profile and natural resource dependency inside STR and the zone of influence of peripheral villages within STR.
6. Baseline study on marketing of dairy products and their impact on economy of villages and alternative methods of livelihood.
7. Status and Distribution of each carnivore species through camera trapping.
8. Status and distribution of major herbivore species.
9. Monitoring of large carnivores- home range and territoriality through radio-telemetry technique.
10. Monitoring of Prey-predator relationship after Tiger crisis.
11. A full functional GIS cell is required to be set up in Sariska Tiger Reserve, which will serve the purpose of having the most updated database at landscape level for planning and management. An advanced and high resolution satellite image like QUICKBIRD imagery will be purchased and processed properly in GIS domain to get the idea of land use and land cover patterns of Sariska Tiger Reserve.

12. Animal health monitoring.
13. Genetic study- Study of Gene pool of each carnivore and genetic coding of each species through scats and other available body parts.
14. Studies of food habits of large predators and prey-base through scats, kills and pellet analysis.
15. Studies on Reintroduced Tigers regarding home range, radiotelemetry, breeding status etc.
16. Studies on Reintroduction of sloth bear, chinkara and other species which existed earlier.
17. Studies on monitoring of Tigers and other prey base, by GPS based trekking system, camera-trapping etc.

There is one post of research officer sanctioned for this purpose. This post is filled by an Assistant Conservator of Forests who in fact is not a research officer. There is no staff posted exclusively for collection of data. Inclination and continuity for conducting fruitful research is lacking. Thus, little or no attention has been paid to research that would have been of help in better management of forest and the wildlife.

8.3 Research Monitoring Framework

The research work in the STR will be monitored to make use of research in the field. Monitoring should be done by appointing a Research Advisory Committee (RAC) at the Tiger Reserve level. In order to advise on various policy matters concerning research, It is suggested that eminent scientists and Tiger Reserve managers should be requested to serve on this committee. The RAC would meet at least once in six months and will advise the CWLW on matters relating to the research. Following is the suggested composition of RAC:

- | | | |
|----|--|-------------|
| 1. | Chief wildlife Warden | Chairperson |
| 2. | Chief Conservator of Forests, wildlife, Jaipur | Member |
| 3. | Two eminent scientists working on Ecology/Bio sciences/wildlife science drawn from WII/RU etc. | Member |
| 4. | An eminent social scientist | Member |

5.	An eminent forester / wildlife manager	Member
6.	A representative of NGO	Member
7.	DCF. Sariska	Member
8.	DCF. Relocation	Member
9.	Field Director, STR	Member
		Secretary

8.4 Training Needs Assessment :

Proper training is required in -

1. Crime investigation and filing complaints
2. Intelligence network building
3. Preparation of forest offence cases
4. Monitoring methods including camera trap
5. Wildlife laws and latest amendments
6. Wildlife forensics
7. Collection of samples
8. Stress management
9. Experience by exposure to other protected areas of the country

Training programmes :

Training of local people for skill transfer

Teachers' training for programmes with children.

Training of eco-animators, eco-wardens.

Training of forest department personnel for eco-activities.

Training of trainers for above approach methods.

CHAPTER - 9

TIGER POPULATION AND HABITAT ASSESSMENT

Monitoring Tiger Population

Tiger project Sariska was envisaged for better management and protection of wild life, especially Tiger. Tiger is at the apex of the biological pyramid of food chain and its existence depends on availability of sufficient prey, which in turn depends on forest, and grass lands. The tiger habitat of Sariska falls in the category of dry deciduous forest and according to Mr. Kailash Sankhla the author of 'Tiger', such forests are "more productive and richer in forage than any of the other habitat types and can support large concentration and wider range of ungulates and hence tigers" (Kailash Sankhla Tiger : the story of Indian Tigers page 9.2) The first priority, therefore, is to maintain and upgrade the availability of forage and save it from overgrazing and competition from domestic cattle. If the population of ungulates is sufficient, the tiger will also survive and prosper. Till 2004 the monitoring of the number of tigers and Panthers was done through annual pug mark census. However, Wild Life Institute of India has now modified the guidelines and has suggested a comprehensive and continuous monitoring method for both prey and predator.

In each beat 5 PIP has been made. Each beat guard records data on PIP's in required format and send it to Headquarter for compilation.

The monitoring of Reintroduced Tigers is being done through dedicated teams for each Tiger, who collects data in required format. The GPS locations alongwith other observation in recorded data sheet. The data is compiled every month to generate monthly reports. The monthly maps showing location of each Tiger is also produced. The monthly reports are sent to Chief Wildlife Wardern, Rajasthan and NTCA, New Delhi.

Evaluation of habitat and prey based is done by Transect Method twice a year. Every beat has two transects of length 1.5 to 2 kms.

Observation is compiled in data sheet and evaluation is done by DISTANCE Software.

These monitoring methods will not only strengthen supervision at field level but will also generate information on regular basis for evaluating tiger and panther occupancy. The manager should use daily monitoring data in a suitable manner to generate tiger and panther occupancy maps. The analyzed information thus generated will be sent to National Tiger Conservation Authority, New Delhi, every month.

9.1 Recording data from 'pressure impression pads' (PIP)

As a part of intensive monitoring of source populations of tigers, data will be recorded from pressure impression pads (PIP's, track plots) in every beat.

A minimum of 5 PIPs will be permanently maintained in each beat. The dimension of the PIP shall not be less than 6m in length the width of the PIP should equal the foot path, jungle trail or dry nullaha's width on which the PIP is made. GPS coordinates of all PIP's need to be recorded.

The location of the PIPs within the beat should be such that they maximize the possibility of recording carnivore tracks. Minimum distance between any 2 PIPs should be more than 1.5km.

The PIPs should be cleaned of debris, leaf litter, gravel and covered with fine dust of about 0.5cm depth. After preparing the PIP, data should be recorded the next morning and the PIP cleared of all tracks. The PIPs should be sampled thrice every month during summer and winter. In case a prepared PIP is disturbed due to rain, traffic etc. then it should be set again before data is collected. The topography and forest type should be recorded for each PIP.

Trails of all carnivore and mega herbivores species should be recorded e.g. tiger one track set, leopard two track sets, one small cat track (as species level identification may not be possible).

It is important to note that a track set is constituted by one to many pugmarks made by a single animal traversing the track plot (PIP). One need not identify the gender or individual animal (tiger), but if this information is known, it should be entered in the remarks column. If there are more than one track sets of "same" animal eg. A tiger moving up and

down the trail several times, they should be recorded as separate track sets. The list of PIPs in CTH is given in **Annexure – 18**.

9.2 Phase-IV Management-Oriented Monitoring

This consists of : -

(a) Tiger presence and relative abundance.

(b) Tiger prey presence and relative abundance.

©Habitat quality and anthropogenic pressure at a high spatial resolution of 15-20 sq.kms.

A forest beat (an administrative unit) 15-20 sq.km in size, delineated primarily on natural boundary, will be the unit of sampling . Since each beat is allocated to a beat guard for patrolling and protection, the boundaries of a beat are well recognized by forest staff. The sampling will be systematically distributed in all beats of tiger occupied forests (tiger reserve ,revenue and reserve forest). Thus in fact, the entire landscape where tiger are likely to occur is sampled .The detailed methodological approach for sampling Carnivore signs, Pellet/dung counts, habitat and anthropogenic pressure will be followed. The Carnivore sign survey & Transect line sampling formats is given in **Annexure – 32**.

9.2.1 Sampling for Tiger, Leopard, and Other Carnivore Sign Encounter Rate-

To obtain data on the presence, absence and intensity of use of a beat by tigers and other carnivores, we shall quantify the relative abundance of tiger, leopard, and carnivore signs in an area. The following procedure will be followed for data collection:

- A beat will be considered as a sampling unit.
- Areas within the beat that have maximum potential for tiger occupancy will be intensively searched.
- Since tigers & leopards have a tendency of using dirt roads, trails, foot paths, river beds and nullahas, these landscape features, within the beat, need to be searched intensively
- One to the three persons who know the terrain and habitat features of the beat will conduct the search for tigers' sign.

- There will be 3-5 separate searches (in different compartments within the beat and/or at different times 1-5 days apart), each search covering about 4-6 km distance in areas having the best potential for tiger presence. It is important to record the distance covered and the time spent during each search separately and accurately. If time is spent in resting or in other activities, while conducting the search, this duration should be reported separately. If possible the GPS coordinate of the beginning point of each search path will be recorded.
- The total minimum distance covered while searching for tiger and other carnivore sign will be 15 kms. per beat.
- Tiger & leopard signs will be classified into following categories 1) Pugmark trails, 2) Scats (Old : dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly, 3) Scrapes, 4) Scent marks (spray, rolling), 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization).
- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set is considered as one sign (not each pugmark as one sign). In case a tiger (or other carnivore) continues to walk along a dirt road for a long distance (say 1 km), then this will be considered as one sign, and a comment recorded in the remarks section of the data regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside of the sampling route will also be recorded with GPS coordinates (if available) and with appropriate comments.
- Special emphasis will be given to sign of tigress & leopards with cubs, and any authentic evidence of tiger cubs (sighting of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months will be mentioned in the data sheet.
- While sampling for tiger and leopard signs, record will also be kept for signs of any other carnivore that are encountered.

- The number of livestock that are killed by predators within past three months needs to be recorded in the questionnaire following the data sheet.

It is important to report data sincerely. It is likely to happen that there may be reliable information that tiger/leopard is present in the beat being sampled, but no tiger/leopard signs are recorded during the intensive search survey. In such cases, mention will be made in the remarks column of the data sheets. However, failure in obtaining tiger sign from a beat is equally important as recording tiger/leopard signs and for appropriate analysis of this data the actual data should be reported.

9.2.2 Sampling for Ungulate Encounter Rates

This protocol outlines a simple method for quantifying ungulate abundance in an area based on visual encounters, while walking along fixed line transects. The following procedure needs to be followed for data collection:

- A beat will be considered as the unit for sampling.
- After considering the shape, size, vegetation, and terrain type of the beat, a transect line of a minimum of 2 km and not exceeding 4 km will be marked for sampling.
- The transect line should traverse similar habitat (broad vegetation types) as far as possible. If the beat is composed of 2 or 3 distinct vegetation types, then 2 separate line transects should be marked for sampling .
- The line transect within a beat may be broken up into 2 or more segments so that each segment has a minimum length of 2 km and traverses similar habitat.
- Care has to be taken that a line transect is not located near a busy road nor should it run parallel to a river or other features of the landscape which may bias sighting of ungulates.
- For each transect the point of beginning and end point coordinates (Latitude and Longitude) should be recorded by a global positioning system.

- The broad forest type and terrain type that the transect traverses needs to be recorded.
- Each transect should be walked by 1-2 persons during the early morning hours (6:30 AM to 8:30 AM). Preferably one of the persons walking should be a good field person who is able to spot wildlife.
- A record should be kept of all mammals and peafowl seen during the walk in the prescribed format. For each animal sighting, the following needs to be recorded: 1) serial number of the sighting, 2) time of the sighting, 3) species (eg. sambar, chital, wild pig, peafowl, langur, etc.), 4) group size – number of animals of the same species in the group sighted. It is important to try to count the number of animals in the group as accurately as possible. Animals are considered to belong to two different groups if the closest animals from the two groups are separated by a distance of over 30 m.
- If possible, the number of young (fawns/calves less than 1 year of age) seen in the group should also be recorded.
- A broad habitat category (vegetation and terrain type) needs to be recorded for each sighting eg. S. No.5. 12 chital (10 adults and 2 young) were seen at 6:40 am, in mixed dhok forest, gently undulating terrain.
- Each line transect needs to be walked at least on three different mornings for estimating ungulate encounter rates.

9.2.3 Sampling for Vegetation, Human Disturbance, and Ungulate Pellets

To quantify the habitat parameters and to determine relative abundance of ungulates, sampling will be done along the same line transect on which ungulate encounter rates were estimated. For economy of time and effort, it would be possible to first sample the line transect during early morning hours for ungulate encounter rate and then while returning along the same line, sample for vegetation and ungulate pellets. Sampling for vegetation, ungulate dung and human disturbance will be done only once on a transect.

- Again a beat will be the sampling unit, and sampling will be done along the established line transect.

- The beginning and end point coordinates of the line transect need to be recorded using a GPS unit.
- The same principal of laying line transects as followed for ungulate encounter rates is applicable here .
- Vegetation would need to be sampled at every 400 m along the transect.
- The vegetation would need to be quantified visually in following categories for each plot:

In 15 m. radius circular plot-

- 1) Broad vegetation type and associated terrain type eg. Grass land on hilly Plato terrain, semi evergreen &moist deciduous forest on hilly slopes and valley etc.
- 2) Within a distance of approximately 15 m of the observer the five most dominant trees need to be listed in the order of dominance (abundance)
- 3) The observer needs to list the 5 most dominant shrub species in order of dominance (abundance) within 15m. radius of the location. He needs to categorize shrub density (under-story vegetation) as absent, very low, low, medium, or dense. Shrubs will be assessed on five point scale (0 to 4 i.e. absent to most abundant) for density estimation.
- 4) If weeds are present, their abundance needs to be scored on 0 to 4 scale (0 being absent and 4 high abundance) and the three most common weeds seen in 15 m. radius need to be listed in order of abundance.
- 5) Within the same 15 m. radius, the observer needs to record number of signs of lopping, wood cutting, and presence/absence of human foot trail.
- 6) The observer needs to visually quantify the canopy cover at the location. The observer should subjectively classify the proportion of the sky above him that is covered by canopy foliage and categorize it into <0.1, 0.1-0.2, 0.2-0.4, 0.4- 0.6, 0.6-0.8, >0.8 canopy cover
- 7) A mention needs to be made in the data sheet regarding the number of permanent human settlements, human population, and livestock population present in the beat (to the best of his knowledge).

- 8) A mention needs to be made, based on the observers' knowledge, if any non timber forest product is collected from the beat. If yes, which NTFP and to score the magnitude of collection on a 5 point scale (0- no collection 4-high rate of collection).

In 1 m radius circular plot-

The observer needs to use a 2m long stick to define an imaginary circle around him with the stick as the diameter. Within this circular plot (2m diameter) the observer needs to a) quantify the percent ground cover, i.e. the proportion of the ground covered by herbs, grasses, litter, and bare ground, b) List the 3 most dominant grass species, and herb species in order of dominance

Sampling for Ungulate Pellets

- ❖ Ungulate abundance will also be indexed by enumerating their faecal pellets. This exercise will be done on the same line transect that has been sampled for ungulate encounter rate. To save time, this exercise could be done after the line transect has been sampled in the early morning for ungulate encounters.
- ❖ At every 400 m along the transect (line of walk) the observer needs to sample an area of 2m by 20m, perpendicular to the transect for quantifying ungulate pellets. This is done by using the 2 m long stick held at the centre horizontally in his hand and by walking slowly, 20m right and left of the transect alternately at every 400m
- ❖ All ungulate pellets encountered need to be recognized for ungulate species and recorded in appropriate columns of the attached data sheet .
- ❖ The number of faecal pellets need to be counted. In cases where the pellets occur in large heaps, then they should be categorized into the following categories: A (50-100), B (100-200) and C (>200).
- ❖ In areas where small livestock like sheep and goat are known to be grazed, it is possible that fecal pellets of these can be confused with wild ungulates especially those of chital. In such areas, a mention needs to be made that goat or sheep graze the area.
- ❖ In the last row of the data sheet the observer needs to report if ungulate/animal listed in the data sheet occurs in the sampled beat to

the best of his knowledge, irrespective of whether its pellets/dung were recorded in the plots or not. The list of Beat wise Transect Lines in CTH of Sariska Tiger Reserve is given in **Annexure -19**.

9.2.4 Obtaining the minimum number of tigers in the tiger reserve

- (i) Three pairs of camera traps to be deployed per beat and should be left open within a closed period of 40-60 days depending on the reserve.
- (ii) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of “population closure” (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration will lead to over estimation of tiger numbers.
- (iii) The photographs obtained from camera trapping should be submitted to NTCA for analysis for fixing individual IDs of tigers.
- (iv) A digital camera trap tiger photo database should be prepared for the reserve with location ID, Date and Time Stamps as per format to be provided by NTCA.
- (v) The minimum number of tigers should be ascertained based on individual camera photo traps of tigers obtained within the closure period specified to be 45-60 days.
- (vi) Details of new captures / missing tigers should be recorded.
- (vii) The format for recording the camera trap capture data will be provided by NTCA

The List of Camera trapping locations in CTH is given in **Annexure -17**.

Obtaining tiger population size for the reserve using spatially-explicit capture recapture framework

The camera traps deployed as per the survey design should be left open for a period of 40-60 days (depending on the areas). Where possible the entire Tiger Reserve must be surveyed. If the survey area is very large, tiger population size can be obtained by sampling a minimum block of 400 square kilometers at a time, but following all other minimum standards in section 3. If deployment of camera traps in an entire reserve or parts of it is not feasible for any reason, fecal DNA samples may be collected over the entire Tiger Reserve for Capture-Recapture analysis. The tiger

population size may then be estimated over the entire Tiger Reserve using Mark-recapture methodology.

The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with spatially explicit capture-recapture process / analysis.

The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to over estimation.

The analysis of capture data between years (using open population models) should also be done in collaboration with technical experts / scientists/ WII

Mark recapture technique-

Assessment of tiger population at beat level using photographic mark-recapture camera trapping while analyzing the data with an appropriate softwares like MARK, CAPTURE and CARE. This should result in the preparation of a reserve-level photocapture database of individual tigers, to be shared with the Chief Wildlife Warden / NTCA / WII.

(I) The capture–recapture methodology is largely derived from the classical Peterson-Lincoln Estimat. The mark-recapture methods based on Peterson Estimate constitute the most important pseudo-sample methods. A large number of variations of this basic method have been evolved, which have been further complicated since the technique is simultaneously utilised to measure movement or mortality.

Here the sample of a population is marked after it is caught and then released; subsequently, samples are again taken from the population after recapturing and the proportion of marked individuals are recorded. Using the proportion of marked individuals in the subsequent samples, the total population is estimated. The capture-recapture sampling facilitate estimation of the 'proportion' of animals captured which facilitates estimation of true population size. The simplest form of the mark-recapture estimator is the Lincoln-Peterson estimator; this is known variously as 'Peterson index', 'Lincoln index' or 'the Peterson estimate'. This method gives an estimate of actual numbers and hence it is a sample

census rather than an index. Peterson, in 1896, described this method for fish populations; however it was first applied for wildlife in 1930 by F.C. Lincoln, for populations of waterfowl.

9.2.5 Using scats for DNA analysis to obtain the minimum tiger numbers-

- (i) Collection of tiger scat samples: a) Use disposable surgical gloves to handle scat samples, b) for each scat a new set of gloves should be used to avoid cross contamination, used gloves should be discarded in an environmentally friendly way c) about 20 gms of fresh scat sample should be taken and stored in a vial/tube containing buffer & / or 70% alcohol. Tubes should be prepared in duplicate with GPS coordinates and date clearly recorded on the tube (alcohol erases permanent marking pens).
- (ii) Obtaining the minimum number of tigers in the area through DNA analysis of tiger scats involving an institution having the domain expertise.

CHAPTER - 10

MISCELLANEOUS ISSUES

10.1 WILDLIFE HEALTH MONITORING

The health of wild animals inside Sariska is noticed to be good. The principal prey animals like sambar, Chittal, Nilgai and wild boar available in good numbers are seen to be very healthy. Langur and other animals largely appear healthy free from any diseases. However, regular vaccination of the cattle in the peripheral villages needs to be made. The work will be done following plan and schedule. The carcass of the cattle shall be disposed of by burning. Similarly death of any wild animal due to poisoning and suffering from any infectious disease shall also be burnt.

10.2 Wildlife Health Management

Protected areas are established with an aim to conserve components of biodiversity to maintain their status in the natural ecosystem to protect the species from premature extinction. Outbreak of fatal diseases among the population of wild animals has lost considerable wild fauna in the past. In 1967-69 there was outbreak of Haemorrhagica septicaemia (HS) and thousands of Sambhar died. It took many years for Sambhar population to revive. The disease spread through water hole contamination. The water holes were treated with Potassium permanganate and Terramycin was orally given to infected animals. A little outbreak was again reported in 2010 in Bera area when 24 sambhar died at one place. So such outbreaks can create disaster in herbivore population.

There is a great competition of survival among wild ungulates and cattle for both forage and water. The domestic animals come in contact with wild animals, particularly ungulates at common grazing fields and at waterholes. Due to this, chances of the transmission of various fatal infectious diseases from livestock, to wild animals, namely Rinderpest (RP), Anthrax, Foot and Mouth Disease (FMD), Hemorrhagic Septicemia (HS) etc., are extremely high. It is also known that there are few diseases

which are communicable to carnivores from diseased ungulates; e.g. Rabies, Anthrax, Hydatidosis and Trypanosomiasis (Arora, 1994).

10.2.1. Handling of injured / sick Schedule I Wild animals like Tiger

All cases of sick / injured Scheduled I wild animals, as reported by the field staff, shall be subjected to examination by an independent team, to ascertain whether human intervention/treatment is required. Since wild animals in nature are subjected to ongoing, natural intra/inter specific interactions, human interventions for treating such animals may not always be necessary. However, till the arrival of the independent team, the field staff shall continue with the monitoring of sick/injured wild animal.

The composition of the team is suggested as follows

- a) An authorized representative of the National Tiger Conservation Authority.
- b) A Non governmental outside expert nominated by the Chief Wildlife Warden of the State.
- c) One Veterinary Asst Surgeon

10.2.2. Wildlife Health Monitoring Protocol for staff:

In the present scenario where a Wildlife Manager has to deal with Human-Wildlife Conflict, diseased, sick and injured animals, Stray Wild animals, Post-mortem, domestic livestock and stray dogs etc. the services of Veterinary Officer are highly essential. Presently the service of Veterinary Asst Surgeon, Jashipur is mostly utilized for all the above said purposes. It is noticed that there is considerable delay in tackling the issues for want of expert services. Recently govt have sanctioned one post of Veterinary surgeon for Sariska TR on deputation from Animal Husbandry Department. The veterinary surgeon will arrange training to all the field staff covering the following aspects including reporting system. The veterinary expert will also monitor the implementation of the protocol and submit report to the Field Director Sariska Tiger Reserve.

- Signs and symptoms of various diseases of Wild Animals.
- Identification of Wild-Animal from bones, skeleton, Hairs etc.

- Immunization Programme for livestock and straydogs.
- De worming medicines, vitamins and mineral supplements to wild animals based on necessity.
- Testing the water quality in water holes.
- Collection of samples, preservation, transportation etc.
- Rescue operation for stray Wild Animals and after care and facilities for rescue animals.
- Keeping track of cattle depredation by carnivores through wireless on a daily basis, and ensuring timely compensation to affected people.
- Monitoring movement of wild carnivores near human habitations through “impression pads” created near water points and other sensitive areas, and maintaining a record of such village level monitoring in the Gram Sabha/ Panchayat/EDC.
- Alerting / sensitizing local people appropriately, including safe disposal of livestock carcass and other garbage, to prevent habituation of wild carnivores like panther from frequenting and subsequently becoming resident in the area.
- Deployment of tracking squads comprising of frontline staff and experienced local people, and plotting day-to-day movement of the aberrant wild carnivore (preferably using GPS in the GIS domain).
- Deployment of a “watch team” for patrolling the affected village area, techniques like crackers, light, etc.
- Using camera traps/impression pads for collecting field evidence relating to the wild carnivore for arriving at an inference.
- Constituting an advisory committee comprising of field staff, experienced trackers and NGOs for obtaining advice relating to identify/sex of the aberrant wild carnivore causing depredation, especially for ascertaining its sex, age, physical deformity and other related parameters.
- In case of recurring human depredation in quick succession, use of dummies with a bent posture inside trap cages for trapping the

aberrant animal (such traps, with inbuilt mechanism for automatic closure after animal entry, should be placed at several sensitive areas) in consultation with Chief Wildlife Warden.

- Radio collaring and monitoring the problematic animals in consultation with Chief Wildlife Warden.

The procurement and supply of Drugs/Medicines, Cages, metal detector, vehicle etc to the veterinary expert will be ensured. Sufficient budgetary provision for the establishment of Laboratory and related facilities in a phased manner will be made.

Free-ranging wild animals are as susceptible to diseases as any other living beings. Diseases have been a major cause of local extirpation of a number of wild animal species in India. With the increasing interaction between wild and domestic animals, the chances of disease transmission amongst them are high. Therefore, similar to the attempts made for recording the occurrence of disease outbreaks in wild animals of protected regions, efforts shall also be made to know the occurrence of specific infectious and contagious diseases in domestic animals at the periphery of the protected wildlife areas. Until and unless different epizootiological cycles of various parasitic and infectious diseases are delineated, it will not be possible to plan out measures to eradicate these diseases from free ranging wild animals.

For maintenance of health of wild animals, it is essential to monitor and survey the parasitic and infectious diseases periodically so that necessary actions could be taken to prevent disease outbreaks and control large-scale mortality. Surveillance programmes will be a major aid in the implementation of long-term health management plan on the appropriate measure to maintain healthy population of wild animals and guarding them against the risk of sudden and heavy mortality or morbidity in Protected Areas. This can be best achieved by preventing transmission of diseases between wild and domestic and in-between wild animals by manipulating the factors involved in the transmission. Establishing the database for forecasting the diseases by performing epizootiological studies in and

around the Protected Areas round the year is of utmost importance and needs attention.

Preventive medicine in free ranging wild animals is more closely related to wildlife management. In wild life medicine health of population is its highest priority. Individual animal therapy in wild life medicine is difficult, if not impossible in most instances. Preventive medicine will be practiced to ensure the health of wild animals of the reserve.

A large number of cattle pass through the near by area to Sariska Tiger Reserve. There is a problem of illegal cattle grazing. The common use of water hole by cattle and wild animal is the main cause of introduction of infectious diseases in to wilds. Following are the diseases that may attack wild animals of the reserve.

FMD

Anthrax

Brucellosis

Leptospirosis

Protozoic

Ecto-Endo parasite

(A) Prophylactic Immunization:

Some disease which are common to this area and are epidemic in nature and spread by both wild and domestic animals, preventive treatment against these diseases by the means of prophylactic immunization to the domestic animals is given. Domestic cattle, which may transmit the disease among wild fauna, can be vaccinated to prevent the occurrence.

Such immunization is carried out in villages located within a radius of 5 Km from the tiger reserve. It is believed that an animal can cover maximum distance of 5 Km. to graze and browse.

Prophylactic immunization shall be regularly carried out with the help of Veterinary Department every year, to reduce the chances of spread of disease from cattle to the wildlife.

(B) Disease Surveillance:

A quick disease reporting, detection and treatment system only can achieve proper disease surveillance. In the case of wild animals, detection of disease is only based on observation on animal behaviour and their day to day activities. Concept of landscape epidemiology that associates the occurrence of a certain disease with the existing landscape shall also be kept in the mind. The knowledge of animal species typical to the given area and particular disease maintained and spread by them will be extremely useful in disease detection and treatment. If such a disease is detected, its prophylactic treatment by immunization, water hole treatment or aerosol immunization can be done. To protect and maintain wildlife in tiger reserve with good health, it is necessary to achieve disease surveillance of –

- (i) Native wild population
- (ii) Domestic cattle of adjoining villages

Parameters for the monitoring of wild animals health –

1. General examination
 - i. Physical examination
 - ii. Clinical observation
2. Laboratory investigations
 - i. Faecal examination
 - ii. Haematological examination
 - iii. Serological examination
3. Study of kill / Mortality
4. Detailed post-mortem examination
5. Collection of material for laboratory examination

10.3 MORTALITY SURVEY

A survey to be conducted regularly and intensively at section level to find out the mortality of any animals. All such instances are to be recorded and reported on regular basis to the higher office. As per the NTCA guidelines all half eaten kills are to be disposed of by following proper procedure to avoid poisoning of the kill by locals in retaliation.

Mortality means susceptible to death. Mortality in wildlife may be due to environmental stress, disease outbreak, poisoning, accident etc. information about mortality rate for wild animal is very important for population dynamics. Heavy mortality rate for any species can change the survival possibility. So, it is very important to keep the record of mortality of wild animals for the core of Sariska TR. Mortality survey is regular process which can be done in following steps-

- Mortality register shall be maintained at range level on daily basis for each and every type of mortality. Monthly compiled record at range level shall be sent to DD/FD. Separate record shall be maintained for mortality other than that attributable to an offence and mortality attributed to poaching or an act of vandalism. Survey record can be maintained in prescribed Format. All records shall be analyzed at FD office annually and report shall be submitted to CWLW.
- Mortality data shall be collected by the field staff at block.
- Each mortality information shall be immediately reported to range office and if needed, specimen shall be collected and sent for pathological investigation.
- It shall be informed to all the staff through a circular in Odia language that Tiger or any other Carnivore on kill shall not be disturbed for knowing dead animals.

ANIMAL MORTALITY OTHER THAN THAT ATTRIBUTABLE TO AN OFFENCE

SL NO	SPECIES	LOCATION	YEAR	SEX & Age	Number	Discovered in what condition	Cause of mortality	remarks
1	2	3	4	5	6	7	8	9

Note : Location :
Sex & age :

By compartment, landmark etc.
As per parameters for age class. Sex, if possible to identify.

Discovered in what condition :Carcass, complete or partial. Skull or any other recognisable remains collected where only some remains of an animal are found.

Cause of mortality : If known e.g. territorial fight, accident, possible disease (following postmortem results), old age, cause difficult to determine, predation etc.

Remarks : Any other useful information.

ANIMALS MORTALITY ATTRIBUTED TO POACHING OR AN ACT OF VANDALISM

Sl No	Species	Location	Cause of mortality				Remark
			Number	Sex	Age	Class	
1	2	3	4	5	6	7	8

Location : By compartments or landmarks.

Cause of mortality : Whether the animal was intact or remains found, article or trophy to be recorded. Cause if known e.g. animal snared, shot or poisoned etc.

Remarks : Any other useful information, especially matters of illegal trade.

10.3.1 Post Mortem Protocol For Ensuring Transparency Incases Relating To Tiger Mortality.

In this context, the following actions are advised.

- All the tiger carcasses shall be preserved in a deep freeze till an independent team analysed the cause of tiger death.
- Every incident of tiger mortality shall be thoroughly examined by an independent team whose composition is as below:
 - An authorized representative of the NTCA.
 - A Veterinary Officer of the tiger reserve/district.
 - A non-governmental outside expert nominated by the Chief Wildlife Warden of the State.
- Every incident of tiger mortality shall be brought to the notice of the NTCA by telephone/fax, followed by a detailed post-mortem report along with the report of the independent team. The death of schedule animals shall also be informed to the Chief Wildlife Warden.

- The Standard Operating Procedure to deal with tiger/leopard death issued by NTCA on 17.12.2012 and 18.03.2013 will be strictly followed. **Annexure -58.**

10.3.2 Performing Necropsy And Collecting Samples For Test

Many diseases affecting valuable wildlife resources have gone undetected because appropriate samples were not collected for diagnostic testing from animals that died due to the disease. When appropriate samples and accurate written and photographic records are taken, the cause of disease can be determined in most cases. It would be worthwhile to collect complete tissue samples including blood as it would aid in the recognition of disease condition. If only selected samples are taken because a particular disease is suspected and the animal does not have that disease, these samples may be inadequate to test for other disease that might be causing the disease. Furthermore, selective sampling limits the information that could be procured from a wild animal necropsy that aid in future population or ecosystem management. Before performing a necropsy on an animal two important points need to be considered:

1. **ZOONOTIC DISEASES:** Examine whether species have a disease that is transmissible to humans. Disease such as rabies or Echinococcosis (Hydatid disease) in carnivores, anthrax or rabies in ungulates or psittacosis in birds can cause serious and fatal diseases in humans. Many primate diseases also can cause human illness. Hence it is necessary to take appropriate protective measures before conducting the necropsy. Wearing a mask is particularly important when performing a necropsy on a primate, bird, or a carnivore suspected of rabies. Also, all samples should be handled with care and unfixed samples should be placed in leak proof containers so that dangerous infectious materials do not leak during transport.

2. **REPORTABLE AND INFECTIOUS DISEASES:** Examine whether animal have a disease that is infectious to livestock or other wild animals. Diseases such as anthrax, foot and mouth disease, or tuberculosis can spread to other animals through contamination of the environment during

the necropsy procedure. Anyone conducting necropsy of wild animals should be aware of the typical lesions of these diseases and take extra precautions when decontaminating a necropsy site.

EQUIPMENT

A basic necropsy kit can be assembled in preparation for transport to a field necropsy site on short notice. The kit shall contain the following items:

Necropsy equipment

1. Bone cutter (small), 2. Bone cutter (Large), 3. Butcher knife, 4. Hammer, 5. Knife (Large), 6. Knife (Small), 7. Knife Sharpener, 8. Surgical Blades, 9. BP blade handle, 10. Rat tooth forceps (small and large), 11. Tissue forceps (small and large), 12. Probe, 13. Scissor (both ends sharp) (small and large), 14. Scissor (blunt-sharp) (small and large), 15. Tray, 16. Sharp container, 17. Spirit lamp, 18. Match box, 19. Measuring tape (30 meter length), 20. Nylon thread

Necropsy documentation

21. Marker pen and pencil, 22. Labels, 23. Necropsy forms, Laboratory specimen forms, 24. Notebook, papers

Protective Clothing

25. Apron (disposable or non-disposable), 26. Shoe covers (disposable), 27. Sterilised Gloves (disposable), 28. Non-sterilised Gloves (disposable), 29. Veterinary Gloves (disposable)
30. Face Mask (disposable), 31. Cap (disposable), 32. Full Face Shield (disposable)

Specimen containers and sampling instruments

33. EDTA vacutainer, 34. Serum separator vacutainer, 35. Syringe with needles (20g) 2ml, 5ml, 10ml, 36. Microscope glass slides & slides box, 37. Aluminium foil, 38. Containers 250ml, 500ml, 39. Zip lock bags – medium and large, 40. Sterile swabs, 41. Sterile containers (50ml)

Transport materials

42. Cotton roll (500g), 43. Insulated container, 44. Packaging tapes (1 inch and 2 inch), 45. Ice packs, 46. Ice box – small

Disinfecting materials

47. Chlorhexidine Solution (Savlon®), 48. Isopropyl Alcohol, 49. Liquid soap, 50. Lime

Fixatives and Preservatives

51. Methanol, 52. Silica gel, 53. Buffered formalin 10%, 54. Sterile Buffered glycerin 50%, 55. 70% Ethyl alcohol

10.3.3 Safety Considerations

Personal safety

Some diseases of wildlife can cause serious illness or death in humans, all carcasses should be handled as if they were harbouring potentially dangerous disease and precautions for personal safety should be exercised. Minimal protective clothing is always advised that includes apron, gloves and a mask that covers the nose and mouth, shoe covers.

Handling of carcass

Diseased wild animal should be handled carefully to minimize exposure of other wild and domestic animals. If Anthrax is suspected, a blood smear shall be made by nicking an ear vein or other available vein and checking for *Bacillus anthracis* by microscopy before the carcass is opened. Carcasses with anthrax or other infectious diseases should be buried (preferably covered with a disinfectant and buried at least 2 m deep to prevent scavenging).

Despatching samples

Fresh collected and frozen samples shall be packed and dispatched immediately after necropsy so that no further deterioration occurs. Laboratory must also be telephonically informed about the details of the samples.

Labelling of specimen

All containers, tubes, slides and bags shall be labelled using a waterproof marker. Placing a second label in a plastic bag that is then attached to the container adds further security. For formalin fixed tissues, a paper label with the animal identification written in pencil can be submerged in formalin with the tissues.

The following information should be included on the labels:

Date :
Location :
Species :
Tissue type & preservative used :

10.3.4 General Observations about the Carcass and its Surroundings

Assessment of the Condition

Examine:

- Any recent weather conditions that could have caused animal deaths
- Ambient temperature that might lead to further deterioration of carcass
- Signs of struggle.
- Condition of the animal.
- Any bite wounds, other signs of predation. If wounds are present, look for bruising and bleeding in the tissues near the wounds would indicate that they occurred before the animal died. Look for signs of human or injuries caused by humans. Otherwise these wounds most likely were caused from the carcass being scavenged.
- Broken bones, missing hair, broken or missing teeth or other signs of trauma.
- Deformities (if any).
- External parasites (preserve if any).
- Consideration about Nutritional Status
- Evaluate weight, body length and chest girth (details mentioned in the necropsy form).

Examine:

- Fat stores under the skin and in body cavities.
- Amount of fat around the heart and kidneys
- Muscle mass.
- Amount of food in the digestive tract.

- Condition of the teeth like deposition of tartar, chipping, fracture, pulpal exposure, etc.

10.3.5 Specimen Collection and Preservation

Most carcass will have some Autolysis, but diagnostic tests can still be performed if tissues are properly handled. Therefore gentle handling of autolysed tissues is recommended. Quickly place in preservative. Freeze or refrigerate samples as soon as possible for infectious disease or toxicology testing. Autolysis can cause many artefacts in tissues that can be confused with a disease process. However, it is always best to take a sample from an area that looks abnormal rather than assume that the change was caused by autolysis. Histopathology will be able to distinguish between true lesions and post-mortem changes.

Histopathology

- Samples shall be taken from all major organs and any abnormal areas as well.
- Samples from GIT can be placed in one container and should not be replaced with other organs.
- Samples shall be placed in container of 10% buffered formalin.
- Quickly submerge tissues in 10 times the volume of formalin as the volume of tissue.
- Samples shall not be thicker than 1 cm so that they can fix, but long and wide enough to represent the different areas of a tissue as well as any abnormalities.
- Samples that include abnormal areas and surrounding normal areas are best.
- Samples should be handled carefully by grasping at the edges.
- Crushing, stretching, scraping, or otherwise damaging specimens should be avoided. Gentle handling is required.
- If a tissue needs special labelling, it will be placed in a different container or a piece of paper attached to the tissue with string or a pin and label the paper or container with pencil or waterproof marking pen.

Microbiology (Bacteriology and Virology)

To take sample without contaminating them, the samples need to be taken before tissues are touched and the instrument need to be sterilized. These samples also should be placed in sterile containers. To sterilize instruments, the tips need to be dipped in alcohol and then flame them or to flame the tips until they are red and then to let them to be cool. Samples also can be taken with a sterile swab, sterile syringe, or by placing a large (3cm X 3cm) section of tissue directly in a sterile container (the centre of the tissue will be uncontaminated). Samples that contain abnormal areas shall be taken. Appropriate samples include: whole blood, pus, areas with abscesses or nodules, or intestinal contents (with a loop of intestines). When taking samples from infected tissues, an area near the edge of the affected tissue where live organism are most likely to be found is to be selected. If no abnormal areas are present, standard tissue samples of lung, liver, kidney, spleen, tonsil, and intestines will be taken. Samples need to be kept moist with sterile transport media, sealed in a sterile container and cold. If refrigeration is not available, samples can be placed in 25% buffered glycerine in sterile containers. Transport swab need to be taken from areas where the presence of pathogens is suspected. Sampling of the pleural surface of the lungs, bronchi, stomach mucosa, perineal fluid, fluid in the pericardial sac, brain surface, abscesses, or infected areas is recommended for relatively fresh carcasses.

Smears of pus and infected tissues are also useful and can be air-dried and fixed with heat.

Toxicology

After taking samples half of each sample need to be placed in aluminium foil and half in plastic bags or containers (aluminium or plastic interfere with the testing of some toxins). Samples need to be stored frozen (if possible) until shipped to a laboratory.

Parasitology

- Faeces, gastro-intestinal contents and mucosal scraping can be preserved by refrigeration or 10% buffered formalin. If GIT

protozoa are suspected, the faecal matter can be stored in normal saline and then refrigerated.

- External parasites are best preserved in 70% ethanol.
- Trematodes (flukes) and cestodes (tape-worms) can be preserved by 10% buffered formalin.
- Nematodes can be preserved in 70% ethanol. A small quantity of glycerine if added prevents shrinkage.
- Thin and thick blood smears on clean glass slides need to be made and air dried and fixed with methanol.
- Preparation of Slides for Cytology
- A clean cut with a scalpel blade be made across the surface of the abnormal area of the tissue which is required to be examined.
- The sample is to be firmly grasped with forceps, placing the cut surface down.
- The cut surface of the sample is to be blotted across a paper towel or other absorbent surface until no blood or fluids are evident.
- Then the blotted surface is to be gently touched in several locations on clean slides.
- Fixing with methanol.

Urine

Urine can be collected from the urinary bladder of relatively fresh carcasses with a sterile syringe. If the bladder is not distended it may be desirable to slit it to remove the urine with a syringe. Urine can be refrigerated but it should be submitted for culturing or clinical pathology as soon as possible after collecting. Samples can otherwise be frozen for later determination of osmolality and other urine values.

10.3.6 General Concerns for Performing the Necropsy

- All the procedures involved during necropsy must be carried out before sunset and proper light is essential.
- Proper history and thorough ante-mortem examination of the carcass to be ensured.

- All carnivores and ungulates are placed on the left side so that the rightside of the carcass is opened. All birds, reptiles, and primates areplaced on their back.
- After the body cavities are opened, the general nutritional condition ofthe animal and location of all organs shall be assessed(to determine ifany organs are displaced) before organs are removed. At this time, asterile blood sample for culture can be taken to obtain serum forserological tests. Also sterile samples of other organs shall be takenfor culture before organs are handled.
- After the general condition of the animal has been recorded, individualorgans can be removed, examined, and sampled in a systematicmanner. Any abnormal findings (lesions) need to be described.
- Photographs of abnormal findings provide the best documentation forrecords.

Description of Abnormalities found at Necropsy

Criteria preferred for describing any abnormality is location, number &distribution, colour, size, shape, consistency, and texture. For example: “The livercontains multiple tan, firm nodules ranging from 1 to 3 cm in diameter that are distributed through out all liver lobes. The nodules are gritty oncut surface”.

10.3.7 Post-necropsy

Disposal of carcass

Open air incineration is best preferred for all predators, small to medium-sizedungulates, primates, birds and reptiles as it allows complete disposal of all bodyparts (highly priced in wildlife illegal trade). If facility permits, large-sized ungulatescan be cut to pieces before incineration.On-site burning is best preferred for elephants after removal of tusks. TheVeterinary expert may decide whether the Carcasses to be left to nature for foragingby carnivores, Wildboars, vultures etc. The Standard Operating Procedure issued by NTCA for disposal of carcass will be followed for each case.

Disinfecting the necropsy site

The carcass and all tissues from the carcass including blood soaked dirt shall be buried or incinerated. All contaminated paper or plastic materials shall be either thoroughly disinfected or incinerated. All blood and residual tissues shall be removed from the instruments and tools with soap and water. Then the instruments shall be disinfected. Necropsy boots and apron shall be cleaned and any contaminated clothing thoroughly washed. The external surface of any containers with samples shall also be washed. Lime shall be sprinkled to disinfect the necropsy site.

10.3.8 Storage or submission of samples

All the samples must be packed separately with proper packaging tapes to avoid leakage and cushioned with absorbent materials to avoid spoilage. If necessary, ice packs would be interspersed with specimen to provide uniform refrigeration or freezing effect. Formalin-fixed samples can be kept at a cool room temperature until shipped. Any samples for culture need to be kept refrigerated (for parasitology or bacterial culture) or frozen (for toxicology or virus cultures). It is best to ship frozen and fixed samples separately. If they must be shipped together, then insulate the fixed tissues from freezing by wrapping in newspapers. There should be no spillage of formalin, because fixation of frozen samples will make culturing for bacteria or viruses impossible and will alter cells on blood smears or cytology slides. Furthermore, formalin will cause undesirable effect on the samples for toxicological investigation.

Fixative and Preserves

Sterile Buffered Glycerine (50%)

For transporting tissue for culture when refrigeration is not available. To make sterile buffered glycerine with an equal amount of buffer composed of:

- A. 21 g citric acid mixed in 1000 distilled water
- B. 28.4 g anhydrous sodium phosphate in 1000 distilled water

Mix 9.15 ml of A and 90.85 ml of B

Mix 100 ml of buffer with 100 ml of glycerine.

Then sterilize in small tubes to take into the field

10% Buffered Formalin

For fixation of tissues for histology.

To make one litre mix.
 100 ml formalin (38-40% formaldehyde)
 900 ml distilled water
 4 g sodium chloride (table salt)

70% Ethyl Alcohol

To make one litre mix. Add 700 ml of 100% ethanol and 100 ml of distilled water

Tissue	Microbiology	Toxicology
Brain	✓	✓
Fat	✓	✓
Stomach contents		✓
Hair		✓
Liver	✓	✓
White Blood	✓	✓
Lymph	✓	✓
Tonsils	✓	✓
Spleen	✓	✓
Abscesses, granulomas	✓	✓

10.4 Ecosensitive Zone

National Wildlife board in its meeting on 17th march 2005 decided delination of eco sensitive Zone around sanctuary/national park which would be sites specific and relate to regulation rather than prohibition of specific activities.

Hon'ble Supreme Court in Writ Petation No. 460/2004 has directed on 4th Dec. 2006 that in all cases where enviornmental clearness were granted where activities are within 10 Km. zone, be referred to Standing Committee of NBWL.

The purpose of declaring Eco Sensative zone around Tiger Reserve is to create some kind of "Shock Absorber" for protected areas. The would also act as a transation zone from area high protection to areas involving lesser protection.

Guidelines for declaration of Eco Sensative zone has been issued by Ministry of Environment & Forest, [Wildlife Division] New Delhi vide their letter no. 1-9/2007WL-1[Pt] dated 11th January 2011, 9th Feb.2011& 15th March 2011.

In Hon'ble Supreme court Writ petition no. 202/1995, order dated 12/12/1996 has constituted central empowered committee (CEC) and CEC, in due course, has submitted report dated 20/11/2013 which was re-numbered as I.A. 1000 in writ petition no. 202/1995 titled T.N. Godawarman V/s union of India. According to this report, CEC recommended that for Jamua Ramgarh wild life sanctuary, for the existing mines, the safety zone may be fixed as 100 Mtr where in no mining should be permitted, the safety zone may be fixed as 500 Mtrs. The Supreme court in IA no. 1413, 1414, 1454 in I.A. no.1413, 1426, 1428, 1440, 1439, 1441, 1444-45, 1459 and 1460 in writ petition 202/1995 has passed interim order on 4/8/2006 which says the grant of the T.W.V would not result in any mining activity within the safety zone around national park/sanctuary (as interim measure ,one kilometer safety zone shall be maintained subject to the orders in I.A. no. 1000 regarding jmua ramgarh sanctuary.) I.A. no. 1000 is still pending before the Hon'ble supreme court and no interim /final order with regard to recommendations of CEC has been made till date.

The extent of Eco Sensative zone around Sariska Tiger Reserve has been decided by Committee Consituted for demarcation of Eco sensitive zone vide Dy. Secretary, Adm. reforms [Gr.3] Department Govt.of Rajasthan Letter No. F6[54]/AR/Gr.3/2007 dated 03.07-2012. The Committee Constitute of Official of Revenue department [SDO, Alwar, Thangazi, Bansur, Rajgarh], Ecologist [Honory Wildlife Warden], Official of the local self Govenment [Pradhan, Umrain, Thanagazi, Rajarh, Bansur], DCF's Tiger Project, Sariska as member Secretary under the Chairmainship of District Collector Alwar. The committee has submitted its report which has been forwarded to Govt. of Rajasthan by APCCF & CWLW Rajasthan vide letter no. 5466-71 dated 14-8-2013 for forwarding to Govt. of India. NTCA vide letter No. F 18-25/2014-NTCA Dated 10th October 2014 as directed State Government to re-framed proposals in accordance with the following criteria–

1. The entire buffer zone should be included in the eco sensitive zone.
2. A radial cushion of minimum 1 km should be kept from the critical tiger habitat wherever the buffer is disjunt/absent.

3. Where a Protected Area forms part of the buffer, then a minimum 1 km cushion should be demarcated around the said buffer also.

to The proposal for declaration of Eco- sensitive Zone around CTH of Sariska Tiger Reserve still under consideration. The following activities are suggested:-

Identification of activities in the Eco sensitive zone

1. **Quarrying and Mining:** All commercial mining activities in the eco sensitive zone shall be prohibited.
2. **Cutting of trees:** No tree cutting to be allowed in the eco sensitive zone over land of ownership of anyone. Tree cutting from the forest land shall be as per the management plan approved by the State Government and by the prior permission of the competent authority from any other Government Land and private land.
3. **Establishment of Saw mill:** No establishment of saw mill in the Eco Sensitive Zone.
4. **Establishment of Polluting Industries.** No establishment of any industries causing air, water or noise pollution in the Eco sensitive zone.

Permission to non-hazardous small scale industries, service industries, agro-based industries which are dependent on local raw materials and do not have adverse effect on the environment to be given as per guidelines approved from the Ministry of Environment, Government of India.

5. **Hotel and Resorts:**

Hotel activities in the Eco sensitive zone to be controlled as per approved tourism plan.

6. **Commercial use of wood:**

Commercial use of wood in the Eco sensitive zone to be prohibited.

7. **Commercial Diversion in agricultural system:**

Use of farm yard manure and vermi- compost based agriculture to be encouraged and and the land use shall remain unchanged.

8. Ground water

Extraction of ground water or commercial use to be prohibited. There to be no prohibition on extraction of ground water for meeting the needs of local habitants, domestic cattle, and agricultural needs.

9. Hydel power production

No hydel power project to be established in eco sensitive zone.

10. Erection of electric poles:

Underground cabling to be encouraged. If it is inevitable to erect electric poles, then recommendation of the monitoring committee to be procured.

11. Agriculture and horticulture:

Agriculture and horticulture with Indigenous methods by local communities to continue.

12. Rain water harvesting:

Efforts to be made to conserve maximum rain water by adopting suitable water harvesting systems.

13. Boundary wall construction of hotels premises etc.

Construction of boundary walls of hotels, lodges which are established as per approved tourism master plan to be controlled in such a way that it does not disturb the free movement of wild animals.

14. Use of polythene bags:

Use of polythene bag is prohibited as per the rules notified by the State Government. Its compliance has to be ensured.

15. Use of non-conventional sources fo energy:

Use of non-conventional sources, like solar energy, shall have to be promoted actively.

16. Widening of roads:

Activities like widening of roads to be controlled. If inevitable, recommendation of monitoring committee to be procured.

17. Vehicle movement in night:

Vehicle movement in eco sensitive zone during night may be allowed with complete watch. Monitoring committee may prohibit or regulate it, if required.

18. Low height flights for tourism shall be prohibited

19. Hill slopes and river banks shall be conserved.

20. Disposal of waste:

No waste, treated or untreated, to be disposed of in any water body inside the eco sensitive zone. Monitoring committee may decide, about the treatment or no treatment of waste on land mass inside the eco sensitive zone, in consultation with the subject specialists.

Solid waste: Local officers shall prepare plan to segregate solid bio-degradable and non bio-degradable waste. Solid bio-degradable waste shall be re-cycled by composting or vermi-composting methods on priority basis. Carbonic waste, if any, shall be disposed of at some identified suitable place outside the eco sensitive zone in environmentally acceptable manner.

Disposal of solid waste by burning method to be prohibited in eco sensitive zone.

21. Air and vehicle pollution shall be controlled.

22. Signage's and hoardings:

Monitoring committee to control the activity of fixing the signage's and hoardings.

23. Green technology shall be promoted in the eco sensitive zone.

24. Fishing in all rivers and nullahs in eco sensitive zone to be prohibited.

25. Natural Springs:

The catchment areas of all springs shall be identified and plans for their conservation and rejuvenation of those that have run dry, in their natural settings shall be incorporated in Zonal Master Plan and strict guidelines to be drawn up by the State Government to ban development activities at or near these areas.

10.5 Sariska Vistar Wildlife Sanctuary

Sariska National Park and Sariska Wild Life Sanctuary was declared by Government of Rajasthan vide notification dated 27th August 1982 and 18 September 1958 for protection and conservation of Wildlife and its habitat. Sariska was included in Project Tiger in year 1983. For longterm survival of tiger, Critical Tiger Habitat for Sariska Tiger Reserve was declared by State Government vide notification No. F3(34)Forest/2007 dated 28.12.2007 over and area of 881.11 sqkm. As per the provisions of Wildlife Protection Act, 1972 areas falling within the limits of Critical Tiger Habitat should have status of Sanctuary or National Park. The areas of Critical Tiger Habitat extend 15 to 25 kms in north and south direction. Areas falling within CTH outside Sariska Wildlife Sanctuary will be given status of Sanctuary. For this such areas will be included in Sariska Vistar Wildlife Sanctuary, as a result of this the whole area of 881.11 sq.kms of CTH would have status of Sanctuary or National Park.

10.6 Sariska 'A' Wild Life Sanctuary

Preliminary Notification for declaration of Sariska 'A' Wild Life Sanctuary dated 20-06-2012 (**Annexure -20**) has been done over in area of 301.22 hact. This sanctuary is adjoining to CTH on Tehla boundary. The proclamation has to be issued by Collector Alwar for determination of rights. This sanctuary would act as buffer to CTH of Sariska Tiger Reserve and would also be important for maintaining tourism activities outside CTH.

CHAPTER - 11

ORGANIZATION AND ADMINISTRATION

11.1 Tiger Steering Committee -

The steering committee will be constituted by GOR to look after the affairs of Forestry and wildlife management in the state.

11.2 Tiger Conservation Foundation -

Sariska Tiger Conservation Foundation has been constituted as follows :

Name of the Society : The name of the SOCIETY shall be SARISKA TIGER CONSERVATION FOUNDATION (hereinafter referred to as the "Foundation"), Registration No 310/2010 Alwar(4.02.2010). Bank Account SBBJ Thanagazi No 61091230126.TAN No SPRS10463F.PAN No AAFAS2252N.

Registered Office : Registered office of the Foundation shall be situated in the State of Rajasthan and its the present address is as hereunder:

Office of the Principal Chief Conservator of Forests
& Chief Wildlife Warden, Forest Department
Van Bhawan, Tilak Marg, C-Scheme, Jaipur.

Aims and Objects:

- i) **Aims:** To facilitate and support the tiger reserve management for conservation of tiger and biodiversity, through multi-stakeholder participation as per approved management plans, and to support similar initiatives in adjoining landscapes, consistent with the national and state legislations.
- ii) **Objects:** To achieve the above said aims, the Foundation shall have the following objects, namely:-
 - a) to facilitate ecological, economic, social and cultural development in and around the Tiger Reserve so as to promote sustainability of the tiger conservation programs;
 - b) to provide support to protect the natural environment in the Tiger Reserve and relevant places;
 - c) to facilitate the creation of, and or maintenance of, such assets as deemed necessary for fulfilling these objects;

- d) to solicit technical, financial, social, and other support required, from different sources permitted by law, for the activities of the Foundation for achieving these objects;
- e) to support eco-tourism, eco-development, research, environmental education, training, management and advisory aspects in the above and related fields to support the implementing agency; and
- f) Anything incidental or ancillary to the above for furthering the above said objects.

Articles of Association

Definitions: In these Articles of Association, also known as the Rules, Regulations and Bye-laws of the Foundation, the following words and expressions shall have the following meaning unless repugnant to the subject or context:

- a. "Act" means the wildlife (Protection) Act 1972 as amended from time to time;
- b. "Government" means the Government of Rajasthan;
- c. "Member" means a member of the Foundation;
- d. "Operations Manual" means a manual laying down in detail the work procedure for the foundation. This manual will be developed by the Executive Director of the Foundation and will be enforceable once approved by the Governing Body of the Foundation; and
- e. "The tiger reserve" or "the reserve" means the Sariska Tiger Reserve comprising of the Sariska Tiger Reserve, and its surrounding wildlife sanctuaries.

Membership of the Foundation

Membership of the Foundation shall be of two types as laid down in Para 4 of the Memorandum of Association of the foundation:

- (i) Ex-officio Members, are members of the Foundation by virtue of office which they hold for the time being or will be holding in future;
- (ii) Nominated members are those members who will be nominated as such members by the State Government by virtue of their

experience, expertise or special knowledge they hold in respect of wildlife conservation in general and tiger conservation in particular;

- (iii) A member of the Governing Body shall, upon ceasing to be a Member of Legislative Assembly or, as the case may be, the Zila Parishad, cease to be a member of the Governing Body.
- (iv) The tenure of a nominated member shall be for a period of three years from the date of assuming charge;
- (v) A nominated member of the Governing Body shall cease to be a member if-
 - a) he resigns from his membership.
 - b) he is convicted by a court of law for a criminal offence, or is declared insolvent, or is of unsound mind.
 - c) he does not attend three consecutive meetings of the Governing Body without proper permission of the President.
- (vi) The State Government may remove a nominated member from membership of the Foundation at any time.

Composition of the Governing Body

The Governing Body of the Foundation shall consist of the following members, namely:-

S.no.	Address and occupation	Designation
(i)	Forest Minister, Government of Rajasthan	President
(ii)	Principal Secretary (Forest), Government of Rajasthan	Vice President
(iii)	Principal Secretary / Secretary (Tourism), Government of Rajasthan	Member
(iv)	Principal Chief Conservator of Forests, Rajasthan	Member
(v)	Conservator of Forests & Field Director, Sariska Tiger Reserve, Alwar	Member
(vi)	Collector, Alwar	Member
(vii)	Superintendent of Police, Alwar	Member
(viii)	Deputy Conservator of Forests & Deputy Director, Sariska Tiger Reserve, Sariska	Member
(ix)	Two prominent scientists or experts in the field of wildlife	Members

	conservation (to be nominated by the State Government)	
(x)	Two Members of Legislative Assembly representing constituencies situated in Alwar District nominated by the State Government	Members
(xi)	Zila Pramukh of Alwar	Member
(xii)	Two members of the Executive Committee of the Foundation, other than Field Director / Deputy Conservator of Forests & Deputy Director	Members
(xiii)	Principal Chief Conservator of Forests & Chief Wildlife Warden, Rajasthan	Member Secretary

Powers and functions of the Governing Body:

The Governing Body shall have the following powers and perform the following functions, namely:-

- (i) make overall policies of the Foundation in consonance with the provisions of the Act;
- (ii) consider and approve the balance sheet and audited accounts of the Foundation;
- (iii) consider and approve the Annual Report of the Foundation;
- (iv) approve the work plan, fund flow, Annual Budget of the Foundation;
- (v) make amendment in these articles of association, which may be necessary, subject to the approval of the Government;
- (vi) approve the "Operations Manual" of the Foundation;
- (vii) coordinate between different departments of the State Government and other institutions and non-Governmental organizations to achieve the objects of the Foundation;
- (viii) frame rules and regulations for managing the affairs of the Foundation;
- (ix) take all policy decisions regarding fund raising, investment budget of the Foundation; levy any charges for development of the Parks/Tiger Reserve; and
- (x) perform such other functions as may be necessary to achieve the objectives of the society.

Meetings of the Governing Body

The meetings of the Governing Body shall be held in the following manner, namely:-

The meetings of the Governing Body shall be held atleast twice in a year, preferably in the first month of the financial year and in the middle of the financial year;

- (a) every meeting of the Governing Body shall be called in writing by and under the signature of the Member-Secretary of the Governing Body through a prior notice of fifteen days containing a summary of the business to be transacted in such meeting;
- (b) any inadvertent omission to give notice to, or the non-receipt of notice of any meeting by any member shall not invalidate the proceedings of the meeting;
- (c) if the President is not present in the meeting of the Governing Body, the Vice-President shall preside over the meeting;
- (d) one third of the members of the Governing Body present shall form the quorum of the Governing Body provided that no quorum shall be necessary in respect of any meeting subsequent to an adjournment caused by lack of such quorum;
- (e) all disputes in a meeting shall be determined by a division of vote;
- (f) the member who is unable to attend the Governing Body meeting may send his views on the agenda in writing and such expression of opinion shall be taken to be his vote on the matter concerned; and
- (g) The minutes of the proceedings of the meeting shall be recorded and such minutes after being approved by the President and signed by the Member Secretary shall be the conclusive proof of the business transacted in the meeting.

The Executive Committee:

- 1) The Foundation shall have an Executive Committee to look after its day-to-day management.

- 2) The Executive Committee of the Foundation shall have the following composition:

(i)	Conservator of Forests & Field Director, Sariska Tiger Reserve, Alwar	Chairperson
(ii)	Deputy Conservator of Forests & Deputy Director, Sariska Tiger Reserve, Sariska	Member Secretary
(iii)	Divisional Forest Officer, Alwar	Member
(iv)	Assistant Director (Tourism), Alwar	Member
(v)	Two representatives of Ecodevelopment Committees (EDCs) working in the Tiger Reserve, one of them to be nominated in the Governing body	Members
(vi)	Two members of frontline staff of the Tiger Reserve, one of them to be nominated in the Governing Body	Members

- 3) The tenure of the nominated members shall be for a period of two years from the date of assuming charge.
- 4) A member of the Executive Committee, other than nominated members, shall cease to be a member as such, if he ceases to hold that office or post by virtue of which he became the member of the Committee.

Powers and Functions of the Executive Committee:

The Executive Committee shall have the following powers and perform the following functions, namely:

- (i) manage the affairs and funds of the Foundation in accordance with the rules and regulations of the Foundation;
- (ii) make endeavor to achieve the objectives of the Foundation and discharge all its functions;
- (iii) exercise administrative and financial powers including power to engage any person for any specialised task in accordance with the rules and regulations of Foundation;
- (iv) enter into arrangement with other public or private organizations or individuals for furtherance of the objects of the Foundation in accordance with the rules and regulations of the Foundation;
- (v) raise and accept endowments, grants-in-aid, donations, or gifts to the Foundation not inconsistent with the rules and regulations of the Foundation and interests of the Government;

- (vi) take over or acquire, in the name of the Foundation, by purchase, gift or otherwise, from Government or other public bodies or private individuals or organizations, any movable and immovable property in the state or elsewhere in conformity with the rules and regulations of the Foundation; and
- (vii) Perform such other functions as are assigned to it by the Governing Body.

Meetings of the Executive Committee

- (I) Every meeting of the Executive Committee shall be presided over by the Chairperson, provided that in the absence of the Chairperson the Executive Committee shall elect a Chairman to preside over the meeting.
- (II) One-half of the total members of the Executive Committee present in the meeting shall constitute the quorum, provided that no quorum shall be necessary in respect of any adjourned meeting.
- (III) Not less than seven days notice for every meeting of the Executive Committee shall be given to each member of the said Committee, provided that the Chairperson may call an emergency meeting if the situation so warrants.
- (IV) Any inadvertent omission to give notice to or non-receipt of meeting notice by any member shall not invalidate the proceedings of the meeting.
- (V) The Executive Committee shall meet as and when necessary but at least once in every month.
- (VI) All disputed issues in the Executive Committee meetings shall be determined by vote among members.
- (VII) Any member who is unable to attend the Executive Committee meeting may send his views on the agenda in writing and such expression of opinion shall be taken to be his vote on the matter concerned.
- (VIII) The Executive Committee shall refer any issue for the advice or recommendation to a Sub-Committee constituted by it for the purpose and the Executive Committee shall have the right to

override the recommendation or advice given by the Sub-Committee and in doing so, it shall record reasons thereof.

- (IX) The Minutes of proceedings of Executive Committee meetings shall be recorded and such minutes after due approval shall be issued by the Member Secretary.

Officers and Authorities of the Executive Committee:

- (1) The Field Director of the Sariska Tiger Reserve shall be the Executive Director of the Foundation and he or she shall carry out all administrative and day-to-day functions of the Foundation on behalf of the Executive Committee and he shall be the custodian of all records, assets and belongings of the Foundation.
- (2) The Executive Director shall have the following powers in conformity with the rules of Foundation, namely:-
 - (i) To accept contributions on behalf of the Foundation either in cash or in kind from a person or institutions.
 - (ii) To purchase, acquire, take on lease any movable and immovable property for the purpose of achieving the objects of the Foundation.
 - (iii) To have control and authority on the general administration of the Foundation.
 - (iv) To open and operate accounts with banks.
 - (v) To prosecute, sue and defend all actions at law for and on behalf of the Foundation.
- (3) The Executive Director shall have powers to convene seminars, workshops, etc., and to oversee publications of research materials and books of the Foundation.
- (4) The Executive Director shall initiate appropriate actions for the preparation and submission of project proposals on different programmes to be undertaken by the Foundation to various agencies for support.
- (5) The Executive Director shall have powers to interact with National and International Agencies for furthering the objects of the Foundation.

Property, Assets and Liabilities of the Foundation:

- 1) The income and property of the Foundation, howsoever derived, shall be applied solely towards the promotion of the objects there of as set forth above.
- 2) No portion of the income and property of the Foundation shall be paid or transferred directly or indirectly, by way of dividend, bonus or otherwise, to the persons who at any point of time have been members of Foundation or to any person claiming through them.
- 3) Provided that nothing herein contained shall prevent the payment of remuneration to any member or any person in return of any service rendered to the Foundation or for any administrative expenses as stipulated in the Operations Manual.

Powers of the Government:

The Government may from time to time review the functioning of the Foundation and issue such directions, as it may consider necessary in respect of the affairs of the Foundation.

Financial Regulations:

(1) Funds of the Society: The following shall be the various sources of funds for running the affairs of the Foundation in conformity with the rules and regulations of the Foundation, namely:-

- i) the income generated from levying other charges excluding the statutory duties for the services generated out of the Tiger Reserve.
- ii) contribution from other sources in terms of specific projects from national as well as international agencies as permitted by law;
- iii) grant-in-aids, donation or assistance of any kind received from Central or State Government, National Tiger Conservation Authority (NTCA) or from any individuals or organizations including foreign Government and other external agency as permitted by law; and
- iv) any other activity as permitted by law and in conformity with the rules of the Society.

In the meeting of Governing Body of STCF on 18.05.2010, the revenue receipts collected by the foundation as statutory duties shall be deposited by the foundation in the Government account and the State Government will make available 50% of additional receipt over

the base year of 2008-09 receipts for ploughing them back for the development of the park.

In meeting dated 18.5.2010 decision (Minutes issued by CWLW letter no. F3 (06)TCF/Tech.II/CWLW/2010/65-75 Dated 8.6.2010) was also taken to charge Tiger Reserve development of Rs. 10/- from Indian citizens and Rs. 50/- from Foreign citizens.

The following expenditure has been made through STCF:

Sr.no.	Year	Amount(in lacs)
1	2011-12	5.5
2	2012-13	53.47
3	2013-14	29.90

(2) Accounts and Audit:

- I) The Foundation shall maintain proper accounts and prepare annual accounts comprising of the receipts and payments, statement of liabilities, etc., in such form as may be determined.
- II) The accounts of the Foundation shall be audited annually by the qualified Chartered Accountant, empanelled by the Comptroller Auditor-General of India, approved by the Governing Body.
- III) The audited accounts shall be discussed and approved by the Governing Body in its annual meeting held for the purpose; and
- IV) The accounts of the Foundation shall be subject to the general provisions and directives of the Comptroller and Auditor-General of India.

Dissolution of the Foundation:

The Foundation is irrevocable. However, in the event of any circumstances in which it is decided to terminate or dissolve the Foundation, after the satisfaction of all its debts and liabilities, any assets and property, whatsoever be the same, shall not be paid to or distributed among the members of the Foundation but shall be dealt with in such a manner as the State Government may determine in that behalf.

Miscellaneous:

- 1) As and when there is any change in the nomenclature of Ministries, departments, or institution and designation mentioned, such changes shall automatically stand incorporated in the rules of the Foundation.
- 2) Every staff of the Foundation may be sued or prosecuted by the Foundation for any loss or damage caused to the Foundation or its property or for anything done by him detrimental to the interests of the Foundation.
- 3) As the Foundation is a statutory entity and will be managing property of the State Government creation of posts and other benefits to employees shall always be subject to RAPSAR ACT.

11.3 Coordination with Line Agencies/Departments

Field Director Sariska and Dy. Conservator of Forests, Sariska will coordinate with different departments of the State Government and other institutions and non-Governmental organizations for conservation of Sariska Tiger Reserve.

11.4 Staff Deployment/ Re-organization**Re-organization of forest staff in Sariska Tiger Reserve**

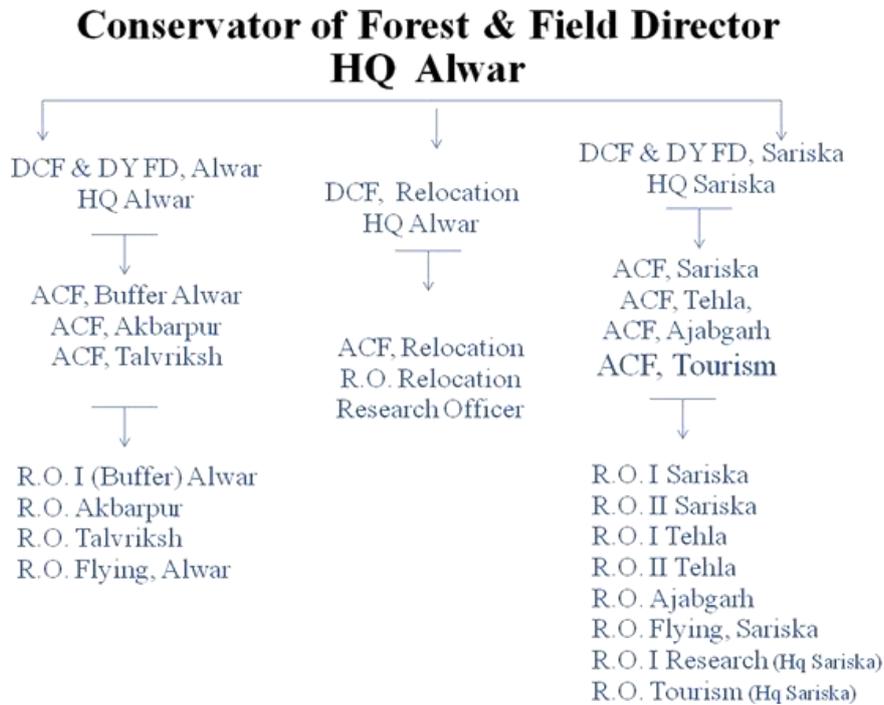
The effective management of Sariska Tiger Reserve can only be ensured by proper staffing. The Beats, Nakas & Ranges has to be adequately staffed with forest personnels. The problem has been further aggravated due to aging staff. The average age of staff is more than 45 years. Due to aging staff it becomes difficult for them to patrol steep slopes, chase offenders and use modern technology based GPS, Camera trap, Rang finder, Compass etc. It is extremely difficult to increase their efficiency through Capacity building programme.

The regular training programmes are organized for skill upgradation of frontline staff. Trainings organized for phase iv monitoring programme, law enforcement, beat ptrolling etc to improve their efficacy. Newly recruited forest guards are given compulsory regular three month training.

Stop gap arrangement of meeting demand of staff by temporarily employing Homeguards & Boarder Homeguards should not be continued for a long time as deployment of trained forest staff is utmost essential for

having committed ground staff for long term survival of tiger. Review of staff strength depending on management problems should be done every 5 years and accordingly staff strength has to be revised.

The geographical distribution and the tough terrain require adequate staff, for effective management. The nature of job calls for rationalized staffing pattern. The staffing pattern, in the tiger reserve, on lines of traditional forestry setup is inadequate. The wild life management involves monitoring of animal population, health, habitat and different components of it. It requires continuous collection of data. This also requires well educated and committed, technically qualified people to do the job. The following infrastructure is proposed:



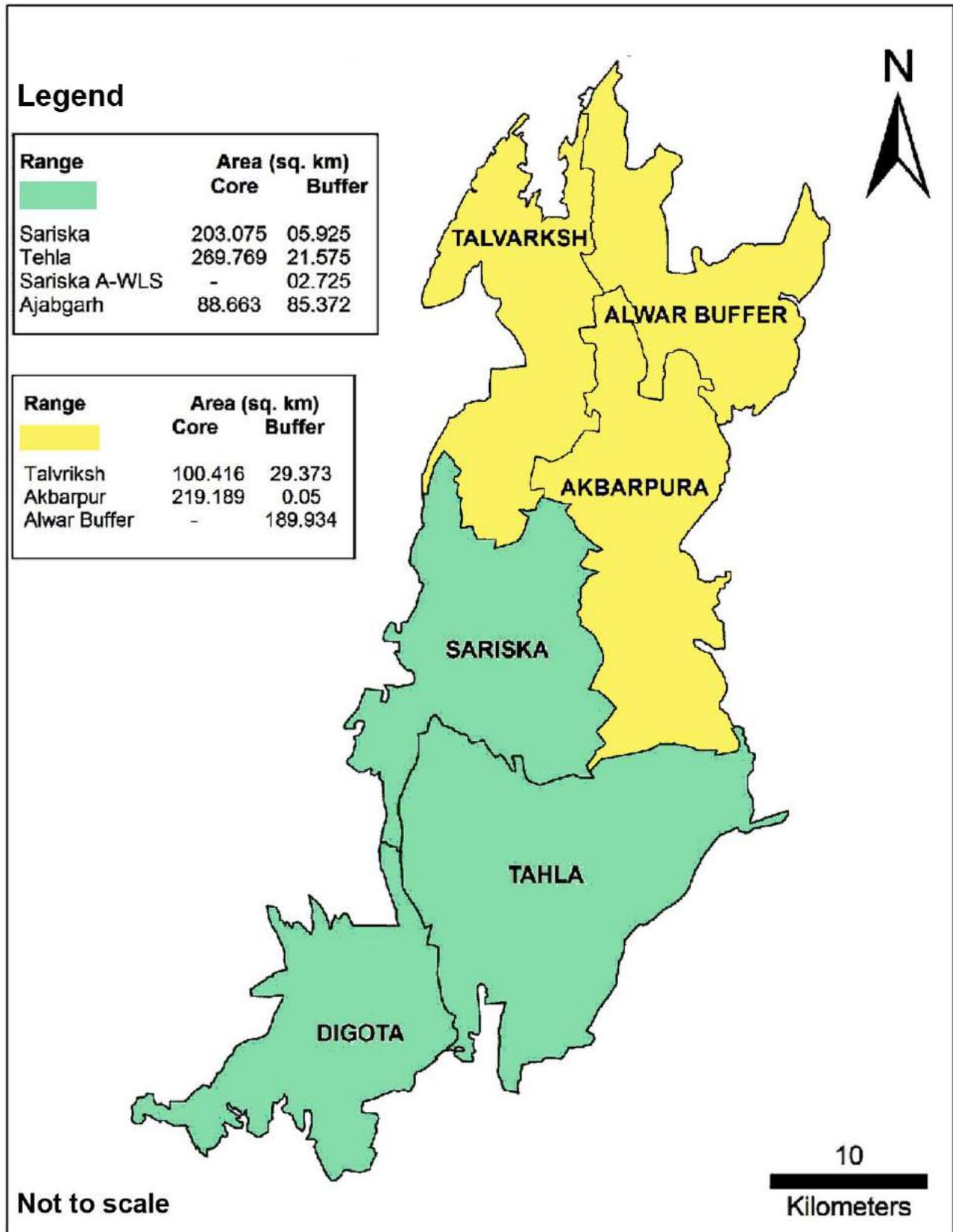
Division I - STR

Sr.No.	Name of Division	Name of Range	Area in Sq.Km.		
			Core	Buffer	Total
1	DCF & Dy. FD I (H.Q. Sariska)	Sariska	203.075	05.925	209.00
		Tehla	269.769	21.575	291.344
		Tehla (Sariska A)	-	02.725	2.725
		Ajabgarh	88.663	85.372	174.035
		Total	561.507	115.597	677.104

Division II - STR

Sr.No.	Name of Division	Name of Range	Area in Sq.Km.		
			Core	Buffer	Total
1	DCF & Dy. FD I (H.Q. Alwar)	Talvriksh	100.416	29.373	129.789
		Akbarpur	219.189	0.05	219.239
		Alwar (Buffer)	-	189.934	189.935
		Total	319.605	219.357	538.962

Map 21: Proposed DCF & DY FD I and Proposed DCF & DYFD II



Frontline Staff-

Foresters

Naka Incharge	- 28
Tourism	- 02
Relocation	- 02
Research	- 02
Div. Flying Squad	- 04
Range Flying squad	- 06
Check Barriers	- 04
Total	- 48

Assistant Foresters

Astt Naka Incharge	- 28
Tourism	- 02
Relocation	- 02
Research	- 02
Div. Flying Squad	- 04
Range Flying squad	- 06
Check Barriers	- 04
Total	- 48

Forest Guards

CTH – 77 Beats,	2 FG per beat-	154 Forestguard
BUFFER- 23 Beats,	2FG per beat-	46 Forestguards
Flying Squads- Sariska & Alwar-		20 Forestguards
Tourism-Sariska& Alwar-		10 Forestguards
Entry gates- Sariska Tehla & Siliberi.		12 Forestguards
Check Barriers established on State High way-13 at Ghata Bandrole, ThankYou Board, Bharathari Tiraha and Kushalgarh Tiraha		24 Forestguards
Wireless Station-6 Range HQ. & 2 Divison Control,FD office		24 Forestguards
Interpretation Centre		05 Forestguards
Village R elocation		05 Forestguards
Range Flying(6) Reserve line		24 Forestguards 26 Forestguards
Total		350 Forestguards

Drivers

For FD-1 , DCF's-3 , ACF's-7 , RO's-06 ,Flying-02 ,Antipoaching units - 12,

Total

31 Drivers

Range level –

Apart from this each range will have one range clerk (LDC) for managing range office for assistance routine office work and development works.

Naka level –

In charge: one forester

Naka Astt - one Assistant forester.

Beat level -

Two forest guard and Two Cattle guard/Homeguards/ Border Homeguards/ EDC persons.

Flying squad-

One R.O. plus two foresters or two assistant foresters plus 10 forest guards and four Homeguards/ Border Homeguards.

Tourism

One ACF should be made over all incharge of tourism. The tourism information cum protocol cell should also have two R.O. tourism, 4 foresters and 10 forest guards for managing tourism in Core and Buffer. This tourism cell will exclusively deal with tourism. Other staff shall remain free from tourism. The tourism cell will directly report to DCF Sariska and Alwar under supervision of Field Director.

Research

The research wing will be under the direct control of Field Director and it should be handled by Separate Research officer. The research officer should be a wildlife researcher. Preferably non forest officer should be posted. The main tasks include routine data collection and compilation, like trekking data, sighting, kills, scat analysis, density distribution, census, vegetation monitoring. Research officer should be supported by 2 foresters and 2 Asst Foresters. The team will be responsible for documentation of scientific data.

Women staff

The crime prevention against women offenders has become a ticklish issue as women related laws are becoming more and more stringent. Some time these laws are misused by village woman to save the wild life offenders from being nabbed. Some times women themselves are involved in the forest and wildlife offences. To catch the woman offenders and for registering proper case for prosecuting them, women personnel are required. 33% women forest guards will be recruited as per norms. To fill gap they can be employed from home guards.

Wireless system

All the wireless stations should be manned by trained staff. There should be atleast one person available for each station. At H.Q., there should be

one technician who can take care of technical problems. Range officer should station should be left unattended

ADEQUATE STAFFING

So on rewing staff deployment situation, the present deployment of staff is far less than actual requirement. The Sariska tiger reserve being human dominated landscape with all kinds of biotic pressures including poaching, wood cutting, illicit grazing, lopping, encroachment, road & highway traffic disturbance, religious traffic disturbance etc. Sariska lost all its Tigers in 2005, due to system failure and inadequate and ineffective staffing was main reason for disaster. In 2005, a company of RAC was under control of FD Sariska which has been withdrawn after initial few years. About 200 work charge employees were transferred to Sariska to meet crises, most of these work charged employees either got transferred elsewhere or got retired reducing to less than 90. This is a dying cadre and temporary relief by deploying 60 to 150 homeguards/ boarder home guards every month is being taken since year 2005. For effective management of Tiger reserve young and trained frontline staff is must for long term survival of tiger in human dominated landscape like Sariska.

So looking to overall need for adequate frontline staffing the present requirement of 350 forest guards against 106 sanctioned posts, needs increase of 244 forest guard posts. Similarly present sanctioned 21 posts of Foresters need to be increased to 48, Asst Forester 23 posts to be increased to 48 for ensuring effective protection and field monitoring. For effective patrolling, monitoring, supervision and law enforcement mobility of Antipoachig/Antigrazing vehicles, monitoring and supervising vehicles posts of 31 drivers is needed against sanctioned 7 posts.

Till the additional posts are sanctioned, the shortage of manpower will continue to be met by deploying homeguards, boarder homeguards or EDC personnels.

Apart from above deployment, STPF needs to be constituted and deployed on priority to adequately equip Tiger reserve to meet day to day growing challenges

11.5 Fund Raising Strategies

For the management of wildlife and habitat, Government of India and State Government provide funds under various heads of expenditure.

At present NTCA provides maximum funds under CSS head. Some share is provided by State Government. Every year STR formulates APO & submits it to NTCA. But this budget is not sufficient. STR management is also getting funds under other schemes like NGEES, Thirteen Finance Commission, Integrated Forest Protection, NABARD etc. These schemes are likely to continue in future also.

Donation can also be received in Sariska Tiger Conservation Foundation from donors. Organizations like WCT Mumbai/ HKF Foundation are supporting Sariska Tiger Reserve in providing infrastructure support, organizing health camps in peripheral villages, organizing health checkup of field staff etc.

11.6 Schedule of Operations

Sanctioned works will be executed as per schedule of time. Following is the proposed time schedule:

- (i) Soil & moisture conservation works – before rains.
- (ii) Desilting of water holes, nadis & anicuts – before rains.
- (iii) Eradication of unwanted species – during & after rains.
- (iv) Clearing & maintenance of tracks – after rains
- (v) Cutting of fire lines – in winters
- (vi) Construction of new structures – after rains
- (vii) Repair of buildings – after rains

CHAPTER - 12

MONITORING AND EVALUATION

The main focus of monitoring and evaluation in this Plan is to check annually the status of problems, gap in information and the capacity of the frontline staff to tackle management issues identified in the plan and SWOT analysis. The following procedures will be followed for monitoring and evaluation.

12.1 CRITERIA

The criteria for monitoring the plan programmes implemented in the plan will be as follows

1. Monitoring the reduction of threat to wildlife by creating awareness and enforcing the law through network of field functionaries.
2. Monitoring the habitat through reduction of illicit felling of trees and monthly review of the performance of each camp and administrative units.
3. The monitoring work will be taken up by the Deputy Director and Assistant Conservator of Forests while the works are in operation.

The criteria for evaluation of the success of the projects undertaken will be taken up regularly by the Field Director, STR

12.2 PROCESS

Adequate arrangements with elaborate procedure have been laid down about for protection of the forests. For the purpose of intensive supervision the area of each forest beat has been reduced. Besides huge amount of money is being spent for which the accountability for the successive implementation of the scheme rests with the Forest Officials. Proper monitoring at the time of implementation and evaluation at frequent intervals will foretell the success. Hence the modality for monitoring and evaluation is laid down as detailed below;

1. The target for each beat Forest Guard along with the concerned Forester in detection of forest cases is fixed at five for each beat in case of the core area and ten in case of the buffer area per months i.e. for 30 days. These cases should spread uniformly over the

month. If the required number of cases are detected within a week then it will be presumed that for the next three weeks the staff have not performed their duties. In case no case is detected the concerned Forest Guard / Forester will give a certificate that no illicit felling of trees and no killing of wild animals has been done in his Beat / Section in the following manner.

- a. In case of Forest Guard “certified that with all efforts I could identify cases. Except these there is no case in my Beat area”.
 - b. In case of Forester “certified that with all efforts I could identify cases. Except these cases in my Section with Beat Forest Guards no other cases occurred.
2. Each Forest Guard will move around each Beat area and cover the entire area once in a week. Similarly the Forester and the Range Officer will inspect Beat area of one Beat within a week and within a fortnight respectively on rotation basis, so that all the Beats are covered. The inspection report of the Forest Guard / Forester and Range Officer will be submitted to the concerned Deputy Director / Divisional Forest Officer concerned, who will either check it or get it checked by the Asst. Conservator of Forests attached to Division during tour. Such report will be submitted to this office at the time of Divisional Forest Officers conference. The Deputy Director and Divisional Forest Officer will devise a format of questionnaire for the purpose of inspection and circulate among the staff to be filled in and submitted to him.
 3. The Deputy Director Sariska Tiger Reserve along with the Divisional Forest Officers of buffer area will meet once in a month prior to 15th of each month along with the concerned Range Officer and discuss about the problems relating to illicit felling and poaching of animals inside the Sanctuary. The Deputy Director will hold the meeting with neighboring DCF on rotation basis. The proceedings of the meeting will be submitted to the Field Director. There will be a bi-monthly Core-Buffer meeting chaired by the Field Director in which all aspects related to protection shall be exhaustively reviewed.

12.3 MAINTENANCE OF GEO REFERAL DATA

Deputy Director will open a division journal and will record the following details in the division journal.

Latitude/Longitude of waterholes

Latitude/Longitude of checkdams

Latitude/Longitude of daldalies

Latitude/Longitude of Division headquarter.

Latitude/Longitude of Range headquarters.

Latitude/Longitude of Forest Section headquarters.

Latitude/Longitude of headquarter of beats.

Latitude/Longitude of locations of Antipoaching camp.

Latitude/Longitude of Checkposts

Start and end point of each Road.

Start and end point of each Trek paths.

Start and end point of each Firelines.

Latitude/Longitude of Bridges, Culverts.

Latitude/Longitude of Illegal entry points.

12.4 BIODIVERSITY MONITORING

1 ha plot in each vegetation type will be maintained and entered in the division journal the following details.

- Inventory of all species of trees(including seedlings and sapling), shrubs,herbs and weeds The measurement of all the tree species will also be recorded in the journal. Deputy Director should also calculate the biomass of Tree,shrubs,herbs and grass in each vegetation type and arrive at carbon sequestration of each vegetation type in consultation with experts.
- Presents/ absent, abundance, density of Wildlife evidences This exercise of recording Wildlife evidences and inventory will be repeated every year and the record for the same will be entered in the division journal.

HABITAT SHIFT OF SPECIES

The annual surveys/census will be analysed for habitat shift of species to study the impacts of climate change/global warming.

12.5 DISASTER MANAGEMENT & MONITORING

In the circumstances there is disaster such as fire, epidemic etc. The Deputy Director may take the following actions.

Fire

Adequate preventive measures like clearance of fire lines, awareness of villagers, deployment of fire squad and watchers with vehicles will be taken up in every fire season. In case of uncontrollable fire, help of fire fighting squad will be sought from District Administration.

Epidemic

Expert team may be constituted by involving a panel of veterinary experts. A detailed plan may be drawn by expert team and implemented in order to contain the epidemic.

12.6 ANNUAL REPORT

The annual report will be generated based on the prescriptions in the foregoing chapters and placed before the steering committee and governing body of the foundation.

12.7 MANAGEMENT EFFECTIVENESS EVALUATION (MEE): BY MANAGEMENT ITSELF OR THROUGH EXTERNAL AGENCY

Since the second half of last century, protected areas across the world have increased dramatically in area and size as most countries have developed protected area systems as a core strategy to protect biodiversity and environment. The many values of protected areas for biodiversity conservation, protection of cultural heritage, maintenance of vital 'ecosystem services' and provision of a range of socio-economic benefits have been well recognised, and the roles of protected areas in mitigating and adapting to climate change are increasingly important (Dudley et al. 2010). However, using protected areas as a key strategy for

biodiversity conservation is reliant on the assumption that they can protect their values for the foreseeable future. Society is making investments of money, land, and human effort into protected area acquisition and management and into specific intervention projects. The community, people investing in protected areas, and protected area managers need to know if these investments are sound. Questions include:

- Are protected areas effectively conserving the values for which they exist?
- Is management of these areas effective and how can it be improved?
- Are specific projects, interventions and management activities achieving their objectives, and how can they be improved?

The need to evaluate protected area management effectiveness has become increasingly well recognised internationally over the past ten years, as we have seen in both developed and developing countries that declaration of protected areas does not always result in adequate protection . As the total number of protected areas continues to increase, so too do calls for proper accountability, good business practices and transparency in reporting (Hockings et al. 2006). In addition, as other strategies for 'off-park' conservation and multi-use reserves have developed, and as concern for rural poor and Indigenous rights has increased, there has been more questioning about the role and effectiveness of protected areas.

Evaluation is also critical for adaptive management. We live in a world where we experience and can expect dramatic changes – in the biophysical world, the community, the economy and the way we govern ourselves. As global change accelerates, we need to be able to show to what extent protected areas are functioning as an effective strategy for conservation. Managers need to understand what works and what does not, so they can build on the best ideas and practices. Evaluation of management effectiveness is a vital component of this responsive, proactive style of protected area management. Through evaluation, both positive and negative experiences can be used as opportunities for

learning, and continual improvement can be combined with anticipation of future threats and opportunities.

As per guidelines issued by World Congress of Protected areas (WPCA), 2006, Management Effectiveness Evaluation (MEE) is the assessment of how well a protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives. It includes consideration of design issues, the adequacy and appropriateness of management systems and processes and the delivery of protected area objectives including conservation of values.

Purpose of Evaluation

Broadly speaking, MEE can:

- Enable and support an adaptive approach to management
- Assist in effective resource allocation and Promote accountability and transparency and
- Help involve the community, build constituency and promote protected area values

In addition to substantive benefits, the process of MEE can also deliver a number of procedural benefits such as improved communication between managers and other stakeholders. Evaluation should be seen primarily as a tool to assist managers in their work, not as a system of watching and punishing managers for inadequate performance. Evaluation must be used positively to support managers and be seen as a normal part of the process of management. Recent experiences around the world have demonstrated that involving external stakeholders in the assessment process and transparent sharing of the results of assessment can help to build cooperation and support for protected areas Protected areas management effectiveness evaluation has been conducted in many countries using range of methodologies/ approaches emanating from the global MEE framework. These approaches vary considerably in their scale, depth, duration and data collection methods.

NTCA is conducting MEE of Tiger Reserves in India through constitution of committees of experts in the relevant fields every year.

The terms and reference of the above Committees are;

(i) To apply the Management Effectiveness Evaluation (MEE) framework and assessment criteria for independent evaluation of the Tiger Reserves in the country.

(ii) To evaluate whether the chosen approaches in Tiger Reserve management are sound, adequate and appropriate.

(iii) To evaluate whether the funds allocated are being used effectively for meeting the objectives of management of Tiger Reserves as laid down in the respective Tiger Conservation Plans/ Management Plans.

(iv) To evaluate the process and outcome of long-term monitoring of the biological and socio-cultural resources.

The Wildlife Institute of India provides a pre-assessment orientation to the experts for using the new matrix, apart from collation/publication of the results with financial support from the National Tiger Conservation Authority.

The MEE Framework

Element Name	Headline Indicators	
Context	1.1	Identification of values
	1.2	Assessment of threats
	1.3	Biotic interference in core area
	1.4	Compliance of statutory requirements
Planning	2.1	Tiger conservation plan
	2.2	Safeguarding of biodiversity values
	2.3	Stakeholder participation
	2.4	Habitat management
	2.5	Effective protection strategy
	2.6	Mitigation of human-wildlife conflicts
	2.7	Landscape conservation approach
Inputs	3.1	Adequacy of manpower deployment
	3.2	Adequacy of physical infrastructure
	3.3	Adequacy of central government funding
	3.4	Adequacy of state government

		funding
	3.5	NGO resource contribution
Process	4.1	Adequacy of trained manpower resources
	4.2	Frontline staff performance evaluation
	4.3	Effectiveness of public participation
	4.4	Process of complaint handling
	4.5	Livelihood support to local communities
	4.6	Village relocation planning
Outputs	5.1	Dissemination of information to public
	5.2	Management of visitor facilities
	5.3	Evaluation of research/monitoring trends
	5.4	Adequacy of infrastructure maintenance & funds
Outcomes	6.1	Population trends of tiger & other species
	6.2	Threat assessment
	6.3	Visitor satisfaction
	6.4	Local community support

Recommendations of MEE report 2010-11 and status of compliance

In 2010-11, 39 Tiger Reserves were evaluated by independent expert teams under the guidance of Wildlife Institute of India and NTCA and MEE ratings obtained. According to the evaluation report, Sariska falls within “red corridor” and was included under cluster –III.

Action points recommended by MEE

- **The core and buffer of Sariska TR must be brought under the unified command of the Field Director.**

Compliance-The post of Field Director, Sariska TR has been upgraded to that of Regional C.C.F. Vide govt notification no. 11884 dated 02.07.2011 and the unified post has been named as FD, STR cum RCCF, Baripada, which has started functioning with effect from 08/08/2011. With this, core and buffer areas have come under a single administration.

- **The staff shortage must be filled, and also augmented from its current strength.**

Compliance- 9 posts of Forester and 29 posts of Forest Guard have been filled up in the recruitment of 2011-12. This has substantially sorted out the problem of staff shortage for the time being at the field level. However, this process needs to continue regularly as many staff are retiring and are likely to retire every now and then.

- **There is a need for the provision of a para-military force, to work with the forest department for protection, given the kind of mass ritual hunting in the reserve, and the influx of armed poachers, and timber smugglers**

Compliance-Govt of Odisha have already notified the creation of Sariska Special Tiger Protection Force during 2012. Action is on to recruit the members of the force

- **Rehabilitation of villages from the core critical habitat**

Compliance-One village has been completely relocated out of 4 villages in core area of the TR during 2010. There are 3 villages still present in core area. Efforts are on to motivate the inhabitants of these villages to come out of the TR.

12.8 TCP TO BE PLACED IN PUBLIC DOMAIN

The Tiger Conservation Plan of Sariska Tiger Reserve after its approval will be placed in the public domain by displaying the plan on official website of wildlife wing Rajasthan www.rajasthanwildlife.rajasthan.gov.in

Tiger Conservation Plan

Part – II

BUFFER AREA

Sariska Tiger Reserve

Part A

The existing Situation

Chapter – 1

Introduction of the Area

1.1 Name, Location, Constitution & Extent

1.1.1 Name

The name of the area is “Buffer area of Sariska Tiger Reserve” i.e. the area surrounding the critical Tiger Habitat or core of STR.

1.1.2 Location

The Core Area of Sariska Tiger Reserve is surrounded mostly by revenue land and villages with some contiguous forest patches of territorial Forest Division-Alwar and Jamua Ramgarh Sanctuary. The forest blocks of Alwar Forest Division covering forest area of 180.14 sq. km and 60.58 sq.km of Jamuwaramgarh Wildlife Sanctuary in total 245.74 sq.km forest area have been included in the buffer area so that the contiguous areas could form important conduits for prey and predators’ movement. Low protection level and higher biotic pressure have also caused degradation of these areas and inclusion of these areas in the buffer area of the Tiger Reserve shall accord better level of protection with habitat improvement. The forest buffer area has been divided in three blocks which are contiguous to Critical tiger Habitat area of Sariska Tiger Reserve.

1.1.3 Constitution

Section 38 V (4) (II) of the amended Wildlife (protection) Act 1972 deals with the “buffer or peripheral area” consisting of area peripheral to critical tiger habitat or core area, where a lesser degree of habitat protection is required to ensure the integrity of core critical tiger habitat with adequate dispersal of tiger.

1.1.4. Extent (Area statement)

The forest area of Buffer area of Sariska Tiger Reserve has been transferred under the control of Deputy Conservator of Forests and Deputy Director, Sariska Tiger Reserve vide order no-F 19 () 2012/Karmik-Raj/PCCF/8817-25 dated 10th December 2012. 180.1421 sq. Km. forest area of 16 forest blocks from Alwar forest Division and 65.58 sq.km. forest area of Jamuwaramgarh Wildlife Sanctuary, Jaipur Central Division has been included in buffer area of Sariska Tiger Reserve.

The details of forest area included in the buffer of Sariska Tiger Reserve is as follows:-

S.no	Name of forest division	Name of Forest Block	Type of Block	Area in Ha.	Block no & area (in Ha)
1	Alwar	Sirawas	RF	2555.59	1(15917.34)
2	Alwar	Sedawas	RF	3726.90	
3	Alwar	Dadikar	RF	2808.73	
4	Alwar	Nidani	RF	1570.43	
5	Alwar	Bakheda	RF	2885.74	
6	Alwar	Dhamla-ka-bas	PF	600.86	
7	Alwar	Hamirpur Comp. 1-5	PF	717.84	
8	Alwar	Dhamla-ka-bas-A	PF	88.06	
9	Alwar	Umrain	PF	511.04	
10	Alwar	Bag Kesarpur	PF	35.39	
11	Alwar	Bakheda	PF	69.31	
12	Alwar	Dholidhup	PF	41.18	
13	Alwar	Balla voda	PF	31.55	
14	Alwar	Jatiana	PF	103.79	
15	Alwar	Todiyar-A	PF	107.93	
16	Alwar	Bigota	RF	2096.87	2(2096.87)
17	Jaipur Central	Badi line Digota 61 (Jamuwaramgarh WLS)	RF	6558.00	4(6558.00)
Total				24572.21	

Tehsil wise Buffer area of STR (Forest and revenue area)

(Area in Hectare.)

Name of Tehsil (District)	R. F.	P. F.	Revenue land	Number of villages
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Jamuwaramgarh(Jaipur)	6558.00		-	-
Rajgarh (Alwar)	2096.87	-	204.21	4
Bansur (Alwar)	-	-	2051.77	10
Alwar (Alwar)	11244.39	4672.95	3081.08	12
Thanagazi (Alwar)	-	-	3313.86	25
Total	19899.26	4672.95	8650.92	51

Revenue buffer has been declared in Alwar district. The revenue buffer has been identified in 11 blocks. The details of area is as follows:-

S.no.	Block no & area (in ha.)	Name of village	Tehsil	Area in ha.
1	1(3076.08)	1-Sirawas	Alwar	680.86
2		2-Dehlawas	Alwar	711.31
3		3-Chak Shamlat	Alwar	97.96
4		4-Ramnagar	Alwar	189.93
5		5-Rogada	Alwar	334.86
6		6-Bakhatapura	Alwar	195.97
7		7-Rundh Binak	Alwar	126.46
8		8-Kishanpur	Alwar	161.34
9		9-Pantpur	Alwar	339.83
10		10-Doba Ringatpuri	Alwar	222.48
11		11-Shodanpura	Alwar	15.08
12	2. (60.71)	Toda Jaisinghpura	Rajgarh	60.71
13		1-Khirat ka bas	Rajgarh	83.12
14		2-Todi ka bas	Rajgarh	51.49
15	3 (143.5)	3-Bhangarh	Rajgarh	8.89
16	5 (1835.70)	1-Guada Kundyal	Thanagazi	99.32
17		2-Ajabgarh	Thanagazi	195.70
18		3-Guada Dabar	Thanagazi	13.85
19		4-Gu.Ghasi	Thanagazi	136.20
20		5-Gu. Hanuman	Thanagazi	58.25
21		6-Gu. Lalabhaiya	Thanagazi	12.98
22		7 -Gu. Sayab	Thanagazi	20.07
23		8- Gu. Bhagwan	Thanagazi	55.82
24		9- Gu. Janawat	Thanagazi	15.21
25		10- Gu. Har	Thanagazi	113.83
26		11- Gu. Birkadi	Thanagazi	225.60
27		12- Gu. Soti	Thanagazi	42.13
28		13- Gu. Vyas	Thanagazi	15.11
29		14- Gu. Jamidar	Thanagazi	8.42
30		15- Gu. Ramji	Thanagazi	168.49
31		16- Gu. Gugli	Thanagazi	166.85
32		17- Gu. Leswa	Thanagazi	04.12
33		18- Gu. Nirma	Thanagazi	54.25
34		19- Gu. Radi	Thanagazi	119.02
35		20- Gu. Kalot	Thanagazi	54.45

36		21-Bhuriawali	Thanagazi	256.03
37	6 (56.24)	Raipura	Thanagazi	56.24
38	7 (885.60)	1-Manawas	Thanagazi	326.10
39		2-Mundawara	Thanagazi	559.50
40	8 (1644.08)	1-Lekadi	Bansoor	210.93
41		2-Ghat	Bansoor	331.48
42		3-Behramka bas	Bansoor	190.20
43		4-Mundli	Bansoor	1.42
44		5-Guda Bhakarwala	Bansoor	171.65
45		6-Kalyanpura	Bansoor	38.44
46		7-Kasba Rampur	Bansoor	614.60
47		8-Dhamlakabas	Bansoor	85.36
48	9 (15.47)	Hazipur	Bansoor	15.47
49	10 (536.32)	Duharmala	Thanagazi	536.32
50	11(392.22)	Nathusar	Bansoor	392.22
51	12 (5.00)	Gu. Raika (Madhogarh)	Alwar	5.00
Total				8650.92

Total Buffer Area of Sariska TR – 322.22 km².

The Buffer area has been transferred under Sariska Tiger Reserve management vide P.C.C.F. Rajasthan letter No. 8817-25 Dated 10-12-2012 (Annexure -2)

1.2 Approach & Access

The major town and villages in buffer area are approachable by road. The area can be approached either after reaching the head quarter of Field Director, Sariska Tiger Reserve at Alwar or from Deputy Field Director's office at Sariska. Important towns and villages falling within the buffer zone are approachable by Bus, while few towns are having rail facilities too. The major cities in the vicinity of the area are Alwar, Dausa and Jaipur.

The nearest airport is at Jaipur from where one can have approach to areas of buffer by means of road transport, conveniently.

1.3 Statement of Significance

Aravalli landscape is one of the biodiversity rich locations in which Sariska Tiger Reserve is one of the important units. Significance of this Tiger Reserve is manifold, starting from local importance to global. This

Tiger reserve also has some significant contribution towards the global common aim of conservation. The buffer area for Sariska tiger reserve has different levels of importance as discussed below.

The region is very rich in diversity of flora & fauna in western Indian landscape. From the angle of biodiversity conservation, the area included in buffer zone, is a supplementary habitat for the wildlife present inside the core. It also provides regional connectivity among different important wildlife habitats. It also provides good dispersal pathways.

This buffer area consists of several villages and thus has large population dependent on forest products for their livelihood. Proper management of these forest resources can provide better livelihood options for the local community.

The buffer zone is also rich in fruit plants, fodder and other valuable forest products. Proper management of these resources can lead to sustainable use of NWFPs.

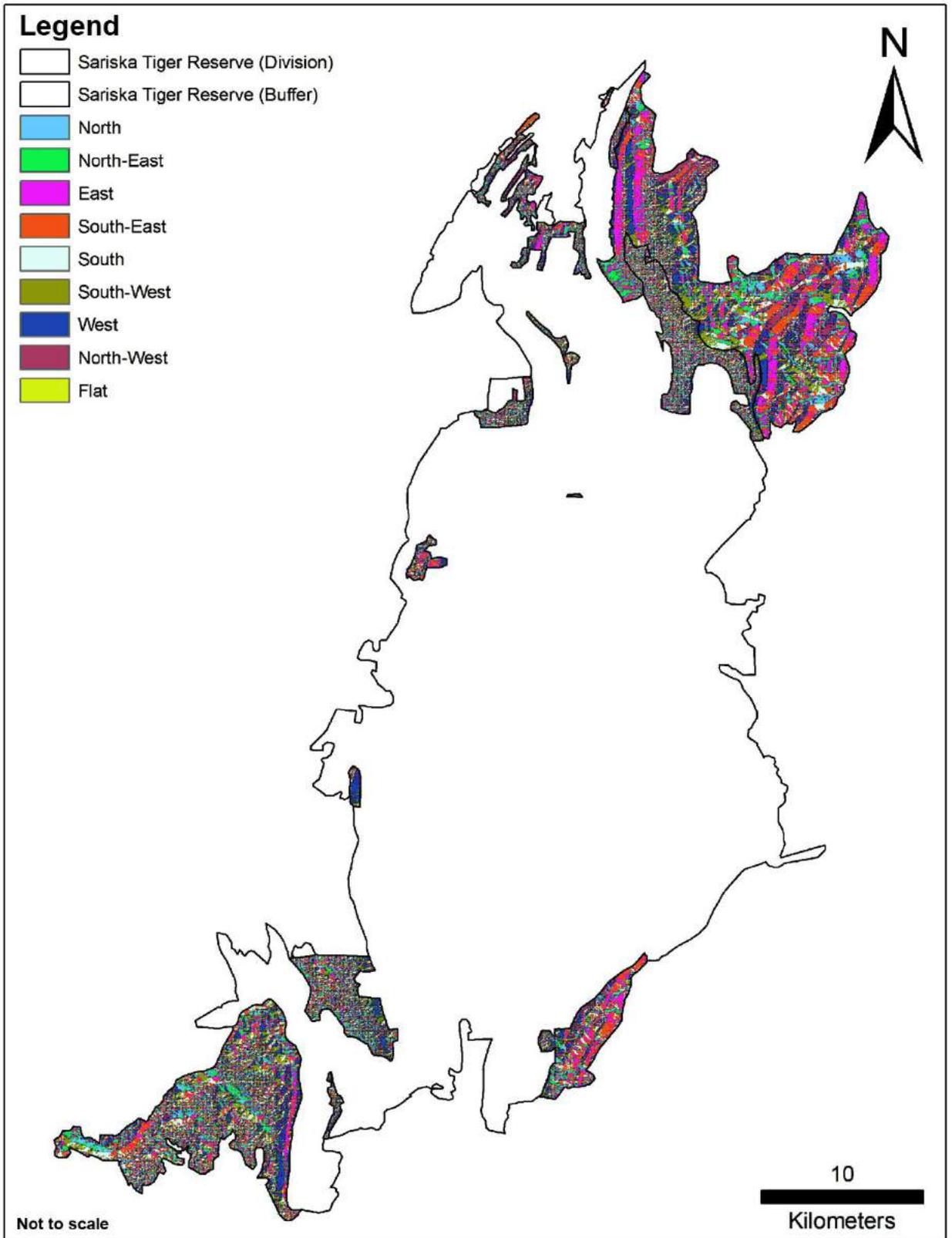
1.4 Geology, Rock and Soil

Rocks of Delhi system and Aravalli system comprising of quartzite, conglomerates, grits, limestone, phyllites, granites and schist occupy the major part of the area. Soil differs depending on the underlying rock. There are comparatively rich, fertile and dark colored soils in plains & river valleys.

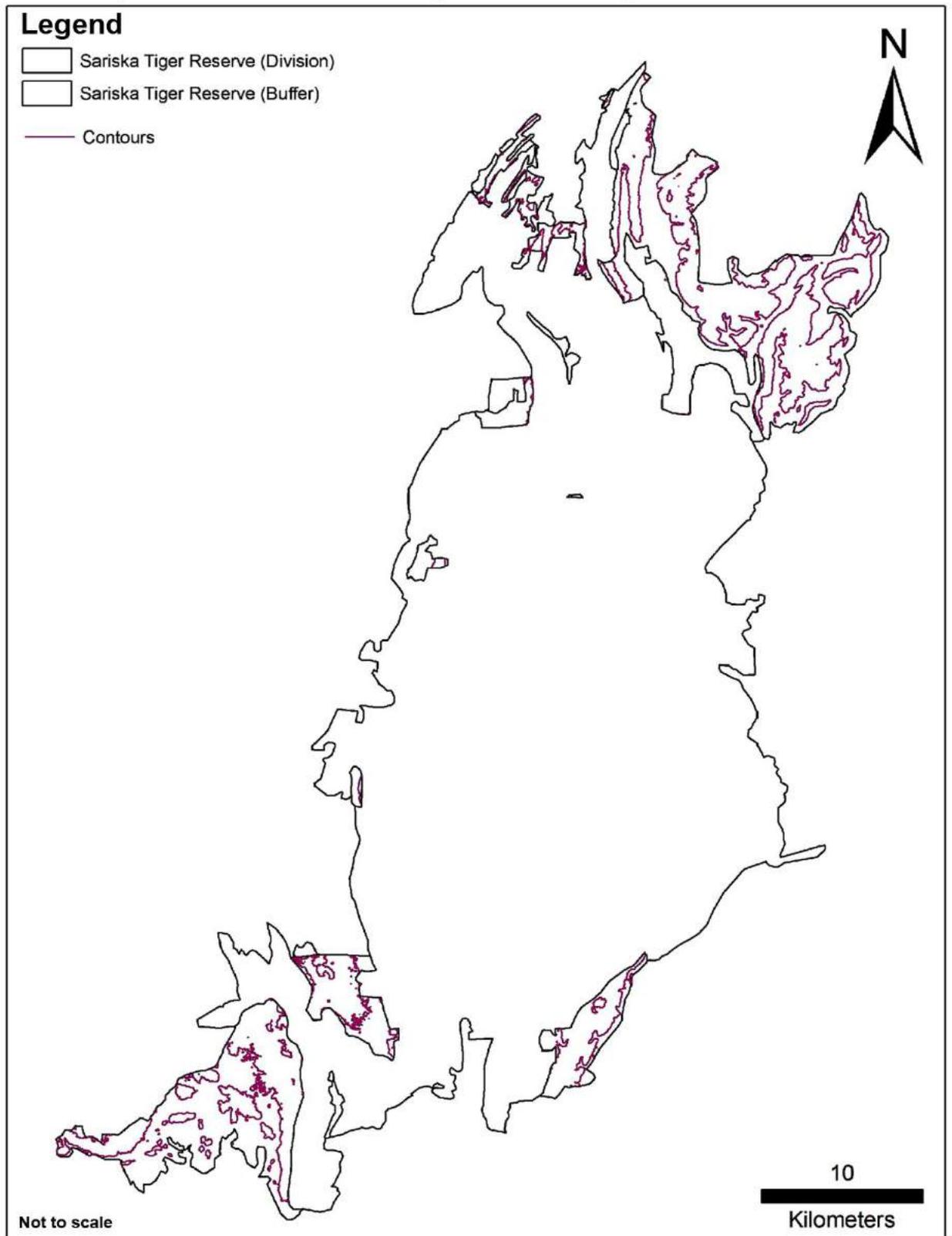
1.5 Hydrology and water sources

The bulk of precipitation is from south-west monsoon and occurs during the months of July to September. The winter rains from North-east monsoon are quite common. The average rainfall is 600 mm. The distribution of rainfall is fairly erratic. The availability of water is not uniform throughout the year. The terrain, topography and geology of the area influence the water regime by contributing towards runoff and recharging of the ground water. The availability of water increases in valleys, khoh, Riparian area and wet lands. The major river is Ruparail that also flows through core area of STR. Water is always a limiting factor in summer.

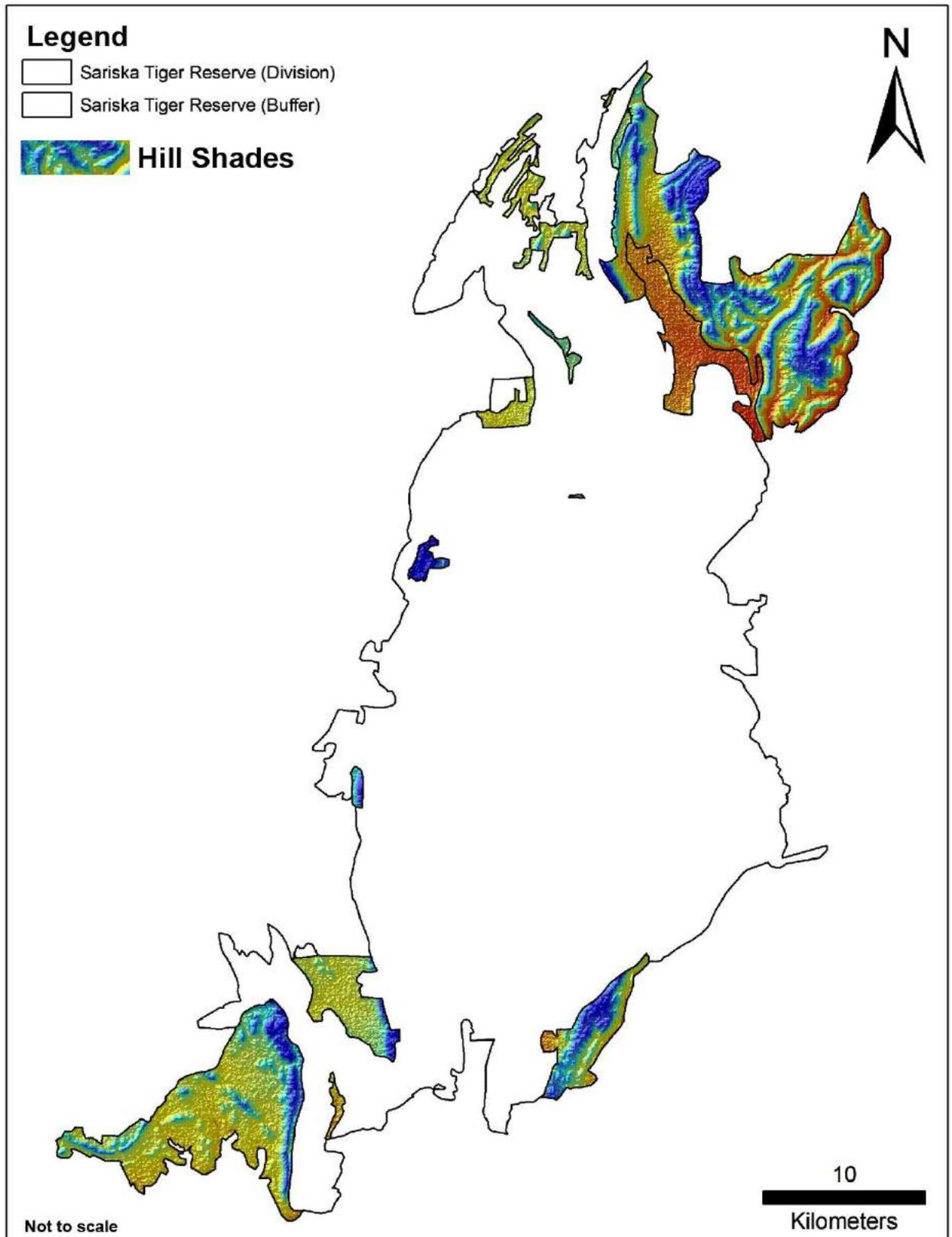
Map 22 - Aspect Map –Sariska Tiger Reserve Buffer



Map 23 - Contours Map –Sariska Tiger Reserve Buffer



Map 24 - Hill Shade Map –Sariska Tiger Reserve Buffer



1.6 Vegetation types

Revenue and agricultural lands/private holdings are, by and large, devoid of good vegetation except scattered trees of Neem (*Azadirachta indica*), Ber (*Zizyphus mauritiana*), Aonla (*Emblica officinalis*), Deshi Babool (*Acacia nilotica*), Mango (*Mangifera indica*), Churel (*Holoptelia integrifolia*), Ficus spp. etc. Forest areas included in the buffer area, however, have good vegetation that corresponds to Northern tropical dry deciduous forests and Northern tropical thorn forests. *Anogeissus pendula* is the dominant tree species supported by *Boswellia serreta*, *Lannea coromandelica*, *Acacia catechu*, *Butea monosperma*, *Zizyphus mauritiana* etc.

1.7 Wild fauna and habitats

The revenue lands included in the buffer area hardly have resident wild mammal population except Nilgai (*Boselaphus tragocamelus*) and Black napped hare (*Lepus nigricollis*) but are regularly visited by principal herbivores of the CTH i.e. Sambar deer (*Cervus unicolor*), spotted deer (*Axis axis*) Wild boar (*Sus scrofa*) etc.. Other regular visitors to these areas are leopard (*Panthera pardus*), Hyena (*Hyena hyena*), Jungle cat (*Felis chaus*), Small Indian Civet (*Viverricula indica*), Common mongoose (*Herpestes edwardsii*), Palm Civet (*Paradoxurus hermaphroditus*), Porcupine (*Hystrix indica*), Jackal (*Canis aureus*) etc. The forest areas included in the buffer, however, support a good resident wild mammal population such as Leopard, Nilgai, Sambar deer, Wild boar, Hyena, Common Mongoose, Porcupine, Jackal, Hare etc. The movement of Tigers to buffer area is not present. The buffer area does not have good supportive habitat for wild life except a few good patches of forests. Protection, during their migration from one area to the other, requires great attention. Most of the areas are degraded and do not provide proper shelter for wild life. Cattle occupy most of the available natural shelter.

1.8 Major conspicuous changes in the habitat since inception

There has been regular deterioration of habitat of buffer area due to increasing population, resulting in enhanced demand of fuel wood, fodder, small timber and also land for agriculture. Animal husbandry is the main profession in this area and thus most of the forest areas/ grazing lands are overgrazed hardly leaving any thing for visiting wild life. Development of buffer area requires development of good pastures & fuel wood plantations on community / waste lands.

CHAPTER – 2

STATUS OF TIGER AND CO-PREDATORS

Introduction

Presently there is no presence of Tiger since more than four decades in the notified buffer area. Prior to independence these areas had good tiger population but due to poaching the tiger became extinct from these areas. As a result of habitat degradation and diverting large chunk of forest pastures for agriculture, the prey base also declined. Still with effective law enforcement for habitat protection and poaching wildlife population can be revived. The Jamuwa wildlife sanctuary which is part of buffer has great potential for revival of tiger population. The Sirawas, Nidani and Balaquila forest blocks also have tremendous potential for revival of tiger population. The Balaquila area even today has viable sambar population as prey base for tiger. The survival of the prey and the predator species, mainly Tiger and Leopard, in the Buffer area, will depend upon the following factors:

- a. Reduction of poaching pressure from the Peripheral villages.
- b. Effective habitat protection and reducing other biotic disturbances such as roads, temple visitation, fisheries etc.
- c. Eco development initiatives to reduce the biomass extraction pressure in the Zone of Influence
- d. Involvements of the local people as primary stakeholders in the Tiger Reserve vis a vis economic benefits.
- e. Conservation Education Initiatives

2.1. Distribution

Tiger is absent from buffer areas since long time. However the occurrence of leopards, characteristic of occupying even disturbed habitats is reported but population density is relatively low. The other carnivores Hyeana, Jackal. Jungle cat are present in good number. The prey base is mostly blue bull, sambhar and wild boar. Due to high degree of disturbance, these areas have very low density of Prey base.

2.2 Abundance Status

No tiger movement has been reported in the buffer area owing to the high degree of disturbance. Evidences of occurrence of leopards have, however, been reported on the basis of kills of wild prey as well as sheep and goats. Occasional sightings of leopards have also been reported in the buffer area.

As far as prey base is concerned, blue bulls are available in abundance. Sambhar and wild boar are also found in buffer area.

2.3. Prey Predator Relationship

The complexity of relations between predator, co-predator and prey is viewed as an important aspect of Wildlife Biology today. The challenge before the wildlife manager is to keep these relations undisturbed. The impact of the predator on their prey has always been a controversial aspect of predator ecology. Information's such as how many predator and prey are there in an area, how often the predator kills, how they select prey species, sex age and condition of the prey and the contribution of mortality of prey other than predation are essentially different aspects of study of the population dynamics of the prey.

Studies show that Leopard (*Panthera pardus*) is the major mammalian predators in buffer of STR. Their main prey species comprise of Sambhar, blue bull, Wild boar etc. The predators also prey on porcupine, black-napped hare and domestic livestock.

2.4 Assessment of threats

- Presence of hunting tribes like Bawaria, Bhopa, Nat, Kanjar etc in and around the buffer areas.
- Tremendous Grazing Pressure in and around villages on buffer (Zone of Influence)
- High biomass extraction from the buffer forest areas of the STR in form of firewood, lopped fodder, gazing etc. leading to habitat degradation.

CHAPTER – 3

History of Past Management and Present Practices

3.1 Conservation and Forest Management History -

Late Padamshree Kailash Sankhla wrote the first management plan (1978-1979 to 1982-1983) of Sariska Tiger Reserve for 800 sq.kms., including 492 sq.kms. of the notified Sariska Sanctuary and 308 sq.kms., of adjoining areas of Alwar, Rajgarh and Sariska forest ranges. This plan mentions about the Core and Buffer zones, Core zone to eliminate human disturbances and buffer zone of 308 sq.kms. to absorb the impact of artificial disturbing pressures and to maintain the seclusion of the core area. However, no serious management initiatives have so far been under taken for the development of buffer zone and to truly reduce the biotic pressure on core from peripheral villages. Though a few eco-development committees have been constituted but efforts are insufficient. A few plantation works have, however, been taken in the forest areas falling in the buffer zone but no forestry work has been taken on village community lands & thus the local inhabitants are mainly dependent on forest resources.

There is an ardent need of taking eco-development initiatives in the buffer area to associate the stakeholders with the management of the tiger reserve. Promoting stall feeding through dairy development and breed improvement programme will have to be taken up on priority. Similarly providing subsidized LPG connections and other renewal sources of energy to reduce forest dependency is must.

3.1.1 Vision

The vision for the buffer area, adjoining STR is to create a “managed resource zone” outside the tiger reserve, including forest patches and revenue lands/ private lands/ community lands, addressing the conflict issues, thereby reducing pressure in all forms, to preserve the population of tigers.

3.2 Protection of Tiger, its Prey and Habitat

Area under buffer includes areas notified as buffer. In these areas, main emphasis is on habitat improvement and forest protection through law enforcement.

The forest areas falling in the buffer are inhabited by panthers and also have prey base in the form of Blue bulls, Wildboar & Sambars. Adjoining areas have no significant wild life.

3.3 Other Land Use-Villages, Agriculture, Developmental Programmes, Tourism etc.

51 villages, which are closely associated with core STR have been included in buffer area. The enclaved villages have very small land holdings with good to poor quality soils, where they grow millet, wheat, gram, sorghum, maize, mustard etc. depending on availability of water. Horticulture of guava, lemon etc. and cultivation of vegetables is also gaining momentum. Animal husbandry still remains the principal occupation. The 143 villages on the periphery of critical tiger habitat have also to be dealt as buffer villages as the core area is directly exposed to habitations to reduce forest resource dependency. This is because of patchy buffer around CTH due to non availability of contiguous forest areas around core. Tourism development programme comprising of rural tourism, boating, water sports, camping, adventure sports, safari parks, safari trips etc can be initiated in buffer areas to provide employment opportunities.

Land use category :

- Agriculture
- Fallow Land
- Moderate tree cover
- Less tree cover
- Horticulture farms
- Scrubland
- Water body
- Habitation
- Road network
- Abandoned mines
- Historical monuments
- Temples
- RTDC Silised
- Water sports in Silised lake

Developmental programme under various development schemes of

the State Government & Govt. of India are being under taken in the buffer area, NREGS being the principal scheme. Still the availability of funds is much less than the employment requirement of the local people.

Involvement of local people in tourism activity is almost negligible. Only a few persons are engaged in boating, water sports ,catering in Silised lake. Some people engage as guides for taking tourist to Balaquila but all these activities are unorganized.

3.4 Research, Monitoring and wildlife Health

In Buffer areas, which are managed for various objectives other than wildlife management, Research, Monitoring and wildlife health get less importance. Sudden outbreak of diseases, suitability of a given area for a particular species, carrying capacity of the forests, crop raids and methods to check the excessive breeding of a particular species require research inputs. These problems can be addressed by appointing qualified persons for research and monitoring or by entrusting the same to specialized research organizations like WII, IVRI and state universities. It is essential to monitor the growth and development of wildlife in these areas to assess the impact of management practices. But present status in these matters is insignificant.

3.5 Nature Education and Interpretation

Nature education and interpretation are two very important aspects for the awareness of local people for management of wildlife. Educating the local population about the importance of wildlife in the ecosystem and creating awareness about their conservation will go a long way in protecting our forests and wild life as well as in reducing man-animal conflicts. Such awareness can be brought through nature camps for different target groups such as students, fringe dwellers, and plantation workers etc.. Seminars, workshops and guest lectures can also be organized at important locations in the buffer area. Presently there is no interpretation facility available in buffer. The Balaquila palace which has been renovated by archeology department is ideal site for developing as museaum cum interpretation centre.

3.6 Administration and Organization

Administrative control for the management of buffer area has been transferred under tiger reserve management. The northern buffer comprising of Bala quila –Silised area having 15 beats is being managed as Alwar Buffer range with head quarter at Alwar. Bigota forest Block having 2 beats is managed by Tehla range. The Digota forest block of buffer haing 6 beats is under administrative control of Ajabgarh range. The following staff has been transferred to Sariska tiger reserve along with transfer of buffer area;

S No	Name of Post	No. of Posts
1	Forester	3
2	Assistant Forester	2
3	Forest Guards	17
4	Work charge employees	8

The reorganization of staff for buffer area has been dealt in CTH plan as the management is integrated with core and completely separate infrastructure for buffer will not be feasible. The List of existing buildings in Buffer of Sariska Tiger Reserve is given in **Annexure – 35**.

CHAPTER – 4

PRODUCTION SECTORS IN THE LANDSCAPE

4.1 Forestry

The operations such as thinning and final felling are not being carried out by the Forest Department as well as by other agencies in buffer area. In the Buffer areas of Sariska Tiger reserve however afforestation and eco-restoration works have been carried out by Alwar and Jaipur forest divisions. These activities do cause some disturbance to wildlife, but at the same time ensure protection which totally fits into buffer area norms. The villagers who live adjacent to reserved/ protected forests of this division need small timber for their requirements, in small quantities, and they collect it either from the forest or from private and revenue lands. Often the people trespass into the forests and collect their requirements. In order to achieve the specified objectives aiming at resource building and improving crop status of forest, re-establishing coexistence between forests and various stake holders on forests is of great importance.

4.2 Agriculture

Extensive agriculture activities are going on in the Buffer area. Main crops are rice, wheat, cereals, and different vegetables etc. The adjoining forests of leased areas were also systematically encroached upon and brought under cultivation of agricultural crops by the lessees & other people.

Clearing the undergrowth and opening the canopy for cultivation creates a barrier for the movement of wildlife to the adjacent and nearby forests resulting in conflicts and mortality of the wild animals.

4.3 Integrated Development

A participatory management strategy of tiger reserve has to be adopted. Eco-development aims at conserving the biodiversity by addressing both, the impact of local people on the tiger reserve and the impact of tiger reserve on the local people. The goal of the project is biodiversity conservation through people's participation. General stress is on socioeconomic upliftment of local people, reduction of negative impact

on tiger reserve resources and promotion of long-term positive interaction of the group with the tiger reserve. EDCs have been constituted for this purpose. The dependency on forest is a precondition for selecting appropriate villages for EDC formation. Attempts have also been made to link EDCs with other developmental Institutions and Agencies like Gram Panchayat, Block Panchayat, District Panchayat, etc. Development works are being under taken in proposed buffer area through various development schemes of Govt. of Rajasthan & Govt. of India, NREGS being an important source of funding.

4.4 Tourism

The importance of wildlife in tourism development is well known. Sariska wilderness have been attracting both domestic as well as foreign tourists. The number is increasing year after year. Sariska Tiger Reserve is unique in its facilities for viewing wildlife as such. Large numbers of Tourists visit this place and sometimes their activities are detrimental to the wildlife especially of pilgrims. As per Honb'le Supreme courts dicision in CTH,not more than 20% area can be used for tourism.Efforts has to be made to divert tourism from core to buffer.

There are many tourist destinations in the buffer area. The Bala Quila which is located in Nidani Reserve Forest is tourist attraction. It is situated close to Alwar city. Many people visit this area on week ends. The area has tremendous potential for development of eco tourism. The Silised lake is also important tourist definition and needs to be regulated and developed. It is proposed to construct Tiger Safari cum Rescue Centre at Bala Quila Forest area. The Jamuwaramgarh Wildlife Sanctuary located in Buffer of Sariska Tiger Reserve is also a potential site for eco tourism.

4.5 Fisheries

Fishing is practiced in the Reservoirs at Silised lake where the fishing is done for commercial purposes. Fishing is regularly done every year.

4.6 Road/ Rail transport

No rail transport is available in the buffer area. Nearest railway station is Rajgarh and Alwar. Road network is well established in the buffer

area. All the villages with population more than 250 are connected by road. Regular transport facilities are available.

4.7 Industry

No Industries are there in buffer area but small-scale industries are there. Part of Buffer area falls in Jaipur district, which is also industrially backward. At present there are a very few registered small-scale industrial units functioning in buffer area falling in Jaipur & Alwar districts.

4.8 Mining

Mining is a very important biotic factor, which affects the well being of the buffer area. Major mining is carried out in southern buffer near Digota and Tehla for excavating marble. Small scale quarrying by the villagers is also done for acquiring building material.

These mines create a lot of disturbance by way of blasting, transportation of material, disposal of mining waste, accumulation of stone dust and presence of human in the area. A considerable area around such mines remains disturbed and no wild animal uses such areas. This leads to depletion of habitat and area available for wild life.

4.9 Irrigation projects

There is only one Silised irrigation project in the area which provide water for local irrigation .

4.10 Temple tourism

There are some small and large temples inside the buffer area to which, people have rights to visit but there is no large/ important temple of national importance in the buffer area of STR. Annual fair is organized at Karnimata temple, Balaquila during Navratra period.

CHAPTER - 5

LAND USE PATTERNS AND CONSERVATION MANAGEMENT ISSUES

5.1 Land use classification

The buffer zone of STR has a variety of settlers. Mainly Gujjars and Meenas who reside in and around the Reserve constitute the primary group of settlers. The other settlers are Scheduled Castes and other castes as well as the Muslim Community. They range from poorhouse holds of work force, small farmers to relatively well off agriculturists who can be categorised as secondary stakeholders.

Some plantations have been done in the degraded forest areas of buffer, in recent past, to develop the areas. The enclaved villages have very small land holdings with good to poor quality soils where they grow millet, wheat, gram, sorghum, maize, mustard etc. as per the season and availability of water. In recent past, horticulture and cultivation of vegetables is gaining momentum, particularly on the western side. Land use categories in the buffer area of STR are as follows:

- | | |
|--------------------------------------|---------------------------------|
| i) Agriculture | ii) Fallow |
| iii) Forest with moderate tree cover | iv) Forest with less tree cover |
| v) Blank forest land | vi) Scrub land |
| vii) River land | |

5.2 Socio-economic profile of villages

Villagers residing in buffer depend mainly on forests for their livelihood. Traditionally a pastoral community, their main source of income is selling milk and its products like "Mawa & Ghee". Other occupations are agriculture, daily labourers, drivers, Govt. service etc. Milk production is highest in the monsoon period when people desire to save money for the entire year. The livestock from the villages is taken out daily for grazing in

the forest and the maximum distance covered by the livestock is 7-8 km. and minimum is 3-6 km.

The land holdings in these villages are small and the quality of cattle is also poor which results in poor economy of the people in general. There is no large or small industrial set up in the area. The other industrial option is mining, thus they are dependent on natural resources.

People also take illegal activities like collection of firewood, small timber and other NWFP. Primarily they do it during the season when they are free from agricultural works & other occupations.

5.3 Resource Dependence of Villages

The life of the rural people is interwoven with the forests and wildlife. Naturally, these rural people have developed intimate relationship with their surroundings and forests, which provide livelihood and the very mean of existence to them. Ecologically and economically, they are inseparable from forests. There is a basic and traditional resource dependency on forests. It is mainly for the firewood, thatch grass, seed collection, collection of medicinal plants, fishing etc.

Fuel wood:

The legitimate demand of fuel wood is being met from revenue lands and other community lands. In rural area, the habitations adjoining the forest meet their demand by collection of dried twigs and fallen wood from forests. Some times they cut the small trees also.

Small timber:

The Villagers who live adjacent to reserved forests meet their demand of small timber for making agricultural implements and for construction of houses from forests. Often these people trespass into forests and collect their requirements.

Grazing:

Livestock rearing is an important economic activity. In buffer area the grazing of cattle is traditionally done in forest area. Camping of cattle in forest is also done.

Non-wood forest products (NWFP) collection

Butea and other tree leaves for fodder, *Phoenix* leaves for cottage industry, honey, grass, etc are extracted from buffer. Although collection is not permitted from the buffer, there are unauthorized attempts to collect various NWFPs. Due to vastness of area it is difficult to control these illegal activities. Attempts have to be made to reduce these destructive activities through participatory methods and have been successful to a limited extent.

5.4 Human-wildlife conflict

The proximity of villages, presence of human settlements on the migratory route of animals and the extension of cultivation by the villagers' right up to the boundary of the park is another important factor. The Wild animals are lured by such cultivated areas and cause damage in the form of human casualty, livestock killing, crop depredation, property damage etc.. On the other hand, human also cause adverse effects on the wildlife, such as retaliatory killing and poaching, livestock grazing, habitat fragmentation etc.

5.4.1 Effects to human

In buffer area, the extent of Human-wildlife conflict in the form of effect to human is little less. It is because of cropping pattern (farming in form of cash crop) in part of buffer zone, less human settlements due to arid landscape and in some of the areas there is larger tolerance. Still it is present in following forms:

1. Human casualties by wildlife
2. Livestock Depredation by carnivores
3. Crop and Property damage by large ungulates

Crop damage due to wildlife is very common in most of the rural settlements, the Food Production Areas and Arable Lands, adjoining the forest. Since, the wildlife damage on the farms is large and uncontrollable, people are not interested in growing food crops in near by areas. Blue bull, wild boar, monkey, porcupine and languor are some of the important animals responsible for such man-animal conflicts.

5.4.2 Effect to wildlife

The other form of human-wildlife conflict is effect to wildlife. It is in the form of following:

- Retaliatory killing and poaching
- Accidental animal death due to electrocution
- Pressure of livestock grazing
- Transmission of communicable diseases from domestic livestock to wild animals.
- Habitat destruction and fragmentation by encroachments and other developmental activities

5.5 Assessments of inputs of line agencies / other departments

Various line agencies / departments are working in the buffer zone of Sariska tiger reserve. These are:

1. Irrigation Department.
2. Public Works Development.
3. Electricity Distribution Corporation.
4. Rajasthan Tourism Development Corporation.
5. Police Department.
6. Transport Department.
7. Gram Panchayat and Municipality.

Part - B

The Proposed Management

Chapter – 6

Vision, Goals, Objectives and Problems

6.1 The Vision:

The buffer zone, consisting of the area peripheral to critical tiger habitat or core area will ensure the integrity of the critical tiger habitat with adequate dispersal of tiger and other key species. The area will also ensure the co-existence of wildlife and human activities. Buffer will also support the livelihood, developmental, social and cultural rights of the local people (u/s 38 V (4) (ii) of W.L.P. act). The area will also support the production sector activities intermingled with biodiversity conservation and ecosystem function values. The tourism and religious values will also be addressed here. This will be a “managed resource zone” out side the CTH including forest patches, revenue lands & private holdings, addressing the issues of conflict, there by reducing pressure on core area.

6.2 Management Goals:

The buffer area should serve as an additional habitat for spill over population of wildlife and provide them way for dispersal, coexisting with human activities. This should also reduce impact of local people upon core & vice versa through active people’s participation thereby improving park – people interface.

6.3 Management objectives:

The following objectives have been thought to maintain the set of values of buffer area recognized and prioritized earlier.

1. To provide and protect the supplemental habitat and dispersal path way for the spill over wildlife population specially tiger.

2. To support the social, cultural and economical well being of the communities in the zone of influence to reduce their dependence on core area for forest based resources through eco-development activities and conservation education.
3. To maintain and wherever necessary restore the key ecosystem functions for ecological security and economic prosperity of the region with special importance to the water shed function of the major rivers of the area.
4. To maintain the productivity of the production sectors after mainstreaming with conservation values on sustainable basis and to generate alternate livelihood options for the local communities.
5. To enhance the quality of educational, recreational and wilderness experience given to the general public.
6. To provide the opportunity of religious tourism in a sustainable manner.

The general principles of management of buffer will be as follows-

1. Co-occurrence agenda (Wildlife and People).
2. A 'no-go-area' for industrial development (but retrofitting safeguards required if such infrastructure already exists)
3. The wildlife status of buffer should not be elevated to that of the core and managerial interventions should be restricted to allow tiger/wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
4. Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
5. Using the impact of natural / managerial interventions in the core area as a guide for dealing with forestry practices and wildlife management in the buffer.
6. Identifying zones of influence vis-à-vis the various land uses operating in the area.
7. Overarching focus on habitat restoration/productivity, reduction of forest resource dependency, providing ecologically sustainable

livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive forms of land uses like mining or heavily used infrastructure and actively addressing human wildlife interface. In case such land uses are present or permitted appropriate mitigation measures need to be enforced so as not to compromise on the conservation objectives of the buffer.

8. Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much needed public support. A sizeable portion of tourism gate receipts should be recycled and earmarked to eco-development committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

6.4 Problems in achieving objectives:

6.4.1 Constraints/ problems in achieving objective no.1

1. **Disturbance due to Habitations**—The major part of the buffer consists of human interaction zone, which includes human habitations, private lands, agricultural fields, road network etc. that creates a lot of disturbance to the wildlife dispersal. The private estates and farmlands are contiguous to the core. Many of them are abandoned and have a large number of laborers' settlements that are dependent on forest for various resources.
2. **Resource dependency of local people**- Dependency of local people for livelihood and NTFP collection is increasing day by day. It is also a potential threat to the objective.
3. **Illegal activities**- The area is having potential threat of lopping, poaching, felling etc. These are also management problems and need constant watch.
4. **Road and transmission line** - The expanding road network and transmission lines are also threat to dispersal.

5. **Lack of data base-** Above all, the lack of database of dispersal of wild life is another problem in implementing any management strategy.

6.4.2 Constraints/ problems in achieving objective no.2

1. **Lack of socio-economic database** - Only a very few studies have so far scientifically dealt with assessing the socio-economic status of adjoining villages. Not much information has been documented so as to formulate an effective eco-development plan.
2. **Low priority to eco-development** - Not much work has been done earlier for the eco-development.
3. **Poor integration with other departments-** Poor integration with other departments results in poor developmental activities .
4. **Lack of infrastructure and trained staff:-** The staff especially, at the lower level, lacks in proper training regarding eco development and lack of infrastructural facilities adds more problems to it.

6.4.3 Constraints/ problems in achieving objective no.3

1. **Absence of base line data** – The base line data about the different factors affecting the water sheds like silting, soil erosion, surface runoff; chemical characteristics of water, etc. is not available till date. These data are very crucial to monitor the ecosystem functions and conserve the watersheds.
2. **Fire** –The man made fires by grazers, poachers, NTFP collectors etc. is a problem for maintaining the watershed capacity.
3. **Activities in the private lands** – Clearing of lands, use of pesticides etc. by the estate management and rich farmers reduce the quality of the ecosystem services.
4. **Potential threat- Illegal activities** – Different illegal activities like lopping & felling, NTFP & fire wood collection, livestock grazing, etc are affecting the ecosystem functions and creating major threats towards the conservation of inviolate areas.

6.4.4 Constraints/ problems in achieving objective no.4

1. **More and more emphasis on conservation values** – Now a days more and more emphasis is given on conservation values that are impediment to fulfill the needs of this objective.
2. **Lack of database** – the knowledge regarding the actual extraction capacity without disturbing the conservation values is lacking. This is also hampering the implementation strategies of this objective.
3. **Market** – Though the market for cash crop is still very good but ups & downs in the market is a global phenomenon and problem for management.

6.4.5 Constraints/ problems in achieving objective no.5

1. **Tourism for jungle safari** – Maximum number of tourists come for jungle safari. At present, no nature interpretation and education service is available. So presently there is very little scope for going for extensive nature education for tourists.
2. **No alternative developed tourism sites** – There are a few fixed tourism points viz. Bala Quila, Jamuwaramgarh etc. No other such places have been developed in buffer area till date. So, all the pressure is coming only on core zone. So, development of alternative sites Bala Quila and Jamuwaramgarh is needed, in future, to reduce the pressure on core.
3. **Multi-agency working** –Two different organizations are working in the buffer of STR for tourism viz. STR management & RTDC. This also creates problem for arranging a common interpretation program for all the tourists.
4. **Condition of existing signages** – Very few signages exist in the buffer area. The existing signages are not sufficient for new generation interpretation. There is strong need of signage's in buffer area.

6.4.6 Constraints/ problems in achieving objective no.6

1. **Lack of coordination between religious trusts and forest department** – Different problems are there during the days of festivals. Lack of coordination between the religious trusts (Karnimata, Hanuman temple etc) and forest department is there in the matters of solid waste disposal, visiting facilities of the pilgrims and other environmental pollutions.
2. **Large number of pilgrims over a short period** – Around one lac of pilgrims visit the Karnimata temple every year in Navratras. This leads to pollution in the form of solid waste, water pollution, cutting of small timber etc.
3. **Lack of awareness among the pilgrims** – Lack of awareness among the pilgrims about the conservation issues and biodiversity values is another threat towards the management of the park, especially the inviolate areas.
4. **Lack of awareness campaigns** – Awareness campaigning organized by the forest department for the pilgrims to protect the sanctity of the inviolate areas is not sufficient and the interpretation & publicity activities are not effective towards the mass.

6.5 Strengths- Weaknesses – Opportunities- Limitations (SWOT) Analyses

6.5.1 Strengths

1. Along with the ecological buffer, it provides the most expected size and structure of buffer which covers the core from all sides and protects it by reducing the biotic pressures.
2. Unlike the other PAs of the country, it is having less urban pressure as well as less traditional resource dependency.
3. The buffer provides connectivity towards north and south west. This will help in dispersal and genetic exchange of the animals.
4. The area is also rich in biodiversity that alone has a capacity to be a good wild life reserve.
5. The extent of man wildlife conflict is less.

6.5.2 Weaknesses

1. There is very less baseline data available regarding the buffer zone. Documentation of the values of this area has not been done so far; thus it is difficult to implement any management strategy.
2. There are 51 villages inside the buffer of STR. These rural people mostly depend on their livestock and fire wood collection. Their activities are constantly posing threat to the habitat.
3. There is no or very less participatory initiative and institutions (EDC) in the north and southwestern part of the buffer.
4. Existing protection strategy is not sufficient for proper vigilance of the buffer area.

6.5.3 Opportunities

1. There is a very good opportunity for demonstrating the good landscape level planning.
2. There is a great opportunity for research regarding dispersal of wild animals, use of corridors, human animal coexistence etc.
3. There is a great opportunity to attract funds from National and international level for developmental activities.

6.5.4 Limitations (Threats)

1. There is increasing threat of pollution due to excessive pilgrimage pressure and solid waste disposal.
2. There is a possible threat in the form of resource extraction. The resource extraction may increase manifold due to high demand and population explosion.
3. Increasing Man-animal conflict is another threat to this area
4. There is a constant threat from national and international illegal wildlife trade rackets as they can target this area if proper vigil is not kept.
5. The absence of uniform buffer around CTH in Sariska due to non availability of suitable areas has manifold increased the challenge. To maintain integrity of core critical tiger habitat where CTH is directly exposed will be difficult and managed by adopting suitable mitigating measures in peripheral areas along with declaration of ecosensitive zones.

Chapter – 7

Management Strategies

7.1 Delineation of Buffer areas

In terms of tiger land tenure dynamics (Jhala *et al.*, 2007), minimum population of tigers in breeding age needed to maintain a viable population of 80-100 tigers require an inviolate space of 800-1000 square kilometers, against which core of 881 sq km has been declared as core area in Sariska Tiger Reserve. Atleast an equal buffer area needs to be delineated but due to non availability of suitable areas only patchy buffer has been declared over an area of 322.23 sq km.

The buffer zone of a Tiger Reserve has twin functions, viz.:

- i) To provide habitat supplement to the spill over population of wild animals from the core area, conserved with the active cooperation of stakeholder Communities, and
- ii) Providing site specific, need based, participatory eco-development inputs to local stake holders for reducing their resource dependency on the core zone and for eliciting their support towards conservation initiatives in the area.

Therefore, both the buffer zone and the multiple use area, if any, surrounding the buffer, should be subjected to conservation oriented community program as a part of eco-development, taking care not to distort the village dynamics in an artificial manner resulting in the entry of market economy, which may make the whole exercise counter-productive.

Guidelines for the management of buffer Zone

1. The Tiger Conservation Plan should have a separate section for buffer zone highlighting the strategy for eco development in the impact area. The village level micro plans would form part of buffer.

(A) Communities living in the buffer zone,(having the status of Sanctuary,Reserve forest,Protected forest or revenue land) should be involved in the management of Tiger Reserves with reciprocal commitment as a part of overall conservation strategy. The reciprocity would decide in the mutual *quid pro quo* of

(i) Fostering site-specific eco-development initiatives based on participatory micro-level village plans to provide alternative resources to people apart from livelihoods. The eco-development inputs, interalia, may include biomass substitution (eg. alternative fuels), biomass generation and forestry, eco-tourism, agriculture, watershed management, small irrigation, local livestock improvement, agro processing, artisan and any other site specific item as desired by the people, not having a deleterious effect on buffer area resources.

(ii) Reciprocation by the local people through specific measurable actions as per a MOU for improving protection and conservation, which interalia, may include curtailment of illicit grazing, reducing fuel wood and small timber collection from buffer areas, increasing participation in fire protection and anti-poaching efforts.

(B) Community involvement in the management of buffer zone, should be promoted as provided in sections 33B, 36B and 36D of the Wildlife (Protection) Act, 1972.

2. No intensive form of land use like mining, quarrying and the like should be fostered in the buffer zone, and due care should be exercised while granting NOC to such activities in private/revenue areas, if any, included in the buffer area.

3. No 'clear felling' should be allowed in the forest areas of the buffer area . Such areas should be managed by specially formulated, site specific 'forest plans' forming part of village level micro plans and should be executed with the active involvement of local communities. Only 'selection-cum improvement fellings' should be done with the main objective of sustaining the demands of people living in the area.

4. Ecotourism activities in the buffer zone areas should be fostered as a component of eco-development with the active involvement of stakeholder communities.

5. Capacity Building of field staff as well as Eco-Development Committee members should be undertaken on a regular basis.

Management of buffer area plays an important role in the conservation of any Tiger reserve. Major functions of the Buffer area are;

1. To provide habitat supplement to the spill over population of Tigers and its prey from the Core Area, conserved with the active cooperation of stakeholder communities.
2. To provide site specific, need based, participatory eco-development inputs to local stakeholders for rationalizing their resource dependency on the Tiger Reserve and strengthen their livelihoods, so as to elicit their support for conservation of the area.
3. Mainstreaming wildlife concerns in various production sectors in the area.

MANAGEMENT OF BUFFER

Management of the buffer area will be carried out on following general principles:

1. Co-occurrence agenda(Wildlife and People)
2. A 'no go area' for industrial development .Retrofitting safeguards to be taken up for existing infrastructures.
3. The wildlife status of should not be elevated to that of core and managerial interventions should be restricted to allow tiger /wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
4. Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
5. Using the impact of natural/managerial interventions in the core area as a guide for dealing with forestry practices and wildlife management in buffer..
6. Identifying zones of influence vis-à-vis the various land uses operating in the area.
7. Overreaching focus on habitat restoration /productivity, reduction of forest resource dependency ,providing ecologically sustainable livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive forms of land uses like mining or heavily used infrastructure and actively addressing human wildlife interface. In case such land uses are present or permitted appropriate mitigation

measures need to be enforced so as not to compromise on the conservation objective of the buffer.

8. Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much needed public support. A sizable portion of tourism gate receipts should be recycled and earmarked to development committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

SCOPE OF MANAGERIAL INTERVENTIONS

1. Providing ecologically sustainable livelihood options to local people in collaboration with various sectors / organizations.
2. Incentivizing local people for protecting forests and wildlife (PES, Ecotourism)
3. Ensuring retrofitting measures in sectors of development with reciprocal commitments.
4. Ensuring active management in areas where tiger / Co predators / wild ungulates co-occur with people to minimize human wildlife interface conflicts.
5. Ensuring monitoring of tiger / wildlife on a periodic basis in standardized manner, amenable to scientific inference.
6. Ensuring surveillance and protection of tiger and wildlife.
7. Building up the capacity of field staff and local people as part of an adaptive management to ensure effective implementation.
8. In case the buffer comprises of protected area then managerial interventions should be in conformity with the provisions of wildlife (protection) Act, 1972.

Declaring buffer area of Sariska Tiger Reserve

A meeting was held under chairmanship of PCCF & CWLW, Raj. Jaipur on 07.04.10 in Jaipur for identification of buffer zones around critical Tiger habitat around Sariska Tiger Reserve. Proposals were discussed and

following action points were communicated to Field Director, Sariska Tiger Reserve vide letter no 1179-80 dated 11-5-2010;

1. Forest land may identify in the first phase for buffer zones. All relevant records may be collected for such forest lands.
2. Revenue/Waste land situated near these forest lands may also be identified which are suitable and fulfill to criteria to be declared as buffer zones.
3. Such areas are determined on the basis of scientific and objective criteria in consultation with concerned Gram Sabha and an Expert Committee constituted for the purpose.

A meeting was held on 26-07-2010 under the chairmanship of Principal Secretary Forests, Rajasthan to finalize buffer areas for Sariska Tiger Reserve in which decision was taken to include 6356.00 Ha. Forest land of Digota RF, Jamuwaramgarh wildlife sanctuary and meeting minutes were circulated vide government letter no P 1(16) /forest/2000 dated 06-08-2000.

For identification of buffer areas in Sariska Tiger Reserve, an Expert Committee was constituted by government of Rajasthan vide letter no F 3 (34)Forest/07 dated 30-9-2010 under the chairmanship of PCCF & CWLW , Rajasthan with following members:-

1. Rajpal Singh, Member State Wildlife Board.
2. Deputy Conservator of Forests & Deputy Field Director, Sariska Tiger Reserve.

After series of meeting of Expert Committee and field visit of proposed areas to be included in buffer of Sariska Tiger Reserve, Expert Committee decided following criterias for areas to be included in buffer of Sariska Tiger Reserve:

1. Forest areas adjoining the Critical Tiger Habitat of Sariska Tiger Reserve which are important habitat for Tiger and other wildlife and which will help in reducing biotic pressure on Critical Tiger Habitat will be included in buffer.

2. Parts of Critical Tiger Habitat which are not attach to the main land will be joined by including revenue area situated in between such areas as buffer to maintain continuity of wildlife habitat.

3. Conservation of buffer area will be done with the active support of local communities to protect Tiger and its habitat.

4. After consultation with local people and with their active cooperation alternate livelihood activities would be taken up to reduce pressure on forest areas, so that the eco-system will be sustainable. In buffer areas the wildlife tourism activities will be mainstreamed into production sector.

Consultation was made with Gram Sabhas whose land was being included in the buffer of Sariska Tiger Reserve, For this request letter was sent DCF, Sariska to discuss inclusion of areas in buffer to Gram Panchayats.

The buffer area of STR has been declared keeping following set of considerations:

1. Forest areas adjoining the Critical Tiger Habitat of Sariska Tiger Reserve which are important habitat for Tiger and other wildlife and which will help in reducing biotic pressure on Critical Tiger Habitat will be included in buffer.

2. Parts of Critical Tiger Habitat which are not attach to the main land will be joined by including revenue area situated in between such areas as buffer to maintain continuity of wildlife habitat.

With the perspective of creating an enabling atmosphere and to work out a strategy to improve Park-People Interface, Revenue lands and villages in the buffer area has been included for the Eco-Development measures for which consultation of Gram Sabha as per the Wildlife (Protection) Act, 1972 amended up to 2006, has been taken before final notification of Buffer area.

7.2 Zone and Theme Approaches to Management Strategies

Wildlife management strategies

- Buffer areas require a 'course filter' approach for maintaining a variety of plant and animal species.
- Day to day monitoring

- Habitat amelioration.
- Fostering indigenous fodder and fruit species.
- Maintaining existing water points.
- No drastic habitat interventions
- .Cropping pattern / harvesting to factor in cover values.
- Inherent /induced diversity indices need to be computed for maintaining the edges.
- Human – wildlife interface issues to be addressed.
- Treatment for riparian zones/unique features.
- Retention of dead trees, snags.
- Restoration/protection of existing corridors.

The Scope of Managerial interventions will be as follows:-

- i) Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.
- ii) Incentivizing local people for protecting forests and wildlife (PES, Eco-tourism)
- iii) Ensuring retrofitting measures in sectors of development with reciprocal commitments.
- iv) Ensuring active management in areas where tiger/ Co predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.
- v) Ensuring monitoring of tiger/wildlife on periodic basis in standardized manner, amenable to scientific inference.
- vi) Ensuring surveillance and protection of tiger and wildlife.
- vii) Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.
- viii) In case the buffer comprises of protected area then managerial interventions should be in conformity with the provisions of the Wildlife (Protection) Act, 1972.

7.2.1 Zone Plans

The following zone plans are proposed for buffer of STR.

1. Zone Plan for Eco-Development
2. Zone Plan for Forestry
3. Zone Plan for safeguards/retrofitting measures
4. Zone Plan for tourism
5. Zone Plan for reclamation of mined areas

These zones are overlapping and segregation has been described only for management purposes.

7.2.1.1 Zone Plan for Eco-Development

Sariska Tiger Reserve has many peripheral villages on all sides. The problems of these peripheral villages need to be addressed properly. The management practices in the past attempted to keep the villagers away. The villagers residing in the vicinity have been dependent on this protected area. It has resulted in conflicts with the villagers. In response to biotic pressures on protected (core) area, a broad based strategy of eco-development has to be adopted. The eco-development has two main thrusts i.e. improvement of buffer management and involvement of local people in developmental activities so that the negative impact on the core could be reduced.

Eco-development activities to provide alternative fuel and fodder resource on the fringes of STR were executed. These also provided alternative livelihood opportunities for the local people. These schemes overlooked the participatory approach, which is fundamental philosophy of eco-development programme. At this juncture, we have to initiate the process of trust building and participation. These initiatives will generate initial trust of the local communities with the park management enhancing the understanding of the staff about the programme and generating base line information on the impact villages. The investments, so far, had been very low, sporadic & without proper micro planning. The real issues of management – conflict with people, could not be addressed.

An elaborate institutional mechanism for implementation of the eco-development programme in buffer areas of STR will be developed. This institution will ensure participation of different stake holders, quick decision making at park management & state level and will facilitate the implementation of eco-development programme at grass root level.

Whole of the buffer area will fall under Eco-development zone. As per section 18A (read with section 36A) of the Wildlife (Protection) Act, 1972, till the rights of affected persons are finally settled, the State Government should make alternative arrangement for making available fuel, fodder and other forest produce to affected persons in terms of their rights as per record.

The objectives will be:

- To improve fuel-fodder resource so that local demands can be met.
- To develop strategy based upon micro plans to meet the needs of local people.
- To motivate the local people to adopt such agricultural patterns and land use which are compatible for wild life.
- To promote district level welfare schemes in eco-development zone to benefit local people through ongoing welfare programme as well as special programme for their upliftment in various government scheme.
- To maintain natural demographic setup of the prey & predators.
- Spreading environmental education.

Strategies

The strategy of micro planning should be adopted at village level apart from: creation of EDCs with Panchayati Raj Institution representation, confederating such EDCs, ensuring benefits to local people for protecting forests on a quid-pro-quo-basis etc. The agricultural practices (if intense) require monitoring in the context of cropping pattern and ensuing change in cover values. Likewise, sale of agricultural land resulting change in land use pattern should also be monitored so that the

corridor values are not affected. Since livelihood is a big concern and dependency of local people on forests is considerable, the district level welfare schemes should be factored in the eco-development zone to benefit local people. Further, special programmes should be fostered through funding support from Finance Commission, State Plan, CAMPA etc., apart from Project Tiger.

The strategies can be summarized as follows:

- Village level micro planning for benefits to local people on quid-pro-quo-basis(involving EDC)
- Innovative use of Participatory Management/REDD+/recycling of tourism gate receipts to EDCs.
- Benefits from district level developmental works (convergence), interalia covering
 - (i) Public health and family welfare
 - (ii) Food and nutrition security
 - (iii) Education
 - (iv) Natural resource management and water security
 - (v) Roads
 - (vi) Energy
 - (vii) Housing and
 - (viii) Livelihoods

After identification of problems, specific strategies have been perceived which are as follows:

(i) Strategy to meet fuel wood Demand:

The strategy would be two fold:

- ❖ Immediate measures
- ❖ Long Term measures

Immediate Measures:

- a. Subsidized LPG distribution to the prioritized in buffer and other peripheral villages.
- b. Linkage with District agencies for ensuring better LPG supply by opening, LPG outlets at Andhi, Tehla, Bansoor and Pratapgarh.

Long Term measures:

- a. Creating fuel wood and fodder plantations on charagah/ community lands with consent of Gram Sabha on silvi-pastoral model.
- b. The degraded forestlands to be taken up by planting indigenous species for fuel wood plantations.

(ii) Strategy to reduce grazing pressure:

Since grazing is being practiced in the buffer areas, some steps for mitigating it are proposed subject to availability of land. Wastelands/ charagah . Grazing will be regulated in the buffer area. No grazing will be permitted in the reserve forest as these areas potential sites for breeding of tigers. For development of herbivores also some areas has to be made free from cattle grazing.

(iii) Strategy for improving Socio-economic conditions**(a) Improvement of Agricultural productivity:**

- ❖ The Government of Rajasthan has recently issued orders to provide electricity connections to villagers in the periphery on priority basis to utilize land for fodder development. This can also be utilized to improve the agricultural productivity.
- ❖ Funds can be used on watershed basis for improving the irrigation system by making dams and soil & moisture conservation works in the agriculture field.

(b) Integrated livestock development program for income enhancement of farmers

Increasing livestock population with increase in consumption of milk products has put a great stress on natural resources like water & vegetation. Because of low productivity of cattle, farmers always tend to rear livestock on zero cost or low cost basis by utilizing available pastures & forest areas at no cost. This situation can be avoided by increasing the productivity of livestock through technological inputs in livestock production sector. Breed improvement

techniques health care & training of farmers can help them a lot. Artificial insemination de-worming and immunization are important aspects of livestock development. Stall feeding of cattle will be promoted by breed improvement.

(c) Income Generating Activities

i) **Constitution of self help groups:** Self help groups will be constituted amongst the members of EDCs. Micro financing through self-help groups will help in upliftment of their economic status. Various handicraft works, candle making, agarbatti making etc. activities can be initiated through self-help groups.

ii) **Employment as travel/ tourist guides:**

It is mandatory for all the tourists to take a registered travel guide while visiting Sariska Tiger Reserve. The local unemployed youth of buffer area will be trained as wild life guides and will be registered with STR to go with the tourists. This will not only provide employment to these youths but will also inculcate inclination towards wild life conservation. These guides will also work as messengers amongst the rural mass & will act as connecting link between forest administration & villagers.

iii) **Tourism vehicles to EDC members**

The villages in the buffer areas will be prioritized for registering tourism vehicle to be utilized for tourism purpose and the benefit will flow to the villagers. This will spread a positive message for tiger conservation, the economic benefits are flowing to the people.

iv) **Use of Local work force/home guards in Protection and patrolling in buffer areas:** Local work force will be employed through EDCs. for protection purposes in the buffer area. This will not only provide employment for the local unemployed youth but will also spread the message of

benefits of forest & wild life conservation. Home guards locally recruited will be employed to assist local staff in forest and Wild life protection.

For eco development micro plan would be prepared for villages in and around buffer forest area. The Eco development committee will be formed/activated. Activities will be taken up in consultation with committee.

Livelihood support initiatives through village micro plans

a) Participatory micro planning and implementation processes:

Micro planning support teams composed of park personnel, collaborating NGOs and villagers (each team with at least one woman and with members able to easily communicate with village woman) would assist village communities to develop and implement site-specific reciprocal plan on a sustainable basis. Focused guidelines, clearly determined investment criteria, supportive training programs and carefully scheduled planning will be ensured to meet the objectives of eco-development and to embody the active commitment & participation of local people.

b) Methodology to be adopted for village eco-development

- i. Active participation of all segments of society in plan formulation and decision making through a community institutional frame work of village eco-development committees that elicits the widest possible consensus.
- ii. Participatory rural appraisal (PRA) focused on the mutual interactions and reciprocal arrangements between the management and people.

Integration of rural development programs

Various rural development programs are being implemented in the district under financial support of Govt. of India and with the plan funds of State of Rajasthan. Efforts will be made to channelize maximum funds towards the buffer area. National rural employment guarantee scheme is

an important scheme flowing maximum funds to the rural areas. Focus will be to propose more & more eco-development works in buffer area under this scheme. Funds available under other social welfare & employment generation schemes will also be utilized in buffer area at optimum level.

Monitoring and evaluation

Monitoring and evaluation are two indispensable arms, which support and strengthen any management. Developing & using information base is essential step in deciding management goals & objectives. It is expected that findings of a well organized, rigorous scientific monitoring will help park management in the following aspects:

- i) Status of implementation of scheme.
- ii) Quality of works executed.
- iii) Enhancement in benchmark knowledge.
- iv) Improve decision-making.
- v) Reduce overall management costs & enhance benefits.
- vi) Improve sustainability.
- vii) Increase public awareness & people's participation.

An analysis of reciprocal commitments and obligations will be done to evaluate the works. The success indicators have to be evaluated whether these are in accordance with those anticipated at the time of micro planning.

7.2.1.2 Zone Plan for Forestry

The objectives will be –

- All forestry operations will be done according to Working Plan/Tiger Conservation Plan.
- Eco system management required.
- Ecological availability of a tree should be ascertained before removal.
- A tree should be considered ecologically available if.
 - (a) Its removal does not create a gap beyond 43 to 45%.
 - (b) The regeneration of species at various formation levels within a radial distance of twice the crown radius of the tree being selected for felling should have an established status.

- Presently no felling or thinning are proposed to be done in buffer and activities which are compatible with the wild life management will be practiced in buffer areas.
- Plantation activities will be taken in buffer area under various government schemes and programme to meet out fuel & fodder requirement of local people.
- Only indigenous species would be taken for plantation.
- Carrying capacity is lower than the optimal level (CTH of Sariska) observed in buffer habitats.

An appraisal of forestry operations (covered by working plans) ongoing in the buffer areas has to be done for prescribing the degree of canopy opening (through felling/thinning), creation of plantations (requiring staggering to avoid undue edge effect), choice of species for plantation (only indigenous to be permitted), protection of special/unique habitats/riparian zones, regulation of NTFP collection (indicators to be prescribed using regeneration status of these species)]. The benefits of ongoing JFM activities need to be continued. Under the forestry zone plan, an overarching safeguard should be provided for tree fellings/ thinning under various systems of silviculture as indicated below:

Tree fellings / thinnings

- Clear felling and all silvicultural systems resulting in concentrated regeneration should not be allowed, since this would foster wild ungulates and increase human-wildlife interface problems.
- A high forest system with diffused regeneration (selection / group selection etc.) or assessor system (improvement felling etc.) should be allowed.
- The status of regeneration should be used as an overarching condition for permitting tree felling. An area with unestablished regeneration should not be permitted for felling.
- A relationship between canopy class and mean ungulate dung density should be worked out for areas subjected to different silvicultural operations.

- As a thumb rule, the buffer areas should be managed for wild ungulates at a level which is lower than the optimal level observed in such habitats (core area can be taken as a standard for reference).
- Thus the timber removal / thinning can be permitted in a selective manner so that the canopy cover does not fall below 40% in winter months (more canopy opening would result in more exposed areas which would foster/ lure wild ungulates). However, if the marking prescribed earlier for the area resulted in lesser canopy opening (less quantum of timber), then the same should be adopted.
- The timber exploitation activities in coups should be staggered in such to ensure minimum edge effect.
- The plantation activity should be staggered to safeguard from induced edge effect, especially near human settlements.
- Only species indigenous to the area should be taken up for plantation.

COLLECTION OF NTFP:

- Indicators for sustainable harvesting of NTFP (based on regeneration status of the species) should be prescribed.
- NTFP collection should not be permitted in areas with maximum disturbance and established regeneration status ,as this would adversely affect the demography of such species.
- The regeneration status of NTFP species in the buffer area should be compared with its status in the core.
- Collection should not be permitted in areas having endangered arboreal fauna.
- No lopping/felling should be permitted during NTFP collection.
- Collection should not disturb 'canopy bridges'in an area.
- The timings of NTFP collection should be regulated while avoiding early morning or late evening.
- The patterns of NTFP collection should be studied for prescribing ecologically permissible collection.
- The quantum of NTFP collected in the area should be regulated, considering its consumption by wild animals.
- An estimation of availability of NTFP should be done .

- Fire should not be used to new flush of leaves ,as this would lead to forest fire.
- Fruit removal affects frugivory ,hence fruit trees should be fostered.
- The density of NTFP species in the buffer area should be compared with their densities in the core .In low density areas such NTFP species should not be permitted for extraction.
- A chart depicting NTFPs collected in various areas within the buffer over months during a year should be prepared for close monitoring.
- Different parts of a tree /shrub/herb are harvested as NTFP and many of them are valuable in medicinal plants. To avoid overexploitation ,it is important to prescribe site specific indicators for their ecologically sustainable management, vis-a –vis the regeneration status.
- The nursery technique of NTFP species should be fostered through the community linked to incentives for growing species.
- Regulation through PES (Payement for Ecosystem Services)

COLLECTION OF NTFP-Indicators to avoid over exploitation

NTFP Part harvested	Indicators
Fuelwood	<ul style="list-style-type: none"> • Regeneration status • Intensity of girdling / fallen twig branches on forest floor • Change in the rate of extraction • Quantum of dead/fallen twig branches on forest floor.
Leaves	<ul style="list-style-type: none"> • Girdling • Tree mortality • Regeneration status • Number of dead stumps per unit area
Fruit/flower/seed	<ul style="list-style-type: none"> • Regeneration status • Annual productivity per sample tree as compared to CTH • Method of harvesting
Bark	<ul style="list-style-type: none"> • Girdling • Tree mortality • Regeneration status • Number of dead stems per unit area.
Rhizome	<ul style="list-style-type: none"> • Regeneration status

FUEL /FODDER COLLECTION

- Grazing should be regulated in a rotational manner and prophylactic immunization should be done for village livestock.

- Since the unrecorded removal from forest exceeds the recorded removal .Fuel/fodder collection should not be permitted in disturbed areas with poor regeneration status .Such areas should be prescribed a 'recovery 'period before opening them for fuel/fodder collection.
- A safe lopping index based on site specific studies should be prescribed for fodder removal on rotational basis.

In buffer areas the degraded habitats will be improved by afforestation and eco restoration works. Some of the forest areas in Digota, Bigota and Balquila forest areas are degraded. These areas would be taken up for construction of pucca wall would be taken up to improve habitat.

In revenue buffer areas agro forestry and horticulture will be taken up to ensure better fuel and fodder supply and also make available better economic options for local people.

7.2.1.3 Zone Plan for safeguards/retrofitting measures

This should include safeguards / patrolling in : existing highways, area with high tension cables, and related infrastructure. An MOU with concerned sectors should be executed for factoring in the concerns of tiger and other wild animals to ensure their movement and safety.

Road network/Transmission lines

Measure will be taken up along with line deptt vis PWD, Electricity Board etc to safeguards the interest of wild animals as follows:-

- Along national/state highways speed backers would be provided at regular interval to avoid any road accident of wild animals.
- Proper signages along national/state highways would be placed so as to make the people aware about presence of wild life along the roads so as to limit the speed of their vehicles.
- Proper measures will be taken up to avoid any mishap/accident on account of transmission line passing through the area.
- Suitable plan in the regard will be prepared and implemented in a phased manner.

Silised lake

A Rajasthan tourism development corporation hotel is existing at Silised will continue but following precautions will be ensured ;

- No tourist should move away in buffer without permit and disturb wildlife habitat.
- Proper disposal of sewage,garbage and poletene should be ensured.In no case contaminated water to be released in lake.
- Norms for sound and air pollution to be strictly followed.

Silised lake water sports activities

The water sports activities are being carried out by agency through RTDC as part of tourism promotion activity.Presently apart from boating activities like skiing,rafting etc are being taken up in silised lake.As the Silised lake issituated in buffer area of STR,tourism activities should be regulated through tiger reserve management. Appropriate entry fee to be prescribed by local area committee/STCF so that revenue generated is ploughed back for tiger reserve development and welfare of local people. Following safeguards are to be implemented;

- Water activities only to be carried from sunrise to sunset.
- No waste affluent,garbage to be thrown in water.
- SOP for safety of tourist be prepared and strictly followed.
- Local people to be given maximum employment opportunity.

Balaquila

The palace is property of forest department and is part of buffer.It has been renovated by state archeology department.The palace is ideal site for musaeum cum interpretation center.The moughal styled building with carved arches and cenotops further add to the beauty.The breathtaking panoramic view of Alwar city and surrounding hills attracts anyone to this palace. The tiger reserve management should develop this as world class center of excellancy.

All historical places including fort rampart walls, buildings, step wells etc to be maintained without destroying originality. For this services of experts can be taken. These structures should be well protected from

damaging elements. These structures can be used for tourism activities in which local people to be given employment opportunity.

Temples

In buffer area temples like Karnimata, Balaquila are situated where annual fair is organized every year .A SOP should be prepared for handling crowd and avoid untoward incident.No littering of habitat and strict adherence of pollution norms to be ensured through district administration.Their are many other temples in buffer.No further expansion in temples situated in forest areas should be permitted.No garbage,polythene be allowed to thrown in tiger habitat and mechanism for safe disposal to be ensured.

Wildlife injuring fences

In the revenue buffer people are using barbed wire fence for crop protection and other security reasons.These barbed wire fences cause serious injuries to wildlife. Some people put glass pieces on top of masonry wall which cause damage to Langurs,birds and other small animals Some of the people put modern coiled iron fences in which wildlife gets stranded and die.

The people living in buffer will be educated for danger to wildlife from such fences.The already existing damaging fences will be appropriately modified for safety of wildlife.

7.2.1.4 Zone Plan for Eco-tourism

In STR, tourism is restricted to the core zone only because no other site has been developed to attract the tourists. The development of Eco-tourism in buffer area will not only reduce the pressure of tourists over the core area but will also earn sizable foreign exchange together with employment generation largely around forest areas benefiting rural population around Sariska Tiger Reserve. Zone Plan for Eco-tourism will include areas having tourism infrastructure/ tourism regulation as per the NTCA guidelines.

Eco-tourism strategy:

- i. Earmarking the trekking, camping and safari routes at Bala Quila and Jamuwaramgarh.
- ii. Developing ecotourism activities at Silised lake including water sports.
- iii. Developing historical sites at Bala Quila.
- iv. Developing Tiger Safari Park and Rescue Centre in Bala Quila area.
- v. Entry Fees for Buffer areas for safari and boating etc to be decided by local area committee
- vi. Training of local guides to take the tourists on to the safari trips.
- vii. Fixing of proper signages & hoardings at important places showing the historical sites, important flora & fauna and camping / trekking facilities.
- viii. Publicity through colorful, informative brochures/ folders and audio-visual programmes.

Sariska Tiger Conservation Foundation and Eco-tourism Programs

Sariska Tiger conservation foundation has been constituted by Govt. of Rajasthan vide order no. F3 (21) forest/2005 dated 11 January 2010, details of which have already been mentioned in Tiger Conservation Plan for core area of STR. The main objects of this foundation are:

- a) To facilitate ecological, economic, social & cultural development in and around the Sariska Tiger Reserve so as to promote sustainability of the tiger conservation programs.
- b) To provide support to protect the natural environment in the tiger reserve and relevant places.
- c) To facilitate the creation of and/ or maintenance of, such assets as deemed necessary for fulfilling these objects.
- d) To solicit technical, financial, social and other support required from different sources permitted by law for the activities of the foundation for achieving these objectives.

- e) To support eco-tourism, eco-development, research, environmental education, training, management and advisory aspects in the above and related fields to support the implementing agency, and
- f) Anything incidental or ancillary to the above for furthering the above said objects.

Sariska Tiger Reserve is fortunate to have richness of natural beauty, flora and fauna accompanied with places of religious, historical and archeological importance so is its buffer area. The development of Eco-tourism will not only enhance the tourist arrivals in the district but will also earn sizable foreign exchange together with employment generation largely in and around forest areas benefiting rural population living in buffer area around STR. It is a mode of eco-development that represents a practical and effective mean for attaining social and economic improvement. On careful promotion, eco-tourism can help strengthening economic growth of local people besides earning valuable foreign exchange for the state and the country as a whole. This will include:

- i) Development of trekking routes in tracts that have potential for eco-tourism.
- ii) Obligatory use of local guides (after training) on nature trails, trekking and mountaineering routes.
- iii) Preferential and assisted allocation of wayside lodges on long trekking routes to locals.
- iv) Preferential employment to locals in protected areas and tourism facilities, after proper education and training.
- v) Promotion of local handy-crafts as tourist souvenirs with appropriate sale outlets.

Engagement of local community in all types of eco-tourism activities can only ensure the sustainability of the process. Work of Nature guide, information desk representative and entrepreneur at the eco tourism shops will be a good livelihood option for the local community.

Eco-tourism guidelines

Eco-tourism will be based on following guidelines:

- i) Facilitating wild life eco-tourism involving local host communities.
- ii) Facilitating wild life tourism on private lands in the vicinity as per the normative guidelines.
- iii) Obtaining contributions from private commercial tour operators and lodge owners for local community development.
- iv) Obtaining contributions from tour operators for maintaining tourist facilities and staff welfare.

Eco tourism objectives-

- i) Help visitors to minimize their negative impacts on the environment by enhancing their understanding of the fragility of the environment. This will be supported by offering literature, briefings, leading by examples and taking corrective actions.
- ii) Prevent both accidental and purposeful action by tourists that cause damage to environment, such as crowding, harassment of endangered species, trampling, off-road driving and improper disposal of waste.
- iii) Ensure that tourism revenue covers the cost of management of tourism on wild lands and protected areas.

New untouched eco-tourism sites will be searched. Ban on use of plastics at eco-tourism sites will be imposed. There will be strict code of conduct for the visitors. Severe punishments will be awarded for persons violating the rules.

Nature Education

It is very essential to have a proper extension network to promote education and awareness towards wild life protection and conservation at Sariska Tiger Reserve. Following specific activities will be undertaken for this purpose.

- i) Extension unit will prepare, develop and disseminate publications, pamphlets, posters & other relevant publicity material. A library will also be set up.

- ii) Film/Video shows, puppet shows, 'chaupals', exhibitions etc for both rural and urban populace will be organized. Schools & other educational institutions will also be associated.
- iii) Experience sharing workshops and exchange visits will be organized and bidirectional feed back will be obtained.
- iv) To achieve maximum publicity, mass media will be utilized. TV programmes, radio talks, press releases etc will be organized.

Environmental awareness camps will be organized for nature education to students.

Development of Eco tourism in buffer-

(i) Development of Eco tourism

The Balaquila, 1200 year old fort situated on top of hill overlooking city of Alwar like crown on the cityhead. The first Mughal Emperor Babar, had stayed here for few days & took away huge wealth from here. During reign of Akbar the Great, his rebellious son Salim who was later Emperor Jahangir was exiled for three years in this fort. The meandering approach passing through sprawling vegetative cover & series of historical entry gates and monuments gives unique experience to a visitor. The water harvesting through diversion channels and huge storage tanks built on hillock top finally draining into the 'Sagar' a huge water storage tank is worth seeing. The presence of Leopard, Sambhar, Jungle cat, variety of birds and reptiles further add to its biodiversity.

In city of Alwar, many unique heritage and architectural monuments like the City Palace, the Sagar, Moosi Rani Ki Chatri, Fateh Gumbaj, Purjan Vihar and Vijay Mandir are great attraction. Alwar museum which has a unique collection of marvellous paintings of Rajput and Mughal schools, armoury including various kinds of Shields, swords, daggers, rifles, pistols etc. It also has a unique collection of bidri work, lacquered and ivory works, musical instruments, archeological finds, sculptures and inscription of ancient times.

Activities

During state times Water Conservation in Bala Quila was amazing. Every drop of water was preserved and taken into same or other reservoir through canal system. The series of stepwells and kunds were constructed to harvest water. The Pratap Bandh and Jatal Band were constructed to store water of Bala Quila area. The Kishan Pol Kund ,Matia Kund and Sagar were constructed to store huge amount of water in Bala Quila region. The water conservation practices adopted in past to store water in Bala Quila area would be shown to tourists as heritage.

The Andheri-Jaivillas area would be developed into mini sanctuary where from the regulatory gate at Chakardhari Hanuman mandir entry of gypsy or other light vehicle would be permitted along with Nature Guide to visit forest area. For this track from Jaivillas to Jaital Bandh length 3 kms, Jaivillas to Suraj Pol 3 kms and Jaivillas to Matia kund-2 kms would be constructed for Safari trip. The tourist vehicles will be permitted as per carrying capacity of the area.

The movements, walls, kheranja would be repaired and renovated. The kharenga would be repaired for using as walking trail for tourists.

A heritage walking trail on Ramparts of Bala Quila wall from Hawa Mahal Burj-Laxman Pol-Nangoza burj-Chand Pol Jaipol for a length of about 5 kms would be designed with appropriate signage and sitting places, which will be unique of its kind.

The Bala Quila Palace which is under renovation by state Archeological department is property of forest department. The palace after renovation would be developed in at heritage museum cum wildlife Interpretation centre. It will be a major attraction for tourists.

Proper Parking arrangements at Pratap Band and Bala Quila Tiraha would be made. Way side signage would be put at appropriate places along with dustbins. Special care would be taken to keep whole area free from garbage.

Local nature guides would be recruited and trained for interpretation of Wildlife and heritage sites. This will ensure involvement of local people and

job opportunities for them. The vehicles of local people would also be registered for safari drive. The management of tourism would be done by Sariska Tiger Conservation Foundation.

Tiger Safari and Rescue Centre

A Tiger Safari and Rescue centre will be an ecological tourism place of international caliber. It will be place for showcasing, archives, study and preservation of India's valuable and rare animals and plants. The tiger safari will be play an important role in promoting the development of local and regional tourism activities. This area is to display animals in close proximity for visitors to watch, create nice surprise then help to impress visitors by their beauty and friendliness which make people love them.

The scheme will cater regional operational frameworks, comprehension in architectural planning, construction technique and infra structural system by suitable economic technical standards and satisfaction to the highest requirement of special utilization for each function of recreation, safari area, sightseeing and services.

Tiger Safari Park and Rescue Centre will be in form of enclosure area. Tiger Safari Park area ideal place to foster compassion for wild animals and raise awareness and understand conservation. Keeping in mind the pressure of tourism in the coming future in Sariska, establishing a safari park where tourists can feel the forest and see the tiger and other wildlife in as natural habitat.

Rescue and veterinary Centre: This safari park section can provide home to the problematic. Injured and aged animals of Sariska Tiger Reserve and other adjoining areas.

Rescue and veterinary centre

Two Rescue and Rehabilitation centre for tiger would be constructed. It is aimed to rescue those animals, who have suffered at the hands of human, rehabilitating and releasing them where possible, and caring for those who are unable to be returned to the wild. It is aimed to provide the best standard of living and a life as close to wild as possible for these animals.

The rescue centre will have 2 enclosures and 2 night time animals rest shades. The rescue centre would have injured animals and it is very important to have a good state of art veterinary unit in it. This should have air conditioning and equipments required for treating animals. Presently Tiger Reserve Sariska has no veterinary unit for wildlife rescue and treatment. Sariska has a lot of human pressure and many times wild animals have got injured due to various reasons, a veterinary unit will save precious wildlife including the tigers .

Interpretation and Conservation Education Centre

The Bala Quila palace which has been renovated by State Archeological Department will be used as Museum cum Nature Interpretation Centre. The centre will have a display hall and slide show presentation space. The modern interpretation centre will be equipped with 'stat-of-art audio visual facilities. It will have interactive three dimensional models of bio-diversity of the Sariska Tiger Reserve.

In the audio visual section one can come across different and interesting bio-acoustics and feel the sound of forest and wildlife. This will be a good medium for students to understand biodiversity and expand their understanding about wildlife. A big auditorium is planned where the flora, fauna, including birds, spiders, and insects will be digitally displayed and these can be easily changes. They can be thematic depending on the months, species and the climate. The Villagers can also be connected through these, also it will be a good medium to get together villagers and decrease the distance of wildlife and local community.

Birding trails

An entire pathway will be developed in Bala Quila forest area and ramparts of fort wall would be used as birding trails. The local villagers will be trained along with this so that they can turn into good birding /Naturalist guides & are participant in this activity. There is no need to do anything extra in terms of creating space or having extra infrastructure. Initially 10 persons will be given the guide training and they will be provided with binoculars and reading material in local language. A gate needs to be

constructed at Bala Quila entrance, from where entry of tourist will be regulated.

(ii) Developing Tourism Routes in Buffer forest area

Safari routes are proposed to be developed in Digota and, Bigota forest area which fall in Buffer area of Sariska Tiger Reserve. The local EDC would be made responsible for the management of the eco tourism sites. The forest roads would be maintained in such a way that tourists are able to view variety of wildlife. Local people will be trained as nature guides. In Digota the existing Digota top watch tower overlooking Bhangarh and historical shikarburj at Bassi will be renovated for visitor facility. The existing mined areas can also be reclaimed into tourist destination after suitable interventions. The mining pits which remain full of water can be converted into tourist attraction. Tourist vehicles will be allowed as per carrying capacity of the area.

7.2.1.5 Zone Plan for Mining Areas

All the mining areas should be covered under this zone plan. There are 68 mines reportedly operating within 1 km. of Sariska boundary on non-forest land. The factual status needs to be reviewed with the State Mining Department for closure of all such mines in the interest of tiger conservation. Livelihood options for local people involved in the same needs to be provided in the buffer part of the Tiger Conservation Plan. A recovery plan for mined areas, besides fostering good practices, timing of activities, ancillary development etc. should be prepared under this zone plan to ensure regulation.

Mitigation strategy for mining should have two components:

- (i)** Improved/green technology and minimum ancillary development causing minimum habitat loss.
- (ii)** Inputs for providing ecologically sustainable livelihood options to locals, beside offside 'offsets' to achieve tiger conservation. This should include onsite modification of the mined area to the original form of restoration of topsoil with indigenous ground cover or through creation of water body /wetland. Providing livelihood options within zone of influence.

Sariska Tiger Reserve buffer area of Jamuaramgarh wildlife sanctuary is surrounded by mining areas comprising of mainly of marble mining. No mining activity is permitted inside the buffer area .

Minining leases were closed due to Hon'ble Supreme court's order in 1996. These mines are spread in an area of 500 hectares making habitat unfit for wildlife. The mining pits, mining overburden dumps, scattered rubbish make it very difficult to revive habitat. The only advantage has been the availability of water, as now water is available in these mining pits through out the year. During last 27 years after closure of these mines where ever soil was available on dumps thick growth of Prosopis juliflora.

This mining affected areas after suitable interventions can be developed into eco tourism sites. The area can once again become home of wildlife once it is protected and developed.

This forest area in Sankotara forest area needs to be reclaimed . These wildlife areas needs to be reclaimed. The mining pits will be made safe for wildlife. The dumps would be treated by putting soil cover and sowing suitable indigenous species. Restoration of the non-operational existing mine areas would be done as earlier as possible. A recovery strategy in this regard would be formulated so as to recover these areas as wildlife habitats and tourism destination.

7.2.2 Theme Plans

Management strategies, sometimes, cannot be confined to a particular zone & these cut across two or more zones.

Various theme plans, which have been, conceived for the buffer zone of STR are as follows:

1. Theme plan for addressing human-wildlife interface
2. Theme plan for protection
3. Theme Plan for wildlife monitoring
4. Theme Plan for habitat restoration
5. Theme plan for staff development and capacity improvement
- 6 Theme plan for retrofitting measures

7.2.2.1 Theme plan for addressing human-wildlife interface

Human wildlife interface is one of the priority area of buffer management. This will be achieved through strategy mentioned in Theme Plan for Protection (Security Plan) given in Theme Plans in Chapter 7 [7.2.2.1 (ix)] of Core area TCP.

7.2.2.2 Theme Plan for Protection

Protection is the most priority area of buffer management. Protection will be mainly achieved through protection strategy mentioned in Theme Plan for Protection (Security Plan) given in Theme Plans in Chapter 7 of Core area TCP.

Anti poaching camps

Anti poaching camps will be set up at strategic places in areas which are prone to poaching. The camps would be set up at;

1. Digota
2. Sankotra
3. Sirawas
4. Kundla
5. Balaquila

Fire Protection

Fire Protection will be achieved through protection strategy mentioned in Theme Plan for Protection (Security Plan) given in Theme Plans in Chapter 7 [7.2.2.1(iii)] of Core area TCP.

7.2.2.3 Theme Plan for wildlife Monitoring

Wildlife Monitoring of Buffer area will be achieved through strategy mentioned in Chapter 9 of Core area TCP.

7.2.2.5 Theme Plan for re-organization/staff development

Re-organization/staff development of Buffer area will be achieved through strategy mentioned in Chapter 11 of Core area TCP.

7.2.2.6 Theme plan for retrofitting measures

Appropriate measures will be taken up to minimize negative impact of human developmental impacts like existing dam, roads, buildings, hotel, transmission lines etc which adversely affect wildlife habitat.

Mitigation strategy for linear infrastructure like roads, transmission lines, irrigation canals etc. would be as follows;

- Creation of overpasses/under passes on roads/highways.
- Speed regulation and closure of traffic on roads passing through buffer.
- Insulation, surveillance MOU with electricity department for transmission lines.
- Ensuring special patrolling, under ground cabling and adequate height of transmission lines.
- Irrigation canals should be covered if canal is more than 2mts deep and bridges a suitable places should be made for crossing of wild animals.

ROADS

In notified buffer metal roads exists Alwar-Balaquila, Alwar-Nidani, Kishanpur – Dehlawas - Sirawas, Sankotada – Natata - Pratapgarh, (Kalitpuri) Raiwala - Rasawala etc which needs to be regulated. At every 500 mt speed breaker should be constructed and widening of existing road should not be done. The Raiwala (Kalitpuri)- Digota-Bassi-Birkadi mooram road should not be allowed to be black topped and maintained as forest road.

HOTEL

The Ajabgarh hotel which lies in revenue buffer, proper fence on boundary that does not harm wildlife should be used. The hotel management to ensure pollution control norms and proper disposal of waste.

TRANSMISSION LINES

The electric transmission lines should be checked form time to time by electricity department to avoid short circuiting which may cause fire at the same time watch to be kept on electrocution of wild animals in agriculture fields.

DAMs

Mitigation strategy for Silised and Ajabgarh dams situated inside buffer of Sariska tiger reserve ;

- The first order impacts like barrier effects, effects on water quality , water quality, flow regime and sediment load.

- The second order impacts on terrestrial environment affecting primary production like planktons(aquatic flora),morphology(channel form, substrate composition).
- Mitigation measures are required to address impacts due to operation of dams for irrigation and fisheries.
- The mitigation measures should include onsite as well as offsite initiatives based on best global practices.
- Retention of dead trees in submergence areas as snags for water birds and aquatic fauna.
- Prohibiting the reduction of river flow to zero or critical levels which would have deleterious affect on local flora and fauna especially aquatic species permitting migration across dams through mitigation e.g. fish ladder etc.
- Mimicking the water release to the natural flooding regime.
- Ensuring control of aquatic weeds and disease factors.
- Safeguarding against water pollution.
- Appropriate fish management measures to benefit local communities through the tiger reserve management. Illegal fishing is a problem.
- Site specific watershed management to safeguard against sedimentation.
- Prescribing timings for use of access of roads,and regulation on maintenance of infrastructure and retaining it to the minimum.
- Evolving and implementing a SOP for rescuing wild animals from drowning.
- Periodic monitoring of water quality and river ecosystem recovery.
- Ensuring maintaining of minimum 2 meter water levels in dams to ensure survival of aquatic flora and fauna.

OPEN WELLS

All open wells in buffer area should be covered suitably or parapet wall 5feet high should be constructed.All abandoned wells should be either closed or buried back to avoid accident of wild animals.

Chapter – 8

RESEARCH, MONITORING, TRAINING & WILDLIFE HEALTH

8.1 Research Priorities, Main Projects and Implementation:

In the buffer area of Sariska Tiger Reserve as on date no detailed research is carried out. Hence there is a need for setting out priorities and carrying out research. The Research directly contributes towards improvement of management. Detailed study and observations for a prolonged period and analysis are necessary in order to achieve the objectives of better management and conservation of bio-diversity in the buffer area of the Kawal Tiger Reserve. In this buffer area management plan research and monitoring is proposed on Biological aspects and on management and sociological aspects and their impacts on wildlife habitat. In this management plan the guide lines are proposed for research duly identifying the issues and priorities as follows:

- a) Buffer area species, habitat and Management
- b) Buffer area - People Interactions
- c) Village and Eco-development

8.2 Research on Buffer area species, habitat and Management, comprises of :

- a) Fragile ecosystems or habitats
- b) Connectivity with surrounding areas
- c) Key species requiring attention
- d) Species distribution and population trends
- e) Impacts of different buffer area Management practices on wild life, habitat as well as local people.
- f) Buffer area boundary with reference to the types and extent of various ecosystems, and animal ranges.
- g) Impact and control of forest fire
- h) Tourism.

8.3 Research on buffer area - People Interactions comprises of-

- a) Impacts of legal or customary uses such as grazing and NWFP collection or resource dependency.
- b) Illegal human activities like encroachment and poaching.
- c) Injuries or death to human, livestock and crop depredation by wildlife.

8.4 Research on Village and Eco-development comprises of-

- a) Structure and dynamics of local communities, cultural heritage and institutions, traditional knowledge systems.
- b) Socio-economic: tenure rights, participatory processes in traditional organizations, access to, use and management of buffer area resources.
- c) Impact of alternate livelihood activities.

8.5 POTENTIAL RESEARCH PROJECTS: The buffer zone has been recently notified in July, 2012. As on date no potential research has been carried out. The research projects proposed include both pure (inventory) and applied aspects. The potential areas for research are :

8.5.1 Short Term Projects:

1. Eco-system level studies of fundamental importance to buffer area management: This study involves information on regional landscape consisting of buffer area and its surrounds, extent and status of communities/eco-systems existing within. These studies are necessary for -

- a) Setting ecological boundaries of the buffer area
- b) Identifying degraded and fragile eco-systems.
- c) Research methods would include analysis of satellite imageries and aerial photographs with ground truthing and ground studies on vegetation composition and status.
- d) Outputs would include map showing topography, major land features, water bodies, classified vegetation, major disturbance habitats, trends in land use changes, important Animal Movement corridors etc.

2. Species/Population Level Studies: A) The faunal and floral distribution and their abundance with reference to landscape and eco-systems are critical to buffer area management for the following reasons:

i) Rationalization of buffer area boundaries with reference to Animal distribution and movement.

ii) Identification of habitat features (e.g., fodder distribution, water holes) or management measures (e.g., tourism management, roads) that are critical to animal distribution.

iii) Identifying seasonal movement pattern of animals, especially large mammals and its implications for buffer area management (e.g., crop damage, water hole management)

iv) Monitoring the status and management requirements of species or species assemblages or communities that need particular management attention.

B) The species/population level research includes studies on species composition in various eco-systems on a seasonal basis, population density on other abundance estimates, estimation of age/sex composition, natality and mortality rates, analysis of habitat features etc. The outputs include an overlay of animal and plants distribution and eco-system maps, identification of habitat features critical to animal distribution, population projections of threatened species etc.

3) Livestock Depredation:

Cattle lifting by large carnivores is one of the major management problems in this buffer area. This buffer area has already taken management measures, often on an ad hoc basis, to contain these problems. These measures include payment of compensation. However, a comprehensive assessment of the nature and extent of damage in terms of spatial and temporal distribution and economic loss to villagers has not been done. This would thus form a typical short-term project.

8.5.2 Long Term Projects:

a) Studies on critically endangered species.

- b) Grazing impacts under different buffer area management practices
- c) The role of fire in maintaining critical habitats of different species
- d) The buffer area and people interaction studies, which will be essential for assessing the socio-economic impacts of buffer area on the people. Indigenous knowledge and practices and their impacts to bio-diversity conservation studies which includes studies on cultural aspects and relations between natural resources of buffer area and people, the management of natural resources through traditional systems and the economics of livelihood based on forest resources especially on women and tribals groups.

8.5.2.1 Monitoring Framework: Monitoring is intended to assess the ecological and socio-economic impacts of the project to determine, whether these are in agreement, with those anticipated. Monitoring also assess the effectiveness of project institutions and processes in achieving the objectives.

8.5.2.2 Project Objects:

The monitoring of Ecological and Socioeconomic impacts of this plan includes the following:

- a. Buffer area values, b. Anticipated changes. c. Indicators. d. Sampling and analytical methods. e. Mechanisms of feed back. f. Project adjustment. g. Responsibilities for monitoring. These objects are discussed below:

a) Buffer area Values:

The buffer area has important bio-diversity values that are of regional and national significance. The progressive decline of these values is of great concern and their restoration is the objective of the buffer area management. Other values relate to buffer area are people interactions such as traditional knowledge systems (e.g., ethnobotany), tourism, watershed etc. One or more measurable indicators that together describe the values would form the basis for evaluation.

b) Anticipated Changes:

A statement of anticipated changes on the status of bio-diversity in the buffer area, disturbance factors, and relevant socio-economic attributes would form a set of predetermined standards and the findings from monitoring would be compared and evaluated.

c) Indicators:

Eco-systems in the buffer area and the mutual impact of their interaction with people are so complex that an assessment of their status and trends would be based on a set of indicators, that are placed in several categories. These categories reflect the values for which the buffer area is being managed, the control and mitigation of threats to the project, and project institutions and processes.

d) Sampling Methodology:

The overall sampling area for buffer area would be estimated from remote sensing and field surveys. Vegetation status would be determined by remote sensing, transects, or quadrants. Animal presence/absence or absolute/relative abundance would be assessed from quadrants or line transects (either through direct sightings or indirect evidences such as pellets and scats);

e) Socio-economic sampling would be field based, interview based, or both.

f) Project Adjustments:

Mechanisms for feed back for buffer area management would ensure project adjustment in response to findings from monitoring. Active participation of buffer area management personnel and local people would ensure that there is an ongoing interaction between monitoring and management.

g) Impact Evaluation:

Impact Evaluation would basically comprise a baseline survey prior to project implementation followed by impact surveys at end of the project period.

h) Baseline Survey:

The Eco-Development Planning Unit as a part of the project preparation exercise, has undertaken benchmark surveys in a sample of villages.

These were backed up by PRA exercises in the villages. These studies have provided useful information but some inconsistencies have arisen in the database due to the rapidity with which the surveys had to be carried out. The area profiles and compilation of village registers envisaged under the monitoring system, if executed in a timely manner, will provide the basic data on the pre-project situation of the villages and the households required from the base line survey.

i) Environment Impact:

The main measurable impact of the environmental benefits of the project relates to the reduction in soil erosion and soil loss and the increase in moisture content in the soil available to crops as a result of the soil and water conservation measures and the restoration of tree cover. Assessment of the soil loss and improved water retention would be made in the field through an analysis of different crop canopies as part of the adaptive research programme.

8.6 RESEARCH FACILITIES: There are no research facilities at the Sariska Tiger Reserve. However to make a beginning it is proposed as follows:

- a) Establishing a small laboratory to store field collections such as skulls, jaw bones, antlers, scats of animal remains and also plant specimens for taking up further planned investigations.
- b) Providing small refrigerator and oven and necessary glassware and other laboratory equipment for storing the samples before sending for analysis.
- d) A library with scientific literature in the form of books, journals would be of much help in carrying out different studies with updated knowledge.
- e) It is proposed to provide sufficient number of Computers and Printers and computer peripherals and other required equipment like Telephone, Xerox, Fax, Scanners etc for smooth management during the buffer plan period. Similarly it is proposed towards maintenance of Computers, Printers, Computer Peripherals, telephone, xerox etc.
- f) Providing / Procurement of tranquilizing equipment and their accessories is proposed in this buffer plan.
- g) A vehicle especially for research programmes/projects.

g) Due to non availability of adequate infrastructure and personal for carrying out research based studies it is proposed to use the available expert agencies in research and investigation such as WII, BSI, University Research Scholars etc on contractual engagements or consultancies.

8.7 Training Needs Assessment: There are no adequate wildlife trained staff in the area under this buffer management plan of Sariska Tiger Reserve. There is a need to impart Wildlife Management Training to all level staff. Moreover there are no facilities for formal training to the low level staff. It is proposed to impart training as follows:

a) Formal Training Course: It is proposed to impart formal training as follows:

i) It is proposed to impart (9) months post graduate diploma course to the Divisional Forest Officers and 3 months certificate course to (3) Range Officers in a phased manner during this plan period.

ii) It is also proposed to impart training courses on wildlife management to all the lower level staff such as Foresters, Asstt. Forester, Forest Guard at training courses arranged at Rajasthan Forest Training Institute Jaipur/Alwar in a phased manner.

iii) In addition to this senior faculty members of wildlife institutes will be engaged to upgrade the knowledge on buffer area management.

b) On the Job Training: The experience senior staff will be engaged in imparting different skills among the junior staff such as recognizing wildlife evidences, documentation and interpretation. The resource persons who are experts in related fields of wildlife and buffer area management, forest offences and investigations etc., will be invited and refreshment courses conducted to the staff of all levels for updating the knowledge in the following fields:

i) Application of laws and regulations.

ii) Administrative Accountability

iii) Collection of samples of vital organs for analysis

iv) Education on symptomatology of various wildlife diseases

v) Recognizing/Identification of wildlife evidences and their interpretation for taking management decisions

- vi) Weapon handling and maintenance
- vii) Registers to be maintained
- viii) Field research techniques
- ix) Forms of correspondence documentation formats and certificates.

c) Establishing a Learning Centre: During the earlier periods no research and investigation studies were taken up. In this management plan period proposals have been made for taking up short terms studies and initiating long terms studies. Based on these studies it is proposed to identify various sites of conservation and strategies significance both biological and abiological and will be maintained as a demonstration area for further learning.

8.8 HRD Plan: For carrying out research at species / population level and eco-system level involving short term and long term projects the assistance of wildlife trained staff specially designated for research, research scholars of various fields, scientist and collaboration with renowned institutions is essentially required. The requirement of the personnel for research is proposed as follows:

- 1) Field Director.
- 2) Deputy Directors / Divisional Forest Officers of concerned divisions.
- 3) Asst. Conservator of Forests (wildlife research) at Pembi – 1 No.
- 4) Forest Range Officers (wildlife research) – 2 Nos. (01) for Nirmal and Adilabad Division and another (01) for Jannaram and Bellampally Divisions.
- 5) Forest Section Officers (wildlife research) – 4 Nos. (one each for four divisions).
- 6) Biological research scientists – 2 Nos. h.
- 7) Sociology research scientist – 2 Nos. 8) Research Assistants – 4 Nos..
- 9) Other supporting staff in field and laboratory – 5 Nos.

The laboratory facilities in the core area at Jannaram shall be utilized. The total provision is made for engaging Biological research scientists – 2 Nos, Sociology research scientist – 2 Nos, Research Assistants – 4 Nos. and Other supporting staff in field and laboratory – 5 Nos per year.

8.9. Wildlife Health Monitoring: Wildlife diseases have gained prominence in recent decades as research has elucidated their role in influencing population dynamics in free-range situations, thereby necessitating veterinary interventions for wildlife conservation. The disease Rinderpest, Foot-and-Mouth disease which is a communicable disease causes mass mortalities of herbivores. As such, continuous wildlife health monitoring and surveillance, proper diagnosis and timely veterinary interventions are essential for effective conservation of wildlife in general, and endangered species in particular. Transmission of infectious diseases to wildlife, from domestic animals living close to protected areas presents a major threat to the survival of endangered species. There is a need to address the various health aspects of the indigenous wild fauna of buffer area through veterinary intervention and research approaches. There is a need for routine health monitoring of tigers and other wildlife within the confines of the buffer area and adjoining areas. For wildlife health monitoring in the buffer area the following prescriptions are proposed:

- a) Establishing a Wildlife Health Monitoring, Disease Diagnostic and Research Cell in collaboration with the Acharya NG Ranga Agricultural university, Hyderabad.
- b) Engaging the services of a Veterinary Surgeon.
- c) Studies on diseases of wildlife, particularly of highly endangered Species like tiger and its prey species.
- d) Provide technical training to buffer area staff in various aspects of wildlife health monitoring and management chemical restraint, autopsy, collection and presentation of body parts of dead animals for lab analysis.
- e) Creation of database on various parameters related to wild animal health that will help in assessing the health status of wild animals based on hematological and biochemical studies.
- f) Study the inter-relationship of wild and domestic animal diseases to evolve strategy for prophylactic measures and control methods.
- g) Evolve a treatment plan for diseases of endangered wild animals in ex-situ conservation areas.
- h) Establishing a wildlife health monitoring team / squad with a trained Forest Range Officer, Forest Beat Officer, a lab technician and support

staff with a vehicle. The activities of the said team includes regular field visits to observe and assess individual and herd health of wildlife, microscopic examination of field samples for determining parasitic loads, performing necropsies of wildlife found dead from the buffer area and surrounding areas and training the field staff in sampling and health monitoring techniques, in coordination with Range Officers concerned.

i) Treatment of Sick or injured wild animals in the field and when necessary, rescued at in-patient facility at Wildlife Health Monitoring, Disease Diagnostic and Research Cell. They are then released back into the wild or rehabilitated in zoos and rescue centres following recovery, observing established guidelines.

j) Conducting the veterinary camps regularly in the villages for treatment to the cattle against communicable diseases including Deworming, inoculation of village cattle as per Act.

k) The laboratory / veterinary infrastructure facilities in the core area at Jannaram shall be utilized.

During the buffer plan period for protecting the wildlife against the communicable diseases it is proposed for immunization of the cattle at periodical intervals on regular basis..

8.10 Mortality Survey: The mortality survey in a habitat is important to ascertain the age/sex specific natural mortality of wild animals. The field staff shall collect all evidences of such mortality (mandibles/skulls) found on the forest floor every six months. The death of the wildlife occurs due to various reasons and there is a need for the mortality survey. It helps in identifying the main causes for the death and for taking immediate necessary action in controlling further loss of wildlife. It should also be aimed at thorough investigation into cause of death of tiger and its co-predators and prey including laboratory studies / diagnosis. The reasons for the mortality may be due to road accidents, poaching, electrocution, poisoning, diseases, epidemics, old age, scarcity of fodder and water etc. The mortality survey indicates the health of the wildlife, protection status and the habitat. The following prescriptions are proposed:

a) A comparative study of the census details of different years to be done.

- b) On detection of death of any wildlife, the samples have to be collected in scientific prescribed manner.
- c) The samples shall be sent to the laboratory for analysis for knowing the cause of death.
- d) Investigation to be done for the cause of death and necessary mitigation / protection measures to be taken up.
- e) In case of communicable diseases, necessary action to be taken for vaccination and treatment to prevent its out break.
- f) A close watch in coordination with veterinary department has to be kept for the diseases in cattle.
- g) The details of death shall be recorded in the prescribed mortality control form.

SARISKA TIGER RESERVE

PART – III

Corridor Plan

The tiger continues to remain one of the most endangered large predators in the world. Based on scientific empirical data and simulation results for a viable tiger population, it has been established that a minimum inviolate area of 800-1200 sq.km. is required for a viable population of tiger (20 breeding tigresses). An ecologically sensitive zone (buffer, coexistence area, multiple use area) of 1000-3000 sq km is required around this inviolate space for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers. Together with the core area, this would sustain the dynamics of source - sink while sustaining a population of 75-100 tigers. ('Guidelines for Preparation of Tiger Conservation Plan' issued by the NTCA (Technical Document: NTCA/01/07).

Conservation of tiger will not only require the management of core and the buffer areas but it will also be necessary to maintain connectivity to other core areas for ensuring gene flow as an ecological requirement for long term survival of tiger. Therefore, it will be necessary to identify these areas of corridors between two source populations.

The linking of Sariska Tiger Reserve with existing another source tiger population of Ranthambhore tiger reserve is practically no more feasible due presence of agriculture landscape for more than hundred kilometer with almost no corridorial connectivity. The structural corridors like rivers, culverts, rivines, plantations, orchards, private forests, pastures, revenue hillocks have also been taken into consideration to make functional corridor between Sariska and Ranthambhore but due to lack of contiguity it is not possible.

National tiger conservation authority vide letter no. 1-9/2013-NTCA dated 16.5.2014 has directed for delineating corridor linkage of sariska tiger reserve with Jamwa Ramgarh wild life sanctuary as per 2010 country level assessment.

The linking of Jamwa Ramgarh Sanctuary with STR has already been done by including it in buffer are The jamuwa ramgarh sanctuary has a good corridor connectivity. So there is no need for further linking of jamuwa ramgarh sactuary.

As there is no possibility of linking CTH of sariska tiger reserve with CTH of Ranthambhore tiger reserve, so no corridor plan is required to be prepared for Sariska tiger reserve and the exchange and improvement of gene pool in reintroduced tiger population in sariska tiger reserve would be ensured through translocation.

APPENDICES



सत्यमेव जयते

राजस्थान राज-पत्र
विशेषांक
साधिकार प्रकाशित

RAJASTHAN GAZETTE
Extraordinary

Published by Authority

पौष ७, शुक्रवार शाके १९२९-दिसम्बर २८, २००७
Pousa 7, Friday, Saka 1929-December 28, 2007

भाग १ (ख)

महत्वपूर्ण सरकारी आज्ञायें।

FOREST DEPARTMENT

NOTIFICATION

Jaipur, December 28, 2007

No.F3(34) Forest/2007.-In exercise of the powers conferred under section 38 V of the Wildlife (Protection) Act, 1972 as amended up to date and on the basis of the recommendations of the Expert Committee constituted for this purpose, the Governor of Rajasthan is pleased to declare the following areas as critical tiger habitat in the tiger reserves of the state of Rajasthan in the interest of conservation of tigers :-

A. Ranthambhore Tiger Reserve

The following Forest Blocks falling in the Ranthambhore Tiger Reserve are declared as core or critical tiger Habitat:-

S.No.	Name of Forest Block	Reserve Forest/ Protected Forest	Area in hact.
1	2	3	4
1.	Sawai Madhopur 6 main	Reserve Forest	7796
2.	Sawai Madhopur 6 A	Reserve Forest	13047
3.	Sawai Madhopur 6 B	Reserve Forest	5182
4.	Khandar -9A	Reserve Forest	10857
5.	Khandar -9B	Reserve Forest	5492
6.	Khandar -9 C	Reserve Forest	10471
7.	Quila Khandar	Reserve Forest	955
8.	Phalodi	Protected Forest	2050
9.	Aamli Main	Protected Forest	383
10.	Ranwajala Balwan	Protected Forest	3612
11.	Baler	Protected Forest	2496
12.	Dang Doodhbhat	Reserve Forest	6017
13.	Papada	Reserve Forest	1187.20
14.	Gajipur	Protected Forest	517.20
15.	Kalakheth	Protected Forest	4402
16.	Kanarda	Protected Forest	5046
17.	Simarkhoh A	Protected Forest	2638
18.	Dailatpura	Protected Forest	3471
19.	Marmada	Protected Forest	6890
20.	Nibhera	Protected Forest	5808
21.	Quila Devgir Udgir	Protected Forest	5111
22.	Simarkho	Protected Forest	2138
23.	Daulatpura	Protected Forest	3553
24.	Hadoti	Protected Forest	497
25.	Simarkho B	Protected Forest	1720
Total			111336.4

(B) Sariska Tiger Reserve

The following Forest Blocks falling in the Sariska Tiger Reserve are declared as core or critical tiger Habitat:-

S.No.	Name of Forest Block	Reserve Forest/ Protected Forest	Area in ha.
1	2	3	4
1.	Kushalgarh	Reserve Forest	1319.50
2.	Kraska	Reserve Forest	1314.25
3.	Jodhabas with Rajoo	Reserve Forest	1359.00
4.	Kalighati	Reserve Forest	6902.00
5.	Todinjran	Reserve Forest	230.00
6.	Kankwari	Reserve Forest	3217.00
7.	Kushalgarh	Protected Forest	227.91
8.	Kraska	Protected Forest	1216.74
9.	Indok	Protected Forest	1313.61
10.	Kalachara	Protected Forest	219.92
11.	Karnakabas	Protected Forest	323.20
12.	Amrakabas	Protected Forest	216.30
13.	Dhuarmala	Protected Forest	1673.86
14.	Thanagazi	Protected Forest	235.07
15.	Budiyabas	Protected Forest	129.12
16.	Shyampura	Protected Forest	200.00
17.	Raipura	Protected Forest	210.00
18.	Silibawdi	Reserve Forest	2553.25
19.	Ajabgarh	Reserve Forest	465.75
20.	Bhangarh	Reserve Forest	1127.00
21.	Narayaniji	Reserve Forest	1458.00
22.	Dabkan	Reserve Forest	1492.75
23.	Tehla with Bhagani	Reserve Forest	2482.50
24.	Naundu	Reserve Forest	6944.50
25.	Umari-Devri	Reserve Forest	7469.75
26.	Haripura	Reserve Forest	390.25
27.	Choti Chind	Reserve Forest	42.25
28.	Ajabgarh	Protected Forest	95.25
29.	Piplai main	Protected Forest	1391.88
30.	Piplai 'A'	Protected Forest	34.75
31.	Nadoli	Protected Forest	66.00
32.	Khirat ka Bas	Protected Forest	118.79
33.	Bhangarh	Protected Forest	462.35
34.	Dhiroda	Protected Forest	421.05
35.	Dhiroda	Protected Forest	610.90
36.	Pawta	Protected Forest	61.37
37.	Berwa Dungle	Protected Forest	605.89
38.	Beldevgarh	Protected Forest	680.90
39.	Tilwar	Protected Forest	770.29
40.	Jaisingh Pura	Protected Forest	926.45
41.	Mallana	Protected Forest	381.76
42.	Kalwad	Protected Forest	299.20
43.	Dabkan	Protected Forest	506.40
44.	Tehla	Protected Forest	174.59
45.	Khariyavas	Protected Forest	218.50
46.	Naundu	Protected Forest	822.55
47.	Seliberi	Protected Forest	218.50
48.	Rajoor	Protected Forest	2462.50

1	2	3	4
49.	Mitravat	Protected Forest:	39.32
50.	Kanyavas	Protected Forest	83.71
51.	Beenak	Reserve Forest	6225.75
52.	Kalikhhol	Reserve Forest	3307.25
53.	Prathvipura	Reserve Forest	329.00
54.	Madhogarh	Reserve Forest	649.25
55.	Seliberi	Reserve Forest	6870.00
56.	Dhelavas	Protected Forest	64.77
57.	Bhaketpura	Protected Forest	67.18
58.	Kishanpur	Protected Forest	418.17
59.	Sawdi	Protected Forest	104.72
60.	Dhawala	Protected Forest	151.75
61.	Gopalpura	Protected Forest	107.22
62.	Dharampura	Protected Forest	325.07
63.	Madhogarh	Protected Forest	2217.01
64.	Prathvipura	Protected Forest	1081.82
65.	Rampur	Reserve Forest	4244.75
66.	Bani Talvriksh	Reserve Forest	103.75
67.	Nangalhedi	Protected Forest	919.57
68.	Beravas	Protected Forest	1354.49
69.	Raikamala	Protected Forest	530.31
70.	Manavas	Protected Forest	115.61
71.	Tolavas	Protected Forest	210.09
72.	Billahat	Protected Forest	268.53
73.	Basna	Protected Forest	42.12
74.	Bishallu	Protected Forest	179.59
75.	Lekri	Protected Forest	140.57
76.	Todiakabas	Protected Forest	32.36
77.	Ghaat	Protected Forest	174.65
78.	Mundali	Protected Forest	33.24
79.	Hazipur	Protected Forest	59.60
80.	Rampur I	Protected Forest	151.27
81.	Rampur II	Protected Forest	194.41
82.	Rampur III	Protected Forest	40.46
83.	Rampur IV	Protected Forest	710.86
84.	Nathusar	Protected Forest	535.24
		Total	88111.24

By Order
प्रेम सिंह मेहरा,
Secretary Forest.

 सत्यमेव जयते	राजस्थान राज-पत्र	RAJASTHAN GAZETTE
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आषाढ 18, सोमवार, शाके 19८4-जुलाई 9, 2012 <i>Asadha 18, Monday, Saka 1934- July 9, 2012</i>		

भाग 4 (ग)

उप-खण्ड (II)

राज्य सरकार तथा अन्य राज्य प्राधिकारियों द्वारा जारी किये गये
कानूनी आदेश तथा अधिसूचनाएं।

वन विभाग

अधिसूचनाएं

जयपुर, जुलाई 6, 2012

एस. ओ. 65:- राज्य सरकार वन्यजीव (सुरक्षा) अधिनियम, 1972 (1972 का केन्द्रीय अधिनियम संख्या 53) की धारा 38 V की शक्तियों का प्रयोग करते हुए सम्बद्ध ग्राम सभा एवं विशेषज्ञ समिति से परामर्श उपरांत एतद् द्वारा इस विभाग की समसंख्यक अधिसूचना दिनांक 28-12-2007 से अधिसूचित रणथम्भौर व्याघ्र आरक्षित (Tiger Reserve) के क्रान्तिक व्याघ्र निवासी क्षेत्र (Critical Tiger Habitat) के चारों ओर नीचे अनुसूची - I में वर्णित वन एवं राजस्व क्षेत्र, जिसकी सीमाएं अनुसूची - II में वर्णित हैं, जहां क्रान्तिक व्याघ्र निवास की समग्रता और व्याघ्र प्रजातियों के लिए पर्याप्त विचरण को सुनिश्चित करने के लिए न्यूनतम मात्रा में निवास संरक्षण अपेक्षित है, जिसका उद्देश्य वन्यजीव और मानव क्रियाकलाप के बीच स्थानीय व्यक्तियों के जीविकोपार्जन, विकास, सामाजिक और सांस्कृतिक अधिकारों की सम्यक् मान्यता के साथ सह अस्तित्व का संवर्धन करना है, को बफर क्षेत्र घोषित करती है। जिसे भविष्य में "रणथम्भौर व्याघ्र आरक्षित के मध्यवर्ती क्षेत्र (Buffer area)" के रूप में जाना जावेगा।

अनुसूची - I

जिला सवाई माधोपुर

वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मंडल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1	2	3	4	5
1	ओलवारा निवारी	उप वन संरक्षक कोर बाघ परि.	आरक्षित वन	555.00

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राजस्थान राज-पत्र, जुलाई 9, 2012

भाग 4 (ग)

1	2	3	4	5
2.	श्यामौली बिलोली 82 ए	उप वन संरक्षक सामाजिक वानिकी	आरक्षित वन	366.16
3.	श्यामौली बिलोली 82 बी	उप वन संरक्षक सामाजिक वानिकी	आरक्षित वन	199.94
4.	रवाजना डूंगर मेन	उप वन संरक्षक कोर बाघ परि.	संरक्षित वन	932.00
5.	रवाजना डूंगर ए	उप वन संरक्षक कोर बाघ परि.	संरक्षित वन	72.00
6.	सेवती चम्बल	उप वन संरक्षक कोर बाघ परि.	आरक्षित वन	4870.00
योग				6995.10

जिला सवाई माधोपुर
राजस्व क्षेत्र

क्र.सं.	तहसील	ग्राम पंचायत	ग्राम का नाम	क्षेत्रफल (हेक्टर)
1.	खंडार	डूंगरी	गढी, कालाखोहरा (तालरा)	148.00
2.	खंडार	डूंगरी	भावपुर	407.00
3.	खंडार	डूंगरी	खिदरपुर जादौन	787.63
4.	खंडार	नायपुर	सांवटा	931.00
योग				2273.63

जिला बूंदी
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मंडल	वन प्रकार	क्षेत्रफल (हेक्टर)
1	2	3	4	5
1.	बलवन	उप वन संरक्षक कोर बाघ परि. एवं मण्डल वन अधिकारी बूंदी	आरक्षित वन	967.83
2.	पोलघटा	उप वन संरक्षक कोर बाघ परि.	संरक्षित वन	435.00
3.	तलवास	मण्डल वन अधिकारी बूंदी	आरक्षित वन	4277.48
4.	मोहनपुरा	मण्डल वन अधिकारी बूंदी	आरक्षित वन	1777.58
5.	अरियाली वूढी करवर	मण्डल वन अधिकारी बूंदी	संरक्षित वन	1559.92
6.	गढवाला	मण्डल वन अधिकारी बूंदी	आरक्षित वन	949.41
7.	गाताजीवाला	मण्डल वन अधिकारी बूंदी	आरक्षित वन	440.06
8.	सालमदरा - ए	मण्डल वन अधिकारी बूंदी	संरक्षित वन	98.70
9.	सालमदरा - बी	मण्डल वन अधिकारी बूंदी	संरक्षित वन	139.19
10.	सालमदरा - सी	मण्डल वन अधिकारी बूंदी	संरक्षित वन	256.55

1	2	3	4	5
11.	सालमदरा - डी	मण्डल वन अधिकारी बूदी	संरक्षित वन	177.72
12.	गेंडोली	मण्डल वन अधिकारी बूदी	संरक्षित वन	1732.14
13.	कांकरा	मण्डल वन अधिकारी बूदी	संरक्षित वन	1372.83
14.	लाखेरी	मण्डल वन अधिकारी बूदी	संरक्षित वन	2435.18
15.	फौलाई	मण्डल वन अधिकारी बूदी	संरक्षित वन	2438.89
16.	डोबरली	मण्डल वन अधिकारी बूदी	संरक्षित वन	85.95
17.	बांकलिया महादेव	मण्डल वन अधिकारी बूदी	संरक्षित वन	438.00
18.	रामनगर	मण्डल वन अधिकारी बूदी	संरक्षित वन	38.02
योग				19620.45

जिला टोंक
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मंडल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	आमली ए	मण्डल वन अधिकारी टोंक	संरक्षित वन	903.47

मध्यवर्ती क्षेत्र (Buffer area) का विवरण

वन क्षेत्र में मध्यवर्ती क्षेत्र :	27519.02 हेक्टर
राजस्व क्षेत्र में मध्यवर्ती क्षेत्र :	2273.63 हेक्टर
कुल योग :	29792.65 हेक्टर

अनुसूची II
सीमा विवरण

खण्ड-1 रणथम्भौर बाघ परियोजना के क्रिटीकल टाइगर हैबीटाट के वनखण्ड 9-बी के मौजा सांवटा के दक्षिणी पूर्वी बिन्दु से प्रारम्भ होकर बनास नदी के अन्दर चलते हुए रणथम्भौर बाघ परियोजना के क्रिटीकल टाइगर हैबीटाट क्षेत्र के वनखण्ड डांग दूध भात के मौजा भावपुर की पूर्वी सीमा एवं क्रिटीकल टाइगर हैबीटाट सीमा के मिलन बिन्दु तक। बाद क्रिटीकल टाइगर हैबीटाट सीमा लाइन के सहारे-सहारे वनखण्ड डांगदूधभात की दक्षिणी सीमा के साथ-साथ मौजा खिदरपुर जादौन की ढाणी महारू एवं क्रिटीकल टाइगर हैबीटाट के मिलन बिन्दु तक। इसके बाद मौजा खिदरपुर जादौन की ढाणी महारू की राजस्व सीमा से शुरू होकर बनास नदी के अन्दर उत्तर से दक्षिण की ओर ग्राम तालड़ा के क्रिटीकल टाइगर हैबीटाट क्षेत्र के मिलन बिन्दु तक। उसके पर्याप्त क्रिटीकल टाइगर हैबीटाट क्षेत्र के मौजा तालड़ा की

ढाणी गढी एवं कालाखोहरा के राजस्व क्षेत्र होते हुए मौजा सांवटा के प्रारम्भ बिन्दु तक।

- खण्ड-2 रणथम्भौर बाघ परियोजना के क्रिटीकल टाइगर हैबीटाट क्षेत्र के वनखण्ड 9-ए के कम्पार्टमेंट 38 के पास ग्राम बस्सोकलां के उत्तर बनास नदी के दूसरे किनारे पर स्थित वनखण्ड श्यामोली बिलौली 82बी की सीमा होते हुए वनखण्ड श्यामोली बिलौली 82ए के मौजा साकडा रघुबंटी चक बिलौली की वन सीमा एवं सम्पूर्ण वनखण्ड क्षेत्र।
- खण्ड-3 रणथम्भौर बाघ परियोजना के क्रिटीकल टाइगर हैबीटाट क्षेत्र के वनखण्ड 9-ए के कम्पार्टमेंट 38 के पास ग्राम बस्सोकलां के उत्तर पश्चिम में स्थित वनखण्ड ओलवाडा निवाडी का सम्पूर्ण वन क्षेत्र।
- खण्ड-4 क्रिटीकल टाइगर हैबीटाट क्षेत्र के वनखण्ड 6-बी की लाइन के कम्पार्टमेंट 14 के पश्चिम में स्थित ग्राम हरिपुरा के पश्चिम से दक्षिण की ओर स्थित सम्पूर्ण वनखण्ड रवांजना डूंगर-मेन की सीमा एवं मौजा पांचोलास में स्थित इसे लंगता हुआ रक्षित वनखण्ड रवाजना डूंगर ए का सम्पूर्ण हिस्सा।
- खण्ड-5 रणथम्भौर बाघ परियोजना के क्रिटीकल टाइगर हैबीटाट क्षेत्र के आरक्षित वनखण्ड आमली के कम्पार्टमेंट 2 के पश्चिम में वनखण्ड आमली-ए का सम्पूर्ण वन क्षेत्र जिसमें से (465 है. क्षेत्र डाइवर्जन) किया गया है।
- खण्ड-6 आरक्षित वनखण्ड मोहनपुरा के उत्तर पश्चिम में स्थित ग्राम बाबई के पास स्थित वनखण्ड रामनगर का सम्पूर्ण हिस्सा।
- खण्ड-7 आरक्षित वनखण्ड गढ़वाला की उत्तरी सीमा पर स्थित ग्राम इन्द्रगढ़, खेड़ली की सीमा से शुरू होकर गढ़वाला वनखण्ड की पश्चिमी सीमा के सहारे ग्राम मौजा कस्बा इन्द्रगढ़ एवं ग्राम गजपुरा की वन सीमा के सहारे चलते हुए वनखण्ड लाखेरी के कम्पार्टमेंट 6 के मिलन बिन्दु तक। वनखण्ड लाखेरी की पश्चिमी सीमा के कम्पार्टमेंट 6, 5, 4, 3, 1 मौजा सेरिया, हीरापुर, बांसी, कोटडी की वन सीमा के सहारे चलते हुए वनखण्ड कांकरा के कम्पार्टमेंट 8 के मिलन बिन्दु तक। वनखण्ड कांकरा के कम्पार्टमेंट 8 के पश्चिमी सीमा पर स्थित ग्राम नयागांव मुदली की वन सीमा के सहारे चलते हुए वनखण्ड गेंडोली के मिलन बिन्दु तक। वनखण्ड गेंडोली एवं वनखण्ड कांकरा के मिलन बिन्दु से प्रारम्भ होकर वनखण्ड गेंडोली की पश्चिमी सीमा पर स्थित ग्राम माणपुर-बिच्छुलंका की वन सीमा के सहारे चलते हुए वनखण्ड फौलाई के मिलन बिन्दु तक। इसके बार खण्ड फौलाई की दक्षिणी सीमा में स्थित ग्राम खटकड़, कुआगांव, खडीवारा, फौलाई की वन सीमा के सहारे चलते हुए वनखण्ड गेंडोली के मिलन बिन्दु तक। वनखण्ड गेंडोली की दक्षिणी सीमा पर स्थित ग्राम गेंडोली से चलकर महुआ का देवजी गूथा होते हुए वनखण्ड कांकरा के मिलन बिन्दु तक। वनखण्ड कांकरा के दक्षिण में स्थित ग्राम डांगर से उत्तराणा,

बुदेल, गुडहेल, कांकरा, चमावली होते हुए लाखेरी वनखण्ड के मिलन बिन्दु तक। लाखेरी वनखण्ड की दक्षिणी सीमा पर स्थित ग्राम चमावली से पूर्व में होते हुए ग्राम लाखेरी, भावुरा, लोनाता की वन सीमा के सहारे होते हुए वनखण्ड गढवाला के मिलन बिन्दु तक। आरक्षित वनखण्ड गढवाला के दक्षिण में स्थित ग्राम लोनावा होते हुए वनखण्ड सालमदरा ए की दक्षिणी पूर्वी सीमा होते पुनः ग्राम अणघोरा के पास आरक्षित वनखण्ड गढवाला के मिलन बिन्दु तक। बाद आरक्षित वनखण्ड गढवाला की वन सीमा होते हुए उत्तर में स्थित ग्राम इन्द्रगढ खेडली के प्रारम्भ बिन्दु तक।

खण्ड-8 आरक्षित वनखण्ड मोहनपुरा के पश्चिम में स्थित ग्राम आजाद नगर के पास वनखण्ड की वन सीमा से शुरू होकर आरक्षित वनखण्ड मोहनपुरा के पश्चिम में स्थित ग्राम मोहनपुरा, फतेपुरा और जयनगर होते हुए आरक्षित वनखण्ड माताजीवाला के कोट (वर्तमान में टोल प्लाजा पर) स्थित मिलन बिन्दु तक। बाद आरक्षित वनखण्ड माताजीवाला की उत्तरी पश्चिमी वन सीमा पर चलते हुए ग्राम खालपुरा एवं जयनगर की सीमा के लगते हुए आरक्षित वनखण्ड अरियाली बुढकरवर के कम्पार्टमेंट 6 के मिलन बिन्दु तक। बाद आरक्षित वनखण्ड अरियाली बुढकरवर के कम्पार्टमेंट 6 की पश्चिमी सीमा से शुरू होकर कम्पार्टमेंट 6, 5, 4, 3, 2, 1 जो कि वन सीमा बनाती है के सहारे आरक्षित वनखण्ड तलवास के मिलन बिन्दु तक। बाद आरक्षित वनखण्ड तलवास के पश्चिम से दक्षिण की ओर कम्पार्टमेंट 9, 8, 7, 5, 4, 3, 2, 1 की वन सीमा के सहारे रामगढ विषधारी अभयारण्य के वनखण्ड पीपलिया माणक चौक के मिलन बिन्दु तक। बाद आरक्षित वनखण्ड तलवास के दक्षिणी सीमा से होते हुए कम्पार्टमेंट 19, 20, 21, 22, 23, 24 की पूर्वी सीमा जो कि वन सीमा है के सहारे वनखण्ड अरियाली बुढकरवर के कम्पार्टमेंट 5 पर स्थित मिलन बिन्दु तक। बाद वनखण्ड अरियाली बुढकरवर के कम्पार्टमेंट 5 की पूर्वी सीमा से उत्तर की ओर चलते हुए कम्पार्टमेंट 7 पर स्थित माताजीवाला वनखण्ड के मिलन बिन्दु तक। बाद आरक्षित वनखण्ड माताजीवाला की पूर्वी सीमा होते हुए कोट (वर्तमान में टोल प्लाजा पर) स्थित मिलन बिन्दु तक। बाद वनखण्ड मोहनपुरा की पूर्वी एवं उत्तरी सीमा होते हुए प्रारम्भ बिन्दु तक।

खण्ड-9 आरक्षित वनखण्ड गढवाला के पूर्व में ग्राम विशनपुरा में स्थित वनखण्ड सालमदरा बी एवं इससे मिलते हुए वनखण्ड सालमदरा डी जिसकी सीमाए मौजा भाण्डगंवार, लाखेरी बालापुरा है के सम्पूर्ण हिस्सा।

खण्ड-10 रणथाम्बौर बाघ परियोजना के क्रिट्रीकल टाइगर हैबीटाट क्षेत्र से लगते हुए वनखण्ड गाजीपुर के कम्पार्टमेंट 5 से एवं वनखण्ड पोलघटा के कम्पार्टमेंट 1 के चाकल नदी स्थित मिलन बिन्दु से प्रारम्भ होकर वनखण्ड पोलघटा के कम्पार्टमेंट 1, 2, 3 की पश्चिमी

सीमाएं होते हुए वनखण्ड बलवन के कम्पार्टमेंट 4 के मिलन बिन्दु तक वहाँ से आरक्षित वनखण्ड बलवन के कम्पार्टमेंट 4 की पश्चिमी सीमा होते हुए वनखण्ड बांकलिया महादेव की पश्चिमी सीमा के सहारे चलते हुए पुनः आरक्षित वनखण्ड के कम्पार्टमेंट 5 स्थित मिलन बिन्दु तक। बाद वनखण्ड बलवन के कम्पार्टमेंट संख्या 5 की दक्षिणी सीमा होकर चलते हुए कम्पार्टमेंट संख्या 4 की पूर्वी सीमा के सहारे चलते हुए वनखण्ड सालमदरा सी के मिलन बिन्दु तक। बाद वनखण्ड सालमदरा सी की दक्षिणी पूर्वी सीमा पर चलते हुए उत्तर की ओर आरक्षित वनखण्ड बलवन के कम्पार्टमेंट संख्या 2 के मिलन बिन्दु तक। बाद वनखण्ड बलवन के कम्पार्टमेंट संख्या 2, 1 की पूर्वी सीमा होते हुए क्रिट्रीकल टाइगर हैबीटाट के आरक्षित वनखण्ड पापडा के कम्पार्टमेंट संख्या 8 के मिलन बिन्दु तक। बाद क्रिट्रीकल टाइगर हैबीटाट वनखण्ड पापडा के कम्पार्टमेंट 8, 7 एवं 4 की दक्षिणी सीमा के सहारे चलते हुए वनखण्ड पोलघटा के कम्पार्टमेंट संख्या 1 के क्रिट्रीकल टाइगर हैबीटाट से चाकल नदी में स्थित मिलन बिन्दु एवं प्रारम्भ बिन्दु तक।

खण्ड-11 रणथम्भौर बाघ परियोजना के क्रिट्रीकल टाइगर हैबीटाट क्षेत्र से लगते हुए वनखण्ड बलवन के कम्पार्टमेंट संख्या 2 के पूर्वी दिशा में स्थित वनखण्ड डोबरली का सम्पूर्ण हिस्सा।

खण्ड-12 रणथम्भौर बाघ परियोजना के क्रिट्रीकल टाइगर हैबीटाट के वनखण्ड किला खण्डार के पूर्व में स्थित आरक्षित वनखण्ड सेंवती चम्बल का सम्पूर्ण रकबा इस वनखण्ड के पूर्वी दिशा में चम्बल नदी एवं दक्षिण दिशा में वनास नदी इसकी सीमा बनाती है।

[संख्या एफ.3(34)वन/2007]

जयपुर, जुलाई 6, 2012

एस. ओ. 66:- राज्य सरकार वन्यजीव (रक्षक) अधिनियम, 1972 (1972 का केन्द्रीय अधिनियम संख्या 53) की धारा 38 V की शक्तियों का प्रयोग करते हुए सम्बद्ध ग्राम सभा एवं विशेषज्ञ समिति से परामर्श उपरांत एतद्वारा इस विभाग की समसंख्यक अधिसूचना दिनांक 28-12-2007 से अधिसूचित सरिस्का व्याघ्र आरक्षित (Tiger Reserve) के क्रान्तिक व्याघ्र निवासी क्षेत्र (Critical Tiger Habitat) के चारों ओर नीचे अनुसूची - I में वर्णित वन एवं राजस्व क्षेत्र, जिसकी सीमाएं अनुसूची - II में वर्णित है, जहां क्रान्तिक व्याघ्र निवास की समग्रता और व्याघ्र प्रजातियों के लिए पर्याप्त विचरण को सुनिश्चित करने के लिए न्यूनतम मात्रा में निवास संरक्षण अपेक्षित है, जिसका उद्देश्य वन्यजीव और मानव क्रियाकलाप के बीच स्थानीय व्यक्तियों के जीविकोपार्जन, विकास, सामाजिक और सांस्कृतिक अधिकारों की सम्यक् मान्यता के साथ सह अस्तित्व

का संवर्धन करना है, को वफर क्षेत्र घोषित करती है। जिसे भविष्य में "सरिरका व्याघ्र आरक्षिति के मध्यवर्ती क्षेत्र (Buffer area)" के रूप में जाना जावेगा।

अनुसूची - I
जिला अलवर वन क्षेत्र
वन मण्डल अलवर

क्र. सं.	रेज	वन खण्ड	वन का प्रकार	क्षेत्रफल (हेक्टेयर में)
1.	अलवर	सीराबास	आरक्षित वन	2555.59
2.	अलवर	शेदावास	आरक्षित वन	3726.90
3.	अलवर	डडीकर	आरक्षित वन	2808.73
4.	अलवर	निदानी	आरक्षित वन	1570.43
5.	अलवर	भाखेडा	आरक्षित वन	2885.74
6.	अलवर	धामला का बास	संरक्षित वन	600.86
7.	अलवर	हमीरपुर-क.नं 1 से 5	संरक्षित वन	717.84
8.	अलवर	धामला का बास A	संरक्षित वन	88.06
9.	अलवर	उमरैण	संरक्षित वन	511.04
10.	अलवर	बाग केशरपुर	संरक्षित वन	35.39
11.	अलवर	भाकेडा	संरक्षित वन	69.31
12.	अलवर	घोली घूप	संरक्षित वन	41.18
13.	अलवर	बल्ला वीडा	संरक्षित वन	31.55
14.	अलवर	जटियाना	संरक्षित वन	103.79
15.	अलवर	टोडियार A	संरक्षित वन	170.93
16.	अलवर	बीघोता (क.नं. 5 से 9)	आरक्षित वन	2096.87
योग				18014.21

जिला अलवर राजस्व क्षेत्र

क्र. सं.	खण्ड संख्या व क्षेत्रफल (हेक्टेयर में)	ग्राम का नाम	तहसील	क्षेत्रफल (हेक्टेयर में)
1	2	3	4	5
1.	1 (3076.08)	1--सिरावास	अलवर	680.86
2.		2--ढहलावारा	अलवर	711.31
3.		3--चकशामलात	अलवर	97.96
4.		4--रामनगर	अलवर	189.93
5.		5--रोगडा	अलवर	334.86
6.		6--बख्तपुरा	अलवर	195.97
7.		7--रुंध बीनक	अलवर	126.46
8.		8--किशनपुर	अलवर	161.34
9.		9--पैतपुर	अलवर	339.83
10.		10--दौबा रिगतपुरी	अलवर	222.48
11.		11--शोदानपुरा	अलवर	15.08

1	2	3	4	5
12.	2 (60.71)	टोडा जयसिंहपुरा	राजगढ	60.71
13.	3 (143.50)	1-खिरतकावास	राजगढ	83.12
14.		2-तोडीकावास	राजगढ	51.49
15.		3-भानगढ	राजगढ	8.89
16.	5 (1835.70)	1-गुवाडा कुण्डयाल	थानागाजी	99.32
17.		2-अजवगढ	थानागाजी	195.70
18.		3-गुवाडा डावर	थानागाजी	013.85
19.		4-गुवाडा घासी	थानागाजी	136.20
20.		5-गुवाडा हनुमान	थानागाजी	58.25
21.		6-गुवाडा लालामैया	थानागाजी	12.98
22.		7-गुवाडा सायब	थानागाजी	20.07
23.		8-गुवाडा भगवान	थानागाजी	55.82
24.		9-गुवाडा जानावत	थानागाजी	15.21
25.		10-गुवाडा हार	थानागाजी	113.83
26.		11-गुवाडा बिरकडी	थानागाजी	225.60
27.		12-गुवाडा सोती	थानागाजी	42.13
28.		13-गुवाडा व्यास	थानागाजी	15.11
29.		14-गुवाडा जर्मीदार	थानागाजी	8.42
30.		15-गुवाडा रामजी	थानागाजी	168.49
31.		16-गुवाडा गुगली	थानागाजी	166.85
32.		17-गुवाडा लेखावा	थानागाजी	04.12
33.		18-गुवाडा निरमा	थानागाजी	54.25
34.		19-गुवाडा राडी	थानागाजी	119.02
35.		20-गुवाडा कालोत	थानागाजी	54.45
36.		21-भूरियावाली	थानागाजी	256.03
37.	6 (56.24)	रायपुरा	थानागाजी	56.24
38.	7 (885.60)	1-मानावास	थानागाजी	326.10
39.		2-गुण्डावरा	थानागाजी	559.50
40.	8 (1644.08)	1-लेकडी	वानसूर	210.93
41.		2-घाट	वानसूर	331.48
42.		3-बहरामकावास	वानसूर	190.20
43.		4-गुण्डली	वानसूर	1.42
44.		5-गुडा भाखरवाला	वानसूर	171.65
45.		6-कल्याणपुरा	वानसूर	38.44
46.		7-करवा रामपुर	वानसूर	614.60
47.		8-धागलाकाबास	वानसूर	85.36
48.	9 (15.47)	हाजीपुर	वानसूर	15.47
49.	10 (536.32)	दुहारमाला	थानागाजी	536.32
50.	11 (392.22)	नाथूसर	वानसूर	392.22

1	2	3	4	5
51.	12 (5.00)	गुवाडा रईका (माधोगढ)	अलवर	5.00
योग				8650.92

**जिला जयपुर वन क्षेत्र
वन मण्डल जयपुर (मध्य)**

क्र. सं.	नाम वनखण्ड	वन क्षेत्र का प्रकार	क्षेत्रफल (हैक्टर में)
1.	बडी लाईन डीगोता 61	आरक्षित वन	6558.00

मध्यवर्ती क्षेत्र (Buffer area) का विवरण

वन क्षेत्र में मध्यवर्ती क्षेत्र :	24572.21 हैक्टर
राजस्व क्षेत्र में मध्यवर्ती क्षेत्र :	8650.92 हैक्टर
कुल योग :	33223.13 हैक्टर

अनुसूची - II

सीमा विवरण

खण्ड- 1 रक्षित वनखण्ड हमीरपुर के कम्पार्टमेंट 5 की उत्तरी पश्चिमी सीमा के कोने से प्रारम्भ होकर कम्पार्टमेंट नं. 5 की उत्तरी सीमा तथा कम्पार्टमेंट 5, 4, 3 व 2 की पूर्वी सीमा तथा कम्पार्टमेंट 1 की पश्चिमी-उत्तरी सीमा के साथ-साथ चलते हुए आरक्षित वनखण्ड सीरावास के कम्पार्टमेंट 19, 17, 16 व 15 की पूर्वी सीमा के साथ-साथ, आरक्षित वनखण्ड डडीकर के कम्पार्टमेंट नं. 3 की पूर्वी सीमा के साथ-साथ तथा कम्पार्टमेंट नं. 4, 5, 10, 11 व 12 की उत्तरी सीमा के साथ-साथ। यहां से रक्षित वनखण्ड की टोडियार ए की पश्चिमी-उत्तरी सीमा तक। रक्षित वनखण्ड टोडियार के उत्तर-पूर्व कोने से प्रारम्भ होकर रक्षित वनखण्ड जटियाना, धौली धूप, बल्लाबोडा की पूर्वी सीमा के साथ-साथ। यहां से आरक्षित वनखण्ड निदानी के कम्पार्टमेंट 7, 8 व 9 की पूर्वी सीमा तथा कम्पार्टमेंट 9 की दक्षिण सीमा के साथ-साथ, आरक्षित वनखण्ड भाखेडा के कम्पार्टमेंट 1, 2, 3 व 4 की उत्तरी सीमा के साथ-साथ तथा कम्पार्टमेंट 4 व 5 की पूर्वी सीमा के साथ-साथ, रक्षित वनखण्ड भाखेडा की सीमा तक। यहां से रक्षित वनखण्ड भाखेडा की पूर्वी सीमा, आरक्षित वनखण्ड के कम्पार्टमेंट 5 व 7 की पूर्वी सीमा के साथ-साथ तथा रक्षित वनखण्ड बाड केसरपुर व रक्षित वनखण्ड उगरेन की पूर्वी-दक्षिणी सीमा के साथ-साथ। यहां से आरक्षित वनखण्ड भाखेडा के कम्पार्टमेंट नं. 11 ए की दक्षिणी कोने तक। यहां से ग्राम साहोडी की उत्तरी सीमा (जो इसी ग्राम के खसरा नं. 1, 36,

37, 38, 91, 92, 93, 94, 134, 135, 139, 140, 145, 146, 147, 148 की उत्तरी सीमा भी बनती है) के साथ-साथ आरक्षित वनखण्ड वीनक के कम्पार्टमेंट नं. 16 की पूर्वी सीमा के मिलन बिन्दु तक। आरक्षित वनखण्ड वीनक के कम्पार्टमेंट नं. 16, 11 वी, 15 के साथ उत्तर से चलकर क्रिड्रीकल टाइगर हैबीटाट की सीमा के साथ-साथ चलकर रक्षित वनखण्ड हमीरपुर के कम्पार्टमेंट 5 की उत्तरी पश्चिमी कोने तक।

- खण्ड- 2** आरक्षित वनखण्ड वीघोता के कम्पार्टमेंट नं. 8 के उत्तरी-पश्चिमी कोने से चलकर कम्पार्टमेंट नं. 8, 9 की उत्तरी सीमा के साथ-साथ तथा कम्पार्टमेंट नं. 9, 8, 7, 6 व 5 की पूर्वी सीमा के साथ-साथ चलकर जिला दौसा-सीमा तक। यहां से पश्चिम में जिला सीमा (कम्पार्टमेंट नं. 5 की दक्षिणी सीमा) के साथ-साथ चलकर दक्षिणी-पश्चिमी कोने तक। यहां से इसी रक्षित वनखण्ड की पश्चिमी सीमा के साथ-साथ चलकर उत्तरी-पश्चिमी कोने तक। यहां से रक्षित वनखण्ड जयसिंहपुरा की उत्तरी सीमा के साथ-साथ चलकर दक्षिणी-पश्चिमी कोने तक। यहां से सीधे चलकर वनखण्ड जयसिंहपुरा में की दक्षिणी पश्चिमी सीमा के मिलन बिन्दु तक। यहां से दक्षिण सीमा के साथ-साथ चलकर कम्पार्टमेंट नं. 6, 7 व 8 की पश्चिमी सीमा के साथ-साथ चलकर क्रिड्रीकल टाइगर हैबीटाट के रक्षित वनखण्ड जयसिंहपुरा में की सीमा के मिलान बिन्दु कम्पार्टमेंट नं. 8 की उत्तरी-पश्चिमी कोने तक।
- खण्ड- 3** क्रिड्रीकल टाइगर हैबीटाट के आरक्षित वनखण्ड नारायणी जी के कम्पार्टमेंट नं. 2 के दक्षिणी-पश्चिमी कोने से चलकर रक्षित वनखण्ड धीरंडा (क्रिड्रीकल टाइगर हैबीटाट) के पश्चिमी वन सीमा के साथ-साथ चलकर इस वनखण्ड के दक्षिणी-पश्चिमी कोने तक। यहां से पश्चिम में सरसा गाता बांध की पाल के साथ-साथ चलकर आरक्षित वनखण्ड गानगढ़ के कम्पार्टमेंट नं. 3 की पूर्वी सीमा तक। यहां से उत्तर में चलकर इसी वनखण्ड के कम्पार्टमेंट नं. 2 व 3 की पूर्वी सीमा तथा रक्षित वनखण्ड खिरत का वास की पूर्वी वन सीमा के साथ-साथ चलकर आरक्षित वनखण्ड अजवगढ़ के कम्पार्टमेंट नं. 2 की दक्षिणी सीमा तक। यहां से पूर्व को चलकर आरक्षित वनखण्ड नारायणीजी के कम्पार्टमेंट नं. 2 के दक्षिणी-पश्चिमी कोने तक।
- खण्ड- 4** आरक्षित वनखण्ड बडी लाईन डीगोता 61 के दक्षिणी-पूर्वी कोने से प्रारम्भ होकर इसी वनखण्ड की दक्षिणी-पश्चिमी वन सीमा (जिला सीमा) के साथ-साथ चलकर क्रिड्रीकल टाइगर हैबीटाट के रक्षित वनखण्ड पिपलाई में की दक्षिणी सीमा के मिलान बिन्दु तक। यहां से उत्तर व पूर्व को जिला सीमा (क्रिड्रीकल टाइगर हैबीटाट) के साथ-साथ चलकर वनखण्ड बडी लाईन डीगोता 61 के दक्षिणी-पूर्वी कोने तक।
- खण्ड- 5** क्रिड्रीकल टाइगर हैबीटाट के रक्षित वनखण्ड नडोली के दक्षिणी-पूर्वी कोने से प्रारम्भ होकर पूर्व को इसी ग्राम के खसरा नं. 861 की दक्षिणी सीमा (जो ग्राम भूराती की उत्तरी सीमा भी है) के साथ-साथ

चलकर ग्राम कलियान की दक्षिणी सीमा जो ग्राम कलियान के खसरा नं० 502, 503, 507, 508, 510, 408 की दक्षिणी सीमा भी है, के साथ-साथ नदी तक। यहां से ग्राम कलियान की सीमा से ग्राम गुवाडा सीरा के खसरा नं० 135 व 142 की पश्चिमी सीमा के साथ-साथ ग्राम गुवाडा डाबर की सीमा तक। यहां से गुवाडा सीरा की दक्षिणी सीमा के साथ-साथ (खसरा नं० 143, 144, 155, 156, 162, 171, 184, 182, 187, 188, 189, 193, 198, 199, 204, 205 की दक्षिणी सीमा है) चलकर क्रिड्रीकल टाइगर हैबीटाट की सीमा तक। यहां से आरक्षित वनखण्ड सिलीबावडी के कम्पार्टमेंट नं. 4 व 5 के मिलान बिन्दु तक। यहां से इसी वनखण्ड सिलीबावडी के कम्पार्टमेंट नं. 5, 6 की पश्चिमी सीमा के साथ-साथ तथा आरक्षित वनखण्ड नारायणीजी के कम्पार्टमेंट नं. 5 वी की पश्चिमी सीमा, कम्पार्टमेंट नं. 4 की उत्तरी सीमा, कम्पार्टमेंट नं. 1 की पूर्वी- उत्तरी-पश्चिमी सीमा के साथ-साथ चलकर जयसागर बांध (अजबगढ़) तक। यहां से जयसागर बांध की पाल के साथ-साथ चलकर आरक्षित वनखण्ड अजबगढ़ के कम्पार्टमेंट नं. 1 तथा रक्षित वनखण्ड पिपलाई मैन की पूर्वी वन सीमा के साथ-साथ (सिद्ध का तिराहा से पहले) ग्राम नडोली की ग्राम सीमा तक। यहां से इसी ग्राम के खसरा नं० 17, 18 व 19 की उत्तरी सीमा के साथ-साथ चलकर रक्षित वनखण्ड नडोली की दक्षिणी सीमा के साथ-साथ चलते हुए इसी वनखण्ड के दक्षिणी-पूर्वी कोने तक।

खण्ड- 6 ग्राम रायपुरा के पास रक्षित वनखण्ड रायपुरा की पूर्वी वन सीमा के कोने से प्रारम्भ होकर वनखण्ड की पूर्वी-उत्तरी वन सीमा के साथ-साथ चलकर आरक्षित वनखण्ड जांघावास मय राजौर के कम्पार्टमेंट नं. 6 के मिलान बिन्दु तक। यहां से कम्पार्टमेंट नं. 6 व 5 की पश्चिमी सीमा के साथ-साथ चलकर कम्पार्टमेंट नं. 5 की पश्चिमी व दक्षिणी सीमा के मिलान बिन्दु तक। यहां से ग्राम रायपुरा की दक्षिणी सीमा (खसरा नं० 99, 100, 103) की दक्षिणी सीमा के साथ-साथ चलकर खसरा नं० 165, 148, 166, 108, 96, 61, 58, 56, 15, 7 की पश्चिमी सीमा (जो वन सीमा भी है) के साथ-साथ चलकर ग्राम की आवादी खसरा नं० 16 के पास रक्षित वनखण्ड रायपुरा की उत्तरी-पूर्वी कोने पर वन सीमा के मिलान बिन्दु तक। (बफर क्षेत्र में शामिल खसरा नं० 15, 17 से 58, 61 से 95, 97 से 107)

खण्ड- 7 क्रिड्रीकल टाइगर हैबीटाट के आरक्षित वनखण्ड बनी तालवृक्ष के उत्तरी पूर्वी कोने (खसरा नं० 2043) से खसरा नं० 2026 (नाला), खसरा नं० 2011 (नदी) के साथ-साथ घूम तक। यहां से खसरा नं० 1980 के साथ-साथ चलकर खसरा नं० 1940, 1939, 1936, 1935 की उत्तरी सीमा के साथ-साथ चलते हुए ग्राम सीमा तक। यहां से ग्राम मानावास के खसरा नं० 35, 37, 39 व 29 की पश्चिमी सीमा के साथ-साथ चलकर रक्षित वनखण्ड मानावास के दक्षिणी-पश्चिमी सीमा मिलान के कोने तक। यहां से इसी वनखण्ड मानावास की

दक्षिणी-पूर्वी सीमा के साथ-साथ चलकर उत्तरी-पूर्वी कोने तक। यहां से सीधे पूर्व में खसरा नं. 405, 406, 409, 410, 412, 413, 416 की उत्तरी सीमा के साथ-साथ चलकर क्रिड्रीकल टाइगर हैबीटाट की सीमा तक। यहां से दक्षिण में चलकर क्रिड्रीकल टाइगर हैबीटाट की सीमा के साथ-साथ चलकर ग्राम बैरावास की उत्तरी सीमा तक। यहां से पश्चिम में क्रिड्रीकल टाइगर हैबीटाट की सीमा (जो ग्राम सीमा है) के साथ-साथ चलकर कुशलगढ़-नारायणपुर सड़क तक। यहां से सड़क के साथ-साथ उत्तर में क्रिड्रीकल टाइगर हैबीटाट की सीमा के साथ चलते हुए आरक्षित वनखण्ड बनी तालवृक्ष के उत्तरी-पूर्वी कोने तक।

खण्ड- 8 ग्राग लेकडी के दक्षिण-पूर्व में इसी ग्राम के साविक खसरा नं0 365 के दक्षिणी-पश्चिमी कोने (जो वन सीमा भी है) से प्रारम्भ होकर खसरा नं0 365 की पश्चिमी, खसरा नं0 392, 394, 407, 406 की पूर्वी सीमा के साथ-साथ चलकर रक्षित वनखण्ड लेकडी ए के दक्षिणी-पूर्वी कोने तक। यहां से इसी वनखण्ड व रक्षित वनखण्ड घाट वी तथा ग्राग घाट के साविक खसरा नं0 320 की पूर्वी सीमा के साथ-साथ चलकर रक्षित वनखण्ड मूण्डली के दक्षिणी-पूर्वी कोने तक। यहां से रतनपुरा-बहराम का बास सड़क के साथ-साथ पूर्व में चलकर वनखण्ड घाट ए की सीमा क्रॉस तक। यहां से वनखण्ड घाट ए की पश्चिमी-दक्षिणी-पूर्वी सीमा के साथ-साथ चलकर इसी सड़क के क्रॉसिंग बिन्दु तक। यहां से रतनपुरा-बहराम का बास- रामपुर सड़क के साथ-साथ ग्राम रामपुर से उत्तर में नाला क्रॉसिंग तक। यहां से इस नाले के साथ-साथ चलकर ग्राम की आबादी को बाहर रखते हुए दक्षिण में स्थित पहाड़ियों को शामिल करते हुए ग्राम रामपुर से गुढा- कल्याणपुरा सड़क के साथ-साथ कल्याणपुरा तक। यहां से आरक्षित वनखण्ड रामपुर के कम्पार्टमेंट नं. 7 की पश्चिमी सीमा तक। यहां से दक्षिण की ओर चलकर इसी वनखण्ड के कम्पार्टमेंट नं. 3 व 4 की पश्चिमी सीमा व कम्पार्टमेंट नं. 8, 9, 10, 11, 12, 31 व 32 की उत्तरी सीमा के साथ-साथ तथा रक्षित वनखण्ड रामपुर की उत्तरी-पश्चिमी वन सीमा व रक्षित वनखण्ड घाट मैन की पूर्वी वन सीमा के साथ-साथ चलकर वन चौकी बहराम का बास के पश्चिमी-उत्तरी कोने तक। यहां से घाट को जाने वाली सड़क के साथ-साथ ग्राम घाट की ढाणी तक। यहां से रक्षित वनखण्ड घाट मैन की पश्चिमी वन सीमा के साथ-साथ तथा रक्षित वनखण्ड लेकडी मैन की उत्तरी-पश्चिमी सीमा के साथ-साथ चलकर ग्राम लेकडी के दक्षिण में वनखण्ड लेकडी मैन के प्रारम्भिक बिन्दु खसरा नं0 365 के दक्षिणी-पश्चिमी कोने तक।

खण्ड- 9 रक्षित वनखण्ड हाजीपुर के दक्षिणी-पूर्वी कोने से प्रारम्भ होकर वनखण्ड की पूर्वी सीमा के साथ-साथ चलकर उत्तरी-पूर्वी कोने तक। यहां से सीधे पूर्व में खसरा नं0 687, 688 की दक्षिणी सीमा के साथ-साथ चलकर आरक्षित वनखण्ड रामपुर के कम्पार्टमेंट नं. 1 की पश्चिमी सीमा तक। यहां से दक्षिण में चलकर कम्पार्टमेंट नं. 1 की

पश्चिमी सीमा के साथ-साथ चलकर कम्पार्टमेंट नं. 2 की उत्तरी सीमा के मिलान बिन्दु तक। यहां से ग्राम हाजीपुर के खसरा नं० 721, 722, 723, 724 की दक्षिणी, 724, 717, 718, 707 की पश्चिमी सीमा के साथ-साथ चलकर रक्षित वनखण्ड हाजीपुर के दक्षिणी-पूर्वी कोने तक।

खण्ड- 10 क्रिड्रीकल टाइगर हैबीटाट के रक्षित वनखण्ड दुहारमाला के मध्य इन्टीरियर वन सीमा लाईन के अन्दर स्थित समस्त राजस्व क्षेत्र शामिल है।

खण्ड- 11 क्रिड्रीकल टाइगर हैबीटाट के रक्षित वनखण्ड नाथूसर के मध्य इन्टीरियर वन सीमा लाईन के अन्दर स्थित ग्राम लोज नाथूसर का समस्त राजस्व क्षेत्र शामिल है।

खण्ड- 12 गुवाडा रईका की आबादी व काश्त रकबा शामिल है।

[संख्या एफ.3(34)वन/2007]
राज्यपाल की आज्ञा से,
सी.एस. रत्नासामी,
शासन सचिव,
वन विभाग,
शासन सचिवालय, जयपुर।

राज्य केन्द्रीय मुद्रणालय, जयपुर।

FOREST DEPARTMENT

NOTIFICATION

Jaipur, November 7, 1955.

Miscellaneous No. P. 39(2) For. 155.—In exercise of the powers conferred under Section 5 of the Rajasthan Wild Animals and Birds Protection Act, 1951, the Rajpramukh is pleased to declare the following areas the boundaries of which are described in Schedule A attached hereto, as Reserved Areas wherein it shall be unlawful to hunt, shoot, net, trap, snare, capture or kill any kind of wild animals and birds at any time of the year.

(1) Jaisamand. (2) Sawai Madhopur. (3) Sariska. (4) Darrah. (5) Dholpur (Ramsagar, Ban Bihar and Kesarbagh).

SCHEDULE A.

Jai Samand.	East :—Gandhi village and Jaisamand Bund. West :—Jadina and Pladhar village. North :—Nandvi, Advaa, Guda, Dayana and Juni Jhari villages. South :—Ghanda-ji-ka-Gara, and Nehudi, Bambuda, viran, Ghatot, Veerpur and Ghatpur villages.
Sawai Madhopur:	East :—Sawai Madhopur-Khandar Road. West :—Mor Doongri and Mansorowar. North :—Chindali forests. South :—Gosadan, Indala.
Sariska.	East :—Kalighat-Tehla Road. West :—Thana Gazi, Amra-ka-Bas, Mala Dohar. North :—Indok, Karma-ka-Bas Protected Zamindar forests. South :—Dabkah, Reserved forests.
Darrah.	East :—The Ahu and Kali Sindh-rivers. West :—The Chambal river. North :—The Mukandwara hill range from the Kalisindh rivers, along Kalipura, Chand baori, Baontha and Molse villages. South :—The Mukandwara hill range from the Chambal to the Kalisindh, along Ghantoli & Ghati Jagda villages.
Dholpur (Ramsagar).	East :—Sateri Village. West :—Jamura, Neharawalala villages. North :—Ramsagar embankment. South :—Pucca Road from Dholpur to Gurja.
Dholpur (Ban Bihar).	East :—Patwari Village. West :—Waripura. North :—Kukpur Bibhi village. South :—Virpur Baripura Village.
Dholpur (Kesarbagh).	East :—Bichia village. West :—Bishonoda. North :—Hirnoda village. South :—Garbapura village.

By Order
P. N. KAUL

Secretary to the Government.

CHARBHUJA TALKIES

- (1) Exits do not directly open on main road (Rule 18 (1)).
- (2) There is no parking place provided within the enclosures (Rule 18 (4)).
- (3) There is no cloak room (Rule 31(1)).
- (4) The floor of the landing is 4' thick (Rule 33 (6)).
- (5) The height of Tiers is less than that mentioned in (Rule No. 23 (1)).

- (4) There shall be maintained sufficient number of exits to enable cinemagoers to come out immediately in the event of out-break of fire etc.; and
- (5) Adequate arrangement for seating and other normal conveniences shall be made for cinemagoers.

By Order of the Governor,
C. S. GUPTA,
Secretary to the Government.

Jaipur, September 2, 1958.

No. F. 14 (20)/Homs. D/58.—In exercise of the powers conferred by section 11 of the Rajasthan Cinemas (Regulation) Act, 1952 (Act No. XXX of 1952), the Rajasthan Government, being of the opinion that reasonable grounds exist for doing so, does hereby direct that the conditions contained in Sub-Rule (3) of Rule 3 of the Rajasthan Cinemas (Regulation) Rules, 1953 that the aggregate period of a temporary licence cannot exceed six months in a calendar year, shall not apply to cinematograph exhibition of films by the Kanwal Talkies, at Raisinghnagar, District Ganganagar, for a period of six months commencing from the date of orders subject to the conditions that :—

- (1) There shall be made adequate arrangement for prevention of fire;
- (2) The screen will be cordoned off and kept apart from the place where people will sit;
- (3) The temporary structure where exhibition of cinematograph will be made, shall be temporarily covered in rainy and winter seasons;

**EXCISE AND TAXATION DEPARTMENT
NOTIFICATION**

Jaipur, September 4, 1958.

No. F. 7 (15)/E & T/58.—In exercise of the powers conferred by sub-section 2 of section 7 of the Rajasthan Entertainments Tax Act, 1957 (Act No. 24 of 1957) the State Government being of the opinion that reasonable grounds exist for doing so in the public interest, hereby exempts from the payment of entertainments tax the Foot-ball matches to be played at Ajmer by the Rajasthan Foot-ball Association, Ajmer with effect from the 9th September, 1958.

2. This exemption will be only for this particular occasion.

By Order of the Governor,
G. S. PUROHIT,
Secretary to the Government.

**REVENUE (A) DEPARTMENT
NOTIFICATION**

Jaipur, August 5, 1958.

No. F. 33 (2) Rev. A/54.—In exercise of the powers conferred by section 5 of the Rajasthan Wild Animals and Birds Protection Act, 1951, (Act No. XIII of 1951) the Governor is hereby pleased to make the following amendment in the Schedule 'A' to the Forest Department Notification, Miscellaneous No. F. 33 (2) For./55 dated 7-11-1955, namely:—

AMENDMENT

In the said notification—
For the existing entries against Sawai Madhopur and Sariska, the following entries may be substituted:—

Sawai Madhopur	East.	Glaisagar, Korvan hill, Khandar Sawai Madhopur service road.
	West.	Bodel Khandar Forest Road (2 miles) Tenduwala Patta, Soleshwar Range Misra Dra.
	North.	Dang Itawda, Hills of Berda and Lakarda, Millak talab Misra Dra.
	South.	Khandar-Sawai Madhopur Road.
	East.	Dangawara, Borota, Thosra, Naya Gaon, Bhandodi, Baleta, Mundawara, Prithipura, Impipura, Chand Pahari, Nirbhanpura and Dharampura village.
Sariska	West.	Mundawara, Rechamala, Duharmala, Thanagazi, Amarkabas, Jodha Bas, Shyempura, Rajpura, Gopal pura and Jaipura Villages.
	North.	Mundawar, Manawas villages, Adamasa Reserved Forest, Raska Guara and Kali Khol Reserved Forests.
	South.	Spliberi Reserved Forest, Kalwar villages, Tilwari Reserved Forests, Dadkan, Ghewar, Chavaka Bas, Munlipura, Nanda villages and Tehla-Rajgarh Road.

राजस्थान-सरकार
राज्य-8 विभाग

क्रमांक/एफ 11 22 राज-8/78 जयपुर, दिनांक 27 अगस्त, 1982
अधि-सूचना

यथा: राज्य सरकार को यह प्रतीत होता है कि इससे संलग्न उपाबंध में परिनिश्चित क्षेत्र को उत्तम पाये जाने वाले वन्य जीवों के संरक्षण, प्रचारणा एवं उनके विकास व पर्यावरण के प्रयोजनार्थ उसके परिस्थितिक, प्राणी जालीय, वैज्ञानिक, भू संरचना तथा प्राणी विज्ञान संबंधी कार्यक्रम और महत्त्व के कारण राष्ट्रीय उद्यान के स्तर में गठित करने की आवश्यकता है।

अतः वन्य जीव संरक्षण अधिनियम, 1972 1972 का केन्द्रीय अधिनियम सं053 की धारा 35 की उप धारा 1 के अधीन प्रदत्त शक्तियों के प्रयोग में राज्य सरकार उक्त क्षेत्र एक राष्ट्रीय उद्यान जिसको "राष्ट्रीय उद्यान सरिस्का" के नाम से उदबोधित किया जावेगा, के स्तर में गठित करने के अपने आशय की इसके द्वारा घोषणा करती है।

उपाबंध

- 1- उत्तर - बारा नाहरखोरा जंगली, नल देश्वर, धमोडी, भूसुरि, करना का बास, सरिस्का, राहूका माला, दुलार माला तालवृक्ष।
- 2- पूर्व - नाडू जंगल, बोरेठा की पहाडी, देवरी आरक्षित वन घुण्ड, सीती-बेरी आरक्षित वन घुण्ड, नाहर सत्ती, पृथ्वीपुरी की पहाडी रक्षित वन बारा न।
- 3- पश्चिम - तालवृक्ष, पहाडी राई का माला, ताल गेट, उदयनाथ।
- 4- दक्षिण - समस्त, बारायावास ग्राम जंगली भगानी, भगानी से कार्वा लाडी तालवृक्ष घुण्ड।

बाका से
3
मानन्द मोहन शर्मा
राजस्थान सरकार

क्रमांक/एफ 11 22 राज-8/78 जयपुर, दिनांक

प्रतिलिपि सूचार्थ एवं आवश्यक कार्यवाही हेतु निम्नांकित को:-

- 1- सचिव, राजस्थान मत्तोदय, राजस्थान जयपुर
- 2- सचिव, वन्य जीव संरक्षण, राजस्थान जयपुर
- 3- समस्त निजी अधिकारी, मंत्री/उप मंत्री, राजस्थान जयपुर।

4090, 30--2

Annexure - 5

राजस्थान सरकार
राजस्व विभाग-33

प्रमाण संख्या 11/22/राज/8/78

जयपुर, दिनांक :- 29.5.85

अधिसूचना

इस विभाग की समेकित अधिसूचना दिनांक 27.8.82 के उपाबंध में जो सीमाये दर्शायी है उनका स्पष्टीकरण निम्न प्रकार से किया जाता है:-

उत्तर:- वाराणसी पुरा अधीन वन अण्ड कम्पाटमेन्ट नं. 1 व 2 की उत्तरी सीमा ॥ नाहरपोरा जंगल ॥ भादोपेट वन अण्ड रजिस्ट्र के कम्पाटमेन्ट नं. 1-2 की उत्तरी सीमा ॥ नमरोवर कुशाभट वारजित वन अण्ड कम्पाटमेन्ट नं. 1 व 2 की उत्तरी सीमा ॥ धौडी ॥ पूर्व इन्दोक वन अण्ड वारजित के कम्पाटमेन्ट नं. 2 की उत्तरी सीमा ॥ भूतवरी ॥ पूर्वी इन्दोक वन अण्ड वारजित के कम्पाटमेन्ट नं. 4 व 5 की उत्तरी सीमा ॥ फरनाकावास सरिखा ॥ काली घाटी वन अण्ड वारजित के कम्पाटमेन्ट नं. 9-8 की उत्तर पूर्व सीमा कम्पाटमेन्ट नं. 7 की पूर्वी सीमा, इन्दोक परिचमी वन अण्ड वारजित के कम्पाटमेन्ट नं. 1 व 4 की पूर्वी सीमा, ॥ दहारमाला ॥ दहारमाला वन अण्ड वारजित के कम्पाटमेन्ट नं. 4 की पूर्वी सीमा कम्पाटमेन्ट नं. 3 की पूर्वी सीमा होते हुए ॥ रैकामाला ॥ रैकामाला वारजित वन अण्ड के कम्पाटमेन्ट नं. 4-3 व 2 की पूर्वी सीमा ॥ तालवृक्ष ॥ वनीताल वन अण्ड तालवृक्ष में मन्दिर व वनीको को बहार करते हुए ॥

परिचमी:- ताल वृक्ष ॥ वनीताल वृक्ष की दक्षिण सीमा ॥ बहाडी रैकामाला ॥ रैकामाला वन अण्ड वारजित की परिचमी सीमा व दहारमाला वन अण्ड वारजित कम्पाटमेन्ट नं. 4 की परिचमी सीमा ॥ दहारमाला वन अण्ड के इन्टरनल डिभाइजन लाईन होते हुए दहारमाला वन अण्ड के कम्पाटमेन्ट नं. 1 का पूर्वी भागीटाल को शामिल करते हुए ॥ तालगेट ॥ कालीघाटी वन अण्ड वारजित के कम्पाटमेन्ट नं. 5 की परिचमी सीमा व काली घाटी कम्पाटमेन्ट नं. 4, 3, व 2 की परिचमी सीमा ॥ उदयनाथ काली घाटी वन अण्ड वारजित के कम्पाटमेन्ट नं. 43 की दक्षिणी व परिचमी सीमा 42 की परिचमी सीमा व काकवाडी वन अण्ड वारजित के कम्पाटमेन्ट नं. 14 की परिचमी सीमा ॥

दक्षिण:- उदयनाथ ॥ काकवाडी वन अण्ड वारजित के कम्पाटमेन्ट नं. 14 के

कार्यालय जिला धौश अल्वर जिला अल्वर
 दिनांक नं. 398/28 राज/73/6805-8 दिनांक 25 नवम्बर, 1975

धौश पत्र

भारत सरकार के वन्य जीवन अधिनियम 1972 की धारा 21 में प्रदत्त शक्तियों का प्रयोग करने हुए मैं, आदर्श किशोर, जिला धौश जिला अल्वर धौश पत्र जारी करता हूँ -

शिकारियों के वन्य से जीवन से नुकसान जो राज्य सरकार, नोटिफिकेशन संख्या सं. 5039/28 रेव/54 दिनांक 5-8-1958 द्वारा वन्य जीवन से नुकसान को रोकने और जिसको, सोमाए निम्न प्रकार है।

सहस्रिका पूर्व - डारवाड़ा, जोरेटा, धेरसरा, न्यागांव, अमरावाड़ा, भोरोडी, आलेटा, मण्डावरा, पथवोपुरा, कांदपहाड़ी, निर्भयपुरा, धर्मपुरा।

पश्चिम - मण्डावरा, रेकावाला, दोहारवाला, धानागाँव, अमरावाड़ा, जोधावाड़ा, श्यामपुरा, राउपुरा, गोपालपुरा, जलपारा

उत्तर - मण्डावरा, मायावाड़ा, जाडावाड़ा, चिनी फोरेस्ट एवं का गुवाड़ा, कालोडी और रिजर्व फोरेस्ट।

दक्षिण - सोलोवेरी रिजर्व फोरेस्ट, बालवाड़ा, मिलावाड़ी, रिजर्व फोरेस्ट, दुबकणी डेवर, चावाकाबास, मिलापुरा, नाड़, लहला, मोजगाड़ा, सडक

जो वन्य जीवन से नुकसान के अन्दर बसे हुए ग्रामों में निम्नलिखित नामों का बास 28 किगासका 3 उमरा देहरा को प्रथम वर्ण में रखा गया है। उन ग्रामों में जो भी व्यापक बसे हुए हैं वे अपनी भूमि निहित अधिकारों का पूर्ण विवरण सहित जिला अंतर्गत क्षेत्र में निर्धारित प्रथम दिनांक 28-11-1976 तक मेरे कार्यालय में असाबतन या वकाफतन हाजिर करने होंगे। उक्त निर्धारित तारीख तक बसे हुए ग्रामों में कराने पर आदेश जारी है। उनको समाप्त नहीं किया जाएगा।

आज, दिनांक 25 नवम्बर, 1975 को मेरे हस्ताक्षर व

हस्ताक्षर किया गया

हस्ताक्षर
 आदर्श किशोर
 जिला धौश अल्वर
 दिनांक 25 नवम्बर, 1975

तीनों गांवों में पृथक पृथक रूप से खुलेआम जन साधारण को सूचना देकर तथा एक प्रति अपने तहसील के नोटिस बोर्ड पर भी चूसा करे।

प्रतिलिपि विकास अधिकारी, पंचायत समिति उमरेण को प्रेषित कर दे कि वे एक प्रति जो सलग्न भेजी जा रही है अपने कार्यालय के नोटिस बोर्ड पर चूसा करे तथा एक प्रति ग्राम पंचायत माधोगढ़ के नोटिस बोर्ड पर जन साधारण को सूचना देकर चूसा करे।

मैजिस्ट्रेट कलेक्ट्रेट अलवर को एक अतिरिक्त प्रति भेजकर लेते हैं कि एक प्रति जिलाधीश कार्यालय के नोटिस बोर्ड पर चूसा कराये।

तहसीलदार थानागाजी को भेजकर लेते हैं कि वे एक प्रति अपने नोटिस बोर्ड पर चूसा करे।

हस्ता ०

जिलाधीश अलवर

Ally Steel

सहायक निदेशक
घाघरा योजना

कार्यालय उप जिला कलेक्टर प्रौढिकृत अधिकारी अलवर

क्रमांक/राजस्व/99/

दिनांक:-

आ दे श्री

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यतः माननीय उच्चतम न्यायालय के द्वारा सिविल रिट पिटिशन संख्या 337/95 में पारित निर्णय दिनांक 22.8.97 के अनुसरण में जिला अलवर में स्थित राष्ट्रीय उद्यान सरिस्का एवं राष्ट्रीय अभयारण्य सरिस्का क्षेत्र में बसे हुए निवासीयों के दावों एवं अधिकारों का निर्धारण किया जाना है।

राजस्थान सरकार वन विभाग द्वारा अधिसूचना संख्या एक 39/2/कोरे/55 दिनांक 7.11.1955 के द्वारा राजस्थान वन्य जीव एवं पक्षी संरक्षण अधिनियम 1951 के तहत आरक्षित क्षेत्र घोषित किया गया इसके अंतर्गत राजस्व विभाग द्वारा अधिसूचना क्रमांक एक 39/2/राज/ए 54 दिनांक 5.8.1958 को सरिस्का क्षेत्र वन्य जीव सैन्युरी कक्षोपित सीमायें निम्न प्रकार घोषित की गई।

पूर्व:- डांगरवाडा, बोरेटा, ^{पौसरा} पृथ्वीपुरा, नया गाँव, अण्डोड़ी, बानेटा मुण्डावरा, इमठीपुरा, चांदपाडी, निर्धमपुरा, एवं धर्मपुरा

पश्चिम:- मुण्डावरा, रेकामाला, दुडारमाला, थानागाजी, अयराकाबास जोधाबास, श्यामपुरा, रामपुरा, गोपालपुरा एवं जैतपुरा

उत्तर:- मुण्डावरा, भानाबास, आडामाला, रिजर्व वन, रेका गुवाडा कालीखोल, रिजर्व वन

दक्षिण:- तिलोवावरी, रिजर्व फोरस्ट दक्कन, धेवर, चावाकाबास, सुरलीपुरा नाडू विलेज एवं छ टहला राजगट रोड कालवाड, तिलवाडी रिजर्व फोरस्ट

उक्त अधिसूचना दिनांक 5.8.1958 के अनुसरण में जिला कलेक्टर अलवर द्वारा वन्य जीव संरक्षण अधिनियम 1972 की धारा 21 के तहत धोषणा पत्र संख्या प-39-2/राज/72/6805-8 दिनांक 25.11.1975 जारी कर इस क्षेत्र के अन्दर बसे हुये ग्राम 1. करनाकाबास, 2. किरास्का 3. उमरीदेवरी को प्रथम चरण में बाहर बसाने के लिये इसे क्षेत्र के निवासीयों के क्लेम निर्धारित प्रपत्र में दिनांक 28.11.1975 तक आमंत्रित किये गये। इसके अनुसरण में पुनः

धोषणा पत्र संख्या प-39-2/1/राज/72/8887-8907 दिनांक 24.11.1976

जारी किया गया। इसके तहत ग्राम डावली, छोटी इन्दोक डूगावाली कुण्डलका, देहरी देवरी में बसे निवासीयों के अधिकारों को तय करने हेतु क्लेम दिनांक 27.1.77 तक आमंत्रित किये गये। तत्पश्चात धोषणा पत्र संख्या एफ39-2-राज/72/1766-70 दिनांक 14.4.80 को जारी किया गया इसमें, ग्राम हरीपुरा, उमरी देवरी, डावली, छोटी इन्दोक, डूगावाली में बसे हुये निवासीयों के अधिकार निर्धारण हेतु क्लेम दिनांक 16.5.1980 तक आमंत्रित किये गये।

इस क्षेत्र में वनों ग्रामवासीयों के कोई क्लेम प्राप्त नहीं हुये। इस क्षेत्र के अन्दर आने वाले ग्राम करनकाबास, कास्का कुण्डलका को अन्य क्षेत्र में विस्थापित करने की कार्यवाही की गई। सरिस्का अभयारण्य क्षेत्र के अंतर्गत ही सरिस्का राष्ट्रीय उद्यान स्थित हैं। सरिस्का राष्ट्रीय उद्यान के संबंध में तत्संबंधी आदेशों द्वारा निर्धारित प्रतिबंध लागू रहेंगे। शेष वन क्षेत्र में वन्य जीव संरक्षण अधिनियम 1972 के प्रवधानों के तहत उक्त सरिस्का अभयारण्य क्षेत्र के लिये निम्न अधिकार निर्धारित किये जाते हैं।

- 1- लोक^{स्वयं}राजकीय दायित्वों के ^{निर्दिष्ट} में प्रवेश कर सकेंगे।
- 2- मुख्य वन जीव प्रतिपालक या उनके द्वारा अधिकृत अधिकारी द्वारा प्रवेश की अनुमति प्राप्त कर्ता ही प्रवेश कर सकेंगे।
- 3- अभयारण्य क्षेत्र में दिनांक 25.11.75 से पूर्व के विद्यमान रास्तों के अधिकार जो राजस्व अभिलेखों में अंकित है यथावत रहेंगे।
- 4- धार्मिक स्थल, पीने के पानी के स्थलों पर दिनांक 25.11.75 से पूर्व में विद्यमान अधिकार जो राजस्व अभिलेखों में अंकित है यथावत रहेंगे।
- 5- ऐसा कोई व्यक्ति जिसकी इस क्षेत्र में कोई अचल सम्पत्ति है ऐसा व्यक्ति इस क्षेत्र में आ जा सकेगा।
- 65- राजस्व भूमि पर ग्रामवासीयों एवं पंचायतों को 25.11.1975 से पूर्व के प्राप्त सार्वजनिक एवं निजी अधिकार जो राजस्व अभिलेखों में अंकित है यथावत रहेंगे।
- 7- मुख्य वन्य जीव प्रतिपालक द्वारा लगाये गये प्रतिबंधों के अधीन इस क्षेत्र में पशुओं की चराई की जा सकेगी।
- 8- भविष्य में इस क्षेत्र के निवासीयों को अन्यत्र विस्थापित करने का अधिकार राज्य सरकार के पास रहेगा, किन्तु अधिग्रहण की कार्यवाही

के तहत नियमानुसार सुआवजा दिया जावेगा ।

9- इन उक्त वाणित सभी अधिकारों का प्रयोग वन्य जीव संरक्षण अधिनियम 1972 के प्रावधानों के अधिन किया जावेगा । तथा नियम 1972 के तहत जो प्रतिबंध राज्य सरकार द्वारा लगाये गये हैं वे यथावत रहेंगे ।

उक्त आदेश राज्य सरकार द्वारा वन्य जीव संरक्षण अधिनियम 1972 की धारा 126 के तहत जारी अधिसूचना संक 11१२२१ राज/सूप-8/78/पीटी-1 दिनांक 4.8.83 के द्वारा प्रदत्त शाक्तियों के तहत अधो-हस्ताक्षरकर्ता द्वारा दिनांक को हस्ताक्षर एवं मोडर अदालत से जारी क किये गये ।

उप जिला कलेक्टर
अलवर

१ प्राधिकृत अधिकारी १

क्रमांक:- सं/१२२/1874-1923

दिनांक:-22/01/89

प्रतिलिपि निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

1. शासन सचिव महोदय, वन एवं पर्यावरण विभाग राज. सरकार, जयपुर
2. मुख्य वन्य जीव प्रतिपालक राज. सरकार, जयपुर
3. जिला कलेक्टर, अलवर
4. उप जिला कलेक्टर, राजगढ़
5. क्षेत्र निदेशक बाघ परियोजना सरिस्का १ अलवर १
6. तहसीलदार अलवर/धानागाजी/राजगढ़ को दस-दस अतिरिक्त प्रतियां भेजकर लेखा है कि उक्त आदेश समस्त ग्रामों के सार्वजनिक स्थानों पर सूचनार्थ चस्पा करावें ।
7. विकास अधिकारी पंचायत समिति उमरैणा/धानागाजी/राजगढ़
8. सूचना एवं जन सम्पर्क अधिकारी, अलवर
9. तरपंच ग्राम पंचायत ग्राम - - - - -
10. नोटिस बोर्ड कलेक्ट्रेट/स.डी.ओ./तहसील/पंचायतसमिति/ग्रामपंचायत पर सूचनार्थ

उप जिला कलेक्टर
अलवर

१ प्राधिकृत अधिकारी १

कार्यालय उप जिला कलेक्टर {प्राधिकृत अधिकारी} अलवर
क्रमांक/राजस्व/99/

दिनांक:-

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वतः माननीय उच्चतम न्यायालय के द्वारा सिविल रिट पिटीशन संख्या 337/95 में पारित निर्णय दिनांक 22.8.97 के अनुसरण में जिला अलवर में स्थित राष्ट्रीय उद्यान सरिस्का एवं राष्ट्रीय अभयारण्य सरिस्का के क्षेत्र में बसें हुये निवासीयों के दावों स्वअधिकारी का विधारण किया जाना है।

वन्य जीव संरक्षण अधिनियम 1972 की धारा 35 की उप धारा -1 के अधीन प्रदत्त शक्तियों का प्रयोग करते हुये राज्य सरकार, राजस्व {गुप्त-8} विभाग द्वारा जारी अधिसूचना क्रमांक एफ।।22{राज-8/78/ दिनांक 27.8.1982 के द्वारा राष्ट्रीय उद्यान सरिस्का के नाम से उद्धोक्षित राष्ट्रीय उद्यान की घोषणा जारी की गई। उक्त अधिसूचना के अंतर्गत उक्त उद्यान की निम्न प्रकार से सीमायें निर्धारित की गई।

उत्तर:- बांरा नाहरखोरा जंगली नलदेश्वर, धमोडी, भुर्तहरी, करनाकाबसत सरिस्का, रेकामाला, हुडारमाला, तालवृक्ष।

पूर्व :- नाडू, जगल बोरेठा की पहाडी, देवरी आरक्षित वन खण्ड, तीलीबेरी आरक्षित वन खण्ड, नाहरसत्ती, पृथ्वीपुरा, की पहाडी रक्षित वन बांरा

पश्चिम:- तालवृक्ष, पहाडी, रेकामाला, तालगैट उदयनाथ

दक्षिण :- उदयनाथ, कान्यावास ग्राम जंगल, भगानी, भगानी से काली धाटी सडक, नाडू वन खण्ड

उक्त अधिसूचना दिनांक 27.8.82 के अनुसरण में जिला कलेक्टर द्वारा वन्य जीव संरक्षण अधिनियम 1972 {1972 का केन्द्रीय अधिनियम संख्या 53} की धारा 21 में प्रदत्त शक्तियों का प्रयोग करते हुये उक्त क्षेत्र में बसे हुये व्यक्तियों के अधिकार/क्लेम का निर्धारण करने के लिये धोषण पत्र संख्या क्रमांक 39-2{राज-72/पार्ट 2/4999 दिनांक 27.9.82 तथा धोषण पत्र क्रमांक 39-2{राज-72 पार्ट 2/1272 दिनांक 27.1.83 को धोषणा पत्र जारी किया गया। उक्त राष्ट्रीय उद्यान की सीमायों का स्पष्ट टीकरण राज्य सरकार द्वारा अधिसूचना क्रमांक एफ।।22{राज/8/78/ दिनांक 29.5.85 को जारी किया गया।

1-उत्तर:- बांरा $\{$ पृथ्वीपुरा अवर्गीकृत वन खण्ड कम्पाटमेंट $\}^7$ 1 व 2 की उत्तरी सीमा $\{$ नाहरखारा जंगल $\}$ माधोगढ वन खण्ड रक्षित के कम्पाटमेंट नं. 1-2 की उत्तरी सीमा $\{$ नलदेश्वर कुशालगढ आरक्षित वन खण्ड कम्पाटमेंट नं. 1 व 2 की $\}^3$ सीमा $\{$ धमोडी $\}$ पूर्व इन्दोक वन खण्ड आरक्षित के कम्पाटमेंट नं. 2 की उत्तरी सीमा $\{$ भुर्तहरी $\}$ पूर्वी इन्दोक वन खण्ड आरक्षित के कम्पाटमेंट नं. 4 व 5 की उत्तरी सीमा $\{$ करनाकाबास सरिस्का $\}$ कालीधाटी वन खण्ड आरक्षित के कम्पाटमेंट नं. 9-8 की उत्तर पूर्व सीमा कम्पाटमेंट नं. 7 की पूर्वी सीमा, इन्दोक पश्चिमी वन खण्ड आरक्षित के कम्पाटमेंट नं. 1 व 4 की पूर्वी सीमा $\{$ दुहारमाला $\}$ दुहारमाला वन खण्ड आरक्षित के कम्पाटमेंट नं. 4 की पूर्वी सीमा कम्पाटमेंट नं. 3 की पूर्वी सीमा होते हुये $\{$ रेकामाला $\}$ $\{$ रेकामाला $\}$ आरक्षित वन खण्ड के कम्पाटमेंट नं. 4-3 व 2 की पूर्वी सीमा $\{$ तालवृक्ष $\}$ बनी तालवृक्ष तक तालवृक्ष में मन्दिर व वन को बाडर करते हुये

पश्चिमी:- तालवृक्ष $\{$ बनी तालवृक्ष $\}$ की दक्षिण सीमा $\{$ पहाडी रेकामाला $\}$ $\{$ रेकामाला $\}$ वन खण्ड आरक्षित की पश्चिमी सीमा व दुहारमाला वन खण्ड के इन्टरमीडियर डिमार्केशन लाइन $\{$ होते हुये दुहारमाला वन खण्ड के कम्पाटमेंट नं. 1 का पूर्वी पानीढाल को शामिल करते हुये $\{$ तालगेट $\{$ कालीधाडी वन खण्ड आरक्षित के कम्पाटमेंट नं. 5 की पश्चिमी सीमा व कालीधाटी कम्पाटमेंट नं. 4-3 व 2 की पश्चिमी सीमा $\{$ उदयनाथ कालीधाटी वन खण्ड आरक्षित के कम्पाटमेंट नं. 43 की दक्षिणी व पश्चिमी सीमा 42 की पश्चिमी सीमा व काकवाडी वन खण्ड आरक्षित के कम्पाटमेंट नं. 14 की पश्चिमी सीमा $\}$

दक्षिण:- उदयनाथ $\{$ काकवाडी वन खण्ड आरक्षित के वन कम्पाटमेंट नं. 14 के $\{$ दक्षिण पूर्वी सीमा $\}$ $\{$ कान्यावास ग्राम $\}$ कान्यावास वन खण्ड रक्षित की उत्तरी पश्चिमी सीमा $\{$ जंगल भगानी काकवाडी वन खण्ड आरक्षित के कम्पाटमेंट नं. 9 के दक्षिणी पश्चिमी सीमा टहला वन खण्ड के कम्पाटमेंट नं. 6 की दक्षिणी पश्चिमी सीमा 7 की दक्षिणी सीमा भू भगानी से कालीधाडी तक टहला वन खण्ड

आरक्षित के कम्पाटमेन्ट नं. 9 व 10 की दक्षिणी सीमा १ नाडू वन खण्ड नाडू वन खण्ड आरक्षित के कम्पाटमेन्ट नं. 2, 7, 8, 9, 10 की दक्षिणी सीमा व 11 व 15 की पश्चिमी सीमा व 16 की दक्षिणी सीमा १

पूर्व:- नाडू जंगल १ नाडू आरक्षित वन खण्ड के कम्पाटमेन्ट नं. 16 की पूर्वी सीमा १ बोरेठा की पहाडी १ उमरीदेवरी आरक्षित वन खण्ड कम्पाटमेन्ट नं. 17, 16 व 15, 14 की पूर्वी सीमा १ देवरी आरक्षित वन खण्ड १ देवरी आरक्षित वन खण्ड कम्पाटमेन्ट नं. 11 व 9 की पूर्वी सीमा (सीलीबेरी आरक्षित वन खण्ड) सीलीबेरी आरक्षित वन खण्ड कम्पाटमेन्ट नं. 1 की पूर्वी सीमा १ नाहरसत्ती १ सीलीबेरी कम्पाटमेन्ट नं. 24 व 25 व 28 की पूर्वी सीमा १ (पृथ्वीपुरा पहाडी रक्षित वन खण्ड) १ पृथ्वीपुरा आरक्षित वन खण्ड कम्पाटमेन्ट नं. 3 की पूर्वी सीमा १ पृथ्वीपुरा अवगीकृत की पूर्वी सीमा, बारा १ बारा जियर तक १

वन्य जीव संरक्षण अधिनियम 1972 १ 1972 का केन्द्रीय अधिनियम 53 के तहत राज्य सरकार राजस्व गुप-8 विभाग द्वारा विज्ञापित संख्या एक-11 १ 22 १ राज/गुप-8/70 पीटी १ १ दिनांक 4.8.83 के द्वारा उप जिला कलेक्टर अलवर १ अधोहस्ताक्षरफत १ को जिला कलेक्टर की शक्तियों प्रदत्त की गई। उप जिला कलेक्टर अलवर १ भूमि अर्जन अधिकारी १ द्वारा वन्य जीव संरक्षण अधिनियम 1972 की धारा 19 व 21 से 25 के अंतर्गत प्रदत्त शक्तियों का प्रयोग करते हुये राष्ट्रीय उद्यान संरक्षा के अंतर्गत बसे हयु नागरिकों के दावों की सुनवाई की गई तथा दिनांक 24.6.85 को आदेश पारित कर वन्य जीव संरक्षण अधिनियम 1972 की धारा 24 व 25 के अंतर्गत अवार्ड जारी किया गया। उक्त अवार्ड के तहत 19 क्लेम राष्ट्रीय उद्यान की सीमा में नही आने के कारण खारिज किये गये तथा संरक्षा पैलेन्स क्लेम को लम्बित रखते हुये 8 दावों का जो निजी खातेदारी भूमि से सम्बंधित थे का सुआवजा निर्धारित किया गया तथा ग्राम काकवाडी, पिलापानी, किला 3 नीचा व कडाहट तहसील राजगढ़ के ग्राम वासियों द्वारा जो क्लेम प्रस्तुत किये गये वे निर्धारित प्रपत्र में नही होने एवं जंगलात की भूमियों पर अतिक्रमण किया हुआ होने पर उन्हें किसी प्रकार का सुआवजा नही दिया जाकर इनके दावों को अस्वीकार किया गया। ग्राम वासीयान का न्यायालय के द्वारा राजस्व एवं

क्रमांक-सं/अलवर/1824-73

दिनांक:-22/10/99

प्रतिलिपि निम्न की सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रस्तुत हैं।

- 1- शासन सचिव महोदय, वन एवं पर्यावरण विभाग, राज. सरकार जयपुर।
2. मुख्य वन्य जीव प्रतिपालक राज. सरकार जयपुर।
3. जिला कलेक्टर अलवर
4. उप जिला कलेक्टर राजगढ़
5. क्षेत्र निदेशक बाध परियोजना सारिका।
6. तहसीलदार/राजगढ़/धानागाजी/अलवर को 10-10 अतिरिक्त प्रति भेज कर लेख है कि उक्त आदेश का समस्त ग्रामों के सार्वजनिक स्थानों पर सूचनार्थ चस्पा कराये।
7. विकास अधिकारी पंचायत समिति राजगढ़/धानागाजी/उभरेण
8. सूचना एवं जन सम्पर्क अधिकारी अलवर।
9. सरपंच ग्राम पंचायत ग्राम--
10. नोटिस बोर्ड कलेक्ट्रेट/एस.डी.ओ./तहसील/पंचायत समिति/ग्राम पंचायत/पंचायत पर सूचनार्थ।


उप जिला कलेक्टर
अलवर

॥ प्राधिकृत अधिकारी ॥

कार्यालय प्रधान मुख्य वन संरक्षक, राजस्थान, जयपुर

क्रमांक : एफ 19 () 2012 / कार्मिक-राज / प्रमुवसं /

दिनांक :

कार्यालय आदेश

सरिस्का व्याघ्र आरक्षित (Tiger Reserve) के मध्यवर्ती क्षेत्र (Buffer area) के संबंध में राज्य सरकार द्वारा जारी अधिसूचना दिनांक 6.7.2012 में वन मंडल, अलवर एवं वन मंडल, जयपुर (मध्य) हाल वन मंडल, जयपुर (वन्य जीव) के अधीन उल्लेखित निम्नांकित वन-क्षेत्र को मय स्टाफ तत्काल प्रभाव से उप वन संरक्षक एवं उप क्षेत्रीय निदेशक, बाघ परियोजना, सरिस्का के अधीन किए जाने के आदेश एतद्द्वारा प्रसारित किए जाते हैं:-

क.सं.	वन मण्डल जिसमें वन खण्ड स्थित है	वन खंड	वन का प्रकार	क्षेत्रफल (हेक्टेयर) में
1.	अलवर	सीराबास	आरक्षित वन	2555.59
2.	अलवर	शेदावास	आरक्षित वन	3726.90
3.	अलवर	डडीकर	आरक्षित वन	2808.73
4.	अलवर	निदानी	आरक्षित वन	1570.43
5.	अलवर	भाखेडा	आरक्षित वन	2885.74
6.	अलवर	धामला का बास	संरक्षित वन	600.86
7.	अलवर	हमीरपुर-क.नं.1 से 5	संरक्षित वन	717.84
8.	अलवर	धामला का बास A	संरक्षित वन	88.06
9.	अलवर	उमरैण	संरक्षित वन	511.04
10.	अलवर	बाग केशरपुर	संरक्षित वन	35.39
11.	अलवर	भाकेडा	संरक्षित वन	69.31
12.	अलवर	धोली धूप	संरक्षित वन	41.18
13.	अलवर	बल्ला वोडा	संरक्षित वन	31.55
14.	अलवर	जटियाना	संरक्षित वन	103.79
15.	अलवर	टोडियार A	संरक्षित वन	170.93
16.	अलवर	बीघोता (क.नं. 5 से 9)	आरक्षित वन	2096.87
योग:-				18014.21

क.सं.	वन मण्डल जिसमें वन खण्ड स्थित है	वन खण्ड	वन का प्रकार	क्षेत्रफल (हेक्टेयर) में
1.	जयपुर मध्य हाल (वन्यजीव) जयपुर	बडी लाईन डीगोता 61	आरक्षित वन	6558.00

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प्रधान मुख्य वन संरक्षक
राजस्थान, जयपुर

क्रमांक : एफ 19 () 2012 / कार्मिक-राज / प्रमुवसं /

8818-25

दिनांक : 10-12-12

प्रतिलिपि निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

1. अति० मुख्य सचिव, वन विभाग, राज. जयपुर।
2. प्रधान मुख्य वन संरक्षक एवं मुख्य वन्य जीव प्रतिपालक, राजस्थान, जयपुर।
3. मुख्य वन संरक्षक, जयपुर।
4. वन संरक्षक एवं क्षेत्र निदेशक, बाघ परियोजना, सरिस्का।
5. उप वन संरक्षक एवं उप क्षेत्रीय निदेशक, बाघ परियोजना, सरिस्का।
6. उप वन संरक्षक, अलवर / उप वन संरक्षक (वन्य जीव), जयपुर। आपके अधीन उक्त वन क्षेत्र का चार्ज मय समस्त रिकार्ड उप वन संरक्षक एवं उप क्षेत्रीय निदेशक, बाघ परियोजना, सरिस्का को संभलाए जाने की कार्यवाही तत्काल संपादित की जावे।
7. रक्षी पत्रावली।

२०१८
मुख्य वन संरक्षक (संस्थापन)
राजस्थान, जयपुर।

List of Existing Fire lines**Range Sariska –**

1.	Kankwari to Mala Ghanka	- 3 km
2.	Kankwari Matua paz to Mala Jhodka	- 2.7 km
1.	Kaniawas to Udainath	- 7 km
2.	Slopka to Bera Bhensota	- 2.7 km
3.	Chimraj to Jahaj	- 3.3 km
4.	Slopka to Pandupole	- 4.5 km
5.	Kalighati to Pandupole	- 7 km
6.	Brahmnath to 8 th Mile Tehla road	- 5 km
7.	Brahmnath to Kalighati top	- 1 km
8.	Kherawali to Leelunda	- 2 km
9.	Bharathari to Leelunda	- 2 km
10.	Sawar to Duharmala	- 4 km
11.	Kushalgarh to Naldi	- 5.6 km
12.	Ghanka anicut to Mala Ghanka	- 4 km
15.	Sadar Gate to Brahmnnath	- 8 km
16.	Jalebi chowk to Kundli	- 6 km
17.	Jalebi chowk to Brahmnnath	- 2 km
18.	Thank U Board to Kushalgarh	- 13 km
19.	Bandipul to Sarunda	- 6 km
20.	Kushalgarh to Kraska	- 15 km
21.	Sarunda to Duharmala	- 6 km
22.	Slopka chain to Slopka watch tower	- 0.6 km
23.	Sarunda anicut to Chota Bharathari	- 5 km
24.	Tarundi to Mala Tarundi	- 4 km

Range Tehla

1.	Deori to Kaimala	- 8 km
2.	Bhagani to Multani	- 5 km
3.	Haripura rundh to Mandalwas	- 10 km

4.	Parashar to Haripura rundh	- 5 km
5.	Ghat to Deori	- 10 km
6.	Gahrat to Burja	- 12 km
7.	Bhivani to Bhagani	- 8 km
8.	Som sagar to Bhangarh	- 15 km
9.	Narayani Mata to Guwada Janavat	- 8 km
10.	8 th Mile Tehla Road to Tehla Pulia	- 4 km
11.	Kaimala to Dangarwara	- 20 km
12.	Nadoli to Dabkan	- 7 km
13.	Dabkan to Tilwari	- 5 km
14.	Ramkunda to Onkari Jungle	- 7 km

Range Akbarpur

1.	Harsaval to Boh Jungle	- 4.5 km
2.	Kalakari to Katighati	- 3 km
3.	Jharandi to Narandi	- 4 km
4.	Harsaval to Rotkyala	- 5 km
5.	Beenak to Jamunda	- 8 km
6.	Madhogarh to Raika	- 5 km
7.	Dabli to Sukola	- 7 km
8.	Chand Pahari to Dabli	- 3 km
9.	Bera to Dhawala	- 7 km
10.	Paithpur to Bhakatpura	- 8 km
11.	Gole Pahari to Dabli	- 6 km
12.	Prathvipura to Kishanpur	- 4 km
13.	Khoh Jungle to Narandi Jungle	- 5 km
14.	Andheri Jharandi to Naharkund	- 5 km

Range Talvirksh

1.	Talvirksh to Garvaji Kund	- 8 km
2.	Peepali wali cheend to Leelka Ghati	- 10 km
3.	Kalyanpura mala to Peepliwali	- 6 km
4.	Savar to Adamala	- 3 km
5.	Hazipur to Siddh ka mala	- 5 km

List of Talaies/ Anicuts

Sr. No.	Range	Talai/Earthen Pond	Anicut	Nallas
1	Sariska	Bal ka johda (Duharmala)	Kalakund AAP	Ruparail
2	Sariska	Punja wali johdi (Amra ka bas)	Ghamodi JRY	Udainath
3	Sariska	Pagli ka johda (Kishori)	Bandipul AAP	Bharathari
4	Sariska	Kiraska Johdi	Sarunda AAP	Peepalwala Nala
5	Sariska	Pilapani	Ghanka JRY	Slopka
6	Sariska	Kali chotri	Kala kua JRY	Pandupole
7	Sariska	Geruka	Mauj Nath AAP	Ghanka
8	Sariska	Kunda	Tarunda FR	Tarunda
9	Sariska	Kana wali	Karna ka bas CSS	Alguwal
10	Sariska	Kundalka	Gopichand Sagar AAP	
11	Sariska	Kharrika	Bharathari Sagar FR	
12	Sariska	Mandi Rawal	Alguwal AAP	
13	Sariska	Doraka	Brahamnath AAP	
14	Sariska	Buja	Slopka AAP	
15	Sariska	Kachhi Mori	Kankwari AAP	
16	Sariska	Kalighati Kua	Bherughati TBS	
17	Sariska	Slopka	Phenta ki Pal JRY + TBS	
18	Sariska	Amra ka bas	Kundalka FR	
19	Sariska	Bandriyan	Nala Haripura (Hiraman Sagar)	

			FR	
20	Sariska	Channi	Kundli AAP	
21	Sariska	Salawai (Indok)	Kankwari Bandh FR	
22	Sariska	Kabri	Pandupole Nala I TBS	
23	Sariska	Behdawala	Pandupole Nala II TBS	
24	Sariska	Ghedi	Amra ka bas	
25	Sariska	Pattaka	Kundalka UNICEF	
26	Sariska	Udainath		
27	Sariska	Nayapani		
28	Akbarpur	Khataka	Narandi AAP	Chillo
29	Akbarpur	Sukola	Harsawal AAP	Jaipal
30	Akbarpur	Madhogarh	Nandwaj AAP	Lilka
31	Akbarpur	Andhaka	Raika AAP	Raika
32	Akbarpur	Umri	Garibdas AAP	Narandi
33	Akbarpur	Dheni wala	Chillo AAP	Siliberi
34	Akbarpur	Gopalpura	Benak AAP	
35	Akbarpur	Raika	Siliberi CSS	
36	Akbarpur	Beri	Hanuman Sagar	
37	Akbarpur	Narandi	Siliberi TBS	
38	Akbarpur	Siliberi	Dhawala CSS	
39	Akbarpur	Dabli	Dhelawas ED	
40	Akbarpur	Pandupole		
41	Akbarpur	Raika		
42	Akbarpur	Boh		
43	Akbarpur	Kalikhhol		
44	Akbarpur	Gopalpura		
45	Talvriksh	Raniwal	Talvriksh AAP	Loz Nathusar
46	Talvriksh	Veraka	Berwas I AAP	Pandidhal

47	Talvriksh	Bamanvas	Berwas II AAP	Raika nala
48	Talvriksh	Harukala	Nangelheri AAP	Garwaji
49	Talvriksh	Nangalheri	Nathusar AAP	Nangalheri
50	Talvriksh	Gopiwala	Nathusar bas AAP	
51	Talvriksh	Berawas	Gudha toda wali AAP	
52	Talvriksh	Basaka	Loz AAP	
53	Talvriksh	Nevlika	Renu AAP	
54	Talvriksh	Kuralka	Chota Bharathari AAP	
55	Talvriksh	Bas ka kua	Panidhal AAP	
56	Talvriksh	Gudha	Jamunda CSS	
57	Talvriksh	Kharkeri	Pandidhal AAP	
58	Talvriksh	Gudahri		
59	Talvriksh	Sheetal nath		
60	Talvriksh	Puprel		
61	Talvriksh	Beja ghat		
62	Talvriksh	Bani Talvriksh		
63	Talvriksh	Bera was		
64	Talvriksh	Badi Chind		
65	Talvriksh	Badi Chind (Ram Sagar)		
66	Talvriksh	Kharkhadi		
67	Talvriksh	Sainwar chind		
68	Talvriksh	Chaani		
69	Talvriksh	Gadha Ghati		
70	Tehla	Boretha	Bhagani AAP	Devri guwada ka Jharna
71	Tehla	Tilwari	Boretha AAP	Narayani Mata
72	Tehla	Baldevgarh	Richunda AAP	Bhagani
73	Tehla	Murlipura	Mungi AAP	Chamari Ka

				Bera
74	Tehla	Durakka	Molera AAP	Bandipul
75	Tehla	Narayaniji	Komalkha AAP	
76	Tehla	Talab	Behardah AAP	
77	Tehla	Jahaj	Kundala AAP	
78	Tehla	Bhagani	Bhensota Bera CSS	
79	Tehla	Kundala	Omkari CSS	
80	Tehla	Devri	Sona ED	
81	Tehla	Bagori Mata	Bhangarh UNICEF	
82	Tehla	Bangas		
83	Tehla	Siddh		
84	Tehla	Haripura rundh		
85	Tehla	Baldevgarh		

List of Veterinary Hospitals around Sariska Tiger Reserve

S.No.	Place	Tehsil
1	Thanagazi	Thanagazi
2	Pratapgarh	Thanagazi
3	Narayanpur	Thanagazi
4	Rajgarh	Rajgarh
5	Tehla	Rajgarh
6	Umrain	Alwar

List of existing Forest Roads

S.No.	From	To	Length
Range Sariska -			
1	Sariska gate	Udainath	9 km
2	Udainath	Raipuria	3 km
3	Kalakua	Talgate	4 km
4	Bandipul	Bandipul hodi	1 km
5	Ghanka	Tarunda	3 km
6	Tarunda	Brahmnath	5 km
7	Sariska gate	Tarunda	6 km
8	Brahmnath	Kalighati	3 km
9	Kalighati	Malajhodka	16 km
10	Sariska gate	Kalighati (Via naya pani kundli)	12 km
11	Tarunda	Kraska kunda	8 km
12	Kraska	Pandupole	6 km
13	Jebebi chowk	Brahamnath (via kali chotri)	4 km
14	Dauraka jhoda	Bhensota	1 km
15	Governor road		1 km
16	Kalighati kua	Dauraka	4 km
17	Slopka	Pandupole	5 km
Range Tehla			
1	Malajhodka	Mandalwas	8 km
2	Richunda	Bhagani	5 km
3	Nandu rada	Devri	6 km
4	Devri road	Kamala	3 km
5	Devri	Jahaj	5 km
6	Dauraka	Jahaj	11 km
7	Bhiwani	Basrool	10 km
Range Akbarpur			

1	Umri tiraya	Naharsati	9 km
2	Naharsati	Rotkyala	10 km
3	Rotkyala	Boh jungle	4 km
4	Rotkyala	Dabli	11 km
5	Madogarh	Raika	11 km
6	Beenak	Leelka ghati	8 km
7	Raika	Kalikhhol	7 km
8	Kalikhhol	Beenak	4 km
9	Bera	Prathvipura	6 km
10	Prathvipura	Kalakeri	2 km
Range Talvriksh			
1	Lelka ghati	Nathusar	5 km
2	Nathusar via badi chind	Rampur	8 km
3	Todali	Gurha	6 km
4	Jamunda raika	Nathusar	5 km
5	Talvriksh pacca road	Chota Bharathari	1 km
6	Talvriksh pacca road	Sheetal nath	2 km

List of Villages in Periphery of Critical Tiger Habitat of Sariska Tiger Reserve

कार्यालय उप वन संरक्षक, बाघ परियोजना सरिस्का

क्रमांक/एफ()विविध/बापस/2014-15/5459

दिनांक 10.06.14

कार्यालय आदेश

ग्रामवासियान भानगढ़ एवं बिरकडी के द्वारा प्रेषित प्रार्थना पत्र के आधार पर संबंधित तहसीलदार के उक्तांकित ग्रामों का राजस्व रिकार्ड एवं भौगोलिक स्थिति अनुसार उक्त ग्रामों को बाघ परियोजना सरिस्का के क्रिटिकल टाइगर हैबीटाट के नजदीक ग्रामों की चयन सूची में सूचीबद्ध किये जाकर निम्नानुसार संशोधित आदेश जारी किये जाते हैं।

जिला अलवर

क्र.सं.	नाम ग्राम	तहसील	रेंज
1	सीरावास	अलवर	अकबरपुर
2	ढहलावास	अलवर	अकबरपुर
3	बीनक	अलवर	अकबरपुर
4	बख्तपुरा	अलवर	अकबरपुर
5	किशनपुर	अलवर	अकबरपुर
6	पैतपुर	अलवर	अकबरपुर
7	सावडी	अलवर	अकबरपुर
8	धंवाला	अलवर	अकबरपुर
9	अकबरपुर	अलवर	अकबरपुर
10	कालीखोल	अलवर	अकबरपुर
11	गोपालपुरा	अलवर	अकबरपुर
12	धर्मपुरा	अलवर	अकबरपुर
13	निर्भयपुरा	अलवर	अकबरपुर
14	चांदपहाडी	अलवर	अकबरपुर
15	सिया का बास	अलवर	अकबरपुर
16	ईम्टीपुरा (खाताका)	अलवर	अकबरपुर
17	पृथ्वीपुरा	अलवर	अकबरपुर

18	भडोली	अलवर	अकबरपुर
19	बालेटा मय भाटयाला	अलवर	अकबरपुर
20	नया गांव प्रतापुर	राजगढ	टहला
21	थोसडा	राजगढ	टहला
22	अनावडा	राजगढ	टहला
23	बोरेठा	राजगढ	टहला
24	धमरेड (धर्मपुरा के पास)	राजगढ	टहला
25	नया गांव बोलका	राजगढ	टहला
26	डांगरवाडा	राजगढ	टहला
27	धोलान	राजगढ	टहला
28	कूण्डला	राजगढ	टहला
29	तालाब	राजगढ	टहला
30	लोसल बाहामण	राजगढ	टहला
31	लोसल गूजर्न	राजगढ	टहला
32	नांडू	राजगढ	टहला
33	मुरलीपुरा	राजगढ	टहला
34	चाहा का बास (मय नाथरा)	राजगढ	टहला
35	घेवर	राजगढ	टहला
36	राजडोली	राजगढ	टहला
37	खारयाबास	राजगढ	टहला
38	टहला	राजगढ	टहला
39	नेडोली	राजगढ	टहला
40	सिटावट	राजगढ	टहला
41	कोटडी रामपुरा	राजगढ	टहला
42	मल्लाना	राजगढ	टहला
43	गोर्वधनपुरा	राजगढ	टहला
44	ककराली रामपुरा	राजगढ	टहला
45	बेरली	राजगढ	टहला
46	दूदपुरी थाना	राजगढ	टहला
47	टोडा जयसिंहपुरा	राजगढ	टहला
48	घाटडा	राजगढ	टहला
49	खोह	राजगढ	टहला
50	पालपुर	राजगढ	टहला
51	तिलवाड	राजगढ	टहला
52	तिलवाडी	राजगढ	टहला
53	कालवाड मय सक्काला	राजगढ	टहला
54	बरवा डूंगरी	राजगढ	टहला

55	बल्देवगढ	राजगढ	टहला
56	नांगल कर्णा	राजगढ	टहला
57	पावटा	राजगढ	टहला
58	नांगल चन्देर	राजगढ	टहला
59	लाकास	राजगढ	टहला
60	धिरोडा	राजगढ	टहला
61	खिरत का बास (बुर्जा)	राजगढ	टहला
62	तोडी का बास	राजगढ	टहला
63	गोला का बास	राजगढ	टहला
64	अजबगढ	थानागाजी	टहला
65	बिरकडी	थानागाजी	टहला
66	सोत्या का गुवाडा	थानागाजी	टहला
67	गुवाडा गूगली	थानागाजी	टहला
68	गुवाडा राडी	थानागाजी	टहला
69	लेसा का गुवाडा	थानागाजी	टहला
70	गु0 हार	थानागाजी	टहला
71	गु0 जानावत	थानागाजी	टहला
72	गु0 रामजी	थानागाजी	टहला
73	गु0 कालोत	थानागाजी	टहला
74	मालियो का गुवाडा	थानागाजी	टहला
75	भूलो का गुवाडा	थानागाजी	टहला
76	गु0 सीरा	थानागाजी	टहला
77	फाकला का गुवाडा	थानागाजी	टहला
78	सीलीबावरी	थानागाजी	टहला
79	जैतपुर ब्राहमण	थानागाजी	टहला
80	भूरयाली	थानागाजी	टहला
81	नडोली	थानागाजी	टहला
82	गु0 सिदराय	थानागाजी	टहला
83	मोरडी	थानागाजी	टहला
84	कालापारा	थानागाजी	टहला
85	पीपलाई	थानागाजी	टहला
86	समरा	थानागाजी	टहला
87	गोविन्दपुरा	थानागाजी	सरिस्का
88	गोपालपुरा	थानागाजी	सरिस्का
89	रायपुरा	थानागाजी	सरिस्का
90	काला लांका	थानागाजी	सरिस्का
91	श्यामपुरा	थानागाजी	सरिस्का

92	बाछेडी	थानागाजी	सरिस्का
93	मेजोड	थानागाजी	सरिस्का
94	खेडा	थानागाजी	सरिस्का
95	मुडियावांस	थानागाजी	सरिस्का
96	टोडी	थानागाजी	सरिस्का
97	जोधवास	थानागाजी	सरिस्का
98	हरनेर	थानागाजी	सरिस्का
99	भांगडोली	थानागाजी	सरिस्का
100	लावा का बास	थानागाजी	सरिस्का
101	अमरा का बास	थानागाजी	सरिस्का
102	थानागाजी	थानागाजी	सरिस्का
103	दुहार चौगान	थानागाजी	सरिस्का
104	भूडया बास	थानागाजी	सरिस्का
105	नवल सिंह की गढी	थानागाजी	सरिस्का
106	कालाखोरा	थानागाजी	सरिस्का
107	बाड गूजरान	थानागाजी	सरिस्का
108	तोलावास	थानागाजी	तालवृक्ष
109	बामणवास कांकड	थानागाजी	तालवृक्ष
110	मुण्डावरा	थानागाजी	तालवृक्ष
111	मानावास	थानागाजी	तालवृक्ष
112	खरकडी कला	थानागाजी	तालवृक्ष
113	कानपुरा लोज	थानागाजी	तालवृक्ष
114	गढी	थानागाजी	तालवृक्ष
115	बिलाहट	बानसूर	तालवृक्ष
116	बासना	बानसूर	तालवृक्ष
117	बिसालू	बानसूर	तालवृक्ष
118	लेकडी	बानसूर	तालवृक्ष
119	अन्नतपुरा	बानसूर	तालवृक्ष
120	धाट	बानसूर	तालवृक्ष
121	मूडंली	बानसूर	तालवृक्ष
122	बहरान का बास	बानसूर	तालवृक्ष
123	रामपुर	बानसूर	तालवृक्ष
124	आशा का बास	बानसूर	तालवृक्ष
125	गुढा (भांकरवाला)	बानसूर	तालवृक्ष
126	कल्याणपुरा	बानसूर	तालवृक्ष
127	कालीपहाडी	बानसूर	तालवृक्ष
128	सबलपुरा	बानसूर	तालवृक्ष

129	मंगलवा	बानसूर	तालवृक्ष
130	हाजीपुर	बानसूर	तालवृक्ष
131	हमीरपुर	बानसूर	तालवृक्ष
132	धामला का बास	बानसूर	तालवृक्ष
133	भण्डोडी	उमरैन	अकबरपुर
134	सांवतसर	थानागाजी	टहला
135	डूमोली	थानागाजी	टहला
136	झिरी	थानागाजी	टहला
137	जगन्नाथपुरा	थानागाजी	टहला
138	नावली	अलवर	अकबरपुर
139	टोडिया का बास	बानसूर	तालवृक्ष
140	लादूवास	बानसूर	तालवृक्ष
141	तिबारा	थानागाजी	सरिस्का
142	स्यालूता	राजगढ़	टहला
143	खारेडा	मालाखेडा	अकबरपुर
144	दुहारमाला	थानागाजी	सरिस्का
145	बासबूरिया	थानागाजी	तालवृक्ष
146	गुवाडा हनुमान	थानागाजी	सरिस्का
147	गुवाडा साहिबा	थानागाजी	सरिस्का
148	भानगढ़	राजगढ़	अजबगढ़
149	बिरकडी	राजगढ़	अजबगढ़

-sd-

(मनोज पाराशर)

उप वन संरक्षक

बाघ परियोजना सरिस्का

क्रमांक / एफ () विविध / बापस / 2014-15 / 5460-67

दिनांक 10.06.14

प्रतिलिपि निम्न को सादर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-

1. मुख्य वन संरक्षक (वन्य जीव) जयपुर।
2. वन संरक्षक एवं क्षेत्र निदेशक, बाघ परियोजना सरिस्का, मु0 अलवर।
3. जिला कलक्टर, अलवर।
4. जिला रसद अधिकारी, अलवर।
5. मुख्य अभियन्ता/अधीक्षण अभियन्ता, जयपुर विद्युत वितरण निगम लि0 अलवर को राज्यादेश संख्या प.12(16)ऊर्जा/04/पार्ट जयपुर दिनांक 7 मार्च 2008 के अनुसरण में नियमानुसार प्राथमिकता से कृषि विद्युत कनेक्शन दिये जाने के संदर्भ में
6. विविध शाखा प्रभारी, कार्यालय हाजा।
7. रक्षित पत्रावली।

(मनोज पाराशर)

उप वन संरक्षक

बाघ परियोजना सरिस्का

Annexure – 15

Information regarding Beat, Naka & Range in STR

रेंज	नाका	बीट का नाम	बीट नं०
तालवृक्ष	रामपुर	हाजीपुर	1
तालवृक्ष	रामपुर	लेकडी	2
तालवृक्ष	तालवृक्ष	खरखडी	3
तालवृक्ष	तालवृक्ष	लोजकानपुरा	4
तालवृक्ष	रामपुर	रामपुर 1	5
तालवृक्ष	रामपुर	रामपुर 2	6
तालवृक्ष	रामपुर	रामपुर 3	7
तालवृक्ष	नाथूसर	लोजनाथूसर	8
तालवृक्ष	तालवृक्ष	मानावास	9
तालवृक्ष	नाथूसर	पानीढाल	10
तालवृक्ष	तालवृक्ष	बनीतालवृक्ष	11
तालवृक्ष	तालवृक्ष	रैकामाला	12
तालवृक्ष	तालवृक्ष	बैरावास	13
तालवृक्ष	तालवृक्ष	नांगलहेडी उप बीट	13
अकबरपुर	किशनपुर	ढहलावास	14
अकबरपुर	किशनपुर	बीणक	15
अकबरपुर	किशनपुर	बख्तापुरा	16
अकबरपुर	किशनपुर	पैतपुर	17
अकबरपुर	किशनपुर	धंवाला	18
अकबरपुर	बारां	कालीखोल	19
अकबरपुर	बारां	रईका	20
अकबरपुर	बारां	माधोगढ	21
अकबरपुर	बारां	धर्मपुरा	22
अकबरपुर	पृथ्वीपुरा	चांदपहाडी	23
अकबरपुर	पृथ्वीपुरा	डाबली	24
अकबरपुर	पृथ्वीपुरा	सुकोला	25
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा	26
अकबरपुर	उमरी	रोटक्याला	27
अकबरपुर	बालेटा	भाट्याला	28

अकबरपुर	उमरी	उमरी	29
अकबरपुर	बालेटा	बालेटा	30
सरिस्का	थानागाजी	दुहारमाला	31
सरिस्का	थानागाजी	गणेशपुरा	32
सरिस्का	थानागाजी	घाणका	33
सरिस्का	कांकवाडी	फाटयाखोरा	33 ए
सरिस्का	थानागाजी	खर्रीका	34
सरिस्का	थानागाजी	किशोरी	35
सरिस्का	सदर सरिस्का	भूर्तहरी	36
सरिस्का	सदर सरिस्का	इन्दौक	36 ए
सरिस्का	सदर सरिस्का	बांदीपुल	37
सरिस्का	सदर सरिस्का	सदर	38
सरिस्का	सदर सरिस्का	हरिपुरा	39
सरिस्का	सदर सरिस्का	तारुण्डा	40
सरिस्का	सदर सरिस्का	करणाकाबास	41
सरिस्का	सदर सरिस्का	क्रास्का	42
सरिस्का	कुशालगढ	कुशालगढ	43
सरिस्का	कुशालगढ	नलदेश्वर	44
सरिस्का	कुशालगढ	कालाछारा	45
सरिस्का	कालीघाटी	कालीघाटी	46
सरिस्का	कांकवाडी	कांकवाडी	47
सरिस्का	कालीघाटी	बना	47 ए
सरिस्का	कालीघाटी	स्लोपका	48
सरिस्का	कालीघाटी	पाण्डूपोल	49
टहला	गढ	राजौर	50
टहला	गढ	गढ	51
टहला	गढ	दबकन	52
टहला	टहला	भगानी	53
टहला	टहला	रिछुण्डा	54
टहला	टहला	घेवर	55
टहला	टहला	जहाज	56
टहला	टहला	नांडू	57
टहला	नाका बोरेठा	देवरी गुवाडा	58

टहला	नाका बोरेठा	बोरेठा	59
टहला	नाका बोरेठा	डांगरवाडा	60
टहला	नाका बोरेठा	कुण्डला	61
टहला	टहला	तालाब	62
टहला	टहला	छोटी छींड (गोवर्धनपुरा)	63
टहला	टहला	तिलवाड	64
टहला	खोह	खोह	65
टहला	खोह	घाटडा आसन	66
टहला	गोलाकाबास	बलदेवगढ	67
टहला	गोलाकाबास	नारायणी माता	68
टहला	अजबगढ	जैतपुर सिलीबावडी	69
टहला	अजबगढ	अजबगढ	70
टहला	अजबगढ	बान्दीपुल	71
टहला	गोलाकाबास	जाटवाना	72
टहला	गोलाकाबास	भानगढ	73
टहला	अजबगढ	समरा	74

Annexure – 16

List of Water Holes in Sariska Tiger Reserve with GPS Location

रेंज का नाम	नाका	बीट का नाम व नं०	वॉटर हॉल का I.D.	अक्षांश N			देशांतर E			प्राकृतिक / अप्राकृतिक
				दृ०	मि०	सेकण्ड	दृ०	मि०	सेकण्ड	
तालवृक्ष	रामपुर	हाजीपुर-1	1/1 कालीपहाडी जोहडा	27°	38.	38.6	076°	26.	19.8	प्राकृतिक
तालवृक्ष	रामपुर	हाजीपुर-1	1/2 सबलपुरा जोहडी	27°	38.	54.6	076°	26.	31.9	अप्राकृतिक
तालवृक्ष	रामपुर	लेकडी-2	2/1 लेकडी जोहडा	27°	37.	54.5	076°	23.	5.4	अप्राकृतिक
तालवृक्ष	रामपुर	लेकडी-2	2/2 लेकडी कुण्ड	27°	37.	15.0	076°	22.	43.1	प्राकृतिक
तालवृक्ष	रामपुर	लेकडी-2	2/3 विसालू कुण्ड	27°	37.	4.6	076°	22.	30.0	प्राकृतिक
तालवृक्ष	रामपुर	लेकडी-2	2/4 कचोलिया कुण्ड	27°	36.	7.4	076°	22.	3.1	प्राकृतिक
तालवृक्ष	तालवृक्ष	खरखडी-3	मामोडी जोहडा	27°	35	17.7	076°	22	52.5	प्राकृतिक
तालवृक्ष	तालवृक्ष	खरखडी-3	शिवसागर ऐनिकट	27°	35	45.4	076°	23	4.6	अप्राकृतिक
तालवृक्ष	तालवृक्ष	खरखडी-3	खरखडी बाबडी	27°	36	1.8	076°	23	4.5	अप्राकृतिक
तालवृक्ष	तालवृक्ष	खरखडी-3	बनक्या जोहडी	27°	35	39.9	076°	22	19.4	प्राकृतिक
तालवृक्ष	तालवृक्ष	खरखडी-3	मामोड कुण्ड	27°	34	11.6	076°	22	3.3	अप्राकृतिक
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	गर्बाजी जोहडा	27°	32	39.8	076°	24	42.7	प्राकृतिक
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	आडा भाग ऐनिकट	27°	33	7.0	076°	24	17.1	अप्राकृतिक
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	दानाल जोहडा	27°	33	26.0	076°	24	0.4	प्राकृतिक
तालवृक्ष	रामपुर	रामपुर-1-5	सुण्डा जाट कि जोहडी	27°	35	21.0	076°	26	44.4	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-1-5	शिमू वाली जोहडी	27°	36	29.6	076°	26	33.2	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-2-6	नाथा वाली खेडी	27°	36	25.5	076°	26	14.3	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-2-6	मूलनाथ जोहडा	27°	35	43.2	076°	26	18.4	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-2-6	कुम्हारी का बेरा	27°	35	21.6	076°	26	13.8	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-3-7	आसाबास खेली	27	36	40.4	076	25	25.0	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-3-7	मोडा वाला जोहडा	27	36	3.1	076	25	11.2	प्राकृतिक
तालवृक्ष	रामपुर	रामपुर-3-7	जयसिंह का जोहडा	27	36	28.0	076	24	37.4	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-3-7	नया ऐनिकट छोटी छिन्ड	27	35	28.1	076	24	24.0	अप्राकृतिक
तालवृक्ष	रामपुर	रामपुर-3-7	इमली वाला जोहडा	27	37	2.3	076	23	35.2	अप्राकृतिक
तालवृक्ष	देवरा	लोज-8	गोपी वाला जोहडा	27°	33	3.6	076	26	54.3	प्राकृतिक
तालवृक्ष	देवरा	लोज-8	बांस का कुंआ	27°	34	12.5	076	26	11.6	अप्राकृतिक
तालवृक्ष	तालवृक्ष	मानावास-9	9/1 भैरू घाटी जोहडी	27°	32	4.0	076	25	22.0	प्राकृतिक
तालवृक्ष	तालवृक्ष	मानावास-9	9/2 डोया वाली जोहडी	27°	31	26.6	076	25	22.9	प्राकृतिक
तालवृक्ष	तालवृक्ष	मानावास-9	9/3 शीतलनाथ	27°	29	39.5	076	24	44.2	अप्राकृतिक
तालवृक्ष	तालवृक्ष	मानावास-9	9/4 पुराना दरवाजा.	27°	29	59.0	076	24	41.2	प्राकृतिक
तालवृक्ष	तालवृक्ष	मानावास-9	9/5 गूदडी वाली जोहडी	27°	30	24.9	076	24	39.5	प्राकृतिक
तालवृक्ष	नाथूसर	पानीढाल-10	10/1 जामुण्डा	27°	29	28.5	076	27	12.3	प्राकृतिक
तालवृक्ष	नाथूसर	पानीढाल-10	10/2 बोरिंग वाला जोहड	27°	29	31.5	076	26	13.8	अप्राकृतिक
तालवृक्ष	नाथूसर	पानीढाल-10	10/3 छानीकुण्ड	27°	29	41.4	076	25	53.8	प्राकृतिक

तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/1 बनी ऐनीकट	27 ⁰	30	35.9	076	22	54.7	प्राकृतिक
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/2 रानी वाला जोहडा	27 ⁰	30	21.1	076	21	46.4	प्राकृतिक
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/3 पांचू राम की खेल	27 ⁰	30	55.0	076	22	29.7	अप्राकृतिक
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/4 रेंज कैम्पस के पीछे ऐनीकट	27 ⁰	30	48.9	076	22	74.1	अप्राकृतिक
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/5 बनी तलाई	27 ⁰	30	70.0	076	22	93.1	प्राकृतिक
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/6 बनी शमशान घाट	27 ⁰	30	78.0	076	22	59.7	अप्राकृतिक
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/1 नानची वाला जोहडा	27 ⁰	99	8.5	076	20	56.1	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/2 बडा जोहडा	27 ⁰	29	59.9	076	21	16.5	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/3 लोहडा वाला जोहडा	27 ⁰	28	38.9	076	22	12.6	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/4 घाटी वाला कुण्ड	27 ⁰	27	27.0	076	21	55.8	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/5 पक्का ऐनीकट	27 ⁰	29	17.5	076	22	23.2	-
तालवृक्ष	तालवृक्ष	बैरावास नांगलहेडी-13	13/1 खानवाली जोहडी	27 ⁰	26	48.5	076	24	15.1	अप्राकृतिक
तालवृक्ष	तालवृक्ष	बैरावास नांगलहेडी-13	13/2 देवीकुण्ड	27 ⁰	27	1.2	076	23	55.6	अप्राकृतिक
तालवृक्ष	तालवृक्ष	बैरावास नांगलहेडी-13	13/3 छोटा भूर्तहरि	27 ⁰	26	23.7	076	24	27.4	अप्राकृतिक
तालवृक्ष	तालवृक्ष	बैरावास नांगलहेडी-13	13/4 लाम्बा खोरा ऐनीकट	27 ⁰	26	42.4	076	23	12.6	अप्राकृतिक
अकबरपुर	किशनपुर	ढेहलावास-14	14/1 गोलाहेडी	27 ⁰	33	4.6	076	28	43.0	-
अकबरपुर	किशनपुर	ढेहलावास-14	14/2 कालका-1	27 ⁰	34	30.2	076	28	8.0	-
अकबरपुर	किशनपुर	ढेहलावास-14	14/3 कालका-2	27 ⁰	34	28.9	076	28	5.8	-
अकबरपुर	किशनपुर	ढेहलावास-14	14/4 गर्वाजी-1	27 ⁰	33	28.6	076	28	29.4	-
अकबरपुर	किशनपुर	ढेहलावास-14	14/5 गर्वाजी-2	27 ⁰	33	24.1	076	28	22.1	-
अकबरपुर	किशनपुर	बीनक-15	15/1 घीयागुर्जर की खेल	27 ⁰	30	40.5	076	29	14.2	अप्राकृतिक
अकबरपुर	किशनपुर	बीनक-15	15/2 ऐनीकट	27 ⁰	31	8.2	076	28	28.9	प्राकृतिक
अकबरपुर	किशनपुर	बीनक-15	15/3 गुलर देह	27 ⁰	31	18.2	076	28	30.3	प्राकृतिक
अकबरपुर	किशनपुर	बख्तापुरा-16	16/1 ओदी जोहडा	27 ⁰	32	18.5	076	30	22.1	अप्राकृतिक
अकबरपुर	किशनपुर	पैतपुर-17	17/1 कमल बघडी	27 ⁰	30	50.0	076	32	1.7	-
अकबरपुर	किशनपुर	पैतपुर-17	17/2 उपरा सिलीसेढ बन्ध	27 ⁰	31	23.5	076	31	28.2	-
अकबरपुर	किशनपुर	पैतपुर-17	17/3 गुलर देह	27 ⁰	31	14.6	076	31	30.7	-
अकबरपुर	किशनपुर	सावडी धवाला-18	18/1	27 ⁰	27	52.3	076	32	22.1	अप्राकृतिक

			धवाला जोहडा							
अकबरपुर	बांरा	कालीखोल-19	19 / 1 जयपाल-1	27 ⁰	27	10.1	076	27	39.0	—
अकबरपुर	बांरा	कालीखोल-19	19 / 2 जयपाल-2	27 ⁰	29	11.1	076	27	50.5	—
अकबरपुर	सदर बांरा	रईका-20	20 / 1 गांव वाला	27 ⁰	27	9.17	076	26	1.9	—
अकबरपुर	सदर बांरा	रईका-20	20 / 2 रंजन के पास	27 ⁰	28	1.27	076	26	29.9	—
अकबरपुर	सदर बांरा	रईका-20	20 / 3 चौकी वाला जोहडा	27 ⁰	28	11.4	076	26	32.5	—
अकबरपुर	सदर बांरा	रईका-20	20 / 4 रास्ता वाला कुण्डा	27 ⁰	27	7.3	076	26	33.2	—
अकबरपुर	सदर बांरा	माधोगढ-21	21 / 1 करतार सरदार वाली देह	27 ⁰	25	9.9	076	29	18.8	—
अकबरपुर	सदर बांरा	माधोगढ-21	—	27 ⁰	26	20.3	076	27	27.0	—
अकबरपुर	बांरा	धर्मपुरा-22	22 / 1 बांरा बीयर नदी मंदिर के पास	22 ⁰	25	12.4	076	30	12.2	
	बांरा	धर्मपुरा-22	22 / 2 व्यास फार्म के पास देह पर	27	25	4.0	076	30	2.5	—
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / 1 गीला वाली जोहडी	27 ⁰	24	39.0	076	31	12.9	अप्राकृतिक
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / 2 बांरा बियर-1	27 ⁰	25	15.7	076	30	28.1	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / 3 बांरा बियर-2	27 ⁰	25	21.8	076	30	52.4	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / 4 बांरा बियर-3	27 ⁰	25	9.4	076	31	4.1	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / 1 बडा जोहडा	27 ⁰	23	39.6	076	29	46.7	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / 2 नया ऐनीकट	27 ⁰	23	40.5	076	30	9.0	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / 1 बडा जोहडा	27 ⁰	23	30.5	076	23	30.5	—
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / 2 ऐनीकट	27 ⁰	24	14.6	076	27	26.9	—
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / 1 कलाकडी कुंआ	27 ⁰	22	79.8	076	29	40.2	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / 2 गोलेण्डा	27 ⁰	22	19.4	076	31	45.1	प्राकृतिक
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / 3 खाता का जोहडा	27 ⁰	23	28.6	076	31	48.1	प्राकृतिक
अकबरपुर	बालेटा	रोटक्याला-27	27 / 1 आमन की बेरी	27 ⁰	21	27.7	076	28	33.3	प्राकृतिक
अकबरपुर	बालेटा	रोटक्याला-27	27 / 2 बढ वाला देह	27 ⁰	21	36.7	076	28	19.3	प्राकृतिक
अकबरपुर	बालेटा	रोटक्याला-27	27 / 3 नाहरकुण्ड	27 ⁰	20	48.9	076	29	25.8	प्राकृतिक
अकबरपुर	बालेटा	रोटक्याला-27	27 / 4 सूली का नाला	27 ⁰	20	12.9	076	29	40.7	प्राकृतिक
अकबरपुर	बालेटा	भाट्याला-28	28 / 1 सिलीबेरी ऐनीकट	27 ⁰	19	33.5	076	30	56.2	अप्राकृतिक
अकबरपुर	बालेटा	भाट्याला-28	28 / 2 नाहर सती होदी-1	27 ⁰	19	44.2	076	31	7.8	अप्राकृतिक

अकबरपुर	बालेटा	भाट्याला-28	28/3 नाहर सती होदी-2	27 ⁰	19	42.2	076	31	8.6	अप्राकृतिक
अकबरपुर	बालेटा	भाट्याला-28	28/4 नाराण्डी ऐनीकट	27 ⁰	21	28.7	076	30	46.9	अप्राकृतिक
अकबरपुर	बालेटा	भाट्याला-28	28/5 बगीचा मोड	27 ⁰	19	49.1	076	31	11.8	प्राकृतिक
अकबरपुर	बालेटा	उमरी-29	29/1 हनुमान सागर ऐनीकट	27 ⁰	18	29.0	076	27	26.6	अप्राकृतिक
अकबरपुर	बालेटा	उमरी-29	29/2 हरसावल ऐनीकट	27 ⁰	19	28.0	076	28	30.7	अप्राकृतिक
अकबरपुर	बालेटा	उमरी-29	29/3 गांव वाली जोहडी	27 ⁰	19	5.5	076	28	52.5	अप्राकृतिक
अकबरपुर	बालेटा	उमरी-29	29/4 उमरी चौकी	27 ⁰	19	18.5	076	28	36.3	अप्राकृतिक
अकबरपुर	बालेटा	बालेटा-30	30/1 पूछडी हनुमान	27 ⁰	20	59.0	076	32	34.1	अप्राकृतिक
सरिस्का	थानागाजी	दुहारमाला-31	31/1 बडा जोहडा(गर्वाजी)	27 ⁰	26	38.8	076	20	30.6	प्राकृतिक
सरिस्का	थानागाजी	दुहारमाला-31	31/2 चौथा ऐनीकट	27 ⁰	25	11.6	076	20	8.1	प्राकृतिक
सरिस्का	थानागाजी	दुहारमाला-31	31/3 बाल जोहडा	27 ⁰	24	17.1	076	20	29.8	प्राकृतिक
सरिस्का	थानागाजी	गणेशपुरा-32	32/1 गणेशपुरा जोहडी	27 ⁰	22	18.8	076	19	51.5	अप्राकृतिक
सरिस्का	कांकवाडी	फाट्याखोरा-33-A	33-A/1 फाट्याखोरा जोहडी	27 ⁰	20	27.6	076	20	28.0	अप्राकृतिक
सरिस्का	थानागाजी	घानका-33	33/1 घानका वॉटर हॉल	27 ⁰	22	7.5	076	21	13.6	अप्राकृतिक
सरिस्का	थानागाजी	उदयनाथ-34	34/1 खरी का जोहडा	27 ⁰	19	38.3	076	19	54.0	प्राकृतिक
सरिस्का	थानागाजी	उदयनाथ-34	34/2 उदयनाथ खेड	27 ⁰	20	35.2	076	19	39.9	अप्राकृतिक
सरिस्का	थानागाजी	उदयनाथ-34	34/3 उदयनाथ गूलर पाईन्ट	27 ⁰	20	30.9	076	19	40.2	प्राकृतिक
सरिस्का	थानागाजी	किशोरी-35	35/1 माला जोहडका जोहडा	27 ⁰	18	43.0	076	19	59.1	अप्राकृतिक
सरिस्का	थानागाजी	किशोरी-35	35/2 पामली वाला जोहडा	27 ⁰	17	19.6	076	18	18.4	प्राकृतिक
सरिस्का	थानागाजी	किशोरी-35	35/3 कैलाश बलाई का कुआ	27 ⁰	16	30.8	076	18	51.8	अप्राकृतिक
सरिस्का	थानागाजी	किशोरी-35	35/4 रायपुरिया जोहडा	27 ⁰	18	39.6	076	18	45.3	प्राकृतिक
सरिस्का	सदर	भूर्तहरि-36	36/1 लीलूण्डा जोहडा	27 ⁰	23	29.2	076	25	30.9	प्राकृतिक
सरिस्का	सदर	भूर्तहरि-36	36/2 लीलूण्डा कुआ	27 ⁰	23	59.7	076	25	28.9	प्राकृतिक
सरिस्का	सदर	भूर्तहरि-36	36/3 फूटी ओदि	27 ⁰	24	34.2	076	25	25.3	प्राकृतिक
सरिस्का	सदर	भूर्तहरि-36	36/4 ऐनीकट घोमडी	27 ⁰	24	38.8	076	25	27.4	प्राकृतिक
सरिस्का	सदर	इन्दौक-36 A	-	27 ⁰	-	-	076	-	-	-
सरिस्का	सदर	इन्दौक-36 A	-	27 ⁰	-	-	076	-	-	-
सरिस्का	सदर	इन्दौक-36 A	-	27 ⁰	-	-	076	-	-	-
सरिस्का	सदर	इन्दौक-36 A	-	27 ⁰	-	-	076	-	-	-

सरिस्का	सदर	इन्दौक-36 A	-	27 ⁰	-	-	076	-	-	-
सरिस्का	सदर	बंदीपुल-37	37/1 बांदीपुल मंदिर	27 ⁰	23	29.8	076	21	24.2	प्राकृतिक
सरिस्का	सदर	बंदीपुल-37	37/2 गूलर देह प्रथम	27 ⁰	23	33.0	076	21	35.2	प्राकृतिक
सरिस्का	सदर	बंदीपुल-37	37/3 गूलर देह तृतीय	27 ⁰	23	32.0	076	21	50.0	प्राकृतिक
सरिस्का	सदर	सदर-38	38/1 ऐनीकट कालाकुआ	27 ⁰	23	1.3	076	22	19.6	अप्राकृतिक
सरिस्का	सदर	सदर-38	38/2 कुण्डा कालाकुआ	27 ⁰	22	45.0	076	22	12.7	अप्राकृतिक
सरिस्का	सदर	सदर-38	38/3 छानपापडा	27 ⁰	22	15.5	076	21	38.0	प्राकृतिक
सरिस्का	सदर	सदर-38	38/4 छीलावाली जोहडी	27 ⁰	23	16.1	076	23	29.4	प्राकृतिक
सरिस्का	सदर	सदर-38	38/5 कुण्डा जोहडी	27 ⁰	23	3.4	076	23	36.7	प्राकृतिक
सरिस्का	सदर	हरिपुरा-39	39/1 हरीपुरा कुआ	27 ⁰	22	31.9	076	22	55.5	अप्राकृतिक
सरिस्का	सदर	हरिपुरा-39	39/2 हरीपुरा जोहडी	27 ⁰	22	27.3	076	23	11.0	अप्राकृतिक
सरिस्का	सदर	हरिपुरा-39	39/3 पचबीर जोहडा	27 ⁰	22	21.1	076	22	54.5	अप्राकृतिक
सरिस्का	सदर	हरिपुरा-39	39/4 खोजा वाली जोहडी	27 ⁰	22	1.6	076	23	18.1	अप्राकृतिक
सरिस्का	सदर	तारुण्डा-40	40/1 तारुण्डा कुण्डा	27 ⁰	21	17.8	076	24	2.1	अप्राकृतिक
सरिस्का	सदर	तारुण्डा-40	40/2 ऐनीकट मौजनाथ	27 ⁰	21	10.8	076	23	30.5	प्राकृतिक
सरिस्का	सदर	तारुण्डा-40	40/3 ऐनीकट तारुण्डा	27 ⁰	21	14.4	076	24	1.3	प्राकृतिक
सरिस्का	सदर	तारुण्डा-40	40/4 मौजनाथ कुटी	27 ⁰	20	53.4	076	23	32.7	प्राकृतिक
सरिस्का	सदर	तारुण्डा-40	40/5 ऐनीकट मौजनाथ A	27 ⁰	21	10.9	076	23	37.2	प्राकृतिक
सरिस्का	सदर	करना बास-41	का 41/1 करना का बास ऐनीकट	27 ⁰	22	6.2	076	23	57.8	प्राकृतिक
सरिस्का	सदर	करना बास-41	का 41/2 आलग्वाल प्रथम	27 ⁰	21	57.0	076	24	54.2	प्राकृतिक
सरिस्का	सदर	करना बास-41	का 41/3 नया पानी एनक्लोजर	27 ⁰	21	22.2	076	24	54.1	प्राकृतिक
सरिस्का	सदर	करना बास-41	का 41/4 आलग्वाल बेरी	27 ⁰	21	40.8	076	25	25.8	प्राकृतिक
सरिस्का	सदर	कास्का-42	42/1 बडा जोहडा	27 ⁰	21	41.6	076	26	24.8	-
सरिस्का	सदर	कास्का-42	42/2 नांगलिया जोहडा	27 ⁰	20	6.3	076	25	51.9	-
सरिस्का	सदर	कास्का-42	42/3 सूर्य बांध	27 ⁰	21	48.8	076	26	42.7	-
सरिस्का	सदर	कास्का-42	42/4 कुण्ड जोहडा कास्का	27 ⁰	22	36.6	076	26	35.6	-
सरिस्का	सदर	कास्का-42	42/5 ओखा ऐनीकट(आलग्वाल)	27 ⁰	21	32.2	076	25	33.8	-

सरिस्का	सदर	कास्का-42	42/6 कास्का पगडंडी वाला	27 ⁰	21	39.7	076	25	31.5	-
सरिस्का	सदर	कास्का-42	42/7 जोहडी कास्का	27 ⁰	21	7.5	076	25	606.0	-
सरिस्का	कुशालगढ	कुशालगढ-43	43/1 धानी गह	27 ⁰	25	11.1	076	26	26.2	-
सरिस्का	कुशालगढ	कुशालगढ-43	43/2 धानी जोहडा	27 ⁰	25	24.9	076	25	33.0	-
सरिस्का	कुशालगढ	कुशालगढ-43	43/3 सैनी जोहडा	27 ⁰	25	36.4	076	25	54.5	-
सरिस्का	कुशालगढ	नलदेश्वर-44	44/1 गूलर देह	27 ⁰	24	42.2	076	26	58.0	
सरिस्का	कुशालगढ	नलदेश्वर-44	44/2 नाथों की समाधी	27 ⁰	24	36.0	076	25	54.6	
सरिस्का	कुशालगढ	नलदेश्वर-44	44/3 नलदेश्वर नाला(इमली का पेड)	27 ⁰	24	49.8	076	27	4.6	
सरिस्का	कुशालगढ	कालाछारा-45	45/1 ब्रहमनाथ	27 ⁰	25	44.9	076	24	59.5	-
सरिस्का	कुशालगढ	कालाछारा-45	45/2 भोमिया बनी	27 ⁰	26	43.1	076	25	24.1	-
सरिस्का	कालाघाटी	कालाघाटी-46	46/1 कालीघाटी वॉटर हॉल	27 ⁰	18	42.9	076	24	30.5	अप्राकृतिक
सरिस्का	कालाघाटी	कालाघाटी-46	46/2 कुण्डली वॉटर हॉल	27 ⁰	18	48.0	076	24	40.5	अप्राकृतिक
सरिस्का	कालाघाटी	कालाघाटी-46	46/3 बहडा वॉटर हॉल	27 ⁰	19	28.1	076	24	45.1	अप्राकृतिक
सरिस्का	कालाघाटी	कालाघाटी-46	46/4 ब्रहमनाथ वॉटर हॉल	27 ⁰	19	55.2	076	24	35.3	अप्राकृतिक
सरिस्का	कालाघाटी	कालाघाटी-46	46/5 दोरा का वॉटर हॉल	27 ⁰	17	41.0	076	24	52.7	अप्राकृतिक
सरिस्का	कांकवाडी	कांकवाडी-47	47/1 जोहडा पीला पानी	27 ⁰	19	49.1	076	22	4.8	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/2 जोहडा चौकी कांकवाडी के सामने	27 ⁰	19	40.7	076	22	3.8	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/3 बडा दैया गलढ	27 ⁰	19	43.3	076	22	9.8	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/4 नहाने वाला भाटा	27 ⁰	19	44.0	076	22	15.7	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/5 काबरी पक्का ऐनीकट	27 ⁰	19	9.6	076	23	29.8	अप्राकृतिक
सरिस्का	कालीघाटी	बना-47 A	47 A /1 बना जोहडा	27 ⁰	20	24.9	076	23	27.8	अप्राकृतिक
सरिस्का	कालीघाटी	बना-47 A	47 A /2 नई वाल	27 ⁰	19	38.1	076	23	49.1	अप्राकृतिक
सरिस्का	कालीघाटी	स्लोपका-48	48/1 स्लोपका वॉटर हॉल	27 ⁰	18	9.5	076	25	53.9	प्राकृतिक
सरिस्का	कालीघाटी	स्लोपका-48	48/2 स्लोपका जोहडी	27 ⁰	17	59.8	076	25	49.6	अप्राकृतिक
सरिस्का	कालीघाटी	स्लोपका-48	48/3 फेटा की पाल वॉटर हॉल	27 ⁰	18	9.6	076	27	2.4	प्राकृतिक
सरिस्का	कालीघाटी	स्लोपका-48	48/4 भेरू घाटी वॉटर हॉल	27 ⁰	17	40.8	076	25	16.1	अप्राकृतिक
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/1 भृत्हरि बेरी	27 ⁰	19	43.8	076	26	59.0	प्राकृतिक
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/2	27 ⁰	19	7.9	076	26	10.1	प्राकृतिक

			पोल								
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/3 मांकरूदा 2 पुलिया	27 ⁰	18	53.5	076	27	5.3	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/4 मांकरूदा 1	27 ⁰	18	58.2	076	27	14.2	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/5 हाथी देह	27 ⁰	18	55.4	076	27	11.5	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/6 मच्छी देह	27 ⁰	18	53.6	076	27	9.4	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/7 सांरन नाला 3	27 ⁰	19	22.6	076	26	52.3	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/8 सांरन नाला 2	27 ⁰	19	20.0	076	26	51.3	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/9 सांरन नाला 1	27 ⁰	19	15.0	076	26	49.5	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/10 मच्छी देह 2	27 ⁰	19	1.6	076	26	39.3	प्राकृतिक	
सरिस्का	कालीघाटी	पाण्डूपोल-49	49/11 सांरन खरा	27 ⁰	18	58.1	076	26	44.4	प्राकृतिक	
टहला	गढ	राजौर-50	50/1 राजौर जोहडा	27 ⁰	17	32.3	076	20	9.4	-	
टहला	गढ	राजौर-50	50/2 आमपाडा जोहडी	27 ⁰	18	12.8	076	21	11.3	-	
टहला	गढ	राजौर-50	50/3 तुडा-1	27 ⁰	18	12.8	076	21	1.1	-	
टहला	गढ	राजौर-50	50/4 तुडा-2	27 ⁰	18	12.8	076	21	1.1	-	
टहला	गढ	राजौर-50	50/5 तुडा-3	27 ⁰	18	55.9	076	22	54.7	-	
टहला	गढ	राजौर-50	50/6 भृर्तहरि स्थान जोहडा	27 ⁰	18	24.1	076	19	40.6	-	
टहला	गढ	गढ-51	51/1 रामकुण्डा	27 ⁰	14	34.9	076	21	48.8	-	
टहला	गढ	गढ-51	51/2 भैरुबाबा खेड	27 ⁰	15	9.7	076	20	12.5	-	
टहला	गढ	गढ-51	51/3 मण्डलावास जोहडा भौमिया जी	27 ⁰	17	20.2	076	18	20.7	-	
टहला	गढ	दबकन-52	52/1 फूटटया जोहडा	27 ⁰	16	2.6	076	22	41.8	-	
टहला	गढ	दबकन-52	52/2 सिद्ध बाबा का जोहडा	27 ⁰	16	33.3	076	22	1.9	-	
टहला	गढ	दबकन-52	52/3 राम कुण्डा बाग	27 ⁰	14	46.1	076	21	56.8	-	
टहला	गढ	दबकन-52	52/4 मनसरोवर बांधकुई का नाला	27 ⁰	14	40.0	076	21	5.8	-	
टहला	गढ	दबकन-52	52/5 मानसरोवर बांध कालीराडी नाला	27 ⁰	14	36.4	076	23	26.0	-	
टहला	गढ	दबकन-52	/6 मानसरोवर बांध हमला का नाला	27 ⁰	14	36.9	076	23	16.9	-	
टहला	टहला	भगानी-53	53/1 र बेहडी वाला देह	27 ⁰	17	20.6	076	23	22.3	प्राकृतिक	
टहला	टहला	भगानी-53	53/2 धूलिया देह	27 ⁰	17	41.0	076	23	11.5	प्राकृतिक	
टहला	टहला	भगानी-53	53/3 मं सामला देह	27 ⁰	17	52.7	076	23	6.5	प्राकृतिक	
टहला	टहला	भगानी-53	53/4 म तूडा	27 ⁰	18	31.4	076	22	30.2	प्राकृतिक	
टहला	टहला	रिछूण्डा-54	54/1 भगानी रोड ऐनीकट के नीचे	27 ⁰	16	20.0	076	24	27.1	अप्राकृतिक	
टहला	टहला	रिछूण्डा-54	54/2 चौकी कुण्डा	27 ⁰	16	21.2	076	24	32.5	अप्राकृतिक	
टहला	टहला	रिछूण्डा-54	54/3 पुरानी खेड	27 ⁰	16	47.7	076	24	19.1	अप्राकृतिक	
टहला	टहला	रिछूण्डा-54	54/4 चमारी बेरा	27 ⁰	17	17.9	076	24	16.0	अप्राकृतिक	
टहला	टहला	घेवर-55	-	27 ⁰	-	-	076	-	-	-	

टहला	टहला	घेवर-55	-	27 ⁰	-	-	076	-	-	-
टहला	टहला	घेवर-55	-	27 ⁰	-	-	076	-	-	-
टहला	टहला	घेवर-55	-	27 ⁰	-	-	076	-	-	-
टहला	टहला	भैसोटा-56	56/1 भैसोटा कुण्ड	27 ⁰	17	6.3	076	26	28.7	-
टहला	टहला	भैसोटा-56	56/2 जहाज	27 ⁰	17	27.3	076	28	14.2	-
टहला	टहला	नाण्डू-57	57/1 सोना बांध	27 ⁰	16	3.5	076	29	54.4	अप्राकृतिक
टहला	टहला	नाण्डू-57	57/2 खासका बांध	27 ⁰	15	46.3	076	30	31.9	अप्राकृतिक
टहला	बोरेठा	देवरी-58	58/1 दहेडा ऐनीकट	27 ⁰	17	39.8	076	28	17.1	अप्राकृतिक
टहला	बोरेठा	देवरी-58	58/2 गुवाडा ऐनीकट	27 ⁰	17	5.2	076	30	41.8	अप्राकृतिक
टहला	बोरेठा	देवरी-58	58/3 रुपनाथ जी का कुण्ड	27 ⁰	17	33.3	076	29	49.1	अप्राकृतिक
टहला	बोरेठा	बोरेठा-59	59/1 नया जोहडा	27 ⁰	16	48.1	076	32	5.3	अप्राकृतिक
टहला	बोरेठा	बोरेठा-59	59/2 बाघ का कुण्ड	27 ⁰	16	24.4	076	32	47.1	अप्राकृतिक
टहला	बोरेठा	बोरेठा-59	59/3 अनावडा बंध	27 ⁰	17	2.2	076	33	6.8	अप्राकृतिक
टहला	बोरेठा	डांग खाडा-60	60/1 लुहार वाला जोहडा	27 ⁰	15	57.5	076	32	11.7	अप्राकृतिक
टहला	बोरेठा	कुण्डला-61	61/1 घाट चौकी	27 ⁰	12	13.2	076	28	49.7	अप्राकृतिक
टहला	टहला	तालाब-62	62/1 तालाब बंध	27 ⁰	13	12.1	076	27	19.7	प्राकृतिक
टहला	टहला	तालाब-62	63/2 बेरी भैरू बाबा	27 ⁰	13	45.2	076	28	37.1	प्राकृतिक
टहला	टहला	गोवर्धनपुरा-63	63/1 मंगलसर बांध	27 ⁰	13	5.9	076	25	5.5	-
टहला	टहला	गोवर्धनपुरा-63	63/2 दाताखारिया	27 ⁰	13	25.3	076	25	27.7	-
टहला	टहला	गोवर्धनपुरा-63	63/3 मनफूल की खेल	27 ⁰	11	20.9	076	26	5.7	-
टहला	टहला	गोवर्धनपुरा-63	63/4 बेरली छिन्डी	27 ⁰	10	27.5	076	25	43.0	-
टहला	टहला	गोवर्धनपुरा-63	63/5 तिल देह	27 ⁰	11	28.1	076	24	43.3	-
टहला	टहला	तिलवाड-64	64/1 अमरचन्द प्रजापत की बंद खान के पास	27 ⁰	12	19.3	076	24	1.0	-
टहला	टहला	तिलवाड-64	64/2 नवल शर्मा की बंद खान	27 ⁰	12	44.4	076	23	41.5	-
टहला	टहला	तिलवाड-64	64/3 सुकवार शिवालय के पीछे	27 ⁰	13	15.4	076	21	33.3	-
टहला	खोह	खोह-65	65/1 घरेंट खेल	27 ⁰	10	16.4	076	21	44.9	अप्राकृतिक
टहला	खोह	खोह-65	65/2 पारासर कुण्ड के नीचे	27 ⁰	10	10.7	076	20	23.7	प्राकृतिक
टहला	खोह	खोह-65	65/3 पारासर उपर	27 ⁰	10	47.2	076	21	55.9	प्राकृतिक
टहला	खोह	खोह-65	65/4 ओकारी	27 ⁰	11	5.9	076	20	49.9	प्राकृतिक
टहला	खोह	घाटडा-66	66/1 रेडिया बांध-1	27 ⁰	07	38.5	076	24	39.8	-
टहला	खोह	घाटडा-66	66/2 रेडिया बांध-2	27 ⁰	07	45.4	076	24	27.9	-
टहला	गोलाकाबास	बलदेवगढ-67	67/1 गवाना हनुमान जी	27 ⁰	09	19.9	076	22	13.7	-
टहला	गोलाकाबास	नारायाणी माता-68	68/1 फेंटा	27 ⁰	08	13.3	076	20	34.6	-

टहला	गोलाकाबास	नारायाणी माता-68	68/2 घरेट खान	27 ⁰	09	12.1	076	21	14.0	-
टहला	अजबगढ	जैतपुर सिलीबावडी-69	69/1 सावलदास जोहडा	27 ⁰	10	19.8	076	18	47.4	प्राकृतिक
टहला	अजबगढ	अजबगढ-70	70/1 कटिया घाटी	27 ⁰	10	33.4	076	17	7.4	अप्राकृतिक
टहला	अजबगढ	अजबगढ-70	70/2 सोमा सागर	27 ⁰	10	41.6	076	16	46.6	प्राकृतिक
टहला	अजबगढ	बांदीपुल-71	71/1 झीलमील देह	27 ⁰	10	4.7	076	17	38.4	प्राकृतिक
टहला	अजबगढ	बांदीपुल-71	71/2 हाडा देह	27 ⁰	09	42.4	076	17	50.9	प्राकृतिक
टहला	गोलाकाबास	जांटवाणा-72	-	27 ⁰	-	-	076	-	-	-
टहला	गोलाकाबास	भानगढ-73	73/1 गणेश देहडी	27 ⁰	05	42.2	076	17	17.3	-
टहला	गोलाकाबास	भानगढ-73	73/2 सरसा माता	27 ⁰	06	17.8	076	17	48.9	-
टहला	खोह	समरा-74	74/1 मालादेहनदी	27 ⁰	10	43.0	076	13	30.3	-
टहला	खोह	समरा-74	74/2 तलावडाजोहडा	27 ⁰	10	59.2	076	14	37.7	-

Annexure – 17

List of Camera Trap Locations in Sariska Tiger Reserve with GPS

रेंज का नाम	नाका	बीट का नाम व नं०	Camera Trap Location	अक्षांश N			देशांतर E		
				दृिणी	मिनट	संकाइ	दृिणी	मिनट	संकाइ
तालवृक्ष	रामपुर	हाजीपुर.1	CTS-1/1 प्लान्टेशन सबलपुरा	27 ⁰	38	54.96	076 ⁰	26	40.2
तालवृक्ष	रामपुर	हाजीपुर.1	CTS-1/2 सिद्ध बाबा मंदिर	27 ⁰	38	0.91	076 ⁰	26	31.92
तालवृक्ष	रामपुर	हाजीपुर.1	CTS-1/3 घाटा के पास	27 ⁰	38	5.46	076 ⁰	26	43.86
तालवृक्ष	रामपुर	लेकडी.2	CTS-2/1 लेकडी नाला	27 ⁰	37	3.96	076 ⁰	22	38.22
तालवृक्ष	रामपुर	लेकडी.2	CTS-2/2 लेकडीमाला	27 ⁰	37	1.14	076 ⁰	22	19.38
तालवृक्ष	रामपुर	लेकडी.2	CTS -2/3 कचोलिया कुण्ड	27 ⁰	36	11.28	076 ⁰	22	1.98
तालवृक्ष	तालवृक्ष	खरखडी.3	CTS-3/1 मामोडी जोहडा	27 ⁰	35	18.9	076 ⁰	22	52.8
तालवृक्ष	तालवृक्ष	खरखडी.3	CTS-3/2 शिवसागर ऐनीकट की पाल के पास	27 ⁰	35	45.4	076 ⁰	23	4.6
तालवृक्ष	तालवृक्ष	खरखडी.3	CTS-3/3 मामोड कुण्ड के नीचे	27 ⁰	34	8.2	076 ⁰	21	5.8
तालवृक्ष	तालवृक्ष	लोज कानपुरा.4	CTS-4/1 गर्वाजी वाला जोहडा	27 ⁰	32	39.84	076 ⁰	24	42.72
तालवृक्ष	तालवृक्ष	लोज कानपुरा.4	CTS-4/2 आडा भाप ऐनीकट	27 ⁰	33	6.96	076 ⁰	24	17.1
तालवृक्ष	तालवृक्ष	लोज कानपुरा.4	CTS-4/3 दानव जोहडा	27 ⁰	33	25.98	076 ⁰	24	0.42
तालवृक्ष	रामपुर	रामपुर.1.5	CTS-5/1 गर्वा जी	27 ⁰	35	18.3	076 ⁰	26	52.6
तालवृक्ष	रामपुर	रामपुर.1.5	CTS-5/2 लूण्डा जाटिनी खेडी	27 ⁰	35	21	076 ⁰	26	46.5
तालवृक्ष	रामपुर	रामपुर.1.5	CTS-3 पीपली का बेरा	27 ⁰	35	9.3	076 ⁰	26	59.5
तालवृक्ष	रामपुर	रामपुर.2.6	CTS-6/1 कुम्हारी का बेरा	27 ⁰	35	24.5	076 ⁰	26	19.8
तालवृक्ष	रामपुर	रामपुर.2.6	CTS-6/2 भूतनाथ जोहडा	27 ⁰	35	45.1	076 ⁰	26	18.9
तालवृक्ष	रामपुर	रामपुर.2.6	CTS-6/3 पपरेल जोहडा	27 ⁰	35	2.1	076 ⁰	26	13.2
तालवृक्ष	रामपुर	रामपुर.3.7	CTS-7/1 मोडावाला जोहडा	27 ⁰	36	1.98	076 ⁰	25	9.12
तालवृक्ष	रामपुर	रामपुर.3.7	CTS7-2 इमली वाला जोहडा के पास	27 ⁰	37	1.68	076 ⁰	23	35.16
तालवृक्ष	रामपुर	रामपुर.3.7	CTS-7/3 नया ऐनीकट	27 ⁰	35	28.08	076 ⁰	24	24
तालवृक्ष	देवरा	लोज.8	CTS-8/1 गोपीवाला जोहडा	27 ⁰	33	3.6	076 ⁰	26	54.3
तालवृक्ष	देवरा	लोज.8	CTS-8/2 बांस का कुंआ खेली	27 ⁰	34	12.48	076 ⁰	26	11.64
तालवृक्ष	देवरा	लोज.8	CTS-8/3 जीप रोड	27 ⁰	33	32.76	076 ⁰	26	36.78
तालवृक्ष	तालवृक्ष	मानावास.9	CTS-9/1 भैरू घाटी जोहडी	27 ⁰	32	3.96	076 ⁰	25	22.02
तालवृक्ष	तालवृक्ष	मानावास.9	CTS-9/2 डोयावाली जोहडी	27 ⁰	31	26.64	076 ⁰	25	22.86
तालवृक्ष	तालवृक्ष	मानावास.9	CTS-9/3 पुराना दरवाजा	27 ⁰	29	49.98	076 ⁰	24	41.16
तालवृक्ष	नाथूसर	पानीढाल.10	CTS-10/1 प्रथम बोरिंग वाला जोहडा	27 ⁰	29	31.56	076 ⁰	26	13.92
तालवृक्ष	नाथूसर	पानीढाल.10	CTS-10/2 पापडी वाला	27 ⁰	29	44.52	076 ⁰	26	11.52

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तालवृक्ष	नाथूसर	पानीढाल.10	CTS-10/3 छानी कुण्ड रास्ता	27 ⁰	29	52.62	076 ⁰	26	8.76
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष.11	CTS-11/1	27 ⁰	30	39.5	076 ⁰	22	57.4
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष.11	CTS-11/2 रेंज के पीछे ऐनीकट	27 ⁰	30	48.9	076 ⁰	22	74.1
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष.11	CTS-11/3 बनी ऐनीकट	27 ⁰	30	54.8	076 ⁰	22	91.8
तालवृक्ष	तालवृक्ष	रेकामाला.12	CTS-12/1 बडा जोहडा	27 ⁰	29	59.88	076 ⁰	21	16.5
तालवृक्ष	तालवृक्ष	रेकामाला.12	CTS-12/2 पक्का ऐनीकट	27 ⁰	29	17.5	076 ⁰	22	23.2
तालवृक्ष	तालवृक्ष	रेकामाला.12	CTS-12/3 घाटीवाला कुण्ड	27 ⁰	27	27	076 ⁰	21	55.8
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी.13	CTS-13/1 छोटा भृत्हरि	27 ⁰	26	23.7	076 ⁰	24	27.4
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी.13	CTS-13/2 ऐनीकट प्रथम	27 ⁰	28	58.6	076 ⁰	23	18.1
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी.13	CTS-13/3 गर्वाजी	27 ⁰	28	56.6	076 ⁰	23	17.2
अकबरपुर	किशनपुर	देहलावास.14	CTS-14/1 गोलाहेडी	27 ⁰	33	4.62	076 ⁰	28	0.77
अकबरपुर	किशनपुर	देहलावास.14	CTS-14/2 गर्वाजी प्रथम	27 ⁰	33	27.66	076 ⁰	28	27.96
अकबरपुर	किशनपुर	देहलावास.14	CTS-14/3 कालाका	27 ⁰	34	29.52	076 ⁰	28	9.72
अकबरपुर	किशनपुर	बीनक.15	CTS-15/1 जयबोलनी	27 ⁰	30	52.38	076 ⁰	28	42.6
अकबरपुर	किशनपुर	बीनक.15	CTS-15/2 ऐनीकट व गूलर देह के बीच	27 ⁰	31	12.48	076 ⁰	28	28.38
अकबरपुर	किशनपुर	बीनक.15	CTS-15/3 सरसाला घाटी से आगे	27 ⁰	31	34.56	076 ⁰	28	39.6
अकबरपुर	किशनपुर	बख्तपुरा.16	CTS-16/1 ओदी जोहडा	27 ⁰	32	2.54	076 ⁰	30	20.28
अकबरपुर	किशनपुर	बख्तपुरा.16	CTS-16-2 आधा वाला जोहडा	27 ⁰	31	13.32	076 ⁰	29	58.92
अकबरपुर	किशनपुर	बख्तपुरा.16	CTS-16/3 डाकनावाला जोहडा	27 ⁰	30	47.16	076 ⁰	29	50.88
अकबरपुर	किशनपुर	पैतपुर.17	CTS-17/1 उपरा सिलीसेढ	27 ⁰	31	23.76	076 ⁰	31	26.7
अकबरपुर	किशनपुर	पैतपुर.17	CTS-17/2 पैतपुर बेडा	27 ⁰	31	12.18	076 ⁰	31	25.26
अकबरपुर	किशनपुर	पैतपुर.17	CTS-17/3 लादिया पाज बेडा	27 ⁰	31	5.1	076 ⁰	31	8.52
अकबरपुर	किशनपुर	सावडी धवाला.18	CTS-18/1 बड चौतरी	27 ⁰	27	45	076 ⁰	31	56.46
अकबरपुर	किशनपुर	सावडी धवाला.18	CTS-18/2 धवाला जोहडा	27 ⁰	27	54.84	076 ⁰	32	19.68
अकबरपुर	किशनपुर	सावडी धवाला.18	CTS-18/3 सुकल भूत खोरा	27 ⁰	28	48.96	076 ⁰	32	23.52
अकबरपुर	बारा	कालीखोल.19	CTS-19/1 जयपोल नाला	27 ⁰	29	9.06	076 ⁰	6-0	51.6
अकबरपुर	बारा	कालीखोल.19	CTS-19/2 गधा घाटी के रास्ते पर	27 ⁰	28	9.6	076 ⁰	28-	18.42
अकबरपुर	बारा	कालीखोल.19	CTS-19/3 छीलों के रास्ते पर	27 ⁰	28	2.28	076 ⁰	30-	58.2
अकबरपुर	सदर बारा	रईका.20	CTS-20/1 गांव वाला जोहडा के पास	27 ⁰	27	52.7	076 ⁰	25	59.1
अकबरपुर	सदर बारा	रईका.20	CTS-20/2 सक्कर घट्टा	27 ⁰	28	75.1	076 ⁰	26	24.2
अकबरपुर	सदर बारा	रईका.20	CTS-20/3 चौकी वाला जोहड	27 ⁰	28	5.5	076 ⁰	26	39.5
अकबरपुर	सदर बारा	माधोगढ.21	CTS-21/1 सुकोला के पास बेनामी रोड से बाएं	27 ⁰	25	10.44	076 ⁰	27	24.78
अकबरपुर	सदर बारा	माधोगढ.21	CTS-21/2 नीचला नाहर	27 ⁰	26	23.46	076 ⁰	28	85.9

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अकबरपुर	सदर बांरा	माधोगढ.21	CTS-21/3 लाम्बी पहाडी	27 ⁰	26		076 ⁰	27	27
अकबरपुर	बांरा	धर्मपुरा.22	CTS-22/1 ब्यास फार्म देह के पास	27 ⁰	25-	15.96	076 ⁰	30-	2.52
अकबरपुर	बांरा	धर्मपुरा.22	CTS-22/2 कोलियो की ढाणी कुंआ के पास	27 ⁰	25-	32.76	076 ⁰	30-	37.08
अकबरपुर	बांरा	धर्मपुरा.22	CTS-22/3 गोपाल पुरा जोहडा	27 ⁰	26-	52.86	076 ⁰	30-	7.5
अकबरपुर	पृथ्वीपुरा	चांदपहाडी.23	CTS-23/1 सर	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	चांदपहाडी.23	CTS 23-/2	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	चांदपहाडी.23	CTS-23/3 सर	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	डाबली.24	CTS-24/1 सर	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	डाबली.24	CTS-24/2	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	डाबली.24	CTS-24/3 सर	27 ⁰	-	-	076 ⁰	-	.
अकबरपुर	पृथ्वीपुरा	सुकोला.25	CTS-25/1 चौपडा पर	27 ⁰	22	48.5	076 ⁰	28	19.2
अकबरपुर	पृथ्वीपुरा	सुकोला.25	CTS-25/2 छोला छीला	27 ⁰	23	17	076 ⁰	27	38.6
अकबरपुर	पृथ्वीपुरा	सुकोला.25	CTS -25/3 बडा जोहडा	27 ⁰	23	31.1	076 ⁰	27	13.8
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा.26	CTS-26/1 पीपलमोड	27 ⁰	22	48.2	076 ⁰	29	88
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा.26	CTS-26/2 कलाकडी कुंआ	27 ⁰	22	79.8	076 ⁰	29	0.67
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा.26	CTS-26/3 कालाघट्टा	27 ⁰	22	48.8	076 ⁰	28	97.5
अकबरपुर	बालेटा	रोटक्याला.27	CTS-27/1 स्र आमन की बेरी	27 ⁰	21	27.66	076 ⁰	28	33.3
अकबरपुर	बालेटा	रोटक्याला.27	CTS-27/2 साम रोटी	27 ⁰	21	24.66	076 ⁰	29	10.74
अकबरपुर	बालेटा	रोटक्याला.27	CTS27-/3 पठार	27 ⁰	21	29.88	076 ⁰	28	3.9
अकबरपुर	बालेटा	भाट्याला.28	CTS-28/1 बगीचा मोड	27 ⁰	19	31.68	076 ⁰	30	41.1
अकबरपुर	बालेटा	भाट्याला.28	CTS-28/2 सुकडा जोहडी	27 ⁰	19	49.08	076 ⁰	31	11.76
अकबरपुर	बालेटा	भाट्याला.28	CTS-28/3 कटी घाटी	27 ⁰	19	55.5	076 ⁰	30	54.6
अकबरपुर	बालेटा	उमरी.29	CTS-29/1 हरसावल ऐनीकट	27 ⁰	19	28.02	076 ⁰	28	30.72
अकबरपुर	बालेटा	उमरी.29	CTS-29/2 सर कूचावाली जोहडी	27 ⁰	19	41.94	076 ⁰	30	1.68
अकबरपुर	बालेटा	उमरी.29	CTS-29/3 गांव वाली जोहडी	27 ⁰	19	5.46	076 ⁰	28	52.5
अकबरपुर	बालेटा	बालेटा.30	CTS-/1 गउ पाज जोहडी	27 ⁰	21	43.44	076 ⁰	31	56.28
अकबरपुर	बालेटा	बालेटा.30	CTS-/2 चूली मंदिर	27 ⁰	20	5.16	076 ⁰	32	52
अकबरपुर	बालेटा	बालेटा.30	CTS-/3 खोह ऐनीकट	27 ⁰	20	57.3	076 ⁰	31	56.58
सरिस्का	थानागाजी	दुहारमाला.31	CTS-31/1 सर	27 ⁰	25	10.5	076 ⁰	20	21.2
सरिस्का	थानागाजी	दुहारमाला.31	CTS-31/2 सर	27 ⁰	24	39.4	076 ⁰	20	32.5
सरिस्का	थानागाजी	दुहारमाला.31	CTS-31/3 सर	27 ⁰	23	14	076 ⁰	20	20.4
सरिस्का	थानागाजी	गणेशपुरा.32	CTS-32/1 सर	27 ⁰	22	19.3	076 ⁰	19	57.2
सरिस्का	थानागाजी	गणेशपुरा.32	CTS-/2 सर	27 ⁰	22	24.9	076 ⁰	20	18.7
सरिस्का	थानागाजी	गणेशपुरा.32	CTS-32/3 सर	27 ⁰	22	7.3	076 ⁰	19	49.4
सरिस्का	थानागाजी	घानका.33	CTS-32/1 सर	27 ⁰	21	41.7	076 ⁰	21	4.3
सरिस्का	थानागाजी	घानका.33	CTS-/2 सर	27 ⁰	22	3.3	076 ⁰	21	14.9
सरिस्का	थानागाजी	घानका.33	CTS-32/3 सर	27 ⁰	22	15.5	076 ⁰	21	28.8
सरिस्का	कांकवाडी	फाट्याखोरा.33 A	CTS-33 A /1 सर	27 ⁰	20	23.3	076 ⁰	20	23.3
सरिस्का	कांकवाडी	फाट्याखोरा.33 A	CTS-33 A /2 सर	27 ⁰	20	25.3	076 ⁰	20	25.5
सरिस्का	कांकवाडी	फाट्याखोरा.33 A	CTS-33 A /3	27 ⁰	20	49.2	076 ⁰	21	5
सरिस्का	थानागाजी	उदयनाथ.34	CTS-34/1	27 ⁰	20	52.4	076 ⁰	20	12.1
सरिस्का	थानागाजी	उदयनाथ.34	CTS-34/2	27 ⁰	20	41.8	076 ⁰	19	49.5

सरिस्का	थानागाजी	उदयनाथ.34	CTS-34/3	27 ⁰	20	10.4	076 ⁰	19	24.2
सरिस्का	थानागाजी	किशोरी.35	CTS-35/1	27 ⁰	19	21	076 ⁰	19	57.2
सरिस्का	थानागाजी	किशोरी.35	CTS-35/2	27 ⁰	18	48.8	076 ⁰	19	59.5
सरिस्का	थानागाजी	किशोरी.35	CTS-35/3	27 ⁰	17	47.3	076 ⁰	19	41.9
सरिस्का	सदर	भूतहरि.36	CTS-36/1	27 ⁰	23	21.4	076 ⁰	25	29.5
सरिस्का	सदर	भूतहरि.36	CTS-36	27 ⁰	24	33.5	076 ⁰	25	25.3
सरिस्का	सदर	भूतहरि.36	CTS-36/3	27 ⁰	24	43.2	076 ⁰	25	25.5
सरिस्का	सदर	इन्दौक.36 A	CTS-36 A /1	27 ⁰	23	49.6	076 ⁰	22	20.5
सरिस्का	सदर	इन्दौक.36 A	CTS-36 A /2	27 ⁰	24	45	076 ⁰	22	10.3
सरिस्का	सदर	इन्दौक.36 A	CTS-36 A /3	27 ⁰	23	44.9	076 ⁰	22	19.6
सरिस्का	सदर	बंदीपुल.37	CTS-37/1	27 ⁰	23	53.82	076 ⁰	21	3.48
सरिस्का	सदर	बंदीपुल.37	CTS-37/2	27 ⁰	23	34.5	076 ⁰	21	12
सरिस्का	सदर	बंदीपुल.37	CTS-37/3	27 ⁰	23	27.54	076 ⁰	21	35.16
सरिस्का	सदर	सदर.38	CTS-38/1	27 ⁰	22	46.9	076 ⁰	22	3.7
सरिस्का	सदर	सदर.38	CTS-38/2	27 ⁰	22.0	3.9	076 ⁰	22	24.6
सरिस्का	सदर	सदर.38	CTS-38/3	27 ⁰	22.0	2.6	076 ⁰	22	23.4
सरिस्का	सदर	हरिपुरा.39	CTS-39/1	27 ⁰	22	2.94	076 ⁰	23	29.52
सरिस्का	सदर	हरिपुरा.39	CTS-39/2	27 ⁰	21	46.8	076 ⁰	23	16.98
सरिस्का	सदर	हरिपुरा.39	CTS-39/3 सर	27 ⁰	21	58.86	076 ⁰	22	38.94
सरिस्का	सदर	तारुण्डा.40	CTS-40/1	27 ⁰	22	25.3	076 ⁰	23	59.9
सरिस्का	सदर	तारुण्डा.40	CTS-40/2	27 ⁰	21	10.1	076 ⁰	23	56.3
सरिस्का	सदर	तारुण्डा.40	CTS-40/3	27 ⁰	20	25	076 ⁰	24	22.8
सरिस्का	सदर	करना का बास.41	CTS-41/1	27 ⁰	21	34.3	076 ⁰	24	27.9
सरिस्का	सदर	करना का बास.41	CTS-41/2	27 ⁰	20	50.5	076 ⁰	24	50.2
सरिस्का	सदर	करना का बास.41	CTS-41/3	27 ⁰	21	47	076 ⁰	25	10.9
सरिस्का	सदर	क्रास्का.42	CTS-42/1 जीप रोड पर	27 ⁰	20	17.4	076 ⁰	26	23.7
सरिस्का	सदर	क्रास्का.42	CTS-42/2 आलग्वाल जीपरोड	27 ⁰	21	14.46	076 ⁰	25	30.24
सरिस्का	सदर	क्रास्का.42	CTS-42/3 नांगलिया जोहडा	27 ⁰	20	4.56	076 ⁰	25	50.82
सरिस्का	कुशालगढ	कुशालगढ.43	CTS-43/1 घानी डाह	27 ⁰	25	12.48	076 ⁰	26	27.9
सरिस्का	कुशालगढ	कुशालगढ.43	CTS-43/2 पट्टावाला जोहडा	27 ⁰	25	21.18	076 ⁰	25	57.24
सरिस्का	कुशालगढ	कुशालगढ.43	CTS-44/3 नाली के उपर	27 ⁰	25	32.58	076 ⁰	25	27
सरिस्का	कुशालगढ	नलदेश्वर.44	CTS 44-/1 नलदेश्वर नाला	27 ⁰	24	53.16	076 ⁰	27	6.42
सरिस्का	कुशालगढ	नलदेश्वर.44	CTS-44/2 क्लोजर रास्ता	27 ⁰	25	14.88	076 ⁰	26	51.06
सरिस्का	कुशालगढ	नलदेश्वर.44	CTS-45/3 मोटा राजा के पास	27 ⁰	25	21.54	076 ⁰	26	43.32
सरिस्का	कुशालगढ	कालाछारा.45	CTS- 45/2 गधाघाटी	27 ⁰	26	77.4	076 ⁰	25	39.2
सरिस्का	कुशालगढ	कालाछारा.45	CTS- 45/3 योगियों बनी	27 ⁰	26	5.52	076 ⁰	26	37.5
सरिस्का	कुशालगढ	कालाछारा.45	CTS- 45/4 गैल होदी	27	25	5.16	076	29	6.8
सरिस्का	कालाघाटी	कालाघाटी.46	CTS-46/1	27 ⁰	18	34	076 ⁰	24	9
सरिस्का	कालाघाटी	कालाघाटी.46	CTS-46/2	27 ⁰	19	49.7	076 ⁰	24	29.6
सरिस्का	कालाघाटी	कालाघाटी.46	CTS-46/3	27 ⁰	18	56.4	076 ⁰	24	56.5
सरिस्का	कांकवाडी	कांकवाडी.47	CTS-47/1	27 ⁰	19	15.5	076 ⁰	22	30.2
सरिस्का	कांकवाडी	कांकवाडी.47	CTS-47/2	27 ⁰	19	56.7	076 ⁰	22	53.9
सरिस्का	कांकवाडी	कांकवाडी.47	CTS-47/3 सर	27 ⁰	20	7.7	076 ⁰	23	1.7
सरिस्का	कालाघाटी	बना.47 A	CTS-47/1 सर	27 ⁰	20	35.3	076 ⁰	23	31.1
सरिस्का	कालाघाटी	बना.47 A	CTS-47/2	27 ⁰	21	5.4	076 ⁰	22	48.2
सरिस्का	कालाघाटी	बना.47 A	CTS-47/3	27 ⁰	20	8.1	076 ⁰	23	38.6
सरिस्का	कालाघाटी	स्तोपका.48	CTS-48/1	27 ⁰	18	14.8	076 ⁰	26	28.8

सरिस्का	कालाघाटी	स्लोपका.48	CTS-48/2	27 ⁰	17	36.1	076 ⁰	25	7.5
सरिस्का	कालाघाटी	स्लोपका.48	CTS-48/3	27 ⁰	18	37.1	076 ⁰	27	31.6
सरिस्का	कालाघाटी	पाण्डूपोल.49	CTS-49/1	27 ⁰	20	43.8	076 ⁰	27	53
सरिस्का	कालाघाटी	पाण्डूपोल.49	CTS-49/2	27 ⁰	19	42.5	076 ⁰	26	85
सरिस्का	कालाघाटी	पाण्डूपोल.49	CTS-49/3	27 ⁰	20	26.3	076 ⁰	27	31.8
टहला	गढ	राजौर-50	CTS-50/1 मुलतान	27 ⁰	18	25.4	076 ⁰	21	49.4
टहला	गढ	राजौर-50	CTS-50/2 बंगस	27 ⁰	18	14.8	076 ⁰	21	2.9
टहला	गढ	राजौर-50	CTS-50/3 कालाखेत बेरीगल	27 ⁰	19	4.3	076 ⁰	20	32.7
टहला	गढ	गढ-51	CTS-51/1 सनाट	27 ⁰	14	51.8	076 ⁰	20	37.6
टहला	गढ	गढ-51	CTS-51/2 मूदण्डी	27 ⁰	13	36.2	076 ⁰	20	58.7
टहला	गढ	गढ-51	CTS-51/3 रामकुण्डा	27 ⁰	14	9.5	076 ⁰	21	20.1
टहला	टहला	दबकन-52	CTS-52/1 रामकुण्डा बाग	27 ⁰	14	38.3	076 ⁰	21	43.5
टहला	टहला	दबकन-52	CTS-52/2 गुढा जंगल	27 ⁰	15	56.2	076 ⁰	21	22.4
टहला	टहला	दबकन-52	CTS-52/3 कालीराडी	27 ⁰	15	56.9	076 ⁰	22	45.7
टहला	टहला	भगानी-53	CTS-53-1 बावडी मोड के पास	27 ⁰	17	31.5	076 ⁰	23	10.5
टहला	टहला	भगानी-53	CTS-53/2 चौकी सामने तिराये पर	27 ⁰	17	41.5	076 ⁰	23	5.6
टहला	टहला	भगानी-53	CTS-53/3 तुडा की तरफ जीपरोड का अंतिम सिरा	27 ⁰	18	13.3	076 ⁰	22	44.8
टहला	टहला	रिछूण्डा-54	CTS-54/1 जामुन पुलिया	27 ⁰	16	30.6	076 ⁰	24	32.3
टहला	टहला	रिछूण्डा-54	CTS-54/2 चमारी का बेरा	27 ⁰	17	17.3	076 ⁰	24	15.6
टहला	टहला	रिछूण्डा-54	CTS-54/3 नया ऐनीकट कुण्ड मोड चैन पर	27 ⁰	17	34.8	076 ⁰	24	10.4
टहला	टहला	घेवर-55	CTS-55/1 भैंसोटा ऐनीकट	27 ⁰	17	8.0	076 ⁰	26	25.8
टहला	टहला	घेवर-55	CTS-55/2 भैंसोटा जोहडा	27 ⁰	17	18.6	076 ⁰	25	39.1
टहला	टहला	घेवर-55	CTS-55/3 डाबर का जोहडा	27 ⁰	17	13.4	076 ⁰	25	7.1
टहला	टहला	भैंसोटा-56	CTS-56/1 नये ऐनीकट से आगे	27 ⁰	17	28.4	076 ⁰	27	36.2
टहला	टहला	भैंसोटा-56	CTS-56/2 ऐनीकट धोलाकुण्ड से आगे	27 ⁰	17	15.1	076 ⁰	26	50.2
टहला	टहला	भैंसोटा-56	CTS-56/3 भैंसोटा बोरिंग के पास	27 ⁰	17	24.4	076 ⁰	26	25.3
टहला	टहला	नाण्डू-57	CTS-57/1 मंगलदास जोहडे के पास	27 ⁰	17	1.8	076 ⁰	28	50.1
टहला	टहला	नाण्डू-57	CTS-57/2 कालापापडा	27 ⁰	17	0.2	076 ⁰	29	2.9
टहला	टहला	नाण्डू-57	CTS-57/3 बासरोल से पहले एस रोड	27 ⁰	17	1.2	076 ⁰	29	17.1
टहला	बोरेठा	देवरी-58	CTS-58/1	27 ⁰	17	42.5	076 ⁰	29	5.2
टहला	बोरेठा	देवरी-58	CTS-58/2	27 ⁰	17	1.6	076 ⁰	30	45.9
टहला	बोरेठा	देवरी-58	CTS-58/3	27 ⁰	16	31.5	076 ⁰	30	51.4
टहला	बोरेठा	बोरेठा-59	CTS-59/1 नूनपुर जोहड	27 ⁰	17	13.1	076 ⁰	32	43.7
टहला	बोरेठा	बोरेठा-59	CTS-59/2 नूनपुर जोहड	27 ⁰	17	13.1	076 ⁰	32	41.6
टहला	बोरेठा	बोरेठा-59	CTS-59/3 बाग का जोहडा	27 ⁰	17	27.1	076 ⁰	32	44.5
टहला	बोरेठा	डांग खाडा-60	CTS-60/1 लुहार वाला जोहडा	27 ⁰	15	2.9	076 ⁰	32	11.9
टहला	बोरेठा	डांग खाडा-60	CTS-60/2 रोटक्याल जोहडा	27 ⁰	15	17.3	076 ⁰	31	59.6
टहला	बोरेठा	डांग खाडा-60	CTS-60/3 परसाली	27 ⁰	15	27.5	076 ⁰	32	31.1
टहला	बोरेठा	कुण्डला-61	CTS-61/1	27 ⁰	12	36.7	076 ⁰	29	21.0

टहला	बोरेठा	कुण्डला-61	CTS-61/2	27 ⁰	12	48.0	076 ⁰	29	53.6
टहला	बोरेठा	कुण्डला-61	CTS-61/3	27 ⁰	13	24.8	076 ⁰	29	40.0
टहला	टहला	तालाब-62	CTS-62/1 घाट क्लोजर	27 ⁰	12	43.6	076 ⁰	28	28.4
टहला	टहला	तालाब-62	CTS-62/2 चन्दा माण्डन की जोहडी	27 ⁰	12	53.9	076 ⁰	28	28.7
टहला	टहला	तालाब-62	CTS-62/3 भैरु जी की बरी	27 ⁰	13	36.3	076 ⁰	28	56.0
टहला	टहला	गोवर्धनपुरा-63	CTS-63/1 छोटी छिन्द	27 ⁰	11	39.5	076 ⁰	26	35.2
टहला	टहला	गोवर्धनपुरा-63	CTS-63/2 कुए के पास	27 ⁰	11	44.9	076 ⁰	26	33.7
टहला	टहला	गोवर्धनपुरा-63	CTS-63/3	27 ⁰	11	46.6	076 ⁰	26	35.8
टहला	टहला	तिलवाड-64	CTS-64/1 जयन्ती बंद खान के पास	27 ⁰	12	35.4	076 ⁰	23	42.8
टहला	टहला	तिलवाड-64	CTS-64/2 सुकवार स्थान की पगडंडी पर	27 ⁰	13	10.3	076 ⁰	21	46
टहला	टहला	तिलवाड-64	CTS-64/3 सुकवार मंदिर के पीछे	27 ⁰	13	12.9	076 ⁰	21	37.1
टहला	खोह	खोह-65	CTS-65/1	27 ⁰	11	0.7	076 ⁰	20	52.0
टहला	खोह	खोह-65	CTS-65/2	27 ⁰	10	51.5	076 ⁰	21	7.9
टहला	खोह	खोह-65	CTS-65/3	27 ⁰	09	4.6	076 ⁰	21	20.6
टहला	खोह	घाटडा-66	CTS-65/1	27 ⁰	08	58.2	076 ⁰	25	22.1
टहला	खोह	घाटडा-66	CTS-66/2	27 ⁰	09	33.8	076 ⁰	25	24.2
टहला	खोह	घाटडा-66	CTS-66/3	27 ⁰	08	23.6	076 ⁰	23	59.3
टहला	गोलाकाबास	बलदेवगढ-67	CTS-67/1	27 ⁰	08	46.4	076 ⁰	21	32.9
टहला	गोलाकाबास	बलदेवगढ-67	CTS-67/2	27 ⁰	09	19.9	076 ⁰	22	14.3
टहला	गोलाकाबास	बलदेवगढ-67	CTS-67/3	27 ⁰	08	23.5	076 ⁰	23	23.1
टहला	गोलाकाबास	नारायाणी माता-68	CTS-68/1 बागराडी	27 ⁰	08	8.2	076 ⁰	20	30.3
टहला	गोलाकाबास	नारायाणी माता-68	CTS-68/2 बाग	27 ⁰	08	1.0	076 ⁰	20	47.0
टहला	गोलाकाबास	नारायाणी माता-68	CTS-68/3 नारायणा मात ऐनीकट	27 ⁰	08	29.7	076 ⁰	20	34.7
टहला	अजबगढ	जैतपुर सिलीबावडी-69	CTS-69/1	27 ⁰	09	48.2	076 ⁰	18	48.9
टहला	अजबगढ	जैतपुर सिलीबावडी-69	CTS-69/2	27 ⁰	09	27.4	076 ⁰	19	19.9
टहला	अजबगढ	जैतपुर सिलीबावडी-69	CTS-69/3	27 ⁰	09	52.3	076 ⁰	19	10.1
टहला	अजबगढ	अजबगढ-70	CTS-70/1	27 ⁰	10	29.3	076 ⁰	17	5.6
टहला	अजबगढ	अजबगढ-70	CTS-70/2	27 ⁰	10	23.9	076 ⁰	16	43.9
टहला	अजबगढ	अजबगढ-70	CTS-70/3	27 ⁰	11	8.8	076 ⁰	16	29.2
टहला	अजबगढ	बांदीपुल-71	CTS-71/1 झीलमील देह	27 ⁰	10	7.5	076 ⁰	17	33.1
टहला	अजबगढ	बांदीपुल-71	CTS-71/2 नादरी जोहडा सिद्धबाबा	27 ⁰	9	3.0	076 ⁰	18	15.4
टहला	अजबगढ	बांदीपुल-71	CTS-71/3 गूलर देह	27 ⁰	08	58.7	076 ⁰	17	47.5
टहला	गोलाकाबास	जांटवाणा-72	CTS-72/1	27 ⁰	07	20.4	076 ⁰	19	1.5
टहला	गोलाकाबास	जांटवाणा-72	CTS-72/2	27 ⁰	07	25.7	076 ⁰	19	0.3
टहला	गोलाकाबास	जांटवाणा-72	CTS-72/3	27 ⁰	07	29.5	076 ⁰	19	0.7
टहला	गोलाकाबास	भानगढ-73	CTS-73/1	27 ⁰	05	46.8	076 ⁰	17	26.5
टहला	गोलाकाबास	भानगढ-73	CTS-73/2	27 ⁰	05	45.7	076 ⁰	17	23.0
टहला	गोलाकाबास	भानगढ-73	CTS-73/3	27 ⁰	05	41.9	076 ⁰	17	19.8
टहला	खोह	समरा-74	CTS-/1	27 ⁰	10	53.9	076 ⁰	14	37.7
टहला	खोह	समरा-74	CTS-74/2	27 ⁰	11	0.6	076 ⁰	14	41.8
टहला	खोह	समरा-74	CTS-74/3	27 ⁰	11	10.6	076 ⁰	14	51.8

Annexure – 18

List of PIP Locations in Sariska Tiger Reserve with GPS

रेंज का नाम	नाका	बीट का नाम व नं०	PIP NO	अक्षांश N			देशांतर E		
				दृि	मिनिट	सैकण्ड	दृि	मिनिट	सैकण्ड
तालवृक्ष	रामपुर	हाजीपुर-1	PIP-1/1 प्लान्टेशन सबलपुरा	27 ⁰	38	54.96	076 ⁰	26-	40.2
तालवृक्ष	रामपुर	हाजीपुर-1	PIP-1/2 प्लान्टेशन सबलपुरा	27 ⁰	38-	54.96	076 ⁰	26-	39.66
तालवृक्ष	रामपुर	हाजीपुर-1	PIP-1/3 (प्लान्टेशन सिद्ध बाबा)	27 ⁰	38-	52.56	076 ⁰	26-	37.86
तालवृक्ष	रामपुर	हाजीपुर-1	PIP-1/4 सिद्ध बाबा मंदिर	27 ⁰	38-	54.6	076 ⁰	26-	31.92
तालवृक्ष	रामपुर	हाजीपुर-1	PIP-1/5 घाटा के पास	27 ⁰	38-	5.46	076 ⁰	26-	43.86
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/1 लेकडी नाला	27 ⁰	37-	3.96	076 ⁰	22-	38.22
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/1 लेकडी माला	27 ⁰	37-	1.14	076 ⁰	22-	37.38
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/3 लेकडी माला	27 ⁰	36-	51.72	076 ⁰	22-	35.82
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/4 नीमडीवाली पाज	27 ⁰	36-	31.14	076 ⁰	22-	29.4
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/5 बुडी का जोहडा	27 ⁰	37-	21.96	076 ⁰	23-	13.98
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/6 लेकडी नाला	27 ⁰	37-	2.1	076 ⁰	23-	5.52
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/7 बुडी का नाला	27 ⁰	36-	58.32	076 ⁰	23-	5.04
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/8 कचोलिया कुण्ड	27 ⁰	36-	7.08	076 ⁰	22-	1.98
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/9 विसालू कुण्ड	27 ⁰	37-	2.64	076 ⁰	22-	29.46
तालवृक्ष	रामपुर	लेकडी-2	PIP-2/10 हनुमान जी खेली	27 ⁰	35-	58.68	076 ⁰	21-	54.9
तालवृक्ष	तालवृक्ष	खरखडी-3	PIP3/1 मामोडी जोहडा	27 ⁰	35	18.9	076 ⁰	22	52.8
तालवृक्ष	तालवृक्ष	खरखडी-3	PIP3/2 शिवसागर एनिकट की पाल के पास	27 ⁰	35	45.4	076 ⁰	23	4.6
तालवृक्ष	तालवृक्ष	खरखडी-3	PIP3/3 खरखडी बाबडी	27 ⁰	36	1.8	076 ⁰	23	4.5
तालवृक्ष	तालवृक्ष	खरखडी-3	PIP3/4 बनक्या जोहडी	27 ⁰	35	39.9	076 ⁰	22	19.4
तालवृक्ष	तालवृक्ष	खरखडी-3	PIP3/5 मामोड कुण्ड के नीचे	27 ⁰	34	8.2	076 ⁰	21	5.8
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	PIP 4/1 खिन्नी वाली जोहडी के पास	27 ⁰	33	8.34	076 ⁰	24	52.08
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	PIP 4/2 खिन्नी वाली जोहडी के पास	27 ⁰	33	4.56	076 ⁰	24	55.02
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	PIP 4/3 गर्बाजी वाला जोहडा	27 ⁰	32	39.84	076 ⁰	24	42.72
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	PIP 4/4 आडा भाग एनिकट	27 ⁰	33	6.96	076 ⁰	24	17.1
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	PIP 4/5 दानाल जोहडा	27 ⁰	33	25.98	076 ⁰	24	0.42
तालवृक्ष	रामपुर	रामपुर-1-5	PIP 5/1 (बेलकी का नाला)	27 ⁰	34^	58	076 ⁰	27	31.2
तालवृक्ष	रामपुर	रामपुर-1-5	PIP 5/2 पीपली का बेरा	27 ⁰	35^	10.9	076 ⁰	26^	58.4

तालवृक्ष	रामपुर	रामपुर-1-5	PIP 5/3 गर्बाजी	27 ⁰	35 [^]	18.3	076 ⁰	26 [^]	52.6
तालवृक्ष	रामपुर	रामपुर-1-5	PIP 5/4 गर्बाजी	27 ⁰	35 [^]	19.5	076 ⁰	26 [^]	51.4
तालवृक्ष	रामपुर	रामपुर-2-6	PIP 6/1 (कुम्हारी का बेरा	27 ⁰	35	24.5	076	26	19.8
तालवृक्ष	रामपुर	रामपुर-2-6	PIP /21 नाथा वाली खेली	27 ⁰	36	22.6	076	26	14.1
तालवृक्ष	रामपुर	रामपुर-2-6	PIP 6/3 मूलनाथ जोहडा	27 ⁰	35	45.1	076	26	18.9
तालवृक्ष	रामपुर	रामपुर-2-6	PIP 6/4 कुम्हारी का बेरा	27 ⁰	35	19.1	076	26	12.7
तालवृक्ष	रामपुर	रामपुर-2-6	PIP 6/5 पपरैल जोहडा	27 ⁰	35	2.1	76	26	13.2
तालवृक्ष	रामपुर	रामपुर-2-6	PIP 6/ 6 खाक का देह	27 ⁰	34	45.5	076	26	37.2
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/1 मोडा वाला जोहडा	27	36	1.98	076	25	9.12
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/2 पुराना प्लान्टेशन	27	36	1.38	076	25	12.48
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/3 मोडा वाला जोहडा	27	36	2.46	076	25	14.52
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/4 पहाडी के नीचे	27	37	4.32	076	25	13.62
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/5 इमली वाला जोहडा	27	37	2.7	076	23	34.56
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/6 इमली वाला जोहडा के पास	27	37	1.68	076	23	35.16
तालवृक्ष	रामपुर	रामपुर-3-7	PIP 7/7 नया ऐनीकट	27	35	28.08	076	24	24
तालवृक्ष	देवरा	लोज-8	गोपी वाला जोहडा	27	33	3.6	076	26	54.3
तालवृक्ष	देवरा	लोज-8	बांस का कुंआ	27	34	12.48	076	26	11.64
तालवृक्ष	देवरा	लोज-8	लीलरा घाटी	27	32	56.7	076	26	58.86
तालवृक्ष	देवरा	लोज-8	फूटा जोहडा	27	33	13.8	076	26	42.96
तालवृक्ष	देवरा	लोज-8	जीपरोड	27	33	32.76	076	26	36.78
तालवृक्ष	तालवृक्ष	मानावास-9	PIP 9/1 भैरुघाटी जोहडी	27 ⁰	32	3.96	076	25	22.02
तालवृक्ष	तालवृक्ष	मानावास-9	PIP 9/2 डोयावाली जोहडी	27 ⁰	31	26.64	076	25	22.86
तालवृक्ष	तालवृक्ष	मानावास-9	PIP 9/3 शीतलनाथ	27 ⁰	29	39.54	076	24	44.22
तालवृक्ष	तालवृक्ष	मानावास-9	PIP 9/4 पुराना दरवाजा	27 ⁰	29	49.98	076	24	41.16
तालवृक्ष	तालवृक्ष	मानावास-9	PIP 9/5 गुदडी वाली जोहडी	27 ⁰	30	24.9	076	24	39.54
तालवृक्ष	नाथूसर	पानीढाल-10	PIP 9/1 प्रथम बोरिंग वाला जोहडा	27 ⁰	29	31.56	076	26	13.92
तालवृक्ष	नाथूसर	पानीढाल-10	PIP 10/2 बोरिंग वाला जोहडा घूमपर	27 ⁰	29	28.2	076	26	13.8
तालवृक्ष	नाथूसर	पानीढाल-10	PIP 10/3 जीप रोड	27 ⁰	29	35.82	076	26	12.66
तालवृक्ष	नाथूसर	पानीढाल-10	PIP 10/4 पापडी वाला कुण्ड	27 ⁰	29	44.52	076	26	11.52
तालवृक्ष	नाथूसर	पानीढाल-10	PIP 10/5 छानी कुण्ड रास्ता	27 ⁰	29	52.62	076	26	8.76
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	PIP 11/1	27 ⁰	30	39.3	076	22	57.4

तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	PIP 11/2	27 ⁰	30	23.1	076	21	55.6
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	PIP 11/3 रेंज के पीछे ऐनीकट पर कैमरा	27 ⁰	30	48.9	076	22	74.1
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	PIP 12/4 बनी ऐनीकट कैमरा	27 ⁰	30	54.8	076	22	91.8
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	PIP 12/5 ऐनीकट रास्ता तालवृक्ष	27 ⁰	23	33.48	076	22	36.18
तालवृक्ष	तालवृक्ष	रेकामाला-12	PIP 12/1 नावली वाला जोहडा	29 ⁰	99	8.5	076	20	56.1
तालवृक्ष	तालवृक्ष	रेकामाला-12	PIP 12/2 बडा जोहडा	27 ⁰	29	59.88	076	21	16.5
तालवृक्ष	तालवृक्ष	रेकामाला-12	PIP 12/3 पक्का ऐनीकट	27 ⁰	29	17.5	076	22	23.2
तालवृक्ष	तालवृक्ष	रेकामाला-12	PIP 12/4 लोहडा वाला जोहडा	27 ⁰	28	38.9	076	22	12.6
तालवृक्ष	तालवृक्ष	रेकामाला-12	PIP12 /5 घाटी वाला कुण्ड	27 ⁰	27	27	076	21	55.8
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	PIP 13/1 माली वाला पारा	27 ⁰	27	0.7	076	24	5.4
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	PIP 13/2 व वी छोटा भूर्तहरि	27 ⁰	26	23.7	076	24	27.4
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	PIP 14/3 खान वाली जोहडी	27 ⁰	26	48.5	076	24	15.1
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	PIP 13/4 प्रथम ऐनीकट	27 ⁰	28	58.6	076	23	18.1
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	PIP 13/5 गर्वा जी	27 ⁰	28	56.6	076	23	17.2
अकबरपुर	किशनपुर	ढेहलावास-14	PIP 14/1 गोलाहेडी	27 ⁰	33	4.62	076	28	43.02
अकबरपुर	किशनपुर	ढेहलावास-14	PIP 14/2 कालाका-प्रथम	27 ⁰	34	30.24	076	28	7.98
अकबरपुर	किशनपुर	ढेहलावास-14	PIP 14/3 कालाका-द्वितीय	27 ⁰	34	28.86	076	28	5.76
अकबरपुर	किशनपुर	ढेहलावास-14	PIP 14/4 गर्वा जी प्रथम	27 ⁰	33	28.56	076	28	29.4
अकबरपुर	किशनपुर	ढेहलावास-14	PIP 14/5 गर्वा जी द्वितीय	27 ⁰	33	24.06	076	28	22.08
अकबरपुर	किशनपुर	बीनक-15	PIP 15/1 जयबोलनी	27 ⁰	30	52.38	076	28	42.6
अकबरपुर	किशनपुर	बीनक-15	PIP 15/2 शीलाधर नाला	27 ⁰	30	52.08	076	28	27
अकबरपुर	किशनपुर	बीनक-15	PIP 15/3 ऐनीकट एवं गूलर देह के बीच	27 ⁰	31	12.48	076	28	28.38
अकबरपुर	किशनपुर	बीनक-15	PIP15 /4 सरसाला घाटी से आगे	27 ⁰	31	34.56	076	28	39.6
अकबरपुर	किशनपुर	बीनक-15	PIP 15/5 पटेल जोहडा	27 ⁰	32	5.64	076	28	1.44
अकबरपुर	किशनपुर	बख्तपुरा-16	PIP 16/1 ओदी जोहडा	27 ⁰	32	15.24	076	30	20.28
अकबरपुर	किशनपुर	बख्तपुरा-16	PIP 16 /2 आंदा वाला जोहडा	27 ⁰	31	13.32	076	29	58.92
अकबरपुर	किशनपुर	बख्तपुरा-16	PIP 16/3 डाकन वाला जोहडा	27 ⁰	30	47.16	076	29	50.88

अकबरपुर	किशनपुर	बख्तपुरा-16	PIP 16/4 ओदी वाला जोहडा से आगे	27 ⁰	32	3.3	076	30	18.24
अकबरपुर	किशनपुर	बख्तपुरा-16	PIP 16/5 लाल डूगरी के पास	27 ⁰	31	53.46	076	30	7.56
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/1 जंगल झीढ	27 ⁰	29	37.08	076	32	5.28
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/2 व पीपलगढ	27 ⁰	30	20.76	076	31	45.9
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/3 उपरा सिलीसेढ	27 ⁰	31	23.76	076	31	26.7
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/4 पैतपुर बेडा	27 ⁰	31	12.18	076	31	25.26
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/5 लादिया पाज बेडा	27 ⁰	31	5.1	076	31	8.52
अकबरपुर	किशनपुर	पैतपुर-17	PIP 17/6 किशनपुर खोरा	27 ⁰	31	51.24	076	31	9.06
अकबरपुर	किशनपुर	सावडी धवाला-18	PIP NO-18/1 अकबरपुर जोहडा	27	27	6.72	76	31	58.98
अकबरपुर	किशनपुर	सावडी धवाला-18	PIP NO-18/1 बड चौतरी	27	27	42.9	76	31	56.46
अकबरपुर	किशनपुर	सावडी धवाला-18	PIP NO-18/1 धवाला जोहडा	27	27	54.84	76	32	19.68
अकबरपुर	किशनपुर	सावडी धवाला-18	PIP NO-18/1 सुकल भूत खोरा	27	28	52.56	76	32	23.52
अकबरपुर	किशनपुर	सावडी धवाला-18	PIP NO-18/1 बड चौतरी	27	27	27.66	76	32	16.14
अकबरपुर	बारा	कालीखोल-19	PIP NO-19/2 जयपोल नाला	27	29	9.06	76	6	51.6
अकबरपुर	बारा	कालीखोल-19	PIP NO-19/3 गधा घाटी के रास्ते पर	27	28	9.6	76	28	18.42
अकबरपुर	बारा	कालीखोल-19	PIP NO-19/4 गिलाडी के सामने	27	28	8.88	76	29	8.52
अकबरपुर	बारा	कालीखोल-19	PIP NO-19/5 छिलों के रास्ते पर	27	28	22.8	76	30	58.2
अकबरपुर	बारा	कालीखोल-19	PIP NO-19/6 रोंध वाले जोहडा के रास्त	27	29	25.98	76	29	11.64
अकबरपुर	सदर बारा	रईका-20	PIP NO-20/1 गांव वाला जोहडा के पास	27	27	52.7	76	25	59.1
अकबरपुर	सदर बारा	रईका-20	PIP NO 20/2 रावत वाला जोहडा के पास	27	26	57.2	76	26	53.1
अकबरपुर	सदर बारा	रईका-20	PIP NO-20/3 सक्कर घट्टा के पास	27	28	75.1	76	26	24.2
अकबरपुर	सदर बारा	रईका-20	PIP NO-20/4 चोली वाला जोहडा	27	28	5.5	76	26	39.5
अकबरपुर	सदर बारा	रईका-20	PIP NO-20/5 रास्ता कुण्ड की तरफ	27	28	6.0	76	26	32.6
अकबरपुर	सदर बारा	माधोगढ-21	PIP 21/1 सुकोला के पास बेनामी रोड से बाएं	27	25	10.4	76	27	24.78
अकबरपुर	सदर बारा	माधोगढ-21	PIP 21/2 नीचला नाहर खोरा	27	26	23.5	76	28	85.9
अकबरपुर	सदर बारा	माधोगढ-21	PIP 21/3 लाम्बी पहाडी	27	26	1218.0	76	27	27.0
अकबरपुर	सदर बारा	माधोगढ-21	PIP 21/4 नारायण वाला देह	27	26	12.2	76	27	16.2

अकबरपुर	सदर बांरा	माधोगढ-21	PIP 21/5 करतार सरदार वाली देह	27	25	9.9	76	29	18.8
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/1 मंदिर के पास बांरा बियर नदी	22	25	12.4	76	30	12.24
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/2 व्यास फार्म देह के पास	27	25	16.0	76	30	2.52
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/3 लोह मोड पुलिया के पास	27	25	34.5	76	29	36.9
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/4 मुर्गी फार्म के पास रोड के नजदीक	27	25	26.2	76	29	55.08
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/5 कोलियो की ढाणी कुंआ के पास	27	25	26.8	76	30	37.08
अकबरपुर	बांरा	धर्मपुरा-22	PIP 22/6 गोपालपुरा जोहडा	27	26	52.9	76	30	7.5
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	PIP 23/1	27	24	4.1	76	31	8.6
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	PIP 23/2	27	23	53.9	76	30	34.4
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	PIP 23/3	27	24	38.7	76	31	12.6
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	PIP 23/4	27	24	5.3	76	30	26.9
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	PIP 23/5	27	24	17	76	30	28.1
अकबरपुर	पृथ्वीपुरा	डाबली-24	PIP 24/1 भैसाज पाज	27	23	51.2	076	30	26.2
अकबरपुर	पृथ्वीपुरा	डाबली-24	PIP 24/2 कलाकडी फायरलाइन	27	23	45	076	29	18.8
अकबरपुर	पृथ्वीपुरा	डाबली-24	PIP 24/3 कलाकडी फायरलाइन	27	23	37.7	076	29	22.6
अकबरपुर	पृथ्वीपुरा	डाबली-24	PIP 24/4 सुकोला रास्ता	27	23	49.1	076	29	11.9
अकबरपुर	पृथ्वीपुरा	डाबली-24	PIP 24/5 डाबली सुकोला रास्ता	27	23	49.6	076	29	5.8
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/1 हाथीडांग	27	23	46.1	076	27	49.6
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/2 डाबली रोड	27	23	36.4	076	28	10.2
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/3 चोपडा रोड	27	23	25.4	076	27	52.3
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/4 नलदी पाज	27	23	28.9	076	27	12.8
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/5 कास्का रोड	27	23	10.1	076	27	10.6
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/6 चौपडा पर	27	23	48.5	076	28	19.2
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/7 धोला छीला	27	23	17	076	27	38.6
अकबरपुर	पृथ्वीपुरा	सुकोला-25	PIP 25/8 बडा जोहडा	27	23	31.1	076	27	13.8
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	PIP 26/1	27	22	15.8	076	30	14.9

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अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	PIP 26/2 पीपलमोडा	27	22	48.2	076	29	88.0
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	PIP 26/3 कलाकडी कुआ	27	22	79.8	076	29	40.2
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	PIP 26/4 काला घट्टा	27	22	48.8	076	28	97.5
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	PIP 26/5 कलाकडी जोहडा	27	22	78	076	29	30.6
अकबरपुर	बालेटा	रोटक्याला-27	PIP 27/1 बडा भेडा	27	21	14.0	076	29	49.98
अकबरपुर	बालेटा	रोटक्याला-27	PIP 27/2 मीठी बेरी साम रोटी	27	21	24.7	076	29	10.74
अकबरपुर	बालेटा	रोटक्याला-27	PIP 27/3 आमन की बेरी	27	21	27.7	076	28	33.3
अकबरपुर	बालेटा	रोटक्याला-27	PIP 27/4 पठार	27	21	29.9	076	28	3.9
अकबरपुर	बालेटा	रोटक्याला-27	PIP 27/5 जोडला भेडा	27	21	5.5	076	27	46.08
अकबरपुर	बालेटा	भाट्याला-28	PIP 28/1 बगीचा मोड	27	19	31.7	076	30	41.1
अकबरपुर	बालेटा	भाट्याला-28	PIP 28/2 सूकडा जोहडी	27	19	49.1	076	31	11.76
अकबरपुर	बालेटा	भाट्याला-28	PIP 28/3 कटी घाटी चूडसिद्ध	27	19	55.5	076	30	54.6
अकबरपुर	बालेटा	भाट्याला-28	PIP 28/4 नाराण्डी ऐनीकट	27	21	28.7	076	30	46.92
अकबरपुर	बालेटा	भाट्याला-28	PIP 28/5 जलेबी चौक	27	21	0.9	076	30	12.06
अकबरपुर	बालेटा	उमरी-29	PIP 29/1 आडी नदी	27	19	25.3	076	30	1.26
अकबरपुर	बालेटा	उमरी-29	PIP 29/2 कूचा वाली जोहडी	27	19	41.9	076	29	1.68
अकबरपुर	बालेटा	उमरी-29	PIP 29/3 नई जोहडी	27	20	13.7	076	29	13.98
अकबरपुर	बालेटा	उमरी-29	PIP 29/4 हरसावल ऐनीकट	27	19	28.1	076	28	30.72
अकबरपुर	बालेटा	उमरी-29	PIP 29/5 गांव वाली जोहडी	27	19	5.5	076	28	52.5
अकबरपुर	बालेटा	बालेटा-30	PIP 30/1 लालमोडी की पांज	27	21	55.4	076	31	42.12
अकबरपुर	बालेटा	बालेटा-30	PIP 30/2 गउ पाज जोहडी	27	21	43.4	076	31	56.28
अकबरपुर	बालेटा	बालेटा-30	PIP 30/3 कखोह ऐनीकट	27	20	57.3	076	31	56.58
अकबरपुर	बालेटा	बालेटा-30	PIP 30/4 चूली मंदिर	27	20	5.2	076	32	3.12
अकबरपुर	बालेटा	बालेटा-30	PIP 30/5 पूछडी का हनुमान	27	20	59.0	076	32	34.14
सरिस्का	थानागाजी	दुहारमाला-31	PIP 31/1	27	26	40.5	076	20	31.2
सरिस्का	थानागाजी	दुहारमाला-31	PIP 31 /2	27	26	43.5	076	21	23.7
सरिस्का	थानागाजी	दुहारमाला-31	PIP 31 /3	27	25	7.7	076	20	22.3
सरिस्का	थानागाजी	दुहारमाला-31	PIP 31 /4	27	24	26.1	076	20	31.5
सरिस्का	थानागाजी	दुहारमाला-31	PIP 31/5	27	23	24.1	076	20	22.8
सरिस्का	थानागाजी	गणेशपुरा-32	PIP 32/1	27	22	18.4	076	19	54.6

सरिस्का	थानागाजी	गणेशपुरा-32	PIP 32/2	27	21	57.7	076	19	31.9
सरिस्का	थानागाजी	गणेशपुरा-32	PIP 32/3	27	22	25	076	20	18.5
सरिस्का	थानागाजी	गणेशपुरा-32	PIP 32/4	27	22	47.6	076	20	40.6
सरिस्का	थानागाजी	गणेशपुरा-32	PIP 32/5	27	21	35.3	076	20	8.2
सरिस्का	कांकवाडी	फाट्याखोरा-33 A	PIP 33 A /1	27	20	23.3	076	20	23.3
सरिस्का	कांकवाडी	फाट्याखोरा-33 A	PIP 33 A /2	27	20	25.3	076	20	25.5
सरिस्का	कांकवाडी	फाट्याखोरा-33 A	PIP 33 A /3	27	20	49.2	076	21	5.0
सरिस्का	कांकवाडी	फाट्याखोरा-33 A	PIP 33 A /4	27	21	7.9	076	21	17.1
सरिस्का	कांकवाडी	फाट्याखोरा-33 A	PIP 33 A /5	27	21	45.2	076	21	48.5
सरिस्का	थानागाजी	घानका-33	PIP 33/1	27	20	55.6	076	20	18.3
सरिस्का	थानागाजी	घानका-33	PIP 33/2	27	21	20.7	076	20	41.0
सरिस्का	थानागाजी	घानका-33	PIP 33/3	27	21	41.8	076	21	4.3
सरिस्का	थानागाजी	घानका-33	PIP 33/4	27	22	3.2	076	21	15.0
सरिस्का	थानागाजी	घानका-33	PIP 33/5	27	22	15.4	076	21	28.7
सरिस्का	थानागाजी	उदयनाथ-34	PIP 34/1	27	20	42	076	19	49.6
सरिस्का	थानागाजी	उदयनाथ-34	PIP 34/2	27	19	26.9	076	19	2.3
सरिस्का	थानागाजी	उदयनाथ-34	PIP 34/3	27	20	10.1	076	19	24.4
सरिस्का	थानागाजी	उदयनाथ-34	PIP 34/4	27	19	52.5	076	19	17.5
सरिस्का	थानागाजी	उदयनाथ-34	PIP 34/5	27	20	52.4	076	20	12.4
सरिस्का	थानागाजी	किशोरी-35	PIP 35/1	27	17	19.6	076	18	18.4
सरिस्का	थानागाजी	किशोरी-35	PIP 35/2	27	18	44	076	19	59.3
सरिस्का	थानागाजी	किशोरी-35	PIP 35/3	27	19	20.9	076	19	57.8
सरिस्का	थानागाजी	किशोरी-35	PIP 35/4	27	18	7.4	076	19	48.0
सरिस्का	थानागाजी	किशोरी-35	PIP 35/5	27	17	43.7	076	19	39.8
सरिस्का	सदर	भूर्तहरि-36	PIP 36/1	27	23	53.6	076	24	48.2
सरिस्का	सदर	भूर्तहरि-36	PIP 36/2	27	24	4.4	076	25	15.5
सरिस्का	सदर	भूर्तहरि-36	PIP 36/3	27	23	21.4	076	25	29.5
सरिस्का	सदर	भूर्तहरि-36	PIP 36/4	27	24	33.5	076	25	25.3
सरिस्का	सदर	भूर्तहरि-36	PIP 36/5	27	24	43.2	076	25	25.5
सरिस्का	सदर	इन्दौक-36 A	PIP 36 A /1 ल	27	23	49.6	076	22	20.5
सरिस्का	सदर	इन्दौक-36 A	PIP 36 A /2 ग	27	24	45	076	22	10.3
सरिस्का	सदर	इन्दौक-36 A	PIP 36 A /3 क	27	23	44.9	076	22	19.6
सरिस्का	सदर	इन्दौक-36 A	PIP 36 A /4	27	23	38.5	076	22	26.1
सरिस्का	सदर	इन्दौक-36 A	PIP 36 A /5	27	23	39.5	076	22	46.9

सरिस्का	सदर	बंदीपुल-37	PIP 37/1	27	23	53.8	076	21	3.48
सरिस्का	सदर	बंदीपुल-37	PIP 37/2	27	23	34.5	076	21	12
सरिस्का	सदर	बंदीपुल-37	PIP 37/3	27	23	32.9	076	21	35.16
सरिस्का	सदर	बंदीपुल-37	PIP 37/4	27	23	34.8	076	22	37.8
सरिस्का	सदर	बंदीपुल-37	PIP 37/5	27	23	58.0	076	21	1.56
सरिस्का	सदर	सदर-38	PIP 38/1	27	22	46.9	076	22	
सरिस्का	सदर	सदर-38	PIP 38/2	27	22.0	3.9	076	22	
सरिस्का	सदर	सदर-38	PIP 38/3	27	22.0	2.6	076	22	
सरिस्का	सदर	सदर-38	PIP 38/4	27	23	23.9	076	22	
सरिस्का	सदर	सदर-38	PIP 38/5	27	23	4.9	076	22	
सरिस्का	सदर	हरिपुरा-39	PIP 39/1	27	22	2.9	076	23	29.52
सरिस्का	सदर	हरिपुरा-39	PIP 39/2	27	21	46.8	076	23	16.98
सरिस्का	सदर	हरिपुरा-39	PIP 39/3	27	21	58.9	076	22	38.94
सरिस्का	सदर	हरिपुरा-39	PIP 39/4	27	21	53.8	076	22	32.94
सरिस्का	सदर	हरिपुरा-39	PIP 39/5	27	22	28.4	076	23	25.32
सरिस्का	सदर	तारुण्डा-40	PIP 40/1	27	22	25.3	076	23	59.9
सरिस्का	सदर	तारुण्डा-40	PIP 40/2	27	21	9.2	076	23	34.1
सरिस्का	सदर	तारुण्डा-40	PIP 40/3	27	21	10.1	076	23	56.3
सरिस्का	सदर	तारुण्डा-40	PIP 40/4	27	21	0.4	076	24	13.5
सरिस्का	सदर	तारुण्डा-40	PIP 40/5	27	20	25	076	24	22.8
सरिस्का	सदर	करना का बास-41	PIP 41 /1	27	21	34.3	076	24	27.9
सरिस्का	सदर	करना का बास-41	PIP 41/2	27	20	50.5	076	24	50.2
सरिस्का	सदर	करना का बास-41	PIP 41/3	27	20	54.4	076	24	39.1
सरिस्का	सदर	करना का बास-41	PIP 41 /4	27	21	47	076	25	10.9
सरिस्का	सदर	करना का बास-41	PIP 41/5	27	22	2.3	076	24	11.3
सरिस्का	सदर	कास्का-42	PIP 42/1 बो जीप रोड पर	27	20	17.4	076	26	23.7
सरिस्का	सदर	कास्का-42	PIP 42/2 आलम्बाल जीप रोड	27	21	14.5	076	25	30.24
सरिस्का	सदर	कास्का-42	PIP 42/3 नांगलिया जोहडा	27	20	4.6	076	25	50.82
सरिस्का	सदर	कास्का-42	PIP 42/4 कास्का टॉप	27	20	20.7	076	26	52.38
सरिस्का	सदर	कास्का-42	PIP 42/5 सुकोला तिराया	27	22	14.9	076	27	6.66
सरिस्का	कुशालगढ	कुशालगढ-43	PIP 43/1 धानी गेह	27	25	12.5	076	26	27.9
सरिस्का	कुशालगढ	कुशालगढ-43	PIP 43/2 धानी डगर	27	25	21.4	076	25	24.9
सरिस्का	कुशालगढ	कुशालगढ-43	PIP 43/3 पट्टावाला जोहडा	27	25	21.2	076	25	57.24
सरिस्का	कुशालगढ	कुशालगढ-43	PIP 43/4 घमोडी जोहडा	27	25	15.3	076	25	26.1
सरिस्का	कुशालगढ	कुशालगढ-43	PIP 43/5 गधी के उपर	27	25	32.6	076	25	2.7
सरिस्का	कुशालगढ	नलदेश्वर-44	PIP 44/1 नलदेश्वर नाला	27	24	53.2	076	27	6.42
सरिस्का	कुशालगढ	नलदेश्वर-44	PIP 44/2 क्लोजर रास्ता	27	25	14.9	076	26	51.06
सरिस्का	कुशालगढ	नलदेश्वर-44	PIP 44/3 मोटा राडा के पास	27	25	20.9	076	26	43.32
सरिस्का	कुशालगढ	नलदेश्वर-44	PIP 44/4	27	25	17.0	076	26	6.12

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सरिस्का	कुशालगढ	नलदेश्वर-44	PIP 44/5 धानी डगर	27	25	36.4	076	26	6.6
सरिस्का	कुशालगढ	कालाछारा-45	PIP 45/1 ब्रहमनाथ	27	25	7.48	076	24	99.2
सरिस्का	कुशालगढ	कालाछारा-45	PIP 45/2 गधाघाटी	27	26	77.4	076	25	39.2
सरिस्का	कुशालगढ	कालाछारा-45	PIP 45/3 योगियों की बनी	27	26	5.52	076	25	49.0
सरिस्का	कुशालगढ	कालाछारा-45	PIP 45/4 कालापापडा	27	25	88.7	076	26	37.5
सरिस्का	कुशालगढ	कालाछारा-45	PIP 45/5 गैल होदी	27	25	5.16	076	29	6.8
सरिस्का	कालाघाटी	कालाघाटी-46	PIP 46/1	27	19	25.8	076	24	35.2
सरिस्का	कालाघाटी	कालाघाटी-46	PIP 46/2	27	18	34	076	24	9.0
सरिस्का	कालाघाटी	कालाघाटी-46	PIP 46/3	27	19	49.7	076	24	29.6
सरिस्का	कालाघाटी	कालाघाटी-46	PIP 46/4	27	18	56.4	076	24	56.5
सरिस्का	कालाघाटी	कालाघाटी-46	PIP 46/5	27	18	24.1	076	23	46.0
सरिस्का	कांकवाडी	कांकवाडी-47	PIP 47/1	27	19	15.5	076	22	30.2
सरिस्का	कांकवाडी	कांकवाडी-47	PIP 47/2	27	19	56.7	076	22	53.9
सरिस्का	कांकवाडी	कांकवाडी-47	PIP 47/3	27	20	7.7	076	23	1.7
सरिस्का	कांकवाडी	कांकवाडी-47	PIP 47/4	27	19	7.6	076	23	31.1
सरिस्का	कांकवाडी	कांकवाडी-47	PIP 47/5	27	18	24.1	076	23	46.0
सरिस्का	कालीघाटी	बना-47 A	PIP 47 A /1	27	20	35.3	076	23	31.1
सरिस्का	कालीघाटी	बना-47 A	PIP 47 A /2	27	21	5.4	076	22	48.2
सरिस्का	कालीघाटी	बना-47 A	PIP 47 A 47 A /3	27	20	8.1	076	23	38.6
सरिस्का	कालीघाटी	बना-47 A	PIP 47 A /4	27	19	37.5	076	23	49.3
सरिस्का	कालीघाटी	बना-47 A	PIP 47 A /5	27	20	10.7	076	23	18.3
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/1	27	18	41.7	076	27	32.0
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/2	27	18	9.7	076	27	2.1
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/3	27	18	4	076	25	55.1
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/4	27	18	14.8	076	26	28.8
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/5	27	17	36.1	076	25	7.5
सरिस्का	कालीघाटी	स्लोपका-48	PIP 48/6	27	18	37.1	076	27	31.6
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/1	27	20	43.8	076	27	53.0
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/2	27	19	42.5	076	26	85.0
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/3	27	20	26.3	076	27	31.8
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/4	27	20	21	076	27	26.7
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/5	27	20	24.9	076	27	34.9
सरिस्का	कालीघाटी	पाण्डूपोल-49	PIP 49/6	27	18	57.1	076	26	25.6
टहला	गढ	राजौर-50	PIP 50/1 बंगस	27	18	14.8	076	21	2.9
टहला	गढ	राजौर-50	PIP 50/2 मुलतानी	27	18	25.4	076	21	49.4
टहला	गढ	राजौर-50	PIP 50/3 बालकनाथ	27	19	4.4	076	20	32.5
टहला	गढ	राजौर-50	PIP 50/4 कालाखेत	27	19	4.3	076	20	32.7
टहला	गढ	राजौर-50	PIP 50/5 राजौर जोहडा	27	17	32.3	076	20	9.4

टहला	गढ	गढ-51	PIP 51/1 मांडलवास जोहडा	27	16	29.6	076	20	0.7
टहला	गढ	गढ-51	PIP 51/2 हरीपुरा रुद		15	43.1	076	19	51.3
टहला	गढ	गढ-51	PIP 51/3 सन्नाट	27	14	51.8	076	20	37.6
टहला	गढ	गढ-51	PIP 51/4 मूदण्डी	27	13	36.2	076	20	58.7
टहला	गढ	गढ-51	PIP 51/5 रामकुण्डा	27	14	9.5	076	21	20.1
टहला	टहला	दबकन-52	PIP 52/1 नया क्लोजर	27	14	50.2	076	22	26.8
टहला	टहला	दबकन-52	PIP 52/2 तिगढा स्थान	27	14	12.7	076	22	26.0
टहला	टहला	दबकन-52	PIP 52/3 रामकुण्डा बाग	27	14	38.3	076	21	43.5
टहला	टहला	दबकन-52	PIP 52/4 गुडा जंगल	27	15	56.2	076	21	22.4
टहला	टहला	दबकन-52	PIP 52/5 काली राडी	27	14	56.9	076	22	45.7
टहला	टहला	भगानी-53	PIP 53/1 मंदिर के पास	27	16	37.6	076	23	39.4
टहला	टहला	भगानी-53	PIP 53/2 खान कुआ के पास	27	16	48.5	076	23	25.0
टहला	टहला	भगानी-53	PIP 53/3 बहेडी देह से मंदिर की तरफ	27	17	1.3	076	22	3.7
टहला	टहला	भगानी-53	PIP 53/4 नया ऐनीकट के रोड पर	27	17	19.7	076	22	55.0
टहला	टहला	भगानी-53	PIP 53/5 चौकी से आगे रोड पर	27	18	2.0	076	22	44.2
टहला	टहला	रिछूण्डा-54	PIP 54/1 कांकवाडी मोड पर	27	17	38.1	076	24	9.2
टहला	टहला	रिछूण्डा-54	PIP 54/2 ऐनीकट के नीचे रोड पर	27	17	14.9	076	23	44.5
टहला	टहला	रिछूण्डा-54	PIP /543 चमारी को बेरा पर	27	17	1.6	076	24	55.1
टहला	टहला	रिछूण्डा-54	PIP 54/4 नया ऐनीकट मोड पर	27	17	57.7	076	24	3.5
टहला	टहला	रिछूण्डा-54	PIP 54/5 जामुन पुलिया पर	27	16	42.4	076	24	30.9
टहला	टहला	घेवर-55	PIP 55/1	27	16	5.1	076	26	44.3

			भैसोटबोरबेल						
टहला	टहला	घेवर-55	PIP 55/2 भैसोटऐनीकट	27	17	6.4	076	26	28.6
टहला	टहला	घेवर-55	PIP 55/3 फूट्याजोहडी	27	17	18.8	076	25	43.9
टहला	टहला	घेवर-55	PIP 55/4 डाबर का जोहडा	27	17	12.8	076	25	8.5
टहला	टहला	घेवर-55	PIP /55/5 बिहानी बेरा	27	16	32.5	076	25	36.6
टहला	टहला	भैसोटा-56	PIP 56/1	27	17	22.5	076	26	22.9
टहला	टहला	भैसोटा-56	PIP 56 /2	27	17	24.6	076	26	25.1
टहला	टहला	भैसोटा-56	PIP 56/3	27	17	18.9	076	27	7.0
टहला	टहला	भैसोटा-56	PIP 56/4	27	17	26.3	076	27	43.8
टहला	टहला	भैसोटा-56	PIP 56/5	27	17	28.9	076	28	11.0
टहला	टहला	नाण्डू-57	PIP 57/1 जहाज बासरोल तिराए के पास	27	17	8.7	076	28	40.3
टहला	टहला	नाण्डू-57	PIP 57/2 मंगलदास जोहडे के पास	27	17	1.8	076	28	50.1
टहला	टहला	नाण्डू-57	PIP 57/3 कालापापाडा	27	17	0.2	076	29	2.9
टहला	टहला	नाण्डू-57	PIP 57/4 बांसरोल से पहले एस मोड	27	17	1.2	076	29	17.1
टहला	टहला	नाण्डू-57	PIP 57/5 बांसरोल में बहेडा विशाल वृक्ष	27	17	11.6	076	29	31.4
टहला	बोरेठा	देवरी-58	PIP 58/1	27	17	22.6	076	28	48.8
टहला	बोरेठा	देवरी-58	PIP 58/2	27	17	42.5	076	29	5.2
टहला	बोरेठा	देवरी-58	PIP 58/3	27	17	1.6	076	30	45.9
टहला	बोरेठा	देवरी-58	PIP 58/4	27	16	31.5	076	30	51.4
टहला	बोरेठा	देवरी-58	PIP 58/5	27	17	31.1	076	29	54.5
टहला	बोरेठा	बोरेठा-59	PIP 59/1 नया जोहडा	27	16	48.1	076	32	41.3
टहला	बोरेठा	बोरेठा-59	PIP 59/2 नूनपुर का जोहडा	27	17	13.1	076	32	43.7
टहला	बोरेठा	बोरेठा-59	PIP 59/3 नूनपुर का जोहडा	27	17	13.1	076	32	41.6
टहला	बोरेठा	बोरेठा-59	PIP 59/4 नल ऐनीकट	27	17	26.5	076	32	36.8
टहला	बोरेठा	बोरेठा-59	PIP 59/5 बाग का जोहडा	27	17	27.1	076	32	44.5
टहला	बोरेठा	डांग खाडा-60	PIP 60/1	27	14	48.9	076	31	45.3

			पंचायत ऐनीकट						
टहला	बोरेठा	डांग खाडा-60	PIP 60/2 लुहार वाला जोहडा	27	14	57.7	076	32	9.7
टहला	बोरेठा	डांग खाडा-60	PIP 60/3 लुहारवाला जोहडा	27	15	2.9	076	32	11.9
टहला	बोरेठा	डांग खाडा-60	PIP 60/4 रोटक्याला जोहडा	27	15	17.3	076	31	59.6
टहला	बोरेठा	डांग खाडा-60	PIP 60/5 परसाली जोहडी	27	15	27.5	076	32	31.1
टहला	बोरेठा	कुण्डला-61	PIP 61/1	27	12	26.8	076	28	50.1
टहला	बोरेठा	कुण्डला-61	PIP 61/2	27	12	36.7	076	29	21.0
टहला	बोरेठा	कुण्डला-61	PIP 61/3	27	12	43.6	076	29	26.8
टहला	बोरेठा	कुण्डला-61	PIP 61/4	27	12	48.0	076	29	53.6
टहला	बोरेठा	कुण्डला-61	PIP 61/5	27	13	24.8	076	30	40.0
टहला	टहला	तालाब-62	PIP 62/1 घाट क्लोजर	27	12	43.6	076	28	28.4
टहला	टहला	तालाब-62	PIP 62/2 कोली जोहडा	27	12	53.9	076	28	28.7
टहला	टहला	तालाब-62	PIP 62/3 चन्दा माण्डन की जोहडी	27	13	7.8	076	28	34.9
टहला	टहला	तालाब-62	PIP 62/4 लभेरू जी की बेरी	27	13	36.3	076	28	56.0
टहला	टहला	तालाब-62	PIP 62/5 अंगू रान पाज	27	13	44.9	076	28	46.7
टहला	टहला	गोवर्धनपुरा-63	PIP 63/1 मंगलसर बांध	27	13	5.9	076	25	5.5
टहला	टहला	गोवर्धनपुरा-63	PIP 63/2 दाताखारिया	27	13	25.3	076	25	27.7
टहला	टहला	गोवर्धनपुरा-63	PIP 62/3 मनफूल की खेर	27	11	20.9	076	26	5.7
टहला	टहला	गोवर्धनपुरा-63	PIP 63/4 बेरली छिण्ड	27	10	27.5	076	25	43.0
टहला	टहला	गोवर्धनपुरा-63	PIP 63/5 तिल देह	27	11	28.1	076	24	43.3
टहला	टहला	तिलवाड-64	PIP 64/1 अमरचंद प्रजापत की बंद खान के पास	27	12	21.9	076	23	58.3
टहला	टहला	तिलवाड-64	PIP 64/2 जयन्ती बन्द खान के पास	27	12	35.4	076	23	42.8
टहला	टहला	तिलवाड-64	PIP 64/3 पलपुर होस्टल के पीछं	27	12	1.0	076	23	46.8
टहला	टहला	तिलवाड-64	PIP 64/4 सुकवार स्थान की पगडंडी पर	27	13	10.3	076	21	46.0
टहला	टहला	तिलवाड-64	PIP 64/5 सुकवार मंदिर के	27	13	12.9	076	21	37.1

			पीछे						
टहला	खोह	खोह-65	PIP 65/1	27	11	0.7		20	52.0
टहला	खोह	खोह-65	PIP 65/2	27	10	51.5	076	21	7.9
टहला	खोह	खोह-65	PIP 65/3	27	09	4.6	076	21	20.0
टहला	खोह	खोह-65	PIP 65/4	27	10	59.7	076	21	25.9
टहला	खोह	खोह-65	PIP 65/5	27	10	14.5	076	21	44.9
टहला	खोह	घाटडा-66	PIP 66 /1	27	07	37.4	076	24	47.4
टहला	खोह	घाटडा-66	PIP 66/2	27	08	24.4	076	25	11.9
टहला	खोह	घाटडा-66	PIP 66/3	27	08	58.2	076	25	22.1
टहला	खोह	घाटडा-66	PIP 66/4	27	09	33.8	076	25	24.2
टहला	खोह	घाटडा-66	PIP 66/5	27	08	23.6	076	23	59.3
टहला	गोलाकाबास	बलदेवगढ-67	PIP 67/1	27	08	55.7	076	21	18.3
टहला	गोलाकाबास	बलदेवगढ-67	PIP 67 /2	27	08	46.4	076	21	32.9
टहला	गोलाकाबास	बलदेवगढ-67	PIP 67/3	27	09	19.9	076	22	13.7
टहला	गोलाकाबास	बलदेवगढ-67	PIP 67/4	27	08	23.5	076	23	23.1
टहला	गोलाकाबास	बलदेवगढ-67	PIP 67/5	27	08	36.2	076	23	32.5
टहला	गोलाकाबास	नारायाणी माता-68	PIP 68/1 फेटा	27	08	13.3	076	20	34.6
टहला	गोलाकाबास	नारायाणी माता-68	PIP 68/2 बागराडी	27	08	8.2	076	20	30.3
टहला	गोलाकाबास	नारायाणी माता-68	PIP 68/3 बाग	27	08	1.0	076	20	47.0
टहला	गोलाकाबास	नारायाणी माता-68	PIP 68/4 घरेट खान	27	09	12.1	076	21	14.0
टहला	गोलाकाबास	नारायाणी माता-68	PIP 68/5 नारायणी माता एनीकट	27	08	29.7	076	20	34.7
टहला	अजबगढ	जैतपुर सिलीबावडी-69	PIP 69/1	27	10	17.8	076	17	42.5
टहला	अजबगढ	जैतपुर सिलीबावडी-69	PIP 69/2	27	10	13.3	076	18	24.6
टहला	अजबगढ	जैतपुर सिलीबावडी-69	PIP 69/3	27	09	48.2	076	18	48.9
टहला	अजबगढ	जैतपुर सिलीबावडी-69	PIP 69/4	27	09	27.4	076	19	19.9
टहला	अजबगढ	जैतपुर सिलीबावडी-69	PIP 69/5	27	09	52.3	076	19	10.1
टहला	अजबगढ	अजबगढ-70	PIP 70/1	27	10	29.3	076	17	5.6
टहला	अजबगढ	अजबगढ-70	PIP 70/2	27	10	43.8	076	16	50.0
टहला	अजबगढ	अजबगढ-70	PIP 70/3	27	10	23.9	076	16	43.9
टहला	अजबगढ	अजबगढ-70	PIP 70/4	27	10	57.9	076	16	36.1

टहला	अजबगढ	अजबगढ-70	PIP 70/5	27	11	8.8	076	16	29.2
टहला	अजबगढ	बांदीपुल-71	PIP 71/1 झीलमिल देह	27	10	7.5	076	17	33.1
टहला	अजबगढ	बांदीपुल-71	PIP 71/2 आडा देह	27	09	28.3	076	17	57.5
टहला	अजबगढ	बांदीपुल-71	PIP 71/3 नादरी जोहडी सिद्ध बाबा	27	09	3.0	076	18	15.4
टहला	अजबगढ	बांदीपुल-71	PIP 71/4 गूलर देह	27	08	58.7	076	17	47.5
टहला	अजबगढ	बांदीपुल-71	PIP 71/5 भोमिया बाबा जंगल	27	08	30.1	076	17	50.9
टहला	गोलाकाबास	जांटवाणा-72	PIP 72/1	27	07	15.5	076	19	2.9
टहला	गोलाकाबास	जांटवाणा-72	PIP 72/2	27	07	20.4	076	19	1.5
टहला	गोलाकाबास	जांटवाणा-72	PIP 72/3	27	07	25.7	076	19	0.3
टहला	गोलाकाबास	जांटवाणा-72	PIP /4	27	07	29.5	076	19	0.7
टहला	गोलाकाबास	जांटवाणा-72	PIP 72/5	27	07	32.2	076	19	1.4
टहला	गोलाकाबास	भानगढ-73	PIP 73/1	27	05	45.6	076	17	35.4
टहला	गोलाकाबास	भानगढ-73	PIP 73/2	27	05	46.4	076	17	33.0
टहला	गोलाकाबास	भानगढ-73	PIP 73/3	27	05	46.8	076	17	26.5
टहला	गोलाकाबास	भानगढ-73	PIP 73/4	27	05	45.7	076	17	23.0
टहला	गोलाकाबास	भानगढ-73	PIP 73/5	27	05	41.9	076	17	18.2
टहला	खोह	समरा-74	PIP 74/1	27	10	8.9	076	17	28.4
टहला	खोह	समरा-74	PIP 74/2	27	10	53.9	076	14	30.1
टहला	खोह	समरा-74	PIP 74/3	27	10	53.9	076	14	37.7
टहला	खोह	समरा-74	PIP 74/4	27	11	0.6	076	14	41.8
टहला	खोह	समरा-74	PIP 74/5	27	11	10.6	076	14	51.8

Annexure – 19

List of Beat wise Transect Lines in Sariska Tiger Reserve

रेंज का नाम	नाका	बीट का नाम व नं०	ट्रांजेक्ट लाईन का I.D.	अक्षांश N			देशांतर E			ट्रांजेक्ट लाईन F.B.
				दिशा	दिशा	शेकापट्ट	दिशा	दिशा	शेकापट्ट	
तालवृक्ष	रामपुर	हाजीपुर-1	1/SP A	27 ⁰	38	55.4	076 ⁰	26	40.0	15 ⁰
तालवृक्ष	रामपुर	हाजीपुर-1	1/EP A	27 ⁰	39	55.5	076 ⁰	27	10.6	195 ⁰
तालवृक्ष	रामपुर	हाजीपुर-1	1/SP B	27 ⁰	38	51.9	076 ⁰	26	41.3	180 ⁰
तालवृक्ष	रामपुर	हाजीपुर-1	1/EP B	27 ⁰	37	47.3	076 ⁰	26	44.7	360 ⁰
तालवृक्ष	रामपुर	लेकडी-2	2/SP A	27 ⁰	37-	12.7	076 ⁰	22-	42.5	200 ⁰
तालवृक्ष	रामपुर	लेकडी-2	2/EP A	27 ⁰	36-	9.6	076 ⁰	22-	25.0	20 ⁰
तालवृक्ष	रामपुर	लेकडी-2	2/SP B	27 ⁰	37-	42.8	076 ⁰	23-	14.5	196 ⁰
तालवृक्ष	रामपुर	लेकडी-2	2/EP B	27 ⁰	36-	39.6	076 ⁰	22-	59.9	16 ⁰
तालवृक्ष	तालवृक्ष	खरखडी-3	3/SP A	27 ⁰	36	32.0	076 ⁰	23	9.9	S.W.
तालवृक्ष	तालवृक्ष	खरखडी-3	3/EP A	27 ⁰	35	42.3	076 ⁰	22	22.4	S.W.
तालवृक्ष	तालवृक्ष	खरखडी-3	3/SP B	27 ⁰	35	8.1	076 ⁰	23	13.3	N
तालवृक्ष	तालवृक्ष	खरखडी-3	3/EP B	27 ⁰	36	8.2	076 ⁰	23	18.0	N
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	4/SP A	27 ⁰	32	9.8	076 ⁰	25	23.0	-
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	4/EP A	27 ⁰	33	8.3	076 ⁰	24	52.1	-
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	4/SP B	27 ⁰	32	37.4	076 ⁰	24	47.5	-
तालवृक्ष	तालवृक्ष	लोज कानपुरा-4	4/EP B	27 ⁰	33	26.0	076 ⁰	24	0.4	-
तालवृक्ष	रामपुर	रामपुर-1-5	5/SP A	27 ⁰	35^	12.4	076 ⁰	26	41.6	152 ⁰
तालवृक्ष	रामपुर	रामपुर-1-5	5/EP A	27 ⁰	34^	14.5	076 ⁰	27	15.5	332 ⁰
तालवृक्ष	रामपुर	रामपुर-1-5	5/SP B	27 ⁰	36^	17.09	076 ⁰	26	35.4	148 ⁰
तालवृक्ष	रामपुर	रामपुर-1-5	5/EP B	27 ⁰	35^	23.1	076 ⁰	27	13.9	328 ⁰
तालवृक्ष	रामपुर	रामपुर-2-6	6/SP A	27 ⁰	35^	55.9	076 ⁰	26	19.7	265 ⁰
तालवृक्ष	रामपुर	रामपुर-2-6	6/EP A	27 ⁰	35^	43.3	076 ⁰	25	8.1	85 ⁰
तालवृक्ष	रामपुर	रामपुर-2-6	6/SP B	27 ⁰	35^	22	076 ⁰	26	9.3	171 ⁰
तालवृक्ष	रामपुर	रामपुर-2-6	6/EP B	27 ⁰	34^	17.1	076 ⁰	26	12.0	351 ⁰
तालवृक्ष	रामपुर	रामपुर-3-7	7/SP A	27 ⁰	35	59.6	076	25	22.5	220
तालवृक्ष	रामपुर	रामपुर-3-7	7/EP A	27 ⁰	35	8.8	076	24	40.5	40
तालवृक्ष	रामपुर	रामपुर-3-7	7/SP B	27 ⁰	37	3.2	076	23	36.2	180
तालवृक्ष	रामपुर	रामपुर-3-7	7/EP B	27 ⁰	35	59.8	076	23	49.8	360
तालवृक्ष	देवरा	लोज-8	8/SP A	27 ⁰	32	36.3	076	26	19.4	-
तालवृक्ष	देवरा	लोज-8	8/EP A	27 ⁰	34	9.0	076	26	8.1	-
तालवृक्ष	देवरा	लोज-8	8/SP B	27 ⁰	34	55.5	076	26	59.7	-
तालवृक्ष	देवरा	लोज-8	8/EP B	27 ⁰	33	25.7	076	26	39.9	-
तालवृक्ष	तालवृक्ष	मानावास-9	9/SP A	27 ⁰	32	1.56	076	25	23.8	-
तालवृक्ष	तालवृक्ष	मानावास-9	9/EP A	27 ⁰	31	6.2	076	25	20.0	-
तालवृक्ष	तालवृक्ष	मानावास-9	9/SP B	27 ⁰	30	54.5	076	24	52.1	-
तालवृक्ष	तालवृक्ष	मानावास-9	9/EP B	27 ⁰	31	54.5	076	24	52.7	-
तालवृक्ष	नाथूसर	पानीढाल-10	10/SP A	27 ⁰	28	35.6	E 076	26	20.1	सक्करघट्टा

तालवृक्ष	नाथूसर	पानीढाल-10	10/EP A	27 ⁰	30	14.6	E 076	26	11.3	रेणु निकट अन्त
तालवृक्ष	नाथूसर	पानीढाल-10	10/SP B	N 27 ⁰	29	20.6	E 076	26	12.8	जंगल मांजेडा
तालवृक्ष	नाथूसर	पानीढाल-10	10/EP B	N 27 ⁰	30	18.2	E 076	26	4.3	रेणु निकट रोड तक(अन्त)
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/SP A	27 ⁰	30	32.9	076	22	20.1	-
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/EP A	27 ⁰	30	26.4	076	22	45.2	-
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/SP B	27 ⁰	30	39.5	076	22	57.4	-
तालवृक्ष	तालवृक्ष	बनी तालवृक्ष-11	11/EP B	27 ⁰	30	19.9	076	21	43.4	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/SP A	27 ⁰	29	17.5	076	22-	23.2	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/EP A	27 ⁰	28	38.9	076	22-	12.6	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/SP B	27 ⁰	28	47.4	076	20-	50.2	-
तालवृक्ष	तालवृक्ष	रेकामाला-12	12/EP B	27 ⁰	29	32.2	076	21-	17.7	-
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	13/SP A	27 ⁰	27	4.1	076	24	11.2	-
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	13/EP A	27 ⁰	26	29.4	076	24	23.4	-
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	13/SP B	27 ⁰	30	5.7	076	23	6.4	-
तालवृक्ष	तालवृक्ष	बेराबास नांगलहेडी-13	13/EP B	27 ⁰	29	1.2	076	23	11.5	-
अकबरपुर	किशनपुर	देहलावास-14	14/SP A	27	41	1.1	076	29	28.9	-
अकबरपुर	किशनपुर	देहलावास-14	14/EP A	29	41	32.2	076	29	17.5	-
अकबरपुर	किशनपुर	देहलावास-14	14/SP B	27	33	22.8	076	28	39.8	-
अकबरपुर	किशनपुर	देहलावास-14	14/EP B	27	38	56.3	076	28	35.1	-
अकबरपुर	किशनपुर	बीनक-15	15/SP A	29	44	24.2	076	33	3.0	-
अकबरपुर	किशनपुर	बीनक-15	15/EP A	29	44	21.2	076	29	2.7	-
अकबरपुर	किशनपुर	बीनक-15	15/SP B	27	30	51.6	076	29	3.7	-
अकबरपुर	किशनपुर	बीनक-15	15/EP B	27	31	8.6	076	28	24.9	-
अकबरपुर	किशनपुर	बख्तपुरा-16	16/SP A	27 ⁰	32	10.1	076	30	8.3	-
अकबरपुर	किशनपुर	बख्तपुरा-16	16/EP A	27 ⁰	32	8.2	076	31	3.3	-
अकबरपुर	किशनपुर	बख्तपुरा-16	16/SP B	27 ⁰	32	18.5	076	30	22.1	-
अकबरपुर	किशनपुर	बख्तपुरा-16	16/EP B	27 ⁰	31	15.5	076	29	59.0	-
अकबरपुर	किशनपुर	पैतपुर-17	17/SP A	27 ⁰	32	4.5	076	31	6.7	-
अकबरपुर	किशनपुर	पैतपुर-17	17/EP A	27 ⁰	32	0.4	076	30	24.2	-
अकबरपुर	किशनपुर	पैतपुर-17	17/SP B	27 ⁰	31	51.4	076	31	8.1	-
अकबरपुर	किशनपुर	पैतपुर-17	17/EP B	27 ⁰	31	1.3	076	31	5.3	-
अकबरपुर	किशनपुर	सावडी धवाला-18	18/SP A	27 ⁰	27	46.8	076	32	11.6	-
अकबरपुर	किशनपुर	सावडी धवाला-18	18/EP A	27 ⁰	29	1.6	076	32	22.2	-
अकबरपुर	किशनपुर	सावडी धवाला-18	18/SP B	27 ⁰	27	9.5	076	32	3.2	-
अकबरपुर	किशनपुर	सावडी धवाला-18	18/EP B	27 ⁰	27	41.6	076	31	58.0	-
अकबरपुर	बांरा	कालीखोल-19	19/SP A	27 ⁰	28	16.6	076	30	8.1	-
अकबरपुर	बांरा	कालीखोल-19	19/EP A	27 ⁰	29	3.0	076	29	18.4	-
अकबरपुर	बांरा	कालीखोल-19	19/SP B	27 ⁰	27	58.5	076	308	45.0	-
अकबरपुर	बांरा	कालीखोल-19	19/EP B	27 ⁰	28	52.9	076	30	47.8	-
अकबरपुर	सदर बांरा	रईका-20	20/SP A	27 ⁰	27	52.6	076	26	29.4	-
अकबरपुर	सदर बांरा	रईका-20	20/EP A	27 ⁰	28	35.5	076	26	20.2	-
अकबरपुर	सदर बांरा	रईका-20	20/SP B	27 ⁰	27	31.2	076	25	35.6	-
अकबरपुर	सदर बांरा	रईका-20	20/EP B	27 ⁰	26	59.4	076	26	49.0	-
अकबरपुर	सदर बांरा	माधोगढ-21	21/SP A	27 ⁰	25	15.4	076	27	32.7	-
अकबरपुर	सदर बांरा	माधोगढ-21	21/EP A	27 ⁰	24	32.6	076	28	52.8	-
अकबरपुर	सदर बांरा	माधोगढ-21	21/SP B	27 ⁰	26	40.9	076	27	32.9	-
अकबरपुर	सदर बांरा	माधोगढ-21	21/EP B	27 ⁰	26	31.2	076	28	36.4	-

अकबरपुर	बांरा	धर्मपुरा-22	22 / SP A	27 ⁰	25	18.2	076	30	32.6	—
अकबरपुर	बांरा	धर्मपुरा-22	22 / EP A	27 ⁰	26	20.2	076	30	38.7	—
अकबरपुर	बांरा	धर्मपुरा-22	22 / SP B	27 ⁰	26	14.8	076	30	15.9	—
अकबरपुर	बांरा	धर्मपुरा-22	22 / EP B	27 ⁰	25	25.4	076	29	54.8	—
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / SP A	27 ⁰	24	19.5	076	31	17.6	—
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / EP A	27 ⁰	23	49.9	076	30	37.2	—
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / SP B	27 ⁰	23	48	076	30	45.4	—
अकबरपुर	पृथ्वीपुरा	चांदपहाडी-23	23 / EP B	27 ⁰	24	27.7	076	30	37.8	—
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / SP A	27 ⁰	24	30.4	076	30	10	—
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / EP A	27 ⁰	25	17.6	076	30	42.0	—
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / SP B	27 ⁰	23	15.5	076	29	19.5	—
अकबरपुर	पृथ्वीपुरा	डाबली-24	24 / EP B	27 ⁰	24	17.5	076	29	40.3	—
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / SP A	27 ⁰	24	27.6	076	27	38.5	—
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / EP A	27 ⁰	23	38.2	076	27	50.2	—
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / SP B	27 ⁰	23	53.5	076	27	11.2	—
अकबरपुर	पृथ्वीपुरा	सुकोला-25	25 / EP B	27 ⁰	22	59.5	076	27	10.3	—
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / SP A	27 ⁰	23	93.8	076	31	69.4	—
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / EP A	27 ⁰	22	82.5	076	31	74.8	—
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / SP B	27 ⁰	22	48.8	076	28	97.5	—
अकबरपुर	पृथ्वीपुरा	पृथ्वीपुरा-26	26 / EP B	27 ⁰	22	81.4	076	28	96.9	—
अकबरपुर	बालेटा	रोटक्याला-27	27 / SP A	27 ⁰	21	1.4	076	29	47.6	—
अकबरपुर	बालेटा	रोटक्याला-27	27 / EP A	27 ⁰	21	21.9	076	28	15.3	—
अकबरपुर	बालेटा	रोटक्याला-27	27 / SP B	27 ⁰	21	36.7	076	28	19.3	—
अकबरपुर	बालेटा	रोटक्याला-27	27 / EP B	27 ⁰	20	26.5	076	27	31.6	—
अकबरपुर	बालेटा	भाट्याला-28	28 / SP A	27 ⁰	19	45.1	076	29	56.9	—
अकबरपुर	बालेटा	भाट्याला-28	28 / EP A	27 ⁰	21	0.9	076	30	12.1	—
अकबरपुर	बालेटा	भाट्याला-28	28 / SP B	27 ⁰	19	25.9	076	30	19.5	—
अकबरपुर	बालेटा	भाट्याला-28	28 / EP B	27 ⁰	19	27.2	076	31	32.2	—
अकबरपुर	बालेटा	उमरी-29	29 / SP A	27 ⁰	18	30.5	076	27	16.7	—
अकबरपुर	बालेटा	उमरी-29	29 / EP A	27 ⁰	19	5.5	076	28	52.5	—
अकबरपुर	बालेटा	उमरी-29	29 / SP A	27 ⁰	20	18.5	076	29	14.1	—
अकबरपुर	बालेटा	उमरी-29	30 / EP A	27 ⁰	19	18.5	076	28	40.5	—
अकबरपुर	बालेटा	बालेटा-30	30 / SP A	27 ⁰	20	58.5	076	31	58.3	—
अकबरपुर	बालेटा	बालेटा-30	30 / EP A	27 ⁰	19	33.2	076	30	32.3	—
अकबरपुर	बालेटा	बालेटा-30	30 / SP A	27 ⁰	19	39.6	076	31	49.0	—
अकबरपुर	बालेटा	बालेटा-30	30 / EP A	27 ⁰	20	51.1	076	31	52.8	—
सरिस्का	थानागाजी	दुहारमाला-31	31 / SP A	27 ⁰	25	18.6	076	20	18.9	—
सरिस्का	थानागाजी	दुहारमाला-31	31 / EP A	27 ⁰	24	15.3	076	20	28.8	—
सरिस्का	थानागाजी	दुहारमाला-31	31 / SP B	27 ⁰	26	12.2	076	20	30.9	—
सरिस्का	थानागाजी	दुहारमाला-31	31 / EP B	27 ⁰	27	16.5	076	20	38.3	—
सरिस्का	थानागाजी	गणेशपुरा-32	32 / SP A	27 ⁰	22	26.6	076	20	15.3	210
सरिस्का	थानागाजी	गणेशपुरा-32	32 / EP A	27 ⁰	21	30.1	076	19	37.9	—
सरिस्का	थानागाजी	गणेशपुरा-32	32 / SP B	27 ⁰	22	31.4	076	20	1.9	—
सरिस्का	थानागाजी	गणेशपुरा-32	32 / EP B	27 ⁰	22	51.7	076	20	55.3	247
सरिस्का	कांकवाडी	फाट्याखोरा-33-A	33-A / SP A	27 ⁰	19	50.1	076	20	41.8	325
सरिस्का	कांकवाडी	फाट्याखोरा-33-A	33-A / EP A	27 ⁰	20	26.9	076	19	57.9	—
सरिस्का	कांकवाडी	फाट्याखोरा-33-A	33-A / SP B	27 ⁰	20	27.1	076	20	28.2	40
सरिस्का	कांकवाडी	फाट्याखोरा-33-A	33-A / EP B	27 ⁰	20	48.9	076	21	5.1	—
सरिस्का	थानागाजी	घानका-33	33 / SP A	27 ⁰	22	2.8	076	21	7.4	225
सरिस्का	थानागाजी	घानका-33	33 / EP A	27 ⁰	21	16.8	076	20	14.8	45
सरिस्का	थानागाजी	घानका-33	33 / SP B	27 ⁰	20	53.9	076	20	12.8	40

सरिस्का	थानागाजी	घानका-33	33 / EP B	27 ⁰	21	43.2	076	21	6.0	220
सरिस्का	थानागाजी	उदयनाथ-34	34 / SP A	27 ⁰	20	34.6	076	19	42.8	278
सरिस्का	थानागाजी	उदयनाथ-34	34 / EP A	27 ⁰	20	43.6	076	18	30.7	98
सरिस्का	थानागाजी	उदयनाथ-34	34 / SP B	27 ⁰	20	29.1	076	19	28.7	200
सरिस्का	थानागाजी	उदयनाथ-34	34 / EP B	27 ⁰	19	26.9	076	19	2.9	20
सरिस्का	थानागाजी	किशोरी-35	35 / SP A	27 ⁰	17	43.1	076	19	40.9	-
सरिस्का	थानागाजी	किशोरी-35	35 / EP A	27 ⁰	17	44.8	076	18	28.1	-
सरिस्का	थानागाजी	किशोरी-35	35 / SP B	27 ⁰	18	20.8	076	19	44.1	271
सरिस्का	थानागाजी	किशोरी-35	35 / EP B	27 ⁰	19	21.2	076	19	57.1	91
सरिस्का	सदर	भूर्तहरि-36	36 / SP A	27 ⁰	24-4	40.8	076	25	28.2	-
सरिस्का	सदर	भूर्तहरि-36	36 / EP A	27 ⁰	23	41.2	076	24	46.9	-
सरिस्का	सदर	भूर्तहरि-36	36 / SP B	27 ⁰	24	4.8	076	25	14.4	-
सरिस्का	सदर	भूर्तहरि-36	36 / EP B	27 ⁰	23	1.1	076	25	26.4	-
सरिस्का	सदर	इन्दौक-36 A	36 A / SP A	27 ⁰	24	7.2	076	22	36.3	-
सरिस्का	सदर	इन्दौक-36 A	36 A / EP A	27 ⁰	24	58.9	076	22	32.9	-
सरिस्का	सदर	इन्दौक-36 A	36 A / SP B	27 ⁰	23	25.2	076	22	8.4	-
सरिस्का	सदर	इन्दौक-36 A	36 A / EP B	27 ⁰	24	22.7	076	22	34.9	-
सरिस्का	सदर	बंदीपुल-37	37 / SP A	27 ⁰	23	27.2	076	21	39.6	-
सरिस्का	सदर	बंदीपुल-37	37 / EP A	27 ⁰	-	.	-	-	.	-
सरिस्का	सदर	बंदीपुल-37	37 / SP B	27 ⁰	23	32.0	076	21	49.9	266
सरिस्का	सदर	बंदीपुल-37	37 / EP B	27 ⁰	23	6.7	076	20	43.1	-
सरिस्का	सदर	सदर-38	38 / SP A	27 ⁰	23	19.0	076	22	34.6	-
सरिस्का	सदर	सदर-38	38 / EP A	27 ⁰	22	12.3	076	22	32.2	-
सरिस्का	सदर	सदर-38	38 / SP B	27 ⁰	22	46.8	076	22	3.9	-
सरिस्का	सदर	सदर-38	38 / EP B	27 ⁰	22	53.4	076	20	51.5	-
सरिस्का	सदर	हरिपुरा-39	39 / SP A	27 ⁰	22	82.3	076	23	4.9	-
सरिस्का	सदर	हरिपुरा-39	39 / EP A	27 ⁰	21	50.6	076	23	3.7	-
सरिस्का	सदर	हरिपुरा-39	39 / SP B	27 ⁰	21	25.6	076	23	58.2	-
सरिस्का	सदर	हरिपुरा-39	39 / EP B	27 ⁰	21	52.9	076	23	4.2	-
सरिस्का	सदर	तारुण्डा-40	40 / SP A	27 ⁰	21	14.1	076	24	1.9	-
सरिस्का	सदर	तारुण्डा-40	40 / EP A	27 ⁰	20	46.6	076	24	23.4	-
सरिस्का	सदर	तारुण्डा-40	40 / SP B	27 ⁰	21	32.3	076	24	12.4	-
सरिस्का	सदर	तारुण्डा-40	40 / EP B	27 ⁰	20	26.5	076	24	25.4	-
सरिस्का	सदर	करना का बास-41	41 / SP A	27 ⁰	22	4.7	076	23	59.8	-
सरिस्का	सदर	करना का बास-41	41 / EP A	27 ⁰	21	22.4	076	24	38.6	-
सरिस्का	सदर	करना का बास-41	41 / SP B	27 ⁰	21	44.7	076	24	47.1	-
सरिस्का	सदर	करना का बास-41	41 / EP B	27 ⁰	20	38.5	076	24	51.6	-
सरिस्का	सदर	क्रास्का-42	42 / SP A	27 ⁰	20	50.2	076	26	13.0	-
सरिस्का	सदर	क्रास्का-42	42 / EP A	27 ⁰	21	48.3	076	25	57.4	-
सरिस्का	सदर	क्रास्का-42	42 / SP B	27 ⁰	21	45.0	076	26	15.0	-
सरिस्का	सदर	क्रास्का-42	42 / EP B	27 ⁰	22	14.2	076	25	10.1	-
सरिस्का	कुशालगढ	कुशालगढ-43	43 / SP A	27 ⁰	25	12.8	076	26	30.5	-
सरिस्का	कुशालगढ	कुशालगढ-43	43 / EP A	27 ⁰	28	25.7	076	26	2.5	-
सरिस्का	कुशालगढ	कुशालगढ-43	43 / SP B	27 ⁰	25	36.1	076	26	6.2	-
सरिस्का	कुशालगढ	कुशालगढ-43	43 / EP B	27 ⁰	25	16.5	076	25	42.3	-
सरिस्का	कुशालगढ	नलदेश्वर-44	44 / SP A	27 ⁰	25	23.1	076	27	4.7	-
सरिस्का	कुशालगढ	नलदेश्वर-44	44 / EP A	27 ⁰	25	9.5	076	26	52.0	-
सरिस्का	कुशालगढ	नलदेश्वर-44	44 / SP B	27 ⁰	25	11.1	076	26	52.0	-
सरिस्का	कुशालगढ	नलदेश्वर-44	44 / EP B	27 ⁰	25	22.2	076	27	6.8	-

सरिस्का	कुशालगढ	कालाछारा-45	45/SP A	27 ⁰	26	76.6	076	25	34.9	-
सरिस्का	कुशालगढ	कालाछारा-45	45/EP A	27 ⁰	26	43.5	076	25	57.0	-
सरिस्का	कुशालगढ	कालाछारा-45	45/SP B	27 ⁰	26	29.0	076	25	8.6	-
सरिस्का	कुशालगढ	कालाछारा-45	45/EP B	27 ⁰	25	43.9	076	27	15.1	-
सरिस्का	कालाघाटी	कालाघाटी-46	46/SP A	27 ⁰	18	51.3	076	24	37.0	120
सरिस्का	कालाघाटी	कालाघाटी-46	46/EP A	27 ⁰	18	1.2	076	25	17.8	-
सरिस्का	कालाघाटी	कालाघाटी-46	46/SP B	27 ⁰	18	56.5	076	24	56.5	345
सरिस्का	कालाघाटी	कालाघाटी-46	46/EP B	27 ⁰	19	59.6	076	24	38.0	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/SP A	27 ⁰	19	49.1	076	22	4.8	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/EP A	27 ⁰	19	12.4	076	28	6.0	-
सरिस्का	कांकवाडी	कांकवाडी-47	47/SP B	27 ⁰	19	25.3	076	22	15.0	292
सरिस्का	कांकवाडी	कांकवाडी-47	47/EP B	27 ⁰	19	49.9	076	21	7.5	-
सरिस्का	कालाघाटी	बना-47 A	47 A /SP A	27 ⁰	19	38.5	076	23	48.6	316
सरिस्का	कालाघाटी	बना-47 A	47 A /EP A	27 ⁰	20	28.6	076	23	4.9	-
सरिस्का	कालाघाटी	बना-47 A	47 A /SP B	27 ⁰	20	58.2	076	22	38.8	322
सरिस्का	कालाघाटी	बना-47 A	47 A /EP B	27 ⁰	21	45.0	076	21	38.8	-
सरिस्का	कालाघाटी	स्लोपका-48	48/SP A	27 ⁰	18	2.6	076	256	11.3	146
सरिस्का	कालाघाटी	स्लोपका-48	48/EP A	27 ⁰	18	54.1	076	25	32.9	-
सरिस्का	कालाघाटी	स्लोपका-48	48/SP B	27 ⁰	18	48.4	076	27	30.2	156
सरिस्का	कालाघाटी	स्लोपका-48	48/EP B	27 ⁰	17	47.1	076	27	54.3	-
सरिस्का	कालाघाटी	पाण्डूपोल-49	49/SP A	27 ⁰	19	9.3	076	26	31.4	-
सरिस्का	कालाघाटी	पाण्डूपोल-49	49/EP A	27 ⁰	19	22.3	076	27	32.0	-
सरिस्का	कालाघाटी	पाण्डूपोल-49	49/SP B	27 ⁰	19	25.1	076	26	51.7	-
सरिस्का	कालाघाटी	पाण्डूपोल-49	49/EP B	27 ⁰	20	24.7	076	27	48.8	-
टहला	गढ	राजौर-50	50/SP A	27 ⁰	17	50.6	076	20	42.7	-
टहला	गढ	राजौर-50	50/EP A	27 ⁰	18	20.4	076	21	37.0	-
टहला	गढ	राजौर-50	50/SP B	27 ⁰	18	27.7	076	20	27.9	-
टहला	गढ	राजौर-50	50/EP B	27 ⁰	17	37.0	076	20	13.6	-
टहला	गढ	गढ-51	51/SP A	27 ⁰	14	51.2	076	21	20.6	-
टहला	गढ	गढ-51	51/EP A	27 ⁰	15	22.1	076	20	22.6	-
टहला	गढ	गढ-51	51/SP B	27 ⁰	16	10.0	076	21	7.3	-
टहला	गढ	गढ-51	51/EP B	27 ⁰	17	9.4	076	21	5.8	-
टहला	गढ	दबकन-52	52/SP A	27 ⁰	15	11.0	076	23	22.1	-
टहला	गढ	दबकन-52	52/EP A	27 ⁰	15	14.2	076	22	23.6	-
टहला	गढ	दबकन-52	52/SP B	27 ⁰	14	42.5	076	22	4.0	-
टहला	गढ	दबकन-52	52/EP B	27 ⁰	13	49.5	076	22	58.6	-
टहला	टहला	भगानी-53	53/SP A	27 ⁰	16	40.1	076	23	32.9	-
टहला	टहला	भगानी-53	53/EP A	27 ⁰	17	29.6	076	23	15.7	-
टहला	टहला	भगानी-53	53/SP B	27 ⁰	17	57.8	076	22	56.9	-
टहला	टहला	भगानी-53	/53EP B	27 ⁰	17	2.3	076	23	28.8	-
टहला	टहला	रिछूणडा-54	54/SP A	27 ⁰	16	1.7	076	24	16.3	-
टहला	टहला	रिछूणडा-54	54/EP A	27 ⁰	16	3.9	076	24	12.6	-
टहला	टहला	रिछूणडा-54	54/SP B	27 ⁰	16	20.0	076	24	33.7	-
टहला	टहला	रिछूणडा-54	54/EP B	27 ⁰	17	18.5	076	24	15.1	-
टहला	टहला	घेवर-55	55/SP A	27 ⁰	16	7.4	076	25	43.3	-
टहला	टहला	घेवर-55	55/EP A	27 ⁰	17	11.2	076	25	31.1	-
टहला	टहला	घेवर-55	55/SP B	27 ⁰	16	2.8	076	25	30.1	-
टहला	टहला	घेवर-55	55/EP B	27 ⁰	17	9.9	076	25	12.6	-
टहला	टहला	भैसोटा-56	56/SP A	27 ⁰	17	25.0	076	26	25.1	-

टहला	टहला	भैसोटा-56	56/EP A	27 ⁰	17	27.8	076	27	37.9	-
टहला	टहला	भैसोटा-56	56/SP B	27 ⁰	17	6.3	076	26	28.0	-
टहला	टहला	भैसोटा-56	56/EP B	27 ⁰	16	36.3	076	27	32.8	-
टहला	टहला	नाण्डू-57	57/SP A	27 ⁰	15	50.2	076	28	46.1	-
टहला	टहला	नाण्डू-57	57/EP A	27 ⁰	16	1.6	076	30	23.8	-
टहला	टहला	नाण्डू-57	57/SP B	27 ⁰	16	40.7	076	28	39.8	-
टहला	टहला	नाण्डू-57	57/EP B	27 ⁰	17	13.4	076	29	33.2	-
टहला	बोरेठा	देवरी-58	58/SP A	27 ⁰	17	57.2	076	29	20.3	-
टहला	बोरेठा	देवरी-58	58/EP A	27 ⁰	17	42.5	076	30	27.4	-
टहला	बोरेठा	देवरी-58	58/SP B	27 ⁰	17	11.6	076	30	40.8	-
टहला	बोरेठा	देवरी-58	58/EP B	27 ⁰	16	12.8	076	31	11.0	-
टहला	बोरेठा	बोरेठा-59	59/SP A	27 ⁰	17	38.5	076	32	4.4	-
टहला	बोरेठा	बोरेठा-59	59/EP A	27 ⁰	16	48.7	076	31	34.6	-
टहला	बोरेठा	बोरेठा-59	59/SP B	27 ⁰	16	39.8	076	32	38.0	-
टहला	बोरेठा	बोरेठा-59	59/EP B	27 ⁰	17	41.7	076	32	40.3	-
टहला	बोरेठा	डांग खाडा-60	60/SP A	27 ⁰	14	47.7	076	31	46.0	-
टहला	बोरेठा	डांग खाडा-60	60/EP A	27 ⁰	15	32.8	076	32	12.0	-
टहला	बोरेठा	डांग खाडा-60	60/SP B	27 ⁰	15	0.7	076	32	7.3	-
टहला	बोरेठा	डांग खाडा-60	60/EP B	27 ⁰	15	50.4	076	32	42.7	-
टहला	बोरेठा	कुण्डला-61	61/SP A	27 ⁰	13	55.4	076	31	8.3	-
टहला	बोरेठा	कुण्डला-61	61/EP A	27 ⁰	13	2.6	076	30	39.8	-
टहला	बोरेठा	कुण्डला-61	61/SP B	27 ⁰	12	47.9	076	29	26.5	-
टहला	बोरेठा	कुण्डला-61	61/EP B	27 ⁰	12	38.9	076	28	43.7	-
टहला	टहला	तालाब-62	62/EP A	27 ⁰	12	43.7	076	28	27.8	-
टहला	टहला	तालाब-62	62/EP A	27 ⁰	18	55.9	076	28	45.8	-
टहला	टहला	तालाब-62	62/SP B	27 ⁰	12	17.5	076	27	58.2	-
टहला	टहला	तालाब-62	62/EP B	27 ⁰	12	44.1	076	27	0.2	-
टहला	टहला	गोवर्धनपुरा-63	63/SP A	27 ⁰	12	59.3	076	25	43.1	-
टहला	टहला	गोवर्धनपुरा-63	63/EP A	27 ⁰	12	23.9	076	26	46.5	-
टहला	टहला	गोवर्धनपुरा-63	63/SP B	27 ⁰	12	3.7	076	27	4.1	-
टहला	टहला	गोवर्धनपुरा-63	63/EP B	27 ⁰	11	1.2	076	26	34.9	-
टहला	टहला	तिलवाड-64	64/SP A	27 ⁰	11	24.1	076	24	1.4	-
टहला	टहला	तिलवाड-64	64/EP A	27 ⁰	12	13.7	076	23	15.8	-
टहला	टहला	तिलवाड-64	64/SP B	27 ⁰	12	28.0	076	23	16.8	-
टहला	टहला	तिलवाड-64	64/EP B	27 ⁰	13	10.9	076	22	13.6	-
टहला	खोह	खोह-65	65/SP A	27 ⁰	08	51.5	076	21	21.7	-
टहला	खोह	खोह-65	65/EP A	27 ⁰	09	43.4	076	21	16.0	-
टहला	खोह	खोह-65	65/SP B	27 ⁰	10	47.3	076	21	6.1	-
टहला	खोह	खोह-65	65/EP B	27 ⁰	11	43.8	076	21	21.4	-
टहला	खोह	घाटडा-66	66/SP A	27 ⁰	07	57.7	076	24	57.4	-
टहला	खोह	घाटडा-66	66/EP A	27 ⁰	08	58.0	076	25	26.0	-
टहला	खोह	घाटडा-66	66/SP B	27 ⁰	07	33.4	076	24	16.1	-
टहला	खोह	घाटडा-66	66/EP B	27 ⁰	08	36.7	076	23	52.3	-
टहला	गोलाकाबास	बलदेवगढ-67	67/SP A	27 ⁰	08	41.7	076	21	28.6	-
टहला	गोलाकाबास	बलदेवगढ-67	67/EP A	27 ⁰	09	20.2	076	22	5.1	-
टहला	गोलाकाबास	बलदेवगढ-67	67/SP B	27 ⁰	07	45.1	076	23	6.3	-
टहला	गोलाकाबास	बलदेवगढ-67	67/EP B	27 ⁰	08	35.9	076	23	32.2	-
टहला	गोलाकाबास	नारायाणी माता-68	68/SP A	27 ⁰	08	29.7	076	20	34.7	-
टहला	गोलाकाबास	नारायाणी माता-68	68/EP A	27 ⁰	09	12.1	076	21	14.0	-

टहला	गोलाकाबास	नारायाणी माता-68	68 / SP B	27 ⁰	07	41.0	076	20	33.2	-
टहला	गोलाकाबास	नारायाणी माता-68	68 / EP B	27 ⁰	08	23.8	076	20	25.8	-
टहला	अजबगढ	जैतपुर सिलीबावडी-69	69 / SP A	27 ⁰	10	8.1	076	19	28.2	-
टहला	अजबगढ	जैतपुर सिलीबावडी-69	69 / EP A	27 ⁰	09	20.3	076	19	40.4	-
टहला	अजबगढ	जैतपुर सिलीबावडी-69	69 / SP B	27 ⁰	10	25.1	076	18	16.1	-
टहला	अजबगढ	जैतपुर सिलीबावडी-69	69 / EP B	27 ⁰	09	10.9	076	18	2.8	-
टहला	अजबगढ	अजबगढ-70	70 / SP A	27 ⁰	10	56.0	076	17	24.7	-
टहला	अजबगढ	अजबगढ-70	70 / EP A	27 ⁰	11	10.1	076	16	32.2	-
टहला	अजबगढ	अजबगढ-70	70 / SP B	27 ⁰	10	28.3	076	16	56.2	-
टहला	अजबगढ	अजबगढ-70	70 / EP B	27 ⁰	10	30.8	076	17	7.9	-
टहला	अजबगढ	बांदीपुल-71	71 / SP A	27 ⁰	08	28.7	076	17	56.6	-
टहला	अजबगढ	बांदीपुल-71	71 / EP A	27 ⁰	09	32.5	076	17	56.2	-
टहला	अजबगढ	बांदीपुल-71	71 / SP B	27 ⁰	10	12.5	076	17	22.9	-
टहला	अजबगढ	बांदीपुल-71	71 / EP B	27 ⁰	09	9.8	076	17	43.2	-
टहला	गोलाकाबास	जांटवाणा-72	72 / SP A	27 ⁰	07	13.1	076	19	1.1	-
टहला	गोलाकाबास	जांटवाणा-72	72 / EP A	27 ⁰	08	0.0	076	18	56.4	-
टहला	गोलाकाबास	जांटवाणा-72	72 / SP B	27 ⁰	07	14.9	076	19	23.4	-
टहला	गोलाकाबास	जांटवाणा-72	72 / EP B	27 ⁰	08	0.0	076	18	56.4	-
टहला	गोलाकाबास	भानगढ-73	73 / SP A	27 ⁰	05	20.8	076	17	42.6	-
टहला	गोलाकाबास	भानगढ-73	73 / EP A	27 ⁰	05	40.0	076	17	13.2	-
टहला	गोलाकाबास	भानगढ-73	73 / SP B	27 ⁰	06	17.8	076	17	48.9	-
टहला	गोलाकाबास	भानगढ-73	73 / EP B	27 ⁰	06	47.8	076	17	58.6	-
टहला	खोह	समरा-74	74 / SP A	27 ⁰	10	26.9	076	13	58.3	-
टहला	खोह	समरा-74	74 / EP A	27 ⁰	11	8.3	076	14	53.3	-
टहला	खोह	समरा-74	74 / SP B	27 ⁰	11	8.3	076	14	59.3	-
टहला	खोह	समरा-74	74 / EP B	27 ⁰	12	40.0	076	15	13.7	-

Notification Sariska 'A' Wild Life Sanctuary dated 20-06-2012**राजस्थान सरकार
वन विभाग**

संसाधन/01(24)वन/2008

जयपुर, दिनांक: 20-06-2012

अधिसूचना

सम्पत्तीय (सुरक्षा) अधिनियम, 1978 (1978 का केंद्रीय अधिनियम संख्या 53) की धारा 18 के उपबन्धों के अधीन राज्य सरकार एवं द्वारा प्राप्त कृष्णा तटस्थ राजागढ़ जिला अलावर की भूमि, जो जिला कलेक्टर, अलावर द्वारा आदेश संसाधन/01(24)वन/2008 दिनांक 27-03-2012 से वन विभाग को संभार करार गृह्य करती पुनर्वासि योजना के लिए राजागढ़ अभयारण्य से 70 हेक्टेयर भूमि को प्रस्तावित हेतु स्थानांतरित की गयी 85.44 हेक्टेयर भूमि, जिसका विवरण अनुसूची- प्रथम में है तथा उसके समीपवर्ती अन्य 215.70 हेक्टेयर भूमि, जिसका विवरण अनुसूची- द्वितीय में है, कुल 301.22 हेक्टेयर भूमि, जिनकी सीमा विवरण अनुसूची- तृतीय के अनुसार है तथा उक्त भूमियों सरिस्का अभयारण्य की समीपवर्ती हैं, जो उनकी प्राविधिकी, प्राणी जातीय, वन एवं स्थानीय भू-संरचना सम्बन्धित वैज्ञानिक एवं प्राणी शास्त्रीय महत्व को ध्यान में रखते हुए सम्पत्तीय अभयारण्य अधिसूचित करने के आदेश की घोषणा करती है, जिसे भविष्य में "सरिस्का "अ" अभयारण्य" के रूप में जाना जाएगा एवं जो उक्त अधिनियम या तदधीन बनाये गये विधियों या समय-समय पर जारी किये गये आदेशों के उपबन्धों का विषय होगा। "सरिस्का "अ" अभयारण्य" क्षेत्र को सम्बन्ध में जिला कलेक्टर, अलावर अधिनियम की धारा 19 से उप-ध की धर्मशाली करेंगे।

अनुसूची- प्रथम

जिला कलेक्टर, अलावर द्वारा स्थानांतरित भूमि का विवरण

क्र.सं०	ग्राम	खसरा नं०	क्षेत्रफल हेक्टर में	विस्तार भूमि
1	कृष्णा	10/2211	2.94	वन विभाग
		13	4.17	वन विभाग
		14	0.70	वन विभाग
		28/2184	2.10	वन विभाग
		72/2105	7.80	वन विभाग
		101	25.54	वन विभाग
		128	17.36	वन विभाग
		127	16.89	वन विभाग
	योग :-	85.44		

अनुसूची- द्वितीय

अन्य समीपवर्ती भूमियों का विवरण

क्र.सं०	ग्राम	खसरा नं०	क्षेत्रफल हेक्टर में	विस्तार भूमि
1	तजोली	1	11.85	घारागाह
		2	8.00	वन विभाग
		3	7.45	घारागाह
		4	1.85	घारागाह
		5	0.34	वन विभाग

		7	2.14	वन विभाग
		177	0.10	वन विभाग
		178	1.40	वन विभाग
		179	4.66	बजट
		180	3.75	वन विभाग
		203	0.48	वन विभाग
		204	6.82	वन विभाग
		205	1.88	वन विभाग
		योग :-	51.25	
2	कड़वा	5	3.24	साधारण
		7	15.14	साधारण
		8	14.25	साधारण
		9	0.75	वन विभाग
		10	7.60	नैऋत्य क्षेत्रीय प्रायद्वीप
		22	1.20	सांख्यिक विभाग
		23	19.62	साधारण
		24	9.08	साधारण
		25	2.75	सांख्यिक विभाग
		30	31.30	साधारण
		30/2101	1.40	बजट
		31	1.10	बजट
		32	0.15	बजट
		33	0.05	साधारण
		34	9.74	साधारण
		74	5.83	साधारण
		75	19.36	साधारण
		78	1.90	वन विभाग
		80	3.55	बजट
		100	9.74	नैऋत्य क्षेत्रीय प्रायद्वीप
		102	0.36	बजट
		125	5.44	बजट
		128	0.00	बजट
		योग :-	164.53	
		महायोग :-	215.78	

अनुसूची- द्वितीय
सीमा का विवरण

क्रिया	सीमा विवरण
वर्णन	पश्चिमी बंगालीय अक्षांश 24° 30' 00" उत्तरीय सीमा पर स्थित प्रायद्वीप के क्षेत्रों में नं० 1 व 23 के मिलन बिन्दु (बागेश्वर तालाब) से आरम्भ होकर पूर्व दिशा में पश्चिमी बंगाल की अक्षांश 24° 30' 00" उत्तरीय सीमा के साथ-साथ प्रायद्वीप के क्षेत्रों में नं० 29 व 30 के मिलन बिन्दु तक।

पूर्व	ग्राम नजोली व ग्राम डहला के खसरा नं. 39 व 30 के मिलन बिन्दु से प्रारम्भ होकर सारिस्का वन्य जीव अभयारण्य की सीमा के साथ-साथ दक्षिण में चलते हुए ग्राम डहला के खसरा नं. 76 (आड़वा का खसरा) के मिलन बिन्दु तक।
दक्षिण	ग्राम डहला के खसरा नं. 70 (आड़वा का खसरा) व सारिस्का वन्य जीव अभयारण्य सीमा के मिलन बिन्दु से प्रारम्भ होकर दक्षिण में चलते हुए ग्राम डहला के खसरा नं. 76 व 77 की सीमा के साथ-साथ ग्राम डहला के खसरा नं. 76, 80 व 83 के मिलन बिन्दु तक। यहाँ से चलकर उत्तर दिशा में खसरा नं. 73 की पूर्वी-उत्तरी व पश्चिमी सीमा के साथ-साथ खसरा नं. 78 की दक्षिणी सीमा के साथ-साथ ग्राम डहला के खसरा नं. 72/2106 की पश्चिमी सीमा के साथ-साथ खसरा नं. 80 व 87 की उत्तरी सीमा के साथ-साथ खसरा नं. 32 व 33 की पश्चिमी सीमा के साथ-साथ खसरा नं. 34/8222 की पूर्वी व उत्तरी सीमा के साथ-साथ टहला-सारिस्का पक्षी अभयारण्य में पक्षी सङ्ग्रह के साथ-साथ दक्षिण की तरफ चलते हुए ग्राम डहला के खसरा नं. 9 की मिलन बिन्दु से होते हुए खसरा नं. 8 (खसरा) की दक्षिण सीमा के साथ-साथ चलते हुए ग्राम डहला की सीमा पर खसरा नं. 10 के मिलन बिन्दु तक। यहाँ से आड़वा ग्राम डहला के खसरा नं. 10 के पश्चिमी, दक्षिणी तथा खसरा नं. 10/2211 की उत्तरी, पूर्वी दक्षिणी की सीमा के साथ-साथ चलते हुए खसरा नं. 11 व 12 को छोड़ते हुए खसरा नं. 13 की पूर्वी सीमा के साथ-साथ चलकर खसरा नं. 14 की उत्तरी व पूर्वी सीमा, खसरा नं. 19 की उत्तरी सीमा के साथ-साथ टहला-सारिस्का पक्षी सङ्ग्रह तक। यहाँ से चलकर ग्राम डहला के खसरा नं. 00 की पश्चिमी, उत्तरी तथा पूर्वी सीमा के साथ-साथ खसरा नं. 102, 126 व 128 की उत्तरी सीमा के साथ-साथ आड़वा दक्षिण में चलते हुए खसरा 128, 127 की पूर्वी सीमा के साथ-साथ चलकर खसरा नं. 127 की दक्षिण, पश्चिमी सीमा के साथ-साथ खसरा नं. 128, 101, 100 की दक्षिण सीमा के साथ-साथ सारिस्का पक्षी सङ्ग्रह पर कर खसरा नं. 19 की दक्षिण सीमा के साथ-साथ होकर खसरा नं. 10 की पश्चिमी सीमा के साथ-साथ खसरा नं. 14 व 15 के मिलन बिन्दु तक। यहाँ से ग्राम डहला के खसरा नं. 14, 13 तथा नजोली के खसरा नं. 206 की दक्षिणी सीमा के साथ-साथ होते हुए ग्राम नजोली के खसरा नं. 206 के मिलन बिन्दु तक।
पश्चिम	ग्राम नजोली के खसरा नं. 200 व 206 के मिलन बिन्दु से प्रारम्भ होकर ग्राम नजोली के खसरा नं. 205, 204, 203, 199, 179, 177, 7, 8 की पश्चिमी सीमा के साथ-साथ चलते हुए ग्राम नजोली के खसरा नं. 2, 3 व 4 की दक्षिणी सीमा के साथ-साथ खसरा नं. 1 व 23 के मिलन बिन्दु (आड़वा का खसरा) तक।

राज्यमाल की आज्ञा से.

(सी. एस. पलासामी)
शासन सचिव

List of Vehicles in Sariska Tiger Reserve

क्र.सं.	उपलब्ध वाहन				अधिकारी / कर्मचारी / कार्यालय जिसे उक्त वाहन आवंटित है	वि०वि०
	प्रकार	मॉडल	रजिस्ट्रेशन	क्रय वर्ष		
1	कार एम्बेसेडर	एम्बेसेडर	RJ19-2C-1643	02 / 2003	वन संरक्षक एवं क्षेत्र निदेशक	विभागीय
2	बोलेरो	महेन्द्रा	RJ14-UB-8970	2011-12	उप वन संरक्षक, सरिस्का	विभागीय
3	बोलेरो	महेन्द्रा	RJ14-UB-2832	12 / 08	उप वन संरक्षक, विस्थापन	एनटीसीए
4	बोलेरो	महेन्द्रा	RJ14-UD-1968	02 / 2014	उप वन संरक्षक	कैम्पा
5	जिप्सी	मारुती	RJ02-UA-1042	12 / 08	सहायक वन संरक्षक, विस्थापन	एनटीसीए
6	जिप्सी	मारुती	RJ02-UA-1044	12 / 08	सहायक वन संरक्षक, अनुसंधान / एसीएफ टहला	एनटीसीए
7	जिप्सी	मारुती	RJ14-UA-3025	2 / 06	सहायक वन संरक्षक तालवृक्ष	विभागीय
8	जिप्सी	मारुती	RJ02-UA-1826	2010-11	उप वन संरक्षक, सरिस्का	अनुदानित डनउइंपद्ध
9	बोलेरो	महेन्द्रा	RJ25-GA-1095	2010-11	क्षेत्रीय उडनदस्ता	अनुदानित डनउइंपद्ध
10	बोलेरो	महेन्द्रा	RJ25-GA-1096	2010-11	सहायक वन संरक्षक, अकबरपुर	अनुदानित डनउइंपद्ध
11	जीप	महेन्द्रा	RJ-02-4378	2001-02	क्षेत्रीय टहला	ग्लोबल टाइगर
12	जीप	थार	RJ14-UD-1934	2013-14	एसीएफ टहला	विभागीय (कैम्पा योजनान्तर्गत)
13	जीप	थार	RJ14-UD-1935	2013-14	एसीएफ अनुसंधान	विभागीय (कैम्पा योजनान्तर्गत)
14	बोलेरो केम्पर	महेन्द्रा	RJ14-GF-4340	2013-14	क्षेत्रीय सरिस्का	विभागीय (कैम्पा योजनान्तर्गत)
15	बोलेरो	महेन्द्रा	RJ25-G-0646	2008-09	क्षेत्रीय सरिस्का	डब्लूडब्लूएफ
16	बोलेरो केम्पर	महेन्द्रा	RJ32-GA-8679	2011-12	क्षेत्रीय डिगोता मु० अजबगढ़	अनुदानित (TT, Mumbai)
17	ट्रेक्टर	हालैण्ड	RJ02-RB-0366	2008-09	क्षेत्रीय सरिस्का	एनटीसीए
18	केन्टर	टाटा 407	RJ-02-5892	99-2000	क्षेत्रीय तालवृक्ष	डब्लूडब्लूएफ
19	केन्टर	ऑयशर	RJ-02-5861	99-2000	क्षेत्रीय टहला	डब्लूडब्लूएफ
20	केन्टर	टाटा 407	RJ-02-5894	99-2000	क्षेत्रीय अकबरपुर	डब्लूडब्लूएफ
21	मोटर साईकिल	इनफिल्ड	RJ-02-5M-8204	99-2000	क्षेत्रीय तालवृक्ष	डब्लूडब्लूएफ
22	मोटर साईकिल	इनफिल्ड	RJ-02-5M-8207	99-2000	क्षेत्रीय स्वागतकक्ष	डब्लूडब्लूएफ

23	मोटर साईकिल	बुलट	RJ-02-5M-8554	99-2000	क्षेत्रीय सरिस्का	डब्लूडब्लूएफ
24	मोटर साईकिल	बजाज	RJ-02-12M-1045	2004-05	क्षेत्रीय तालवृक्ष	डब्लूडब्लूएफ
25	मोटर साईकिल	बुलट	DL-2-8272	2005-06	क्षेत्रीय उडनदस्ता	डब्लूडब्लूएफ
26	मोटर साईकिल	बुलट	DL-2-8273	2005-06	क्षेत्रीय अकबरपुर	डब्लूडब्लूएफ
27	मोटर साईकिल	बुलट	DL-2-8274	2005-06	वनपाल किशनपुर	डब्लूडब्लूएफ
28	मोटर साईकिल	पल्सर	RJ02-SB-5874	2/06	क्षेत्रीय टहला	विभागीय
29	मोटर साईकिल	पल्सर	RJ02-SB-7530	2/06	वनपाल, कालीघाटी	विभागीय
30	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1375	2010-11	क्षेत्रीय सरिस्का	अनुदानित
31	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1374	2010-11	क्षेत्रीय सरिस्का	अनुदानित
32	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1378	2010-11	वनपाल बोरेठा	अनुदानित
33	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1377	2010-11	क्षेत्रीय तालवृक्ष	अनुदानित
34	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1376	2010-11	क्षेत्रीय अकबरपुर	अनुदानित
35	मोटरसाईकिल	हीरोहोण्डा	RJ02-SR-1373	2010-11	सहायक निदेशक, विस्थापन	अनुदानित
36	मोटरसाईकिल	हीरोहोण्डा	RJ02-ST-4423	2011-12	क्षेत्रीय वन अधिकारी, सरिस्का	अनुदानित
37	मोटरसाईकिल	हीरोहोण्डा	RJ02-ST-4422	2011-12	क्षेत्रीय वन अधिकारी, सरिस्का	विभागीय
38	मोटरसाईकिल	हीरोहोण्डा	RJ02-ST-4424	2011-12	क्षेत्रीय वन अधिकारी, टहला	अनुदानित
39	मोटरसाईकिल	हीरोहोण्डा	RJ02-ST-4425	2011-12	क्षेत्रीय वन अधिकारी, अकबरपुर	अनुदानित
40	मोटरसाईकिल	हीरोहोण्डा	RJ02-SZ-5962	2012-13	क्षेत्रीय सरिस्का	कैम्पा मद
41	मोटरसाईकिल	हीरोहोण्डा	RJ02-AS-5963	2012-13	क्षेत्रीय अनुसंधान	कैम्पा मद
42	मोटरसाईकिल	हीरोहोण्डा	RJ02-ES-7249	2013-14	क्षेत्रीय अनुसंधान	कैम्पा मद
43	मोटरसाईकिल	पलसर	RJ02-SB-7630	2004-05		
44	केन्टर	टाटा		2013-14		कैम्पा मद

List of Wireless Sets in Sariska Tiger Reserve

क्र. सं.	रेंज का नाम	मोटोरोला बडे सेट नं०	कैनवुड बडे सेट नं०	मोटोरोला हैण्डसेट नं०	कैनवुड हैण्डसेट नं०
1	तालवृक्ष		K 60400616	672HFR6989	K 31200987
2	तालवृक्ष		K 60400622	672HFR6990	K 6900140
3	तालवृक्ष		K 60400614	672HFR6993	K 60900141
4	तालवृक्ष		K 41100182	M 7012	K 60900133
5	तालवृक्ष		K 41100181	672HFR6996	K 60900134
6	तालवृक्ष		K 31200898	M 7582	
7	तालवृक्ष		K 60400618	M 7203	
8	तालवृक्ष			M 7024	
9	तालवृक्ष			672HFR6987	
10	तालवृक्ष			M 5126	
11	तालवृक्ष			M 6542	
12	तालवृक्ष			M 5123	
13	अकबरपुर	M 3012291	K 60400617	M 7767	K 41100501
14	अकबरपुर		K 51000492	M 4402	K 60900119
15	अकबरपुर		K 60400626	M 386	K 60900136
16	अकबरपुर		K 31200897	M 6521	K 50903047
17	अकबरपुर		K 60400621	M 3784	K 41100497
18	अकबरपुर		K 60400624	M 785	K 50903120
19	अकबरपुर		K 60400627	M 799	K 60900118
20	अकबरपुर		K 5100494	M 719	K 41100502
21	अकबरपुर		K 60400615	M 4102	K 60900132
22	अकबरपुर		K 5100495	M 7021	K 41100504
23	अकबरपुर			M 7021	
24	अकबरपुर			M 5136	
25	सरिस्का	M 304	K 60400620	M 7604	K 50903048
26	सरिस्का	M 517	K 31200969	M 7621	K 41100500

27	सरिस्का	M 478	K 31200967	M 8965	K 31200986
28	सरिस्का		K 31200899	M 7613	K 31200985
29	सरिस्का		K 31200896	M 8966	K 31200983
30	सरिस्का		K 60300714	M 7581	K 50903050
31	सरिस्का		K 51000484	M 7020	K 31200989
32	सरिस्का		K 60400613	M 7615	K 41100500
33	सरिस्का		K 30401320	M 8969	K 31200988
34	सरिस्का			M 985	
35	सरिस्का			M 8961	
36	सरिस्का			M 8968	
37	सरिस्का			M 8967	
38	सरिस्का			M 8962	
39	सरिस्का			M 7009	
40	सरिस्का			M 7614	
41	सरिस्का			M 6529	
42	सरिस्का			M 7582	
43	टहला		K 60400625	M 5125	K 41100499
44	टहला		K 8710385	M 8959	K 60900139
45	टहला		K 30401320	M 8963	K 60900142
46	टहला		K 41160180	M 7580	K 60900136
47	टहला		K 6040623	M 6513	K 41100503
48	टहला		K 5100493	M 8960	K 60900120
49	टहला		K 60400619	M 6545	K 50903127
50	टहला		K 51100485	M 8167	K 60900135
51	टहला		K 41100179	M 6528	K 50903049
52	टहला		K 31200966	M 781	K 8913672
53	टहला		K 60400620	M 5124	K 31200981
54	टहला		K 51000484	M 6531	K 3120984
55	टहला		K 41100183	M 6532	K 41100498
56	टहला			M 6976	
57	टहला			M 7025	
58	टहला			M 7026	

59	उडनदस्ता			246XGC6527	K 50903046
60					K 60900138
61	अनुसंधान			246XGC6507	
62	स्वागतकक्ष		K 31200900		K 31200990
63	स्वागतकक्ष				K 31200986
64	मण्डल कार्यालय	M 225	K 31200968		
65	मण्डल	M 1523			
66	मण्डल	M 379			
67	मण्डल	M 8105			
68	मण्डल	M 8044			
69	अन्य			246XGC6509	
70	अन्य			246XGC7008	
71	अन्य			246XGC6543	
72	अन्य			246XGC6546	
73	अन्य			246XGC6544	
74	अन्य			246XGC6508	

List of Buildings in Sariska Tiger Reserve

S.No.	Name of Place	Name of Building
CF& FD, Alwar		
1	Alwar	CF & FD Office Building
2		CF & FD Residence
3	Alwar	DCF , Relocation, Residence
4	Alwar	Store Room
DCF & Deputy Field Director, Sariska		
5	Sariska	DCF office
6	Sariska	DCF Residence
7	Sariska	ACF-I Residence
8	Sariska	ACF, Research Residence
9	Sariska	ACF-II Residence
10	Sariska	Berrick no-3 for Flying Squad
11	Sariska	Residence for driver-I
12	Sariska	Residence for driver-II
13	Sariska	Berrick no-2 for Tourism staff Residence
14	Sariska	Residence for Range officer Flying Squad
15	Sariska	Residence for Forester Tourism
16	Sariska	Berrick No 1 for Homeguards
17	Sariska	WII Scholar Cottage
18	Sariska	Interpretation Centre, Sariska
19	Sariska	Canteen
20		Forest Rest House, Sariska
21	Sariska	Sariska Main Gate/Wireless Control
22	Sariska	Office-cum-Residence Range officer, Sariska
23	Sariska	Residence for Women Forest Guard-3
24	Sariska	Residence for Range Clerk, Sariska
25	Sariska	Office-cum-Residence Forester, Sariska
26	Sariska	Beat Guard Residence, Indok
27	Sariska	Residence for Forest Guard Range Sariska
28	Sariska	Residence for Forest Guard-2 Range Sariska
29	Sariska	Wireless control station, range Sariska
30	Sariska	Jail
31	Thanagazi	Forest Naka
32	Duharmala	Forest Guard Chowky
33	Duharmala	Bharathari Tila Chowky
34	Ganeshpura	Thank You Board Barrier-cum-tent
35	Ghanka	Forest Guard Chowky
36	Udainath	Forest Guard Chowky
37	Kishore	Forest Guard Chowky
38	Raipuria Bal	Forest Guard Chowky
39	Malajhodka	Forest Guard Chowky
40	Bharathari	Bharathari Barrier-cum-tent
41	Bandipul (Talgate)	Forest Guard Chowky
42	Tarunda	Forest Guard Chowky

43	Karanakabas	Nayapani Tiger Enclosure
44	Kraska	Forest Guard Chowky
45	Kushalgarh	Forester Naka
46	Kalighati	Forester Naka
47	Kalighati	Research Hut
48	Bana	Forest Guard Chowky
49	Slopka	Forest Guard Chowky
50	Umri Tiraha	Forest Guard Chowky
51	Boh	Forest Guard Chowky
52	Phatya khora	Forest Guard Chowky
53	Kankwari	Forester Naka
54	Kankwari	Kankwari fort
55	Kushalgarh	Kushalgarh fort
Akbarpur Range		
56	Natni ka Baran	Range Office
57	Natni ka Baran	Range Officer Residence
58	Natni ka Baran	Forester Naka
59	Natni ka Baran	Women Forest Guard Residence-2
60	Natni ka Baran	Forest Guard Chowky, Dharpura
61	Natni ka Baran	Cattle pond
62	Natni ka Baran	Wireless room
63	Natni ka Baran	Berrack for Boarder homeguard/homeguard
64	Kalikhhol	Forest Guard Chowky
65	Bera	Forest Guard Chowky
66	Raika	Forest Guard Chowky
67	Silised Tiraha	Kishanpur Forester Naka
68	Pantpur	Forest Guard Chowky
69	Bhaktpura	Forest Guard Chowky
70	Binak	Forest Guard Chowky
71	Dehlawas	Forest Guard Chowky
72	Dhawala	Forest Guard Chowky
73	Baleta	Forester Naka
74	Baleta	Forest Guard Chowky
75	Bhatyala	Forest Guard Chowky
76	Siliberi	Resthouse-cum- Forest Guard Chowky
77	Umri	Forest Guard Chowky
78	Rotekyla	Forest Guard Chowky
79	Prithvipura	Forester Naka
80	Prithvipura	Forest Guard Chowky
81	Kalakadi	Forest Guard Chowky
82	Sukola	Forest Guard Chowky
83	Dabali	Forest Guard Chowky
Range Tehla		
84	Tehla	ACF office-cum-residence
85	Tehla	Range Office-cum-residence
86	Tehla	Tehla Naka
87	Tehla	Range Office
88	Tehla	Women Forest Guard Quarters
89	Tehla	Forest Guard Chowky
90	Tehla	Jail Room
91	Tehla	Store Room
92	Tehla	Fort Tehla
93	Richunda	Forest Guard Chowky

94	Bhagani	Forest Guard Chowky
95	Bhansota	Forest Guard Chowky
96	Nandu	Forest Guard Chowky
97	Talab	Forest Guard Chowky
98	Ghewar	Forest Guard Chowky
99	Ghordanpura	Forest Guard Chowky
100	Tilwad	Forest Guard Chowky
101	kho	Forester Naka
102	Asan	Forest Guard Chowky
103	Parasarji	Forest Guard Chowky
104	Boreta	Forester Naka
105	Dangarwada	Forest Guard Chowky
106	Ghat	Forest Guard Chowky
107	Devri	Forest Guard Chowky
108	Golakabas	Forester Naka
109	Jatwana	Forest Guard Chowky
110	Baldevgarh	Forest Guard Chowky
111	Ajabgarh	Forester Naka
112	Samra	Forest Guard Chowky
113	Garh	Forester Naka
114	Dabkan	Forest Guard Chowky
115	Rajor	Forest Guard Chowky
Range Talvriksh		
116	Talvriksh	Range Office
117	Talvriksh	Range officer Residence
118	Talvriksh	Women forest guard residence-2
119	Talvriksh	Forester office-cum-residence
120	Talvriksh	Barrick
121	Berawas	Forest Guard Chowky
122	Tolawas	Forest Guard Chowky
123	Nagalhedhi	Forest Guard Chowky
124	Kharkadikala	Forest Guard Chowky
125	Loz Kanpura	Forest Guard Chowky
126	Panidhal	Forest Guard Chowky
127	Nathusar	Forester Naka
128	Devra	Forest Guard Chowky
129	Rampur	Forester Naka
130	Guda	Forest Guard Chowky
131	Lekadi	Forest Guard Chowky
132	Bilahat	Forest Guard Chowky

List of Anicuts Constructed under NABARD in Sariska Tiger Reserve

क्र. सं	नाम जल संरक्षण संरचना	स्वीकृत राशि (लाखों में)	प्रशासनिक स्वी० संख्या व दिनांक	तक०स्वी० सं० व दि०	वित्तीय स्वी० अनुसार जारी की गई स्वीकृति का आदेश संख्या / दिनांक	सितम्बर 2012 तक व्यय (लाखों में)
1	हनुमान सागर	41.03	681-84 / 21.4.10	716 / 7.5.10	1037 / 4.6.10	21.16
2	करणा का बास	42.37	681-84 / 21.4.10	716 / 7.5.10	1037 / 4.6.10	26.11
3	चमारी का बेरा	39.91	709 / 11.4.11	4160 / 19.7.11	1384 / 22.7.11	33.49
4	काली घाटी	44.48	709 / 11.4.11	4168 / 19.7.11	1384 / 22.7.11	41.16
5	गोलेण्डा	39.39	709 / 11.4.11	4164 / 19.7.11	1384 / 22.7.11	36.86
6	खोह बालेटा	48.20	709 / 11.4.11	4172 / 19.7.11	1384 / 22.7.11	37.36
7	मौजनाथ	42.34	709 / 11.4.11	4156 / 19.7.11	1384 / 22.7.11	37.77
8	भानगढ	19.97	709 / 11.4.11	4275 / 22.7.11	1434 / 27.7.11	17.73
9	जहाज बाबा	34.85	709 / 11.4.11	4271 / 22.7.11	1434 / 27.7.11	23.41
10	सुकल	61.84	709 / 11.4.11	6829 / 25.7.11	1434 / 27.7.11	42.51
11	कलाकडी	68.382	709 / 11.4.11	6833 / 25.7.11	1434 / 27.7.11	62.73
12	नलनाला	67.50	709 / 11.4.11	6833 / 25.7.11	1434 / 27.7.11	64.63
13	सिद्ध कानाला	54.625	709 / 11.4.11	6841 / 25.7.11	1434 / 27.7.11	46.65
14	भगानी	85.025	709 / 11.4.11	6845 / 25.7.11	1434 / 27.7.11	82.93
15	फूटा जोहडा	50.731	709 / 11.4.11	6850 / 25.7.11	1434 / 27.7.11	46.02
16	बांस कुआ	48.81	709 / 11.4.11	4392 / 27.7.11	1518 / 11.8.11	47.27
17	रेणुका हक	62.0468	709 / 11.4.11	7176 / 4.8.11	1518 / 11.8.11	32.26
18	शाहनाथ	55.694	709 / 11.4.11	7029 / 29.7.11	1518 / 11.8.11	53.15
19	फैटा की पाल	61.8469	709 / 11.4.11	7172 / 4.8.11	1518 / 11.8.11	45.81
20	आलग्वाल	42.33	1952 / 5.10.11	8056 / 11.11.11	2203 / 14.11.11	23.00
21	धोलाकुण्ड	41.15	1952 / 5.10.11	8056 / 11.11.11	2203 / 14.11.11	29.59
22	भूर्तहरी सागर	92.4565	1952 / 5.10.11	10019 / 16.11.11	2292 / 28.11.11	12.27
	योग	812.51				

List of Villages in CTH with GPS Location

S. N.	Village Name	LAT	LONG	Deg	Min	Sec	Deg decimal	Deg	Min	Sec	Deg decimal
1	Bhagani	27.297361	76.383333	27	17	50.5	27.297361	76	23	0.0	76.383333
2	Umari	27.316778	76.479667	27	19	0.4	27.316778	76	28	46.8	76.479667
3	Devri	27.296305	76.504861	27	17	46.7	27.296306	76	30	17.5	76.504861
4	Rotkyala	27.360972	76.472944	27	21	39.5	27.360972	76	28	22.6	76.472944
5	Dabli	27.396806	76.494583	27	23	48.5	27.396806	76	29	40.5	76.494583
6	Kankwari	27.331139	76.373417	27	19	52.1	27.331139	76	22	24.3	76.373417
7	Haripura	27.373917	76.383278	27	22	26.1	27.373917	76	22	59.8	76.383278
8	Kraska	27.348222	76.441417	27	20	53.6	27.348222	76	26	29.1	76.441417
9	Sukola	27.398167	76.459667	27	23	53.4	27.398167	76	27	34.8	76.459667
10	Kanyawas	27.294944	76.347750	27	17	41.8	27.294944	76	20	51.9	76.347750
11	Naya Kundalka	27.393167	76.397722	27	23	35.4	27.393167	76	23	51.8	76.397722
12	Rekamala	27.467861	76.369889	27	28	4.3	27.467861	76	22	11.6	76.369889
13	Lilunda	27.397222	76.426889	27	23	50.0	27.397222	76	25	36.8	76.426889
14	Berawas	27.475111	76.393083	27	28	30.4	27.475111	76	23	35.1	76.393083
15	Nangalhedhi	27.455556	76.400611	27	27	20.0	27.455556	76	24	2.2	76.400611
16	Kalachhara	27.439667	76.430750	27	26	22.8	27.439667	76	25	50.7	76.430750
17	Kushalgarh	27.426972	76.435778	27	25	37.1	27.426972	76	26	8.8	76.435778
18	Madhogarh	27.422417	76.456472	27	25	20.7	27.422417	76	27	23.3	76.456472
19	Indok	27.402417	76.377722	27	24	8.7	27.402417	76	22	39.8	76.377722
20	Kundalka	27.398194	76.404944	27	23	53.5	27.398194	76	24	17.8	76.404944
21	Mitrawat	27.289667	76.354583	27	17	22.8	27.289667	76	21	16.5	76.254583
22	Rajore	27.286778	76.336833	27	17	12.4	27.286778	76	20	12.6	76.336833
23	Garh	27.256194	76.340278	27	15	22.3	27.256194	76	20	25.0	76.340278
24	Dabkan	27.253389	76.369556	27	15	12.2	27.253389	76	22	10.4	76.369556
25	Loj Nathusar	27.543694	76.434056	27	32	37.3	27.543694	76	26	2.6	76.434056
26	Raika	27.466611	76.435250	27	27	59.8	27.466611	76	26	6.9	76.435250
27	Panidhal	27.490306	76.435833	27	29	25.1	27.490306	76	26	9.0	76.435833
28	Duharmala	27.426861	76.349611	27	25	36.7	27.426861	76	20	58.6	76.349611
29	Bera	27.483056	76.475028	27	28	59.0	27.483056	76	28	30.1	76.475028

List of Commerical Activities in Sariska Tiger Reserve

क्र.सं.	व्यवसायकर्ता का नाम व पता	स्थान	निर्माण की प्रकृति	व्यवसाय का प्रकार	चालू / बन्द
1	मै0 शिब्बा व्हील्स प्रा0लि0 (सरिस्का पैलेस होटल)	सरिस्का	पक्की बिल्डिंग	होटल (आवासीय)	चालू
2	टाइगर डैन (आरटीडीसी होटल)	सरिस्का	पक्की बिल्डिंग	आरटीडीसी होटल	चालू
3	श्री दिनेश दुर्गानी, अमराकाबास (टाइगर हैवन होटल)	सरिस्का (थानागाजी)	पक्की बिल्डिंग	होटल (आवासीय)	चालू
4	लालाराम यादव पुत्र देवकरण यादव निवासी इन्दौक	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
5	शंकर/जीवननाथ योगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
6	बनारसी/भगवान सहाय गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
7	रतनलाल/परसाराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
8	घनश्याम/गंगा सहाय गूर्जर, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
9	अमरसिंह/रामसहाय यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
10	श्रवण कुमार/घम्मन गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
11	पप्पूराम/गोकल मीणा, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
12	दयाराम/भौरैलाल मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
13	ओमप्रकाश/लख्खीराम शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
14	रमेश चंद/चन्दर नाथ जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
15	श्री भरतलाल/लल्लू नाथ, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
16	श्री हरि/लल्लूराम पटवा, अलवर	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
17	श्री सतीश कुमार/हरिराम पटवा, अलवर	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
18	अशोक/कन्हैयालाल पटवा, अलवर	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
19	श्री रूपचन्द/हीरालाल पटवा, अलवर	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
20	श्री बट्टी प्रसाद/बुद्धालाल मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
21	श्री बनवारी/भोरेनाथ जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
22	मातादीन/बनवारीलाल जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	
23	राजेश/बनवारीलाल, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	
24	नारायण/बट्टी मीणा, कुण्डलका	भर्तृहरी	खोखा टीन शेड	चाय होटल	
25	पप्पू/देवकरण यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
26	रतनलाल/प्रभात घाणका, थानागाजी	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
27	कमलेश/रामू जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
28	दुर्गाप्रसाद/छीतर गूर्जर, क्रास्का	भर्तृहरी	खोखा टीन शेड	चाय होटल	चालू
29	प्रकाश/सेडूराम सैनी, थानागाजी	भर्तृहरी	खोखा टीन शेड	मिठाई	चालू
30	सुरेन्द्र/मनोहर लाल शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	मिठाई	चालू
31	हरिराम/रामचन्द मीणा, अंगारी	भर्तृहरी	खोखा टीन शेड	मिठाई	चालू
32	रामू/लल्लूनाथ, इन्दौक	भर्तृहरी	खोखा टीन शेड	मिठाई	चालू
33	हीरालाल/प्रभू गूर्जर, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
34	महेश/लीलानाथ, अंगारी	भर्तृहरी	खोखा टीन शेड	—	बन्द

35	लल्लू/गंगासहाय गूर्जर, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
36	श्रीराम/रामकरण गूर्जर, बस्सी	भर्तृहरी	खोखा टीन शेड	—	बन्द
37	भगवती पत्नी लालाराम जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
38	विष्णु पुत्र सीताराम शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
39	परसोराम/सीताराम शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
40	हरिराम/परसा गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
41	कल्याण सहाय/भौरेलाल मीणा, काबली गढ़	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
42	नारायण/भोरेनाथ जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड	चाट भण्डार	चालू
43	मदनलाल/परसाराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मिठाई	चालू
44	किशनलाल/हरफूल यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	किराना स्टोर	चालू
45	रामसहाय/जीवनराम यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
46	जगदीश/जीवनराम, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
47	जगदीश/मोटूराम मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	म्यूजिक सैन्टर	चालू
48	हीरालाल/बद्रीप्रसाद मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	म्यूजिक सैन्टर	चालू
49	रामेश्वर/छीतरराम बलाई, मोमाडा ढाणी	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
50	पप्पूराम/देवकरण यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	म्यूजिक सैन्टर	चालू
51	निवास/चिरंजी माली, माधोगढ़	भर्तृहरी	खोखा टीन शेड	—	बन्द
52	मोटूराम/भोरेलाल मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
53	रामस्वरूप/कन्हैयालाल गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
54	मदन/कजोड सैनी, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
55	जगदीश/झूथाराम बलाई, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
56	नानगा/प्रभाती राम, दुहार	भर्तृहरी	खोखा टीन शेड	—	बन्द
57	शिमभू/जीवणराम नाथ, इन्दौक	भर्तृहरी	खोखा टीन शेड	चाय होटल	चालू
58	विनोद/रामजीलाल गूर्जर कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
59	इन्द्र/रतन सिंह राजपूत, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
60	जगदीश/भगवान सहाय गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
61	कैलाश/बद्री प्रसाद सैनी, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
62	मन्नीराम/अर्जुन गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
63	दिनेश/कैलाश पुजारी, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
64	मन्याराम/भैरुबक्स गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
65	भोला/रामस्वरूप शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
66	रामचन्द्र/बुद्धाराम मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
67	महावीर/अतर सिंह शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	होटल	चालू
68	सीताराम/नाथू लाल शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	होटल	चालू
69	पवन/सीताराम शर्मा, इन्दौक	भर्तृहरी	खोखा टीन शेड	होटल	चालू
70	बद्री प्रसाद/छोटेलाल सैनी, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
71	बबरी/अर्जुन गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
72	बोदूराम/कालूराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
73	रामेश्वर/कालूराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
74	रामकुमार/कन्हैयालाल गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	—	बन्द
75	बबली/बद्री जोगी, बालेटा	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू

76	बाबू/परेवा, बालेटा	भर्तृहरी	खोखा टीन शेड	—	बन्द
77	हरिसिंह/रामजीलाल राजपूत, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
78	धन्नालाल/सल्लाराम सैनी, भण्डोडी	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
79	सीताराम/घम्मन गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
80	कालूराम/लक्ष्मण मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	—	बन्द
81	मूलचन्द/सोन्याराम गूर्जर, लीलूण्डा	भर्तृहरी	खोखा टीन शेड	—	बन्द
82	प्रभूदयाल/हरि यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
83	राजेन्द्र/रामनारायण पटवा, दिल्ली	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
84	सीताराम/उमराव गूर्जर, क्रास्का	भर्तृहरी	खोखा टीन शेड	—	बन्द
85	बीरबल/गणपत गूर्जर, क्रास्का	भर्तृहरी	खोखा टीन शेड	—	बन्द
86	छुटटन/छीतर गूर्जर, कुशालगढ	भर्तृहरी	खोखा टीन शेड	—	बन्द
87	बुद्धाराम/नान्याराम गूर्जर, क्रास्का	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
88	रमेश/नान्याराम, क्रास्का	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
89	छोटेला/बुद्धाराम मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड	मणिहारी	चालू
90	मोहरपाल/प्रभातीलाल मीणा, राजौर गढ	भर्तृहरी	खोखा टीन शेड	म्यूजिक सैन्टर	चालू
91	अजय/पप्पू यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	परसादी	चालू
92	लक्ष्मण/कन्हैया लाल गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	परसादी	चालू
93	अशोक/अमरसिंह यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
94	देवकरण/प्रभातीलाल गूर्जर, लीलूण्डा	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
95	रामस्वरूप/कन्हैयालाल, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
96	मातादीन/सोन्या गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
97	सुगन/भोडया गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
98	शंकर/भोरेलाल जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
99	भूरया/शंकर जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
100	पप्पू/देवकरण यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
101	ओमप्रकाश/कजोड सैनी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
102	रामजीलाल/गणपत गूर्जर, क्रास्का	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
103	किशोर/हीरालाल यादव, बिनजारी	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
104	हरिप्रसाद/श्री नारायण यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड	प्रसाद	चालू
105	छोटेला/प्रभू यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
106	छीतर/रामचन्द्र शर्मा, हरनेर	भर्तृहरी	खोखा टीन शेड	—	बन्द

			त्रिपाल		
107	नारायण/सेडूराम सैन, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	नाई की दुकान	चालू
108	यादराम/ नन्दा राम गूर्जर, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	चाय	चालू
109	बलदेव/ मनोहर पुजारी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
110	रामधन/ कालूराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	प्रसाद	चालू
111	जयराम/ कालूराम गूर्जर, सराधना की ढाणी	भर्तृहरी	खोखा टीन शेड त्रिपाल	परचूनी	चालू
112	मन्ना/ अर्जुन गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	मणिहारी	चालू
113	जयराम/ रामकंवार गूर्जर, तुलस्याला	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
114	रामकरण/ हरफूल यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
115	घरसीराम/ कन्हैया गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
116	मन्ना राम/ कन्हैयालाल गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
117	रतन/ प्रभूराम गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
118	पप्पू/ देवकरण यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
119	ओमप्रकाश/ लालाराम जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
120	रामस्वरूप/ कन्हैया गूर्जर, कुण्डलका	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
121	छोटेराल/ बुद्धाराम मीणा, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
122	रोताश/ नारायण गूर्जर, नांगलहेडी	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
123	पूरण/ शिवसहाय गूर्जर, नांगलहेडी	भर्तृहरी	खोखा टीन शेड त्रिपाल	—	बन्द
124	रामबाबू/ कालूराम जोगी, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	म्यूजिक सेन्टर	चालू
125	लालाराम/ हरिसिंह यादव, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	चाय	चालू
126	ओमप्रकाश/ लख्खीराम, इन्दौक	भर्तृहरी	खोखा टीन शेड त्रिपाल	चाय	चालू
127	रतनलाल/ पूरण मीणा, इन्दौक	डूंगाली ढाणी	पक्की	परचूनी	चालू
128	आनन्दी/ शंकर मीणा, इन्दौक	डूंगाली ढाणी	पक्की (पाटोल)	होटल ढाबा	चालू
129	रामप्रताप/ छोटेराल मीणा, इन्दौक	डूंगाली ढाणी	टीन शेड	होटल ढाबा	चालू
130	नारायण/ रामप्रताप मीणा, इन्दौक	डूंगाली ढाणी	खोखा	टायर पंकचर	चालू

131	प्रभूदयाल / छोटूराम मीणा, इन्दौक	डूंगाली ढाणी	टीन शेड	होटल ढाबा	चालू
132	रामू / कानाराम मीणा, इन्दौक	डूंगाली ढाणी	पक्की	परचूनी	चालू
133	रामकिशन / कानाराम मीणा, इन्दौक	डूंगाली ढाणी	टीन शेड	होटल	चालू
134	बाबूलाल / रामप्रताप मीणा, इन्दौक	डूंगाली ढाणी	पाटोल	होटल	चालू
135	जयराम / रामप्रताप मीणा, इन्दौक	डूंगाली ढाणी	पक्की टीन शेड	चाय ढाबा	चालू
136	मोहन / प्रभूदयाल मीणा, इन्दौक	डूंगाली ढाणी	पक्की पाटोल	चाय ढाबा	चालू
137	ओमप्रकाश / बाबूलाल मीणा, इन्दौक	डूंगाली ढाणी	पक्की	होटल	चालू
138	धूणीलाल / बाबूलाल मीणा, इन्दौक	डूंगाली ढाणी	खोखा	चाय	चालू
139	कैप्टिन योगी / बट्टी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 4 दुकान	सिलाई	चालू
140	खगेश / मनोहर नाथ योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 3 दुकान	सिलाई	चालू
141	प्रभूदयाल / मोटूराम मीणा, इन्दौक	भर्तृहरी तिराया	पक्की 2 दुकान	परचूनी	चालू
142	जगदीश / मोटूराम मीणा, इन्दौक	भर्तृहरी तिराया	पक्की 1 दुकान	—	बन्द
143	मंगल / मोटूराम मीणा, इन्दौक	भर्तृहरी तिराया	पक्की	—	बन्द
144	लीलाराम / झूथाराम मीणा, इन्दौक	भर्तृहरी तिराया	पक्की	—	बन्द
145	श्रीमती गोमा पत्नी चन्दरनाथ योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 7 टीन शेड 1	परचूनी आटा चक्की मैडीकल	चालू
146	लीलाराम पुत्र झूथाराम मीणा, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	साईकिल पिंचर	चालू
147	लक्ष्मीनारायण / रामेश्वर गुप्ता, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2	कोल्ड ड्रिंक्स	चालू
148	किशनलाल / सोहनलाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
149	श्रीमती मंजू पत्नी किशोर सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
150	रामस्वरूप पुत्र सोहनलाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
151	चिरंजीलाल / अर्जुन लाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 3	मिष्ठान भंडार	चालू
152	भोटा राम / ओंकार गूर्जर, कुण्डलका	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
153	बाबूलाल / ओंकार गूर्जर, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
154	दयाराम / राधाकिशन गूर्जर, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
155	लक्ष्मण / रामधन सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
156	हीरालाल / रामधन सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
157	रामचन्द्र / सेडूराम सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	मिष्ठान भंडार	चालू
158	इन्द्रसिंह / रतन सिंह राजपूत, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2 पक्की 3	मिष्ठान भंडार —	चालू बन्द

159	शयोसहाय/ चोथमल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2	—	बन्द
160	सीताराम/ हरसहाय सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	ढेली	फल सब्जी	चालू
161	लीलाराम/ पप्पू योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	ढेली	फल सब्जी	चालू
162	लालाराम/ डालचन्द सैन, इन्दौक	भर्तृहरी तिराया	टीन शेड खोखा	नाई	चालू
163	पेमाराम/ कन्हैयालाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	म्यूजिक सैन्टर	चालू
164	बनवारी/ नारायण योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	म्यूजिक सैन्टर	चालू
165	राजू/ बनवारी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	क्लिनिंग	चालू
166	रामकिशन/ बनवारी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	होटल	चालू
167	टीकाराम/ बनवारी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	ढाबा	चालू
168	सम्पत/ बनवारी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	मिष्ठान भण्डार	चालू
169	योगेश/ बनवारी योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	कोल्ड ड्रिंक्स	चालू
170	सज्जन/ मनोहर प्रजापत, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	म्यूजिक सैन्टर	चालू
171	राजू/ मनोहर प्रजापत, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	जनरल स्टोर	चालू
172	दीवान/ मनोहर लाल, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	म्यूजिक सैन्टर	चालू
173	रामकुमार/ श्योनारायण गूर्जर, इन्दौक	भर्तृहरी तिराया	पक्की 2	मिष्ठान भंडार	चालू
174	हरिराम/ कन्हैयालाल गूर्जर, क्रास्का	भर्तृहरी तिराया	पक्की 2	मोबाईल/ नाई	चालू
175	किसनी पत्नी लादूनाथ योगी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2	—	बन्द
176	पिकू पुत्र रामजीलाल, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	परचूनी	चालू
177	मदन लाल/ रामजीलाल, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	परचूनी	चालू
178	बब्लू/ रामजीलाल, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 1	परचूनी	चालू
179	किशनलाल/ हरफूल यादव, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2	डेयरी/ पर चून	चालू
180	रामलाल/ चिरंजी लाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की 2	डेयरी/ पर चून	चालू
181	चेतराम/ प्रभूदयाल सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	म्यूजिक सेन्टर	चालू
182	कन्हैयालाल, इन्दौक रोडी	भर्तृहरी तिराया	पक्की	—	बन्द
183	दयाराम, इन्दौक रोडी	भर्तृहरी तिराया	पक्की	—	बन्द
184	रामस्वरूप, इन्दौक रोडी	भर्तृहरी तिराया	पक्की	—	बन्द
185	कैलाश/ बद्दी सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	—	बन्द
186	कालू/ बद्दी सैनी, भर्तृहरी तिराया	भर्तृहरी तिराया	पक्की	—	बन्द
187	घनश्याम/ गंगासहाय गूर्जर, इन्दौक राडी	भर्तृहरी तिराया	पक्की	डाक्टर	चालू
188	कन्नड/ ग्यारसा गूर्जर, इन्दौक राडी	भर्तृहरी तिराया	पक्की	चाय	चालू
189	नन्दा/ ग्यारसा गूर्जर, इन्दौक राडी	भर्तृहरी तिराया	पक्की	डीजल तेल	चालू
190	भोरा राम/ ग्यारसा गूर्जर, इन्दौक राडी	भर्तृहरी तिराया	पक्की	चाय	चालू
191	मूलचन्द/ गंगाबक्स बलाई, इन्दौक	भर्तृहरी तिराया	पक्की 2	—	बन्द

192	किशनलाल / गंगा बक्स बलाई, इन्दौक	भर्तृहरी तिराया	पक्की	चक्की	चालू
193	सुवालला / रामसहाय शर्मा, इन्दौक	भर्तृहरी तिराया	पक्की	होटल ढाबा	चालू
194	रामकृपाल / मंगल प्रजापत, इन्दौक	भर्तृहरी तिराया	पक्की	टायर पिंचर	चालू
195	बद्री / नानछा राम मीणा, इन्दौक	भर्तृहरी तिराया	पक्की 2	—	बन्द
196	सरदार बंजारा, कालामेडा	कालामेडा	पक्की टीन शेड	होटल ढाबा	चालू
197	हरि / गणेश गूर्जर, कुशालगढ	कुशालगढ मोड	पक्का	होटल ढाबा	चालू
198	रामकंवार / पांचूराम गूर्जर, सावर	कुशालगढ तिराया	पक्की 3	होटल ढाबा	चालू
199	रामकरण / भगवान सहाय गूर्जर, सावर	कुशालगढ तिराया	पक्की 2	होटल ढाबा	चालू
200	रामेश्वर / भगवान गूर्जर, सावर	कुशालगढ तिराया	पक्की 1	होटल ढाबा	चालू
201	रामोतार / मोहनलाल शर्मा, सावर	कुशालगढ तिराया	पक्की 1	होटल ढाबा	चालू
202	हरिसिंह / मोहनलाल शर्मा, कुशालगढ	कुशालगढ तिराया	पक्की 1	होटल ढाबा	चालू
203	हीरू / पप्पी गूर्जर, सियाकाबास	कुशालगढ तिराया	पक्की 1	चाय	चालू
204	श्रवण / मूलचन्द गूर्जर, सावर	कुशालगढ तिराया	पक्की 1	चाय	चालू
205	सूरज / मूलचन्द गूर्जर, सावर	कुशालगढ तिराया	पक्की 1	चाय	चालू
206	हीरालाल / प्रभू गूर्जर, सावर	कुशालगढ तिराया	पक्की 1	सिलाई कपडा	चालू
207	महादेव / सूसाराम यादव, कुशालगढ	कुशालगढ तिराया	पक्की 2	चाय / पिंचर	चालू
208	जयराम / नानगराम गूर्जर, माधोगढ	कुशालगढ तिराया	पक्की 2	होटल ढाबा	चालू
209	गणपत / नारायण गूर्जर, कुशालगढ	कुशालगढ तिराया	खोखा	जनरल स्टोर	चालू
210	किशन / पांचूराम गूर्जर, सावर	कुशालगढ तिराया	खोखा	चाय	चालू
211	रूपराम / बद्री प्रसाद गूर्जर, सावर	कुशालगढ तिराया	खोखा	चाय	चालू
212	जयराम / रिछपाल गूर्जर, सावर	कुशालगढ तिराया	खोखा	जनरल स्टोर	चालू
213	सीताराम / कन्हैयालाल सैनी, कुशालगढ	कुशालगढ तिराया	खोखा टीन शेड	मिष्ठान भंडार	चालू
214	मदन / मंगल राम प्रजापत, इन्दौक	कुशालगढ तिराया	पक्की 1 टीन शेड 1	विलनीक पंचर	चालू चालू
215	शुभराम सैनी, उमरैन	कुशालगढ तिराया	पक्की 2	—	बन्द
216	भूरिया शर्मा, बालेटा	पाण्डुपोल	पक्की टीन शेड	प्रसाद-चाय	चालू
217	सगरा / छीतरमल सैनी, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	मिष्ठान भंडार किराना स्टोर	चालू
218	सुखराम / नारायण सैन, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	मिष्ठान भंडार कोल्ड ड्रिंक्स	चालू
219	कैलाश / नारायण सैन, माधोगढ	माधोगढ स्टैण्ड	पक्का 5	राशन डीलर मिष्ठान भंडार	चालू
220	गिर्राज, माधोगढ	माधोगढ स्टैण्ड	पक्का 1	मिष्ठान भंडार	चालू
221	जवाहर / छोटेलाल, माधोगढ	माधोगढ स्टैण्ड	पक्का 6	किराना	चालू

				स्टोर 2 बन्द 4	बन्द
222	योगेन्द्र / विनोद शर्मा, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	टायर पंचर क्लोथ मर्चेन्ट	चालू
223	चिरंजी / प्रभू गूर्जर, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	डीजल	चालू
224	बनवारी / महादेव गुप्ता, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	जनरल स्टोर किराना	चालू
225	धर्मी / प्रभू गूर्जर, माधोगढ	माधोगढ स्टैण्ड	पक्का 4	क्लिनीक 1 बन्द 3	चालू बन्द
226	योगेश / पांचूराम शर्मा, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	किराना स्टोर	चालू
227	लाला / गोलाराम गूर्जर, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	—	बन्द
228	पप्पू / चन्दर सैनी, माधोगढ	माधोगढ स्टैण्ड	पक्का	—	बन्द
229	छीतर / चन्दन रैगर, माधोगढ	माधोगढ स्टैण्ड	पक्का 4	पंचर, डीजल	चालू
230	जयमल / छाजू रैगर, माधोगढ	माधोगढ स्टैण्ड	पक्का 2	—	बन्द
231	गुरुदयाल / रूपाराम जाटव, माधोगढ	नवल की ढाणी	पक्का	किराना	चालू
232	धर्मसिंह / नारायण सिंह गूर्जर, माधोगढ	लो मोड पुलिया	पक्का	किराना	चालू
233	कमलसिंह / नारायण सिंह गूर्जर, माधोगढ	लो मोड पुलिया	पक्का	ढाबा	चालू
234	विक्रम / हरिराम गूर्जर, धर्मपुरा	नटनी का बांरा	पक्का	चाय व किराना	चालू
235	बंशी / हरिराम गूर्जर, धर्मपुरा	नटनी का बांरा	पक्का	पंचर	चालू
236	गणेश उर्फ गीला / मंगलराम प्रजापत, बालेटा	नटनी का बांरा	खोखा	चाय व जनरल स्टोर	चालू
237	बिटटू / बब्बू सैनी, अलवर	बारां बीयर नदी के पास	पक्का	मुर्गी फार्म	चालू
238	शिया / हरबक्स गूर्जर, धर्मपुरा	नटनी का बांरा रोड	पक्का	पनीर की दुकान	चालू
239	लालाराम / गोकुल सैन, अकबरपुर	नटनी का बांरा	खोखा	हेयर सैलून	चालू
240	रोहिताश / जगदीश मीणा, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान टीन शेड	चाय दुकान किराना स्टोर	चालू
241	राधेश्याम / जगदीश मीणा, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान टीन शेड	चाय दुकान किराना स्टोर	चालू
242	सुरेश चंद / जगदीश मीणा, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान टीन शेड	चाय दुकान किराना स्टोर	चालू
243	सीताराम / भौरेलाल स्वामी, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान टीन शेड	चाय दुकान किराना स्टोर	चालू
244	टीनू शर्मा / सत्यनारायण शर्मा, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान टीन शेड	चाय दुकान किराना	चालू

				स्टोर	
245	पप्पू स्वामी / रूडा स्वामी, तालवृक्ष मुण्डावरा	तालवृक्ष	खोखा झोपडी	चाय दुकान किराना स्टोर	चालू
246	रामकरण / मूलाराम जाट, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान आगे बरामदा	—	बन्द
247	बुद्धाराम / मलाराम जाट, तालवृक्ष मुण्डावरा	तालवृक्ष	पक्की दुकान आगे बरामदा	—	बन्द
248	हरिराम / भौरैलाल गूर्जर, भोजपुरी बैरावास	तालवृक्ष	खोखा	—	बन्द
249	धूणीलाल / सुल्तान गूर्जर, बावडी की ढाणी, मुण्डावरा	तालवृक्ष	टीन शेड खोखा	चाय दुकान किराना स्टोर	चालू
250	हजारी सैनी / रामनाथ सैनी, मुण्डावरा	तालवृक्ष	टीन शेड	चाय की दुकान	चालू
251	कमलेश / बिरजू शर्मा, मुण्डावरा	तालवृक्ष	झोपडी खोखा	किराना स्टोर व चाय	चालू
252	ग्यारसी लाल / ओमप्रकाश जाट, मुण्डावरा	तालवृक्ष	खोखा	—	बन्द
253	कन्हैया धोबी / प्रभात धोबी, मानावास	तालवृक्ष	झोपडी	कपडा प्रेस	चालू
254	दयाराम / बूचाराम सैन, मुण्डावरा	तालवृक्ष	पक्की दुकान	हैयर ड्रेसर	चालू
255	काना / मातादीन सैन, मुण्डावरा	तालवृक्ष	पक्की दुकान	हैयर ड्रेसर	चालू
256	पूरण / बनू सैन, मुण्डावरा	तालवृक्ष	खोखा लकडी	हैयर ड्रेसर	चालू
257	सोन्या बनजारा, भोजपुरी नांगलहेडी (किराये पर है)	तालवृक्ष	खोखा लकडी	हैयर ड्रेसर	चालू

Expenditure Report 2008-09 to 2013-14 in Sariska Tiger Reserve**YEAR 2008-09**

Sr. No.	Item of work	Sanctioned			Actual			Deviation, if any (give reasons)
		Amount	Quantity	Location	Amount	Quantity	Location	
	Non-Recurring							
1	Re-introduction of Tiger in Sariska	30.00			30.00			
2	Purchase of Arms & Ammunition & repair (especially for monsoon period)	1.00			0			
3	Purchase of Metallic detectors	1.00			0			
4	Purchase of 5 fixed & 10 mobile wireless sets for night patrolling parties with accessories (including batteries, chargers, antenna, cable and matts)	2.00			2.00			
5	Purchase of solar equipments for chowkies / nakas with extra batteries	3.00			2.99			
6	Purchase of Speed Detecting Radar Guns	3.00			0			
7	Purchase of Gypsies for Range Officers (Sariska, Tehla, Akbarpur, Talvriksh, Flying squad)	25.00			24.33			
8	Purchase of tractors with trolleys in each range to supply water in pinch period	8.00			6.38			
9	Anti Poaching unit (Home Guards Deployment including monsoon period amounting to 11 lacs)	29.00			28.48			
10	Genrator set at Kalighati	4.00			3.98			
11	New road at vulnerable areas	9.00			9.00			
12	Land levelling & demarcation	2.00			2.00			
13	Radio Collaring	18.00			18.00			
14	Project Allowance for regular ministerial staff	12.00			10.11			
15	Deployment of fire watchers from local youth in the peripheral village	0.50			0.50			
16	Secret information service	1.00			0.93			
17	Patrolling kit to staff including ex-armyman	5.00			5.00			
18	Installation of hand pumps in chowkies	5.00			5.00			
19	Construction of forest guard chowkies	6.00			5.99			
20	Training/ Workshop for frontline staff and officers	3.00			3.00			
21	Exposure visits to other PA's	1.00			0			
22	Creation of Drinking water facility at Bana forest guard chowky	8.00			7.97			
23	Purchase of Fabricate of cages	1.50			0.23			
24	Research Hut at Kalighati	1.00			0			

<u>Eco-development activities</u>							
1	Inocuation of cattle	2.00			1.94		
2	Medicale camps for villagers & staff	0.50			0.50		
3	Purchase of Projector (Telinijet) for tranquillization with accessories and medicines	2.50			0.04		
4	Purchase & Fixing of Camera traps	1.50			0		
5	Relocation of villages	1879.50			335.50		
6	Eco-development for relocated village Bhagani	2.00			2.00		
	Total (Non Rec. +Eco-dev.) 100%	2067.00			505.870		
<u>Recurring Items (CSS)</u>							
1	Tiger Protection Force including deployment of local work force	1.00			1.00		
2	Maintenance of buildings	4.50			4.50		
3	Maintenance of vehicle & POL	8.75			8.75		
4	Maintenance of wireless system	1.00			1.00		
5	Maintenance of fire line	2.50			2.50		
6	Maintenance of fair weather road	4.00			3.99		
7	Transportation of water to tents in inaccessible areas	1.00			1.00		
8	Publicity material and brochures	1.50			1.45		
9	Material for Wildlife Week including certificate and Awards	0.25			0.25		
10	Water arrangement for water holles & camps site	1.50			1.50		
11	Compensation to dependents killed/ injured by wild animals	1.25			0.01		
12	Compensation to cattle owners killed by wild animals	0.25			0.02		
13	Legal Support	0.50			0.24		
14	Internet facility	0.10			0.02		
15	Office expenditure	7.50			7.50		
16	Hiring of Vehicles	0.75			0.72		
	Total Recurring (CSS) 50%	36.35			34.450		
	GRAND TOTAL	2103.35			540.320		

YEAR 2009-10

Sr. No.	Item of work	Sanctioned			Actual Expenditure			Deviation, if any (give reasons)
		Amount (in lacs)	Quantity	Location	Amount (in lacs)	Quantity	Location	

Non-Recurring									
1	Relocation of villages	Relocation work	1432.65			604.176			
2	All India Field Directors Seminar	All India Field Directors Seminar	1.92			1.92			
3	4.1 Anti Poaching 4.1.1 Deployment of Anti Poaching squads	Purchase of Arms, ammunitions & repairs	0.10			0.10			
4	4.1.6 Deployment of Ex-army personnel/ Home Guards	Home guards will be deployed through out the year to strengthen the protection. These Home Guards will be deployed under various chowkies and nakas	53.00			51.67			
5	4.1.11 Procurement of field gear	For effective patrolling the field staff needs to be equipped with proper warm clothing , shoes & other devices etc.	2.00			2.00			
6	4.2.1 Construction of new chowkies	5. Construction of Barracks for flying squad.	3.00			2.99			
		7. Construction of wireless rooms at Boh, Phatya Khora, Bhagani & Bana locations	3.00			2.99			
		11. Construction of gate barrier and speed breakers to divert the heavy vehicular traffic on to the diversion road	1.00			0.89			
7	4.2.10 Procurement of equipments	Camera traps, Laptop Computer with Laser Printer for Field director and Intercom system for the office of the Dy. Conservator, Sariska Office.	2.00			1.92			
8	4.2.11 Construction of Bore well and purchase of Pipe (along with laying of pipe line) generator motor and other accessories.	Kundali Road, Bhensota & Phantya khora are inviolate & ideal wild life habitats located inside the national park area of the reserve but are totally devoid of water. It is proposed to bring water in these prime areas through pipe lines connected to bore wells & natural reservoir. This will prove to be a mile stone in the management history of the reserve.	15.00			9.63			

9	4.3 Habitat improvement and water development	(a) Invasive spp. like Prosopis Juliflora, Cassia tora have caused mentionable damage to this critical tiger habitat by replacing palatable grass & other fodder spp. in prime tiger habitat of the reserve. These plants/trees need to be uprooted on top priority for habitat revival.	5.00			5.00			
		(b) Number of water holes spread over the entire reserve are filled with the help of diesel engines/Pipe Lines/Tractor tankers etc. Budget is required for this vital purpose which largely includes expenditure on purchase of Diesel /oil etc.	7.00			7.00			
10	4.4 Addressing man-animal conflict 4.4.1 Payments of compensation for	Cattle/humen damage by the carnivores in the villages situated in the proximity of the reserve is to be compensated as per the prescribed norms in order to avoid conflict with the villagers.	0.50			0.50			
11	4.4.2 Construction of new orthen water bodies	As per the verbal instructions from Sh. Rajesh Gopal, the Member Secretary, N.T.C.A., 3 water ponds have already been constructed on the water less plateau. This demand has been made in order to regularize the committed expenditure only.	5.00			4.87			
12	4.5 Co-existence agenda in buffer / fringe areas								
	4.5.1 Providing ecological viable livelihood for reducing their dependency on forest	Assistance on payment will be taken from youth of Bawaria/ Banjara & other Shikari communities in organizing raids/searches on deras/ houses & other outfits of Shikaris	0.25			0.16			

	4.5.2 Habitat supplement to wild animals moving out of Core area.	Conserving the forest areas through restorative inputs involving local people for providing habitat supplement to wild animals(including restoration of vacated villages/Guvadas like Bhagani, Kankwari,Umari etc.	3.00			2.97			
13	4.6 Rehabilitation package for traditional hunting tribes living around								
	4.7 Research and field equipment	1. 8 additional Radio Collar receivers & other related essential equipments are required to be purchased for effective research & monitoring of the reintroduced tigers in the reserve.	5.00			4.98			
		2. Budget is required for forensic examination of Visra & other vital parts of the scheduled animals in case of their un natural death.	0.05			0.05			
		3. Other equipment required for research unit (like Frizz for storing medicines etc.)	0.20			0.20			
		4. Purchase of Tele Inject tranquilizing gun with accessories and medicines.	3.00			0.00			
		5. Annual wild life census and monitoring of population	1.00			0.99			
		6. Purchase of POP and creation of PIPs for monitoring of present movement of Tiger / Leopard / Hyena and other wild cats.	0.50			0.50			
4.8 Staff development									
14	4.8.1 Specialized training in the use of GIS, anti poaching operations jurisprudence, wild life forensic etc.	Trainings will be organized for officers & front line staff on various protection & monitoring techniques	0.88			0.88			

15	4.11 Safeguard/ retrofitting measures in the interest of wild life conservation	(a) Purchase of Fire Fighting equipment including water pump and food/ water for fire fighting teams on spot. (b) Engaging labors for fire fighting & advance early burning.	1.00			1.00			
16	4.15 Project allowances field and office staff.	Project allowances would be given to the ministerial, field staff & officers of STR	12.00			9.80			
17	4.16 Staff welfare activities	(a) To purchase patrolling Kit for staff including ex-service men.	2.00			2.00			
		(d) Purchase of solar equipment for chowkis/ nakas with accessories including batteries	2.00			2.00			
		(e) Providing drinking water to staff at inaccessible chowkies through vehicular/animal transport	2.00			1.97			
18	4.17 Fostering Eco tourism in tiger reserve.	(b) Publicity Material	0.50			0.50			
		(c) Workshop & Seminar	4.25			4.25			
		(e) Celebration of Wildlife Week & other important days	1.00			1.00			
19	Installation of handpumps at forest guard chowkies for drinking water to the staff	Installation of hand pumps at F.G. chowkies for drinking water to the staff, is a priority work.	3.00			1.20			
20	Creation of new road (track)	In order to ensure effective management various sensitive & remote areas need to be frequently patrolled. New roads (tracks) are required to be constructed to achieve this important goal.	6.00			5.96			
21	Construction of forest Guard Chowki at Mala Jhdka	Construction of forest guards chowki at Mala Jhodka in a priority work in order to ensure effective protection on this sensitive pleatue.	4.00			3.33			
Total Non Recurring			1582.80			739.40			
Recurring (CSS)									

1	4.1.2 Establishing and Maintenance of existing patrolling camps and deployment of camp labors for patrolling	Anti poaching camps will be established at various locations in sensitive remote areas. Local laborers shall also be engaged temporarily at these camps.	0.75			0.25			
2	4.1.4 Establishing and maintenance of wireless	This money is proposed for purchase of accessories of wireless sets and its maintenance.	1.00			0.87			
3	4.2.2 Maintenance of Road network	The entire existing patrolling tracks spread over the entire reserve need be repaired/ maintained regularly. Tourism vehicles also ply over these tracks.	7.00			6.95			
4	4.2.3 Maintenance of bridges, dams, anicuts, earthen ponds etc.	Several Water harvesting structures like earthen ponds, anicuts, built in the reserve over period of time, have got damaged/ silted with the passage of time. These need be repaired/ desilted in order to revive their effective utility.	5.00			4.97			
5	4.2.4 Maintenance of fire line	For Maintaining the fire lines created in the past and to reduce incidence of fires	2.50			2.49			
6	4.2.5 Maintenance of Vehicles	For effective running and maintenance of the vehicles. There are 6 Gypsy, 1 Jeep, 4 Canter, 1 Tractor, 1 Camper & 8 Motor Cycle are used for protection and maintenance of the park.	9.00			9.00			
7	4.2.6 Maintenance of Buildings	All the buildings [Chowkis, Nakas, Range and FD Headquarters] constructed in the past need to be repaired, painted & maintained	5.00			5.00			
8	4.18 Other Important Activities	Office expenditure for DCF & CF Office	8.50			7.92			

9	4.1.5 Anti grazing activities	Illicit grazing in the reserve has always been a serious problem especially during monsoon period. To effectively counter this problem. Temporary camps are established with required facilities & local help.	1.00			0.69			
10	4.1.7 Deployment of Local work force for patrolling, surveillance of water holes etc.	Local people will be deployed on various chowkies to assist the field staff especially during patrolling, village/dera checkings etc.	1.00			0.98			
11	Rewards to informers	For strengthening Secret Information System and to motivate the staff budget is required.	0.25			0.07			
12	Legal Support	There are so many Litigations against the department. Money is required for contesting these cases & procure legal assistance.	0.50			0.12			
		Total Recurring (CSS)	41.50			39.31			
		GRAND TOTAL	1624.30			778.71			

YEAR 2010-11

Sr. No.		Item of work	Sanctioned			Actual Expenditure			Deviation, if any (give reasons)
			Amount (in lacs)	Quantity	Location	Amount (in lacs)	Quantity	Location	
Non-Recurring									
1	Relocation of villages	Relocation work	1432.65			604.176			
2	All India Field Directors Seminar	All India Field Directors Seminar	1.92			1.92			
3	4.1 Anti Poaching 4.1.1 Deployment of Anti Poaching squads	Purchase of Arms, ammunitions & repairs	0.10			0.10			

4	4.1.6 Deployment of Ex-army personnel/ Home Guards	Home guards will be deployed through out the year to strengthen the protection. These Home Guards will be deployed under various chowkies and nakas	53.00			51.67			
5	4.1.11 Procurement of field gear	For effective patrolling the field staff needs to be equipped with proper warm clothing , shoes & other devices etc.	2.00			2.00			
6	4.2.1 Construction of new chowkies	5. Construction of Barracks for flying squad.	3.00			2.99			
		7. Construction of wireless rooms at Boh, Phatya Khora, Bhagani & Bana locations	3.00			2.99			
		11. Construction of gate barrier and speed breakers to divert the heavy vehicular traffic on to the diversion road	1.00			0.89			
7	4.2.10 Procurement of equipments	Camera traps, Laptop Computer with Laser Printer for Field director and Intercom system for the office of the Dy. Conservator, Sariska Office.	2.00			1.92			
8	4.2.11 Construction of Bore well and purchase of Pipe (along with laying of pipe line) generator motor and other accessories.	Kundali Road, Bhensota & Phantya Khora are inviolate & ideal wild life habitats located inside the national park area of the reserve but are totally devoid of water. It is proposed to bring water in these prime areas through pipe lines connected to bore wells & natural reservoir. This will prove to be a mile stone in the management history of the reserve.	15.00			9.63			

9	4.3 Habitat improvement and water development	(a) Invasive spp. like Prosopis Juliflora, Cassia tora have caused mentionable damage to this critical tiger habitat by replacing palatable grass & other fodder spp. in prime tiger habitat of the reserve. These plants/trees need to be uprooted on top priority for habitat revival.	5.00			5.00			
		(b) Number of water holes spread over the entire reserve are filled with the help of diesel engines/Pipe Lines/Tractor tankers etc. Budget is required for this vital purpose which largely includes expenditure on purchase of Diesel /oil etc.	7.00			7.00			
10	4.4 Addressing man-animal conflict 4.4.1 Payments of compensation for	Cattle/humen damage by the carnivores in the villages situated in the proximity of the reserve is to be compensated as per the prescribed norms in order to avoid conflict with the villagers.	0.50			0.50			
11	4.4.2 Construction of new orthen water bodies	As per the verbal instructions from Sh. Rajesh Gopal, the Member Secretary, N.T.C.A., 3 water ponds have already been constructed on the water less plateau. This demand has been made in order to regularize the committed expenditure only.	5.00			4.87			
12	4.5 Co-existence agenda in buffer / fringe areas								
	4.5.1 Providing ecological viable livelihood for reducing their dependency on forest	Assistance on payment will be taken from youth of Bawaria/ Banjara & other Shikari communities in organizing raids/searches on deras/ houses & other outfits of Shikaris	0.25			0.16			

	4.5.2 Habitat supplement to wild animals moving out of Core area.	Conserving the forest areas through restorative inputs involving local people for providing habitat supplement to wild animals(including restoration of vacated villages/Guvadas like Bhagani, Kankwari,Umari etc.	3.00			2.97			
13	4.6 Rehabilitation package for traditional hunting tribes living around								
	4.7 Research and field equipment	1. 8 additional Radio Collar receivers & other related essential equipments are required to be purchased for effective research & monitoring of the reintroduced tigers in the reserve.	5.00			4.98			
		2. Budget is required for forensic examination of Visra & other vital parts of the scheduled animals in case of their un natural death.	0.05			0.05			
		3. Other equipment required for research unit (like Frizz for storing medicines etc.)	0.20			0.20			
		4. Purchase of Tele Inject tranquilizing gun with accessories and medicines.	3.00			0.00			
		5. Annual wild life census and monitoring of population	1.00			0.99			
		6. Purchase of POP and creation of PIPs for monitoring of present movement of Tiger / Leopard / Hyena and other wild cats.	0.50			0.50			
4.8 Staff development									
14	4.8.1 Specialized training in the use of GIS, anti poaching operations jurisprudence, wild life forensic etc.	Trainings will be organized for officers & front line staff on various protection & monitoring techniques	0.88			0.88			

15	4.11 Safeguard/ retrofitting measures in the interest of wild life conservation	(a) Purchase of Fire Fighting equipment including water pump and food/ water for fire fighting teams on spot. (b) Engaging labors for fire fighting & advance early burning.	1.00			1.00			
16	4.15 Project allowances field and office staff.	Project allowances would be given to the ministerial, field staff & officers of STR	12.00			9.80			
17	4.16 Staff welfare activities	(a) To purchase patrolling Kit for staff including ex-service men.	2.00			2.00			
		(d) Purchase of solar equipment for chowkis/ nakas with accessories including batteries	2.00			2.00			
		(e) Providing drinking water to staff at inaccessible chowkies through vehicular/animal transport	2.00			1.97			
18	4.17 Fostering Eco tourism in tiger reserve.	(b) Publicity Material	0.50			0.50			
		(c) Workshop & Seminar	4.25			4.25			
		(e) Celebration of Wildlife Week & other important days	1.00			1.00			
19	Installation of handpumps at forest guard chowkies for drinking water to the staff	Installation of hand pumps at F.G. chowkies for drinking water to the staff, is a priority work.	3.00			1.20			
20	Creation of new road (track)	In order to ensure effective management various sensitive & remote areas need to be frequently patrolled. New roads (tracks) are required to be constructed to achieve this important goal.	6.00			5.96			
21	Construction of forest Guard Chowki at Mala Jhdka	Construction of forest guards chowki at Mala Jhodka in a priority work in order to ensure effective protection on this sensitive pleatue.	4.00			3.33			
Total Non Recurring			1582.80			739.40			
Recurring (CSS)									

1	4.1.2 Establishing and Maintenance of existing patrolling camps and deployment of camp labors for patrolling	Anti poaching camps will be established at various locations in sensitive remote areas. Local laborers shall also be engaged temporarily at these camps.	0.75			0.25			
2	4.1.4 Establishing and maintenance of wireless	This money is proposed for purchase of accessories of wireless sets and its maintenance.	1.00			0.87			
3	4.2.2 Maintenance of Road network	The entire existing patrolling tracks spread over the entire reserve need be repaired/ maintained regularly. Tourism vehicles also ply over these tracks.	7.00			6.95			
4	4.2.3 Maintenance of bridges, dams, anicuts, earthen ponds etc.	Several Water harvesting structures like earthen ponds, anicuts, built in the reserve over period of time, have got damaged/ silted with the passage of time. These need be repaired/ desilted in order to revive their effective utility.	5.00			4.97			
5	4.2.4 Maintenance of fire line	For Maintaining the fire lines created in the past and to reduce incidence of fires	2.50			2.49			
6	4.2.5 Maintenance of Vehicles	For effective running and maintenance of the vehicles. There are 6 Gypsy, 1 Jeep, 4 Canter, 1 Tractor, 1 Camper & 8 Motor Cycle are used for protection and maintenance of the park.	9.00			9.00			
7	4.2.6 Maintenance of Buildings	All the buildings [Chowkis, Nakas, Range and FD Headquarters] constructed in the past need to be repaired, painted & maintained	5.00			5.00			
8	4.18 Other Important Activities	Office expenditure for DCF & CF Office	8.50			7.92			

9	4.1.5 Anti grazing activities	Illicit grazing in the reserve has always been a serious problem especially during monsoon period. To effectively counter this problem. Temporary camps are established with required facilities & local help.	1.00			0.69			
10	4.1.7 Deployment of Local work force for patrolling, surveillance of water holes etc.	Local people will be deployed on various chowkies to assist the field staff especially during patrolling, village/dera checkings etc.	1.00			0.98			
11	Rewards to informers	For strengthening Secret Information System and to motivate the staff budget is required.	0.25			0.07			
12	Legal Support	There are so many Litigations against the department. Money is required for contesting these cases & procure legal assistance.	0.50			0.12			
		Total Recurring (CSS)	41.50			39.31			
		GRAND TOTAL	1624.30			778.71			

YEAR 2011-12

Sr. No.	Item of work	Sanctioned			Actual Expenditure			Deviation, if any (give reasons)
		Amount (in lacs)	Quantity	Location	Amount (in lacs)	Quantity	Location	
1	Deployment of Ex-army personnel/ Home Guards	1.10			1.10			
2	Strengthening of infrastructure Construction of new chowkies	5. Completion of C.F. Office at Alwar	0.22			0.22		
		6. Construction of cattle impounding structures at Kalakari and Behram ka bas.	3.83			3.83		
		7. Providing night halting facility for patrolling staff & officers by adding a Toilet & bath room at existing chowkies.	1.83			1.83		

		8. a) Construction of gate barrier and speed breakers to divert the heavy vehicular traffic to Kushalgarh & Ghata Bandrol Road.	0.92			0.92			
		b) Construction of Gate near Kalakari Chowky to prevent poachers to enter kalakari valley.	0.92			0.92			
3	Procurement of equipments	Camera traps, Inkjet Printer & photocopier for the office of the Dy. Conservator, Sariska.	1.78			1.78			
4	Monitoring work of relocated tigers	tigers monitoring	0.15			0.15			
5	Habitat improvement and water development	(a) Eradication of invasive spp. like <i>Prosopis Juliflora</i> , <i>Adhatoda vassica</i> and <i>Lantana camera</i> . These have caused immense damage to this critical tiger habitat by replacing palatable grass & other fodder spp. These plants/trees need to be uprooted on top priority for habitat revival.	1.01			1.01			
		(b) Water holes spread over the entire reserve are filled with the help of diesel engines/Pipe Lines/ Tractor tankers etc. Budget is required for this vital purpose which largely includes expenditure on purchase of Diesel /oil etc.	1.42			1.42			
6	<u>Addressing man-animal conflict</u> <u>Payments of compensation</u>	Cattle/human damage by the carnivores in the villages situated in the proximity of the reserve has to be compensated as per the prescribed norms in order to avoid conflict with the villagers.	0.45			0.45			
	Co-existence agenda in buffer / fringe areas								
7	Providing ecological viable livelihood for reducing their dependency on forest	Assistance will be taken from youths of Bawaria/ Banjara & other Shikari communities in organizing raids/searches on deras/ houses & other outfits of Shikaris	0.50			0.50			
8	Habitat supplement to wild animals moving out of Core area.	1. Conserving the forest areas through restorative inputs involving local people for providing habitat supplement to wild animals (including restoration of vacated villages/ Guvadas like Bhagani, Kankwari, Umari, Dabli etc.	4.00			4.00			

9	Research and field equipment	1. 4 additional Radio Collar receivers & other related essential equipments are required to be purchased for effective research & monitoring of the reintroduced tigers in the reserve.	4.29			4.29			
		2. Forensic examination of Visra & other vital parts of the scheduled animals in case of their unnatural death.	0.01			0.01			
		3. Deep Freezer for keeping Carcass of important animals.	0.89			0.89			
		4. Purchase of Tele Inject tranquilizing gun with accessories and medicines.	3.00			3.00			
		5. Annual wild life census and monitoring of population	0.62			0.62			
10	Staff development								
11	Specialized training in the use of GIS, anti poaching operations, jurisprudence, wild life forensic etc.	Trainings will be organized for officers & front line staff on various protection & monitoring techniques	0.01			0.01			
12	Study tour	Exposure visits to other reserves in the country for front line staff & officers.	0.50			0.49			
13	Safeguard/ retrofitting measures in the interest of wild life conservation	(a) Purchase of Fire Fighting equipments including water pump and food/ water for fire fighting teams on spot. (b) Engaging labors for fire fighting & advance early burning.	1.00			0.99			
14	Project allowances field and office staff.	Project allowances will be given to the ministerial, field staff & officers of STR	0.96			0.96			
15	Staff welfare activities	(b) Installation of hand pumps at F.G. chowkies for drinking water to the staff.	2.00			2.00			
		(d) Providing drinking water to staff at inaccessible chowkies through vehicular/ animal transport	1.13			1.13			
16	Fostering Eco tourism in tiger reserve.	c) Workshop & Seminar	0.44			0.44			
		e) Celebration of Wildlife Week & other important days	0.08			0.08			
17	Interpretation center	Interpretation center	45.60			45.11			
18	Relocation of villages	Relocation work (Total allotment is Rs. 1463.65+600.00 lacs = 2063.65 but 266.44 lacs is allotted to APO 2011-12) so Rest amount in Relocation is Rs. 1797.21 lacs)	1797.21			1148.23			
Total			1875.87			1226.38			
<u>Recurring Items (CSS)</u>									

1	Establishing and Maintenance of existing patrolling camps and deployment of camp labors for patrolling	Anti poaching camps will be established at various locations in sensitive remote areas. Local laborers shall also be engaged temporarily at these camps.	0.27			0.27			
2	Maintenance of Road network	a) The existing patrolling tracks spread over the entire reserve need be repaired/ maintained regularly. Tourism vehicles also ply over these tracks.	0.17			0.17			
		b) Construction of cause way on roads for better movement in raining season.	2.50			2.50			
3	Maintenance of bridges, dams, anicuts, earthen ponds etc.	Several Water harvesting structures like earthen ponds, anicuts, built in the reserve over the period of time, have got damaged/ silted up with the passage of time. These need be repaired/ desilted in order to revive their effective utility.	0.30			0.30			
4	Maintenance of fire lines	For Maintaining the fire lines created in the past to reduce incidence of fires	1.17			1.17			
5	Maintenance of Vehicles	For effective running and maintenance of the vehicles. There are 6 Gypsies, 1 Jeep, 4 Canters, 1 Tractor, 1 Camper & 8 Motor Cycles used for protection and maintenance of the park.	0.44			0.44			
6	Maintenance of Buildings	All the buildings [Chowkis, Nakas, Range and FD Headquarters] constructed in the past need to be repaired, painted & maintained	1.52			1.52			
7	Other Important Activities	Office expenditure for CF, Dy. C.F. & Range Offices.	1.11			1.11			
8	Anti grazing activities	Illicit grazing in the reserve has always been a serious problem especially during monsoon period. To effectively counter this problem. Temporary camps are established with required facilities & local help.	1.00			1.00			
9	Deployment of Local work force for patrolling, surveillance of water holes etc.	Local people will be deployed on various chowkies to assist the field staff especially during patrolling, village/dera checking etc.	0.84			0.84			
10	Reward to informers	For strengthening Secret Information System and to motivate the staff this budget is required.	0.46			0.45			
11	Legal Support	There are so many Litigations against the department. Money is required for contesting these cases.	0.10			0.10			

12	Safeguard/ retrofitting measures in the interest of wild life conservation	Inoculation of cattle against diseases.	0.16			0.16			
13	Fostering Eco tourism in tiger reserve.	a) Land scaping, beautification and developing Eco-tourism facility at Sariska including improvement & updation of reception and Face Lifting of the ambiance of the entrance & surroundings.	0.01			0.01			
		b) Publicity Material	0.01			0.01			
Total			10.06			10.05			
New APO									
1	Deployment of Ex- army personnel/ Home Guards	Home guards will be deployed through out the year to strengthen the protection. These Home Guards will be deployed in various chowkies and nakas	67.60			67.58			
2	<u>Strengthening of infrastructure Construction of new chowkies</u>	Construction of forest guard chowky at Bakhatpura, Baldevgarh, Silibawdi, Kho to ensure effective protection of vulnerable places in the tiger reserve	16.00			15.99			
		residential facilities for the new required women forest guards	14.00			13.89			
		Construction of gate & barrier at thank you board Thanagazi & Dabkan for regulating heavy vehicular traffic.	6.00			5.98			
		Two rooms are required for central store at division h.q.	2.00			1.99			
3	Procurement of equipments	Camera traps, Inkjet Printer & photocopier for the office of the Dy. Conservator, Sariska.	5.00			5.00			
4	<u>Addressing man- animal conflict</u> <u>Payments of compensation</u>	Cattle/human damage by the carnivores in the villages situated in the proximity of the reserve has to be compensated as per the prescribed norms in order to avoid conflict with the villagers.	2.00			0.06			
5	Research and field equipment	2. Forensic examination of Visra & other vital parts of the scheduled animals in case of their unnatural death.	0.50			0.18			
		3. Deep Freezer for keeping Carcass of important animals.	0.50			0.28			
		5. Annual wild life census and monitoring of population	1.00			0.13			
		Purchase of POP, creation of PIPs for monitoring the movement of wild animals	0.50			0.50			

		Monitoring of re-introduced radio collared tigers in collaboration with WII including cost of hiring 5 Gypsies with POL and accessories	25.00			25.00			
6	Staff development								
7	Project allowances field and office staff.	Project allowances will be given to the ministerial, field staff & officers of STR	39.40			35.80			
8	Fostering Eco tourism in tiger reserve.	c) Workshop & Seminar	1.00			0			
		e) Celebration of Wildlife Week & other important days	0.50			0.24			
9		Publicity Material	1.00			0.51			
10	Organizing Vehicular patrolling by constituting squads	Five anti poaching squads with vehicle will be deployed for Anti Poaching at Range HQs & Division HQ. Two Rapid-action mobile parties at vulnerable/sensitive locations.	5.00			4.97			
11	Creation of water harvesting structures	Water is a limiting factor in the tiger reserve. To support the wild animals new water points are to be developed by laying pipe lines from – 1. Phatyakhora to Malajhodka-4.5 km 2. Baghera hodi to Bana-2 km 3. Baghera hodi to Kabri Johda-2 km 4. Kiraska kund to Patin-4 km 5. Douraka to Bheru ghati & Bhensota-4 km	30.00			30.00			
12		Construction of new earthen water bodies for drinking water facility to wild life in water deficit areas at Patya, Kaliradi, Bhramnath, Kalakeri ghati, Kalakeri Kua, Gopalpura etc.,	10.00			9.99			
13		Construction of bore wells and installation of generator to supply water in water holes at Devra, Doraka, Baghera odi, Kalakri	8.00			8.00			
14	Creation of wireless stations	For effective protection and management, new wireless sets and accessories are to be purchased (10 Fixed sets & 20 Hand sets)	5.00			5.00			
15	Map digitization facility for management planning	Demarcation of forest boundary as per directions of the C.E.C.	1.00			0.95			
16	Monitoring of tigers by WII- M.STRIPES	WII M.Stripes	27.05			27.05			
Total			268.05			259.09			
Recurring Items (CSS)									

1	Establishing and Maintenance of existing patrolling camps and deployment of camp labors for patrolling	Anti poaching camps will be established at various locations in sensitive remote areas. Local laborers shall also be engaged temporarily at these camps.	1.00			0.37			
2	Maintenance of Road network	a) The existing patrolling tracks spread over the entire reserve need be repaired/ maintained regularly. Tourism vehicles also ply over these tracks. b) Construction of cause way on roads for better movement in raining season.	10.00			9.88			
3	Maintenance of bridges, dams, anicuts, earthen ponds etc.	Several Water harvesting structures like earthen ponds, anicuts, built in the reserve over the period of time, have got damaged/ silted up with the passage of time. These need be repaired/ desilted in order to revive their effective utility.	5.00			5.00			
4	Maintenance of fire lines	For Maintaining the fire lines created in the past to reduce incidence of fires	4.00			4.00			
5	Maintenance of Vehicles	For effective running and maintenance of the vehicles. There are 6 Gypsies, 1 Jeep, 4 Canters, 1 Tractor, 1 Camper & 8 Motor Cycles used for protection and maintenance of the park.	10.00			9.97			
6	Maintenance of Buildings	All the buildings [Chowkis, Nakas, Range and FD Headquarters] constructed in the past need to be repaired, painted & maintained	5.00			4.58			
7	Anti grazing activities	Illicit grazing in the reserve has always been a serious problem especially during monsoon period. To effectively counter this problem. Temporary camps are established with required facilities & local help.	1.00			0.25			
8	Deployment of Local work force for patrolling, surveillance of water holes etc.	Local people will be deployed on various chowkies to assist the field staff especially during patrolling, village/dera checking etc.	0.50			0.23			
9	Reward to informers	For strengthening Secret Information System and to motivate the staff this budget is required.	0.25			0			
10	Legal Support	There are so many Litigations against the department. Money is required for contesting these cases.	0.50			0.29			
11	Creation of water harvesting structures	Deepening of wells at Kalakadi & Ghanka	1.00			0.99			

12	Safeguard/ retrofitting measures in the interest of wild life conservation	Inoculation of cattle against diseases.	1.00			0.88			
13	Establishing and maintenance of wireless	Repair and maintenance of wireless sets. Purchase of accessories, batteries etc.,	2.00			1.85			
14	Habitat improvement and water development	Eradication of invasive spp. Prosopis Juliflora, in Rotkyala- Sukola, Kalakadi- Katighati, Siliberi-Umari, Naharsati- Rotkyala, Bhagani Beat, Richunda, Bani Talvriksh, & Karnakabas areas.	10.00			10.00			
15	Staff development- Specialized training in the use of GIS, anti poaching operations, jurisprudence, wild life forensic etc.	Trainings of officers & front line staff on protection & monitoring techniques	0.50			0.06			
16	Study tour	Exposure visits of officers and front line staff to other reserves in the country.	0.25			0			
	<u>Co-existence agenda in buffer / fringe areas</u>								
17	Providing ecological viable livelihood for reducing their dependency on forest	To reduce dependency for fuel- wood on forest areas by providing gas connections at 50% subsidy to 1500 families in peripheral villages of STR.	7.50			0.25			
18	Staff welfare activities	Purchase of patrolling Kit for staff including work charge and ex-service men.	1.00			0			
19	-	Installation of hand pumps at F.G. chowkies for drinking water to the staff.	2.50			2.40			
20	-	Purchase of solar equipments for chaukis/ nakas with accessories including batteries	1.00			0			
21	-	Providing drinking water to staff at inaccessible chowkies through vehicular/ animal transport	1.00			0.98			
	-	Total allotment is 65.00 lacs but state share release by state gov. is 52.00 lacs	65.00			51.98			
		GRAND TOTAL	2218.98			1547.50			

YEAR 2012-13

Sr. No		Sanctioned			Actual Expenditure			Deviation, if any (give reasons)
		Amount (in lacs)	Quantity	Location	Amount (in lacs)	Quantity	Location	
Non-Recurring (Unspent)								
1	Relocation of villages	670.99			670.99			
2	Interpretation Center	0.49			0.49			
	Total (Non-Recurring)	671.48			671.48			
Non-Recurring (New)								
1	Organizing Vehicular patrolling by constituting squads	5.50			5.50			
3	Strengthening of infrastructure Construction of new chowkies	8.00			7.64			
4	Women forest guard quarters	4.00			4.00			
5	Habitat Improvement Creation of water holes pinch period	15.91			12.17			
7	construction of earthen bodies	10.00			10.00			
9	Procurement of equipments	3.00			3.00			
10	Map digitization facility for management planning	1.00			1.00			
11	Addressing man-animal conflict Payments of compensation	1.00			0.84			
17	Project allowances field and office staff.	17.50			18.17			
2	Monitoring of Reintroduced Tigers Phase IV	7.50			6.82			
	Total (Non-Recurring)	73.41			69.14			
8	Construction of Interpretation Centre	11.40			11.33			
17	Relocation of villages (630+449.177)	1079.17 7			627.14			
	Total (Non-Recurring)	1090.58			638.47			
	Grand Total (Non-Recurring)	1835.47			1379.09			
Recurring Items (CSS)								
1	Establishing and Maintenance of existing patrolling camps and deployment of camp labours for patrolling	0.50	-	-	0.50	-	-	-
2	Establishing and maintenance of wireless	2.00	-	-	2.00	-	-	-
3	Maintenance of Road network	10.00	-	-	10.00	-	-	-
4	Maintenance of bridges, dams, anicuts, earthen ponds etc.	5.00	-	-	0.00	-	-	-

5	Maintenance of fire lines	3.75	-	-	3.75	-	-	-
6	Maintenance of Vehicles	10.00	-	-	9.99	-	-	-
7	Maintenance of Buildings	5.00	-	-	4.99	-	-	-
8	Anti grazing activities	0.50	-	-	0.50	-	-	-
9	Deployment of Local work force for patrolling, surveillance of water holes etc.	0.50	-	-	0.00	-	-	-
10	Reward to informers	0.25	-	-	0.08	-	-	-
11	Legal Support	0.50	-	-	0.42	-	-	-
12	Habitat improvement and weed eradication	10.00	-	-	4.00	-	-	-
13	Specialized training in the use of GIS, anti poaching operations, jurisprudence, wild life forensic etc.	0.50	-	-	0.23	-	-	-
14	Study tour	0.50	-	-	0	-	-	-
15	Vaccination of cattle	1.00	-	-	0	-	-	-
18	<u>Staff welfare activity</u> Installation of hand pumps	2.50	-	-	0	-	-	-
19	<u>Installation of wireless tower</u> Purchase of solar equipments	1.00	-	-	0	-	-	-
13	Forensic examination	0.125	-	-	0.05	-	-	-
14	Wildlife census	0.25	-	-	0.25	-	-	-
18	Fostering Eco tourism in tiger reserve.	0.75	-	-	0	-	-	-
19	Publicity	0.25	-	-	0.25	-	-	-
20	Wildlife week	0.25	-	-	0.10	-	-	-
30	Co-existence agenda in buffer / fringe areas Nature camp for 100 students	1.50	-	-	0	-	-	-
2	Deployment of Home Guards/EDC personnel	32.50	-	-	31.65	-	-	-
8	Creation of wireless stations	2.50	-	-	2.50	-	-	-
	Total (Recurring) CSS 50%	91.625			71.26			
	GRAND TOTAL	1927.092			1450.35			

YEAR 2013-14

Sr. No.		Sanctioned			Actual Expenditure			Deviation, if any (give reasons)
		Amount (in lacs)	Quantity	Location	Amount (in lacs)	Quantity	Location	
Non-Recurring (Unspent)								
1	Relocation of villages	394.61			347.46			
2	Construction of Interpretation Centre	0.07			0.07			
3	Strengthening of infrastructure Construction of new chowkies	0.36			0.36			
4	Habitat Improvement Creation of water holes pinch period	3.74			3.74			
	Total Non-Recurring (Unspent)	398.78			351.63			
Recurring (CSS) (Unspent)								
1	Maintenance of bridges, dams, anicuts, earthen ponds etc.	5.00			5.00			
2	Deployment of Local work force for patrolling, surveillance of water holes etc.	0.50			0.50			
3	Habitat improvement and weed eradication	6.00			6.00			
4	Vaccination of cattle	1.00						
5	<u>Staff welfare activity</u> Installation of hand pumps	2.50			2.50			
6	Fostering Eco tourism in tiger reserve.	0.75			0.47			
7	Deployment of Home Guards/EDC personnel	0.85			0.85			
	Total Recurring CSS (unspent) 50%	16.60			15.32			
Non-Recurring (New)								
1	Organizing Vehicular patrolling by constituting squads	20.00			8.46			
2	Deployment of Home Guards/EDC personnel	119.00			106.56			
3	Strengthening of infrastructure- Construction of new chowkies	16.00			15.81			
4	One Forest Guard & Two Women forest guard quarters	8.00			7.44			
5	Creation of wireless stations	5.00			4.11			
6	Procurement of equipments	3.00			0.43			
7	Map digitization facility for management planning	5.00			0.13			
8	Addressing man-animal conflict Payments of compensation	0.50			0.27			
9	Forensic examination	0.10			0			
10	Purchase of plaster of paris	0.25			0.25			

11	Phase IV monitoring	20.00			19.73			
12	Co-existence agenda in fringe areas	2.00			0			
13	Project Allowance	20.16			19.67			
	Total Non-Recurring (New)	219.01			182.86			
	Grand Total Non-Recurring	617.79			534.49			
Recurring (New)								
1	Establishing and Maintenance of existing patrolling camps and deployment of camp labours for patrolling	1.00			0.75			
2	Establishing and maintenance of wireless	2.50			2.50			
3	Maintenance of Road network	15.00			13.02			
4	Maintenance of fire lines	3.75			3.53			
5	Maintenance of Vehicles	11.00			10.95			
6	Maintenance of Buildings	5.00			4.94			
7	Anti grazing activities	1.00			0.71			
8	Reward to informers	0.10			0			
9	Legal Support	0.50			0.47			
10	Habitat improvement and weed eradication	10.00			9.92			
11	Capacity building	0.50			0.50			
12	Staff welfare activities	1.50			0.96			
13	<u>Staff welfare activity</u> Installation of hand pumps	1.50			0.20			
14	<u>Installation of wireless tower</u> Purchase of solar equipments	1.00			0.98			
15	Improvement of existing tar roads	15.00			13.21			
	Total Recurring (New) CSS 50%	69.35			62.64			
	Grand Total Recurring	85.95			77.96			
	Grand Total	703.74			612.45			

Distance of Mining leases from Critical Tiger Habiats & GPS location

sr no.	Lease Holder	ML.No.	Point	Latitude			Longitude			Distance from forest	Area (Ha.)
				Deg	Min	Sec	Deg	Min	Sec		
1	Mansing Meena	261/06	A	27	12	76.8	76	23	79.4	94 mtr.	1.24
			B	27	12	82.8	76	23	77.1		
			C	27	12	81.4	76	23	71		
			D	27	12	76.1	76	23	71.5		
2	Bhagwan das mangal	38/98	A	27	12	74.3	76	23	61.6	105 mtr.	1
			B	27	12	70.3	76	23	59.9		
			C	27	12	70.5	76	23	55		
			D	27	12	75.2	76	23	54		
3	Pradeep parik	148/85	A	27	12	76.8	76	23	49.1	204 mtr.	1
			B	27	12	70.9	76	23	48.3		
			C	27	12	71.8	76	23	42.1		
			D	27	12	77.1	76	23	43.3		
4	M/S Khaitan minerals	310/88	A	27	12	73	76	23	39.4	70 mtr.	1
5	M/S Yash marble-II marble-I	27/97	A	27	11	64.2	76	23	66.7	226 mtr.	1
			B	27	11	66.4	76	23	73.9		
			C	27	11	57.9	76	23	78.1		
			D	27	11	55.5	76	23	72.2		
6	M/S Yash marble-II marble-II	27/97	A	27	11	49.7	76	23	84.2	257 mtr.	1
			B	27	11	42.6	76	23	87.1		
			C	27	11	38.5	76	23	78.5		
			D								
7	M/S Ramnarayan & Bro.	46/38	A	27	11	57.9	76	23	59.8	550 mtr.	1
			B	27	11	56.9	76	23	53.9		
			C	27	11	61.2	76	23	52.5		
			D	27	11	63.6	76	23	58		

8	M/S Ramnarayan & Bro.	16/97	A	27	11	55.5	76	23	72.2	640 mtr.	1
			B	27	11	53.5	76	23	65.8		
			C	27	11	48.7	76	23	68.4		
			D	27	11	51	76	23	74.4		
9	M/S Ramnarayan & Bro.	1158/51	A	27	11	70.6	76	23	64.5	450 mtr.	1
			B	27	11	71.1	76	23	70.5		
			C	27	11	66.1	76	23	70.9		
			D	27	11	65.7	76	23	64.5		
10	Shri Sunil Goyal	17/97	A	27	11	58.4	76	23	63.5	400 mtr.	1
			B	27	11	60	76	23	68.5		
			C	27	11	55.5	76	23	72.2		
			D	27	11	53.3	76	23	65.8		
11	M/S Khanij Udyog	64/97	A	27	11	59.7	76	23	66.2	460 mtr.	1
			B	27	11	65.2	76	23	63.8		
			C	27	11	57.9	76	23	59.8		
			D	27	11	63.6	76	23	58		
12	M/S Rajasthan minerals	002/96	A	27	11	65.2	76	23	63.8	560 mtr.	1
			B	27	11	67.9	76	23	55.7		
			C	27	11	63.6	76	23	58		
			D								
13	M/S Shri Ram minerals	246/85 1/96 R	A	27	11	61.2	76	23	52.5	250 mtr.	1
			B	27	11	65.8	76	23	49.3		
			C	27	11	67.9	76	23	55.7		
			D	27	11	63.6	76	23	58		
14	M/S Shri Ram minerals	55/97	A	27	11	44	76	23	64.9	430 mtr.	1
			B	27	11	41.8	76	23	59.1		
			C	27	11	38.4	76	23	59.7		
			D	27	11	39.7	76	23	66.6		
15	M/S Granito marmo Tiles	2092/86	A	27	11	38.4	76	23	59.1	450 mtr.	1
			B	27	11	32.5	76	23	61.3		
			C	27	11	32.7	76	23	68.9		
			D	27	11	39.7	76	23	66.6		

M/S Marble mining co.										
16	130/97	A	27	11	44	76	23	64.9	280 mtr.	1
		B	27	11	39.7	76	23	66.6		
		C	27	11	40.8	76	23	71.6		
		D	27	11	46	76	23	69.6		
M/S Marble mining co.										
17	187/02	A	27	11	43.1	76	23	77	350 mtr.	1
M/S Sruti marmo pvt.										
18	79/97	A	27	11	53.3	76	23	5.5	70 mtr.	1
M/S R.N.B marbles										
19	18/2001	A	27	11	45.8	76	23	16.3	240 mtr.	1
M/S Sruti marmo pvt.										
20	80/97	A	27	11	45.7	76	23	15.9	233 mtr.	1
Shri Pramod kumar										
21	123/88	A	27	11	73.9	76	23	14.7	37 mtr.	1
Shri Mahesh Kumar Goyal										
22	40/97	A	27	11	68.8	76	23	18.1	121 mtr.	1
Smt. Maya Goyal										
23	922/88	A	27	11	64.4	76	23	20.4	210 mtr.	1
Smt.Sushma goyal										
24	34/97	A	27	11	59.9	76	23	23.7	310 mtr.	1
Smt.Sushma goyal										
25	924/88	A	27	11	67.9	76	23	27.5	255 mtr.	1
Shri Mahesh Kumar Goyal										
26	54/2002	A	27	11	93.4	76	23	28.4	5 mtr.	4
Shri Mahesh Kumar Goyal										
27	56/2002	A	27	11	93.4	76	23	28.4	188 mtr.	4
Shri Mahadev prasad meena										
28	33/96	A	27	11	82.6	76	23	30	203 mtr.	1
Shri Jagdish meena										
29	500/03	A	27	11	76.4	76	23	37.2	350 mtr.	4

30	Shri Ashok Gupta	267/88	A	27	11	73.3	76	23	23.4	175 mtr.	1
31	Shri Radheshyam gupta	51/96	A	27	11	73.7	76	23	39.6	350 mtr.	1
32	Smt. Santosh Sharma	923/88	A	27	11	73.7	76	23	35.2	300 mtr.	1
33	Shri Dwarka prasad meena	35/97	A	27	11	67.5	76	23	41.3	400 mtr.	1
34	Shri Deepak kumar gupta	212/88	A	27	11	73.7	76	23	46.8	500 mtr.	1
35	Smt. Sushila Mishra	90/98	A	27	11	73.6	76	23	52.2	300 mtr.	1
36	Smt.Usha Sharma	45/97	A	27	11	76.5	76	23	57.5	225 mtr.	1
37	Shri Chhagan lal acharya	118/02	A	27	11	76.6	76	23	55.6	256 mtr.	1
38	Smt.Manju Sharma	133/04	A	27	11	80.6	76	23	63.4	107 mtr.	4
39	Shri Ramphool meena	280/06	A	27	11	55.6	76	23	39.8	500 mtr.	0.71
40	Shri Bhagirath meena	32/96	A	27	11	55.6	76	23	48.2	430 mtr.	1
41	Shri Indra Gupta	966/88	A	27	11	61.9	76	23	52.6	375 mtr.	1
42	Shri Ramphool meena	280/06	A	27	11	55.6	76	23	39.8	475 mtr.	0.85
43	Shri Chhagan acharya	118/02	A	27	11	43.4	76	23	28.8	450mtr.	
44	Shri Matadeen Sharma	114/02	A	27	12	13.1	76	23	47.6	109 mtr.	4
45	Shri Himmat singh	96/2002	A	27	12	10.5	76	23	23.8	70 mtr.	4

46	Shri Rajesh khanna	372/88	A	27	12	15.4	76	23	20.4	3 mtr.	1
47	Smt. Rajbala Jain	59/07	A	27	11	99.6	76	23	17.3	1 mtr.	4
48	Shri Mahendra rao	53/02	A	27	11	93.5	76	23	41.2	250 mtr.	4
49	Shri Rajendra Agarwal	39/99	A	27	11	66.8	76	22	41.9	480 mtr.	1
50	Shri Rajkumar Agarwal	73/87	A	27	11	43.4	76	23	28.8	600 mtr.	1
51	Shri Hanuman prasad sharma	17/96	A	27	11	30.1	76	24	34.4	500 tr.	1
52	Shri Premkumar /Mangturam Khandewal	121/2004		27	8	20.8	76	23	1	86mtr.	4
53	Shri Kamal kumar meena	334/2009	A	27	9	48.4	76	24	58.2	292mtr	
54	K.K.Marble	Apr-00	A	27	11	39.7	76	26	46.2	200mtr.	2
55	Shri Naresh kumar vashisth	73/06	A	27	11	40.7	76	26	44.6	200mtr.	1
56	Jaypraksh rama marble	38/99	A	27	12	14.3	76	25	17.8	500mtr.	1
57	Vishv marble	66/96	A	27	12	8.1	76	26	7.6	500mtr.	1
58	Ranjit singh/Bhawar	120/2007	A	27	12	49.5	76	24	42.7	300mtr	2
59	Shri Babulal meena	105/2001	A	27	12	57	76	24	35.7	350mtr	1
60	K.R.Marble	106/2001	A	27	12	57.7	76	24	23.3	400mtr	2
61	Shri Neeraj marble	114/2000	A	27	13	3.1	76	24	34.5	400mtr	2

Mines Near Jamwa Ramgarh Sanctuary (Buffer of STR)

Anshul parik S/o sh. Akhlesh narayan parik										
1		273/99®	A	27	5	13	76	13	14	150mtr
			B	27	5	9	76	11	13.03	
			C	27	5	9	76	11	16.6	
			D	27	5	12.9	76	11	17.1	
2	Anshul parik	46/95	A	27	5	9	76	11	16.6	175mtr
			B	27	5	8.3	76	11	0.2	
			C	27	5	13.1	76	11	19.9	
			D	27	5	12.9	76	11	17.1	
3	Balaji mines	Sep-95	A	27	4	47.2	76	11	8.9	250mtr
			B	27	4	44.5	76	11	7.1	
			C	27	4	43.6	76	11	9.5	
			D	27	4	46.1	76	11	11.1	
4	Balaji mines	Oct-95	A	27	4	43.3	76	11	11.3	300mtr
			B	27	4	41.8	76	11	11.2	
			C	27	4	41.4	76	11	12	
			D	27	4	41.8	76	11	13.2	
Yashdeep marbles										
5		71/1995	A	27	5	9	76	11	12	150mtr
			B	27	5	5.9	76	11	11.8	
			C	27	5	6.9	76	11	15.6	
			D	27	5	7.3	76	11	15.8	
6	Shree marbles	280/1994	A	27	4	46	76	11	5.4	300mtr
			B	27	4	49.2	76	11	5.1	
			C	27	4	46	76	11	1.9	
			D	27	4	49.4	76	11	2.9	
Vardhman marbles										
7		191/96	A	27	4	45.3	76	11	5.7	350mtr
			B	27	4	47.9	76	11	5.5	
			C	27	4	45.4	76	11	8.1	
			D	27	4	47.3	76	11	8.7	
8	Andhi marbles	May-89	A	27	4	58.9	76	10	47.6	150mtr
			B	27	4	36.3	76	10	47.6	
			C	27	4	52.6	76	11	14.1	
			D	27	4	56.6	76	11	14.9	

9	Arpit marbles	72/2001	A	27	4	46.4	76	10	49.4	200mtr
			B	27	4	48.9	76	10	49	
			C	27	4	49.7	76	10	53.6	
			D	27	4	45.8	76	10	55.4	
10	Arpit marbles	44/94	A	27	4	48.7	76	10	55.7	300mtr
			B	27	4	49.1	76	10	57.1	
			C	27	4	47.5	76	10	55.8	
			D	27	4	41.2	76	10	59.9	
11	Arpit marbles	258/92	A	27	4	46.1	76	10	56.3	400mtr
			B	27	4	45.1	76	10	2.1	
			C	27	4	40.1	76	10	57.7	
			D	27	4	49.7	76	10	57.6	
12	Premnath Bansal & Company	99/86 67/96®	A	27	5	12.3	76	11	6.2	300mtr
			B	27	5	11.9	76	11	2.9	
			C	27	5	8.8	76	11	3	
			D	27	5	6.7	76	11	7.2	
13	Shri Kamal kishor khetan	82/87 130/08®	A	27	5	12.1	76	11	11.7	150mtr
			B	27	5	15.4	76	11	12.3	
			C	27	5	12.3	76	11	6.2	
			D	27	5	15.4	76	11	8.1	
14	Jagdish prasad khetan	102/86	A	27	5	9	76	11	13.03	175mtr
			B	27	5	13	76	13	14	
			C	27	5	9	76	11	12	
			D	27	5	12.1	76	11	11.7	
15	Sanjay kumar Gupta	175/95	A	27	5	12.3	76	11	6.2	200mtr
			B	27	5	6.7	76	11	7.2	
			C	27	5	8.9	76	11	9.6	
			D	27	5	12.2	76	11	10	
16	Shri Krishan Bihari Mathur	Apr-06	A	27	5	0.3	76	11	12.1	100mtr
			B	27	4	56.1	76	11	11.7	
			C	27	4	56	76	11	14.3	
			D	27	5	0.5	76	11	15.3	
17	Smt. Magan Devi	105/2001	A	27	5	5.4	76	12	19	100mtr
			B	27	5	2.8	76	12	20.6	

			C	27	5	2.3	76	12	17.8	
			D	27	5	5.1	76	12	17.1	
18	Agarwal marble center Pvt.Ltd.	69/93	A	27	5	11.9	76	10	52.6	300mtr
			B	27	5	10.5	76	10	53.2	
			C	27	5	12.3	76	11	6.3	
			D	27	5	11.9	76	11	2.9	
19	Agarwal marble center Pvt.Ltd.	70/93	A	27	5	6.8	76	10	53.1	200mtr
			B	27	5	10.7	76	10	55.3	
			C	27	5	12.5	76	10	58.7	
			D	27	5	9.5	76	10	56.4	
20	Agarwal marble craft Pvt Ltd.	53/2002	A	27	5	12.2	76	10	59.2	250mtr
			B	27	5	12.5	76	10	57.6	
			C	27	5	15.1	76	10	13.5	
			D	27	5	11.3	76	10	13.7	
21	M/S Ridhi Sidhi Marble	311/92	A	27	5	8.7	76	10	58.1	275mtr
			B	27	5	7.6	76	10	58.5	
			C	27	5	7.9	76	10	58.9	
			D	27	5	8.5	76	10	57.9	
22	M/S Ridhi Sidhi Marble	518/90	A	27	5	7.9	76	10	59	300mtr
			B	27	5	8.1	76	10	58.4	
			C	27	5	7.3	76	10	54.4	
			D	27	5	7.6	76	10	56.8	
23	Gomati ninerals & marble Pvt. Ltd.	138/96	A	27	5	13.9	76	11	11.8	200mtr
			B	27	5	13.1	76	11	13.8	
			C	27	5	14.9	76	11	13.6	
			D	27	5	15.5	76	11	12.1	
24	Jaipur minerals syndicate Pvt.Ltd.		A	27	6	24.7	76	14	45.8	100mtr
			B	27	6	21.3	76	14	49.7	
			C	27	6	13	76	14	45.9	
			D	27	6	24.7	76	14	40.3	

Tiger & Panther cases in different courts

(a) Tiger Cases

S.No.	FIR Number/ Date/ Range/ Naka	Details of FIR	Detail of Punishment	Name of wanted offenders as per FIR	Name of wanted offenders as per investigation
1	47-37/05 dated 24-3-05, Sariska, Sadar Sariska	Poaching of Tiger in beat Haripura in July, 2004, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 51 against Kalya S/o Ladya, Pappu urf Pratap s/o Ladia Bawaria	In ACJM-2 , Alwar in case No-23/310/3106 compliant file against 1. Balya S/o Ladya R/o Malvas 2. Hanuman S/o Jagdish Bawaria 3. Kalya S/o Ladya Bawaria R/o Malvas 4. Pappu urf Pratap s/o Ladya Bawaria 5. Abla Banjara R/o Nangal 6. Ramu Koli R/o Garh 7. Juhru S/o Subba R/o Khareda 8. Basir S/o Juhru 9. Tayeb S/o Subba 10. Ramjan R/o Khareda 11. Jeevan Das Kalbelia R/o Panipat (Haryana). The case was decided on 28.4.12 awarded punishment of 5 years imprisonment and Rs. 10000 penalty to Kalya S/o Ladya.	Pappu urf Pratap s/o Ladia Bawaria, Res- Malwas, PS-Nangalrajawatan, distt-Dausa	1 Abla Banjara 2 Ramjan R/o Khareda (Balya s/o Ladya jumped bail and is absconding)
2	48-32/05 dated 30.3.05 Sariska, Sadar Sariska	Poaching of Tiger in beat Kankwari, 7 months earlier , case section 9, 27, 31, 39, 48A, 49 A , 49 B, 51 against Hanuman S/o Jagdish Bawaria R/o Sirjoli Buj, Kalya S/o Ladya R/o Malvas, Pholya S/o Sonya Bawaria R/o Salota, Raju urf Nortya S/o Pholya R/o Salota, Pappu urf Pratap s/o Ladia Bawaria	In ACJM Rajgarh in case No-59/2009(108/06) filed against 1 Hanuman S/o Jagdish Bawaria R/o Sirjoli Buj, 2 Kalya S/o Ladya R/o Malvas,3 Ramkarn S/o Dayal Bawaria R/o Kaledi, 4 Ralla S/o Alladhin Meo R/o Baleta, 5 Phoolya S/o Sonya Bawaria R/o Salota, 6 Raju urf Nortya S/o Pholya R/o Salota,7 Pappu urf Rampratap S/o Ladya Bawaria R/o Malvas,8 Balya S/o Ladya Bawaria R/o Malvas, 9 Gopal Meena R/o Lankas, 10 Jeevan Das Kalbelia R/o Panipat (Haryana), 11 Smt Kamla W/o Jeevan Das R/o Samalka,12 Basira S/o Tatti Meo R/o Khareda,13 Tayeb S/o Subba Meo R/o Khareda decided on	1. Pappu urf Pratap s/o Ladia Bawaria, Res- Malwas, PS-Nangalrajawatan, distt-Dausa 2. Phooliya s/o Sonia Bawaria Res- Shaluta, distt-Dausa	1. Balya s/o Ladia Bawaria, Res-Malwas PS-Nangalrajawatan, distt-Dausa 2 Roshan s/o Sadia Bawaria 3 Bablu s/o Phooliya Bawaria

			21.7.12, acquitta of Kalya S/o Ladya, Ralla S/o Alladhin, Basira S/o Tatti Meo, Tayeb S/o Subba Meo Appeal filed in ADJ Rajgarh.	
3	52-45/05 dated 24.6.05, Akbarpur, Baleta	Poaching of Tiger in beat Rotekyala, Harsawal Paj June , 2004, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Shammi S/o Dalla Meo R/o Bhandodi 2. Manphool S/o Behada Meo R/o Bhandodi 3. Nuru S/o Khera Meo R/o Bhandodi 4. Hazari S/o Shivji Jogi R/o Khareda 5. Ralla S/o Alladin Meo R/o Baleta 6. Darra S/o Ramsahaya Balai R/o Khareda 7. Jeevandas S/o Shyochand R/o Namunda Samalka (Haryana)	In ACJM-1 , Alwar in case No-187/05 filed against 1. Juhru S/o Subba Meo R/o Khareda 2. Manphool S/o Behada Meo R/o Bhandodi 3. Darra S/o Ramsahaya Balai R/o Khareda 4. Hazari S/o Shivji Jogi R/o Khareda 5. Ralla S/o Alladin Meo R/o Baleta 6. Basira S/o Mohar Singh Jogi R/o Kharda ka bas 7. Jeevandas S/o Shyochand R/o Namunda Samalka (Haryana) 8. Shammi S/o Dalla Meo R/o Bhandodi 9. Nuru S/o Khera Meo R/o Bhandodi 10. Ramjan S/o Subba Meo R/o Kharda 11. Tayeb S/o Subba Meo R/o Kharda 12. Rajjak S/o Mehtab Meo R/o Khareda 13. Nawab S/o Hariya Meo R/o Khareda 14. Chota S/o Ranjeeta Gurjar R/o Umri 15. Nawab S/o Majid Mirasi R/o Khareda decided on 24.1.13 awarded punishment of 7 years imprisonment and Rs. 50000 penalty to 1. Juhru S/o Subba Meo, 2. Ralla S/o Alladin Meo 3. Basira S/o Mohar Singh Jogi 4. Ramjan S/o Subba Meo 5. Tayeb S/o Subba Meo 6. Chota S/o Ranjeeta Gurjar 7. Nawab S/o Majid Mirasi and 4 offenders Manphool S/o Behada Meo, Darra S/o Ramsahaya Balai, Hazari S/o Shivji Jogi, Shammi S/o Dalla Meo acquitted. One offender Sh. Rajjak S/o Mehtab R/o Khareda died.	-

4	64-14/05 dated 27-6-05 Akbarpur, Baleta	Poaching of Tiger in beat in Rotekyala, Suli ka Nallah June , 2004, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Shammi S/o Dalla Meo R/o Bhandodi 2. Manphool S/o Behada Meo R/o Bhandodi 3. Rajjak S/o Mehtab Meo R/o Khareda 4. Hazari S/o Shivji Jogi R/o Khareda 5. Darra S/o Ramsahaya Balai R/o Khareda	In ACJM-1 , Alwar in case N0-185/05 decided on 25.6.11 filed against 1. Juhru S/o Subba Meo R/o Khareda 2. Manphool S/o Behada Meo R/o Bhandodi 3. Hazari S/o Shivji Jogi R/o Khareda 4. Darra S/o Ramsahaya Balai R/o Khareda 5. Shammi S/o Dalla Meo R/o Bhandodi 6. Rajjak S/o Mehtab Meo R/o Khareda 7. Ramjan S/o Subba Meo R/o Khareda 8. Fazru S/o Subba Meo R/o Khareda 9. Umardeen S/o Amichand Meo R/o Baleta 10. Sukka S/o Chandi Meo R/o Baleta. 11. Heera S/o Hardeva Khatik R/o Thanagazi Awarded of punishment to 1. Juhru S/o Subba Meo 2. Ramjan S/o Subba Meo 3. Hazari S/o Shivji Jogi 4. Darra S/o Ramsahaya Balai 5. Fazru S/o Subba Meo 6. Umardeen S/o Amichand Meo 7. Sukka S/o Chandi Meo 8. Heera S/o Hardeva Khatik seven years imprisonment and Rs. 50000 penalty. Acquital of Manphool S/o Behadya & Shammi S/o Dalla Meo. one offender Rajjak S/o Mehtab Meo died.	-	Jassu Kalbeliya
5	64-15/05 Dated 27.6.05 Naka Baleta, Beat Rotkyala, Akbarpur	Poaching of Tiger in beat Rotekyala, Amanwali paj in 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria R/o Malvas 2. Surtya S/o Bhakhtawar R/o Samlaka (Panipat) 3. Darra S/o	In ACJM-2 , Alwar in case N0-23/1318/06 decided on 2.8.2011 filed against 1. Juhru S/o Subba Meo R/o Khareda 2. Kalya S/o Ladya Bawaria R/o Malvas 3. Manphool S/o Behada Meo R/o Bhandodi 4. Darra S/o Ramsahaya Balai R/o Khareda 5. Hazari S/o Shivji Jogi R/o Khareda 6. Rajjak S/o Mehtab Meo R/o Khareda 7. Nuru S/o Khera Meo R/o		Deena s/o Mamala Meo R/o Bhandodi

		<p>Ramsahaya Balai R/o Khareda</p> <p>4. Hazari S/o Shivji Jogi R/o Khareda</p> <p>5. Rajjak S/o Mehtab Meo R/o Khareda</p> <p>6. Nuru S/o Khera Meo R/o Bhandodi</p> <p>7. Manphool S/o Behada Meo R/o Bhandodi</p> <p>8. Shammi S/o Dalla Meo R/o Bhandodi</p>	<p>Bhandodi</p> <p>8. Surtya S/o Bhakhtawar R/o Samlaka</p> <p>9. Shammi S/o Dalla Meo R/o Bhandodi</p> <p>10. Ramjan S/o Subba Meo R/o Kharda</p> <p>11. Tayeb S/o Subba Meo R/o Kharda</p> <p>12. Nuru S/o Mohmmad Kha R/o Dabli</p> <p>13. Deena Meo R/o Bhandodi</p> <p>Awarded punishment of 5 years imprisonment and 10000 Rs. penalty to</p> <p>1. Juhru S/o Subba Meo</p> <p>2. Ramjan S/o Subba Meo</p> <p>3. Tayeb S/o Subba Meo</p> <p>4. Kalya S/o Ladya Bawaria</p> <p>5. Nuru S/o Mohmmad Khan</p> <p>Acquital of Darra S/o Ramsahai Balai, Hazari S/o Shivji Jogi, Manphool S/o Bhedya Meo. In this case on 16.06.11 Shammi S/o Dalla Meo was acquitted. On 11.12.13 Jeevan Das S/o Shyochand Bawaria was acquitted. Appeal against this order to be filed in High Court Jaipur.</p>		
6	59-37/05 dated 15.9-05 Tehla	<p>Poaching of Tiger in beat Nandu, Jungle sona in 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against</p> <p>1. Prahlad S/o Badri Bawaria</p> <p>2. Badri Bawaria</p>	<p>Case filed in ACJM Rajgarh on 08.03.13 against Badri urf Salma S/o Bhurya urf Bajranga Bawaria R/o Rudawal.</p>		
7	43-41/05 dated 15-9-05, Tehla	<p>Poaching of Tiger in Loharli and Kharali forest area in 2003 case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against</p> <p>1. Prahlad S/o Badri Bawaria</p> <p>2. Badri Bawaria</p>	<p>In ACJM, Rajgarh in case N0-22/64/2009 filed against</p> <p>1. Prahlad S/o Badri Bawaria decided on 6.4.2011. Acuittal of shri Prahlad Bawaria. Appeal no 11/2011 filed dated 5.8.11 in ADJ Rajgarh. Appeal no 11/2011 decided on 18.11.13 acquital of Badri Bawaria. Appeal to be filed against this decision in High Court Jaipur.</p>		
8	60-03/05 dated 26-10-05, Tehla	<p>Poaching of Tiger in Ajabgarh sagar forest area in</p>	<p>Case No 23/369/06 filed in ACJM Thanagazi against</p> <p>1. Kalya Bawaria S/o Ladya</p>		<p>1. Gyarsa Res: Kaleda, Pratapgarh, Alwar</p>

		2003 case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against Kalya S/o Ladya Bawaria R/o Malvas	Bawaria R/o Malvas 2. Kailash S/o Lunaram Bawaria R/o Pratapgarh 3. Hiralal S/o Hardeva Khatik R/o Thanagazi decided on 28.04.12, punishment of 5 year in prisonment and fine of Rs. 10000 awarded. Acquital of Kailash S/o Lunaram on 29.01.13. Appeal filed against this decision ADJ 3 Alwar. Hiralal Khatik S/o Hardeva died.		2. Chasya 3. Shravan s/o Ramchandra Bawaria Res:Sunderpura Palsana PS Ranoli,Sikar
9	64-44 dated 25-12-05, Naka Baleta beat Rotkyala , Akbarpur	Poaching of Tiger in beat Rotekyala, Narandi, Andhera Jungle in Feb. 2004, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Juhru S/o Subba Meo R/o Khareda 2. Ramjan S/o Subba Meo R/o Khareda 3. Tayeb S/o Subba Meo R/o Khareda 4. Jeevan Das S/o Shyochand Bawaria R/o Namunda Panipat 5. Nawab S/o Hariya Meo R/o Khareda 6. Nuru S/o Mohmmad Khan R/o Khareda	In ACJM-1 , Alwar in case NO-34/06 filed against 1. Juhru S/o Subba Meo R/o Khareda 2. Ramjan S/o Subba Meo R/o Khareda 3. Tayeb S/o Subba Meo R/o Khareda 4. Jeevan Das S/o Shyochand Bawaria R/o Namunda Panipat 5. Nuru S/o Mohmmad Khan R/o Khareda decided on 17-6-2011 awarded punishment of 5 years imprisonment and Rs. 50000. Nawab S/o Hariya Meo died.		-
10	64-45 dated 25-12-05 Naka Baleta, Beat Rotkyala, Akbarpur	Poaching of Tiger in beat Rotekyala, Naharpura Paj in 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Juhru S/o Subba Meo R/o Khareda 2. Ramjan S/o Subba Meo R/o Khareda 3. Tayeb S/o Subba Meo R/o Khareda 4. Jeevan Das S/o	In ACJM-1 , Alwar in case No-34/06 filed against 1. Juhru S/o Subba Meo R/o Khareda 2. Ramjan S/o Subba Meo R/o Khareda 3. Tayeb S/o Subba Meo R/o Khareda 4. Jeevan Das S/o Shyochand Bawaria R/o Namunda Panipat 5. Dina Meo S/o Mamlam Meo R/o Bhandodi Decided on 17.6.2011 awarded punishment of 5 years imprisonment and Rs. 50000 to all offenders. Appeal no 34/2011 filed in		

		Shyochand Bawaria R/o Namunda Panipat 5. Dina Meo S/o Mamla Meo R/o Bhandodi	ADJ 2 Alwar in which Surta urf Surtya S/o Lalchand acquitted on 11.12.2013. Appeal being filed in High Court Jaipur.		
11	43-40/05 dated 15-9-2005 Range Tehla, Beat Devri Guada	Poaching of Tiger by poisoning kill in beat Devri Guada in 2003, case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against unknown.	Matter under investigation.	-	-
12	89-80 dated 14-11-2010 Range Tehla, Beat Rajor	Poaching of Tiger ST-1 by poisoning buffalo kill in beat Rajor, Berika nallah case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against unknown offender.	Case no 23/26/2011 filed in MJM Rajgarh against 1. Parsadi S/o Ramsahai Gurjar R/o Kalakhet Mathuravat 2. Bhagwana S/o Ramsahai Gurjar R/o Kalakhet Mathuravat 3. Kailash S/o Kishna Gurjar R/o Kalakhet Mathuravat	-	-

B. Panther Cases

S.No.	FIR Number/ Date/ Range/ Naka	Details of FIR	Detail of Punishment	Name of wanted offenders as per FIR	Name of wanted offenders as per investigation
1	31-96/05 dated 18.01.05 Flying Squad	Poaching of Panther in Kul ka kund, Narayanpur case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Ratan S/o Dhanna Bawaria 2. Tillu S/o Dhanna Bawaria	Case filed in ACJM Thanagazi against 1. Ratan S/o Dhanna Bawaria 2. Tillu S/o Dhanna Bawaria 3. Hiralal 4. Sansar Chand 5. Purya urf Puran 6. Bhoma 7. Ramdeva 8. Manju urf Munim 9. Shivlal 10. Natthi 11. Arjun. Case in pending.	-	1. Ghanglya s/o Arjun Bawaria Res: Talva PS Viratnagar, Jaipur 2. Jasya Bawaria Res: Smalkha, Haryana 3. Balya s/o Gangu Bawaria Res: Chand Pahadi PS Malakheda 4. Pappu urf Kakuda s/o Arjun Bawaria Res: Talva PS Viratnagar, Jaipur
2	58-42/ 05 dated 25-01-05 Range Tehla	Poaching of Panther in Range Tehla case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o	In ACJM Rajgarh in case No- 23/57/2009 decided on 14-8-2012 filed against 1. Kalya S/o Ladya Bawaria R/o Malvas 2. Prahalad S/o Badri 3. Brijmohan S/o Ladu Bawaria R/o Chandra.	Bhagirath Bawaria	

		Ladya Bawaria R/o Malvas 2. Prahalad S/o Badri 3. Brijmohan S/o Ladu Bawaria R/o Chandera 4. Bhagirath Bawaria	Awarded of punishment to Kalya S/o Ladya Bawaria five years imprisonment and Rs. 5000 penalty. Appeal no 12/2012 filed in ADJ Rajgarh in which Kalya S/o Ladya Bawaria acquitted on 14.02.2013. Appeal being filed in High Court Jaipur.		
3	63-17 /05 dated 18-7-05 Range Akbarpur	Poaching of Panther in Pilikhand Range Akbarpur case section 9, 27, 31, 39, 44, 48A, 49 A, 49 B, 50, 51 against 1. Darra S/o Ramsahai Balai R/o Khareda 2. Hazari S/o Shivji Jogi 3. Jeevan das s/o Shyochand Derawali Bawaria	In ACJM No 1 Alwar compliant file against 1. Darra S/o Ramsahai Balai R/o Khareda 2. Hazari S/o Shivji Jogi The case is pending. In ACJM-2 , Alwar in case No 23/127/2010 decided on 15.12.11 convicted accused Jeevan das s/o Shyochand Derawali Bawaria punishment of 5 years imprisonment and Rs. 10000 fine.	-	
4	63-96/05 dated 6-12- 2005 Range Akbarpur	Poaching of Panther in Pilikhand Jungle Range Akbarpur case section 9, 27, 31, 39, 44, 48A, 49 A , 49 B, 50, 51 against 1. Juhru S/o Subba Meo R/o Khareda 2. Kalya S/o Ladya R/o Chandera 3. Ramjan S/o Subba Meo 4. Tayeb S/o Subba Meo 5. Jeevandas Kalbelia 6. Rosan	In ACJM-2 , Alwar in case No 317/06 decided on 23-3-2009 convicted accused Juhru, Ramjan, Tayaib s/o Subba Meo Res: Khareda PS Malakheda Dis: Alwar, Nuru s/o Mohamad Kha Meo Res: Dabli PS Malakheda and Kalya s/o Ladya Bawaria Rds: Chandera PS Kolwa, Dist Dausa punishment of 5 years imprisonment and Rs. 5000 fine.	1. Jeevandas s/o Shyochand caste Kalbeliya (Rajput) Res: Smalkha, Haryana 2. Roshan res: Namunda PS Smalkha Haryana	-
5	60-19/05 dated 8-12-05 Range Tehla	Poaching of Panther in Jungle Nadri Beat Bandipul Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against Pholya S/o Bhagirath Bawaria R/o Gugli ka guwada	Case no 23/436/09 filed in ACJM No 2 Alwar in which Kalya S/o Ladya Bawaria acquitted on 17.08.2011. Appeal No 234/11 filed in DJ Court Alwar.	-	Surta s/o Bhaktawar , Lodha Rajput, PS Smalkha Haryana
6	60-20/05	Poaching of	Case no. 319/06 is pending in	-	Jasya s/o Ladia

	dated 8-12-2005 Range Tehla	Panther in Jungle Ramji ka guwada to Parasar ji ki paj Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against Pholya S/o Bhagirath Bawaria R/o Gugli ka guwada	ACJM no 2 Alwar.		Bawaria
7	60-21/05 dated 8-12-2005 Range Tehla	Poaching of Panther in Kalod ka guwada ki paj, Uppar Mala Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against Pholya S/o Bhagirath Bawaria R/o Gugli ka guwada	Case no 312A/06 is pending in ACJM No 2 Alwar	-	Jeevandas s/o Shyochand caste Kalbeliya (Rajput) PS Smalkha Hariyana
8	195-40/01 dated 9-9-2001 Range Talvriskh	Poaching of Panther in Dabli ki dhani Near Kho dariba, 2001 case section 9, 39, 50, 51 against unknown offender.	In ACJM Rajgarh in case No-61/2009 (10/06) filed against 1. Kalya S/o Ladya Bawaria R/o Malvas 2. Ramnarayan S/o Chotu Meena R/o Gola ka bas 3. Brijmohan S/o Ladya Acquitted on 31.07.2012. Appeal no 20/2012 filed in ADJ Rajgarh. 1. Kalya S/o Ladya Bawaria 2. Ramnarayan S/o Chotu Meena	-	1. Kamalesh s/o Prabhu Dyal R/o Kho Dariba 2. Licchu Thakur R/o Kho Dariba
9	55-46/2006 dated 31-1-06 Range Talvriksh	Poaching of Panther in Beat Raikamala Range Talvriksh case section 9, 27, 31, 44, 48A, 49 A , 49 B, 50, 51 against 1. Kalya s/o Ladya Bawaria R/o Chandera PS Kolwa, Dist Dausa 2. Rawda urf Rawla Banjara R/o Nangalheri 3. Kailash Gurjar 4. Jeevan Kalbelia	In MJM Thanagazi compliant file against Kalya S/o Ladya Bawaria R/o Chandera case transferred in ACJM No 2 Alwar. Case No 309/06 decided on 17.1.10 convicted accused Kalya s/o Ladya Bawaria R/o Chandera PS Kolwa, Dist Dausa. ACJM No 2 Alwar case no 23/460/12 decided on 10.07.13 acquittal Jeevan das kalbelia. Appeal no CRALLA 1192/14 to be filed against this decession High Court Jaipur. Case No 203/07 compliant file against Rawda urf Rawla Banjara R/o Nangalheri in ACJM No 2 Alwar. Case is		Kailash Gurjar

			Pending. Case No 428/09 compliant file against Kartar S/o Behru Banjara in ACJM No 2 Alwar. Case is Pending.		
10	60-60/06 dated 3-2-06 Range Tehla	Poaching of Panther in Narayani to Gugli ka guwada vali paj, Range Tehla case section 9, 39, 48A, 49 A, 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria 2. Surtya S/o Bakhtawar Kalbelia R/o Samalka Panipat 3. Abla S/o name unknown R/o Nagal Syaluta	ACJM Rajgarh in case NO-23/46/2009 decided on 12-5-2011 convicted accused Kalya s/o Ladya Bawaria Rds: Chandera PS Kolwa, Dist Dausa punishment of 5 years imprisonment and Rs. 10000. Accused Kalya Bawaria Appeal no 4/2011 filed in ADJ Rajgarh. ADJ Rajgarh decided on 9.08.11. ACJM Rajgarh in case No 23/97/2012 decided on 28.03.14 acquittal accused Surtya S/o Bhaktawar. Appeal being filed in High Court Jaipur.	Abla Banjara Res: Nangal (Shaluta) PS Tehla	-
11	61-75/06 dated 3-02-06 Range Tehla	Poaching of Panther in Beat Tilwar Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria 2. Surtya S/o Bakhtawar Kalbelia R/o Samalka Panipat 3. Setula S/o Rugya Bawaria R/o Dubbi 4. Roshan S/o Sedhya Bawaria R/o Kolwa	In ACJM Rajgarh in case No 50/2009 (162/05) decided on 14-10-2011 convicted accused Kalya s/o Ladya Bawaria Rds: Chandera PS Kolwa, Dist Dausa punishment of 5 years imprisonment and Rs. 10000 fine. Accused Kalya Bawaria Appeal no 13/2011 filed in ADJ Rajgarh. ADJ Rajgarh decided on 3.02.12. ACJM Rajgarh in case No 96/2012 decided on 11.02.14 acquittal accused Surtya S/o Bhaktawar. Appeal being filed in High Court Jaipur.	1. Setula s/o Rugya Bawaria Res: Dubbi kelai, Dausa 2 Roshan s/o Sadia Bawaria Res: Kolwa, Dausa	-
12	61/77 dated 3-2-2006 Range Tehla	Poaching of Panther in Range Tehla case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria 2. Surtya S/o Bakhtawar Kalbelia R/o Samalka Panipat	In MJM Rajgarh in case No-256/06 filed against Kalya S/o Ladya Bawaria decided on 8.1.2008 convicted accused Kalya s/o Ladya Bawaria Rds: Chandera PS Kolwa, Dist Dausa punishment of 3 years imprisonment and Rs. 10000. In MJM Rajgarh in case No-254/11 filed against Surtya S/o Bakhtawar Kalbelia decided on 4.10.13 convicted		

			accused Surtya S/o Bakhtawar Kalbelia punishment of 3 years imprisonment and Rs. 10000.		
13	61-76/06 dated 3-2-06 Range Tehla	Poaching of Panther in Beat Kho Range Tehla case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria 2. Rawda urf Rawla S/o Bheru Banjara R/o Nagalheri 3. Balya s/o Gangu Bawaria R/o Chand pahari 4. Shivilal S/o Nancha R/o Chand pahari 5. Juhru S/o Subba Meo R/o Khareda	ACJM Rajgarh in case No 58/2009 (125/06) decided on 21.02.12 acquittal accused 1. Kalya S/o Ladya Bawaria 2. Rawda urf Rawla S/o Bheru Banjara R/o Nagalheri 3. Shivilal S/o Nancha R/o Chand pahari 4. Juhru S/o Subba Meo R/o Khareda. Appeal no 23/2012 filed in ADJ Rajgarh. ACJM Rajgarh in case No 23/98/2012 decided on 02.04.14 acquittal accused Surtya S/o Bakhtawar Kalbelia. Appeal being filed in High Court Jaipur.	1. Balya s/o Gangu Bawaria Res: Chand Pahadi PS Malakheda.	-
14	61-78/09 dated 3-2-06 Range Tehla	Poaching of Panther in Choti Chind Range Tehla case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o Ladya Bawaria 2. Jaisingh S/o Ladya R/o Chandera 3. Rampratap S/o Ladya R/o Chandera 4. Jaisinghda S/o Gulya R/o Saliyas Papadda 5. Hiralal S/o Hardeva Khatik R/o Thanagazi	In ACJM Rajgarh in case No 47/2009 decided on 24.12.11 convicted accused Kalya s/o Ladya Bawaria R/o Chandera PS Kolwa, Dist Dausa punishment of 5 years imprisonment and Rs. 10000 fine. ADJ Rajgarh in case No 1/2012 decided on 13.06.12 acquittal accused Kalya S/o Ladya.	1. Jaisingh s/o Ladia Bawaria 2. Rampratap s/o Ladia Bawaria 3. Jaisingh Ghada s/o Gulla 4. Heeralal s/o Hardeva khatik Res:Thanagazi	-
15	55-60/06 dated 21-2-06 range Talvriskh	Poaching of Panther in Raikamala Range Talvriskh case section 9, 27, 31, 39, 44 48A, 49 A , 49 B, 50, 51 against 1. Kalya S/o	In ACJM No 2, Alwar in case No 308/06 decided on 11.5.2007 convicted accused Kalya s/o Ladya Bawaria R/o Chandera PS Kolwa, Dist Dausa punishment of 4 years imprisonment and Rs. 10000 fine.	-	Jeevandas s/o Sheyochand caste Kalbeliya (Rajput) PS Smalkha Hariyana

		<p>Ladya Bawaria</p> <p>2. Rawda urf Rawla S/o Bheru Banjara R/o Bhojpuri</p> <p>3. Kartar S/o Bheru Banjara R/o Bhojpuri</p> <p>4. Juhru S/o Subba R/o Khareda</p>	<p>Case No 228/07 against accused Juhru Meo S/o Subba Meo R/o Khareda, Rawda urf Rawla S/o Bheru Banjara R/o Bhojpuri in ACJM No 2, Alwar, case is pending.</p> <p>Case No 422/09 against accused Kartar S/o Bheru Banjara R/o Bhojpuri in ACJM No 2, Alwar, case is pending.</p>		
16	61-80/06 dated 28-02-06 Range Tehla	<p>Poaching of Panther in Beat Tilwar Sukar Jungle Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against</p> <p>1. Kalya S/o Ladya Bawaria</p> <p>2. Surtya S/o Bakhtawar R/o Samalka Panipat</p> <p>3. Setula s/o Rugya Bawaria R/o Dubbi kelai, Dausa</p> <p>4. Roshan s/o Sadia Bawaria R/o Kolwa, Dausa</p>	<p>In ACJM Rajgarh in case No 48/09 decided on 9.04.2010 convicted accused Kalya s/o Ladya Bawaria R/o Chandera PS Kolwa, Dist Dausa punishment of 5 years imprisonment and Rs. 20000 fine.</p> <p>Kalya Bawaria appeal no 14/2010 filed in ADJ Rajgarh decided on 9.8.11</p> <p>ACJM Rajgarh in case No 23/99/2012 decided on 14.03.14 acquittal accused Surtya S/o Bakhtawar Kalbelia.</p>	<p>1. Setula s/o Rugya Bawaria Res: Dubbi kelai, Dausa</p> <p>2 Roshan s/o Sadia Bawaria Res: Kolwa, Dausa</p>	-
17	61-81/06 dated 28-02-2006 range Tehla	<p>Poaching of Panther in Beat Kho Okari Jungle Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against</p> <p>1. Kalya S/o Ladya Bawaria</p> <p>2. Rawda urf Rawla S/o Bheru Banjara R/o Nagalheri</p> <p>3. Balya s/o Gangu Bawaria R/o Chand pahari</p> <p>4. Shivlal S/o Nancha R/o Chand pahari</p> <p>5. Juhru S/o Subba Meo R/o Khareda</p>	<p>ACJM Rajgarh in case No 60/2009 (20/07) decided on 23.06.12 acquittal accused</p> <p>1. Kalya S/o Ladya Bawaria</p> <p>2. Rawda urf Rawla S/o Bheru Banjara R/o Nagalheri</p> <p>3. Shivlal S/o Nancha R/o Chand pahari</p> <p>4. Juhru S/o Subba Meo R/o Khareda.</p> <p>Appeal no 10/2012 filed in ADJ Rajgarh.</p>	<p>1. Balya s/o Gangu Bawaria Res: Chand Pahadi PS Malakheda.</p>	-
18	21-2/07 dated 21-8-07 range Talvriksh	<p>Poaching of Panther in Range Talvriksh case section 9, 27, 31, 39, 48A,</p>	<p>In MJM Thanagazi in case No 8/2008 decided on 26.5.2010 convicted accused Jeevan das s/o Shyochand Derawali Bawaria</p>	<p>Bablu s/o Jagram Banjara R/o Gopalpura Kishori PS Thanagazi, Alwar</p>	-

		49 A , 49 B, 50, 51 against 1. Rawda urf Rawla S/o Bheru Banjara R/o Nagalheri 2. Kalya S/o Ladya Bawaria 3. Ballu S/o Jagram Banjara 4. Jeevandas Kalbelia	punishment of 2 years imprisonment and Rs. 5000 fine. MJM Thanagazi in case No 23/08 decided on 30.06.10 acquittal accused Kalya S/o Ladya Bawaria & Rawda urf Rawla S/o Bheru Banjara.		
19	87-67/ dated 24-07-09 range Tehla	Poaching of Panther in Jungle Ghoda ghati beat talab Range Tehla case section 9, 39, 50, 51, 57 against 1. Raju S/o Jagdish Bawaria R/o Nohpur 2. Prahlad s/o Badri Bawaria R/o Dungaria 3. Badri s/o Bhuria Bawaria R/o Dungaria 4. Ramchandra/ Kishana Bawaria R/o Dungaria 5. Bhagirath/ Sonia Bawaria R/o Dungaria 6. Roshan/ Badri Bawaria R/o Dungaria 7. Jagdish S/o Kishna Bawaria R/o Dungaria	In MJM Rajgarh in case No-23/289/2009 filed against Raju S/o Jagdish Bawaria R/o Nohpur decided on 06.04.11. Acquitted on 6.04.11. Appeal No. 9/2011 filed in ADJ Rajgarh. In MJM Rajgarh in case No-132/2012 filed against Badri s/o Bhuria Bawaria R/o Dungaria & case no 55/2013 against Prahlad s/o Badri Bawaria R/o Dungaria. case pending		1. Ramchandra/ Kishana Bawaria R/o Dungaria 2. Bhagirath/ Sonia Bawaria R/o Dungaria 3. Roshan/ Badri Bawaria R/o Dungaria 4. Jagdish S/o Kishna Bawaria R/o Dungaria
20	87-68/ dated 26-07-09 range Tehla	Poaching of Panther in Losal ke uppar paj pagdandi, beat talab Range Tehla case section 9, 39, 50, 51, 57 against 1. Raju S/o Jagdish Bawaria R/o Nohpur 2. Prahlad s/o Badri Bawaria R/o Dungaria 3. Badri s/o Bhuria Bawaria R/o Dungaria 4. Ramchandra/	In MJM Rajgarh in case No 23/288/2009 filed against Raju S/o Jagdish Bawaria R/o Nohpur decided on 06.04.11. Acquitted on 6.04.11. Appeal No. 10/2011 filed in ADJ Rajgarh. In MJM Rajgarh in case No-131/2012 filed against Badri s/o Bhuria Bawaria R/o Dungaria & case no 56/2013 against Prahlad s/o Badri Bawaria R/o Dungaria. case pending	1. Prahlad s/o Badri Bawaria Res: Dungaria PS Jamuwaramgarh 2. Badri s/o Bhuria Bawaria Res: Dungaria PS Jamuwaramgarh 3. Ramchandra/ Kishana Bawaria Res: Dungaria PS Jamuwaramgarh 4. Bhagirath/ Sonia Bawaria Res: Dungaria PS Jamuwaramgarh 5 Roshan/ Badri Bawaria Res:	-

		Kishana Bawaria R/o Dungaria 5. Bhagirath/ Sonia Bawaria R/o Dungaria 6. Roshan/ Badri Bawaria R/o Dungaria 7. Jagdish S/o Kishna Bawaria R/o Dungaria		Dungaria PS Jamuwaramgarh	
21	111-92/ 8.10.93 Range Tehla	Poaching of Panther in Range Tehla case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51	In ACJM-Thanagazi in case NO-81/1996 decided on 28- 11-2007 convicted accused Heera lal s/o Herdeva Khatik Res: Thanagazi PS Thanagazi dist : Alwar punishment of 3 years imprisonment and Rs. 10000	1. Phoolya / Sonia Bawaria Res: Chandera PS Kolwa, Dausa	-
22	66/03 dated 06-1-2006 Range Akbarpur	Poaching of Panther in Pilikhand Naka Prathvipura Range Akbarpur case section 9, 27, 31, 39, 44, 48A, 49 A , 49 B, 50, 51 against 1. Juhru S/o Subba Meo R/o Khareda 2. Kalya S/o Ladya R/o Chandera 3. Surta S/o Bakhtawar R/o Samalka 4. Ramjan S/o Subba Meo 5. Tayeb S/o Subba Meo	In ACJM No 2, Alwar in case No 316/06 decided on 13.01.2009 convicted accused Juhru, Ramjan, Tayaib s/o Subba Meo R/o Khareda PS Malakheda Distt: Alwar punishment of 3 years imprisonment and Rs. 5000 fine. Accused Kalya Bawaria Appeal No 230/2009 filed on ADJ-1 Alwar. In ACJM No 1 Alwar in case no 601/2011 decided on 13.09.13 accused Surtya S/o Lalchand R/o Samalka punishment of 5 years imprisonment and Rs. 50000 fine.		
23	44-99 dated 9- 10-2005 Range Tehla	Poaching of Panther in Phatyakhora Range Tehla case section 9, 39, 48A, 49 A , 49 B, 50, 51 against 1. Pholya S/o Bhagirath Bawaria R/o Gugli ka guwada 2. Jagdish S/o Dhanna ram Khatik R/o Pratapgarh 3. Sansar Chand S/o Munni Lal Gihara R/o Delhi	In MJM court Thanagazi in compliant file against 1. Pholya S/o Bhagirath Bawaria R/o Gugli ka guwada 2. Jagdish S/o Dhanna ram Khatik R/o Pratapgarh. Case transferred in ACJM no 2 Alwar case no 291/06. In ACJM no 2, Alwar in case No 400/09 decided on 04.05.2011 convicted accused Narayan s/o Munilal Gihara R/o Delhi punishment of 5 years imprisonment and Rs. 10000 fine. ADJ No. 3 Alwar appeal no 96/2011 decesion dated		1. Hiralal 2. Khyali S/o Nabbi Meena 3. Ramdhan S/o Pholya

		4. Narayan S/o Munni Lal Gihara R/o Dehli	4.10.13 acquittal offender Narayan. Appeal being filed in High Court Jaipur. ACJM No 2 Alwar case no 23/440/09 compliant file against Accused Sansar Chand S/o Munni Lal Gihara R/o Delhi the case was decided on 22.07.13 Accused Sansar chand acquitted by court. Sansar chand is dead.		
24	34-64 dated 18.07.05 Range Sariska Naldeshwar Jungle	Poaching of Panther case section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Hazaria S/o Shivji Jogi R/o Khareda 2. Darra S/o Ramsahai Balai R/o Khareda 3. Suresh S/o Laxman Jogi R/o Madhogarh	Case No 172/05 filed in ACJM No 1 Alwar against 1. Hazari S/o Shivji Jogi R/o Khareda 2. Darra S/o Ramsahai Balai R/o Khareda 3. Suresh S/o Laxman Jogi R/o Madhogarh 4. Surtya S/o Bakhtawar R/o Namunda Panipat. Case against Surtya S/o Bakhtawar decided on 08.07.11 in which is acquittal was done. Rest matter pending in court.	-	-
25	55-59 dated 21.02.06 Range Talvriksh	Poaching of Panther in Beat Raikamala Range Talvriksh section 9, 27, 31, 39, 48A, 49 A , 49 B, 50, 51 against 1. Kailash S/o Rampal Gurjar R/o Raikamala Bhojpuri PS Narayanpur	Case No 43/08 filed in MJM Thanagazi. Case is pending.	-	-

List of LPG conections on subsidy to peripheral villagers in sariska tiger reserve

Name of Range	Name of village	Number of LPG conection
Talvriksh	Bamanwas kankad	298
	Tolawas	143
	Mundawara	683
	Talvriksh Dhani	60
	Rampur	749
	Lekdi	292
	Bharam ka Bas	90
	Manawas	7
	Balwa ka bas	42
	Mangalwa	60
	Sabalpura	60
	Guda	20
	Kalyanpura	28
	Kaliphadi	54
	Hajipur	60
	Tikli ka bas	46
	Bisalu	37
	Todiya ka bas	22
	Anatpura	9
	Luharwala	8
	Ghat	45
	Kuriyal ki dhani	9
	Dhankda	8
Total		2830
Tahla	Tahla	173
	Ghewar	42
	Rajdoli	34
	Toda jaisingh pura	55
	Talab	104
	Losal	10
	Nadu	10
	Patula ka bas	7
	sitawat	14
	Kotdi rampura	2
	Mallana	35
	Gowerdhanpura	36
	Tejala	9
	Tilwad	76

	Rampura	27
	Palpur	26
	Thana Dudpuri	34
	Pipliwala	2
	Rupwas	31
	Dhola rada	6
	Kayara ka guwada	1
	Baldewgarh	37
	Ajabgharh	18
	Nagal ka rana	6
	Dangarwada	72
	Gola kabas	30
	Asan ghatda	43
	Bhuryali	4
	Jaitpur	2
	Indpura	12
	Kali dungri	1
	Ramnagar Bhangarh	4
	Ramji ka guwada	6
	Naya goan Bholka	5
	Khariyawas	13
	Dafal pura	13
	Birkhadi	8
	Suti ka guwada	7
	Naya bas	9
	Kakroda dhani	2
	Kala para	5
	piplai	1
	Chawa ka bas	2
	Damodar bas	1
	Kundla	13
	Gugi ka guwada	3
	Basal ki dhani	1
	Vyasji ka guwada	2
	Pawta	3
	saluta	1
	Rajgarh	4
	kho	20
	Dhamred	281
	Khodriba	106
	Dabla	7
	Dabkan	1
	Mandalwas	3
	Kakrali rampur	22
	Murlipura	1
	Dewti	16
	Thosda	36
	lanke	19

	Anawda	82
	Bigota	4
	Ramsinghpura	19
	Dhampura	55
	Dholan	40
	Rajor	3
	Kundroli	6
	Nayagaon bholka	71
	idpura	27
	minala	2
	Kherdi	6
	Budhpura	3
	Ratanpura	1
	Garh	1
	Boreta	45
	Maturawat	1
	Nadoli	1
	Berli	2
	Aadhakaguwada	1
	Khalasa	3
	Nayabas	4
	Khobdi rampura	9
	Sakala	1
	Dabkan	3
	Dubbi	1
	Dholarada	1
Total		1987
Akabarpur	Prithvipura	466
	Bhandodi	419
	Khareda	283
	Baleta	488
	Imtipura	34
	Nawli	48
	Parsa ka bas	180
	Chaandpahadi	29
	Nirbhyapura	38
	Kusalpura	15
	Ghatitala	8
	Siya ka Bas	24
	Saranpura	27
	Sirabas	121
	Alapur	46
	Madhogarh	26
	Gopalpura	2
	Akabarpur	939
	Bakhatpura	50
	Machdi	2
	Sawdi	430

	Dhalabas	115
	Khedka	10
	Kishanpura	76
	Ahamadpur	27
	Dhawala	18
	Paitpur	69
	Pipalgarh	6
	Sodanpura	13
	Doba	2
	Sundarbas	2
	Dharampura	64
	Badholi	36
	NayagaoPratappura	24
	Anawda	1
	Thosda	1
	Mojpurrundh	17
	Umren	221
Total		4637
Sariska	Indhok	229
	Kundla	15
	Thanagazi	1487
	Amrakabas	15
	Bhikampura	141
	Bhopala	11
	Jodhabas	76
	Bhangdoli	208
	Todi luharan	55
	Mudiyabas Kheda	126
	Gopalpura	77
	Tibara	9
	Govindpura	44
	Raipura	37
	Kisori	317
	Mejod	75
	Dahtal	73
	Biharisar	2
	Harner	109
	Dhigariya	3
	Jhankdi	1
	Nawalsingh ki gadhi	75
	Nathusar	7
	Duhar chogaan	526
	Aamala	4
	Bhudiyabas	185
	Kyara	2
	Ghuda	1
	Dera bamanbas	1
	Kabli garh	1

	Bachdi	44
	Kusalgarh	5
	Garh basai	1
	Anya gram	37
	Baad gujran	79
	Kola ka bas	74
	Sriska	21
	Lawa ka bas	9
	Kala lanka	5
	Kala khora	2
Total		4106
Ajabgharh	ramnagar	25
	Guwada ramji	31
	Piplai	80
	Gafalpura	19
	Jaitpur	29
	Guwada soti	10
	Guwada vyas	1
	Guwada kalot	1
	Todika bas	5
	Samra	6
	Bhangarh	2
	Kitla	11
	Khajya ki dhadi	1
	Doomoli	1
	Barwa dungri	1
	Gola ka bas	81
	Birkadi	69
	Sili bawdi	33
	Ghiroda	89
	Bina patti	31
	Syaluta	57
	Kutuki	11
	Pawta	6
	Ajabgarh	54
	Bhuriyawali	10
	Kalapara	12
	Guwada googli	12
	Guwada sadaram	20
	Guwada lala bhaiya	4
	Guwada kundla	6
	Guwada jamadar	6
	Guwada dulawa	4
	Guwada nadoli	3
	Nijra	11
	Nimla	8
	Sawatsar	13
	Lakawas	4

	Kalya diwala	2
	Kho dariba	2
	Guwada kudal	9
	Pamawala	3
	Guwada kalot	1
	Chakoriya ki dhadi	2
	Guwada Haar	7
	Guwada Ghasi	4
	Guwada sira	12
	Guwada leswa	4
	Guwada janawat	10
	Jhiri	7
	Thali	58
	Kanyawas	1
	Guwada bhagwan	1
	Guwada dabar	2
	Nagal dosar	1
	Khatiwala	6
	Baldevgharh	49
	Bandipul	2
	Nagal chandel	11
	Khirat ka bas	4
	Damodar ka bas	15
	Aanawala	10
	Guwada kaliaan	5
	Sitapura banjara	10
	Rasawala	2
	Singhpuri	1
	Rayawala	30
	Ramgopalpura	13
	Kilachpuri	1
	Aandhi	1
	Kisori	1
Total		1054
Grand Total		14614

Annexure – 31

Man-Carnivore Conflict Cattle Compensation Cases in STR
(From 2005-06 to 2012-13)

Date and Time of incident	Response period by the FD	Place of incident Forest/ outside	Name of victim and village	Carnivore Type Tiger/Leopard/ Other	Livestock Type or Human	Amount of given Compensation	Date of giving compensation
1	2	3	4	5	6	7	8
2005-06	----- NIL -----						
2006-07							
7.02.06	13 months	outside	Sh. Gopal S/o Rameshwar Jogi, R/o Garh Teh. Rajgarh, Alwar	Panther	6 goat, 1 cow cub (live stock)	2800.00	29.03.07
18.11.06	16 months	outside	Sh. Puran S/o Sohan Gurjar, R/o Raikamala, Teh. Thanagazi Alwar	Panther	human	10000.00	29.03.08
2007-08							
23.07.07	8 months	outside	Sh. Babulal S/o Mohan Lal Meena, Village Gawdi, Teh. Laxmangarh, Alwar	Blue bul	human	50000.00	29.03.08
2008-09							
11.01.09	2 months	outside	Sh. Ratan lal S/o Jageram Meena R/o Mandri Teh. Thanagazi Alwar	Hyena	11 goats (livestock)	3300.00	30.03.09
12.01.09	2 months	outside	Sh. Ratan lal S/o Jageram Meena R/o Mandri Teh. Thanagazi Alwar	Hyena	2 goats (livestock)	600.00	30.03.09
23.03.09	7 days	outside	Sh. Prdeep S/o Rajendra Singh, R/o Dabkan, Teh. Rajgarh Alwar	Jungle Cat	human	2214.00	30.03.09
23.03.09	7 days	outside	Smt. Lacchi w/o Ramkuwar R/o Dabkan, Teh. Rajgarh Alwar	Jungle Cat	human	350.00	30.03.09
2009-10							
19.01.10 9.15 AM	2 months	outside	Sh. Nanuram S/o Badan Meena R/o Burja Dabkan, Teh. Rajgarh Alwar	Panther	5 goats (livestock)	1500.00	22.03.10
16.11.09	3 months	outside	Smt. Manju Kumari D/o Sh. Hariram Balai, R/o Talab, Alwar	Jackal	human	10000.00	30.03.10
16.11.09	3 months	outside	Suman D/o Lokesh Sharma, Losal, Alwar	Jackal	human	10000.00	30.03.10
16.11.09	3 months	outside	Sh. Manoj Kumar S/o mahesh Chand Sharma, Losal, Alwar	Jackal	human	8500.00	30.03.10
27.02.10 6 PM	1 months	outside	Smt. Tofli devi w/o Ramjilal Meena R/o Rupu ka bas, Teh. Rajgarh Alwar	Wild Pig	human	10000.00	30.03.10
1.03.10	1 month	Revenue area Tehla	Sh. Manoj Kumar S/o Ramsahaya, R/o Tehla Alwar	Wild Pig	human	10000.00	30.03.10
2010-11							
5.10.10	5 months	outside	Sh. Boduram S/o Baldev Saini R/o Laduvas, Kharkari Kalan, Teh. Thanagazi Alwar	Hyena	human	50000.00	9.03.11
11.08.10	5 months	outside	Sh. Chote lal S/o Badri	Tiger	1 Buffalo	5000.00	19.01.11

5 AM			prasad Gurjar, R/o Sawar, Alwar		(livestock)		
2011-12							
12.12.10	8 month	outside	Sh. Chandarram s/o sardara gurjar R/o lawa ka bas PS thanagazi Alwar	Hyena	1 Cow cub (livestock)	2000.00	17.08.11
4.04.11	5 month	outside	Sh. Hanuman sahaya S/o Shimbhu dayal sharma R/o Thanagazi	Panther	1 Cow cub (livestock)	2000.00	17.08.11
16- 17.07.11	3 month	outside	Sh. Maniram S/o Kajod ram Khatik, VPO Shyaluta Pawta Teh. Rajgarh Alwar	Hyena	13 goats (livestock)	13000.00	14.10.11
19.02.11	7 month	outside	Smt. Bimla devi W/o Ramavtar Berwa R/o Tehla Alwar	Ratel	Human	10000.00	21.10.11
19.02.11	7 month	outside	Sh. Teja ram S/o Ramchandra Meena R/o Nadoli PS Tehla Alwar	Ratel	Human	10000.00	21.10.11
19.02.11	7 month	outside	Bhuli Bai D/o Rampratap Gurjar R/o Misrala PS Tehla Alwar	Ratel	Human	10000.00	21.10.11
29.11.11	16 day	outside	Sh. Maniram S/o Lehri Ram Gurjar age 40 yr. R/o Dharampura PS Malakhera Alwar	Hyena	3 Goats (livestock)	3000.00	14.12.11
03.12.10	13 month	outside	Sh. Laxman S/o Munsu Rebari age 42 yrs R/o Haripura bas Prathvipura Alwar	Panther	8 Goats (livestock)	2400.00	28.12.11
27.01.12	45 days	outside	Sh. Choga ram S/o Pema ram Banjara R/o Dhani Gopalpura PS Malakhera Alwar	Panther	1 Goats (livestock)	1000.00	12.03.11
2012-13							
22.03.12	5 month	outside	Babulal S/o Chanda Lal Jangid R/o Khora Khurd, Distt. Dausa	Panther	Cow cub (livestock)	2000.00	30.08.12
17.04.12	4 month approx	outside	Devkaran S/o Govind Sahai R/o Ghewar, PS Tehla, Alwar	Panther	Cow cub (livestock)	2000.00	11.09.12
09.07.12	51 days	outside	Roop Narayan Meena S/o Latur Meena R/o Anawara, PS Tehla, Alwar	Panther	Buffalow cub (livestock)	2000.00	30.08.12
16.11.09	33 month approx	outside	Smt. Kesar Devi W/o Rameshwar Dayal Sharma R/o Losal, PS Tehla Alwar	Jackal	Human	10000.00	30.08.12
09.08.12	21 days	outside	Chotelal Sharma S/o Gangasahai Sharma, R/o Kolahera, PS Narayanpur, Alwar	Hyena	Cow cub (live stock)	2000.00	30.08.12
31.07.12	1 month	outside	Smt Sonkawat W/o Mushisingh Rajput, R/o Bamanvas Kankar, PS Narayanpur, Alwar	Hyena	Human	10000.00	30.08.12
27.10.12	1 month	outside	Kailash S/o Durga Prasad Sain, R/o Ghewar, PS Tehla Alwar	Panther	Buffalow (livestock)	10000.00	29.11.12
04.11.12	25 days	outside	Smt Sushila Devi W/o Chittarnath R/o Majod, PS Thanagazi, Alwar	Panther	Buffalow (livestock)	10000.00	29.11.12

बाघ/तेन्दुआ एवं अन्य मांसभक्षियों के चिन्हों का सर्वेक्षण

वीट प्रभारी का नाम
 दिनक :
 वन मण्डल : बाघ परियोजना सरिस्का
 वीट संख्या व नाम :
 समय प्रारंभ :
 समय अन्त :
 रेखा :
 पूर्ण तय दूरी : कि.मी.
 प्रारंभ अक्षांश N
 प्रारंभ देशान्तर E
 अन्त अक्षांश N
 अन्त देशान्तर E

प्रपत्र-1

क्र.सं.	प्रजाति (मांसभक्षी) *	चिन्ह के प्रकार **	जंगल के प्रकार ***	भौतिकी ****	जी०पी०एस० निर्देशांक						
					उत्तर			पूर्व			
					डिग्री	मिनट	सेकण्ड	डिग्री	मिनट	सेकण्ड	
1											
2											
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7											
8											
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10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

* मांसभक्षी जाति : बाघ, तेन्दुआ, जंगली कुत्ता, लकड़बग्घा, भालू और भेड़िया।
 ** चिन्हों के प्रकार : पगमार्क; झोंपिंग (विष्ठा), आवाज, गारा (मवेशी/वर्ध जीव), खराचें (जमीन/पेड़), प्रत्यक्ष देखना।
 *** जंगल का प्रकार : विविध मिश्रित, झाड़ी, काटेदार, ग्रास लैण्ड, सवाना।
 **** भौतिकी : समतल, पठार, पहाड़, कम ढाल, तीव्र ढाल, उबड़ खाबड़, नाला

ड्रांजेक्ट लाईन (प्रथम) पर वन्य जीवों एवं मवेशियों की गणना

दिनांक :
 बीट प्रभारी का नाम : समय प्रारंभ :
 ड्रांजेक्ट लाईन क्रमांक : समय अन्त :
 क्षेत्र : बीट :
 प्रारम्भ जीपीएस अक्षांश : देशान्तर : E
 अन्त जीपीएस अक्षांश : देशान्तर : E

ड्रांजेक्ट बेयरिंग :
 लम्बाई :
 मौसम: बादल / खुला / वर्षा

क्र.सं.	समय	प्रजाति *	कुल संख्या (बच्चे एवं अन्य सभी)	बच्चे	जंगल का प्रकार **	भौतिकी के प्रकार ***	जानवर की दूरी (मीटर)	जानवर का बेयरिंग डिग्री
1								
2								
3								
4								
5								
6								
7								
8								
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18								

प्रजाति * - चीतल, सांभर, नीलगाय, चौंसिंघा, जंगली सूअर, लंगूर, ल्याल बंदर, मोर, खरगोश, मवेशी (गाय, भैंस/बकरी ऊट) एवं अन्य सभी स्तनधारी (मासाहारी/शाकाहारी)
 जंगल का प्रकार ** - विविध मिश्रित, झाड़ी, काटेदार, घास लेण्ड, सवाना।
 भौतिकी *** - समतल, पठार, पहाड़, कम-ढाल, तीव्र ढाल, उबड़ खाकड़, नाला

वनस्पति का सर्वेक्षण (ड्राजेक्ट प्रथम)

(15 मीटर के अर्धव्यास में) प्रपत्र - 3 अ

बीट प्रमारी का नाम : दिनांक : वन मण्डल : रेंज :
 बीट संख्या व नाम : ड्राजेक्ट लाईन क्रमांक :

प्लॉट नं०	छत्र घनत्व (0 से 1 तक)	पेड़* (संख्या के घटते क्रम में)					झाड़ी/झाड़ी के समान वृक्षों की प्रजातियाँ (संख्या के घटते क्रम में)					आड़ी घनत्व 0 से 4 तक (0-न होना, 4-बहुत अधिक घनत्व होना)	खरपतवार (बहुलता के घटते क्रम में)			खरपतवार बहुलता 0 से 4 (0-अनुपस्थित, 4-अत्याधिक)	जंगल का प्रकार**	भौतिकी प्रकार***
		एक	दो	तीन	चार	पांच	एक	दो	तीन	चार	पांच		एक	दो	तीन			
0 मीटर																		
400 मीटर																		
800 मीटर																		
1200 मीटर																		
1600 मीटर																		
2000 मीटर																		

पेड़* - 2 मी. से अधिक ऊंचाई वाले बीस को 'वृक्ष' की श्रेणी में, एवं 2 मी. से कम ऊंचाई वाले बीस को 'आड़ी' की श्रेणी में लिखें।
 जंगल का प्रकार ** - विविध मिश्रित, झाड़ी, काटेदार, ग्रास लैण्ड, सबाना।
 भौतिकी *** - समतल, पहाड़, कम ढाल, तीव्र ढाल, उबड़ खाबड़, नाला

मानवीय व्यवधान (ड्राजेक्ट)

प्रपत्र - 3 ब

बीट प्रमारी का नाम : दिनांक : वन मण्डल : बाघ परियोजना सरिस्का
 बीट : ड्राजेक्ट लाईन क्रमांक : रेंज :

प्लॉट नं०	जैविक दबाव							अक्षांश (डि०, मि० से०)	देशान्तर (डि०, मि० से०)
	पेड़ों की कटाई (कटे हुए पेड़ों की संख्या)	शाखाओं की कटाई (कटी शाखाओं की संख्या)	घास/बांस की कटाई (हाँ/नहीं)	पगडंडियों (हाँ/नहीं) मनुष्य या पालतू पशु द्वारा (पगडंडियों की संख्या)	मनुष्य की मौजूदगी (देखी गई संख्या)	पालतू पशुओं की मौजूदगी (देखी गई संख्या)	अक्षांश (डि०, मि० से०)		
0 मीटर									
400 मीटर									
800 मीटर									
1200 मीटर									
1600 मीटर									
2000 मीटर									

क्या बीट में मनुष्यों के स्थाई निवास स्थल हैं? हाँ/नहीं। यदि हाँ, तो कितनी उनकी अनुमानित जनसंख्या
 पालतू जानवरों की संख्या/..... मवेशी अन्य पशु
 क्या इस बीट में लघु वन उपज इकट्ठा की जाती है हाँ/ना। अगर हाँ, तो लघु वन उपज के नाम
 लघु वन उपज इकट्ठा किये जाने की दर 0 से 4 की श्रेणी में लिखें (0-नहीं और 4- बहुत अधिक)

भूमि आच्छादन का सर्वेक्षण (..... ट्रांजेक्ट) (1 मीटर के अर्धव्यास में)

प्रपत्र - 3 स

बीट प्रभारी का नाम : दिनांक : वन मण्डल : बाघ परियोजना सरिस्का रेंज :

बीट संख्या व नाम : ट्रांजेक्ट लाईन क्रमांक :

प्लॉट नं०	सूखे पत्ते %	भूमि आच्छादन पाँचों कॉलम का योग सौ प्रतिशत होना चाहिए						घास की प्रजाति (संख्या के घटते क्रम में)			शक (छोटे पौधे) की प्रजाति (संख्या के घटते क्रम में)	टिप्पणी					
		घास सूखा %	घास हरा %	हर्ब (छोटे पौधे) %	खरपतवार %	खाली भूमि %	घास की प्रजाति (संख्या के घटते क्रम में)	1	2	3							
0 मीटर																	
400 मीटर																	
800 मीटर																	
1200 मीटर																	
1600 मीटर																	
2000 मीटर																	

वन्य प्राणियों एवं मवेशियों की लेंडी एवं गोबर का सर्वेक्षण (ट्रांजेक्ट प्रथम)

प्रपत्र - 4

बीट प्रमारी का नाम : दिनांक : वन मण्डल : बाघ परियोजना सरिस्का
 बीट संख्या व नाम : ट्रांजेक्ट लाईन क्रमांक : रेंज :

प्लॉट नं०	जंगल का प्रकार	भौतिकी	चीतल	सांभर	जंगली सूअर	नीलगाय	चौसिंगा	खरगोश	लंगूर	लाल बन्दर	सेही	मोर	गाय / भैंस	भेड़ / बकरी	अन्य जंगली जानवर	अन्य पालतू जानवर
0 मीटर																
400 मीटर																
800 मीटर																
1200 मीटर																
1600 मीटर																
2000 मीटर																

लेंडी संख्या	श्रेणी
50-100	अ
100-200	ब
200 से अधिक	स

आपकी निजी जानकारी के अनुसार उपरोक्त जानवर आपके बीट में पाये जाते है या नहीं।
 टिप्पणी 1. क्षेत्र में बकरी/भेड़ चरती हैं?
 2. अगर आपको नीलगाय / चौसिंगा / चीतल / सांभर / जंगली सूअर की लेंडियों का ठेक मिले तो उसे आप निम्नलिखित श्रेणियों के अनुसार लिखें-

गिद्ध सर्वे (प्रथम चार दिवस)

प्रपत्र -6

बीट प्रभारी का नाम :
 बीट संख्या व नाम :

रेंज :

क्र.सं.	दिनांक व समय	गिद्ध प्रजातियाँ * देखी गईं	संख्या	गतिविधियाँ (उड़ान/बसरे में/भोजन)	वन प्रकार
1					
2					
3					
4					
5					
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7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

* गिद्ध प्रजातियाँ- लॉग बिल्ड क्लबर्स, किंग वल्कर, वाईट बैंक वल्कर, स्कैक्जर बल्कर

Annexure – 33

List of Beat wise PIP & CameraTrap Location in Buffer of Sariska Tiger Reserve

रेंज का नाम	नाका	बीट का नाम व नं०	PIP NO	अक्षांश N			देशांतर E		
				दृिी	मिटर	सैकण्ड	दृिी	मिटर	सैकण्ड
अलवर बफर	प्रतापबन्ध	भूरासिद्ध -1	1	27	32	7.46	76	35	1.01
			2	27	32	7.13	76	35	0.76
			3	27	32	6.48	76	35	0.24
			4	27	32	7.30	76	35	1.29
			5	27	32	6.78	76	35	1.82
		प्रतापबन्ध-2	1	27	34	4.50	76	34	3.39
			2	27	35	0.43	76	34	2.38
			3	27	35	0.74	76	34	3.03
			4	27	35	0.14	76	34	2.74
			5	27	34	1.54	76	34	5.19
		3- बालाकिला	1	27	35	0.01	76	35	3.16
			2	27	35	1.58	76	35	3.28
			3	27	34	2.74	76	35	1.73
			4	27	34	5.70	76	35	0.95
			5	27	35	0.31	76	35	0.94
		4-अंधेरी	1	27	35	4.65	76	35	1.96
			2	27	35	4.60	76	35	2.41
			3	27	35	5.17	76	35	9.10
			4	27	34	3.18	76	35	5.30
			5	27	34	5.86	76	35	6.50
		5-निदानी	1	27	35	9.80	76	34	9.95
			2	27	35	9.81	76	35	1.71
			3	27	35	0.25	76	35	3.45
			4	27	36	0.53	76	35	4.22
			5	27	36	0.75	76	35	4.25

		6-गंगोडी	1	27	35	6.60	76	33	9.64
			2	27	34	9.22	76	33	4.75
			3	27	33	9.69	76	32	8.78
			4	27	33	7.36	76	32	6.39
			5	27	34	3.75	76	33	4.22
		7-हाजीपुर डडीकर	1	27	36	1.10	76	33	2.13
			2	27	35	9.50	76	32	9.43
			3	27	35	4.12	76	31	8.40
			4	27	35	4.02	76	32	7.20
			5	27	35	3.81	76	31	9.91
		8- डोबारिंगसपुरी	1	27	31	9.79	76	31	9.65
			2	27	31	9.52	76	31	9.82
			3	27	31	9.37	76	31	9.86
			4	27	31	7.82	76	32	0.09
			5	27	31	6.43	76	32	0.92
	उमैरण	9-उमरैण	1	27	30	2.25	76	33	3.28
			2	27	30	1.99	76	33	1.83
			3	27	30	2.27	76	33	1.69
			4	27	30	4.33	76	32	4.50
			5	27	31	0.65	76	32	5.47
		10- बारालिवारी	1	27	31	1.66	76	30	5.82
			2	27	31	3.20	76	34	1.39
			3	27	31	1.85	76	34	0.66
			4	27	31	1.98	76	34	5.43
			5	27	31	4.37	76	34	5.43
	सीरावास	11- मेंढकी	1	27	36	0.53	76	27	5.90
			2	27	36	7.29	76	27	3.40
			3	27	36	3.73	76	27	4.09
			4	27	35	9.25	76	27	6.23
			5	27	36	2.10	76	27	8.55
		12- सीरावास	1	27	34	2.90	76	29	4.22
			2	27	35	4.77	76	29	4.52
			3	27	36	1.76	76	36	2.09
			4	27	36	2.09	76	29	5.43
			5	27	36	5.14	76	29	0.04

		13- बांसी	1	27	38	5.47	76	38	8.23
			2	27	38	6.12	76	29	0.26
			3	27	38	5.59	76	28	8.66
			4	27	35	8.84	76	28	9.00
			5	27	37	8.16	76	28	6.47
	हमीरपुर	14- हमीरपुर	1	27	42	0.94	76	28	4.55
			2	27	42	0.46	76	28	4.22
			3	27	42	1.58	76	28	3.74
			4	27	41	1.82	76	29	1.26
			5	27	41	1.71	76	29	2.00
		15- धामला का बास	1	27	40	2.60	76	27	5.59
			2	27	39	3.57	76	36	0.33
टहला	बीघोता	प्रधानो का गुवाडा- 16	1	27	12	18.1	76	28	46.5
			2	27	12	14.7	76	28	42.5
			3	27	12	5.9	76	28	35.0
			4	27	11.3	34.5	76	28	18.2
			5	27	11	19.0	76	28	5.9
		बीरपुर- 17	1	27	9	62.8	76	27	92.6
			2	27	9	56.0	76	27	0.96
			3	27	8	62.0	76	26	70.4
			4	27	8	53.3	76	26	82.3
			5	27	8	26.0	76	27	21.0
अजबगढ	डिगोता	डिगोता I -18	1	27	7	52.2	76	16	19.7
			2	27	8	0.6	76	16	19.6
			3	27	8	10.2	76	16	15.8
			4	27	8	16.5	76	16	13.3
			5	27	8	12.6	76	16	12.9
		डिगोता II- 19	1	27	7	9.7	76	15	42.0
			2	27	6	33.6	76	14	50.5
			3	27	6	21.7	76	14	24.2
			4	27	6	59.0	76	14	16.2
			5	27	8	0.2	76	14	10.0

		नेतावाला- 20	1	27	4	0.5	76	16	33.1
			2	27	4	43.6	76	15	56.3
			3	27	6	1.2	76	16	9.9
			4	27	5	51.6	76	15	22.4
			5	27	5	3.7	76	15	45.1
		रायावाला-21	1	27	6	51.6	76	14	3.5
			2	27	6	39.8	76	13	32.5
			3	27	7	5.3	76	13	36.1
			4	27	6	8.7	76	13	29.7
			5	27	6	21.0	76	14	0.0
	सानकोटडा	सानकोटडा- 22	1	27	5	58.8	76	10	53.8
			2	27	5	33.1	76	10	56.4
			3	27	5	36.8	76	11	41.8
			4	27	6	47.8	76	12	18.5
			5	27	6	38.3	76	12	44.7
		बिरकडी -23	1	27	9	12.1	76	14	19.8
			2	27	9	19.0	76	14	32.1
			3	27	9	35.1	76	14	49.8
			4	27	9	23.6	76	15	26.1
			5	27	9	28.0	76	14	39.1

Annexure – 34

List of Beat wise Transect Line in Buffer of Sariska Tiger Reserve

रेंज का नाम	नाका	बीट का नाम व नं०	ट्रांजेक्ट लाईन का I.D.	अक्षांश N			देशांतर E		
				दिग्री	मिनिट	सेकण्ड	दिग्री	मिनिट	सेकण्ड
अलवर बफर	प्रतापबन्ध	भूरासिद्ध -1	TL-1 मिलेट्री फायरिंग रेंज से भाखेडा 0 KM	27	33	0.41	76	35	4.62
			TL-1 मिलेट्री फायरिंग रेंज से भाखेडा 2 KM	27	31	9.41	76	35	2.39
			TL- 2 झिक्की की खान से झिरना तक 0 KM	27	33	0.44	76	35	1.70
			TL-2 झिक्की की खान से झिरना तक 1.6 KM	27	32	4.42	76	34	8.75
		प्रतापबन्ध-2	TL-1 रावण देवरा से पुलिस फायरिंग रेंज 0 KM	27	34	4.17	76	34	6.80
			TL-1 रावण देवरा से पुलिस फायरिंग रेंज 1.6 KM	27	33	7.44	76	34	3.77
			TL-2 नागावाली जोहडी से जम्मूसाना 0 KM	27	35	7.04	76	34	5.33
			TL-2 नागावाली जोहडी से जम्मूसाना 2 KM	27	34	7.18	76	34	7.18
		3- बालाकिला	TL-1 सूरजकुण्ड से चक्रधारी हनुमान 0 KM	27	35	3.60	76	35	3.67
			TL-1 सूरजकुण्ड से चक्रधारी हनुमान 1.2 KM	27	34	6.92	76	35	4.84
			TL-2 अंधेरी गेट से हवाबुर्ज 0 KM	27	35	2.27	76	35	1.58
			TL-2 अंधेरी गेट से हवाबुर्ज 1.6 KM	27	34	3.89	76	35	3.42
		4-अंधेरी	TL-1 आडा पारा से अंधेरी होदी 0 KM	27	35	1.59	76	34	5.65
			TL-1 आडा पारा से अंधेरी होदी 1.8 KM	27	35	6-0	76	34	8.10
			TL-2 मदारघाट से कृष्णकुण्ड 0 KM	27	34	5.77	76	35	6.35
		5-निदानी	TL-1 विजयमंदिर से धोलीधूप 0 KM	27	37	7.64	76	35	8.86
			TL-1 विजयमंदिर से धोलीधूप 2 KM	27	36	8.99	76	36	1.41

			TL-2 धोलीधूप से माच का तिराहा 0 KM	27	36	5.75	76	35	5.28
			TL-2 धोलीधूप से माच का तिराहा 1.6 KM	27	36	0.90	76	35	5.23
		6-गंगोडी	TL-1 हाजीपुर घाटा से गंगोडी 0 KM	27	35	7.30	76	33	8.19
			TL-1 हाजीपुर घाटा से गंगोडी 2 KM	27	34	5.44	76	33	2.28
			TL-2 गंगोडी जोहडी से सुगन होदी 0 KM	27	34	2.34	76	33	1.10
			TL-2 गंगोडी जोहडी से सुगन होदी 1.6 KM	27	33	4.50	76	32	3.88
		7-हाजीपुर डडीकर	TL-1 घाटा से झिक्की की खान 0 KM	27	36	5.90	76	33	3.18
			TL-1 घाटा से झिक्की की खान 2 KM	27	35	3.60	76	32	3.84
			TL-2 हाजीपुर खान से शामशाह की दह 0 KM	27	36	2.30	76	31	3.35
			TL-2 हाजीपुर खान से शामशाह की दह 1.6 KM	27	37	1.70	76	31	4.97
		8-डोबारिंगस पुरी	TL-1 सिलीसेढ से टिण्डारा 0 KM	27	32	1.47	76	32	0.66
			TL-1 सिलीसेढ से टिण्डारा 2 KM	27	33	1.48	76	32	1.89
			TL-2 डोबा से भोपर 0 KM	27	33	0.21	76	31	3.23
			TL-2 डोबा से भोपर 2 KM	27	33	3.12	76	31	0.26
	उमैरण	9-उमरैण	TL-1 श्योदानपुरा से कबूतरखाना 0 KM	27	30	18.9	76	32	44.20
			TL-1 श्योदानपुरा से कबूतरखाना 2 KM	27	31	23.8	76	32	48.5
			TL-2 उमरैण जोहडी से जेठबहू की चौतरी 0 KM	27	30	18.0	76	33	19.2
			TL-2 उमरैण जोहडी से जेठबहू की चौतरी 1.6 KM	27	31	2.6	76	33	48.8
		10-बारालिवारी	TL-1 लोहिया की जोहडी से भांखेडा कांकड 0 KM	27	31	14.0	76	34	59.0
			TL-1 लोहिया की जोहडी से भांखेडा कांकड 1.6 KM	27	32	5.7	76	34	58.9
			TL-2 लिवारी प्लांटेशन से जोहडी तक 0 KM	27	31	17.3	76	34	48.0

			TL-2 लिवारी प्लांटेशन से जोहडी तक 2 KM	27	31	17.3	76	33	34.1
	सीरावास	11- मेंढकी	TL-1 सीरावास से हाजीपुर 0 KM	27	35	56.8	76	27	43.6
			TL-1 सीरावास से हाजीपुर 2 KM	27	34	50.4	76	28	1.2
			TL-2 सीरावास से बूजा की सीमा 0 KM	27	36	1.9	76	27	33.6
			TL-2 सीरावास से बूजा की सीमा 2 KM	27	37	6.4	76	27	37.1
		12- सीरावास	TL-1 सीरावास से बावरियां की ढाणी 0 KM	27	36	40.4	76	28	3.5
			TL-1 सीरावास से बावरियां की ढाणी 2 KM	27	37	37.1	76	28	4.7
			TL-2 अढावल से रोगडा 0 KM	27	35	50.1	76	29	26.8
			TL-2 अढावल से रोगडा 2 KM	27	34	30.6	76	29	42.0
		13- बांसी	TL-1 पीर से सीलकोट 0 KM	27	36	56.2	76	28	8.7
			TL-1 पीर से सीलकोट 2 KM	27	36	58.3	76	28	9.9
			TL-2 नईबसावट से गुवाडो के उपर 0 KM	27	37	44.9	76	29	1.4
			TL-2 नईबसावट से गुवाडो के उपर 2 KM	27	38	50.6	76	28	52.8
	हमीरपुर	14- हमीरपुर	TL-1 भैरूघाटी से धान 0 KM	27	42	2.4	76	29	41.8
			TL-1 भैरूघाटी से धान 2 KM	27	40	44.0	76	29	39.8
			TL-2 कसाना की झोपडी से बांसी जाहड 0 KM	27	40	49.2	76	28	55.2
			TL-2 कसाना की झोपडी से बांसी जाहड 2 KM	27	39	42.9	76	28	51.0
		15- धामला का बास	TL-1 नारखोला से हाजीपुर 0 KM	27	41	21.0	76	28	3.7
			TL-1 नारखोला से हाजीपुर 2 KM	27	40	19.8	76	27	38.7
			TL-2 धामला का बास एनिकट से मेंढकी 0 KM	27	40	13.8	76	27	48.5
			TL-2 धामला का बास एनिकट से मेंढकी 2 KM	27	38	48.6	76	27	35.2

टहला	बीघोता	प्रधानों का गुवाडा 16	TL-1 कुण्डला से काकडं तक 0 Mt	27	12	18.40	76	28	39.9
			कुण्डला से काकडं तक 2000 Mt	27	11	35.3	76	28	17.7
			TL-2 <u>Q</u> mt	27	11	33.2	76	28	16.5
			2000Mt	27	10	46.6	76	27	56.7
		बीरपुर 17	TL-1 रामसिंहपुरा से खडगा बाबा तक 0 Mt	27	10	43.4	76	27	52.3
			रामसिंहपुरा से खडगा बाबा तक 2000 Mt	27	9	53.6	76	27	50.3
			TL-2 <u>Q</u> Mt	27	9	46.0	76	27	48.6
			2000 Mt	27	9	10.7	76	27	5.6
अजबगढ	डिगोता	18- डिगोता I	TL-1 <u>Q</u> Mt	27	7	39.3	76	16	17.6
			2000 Mt	27	8	38.7	76	16	14.9
			TL-2 <u>Q</u> Mt	27	8	16.3	76	16	15.2
			2000 Mt						
		19- डिगोता II	TL-1 <u>Q</u> Mt	27	6	24.9	76	14	23.7
			2000 Mt	27	7	6.3	76	14	17.0
			TL-2 <u>Q</u> Mt	27	7	46.6	76	13	33.6
			2000 Mt	27	7	27.1	76	14	27.9
		20- नेतावाला	TL-1 <u>Q</u> Mt	27	4	16.5	76	16	0.9
			2000 Mt	27	8	15.5	76	16	14.0
			TL-2 <u>Q</u> Mt	27	5	52.8	76	15	20.4
			2000 Mt	27	6	3.1	76	15	22.3
		21- रायावाला	TL-1 <u>Q</u> Mt	27	6	18.6	76	14	16.7
			2000 Mt	27	6	43.7	76	13	44.2
			TL-2 <u>Q</u> Mt	27	6	56.6	76	13	32.6
			2000 Mt	27	5	47.0	76	13	25.2
	सानकोटडा	22- सानकोटडा	TL-1 <u>Q</u> Mt	27	6	37.0	76	12	43.7
			2000 Mt	27	6	8.8	76	12	6.4
			TL-2 <u>Q</u> Mt	27	5	58.8	76	12	13.1
			2000 Mt	27	5	8.8	76	12	28.4
		23- बिरकडी	TL-1 <u>Q</u> Mt	27	9	7.5	76	14	25.4
			2000 Mt	27	9	7	76	14	7
			TL-2 <u>Q</u> Mt	27	9	35.1	76	14	49.8
			2000 Mt	27	9	6	76	15	1

List of Buildings in Buffer of Sariska Tiger Reserve

Annexure – 35

रेंज का नाम	नाका/ बीट का नाम	अक्षांश N			देशांतर E		
		दिशी	मिटर	सेकण्ड	दिशी	मिटर	सेकण्ड
अलवर बफर	नाका प्रतापबन्ध	27	34	0.27	76	35	33.25
	वन चौकी भूरासिद्ध	27	32	47.1	76	35	32.7
	वन चौकी प्रतापबन्ध	27	34	1.38	76	35	7.28
	वन नाका उमैण	27	29	39.04	76	33	0.94
	वन नाका सीरावास	27	36	19.68	76	28	16.12
अजबगढ	वन नाका डिगोता	27	7	35.3	76	16	14.4
	वन चौकी नेतावल	27	4	6.1	76	15	35.2
	वन नाका सानकोटडा	27	15	30.6	76	10	56.8
	वन चौकी रायवाला	27	6	3.4	76	14	11.5
	वन चौकी बिरकडी	27	9	5	76	14	24.7
टहला	वन नाका कुण्डला	27	12	37.1	76	28	81.6

List of Water holes in Buffer of Sariska Tiger Reserve with GPS

रेंज का नाम	नाका	बीट का नाम व नं०	वॉटर होल का नाम	अक्षांश N			देशांतर E		
				दृिशी	मिनट	सेकण्ड	दृिशी	मिनट	सेकण्ड
अलवर बफर	प्रतापबन्ध	भूरासिद्ध -1	मंदिर की खेल	27	32	7.60	76	35	0.80
			समाधी के पास	27	32	7.16	76	35	0.83
			सैयद बाबा के पास	27	32	6.36	76	35	0.12
			प्लॉटेशन में खेल	27	32	6.84	76	35	1.70
			चौकी के पास	27	32	7.78	76	35	4.97
	प्रतापबन्ध-2	डकाव के नीचे	27	34	4.47	76	34	2.44	
		आडा पाडा मंदिर	27	35	0.48	76	34	2.34	
		आडा पारा खेल	27	35	0.56	76	34	2.94	
		बगीची कुण्ड	27	35	0.16	76	34	2.77	
		हनुमान मंदिर कुंड	27	34	1.50	76	34	5.16	
		सुनारो की बगीची	27	34	1.16	76	34	4.33	
		चूड सिद्ध	27	34	0.73	76	35	0.44	
		3- बालाकिला	सूरजपोल खेल	27	35	5.99	76	35	3.16
			सूरजपोल कुंड	27	35	1.87	76	35	3.12
			चक्रधारी हनुमान कुंड	27	34	3.51	76	35	2.93
बलाकिला टंकी के पास	27		34	2.93	76	35	1.73		
तोप वाला हनुमान कुण्ड	27		34	3.40	76	35	2.37		
4-अंधेरी	करणी मंदिर खेल	27	34	5.33	76	35	0.73		
	करणी माता के पीछे	27	34	5.24	76	35	0.95		
	गुणी वाला हनुमान	27	35	0.31	76	35	0.91		
	अंधेरी खेल 1	27	35	4.68	76	35	1.98		
	अंधेरी खेल 2	27	35	4.63	76	35	2.39		
	चौडकी होदी	27	35	5.15	76	35	9.06		
	भैरुजी कुण्ड	27	35	5.13	76	35	9.60		
	सागर के पास	27	34	2.51	76	35	5.75		
	हनुमान मंदिर किशन कुण्ड	27	34	3.24	76	35	5.33		
	5-निदानी	मघ का तिराया	27	35	9.55	76	34	5.94	
तोडियार खेल 1		27	36	3.43	76	34	7.53		
तोडियार खेल 2		27	37	3.94	76	35	2.66		
विजय मंदिर बांध		27	38	1.58	76	35	7.18		
धोली धूप खेल		27	37	7.30	76	35	9.39		

		6-गंगोडी	घाटा बावडी	27	35	6.81	76	33	9.79
			गंगोडी खेल	27	34	9.39	76	33	4.97
			पुलिया वॉटरहोल	27	33	9.83	76	32	8.91
			सुगन होदी	27	33	7.47	76	32	6.48
			जम्मूसाना घाटी	27	34	3.87	76	33	4.36
		7-हाजीपुर डडीकर	झिक्की खान	27	35	8.47	76	34	3.68
			हाजीपुर जोहड	27	36	1.28	76	33	2.39
			खान वाला जोहड	27	35	9.70	76	32	9.63
			टंकी वाला जोहड	27	35	4.42	76	31	8.70
		8- डोबारिंगसपुरी	सिलीसेढ ऊपरा	27	32	0.05	76	31	9.60
			रिंगसपुरी घुम	27	31	7.51	76	32	1.75
			टिण्डारा	27	31	8.03	76	32	1.68
	उमैरण	9-उमरैण	शुयोदानपुरा जोहडी	27	30	2.25	76	33	3.28
			उमरैन जोहडी	27	30	1.97	76	33	1.81
		10- बारालिवारी	नर्सरी	27	31	1.66	76	30	5.82
	सीरावास	11-मेंढकी	कुएं पर खेल	27	36	7.49	76	27	3.40
			गूलर दह	27	35	9.55	76	27	6.43
		12- सीरावास	मेंढकी रास्ते पर	27	34	2.90	76	29	4.22
			बागपत	27	35	4.77	76	29	4.52
			बावरियों की ढाणी	27	36	1.76	76	36	2.09
			रोगडा खेल	27	36	2.09	76	29	5.43
			मीणों की ढाणी	27	36	5.14	76	29	0.04
		13- बांसी	रावल	27	38	5.47	76	28	8.23
			चूडासिद्ध नदी	27	37	8.16	76	28	6.47
	हमीरपुर	14- हमीरपुर	मेंढकी जोहडा	27	42	0.76	76	29	0.09
			मीणा वाला जोहडा	27	42	0.78	76	28	4.44
			भैरू घाटी	27	42	1.33	76	28	3.66
			गूगाजी जोहड	27	42	0.80	76	29	0.10
			मेडा अधीरा जोहड	27	41	3.12	76	28	5.42
		15- धामला का बास	धामला जोहड	27	38	4.59	76	27	3.54
			धामला बास खेल	27	31	7.99	76	39	2.83
		डिगोता II- 19	पीली खान	27	09	15.5	76	15	23.2
	सानकोटडा	सानकोटडा- 22	चौकी के पीछे	27	05	30.6	76	10	57.9
			कान्ही दह	27	06	03.6	76	14	12.6

Flora of Sariska Tiger Reserve

<u>S.No.</u>	<u>Name of Plant</u>			
1.	<i>Alangium salyfolium</i>	(r)	26.	<i>Erythrina suberosa</i> (r)
2.	<i>Cassia fistula</i>	(c)	27.	<i>Ficus tomentosa</i> (c)
3.	<i>Bauhinia malabarica</i>	(r)	28.	<i>Gmelina arborea</i> (r)
4.	<i>Embllica officinalis</i>	(lc)	29.	<i>Zizyphus zytopyra</i> (c)
5.	<i>Allanthus excelsa</i>	(r)	30.	<i>Cordia dichotoma</i> (lc)
6.	<i>Clorodendron phlomides</i>	(c)	31.	<i>Cordia rothii</i> (r)
7.	<i>Acacia leuceptloea</i>	(c)	32.	<i>Ficus glomerata</i> (lc)
8.	<i>Acacia nilotica</i>	(lc)	33.	<i>Lannea coromandelica</i> (c)
9.	<i>Terminalia bellerica</i>	(r)	34.	<i>Adina cardifolia</i> (r)
10.	<i>Ehretia laevis</i>	(r)	35.	<i>Balanites aegyptica</i> (c)
11.	<i>Ficus bengalensis</i>	(lc)	36.	<i>Tamarindus indica</i> (r)
12.	<i>Crataeva adinsonia</i>	(lc)	37.	<i>Anogeissus acuminata</i> (r)
13.	<i>Aegle marmelos</i>	(r)	38.	<i>Holopterna antidysentrica</i> (lc)
14.	<i>Zizyphus mauritiana</i>	(f)	39.	<i>Sizygium cumini</i> (lc)
15.	<i>Limonia acidissima</i>	(lc)	40.	<i>Banhinia racemosa</i> (c)
16.	<i>Dichrostrachys cinerea</i>	(c)	41.	<i>Prosopis juliflora</i> (lc)
17.	<i>Diospyros melanoxylon</i>	(c)	42.	<i>Sterculia urens</i> (r)
18.	<i>Butea monosperma</i>	(c)	43.	<i>Ferronia limonia</i> (r)
19.	<i>Casaria tomentosa</i>	(r)	44.	<i>Maytenus emarginata</i> (c)
20.	<i>Diospyros montana</i>	(c)	45.	<i>Flacoreritia indica</i> (lc)
21.	<i>Holoptelia integrifolia</i>	(c)	46.	<i>Mitragyna parvifolia</i> (lc)
22.	<i>Grewia tiliaefolia</i>	(c)	47.	<i>Albizia odoratissima</i> (r)
23.	<i>Anogeissus latifolia</i>	(lc)	48.	<i>Bridelia retusa</i> (r)
24.	<i>Anogeissus pendula</i>	(f)	49.	<i>Pongamia pinnata</i> (lc)
25.	<i>Tamarix aphylla</i>	(r)	50.	<i>Capparis decidua</i> (c)
			51.	<i>Acacia catechu</i> (c)
			52.	<i>Phoenix sylvestris</i> (lc)
			53.	<i>Salvadora persica</i> (lc)

54.	<i>Mimusops hexandra</i>	(r)
55.	<i>Prosopis cinearia</i>	(r)
56.	<i>Acacia senegal</i>	(c)
57.	<i>Wrightia tinctoria</i>	(c)
58.	<i>Wrightia tomentosa</i>	(c)
59.	<i>Sacoptetalum tomentosa</i>	(r)
60.	<i>Boswellia serrata</i>	(a)
61.	<i>Nyctanthes arbortristis</i>	(lc)
62.	<i>Hymenodictylon excelsum</i>	(r)
63.	<i>Schrebera swietenoides</i>	(r)
64.	<i>Mimosups elengi</i>	(r)
65.	<i>Azadirachta indica</i>	(r)
66.	<i>Dalbergia paniculata</i>	(r)
67.	<i>Ficus lacor</i>	(r)
68.	<i>Ficus cordifolia</i>	(r)
69.	<i>Grewia salvifolia</i>	(r)
70.	<i>Ficus religissa</i>	(lc)
71.	<i>Salvadsra olesides</i>	(lc)
72.	<i>Kydia calycina</i>	(r)
73.	<i>Soyamida febrituga</i>	(r)
74.	<i>Mallotus philippinensis</i>	(lc)
75.	<i>Tecomella undulata</i>	(r)
76.	<i>Moringa pterygosperma</i>	(r)
77.	<i>Bombax ceiba</i>	(r)
78.	<i>Dalbergia sisso</i>	(lc)
79.	<i>Albizzia lebbek</i>	(lc)
80.	<i>Albizzia procera</i>	(lc)
81.	<i>Terminalia arjuna</i>	(locally endemic)
82.	<i>Euphorbia nerifolia</i>	(c)

SCRUB & FIELD LEVEL FLORA (

1. *Xanthium strumarium*
2. *Typha elephantina*
3. *Calotropis procera*
4. *Achyranthes aspera*
5. *Cassia auriculata*
6. *Cleome gynandra*
7. *Adhatoda vasica*
8. *Withania somnifera*
9. *Martynia dandra*
10. *Embelli robusta*
11. *Barleria prionitus*
12. *Barleria cristata*
13. *Barleria cacrulea*
14. *Theperia lampas*
15. *Crotolaria mediacaginea*
16. *Acacia jacquemontii*
17. *Ocimum americanum*
18. *Tephrosia hookeriana*
19. *Indigofera cordifolia*
20. *Indigofera anabaptista*
21. *Indigofera linifolia*
22. *Indigofera hirsuta*
23. *Ipomea fistula*
24. *Centella asiatica*
25. *Solanum xanthocarpum*
26. *Commelina bengalensis*
27. *Grewia flavescens*
28. *Pupalia lappacea*
29. *Mollugo cerviana*
30. *Dyrophyton indica*
31. *Plumbago zeylanica*
32. *Fagonia cretica*
33. *Tephrosia purpuria*
34. *Tephrosia pumila*
35. *Tephrosia strigosa*
36. *Tephrosia uniflora var pertusa*
37. *Datura metel*
38. *Woodfordia fruticosa*
39. *Grewia villosa*
40. *Euphorbia hirta*
41. *Euphorbia crenulata*
42. *Euphorbia hypericifolia*
43. *Euphorbia pilulifera*
44. *Euphorbia prostata*
45. *Euphorbia micrphylla*
46. *Grewia tenax*
47. *Tribulus terrestris*
48. *Commiphora mukul*
(*Commiphora wightii*)
49. *Aloe barbadensis*
50. *Convolvulus arvenscs*
51. *Capparis sepriaria*
52. *Ameranthus spinosus*
53. *Carrisa spinarum*
54. *Sesamum indium*
55. *Zizyphus nummularia*

56. *Zizyphus fruticosa*
57. *Indigofera oblongifolia*
58. *Peristrophe bicalyculata*
59. *Phyllanthus reticulatus*
60. *Phyllanthus fraternus*
61. *Cassia occidentalis*
62. *Pandanus odoratissimus*
63. *Sida ovata*
64. *Sida rhombifolia*
65. *Sida cordata*
66. *Sida cordifolia*
67. *Sida acuta*
68. *Corotolana burhia*
69. *Rhus mysorensis*
70. *Leptadimia pyrotechnica*
71. *Andrographis paniculata*
72. *Andrographis echinoides*
(Indonesiella echinoides)
73. *Urgenia indica*
74. *Corchorus trilocularis*
75. *Corchorus aestuens*
76. *Lantana indica*
77. *Solanum nigrum*
78. *Helicteris isora*
79. *Leucas aspera*
80. *Leucas hirta*
81. *Leucas cephalotes*
82. *Opuntia dilen*
83. *Vitax negundo*
84. *Cassia tora*
85. *Cassia purpura*
86. *Bidens biternata*
87. *Bidens pilosa*
88. *Abutilon bidentatum*
89. *Abutilon indicum*
90. *Agave americana*
91. *Vernonia cineria*
92. *Boerhavia diffusa*
93. *Borreria hispida*
94. *Borreria stricta*
95. *Mollugo hirta*
96. *Desmodium gangeticum*
97. *Desmodium repandum*
98. *Evolvulus alsinoides*
99. *Argemone mexicana*
100. *Lepidagathis cuspidata*
101. *Lepidagathis trinervis*
102. *Boerhavia repanda*
103. *Boerhavia verticillata*
104. *Commellina erecta*
105. *Commellina kurzii*
106. *Commelliana forskalaci*
107. *Digeria muricata*
108. *Elytaria acaulis*
109. *Celosia argentea*
110. *Oxalis corniculata*

111. *Echinops echinatus*
 112. *Acalypha ciliata*
 113. *Linaria remosissima*
 114. *Linderbergia indica*
 115. *Lindernia crustesia*
 116. *Aeschynomene indica*
 117. *Lubwigia perennis*
 118. *Tridax procumbens*
 119. *Triumfetta rhomboidea*
 120. *Abrus precatorius*
 121. *Lindernia ciliata*
 122. *Solanum indicum*
 123. *Sclerocarpus africanus*
 124. *Blairvillea divaricata*
 125. *Lencas cephalotus*
 126. *Physalis minima*
 127. *Hibiscus lobatus*
 128. *Hibiscus micranthus*
 129. *Eclipta alba*
 130. *Arisomiles Indica*
 131. *Aerva sanguinolenta*
 132. *Amaranthus viridis*
 133. *Amaranthus spinosus*
 134. *Rangia parviflora*
 135. *Cocculus hirsutus*
 136. *Ichnocarpus frutescens*
 137. *Melhania fultey porense*
 138. *Acalypha indica*
 139. *Anisochilus camora*
 140. *Blepharis maderaspatensis*
 141. *Cardiospermum halicacabum*
 142. *Cayratya trifoliata*
 143. *Cleome viscora*
 144. *Convolvulus microphyllus*
 145. *Deptaracanthus prostratus*
 146. *Depteracanthus patulus*
 147. *Ipomea muricata*
 148. *Ipomea dichora*
 149. *Ipomea pestigridis*
 150. *Ipomea nil*
 151. *Merremia aegyptica*
 152. *Partulaka pilosa*
 153. *Rhynchosia minima*
 154. *Acacia pinnata*
 155. *Millelia auriculata*
 156. *Momordica dioica*
 157. *Celastrus paniculata*
 158. *Capparis zeylanica*
 159. *Asparagus racemosus*
 160. *Lufa actuangula*
 161. *Gloriosa superba*
 162. *Rivea hypocraetariformis*
 163. *Cuscuta reflexa*
 164. *Loranthus longiflorus*
 165. *Cassytha filiformis*
 166. *Parthenium hysterophorus*
 167. *Sopubia delphinifolia*
 168. *Dendrocalamus strictus*
 169. *Mucuna pruriens*

GROUND LEVEL FLORA

1. *Alloteropsis cimicona*
2. *Aristida hystrix*
3. *Aristida depressa*
4. *Andropogon pumilus*
5. *Arundo donax*
6. *Aristida adseenscionis*
7. *Arthraxon quartinianus*
8. *Alloteropsis cimicina*
9. *Bothriochloa pertusa*
10. *Brachiaria ramosa*
11. *Cenchrus setigerus*
12. *Cenchrus parvatus*
13. *Cenchrus biflorus*
14. *Cenchrus ciliaris*
15. *Chloris dolichostachia*
16. *Chloris virgata*
17. *Chloris roxburghiana*
18. *Chloris inflata*
19. *Coix gigantea*
20. *Cyperus platystylis*
21. *Cyperus triceps*
22. *Cyperus rotundus*
23. *Cynodon dactylon*
24. *Cymbopogon jwarancusa*
25. *Cymbopogon martinii*
26. *Dactyloctenium aegyptium*
27. *Dactyloctenium aegyptium*
28. *Desmostachya bipinnata*
29. *Dichanthium caricosum*
30. *Digitaria adscendens*
31. *Dichanthium annulatum*
32. *Digitaria barbata*
33. *Digitaria cruciata*
34. *Eremopogon favodelatus*
35. *Eleusine indica*
36. *Eragrostiella bifaria*
37. *Erianthus munja*
38. *Eragrostis tremula*
39. *Echinochloa colorum*
40. *Eragrostis ciliaris*
41. *Eragrostis tenella*
42. *Eleusine indica*
43. *Heteropogon contortus*
44. *Hackelochloa granularis*
45. *Iseima laxum*
46. *Iseima prostratum*
47. *Imperata cylindrica*
48. *Microchloa indica*
49. *Malanoclenchris plumosa*
50. *Oropetium thomaeum*
51. *Oplismenus undulatifolius*
52. *Oplismenus burmannii*
53. *Panicum antidotale*
54. *Paspalum scrobiculatum*
55. *Paspalum distichum*
56. *Paspalum flavidium*
57. *Perotis indica*
58. *Panicum coloratum*
59. *Pennisetum cenchroides*

60. *Rottboellia exaltata*
61. *Sorghum halepense*
62. *Setaria glauca*
63. *Setaria verticillata*
64. *Saccharum spontaneum*
65. *Setaria nervosum*
66. *Sporobolus marginalis*
67. *Sporobolus coromandelianum*
68. *Setaria pallida*
69. *Tragus biflorus*
70. *Tetrapogon tenellus*
71. *Themeda quadrivalvis*
72. *Vetivera zizanioides*

MOST COMMON FERNS

1. *Achttiniopteris dichotoma*
2. *Adiantum capillaris vemeris*
3. *Equisitum debile*
4. *Marsilea minuta*

Check List of Wild Animals in Sariska Tiger Reserve

Sr. No.	Common English Name / Main Carnivora	Scientific (Latin) Name
1.	Tiger	<i>Panthera tigris</i>
2.	Leopard	<i>Panthera pardus</i>
3.	Caracal	<i>Fellis caracal</i>
4.	Jungle Cat	<i>Fellis chaus</i>
ARTIDACTYLA		
5.	Sambar	<i>Cervus unicolor</i>
6.	Chital / Spotted Deer	<i>Axis axis</i>
7.	Blue Bull or Nilgai	<i>Boselaphus tragocamalus</i>
8.	Chinkara or Indian Gazelle	<i>Gazella gazella</i>
9.	Indian Wild Boar	<i>Sus scrofa</i>
SCAVENGERS		
10.	Striped Hyaena	<i>Hyaena hyaena</i>
11.	Jackal	<i>Canis aureus</i>
PRIMATES		
13.	Rhesus Monkey / Maraque	<i>Macaca mulatta</i>
14.	Common Langur	<i>Presbytis entellus</i>
RODENTIA		
15.	Indian Porcupine	<i>Hystrix indica</i>
16.	Indian Hare	<i>Lepus nigricollis</i>
OTHERS		
17.	Common Peafowl	<i>Pavo cristatus</i>
18.	Indian Python or Ajar	<i>Python molurus</i>
19.	Small Indian Civet	<i>Viverricula indica</i>
20.	Common Palm Civet	<i>Paradoxurus hermaphroditus</i>

Check List of Birds in Sariska Tiger Reserve

Sl.	Name of Bird Species	Scientific name	SIGHTING YES/NO
	Family Podicipedidae (Grebes)		
1	Little Grebe (Dabchick)	<i>Tachybaptus ruficollis</i>	
2	Great Crested Grebe	<i>Podiceps cristatus</i>	
3	Black-necked Grebe	<i>Podiceps nigricollis</i>	
	Family Pelecanidae (Pelicans)		
4	Great White Pelican (Rosy Pelican)	<i>Pelecanus onocrotalus</i>	
5	Spot-billed Pelican (Grey Pelican)	<i>Pelecanus philippensis</i>	
6	Dalmatian Pelican	<i>Pelecanus crispus</i>	
	Family Phalacrocoracidae (Cormorants/Shags)		
7	Little Cormorant	<i>Phalacrocorax niger</i>	
8	Indian Cormorant (Indian Shag)	<i>Phalacrocorax fuscicollis</i>	
9	Great Cormorant	<i>Phalacrocorax carbo</i>	
	Family Anhingidae (Darters)		
10	Darter (Snake-bird)	<i>Anhinga melanogaster</i>	
	Family Ardeidae (Herons, Egrets & Bitterns)		
11	Little Egret	<i>Egretta garzetta</i>	
12	Western Reef-Egret	<i>Egretta gularis</i>	
13	Grey Heron	<i>Ardea cinerea</i>	
14	Purple Heron	<i>Ardea purpurea</i>	
15	Great Egret (Large Egret)	<i>Casmerodius albus</i>	
16	Intermediate Egret (Median Egret)	<i>Mesophoyx intermedia</i>	
17	Cattle Egret	<i>Bubulcus ibis</i>	
18	Indian Pond-Heron	<i>Ardeola grayii</i>	
19	Little Heron (Little Green Heron)	<i>Butorides striatus</i>	
20	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	
21	Little Bittern	<i>Ixobrychus minutus</i>	
22	Yellow Bittern	<i>Ixobrychus sinensis</i>	
23	Cinnamon Bittern (Chestnut Bittern)	<i>Ixobrychus cinnamomeus</i>	
24	Black Bittern	<i>Dupetor flavicollis</i>	
25	Great Bittern (Tiger bittern)	<i>Botaurus stellaris</i>	
	Family Ciconiidae (Storks)		
26	Painted Stork	<i>Mycteria leucocephala</i>	
27	Asian Openbill (Asian Openbill-Stork)	<i>Anastomus oscitans</i>	
28	Black Stork	<i>Ciconia nigra</i>	
29	Woolly-necked Stork (White-necked Stork)	<i>Ciconia episcopus</i>	
30	White Stork (European White Stork)	<i>Ciconia ciconia</i>	
31	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	
32	Lesser Adjutant-Stork	<i>Leptoptilos javanicus</i>	
33	Greater adjutant stork	<i>Leptoptilos dubius</i>	
	Family Threskiornithidae (Ibises & Spoonbills)		

34	Glossy Ibis	<i>Plegadis falcinellus</i>	
35	Black-headed Ibis (Oriental White Ibis)	<i>Threskiornis melanocephalus</i>	
36	Black Ibis	<i>Pseudibis papillosa</i>	
37	Eurasian Spoonbill	<i>Platalea leucorodia</i>	
	Family Phoenicopteridae (Flamingos)		
38	Greater Flamingo	<i>Phoenicopterus ruber</i>	
39	Lesser Flamingo	<i>Phoenicopterus minor</i>	
	Family Anatidae (Swans, Geese & Ducks)		
40	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	
41	Greater White-fronted Goose	<i>Anser albifrons</i>	
42	Lesser White-fronted Goose	<i>Anser erythropus</i>	
43	Greylag Goose	<i>Anser anser</i>	
44	Bar-headed Goose	<i>Anser indicus</i>	
45	Ruddy Shelduck (Brahminy Shelduck)	<i>Tadorna ferruginea</i>	
46	Common Shelduck	<i>Tadorna tadorna</i>	
47	Comb Duck	<i>Sarkidiornis melanotos</i>	
48	Cotton Pygmy-Goose (Cotton Teal)	<i>Nettapus coromandelianus</i>	
49	Gadwall	<i>Anas strepera</i>	
50	Falcated Duck	<i>Anas falcata</i>	
51	Eurasian Wigeon	<i>Anas penelope</i>	
52	Mallard	<i>Anas platyrhynchos</i>	
53	Spot-billed Duck	<i>Anas poecilorhyncha</i>	
54	Northern Shoveller	<i>Anas clypeata</i>	
55	Northern Pintail	<i>Anas acuta</i>	
56	Garganey	<i>Anas querquedula</i>	
57	Baikal Teal	<i>Anas formosa</i>	
58	Common Teal	<i>Anas crecca</i>	
59	Marbled Teal	<i>Marmaronetta angustirostris</i>	
60	Red-crested Pochard	<i>Rhodonessa rufina</i>	
61	Common Pochard	<i>Aythya ferina</i>	
62	Ferruginous Pochard	<i>Aythya nyroca</i>	
63	Tufted Pochard	<i>Aythya fuligula</i>	
	Family Accipitridae (Hawks, Eagles, Buzzards, Old World Vultures, Kites, Harriers)		
64	Oriental Honey-Buzzard	<i>Pernis ptilorhynchus</i>	
65	Black-shouldered Kite	<i>Elanus caeruleus</i>	
66	Black Kite	<i>Milvus migrans</i>	
67	Brahminy Kite	<i>Haliastur Indus</i>	
68	Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i>	
69	White-tailed Eagle (White-tailed Sea-Eagle)	<i>Haliaeetus albicilla</i>	
70	Lesser Fish Eagle	<i>Ichthyophaga humilis</i>	
71	Grey headed fish eagle	<i>Ichthyophaga ichthyaetus</i>	
72	Egyptian Vulture	<i>Neophron percnopterus</i>	
73	White-rumped Vulture (Indian White-backed Vulture)	<i>Gyps bengalensis</i>	
74	Long-billed Vulture	<i>Gyps indicus</i>	

75	Eurasian Griffon	<i>Gyps fulvus</i>	
76	Cinereous Vulture	<i>Aegypius monachus</i>	
77	Red-headed Vulture	<i>Sarcogyps calvus</i>	
78	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	
79	Crested Serpent-Eagle	<i>Spilornis cheela</i>	
80	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	
81	Hen Harrier	<i>Circus cyaneus</i>	
82	Pallid Harrier	<i>Circus macrourus</i>	
83	Pied Harrier	<i>Circus melanoleucos</i>	
84	Montagu's Harrier	<i>Circus pygargus</i>	
85	Shikra	<i>Accipiter badius</i>	
86	Besra (Besra Sparrowhawk)	<i>Accipiter virgatus</i>	
87	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	
88	Northern Goshawk	<i>Accipiter gentilis</i>	
89	White-eyed Buzzard	<i>Butastur teesa</i>	
90	Common Buzzard	<i>Buteo buteo</i>	
91	Long-legged Buzzard	<i>Buteo rufinus</i>	
92	Lesser Spotted Eagle	<i>Aquila pomarina</i>	
93	Greater Spotted Eagle	<i>Aquila clanga</i>	
94	Tawny Eagle	<i>Aquila rapax</i>	
95	Imperial Eagle (Eastern Imperial Eagle)	<i>Aquila heliaca</i>	
96	Bonelli's Eagle	<i>Hieraetus fasciatus</i>	
97	Booted Eagle	<i>Hieraetus pennatus</i>	
	Family Pandionidae (Osprey)		
98	Osprey	<i>Pandion haliaetus</i>	
	Family Falconidae (Falcons)		
99	Common Kestrel	<i>Falco tinnunculus</i>	
100	Red-necked Falcon (Red-headed Falcon)	<i>Falco chicquera</i>	
101	Merlin	<i>Falco columbarius</i>	
102	Laggar Falcon (Laggar)	<i>Falco jugger</i>	
103	Shaheen Falcon (Saker)	<i>Falco peregrinus peregrinus</i>	
104	Peregrine Falcon	<i>Falco peregrinus japonensis</i>	
	Family Phasianidae (Pheasants, Partridges, Quails)		
105	Black Francolin	<i>Francolinus francolinus</i>	
106	Grey Francolin	<i>Francolinus pondicerianus</i>	
107	Jungle Bush-Quail	<i>Perdica asiatica</i>	
108	Indian Peafowl	<i>Pavo cristatus</i>	
	Family Turnicidae (Buttonquails/Bustardquails)		
109	Barred Buttonquail (Common Buttonquail)	<i>Turnix suscitator</i>	
110	Rain Quail	<i>Coturnixcoromandelica</i>	
	Family Gruidae (Cranes)		
111	Siberian Crane	<i>Grus leucogeranus</i>	
112	Sarus Crane	<i>Grus antigone</i>	
113	Demoiselle Crane	<i>Grus virgo</i>	

114	Common Crane	<i>Grus grus</i>	
	Family: Otididae		
115	Lesser Florican	<i>Eupodotis indica</i>	
	Family Rallidae (Rails, Crakes, Moorhens, Coots)		
116	Water Rail	<i>Rallus aquaticus</i>	
117	Brown Crake	<i>Amaurornis akool</i>	
118	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	
119	Baillon's Crake	<i>Porzana pusilla</i>	
120	Spotted Crake	<i>Porzana porzana</i>	
121	Ruddy-breasted Crake	<i>Porzana fusca</i>	
122	Watercock	<i>Gallinula cinerea</i>	
123	Purple Moorhen	<i>Porphyrio porphyrio</i>	
124	Common Moorhen	<i>Gallinula chloropus</i>	
125	Common Coot	<i>Fulica atra</i>	
	Family Jacanidae (Jacanas)		
126	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	
127	Bronze-winged Jacana	<i>Metopidius indicus</i>	
	Family Rostratulidae (Painted-Snipes)		
128	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	
	Family Charadriidae (Plovers, Dotterels, Lapwings)		
129	Pacific Golden-Plover	<i>Pluvialis fulva</i>	
130	Common Ringed Plover	<i>Charadrius hiaticula</i>	
131	Little Ringed Plover	<i>Charadrius dubius</i>	
132	Kentish Plover	<i>Charadrius alexandrinus</i>	
133	Northern Lapwing	<i>Vanellus vanellus</i>	
134	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	
135	River Lapwing	<i>Vanellus duvaucelii</i>	
136	Grey-headed Lapwing	<i>Vanellus cinereus</i>	
137	Red-wattled Lapwing	<i>Vanellus indicus</i>	
138	Sociable Lapwing	<i>Vanellus gregarius</i>	
139	White-tailed Lapwing	<i>Vanellus leucurus</i>	
	Family Scolopacidae (Sandpipers, Stints, Snipes, Godwits & Curlews)		
140	Eurasian Woodcock	<i>Scolopax rusticola</i>	
141	Pintail Snipe	<i>Gallinago stenura</i>	
142	Common Snipe	<i>Gallinago gallinago</i>	
143	Jack Snipe	<i>Lymnocyptes minimus</i>	
144	Black-tailed Godwit	<i>Limosa limosa</i>	
145	Eurasian Curlew	<i>Numenius arquata</i>	
146	Spotted Redshank	<i>Tringa erythropus</i>	
147	Common Redshank	<i>Tringa totanus</i>	
148	Marsh Sandpiper	<i>Tringa stagnatilis</i>	
149	Common Greenshank	<i>Tringa nebularia</i>	
150	Green Sandpiper	<i>Tringa ochropus</i>	
151	Wood Sandpiper	<i>Tringa glareola</i>	

152	Common Sandpiper	<i>Actitis hypoleucos</i>	
153	Long billed Dowitcher	<i>Limnodromus scolopaceus</i>	
154	Little Stint	<i>Calidris minuta</i>	
155	Temminck's Stint	<i>Calidris temminckii</i>	
156	Dunlin	<i>Calidris alpina</i>	
157	Curlew Sandpiper	<i>Calidris ferruginea</i>	
158	Spoonbill sandpiper	<i>Calidris pygmaea</i>	
159	Ruff	<i>Philomachus pugnax</i>	
	Family Recurvirostridae (Ibisbill, Avocets & Stilts)		
160	Black-winged Stilt	<i>Himantopus himantopus</i>	
161	Pied Avocet	<i>Recurvirostra avoetia</i>	
	Family Burhinidae (Stone-Curlew & Stone-Plovers/Thick-knees)		
162	Eurasian Thick-Knee (Stone-Curlew)	<i>Burhinus oedipnemus</i>	
163	Great Thick-Knee (Great Stone-Plover)	<i>Esacus recurvirostris</i>	
	Family Glareolidae (Coursers & Pratincoles)		
164	Indian Courser	<i>Cursorius coromandelicus</i>	
165	Collared Pratincole	<i>Glareola pratincola</i>	
166	Small Pratincole	<i>Glareola lactea</i>	
167	Oriental pratincole	<i>Glareola maldivarum</i>	
	Family Laridae (Gulls, Terns & Noddies)		
168	Herring gull	<i>Larus argentatus</i>	
169	Brown-headed Gull	<i>Larus brunnicephalus</i>	
170	Black-headed Gull	<i>Larus ridibundus</i>	
171	Gull-billed Tern	<i>Gelochelidon nilotica</i>	
172	River Tern	<i>Sterna aurantia</i>	
173	Little Tern	<i>Sterna albifrons</i>	
174	Black-bellied Tern	<i>Sterna acuticauda</i>	
175	Whiskered Tern	<i>Chlidonias hybridus</i>	
	Family Rynchopidae (Skimmers)		
176	Indian Skimmer	<i>Rynchops albicollis</i>	
	Family Pteroclididae (Sandgrouse)		
177	Chestnut-bellied Sandgrouse (Common sandgrouse)	<i>Pterocles exustus</i>	
	Family Columbidae (Pigeons & Doves)		
178	Rock Pigeon (Blue Rock Pigeon)	<i>Columba livia</i>	
179	Oriental Turtle-Dove (Rufous turtle dove)	<i>Streptopelia orientalis</i>	
180	Laughing Dove (Little Brown Dove)	<i>Streptopelia senegalensis</i>	
181	Spotted Dove	<i>Streptopelia chinensis</i>	
182	Red Collared-Dove (Red turtle dove)	<i>Streptopelia tranquebarica</i>	
183	Eurasian Collared-Dove (Ring dove)	<i>Streptopelia decaocto</i>	
184	Yellow-legged Green-Pigeon	<i>Treron phoenicoptera</i>	
	Family Psittacidae (Parakeets)		
185	Rose-ringed Parakeet	<i>Psittacula krameri</i>	
186	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	
	Family Cuculidae (Cuckoos, Malkohas & Coucals)		

187	Pied Cuckoo (Pied Crested Cuckoo)	<i>Clamator jacobinus</i>	
188	Common Hawk Cuckoo (Brainfever Bird)	<i>Hierococcyx varius</i>	
189	Eurasian Cuckoo (Cuckoo)	<i>Cuculus canorus</i>	
190	Grey-bellied Cuckoo (Indian Plaintive Cuckoo)	<i>Cacomantis passerinus</i>	
191	Drongo Cuckoo	<i>Surniculus lugubris</i>	
192	Asian Koel	<i>Eudynamys scolopacea</i>	
193	Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>	
194	Greater Coucal (Crow pheasant)	<i>Centropus sinensis</i>	
	Family Tytonidae (Barn Owls)		
195	Barn Owl	<i>Tyto alba</i>	
	Family Strigidae (Owls)		
196	Oriental Scops-Owl	<i>Otus sunia</i>	
197	Collared Scops-Owl	<i>Otus bakkamoena</i>	
198	Eurasian Eagle-Owl (Indian great horned owl)	<i>Bubo bubo</i>	
199	Dusky Eagle-Owl (Dusky horned owl)	<i>Bubo coromandus</i>	
200	Brown Fish-Owl	<i>Ketupa zeylonensis</i>	
201	Mottled Wood-Owl	<i>Strix ocellata</i>	
202	Spotted Owlet	<i>Athene brama</i>	
203	Brown Hawk Owl	<i>Ninox scutulata</i>	
204	Short-eared Owl	<i>Asio flammeus</i>	
	Family Caprimulgidae (Nightjars)		
205	Grey Nightjar (Indian Jungle Nightjar)	<i>Caprimulgus indicus</i>	
206	Large-tailed Nightjar	<i>Caprimulgus macrurus</i>	
207	Indian Nightjar (Common Indian Nightjar)	<i>Caprimulgus asiaticus</i>	
208	Savanna Nightjar (Franklin's Nightjar)	<i>Caprimulgus affinis</i>	
	Family Apodidae (Swifts)		
209	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	
210	House Swift	<i>Apus affinis</i>	
	Family Alcedinidae (Kingfishers)		
211	Common Kingfisher (Small Blue Kingfisher)	<i>Alcedo atthis</i>	
212	Stork-billed Kingfisher	<i>Halcyon capensis</i>	
213	White-throated Kingfisher (White-breasted Kingfisher)	<i>Halcyon smyrnensis</i>	
214	Black-capped Kingfisher	<i>Halcyon pileata</i>	
215	Pied Kingfisher (Lesser Pied Kingfisher)	<i>Ceryle rudis</i>	
	Family Meropidae (Bee-eaters)		
216	Green Bee-eater (Small Bee-eater)	<i>Merops orientalis</i>	
217	Blue-cheeked Bee-eater	<i>Merops persicus</i>	
218	Blue-tailed Bee-eater	<i>Merops philippinus</i>	
	Family Coraciidae (Rollers)		
219	European Roller	<i>Coracias garrulus</i>	
220	Indian Roller	<i>Coracias benghalensis</i>	
	Family Upupidae (Hoopoes)		
221	Common Hoopoe	<i>Upupa epops</i>	
	Family Bucerotidae (Hornbills)		

222	Indian Grey Hornbill	<i>Ocyroceros birostris</i>	
	Family Capitonidae (Barbets)		
223	Brown-headed Barbet	<i>Megalaima zeylanica</i>	
224	Coppersmith Barbet	<i>Megalaima haemacephala</i>	
	Family Picidae (Woodpeckers)		
225	Eurasian Wryneck	<i>Jynx torquilla</i>	
226	Brown-capped Pygmy Woodpecker	<i>Dendrocopos nanus</i>	
227	Yellow-crowned Woodpecker (Yellow-fronted Pied Woodpecker)	<i>Dendrocopos mahrattensis</i>	
228	Black-rumped Flameback (Lesser Golden-backed Woodpecker)	<i>Dinopium benghalense</i>	
	Family Pittidae (Pittas)		
229	Indian Pitta	<i>Pitta brachyuran</i>	
	Family Alaudidae (Larks)		
230	Singing Bush-Lark	<i>Mirafra cantillans</i>	
231	Indian Bush-Lark (Red-winged Bush-Lark)	<i>Mirafra erythroptera</i>	
232	Ashy-crowned Sparrow-Lark	<i>Eremopterix grisea</i>	
233	Rufous-tailed Lark (Rufous-tailed Finch-Lark)	<i>Ammomanes phoenicurus</i>	
234	Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	
235	Crested Lark (Common Crested Lark)	<i>Galerida cristata</i>	
236	Sykes's Crested Lark	<i>Galerida deva</i>	
237	Eurasian Skylark	<i>Alauda arvensis</i>	
238	Bimaculated lark (Calandra lark)	<i>Melanocorypha bimaculata</i>	
239	Oriental Skylark (Eastern Skylark)	<i>Alauda gulgula</i>	
	Family Hirundinidae (Swallows & Martins)		
240	Sand Martin	<i>Riparia riparia</i>	
241	Plain Martin	<i>Riparia paludicola</i>	
242	Dusky Crag-Martin	<i>Hirundo concolor</i>	
243	Barn Swallow (Common Swallow)	<i>Hirundo rustica</i>	
244	Wire-tailed Swallow	<i>Hirundo smithii</i>	
245	Red-rumped Swallow (Striated swallow)	<i>Hirundo daurica</i>	
246	Streak-throated Swallow (Indian cliff swallow)	<i>Hirundo fluvicola</i>	
	Family Motacillidae (Wagtails & Pipits)		
247	Forest Wagtail	<i>Dendronanthus indicus</i>	
248	White Wagtail	<i>Motacilla alba</i>	
249	White-browed Wagtail (Large Pied Wagtail)	<i>Motacilla maderaspatensis</i>	
250	Citrine Wagtail	<i>Motacilla citreola</i>	
251	Yellow Wagtail	<i>Motacilla flava</i>	
252	Grey Wagtail	<i>Motacilla cinerea</i>	
253	Richard's Pipit	<i>Anthus richardi</i>	
254	Paddyfield Pipit	<i>Anthus rufulus</i>	
255	Tawny Pipit	<i>Anthus campestris</i>	
256	Tree Pipit (Eurasian Tree Pipit)	<i>Anthus trivialis</i>	
257	Olive-backed Pipit (Oriental Tree Pipit)	<i>Anthus hodgsoni</i>	
258	Rosy Pipit	<i>Anthus roseatus</i>	

259	Long-billed Pipit	<i>Anthus similis</i>	
260	Water Pipit	<i>Anthus spinoletta</i>	
	Family Campephagidae (Cuckoo-Shrikes, Flycatcher-Shrikes, Trillers, Minivets, Woodshrikes)		
261	Large Cuckoo-Shrike	<i>Coracina macei</i>	
262	Black-winged Cuckoo-Shrike	<i>Coracina melaschistos</i>	
263	Small Minivet	<i>Pericrocotus cinnamomeus</i>	
264	White-bellied Minivet	<i>Pericrocotus erythropygius</i>	
265	Long-tailed Minivet	<i>Pericrocotus ethologus</i>	
266	Scarlet Minivet	<i>Pericrocotus flammeus</i>	
267	Short-billed Minivet	<i>Pericrocotus brevirostris</i>	
268	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	
	Family Pycnonotidae (Bulbuls & Finchbills)		
269	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	
270	White-eared Bulbul	<i>Pycnonotus leucotis</i>	
271	Red-vented Bulbul	<i>Pycnonotus cafer</i>	
	Family Irenidae (Ioras, Chloropsis/Leafbird, Fairy-Bluebird)		
272	Common Iora	<i>Aegithina tiphia</i>	
273	Marshall's Iora	<i>Aegithina nigrolutea</i>	
	Family Laniidae (Shrikes)		
274	Red-backed Shrike	<i>Lanius collurio</i>	
275	Rufous-tailed Shrike (Isabelline shrike)	<i>Lanius isabellinus</i>	
276	Brown Shrike	<i>Lanius cristatus</i>	
277	Bay-backed Shrike	<i>Lanius vittatus</i>	
278	Long-tailed Shrike (Rufous-backed Shrike)	<i>Lanius schach</i>	
279	Southern Grey Shrike	<i>Lanius meridionalis</i>	
	Family Turdinae (Thrushes, Shortwings, Robins, Forktails, Wheaters)		
280	Blue-capped Rock Thrush (Blue-headed Rock-Thrush)	<i>Monticola cinclorhynchus</i>	
281	Blue Rock-Thrush	<i>Monticola solitarius</i>	
282	Orange-headed Thrush	<i>Zoothera citrina</i>	
283	Scaly Thrush	<i>Zoothera dauma</i>	
284	Tickell's Thrush	<i>Turdus unicolor</i>	
285	Black-breasted Thrush	<i>Turdus dissimilis</i>	
286	Grey-winged Blackbird	<i>Turdus boulboul</i>	
287	Siberian Rubythroat	<i>Luscinia calliope</i>	
288	White-tailed Rubythroat	<i>Luscinia pectoralis</i>	
289	Bluethroat	<i>Luscinia svecica</i>	
290	Oriental Magpie-Robin	<i>Copsychus saularis</i>	
291	Indian Robin	<i>Saxicoloides fulicata</i>	
292	Black Redstart	<i>Phoenicurus ochruros</i>	
293	Common Stonechat	<i>Saxicola torquata</i>	
294	White-tailed Stonechat	<i>Saxicola leucura</i>	
295	Pied Bushchat	<i>Saxicola caprata</i>	
296	Grey Bushchat	<i>Saxicola ferrea</i>	

297	Variable Wheatear	<i>Oenanthe picata</i>	
298	Desert Wheatear	<i>Oenanthe deserti</i>	
299	Isabelline Wheatear	<i>Oenanthe isabellina</i>	
300	Pied Wheatear	<i>Oenanthepleschanka</i>	
301	Brown Rock-Chat (Indian Chat)	<i>Cercomela fusca</i>	
	Family Timaliinae (Babblers, Laughingthrushes, Babaxes, Barwings, Yuhinas)		
302	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	
303	Common Babbler	<i>Turdoides caudatus</i>	
304	Large Grey Babbler	<i>Turdoides malcolmi</i>	
305	Jungle Babbler	<i>Turdoides striatus</i>	
	Family Sylviinae (Goldcrest, Prinias, Tesias, Warblers)		
306	Ziting Cisticola (Streaked Fantail-Warbler)	<i>Cisticola juncidis</i>	
307	Ashy Prinia	<i>Prinia socialis</i>	
308	Plain Prinia	<i>Prinia inornata</i>	
309	Cetti's Bush-Warbler	<i>Cettia cetti</i>	
310	Lanceolated Warbler (Streaked Grasshopper-Warbler)	<i>Locustella lanceolata</i>	
311	Paddyfield Warbler	<i>Acrocephalus agricola</i>	
312	Blyth's Reed-Warbler	<i>Acrocephalus dumetorum</i>	
313	Clamorous Reed Warbler (Indian Great Reed-Warbler)	<i>Acrocephalus stentoreus</i>	
314	Booted Warbler	<i>Hippolais caligata</i>	
315	Common Tailorbird	<i>Orthotomus sutorius</i>	
316	Common Chiffchaff	<i>Phylloscopus collybita</i>	
317	Plain Leaf-Warbler	<i>Phylloscopus neglectus</i>	
318	Dusky Warbler	<i>Phylloscopus fuscatus</i>	
319	Tickell's leaf Warbler	<i>Phylloscopus affinis</i>	
320	Sulphur-bellied Warbler (Olivaceous Leaf-Warbler)	<i>Phylloscopus griseolus</i>	
321	Brooks's Leaf-Warbler	<i>Phylloscopus subviridis</i>	
322	Hume's Warbler	<i>Phylloscopus humei</i>	
323	Greenish Warbler (Greenish Leaf-Warbler)	<i>Phylloscopus trochiloides</i>	
324	Lesser Whitethroat (Common Lesser Whitethroat)	<i>Sylvia curruca</i>	
325	Orphean Warbler	<i>Sylvia hortensis</i>	
326	Moustached Warbler	<i>Acrocephalus melanopogon</i>	
327	Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	
	Family Muscipinae (Flycatchers)		
328	Rusty-tailed Flycatcher	<i>Muscicapa ruficauda</i>	
329	Red-throated Flycatcher	<i>Ficedula parva</i>	
330	Ultramarine Flycatcher	<i>Ficedula superciliaris</i>	
331	Verditer Flycatcher	<i>Eumyias thalassina</i>	
332	Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	
333	Grey-headed Canary Flycatcher	<i>Culicicapa ceylonensis</i>	
	Family Monarchinae (Monarch-Flycatchers & Paradise-Flycatchers)		
334	Asian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	
	Family Rhipidurinae (Fantail-Flycatchers)		

335	White-browed Fantail (White-browed Fantail-Flycatcher)	<i>Rhipidura aureola</i>	
	Family Remizidae (Penduline-Tits)		
336	Fire-capped Tit	<i>Cephalopyrus flammiceps</i>	
	Family Paridae (Tits)		
337	Great Tit	<i>Parus major</i>	
	Family Sittidae (Nuthatches, Wallcreeper)		
338	Chestnut-bellied Nuthatch	<i>Sitta castanea</i>	
	Family Certhiidae (Tree-Creepers, Creepers)		
339	Spotted Creeper	<i>Salpornis spilonotus</i>	
	Family Nectariniidae (Sunbirds & Spiderhunters)		
340	Purple Sunbird	<i>Nectarinia asiatica</i>	
	Family Zosteropidae (White-eyes)		
341	Oriental White-eye	<i>Zosterops palpebrosus</i>	
	Family Emberizinae (Buntings)		
342	Crested Bunting	<i>Melophus lathami</i>	
343	White-capped Bunting	<i>Emberiza stewarti</i>	
344	Black-headed Bunting	<i>Emberiza melanocephala</i>	
345	Red-headed Bunting	<i>Emberiza bruniceps</i>	
	Family Fringillidae (Finches)		
346	Common Rosefinch	<i>Carpodacus erythrinus</i>	
	Family Estrildidae (Munias (Estrildid Finches))		
347	Red Avadavat (Red Munia)	<i>Amandava amandava</i>	
348	Indian Silverbill (White-throated Munia)	<i>Lonchura malabarica</i>	
349	Scaly-breasted Munia (Spotted Munia)	<i>Lonchura punctulata</i>	
350	Black-headed Munia	<i>Lonchura malacca</i>	
	Family Passerinae (Sparrows)		
351	House Sparrow	<i>Passer domesticus</i>	
352	Spanish Sparrow	<i>Passer hispaniolensis</i>	
353	Chestnut-shouldered Petronia (Yellow-throated Sparrow)	<i>Petronia xanthocollis</i>	
	Family Ploceinae (Weavers)		
354	Black-breasted Weaver	<i>Ploceus benghalensis</i>	
355	Streaked Weaver	<i>Ploceus manyar</i>	
356	Baya Weaver	<i>Ploceus philippinus</i>	
	Family Sturnidae (Starlings & Mynas)		
357	Brahminy Starling	<i>Sturnus pagodarum</i>	
358	Rosy Starling	<i>Sturnus roseus</i>	
359	Common Starling	<i>Sturnus vulgaris</i>	
360	Asian Pied Starling	<i>Sturnus contra</i>	
361	Common Myna	<i>Acridotheres tristis</i>	
362	Chestnut-tailed Starling (Grey-headed Myna)	<i>Sturnus malabaricus</i>	
363	Bank Myna	<i>Acridotheres ginginianus</i>	
	Family Oriolidae (Orioles)		
364	Eurasian Golden Oriole	<i>Oriolus oriolus</i>	

365	Black-headed Oriole	<i>Oriolus xanthornus</i>	
366	Black-naped Oriole	<i>Oriolus chinensis</i>	
	Family Dicuridae (Drongos)		
367	Black Drongo	<i>Dicurus macrocercus</i>	
368	Ashy Drongo	<i>Dicurus leucophaeus</i>	
369	White-bellied Drongo	<i>Dicurus caerulescens</i>	
370	Spangled Drongo	<i>Dicurus hottentottus</i>	
371	Greater Racket tailed drongo	<i>Dicurus paradiseus</i>	
	Family Corvidae (Crows, Jays, Treepies, Magpies)		
372	Rufous Treepie (Indian Treepie)	<i>Dendrocitta vagabunda</i>	
373	House Crow	<i>Corvus splendens</i>	
374	Large-billed Crow (Jungle Crow)	<i>Corvus macrorhynchos</i>	

Add. Chief Secretary Circular Dated 02.05.2012 regarding action against encroachment on forest land

राजस्थान सरकार
वन विभाग

संख्या: 188/वन/2012

जयपुर दिनांक 02-05-2012-

परिपत्र

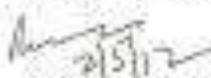
विषय :- वन भूमि पर अधिकरण के विरुद्ध कार्यवाही।

किसी व्यक्ति, व्यक्तियों या संस्था द्वारा बिना सक्षम अधिकारी से प्रस्ताव अधिकारों के वन भूमि का अधिभोग में लेना या वनका अधिभोग में लेना वाली एका राजस्थान वन अधिनियम, 1980 की धारा 28 एवं 30 तथा वन (संरक्षण) अधिनियम, 1980 की धारा-2 संबंधित धारा-3ए के तहत अवैधिक कृत्य है। ऐसे अधिकारी (अधिकारी) को पर्यवेक्षक अधिनियमों के अर्थात् अवैधिक कृत्य के लिए इस मामले अधिसूक्त सक्षम अधिकारी द्वारा दंडित करने वाले की कार्यवाही करनी होती है।

पर्यवेक्षक संरक्षण कार्यवाही के अधिनियम वन भूमि पर से अधिकारी का अधिभोग को हटाया जाने इसके लिए अधिसूक्त एवं अवैधिक है कि राजस्थान वन-संरक्षण अधिनियम, 1980 की धारा 21 एवं वन्यजीव (संरक्षण) अधिनियम, 1972 की धारा-34A के अंतर्गत संरक्षण कार्यवाही वन अधिकारी को वेदवत् किया जाने। इन दोनों ही अधिनियमों में कार्यवाही हेतु संबंधित क्षेत्र का सहायक वन संरक्षण अधिकारी है। परन्तु राज्य सरकार के संज्ञान में आया है कि इन प्रकार की कार्यवाही करने के लिए अधिसूक्त सक्षम अधिकारियों (सहायक वन संरक्षण) द्वारा अपने दायित्वों का सही प्रकार से निर्वाह नहीं किया जा रहा है। पर्याप्ततर वेदवत् हेतु संबंधित कार्यवाही के प्रकरणों के निराकरण में गंभीरता/वृत्ति की अपेक्षा कम रही है।

राज्य सरकार के संज्ञान में यह भी आया है कि अधिकरण के प्रकरणों में सखियत सहायक वन संरक्षणों का संज्ञान यह है कि प्रस्ताव दायित्व केवल प्रकरण में निर्बंध प्रेषित करने तक ही सीमित है। देना संज्ञान करने वाले अधिकारी स्पष्ट रूप से धारा-21 राजस्थान वन-संरक्षण अधिनियम, 1980 एवं धारा-34A वन्यजीव (संरक्षण) अधिनियम, 1972 के प्रकरणों का सख्यक संरक्षण नहीं कर रहे हैं। दोनों ही अधिनियमों के अंतर्गत अधिसूक्त अधिकारी का सखियत अधिभोग हटाने वाले की कार्यवाही को अतिम स्तर तक निराकरण करने का है।

यह स्पष्ट देने प्रोत्साहित है कि यदि किसी सहायक वन संरक्षण के सहायक/सर्वोच्च सर्वोच्च निर्यादन के कारण वन भूमि का गैर वन भूमि के रूप में प्रयोग होता है तो राजस्थान वन-संरक्षण अधिनियम, 1980 की धारा-21 एवं वन्यजीव (संरक्षण) अधिनियम, 1972 की धारा-34ए के अंतर्गत धाराके लिए निर्धारित विधि दायित्वों का सखी वन के निर्वाह नहीं करने के कारण सबसे विरुद्ध अनुमानसंगत कार्यवाही अधिसूक्त होवती है। साथ ही यदि यह स्पष्ट प्रस्ताव है कि किसी सहायक वन संरक्षण के संज्ञान में अपने के बाद की वन भूमि का बिना सक्षम अधिकारी की सखियत के गैर वन भूमि के रूप में उपयोग करती रहा है तो वन अधिनियमों का यह कृत्य का संज्ञान अधिनियम, 1980 की धारा-3ए के तहत अवैधिक का सख्यक देने (अर्थात् करने) की दायित्व में आता है एवं इसके लिए वन अधिकारी धारा-30 के अर्थात् दंडित किया जा सकता है।


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एक भूमि की एक बन्दगी की संरक्षण की लिए यह निर्दिष्ट आवश्यक है कि एक बन्दगी निर्दिष्ट अधिकारी एक अन्य सभी विचारणीय वर्गीकृतता का प्रयोग करते हुए अपने विवेक द्वारा जो विवेक मानक के अनुसार समझदारी के साथ निर्दिष्ट करें एक पर्याप्त अधिकारी समझ-समझ का निर्दिष्ट करें। यह भी उल्लेखित है कि अधिकृत हटाने के लिए निर्धारित में विचार करते हैं जो जाने पर संबंधित अधिकारी के विवेक द्वारा में समझदारी करने के लिए या अनुमानात्मक कार्यवाही करने एक अन्य कार्य करने वाले को प्रस्तावित किया जाये।

आम राजस्वान सू-राजस्व अधिनियम, 1958 एक अन्य (संरक्षण) अधिनियम, 1972 के प्रावधानों का सुविधानगत रूप से विचारणता हो एक पर्याप्त उचित विवेक प्रावधानों का प्रावधान करने से प्रयोग करने हुए एक भूमि एक बन्दगी की संरक्षण की भूमि से अधिकारियों के विवेक द्वारा कार्यवाही की जाये इसके लिए यह उल्लेखित है कि :-

1. एक बन्दगी को शुरू करने की अधिकारी/कार्यवाही द्वारा एक भूमि पर अधिकृतता का प्रयोग प्रावधान में उल्लेखित है प्रावधान सुझाव संबंधित प्रस्तावक एक संरक्षण के प्रावधान की प्रावधान एक संरक्षण एक संरक्षण ऐसी सुझाव प्रस्ताव होते ही यदि प्रस्ताव राष्ट्रीय संरक्षण / राष्ट्रीय प्रस्ताव क्षेत्र में संबंधित है प्रावधान 245 राष्ट्रीय (संरक्षण) अधिनियम, 1972 के प्रावधान एक यदि प्रावधान क्षेत्रों के एक क्षेत्र में संबंधित है तो प्रावधान-24 राजस्वान सू-राजस्व अधिनियम, 1958 में प्रस्ताव कार्य का अधिकृत हटाने की कार्यवाही करने।
2. अधिकृत संबंधी प्रावधानों प्रावधानों को प्रावधान करने पर भी संरक्षण एक संरक्षण प्रस्ताव कार्य का अधिकृत हटाने की कार्यवाही करने।
3. एक भूमि पर अधिकृतता का प्रस्ताव प्रस्तावक एक संरक्षण के प्रावधान में उल्लेखित है राष्ट्रीय संरक्षण की प्रावधान में प्रावधान प्रस्तावों को प्रावधान-245 राष्ट्रीय (संरक्षण) अधिनियम, 1972 के प्रावधान करने एक अन्य एक क्षेत्रों के प्रावधानों को प्रावधान-24 राजस्वान सू-राजस्व अधिनियम, 1958 के प्रावधान करने।
4. अधिकृत संबंधी प्रस्ताव कार्य करने के प्रावधान बाद प्रस्तावक एक संरक्षण का सुविधानगत करने कि :-

(क) यदि प्रस्ताव प्रावधान-24 राजस्वान सू-राजस्व अधिनियम, 1958 के प्रावधान कार्य है तो अधिनियम में उचित प्रावधान के अनुसार संरक्षण प्रावधान की प्रस्ताव अपनाई जाये एक अधिकारी को सुझाव का अन्तर्गत प्रस्ताव का प्रस्ताव में अधिकृतता की प्रावधान की प्रावधान में निर्दिष्ट प्रावधान का अधिकृत हटाने की कार्यवाही संरक्षण का की जाती है।

(ख) यदि प्रावधान प्रावधान-245 राष्ट्रीय (संरक्षण) अधिनियम, 1972 के प्रावधान कार्य है तो अधिनियम में उचित प्रावधान के अनुसार संरक्षण प्रावधान की प्रस्ताव अपनाई हुए अधिकृतता की प्रावधान की प्रावधान में अधिकृत हटाने की कार्यवाही संरक्षण का की जाती है।



5. महापंचक वन संरक्षक द्वारा अधिकांश संश्लेषी प्रकल्पों में निर्णय प्रदर्शित करने हुए यदि प्रकल्प में अधिकांश होने निर्धारित किया जाता है तो उसके द्वारा मुख्य अधिकांश इटानों की कार्यवाही कराई जाये। अधिकांश इटानों की कार्यवाही में प्रस्तावित क्षेत्र को क्षेत्रीय एवं अन्य अन्य क्षेत्रों द्वारा पूर्ण निष्ठा से अवशेषित प्रकल्प दिया जाये।
6. मंडल वन अधिकारी द्वारा वनसिद्ध क्षेत्रों में वन भूमि पर अधिकांशों को बाधों की विधिवत समीक्षा की जाये एवं प्रकल्प वन संरक्षक कार्यवाही का निर्धारण करते समय भी इस विषय को प्राथमिकता से ध्यान देना जाये। यह भी देखा जाये कि क्षेत्रीय एवं अन्य अन्य क्षेत्रों में महापंचक वन संरक्षक की कार्यवाही देने में या उसके निर्देशों की अनुपालना में अक्षमता को गंभीर बनाया है। यदि कार्यवाही की विचारणा जाती है तो संबंधित क्षेत्रीय अनुशासनगत कार्यवाही की जाये।
7. मुख्य वन संरक्षक / वन संरक्षक या मुख्यवक्ता से अन्य संबंधित अधिकारी वन की क्षेत्रीय क्षेत्र पर जाने का निर्धारण करे तो वन भूमि के अधिकांशों के बाधों की समीक्षा कराये एवं उसके निर्धारण प्रविष्टिगत में यह अधिकार किया जाता है कि वन भूमि के अधिकांशों की समीक्षा को क्षेत्रीय स्तरों द्वारा करा लया जाये एवं।
8. मुख्य वन संरक्षक अपने कार्यक्षेत्र में अधिकांशों के विरुद्ध प्रस्तावित कार्यवाही करने वाले अधिकारियों / कार्यवाही को प्रस्तावित करने एवं कार्यवाही करने वाले अधिकारियों / कार्यवाही के विरुद्ध अनुशासनगत कार्यवाही करने की तथ्याई प्रस्तुत कराये।

दुबारे अधिकार प्रकल्पों के विचारणा हेतु 16 जून 2012 तक का समय दिया जाता है। तदनंतर प्रकल्प अधिकारियों पर संबंधित महापंचक वन संरक्षक के विरुद्ध अनुशासनगत कार्यवाही की जाये।

उपरोक्तानुसार कार्यवाही करते हुए यह सुनिश्चित किया जाये कि :-

- (i) महापंचक वन संरक्षक द्वारा नये प्रकल्पों की विधिक भाषणा के अनुसार क्षेत्रीय कार्यवाही का क्षेत्रीयवर्तक निर्धारित किया जाता है एवं संबंधित क्षेत्र को क्षेत्रीय एवं अन्य अन्य क्षेत्रों महापंचक वन संरक्षक को आवेदों का पूर्ण निष्ठा एवं अनुपालना करती है।
- (ii) निर्धारित अधिकारी द्वारा यह जाये जाने पर कि महापंचक वन संरक्षक ने कार्यवाही करने में अवशेषित दिखाने किया है तो उसके विरुद्ध कसबाद निदेश 17 सीसीए (वर्गीकरण विवरण एवं अवैत) नियमों के अंतर्गत कार्यवाही प्रस्तावित की जाये।
- (iii) महापंचक वन संरक्षक द्वारा कार्यवाही में जो गलत तो अधिकार का समय करने के कारण अधिकांश जाती रहने को प्रकल्पों में संबंधित महापंचक वन संरक्षक द्वारा वन भूमि को वन वन भूमि को लिए उपभोग होने होने की अति धारों को प्रकल्प देने (Abuse करने) का कृप्य भाषणा हुए ऐसे महापंचक वन संरक्षक के विरुद्ध कसबा-17 की वन अधिनियम, 1860 की अंतर्गत कार्यवाही का प्रकल्प तैयार कराया जाता है।
- (iv) महापंचक वन संरक्षक द्वारा प्रकल्प वन अधिकारी के संज्ञान में यह लया जाये जाने पर कि किसी क्षेत्रीय / वन वन द्वारा अधिकांश इटानों को कार्य में उसके निर्देशों

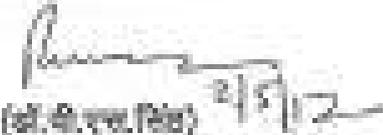
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की चालना नहीं की जा रही है या अपेक्षित सहयोग नहीं दिया जा रहा है तो ऐसे क्षेत्रों / वन क्षेत्रों के विस्तृत अनुशासनात्मक कार्यवाही अन्वय की जाती है।

- (v) वन क्षेत्रों सहस्रक वन संरक्षणी, विन वन वन भूमि वन अधिकारन की मामलों में विशेष कार्यवाही करने का शामिल है, जो वार्षिक कार्य सूचकांक प्रतिवेदन में इस बात का स्पष्ट उल्लेख किया जाता है कि प्रतिवेदित अधिकारी ने वन संरक्षण/संवर्धन संरक्षण के वैधानिक प्रावधानों के क्रियान्वयन हेतु वैधानिक प्रावधानों को विचारित करने में सम्यक्दृष्टा एवं उपायी कार्यवाही की दृष्टि में सैदा कार्यन निष्पादन किया है।

वन भूमि वन अधिकारन की मामलों में नीचे बर्णित निम्न क्षेत्रों के उपरोक्त सम्यक् कार्यवाही की कक्षा निम्नानुसार कार्यवाही की जाये :-

1. यदि प्रकल्प किसी न्यायालय द्वारा कार्यवाही किये जाने के विस्तृत सूचना अर्पित प्रकल्प किया गया है तो ऐसे प्रकल्प अर्पण की निरस्त कराये जाने के प्रस्ताव किये जाये और प्रकल्प अर्पण निरस्त होने का अधिकारन करने की कार्यवाही की जाये।
2. यदि अधिकारी का प्रकल्प वन अधिकारन अधिकारन के अर्पण विचारणीय है तो उसे सही निर्णय करने का आग्रह किया जाये एवं निर्णय को वेक्षण कीती किये जाती हो उसकी अनुसार कार्यवाही की जाये।
3. जहाँ वन भूमि वन भूतनी बर्णित नहीं हुई है वन मामलों को संकलित कर राज्य सरकार से संज्ञान में लाया जाये।


 (अ.के.एस.सिंह) 2/5/22
 प्रतिष्ठित मुख्य अधिकारी

प्रतिवेदित विभागीय को सूचनाएँ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

1. प्रमुख वन्य संधि, राज्य, राजस्थान, जयपुर।
2. प्रधान मुख्य वन संरक्षक (ADFO), राजस्थान, जयपुर। अर्पण कर के सम्बन्धित अधिकारी को सूचना देनी
3. प्रधान मुख्य वन संरक्षक एवं मुख्य सहायक अधिकारी, राजस्थान, जयपुर।
4. प्रधान मुख्य वन संरक्षक, कार्य सम्पन्न एवं वन अर्पण, राजस्थान, जयपुर।
5. प्रधान मुख्य वन संरक्षक (ADFO), राजस्थान, जयपुर।
6. समस्त जिला कलक्टर।
7. समस्त पुलिस अधीक्षक।
8. समस्त मुख्य वन संचालक / वन संरक्षक।
9. निदेशक, वन एवं भू विज्ञान विभाग, राजस्थान, जयपुर।
10. सहायक वन वन संरक्षक / सहायक वन अधिकारी।
11. उचित प्रमाणों।


 प्रधान अधिकारी (वन)

Annexure – 41

Deligation of Powers of Tehsildar to A.C.F. under Land Revenue Act Section 260 to remove encroachments under section 91

2397.
3/9/12

राजस्थान सरकार
राजस्व (धुप-6) विभाग

क्रमांक प. 8(14)राज-6/95/25 दिनांक 21-8-12

- अधिसूचना :-

राजस्थान भू-राजस्व अधिनियम, 1956 (1956 का अधिनियम संख्या 15) की धारा 260 की उप-धारा (1) के खण्ड (ख) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए एवं इस निमित्त पूर्व में जारी अधिसूचनाओं को अधिष्ठित करते हुए राज्य सरकार एतद् द्वारा निर्देश प्रदान करती है कि निम्नांकित अनुसूची के कॉलम संख्या 2 में वर्णित सहायक वन संरक्षक को पदों पर पूर्णकालिक रूप से पदस्थापित राजपत्रित अधिकारियों द्वारा अनुसूची के कॉलम संख्या 3 में वर्णित प्रादेशिक अधिकारित क्षेत्र (रेंज) के भीतर स्थित वन भूमि पर उपरोक्त अधिनियम की धारा 91 के अधीन तहसीलदार की समस्त शक्तियों एवं कर्तव्यों का प्रयोग एवं पालन किया जावेगा :-

अनुसूची

क्र.सं.	अधिकारी का नाम	नाम वन रेंज मय क्षेत्राधिकार
1	2	3
66	सहायक वन संरक्षक, वन्यजीव, प्रतापगढ़, मुख्यालय प्रतापगढ़, अलवर	1 बिगोता मुख्यालय प्रतापगढ़
67	सहायक वन संरक्षक, वन्यजीव, टहला, मुख्यालय टहला, अलवर	1 टहला
68	सहायक वन संरक्षक, वन्यजीव अकबरपुर, मुख्यालय अकबरपुर, अलवर	1 अकबरपुर 2 तालवृक्ष
69	सहायक वन संरक्षक, वन्यजीव सरिस्का, मुख्यालय सरिस्का, अलवर	1 सरिस्का

राज्यपाल की आज्ञा से.

21/8/12
(अन्तर सिंह)
शासन उप सचिव

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

- 1 निजी सचिव, माननीय राजस्व मंत्री महोदय, राजस्थान ।
- 2 निजी सचिव, मुख्य सचिव, राजस्थान सरकार, जयपुर ।
- 3 निजी सचिव, अतिरिक्त मुख्य सचिव, वन विभाग, राजस्थान सरकार, जयपुर ।
- 4 निजी सचिव, प्रमुख शासन सचिव, राजस्व विभाग, राजस्थान सरकार, जयपुर ।
- 5 निजी सचिव, शासन सचिव, वन विभाग, राजस्थान सरकार, जयपुर ।
- 6 समस्त सम्भागीय आयुक्त, राजस्थान ।
- 7 समस्त जिला कलेक्टर, राजस्थान ।
- 8 प्रधान मुख्य वन संरक्षक, राजस्थान, जयपुर
- 9 निबंधक, राजस्व मण्डल, अजमेर ।
- 10 निदेशक, राज्य केंद्रीय मुद्रणालय, राजस्थान, जयपुर को राजपत्र विरोधांक दिनांक 21-8-12 में प्रकाशनार्थ
- 11 रायिच, राजस्व मण्डल, अजमेर ।
- 12 विधि संहिताकरण विभाग, शासन सचिवालय, जयपुर ।
- 13 सम्बन्धित सहायक वन संरक्षक
- 14 शासन उप सचिव, वन विभाग
- 15 रक्षित पत्रावली

21/8/12
शासन उप सचिव

Government Order dated 07 March 2008, for out of turn agriculture electric connections in peripheral areas & relocated families

राजस्थान सरकार
ऊर्जा विभाग

क्रमांक- प.12(16)ऊर्जा/04/पाठ

जयपुर, दिनांक 7 मार्च, 2008

आदेश

16

इस विभाग के पत्र संख्यांक दिनांक 18.9.04, 2.12.04, 6.11.06 एवं 3.4.2007 द्वारा अधोषिक्त कृषि नीति 2004 के बिन्दु संख्या 7(i) से (iv) (स) में कृषि आवेदकों को कृषि कनेक्शनों में मांग पत्र में तुरन्त प्राथमिकता दिये जाने का प्रावधान किया गया था। इसी क्रम में बिन्दु 7 (iv) (स)(2) के पश्चात 7 (iv) (द)-(1) व (द) (2) विन्यानुसार जोड़ा जाता है:-

7 (iv) (द)(1)	बाघ परियोजना, रणथम्भौर एवं सारिस्ता के किटिकल टाईगर हैबिटेड की सीमा से लगे हुए राजस्थान गावों के कृषकों को चार उगाने हेतु कृषि विद्युत कनेक्शन तुरन्त प्राथमिकता के आधार पर दिये जावेंगे। बाघ परियोजना के किटिकल टाईगर हैबिटेड की सीमा से लगे हुए गावों का चयन पार्क के अधिकारियों द्वारा राजस्थान अधिकारियों से विमर्श पश्चात किया जावेगा। यदि इन कृषकों द्वारा पूर्व में कृषि कनेक्शन हेतु आवेदन पत्र प्रस्तुत नहीं किया गया है, तो सम्बन्धित अधिशाही अभियन्ता को आवेदन पत्र प्रस्तुत किया जावेगा जो आवेदन करने की तिथि से अधिकतम तीन माह की अवधि में कनेक्शन जारी करना सुनिश्चित करेंगे।
(iv) (द)(2)	राज्य के राष्ट्रीय उद्यानों/अभ्यारण क्षेत्रों से हटाकर अन्वयन वसाये गये कृषकों को भी प्रति परिवार एक कृषि विद्युत कनेक्शन तुरन्त प्राथमिकता के आधार पर दिया जावेगा। इस हेतु राष्ट्रीय उद्यान/अभ्यारण क्षेत्र निदेशक अथवा मण्डल वन अधिकारी/उष्ण वन संरक्षक द्वारा जारी प्रमाण पत्र को आधार माना जावेगा।

यह आदेश तुरन्त प्रभाव से प्रभावी माना जावेगा।

आज्ञा से,

(एस. एन. शर्मा)
शासन उप सचिव

प्रतिनिधि निम्न को सूचनाार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-

1. सचिव, राजस्थान विद्युत नियामक आयोग, जयपुर।
2. अध्यक्ष एवं प्रबंध निदेशक, राजस्थान राज्य विद्युत प्रसारण निगम लि एण उच्चतर समन्वय समिति, जयपुर।
3. अध्यक्ष एवं प्रबंध निदेशक, जयपुर/अजमेर/जोधपुर विद्युत वितरण निगम लि।
4. प्रधान मुख्य वन संरक्षक, राजस्थान, जयपुर।
5. जिला कलेक्टर, अलवर/सवाई माधोपुर।
6. निजी सचिव, मुख्य सचिव।
7. निजी सचिव, माननीय ऊर्जा राज्य मंत्री।
8. निजी सचिव, अतिरिक्त मुख्य सचिव, सामल इन्फ्रास्ट्रक्चर।
9. निजी सचिव, शासन सचिव, वन विभाग।
10. मण्डल वन अधिकारी, अलवर/सवाई माधोपुर।
11. रक्षित पन्नाचली।

शासन उप सचिव

Superintending Engineer JVVNL letter dated 26 September 2012, for out of turn agriculture electric connections in peripheral areas & relocated families



जयपुर विद्युत वितरण निगम लिमिटेड

कार्यालय अधीक्षण अभियंता (पवस) अलवर

कालीमोरी फाटक के पास, अलवर (राज.)-301001

फोन:- 0144-2701960, फैक्स:- 0144-2337992

E-mail: - se.ipd.alwar@gmail.com

क्र.: जेपीडी/अअ/पवस/अल./तक./प्रे : 5195 दिनांक : 26/9/12

सहायक अभियन्ता (पवस)

जयपुर डिस्कॉम,

बहरोड/मालाखेड/धानागाजी/राजगढ/लक्ष्मणगढ

विषय : बाघ परियोजना सरिस्का से विस्थापित परिवारों को एवं किटीकल टाईगर हैबिटेट की सीमा से लगे हुए राजस्व गांवों के कृषकों को कृषि कनेक्शन हेतु मांग पत्र जारी करने के क्रम में।

ऊर्जा विभाग राजस्थान सरकार के आदेश दिनांक 10/03/2008 के अनुसार सरिस्का बाघ परियोजना से विस्थापित एवं किटीकल टाईगर हैबिटेट की सीमा से लगे हुए राजस्व गांवों के कृषकों को तुरन्त प्राथमिकता के आधार पर कृषि कनेक्शन जारी करने हेतु निर्देश प्रदान किये गये हैं।

निगम के आदेश संख्या 1609 दिनांक 04/11/2011 (आरईओ-228) के द्वारा द्वितीय चरण के मांग पत्रों को जारी करने हेतु लगाई गई रोक के कारण उक्त परिवारों को भी मांग पत्र जारी नहीं किये जा रहे हैं। चूंकि राज्य सरकार की नीति के अनुसार उक्त आवेदकों को तुरन्त प्राथमिकता के आधार पर कृषि कनेक्शन जारी करना है। उक्त परिवारों से प्राप्त आवेदन पत्र किसी श्रेणी विशेष में सम्मिलित न होकर अलग योजना के आधार पर हैं।

अतः यह आदेश दिये जाते हैं कि सरिस्का बाघ परियोजना से विस्थापित परिवारों एवं किटीकल टाईगर हैबिटेट की सीमा से लगे हुए राजस्व गांवों के कृषकों से प्राप्त लम्बित कृषि आवेदन पत्रों के तुरन्त प्रभाव से मांग पत्र जारी करना सुनिश्चित करें।

de.
अधीक्षण अभियंता (पवस)
जयपुर डिस्कॉम, अलवर

प्रतिलिपि अधिशाषी अभियन्ता (जिला खण्ड/पवस) जयपुर डिस्कॉम, अलवर/बहरोड/राजगढ/लक्ष्मणगढ को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है।

de.
अधीक्षण अभियंता (पवस)

26/9/12
24/9

Government Order Dated 01.03.2011 for payment of compensation for human injuries & cattle kills

राजस्थान सरकार
वन विभाग

कमाक एंफ. 11 (1) वन/78

जयपुर, दिनांक [01.03.2011]

आदेश

इस विभाग के समसंख्यक पूर्व आदेश दिनांक 25.7.2005 का अधिलक्षण करते हुये माननीय राज्यपाल महोदय की ओर से, राष्ट्रीय उद्यान/वन्यजीव अभ्यारण्यों में अथवा उसके बाहर वन्य जीवों द्वारा जनहानि अथवा घायल किये जाने पर तथा राष्ट्रीय उद्यान/वन्यजीव अभ्यारण्य के वन क्षेत्रों के बाहर पालतू मवेशियों को मारे जाने पर निम्नानुसार मुआवजा/एकसप्रेशिया राशि का भुगतान किये जाने की दरों के निर्धारण की स्वीकृति प्रदान कि जाती है।

जन श्रेणी

1. जनहानि होने पर	रु 2,00,000 (सक्षम चिकित्सा अधिकारी
2. स्थायी अयोग्य होने पर	रु 1,00,000 द्वारा इस आशय का प्रमाण
3. अस्थायी अयोग्य होने पर	रु 20,000 जारी होने कि शर्त पर)

पालतू मवेशियों की श्रेणी

1. भैंस व गैल	रु 10,000
2. गाय	रु 5,000
3. भैंस व गाय का बच्चा	रु 2,000
4. बकरी/बकरा व भेड़	रु 1,000
5. ऊँट	रु 10,000
6. गधा/खच्कार	रु 1,000

यह मुआवजा/एकसप्रेशिया संलग्न प्रक्रिया एवं शर्तों के अधीन देय होगा एवं निम्न मद से देय होगा:-

2406-यानिकी और वन्यजीवन, 02-पर्यावरण यानिकी और वन्य जीवन, 110-वन्य जीव परिरक्षण, 01 से 05 रणधम्भीर, सरिस्का वन क्षेत्रों का संधारण, घना शरी, राष्ट्रीय वन उद्यान, 15 लघु निर्माण कार्य (केन्द्रीय परिवर्तित योजना)।

उक्त राशि का भुगतान- शत प्रतिशत केन्द्रीय परिवर्तित योजना मद में भारत सरकार से ए0पी0ओ0 स्वीकृति के पश्चात राशि प्राप्त होने पर किया जाता था, परन्तु यदि ए0पी0ओ0 स्वीकृति नहीं हुआ है, तो भी केन्द्रीय परिवर्तित योजना मद में शेष बची अनुपयोगी राशि में से भी भुगतान किया जावेगा।

यह स्वीकृति वित्त (व्यय-3) विभाग के आई0डी0 संख्या 171100210 दिनांक 25.2.2011 द्वारा प्रदत्त सहमति के अनुसरण में जारी की जाती है।


(सी0एस0 रत्नामामी)
सचिव

प्रतिलिपि निम्नांकित को सूचनाार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-

1. प्रधान मुख्य वन संरक्षक (एवओएफएफ), राजस्थान, जयपुर।
2. प्रधान-मुख्य वन संरक्षक एवं मुख्य वन्य जीव प्रतिपालक, राजस्थान जयपुर।
3. समस्त संभागीय आयुक्त।
4. समस्त जिला कलेक्टर।
5. समस्त मुख्य वन संरक्षक राजस्थान।
6. समस्त भण्डल वन अधीक्षक एवं वन संरक्षक, राजस्थान।
7. वित्त (व्यय-3) विभाग, राजस्व सचिवालय, जयपुर।
8. प्रमुख पत्रिका

राष्ट्रीय उद्यान / वन्य जीव अभ्यारण्यों में अथवा बाहर अन्य जगहों द्वारा जनहानि
अथवा क्षय के कारण होने पर तथा वन क्षेत्रों के बाहर पालतू पशुओं को मार
जाने पर मुआवजा / एकत्रशिक्षा निम्न शर्तों व अध्याधीन देय होगा:-

जनहानि मामले में :-

- घटना की सूचना निकटतम पुलिस अथवा वन अधिकारी को देनी होगी। जिसका निरीक्षण उनके द्वारा ही किया जावेगा।
- घटना के बारे में शासकीय चिकित्सक का प्रमाण-पत्र आवश्यक होगा।
- घात हाथ में मृत्यु प्रमाण-पत्र आवश्यक होगा।
- मृतक के परिवार को सदस्यों में से विधि मान्य उत्तराधिकारी को ही व तैयारी राशि प्रदान की जावेगी।
- यदि व्यक्ति घायल ही जाता है तो उसका उपचार सक्षम चिकित्सा अधिकारी करेंगे तथा प्रमाण पत्र के आधार पर तैयारी राशि देय होगी। घायल व्यक्ति स्वयं व तैयारी राशि प्राप्त करने का अधिकारी होगा।
- यदि मुआवजा राशि ऐसे व्यक्ति को देय नहीं होगा जो इसले के साथ वन्य जीव (सुरक्षा) अधिनियम 1972 के अन्तर्गत किसी अपराध करने हेतु राष्ट्रीय उद्यान/वन्य जीव अभ्यारण्य में प्रविष्ट हुआ था अथवा किसी स्थल पर वन्य प्राणी सम्बन्धी किसी नियम विरुद्ध कार्य में लिप्त था/सहायक था।
- मुआवजा/एकत्रशिक्षा राशि का पुनर्भरण केन्द्र सरकार द्वारा शत प्रतिशत केन्द्रीय प्रायोजित योजना के अन्तर्गत किया जावेगा।
- मुआवजा/एकत्रशिक्षा राशि के भुगतान हेतु मर डल का अधिकारी/उप वन सहायक/उप मुख्य वन्य जीव परिपालक/उप निदेशक सक्षम होंगे तथा सम्बन्धित क्षेत्रीय वन अधिकारी की कार्यवाही पर ही मुआवजा / एकत्र शिक्षा राशि देय होगी।
- राष्ट्रीय उद्यान/वन्य जीव अभ्यारण्य में देय रूप से निजात कर रहे तथा इनके आस-पास व बाहर रह रहे किसी जमानवासी को शेर, चक्रे या अन्य हिसक वन्य जीवों द्वारा मृत्यु व स्थायी/अस्थायी रूप से असमर्थ (Incapacitate) करने पर इस आदेश में बर्शायी गयी राशि देय होगी।
- मृत्यु/असमर्थ (स्थायी/अस्थायी) होने का सक्षम शासकीय चिकित्सक से प्रमाण पत्र आवश्यक होगा।

पशु हानि मामले में :-

- घटना के 48 घंटे के अन्दर सूचना निकटतम वन अधिकारी जो कि वनपाल या सहायक वनपाल से वन्य जीव का नाम ही उनकी पवेशी के तालिका द्वारा सूचना दिया जाना आवश्यक होगा।
- मारि गए पवेशी के शव को घटना स्थल से तब तक नहीं हटाया जावे जब तक घटना की जांच स्थानीय वन अधिकारी द्वारा नहीं कर ली जाते है तथा उसके नाश में किसी प्रकार का विष अथवा घातक पदार्थ नहीं मिलाया गया है।
- अभ्यारण्य/राष्ट्रीय उद्यान के वन क्षेत्र के बाहर मारे गये पशुओं को ही मुआवजा देय होगा। इस हेतु सक्षम पशु चिकित्सक का मृत्यु प्रमाण-पत्र आवश्यक होगा।
- मुआवजा राशि का पुनर्भरण केन्द्र में केन्द्र सरकार द्वारा शत प्रतिशत केन्द्रीय प्रायोजित योजना के अन्तर्गत किया जावेगा।
- मुआवजा के भुगतान हेतु मर डल का अधिकारी/उप वन सहायक/उप मुख्य वन्य जीव परिपालक/उप निदेशक सक्षम होंगे तथा सम्बन्धित क्षेत्रीय वन अधिकारी की कार्यवाही पर ही मुआवजा / एकत्रशिक्षा राशि देय होगी।

17/31
 वन्य जीव अधिकारी

**Constitution of District Level Implementation Committee for
Village Relocation & Rehabilitation Order dated 08.02.12**

**GOVERNMENT OF RAJASTHAN
ADMINISTRATIVE REFORMS (GROUP 3) DEPARTMENT**

No.F.6(1)AR/Gr.3/2003

Jaipur, dated : 8.2.2012

ORDER

In pursuance of the National Tiger Conservation Authority suggestion contained in the guidelines circulated vide letter No.3-1/2003-PT dated 26.2.08 regarding "Format for preparation of Village Relocation Plan from Core/Critical Tiger Habitats" the State hereby constitute the District Level Implementing Committee for looking into the relocation and rehabilitation process for the Tiger Reserves of Sariska and Ranthambhore as below in supersession of the district committees constituted vide order F.6(1)AR/Gr-3/2003 dated 22.1.2003 with respect to Alwar, Sawai Madhopur and Karauli districts only:

1	District Collector	Chairman
2	Chief Executive Officer, Zila Parishad	Member
3	Deputy Conservator of Forests	Member
4	Executive Engineer, Irrigation	Member
5	Executive Engineer, Public Works	Member
6	Chief Medical & Health Officer	Member
7	Deputy Director, Agriculture	Member
8	District Education Officer	Member
9	Deputy Director, Animal Husbandry	Member
10	Executive Engineer, PHED	Member
11	District Officer, Social Justice & Empowerment and Social Security	Member
12	Executive Engineer, JVVNL	Member
13	Manager concerned Lead Bank	Member
14	Chairman of the Eco Development Committees adjoining Tiger Reserves	Members
15	DCF/Deputy Director of concerned Tiger Reserves	Member Secretary

1. The terms of reference of the district committee will be as follows:-

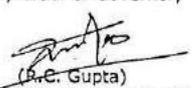
- i. Land acquisition for rehabilitation and relocation;
- ii. Ensuring integration between revenue and development administration;
- iii. Ensuring access to basic infrastructure;
- iv. Linking relocated communities with district development programmes and Providing State support to the handholding agency.

2. The committee can meet as and when needed but at least every three month.

3. The Chairman of committee may invite other officers as per requirement.

4. The tenure of the committee will be till further orders and Forest Department will be the administrative department for the committee.

By order of Governor,


(P.C. Gupta)
Deputy Secretary to the Govt.

Diversion of Nangla Rundh RF for Relocation order dated 23.08.06

F.No.8-127/2003-FC
Government of India
Ministry of Environment and Forests
(FC Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110003
Dated: 23.08.2006

To

The Principal Secretary (Forests),
Government of Rajasthan,
Jaipur.

Sub: Diversion of 222.67 ha. of forest land at Nangla Rundh(RF), Behror Tehsil, of Alwar Forest Division for relocation and rehabilitation of forest villages namely Bhagani And Kanakwari outside proposed Sariska National Park, Rajasthan.

Sir,

I am directed to refer to letter No. P.1(60)Van/2003, dated 21.10.2003 from Government of Rajasthan on the above mentioned subject seeking prior approval of the Central Government in accordance with the Section-2 of the Forest (Conservation) Act, 1980, and to say that the above proposal has been examined by the Forest Advisory Committee of the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government, and on the basis of the recommendations of the above mentioned Advisory Committee, the Central Government granted in-principle approval vide letter of even No. dated 30.04.2005 subject to certain conditions. The compliance of these conditions was submitted vide P.C.C.F's letter No. F/6/03/Vasu/Pramukh/7020 dated 05.08.2006. After consideration of the proposal and compliance of various conditions by the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 222.67 ha. of forest land at Nangla Rundh (RF), Behror Tehsil, of Alwar Forest Division for relocation and rehabilitation of forest villages namely Bhagani and Kanakwari outside proposed Sariska National Park, Rajasthan subject to following conditions:-

1. The land to be used for agriculture should be so developed that it meets the fodder requirement of the cattle reared by the families to be shifted. Practice of stall-feeding should be adopted as far as possible.

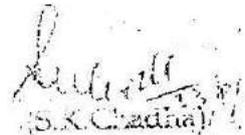
2. After relocation, the area to be vacated by the villages shall be reverted back to wildlife habitat.
3. Forest land will not be de-reserved.
4. The relocated persons shall be conferred heritable but inalienable rights.
5. The administration of such relocated areas shall be entrusted to the State Forest Department.
6. Any other condition that CCF (Central) , Regional Office, Lucknow may impose from time to time for protection improvement of flora and fauna in the forest area, shall also be applicable.

(S.K.Chadha)

Assistant Inspector General of Forests

Copy to :-

1. The Principal Chief Conservator of Forests, Government of Rajasthan, Jaipur.
2. The Nodal Officer, C/o PCCF, Govt. of Rajasthan, Jaipur.
3. The Conservator of Forests (Central), Regional Office, Lucknow.
4. User Agency.
5. Guard File.
6. Monitoring Cell of FC Section.


(S.K.Chadha)

Assistant Inspector General of Forests

Diversion of Maujpur RF for Relocation order dated 29.07.08

F. No. 8-141/2006-FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan, CGO Complex,
Lodhi Road, New Delhi-110 51,
Date: 29.07.2008

The Principal Secretary (Forests),
Government of Rajasthan,
Jaipur.

Sub: Diversion of 181.97 ha of forest land forest in Maujpur RF block of Alwar Forest Division, Rajasthan for relocation of villages from National Park Sariska.

Sir,

I am directed to refer to your letter no. P-1 (120)/Van/2006 dated 06.11.2006 on the above mentioned subject seeking prior approval of the Central Government under Section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under Section-3 of the said Act, in-principle approval for the said Mining Lease was granted vide this Ministry's letter of even number dated 29.04.2008 subject to fulfillment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government vide Nodal Officer's letter no. F. 14 (247) 2006 PCC/1 6750 dated 19.06.2008, approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 181.97 ha of forest land forest in Maujpur RF block of Alwar Forest Division, Rajasthan for relocation of villages from National Park Sariska subject to fulfillment of the following conditions:

- (i) Legal status of the diverted forest land shall remain unchanged.
- (ii) Areas vacated by villagers in the sanctuary shall be developed into pasture / meadow land at the project cost.
- (iii) The forest land shall not be utilized for any purpose other than that specified in the proposal.
- (iv) Any other condition which the State Government or Chief Conservator of Forests (Central), Regional Office, Lucknow may stipulate from time to time in the interest of afforestation, protection and improvement of flora and fauna of the area.

Yours faithfully

(C.D. Singh)
Sr. Assistant Inspector General of Forests

Notification of Government of Rajasthan dated 20.07.2010 for prescribing entry fee

①

**Government of Rajasthan
Forest Department**

No. F.11(35)Forest/1997 Pt Jaipur, Dated:
20 JUL 2010

NOTIFICATION

In exercise of the powers conferred by section 64 of the Wildlife (Protection) Act, 1972 (Central Act No. 53 of 1972), the State Government hereby makes the following rules further to amend the Wildlife (Protection) (Rajasthan) Rules, 1977, namely:-

1. Short title and commencement.- (1) These rules may be called the wildlife (Protection)(Rajasthan)(Amendment) Rules, 2010.
(2) They shall come into force on and from 1st October, 2010.

2. Amendment of rule 23.- The existing sub-rule (3) of rule 23 of the Wildlife (Protection) (Rajasthan) Rules, 1977 shall be substituted by the following, namely:-

"(3) Every person to whom a permit has been issued under sub-rule (1) shall, before entering a Sanctuary or National Park, pay,-

(A) an entrance fee at the following rates:-

(i) for Keoladeo National Park, Bharatpur, Critical Tiger Habitat of Ranthambhore Tiger Reserve, Sawai Madhpur and Critical Tiger Habitat of Sariska Tiger Reserve, Alwar,-

Category	Entrance fee (in Rs.)	Eco-dev. Surcharge (in Rs.)	Total fee per person per visit (in Rs.)
(a) Indian Citizens	10	40	50
(b) Non- Indian Citizens	100	300	400
(c) Students (Indian)	2	8	10

(ii) for all other Sanctuaries,-

Category	Entrance fee (in Rs.)	Eco-dev. Surcharge (in Rs.)	Total fee per person per visit (in Rs.)
(a) Indian Citizens	6	14	20
(b) Non- Indian Citizens	40	120	160
(c) Students (Indian)	2	2	4

Provided that Nature Education trip of students organized by Forest Department shall be exempted from the payment of entrance fee.

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(B) an additional entry-fee for vehicles at the following rates:-

(i) for Keoladeo National Park, Bharatpur, Critical Tiger Habitat of Ranthambhore Tiger Reserve, Sawai Madhpur and Critical Tiger Habitat of Sariska Tiger Reserve, Alwar,-

Types of vehicles	Entrance fee (in Rs.)	Eco-dev Surcharge (in Rs.)	Total fee per vehicle per visit (in Rs.)
(a) Bus	100	300	400
(b) Jeep/Car/Mini-bus/Canter	50	200	250
(c) Gypsy			
i. Critical Tiger Habitat of Ranthambhore Tiger Reserve.	75	325	400
ii. Keoladeo National Park/ Critical Tiger Habitat of Sariska Tiger Reserve	50	200	250
(d) Auto driven two wheelers	8	22	30

Provided that the rate of entry fee for vehicles entering Keoladeo National park, Bharatpur from the entrance-gate upto Shanti Kutir shall be charged at the following rates:-

(a) Bus Rs.200/- per bus
 (b) Gypsy, Jeep or Car Rs.100/- per vehicle
 (c) auto driven two wheeler Rs.20/- per vehicle

(ii) for all other Sanctuaries,-

Types of vehicles	Entrance fee (in Rs.)	Eco-dev Surcharge (in Rs.)	Total fee per vehicle per visit (in Rs.)
(a) Bus	50	150	200
(b) Gypsy/Jeep/Car/Mini-bus/Canter	30	100	130
(c) Auto driven two wheelers	6	14	20
(d) Auto Riksha	10	30	40

(C) boating fee at the following rates:-

	Boating fee (in Rs.)	Eco-Dev. Surcharge (in Rs.)	Total fee (in Rs.)
(a) Boating per head per one hour trip	10	40	50
(b) Minimum charges for 4 seater small boat per hour	30	120	150
(c) Minimum charges for big boat of 8 seater capacity per hour	60	240	300

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(D) electra-van fee at the following rates:-

	Boating fee (in Rs.)	Eco-Dev. Surcharge (in Rs.)	Total fee (in Rs.)
(a) Electra Van per head per trip	10	30	40
(b) Minimum charges per trip, if adequate passengers are not available	50	150	200

(E) Camera fee and security-deposits for operating a camera other than still camera in a Critical Tiger Habitat/ National Park/ Sanctuary at the following rates:-

(i) Camera Fee:

Category	Camera fee (in Rs.)	Eco-dev. Surcharge (in Rs.)	Total fee per day (in Rs.)
(i) Movies 8 mm, 16mm and video camera used by amateur photographer	100	300	400
(ii) Video Camera and Movie camera used by professional photographer for films other than feature films- filming by Indian Company/ Agency	2000	4000	6000
(iii) Video Camera and Movie camera used by professional photographer for other than feature film- filming by foreign Company/ Agency	4000	6000	10000
(iv) Movie and Video camera used for feature film	10000	30000	40000

(ii) Security Deposit:-

- (a) For feature film: Rs.80000 /-
(b) For film other than feature film by a professional Indian Company/ agency: Rs 30000/-
(c) For film other than feature film by a professional foreign Company/ agency: Rs50000/-

Note: 1. Feature film will mean and include a cinema, video film in which the main theme is not directly related to wildlife and nature preservation. The film in

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which wildlife and forests are shown as background only will be treated as feature film.

2. A visit means only one trip to the National Park/ Critical Tiger Habitat/Sanctuary during the prescribed time schedule in force.

(F) Camping Fee at the following rates:-

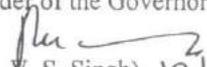
Tent fee	Rs.200/- per tent per day i.e. 24 hrs., and
Camping fee	Rs.50/- per person per day i.e. 24 hrs., and

Note: It will be compulsory for camping groups/ individuals to take the services of a Nature Guide provided by the forest department. The fee for Nature Guide will be fixed by Chief Wildlife Warden in accordance with Government order No. F.11 (90) Forest/2002 dated 4.12.2006.

Provided,-

1. that no fee shall be payable by the Government servant who enters a National Park Sanctuary on duty.
2. that the Chief Wildlife Warden, in the interest of the National Park or Sanctuary may exempt any person from payment of fee.
- ✓ 3. that no entrance fee and additional fee shall be charged from Indian Citizen entering Sarjska Tiger Reserve, Alwar on the two 'mela' days of Pandupole village and on the days preceding and following these 'mela' days.
- ✓ 4. that shuttle bus service shall be started for religious tourist to Pandupole. Till such time no entrance fee and additional fee shall be charged for the vehicles registered in Alwar district and entering Sariska Tiger Reserve for Pandupole on every Tuesday and Saturday and the day of the full moon.
5. that no entrance fee and additional fee shall be charged from Indian Citizens entering the Sitamata Wildlife Sanctuary on the mela days of every year i.e. from two days before to one day after the 'Amavasya' of 'Jyestha Mas' of every year."

By order of the Governor


(Dr. V. S. Singh) 19/7

Principal Secretary to the Government.

(a)
(b)
(c)
on

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Copy forwarded to the following for information and necessary action:-

1. Addl. Chief Secretary to the Governor, Rajasthan, Jaipur.
2. Pr. Secretary to the Chief Minister, Rajasthan, Jaipur.
3. All Private Secretaries to the Minister/ State Ministers
4. All Principal Secretaries / Secretaries to the Government
5. All Heads of the Department
6. Director General of Police, Rajasthan, Jaipur.
7. All Inspector General of Police
8. All Inspector General of Police (Range)
9. All Collectors
10. All Superintendents of Police
11. Principal Chief Conservator of Forests (HOF), Rajasthan, Jaipur.
12. Principal Chief Conservator of Forests and Chief Wildlife Warden, Rajasthan, Jaipur.
13. Principal Chief Conservator of Forests, Working Plan & Forest Settlement, Aravali Bhawan, Rajasthan, Jaipur.
14. All Chief Conservators of Forests
15. All Conservators of Forests
16. All Dy. C.F.s/D.F.O.s/Dy.CWLWs, Rajasthan
17. Field Director, Tiger Project, Kota / Sariska
18. Dy. Chief Wildlife Warden, Keoladeo National Park, Bharatpur
19. All Officers In-charge, Flying Squads (Forestry & Wildlife)
20. Director, Public Relations, Rajasthan, Jaipur.
21. The Superintendent, Government Central Press, Jaipur. He is requested for publication of this notification in the Extra Ordinary Gazette immediately and to send 30 copies thereof for record.


(Virender Singh)

Addl. Secretary to the Govt.

Copy also forwarded to:-

- (i) Joint Secretary to the Government of India, Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi.
- (ii) The Secretary, Rajasthan Legislative Assembly, Jaipur.
- (iii) The Secretary, Rajasthan Public Service Commission, Ajmer


(Virender Singh)

Addl. Secretary to the Govt.

Guidelines by CWLW, Rajasthan dated 24.06.2011 for tourism

कार्यालय प्रधान मुख्य वन संरक्षक एवं मुख्य वन्य जीव प्रतिपालक,
राजस्थान, जयपुर

क्रमांक:- एफ.3(10)पर्यटन/तकनीकी-1/मुवजीप्र/2011/17307 दिनांक 24.06.2011

आदेश

विषय :- वन्य जीव अभ्यारण्यों/ राष्ट्रीय उद्यान/ बाघ परियोजना क्षेत्रों में पर्यटन हेतु प्रवेश ।

विगत वर्षों में राज्य के संरक्षित क्षेत्रों में प्रकृति प्रेमियों के भ्रमण की रुचि में निरन्तर वृद्धि देखने में आ रही है। संरक्षित क्षेत्रों (राजस्थान में स्थित वन्यजीव अभ्यारण्यों, राष्ट्रीय उद्यानों तथा बाघ परियोजना क्षेत्रों) की जैवविविधता को संरक्षित रखते हुए इन क्षेत्रों के भ्रमण से आमजन को वानस्पतिक विविधता एवं वन्य जीवों की जानकारी तथा उनके प्रति प्रेम एवं सम्मान की भावना बने, इस दृष्टि से संरक्षित क्षेत्रों में प्रकृति प्रेमियों/पर्यटकों के भ्रमण के लिए प्रदत्त अवसर को सुव्यवस्थित (Smooth) एवं नियंत्रित (Regulated) रखा जाना आवश्यक है। इस प्रकार की व्यवस्था में जहां एक तरफ प्रकृति प्रेमियों/पर्यटकों को संरक्षित क्षेत्र में प्रवेश करने एवं भ्रमण करने बाबत ऐसी उपयुक्त व्यवस्था स्थापित की जानी अपेक्षित है जिससे उन्हें जैव विविधता की जानकारी सुगमता से प्राप्त हो, वहीं दूसरी तरफ यह भी आवश्यक है कि वन्यजीवों की सुरक्षा तथा उनके जीवन की गतिविधियों में कोई व्यवधान उत्पन्न नहीं हो।

उपरोक्त भावना को ध्यान में रखते हुए संरक्षित क्षेत्रों में पर्यटकों के प्रवेश हेतु प्रचलित पूर्व दिशा-निर्देशों/आदेश/नीतियों को अतिक्रमित करते हुए वन्य जीव (सुरक्षा) अधिनियम 1972 के अन्तर्गत प्रदत्त शक्तियों का प्रयोग करते हुए तत्काल प्रभाव से नयी व्यवस्था प्रचलित की जाती है। इस व्यवस्था के निर्धारण में संरक्षित क्षेत्र में प्रवेश का समय (जिससे वन्यजीवों की गतिविधियों पर विपरीत प्रभाव नहीं पड़े), संरक्षित क्षेत्र की धारण क्षमता एवं वन्य जीवों के प्राकृतिक आवास संबंधी तकनीकी पहलुओं के साथ साथ ऐसे प्रकृति प्रेमी मार्ग दर्शकों (नेचर गाईड) की सुविधा उपलब्ध कराने की भी सोच रखी गयी है जो पर्यटकों को जैव विविधता तथा वन्यजीवों की जीवनशैली के बारे में तकनीकी जानकारी रोचक ढंग से उपलब्ध कराने की दक्षता रखते हों।

1. संरक्षित क्षेत्र में प्रवेश / भ्रमण का समय :-
संरक्षित क्षेत्र में प्रवेश / भ्रमण निम्नानुसार नियमित होगा:-

1.1 रणथम्भौर राष्ट्रीय उद्यान

- 1.1.1. - 1 अक्टूबर से 30 जून की अवधि में निम्नांकित समयानुसार प्रवेश की अनुमति होगी

अवधि	समय पूर्वान्ह	समय अपरान्ह
1 अक्टूबर से 31 अक्टूबर	6.30 से 10.00 ए.एम.	2.30 से 6.00 पी.एम.
1 नवम्बर से 31 जनवरी	7.00 से 10.30 ए.एम.	2.00 से 5.30 पी.एम.
1 फरवरी से 31 मार्च	6.30 से 10.00 ए.एम.	2.30 से 6.00 पी.एम.
1 अप्रैल से 16 मई	6.00 से 9.30 ए.एम.	3.00 से 6.30 पी.एम.
16 मई से 30 जून	6.00 से 9.30 ए.एम.	3.30 से 7.00 पी.एम.

- 1.1.2. - 1 जुलाई से 30 सितम्बर की अवधि में प्रवेश वर्जित रहेगा

1.2 सरिस्का टाईगर रिजर्व

- 1.2.1- 1 अक्टूबर से 30 जून की अवधि में निम्न समयानुसार प्रवेश एवं ठहराव की अनुमति होगी :-

शरद ऋतु (Winters)	7.00 ए.एम. से 3.30. पी.एम.
ग्रीष्मकालीन (Summers)	6.30 ए.एम. से 4.00 पी.एम.

- 1.2.2 - 1 जुलाई से 30 सितम्बर की अवधि में प्रवेश एवं ठहराव वर्जित रहेगा।

1.3 केवला देव राष्ट्रीय उद्यान

- सूर्योदय से सूर्यास्त तक प्रवेश एवं ठहराव की अनुमति होगी ।

1.4 अन्य अभयारण्य

- सूर्योदय से सूर्यास्त तक प्रवेश एवं ठहराव की अनुमति होगी।

2. प्रकृति प्रेमियों / पर्यटकों को प्रवेश हेतु प्रवेश पत्र :-

बाघ परियोजना क्षेत्रों एवं राष्ट्रीय उद्यानों में परियोजना प्रबन्धन का दायित्व निर्वहन करने वाले अधिकारियों एवं कार्मिकों तथा क्षेत्र निदेशक / उप क्षेत्र निदेशक द्वारा अनुमत विशेष अतिथियों के अतिरिक्त किसी भी व्यक्ति को निर्धारित प्रवेश पत्र के आधार पर ही प्रवेश दिया जा सकेगा। प्रवेश पत्र जारी करने हेतु व्यवस्था निम्नानुसार होगी :-

- 2.1 रणथम्भौर नेशनल पार्क क्षेत्र में स्थित गढगणेश मन्दिर एवं सरिस्का बाघ परियोजना क्षेत्र में स्थित पाण्डुपोल व धार्मिक स्थल के लिए परंपरानुसार निर्धारित दिवसों एवं परम्परागत मेला अवधि में श्रद्धालुओं को धार्मिक स्थल तक जाने के लिए बिना प्रवेश-पत्र प्रवेश की अनुमति होगी। किन्तु इस प्रकार के प्रवेश प्रबंधन आवश्यकतानुसार निम्न समिति के आदेशों के द्वारा नियंत्रित होंगे :-

- (i) क्षेत्र निदेशक – अध्यक्ष
- (ii) जिला कलक्टर का प्रतिनिधि,
जो उपखण्ड अधिकारी स्तर से कम का नहीं हो – सदस्य
- (iii) उप क्षेत्र निदेशक – सदस्य सचिव

2.2 सामान्य दिवसों पर रणथम्भौर बाघ परियोजना क्षेत्र, सरिस्का बाघ परियोजना क्षेत्र एवं केवला देव राष्ट्रीय उद्यान में प्रतिदिन प्रकृति प्रेमियों / पर्यटकों के प्रवेश की अधिकतम संख्या निम्नानुसार होगी :-

क्र. स.	संरक्षित क्षेत्र	पर्यटकों के प्रवेश पत्रों की अधिकतम संख्या	विशेष अतिथियों के प्रवेश पत्रों की अधिकतम संख्या	कुल संख्या
1	सरिस्का बाघ परियोजना	520	30	550
2	रणथम्भौर राष्ट्रीय उद्यान	520 प्रति पारी	30 प्रति पारी	550 प्रति पारी
3	केवला देव राष्ट्रीय उद्यान	4000	30	4030

2.3 विशेष दिवसों जैसे कि, वर्षान्त एवं दशहरा, दीपावली, क्रिसमस के अवकाश की अवधि में अतिरिक्त संख्या में पर्यटकों को भ्रमण हेतु अनुमति दी जा सकेगी परन्तु अतिरिक्त पर्यटकों की संख्या का निर्धारण निम्न समिति द्वारा किया जायेगा:-

- (i) क्षेत्र निदेशक – अध्यक्ष
- (ii) जिला कलक्टर का प्रतिनिधि,
जो उपखण्ड अधिकारी स्तर से कम का नहीं हो – सदस्य
- (iii) उप क्षेत्र निदेशक – सदस्य सचिव

2.4 पर्यटकों को प्रवेश पत्र जारी करने के लिए प्रवेश हेतु निर्धारित संख्या के 75 प्रतिशत तक ऑन लाइन अग्रिम आरक्षण किया जा सकेगा। शेष संख्या तत्काल बुकिंग व्यवस्था के अधीन रखी जावेगी।

2.5 तत्काल बुकिंग से प्रवेश पत्र सीधे पर्यटक को ही जारी किया जावेगा। किसी एजेंट/बिचौलिये को या उनके माध्यम से जारी नहीं किया जावेगा। इस बाबत पर्यटक द्वारा फोटोशुदा पहचान पत्र प्रस्तुत करना अनिवार्य होगा। ऐसे पर्यटकों को वाहन उपलब्ध कराने की व्यवस्था प्रवेश पत्र काउंटर के पास ही रखी जावेगी।

2.6 इसी प्रकार ऑनलाईन बुकिंग के माध्यम से प्रवेश पत्र प्राप्त करने वाले पर्यटकों को फोटोयुक्त पहचान पत्र दिखा कर पहचान बताना अनिवार्य होगा तथा भ्रमण के दौरान अपना पहचान पत्र साथ रखना अनिवार्य होगा।

2.7 प्रत्येक पर्यटक को निर्धारित प्रपत्र (परिशिष्ट - 1) में इन्डेमिटी बॉण्ड प्रस्तुत करना अनिवार्य होगा। इन्डेमिटी बॉण्ड प्रस्तुत किये बिना संरक्षित क्षेत्र में प्रवेश नहीं दिया जा सकेगा।

2.8 संरक्षित क्षेत्र के प्रबंधन के लिए जिम्मेदार अधिकारियों द्वारा ऐसे व्यक्तियों, जिनके द्वारा इण्डेम्निटी बॉण्ड/प्रवेश पत्र प्राप्त करने के संबंध में गलत सूचना दिया जाना पाया जाता है, के विरुद्ध विधिक कार्यवाही की जावेगी।

3. वाहनों का प्रवेश :-

किसी भी संरक्षित क्षेत्र में संरक्षित क्षेत्र के प्रबंधन से जुड़े वन विभाग के अधिकारियों के वाहन के अलावा अन्य वाहनों का प्रवेश सक्षम अधिकारी द्वारा जारी प्रवेश पत्र के बिना वर्जित होगा। 1.10.2011 से संरक्षित क्षेत्रों में भ्रमण हेतु वाहनों के प्रवेश हेतु अनुमति पत्र जारी किये जाने बाबत निम्न व्यवस्था रहेगी :-

3.1 किसी भी संरक्षित क्षेत्र में पर्यटकों के भ्रमण हेतु वाहन के प्रवेश के लिए प्रवेश पत्र केवल उन्हीं वाहनों को दिया जा सकेगा जो मोटर यान अधिनियम, 1988 के अधीन वैद्य पंजीकरण प्रमाण पत्र वैद्य प्रदूषण अंडर कंट्रोल सर्टिफिकेट फिटनेस सर्टिफिकेट एवं वैद्य इश्यारेन्स रखते हों। इसके अतिरिक्त संबंधित वाहन के चालन हेतु अधिकृत चालक के पास वैद्य ड्राइविंग लाइसेन्स होना भी आवश्यक होगा।

3.2 जिन संरक्षित क्षेत्रों में पर्यटकों के प्रवेश हेतु निर्धारित रूट्स पर नियमित वाहन संचालन की व्यवस्था स्थापित है (या होगी) उनमें संबंधित संरक्षित क्षेत्र के उप क्षेत्र निदेशक/उप वन संरक्षक द्वारा संरक्षित क्षेत्र में पर्यटकों को प्रवेश हेतु ले जाने के लिए इच्छुक वाहनों को पंजीबद्ध किया जावेगा एवं ऐसे सभी वाहन केवल हरे रंग के होने आवश्यक होंगे। इन वाहनों में जी.पी.एस. सिस्टम लगाया जाना भी अनिवार्य होगा।

3.3 प्रत्येक पर्यटन वाहन जो इन क्षेत्रों में भ्रमण हेतु अधिकृत किया जायेगा उन पर जी. पी.एस. सिस्टम लगाया जाना अनिवार्य होगा ताकि पर्यटक जोनों में वाहनों के आवागमन पर नियंत्रण रखा जा सके। वाहन पर लगाया जाने वाला जी.पी.एस. सिस्टम को क्रय कर लगाने एवं उन्हें तदुपरान्त संधारित करने की जिम्मेदारी वाहन मालिक की होगी। वाहन के संचालन के संबंध में रिकार्डिंग की जिम्मेदारी संबंधित वाहन चालक की होगी।

3.4 सम्बन्धित वन संरक्षक एवं क्षेत्र निदेशक/उप वन संरक्षक द्वारा उन्हीं वाहनों को पंजीबद्ध किया जावेगा जो पर्यटन सीजन के प्रारम्भ होने की तिथि को चार वर्ष से अधिक पुराने न हों, उनमें यूरो-III/IV मानक के एंजिन लगे हुए हों।

3.5 रणथम्भौर राष्ट्रीय उद्यान में पर्यटन हेतु वाहनों के प्रवेश की व्यवस्था निम्नानुसार होगी:-

3.5.1 दो पारियों (एक दोपहर से पूर्व एवं दूसरी दोपहर बाद) में वाहनों को प्रवेश की अनुमति होगी एवं प्रत्येक पारी में कुल पर्यटक वाहनों की अधिकतम संख्या निम्नानुसार होगी :-

क. सामान्य वर्ग

- 37

ख. वी.आई.पी. रिजर्व	-	03
कुल	-	40

- 3.5.2 रणथम्भौर राष्ट्रीय उद्यान में प्रत्येक पारी में 20 वाहनों (6 व्यक्तियों के बैठने योग्य), तथा 20 मिनी बस वाहनों (16-20 व्यक्तियों के बैठने योग्य) को प्रवेश हेतु अनुमति प्रदान की जायेगी।
- 3.5.3 सामान्य वर्ग के वाहनों के लिए पंजीबद्ध वाहनों का रोस्टर के आधार पर प्रवेश हेतु अनुमति प्रदान की जावेगी।
- 3.5.4 वी.आई.पी. रिजर्व केटेगरी के वाहन का आवंटन उप वन संरक्षक (कोर) द्वारा किया जायेगा। रणथम्भौर राष्ट्रीय उद्यान के प्रतिदिन खुलने के निर्धारित समय से पन्द्रह मिनट पूर्व वी.आई.पी. रिजर्व के अनारक्षित वाहन सामान्य पर्यटकों के लिये दिये जा सकेंगे।
- 3.5.5 रणथम्भौर टाइगर रिजर्व में भ्रमण हेतु जोन का निर्धारण मुख्य वन्य जीव प्रतिपालक, राजस्थान द्वारा अधिकृत प्राधिकारी द्वारा किया जायेगा।
- 3.5.6 केन्द्रीय बाघ संरक्षण प्राधिकरण, भारत सरकार द्वारा पर्यटन को टाइगर रिजर्व के बाहरी क्षेत्रों में बढ़ावा दिये जाने बाबत निर्देश दिये गये हैं। अतः रणथम्भौर टाइगर रिजर्व में स्थित अन्य पर्यटन जोन जैसे कुंडाल, चिड़िखो, बालास, कूवाल्जी, मोरकुण्ड, भूरी पहाड़ी, आमलीदेह आदि में पर्यटन को बढ़ावा दिया जाये, जिसमें वाहन मालिक आवश्यक सहयोग प्रदान करें।
- 3.6 क्षेत्रों में भ्रमण हेतु जाने वाले वाहन पर किराये की दरें एवं उनको आवंटित जोन नम्बर को स्पष्ट रूप से हिन्दी व अंग्रेजी में वाहन के आगे एवं पीछे प्रदर्शित करेंगे। ऑनलाईन बुकिंग की दशा में कम्प्यूटर द्वारा रेण्डम पद्धति से जोन नम्बर आवंटित किये जायेंगे एवं तत्काल बुकिंग की दशा में जोन नम्बर का आवंटन लॉटरी पद्धति से किया जायेगा। वाहन में प्रत्येक सीट पर नम्बर अंकित किया जायेगा तथा पर्यटक को परमिट फार्म में अंकित सीट नम्बर पर बैठाने की जिम्मेदारी पंजीकृत गाईड/चालक की होगी।
- 3.7. पर्यटक वाहनों के चालकों को ऑलिव ग्रीन रंग का यूनिफार्म जिस पर उनका नाम अंकित हों, धारण किया जायेगा तथा उनके द्वारा वाहन चलाने का लाईसेंस जैसा कि अधिकृत हो उनके पास मौजूद होना आवश्यक होगा। भ्रमण हेतु प्रवेश से पूर्व अधिकृत वाहन चालक को एक टोकन दिया जायेगा जिस पर उस वाहन का नम्बर एवं जोन नम्बर अंकित होगा एवं जिसे वह गेट पर सुरक्षाकर्मी को सौंप कर भ्रमण हेतु प्रवेश करेगा।

3.8 वाहनों की संख्या जैसा कि ऊपर दिया गया है, को अवकाश/ वर्षान्त एवं इस प्रकार के अन्य अवसरों पर आवश्यकतानुसार कुछ समय बढ़ाने हेतु निम्न समिति द्वारा निर्धारित की जा सकेगी:-

- (i) क्षेत्र निदेशक - अध्यक्ष
- (ii) जिला कलक्टर का प्रतिनिधि,
जो उपखण्ड अधिकारी स्तर से कम का नहीं हो - सदस्य
- (iii) उप क्षेत्र निदेशक - सदस्य
- (iv) सहायक वन संरक्षक - सदस्य सचिव

3.9 प्रत्येक वाहन मालिक द्वारा पंजीयन के समय दस हजार रुपये की अमानत राशि जमा कराई जानी आवश्यक है।

3.10 भ्रमण के दौरान वाहन-चालक अपने साथ प्राथमिक उपचार पेटी (First-aid kit) रखें तथा किसी दुर्घटना अथवा स्वास्थ्य सम्बन्धी तकलीफ होने पर पर्यटक को तत्काल समीपस्थ चिकित्सा केन्द्र तक ईलाज हेतु पहुँचायेंगे तथा निकटतम चौकी को सूचित करेंगे।

4. नेचर गाईड के लिए लाईसेन्स :-

बाघ परियोजना क्षेत्रों एवं केवला देव राष्ट्रीय उद्यान में भ्रमण करने वाले पर्यटकों के वाहनों के साथ लाईसेन्सशुदा नेचर गाईड रखा जाना अनिवार्य होगा। नेचर गाईड ऐसा व्यक्ति होगा जो जैव विविधता विशेषकर वन्य जीवों की जीवन शैली आदि का ज्ञान रखता हो एवं पर्यटक को दक्षता एवं सुरक्षा के साथ रोचक शैली में जानकारी प्रस्तुत करने की क्षमता रखता हो। नेचर गाईड को लाईसेन्स दिये जाने की प्रक्रिया निम्नानुसार होगी :-

4.1 प्रत्येक पर्यटक वाहन के साथ नेचर गाईड का होना अनिवार्य है। पर्यटक/ टूर ऑपरेटर/ होटलीयर्स द्वारा नेचर गाईड की विशेष मांग पर उनके द्वारा चाहा गया नेचर गाईड अतिरिक्त निर्धारित फीस जमा कर आवंटित किया जायेगा। शेष नेचर गाईड्स का आवंटन रोस्टर के आधार पर किया जायेगा।

4.2. लाईसेन्स जारी करने हेतु अधिकृत अधिकारी :-

रणथम्भौर एवम् सरिस्का बाघ परियोजनाओं तथा केवला देव राष्ट्रीय उद्यान के लिए नेचर गाईड को लाईसेन्स देने हेतु सक्षम अधिकारी निम्नानुसार होंगे -

क्र.स.	संरक्षित क्षेत्र	लाईसेन्स जारी करने हेतु सक्षम अधिकारी
1	सरिस्का बाघ परियोजना	उप वन संरक्षक, बाघ परियोजना, सरिस्का
2	रणथम्भौर बाघ परियोजना	उप वन संरक्षक एवं उप निदेशक (कोर ऐरिया) रणथम्भौर टाईगर रिजर्व, सवाईमाधोपुर
3	केवला देव राष्ट्रीय उद्यान	उप मुख्य वन्य जीव प्रतिपालक, भरतपुर
4.	अन्य वन्य जीव अभयारण्य	सम्बन्धित उप वन संरक्षक / उप वन संरक्षक (वन्य जीव) / उप मुख्य वन्य जीव प्रतिपालक

4.3 नेचर गाईड के लाईसेन्स हेतु पात्रता :-

- 4.3.1 संरक्षित क्षेत्र की जैव विविधता एवं वहाँ के वन्य जीवों के जीवन की शैली के बारे में जानकारी रखने वाले स्थानीय लोगों (उस जिले के नागरिकों जिसमें वह संरक्षित क्षेत्र आता है) को ही नेचर गाईड का लाईसेन्स दिया जा सकेगा।
- 4.3.2 नेचर गाईड का लाईसेन्स प्राप्त करने के इच्छुक व्यक्ति को प्रकृति में रुचि रखने के अलावा भारत के किसी भी मान्यता प्राप्त बोर्ड से 12वीं पास की योग्यता रखना आवश्यक होगा।

परन्तु केवला देव राष्ट्रीय उद्यान के संबंध में कई वर्षों का अनुभव रखने वाले ऐसे व्यक्तियों को जो वहाँ के वन्यजीवों विशेषकर पक्षियों के बारे में ज्ञान रखते हों, को मुख्य वन्य जीव प्रतिपालक द्वारा शैक्षणिक योग्यता में छूट दी जा सकेगी।

शैक्षणिक योग्यता की अनिवार्यता की व्यवस्था उन नेचर गाईड लाईसेन्स धारियों पर लागू नहीं होगी जो इस आदेश के प्रचलित होने से पूर्व वैध नेचर गाईड लाईसेन्स रखते हों।

- 4.3.3 नेचर गाईड लाईसेन्स प्राप्त करने के इच्छुक व्यक्ति के जैव विविधता संबंधी जानकारी एवं अनुभव का विनिश्चयन करने के लिए लाईसेन्स अधिकारी द्वारा आवेदक का साक्षात्कार लिया जावेगा।
- 4.3.4 साक्षात्कार के आधार पर पात्रता निर्धारण के उपरान्त आवेदक नेचर गाईड का प्रशिक्षण प्राप्त करने के लिए पात्र होगा। उसे नेचर गाईड हेतु ट्रेनिंग के लिए निम्न शर्तों के अधीन बुलाया जा सकेगा :-

- क. आवेदक की आपराधिक पृष्ठभूमि का नहीं होने का प्रमाणीकरण स्थानीय पुलिस से कराया जाना आवश्यक होगा।
- ख. यदि संबंधित बाघ परियोजना क्षेत्र / राष्ट्रीय उद्यान के लिए पूर्व में पंजीकृत नेचर गाईड्स के अतिरिक्त और नेचर गाईड्स की संख्या में वृद्धि किये जाने की आवश्यकता हो। इस हेतु यह आवश्यक रहेगा कि प्रतिवर्ष लाईसेन्सिंग अधिकारी आवश्यकता का आंकलन कर उसे अगला पर्यटक सीजन प्रारम्भ होने के तीन माह पूर्व अपने कार्यालय के सूचनापट्ट पर प्रदर्शित कर दे।
- ग. प्रशिक्षण हेतु चयनित अभ्यर्थी को लाईसेन्स तभी दिया जा सकेगा जब कि वह नेचर गाईड के लिए वन विभाग द्वारा निर्धारित तीन सप्ताह के प्रशिक्षण कार्यक्रम को सफलता पूर्वक पूर्णकर प्रमाण प्राप्त कर लेता है।
- घ. प्रशिक्षण का कार्यक्रम फीस आदि का व्यौरा संलग्न परिशिष्ट- 2 के अनुसार होगा।
- ङ. प्रशिक्षण सफलता पूर्वक पूर्ण कर प्रमाण पत्र प्राप्त करने के बाद व्यक्ति नेचर गाईड का लाईसेन्स प्राप्त करने के लिए पात्र होगा।

4.4 नेचर गाईड लाईसेन्स की अवधि :-

- 4.4.1 नेचर गाईड लाईसेन्स एक साल की परिवीक्षाधीन अवधि के लिए जारी किया जावेगा। परिवीक्षाधीन अवधि में कार्य संतोषपूर्ण पाये जाने पर लाईसेन्स की समायावधि एक वर्ष के लिए बढ़ा दी जावेगी।
- 4.4.2 नेचर गाईड लाईसेन्स का प्रत्येक दो वर्ष पर नवीनीकरण कराया जाना आवश्यक होगा। नवीनीकरण से पूर्व नेचर गाईड को विभाग द्वारा प्रायोजित तीन दिवस का पुनश्चर्या प्रशिक्षण कार्यक्रम (रिफ्रेशर कोर्स) सफलता पूर्वक पूरा कर प्रमाण पत्र प्राप्त करना अनिवार्य होगा।
- 4.4.3 पर्यटन सत्र प्रारम्भ होने की तिथि को 60 वर्ष की आयु के उपरान्त नेचर गाईड की शारीरिक एवं मानसिक स्थिति का आंकलन कर ही लाईसेन्स का नवीनीकरण किया जायेगा।
- 4.4.4 पर्यटकों द्वारा किसी नेचर गाईड की 3 बार निरन्तर शिकायत प्राप्त होने पर उप वन संरक्षक द्वारा इसकी जांच की जायेगी तथा सही पाये जाने पर उसका लाईसेन्स निरस्त कर दिया जायेगा। पार्क अधिकारियों द्वारा भी नेचर गाईड द्वारा ड्यूटी में निरन्तर पार्क नियमों एवं आदेशों की अवहेलना एवं दुर्व्यवहार आदि करने पर जांच उपरान्त लाईसेन्स निरस्त किया जायेगा।

4.5 लाईसेन्स शुल्क :-

- 4.5.1 नेचर गाईड को नीचे सारणी में निर्धारित लाईसेन्स शुल्क का भुगतान करना अनिवार्य होगा।

क्र.स.	संरक्षित क्षेत्र	लाईसेन्स शुल्क	नवीनीकरण
1	सरिस्का बाघ परियोजना	₹ 1000	₹ 500
2	रणथम्भौर बाघ परियोजना	₹ 1000	₹ 500
3	केवला देव राष्ट्रीय उद्यान	₹ 1000	₹ 500
4	अन्य वन्य जीव अभयारण्य	₹ 100	₹ 50

- 4.5.2 मुख्य वन्य जीव प्रतिपालक की आज्ञा से विशेष पर्यटक दल को भ्रमण कराने हेतु निर्धारित नेचर गाईड को समयावधि एवं पर्यटकों की संख्या के आधार पर फीस का भुगतान करना होगा। जिसका निर्धारण मुख्य वन्य जीव प्रतिपालक द्वारा ऐसे पर्यटक दल को भ्रमण करने के अनुमति देने के साथ ही किया जावेगा।

4.6 नेचर गाईड द्वारा पर्यटक से ली जाने वाली फीस :-

क्र.स.	संरक्षित क्षेत्र		शुल्क
1	सरिस्का बाघ परियोजना	प्रति वाहन/ प्रति पारी	₹ 250/-
2	रणथम्भौर बाघ परियोजना	प्रति वाहन/ प्रति पारी	₹ 400/-
3	केवला देव राष्ट्रीय उद्यान	i. प्रति घंटे पांच पर्यटकों तक	₹ 100/-

		समूह के लिये ii. प्रति घंटे पांच पर्यटकों से अधिक के समूह के लिये	₹ 150/-
4	अन्य वन्य जीव अभ्यारण्य	प्रति पर्यटक	₹ 20/-

5. सामान्य निर्देश

- 5.1 वन्य जीव (सुरक्षा)(राजस्थान) नियम, 1977 के नियम 23 के अन्तर्गत अधिघोषित पर्यटकों एवं पर्यटन वाहनों के प्रवेश हेतु निर्धारित दरों एवम् अन्य दरों (परिशिष्ट-3) को बुकिंग खिड़की एवं अन्य उपयुक्त स्थानों पर प्रमुखता से प्रदर्शित किया जायेगा।
- 5.2. वाहन स्वामी/ नेचर गाईड को कुल किराया/मानदेय की 5% राशि बाघ संरक्षण फाउण्डेशन अथवा राजस्थान इको टूरिज्म डवलपमेन्ट सोसाइटी को सहयोग राशि के रूप में वन्य जीव प्रबन्धन एवं संरक्षण कार्य हेतु जमा करानी होगी।
- 5.3 निर्धारित पारी में भ्रमण हेतु अधिकृत वाहनों को प्रवेश का समय एवं क्षेत्र से बाहर निकलने का समय गेट पर संधारित पंजिका/ बायोमेट्रिक मशीन में अंकित करना अनिवार्य होगा।
- 5.4 क्षेत्र निदेशक/ उप वन संरक्षक भ्रमण हेतु वाहनों को जोन का आवंटन इस प्रकार करेंगे कि जहां तक सम्भव हो प्रत्येक जोन में अनुमति प्रदान किये गये वाहनों की संख्या बराबर हों। वन्य जीव संरक्षण को ध्यान में रखते हुए क्षेत्र में एक ही स्थान पर वाहनों के जमावड़े को हतोत्साहित किया जाना चाहिये। इस हेतु पर्यटक वाहन के चालकों को निर्देशित किया जाना वांछनीय होगा।
- 5.5 पर्यटक वाहन के वाहन चालकों को क्षेत्र में बाघ देखे जाने की स्थिति में उनसे निकटतम दूरी कम से कम 30 मीटर, एवं बाघ शावकों से निकटतम दूरी कम से कम 50 मीटर रखना आवश्यक होगा। इसकी पालना अधिकारियों द्वारा कठोरता से कराई जावेगी।
- 5.6 क्षेत्र निदेशक/ उप वन संरक्षक द्वारा पर्यटक वाहन के वाहन चालकों को उनके वाहन की गति नियंत्रित करने एवं एक स्थान पर ज्यादा समय तक न रुकने के सम्बन्ध में दिशा-निर्देश यथा वाहन की निर्धारित गति, एक स्थान पर वाहन के रुकने का समय एवं एक स्थान पर अधिकतम वाहनों की संख्या इत्यादि के सम्बन्ध में जारी किये जायेंगे।
- 5.7 टिकिट विक्रय से प्राप्त आय को राजकीय कोष में उपयुक्त लेखा मद में जमा कराया जावेगा।
- 5.8 क्षेत्र निदेशक/ उप वन संरक्षक उनके अधीन क्षेत्रों में पर्यटक वाहनों के नियंत्रण एवं निरीक्षण के लिये उनके अधीन कार्यरत अधिकारियों/ कर्मचारियों को अधिकृत कर सकेंगे एवं दिशा-निर्देशों की अवहेलना पाये जाने पर सम्बन्धित वाहन चालक एवं नेचरगाईड के विरुद्ध कार्यवाही करने हेतु सक्षम होंगे। जोन प्लेट को प्रदर्शित न करना, जोर से हॉर्न बजाना, शोर मचाना, क्षेत्र में कचरा फेंकना एवं गन्दगी करना, अपने निर्धारित जोन का उल्लंघन करना, वन्य जीवों के पीछे वाहन दौड़ाना, वाहन का पंजीकृत न होना, निर्धारित शुल्क जमा न कराना इत्यादि अवहेलना की श्रेणी में माने जाकर वाहन, गाईड, वाहन चालक पर उप वन, संरक्षक द्वारा जुर्माना एवं पार्क में प्रवेश निषेध जैसे दण्ड दिये जा सकेंगे। विवाद की स्थिति में वन संरक्षक एवं

क्षेत्र निदेशक के सम्मुख अपील की जा सकेगी तथा इस सम्बन्ध में वन संरक्षक एवं क्षेत्र निदेशक का निर्णय अन्तिम होगा।

- 5.9 ऐसा कोई विषय जिसका समावेश इन आदेशों में स्पष्ट रूप से अंकित नहीं हो पाया हो, उन विषयों के सम्बन्ध में सम्बन्धित उप वन संरक्षक उनके नियन्त्रण अधिकारी के अनुमोदन उपरान्त निर्णय लेने हेतु अधिकृत होंगे।

N
प्रधान मुख्य वन संरक्षक एवं
मुख्य वन्य जीव प्रतिपालक,
राजस्थान, जयपुर

Indemnity Bond for Tourist

Please print/make the multiple copies required of the below indemnity Bond as it mandatory to submit the same by every individual visitor at the time of collection of Boarding pass prior to entering Tiger Reserve or Sanctuary.

Indemnity Bond

To,
Dy. Conservator of Forest & Dy. Field Director
Sariska Tiger Reserve, Alwar

I.....Son/daughter/Husband of..... Ageyrs, resident of town/city.....country.....hereby state that I am aware of the risks involved in visiting this wildlife sanctuary / Tiger Reserve. I further state that I am entering the wildlife sanctuary /Tiger Reserve at my own risk and I shall be fully liable if any accident occurs. I am fully satisfied with the security arrangements made by the sanctuary/Tiger Reserve management and I am also responsible for loss or damage to my personnel belongings i.e.. life camera, binocular. Video camera etc. I am informed that in case of any unforeseen accident the sanctuary / Tiger Reserve management shall not be responsible in any manner whatsoever.

I also agree that should there be need of any litigation the same would be tenable only in a court of law in state of Rajasthan. I submit this indemnity bond with full consciousness and also acknowledge the acceptance of all terms and conditions I accepted while making the online booking.

Date.....

Signature of visitor

Passport No:.....

.....

Email Address:.....

Signature of guide/witness:.....

Name of guide/witness:.....Do not Remove:

(The nature guide is required to collect signed forms and deposit it at park entry gate.)Do not Remove:

Statement showing Monthly Temperature

METEOROLOGICAL INFORMATION OF ALWAR DISTRICT, RAJASTHAN
 Monthly Temperature in degrees - Centigrade

Month	Mean Max.	Mean Min.	Month by mean.	Monthly average
January	22.1	6.9	14.5	15.2
February	28.2	10.1	19.1	18.1
March	32.3	15.8	23.9	16.5
April	36.2	22.2	29.2	14.0
May	40.5	26.2	33.3	14.3
June	41.6	30.5	35.5	11.1
July	35.9	29.1	32.0	7.8
August	33.7	26.9	30.3	6.8
September	32.4	18.5	25.4	13.9
October	32.4	18.5	25.4	13.9
November	28.8	12.7	20.7	16.1
December	24.2	8.1	16.1	16.1

Statement showing Monthly Mean Wind Velocity

STATEMENT SHOWING THE MEAN WIND VELOCITY Km./hour.

Month	Wind Velocity Km./ho	Remarks
January	1.8	
February	2.9	
March	3.1	
April	4.2	
May	4.9	
June	6.5	Maximum
July	4.5	
August	2.7	
September	2.2	
October	2.1	
November	1.9	
December	1.5	Minimum

Annexure – 53

Rain Fall data of Alwar District (Year 1971-2011)

Rainfall Station	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Alwar	821	699	777	645	544.50	945	645	852	367	925	15	698.30	973
Ajabgarh	710	591	488	266	1066	431	-	813	472	585	-	810	834
Behror	680	436	213	285	498	780	-	-	973	1137	571	-	665
Bunoor	660	301	397	345	575	640	-	-	43	-	795.40	549	287
Govindgarh	589	414	529	319	717	721	-	-	418	546	370	568	851
Kishangarh	828	314	267	143	785	960	-	694	451	518	387	480	833
Kotkasim	684	538	499	232	597	585	-	-	456	936	351.20	459	765
Kathumar	725	677	452	437	803	531	-	-	531	555	323	685	577
Mundawar	804	550	444	96	514	838	-	-	202	-	644.60	485	1116
Laxmangarh	649	263	393	221	490	478	-	532	318	497	253	557	389
Mangalwar	575	623	417	233	586	481	-	956	437	516	-	585	826
Rajgarh	819	833	520	414	738	637	-	662	209	514	439	559	632
Rangarh	553	641	493	325	702	781	-	510	422	635	407	595	997
Siliserh	658	629	524	330	683.50	793	-	100	530.44	698	-	557	955
Thanagezi	823	657	689	405.50	879	932	-	858	487	594.80	757.50	501	947
Tijara	742	599	422.50	213	780	837	-	945	357	408	434	506	558
Tapukara	696	202	-	251	694	519	-	-	544	671	687.70	820	1164
Neemrana	540	758	769	525	747	1096	-	-	908	918	542	422	-
TOTAL	12556	9725	8306.50	5745.50	12859	12985	645	6962	8125.44	10653.80	6958.40	9836.30	9836.30
Average	698	540	489	319	714	721	645	696	451	666	464	579	752

STATION	1984	1985	1986	1987	1988	1989	1990	1991	1992
Alwar	552.0	763.5	312.9	223.8	678.0	392.5	767.0	319.0	675.0
Ramgarh	411.0	970.0	257.7	374.8	606.0	273.0	836.3	335.0	651.0
Malakhera	479.0	644.0	135.0	376.0	660.0	479.0	719.0	380.0	640.0
Rajgarh	526.0	729.5	234.0	363.5	421.0	407.0	577.0	335.0	757.0
Laxmangarh	508.0	806.0	245.0	273.0	358.0	235.0	619.0	312.0	714.0
Kathumar	617.0	519.0	354.0	158.0	326.0	301.0	718.0	340.0	589.0
Govindgarh	761.0	863.0	493.0	270.0	527.0	363.0	600.0	387.0	600.0
Thanagazi	703.0	731.0	430.0	464.0	561.0	424.0	734.0	322.0	763.0
Kishangarh	516.0	886.5	241.0	280.5	705.5	306.5	593.0	441.0	229.5
Kotkasim	304.5	707.0	299.7	204.5	707.0	389.7	924.6	497.0	468.0
Tijara	457.7	707.8	274.7	195.0	678.0	288.3	721.0	527.0	697.0
Tapukara	611.2	1435.1	530.0	465.0	889.0	588.0	941.0	551.0	432.0
Mundawar	397.0	561.0	337.0	155.2	821.0	196.0	457.0	401.0	881.0
Behror	333.8	618.0	284.2	216.0	565.0	227.0	541.0	531.0	549.0
Neemrana	312.3	568.7	467.2	254.1	864.0	328.4	783.5	512.0	641.1
Bansur	624.8	1088.8	425.6	373.4	383.5	428.4	954.4	976.2	935.6
Bahadurpur	-	-	-	-	-	-	-	-	-
Agerage	507.0	940.7	332.5	290.4	646.8	998.6	724.1	422.8	659.3

STATION	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Alwar	665	509	750	1445	745	734	430	358	539	189
Ramgarh	573	560	1025	1216	651	700	497	634	715	268
Malakhera	673	530	1145	1328	888	875	512	387	535	178
Rajgarh	823	643	1073	1020	705	782	413	335	535	165
Laxmangarh	599	498	911	1010	495	831	492	362	523	218
Kathumar	466	660	1101	1215	726	909	530	392	583	266
Govindgarh	291	569	1078	1445	601	663	570	454	490	263
Thanagazi	918	909	1102	1272	1131	807	682	498	567	118
Kishangarh	564	726	1123	1253	776	679	465	486	585	217
Kotkasim	797	618	1119	1300	802	845	530	500	495	239
Tijara	590	645	995	1119	576	793	425	283	527	222
Tapukara	658	570	1182	1098	505	526	431	285	516	236
Mundawar	1010	935	1726	1450	1411	1038	692	458	466	200
Behror	555	401	978	1238	837	453	348	400	638	214
Neemrana	948	795	1373	1126	977	732	508	394	637	94
Bansur	781	580	867	1372	803	468	485	236	579	102
Bahadurpur	-	-	-	1111	617	671	615	-	576	201
Total	10911	10148	17548	21018	13246	12502	8625	6464	9506	3390
Average	682	634	1097	1236	779	735	507	404	522	199

STATION	2003	2004	2005	2006	2007	2008	2009	2010	2011
Alwar	964	312.5	594	427	466	864	478	746	556
Ramgarh	836	429	661	251	451	733	614	1167	652
Malakhera	762	346.5	531	393	417	1040	487	767	660
Rajgarh	839	349	641	332	489	1059	466	641	681
Laxmangarh	620	261.4	754	360	313	850	619	679	756
Kathumar	707	370	553	319	486	682	513	768	584
Govindgarh	1067	621	806	618	536	1020	619	1245	600
Thanagazi	898	454	770	466	590	1060	445	824	770
Kishangarh	923	448.5	685	436	529	712	558	743	548
Kotkasim	1120	723	971	604	814	1057	740	939	900
Tijara	788	453	609	426	374	661	545	615	306
Tapukara	619	206	413	328	355	415	319	495	415
Mundawar	864	391	486	467	439	691	318	707	569
Behror	710.5	357	619	595	422	707	362	381	602
Neemrana	771	309	622	316	499	959	372	697	289
Bansur	929	306	563	411	490	645	308	678	664
Bahadurpur	800	326	719	398	443	854	347	798	405
Total	14217.5	6662.9	13750	7147.00	8113.00	14009.00	8110	12890	9957
Average	836.00	392.00	625.00	420.41	477.23	824.05	477.05	758.23	585.71

No. 15-4/2010-NTCA (Part-III)
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
E-mail: jdntca@gmail.com
Telefax: 2338 9883

Dated the 28th November, 2011

To,

1. Chief Wildlife Warden(s)
All Tiger Range States
2. Field Director(s)
All Tiger Reserves

Sub: Additional guidelines for the ongoing Centrally Sponsored Scheme of Project Tiger relating to new components – reg.

Sir,

With the approval of the competent authority, I am directed to send herewith a copy of additional guidelines for the ongoing Centrally Sponsored Scheme of Project Tiger relating to new components for information and necessary action.

Yours faithfully,

Encl: As above

SD/-
(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PS to ADG (WL), MoEF.
5. PS to AS & FA.
6. Director (IFD), MoEF.
7. Regional Office of NTCA, Nagpur / Guwahati
8. DIG / AIGs – NTCA (HQ).

**ADDITIONAL GUIDELINES FOR THE ONGOING
CENTRALLY SPONSORED SCHEME OF PROJECT
TIGER RELATING TO NEW COMPONENTS**



**PROJECT TIGER / NATIONAL TIGER
CONSERVATION AUTHORITY**

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

Government of India
Ministry of Environment and Forests
Project Tiger / National Tiger Conservation Authority

Additional guidelines for the ongoing Centrally Sponsored Scheme of Project Tiger relating to new components

Based on the approval of the competent authority in August, 2011, the additional guidelines relating to new components included in the ongoing Centrally Sponsored Scheme of Project Tiger are indicated below, which would be in addition to the earlier guidelines of the said Scheme issued vide F.No. 3-1(2003)-PT in February, 2008:

- 1. Change in the funding pattern in respect of North Eastern States by increasing the central share from the existing 50% to 90% for Recurring Expenditure, with the States' share becoming 10%. The ongoing support for Non-Recurring Expenditure would continue to be 100%.**

There is considerable delay in the release of central assistance to the field formations (Tiger Reserve) by the North Eastern States under the Project Tiger Scheme, owing to non availability of matching State share for recurring activities, despite allocation from the Centre. There has been a demand for increasing the central share in the recurring component of funding support. Accordingly, the central share has been increased from 50% to 90% for recurring items of expenditure.

- 2. Raising compensation for man-animal conflict to Rs. 2 lakhs in case of loss of human life, 30 per cent of the same for grievous injury and cost of treatment for minor injury (Non-Recurring).**

The human-wildlife interface is extremely sensitive due to spill over of wild animals from core areas of tiger reserves. The loss on account of such depredation needs to be compensated adequately in a time bound manner to avoid 'revenge killings'. The compensation on man-wildlife conflict has been doubled from Rs. 1 lakh to Rs. 2 lakh in the case of loss of human life, while the compensation for serious injury has been retained at 30% of the amount of compensation on death, besides meeting the cost of treatment of minor injuries to people due to wildlife.

3. Acquisition of private land for making the core/critical tiger habitat inviolate (Non-Recurring).

In several tiger reserves, there are private land holdings/estates within the core/critical tiger habitats of Tiger Reserves. The above component has been included under the PT Scheme for providing 100% central assistance to States to acquire such areas, if necessary, for making the core/critical tiger habitat inviolate.

4. Establishment of Tiger Safari, interpretation/awareness centres under the existing component of ‘co-existence agenda in buffer/fringe areas’, and management of such centres through the respective Panchayati Raj Institutions (creation – Non-Recurring; maintenance – Recurring).

The Tiger Safaris may be established in the buffer areas of tiger reserves which experience immense tourist influx in the core/critical tiger habitat for viewing tiger. The interpretation / awareness centres would also be supported in such buffer areas to foster awareness for eliciting public support. The management of such centres would be through the respective Panchayati Raj (PR) institutions.

5. Re-introduction of Cheetah in the States of Madhya Pradesh and Rajasthan under the Scheme at a cost of Rs. 50 crore after ensuring the historical co-existence of Cheetah with other carnivores, especially the tiger.

Reintroduction of large carnivores has increasingly been recognised as a strategy to conserve threatened species and restore ecosystem functions. The cheetah is the only large carnivore that has been extirpated, mainly by over-hunting in India in historical times. Based on the recommendations of an expert group involving the Wildlife Institute of India, the Ministry of Environment and Forests has decided to take up reintroduction of Cheetah in the States of Rajasthan (Shahgarh area) and Madhya Pradesh (Kuno-Palpur and Noradehi Wildlife Sanctuaries). The said States would receive 100% support towards village relocation, habitat management/restoration, holding facility, veterinary facility, training professionals, monitoring, procurement of cheetah, eco-development in the fringes and maintenance.

PROTOCOL/GUIDELINES FOR VOLUNTARY VILLAGE RELOCATION IN NOTIFIED CORE/CRITICAL TIGER HABITATS OF TIGER RESERVES

PREAMBLE:

The Wildlife (Protection) Act, 1972 has been amended in 2006, and a separate chapter (Chapter IVB) has been provided, which inter alia, provides for constituting the National Tiger Conservation Authority (NTCA), its powers and functions, reporting requirements, constitution of State level Steering Committees, preparation of Tiger Conservation Plan, explanation regarding the core or critical tiger habitat and the buffer or peripheral areas of a tiger reserve and establishment of the Tiger Conservation Foundation. The said amendment came into force with effect from 4th of September, 2006. The above statutory provisions have been incorporated to strengthen tiger conservation in the country vis-à-vis the urgent recommendations of the Tiger Task Force constituted by the National Board for Wildlife. The purpose of this Protocol is to facilitate the State Forest Departments to carry out village relocation from notified core/critical tiger habitats, in compliance of the relevant provisions of the Wildlife (Protection) Act, 1972, read with the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, while complying with the earlier advisories issued in this regard.

1. BACKGROUND

- 1.1. The tiger continues to remain one of the most endangered large predators in the world. Based on scientific empirical data and simulation results for a viable tiger population, it has been established that a minimum inviolate area of 800-1200 sq.km. is required for a viable population of tiger (20 breeding tigresses). An ecologically sensitive zone (buffer, coexistence area, multiple use area) of 1000-3000 sq.km. is required around this inviolate space for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers. Together with the core area, this would sustain the dynamics of source-sink while sustaining a population of 75-100 tigers. The scientific simulation results have been provided in the 'Guidelines for Preparation of Tiger Conservation Plan' issued by the NTCA (Technical Document: NTCA/01/07), which constitute the scientific criteria for identifying the core/critical tiger habitats.

- 1.2. A tiger reserve consists of two parts, viz., 'a core or critical tiger habitat', and 'a buffer or peripheral area'. Section 38V 4(i) of the Wildlife (Protection) Act, 1972 (hereinafter referred to as WPA, 1972) explains the core or critical tiger habitats, identified on the basis of scientific and objective criteria, areas of National Parks and Sanctuaries to be kept as inviolate for tiger conservation, without affecting the rights of the Scheduled Tribes and Other Traditional Forest Dwellers, and notified as such by the State Government in consultation with an expert Committee constituted for the purpose.
- 1.3. Section 38V 4(ii) of the Wildlife (Protection) Act, 1972 (hereinafter referred to as WPA, 1972) explains the buffer or peripheral area consisting of the area peripheral to the critical tiger habitat or core area, where a lesser degree of habitat protection is required to ensure the integrity of the critical tiger habitat, providing habitat supplement for dispersing tigers, besides offering scope for coexistence of human activity. The limits of the buffer / peripheral areas are to be determined on the basis of scientific and objective criteria in consultation with the concerned Gram Sabha and an expert Committee constituted for the purpose.
- 1.4. Thus, the voluntary relocation of people needs to be done only in the identified core / critical tiger habitats of a tiger reserve.
- 1.5. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (hereinafter referred to as FRA, 2006) came into force on 31.12.2007 (midnight). The said Act provides for recognition of, and vesting of forest rights in forest dwelling Scheduled Tribes and Other Traditional Forest Dwellers. Section 4(2) (a) to (f) provide for satisfying several conditions while modifying the Recognised Forest Rights in critical wildlife habitats of National Parks and Sanctuaries. These, interalia, include completion of the process of recognition and vesting of rights as specified in section 6 of the said Act, establishing by the concerned agencies of the State Government vis-à-vis their powers under the Wildlife (Protection) Act, 1972, that the activities / impact of right holders are sufficient to cause irreversible damage to wild animals, concluding the non-availability of other coexistence options by the State Government, preparation of resettlement package while providing a secure livelihood and free informed consent of the Gram Sabha.

2. OBJECTIVE

- 2.1. The NTCA has issued a set of guidelines for implementing the Centrally Sponsored Scheme of Project Tiger, after its revision by the competent authority in February, 2008, alongwith a format for preparation of village relocation plan from core/critical tiger habitats. Further, guidelines for ensuring the centrality of the Panchayati Raj Institutions, defining the 'family' for relocation and the need for ensuring the implementation of the Wildlife (Protection) Act, 1972, read with the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (after the coming into force of the latter) have also been issued. The instant protocol/guidelines consolidate the same to facilitate the implementing agencies in States. The guidelines have necessarily been kept broad and generic in nature, for States to refine procedures as per their requirements to facilitate implementation.
- 2.2. The instant protocol/guidelines aim to ensure that all necessary statutory procedures required for the effective implementation of relocation are undertaken, and that in the process of conservation and protection of tigers and their habitats, the rights of forest dwellers are respected, and the process of recognition and determination of rights is complete.

3. RELEVANT PROVISIONS

The relevant provisions of the FRA, 2006, and the WPA, 1972 relating to relocation from core/critical habitats of tiger reserves are detailed below:

- 3.1. Section 4(1) of the FRA, 2006 recognizes and vests forest rights in Scheduled Tribes and other traditional forest dwellers. The Forest Rights are listed in Section 3 of the FRA, 2006, which, *inter-alia*, secure individual or community tenure or both.
- 3.2. The said forest rights (under Section 3 of the FRA, 2006), can subsequently be modified or resettled outside of Critical Wildlife Habitats, conditional upon all the relevant provisions being met under Section 4 (2) (a) to (f) of the said Act. As per the said Act, payment of compensation for the immovable property of people forming part of modifying/ settling their rights is a statutory requirement.

- 3.3. Chapter IV of the WPA, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (constituting a Sanctuary) or Section 35 (constituting a National Park).
- 3.4. Under the WPA, 1972, as amended in 2006, section 38V (4)(i) the core or critical tiger habitat and the process of its notification have been explained as *'core or critical tiger habitat areas of National Park and Sanctuaries, where it has been established, on the basis of scientific and objective criteria, that such areas are required to be kept as inviolate for the purposes of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers, and notified as such by the State Government in consultation with an Expert Committee constituted for the purpose'*.
- 3.5. Under the WPA, 1972, as amended in 2006, requirements have been laid down for voluntary relocation of people on *'mutually agreed terms and conditions'*, for the purpose of creating inviolate areas for tiger conservation:
 - 3.5.1. "the process of recognition and determination of rights and acquisition of land or forest rights of the Scheduled Tribes and such other forest dwelling persons is complete;
 - 3.5.2. the concerned agencies of the State Government, in exercise of their powers under this Act establishes with the consent of the Scheduled Tribes and such other forest dwellers in the area, and in consultation besides with an ecological and social scientist familiar with the area, that the activities of the Scheduled Tribes and other forest dwellers or the impact of their presence upon wild animals is sufficient to cause irreversible damage and shall threaten the existence of tigers and their habitat;
 - 3.5.3. the State Government, after obtaining the consent of the Scheduled Tribes and other forest dwellers inhabiting the area, and in consultation with an independent ecological and social scientist familiar with the area, has come to a conclusion that other reasonable options of co-existence, are not available;
 - 3.5.4. resettlement or alternative package has been prepared providing for livelihood of affected individuals and communities and fulfills the requirements given in the National Relief and Rehabilitation Policy;
 - 3.5.5. the informed consent of Gram Sabhas concerned, and of the persons affected, to the resettlement programme has been obtained;

3.5.6. the facilities and land allocation at the resettlement location are provided under the said programme, otherwise their existing rights shall not be interfered with.”

4. COMPATIBILITY OF SECTION 38V OF THE WILDLIFE (PROTECTION) ACT, 1972 (RELATING TO RELOCATION FROM CORE/CRITICAL TIGER HABITATS) WITH THE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT, 2006

4.1. The phrase '*core or critical tiger habitat*' is mentioned only in the Wildlife (Protection) Act, 1972, as a sequel to amendment made to the said Act in 2006. It is **NOT** defined in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

4.2. The phrase '*critical wildlife habitat*' is defined only in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, and **NOT** in the Wildlife (Protection) Act, 1972.

4.3. 'Core or critical tiger habitat' is different from the 'critical wildlife habitat'. Since tigers are territorial big cats, hence considering their social land tenure dynamics, the 'core / critical tiger habitat' has been viewed separately from the 'critical wildlife habitat', which is applicable to other wild animal species.

4.4. Based on deliberations with experts and simulation results from scientific data, it has been found that a minimum inviolate area of 800-1200 sq.km. is required to sustain a viable population of tigers (20 breeding females).

4.5. Establishing the core / critical tiger habitat as 'inviolate' involves two steps as per the Wildlife (Protection) Act, 1972:

(a) Identifying the core / critical tiger habitats as per section 38V 4(i) of the Wildlife (Protection) Act, 1972 by establishing on the basis of scientific and objective area that such areas are required to be kept as inviolate for the purpose of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers, and notified as such by the State Government in consultation with an expert committee constituted for the purpose.

(b) Establishing the identified core / critical tiger habitat as inviolate through voluntary relocation on mutually agreed terms and

conditions as per section 38V (5)(i) to (vi) of the Wildlife (Protection) Act, 1972, read with section 4(2) (a) to (f) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, provided that such terms and conditions satisfy the requirements laid down in the Wildlife (Protection) Act, 1972.

4.6. The above provisions laid down in the Wildlife (Protection) Act, 1972 (section 38V), subsequent to the 2006 amendment are specific to tiger conservation, and are not only compatible but more stringent than the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

4.7. Under the revised Centrally Sponsored Scheme of Project Tiger (2008), two options have been given to people:

Option-I: Payment of Rs. 10 lakhs per family in case the family opts so, without any rehabilitation / relocation process by the Forest Department.

Option-II: Carrying out relocation / rehabilitation by the Forest Department with the following per family norms out of Rs. 10 lakhs:

(a)	Agricultural land procurement (2 ha.) and development	35% of the total package
(b)	Settlement of rights	30% of the total package
(c)	Homestead land and house construction	20% of the total package
(d)	Incentive	5% of the total package
(e)	Community facilities (access road, irrigation, drinking water, sanitation, electricity, telecommunication, community centre, places of worship, cremation ground)	10% of the total package

4.8. The cash option has been provided for catering to people who are not interested in a resettlement and are prepared to establish themselves elsewhere under 'mutually agreed terms and conditions', as indicated in the Wildlife (Protection) Act, 1972. This has checks and balances as the money is provided through the District Collector after the villager produces evidence of his procuring land etc.

- 4.9. The relocation is voluntary, and is done only if people are willing to move.
- 4.10. Monitoring committees at the District as well as State levels are required to be constituted by the States.

5. 'CRITICAL TIGER HABITAT' VIS-À-VIS 'CRITICAL WILDLIFE HABITAT'

- 5.1. The salient points relating to 'critical tiger habitat' (CTH) and 'critical wildlife habitat' (CWH) are comparatively indicated below:

CTH	CWH
Legal mention in WLPA (2006) amendment	Legal mention in FRA (2006 Sec. 2(b))
Process outlined in WLPA	Process outlined in MoEF guidelines
Recognition, vesting of rights as per FRA, read with WLPA	Recognition, vesting and resettlement as per FRA
Clear criteria based on existing scientific knowledge / simulation data pertaining to tiger	Necessity for generic criteria that encompass diversity of species and landscapes
Informed consent of concerned Gram Sabha and affected persons required for resettlement programme	Free informed consent of Gram Sabha pertaining to the area vis-à-vis proposed resettlement / relocation package is essential

- 5.2. Section 4(2)(a) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 necessitates that the process of recognition and vesting of rights as specified in section 6 of the said Act is complete in all the areas under consideration before modification or resettlement.
- 5.3. Section 4(2)(b) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 necessitates that the concerned agencies of the State Governments should establish in exercise of their powers under the Wildlife (Protection) Act, 1972 that the activities or impact of

the presence of holders of rights upon wild animals is sufficient to cause irreversible damage and threaten the existence of the said species and their habitat, before modification or resettlement.

- 5.4. Section 4(2)(c) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 necessitates that the State Government has to conclude that other reasonable options such as coexistence are not available, before modification or resettlement.
- 5.5. Section 13 of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 provides that the said Act shall be in addition to and not in derogation of the provisions of any other law for the time being in force.
- 5.6. It has been established on the basis of existing scientific knowledge that an area of 800-1200 sq.km. of inviolate core/critical habitat is required for a viable population of tiger. Section 38V 4(i) of the Wildlife (Protection) Act, 1972, as amended in 2006, specifically provides for establishing the core/critical tiger habitats on the basis of scientific and objective criteria, in consultation with an expert Committee, without affecting the rights of the Scheduled Tribes or such other forest dwellers. Therefore, under section 4(b) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the field authorities / Field Director of a Tiger Reserve may identify the core/critical tiger habitat as per section 38V 4(i) of the Wildlife (Protection) Act, 1972, using the criteria of 800-1200 sq.km., which has to be notified by the State Government in consultation with an expert Committee constituted for the purpose. The latter takes into account the impact of biotic disturbance on tiger resulting in man-tiger conflicts, besides underlining the need for such minimal area of inviolate space for tiger where no coexistence is possible.

6. GUIDELINES FOR IDENTIFICATION/NOTIFICATION OF CORE/CRITICAL TIGER HABITAT IN TIGER RESERVES AND VILLAGE RELOCATION

A checklist of steps and documents for all stages is contained in **ANNEXE 1.**

Step I: Identification/notification of the core/critical tiger habitat

The identification should be done as provided under section 38V (4)(i) of the Wildlife (Protection) Act 1972.

Step II: Establishing the core/critical tiger habitat for creating inviolate area for tiger involving relocation of families / villages from such areas

The provisions contained in the FRA sections 4 and 6 and the provisions contained in the Wildlife (Protection) Act 1972 section 38V (5) should be followed.

In case of voluntary relocation also, the rights of people should be recognized and settled before relocation.

6.1. Operational guidelines for Step II (Village relocation)

[Involving provisions of Wildlife (Protection) Act, 1972 read with provisions contained in the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006]

6.1.1 Recognition / settlement of Rights

Recognition and vesting of rights as per section 6(i) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006:

- (a) Constituting a Sub-Divisional Committee by the State Government as provided in the FRA (section 6) for examining the resolution passed by the Gram Sabha, besides preparing the record of forest rights and forwarding it through the Sub-Divisional Officer to the District level Committee for a final decision.
- (b) Initiation of the process for determining the nature / extent of individual / community forest rights or both by the local Gram Sabha, involving consolidation, verification, area delineation on a map, passing a resolution and forwarding a copy to the Sub-Divisional Committee as provided in the FRA.
- (c) Disposal of petitions, if any, from persons aggrieved by the Gram Sabha resolution by the Sub-Divisional Committee as provided in the FRA.
- (d) Constituting a District level Committee by the State Government for considering and finally approving the record of forest rights prepared by the Sub-Divisional level Committee.

- (e) Disposal of petitions, if any, from aggrieved persons by the District level Committee within 60 days from the date of decision by the Sub-Divisional level Committee, as provided in the FRA.
- (f) Constituting the State level Monitoring Committee by the State Government as provided in the FRA.

**6.1.2. Relocation of villages after recognition / settlement of rights as above
(Identification/prioritization of villages, cut off date for residing families, choice of options etc.)**

- 6.1.2.1. Following the notification of the core/critical tiger habitat, the Field Director must identify the village/villages situated within such notified core area.
- 6.1.2.2. A prioritization of villages to be relocated should be done based on man-tiger conflicts, presence of tiger den sites, grazing areas of wild ungulates, grazing pressure from livestock, presence of water and other welfare factors, site specific attributes etc.
- 6.1.2.3. A meeting of the concerned Gram Sabha should be convened with the active participation of the villagers to be relocated. The villagers must be informed about the details of the core/critical tiger habitat, its importance, man-tiger conflicts, options available under voluntary resettlement, options for payment, process of relocation/rehabilitation, and grievance redressal system.
- 6.1.2.4. The proposed package has two options:
Option I: payment of the entire package amount (Rs. 10 lakhs per family) to the family, in case the family opts for this, without involving any rehabilitation/ relocation process by the Forest Department.
Option II: carrying out relocation/ rehabilitation of village from protected area/tiger reserve by Forest Department.
- 6.1.2.5. Free informed consent of the Gram Sabha and affected villagers must be taken in writing regarding the proposed resettlement package/option.
- 6.1.2.6. The recognition / settlement of rights must be done as indicated under Step-II (para 6.1 above).
- 6.1.2.7. Records of the rights vested in the said villages/forest dwellers must be obtained from the Gram Sabha, as have been approved by the District level Committee under section 6(5) of the FRA, 2006. In case where records of forest rights are

unavailable, the matter should be taken up with the District Collector.

- 6.1.2.8. After obtaining the details of rights as above, a meeting of the District level Implementing Committee, as indicated at para 4.2.4. of the Guidelines issued from Project Tiger/NTCA [F.No. 3-1/2003-PT (relocation)] should be convened for deciding the 'cut off date' vis-à-vis the definition of the 'family' provided in the Guidelines (Advisory No. 3-1/2003-PT dated 19.3.2008 as per the National Rehabilitation and Resettlement Policy, 2007).
- 6.1.2.9. The valuation of the recognised rights/assets of the villagers to be relocated must be obtained from the District Collector.
- 6.1.2.10. The Field Director should submit a Village Relocation Proposal (VRP) to the National Tiger Conservation Authority/Project Tiger for funding support, through the Chief Wildlife Warden/State Government. The format for a VRP document is detailed in **ANNEXE 2.**

6.2. Field implementation

- 6.2.1. Once the VRP is approved for central assistance under Project Tiger and the options are decided, the following steps may be ensured:

Option-I (payment of the entire package amount of Rs. 10 lakhs per family)

- 6.2.1.1. On receipt of central assistance under Project Tiger vis-à-vis the relocation proposal sent by the Field Director, the funds should be deposited in the account of the District Collector and a joint savings bank account must be opened for each beneficiary / family with a deposit of Rs. 10 lakh each.
- 6.2.1.2. In case of forest villagers having no tenurial rights, two bank accounts should be opened for each family viz., a savings account with a deposit of Rs. 1 lakh, and a joint savings account with the District Collector for an amount of Rs. 9 lakhs. Out of the latter, a minimum amount of Rs. 3 lakhs should be earmarked as a fixed deposit for a period of three years to ensure interest payment to the relocated villagers. On production of documentary evidence by the villagers (within a prescribed time period) relating to proposal for acquiring immovable property / agriculture land, funds should be made available to the seller from the joint savings account after due verification by the District level Committee through a Demand Draft, which should be mentioned in the sale agreement. The

balance amount, if any, in the joint savings account, alongwith the interest accrued, should be transferred to the savings account of the villager / beneficiary.

- 6.2.1.3. In case of revenue villages, the following two options are suggested under option-I:

Option A

In case, the villagers through the Gram Sabha agree for receiving a payment of Rs. 10 lakhs per family (inclusive of the valuation for their assets), then the said amount would be deposited in the name of the beneficiary (a joint account with spouse in case of a married individual).

Option B

In case, the villagers through the Gram Sabha do not agree for the above (option A) and demand due compensation for their assets then the following may be adopted:

- Compensating the beneficiaries in proportion to the assets as per valuation done by the Collector.
- Distributing the balance amount equally to all eligible families / beneficiaries.

The shortfall, if any, of compensation amount in proportion to the assets will be met by the State Government.

Option-II (Carrying out relocation/ rehabilitation through the Forest Department)

- 6.2.1.4. 2 hectares of agriculture land should be provided per family. In case revenue land is not available for this purpose, diversion of degraded forest land may be obtained after due clearance under the Forest (Conservation) Act, 1980.
- 6.2.1.5. Payment of compensation for the assets owned by individual family should be done based on the evaluation, amounting to 30% of the total package of Rs. 10 lakhs.
- 6.2.1.6. In case the amount for compensation for such assets covering the entire village exceeds 30% of the package, then the balance amount should be provided through funding support from the State Government.

- 6.2.1.7. Payment amounting to 20% of package should be provided to each beneficiary for homestead land and house construction.
- 6.2.1.8. An incentive amounting to 5% of the total package should be provided per beneficiary/family.
- 6.2.1.9. In case agricultural land is made available free of cost to the beneficiaries then the amount earmarked for the same (35% of the total package alongwith the balance amount, if any, remaining after settlement of rights) should be used for community facilities as indicated in the Guidelines of Project Tiger alongwith the 10% of the total package (to be used after depositing in a PDA account).
- 6.2.1.10. A community development plan should be prepared for each relocated village in consultation with the District Collector while ensuring integration of other ongoing District level schemes.
- 6.2.1.11. The balance amount, if any, after the community development works should be deposited in the respective Gram Sabha to benefit the relocated villagers.
- 6.2.1.12. A special monitoring Committee involving members of the Gram Sabha, relocated villagers, civil society institution, should be created for periodic reporting to the District Collector and the Field Director.

6.3. Related complementary guidelines

- 6.3.1. The requisite amount for each beneficiary must be deposited into a joint savings account as indicated earlier in a Nationalized Bank, and passbooks should be handed over to the beneficiaries. The Zilla Parishad should be involved in monitoring the payment and utilization of the compensation package, whether under Option I or Option II.
- 6.3.2. Annuity mechanisms must be developed for beneficiaries to obtain a monthly income through interest (eg. 1 lakh in savings, Rs. 3 lakhs in fixed deposit in case of option I).
- 6.3.3. In case of option I, the beneficiary should be given a timeline for purchase of agricultural land, construction of house etc. The amount should be allowed for withdrawal from the fixed deposit only for the creation of fixed assets.
- 6.3.4. The agreed amount should be given to the seller through a bank draft, and the beneficiary must indicate this in the sale deed.
- 6.3.5. The Forest Department (through the Field Director) must execute a MoU on stamp paper with the beneficiary as a proof of voluntary settlement.
- 6.3.6. Individual records of beneficiaries must be maintained at the office of the Field Director of the Tiger Reserve as well as the District Collectorate.
- 6.3.7. The Collector must provide each beneficiary a certificate indicating their eligibility for all schemes applicable to relocated people.
- 6.3.8. Handholding after relocation must be ensured through the Field Director and a District level Monitoring Committee under the Chairperson of the Zilla Parishad. In this effort, assistance of competent civil society organizations having the domain expertise may be obtained.
- 6.3.9. Implementation and monitoring of district level schemes in relocated villages should be done through Gram Panchayat/ Gram Sabha.
- 6.3.10. Village Relocation Committees (F.No.15-63/2008-NTCA, 23rd April 2010) will monitor the progress of village relocation, and a State level Monitoring Committee must oversee the process.
- 6.3.11. The relocation of villages from the core areas of tiger reserves should be dovetailed preferably in a State level 'Rehabilitation Act for Project Affected Persons' (as done for national park/sanctuary) by the Government of Maharashtra vide its Act No. XI of 2001. This would enable the project authority under

the said Act for ensuring the ongoing development of the relocated families.

7. CLARIFICATION

7.1. A 'Family' includes a person, his or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relatives residing with him or her and dependent on him or her for their livelihood; includes "nuclear family" consisting of a person, his or her spouse and minor children (as per order No. 3-1/2003-PT).

ANNEXE 1: CHECKLIST

Stage	Y/N	
I		Notification of core/critical habitat? If yes, copy of notification.
		Certificate that village is within core area of Tiger Reserve
		Consent of villagers, Gram Sabha obtained
		Survey and Master list
		Record of Rights
		Village Relocation Proposal drawn up with involvement of District Administration
		Certificate that the detailed relocation plan has been formulated on the basis of voluntary consent of beneficiaries;
		Indicative time frame within which relocation will be completed
II		Collector Committee constituted
		Cut-off date
		Rights and property evaluation by Committee
		In case of option II: where relocated land is forest land, copy of forest clearance received from FC Division of this Ministry, and certificate stating that terms and conditions of FC have been complied with.
		District Level and State Level Monitoring Committees established?
III		Joint Account created for beneficiary and spouse
		Money deposited into JA, with fixed deposit plan, passbooks to beneficiaries
		MoU between FD and beneficiary
		Individual files of beneficiaries maintained at Range Office, Tiger Reserve Office and Collector Office
		Collector certificate to beneficiaries
		Handholding procedures and Monitoring Committee

ANNEXE 2: VILLAGE RELOCATION PROPOSAL FORMAT

1. Introduction
 - Name of Tiger Reserve
 - Name of village
 - Total area of village
 - Legal Status: Revenue/ Forest/ Other
 - Summary: Number of families, total human population, total livestock population, proposed site for relocation (in case of Option II), Area of proposed site and its legal status, total allocation required
2. Master List of families identified
3. Details of settlement rights
4. Details of incentives provided
5. In case of Option II:
 - (a) Description of relocation site, with a map showing layout of homestead land, houses and community facility
 - (b) Details of proposed work at relocation site: agricultural land (procurement/development), transportation, construction, pasture/woodlot, road access, irrigation, drinking water facility, sanitation, electricity, community centre, places of worship, burial/cremation ground
 - (c) Other details: access to forest resources, irrigation, Anganwadi/school, hospital, fare price shop, telecommunication
6. Details of livelihood support and handholding
7. Grievance redressal system
8. State level monitoring and evaluation
9. Cost table and phasing

No. 15-37/2012-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 9883
E-mail: jdntca@gmail.com

Dated the 30th January, 2013

To,

1. The PCCF/HOFF(s),
Tiger Range States.
2. The Chief Wildlife Warden(s)
Tiger Range States.

Sir,

As you are aware, advisories have been issued by the Project Tiger / National Tiger Conservation Authority, time and again, for dealing with emergency arising due to straying of tigers in human dominated landscapes. Based on inputs from field officers, experts vis-à-vis the said advisories, a Standard Operating Procedure has been developed after fine tuning to meet the present challenges.

In this context, I am directed to forward herewith a copy of the said Standard Operating Procedure (SOP) for dealing with emergency arising due to straying of tigers in human dominated landscapes, duly approved by the competent authority, for implementation.

The SOP may please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully,

Encl: As above

(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy for information to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PPS to ADG (WL).

Copy for information to:

1. Additional Director, WCCB, New Delhi.
2. IGF, Guwahati.
3. AIGs, Nagpur and Bangalore.

**STANDARD OPERATING PROCEDURE TO DEAL WITH
EMERGENCY ARISING DUE TO STRAYING OF TIGERS
IN HUMAN DOMINATED LANDSCAPES**



MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

1. **Title:** Standard Operating Procedure to deal with emergency arising due to straying of tigers in human dominated landscapes
2. **Subject:** Dealing with emergency arising due to straying of tigers in human dominated landscapes
3. **Reference:** Advisories of National Tiger Conservation Authority /Project Tiger on the subject
4. **Purpose:** To ensure that straying tigers are handled in the most appropriate manner to avoid casualty / injury to human beings, tiger, cattle and property.
5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger straying in human dominated landscapes.
6. **Scope:** The SOP applies to all forest field formations including tiger reserves besides other areas where such incidents occur.
7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve / fringe areas. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. Suggested field actions to deal with strayed wild carnivores (tiger / leopard)

(a) At the outset, constitute a Committee immediately for technical guidance and monitoring on day to day basis, as under:-

- i. A nominee of the Chief Wildlife Warden
- ii. A nominee of the National Tiger Conservation Authority
- iii. A veterinarian
- iv. Local NGO representative
- v. A representative of the local Panchayat
- vi. Field Director/ Protected Area Manager/ DFO I/C - Chairman

(b) Since it may not be always possible for experts from the Wildlife Institute of India to provide assistance, it is advised that some outside experts may be involved in the ongoing monitoring.

(c) Establish identity of the tiger by comparing camera trap photographs with National Repository of Camera Trap Photographs of Tigers (NRCTPT) / Reserve level photo database and find out the source area of the animal.

(d) Collect recent cattle / livestock depredation or human injury / fatal encounter data, if any, in the area. If it is an area historically prone to such incidences, detailed research work has to be carried out in order to assess the reasons for the frequent tiger emergencies in the area.

(e) In case of confirmed livestock depredation / human injury / fatal encounters or frequent straying of tiger near human settlements, set traps (automatic closure) with appropriate luring while avoiding disturbance, to trap the animal.

- (f) Set up camera traps near kill site to confirm / establish the ID of the animal.
- (g) Ensure unobtrusive guarding of the kill to allow feeding of the carcass (if not close to a human settlement) besides safeguarding from poisoning (for revenge killing).
- (h) Create 'pressure impression pads (PIPs)' in the area to ascertain the daily movement of the animal, while plotting the same on a map (4"=1 mile scale or 1:50,000 scale).
- (i) Proactively involve District Collector / DM and SSP / SP of the area to maintain law and order in the area, besides avoiding crowding by local mobs. Acquaint them with human-tiger conflict issues and guidelines of the NTCA to deal with the situation.
- (j) In all instances of wild carnivores like tiger / leopard straying into a human dominated landscape, the district authorities need to ensure law and order by imposing section 144 of the Cr.Pc. This is essential to avoid agitation / excited local people surrounding the animal spot which hampers capture operation, leading to serious injuries on people and staff. It is also necessary that police and local administration be involved at an early stage. Effective coordination with them is critical to control mobs which as has been seen in several instances, worsen the situation and lead to avoidable fatalities/ tragedies.
- (k) Take help of the district level officials to alert the villages in the vicinity of the area having the spatial presence of the tiger.
- (l) If successive trapping efforts fail, chemical immobilization of the wild carnivore should be done by an expert team having a veterinarian, as per the protocol at **Annexure-I**.

- (m) In case, the tranquilised tiger is found to be healthy in prime or young age without any incapacitation (loss of canine, injury, broken paw etc.), as confirmed / certified by the Committee as constituted at para (1), then it may be released after radio collaring in a suitable habitat with adequate prey base, away from the territory of a resident male tiger (if any) or human settlements, under intimation to the National Tiger Conservation Authority. (Under no circumstances an injured / incapacitated tiger should be released back, and the same needs to be sent to a recognized zoo).
- (n) Under no circumstances, a tiger should be eliminated by invoking the Wildlife (Protection) Act, 1972, if it is not habituated for causing human death. The guidelines for dealing with 'man-eaters' are annexed for compliance / guidance in this regard (**Annexure-II**).
- (o) In case of a healthy tiger/encumbered tigress occupying a sugar cane field or similar habitat, attempt should be made first to attract it to nearby forest area, while avoiding disturbance. If such operations fail, the animal should be captured through immobilization for release in low density area of a nearby tiger reserve/protected area after radio collaring.
- (p) An authorized spokesperson of the Forest Department, should periodically update the media (if required) to prevent dissemination of distorted information relating to the operation / incidents. Sensalization or distorted information can lead to further damage.
- (q) In case monitoring using camera traps (Phase-IV) is ongoing in the area, the minimum tiger numbers based on individual tiger captures, should not be given undue publicity without due cross checking with the National Tiger Conservation Authority.

- (r) The Chief Wildlife Warden has to take the final decision on whether a tiger has to be released back in the wild or transferred to a zoo.
 - (s) It is important to have properly designed suitable cages and transport mechanism which cause least stress to the captured carnivore.
9. **Preventive / Proactive Measures** to be followed in tiger straying incidents / areas prone are at **Annexure-III**.
 10. Guidelines for prioritizing areas for tiger monitoring are at **Annexure-IV**.

**PROTOCOL ON
IMMOBILIZATION AND
RESTRAINT OF TIGERS**

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

General Consideration

Behavior: Tigers in conflict or those strayed into human habitation differ considerably in behavior as compared to those in native/ natural habitats. The animals may be stressed, shy, elusive, secretive and even unpredictable thereby posing challenge in capture. These animals may even pose safety threats for human involved in capture as well as to general public. *Utmost care needs to be taken to ensure safety of humans when attempts for capture are made.*

Capture options: Tigers can be captured employing physical and chemical restraint methods or combination of both. The physiological and emotional status of the animal; length of the procedure; the environmental conditions; terrain/ escape cover; equipment availability; drug appropriateness and availability and most importantly the safety of the operator/team needs to be considered prior to making a choice of procedure. Both the procedures have their benefits and limitations however the present guidelines would focus primarily on the chemical restraint procedures.

Chemical Restraint

Chemical immobilization has become an important tool in wildlife management over the last few decades. Advancement and development in this field has resulted in use of newer and safer drugs for immobilization, and efficient and reliable systems of drug delivery. Chemical Immobilization involves use of drugs to restrict animal's movement by inducing a state of insensibility and preventing deliberate and coherent mobility. The technique is well suited for tigers in conflict as it allows capture of select individual, enables selection of time of capture and causes minimal stress to the animal. Chemical restraint drugs alter certain CNS functions without compromising the vital functions and produce a state of anaesthesia which immobilizes the animal to the extent that provides considerable safety both for human and animal.

Immobilization Equipment

Due to difficulty of directly approaching and handling wild animals, it is necessary to have safe and effective methods by which drugs can be administered. Projected darts have proved to be effective and safe option

for delivering drugs to wild animals. The dart is projected through an equipment and discharges the medicaments intramuscularly upon impact. The darts are available in different sizes, however are specific to the type of equipment used to propel them. Different power projection systems have been used for projecting the darts however for tigers; the system that employs compressed gas/CO₂ to propel the dart should be selected. Light weight plastic darts of 3-5 ml. capacity should be used for remote injection using air powered/CO₂ tele-injection projector. Needle length is critical factor while darting tigers. The outside diameter of the needle should be 1.5- 2.0 mm and length of 38- 40 mm.

Immobilization Drugs

Though there are varieties of drugs that have been used for capturing tigers, a combination of alpha-2 adrenergic agonists (sedatives) and dissociatives have proved to be effective for immobilizing tigers.

Alpha-2 adrenergic agonists/ Sedatives: These drugs are CNS depressants with good sedative, muscle relaxant, and analgesic properties. These drugs need to be used with caution in animals as they produce initial hypertension followed by severe hypotension, bradycardia, hyperglycemia and glucosuria, disrupts thermoregulation and may lead to regurgitation/ vomiting in carnivores. These drugs however have the advantage of being non-controlled, inexpensive and reversible. The drugs have been extensively used in felids in combination with dissociatives. A mixture of *Xylazine* and *Ketamine* in a proportion of 1.25 :1 known as Hellabrunn mixture has been effectively used in tigers and other carnivores.

Another new Alpha-2 agonists Medetomidine in combination with ketamine has proved to be effective and specific sedative in large carnivores as it induces rapid drug induction and has specific antidote for reversal.

These Alpha-2 adrenergic agonists can be negated by antidote.

Examples: Xylazine, Detomidine, Medetomidine.

Antidotes include Yohimbine hydrochloride, Atipamezole hydrochloride, Tolazoline hydrochloride.

Dissociatives

These include the psychotomimetic drugs that are cyclohexamine derivatives. The drugs act by separating the conscious mind from sensory and motor or control mechanism in the brain (dissociative) producing, rapid analgesia and a trance-like state (psychosis) which may be as a

result of over stimulation of the CNS. The animal appears unaware of human presence. They have the advantage of being rapidly absorbed following IM, IV administration, have good safety margin and cause little depression of the respiratory and circulatory system. Pronounced muscle rigidity, hyperthermia, hyper salivation, convulsion and rough recovery are common side effects. These effects can be considerably reduced by combining these drugs with a tranquilizer or sedatives. Their effect cannot be reversed and the animal has to be monitored for long till complete recovery takes place. These drugs lack specific antidote.

Examples: Phencyclidine, Ketamine hydrochloride, Tiletamine Hydrochloride

The choice of drug for immobilization may include the Hellabrunn mixture (HBM) (Xylazine –Ketamine mixture in ratio of 1.25:1) in appropriate doses. The dosage can be decided on the spot, taking into consideration the animal's health and condition, level of excitement, physiological status, sex, time of the day, and ambient temperature besides other habitat parameters. Medetomidine in combination with ketamine has proved to be effective for capturing tigers in conflict as it provides short and rapid induction thereby ensuring minimal movement of animal following darting.

Recommended drug/ dosages for immobilization of adult tiger

Sr. No.	Drug(s) for immobilization	Male	Female	Reversal drugs (antidote)
1.	Hellabrunn mixture (HBM) [Xylazine (XYL) and Ketamine (KET)] mixture in a ratio of 1.25:1	3.0 ml (375 mg XYL & 300mg KET) to 3.5 ml (437.5 mg XYL & 350 mg KET)	2.5 ml (312.5 mg XYL & 250 mg KET) to 3.0 ml (375 mg XYL & 300mg KET)	Yohimbine hydrochloride (0.125 mgkg ⁻¹ body weight)
2	Medetomidine (MED) and Ketamine (KET)	50-60 µg kg ⁻¹ body weight MED and 1-2 mgkg ⁻¹ body weight KET		25-35 mg of Atipamezole hydrochloride

Approach to the Target Animal

A four wheel field vehicle or trained captive elephants may be used to approach the animal taking due care of human safety and an overriding degree of patience. In a terrain where the vehicle cannot be used, possibility of darting the animal from a *machan* (raised platforms) may also be considered. Tigers in conflict provide limited opportunities for darting and therefore require adequate experience by personnel in effective darting as well as knowledge of anatomical peculiarities. Hindquarters should be preferred for tele-injection however depending on the opportunities; other suitable areas can also be explored.



Preferred darting site in a large carnivore

Induction Phase

The time interval between injection (darting) and the point when the animal is rendered immobile is induction period. The total time for the completion of induction may vary from 10-15 minutes. A close observation should be kept by the team for any movement of the animal however the team should ensure minimal disturbance during induction.

Handling and Care of the Immobilized Animal

The animal should be approached quietly and following steps should be followed:

- Removal of dart
- Blindfolding to protect the cornea from direct sunlight, dust and injury.
- Ensuring proper animal positioning (sternal or lateral recumbancy) to maintain patent airways and ensure normal breathing and circulation.
- Assessing the status of animal, the degree of muscle relaxation and the rate and depth of respiration. Assessment of anesthesia should be done using following methods:

- Monitor tissue perfusion: Anesthetic drugs frequently depress the contractile force of the heart and vasodilatation results in decreased tissue perfusion. Evaluation of tissue perfusion should be done by observation, auscultation, palpation and capillary refill time.
- Monitor gas exchange: Respiratory rates are highly variable during anesthesia.
- Quality of respiration should be evaluated by observing animal's chest movement.
- Monitor level of CNS depression by assessing the muscle tone-jaw tone and eye reflexes.
- Monitor vital signs such as respiration, heart rate and body temperature.
- Examine animal for any wound or injuries (including status of canines and claws).
- Estimate animal body weight and if possible take bodily measurements.

Shifting of the Animal to Stretcher

The animal should be shifted to a stretcher and placed in lateral or sternal recumbancy. Animal should then be shifted to a transport container.

Reversal of Anesthesia

Specific Alfa-2 antagonists (Yohimbine HCl , Atipamezole HCl) should be used to reverse the anesthesia.

Supplemental Information

- Preparedness:** All equipment for crating the animal, radio collars and accessories, emergency medicaments, biological sampling accessories, transport containers and any other essentials should be in place before the animal is darted.
- Data recording:** A complete immobilization record, particularly including each drug given, amount given, time of administration and physiological parameters should be maintained during the procedure. These details should be recorded in the datasheet in the format provided. It would be appropriate to ensure human safety considerations to meet any eventuality at all the time.
- Assessing depth of anaesthesia:** It should take about 15 minutes for the drug induction to happen. Prior to approaching the animal, the depth of anaesthesia should be assessed by either tapping on the tail or ears with the help of long pole and if the animal does not react, it should be approached. The depth of anaesthesia should be optimum if the jaws can be opened and the

tongue exteriorized with little or no resistance. Other indicators would include responses to stimulation of body, feet, cornea, ears and tongue. The physiological parameters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth. In case of emergency (depressed respiration or cardiac arrhythmias or depression) the animal should be revived. Emergency drug including cardiac and respiratory stimulants should be kept handy at all times. The physiological parameters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth.

- d. **Managing emergencies:** Emergency drugs and equipment would be available during the entire operation. Adequate supplies of emergency drugs should be ensured at all times.
- e. **Composition of team:** Capturing large felids poses a challenge and therefore requires a skilled team comprising wildlife managers, biologists, trained veterinarians and most preferably an individual specializing in animal anaesthesia.

Data Sheet for Recording and Monitoring Immobilized Animal

Area Details

Date

Location GPS Lat..... Long.....

Collar Frequency

Purpose of capture

Ambient temperature Day (cloudy, bright)

Animal Details

Species Physical condition

Emotional state before drugging Sex

Approximate age Weight (kg).....

Breeding status

Body Measurements

Nose tip to Tip of tail Nose tip to base of tail

Nose tip to base of skull (Occipital) Tail length.....

Height (Shoulder blade to heel) Hind limb length

Left fore limb or Hind limb paw dimension Length Width

Neck girth Length of Canines

Immobilization Details

Name of Immobilizing Drug(s)	Time of Injection	Drug dose given	Route	Site
1.				
2.				
3.				
4.				

Behaviour at the time of darting

(running, walking, standing, excited)

Induction time when animal goes down/ approached.....

Animal Monitoring

Time	Signs shown following immobilization	Respiration Shallow/ deep/ irregular & rate	Temperature (°F)	Pulse (rate)

Drug reversal

Name of reversal Drug(s)	Time of Injection	Drug dose & volume given	Route	Site
1.				
2.				

Time when animal shows first sign of recovery -

Details about recovery event till animal regains consciousness /shows signs of recovery

.....

Any other comments -

Supplemental drugs

Name of other supportive Drug(s)/antibiotic(s) etc. given	Trade name	Volume used	Route	Site
1				
2.				
3.				
4.				

Biological sampling

Name of sample	Preservative used	Examination required	Handed over to	Remarks

Annexure-II

GUIDELINES FOR DECLARATION OF BIG CATS AS ‘MAN-EATERS’

- Both tiger as well as leopard are known to cause habituated loss of human life (man-eaters). Such confirmed ‘man-eaters’ should be eliminated as per the statutory provisions provided in section 11 of the Wildlife (Protection) Act, 1972.
- Tiger as well as leopard are categorized under Schedule I of the Wildlife (Protection) Act, 1972, with highest statutory protection against hunting under section 9 (1) of the said Act. Hence, such species can be killed if they become dangerous to human life or are so disabled / diseased beyond recovery.
- Under section 11 (1) (a) of the Wildlife (Protection) Act, 1972, the Chief Wildlife Warden of a State alone has the authority to permit hunting of such animals becoming dangerous to human life or disabled or diseased beyond recovery. However, as per the statutory requirement, the Chief Wildlife Warden of the State has to state in writing the reasons for permitting elimination before hunting.
- There are several reasons for a big wild cat like tiger or a leopard to get habituated as a ‘man-eater’, viz. disability due to old age, incapacitation due to serious injury or loss / breakage of its canines etc. However, there may be several exceptions, and hence specific reasons have to be ascertained on a case to case basis.
- The tiger bearing forests and areas nearby prone to livestock depredation, besides having human settlements alongwith their rights and concessions in such areas, are generally prone to ‘man-eaters’. Besides, loss of habitat connectivity in close proximity to a tiger source area owing to various land uses also foster straying of tiger near human settlements, eventually ending up as a ‘man-eater’.

Suggested steps on loss of human life due to tiger / leopard

- Constitute a team for technical guidance and monitoring on day to day basis, as below:
 - A nominee of the Chief Wildlife Warden
 - A nominee of the National Tiger Conservation Authority
 - A veterinarian
 - Local NGO representative
 - A representative of the local Panchayat
 - Field Director/Protected Area Manager/DFO I/C - Chairman
- Set up camera traps near kill sites, besides creating pug impression pads to monitor the day to day spatial movement of the wild carnivore.
- Inform the district officials (Collector / DM / SP) for duly alerting the local people to refrain temporarily from the area where human death(s) has / have been reported, besides ensuring tranquility in the area from mobs / crowds of local people.
- Obtain / establish the ID of the aberrant animal causing loss of human life, through the committee constituted for the purpose, through camera trappings or direct sightings or pug impressions if camera trappings could not be done, besides collecting pieces of hair / scats of the carnivore (if available) for DNA profiling.
- A differentiation should be made between 'human kill' due to chance encounters and 'habituated man-eaters'. As most of our forests outside protected areas are right burdened, the probability of chance encounters is very high. Further, tigers often use agriculture / sugar cane field and similar cover along river courses while feeding on livestock or blue bull, which may also cause lethal encounters with human beings. Such animals should not be declared as 'man-eaters'. However, confirmed habituated tiger / leopard which 'stalk' human beings and feed on the dead body are likely to be 'man-eaters'.
- The declaration of an aberrant tiger / leopard as a man-eater requires considerable examination based on field evidences. At

times, the human beings killed due to chance of encounters may also be eaten by the animal (especially an encumbered tigress in low prey base area). However, such happenings are not sufficient for classifying a tiger / leopard as a 'man-eater', which can best be established only after confirming the habituation of the aberrant animal for deliberate stalking of human beings, while avoiding its natural prey.

- Under no circumstances, mere an animal resorting to cattle depredation should be declared as a 'man-eater', despite the fact it may venture close to human settlements. To avoid untoward incidents in such situations, the efforts to trap the animal (chemical immobilization / use of traps) should alone be resorted to.
- Set up trap cages (automatic closure) in areas most frequented by the carnivore (with appropriate luring) for trapping.
- In case successive trapping operation fails set up an expert team for chemical immobilization of the aberrant animal as per the annexed protocol.
- The option of capturing the aberrant animal either through traps or chemical immobilization should be invariably resorted to as the first option. The wild carnivore thus captured, should be sent to a nearest recognized zoo and NOT released in the wild.
- Elimination of a tiger / leopard as a 'man-eater' should be the last option, after exhausting the option of capturing the animal live as detailed in the SOP.
- The Chief Wildlife Warden of the State after the above due diligence should record in writing the reasons for declaring the tiger / leopard as a 'man-eater'.
- After 'declaring' the man-eater, its elimination should be done by a Departmental personnel having the desired proficiency, while providing the fire arm with the appropriate bore size (not below .375 magnum). In case, such expertise is not available within the Department, an expert may be co-opted from the other State Governments or outside with due authorization.
- No award / reward should be announced for destruction of 'man-eaters'.

Annexure-III

DETAILED INSTRUCTIONS FOR THE PROCEDURE TO BE FOLLOWED IN TIGER STRAYING INCIDENTS / AREAS PRONE FOR SUCH INCIDENTS : PREVENTIVE / PROACTIVE MEASURES

- (a) Identify the crisis spots / districts in the State.
- (b) Conduct science based research and analysis to arrive at reasons for frequent straying of tigers in such areas.
- (c) Prepare a google map indicating forest patches, territory of the tigers, nearby habitation and corridors.
- (d) Form monitoring teams consisting of locals with wireless communication on 24X7 basis besides rapid response team.
- (e) Establish an early warning system.
- (f) Issue alert to all nearby villages to take utmost caution.
- (g) Monitor the cattle kill and immediately pay ex-gratia / compensation in the case of eventuality.
- (h) Use electronic surveillance to monitor the movement of the tigers during the night.
- (i) Water holes, cattle kill, transmission lines should be regularly monitored.
- (j) Put in place Rapid Response Team (RRT) for capturing the animal to avoid lethal encounter. The RRT to be equipped with the following:-
 - (i) A field van/mini-truck with built in rails for accommodating a trap cage, with space for equipments, attendants and staff.
 - (ii) A tranquilization kit with drugs for chemical immobilization.
 - (iii) Taser gun for instant immobilization of the animal.
 - (iv) 2 mobile phones for continued communication with the authorities.
 - (v) 4 wireless handsets.
 - (vi) 2 GPS sets.
 - (vii) 1 long ranging night vision for seeing objects in the dark.

- (viii) A digital camera.
- (ix) 4 trap cages (2 for tiger and 2 for leopard).
- (x) 1 mini-tractor for transporting the cage in rugged terrain.
- (xi) 2 search lights.
- (xii) 2 radio collars with receiver and antenna.
- (xiii) 2 portable tents.
- (xiv) Portable hides – which can be set up fast, to be used for persons with tranquilizers
- (xv) 2 folding chairs with table.
- (xvi) Hand held audio system.
- (xvii) Rope and net.
- (xviii) First aid kits

- (k) The rapid rescue team is required to ensure unobtrusive close monitoring of the animal with least disturbance, for tracking its movement.
- (l) In addition, at places which are not waterlogged, camera traps should be set up (fixed to a post or a tree) for establishing the identity of the animal.
- (m) The rapid rescue team also requires due capacity building and 'hands on' field training involving the Wildlife Institute of India and other relevant outside experts, if needed.

PRIORITISING AREAS FOR TIGER MONITORING

The tiger source areas and its surrounding forests have the maximum tigers, besides some protected areas and forest patches. The districts/forest divisions having spatial occupancy of tiger as indicated in the maps need ongoing monitoring on a daily basis. In this context, the following actions are indicated:

- (a) Monitoring the tiger source areas using camera traps to generate photo ID for creating a photo database (Phase-IV monitoring)
- (b) Implementing Phase-IV monitoring in areas having tiger occupancy as indicated in the map
- (c) Periodic comparison / review of camera trap tiger photos to fix ID of tigers reported in several areas near a source site
- (d) Complementing the camera trap monitoring with simple foot patrolling in the peripheral areas, while maintaining day-to-day record as per Phase-IV monitoring protocol
- (e) Monitoring livestock depredation by tiger and ready payment of compensation
- (f) Keeping track of sudden change in land use in areas having tiger presence
- (g) Avoiding blockage of traditional tiger / wildlife corridors in areas outside the tiger reserves falling in various forest divisions
- (h) Monitoring sudden change in cover values in tiger areas (change in cropping pattern etc.)
- (i) Monitoring tiger movement along river courses
- (j) Keeping track of insecticides sale outlets and their use in tiger bearing areas (to avoid poisoning of water)
- (k) Networking through local workforce for gathering information relating to wandering gangs traditionally involved in poaching of wild animals
- (l) Keeping track of local market days

- (m) Fostering creation / maintenance of wildlife monitoring register at the Gram Sabha level in areas outside tiger reserves, with incentives for informing tiger presence
- (n) Creation / maintenance of 'wildlife / tiger offence register' at the Gram Sabha level with reward system for assisting in crime detection
- (o) Deploying special monitoring teams around highways, open wells, railway tracks, electrical transmission lines, village ponds, natural water holes, irrigation canals
- (p) Insulating high tension electrical transmission poles in tiger bearing areas, besides covering open wells and irrigation canals
- (q) Keeping track of encumbered tigresses in tiger bearing areas for monitoring the dispersing young ones
- (r) Periodic checking of samples from water points/perennial water sources for lethal contamination
- (s) Alerting local people in right burdened, tiger bearing areas to prevent lethal encounters
- (t) Periodic disease monitoring of village cattle in the tiger bearing areas to avoid disease transmission to natural prey base for tiger
- (u) Monitoring natural salt licks to prevent poisoning / poaching in tiger bearing areas
- (v) Keeping track of local ironsmiths engaged in preparation of 'gin traps', snares etc.
- (w) Creation of wildlife crime dossier and exchange of such information with field units in tiger bearing areas under intimation to the NTCA
- (x) Fortnightly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the Chief Wildlife Warden
- (y) Monthly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the PCCF/HOFF
- (z) Use sniffer dogs for detection of body parts, escape routes and other leads

(The SOP has been prepared by the NTCA with inputs from Shri P.K.Sen, Dr Ullas Karanth, Ms Prerna Singh Bindra, Dr P.K.Malik, Dr Parag Nigam and field officers)

[भारत के राजपत्र, असाधारण, भाग 3, खंड 4, तारीख 15 अक्टूबर, 2012 में प्रकाशनार्थ]

पर्यावरण एवं वन मंत्रालय
(राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण)

अधिसूचना

नई दिल्ली, 15 अक्टूबर, 2012

सं0 15-31/2012-एनटीसीए.- जबकि, राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 38-ग की उपधारा (1) के खंड (ग) के अधीन पर्यटन गतिविधियों के लिए आदर्श मूलक मानक और उनका सम्यक् अनुपालन सुनिश्चित करने के लिए व्याघ्र आरक्षितियों के 'बफर' और 'कोड' (कोर) क्षेत्र में व्याघ्र संरक्षण के लिए व्याघ्र परियोजना हेतु मार्गदर्शी सिद्धांत अधिकथित करने की शक्ति है ;

और अतएव, केन्द्रीय सरकार, वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 38-ग की उपधारा (1) के खंड (ग) के अधीन यथा अनुध्यात कोड क्षेत्रों और 'बफर' क्षेत्रों और पर्यटन, जिसके अंतर्गत कल्याणकारी और धार्मिक पर्यटन भी है, का नियतन करने के संबंध में और साथ ही वन और गैर वन क्षेत्रों में व्याघ्र संरक्षण के संबंध में व्यापक मार्गदर्शी सिद्धांत विरचित करने के लिए प्रतिबद्ध है ;

अतः, अब, वन्य जीव (संरक्षण) अधिनियम, 1972 (1972 का 53) की धारा 38-ग की उपधारा (1) के खंड (ग) के अधीन प्रदत्त शक्तियों के अनुसरण में और राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा फा.सं0-3-1/2003-पी.टी., तारीख 21 फरवरी, 2008 द्वारा जारी किए गए मार्गदर्शी सिद्धांतों को उन बातों के सिवाय अधिक्रांत करते हुए जिन्हें ऐसे अधिक्रमण से पूर्व किया गया है या करने का लोप किया गया है, राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण व्याघ्र आरक्षों के 'बफर' और कोड क्षेत्र में व्याघ्र संरक्षण के प्रयोजन के लिए अनुसरण किए जाने वाले निम्नलिखित मार्गदर्शी सिद्धांत बनाता है और व्याघ्र आरक्षित क्षेत्रों में पर्यटन क्रियाकलापों के लिए आदर्श मूलक मानक अधिकथित करता है, अर्थात्:--

1. संक्षिप्त नाम- इन मार्गदर्शी सिद्धांतों का संक्षिप्त नाम राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (पर्यटन गतिविधियों के लिए आदर्श मूलक मानक और व्याघ्र परियोजना) मार्गदर्शी सिद्धांत, 2012 है ।

भाग-क

व्याघ्र परियोजना के लिए वन्य जीव (संरक्षण) अधिनियम, 1972 की 38-ग (1) (ग) के अधीन मार्गदर्शी सिद्धांत

अध्याय-1

2. व्याघ्र संरक्षण.—

(1) केन्द्रीय सरकार, पर्यावरण और वन मंत्रालय के माध्यम से, अन्य बातों के साथ, व्याघ्र संरक्षण के लिए विभिन्न राज्य सरकारों को तकनीकी मार्गदर्शन और वित्तीय सहयोग प्रदान करती है ।

(2) वन्यजीव संरक्षण से संबंधित दिन-प्रतिदिन का प्रबंधन तथा नीतियों और योजनाओं के क्रियान्वयन का उत्तरदायित्व राज्य सरकारों का है ।

3. पृष्ठभूमि.—

- 3.1 अब केन्द्र प्रवर्तित योजना के रूप में चल रही “व्याघ्र परियोजना” लगभग 14,000 वर्ग कि.मी. के क्षेत्र में विभिन्न राज्यों (असम, बिहार, कर्नाटक, मध्यप्रदेश, महाराष्ट्र, उड़ीसा, राजस्थान, उत्तर प्रदेश और पश्चिमी बंगाल) की 9 आरक्षितियों/आरक्षों में भारत सरकार द्वारा 1973 में प्रारंभ की गई थी। तब से, परियोजना का 17 व्याघ्र राज्यों में 35123 वर्ग कि.मी. अधिसूचित क्रोड/क्रांतिक व्याघ्र प्राकृत्वासों तथा 28750.73 वर्ग कि.मी. के ‘बफर’/उपान्त क्षेत्रों के साथ 17 व्याघ्र राज्यों के लगभग 63874.68 वर्ग कि.मी. क्षेत्र में फैले हुए 41 व्याघ्र आरक्षितियों (टीआर) में पर्याप्त बड़े क्षेत्र में विस्तार हो चुका है। यह देश के भौगोलिक क्षेत्रफल का 2 % है। 41 व्याघ्र क्षेत्रों का कुल क्रोड/क्रांतिक व्याघ्र प्राकृत्वास देश के वन आच्छादित क्षेत्र का 5.2 % है। देश में 668 संरक्षित क्षेत्र हैं (सितंबर, 2012), जिनमें से 41 को क्रोड/क्रांतिक गहन व्याघ्र प्राकृत्वास (6 %) नामित किया गया है। पांच नई व्याघ्र आरक्षितियों/आरक्षों के सृजन के लिए राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा सैद्धांतिक अनुमोदन दिया जा चुका है, और वे स्थल हैं : पीलीभीत (उत्तर प्रदेश), रातापानी (मध्य प्रदेश), सूनाबेडा (ओडिशा), मुकुंदरा पहाड़ियां (दर्रा, जवाहर सागर और चंबल वन्यजीव अभयारण्य सहित) (राजस्थान) और सत्यमंगलम (तमिलनाडु)। व्याघ्र आरक्षित घोषित करने के लिए कुद्रेमुख (कर्नाटक) को अंतिम अनुमोदन दिया जा चुका है। निम्नलिखित क्षेत्रों को व्याघ्र आरक्षित के रूप में घोषित करने के लिए संबंधित राज्य सरकारों को परामर्श दिया गया है : (i) बोर (महाराष्ट्र), (ii) सुहेलवा (उत्तर प्रदेश), (iii) नागजीरा-नवेगांव (महाराष्ट्र), (iv) गुरु घासीदास राष्ट्रीय उद्यान (छत्तीसगढ़), (v) महादेइ अभयारण्य (गोवा) और (vi) श्रीविलीपुतूर ग्रिजिल्ड विशाल गिलहरी/मेगामलाई वन्यजीव अभयारण्य /वरुशनादु घाटी (तमिलनाडु)।
- 3.2 अभिहित व्याघ्र आरक्षितियों/आरक्षों में परियोजना के अधीन चल रहे संरक्षण प्रयासों के कारण, विश्व में 13 व्याघ्र रेंज देशों में भारत में स्रोत क्षेत्रों सहित व्याघ्रों की अधिकतम संख्या है। जैसा कि व्याघ्र, सह शिकारियों, भक्ष्य और प्राकृत्वास अथवा वासस्थल के देश स्तरीय निर्धारण में प्रकट हुआ है, व्याघ्र परियोजना ने संकटापन्न व्याघ्र के पुनः वर्धन को एक सुनिश्चित मार्ग पर बढ़ाया है। इस संदर्भ में हाल के (2010) निष्कर्ष व्याघ्र आरक्षितियों और संरक्षित क्षेत्रों के बाहर क्षेत्रों में व्याघ्रों की संख्या की दयनीय प्रास्थिति इंगित करते हैं। कुल मिलाकर, ऐसे राज्यों की व्याघ्र आरक्षितियों और संरक्षित क्षेत्रों में व्याघ्र संख्या, चल रहे संरक्षण प्रयासों की अपेक्षा करते हुए वर्धनीय है।
- 3.3 व्याघ्र परियोजना में एक समग्र, पारिस्थितिकीय सोच है। इसकी क्रोड बफर रणनीति, संरक्षण और विकास पहल ने हमारे देश में वन्यजीव प्रबंध की संकल्पना को एक नया आयाम दिया और स्व-स्थाने संरक्षण के लिए “आदर्श” है।

4. व्याघ्र, सह-परभक्षी, भक्ष्य और उनके प्राकृत्वास अथवा वासस्थल की वर्तमान प्रास्थिति

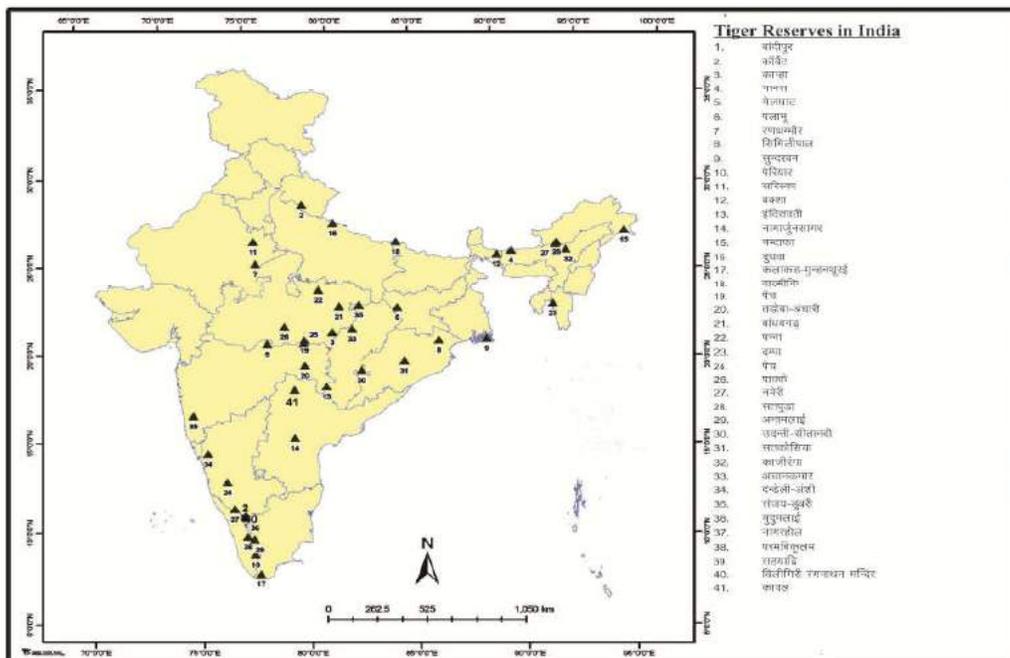
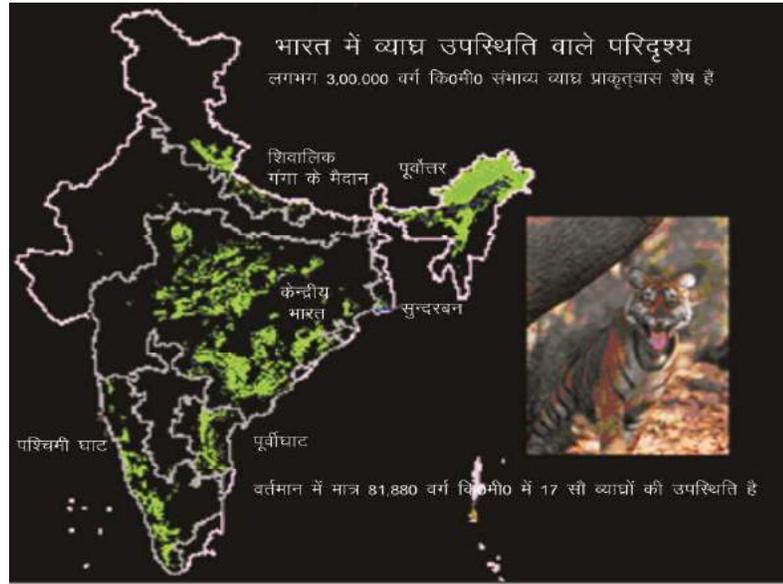
- 4.1 मार्च, 2011 में व्याघ्रों, सह-परभक्षी और उनके भक्ष्य की प्रास्थिति का दूसरा देशव्यापी निर्धारण जारी किया गया। 2010 का यह निर्धारण व्याघ्र कार्यबल द्वारा सिफारिश किये गये उत्कृष्ट पद्धति का प्रयोग करके ऐसा दूसरा देशव्यापी निर्धारण है। ये निष्कर्ष 1706 (1520-1909) की अनुमानित संख्या के साथ 2010 में व्याघ्रों की संख्या में देशव्यापी 20% वृद्धि इंगित करते हैं। वर्ष 2006 में व्याघ्रों की अनुमानित संख्या 1411 (1165-1657) थी। जुड़े हुए प्राकृत्वासों अथवा वासस्थलों से व्याघ्रों के निवास में 12.6 % की कमी भी रिपोर्ट की गई है। यह व्याघ्र आरक्षितियों और व्याघ्र स्रोत जनसंख्या से बाहर कम सघनता वाले आसपास के और छितरे हुए क्षेत्रों में हुआ है।
- 4.2 व्याघ्रों की संख्या में यह वृद्धि इस तथ्य के कारण है कि उत्तराखंड, तमिलनाडु, महाराष्ट्र और कर्नाटक में व्याघ्र संख्या ने व्याघ्र सघनता में वृद्धि दर्शित की है। सुंदरबन, पूर्वोत्तर के कुछ हिस्सों और महाराष्ट्र के हिस्सों को सम्मिलित करने से वृद्धि में योगदान हुआ है।

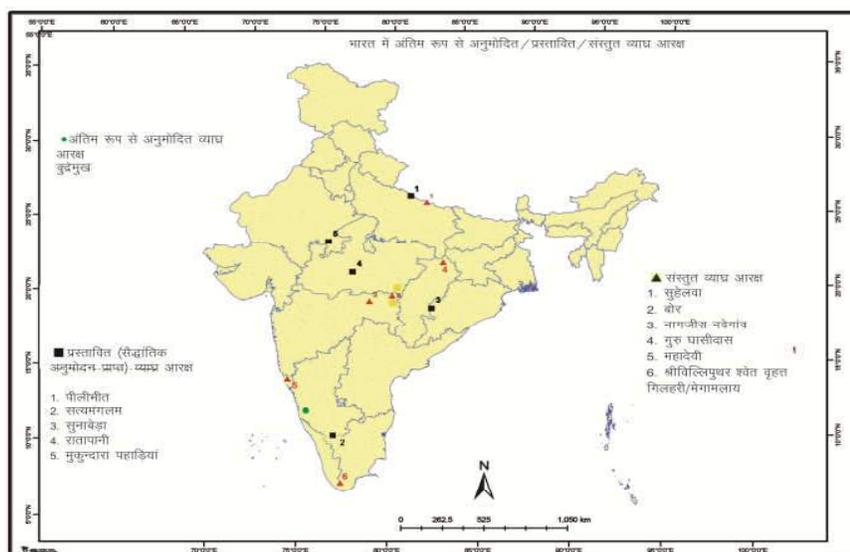
- 4.3 व्याघ्रों की उपस्थिति और सघनता प्राकृतवासों की उपलब्धता पर निर्भर थी जो दूरस्थ स्थित थे, जिनमें न्यूनतम मानव हस्तक्षेप था और बड़े जंगली भक्ष्यों (चीतल, सांबर, गौर और जंगली शूकर) की उच्च उपलब्धता थी ।
- 4.4 भारत में व्याघ्र वाले वनों को निम्नलिखित परिदृश्य संकुलों में वर्गीकृत किया गया है, अर्थात् :
- (क) शिवालिक पहाड़ियां और गंगा का मैदान,
(ख) केन्द्रीय भारत,
(ग) पूर्वी घाट,
(घ) पश्चिमी घाट,
(ङ) पूर्वोत्तरी पहाड़ियां और ब्रह्मपुत्र के मैदान, और
(च) सुंदरबन ।
- 4.4.1 शिवालिक-पहाड़ियों और गंगा के मैदानी क्षेत्रों में पांच पृथक जनसंख्याओं में 353 (320-388) की अनुमानित आबादी के साथ 6712 वर्ग कि.मी. के वन प्राकृतवास में व्याघ्र थे ।
- 4.4.2 केन्द्रीय भारत का मैदान (पूर्वी घाट के नागार्जुनसागर श्री सैलम समेत) एवं कुछ अन्य छितरे आवासों के साथ 20 व्याघ्र आबादी में वितरित 601 (518 से 685) की अनुमानित आबादी के साथ 39,017 वर्ग कि.मी. में व्याघ्रों की उपस्थिति रिपोर्ट की गई ।
- 4.4.3 पश्चिमी घाट मैदान 29,607 वर्ग कि.मी. था और 2006 की तुलना में वहां लगभग 11.5 % की कमी रजिस्ट्रीकृत की गई । वर्तमान व्याघ्र आबादी 534 (500 से 568) अनुमानित की गई थी जिसमें 2006 से 32 % की वृद्धि रजिस्ट्रीकृत की गई ।
- 4.4.4 4,900 वर्ग कि.मी. व्याघ्र प्राकृतवास और 118 से 178 व्याघ्रों की आबादी पूर्वोत्तर के लिए न्यूनतम माना जाना चाहिए, चूंकि संपूर्ण परिदृश्य क्षेत्र को व्यवस्थित रूप से सम्मिलित नहीं किया गया।
- 4.4.5 कैमरा ट्रैपिंग और सैटेलाइट टेलीमेट्री के संयोजन से सुंदरबन के व्याघ्रों की आबादी का अनुमान लगाया गया । प्रति 100 वर्ग कि.मी. में 4.3 (एसई 0.3) व्याघ्र का व्याघ्र घनत्व अनुमानित किया गया । भारतीय सुंदरबन में कुल 64 से 90 व्याघ्रों की आबादी आंकलित की गई ।
- 4.5 वर्तमान में, उत्प्रवास के बिना दीर्घकालीन अस्तित्व के लिए वांछित संख्या केवल कुछ क्षेत्रों जैसे नागरहोल-बांदीपुर-मुदुमलाई-वेयनाड-मोयस-सेगुर, कॉर्बेट, सुंदरबन (भारत और बांगलादेश) और काजीरंगा-कारबीआंगलों में है । व्याघ्रों की शेष आबादी को आनुवांशिक एवं आबादी की संख्या के दृष्टिकोण से व्यवहार्यता हेतु प्राकृतवास संयोजन की आवश्यकता है ।
- 4.6 व्याघ्र की तुलनात्मक प्रास्थिति (2006 और 2010)

परिदृश्य संकुल	व्याघ्र अनुमान 2006			व्याघ्र अनुमान 2010		
	संख्यात्मक निम्नसीमा	आबादी अनुमान	उच्च सीमा	संख्यात्मक निम्न सीमा	आबादी अनुमान	संख्यात्मक उच्च सीमा
शिवालिक गंगा के मैदान	259	297	335	320	353	388
केन्द्रीय भारत और पूर्वीघाट	486	601	718	518	601	685

पश्चिमी घाट	336	402	487	500	534	568
पूर्वोत्तर पहाड़ियां और ब्रह्मपुत्र बाढ़ के मैदान	84	100	118	118	148	178
सुंदरबन	निर्धारण नहीं	निर्धारण नहीं	निर्धारण नहीं	64	70	90
कुल	1165	1411	1657	1520	1706	1909

4.7 भारत में व्याघ्र उपस्थिति वाले परिदृश्य संकुल, व्याघ्र आरक्षित और भारत में प्रस्तावित/अनुशंसित व्याघ्र आरक्षितियां निम्नलिखित नक्शों में दर्शित किए गए हैं :





5. व्याघ्र आरक्षितियों का प्रबंधन प्रभावशीलता मूल्यांकन—

- 5.1 हमारी दशाओं के अनुकूल प्रकृति संरक्षण के लिए अंतर्राष्ट्रीय संघ (आई०यू०सी०एन०) के पैमाने पर आधारित व्याघ्र आरक्षितियों का स्वतंत्र मूल्यांकन 28 व्याघ्र आरक्षितियों के लिए पहली बार 2005-2006 में किया गया। यह निर्धारण प्रकृति संरक्षण के लिए अंतर्राष्ट्रीय संघ (आई०यू०सी०एन०) के विशेषज्ञों द्वारा पुनर्वलोकित किया गया। दोनों निर्धारणों के साथ-साथ पुनर्वलोकन रिपोर्ट संसद के दोनों सदनों के समक्ष वर्ष 2006 में रखी गई।
- 5.2 परिष्कृत पैमाने पर आधारित स्वतंत्र निर्धारण का दूसरा चक्र 39 व्याघ्र आरक्षितियों के लिए 2010-2011 में किया गया। यह भी हमारी दशाओं के अनुकूल, विश्व भर में प्रयुक्त ढांचे पर आधारित है। सभी में, 30 सूचकों का उपयोग करके पांच स्वतंत्र दलों ने मूल्यांकन संचालित किया। ढांचा 6 तत्वों से मिलकर बना था : संदर्भ, योजना, आगत, प्रक्रिया, निर्गत और निष्कर्ष।
- 5.3 देश स्तरीय व्याघ्र अनुमान में अनुसरित 39 व्याघ्र आरक्षित परिदृश्य समूहों में समूहबद्ध किए गए। लाल गलियारे, में व्याघ्रों से मिलकर बना एक अतिरिक्त प्रवर्ग (वामपक्ष चरमपंथी द्वारा प्रभावित क्षेत्रों) को भी सम्मिलित किया गया। मूल्यांकन का निष्कर्ष निम्नानुसार है :

रेटिंग	व्याघ्र आरक्षितियों की संख्यां	प्रतिशत
बहुत अच्छी	15	38
अच्छी	12	31
संतोषप्रद	8	21
खराब	4	10
कुल	39	100

- 5.4 2010-2011 और 2005-2006 की प्रबंधन प्रभावशीलता मूल्यांकन रेटिंग की 28 व्याघ्र आरक्षितियों के लिए तुलना की गई, जो 2005-2006 के मूल्यांकन का भाग थीं। 'बहुत अच्छी' रेटिंग 4 % बढ़ी, 'अच्छी' रेटिंग 3 % बढ़ी, 'संतोषप्रद' रेटिंग 7 % बढ़ी, 'खराब' जस की तस रही।

सारणी-1 परिदृश्य क्षेत्र समूहों का प्रबंधन प्रभावशीलता मूल्यांकन स्कोर (%) (2010-11)

समूह संख्या	समूह नाम	राज्य	व्याघ्र आरक्षितियों की संख्या	माध्य प्रबंधन प्रभावशीलता मूल्यांकन स्कोर %	प्रबंधन प्रभावशीलता मूल्यांकन स्कोर रेंज %
(1)	(2)	(3)	(4)	(5)	(6)
I	शिवालिक-गंगा का मैदान परिदृश्य संकुल और केन्द्रीय भारत परिदृश्य संकुल तथा पूर्वीघाट परिदृश्य संकुल	उत्तर प्रदेश, उत्तराखंड, राजस्थान, महाराष्ट्र	8	64	56-73
II	केन्द्रीय भारत परिदृश्य संकुल और पश्चिमी घाट परिदृश्य संकुल	मध्य प्रदेश	6	79	56-88
III	शिवालिक गंगा का मैदान परिदृश्य संकुल और केन्द्रीय भारत परिदृश्य संकुल तथा पूर्वी घाट परिदृश्य संकुल	बिहार, छत्तीसगढ़, उड़ीसा, आंध्र प्रदेश, झारखंड	8	42	33-63
IV	पश्चिमी घाट परिदृश्य संकुल	कर्नाटक, केरल, तमिलनाडु	9	75	63-80
V	पूर्वोत्तरी पहाड़ियां और ब्रह्मपुत्र बाढ़ के मैदान तथा सुंदरबन	अरुणाचल प्रदेश, असम, मिजोरम, पश्चिमी बंगाल	8	66	56-77
	कुल		39	65	33-88

तालिका-2(क)-एमईई प्रक्रिया (2010-11) का प्रवर्गवार परिणाम

क्रम सं.	प्रवर्ग	व्याघ्र आरक्षित का नाम
1.	बहुत अच्छा	अन्नामलाई, बांधवगढ़, बांदीपुर, भद्रा, डांडेली-अंशी, कालाकाड़-मुंदनथुरई, कान्हा, काजीरंगा, मुदुमलाई, परंबीकुलम, पैंच (मध्य प्रदेश), पेरियार, सतपुड़ा, सुंदरबन
2.	अच्छा	बक्सा, कार्बेट, डंपा, दुधवा, मानस, मेलघाट, नागरहोल, पक्के, पैंच (महाराष्ट्र), रणथंभौर, ताडोबा-अंधारी
3.	संतोषप्रद	अचानकमार, नमेरी, नामदफा, संजय, सहयाद्री, वाल्मीकि
4.	खराब	सतकोसिया

सारणी-2(ख) “लाल गलियारे” में आने वाली व्याघ्र आरक्षितियों की माध्य प्रबंधन प्रभावशीलता प्रक्रिया (2010-11) का प्रवर्गवार परिणाम

क्रम सं०	प्रवर्ग	व्याघ्र आरक्षित का नाम
1.	बहुत अच्छा	---

60 2.	अच्छा	नागार्जुनसागर-श्रीसेलम
3.	संतोषप्रद	सिमलीपाल
4.	खराब	इंद्रावती, पलामू, उदंती-सीतानदी

सारणी-2(ग) उन व्याघ्र आरक्षितियों की माध्य प्रबंधन प्रभावशीलता प्रक्रिया (2010-11) का प्रवर्गवार परिणाम, जिनके सभी व्याघ्र हाल ही में समाप्त हो गए हैं ।

क्रम सं०	प्रवर्ग	व्याघ्र आरक्षिति का नाम
1.	बहुत अच्छा	पन्ना
2.	अच्छा	---
3.	संतोषप्रद	सरिस्का
4.	खराब	---

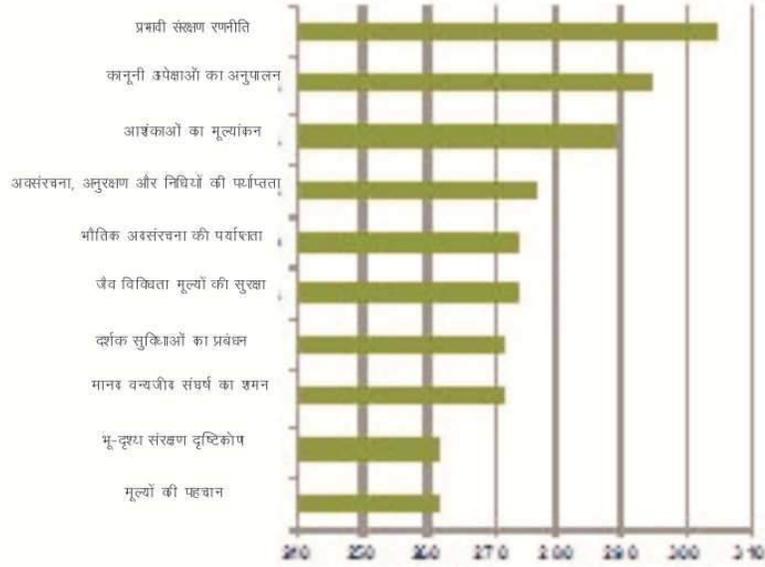
व्याघ्र आरक्षितियों की माध्य प्रबंधन प्रभावशीलता प्रक्रिया का सार

रैटिंग	व्याघ्र आरक्षितियों की संख्या	प्रतिशत
बहुत अच्छा	15	38
अच्छा	12	31
संतोषप्रद	8	21
खराब	4	10
कुल	39	100

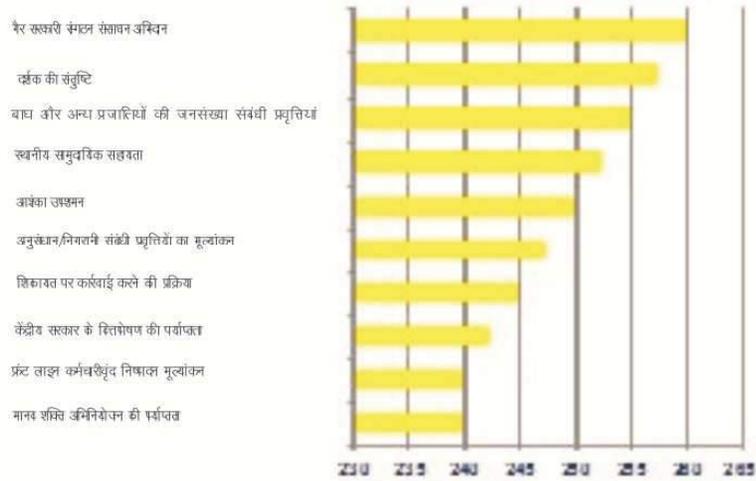
सारणी-3 व्याघ्र आरक्षितियों की माध्य प्रबंधन प्रभावशीलता रैटिंग की तुलना प्रक्रिया 2005-06 और 2010-11

प्रवर्ग	2005-06	%	2010-11	%
बहुत अच्छा	09	32	10	36
अच्छा	10	36	11	39
संतोषप्रद	07	25	05	18
खराब	02	07	02	07
कुल	28		28	

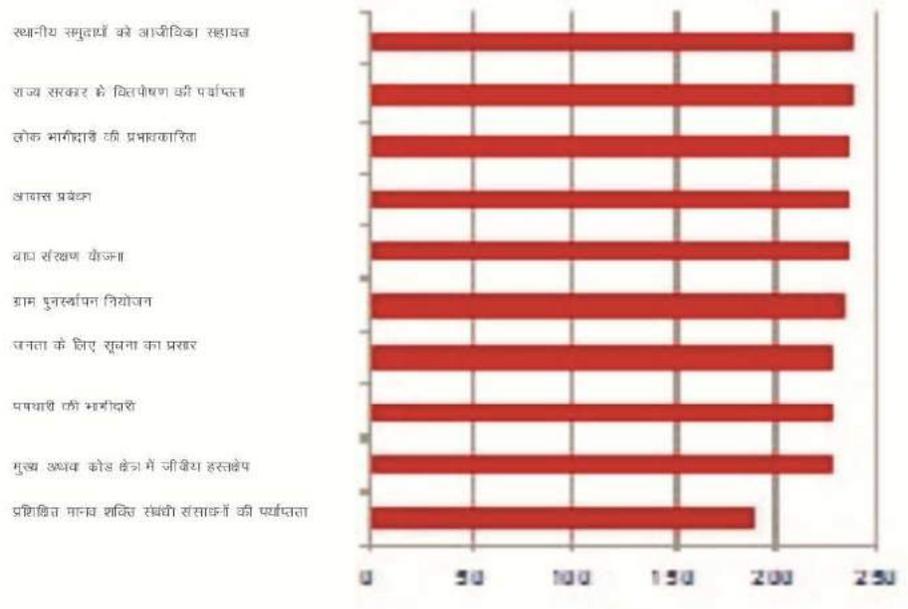
सारणी-4(क) : शीर्ष सूचकों का निष्पादन (पहले दस)



सारणी-4(ख) : श्रीर्ष सूचको का निष्पादन (मध्य दस)



सारणी-4(क) : श्रीर्ष सूचको का निष्पादन (अंतिम दस)



6. व्याघ्र आरक्षों से बाहर के क्षेत्रों में व्याघ्र के ह्रास के लिए सामान्य कारण—

व्याघ्र आरक्षों /संरक्षित क्षेत्रों से बाहर के क्षेत्रों में व्याघ्र के ह्रास के लिए कारण निम्नवत् हैं :

(i) निम्नलिखित के कारण संरक्षित क्षेत्रों / व्याघ्र आरक्षों से बाहर वन प्रास्थिति का अवकर्षण :

(क) मानवीय दबाव ;

(ख) पशुधन दबाव ; और

(ग) पारिस्थितिकीय रूप से अपोषणीय भू उपयोग ।

(ii) विखंडन के परिणामस्वरूप जनसंख्या स्रोत से जीन प्रवाह की हानि ।

(iii) भक्ष्य जैवभार (बायोमास) के रूप में वन गुणवत्ता की हानि ।

(iv) मानव-पशु संघर्ष के कारण व्याघ्रों की मृत्यु ।

(v) अवैध शिकार के कारण व्याघ्रों की मृत्यु

(vi) राजमार्गों जैसी भारी मात्रा में प्रयुक्त अवसंरचना आदि के मद्दे अशांति के कारण संतानोत्पत्ति अथवा प्रजनन की हानि

(vii) बाहरी क्षेत्रों में पर्याप्त संरक्षा का अभाव

(viii) विद्रोह/विप्लव या कानून और व्यवस्था संबंधी समस्याएं—

7. व्याघ्र संरक्षण के प्रति वर्तमान दृष्टिकोण—

पारिस्थितिकीय रूप से अपोषणीय भू उपयोग, जैविक दबाव और अवैध शिकार के मद्दे प्राकृत्वास विखंडन के कारण निम्नलिखित दृष्टिकोण अनिवार्य है :

7.1 व्याघ्र आरक्षों, संरक्षित क्षेत्रों और व्याघ्र वाले वनों में व्याघ्रों की आबादी “स्रोत” और उनके भक्ष्य का समेकन और सुदृढीकरण—

इसमें निम्नलिखित सक्रिय प्रबंधकीय हस्तक्षेप अंतर्वलित हैं, अर्थात् :-

- (i) संरक्षण, अवैध शिकार प्रतिरोधी संक्रियाएं/आसूचना नेटवर्किंग ;
- (ii) व्याघ्र आरक्षों के भीतर अवसंरचना का सुदृढीकरण ;
- (iii) पुनर्स्थापन के माध्यम से अनतिक्रान्त स्थान का सृजन ;
- (iv) अग्रणी/अग्रगामी कर्मचारीवृंद, स्थानीय लोगों तथा अधिकारियों की क्षमता का निर्माण करना (जिसके अंतर्गत प्रशिक्षण केंद्रों का सुदृढीकरण और संबद्ध क्षेत्रों अर्थात् प्रवर्तन, आसूचना नेटवर्किंग, पर्यटन क्रियाकलापों आदि में प्रशिक्षण भी है) ।

7.2 प्राकृत्वास संयोजकता को प्रत्यावर्तित करके “स्रोत-नितल गत्यात्मकता” का प्रबंध करना—

इसमें निम्नलिखित प्रबंधकीय हस्तक्षेप अंतर्वलित है :

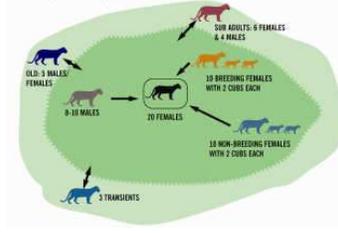
- (i) वन का अवकर्षण न करके स्थानीय लोगों को उनके द्वारा प्रदान की गई पारिस्थितिकीय प्रणाली सेवाओं एवं गलियारे अथवा दीर्घा मूल्यों के लिए सक्रिय रूप से प्रोत्साहन प्रदान करना (पारिस्थितिकीय प्रणाली सेवाओं के लिए संदाय) ;
- (ii) निर्बाध चारण को रोकने के अतिरिक्त पौधा रोपण आरंभ करने और प्राकृतिक प्रकन्दों की संरक्षा करने के लिए स्थानीय लोगों के लिए प्रोत्साहन ;
- (iii) पशुओं को थान पर भोजन कराने को प्रोत्साहित करना और दुग्ध उत्पादों के विपणन को प्रोत्साहन देना ;
- (iv) स्थानीय लोगों को लकड़ी के ईंधन के संग्रहण के प्रति वन पर उनकी निर्भरता को कम करने के लिए आर्थिक सहायता प्राप्त गैस कनेक्शन उपलब्ध कराना ।

7.3 व्याघ्र भू-धृति गत्यात्मकताओं के मुकाबले में बफर जोन का महत्व—

7.3.1 व्याघ्र एक प्रादेशिक प्राणी है जो क्षेत्र में अपनी विद्यमानता की पहचान बनाता है और प्रदेश की रक्षा करता है । यह सर्व विदित तथ्य है कि क्षेत्र में निवासी नर इलाकों की आंशिक अतिव्याप्तियां होती रहती हैं । तथापि, अतिव्याप्ति का स्तर घातक संहारक टकरावों को बढ़ावा देती है । नर व्याघ्र के इलाके के भीतर अति व्याप्ति रीति में अनेक मादा इलाके भी आते हैं । व्याघ्र भू-धृति गत्यात्मकताएं सर्वश्रेष्ठ व्यस्कों की विद्यमानता को सुनिश्चित करती हैं जो निकट के वन क्षेत्रों से वृद्ध नरों के स्थान पर तरुण वयस्कों को आवधिक रूप से रखकर स्रोत जनसंख्या के रूप में कार्य करते हैं । (पट्टिका-1)

7.3.2 व्याघ्र पारिस्थितिकी पर उपलब्ध शोध आंकड़े का चल रहा अध्ययन और विश्लेषण यह उपदर्शित करता है कि प्रजनन अवस्था में मादा व्याघ्रों (बाघिनों) की न्यूनतम आबादी, जिसे 80-100 व्याघ्रों (क्रोड क्षेत्रों के भीतर और इनके इर्द-गिर्द) की जीवनक्षम आबादी को बनाए रखना आवश्यक है, 800-1200 वर्ग किलो मीटर के अनतिक्रान्त स्थान की अपेक्षा करती है । व्याघ्र “समावेशी प्रजाति” होने के कारण, वे अन्य वन्यजीवों (सह-परभक्षी, भक्ष्य) की जीवनक्षम आबादी और वन की जीवंतता को भी सुनिश्चित करेंगे, जिससे संपूर्ण क्षेत्र/प्राकृत्वास क्षेत्र की पारिस्थितिकीय जीवनक्षमता सुनिश्चित होगी । अतः, वन संयोजकता वाले बफर क्षेत्र व्याघ्र परियोजनाओं के लिए अनिवार्य हैं क्योंकि ऐसे क्षेत्र आबादी के उप वयस्कों, तरुण वयस्कों, क्षणभंगुर जीवों और वृद्ध सदस्यों का पालन-पोषण करते हैं । तरुण वयस्क आवधिक रूप से स्रोत आबादी क्षेत्रों से निवासी वृद्ध हो रहे नरों और मादाओं को प्रतिस्थापित करते हैं ।

7.3.3 बफर क्षेत्र व्याघ्र की आबादी और अन्य वन्य जीवों पर अवैध शिकार संबंधी दबाव के “आघात” को समावेशित कर लेता है । बफर क्षेत्रों में प्राकृत्वास में घोर गिरावट की दशा में, स्रोत जनसंख्या को लक्ष्य बनाया जाएगा और अंततः उसका नाश हो जाएगा ।

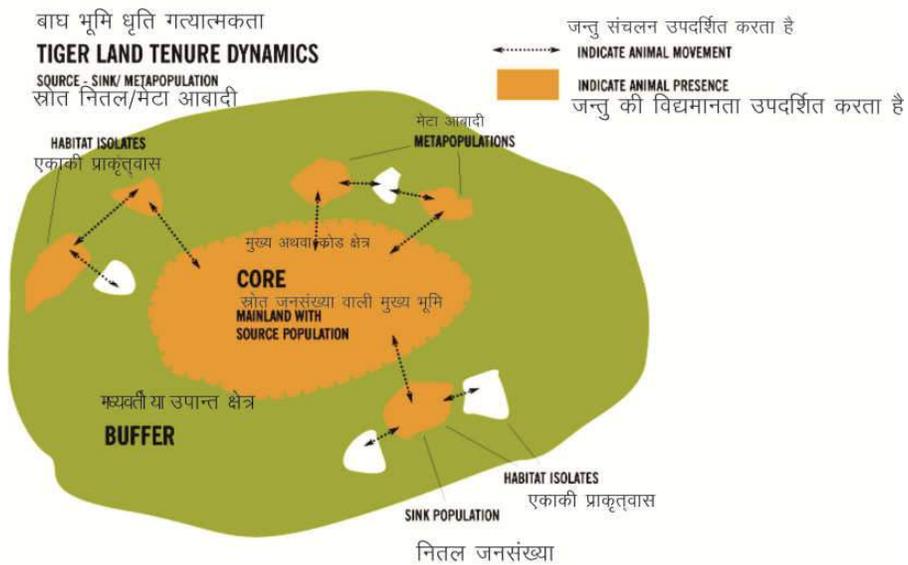


पट्टिका 1 : व्याघ्र भू-धृति गत्यात्मकताएं । जीवनक्षम जनसंख्या (80-100 व्याघ्र) को बनाए रखने के लिए आवश्यक प्रजनन अवस्था में व्याघ्रों की न्यूनतम जनसंख्या, जिसे 800-1200 वर्ग किलोमीटर के अनतिक्रान्त स्थान की आवश्यकता होती है ।

7.4 दीर्घाओं अथवा गलियारों का महत्व—

7.4.1 वन्य जन्तुओं की एकांतवासी जनसंख्या संकीर्णता के कारण विलुप्त होने के जोखिम का सामना करती है। विभिन्न प्राकृतवासों में वन्य जन्तुओं के लिए उपलब्ध हासित अवसर के कारण प्राकृतवास विखंडन वन्यजीव प्रवाह अथवा संचलन को प्रतिकूल रूप से प्रभावित करता है । इससे, बाद में, परिदृश्य में जीन प्रवाह रुक जाता है। द्विपीय जैव भूगोल के संतुलन का सिद्धांत वन्य जन्तुओं के वर्धित संचलन के कारण प्राकृतवास दीर्घा अथवा गलियारों से लगे हुए विशाल वन्यजीव क्षेत्रों में या लघुत्तर क्षेत्रों में अधिक प्रजातियों की बहुलता की भविष्यवाणी करते हैं । जन्तुओं के संचलन को सुगम बनाने के अतिरिक्त ऐसे संयोजनकारी प्राकृतवास क्रोड क्षेत्रों से आबादी के अधिप्लावन के लिए आश्रय के रूप में भी कार्य करते हैं । वे सटे हुए प्राकृतवास को बसाने के लिए मूल वन्यजीव आबादी के प्रजनन और संचलन को सुगम बनाकर लघुत्तर “स्रोत” के रूप में भी कार्य करते हैं । नदियां या पर्वत श्रृंखलाएं जैसी प्राकृतिक रैखिक मुखाकृतियों वन्यजीव आबादी के लिए सीमाओं के रूप में कार्य कर सकती हैं । तथापि, मानवीय हस्तक्षेपों (राजमार्ग, नहर, उद्योग, सड़क, रेल की पटरी, संचरण लाइन) के कारण दीर्घाओं अथवा गलियारों में अशांति वन्यजीव के लिए हानिकारक है ।

7.4.2 “स्रोत” जनसंख्या वह जनसंख्या है जो ऐसे जन्तुओं के आधिक्य की उत्पत्ति करती है और जो संभाव्य उप निवेशक हैं । दूसरी तरफ, “नितल” वे जनसंख्याएं हैं जिनमें मृत्यु जन्म से अधिक होती है और उनकी अचलता अप्रवासियों के निरंतर अंतर्वाह पर निर्भर होती है (पट्टिका 2) ।



पट्टिका 2 : व्याघ्र भू-धृति गत्यात्मकता

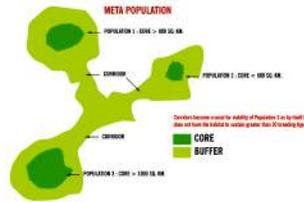
7.4.3 परिदृश्य में उपयुक्त प्राकृत्वास के खंड वन्यजीव आबादी (स्थानीय आबादी) के लिए सहायक हो सकते हैं जिसे विभिन्न अशांतिकारी कारकों के कारण एक दूसरे से अलग किया जा सके। सामूहिक रूप से स्थानीय आबादी के ऐसे खंड “प्रादेशिक आबादी” के नाम से जाने जाते हैं। उप विभाजित आबादी की यह सामान्य स्थिति, जो संचलन के माध्यम से नई जीनों को पूरा करने के लिए परिदृश्य में एक-दूसरे के साथ अन्योन्यक्रिया करती है, “मेटा आबादी” के रूप में जानी जाती है। व्याघ्र भूमि धृति गत्यात्मकताओं के संदर्भ में क्रोड बफर क्षेत्र मेटा आबादी माडल के “मुख्य भूमि” या “क्रोड उपग्रह” के समरूप होते हैं। व्याघ्र आरक्षों का क्रोड क्षेत्र विभिन्न आकारों की आस-पास की स्थानीय आबादी और एकांतवास की परिवर्तनशील स्तरों हेतु उपनिवेशों के लिए स्रोत उपलब्ध कराता है। क्रोड क्षेत्र अपनी अनतिक्रान्त प्रकृति को बनाए रखने के लिए संरक्षण निवेशों के कारण विलोपन का तुरंत अनुभव नहीं कर सकेगा। तथापि, बफर क्षेत्र में आस-पास के एकांत खंड स्थानीय विलोपन से ग्रस्त हो सकते हैं, यदि वन्यजीव समुत्थानों को क्षेत्र की मुख्य धारा में नहीं लाया जाता है। अतः, निम्नलिखित को सुगम बनाने के लिए बफर जोन और साथ ही दीर्घाओं अथवा **गलियारों** के लिए मेटा आबादी प्रबंध दृष्टिकोण अपेक्षित है :-

(क) घटती हुई स्थानीय व्याघ्र जनसंख्या में वृद्धि करना ;

(ख) प्रत्यावर्तनीय प्रबंधन के माध्यम से प्राकृत्वास खंडों में पुनः उपनिवेशन को सुगम बनाना ;

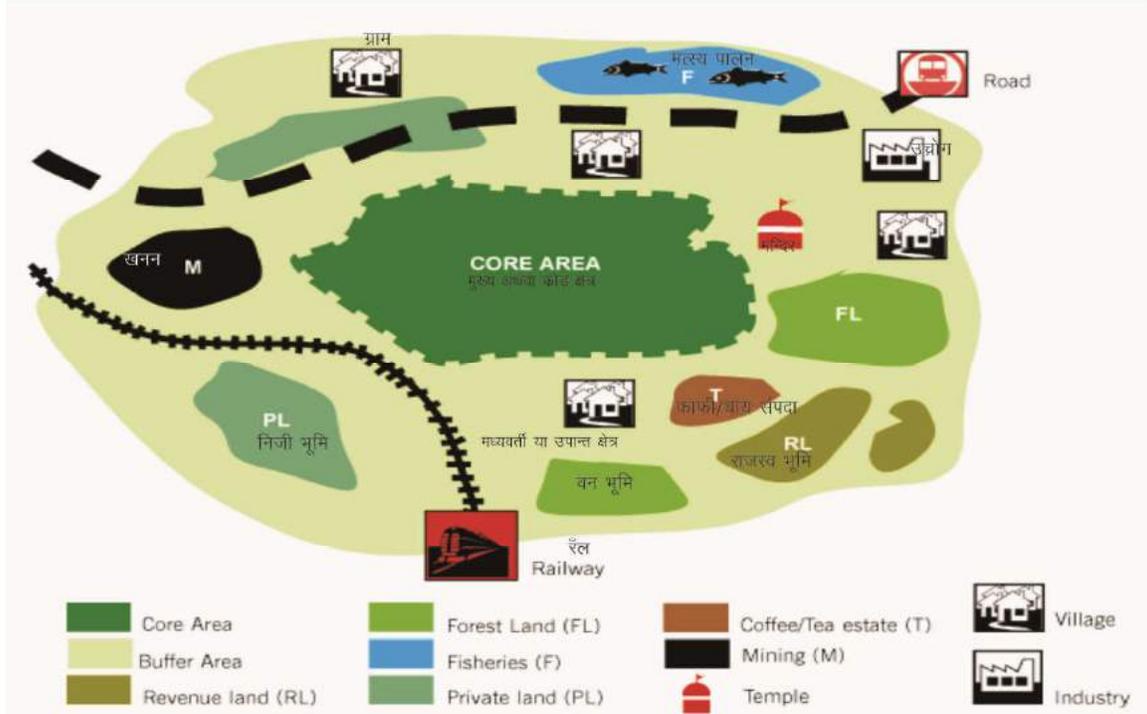
(ग) एकांत आबादी के बीच प्राकृत्वासों (अग्रगमन हेतु आवास उपादान) के खंडों के माध्यम से नए क्षेत्रों का उपनिवेशन करने के लिए व्याघ्र को अवसर उपलब्ध कराना (पट्टिका 3)।

मेटा आबादी



पट्टिका 3: मेटा आबादी गत्यात्मकता। आबादी 2 की जीवनक्षमता को बनाए रखने के लिए दीर्घाएं अथवा गलियारे महत्वपूर्ण बन जाती हैं क्योंकि उसमें 20 प्रजननशील बाघों से अधिक पोषण करने के लिए प्राकृत्वास नहीं होते हैं।

7.5 मानव-व्याघ्र संघर्षों को रोकने/उनका समाधान करने के लिए अन्य सेक्टरों के साथ त्वरित पद्धतियों के माध्यम से परिदृश्य में बाघ/वन्यजीव समुत्थानों को मुख्य प्रवाह में लाना - विभिन्न सेक्टरों का अंतर्वलित होना जैसे: वन, कृषि, जिला कलेक्टर सेक्टर के माध्यम से कल्याणकारी क्रियाकलाप, पर्यटन, मत्स्य पालन, चाय-काफी संपदाएं, सड़क और रेल परिवहन, उद्योग, खनन, तापीय विद्युत संयंत्र, सिंचाई परियोजनाएं, मंदिर पर्यटन और परिदृश्य में प्रचलित संचार परियोजनाएं, मानव-व्याघ्र संघर्ष का प्रभावी रूप से समाधान करने में सक्रिय और व्याघ्र तथा वन्यजीव समुत्थानों को मुख्य प्रवाह में लाने में सहायक होंगे।



पट्टिका 4 : व्याघ्र परिदृश्य में उत्पादन सेक्टर

8. व्याघ्र संरक्षण को सुदृढ़ बनाने के लिए अपनाई गई मील का पत्थर साबित होने वाली पहलें

देश में व्याघ्र संरक्षण को सुदृढ़ बनाने के लिए गत वर्षों में अनेक मील का पत्थर साबित होने वाली पहलें अपनाई गई हैं। प्रधानमंत्री की अध्यक्षता में कार्यरत राष्ट्रीय वन्यजीव बोर्ड द्वारा गठित व्याघ्र कार्यबल की अत्यावश्यक सिफारिशें कार्यान्वित कर दी गई हैं। अन्य बातों के साथ-साथ इन पहलों में निम्नलिखित शामिल हैं, अर्थात् :

8.1 राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण और व्याघ्र तथा अन्य संकटापन्न प्रजाति अपराध नियंत्रण ब्यूरो का गठन करने के लिए समर्थकारी उपबंधों का उपबंध करने के लिए वन्यजीव (संरक्षण) अधिनियम, 1972 का संशोधन।

8.2 व्याघ्र आरक्ष के क्रोड क्षेत्र के संबंध में अपराध या जहां अपराध का संबंध व्याघ्र आरक्ष में भक्ष्य या व्याघ्र आरक्षों की सीमाओं आदि से है, के लिए दंड में वृद्धि।

8.3 अवैध शिकार रोधी गतिविधियों का सुदृढ़ीकरण, जिनके अंतर्गत संसूचना/बेतार सुविधाओं के सुदृढ़ीकरण के साथ-साथ स्थानीय लोगों से मिलकर बने कार्यबल के अतिरिक्त भूतपूर्व सेना कार्मिक/गृहरक्षियों से अंतर्वलित अवैध शिकार रोधी दस्ते के अभिनियोजन के लिए व्याघ्र आरक्षों वाले राज्यों को उनके द्वारा यथा प्रस्तावित वित्तपोषण सहायता उपलब्ध कराकर मानसून गस्त के लिए विशेष रणनीति भी है।

8.4 व्याघ्र आरक्ष प्रबंधन में आदर्श मूलक मानकों को, अन्य बातों के साथ-साथ, यह सुनिश्चित करते हुये आरक्ष विनिर्दिष्ट व्याघ्र संरक्षण योजना की तैयारी कर, संसद के समक्ष वास्तविक लेखा परीक्षा रिपोर्ट पटल पर प्रस्तुत कर व्याघ्र संरक्षण के सुदृढ़ीकरण हेतु राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण का दिनांक 04.09.2006 से प्रभावी गठन, मुख्यमंत्रियों की अध्यक्षता में राज्यस्तरीय संचालन समितियों का गठन और व्याघ्र संरक्षण प्रतिष्ठान की स्थापना।

8.5 वन्यजीव के अवैध व्यापार का प्रभावी रूप से नियंत्रण करने के लिए 6 जून, 2007 से बहु आयामी व्याघ्र और अन्य संकटापन्न प्रजाति अपराध नियंत्रण ब्यूरो (वन्यजीव अपराध नियंत्रण ब्यूरो) का गठन।

8.6 पांच नए व्याघ्र आरक्षों के सृजन के लिए राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा अनुमोदन सिद्धांत रूप में प्रदान कर दिया गया है, और ये स्थल हैं : पीलीभीत (उत्तर प्रदेश), रातापानी (मध्य प्रदेश), सुनाबेड़ा (ओडिशा), मुकुन्दारा पहाड़ी (जिसके अंतर्गत दर्रा, जवाहर सागर और चंबल वन्यजीव अभयारण्य भी हैं) (राजस्थान) और सत्यमंगलम (तमिलनाडु) । कुद्रेमुख (कर्नाटक) को व्याघ्र आरक्षित क्षेत्र के रूप में घोषित करने के लिए अंतिम अनुमोदन प्रदान कर दिया गया है । इसके अतिरिक्त, राज्यों को सलाह दी गई है कि वे निम्नलिखित क्षेत्रों को व्याघ्र आरक्षित क्षेत्रों के रूप में घोषित करने के लिए प्रस्ताव भेजें : (i) बोर (महाराष्ट्र), (ii) सुहेलवा (उत्तर प्रदेश), (iii) नागजीरा - नवेगांव (महाराष्ट्र), (iv) गुरु घासीदास नेशनल पार्क (छत्तीसगढ़), (v) महादेयी अभयारण्य (गोवा), और (vi) श्रीविल्लिपुथर ग्रिजिल्ड विशाल गिलहरी/मेगामलाय वन्यजीव अभयारण्य/ वरुशनादु घाटी (तमिलनाडु) ।

8.7 व्याघ्र संरक्षण के सृद्धीकरण के लिये व्याघ्र परियोजना संबंधी पुनरीक्षित दिशानिर्देश, राज्यों को जारी किए गए हैं जिनके अंतर्गत, अन्य बातों के साथ-साथ, चालू क्रियाकलापों के अतिरिक्त, क्रोड और कांतिक व्याघ्र प्राकृत्ववासों में रह रहे लोगों के लिए वर्धित ग्राम पुनर्स्थापन/पुनर्वास पैकेज के लिए राज्यों को वित्तपोषण सहायता (एक लाख रूपए/परिवार से दस लाख रूपए प्रति परिवार), पारंपरिक रूप से भक्ष्य करने में अंतर्वलित समुदायों का पुनर्वास/पुनर्स्थापन, व्याघ्र आरक्षों से बाहर वनों में आजीविका एवं वन्यजीव समुत्थान का मुख्यधारा में जुड़ाव तथा प्राकृत्ववास विखंडन को रोकने के लिए सबल रणनीति के माध्यम से दीर्घा या गलियारा संरक्षण सम्मिलित है ।

8.8 व्याघ्र (सह-परभक्षी, भक्ष्य जन्तु और प्राकृत्ववास प्रास्थिति मूल्यांकन सहित) का ऑकलन अथवा अनुमान करने के लिए एक वैज्ञानिक पद्धति विकसित की गई है और उसे मुख्य प्रवाह में लाया गया है । इस ऑकलन अथवा अनुमान एवं मूल्यांकन के निष्कर्ष भावी व्याघ्र संरक्षण नीति के लिए न्यूनतम मानदंड हैं ।

8.9 2006 में यथा संशोधित वन्यजीव (संरक्षण) अधिनियम, 1972 की धारा 38 फ के अधीन क्रोड या कांतिक व्याघ्र प्राकृत्ववास के रूप में 17 व्याघ्र राज्यों द्वारा 35123.9547 वर्ग किलोमीटर का क्षेत्र अधिसूचित किया गया है ।

8.10 वन्यजीवों को प्रभावी संरक्षण प्रदान करने के लिये राज्यों को विभिन्न केन्द्र प्रवर्तित योजना यथा व्याघ्र परियोजना और एकीकृत विकास योजना के अधीन उनकी क्षमता और अवसरचना में वृद्धि करने के लिये वित्तीय और तकनीकी सहायता उपलब्ध करायी जाती है ।

अंतरराष्ट्रीय सहयोग

8.11 भारत का, चीन के साथ व्याघ्र संरक्षण संबंधी नयाचार अथवा आदर्श पत्र के अतिरिक्त वन्यजीव और संरक्षण में सीमापार अवैध व्यापार पर नियंत्रण करने के लिए नेपाल के साथ द्विपक्षीय समझौता हुआ है ।

8.12 सुन्दरबन के रायल बंगाल व्याघ्र के संरक्षण के लिए बांग्ला देश के साथ एक नयाचार अथवा आदर्श पत्र पर सितंबर, 2011 में हस्ताक्षर किए गए हैं ।

8.13 व्याघ्र और तेंदुआ संरक्षण संबंधी एक उप-समूह रूसी परिसंघ के साथ सहयोग के लिए गठित किया गया है ।

8.14 व्याघ्र श्रेणी देशों का एक वैश्विक व्याघ्र मंच व्याघ्र संरक्षण से संबंधित अंतरराष्ट्रीय मुद्दों का समाधान करने के लिए सृजित किया गया है ।

8.15 सीआईटीईएस (लुप्तप्राय प्रजातियों के अंतरराष्ट्रीय व्यापार पर कन्वेंशन) के पक्षकारों के सम्मेलन के 14वें अधिवेशन के दौरान, जो हेग में 3 जून से 15 जून, 2007 तक आयोजित किया गया था, भारत ने वन्य व्याघ्र का संरक्षण करने के लिए ही समर्थकारी स्तर तक ऐसी बंधित आबादी को सीमित करने के लिए, वाणिज्यिक पैमाने पर व्याघ्र प्रजनन आपरेशनों वाले पक्षकारों को इन निदेशों के साथ चीन, नेपाल और रूसी परिसंघ के साथ एक संकल्प पुनर्स्थापित किया है । यह संकल्प लघु संशोधनों सहित एक विनिश्चय के रूप में अंगीकृत किया गया था । इसके अतिरिक्त, भारत ने व्याघ्र पालन को समाप्त करने के लिए, और एशियाई बड़ी बिल्लियों के शरीर के अंगों और व्युत्पन्नो के संचित पुंज को समाप्त करने के लिए अपील करते हुए हस्तक्षेप किया है । व्याघ्र के शरीर के अंगों के व्यापार पर प्रतिबंध को बनाए रखने के महत्व पर बल दिया गया था ।

8.16 जेनेवा में 23 जुलाई से 27 जुलाई, 2012 तक सीआईटीईएस (लुप्तप्राय प्रजातियों के अंतरराष्ट्रीय व्यापार पर कन्वेंशन) की स्थायी समिति के 62वें अधिवेशन के दौरान भारत के प्रबल हस्तक्षेप के आधार पर सीआईटीईएस

सचिवालय ने विनिश्चय 14.69 को पूर्ण रूप से कार्यान्वित करने के लिए पक्षकारों को अधिसूचना संख्या 2012/054 तारीख 3.9.32012 जारी किया है और 25 सितंबर, 2012 तक सचिवालय को रिपोर्ट देने के लिए कहा है (व्याघ्र आदि के बंधित प्रजनन आपरेशनों को प्रतिबंधित करने पर हुई प्रगति) ।

8.17 सरिस्का और पन्ना व्याघ्र आरक्षों, जहां व्याघ्र स्थानीय रूप से लुप्त हो चुके थे, की आबादी का पुनर्निर्माण करने के लिए सक्रिय प्रबंधन के अन्तर्गत बाघों/बाघिनों का पुनर्स्थापन किया गया है ।

8.18 व्याघ्र एवं उसके शिकार की कम आबादी प्रास्थिति वाले व्याघ्र आरक्षों में सक्रिय प्रबंधन के माध्यम से भक्ष्य आधारित और व्याघ्र जनसंख्या के स्व-स्थाने निर्माण के लिए विशेष सलाहकारी राय जारी की गई हैं ।

विशेष व्याघ्र संरक्षण बल (एसटीपीएफ) का सृजन

8.19 वित्त मंत्री द्वारा, अन्य बातों के साथ-साथ, 29.02.2008 के उनके बजट भाषण में उद्घोषित नीतिगत पहलों में व्याघ्र संरक्षण से संबंधित कार्रवाई बिन्दू अंतर्विष्ट हैं । विशेष व्याघ्र संरक्षण बल (एसटीपीएफ) खड़ा करने के लिए, सशस्त्रीकृत करने के लिए और अभिनियोजन के लिए राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (एनटीसीए) को 50.00 करोड़ रुपए के एकमुश्त अनुदान के आधार पर उक्त बलों के लिए प्रस्ताव 13 व्याघ्र आरक्षों के लिए सक्षम प्राधिकारी द्वारा अनुमोदित कर दिया गया है । वर्ष 2008-09 के दौरान एसटीपीएफ के सृजन के लिए कॉर्बेट, रणथम्भौर और दुधवा व्याघ्र आरक्ष को 93 लाख रुपए जारी किए गए हैं । तब से ही एक विकल्प-II के रूप में पुलिस के स्थान पर वन कार्मिकों को अभिनियोजित करने के लिए एसटीपीएफ के मार्गदर्शी सिद्धांत पुनरीक्षित किए गए हैं जिनमें वन गुर्जर जैसे स्थानीय लोगों को सम्मिलित करने की गुंजाइश है । वर्ष 2010-11 और वर्ष 2011-12 के दौरान 270 लाख रुपए की रकम एसटीपीएफ को खड़ा करने के लिए, उसे सशस्त्रीकृत करने और अभिनियोजित करने के लिए सिमिलीपाल व्याघ्र आरक्ष को उपलब्ध कराई गई है । कर्नाटक और महाराष्ट्र राज्यों में एसटीपीएफ अभिनियोजित कर दी गई है ।

8.20 ट्रैफिक-इंडिया के सहयोग से, एक आनलाइन व्याघ्र अपराध डाटा बेस की शुरुआत की गई है और आरक्ष विनिर्दिष्ट सुरक्षा योजना को तैयार करने के लिए सामान्य मार्गदर्शी सिद्धांत तैयार किए गए हैं ।

हाल ही में की गई पहलें

8.21 व्याघ्र राज्यों के साथ त्रिपक्षीय समझौता ज्ञापन (एमओयू) को कार्यान्वित करना जो व्याघ्र संरक्षण पहलों के प्रभावी कार्यान्वयन के लिए निधि प्रवाहों से संबद्ध है ।

8.22 व्याघ्र आरक्षित क्षेत्रों का त्वरित मूल्यांकन किया गया है ।

8.23 वामपंथी उग्रवाद प्रभावित और व्याघ्र तथा उसके भक्ष्य की कम आबादी प्रास्थिति वाले व्याघ्र आरक्षों को भेजे गये विशेष कार्य बल (प्रवीण बल) ।

8.24 वामपंथी उग्रवाद प्रभावित व्याघ्र आरक्ष और व्याघ्र तथा उसके कम आबादी प्रास्थिति वाले राज्यों के मुख्यमंत्रियों को विशेष पहल करने के लिए संबोधन ।

8.25 प्रभावी क्षेत्र गश्त और अनुश्रवण के लिए 'व्याघ्र अनुश्रवण प्रणाली-गहन संरक्षण और पारिस्थितिकीय प्रास्थिति (एम-एसटीआरआईपीईएस)' आरंभ करने के अतिरिक्त अवसंरचना और क्षेत्र संरक्षण का आधुनिकीकरण करने के लिए किए गए उपाय ।

8.26 चालू सभी भारतीय व्याघ्र आंकलन में गैर सरकारी विशेषज्ञों के अंतर्वलन के लिए किए गए उपाय ।

8.27 प्रोत्साहन प्रदान करने के अलावा, फील्ड पदाधिकारियों की क्षमता निर्माण के माध्यम से फील्ड परिदान में सुधार करने के लिए की गई पहलें ।

8.28 व्याघ्र आरक्षों में निगरानी को सुदृढ़ करने के लिए सूचना प्रौद्योगिकी का उपयोग करने के संबंध में आरंभ की गई कार्रवाई ।

8.29 वर्ष 2010 में पूरे किए गए देश स्तरीय व्याघ्र प्रास्थिति मूल्यांकन के दूसरे दौर, जिसमें 1706 की व्याघ्र आबादी आकलन सहित वृद्धि को उपदर्शित करने वाले निष्कर्ष हैं, क्रमशः 1520 और 1909 की निचली और ऊपरी

सीमाएं भी हैं की तुलना में वर्ष 2006 के पिछले देश स्तरीय आंकलन में यह आबादी 1411 है और क्रमशः निचली और ऊपरी सीमाएं 1165 और 1657 हैं ।

8.30 वैश्विक रूप से प्रयुक्त कार्य ढांचे के आधार पर 39 व्याघ्र आरक्षों के लिए 2010-11 में किए गए व्याघ्र आरक्षों के प्रबंधन प्रभावशीलता मूल्यांकन के स्वतंत्र निर्धारण का दूसरा दौर ।

8.31 अतिरिक्त संघटकों के साथ व्याघ्र परियोजना के लिए आवंटन में वृद्धि ।

8.32 समस्या ग्रस्त क्षेत्रों में मानव- व्याघ्र संघर्षों के शमन के लिए विशेष सहायता उपलब्ध कराना ।

8.33 नई दिल्ली में आयोजित चौथे सीमा पार परामर्शी समूह अधिवेशन के परिणाम के रूप में, एक संयुक्त संकल्प पर जैव विविधता और व्याघ्र संरक्षण के लिए नेपाल के साथ हस्ताक्षर किए गए हैं ।

8.34 नागपुर, बंगलूरु और गुवाहाटी में राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के क्षेत्रीय कार्यालयों की स्वीकृति प्राप्त हुई है ।

8.35 फेज IV व्याघ्र आरक्ष स्तरीय अनुश्रवण का शुभारंभ ।

8.36 व्याघ्र परियोजना के पुनरीक्षित लागत प्राक्कलन को अगस्त, 2011 में सक्षम प्राधिकारी द्वारा अनुमोदित कर दिया गया है जिसमें 11वीं योजना की अवधि के लिए आबंटन को 650 करोड़ रुपए की केंद्रीय सहायता से बढ़ाकर 1216.86 करोड़ रुपए कर दिया गया है । उर्ध्वगामी पुनरीक्षण अधिसूचित क्रोड अथवा क्रांतिक व्याघ्र प्राकृत्वार्सों से ग्रामों के पुनर्स्थापन के लिए वर्धित कार्रवाई और अतिरिक्त संघटकों के समावेशन के कारण आवश्यक हो गया है ।

9. 12वीं योजना अवधि के लिए महत्वपूर्ण क्षेत्र—

9.1 विशेष व्याघ्र संरक्षण बल (एसटीपीएफ) को खड़ा करने के लिए, उसे सशस्त्रीकृत करके और अभिनियोजित करने के लिए राज्यों को समर्थन देकर संरक्षण में वृद्धि करना (अब तक एसटीपीएफ नागरहोल व्याघ्र आरक्ष के लिए कर्नाटक में एवं तडोबा-अंधारी एवं पेंच व्याघ्र आरक्षों के लिये महाराष्ट्र में ही गठित की गई है; वित्तपोषण सहायता उत्तर प्रदेश, उत्तराखंड और राजस्थान को उपलब्ध कराई गई है जहां उसके गठन की प्रक्रिया चल रही है) । वित्तपोषण, सिमिलीपाल व्याघ्र आरक्ष में एसटीपीएफ के गठन के लिए ओडिशा को भी उपलब्ध कराया गया है ।

9.2 जीवनक्षम आबादी हेतु व्याघ्रों के लिये अनतिक्रान्त स्थान (800-1200 वर्ग किलोमीटर) उपलब्ध कराने हेतु क्रोड क्षेत्रों से स्वैच्छिक ग्राम पुनर्स्थापन के लिए राज्यों को वर्धित वित्तपोषण सहायता की आवश्यकता ।

9.3 अवसंरचना और प्राकृत्वार्स प्रबंध का सुदृढीकरण ।

9.4 वन्यजीव अपराध रोकथाम में सूचना प्रौद्योगिकी का उपयोग ।

9.5 क्षेत्र कार्मिकों का क्षमता निर्माण ।

9.6 प्रतिशोध वर्धों को रोकने के लिए मानव-वन्यजीव संघर्षों से निपटना ।

9.7 पारस्परिक प्रतिबद्धताओं वाले पारिस्थितिकीय विकास के लिए ग्राम स्तरीय भागीदारी नियोजन के माध्यम से बहु उपयोगी जोन के रूप में व्याघ्र आरक्षों के बफर/उपान्त क्षेत्रों का प्रबंध करने के लिए राज्यों की सहायता करके क्रोड/क्रांतिक व्याघ्र प्राकृत्वार्स के सीमावर्ती क्षेत्रों में आजीविका निर्भरता के मुद्दे का समाधान करना (41 व्याघ्र आरक्षितियों में से सभी द्वारा बफर क्षेत्र अधिसूचित किया गया है) । व्याघ्र आरक्षों द्वारा अधिसूचित क्रोड और क्रांतिक व्याघ्र प्राकृत्वार्स तथा बफर और उपान्त क्षेत्रों के ब्यौरे **परिशिष्ट क** और **परिशिष्ट ख** पर हैं ।

9.8 व्याघ्र आरक्ष विनिर्दिष्ट क्षमता निर्माण द्वारा निरंतर अनुश्रवण हेतु फेज-4 का शुभारंभ ।

9.9 सक्रिय प्रबंधन जिसमें परिदृश्य के भीतर उपयुक्त कम सघनता वाले व्याघ्र प्राकृत्वार्सों में व्याघ्र का स्थानान्तरण अंतर्वलित है ।

9.10 समर्थकारी क्षेत्रोन्मुखी अनुसंधान कार्य ।

9.11. नागपुर, गुवाहटी और बैंगलुरु में राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (एन.टी.सी.ए.) के क्षेत्रीय कार्यालयों का सुदृढीकरण (नागपुर और बैंगलुरु क्षेत्रीय कार्यालय में सहायक वन महानिरीक्षक (एआईजी) अभिनियोजित, गुवाहटी में एक सहायक वन महानिरीक्षक के अतिरिक्त, 3 क्षेत्रीय कार्यालयों में वन महानिरीक्षकों का अभिनियोजन अपेक्षित है)।

9.12. नए व्याघ्र आरक्षों की घोषणा करना और उन्हें समेकित करना (5 सिद्धान्ततः अनुमोदित किए गए, और अन्य 6 के लिए राज्य को परामर्श दिया गया है) । इसके अतिरिक्त कर्नाटक में एक व्याघ्र आरक्ष के लिए स्वीकृति दी गई है।

9.13. जागरुकता प्रोत्साहित करना/सहायक आरक्ष विनिर्दिष्ट सम्प्रेषण नीति - पंचायती राज संस्थाओं की सक्रिय भागीदारी के साथ व्याघ्र संरक्षण के लिए जन समर्थन उत्पन्न करना ।

10. उपक्रियाकलापों सहित कार्य रणनीति

10.1 संरक्षण को बढ़ाना : (अवैध शिकार प्रतिरोधी दल/व्याघ्र संरक्षण बल का अभिनियोजन)

व्याघ्र आरक्ष में अवैध शिकार प्रतिरोधी प्रचालन स्थल विनिर्दिष्ट है । तथापि, निम्नलिखित क्रियाकलाप, अन्य बातों के साथ, व्याघ्र आरक्ष में संरक्षण रणनीति का प्रारूप हो सकता है, अर्थात् :-

- (क) विशेष व्याघ्र संरक्षण बल को खड़ा करना, सशस्त्रीकरण और अभिनियोजन करना ।
- (ख) वन्यजीव अपराध रोकथाम में सूचना प्रौद्योगिकी का उपयोग ।
- (ग) क्षेत्र पैट्रोलिंग के लिए (एम एस टी आर आई पी ई एस) आरंभ करना ।
- (घ) अवैध शिकार प्रतिरोधी दलों को अभिनियोजन ।
- (ङ.) विद्यमान गश्त कैंपों/चौकियों की स्थापना और अनुरक्षण करना और कैंप श्रमिकों का गश्त के लिए अभिनियोजन ।
- (च) दस्ता (व्याघ्र संरक्षण बल) गठित करके वाहन द्वारा गश्त करना, क्षेत्रीय कर्मचारिवृन्द श्रमिकों और पुलिस /एस ए एफ / भूतपूर्व सेना कार्मिक का दस्ते के लिए गश्ती कलेन्डर विहित करने से इतर अपराधियों को पकड़ने के लिए बेतार हैंडसेट और अन्य साज सामान सहित उनका समावेश करना ।
- (छ) बेतार नेटवर्क की स्थापना और अनुरक्षण ।
- (ज) संयुक्त रूप से स्थानीय पुलिस के साथ रेलवे स्टेशनों, लोकल ट्रेनों, बस स्टॉपों, बसों, जलपान और अल्पाहार गृहों पर अचानक छापे डालना ।
- (झ) संरक्षित क्षेत्रों के भू-भाग और अभिगम्य को विचार में लेते हुए आपरेशन मानसून के रूप में मानसून के दौरान विशेष विनिर्दिष्ट स्थल संरक्षण उपायों को सुनिश्चित करना ।
- (ञ) पूर्व सेना कार्मिकों/होम गार्डों का अभिनियोजन किया जाना ।
- (ट) गश्त, जल निकासों, मानवयुक्त अवरोधों की निगरानी के लिये स्थानीय कार्य बल का अभिनियोजन करना ।
- (ठ) आयुध और गोला-बारूद का उपापन ।
- (ड) हाथियों के दस्तों का उपापन/अनुरक्षण ।
- (ढ) सूचना देने वालों को पुरस्कार ।

- (ण) न्यायालय वादों के प्रतिवाद के लिए विधिक सहायता ।
- (त) वाहनों, नावों का उपापन ।
- (थ) क्षेत्रोपकरण (फील्ड गियर), रात्रि दर्शन युक्ति अथवा उपकरण का उपापन ।

10.2 समय सीमा के भीतर व्याघ्र आरक्षों में वन्यजीवों के लिये अनतिक्रान्त स्थान विनिश्चय करना और क्रोड अथवा कांतिक व्याघ्र प्राकृतवासों से ग्रामीणों का पुनर्स्थापन एवं अधिकारों का विनिश्चयन ।

10.2.1 अनुसूचित जनजाति और अन्य परंपरागत वन निवासी (वन अधिकारों की मान्यता) अधिनियम, 2006 के साथ ही वन्यजीव (संरक्षण) अधिनियम, 1972 में, व्याघ्र आरक्षों अथवा संरक्षित क्षेत्रों के क्रोड एवं कांतिक व्याघ्र अथवा वन्यजीव प्राकृतवास के भीतर मान्यता प्राप्त वन क्षेत्र में (अनुसूचित जनजातियां और अन्य परंपरागत वन निवासियों) व्यक्तियों के अधिकारों को व्याघ्र या वन्य प्राणियों को अनतिक्रान्त स्थान उपलब्ध कराने के उपबंध के लिए उपांतरित किया जा सकेगा और पुनर्वास अपेक्षित हो सकेगा । इस हेतु प्रतिकर का संदाय अपेक्षित है (वर्तमान में केन्द्रीय प्रवर्तित योजना के अधीन दिए गए पुनर्वास पैकेज के अतिरिक्त अधिकारों का व्यवस्थापन सम्मिलित है) । वन्यजीव (संरक्षण) अधिनियम, 1972 का अध्याय 4 (धारा 24) धारा 18 (अभयारण्य स्थापना के लिए) या धारा 35 (राष्ट्रीय पार्क स्थापना के लिए) राज्य सरकार द्वारा घोषित भूमि में या भूमि पर अर्जन के अधिकारों के लिए उपबंध करता है । वन्यजीव (संरक्षण) अधिनियम की धारा 24 की उपधारा 2, ऐसी भूमि या अधिकारों को अर्जित करने के लिए कलेक्टर को प्राधिकृत करती है । अतः उनके अधिकारों के उपांतरण/व्यवस्थापन के भाग के रूप में व्यक्तियों की अचल संपत्ति के लिए प्रतिकर का संदाय है जो कि एक वैधानिक अपेक्षा है ।

10.2.2 व्याघ्र पारिस्थितिकी विज्ञान पर उपलब्ध अनुसंधान आंकड़ों के सतत् अध्ययन और विश्लेषण से उपदर्शित होता है कि बाघिनों (मादा बाघ) की न्यूनतम संख्या जो प्रजनन अवस्था में हैं एवं जिनका अनुरक्षण करना आवश्यक है, 80-100 व्याघ्रों की जीवनक्षम संख्या (क्रोड क्षेत्र में या उसके आसपास) के लिए 800-1000 वर्ग किलो मीटर स्थान अपेक्षित है । व्याघ्र की “सर्वाच्छादित प्रजाति” होने के कारण इससे अन्य वन्य पशुओं (सह परभक्षी, भक्ष्य) और जंगल की जीव्य संरक्षा भी सुनिश्चित हो जाएगी जिसके द्वारा संपूर्ण क्षेत्र या प्राकृतवास की पारिस्थितिकी जीव्यता सुनिश्चित होगी । अतः, व्याघ्र और अन्य वन्य पशुओं की मूल संरक्षा को जीवित रखने के लिए व्याघ्र आरक्षितियों के क्रोड क्षेत्रों को अनतिक्रान्त बनाए रखने की पारिस्थितिकीय अनिवार्यता हो जाती है ।

10.2.3 प्रस्तावित पैकेज के निम्नलिखित दो विकल्प हैं, अर्थात् :-

- (क) विकल्प 1--वन विभाग द्वारा किसी पुनर्वास या पुनःस्थापन प्रक्रिया को अंतर्वलित किये बिना ऐसे परिवारों को जो यह विकल्प अपनाते हैं, को संपूर्ण पैकेज राशि (प्रत्येक परिवार को 10 लाख रुपए) का संदाय ।
- (ख) विकल्प 2--वन विभाग द्वारा संरक्षित क्षेत्र और व्याघ्र आरक्षित से ग्रामों का पुनःस्थापन या पुनर्वास का किया जाना ।

10.3 व्याघ्र आरक्षितियों के भीतर अवसंरचना को बढ़ाना,--

अन्य बातों के साथ निम्नलिखित क्रियाकलाप, व्याघ्र आरक्षितियों की अवसंरचना (नए व्याघ्र आरक्षित को समर्थन सहित) को प्रवलित करने के भाग के रूप में होगी, अर्थात् :-

- (क) सिविल कार्य (कर्मचारी क्वार्टर, परिवार होस्टल, कार्यालय सुधार, गश्ती शिविर अथवा पैट्रोलिंग कैंप, गृह व्यवस्था भवन, म्यूजियम, कलवर्ट्स) ।
- (ख) सड़क नेटवर्क का अनुरक्षण, सृजन और उन्नयन करना ।
- (ग) बेंतार टावर का अनुरक्षण और सृजन ।
- (घ) अग्नि निगरानी टावर का रखरखाव और सृजन करना ।

- (ड.) पूलों, बॉधों, एनीक्टस का अनुरक्षण और सृजन ।
- (च) अग्निरेखा/अग्नि अवरोधक का अनुरक्षण और सृजन ।
- (छ) मिट्टी के तालाब का अनुरक्षण और सृजन ।
- (ज) वाहनों (जिप्सी, जीप, ट्रक, ट्रैक्टर इत्यादि) का उपापन और अनुरक्षण ।
- (झ) प्राकृत्वास सुधार कार्य ।
- (ञ) हाईवेयर, साफ्टवेयर और भौगोलिक सूचना प्रणाली (जीआईएस) का उपापन ।
- (ट) कम्पास, दूरी मापक (रेंज फाइंडर), भौगोलिक स्थापन प्रणाली (जीपीएस), कैमरा ट्रैप का उपापन।
- (ठ) प्रबंधन योजना के लिए उपग्रह से प्राप्त चित्रों का उपापन ।
- (ड) प्रबंधन योजना के लिए नक्शा अंकुरण सुविधा ।

10.4 प्राकृत्वास सुधार और जल विकास,--

इसमें, अन्य बातों के साथ सम्मिलित हो सकेगी, अपतृण उन्मूलन, घास के मैदानों में उगने वाले समूहचर पौधों को हटाना। घास सुधार, जल अवरोध संरचनायें और इसी प्रकार की अन्य। ये पहले वन्यजीव के लिए प्राकृत्वास के चारा एवं चारण मूल्य में वृद्धि कर पायेंगी।

10.5 मानव - पशु संघर्ष को संबोधन (वन्य पशुओं के कारण मानव मृत्यु, मांसभक्षी द्वारा पशुधन क्षति, वन्य खुरदार पशुओं द्वारा फसलों की क्षति के प्रकरणों में एकरूपता सुनिश्चित करते हुये समयबद्ध प्रतिकर उपलब्ध कराना) (फसल हानि के लिए प्रतिकर एक नया घटक है)

इसमें सम्मिलित हो सकेगा,--

- (क) वन्य पशुओं के कारण मवेशी उत्थापन, मानव मृत्यु और फसलों के विनाश के लिए प्रतिकर का संदाय ।
- (ख) फसल संरक्षण संरचना का सृजन ।
- (ग) समस्याकारक पशुओं को पकड़ने के लिए जाल, पिंजरों का उपापन/लगाना ।
- (घ) शामक उपकरण अथवा प्रशान्तक उपस्कर, बचाव वाहन और औषधि का उपापन ।

10.6 बफर/सीमावर्ती क्षेत्रों में सह अस्तित्व कार्यसूची

व्याघ्र आरक्षित के चारों ओर सीमावर्ती क्षेत्रों का गलियारा मूल्य है और उनकी पारिस्थितिकीय वहनीयता इस क्षेत्र को संसाधनों के अत्यधिक प्रयोग और अनुचित भूमि प्रयोग के कारण पारिस्थितिकीय नितल में परिवर्तित होने से रोकने हेतु महत्वपूर्ण है। यह आह्वान है कि ऐसे सीमावर्ती क्षेत्रों का व्याघ्र आरक्षित के चारों ओर बफर क्षेत्र के रूप में निरूपण किया जाये जिससे निम्नलिखित उद्देश्यों की पूर्ति हो सके :

- (क) वनों पर उनकी निर्भरता को कम करने के लिए स्थानीय पणधारी को पारिस्थितिकीय रूप से साध्य आजीविका विकल्पों का उपबंध करना ।
- (ख) कोड क्षेत्रों से निकलने वाले वन्य पशुओं को प्राकृत्वास प्रतिपूर्ति हेतु स्वास्थ्यकर निवेश के माध्यम से स्थानीय व्यक्तियों की भागीदारी द्वारा वन क्षेत्र को संरक्षित करना ।

10.7 व्याघ्र आरक्षित के चारों ओर रहने वाले परम्परागत शिकारी जनजातियों का पुनर्वास

व्याघ्र आरक्षिति और व्याघ्र गलियारों के चारों ओर रहने वाले परम्परागत शिकार में शामिल होने वाले अधिसूचना से पृथक की गई जनजातियों के लिए पुनर्वास और विकास कार्यक्रम चलाने की सख्त आवश्यकता है। वन्य पशुओं का परम्परागत तरीके से शिकार करने वाली जनजातियां और समुदाय, जो अधिसूचित नहीं हैं, निम्न प्रकार से हैं : बहेलिया, अम्बालगर, बदाक, मोन्गिया, बवरिया, मोंगलिया, परधी, बोया, कैकाद्, कैरवल, नट, निरशिकारी, पिचारी, वालयार, येनादि, चकमा, मिजो, ब्रू, सोलंग और न्यिशी। जबकि यह सूची सुविस्तृत नहीं है, योजना अवधि के दौरान कल्याण कार्यक्रम के अधीन (एन.टी.सी.ए. के भागरूप में की गई पहल) ऐसे लगभग 5000 परिवारों को लिया जाना अपेक्षित है। पुनर्वास और कल्याण पैकेज स्थल विनिर्दिष्ट, विचारणीय रीति से जीवनयापन विकल्प सहित प्रस्तुत करना चाहिए, जिसमें शामिल हो: वन्य जीव संरक्षण के लिए पैदल गश्ती में अभिनियोजित ऐसे व्यक्तियों को मजदूरी देना, सिंचाई सहित कृषि भूमि उपलब्ध कराना, आधारभूत स्वास्थ्य देखभाल, आवास और संबंधित समुदाय कल्याण निवेश और प्राथमिक शिक्षा सुविधा। कार्यक्रम की संरचना के दौरान अधिसूचना से निकाली गयी जनजातियों को विस्थापित करने के लिये मुक्ति सेना द्वारा पूर्वार्जित अनुभव पर निष्पक्ष रूप से विचार किया जाना अपेक्षित है।

10.8 अनुसंधान और कार्यसाधन :-

अखिल भारतीय व्याघ्र ऑकलन जिसमें व्याघ्र कार्य बल द्वारा अनुमोदित नये प्रणाली विज्ञान का प्रयोग हुआ है, के परिणाम स्वरूप कार्य ईकाईयों के लिये स्थायी अनुश्रवण नयाचार का उद्भव हुआ है। व्याघ्र की स्रोत आबादियों के अनुश्रवण हेतु व्याघ्र आरक्ष स्तरीय फेज-4 चलाया जायेगा। इसके आगे क्षेत्रोन्मुखी अनुसंधान एवं कर्मचारीवृंद को भौगोलिक स्थापन प्रणाली (जीपीएस), कैमरा ट्रैप, रात्रि दृष्टि यंत्र, दूरी मापक एवं हार्डवेयर तथा साफ्टवेयर सहित संबंधित सहायक सामग्रियों से सुसज्जित करने के पोषण अभियान में सहायता प्रदान की जायेगी।

10.9 कर्मचारीवृंद विकास और निर्माण क्षमता :-

10.9.1 इसमें शामिल होंगे :-

- (क) क्षमता निर्माण और प्रशिक्षण।
- (ख) परियोजना भत्ता और विशेष प्रोत्साहन उपलब्ध कराना।
- (ग) भौगोलिक सूचना प्रणाली का उपयोग, अवैध शिकार प्रतिरोधी प्रचालन में विशेषीकृत प्रशिक्षण।
- (घ) विधि शास्त्र अथवा न्याय शास्त्र और वन्य जीव विधि चिकित्साशास्त्र में विशेषीकृत प्रशिक्षण।
- (ङ) अन्य आरक्षितियों में अच्छे अभ्यास के मूल्यांकन के लिए अध्ययन भ्रमण करना।
- (च) विकीर्णन कार्यशाला।
- (छ) पार्क व्याख्या में विशेषीकृत प्रशिक्षण।
- (ज) प्रबंधन योजना में विशेषीकृत प्रशिक्षण।

10.9.2 उपरोक्त विवेचन कार्य कर्मचारीवृंद के कौशल को बढ़ाने के लिए अत्यन्त महत्वपूर्ण हैं। अपराध पहचान और उससे संबंधित कौशल में विशेषज्ञता प्रशिक्षण न होने के कारण अवैध शिकार घटित होने के कई उदाहरण हैं।

10.10 व्याघ्र युक्त वनों में वन्यजीव मुद्दों को मुख्य धारा में लाना और प्राकृतवास विखंडन रोकने के लिये स्वास्थ्यकर रणनीति के माध्यम से स्थानीय लोगों को अंतर्वलित करते हुये गलियारा संरक्षण को प्रोत्साहन।

इसमें शामिल होंगे:-

- (क) मानव-पशु संघर्ष निवारण।
- (ख) समस्या मूलक और विपथगामी वन्य पशुओं का अभिग्रहण।
- (ग) वन्य पशुओं का अनुश्रवण।
- (घ) अवैध शिकार प्रतिरोधी प्रचालन।
- (ङ) प्राकृतवास सुधार उपाय।

10.11 वन्य जीव संरक्षण के हित में रक्षोपाय और प्रति संगत उपाय (नवीन क्रियाकलाप)

अनेक व्याघ्र आरक्षितियों पर अत्यधिक प्रयुक्त अवसंरचना जैसे सड़कें, रेलपथ और अन्यो के कारण प्रभाव पड़ा है। अनेक आरक्षितियों से होकर जाने वाली उच्च प्रसरणशील विद्युत लाइनों के कारण अवैध शिकारियों द्वारा वन्य जीवों को विद्युत शक्ति से मारने के कारण उनकी मृत्यु हुई है। इन वन्य जीवों के हित में अनेक रक्षोपाय और प्रति संगत उपाय अपेक्षित है, जिन्हें विनिर्दिष्ट स्थल आधार पर सहयोग दिया जाएगा।

10.12 आधारभूत अवसंरचना, परामर्श हेतु व्याघ्र परियोजनाबद्ध मुख्यालय व्यय, विशेषज्ञ दलों द्वारा क्षेत्र दौरा, अखिल भारतीय व्याघ्र आकॅलन/व्याघ्र का सतत् अनुश्रवण (फेस-4), व्याघ्र आरक्षितियों के बाहर व्याघ्रों का राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण अनुदान के माध्यम से अनुश्रवण हेतु सहायता, राष्ट्रीय व्याघ्र कैमरा ट्रैप फोटो डाटाबेस संग्रह का विकास करने, अनुश्रवण प्रयोगशाला की स्थापना के अतिरिक्त एन.टी.सी.ए. के केन्द्रीय तथा क्षेत्रीय कार्यालयों में सुदृढीकरण के लिए समर्थन का उपबंध करना।

10.13 व्याघ्र आरक्षितियों का स्वतंत्र अनुश्रवण और मूल्यांकन,--

विश्वव्यापी स्वीकृत संकेतकों का उपयोग करके स्वतंत्र अनुश्रवण के दूसरे चक्र को पूरा किया गया है। यह आगे भी परिष्कृत किया जायेगा और जारी रहेगा।

10.14 नए व्याघ्र आरक्षितियों की स्थापना और विकास :

10.14. 'व्याघ्र परियोजना' एक पुनीत पारि-तंत्र दृष्टिकोण है। यद्यपि, मुख्य संकेन्द्र प्रमुख अथवा सर्वोत्कृष्ट प्रजाति 'व्याघ्र' पर है, तथापि, यह परियोजना खाद्य श्रृंखला में अन्य पोषणात्मक स्तरों को उन्नत करके पारिस्थितिकीय प्रणाली के स्थायित्व को बनाए रखने के लिए है। व्याघ्र जो कि पारिस्थितिकीय खाद्य श्रृंखला के शीर्ष बिंदु पर है, की पारिस्थितिक रूप से जीवनक्षम संख्या, सुनिश्चित करने के लिए ऐसा किया जाना अनिवार्य है। विकसित देशों में वनों पर लोगों का दबाव लगातार बढ़ता जा रहा है और भारत इसका कोई अपवाद नहीं है। निष्कर्ष रूप में, व्याघ्र का प्राकृतिक वास कई स्थानों पर अभिखंडित और क्षीण हो गया है, जिसके लिए एक संकेंद्रित संरक्षण दृष्टिकोण की जरूरत है। हमारे संरक्षित क्षेत्र/ व्याघ्र आरक्षितियां अन्य उपयोग प्रतिमानों के सागर में 'द्वीपों' के सदृश है। 'द्वीपीय जैव भौगोलिक दृष्टि' से, आनुभाविक साक्ष्यों से यह उपदर्शित होता है कि 'विच्छिन्न' आरक्षितियां 'पारिस्थितिकीय पृथकीकरण' के कारण अपनी प्रजातियों को बहुत तेजी से खो देती है। इसके अतिरिक्त, विखंडीकरण के अलावा यह स्थिति जैविक दाब, विस्थापित भक्ष्य-परभक्षी अनुपात, संरक्षा के वांछित स्तर को सुनिश्चित करने के प्रभावी उपायों के अभाव और समीप के पणधारियों के लिए अपनी निर्भरता वन संसाधनों पर कम करने के लिए पारि-विकासबद्ध उपायों के अभाव के कारण अवश्रेणीकृत वन आच्छादन से अति निकृष्ट हो गई है। 'व्याघ्र परियोजना' उपर्युक्त स्थिति से निपटने के लिए दूरगामी रूप से सहायक सिद्ध होगी, व्याघ्र परियोजना की संचालन समिति ने तारीख 23 जनवरी, 2003 को हुई अपनी बैठक में नए व्याघ्र आरक्षित क्षेत्रों को सम्मिलित किए जाने की सिफारिश की थी जिससे 'व्याघ्र परियोजना' के विद्यमान 37761 वर्ग किलोमीटर के कुल क्षेत्र को दसवीं योजना अवधि के दौरान बढ़ाकर 50,000 वर्ग किलोमीटर किया जा सके।

10.15 व्याघ्र परियोजना के कर्मचारीवृंद को परियोजना भत्ता का उपबंध :

व्याघ्र आरक्षित वाले राज्यों के कर्मचारीवृंदों के परियोजना भत्तों के लिए व्याघ्र राज्यों को समर्थन (सौ प्रतिशत) दिया जायेगा।

10.16 कर्मचारीवृंद कल्याण क्रियाकलाप :

कर्मचारीवृंद कल्याणकारी निवेश जैसे अग्रणी/अग्रगामी कर्मचारीवृंद के बच्चों के लिए निकटवर्ती नगरों या ग्रामों में आवासीय सुविधा व्यवस्था, मिट्टी के तेल, औषधि, क्षेत्र किट, मच्छरदानी, टार्च और जैसे समर्थकारी वस्तुओं का प्रदाय किया जायेगा।

10.17 व्याघ्र आरक्षित में पर्यटन/ पारि पर्यटन को प्रोत्साहन--

व्याघ्र आरक्षित के संदर्भ में 'पर्यटन' से "पारि पर्यटन" अपेक्षित है, जिसे पारिस्थितिकीय रूप से वहनीय प्राकृत-पर्यटन होने की आवश्यकता है। यह पर्यटन उद्योग के एक महत्वपूर्ण घटक के रूप में उभर रहा है। व्याघ्र आरक्षों के सीमांत क्षेत्र में वास कर रहे स्थानीय, आश्रित समुदाय के जीवन स्तर में सुधार हेतु समुदायिक प्रयास आधारित, वहनीय एवं न्यायसंगत व निष्पक्ष होने के कारण यह 'सामूहिक पर्यटन' से भिन्न है। बफर क्षेत्रों पर संकेन्द्रन सहित, वहन क्षमता के अनुसार विनियमन के अधीन, व्याघ्र संरक्षण योजना के भाग के रूप में, व्याघ्र आरक्ष विनिर्दिष्ट पर्यटन योजना के सादृश्य आश्रित स्थानीय समुदाय को लाभ पहुँचाने के उद्देश्य से पारिपर्यटन को बढ़ावा देना 'व्याघ्र परियोजना' के अंतर्गत प्रस्तावित है। चूंकि राष्ट्रीय उद्यानों एवं वन्यजीव अभयारण्यों क्षेत्रों, जो अब क्रोड एवं क्रांतिक व्याघ्र प्राकृतवास के रूप में नामित हैं, में पर्यटन होता रहा है, स्थल विनिर्दिष्ट वहन क्षमता के अधीन उक्त क्षेत्रों में विनियमित निम्नसंघाती पर्यटन (अभ्यागमन) की अनुमति दी जायेगी। तथापि, कोई नई पर्यटन अवसंरचना ऐसे क्रोड या क्रांतिक व्याघ्र प्राकृतवासों में अनुज्ञात नहीं की जानी चाहिये। इसके अतिरिक्त, बफर वन क्षेत्रों को भी उक्त क्षेत्रों में रहने वाले स्थानीय लोगों की सक्रिय भागीदारी के साथ, वन्यजीव प्राकृतवासों के रूप में विकसित किया जाना चाहिये। लोगों की क्रोड और क्रांतिक व्याघ्र अंतरापृष्ठ संघर्षों को कम करते हुये इन क्षेत्रों में पारिपर्यटन गतिविधियों से स्थानीय लोगों को लाभ पहुँचाने के अतिरिक्त यह व्याघ्र आबादी के जीवन-चक्र गतिकी हेतु विस्तृत प्राकृतवास उपलब्ध करायेगा। पणधारियों के लिए अवसरों में पर्यटकों के लिए कम लागत के आवासों का प्रबंधन, गाइड सेवा उपलब्ध कराना, विक्रय बाजार उपलब्ध कराना, भ्रमण का प्रबंध करना, विशिष्ट सांस्कृतिक नृत्यों को आयोजित करना एवं ऐसे ही अन्य घटक सम्मिलित होंगे।

11. व्याघ्र परियोजना के अधीन स्थानीय जीवनयापन--

व्याघ्र परियोजना के अधीन लगभग 24 करोड़ रुपए (जिसमें राज्यों द्वारा दिए गए 50 प्रतिशत बराबरी का भाग छोड़कर) पचास प्रतिशत केंद्रीय सहायता की रकम के साथ वार्षिक लगभग 24 लाख मानव दिन उत्पन्न होंगे, कई स्थानीय जनजातियां ऐसे स्थानीय कार्यबल का गठन करती हैं (गैर जनजातीय के अतिरिक्त) जैसे मध्य प्रदेश में बैगाज, गोंड, महाराष्ट्र में गोंड, आंध्र प्रदेश में चेंचू, कर्नाटक में शोलिगा, उत्तराखंड में गुजर, तमिलनाडु से इरुला जैसे कुछ नाम हैं। ऐसे स्थानीय जनजातियों का विकास अंतिम दो वर्षों में प्रोत्साहित और समर्थित किया गया।

12. विभिन्न योजना अवधि पर प्रारंभ से व्याघ्र परियोजना के अधीन विनियोजित वित्त पोषण के ब्यौरे--

व्याघ्र परियोजना 1973 से प्रारंभ पर्यावरण और वन मंत्रालय की केंद्रीय प्रयोजित योजना है। परियोजना में गत वर्षों में पर्याप्त व्यय हुआ है। प्रारंभ से परियोजना के लिए पंचवर्षीय योजनाओं में किए गए उपबंध निम्नवत् है :

पंचवर्षीय योजना (1)	लाख (रुपए) (2)
योजना 4 (केवल 1973-74)	2.53
योजना 5 (1974-75 से 1978-79)	387.25
आवर्ती योजना (1979-80)	63.90
योजना 6 (1980-81 से 1984-85)	494.86
योजना 7	1475.42
1990-92	700.98
1991-93	549.81
योजना 8	3890.09
योजना 9	7500.00
योजना 10	1500.00
योजना 11	792.96
कुल	109284.8 (लाख) या 1092.85 करोड़

परिशिष्ट 'क'

2006 में यथा संशोधित वन्यजीव (संरक्षण) अधिनियम, 1972 के अधीन अधिसूचित भारत में व्याघ्र आरक्षित के कोड अथवा क्रांतिक व्याघ्र प्राकृतवास की सूची

(24-09-2012 को यथाविद्यमान)

क्रम सं०	सर्जन का वर्ष	व्याघ्र आरक्षित का नाम	व्याघ्र राज्य	कोड अथवा क्रांतिक व्याघ्र प्राकृतवास का क्षेत्रफल (वर्ग कि.मी. में)
1	2	3	4	5
1.	1973-74	बांदीपुर	कर्नाटक	872.24
2.	1973-74	कोर्बेट	उत्तराखंड	821.99
3.	1973-74	कान्हा	माध्य प्रदेश	917.43
4.	1973-74	मानस	असम	840.04
5.	1973-74	मेलघाट	महाराष्ट्र	1500.49
6.	1973-74	पलामू	झारखंड	414.08
7.	1973-74	रणथम्भौर	राजस्थान	1113.364
8.	1973-74	सिमिलीपाल	ओडिशा	1194.75
9.	1973-74	सुन्दरबन	पश्चिम बंगाल	1699.62
10.	1978-79	पेरियार	केरल	881.00
11.	1978-79	सरिस्का	राजस्थान	881.1124
12.	1982-83	बक्शा	पश्चिम बंगाल	390.5813
13.	1982-83	इंदिरावती	छत्तीसगढ़	1258.37
14.	1982-83	नागार्जुनसागर	आंध्र प्रदेश	3721.00**
15.	1982-83	नन्दाफा	अरुणाचल प्रदेश	1807.82
16.	1987-88	दुधवा	उत्तर प्रदेश	1093.79
17.	1988-89	कलाकड-मुन्डनथूरई	तमिलनाडु	895.00
18.	1989-90	वाल्मीकि	बिहार	598.45
19.	1992-93	पेंच	मध्य प्रदेश	411.33
20.	1993-94	तडोबा-अंधारी	महाराष्ट्र	625.82
21.	1993-94	बांधवगढ़	मध्य प्रदेश	716.903
22.	1994-95	पन्ना	मध्य प्रदेश	576.13
23.	1994-95	दम्पा	मिजोरम	500.00
24.	1998-99	भद्रा	कर्नाटक	492.46
25.	1998-99	पेंच	महाराष्ट्र	257.26
26.	1999-2000	पाक्के	अरुणाचल प्रदेश	683.45
27.	1999-2000	नमेरी	असम	200.00
28.	1999-2000	सतपुड़ा	मध्य प्रदेश	1339.264
29.	2008-2009	अनामलाई	तमिलनाडु	958.59
30.	2008-2009	उदन्ती-सीतानदी	छत्तीसगढ़	851.09
31.	2008-2009	सतकोसिया	उड़ीसा	523.61
32.	2008-2009	काजीरंगा	असम	625.58
33.	2008-2009	अचानकमार	छत्तीसगढ़	626.195
34.	2008-2009	दन्डेली-अंशी	कर्नाटक	814.884

35.	2008-2009	संजय-डुबरी	मध्य प्रदेश	812.571
36.	2008-2009	मुदुमलाई	तमिलनाडु	321.00
37.	2008-2009	नागरहोल	कर्नाटक	643.35
38.	2008-2009	परमबिकूलम	केरल	390.89
39.	2009-2010	सहयाद्रि	महाराष्ट्र	600.12
40.	2011-2012	बिलीगिरी रंगनाथन मन्दिर	कर्नाटक	359.10
41.	2012-2013	कावल	आंध्र प्रदेश	893.23
			कुल	35123.9547

**आंध्र प्रदेश सरकार ने नागार्जुन सागर श्रीसैलम व्याघ्र आरक्ष (ना.श्री.व्या.आ.) के क्रोड क्षेत्र के विस्तारित रूप में गुन्दला ब्रह्मेश्वरम वन्यजीव अभयारण्य को अधिसूचित किया है । विस्तारित क्षेत्रफल 1194 वर्ग कि.मी. है । अतः ना.श्री.व्या.आ. का कुल क्रोड क्षेत्रफल 3721 वर्ग कि.मी. है ।

परिशिष्ट 'ख'

2006 में यथा संशोधित वन्यजीव (संरक्षण) अधिनियम, 1972 के अधीन अधिसूचित भारत में मध्यवर्ती (बफर) और उपान्त क्षेत्र की सूची

(24-09-2012 को यथाविद्यमान)

क्रम सं०	सृजन का वर्ष	व्याघ्र आरक्षित का नाम	व्याघ्र राज्य	मध्यवर्ती / उपान्त क्षेत्र का क्षेत्रफल (वर्ग कि.मी. में)
1	2	3	4	5
1.	1973-74	बांदीपुर	कर्नाटक	584.06
2.	1973-74	काँबेट	उत्तराखंड	466.32
3.	1973-74	कान्हा	मध्य प्रदेश	1134.361
4.	1973-74	मानस	असम	2310.88
5.	1973-74	मेलघाट	महाराष्ट्र	1268.03
6.	1973-74	पलामू	झारखंड	715.85
7.	1973-74	रणथम्भौर	राजस्थान	297.9265
8.	1973-74	सिमिलीपाल	ओडिशा	1555.25
9.	1973-74	सुन्दरबन	पश्चिम बंगाल	885.27
10.	1978-79	पेरियार	केरल	44.00
11.	1978-79	सरिस्का	राजस्थान	332.23
12.	1982-83	बक्शा	पश्चिम बंगाल	367.3225
13.	1982-83	इंदिरावती	छत्तीसगढ़	1540.70
14.	1982-83	नागार्जुनसागर	आंध्र प्रदेश	1175.51
15.	1982-83	नम्दाफा	अरुणाचल प्रदेश	245.00
16.	1987-88	दुधवा	उत्तर प्रदेश	1107.9848
17.	1988-89	कलाकड-मुन्डनथूरई	तमिलनाडु	706.542
18.	1989-90	वाल्मीकि	बिहार	300.93
19.	1992-93	पेंच	मध्य प्रदेश	768.30225
20.	1993-94	तडोबा-अंधारी	महाराष्ट्र	1101.7711
21.	1993-94	बांधवगढ़	मध्य प्रदेश	820.03509
22.	1994-95	पन्ना	मध्य प्रदेश	1002.42
23.	1994-95	दम्पा	मिजोरम	488.00
24.	1998-99	भद्रा	कर्नाटक	571.83
25.	1998-99	पेंच	महाराष्ट्र	483.96
26.	1999-2000	पाक्के	अरुणाचल प्रदेश	515.00
27.	1999-2000	नमेरी	असम	144.00
28.	1999-2000	सतपुड़ा	मध्य प्रदेश	794.04397
29.	2008-2009	अनामलाई	तमिलनाडु	521.28
30.	2008-2009	उदन्ती-सीतानदी	छत्तीसगढ़	991.45
31.	2008-2009	सतकोसिया	ओडिशा	440.26
32.	2008-2009	काजीरंगा	असम	548.00
33.	2008-2009	अचानकमार	छत्तीसगढ़	287.822
34.	2008-2009	दन्डेली-अंशी	कर्नाटक	282.63
35.	2008-2009	संजय-डुबरी	मध्य प्रदेश	861.931
36.	2008-2009	मुदुमलाई	तमिलनाडु	367.59

37.	2008-2009	नागरहोल	कर्नाटक	562.41
38.	2008-2009	परमबिकूलम	केरल	252.772
39.	2009-2010	सहयाद्रि	महाराष्ट्र	565.45
40.	2011-2012	बिलीगिरी रंगनाथन मन्दिर	कर्नाटक	215.72
41.	2012-2013	कावल	आंध्र प्रदेश	1125.89
			कुल	28750.73

भाग - क

अध्याय- II

व्याघ्र परियोजना के विस्तृत मार्गदर्शक सिद्धांत

13. परिचय-

13.1 व्याघ्र परियोजना पर्यावरण और वन मंत्रालय की केंद्रीय रूप से प्रायोजित सतत् स्कीम है। पुनरीक्षित मार्गदर्शक सिद्धांतों में, माननीय प्रधानमंत्री की अध्यक्षता में गठित राष्ट्रीय वन्य जीव बोर्ड द्वारा व्याघ्र कार्यबल की अत्यावश्यक सिफारिशों का क्रियान्वयन सम्मिलित हैं। इनमें, अन्य बातों के साथ वन्य जीव (संरक्षण) संशोधन अधिनियम, 2006 द्वारा यथासंशोधित, जो 4 सितंबर, 2006 से प्रवृत्त हुआ है, वन्य जीव (संरक्षण) अधिनियम, 1972 के उपबंधों के कार्यान्वयन के लिए समर्थन भी सम्मिलित हैं। क्रियाकलाप निम्नानुसार हैं:-

- (i) अवैध शिकार रोधी पहलें ;
- (ii) व्याघ्र आरक्षों के भीतर अवसंरचना को सुदृढ़ करना ;
- (iii) प्राकृतिक वास का सुधार और जल विकास ;
- (iv) मानव - पशु समस्याओं का निदान ;
- (v) मध्यवर्ती एवं सीमावर्ती क्षेत्रों में परिदृश्य दृष्टिकोण के साथ सह अस्तित्व कार्यसूची ;
- (vi) ऐसे लोगों के अधिकारों के निपटान के लिए राज्यों की सहायता के अतिरिक्त बेहतर पुनः अवस्थापन पैकेज की व्यवस्था करते हुए समय सीमा के भीतर क्रांतिक व्याघ्र प्राकृतिक वासों से गांवों के पुनः अवस्थापन एवं अनतिक्रान्त स्थानों को विनिश्चित करना;
- (vii) व्याघ्र आरक्षों में या उसके चारों ओर रहने वाली परंपरागत शिकार करने वाली जनजातियों का पुनर्वासन;
- (viii) अनुसंधान और क्षेत्र उपस्करों के लिए राज्यों को सहायता प्रदान करना ;
- (ix) व्याघ्र आरक्षों में कर्मचारीवृंद विकास और क्षमता निर्माण के लिए राज्यों की सहायता करना ;
- (x) स्थानीय लोगों को प्राकृतिक वासों के विखंडन को रोकने के लिए अंतर्वलित करते हुए पुनःस्थापन योजना के माध्यम से व्याघ्र आरक्षों के बाहर व्याघ्र वाले वनों में वन्य जीव समस्याओं का निदान करना और गलियारा संरक्षण को सुगमता प्रदान करना ;
- (xi) वन्य जीव संरक्षण के लिए व्याघ्र आरक्षों और व्याघ्र वाले वनों में या उसके चारों ओर सुरक्षोपाय और पूर्वोपस्कार उपाय प्रदान करना ;
- (xii) केंद्र में राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण की अवसंरचना को सुदृढ़ करना ;
- xiii) व्याघ्र आरक्ष का स्वतंत्र अनुश्रवण और मूल्यांकन करना ;
- (xiv) आठ नए व्याघ्र आरक्ष की स्थापना और विकास करना ;
- (xv) व्याघ्र आरक्ष में कार्य करने वाले सभी प्रवर्गों के कर्मचारीवृंद को परियोजना भत्ता की व्यवस्था करना ;
- (xvi) व्याघ्र आरक्ष में तैनात अग्रणी/अग्रगामी कर्मचारीवृंद के बालकों को आधारिक शिक्षा सुकर करने के लिए आवास सुविधाएं प्रदान करना ;
- (xvii) स्थानीय लोगों के फायदे हेतु पारि-पर्यटन को प्रोत्साहित करने के लिए राज्यों को सहायता प्रदान करना;

13.2 “व्याघ्र परियोजना” अप्रैल, 1973 में, “वैज्ञानिक, आर्थिक, सौंदर्यपरक, सांस्कृतिक और पारिस्थितिक मूल्यों के लिए और सभी समय पर लोगों के फायदे, शिक्षा तथा मनोरंजन के लिए राष्ट्रीय विरासत के रूप में जैविक महत्त्व के क्षेत्रों को संरक्षित करने के लिए भारत में व्याघ्रों की जीवनक्षम आबादी के अनुरक्षण को सुनिश्चित करने के” उद्देश्य के साथ आरंभ की गई थी।

13.3 व्याघ्र परियोजना, सफल रूप से कार्यान्वित हुई है और वर्तमान में, 63874.68 वर्ग कि.मी. के क्षेत्र को सम्मिलित करते हुए 17 राज्यों में 41 व्याघ्र आरक्ष हैं। उपरोक्त के अतिरिक्त, 5 का सैद्धांतिक रूप से अनुमोदन

किया गया है और अन्य 6 के लिए राज्य सरकार को, कर्नाटक में एक व्याघ्र आरक्ष के लिए अनुमोदन प्रदान करने के अतिरिक्त, सलाह दी गई है। आरक्षों का चयन, देश में व्याघ्रों के समस्त भौगोलिक वितरण की अनन्य पर्यावरणीय प्रणाली और प्राकृतिक वास के प्रकारों को संरक्षित करने की आवश्यकता द्वारा मार्गदर्शित होता है।

13.4 संकटापन्न प्रजाति और उनके प्राकृतिक वास का संरक्षण, संरक्षित क्षेत्र संजाल को सुदृढ़ करने और उसमें अभिवृद्धि करने, शिकार पर नियंत्रण, अनुश्रवण अनुसंधान और वन्य जीव संरक्षण में लोगों की भागीदारी सुनिश्चित करने को, राष्ट्रीय वन्य जीव कार्य-योजना और वन्य जीव संरक्षण रणनीति, 2002 में उच्च प्राथमिकता प्रदान की गई है।

14. स्कीम के अधीन समर्थित पूर्व निधिकरण पैटर्न और मुख्य क्रियाकलाप—

वर्तमान योजना अवधि के दौरान, 100% केंद्रीय सहायता, राज्यों को समस्त गैर-आवर्ती मदों पर व्यय के लिए उपलब्ध कराई गई है; आवर्ती मदों के लिए, केंद्रीय सहायता, व्यय के 50% तक निर्बंधित की गई है, जबकि सुमेलित अनुदान परियोजना वाले राज्यों द्वारा किया जाता है। व्याघ्र परियोजना के अधीन अन्य बातों के साथ, क्रियाकलाप/क्षेत्र आगमों में सम्मिलित हैं :- (अनावर्ती) व्याघ्र आरक्षित क्षेत्रों में संरक्षण को सुदृढ़ करना, व्याघ्र आरक्षों में सशस्त्र बलों का परिनियोजन करना, प्रबंध, सड़कों, बेतार, सिविल कार्यों के लिए आधारीक अवसंरचना का सृजन करना, प्राकृतिक वास का विकास करना, जल संसाधनों की अभिवृद्धि करना, प्राकृतिक वास प्रत्यावर्तन के लिए प्रतिकरात्मक सुधारक उपाय, पारि विकास, गांव पुनःस्थान निर्धारण, अपराधों का पता लगाने में सूचना प्रौद्योगिकी का उपयोग, भौगोलिक सूचना प्रणाली (जीआईएस), क्षेत्र में व्याघ्र परियोजना निदेशालय के साथ सहयोगात्मक संयोजन रखते हुए व्याघ्र आरक्षों में अंकीय डाटाबेस की स्थापना, व्याघ्र आरक्षों का अनुश्रवण और मूल्यांकन, प्राकृतिक वास प्रास्थिति का अनुश्रवण, अति परिष्कृत प्रौद्योगिकी के साथ भौगोलिक सूचना प्रणाली (जीआईएस) क्षेत्र में व्याघ्रों, सह परभक्षी और भक्ष्य पशुओं का अखिल भारतीय स्तर पर आकलन करना, विभिन्न व्याघ्र श्रेणी राज्यों में व्याघ्रों की संख्या का लगातार अनुश्रवण करना, व्याघ्र आरक्षों में पर्यटकों के लिए वन्य जीव दर्शन का पोषण करना, व्याघ्र आरक्षों में मॉसभक्षियों द्वारा मानव वध और पशुधन हानियों के लिए ग्रामीणों को प्रतिकर प्रदान करना, कर्मचारीवृंद को 'परियोजना भत्ता' प्रदान करना, पशु-चिकित्सा सुविधा की स्थापना और व्याघ्र संरक्षण से संबंधित पोषक अनुसंधान और अनुसंधान परियोजनाएं, कर्मचारीवृंद की गतिशीलता को सुनिश्चित करने के लिए विद्यमान और नए व्याघ्र आरक्षों के लिए वाहनों का प्रतिस्थापन और नए वाहनों को क्रय करना सम्मिलित है; (आवर्ती) गश्त और अवरोध फाटकों/बैरियर के लिए स्थानीय कार्यबल का सृजन और परिनियोजन, प्राकृतिक वास सुधार, लवण लेहों की व्यवस्था करना, जल सुविधा, अग्नि अवरोधक उपाय, विभिन्न मदों का अनुसंधान, प्रकाशन और विस्तारण तथा विधि सहायता भी सम्मिलित हैं।

15. राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (एन टी सी ए) का गठन,-

15.1 केंद्रीय सरकार ने व्याघ्र संरक्षण का संवर्द्धन करने के लिए "व्याघ्र परियोजना" आरंभ की थी, क्योंकि इसके संरक्षण का महत्व राज्य सीमाओं से परे फैला है। वनों और वन्य जीवों का प्रबंधन संबद्ध राज्यों का प्राथमिक रूप से उत्तरदायित्व है। परियोजना का क्षेत्र में कार्यान्वयन, अभिहित आरक्षों में संरक्षण और प्रबंधन उन परियोजना वाले राज्यों द्वारा किया जाता है जो व्यय की आवर्ती मदों को सुमेलित अनुदान प्रदान करते हैं, क्षेत्र कर्मचारीवृंद/अधिकारियों को परिनियोजित करते हैं तथा उनको वेतन देने की व्यवस्था भी करते हैं। पर्यावरण और वन मंत्रालय के व्याघ्र परियोजना निदेशालय को तकनीकी मार्गदर्शन और वित्त पोषण प्रदान करने का दायित्व दिया गया था।

15.2 वर्षों से 'व्याघ्र परियोजना' के कार्यान्वयन ने व्याघ्र संरक्षण सुनिश्चित करने के लिए विधिक पृष्ठभूमि के साथ वैधानिक प्राधिकरण की आवश्यकता पर बल दिया है। देश में व्याघ्र संरक्षण की समस्याओं को देखने के लिए माननीय प्रधानमंत्री की अध्यक्षता में गठित राष्ट्रीय वन्यजीव परिषद् की सिफारिशों के आधार पर एक कार्यबल की स्थापना की गई थी। उक्त कार्यबल की सिफारिशों में, अन्य बातों के साथ, वन्य जीव अपराध नियंत्रण ब्यूरो के

सृजन के अतिरिक्त व्याघ्र परियोजना को वैधानिक और प्रशासनिक शक्तियां देते हुए उसको सुदृढ़ करना सम्मिलित है। यह भी सिफारिश की गई है कि वार्षिक रिपोर्ट को संसद में रखे जाने के लिए केंद्रीय सरकार को प्रस्तुत किया जाना चाहिए जिससे व्याघ्र परियोजना के प्रति वचनबद्धता को समय-समय पर स्थानीय लोगों की चिंताओं को दूर करने के अतिरिक्त, पुनरीक्षित किया जा सके। उक्त कार्यबल की प्रमुख अत्यावश्यक सिफारिशें निम्नानुसार हैं :-

- (i) शासन प्रणाली व्यवस्था को बल प्रदान करना।
- (ii) व्याघ्र संरक्षण, शिकार पर नियंत्रण, वन्य जीव अपराधियों का दोषसिद्ध करने और वन्य जीव शारीरिक अंगों और व्युत्पन्नो में अंतर्राष्ट्रीय व्यापार नेटवर्क को तोड़ने के संबंध में प्रयासों को सशक्त करना।
- (iii) मानव दबाव को कम करके व्याघ्रों के लिए शांत क्षेत्रों का विस्तार करना।
- (iv) सह-अस्तित्व की रणनीति के द्वारा स्थानीय लोगों के साथ संबंध में सुधार करना जो व्याघ्रों के प्राकृतिक वासों के साथ भागीदारी करते हैं।
- (v) जनता के वन, जल और हरित भूमि अर्थ नीतियों में विनिधान करके व्याघ्र संरक्षित सीमावर्ती क्षेत्रों में वन प्राकृतिक वासों को पुनःस्थापित करना।

15.3 व्याघ्र आरक्ष, पर्यावरणीय आशांतियों और विभिन्न अन्य समस्याओं का सामना करते हैं। प्राकृतिक वास की कमी के कारण भूमि उपयोगों की समस्या के अतिरिक्त वनीय प्राकृतिक वासों के अत्यधिक उपयोग से प्राकृतिक वासों का विखंडन होता है। ऐसे भी मामले हैं, जहां गांव की अधिक जनसंख्या, एक बड़ी संख्या में मवेशियों के साथ, जो वनों में चरती हैं, नियमित या आंतरायिक अशांति के मुख्य स्रोत जैसे मंदिर और वाणिज्यिक इकाइयां जैसे चाय बागानों के अतिरिक्त, पर्यावरणीय पतन का कारण है। यह मानव वन्यजीव संघर्ष का कारण है जिससे व्याघ्र और भक्ष्य मर्त्यता उत्पन्न होती है।

15.4 बहुत से दबाव परियोजना के क्षेत्र में कार्यान्वयन को प्रभावित करते हैं जैसे क्षेत्र ईकाइयों के लिए राज्यों को दी जाने वाली केंद्रीय सहायता के जारी होने में विलंब होना, कर्मचारीवृंद रिक्तियां, क्षेत्र कर्मचारीवृंद की बढ़ती उम्र, क्षमता निर्माण पहलों की कमी, कमजोर प्रवर्तन एवं संरक्षण कार्य अनुश्रवण आदि का होना। हाल ही में हुई घटनाओं से इस तथ्य पर प्रकाश पड़ता है कि राज्यों में अधिक प्रतिबद्धता और सर्तकता की आवश्यकता है। प्रशासन को अपेक्षित क्षमता निर्माण और पर्यवेक्षण की आवश्यकता है।

15.5 केंद्रीय सरकार स्तर (व्याघ्र परियोजना निदेशालय) पर भी प्रणाली को सुदृढ़ करने की अत्यावश्यकता है जो देश में व्याघ्र संरक्षण की देखभाल करने और मार्गदर्शन का आदेश करता है। राज्यों को सम्मिलित करना और परियोजना के क्षेत्र प्रशासन, पर्यवेक्षण को सुदृढ़ करना और व्याघ्र आरक्षों में और उसके चारों ओर रहने वाले स्थानीय लोगों के हितों को सम्मिलित करते हुए भागीदारी आधार का निर्माण करना अत्याधिक महत्वपूर्ण है।

15.6 स्थिति की अत्यावश्यकता पर विचार करते हुए व्याघ्र परियोजना को संशोधनों जैसे वन्य जीव (संरक्षण) संशोधन अधिनियम, 2006, के माध्यम से वन्य जीव संरक्षण अधिनियम, 1972 में समर्थकारी उपबंध करते हुए एक वैधानिक प्राधिकरण, राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (एन टी सी ए) में परिवर्तित किया गया है। यह, प्रधानमंत्री द्वारा नियुक्त किए गए व्याघ्र कार्यबल की एक आवश्यक सिफारिश की पूर्ति करता है। एन टी सी ए, पर्यावरणीय संवेदनशील क्षेत्रों और संकटापन्न प्रजातियों के संरक्षण के लिए सुदृढ़ संस्थागत तंत्रों का उपबंध करने के अतिरिक्त व्याघ्र आरक्ष के संरक्षण के लिए कानूनी आधार का उपबंध करते हुए व्याघ्रों को संरक्षित करने के लिए पर्यावरणीय और प्रशासनिक समस्याओं का निदान करेगा। प्राधिकरण, व्याघ्र आरक्षों के क्षेत्र निदेशकों के रूप में अच्छी सेवा का रिकार्ड रखने वाले अभिप्रेरित और प्रशिक्षित अधिकारियों के नियोजन के अतिरिक्त व्याघ्र संरक्षण के लिए मार्ग दर्शक सिद्धांतों को प्रवृत्त करना भी सुनिश्चित करेगा और उनके अनुपालन का अनुश्रवण करेगा। यह समयबद्ध कर्मचारीवृंद विकास योजना के अतिरिक्त व्याघ्र आरक्षों में तैनात अधिकारियों और कर्मचारीवृंद की क्षमता निर्माण को सुकर भी करेगा।

15.7 ‘व्याघ्र परियोजना’ के तीन दशकों और केंद्रीय सरकार तथा राज्य सरकार के प्रयासों के होते हुए भी व्याघ्र, विश्व में सबसे संकटापन्न बड़े परभक्षी में से एक बने हुए हैं। कार्योत्पादक कारक बहुत से हैं और उनमें से उदाहरणतः कुछ चिह्नित महत्वपूर्ण कारकों का उल्लेख किया जा सकता है जैसे कृषि विस्तार और विकास के कारण प्राकृतिक वास का नुकसान, मानव - पशु संघर्षों के कारण लोगों द्वारा बदले की भावना से इनका मारा जाना और सबसे ऊपर अवैध अंतर्राष्ट्रीय बाजार में व्याघ्र के अंग के भागों और व्युत्पन्नों के लिए मांग। ये कारक वन्य में हमारी स्व-स्थाने आबादी का विनाश करते हैं। अतः विचारणाधीन, प्रजाति विनिर्दिष्ट और विविध रूप पारि-तंत्र परियोजना जैसे ‘व्याघ्र परियोजना’ का चालू रहना महत्वपूर्ण हो जाता है और इस स्थिति में व्याघ्रों और उसके प्राकृतिक वासों द्वारा सामना किए जा रहे समस्या का निदान करना कठिन हो जाता है।

15.8 व्याघ्र संरक्षण में तीन मुख्य अनिवार्यतायें जो “परियोजना पद्धति” को आवश्यक बनाते हैं वह निम्नानुसार हैं:- व्याघ्र संरक्षण (व्याघ्र आरक्षों के भीतर और बाहर) के हित में प्राथमिक रूप से कार्यवाही करने के लिए संकेंद्रित दृष्टिकोण, स्थानीय पणधारी समुदायों का सहयोग प्राप्त करना और संरक्षण तथा प्रबंधन के लिए आवश्यक अवसंरचना सुनिश्चित करना। इस तथ्य पर विचार करते हुए कि व्याघ्रों का संरक्षण राज्यों की सीमाएं पार करके पर्यावरणीय और राष्ट्रीय महत्व प्राप्त कर चुका है, केंद्रीय सरकार, वन्य जीव संरक्षण के लिए चल रही केंद्रीय रूप से प्रायोजित व्याघ्र परियोजना स्कीम और अन्य स्कीमों के माध्यम से राज्यों को वित्तीय सहायता और तकनीकी मार्गदर्शन प्रदान करती है। वर्तमान में हमारे देश में 17 राज्यों के वनों में, व्याघ्र विद्यमान है, जिनमें उनके संरक्षित क्षेत्र और व्याघ्र आरक्ष भी सम्मिलित हैं।

15.9 व्याघ्रों का छितराव और उनकी संख्या राज्यों में बहुत से पर्यावरणीय तथा मानवीय कारणों से भिन्न होता है जैसे वन का क्षेत्र, भू-भाग, प्राकृतिक भक्ष्य की उपलब्धता, शांत प्राकृतिक वास की विद्यमानता और संरक्षण के संबंध में किए गए प्रबंधीय प्रयासों की गुणवत्ता। चूंकि व्याघ्र पर्यावरणीय “खाद्य-श्रेणी” में ऊपर हैं, अतः उनके संरक्षण से पर्यावरण प्रणाली में रहने वाले सभी अन्य जातियों के पेड़-पौधे तथा पशुओं का समस्त प्रकार संरक्षण होता है। हम कह सकते हैं कि व्याघ्र पर्यावरणीय प्रणाली के दुरस्त होने के उपदर्शक हैं। एक स्वस्थ व्याघ्र की आबादी यह उपदर्शित करती है कि उनके प्राकृतिक वास में अन्य पर्यावरणीय घटक समान रूप से संतुलित है। चूंकि व्याघ्रों को बड़ी संख्या में भक्ष्य और अच्छे प्राकृतिक वास की आवश्यकता होती है, अतः इस प्रकार की परियोजना में किए गए विनिधान पूर्णतया न्यायोचित हैं।

16. पुनरीक्षित केंद्रीय रूप से प्रायोजित व्याघ्र परियोजना स्कीम के अधीन चल रहे क्रियाकलाप और समर्थन दिए जाने वाले अतिरिक्त कार्य -

16.1 अवैध शिकार के विरुद्ध क्रियाकलाप (सतत) (अवैध शिकार रोधी दस्ता और व्याघ्र संरक्षण बल के अभिनियोजन के लिये अनावर्ती और गश्त कैम्प श्रमिकों और चौकीदारों हेतु मजदूरियों के लिए आवर्ती),-

व्याघ्र आरक्षों में अवैध शिकार रोधी प्रचालनों के क्षेत्र विनिर्दिष्ट हैं तथापि निम्नलिखित क्रियाकलाप, अन्य बातों के साथ साथ, व्याघ्र आरक्ष में संरक्षण नीति का भाग होंगे, अर्थात् :-

- (i) विशेष व्याघ्र संरक्षण बल (एस टी पी एफ) के सृजन, सशस्त्रीकरण और परिनियोजन करने के लिए व्याघ्र आरक्षों को 100 प्रतिशत सहयोग प्रदान करना।
- (ii) अवैध शिकार रोधी दस्तों का परिनियोजन।
- (iii) विद्यमान गश्त कैम्पों और चौकियों की स्थापना और उनका अनुरक्षण तथा गश्त के लिए कैम्प श्रमिकों का परिनियोजन।
- (iv) दस्तों के लिए गश्ती कलेंडर विहित करने के अतिरिक्त संभावित अपराधियों की धर-पकड़ के लिए बेतार हस्त उपकरण और अन्य साज सामान सहित क्षेत्र कर्मचारीवृंद, श्रमिकों और पुलिस या एस ए एफ या पूर्व

सशस्त्र कार्मिकों या होमगार्डों से मिलकर बनने वाले दस्तों (व्याघ्र संरक्षण बल) का गठन करके वाहन पर गश्त का प्रबंध करना ।

- (v) बेतार संजाल की स्थापना और अनुरक्षण ।
- (vi) रेल स्टेशनों, स्थानीय रेलों, बस स्टापों, बसों, जलपान और अल्पाहार गृहों में स्थानीय पुलिस के साथ संयुक्त रूप से अचानक छापों का प्रबंध करना ।
- (vii) भू-भाग और संरक्षित क्षेत्रों में पहुंच पर विचार करते हुए - “मानसून प्रचालन” के रूप में मानसून के दौरान विशेष विनिर्दिष्ट स्थल संरक्षण उपायों को सुनिश्चित करना ।
- (viii) पूर्व सैन्य कार्मिकों और होमगार्डों का परिनियोजन ।
- (ix) गश्त, जल निकासों, मानवयुक्त अवरोधों/फाटकों की निगरानी के लिए स्थानीय कार्यबल का परिनियोजन ।
- (x) आयुध और गोला बारूद का उपापन ।
- (xi) हाथी दस्ते का उपापन/अनुरक्षण ।
- (xii) सूचना देने वालों को पुरस्कार ।
- (xiii) न्यायालय के मामलों में बचाव के लिए विधिक सहायता ।
- (xiv) वाहनों, नावों का उपापन ।
- (xv) क्षेत्रोपकरण (फील्ड गेयर), रात्रि दर्शन युक्ति अथवा उपकरण का उपापन ।

16.2 व्याघ्र आरक्षों (सतत) के भीतर अवसंरचना को सुदृढ़ किया जाना (नए सिविल कार्यों के लिए अनावर्ती और अनुरक्षण के लिए आवर्ती)

निम्नलिखित क्रियाकलाप, अन्य बातों के साथ व्याघ्र आरक्षों में अवसंरचना को पुनःप्रवृत्त करने का भाग होंगे (जिसमें नए व्याघ्र आरक्षों को समर्थन सम्मिलित हैं):

- (i) सिविल कार्य (कर्मचारीवृंद आवास, परिवार होस्टल, कार्यालय सुधार, गश्ती शिविर अथवा पेट्रोलिंग कैंप, गृह व्यवस्था भवन, संग्रहालय, पुलिसिया) ।
- (ii) सड़क संजाल का अनुरक्षण, सृजन और उन्नयन ।
- (iii) बेतार टावर का अनुरक्षण और सृजन ।
- (iv) अग्नि निगरानी टावर का अनुरक्षण और सृजन ।
- (v) पुलों, बांधों, ऐनीकटों का अनुरक्षण और सृजन ।
- (vi) अग्नि रेखा और अग्नि अवरोध का अनुरक्षण और सृजन ।
- (vii) भूमिगत तालाबों का अनुरक्षण और सृजन ।
- (viii) वाहनों का (जिप्सी, जीप, ट्रक, ट्रैक्टर इत्यादि) उपापन और अनुरक्षण ।
- (ix) प्राकृतिक वास सुधार कार्य ।
- (x) हार्डवेयर, सॉफ्टवेयर और भौगोलिक सूचना प्रणाली (जी आई एस) का उपापन।
- (xi) कंपास, दूरीमापक, भौगोलिक स्थापन प्रणाली (जीपीएस), कैमरा ट्रैपों का उपापन ।

- (xii) प्रबंधन योजना के लिए उपग्रह प्रतिबिंबों का उपापन ।
- (xiii) प्रबंधन योजना के लिए नक्शा अंकुरण सुविधा ।
- (xiv) एम-एसटीआर आई पी ई एस अनुश्रवण ।
- (xv) ई - निगरानी अथवा इलेक्ट्रॉनिक आवेक्षण ।

16.3 प्राकृतिक वास सुधार और जल विकास (सतत) (आवर्ती)

इनमें, अन्य बातों के साथ निम्नलिखित सम्मिलित हो सकेंगे: अपतृण उन्मूलन, घास के मैदानों में उगने वाले समूहचर पौधों को हटाना, घास का सुधार, जलरोधी या जलसंचयी संरचनाएं और इसी प्रकार की अन्य । ये पहलें वन्य जीवों के लिए प्राकृतिक वास में चारा और चरने की व्यवस्था में वृद्धि करेंगी ।

16.4 मानव पशु संघर्ष का निदान (वन्य प्राणियों के कारण मानव वधों, मॉसभक्षियों द्वारा पशुधन क्षति, वन्य खुरदारों पशुओं द्वारा फसल की क्षति के लिए समय से, समान प्रतिकर सुनिश्चित करना) (अनावर्ती) (फसल क्षति हेतु प्रतिकर नया घटक है)

16.4.1 इसमें निम्नलिखित सम्मिलित होंगे-

- (i) वन्य प्राणियों के कारण पशुधन क्षति, मानव वध और फसल क्षति* के लिए प्रतिकर का संदाय ।
- (ii) फसल संरक्षा संरचना का सृजन ।
- (iii) समस्यात्मक प्राणियों को पकड़ने के लिए फंदे, पिजड़ों का उपापन/लगाना ।
- (iv) प्रशांतक उपस्कर, बचाव वाहन और औषधि का उपापन ।

16.4.2 उपरोक्त पहलें “उद्यान-लोक” द्वारा सामना की जा रही परेशानियों से बचने और उसके निराकरण के लिए अत्यन्त महत्वपूर्ण हैं ।

(* राज्य में विद्यमान सन्नियमों के अनुसार वन्य जीव (संरक्षण) अधिनियम, 1972, 2006 में यथासंशोधित, की धारा 38फ में यथा स्पष्टीकृत अंकित मध्यवर्ती क्षेत्र में समर्थित होगी ।)

16.5 बफर/सीमावर्ती क्षेत्रों में सह अस्तित्व कार्यसूची

व्याघ्र आरक्षित के चारों ओर सीमावर्ती क्षेत्रों का गलियारे के रूप में महत्व है और उनकी पारिस्थितिकीय वहनीयता इस क्षेत्र को संसाधनों के अत्यधिक प्रयोग और अनुचित भूमि प्रयोग के कारण पारिस्थितिकीय नितल में परिवर्तित होने से रोकने हेतु महत्वपूर्ण है। यह आह्वान है कि ऐसे सीमावर्ती क्षेत्रों का व्याघ्र आरक्षित के चारों ओर बफर क्षेत्र के रूप में निरूपण किया जाये जिससे निम्नलिखित उद्देश्यों की पूर्ति हो सके :

- (क) वनों पर उनकी निर्भरता को कम करने के लिए स्थानीय पणधारी को पारिस्थितिकीय रूप से साध्य आजीविका विकल्पों का उपबंध करना ।
- (ख) क्रीडा क्षेत्रों से निकलने वाले वन्य पशुओं को प्राकृतिक वास प्रतिपूर्ति हेतु स्वास्थ्यकर निवेश के माध्यम से स्थानीय व्यक्तियों की भागीदारी द्वारा वन क्षेत्र को संरक्षित करना ।

10 कि.मी. की त्रैज्यिक दूरी तक के व्याघ्र आरक्षितियों के बाहरी सीमांत क्षेत्र की वन आच्छादित प्रास्थिति का तुलनात्मक निर्धारण भारतीय वन सर्वेक्षण के सहयोग से किया गया है । राज्यों से व्याघ्र आरक्षितियों के भीतरी जोन के चारों ओर के सीमांत या मध्यवर्ती क्षेत्र का रेखांकन करने और स्थानीय लोगों से संबंधित आजीविका के मुद्दों को देखते हुए वन्य जीव संरक्षण को सुनिश्चित करने के लिए वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 38फ के अधीन यथा अपेक्षित व्याघ्र संरक्षण योजना प्रस्तुत करने की अपेक्षा की जाती है ।

16.6 व्याघ्र आरक्षितियों के आसपास रहने वाले परम्परागत आखेट करने वाली जनजातियों के लिए पुनर्वास पैकेज (नवीन क्रियाकलाप) (अनावर्ती)

व्याघ्र आरक्षितियों और व्याघ्र गलियारों के आसपास रहने वाली अधिसूचना से पृथक् की गई जनजातियों और परम्परागत आखेट में लगी हुई जनजातियों के लिए एक पुनर्वास और विकास कार्यक्रम को अविलम्ब आरम्भ करने की आवश्यकता है। वन्य पशुओं के परम्परागत आखेट में अधिसूचना से निकाली गई निम्नलिखित जनजातियां और समुदाय सम्मिलित हैं : बहेलिया, अम्बालगार, बदाक, मोंगिया, बावरिया, मोंगलिया, पारधी, बोया, ककाद, करवाल नट, निरशिकारी, पिचारी, वालयार, येनादि, चकमा, मिजो, ब्रू, सोलुंग और न्यिशी। जबकि ये सूची सुविस्तृत नहीं है, लगभग 5000 ऐसे परिवारों को, योजना अवधि के दौरान कल्याण कार्यक्रम (एन.टी.सी.ए. पहल का आरंभिक भाग) के अधीन सम्मिलित किए जाने की अपेक्षा की जाती है। किसी विनिर्दिष्ट स्थल पर जीविका विकल्पों के साथ परामर्शात्मक रीति में पुनर्वास और कल्याण पैकेज को विकसित किया जाना चाहिए, जिसमें शामिल होगा : ऐसे व्यक्तियों की मजदूरी, जो वन्य जीवों के संरक्षण हेतु पैदल गश्त करने के लिए अभिनियोजित है, उन्हें सिंचाई के साथ कृषि भूमि उपलब्ध करवाने, आधारभूत स्वास्थ्य देखभाल, आवासन और संबंधित सामुदायिक कल्याण निवेश और आधारभूत शिक्षा सुविधाएं। कार्यक्रम की संरचना के दौरान, अधिसूचना से पृथक् की गई जनजातियों को विस्थापित करने के लिए मुक्ति सेना द्वारा, पूर्वजित अनुभव पर, निष्पक्ष रूप से विचार किया जाना अपेक्षित है।

16.7 अनुसंधान और क्षेत्रीय उपस्कर (सतत) (अनावर्ती)

व्याघ्र कृतिक बल/व्याघ्र कार्य बल द्वारा अनुमोदित नवीन प्रणाली का उपयोग करते हुए अखिल भारतीय व्याघ्र ऑकलन से क्षेत्रीय इकाइयों के लिए स्थायी अनुश्रवण नयाचार या संलेख की परिणति हुई है। नवीन ऑकलन प्रक्रिया में डाटा संग्रहण के प्रथम चरण (फेज-1) के लिए प्रयुक्त रूप विधान और नयाचार/संलेख को दिन प्रतिदिन के क्षेत्रीय अनुश्रवण में अंगीकृत किया जाना चाहिए। यह और कि क्षेत्रोन्मुखी अनुसंधान विकसित करने और भौगोलिक स्थापन प्रणाली (ग्लोबल पोजीशनिंग सिस्टम), कैमरा ट्रैप, रात्रि दर्शन युक्ति या उपकरण, दूरी मापक तथा हार्डवेयर और साफ्टवेयर सहित उससे संबंधित सुविधाओं से कर्मचारीवृंद को सुसज्जित करने के लिए सहायता उपलब्ध करवानी होगी। जैसा कि राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण की प्रथम बैठक में विनिश्चय किया गया था, व्याघ्र आरक्षित की भौगोलिक सूचना प्रणाली भूसंपत्ति में परिष्कृत प्रक्रिया का उपयोग करते हुए वन्य पशुओं का प्रति दिन अनुश्रवण करना अपेक्षित है जिससे “पूर्वानुमान लगाना” अर्थात् वन्य जीव संरक्षण सुलभ हो जाएगा।

16.8 कर्मचारीवृंद का विकास और सामर्थ्य निर्माण (सतत) (अनावर्ती)

इसमें निम्नलिखित सम्मिलित होगा :

- (i) सामर्थ्य निर्माण और प्रशिक्षण।
- (ii) परियोजना भत्ता और विशेष प्रोत्साहन उपलब्ध करवाना।
- (iii) भौगोलिक सूचना प्रणाली (जी.आई.एस.) के उपयोग, शिकार रोकने वाली संक्रियाओं में विशिष्ट प्रशिक्षण।
- (iv) विधिशास्त्र और वन्य जीव विधि चिकित्साशास्त्र संबंधी विशिष्ट प्रशिक्षण।
- (v) अन्य आरक्षितियों में उत्तम पद्धतियों का आंकलन करने हेतु अध्ययन दौर।
- (vi) विकीर्णन कार्यशालाएं।
- (vii) पार्क निर्वचन के लिए विशिष्ट प्रशिक्षण।
- (viii) योजना प्रबंधन में विशिष्ट प्रशिक्षण।

क्षेत्रीय कर्मचारीवृंद की कौशलवृद्धि के लिए उपर्युक्त उपादान अत्यन्त महत्वपूर्ण है। अपराध का पता लगाने और संबंधित कौशलों के विशिष्ट प्रशिक्षण के अभाव में अवैध शिकार के कई दृष्टांत घटित हुए हैं।

16.9 वन्य जीवों के लिए अनतिक्रान्त स्थानों का विनिश्चय और समय सीमा के भीतर व्याघ्र आरक्षिति में कोड अथवा क्रांतिक व्याघ्र प्राकृत्वास से ग्राम वासियों का पुनः स्थान निर्धारण और अधिकारों का परिनिर्धारण (अधिकारों का परिनिर्धारण एक नवीन क्रियाकलाप है) (अनावर्ती)

16.9.1 वन्य जीव (संरक्षण) अधिनियम, 1972 और अनुसूचित जनजाति और अन्य परम्परागत वन निवासी (वन अधिकारों की मान्यता) अधिनियम, 2006 में यह अपेक्षित है कि व्याघ्र आरक्षितियों तथा संरक्षित क्षेत्रों में कोड अथवा क्रांतिक व्याघ्र प्राकृत्वास और वन्यजीव प्राकृत्वासों के भीतर वन क्षेत्रों में मान्यताप्राप्त लोगों (अनुसूचित जातियों और अन्य परम्परागत वन निवासी) के अधिकार व्याघ्र तथा वन्य पशुओं के लिए अनतिक्रान्त स्थान उपलब्ध करवाने के लिए उपान्तरित और परिनिर्धारित किया जाए, उसके लिए प्रतिकर (वर्तमान में केन्द्र प्रायोजित स्कीम के अधीन दिए गए स्थापन निर्धारण पैकेज के अतिरिक्त अधिकारों का परिनिर्धारण) का संदाय अपेक्षित है। वन्य जीव (संरक्षण) अधिनियम, 1972 का अध्याय 4 (धारा 24), धारा 18 (किसी अभयारण्य के गठन के लिए) या धारा 35 (किसी राष्ट्रीय उद्यानों के गठन के लिए) के अधीन, राज्य सरकार द्वारा घोषित भूमि में या उसके अधिकारों के अर्जन के बारे में उपबंधित है। उक्त अधिनियम की धारा 24 की उपधारा (2) कलक्टर को ऐसी भूमि या अधिकार अर्जित करने के लिए प्राधिकृत करती है। अतः लोगों की स्थावर संपत्ति के लिए प्रतिकर का संदाय, उनके ऐसे अधिकारों का, जो एक वैधानिक अपेक्षा है, उपांतरण या परिनिर्धारण का भाग होगा।

16.9.2 व्याघ्र पारिस्थितिकीय विज्ञान पर उपलब्ध अनुसंधान आंकड़ों के सतत् अध्ययन और विश्लेषण से उपदर्शित होता है कि बाघिनों (मादा बाघ) की न्यूनतम संख्या जो प्रजनन अवस्था में हैं एवं जिनका अनुरक्षण करना आवश्यक है, 80-100 व्याघ्रों की जीवनक्षम संख्या (कोड क्षेत्र में या उसके आसपास) के लिए 800-1000 वर्ग किलो मीटर स्थान अपेक्षित है। व्याघ्र की “सर्वाच्छादित प्रजाति” होने के कारण इससे अन्य वन्य पशुओं (सह परभक्षी, भक्ष्य) और जंगल की जीव्य संरक्षा भी सुनिश्चित हो जाएगी जिसके द्वारा संपूर्ण क्षेत्र या प्राकृत्वास की पारिस्थितिकीय जीव्यता सुनिश्चित होगी। अतः, व्याघ्र और अन्य वन्य पशुओं की मूल संरक्षा को जीवित रखने के लिए व्याघ्र आरक्षितियों के कोड क्षेत्रों को अनतिक्रान्त बनाए रखने की पारिस्थितिकीय अनिवार्यता हो जाती है।

16.9.3 व्यावसायिक अभिकरण के सिफारिशों पर आधारित ग्राम पुनः परिनिर्धारण और पुनर्वास के लिए निम्नलिखित विकल्पों और मापदंडों के साथ नवीन पैकेज का प्रस्ताव किया गया जिसमें “राष्ट्रीय पुनर्वास और पुनःनिर्धारण नीति, 2007” का पर्याप्त रूप से समावेश है, जिस पर विचार करते हुए वन क्षेत्रों में रहने वाले लोगों का पुनः स्थापन करने में कठिनाइयां और अत्यावश्यकतायें अंतर्ग्रस्त हैं।

16.9.4 प्रस्तावित पैकेज में दो विकल्प हैं, अर्थात् :-

विकल्प 1—किसी परिवार द्वारा इस विकल्प का चुनाव करने की दशा में उस परिवार का वन विभाग द्वारा कोई पुनर्वास और पुनःनिर्धारण प्रक्रिया को अंतर्ग्रस्त किए बगैर, संपूर्ण पैकेज राशि (प्रति परिवार 10 लाख रुपए) का संदाय।

विकल्प 2—वन विभाग द्वारा संरक्षित क्षेत्र और व्याघ्र आरक्षिति से गांव का पुनःनिर्धारण और पुनर्वास करना।

(i) विकल्प 1 की दशा में, अनुश्रवण करने की प्रक्रिया में संबद्ध जिले (जिलों) के जिला मजिस्ट्रेट की सम्मिलितता को सुनिश्चित करना होगा, जिससे ग्रामवासी, उन्हें उपलब्ध करवाई गई पैकेज की रकम से स्वयं का पुनर्वास कर सकें। इस संबंध में, उत्पन्न ब्याज के माध्यम से आय अभिप्राप्त करने के लिए किसी राष्ट्रीयकृत बैंक में हितधारी के नाम की रकम के पर्याप्त भाग को जमा करते समय बाह्य अभिकरणों द्वारा आश्रय हेतु अधिमानतः संचालित किए जाने वाले तंत्र को भी सुनिश्चित करना होगा।

(ii) विकल्प 2 की दशा में, प्रति परिवार दस लाख रुपए की दर से निम्नलिखित पैकेज (प्रति परिवार) प्रस्तावित है, अर्थात् :-

(क)	कृषि भूमि उपापन (2 हेक्टेयर) और विकास	:	कुल पैकेज का 35 प्रतिशत
(ख)	अधिकारों का परिनिर्धारण	:	कुल पैकेज का 30 प्रतिशत
(ग)	वास स्थान भूमि और गृह सन्निर्माण	:	कुल पैकेज का 20 प्रतिशत

(घ)	प्रोत्साहन	:	कुल पैकेज का 5 प्रतिशत
(ङ)	परिवार द्वारा संचित सामुदायिक सुविधा (पहुंच मार्ग, सिंचाई, पेयजल, स्वच्छता, विद्युत, दूर-संचार, सामुदायिक केंद्र, प्रार्थना के लिए धार्मिक स्थान, कब्रिस्तान और अन्त्येष्टि स्थल)	:	कुल पैकेज का 10 प्रतिशत

(iii) पुनः स्थापन प्रक्रिया का निम्नलिखित दो समितियों द्वारा अनुश्रवण और कार्यान्वयन किया जाएगा, अर्थात् :

निम्नलिखित से मिलकर बनी (राज्य स्तरीय अनुश्रवण समिति)

(क)	राज्य का मुख्य सचिव	-	अध्यक्ष
(ख)	संबंधित विभागों के सचिव	-	सदस्य
(ग)	राज्य के प्रधान मुख्य वन संरक्षक/प्रमुख वन संरक्षक	-	सदस्य
(घ)	संबद्ध व्याघ्र संरक्षण प्रतिष्ठान के गैर-शासकीय सदस्य	-	सदस्य
(ङ)	मुख्य वन्य जीव प्रतिपालक	-	सदस्य-सचिव

निम्नलिखित से मिलकर बनी अन्य कार्यक्षेत्रों/सेक्टरों के अभिसरण को सुनिश्चित करने के लिए जिला स्तरीय क्रियान्वयन समिति

(क)	जिला कलेक्टर	-	अध्यक्ष
(ख)	मुख्य कार्यकारी अधिकारी (सी0ई0ओ0)	-	सदस्य
(ग)	निम्नलिखित से शासकीय प्रतिनिधि :	-	सदस्य
	लोक निर्माण विभाग, सामाजिक कल्याण विभाग, जनजातीय विभाग, स्वास्थ्य विभाग, कृषि विभाग, शिक्षा विभाग, विद्युत और सिंचाई विभाग		
(घ)	व्याघ्र आरक्ष या संरक्षित क्षेत्र का उप निदेशक	-	सदस्य-सचिव

(iv) उपर्युक्त लागत मापदंड, राज्य और स्थान विनिर्दिष्ट परिस्थिति में लचीलापन लाने के लिए निर्देशात्मक प्रकृति के है और उन्हें क्रमशः राज्य सरकारों द्वारा स्थान विनिर्दिष्ट अपेक्षाओं के अनुसार अंतर अवयव और अंतर परिवार समायोजन को अनुज्ञात करने के लिए उपांतरित किया जा सकेगा ।

(v) पुनर्वासित ग्राम को जिला स्तरीय स्कीमों को एक साथ मिलाकर पारि-विकास और स्थानीय विकास के लिए प्राथमिकता के आधार पर लिया जाएगा ।

(vi) पुनर्वासन प्रक्रिया में अंतर्वलित श्रमोन्मुख कार्यो को अधिमानतः उन ग्रामीणों के माध्यम से, जिन्हें पुनर्वासित किया जा रहा है, कार्यान्वित किया जाना होगा जिससे कि वे अपने समाधानप्रद रूप में क्षेत्रीय कार्यान्वयन को सुनिश्चित करने के अतिरिक्त उससे फायदे प्राप्त कर सकें ।

(vii) यदि पुनर्व्यवस्थापन किसी वन भूमि पर किया गया है तो नई बस्ती ग्राम स्तरीय समिति और ग्राम सभाओं के माध्यम से अपने सहभावी प्रयोग के लिए वन्य संसाधनों तक पहुंच बनाने के लिए पात्र होगी ।

(viii) जिला प्रशासन पुनर्वासित स्थल के समीप उचित कीमत दुकान, शिक्षा, स्वास्थ्य केंद्र को सुलभ कराएगा ।

(ix) पुनर्वासन के पश्चात् “आश्रयदान” को केंद्रीय सहायता तथा जिला प्रशासन से जुड़ी स्कीमों के माध्यम से सतत पारि-विकासात्मक निवेशों के साथ वन विभाग के माध्यम से सुनिश्चित किया जाएगा । इस प्रयास में सक्षम स्वतंत्र अभिकरणों की सहायता, जहां कहीं उपलब्ध हो, ली जा सकती है ।

(x) पुनर्वासित ग्रामीणों को संरक्षित क्षेत्र से उद्भूत आजीविका के विकल्पों के लिए प्राथमिकता दी जाएगी ।

(xi) यदि पुनर्वासन की लागत, जिसके अंतर्गत अधिकारों का परिनिर्धारण भी है, प्रति परिवार दस लाख रुपए से अधिक होती है तो राज्य सरकार अतिरिक्त लागत को वहन करेगी ।

(xii) पुनर्वासन प्रक्रिया एक समय सीमारहित प्रक्रिया होगी, क्योंकि पुनर्वासन प्रक्रिया की प्रगति राज्य के कार्यपालन पर निर्भर करेगी ।

16.10 व्याघ्र वाले वनों में वन्य जीव समुत्थानों का मुख्य प्रवाह और पुनर्नवीकृत युक्ति के माध्यम से, स्थानीय लोगों को शामिल करके, प्राकृतिक वास के विखंडीकरण को रोकने के लिए गलियारे के संरक्षण को आगे बढ़ाना (नवीन क्रियाकलाप) (अनावर्ती)

16.10.1 व्याघ्र आरक्षितियों या संरक्षित क्षेत्रों को जोड़ने वाले वनों में अधिकांश राज्यों में व्याघ्र और अन्य वन्य जीव हैं। इस समय, उन क्षेत्रों में, जहां पुनर्नवीकर और संरक्षात्मक निवेश अपेक्षित हैं, वन्यजीव समुत्थानों की ओर ध्यान देने की कोई स्कीम नहीं है । वन्य जीव (संरक्षण) अधिनियम, 1972 में ऐसे गलियारे क्षेत्रों की ओर ध्यान देने का उपबंध किया गया है । इसमें, अन्य बातों के साथ-साथ, निम्नलिखित अंतर्वलित हैं, अर्थात् :-

- (i) मानव-पशु संघर्ष निवारण ।
- (ii) समस्यात्मक और विपथगामी वन्य पशुओं का अभिग्रहण ।
- (iii) वन्य प्राणियों का अनुश्रवण ।
- (iv) अवैध शिकार प्रतिरोधी प्रचालन ।
- (v) प्राकृतिक वास सुधार संबंधी उपाय ।

16.10.2 राष्ट्रीय उद्यानों, अभयारण्यों और व्याघ्र आरक्षितियों के साथ के क्षेत्रों में रहने वाले लोगों को तृणभक्षी वन्यजीवों द्वारा, जैसे नीलगाय, कृष्ण मृग, वन्य शूकर और हाथियों द्वारा कारित नुकसान के कारण उनकी फसलों को निरंतर विनाश का सामना करना पड़ता है । कई स्थानों पर तो यह स्थिति विकट हो जाती है, क्योंकि लोग वर्ष में एक बार होने वाली वर्षा से सिंचित फसल, जिसकी पैदावार बहुत कम है, पर ही निर्भर करते हैं । व्याघ्र आरक्षितियों और संरक्षित क्षेत्रों के आस-पास मनुष्य-पशु के बीच संघर्ष के कतिपय कारणों में से यह एक मुख्य कारण है और वन्य जीव संरक्षण के लिए स्थानीय लोगों के जिस समर्थन की अत्यधिक जरूरत है वह पाने में यह गंभीर रूप से बाधक है ।

16.10.3 वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 11 के अधीन राज्य के मुख्य वन्य जीव प्रतिपालक और उनकी ओर से प्राधिकृत अधिकारी प्राण और संपत्ति, जिसके अंतर्गत खड़ी फसलें भी हैं, को नुकसान पहुंचाने वाले वन्य जीवों को मारने की अनुज्ञा प्रदान कर सकते हैं, किंतु ग्रामीण लोग इन पशुओं के साथ जुड़ी धार्मिक भावनाओं के कारण ऐसे वध किए जाने के पक्ष में प्रायः नहीं होते हैं। ऐसे वन्य जीवों को फंदे में फंसाना और उनका स्थानान्तरण, जिससे नाशकजीव मूल्य बढ़ता है, न तो साध्य है और न ही खर्च की दृष्टि से सही है । अतः, इस स्थिति में इस आवर्ती हानि से व्याघ्र आरक्षितियों के आसपास रहने वाले पणधारी लोगों का पर्याप्त रूप से क्षतिपूर्ति किया जाना समय की मांग है । राज्य के वर्तमान मानदंडों के अनुसार, निरूपित बफर क्षेत्र में, जैसा कि 2006 में यथा संशोधित वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 38 में स्पष्ट किया गया है, इस घटक हेतु सहायता की जायगी ।

16.11 वन्य जीव संरक्षण के हित में रक्षोपाय और प्रति संगत उपाय (नवीन क्रियाकलाप) (अनावर्ती)

अनेक व्याघ्र आरक्षितियों पर अत्यधिक प्रयुक्त अवसंरचना जैसे सड़कें, रेलपथ और अन्यों के कारण प्रभाव पड़ा है । अनेक आरक्षितियों से होकर जाने वाली उच्च प्रसरणशील विद्युत लाइनों के कारण अवैध शिकारियों द्वारा वन्य जीवों को विद्युत शक्ति से मारने के कारण उनकी मृत्यु हुई है । इन वन्य जीवों के हित में अनेक रक्षोपाय और प्रति संगत उपाय अपेक्षित है, जिन्हें विनिर्दिष्ट स्थल आधार पर सहयोग दिया जाएगा ।

16.12 आधारभूत अवसंरचना/परामर्श हेतु व्याघ्र परियोजनाबद्ध मुख्यालय व्यय, विशेषज्ञ दलों द्वारा क्षेत्र दौरा, अखिल भारतीय व्याघ्र ऑकलन/व्याघ्रों का सतत् अनुश्रवण (चतुर्थ चरण या फेस-4), व्याघ्र आरक्षितियों के बाहर

व्याघ्रों का राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण अनुदान के माध्यम से अनुश्रवण हेतु सहायता, राष्ट्रीय व्याघ्र कैमरा ट्रैप फोटो डाटाबेस संग्रह का विकास करने, अनुश्रवण प्रयोगशाला की स्थापना के अतिरिक्त एन.टी.सी.ए. के केंद्र तथा क्षेत्रीय कार्यालयों के सुदृढीकरण के लिए समर्थन का उपबंध करना (अनावर्ती)

16.13 व्याघ्र आरक्षितियों का स्वतंत्र अनुश्रवण और मूल्यांकन (सतत) (अनावर्ती)

व्याघ्र आरक्षितियों का स्वतंत्र अनुश्रवण प्रकृति संरक्षण के लिए अंतर्राष्ट्रीय संघ (आई यू सी एन) प्रारूप के आधार पर विशेषज्ञों के एक पैनल द्वारा लगभग 45 मापदंडों का उपयोग करके किया गया था। अनुश्रवण रिपोर्टों का प्रकृति संरक्षण के लिए अंतर्राष्ट्रीय संघ (आई यू सी एन) द्वारा गहन पुनर्वलोकन किया गया था और उसे संसद के समक्ष रखा गया था। पुनः एक स्वतंत्र प्रबंधन प्रभावशीलता मूल्यांकन वर्ष 2010-2011 में किया गया था, जिसे पुनः पश्चात्वर्ती वर्षों में दोहराया जाएगा।

16.14 नये व्याघ्र आरक्षितियों की स्थापना और विकास (नवीन क्रियाकलाप) (आवर्ती और अनावर्ती, जैसा विभिन्न क्रियाकलापों में उपदर्शित किया गया है)

16.14.1 'व्याघ्र परियोजना' एक पुनीत पारि-तंत्र दृष्टिकोण है। यद्यपि, मुख्य संकेन्द्र प्रभाव प्रमुख अथवा सर्वोत्कृष्ट प्रजाति 'व्याघ्र' पर है, तथापि, यह परियोजना खाद्य श्रृंखला में अन्य पोषणात्मक स्तरों को उन्नत करके पारिस्थितिकीय प्रणाली के स्थायित्व को बनाए रखने के लिए है। व्याघ्र, जो कि पारिस्थितिकीय खाद्य श्रृंखला के शीर्ष बिंदु पर है, की पारिस्थितिक रूप से जीवनक्षम संख्या, सुनिश्चित करने के लिए ऐसा किया जाना अनिवार्य है। विकसित देशों में वनों पर लोगों का दबाव लगातार बढ़ता जा रहा है और भारत इसका कोई अपवाद नहीं है। निष्कर्ष रूप में, व्याघ्र का प्राकृतिक वास कई स्थानों पर अभिखंडित और क्षीण हो गया है, जिसके लिए एक संकेंद्रित संरक्षण दृष्टिकोण की जरूरत है। हमारे संरक्षित क्षेत्र/व्याघ्र आरक्षितियां अन्य उपयोग प्रतिमानों के सागर में 'द्वीपों' के सदृश है। 'द्वीपीय जैव भौगोलिक दृष्टि' से, आनुभाविक साक्ष्यों से यह उपदर्शित होता है कि 'विच्छिन्न' आरक्षितियां 'पारिस्थितिकीय पृथकीकरण' के कारण अपनी प्रजातियों को बहुत तेजी से खो देती हैं। इसके अतिरिक्त, विखंडीकरण के अलावा यह स्थिति जैविक दाब, विस्थापित भक्ष्य-परभक्षी अनुपात, संरक्षा के वांछित स्तर को सुनिश्चित करने के प्रभावी उपायों के अभाव और समीप के पणधारियों के लिए अपनी निर्भरता वन संसाधनों पर कम करने के लिए पारि विकासबद्ध उपायों के अभाव के कारण अवश्रेणीकृत वन आच्छादन से अति निकृष्ट हो गई है। 'व्याघ्र परियोजना' उपर्युक्त स्थिति से निपटने के लिए दूरगामी रूप से सहायक सिद्ध होगी। व्याघ्र परियोजना की संचालन समिति ने तारीख 23 जनवरी, 2003 को हुई अपनी बैठक में नए व्याघ्र आरक्षों/आरक्षितियों को सम्मिलित किए जाने की सिफारिश की थी जिससे 'व्याघ्र परियोजना' के विद्यमान 37761 वर्ग किलोमीटर के कुल क्षेत्र को दसवीं योजना अवधि के दौरान बढ़ाकर 50,000 वर्ग किलोमीटर किया जा सके।

16.14.2 निम्नलिखित व्याघ्र आरक्षितियों को घोषित किए जाने के लिए सैद्धांतिक रूप से अनुमोदन प्रदान कर दिया गया है :

क्रम सं०	व्याघ्र आरक्षित का नाम	राज्य
1.	रातापानी	मध्य प्रदेश
2.	सुनाबेडा	ओडिशा
3.	पीलीभीत	उत्तर प्रदेश
4.	मुकुन्दारा पहाड़ियाँ (जिसके अंतर्गत दर्रा, जवाहर सागर और चंबल वन्य जीव अभयारण्य भी हैं)	राजस्थान
5.	सत्यमंगलम्	तमिल नाडु

16.14.3 इसके अतिरिक्त, राज्यों को राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा व्याघ्र आरक्षितियों के रूप में सृजन किए जाने के लिए निम्नलिखित क्षेत्रों का सुझाव दिया गया है, जो निम्नानुसार है :

क्रम सं०	नाम	राज्य
1.	नागजीरा	महाराष्ट्र
2.	बोर	महाराष्ट्र
3.	सुहेलवा	उत्तर प्रदेश
4.	गुरु घासीदास	छत्तीसगढ़
5.	महदेई	गोवा
6.	श्रीविल्लीपुथुर ग्रिजिल्ड विशाल गिलहरी/मेगामलाई वन्यजीव अभयारण्य / वरुशनाडु वैली	तमिल नाडु

16.14.4 अंतिम अनुमोदन कुद्रेमुख व्याघ्र आरक्षिति (कर्नाटक) के लिए प्रदान कर दिया गया है ।

16.15 व्याघ्र परियोजना के कर्मचारीवृंद (सभी प्रवर्ग) को परियोजना भत्ते का उपबंध (अनुसचिवीय कर्मचारीवृंद को परियोजना भत्ते का उपबंध किया जाना एक नया उपादान है) (अनावर्ती)

16.15.1 व्याघ्र आरक्षितियों के अधिकारी और कर्मचारीवृंद, व्यय वित्त समिति और आर्थिक कार्य संबंधी मंत्रिमंडल समिति द्वारा नौवीं योजना अवधि के दौरान, यथा अनुमोदित परियोजना भत्ता नीचे दिए गए ब्यौरे के अनुसार प्राप्त करते हैं :

(क) क्षेत्र निदेशक	-@ 1000 रुपये प्रतिमास
(ख) उपनिदेशक	-@ 750 रुपए प्रतिमास
(ग) सहायक निदेशक/ शोध अधिकारी/पशु चिकित्सा अधिकारी/ समतुल्य रैंक	-@ 650 रुपए प्रतिमास
(घ) वन रेंजर और समतुल्य रैंक	-@ 500 रुपए प्रतिमास
(ङ) वन पाल और समतुल्य रैंक	-@ 450 रुपए प्रतिमास
(च) वनरक्षक और समतुल्य रैंक	-@ 350 रुपए प्रतिमास

16.15.2 व्याघ्र आरक्षितियों के कार्यालय दूरस्थ स्थानों पर अवस्थित हैं। अधिकांश सचिवीय कर्मचारीवृंद कहीं नियमित वन कार्यालयों में तैनाती को वरीयता देते हैं, जिसके परिणामस्वरूप व्याघ्र परियोजना कार्यालयों में नियमित कार्यालय कार्यकरण पर विपरीत प्रभाव पड़ता है। राजस्व सेक्टर से विभिन्न चालू पूरक स्कीमों को व्याघ्र आरक्षों की पारिस्थितिकी विकास योजनाओं के एक भाग के रूप में परम्परानुबंधन किया जाता है। ऐसी सतत् स्कीम कार्यालय के कार्य को बढ़ाती हैं और इस कारण से समर्थ सचिवीय समर्थन अत्यंत महत्वपूर्ण हो जाता है। तथापि, अच्छी योग्यताओं को आकर्षित करने के लिए यह प्रस्ताव है कि नीचे प्रदर्शित रूप में वन आरक्षितियों के कार्यालय में कार्य करने के लिए सचिवीय कर्मचारीवृंद को परियोजना भत्ता दिया जाये।

वर्ग-2	500 रुपये (प्रति कर्मचारी प्रतिमास)
वर्ग-3	350 रुपये (प्रति कर्मचारी प्रतिमास)
वर्ग-4	200 रुपये (प्रति कर्मचारी प्रतिमास)

16.15.3 उपर्युक्त दरें वित्त मंत्रालय के अनुमोदन से 1 सितंबर, 2008 से प्रभावी होते हुये पात्र कर्मचारियों की विद्यमान प्रवर्गों के लिए दुगुनी कर दी गयी है।

16.16 कर्मचारीवृंद कल्याणकारी क्रियाकलाप (चालू) (अनावर्ती),--

व्याघ्र आरक्षितियों के क्षेत्र कर्मचारीवृंद दूरस्थ और कठिन क्षेत्रों में सेवा करते हैं जहाँ बहुधा जंगली जानवरों से आकस्मिक मुठभेड़ की जोखिम का सामना करने के अतिरिक्त स्थानिक बीमारियों जैसे मलेरिया, डेंगू, जल जनित

संक्रमण की भी संभावना रहती है। इसके अतिरिक्त सामान्यतया ऐसी तैनाती गैर पारिवारिक तैनाती होती हैं और अग्रिम पंक्ति के कार्मिकों को किसी निकट के गांव या नगर में जहां आधारभूत शिक्षा और चिकित्सा सुविधाएं होती हैं, अपने परिवार के भरण-पोषण की लागत को भी वहन करना पड़ता है। यहां यह कहना प्रासंगिक है कि ऐसे ग्रामीण क्षेत्रों में आवास कदाचित ही सहजता से उपलब्ध होते हैं। इसके अतिरिक्त प्रादेशिक वन प्रभागों अथवा मंडलों में कार्यरत अपने समकक्षियों की तुलना में व्याघ्र आरक्षितियों में कार्यरत कर्मचारीवृंद को, सीमावर्ती क्षेत्रों में अवस्थित स्थानीय समुदाय की वन संसाधनों तक स्वतंत्र अभिगम्यता पर रोक के कारण, उनका कोपभाजन बनना पड़ता है।

इस प्रकार किसी संरक्षित क्षेत्र या व्याघ्र आरक्षित में अग्रिम पंक्ति के किसी क्षेत्र कार्मिक की भूमिका नियमित वन मंडल अथवा प्रभाग में अपने समकक्षी से भिन्न है। प्रबन्धन के विरुद्ध दुर्भावना पालने वाले लोगों द्वारा व्याघ्र आरक्षों एवं संरक्षित क्षेत्रों के कर्मचारीवृंद पर शारीरिक हमले ज्यादा आम हैं जिसके फलस्वरूप बहुधा आकस्मिक दुर्घटनायें घटित हो जाती हैं। इसलिए, कार्यकारी आयु समुह में अच्छी योग्यताओं को आकर्षित करने के लिए कर्मचारीवृंद के कल्याण के लिए सुविधाओं का उपबंध करना अनिवार्य है। योजना अवधि के दौरान कर्मचारीवृंद के कल्याण हेतु निवेश जैसे अग्रिम पंक्ति के कर्मचारीवृंदों के बच्चों के लिए निकटवर्ती नगरों या ग्रामों में आवासीय व्यवस्था, मिट्टी के तेल की आपूर्ति, औषधि, क्षेत्रकित, मच्छरदानी, टार्च और ऐसे अन्य समर्थकारक सामग्रियों हेतु सहयोग किया जायेगा।

16.17 व्याघ्र आरक्षित में पर्यटन/ पारि पर्यटन को प्रोत्साहन (नए क्रियाकलाप) (अनावर्ती),—

व्याघ्र आरक्षित के संदर्भ में 'पर्यटन' से "पारि पर्यटन" अपेक्षित है, जिसे पारिस्थितिकीय रूप से वहनीय प्राकृत-पर्यटन होने की आवश्यकता है। यह पर्यटन उद्योग के एक महत्वपूर्ण घटक के रूप में उभर रहा है। व्याघ्र आरक्षों के सीमांत क्षेत्र में वास कर रहे स्थानीय, आश्रित समुदाय के जीवन स्तर में सुधार हेतु सामुदायिक प्रयास आधारित, वहनीय एवं न्यायसंगत व निष्पक्ष होने के कारण यह 'सामूहिक पर्यटन' से भिन्न है। बफर क्षेत्रों पर संकेन्द्रन सहित, वहन क्षमता के अनुसार विनियमन के अधीन, व्याघ्र संरक्षण योजना के भाग के रूप में, व्याघ्र आरक्ष विनिर्दिष्ट पर्यटन योजना के सादृश्य आश्रित स्थानीय समुदाय को लाभ पहुंचाने के उद्देश्य से पारिपर्यटन को बढ़ावा देना 'व्याघ्र परियोजना' के अंतर्गत प्रस्तावित है। चूंकि राष्ट्रीय उद्यानों एवं वन्यजीव अभयारण्यों, जो अब क्रोड एवं क्रांतिक व्याघ्र प्राकृतवास के रूप में नामित हैं, में पर्यटन होता रहा है, स्थल विनिर्दिष्ट वहन क्षमता के अधीन उक्त क्षेत्रों में विनियमित निम्नसंघाती पर्यटन (अभ्यागमन) की अनुमति दी जायेगी। तथापि, कोई नई पर्यटन अवसंरचना ऐसे क्रोड या क्रांतिक व्याघ्र प्राकृतवासों में अनुज्ञात नहीं की जानी चाहिये। इसके अतिरिक्त, बफर वन क्षेत्रों को भी उक्त क्षेत्रों में रहने वाले स्थानीय लोगों की सक्रिय भागीदारी के साथ, वन्यजीव प्राकृतवासों के रूप में विकसित किया जाना चाहिये। लोगों की क्रोड और क्रांतिक व्याघ्र अंतरापृष्ठ संघर्षों को कम करते हुये इन क्षेत्रों में पारिपर्यटन गतिविधियों से स्थानीय लोगों को लाभ पहुंचाने के अतिरिक्त यह व्याघ्र आबादी के जीवन-चक्र गतिकी हेतु विस्तृत प्राकृतवास उपलब्ध करायेगा। पणधारियों के लिए अवसरों में पर्यटकों के लिए कम लागत के आवासों का प्रबंधन, गाइड सेवा उपलब्ध कराना, विक्रय बाजार उपलब्ध कराना, भ्रमण का प्रबंध करना, विशिष्ट सांस्कृतिक नृत्यों को आयोजित करना एवं ऐसे ही अन्य घटक सम्मिलित होंगे।

16.18 आवर्ती व्ययों के लिए विद्यमान राज्यांश 50 प्रतिशत से 90 प्रतिशत के साथ राज्यों का अंश दस प्रतिशत कर केन्द्रीय भाग को बढ़ाकर पूर्वोत्तर राज्यों के संबंध में वित्त पोषण की पद्धति में परिवर्तन करना और अनावर्ती व्ययों के लिए विद्यमान समर्थन सौ प्रतिशत जारी रखना,—

व्याघ्र परियोजना स्कीम के अंतर्गत पूर्वोत्तर राज्यों में केन्द्र से विनियोजन के बावजूद आवर्ती क्रियाकलापों हेतु अनुकूल अथवा समान राज्यांश की अनुपलब्धता के कारण क्षेत्र संरचनाओं (व्याघ्र आरक्ष) को केन्द्रीय सहायता अवमुक्त करने में काफी विलम्ब होता है। आवर्ती घटकों के वित्तपोषण हेतु केन्द्रांश वृद्धि की मांग की जाती रही है। तदनुसार, व्ययों के आवर्ती मद के लिये केन्द्रीय भाग को 50 प्रतिशत से बढ़ाकर 90 प्रतिशत कर दिया गया है।

16.19 मानव पशु संघर्षों के लिए मानव जीवन की हानि की दशा में प्रतिकर दो लाख रुपए तक बढ़ाना, गंभीर शारीरिक क्षति के लिए उपर्युक्त का तीस प्रतिशत और छोटी क्षतियों के लिए उपचार की लागत (अनावर्ती),—

व्याघ्र आरक्षितियों के कोड क्षेत्रों से वन्य पशुओं के बाहर निकलने के कारण बहुधा मानव-वन्यजीव अन्तरापृष्ठ अत्यन्त संवेदनशील होता है। विनाश के कारण हुई क्षति की पर्याप्तरूपेण क्षतिपूर्ति प्रतिशोध्यात्मक हत्याओं को रोकने के लिए आवश्यक है। मानव वन्यजीव संघर्षों की प्रतिपूर्ति मानव जीवन की क्षति/मृत्यु की दशा में यह राशि दुगुनी करते हुये एक लाख रुपए से दो लाख रुपए कर दी गयी है, जबकि गंभीर शारीरिक चोट अथवा क्षति हेतु प्रतिपूर्ति उपर्युक्त धनराशि को 30 प्रतिशत पर कायम रखी गयी है एवं वन्यजीव के कारण हुई छोटी क्षतियों के मामले में उपचार का व्यय वहन की व्यवस्था की गयी है।

16.20 कोड और क्रांतिक व्याघ्र प्राकृतवास को अनतिक्रान्त बनाने के लिए निजी भूमि का अर्जन (अनावर्ती)।

कई व्याघ्र आरक्षों में, कोड एवं क्रांतिक व्याघ्र प्राकृतवास के अंतर्गत निजी भूमि धृति/सम्पदा है। उपरोक्त घटक को, कोड और क्रांतिक व्याघ्र प्राकृतवास को अनतिक्रान्त बनाने के लिये, राज्यों को, यदि आवश्यक हो तो ऐसे क्षेत्रों को अधिगृहीत/अर्जित करने हेतु, 100 प्रतिशत केन्द्रीय सहायता उपलब्ध कराने के लिये 'व्याघ्र परियोजना' स्कीम में सम्मिलित किया गया है।

16.21 'मध्यवर्ती और सीमांत क्षेत्रों में सह-अस्तित्व कार्यावली' के विद्यमान घटक के अधीन व्याघ्र सफारी व्याख्या एवं जागरूकता केन्द्र की स्थापना और संबंधित पंचायती राज्य संस्थानों के माध्यम से ऐसे केन्द्रों का प्रबंधन (सृजन-अनावर्ती, अनुक्षण-आवर्ती),—

ऐसे व्याघ्र आरक्षों, जिनके कोड/क्रांतिक व्याघ्र प्राकृतवास में व्याघ्र दर्शन हेतु पर्यटकों का अपरिमित आगम होता है, के बफर क्षेत्र में, व्याघ्र सफारी स्थापित किये जा सकते हैं। ऐसे बफर क्षेत्र में जन सहयोग प्राप्ति हेतु जागरूकता बढ़ाने के लिये व्याख्या एवं जागरूकता केन्द्रों को भी सहायता दी जायेगी। इन केन्द्रों का प्रबंधन संबंधित पंचायती राज (पी.आर.) संस्थानों के माध्यम से होगा।

16.22 मध्यप्रदेश और राजस्थान राज्यों में स्कीम के अधीन 50 करोड़ रुपए की लागत पर चीता की अन्य मॉसभक्षियों, विशेषतया व्याघ्रों के साथ ऐतिहासिक सह-अस्तित्व को सुनिश्चित करने के पश्चात् पुनः प्रवेशन,—

वृहत मॉसभक्षियों के पुनः प्रवेशन को संकटग्रस्त प्रजातियों के संरक्षण और पारि-तंत्र कृत्यों को पुनर्स्थापित करने की रणनीति के रूप में उत्तरोत्तर मान्यता मिलती रही है। चीता एकमात्र वृहत मॉसभक्षी है जो ऐतिहासिक समय में भारत में अत्यधिक शिकार के कारण विलुप्त हो चुका है। भारतीय वन्य जीव संस्थान के साथ अंतर्वर्तित विशेषज्ञ दल की सिफारिशों के आधार पर पर्यावरण और वन मंत्रालय ने राजस्थान राज्य (शाहागढ़ क्षेत्र) और मध्य प्रदेश राज्य (कूनो-पालपुर और नोरा देई अभयारण्यों) में चीता का पुनः प्रवेशन विनिश्चित किया है। उक्त राज्यों को गांवों के पुनर्स्थापन, प्राकृतवास प्रबंध और पुनर्स्थापन, धृति सुविधा, पशु चिकित्सा सुविधा, प्रशिक्षण वृत्तिकों, अनुश्रवण, चीता के प्रापण, सीमावर्ती क्षेत्र में पारि विकास और अनुक्षण के मद में सौ प्रतिशत समर्थन प्राप्त होगा।

राज्य द्वारा समझौता ज्ञापन

17. व्याघ्र आरक्षित राज्यों को पर्यावरण और वन मंत्रालय के साथ परिशिष्ट 'ग' में यथा उपबंधित रूप विधान में त्रिपक्षीय समझौता ज्ञापन हस्ताक्षरित करने की आवश्यकता होगी।

18. व्याघ्र आरक्षित वन्य जीव (संरक्षण) अधिनियम, 1972, यथा संशोधित, 2006 की धारा 38फ के अधीन अपेक्षित आरक्ष विशिष्ट व्याघ्र संरक्षण योजना के आधार पर व्याघ्र परियोजना की केन्द्रीय प्रायोजित स्कीम के अधीन समर्थित वित्त पोषण प्राप्त कर सकेंगे। यह राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा जारी मार्गनिर्देशों के अंतर्गत होनी चाहिए। वन्यजीव (संरक्षण) अधिनियम, 1972 के उपबंधों के सापेक्ष व्याघ्र संरक्षण योजना के तैयार होने और उसका अनुमोदन होने तक व्याघ्र राज्य से एक अंतरिम परिचयात्मक/निर्देशात्मक व्याघ्र संरक्षण योजना प्रेषण की अपेक्षा होगी जो व्याघ्र परियोजना के अंतर्गत वार्षिक कार्य प्रचालन हेतु वित्त पोषण समर्थन प्राप्ति का आधार होगी।

19. स्थानीय जनबल के अभियोजन, मानव वन्यजीव संघर्ष से संबंधित मुद्दे, आजीविका विकल्पों, ग्राम पुनर्स्थापन एवं पारि-पर्यटन हेतु विचार-विमर्श के माध्यम से पंचायती राज संस्थानों की केन्द्रीयता सुनिश्चित की जानी चाहिए।

पर्यावरण और वन मंत्रालय
(राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण)
बीकानेर हाउस, शाहजहां रोड, नई दिल्ली
.....सरकार और क्षेत्र निदेशक.....व्याघ्र आरक्षिति
के बीच त्रिपक्षीय समझौता ज्ञापन

भारत सरकार ने राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के स्थापना के माध्यम से अपने व्याघ्र संरक्षण कार्यक्रम को पुनः तैयार किया है। भारत के राष्ट्रीय पशु व्याघ्र के संरक्षण की अत्यावश्यकता केन्द्र सरकार, राज्य सरकार और व्याघ्र आरक्षिति प्रबंधन पर महती उत्तरदायित्व आदिष्ट करती है, जिसका प्रभावी उन्मोचन अनिवार्य है। यह त्रिपक्षीय ज्ञापन देश में प्रभावी व्याघ्र संरक्षण को सुनिश्चित करने हेतु क्रमशः अपने अपने उत्तरदायित्वों और पारस्परिक वचन-बद्धताओं से संबंधित निधियों के प्रवाह को सुनिश्चित करता है।

यह त्रिपक्षीय समझौता ज्ञापन राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण, एनेक्सी संख्या 5, बीकानेर हाउस, शाहजहां रोड, नई दिल्ली-110011 (जिसे इसमें इसके पश्चात् 'रा.व्या.सं.प्रा.' कहा गया है) के माध्यम से पर्यावरण और वन मंत्रालय, प्रथम पक्षकार, (पदाभिधान और कार्यालय का पता)..... राज्य सरकार (जिसे इसके पश्चात् राज्य सरकार कहा गया है), द्वितीय पक्षकार और व्याघ्र आरक्षिति.....के क्षेत्र निदेशक (जिसे इसके पश्चात् क्षेत्र निदेशक कहा गया है), तृतीय पक्षकार के मध्य मास..... तारीख.....वर्षको किया गया।

राज्य सरकार ने पर्यावरण और वन मंत्रालय को क्षेत्र निदेशक के माध्यम से व्याघ्र आरक्षितिजिसे इसमें इसके पश्चात् “.....” के रूप में निर्दिष्ट किया गया है, के संरक्षण और विकास के लिए वित्तीय सहायता के लिए एक प्रस्ताव प्रस्तुत किया है।

और पर्यावरण और वन मंत्रालय वर्ष 2009 -2010 और उसके पश्चात् के लिए नीचे दिए गए निबंधनों और शर्तों पर, उक्त कार्य के अनुमोदित मदों के लिए विस्तारित वित्तीय समर्थन देने के लिए तैयार और इच्छुक है।

अतः, अब, पक्षकारों के मध्य निम्नलिखित सहमति हुई है :

अनुच्छेद 1

पर्यावरण और वन मंत्रालय (रा.व्या.सं.प्रा. के माध्यम से) की निम्नलिखित बाध्यताएं।

पर्यावरण और वन मंत्रालय निम्नलिखित सहमति और अभिपुष्टि करता है कि :-

(1) व्याघ्र परियोजना के अधीन वित्त पोषण का समर्थन व्याघ्र आरक्षिति को “व्याघ्र संरक्षण योजना” विनिर्दिष्ट व्याघ्र आरक्षिति पर आधारित प्रस्तावित क्षेत्र की पहल के लिए लागत के प्रचालन के वार्षिक योजना की प्राप्ति पर दो चरणों में उपलब्ध होगा।

(2) व्याघ्र परियोजना के अधीन वित्त पोषण की पहली किस्त निधि की उपलब्धता और वित्त मंत्रालय के निदेशों के अधीन संबंधित राज्य सरकार से प्रचालन की वार्षिक योजना की प्राप्ति के पश्चात् चार सप्ताह के भीतर देनी होगी।

(3) व्याघ्र परियोजना के अधीन वित्त पोषण की दूसरी किस्त राज्य सरकार से पूर्ववर्ती वर्ष के संबंधित उपयोगिता प्रमाण पत्र वर्तमान वित्तीय वर्ष के दौरान पहली किस्त के रूप में अवमुक्त वित्त पोषण के समर्थन की साठ

प्रतिशत उपयोगिता रिपोर्ट के साथ, और राज्य सरकार के मुख्य वन्य जीव प्रतिपालक द्वारा सम्यक् रूप से अनुशंसित क्षेत्र निदेशक से वांछित प्रपत्र में प्रगति रिपोर्ट की प्राप्ति के पश्चात् दो सप्ताह के भीतर अवमुक्त होगी ।

(4) व्याघ्रों के संरक्षण और उनके प्राकृतवास की बावत वन्य जीव (संरक्षण) अधिनियम, 1972 के प्राविधानों की परिधि के भीतर राज्य सरकार को सूचना के अधीन व्याघ्र आरक्ष के क्षेत्र निदेशक को तकनीकी मार्गनिर्देश उपलब्ध कराया जायेगा ।

(5) आरक्षिति में किए गए विनिवेश के प्रभाव पर एक पारिस्थितिकीय सम्प्रेक्षण विहित मानदंडों के अनुसार करानी होगी ।

अनुच्छेद -2

.....राज्य सरकार की बाध्यताएं

राज्य सरकार निम्नलिखित सहमति और अभिपुष्टि करती है कि :-

(1) व्याघ्र आरक्ष, व्याघ्र संरक्षण योजना वन्य जीव, (संरक्षण) अधिनियम, 1972 यथा संशोधित 2006 की धारा 38 फ के अधीन यथा अपेक्षित व्याघ्र संरक्षण के लिए तैयार करेगा जिसके लिए से छह मास के भीतर विहित मार्गनिदेशों के अनुसार.....से वित्त पोषण है ।

(2) क्रोड या क्रांतिक व्याघ्र प्राकृतवास और बफर अथवा उपान्त क्षेत्रों की रूपरेखा और अधिसूचना..... से छह मास के भीतर वन्य जीव (संरक्षण) अधिनियम, 1972 यथा संशोधित, 2006 के अधीन यथा अपेक्षित अधिचिन्हित एवं अधिसूचित होगी ।

(3) कर्मचारीवृंद की रिक्तियां..... से छह मास के भीतर स्थान विज्ञान अथवा स्थलाकृति के साथ साथ नियत क्षेत्र मानकों के निर्धारण के पश्चात् प्रभावी क्रियान्वयन सुनिश्चित करने और क्षेत्र संरक्षण के लिए.....द्वारा भरी जानी होंगी ।

(4) व्याघ्र परियोजना के अधीन अवमुक्त धन व्याघ्र आरक्षिति पहल के कार्यान्वयन के लिए प्रचालन की वार्षिक योजना में यथा प्रस्तावित, उक्त प्राधिकरण के नियामक मार्गनिर्देशों और परामर्शों के सम्यक् अनुपालन के साथ राज्य को इसकी प्राप्ति के दो सप्ताह के भीतर व्याघ्र आरक्षिति को उपलब्ध कराना होगा ।

(5) राज्य सरकार, व्याघ्र आरक्षिति के क्षेत्र निदेशक के रूप में अधिमानतः वन्य जीव प्रबंध में प्रशिक्षित और सिद्ध सेवा कीर्ति वाले प्रेरणादायक अधिकारी को नियुक्त करेगी जिसकी न्यूनतम पदावधि तीन वर्ष होगी (जिसे परिस्थितियों की मांग पर बढ़ाया जा सकेगा) ।

(6) राज्य सरकार, मुख्यमंत्री की अध्यक्षता के अधीन,..... से एक वर्ष के भीतर समन्वय, अनुश्रवण, व्याघ्रों एवं सह परभक्षी और भक्ष्य पशुओं की सुरक्षा और संरक्षण, सुनिश्चित करने के लिए वन्य जीव (संरक्षण) अधिनियम, 1972, 2006 में यथा संशोधित, की धारा 38 फ के अधीन यथा अपेक्षित अभिचालन/संचालन समिति का गठन करेगी।

(7) राज्य सरकार, किसी विनिर्दिष्ट व्याघ्र आरक्षिति के लिए स्वायत्त “लाभ केन्द्रों” के रूप में किसी व्याघ्र संरक्षण प्रतिष्ठान की स्थापना, व्याघ्र संरक्षण और पारिस्थितिकी विकास के लिए जारी मार्गनिर्देशों के अनुसार इसके प्रबंध को प्रसुविधा और समर्थन देने के लिए करेगी, जिसमें स्थानीय लोग अंतर्वर्तित होंगे एवं जो सरकार द्वारा पर्यटन द्वार पर संग्रहण, राज्य सरकार से सहायता एवं शासन तथा योजना प्राधिकारियों से अन्य निधियां प्राप्त करने के लिए सशक्त होगा जिससे “विकास निधि” सृजित करेगा और.....से छह मास के भीतर आरक्षिति, स्थानीय व्यक्तियों और कर्मचारीवृंद के लाभ के लिये परिनियोजित करेगा ।

(8) राज्य सरकार, स्थानीय सतर्कता प्राप्त करने और व्याघ्र आरक्षितियों की सुरक्षा के लिए कार्यवाही को बढ़ावा देगी और आवधिक “सुरक्षा संपरीक्षा” के उपबंधों के साथ यह “सुरक्षा योजना” व्याघ्र संरक्षण योजना का भाग होगी।

(9) राज्य सरकार व्याघ्र संरक्षण योजना के भाग के रूप में बनाई गई किसी क्षमतावर्धन योजना पर आधारित कर्मचारीवृंद विकास और कर्मचारीवृंद कल्याणकारी उपाय के अतिरिक्त प्रभावी प्रवर्तन के लिए मुख्य धारा के कर्मचारीवृंदों की क्षमता वर्धन सुनिश्चित करेगी ।

- (10) राज्य सरकार,.....से एक वर्ष के भीतर राज्य के आरक्षित हेतु आगणित धारक क्षमता के अनुसार पर्यटन को विनियमित करेगी तथा वन एवं वन्य जीव पर्यटन नीति का विकास करेगी ।
- (11) राज्य सरकार, समयबद्ध रूप से, व्याघ्र परियोजना के पुनरीक्षित मार्गनिर्देशों और वैधानिक प्राविधानों के अनुसार कोड/क्रांतिक व्याघ्र प्राकृतवासों से ग्रामों के पुनः स्थान निर्धारण के लिए बड़े हुये पुनर्स्थापन पैकेज के अनुसार सहायता प्राप्त करेगी ।
- (12) राज्य सरकार, प्रादेशिक वन प्रभागों अथवा मंडलों एवं राजस्व प्राधिकारियों की सक्रिय सहभागिता के साथ, जिसमें शासन तंत्र के बाहर विश्वास्य अभिकरणों अथवा संस्थाओं द्वारा आश्रयदान का अवसर हो, परिदृश्य में व्याघ्र संरक्षण को विभिन्न कार्यक्षेत्रों अथवा सैक्टरों के अंतर्गत मुख्य धारा से जोड़कर व्याघ्र आरक्षों से चिन्हित गलियारा संयोजकता को प्रत्यावर्तित करने हेतु कदम उठायेगी ।
- (13) यह सुनिश्चित करते हुये कि नियमित वन प्रभागों अथवा मंडलों एवं वैसे आसन्न व्याघ्र आरक्षों के वानिकी प्रचालन कार्य तथा व्याघ्र संरक्षण की आवश्यकतायें परस्पर विरोधी न हों, राज्य सरकार एक व्याघ्र आरक्ष को दूसरे व्याघ्र आरक्ष से जोड़ने वाले क्षेत्रों में पारिस्थितिकीय रूप से उपयुक्त भूमि-उपयोग सुनिश्चित करेगी ।
- (14) राज्य सरकार, यह प्रमाणित करेगी कि पारिस्थितिकीय रूप से अधारणीय भूमि उपयोग जैसे खान, उद्योग और समान परियोजना का प्रचालन व्याघ्र आरक्षित के भीतर नहीं होता है ।
- (15) राज्य सरकार को यह सुनिश्चित करना होगा कि राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (व्याघ्र परियोजना) द्वारा जारी परामर्शी के अनुसार व्याघ्र आरक्षित में, किसी अनुचित घटना की भविष्यवाणी की प्रसुविधा के लिए व्याघ्र अनुश्रवण संलेख/नयाचार का दिन प्रतिदिन पालन किया जाता है ।
- (16) राज्य सरकार वन्य जीव मुद्दों को मुख्यधारा से जोड़ते हुये जनसहायता प्राप्त करने हेतु मानव वन्य प्राणी अन्तरापृष्ठ को सम्बोधित करने के अतिरिक्त स्थानीय लोगों एवं वन्य प्राणियों को लाभ पहुँचाने के उद्देश्य से व्याघ्र आरक्ष से बफर क्षेत्र का सक्रिय प्रबन्धन सुनिश्चित करेगी ।
- (17) राज्य आरक्षित, व्याघ्र संरक्षण योजना और निष्पादन के ब्यौरे..... से छह माह के भीतर अपनी शासकीय वेबसाइट पर सार्वजनिक डोमिन पर रखेगा । इसके अतिरिक्त लोक जागरण के संवर्धन हेतु स्थानीय भाषा में उसे उपलब्ध कराएगा ।
- (18) राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा अवमुक्त धन प्रचालन की वार्षिक योजना में प्रस्तावित कार्यों को करने के लिए, उक्त प्राधिकरण के नियामक मार्गनिर्देशों और परामर्शी के सम्यक् अनुपालन के साथ व्याघ्र आरक्षित को तत्काल उपलब्ध कराना होगा ।
- (19) व्याघ्र आरक्षित का प्रभारी निदेशक/ अधिकारी राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण और राज्य सरकार द्वारा निर्धारित मानकों और विहित प्रक्रिया के अनुसार योजना के तत्काल निष्पादन के लिए राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा उपलब्ध कराए गए धन को व्यय करने को सशक्त होगा ।
- (20) राज्य सरकार, यह सुनिश्चित करेगी कि राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा अवमुक्त अनुदान के खाते वार्षिक आधार पर राज्य सरकार के कानूनी संपरीक्षा द्वारा संपरीक्षित होंगे और प्रत्येक वर्ष 31 मई तक वार्षिक रूप से राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को इससे संबंधित प्रमाण पत्र के साथ भेजने होंगे ।

अनुच्छेद III

क्षेत्र निदेशक व्याघ्र आरक्षित की बाध्यताएं

क्षेत्र निदेशक व्याघ्र आरक्षित ने सहमति दी है और यह अभिपुष्ट किया है कि :-

- (1) आरक्षित के लिए उसकी शक्ति, दुर्बलता, अवसर और खतरे को ध्यान में रखते हुए एक सुरक्षा योजना बनाई जाएगी, जो व्याघ्र, अन्य वन्य जीवों की सुरक्षा और प्राकृतवास के आसूचना आधारित प्रवर्तन को सुनिश्चित करने के लिए व्याघ्र संरक्षण योजना का भाग होगी ।
- (2) व्याघ्र और अन्य वन्य जीवों के लिए दिन-प्रतिदिन प्राकृतवास में अप्रिय घटना के पूर्वानुमान को सुनिश्चित करने के लिए राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा यथाविहित अनुश्रवण नयाचार/संलेख का सम्यक् रूप से अनुसरण किया जाएगा ।
- (3) व्याघ्र संरक्षण योजना कोड, बफर और निकटस्थ क्षेत्रों के लिए निर्धारण सहित राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा जारी मार्गदर्शक सिद्धांतों के अनुसार छः महीने की समयसीमा के भीतर तैयार की जाएगी ।

- (4) आरक्षिति में फील्ड कार्य करने की सामर्थ्य सहित उचित आयु समूह में अग्रणी फील्ड कर्मचारीवृंद की उपलब्धता सुनिश्चित करने के लिए एक कर्मचारी विकास योजना तैयार की जानी चाहिए और उसे राज्य सरकार के समक्ष प्रस्तुत करना चाहिए ।
- (5) बफर और बाह्य परिदृश्य में व्याघ्र संरक्षण को मुख्य धारा में लाने के लिए व्याघ्र की सुरक्षा के लिये लाभार्थियों से पारस्परिक वचनबद्धता सहित व्याघ्र आरक्षिति पर अनुषंगी निवासियों की निर्भरता को कम करने के लिए, उनको जीविका का विकल्प देने के लिए विभिन्न जिला स्तर स्कीमों के क्षेत्रीय समांकलन के माध्यम से पहल की जानी चाहिए ।
- (6) व्याघ्र और अन्य वन्य जीवों को प्रतिशोध की भावना से मारने को रोकने के लिए मानव-वन्य जीव द्वंद्व के समय पर निपटारे को सुनिश्चित किया जाना होगा ।
- (7) स्थानीय कार्य करने के लिए राज्यों/केन्द्रीय सरकार से प्रवेश द्वार पर प्राप्त होने वाली प्राप्तियों और अन्य प्राप्तियों के लिए पात्र के रूप में आरक्षिति के लिए एक व्याघ्र संरक्षण प्रतिष्ठान की स्थापना की जाएगी ।
- (8) प्रचालन की वार्षिक योजना में राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण से वित्त पोषण सहायता के लिए व्याघ्र संरक्षण योजना का सन्दर्भ होगा ।
- (9) क्षेत्र निदेशक द्वारा तैयार किये गए व्यय प्राक्कलन राज्य सरकार की अनुमोदित दरों की अनुसूची पर आधारित होना चाहिए ।
- (10) प्रचालन की वार्षिक योजना में प्राक्कलन के आधार सहित भौतिक लक्ष्य, वित्तीय लक्ष्य और इकाई दर के साथ नक्शे में प्रस्तावित अभिक्रम/अभिक्रमों का अवस्थान/क्षेत्र उपदर्शित होगा ।
- (11) प्रगति रिपोर्ट में निरपवाद रूप से भौतिक उपलब्धि (जैसे मात्रा, संख्या, अवस्थान उपदर्शित करने वाला क्षेत्र) और प्रस्तावित क्रियाकलापों के कार्यान्वयन पर पूरे किए गए उद्देश्य उपदर्शित किए जाने चाहिए ।
- (12) पर्यवेक्षण दौरों के दौरान सत्यापन को सुगम बनाने के लिए भौतिक लक्ष्यों की एक वर्षवार फोटो-विवरण पत्रिका रखी जाएगी ।
- (13) निष्पादन के दौरान कार्यस्थल के निकट प्राक्कलन के ब्यौरे, उसमें लगे मानव दिवस आदि प्रदर्शित किए जाएंगे ।
- (14) वित्त वर्ष की समाप्ति के पश्चात् राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को वार्षिक रूप से अव्ययित शेष, यदि कोई हो, दर्शाते हुए उपयोगिता प्रमाणपत्र दिया जाएगा जिससे वह प्रत्येक वर्ष के 31 मई तक इस कार्यालय में पहुंच जाए । कार्य की समाप्ति पर तुरंत पूर्ण उपयोगिता प्रमाणपत्र प्रस्तुत किया जाएगा ।
- (15) राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा दिए गए अनुदानों के लेखे संपरीक्षा की अपेक्षाओं के अनुसार रखे जाएंगे और राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण/संपरीक्षा द्वारा निरीक्षण के लिए खुले रहेंगे । इन खातों की एक प्रति राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को भी जारी की जायेगी । निर्माण अथवा प्राकृत्वास सुधार कार्यों के प्रकरण में, मापन-पुस्तिकाओं की छायां प्रतियाँ (ऐसे कार्यों के लिये जिन्हें राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के अनुदान से निष्पादित किया गया था) भी राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को प्रेषित की जायेंगी । अव्ययित राशि का विवरण, यदि कोई हो तो अव्ययित बचत या पुनर्वैधीकरण के रूप में समायोजन हेतु प्राधिकरण को सूचित किय जायेगा ।
- (16) निधियों का प्रयोग केवल उस प्रयोजन के लिए किया जाएगा जिसके लिए वह मंजूर की गई थी । निधियों का अपयोजन राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के पूर्व अनुमोदन के बिना अनुज्ञात नहीं होगा ।
- (17) राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा दिए गए अनुदान से अर्जित सभी आस्तियों के अभिलेख संपरीक्षा की समीक्षा के लिए उपलब्ध कराए जाएंगे । ऐसी आस्तियों का निपटान, विल्लंगम या उपयोग उस प्रयोजन से भिन्न, जिसके लिए अनुदान मंजूर किया गया है, किसी कार्य के लिए भारत सरकार/राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के पूर्व अनुमोदन के बिना नहीं किया जाएगा ।
- (18) राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा दिए गए अनुदान से सृजित आस्तियों के निष्कर्षण को दर्शाने वाला विवरण वार्षिक रूप से प्रत्येक वर्ष की 31 मई तक राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को दिया जाएगा ।

(19) स्थानीय कार्य बल को अभिनियोजित करते समय व्याघ्र आरक्षित प्रबंधन को ग्राम सभा से परामर्श करना चाहिए जिससे सभा के सदस्य क्षेत्र के बारे में भौगोलिक और अन्य संबंधित सूचना से सुपरिचित हो जाए ।

(20) 1. मवेशी उत्थापन, फसल विध्वंस, मनुष्यों की क्षति या मृत्यु के लिए प्रतिकर, जिला परिषद् से परामर्श करके विनिश्चित किया जाना चाहिए ।

2. व्याघ्र आरक्षित प्रबंधन को फसल सुरक्षा उपायों और मानव-वन्य जीव द्वंद्व से संबंधित अन्य अभिक्रमों को कार्यान्वित करते समय संबंधित ग्राम पंचायत से समन्वय करना चाहिए ।

(21) व्याघ्र आरक्षित प्रबंधन को ग्रामीणों की वनों पर निर्भरता को कम करने के लिए पारिस्थितिकीय जीवन योग्य जीविका विकल्प देने के लिए पंचायती राज संस्थाओं से परामर्श करना चाहिए । बाहरी क्षेत्रों से जाने वाले पशुओं के लिए पूरक प्राकृतवास की व्यवस्था करने के क्रम में बफर क्षेत्रों में आने वाले वन को प्रत्यावर्तित करने के लिए ग्राम सभा को सम्मिलित किया जाना चाहिए ।

(22) विकल्प -I या विकल्प-II के अधीन प्रतिकर पैकेज के भुगतान और उपयोगिता का अनुश्रवण करने के लिए जिला परिषद् को सम्मिलित करना चाहिए ।

(23) विकल्प-II की दशा में वन विभाग द्वारा संरक्षित क्षेत्र/ व्याघ्र आरक्षित से पुनः अवस्थान/पुनर्वास ग्राम सभा से परामर्श करके करना चाहिए ।

(24) अन्य क्षेत्रों से समरूपता सुनिश्चित करने के लिए जिला परिषद् अध्यक्ष को जिला स्तरीय कार्यान्वयन समिति का सदस्य होना चाहिए ।

(25) पुनः अवस्थित गांव में जिला स्तर स्कीमों का कार्यान्वयन और अनुश्रवण ग्राम पंचायत/ग्राम सभा के माध्यम से करना चाहिए ।

(26) पुनः अवस्थान प्रक्रिया से संबंधित श्रमिक अभिमुखी कार्यों की पहचान करने में यह सुनिश्चित करने के लिए कि पुनः अवस्थित ग्रामीणों को उनके श्रम के लिए यथोचित पारिश्रमिक मिला है, ग्राम पंचायत/ग्राम सभा को सम्मिलित करना चाहिए ।

(27) वन भूमि पर पुनः परिनिर्धारण की दशा में नया परिनिर्धारण ग्राम सभा द्वारा यथा प्रमाणित उनके पारंपरिक वन अधिकारों पर आधारित वन संसाधनों की पहुंच के योग्य होना चाहिए ।

(28) पुनः अवस्थित गांव के नजदीक उचित मूल्य की दुकानों, विद्यालयों, स्वास्थ्य केन्द्रों आदि के लिए स्थान विनिश्चित करते समय ग्राम पंचायत/ग्राम सभा की सिफारिशें ली जानी चाहिए ।

(29) सेवाओं, कार्यकलापों और पारि-पर्यटन में लगे कार्मिकों की पहचान करने के लिए ग्राम पंचायत/ग्राम सभा से परामर्श करना चाहिए ।

(30) पंचायत (अनुसूचित क्षेत्रों का प्रसार) अधिनियम, 1996 के अधीन पुनर्वास/कल्याण पैकेज पर, यथास्थिति, स्थानीय पारंपरिक ग्राम परिषद् या ग्राम सभा से यह सुनिश्चित करने के लिए परामर्श करना चाहिए कि ऐसे जनजातीय व्यक्तियों को जीविका विकल्पों के साथ ही 2006 में यथासंशोधित वन्य जीव (संरक्षण) अधिनियम, 1972 में अंतर्विष्ट कानूनी उपबंधों के अनुरूप स्वास्थ्य देखभाल, शिक्षा और आवास सुविधाएं दी गई हैं ।

अनुच्छेद IV

(स्थल-विनिर्दिष्ट कार्रवाई)

कुछ व्याघ्र आरक्षित में उनके अद्वितीय भौगोलिक और अन्य विशेषताओं के लिए विशेष हस्तक्षेप आवश्यक हो सकेगा ।

उदाहरण :

1. सीमा पर अवस्थित आरक्षित और संवेदनशील क्षेत्रों में आसूचना आधारित प्रवर्तन/अवैध शिकार रोधी सक्रियाओं पर सकारात्मक क्रियाशील कदम ।
2. काजीरंगा में वन्य जीवों के मृत्यु की रोकथाम करने के लिए सकारात्मक क्रियाशील कदम ।
3. अग्नि संभावित प्राकृतवासों के लिए सकारात्मक क्रियाशील कदम ।
4. सूखा संभावित प्राकृतवासों के लिए सकारात्मक क्रियाशील कदम ।
5. विप्लव/ विद्रोह और उससे संबंधित समस्याओं से प्रभावित क्षेत्रों के लिए अभिनव कदम ।
6. सुंदरवन जैसे प्राकृतवास-स्थलों में व्याघ्रों के मानव बस्तियों में बारंबार भटकने जैसे विवादाओं पर संबोधन आदि के लिए अभिनव कदम ।

अनुच्छेद V

समझौता ज्ञापन के निबंधनों के अननुपालन के परिणाम

(राज्य सरकार और फील्ड निदेशक द्वारा समझौता ज्ञापन के निबंधनों के अननुपालन की दशा में)

1. व्याघ्र परियोजना के अधीन वित्त पोषण सहायता को रोकना ।
2. राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा प्रथम किस्त से संबंधित उपयोगिता प्रमाणपत्र प्राप्त नहीं किए जाने की दशा में द्वितीय किस्त नहीं दी जाएगी ।
3. समझौता ज्ञापन की अननुषक्ति/अननुपालन ऐसे अभिक्रमों को रोकने का कारण हो सकेगी, जो व्याघ्र आरक्षित के पदाधिकारियों और कर्मचारियों को दी जाए ।
4. समझौता ज्ञापन के अननुपालन पर व्याघ्र और उसके आवास का नुकसान और राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के कानूनी उपबंधों के अतिक्रमण पर राज्य सरकार के माध्यम से क्षेत्र निदेशक पर दंडिक कार्रवाई हो सकेगी ।

साक्षी जिसके समक्ष, इस अवबोध ज्ञापन के सम्यक् रूप से प्राधिकृत पक्षकारों के प्रतिनिधियों ने आज दिन, मास और वर्ष को इस प्रथम बार पूर्वोक्त लिखित अवबोध ज्ञापन पर हस्ताक्षर किए हैं ।

राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के लिए और उसकी ओर से हस्ताक्षरित	सरकार के लिए और उसकी ओर से हस्ताक्षरित	फील्ड निदेशक..... व्याघ्र आरक्षित
नाम और पदनाम (मुहर सहित) तारीख :	नाम और पदनाम (मुहर सहित) तारीख :	नाम और पदनाम (मुहर सहित) तारीख :

भाग -ख

व्याघ्र आरक्षितियों और उनके आसपास पर्यटन के लिए मार्गदर्शक सिद्धांत

प्रस्तावना.—

स्वस्थ प्राकृतिक पारि-तंत्र सभी जीवित सत्ताओं के पारिस्थितिकीय कल्याण के लिये गुणागुणज्ञ है और विशेषकर जनता की आर्थिक सुरक्षा के लिए । पारि-पर्यटन के रूप में पर्यटन प्राकृतिक पारि-तंत्र के आसपास बड़ी संख्या में रहने वाले लोगों के लिए प्रकृति के अनुकूल स्थानीय जीविका और अधिक आय की व्यवस्था करके उससे स्थानीय समुदाय, पणधारी और स्वामियों को इस प्रक्रिया में लाकर वन्य जीव या वन क्षेत्रों की सुरक्षा में प्रत्यक्षतः योगदान पहुँचाने में सक्षम है ।

केंद्रीय सरकार, यह पहचान करने की दृष्टि से कि व्याघ्र आरक्षित और उनके परिदृश्य विविध है, संबंधित राज्य सरकारों द्वारा विकसित किए जाने वाले विनिर्दिष्ट राज्य पर्यटन/पारि-पर्यटन रणनीतियों और संबंधित प्राधिकारियों द्वारा विकसित किए जाने वाले पर्यटन/पारि-पर्यटन योजनाओं के लिए व्याघ्र आरक्षितियों में पर्यटन का चयन, योजना निर्माण, विकास, कार्यान्वयन और अनुश्रवण करने की रूपरेखा मार्गदर्शक सिद्धांत अधिकथित करना आवश्यक समझती है ।

इन मार्गदर्शक सिद्धांतों का गठन अन्य प्रवृत्त कानून के अतिरिक्त वन्यजीव (संरक्षण) अधिनियम, 1972 (डब्लू. एल.पी.ए.) की धारा 38—ण (1) (ग), अनुसूचित जनजाति एवं अन्य परम्परागत वन निवासी (वनाधिकारों की मान्यता) अधिनियम, 2006 के प्राविधानों (एफ.आर.ए.), पंचायत (अनुसूचित क्षेत्रों के लिये विस्तार) अधिनियम, 1996 (पी.ई.एस. ए.) एवं भारतीय संविधान के नवें भाग के अंतर्गत किया गया है । ये मार्गदर्शक सिद्धांत व्याघ्र परियोजना की केन्द्र प्रवर्तित योजना के मार्ग निर्देशों से आनुरूप्यता रखते हैं ।

1. मार्गदर्शक सिद्धांतों की आवश्यकता

1.1 इन मार्गदर्शक सिद्धांतों का उद्देश्य वन्य जीव पर्यटन से पारि-पर्यटन की ओर उन्मुख होना है, जिसे उन प्राकृतिक क्षेत्रों में दायित्वपूर्ण यात्रा के रूप में परिभाषित किया गया है जिससे पर्यावरण का संरक्षण और स्थानीय व्यक्तियों के कल्याण में सुधार होता है । भारत की विद्यमान परिस्थितियों में, यह प्रस्तावित है कि पर्यटन में ऐसा पारि-पर्यटन सम्मिलित है जो समुदाय आधारित या समुदाय चालित है । लक्ष्य, व्याघ्र आरक्षित के आसपास ऐसे पर्यटन तंत्र की तरफ जाने का होना चाहिए जो प्राथमिक रूप से समुदाय आधारित पर्यटन हो । ऐसा पर्यटन स्थानीय समुदायों के आर्थिक कल्याण को प्रत्यक्ष रूप से लाभान्वित करते हुए, कम संघात वाला, शैक्षणिक और पारिस्थितिकी और पर्यावरण के संरक्षण वाला होना चाहिए ।

1.2 व्याघ्र आरक्षित का प्राथमिक उद्देश्य ऐसे व्याघ्र स्रोत आबादी का संरक्षण करना है जो जैव विविधता संरक्षण के लिए छत्र के रूप में काम करता है । यह क्षेत्र पर्यटन के लिये पारि-तंत्र सेवाओं और अवसरों का पूर्ण समूह उपलब्ध कराता है । ऐसे परिदृश्यों में गैर योजनाबद्ध और अनियंत्रित पर्यटन ऐसे पर्यावरण का विनाश कर सकता है जो प्रथम स्थान में ऐसे पर्यटन को आकर्षित करता है । परिणामस्वरूप, पर्यटन के ऐसे प्रकार की ओर जाने की आवश्यकता है जो दायित्वपूर्ण और इन सुकुमार परिदृश्यों के अनुरूप हो ।

1.3 पर्यटन का व्यवसाय जब समुचित रूप से किया जाए तो एक महत्वपूर्ण आर्थिक और शैक्षिक क्रियाकलाप है । इसमें वृहत्तर चयनित क्षेत्र को जोड़ने की गुंजाइश है और इससे बड़े पैमाने पर जनता में ऐसे पारिस्थितिक तंत्रों के महत्व और सुकुमार्य के बारे में जागरूकता पैदा करते हुए संरक्षण सहायता मिलती है । यह इन सुकुमार परिदृश्यों के आसपास और उन पर निर्भर स्थानीय समुदायों के फायदे के लिए आरण्य क्षेत्रों के गैर विनाशक उपयोग में भी अभिवृद्धि करता है ।

1.4 समुचित योजना निर्माण और विनियम के अभाव में ऐसे व्याघ्र आरक्षितियों के आसपास हाल के वर्षों में पर्यटन सुविधाओं का अल्प अवधि में तेजी से विस्तार हुआ है जिससे सुकुमार पारिस्थितिक तंत्रों का शोषण, तिरस्कार, शांतिभंग और दुरुपयोग हुआ है । इससे प्रायः पारिस्थितिक तंत्रों का अहित और स्थानीय जनता और समुदायों के और विरक्ति के प्रति शब्द 'पारि-पर्यटन' का दुरुपयोग भी हुआ है ।

1.5 ये मार्गदर्शक सिद्धांत व्याघ्र आरक्षितियों में और उसके आसपास के क्षेत्रों के लिए लागू हैं ।

1.6 व्याघ्र आरक्षितियों में और उनके आसपास पर्यटन के सिद्धांत

वे लोग जो पर्यटन क्रियाकलापों को कार्यान्वित करते हैं और उसमें भाग लेते हैं, अन्य बातों के साथ-साथ, निम्नलिखित सिद्धांतों को कार्यान्वित करेंगे :-

- (क) कम संघाती वन्य जीव पर्यटन अपनायें जिससे वन और वन्य जीव क्षेत्रों की पारिस्थितिकीय अखंडता संरक्षित होती है, गंतव्य और इसके आसपास के क्षेत्रों के वन्य जीव मूल्य सुनिश्चित होते हैं ।
- (ख) निर्णय लेना सुकर बनाने के लिए अनुसूचित जनजाति एवं अन्य परम्परागत वन निवासी (वनाधिकारों की मान्यता) अधिनियम, 2006 के प्राविधानों (एफ.आर.ए.) और/या पंचायत (अनुसूचित क्षेत्रों के लिये विस्तार) अधिनियम, 1996 (पी.ई.एस.ए.) में यथा परिभाषित ग्राम सभाओं को साथ ले ।
- (ग) ग्राम सभाओं और अन्य सभी पणधारियों की मुक्त सहभागिता और पूर्व सूचित सहमति सुनिश्चित करें ।
- (घ) स्थानीय समुदायों के कल्याण और आर्थिक उत्थान के लिए वन्य जीव पर्यटन से राजस्व पैदा करने की क्रिया विधि विकसित करें ।
- (ङ) जैव विविधता समृद्धि, उनके मूल्यों और जनता के लिए उनके पारिस्थितिकीय सेवाओं को उजागर करें ।
- (च) भारत का आरण्य और व्याघ्र आरक्षितियों के धरोहर मूल्य को उजागर करें ।
- (छ) पर्यावरणीय, सांस्कृतिक जागरुकता और सम्मान पैदा करें ।
- (ज) पर्यटन उपक्रमों और क्रियाकलापों के पोषण को सुकर बनायें ।
- (झ) स्थानीय समुदायों को जीविका अवसर दें ।
- (ञ) पर्यटन क्रियाकलापों के लिए देशी सामग्रियों के वहनीय उपयोग में अभिवृद्धि करें ।
- (ट) वन निवासियों के संसाधनों, संस्कृति और अधिकारों को नियंत्रित और अनुरक्षित करने की प्रक्रियाओं में अभिवृद्धि करें जिससे नकारात्मक संघातों को कम किया जा सके ।

2. व्याघ्र आरक्षित हेतु राज्य पर्यटन रणनीति विकसित करने के लिए मार्गदर्शक सिद्धांत

निम्नलिखित अनुच्छेदों में प्रत्येक पणधारी के लिए विस्तृत रूपरेखा का उपबंध है :-

केंद्रीय सरकार, और सुसंगत राज्य सरकार के विभाग, वन निवासियों, स्थानीय समुदायों और सिविल सोसाइटी संस्थाओं के बीच सहक्रिया और सहयोग मार्गदर्शक सिद्धांतों के सफल कार्यान्वयन को सुनिश्चित करने के लिए अत्यावश्यक हैं ।

2.1 राज्य सरकारें-

2.1.1 व्याघ्र आरक्षितियों के लिए राज्य स्तरीय पर्यटन/पारि-पर्यटन रणनीति यहां उपबंधित मार्गदर्शक सिद्धांतों की रूपरेखा के अनुकूल होंगी । व्याघ्र आरक्षितियों के आसपास के परिदृश्य के लिए पर्यटन से संबंधित पारिस्थितिकीय रूप से संवेदनशील भूमि उपयोग नीतियां विहित की जायेगी । यह सुनिश्चित करने के लिए यथोचित उपबंध किए जाएंगे कि पारि-पर्यटन स्थानीय समुदायों को छोड़ते हुए शुद्ध रूप से उच्च सीमा, अपवर्जित पर्यटन में हस्तांतरित नहीं हो । पर्यटन विकासकर्ताओं और प्रचालकों द्वारा इन मानकों का अवलम्बन सुनिश्चित करने के क्रम में राज्य नियमों और विनियमों में सुसंगत आशोधन किए जाने चाहिए । राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण/पर्यावरण और वन मंत्रालय द्वारा इन मार्गदर्शक सिद्धांतों की अधिसूचना के एक वर्ष के भीतर सभी राज्य सरकारें राज्य स्तरीय पर्यटन एवं पारि-पर्यटन रणनीति अधिसूचित करेंगी ।

2.1.2 राज्य सरकारें यह सुनिश्चित करने के लिए कि व्याघ्र संरक्षण के प्राथमिक उद्देश्य के साथ कोई समझौता नहीं किया गया है, व्यापक योजना के रूप में वन्य जीव पर्यटन के स्थान पर पारि-पर्यटन के पक्ष में एक राज्य स्तरीय विधान और नीति के विकास का प्रयास करेंगी, जिसके अंतर्गत, अन्य बातों के साथ-साथ, निम्नलिखित होने चाहिए :-

- (i) व्याघ्र आरक्षितियों की अखंडता और संयोजन को बनाये रखना ;

- (ii) स्थानीय समुदायों के अधिकार, उनकी सहभागिता और लाभ में हिस्सेदारी ;
- (iii) सुदृढ़ पर्यावरणीय डिजाइन और देशी सामग्रियों का वहनीय उपयोग ;
- (iv) संरक्षण शिक्षा और प्रशिक्षण ;
- (v) वन्य जीव संरक्षण और स्थानीय समुदायों पर पारि-पर्यटन क्रियाकलापों के संघात का अनुश्रवण और मूल्यांकन के लिए यथोचित तंत्र ;
- (vi) योजना निर्माण, व्यवस्था और पारि-पर्यटन सुविधाओं के प्रबंध में स्थानीय समुदायों का सामर्थ्य निर्माण ;
- (vii) समुचित भूमि उपयोग और जल प्रबंध को विकसित करना और व्याघ्र आरक्षिति में और उसके आसपास के परिदृश्य की पारिस्थितिकीय अखंडता अनुरक्षित करने के लिए नियमन ।

2.1.3 वन्य जीव (संरक्षण) अधिनियम, 1972 और माननीय उच्चतम न्यायालय के निदेशों की अनुपालना में व्याघ्र आरक्षितियों के कोड अथवा क्रांतिक प्राकृत्वास के भीतर कोई नई पर्यटन अवसंरचना स्थापित नहीं की जायेगी ।

2.1.4 वन्य जीव (संरक्षण) अधिनियम, 1972 की धारा 38 प के अधीन राज्य स्तरीय संचालन समिति व्याघ्र आरक्षितियों में राज्य स्तरीय पर्यटन एवं पारि-पर्यटन रणनीति के कार्यान्वयन की समीक्षा करेगी ।

2.1.5 राज्य सरकार यह सुनिश्चित करने के लिए एक प्रणाली का विकास करेगी जिससे व्याघ्र आरक्षितियों से द्वार प्राप्तियों का उपयोग उनके प्रबंध द्वारा विनिर्दिष्ट संरक्षण प्रयोजनों के लिए किया जाये एवं राज्य के राजकोष के राजस्व के रूप में नहीं किया जाये । इससे यह सुनिश्चित होगा कि पर्यटन से उत्पन्न संसाधनों, सुरक्षा, संरक्षण और स्थानीय जीविका विकास, मानव वन्यजीव संघर्ष का सामना करने एवं फील्ड कर्मचारीवृंद के कल्याणार्थ उपयोग निर्धारित हो ।

2.1.6 चूंकि व्याघ्र आरक्षितियों में और उसके आसपास का पर्यटन उद्योग वन्य जीव संसाधनों के गैर विनाशक उपयोग से प्राथमिक रूप से वहनीय है और स्थानीय समुदाय ही ऐसे हैं, जो संरक्षणजन्य प्रभावों का सामना करते हैं इसलिए, राज्य सरकारें पारि-विकास और स्थानीय समुदाय के उत्थान कार्यों के लिए पर्यटन उद्योग से संरक्षण फीस प्रभारित कर सकेगी । संरक्षण फीस, किसी सुविधा में बिस्तरों की संख्या, सुविधा के प्रचालन की अवधि (मौसमानुसार या वर्षभर) और विलासी वर्गीकरण तंत्र पर, जैसे गृहवास (जिसके लिए 6 बिस्तरों की सुविधा तक फीस प्रभारित नहीं की जाएगी) से उच्च सीमा तक (जिसकी फीस की मात्रा अधिकतम होगी), पर विनिश्चित की जा सकती है । सुझाई गई फीस संरचना 500/- रुपए से 3000/- रुपए प्रति कमरा प्रति माह के बीच हो सकेगी । संरक्षण फीस की दर और पर्यटक सुविधा स्तर राज्य सरकार द्वारा अवधारित की जायेगी और इस प्रकार एकत्रित निधि को स्थानीय आजीविका विकास, मानव वन्य जीव संघर्ष प्रबंध और पारि-विकास के माध्यम से संरक्षण के लिए निश्चित किया जायेगा, न कि राज्य के राजकोष के लिए, जैसे कि ऊपर 2.1.5 में चर्चा की गई है ।

2.1.7 निधि का प्रशासन व्याघ्र संरक्षण प्रतिष्ठान द्वारा किया जाएगा और इसमें पर्यटन उद्योग की, इस निधि का कहां और कैसे उपयोग किया जाएगा, में भूमिका होगी और विशिष्ट व्याघ्र आरक्षितियों में इसके लिए तंत्रों की आवश्यकता का पता लगाया जाएगा । निधि का उपयोग व्याघ्र आरक्षितियों के भीतर अवस्थित या उनसे लगे हुए सभी गांवों के लिए किया जाएगा । प्रत्येक राज्य सरकार इन मार्गनिर्देशों के अधिसूचना की तारीख से एक वर्ष के भीतर स्थानीय संरक्षण फीस की दर को अधिसूचित करेगी । प्रचालन की लागत पर विचार करते हुए फीस की दर का आवधिक रूप से पुनरीक्षण किया जाएगा । स्थानीय पर्यटक सुविधाओं के पास पहचान सूचक बोर्ड के माध्यम से अधिकांश जनता को स्थानीय संरक्षण फीस के औचित्य को स्पष्ट रूप से बताया जाना चाहिए । राज्य सरकार व्याघ्र संरक्षण प्रतिष्ठानों और ग्राम सभाओं के माध्यम से व्याघ्र संरक्षण प्रबंधन से संबंधित इन निधियों के उपयोग के लिए पारदर्शी तंत्र का निर्माण करेगी ।

2.1.8 स्थानीय सलाहकार समिति (जिसे इसमें इसके पश्चात् एलएसी कहा गया है) का प्रत्येक व्याघ्र आरक्ष के लिए राज्य सरकार द्वारा गठन किया जाएगा । एलएसी के निम्नलिखित कार्य होंगे, अर्थात् :

- (क) व्याघ्र आरक्ष के संबंध में पर्यटन रणनीति का पुनरीक्षण करना और राज्य सरकार को सिफारिशें करना ;

(ख) आरक्ष विनिर्दिष्ट वहन क्षमता की संगणना का सुनिश्चय करना और आवधिक पुनरीक्षणों के माध्यम से इसका कार्यान्वयन ;

(ग) गलियारे का महत्त्व और पारिस्थितिकीय सौन्दर्यबोध को ध्यान में रखते हुए व्याघ्र आरक्षितियों के भीतर और उसके निकट भवनों और अवसंरचनाओं पर स्थल विनिर्दिष्ट मानकों का सुनिश्चय करना ;

(घ) व्याघ्र आरक्षितियों के भीतर और उसके चारों ओर पर्यटन विकास से संबंधित मुद्दों पर स्थानीय स्वशासन और राज्य सरकारों को सलाह देना ;

(ङ) न्यूनीकृत और पश्चात्तवर्ती उपाय, यदि आवश्यकता हो तो, सुझाने के लिए पर्यावरणीय मंजूरी, आच्छादित क्षेत्र, स्वामित्व, सन्निर्माण का प्रकार, कर्मचारियों आदि की संख्या के संबंध में व्याघ्र आरक्षितियों के भीतर और उसके चारों ओर सभी पर्यटक सुविधाओं का नियमित रूप से (कम से कम अर्द्धवार्षिक रूप से) अनुश्रवण करना ;

(च) यात्रा प्रचालकों की गतिविधियों का यह सुनिश्चय करने के लिए नियमित अनुश्रवण करना कि वे आगंतुकों को व्याघ्र आरक्षितियों में ले जाते समय प्राणियों को कोई व्यवधान न कारित करें ;

(छ) पर्यटन उद्योग को स्थानीय समुदाय के सदस्यों को नियोजन अवसरों को बढ़ावा देने के लिए प्रोत्साहित करना ;

2.1.9 स्थानीय सलाहकार समिति निम्नलिखित से मिलकर बनेगी :

(क) राज्य सरकार द्वारा नामित मंडलीय आयुक्त या राज्य सरकार का समकक्ष श्रेणी का अधिकारी (अध्यक्ष)

(ख) राज्य विधानमंडल के सदस्य जो व्याघ्र आरक्षित संरक्षण क्षेत्र का प्रतिनिधित्व करते हैं/करते हों

(ग) जिला कलक्टर

(घ) क्षेत्र निदेशक, व्याघ्र आरक्षित, (सदस्य सचिव)

(ङ) स्थानीय प्रादेशिक उप वन अधिकारी

(च) मानद वन्यजीव प्रतिपालक (यदि हो)

(छ) राज्य पर्यटन विभाग का अधिकारी

(ज) राज्य जनजातीय विभाग का अधिकारी

(झ) एक खंड विकास अधिकारी या उपमंडल दण्डाधिकारी, जिसे राज्य सरकार द्वारा नामनिर्दिष्ट किया जाना है

(ञ) स्थानीय पंचायतों के दो सदस्य जिन्हें राज्य सरकार द्वारा नामनिर्दिष्ट किया जाना है

(ट) राज्य सरकार द्वारा नामनिर्दिष्ट किया जाने वाला एक वन्यप्राणी वैज्ञानिक

(ठ) राज्य सरकार द्वारा नामनिर्दिष्ट किया जाने वाला एक सामाजिक वैज्ञानिक

(ड) राज्य सरकार द्वारा नामनिर्दिष्ट किया जाने वाला पर्यटन सेक्टर का एक प्रतिनिधि

(ढ) राज्य सरकार द्वारा नामनिर्दिष्ट किये जाने वाले दो स्थानीय संरक्षणविद्

(ण) राज्य सरकार द्वारा नामनिर्दिष्ट किया जाने वाला एक स्थानीय, रजिस्ट्रीकृत सिविल सोसाइटी संस्था का प्रतिनिधि

(त) परन्तु ग्राम सभा और पूर्वोत्तर राज्यों की दशा में, जहां ऐसी परिषदें विद्यमान हैं, पारंपरिक ग्राम परिषदों को पंचायत सदस्यों के समकक्ष मान्यता दी जाएगी ।

2.1.10 व्याघ्र आरक्षितियों के लिए व्याघ्र आरक्षित प्रतिष्ठान पर्यवेक्षण प्राधिकरण होगा ।

2.1.11 निबंधन की शर्तें और स्थानीय सलाहकार समितियों की अवधि का अवधारण राज्य द्वारा किया जाएगा ।

2.2 पर्यटन के परिप्रेक्ष्य में व्याघ्र आरक्षित प्रबंधन

2.2.1 राज्य का मुख्य वन्यजीव प्रतिपालक यह सुनिश्चित करेगा कि प्रत्येक व्याघ्र आरक्षिणी राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के तकनीकी मार्गनिर्देशों के सापेक्ष, व्याघ्र संरक्षण योजना के एक भाग के रूप में पर्यटन योजना तैयार करे। योजना में अन्य बातों के साथ-साथ गलियारा संयोजकता एवं/महत्वपूर्ण वन्य जीव प्राकृतवासों की पहचान और उन्हें सुरक्षित करने के तंत्र सम्मिलित होंगे। व्याघ्र संरक्षण योजना का एक भाग बनने वाली इस स्थल विनिर्दिष्ट पर्यटन योजना को वन्य प्राणी (संरक्षण) अधिनियम, 1972 के उपबंधों के अनुसार अनुमोदित किया जाएगा। इस अनुमोदन से पूर्व पर्यटन के लिए (विद्यमान साधारण घरेलू ठहरावों में गौण परिवर्तन के सिवाय) व्याघ्र आरक्षितियों के भीतर और उसके चारों ओर किसी नई अवसंरचना को विकसित करने हेतु अनुज्ञात नहीं किया जाएगा।

2.2.2 पर्यटन योजना में अन्य बातों के साथ-साथ अनुश्रवण तंत्र, अनुमानित वहन क्षमता (वहन क्षमता का आंकलन करने के लिए एक मॉडल तंत्र का उपाबंध 1 और उपाबंध 2 में उपबंध किया गया है, जिसे स्थल विनिर्दिष्ट आधार पर उपांतरित किया जा सकेगा), पर्यटन जोन और पर्यटन के लिए खुले क्षेत्र का चिन्हांकन वस्तुनिष्ठ एवं वैज्ञानिक मानदंड के आधार पर शामिल होगा।

2.2.3 पर्यटन योजना को राज्य पर्यटन और पर्यटन रणनीति संगत होना चाहिए और यह स्थानीय सलाहकार समिति (एलएसी) और राज्य सरकार द्वारा भी अनुमोदित होगा।

2.2.4 योजना में निम्नलिखित होंगे :

(i) गलियारा और बफर क्षेत्रों की पारिस्थितिकीय अखंडता का सुनिश्चय करने के लिए और गलियारा अतिक्रमण रोकने हेतु व्याघ्र आरक्षिणी के चारों ओर के पारिस्थितिकीय रूप से संवेदनशील क्षेत्रों की पहचान (भू-दृश्य पारिस्थितिकीय सिद्धांतों और साधनों का उपयोग करते हुए) और अनुश्रवण करना ;

(ii) आगंतुकों और वाहनों के तीन स्तरों : भौतिक, वास्तविक और प्रभावी या अनुज्ञेय वहन क्षमता का व्याघ्र आरक्षितियों की वहन क्षमता के साथ-साथ व्याघ्र आरक्षितियों में और उसके चारों ओर आवासीय सुविधाओं का पता लगाना (उपाबंध 1, उपाबंध 2 के अनुसार)। पर्यटन वाहन भ्रमण के लिए उपबंध की गई उपदर्शित संगणना के अनुसार हाथी और नाव और पैदल यात्रा को सम्मिलित करते हुए पर्यटन भ्रमणों के लिए स्थल विनिर्दिष्ट आधार पर वहन क्षमता की संगणना करने की आवश्यकता है। व्याघ्र आरक्षितियों के भीतर यातायात और पर्यटन वाहनों में दूरी के प्रबंधन के लिए प्रौद्योगिकीय उपकरणों (जीपीएस, बेतार आदि) की संभावना का पता लगाना।

(iii) प्राकृतवास की वहन क्षमता के आधार पर किसी दिए गए समय पर किसी व्याघ्र आरक्षिणी में अनुज्ञात आगंतुकों को संख्या की ऊपरी सीमा निर्धारित करना ;

(iv) 'पारि-पर्यटन जोन' के रूप में अभिविहित किए जाने वाले अभयारण्यों में पर्यटन के लिए खुले क्षेत्र को उपदर्शित करना;

(v) व्याघ्र आरक्षिणी प्रबंधन के पास प्राधिकृत मार्गदर्शकों के साथ रजिस्ट्रीकृत वाहनों के माध्यम से व्याघ्र आरक्षितियों में आगंतुकों के प्रवेश का सुनिश्चय करना ;

(vi) दीर्घावधि स्थानीय समुदाय अभिलाभ सहभाजन और स्थानीय समुदायों द्वारा चलाई जा रही गतिविधियों का संवर्द्धन करने का सुनिश्चय करने के लिए स्थानीय समुदायों के सहयोग से सहभागी समुदाय आधारित पर्यटन कार्यनीति का विकास करना ;

(vii) क्रोड या क्रांतिक व्याघ्र प्राकृतवास, पारिस्थितिकीय रूप से संवेदनशील जोनों या बफर क्षेत्रों की परिधि में अवस्थित निजी रूप से प्रचालित पर्यटन प्रसुविधाओं के लिए संहिता और मानकों के विकास के लिए अन्य बातों के साथ-साथ स्थानीय समुदायों को अभिलाभ और आय का सुनिश्चय करना ;

(viii) वन्य प्राणी और उसके प्राकृतवास पर पर्यटन गतिविधियों के संघात का पता लगाने के लिए अनुश्रवण तंत्रों का विकास करना, जिससे कि उन्हें न्यूनतम किया जा सके ;

(ix) पर्यावरणीय रूप से स्वीकार्य और सांस्कृतिक रूप से यथोचित पद्धतियों के लिए और सभी नए सन्निर्माणों के लिए साधारण मार्गनिर्देशों का विकास करना;

(x) आंगतुकों के लिए क्या करें और क्या नहीं करें की सूचियों का गठन ;

(xi) शैक्षिक विकास कार्यकलापों को बढ़ाने के लिए विद्यार्थियों के लिए रियायती भ्रमणों का उपबंध ।

2.2.5 मानव और वन्यजीव संघर्षों की दशा में तत्काल अनुग्रह सहायता के अतिरिक्त नागरिक चार्टर के अनुसार तय अवधि के दौरान प्रतिकर का संदाय किया जाएगा ।

2.2.6 पर्यटन योजना में उपदर्शित अंकित 'पर्यटन जोनों' में ही सभी पर्यटन गतिविधियां की जाएंगी । व्याघ्र आरक्षितियों में रिक्त पदों को भरा जाएगा चूंकि अपने नियमित कर्तव्यों के अतिरिक्त कतिपय पर्यटन का प्रबंध करने के लिए भी कर्मचारीवृंद की आवश्यकता होगी ।

2.2.7 व्याघ्र भारत में विभिन्न प्राकृतवासों में मिलते हैं जो ऊंचे पर्वतीय उष्ण उपकटिबंधीय वनों, कटिबंधीय वर्षाकालीन हरित वनों, कुछ वनस्पति दलदली भूमि, उष्ण उपकटिबंधीय आर्द्र या शुष्क पर्णपाती वनों और जलोढ़ जलप्लावित घास के मैदानों तक फैले हैं । बड़े खुरदार प्राणी जो व्याघ्र का मुख्य शिकार/भक्ष्य हैं, इन विभिन्न पर्यावासों में प्रति वर्ग किलोमीटर दो से साठ के बीच पाए जाते हैं । प्रजननशील बाघिनें प्रादेशिक होती हैं और उनके क्षेत्र का आकार उनके भक्ष्य के घनत्व से समायोजित होता है जिससे कि वह सफलतापूर्वक अपने शावकों को बड़ा कर सकें । नर व्याघ्र का इलाका दो से चार प्रजननशील बाघिनों के क्षेत्र से मिलकर बनता है । प्राकृतवास विनिर्दिष्ट भक्ष्य के घनत्व में भिन्नता के कारण प्रजननशील बाघिनों का इलाका भारत में बीस से दो सौ वर्ग किलोमीटर की रेंज में होता है । आबादी के दृष्टिकोण से जीवनक्षम/वर्धनक्षम आबादी के लिए यह अनिवार्य है कि ऐसा क्रोड क्षेत्र हो जिसमें कम से कम बीस से पच्चीस प्रजननशील बाघिनों का पोषण हो सके । दीर्घकालीन अनुवांषिकी पोषणीयता के लिए न्यूनतम प्रभावी आबादी का आकार लगभग पांच सौ व्यष्टिक हैं । प्रजननशील बाघिनों के इलाके के आकार में भिन्नता के कारण और प्रजननशील व्याघ्र घनत्व के लिए साधारणतया आठ सौ से बारह सौ वर्ग किलोमीटर के क्रोड क्षेत्र की आवश्यकता होती है । यह क्रोड क्षेत्र और चारों ओर का बफर क्षेत्र तब पचहत्तर से सौ व्यष्टिक व्याघ्रों की आबादी का पोषण कर सकता है जिससे कि आबादी के दृष्टिकोण से पोषणीयता प्राप्त की जा सके । तथापि, आनुवांषिक पोषणीयता केवल वृहत्तर परिदृश्य के भीतर गलियारा संयोजकता के माध्यम से ही संभव है जहां चारों ओर फैले व्यष्टिक व्याघ्र विभिन्न स्रोत जनसंख्याओं के बीच (व्याघ्र आरक्षित) आनुवांषिक मेल का आबादी परिवर्तन ढांचे में सुनिश्चय कर सकें । वर्तमान पर्यटक जोन में, जहां केवल पर्यटन भ्रमण अनुज्ञात हैं और कोई अन्य उपभोक्ता उपयोग नहीं है, व्याघ्र घनत्व और नवशावकों के आगमन के बीच कोई प्रभाव पड़ा हुआ प्रतीत नहीं होता है । इस कारण से क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास को बीस प्रतिशत तक पर्यटन जोन के रूप में अनुज्ञात करने से व्याघ्र की जैविक आवश्यकता पर प्रतिकूल प्रभाव नहीं पड़ना चाहिए जो कि इन मार्गनिर्देशों में विहित अनुपालन की शर्त के अधीन है ।

2.2.7.1 स्थानीय समुदायों को लाभान्वित करने हेतु पारि-पर्यटन के एक वृहत्तर भाग को पूरा करने के लिए बफर और उपान्त के क्षेत्रों का पोषण करने की भी आवश्यकता है ।

2.2.8 हमारे राष्ट्रीय प्राणी व्याघ्र का संरक्षण व्याघ्र आरक्षितियों का सर्वप्रमुख ध्येय है और विनियमित पर्यटन के माध्यम से व्याघ्र संरक्षण के लिए लोक और समुदायिक समर्थन जुटाना एक अमूल्य साधन है । विनियमित पर्यटन का परिणाम एक संवर्धित जागरूकता होता है और इसका एक शैक्षिक महत्व है, विशेषकर युवा पीढ़ी के लिए । गैर उपभोक्ताकृत विनियमित निम्नसंघात पर्यटन को क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के भीतर इसकी भावना को व्याघ्र संरक्षण के लिए संकट में डाले बिना अनुज्ञात किया जा सकता है । व्याघ्र संरक्षण के लिए पर्यटन की महत्ता को ध्यान में रखते हुए यह सिफारिश की जाती है कि क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास उपयोग के अधिकतम बीस प्रतिशत को (वर्तमान उपयोग से अनाधिक) विनियमित, निम्नसंघात पर्यटन भ्रमणों के लिए अनुज्ञात किया जा सकता है । वर्तमान उपयोग के बीस प्रतिशत से अधिक होने की दशा में स्थानीय सलाहकार समिति (एलएसी) उपयोग को बीस प्रतिशत से कम करने के लिए समयसीमा का विनिश्चय कर सकती है । ऐसे क्षेत्र को पर्यटन जोन के रूप में चिन्हांकित किया जा सकेगा और स्थल विनिर्दिष्ट वाहन क्षमता का कठोरता से पालन किया जाएगा । व्याघ्र परियोजना या राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण के मार्गनिर्देशों को ध्यान में रखते हुए संबंधित व्याघ्र आरक्षित क्षेत्रीय निदेशक के अधीन एकीकृत नियंत्रण के माध्यम से बफर वन क्षेत्रों का पुनरुद्धार किया जाएगा । इसके अतिरिक्त क्रोड क्षेत्रों में किसी नई पर्यटन अवसंरचना का सृजन नहीं किया जाएगा । क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के भीतर विद्यमान आवासीय अवसंरचना का कठोरता से स्थल विनिर्दिष्ट आधार पर स्थानीय सलाहकार

समिति (एलएसी) द्वारा विनिश्चय किए गए पारिस्थितिकीय निम्नसंघातों का अनुपालन करने के लिए विनियमन किया जाएगा ।

2.2.8.1 किसी व्याघ्र आरक्षिति में कोई क्रोड क्षेत्र, जहां से विस्थापन किया गया है, का पर्यटन अवसंरचना के लिए उपयोग नहीं किया जाएगा ।

2.2.9 ऐसे वनवासी जिन्हें क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास से बफर क्षेत्र में पुनःआवस्थित किया गया है, को व्याघ्र आरक्षिति में समुदाय आधारित पारि-पर्यटन से संबंधित जीवनयापन सृजन गतिविधियों में वरीयता दी जाएगी । व्याघ्र आरक्षिति प्रबंधन इस संबंध में अनुपालना का सुनिश्चय करने के लिए आवधिक पुनरीक्षण के अतिरिक्त विशेष प्रयास करेगा ।

2.2.10 पर्यटन अवसंरचना पर्यावरण हितैषी, निम्नसंघात सौन्दर्यशील स्थापत्य जिसके अंतर्गत सौर ऊर्जा, अपशिष्ट पुनरावर्तन, वर्षा जल संग्रहण, प्राकृतिक संपूर्ण वायु संवातन, उचित अपशिष्ट व्ययन और चारों ओर के प्राकृतवास से मेल भी है, का अवश्य पालन करेगी । इन मानकों के उल्लंघन के प्रकरणों से स्थानीय सलाहकार समिति (एलएसी) समुचित रूप से निपटेगी । मार्गनिर्देशों के किसी उल्लंघन को राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण (एनटीसीए) को सूचना के अधीन समुचित प्राधिकरणों को विधि के सुसंगत उपबंधों के अनुसार कार्रवाई करने के लिए निर्दिष्ट किया जाएगा ।

2.2.11 जिला राजस्व और व्याघ्र आरक्षिति प्राधिकारी इस बात का सुनिश्चय करेंगे कि व्याघ्र आरक्षितियों में क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के परिप्रेक्ष्य में प्रभाव क्षेत्र के भीतर (जिनकी स्थानीय सलाहकार समिति/एलएसी द्वारा पहचान की जानी है) सभी पर्यटन सुविधाएं पर्यावरणीय अनुमति, ध्वनि प्रदूषण मानकों का पालन करें और प्रदूषणकारी न हों, और अपने चारों ओर के वातावरण के समरूप हों । इसके अननुपालन पर कठोर दंड का अवश्य अधिरोपण किया जाए ।

2.2.12 क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के भीतर अवस्थित स्थायी पर्यटन सुविधाएं जिनका उपयोग वन्यप्राणी पर्यटन के लिए किया जा रहा है, को स्थानीय सलाहकार समिति (एलएसी) द्वारा विनिश्चय की गई समयसीमा के भीतर चरणबद्ध रूप से समाप्त कर दिया जाएगा । इसी बीच क्रियान्वयन हेतु इन प्रसुविधाओं को एलएसी द्वारा अनुमोदित निम्नसंघात सुविधाओं के अनुपालन का विकास करने की आवश्यकता है और इन्हें कठोरता से कार्यान्वित किया जाए । क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के भीतर जहां रात्रि ठहराव अनुज्ञात है, वहां निजी रूप से कोई खानपान आदि सेवाएं नहीं चलाई जाएगी । ऐसी विद्यमान सुविधाएं, यदि कोई हैं, को व्याघ्र संरक्षण प्रतिष्ठानों द्वारा चलाया जाएगा।

2.2.13 व्याघ्र आरक्षिति के परिप्रेक्ष्य में प्रभाव क्षेत्र (एलएसी द्वारा अवधारित किए गए) के भीतर अवस्थित सभी पर्यटन सुविधाओं को तत्समय प्रवृत्त विधियों और नियमों के अधीन प्रदूषण मानकों (कोलाहल, ठोस अपशिष्ट, वायु और जल), नियमों का पालन करना होगा । बाहरी उच्च घनत्व की प्रकाश व्यवस्था का उपयोग नहीं किया जाएगा, चूंकि इससे रात्रिकालीन वन्यप्राणी गतिविधियों में व्यवधान उत्पन्न होता है ।

2.2.14 व्याघ्र आरक्षिति में और इसके चारों ओर गैर जैविकीय नष्ट न किए जा सकने वाले या विषाक्त अपशिष्ट को दबाने, जलाने या अन्यथा नष्ट करने पर पूर्णतया प्रतिबंध होगा । जैविकीय रूप से नष्ट किए जा सकने वाले अपशिष्ट के निपटान के लिए समुचित योजना का विकास किया जायेगा और इसे कठोरता से कार्यान्वित किया जाएगा ।

2.2.15 पर्यटन प्रयोजनों के लिए प्राणियों के बहुतायत को बढ़ा-चढ़ाकर दिखाने के उद्देश्य से प्राकृतवास प्रबंधन का उपयोग क्रोड अथवा क्रांतिक व्याघ्र प्राकृतवास के भीतर नहीं किया जायेगा । आगंतुकों को सभी वन्यप्राणियों से न्यूनतम बीस मीटर की दूरी रखनी होगी । किसी वन्यप्राणी की घेराबन्दी या उसको आकृष्ट करने या पोषित करने पर पूर्णतया प्रतिबंध होगा । किसी वन्यप्राणी को वाहनों से देखने के लिए उनके मध्य पचास मीटर की दूरी बनाई रखी जानी होगी । वाहनों को किसी वन्यप्राणी को देखने के लिए पंद्रह मिनट से अधिक का एकाधिकार नहीं रखना चाहिए ।

2.2.16 वहन क्षमता से अनधिक आगंतुकों और वाहनों की संख्या से बचने के लिए व्याघ्र आरक्षिति प्रबंधक पर्यटक और वाहन संख्या का नियंत्रण करने के लिए एक अग्रिम बुकिंग व्यवस्था स्थापित करेंगे। बुकिंग के नियम आवश्यक रूप से पारदर्शी होंगे और उल्लंघनकर्ताओं को दंडित किया जायेगा।

2.2.17 व्याघ्र आरक्षिति प्राधिकारियों को संरक्षित क्षेत्र से बाहर आगंतुक सुविधाओं के लिए एक पर्याप्त और समुचित क्षेत्र को अवश्य चिन्हांकित करना होगा।

2.2.18 व्याघ्र आरक्षिति में पर्यटन कार्यकलाप व्याघ्र संरक्षण प्रतिष्ठानों और स्थानीय सलाहकार समिति (एलएसी) के समग्र मार्गनिर्देश के अधीन होंगे।

2.3 पर्यटक सुविधाएं और यात्रा प्रचालक

2.3.1 पर्यटन अवसंरचना को पर्यावरण हितैषी, निम्नसंघाती, निम्न उंचाई के सौंदर्यशील स्थापत्य, नवीकरणीय जिसके अंतर्गत सौर ऊर्जा है, अपशिष्ट पुनरावर्तन, जल प्रबंधन, प्राकृतिक समग्र वायुगमन सहित होना चाहिये, अदह का उपयोग नहीं हो, उपचार किए गए अपशिष्ट को ही केवल प्रवाहित किया जाए, किसी प्रकार का वायु प्रदूषण नहीं होना चाहिए। बाहरी प्रकाश व्यवस्था न्यूनतम हो और आस-पास के परिदृश्य के अनुरूप होना चाहिए।

2.3.2 जहां भू-भाग अथवा पथ अनुज्ञात करें, वहां प्रदूषण को न्यूनतम करने के लिए बैटरी प्रचालित वाहनों के उपयोग को बढ़ावा दिया जाएगा।

2.3.3 वन्यप्राणी पर्यटन की कला, कौशल और पद्धतियों में मार्गदर्शकों और चालकों को प्रशिक्षित करने के लिए एक कार्यक्रम विकसित किया जाएगा जो प्रमाणन प्रदान करता हो। सभी मार्गदर्शकों और चालकों को अनिवार्यतः नियमों और विनियमों के निर्वचन के लिए एक लघु पाठ्यक्रम करना होगा, जिसके पश्चात् एक मौखिक परीक्षा होगी, जिसके पश्चात् ही उन्हें व्याघ्र संरक्षण प्रतिष्ठान द्वारा प्रमाणपत्र दिया जाएगा। पाठ्यक्रमों का आयोजन गैर पर्यटन सत्र के दौरान किया जाए। सभी प्रमाणित मार्गदर्शकों और चालकों को समुचित रूप से तैयार की गई/डिजाइन की गई वर्दियां जिनपर नाम और बिल्ला हो, धारण करनी होगी। इससे उनमें गर्व, अनुशासन और जवाबदेही की भावना सृजित होगी। प्रत्येक पर्यटन सत्र से पूर्व प्रमाणित मार्गदर्शक और चालकों को पुनश्चर्या पाठ्यक्रम या कार्यशाला में भाग लेना होगा। इनसे उनमें पक्षियों की पहचान करने की क्षमता उत्पन्न होगी और अन्य प्रजातियों के विषय में प्राकृतिक इतिहास की सूचना बढ़ेगी, जिससे धीरे-धीरे वह व्याघ्र पर केन्द्रित ग्रस्तता से भी दूर होंगे। उनके कार्य निष्पादन का आवधिक मूल्यांकन स्थानीय सलाहकार समिति (एलएसी) द्वारा उन्हें पुनः अनुज्ञप्ति प्रदान करने से पूर्व किया जाएगा।

2.3.4 व्याघ्र आरक्षिति के प्रभाव क्षेत्र के भीतर आने वाली सभी पर्यटन प्रसुविधाओं का स्थानीय सलाहकार समिति द्वारा पर्यावरण अनुमति, आच्छादित किए जाने वाले क्षेत्र, स्वामित्व, सन्निर्माण का प्रकार, कर्मचारियों की संख्या आदि को दृष्टि में रखते हुए नियमित रूप से पुनरीक्षा की जानी चाहिए जिससे वह न्यूनकारी/पश्चात्पूर्ती (पुनर्स्थापन) उपाय यदि आवश्यक हों, का सुझाव दे सके।

2.3.5 सभी पुरानी और नई पर्यटन सुविधाओं को अपनी कुल ऊर्जा और ईंधन आवश्यकताओं का पचास प्रतिशत वैकल्पिक ऊर्जा स्रोतों जिसमें वायु, सौर और जैविक गैस भी हो सकेगी, से सृजित करने का उद्देश्य रखना होगा।

2.3.6 ईंधन के रूप में, सिवाय कैम्पफायर के, लकड़ी के उपयोग का प्रतिषेध किया जाएगा,, जिसके लिए लकड़ी राज्य वन विभाग या वन विकास निगम डिपो से ही क्रय की जायेगी।

2.3.7 वन्यप्राणियों को मुक्त रूप से मार्ग प्रदान करने के लिए विकास, वनस्पति और प्राणियों के संरक्षण और व्याघ्र आरक्षितियों में और उसके आसपास के क्षेत्र के गलियारे के महत्व के प्रति संवेदनशील होगा।

2.3.8 पर्यटक सुविधाएं और पर्यटक प्रचालक प्राकृतिक पथों पर आगंतुकों को ले जाते समय प्राणियों को किसी भी दशा में व्यवधान उत्पन्न नहीं करेंगे।

2.3.9 मार्गनिर्देशों के किसी उल्लंघन को राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण को संसूचना के अधीन विधि के सुसंगत उपबंधों के अनुसार कार्रवाई करने के लिए समुचित प्राधिकारियों को निर्दिष्ट किया जाएगा।

2.4 मंदिर और तीर्थयात्रा बोर्ड

2.4.1 व्याघ्र आरक्षितियों के भीतर अवस्थित तीर्थ यात्रा स्थल वन (संरक्षण) अधिनियम, 1980, वन्यप्राणी (संरक्षण) अधिनियम, 1972 और पर्यावरण (संरक्षण) अधिनियम, 1986 के अनुरूप होगा ताकि उनके और विस्तारण को निवारित किया जा सके। इसका आवधिक रूप से स्थानीय सलाहकार समिति द्वारा पुनरीक्षण किया जाएगा।

2.4.2 ऐसी तीर्थयात्राओं के लिए अंतरण शिविर और ठहरने के स्थानों को किसी वर्ष में नामनिर्दिष्ट दिनों तक ही निर्बंधित किया जाए। संरक्षित क्षेत्र प्रबंधकों को मंदिर प्राधिकारियों के साथ तीर्थयात्रियों की संख्या को नियंत्रित करने के लिए एक प्रणाली के विकास के लिए कार्य करना होगा ताकि क्षेत्र की पारिस्थितिकीय अखंडता का अनुरक्षण किया जा सके। इस तंत्र का विकास इन मार्गनिर्देशों की अधिसूचना से तीन वर्षों के भीतर किया जाएगा।

2.4.3 पर्यटन सुविधाओं से संबंधित सभी नियम जिसके अंतर्गत कोलाहल, भवन, रचना अथवा डिजाइन, वैकल्पिक ऊर्जा का उपयोग और वन्य जीव का मुक्त मार्ग सन्निहित है, ऐसी तीर्थयात्रा सुविधाओं पर लागू होंगे।

2.4.4 मंदिर बोर्ड स्थानीय समुदायों के साथ राजस्व वितरण के निबंधनों अथवा शर्तों पर बातचीत करेंगे और संग्रहित राजस्व के न्यूनतम दस प्रतिशत को ग्राम समुदायों के माध्यम से विकास के लिए प्रदान करेंगे।

2.4.5 पर्यटन प्रचालक, चालक और मंदिर नियंत्रण प्राधिकारियों को वन पारिस्थितिकीय तंत्र की महत्ता और उनकी पारिस्थितिकीय सेवाओं के साथ वनों/आरक्षित क्षेत्रों के भ्रमण के दौरान क्या करना चाहिए और क्या नहीं करना चाहिए, से परिचित कराया जायेगा।

2.5 ये मार्गनिर्देश वन्यप्राणी (संरक्षण) अधिनियम, 1972 की धारा 38 फ के अधीन अधिसूचित व्याघ्र आरक्षितियों, जिन्हें राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण से विधिवत स्वीकृति प्राप्त है, पर लागू होंगे। राज्य सरकार अन्य संरक्षित क्षेत्रों में पर्यटन के लिए समान मार्गनिर्देश बनायेगी।

2.6 इन मार्गनिर्देशों के किसी उपबंध का या उनमें अधिकथित शर्तों का किसी व्यक्ति या व्यक्ति द्वारा उल्लंघन वन्यप्राणी (संरक्षण) अधिनियम, 1972 की धारा 38ण की उपधारा (2) के अधीन किसी अपराध का दायी होगा।

वहन क्षमता का ऑकलन¹

(वाहन आधाति पर्यटन प्रवसन के लिए दृष्टांत स्वरूप परिगणना : कान्हा व्याघ्र रिजर्व)

(क) भौतिक वहन क्षमता (पीसीसी) : यह “आगन्तुकों की अधिकतम संख्या है जो विशिष्ट समय में निश्चित किए गए स्थान पर भौतिक रूप से समावेशित हो सकती है”। यह निम्नानुसार अभिव्यक्त है :

$$PCC = A \times V/a \times RF$$

जहाँ A= सार्वजनिक उपयोग के लिए उपलब्ध क्षेत्र है

$$V/a = \text{एक आगंतुक}/M^2$$

RF= चक्रानुक्रम कारक (प्रतिदिन दौरों की संख्या)

कान्हा में PCC की माप करने के लिए निम्नलिखित मानदंड ध्यान में रखने चाहिए :

वन की सड़कों पर वाहन द्वारा संचलन मात्र अनुज्ञात किया जाए ।

“अवस्थित क्षेत्र” सुसंगत नहीं हैं किन्तु वाहनों के बीच “सामीप्यता” महत्वपूर्ण है ।

धूल से बचने के लिए 2 वाहनों के बीच कम से कम 500 मीटर (1/2 किमी) की दूरी अपेक्षित है (2 वाहनों/ किमी.) ।

एकल पार्क भ्रमण के लिए कम से कम 3^{1/2} घंटे आवश्यक हैं ।

संरक्षित क्षेत्र वर्ष में 9 मास पर्यटकों के लिए खुला है और 9 घंटे प्रतिदिन के लिए है ।

पर्यटन जोन के भीतर रेखीय सड़क की लंबाई क्षेत्र की अपेक्षा अधिक सुसंगत है और कुल लंबाई निम्नानुसार है :

कान्हा	107.20 किमी.
किसली	72.56 किमी.
मुक्की	103 किमी.
कुल	282.76 या 283 किमी.

वाहन उपयोग के लगातार बने रहने के कारण 283 किमी. की संपूर्ण लंबी सड़क भूक्षरण के लिए संभावित है जिसमें से लगभग 90 किमी. अधिक प्रभावित है

$$\text{चक्रानुक्रम कारक (RF)} = \frac{\text{चालू अवधि}}{\text{एक दौरे का औसत समय}}$$

$$\begin{aligned} \text{भौतिक वहन क्षमता (PCC)} &= 283 \text{ किमी.} \times 2 \text{ वाहन/ किमी.} \times 2.6 \\ &= 1471.6 \text{ या } 1472 \text{ दौरा/दिन} \end{aligned}$$

¹ हेक्टर सिबैलौस -लसक्यूरेन 1992-पर्यटन, पारिस्थितिकी पर्यटन और संरक्षित क्षेत्र, राष्ट्रीय पार्क और संरक्षित क्षेत्रों पर IV विश्व कांग्रेस, आईयूसीएन, ग्लैड, स्विटजरलैंड ।

(ख) वास्तविक वहन क्षमता (RCC): RCC स्थल पर दौरों की अधिकतम अनुज्ञेय संख्या है, एक बार स्थल की विशिष्टता से व्युत्पन्न “लघुकारक” (सुधारात्मक) भौतिक वहन क्षमता पर लागू किया गया है। ये “लघुकारक” (सुधारात्मक) जैव भौतिकी, पर्यावरणीय, पारिस्थितिकीय, सामाजिक और प्रबंधन परिवर्तनशील कारको पर आधारित हैं।

$$RCC = PCC - Cf^1 - Cf^2 \text{-----} Cf_n,$$

जहां Cf प्रतिशत के रूप में सुधारात्मक कारक के रूप में अभिव्यक्त है। इस प्रकार RCC की गणना का सूत्र निम्न है :

$$RCC = \frac{PCC - Cf^1}{100} \times \frac{100 - Cf^2}{100} \times \dots \times Cf_n$$

सुधारात्मक कारक “स्थल- विनिर्दिष्ट” हैं, और प्रतिशत में निम्नानुसार अभिव्यक्त हैं :

$$\text{नीचे : } Cf = \frac{M_1}{M_t} \times 100$$

जहां : Cf = सुधारात्मक कारक

M_1 = परिवर्तनशीलता की सीमित महत्ता (परिमाण)

M_t परिवर्तनशीलता की कुल महत्ता (परिमाण)

(i) सड़क भूक्षरण : यहां स्थल की अतिसंवेदनशीलता को ध्यान में रखा जाना चाहिए।

सड़क की कुल लंबाई = 283 किमी. (M_t)

मध्यम भूक्षरण डुबाव = 50 किमी. (भारकारक : 2)

अधिक भूक्षरण जोखिम = 40 किमी. (भारकारक : 3)

$$M_1 = 50 \times 2 + 40 \times 3 = 100 + 120 = 220 \text{ किमी.}$$

$$M_t = 283 \text{ किमी.}$$

$$Cf_e = \frac{220}{283} \times 100 = 77.8 \text{ या } 78\%$$

(ii) वन्यजीव को व्यवधान : यहां, उन प्रजातियों पर जिन्हें प्रवसन के कारण व्यवधान पड़ने की संभावना रहती है, का विचार किया गया है। मध्य भारतीय बारहसिंघा अत्यधिक संकटापन्न, स्थानीय प्रजाति है जो केवल कान्हा में पाई जाती है जिनकी शीतकाल में लगभग एक मास की अवधि की प्रणयनिवेदन अवधि है जिस समय यह व्यवधान के प्रति अत्यंत संवेदनशील है। इसी तरह नियमित मानसून आगमन के पूर्व दो मास चीतल के लिए चरम प्रणयनिवेदन क्रियाकलाप अवधि है। जहां तक व्याघ्र का प्रश्न है, नवजातों को मार्च और मई के बीच में देखा जा सकता है और वर्षा के दौरान भी ; इस लिए वर्ष में दो मास के औसत मान को विषय चरण के रूप में विचार किया जा सकता है।

$$\text{सुधारात्मक कारक (Cf)} = \frac{\text{सीमित मास/वर्ष}}{12 \text{ मास/वर्ष}} \times 100$$

बारहसिंघा के लिए सुधारात्मक कारक

$$Cf_{w1} = 1/9 \times 100 = 11.1\%$$

चीतल के लिए सुधारात्मक कारक

$$Cfw_2 = 2/9 \times 100 = 22.2\%$$

व्याघ्र के लिए सुधारात्मक कारक

$$Cfw_2 = 2/9 \times 100 = 22.2\%$$

कान्हा राष्ट्रीय उद्यान में वन्य जीव के व्यवधान के लिए समस्त सुधारात्मक कारक =Cfw

$$= Cf + Cf + Cf$$

$$= 11.1 + 22.2 + 22.2 = 55.5\% \text{ या } 55\%$$

(iii) सड़कों का अस्थायी रूप से बंद होना : अनुरक्षण या अन्य प्रबंधकीय कारण वश कतिपय सड़कों में प्रवसन को संरक्षित क्षेत्र के भीतर अस्थायी रूप से निर्बंधित किया जा सकेगा। इस संबंध में सुधारात्मक कारक को निम्नानुसार परिगणित किया गया है :

$$Cf_t = \frac{\text{सीमित सप्ताह/वर्ष}}{\text{कुल सप्ताह/वर्ष}} \times 100$$

कान्हा में प्रतिवर्ष दो सीमित सप्ताहों के औसत मान पर “सीमित सप्ताह” के रूप में विचार किया जा सकेगा और इस प्रकार सुधारात्मक कारक निम्नलिखित के संबंध में परख करता है :

$$Cf_t = \frac{2 \text{ सप्ताह/वर्ष}}{36 \text{ सप्ताह/वर्ष}} \times 100 = 5.5\%$$

RCC की संगणना

$$RCC = 1472 \times \frac{100-78}{100} \times \frac{100-55}{100} \times \frac{100-5.5}{100}$$

$$= 1472 (0.22 \times 0.45 \times 0.95)$$

$$= 138.4 \text{ या } 138 \text{ दौरा/दिन}$$

(ग) प्रभावी अनुज्ञेय वहन क्षमता (ECC) : ECC परिदर्शकों की अधिकतम संख्या है जिसे स्थल उपलब्ध दी गई प्रबंधन क्षमता (MC) में जारी रख सकता है। ECC को प्रबंधन क्षमता (MC) के साथ वास्तविक वहन क्षमता (RCC) के गुणन द्वारा अभिप्राप्त किया जाता है। MC को सभी दशाओं के जोड़ के रूप में पारिभाषित किया गया है जिसकी संरक्षित क्षेत्र के प्रशासन को आवश्यकता होती है, यदि इसे अनुकूलतम परिस्थिति में इसके कृत्यों को क्रियान्वित करना है। कर्मचारीवृंद की कमी और RCC की सीमित अवसंरचना जैसे प्रबंधन में परिसीमा है।

कान्हा के लिए, कर्मचारीवृंद की कमी के कारण MC लगभग 30% है। इसलिए $ECC = 138 \times 0.30 = 41.4$ या 40 वाहन/दिन।

इस प्रकार किसी एकल दिन पर प्रभावी अनुज्ञेय वहन क्षमता केवल 40 वाहन है जिसे निम्नानुसार प्रवेश के लिए अनुज्ञात किया जाना चाहिए :

(पूर्वाह्न) = 25 वाहन (दोनों प्रवेश बिन्दुओं को सम्मिलित करते हुए)

(अपराह्न) = 15 वाहन (दोनों प्रवेश बिन्दुओं को सम्मिलित करते हुए)

पर्यटकों की अधिकतम आमद अवधि के दौरान (सर्दी के महीने/गर्मी की छुट्टियां), कर्मचारीवृंद की संख्या “विशेष कर्तव्य” कार्मिकों को अभिविनियोजित करके बढ़ाई (केवल 10%) जा सकेगी ; यह प्रभावी अनुज्ञेय वहन क्षमता को 55 वाहन प्रतिदिन बढ़ा पायेगा । इसके अतिरिक्त वाहनों की बढ़ती संख्या प्राकृतिक वास पर हानिकर प्रभाव डालेगी।

स्वीकार्य परिवर्तन की सीमाओं पर संक्षिप्त टिप्पण

(1) पारि-पर्यटन संबंधित विश्वकोश वहन क्षमता को “पर्यटन संबंधी क्रियाकलाप की मात्रा जो स्थल या गंतव्य स्थान लगातार समायोजित कर सकता है ; बहुधा परिदर्शकों की संख्या या परिदर्शकों को रात्रियों के लिए दी गई समावधि या उपलब्ध स्थान इकाईयों की संख्या द्वारा ; या प्रबंधन तकनीक जैसे स्थल की वहन क्षमता बढ़ा करके स्थल दृढ़ाभूत करके नियोजित किया जा सकता है”, के रूप में परिभाषित करता है ।

(2) समय के साथ वहन क्षमता फ्रेमवर्क, वन्य जीव/प्रकृति आधारित या पारि-पर्यटन के प्रसंग में विशेष रूप से आलोचना के लिए सामने आया है । उनमें से एक प्रमुख आलोचना यह होती रही है कि वहन क्षमता माडल में संरक्षित क्षेत्र में प्रवेश के लिए अनुज्ञात परिदर्शकों की संख्या निर्धारण करते समय सामाजिक विवक्षाओं को ध्यान में नहीं रखा गया है ।

(3) गत लगभग 10 वर्षों से स्वीकार्य परिवर्तन की सीमाओं की अवधारणा विकसित हुई है और पारि-पर्यटन के प्रकरण में कहीं अधिक सुसंगत पायी गयी है ।

(4) पारि-पर्यटन संबंधित विश्वकोश द्वारा यथा परिभाषित स्वीकार्य परिवर्तन की सीमाओं की परिभाषा “कोई भूमि प्रबंधन दर्शन जो पर्यावरणीय गुणवत्ता के विनिर्दिष्ट उपदर्शकों और पर्यटन प्रभावों की पहचान करता है और प्रारम्भिक सीमा को पारिभाषित करता है जिसके अंतर्गत संरक्षित क्षेत्र के संरक्षण ध्येय पूरे किए जाते हैं” ।

(5) स्वीकार्य परिवर्तन की सीमाएं एक योजनाकारी माडल है और ये केवल पर्यटन के उपयोग और प्रभाव स्तर को ही नहीं देखती अपितु परिदर्शक क्रियाकलाप के लिए वांछनीय पर्यावरणीय और सामाजिक दशाओं की पहचान करती है । प्रक्रिया विद्यमान शर्तों की सूची को आवश्यक बनाती है और भौतिक और सामाजिक दशाओं दोनों के लिए अनुकूलतम सीमाओं की पहचान करती है ।

(6) माडल में 9-चरणीय प्रक्रिया अंतर्वलित है जिसे विश्व भर में विभिन्न नीति निर्माण निकायों द्वारा विभिन्न रूप से जोड़ा गया है । नीचे संयुक्त राष्ट्र पर्यावरण कार्यक्रम (यूएनईपी)² द्वारा यथा रूप से प्रस्तुत की गई 9-चरणीय प्रक्रियाएं हैं :

- (i) क्षेत्र में विशेष मूल्य मुद्दों की पहचान करना और संबद्ध विषयों का योगदान
- (ii) पुनर्सृजन अवसर वर्गों या जोनों की पहचान और वर्णन
- (iii) संसाधनों और सामाजिक दशाओं के उपदर्शनों का चयन
- (iv) विद्यमान सामाजिक संसाधन और शर्तों की तालिका
- (v) प्रत्येक अवसर वर्ग में संसाधन और सामाजिक दशाओं के लिए मानक विनिर्दिष्ट करना
- (vi) वर्ग आवंटन में वैकल्पिक अवसर की पहचान करना
- (vii) प्रत्येक अनुकल्पी के लिए प्रबंधन कार्यों की पहचान
- (viii) अधिमान विकल्प का मूल्यांकन और चयन
- (ix) कार्यों का क्रियान्वयन और अनुश्रवण की शर्तें

(7) ध्यान देने के लिए जो महत्वपूर्ण है वह यह है कि माडल ऐसी प्रक्रिया का उपयोग करता है जो क्रमबद्ध समीचीन सुरक्षायोग्य और युक्तियुक्त है और इसमें लोक भागीदारी अंतर्वलित है । यह अंतिम तत्व सर्वाधिक महत्वपूर्ण रहा है यदि समुदायों को पारि-पर्यटन के लाभ उद्भूत होते हैं ।

(8) यह सुझाव दिया जाता है कि व्याघ्र संरक्षण प्रतिष्ठान, स्थानीय सलाहकार समिति से परामर्श करके व्याघ्र आरक्षों एव उनके आसपास स्वीकार्य परिवर्तन सीमाओं संबंधी माडल अथवा प्रतिरूप के क्रियान्वयन पर उपयुक्त विनिश्चय करे ।

अंतिम टिप्पण

1. डेविड बी वीवर (संस्करण) (2001), इनसाइक्लोपीडिया आफ इकोटूरिज्म, सीएबीआई पब्लिसिंग, यूके
2. ईगल्स, पाल एफ.जे.मैकल, स्टीफन एफ एंड हेंस क्रिस्टोफर डी (1998) सस्टेनेबल टूरिज्म इन प्रोटेक्टेड एरियाज : गाइडलान्स फार प्लानिंग एंड मैनेजमेंट, यूएनईपी

<http://www.unep.fr/shared/publications/other/3064/BP6-6.pdf>.

[फा0सं0 15-31/2012-एनटीसीए]

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A PROTOCOL ON PHASE-IV MONITORING

**(Continuous monitoring of tiger reserves /
tiger source areas)**

Technical Document No. 1/2011



NATIONAL TIGER CONSERVATION AUTHORITY

APRIL, 2012

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SECTION-1

SECTION-1

1. BACKGROUND

1.1 The Tiger Task Force constituted by the National Board for Wildlife (2005) has endorsed the revised methodology / approach propounded by the erstwhile Project Tiger Directorate (now the National Tiger Conservation Authority-NTCA) and the Wildlife Institute of India (WII) for country level estimation / monitoring of tiger / prey status and its habitat. The said approach, inter alia, comprises of the following:

- (a) Country level assessment of tiger, co-predators, prey and habitat in 17 tiger States once in every four years using the double sampling method having three phases (Phase-I: Spatial mapping and monitoring of tigers, prey and habitat; Phase-II: Assimilation of spatial and attribute data; and Phase-III: Estimating the population of tigers and its prey).
- (b) Intensive monitoring of tiger source populations in tiger reserves and protected areas in each tiger landscape complex (Phase-IV), and maintenance of a centralized photo-database of tigers at NTCA obtained from camera traps deployed across all tiger reserves.
- (c) Routine management-oriented monitoring, which, inter alia, comprises of regular monitoring of tiger signs at beat level, which can potentially be integrated with monitoring of law enforcement and patrolling.
- (d) Survey Design (for all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers / scientists is at **Appendix-I**.

1.2 The above endorsement of the Tiger Task Force is being implemented and has also been reiterated in the guidelines issued by the NTCA (Technical Document: NTCA/01/07). In a country level meeting of Chief Wildlife Wardens / Field Directors held in May, 2011, it was decided to taken to implement the Phase-IV monitoring from

November, 2011. This was followed by a discussion with experts / NTCA members and a meeting with Chief Wildlife Wardens / Field Directors in October, 2011.

As per the decision taken, the minimum standards for the Phase IV protocols were:-

- (1) Camera trap density one pair per 4-5 sq.km.
- (2) Minimum trap nights of a 1000 per 100 sq.km. (i.e. 25 pairs of cameras in 100 sq.km. for 40 days)
- (3) Minimum area coverage of 400 sq.km.
- (4) Closure period of 40 to 60 days
- (5) Minimum of 20 spatial replicates of line transects each of a minimum of 2 km length (for the entire reserve)
- (6) Entire reserve needs to be sampled. Each sampling occasion should cover minimum area of 400 sq.km (100 pairs of cameras) and in case of larger reserves, the area should be covered by dividing the area into 400 sq.km blocks and camera trapping should be done successively, within the closure period of 60 days.

The objective of the NTCA exercise is to, at the least, obtain a minimum number of tigers in a Tiger Reserve (Section-2), but aims to estimate the tiger population size and prey densities (Section-3) in a reserve using spatially-explicit capture-recapture approaches using software tools such as SPACECAP / DENSITY for estimating tiger population size & DISTANCE for estimating densities of prey.

In brief, the Phase-IV protocol of NTCA contains six components:

- (a) Maintaining daily patrolling log (described in Section-2)
- (b) Carrying out beat-wise monitoring of sign encounters twice a year (described in Section-2)
- (c) Recording from PIP (described in Section-2)
- (d) Obtaining minimum tiger number using camera traps (described in Section-2)
- (e) Obtaining tiger numbers using camera traps (40-60 days closure period) (described in Section-3)
- (f) Obtaining minimum tiger numbers through DNA analysis from Scats (described in Section-3)

The field managers are familiar with some of these components. Under Phase-IV monitoring, emphasis has been given on the use of camera traps for obtaining minimum tiger numbers or preferably, tiger population size estimation and using line transect sampling for estimating prey densities. It must be borne in mind that for data analysis using camera trap data in a mark recapture framework as well as in DISTANCE sampling, the 'detection probability' or 'probability of detecting animals' is important. Further, it is important to note that more animals in an area may not result in enhanced detection probability, since the latter is governed by terrain features, cover, visibility etc. However, more animals in an area may result in more detections on a line transect or more captures during a camera session.

The phrase 'detection probability' is used in line transects, whereas 'proportions of animals captured' is used in the context of camera traps. The 'proportion of capture' or 'capture probability' facilitates estimation of true population size. To illustrate the importance of a detection probability, a simple example is given below:

- 100 spotted deer were introduced in a known area
- The same area was traversed by a team of two persons six times resulting in a count of 62 spotted deer (mean)
- Here, the detection probability = $\hat{p} = 62/100 = 0.62$
- After a year, the area was again counted along the same trail resulting in a count of 90 spotted deer
- The population estimation is done as below:
 $90/0.62 = 145$ spotted deer, with the assumption that detection probability has remained constant over the two years.

Thus a generic formula is given for population estimation:

$$\hat{N} = \hat{C} / \hat{P}$$

where, \hat{N} = population

\hat{C} = count / index

\hat{P} = probability of detection

In the above example, the initial figure of 100 spotted deer was known, which is not the situation under wild conditions. Further, two counts / indices can be compared only if we know the probability / estimate the probability of detection. Thus, both in camera trap as well as distance sampling, the analysis part requires estimation of the probability of detection / capture.

QuickReferenceGuide

Phase IV involves monitoring of Tiger and its prey on annual basis at Tiger Reserve level, while Phase I to III is done at every 4 year interval for country level monitoring. The following needs to be kept in mind while planning the Phase IV:

Carnivore population estimation

- 1) Camera trap density one per 4-5 sq km
- 2) Minimum trap nights of a 1000 per 100 sq km
- 3) Minimum area coverage of 400 sq. km or whatever is the reserve size
- 4) Closure period of 40 to 60 days

Trap night are number of days of operation multiplied by number of pair of cameras. Closure period is time frame within which animal movement in and out of study area, birth and death are going to have no or negligible effect.

Given the importance of estimating detection probability as outlined above, this concept is central to intensive monitoring under Phase IV, unlike in Phases I, II, and III where 'encounter rates and indices' were employed more prominently.

However, since at the reserve or source population level tiger and prey density estimation methods which can rigorously deal with detection probability require substantial scientific expertise to design and deploy, it may not always be possible for reserve managers to have access to and be guided by adequately qualified scientists. Therefore, Phase IV intensive monitoring is being seen as a "ladder process" in which tiger reserves will gradually move up the ladder from routine management oriented monitoring to the intensive scientific monitoring scheme.

States/Reserve managers who do not have ready access to trained scientists with expertise in design and deployment of intensive scientific methods may use the first step of the ladder described here under Section-2, as routine management oriented activities. These routines will involve a wide range activities covered under parts A, B, C, D under Section 2 of this protocol and will be generally helpful in management of reserves. One aim of this is to generate minimum number of tigers in each reserve, each year without violating important closure assumptions described later. This routine management oriented monitoring is described in Section 2 of this document.

The next step in the “ladder process” involves use of rigorous distance sampling (for prey) and capture-recapture sampling (for tigers). These may require collaboration with adequately qualified scientists in survey design, implementation and data analysis stages. Here the goal is to generate valid estimates of population density and population size for tigers and important prey species in each reserve, fully meeting all the minimum standards and approaches described in Section 3 of this document.

Where such intensive scientific monitoring of tiger and prey populations is undertaken as described in Section 3, there may be no need for deploying other kind of line transect or camera trap surveys, to avoid unnecessary duplication of work.

SECTION-2

SECTION-2

PHASE-IV MANAGEMENT-ORIENTED MONITORING

I. For all tiger reserves except Sundarbans

Part-A Maintaining daily patrolling log in patrolling camp / chowki registers

While on regular or targeted patrolling duties the personnel shall record the following information:

- 1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. firearms, wireless, torch, etc).
- 2) The date, time and GPS coordinates of the beginning of the patrol recorded.
- 3) Preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record form every 30 min or at major deviations from a straight line path.
- 4) The total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, elephant, boat, etc.
- 5) A record of all illegal activities is entered in the data sheet along with time, date and coordinate stamp. A photograph is also taken of the site with a time date stamp.
- 6) A record of signs and sightings or highly endangered species while on Patrol is also maintained by entering the GPS coordinate, date and time of the sighting /sign as well as recording a digital picture of the same if possible.
- 7) After the end of the Patrol, the GPS track log is either downloaded onto a computer (in MSTRIPES program if this is applicable at the site) or the datasheet with the recorded information deposited at the Range Head Quarters. Data formats for recording Patrol data are provided in Annexure-I.

Part-B Carrying out beat-wise monitoring of signs and encounters of animals/vegetation/habitat disturbances following Phase-I protocols twice a year

The entire tiger reserve would be covered at the beat level, by considering the latter as a sampling unit, as done in Phase-I of the country level assessment by following the standardized eight day protocol (the data collection needs to be done twice a year in the formats provided at Annexures-VII, VIII, IX and X). This would involve beat wise collection of data (in the standardized formats) twice a year relating to tiger / carnivore signs survey, ungulate, encounter rates, habitat status, human presence and pellet / dung counts. Based on such data, beat level maps indicating the spatial presence / relative abundance (index) of prey / predators species should be prepared in the GIS domain for record.

- (i) Beat-wise collection of data in the standardized formats of Phase-I country level assessment process.
- (ii) The data collection should be done twice a year (summer and winter).

(If the tiger reserve is following advanced protocols as described in Section-3 in collaboration with scientific institutions, then the routine monitoring of prey animal signs/encounters, vegetation features and habitat disturbance features should be carried out along transect lines designed based on protocols described in Part-E of Section-3. There may be no need for laying of transect lines in each beat as per Phase-I protocol.)

Part-C Recording data from 'pressure impression pads' (PIP)

As a part of intensive monitoring of source populations of tigers, data will be recorded from pressure impression pads (PIP's, track plots) in every beat.

- A minimum of 5 PIPs will be permanently maintained in each beat. The dimension of the PIP shall not be less than 6m in length the width of the PIP should equal the foot path, jungle trail or dry nullaha's width on which the PIP is made. GPS coordinates of all PIP's need to be recorded.

- The location of the PIPs within the beat should be such that they maximize the possibility of recording carnivore tracks. Minimum distance between any 2 PIPs should be more than 1.5km.
- The PIPs should be cleaned of debris, leaf litter, gravel and covered with fine dust of about 0.5cm depth. After preparing the PIP, data should be recorded the next morning and the PIP cleared of all tracks. The PIPs should be sampled thrice every month during summer and winter. In case a prepared PIP is disturbed due to rain, traffic etc. then it should be set again before data is collected. The topography and forest type should be recorded for each PIP.
- Trails of all carnivore and mega herbivores species should be recorded e.g. tiger one track set, leopard two track sets, several dhole track sets (as it may not be possible to identify individual track sets due to many tracks by a passing dhole pack), one small cat track (as species level identification may not be possible).
- It is important to note that a track set is constituted by one to many pugmarks made by a single animal traversing the track plot (PIP). One need not identify the gender or individual animal (tiger), but if this information is known, it should be entered in the remarks column. If there are more than one track sets of “same” animal eg. a tiger moving up and down the trail several times, they should be recorded as separate track sets. Data sheet for recording are provided in Annexure-III.

Part-D **Obtaining the minimum number of tigers in the tiger reserve**

- (i) Three pairs of camera traps to be deployed per beat and should be left open within a closed period of 40-60 days depending on the reserve.
- (ii) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of “population closure” (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration will lead to over estimation of tiger numbers.
- (iii) The photographs obtained from camera trapping should be submitted to NTCA for analysis for fixing individual IDs of tigers.

- (iv) A digital camera trap tiger photo database should be prepared for the reserve with location ID, Date and Time Stamps as per format to be provided by NTCA.
- (v) The minimum number of tigers should be ascertained based on individual camera photo traps of tigers obtained within the closure period specified to be 45-60 days.
- (vi) Details of new captures / missing tigers should be recorded.
- (vii) The format for recording the camera trap capture data will be provided by NTCA

SECTION-3

SECTION-3

(Advanced protocol involving scientists)

PHASE-IV INTENSIVE MONITORING OF SOURCE POPULATIONS AND TIGER RESERVES

Part-E Obtaining tiger population size for the reserve using spatially-explicit capture recapture framework and Obtaining prey population size using line transect sampling.

(A) Obtaining tiger population size.

- (i) The camera traps deployed as per the survey design in Appendix-1. should be left open for a period of 40-60 days (depending on the areas). Where possible the entire Tiger Reserve must be surveyed. If the survey area is very large, tiger population size can be obtained by sampling a minimum block of 400 square kilometers at a time, but following all other minimum standards in section 3. If deployment of camera traps in an entire reserve or parts of it is not feasible for any reason, fecal DNA samples may be collected over the entire Tiger Reserve for Capture-Recapture analysis. The tiger population size may then be estimated over the entire Tiger Reserve using Mark-recapture methodology.
- (ii) The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with spatially-explicit capture-recapture process / analysis.
- (iv) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of “population closure” (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to over estimation.
- (v) The format for summary record of camera captures and the basics of mark recapture process using camera traps are provided at Annexures-V & VI.
- (vi) The analysis of capture data between years (using open population models) should also be done in collaboration with technical experts / scientists/ WII.

(B) Obtaining prey densities

- (i) Line transects must be systematically placed with a random start according to the survey design mentioned in Appendix-1 and implemented in program DISTANCE.
- (ii) The line transect data should be analysed using the “DISTANCE” software for prey density. The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with the DISTANCE SAMPLING analysis.
- (iii) The format for collecting line transect data to facilitate analysis using “DISTANCE” software and the basics of DISTANCE sampling using line transects are provided at Annexure-II.

Part-F Using scats for DNA analysis to obtain the minimum tiger numbers in reserves where camera trapping is not possible

- (i) Collection of tiger scat samples: a) Use disposable surgical gloves to handle scat samples, b) for each scat a new set of gloves should be used to avoid cross contamination, used gloves should be discarded in an environmentally friendly way c) about 20 gms of fresh scat sample should be taken and stored in a vial/tube containing buffer & / or 70% alcohol. Tubes should be prepared in duplicate with GPS coordinates and date clearly recorded on the tube (alcohol erases permanent marking pens).
- (ii) Obtaining the minimum number of tigers in the area through DNA analysis of tiger scats involving an institution having the domain expertise.

APPENIDCES

Appendix-I

SURVEY DESIGN (For all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers / scientists

Minimum Standards for monitoring tiger source populations were: Sampling area:

Minimum area of 400 km² or entire Tiger Reserve, if area is smaller than 400 km².

(i) Tiger monitoring by camera trap sampling:

Camera density = 25 double-sided cameras per 100 km².

Sampling effort = 1000 trap nights / 100 km².

Closure period = 40-60 days

NOTE: The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of “population closure” (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to gross over estimation.

(ii) Prey monitoring by line transect sampling:

1) Straight or square line transects will be systematically placed with a random start over the study area. These designs must be generated using program DISTANCE.

2) At least 20 spatial replicates must be laid out.

3. Each transect must be walked at least 4 times during sampling to generate >40 detections for each important prey species.

DESIGN OF SURVEYS ANALYSES OF DATA

(i) The survey design and analysis of these data needs to be done in collaboration with a technical expert / scientist conversant with the advanced open and closed model mark-recapture and advanced distance sampling methodologies.

(ii) The format for recording camera capture data and the basic ideas of the mark-recapture process using camera traps are provided at Annexures-V & VI and in published scientific literature.

Annexure-II

Field formats for data collection in distance sampling

I. Line Transect Data Sheet for monitoring of ungulate population by DISTANCE sampling:

Observer name: Start time: Date:
 End time: ID no. of line transect: Total length: km
 TR / Forest division: Range: Beat:
 Weather condition: Cloudy/Clear sky
 Beginning GPS Lat:N; Long:E
 End GPS Lat:N; Long:E

Sighting No	Time	Species*	Total Nos. (Adults & Young)	Young	Sighting Distance	Compass Bearing	Forest Type	Terrain Type	Remarks
1									
2									
3									
4									
5									
6									
7									
8									

*Species that need to be recorded on the transect: chital, sambar, nilgai, gaur, barking deer, elephant, rhino, wild buffalo, swamp deer, hog deer, chowsingha, blackbuck, chinkara, wild pig, langur, peafowl, hare, cattle (live stock), and other mammalian species seen.

II. Location of transects in relation to Vegetation and Terrain features

Transect No.	Total length (km)	Name	Bearing	GPS location		Vegetation type	Terrain category
				Start	End		
T1							
T2							
T3							
T4							
T5							
T6							
T7							

Annexure-II
(Basic Information)

Assessment of prey using line transects following
survey design as described in Part-E of
Section-3 and analyzing the data with DISTANCE
Software

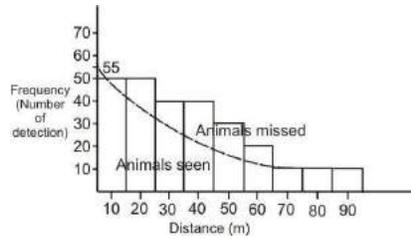
- (i) The use of line transect in estimation of prey density is known as 'line transect sampling'. This technique of abundance estimation is included under 'distance sampling'.
- (ii) It provides a direct estimate of density, provided its assumptions are met.
- (iii) It also accounts for the probability of detection.
- (iv) In 'Distance Sampling', the fact that the 'probability of detection decreases with increasing distance from the observer' is modelled by developing a function, which is used to estimate the 'probability of detection' ($\hat{\beta}$). The density (\hat{D}) is estimated as below:

$$\hat{D} = \frac{n}{\alpha \hat{\beta}}$$

where, n= total number of detections
 α = total area sampled

(v) The observer travels along a line of length 'L', located randomly in the study area, and counts all the animals which are seen. There is no assumption that all animals are counted, and the counts are assumed to be incomplete. More often, a maximum observation distance 'w', which is perpendicular to the transect line on each side, is established. Beyond this distance, no count is made. In some cases, counting of all animals is done without establishing a distance.

(vi) Let us consider the common approach of establishing the 'maximum observation distance' (w). Here, it is important to estimate the 'detection probability' or the proportion of animals that are actually seen (β). This is required to correct the actual counts.



(Hypothetical from the transect line histogram plot of the number of detections against the distance from the transect line, with a smooth function fit.)

(vii) If the number of detections are plotted against distance from the transect line, a smaller number of detections are seen as the distance increases. The detection function to the observed distances is fitted to estimate the detection probability $\hat{\beta}$:-

$$\hat{\beta} = \frac{\text{Area under the curve}}{\text{Total area}} = \frac{3500}{4950} = 0.70$$

(viii) Once the detection probability ($\hat{\beta}$) is computed, animal abundance in the survey area can be calculated, as in the case of the strip sampling, using the canonical estimator as before:

$$\hat{N} = \frac{An}{2wL\hat{\beta}}$$

(ix) For animal density (\hat{D}), the abundance needs to be divided by area, resulting in:

$$\hat{D} = \frac{n}{2wL\hat{\beta}}$$

- (x) The salient features of this estimation technique are as below:-
- From the transect line, the perpendicular distances (x) to each detected animal of interest are computed by measuring the detecting angles 'M' and detection distances 'r'.
 - This computation is done as $x = r \sin M$.
 - Imagine a situation where 'k' transect lines have been laid

in some randomized design, having lengths l_1, \dots, l_k , with a total length 'L'.

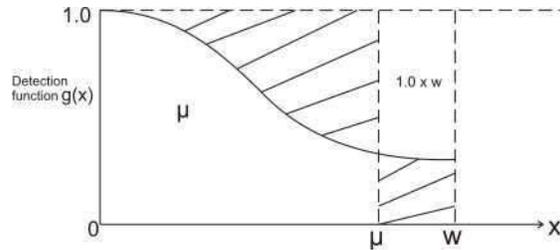
- d. Further, suppose that 'n' animals are seen at perpendicular distances x_1, x_2, \dots, x_n , and animals beyond a distance (w) from the transect (truncation distance) are not taken into account.
- e. In the above situation, the area surveyed (a) is given by :
 $a = 2wL$.
- f. Say 'n' animals are seen/detected within this area.
- g. Estimation of animal density (D) is given by:

$$\hat{D} = \frac{n}{cwLP_a}$$

where, P_a = probability of detection of a randomly chosen animal within the area surveyed;

P_a = estimate of P_a

- h. Thus, it becomes necessary to give a framework to estimate P_a . In this context, the 'detection function' 'g(x)' is defined as the probability of an animal at distance x from the transect line being detected, given that x is between w and 0 (i.e. $0 \leq x \leq w$). Further, it is also assumed that animals on the transect are certainly detected (i.e. $g(0) = 1$).
- i. A new parameter ' μ ' is now defined, which is known as the 'effective strip (half) width'. It is the distance from the transect 'for which as many objects as are detected beyond μ as are missed within μ '.
(Defining a detection function $g(x)$, where $g(0) = 1$; μ = the effective strip width).
- j. If the detection function $g(x)$ is plotted against perpendicular distances 'w' as a histogram, a model for $g(x)$ needs to be specified, and fitted to the distance data.

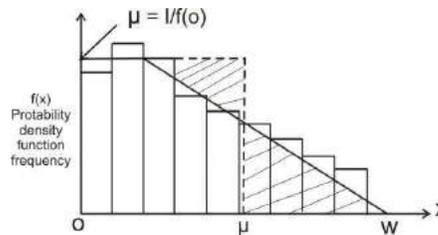


P_a is related to μ . If the definition for $\mu = \int_0^w g(x)dx$, then $P_a = \mu/w$.

$$\text{Thus, } \hat{D} = \frac{n}{aP_a} = \frac{n}{2wL\hat{\mu}/w} = \frac{n}{2\hat{\mu}L}$$

- k. Now $\mu(\text{hat})$, an estimate of μ is required. For this another function known as the 'probability density function' (pdf) of perpendicular distances $f(x)$ to detected animals is used. This is the rescaled detection function $g(x)$ for integrating into unity; i.e. $f(x) = g(x)/\mu$. Since it is assumed that $g(0) = 1$, hence $f(0) = 1/\mu$.

$$\text{Thus, } \hat{D} = \frac{n}{2\mu L} = \frac{n\hat{f}(0)}{2L}$$



[Fitting the probability density function (pdf) to the data. The area under this function is 1].

$f(x)$ is the pdf of perpendicular distance p frequencies, plotted on a histogram of perpendicular distance frequencies. These are scaled so that the area of the histogram is 1. By definition, the area below the curve is unity (1). The two shaded areas in the above curve are equal in size, hence the area of the rectangle, $\mu f(0)$ is also unity, resulting in $\mu = 1/f(0)$.

1. Thus the pdf of perpendicular distances are modeled, and

the fitted function is evaluated at $x=0$. The DISTANCE Software address this standard statistical issue. A parametric 'key' function is selected. However, if the fit provided by it is not adequate, adjustment are done using polynomial or cosine series, till the fit is judged satisfactory by one or more criteria.

- m. Usually, the data are grouped into distance categories before analysis and such grouped data is fitted using standard likelihood methods from the multinomial data.

(xi) The distance software calculates variance and confidence in interval inherently and also besides addressing the estimation of cluster size.

(xii) The data from a line transects includes: (a) number of individual animals / number of individual animals in a cluster, (b) the perpendicular distance of the animal / centre of the cluster from the transect, (c) name / identity of the transect line where count was made / detected, (d) total length of the transect line.

(xiii) The transects should be made in all the beats (at least two line transects of 2 km each per beat).

(xiv) The transect lines may be straight lines or conforming to a continuous shape leading to the starting point. The transects should be randomly laid, separated by at least a distance of 2 to 3 km. and physically marked using GPS for replication.

(xv) The total walks on a transect (total effort) is computed by adding all the walks done on a transects, and totaling up such walks on all the transects laid in the area.

(xvi) For low density areas, more efforts may be required on the transects.

(xvii) Laser range finders and compass should be used for measuring distance and angle respectively.

Assumptions in line transect sampling:

The critical assumptions in line transect sampling, which should be met for a reliable density / abundance estimation are as below:

A. Random location of transect lines with respect to distribution of animals:

This assumption helps in estimating the detection function from the observed distribution of perpendicular distances, leading to the average probability of detection (p). To ensure this assumption, the transect lines should be laid randomly, causing minimum disturbance to the habitat.

B. Detection of animals with certainty on the transect line :

This assumption is fundamental for deriving the density estimator, wherein detection of all objects at 0 perpendicular distance are assumed (i.e. $g(0) = 1$). The density would be underestimated if objects / animals falling on the transects are missed, since bias is a simple function of $g(0)$. Thus, by missing 15% of the animals on the transect line, the density estimate on an average would be less by 15%.

C. Detection of animals at their initial location:

This assumption can be easily met for stationary objects like plants or dung piles of wild animals, but it is difficult to meet for moving animals. It has been pointed out that movement does not create much problem provided it is not in response to the observer. Further, comparatively faster movement of observers also reduces the problem. However, the observers should move as silently as possible to avoid evasive movement of the animals before detection, while trying to detect them. A considerable evasive movement of animals would lead to under estimation.

D. Exact measurements are made:

Proper field measurements are essential to record reliable measurements. Erroneous recordings relating to animals on transect line from a distance makes analysis difficult.

Apart from the above, the other assumptions include :

- (a) Detections are independent events.
- (b) Animals should not be counted twice on the same line.

Hypothetical example of distance sampling:

```
Effort      : 126.0000
# samples   : 42
Width      : 256.0000
Left       : 0.0000000
# observations: 447
```

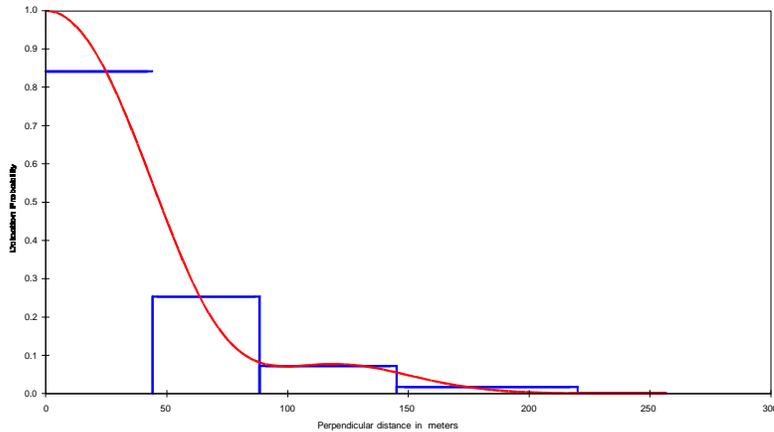
Model

```
Half-normal key,  $k(y) = \text{Exp}(-y^2/(2*A(1)^2))$ 
Simple polynomial adjustments of order(s) : 4, 6
```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95 Percent Confidence Interval	
A(1)	43.57	1.680			
A(2)	-115.6	34.19			
A(3)	755.9	242.4			
f(0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.87661E-02	4.17	0.19348	0.22796
ESW	53.763	2.2441	4.17	49.531	58.358

Sampling Correlation of Estimated Parameters

	A(1)	A(2)	A(3)
A(1)	1.000	0.427	-0.742
A(2)	0.427	1.000	-0.886
A(3)	-0.742	-0.886	1.000



Cell i	Cut Points	Observed Values	Expected Values	Chi-square Values	
1	0.000	44.2	309	308.43	0.001
2	44.2	88.3	93	93.78	0.007
3	88.3	145.	34	34.07	0.000
4	145.	220.	11	10.67	0.011
5	220.	240.	0	0.05	0.054
6	240.	256.	0	0.01	0.007

Total Chi-square value = 0.08 Degrees of Freedom = 2.00

Probability of a greater chi-square value, P = 0.96098

The program has limited capability for pooling. The user should judge the necessity for pooling and if necessary, do pooling by hand.

There is a need for some pooling to achieve a reliable chi-square test. However, the pooling algorithm built into this program would result in no degrees of freedom left. Therefore pooling is left to the user.

One or more expected values is < 1.
Try pooling some cells by hand to obtain a more reliable test.

Model

Half-normal key, $k(y) = \text{Exp}(-y^2/(2*A(1)^2))$
Simple polynomial adjustments of order(s) : 4, 6

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
f(0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.87661E-02	4.17	0.19348	0.22796
ESW	53.763	2.2441	4.17	49.531	58.358
n/L	3.5476	0.39480	11.13	2.8355	4.4386
DS	32.993	3.9214	11.89	26.017	41.839
E(S)	3.7964	0.22495	5.93	3.3794	4.2649
D	125.26	16.635	13.28	96.287	162.94
N	125.00	16.601	13.28	96.000	163.00

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters

Component Percentages of Var(D)

Detection probability : 9.9
Encounter rate : 70.2
Cluster size : 19.9

Annexure-III

Data Sheet-5
Track Plot for Carnivores and Mega Herbivores
(Pressure Impression Pad)

Name of Observer: Date: Forest Division Range:

Beat:

PIP No.	Forest Type	Terrain Type	Tiger		Leopard		Sloth Bear	Dhole	Hyena	Jackal	Small Cat	Gaur	Elephant	Rhino	Water Buffalo	Others	Others	Deg N	Min N	Sec N	Deg E	Min E	Sec E	
			Adult	Cub	Adult	Cub																		
1																								
2																								
3																								
4																								
5																								

If track of young carnivores (eg. tiger cubs) are observed, please mention in remarks.

Remarks:

Details of Digital Photographs taken

Annexure-IV

Format for recording camera trap capture data to obtain tiger numbers at the reserve level

- 1) Place double-sided camera traps at the best locations within a beat to photograph tigers.
- 2) The distance between camera traps within and between beats should be over 1.5 km.
- 3) A minimum of 3 camera traps (consisting of double sided cameras) per beat should be deployed. The number of camera trap will increase as the size of the beat increases, keeping the strategy of one pair of camera traps for 4 sq.km. area (2 km x 2 km).
- 4) The GPS coordinates of each camera location and the dates of deployment should be recorded as given below:

Camera Trap Station ID	Degree, Min, Sec North	Degree, Min, Sec South	Dates deployed	Dates not operating
1 – main Rd nalla				
2- River Junct				
3- temple jct				
4-.....				

5) Format for daily monitoring of camera traps (beat-wise)

Date	Camera Unit	Camera Trap Station 1			Camera Trap Station 2			Camera Trap Station 3			Remarks*
		Tiger	Leopard	Other	Tiger	Leopard	Other	Tiger	Leopard	Other	
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

* Non-functioning of camera traps or missing of tiger capture, etc. to be recorded in the Remark column.

- 6) Photographs of tigers, leopards and all mammal species should be downloaded and saved as folders for each species. Each photograph should have a time and date stamp recorded digitally, the camera trap station identity stored in the file name. An appropriate format is to have a species folder e.g. tiger, sub folder for camera trap station id, within which photographs of each of the cameras (from the double sided camera traps) is stored as separate folders. A CD with the above data (points 4, & 5) should be sent to NTCA every 2 months.
- 7) All Photographs of tigers and leopards should be printed and compared visually based on their stripe and spot patterns to identify individuals. In case of >15 tigers/leopard captures the need of software assisted identification may become essential.
- 8) For estimation of the tiger/leopard population after individual identification using closed capture estimators the data needs to be arranged in the format given below:

Trap Occasion (Day)

Tiger / Leopard ID	Day 1	Day 2	Day 3	Day 35	Day 48....
T-1							
T-2							
T-3							
T-4-.....							

Annexure-V
(Basic information on mark recapture)

Assessment of tiger population at beat level using photographic mark-recapture camera trapping while analyzing the data with an appropriate softwares like MARK, CAPTURE and CARE. This should result in the preparation of a reserve-level photo-capture database of individual tigers, to be shared with the Chief Wildlife Warden / NTCA / WII.

(I) The capture–recapture methodology is largely derived from the classical Peterson-Lincoln Estimator which is highlighted below:

Peterson Estimate (Lincoln Index)

The mark-recapture methods based on Peterson Estimate constitute the most important pseudo-sample methods. A large number of variations of this basic method have been evolved, which have been further complicated since the technique is simultaneously utilised to measure movement or mortality.

Here the sample of a population is marked after it is caught and then released; subsequently, samples are again taken from the population after recapturing and the proportion of marked individuals are recorded. Using the proportion of marked individuals in the subsequent samples, the total population is estimated. The capture-recapture sampling facilitate estimation of the 'proportion' of animals captured which facilitates estimation of true population size.

The simplest form of the mark-recapture estimator is the Lincoln-Peterson estimator; this is known variously as 'Peterson index', 'Lincoln index' or 'the Peterson estimate'. This method gives an estimate of actual numbers and hence it is a sample census rather than an index. Peterson, in 1896, described this method for fish populations; however it was first applied for wildlife in 1930 by F.C. Lincoln, for populations of waterfowl.

The model can be derived from the ratio:
$$\frac{M}{N} = \frac{m}{n}$$

where, M= total number of individuals marked and released during the first capture period;
 \hat{N} = estimated population size (unknown);
n = total sample taken during the second capture period;
m = number of individuals captured in the second capture which were marked.

The above ratio can be rewritten as an estimator:

$$\hat{N} = \frac{Mn}{m}$$

Theoretically this is a very elegant and simple method and can be applied to any vertebrate which can be captured, viz. from fish to cats. However, it is time consuming, laborious and costly and becomes impractical for large areas. Apart from this, several critical assumptions of this method act as constraints:—

1. Each animal has an equal chance of being captured.
2. The behaviour of animals is not influenced by marking.
3. No marks are lost.
4. The individuals which are marked mix randomly in the population after release.
5. There are no immigrations or births in the area under study between the first and second trapping seasons.
6. There is no emigration or differential mortality between the marked and unmarked members of the population.
7. The population is closed; if mortality occurs, then the estimate of N is valid for the initial size of the population. If recruitment occurs then N is valid for the time of recapture.
8. The time spent in sampling is small relative to the inter-sampling period.

The model assumptions can be re-written concisely as follows:

- Assumption 1. A well defined population of animals having N individuals exists.

- Assumption 2. M of these individuals are marked.
- Assumption 3. There exists a sample of n 'observations' of animals from the population, having x 'observations' marked animals.
- Assumption 4. The average probability \bar{p}_m of observing an animal that is marked is equal to \bar{p}_u which is the average probability of observing an unmarked animal.
i.e. $\bar{p}_m = \bar{p}_u$

The formula $\hat{N} = \frac{nM}{m}$ can be used satisfactorily with appropriate assumptions.

Use of Lincoln-Petersen Sample Estimator in camera trapping of tigers

The sample periods can be aggregated into two groups – viz. in a session of 30 days, the first 15 days can be denoted as 'occasion-1' and the next fortnight as 'occasion-2'.

In general, for photo trapping of tigers, the camera traps are set in the study area, covering the animals so that the tigers in the area can encounter the traps at least once (preventing 'holes' so that tigers are not missed). The traps are set for several days in succession, and each day is considered as a 'sample period'. In large areas, the traps can be 'rotated' over the area as per a prescribed scheme, and the data collected over the number of days taken to cover the entire area defines the sampling period.

The camera trap data is summarised in 'capture-history' data sheets, consisting of rows of 'i' and 'o', which indicate the periods when an animal was camera trapped. Thus, a history of '100101', indicates that a tiger was trapped in periods 1, 4 and 6 of a study having 6 periods.

Example

- m_1 = number of tigers, with known identity, trapped on occasion 1
- m_2 = number of tigers trapped and released on occasion 2
- m = number of tigers recaptured in period 2 (i.e. trapped at both occasions 1 and 2)

1. The unknown quantity of interest (total number of tigers in the sampled population) is defined as 'N'.
2. The model parameters are then defined as:
 $p_i =$ probability of a tiger exposed to sampling efforts in the sampled area is trapped on occasion i ($i = 1, 2$)
3. $p=1-(1-p_1)(1-p_2)$ = the probability that a tiger, from the total number of tigers in the sampled population N , is trapped at least once during the study.
4. The 'detection probabilities' for the two sampling periods are estimated, by ascertaining the proportion of tigers which were trapped in one occasion are also trapped in the other occasion. Since the population is "closed", it can be said that the tigers caught during occasion 1 are also present during occasion 2. Thus by "conditioning" tigers trapped in occasion 2, and ascertaining the number of these tigers which were also trapped during occasion 1, p_1 and p_2 can be estimated:

$$\hat{p}_1 = \frac{m}{n_2}, \quad \hat{p}_2 = \frac{m}{n_1}$$

$$\hat{p} = 1 - (1 - \hat{p}_1)(1 - \hat{p}_2)$$

The general equation for estimating abundance is:

$$\hat{N} = \frac{C}{\hat{p}},$$

where, \hat{N} = estimate of abundance N (true number of tigers)

C = Number of tigers counted

p = estimate of capture probability 'p' (probability that a tiger exposed to sampling efforts in the sampled area is captured on occasion i ($i=1, 2$))

For period 1, the following estimator is obtained:

$$\hat{N} = \frac{n_1}{\hat{p}_1} = \frac{n_1}{m/m_2} = \frac{n_1 m_2}{m}$$

For period 2, the following estimator is obtained:

$$\hat{N} = \frac{n_2}{\hat{p}_2} = \frac{n_2}{m/m_1} = \frac{n_2 m_1}{m}$$

The assumptions of the Lincoln-Peterson model are again stated below:-

1. The population is a 'closed' one.
2. It is likely that all animals are equally captured in each sample (equal probability of capture).
3. The marks are not overlooked, gained or lost.

A short interval between samples can meet the first assumption. The second assumption is often relaxed, while the last one can be met with proper marking techniques.

Example of Lincoln-Peterson estimate

(camera trapping exercise)

50 camera traps are placed in a tiger habitat along trails, and for two consecutive nights photographs are taken, resulting in the following data:

$n_1 = 10$ tigers camera trapped during the first night

$n_2 = 8$ tigers camera trapped during the second night

$m = 2$ tigers camera were photographed on both the nights

Estimation of capture probabilities and abundance

Capture probabilities of each night (sampling occasion) and for both nights (combined) are calculated as below:

$$p_1 = \frac{2}{8} = 0.25$$

$$p_2 = \frac{2}{10} = 0.20$$

$$\hat{p} = 1 - (1 - p_1)(1 - p_2)$$

i.e.
$$\begin{aligned} \hat{p} &= 1 - (1 - 0.25)(1 - 0.20) \\ &= 1 - (0.75)(0.80) \\ &= 0.40 \end{aligned}$$

Using the Chapman estimator for abundance:

$$\hat{N}_c = \frac{(n_1 + 1)(n_2 + 1)}{(m_2 + 1)} - 1$$

$$= \frac{(10 + 1)(8 + 1)}{(2 + 1)} - 1$$

$$= 32.$$

The Variance and Standard Error for the estimate are as below:

$$\begin{aligned} \text{Var}(\hat{N}_c) &= \frac{(10 + 1)(8 + 1)(10 - 2)(8 - 2)}{(2 + 1)^2(2 + 2)} \\ &= \frac{(11)(9)(8)(6)}{(3)^2(4)} = \frac{4752}{36} = 132 \end{aligned}$$

$$= \hat{SE}(\hat{N}) = \sqrt{132} = 11.49$$

Thus, the estimated number of tigers in the sampled area is 32.

An approximate 95% confidence interval for this estimate is given by:

$$\hat{N} \pm 1.96 \hat{SE}(\hat{N}) = 32 \pm 22.52 = (9.48, 54.52)$$

The above estimate is not precise and is highly uncertain, perhaps owing to small sample size in studies of elusive animals like the tiger.

(II) Broadly, the mark recapture methods have been categorised on the basis of population 'closure' as below:-

- (1) Closed Population Models – Where the total number of individuals in a population does not change due to birth, deaths, immigration or emigration. There are no 'gains' or 'losses' in the population between sampling occasions. Hence, these are most suitable for short-time period estimators like abundance estimation.
- (2) Open Population Models – Where the population is changing during the study due to births, deaths, immigration or emigration. These gains or losses or both occur between the sampling periods. The time interval between sampling occasions is longer. These models provide scope for estimation of abundance, survival rate and recruitment.

(III) In the Indian context, both models are applicable. The closed population models are good for abundance estimation of tigers and its prey in the country level estimation was carried out after every four years. The open population models are suitable for long term studies (e.g. Phase IV of the new methodology at source sites for monitoring tiger and its prey). In this chapter, the focus would be on the 'closed population model' owing to their relevance in the context of tiger estimation.

Capture-Recapture Models for closed population

Capture-Recapture Data

In the capture-recapture approach, the capture history of the individual animal is maintained as a series of “non-captures” (0’s) and “captures” (1’s).

Hypothetical Individual Capture history of 10 tigers with four capture (camera trap) occasions

Tiger	Occasion 1	Occasion 2	Occasion 3	Occasion 4
1	1	1	1	1
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	0	0
6	0	0	1	0
7	0	0	0	1
8	0	0	0	1
9	0	0	1	0
10	0	1	0	0

The first tiger has a capture record of (1111), and was photo captured on all four occasions. The second tiger, having a photo capture record of (1100), was captured on occasions 1 and 2. Rest of the capture history data can be interpreted similarly. Since the capture-recapture data involving a number of animals becomes large, it is usually represented in the form of summary statistics for statistical analysis:-

- k = number of capture occasions;
 - n_j = number of animals captured on the j^{th} occasion ($j=1, \dots, k$);
 - u_j = number of unmarked animals captured on the j^{th} occasion ($j=1, \dots, k$);
 - m_j = number of marked animals captured on the j^{th} occasion ($j=1, \dots, k$);
 - M_j = number of distinct animals captured before the j^{th} occasion ($j=1, \dots, k$);
- ($M_1=0$, and M_{k+1} is the total number of distinct animal captured in the exercise);
- f_j = number of animals captured exactly j times ($j=1, \dots, k$);

The statistics pertaining to the hypothetical capture history data is provided as a summary below:

Summary Statistics for the Capture history of tigers

J	n_j	m_j	u_j	M_j	f_{1j}
1	4	0	4	0	6
2	6	4	2	4	1
3	5	3	2	6	1
4	4	2	2	8	2
				10 ($M_5=10$)	
TOTAL	19	9	10		10

Description of the statistics:

- n_j = column sum for the j^{th} occasion (column) in the capture data (history matrix), with (n_1, n_2, \dots, n_4) .
- u_j = first captures out of n_j animals, with $(u_1, u_2, \dots, u_4) = (4, 2, 2, 2)$.
- m_j = recaptures out of n_j animals, with $(m_1, m_2, \dots, m_4) = (0, 4, 3, 2)$.
($u_j + m_j = n_j$ i.e. 19)
- M_j = cumulative number of first recaptures on the first $j-1$ occasions, thus $M_j = u_1 + u_2 + \dots + u_{j-1}$ and $(M_1, M_2, \dots, M_5) = (0, 4, 6, 8, 10)$; i.e. there is a progressive increase of marked animals in the population from $M_1 = 0$ to $M_5 = 10$.

The capture frequency of an animal is denoted by its row sum. Thus (f_1, f_2, \dots, f_k) denote the frequency counts of all the animals which were capture $(6, 1, 1, 2)$. Thus, 6 tigers were photo captured once, one tiger photo captured twice, one tiger photo captured thrice and two on all the four occasions.

The number of animals which are never captured is represented by ' f_0 ', so that $f_1 + f_2 + \dots, f_k = M$ and $f_0 + f_1 + \dots, f_k = N$. Thus estimation of population size 'N' becomes equivalent to estimation of f_0 , the number of missing animals ($N = M_{t+1} + f_0$).

(IV) There are a number of models to address different sources of variation in capture probabilities, which are available in the software (CAPTURE):

1. M_0 : equal probability of capture model
2. M_h : Heterogeneity Model
3. M_{bh} : Behaviour-heterogeneity Model
4. M_t : Time Variation (Schnabel) Model
5. M_{th} : Time-Heterogeneity Model
6. M_{tb} : Time-behavioural Response Model
7. M_h : Heterogeneity Model

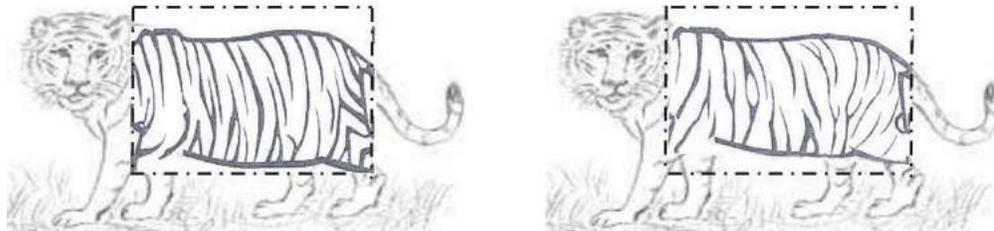
(V) Issues relating to survey design (for camera trapping of tigers)

Some general considerations are as below:

1. The sampling time in camera trapping of tigers should be 'short' vis-à-vis the tiger populations turn over for meeting the assumptions relating to 'close models'. It has been stated that four to six weeks of sampling through camera trapping may be needed which may be stretched to eight to twelve weeks. Experience in general indicates that a period of six to eight weeks of sampling may be required.
2. The space should provide scope for every animal in the study area to have some chance of being captured.
3. The camera traps should be adequately spread through out the study area and should be checked each day during the sampling period to get a good capture history data.
4. The study area may be divided into a number of potential sampling units, whose size should be just sufficient to set up a single camera trap. Each sampling unit can be considered as a 'grid cell' which can be randomly selected to place camera traps at sites which are promising. In the following day, the camera can be moved to other such sites in the grid cell and the process can be repeated between five to thirty days to get a standard capture history data.
5. If the area is difficult or the number of camera traps are not adequate, then smaller portions of the area can be covered (block-wise) for camera trapping for a short period of time before moving successively to other portions. The total number of days used for camera trapping to cover the entire area (all

blocks) is denoted as sample occasion 1. The procedure is repeated to get the capture occasion 2.

The other considerations in camera trapping of tigers include choice of the equipment (camera and the tripping device), choice of sites to set up the traps, spacing of traps and a standard data collection protocol. The tigers are identified visually from photographs using their unique stripe patterns:



Hiby et. al. have used a three dimensional model to match images of living tigers and tiger skins.

The identified individual tigers are numbered and every capture of an individual tiger is assigned to a particular secondary sampling occasions.

The capture history of individual tigers consist from the database in the standard history matrix and are analysed through a suitable computer program CAPTURE or MARK. During analysis, the results are checked to ascertain the violation / non-violation of the closure assumption and finally the statistical tests 'between models' is done to indicate the best fitting model vis-à-vis the data, from which the parameters are obtained. Since tigers are territorial, models which address heterogeneous capture probabilities (like M_h) should be used for tigers.

Hypothetical Data relating to individual capture history of 10 tigers with 6 camera trap (capture) occasions: Analysis with software CAPTURE

Tiger	Occasions
1.	100101
2.	101001

- 3. 010110
- 4. 100010
- 5. 101010
- 6. 101101
- 7. 001010
- 8. 101101
- 9. 010101
- 10. 101001

Input and Errors Listing

Input---title='rg2'

Input---task read captures x matrix occasions=6 captures=6

Input---data='Group 1'

Input---format='(a6,6f1.0)'

Input---read input data

Summary of captures read

Number of trapping occasions	6
Number of animals captured	10
Maximum x grid coordinate	1.0
Maximum y grid coordinate	1.0

Input---task model selection

Input---task population estimate appropriate

** Warning ** Appropriate model has been selected,
but no estimator is available.
Processing will be attempted.

*** ERROR *** Population estimator was not specified.
Scanning for a new task card.

Input---task population estimate null

Input---task population estimate darroch

Input---task population estimate zippin

Input---task population estimate jackknife

Input---task population estimate mh-chao

Input---task population estimate mth-chao

Mark-recapture population and density estimation program Page 2

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rg2

Model selection procedure. See this section of the Monograph for details.

Group 1

Occasion	j=	1	2	3	4	5	6
Animals caught	n(j)=	7	2	6	5	4	6
Total caught	M(j)=	0	7	9	10	10	10
Newly caught	u(j)=	7	2	1	0	0	0
Frequencies	f(j)=	0	2	6	2	0	0

1. Test for heterogeneity of trapping probabilities in population.

Null hypothesis of model M(o) vs. alternate hypothesis of model M(h)

Expected values too small. Test not performed.

2. Test for behavioral response after initial capture.

Null hypothesis of model M(o) vs. alternate hypothesis of model M(b)

Chi-square value = 3.819 degrees of freedom = 1

Probability of larger value = 0.05068

3. Test for time specific variation in trapping probabilities.

Null hypothesis of model M(o) vs. alternate hypothesis of model M(t)

Chi-square value = 8.687 degrees of freedom = 5

Probability of larger value = 0.12223

4. Goodness of fit test of model M(h)

Null hypothesis of model M(h) vs. alternate hypothesis of not model M(h)

Chi-square value = 5.581 degrees of freedom = 5

Probability of larger value = 0.34910

Mark-recapture population and density estimation program Page 3

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rg2

Model selection procedure. See this section of the Monograph for details.

Group 1

5. Goodness of fit test of model M(b)

Null hypothesis of model M(b) vs. alternate hypothesis of not model M(b)

Chi-square value = 7.262 degrees of freedom = 4
Probability of larger value = 0.12265

5a. Contribution of first capture homogeneity across time

Expected values too small. Test not performed.

5b. Contribution of recapture homogeneity across time

Chi-square value = 7.252 degrees of freedom = 4
Probability of larger value = 0.12316

6. Goodness of fit test of model M(t)

Null hypothesis of model M(t) vs. alternate hypothesis of not model M(t)

Expected values too small. Test not performed.

7. Test for behavioral response in presence of heterogeneity.

Null hypothesis of model M(h) vs. alternate hypothesis of model M(bh)

Chi-square value = 0.667 degrees of freedom = 1
Probability of larger value = 0.41422

Model selection criteria. Model selected has maximum value.

Model	M(o)	M(h)	M(b)	M(bh)	M(t)	M(th)	M(tb)	M(tbh)
Criteria	0.89	0.68	0.44	0.91	0.00	0.75	0.43	1.00

Appropriate model probably is M(tbh)

No estimator results from this model.

Mark-recapture population and density estimation program Page 4

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rg2

Population estimation with constant probability of capture.

See model M(o) of the Monograph for details.

Group 1

Number of trapping occasions was 6

Number of animals captured, M(t+1), was 10

Total number of captures, n., was 30

Estimated probability of capture, $\hat{p} = 0.5000$

Population estimate is 10 with standard error 0.4189

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 11

Mark-recapture population and density estimation program Page 5
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rg2

Population estimation with time specific changes in probability of capture.
See model $M(t)$ of the Monograph for details.
Group 1

Occasion	j=	1	2	3	4	5	6
Animals caught	n(j)=	7	2	6	5	4	6

Total animals captured 10

$\hat{p}(j) = 0.70 \ 0.20 \ 0.60 \ 0.50 \ 0.40 \ 0.60$

Population estimate is 10 with standard error 0.0053

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 11

Histogram of n(j)

Frequency	7	2	6	5	4	6

7	*					
6	*	*			*	
5	*	*	*		*	
4	*	*	*	*	*	
3	*	*	*	*	*	
2	*	*	*	*	*	*
1	*	*	*	*	*	*

rg2

Population estimation with constant probability removal estimator.
 See model M(b) of the Monograph for details.

Group 1

Occasion	j=	1	2	3	4	5	6
Total caught	M(j)=	0	7	9	10	10	10
Newly caught	u(j)=	7	2	1	0	0	0

Estimated probability of capture, p-hat = 0.714281

Estimated probability of recapture, c-hat = 0.434783

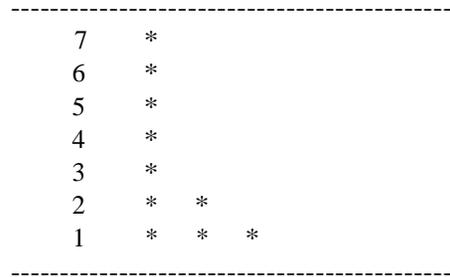
Population estimate is 10 with standard error 0.0751

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 10

Histogram of u(j)

Frequency 7 2 1 0 0 0



rg2

Population estimation with variable probability of capture by animal.
 See model M(h) of the Monograph for details.

Group 1

Number of trapping occasions was 6
 Number of animals captured, M(t+1), was 10

Total number of captures, n., was 30

Frequencies of capture, f(i)

i= 1 2 3 4 5 6
 f(i)= 0 2 6 2 0 0

Computed jackknife coefficients

	N(1)	N(2)	N(3)	N(4)	N(5)
1	1.833	2.500	3.000	3.333	3.500
2	1.000	0.467	-0.233	-0.833	-1.167
3	1.000	1.000	1.225	1.542	1.750
4	1.000	1.000	1.000	0.956	0.914
5	1.000	1.000	1.000	1.000	1.001

The results of the jackknife computations

i	N(i)	SE(i)	.95 Conf. Limits	Test of N(i+1) vs. N(i)
0	10			Chi-square (1 d.f.)
1	10.0	0.00	10.0 10.0	2.250
2	8.9	0.00	8.9 8.9	0.002
3	8.9	1.49	6.0 11.8	0.261
4	9.5	2.83	4.0 15.0	0.488
5	10.0	3.57	3.0 17.0	0.000

The data are ill-conditioned. As a best guess, use

Average p-hat = 0.5000

Interpolated population estimate is 10 with standard error 0.4567

Approximate 95 percent confidence interval 10 to 10

Histogram of f(i)

Frequency	0	2	6	2	0	0
6			*			
5			*			
4			*			
3			*			
2	*	*	*			
1	*	*	*			

Mark-recapture population and density estimation program Page 8

Program version of 16 May 1995 9-Dec-2010

rg2

Population estimate under individual heterogeneity in capture probabilities.

See model M(h) of Chao (1988).

Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

Frequencies of capture, f(i)

i= 1 2 3 4 5 6
f(i)= 0 2 6 2 0 0

Average probability of capture = 0.5000

Population estimate is 10 with standard error 0.0000

Approximate 95 percent confidence interval 10 to 10

Mark-recapture population and density estimation program Page 9

Program version of 16 May 1995 9-Dec-2010

rg2

Population estimate under time variation and individual heterogeneity in capture probabilities.

See model M(th) of Chao et al. (1992).

Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

Frequencies of capture, f(i)

i= 1 2 3 4 5 6
f(i)= 0 2 6 2 0 0

Estimator	Gamma	N-hat	se(N-hat)
1	0.0000	10.00	0.00
2	0.0000	9.74	0.00
3	0.0000	10.34	0.67

p-hat(j)= 0.70 0.20 0.60 0.50 0.40 0.60

Bias-corrected population estimate is 10 with standard error 0.6687

Approximate 95 percent confidence interval 10 to 13

Mark-recapture population and density estimation program Page 10

Program version of 16 May 1995 9-Dec-2010

rg2

S u c c e s s f u l E x e c u t i o n

Capture Matrix of the tiger capture data analysed above:

Tiger	Occasions					
	1	2	3	4	5	6
1	1	0	0	1	0	1
2	1	0	1	0	0	1
3	0	1	0	1	1	0
4	1	0	0	0	1	0
5	1	0	1	0	1	0
6	1	0	1	1	0	1
7	0	0	1	0	1	0
8	1	0	1	1	0	1
9	0	1	0	1	0	1
10	1	0	1	0	0	1

(VI) Analysis

- Every tiger captured was given a unique identification number viz. (MT-002), after examining stripe pattern on flanks, limbs, forequarters
- Following tiger identification, capture histories (X matrix) were developed and analyzed using the program MARK, CAPTURE and CARE.
- CAPTURE gives various probabilities models of the underlying capture-recapture process, that are likely to have generated the observed capture histories
- Analysis of capture history involves comparison between competing models using a series of hypothesis tests and results of an overall discriminant function test, in order to select the most appropriate abundance estimation model
- Assumption: sampled population was demographically and geographically closed during the sampling period
- Since the entire tiger reserve is camera trapped the total population within the reserve is estimated. Also the same area is camera trapped in consecutive years therefore the population is directly comparable and there is no need to compute density of tigers which adds variability and loss of precision to detect trends.

Annexure-VI

Capture-recapture Sampling using Camera Trapping [Mark Software Format]

Tiger ID	Trap Occasion (day)						
	1	2	3	4	5	6	n
1							
2							
3							
4							
5							
6							
7							
N							

Data to be entered as 01 format.

Annexure-VII

Data Sheet for Tiger, Other Animals & Human Sign Encounter Rate

Observer Name: _____ Date: _____ Start Time: _____ End Time: _____
 Begin GPS: Lat: _____ N, Long: _____ E End GPS: Lat: _____ N, Long : _____ E
 Forest Circle _____ Forest Block & Range: _____ Beat _____
 Approx. Kms. travelled: _____ Km. Time Spent in any other activity _____ Min.

SL No	Time	GPS Location (only for tiger sign)						*Animal Species	^Sign Type	Mangrove Type			Creek Bank Type			Sign		Width of mud flat (water to Mangrove edge)
		Lat.			Long.					Tall >10'	Medium 4-10'	Small <4'	Steep	Moderate	Gentle	Fresh	Old	
		D	M	S	D	M	S											
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

* Animal species to be recorded: tiger, fishing cat, jackal, monitor lizard, crocodile, chital, wild pig, rhesus macaque, humans and others.

^ Sign types to be recorded are pugmark/hoof mark/foot print, scat/pellet (with condition), vocalization and direct sighting.

Annexure-VIII

Encounter Rate on Line Transects

Observer Name: _____ Date: _____ Start Time: _____ End Time: _____
Begin GPS: Lat: _____ N, Long: _____ E End GPS: Lat: _____ N, Long : _____ E
Forest Circle _____ Forest Block & Range: _____ Beat _____
Approx. Kms. Travelled: _____ Km.

S. No	Time	Species*	Total Number (Adults & Young)	Young	Mangrove Type			Bank Type			Perpendicular Distance of animal from water's edge	Activity of the animal(s) Basking, foraging, moving, etc.
					Tall >10'	Medium 4-10'	Small <4'	Steep	Medium	Gentle		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

*Species that need to be recorded on the transect: chital, rhesus, macaque, wild pig, monitor lizard and estuarine crocodile and other mammalian species seen.

Human Disturbance

Name of Observer: Date: Forest Circle: Forest Division:.....
 Range: Beat: ID No. of Line Transect:

Sl No	GPS locations of the beginning of creek transect and at every 15 min. travel interval thereafter						Human Disturbances				
							0-4 Rating, 0-None, 4-Very high				
	Lat			Long			Wood Cutting 0-4	Lopping 0-4	Fishing evidence seen from the vegetation plot Y/N	People Seen from the plot Y/N	
1	Deg	Min	Sec	Deg	Min	Sec					
2											
3											
4											
5											
6											
7											
8											
9											
10											

Are there any permanent human settlements in the beat? (Yes/No). If Yes, how many? _____. Approximate human population _____.

Is there NTFP collection in the beat _____(Yes/No). If yes, what NTFP is collected _____, _____, _____, _____.

Rate NTFP collection on a scale of 0-4, 0-No to 4-Very high _____, _____, _____, _____.

Intensity of fishingand tiger prawn seed collection in the beat at 0-4 scale (0 is nil, 4 is very high)

No. 15-37/2012-NTCA
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority

Annexe No.-V, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 9883
E-mail: jdntca@gmail.com

Dated: 18th March, 2013

To

1. The PCCF/HOFF (s),
Tiger Range States.
2. The Chief Wildlife Warden (s),
Tiger Range States.

Sub: Standard Operating Procedure (SOP) for disposing Tiger/ leopard carcass/ body parts – reg.

Sir,

Advisories have been issued by Project Tiger/National Tiger Conservation Authority from time to time, on different issues relating to tiger mortality, post mortem, reporting etc. Based on the same and with inputs from field officers / experts, a Standard Operating Procedure (SOP) for disposing tiger/ leopard carcass/ body parts has been developed to meet the present challenges.

A copy of the said Standard Operating Procedure (SOP) for disposing tiger/ leopard carcass/ body parts, duly approved by the competent authority, is forwarded herewith for information and necessary action.

The SOP may please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully,
SD/-

Encl: As above.

(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PPS to ADG (WL)
5. Additional Director, Wildlife Crime Control Bureau, New Delhi.
6. Inspector General of Forests, Regional Office, Guwahati.
7. Assistant Inspector General (NTCA), Nagpur and Bangalore.

**STANDARD OPERATING PROCEDURE FOR DISPOSING
TIGER/ LEOPARD CARCASS/BODY PARTS**



MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE FOR DISPOSING THE TIGER/ LEOPARD CARCASS/BODY PARTS

1. **Title :** Standard Operating Procedure for disposing the tiger/ leopard carcass/ body parts.
2. **Subject:** Tiger death/seizure of body parts
3. **Reference:** Advisories of the Ministry of Environment & Forests/ Project Tiger/ NTCA on the subject (Advisory No: 1-60/89-WL I dated 04-11-1994 from the Addl. IGF (wildlife) Ministry of Environment and Forests)
4. **Purpose:** To ensure that the carcass/ body parts of tiger/ leopard are disposed of in a transparent manner to prevent any pilferage for illegal market.
5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for disposing of tiger/leopard carcass/ body parts where carcass is available or the body parts have been seized.
6. **Scope :** The SOP applies to all forest field formations including tiger reserves besides other areas where the incident has occurred.
7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.
8. **Detailed instructions for the procedure to be followed for disposing of the tiger/ leopard carcass/ body part(s) where body part(s) / carcass is available**

(i) At Scene of crime (SoC) / incident: when carcass or parts available:

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- Dispose of the carcass by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Post Mortem (PM) Team having representation from the civil society institution
- While incinerating the carcass, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole carcass including bones are fully burnt.
- After ensuring the complete incineration of the carcass, prepare a 'Panchnama (Memo) on disposal of the carcass, duly signed by the PM Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(ii) In case of seizure of body parts (Skin – dry or fresh/ bones/meat or other body parts):

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- In case of seizures of body parts, the same may be required as evidence for prosecution in the courts of law and hence in such situations do not dispose the same till the orders of the concerned court for such disposal are obtained.
- Once orders have been obtained by the competent authority, dispose of the body part (s) by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Team (same as prescribed for the Post Mortem) having representation from a civil society institution
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(iii) In cases of seized stock of wildlife trophies obtained during seizure/ confiscation:

- All seized stock of wildlife trophies, where no case is pending in a Court of law, should be destroyed through incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides a team (same as prescribed for the post mortem) having representation from a civil society institution.
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.
- The provisions of the Wildlife (Protection) Act, 1972 must be followed before destroying such stock.

FINAL REPORT

To be submitted for disposal of each case of tiger/ leopard carcass/ body part (s)/ trophy

1	Name of Office	
2	Locational details of the mortality: description, GPS, Compartment /Block/Range /Sub-Division/ Forest Division/ Tiger Reserve or place/ time	
3	Date of Mortality/ carcass report	
4	In case of seizure of body parts details indicating the status of carcass or seized material	
5	Details of the person (staff/ Others) who reported the incident first: name/address/ contact details/ telephone numbers/e-mail	
6	For carcass: Date, time and Place of Post Mortem (PM)	
7	Details of PM Team (names/designation/ address/ contact)	
8	Details of the missing body parts, if any	
9	Cause of death as ascertained after the PM	
11	Colour photographs of the carcass/ body part (s)- (close ups, indicating injury, if any); details of comparison with camera trap photo data base	
12	Cause of death: Natural/ Poaching	
13	In case of poaching/ seizure of body parts: i. further action taken/ proposed: ii. attach colour photographs of the seized body part/s iii. attach certification regarding species identity (for bone pieces/ meat/ other body parts which are not physically	

	identifiable) iv. action taken with respect to offenders/ suspects (if arrested) v. status of Case/ complaint: number, date of filing the complaint, Sections of law, name of Court where filed	
14	Panchnama/memo of disposal of carcass/ body part (s)	Enclosed/ not-enclosed
15	Remarks if any	
16	Signature of the Officer In-charge with name, designation, date and stamp	

(SOP prepared with inputs from Field Officers of Tiger Reserves)

Food Habits of Golden Jackal (*Canis aureus*) and Striped Hyena (*Hyaena hyaena*) in Sariska Tiger Reserve, Western India

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Abstract: Food habits of golden jackal (*Canis aureus*) and striped hyena (*Hyaena hyaena*) were investigated using scat analysis between November 2010 and June 2011 in Sariska Tiger Reserve, Western India. Total 104 scats of golden jackal and 86 scats of striped hyena were collected and analyzed. The frequency of occurrence of each prey species was estimated through bootstrapping using program SIMSTAT. Niche breadth of these two species was quantified using Levin's measure. The diet overlap in the two species was assessed using Pianka's index. Twelve food items were identified in golden jackal scats and nine in striped hyena scats. Vegetative matter contributed maximum (17.57%) in jackal's diet followed by rodents (15.77%), chital (10.81%), sambar (5.41%) and nilgai (4.05%). Nilgai and domestic cattle contributed maximum (24.76% each) in the diet of striped hyena, followed by sambar (17.14%), chital (16.19%) and vegetative matter (10.48%). The estimated dietary overlap between striped hyena and golden jackal was 67%. Niche breadth for golden jackal was estimated as 0.69 and for striped hyena it was 0.57. The considerable overlap was attributed to mutual dependence on ungulates, which indicated high resource competition between the two species.

Key words: *Canis aureus* % Dietary Niche Overlap % Food Habits % *Hyaena hyaena* % Prey Size % Scat

INTRODUCTION

The extent of niche differentiation and resource partitioning determines the degree to which different species can either coexist or competitively exclude each other [1, 2]. An important mode of resource partitioning is the degree of dietary overlap between sympatric species [3]. This overlap is influenced by each species' physical ability to obtain food [4, 5] and also by variation in the spatial and temporal availability of food [6]. For distinct carnivore guilds different mechanisms may be involved, such as different body sizes of predators [7] and prey species [8, 9], activity pattern [10] and microhabitat use [11]. However, whereas resources are limited, the strength of competition between sympatric species generally decreases with increased resource partitioning [12].

Study by Dickman [13] showed that the smaller predators in an insectivorous mammal guild consumed smaller prey, but switched over to larger prey when the larger predators were removed. Consequently prey selection could depend more on competition among predator guild members than on any inherent relationship

between predator and prey sizes. A confounding factor in predator-prey studies that include a wide size-range of mammalian predators is the high variability in diet of smaller species, which can switch between insectivore, omnivore and carnivore. Canid and felid species above certain threshold weight class predate purely on vertebrates, while those below may be omnivorous or predate on invertebrates and vertebrates. This implies that large carnivores (>21.5 kg) constitute a distinct functional group from which predator-prey size relationships should emerge more clearly than from carnivore assemblages that are distributed across both sides of the body mass threshold [14]. The diet of the golden jackal and the striped hyena was studied through scat analysis in India [15-18] and other countries [19-22]. Merve *et al.* [23] studied diet overlap between brown hyena (*Parahyaena brunnea*) and black-backed jackal (*Canis mesomelas*) in Atherstone Nature Reserve, Pilanesberg National Park and private farm (Mankwe Wildlife Reserve) in South Africa. They inferred that, despite the marked body size differences, brown hyena and black-backed jackal can be considered as either meso-carnivores or apex predators,

depending on the presence or absence of larger carnivores [24]. As meso-predators, the potential food availability increases as dietary items previously unattainable, are killed by apex predators and interspecific competition could decline concomitantly. The diet of black backed jackal comprises high proportion of small and large mammals, corroborating that both scavenge and hunt competently [25]. Brown hyenas, on the other hand, are predominant scavengers [26]. Thus, jackals may be excluded from carcass sites by brown hyenas, eventually forcing them to hunt more frequently [27].

Both striped hyena (*Hyaena hyaena*) and golden jackal (*Canis aureus*) are found in semi-arid zone and tropical dry and moist deciduous forests of the country and their diet ranges from wild ungulates to domestic livestock and rodents. Although numerous studies have investigated their diet separately, only a few studies [23] have investigated the overlap and resource partitioning, which may vary with the presence or absence of apex predators like tiger (*Panthera tigris*) and leopard (*Panthera pardus*). In the present study, we assessed 1) the relative contribution of different prey species to the diet of golden jackal and striped hyena and 2) the dietary overlap between these two sympatric species. In the present study we estimated the food habits of striped hyena (*Hyaena hyaena*) and golden jackal (*Canis aureus*) and compared the dietary overlap between them in Sariska Tiger Reserve, Western India from November 2010 to June 2011.

MATERIALS AND METHODS

Study Area: The study was conducted in Sariska Tiger Reserve (Sariska TR) (27°05'-27°33' N; 76°15'-76°35' E) between November 2010 and June 2011. Sariska TR is situated in the Aravalli Hill Range in the semi-arid part of Western India [28]. The total area of the Tiger Reserve is 881 km², of which 273.8 km² is notified National Park. The vegetation of Sariska corresponds to Northern tropical dry deciduous and Northern tropical thorn forests [29]. Open areas are covered with scrub forests dominated by shrubs such as *Zizyphus nummularia*, *Capparis sepiaria*, *Capparis decidua*, *Adathoda vasica*, *Prosopis juliflora* and *Acacia sp.* The valleys are dominated by *Zizyphus mauritiana* mixed forest, gentle slopes are dominated by *Anogeissus pendula* forest and the steep slopes are occupied by *Boswellia serrata* forest. Other than golden jackal and striped hyena, the Park supports various

carnivores and omnivores such as tiger, leopard, jungle cat (*Felis chaus*), common mongoose (*Herpestes edwardsii*), small Indian mongoose (*H. auropunctatus*), ruddy mongoose (*H. smithi*), common palm civet (*Paradoxurus hermaphroditus*), small Indian civet (*Viverricula indica*), ratel (*Mellivora capensis*) and prey species like chital (*Axis axis*), sambar (*Rusa unicolor*), nilgai (*Boselaphus tragocamelus*), common langur (*Semnopithecus entellus*), wild pig (*Sus scrofa*), porcupine (*Hystrix indica*), rufous-tailed Hare (*Lepus nigricollis ruficaudatus*) and Indian peafowl (*Pavo cristatus*)[30]. There are 32 villages within Sariska TR of which six are located in the intensive study area of 160 km². A large number of brahmini cattle (*Bos indicus*), buffaloes (*Bubalus bubalis*), goats (*Capra hircus*) and sheep (*Ovis aries*) are kept by people living in villages.

Scat Analysis: Estimation of food habits of golden jackal and striped hyena was done using scat analysis. Scats were collected on transects, trails and roads whenever encountered within the intensive study area. Each collected scat sample was labeled with the name of the species, date and location. The collected scats were sun dried and later broken down and washed under running water through a sieve. The scat contents were teased apart and remain of different food items such as hair, feather, scales of reptiles, invertebrate remains and vegetable matter (grass and fruit seeds) were separated. The frequency of occurrence of each food item was estimated through bootstrapping using program SIMSTAT [31]. This technique measures 95% confidence limits of the proportion of each food item in the diet, the limits of which range measure the random sampling errors [19]. Niche breadth of the two species was quantified using Levin's measure [26] to measure the uniformity of resources being utilized by each species. The overlap in diet of the two species was assessed using Pianka's [32] index.

RESULTS

Altogether 104 scats of golden jackal and 86 scats of striped hyena were collected and analyzed. Hair samples from scats were identified from their histological structure using microscope. In total 12 food items were identified in golden Jackal scats and nine in striped hyena scats. The frequency of occurrence and percentage frequency of occurrence of each food item found in golden jackal and striped hyena scats are given in table 1.

Table 1: Frequency of occurrence and percentage frequency occurrence of each food item found in golden jackal and striped hyena scats in Sariska Tiger Reserve, Western India between November 2010 and June 2011

Food item	Golden jackal		Striped hyena	
	Frequency of occurrence (\pm SD)	Percentage frequency of occurrence	Frequency of occurrence (\pm SD)	Percentage frequency of occurrence
Scales of reptiles	4 \pm 1.9	1.80	-	-
Vegetation	37.5 \pm 4.7	17.57	12.8 \pm 3.4	10.48
Fruit	19.1 \pm 3.8	9.01	-	-
Bird	15.5 \pm 3.6	7.21	2.3 \pm 1.5	1.90
Insect	15.3 \pm 3.8	7.21	-	-
Rodent	34 \pm 4.5	15.77	1.2 \pm 1.1	0.95
Hare	8.9 \pm 2.9	4.05	1.2 \pm 1.1	0.95
Sambar	11.3 \pm 3.1	5.41	20.9 \pm 4.4	17.14
Chital	23.1 \pm 3.9	10.81	19.8 \pm 4.0	16.19
Nilgai	8.7 \pm 2.8	4.05	30.2 \pm 4.8	24.76
Cattle	32.9 \pm 4.5	15.32	30.2 \pm 4.8	24.76
Goat	3.7 \pm 1.9	1.80	3.5 \pm 2.1	2.86

Vegetative matter contributed maximum (17.57%) in golden jackal's diet followed by rodents (15.77%), cattle *Bos indicus* (15.32%), chital (10.81%), fruits (9.01%), birds (7.21%), sambar (5.41%), hare (4.05%), nilgai (4.05%), goat (1.80%) and reptile scales (1.80%). No attempt was made to identify the rodent and reptile species in golden jackal's scat. Out of 104 golden jackal scats, one had six food items, one had five food items, ten had four food items, 23 had three food items, 34 had two food items and 35 had single food item. *Zizyphus mauritiana* seeds were the only fruit species found in golden jackal's diet. Beetles (Class: Insecta), centipedes (Class: Chilopoda), millipedes (Class: Diplopoda) in golden jackal's diet were identified on the basis of locomotory organs, i.e. shiny elytra of beetles and round or oval shields of centipedes/millipedes. Feathers of grey partridge (*Francolinus pondicerianus*) and peafowl (*Pavo cristatus*) were identified in golden jackal's diet. Narrow ventral scales and translucent round scales were also identified to be of lizards (*Calotes sp.*) and skinks (family: Scincidae) but not at species level.

In some incidences (n=9) golden jackals were found to prey upon chital fawns in the study area and this may be attributed to higher occurrence of chital in their scats. Golden Jackal was never found to prey on sambar or nilgai (adult or fawn) in the study period, but they scavenge on sambar and nilgai kills made by tiger or leopard in the study area, which is reflected in lower occurrence in their scats. Golden Jackal were also found scavenging on cattle carcasses at the dump sites outside villages in the study area, which is attributed to higher occurrence of cattle in their diet. There were records of

jackal predating on goats in the study area but cattle predation by them was not recorded. The result of scat analysis supports the typical diet generalist of golden jackal, feeding on a variety of food source available to them in the study area.

Out of 86 striped hyena scats, three scats had three food items; 40 scats had two food items and 43 scats had single food items. Nilgai and cattle (*Bos indicus*) contributed maximum (24.76%) in the diet of striped hyena followed by sambar (17.14%), chital (16.19%), vegetation (10.48%), goat (2.86%), unidentified bird (1.90%), hare (0.95%) and unidentified rodent (0.95%). The remains of larger ungulates such as sambar, nilgai and chital were observed more in scat samples as compared to the remains of goat, bird, rodent and hare. The above mentioned large ungulates are also the major food items of tiger and leopard in the study area [33, 34]. This may lead to the inference that the occurrence of larger ungulates in hyena diet is perhaps the result of scavenging.

The estimated dietary overlap between striped hyena and golden jackal was 67% (Table 2). Niche breadth for golden jackal was estimated as 0.69 and for striped hyena it was 0.57 (Table 3). MacArthur and Levin's [35] niche overlap was calculated as an overlap measure of species A on species B and vice-versa. The niche overlap of golden jackal on striped hyena was 66% (0.66) i.e. out of total diet range of striped hyena, 66% of food items are common with golden jackal and the niche overlap of striped hyena on golden jackal was 47% (0.47) i.e. out of total diet range of golden Jackal, 47% of food items are common with striped hyena.

Table 2: Dietary overlap between golden jackal and striped hyena as shown by scat analysis in Sariska Tiger Reserve, Western India between November 2010 and June 2011

Food Item	Percentage frequency of occurrence (striped hyena) (P_{iA})	Percentage frequency of occurrence (golden jackal) (P_{iB})	$P_{iA} * P_{iB}$ (C)	P_{iA}^2 (D)	P_{iB}^2 (E)
Vegetation	10.48	17.57	184.04	109.75	308.62
Bird	1.90	7.21	13.73	3.63	51.94
Rodent	0.95	15.77	15.02	0.91	248.56
Hare	0.95	4.05	3.86	0.91	16.44
Sambar	17.14	5.41	92.66	293.88	29.22
Chital	16.19	10.81	175.03	262.13	116.87
Nilgai	24.76	4.05	100.39	613.15	16.44
Cattle	24.76	15.32	379.24	613.15	234.56
Goat	2.86	1.80	5.15	8.16	3.25
Scales of reptiles	0.00	1.80	0.00	0.00	3.25
Fruit	0.00	9.01	0.00	0.00	81.16
			969.11(F)	1905.67 (G)	1110.30 (H)
				43.65 (I)	33.32 (J)
					0.67 (O)

P_{iA} -% of food item i in the diet of striped hyena; P_{iB} -% of food item i in the diet of golden jackal; $C = P_{iA} * P_{iB}$; $D = P_{iA}^2$; $E = P_{iB}^2$; $F = EC$; $G = ED$ and $H = EE$; $I = G^{0.5}$; $J = H^{0.5}$, $O = F / (I * J)$.

Table 3: Dietary niche breadth between Golden Jackal and Striped Hyena as shown by scat analysis in Sariska Tiger Reserve November 2010 to June 2011

Variable	Golden jackal ₁	Striped hyena ₂
n	12	10
B	8.604	6.157
B _A	0.691	0.573
M _{MacArthur and Levins measure}	0.663	0.475

DISCUSSION

In Sariska TR, the striped hyena occupies all the major habitat types, compared to golden jackal that is mainly distributed in the open scrub land and valley habitat. There are predictions that body size and behavioral flexibility would influence the response of predators and this response would be evidenced in individual use of habitat elements and in the spatial distribution of predators [36]. Specifically, larger species (i.e. striped hyena) would be more equitably distributed among all spatial habitat elements compared to smaller species (i.e. golden jackal), because large size would confer an increased ability to traverse the habitat matrix with minimal risk of predation. Similarly, species with a broader niche would be more equitably distributed among spatial habitat elements because broader diet breadth would allow a species to use the majority of spatial elements and exploit a wider range of resources. Additionally, presence of larger species and species with

broader niches would be more closely linked to characteristics of favorable elements (cover or food) and the landscapes surrounding an element, because the combined effects of large size and a broad niche on the species would impose fewer constraints on its element and landscape use compared to smaller, more specialized species [36]. In Sariska TR, golden jackals are found to be confined in the valley areas where a range of smaller prey species as well as fruiting trees (*Zizyphus* sp.) are available, while distribution of striped hyena was wider including valley habitats and hilly areas [37]. In the present study, broader dietary niche was observed for golden jackal as compared to striped hyena, because golden jackal assumed to compensate their limited distribution by utilizing broader spectrum of food.

Many studies have explained dietary differences within the context of alternative feeding strategies (i.e. generalist vs. specialist foraging) or intrinsic niche differentiation (i.e. disparity in habitat requirements or body size) [38-41]. However, not all species fall into such discrete categories [42]. Indeed, within a given community, the relative breadth of a carnivore's diet (and by extension levels of interspecific dietary overlap) is best defined in relation to the feeding habits manifested by its tropical counterparts [43]. However, when prey abundance fluctuates dramatically over a period of time, even alleged specialist species may exhibit more generalist feeding patterns [44]. Moreover, a review of dietary breadth among herbivorous insects revealed that while

generalization characterized the diet of many insect species, the dietary choices of individuals within particular populations were often specialized (according to the traditional framework described above), suggesting that in many cases dietary breadth may be a local (i.e. system-specific) phenomenon rather than an immutable species characteristic [42]. The considerable overlap (67%) characterizing the diets of striped hyena and golden jackal, may be attributed to mutual dependence on ungulates, which intern indicates that resource competition between these two species may be high. However, striped hyena relied more on large ungulates, whereas golden jackal preyed largely on small ungulates and rodents; these dietary specializations may have alleviated overall levels of competition between two species. This pattern of exclusive use of a particular prey items, despite the overall dietary similarity, characterizes the relationships between sympatric coyotes *Canis latrans* and gray foxes *Vulpes velox* [45] and coyotes and red foxes *Vulpes vulpes* [46].

Depending on food availability, golden jackals may be solitary hunters, co-operating in pairs or hunting as groups (mainly when the parents teach the offspring to hunt). The differences in large mammal and small mammal proportions between the diets resulted in a significant difference between golden jackal and striped hyena diets. However, at 67%, the niche overlap between the species was still high. Result of the present study is comparable with the studies by Nowell and Jackson [46] and Walton and Joly [25] on black-backed jackal (*Canis mesomelas*) in Africa. Studies by Owens and Owens [26, 27] on brown hyenas showed that they are predominantly scavengers and black-backed jackals are generally excluded from carcass sites by the much larger brown hyenas, forcing them to hunt more frequently. The similar case may likely happen in Sariska TR where striped hyenas occur in high density i.e. 24.5 individual/ 100 sq. km [47]. Study by Merwe *et al.* [23] on assessment of diet overlap between brown hyena and black-backed jackal suggested that in black backed jackal's diet, more large mammals were consumed outside protected areas whereas more small mammals were consumed inside protected areas in South Africa's North West Province. This observation supports the fact that golden jackal are being excluded from scavenging sites and forced to actively hunt when competing with striped hyena in the present study. The low frequency of smaller prey species in the diet of the striped hyena may reflect sufficient carrion resources, as most samples originated in the study area where the hyenas are relegated to meso-carnivore status by the

presence of apex predators like tiger and leopard. This suggests that niche partitioning in protected areas in the presence of an apex predator results in a form of competitive exclusion of jackal at carcasses by hyena, resulting in a greater level of hunting by the jackals, connatural to the study in Africa [23].

Review of the studies showed marked interspecific difference in plant-matter consumption by golden jackal. Whereas, plants did not play an important role in the feeding of golden jackals in Hungary [20], compared with the feeding of jackals in southern areas of Asia [48]. In the present study vegetative matter i.e. grass and *Zizyphus* fruits comprised a higher proportion 26.58% in golden jackal's diet.

Seasonal dominance of small mammals was reported in golden jackal's diet [49-51]. In the present study no attempt was made to quantify the seasonal diet of golden jackal. Study by Lanszki *et al.* [20] on feeding habits and tropical niche overlap between golden jackal (*Canis aureus*) and red fox (*Vulpes vulpes*) in the Pannonia eco-region, Hungary revealed that functional response of the golden jackal to a limited but favored food item was more rapid than that of the red fox. The golden jackal shifted from small prey to other food items earlier when the availability of small mammals declined and also returned to rodent hunting earlier than did the red fox. Long term ecological studies including seasonal food habits on golden jackal and striped hyena are much desired across different landscapes in the country.

ACKNOWLEDGEMENTS

We thank Rajasthan Forest Department for facilitation of this work in Sariska, as a part of 'Ecology of Leopard' research project conducted by the Wildlife Institute of India. We thank Director and Dean, WII, for their encouragement and support provided for the study. We thank our field assistants Jairam, Omprakash and Ramesh for their assistance in field.

REFERENCES

1. Pianka, E.R., 1973. The structure of lizard communities. Annual Review of Ecology and Systematics, 4: 53-74.
2. Carvalho, J.C. and P. Gomes, 2004. Feeding resource partitioning among four sympatric carnivores in the Peneda-Gere^ s National Park (Portugal). J. of Zool. (Lond.), 263: 275-283.

3. Hayward, M.W. and G.I.H. Kerley, 2008. Prey preferences and dietary overlap amongst Africa's large predators. *South African Journal of Wildlife Research*, 38: 93-108.
4. Radloff, F.G.T. and J.T. Du Toit, 2004. Large predators and their prey in a southern African savanna: a predator's size determines its prey size range. *Journal of Animal Ecology*, 73: 410-423.
5. Owen-Smith, N. and M.G.L. Mills, 2008. Shifting prey selection generates contrasting herbivore dynamics within a large-mammal predator-prey web. *Ecology*, 89: 1120-1133.
6. Azevedo, F.C.C., V. Lester, W. Gorsuch, S. Lariviere, A.J. Wirsing and D.L. Murray, 2006. Dietary breadth and overlap among five sympatric prairie carnivores. *Journal of Zoology, London*, 269: 127-135.
7. Carvalho, J.C. and P. Gomes, 2004. Feeding resource partitioning among four sympatric carnivores in the Peneda-Gerês National Park (Portugal). *J. of Zool. (Lond.)*, 263: 275-283.
8. Karanth, K.U. and M.E. Sunquist, 2000. Behavioral correlates of predation by tiger (*Panthera tigris*), leopard (*Panthera pardus*) and dhole (*Cuon alpinus*) in Nagarhole, India. *J. Zool. (Lond.)*, 250: 255-265.
9. Juarez, K.M. and J. Marinho-Filho, 2002. Diet, habitat use and home ranges of sympatric canids in central Brazil. *J. Mammal.*, 83: 925-933.
10. Loveridge, A.J. and D.W. MacDonald, 2003. Niche separation in sympatric jackals (*Canis mesomelas* and *Canis adustus*). *J. Zool. (Lond.)*, 259: 143-153.
11. Johnson, W.E. and W.L. Franklin, 1994. Spatial resource partitioning by sympatric grey fox (*Dusicyon griseus*) and culpeo fox (*Dusicyon culpaeus*) in southern Chile. *Can. J. Zool.*, 72: 1788-1793.
12. Pacala, S.W. and J. Roughgarden, 1985. Population experiments with the *Anolis* lizards of St. Maarten and St. Eustatius. *Ecology*, 66: 129-141.
13. Dickman, C.R., 1988. Body size, prey size and community structure in insectivorous mammals. *Ecology*, 69: 569-580.
14. Ray, J.C. and M.E. Sunquist, 2001. Trophic relations in a community of African rainforest carnivores. *Oecologia*, 127: 395-408.
15. Sankar, K., 1988. Some observations on food habits of jackals (*Canis aureus*) in Keolao National Park, Bharatpur, as shown by scat analysis. *J. Bombay. Nat. Hist. Soc.*, 85: 185-186.
16. Mukherjee, S., S.P. Goyal, A.J.T. Johnsingh and M.R.P.L. Pitman. 2004. The importance of rodents in the diet of Jungle Cat (*Felis chaus*), Caracal (*Caracal caracal*) and Golden Jackal (*Canis aureus*) in Sariska Tiger Reserve, Rajasthan, India. *Journal of Zoology*, 262: 405-411.
17. Aiyadurai, A. and Y.V. Jhala, 2006. Foraging and habitat use by Golden Jackal (*Canis aureus*) in the Bhal Region, Gujarat, India. *J. Bombay Nat. Hist. Soc.*, 103(1): 5-12.
18. Singh, P., 2008. Population density and feeding ecology of striped hyena (*Hyaena hyaena*) in relation to land-use patterns in an arid region of Rajasthan. M.Sc. dissertation submitted to Manipal University, NCBS, Bangalore, pp: 56.
19. Reynolds, J.C. and H.S. Aebischer, 1991. Comparison and quantification of carnivore diet by faecal analysis: a critique, with recommendations, based on a study of Fox (*Vulpes vulpes*). *Mammal Review*, 21: 97-122.
20. Lanszki, J., M. Heltai and L. Szabo, 2006. Feeding habits and trophic niche overlap between sympatric golden jackal (*Canis aureus*) and red fox (*Vulpes vulpes*) in the *Pannonian ecoregion* (Hungary). *Can. J. Zool.*, 84: 1647-1656.
21. Giannatos, G., Y. Marinos, P. Maragou and G. Catsadorakis, 2005. The status of the golden jackal (*Canis aureus* L.) in Greece. *Belg. J. Zool.*, 134: 37-42.
22. Yom-Tov, Y., S. Ashkenazi and O. Viner, 1995. Cattle predation by the golden jackal *Canis aureus* in the Golan Heights, Israel. *Biol. Conserv*, 73: 19-22.
23. Merwe, I.V.D., C.J. Tambling, M. Thorn, D.M. Scott, R.W. Yarnell, M. Green, E.Z. Cameron and P.W. Bateman, 2009. An assessment of diet overlap of two mesocarnivores in the North West Province, South Africa. *African Zoology*, 44(2): 288-291.
24. Ritchie, E.G. and C.N. Johnson, 2009. Predator interactions, mesopredator release and biodiversity conservation. *Ecology Letters*, 12: 982-998.
25. Walton, L.R. and D.O. Joly, 2003. *Canis mesomelas*. *Mammalian Species*, 715: 1-9.
26. Owens, M.J. and D.D. Owens, 1978b. Feeding ecology and its influence on social organization in brown hyenas (*Hyaena brunnea*, Thunberg) of the central Kalahari Desert. *East African Wildlife Journal*, 16: 113-135.
27. Owens, M.J. and D.D. Owens, 1978a. Feeding ecology and its influence on social organization in brown hyena (*Hyaena brunnea*, Thunberg) of the central Kalahari Desert. *East African Wildlife Journal*, 16: 113-135.

28. Rodgers, W.A. and H.S. Panwar, 1988. Planning a Wildlife Protected Area Network in India. Vol. I, Wildlife Institute of India, Dehradun, pp: 341.
29. Champion, H.G. and S.K. Seth, 1968. A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi, pp: 404.
30. Sankar, K., Q. Qureshi, K. Mondal, D. Worah, T. Shrivastava, S. Gupta and S. Basu, 2009. Ecological studies in Sariska Tiger Reserve, Final report submitted to National Tiger Conservation Authority, Gov. of India, New Delhi. Wildlife Institute of India, Dehradun, pp: 145.
31. Efron, B. and R. Tibshirani, 1986. Bootstrap methods for standard errors, confidence intervals and other measures of statistical accuracy. *Statistical Science*, 1: 54-77.
32. Pianka, E.R., 1981. Competition and niche theory. *Theoretical ecology: principles and applications* (R.M. May, eds). Blackwell Scientific Publications, Oxford, United Kingdom, pp: 167-196.
33. Mondal, K., S. Gupta, Q. Qureshi and K. Sankar, 2011. Prey Selection and food habit of leopard (*Panthera pardus fusca*) in Sariska tiger reserve, Rajasthan. *Mammalia*, 75: 201-205.
34. Sankar, K., Q. Qureshi, P. Nigam, P.K. Malik, P.R. Sinha, R.N. Mehrotra, R. Gopal, S. Bhattacharjee, K. Mondal and S. Gupta, 2010. Monitoring of reintroduced tigers in Sariska Tiger Reserve, Western India: preliminary findings on home range, prey selection and food habits. *Journal of Tropical Conservation Science*, 3(3): 301-318.
35. MacArthur, R. and R. Levins, 1967. The limiting similarity, convergence and divergence of coexisting species. *American Naturalist*, 101: 377-385.
36. Gehring, T.M. and R.K. Swihart, 2003. Body size, niche breadth and ecologically scaled responses to habitat fragmentation: mammalian predators in an agricultural landscape. *Biological Conservation*, 109: 283-295.
37. Gupta, S., 2011. Ecology of medium and small sized carnivore in Sariska tiger reserve, Rajasthan, India. Ph.D Thesis Submitted to the Saurashtra University. Rajkot. Gujarat, pp: 156.
38. Rosenzweig, M.L., 1966. Community structure in sympatric Carnivora. *J. Mammal.*, 47: 602-612.
39. Schoner, T.W., 1974. Some methods for calculating competition coefficients from resource-utilization spectra. *Am. Nat.*, 108: 332-340.
40. Brown, J.H., 1975. Geographical ecology of desert rodents. In *Ecology and evolution of communities*, pp: 315-341.
41. Tokeshi, M., 1999. Species coexistence. Ecological and evolutionary perspectives. UK: Blackwell Science.
42. Fox, L.R. and P.A. Morrow, 1981. Specialization: species property or local phenomenon? *Science*, 211: 887-893.
43. Azevedo, F.C.C., V. Lester, W. Gorsuch, S. Lariviere, A.J. Wirsing and D.L. Murray, 2006. Dietary breadth and overlap among five sympatric prairie carnivores. *Journal of Zoology*, London, 269: 127-135.
44. O'Donoghue, M., S. Boutin, C.J. Krebs, G. Zutla, D.L. Murray and E.J. Hofer, 1998. Functional responses of coyotes and lynx to the snowshoe hare cycle. *Ecology*, 79: 1209-1222.
45. Kitchen, A.M., E.M. Gese and E.R. Schauster, 1999. Resource partitioning between coyotes and swift foxes: space, time and diet. *Can. J. Zool.*, 77: 1645-1656.
46. Nowell, K. and P. Jackson, 1996. Wild Cats: Status Survey and Conservation Action Plan. IUCN/SSC Cat Specialist Group, Gland, Switzerland and Cambridge, UK. IUCN. Gland, Switzerland.
47. Gupta, S., K. Mondal, K. Sankar and Q. Qureshi, 2010. Estimation of Striped hyena (*Hyaena hyaena*) population using camera trap in Sariska Tiger Reserve, Rajasthan, India. *J. Bombay. Nat. Hist. Soc.*, 106(3): 284-288.
48. Balasubramaniam, P. and P.V. Bole, 1993. Seed dispersal by mammals at Point Calimere wildlife sanctuary. Tamil Nadu. *J. Bombay Nat. Hist. Soc.*, 90: 33-44.
49. Taryannikov, V.I., 1974. Feeding of *Canis aureus* in the Syrdarja Basin. *Zool. Zh.*, 53: 1539-1547. [In Russian with English summary].
50. Ishunin, G.I., 1980. The boar, jackal, red fox and badger in the Aydarsk solonceks inundated by the waters of the Syr Daria. *Bull. Moscow Soc. Nat. Biol. Ser.*, 85: 43-51. [In Russian with English summary].
51. Mukherjee, S., S.P. Goyal, A.J.T. Johnsingh and M.R.P.L. Pitman, 2004. The importance of rodents in the diet of Jungle Cat (*Felis chaus*), Caracal (*Caracal caracal*) and Golden Jackal (*Canis aureus*) in Sariska Tiger Reserve, Rajasthan, India. *Journal of Zoology*, 262: 405-411.

ESTIMATION OF STRIPED HYENA *HYAENA HYAENA* POPULATION USING CAMERA TRAPS IN SARISKA TIGER RESERVE, RAJASTHAN, INDIA

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We used camera trap based capture-recapture method to estimate the population size of Striped Hyena *Hyaena hyaena* in Sariska Tiger Reserve. Twenty-five days of camera trapping was done with a sampling effort of 1,675 trap nights from January to April 2008. Camera traps yielded a total of 85 Hyena photographs of 26 individuals within an effective trapping area of 229.7 sq. km. Heterogeneous Jackknife model was best fit in estimating population with a capture probability of 0.31 P(hat). Population size was $34 \pm (\text{SE } 5.4)$ and density was estimated as 15.1 ± 6.2 hyena/100 sq. km (spatially explicit model). The study revealed that camera based capture-recapture method is an effective tool for assessing the population size of Striped Hyena in Sariska.

Key words: Camera trapping, *Hyaena hyaena*, individual identification, Sariska Tiger Reserve

INTRODUCTION

The Striped Hyena *Hyaena hyaena* is one of the most important large scavengers; its role in clearing off carrion in tropical ecosystems and in recycling mineral compounds from dead organic matter enhances its biological importance (Kruuk 1976). They generally prefer arid to semi-arid environment and avoid open desert and dense thickets (Prater 1971; Kruuk 1976; Leakey *et al.* 1999). The current distribution range of this species extends from East to North-east Africa, through the Middle East, Caucasus region, Central Asia and into the Indian subcontinent (Mills and Hofer 1998). In the Indian subcontinent, they occur in arid and semi-arid ecosystems, as well as in the extremely wet regions of south-western coast (Prater 1971; Karanth 1986). According to Mills and Hofer (1998), the estimated population of Striped Hyena in India was c. 1,000, which was a gross under-estimate. The camera trap based capture-recapture framework to estimate population of large carnivores, based on natural markings on their bodies, has proven to be amongst the most successful non-invasive method for species such as Tiger *Panthera tigris* (Karanth and Nichols 1998; Karanth *et al.* 2004; Contractor 2008; Sharma *et al.* 2009), Leopard *Panthera pardus* (Chauhan *et al.* 2005; Edgoankar *et al.* 2007; Harihar *et al.* 2009), Jaguar *P. onca* (Silver *et al.* 2004), Geoffrey's Cat *Oncifelas geoffroyi* (Cuéller *et al.* 2006), Snow Leopard *Uncia uncia* (Jackson *et al.* 2006) and Striped Hyena (Singh 2008). This technique takes advantage of distinctive individual markings through photographs for even heavily furred animals such as Ocelot *Leopardus pardalis* (Trolle and Kery 2003), Wolf *Chrysocyon brachyurus* (Trolle *et al.* 2007), and Puma *Puma concolor* (Kelly *et al.* 2008). The individual

identification in Spotted Hyena has been done earlier using pelage and nicks in ears (Holekamp and Smale 1990; Hofer and East 1993). The present study was aimed to estimate the population of Striped Hyena on the basis of spatially explicit closed capture models in a semi-arid landscape and to standardize the camera trapping method.

MATERIAL AND METHODS

Study area

The study was conducted in Sariska Tiger Reserve (Sariska TR), (25°5'-27°33' N; 74°17'-76°34' E), which is situated in the Aravalli Hill Range and lies in the semi-arid part of Rajasthan (Rodgers and Panwar 1988). The total area of the Tiger Reserve is 881 sq. km, with 273.8 sq. km as a notified National Park. The vegetation of Sariska corresponds to Tropical dry deciduous and Northern Tropical thorn forests (Champion and Seth 1968). The Park supports various carnivore species such as Tiger, Leopard, Striped Hyena, Caracal *Caracal caracal*, Jackal *Canis aureus*, Jungle Cat *Felis chaus* and prey species like Chital *Axis axis*, Sambar *Rusa unicolor*, Nilgai *Boselaphus tragocamelus*, Common Langur *Semnopithecus entellus*, Wild Pig *Sus scrofa*, Porcupine *Hystrix indica*, Rufous-tailed Hare *Lepus nigricollis ruficaudatus* and Indian Peafowl *Pavo cristatus* (Sankar 1994). There are 32 villages within Sariska TR. A large number of buffaloes, goats, sheep and cattle are kept by people living in villages.

METHODS

A preliminary survey was carried out from November to December 2007 in the intensive study area of 80 sq. km in

ESTIMATION OF STRIPED HYENA POPULATION USING CAMERA TRAPS IN SARISKA TIGER RESERVE

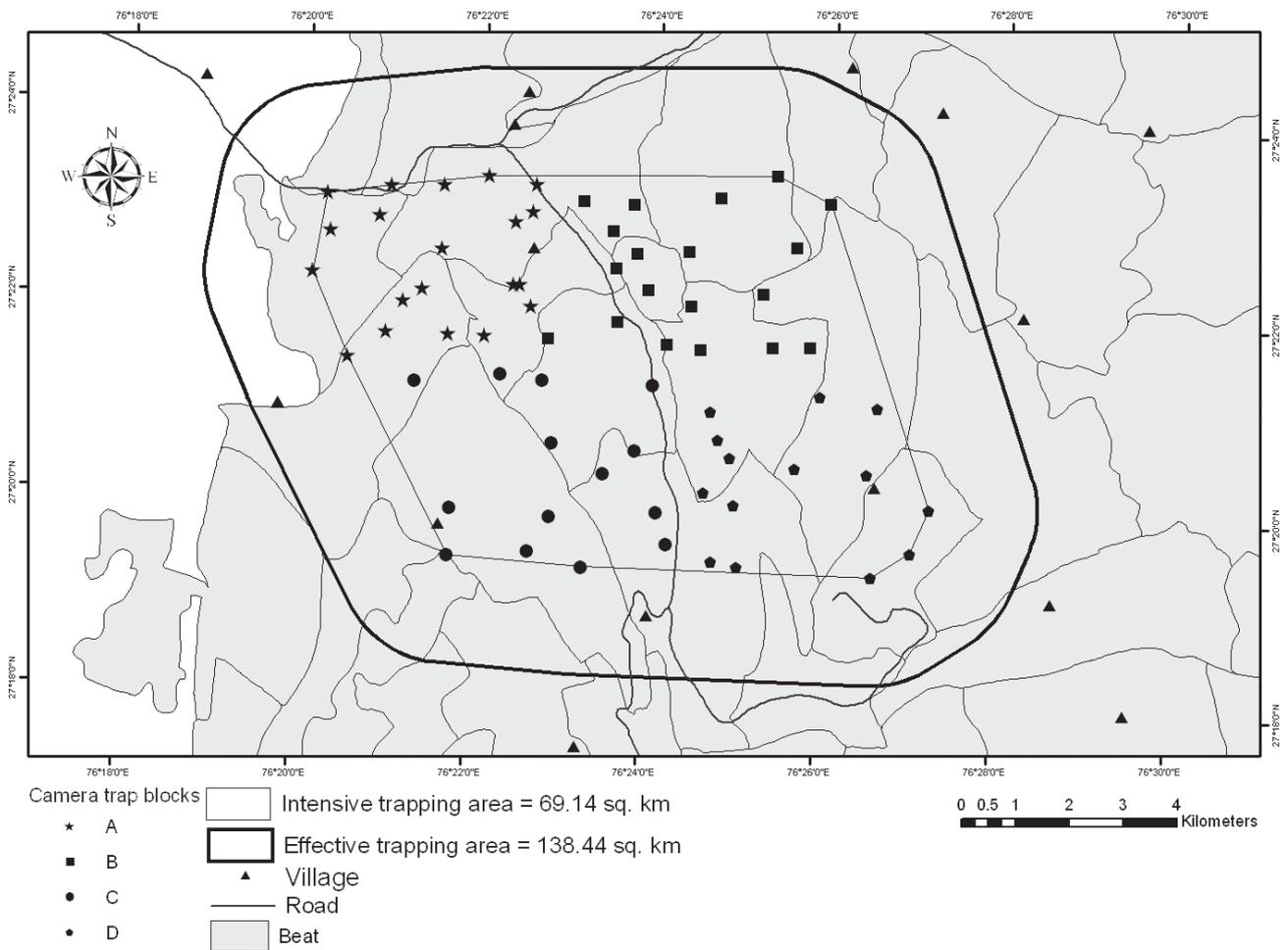


Fig. 1: Camera trap locations in intensive study area of Sariska Tiger Reserve (January to April 2008)

the National Park. Indirect signs such as spoor and scats of Hyena were identified and marked using a handheld Global Positioning System. Striped Hyena camera trapping data was collected from January to April 2008 in the intensive study area. We placed the camera in 1x1 sq. km grid. Camera traps were placed on the basis of hyena evidence (tracks, scats) on the trails. We used 20 units of analog cameras that worked on passive infrared motion/heat sensors. The camera traps were equipped with 35 mm lens which recorded the date and time of each photograph. The camera delay was kept at minimum (15 seconds) and sensor sensitivity was set at high. A total of 67 locations were selected for the placement of camera traps in the study area (Fig. 1). The study area was divided into four blocks of 20 sq. km each. Block A consisted of 20 camera trap sites, block B had 19, C and D blocks had 14 camera trap sites each. The mean inter trap distance was 726 m (ranging from 700 to 1,200 m). Camera traps were operated for 25 consecutive occasions with the total sampling period of 100 days (1,675 trap nights). Individual Hyena obtained from camera trap photographs were identified by a combination

of distinguishing characters such as position and shape of stripes on flanks, limbs and forequarter, pattern and spots on flanks (Schaller 1967; Karanth 1995; Singh 2008) (Fig. 2). Any photograph with distorted perspective, or which lacked clarity, was discarded (n=8). Every Hyena captured was given a unique identification code like H1, H2, H3, etc. Capture history of each individual was generated in an X matrix format (Otis *et al.* 1978). Each day-wise sampling occasion was constructed for example by taking 1st day from block A, B, C and D as day one for entire study area and all subsequent days were combined in this manner to construct a matrix of capture for study area (Karanth 1995). Estimation of population size using closed capture models requires the population under investigation to be both demographically and geographically closed. We tested for population closure using software CAPTURE (Otis *et al.* 1978; Rexstad and Burnham 1991). The density (D) of Hyena in the study area was estimated by spatially explicit model (Efford 2004; Sharma *et al.* 2009) using Density 4.1 software (Efford 2004). The density of Striped Hyena was calculated by four different

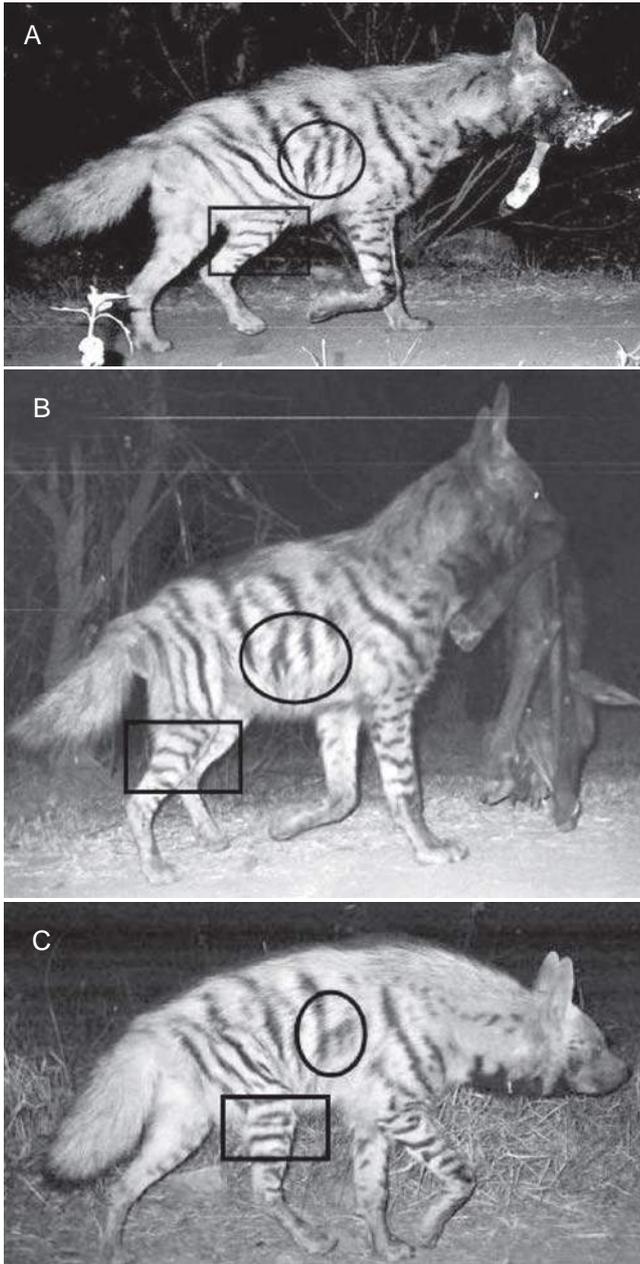


Fig. 2: Two individual hyenas captured by camera trap (A) and (B) show individual H4 with stripes and spots on flanks identical in shape and pattern. While (C) shows a different individual H10 with stripes and spots on flanks being clearly different in shape and pattern

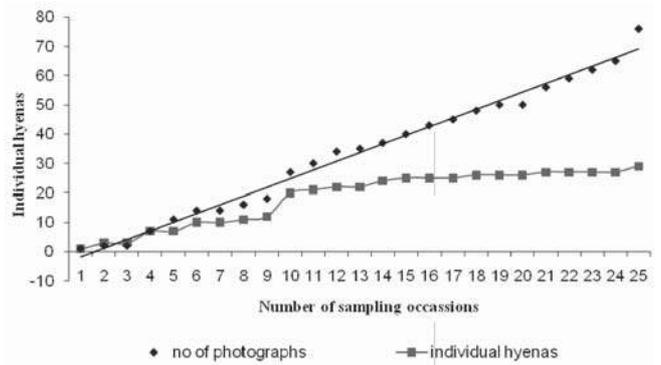


Fig. 3: Number of Striped Hyena photographed and number of hyena photographs with increasing number of sampling occasions to evaluate trap shyness and sampling adequacy in intensive study area

methods such as full mean maximum density moved (MMDM), half MMDM, spatially explicit Inverse Prediction density (IP dens) and spatial Maximum Likelihood density (ML dens) (Sharma *et al.* 2009).

RESULTS

The intensive trapping resulted in a total of 85 photographs of 26 individual hyenas, based on right flank profile, as the number of individuals identified from the right flank was maximum. The 67 trapping stations covered an effective trapping area (ETA) of 229.7 sq. km (Full MMDM) and the number of new individuals was found to stabilize after the 19th trap night (Fig. 3). Population was closed for the sample period ($z = -0.49, P=0.31$) (Otis *et al.* 1978). The overall model selection test based on discriminant functions using the model selection algorithm of CAPTURE identified Mh as the most appropriate model in our study. The model selection scores are as follows: $M(h) = 1.00, M(tb) = 0.99, M(o) = 0.96, M(b) = 0.82, M(tbh) = 0.78, M(bh) = 0.68, M(th) = 0.42,$ and $M(t) = 0.00$. The estimated Hyena population size (N) was $34 \pm SE(5.4)$ (Table 1). Density (D) and flank data using spatial explicit model was 15.1 individual/100 sq. km. MMDM and effective trapping area (ETA) was calculated by different methods using the program DENSITY 4.4 (Table 1). Half normal detection function fitted the best and

Table 1: Density estimates of Striped Hyena in Sariska Tiger Reserve (January to April 2008)

Model	N	SE(N)	P (hat)	Methods for Calculating ETA	Width (km)	ETA (sq. km)	D (hyenas/ 100 sq. km)	SE
Mh (Jackknife)	34	5.4	0.31	MMDM/2	1.832	138.9	24.5	4.3
				MMDM	3.663	229.7	14.9	3.0
				IP DENS	-	-	15.1	6.2
				ML DENS	-	-	12.7	2.8

(N= Population estimate, P (hat)=capture probability, Width=Buffer strip width, ETA=effectively trapped area, D=Density estimate, MMDM=mean maximum distance moved, IP Dens=Inverse Prediction density, ML Dens= Maximum Likelihood density, SE = Standard error)

the density arrived from right half MMDM densities were 24.5 individual/ 100 sq. km and 14.9 individual/ 100 sq. km respectively. Spatial density and full MMDM yielded almost similar results.

DISCUSSION

The capture-recapture technique based on camera trap photographs of Hyena provided a statistically robust estimate in estimating the population. We had also corroborated hyena tracks and photographs at camera location for trap shyness response and did not observe any behavioural response during the study period. Effort required in terms of sampling occasions suggested that a minimum of 20 days are required to get reliable density estimates for hyena in the study area. Out of 85 captures, 12 individual Hyena were recaptured more than three times, 4 individuals were captured twice and 10 individuals had single captures. Some traps showed very high capture rates (2 to 20 captures/trap location), while individual captures/trap ranged from 1 to 8 individuals/trap location. Camera traps deployed near villages Haripura and Kiraska showed high individual capture rates such as 11% (n=7) and 14% (n=9) respectively. This may be attributed to

availability of carcasses (livestock) in and around these villages on which hyenas might be scavenging. The estimated Hyena density in Sariska TR is the highest as compared to available studies in India and Africa (Kruuk 1976; Wagner 2006; Singh 2008; Wagner *et al.* 2008) and this might be attributed to the availability of high wild prey base and domestic livestock, i.e., of 105 animal/sq. km and 222 animals/sq. km respectively (Avinandan *et al.* 2008; Sankar *et al.* 2009). Spatially explicit models and full MMDM give reliable estimates of density (Sharma *et al.* 2009) and we chose these estimates for density estimation. The camera trap based capture-recapture method is proven to be good to estimate Hyena abundance and can be reliably used in various habitat types.

ACKNOWLEDGEMENTS

We thank Rajasthan Forest Department for facilitation of this work in Sariska, as a part of 'Ecology of Leopard' research project conducted by the Wildlife Institute of India. We thank Director and Dean, WII, for their encouragement and support provided for the study. We also thank anonymous reviewers for their valuable comments on the draft manuscript.

REFERENCES

- AVINANDAN, D., K. SANKAR & Q. QURESHI (2008): Prey selection by tigers (*Panthera tigris*) in Sariska Tiger Reserve, Rajasthan, India. *J. Bombay Nat. Hist. Soc.* 105(3): 247-254.
- CHAMPION, H.G. & S.K. SETH (1968): A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi. 404 pp.
- CHAUHAN, D.S., A. HARIHAR, S.P. GOYAL, Q. QURESHI, P. LAL & V.B. MATHUR (2005): Estimating leopard population using camera traps in Sariska Tiger Reserve, Wildlife Institute of India, Dehradun, India. 23 pp.
- CONTRACTOR, D. (2008): Evaluating the effects of design and sampling intensity on estimating tiger (*Panthera tigris*) population and density. M.Sc. thesis submitted to Saurashtra University, Rajkot. 64 pp.
- CUÉLLER, E.L., M.R. ARISPE & A.J. NOSS (2006): Geoffroy's cat at the northern limit of their range: activity patterns and density estimates from camera trapping in Bolivian dry forests. *Stud. Neotrop. Fauna Environ.* 41: 169-178.
- EDGAONKAR, A., R. CHELLAM & Q. QURESHI (2007): Ecology of the Leopard (*Panthera pardus fusca*) in Satpura National Park and Bori Wildlife Sanctuary. Final Report. Wildlife Institute of India, Dehradun. 119 pp.
- EFFORD, M. (2004): Density estimation in live trapping studies. *Oikos* 106: 598-610.
- HARIHAR, A., B. PANDAV & S.P. GOYAL (2009): Density of Leopard (*Panthera pardus*) in Chilla Range of Rajaji National Park, Uttarakhand, India. *Mammalia* 73: 68-71.
- HOFER, H. & M.L. EAST (1993): The commuting system of Serengeti Spotted Hyenas: how a predator copes with migratory prey. Social organization. *Anim. Behav.* 46: 547-557.
- HOLEKAMP, K.E. & L. SMALE (1990): Provisioning and food sharing by lactating Spotted Hyenas, *Crocuta crocuta* (Mammalia, Hyaenidae). *Ethology* 86: 191-202.
- JACKSON, R.M., J.D. ROE, R. WANGCHUK & D.O. HUNTER (2006): Estimating snow leopard population abundance using photography and capture-recapture techniques. *Wildl. Soc. Bull.* 34: 772-781.
- KARANTH, K.U. (1986): Status of wildlife and habitat conservation in Karnataka. *J. Bombay Nat. Hist. Soc.* 83: 166-179.
- KARANTH, K.U. (1995): Estimating Tiger *Panthera tigris* populations from camera-trap data using capture-recapture models. *Biological Conservation* 71: 333-338.
- KARANTH, K.U. & J.D. NICHOLS (1998): Estimation of tiger densities in India using photographic captures and recaptures. *Ecology* 79: 2852-2862.
- KARANTH, K.U., J.D. NICHOLS, N.S. KUMAR, W.A. LINK & J.E. HINES (2004): Tigers and their prey: predicting carnivore densities from prey abundance. *Proc. Natl. Acad. Sci. USA* 14: 4854-4858.
- KELLY, M.J., A.J. NOSS, M.S. BITETTI, L. MAFFEI, R.L. ARISPE, A. PAVIOLO, C.D. DE ANGELO & Y.E. DI BLANCO (2008): Estimating Puma densities from camera trapping across three study sites: Bolivia, Argentina and Belize. *J. Mammal.* 89: 408-418.
- KRUUK, H. (1976): Feeding and social behaviour of the Striped Hyena (*Hyaena vulgaris* Desmarest). *East African Wildlife Journal* 14: 91-111.
- LEAKEY L.N., S.A.H. MILLEDGE, S.M. LEAKEY, J. EDUNG, P. HAYNES, D.K. KIPTOO & A. McGEORGE (1999): Diet of Striped Hyena in northern Kenya. *African Journal of Ecology* 37: 314-326.
- MILLS, M.G.L. & H. HOFER (1998): Hyaenas: Status Survey and Conservation Action Plan. IUCN/SSC Hyaena Specialist Group, IUCN, Gland, Switzerland. 154 pp.

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- OTIS, D.L., K.P. BURNHAM, G.C. WHITE & D.R. ANDERSON (1978): Statistical inference from capture data on closed animal populations. *Wildlife Monographs* 62: 1-135.
- PRATER, S. (1971): The Book of Indian Animals. Bombay Natural History Society, Bombay. 263 pp.
- REXSTAD, E. & K.P. BURNHAM (1991): User's Guide for Interactive Program CAPTURE. Fort Collins: Colorado State University. 30 pp.
- RODGERS, W.A. & H.S. PANWAR (1988): Planning a Wildlife Protected Area Network in India. Vol. I, Wildlife Institute of India, Dehradun. 341 pp.
- SANKAR, K. (1994): Ecology of three large sympatric herbivores (chital, sambar, nilgai) with special reference to the reserve management in Sariska Tiger Reserve, Rajasthan. Ph.D., Thesis. University of Rajasthan. Jaipur, India. 190 pp.
- SANKAR, K., QAMAR QURESHI, KRISHNENDU MONDAL, D. WORAH, T. SRIVASTAVA, S. GUPTA & S. BASU (2009): Ecological studies in Sariska Tiger Reserve, Final report submitted to National Tiger Conservation Authority, Govt of India, New Delhi. Wildlife Institute of India, Dehradun. 145 pp.
- SHARMA, R.K., Y.V. JHALA, Q. QURESHI, J. VATTAKARAN, R. GOYAL & K. NAYAK (2009): Evaluating capture recapture population density estimating of tigers in a population with known parameter. *Animal Conservation* 13: 94-103.
- SCHALLER, G.B. (1967): The Deer and the Tiger: A study of Wildlife in India. Chicago: University of Chicago Press. 370 pp.
- SILVER, S.C., L.E. OSTRO, L.K. MARSH, L. MAFFEI, A.J. NOSS & M.J. KELLY (2004): The use of camera traps for estimating Jaguar (*Panthera onca*) abundance and density using capture/ recapture analysis. *Oryx* 38: 148-154.
- SINGH, P. (2008): The population estimation and feeding habits of Striped Hyena (*Hyaena hyaena*) in related to land use pattern in semi-arid region of Rajasthan, M.Sc., thesis submitted to Manipal University, India. 56 pp.
- TROLLE, M. & M. KERY (2003): Estimation of ocelot density in the Pantanal using capture recapture analysis of camera trapping data. *J. Mammal.* 84: 607-614.
- TROLLE, M., A.J. NOSS, E. DE S. LIMA & J.C. DALPONTE (2007): Camera-trap studies of maned wolf density in the Cerrado and Pantanal of Brazil. *Biodivers. Conserv.* 16: 1197-1204.
- WAGNER, A.P. (2006): Behavioral ecology of the Striped Hyena (*Hyaena hyaena*). Ph.D., Dissertation. Bozeman, MT: Montana State University. 195 pp.
- WAGNER, A.P., L.G. FRANK & S. CREEL (2008): Spatial grouping in behaviourally solitary striped hyaenas (*Hyaena hyaena*). *Anim. Behav.* 75(3): 1131-1142.



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Italian Journal of Zoology

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/tizo20>

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Version of record first published: 02 Aug 2012

To cite this article: K. Mondal, S. Gupta, S. Bhattacharjee, Q. Qureshi & K. Sankar (2012): Prey selection, food habits and dietary overlap between leopard *Panthera pardus* (Mammalia: Carnivora) and re-introduced tiger *Panthera tigris* (Mammalia: Carnivora) in a semi-arid forest of Sariska Tiger Reserve, Western India, *Italian Journal of Zoology*, DOI:10.1080/11250003.2012.687402

To link to this article: <http://dx.doi.org/10.1080/11250003.2012.687402>



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Prey selection, food habits and dietary overlap between leopard *Panthera pardus* (Mammalia: Carnivora) and re-introduced tiger *Panthera tigris* (Mammalia: Carnivora) in a semi-arid forest of Sariska Tiger Reserve, Western India

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(Received 23 August 2011; accepted 9 April 2012)

Abstract

After the extermination of tigers in Sariska Tiger Reserve, Western India in 2004, three tigers were re-introduced in Sariska during 2008–2009. The present study examined the prey selection and dietary overlap between leopard and tiger after re-introduction of tiger in the study area. Scat analysis revealed the presence of nine prey species in leopard scat ($n = 90$ scats) and five prey species in tiger scats ($n = 103$ scats). Percentage frequency of occurrence of sambar (45.5%) was found to be the highest followed by chital (15.2%) > nilgai (8.9%) > cattle (7.1%) > common langur (6.3%) > peafowl (6.3%) > rodent (5.4%) > wild pig (2.7%) and hare (2.7%) in leopard diet. In the diet of tiger, sambar contributed maximum (41.7%) followed by chital (26.2%), cattle (19.4%), nilgai (10.7%) and common langur (1.9%). The present study revealed that both the predator utilized and preferred prey species in similar way, though there was difference in selection of prey species in terms of sex and age class as observed by kill records. The dietary overlap between leopard and tiger was found to be 94%. The results suggested considerable overlap between the two carnivores along diet axis.

Keywords: Distance sampling, leopard, niche breadth, scat analysis, tiger

Introduction

The survival of any predator is directly related to its habitat, presence of other competitor species and quality and quantity of its diet (Melville 2004). Prey selection of a predator determines spacing patterns, population growth rate and distribution of the species. The key factors that determine large carnivore habitats are prey abundance, less disturbance, water availability and forest continuity. The acquirement of food is a fundamental component for every predator's existence. Hence, prey selection is critical for understanding life history strategies of any carnivore (Miquelle et al. 1996).

A small population of tigers (10–12 individuals) got exterminated in Sariska due to poaching in 2004 (Sankar et al. 2005). Subsequently, re-introduction of tigers from Ranthambhore Tiger Reserve (Ranthambhore TR) to Sariska Tiger Reserve (Sariska TR) was envisaged by translocating

initial population of five tigers (two males and three females), with a supplementation of three tigers (one male and two females) in every two years for a period of six years (Sankar et al. 2005). An adult tiger and adult tigress were translocated from Ranthambhore to Sariska on 28th June and 4th of July, 2008 respectively. There after another tigress was reintroduced to Sariska from Ranthambhore on 25th February 2009. After the tiger extermination in Sariska, leopard took over the entire tiger habitat (Sariska National Park), which was the best habitat available in Sariska and became the top predator (Sankar et al. 2009). Afterwards, the re-introduced tigers again established their territory in the same area of Sariska National Park (Sankar et al. 2010). Several hypotheses have been proposed to explain the prey selection by competitor predators. The hypotheses pertain to ultimate causal factor such as energetic benefits and costs involved (Kruuk 1972; Schaller 1972;

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Griffiths 1975; Stephens & Krebs 1986) and seem to be affected by the change in development prey predator assemblages due to recent extinctions and simultaneous human predation on prey and predator species (Karanth & Sunquist 1995). However, both of these factors were observed to happen in the present study area (Sankar et al. 2005), it is expected that the prey-predator relations and the intra-guild competition between large predators in terms of food will get balanced after the reintroduction of tiger in the study area. In the present study, the prey selection of leopard and re-introduced tiger was studied and dietary overlap between these two top predators was examined between 2008 and 2009. The result was compared with the previous study (Sankar & Johnsingh 2002), when there were 12–16 tigers in the study area. In the present study, the prey selection of leopard was also compared with a previous study (Mondal et al. 2011), when there was no tiger in the study area.

Study area

The study area is the Sariska Tiger Reserve (Sariska TR), Western India. The park lies between

Longitude: N27°05' to N27°45' and Latitude: E76°15' to E76°35' and is situated in the Aravalli Hill Range of semi arid part of Rajasthan (Rodgers & Panwar 1988). It became a wildlife sanctuary in 1955 and Tiger Reserve in 1982. The total area of the Tiger Reserve is 881 km² (Figure 1), of which 273.8 km² is a notified National Park. The altitude of Sariska varies from 540–777 m. Sariska terrain is undulating to hilly in nature and has numerous narrow valleys.

The climate of this tract is subtropical, characterized by a distinct summer, monsoon, post monsoon and winter. The vegetation of Sariska falls under Northern Tropical Dry Deciduous Forests and Northern Tropical Thorn Forest (Champion & Seth 1968). Apart from leopard and tiger, other carnivores present are striped hyena (*Hyaena hyaena*), jackal (*Canis aureus*), jungle cat (*Felis chaus*), desert cat (*Felis silvestris*), common mongoose (*Herpestes edwardsi*), small Indian mongoose (*H. auropunctatus*), ruddy mongoose (*H. smithi*) palm civet (*Paradoxurus hermaphroditus*), small Indian civet (*Viverricula indica*) and ratel (*Mellivora capensis*). Prey species of leopard and tiger in the area include chital (*Axis axis*), sambar

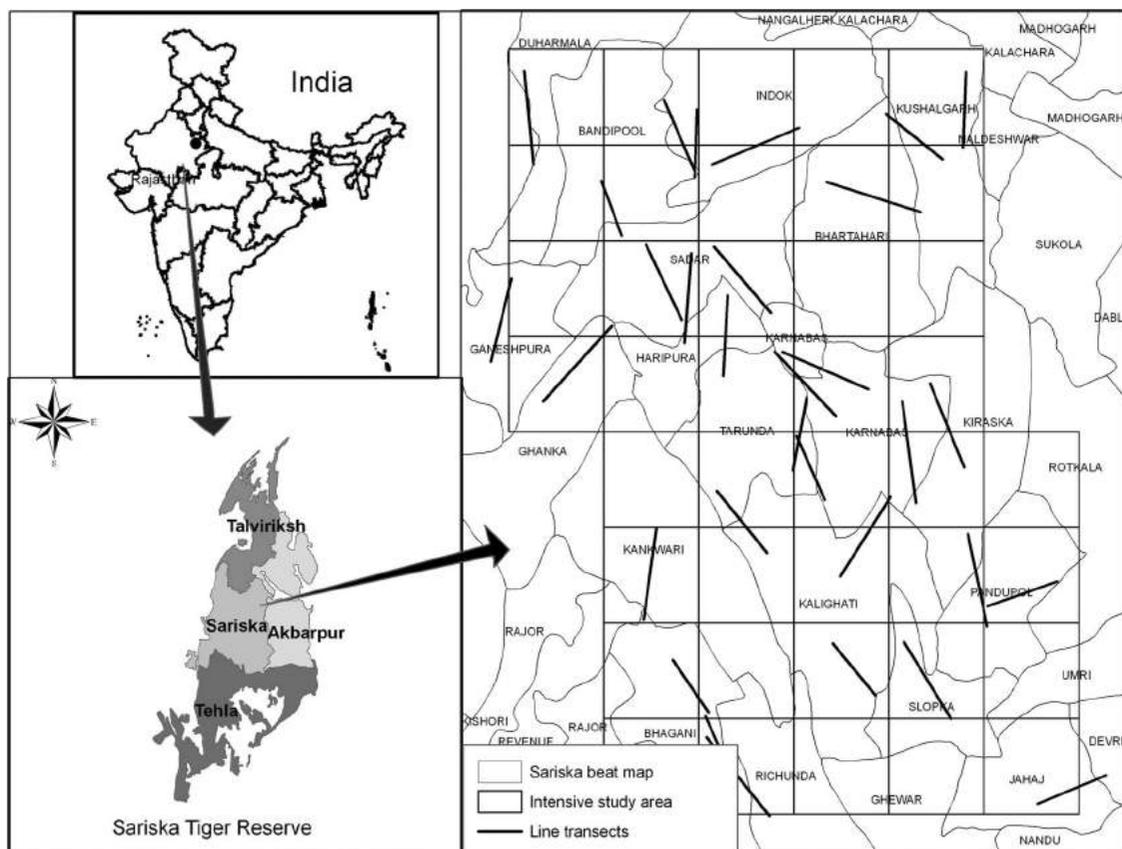


Figure 1. Geographic location of Sariska Tiger Reserve and location of line transects in the intensive study area.

(*Rusa unicolor*), nilgai (*Boselaphus tragocamelus*), common langur (*Semnopithecus entellus*), wild pig (*Sus scrofa*), rhesus macaque (*Macaca mulatta*), porcupine (*Hystrix indica*), rufous tailed hare (*Lepus nigricollis ruficaudatus*) and Indian peafowl (*Pavo cristatus*). The predominant domestic livestock found inside the reserve are buffaloes (*Bubalis bubalis*), brahminy cattle (*Bos indicus*) and goats (*Capra hircus*). There are 10 villages located inside the National Park area which are due for relocation since 1984. The human population is over 1700 in the villages of National Park along with a population 10,000 livestock including buffalo, cow, goat and sheep (Sankar et al. 2009). There are 21 villages located outside the National Park but within the Tiger Reserve. The human population in these villages is around 6000 and the livestock population is more than 20,000 (Sankar et al. 2009).

Materials and methods

Prey species density in the study area was estimated by line transect method under distance sampling technique (Burnham et al. 1980). This method has been widely applied to estimate densities of prey species in different forest in Indian subcontinent (Karanth & Sunquist 1995; Khan et al. 1996; Biswas & Sankar 2002; Sankar & Johnsingh 2002; Bagchi et al. 2003). The study area was divided into 40 grids of 4 km² covering 160 km² areas. A number of 32 line transects varying in length from 1.6 km to 2 km were laid covering the intensive sampling area of 160 km². The total transects length of 60.4 km were walked three times in early morning resulting in total effort of 181.2 km. On each sighting of prey species on line transects, total number of individuals, animal bearing and angular sighting distance were recorded. Program DISTANCE 5 (Laake et al. 2001) was used to estimate the density of prey species. The best model was selected on the basis of the lowest Akaike Information Criterion (AIC) (Burnham et al. 1980; Buckland et al. 1993). The half normal key function with cosine adjustment gave the best fit for all the prey species.

Predators' diets have been found to be precisely studied by scat analysis as opposed to kills in forested habitats (Karanth & Sunquist 1995). Studies based on kills being biased towards large prey, the remains of which are more easily detected than those of small prey (Edgaonkar & Chellam 2002). Diet and food preference of leopard and tiger can be estimated from the scat analysis and as well as from the kills (Mukherjee et al. 1994; Biswas & Sankar 2002; Sankar & Johnsingh 2002; Bagchi et al. 2003; Mondal et al. 2011). Fresh leopard and tiger scats

were collected in all seasons whenever encountered during the study period. All the scats were washed, oven dried and subsequently preserved for future analysis. Micro-histological structures of hairs were used to identify the prey species (Johnsingh 1983; Mukherjee et al. 1994; Biswas & Sankar 2002; Sankar & Johnsingh 2002; Bagchi et al. 2003; Mondal et al. 2011). The biomass and number of individuals of the prey consumed by both the carnivores were estimated using Ackerman's equation (Ackerman et al. 1984) to get a more accurate estimate of prey consumption. The assumption for extrapolating of the above equation was that the leopard, tiger and cougar (*Felis concolor*) had similar utilization and digestibility (Karanth & Sunquist 1995). It was also presumed that the scats containing various prey items had similar decay rate and their detection was equally probable and would apply the same formula as mentioned above (Ackerman et al. 1984) to estimate the prey consumption by leopard and tiger.

Each scat yielded the remains of one or more species. It was necessary to know whether the number of scats analyzed reflect an accurate picture of the diet of the leopard and tiger. The following procedure was adopted to find out the adequacy of sample size. After all the scats were analyzed, an observation-area curve (Odum & Keunzler 1955) which is a curve for the percent frequency of occurrence of major prey species represented in the diet was calculated at an interval of every ten scats, after randomizing the order of the results obtained.

Prey selectivity by leopard and tiger was estimated for each prey species by comparing their availability and utilization data. The expected proportion of scats in the environment (i.e. availability) was calculated using the following equation (Karanth & Sunquist 1995): $f_i = [(di/dt) * \lambda_i] / \sum [(di/dt) * \lambda_i]$, where f_i = expected scat proportion in the environment, d_i = density of i th species, dt = sum of density of all species, $\lambda_i = X/Y$ = the average number of collectible scats produced by leopard from an individual of i th prey species, X = average body weight of the species and $Y = 1.980 + 0.035 X$ (Ackerman et al. 1984). Percentage biomass consumption and percentage individual consumption were also estimated using the parameters of percentage occurrence of the prey species in the scats, Ackerman's correction factor and average body weight of the prey species (Karanth & Sunquist 1995; Biswas & Sankar 2002; Mondal et al. 2011). The average body weight of prey species of leopard and tiger required for biomass estimation were taken from Karanth & Sunquist (1995), Sankar & Johnsingh (2002), Ramesh et al. (2008) and Mondal et al. (2011). The prey selection was also

determined by using Iyevlev's index (Iyevlev 1961), $E = (u - a)/(u + a)$, where, 'u' was observed relative frequency occurrence of prey items in predator scats and 'a' was expected scat proportion in the environment. If a species was preyed relatively more frequently than it exists in the prey population then it was considered preferred, whereas if it was taken less frequently it was avoided.

To assess the dietary overlap between tiger and leopard, the Pianka's niche overlap index was used (Pianka 1973). Where: Pianka index = $(\sum pij * pik) / \{(\sum pij)^2 * \sum (pik)^2\}$. Here, Pij = percentage of prey items i of predator j; Pik = percentage of prey items i of predator k. The index distributes between 0 and 1, the similarity is higher as the index is close to 1. The diet niche breadth of leopard and tiger were assessed using Levins measure (Levins 1968), standardized to a scale of 0–1 following Hurlbert (1978). Levin's Niche breadth $B = 1/\sum pi^2$, where pi = Proportion of diet contributed by prey species i; Standardized Niche breadth $B_s = (B-1)/(n-1)$, where n = Total number of prey species.

Results

In the intensive study area (Sariska National Park), estimation of cluster size, group encounter rate and density of different prey species of leopard and tiger was given in the Table I. In program DISTANCE 5, the selected model was half normal with cosine adjustment 2, 3 ($P = 0.69783$, Chi-square = 0.1507 and degree of freedom = 1). The density of peafowl was found to be the highest (121.4/km²) followed by goat (54.1/km²), chital (44.3/km²), cattle (36.5/km²), sambar (25.2/km²), common langur (22.1/km²), nilgai (18.9/km²), wild pig (14.9/km²), hare (3.6/km²).

Nine prey species were identified in 90 leopard scats and five prey species in 103 tiger scats. Frequency of occurrence and percentage occurrence of prey species of both leopard and tiger are given in Table II. Sambar contributed maximum (45.5%) in leopard's diet followed by chital (15.2%), nilgai (8.9%), cattle (7.1%), common langur (6.3%), peafowl (6.3%), rodent (5.4%), hare (2.7%) and wild pig (2.7%). In tiger's diet, sambar contributed maximum (41.7%) followed by chital (26.2%), cattle (19.4%), nilgai (10.7%) and common langur (1.9%).

To know the required sample size to analyze the food habits of leopard and tiger in the study area, successively ten scats were randomly drawn from the total sample size, which gave the cumulative frequency of occurrence of each species (Figures 2 and 3). The proportion of different prey species in scats got stabilized once a sample 70 scats were analyzed of leopard and 80 scats of tiger. Hence, it is suggested that a minimum of 70–80 scats should be analyzed to understand the food habits of leopard and tiger in the study area. In addition, no new prey species were found after analyzing 70 leopard scats and 80 tiger scats, as shown by diet stabilization curve (Figures 4 and 5).

Estimation of relative biomass contribution of different prey species in the diet of leopard and tiger, using the equation developed by Ackerman et al. (1984) gave an assessment of prey use by both the predators in the study area. Biomass contribution of each prey species in the diet of leopard and tiger is given in Table II. Comparison of observed utilization and expected availability was done using Iyevlev's index (Iyevlev 1961) to know the prey selection by leopard and tiger in the study area. Sambar ($P < 0.05$) and Chital ($P < 0.05$) were preyed upon by both leopard and tiger in excess of their availability, suggesting

Table I. Density, cluster size and group encounter rate of different prey species in the intensive study area (National Park) in 2008.

Species	No. of sightings	Cluster Size		Group Encounter Rate		Density/km ²		Biomass/km ²
		Mean	SE	ER	SE	D	SE	
Chital	64	6.40	0.67	0.37	0.06	44.30	9.26	1993.50
Sambar	71	3.14	0.24	0.44	0.07	25.23	4.83	3153.75
Nilgai	73	2.47	0.21	0.41	0.05	18.91	3.24	3403.80
Wild pig	27	5.44	1.00	0.15	0.03	14.95	4.31	568.10
Peafowl	223	5.35	0.42	1.24	0.10	121.43	15.02	412.86
Cow	38	9.44	1.46	0.21	0.05	36.51	11.51	6571.80
Goat	23	23.13	2.11	0.12	0.03	54.10	16.19	865.60
Hare	27	1.25	0.08	0.15	0.03	3.45	0.92	12.42
Common langur	21	10.33	1.29	0.11	0.02	22.06	6.39	176.48

SE = Standard error; ER = encounter rate; D = Density.

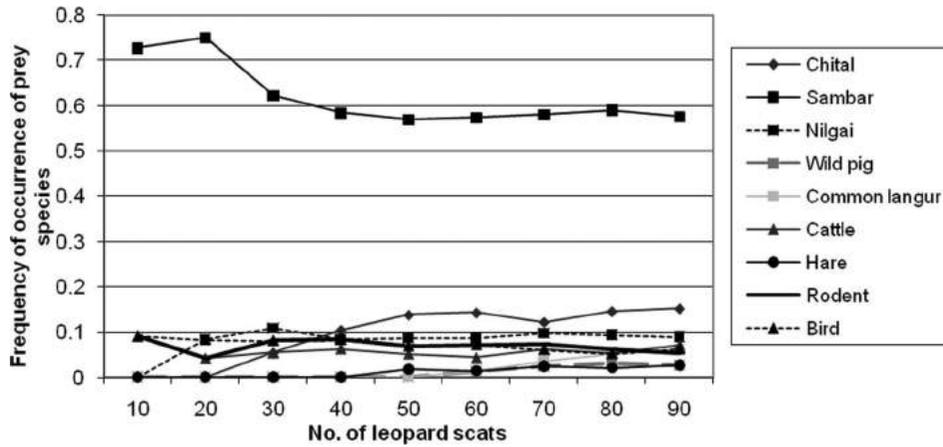


Figure 2. Frequency of occurrence of prey species in leopard diet with increasing number of scats in Sariska Tiger Reserve, Rajasthan, India.

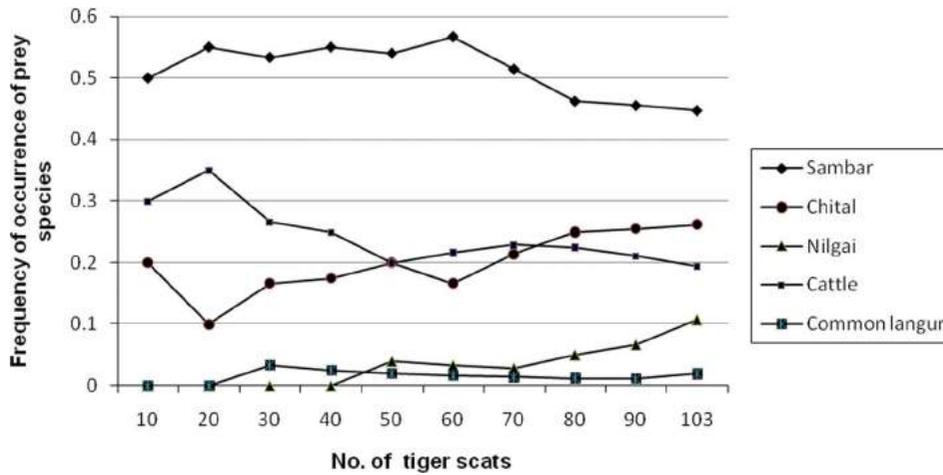


Figure 3. Frequency of occurrence of prey species in tiger diet with increasing number of scats in Sariska Tiger Reserve, Rajasthan, India.

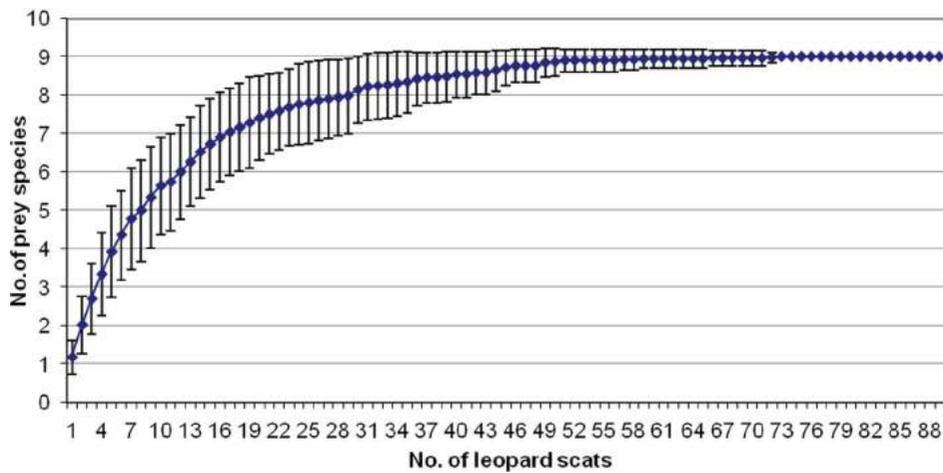


Figure 4. Diet stabilization curve of leopard in Sariska Tiger Reserve, Rajasthan, India.

positive selection or preference, while nilgai ($P < 0.05$) and cattle ($P < 0.05$) were preyed upon less than their availability, suggesting negative selection or rejection. The common langur was preyed upon

more than its availability ($P > 0.05$) by leopard but avoided by tiger (Figure 6). The index of prey selection by leopard at individual species level was in the following order: sambar > common langur >

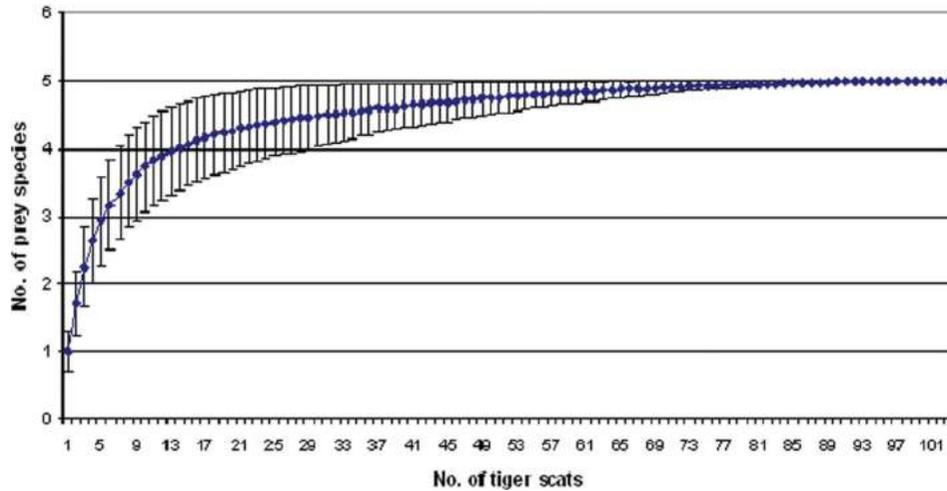


Figure 5. Diet stabilization curve of tiger in Sariska Tiger Reserve, Rajasthan, India.

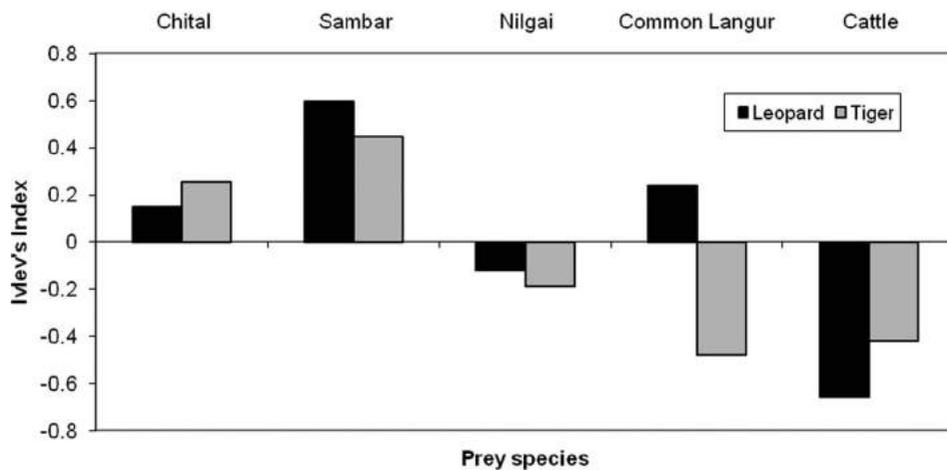


Figure 6. Prey selection of leopard and tiger in the study area of Sariska Tiger Reserve, Rajasthan, India.

Table II. Frequency of occurrence, percentage of occurrence and percentage biomass consumed of different prey species by leopard and tiger as shown by scat analysis.

Species	Frequency of occurrence		Percentage occurrence		(%) Biomass consumed	
	Leopard N = 90	Tiger N = 103	Leopard	Tiger	Leopard	Tiger
Chital	17	27	15.2	26.2	10.1	15.2
Sambar	51	43	45.5	41.7	54.2	43.2
Nilgai	10	11	8.9	10.7	14.1	14.7
Wild pig	3	–	2.7	–	1.7	–
Common langur	7	2	6.3	1.9	2.9	0.8
Cattle	8	20	7.1	19.4	11.1	26.2
Hare	3	–	2.7	–	1.1	–
Porcupine	6	–	5.4	–	2.5	–
Peafowl	7	–	6.3	–	2.5	–

chital > nilgai > cattle (Figure 6) and that of tiger was sambar > chital > nilgai > cattle > common langur (Figure 6).

The dietary overlap between leopard and tiger was calculated to be 94% (Pianka index). The Levin's niche breadth for the diet of leopard in the study area

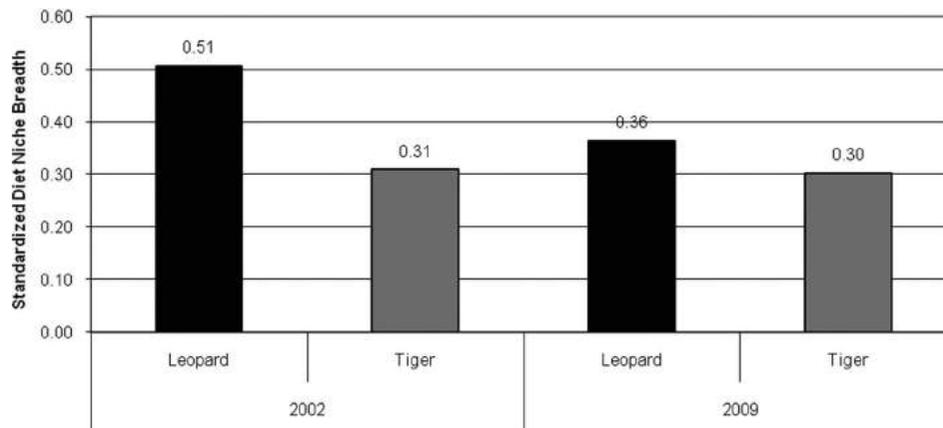


Figure 7. Standardized diet niche breadth of leopard and tiger in the study area in 2002 and 2009.

was 3.91 and that of tiger was 3.41. The standardized diet niche breadths of leopard and tiger in the study area were 0.36 and 0.30 respectively (Figure 7).

Discussion

Leopards hunt by stalking, utilizing their prey opportunistically and mostly at night (Nowell & Jackson 1996; Arivazhagan et al. 2007). The prey of leopards varies in different geographical areas. In Kruger National Park, South Africa, leopards were found to kill mainly medium-sized prey such as Impala (*Aepyceros melampus*), though a wide variety of small animals including hyraxes (*Procavia capensis*), civets (*Civettictis civetta*) and mongooses (*Herpestes* sp.) also formed part of their diet (Bailey 1993). In Tai Natinal Park, Ivory Coast, leopards prey upon 30 species of animals (Hoppe-Dominik 1984). Small prey also constituted a significant proportion of leopard diet in Tsavo, Kenya (Hamilton 1976). Muckenhirn and Eisenberg (1973) reported that in Sri Lanka leopards preyed mainly on chital and wild pig, while also feeding on sambar, common langur, black-naped hare, porcupine and calves of domestic buffalo. In India, Schaller (1967), Johnsingh (1983), Karanth & Sunquist (1995, 2000) studied leopard food habits; the major prey reported were chital, sambar, barking deer, goral and livestock. In Bandipur, Johnsingh (1983) found that 66% of leopard kills were chital. Chellam (1993) found that in Gir, 40% of leopards scats consisted of chital and 25% common langur. In the tropical forest of Nagarhole, Karanth & Sunquist (2000) found that chital constituted the major prey base of leopards. In the present study it was found that leopard and tiger were utilizing prey species in similar manner. Comparing with previous study, it was found that, leopard largely used to prey upon rodents when there

was an established population of 12–16 tigers in Sariska TR (Sankar & Johnsingh 2002). During the present study, both leopard and tiger largely preyed on sambar and chital (Table I). The contribution of rodent in leopard's diet was 44.2% in 1990, when the study area was largely occupied by tigers (Sankar & Johnsingh 2002), but after the local extermination of tiger from the study area (2007–08), Mondal et al. (2011) found no contribution of rodent in leopard's diet. Later, after the re-introduction of tiger in the study area (in 2009), the contribution of rodent in leopard's diet raised to 5.4% (Table III). In 1990, chital contributed maximum in tiger diet (57.2%) followed by sambar (18.1%) and in leopard diet, rodent contributed maximum (44.2%) followed by chital (20.2%), sambar (19.4%) and nilgai (7%). But after the local extermination of tiger from the study area, the diet of leopard changed significantly. The contribution of sambar and nilgai in leopard's diet increased to 40.3% and 11.5% respectively in 2007–08, when there was no tiger in the study area (Mondal et al. 2011) (Table III). It was evident that, leopard shifted their diet from lesser prey species

Table III. Percentage occurrence of different prey species of leopard and tiger scats between 1990 and 2009 in Sariska Tiger Reserve, Rajasthan, India.

	1990		2008		2009	
	Leopard	Tiger	Leopard	Leopard	Tiger	
Chital	20.2	57.2	22.4	15.2	26.2	
Sambar	19.4	18.1	40.3	45.5	41.7	
Nilgai	7.0	2.2	11.5	8.9	10.7	
Common langur	6.2	17.4	10.4	6.3	1.9	
Rodent	44.2	4.3	0	5.4	–	
Peafowl	3.1	0.7	1.6	6.3	–	
Dietary overlap*		0.54			0.94	

*Pianka Index.

to large ungulates after tiger extermination from Sariska (Sankar et al. 2009; Mondal et al. 2011). In the present study, it was found that, leopard and tiger consumed the prey species in similar way. Both leopard and tiger showed similar preference except for the arboreal prey species common langur, as common langur was preferred by leopard but avoided by tiger due to its less capability to climb tree (Figure 6). Ranathambore Tiger Reserve and Sariska Tiger Reserve both lies in Aravalli hills with similar habitat condition, environmental condition and prey base. The re-introduced tigers in Sariska TR consumed largely sambar (41.7%), chital (26.2%) and nilgai (10.7%), which are very similar to the previous study in Ranathambore Tiger Reserve (original habitat of re-introduced tigers), where tigers found to consume largely chital (45.7%), sambar (36.9%) and nilgai (3.3%) (Bagchi et al. 2003). Because of the presence of around 10,000 livestock population in the study area, the contribution of livestock in tiger diet is higher in Sariska TR (19.4%) than Ranthambore Tiger Reserve (5.5%), as there is no village situated inside Ranathambore Tiger Reserve. A high overlap (94%) was observed between leopard and tiger diet in the present study, though in the previous study the diet overlap was only 54% (Sankar & Johnsingh 2002). The standardized diet niche breadth of leopard (0.51) was observed much higher than tiger (0.31) in the previous study in the study area (Sankar & Johnsingh 2002), as leopard was largely dependent on small to medium sized prey species and had broader prey spectrum. But in the present study, the standardized diet niche breadth of leopard (0.36) and tiger (0.30) are similar (Figure 7).

Leopards have been found to coexist with other large canivores across most of their range. In Asia, it shares its habitat with the tiger, Asiatic lion and dhole (Karanth & Sunquist 1995, 2000). In Zaire, Central Africa, Hart et al. (1996) found the leopard coexisting with the golden cat (*Felis aurata*) by specializing on different prey. In Nagarhole, Karanth & Sunquist (2000) found that the tiger, leopard and dhole selectively killed different prey in terms of species, size and age-sex classes, allowing for the co-existence of all three predators. Leopards are opportunists and are flexible in diet; their ability to feed on both small and large prey, to climb trees and scavenge (Johnsingh 1983) may help them survive in highly disturbed habitat where prey species are scarce. Tigers, on the other hand, are not good climbers, limiting their ability to hunt arboreal prey. Unlike the study of Arivazhagan et al. (2007) and Seidenstickker & Lumpkin (1996), where leopards are more likely to move through open terrain and raid villages for domestic prey and tigers depend upon large ungulate prey (Ramakrishnan et al. 1999), in Sariska both the predators utilized the prey species in same manner and tiger consumed more domestic cattle (19.4%) than leopard (7.1%).

Available studies in India reported high dietary overlap amongst leopard, wild dog and tiger (Johnsingh 1983; Karanth & Sunquist 1995; Ramesh et al. 2008). Similar to present study, the dietary overlap between leopard and tiger was observed 94% in Nagarhole Tiger Reserve (Karanth & Sunquist 1995) and 82% in Mudumalai Tiger Reserve (Ramesh et al. 2008). Evidences suggest that among large sympatric carnivores, the larger carnivores can prey on broader size ranges of prey classes due to

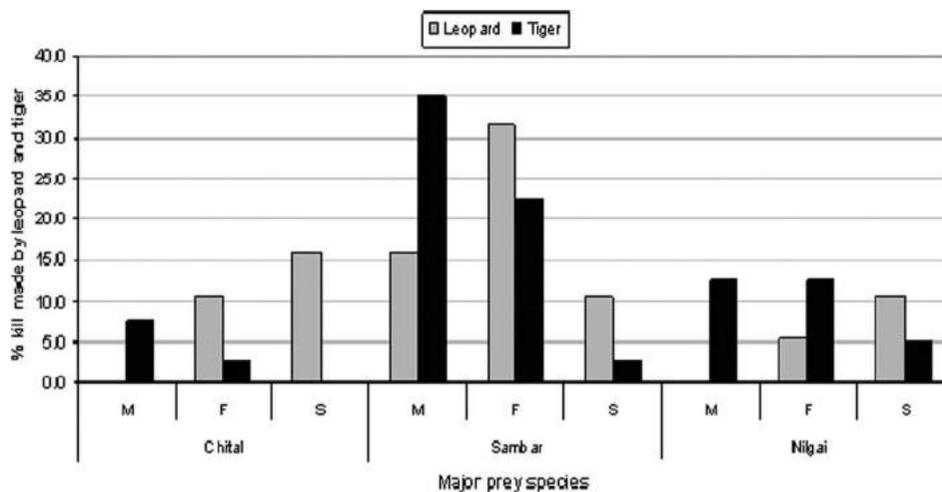


Figure 8. Age and sex classes of large herbivores observed by kill records of leopard (n=29) and tiger (n=40) in Sariska Tiger Reserve, Rajasthan, India. M= Male, F= Female, and S= Subadult.

their prey handling capabilities (Gittleman 1983). In Chitawan National Park where tigers and leopards co-exist, tigers were recorded utilizing a much wider range of prey sizes than leopards (Seidensticker 1976). The wild ungulate density in the intensive study area (102 individuals/km²) is one of the highest reported density in Indian sub-continent (Mondal 2011) and adequate to support both leopard and re-introduced tiger population in the study area (Sankar et al. 2009). Though leopards and tigers utilized the same prey species in the study area, but there is a difference between the sex and size classes of prey species, as observed by kill records. Present study showed that tiger and leopard killed chital, sambar and nilgai but leopards largely killed females and fawns while tigers largely killed adult males and females (Figure 8). From the present study it was understood that, when there was a large number of tigers (12–16) in the study area (1988–1990), leopard was dependent on lesser bodied prey species and occupied broader diet niche breadth than tiger (Sankar & Johnsingh 2002). But after the extermination of tigers, diet of leopard completely shifted to large bodied ungulates (Mondal et al. 2011). After the re-introduction of tiger in the study area, both the predators utilized the prey species in a similar manner and showed similar preference towards large ungulates. The dietary overlap between leopard and tiger was also increased from 54% (1988–1990) to 94% (present study). There was a noticeable difference observed in the selection of sex and age class of prey species by these two predators, as leopard largely hunted fawns and females of large ungulates, while tiger largely hunted adult males, as observed by kill records (Figure 8). At present, there are only six re-introduced tigers in Sariska TR. With the increase in the number of re-introduced tigers a clearer picture of prey utilization and dietary interaction between these two top predators in the study area is expected.

Acknowledgements

We thank Rajasthan Forest Department for granting permission to work in Sariska, as part of the 'Ecology of Leopard' project conducted by Wildlife Institute of India (WII). We thank Director and Dean, WII for their encouragement and support provided for the study. We thank our field assistants Jairam, Omi and Ramesh for their assistance in field.

References

Ackerman BB, Lindzey FG, Hernker TP. 1984. Cougar food habits in Southern Utah. *Journal of Wildlife Management* 48:147–155.

- Arivazhagan C, Arumugam R, Thiyagesan K. 2007. Food habits of leopard (*Panthera pardus fusca*), dhole (*Cuon alpinus*) and stiped hyaena (*Hyaena hyaena*) in a dry thorn forest of Southern India. *Journal Bombay Natural History Society* 104:178–187.
- Bagchi S, Goyal SP, Sankar K. 2003. Prey abundance and prey selection by tigers (*Panthera tigris*) in a semi-arid, dry deciduous forest in western India. *Journal of Zoology London* 260:285–290.
- Bailey TN. 1993. *The African Leopard: Ecology and behavior of a solitary felid*. New York: Columbia University Press.
- Biswas S, Sankar K. 2002. Prey abundance and food habits of tigers (*Panthera tigris tigris*) in Pench National Park, Madhya Pradesh. *Journal of Zoology London* 256: 411–420.
- Buckland ST, Anderson DR, Burnham KP, Laake JL. 1993. *Distance Sampling: Estimating Abundance of Biological Populations*. London: Chapman and Hall. pp. 446.
- Burnham KP, Anderson DR, Laake JL. 1980. Estimation of density from line transect sampling of biological populations. *Wildlife Monographs*, no. 72, supplement to: *The Journal of Wildlife Management* 44. pp. 202.
- Champion HG, Seth SK. 1968. *A revised survey of forest types of India*. Manager of Publications, Government of India, New Delhi. pp. 404.
- Edgaonkar A, Chellam R. 2002. Food habit of the leopard (*Panthera pardus*) in Sanjay Gandhi National Park, Maharashtra, India. *Mammalia* 2002:353–360.
- Gittleman JL. 1983. *The behavioral ecology of carnivores*. Ph.D. Thesis. University of Sussex.
- Griffiths D. 1975. Prey availability and the food of predators. *Ecology* 56:1209–1214.
- Hamilton PH. 1976. *The Movements of Leopards in Tsavo National Park, Kenya as Determined by Radio-tracking*. MSc thesis. University of Nairobi.
- Hart JA, Katembo M, Punga K. 1996. Diet, prey selection and ecological relations of leopard and golden cat in the Ituri Forest, Zaire. *African Journal of Ecology* 34:364–379.
- Hoppe-Dominik B. 1984. Etude du spectre des proies de la panthere, *Panthera pardus*, dans le Parc National de Tai en Cote d' Ivoire (Prey frequency of the leopard, *Panthera pardus*, in the Tai National Park of the Ivory Coast). *Mammalia* 48: 477–487.
- Hurlbert SH. 1978. The measurement of niche overlap and some relatives. *Ecology* 59:67–77.
- Ivelev VS. 1961. *Experimental ecology of the feeding of fishes*. New Haven, Conn., USA: Yale University press. pp. 302.
- Johnsingh AJT. 1983. Large mammalian predators in Bandipur. *Journal of the Bombay Natural History Society* 80:1–57.
- Karanth KU, Sunquist ME. 1995. Prey selection by tiger, leopard and dhole in tropical forests. *Journal of Animal Ecology* 64:439–450.
- Karanth KU, Sunquist ME. 2000. Behavioral correlates of predation by tiger (*Panthera tigris*), leopard (*Panthera pardus*) and dhole (*Cuon alpinus*) in Nagrahole, India. *Journal of Zoology London* 250:255–265.
- Khan JA, Chellam R, Rogers WA, Johnsingh A J T. 1996. Ungulate densities and biomass in the tropical dry deciduous forest of Gir, Gujarat, India. *Journal of Tropical Ecology* 12: 149–162.
- Kruuk H. 1972. *The spotted Hyena*. Chicago: The University of Chicago Press.
- Laake J, Thomas L, Strindberg S, Marques FFC, Borchers DL, Buckland ST, Anderson DR, Burnham KP, Hedley SL, Pollard JH. 2001. *Distance User's Guide (Research Unit for*

- Wildlife Population Assessment, Univ. Of St. Andrews, St. Andrews, U.K.), Ver. 5.0. pp. 185.
- Levins R. 1968. Evolution in changing environments: some theoretical explorations. Princeton University press. 319 pp.
- Melville HIAS. 2004. Behavioural Ecology of the Caracal in the Kgalagadi Transfrontier Park, and its Impact on Adjacent Small Stock Production Units. M.Sc. Dissertation. Pretoria: University of Pretoria.
- Miquelle DG, Smirnov EN, Hornocker HG, Nikolaev IG, Matyushkin EN. 1996. Food habits of Amur tigers in Skhote-Alin Zapovednik and the Russian Far East and implications for conservation. *Journal of Wildlife Research* 1: 138–147.
- Mondal K. 2011. Ecology of leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan. Ph.D. Thesis submitted to Saurashtra University, Gujarat, India. pp 233.
- Mondal K, Gupta S, Qureshi Q, Sankar K. 2011. Prey selection and food habits of leopard (*Panthera pardus fusca*) in Sariska Tiger Reserve, Rajasthan, India. *Mammalia* 75:201–205.
- Muckenhirn NA, Eisenberg JF. 1973. Home ranges and predation of the Ceylon leopard. In: Eaton RL, editor. *The world's cats*. Winston, OR: World Wildlife Safari. pp. 142–175.
- Mukherjee S, Goyal SP, Chellam R. 1994. Standardization of scat analysis technique for leopard (*Panthera pardus*) in Gir National Park, western India. *Mammalia* 58:139–143.
- Nowell K, Jackson P. 1996. *Wild Cats: Status Survey and Conservation Action Plan*. IUCN, Gland, Switzerland
- Odum EP, Keunzler EJ. 1955. Measurement of territory and home-range size in birds. *Auk* 72:128–137.
- Pianka ER. 1973. The structure of lizard communities. *Annual Review of Ecology, Evolution and Systematics* 4:53–74.
- Ramakrishnan U, Coss RG, Pelkey NW. 1999. Tiger decline caused by the reduction of large ungulate prey: evidence from a study of leopard diets in southern India. *Biological Conservation* 89:113–120.
- Ramesh T, Snehalatha V, Sankar K, Qureshi Q. 2008. Food habits and prey selection of tiger and leopard in Mudumalai Tiger Reserve, Tamil Nadu, India. *Journal of Scientific Transactions in Environment and Technovation* 2:170–181.
- Rodgers WA, Panwar HS. 1988. *Planning a Wildlife Protected Area Network in India*. Vol. I and II. Wildlife Institute of India, Dehra Dun.
- Sankar K, Goyal SP, Qureshi Q. 2005. Assessment of status of tiger in Sariska Tiger Reserve Rajasthan. A Report submitted to the Project Tiger, Ministry of Environment and Forests, Government of India, New Delhi. 41 pp.
- Sankar K, Johnsingh AJT. 2002. Food habits of tiger (*Panthera tigris*) and leopard (*P. pardus*) in Sariska Tiger Reserve, Rajasthan, India, as shown by scat analysis. *Mammalia* 66:285–289.
- Sankar K, Qamar Q, Parag N, Malik PK, Sinha PR, Mehrotra RN, Gopal R, Bhattacharjee S, Mondal K, Gupta S. 2010. Monitoring of reintroduced tigers in Sariska Tiger Reserve, Western India: preliminary findings on home range, prey selection and food habits. *Journal of Tropical Conservation Science* Vol. 3:301–318.
- Sankar K, Qureshi Q, Mondal K, Worah D, Srivastava T, Gupta S, Basu S. 2009. *Ecological studies in Sariska Tiger Reserve, Rajasthan*. Final Report. Wildlife Institute of India, Dehra Dun. p. 145.
- Schaller GB. 1967. *The deer and the tiger: a study of wildlife in India*. Chicago, IL: University of Chicago Press.
- Schaller GB. 1972. *The Serengeti lion*. Chicago, IL: University of Chicago Press.
- Seidensticker JC. 1976. On the ecological separation between tigers and leopards. *Biotropica* 8:225–234.
- Seidensticker J, Lumpkin S. 1996. The adaptable leopard. *Wildlife Conservation* 99:52–55.
- Stephens DW, Krebs JR. 1986. *Foraging Theory*. Princeton, NJ: Princeton University Press.

Home range and resource selection of ‘problem’ leopards trans-located to forested habitat

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To understand the home range and resource selection of trans-located leopards, two male leopards were captured from conflict areas and released in the Sariska Tiger Reserve, western India (March 2009–August 2010). Both the leopards were fitted with VHF radio-collar, and 148 locations were collected from the first leopard (SP1) and 268 locations from the second (SP2). Third-order resource selection function (resource selection of the individual animal within its home range) was estimated from trans-located leopards using generalized linear mixed effect model with data on vegetation types, elevation, encounter rate of prey species and presence of tiger. With 100% minimum convex polygon (MCP), the estimated home range of SP1 and SP2 was 84.3 and 63.2 km² respectively. Both the leopards established their home ranges in and around the Sariska Tiger Reserve. The resource use of these trans-located leopards increased with increasing area of *Zizyphus* mixed forest and *Acacia* mixed forest, and decreased with increasing area of *Anogeissus*-dominated forest. Similarly, they selected habitats with higher encounter rate of wild pig and nilgai, and used less the habitats with high encounter rate of chital and common langur. Finally, it was observed that the ‘problem’ leopards in this study showed significant positive selectivity to the available natural vegetation types and wild-prey abundance, rather than degraded habitats and domestic prey species.

Keywords: Home range, human–leopard conflict, *Panthera pardus*, radio-telemetry, resource selection.

THE leopard (*Panthera pardus*) is a wide-ranging large carnivore that is less susceptible to disturbance, is a generalist with respect to habitat requirements and can survive on a wide range of prey species¹, yet the species is vulnerable to habitat loss and fragmentation. Unlike the tiger, which needs a high biomass of large-sized prey², the leopard has been known to survive on domestic dogs and rodents in the absence of wild-prey populations³. Very little information is available on the leopard populations

in India by studying their ranging pattern and resource selection for understanding their ecology, behaviour and social aspects as well as their responses to changes in land use and land cover⁴.

In the last few decades severe leopard–human conflicts have been reported from different regions of India such as Maharashtra^{3,5–7}, Gujarat⁸, West Bengal–northern part⁹ and Himalayan region of Pauri-Garhwal, Uttarakhand¹⁰. Leopards are also widely distributed in both protected areas and human-dominated landscapes in the Indian sub-continent. They can persist near human settlements by feeding on livestock and domestic dogs^{5,11}. According to Athreya *et al.*⁵, high tolerance of the people to the presence of large, wild and potentially dangerous animals^{12,13} makes it possible for species such as leopards to come close to human settlements to prey on domestic animals. Athreya *et al.*¹⁴ have stated that various reasons have been put forward to explain the increase in man–leopard conflict intensity, such as depletion of the natural prey base and degradation or fragmentation of natural habitat. Beside this, man-made modification of the landscape results in suitable habitat formation for the leopard (e.g. sugarcane, tea plantations; tall crops) and increase in local leopard populations¹⁴. The leopard–human conflict not only affects humans or livestock, but the leopard population also. The leopard is a Schedule I animal in Wildlife (Protection) Act, 1972, which provides it highest protection in India. Still the killing and illegal trade of body parts of leopard are being reported at a high intensity compared to tiger or other large felids¹⁴.

Several factors like habitat degradation, presence of domestic dogs, non-availability of electricity in rural areas and distance to forest from the villages have been identified as the indicators of conflict in Pauri Garhwal, Himalaya¹⁰. During a two-year study in Bandipur Tiger Reserve, India, 26% of the leopard kill comprised of domestic cattle and dog¹⁵. In Majhtal Wildlife Sanctuary, Western Himalayas, leopard largely preyed on domestic species (>50%) despite presence of wild prey species¹⁶. Leopard is known to feed on carcasses and return to kill made by them, which makes them more susceptible to being poisoned¹⁷. The present study shows that translocation of leopards from human-dominated areas to forested

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areas could be a better management strategy to mitigate leopard–human conflict. Considering the fact that Sariska Tiger Reserve (STR), Rajasthan holds very high prey base, two leopards were trans-located from conflict areas to STR. Earlier it was reported that Sariska National Park (SNP) area (~274 km²) can support 10–12 tigers¹⁸. During the present study, there were only five tigers and an established population of 14 leopards in and around SNP area (~400 km²)¹⁹. Hence, it was assumed that some areas were available for accommodating the trans-located leopards. Leopard–human conflict has been reported throughout South Asia and the ‘problem’ leopards were rescued from the conflict areas and released back in forested areas in many cases. But, no information is available on habitat use or resource selection of those trans-located leopards after release. In the present study, two leopards were captured from the conflict areas, radio-collared and released in forested areas of STR and an endeavour was undertaken to study their resource selection after release.

Study area

The study was carried out at STR (27°05′–27°45′N and 76°15′–76°35′E) from January 2009 to August 2010. The total area of the Reserve is 881 km², of which 273.8 km² is a notified National Park. According to Champion and Seth²⁰, the vegetation of this region falls under tropical dry deciduous forest and tropical thorn forest. The climate is subtropical, characterized by a distinct winter (November–February), summer (March–June), monsoon (July–August) and post-monsoon (September–October). The average annual rainfall is 700 mm, occurring mostly during July–September. The wild ungulates found in Sariska are chital (*Axis axis*), sambar (*Rusa unicolor*), nilgai (*Boselaphus tragocamelus*) and wild pig (*Sus scrofa*). Apart from leopards, other carnivores present are tiger (*Panthera tigris*) and striped hyaena (*Hyaena hyaena*). Small carnivores found are jackal (*Canis aureus*), jungle cat (*Felis chaus*), desert cat (*Felis silvestris*), common mongoose (*Herpestes edwardsi*), small Indian mongoose (*H. auropunctatus*), palm civet (*Paradoxurus hermaphroditus*), small Indian civet (*Viverricula indica*) and Ratel (*Mellivora capensis*). Rhesus monkey (*Macaca mulatta*) and common langur (*Semnopithecus entellus*) are the two primates found. Porcupine (*Hystrix indica*) and rufous tailed hare (*Lepus nigricollis ruficaudatus*) are also found in Sariska¹⁸.

There are 32 villages within the Reserve of which 10 are located in the SNP area. In the entire STR, the human population is around 6000 and the livestock population is more than 20,000 (ref. 18). There were 14 major villages inside the home ranges of two trans-located leopards with approximate human population of 8400 and livestock population of 13,500.

Materials and methods

Home range of trans-located leopards

Radio-telemetry technique was used to estimate the home range and habitat use of trans-located leopards. Two male leopards were captured from conflict areas outside the Reserve and released in the forested area of STR to study their home range and resource selection.

The first male leopard (SP1) was captured from a village near Shahpura, 50 km away from STR (Figure 1). On 24 December 2008, the animal strayed into that village probably to kill a goat but got trapped in a small house. The animal was immobilized using N-45 tranquilizing equipment and a HBM mixture of xylazine and ketamine. After capturing, the animal was kept in Jaipur Zoo for three months for treatment. On 27 March 2009, SP1 was again immobilized using the same drug, fitted with Telonics-made VHF radio-collar and released in the study area. The weight of SP1 was 40 kg and estimated age was 2 years 6 months at the time of collaring. The second male leopard (SP2) was rescued from a 96 ft deep dry well in Madhogarh Fort around 100 km from STR²¹ (Figure 1). This animal strayed to Madhogarh village from Jamwa Ramgarh Wildlife Sanctuary, which is adjacent to STR. Being chased away by the villagers, it took shelter in Madhogarh Fort inside the village and fell down into an old dry well. After a long effort of 50 h, the animal was rescued from the well by immobilizing using Dist-Inject tranquilizing equipment and a HBM mixture of xylazine and ketamine. The animal (SP2) was fitted with Telonics-made VHF radio-collar and released in the study area on 28 October 2010. The weight of SP2 was around 65 kg and estimated age was 4 years at the time of collaring.

Radio-locations of each collared animal were determined by ground tracking through VHF signal following ‘homing in’ and ‘triangulation’ techniques²². Four to six locations every week per collared animal were recorded at different times of the day. SP1 was monitored from 27 March to 18 December 2009 (266 days) till the animal died due to unknown liver–lung infection. In total, 148 locations were collected from it. SP2 was monitored from 28 October 2009 to 18 August 2010 (292 days) till the animal was lost due to malfunctioning of radio-collar. In total, 268 locations were collected from it.

Coordinates for all the radio-location points were determined with the help of global positioning system (GPS) and later plotted in Mapsource²³ and ArcGIS 9.2 (ref. 24) to estimate the home range. Two methods of home range analysis were used, i.e. minimum convex polygon method²⁵ and kernel method²⁶. As both the animals were captured outside STR and later released in the study area, they took around two months to explore the area and establish their home ranges in STR. Hence, the locations of initial two months were excluded from the home-range analysis.



Figure 1. The sites of capture of two male leopards (SP1 and SP2) and the site of release in Sariska Tiger Reserve, Rajasthan.

CALHOME²⁷ and ArcGIS 9.2 (ref. 24) with Hawth's tool²⁸ and HRT tool²⁹ were used to estimate the home ranges.

Resource selection of trans-located leopards

Resource selection of trans-located leopards was studied between March 2009 and August 2010 based on their home ranges. The home ranges of each leopard were divided into 2 km × 2 km grids. The percentage available area of different vegetation types, and mean and variance of elevation were extracted from each grid cell (2 km × 2 km) using the land-use/land-cover and SRTM (Shuttle Radar Topography Mission) maps of STR. A multispectral (Landsat 7 ETM+), high-resolution (28.5 m) satellite imagery from the Global Land Cover Facility (<http://glcf.umiacs.umd.edu/>), NASA, USA, was used to generate a land-use/land-cover map of the study area, which was later validated through ground truth method in various vegetation points along the line transects. One pair of camera traps was placed in each 2 km × 2 km grid to obtain photo-capture rate of other competitor species, i.e. tigers in each grid in the study area. The cameras were operated continuously for 24 h during the entire study period. Twenty-six line transects were laid covering home ranges of both the leopards and walked thrice in summer and winter seasons. The length of the line transects varied from 1.6 km to 2 km and the total effort was 138.6 km

each in summer and winter. Encounter rate of prey species in the study area was estimated by line transect method under distance sampling technique and then extracted from each grid (2 km × 2 km). Thus, the data on available vegetation types, elevation, encounter rate of prey species and the presence of tiger were obtained from each grid and based on these data third-order resource selection of trans-located leopards was studied³⁰.

The third-order resource selection (resource selection of the individual leopard within its home range) of trans-located leopards was estimated through generalized linear mixed effect model (GLMM)^{31,32}. All the resource parameters (vegetation types, elevation, encounter rate of prey species and presence of tiger) were chosen as fixed effects and individual leopards were chosen as the random effect for GLMM models. Poisson distribution and log link function were selected based on the number of locations of each individual leopard in each grid for the analysis. The data were analysed in R environment using lme4 (ref. 33) and MuMin³⁴ packages.

Results

Home range of trans-located leopards

As both the male leopards were rescued from outside STR and released inside the Reserve, initially they explored larger areas to establish their new home ranges.

Both the animals took nearly one and half months (45 days) to explore the habitat and settle down (Figure 2). SP1 explored around 96.7 km² in the first 45 days after release; similarly, SP2 explored around 223.8 km² in the first 40 days after release. Therefore, the locations for initial 45 days were excluded from home-range analysis.

The estimated home range of SP1 with 100% minimum complex polygon (MCP) was 84.3 km² and that of SP2 was 63.2 km² (Figure 3). The estimation of home ranges with 95% MCP was 66.3 and 42.1 km² for SP1 and SP2 respectively. With 95% kernel, the estimated home range of SP1 was 92.5 km² and that of SP2 was 47.4 km². The home-range estimates with 50% kernel, the core areas within home range, were 12.2 km² for SP1 and 4.1 km² for SP2. The estimated home ranges with 90% and 50% harmonic mean of both the individuals are given in Table 1.

Resource selection of trans-located leopards

To understand the resource selection of trans-located leopards, 12 models were analysed in combination with different habitat types, encounter rate of wild prey species and livestock, elevation and encounter rate of tigers (Table 2). A correlation test was done amongst all the resource variables. The *Butea*-dominated forest and barren land were found to be significantly correlated

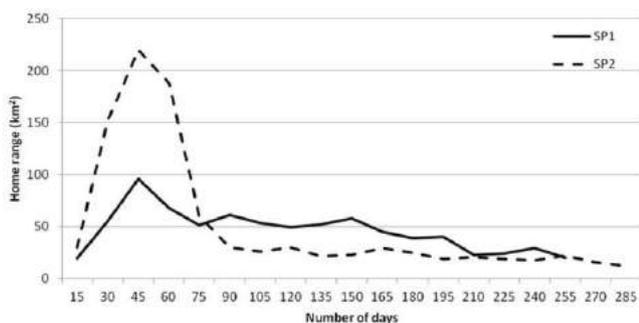


Figure 2. Estimation of home ranges of the two leopards every 15 days after being released into the forested habitats.

Table 1. Estimation of overall home range of leopard using different methods in Sariska Tiger Reserve between 2009 and 2010

Methods	SP1*	SP2*
100% MCP	84.3	63.2
95% MCP	66.3	42.1
90% MCP	58.9	35.0
95% Kernel	92.5	47.4
90% Kernel	72.4	25.9
50% Kernel	12.2	4.1
90% Harmonic mean	58.7	27.6
50% Harmonic mean	9.4	3.5

*Home range in km².

($P = 0.796$ and 0.891 respectively) with *Zizyphus* mixed forest and scrubland respectively and hence they were excluded from the aforementioned models. The model with habitat variables (excluding *Boswellia*-dominated forest) and wild prey species (excluding peafowl and sambar) was top-ranked based on lowest Akaike Information Criterion (AIC), but no single model best explained patterns of resource use by leopards in the study area (Table 2). The differences between AIC values were less than four for the top-three models, which were averaged to obtain the best explained estimate. The model-averaged importance value for each parameter is given in Table 3.

The *Acacia* mixed forest influenced most positively ($P = 4.61e^{-07}$) amongst the habitat variables explaining resource use of the trans-located leopards followed by *Zizyphus* mixed forest ($P = 2.00e^{-16}$). For instance, the leopard's use of an area increased by a factor of 1.06 and 1.04 (log-transformed estimates) with unit increase of *Acacia* mixed forest and *Zizyphus* mixed forest respectively (Table 3). *Anogeissus*-dominated forest ($P = 0.014$) and scrubland ($P = 2.88e^{-05}$) had negative influence in explaining resource use by the trans-located leopard in the study area. Leopard's use of an area decreased by a factor of 0.99 and 0.98 with unit increase of *Anogeissus*-dominated forest and scrubland respectively. These two leopards significantly used more habitat with higher encounter rate of nilgai ($P = 5.67e^{-09}$) and wild pig ($P = 0.009$) and used less habitats with higher encounter rate of chital ($P = 0.019$) and common langur ($P = 0.006$). Leopard's use of an area increased by a factor of 1.08 and 1.01 with unit increase in encounter rate of nilgai and wild pig respectively. Subsequently, leopard's use of an area decreased by a factor of 0.87 and 0.95 with unit increase in encounter rate of chital and common langur respectively. Encounter rate of tiger had a negative correlation with resource use of trans-located leopards, but it was not found significant.

Discussion

Leopards are endangered in Southeast Asia and yet little is known about their resource necessities which are to be secured for long-term conservation. The present study used radio-telemetry to investigate home-range size of trans-located 'problem' leopards in STR. Like all large carnivores, leopards maintain home ranges that must be large enough to provide them with sufficient prey year round. The land tenure system of leopards is broadly similar to that of many other cats and adult males typically occupy large areas that overlap with home areas of one or more adult females. Female ranges are usually smaller than those of males^{35,36}. In semi-arid areas like STR or other sites of low primary productivity, the home-range sizes of leopard are much larger and range overlap

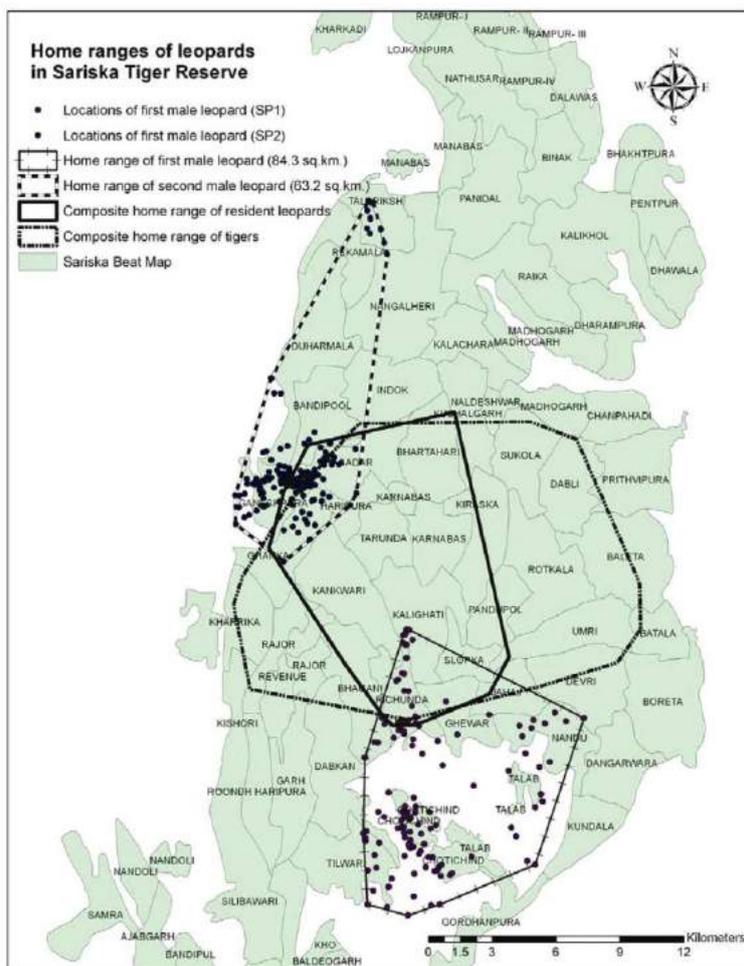


Figure 3. Home ranges (MCP) of radio-collared leopards in Sariska Tiger Reserve between 2009 and 2010.

for the same-sex animals is more common³⁷. In the Israeli desert³⁸, female home ranges averaged 84 km² whereas those of males measured 137 km². Two adult females in the Russian Far East³⁹ had ranges between 33 and 63 km² and an adult male home range was 280 km². In northeastern Namibia⁴⁰ male ranges were even larger (mean = 451 km²; range 210–1164 km²), and female ranges measured 183–194 km². Jenny³⁷ placed radio-collars on one male and two female leopards in the Taï NP, Ivory Coast, and found that the home range was 86 km² for a male, and 29 and 22 km², respectively, for the two females.

In the present study, the home range of leopard was estimated following different estimators, such as MCP (100%, 95% and 90%), adaptive kernel (95%, 90% and 50%) and harmonic mean (95%, 90% and 50%). But the estimate using 100% MCP method was considered for comparing home range of trans-located leopards in the present study with other available studies in Africa and Southeast Asia (Table 4). It was found that the leopard home ranges estimated in the study area were larger than in many other areas (Table 4). Estimates from various regions were made using a variety of techniques, which probably accounts for a large degree of variation, but

even when analyses were restricted to those made using the 100% MCP technique, estimates of home range size of leopard varied from 9.8 to 451 km². These studies were conducted in a variety of habitats, with large variation in prey abundance, different rainfall regimes, as well as disparities in other factors such as whether the study was conducted in a protected area and whether larger sympatric carnivores coexisted in the area. The reported home ranges of leopard in tropical forest are smaller than those in the dry deciduous forest or savanna forest^{41–44}. Most of the African studies reported larger home ranges for leopards in woodland savanna or dry thorn forest^{35,40,45–48}. The home range estimate in the present study was similar to those in African studies as the habitat of STR falls under dry deciduous forest (with some savanna patches) and dry thorn forest.

In the present study, habitat use of trans-located leopard was determined by its trajectory, sub-sampled by radio locations. Since the study was based on direct accidental conflict between humans and leopards, which involves capturing of the ‘problem’ leopards from conflict locations, release into forested areas and subsequent monitoring, determination of required sample size was

Table 2. Model selection statistics of generalized linear mixed model (GLMM) analysis for resource selection of trans-located leopards in STR (2009–2010)

Models in GLMM	<i>K</i>	AIC	ΔAIC
(la + ni + wp + ch + ziz + scrb + aca + ano)	8	307.0807	0
(la + ni + wp + ch + ziz + scrb + aca + ano + tiger)	9	307.6718	0.5911
(pe + la + ni + wp + ch + ziz + scrb + aca + ano + tiger)	10	309.6696	2.5888
(pe + la + ni + wp + sa + ch + ziz + scrb + aca + ano + bos)	11	311.1797	4.0990
(pe + la + ni + wp + sa + ch + ziz + scrb + aca + ano + tiger)	11	311.3301	4.2494
(pe + la + ni + wp + sa + ch + ziz + scrb + aca + ano + bos + tiger)	12	311.8580	4.7773
(pe + la + ni + wp + sa + ch + livs + ziz + scrb + aca + ano + bos + tiger)	13	312.0693	4.9886
(pe + la + ni + wp + sa + ch + livs + ziz + scrb + aca + ano + bos)	12	312.2868	5.2061
(pe + la + ni + wp + sa + ch + livs + ziz + scrb + aca + ano + bos + demcv)	13	314.2867	7.2061
(ziz + scrb + aca + ano + bos)	5	355.1378	48.0571
(tiger)	1	464.5915	157.5108
(demcv)	1	465.7565	158.6758

K, Number of parameters; pe, peafowl; ni, nilgai; la, common langur; wp, wild pig; sa, sambar; ch, chital; livs, livestock; ziz, *Zizyphus* mixed forest; scrb, scrubland; aca, *Acacia* mixed forest; ano, *Anogeissus* dominated forest; bos, *Boswellia* dominated forest; demcv, elevation; Tiger, encounter rate of tiger.

Table 3. Most influential model-averaged parameter estimates from the top models (< 4 AIC) explaining resource selection of trans-located leopards in Sariska Tiger Reserve (2009–2010)

Parameters (fixed effects)	Estimate $\beta \pm SE$	Log-transformed estimate	Z value	Significance (<i>P</i> value)
<i>Acacia</i> mixed forest	0.062 ± 0.012	1.063962	5.042	4.61e ⁻⁰⁷
<i>Anogeissus</i> -dominated forest	-0.007 ± 0.003	0.993024	-2.448	0.014
<i>Zizyphus</i> mixed forest	0.034 ± 0.003	1.035413	8.769	2.00e ⁻¹⁶
Scrubland	-0.018 ± 0.004	0.982161	-4.182	2.88e ⁻⁰⁵
Chital	-0.137 ± 0.063	0.87197	-2.332	0.019
Common langur	-0.041 ± 0.015	0.959829	-2.734	0.006
Nilgai	0.084 ± 0.014	1.087629	5.826	5.67e ⁻⁰⁹
Peafowl	-0.001 ± 0.028	0.999	-0.048	0.961
Wild pig	0.011 ± 0.004	1.011061	2.577	0.009
Tiger	-0.087 ± 0.075	0.916677	-1.162	0.245

SE, Standard error.

not governed by the authors. Though in many areas, problem leopards have been trans-located from conflict areas to forested areas, no literature is available on home ranges and resource selection of trans-located leopards. The present study documented ranging pattern and resource selection of leopards which are trans-located from conflict areas and have successfully established their home ranges in and around forested areas.

Before the release of these two male leopards, five tigers (two males and three females) were re-introduced in the SNP area. Though both the leopards were initially released in the tiger-occupied area in SNP, later they established their home ranges outside the tiger-occupied areas of STR. Since both the leopards were rescued from conflict areas, they were more familiar with human-dominated landscapes. Even after establishment of their home ranges, a proportion of their home ranges was found outside the protected area. The annual home range of SP1 was calculated to be 84.3 km² (100% MCP), out of which 47.8 km² was found outside forested areas. Similarly, the estimated annual home range of SP2 was 63.2 km² (100% MCP), out of which 6.8 km² was found outside forested areas. Although parts of the home ranges

of both trans-located leopards were found outside forested areas, less than 20% locations were found outside the forest. The part of the home ranges of both the leopards found outside the forested areas comprised of largely barren lands, scrubland and sparse human settlements. The prime habitat in SNP was occupied by tigers and resident leopards. The trans-located leopards, probably being pushed off by tigers and resident leopards, established their home ranges in the peripheral areas of STR, which are comparatively inferior habitats in terms of prey base and anthropogenic disturbances (Figure 3). In general, both the leopards significantly (*P* < 0.001) selected *Zizyphus* mixed forest and *Acacia* mixed forest in the periphery of STR, which showed a disparate observation to other conflict studies¹⁰. In the periphery of STR, distribution of *Zizyphus* mixed forest and *Acacia* mixed forest is scattered along with scrubland and barren land. The total area of *Acacia* mixed forest and *Zizyphus* mixed forest together is less (15%) in the total available habitat in home ranges of both the animals, but it was used more than its availability, thereby influenced most in the resource selection of trans-located leopards in the study area. Amongst the prey species of leopard, presence of

Table 4. Home range of leopards in different study sites

Study area	Habitat type	Method	Mean home range size (male; km ²)
Present study, Sariska TR, India	Dry deciduous/thorn forest	100% MCP	73.8
KaengKrachen NP, Thailand ⁴⁴	Forested hills	100% MCP	17.7
Kaandom Game Reserve, Namibia ⁴⁰	Woodland savanna	100% MCP	451.2
Kruger NP, South Africa ³⁵	Woodland savanna	100% MCP	76.2
Cape Province, South Africa ⁴⁷	Fynbos/plantation	100% MCP	388
Tai NP, Ivory Coast ³²	Tropical forest	100% MCP	85.6
Waterberg Plateau Park, Namibia ⁴⁶	Thornbush savanna	100% MCP	118.7
Hula KhaKueng WLS, Thailand ⁴¹	Dry tropical forest	–	32
Kalahari Gemsbok NP, SA ⁴⁵	Desert/grassland	95% Kernel	2182
Nagarhole NP, India ⁴²	Tropical forest	95% MCP	21.7
Serengeti NP, Tanzania ⁴⁸	Plains/woodland	Sightings	57.5
Sabie River, Kruger NP, SA ³⁵	Woodland savanna	100% MCP	27.7
Wilpattu NP, Sri Lanka ⁴³	Tropical forest/scrubland	–	9.5

nilgai and wild pig influenced positively the resource selection of trans-located leopards, as both the ungulates species occur in high densities in *Zizyphus* mixed forest and *Acacia* mixed forest in the periphery of STR and near the village areas. Chital influenced negatively the resource selection of trans-located leopards, as chital mostly occur in *Zizyphus* mixed forest in the valley habitat of SNP, which was less used by these trans-located leopards. The abundance of chital and sambar is low in the peripheral areas of STR²⁸, where the trans-located leopards established their home ranges. In contrast, the resident leopards inside STR preferred *Boswellia*-dominated forest and *Anogeissus*-dominated forest inhabited by large number of sambar and chital⁴⁹. Forty-one scats were collected from the two trans-located leopards, which revealed that nilgai was the most dominant prey item (20%) followed by peafowl (18%), goat (18%), cattle (14%), wild pig (11%), sambar (11%) and chital (7%). Common langur influenced negatively the resource selection of trans-located leopards, which can be attributed to the low abundance of the former in those areas. Though there were few villages inside the home ranges of both the leopards, encounter rate of livestock could not define the resource selection of trans-located leopards; hence they were not selected in the top models in GLMM. In contrast, the resident leopards inside STR significantly selected habitat with less encounter rate of livestock⁴⁹. The trans-located leopards showed negative correlation with tiger encounter rate for the selection of resources, but it was not statistically significant. Leopard–human conflict study in Pauri-Garhwal showed that the scrubland area was highest in proportion among the entire land-use/land-cover patterns across the conflict areas^{10,50}. It was estimated that the habitat utilization pattern by leopard and wild prey was mostly similar and therefore, the encounters of leopards with humans and domestic prey were not deliberate from the leopard's point of view as natural forested habitat was altogether least available in that region⁵⁰.

The present study shows that the 'problem' leopards trans-located from conflict areas to forested areas established their home ranges in and around STR. The resource use of these trans-located leopards increased with increasing area of *Zizyphus* mixed forest and *Acacia* mixed forest and decreased with increasing area of *Anogeissus*-dominated forest. Similarly, they selected habitats with higher encounter rate of wild pig and nilgai and used less the habitats with high encounter rate of chital and common langur. Finally, it was observed that the 'problem' leopards in this study showed significant positive selectivity to the available natural vegetation types and wild-prey abundance, rather than degraded habitats and domestic prey species.

1. Sunquist, M. E. and Sunquist, F., *Wild Cats of the World*, University of Chicago Press, 2002.
2. Karanth, K. U. and Sunquist, M. E., Prey selection by tiger, leopard and dhole in tropical forests. *J. Anim. Ecol.*, 1995, **64**, 439–450.
3. Edgaonkar, A. and Chellam, R., Food habit of the leopard (*Panthera pardus*) in Sanjay Gandhi National Park, Maharashtra, India. *Mammalia*, 2002, **66**, 353–360.
4. Edgaonkar, A., Ecology of the leopard (*Panthera pardus fusca*) in Satpura National Park and Bori Wildlife Sanctuary. Ph D thesis, Saurashtra University, Rajkot, 2008.
5. Athreya, V., Odden, M., Linnell, J. D. C. and Karanth, K. U., Translocation as a tool for mitigating conflict with leopards in human-dominated landscapes of India. *Conserv. Biol.*, 2010, **25**, 133–141.
6. Edgaonkar, A. and Chellam, R., A preliminary study on the ecology of the leopard, *Panthera pardus fusca* in Sanjay Gandhi National Park, Maharashtra. Wildlife Institute of India, Dehradun, 1998.
7. Athreya, V., Thakur, S. S., Chaudhuri, S. and Belsare, A. V., A study of the man–leopard conflict in the Junnar Forest Division, Pune district, Maharashtra. Submitted to the Office of Chief Wildlife Warden, Maharashtra Forest Department, Nagpur, 2004.
8. Chaudhuri, S., Man–leopard conflict in the Baria Forest Division, Vadodara Circle, Gujarat. Submitted to the Office of Chief Wildlife Warden, Gujarat Forest Department, 2003.
9. Raha, A. K., Wildlife conservation in West Bengal – a decade at a glance. Wildlife Wing, Forest Department, Government of West Bengal, 1996.

10. Chauhan, D. S. and Goyal, S. P., A study on distribution, relative abundance and food habits of leopard (*Panthera pardus*) in Garhwal Himalayas. Technical Report. Wildlife Institute of India, Dehradun, 2001.
11. Goyal, S. P., Chauhan, D. S., Agrawal, M. K. and Thapa, R., A study on distribution, relative abundance and food habits of leopard (*Panthera pardus*) in Garhwal Himalayas. Technical report. Wildlife Institute of India, Dehradun, 2000.
12. Madhusudan, M. D. and Mishra, C., Why big, fierce animals are threatened: conserving large mammals in densely populated landscapes. In *Battles over Nature: Science and the Politics of Wildlife Conservation* (eds Saberwal, V. K. and Rangajaran, M.), Permanent Black, New Delhi, 2003, pp. 31–55.
13. Karanth, K. U. and Gopal, R., An ecology-based policy framework for human–tiger coexistence in India. In *People and Wildlife: Conflict or Coexistence?* (eds Woodroffe, R., Thirgood, S. and Rabinowitz, A.), Cambridge University Press, Cambridge, United Kingdom, 2005, pp. 373–387.
14. Athreya, V. R., Thakur, S. S., Chaudhuri, S. and Belsare, A. V., A study of the man–leopard conflict in the Junnar Forest Division, Pune District, Maharashtra. Submitted to the Office of the Chief Wildlife Warden, Maharashtra State Forest Department and the Wildlife Protection Society of India, New Delhi, 2004.
15. Johnsingh, A. J. T., Prey selection in three large sympatric carnivores in Bandipur. *Mammalia*, 1992, **56**, 517–526.
16. Mukherjee, S. and Misha, C., Predation by leopard (*Panthera pardus*) in Majhtal Harsang Wildlife Sanctuary, Western Himalayas. *J. Bombay Nat. Hist. Soc.*, 2001, **98**, 267–268.
17. Seidensticker, J. and Lumpkin, S., *Great Cats. Majestic Captures of the Wild*, Rodale Press, Inc, Pennsylvania, 1991, p. 240.
18. Sankar, K., Qureshi, Q., Mondal, K., Worah, D., Srivastava, T., Gupta, S. and Basu, S., Ecological studies in Sariska Tiger Reserve. Report submitted to National Tiger Conservation Authority, Government of India and Wildlife Institute of India, Dehra Dun, 2009, p. 144.
19. Mondal, K., Sankar, K., Qureshi, Q., Gupta, S. and Chourasia, P., Estimation of population and survivorship of leopard *Panthera pardus* (Carnivora: Felidae) through photographic capture–recapture sampling in western India. *World J. Zool.*, 2012, **7**, 30–39.
20. Champion, H. G. and Seth, S. K., *A Revised Survey of Forest Types of India*, Manager of Publications, Government of India, 1968, p. 404.
21. Mondal, K., Qureshi, Q. and Sankar, K., A spot of trouble. *Sanctuary Asia*, August 2010, pp. 40–43.
22. White, G. C. and Garrot, R. A., *Analysis of Radio Tracking Data*, Academic Press, 1990.
23. Garmin Ltd, 1999; <http://www.garmin.com/us/maps/mapsource>
24. ESRI, Arc Map 9.2. Environmental systems Research Institute Inc., 2006; <http://www.esri.com/>
25. Mohr, C. O., Table of equivalent populations of North American small mammals. *Am. Midl. Nat.*, 1997, **37**, 223–249.
26. Katajisto, J. and Moilanen, A., Kernel based home range method for data with irregular sampling intervals. *Ecol. Model.*, 2006, **194**, 405–413.
27. Kie, J. G., CALHOME. Forestry Sciences Lab., Fresno, California, 1994.
28. Beyer, H. L., Hawth’s analysis tools for ArcGIS, 2004; <http://www.spatialecology.com/htools>
29. Rodgers, A. R., Carr, A. P., Beyer, H. L., Smith, L. and Kie, J. G., HRT: home range tools for ArcGIS. Version 1.1. Ontario Ministry of Natural Resources, Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario, Canada, 2007.
30. Johnson, D. H., The comparison of usage and availability measurements for evaluating resource preference. *Ecology*, 1980, **61**, 65–71.
31. Breslow, N. E. and Clayton, D. G., Approximate inference in generalized linear mixed models. *J. Am. Stat. Assoc.*, 1993, **88**, 9–25.
32. Williams, D. A., Extra-binomial variation in logistic linear models. *Appl. Stat.*, 1982, **31**, 144–148.
33. Bates, D., Maechler, M. and Bolker, B., lme4: Linear mixed-effects models using S4 classes. Version: 0.999375-42, 2011; <http://cran.r-project.org/web/packages/lme4/index.html>
34. Barton, K., MuMIn: multi-model inference. Version: 1.6.6, 2012; <http://cran.r-project.org/web/packages/MuMIn/index.html>
35. Bailey, T. N., *The African Leopard: Ecology and Behaviour of a Solitary Field*, Columbia University Press, New York, 1993.
36. Hamilton, P. H., The movements of leopards in Tsavo National Park, Kenya as determined by radio-tracking. M Sc thesis, University of Nairobi, Kenya, 1976.
37. Jenny, D., Spatial organization of leopards *Panthera pardus* in Tai National Park, Ivory Coast: is rain forest habitat a ‘tropical haven’? *J. Zool.*, 1996, **240**, 427–440.
38. Ilany, G., The leopard of the Judean desert. *Isr. Land Nat.*, 1981, **6**, 59–71.
39. Miquelle, D. G., Smirnov, E. N., Hornocker, H. G., Nikolaev, I. G. and Matyushkin, E. N., Food habits of Amur tigers in Skhote-Alin Zapovednik and the Russian Far East and implications for conservation. *J. Wildl. Res.*, 1996, **1**, 138–147.
40. Stander, P. E., Haden, P. J. and Kagece, G., The ecology of sociality in Namibian leopards. *J. Zool.*, 1997, **242**, 343–364.
41. Rabinowitz, A., The density and behaviour of large cats in a dry tropical forest in Huai Kha Khaeng Wildlife Sanctuary, Thailand. *Nat. Hist. Soc. Bull. Siam Soc.*, 1989, **37**, 235–251.
42. Karanth, K. U. and Sunquist, M. E., Behavioral correlates of predation by tiger (*Panthera tigris*), leopard (*Panthera pardus*) and dhole (*Cuon alpinus*) in Nagarhole, India. *J. Zool.*, 2000, **250**, 255–265.
43. Eisenberg, J. F. and Lockhart, M. C., An ecological reconnaissance of Wilpattu Park, Ceylon. *Smithson. Contrib. Zool.*, 1972, **101**, 1–118.
44. Grassman Jr, L. L., Ecology and behavior of the Indochinese leopard in Kaeng Krachan National Park, Thailand. *Nat. Hist. Bull. Siam Soc.*, 1999, **47**, 77–93.
45. Bothma, J. D. P. and Le Riche, E. A. N., Aspects of the ecology and the behaviour of the leopard *Panthera pardus* in the Kalahari Desert. *Koedoe*, 1984, **27**, 259–279.
46. Zeiss, B., Waterberg leopard project. Albert-Ludwigs-Universität Freiburg, Germany and the Ministry of Environment and Tourism, Namibia, 1997, p. 38.
47. Norton, P. M. and Lawson, A. B., Radio tracking of leopards and caracals in the Stellenbosch area, Cape Province. *S. Afr. J. Wild. Res.*, 1985, **15**, 17–24.
48. Schaller, G. B., *The Serengeti Lion*, University Chicago Press, Chicago, 1972.
49. Mondal, K., Ecology of leopard (*Panthera pardus fusca*) in Sariska Tiger Reserve, Rajasthan, India. PhD thesis submitted to Saurashtra University, Rajkot, 2011, p. 235.
50. Bhattacharjee, S., Monitoring leopard (*Panthera pardus*) and its prey in different human–leopard conflict zones (high, medium and low), Pauri Garhwal, Uttaranchal. M Sc dissertation. Forest Research Institute (Deemed University), 2006.

ACKNOWLEDGEMENTS. We thank the Rajasthan Forest Department for granting permission to work in Sariska, as part of ‘Ecology of Leopard’ project conducted by Wildlife Institute of India (WII), Dehradun. We also thank the Director and Dean, WII for providing encouragement and support; Dr Arvind Mathur and Dr C. P. Singh for help in capturing leopards and Jairam, Omi, Chhotelal and Khagesh for field assistance.

Received 24 August 2012; revised accepted 16 May 2013

Full Length Research Paper

Response of leopards to re-introduced tigers in Sariska Tiger Reserve, Western India

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Accepted 3 February, 2012

Tigers got exterminated from Sariska Tiger Reserve before 2005. After that, five tigers were re-introduced to Sariska during 2008 to 2010. The present study compared the abundance, site occupancy and temporal activity pattern of leopard before and after tiger re-introduction. The population of leopard was estimated by mark-recapture technique using camera traps during 2008 to 2010 in an effective trapping area of 223.3 km². Before tiger re-introduction (2008), the leopard density was estimated to be 7.6±0.6 (SE) /100 km² and after tiger reintroduction it was 6.2±0.8 /100 km² (2009) and 3.1±0.4 /100 km² (2010). It was observed that the density of leopard declined significantly (Two sample T-Test; P = 0.0002) from 2008 to 2010. Rate of site occupancy was calculated through site-wise capture history of leopard obtained from camera traps. Before tiger re-introduction the probability of site utilization of leopard was 0.75, while after tiger re-introduction probabilities of site utilization of leopard and tiger were estimated at 0.54 and 0.52 respectively and the co-occurrence of both the species was 0.51. Temporal activity patterns of tiger and leopard were investigated from photo captures. Prior to the release of tigers, mean activity time of leopard was 20: 57 h (95% CI 20: 19 to 22: 53) but shifted to 22: 35 h (21: 02 to 01: 25 h) after tiger release (Watson's U² test: p<0.005). The present study showed that there was a decline in the leopard population after tiger re-introduction and considerable segregation between the two carnivores along the spatial and temporal axes.

Key words: Competition, density, leopard, population, reintroduction, spatial distribution, temporal activity, tiger.

INTRODUCTION

Competition in carnivores may result in reduced fecundity, growth or energy stores of individuals and reduced density and/or an altered age structure at a population level (MacNally, 1983; Petren and Case, 1998). Substantial data shows that large carnivores can limit the density of smaller carnivores by stealing food (Gorman et al., 1998), monopolizing areas of high prey density (Johnson and Franklin, 1994), competing for food (Hayward and Kerley, 2008), or by direct aggression and predation (Palomares and Caro, 1999). For example, studies showed that lions (*Panthera leo*) and/or hyenas

(*Crocuta crocuta*) affect wild dogs (*Lycaon pictus*) through partial exclusion from preferred habitat (Creel et al., 2001) and direct killing (Ginsberg et al., 1995). Consequently, wild dog densities are low where the densities of lions or hyenas are high (Creel and Creel, 1996) and local extinctions are more likely to occur where competition is intense (Vucetich and Creel, 1999). Brown and Maurer (1986) suggested that the ecological advantages of large body size, such as greater energy efficiency, greater mobility and more efficient homeostatic mechanisms, enable large bodied species to use a greater range of habitats. Also, large species can dominate resource use within habitats (Jones and Barmuta, 1998).

Tigers (*Panthera tigris*) and leopards (*Panthera pardus*) are sympatric in several parts of Asia. Karanth and Sunquist (1995, 2000) studied prey selection and

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interactions between these large cats in Nagarahole, India, where the densities of both species were reported high (Karanth, 1993, 1995), and their prey base is rich and diverse in terms of species and sizes (Karanth and Sunquist, 1992). The authors observed similar patterns between the species in space use and activity patterns (Karanth and Sunquist, 2000), but differences in prey selection with respect to prey size (Karanth and Sunquist, 1995). Similar differences are found in the preferred weight range throughout the entire distributions of tigers and leopards (Hayward et al., 2006, 2012).

A small population of tigers (10 to 12 individuals) got exterminated from Sariska Tiger Reserve (Sariska) due to poaching in 2004 (Sankar et al., 2009). Subsequently, leopard took over the entire tiger habitat, which was the best habitat available in Sariska and became the top predator (Sankar et al., 2009). The re-introduction of tigers from Ranathambore Tiger Reserve (RTR) to Sariska TR was envisaged by translocating initial population of five tigers (two males and three females) during 2008 to 2010 (Sankar et al., 2010). Accordingly, two tigers (male and female) in 2008, a tigress in 2009 and two tigers (male and female) in 2010 were re-introduced in Sariska. It was imperative to study the responses of resident leopards to re-introduced tigers in the study area. In Sariska, studies on prey selection of leopard and re-introduced tigers showed that both the carnivores preferred wild prey species such as sambar (*Rusa unicolor*) and chital (*Axis axis*) in similar manner (Mondal et al., 2011; Sankar et al., 2010) and size and sex classes of prey species consumed by leopard and tiger were not investigated. Based on photo-capture rate through camera traps and pugmark evidences of leopard before and after tiger re-introduction, it was assumed that there might be some change in site utilization and activity pattern of leopard, which are accounted for in the present study.

Theory and empirical data suggested that behavioral factors may play a role in tiger–leopard co-existence in certain circumstances. Seidensticker (1976) and McDougal (1988) observed indications of avoidance of tiger by leopard Chitwan National Park, Nepal. Furthermore, theoretically the size difference between tigers and leopards, their similar feeding habits, and their close taxonomic relatedness are strong indicators of a high risk of intra-guild predation (Donadio and Buskirk, 2006; Palomares and Caro, 1999; Polis et al., 1989). Empirical studies have demonstrated that an inferior competitor may avoid interference competition by inhabiting “competition refuges”, areas where encounters with the superior opponent are less frequent (Durant, 1998; Odden et al., 2010; Saleni et al., 2007; Woodroffe and Ginsberg, 2005). Other competitors avoid interference competition by partitioning their activity times (Hayward and Slotow, 2009). Two main types of refuges are reported in the literature; some species avoid conflicts by inhabiting the margins of their competitors’

home ranges, whereas others seek out areas within the ranges of their opponents that are low in resource density, thereby, reducing the probability of inter-specific encounters (Odden et al., 2010; Woodroffe and Ginsberg, 2005). According to Creel et al. (2001), a sound approach of detecting avoidance due to interference competition among carnivores requires objective methods of mapping habitat quality for the competitors and of recording their spatial distributions. In the present study, the non-invasive method of camera trapping technique under a mark-recapture framework was used for: (a) estimation of population of leopard before and after tiger re-introduction, (b) site utilization of leopard and tiger in the study area and (c) temporal activity pattern of leopard and tiger.

MATERIALS AND METHODS

Study area

The study area is the Sariska Tiger Reserve (Sariska), Western India. The park lies between Longitude: N27°05' to N27°45' and Latitude: E76°15' to E76°35' and is situated in the Aravalli hill range in the semi-arid part of Rajasthan (Rodgers and Panwar, 1988). It became a Wildlife Sanctuary in 1955 and Tiger Reserve in 1982. The total area of the Tiger Reserve is 881 km² (Figure 1), of which 273.8 km² is a notified National Park. The altitude of Sariska varies from 540 to 777 m. Sariska terrain is undulating to hilly in nature and has numerous narrow valleys.

The climate of this tract is subtropical, characterized by a distinct summer, monsoon, post monsoon and winter. The vegetation of Sariska falls under Northern tropical dry deciduous forests and Northern tropical thorn forest (Champion and Seth, 1968). Apart from leopard and tiger, other carnivores present are striped hyena (*Hyaena hyaena*), jackal (*Canis aureus*), jungle cat (*Felis chaus*), common mongoose (*Herpestes edwardsi*), small Indian mongoose (*Herpestes auropunctatus*), ruddy mongoose (*Herpestes smithi*), palm civet (*Paradoxurus hermaphroditus*), small Indian civet (*Viverricula indica*) and honey badger (*Mellivora capensis*). In 2009, desert cat (*Felis silvestris*) was reported from Sariska (Gupta et al., 2009). Prey species of leopards and tigers in the area include chital (*A. axis*), sambar (*R. unicolor*), nilgai (*Boselaphus tragocamelus*), common langur (*Semnopithecus entellus*), wild pig (*Sus scrofa*), rhesus macaque (*Macaca mulatta*), porcupine (*Hystrix indica*), rufous tailed hare (*Lepus nigricollis ruficaudatus*) and Indian peafowl (*Pavo cristatus*). The predominant domestic livestock found inside the reserve are buffaloes (*Bubalis bubalis*), brahminy cattle (*Bos indicus*) and goats (*Capra hircus*). There are 10 villages located inside the National Park area which are still due for relocation since 1984. The human population is over 1700 in the villages of National Park along with a population 10,000 livestock including buffalo, cow, goat and sheep (Sankar et al., 2009). There are 21 villages located outside the National Park but within the Tiger Reserve. The human population in these villages is around 6000 and the livestock population is more than 20,000 (Sankar et al., 2009).

Estimation of population of leopard before and after tiger re-introduction

To estimate the population of leopard, camera trapping was used under a mark-recapture framework (Karanth, 1995). A

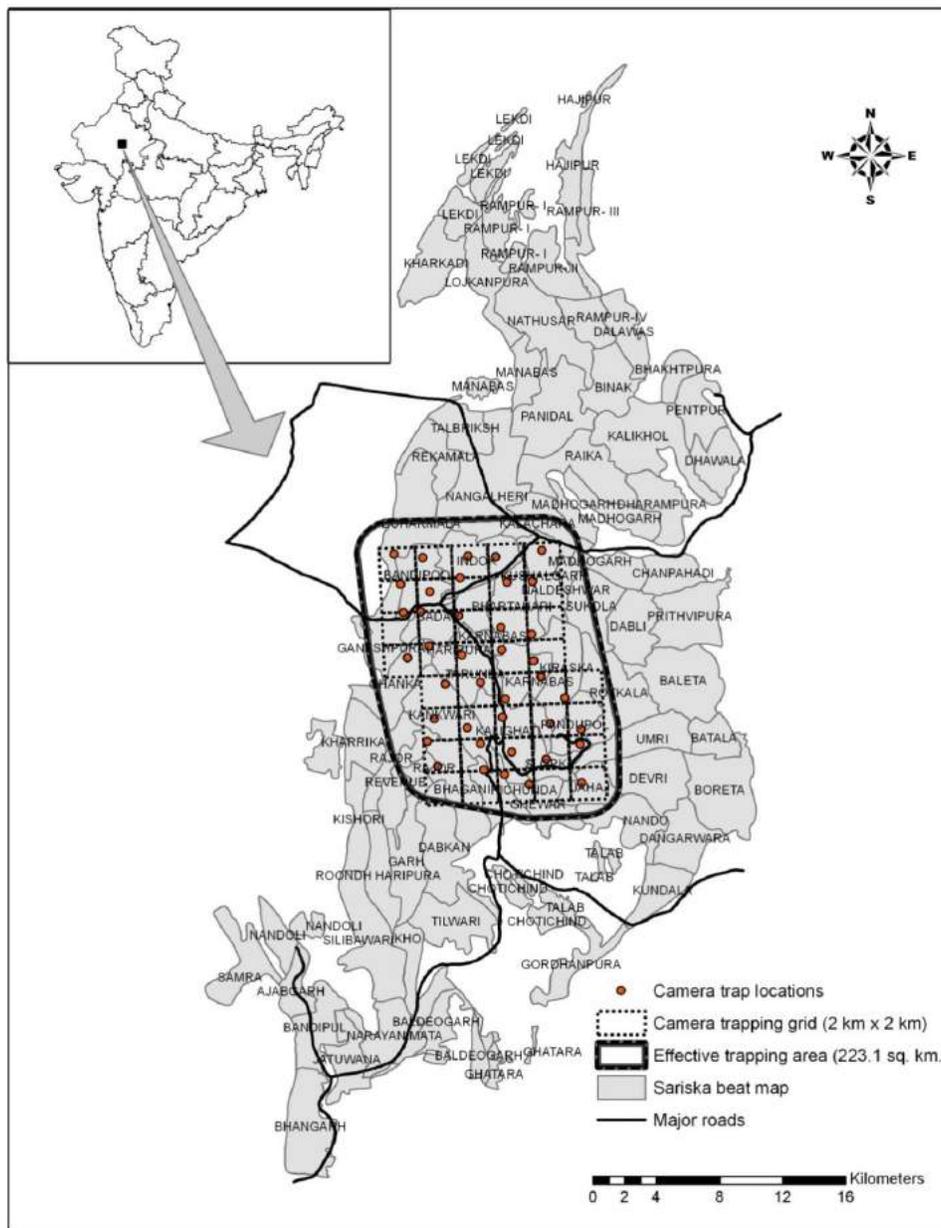


Figure 1. Geographic location of Sariska Tiger Reserve and location of camera traps in the intensive study area.

comprehensive overview of camera trapping tigers and leopards for the purpose of estimating abundance is given by Karanth (1995) and Karanth and Nichols (1998). Camera trapping was done in the study area from December, 2007 to June, 2008, from January to June, 2009 and from January to May, 2010. A preliminary survey was carried out during November to December 2007 in the intensive study area of 160 km² in the National Park by surveying available trails. Indirect signs such as spoor and scats of leopard were identified and marked using a handheld Global Positioning System. The entire study area was divided into two 80 km² blocks and each block was subdivided into 20 grids of 2 × 2 km². A pair of cameras was placed in each 2 × 2 km² grid (Figure 1). Camera traps were placed on the basis of leopard evidence (spoor, scats) on the trails. Forty units of analog and digital cameras were used

which worked on passive infrared motion/ heat sensors. The camera traps were equipped with 35 mm lens and date and time of each photograph were recorded. The camera delay was kept at minimum (15 s) and sensor sensitivity was set high. A total of 40 locations were selected for the placement of camera traps in the study area. Camera traps were operated for 117 consecutive nights in 2008, 130 in 2009 and 85 in 2010. The main concern was to cover the area fairly completely, in the sense that it would be difficult for a tiger or leopard in the sampled area to travel about and not encounter at least one camera trap (Karanth and Nichols, 2002). Every two nights were considered as a single occasion, resulting in 59 occasions and effort of 4680 trap nights in 2008, 65 occasions and effort of 5200 trap nights in 2009 and 43 occasions and 3400 trap nights in 2010. Individual leopard obtained from

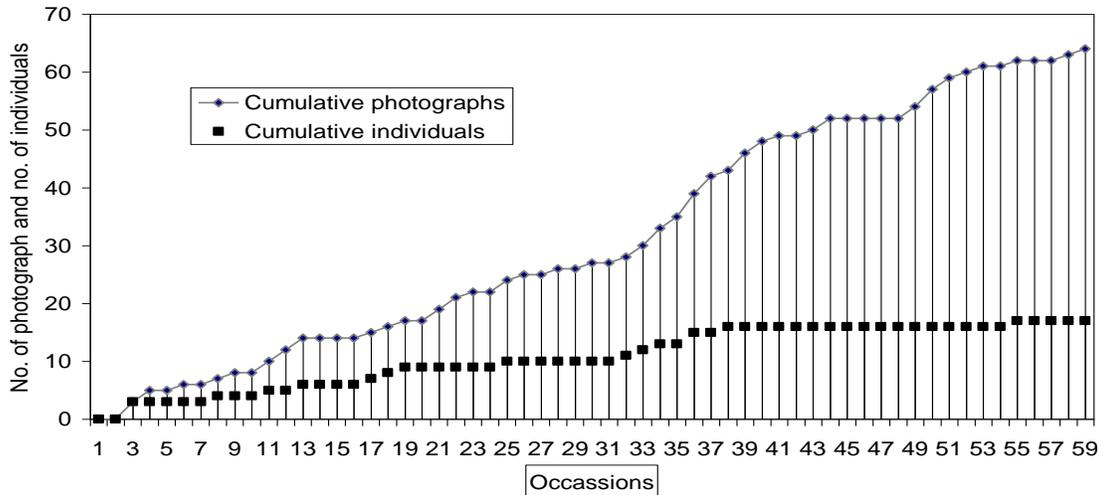


Figure 2. Number of individual leopard photographed and number of leopard photographs with increasing number of sampling occasions in Sariska Tiger Reserve to evaluate sampling adequacy in 2008.

camera trap photographs were identified by a combination of distinguishing characters, such as position and shape of rosettes on flanks, limbs and forequarters (Schaller, 1967; Karanth, 1995). Any photograph with a distorted perspective or which lacked clarity, were discarded ($n = 3$). Every leopard captured was given a unique identification code like L1, L2, and L3 etc.

Occasion wise capture history of each individual was generated in an X matrix format (Otis et al., 1978) for the analysis of population estimation. Population closure test was performed using software CAPTURE (Otis et al., 1978; Rexstad and Burnham, 1991). The density of leopard was calculated by four different methods such as full MMDM, half MMDM, spatially explicit Inverse Prediction density (IP dens) and spatial maximum likelihood density (ML dens) using program DENSITY 4.1 (Efford et al., 2004) and SPACECAP (Singh et al., 2010).

Spatial distribution of leopard and tiger

Spatial distribution of leopard and tiger were studied through photographic evidences obtained from camera trapping study and later used in a Geographical Information System (GIS) domain to understand site-utilization of both the species. The number of photographs per 100 trap nights was calculated in each camera trapping grid ($2 \times 2 \text{ km}^2$) for both species. This data was then projected in GIS along with the Sariska map to get a visual interpretation of site utilization of leopard and tiger in the study area. One binary matrix of camera trap locations against photo-captures was prepared for tiger and leopard (before and after tiger release) from camera trap data. This matrix was then analyzed for presence/absence site utilization in program PRESENCE 4.0 (Hines, 2006) following single session two species model. The detection probabilities of leopard and tiger in the study area in the presence or absence of either species were analyzed using the program PRESENCE 4.0 (Hines, 2006).

Temporal activity pattern of leopard and tiger

Temporal activity pattern of leopard and tiger was studied through the photographic time evidence obtained from camera traps. In total the camera traps yielded 81 and 64 leopard photographs before and after tiger release respectively along with 27 tiger photographs.

These photographs were further pooled (Hayward and Hayward, 2007) into following categories for leopard and tiger: 9:01-12:00 hrs, 12:01 to 15:00 h, 15:01 to 18:00 h, 18:01 to 21:00 h, 21:01 to 0:00 h, 0:01 to 3:00 h, 3:01 to 6:00 h and 6:01 to 9:00 h. Peak activity period (95% CI) and peak activity time were analyzed in program ORIANA (Andersen et al., 2000).

RESULTS

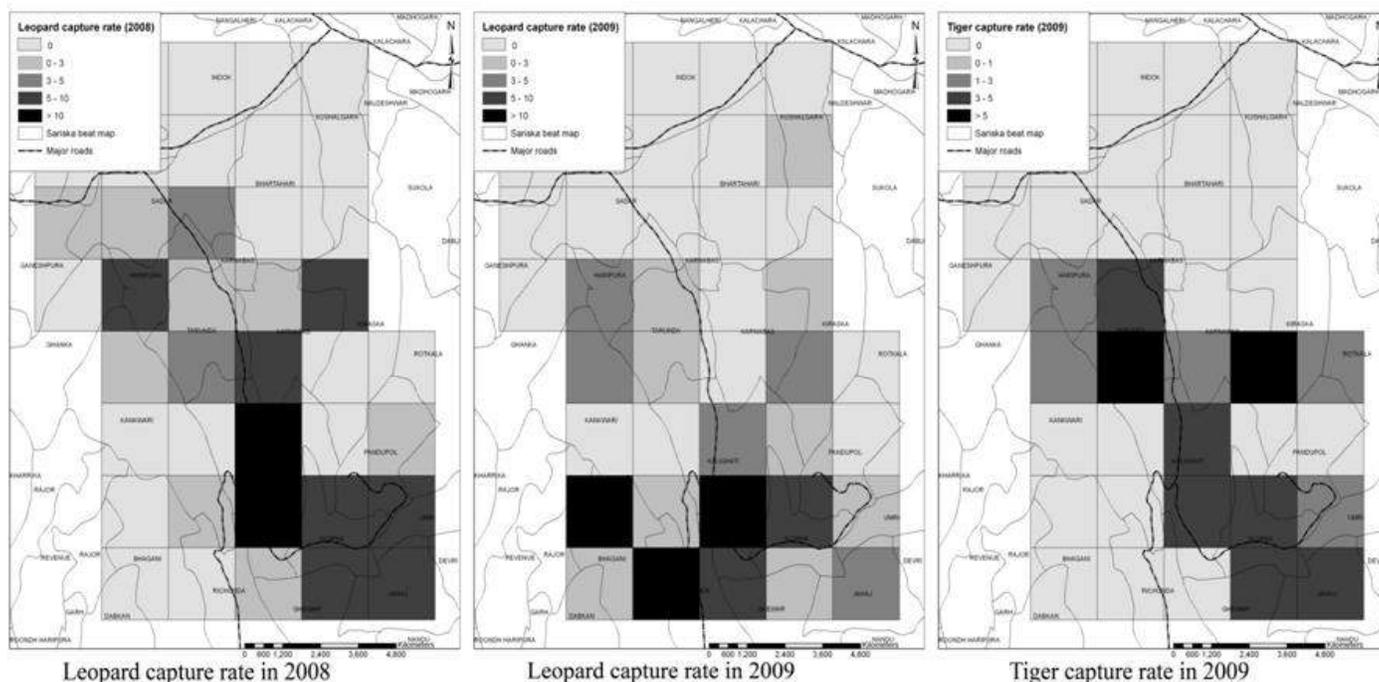
Estimation of population of leopard before and after tiger re-introduction

The camera trapping study resulted in a total of 81 photographs of 17 individual leopards in 2008, 64 photographs of 14 individual leopards in 2009 and 31 photographs of 8 individual leopards in 2010, based on the number of individuals identified from the rosette pattern. Effective trapping area (ETA) and density (D) was calculated by different methods using program DENSITY 4.1 (Efford et al., 2004). The 40 trapping locations covered a minimum convex polygon area of 118 km^2 and an effective trapping area (ETA) of 223.8 , 223.1 and 250.3 km^2 with a buffer of half mean maximum distance moved model (1/2 MMDM) in 2008, 2009 and 2010 respectively.

The number of individual leopard was found to stabilize after the 37th occasion (74 days) of camera trapping in 2008, hence, it was inferred that a minimum of 80 days camera trapping is necessary to capture the entire leopard population in the study area (Figure 2). As population estimation was done separately between years, it was found to be geographically and demographically closed for the sample period in 2008 ($P = 0.06$), 2009 ($P = 0.07$) and 2010 ($P = 0.08$). The overall model selection test based on discriminant functions using the model selection algorithm of program

Table 1. Population and density estimation of leopard before and after tiger release in Sariska Tiger Reserve between 2008 and 2010.

Estimates	Pre-release of tigers		Post-release of tigers (2009)	
	2008	2009	2009	2010
Population (Mh Jackknife)	17.9 (3.0)	16.3 (3.3)	9.0 (1.5)	
Population (Mh Chao)	18.6 (2.2)	18.2 (4.9)	8.0 (0.7)	
Population (Mo Null)	17.0 (0.6)	14.0 (0.6)	8.0 (0.3)	
Density (MMDM/2)	7.6 (0.6)	6.2 (0.8)	3.1 (0.4)	
Density (Max likelihood)	8.0 (2.0)	5.7 (1.5)	3.3 (1.2)	
Density (Bayesian)	7.4 (1.3)	5.2 (0.8)	2.3 (0.5)	

**Figure 3.** Spatial distribution of tiger and leopard based on camera trap photo-captures in the study area of Sariska Tiger Reserve.

CAPTURE identified Mh (heterogeneity model) as the most appropriate model in our study. With Mh (jackknife) estimator, the leopard population (N) was estimated at $17.9 \pm SE 3.0$ in 2008 (before tiger release), $16.3 \pm SE 3.3$ in 2009 and $9.0 \pm SE 1.5$ in 2010 (after tiger release) (Table 1). The estimated population of leopard with other models such as Mh (Chao) and Mo are given in Table 1. For estimation of density of leopard in the study area, half normal detection function fitted the best for both maximum likelihood approach and Bayesian approach. The density of leopard estimated using maximum likelihood approach was 8.0 individual/ 100 km^2 (SE 2.0) in 2008 (before tiger release), 5.7 individual/ 100 km^2 (SE 1.5) in 2009 and 3.3 individual/ 100 km^2 (SE 1.2) in 2010 (after tiger release). The estimated density of leopard following Bayesian approach was 7.4 individual/ 100 km^2

(SE 1.3) in 2008 (before tiger release), 5.2 individual/ 100 km^2 (SE 0.8) in 2009 and 2.3 individual/ 100 km^2 (SE 0.5) in 2010 (after tiger release). Density of leopard calculated with half MMDM model is given in Table 1. It was observed that the density of leopard (using Bayesian approach) declined significantly (Two samples T-Test; $P = 0.0002$) from 2008 to 2010.

Spatial distribution of leopard and tiger in the study area

The capture rate of leopard and tiger per 100 trap nights in each grid was calculated and projected on Sariska grid map through color gradient (Figure 3). It was found that the grids with maximum tiger photo-captures were largely

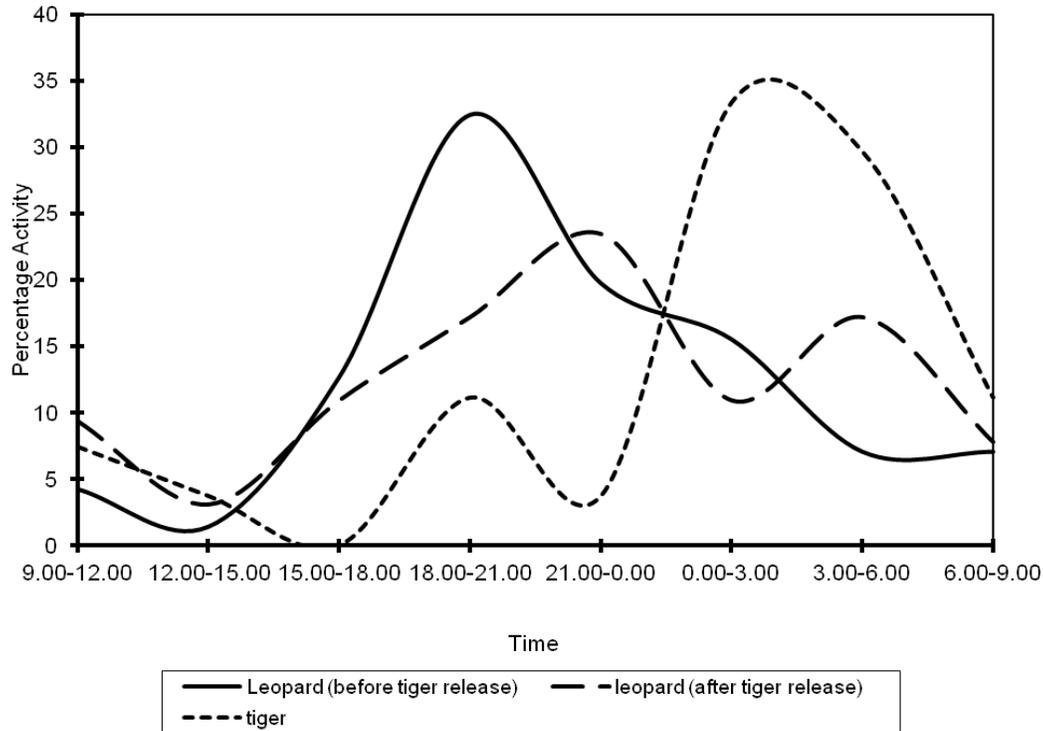


Figure 4. Temporal activity of leopard and tiger in Sariska Tiger Reserve between 2008 and 2010.

Table 2. Activity period of tiger and leopard (before and after tiger release) in Sariska Tiger Reserve between 2008 and 2010.

Variable	Leopard before tiger release	Leopard after tiger release	Tiger
Mean peak activity	20:57 h	22:35 h	03:02 h
Peak activity period	20:19 – 22:53 h	21:02 – 01:25 h	01:15 – 04:37 h
U ² value	0.869 (P<0.005)	0.342 (P<0.005)	0.520 (P<0.005)

avoided by leopard that selected areas where tiger occurrence is less. Site utilization of both the species was estimated with site-wise capture records. Before release of the tiger in 2008, the probability of site utilization of leopard was 0.75 in the study area. But after tiger release the site utilization of leopard and tiger were 0.55 and 0.53 respectively in the absence of either species, while that of both leopard and tiger together was 0.51. The detection probability of leopard was estimated to be 0.36 in the absence of tiger and it was 0.07 when tiger is present. Detection probability of leopard and tiger together was only 0.008 when both the species were utilizing the same area.

Temporal activity pattern of leopard and tiger

Leopard was found to be most active in the evening between 18:00 to 21:00 h before tiger release and it was

shifted to late evening that is, 21:00 to 0:00 h after tiger release (Figure 4). Tiger showed a bimodal activity pattern with a minor and major peak. The major peak of tiger activity was observed after midnight 0:00 to 3:00 h and the minor peak was between 18:00 to 21:00 h. The leopard activity was found very low after midnight between 0:00 to 3:00 h, when tiger was most active. The mean peak activity time of leopard was 20:57 and 22:35 h before and after tiger release respectively (Watson's U² test: P<0.005), while mean peak activity time of tiger was 03:02 h (Table 2).

DISCUSSION

After the extermination of tigers from Sariska in 2004, leopard occupied the entire Sariska National Park area (present study area), which was previously occupied by tigers. Sankar et al. (2009) also recorded comparatively

high density of leopard ($10.7/100 \text{ km}^2$) in the study area before tiger release. The present study showed that there was a significant ($P = 0.0002$) decline in leopard population after the reintroduction of tigers in the study area. In regions of high tiger density, tigers are known to out-compete leopards (McDougal, 1988; Schaller, 1967). Radio-tracking studies on tiger and leopard indicate that leopards avoid areas frequented by tigers and occupy the periphery of parks near human settlements (Seidensticker, 1976). In the present study, photo capture rate of leopard and tiger showed that leopard avoided valley habitats which were frequented by tigers. Leopard largely occupied the peripheral hilly areas which are less frequented by tigers in the study area. In two occasions, re-introduced tigers killed two leopards in the study area due to confrontation between 2009 and 2010. A number of studies reported that, one species may occupy areas that do not overlap with the competitor species' home ranges, or they may use different habitats (Fuller and Keith, 1981; Major and Sherburne, 1987; Voigt and Earle, 1983). Red foxes (*Vulpes vulpes*) have been reported using the periphery of coyote (*Canis latrans*) home ranges or different habitats from coyotes where they occur sympatrically and coyotes have been recorded as using areas between wolf (*Canis lupus*) home ranges (Dekker, 1989; Harrison et al., 1989; Sargeant et al., 1987). European genets (*Genetta genetta*) and Egyptian mongooses (*Herpestes ichneumon*) avoid suitable habitats where densities of Iberian lynx (*Lynx pardinus*) are high (Palomares et al., 1996), as do wild dogs and cheetahs (*Acinonyx jubatus*) where lions are common (Durant, 1998; Mills and Gorman, 1997).

Based on photo capture time, it was found that leopard changed their mean peak activity period from 20:57 h before tiger release to 22:35 h after tiger release. Leopards became more active in the late evening in between two tiger activity peaks, which reflects a temporal segregation between these two sympatric large cats. Temporal segregation is a mechanism that ecologically similar species can use to avoid competition (Kronfeld-Schor and Dayan, 2003; Hayward and Slotow, 2009). Examination of our data suggests that temporal niche segregation may occur between leopard and tiger. One species may adjust its activity patterns to reduce encounters with competitor species (Litvaitis, 1992; Johnson et al., 1996). For example, in Kruger National Park, lions became active mainly at night, wild dogs in early morning, and cheetahs around the middle of the day (Mills and Biggs, 1993). Rudzinski et al. (1982) found that the activity of arctic foxes (*Vulpes lagopus*) decreased when red foxes were present. Nevertheless, clear temporal segregation has been found rarely in studies of resource partitioning between sympatric and potentially interacting carnivores (Litvaitis and Harrison, 1989; Major and Sherburne, 1987; Saleni et al., 2007).

The present study suggested that there is segregation along the spatial and temporal axis between these two

carnivores. The dietary segregations between leopard and tiger were observed in many study sites (Hayward et al., 2006, 2012), but in the present study area, both leopard and tiger utilized and preferred wild prey species (sambar and chital) in similar manner (Mondal et al., 2011; Sankar et al., 2010). Leopard responded to tiger presence in terms of (a) space (detection probability of leopard is 0.36 when tiger is not present and detection probability of leopard is 0.07 when tiger is present; similarly site utilization of leopard reduced from 0.75 to 0.55 after tiger release) and (b) time (peak activity period is shifted from 20:19 to 22:53 h to 21:02 to 01:25 h). The results reflected that there is inter-specific competition between leopards and re-introduced tigers in Sariska. The reintroduction efforts for carnivores should routinely include assessment of the potential effects of inter-specific competition, as Gusset et al. (2008) assessed the effects of re-introduction of wild dogs in South Africa. Inter-specific social dominance can confer the right of first choice in food and space. The tiger, through inter-specific interactions, can reduce the abundance of leopards and in effect substitute ability in utilization of resources (MacArthur, 1972), and thereby secure a wider potential resource base (Schaller, 1967). The leopard, as subordinate, can derive no benefit from inter-specific competition with the tiger. For the leopard to co-exist with the larger cat in many areas of range overlap, it must have the ability to exist within a decreased niche breadth or else shift to areas where the tiger is absent. Selection pressure on the leopard is directed both towards specialization by reducing overlap with the tiger in use of resources and expansion of the fundamental niche in terms of areas and habitats it occupies (Eisenberg and Lokhart, 1972; Schaller, 1972; Seidensticker, 1976). In Kanha Tiger Reserve, leopards were resident only in areas where the tiger was absent. This inter-specific competition can have strong effects on the distribution and abundance of carnivores and should be an important consideration in their conservation. Studies of an ecologically and phylogenetically broad set of carnivore species show that the effects of competition on carnivore populations are sometimes difficult to predict (Creel et al., 2001; Palomares and Caro, 1999). The spatial and temporal factors, which can modify the effect of competition among carnivores, sometimes in ways are counter-intuitive under classical competition theory (Creel et al., 2001). At present, there are only five re-introduced tigers in Sariska TR. With the increase of number of re-introduced tigers, it is expected to get a clear picture of co-existence of tiger and leopard in Sariska TR.

ACKNOWLEDGEMENTS

We thank Rajasthan Forest Department for granting permission to work in Sariska, as part of the 'Ecology of Leopard' project conducted by Wildlife Institute of India

(WII). We thank the Director and Dean, WII for their encouragement and support provided for the study. We also thank our field assistants Jairam, Omi and Ramesh for their assistance in field.

REFERENCES

- Andersen DC, Wilson KR, Miller MS, Falck M (2000). Movement patterns of riparian small mammals during predictable floodplain inundation. *J. Mammalogy*, 81: 1087-1099.
- Brown JH, Maurer BA (1986). Body size, ecological dominance and Cope's rule. *Nature*, 324: 48-50.
- Champion HG, Seth SK (1968). A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi, p. 404.
- Creel S, Creel NM (1996). Limitation of African wild dogs by competition with larger carnivores. *Conserv. Biol.*, 10: 526-538.
- Creel S, Spong G, Creel NM (2001). Interspecific competition and the population biology of extinction-prone carnivores. In press in D. Macdonald, J. Gittleman, S. Funk and R. Wayne, editors. *Conservation of carnivores*. Cambridge University Press, pp 35-60.
- Dekker D (1989). Population fluctuations and spatial relationships among wolves (*Canis lupus*), coyotes (*Canis latrans*), and red foxes (*Vulpes vulpes*) in Jasper National Park, Alberta. *Can. Field-Nat.*, 103: 261-264.
- Donadio E, Buskirk SW (2006). Diet, morphology and interspecific killing in carnivora. *Am. Nat.*, 167: 524-536.
- Durant SM (1998). Competition refuges and coexistence: an example from Serengeti carnivores. *J. Anim. Ecol.*, 67: 370-386.
- Efford MG, Dawson DK, Robbins CS (2004). DENSITY: Software for analysing capture-recapture data from passive detector arrays. *Anim. Biodivers. Conserv.*, 27: 217-228.
- Eisenberg JF, Lockhart M (1972). An ecological reconnaissance of Wilpattu National Park, Ceylon. *Smithsonian Contrib. Zool.*, 101: 1-118.
- Fuller TK, Keith LB (1981). Non-overlapping ranges of coyotes and wolves in northeastern Alberta. *J. Mammal.*, 62: 403-405.
- Ginsberg JR, Alexander KA, Creel SP, Kat W, McNutt JW, Mills MGL (1995). Handling and survivorship of African wild dogs (*Lycaon pictus*) in five ecosystems. *Conserv. Biol.*, 9: 665-674.
- Gorman ML, Mills MGL, Raath JP, Speakman JR (1998). High hunting costs make African wild dogs vulnerable to kleptoparasitism by hyaenas. *Nature*, 391: 479-481.
- Gupta S, Mondal K, Sankar K, Qureshi Q (2009). Record of desert cat (*Felis silvestris ornata*) in Sariska Tiger Reserve, Rajasthan. *Indian Forester*, 135: 10.
- Gusset M, Ryan SJ, Hofmeyr M, Dyk G, Davies-Mostert HT, Graf JA, Owen C, Szykman M, Macdonald DW, Monfort SL, Wildt DE, Maddock AH, Mills MG, Slotow R, Somers MJ (2008). Efforts going to the dogs? Evaluation attempts to re-introduce endangered wild dogs in South Africa. *J. Appl. Ecol.*, 45: 100-108
- Harrison DJ, Bissonette JA, Sherburne JA (1989). Spatial relationships between coyotes and red foxes in eastern Maine., *J. Wildlife Manage.*, 53: 181-185.
- Hayward MW, Hayward GJ (2007). Activity patterns of reintroduced lion *Panthera leo* and spotted hyaena *Crocuta crocuta* in Addo Elephant National Park, South Africa. *Afr. J. Ecol.*, 45: 135-141.
- Hayward MW, Henschel P, O'Brien J, Hofmeyr M, Balme G, Kerley GIH (2006). Prey preferences of the leopard (*Panthera pardus*). *J. Zool.*, 270: 298-313.
- Hayward MW, Jedrzejewski W, Jedrzejewska B (2012). Prey preferences of the tiger *Panthera tigris*. *J. Zool.* In press.
- Hayward MW, Kerley GIH (2008). Prey preferences and dietary overlap amongst Africa's large predators. *South Afr. J. Wildlife. Res.*, 38: 93-108.
- Hayward MW, Slotow R (2009). Temporal partitioning of activity in large African carnivores: Tests of multiple hypotheses. *South Afr. J. Wildlife Res.*, 39: 109-125.
- Hines JE (2006). PRESENCE 4.0- Software to estimate patch occupancy and related parameters. USGS-PWRC. <http://www.mbr-pwrc.usgs.gov/software/presence.html>.
- Johnson WE, Franklin WL (1994). Spatial resource partitioning by sympatric grey fox (*Dusicyon griseus*) and culpeo fox (*Dusicyon culpaeus*) in southern Chile. *Can. J. Zool.*, 72: 1788-1793.
- Johnson WE, Fuller TK, Franklin WL (1996). Sympatry in canids: A review and assessment. Pages 189-218 in J. L. Gittleman, ed. *Carnivore behavior, ecology, and evolution*. Cornell University Press, Ithaca, N.Y.
- Jones ME, Barmuta LA (1998). Diet overlap and relative abundance of sympatric dasyurid carnivores: A hypothesis of competition. *J. Anim. Ecol.*, 67(3): 410-421.
- Karanth KU (1993). Predator-prey relationships among large mammals of Nagarhole National Park, India. PhD Dissertation, Mangalore University, Mangalore, India.
- Karanth KU (1995). Estimating Tiger (*Panthera tigris*) populations from camera trapping data using capture-recapture models. *Biol. Conserv.*, 71: 333-338.
- Karanth KU, Nichols JD (1998). Estimation of tiger densities using Photographic captures and recaptures. *Ecology*, 79(8): 2852-2862.
- Karanth KU, Nichols JD (2002). Monitoring tigers and their prey (Eds.): a manual for researchers, managers and conservationists in tropical Asia. Bangalore: Centre for Wildlife Studies.
- Karanth KU, Sunquist ME (1992). Population structure density and biomass of large herbivores in the tropical forests of Nagarhole, India. *J. Trop. Ecol.*, 8: 21-35.
- Karanth KU, Sunquist ME (1995). Prey selection by tiger, leopard and dhole in tropical forests. *J. Anim. Ecol.*, 64: 439-450.
- Karanth KU, Sunquist ME (2000). Behavioral correlates of predation by tiger (*Panthera tigris*), leopard (*Panthera pardus*) and dhole (*Cuon alpinus*) in Nagarhole, India. *J. Zool.*, London, 250: 255-265.
- Kronfeld-Schor N, Dayan T (2003). Partitioning of time as an ecological resource. *Annu. Rev. Ecol. Syst.*, 34: 153-181.
- Litvaitis JA (1992). Niche relations between coyotes and sympatric Carnivora in A. H. Boer, ed. *Ecology and management of the eastern coyote*. Wildlife Research Unit, University of Brunswick, Canada, pp. 73-86.
- Litvaitis JA, Harrison DJ (1989). Bobcat-coyote niche relationships during a period of coyote population increase. *Canadian. J. Zool.*, 67: 1180-1188.
- MacArthur RH (1972). "Geographical Ecology". Harper and Row. \New York, p. 269.
- Nichols JD, MacKenzie DI, Lachman GB, Droege S, Royle JA, Langtimm CA (2002). Estimating site occupancy rates when detection probabilities are less than one. *Ecology*, 83: 2248-2255.
- MacNally RC (1983). On assessing the significance of interspecific competition to guild structure. *Ecology*, 64: 1646-1652.
- Major JT, Sherburne JA (1987). Interspecific relationships of coyote, bobcats, and red foxes in western Maine. *J. Wildlife. Manage.*, 51: 606-616.
- McDougal C (1988). Leopard and tiger interactions at Royal Chitwan National Park, Nepal. *J. Bomb. Nat. Hist. Soc.*, 85: 609-611.
- Mills MGL, Biggs HC (1993). Prey apportionment and related ecological relationships between large carnivores in Kruger National Park. *Symp. Zool. Soc. London.*, 65: 253-268.
- Mills MGL, Gorman ML (1997). Factors affecting the density and distribution of wild dogs in the Kruger National Park. *Conserv. Biol.*, 11: 1397-1406.
- Mondal K, Gupta S, Qureshi Q, Sankar K (2011). Prey selection and food habits of leopard (*Panthera pardus fusca*) in Sariska Tiger Reserve, Rajasthan, India. *Mammalia*, 75(2011): 201-205.
- Odden M, Wegge P, Fredriksen T (2010). Do tigers displace leopards? If so, Why? *Ecol. Res.*, 25: 875-881.
- Otis DL, Burnham KP, White GC, Anderson DR (1978). Statistical interference from capture data on closed animal populations. *Wildlife Monogram*, 62: 135.
- Palomares F, Caro TM (1999). Interspecific killing among mammalian carnivores. *The American Naturalist.*, 153: 492-508.
- Palomares F, Ferreras P, Fedriani JM, Delibes M (1996). Spatial relationships between Iberian lynx and other carnivores in an area of south-western Spain. *J. Appl. Ecol.*, 33: 5-13.
- Petren K, Case TJ (1998). Habitat structure determines competition intensity and invasion success in gecko lizards. *PNAS*, 95: 11739-

- 11744.
- Polis GA, Myers CA, Holt RD (1989). The ecology and evolution of intraguild predation: Potential competitors that eat each other. *Annu. Rev. Ecol. Syst.*, 20: 297–330
- Rexstad EA, Burnham KP (1991). User's guide for interactive program CAPTURE. Colorado Cooperative Wildlife Research Unit, Colorado State University, Fort Collins Co., p. 29.
- Rodgers WA, Panwar HS (1988). Planning a Wildlife Protected Area Network in India (Vol I and II) Wildlife Institute of India, Dehra Dun.
- Rudzinski DR, Graves HB, Sargeant AB, Storm GL (1982). Behavioral interactions of penned red and arctic foxes. *J. Wildlife. Manage.*, 46: 877–884.
- Saleni P, Gusset M, Graf JA, Szykman M, Walters M, Somers MJ (2007). Refuges in time: temporal avoidance of interference competition in endangered wild dogs *Lycaon pictus*. *Canid News*, 10: 2.
- Sankar K, Qureshi Q, Mondal K, Worah D, Srivastava T, Gupta S, Basu S (2009). Ecological studies in Sariska Tiger Reserve, Rajasthan. Final Report. Wildlife Institute of India, Dehra Dun, p. 145.
- Sankar K, Qureshi Q, Nigam P, Malik PK, Sinha PR, Mehrotra RN, Gopal R, Bhattacharjee S, Mondal K, Gupta S (2010). Monitoring of reintroduced tigers in Sariska Tiger Reserve, Western India: Preliminary findings on home range, prey selection and food habits. *J. Trop. Conserv. Sci.*, 3(3): 301-318
- Sargeant AB, Allen SH, Hastings JO (1987). Spatial relations between sympatric coyotes and red foxes in North Dakota. *J. Wildlife. Manage.*, 51: 285–293.
- Schaller GB (1967). The deer and the tiger: A study of wildlife in India. Chicago, IL, University of Chicago Press, p. 370.
- Schaller GB (1972). The Serengeti lion. University Chicago Press, Chicago.
- Seidensticker JC (1976). On the ecological separation between tigers and leopards. *Biotropica* 8: 225-234.
- Sankar RK, Jhala YV, Qureshi Q, Vattakavan J, Gopal R, Nayak K (2009). Evaluating capture-recapture population and density estimation of tigers in a population with known parameters. *Animal Conservation*.
- Singh P, Gopaldaswamy AM, Royle AJ, Kumar NS, Karanth KU (2010). SPACECAP: A program to estimate animal abundance and density using Bayesian spatially explicit capture-recapture models. Version 1.0. Wildlife Conservation Society - India Program, Centre for Wildlife Studies, Bangalore, India, p. 12.
- Voigt DR, Earle BD (1983). Avoidance of coyotes by red fox families. *J. Wildlife, Manage.*, 47: 852–857.
- Vucetich JA, Creel S (1999). Ecological interactions, social organization and extinction risk in African wild dogs. *Conserv. Biol.*, 13: 1172-1182.
- Woodroffe R, Ginsberg JG (2005) King of the beasts? Evidence for guild redundancy among large mammalian carnivores. In: Ray J, Berger J, Redford KH, Steneck R (eds) Large carnivores and biodiversity: Does saving one conserve the other? Island Press, New York. pp. 154–176.

J. Bombay Nat. Hist. Soc. Vol. 105(3), December 2008

PREY SELECTION BY TIGERS (*PANTHERA TIGRIS TIGRIS*) IN SARISKA TIGER RESERVE
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PREY SELECTION BY TIGERS (*PANTHERA TIGRIS TIGRIS*)
IN SARISKA TIGER RESERVE, RAJASTHAN, INDIA

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Prey selection by tigers (*Panthera tigris tigris*) was studied in Sariska Tiger Reserve, Rajasthan, India, from November 2002 to April 2003. The line transect method was used for estimating prey availability and prey selection was determined from scats. Sariska was observed to have a high wild ungulate density of 42.8 animals/sq. km. Chital (*Axis axis*) was the most common ungulate species (27.6/sq. km) followed by Sambar (*Cervus unicolor*) (8.4/sq. km) and Nilgai (*Boelaphus tragocamelus*) (5.2/sq. km). Seventy-seven tiger scats were collected and analyzed for prey remains. Scat analysis revealed that Sambar constituted the major prey species in terms of number and biomass. It was the principal and preferred prey ($P < 0.05$) of tigers. Other medium to large sized prey species, including domestic livestock, contributed significantly to the tiger diet. The order of selection on the basis of prey occurrence in scats was sambar>chital>nilgai>cattle>buffalo>common langur>wild pig. It was evident that tigers were heavily dependent on sambar in greater proportion to their availability. This study provides food habits of now extinct tiger population. Two tigresses and a tiger were recently reintroduced from Ranthambhore to revive the population.

Key words: Food habits, prey selection, tiger, *Panthera tigris*, line transect, scat analysis, ungulate density

INTRODUCTION

The Tiger (*Panthera tigris* Linnaeus) occurs in a large variety of habitats showing remarkable tolerance to variation in altitude, temperature and rainfall regimes (Sunquist *et al.* 1999). There has been a drastic reduction in the distribution of the tiger in the last 100 years resulting in the extinction of three subspecies (Caspian, Javan and Bali) and massive reduction in numbers of the rest (Seidensticker 1986, 1987, 1997; Sunquist *et al.* 1999; Qureshi *et al.* 2006; Jhala *et al.* 2008). The depletion of prey populations, habitat fragmentation, disturbance and poaching are the major factors responsible for the decline of tigers in the wild (Karanth 1991; Chapron *et al.* 2008).

The tiger is the largest obligate terrestrial carnivore in any of the mammalian assemblages in which it occurs and preys on the larger ungulates living in those assemblages (Seidensticker 1997). Despite their potential to hunt a wide variety of prey animals, ranging from small mammals to large bovids, the mean weight of species hunted is around 60 kg (Biswas and Sankar 2002). This is obtained predominantly from cervids, which constitute up to 75% of the prey biomass requirement in most parts of the range (Sunquist *et al.* 1999; Biswas and Sankar 2002; Bagchi *et al.* 2003). Food habits comprise one of the major determinants of various life history patterns including spacing pattern, movement, habitat selection, social structure, success of reproduction and geographical distribution (Krebs 1978; Beckoff *et al.* 1984; Sunquist and Sunquist 1989). The factors affecting prey

choice are a result of a complex interplay of various ecological parameters, which vary at the extremes of distribution of the same species (Sunquist and Sunquist 1989). Carbone and Gittleman (2002) estimated 10,000 kg/100 sq. km would support 0.33 tigers/100 sq. km. The effective size of the territory is a function of density and biomass of larger prey species in its habitat (Sunquist 1981; Karanth 1991). This makes the species vulnerable to changes in the habitat and prey abundance (Karanth 1991).

STUDY AREA

The study was conducted in Sariska Tiger Reserve (Sariska TR) (25° 5'-27' 33" N; 74° 17'-76' 34" E), Rajasthan. The total area of the Tiger Reserve is 800 sq. km, of which 302.2 sq. km is a buffer zone and 497.8 sq. km is the core zone. Sariska National Park of 273.8 sq. km was notified in 1982. The intensive study area was 45 sq. km situated in core zone I. The terrain is undulating to hilly in nature and has numerous narrow valleys and two large plateaux, Kiraska (592 m above mean sea level) and Kankwari (524 m above mean sea level).

The climate of this tract is subtropical, characterised by a distinct summer, monsoon, post monsoon and winter. Summer commences from mid-March and continues till the end of June (max temperature recorded was 44 °C in March (Sankar 1994)). The monsoon extends from June to September with the annual average rainfall ranging from 60 to 70 cm. In winter the temperature has been observed to drop to 3 °C

(Sankar 1994). The vegetation of the region falls under Northern Tropical Dry Deciduous Forest (subgroups 5 B: 5/E1 and 5/E2) and Northern Tropical Thorn Forest (sub group 6 B) (Champion and Seth 1968).

Prey species of tigers in the area include Chital (*Axis axis* Erxleben), Sambar (*Cervus unicolor* Kerr), Nilgai (*Boselaphus tragocamelus* Pallas), Common Langur (*Presbytis entellus* Dufresne), Indian Wild Boar (*Sus scrofa* Linnaeus), Four-horned Antelope or Chowsingha (*Tetracerus quadricornis* Blainville), Chinkara (*Gazella bennetti* Sykes), Rhesus Macaque (*Macaca mulata* Zimmermann), Indian Porcupine (*Hystrix indica* Kerr), Rufous-tailed Hare (*Lepus nigricollis ruficaudatus* Geoffrey), and Indian Peafowl (*Pavo cristatus* Linnaeus). The predominant domestic livestock found inside the reserve are buffaloes (*Bubalis bubalis* Linnaeus), Brahminy cattle (*Bos indicus* Linnaeus) and goats (*Capra hircus* Linnaeus).

METHODS

Estimation of prey availability

The variable distance line transect method was used to estimate prey density in the study area (Burnham *et al.* 1980; Buckland *et al.* 1993). This method has been extensively used to determine animal densities in similar habitats (Sunquist 1981; Karanth and Sunquist 1995; Varman and Sukumar 1995; Chundawat *et al.* 1999; Biswas and Sankar 2002; Sankar and Johnsingh 2002; Bagchi *et al.* 2003; Karanth *et al.* 2004). Twelve transects were laid in the study area in a random manner. The lengths of each transect varying from 2 km to 2.4 km. All transects (24.8 km) were walked seven times during the course of the study period totalling to 173.6 km. Transects were walked early in the morning in the first three hours after sunrise when the animals are said to be most active (Schaller 1967). For each cluster of prey animals encountered on transects, the following variables were noted: (1) time (2) species (3) cluster size (4) radial distance (Using *Yardage Pro 400* Rangefinder) (5) sex and age (6) sighting angle.

The density of all prey species was calculated using the program Distance (Thomas *et al.* 2005). The analysis involved fitting of different detection functions to the observed data for estimation of densities. The best model was selected on the basis of the lowest Akaike Information Criteria (AIC) values (Burnham *et al.* 1980; Buckland *et al.* 1993).

Reconstruction of tiger diet

Hairs from the scats were observed for prey identification, because they pass undigested through the gut and can be used for species identification (Sunquist 1981;

Mukherjee *et al.* 1994a,b; Karanth and Sunquist 1995). Scat analysis was used to estimate the proportion of different prey species consumed by tiger, since it is non-invasive, cost and time effective (Schaller 1967; Sunquist 1981; Johnsingh 1983; Johnsingh *et al.* 1993; Karanth and Sunquist 1995). Tiger scats were collected wherever encountered in the intensive study area. They were distinguished from leopard scats by the size of the scat and associated pugmarks as described by Sunquist (1981), Karanth and Sunquist (1995), and Biswas and Sankar (2002). Scats were washed in water, and held over a sieve. The washed hairs were sun dried and kept in zip lock bags for further analysis.

Prey species in the scats were identified based on the variables described by Mukherjee *et al.* (1994b). Sample slides were compared with reference slides available in the laboratory of the Wildlife Institute of India, Dehradun.

Estimation of biomass and number of prey

The biomass and number of individuals of the prey consumed by tiger was estimated using Ackerman's equation (Ackerman *et al.* 1984; Karanth and Sunquist 1995; Biswas and Sankar 2002; Sankar and Johnsingh 2002; Bagchi *et al.* 2003).

$Y = 1.980 + 0.035X$, where X = average weight of a particular prey type and Y = kg of prey consumed per field collectible scat (Ackerman *et al.* 1984).

The assumption for extrapolation of the above equation is that the tigers and cougars (*Felis concolor concolor* Linnaeus) have similar utilization and digestibility (Karanth and Sunquist 1995). We also presume that the scats containing various prey items have similar decay rate and their detection is equally probable.

Estimation of prey selectivity

Prey selectivity by tigers was estimated for each species by comparing the proportion of prey species recovered from scats with the expected number of scats in the environment for each of the prey species consumed. Frequencies of the identifiable prey remains in the scat do not tell us about the actual proportion of prey type eaten. This is more so when the prey types vary in size to a considerable degree. Smaller prey species have more undigested material (i.e., hair) due to higher body surface to mass ratio. Hence, intake of smaller body sized prey induces relatively more amount of scat production per unit mass of prey consumed leading to an over estimation of smaller prey species in the diet studies of carnivores (Floyd *et al.* 1978; Ackerman *et al.* 1984). The average weight of prey species of the tiger required for biomass estimation was taken from Karanth and Sunquist

Table 1: Individual and group densities of major Tiger prey species estimated using line transect method in Sariska Tiger Reserve, Rajasthan, November 2002 to April 2003

Species	Model	No. of Groups	Density	SE	Group Density	SE	ESW	SE	Encounter rate/km	SE
Chital	Uniform Cosine	99	27.62	7.83	5.62	0.52	51.46	4.61	0.57	0.11
Livestock	Half Normal Cosine	45	6.47	3.35	1.40	0.78	93.52	8.77	0.26	0.19
Langur	Uniform Cosine	40	14.13	4.86	6.63	1.18	54.91	2.61	0.23	0.06
Nilgai	Uniform Cosine	63	5.19	1.26	1.88	0.24	66.64	3.72	0.36	0.07
Peafowl	Half-Normal Cosine	181	20.81	6.46	1.90	0.09	47.93	3.54	1.04	0.31
Wild Pig	Half Normal Cosine	14	1.64	0.80	0.60	0.19	67.74	0.51	0.87	0.02
Sambar	Half Normal Cosine	7	8.44	2.53	2.28	0.26	40.01	5.08	0.33	0.08

Density : Individual density

SE : Standard Error

Group Density : Mean group density of each species encountered during the transect walks

ESW : Effective Strip Width

Encounter rate : Number of animals encountered per kilometer of transect walk. Total transect length walked 173.6 km.

(1995), Khan *et al.* 1996, Sankar and Johnsingh (2002).

Prey selectivity by tigers was estimated for each prey species by comparing their availability and utilization data. The expected proportion of scats in the environment (i.e., availability) was calculated using the following equation (Karanth and Sunquist 1995):

$$f_i = \left[\frac{d_i}{\sum d_i} \right] \lambda_i \left[\frac{d_i}{\sum d_i} \right] \lambda_i$$

where f_i = expected scat proportion in the environment, d_i = density of i th species, $\sum d_i$ = sum of density of all species, $\lambda_i = X/Y$ the average number of collectible scats produced by tiger from an individual of i th prey species, X = average body weight of the species and $Y = 1.980 + 0.035X$.

Multinomial likelihood ratio test was used to evaluate prey selection of tigers in the study area (Manly *et al.* 1972; Chesson 1978; Reynolds and Aebischer 1991; Link and Karanth 1994; Karanth and Sunquist 1995). The exact variability of prey items in scats is not known and in order to account for it sensitivity analysis was done by changing coefficient of variance from 10 to 40% (Link and Karanth 1994). Program Scatman (Hines 1999) was used to do multinomial test and sensitivity analysis by bootstrapping data 5,000 times. Sample size needed to construct tiger diet was estimated by bootstrapping prey presence data in scats using program Simstaf 2.0 (Provalis Research). The variance in data significantly reduced after 60 scats suggesting that the sample size collected was adequate to reconstruct tiger diet.

RESULTS

Availability of prey species

The uniform key model fitted for density estimation of chital, common langur and nilgai. Half normal cosine was the best-fitted model for sambar, wild pig, cattle, buffalo, and peafowl (Table 1). All density estimates were done after 1% truncation of the farthest sighting data from the line

transect. The highest density was of chital 27.62, followed by peafowl 20.81, common langur 14.13, sambar 8.44, livestock 6.47, nilgai 5.19 and wild pig 1.64 (Table 1). Amongst wild prey cervids contribute maximum biomass of which chital contribute maximum (1,243 kg/sq. km) followed by sambar (Table 2).

Composition of tiger diet

Altogether 87 prey items were found in 77 tiger scats collected from the study area (Table 3). The analysis of 77 tiger scats revealed the presence of seven prey species with a high preponderance of medium to large sized ungulates in the tiger's diet (Table 3). Eighty-seven per cent of tiger scat contained single prey species and 13% contained two prey species. The wild prey species in tiger scats constituted 83.9% and remaining 16.1% by domestic livestock (cattle and buffalo). Of the wild prey species sambar constituted 48.2% followed by chital (18.1%), nilgai (14.5%), common langur (4.8%) and wild pig (1.2%). Cattle and buffalo constituted 11.5% and 5.7% of the remains encountered in the tiger scats.

The wild prey base in total contributed 74.5% in terms of relative biomass of prey consumed by tiger (Table 3), of which cervids contributed 73.9% of the total biomass, and livestock (buffalo and cattle) contributed 25.5% (Table 2). Sambar contributed 254.2 kg biomass to the diet of tiger followed by nilgai (99.36 kg), cattle (82.8 kg), buffalo (57.67 kg), chital (53.32 kg), common langur (9.04 kg) and wild pig (3.31 kg) (Table 3).

Estimation of prey selectivity

Sambar was consumed by tiger more than expected on basis of the availability of individuals and groups (Tables 4a,b and 5). Chital utilization was proportionally less than available group and individual density. Common Langur

PREY SELECTION BY TIGERS IN SARISKA TIGER RESERVE

Table 2: Frequency of occurrence of food items in 77 Tiger scats and contribution of different prey species in terms of biomass to the Tiger diet in Sariska Tiger Reserve (November 2002 to April 2003)

Prey species	Average Body weight (X)	Prey species remains (F=87)	Percent occurrence of prey species (n = 77)	Relative occurrence (R) in %	Number of collectible scats produced per kill (Y)	Prey biomass consumed B = F*Y	Percentage relative biomass of prey contribution (P = F*R in %)
Chital	45	15	19.48	17.24	3.55	53.32	9.52
Sambar	125	40	51.85	45.67	6.35	254.2	45.41
Nilgai	180	12	15.58	13.79	8.26	99.36	17.75
Wild Pig	38	1	1.3	1.14	3.31	3.31	1.59
Domestic Buffalo	273	5	6.49	5.74	11.53	57.67	10.03
Domestic Cattle	180	10	12.99	11.49	8.26	82.8	14.79
Common Langur	8	4	5.19	4.59	2.26	9.04	1.61
						559.71	

X = Average body weight of an individual prey type in kg

Y (kg of prey consumed per field collectible scat) = 1.980+0.035 X (Ackerman *et al.* 1984)

and Wild Pig were used in proportion to their available individual density and in less proportion to their group density (Tables 4a,b and 5). Nilgai was utilized in proportion to their available individual and group density (Tables 4a,b and 5). Based on the index of selection at individual level the prey species used by tiger were ranked as sambar > nilgai > wild pig > cattle and buffalo > common langur > chital. Ranking on the basis of group density was in the following order: sambar > cattle and buffalo > nilgai > chital > wild pig > common langur. The order of selection on the basis of prey occurrence in scats was sambar > chital > nilgai > cattle-buffalo > common langur > wild pig.

DISCUSSION

Availability of prey species

Chital were the most abundant wild ungulate species in Sariska study area. However, the crude density estimates for Chital in Sariska were less than other protected areas in

India; Pench (Biswas and Sankar 2002), Kanha, Nagarhole (Karanth and Nichols 1998), Gir (Khan *et al.* 1996) and Bandipur (Johnsingh 1983). Chital was also the least widespread of the three large wild ungulates found in the study area. Chital had a clumped distribution pattern, largely encountered in the valleys interspersed between the hills and in areas in the plains, which had a tall vegetation cover with least disturbance.

Sambar density in the study area (8.44 animals/sq. km) was higher than the density figures obtained for Kanha, Nagarhole (Karanth and Nichols 1998), Mudumalai (Varma and Sukumar 1995), Chitwan (Seidensticker 1976). Sambar densities in Sariska can be compared with protected areas like Pench (Biswas and Sankar 2002) and Bandipur (Johnsingh 1983). Sambar is predominantly a browser and has evolved in forest environment (Eisenberg and Lockhart 1972). Its abundance in any particular area probably is limited by the dispersion of browse species in the forest, the phenophase of browse species and water availability (Sankar

Table 3: The estimated biomass of prey species in Sariska Tiger Reserve (November 2002 to April 2003)

Species	Density/sq. km	Confidence Interval		Avg. Body weight (kg)	Mean Biomass sq. km (kg)	Confidence Interval	
		Lower	Upper			Lower	Upper
Chital	27.62	19.98	35.25	45	1,242.9	899.23	1,586.56
Livestock	06.47	03.11	09.82	217	1,403.99	675.73	2,132.24
Common Langur	14.13	08.26	18.99	8	113.04	74.09	151.58
Nilgai	05.19	03.92	06.45	180	934.2	706.68	1,161.72
Peafowl	20.81	14.34	27.27	4.2	87.40	60.26	114.53
Wild Pig	17.52	16.91	18.12	38	665.76	642.69	688.82
Sambar	06.44	05.90	10.97	125	1,055	738.62	1,371.37
Total (kg)					6,503.37	3,797.33	7,297.25

Table 4a: Preference of prey species by tiger in Sariska Tiger Reserve based on availability of individuals and utilization based on scat data (November 2002 to April 2003)

Species	Chi-square value	Un-adjusted P-value	Adjusted P-value 10% CV	Adjusted P-value 20% CV	Adjusted P-value 30% CV	Adjusted P-value 40% CV	Iviev's index
Chital	11.18	0.001	0.00	0.00	0.00	0.03	-0.34
Sambar	54.82	0	0	0	0	0	0.48
Cattle & Buffalo	05.75	0.01	0.03	0.03	0.03	0.04	-0.27
Common Langur	01.00	0.31	0.32	0.32	0.32	0.33	-0.32
Nilgai	00.32	0.56	0.57	0.57	0.58	0.58	0.08
Wild Pig	00.16	0.68	0.68	0.68	0.68	0.68	-0.19

1994; Biswas 1999). Of the two cervids, sambar was the most widely distributed in the study area. This may be attributed to the fact that a large portion of the terrain is hilly in the study area that was relatively undisturbed.

Nilgai density in the study area was observed to be 5.2 animals/sq. km, which is comparable to the Royal Bardia National Park (RBNP) (Dinerstein 1980). It is higher than the nilgai densities recorded in Pench (Biswas and Sankar 2002) and Gir (Khan *et al.* 1996). Nilgai was observed to be widely distributed across the entire study area. However, their occurrence was recorded more in the plains than in the hills. This could be attributed to their higher tolerance of anthropogenic pressure than the cervids. The nilgai's wide dispersal in Sariska TR was attributed to its tolerance of disturbance (Sankar and Johnsingh 2002).

The observed density for wild pigs (1.64 animals/sq. km) was lower than recorded densities in other studies – Pench: 2.6 animals/sq. km (Biswas and Sankar 2002), Nagarhole: 3.3 animals/sq. km (Karanth and Sunquist 1995), Bandipur: 2.5 animals/sq. km (Johnsingh 1983), Royal Bardia National Park: 4.2 animals/sq. km (Dinerstein 1980) and Chitwan: 5.8 animals/sq. km (Seidensticker 1976) (Table 5). Though Chowsingha was not encountered during transect walks, their pellet groups were recorded along transects. This showed the presence of chowsingha in the study area. Sankar

(1994) reported low occurrence of chowsingha in Sariska. Common Langur density in the study area was observed to be 14.1 animals/sq. km. It was observed to be very low compared to the density recorded in Pench, which was 77.2 animals/sq. km (Biswas and Sankar 2002).

Domestic cattle and buffalo were distributed largely in the plains, their combined density was 6.47 individuals/sq. km. Buffaloes and goats were accompanied by villagers in the forest, whereas the cattle were left unattended.

Prey Selection by tigers

Sambar were observed to be the principal prey species for tigers as inferred from the percentage occurrence of prey remains in scats (Table 3). Sambar also contributed to the highest biomass of prey consumed by the tiger. Sambar was selected in greater proportion than its available group and individual densities.

Of the prey remains encountered in scats, sambar constituted the maximum amounting to 46% of the total. This is high compared to the frequency observed in Pench – 13.8%, (Biswas and Sankar 2002), Kanha – 10.4% (Schaller 1967) and Nagarhole – 34.9% (Karanth and Sunquist 1995) (Table 6). Sambar ranked first in terms of frequency of occurrence in scats, which is not observed in all previous studies (Table 6). Chital constituted 17.2% of the total prey

Table 4b: Preference of prey species by tiger in Sariska Tiger Reserve based on availability of groups and utilization based on scat data (November 2002 to April 2003)

Species	Chi-square value	Un-adjusted P-value	Adjusted P-value 10% CV	Adjusted P-value 20% CV	Adjusted P-value 30% CV	Adjusted P-value 40% CV	Iviev's index
Chital	05.31	0.02	0.03	0.03	0.03	0.03	-0.25
Sambar	34.17	0.001	0.001	0.001	0.001	0.001	0.38
Cattle & Buffalo	00.06	0.79	0.82	0.82	0.82	0.82	0.03
Common Langur	05.68	0.01	0.01	0.02	0.02	0.02	-0.82
Nilgai	01.68	0.19	0.21	0.22	0.23	0.25	-0.17
Wild Pig	00.96	0.03	0.33	0.33	0.33	0.33	-0.43

PREY SELECTION BY TIGERS IN SARISKA TIGER RESERVE

Table 5: Densities of ungulate species from different areas in south Asia

Species	PNP	RAN	KNH	NGH	BDP	MML	RBNP	CTW	STR
Chital	60.75	31.05	49.7	38.1	43	25.03	29.7	17.3	27.82
Sambar	6.00	17.15	1.5	4.2	8-9	6.61		2.9	8.44
Wild Pig	2.59	9.77	2.5	3.9	2.5		4.2	5.8	17.52
Gaur	0.34			4.5	0.5	14.38			
Nilgai	0.43	11.36					5.0		5.19
Chowsingha	0.29								
Muntjac			0.6	6.0	1		1.7	8.7	
Chinkara		5.2							
Barasingha			3.0						

PNP (Pench National Park) - Biswas & Sankar (2002); RAN (Ranthambhore) - Bagchi *et al.* (2003); KNH (Kanha) & NGH (Nagarhole) - Karanth & Nichols (1998); BDP (Bandipur) - Johnsingh (1983); MML (Mudumalai) - Varman & Sukumar (1995); RBNP (Bardia) - Dinerstein (1980); CTW (Chitwan) - Seidensticker (1976); STR (Sariska) Present study 2002

remains in tiger scat in Sariska, which is less than that was observed in other studies – Pench 53%, (Biswas and Sankar 2002), Kanha 52.2% (Schaller 1967), Nagarhole 31.2% (Karanth and Sunquist 1995) and Bandipur 39% (Johnsingh 1983) (Table 6).

Nilgai remains were observed in 13.7% of the scats. This is higher than the percentage observed for all other areas mentioned above. Sankar and Johnsingh (2002) reported the occurrence of remains of rodents, insectivore, chowsingha, peafowl (*Pavo cristatus*) and Grey Francolin (*Francolinus pondicerianus*) in tiger scats in Sariska. However, during the present study the remains of these species were not

observed. Remains of domestic cattle was recorded in the present study, but not reported earlier (Sankar and Johnsingh 2002).

The preference for sambar could be attributed to the larger body weight and wide distribution of sambar across the study area thereby the higher frequency of encounter. The tiger distribution range also coincided with the good sambar habitat in the reserve. Nilgai were selected in proportion to their available individual density and were second in terms of biomass contribution to the tiger diet. Chital were selected in less proportion to their available individual and group density, and were fifth in terms of biomass

Table 6: Frequency of occurrence of major prey species in Tiger (*Panthera tigris tigris*) scats from different areas of the Indian subcontinent

Species	Sariska	Kanha	Bandipur	Nagarhole	Chitwan-1	Chitwan-2	Bardia	Pench	Sariska-1	Ranthambhore
Chital	17.24	52.2	39	31.2	33.3	61.8 ^a	77.7	53.01	33.19	45.67
Sambar	45.97	10.4	30.5	34.9	29.3	20		13.78	31.51	36.86
Muntjac				6.1	4.1			5.34		
Barasingha		8.6					1.4			
Hog Deer					15.4		7.7			
Wild Pig	1.1	0.8 ^b	5.5	9.4	10.6	3.6	8.8	8.88		2.89
Gaur		8.3	5.5	17.4						
Nilgai	13.78						1.9		1.26	3.27
Chowsingha								2.67	2.1	
Chinkara										0.58
Common Langur	4.59	6.2		3.9	5.7	3.6	2.3	3.65	10.08	4.86
Cow	11.49	5.9	5.5 ^c			1.8 ^c		4.34		2.89
Buffalo	5.7	1.7						2	1.26	2.6
Others	0	6.1	14	7.1	1.6	9	5.2	6.33	20.58	

a: includes percent occurrence of Chital, Hog Deer and Muntjac

b: Both domestic and Wild Pigs

c: Domestic livestock as a whole

Kanha - Schaller (1967); Bandipur - Johnsingh (1983); Nagarhole - Karanth & Sunquist (1995); Chitwan-1 - McDougal (1977); Chitwan-2 - Sunquist (1981); Bardia - Stoen & Wegge (1996); Pench - Biswas & Sankar (2002); Sariska-1 - Sankar & Johnsingh (2002); Ranthambhore - Bagchi *et al.* (2003)

contribution to the tiger diet. Chital were the least widespread of the three ungulates and their distribution was clumped thereby reducing the frequency of encounter.

Different factors like abundance of the prey species, temporal and spatial distribution, size, defences, and anti-predator tactics determine the predator choice (Sunquist and Sunquist 1989). For tigers in the Indian subcontinent, sambar and chital constituted the main prey base wherever they occur in considerable numbers (Schaller 1967; Tamang 1979; Sunquist 1981; Johnsingh 1983; Johnsingh *et al.* 1993; Stoen 1994; Karanth and Sunquist 1995). Other common prey species of tiger are wild pig, gaur and nilgai (Biswas and Sankar 2002; Sankar and Johnsingh 2002).

Mammalian carnivores are characterized by classic relationship with their prey. It seems that carnivores are closely tied not only to prey size, but also to prey biomass (Karanth and Nichols 1998; Carbone and Gittleman 2002; Karanth *et al.* 2004). Carbone and Gittleman (2002) suggested that 10,000 kg of prey support about 90 kg of a given species of carnivore irrespective of body mass and that the ratio of carnivore number to prey productivity scales to carnivore mass near -0.75, and that the scaling rule can predict population density across more than three order of the magnitude. Prey density is critical to maintenance of a large carnivore population. Habitat loss, poaching and prey loss are most critical factors determining tiger population (Cardillo *et al.* 2004; Chapron *et al.* 2008). Looking at the current socio-political scenario it is important to maintain core-breeding areas for tigers at landscape level. In any given Protected Area it is important to maintain mini-cores as a source area for tiger and its prey. In Sariska Tiger Reserve, the Sariska-Kalighati - Pandupole valley (c. 80 sq. km) is the only area that can be considered as mini-core. As the rest of the Park area is disturbed due to the anthropogenic pressure, having

very low wild ungulate density, and hence it can support only a few tigers (Johnsingh *et al.* 1997).

Wikramanayake *et al.* (1999) classified the Sariska Tiger Reserve as Tiger Conservation Unit 3 (TCU 3) among the dry deciduous habitat types. The long-term survival of tigers in such units is threatened due to various anthropogenic factors. These areas require active interference to prevent the extinction of tigers. In the study area, evidences of tiger (tracks, signs, scats) were recorded only from the hilly tracts, which is relatively undisturbed. This forms a very small area (c. 80 sq. km) of the Core Zone I and corresponds to the area where there is a high wild cervid density (Sankar 1994; Sankar and Johnsingh 2002). The reported total tiger population in the entire Tiger Reserve was 26 (Anon. 2002), a gross over estimate. The maximum of 15 tigers would have been supported by prey density, based on the equation of Karanth *et al.* (2004). Tiger population got extinct in 2004 due to poaching, but proximate causes were isolation, habitat degradation and loss of prey from a large area.

Denial of poaching, long history of passive management, inaction, carnivore-people conflict, lack of interest and organized poaching were the reasons of extinction of tiger. If we forget these and fail to respond in appropriate time, there might be many more extinctions. It is now extremely important to relocate villages with appropriate package to make available the meaningful area to sustain demographically viable tiger population. There are 12 villages located in the proposed national park of the tiger reserve and are due for relocation (Sankar 1994; Johnsingh *et al.* 1997). In 2006-07, Bhagani village was relocated; rest are in process of relocation. This will make available 120 sq. km of intact forest (Sankar 1994; Johnsingh *et al.* 1997). Two tigrises and a tiger were reintroduced in 2007-2008 from Ranthambhore.

REFERENCES

- ACKERMAN, B.B., F.G. LINDSEY & T.P. HERRNER (1984): Cougar food habits in Southern Utah. *J. Wildl. Manage.* 48: 147-155.
- ANON (2002): Census report of wild animals in Sariska Tiger Reserve. Unpublished. Office of the Field Director, Sariska Tiger Reserve, Rajasthan.
- BALCH, S., S.P. GOYAL & K. SANKAR (2003): Prey abundance and prey selection by tigers (*Panthera tigris*) in a semi-arid, dry deciduous forest in western India. *J. Zoology London*, 260: 285-290.
- BECKOFF, M., T.J. DANIELS & J.L. GRITTEMAN (1984): Life history patterns and the comparative social ecology of carnivores. *Ann. Rev. Ecol. Syst.* 15: 191-232.
- BISWAS, S. (1999): Food habits of Tiger (*Panthera tigris tigris*) in Pench National Park, Madhya Pradesh. M.Sc. thesis, Saugarrastra University, Rajkot. 61 pp.
- BISWAS, S. & K. SANKAR (2002): Prey abundance and food habits of tigers (*Panthera tigris tigris*) in Pench National Park, Madhya Pradesh, India. *J. Zoology London*, 256: 411-420.
- BUCKLAND, S.T., D.R. ANDERSON, K.P. BURSHAM & J.L. LAKE (1993): Distance Sampling: Estimating abundance of biological populations. Chapman and Hall, London. 446 pp.
- BURSHAM, K.P., D.R. ANDERSON & J.L. LAKE (1980): Estimation of density from line transect sampling of biological populations. *Wildlife Monograph* 72: 1-202.
- CARBONE, C. & J.M.C. GITTLEMAN (2002): A COGNITIVE rule for the scaling of carnivore density. *Science* 295: 2273-2276.
- CARRIJO, M., A. PAVIK, S. CHITRY, W. J.L. GITTLEMAN, J. BIELEY & G.M. MACE (2004): Human Population Density and Extinction Risk in the World's Carnivores. *PLoS Biol.* 2: 909-912.
- CHAMPSON, H.G. & S.K. SIMS (1968): The Forest Types of India. Delhi: The Government of India press, New Delhi. 404 pp.
- CHAMPSON, G., D.G. MIQUELLE, A. LAMBERT, J.M. GOODRICH, S. LEGENDE & J. CLOBERT (2008): The impact on tigers of poaching versus prey depletion. *Journal of Applied Ecology* 45: 1667-1674.
- CHITSON, J. (1978): Measuring preference in selective predation. *Ecology* 59: 211-215.
- CHUDAWAT, R.S., N. GOGATE & A.J.T. JOHNSINGH (1999): Tigers in

- PANDE: Preliminary results from an Indian tropical dry forest. In: Seidensticker, J., S. Christie & P. Jackson (Eds): Riding the Tiger, Tiger conservation in human-dominated landscapes. Cambridge University Press. Pp. 123-129.
- DINKESTEIN, E. (1980): An ecological survey of the Royal Karnali-Bardia Wildlife Reserve, Nepal. Part 2: Ungulate populations. *Biol. Conserv.* 18: 5-38.
- EISENBERG, J.F. & M. LOCKHART (1972): An ecological reconnaissance of Wilpattu National Park, Ceylon. Smithsonian Contribution to Zoology, 101: 1-118.
- FLOYD, T.J., L.D. MICH & P.J. JORDAN (1978): Relating Wolf Scat Counts to prey consumed. *J. Wildl. Manage.* 42: 528-532.
- HINES, J.E. (1995): SCATMAN - a software to test the hypothesis of prey selectivity based on random samples of predator scats. USGS-PWRC. www.mbr.wildlife.gov.gov/80/catscan.html.
- JHALA, Y.V., QAMAR QURESHI & R. GOPAL (2008): Status of Tiger, Co-predators and Prey in India. National Conservation Authority and Wildlife Institute of India, TR08/001, pp. 164.
- JOHNSINGH, A.J.T. (1983): Large mammalian prey-prey in Bandipur. *J. Bombay Nat. Hist. Soc.* 80:1-57.
- JOHNSINGH, A.J.T., K. SANKAR & S. MUKHERJEE (1997): Saving Prime Tiger Habitat in Sariska Tiger Reserve. *Cat news*, 27-Autumn 1997.
- JOHNSINGH, A.J.T., S.P. GOYAL, G.S. RAWAT & S. MUKHERJEE (1993): Food habits of tiger and leopard in Rajaji National Park, North-west India. Abstract presented at International Tiger Symposium on the Tiger, 22nd to 24th February 1993, New Delhi.
- KARANTH, K.U. (1991): Ecology and management of Tigers in Tropical Asia. Pp. 156-159. In: Maruyama, B. Bobek, Y. Ono, W. Regalia, L. Barrio & R. Ratcliffe (Eds): Wildlife Conservation: Present trends and perspectives for the 21st century. Japan Wildlife Research Center, Tokyo.
- KARANTH, K.U. & M.E. SUNQUIST (1995): Prey Selection by Tiger, leopard and dhole in tropical forests. *J. Anim. Ecol.* 64: 439-450.
- KARANTH, K.U. & J.D. NICHOLS (1998): Estimation of tiger densities in India using photographic captures and recaptures. *Ecology* 79: 2852-2862.
- KARANTH, K.U., NICHOLS, JAMES D., KUMAR, N. SAMBA, LINK, A. WILLIAM & E. HINES JAMES (2004): Tigers and their prey: Predicting carnivore densities from prey abundance. *PNAS*, 102: 4854-4858.
- KHAN, J.A., R. CHELLAM, W.A. ROEDERS & A.J.T. JOHNSINGH (1996): Ungulate densities and biomass in the tropical dry deciduous forests of Gir, Gujarat, India. *J. Trop. Ecol.* 12: 149-162.
- KREBS, J.R. (1978): Optimal foraging: decision rules for predators. Pp. 23-63. In: Krebs, J.R. & N.B. Davies (Eds): Behavioral Ecology. Sinauer Associates, Sunderland, Massachusetts 494 pp.
- LINK, W.A. & K.U. KARANTH (1994): Correcting for overdispersion in tests of prey selectivity. *Ecology* 75: 2456-2459.
- MANLY, B.F.J., P. MILLER & L.M. COOK (1972): Analysis of selective predation experiment. *Am. Nat.* 106: 719-736.
- McDONALD, C. (1977): The face of the tiger. London: Rivington, 180 pp.
- MUKHERJEE, S., S.P. GOYAL & R. CHELLAM (1994a): Standardization of scat analysis techniques for leopard (*Panthera pardus*) in Gir National Park, Western India. *Mammalia* 58(1): 139-143.
- MUKHERJEE, S., S.P. GOYAL & R. CHELLAM (1994b): Refined techniques for the analysis of Asiatic lion (*Panthera leo persica*) scats. *Acta Theriol.* 39: 425-430.
- QURESHI, QAMAR, R. GOPAL, S. KYATHAM, S. BASHI, A. MITRA & Y.V. JHALA (2006): Evaluating tiger habitat at the Tehri level Project Tiger Directorate, Govt. of India, New Delhi and Wildlife Institute of India, Dehradun, TR No. 06/001, pp. 162.
- REYNOLDS, J.C. & N.J. ABERNETHY (1991): Comparison and quantification of carnivore diet by faecal analysis: a critique with recommendations, based on the study of the fox (*Vulpes vulpes*). *Mammal Review* 21: 97-122.
- SANKAR, K. (1994): Ecology of three large sympatric herbivores (Chital, Sambar, Nilgai) with reference to reserve management in Sariska Tiger Reserve, Rajasthan. Ph.D. Thesis, University of Rajasthan, Jaipur, India.
- SANKAR, K. & A.J.T. JOHNSINGH (2002): Food Habits of tiger (*Panthera tigris*) and leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan, India, as shown by scat analysis. *Mammalia* 66(2): 285-289.
- SCHALLER, G.B. (1967): The Deer and the Tiger: A study of Wildlife in India. University of Chicago Press, Chicago.
- SEIDENSTICKER, J. (1976): Ungulate populations in Chitwan valley, Nepal. *Biol. Conserv.* 10: 183-209.
- SEIDENSTICKER, J. (1986): Large carnivores and the consequences of habitat insularization: Ecology and conservation of tigers in Indonesia and Bangladesh. Pp. 1-41. In: Miller, S.D. & D.D. Everett (Eds): Cats of the World: Biology Conservation and Management. Natl. Wildl. Fed., Washington, D.C.
- SEIDENSTICKER, J. (1987): Bearing witness: observations on the extinctions of *Panthera tigris balica* and *Panthera tigris sondaica*. Pp. 1-8. In: Tilson, R.L. & U.S. Seal (Eds): Tigers of the World: Biology, Biopolitics, Management and Conservation of an Endangered Species. Noyes Publ. Park Ridge N.J.
- SEIDENSTICKER, J. (1997): Saving the Tiger. *Wildlife Society Bulletin* 25: 6-17.
- STOKES, O. (1994): The status and food habit of the tigers (*Panthera tigris*) population in Karnali floodplain of Royal Bardia National Park, Nepal. M.Sc. Thesis, Agricultural University, Norway.
- STOKES, O. & P. WIGGE (1996): Prey selection and prey removal by tiger (*Panthera tigris*) during the dry season in lowland Nepal. *Mammalia* 60: 363-373.
- SUNQUIST, M.E. (1981): The Social organization of tigers (*Panthera tigris*) in Royal Chitwan National Park. Smithsonian contribution to Zoology, 336: 1-98.
- SUNQUIST, M.E. & F. SUNQUIST (1989): Ecological constraints on predation by large felids. Pp. 283-301. In: Gittleman, J.L. (Ed.): Carnivore behaviour, Ecology and Evolution. New York: Cornell University Press.
- SUNQUIST, M.E., K.U. KARANTH & F. SUNQUIST (1999): Ecology, Behaviour and Resilience of the tiger and its conservation needs. Pp. 5-18. In: Seidensticker, J., S. Christie & P. Jackson (Eds): Riding the Tiger, Tiger conservation in human-dominated landscapes. Cambridge University Press.
- TAMANG, K.M. (1979): Population characteristics of the tiger and its prey. 23 pp. Unpublished paper presented at the international symposium of the tiger, New Delhi, India.
- THOMAS, L., J.L. LAAKE, S. STEINBERG, F.F.C. MARQUES, S.T. BUCKLAND, D.L. BORCHERS, D.R. ANDERSON, K.F. BURRMAN, S.L. HEDLEY, J.H. POLLARD, J.R.B. BISHOP & T.A. MARQUES (2005): Distance 5.0 Release 1. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK. <http://www.ruwpa.st-and.ac.uk/distance/>. 305 pp.
- YARMAN, K.S. & R. SKETNAM (1995): The line transect method for estimating densities of large mammals in a tropical deciduous forest: An evaluation of models and field experiment. *J. Biomet.* 20: 273-278.
- WIKRAMANAYAKE, E.D., E. DONISTON, J.G. ROBINSON, K.U. KARANTH, A. RABINOWITZ, D. OLSON, T. MATTHEWS, P. HIDAO, M. CONNOR, G. HESLEY & D. BOLZE (1999): People, tiger habitat availability, and linkages for the tiger's future. Pp. 255-272. In: Seidensticker, J., S. Christie & P. Jackson (Eds): Riding the Tiger, Tiger conservation in human-dominated landscapes. Cambridge University Press.

Short Note

Prey selection and food habits of leopard (*Panthera pardus fusca*) in Sariska Tiger Reserve, Rajasthan, India

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Keywords: food habits; leopard; prey biomass; scat analysis; ungulate density.

Leopard (*Panthera pardus fusca* Meyer 1794) has a wide range of distribution in India, with the exception of above the tree line in the Himalaya and the desert areas (Daniel 1996). In addition to natural habitats, the elusiveness and behavioral flexibility of the leopard allow them to survive near villages and human settlements (Daniel 1996, Nowell and Jackson 1996). The studies on food habits of leopard suggest that it has a more diverse diet ranging from small rodents and birds to medium-sized wild ungulates weighing less than 50 kg (Eisenberg and Lockhart 1972, Bothma et al. 1982, Santiapillai et al. 1982, Johnsingh 1983, Rabinowitz 1989, Seidensticker et al. 1990, Karanth and Sunquist 1995, 2000, Sankar and Johnsingh 2002, Henschel et al. 2005, Andheria et al. 2007, Ramesh et al. 2009).

The present study on leopard food habit was carried out in Sariska Tiger Reserve (STR), Rajasthan (74°17'E to 76°34'E and 25°5'N to 27°33'N) (Figure 1) from December 2007 to June 2008. The total area of the Tiger Reserve is 881 km², with 274 km² as a notified National Park. There are 32 villages within the Tiger Reserve boundary and out of them 10 are in notified National Park. The vegetation of this region is tropical dry deciduous forest and tropical thorn forest (Champion and Seth 1968). The climate is subtropical, characterized by a distinct winter (October–February), summer (March–June), monsoon (July–September). The average annual rainfall is 700 mm, mostly occurring during July–September. The wild ungulates found in Sariska are chital (*Axis axis*), sambar (*Cervus unicolor*), nilgai (*Boselaphus tragocamelus*) and wild pig (*Sus scrofa*). Apart from leopard, other carnivores present are tiger (*Panthera tigris*), striped hyaena (*Hyaena hyaena*), jackal (*Canis aureus*), jungle cat (*Felis chaus*), common mongoose (*Herpestes edwardsi*), small Indian mongoose (*Herpestes auropunctatus*), ruddy mongoose (*Herpestes smithi*) palm civet (*Paradoxurus hermaproditus*), small Indian civet (*Viverricula indica*) and ratel

(*Mellivora camensis*). Rhesus monkey (*Macaca mulatta*) and common langur (*Semnopithecus entellus*) are the two primates found. Porcupine (*Hystrix indica*), rufous tailed hare (*Lepus nigricollis ruficaudatus*) and peafowl (*Pavo cristatus*) are other potential prey which are found in Sariska (Sankar et al. 2008). A large number of cows, buffaloes, goats, sheep and dogs are kept by people living in villages.

Densities of the wild prey species in the study area (274 km² National Park area of STR) were estimated using line transects (Anderson et al. 1979, Burnham et al. 1980, Buckland et al. 1993, 2001). A total of 17 line transects were laid randomly in the intensive study area covering major vegetation and terrain types (Figure 1). The length of transects varied from 1.4 to 2.0 km. All transects were walked thrice in the early morning between 06:30 h and 09:30 h from December 2007 to June 2008 and the total effort was 115.5 km. No transects were walked in the evening time because of feasibility. On each sighting of potential prey species, data on (1) animal bearing (using a compass), (2) radial distance (using a range finder), and (3) group size was recorded. Density of prey species was calculated using program DISTANCE 5 (Laake et al. 1994). Minimum Akaike Information Criterion was used to select the best fitted models (Buckland et al. 1993).

Scat analysis method was chosen to estimate the proportion of different prey species consumed by leopard (Schaller 1967, Sunquist 1981, Johnsingh 1983, Link and Karanth 1994). Leopard scats were collected whenever encountered during the study period. Leopard scats were differentiated from that of other carnivore species on the basis of diameter (Norton et al. 1986, Rabinowitz 1989), pointed ends and numerous lobes (Edgaonkar and Chellam 2002). Because there was no tiger in Sariska in the study period, leopard scats were easily identified. Each scat was then broken down and washed under running water by using a sieve. The scat contents were then teased apart with forceps and undigested prey remains such as hairs, bones, skin, claws, hooves, mandible, quills and vegetable material were separated. Undigested prey hairs which remained in the scat after washing were used for the identification of prey species as described by Mukherjee et al. (1994).

The biomass and number of individuals of the prey consumed by leopard was estimated using Ackerman's equation (Ackerman et al. 1984). The equation used was as follows: $Y=1.980+0.035X$, where Y =kg of prey consumed per field collectible scat; X =average weight of an individual of a particular prey type. Prey selection of leopard was estimated for each species by comparing the proportion of the prey species utilized from scats with the expected number of scats avail-

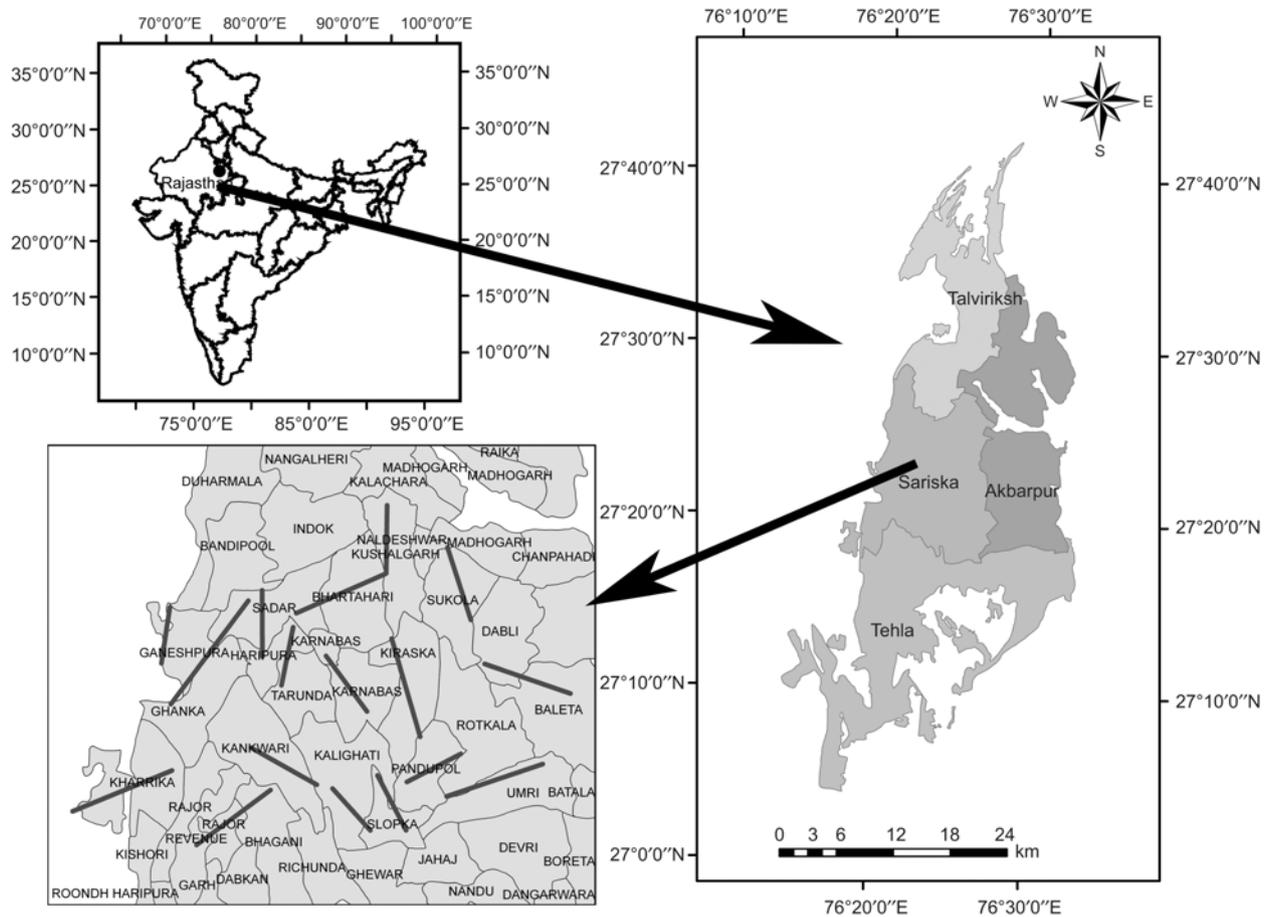


Figure 1 Location of line transects in the intensive study area, Sariska Tiger Reserve, Rajasthan.

able in the environment for each of the prey species consumed (Karanth and Sunquist 1995). The prey selection was also determined by using Izelev's index (Izelev 1961): $E = (U - A) / (U + A)$, where, U = relative frequency occurrence of prey items in predator scats and A = expected scat proportion in the environment.

Individual densities (along with standard error), biomass, mean group size, sample size of each prey species estimated in study area are summarized in Table 1. The study area was found to hold a high prey density ($298.8/\text{km}^2$). Peafowl was found to be the most abundant prey species in the study area

followed by wild pig, common langur, nilgai, chital and sambar. The estimated wild ungulate biomass was $14,739.1 \text{ kg}/\text{km}^2$ in the study area (Table 1). The estimated prey densities in the study area, when compared with those from other parts of the country, revealed that National Park area of Sariska harbors high densities of chital, sambar, nilgai and wild pig (Khan et al. 1996, Karanth and Nichols 1998, Chundawat et al. 1999, Biswas and Sankar 2002, Bagchi et al. 2003, Banerjee 2005, Mondal 2006). The presence of several water bodies, salt licks, availability of the grass species, such as *Chloris dolychostachya*, *Heteropogon contortus* and *Cyno-*

Table 1 Density, biomass and group size estimates of leopard prey species in Sariska Tiger Reserve, Rajasthan (December 2007 and June 2008).

Species	Number of groups	Density/ km^2	Standard error	Biomass/ km^2	Group size	Standard error
Chital	27	33.88	12.77	1534.6	8.37	2.51
Sambar	53	26.38	5.21	3297.5	3.32	0.33
Nilgai	91	42.72	9.12	7860.5	3.13	0.33
Wild pig	31	54.12	27.00	2056.6	11.64	5.22
Common langur	29	50.67	15.74	709.4	11.65	2.08
Cattle	24	28.03	9.57	5045.4	7.79	1.49
Hare	5	6.74	0.43	24.3	1.00	0.00
Peafowl	134	56.21	8.84	191.1	2.79	0.23

Table 2 Prey species composition in leopard scats (n=171), their relative biomass contribution in leopard diet and production of scats for each prey species in Sariska Tiger Reserve, Rajasthan (December 2007 to June 2008).

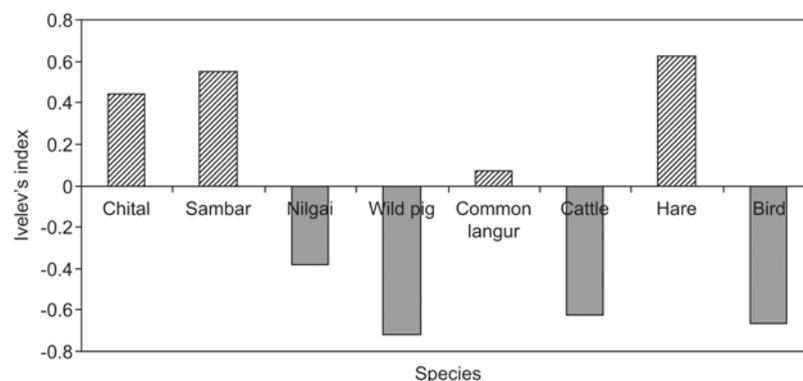
Species	No. of scats (F)	Percentage frequency of occurrence (%F)	Average body weight (kg) (B)	Prey consumed per field collectible scat (kg) (Y)	(%) Biomass consumed (F×Y) in %	Number of scat produced/ animal (B/Y)	Total no. of scat produced/ species (B/Y)×D	Percentage of scat produced/ species
Chital	41	22.4	45	3.555	15.36	12.66	428.86	12.2
Sambar	74	40.4	125	6.355	49.55	19.67	518.88	14.8
Nilgai	21	11.5	184	8.42	18.63	21.85	933.55	26.7
Wild pig	4	2.2	38	3.31	1.40	11.48	621.32	17.7
Common langur	19	10.4	14	2.47	4.94	5.67	287.20	8.2
Cattle	7	3.8	180	8.28	6.11	21.74	609.35	17.4
Hare	8	4.4	3.6	2.106	1.78	1.71	11.52	0.3
Porcupine	5	2.7	14	2.47	1.30	–	–	–
Peafowl	3	1.6	3.4	2.099	0.66	1.62	91.05	2.6
Dog	1	0.5	18	2.61	0.28	–	–	–

don dactylon and fallen *Zizyphus mauritiana* fruits and leaves and fallen leaves of *Anogeissus pendula* in the study area might have contributed to the high density of wild ungulates in the study area. The fallen leaves of *Anogeissus pendula* and *Zizyphus mauritiana* and fruits of *Zizyphus mauritiana* contain high protein (Sankar et al. 2007). The density of leaf eating common langur was also very high in the study area, because of the abundance of food plants for common langur throughout the year. The ungulate population is being studied in Sariska since 1988. Nilgai and sambar densities were always found to be higher (Sankar 1994, Avinandan et al. 2008, Sankar et al. 2008). Because there are 10 villages found inside the study area, the proximity of nilgai to, in and around villages are probably preferred habitats for them. A high sambar density in the study area is attributed to hilly terrain, valley habitats and availability of food plants in the intensive study area.

A total of 10 prey species were identified in 171 leopard scats of which 8% had two prey items and 92% had single prey item. Frequency of occurrence and percentage occurrence of prey remains in leopard scats are given in Table 2. Sambar constituted 40.4% of leopard diet followed by chital

(22.4%), nilgai (11.5%), common langur (10.4%), hare (4.4%), cattle (3.8%), rodent (2.7%), wild pig (2.2%), peafowl (1.6%) and dog (0.5%). The wild prey species contributed to 95.6% of the diet of leopard, whereas domestic livestock contributed 4.4%. Chital and sambar together contributed the maximum (62.8%) to the diet of leopard (Table 2). In terms of biomass contribution, sambar contributed most (49.6%), followed by nilgai (18.6%), chital (15.4%), cattle (6.1%), common langur (4.9%), hare (1.8%), wild pig (1.4%), rodent (1.3%), peafowl (0.7%) and dog (0.3%) (Table 2).

Sambar ($p < 0.01$), chital ($p < 0.01$) and hare ($p < 0.01$) were preyed more than their availability, whereas nilgai ($p < 0.01$), wild pig ($p < 0.01$) and peafowl were preyed less than their availability. Common langur was preyed in proportion to its availability ($p > 0.05$) (Figure 2). As the densities of prey species were determined from the data obtained from line transect walks during morning time, the sightings of hare were very less (as they were largely nocturnal and have the habit of crouching in a small cover and escaping), which led in underestimation of its density. The index of prey selection by leopard at individual species level was in the following

**Figure 2** Prey selection by leopard in Sariska Tiger Reserve, Rajasthan based on availability of individuals and utilization based on scat data (December 2007 to June 2008).

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order: sambar>chital>common langur=hare=nilgai>cattle>peafowl>wild pig (Figure 2).

In total, leopard fed on 10 different prey species. Chital, sambar and common langur constituted 73.2% of the diet of leopard (Table 2), which is similar to the findings reported from Nagarhole (Karanth and Sunquist 1995) and Mudumalai (Ramesh et al. 2009). In the moist deciduous forest of Duduwa National Park, Ahmed and Khan (2008) found 20 prey species in the diet of leopard. Comparatively broader prey spectrum in leopard diet has been documented in African tropical forest by Hoppe-Dominik (1984) (n=32 species), Hart et al. (1996) (n=31 species), Ososky (1998) (n=25 species), Ray and Sunquist (2001) (n=17 species), Henschel et al. (2005) (n=30 species) and Bodendorfer et al. (2006) (n=37 species). Owing to the opportunistic hunting behavior of leopard, the total number of prey species recorded depends very much on sample size (Bodendorfer et al. 2006, Ahmed and Khan 2008).

Sambar was found to be the principal prey species for leopard in Sariska as inferred from the relative frequency of occurrence (40.4%) and relative biomass consumed (49.6%). Considering the relative frequency of occurrence, chital was found to be the second preferred prey species (Table 2), followed by nilgai, common langur, hare, cattle, rodent, wild pig, peafowl and dog. When compared with the other studies, predation rate of sambar by leopard as recorded during the present study was more than Mudumalai, Bandipur, Nagarhole, Kalakad-Mundanthurai and Dudhuwa Tiger Reserves (Karanth and Sunquist 1995, Ramakrishnan et al. 1999, Andheria et al. 2007, Ahmed and Khan 2008, Ramesh et al. 2009), but predation of chital was found to be lower than these areas. More sambar predation in the present study could be attributed to the wide distribution of sambar across the study area, whereas distribution of chital was largely restricted in the valley habitats (Avinandan et al. 2008). Although peafowl occurred in high density in the study area their remains were found only in 1.6% of the leopard scats. Sankar and Johnsingh (2002) also reported low occurrence of peafowl remains in leopard scats (<4%) in the same study area.

A high occurrence of rodents in leopard diet (45.6%) which was 23.1% of the overall biomass consumed was documented in Sariska and the reason for the same was attributed to high rodent and insectivore availability during 1988–1990 (Sankar and Johnsingh 2002). Some recent studies (Sankar et al. 2008 and present study) reported that the occurrence of rodents in leopard diet was <3%. High occurrence of rodents was also reported from studies outside India, and the reasons attributed were the nocturnal habits and abundance of rodents (Grobler and Wilson 1972, Henschel et al. 2005). When comparing the frequency of occurrence of prey species in leopard scats with previous studies, it was evident that the utilization rates of sambar, chital, nilgai and common langur increased from 2002 to 2008 (Sankar et al. 2008). Leopard are known to prefer small- to medium-sized prey within a weight range of 10–40 kg (Henschel et al. 2005) and such species are considered to be the energetically most profitable prey for the leopard (Ahmed and Khan

2008). A small population of tigers (10–12 individuals) became exterminated in Sariska due to poaching in 2004. Prior to extermination of tigers it was found that leopards largely fed on rodents. After the local extermination of tigers, leopard occupied the entire tiger habitat (Sankar et al. 2008) and their diet selection which shifted from rodents to large herbivores could be because of high wild prey availability, as evident from the present study. Some tigers were reintroduced in Sariska during 2008–2009. Long-term studies on leopard food habits would reveal the change in diet selection, if any, in the occurrence of tigers in Sariska.

Acknowledgements

We thank Rajasthan Forest Department for granting permission for the project 'Ecology of Leopard' conducted by the Wildlife Institute of India (WII). We thank Director and Dean, WII, for their encouragement and support provided for the study. We thank our field assistants Jairam, Omi and Ramesh for their assistance in the field.

References

- Ackerman, B.B., F.G. Lindzey and T.P. Hemker. 1984. Cougar food habits in southern Utah. *J. Wildl. Manage.* 48: 147–155.
- Ahmed, K. and J.A. Khan. 2008. Food habits of leopard in tropical moist deciduous forest of Dudhuwa National Park, Uttar Pradesh, India. *Int. J. Ecol. Environ. Sci.* 34: 141–147.
- Anderson, D.R., J.L. Laake, B.R. Crain and K.P. Burnham. 1979. Guidelines for the transect sampling of biological populations. *J. Wildl. Manage.* 43: 70–78.
- Andheria, A.P., K.U. Karanth and N.S. Kumar. 2007. Diet and prey profiles of three sympatric large carnivores in Bandipur Tiger Reserve, India. *J. Zool.* 273: 169–175.
- Avinandan, D., K. Sankar and Q. Qureshi. 2008. Prey selection by tigers (*Panthera tigris*) in Sariska Tiger Reserve, Rajasthan, India. *J. Bombay Nat. Hist. Soc.* 105: 247–254.
- Bagchi, S., S.P. Goyal and K. Sankar. 2003. Prey abundance and prey selection by tigers (*Panthera tigris*) in a semi arid, dry deciduous forest in western India. *J. Zool.* 260: 285–290.
- Banerjee, K. 2005. Estimating the ungulate abundance and developing the habitat specific effective strip width models in Kuno Wild Life Sanctuary, Madhya Pradesh. Masters thesis. Forest Research Institute, Deemed University.
- Biswas, S. and K. Sankar. 2002. Prey abundance and food habit of tigers (*Panthera tigris tigris*) in Pench National Park, Madhya Pradesh, India. *J. Zool.* 256: 411–420.
- Bodendorfer, T., B. Hoppe-Dominik, F. Fischer and K.E. Linsenmair. 2006. Prey of the leopard (*Panthera pardus*) and lion (*Panthera leo*) in the Comoe and Marahoue National Park, Cote d'Ivoire, West Africa. *Mammalia* 35: 231–246.
- Bothma, J., P. Du and E.A.N. Le Riche. 1982. Prey preference and hunting efficiency of the Kalahari Desert leopard. *Cat Symposium, Texas.*
- Buckland, S.T., D.R. Anderson, K.P. Burnham and J.L. Laake. 1993. Distance sampling: estimating abundance of biological populations. Chapman and Hall, London. pp. 446.
- Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers and L. Thonas. 2001. In introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, Oxford. pp. 432.

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- Burnham, K.P., D.R. Anderson and J.L. Laake. 1980. Estimation of density from line transect sampling of biological populations. *Wildl. Monogr.* 72: 1–202.
- Champion, H.G. and S.K. Seth. 1968. A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi. pp. 404.
- Chundawat, R.S., N. Gogate and A.J.T. Johnsingh. 1999. Tigers in Panna: preliminary results from an Indian tropical dry forest. In: (J. Seidensticker, S. Christie and P. Jackson, eds.) *Riding the tiger: tiger conservation in human dominated landscapes*. Cambridge University Press, Cambridge. pp. 123–129.
- Daniel, J.C. 1996. The leopard in India: a natural history. Natraj Publishers, Dehra Dun. pp. 228.
- Edgaonkar, A. and R. Chellam. 2002. Food habits of the leopard, *Panthera pardus*, in the Sanjay Gandhi National Park, Maharashtra, India. *Mammalia* 2002: 353–360.
- Eisenberg, J.F. and M. Lockhart. 1972. An ecological reconnaissance of Wilpattu National Park, Ceylon. *Smithsonian Contrib. Zool.* 101: 1–118.
- Grobler, J.H. and V.J. Wilson. 1972. Food of the leopard *Panthera pardus* (Linn.) in the Rhodes Matapos National Park, Rhodesia, as determined by faecal analysis. *Arnoldia* (Rhodesia), National Museums of Rhodesia, Zimbabwe.
- Hart, J.A., M. Katembo and K. Punga. 1996. Diet prey selection and ecological relations of leopard and golden cat in the Ituri Forest, Zaire. *Afr. J. Ecol.* 34: 364–379.
- Henschel, P., K.A. Abernethy and L.J.T. White. 2005. Leopard food habits in the Lope' National Park, Gabon, Central Africa. *Afr. J. Ecol.* 43: 21–28.
- Hoppe-Dominik, B. 1984. Etude du spectre des proies de la panthere, *Panthera pardus*, dans le Parc National de Tai en Cote d'Ivoire (Prey frequency of the leopard, *Panthera pardus*, in the Tai National Park of the Ivory Coast). *Mammalia* 48: 477–487.
- Ivelev, V.S. 1961. Experimental ecology of the feeding of fishes. Yale University Press, New Haven, CT. pp. 302.
- Johnsingh, A.J.T. 1983. Large mammalian prey-predators in Bandipur. *J. Bombay Nat. Hist. Soc.* 80: 1–57.
- Karanth, K.U. and J.D. Nichols. 1998. Estimation of tiger densities using photographic captures and recaptures. *Ecology* 79: 2852–2862.
- Karanth, K.U. and M.E. Sunquist. 1995. Prey selection by tiger, leopard and dhole in tropical forests. *J. Anim. Ecol.* 64: 439–450.
- Karanth, K.U. and M.E. Sunquist. 2000. Behavioral correlates of predation by tiger (*Panthera Tigris*), leopard (*Panthera pardus*) and dhole (*Cuon alpinus*) in Nagarhole, India. *J. Zool.* 250: 255–265.
- Khan, J.A., R. Chellam, W.A. Rodgers and A.J.T. Johnsingh. 1996. Ungulate densities and biomass in the tropical dry deciduous forests of Gir, Gujarat, India. *J. Trop. Ecol.* 12: 149–162.
- Laake, J.L., S.T. Buckland, D.R. Anderson and K.P. Burnham. 1994. DISTANCE user's guide, Version 2.1. Colorado Cooperative Fish and Wildlife Research Unit, Colorado State University, Fort Collins, CO.
- Link, W.A. and K.U. Karanth. 1994. Correcting for overdispersion in tests of prey selectivity. *Ecology* 75: 2456–2459.
- Mondal, K. 2006. Leopard and ungulate abundance estimation in Rajaji National Park, Uttarakhand. Masters thesis. Forest Research Institute (Deemed University), Dehradun.
- Mukherjee, S., S.P. Goyal and R. Chellam. 1994. Standardization of scat analysis techniques for leopards (*Panthera pardus*) in Gir National Park, Western India. *Mammalia* 58: 139–143.
- Norton, P.M., A.B. Lawson, S.R. Henley and G. Avery. 1986. Prey of leopards in four mountainous areas of the South-Western Cape Province. *S. Afr. J. Wildl. Res.* 16: 41–48.
- Nowell, K. and P. Jackson. 1996. Wild cats: status survey and conservation action plan. IUCN, Gland, Switzerland.
- Ososky, J.J. 1998. Diet of leopards and golden cats in Ndoki Park, Republic of Congo. M.Sc. thesis. Northern Illinois University, DeKalb, IL.
- Rabinowitz, A. 1989. The density and behavior of large cats in dry tropical forest mosaic in Huai Kha Khaeng Wildlife Sanctuary, Thailand. *Nat. Hist. Bull. Siam Soc.* 32: 225–251.
- Ramakrishnan, U., R.G. Coss and N.W. Pelkey. 1999. Tiger decline caused by the reduction of large ungulate prey: evidence from a study of leopard diets in southern India. *Biol. Conserv.* 89: 113–120.
- Ramesh, T., V. Snehlatha, K. Sankar and Q. Qureshi. 2009. Food habits and prey selection of tiger and leopard in Mudumali Tiger Reserve, Tamil Nadu, India. *J. Sci. Trans. Environ. Techn.* 2: 170–181.
- Ray, J.C. and M.E. Sunquist. 2001. Trophic relations in a community of African forest carnivores. *Oecologia* 127: 397–408.
- Sankar, K. 1994. Ecology of three large sympatric herbivores (Chital Sambar, Nilgai) with reference to reserve management in Sariska Tiger Reserve, Rajasthan. Ph.D. thesis. University of Rajasthan, Jaipur, India.
- Sankar, K. and A.J.T. Johnsingh. 2002. Food Habits of tiger (*Panthera tigris*) and leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan, India, as shown by scat analysis. *Mammalia* 66: 353–360.
- Sankar, K., A.J.T. Johnsingh and R. Mathur. 2007. Food habits of three major ungulate species in a semi-arid zone of Rajasthan, India. *Cheetal* 44: 18–39.
- Sankar, K., Q. Qureshi, K. Mondal, D. Worah, T. Srivastava, S. Gupta and S. Basu. 2008. Ecological studies in Sariska Tiger Reserve, Rajasthan. Final Report. Wildlife Institute of India, Dehra Dun. pp. 145.
- Santiapillai, C., M.R. Chambers and N. Ishwaran. 1982. The leopard *Panthera pardus fusea* (Meyer 1794) in the Ruhuna National Park, Sri Lanka and observations relevant to its conservation. *Biol. Conserv.* 23: 5–14.
- Schaller, G.B. 1967. The deer and the tiger. A study of wildlife in India. University of Chicago Press. Chicago, IL.
- Seidensticker, J.C., M.E. Sunquist and C.W. McDougal. 1990. Leopards living at the edge of Royal Chitawan National Park, Nepal. In: (J.C. Daniel and J.S. Serrano, eds.) *Conservation in developing countries: problems and prospects*. Bombay Natural History Society, Bombay, India/Oxford University Press, Oxford. pp. 415–423.
- Sunquist, M.E. 1981. The social organization of tigers (*Panthera tigris*) in Royal Chitwan National Park, Nepal. *Smithsonian Contrib. Zool.* 336: 1–98.

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ORIGINAL PAPER

ABUNDANCE AND HABITAT SUITABILITY MODEL FOR RATEL (*MELLIVORA CAPENSIS*) IN SARISKA TIGER RESERVE, WESTERN INDIA

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Keywords

Camera Trapping;
Density;
Dry Deciduous Habitat;
Habitat variables;
Honey Badger;
Logistic Regression;
Royle and Nichols Model.

Abstract

The honey badger, or ratel *Mellivora capensis* has not been well studied and very little information is available on its population and habitat use. We used occupancy based technique and binary logistic regression to assess the abundance and habitat suitability for ratel in Sariska Tiger Reserve, Rajasthan, Western India between November 2007 to June 2009. In total, 100 trapping stations were sampled for 25 days resulting into total effort of 2500 trapping nights. The 100 trapping stations covered an area of 95.99 km² (MCP). Presence/absence data was gathered through camera trap photographs in two seasons, winter and summer. The density of ratel was found to be 5.48 ± 4.33 animals/100 km² in summer and 6.43 ± 2.79 animals/100 km² in winter. Two sample T-test revealed no significant difference in the abundance of ratel between seasons ($t=1.493$, $df=8$, $P=0.173$). Binary logistic regression analysis revealed overall prediction accuracy for depicting the ratel presence in the intensive study area was 64.8%. Elevation, closeness to water and *Zizyphus* mixed forest was found to contribute positively for the prediction of suitable habitat for ratel in the intensive study area. Comparatively, very less area was found as medium and high suitable areas for this species.

Introduction

The honey badger or ratel (*Mellivora capensis*) is found across the greater part of Africa, south of the Sahara and extending through Arabia, Iran and western Asia to Turkmenistan and the Indian peninsula [1, 2]. A very few studies conducted on this species especially on its foraging habits in the southern Kalahari [3-7] but little information was available on its general ecology from Asia [8, 9], reproductive biology or social organization [10, 11]. Ratel in India lives in the desert and in the dry and moist deciduous zones avoiding regions of heavy rainfall [8]. They prefer hilly broken country where shelter is easier to find. In the plains they choose the banks of streams or rivers where burrows are easy to dig. They live in burrows of their own or of some other animal, rock crevices or by the shelter provided by tree roots or among thick bushes. They are largely nocturnal though also seen during day

hours, occasionally in pairs. The gestation period is believed to be around 180 days and the litter size is two [12]. According to IUCN Red List status and Indian Wildlife (Protection) Act, 1972 they are placed in Lower risk and Schedule I respectively. This paper documented abundance of ratel and developed its habitat suitability model in Sariska Tiger Reserve, Western India aiming to provide information of its present status and possible variables governing its distribution.

Materials and methods

Study Area

The study was conducted in Sariska Tiger Reserve (Sariska TR), Western, India, (79° 17' to 76°34'N, 27° 5' to 27° 33' E) from November 2007 to June 2009. The total area of the Tiger Reserve is 881 km², of which 274 km² area is notified National Park. The vegetation of Sariska TR corresponds to (1) Northern tropical dry deciduous forests (subgroups 5B; 5/E1 and 5/E2) and (2) Northern Tropical Thorn forest (subgroup 6B) [13]. Wild herbivores found in Sariska TR are chital (*Axis axis*), sambar (*Rusa unicolor*) and nilgai (*Boselaphus tragocamelus*). Omnivores found are wild pig (*Sus scrofa*) and jackal (*Canis aureus*). The carnivore species found in Sariska are tiger (*Panthera tigris*), leopard (*Panthera pardus*) and striped hyena (*Hyaena hyaena*). Small carnivores found are jungle cat (*Felis chaus*), desert cat (*Felis silvestris*), common mongoose (*Herpestes edwardsii*), ruddy mongoose (*H. smithii*), palm civet (*Paradoxurus hermaphroditus*) and small Indian civet (*Viverricula indica*). Rhesus macaque (*Macaca mulatta*) and common langur (*Semnopithecus entellus*) are the two primates found here. Porcupine (*Hystrix indica*) and rufous tailed hare (*Lepus nigricollis ruficaudatus*) are also found in Sariska TR. There are 32 villages within Sariska TR. A large number of buffaloes, goats, sheep and cattle are kept by people living in villages. Present study was conducted in the intensive study area of 144 km² (Fig. 1) in two different seasons, winter (November to February) 2007 and summer (March to June) 2009.

Sampling design for camera traps

A preliminary survey was carried out during November 2007 in the intensive study area of 144 km² in the National Park by surveying available trails. Camera traps were placed in 1x1 km² grid on the basis of any evidence (track sign) on the trails. Total 30 units of Deercam™ analog cameras that worked on passive infrared motion/heat sensors were deployed. A total of 100 locations were selected for the placement of camera traps in the study area. Since it was logistically impractical to conduct sampling at all these camera trap locations simultaneously, the trap points were divided into six blocks. Block A consisted of 17 camera trap sites, blocks B had 14 sites and C had 18, D had 16, E had 20 and F had 15 sites each depending upon the feasibility of camera trap locations in the study area (Fig. 1). The mean inter trap distance was 726 m (ranging from 500 m to 1.2 km) and each camera traps ran for 25 consecutive occasions with the total sampling period amounting to 150 days (2500 trap nights per season). Capture matrix was prepared from each sampling occasion combined with captures from 1st day drawn from each block [14- 16]. Rolls of film used during

the trapping session were given a unique code (Block1/Trap point1/Roll1) in order to correctly note the date, time, and location of the captures.

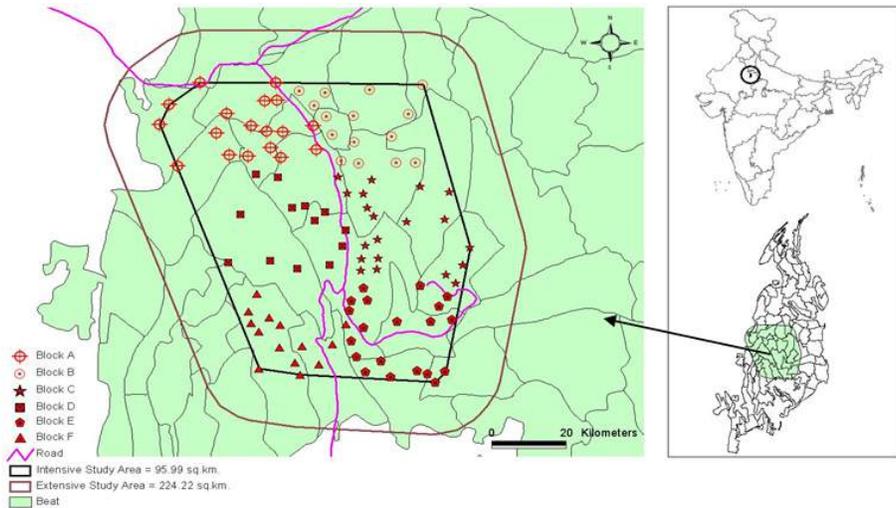


Fig. 1: Camera trap locations in the sampled area of Sariska Tiger Reserve, Western India (December 2008 - June 2009).

Habitat features

Mapping of vegetation types was done earlier in Sariska TR based on remotely sensed data of Landsat -7-ETM+ imagery Geo-coded False Color Composite (FCC) map on 1:50,000 scale for the entire study area with different color tones for 30 classes [17]. Nine vegetation and land cover classes were delineated and mapped with 80% accuracy [17]. Area occupied by each vegetation type was extracted grid wise (1 x 1 km²) from vegetation map. A separate layer was prepared for each vegetation type thereby computing the area for each habitat variables. Digital data on contour and drainage were used to create Digital Elevation Model (DEM) on the basis of interpolation. All village locations and water holes were recorded using Global Positioning System (GPS). Euclidean distance was calculated from each grid center to the nearest water sources, roads and villages.

Records on presence/absence of ratel were converted into digital data in GIS using ArcMap program, and were stored on the base map previously prepared for the intensive study area in Sariska TR. The entire map was initially divided into 1 x 1 km² grids (n = 144) and the records were plotted as presence/absence information for ratel on each grid. If the species was detected at least once at a site over the entire sampling duration then it was recorded as present '1' or '0' otherwise. Total of 11 macro habitat characteristics and variables were considered for the preliminary analyses which were characterized under four environmental descriptor classes (Table 1). Topographical variable includes elevation (DEM), anthropogenic variables (include Euclidean distance from villages and roads), habitat variables (includes vegetation types) and Normalized Differential Vegetation Index (NDVI) and hydrological variable (includes Euclidean distance to water). These variables were chosen on the basis of field knowledge and information on species biology [8, 9].

Table 1: List of the variables used in Logistic Regression analysis for developing habitat suitability model for ratel in Sariska Tiger Reserve, Western India.

Variables	Variables type	Source
1. Habitat	<i>Anogeissus</i> dominated forest	Land use and land cover map from Landsat -7 – ETM+ data (source: Sankar <i>et al.</i> 2009)
	<i>Boswellia</i> dominated forest	
	<i>Butea</i> dominated forest	
	<i>Zizyphus</i> mixed forest	
	<i>Acacia</i> mixed forest	
	Scrubland	
2. Anthropogenic	NDVI	GIS cell, WII
	Distance from village (mean)	Village and road map, WII
3. Topographical	Distance from roads (mean)	
	DEM	Contour map, WII
4. Hydrological	Distance from water (mean)	Water source map, WII

Abundance estimation of ratel based on Royle and Nichols model

Recent advancements in occupancy based techniques allowed to estimate population status using detection and non-detection data from repeated survey through camera trapping. We considered the home range of ratel as a unit area for estimating its abundance. Based on available literature, the reported home range of European badger in South East Finland was taken in to consideration for the analysis of abundance of ratel or honey badger in Sariska TR using Royle and Nichols Model. The estimated home range of European badger varied from 6.7 to 9.2 km² [18]. We also estimated the probable home range of ratel or honey badger using its body size, with the formula $[A = 15.14 * M^{1.26}]$ [19], where A = home range area in hectare and M = body weight of target species (carnivore). In this way, the estimated home range of ratel or honey badger varied from 5.9 to 6.6 km², which is very much similar to the home range of European badger. Accordingly, grid-cell of 4 x 4 km² was selected as a single unit area for abundance estimation of ratel. Accordingly, total ten grids were delineated in the intensive study area. Capture history matrix for a species was constructed from its detection at all sites across repeated sampling occasions (or visits) [20]. We defined one sampling occasion to be comprised of 25 trap nights/block. If the species was detected at least once at a site over the entire sampling duration, it was recorded its capture history as ‘1’, or ‘0’ otherwise for non detection.

The Royle and Nichols Induced Heterogeneity model [20] assumes that heterogeneity in detection probability among sites primarily results from variation in animal abundance. This relationship can be explained using likelihood techniques to estimate abundance from repeated detection/non detection data at sites, by assuming abundance to be a random variable with Poisson or Negative Binomial probability distribution. The Royle and Nichols model [20] relates detection probability and abundance using following formula: $pi = 1-(1-r)^{Ni}$; Where pi is the species specific detection probability at site i ; r is the animal specific detection probability at site and Ni is the actual animal abundance at site i .

To characterize the underlying estimation of abundances, the Poisson model can be a good starting point as it arises under a random distribution of animals in space [21]. Using this model for abundance estimation, the final likelihood equation to estimate

parameters (mean abundance at site and animal specific detection probability) is as follows:

$$L(w | r, \lambda) = \prod_{i=1}^R \sum_{k=0}^{\infty} r C_{w_i, k} [1 - (1 - r)^k]^{w_i} [(1 - r)^k]^{T - w_i} \frac{\lambda^k e^{-\lambda}}{k!}$$

where, R is the number of sites; T is the number of repeated samples; w is the detection vector of the total number of detections from each site i , i.e. a vector of all the individual site-specific detections, w_i and λ is the expected abundance at each site, also the Poisson mean. Parameters were estimated using camera trap capture matrices, in Program PRESENCE version 2.0 [22]. Two sample T-test was used to compare mean and standard deviation to check any significant difference in ratel abundances between seasons, using Program NCSS [23].

Development of habitat suitability model through Binary Logistic Regression

All grid data including eleven explanatory variables (DEM, NDVI, vegetation classes) was used for binary logistic regression analysis (Table 1). These variables were selected for model building and further validation. A cross-correlation matrix was prepared to see if the variables were correlated to one another. Variables with correlation coefficients >0.60 were removed from the analysis. Enter elimination processes were applied to identify and remove redundant variables and those variables that did not contribute significantly in detecting presence of ratel in the study area. Enter method was more useful as it enables better control over variables and consequently, allows inclusion of desired variables that have biological significance, but could have been compromised over better model fit by different elimination processes [24]. Overall prediction efficiency of the variables was assessed based on Nagelkerke- R^2 and $-\text{Log Likelihood}$ values. Influence of individual variables including categorical variables was assessed using wald statistics. Goodness-of-fit test (chi square test) and concordance analysis (classification tables) were done to understand the fit of the model [25]. Sensitivity (percentage true positive or presence correctly predicted) and specificity (percentage true negative or absence correctly predicted) were calculated for each cut-off point (0.1 to 0.9) and best cut-off point was chosen on the basis of optimum sensitivity and specificity. The cut-off level would allow categorization of the probability values to represent either 0 if it is below the cut-off point or 1 if it is above the cut-off point. Logistic regression was done using the selected variables and at an appropriate cut-off level and the probability of occurrence was estimated for the study species using the following formula: Probability of event (or presence) = $1 / (1 + \text{EXP}(-z))$; where, $Z = a + (b_1 \cdot X_1) + (b_2 \cdot X_2) + (b_3 \cdot X_3) + \dots + (b_k \cdot X_k)$; a = constant, b = coefficients and X = predictor variable. Further the equation was then taken to GIS domain and probability of occurrence of ratel was predicted for the intensive study area and habitat suitability map was generated using Arc info and Arc view software for ratel. Based on probability values the transformed output was sliced into equal intervals as very low, low, medium and high suitable areas for ratel in the intensive study area. No attempt was made to extrapolate data for the entire Tiger Reserve, as true absence in different parts of the entire Tiger Reserve cannot be defined due to no sampling in those areas.

Results

Abundance estimation

A number of 18 photo captures of ratel were recorded in summer and 27 photo captures in winter. Individual identification of ratel from camera trap photos was not possible (Fig. 2), because ratel does not have any distinct coat/rosette/stripe pattern like tiger, leopard or jaguar (*Panthera onca*). There is no sexual dimorphism in ratel and hence no attempt was made to identify male and female. Naive occupancy for ratel was 60% in winter and 50% in summer. Detection probability (r) was estimated as 0.10 ± 0.04 in summer and 0.13 ± 0.04 in winter. After correcting for imperfect detection, the probability of site occurrence (Ψ) for ratel was found to be 0.49 ± 0.18 in summer and 0.58 ± 0.16 in winter. The abundance of ratel per unit area (λ) was estimated as 0.67 ± 0.35 in summer and 0.87 ± 0.37 in winter. Two sample t-test revealed no significant difference in abundance of ratel between seasons ($t=1.493$ $df=8$, $P=0.173$). The estimated population of ratel was estimated to be 7.90 ± 6.23 in summer and 9.27 ± 4.01 in winter in the intensive study area (Table 2). The density of ratel was estimated 5.48 ± 4.33 individuals/100 km² in summer and 6.43 ± 2.79 individuals/100 km² in winter (Table 2).



Fig. 2: Camera trap photograph of a ratel in the study area of Sariska Tiger Reserve, Western India.

Table 2: Abundance estimation of ratel from camera trap data based on Royle-Nichols Induced heterogeneity model in Sariska Tiger Reserve, Western India (*Estimated values = Mean \pm Standard Error*).

Season	Grid size Km ²	Number of grids	Group abundance	Mean group size	Population Size (N)	Density/100 km ²
Summer	4 x 4	10	6.75 ± 3.47	1.17 ± 0.70	7.90 ± 6.23	5.48 ± 4.33
Winter	4 x 4	10	8.66 ± 3.73	1.07 ± 0.05	9.27 ± 4.01	6.43 ± 2.79

Habitat suitability model

Estimated -2 Log Likelihood and R² in the model obtained for ratel was 63.11 and 0.157 respectively and was found significant with the model prediction values. Goodness-of-fit test revealed better model fit ($\chi^2 = 6.685$, $p=0.5711$) [24]. Overall correct classification rate of the model was 64.8%, while predicted positives and negatives were 57.1% and 66.7 % respectively. The best cut-off point optimizing sensitivity and specificity was found to be at 0.2 for the species (Fig. 3). In total eight explanatory variables including land cover were selected to develop better model fit and also for development of final equation at this cut off point). It was found that,

elevation, *Zizyphus* mixed forest and areas close to water contributed positively for predicting habitat suitability model for ratel in the intensive study area (Table 3). *Anogeissus* dominated forest, *Acacia* mixed forest, scrubland and areas close to villages and roads were found to have negative correlation for the prediction of habitat suitability model for ratel in the intensive study area (Table 3).

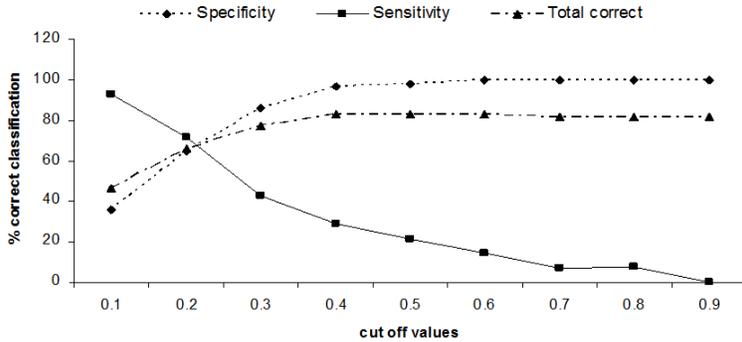


Fig. 3: Concordance analysis depicting sensitivity and specificity in different cut-off values for ratel.

Table 3: Coefficient and variables used in Logistic Regression for ratel in Sariska Tiger Reserve, Western India.

Variable	B coefficient	Standard error	Wald statistics	Degree of freedom	Significance	Exponential B coefficient
SCRUBLAND	-26.668	34.077	.612	1	.434	.000
ROAD	-.005	.006	.667	1	.414	.995
DEM	.011	.008	1.910	1	.167	1.011
ZIZYPHUS	10.078	9.747	1.069	1	.301	2.381
VILLAGE	-.003	.003	.816	1	.366	.997
ANOGESSUS	-3.223	2.925	1.214	1	.270	.040
ACACIA	-4.895	4.874	1.008	1	.315	.007
WATER	.004	.006	.398	1	.528	1.004
Constant	-.086	2.341	.001	1	.971	.918

Discussion

The simulation results from present study showed that the occupancy based Royle and Nichols [20] model can provide a useful tool for the estimation of abundance of ratel in Sariska, since it is relatively inexpensive to obtain presence-absence data from sites. The abundance estimates showed high standard error in both the seasons are likely to improve (lower standard errors) when animal specific detection probabilities are improved, and also when the numbers of repeated visits are increased and more sites (grids) will be surveyed. In Sariska TR, the density of ratel i.e. 6.43 individuals /100 km² was found to be high as compared with Serengeti National Park, Tanzania (0.1 individuals/100 km²) [26], Niokolo-Koba National Park, Senegal (0.07 individuals/100 km²) [27] and in Kgalagadi Transfrontier Park, South Africa (0.03 individuals/km²) [28]. *Boswellia* dominated forest, *Butea* mixed forest and NDVI were

found highly correlated ($P > 0.6$) with other forest types, hence removed from the final model selection. The remaining variables (*Anogeissus* dominated forest, *Zizyphus* mixed forest, *Acacia* mixed forest, scrubland, elevation and distances to water, villages and road) collectively accounted for 64.8% for explaining suitable habitat for ratel ($R^2 = 0.5711$). DEM, distance to water and one land cover class (*Zizyphus*) were found to be positively correlated with the ratel occurrence and distance to road and village and vegetation types such as *Anogeissus*, *Acacia* and scrubland were found to be negatively correlated with the occurrence of ratel. Results obtained from present study were consistent with available studies where riverine habitats for foraging and undulating dry deciduous patches were important for its distribution [29]. Out of total intensive study area of 144 km², 103 km² and 4 km² were found to be very low and low suitable areas respectively which represented 75% of the total study area, while 6 km² and 31 km² were found to be medium and high suitable areas respectively for ratel which represented for 25% of the total study area (Fig. 4). Elevation, area close to water and one vegetation class (*Zizyphus*) affected the distribution and suitable areas for ratel in the intensive study area (Fig. 4). The present study showed that specific vegetation patterns played an important role in the distribution and abundance of ratel in Sariska TR. The habitat suitability map prepared in this study predicted the probability of presence of ratel in Sariska TR and developed basis for management of areas for future conservation of this species in the study area and other similar habitat of the country.

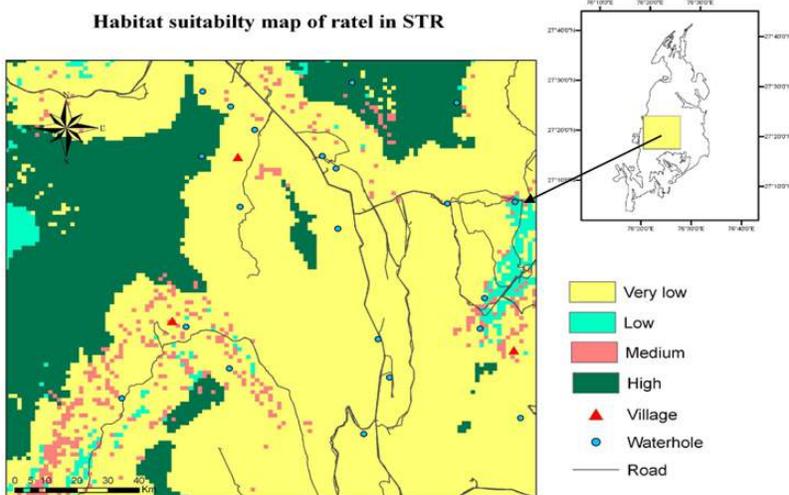


Fig. 4: Habitat suitability map for ratel in the intensive study area of Sarsiska Tiger Reserve, Western India.

Acknowledgements

We thank Rajasthan Forest Department for granting permission to work in Sariska, as part of 'Ecology of Leopard' project conducted by Wildlife Institute of India (WII). We thank Director and Dean, WII for their encouragement and support provided for the study. We thank our field assistants Jairam, Omi and Ramesh for their assistance in field.

References

Five “key references”, selected by the authors, are marked below (Three recommended (●) and two highly recommended (●●) papers).

1. Harrison, D.L. & Bates, P.J.J. 1991. The mammals of Arabia. Harrison Zool. Mus. Publ. 1991: 135–137.
2. Neal, E. & Cheeseman, C. 1996. Badgers. London: Poyser Natural History.
3. Kruuk, H. & Mills, M.G.L. 1983. Notes on the food and foraging of the honey badger (*Mellivora capensis*) in the Kalahari Gemsbok National Park. Koedoe 26: 153–157.
4. Begg, C.M. 2001a. Feeding ecology and social organization of honey badgers in the southern Kalahari. Ph.D. thesis. University of Pretoria, South Africa.
5. Begg, C.M., Begg, K.S., Du Toit, J.T. & Mills, M.G.L. 2003a. Sexual and seasonal variation in the diet and foraging behavior of a sexually dimorphic carnivore, the honey badger *Mellivora capensis*. J. Zool. (Lond.) 260: 301–316.
DOI:10.1017/S0952836903003789
6. ●● Begg, C.M., Begg, K.S., Du Toit, J.T. & Mills, M.G.L. 2003b. Scent-marking behavior of the honey badger *Mellivora capensis* (Mustelidae) in the southern Kalahari. Anim. Behav. 66: 917–929.
DOI:10.1006/anbe.2003.2223
7. Begg, C.M., Begg, K.S., Du Toit, J.T. & Mills, M.G.L. 2005. Spatial organization of the honey badger *Mellivora capensis* in the southern Kalahari: home range size and movement patterns. J. Zool. (Lond.) 265: 27–39.
DOI:10.1017/S0952836904005989
8. Prater, S.H. 1980. The book of Indian animals, Bombay Natural History Society, Bombay, India.
9. Schaller, G.B. 1967. The Deer and the Tiger: A study of Wildlife in India. Chicago. University of Chicago Press, USA.
10. Gittleman, J.L. 1986. Carnivore life history patterns: allometric, phylogenetic and ecological associations. Am. Nat. 127: 744–771.
DOI:10.1086/284523
11. Johnson, D.S.P., Macdonald, D.W. & Dickman, A.J. 2000. An analysis and review of models of the sociobiology of the Mustelidae. Mammal Rev. 30: 171–196.
DOI:10.1046/j.1365-2907.2000.00066.x
12. Pocock, R.I. 1941. The Fauna of British India including Ceylon and Burma. Vol. II. Taylor & Francis, London.
13. Champion, H.G. & Seth, S.K. 1986. A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi.
14. Gupta, S., Mondal, K., Sankar, K. & Qamar Q. 2009. Estimation of Striped hyena (*Hyaena hyaena*) population using camera trap in Sariska Tiger Reserve, Rajasthan, India. J. Bombay. Nat. His. Soc 106(3): 284-288.
15. Harihar, A., Pandav, B., & Goyal, S.P. 2010. Density of leopard (*Panthera pardus*) in Chilla Range of Rajaji National Park, Uttarakhand, India. Mammalia 73: 68.71.
16. Otis, D.L., Burnham, K.P., White, G.C., & Anderson, D.R. 1978. Statistical inference from capture data on closed animal populations. Wildlife Monographs 62: 1-135.
17. Sankar, K., Qureshi Q., Mondal, K., Worah, D., Srivastava, T., Gupta, S., & Basu, S. 2009. Ecological studies in Sariska Tiger Reserve, Report submitted to National Tiger Conservation Authority, Govt. of India, New Delhi and Wildlife Institute of India, Dehra Dun 145pp.

18. ●● Kauhala, K., Holmala, K., Lammers, W., & Schregel, J. 2006. Home range and densities estimates of medium sized carnivores in south east Finland, with special reference to rabies spread. *Acta Theriologica* 51(1):1-13.
DOI:10.1007/BF03192650
19. ● Swihart, R.K., Slade, N.A. & Bergstrom, B.J. 1988. Relating body size to the rate of home range use in mammals. *Ecology* 69: 393-399.
DOI:10.2307/1940437
20. ● Royle, J.A., & Nichols, J.D. 2003. Estimating abundance from repeated presence-absence data or point counts. *Ecology* 84(2): 777-790.
DOI:10.1890/0012-9658(2003)084[0777:EAFRPA]2.0.CO;2
21. Royle, J.A., & Dorazio, R.M. 2006. Hierarchical models of animal abundance and occurrence. *Journal of agricultural, biological and environmental statistics* 11(3): 249-263.
DOI:10.1198/108571106X129153
22. ● MacKenzie, D.I., Nichols, J.D., Lachman, G.B., Droege, S., Royle, J.A. & Langtimm, C.A. 2002. Estimating site occupancy rates when detection probabilities are less than one. *Ecology*, 83(8): 2248-2255.
DOI:10.1890/0012-9658(2002)083[2248:ESORWD]2.0.CO;2
23. Hintze, J. 2006. NCSS, PASS, and GESS. Kaysville, Utah: NCSS.
24. Ramesh, K. 2003. An Ecological study on pheasants of the Great Himalayan National park, Western Himalaya, Ph.D. Thesis. Forest Research Institute, Deemed University, Dehra Dun 198pp.
25. Hosmer, D.W. & Lemeshow, S. 1989. *Applied Logistic Regression*. John Wiley and Sons Inc, New York.
26. Waser, P.M. 1980. Small nocturnal carnivores. *Ecological studies in the Serengeti*. *African Journal of Ecology* 18: 167-185.
DOI:10.1111/j.1365-2028.1980.tb00640.x
27. Sillero-Zubiro & Marino, J. 1997. The status of small carnivore species in Niokolo-Koba National Park, Senegal. *Small Carnivore Conservation* 17: 15-18.
28. Begg, K.S. 2001b. Report on the conflict between beekeepers and honey badgers *Mellivora capensis*, with reference to their conservation status and distribution in South Africa. Unpublished report for the Endangered Wildlife Trust, Johannesburg.
29. Pati, B.P., Vijayan, S., & Mehra, B.S. 2000. Some observation on food habits and distribution of Ratel (*Mellivora capensis*) in Gir, India, *Indian Forester* 95:15-16.

DIVERSITY AND ABUNDANCE OF RODENTS IN THE SEMI-ARID LANDSCAPE OF SARISKA TIGER RESERVE, WESTERN INDIA

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The diversity and abundance of rodents were estimated in Sariska Tiger Reserve, Rajasthan, from November 2007 to June 2009. A total of 41 Sherman traps were deployed at twelve sites under different vegetation types for 10 days during winter and summer, which amounted to a total effort of 4,920 trap nights and recorded eleven species of small rodents. The diversity of rodents was found to be highest in open scrub in winter, and in summer it was highest in *Ziziphus* mixed forest. Overall (combining both summer and winter), *Mus platythrix* was found to be most abundant (6.26 individuals/ha), followed by *Golunda ellioti* (3.41 individuals/ha). The overall rodent density was 22.92 ±4.65 (SE) animals/ha in winter, and 7.81 ±2.25 (SE) animals/ha in summer.

Key words: Rodents, density, semi-arid landscape, Sariska Tiger Reserve, Web trapping design

INTRODUCTION

The rodents of the Indian subcontinent are represented by 46 genera and 128 species (Ellerman 1961; Roonwal 1987). They are generally viewed as pests due to the economic losses caused to agriculture and the prospect of their being carriers of disease (Mukherjee *et al.* 2004). However, the importance of rodents in the diet of many large and small carnivores has been documented by various studies (Comman and Brunner 1972; Gupta 2006, 2011; Jones and Smith 1979; Kitchener 1991; Ludlow and Sunquist 1987; Moehlman 1986; Mondal *et al.* 2011; Mukherjee 1998; Palmer and Fairall 1988; Pearson 1964; Sankar and Johnsingh 2002; Sankar *et al.* 2009; Sillero-Zubiri and Gottelli 1995). In the recent past, many workers have contributed to an understanding of the distribution pattern of rodents in India. Chakraborty (1983) studied the rodent distribution in Jammu & Kashmir region. Mahajan and Mukherjee (1972, 1974) prepared a checklist of rodents in Himachal Pradesh. Sood and Dilber (1977) documented the rodent species of Punjab. Sheiker *et al.* (1983) and Jain (1975) studied the rodents of Uttar Pradesh. The rodents of the Thar Desert in Rajasthan was studied in detail by Agarwal (1976), Biswas and Ghose (1968), Ghose (1976), and Prakash (1959, 1963, 1972, 1974, and 1981). Hill (1958), Jain (1985), and Khajuria and Ghosal (1981) documented the rodent fauna of Madhya Pradesh. Pradhan (1975) provided an account of the rodents of Maharashtra. Agarwal (1973) gave a detailed account of the rodent species of the Goa region. Agarwal and Bhattacharyya (1987) supplemented our knowledge of rodent distribution in West Bengal. Agarwal and Bhattacharyya

(1977) and Roonwal (1949, 1950) made remarkable contributions to the rodent distribution of North-east India. A sum total of these efforts came out as compilations and Ellerman and Morrison Scott (1966) published a checklist of Indian rodents. But these were taxonomic studies and have not assessed the ecological aspects of species assemblage, co-existence, and diversity in the natural habitat.

Although numerous studies have investigated the distribution, behaviour, ecology, and management of rodents in agricultural fields (Advani and Mathur 1982; Alibhai 1985; Chopra and Gupta 1987; Chopra *et al.* 1996; Davis 1953; Prakash and Prakash 1985; Prakash and Mathur 1987; Rana 1992; Santra and Manna 2008; Spillett 1968; WHO 1974), only a few studies had investigated population of rodents in forested landscape in Rajasthan deserts (Prakash 1981, 1995). In this paper, we discuss the diversity and abundance of rodents in different vegetation types in the semi-arid landscape of Sariska Tiger Reserve, Rajasthan, assessed by the web trapping design method.

STUDY AREA

Sariska Tiger Reserve (STR), (25° 5'–27° 33' N; 74° 17'–76° 34' E) is situated in the Aravalli Hills range and lies in the semi-arid region of Rajasthan (Fig. 1). The Reserve is spread over 881 sq. km, of which 274 sq. km is notified as a national park. There are 30 villages in the Reserve and 10 in the National Park. The vegetation is tropical dry deciduous forest and tropical thorn forest (Champion and Seth 1968). The climate is subtropical, characterised by a distinct winter

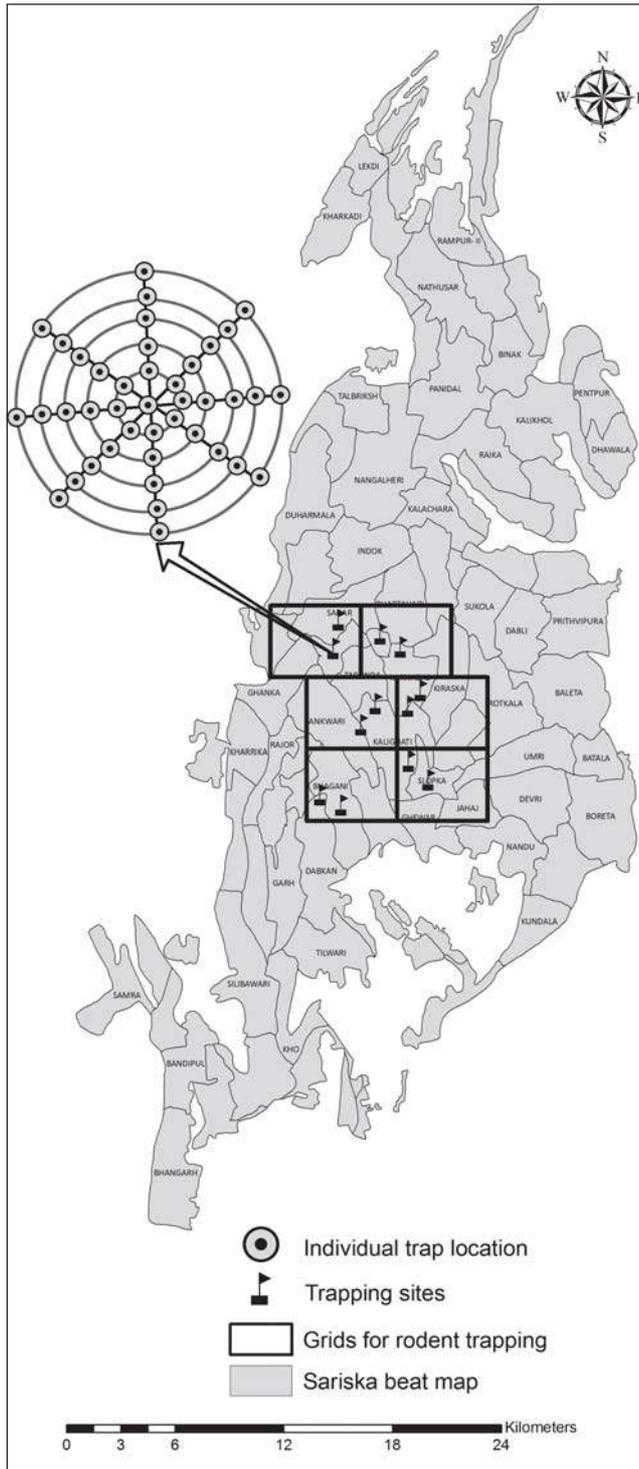


Fig. 1: Location of Sariska Tiger Reserve and the sampling sites in Intensive Study Area

(October–February), summer (March–June), and monsoon (July–September). The average annual rainfall is 700 mm, mostly received during July–September. Large carnivores are Tiger *Panthera tigris*, Leopard *Panthera pardus*, and Striped Hyena *Hyaena hyaena*, while the small carnivores include

Caracal *Caracal caracal*, Golden Jackal *Canis aureus*, Jungle Cat *Felis chaus*, Common Mongoose *Herpestes edwardsi*, Small Indian Mongoose *Herpestes auropunctatus*, Ruddy Mongoose *Herpestes smithi*, Palm Civet *Paradoxurus hermaphroditus*, Small Indian Civet *Viverricula indica*, Ratel *Mellivora capensis*, and Desert Cat *Felis silvestris*.

METHODOLOGY

The study was conducted in an area of 120 sq. km of the National Park, divided into six blocks of 20 sq. km (Fig. 1). The diversity and abundance of rodents was estimated using the web trapping design (Anderson *et al.* 1983), which requires rodent captures to be collected from the trapping web, and treats the data (capture occasions and locations) as distance measures from the centre of the web.

Two trap points were randomly selected in each block. Thus, there was a total of 12 trapping sites for the six blocks. Forty-one standard Sherman live traps (5 x 6.5 x 16.5 cm) were placed at each trap points encompassing different vegetation types. Each Sherman live trap ran for ten consecutive trap nights (a trap night denoting the use of one trap/night), and thus, the total sampling amounted to 4,920 trap nights/season. The traps were operated in 0.79 ha, having concentric rings of 5 traps each at intervals of 10 m covering 50 m radius (Fig. 1). Traps were placed on the forest floor and concealed with bushes and dry leaves. All traps were painted brown, and placed near bushes, trees, rocks, fallen logs, or any other possible runways of rats. All the traps were baited with peanut butter, placed between 17:30–18:30 hrs, and checked for animals between 5:30–7:30 hrs. Equal efforts were made in all the blocks in both the seasons. Trapping success was calculated from the number of rodents captured divided by the number of trap nights.

The trapped rodents were photographed and identified, weighed and measured for tail length and body to head length (HBL). Rodents were identified up to species level using field guides (Corbett and Hill 1992; Menon 2003; Prater 1980). Sex was identified based on their genitalia; adults, subadults, and pregnant females were not identified separately. The animals were released at the spot where they had been trapped.

Simpson's Index (d) was used to evaluate species richness at the different trap sites. The Shannon Wiener diversity and evenness indices were used to estimate the species diversity across the trap sites (Shannon and Wiener 1963). The trapping web design was used for estimation of abundance of different rodent species (Burnham *et al.* 1980), while the program DISTANCE 5.0 (Laake *et al.* 1994) was used for computations of seasonal (summer and winter) densities in the different sites. Each dataset was analysed by three different models

Table 1: Species richness (Simpson's Index) and species diversity (Shannon Wiener Index) of rodent species in different trap sites in Sariska Tiger Reserve during November 2007–June 2009

Trap sites	Winter					Summer						
	Number of species (S)	Species diversity (Shannon Wiener index-H)	Species richness Simpson's index of diversity=(1-d)	Evenness (E) = e ^{Hs}	Number of species (S)	Species diversity (Shannon Wiener index-H)	Species richness Simpson's index of diversity=(1-d)	Evenness (E) = e ^{Hs}	Number of species (S)	Species diversity (Shannon Wiener index-H)	Species richness Simpson's index of diversity=(1-d)	Evenness (E) = e ^{Hs}
Riverine F	6	1.364	0.656	0.652	5	1.458	0.746	0.859	5	1.458	0.746	0.859
Riverine-Ziziphus F	7	1.837	0.826	0.896	1	0.000	0.000	1.000	1	0.000	0.000	1.000
Acacia W	2	0.683	0.498	0.989	2	0.636	0.444	0.945	2	0.636	0.444	0.945
Acacia MF	2	0.451	0.278	0.784	3	1.040	0.625	0.943	3	1.040	0.625	0.943
Anogessius W	3	0.901	0.531	0.820	3	1.011	0.611	0.916	3	1.011	0.611	0.916
Anogessius MF	3	1.030	0.620	0.933	3	1.040	0.625	0.943	3	1.040	0.625	0.943
Ziziphus MF	4	0.610	0.283	0.460	6	1.696	0.800	0.908	6	1.696	0.800	0.908
Ziziphus W	1	0.000	0.000	1.000	3	1.055	0.640	0.957	3	1.055	0.640	0.957
Open Scrubland	8	1.789	0.783	0.784	4	1.360	0.732	0.974	4	1.360	0.732	0.974
Scrubland-Acacia W	9	1.993	0.837	0.815	0	—	—	—	0	—	—	—
Butea MF	4	1.303	0.703	0.920	3	0.678	0.380	0.656	3	0.678	0.380	0.656
Butea-Ziziphus MF	2	0.377	0.219	0.729	1	0.000	0.000	1.000	1	0.000	0.000	1.000

F= Forest, W= Woodland, MF= Mixed forest

Table 2: Overall density estimates of rodent species during November 2007–June 2009 in Sariska Tiger Reserve

S. No	Species	Overall				
		N	Density/ ha	SE	Encounter rate	SE
1	<i>Golunda ellioti</i>	67	3.41	0.66	0.279	0.044
2	<i>Vandeleuria oleracea</i>	12	0.61	0.26	0.050	0.021
3	<i>Mus booduga</i>	21	1.06	0.30	0.087	0.022
4	<i>Mus musculus</i>	18	0.92	0.27	0.075	0.020
5	<i>Mus platythrux</i>	123	6.26	1.07	0.510	0.065
6	<i>Millardia gleadowi</i>	11	0.52	0.19	0.045	0.014
7	<i>Millardia meltada</i>	4	0.20	0.10	0.016	0.008
8	<i>Rattus norvegicus</i>	25	1.27	0.30	0.104	0.022
9	<i>Rattus rattus</i>	14	0.71	0.23	0.058	0.018
10	<i>Tatera indica</i>	16	0.81	0.27	0.066	0.020
11	<i>Gerbillus nanus indus</i>	5	0.25	0.11	0.020	0.009

N = Total number of captures

(uniform, half-normal, and hazard) with three possible model adjustments (cosine, polynomial, and hermite). Akaike’s information criterion was used to select the model that best fit the present dataset (Buckland *et al.* 1993). Z test was used to check for any significant difference in the densities of rodents between seasons (Zar 2004). Rodent biomass was calculated by multiplying the mean species body weight by estimated density of the species (Nichlos *et al.* 1975).

RESULTS

Species diversity and richness: The Shannon Wiener diversity and Simpson richness indices indicated high rodent species diversity in Open Scrubland, followed by *Acacia* woodland and Riverine Forest in winter (Table 1). In summer, the diversity and richness indices indicated high rodent species diversity in *Ziziphus* mixed forest and Riverine forest (Table 1). Species wise: *Vandeleuria oleracea* was captured only in *Anogessius* dominant forest; three species of *Mus* were recorded in open scrubland, *Ziziphus* woodland, and *Anogessius* mixed forest; two species of gerbils were captured in *Ziziphus* woodland and scrubland; *Rattus rattus*, *R. norvegicus*, and *Millardia meltada* were found in *Butea* mixed forest; *Millardia gleadowi* was captured only in *Butea-Ziziphus* mixed forest; and *Golunda ellioti* was largely captured in open scrubland.

Overall density: A total of 316 individuals belonging to 11 species of rodents were recorded during the study. The overall weight of male and female, average HBL, and average tail length of species is given in Table 3. The overall rodent density was 16.15 ± 2.76 animals/ha, and their estimated total

Table 3: Weight and body measurements of rodent species in Sariska Tiger Reserve

Species	Average weight (gm)		Head to body length (cm)		Tail length (cm)	
	Female	Male	Min.	Max.	Min.	Max.
<i>Golunda ellioti</i>	41.7	53.7	6.5	12.1	7.3	12.1
<i>Vandeleuria oleracea</i>	16.0	18.9	4.5	7.0	9.0	11.5
<i>Mus booduga</i>	8.3	7.3	4.3	6.8	5.0	8.5
<i>Mus musculus</i>	7.8	8.8	4.0	7.2	4.7	11.3
<i>Mus platythrux</i>	15.3	13.7	4.3	7.8	5.1	9.1
<i>Millardia gleadowi</i>	54.5	52.0	8.2	11.5	8.0	15.5
<i>Millardia meltada</i>	66.8	68.0	7.1	11.5	9.0	17.0
<i>Rattus norvegicus</i>	108.8	124.9	9.2	20.0	16.0	21.0
<i>Rattus rattus</i>	135.1	134.9	12.5	17.3	18.6	23.5
<i>Tatera indica</i>	54.3	50.2	8.2	13.5	10.2	20.5
<i>Gerbillus nanus indus</i>	23.5	14.5	7.0	8.7	10.5	13.5

* Min. = minimum; Max. = maximum

biomass was 612.9 gm/ha. Global detection model was fitted using the abundance of all species. Half normal detection function with cosine adjustment of order two was the best fitted model for all species. *Mus platythrux* was found to be the most abundant species (6.26 individuals/ha) in the study area, followed by *Golunda ellioti* (3.41 individuals/ha) and *Rattus norvegicus* (1.27 individuals/ha) (Table 2).

Seasonal density: Least trap success was recorded in summer (0.89%) and maximum trap success in winter (2.6%) (Table 4). The species detection was explained by half normal detection function with cosine adjustment of order two in summer and uniform with cosine of order two in winter, based on lowest Akaike information criterion. The overall rodent density in winter was 22.92 ± 4.65 (SE) animals/ha, and 7.81 ± 2.25 (SE) animals/ha in summer. Z test revealed significant difference in the densities of rodents between seasons ($Z=2.915$, $P=0.0039$). *Gerbillus nanus indus* was captured ($n=5$) only in summer, and *Millardia meltada* ($n=5$) only in winter.

Of the 316 captures of 11 species, *Mus platythrux* ($n=127$) was found to be the most abundant rodent species in both the seasons followed by *Golunda ellioti* (5.56 individuals/ha) in winter, *Golunda ellioti* (1.01 individuals/ha) and *Rattus norvegicus* (0.92 individuals/ha) in summer (Table 4).

DISCUSSION

The overall density of rodents in Sariska Tiger Reserve (STR) was low compared to those reported in some other tropical

Table 4: Density estimates of rodent species during winter and summer (2007–2009) in Sariska Tiger Reserve

	Winter (Nov–Feb)					Summer (Mar–June)				
	N	Density/ha	SE	EDR	SE	N	Density/ha	SE	EDR	SE
<i>Golunda ellioti</i>	56	5.56	1.2	0.466	0.08	11	1.01	0.4	0.091	0.028
<i>Vandeleuria oleracea</i>	11	1.09	0.5	0.091	0.04	1	0.09	0.09	0.008	0.008
<i>Mus booduga</i>	17	1.69	0.54	0.141	0.041	4	0.37	0.2	0.033	0.016
<i>Mus musculus</i>	12	1.29	0.45	0.108	0.035	6	0.46	0.26	0.041	0.021
<i>Mus platythrix</i>	91	9.04	1.77	0.758	0.11	32	2.95	0.99	0.266	0.064
<i>Millardia gleadowi</i>	5	0.49	0.22	0.041	0.018	6	0.55	0.28	0.05	0.023
<i>Millardia meltada</i>	4	0.39	0.2	0.033	0.016	0	–	–	–	–
<i>Rattus norvegicus</i>	15	1.49	0.47	0.125	0.036	10	0.92	0.35	0.083	0.025
<i>Rattus rattus</i>	7	0.69	0.33	0.058	0.027	7	0.64	0.31	0.058	0.024
<i>Tatera indica</i>	12	1.19	0.46	0.1	0.036	4	0.36	0.24	0.033	0.02
<i>Gerbillus nanus indus</i>	–	–	–	–	–	5	0.46	0.23	0.042	0.018

EDR= Effective distance radius; N = Total number of captures

deciduous forest areas in India: Kerala in Western Ghats (Jayahari 2008); upper Nilgiris, southern India (Shanker 2000, 2001, 2003; Shanker and Sukumar 1999). However, the trapping success of murid rodents in this study was high (2.8%) compared to an earlier study in Sariska (0.9%) by Mukherjee (1998).

There was a higher abundance of rodents in the study area during winter (6.33 animals/ha) than in summer (2.32 animals/ha), and this may be due to the congregation of rodents in the areas due to availability of seasonal fruits like *Ziziphus mauritiana*, *Z. nummularia*, and *Balanites aegyptiaca* that were observed to be consumed by them during winter. Prakash (1995) reported low abundance of rodents in summer in semi-arid areas of the Thar Desert in Rajasthan, where gerbils switch over their diet to insects when the vegetation is without water content. Prakash (1995) recorded spectacular fluctuation in feeding on various plant parts over the year (depending on their availability) for some rodent species in the desert ecosystem.

Rodents were found to play an important role in the diet of large, medium, and small-sized carnivores in STR, contributing 4.4% in the diet of Golden Jackal and 34.3% in Jungle Cat (Gupta 2011), and about 3–7% in the Leopard (Mondal 2011). A long-term study using web trapping design may give better understanding of rodent abundance in different habitat types and seasons in the study area, and also their contribution in small carnivores' diet in different seasons.

ACKNOWLEDGEMENTS

We thank the Rajasthan Forest Department for granting permission to work in Sariska Tiger Reserve, Rajasthan, under the research project 'Ecology of Leopard'; the Director and the Dean, FWS, Wildlife Institute of India, Dehradun, for their support and guidance; and our field assistants, Jairam, Omi, and Ramesh for their help in field data collection.

REFERENCES

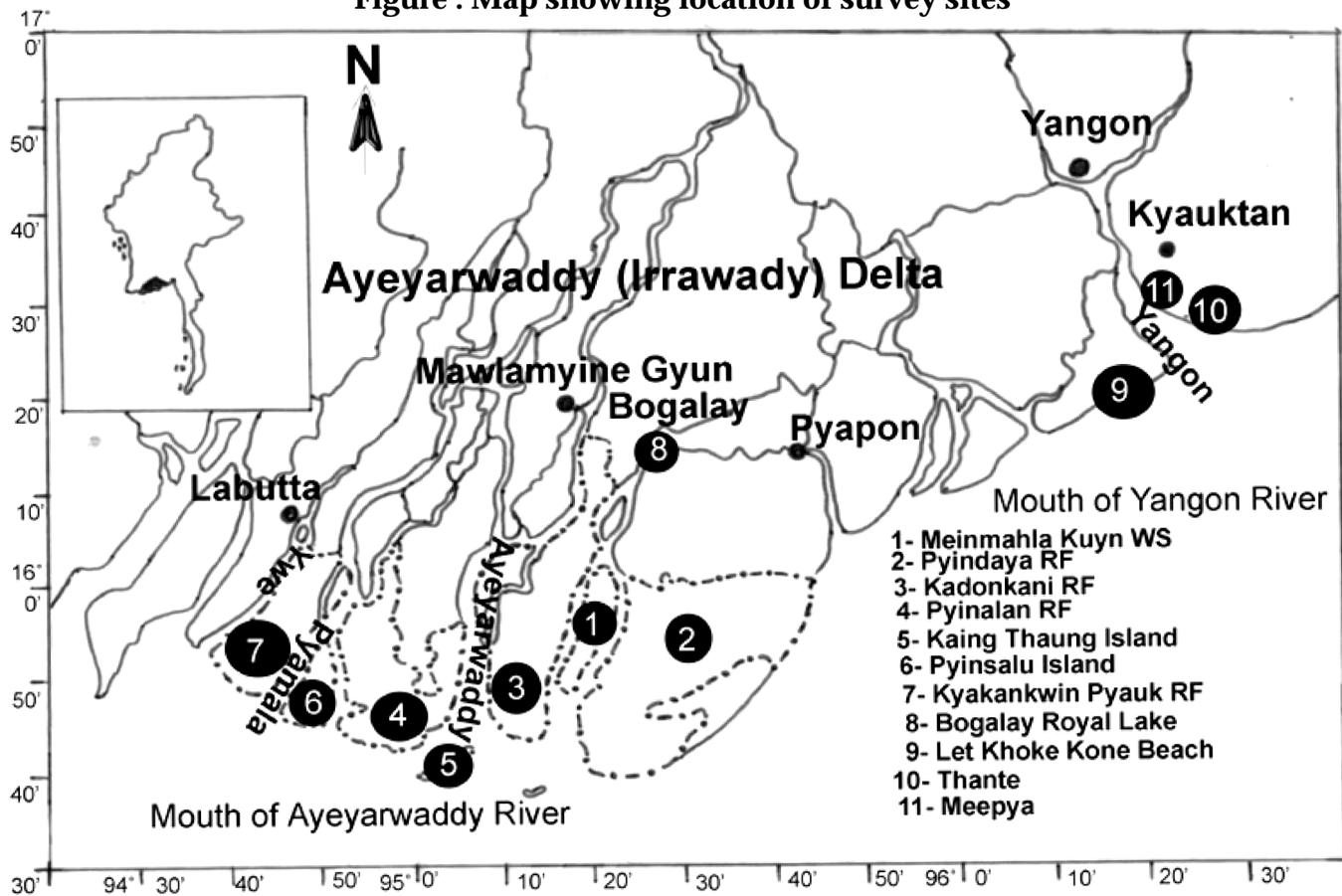
- ADVANI, R. & R.P. MATHUR (1982): Experimental reduction of rodent damage to vegetable crops in Indian villages. *Agro Ecosystems* 8: 39–45.
- AGARWAL, V.C. (1973): Notes on collection of mammals from Goa. *Rec. Zool. Surv. India* 67: 261–280.
- AGARWAL, V.C. (1976): New mammal records from Rajasthan. *Journal of Science and Technology* 5: 342–344.
- AGARWAL, V.C. & T.P. BHATTACHARYYA (1977): Reports on collection of mammals from Tripura. *Reports Zool. Surv. India*. 73: 135–157.
- AGARWAL, V.C. & T.P. BHATTACHARYYA (1987): New mammal records from West Bengal. *Bulletin Zool. Surv. India* 8: 221–222.
- ALIBHAI, S.K. (1985): Effect of diet on reproductive performance of the bank vole (*Clethrionomys glareolus*). *J. Zool. (Lond.)* 205(3): 445–452.
- ANDERSON, D.R., K.P. BURNHAM, G.C. WHITE & D.L. OTIS (1983): Density estimation of small-mammal populations using a trapping web and distance sampling methods. *Ecology* 64: 674–680.
- BISWAS, B. & R.K. GHOSE (1968): New record of mammal from Rajasthan, India. *J. Bombay Nat. Hist. Soc.* 65(2): 481–482.
- BUCKLAND, S.T., D.R. ANDERSON, K.P. BURNHAM & J.L. LAAKE (1993): Distance sampling: estimating abundance of biological populations. Chapman and Hall, London, UK. 446 pp.
- BURNHAM, K.P., D.R. ANDERSON & J.L. LAAKE (1980): Estimation of density from line transect sampling of biological populations. *Wildlife Monographs* 72: 1–202.
- CHAMPION, H.G. & S.K. SETH (1968): A revised survey of forest types of India. Manager of Publications, Government of India, New Delhi. 404 pp.

- COMMAN, B.J. & H. BRUNNER (1972): Food habits of the feral house cat in Victoria. *J. Wildlife. Manage.* 36: 848–853.
- CHAKRABORTY, S. (1983): Contribution to the knowledge of mammalian fauna of Jammu and Kashmir. *Record Zool. Surv. India Occ. Pap.* 38: 128.
- CHOPRA, G. & R.C. GUPTA (1987): Strategic use of single dose anticoagulants for rodent control in paddy. *Ninth International Conference of Tropical Ecology*. BHU, Varanasi, December.
- CHOPRA, G., P. KAUR & S.S. GURAYA (1996): Rodents: Ecology, Biology and Control. R. Chand and Co., New Delhi. 202 pp.
- CORBETT, G.B. & J.E. HILL (1992): The Mammals of Indo-Malayan Region. A Systematic Review. Oxford University Press, Oxford. 496 pp.
- DAVIS, D.E. (1953): The characteristics of rat populations. *Q. Rev. Biol.* 28: 373–401.
- ELLERMAN, J.R. & T.S.C. MORRISON SCOTT (1966): Checklist of Palaearctic and Indian Mammals, 1758–1946. British Museum (Natural History), London. 810 pp.
- ELLERMAN, J.R. (1961): The Fauna of India including Pakistan, Burma and Ceylon. Mammalia. 2nd edn, Vol. 3 (Rodentia), Parts 1 & 2. Manager of Publications, Zoological Survey of India, Calcutta. 884 pp.
- GHOSE, R.K. (1976): Further new records of mammals from Rajasthan, India. *Journal Zool. Soc. India* 26: 149–150.
- GUPTA, S. (2006): Prey abundance and feeding habits of jackal (*Canis aureus*) in Keoladeo National Park, Bharatpur, Rajasthan. M.Sc. dissertation submitted to Department of Wildlife Sciences, Aligarh Muslim University, Aligarh. 72 pp.
- GUPTA, S. (2011): Ecology of medium and small sized carnivores in Sariska Tiger Reserve, Rajasthan. Ph.D. Thesis, Saurashtra University, Rajkot, Gujarat. 192 pp.
- HILL, J.E. (1958): Some observations on the fauna of Maldives Islands. II. Mammals. *J. Bombay Nat. Hist. Soc.* 55(1): 3–10.
- JAIN, A.P. (1975): Determination of bait preference of Rodents. *Proc. Summer Inst. Rodentol.*, Jodhpur, India. Pp. 81–87.
- JAIN, A.P. (1985): A note on the field rodents of Mandsaur District, Madhya Pradesh. *J. Bombay Nat. Hist. Soc.* 82(2): 397–407.
- JAYAHARI, K.M. (2008): Ecology and behavior of small mammals in the Western Ghats of Kerala, southern India with special reference to rodents. Ph.D. Thesis, Forest Research Institute, Dehradun. 167 pp.
- JONES, J.H. & N.S. SMITH (1979): Bobcat density and prey selection in Central Arizona. *J. Wildlife. Manage.* 43: 666–672.
- KHAJURIA, H. & D.K. GHOSAL (1981): Studies on Wildlife of Narbada Valley, Part IV. Mammals. *Rec. Zool. Surv. India* 79: 235–257.
- KITCHENER, A. (1991): The Natural History of the Wild Cats. Christopher Helm Publishers, London. 70 pp.
- LAAKE, J.L., S.T. BUCKLAND, D.R. ANDERSON & K.P. BURNHAM (1994): DISTANCE User's Guide. Colorado State University, Fort Collins, CO. 84 pp.
- LUDLOW, M.E. & M.E. SUNQUIST (1987): Ecology and behaviour of ocelots in Venezuela. *Nat. Geogr. Res.* 3: 447–461.
- MAHAJAN, K.K. & R.N. MUKHERJEE (1972): Checklist of mammal of Himachal Pradesh with a district wise distribution. *Proc. 59th Indian Sci. Congr. Pt. 3, Abstrs, Calcutta*. Pp. 473–474.
- MAHAJAN, K.K. & R.N. MUKHERJEE (1974): A checklist of mammals Himachal Pradesh with notes on distribution in the area. *Hippocampus, Chandigarh* 5: 40–47.
- MENON, V. (2003): A Field Guide to Indian Mammals. Dorling Kindersley (India) Pvt. Limited. 200 pp.
- MOEHLMAN, P.D. (1986): Ecology of co-operation in Canids. Pp. 64–86. In: Roubenstein, D.I. and R.W. Wrangham (Eds): Ecological aspects of social evolution in birds and mammals. Princeton University Press, Princeton.
- MONDAL, K. (2011): Ecology of leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan. Ph.D., Thesis, Saurashtra University, Gujarat, India. 233 pp.
- MONDAL, K., S. GUPTA, Q. Qureshi & K. SANKAR (2011): Prey selection and food habits of leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan. *Mammalia* 75: 201–205.
- MUKHERJEE, S. (1998): Ecological separation of three sympatric carnivores in Keoladeo Ghana National Park, Rajasthan, India. M.Sc., Dissertation, Saurashtra University, Rajkot. 60 pp.
- MUKHERJEE, S., S.P. GOYAL, A.J.T. JOHNSINGH & L. PITMAN (2004): The importance of rodents in the diet of jungle cat (*Felis chaus*), caracal (*Caracal caracal*) and the golden jackal (*Canis aureus*) in Sariska Tiger Reserve, Rajasthan, India. *J. Zool. (Lond.)* 262: 405–411.
- NICHLOS, D.W., H.D. SMITH & M.F. BAKER (1975): Rodent population, biomass and community relationship in *Artemisia tridentata* Rush valley, Utah. *Great Basin Naturalist* 35: 191–202.
- PALMER, R. & N. FAIRALL (1988): Caracal and African wildcat diet in the Karoo National Park and the implications thereafter for hyrax. *S. Afr. J. Wildl. Res.* 18: 30–34.
- PEARSON, O.P. (1964): Carnivore mouse predation: an example of its intensity and bioenergetics. *J. Mammal.* 45: 177–188.
- PRADHAN, M.S. (1975): Studies on Bombay Rats. Ph.D. Thesis, Bombay University, Bombay. 180 pp.
- PRAKASH, I. (1959): Food of some Indian desert mammals. *J. Biol. Sci.* 2: 100–109.
- PRAKASH, I. (1963): Taxonomical and ecological account of mammals in Rajasthan Desert, India. *J. Mammal.* 41: 386–389.
- PRAKASH, I. (1972): Extension of the range of *Suncus stoliczkanus* in the Rajasthan desert. *J. Bombay Nat. Hist. Soc.* 69(3): 643–644.
- PRAKASH, I. (1974): The Ecology of vertebrates in Indian desert. Pp. 369–420. In: Mani, M.S. (Ed.): Ecology and Biogeography in India. Dr. W. Junk, The Hague, Netherlands.
- PRAKASH, I. (1981): Ecology of Indian Gerbil (*Meriones hurrianae*). *Monograph. Central Arid Zone Res. Inst., Jodhpur* 10: 1–87.
- PRAKASH, I. (1995): Invasion of peninsular small mammals towards the Aravalli ranges and the Thar Desert. *Int. J. Ecol. Env. Sci.* 21: 17–24.
- PRAKASH, B.G. & K.S. PRAKASH (1985): Estimation of rodent damage in a hybrid rice trial. *Rodent Newsl.* 9(2–4): 12–13.
- PRAKASH, I. & R.P. MATHUR (1987): Management of rodent pests. ICAR Publ. 133 pp.
- PRATER, S.H. (1980): The Book of Indian Animals. Bombay Natural History Society and Oxford University Press, Bombay, India. 324 pp.
- RANA, B.D. (1992): The soft-furred field rat, *Rattus meltada*. Pp. 127. In: Prakash, I. and P.K. Ghosh (Eds): Rodents in Indian Agriculture. Vol. 1, Chap. 10. Scientific Publishers, Jodhpur, India.
- ROONWAL, M.L. (1949): The geographical and geological aspects of migration in animals. *Bull. Natl. Geogr. Soc. India* 11: 1–33.
- ROONWAL, M.L. (1950): Contributions to the fauna of Manipur State Assam. Part III – Mammalia with special reference to the family Muridae (Order Rodentia). *Records of Indian Museum.* 47: 1–64.
- ROONWAL, M.L. (1987): Records of the Zoological Survey of India: Recent Advances in Rodentology in India. *Zoological Survey of India, Calcutta, Miscellaneous Publication.* 105: 126.
- SANKAR, K. & A.J.T. JOHNSINGH (2002): Food habits of tiger (*Panthera tigris*) and leopard (*Panthera pardus*) in Sariska Tiger Reserve, Rajasthan, India, as shown by scat analysis. *Mammalia* 66: 285–289.
- SANKAR, K., Q. Qureshi, K. MONDAL, D. WORAH, T. SRIVASTAVA, S. GUPTA & S. BASU (2009): Ecological studies in Sariska Tiger Reserve. Report submitted to National Tiger Conservation Authority, Govt. of India, New Delhi, and Wildlife Institute of India, Dehradun. 145 pp.

- SANTRA, K.B. & C.K. MANNA (2008): Studies on some aspects of rodent ecology in four districts of Gangetic plains of West Bengal, India. *Univ. J. Zool. Rajshahi Univ.* 27: 85–90.
- SHANKER, K. (2000): Small mammal trapping in tropical montane forests of the Upper Nilgiris, southern India: an evaluation of Capture-Recapture models in estimating population size. *Journal of Biosciences* 25: 99–111.
- SHANKER, K. (2001): The role of competition and habitat in structuring small mammal communities in a tropical montane ecosystem in southern India. *J. Zool. (Lond.)* 253: 15–24.
- SHANKER, K. (2003): Small mammal communities in montane ecosystems in the Nilgiris, southern India: their ecology and natural history. *J. Bombay Nat. Hist. Soc.* 100(1): 46–57.
- SHANKER, K. & R. SUKUMAR (1999): Synchrony in small mammal populations of montane forest patches in southern India. *Journal of Animal Ecology* 68: 50–59.
- SHANNON, C.E. & W. WIENER (1963): *The Mathematical Theory of Communication*. University of Illinois Press, Urbana, Illinois. 11 pp.
- SHEIKER, C., C.S. MALHI, N.S. RAWATH & R. SINGH (1983): Murids of Garhwal Himalayas. *Rodent Newsl.* 7(4): 17.
- SILLERO-ZUBIRI, C. & D. GOTTELLI (1995): Diet and feeding behavior of Ethiopian wolves (*Canis simensis*). *J. Mammal.* 76: 531–541.
- SOOD, M.L. & D.S. DILBER (1977): The composition and fluctuation of population of sympatric Murid in PAU fields. *J. Bombay Nat. Hist. Soc.* 74(3): 521–524.
- SPILLETT, J.J. (1968): *The ecology of the lesser bandicoot rat in Calcutta*. Unpubl. Sc.D. Dissertation, School of Hygiene and Public Health, Johns Hopkins University. Pp. 23.
- WHO (1974): *Ecology and control of rodents of public health importance*. WHO Technical Report. Series No. 553: 1–2.
- ZAR, J.H. (2004): *Biostatistical analysis*. Pearson Education, Inc. Pp. 130.



Figure : Map showing location of survey sites



Annotated checklist of the birds of Sariska Tiger Reserve, Rajasthan, India

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Shahabuddin, G., Kumar, R. & Verma, A. 2006. Annotated checklist of the birds of Sariska Tiger Reserve, Rajasthan, India. *Indian Birds* 2 (3): 71-76.

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Introduction

Sariska Tiger Reserve is one of the important areas for biodiversity conservation in the state of Rajasthan, located in the Aravalli Hills (27°30'N 76°22'E). It covers an area of 866 km² and is composed of Sariska Wildlife Sanctuary, covering 492 km² and stretches of adjoining reserved and protected forests which together cover 374 km².

Sariska is located in the semi-arid zone of north-western India delineated as biogeographic province 4A (semi-arid Gujarat-Rajputana) in the classification of Rodgers & Panwar (1988). Sariska

forests represent the tropical dry forest ecosystem that exists in this part of India. Low hills and slopes are covered by deciduous forests dominated by *Anogeissus pendula*, mixed with *Boswellia serrata*, *Lannea coromandelica* and *Wrightia tinctoria*. The ridges, hill-tops and drier strata are dominated by *B. serrata*. Floors of valleys that have seasonal streams or perennial springs, harbour much more diverse semi-deciduous riparian forests of *Mitragyna parvifolia*, *Ficus glomerata*, *Phoenix sylvestris*, *Syzygium cumini*, *Diospyros melanoxylon*, *Mangifera indica* and *Terminalia bellerica*, along with bamboo

clumps *Dendrocalamus strictus*. In narrow rocky valleys with perennial water sources, *Phoenix sylvestris* is commoner than the other associate species of riparian forest. In drier and flatter terrain, tropical scrub forest dominates, consisting of *Ziziphus mauritiana*, *Acacia leucophloea*, *Butea monosperma*, *Balanites aegyptiaca*, *Acacia catechu* and *Aegle marmelos*. The understorey of scrub forests consists of shrubs such as *Capparis sepiaria*, *C. decidua*, *Ziziphus nummularia* and *Adhatoda vasica*. Grasses such as *Cenchrus ciliaris*, *Dicanthium annulatum* and *Heteropogon contortus* occur in the scrub forest and other flatter

terrain.

Prior to this study, avifauna in Sariska Tiger Reserve was documented once, more than ten years ago (Sankar et al. 1993). The present paper describes the bird community of Sariska Tiger Reserve based on studies during the period March 2003 to June 2005. The avifauna of Sariska Tiger Reserve was studied through systematic large-scale surveys utilizing point counts as well as opportunistic observations throughout the study period. Birds were identified using field guides by Grimmett et al. (1998) and Kazmierczak (2000).

Additions to earlier study

During the current study, a total of 183 avian species were recorded. Twenty-seven bird species have been added to the earlier checklist for Sariska (Sankar et al. 1993). Interesting sightings in this category include Isabelline Wheatear *Oenanthe isabellina*, Bar-headed Goose *Anser indicus*, Eurasian Wryneck *Jynx torquilla*, and the Common Cuckoo *Cuculus canorus*. The attached table (Table 1) lists the bird species recorded by us in Sariska, along with notes on habitat preferences and date and place of rare / solitary sightings. Bird nomenclature and taxonomy follow Manakadan & Pittie (2004).

Possible changes in bird fauna since 1993

53 species recorded by Sankar et al (1993) were not recorded by us. However, Sankar et al (1993) had visited several more sites inside the Reserve than we did, during the course of their surveys. But importantly, several species recorded as being common by Sankar et al (1993) were not seen by us, including Cotton Teal *Nettapus coromandelianus*, Chestnut-bellied Sandgrouse *Pterocles exustus*, Painted Sandgrouse *P. indicus* and Spanish Sparrow *Passer hispaniolensis*. There is possibly a decline in sandgrouse populations in Sariska due to recent changes in vegetation following various water conservation measures, such as check-damming of streams and increased protection of habitat from grazing by domestic cattle. Red Spurfowl *Galloperdix spadicea*, previously reported from the rocky tracts of Pandupol and Salopka, was another species that we did not record. Another striking absence from our list is that of

Grey Hornbill *Ocyrceros birostris*, a frugivorous species, otherwise moderately common in deciduous forests of north-western India. This species, recorded as rare by Sankar et al (1993), was never seen by us inside the Reserve despite the abundance of fruiting *Ficus glomerata* and tall trees along the streams suitable for nesting. It is possible that patches of suitable riparian habitat in Sariska are now too fragmented to support a population of hornbills.

Role of Sariska Tiger Reserve in conservation of regional bird diversity

The list of birds in Table 1 indicates that Sariska is extremely rich in avifauna.

Sariska plays an important role in providing a stopover point for numerous passage migrants such as the Common Rosefinch *Carpodacus erythrinus* that occurs in large flocks during March and October. Other passage migrants include Rosy Starling *Sturnus roseus* and rarely, the Verditer Flycatcher *Eumyias thalassina*. Sariska also provides wintering grounds for many species such as Hume's Warbler *Phylloscopus humei*, Black Redstart *Phoenicurus ochruros*, Eurasian Griffon *Gyps fulvus* and Grey-headed Flycatcher *Culicicapa ceylonensis*. From our observations during summer and monsoon, it appears likely that several insectivorous taxa such as Indian Pitta *Pitta brachyura*, Asian Paradise-Flycatcher *Terpsiphone paradisi*, Eurasian Golden Oriole *Oriolus oriolus* and Pied Crested Cuckoo *Clamator jacobinus* are summer migrants to Sariska.

An important reason for high bird diversity in Sariska may be the existence of a varied topography coupled with a mosaic of forest types including scrub forest, tall riparian forest (gallery forest), hilltop forest and dry deciduous *Anogeissus* forest. For instance, a number of species such as the Crested Serpent-Eagle *Spilornis cheela*, Brown Fish-Owl *Ketupa zeylonensis* and Tickell's Blue-Flycatcher *Cyornis tickelliae* have been found restricted to the few patches of tall riparian forest in Sariska. Riparian forest is also important in providing cover and water for numerous bird species during the harsh summer, such as Indian Treepie *Dendrocitta vagabunda*, Oriental Magpie-Robin *Copsychus saularis* and Oriental White-eye *Zosterops palpebrosus*. Bird communities of each

forest type were found to be rather distinct.

Importance of Sariska for bird conservation

Sariska has justifiably been identified as one of the Important Bird Areas (IBA) in the state of Rajasthan by BirdLife International (Jhunjunwala et al. 2001) due to the fact that it supports seven globally threatened species (see below) and has 30 species out of the 60 that are restricted by habitat to the Indo-Malayan Tropical Dry Zone (Jhunjunwala et al. 2001). Important species in the latter category include Painted Spurfowl *Galloperdix lunulata*, Red-headed Vulture *Aegypius calvus*, Jungle Bush-Quail *Perdica asiatica* and White-bellied Drongo *Dicurus caeruleus*.

Species of conservation interest

Two Critically Endangered species and five Near-threatened species occur in Sariska (BirdLife International 2001). Among the Critically Endangered species, the Indian White-backed Vulture *Gyps bengalensis* occurs in Sariska in a small resident population possibly numbering less than ten. Presence of open scrub woodlands, patches of tall forest and high inaccessible cliffs, along with presence of considerable livestock populations, makes Sariska an ideal habitat for this vulture. The Long-billed Vulture *G. indicus*, another Critically Endangered species, also occurs here in a sizeable resident population, often seen soaring, near cliffs. Sariska offers relatively unpolluted habitat and tall cliffs for the nesting of this species.

Most of the Near-threatened species are uncommonly seen in Sariska. Only the Darter *Anhinga melanogaster* was seen frequently in the Reserve at reservoirs such as Kankwari lake and Karnakawas reservoir. There are just a few individuals in the entire Reserve. Painted Stork *Mycteria leucocephala* has been observed feeding in Kankwari lake and at Karnakawas but is not very common in the Reserve. The Oriental White Ibis *Threskiornis melanocephalus* is not very common in Sariska, having been seen only twice so far. It was seen in swampy fallow fields close to Mansarovar Lake and at Karnakawas reservoir. The Greater Grey-headed Fish-Eagle *Ichthyophaga ichthyaetus*,

possibly a resident, was spotted twice in secluded riparian forest abutting a perennial stream at Bandipul. However, the Red-headed Vulture is quite frequently seen in Sariska, soaring near cliffs and once at a kill in scrub forest at Karnakawas.

Local threats to bird communities

Studies on vegetation have revealed that intensive biomass extraction (mainly through grazing and fuelwood collection) is leading to changes in vegetation structure and composition of the forest (Kumar & Shahabuddin 2005). These changes in forest structure are leading to changes in bird species composition (Shahabuddin & Kumar 2005). Several insectivorous bird species such as the Plain Prinia *Prinia inornata*, Red-throated Flycatcher *Ficedula parva*, Tickell's Blue-Flycatcher, Great Tit *Parus major*, Grey-headed Flycatcher, Oriental White-eye, and Painted Spurfowl are adversely affected by changes in forest structure caused by cutting and lopping activities. Some species such as Indian Robin *Saxicoloides fulicata*, Black Redstart, Eurasian Collared Dove *Streptopelia decaocto* and Grey Francolin *Francolinus pondicerianus* are encouraged and are benefiting by habitat degradation. Apart from extractive activities, escalating

tourism is also likely to adversely impact bird communities in Sariska, as tourism is concentrated around permanent springs such as Pandupol, which are critical to landscape-level diversity in the Reserve.

The forest habitat mosaic found in Sariska comprising dry deciduous, scrub and evergreen riparian forest, along with secluded streams and jheels, is now mainly restricted to protected areas in the Aravalli Hills of Rajasthan. In this context, the protection of Sariska Tiger Reserve as a refuge for avian diversity of Indian tropical dry forest in north-western India is of crucial importance (see also Rodgers & Panwar 1988).

Acknowledgements

This report is based on research projects that were carried out with the financial support of Wildlife Conservation Society—India Programme, Centre for Wildlife Studies (Bangalore), Wildlife Protection Society of India (Delhi) and Oriental Bird Club (U.K.).

References

Birdlife International. 2001. *Threatened birds of Asia*. (Eds) N.J. Collar, A.V. Andreev, S. Chan, M.J. Crosby, S. Subramanya and J.A. Tobias. Cambridge, UK: Birdlife International.
Jhunjhunwala, S., A.R. Rahmani, F. Ishtiaq

& Z.-u. Islam. 2002. The Important Bird Areas Programme in India. *Buceros* 6 (2): 2 ll., 1-49. (2001).

- Grimmett, R., Inskipp, C. & Inskipp, T. 1998. *Birds of the Indian subcontinent*. Delhi: Oxford University Press.
Kazmierczak, K. 2000. *A field guide to the birds of India*: Delhi: OM Book Service.
Kumar, R. & Shahabuddin, G. 2005. Effects of biomass extraction on vegetation structure, diversity and composition of an Indian tropical dry forest. *Environmental Conservation* 32 (2): 1-12.
Manakadan, R. & Pittie, A. 2001. Standardized English and scientific names of the birds of the Indian subcontinent. *Buceros* 6 (1): i-ix, 1-38.
Rasmussen, P. & Anderton, J.C. 2005. *Birds of South Asia. The Ripley guide*. 2 vols. Washington, D.C. & Barcelona: Smithsonian Institution & Lynx Edicions.
Rodgers, W.A. & Panwar, H.S. 1988. *Planning a Wildlife Protected Area Network in India*. Dehradun: Wildlife Institute of India.
Sankar, K., Mohan, D. & Pandey, S. 1993. Birds of Sariska Tiger Reserve, Rajasthan, India. *Forktail* 8: 133-141.
Shahabuddin, G. & Kumar, R. 2005. Linkages between human use of forests and biodiversity indicators in Sariska Tiger Reserve, Rajasthan. Paper presented at seminar on 'Making conservation work: Attempting solutions to biodiversity loss in India', Environmental Studies Group, Council for Social Development, Delhi, March 11-12.

Table 1. Checklist of bird species found in Sariska (March 2003—June 2005)
(R: Resident, W: Winter migratory, S: Summer migratory, P: Passage migrant)

S. No.	Systematic list	Seasonal status	Comments on habitat preferences; dates for raresightings
1	LITTLE GREBE <i>Tachybaptus ruficollis</i>	R	Seen at jheels and waterholes
2	GREAT WHITE PELICAN <i>Pelecanus onocrotalus</i>	W	Occasionally at Karnakawas and Kankwari
3	LITTLE CORMORANT <i>Phalacrocorax niger</i>	R	Seen at jheels and waterholes
4	INDIAN SHAG <i>P. fuscicollis</i>	R	Seen at streams, jheels and waterholes
5	GREAT CORMORANT <i>P. carbo</i>	R	Seen at jheels
6	DARTER <i>Anhinga melanogaster</i>	R	Frequently seen at jheels and waterbodies
7	LITTLE EGRET <i>Egretta garzetta</i>	R	Seen at streams, jheels and waterholes
8	GREY HERON <i>Ardea cinerea</i>	R	Seen at jheels
9	LARGE EGRET <i>Casmerodius albus</i>	R	Seen at jheels
10	MEDIAN EGRET <i>Mesophoyx intermedia</i>	R	Seen at jheels
11	CATTLE EGRET <i>Bubulcus ibis</i>	R	Near water and cultivation
12	INDIAN POND-HERON <i>Ardeola grayii</i>	R	Seen at streams, jheels and waterholes
13	BLACK-CROWNED NIGHT-HERON <i>Nycticorax nycticorax</i>	R?	Karnakawas, 25.x.2003
14	LITTLE BITTERN <i>Ixobrychus minutus</i>	?	A few times in secluded riparian zone
15	PAINTED STORK <i>Mycteria leucocephala</i>	R	Seen regularly at Karnakawas / Kankwari, Mar-Apr 2005
16	BLACK STORK <i>Ciconia nigra</i>	W	Throughout winter at Karnakawas, also streams
17	WHITE-NECKED STORK <i>Ciconia episcopus</i>	R	At jheels and reservoirs
18	GLOSSY IBIS <i>Plegadis falcinellus</i>	V	Seen once at Kankwari, 9.ii.2006
19	WHITE IBIS <i>Threskiornis melanocephalus</i>	R	Seen in fields, at jheels
20	EURASIAN SPOONBILL <i>Platalea leucorodia</i>	R	A few times at jheels
21	GREYLAG GOOSE <i>Anser anser</i>	W	Karnakawas. 24.i.2004
22	BAR-HEADED GOOSE <i>A. indicus</i>	W	Open stretches near wetland, close to village

S. No.	Systematic list	Seasonal status	Comments on habitat preferences; dates for resightings
23	BRAHMINY SHELDUCK <i>Tadorna ferruginea</i>	W	Jheels and reservoirs
24	GADWALL <i>Anas strepera</i>	W	Karnakawas, 29.i.2004
25	MALLARD <i>A. platyrhynchos</i>	W	Karnakawas, 16.xii.2003
26	SPOT-BILLED DUCK <i>A. poecilorhyncha</i>	R	Common at waterholes and reservoirs
27	NORTHERN SHOVELER <i>A. clypeata</i>	W	Common at jheels and reservoirs
28	NORTHERN PINTAIL <i>A. acuta</i>	W	Common at jheels and reservoirs
29	GARGANEY <i>A. querquedula</i>	W	Karnakawas, 12.xi.2003
30	COMMON TEAL <i>A. crecca</i>	W	Infrequent at jheels and reservoirs
31	COMMON POCHARD <i>Aythya ferina</i>	W	Karnakawas, 12.xii.2003
32	ORIENTAL HONEY-BUZZARD <i>Pernis ptilorhynchus</i>	R	Occasional sightings in all habitats
33	BLACK-SHOULDERED KITE <i>Elanus caeruleus</i>	R	Fairly common in scrub forest
34	GREATER GREY-HEADED FISH-EAGLE <i>Ichthyophaga ichthyaetus</i>	R	Seen in riparian forest only
35	EGYPTIAN VULTURE <i>Neophron percnopterus</i>	R	All habitats, commonly near Kankwari village
36	INDIAN WHITE-BACKED VULTURE <i>Gyps bengalensis</i>	R	Soaring near cliffs occasionally
37	LONG-BILLED VULTURE <i>G. indicus</i>	R	Commonly seen soaring and at kills
38	EURASIAN GRIFFON <i>G. fulvus</i>	W	Occasionally seen soaring
39	RED-HEADED VULTURE <i>Aegyptius calvus</i> ¹	R	Often seen soaring and at kills
40	CRESTED SERPENT-EAGLE <i>Spilornis cheela</i>	R	Restricted to dense riparian forest
41	WESTERN MARSH-HARRIER <i>Circus aeruginosus</i>	W	Seen a few times near jheels and reservoirs
42	SHIKRA <i>Accipiter badius</i>	R	Seen in all habitats
43	EURASIAN SPARROWHAWK <i>A. nisus</i>	W	Seen a few times in all habitats
44	WHITE-EYED BUZZARD <i>Butastur teesa</i>	R	Seen a few times in all habitats, more in degraded scrub
45	BONELLI'S EAGLE <i>Hieraetus fasciatus</i>	R	Seen a few times in all habitats
46	BOOTED EAGLE <i>H. pennatus</i>	W	Governor Route, 12.xi.2003
47	OSPREY <i>Pandion haliaetus</i>	W	A few times at jheels
48	COMMON KESTREL <i>Falco tinnunculus</i>	W	Seen a few times in open, rocky habitat
49	LAGGAR FALCON <i>F. jugger</i>	R	16 Dec 03 at Bhaironghati
50	PEREGRINE FALCON <i>F. peregrinus</i>	W	A few times at jheels and scrub forest
51	BLACK FRANCOLIN <i>Francolinus francolinus</i>	R	A few times near jheel in thicket
52	GREY FRANCOLIN <i>F. pondicerianus</i>	R	Mostly degraded scrub forest
53	RAIN QUAIL <i>Coturnix coromandelica</i>	R	Bhaironghati, 9.xii.2003
54	JUNGLE BUSH QUAIL <i>Perdica asiatica</i>	R	Occasionally in scrub forest
55	PAINTED SPURFOWL <i>Galloperdix lunulata</i>	R	Restricted to undisturbed riparian forest
56	INDIAN PEA FOWL <i>Pavo cristatus</i>	R	Common in all habitats
57	WHITE-BREASTED WATERHEN <i>Amaurornis phoenicurus</i>	R	Near jheels and ditches
58	COMMON MOORHEN <i>Gallinula chloropus</i>	R	Near jheels and ditches
59	COMMON COOT <i>Fulica atra</i>	W	Only in jheels and reservoirs
60	LITTLE RINGED PLOVER <i>Charadrius dubius</i>	W	Jheels and reservoirs
61	RED-WATTLED LAPWING <i>Vanellus indicus</i>	R	Jheels, streams and waterholes, open land
62	WHITE-TAILED LAPWING <i>V. leucurus</i>	W	Karnakawas. i.2005
63	BLACK-TAILED GODWIT <i>Limosa limosa</i>	W	Regularly seen at Karnakawas, in Nov 2003 & Mar 2005
64	COMMON REDSHANK <i>Tringa totanus</i>	W	Near jheels and reservoirs
65	COMMON GREENSHANK <i>T. nebularia</i>	W	Near jheels and reservoirs
66	GREEN SANDPIPER <i>T. ochropus</i>	W	Near streams, waterholes and jheels
67	WOOD SANDPIPER <i>T. glareola</i>	W	Near streams, waterholes and jheels
68	COMMON SANDPIPER <i>Actitis hypoleucos</i>	W	Near streams, waterholes and jheels
69	LITTLE STINT <i>Calidris minuta</i>	W	Karnakawas, 4.v.2005
70	BLACK-WINGED STILT <i>Himantopus himantopus</i>	R	Jheels and waterholes
71	STONE-CURLEW <i>Burhinus oedicephalus</i>	P?	Degraded scrub forest
72	RIVER TERN <i>Sterna aurantia</i>	R	Jheels and reservoirs
73	WHISKERED TERN <i>Chlidonias hybridus</i>	W	Jheels and reservoirs
74	WHITE-WINGED BLACK TERN <i>C. leucopterus</i>	W	Kankwari, 27.iv.2005
75	BLUE ROCK PIGEON <i>Columba livia</i>	R	In all habitats, mainly undisturbed
76	LITTLE BROWN DOVE <i>Streptopelia senegalensis</i>	R	Mostly in disturbed habitats
77	SPOTTED DOVE <i>S. chinensis</i>	R	Seen in all habitats apart from Anogeissus
78	RED COLLARED-DOVE <i>S. tranquebarica</i>	R	Mostly in disturbed habitats
79	EURASIAN COLLARED-DOVE <i>S. decaocto</i>	R	Only in disturbed habitats
80	YELLOW-LEGGED GREEN-PIGEON <i>Treron phoenicoptera</i>	R	Mostly in riparian habitat, occasionally in scrub forest
81	ROSE-RINGED PARAKEET <i>Psittacula krameri</i>	R	Mostly in riparian habitat, occasionally in others
82	PLUM-HEADED PARAKEET <i>P. cyanocephala</i>	R	In all habitats
83	PIED CRESTED CUCKOO <i>Clamator jacobinus</i>	R	A few times in scrub forest
84	BRAINFEVER BIRD <i>Hierococcyx varius</i>	R	A few times in scrub forest
85	COMMON CUCKOO <i>Cuculus canorus</i>	P?	A few times in scrub forest

S. No.	Systematic list	Seasonal status	Comments on habitat preferences; dates for resightings
86	ASIAN KOEL <i>Eudynamis scolopacea</i>	R	Mostly in riparian habitat, occasionally in others
87	GREATER COUCAL <i>Centropus sinensis</i>	R	Mostly in scrub, also in riparian habitat
88	COLLARED SCOPS-OWL <i>Otus bakkamoena</i>	R	A few times in scrub forest
89	BROWN FISH-OWL <i>Ketupa zeylonensis</i>	R	Restricted to undisturbed riparian forest
90	SPOTTED OWLET <i>Athene brama</i>	R	In all habitats
91	INDIAN JUNGLE NIGHTJAR <i>Caprimulgus indicus</i>	R	Frequently seen/heard during Mar-May 2005
92	HOUSE SWIFT <i>Apus affinis</i>	R	Near waterbodies
93	SMALL BLUE KINGFISHER <i>Alcedo atthis</i>	R	Only in riparian habitat
94	WHITE-BREASTED KINGFISHER <i>Halcyon smyrnensis</i>	R	Mostly near streams and jheels, also near habitation
95	LESSER PIED KINGFISHER <i>Ceryle rudis</i>	R	A few times at jheels and streams
96	SMALL BEE-EATER <i>Merops orientalis</i>	S	Everywhere in open habitats
97	BLUE-TAILED BEE-EATER <i>M. philippinus</i>	R	Ghandka, ii.2004
98	INDIAN ROLLER <i>Coracias benghalensis</i>	R	Degraded scrub and cultivation
99	COMMON HOOPOE <i>Upupa epops</i>	R	Mostly in degraded habitat
100	COPPERSMITH BARBET <i>Megalaima haemacephala</i>	R	Mostly in scrub forest
101	EURASIAN WRYNECK <i>Jynx torquilla</i>	W	Degraded open habitats
102	BROWN-CAPPED PYGMY WOODPECKER <i>Dendrocopos nanus</i>	R	In all habitats, more in tall forest
103	YELLOW-FRONTED PIED WOODPECKER <i>D. mahrattensis</i>	R	In all habitats
104	LESSER GOLDEN-BACKED WOODPECKER <i>Dinopium benghalense</i>	R	Seen in all habitats
105	INDIAN PITTA <i>Pitta brachyura</i>	P?	Kalighati, 21.vii.2003
106	RED-WINGED BUSH-LARK <i>Mirafra erythroptera</i>	R	Seen in winter in rocky, open areas like Kankwari/Kirashka
107	ASHY-CROWNED SPARROW-LARK <i>Eremopterix griseus</i> ¹	R	Common in rocky, open areas like Kankwari
108	RUFIOUS-TAILED FINCH-LARK <i>Ammomanes phoenicura</i> ¹	R	A few times in degraded open scrub and rocky sites
109	GREATER SHORT-TOED LARK <i>Calandrella brachydactyla</i>	W	Kankwari, 18.xii.2003
110	DUSKY CRAG-MARTIN <i>Ptyonoprogne concolor</i> ¹	R	Near jheels, reservoirs and rocky slopes
111	WIRE-TAILED SWALLOW <i>Hirundo smithii</i>	R	Near jheels and reservoirs
112	RED-RUMPED SWALLOW <i>H. daurica</i>	R	In open areas near ditches and rocky slopes
113	WHITE WAGTAIL <i>Motacilla alba</i>	W	Near streams and jheels
114	LARGE PIED WAGTAIL <i>M. maderaspatensis</i>	R	Near streams and jheels
115	CITRINE WAGTAIL <i>M. citreola</i>	W	Infrequently near jheels
116	GREY WAGTAIL <i>M. cinerea</i>	W	Near streams and jheels
117	EURASIAN TREE PIPIT <i>Anthus trivialis</i>	W	Mainly in undisturbed habitat
118	LARGE CUCKOO-SHRIKE <i>Coracina macei</i>	R	Seen a few times in degraded scrub forest
119	BLACK-HEADED CUCKOO-SHRIKE <i>C. melanoptera</i>	R	Kalighati, 2.x.2003
120	SMALL MINIVET <i>Pericrocotus cinnamomeus</i>	R	Seen mainly in scrub and riparian
121	COMMON WOODSHRIKE <i>Tephrodornis pondicerianus</i>	R	Seen in all habitats
122	RED-VENTED BULBUL <i>Pycnonotus cafer</i>	R	Seen in all kinds of habitats
123	RUFIOUS-TAILED SHRIKE <i>Lanius isabellinus</i>	R	Sariska, 4.iii.2005
124	BAY-BACKED SHRIKE <i>L. vittatus</i>	R	Seen in all habitats
125	RUFIOUS-BACKED SHRIKE <i>L. schach</i>	R	Seen in all habitats
126	SOUTHERN GREY SHRIKE <i>L. meridionalis</i>	R	Several times throughout winter in degraded scrub
127	TICKELL'S THRUSH <i>Turdus unicolor</i>	W	Few times in scrub forest
128	EURASIAN BLACKBIRD <i>T. merula</i>	W	Seen often during Mar-Apr 2005
129	BLUETHROAT <i>Luscinia svecica</i>	W	Near jheels and waterholes
130	ORIENTAL MAGPIE-ROBIN <i>Copsychus saularis</i>	R	Mainly in undisturbed riparian and scrub forest
131	INDIAN ROBIN <i>Saxicoloides fulcata</i>	R	Common in disturbed habitats everywhere
132	BLACK REDSTART <i>Phoenicurus ochruros</i>	W	Seen in all habitats, more common in open habitats
133	COMMON STONECHAT <i>Saxicola torquata</i>	W	Seen occasionally in open scrub habitat
134	PIED BUSHCHAT <i>S. caprata</i>	R	Seen occasionally in degraded scrub
135	GREY BUSHCHAT <i>S. ferrea</i>	W	Twice in scrub forest
136	DESERT WHEATEAR <i>Oenanthe deserti</i>	W	Kankwari, 18.xii.2003
137	ISABELLINE WHEATEAR <i>O. isabellina</i>	W	A few times in rocky degraded areas
138	INDIAN CHAT <i>Cercomela fusca</i>	R	Mostly in rocky riparian habitat
139	YELLOW-EYED BABBLER <i>Chrysomma sinense</i>	R	Occasional sightings in open scrub forest
140	COMMON BABBLER <i>Turdoides caudata</i> ¹	R	Restricted to degraded scrub forest
141	LARGE GREY BABBLER <i>T. malcolmi</i>	R	Restricted to degraded scrub forest
142	JUNGLE BABBLER <i>T. striata</i> ¹	R	Seen in all habitats, more in dense vegetation
143	FRANKLIN'S PRINIA <i>Prinia hodgsonii</i>	R	Mostly in undisturbed habitats
144	JUNGLE PRINIA <i>P. sylvatica</i>	R	Mostly in scrub forest
145	ASHY PRINIA <i>P. socialis</i>	R	Mostly in scrub forest, particularly disturbed
146	PLAIN PRINIA <i>P. inornata</i>	R	Mostly in disturbed habitats
147	COMMON TAILORBIRD <i>Orthotomus sutorius</i>	R	Seen in all habitats, esp. riparian
148	COMMON CHIFFCHAFF <i>Phylloscopus collybita</i>	W	A few times in scrub, near jheels

S. No.	Systematic list	Seasonal status	Comments on habitat preferences; dates for resightings
149	OLIVACEOUS LEAF-WARBLER <i>P. griseolus</i>	W	Seen mainly in rocky streambeds in dense forest
150	HUME'S WARBLER <i>P. humei</i>	W	Seen mainly in undisturbed and riparian habitats
151	GREENISH LEAF-WARBLER <i>P. trochiloides</i>	W	Near Kirashka, 3.x.2003
152	COMMON LESSER WHITETHROAT <i>Sylvia curruca</i>	W	Mainly in disturbed habitats everywhere
153	RUSTY-TAILED FLYCATCHER <i>Muscicapa ruficauda</i>	P?	A few times in undisturbed riparian forest, waterholes
154	RED-THROATED FLYCATCHER <i>Ficedula parva</i>	W	Mostly in riparian also undisturbed scrub
155	VERDITER FLYCATCHER <i>Eumyias thalassina</i>	P?	Seen occasionally in riparian forest
156	TICKELL'S BLUE FLYCATCHER <i>Cyornis tickelliae</i>	R	Mainly in undisturbed riparian forest
157	GREY-HEADED FLYCATCHER <i>Culicicapa ceylonensis</i>	W	Mainly in undisturbed riparian forest
158	ASIAN PARADISE-FLYCATCHER <i>Terpsiphone paradisi</i>	S	Only in undisturbed scrub and riparian
159	WHITE-BROWED FANTAIL-FLYCATCHER <i>Rhipidura aureola</i>	R	Seen mainly in undisturbed habitats
160	GREAT TIT <i>Parus major</i>	R	Mainly in undisturbed habitats esp. riparian
161	PURPLE SUNBIRD <i>Nectarinia asiatica</i>	R	Seen in all habitats, more in open, disturbed areas
162	ORIENTAL WHITE-EYE <i>Zosterops palpebrosus</i>	R	Mostly in undisturbed habitats, particularly riparian
163	CRESTED BUNTING <i>Melophus lathami</i>	R	Mostly in disturbed habitats and scrub forest
164	WHITE-CAPPED BUNTING <i>Emberiza stewarti</i>	W	Seen in all habitats, more in undisturbed habitats
165	RED-HEADED BUNTING <i>E. bruniceps</i>	W	Dec 05 in Kalighati area
166	COMMON ROSEFINCH <i>Carpodacus erythrinus</i>	P	Mostly in degraded scrub forest
167	WHITE-THROATED MUNIA <i>Lonchura malabarica</i>	R	Disturbed scrub and riparian sites
168	SPOTTED MUNIA <i>L. punctulata</i>	R	Near Indauk village, x.2003
169	HOUSE SPARROW <i>Passer domesticus</i>	R	Few times in scrub forest
170	YELLOW-THROATED SPARROW <i>Petronia xanthocollis</i>	R	Seen in all habitats, but more in disturbed forests
171	BAYA WEAVER <i>Ploceus philippinus</i>	R	Open scrub forest near water
172	GREY-HEADED STARLING <i>Sturnus malabaricus</i>	W	Near Haripura, x.2003
173	BRAHMINY STARLING <i>S. pagodarum</i>	R	Seen mainly in disturbed habitats
174	ROSY STARLING <i>S. roseus</i>	P	Seen in flocks in degraded scrub
175	COMMON STARLING <i>S. vulgaris</i>	W	Kankwari, 3.xi.2003
176	ASIAN PIED STARLING <i>S. contra</i>	R	Seen occasionally in scrub forest
177	COMMON MYNA <i>Acridotheres tristis</i>	R	Seen mainly in riparian and scrub habitat
178	BANK MYNA <i>A. ginginianus</i>	R	Seen a few times near villages
179	EURASIAN GOLDEN ORIOLE <i>Oriolus oriolus</i>	S	Seen in all habitats, commonly in undisturbed sites
180	BLACK DRONGO <i>Dicrurus macrocercus</i>	R	Seen in all habitats
181	WHITE-BELLIED DRONGO <i>D. caerulescens</i>	R	Mostly in undisturbed habitats
182	JUNGLE CROW <i>Corvus macrorhynchos</i>	R	Karnakawas, 30.xi.2003
183	INDIAN TREEPIE <i>Dendrocitta vagabunda</i>	R	Abundant in all habitats

¹Based on nomenclature used in Rasmussen & Anderton (2005).

Recoveries from the Newsletter for Birdwatchers (1966)—11

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Futehally, Z. 2006. Recoveries from the Newsletter for Birdwatchers (1966)—11. *Indian Birds* 2 (3): 76-77.

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At our Annual Meeting on 15.i.1967, giving "vital statistics" for the year's performance, I reported that 46 persons had sent articles, 16 of whom were Englishmen and women, and these have proved to be our keenest supporters. The number of subscribers in December 1966 was 375.

There are some splendid articles in the 1966 Newsletter, of the type which could be models for current contributors—pleasant reading based on careful observation. So I thought I would quote extensively from some of these writers,

K.K. Neelakantan, Stewart Melluish, T.J. Roberts, etc. The wealth of material makes it necessary to spread this over more than one issue of *Indian Birds*, and in this one I confine myself to dealing only with 'KKN'.

Writing about the strange choice of roosts by crows, KKN [*NLBW* 6 (1): 1-2] said,

"That crows, mynas, house sparrows, and parakeets roost in larger numbers in trees standing in the middle of crowded bazaars is well known, but I used to think that this was due to the absence of more suitable roosts near by. A recent experience makes me wonder whether these birds

deliberately choose trees in the heart of the town.

"Towards the end of the third week of November I was passing through Shoranur (central Kerala) at 11 p.m. It was a dark night. The spot where we had stopped was at the very centre of this small town, not far from the Railway Station and close to a hotel which is open all night. It is also the town bus stand, and till about 10 p.m. is full of bustle. Throughout the night lorries and buses stop there and small, noisy crowds of people are never absent. The place is also brilliantly lit from dusk to dawn. Yet a clump of *Pongamia* trees standing under a street lamp and in the glare of the fluorescent lights of the hotel sign was full of crows. Those I

As already mentioned, the Relict Gull dominates in nest-site selection and the arrangement of colonies of the two species on islets (Figures 3 and 4). The terns allow gulls to nest within their established colonies and benefit both species by their rapid and concerted reaction to predators.

Gull-billed Terns are also found at other breeding, or potential breeding, localities of the Relict Gull: Wuliangsu Hai and Suoguo Nur (Zhang Yin-sun); Lake Alakul, Russia (Knystautas 1987); Tatsain Tsagaan Nuur, Mongolia (Fisher 1985); Orok Nor, Mongolia (Kitson 1980, Vaurie 1964).

We would like to express our gratitude to the Oriental Bird Club for the honourable decision that they made of granting us their *Forktail-Leica* Conservation Award in 1990, which provided us with the opportunity to continue our fieldwork, leading to the results set out in this paper. We particularly appreciate Carol Inskipp for all the kind help she gave us, and the contribution she made towards the implementation of the project.

REFERENCES

- Anëzov, E. M. (1975) [*Larus relictus* at Lake Alakul']. Pp. 58-59 in [*Colonies of waterbirds and their protection*]. Moscow. (In Russian.)
- Fisher, D. J. (1985) Observations on Relict Gulls in Mongolia. *Dutch Birding* 7: 117-120.
- Golovushkin, M. I. (1977) [On the colony of Relict Gulls in the Chita district.] Pp. 207-209 in [*Proceedings of the 7th all-Union ornithological conference, Kiev*]. (In Russian.)
- He Fen-qi, Zhang Yin-sun, Wu Yong and Gao Tie-jun (1992) The distribution of the Relict Gull *Larus relictus* in Maowusu Desert, Inner Mongolia, China. *Forktail* 7: 151-154.
- Il'ichyev, V. D. and Zubakin, V. A. (1988) [*Birds of the U.S.S.R.: seabirds*]. Moscow: Izdatyelstvo Nauk [Publishers of Science]. (In Russian.)
- Kitson, A.R. (1980) *Larus relictus* - a review. *Bull. Brit. Orn. Club* 100: 178-185.
- Knystautas, A. (1987) *The natural history of the U.S.S.R.* London: Century.
- Potapov, R. L. (1971) [A find at the Torey lakes.] *Priroda* 5: 77-81. (In Russian.)
- Zhang Yin-sun et al. (1991a) [A new finding of a breeding population of the Relict Gull in Ordos.] *Chinese J. Zool.* 26(3): 32-33.
- Zhang Yin-sun, Liu Chang-jiang, Tian Lu and Bu He (1991) Recent records of the Relict Gull *Larus relictus* in western Nei Mongol autonomous region, China. *Forktail* 6: 66-67.
- Zhang Yin-sun, Ding Wen-ning, Bu He and Tian Lu (1992) Breeding ecology of the Relict Gull *Larus relictus* in Ordos, Inner Mongolia, China. *Forktail* 7: 131-137.

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Birds of Sariska Tiger Reserve, Rajasthan, India

K. SANKAR, D. MOHAN and S. PANDEY

Sariska Tiger Reserve (76°17'-76°34'N and 27°5'-27°33'E), situated in the Aravali hill range, is located in the district of Alwar, Rajasthan. Sariska is in the semi-arid part of Rajasthan (Rodgers and Panwar 1988). The tract is mainly hilly and undulating and has numerous narrow valleys, two large plateaus: Kiraska and Kankwari, and two lakes: Manasarovar and Somasagar. Silisad Lake is situated along the north-eastern boundary of the reserve. The total area of the reserve is 800 km², of which 302.2 km² is a buffer zone and 497.8 km² is the core zone.

According to Champion and Seth (1968) the vegetation of Sariska comes under (1) Tropical Dry Deciduous Forest and (2) Tropical Thorn Forest. The dominant vegetation types include *Anogeissus* forest, *Boswellia* forest, *Acacia*-mixed forest, *Butea*-mixed forest, *Ziziphus* woodland, scrub land and riverine forest. The climate of this tract is subtropical, characterised by distinct winter (November to February), summer (March to June), monsoon (July to August) and autumn (September to October). In winter the temperature drops to 0° and in summer it rises as high as 47°. The average annual rainfall is around 600 mm.

Little previous work has been carried out on the avifauna of the reserve. Rodgers (1991) recorded 24 species of birds from Algal spring. KS stayed in Sariska from July 1988 to December 1990 studying the ecology of large herbivores. Birds were identified during this period and also during November 1986, November 1987, May 1988, November 1991 and February 1992. The most interesting finds were Painted Spurfowl *Galloperdix lunulata*, which had not been recorded previously from the arid and semi-arid tracts of Rajasthan, and Indian Cuckoo *Cuculus micropterus*, a rare straggler to the semi-arid tracts. The Aravali race of Red Spurfowl *Galloperdix spadicea caurina*, endemic to the Aravali hill range, is only found in a few localities.

SYSTEMATIC LIST

A total of 211 species was recorded, of which 120 were resident, 73 were migrant visitors and 18 were considered to be vagrants. In the list the following codes are used:

- R = resident
 W = winter visitor
 S = summer visitor
 M = monsoon visitor
 V = presumed vagrant
 ? = uncertain status
 B = confirmed breeding
 PB = probably breeding

GREY FRANCOLIN *Francolinus pondicerianus* R, B. Abundant.
 BLACK FRANCOLIN *Francolinus francolinus* R, B. Rare - Karnakawas scrubland only.
 RAIN QUAIL *Coturnix coromandelica* R, B. Common.
 BLUE-BREASTED QUAIL *Coturnix chinensis* R, B. Rare.
 JUNGLE BUSH-QUAIL *Pardipula asiatica* R, B. Abundant.
 RED SPURFOWL *Galloperdix spadicea* R, B. Rare - rocky areas near Pandupole, Siliberi and Slopka.
 PAINTED SPURFOWL *Galloperdix lunulata* R, B. Rare - rocky areas close to water, near Pandupole, Slopka, Udainath, Siliberi, Algal and Naldeshwar.
 INDIAN PEA FOWL *Pavo cristatus* R, B. Abundant.
 COMB DUCK *Sarkidiornis melanotos* R, PB. Rare.
 COTTON PYGMY-GOOSE *Nettapus coromandelianus* R, PB. Common.
 GADWALL *Anas strepera* W. Rare.
 COMMON TEAL *Anas crecca* W. Fairly common.
 MALLARD *Anas platyrhynchos* W. Rare.
 SPOT-BILLED DUCK *Anas poecilorhyncha* R, PB. Common.
 NORTHERN PINTAIL *Anas acuta* W. Fairly common in Silisad.
 NORTHERN SHOVELER *Anas clypeata* W. Common in Silisad.
 RED-CRESTED POCHARD *Netta rufina* W. Common.
 COMMON POCHARD *Aythya ferina* W. Rare.
 TUFTED DUCK *Aythya fuligula* W. Rare.
 SMALL BUTTONQUAIL *Turnix sylvatica* R, B. Common.
 BROWN-CAPPED WOODPECKER *Dendrocopos nanus* V. One near Sariska, November 1986.
 YELLOW-CROWNED WOODPECKER *Dendrocopos maharattensis* R, PB. Rare.
 BLACK-RUMPED FLAMEBACK *Dinopium benghalense* R, B. Fairly common.
 COPPERSMITH BARBET *Megalaima haemacephala* W. Common.

INDIAN GREY-HORNBILL *Ocyrceros birostris* R, B. Rare - only along the park boundary near Thanagazi and Malakera.
 EURASIAN HOOPOE *Upupa epops* R, B. Common.
 INDIAN ROLLER *Coracias benghalensis* R, B. Common.
 COMMON KINGFISHER *Alcedo atthis* R, PB. Rare.
 WHITE-THROATED KINGFISHER *Halcyon smyrnensis* R, PB. Common.
 PIED KINGFISHER *Ceryle rudis* R, PB. Rare.
 LITTLE GREEN BEE-EATER *Merops orientalis* R, PB. Rare.
 BLUE-TAILED BEE-EATER *Merops philippinus* R, PB. Rare.
 PIED CUCKOO *Oxylophus jacobinus* M. Common.
 COMMON HAWK-CUCKOO *Cuculus varius* R, B. Common.
 INDIAN CUCKOO *Cuculus micropterus* V. One seen near Kundli road, 23 June 1989; one heard, 3 July 1989.
 ASIAN KOEL *Eudynamis scolopacea* R, B. Rare.
 SIRKEER MALKOHA *Phaenicophaeus leschenaultii* R. Rare.
 GREATER COUCAL *Centropus sinensis* R, B. Rare.
 ALEXANDRINE PARAKEET *Psittacula eupatria* V. Seen only in November 1987, in three places between Sariska and Kalighati.
 ROSE-RINGED PARAKEET *Psittacula krameri* R, B. Fairly common.
 PLUM-HEADED PARAKEET *Psittacula cyanocephala* W, B. Fairly common.
 LITTLE SWIFT *Apus affinis* R, B. Common.
 BARN OWL *Tyto alba* R, B. Rare.
 INDIAN SCOPS-OWL *Otus bakkamoena* R, B. Rare - one heard, 12 November 1991.
 BROWN FISH-OWL *Ketupa zeylonensis* R, B. Bandipul stream.
 MOTTLED WOOD-OWL *Strix ocellata* R, PB. One at Slopka waterhole, 8 June 1988.
 SPOTTED OWLET *Athene brama* R, B. Common.
 SHORT-EARED OWL *Asio flammeus* W. Seen around Karnakawas, January to February 1989.
 GREY NIGHTJAR *Caprimulgus indicus* R, B. Common.
 ROCK PIGEON *Columba livia* R, B. Common.
 ORIENTAL TURTLE-DOVE *Streptopelia orientalis* V. One at Sariska, 15 June 1989.
 LAUGHING DOVE *Streptopelia senegalensis* R, B. Fairly common.
 SPOTTED DOVE *Streptopelia chinensis* R, B. Fairly common.
 RED COLLARED-DOVE *Streptopelia tranquebarica* R, B. Fairly common.
 EURASIAN COLLARED-DOVE *Streptopelia decaocto* R, B. Fairly common.

- YELLOW-FOOTED GREEN-PIGEON *Treron phoenicoptera* W. Fairly common - flocks of 30-50 birds seen feeding on *Ziziphus* fruits.
- SARUS CRANE *Grus antigone* W. Rare - one near Manasarovar, 12 January 1990.
- WHITE-BREASTED WATERHEN *Amaurornis phoenicurus* R, B. Not very common.
- PURPLE SWAMPHEN *Porphyrio porphyrio* R, PB. Rare.
- COMMON MOORHEN *Gallinula chloropus* R, PB. Rare - Silisad and Manasarovar.
- COMMON COOT *Fulica atra* W. Common - 60 on Manasarovar, 12 December 1990.
- CHESTNUT-BELLIED SANDGROUSE *Pterocles exustus* R. Common.
- BLACK-BELLIED SANDGROUSE *Pterocles orientalis* R. Rare.
- PAINTED SANDGROUSE *Pterocles indicus* R. Common in winter.
- BLACK-TAILED GODWIT *Limosa limosa* V. One at Somasagar, 10 March 1990.
- COMMON REDSHANK *Tringa totanus* W. Fairly common.
- COMMON GREENSHANK *Tringa nebularia* W. Common.
- GREEN SANDPIPER *Tringa ochropus* W. Common.
- WOOD SANDPIPER *Tringa glareola* W. Common.
- COMMON SANDPIPER *Tringa hypoleucos* W. Common.
- LITTLE STINT *Calidris minuta* W. Rare.
- TEMMINCK'S STINT *Calidris temminckii* W. Rare - one at Silisad, November 1986.
- EURASIAN THICK-KNEE *Burhinus oedipnensis* R, PB. Rare.
- BLACK-WINGED STILT *Himantopus himantopus* R, PB. Not very common.
- PIED AVOCET *Recurvirostra avosetta* W. Not very common - 20 on Manasarovar, 11 January 1990.
- LITTLE RINGED PLOVER *Charadrius dubius* W. Rare.
- KENTISH PLOVER *Charadrius alexandrinus* W. Rare.
- NORTHERN LAPWING *Vanellus vanellus* W. Rare - Silisad, 1988, 1989 and 1990.
- YELLOW-WATTLED LAPWING *Vanellus malabaricus* V. Two records from Udainath, July 1989.
- RIVER LAPWING *Vanellus duvaucelii* V. Silisad, November 1986.
- RED-WATTLED LAPWING *Vanellus indicus* R, B. Fairly common.
- BROWN-HEADED GULL *Larus brunnicephalus* V. One on Manasarovar, 14 January 1989.
- RIVER TERN *Sterna aurantia* R. Rare.

- BLACK-BELLIED TERN *Sterna acuticauda* V. One at Kankwari, 10 April 1989.
- WHISKERED TERN *Chlidonias hybridus* W. Rare - two near Kankwari, January 1989.
- ORIENTAL HONEY-BUZZARD *Pernis ptilorhynchus* W. Rare - one in Bandipul, 12 December 1989.
- BLACK-WINGED KITE *Elanus caeruleus* R, PB. Rare.
- BLACK KITE *Milvus migrans* R. Rare - only two records near Udainath during monsoon and summer 1989.
- EGYPTIAN VULTURE *Neophron percnopterus* R, B. Rare.
- WHITE-RUMPED VULTURE *Gyps bengalensis* R, B. Fairly common.
- LONG-BILLED VULTURE *Gyps indicus* R, B. Fairly common.
- EURASIAN GRIFFON *Gyps fulvus* V. One near Sariska, November 1986.
- RED-HEADED VULTURE *Sarcogyps calvus* R, B. Rare.
- CRESTED SERPENT-EAGLE *Spilornis cheela* R, PB. Rare.
- WESTERN MARSH-HARRIER *Circus aeruginosus* W. Rare - one near Silisad, November 1986.
- SHIKRA *Accipiter badius* R, PB. Common.
- EURASIAN SPARROWHAWK *Accipiter nisus* W. Seen very occasionally near Sariska, 1988 and 1990.
- WHITE-EYED BUZZARD *Buteo teesa* W. More than 100 were seen around Karnakawas in 1989 when rodents were abundant; however, in 1990 very few were seen.
- GREATER SPOTTED EAGLE *Aquila clanga* W. Rare - one near Kankwari, 20 November 1989 and one near Kalighati, 17 November 1991.
- IMPERIAL EAGLE *Aquila heliaca* W. Rare - one near Karnakawas, 17 January 1990.
- COMMON KESTREL *Falco tinnunculus* W. Rare.
- ORIENTAL HOBBY *Falco severus* ? Rare - only in November 1986, in Sariska, Silisad and Kankwari.
- LITTLE GREBE *Tachybaptus ruficollis* R. Common in winter.
- GREAT CRESTED GREBE *Podiceps cristatus* V. Four seen on Manasarovar, 12 January 1990.
- ORIENTAL DARTER *Anhinga melanogaster* W. Rare - 2-3 on Manasarovar and Silisad.
- LITTLE CORMORANT *Phalacrocorax niger* R.
- INDIAN CORMORANT *Phalacrocorax fuscicollis* R.
- GREAT CORMORANT *Phalacrocorax carbo* R. Numbers of all three cormorants are augmented by migrants in winter.
- LITTLE EGRET *Egretta garzetta* R. An influx of migrants in winter.

- GREY HERON *Ardea cinerea* R. Rare.
 PURPLE HERON *Ardea purpurea* R. Rare.
 GREATER EGRET *Casmerodius albus* ? Rare - 2-4 seen in winter on Somasagar, Silisad and Monasarovar.
 INTERMEDIATE EGRET *Mesophoyx intermedia* R. Numbers augmented by migrants in winter.
 CATTLE EGRET *Bubulcus ibis* R. Most frequent during summer and the early monsoon period.
 INDIAN POND-HERON *Ardeola grayii* R, B. A colony found in summer 1989.
 GREATER FLAMINGO *Phoenicopterus ruber* W. Rare - four on Manasarovar on 15 January 1990.
 BLACK-HEADED IBIS *Threskiornis melanocephalus* W. Rare - 11 on Manasarovar, 11 January 1989.
 RED-NAPED IBIS *Pseudibis papillosa* W. Rare - one on Manasarovar, 11 January 1990.
 EURASIAN SPOONBILL *Platalea leucorodia* W. Common, maximum of 50 on Manasarovar, 11 January 1990.
 GREAT WHITE PELICAN *Pelecanus onocrotalus* W. 45 at Silisad, 11 January 1990; six on Manasarovar, 13 January 1990.
 DALMATIAN PELICAN *Pelecanus crispus* W. Two on Manasarovar, 12 January 1990.
 PAINTED STORK *Mycteria leucocephala* W. 30 on 11 and 15 on 13 January 1990 on Silisad.
 ASIAN OPENBILL *Anastomus oscitans* W. 10 on Manasarovar, 13 January 1990; 4 on Somasagar, 16 March 1990.
 BLACK STORK *Ciconia nigra* W. Six at Kankwari, 12 January 1989.
 WOOLLY-NECKED STORK *Ciconia episcopus* R, B. Rare - breeds near Bharthari.
 INDIAN PITTA *Pitta brachyura* S, B. Fairly common and widespread during May and June.
 GREY-HEADED CANARY-FLYCATCHER *Culicicapa ceylonensis* W. Common.
 BAY-BACKED SHRIKE *Lanius vittatus* R, PB. Common.
 LONG-TAILED SHRIKE *Lanius schach* R, PB. Common.
 NORTHERN SHRIKE *Lanius excubitor* R, PB. Rare.
 RUFOUS TREEPIE *Dendrocitta vagabunda* R, B. Common.
 HOUSE CROW *Corvus splendens* R, PB. Rare.
 LARGE-BILLED CROW *Corvus macrorhynchos* R, B. Fairly common.
 EURASIAN GOLDEN-ORIOLE *Oriolus oriolus* S, B. Common.

- LARGE CUCKOO-SHRIKE *Coracina macei* R. Rare.
 BLACK-HEADED CUCKOO-SHRIKE *Coracina melanoptera* S. Rare - one at Kalighati, 23 June 1989.
 SMALL MINIVET *Pericrocotus cinnamomeus* W. Rare.
 SCARLET MINIVET *Pericrocotus flammeus* V. One near Sariska, November 1987.
 WHITE-BROWED FANTAIL *Rhipidura aureola* R, B. Common.
 BLACK DRONGO *Dicrurus macrocercus* R, B. Fairly common.
 WHITE-BELLIED DRONGO *Dicrurus caeruleus* W. Rare.
 ASIAN PARADISE-FLYCATCHER *Terpsiphone paradisi* R. Rare.
 COMMON IORA *Aegithina tiphia* W. Rare.
 COMMON WOODSHRIKE *Tephrodornis pondicerianus* R, PB. Common.
 RED-BREASTED FLYCATCHER *Ficedula parva* W. Common.
 TICKELL'S BLUE-FLYCATCHER *Cyornis tickelliae* R, PB. Rare.
 BLUETHROAT *Luscinia svecica* W. Rare.
 ORIENTAL MAGPIE-ROBIN *Copsychus saularis* R, B. Common.
 INDIAN ROBIN *Saxicoloides fulicata* R, B. Common.
 BLACK REDSTART *Phoenicurus ochruros* W. Common.
 SIBERIAN STONECHAT *Saxicola maura* R, PB. Rare.
 PIED BUSHCHAT *Saxicola caprata* R, B. Common.
 GREY BUSHCHAT *Saxicola ferrea* V.
 DESERT WHEATBEAR *Oenanthe deserti* V. One near Tehla, 12 February 1989.
 INDIAN CHAT *Cercomela fusca* R, PB. Rare.
 CHESTNUT-TAILED STARLING *Sturnus malabaricus* R. Abundant, July to October; otherwise rare.
 BRAHMINY STARLING *Sturnus pagodarum* R, PB. Common.
 ROSY STARLING *Sturnus roseus* W. Rare.
 COMMON STARLING *Sturnus vulgaris* W. Only in November 1986 around Sariska.
 ASIAN PIED STARLING *Sturnus contra* R, PB. Common.
 COMMON MYNA *Acridotheres tristis* R, B. Common.
 BANK MYNA *Acridotheres ginginianus* R, PB. Common.
 SPOTTED CREEPER *Salpornis ptilonotus* W. Seen near Sariska, 3 January and 12 November 1989, 13 November 1991.
 GREAT TIT *Parus major* R, B. Numbers augmented in winter.
 PLAIN MARTIN *Riparia paludicola* R, PB. Common.
 DUSKY CRAG-MARTIN *Hirundo concolor* R, PB. Common.
 BARN SWALLOW *Hirundo rustica* W. Rare.

- WIRE-TAILED SWALLOW *Hirundo smithii* R, PB. Rare.
 RED-RUMPED SWALLOW *Hirundo daurica* R, PB. Rare.
 WHITE-EARED BULBUL *Pycnonotus leucotis* R. Rare.
 RED-VENTED BULBUL *Pycnonotus cafer* R, B. Abundant.
 GREY-BREASTED PRINIA *Prinia hodgsonii* R, PB. Common.
 JUNGLE PRINIA *Prinia sylvatica* R. Rare.
 ASHY PRINIA *Prinia socialis* R, PB. Rare.
 PLAIN PRINIA *Prinia inornata* R, PB. Common.
 ORIENTAL WHITE-EYE *Zosterops palpebrosus* R, PB. Common.
 COMMON TAILORBIRD *Orthotomus sutorius* R, B. Common.
 EURASIAN CHIFFCHAFF *Phylloscopus collybita* W. Common.
 INORNATE WARBLER *Phylloscopus inornatus* W. Rare.
 GREENISH WARBLER *Phylloscopus trochiloides* W. Rare.
 TAWNY-BELLIED BABBLER *Dumetia hyperythra* V. One near Raika village, 12 November 1988.
 YELLOW-EYED BABBLER *Chrysomma sinense* R, B. Fairly common.
 COMMON BABBLER *Turdoides caudatus* R, B. Fairly common.
 LARGE GREY BABBLER *Turdoides malcolmi* R, B. Common.
 JUNGLE BABBLER *Turdoides striatus* R, B. Fairly Common.
 LESSER WHITETHROAT *Sylvia curruca* W. Rare.
 SINGING LARK *Mirafra cantillans* R, PB. Rare.
 INDIAN LARK *Mirafra erythroptera* R, PB. Common.
 PURPLE SUNBIRD *Nectarinia asiatica* R, B. Common.
 HOUSE SPARROW *Passer domesticus* R, B. Fairly common.
 SPANISH SPARROW *Passer hispaniolensis* W. Abundant - flocks of over 1000 around Karnakawas and Sariska, December to February.
 EURASIAN TREE SPARROW *Passer montanus* W. Rare.
 CHESTNUT-SHOULDERED PETRONIA *Petronia xanthocollis* R, B. Common.
 WHITE WAGTAIL *Motacilla alba* W. Rare.
 WHITE-BROWED WAGTAIL *Motacilla maderaspatensis* R, PB. Common.
 YELLOW WAGTAIL *Motacilla flava* W. Rare.
 GREY WAGTAIL *Motacilla cinerea* W. Rare.
 PADDYFIELD PIPIT *Anthus rufulus* R, PB. Rare.
 TREE PIPIT *Anthus trivialis* W. Rare.
 BAYA WEAVER *Ploceus philippinus* R, B. Fairly common.
 RED AVADAVAT *Amandava amandava* V. One near Umri village, February 1988.

- WHITE-THROATED SILVERBILL *Lonchura malabarica* R, B. Fairly common.
 COMMON ROSEFINCH *Carpodacus erythrinus* W. Rare.
 CRESTED BUNTING *Melophus lathami* R, B. Fairly common during summer.
 GREY-NECKED BUNTING *Emberiza buchanani* W. Rare - November 1986 near Sariska.
 CHESTNUT-BREASTED BUNTING *Emberiza stewarti* W. Fairly common. Large flocks in 1988 and 1989.

We thank Dr A. J. T. Johnsingh and Dr A. R. Rahmani for their comments.

REFERENCES

- Champion, H. G. and Seth, S. K. (1968) *A revised survey of forest types of India*. Govt. of India.
 Rodgers, W. A. (1991) A preliminary ecological survey of Aigual spring, Sariska Tiger Reserve, Rajasthan. *J. Bombay Nat. Hist. Soc.* 7: 201-209.
 Rodgers, W. A. and Panwar, H. S. (1988) *Planning of wildlife protected area network in India*, 2. Wildlife Institute of India.
 K. Sankar, D. Mohan and S. Pandey, *Wildlife Institute of India, P.O. Box 18, Dehradun, 248001, India.*

BI-MONTHLY OUTREACH JOURNAL OF NATIONAL TIGER CONSERVATION AUTHORITY

GOVERNMENT OF INDIA



s t r i p e s

Volume 3 Issue 6

Sept-Oct 2012



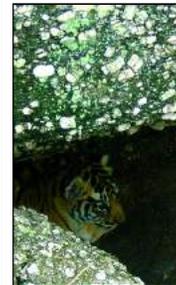
LANDMARKS



CHALLENGES



PERSPECTIVES



Core & critical tiger habitats of tiger reserves, notified under Wildlife (Protection) Act, 1972, as amended in 2006

RESERVE	STATE	AREA OF CORE/CRITICAL TIGER HABITAT (in sqkm)
Bandipur	Karnataka	872.24
Corbett	Uttarakhand	821.99
Kanha	Madhya Pradesh	917.43
Manas	Assam	840.04
Melghat	Maharashtra	1500.49
Palamau	Jharkhand	414.08
Ranthambhore	Rajasthan	1113.364
Similipal	Odisha	1194.75
Sunderbans	West Bengal	1699.62
Periyar	Kerala	881.00
Sariska	Rajasthan	881.1124
Buxa	West Bengal	390.5813
Indravati	Chhattisgarh	1258.37
Nagarjunasagar	Andhra Pradesh	3721.00
Namdapha	Arunachal Pradesh	1807.82
Dudhwa	Uttar Pradesh	1093.79
Kalakad-Mundanthurai	Tamil Nadu	895.00
Valmiki	Bihar	598.45
Pench	Madhya Pradesh	411.33
Tadoba-Andhari	Maharashtra	625.82
Bandhavgarh	Madhya Pradesh	716.903
Panna	Madhya Pradesh	576.13
Dampa	Mizoram	500.00
Bhadra	Karnataka	492.46
Pench	Maharashtra	257.26
Pakke	Arunachal Pradesh	683.45
Nameri	Assam	200.00
Satpura	Madhya Pradesh	1339.264
Anamalai	Tamil Nadu	958.59
Udanti-Sitanadi	Chhattisgarh	851.09
Satkosia	Odisha	523.61
Kaziranga	Assam	625.58
Achanakmar	Chhattisgarh	626.195
Dandeli-Anshi	Karnataka	814.884
Sanjay-Dubri	Madhya Pradesh	812.571
Mudumalai	Tamil Nadu	321.00
Nagarahole	Karnataka	643.35
Parambikulam	Kerala	390.89
Sahyadri	Maharashtra	600.12
BRT	Karnataka	359.10
Kawal	Andhra Pradesh	893.23

TOTAL

35123.9547



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Cover photo
S P Yadav

BI-MONTHLY OUTREACH JOURNAL OF NATIONAL TIGER CONSERVATION AUTHORITY

GOVERNMENT OF INDIA

s t r i p e s

n o t e f r o m t h e e d i t o r



WILD caught tigers have been successfully released in the wild, and this initiative is the first of its kind in the world where India has taken the lead. In both Sariska as well as Panna, where this was done, the results are encouraging. Based

on a recovery strategy planned in collaboration with the Wildlife Institute of India and the state of Rajasthan, wild tigers were reintroduced from Ranthambhore to Sariska. One of the reintroduced tigresses has bred and two cubs have been photo captured. The technical monitoring in Sariska using radio telemetry is providing valuable insights regarding the spatial occupancy patterns of tigers and their internecine behaviour. This issue carries an interesting write-up on Sariska tigers.

Namdapha in Arunachal is one of our old tiger reserves constituted in 1982-83, encompassing a large core area of 1807.82 sq km., with a buffer of 245 sq km. The NTCA is striving hard in collaboration with the state to address several issues including poaching, dependence of local community on the

habitat and relocation. An appraisal report from an NTCA independent team is contained in this issue.

The MoEF through the NTCA/Project Tiger has formulated a set of comprehensive guidelines for Project Tiger and tourism in tiger reserves to foster conservation and tourism in a mutually compatible manner. The salient features of these guidelines are highlighted.

An interesting side event on tiger conservation was organized by the NTCA, Wildlife Institute of India, Global Tiger Forum and WWF-India on October 17, 2012, which was inaugurated by the Hon'ble minister for environment and forests.

A meeting of the sub-group on tiger and leopard conservation between India and Russia, under the intergovernmental commission on Trade, Economic, Scientific, Technical and Cultural Cooperation took place in Moscow on 17-18 September, 2012. A report on this meeting is highlighted in this issue.

Dr Rajesh Gopal
Member-Secretary, NTCA

Sariska: The Reign of Tigers



K Sankar & Subhadeep Bhattacharjee, Wildlife Institute of India, Dehra Dun

Sariska Tiger Reserve, the one name which was questioned by all, the one name which was belittled by the media, the one name which stirred so much negativity due to its loss of the most magnificent clan of the *Panthera tigris tigris* in 2005 has finally unfolded its bounty!!!

Sariska undoubtedly has

always had a significant position in the Indian semi-arid ecosystem with potential habitats and very high densities of tiger prey base. The year 2008 created history as India attempted its first “reintroduction strategy of large carnivore” by planning and implementation of tiger reintroduction in Sariska from the

neighbouring semi-arid tract of Ranthambhore Tiger Reserve.

Based on the scientific ‘Species Recovery Plan’ and the ‘Tiger Reintroduction Protocol’ prepared by the Wildlife Institute of India (WII), Dehra Dun, Rajasthan Forest Department (RFD) and National Conservation Authority (NTCA), two adult tigers (ST1, a

male, and ST2, a female) were brought to Sariska in June 2008. Both the Tigers were first chemically immobilized and then radio-collared in Ranthambhore. Finally they were airlifted in the Indian Air force MI-17 helicopters and introduced into the majestic forest of Sariska. In Sariska they were released inside a carnivore proof one hectare enclosure, which was enriched with a natural vegetation cover and adequate water holes. This process is known as “soft release” and it helped to monitor their physiological and behavioral response in the new environment. No one had any speculation regarding the post-introduction behavior of the tigers as this had never been tried before. After three to four days of critical observations from a camouflaged watch tower, the individuals were released into the wild. Continuous monitoring was carried out with the joint effort of the RFD personnel and WII research team from the very moment the tigers were released into the wild.

After being released in the wild, the tigers started exploring the areas of Sariska. The male strolled in the southern part where as the female moved towards the northern part of Sariska. In the first two months they covered a significantly large area of around 350 sqkm. Then came the twist!! These two tigers met during the third month and stayed together in a smaller area of about 30 sqkm for nearly a month. Since then they were often spotted together and remained in association for different time intervals.

In February 2009 another female (ST3) was brought from Ranthambhore to Sariska, by following similar protocol. She too after being released in the wild went on to explore a vast area of 225 sqkm in Sariska. In April 2009 the tigress (ST3) was seen associating with the male (ST1) in

a relocated village site, Bhagani, in Sariska. Thereafter she got settled in that area and formed her home range of around 40 sqkm. The male had a larger home range covering the two females (ST2 and ST3).

In 2010 July, two more tigers (a male - ST4 and a female - ST5) were reintroduced in Sariska from Ranthambhore aiming to complete the initial stock of the population according to the species recovery plan. ST4, soon after his release in the wild moved towards the south eastern

Jubilation engulfed Sariska when the first reintroduced female ST2 was seen with symptoms of lactation in June 2012. On August 7, we captured the photograph of this tigress with a cub through a camera trap deployed in her territory, near Slopka

part of the Sariska and in several occasions drifted out of the reserve to find himself in the vicinity of township of Rajgarh. This might have been due to the territorial dominance of the first male ST1. While ST4 was giving the Sariska administration and the research team a tough time with the task of tracking his movements, the ST5 tigress followed a similar exploratory route as that of the ST2 tigress and moved towards the northern parts of Sariska, crossing two state highways simultaneously.

But after roaming in the northernmost areas of the reserve with less wild prey abundance and more human disturbance, she

came back to the best available habitat and started establishing her territory in the eastern part of the reserve.

While the Sariska management and the WII research team were meticulously striving to track down the male tiger ST4 in the territorial forest areas of Rajgarh range of Alwar division, the first ever reintroduced male ST1 was shockingly found dead due to feeding on a poisoned buffalo kill inside the Sariska Tiger Reserve at Kalakhet area in November 2010. Subsequent to the death of ST1, ST4 found its way back to the reserve and started occupying the same areas which had been utilized by ST1 for almost two-and-a-half years. ST4 was observed to even develop new associations with all the three females (ST2, ST3 and ST5) within a month and covered the entire home ranges of all three females.

In February 2011, a male tiger (T-07) dispersed from Ranthambhore and moved almost 250 km to Mathura in Uttar Pradesh and backtracked, finally settled in a tiny bird sanctuary of Bharatpur (Keoladeo National Park). This tiger was translocated to Sariska. This male tiger (renamed as ST6 in Sariska) soon after his release in the wild was observed to get himself associated with ST3 (female) in the south western part of the Tiger Reserve. The other male tiger ST4 was also observed to reduce his territory providing space to this new male and kept his association with the other two females (ST2 and ST5) (Fig. 4). In occasional events we observed the females (ST2 and ST3) to engage them in new associations with both the males (ST6 and ST4 respectively).

But dark clouds seemed to continuously hover above Sariska and every soul associated with Sariska and this project silently prayed for a silver lining!! Now it

was almost four years and no birth of offspring was observed in Sariska, whereas a similar re-introduction project carried out in Panna Tiger Reserve, Madhya Pradesh, which was initiated after Sariska, became successful with the birth of tiger cubs within a year's time.

Experts in the field of wildlife management and research engaged themselves in scrutinizing the project to find out the exact reason behind the unfavourable conditions for the arrival of tiger cubs in Sariska.

Issues of human disturbances such as heavy traffic in state highways within the reserve, the presence of villages, human and domestic livestock activities in the core areas of the reserve were speculated as the major reasons, whereas the presence of radio collars on the tigers were also raised as an issue by some experts.

Jubilation engulfed Sariska when the first reintroduced female ST2 was photographed with symptoms of lactation in June 2012. Mother Nature seemed to rejoice as on August 7, 2012, in Sariska, when we captured the photograph of this

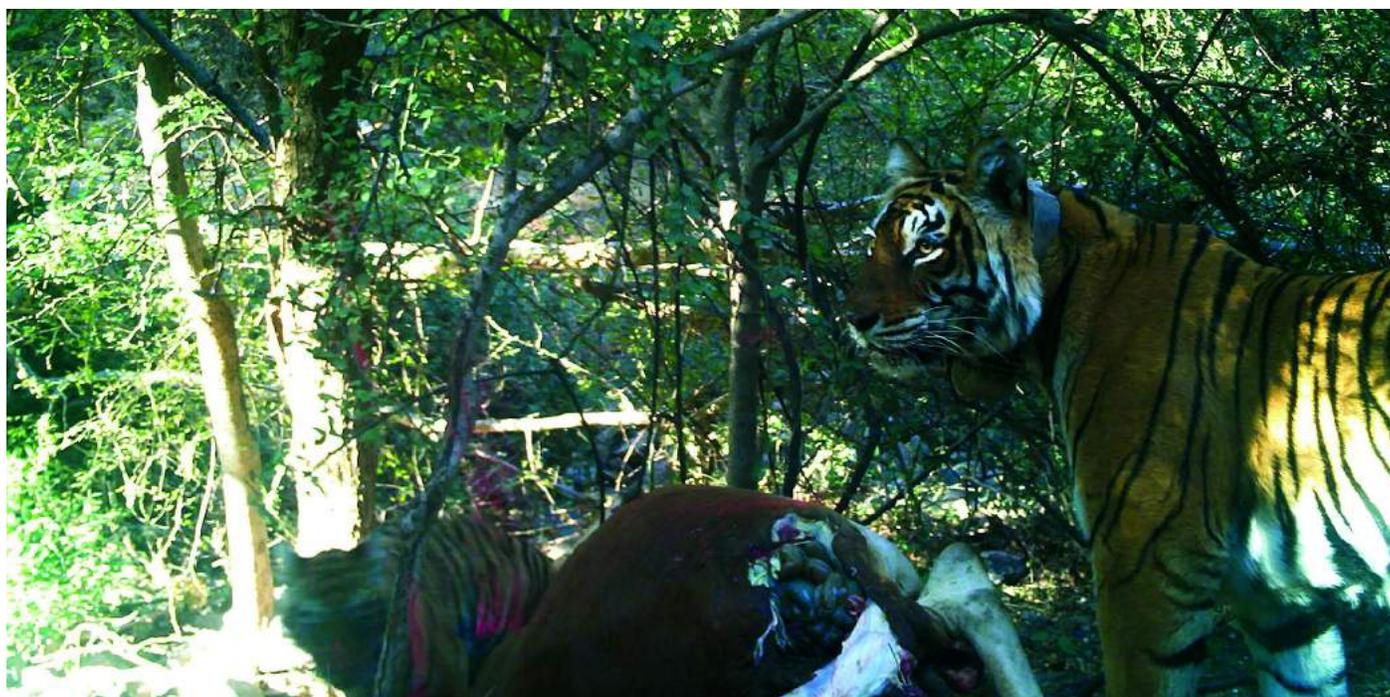


(Above & below) Camera trap photographs of the Sariska tiger cubs

tigress with a cub through a camera trap deployed in her territory, near Slopka. The birth of this cub in the lap of Sariska signified the grand success of this first-ever tiger re-introduction project undertaken by the finest wildlife experts of our country and thereby engraving the name of India on the milestone marking a new

era of global wildlife management and research.

Let's hope to see these magnificent beasts establish their presence deep in the heart of Sariska. The next time you plan a trip to Sariska, we sincerely hope that you will sight the "striped fur" proudly strolling through this forest accompanied by their cubs.



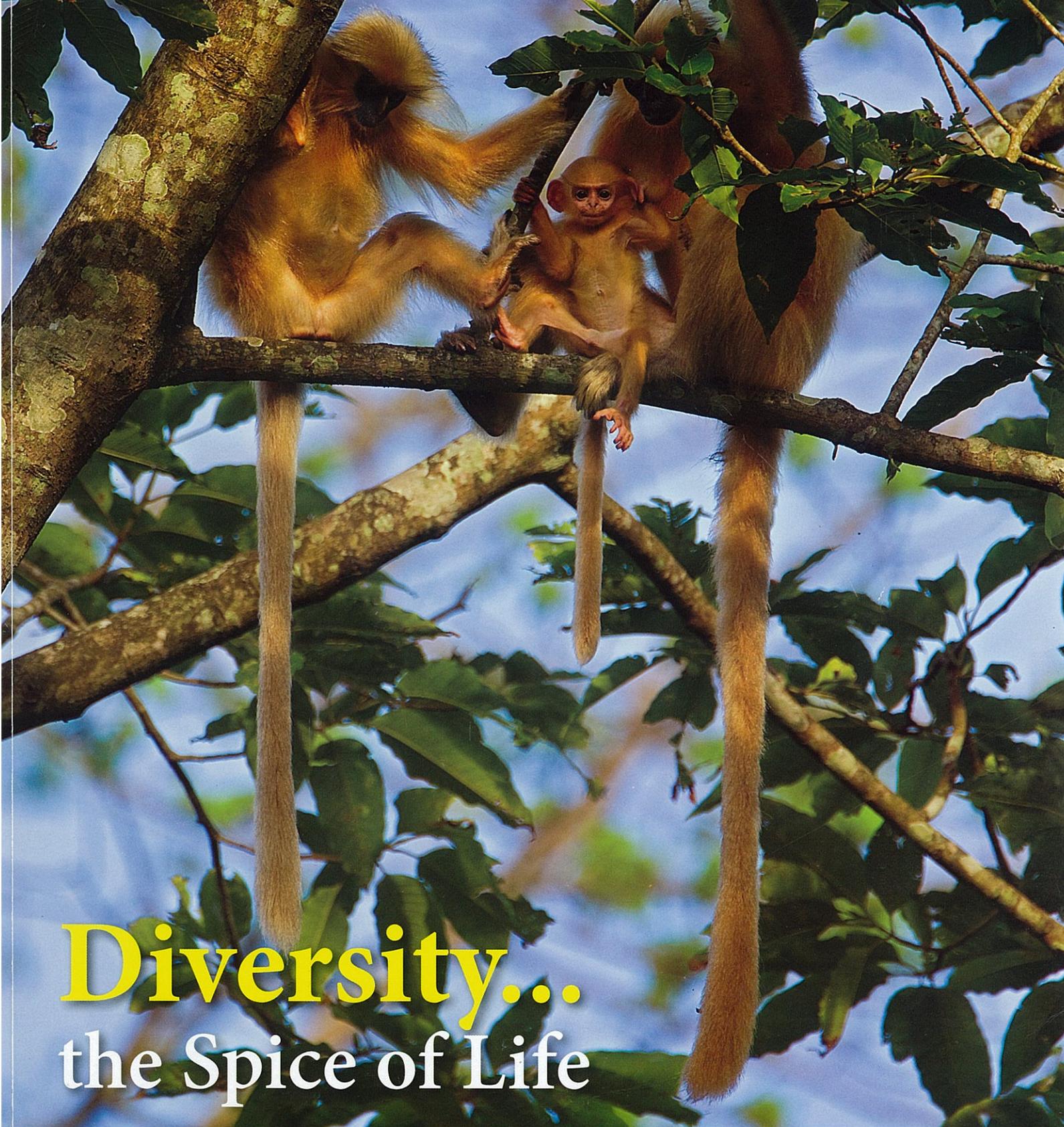
Call of the wild

Sanctuary

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Vol. XXXII No.3, June 2012



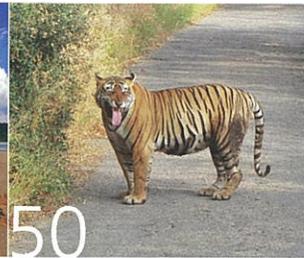
Diversity...
the Spice of Life

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On the Cover

The golden langur, *Trachypithecus geei*. This family portrait of one of the rarest, most fetching members of the langur family, in Ulta Pani in Assam, underscores the wisdom of Project Tiger's founders who insisted: "Save the habitat to save all biodiversity... that will save the tiger."

Photographer: Ramki Sreenivasan / Conservation India



Cover Story

10 Diversity – the Spice of Life Ramakrishnan (Ramki) Sreenivasan uses imagery to showcase the natural heritage of India. Using his camera and an intrepid determination to travel across wild India he has dedicated his life to promoting mass-collaboration for biodiversity protection by providing conservationists with timely, reliable information and the tools they need to campaign effectively.

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Contributors



10 Ramakrishnan (Ramki) Sreenivasan A wildlife photographer, he travels across India documenting ecosystems and species and helps network conservation groups by offering them a platform for cohesive action.



40 Maya Khosla An award-winning poet, she is Co-Director of the Turtle Diaries Project together with Rita Banerji and is currently filming turtle monitoring teams in the Andamans.



70 Sandip Chaudhuri A marketing and communication professional, he currently designs and runs educational courses. He is passionate about photography and the conservation of India's wilds.



76 Nirmal Ghosh Journalist based in Bangkok, author of several books, musician, performer and Trustee of the Corbett Foundation, he has worked on wildlife issues for decades.



Tale of a travelling tiger

*“Better to live one year as a tiger, than a hundred as a sheep.” These are the words of an American pop singer unacquainted with tiger biology and nature conservation. Yet this is the core of the character that every single individual tiger is innately gifted with, say authors, **Subhadeep Bhattacharjee, Dr. P. K. Malik, R.S. Shekhawat, Anoop K.R. and Dr. K. Sankar** who share with Sanctuary readers an amazing expedition of a brave heart tiger who travelled from Ranthambhore to the Sariska Tiger Reserve.*

The call came at midnight on October 3, 2010. We were informed about pugmarks of a large wild felid at a location near Mathura, Uttar Pradesh. Four wrestlers (yes, wrestlers!) claimed to have been injured by a

yellow-bodied black-striped mysterious animal while practicing in their *akhada* (exercise centre). Mathura is best known for its chemical refineries, jam-packed streets, busy markets, dusty localities and high-pitched religious chants. It really required an over-ambitious day-dreamer

to slot a large wild cat in this urbanised fiasco. If the reports we heard were true, then we had a double-jeopardy with people who had never been exposed to living alongside a large cat and the tiger that had never lived alongside people. We had to act immediately.

We continued to search for the cat until darkness fell following a single pugmark trail through endless distances of agricultural fields and wetlands. After some 4.5 km., an intermittent trail brought us to a canal bank, which the tiger seemed to have crossed.

The next morning, with forest officials from the Sariska Tiger Reserve, we reached the *akhada*, situated in the middle of a huge agricultural field where the incident had occurred. The location was just 300 m. away from National Highway 02, better known as the Delhi-Kolkata Highway that linked several large towns and cities from Delhi, through Uttar Pradesh, Bihar and West Bengal to Kolkata.

Finding the cat

Our first objective was to confirm the identity of the animal. Within two minutes, we found a pugmark inside a sugarcane field, 200 m. away from the NH-02 Mathura city toll gate. It was undoubtedly a tiger pugmark, possibly a sub-adult. But we could still not come to grips with the possibility that a tiger... a tiger could land up in this human-dominated landscape.

When we reached we discovered that officials from the Mathura Territorial Forest Division, Bharatpur Keoladeo National

Park (KNP), Ranthambhore Tiger Reserve and senior forest officers from Uttar Pradesh and Rajasthan had already arrived at the spot. The Uttar Pradesh State Police barricaded the field. And, as is common in India, thousands of people had thronged from all around. Several had come armed and ready to hunt down the big 'dangerous beast'. It was pure chaos without any prior caveat and the police had to *lathi-charge* the mob to disperse it.

Amidst this pandemonium, we divided ourselves into small groups and began to follow the tiger's pugmarks. We realised right away why the tiger had managed to escape detection so far. The fields were laden with full-grown sugarcane and paddy crops and, coupled with water-logged ditches, the two most basic habitat requirements of cover and water were there for the asking. We continued to search for the cat until darkness fell following a single pugmark trail through endless distances of agricultural fields and wetlands.

After some 4.5 km., an intermittent trail brought us to a canal bank, which the tiger seemed to have crossed. But it was too dark to continue the search, so the teams returned to their temporary base camps in Bharatpur and Mathura.

Meanwhile villages in the area and those across the Bharatpur district border had been alerted to the presence of a tiger and emergency help lines were set up to deal with any report confirming a tiger sighting.

On October 5, as our search unfolded, we had a day of mixed fortunes. We did find the track, but quickly lost it within just 20 to 30 m. One of the teams however, picked it up again 300 or 400 m. away. This pattern continued from morning to night, as we foot-searched all possible routes that the cat might have taken for four full days.

FACING PAGE AND BELOW T-07 roams through his kingdom in Ranthambhore (facing page) before making his journey to Bharatpur. For days, he had researchers tailing him and is seen here (below) in a camera trap image, feeding on a wild pig.



COURTESY: BHARATPUR FOREST DEPARTMENT

On October 7, we discovered that the tiger had crossed over through Uttar Pradesh to the Bharatpur district of Rajasthan. Incredibly, not one report of cattle kill or human casualty emerged as the tiger had by now traversed several villages and crop fields.

A tiger in birdland

It was a stressful time for us, with sleepless nights involving our dashing off in response to emergency calls from different parts of the Bharatpur district. All these proved to be false alarms with the animal turning out to be a striped hyena or nilgai or, on one hilarious occasion, a buffalo! Essentially, rural people from Bharatpur

ABOVE This map depicts T-07's arduous journey from Ranthambhore. Incredibly, there was not a single instance of conflict during his passage from Mathura to Bharatpur.

BELOW Deciding that the Sariska Tiger Reserve was the best place for T-07, forest officials tranquillised him, and readied him for his journey to his new home.



had never ever seen a tiger and a genuine sense of panic and excitement pervaded the air, especially thanks to media broadcasts that kept floating different theories on where the tiger had come from and where it was hiding.

Sariska had five tigers at the time, all under radio-telemetry surveillance. So, we were certain that Ranthambhore

was the only possible area from where the tiger could have come. But there was also speculation from some quarters on whether the tiger could be from the Dudhwa Tiger Reserve or the Katerniaghat Sanctuary of Uttar Pradesh.

On October 9, we found ourselves some 600 m. away from the Keoladeo Ghana Bird Sanctuary when we recorded





SUBHADEEP BHATTACHARJEE

what seemed to be the last sign of our tiger. Despite our best efforts, we simply lost its trail. The fields in the area were being tilled and prepared for the winter crop to be sown. The day ended without finding a single pugmark.

From the very first day, we had been plotting the pugmark locations using Google Earth and a sort of pattern of movement emerged. Incredibly, the tiger was moving in a south-western direction and seemed to have drawn a straight line to the Keoladeo National Park, Bharatpur a small droplet of protected forest land 29 sq. km. within thousands of acres of human land.

On the morning of October 10, at 4 a.m., chital alarm calls were heard once from behind the Shanti Kutir forest rest house in Keoladeo National Park. We set out on an intensive search inside the

park, but could not locate the tiger or any indirect evidence of its presence. Until late afternoon we waited for more alarm calls and searched for pugmarks. To our consternation 14 hours of effort had yielded no success. That evening we gathered at Shanti Kutir when a call came through from Range Forest Officer, Ram Singh to DFO Anoop K.R. regarding a fresh kill of an adult female nilgai located near the *Lala Pyare ka kunda* waterhole. Since Keoladeo has no leopards and has only a few striped hyenas and golden jackals, that nilgai kill had to be of the tiger. We rushed to the spot and to our utter delight in the beam of our flashlights we saw fresh tiger pugmarks around the kill.

Against all odds, the tiger had arrived safely in Keoladeo all the way from Ranthambhore.

ABOVE Now christened ST-06, the tiger has made Sariska his home. A radio collared tracking device reveals he has made several successful kills and that his territory now overlaps that of a female.

Without much ado, camera traps were deployed next to the kill and in other strategic spots. The very next morning we got two photographs of an adult male tiger near the kill. That helped us identify the cat as T-07 of the Ranthambhore Tiger Reserve based on stripe patterns.

More than 15 minutes of fame!

This was the same tiger that had attacked Range Forest Officer Daulat Singh Shaktawat in August 2010 (*Sanctuary* Vol. XXX No. 6, December 2010) when it had been mobbed by thousands of people near the Bhuri Pahari area at the periphery

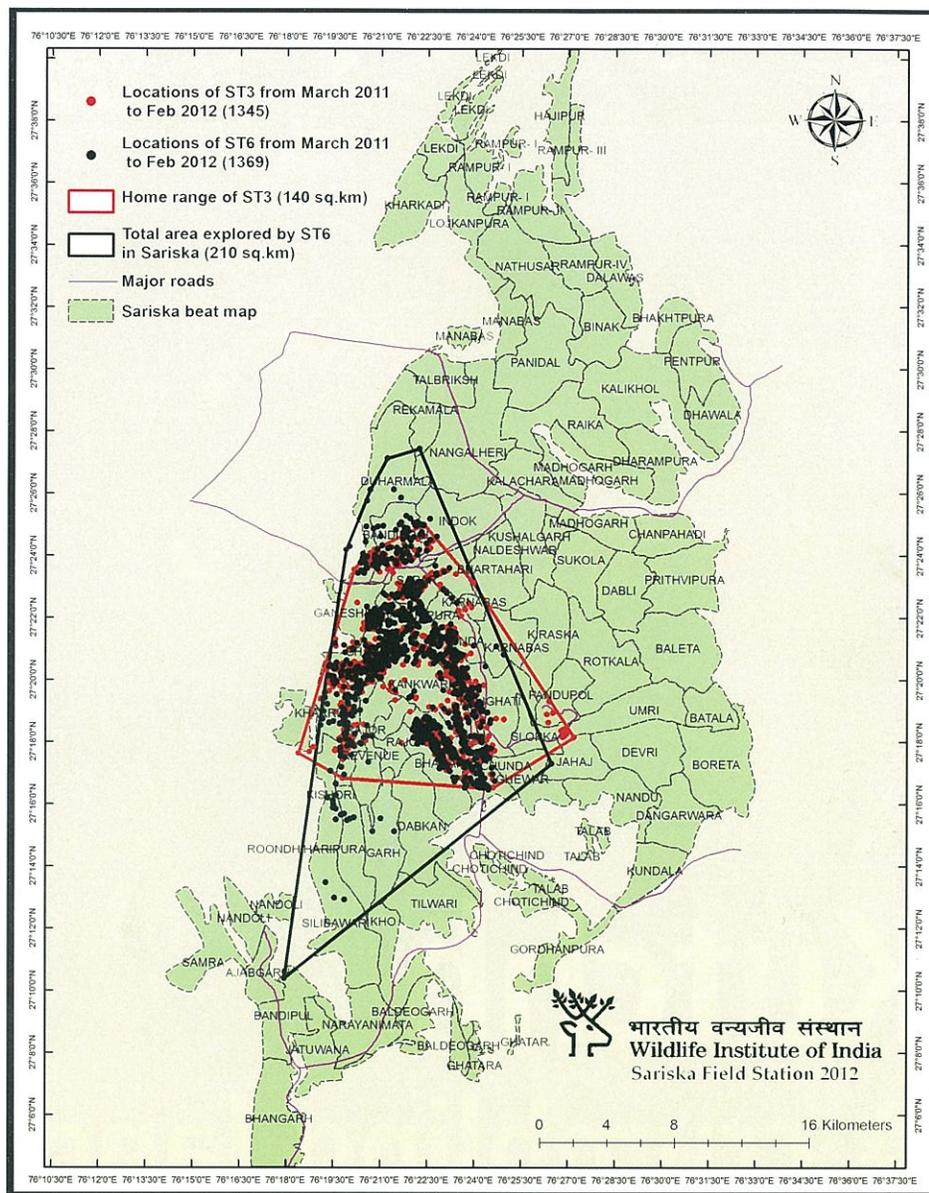
of Ranthambhore. Daulat Singh had been trying to immobilise and rescue the cat, but the unruly crowd literally cornered it and forced it to pounce on Daulat Singh who lost an eye in the process.

After that encounter we had no report of T-07 until the camera trap images in Keoladeo emerged on October 10, 2010. But we knew he couldn't stay in this tiny bird sanctuary forever. He had to be relocated to a new home, probably to a tiger reserve.

In February 2011, a joint team comprising the Wildlife Institute of India (WII) and Sariska Tiger Reserve officials successfully immobilised and radio-collared T-07 and translocated him to the Sariska Tiger Reserve. During his epic four-month stay in Keoladeo, he killed seven nilgai, three wild pigs and uncounted chital and feral cattle. Twice he was seen to have moved out of the park but returned to the safe environs of the park.

In Sariska, T-07 was rechristened ST-06 (Sariska Tiger – 06) and released in the wild on February 27, 2011. From the very first week he was seen following a tigress (ST-03) into whose territory he has remained until today. In Sariska he is being monitored constantly using VHF radio-telemetry on ground and through satellite tracking. He has been sighted on many occasions by us, by Sariska's forest officials and by tourists.

What an amazing animal. He travelled more than 200 km. from Ranthambhore, Rajasthan to Mathura, Uttar Pradesh where we found his first pugmark. From Mathura he travelled more than 40 km. to reach Keoladeo National Park, Bharatpur. In the course of this adventure, our seven-day-tracking between Mathura and Bharatpur confirms that he crossed two national highways (NH-02 and NH-11), four state highways, three railway tracks, seven canals and more villages than we can count, all in search of a safe refuge. With each day of his exploration he became more and more adept at avoiding humans. There was not one incident of conflict. Never before has anything like this been observed or reported.



As for us all, we are thrilled that ST-06 now has a larger home, stocked with cover, water and food. With another adult male and three female tigers for company, hopefully over time he will forge a tiger society and bring some of Sariska's old tiger glory back to life. In the past 12 months, ST-06 has successfully killed sambar, nilgai, chital, wild pig and some feral livestock. His present home range is around 140 sq. km. and he has explored an area of 210 sq. km. He holds a territory in the south-western part of the Sariska Tiger Reserve, and this partially overlaps the territory of tigress ST-03. The chronicle of his adventure is nothing less than a landmark in the

ABOVE A map of the movement of ST-03 and ST-06 in the Sariska Tiger Reserve, based on information from radio collaring devices.

history of tiger biology. We will follow his fortunes closely in the years ahead.

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