

SURVEY OF WILDLIFE PROTECTED AREAS IN INDIA

VOLUME I MAIN REPORT



SPONSORED BY
THE MINISTRY OF ENVIRONMENT AND FORESTS
GOVERNMENT OF INDIA

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION
NEW DELHI

DRAFT FINAL REPORT
NOT TO BE QUOTED

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2001

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PREFACE

The Ministry of Environment, Government of India, sponsored this survey of wildlife protected-areas in India. This was a part of the World Bank sponsored Forestry Research, Education and Extension Project (FREEP).

Objectives

The terms of reference specified that the IIPA would:

1. Survey the status of wildlife protected areas (PAs) in India, including the legal and administrative status, socio-economic pressures, management planning and implementation, staffing, research, monitoring, and tourism.
2. Use a methodology, for the basic survey, that is such that it allows comparison of data with the earlier survey done by the IIPA in 1984-86.
3. Based on this survey, undertake various specific tasks.

Tasks

In order to fulfill these objectives, the survey team set itself to survey the wPAs in India in terms of their:

- **Legal Status:** how many of the steps prescribed, for setting up a national park or sanctuary, under the Wild Life (Protection) Act of 1972, as amended in 1991, have been carried out? With whom does the control over the PA vest?
- **Management Status:** Are there up-to-date and approved management plans? Are their appropriate budget provisions? What levels and numbers of staff are in position, and how many are trained in wildlife management? What are the management practices, especially relating to control of poaching, regulation of visitors, and prevention and vacation of encroachments? What is the availability of equipment, literature and reference materials? What interpretation, education and extension facilities and activities are in evidence? What level of participation is there of the local people in the protection and management of the PA? What ecodevelopment initiatives have taken place?

- **Biological Profile:** What habitat and ecosystem types, including forest and biogeographic types, occur in the PA, what is their location and extent, and what is their status? What species of fauna and flora occur in the PA, what is their distribution and status? What geographical connection, if any, does the PA have, through corridors and such like, with other PAs? What are the significant biological values in the PA?
- **Socio-economic Profile:** How many people live within or adjacent to (10 kms radius) the PA? What is their socio-economic status and their dependence on natural resources, especially those of the PA? What is the nature and legitimacy of their use of, and dependence on, the PA, past and present? What is the tourism value of the PA and how many and what sorts of tourists visit it, and when? What are the religious and cultural values of the PA? What impact does the PA have on the local people, especially adverse impacts including depredation by wild animals and restrictions on the use of resources?
- **Management Issues:** What are the major threats to the habitat and species? What is the incidence and nature of illegal activities in the PA? What is the incidence and impact of activities within the PA by other government departments? What is the cause, intensity and frequency of law and order problems, including tensions with the local people?

Methodology

As the findings of this survey had to be contrasted with the findings of the earlier survey, in order to assess the changes that have occurred in the interim, the basic methodology followed was the same as that which was followed in the earlier survey. This methodology is described below.

- A questionnaire seeking information on all these aspects will be sent to the directors or officers-in-charge of each national park and sanctuary. They would be requested to complete the questionnaire and return it to IIPA.
- Meanwhile, a search of secondary literature on each PA, dealing with any of the listed aspects, will be undertaken, and the documents compiled.
- Simultaneously, a database would be created of the known distribution of plant and animal species and of biomes, across India and, based on that, a

listing of what species and biomes could ordinarily be expected to occur in which PA.

- Also, a survey of census records and other related data would be made and details of the population and socio-economic parameters relevant to PAs and their adjacent areas would be compiled from these sources.
- Similarly, the boundaries of each PA would be marked out on a Survey of India toposheet of appropriate scale, and on forest cover maps of the Forest Survey of India, and basic maps produced for each PA. The information on these maps would be supplemented once information from the PAs becomes available.
- National and state budgets and plans will also be analysed to identify the allocations and schemes relevant to each PA and to its adjacent area.
- On receipt of the completed questionnaires, they would be analysed and if any gaps or questions remain, they would sought to be filled and answered respectively.
- Based on a quick survey of the questionnaires received, those PAs would be identified that warrant a field visit. These would be those PAs where the information provided in the questionnaires needs to be supplemented by personal observation and/or a discussion with the local level officials.
- The field visits would be done by teams of three or more researchers who would collectively represent all the different areas of expertise required. These teams would not only visit the PA and meet with the forest officials but also, where required, meet revenue and other officials connected with the PA and its adjoining areas. The field visitors would also meet with local NGOs and other knowledgeable and concerned individuals, including a sample of the local villagers.
- The information so gathered would be compiled and a profile made of each PA. There would also be a compilation of state level data. These compilations would then be sent back to the PA/state and, wherever necessary, discussions would be held at the state level.
- The final data set would then be analysed and a draft report produced, which would be discussed in one or more workshops, before being finalised.

Outputs

The study was expected to produce:

- A profile and map of each PA, along with a description of its adjacent areas.
- An analysis of the major management issues in each PA.
- An analysis of the changes that have taken place in the period between the surveys.
- A compilation and analysis of the status of the PA network, statewise and nationally.
- State and national level analysis of the socio-economic issues related to PAs.

Structure of the Report

This report is in seven volumes. Volume 1 contains the main report and some annexes. Volume 2, 3 and 4 contain the data tables, volume 5 contains the bibliography and references and volume 6 contains the maps.

Codes are used for the various PAs. These codes have three elements. The first represents the state in which they occur, eg., ARU for Arunachal Pradesh, MP for Madhya Pradesh, and so on. The second element specifies their legal status, N for national parks and S for sanctuaries. The third element gives the first three or four letters of their name, BAND for Bandipur, BANN for Bannerghata, or SAD for Saddle Peak. Therefore, Great Himalayan National park in Himachal Pradesh would be coded as HP/N/GRE. A list of the codes along with the names of the PAs responding is given after the preface.

NAMES AND CODES OF PROTECTED AREAS RESPONDING TO THE SURVEY

Andaman and Nicobar Islands		
1.	A&N/N/SAD	Saddle Peak National Park
2.	A&N/S/CUT	Cuthbert Bay Sanctuary
3.	A&N/S/INT	Interview Island Sanctuary
Andhra Pradesh		
1.	AP/N/KAS	Kasu Brahmananda Reddy National Park
2.	AP/N/MAH	Mahaveer Harina Vanasthali National Park
3.	AP/N/MRU	Mrugavani National Park
4.	AP/N/VEN	Sri Venkateswara National Park
5.	AP/S/COR	Coringa Sanctuary
6.	AP/S/ETU	Eturnagaram Sanctuary
7.	AP/S/GUN	Gundla Brahmeswaram Sanctuary
8.	AP/S/KAW	Kawal Sanctuary
9.	AP/S/KOL	Kolleru Sanctuary
10.	AP/S/KOU	Koundinya Sanctuary
11.	AP/S/KRI	Krishna Sanctuary
12.	AP/S/MAN	Manjira Sanctuary
13.	AP/S/NEL	Neelapattu Bird Sanctuary
14.	AP/S/PAK	Pakhal Sanctuary
15.	AP/S/PAP	Papikonda Sanctuary
16.	AP/S/POC	Pocharam Sanctuary
17.	AP/S/PRA	Pranhita Black Buck Sanctuary
18.	AP/S/PUL	Pulicat Bird Sanctuary
19.	AP/S/SIW	Siwaram Sanctuary
Arunachal Pradesh		
1.	ARU/N/MOU	Mouling National Park
2.	ARU/N/NAM	Namdapha National Park
3.	ARU/S/DER	D' Ering Memorial Sanctuary
4.	ARU/S/KAM	Kamlang Sanctuary
5.	ARU/S/MEH	Mehao Sanctuary
6.	ARU/S/YOR	Yordi Rabe Supse Sanctuary
Assam		
1.	ASS/N/DIB	Dibru Saikhowa National Park
2.	ASS/N/KAZ	Kaziranga National Park
3.	ASS/N/MAN	Manas National Park
4.	ASS/N/ORA	Orang Sanctuary
5.	ASS/S/BAR	Barnadi Sanctuary
6.	ASS/S/DIP	Dipar Beel Sanctuary
7.	ASS/S/GIB	Gibbon Sanctuary
8.	ASS/S/LAO	Laokhowa Sanctuary
9.	ASS/S/PAN	Panidehing Bird Sanctuary
10.	ASS/S/POB	Pobitora Sanctuary
11.	ASS/S/SON	Soni-Rupai Sanctuary
Bihar		
1.	BIH/S/RAJ	Rajgir Sanctuary

Chandigarh		
1.	CHD/S/SUK	Sukhna Sanctuary
Chattisgarh		
1.	CHT/N/IND	Indravati National Park
2.	CHT/N/KAN	Kanger Valley National Park
3.	CHT/S/ACH	Achanakmar Sanctuary
4.	CHT/S/BAD	Badakhhol Sanctuary
5.	CHT/S/BAG	Bagdara Sanctuary
6.	CHT/S/BAR	Barnawapara Sanctuary
7.	CHT/S/BHA	Bhairamgarh Wild Buffalo Sanctuary
8.	CHT/S/PAM	Pamed Wild Buffalo Sanctuary
9.	CHT/S/SIT	Sitanadi Sanctuary
10.	CHT/S/TAM	Tamor Pingla Game Sanctuary
11.	CHT/S/UDA	Udanti Sanctuary
Delhi		
1.	DEL/S/ASO	Asola-Bhatti Sanctuary
Goa		
1.	GOA/S/CHO	Dr. Salim Ali Bird Sanctuary
Gujarat		
1.	GUJ/N/BAN	Bansda National Park
2.	GUJ/S WIL	Wild Ass Sanctuary
3.	GUJ/S/PUR	Purna Sanctuary
Haryana		
1.	HAR/N/SUL	Sultanpur National Park
2.	HAR/S/ABU	Abuabsher Sanctuary
3.	HAR/S/BHIN	Bhindarwas Bird Sanctuary
4.	HAR/S/BIRB	Bir Bara Ban Sanctuary
5.	HAR/S/BIRS	Bir Sikargah Sanctuary
6.	HAR/S/CHIL	Chilchilla (Bird) Sanctuary
7.	HAR/S/KAL	Kalesar Sanctuary
8.	HAR/S/KHA	Khaparwas Bird Sanctuary
9.	HAR/S/NAH	Nahar Sanctuary
10.	HAR/S/SAR	Saraswati Plantation Sanctuary
Himachal Pradesh		
1.	HP/N/GRE	Great Himalayan National Park
2.	HP/S/DAR	Daranghati Sanctuary Part I & II
3.	HP/S/DHA	Dhauladhar Sanctuary
4.	HP/S/GAM	Gangul Siyabehi Sanctuary
5.	HP/S/KAL	Kalatop - Khajjiar Sanctuary
6.	HP/S/KUG	Kugti Sanctuary
7.	HP/S/LIP	Lippa Asrang Sanctuary
8.	HP/S/NAR	Nargu Sanctuary
9.	HP/S/PON	Pong Lake Bird Sanctuary
10.	HP/S/RUP	Rupi Bhaba Sanctuary
11.	HP/S/SAN	Sangla Valley Sanctuary
12.	HP/S/SHI	Shikari Devi Sanctuary
13.	HP/S/TUN	Tundah Sanctuary

Jammu & Kashmir		
1.	J&K/N/KIS	Kishtwar High Altitude National Park
2.	J&K/S/OVE	Overa Aru Sanctuary
Jharkhand		
1.	JHA/N/RAJ	Rajmahal National Fossil Park
2.	JHA/S/HAZ	Hazaribagh Sanctuary
3.	JHA/S/PAR	Parasnath Sanctuary
4.	JHA/S/UDH	Udhawa Bird Sanctuary
Karnataka		
1.	KAR/N/ANS	Anashi National Park
2.	KAR/N/BAN	Bandipur National Park
3.	KAR/N/KUD	Kudremukh National Park
4.	KAR/N/NAG	Rajiv Gandhi National Park
5.	KAR/S/ADI	Adichunchanagiri Peacock Sanctuary
6.	KAR/S/ARA	Arabitittu Sanctuary
7.	KAR/S/BHA	Bhadra Sanctuary
8.	KAR/S/BRA	Brahmagiri Sanctuary
9.	KAR/S/DAN	Dandeli Sanctuary
10.	KAR/S/DOR	Doraji Bear Sanctuary
11.	KAR/S/GHA	Ghataprabha Bird Sanctuary
12.	KAR/S/GUD	Gudavi Bird Sanctuary
13.	KAR/S/KAV	Kaveri Sanctuary
14.	KAR/S/MEL	Melkote Sanctuary
15.	KAR/S/MOO	Mookambika Sanctuary
16.	KAR/S/NUG	Nugu Sanctuary
17.	KAR/S/PUS	Pushpagiri Sanctuary
18.	KAR/S/RANE	Ranebennur Black Buck Sanctuary
19.	KAR/S/RANG	Ranganathittu Bird Sanctuary
20.	KAR/S/SHA	Sharavathi Valley Sanctuary
21.	KAR/S/SHE	Shettihalli Sanctuary
22.	KAR/S/SOM	Someshwara Sanctuary
23.	KAR/S/TAL	Talakaveri Sanctuary
Kerala		
1.	KER/N/ERA	Eravikulam National Park
2.	KER/S/CHIN	Chinnar Sanctuary
3.	KER/S/WAY	Wayanad Sanctuary
Maharashtra		
1.	MAH/N/AND	Tadoba Andhari Tiger Reserve
2.	MAH/N/NAV	Navegaon National Park
3.	MAH/N/PEN	Pench Tiger Reserve
4.	MAH/N/SAN	Sanjay Gandhi National Park
5.	MAH/S/AMB	Ambabarva Sanctuary
6.	MAH/S/ANR	Aner Dam Sanctuary
7.	MAH/S/BHA	Bhamragarh Sanctuary
8.	MAH/S/BOR	Bor Sanctuary
9.	MAH/S/CHA	Chaprala Sanctuary
10.	MAH/S/GAU	Gautala-Autramghat Sanctuary
11.	MAH/S/GYA	Gyanganga Sanctuary

12.	MAH/S/JAI	Jaikwadi Bird Sanctuary
13.	MAH/S/KAL	Kalusubai Harishchandragad Sanctuary
14.	MAH/S/KAR	Karnala Bird Sanctuary
15.	MAH/S/KAT	Katepurna Sanctuary
16.	MAH/S/MAL	Malwan Marine Sanctuary
17.	MAH/S/NAG	Nagzira Sanctuary
18.	MAH/S/NAI	Naigaon Peacock Sanctuary
19.	MAH/S/NAR	Narnala Bird Sanctuary
20.	MAH/S/PAI	Painganga Sanctuary
21.	MAH/S/RAD	Radhanagri Sanctuary
22.	MAH/S/SAG	Sagreshwar Sanctuary
23.	MAH/S/TIP	Tipeshwar Sanctuary
24.	MAH/S/WAN	Wan Sanctuary
25.	MAH/S/YAW	Yawal Sanctuary
26.	MAH/S/YED	Yedshi Ramling Ghat Sanctuary

Manipur

1.	MAN/N/KEI	Keibul Lamjao National Park
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Meghalaya

1.	MEG/N/BAL	Balpakram National Park
2.	MEG/N/NOK	Nokrek National Park
3.	MEG/S/BAG	Baghmara Pitcher Plant Sanctuary
4.	MEG/S/NON	Nongkhylllem Sanctuary
5.	MEG/S/SIJ	Siju Sanctuary

Mizoram

1.	MIZ/N/MUR	Murlen National Park
2.	MIZ/N/PHA	Phawngpui (Blue Mountain) National Park
3.	MIZ/S/DAM	Dampa Tiger Reserve
4.	MIZ/S/KHA	Khawnglung Sanctuary
5.	MIZ/S/LEN	Lengteng Sanctuary
6.	MIZ/S/NGE	Ngengpui Sanctuary

Madhya Pradesh

1.	MP/N/BAN	Bandhavgarh Tiger Reserve
2.	MP/N/GHU	Ghughuwa Fossil National Park
3.	MP/N/PEN	Pench National Park
4.	MP/N/SAT	Satpura National Park
5.	MP/N/VAN	Van Vihar National Park
6.	MP/S/GAN	Gandhi Sagar Sanctuary
7.	MP/S/KAR	Karera Great Indian Bustard Sanctuary
8.	MP/S/KHE	Kheoni Sanctuary
9.	MP/S/KUN	Kuno Sanctuary
10.	MP/S/NAR	Narsingarh Sanctuary
11.	MP/S/NAT	National Chambal Sanctuary
12.	MP/S/NOR	Noradehi Sanctuary
13.	MP/S/PEN	Pench Sanctuary
14.	MP/S/RAL	Ralamandal Sanctuary
15.	MP/S/SAI	Sailana Sanctuary
16.	MP/S/SAN	Sanjay (Dubri) Sanctuary
17.	MP/S/SAR	Sardarpur Sanctuary

Nagaland		
1.	NAG/N/INT	Intanki National Park
2.	NAG/S/FAK	Fakim Sanctuary
3.	NAG/S/PUL	Pulie Badze Sanctuary
4.	NAG/S/RAN	Rangapahar Sanctuary
Orissa		
1.	ORI/S/BAD	Badarma Sanctuary
2.	ORI/S/BAI	Baisapalli Sanctuary
3.	ORI/S/BAL	Balukhand-Konark Sanctuary
4.	ORI/S/CHA	Chandaka-Dompada Sanctuary
5.	ORI/S/CHI	Chilika Sanctuary
6.	ORI/S/DEB	Debrigarh Sanctuary
7.	ORI/S/HAD	Hadgarh Sanctuary
8.	ORI/S/KHA	Khalasuni Sanctuary
9.	ORI/S/KOT	Kotgarh Sanctuary
10.	ORI/S/LAK	Lakhari Valley Elephant Sanctuary
11.	ORI/S/SUN	Sunabeda Sanctuary
Punjab		
1.	PUN/S/ABO	Abohar Sanctuary
2.	PUN/S/AIS	Bir Aishwan Sanctuary
3.	PUN/S/BHA	Bir Bhadson Sanctuary
4.	PUN/S/BHU	Bir Bhunerheri Sanctuary
5.	PUN/S/DOS	Bir Doshamajan Sanctuary
6.	PUN/S/GUR	Bir Gurdial Pura Sanctuary
7.	PUN/S/HAR	Harike Lake Bird Sanctuary
8.	PUN/S/MAH	Bir Mahas Sanctuary
9.	PUN/S/MOT	Bir Moti Bag Sanctuary
10.	PUN/S/TAK	Takhani Rehmapur Sanctuary
Rajasthan		
1.	RAJ/N/DES	Desert National Park
2.	RAJ/S/JAM	Jamwa Ramgarh Sanctuary
3.	RAJ/S/NAH	Nahargarh Sanctuary
4.	RAJ/S/TAL	Tal Chappar Sanctuary
Sikkim		
1.	SIK/N/KHA	Khangchendzonga National Park
2.	SIK/S/BAR	Barsey Rhododendron Sanctuary
3.	SIK/S/KYON	Kyongnosla Alpine Sanctuary
4.	SIK/S/SHIN	Shingba Rhododendron Sanctuary
Tamil Nadu		
1.	TN/N/GUL	Gulf of Mannar Marine National Park
2.	TN/N/IND	Indira Gandhi National Park & Sanctuary
3.	TN/N/MUD	Mudumalai National Park & Sanctuary
4.	TN/N/MUK	Mukurthi National Park
5.	TN/S/CHI	Chitrangudi Birds Sanctuary
6.	TN/S/GRI	Giant Squirrel Sanctuary
7.	TN/S/KAN	Kanjarankulam Birds Sanctuary
8.	TN/S/KARA	Karaivetti Bird Sanctuary
9.	TN/S/KARI	Karikili Bird Sanctuary

10.	TN/S/KOO	Koontakulam Birds Sanctuary
11.	TN/S/MEL	Mela Selvanur and Kela Selvanur Birds Sanctuary
12.	TN/S/POIN	Point Calimere Sanctuary
13.	TN/S/PUL	Pulicat Bird Sanctuary
14.	TN/S/UDA	Udayamarthandapuram Bird Sanctuary
15.	TN/S/VAD	Vaduvoor Bird Sanctuary
16.	TN/S/VALL	Vallanad Black Buck
17.	TN/S/VED	Vedanthangal Bird Sanctuary
18.	TN/S/VELL	Vellode Birds Sanctuary
19.	TN/S/VET	Vettangudi Birds Sanctuary
Tripura		
1.	TRI/S/GUM	Gumati Sanctuary
2.	TRI/S/TRI	Trishna Sanctuary
Uttar Pradesh		
1.	UP/S/CHA	Chandraprabha Sanctuary
Uttranchal		
1.	UTT/N/COR	Corbett National Park
2.	UTT/S/BIN	Binsar Sanctuary
3.	UTT/S/KED	Kedarnath Muskdeer Sanctuary
West Bengal		
1.	WB/N/GOR	Gorumara National Park
2.	WB/N/SUN	Sunderban National Park
3.	WB/S/BAL	Ballavpur Sanctuary
4.	WB/S/BET	Bethuadahari Sanctuary
5.	WB/S/BIB	Bibhuti Bhushan Sanctuary
6.	WB/S/HAL	Halliday Island Sanctuary
7.	WB/S/LOT	Lothian Island Sanctuary
8.	WB/S/RAI	Raiganj Sanctuary
9.	WB/S/RAM	Ramnabagan Sanctuary
10.	WB/S/SEN	Senchal Sanctuary

I. Biological Profile

The primary reason for setting up protected areas is to conserve the biological diversity inherent in them. The Act says that the primary function of national parks and sanctuaries is '... protecting, propagating or developing wild life or its environment' (Section 18 (1)). Consequently, our first task was to investigate the biological profile of PAs and to determine how comprehensively and effectively they protected the biodiversity of India. The type and status of the biological resources in a PA would also determine the level of protection it deserves and the types of management practices appropriate.

Unfortunately, there is still poor information about the biological profile of most PAs. The PA authorities often do not have the staff or facilities to properly list and monitor all the species found in the PA. Though other agencies of the government and universities and other professional institutions have also been helping in this task, much still needs to be done.

In studying the biological profile of PAs, information was collected for:

- Habitat types and extent
- Types of Forests and their Status
- Plantations
- Corridors
- Species (faunal), including list of schedule I species occurring, details of overpopulation, of threatened species, of species of special interest, and of those accidentally or deliberately introduced.
- Species (floral), including list important species occurring, details of overpopulation and of infestation of weeds, of threatened species, of species of special interest, of those accidentally or deliberately introduced, and of *ex situ* cultivation.

- Impact of pressures on the biodiversity of the PA, including impacts of projects and activities, floods, fires, droughts, pollution, water logging, various natural phenomenon, tree-felling and timber extraction, and disease.

1.1 Habitat Types and Extent (Table 1.1)

Several alternative approaches are available, or are being developed, for classification of natural ecosystems. There is now an increasing acceptance of biogeographic along with vegetation classifications of areas as a starting point for the planning of a protected area network. A classification of biogeographic realms, provinces and biomes has been being elaborated for Indian application at the Wildlife Institute of India.

However, there still appears to be no standardised system of classification for all the different ecosystem types in India. Consequently, for this study we have used a "common sense" classification and listed the various types of habitats as follows:

- Forests
- Wetlands
- Perennial rivers/streams
- Coasts
- Islands
- Ocean
- Rangelands (grasslands)
- Mountains
- Deserts
- Glaciers and other permanently snowbound areas
- Others

Clearly, there is an overlap in these categories and you can have the same area classified, for example, as forest, mountain and island. For classifying vegetation and forest types, there are alternate systems available. In terms of pure vegetation mapping, the most recent classifications are those of Meher-Homji and others of the French Institute, Pondicherry (Gadgil et al., 1986). However, the present study,

uses the *Revised Classification of Forest Types* by Champion and Seth(1968) as this is the vegetation classification currently most widely used in India and therefore most familiar to park managers.

As will be noticed, this divides India's forests into 16 major groups (e.g., Group 3 Tropical Moist Deciduous Forests), which in turn are divided into sub-groups (e.g., Sub-group 3B Andamans Moist Deciduous Forests). themselves further divided into types (e.g., 3B/C1 Moist Teak-bearing Forest, or further, 3B/C1a Very Moist Teak Forest). Of these, the unit most commonly used for categorisation is 'type'.

India has a great variety of habitat types, many of which are represented in its parks and sanctuaries. Most parks and sanctuaries in fact contain more than one type of habitat, some having over half a dozen.

Information on habitat type was available for 235 PAs (see table 1.1). As can be expected, forests were the most common type of habitat reported. The percentage of area covered by different types of habitat in the parks and sanctuaries responding was as follows:

	Area (sq. km.)	% of total area
Forests	39445.05	58.60
Wetlands	4473.06	6.65
Islands	2101.89	3.12
Oceans	173.55	0.26
Rangelands/grasslands	5481.96	8.14
Mountains	11817.28	17.56
Deserts	5048.59	7.50
Glaciers	714.50	1.06
Total	67311.19	102.89

Area and percentage totals do not add up because of overlaps.

1.2 Forest Types (Table 1.2)

Information on forest types was available for 191 PAs. As can be seen, many of Champion and Seth's types are represented in one or more of these protected areas. Some of the parks and sanctuaries reported a great diversity of forest types. Kedarnath Sanctuary (UTT) recorded as many as 17 types, by far the area with greatest diversity of vegetation reported. Corbett National Park (UTT), Sangla Sanctuary (HP), Lippa Asrang Sanctuary (HP), Namdapha National park (ARU), and Kawal Sanctuary (AP) are other areas reporting significant diversity.

Further analysis of the data reveals the following incidence of the 16 major groups of forest identified by Champion and Seth:

S.No	Forest Group	No. of PAs	
		Old data	New data
1.	Tropical Wet Evergreen	34	21
2.	Tropical Semi-Evergreen	47	33
3.	Tropical Moist Deciduous	82	52
4.	Littoral and Swamp	35	14
5.	Tropical Dry Deciduous	129	86
6.	Tropical Thorn	18	9
7.	Tropical Dry Evergreen	2	2
8.	Subtropical Broadleaved Hill	16	6
9.	Subtropical Pine	11	5
10.	Subtropical Dry Evergreen	2	0
11.	Montane Wet Temperate	9	17
12.	Himalayan Moist Temperate	29	18
13.	Himalayan Dry Temperate	10	4
14.	Sub-Alpine	7	7
15.	Moist Alpine Scrub	8	11
16.	Dry Alpine Scrub	1	3

It can be seen from the above that by far the most common forest group in India's national park and sanctuaries is Tropical Dry Deciduous, which also happens to be the most common kind of forest found in India.

Tropical Moist Deciduous Forests also have a strong representation in our protected areas.

On the other hand, forest groups rarely represented are the Dry alpine Scrub, the Tropical Dry Evergreen, and the subtropical Dry Evergreen.

1.3 Forest Status (Table 1.3)

Data were also sought regarding the status of forests in the PAs.

Responses were received from 222 PAs, covering 382 forest ranges and a total of 47493.79 sq. km (see table 1.3). The status was sought under four categories and the findings are as follows:

Category*	Area (sq. km.)	% of total
Undisturbed	17182.43	36.18
Slightly Disturbed	17571.19	37.00
Heavily Disturbed	10995.15	23.15
Plantations	1745.02	3.67
Total	47493.79	100.00

1.4 Plantations (Table 1.4)

Manipulation of the habitat of protected areas is being done in various ways. One such is the plantation of trees within the boundaries. Data collected show that plantation work takes place in quite a few of the parks and sanctuaries (Table 1.4)

Of the 44 national parks and 176 sanctuaries responding, 24 (55%) and 128 (73%) respectively, reported that plantations had been established in the PA. (Comparable figures from the old

* The categories are defined as follows

Undisturbed: Those forest ranges which are undisturbed as they have not been subjected to any forestry operations and human pressures including non-forestry land use like mining and quarrying, habitation, or some other developmental activities, biotic pressures like grazing, NTFP collection etc., and habitat related factors like forest fires or floods and retain their natural species composition.

Slightly Disturbed: Those forest ranges which are subject to some disturbance and show a slight change in their natural species composition

Heavily Disturbed: Those forest ranges which are heavily disturbed and where there is a significant alteration of the natural species composition.

Plantations: Those forest ranges which have either been clear felled and planted, or where the predominant vegetation cover is planted.

database were that of the 39 national parks and 163 sanctuaries responding, 17 (44%) and 94 (58%) respectively, reported that plantation work was undertaken between 1979 and 1984.)

Of the PAs that responded for both the studies, 23 of the PAs that had indicated no plantations in the earlier survey (1979-84) now reported the existence of plantations. Of these 23, at least in eight the plantations were recent (after the last survey). These PAs were: Manjira Sanctuary (AP), Mehao Sanctuary (ARU), Bansda National Park (GUJ), Kishtwar National Park, (J&K), Ghataprabha Sanctuary (KAR), Nagzira Sanctuary (MAH), Desert National Park (RAJ), and Pulicat Sanctuary (TN). In the remaining 15 the plantations were either old but had not been reported in the earlier survey or their years were not specified.

Of the 152 PAs reporting plantation activities, 88 (52.63%) reported establishing plantations in the 1990s. Of these 88, in 28 (31.82%) PAs species exotic to the PA were planted in the 1990s.

Some of the more common exotic species planted were Eucalyptus, Robina, Poplar, *Acacia* sp., Teak, and *Prosopis Juliflora*

Limitations of the Data

Since many of our national parks and sanctuaries have not been adequately surveyed on the ground, it is possible that the above data is incomplete. Also, it appears that in some cases the forest types reported was that of the general region within which the park or sanctuary itself. Considering the most convenient listing of forest types in an areas in usually found in the forest working plans, which pertain to areas mostly larger than and including the parks or sanctuaries, this is understandable.

Besides, the actual present state of these forests is not at all clear, and it is quite possible that some of this information represents areas where these forest types did exist in the past but now either no forest exists or extensive felling of certain species of trees, or the introduction of exotic tree species, or both, has changed the nature of the forests.

The extent of area under different forest types in each park and sanctuary was asked for, but the replies were scanty. The information obtained is thus not reproduced here. It has also, therefore, not been possible to work out the extent of each type protected in parks and sanctuaries.

1.5 Corridors (Table 1.5)

In a country where there is great pressure on land and it is difficult to create and maintain protected areas that are large enough units to allow the existence of viable populations of species, especially large mammals, one alternative is to connect existing PAs with corridors so that their effective size significantly increases without the concomitant increase in adverse impacts on human populations living in and around. This also allows valuable land to be saved and put under other uses.

Consequently, the existence of corridors connecting various parks and sanctuaries is considered important for the well-being of wildlife, especially of the larger mammals. Such corridors allow movement of animals between different protected areas, enlarge their range and the habitat available to them, and facilitate the maintenance of genetic diversity and health by allowing different populations to intermingle. This significantly increases their chances of survival. Ideally, all the protected areas should be so interlined so that the problems attendant to the restrictions of habitat are minimised.

Of the 44 national parks and 186 sanctuaries responding, 23(52.27%) of the parks and 56 (30.11%) of the sanctuaries reported being connected to another sanctuary or park through a corridor.

(Corresponding figures in the earlier survey were that of the 46 national parks and 199 sanctuaries responding (extended database). 14 (30%) of the parks and 52 (26%) of the sanctuaries reported being connected to another sanctuary or park in this manner.)

It is worth noting that in Goa, Haryana, and Manipur, none of the responding parks and sanctuaries are connected by corridors.

Limitations of the Data

The data presented do not give any idea of the quality and protection status of the corridors. Also, this information may be under-reporting the presence of corridors like aquatic or marine stretches, or natural ecosystem corridors other than forests.

1.6 Faunal Species (No table)

The network of protected areas should, ideally, contain viable and multiple populations of all species of fauna, especially those that are threatened or endangered. Unfortunately, barring a few areas, our information about faunal species occurring in various PAs, especially the less well-known species, is inadequate. Though, in response to our questionnaire, listings of species found in various PAs were received, they have been found inadequate to make any judgement about the adequacy of protection being provided to faunal species by the PA network in India. Perhaps a separate survey is needed to conduct a gap analysis and identify those species that are not adequately represented in the network.

One way of doing this is to first identify the distribution range of priority species and then locate the PAs that occur within that range. As a second step, the ecology of the species, especially the bio-geographic parameters of its habitat, need to be determined. Based on this, those PAs need to be identified that both occur in the known distribution range of a species and contain the appropriate habitat. These PAs have then to be surveyed to determine whether that species is found there and what is its status.

1.7 Overpopulation of Faunal Species (Table 1.6)

In many cases, populations of specific species of animals grow to a point where they cross the carrying capacity of their habitat or start upsetting the balance of species. This happens for various reasons and it is necessary to prevent such overpopulation from occurring or to manage it effectively so that damage to the ecosystem is contained and to the biological integrity of the PA is safeguarded.

48 of the PAs indicated that they had an overpopulation of one or more faunal species. Some of the more commonly mentioned species included Cheetal, Elephant, Wild boar, and Neelgai, The most common reasons for overpopulation was stated to be prolific breeding and the lack of predators.

Interestingly, from these 48 PAs there were 10 that had indicated in the earlier survey that there was no overpopulation of faunal species. These were: Interview Island Sanctuary (A&N), Rajgir Sanctuary (BIH), Sukhna Lake Sanctuary (CHA), Suktanpur National Park (HAR), Keibul Lamjao National Park (MAN), Dampa Sanctuary (MIZ), Jamva-Ramgarh Sanctuary (RAJ), Nahargarh Sanctuary (RAJ), Vedanthangal Sanctuary (TN), and Corbett National Park (UP).

1.8 Locally Threatened Faunal Species (Table 1.7)

Whereas the threatened status of species, at a national, regional or global level has to be ascertained on the basis of their over-all population, trends and threats, such information is not always readily available at the specific PA level. Besides, lists of national, regionally or globally threatened species are already available. Therefore, this study attempted to discover those species that were considered to be locally threatened, i.e., their populations were non-viable or dwindling at the local level, irrespective of what their status was nationally or globally.

The status of species in particular PAs is also important in its own right for, whatever their status at a national level, if their populations are dwindling at the local level there would be local adverse impacts, irrespective of whether they are overpopulated elsewhere.

84 protected areas reported one or more faunal species as locally threatened and 88 species were reported as those that were locally threatened in one or more PAs. These locally threatened species included: Tiger, Leopard, Wild buffalo, Wild dog, Barking deer, Leopard cat, Giant squirrel, Sambar, Clouded leopard, Snow leopard, Musk deer, Red Panda, Marbled cat, Golden cat, Hog deer, Mouse deer, Slow loris, Pangolin, Serow, Rhino, Hispid hare, Pygmy hog, Wild boar, Peafowl,

Cheetal, Chinkara, Caracal, Black and Grey Partridge, Blue sheep, Western tragopan, Monal and Cheer pheasant, Hangul, Lion tailed, Pigtailed and Stumptailed macaque, Hoolock gibbon, Sloth bear, Indian wolf, Caracal, Ratel, Sea cow, Gangetic dolphin, and the porcupine. The names of the PAs they are reported from are given in Table 1.7. The most common cause for decline in population was loss of habitat, followed by disturbance and poaching.

Corresponding information from the last survey is given below:

<i>Bear. Himalayan Black</i>	<i>Rakchham Chitkul and Tundah Sanctuaries (both HP), Senchal Sanctuary (WB)</i>
<i>Bear. Himalayan Brown</i>	<i>Daranghati, Lippa Asrang, Rakchham Chitkul, and Tundah Sanctuaries (all HP)</i>
<i>Cobra, King</i>	<i>Dandeli Sanctuary (KAR)</i>
<i>Coral spp.?</i>	<i>Marine National Park (GUJ)</i>
<i>Crab. Gaint Robber</i>	<i>South Sentinal Island Sanctuary (A&N)</i>
<i>Crab. Horse-shoe</i>	<i>Sunderbans National Park (WB)</i>
<i>Deer. Baeking</i>	<i>Darlaghat And Lippa Asrang Sanctuaries (Both HP), Bethuadahari Sanctuary (WB)</i>
<i>Deer. Hog</i>	<i>Rajaji Sanctuary (now a national park-UP)</i>
<i>Deer. Spotted</i>	<i>Nandur Madhmeshwar Sanctuary (MAH), satpura National Park (MP), Barnawapara Sanctuary (MP), Chandka Dampara and Simlipal Sanctuaries (both ORI), Jaisamand and Sita Mata Sanctuaries (both RAJ) Anamalai Sanctuary(TN), Bethuadahari Sanctuary (WB)</i>
<i>Dog. Wild</i>	<i>Ghatigaon Sanctuary (MP)</i>
<i>Dolphin, Gangetic</i>	<i>National Chambal Sanctuary (MP)</i>
<i>Dolphin, Gangetic /Common?</i>	<i>Sunderbans National Park (WB), Sajnakhali Sanctuary (WB)</i>
<i>Gaur or Indian Bison</i>	<i>Nongkhylllem and siju Sanctuary (both MEG), Sanjay and Bandhavgarh National Park (both</i>

	<i>MP), Udanti Sanctuary (MP), Simlipal sanctuary (ORI)</i>
<i>Goral</i>	<i>Lippa Asrang Sanctuary (HP), Senchal Sanctuary (WB)</i>
<i>Hyena</i>	<i>Tadoba National Park (MAH)</i>
<i>Marten, Nilgiri</i>	<i>Nilgiri Tahr Sanctuary (TN)</i>
<i>Myna, Hill</i>	<i>Siju Sanctuary (MEG), Hadgarh Sanctuary (ORI)</i>
<i>Nilgai (Bluebull)</i>	<i>Mudumalai Sanctuary (TN)</i>
<i>Otter, Clawless</i>	<i>Mudumalai Sanctuary (TN)</i>
<i>Oyster, Pearl?</i>	<i>Marine National Park (GUJ)</i>
<i>Panda, Red</i>	<i>Siju Sanctuary (MEG), Gambung Lho Sanctuary (SIK)</i>
<i>Pig, Indian wild</i>	<i>Barnawapara Sanctuary (MP), Chandka Dampara Sanctuary ((ORI)</i>
<i>Porcupine, Indian</i>	<i>Tadoba National Park (WB)</i>
<i>Sambar</i>	<i>Udanti Sanctuary (MP), Kumbhalgarh, Mount Abu, and Sita Mata Sanctuaries (all RAJ), Bethuadahari Sanctuary (WB)</i>
<i>Terrapin, Batagur (River)</i>	<i>Sunderbans National Park (WB)</i>
<i>Woodpecker, Black</i>	<i>Mudumalai sanctuary (TN)</i>

1.9 Faunal Species of Special Interest (Table 1.8)

Park managers were asked to list those faunal species that they considered to be of special interest and to indicate the reason why they thought these species to be of special interest. Species of special interest were reported from 137 PAs. They included the Golden gecko, Slender loris, Clawless otter, Gaur, Tiger, Pelicans, various species of cats, many species of water and forest birds, Hoolock gibbon, Bengal florican, Snow leopard, Wild dog, Musk deer, Wolf and others such. Endemism, cultural and medicinal value, relationship with domesticated species, level of threat, rarity, commercial value, religious significance,

and value as a game species were cited as some of the reasons why the species was considered to be of special interest.

1.10 Deliberate Introduction of Faunal Species (Table 1.9)

Introduction of fauna refers to the release by humans of animals into an ecosystem to which these animals are not indigenous. Such introduction could be accidental or deliberate. If the latter, it could be for one of several reasons-the introduced species may be economically useful, it may have aesthetic value, or it may simply be an object of someone's whims. It is usually difficult to justify introduction of a species on ecological grounds, for the result of such an introduction is mostly a disruption of the ongoing ecological processes of a natural ecosystem. Such an ecosystem has a complex and stable web of relationships between its various components, a balance which the entry of an alien element could easily upset.

The history of faunal introduction by humans is full of disasters-rabbits in Australia, dogs in Mauritius, Spotted deer in the Andamans. Animals exotic to the place of introduction have usually either died out because the new habitat was not hospitable, or have caused great ecological damage, mainly because in the absence of natural predators, they have multiplied rapidly and overrun or displaced many indigenous species. However, in certain cases introduction of fauna may be ecologically justified, as in the attempt to redress an imbalance created earlier. Thus for instance an exotic species which has been introduced earlier and has become a nuisance could be checked by introducing its natural enemies from its original habitat. Such a step requires a thorough understanding of the ecosystem into which the species is being introduced, the habits of the introduced species, the potential impact of its introduction and many other factors. In the absence of such an understanding, introduction of exotic species is always risky.

Far more justifiable is the release of animals into an ecosystem to which they are or were indigenous. This is what is referred to here as reintroduction of fauna. The attempt is usually to 'restock' the

ecosystem with an element which has at some point been a part of its ecological web but whose population has either been destroyed or declined considerably leaving a gap in the web*.

Reintroduction does not pose the same level or risk to the ecosystem as introduction of exotics, it is nevertheless fraught with many uncertainties. Human understanding of the complex inter-relationship within an ecosystem is still extremely limited.

Various factors like the number and composition of animals to be reintroduced, the time and place of reintroduction and their effect on the ecosystem are all difficult to determine perfectly, especially where a particular species might have declined or died out naturally and not because of human interventions. An understanding of all these factors is also relevant to the proper design of a reintroduction strategy. Very many reintroduction attempts have failed due to an inadequate understanding of these factors.

While the conceptual distinction between introduction and reintroduction is clear, in practice there is a likelihood of confusion. One problem is the difficulty in establishing whether or not an ecosystem has at any time in the past been the natural habitat of the species sought to be released. For example, it may be thought to be exotic till indications of its earlier presence are found, in which case its status would change from 'introduced' to reintroduced'.

Whatever the difficulties and uncertainties, both introduction and reintroduction of fauna species have important implications for the management of wildlife habitats.

Separate questions were asked on the deliberate and accidental introduction of fauna in India's national parks and sanctuaries. Several parks and sanctuaries reported details of animals released not into the wild but into enclosures. In some cases it was not clear where the animals were released; some specified that release was only proposed.

* While 'reintroduction' usually refers to an attempt to restock a species which has become locally extinct, here it has been defined to include augmentation of populations

Excluding all such cases, **introduction of fauna has been reported from 10 (21.3%) of the 47 national parks and 14 (7.4%) of the 188 sanctuaries.**

(Data from the earlier survey, though not strictly comparable, indicates that introduction of fauna was reported from 3 (7%) of the 46 national park and 10 (5%) of the 197 sanctuaries responding. Reintroduction was reported from 4 (9%) of the 43 national parks and 10 (5%) of the 194 sanctuaries responding.)

Of the fauna introduced or reintroduced deliberately, the most common is the Chital (*Axis axis*), reportedly released in seven areas – Sukhna Sanctuary (CHA), Bibhutibhushan and Bethuadahari Sanctuaries (WB), Sharavathi Valley Sanctuary (KAR), Sagareshwar Sanctuary (MAH), Point Calimere Sanctuary (TN), and Trishna Sanctuary (TRI).

Other species that have been introduced include various species of crocodiles, Pygmy hog, Black buck, Minor carp and the Indian major carp, Bison, Rainbow and Brown trout, Tiger, Lion, Giant squirrel, Sambar, Peacock, Jackal, and Leopard.

1.11 Accidental Introduction of Faunal Species (Table 1.10)

Often species get introduced accidentally into a protected area. Though this is not as common for faunal species as it is for floral ones, nevertheless it occasionally happens. **Only 6 (2.8%) of the 216 PAs responding reported accidental introduction of faunal species.**

These were Interview Island Sanctuary (A&N), Dibru Saikhow National Park (ASS), Kalesar Sanctuary (HAR), Aner Dam Sanctuary (MAH), Ralamandal Sanctuary (MP), and Kyongnasla Alpine Sanctuary (SIK).

1.12 Captive Breeding of Faunal Species (Table 1.11)

Though in a natural ecosystem animal populations perpetuate themselves through free breeding, there may be instances when captive breeding becomes essential. This usually happens when a species is endangered and individuals of that species need to be released into the

which have declined considerably.

wild after being bred in captivity. Such breeding of fauna has been tried out in some parks and sanctuaries.

17 (9.8%) of the 173 PAs responding reported the captive breeding of fauna.

(Comparable data from the earlier survey indicates that 36 (15.3%) of the 236 PAs responding had answered this question in the affirmative.)

Among the species bred in captivity there were Turtles (species not specified), Cheetal, Chowsingha, Neelgai, Black Buck, Hispid hare, Sambar, Langur, Pigmy hog, Bonnet macaque, Indian fox, Tiger, Lion, Marsh crocodile, Elephant, Leopard, Musk deer, and Purple moorehen. The most common reason for breeding species was their reintroduction in the wild or for the enhancement of natural populations. Some were also bred for captivity.

1.13 Floral Species (No table)

Information on floral species occurring in PAs was even more patchy than that of faunal species. Consequently, no judgement can be made on the adequacy of coverage, in terms of floral species, of the PA network in India. Perhaps the only thing that can be commented upon is the occurrence of the various forest types within PAs (section 1.2). Perhaps a special study is required for floral species also, along the same lines as suggested for faunal species (section 1.6).

1.14 Floral Species of Special Interest (Table 1.12)

Park managers were asked to list those floral species that they considered to be of special interest and to indicate the reason why they thought these species to be of special interest.

99 (42.1%) of the PAs reported the existence of floral species of special interest.

(Comparable data from the earlier survey suggests that 13 (50%) of the 26 PAs responding had reported such species.)

Unfortunately, almost all the species of special interest were reported to be in decline.

1.15 Deliberate Introduction of Floral Species (Table 1.13)

The introduction, deliberate or accidental, of exotic species of flora into an ecosystem is normally considered detrimental to the well-being of that ecosystem. Certainly in an area protected for its value as a wildlife habitat such introduction can be ecologically justified only in such exceptional cases where it is established to be of benefit to the ecosystem and its living components, mainly as remedial measures for earlier human-caused damage. Park or sanctuary authorities were asked to provide details of deliberate introduction, if carried out in their area, including the species chosen and the purpose for introducing them.

9 (22%) of the 41 national parks responding to this question, and 34 (22%) of the 158 sanctuaries responding, reported deliberate introduction of flora.

(The comparable figures from the old survey are that 7 (16%) of the 43 national parks responding to this question, and 37 (19%) of the 192 sanctuaries responding, reported introduction of flora.)

Of the plants introduced, the most common are species of *eucalypt*, *Prosopis juliflora*, Robinia, various Acacia species, and Teak.

Limitations of the Data

A limitation is that the data given here do not reflect the impact of introduction of flora into a park or sanctuary. It is thus not possible to say how extensive the impact is, and with what results.

1.16 Accidental Introduction of Floral Species (Table 1.14)

Many species of flora get accidentally introduced into PAs due to random seed dispersal. The more aggressive or hardier of these establish themselves at the cost of other, indigenous species. Most infestations of weeds occur in this way.

Information was sought from PA directors about the accidental introduction of species in the PA. **Of the 196 PAs responding, 14 (7.1%) reported incidence of accidental introduction of species.** The

species accidentally introduced included *Prosopis juliflora*, *Cassipourea*, *Lantana*, *Eupatorium*, *Parthenium*, *Eucalyptus*, *Casuarina*, and Teak.

1.17 Threatened Floral Species (Table 1.15)

Threatened species of flora were reported from 64(27.2%) of the PAs responding reported the presence of threatened floral species. Teak was cited most commonly as a threatened species (nine PAs). Other species cited as being threatened included Beeje (*Dalbergia latifolia*), Pitcher plant (*Nepenthus khasiana*), *Boswellia Serrata*, Sandal or Chandan (*santalum album*), Sisham (*Dalbergia sisoo*), and *Sterculia urens*. As can be seen, a majority of species reported as threatened were tree species. Interestingly, Sukhna Lake Sanctuary, Chandigarh, listed among threatened species Eucalyptus, Parthenium and Lantana! Hazaribagh Sanctuary, Jharkand, sent the depressing report that all species except weeds were threatened.

Among the reasons for the species being threatened, the most common were the generic "biotic pressures". More specifically, threats included illicit felling and extraction, commercial exploitation, medicinal use, climate change, and encroachments. Interestingly, many species were reported to be threatened due to "botanical collections".

1.18 Excessive Spread of Floral Species- Apart from Weeds (No Table)

Despite this being an important indicator of the health of an ecosystem, no significant data were available for the excessive spread of floral species, other than weeds.

1.19 Infestation by Weeds (Table 1.16)

Infestation by weeds (exotic and aggressive species) is a major threat to the ecosystems of PAs in India. ***Of the 206 PAs responding to this question, 118 (57.3%) reported infestation by weeds. Of the PAs responding this time, 79 had responded to the same question in the earlier survey. At that time only 19 (24%) had reported weed infestation.***

This, therefore appears not only to be widespread problem but one which is growing rapidly, considering the percentage of PAs

reporting such infestation have more than doubled in the ten years since the last survey. Also, 28 of the PAs that had reported no weed infestations in the latest survey have now reported the existence of weeds.

Among the species of weeds reported were *Anisomeles*, *Cassia tora*, *Parthenium*, Water hyacinth, *Eucalyptus*, *Eupatorium*, *Ipoemia*, *Lantana*, *Mahavira*, *Mikania*, *Ocimum sp.*, and *Prosopis juliflora*. The most common management initiative reported for fighting weeds was their manual uprooting or clearing. This was almost the universal response.

1.20 Impact of Various Pressures on the Biodiversity (Table 1.17)

Various human activities within the PAs have a potential for adversely impacting the PA and its biodiversity. Most of these activities are either banned or restricted by the WLPA. These include:

Activity	Legal Status
Grazing	Banned in national parks and controlled in sanctuaries
Extraction of Timber	Banned in all PAs
Cultivation	Banned in all PAs
Human habitation	Banned in national parks, controlled in sanctuaries
Pilgrimage	Controlled in all PAs
Fuel wood collection	Banned in all PAs
Fodder collection	Banned in all PAs
NTFP collection [#]	Banned in all PAs
Fishing	Banned in all PAs

Data were collected from PAs regarding the existence of such pressures.

[#] Permitted only where it is for the better management of the PA
In some cases response was for all NTFPs and not specifically for fuelwood or fodder

1.20.1 Grazing by Livestock^y

Of the 32 national parks and 129 sanctuaries responding, 15 (46.9%) and 75 (58.2%) respectively, reported impact on biodiversity because of the grazing of livestock within their boundaries.

1.20.2 Extraction of Timber

Of the 45 national parks and 165 sanctuaries responding, 11 (24.4%) and 54 (32.7%) respectively reported impact on biodiversity because of extraction of timber.

1.20.3 Cultivation

Of the 161 PAs responding, 42 (26%) reported impact on biodiversity because of cultivation within their boundaries. Four among these were cases of shifting cultivation.

1.20.4 Human Habitation

Of the 161 PAs responding, 39 (24.22) reported impact on biodiversity because of human habitation.

1.20.5 Pilgrimage

Of the 161 PAs responding, 15 (9.3%) reported impact on biodiversity because of pilgrimage.

1.20.6 Fuelwood Collection

Of the 161 PAs responding, 5 (3.1%) reported impact on biodiversity because of collection of fuelwood from within.

1.20.7 Extraction of Fodder

Of the 161 PAs responding, only 3 (1.9%) reported impact on biodiversity because of the extraction of fodder.

1.20.8 NTFP Collection

Of the 161 PAs responding, 42 (26.1%) reported impact on biodiversity because of NTFP collection.

1.20.9 Fishing

^y There is detailed data on grazing in the later section on "Socio-Economic Profile".

Of the 161 PAs responding, 9 (5.6%) reported impact on biodiversity because of fishing.

1.20.10 Fire

Of the 161 PAs responding, 60 (37.3%) reported impact on biodiversity because of fires.

1.21a Impact on Fauna (Table 1.18)

PA managers were asked to list those activities and factors in their PA that impacted on the fauna. 133 PAs responded to this question and some of the activities and factors that were reported included:

Activity/Factor	Number of PAs (percentage of total responding)
Fishing	9(6.8%)
Trapping/Hunting/Shooting/poaching	16(12%)
Cutting/Felling of trees	27(20%)
Fire	49(37%)
Habitation	28(21%)
Mining	7(5%)
Development Projects	11(8%)
Roads	7(5%)
Collection of NTFP	23(17%)

Some of the main impacts that were reported included: "migration away from the site" reported from 64(48%), "loss of food source" reported from 61(46%), and "population decline" reported from 51(38%) of the PAs responding.

1.21b Impact on Flora (Table 1.19)

PA managers were asked to list those activities and factors in their PA that impacted on the flora. 126 PAs responded to this question and some of the activities and factors that were reported included:

Activity/Factor	Number of PAs (percentage of total responding)
Grazing	59(47%)
Cultivation	25(20%)
NTFP Collection	35(28%)
Fire	47(37%)
Felling of Trees	49(39%)

Some of the main impacts that were reported included: "degradation of habitat" reported from 49(39%), "poor regeneration" reported from 57(45%), "extinction" reported from 8(6%) and "population decline" reported from 24(19%) of the PAs responding.

I.22 Forest Fires (Table 1.20)

Fires often occur as a natural phenomenon, a part of the dynamics of forest regeneration and succession. Using fire as a deliberate management strategy is also not uncommon in wildlife protected areas, the idea being to allow the growth of new shoots which are favored by wild herbivores.

However, in India a large number of accidental, human-caused fires are reported from forest areas. These are often a result of carelessness, a cigarette or '*bidi*' thrown unthinkingly, a small deliberate fire spreading over a much larger area than desired, and so on. Such fires are a threat to the ecosystem. Their prevention and control has thus become an important part of the management strategies in national parks and sanctuaries.

Information was sought on the occurrence and extent of forest fires in each national park and sanctuary, and on the measures being taken, if any, to counter these fires. Data on occurrence are presented below, while data on fire-fighting measures is given separately (see section IV:2.21).

Of the 47 national park and 188 sanctuaries sending in information on this aspect, 18(38%) national park 82 (44%) sanctuaries reported the occurrence of forest fires.

(The earlier survey had indicated that of the 37 national park and 165 sanctuaries sending in information on this aspect, 20 national park (54%) and 65 sanctuaries (39%) had reported the occurrence of forest fires.)

Limitations of the Data

Considering the vast variation between different parks, perhaps the national and state averages might not be reliable indicators of the occurrence area wise.

The level of detection and recording of fires is not comparable. At best, this information can be taken as reflecting the minimum incidence for it would be rare for an area to report a fire when there has been none. The converse, unfortunately, need not be true.

As already mentioned, these fires might have varying impact on the habitat, and without detailed study no conclusions can be drawn about the 'threat' they pose, if any. Neither can one deduce, from the number of fires that occurred, any facts about how the area is managed. There is no necessary link between the number of fires reported and the quality of management. The relative size of the area, the cause of the fire, the staff's response to the fire and the fire-proneness of the different parks and sanctuaries have to be studied, and only then can a comparative picture emerge in terms of the management of the area. Obviously some areas, like wetlands or evergreen rain forests, are far less susceptible than others.

I.23 Floods (Table 1.21)

Of the 193 PAs responding, 121(63%) reported the incidence of floods.

(Comparable data from the earlier survey was that of the 210 PAs responding, 16 (7.6%) reported incidence of floods: 2 (5%) of the 42 parks and 14 (8%) of the 168 sanctuaries.)

Of these 193 PAs, 22(11.4%) were reportedly situated in flood prone zones. Kaziranga National Park (ASS) reported the flooding of 400 sq km out of its total area of 407 sq km. Harike Lake Sanctuary (PUN) reported that, in 1994, its entire area of 86 sq km was flooded.

1.24 Droughts (Table 1.22)

Though availability of water is a crucial factor for wildlife and habitat management, the data available for this and for droughts are very scanty. Perhaps the level of monitoring needed to properly evaluate the adequacy of water resources is not yet possible in most of the parks and sanctuaries. This is especially unfortunate as droughts not only directly affect the wildlife within a park or sanctuary, but also often increase the pressures on the resources of these areas as livestock from surrounding areas enter in search of water.

Of the 206 PAs responding, 28(13.6%) reported the incidence of drought. Of these 28, 12 (42.9%) were reportedly not in the drought prone zone.

(Comparable figures from the earlier survey indicated that of the 192 PAs responding, 32 (16.7%) reported incidence of drought.)

Chandraprabha Sanctuary (UP) is reportedly in both the flood prone and the drought prone zone! Bansda National Park (GUJ) has reported the incidence of drought every year from February to May.

1.25 Pollution (Table 1.23)

Air, water and noise pollution poses a significant threat to PAs and the biodiversity within them. Some of these threats are long term and their impact is not easy to detect or monitor. Therefore, the practical solution is to monitor the levels of pollution, especially air and water pollution and ensure that PAs are "zero pollution" zones. Unfortunately, very few PAs have facilities to monitor pollution levels.

Of the 201 PAs that responded to this question, only 2 (1%) reported that they had a pollution monitoring system (Barnawapara Sanctuary in Chattisgarh and Trishna Sanctuary in Tripura).

However, a few other PAs reported the incidence of pollution.

5 (2.5%) of the PAs responding reported pollution due to industry. 10 (5%) reported air and sound pollution due to traffic, another 5 (2.5%) reported water pollution due to sewage and garbage, 3 (1.5%) reported water pollution due to cultivation, pisciculture, aqua culture and salt farming, 2 (1%) reported pollution due to mining activities and one each due to hydroelectric power station and tea garden.

(Comparable information on water pollution, from the earlier survey, was that 26(12.1%) of the 215 PAs responding reported pollution of their water sources.

The major sources of pollution reported were industries and urban sewers, the former emitting industrial effluents and the later municipal waster. In a few cases, cattle and soil reason from fields were also cited as sources of pollution.

Among the worst polluted of the national parks responding seemed to be the Marine National Park in Gujarat, which reported multiple sources of pollution: salt works, oil terminal and steamers.

Among sanctuaries, Gobind Sagar in Himachal Pradesh was the recipient of pollutants from a cement factory, limestone quarry, match factory and from municipal sewers. Similarly, National Chambal Sanctuary in Rajsthan reported the Kota Thermal Plant, Sriram Chemicals factory, and Rajasthan Atomic Power Station as sources of pollution. Interestingly, 'possible radiation' from the Rajasthan Atomic Power Station was also cited as a pollutant in Jawahar Sagar Sanctuary of Rajasthan.)

Limitations of the Data

Only those national parks and sanctuaries seem to have reported incidence of pollution where the sources of pollution are visible or obvious.

Considering the level of monitoring in parks and Sanctuaries and considering that there is no evidence to believe that any other agency monitors the water or air quality in most of these areas, it seems

inevitable that much of the pollution in parks and sanctuaries, especially due to the widespread use of pesticides and chemical fertilizers, goes undetected.

I.26 Water-logging (Table 1.24)

Physical factors affecting the habitat, such as water-logging, have implications on the management of a park or sanctuary. While these factors are usually termed 'natural', they may in fact at times be caused, or aggravated, by human activities.

Only 11 (4.7%) of the 235 PAs reported incidence of water logging. The most common cause of water logging was reportedly the building of a dam.

(comparable data from the earlier survey suggests that only 4 (1.9 %) of 214 PAs responding reported the presence of water-logging. These are the Tadoba National Park in Maharashtra, Dhrangadhra Sanctuary in Gujarat, Valmiki Nagar Sanctuary in Bihar, and Ballavpur Sanctuary in West Bengal.)

Limitation of the Data

The figures given here may not give a completely accurate picture because many of these factors are hard to define and distinguish clearly, as is the case with water-logging. An area where the water table rises to just below the land surface could in certain conditions be said to be water-logged, but since this is not readily visible, wildlife personnel with no equipment for, or training in, such matters would be hard put to recognize it. In any case, the level of monitoring and research work in most parks and sanctuaries is so little that many of these factors may not be noticed at all. On the other hand, very temporary instances of land becoming marshy may be taken as a sign of water-logging though it may not be so.

The data on the presence of such factors does not show the kinds of impact they have. It is difficult to state *prima facie* that these factors are all actually problematic, i.e., that they have adverse effects on the ecosystem, flora and fauna. Establishing such an impact would require

studies of the sort that do not seem to have been carried out so far in most of our parks and sanctuaries.

1.27 Other Recurring Problems (Table 1.25)

Of the 235 PAs, 31 (13.2g%) reported other recurring problems. Of these, 12 reported landslides, 5 reported soil erosion, 2 reported flowering of bamboos, 1 reported avalanches, 1 reported cyclone, 2 reported cloud bursts, 1 reported wind storm, 1 reported accumulation of sandbars. 4 PAs, all from HP, reported glaciers, and 2 reported rainfall, to be a recurring problem!

1.28 Felling and/or Extraction of Timber (Table 1.26)

Of the 45 national parks and 165 sanctuaries responding, 11 (24.4%) and 54 (32.7%) respectively reported extraction of timber.

(Comparable data from the earlier survey indicated that of the 44 national parks and 183 sanctuaries responding, 7 (16%) and 78 (43%) respectively reported extraction of timber.)

1.29 Floral Epidemics (Table 1.27)-

Serious management issues arise when plant or animal species in a national park or sanctuary are affected by an epidemic. The resultant loss in numbers, and the consequences of this on the food web and the ecosystem of which these species are a part, are matters of grave concern to those managing a wildlife habitat. Details or recorded epidemics of flora and fauna were solicited to judge the extent to which out protected areas suffers from such problems.

Epidemics of flora were reported from only 3 (7.7%) of the 39 national parks and 9 (6.2%) of the 146 sanctuaries responding. The most common problem was the Sal borer followed by defoliation. The most common species affected were Sal and Teak. Control measures taken included application of pesticides, monitoring, trapping (!), and biotic control.

(Comparable data from the earlier survey indicated that epidemics of flora were reported from only 1 (2%) of the 41 national

parks and 11 (6%) of the 174 sanctuaries responding. The most common problems mentioned were defoliation and skeletonisation, and in all but two of the instances the species affected was teak (Tectona grandis). Preventive measures were reportedly not undertaken in any of the parks or sanctuaries reporting plant epidemics.)

1.30 Faunal Epidemics (Table 1.28)

Faunal epidemics were reported from 3 (8%) of the 39 national parks and 6 (4%) of the 159 sanctuaries responding. The most commonly affected species was the Gaur. There were also reports of epidemics affecting Leopards, Tigers and Wild boar. The most common of the diseases reported were Rinderpest and the foot and mouth disease. Domestic cattle were reported to be the most common carriers of disease. Seven of the nine PAs reporting epidemics also reported that they inoculated the cattle. One reported the epidemic to the animal husbandry department.

(Comparable data for fauna epidemics in the earlier survey indicated that 8 (19%) of the 43 national parks and 9 (5%) of the 176 sanctuaries responding reported the incidence of epidemics. The two most common diseases reported were foot and mouth disease, and rinderpest. The species commonly affected were Spotted deer, Nilgai, Goral, Sambar and Gaur - others affected in one or two cases were the Himalayan tahr, Black buck, Jackal and Wild boar. Of the 17 parks and sanctuaries reporting epidemics, 10 reported having taken some form of preventive measures. These usually consisted of vaccinating the cattle, the main transmitter of these diseases, and treating the wild animals' water sources.)

Limitation of the Data

The responses to these questions were very scanty. It appears that the kind of monitoring necessary to keep accurate records of plant and animal epidemics is presently not possible. In most cases the response received was 'no such report' (of epidemics) or 'no study done' – very rarely was the response a definite 'no incidence of epidemic'. It is

notable that the diseases reported are almost always the same, which seems to indicate that information regarding diseases other than the most common and obvious ones may be lacking. For these reasons data received can only be seen to reflect a bare minimum of the actual incidence of epidemics

1.31 Vaccination of Cattle (Table 1.29)

Disease-carrying domestic cattle, while grazing in or passing through parks and sanctuaries, have been known to infect wild animals and occasionally cause epidemics. Where grazing and moving of cattle through parks and sanctuaries cannot be totally stopped, and where the consequent direct or indirect contact between wild animals and domestic cattle also cannot be prevented, one of the ways of controlling the spread of diseases is by vaccinating the cattle.

Data collected indicated that of the 29 national parks and 114 sanctuaries responding, 18 (65%) of the national parks and 75 (67%) of the sanctuaries reported vaccinating the cattle within the PAs.

For vaccination around the PA (10 km radius), of the 35 national parks and 129 sanctuaries responding, 30 (86%) of the national parks and 108 (84%) of the sanctuaries reported that they vaccinated the cattle around the PA.

(Data collected in the earlier survey indicates that 18 (20%) of the 90 PAs responding reported vaccinating cattle within and 37 (38%) of the 97 PAs responding reported vaccinating cattle around the PA.)

Four of the PAs who had reported vaccination within in the last survey now reported that they did not vaccinate cattle within. These are Mookambika Sanctuary, Sharavathi Valley Sanctuary, and Someshwara Sanctuary, all from Karnataka, and Point Calimere Sanctuary (TN). Both Mookambika and Point Calimere also reported discontinuation of cattle vaccination in areas around the PA.

36 (38.7%) of the PAs vaccinating within reported that they vaccinated 100% of the cattle inside. The remaining vaccinated varying

percentages from 5% to 90%. In the earlier survey, only 2 (11.1%) PAs had reported that they were vaccinating 100% of the cattle inside. 30 (21.7%) of the PAs vaccinating around reported vaccinating 100% of the cattle, as opposed to only 5 (13.5%) reporting this in the earlier survey.

Of the 105 PAs responding, 10 (9.5%) reported that they always vaccinated cattle passing through their boundaries, 34 (32.4%) reported that they occasionally vaccinated such cattle and 61 (58.1%) reported that they never vaccinated such cattle. Five PAs reported that they had no road or cattle passing through.

In the earlier survey, of the 86 PAs responding, 25 (29%) has stated that they vaccinated cattle passing through, though it is not known whether this was always or occasionally. The remaining 61 (71%) reported that they did not vaccinate such cattle.

1.32 Existence of Quarantine Facilities (Table 1.29)

The ability to quarantine animals infected with disease significantly enhances the chances of controlling diseases. Also, for cattle passing through, sometimes it is essential to quarantine them after vaccination so that the vaccine becomes effective before they move into the PA.

Of the 197 PAs that responded to this question, only 7 (3.6%) reported the existence of quarantine facilities. The remaining 190 (96.4%) had none.

(Comparable data from the earlier survey indicates that 4 (4.3%) of the 94 PAs responding reported quarantine facilities.)

Interestingly, all the four PAs that had reported such facilities in the last survey, namely Namdapha National Park (ARU), Nagarahole National Park (KAR), Nugu Sanctuary (KAR) and Ballavpur Sanctuary (WB), have now reported that they have none!

II. Socio-Economic Profile

The conservation of biodiversity, within PAs, often necessitates the restriction and regulation of the use of the PA's resources by human beings. Depending on the nature of the PA and the level of conservation sought to be achieved, the severity of these restrictions can vary. Therefore, in an national park, no human use activity is allowed with the possible exception of tourism and research. In a sanctuary, on the other hand, grazing and even human habitation and the exercise of certain rights can be allowed, depending on the needs of conservation.

The interaction between human populations and wilderness areas is fundamental to human civilization. In fact, human beings are as much a part of nature as any of the other animals or plants. Human activities in and around national parks and sanctuaries cannot, therefore, be *prima facie* considered undesirable. What is undesirable is the pushing of the ecosystem to beyond its carrying capacity by excessive destruction of fauna and flora. This is unfortunately becoming increasingly common due either to new types of human activities or to an increase in population leading to even the traditional activities becoming destructive.

Obviously it is neither desirable nor possible to alienate the people living in and around the protected areas, most of whom are poor. from the natural resources around them. However, if they and the rest of humanity have to have a continued and sustainable interaction with nature, it has to be ensured that these areas are not progressively degraded.

In order to work towards an understanding of these aspects, information was collected on various human activities and uses. and is presented in this section. This section contains details regarding

- Human settlements within and around parks and sanctuaries
- Relocation of human populations from the PA
- Grazing within the PA

- Fishing, collection of large timber, non-timber forest produce and other animals and/or their parts
- Religious and cultural use of the PA
- Impact of PA on the local people, including injury or death caused to humans by wild animals; injury or death of livestock; crop damage; conflicts and clashes between PA staff and communities; the patterns of use of PA resources and the rights and leases existing within the PA, and details of ecodevelopment initiatives, if any.

2.1 Human Population

Information was obtained separately for human populations residing inside each park or sanctuary and those living in areas adjacent to it (i.e. within a 10 km radius of the park boundary).

2.1.1 Human Population within Parks and Sanctuaries (Tables 2.1 & 2.2)

Data on human population within PAs was compiled from two different sources. First, it was compiled from the data contained in the filled in questionnaires sent back by the PA managers. Separately, an exercise was carried out to plot the boundaries of PAs on census maps and, based on this, census data was compiled for the settlements falling within the PA.

Data compiled from filled in questionnaires indicate that of the 37 national parks and 145 sanctuaries responding, 17 (45.9%) and 61 (42.1%) respectively reported human populations within their boundaries. The total population in these 78 PAs was 8,16,838, giving an average population of 10,472 per PA having population.

(Comparable data from the earlier survey indicates that of the 32 national parks and 138 sanctuaries responding, 18 (56%) and 100 (72%) respectively reported human populations within their boundaries.

However, population figures were only available for 22 of the PAs

currently responding. In these 22 PAs the total population was 4,29,117 with an average PA population of 19,505.)

Human population figures compiled from census data (1991) reveal that the 27 PAs studied had a total population of 6,13,162, in 1049 villages. Of these, 63,111(10.3%) belonged to scheduled castes and 2,66,986 (43.5%) belonged to scheduled tribes.

2.1.2 Human Population Adjacent to Parks and Sanctuaries (Tables 2.3 & 2.4)

Human populations adjacent to a PA could be a source of pressure on the protected area. This is especially true of many parts of India where these protected areas are the only remaining source of fuel, fodder, and other forest produce, with most surrounding areas having been degraded.

Adjacent human settlements can also affect the potential of wild animals to migrate to nearby habitats. Where traditional migrating routes are thus cut off, as has happened in many parts of the country, it is a loss not only to the wild animals but also to the humans in the form of crop and livestock damage and the injuring or killing of people by animals trying to migrate. The case of elephants is especially illustrative of this.

It was, thus, thought important to obtain information on the existence and extent of populations living adjacent to parks and sanctuaries, i.e. within a 10 km. Radius of the boundary.

The data compiled from questionnaires indicates that all the 94 PAs responding to this question reported adjacent human population. The total population reported from these 94 areas was 49,40,725, with a per PA average of 52,561.

(Comparative data collected in the last survey indicates that of the 23 national parks and 132 sanctuaries responding, 19 (83%) and 115 (87%) respectively, reported populations in their adjacent areas. However, population figures were only available for 27 of the PAs that

also responded this time. The total population adjacent to these 27 PAs was 21,14,907, with an average of 78,330 per PA.)

Human population figures compiled from census data (1991) reveal that the 31 PAs studied had a total adjacent population of 79,72,695, in 4985 villages. Of these, 7,12,498 (8.9%) belonged to scheduled castes and 18,15,799 (22.8%) belonged to scheduled tribes.

2.2 Relocation of Human Population (Table 2.5 & 2.6)

As noted in the earlier paras, a very high percentage of our parks and sanctuaries have human population inside them. Attempts have been made to relocate part or all of this population from a few parks and sanctuaries, as a means of reducing human pressure on these areas.

Of the 15 national parks and 59 sanctuaries that have (or have had) human population inside them and have responded to this question, 9 (60%) of the parks and 12 (20.3%) of the sanctuaries have relocated part or whole of their population. Relocation has been proposed in the case of 10 national parks (66% of those having human population and responding), and 12 sanctuaries (20%).

Of the PAs that have relocated, details about population relocated was available from 16 of the 21 PAs. The total population relocated from these PAs was 13,007, of which 185 were SCs and 1266 were STs.

(Comparable data from the earlier survey indicate that of the 16 national parks and 88 sanctuaries which have human population inside them and which have responded to this question, 5 (31%) of the parks and 4 (5%) of the sanctuaries had proposed to relocate a part or whole of their population prior to 1984.

Actual relocation till 1984 has been done in 4 (25%), of the national parks and 3 (3%) of the sanctuaries having human population and responding. This represents 80% of the parks and 75% of the sanctuaries where relocation was proposed. Post-1984 relocation has

been proposed in the case of 6 national parks (38%) of those having human population and responding, and 13 sanctuaries (15%).

Limitations of the Data

Where relocation has been proposed or actually done, it has not necessarily been proposed or done for the entire population existing in the park or sanctuary. This information, therefore, does not indicate whether human habitation has been completely removed from any area or not. It is also not possible from these data to judge the impact of relocation on the park or sanctuary, nor to comment on the nature or efficacy of the relocation itself.

2.3 Grazing of Livestock (Table 2.7 & 2.8)

Grazing of livestock is one of the most common uses that local communities make of PAs. On the one hand, the PAs are often the only patches of greenery left and therefore are the last resorts of livestock, especially during drought conditions. On the other hand, the prevalence of livestock populations within PAs not only threatens the wild population with possible infection and epidemic of diseases but these livestock also compete with the wild animals, especially with the ungulates, for water, food and space.

Of the 47 national parks and 176 sanctuaries responding, 27(57.4%) and 101 (57.4%) respectively reported incidence of grazing. Data was available from 50 PAs regarding the number of livestock grazing. The total was 6,89,586 with a PA average of 13,792 per PA per annum.

(Comparable data from the earlier survey indicate that of the 36 national parks and 138 sanctuaries responding, 24 (67%) and 114 (83%) respectively reported incidence of grazing.)

Data were also collected regarding migratory livestock visiting the PAs. ***Of the 217 PAs responding, 35 (16.1%) reported grazing by migratory livestock. Figures for the number of migratory livestock grazing were available from 27 PAs, where totally 4,61,791 heads of livestock grazed annually, at an average of 17,103 heads per PA.***

Limitations of the Data

As in the case of human populations, the data presented above can be better appreciated after more sophisticated analysis involving factors such as the distribution of the livestock within the areas, the mix of livestock grazing at any given time, and so on. This has not been possible here.

2.4 Use of Other PA Resources by the People (Table 2.9)

Apart from grazing, many other resources are used from within PAs. Legally the use of resources from PAs is not permitted under the WLA. However, returns received from PA managers suggested that it, nevertheless, continues in many PAs.

Of the 235 PAs responding, 95 (40.4%) reported use of other PA resources.

(Comparable data from the earlier survey indicates that of the 40 PAs responding both times, 33 (82.5%) reported similar use)

Interestingly, most commonly the resources so collected were used by the collector for household consumption. The next most common was sale to a trader, followed by sale in local market and finally sale in a town.

Among the things so used were Deodar trees, *Acacia* spp., *Albizia* spp., *amla*, bamboo, *ban*, *Dendrocalamus* spp., *dhoop*, *Diospyros* spp., *Eucalypt* spp., fish spp., various types of grasses, gum, *guchhi* (morel), honey, *Imperata* spp., *jamun*, *kail*, *karu*, *katla*, *keluthi*, *Lagerstroemia* spp., *mahua*, *Michelia* spp., musk, animal and bird meat, *Prosopis* spp., *Rubinia*, *sal*, swiftlets nests, tamarind, teak, *tendu*, *Terminalia* spp., wax, *Xylocarpus* spp., and *Zizphus* spp. From one PA even *Eupatorium* was being extracted and used!

The use that the people put these various things to included adhesives, *bidi* making, building material, mats, country liquor, fodder, food, thatching material, medicine, fuel, making *katha*, furniture, incense, leaf plates, baskets, other implements, soap, ornaments, oil, paint, brooms, sweetening agent, and for timber.

2.4 Religious Significance of Protected Areas (Table 2.10)

Many of the PAs are also places of religious significance, containing sites of pilgrimage or holy shrines of various religions. The existence of such sites is a potential that can be utilized for promoting the conservation of these areas, though sometimes the levels of pilgrimage can also be a threat to the PA.

Of the 203 PAs responding, 79 (38.9%) reported the existence of shrines or sites of pilgrimage, the remaining 124 (61.1%) reported none.

(Comparable data from the earlier survey indicate that of the 105 PAs responding then and now, 44 (41.9%) reported shrines and pilgrimage sites)

Among the sites and sites reported, the majority was sacred to the Hindus, some were for sacred to both Hindus and Muslims. There were also sites sacred to the Muslims, Buddhists, and Jains. Many sites were also sacred to tribals and one PA reported a Sikh shrine. Surprisingly, none of the PAs responding reported Christian shrines or sacred sites.

2.5 Impact of PA on Local People

The setting up and management of PAs, as also the restrictions on the use of resources that this implies, often has adverse impact on the local communities living in and around the PA or otherwise dependent on its resources. Besides, there is often an increase in the population of wild animals once a PA is established and this sometimes causes problems for the villagers, their livestock and crops.

Consequently, information was gathered on various types of possible adverse impacts on local people.

2.5.1 Human Death or Injury Caused by Wild Animals (Table 2.11)

A disturbing aspect of the human pressures in and around parks and sanctuaries is the incidence of injury or death of human beings caused by wild animals.

Most parks and sanctuaries have large human populations in and around them. The chance of such incidents is heightened by the fact that in many of the parks and sanctuaries there is free entry and movement of people. The lack of boundary walls or fences, in most of the areas, contributes to this. In a large proportion of the parks and sanctuaries people graze cattle or carry out other types of activities, often illegally.

Apart from this, in some of the areas wild animals, perhaps in search of food and water, often cross the boundaries of the parks or sanctuaries and enter neighboring fields and villages. This also results in confrontations.

Of the 47 national parks and 188 sanctuaries responding, 15 (31.9%) and 45 (23.9%) respectively reported death or injury to human beings, either inside or adjacent to the PA, in the period 1995-2000.

(Comparable data from the earlier survey indicate that of the 39 national parks and 167 sanctuaries responding, 14(36%) and 49 (29%) respectively reported incidents of injury or death of human beings due to attacks by wild animals, either in side or adjacent to them.)

In these 60 PAs, a total of 666 people were attacked within and adjacent to the PA, in 182 incidents, in the last five years. 92 of these incidents were within the PA and 85 in adjacent areas. There was no information regarding the exact location of the remaining 5 incidents.

Of these 666 people attacked, 242 (36.3%) died, 270 (40.5%) were injured and there were no details about the remaining 154 (23.1%).

A total of Rs. 25,88,503 was paid as compensation for 76 cases of death and Rs. 6,99,047 was paid as compensation for 93 cases of injury

(Earlier survey data suggest that the proportion of people injured and dead was almost the same: 56 dead in 11 incidents and 54 injured in 12 incidents).

This is perhaps one of the most heart-rending aspects of human wildlife interaction. Tigers, Elephants, Bears and Leopards cause most of such deaths or injuries. However, other species cited include Wild boar, Bison, Wild buffalo, Rhino, Hyena, Monkey, a Viper and a Takin.

(Earlier survey data indicate that of the species of wild animals involved, tigers were responsible for 221 attacks (190 in West Bengal alone), bear for 68 (62 in Madhya Pradesh alone) elephants for 56 and leopards for 21 (51 in Gujarat). The other species involved were wolf, gaur, lion, crocodile, buffalo, hyena, wild boar, a snake and a shark. There was one case of a fatal attack by a nilgai!)

Limitation of the Data

First, the cases reported here are those which were officially recorded or brought to the notice of wildlife authorities. It seems plausible that many other cases, especially those not fatal, might not have been officially recorded. Also, there might be some other cases where fatalities occurred while the victim was indulging in illegal activities within the PA and these might also have been hushed up by the victim's companions or relatives. The data, as such, must be seen as reflecting only the minimum number of cases.

2.5.2 Livestock Death or Injury Caused by Wild Animals (Table 2.12)

Another major problem inherent in the management of India's PAs is the potential for attacks on local livestock by the wild animals. This adversely affects the interests of the local people.

Of the 47 national parks and 188 sanctuaries responding, 22(46.8%) and 58 (30.9%) respectively reported attack on livestock by wild animals. The number of animals attacked in a five year period (1995-2000) were 4181 in 567 incidents. Of these, 75% of the incidents occurred within the PA and the remaining adjacent to the PA.

Of those attacked, only about 3% were injured and the remaining 97% were killed.

One of the measures taken to offset or reduce the loss these entail, and to discourage the villagers from attacking the wild animals involved, is the payment of cash compensation to the affected villagers. Details of the amount payable and actual cases of payment, were asked for in the questionnaire.

An amount of Rs. 1,96,27,108 was paid out as compensation for 494 incidents of death to livestock. A total of Rs. 70,706 was paid out as compensation for livestock injury, for 32 incidents.

(Data from the earlier survey indicate that 10 (22%) of the 45 national parks and 57 (31%) of the 182 sanctuaries responding have reported that compensation is payable for injury or killing of livestock by wildlife within a park or sanctuary. Corresponding figures of compensation payable for livestock injured or killed in adjacent areas are 20 (44%) of the 45 parks and 59 (32%) of the 182 sanctuaries responding. Combining the two, what emerges is that 9 (20%) of the parks and 46 (25%) of the sanctuaries responding have compensation payable for livestock injured or killed both within and in areas adjacent to them.

The most common wild animal responsible for such damage was the tiger, followed by the leopard. Some of the other species responsible are Wolf, bear, wild dog, crocodile, rhino, snow leopard, and elephant.

The species attacked included cow, buffalo, bullock, goat, sheep, horse, elephant, and ox.

Limitations of the Data

The data here are unlikely to give a complete picture of the attack on livestock, especially where only injury results, because in most cases records are only maintained of those cases that are reported and where compensation is claimed.

2.5.2 Damage to Crops Caused by Wild Animals (Table 2.13)

Apart from attacking human beings and livestock, wild animals often forage in the agricultural fields in and around protected areas. This results in damage to the crops and economic loss to the villagers.

Of the 47 national parks and 188 sanctuaries responding, 14 (29.8%) and 58 (30.9%) respectively reported crop damage by wild animals. Details regarding the area affected inside the PA were available from 13 PAs, where a total of 695.4 sq km were affected, giving an average of 53.5 sq km per PA reporting. Four of those giving details of crop damage from inside were national parks (Dibru Saikhowa in Assam- 4 sq km; Manas in Assam – 50 sq km; Anshi in Karnataka – 3.7 sq km; Intanki in Nagaland – 7 sq km).

Similarly, details regarding the area affected adjacent to the PA were available from 29 PAs, where a total of 10,899.5 sq km were affected, giving an average of 375.8 sq km per PA giving details. Ten of these 29 PAs were national parks.

The total compensation paid for crop damage inside was Rs. 2,26,834 for 17 incidents, at an average of Rs. 13,343.18. Similarly, compensation paid for crop damage in adjacent areas was Rs. 76,40,289 for 75 incidents, with an average of Rs. 1,01,870.52 per incident.

The species damaging crops included chital, sambar, wild boar, neelgai, buffalo, elephant, bear, gaur, monkey, rhino and porcupine. There was also one case reported of the Wild ass damaging crops.

2.6 Clashes Between PA Authorities and Local People (Table 2.14)

The alienation of the local people from the natural resources around them and the inadequate alternative sources of fuel, fodder, water, timber and of earning a livelihood, often force the local people to make demands on the resources of parks and sanctuaries, thereby coming into conflict with park and sanctuary authorities. Sometimes vested interests also provoke, or directly participate in, such confrontations.

Whatever the reasons, very often conflicts over the use and control of natural resources become law and order problems and result in physical confrontations between the people and the authorities.

Of the 47 national parks and 188 sanctuaries responding, 14 (29.8%) and 30 (16%) reported clashes with local people. Of the 159 incidents of clashes reported, 75 (47.2%) were violent clashes.

Among the PAs reporting a large number of clashes were Orang Sanctuary (15), Barnadi Sanctuary (10), Laokhowa Sanctuary (17), Pobitora sanctuary (10), all from Assam.

The major reasons for these clashes included:

- Attacks by timber smugglers
- Prevention/eviction of encroachment
- Death or injury to villager caused by wild animals
- Protest against displacement
- Restrictions on the extraction of NTFP
- Restrictions on the use of burial grounds
- Prevention of cultivation/jhumming
- Restrictions on grazing
- Crop damage by wild animals
- Poaching
- Inadequate or lack of compensation for damage, injury or death
- Protest by villagers against the felling of trees by the electricity department
- Restrictions on fishing
- Restrictions against construction activity
- Improper entry
- Against the notification of the sanctuary
- Demanding the de-notification of parts of the sanctuary
- Action by extremists
- Protest by villagers against the diversion of water

- Restrictions on the construction of roads
- Restrictions on the washing of clothes.

(Comparable data from the earlier survey indicate that 16 (37%) of the 43 national parks and 31 (17%) of the 179 sanctuaries responding, reported the incidence of such confrontations or clashes.

A few of the park and sanctuaries witnessed a fairly high number of clashes. The Gir National Park and Sanctuary in Gujarat reported 10 and Madhav National Park reported 18. In West Bengal Jaldapara Sanctuary reported 20 clashes.

The major reasons given for these clashes were: illicit felling of trees, poaching, illegal grazing, encroachments and other forest offences.)

Limitation of the Data

These figures reflect only those clashes, which were officially recorded because of their seriousness, or for other reasons. They, then, can at best be seen as reflecting the minimum number of clashes that occurred, and cannot be seen as representing a complete picture.

The reasons given for the clashes are those given by the wildlife authorities. A proper understanding of the reasons must include the people's versions, which have not been recorded in this report.

2.7 Rights of People Within the PA (Table 2.15)

Many of the PAs have been notified in areas where historically local people had and exercised written or unwritten rights and privileges. One of the problems that occurs when these areas get notified is that these rights and privileges have to be curtailed or extinguished.

Of the 47 national parks and 188 sanctuaries responding, 15 (31.9%) and 67 (35.6%) reported the existence of rights within the PA.

The total area used for exercising these rights was 30,264 sq km, for 77 different activities. The area that was affected by the use of these rights was 171512 sq km, for 121 activities.

Responses indicated that there were customary rights, recorded rights, leases, licenses, and privileges. Some activities were “permitted” while others were stated to be illegal since the formation of the PA.

The types of activities covered included:

- *Passage and thoroughfare*
- *Pilgrimage and worship*
- *Cultivation, including shifting cultivation*
- *Collection of wood for domestic use*
- *Access to water*
- *Grazing of livestock*
- *Collection of firewood*
- *Collection of medicinal plants*
- *Collection of edible plants and their parts*
- *Fishing*
- *Extraction of fodder*
- *Habitation*
- *Collection of honey*
- *Nistar rights*
- *Collection of silk cocoons*
- *Collection of thatch grass*
- *Collection of other NTFP*

(Data from the earlier survey indicated that in 19 (43%) of the 44 national parks and 128 (68%) of the 187 sanctuaries responding there existed some rights or leases. In national parks the most common types of rights and leases pertained to grazing, which was present in 60% of the 20 parks with rights and leases, habitation in 50%, religious yatra in 45% and agriculture in 45%. Similarly, in sanctuaries grazing was by far the most common right, present in 84% of the 128 with rights. The other common ones are fuel wood collection in 54%, collection of minor forest

produce in 47%, agriculture in 43%, and habitation in 42% of the sanctuaries with rights.)

Limitations of the Data

Considering that only for 30% of the sanctuaries and 21% of the national parks have the legal procedures been completed (see section 3.1.3), it is probable that in many of the areas the rights and leases existing have not yet been recorded by the wildlife authorities. It is, therefore, possible that many more areas might actually have rights and leases, and many of the areas might have more rights and leases than reported. These figures can, thus, be taken to represent only a minimum.

2.8 Stoppage of Earlier Use of PA Resources (Table 2.16)

As already mentioned above, the declaration of a PA often results in the stopping of many of the activities that have traditionally been going on in that PA. These activities are not only those that the villagers and local people are involved with but also those done by the government, by commercial and industrial interests.

Of the 47 national parks and 188 sanctuaries responding to this question, 18(38.3%) and 68(36.2%) respectively reported that one or more type of use or activity had been stopped since the area became a PA.

The activities that have been stopped include:

- Use of water resources
- Felling of trees
- Working of forests
- Hunting
- Cultivation
- Grazing
- Collection of NTFP
- Fishing
- Mining
- Encroachment

The individuals/agencies carrying out these activities include:

- Villagers
- Contractors
- Forest Department
- Forest Development Corporation
- Encroachers
- Miners
- Pilgrims
- Industry
- European hunters!

2.9 Provision of Alternatives to the Local People (Table 2.17)

The stopping of access to PA resources often adversely affects the local communities dependent on these resources for their survival. Therefore, many progressive PAs also try and provide alternatives to the people that are sustainable and do not adversely impact on the PA.

Of the 30 national parks and 120 sanctuaries responding to this question, 6(20%) and 15(12.5%) respectively reported that they provided for some alternatives.

(Comparable data from the earlier survey suggest that of the 20 national parks and 71 sanctuaries responding, 0 and 9 (12.7%) respectively were providing such alternatives.)

The alternatives offered included biogas plants, free collection of grass and other NTFP, distribution of honey bee boxes, improved and smokeless *chullahs*, housing material, free rations, agricultural implements, fuel and fodder plantations, employment and income generation opportunities, drinking water, nistar depots and milch cattle.

2.10 Ecodevelopment Around PAs (Table 2.18)

A recent approach to resolve potential human nature conflicts, ensure that neither the people are adversely affected by the PA nor is the PA degraded by the people and to elicit their support for conservation, is the eco-development approach. In the last ten years, various NGOs and the government have taken up eco-development activities in and around various PAs in India. There is now a centrally sponsored scheme for

ecodevelopment around PAs, a World Bank project (FREEP) supporting ecodevelopment around two protected areas (Kalakad Mundanthurai Tiger Reserve in Tamil Nadu and Great Himalayan National Park in Himachal Pradesh) and the GEF sponsored Indian Ecodevelopment, that is being implemented in seven PAs. There are also various externally sponsored forestry programmes that have an ecodevelopment component.

Of the 41 national parks and 158 sanctuaries responding to this question, 31(75.6%) and 68(43%) respectively reported that they were undertaking some ecodevelopment activities.

(Data from the earlier survey indicate that of the 96 PAs responding, only 9(9.4%) reported undertaking any ecodevelopment activity. Of these, only one was a national park)

The common activities being undertaken included support for income generating activities (8 PAs), animal husbandry initiatives (7), biogas plants and smokeless chullahs (32), and provision of water facilities (30).

III. Management Profile

The primary objective in the management of national parks or sanctuaries is to accord 'better protection of habitat and the wildlife thereby creating conditions under which populations may reach a natural population density for purposes *including scientific, research, education, recreation and wildlife products*' (Kishore, 1987a). This chapter deals with some of the various aspects of the management of national parks and sanctuaries.

Legal Status

It was only in 1972 that a unified national act came into being under which areas could be constituted and managed as national parks, sanctuaries, game reserves and closed areas. Entitled the Wild Life (Protection) Act, 1972, (here after called the Act), this act was adopted by all states except Jammu and Kashmir, which has its own act differing in certain respects from the national act.

Before the enactment of a national act, some states had their own legislations (e.g., the Hailey National Park Act of UP, 1936, under which the present Corbett National Park was set up as the Hailey National Park). The provisions in the Indian Forest Act of 1927, which allow the setting up of wildlife sanctuaries, were also invoked prior to the passing of the Wild Life (Protection) Act of 1972. This Act was comprehensively reviewed and amended in 1991, making some clauses more stringent while liberalising others.

The present Act not only specifies the procedures to be followed in setting up national parks and sanctuaries, but also specifies the management parameters by indicating the sorts of activities that are allowed or forbidden in such protected areas. The Act also lists the powers and functions of various officials, and the procedures and considerations relevant to the allowing or disallowing of diverse uses of national parks or sanctuaries.

National parks are given a higher level of protection, considering no grazing is permitted within them and it is specified that

No person shall destroy, exploit or remove any wildlife from a National Park or destroy or damage the habitat of any wild animal or deprive any wild animal of its habitat within such National Park except under and in accordance with a permit granted by the Chief Wild Life Warden and no such permit shall be granted unless the State Government, being satisfied that such destruction, exploitation or removal of wildlife from the National Park is necessary for the improvement and better management of wild life therein, authorises the issue of such permit. (Section 53 (6) of the Act).

Also, no private land holding or right is allowed within a national park.

Sanctuaries are accorded a lesser level of protection, for in sanctuaries certain types of activities might be permitted. Prior to the amendments in 1991, activities could be permitted in sanctuaries not only 'for the better protection of wildlife', but also 'for any other good and sufficient reason'. The provisions of the act are given below. However, in 1991 clause (b) – "for any other good and sufficient reason" was deleted. Notwithstanding anything contained elsewhere in this Act, no person shall hunt any wild animal in a sanctuary or remove therefrom any wild animal, whether alive or dead, or any trophy, uncured trophy, or meat derived from such animal;

Provided that if the Chief Wild Life Warden is satisfied that it is necessary that any wild animal in a sanctuary should be hunted or removed;

- for the better protection of wild life , or
- for any other good and sufficient reason,

he may, with the previous approval of the State Government, grant a permit authorising any person to hunt or remove such wild animal under the direction of an officer authorised by him or cause it to be hunted or removed. (Section 29(1) of the Act)

The Chief Wild Life Warden shall be the authority who shall control, manage and maintain all sanctuaries and for that purpose, within

the limits of any sanctuary, may construct such roads, bridges, buildings, fences or barrier gates, and carry out such other works as he may consider necessary for the purposes of such sanctuary; shall take such steps as will ensure the security of wild animals in the sanctuary and the preservation of sanctuary and wild animals therein; may take such measures, in the interests of wild life, as he may consider necessary for the improvement of any habitat; may regulate, control or prohibit, in keeping with the interests of wild life, the grazing or movement of cattle: May regulate, control or prohibit any fishing. (Section 33 of the Act)

The Act further says that "wild life" includes any animal, bees, butterflies, crustacea, fish and moth; and aquatic or land vegetation which forms part of any habitat'. (Section 2(37) of the Act)

The procedures specified in the Act for the setting up of national parks and sanctuaries have the following broad objectives.

- To identify the extent and boundary of the park or sanctuary.
- To determine rights, if any, that exist within such an area (to be done by the collector, or an officer appointed specially for the purpose by the state government).
- In the case of existing rights, to either compensate the owner of such rights, if the owner is agreeable, or to acquire the land or such rights, where the owner is not willing to voluntarily accept compensation.
- To exclude areas where unacceptable levels of disturbance exist, and where the disturbance cannot be satisfactorily stopped.
- To allow the continuation of those activities which are considered acceptable.
- To provide for alternatives to public way or a common pasture, 'as far as may be practicable or convenient.' (section 25[1{f}] of the Act)

3.1 LEGAL STATUS AND CONTROL

The procedure for setting up a national park differed significantly from the procedure for setting up a sanctuary, till the Act was amended in 1991. In the case of sanctuaries, an area was first declared a sanctuary (Section 18 of the Act). Then other steps were taken to determine, extinguish, acquire or otherwise adjust existing rights (Sections 19 to 26 of the Act). This ensured that only those activities were allowed in a sanctuary, which were considered compatible with the interests of wildlife protection.

For national parks, the intention to constitute an area into a national park was first declared (section 35 of the Act) and then all the steps prescribed for a sanctuary were followed. After the completion of these steps, the area was declared a national park through a notification (section 35(4) of the Act).

This procedural difference had an important consequence. A protected area was legally not a *national park* until the final notification under Section 35(4) of the Act, had been issued. On the other hand, an area becomes a *sanctuary* upon declaration (under Section 18) even though various rights and leases had still to be settled. In both cases, of course, completion of the specified procedures was essential for proper management of the area, but in addition it was necessary for the very creation of a national park.

In 1991, the Act was amended and now the procedure for setting up sanctuaries is identical to that of setting up national parks, i.e., even for sanctuaries there are two stages, first an initial notification and then, after all the rights have been settled, a final notification. However, a special clause has been inserted by the 1991 amendment whereby any area that is already a reserve forest (under the Indian Forest Act of 1927) or part of the territorial waters of India, can be declared a sanctuary or a national park without determining and settling rights. In such cases, the notification for declaring intention and the final notification can be simultaneously issued. The logic behind this seems to

be that, in any case, as no rights are allowed in reserved forests or in the territorial waters of India, there is no need to go through the process of determining and settling rights.

3.1.1 Notification of PAs (Table 3.1)

This section deals with the various acts under which PAs have been notified and their year of notification.

Of the 176 PAs that responded to this part of the question 16 (9%) were declared prior to 1972, 113(64%) were declared between 1972 & 1991, 47 (27%) were declared after 1991.

Of the 172 PAs that responded to the section concerning the act under which they were notified, 166 (96%) reported notification under the Wildlife (Protection) Act, 1972. Some of the other acts under which the remaining PAs were notified, were the Indian Forest Act, 1927, and the Punjab Wild Birds and Animals Protection Act, 1933.

3.1.2 Status of the Required Legal Steps Taken by PAs (Table 3.2)

The WL Act prescribes many steps that need to be taken before an can legally be constituted as a national park or sanctuary. As already mentioned, this was not so for sanctuaries prior to 1991, for the Act then allowed sanctuaries to be legally and finally notified on the basis of a single, first, notification. This, however, changed after the amendment of the Act in 1991.

Apart from declaring notifying the intention to declare an area into a national park or sanctuary. the government is also obliged to define the boundaries, invite right holders to prefer their rights, enquire about existing rights, settle these rights and then finally notify the PA.

This section describes the various legal steps that PAs have completed in the process of being notified as national parks or sanctuaries.

LEGAL STEPS	NEW DATA *	OLD DATA
<i>Sanctuaries for which the intention to constitute them was notified as per the WL Act, as amended in 1991.</i>	36	Not Applicable
<i>PA limits defined</i>	21 (45%) National Parks 55 (29%) Sanctuaries	Not present in Old Data
<i>Proclamation issued by the collector for preferment of rights</i>	20 (43%) National parks 51 (27%) Sanctuaries	7 (37%) of 19 National Parks 10 (16%) of 63 Sanctuaries
<i>Appointment of settlement or other officer to perform the functions of a collector</i>	14 (30%) National Parks 35 (19%) Sanctuaries.	4 (22%) of 18 National Parks 5 (8%) of 62 Sanctuaries
<i>Commencement of inquiry</i>	13(28%) National Parks 27(14%) Sanctuaries	7 (37%) of 19 National Parks 9 (15%) of 58 Sanctuaries
<i>Completion of inquiry</i>	12(26%) National Parks 26 (14%) Sanctuaries	3 (19%) of 16 National Parks 7 (12%) of 60 Sanctuaries
<i>Admittance/rejection of claims</i>	11(23%) National Parks 25 (13%) Sanctuaries	3 (17%) of 18 National Parks 8 (13%) of 60 Sanctuaries
<i>Exclusion of area</i>	5 (11%) National Parks 17 (9%) Sanctuaries	Not present in Old Data
<i>Acquisition of the area</i>	5 (11%) National Parks 17 (9%) Sanctuaries	5 (26%) of 19 National Parks 6 (9%) of 64 Sanctuaries
<i>Allowing of rights</i>	3 (6%) National Parks 18 (10%) Sanctuaries	Not present in Old Data
<i>Settlement of appeals</i>	7 (15%) National Parks 17 (9%) Sanctuaries	2 (12%) of 17 National Parks 0 of 59 Sanctuaries

All percentages given in this section have been calculated out of a total of 47 national parks

3.1.3 Final notification (Table 3.3)

As already mentioned, a national park is not legally so unless the final notification has been done. Similar is the case for sanctuaries declared after 1991.

National Parks

Data indicated that of the 47 national parks that responded, 10(21%) national parks had been finally notified.

(Data from the earlier survey indicated that 21 (43.8%) of the 48 national parks responding had been finally notified.)

Details are given in the table below.

ISSUANCE OF FINAL NOTIFICATION OF NATIONAL PARKS

CODE	NAME OF NATIONAL PARK	NEW DATA (1998-2000)	OLD DATA (1984-87)
A&N/N/MAR	Marine National Park		N
A&N/N/MID	Middle Button National Park		N
A&N/N/MOU	Mount Harriet National Park		N
A&N/N/NOR	North Button National Park		N
A&N/N/SAD	Saddle Peak National Park	N	N
A&N/N/SOU	South Button National Park		N
AP/N/KAS	Kasu Brahmananda Reddy National Park	N	
AP/N/MAH	Mahaveer Harina Vanasthali National Park	N	
AP/N/MRU	Mrugavani National Park	N	
AP/N/VEN	Sri Venkateswara National Park	Y (1998)	
ARU/N/MOU	Mouling National Park	N	
ARU/N/NAM	Namdapha National Park	N	Y
ASS/N/DIB	Dibru Saikhowa National Park	N	
ASS/N/KAZ	Kaziranga National Park	N	
ASS/N/MAN	Manas National Park	N	
ASS/N/ORO	Orang Sanctuary	Y (1998)	
CHT/N/IND*	Indravati National Park	N	
CHT/N/KAN*	Kanger Valley National Park	N	
GOA/N/BHA	Bhagwan Mahavir National Park		N
GUJ/N/BAN	Bansda National Park	N	Y

and 188 sanctuaries responding
 Formerly in Madhya Pradesh (MP)
 Formerly in Madhya Pradesh (MP)

GUJ/N/GIR	Gir National Park		Y
GUJ/N/MAR	Marine National Park		Y
GUJ/N/VEL	Velvadar National Park		Y
HAR/N/SUL	Sultanpur National Park	N	
HP/N/GRE	Great Himalayan National Park	Y (1999)	N
HP/N/PIN	Pin Valley National Park		N
J&K/N/DAC	Dachigam National Park		Y
J&K/N/HEM	Hemis National Park		Y
J&K/N/KIS	Kishtwar High Altitude National Park	Y (1980)?	N
JHA/N/RAJ*	Rajmahal National Fossil Park	N	
KAR/N/ANS	Anashi National Park	N	
KAR/N/BAND	Bandipur National Park	N	N
KAR/N/BANN	Bannerghatta National Park		N
KAR/N/NAG	Nagarahole National Park		Y
KAR/N/KUD	Kudremukh National Park	N	
KAR/N/NAG	Rajiv Gandhi National Park	N	
KER/N/ERA	Eravikulam National Park	N ?	Y
MAH/N/AND	Tadoba Andhari Tiger Reserve	N	
MAH/N/NAV	Navegaon National Park	N	N
MAH/N/PEN	Pench Tiger Reserve	Y (1975)?	N
MAH/N/SAN	Sanjay Gandhi National Park	N	N
MAN/N/KEI	Keibul Lamjao National Park	Y (1997)	Y
MAN/N/SIR	Siroy National Park		N
MEG/N/BAL	Balpakram National Park	N	
MEG/N/NOK	Nokrek National Park	Y (1997)	
MIZ/N/MUR	Murlen National Park	N	
MIZ/N/PHA	Phawngpui (Blue Mountain) National Park	Y (1997)	
MP/N/BAN	Bandhavgarh Tiger Reserve	N	N
MP/N/GHU	Ghughuwa Fossil National Park	N	N
MP/N/IND	Indravati National Park		N
MP/N/KANG	Kanger Ghati National Park		Y
MP/N/KANH	Kanha National Park		N
MP/N/MAD	Madhav National Park		Y
MP/N/PAN	Panna National Park		N
MP/N/PEN	Pench National Park	N	N
MP/N/SAN	Sanjay National Park		N
MP/N/SAT	Satpura National Park	N	N

* Formerly in Bihar (BIH)

MP/N/VAN	Van Vihar National Park	N	Y?
NAG/N/INT	Intanki National Park	Y (1993)	
ORI/N/SIM	Simlipal National Park		N
RAJ/N/DES	Desert National Park	N	N
RAJ/N/KEO	Keoladeo National Park		Y
RAJ/N/RAN	Ranthambhore National Park		Y
RAJ/N/SAR	Sariska National Park		N
SIK/N/KHA	Khangchendzonga National Park	N	Y?
TN/N/GUI	Guindy National Park		Y
TN/N/GUL	Gulf of Mannar Marine National Park	N	
TN/N/IND	Indira Gandhi National Park & Sanctuary	N	
TN/N/MUD	Mudumalai National Park & Sanctuary	N	
TN/N/MUK	Mukurthi National Park	N	
UTT/N/COR"	Corbett National Park	Y (1966)	
UTT/N/DUD"	Dudhwa National park		Y
UTT/N/NAN"	Nanda Devi National Park		Y
UTT/N/VAL"	Valley of Flowers National Park		Y
WB/N/GOR	Gorumara National Park	N	
WB/N/SUN	Sunderban National Park	N	Y?

Total number of national parks responding: new data – 47; old data – 48. Total number reporting final notification: new data - 10/47 = 21.3%; old data – 21/48 = 43.8%.

Combined response from 76 national parks of which 30(39.5%) report final notification. However, for five of these national parks there is some confusion about whether they actually have been finally notified or not (marked ? in the list above).

Sanctuaries

Data indicated that of the 188 sanctuaries that responded to the survey, 57 (30%) had completed legal processes and also issued the final notification.

(During the earlier survey it was not required to issue such a notification for sanctuaries).

Formerly in Uttar Pradesh (UP)

Formerly in Uttar Pradesh (UP)

Formerly in Uttar Pradesh (UP)

Formerly in Uttar Pradesh (UP)

Interestingly, of these 57 sanctuaries, 40 (listed below) had been notified prior to 1991. Therefore, according to the unamended wildlife act, these sanctuaries were not required to issue a final notification, but were legally constituted sanctuaries from the date of notification. However, despite this, these forty sanctuaries thought it fit to also issue a final notification. Perhaps this is due to a possible ambiguity in the amended WL Act with regards to the required legal processes for sanctuaries that had not completed settlement of rights by 1991 but were notified prior to 1991. The amended wildlife act came into force in 1991 and stipulated that sanctuaries too will have to issue a final notification after settling rights and would, till such a final notification, only be intended sanctuaries.

List of 40 sanctuaries that have issued final notification but were notified prior to 1991.

Coringa Sanctuary (Andhra Pradesh)	Sukhna Sanctuary (Chandigarh)
Kawal Sanctuary (Andhra Pradesh)	Gamgul Siahbehi Sanctuary (Himachal Pradesh)
Kolleru Sanctuary (Andhra Pradesh)	Kalatop Khajjiar Sanctuary (Himachal Pradesh)
Koundinya Sanctuary (Andhra Pradesh)	Kugti Sanctuary (Himachal Pradesh)
Manjira Sanctuary (Andhra Pradesh)	Pong Lake Sanctuary (Himachal Pradesh)
Papikonda Sanctuary (Andhra Pradesh)	Tunda Sanctuary (Himachal Pradesh)
D'Ering Memorial Sanctuary (Arunachal Pradesh)	Brahmagiri Sanctuary (Karnataka)
Laokhowa Sanctuary (Assam)	Dandeli Sanctuary (Karnataka)
Pobitora Sanctuary (Assam)	Ghataprabha Sanctuary (Karnataka)

Gudavi Sanctuary (Karnataka)	Kheoni Sanctuary (Madhya Pradesh)
Melkote Temple Sanctuary (Karnataka)	Tal Chapper Sanctuary (Rajasthan)
Mookambika Sanctuary (Karnataka)	Kyongnosla Sanctuary (Sikkim)
Nugu Sanctuary (Karnataka)	Shingba Sanctuary (Sikkim)
Pushpagiri Sanctuary (Karnataka)	Chitragudi Sanctuary (Tamil Nadu)
Ranebennur Sanctuary (Karnataka)	Kanjarankulam Sanctuary (Tamil Nadu)
Ranganathittu Sanctuary (Karnataka)	Karikili Sanctuary (Tamil Nadu)
Someshwara Sanctuary (Karnataka)	Vedanthangal Sanctuary (Tamil Nadu)
Talkaveri Sanctuary (Karnataka)	Vettangudi Sanctuary (Tamil Nadu)
Yawal Sanctuary (Maharashtra)	Bethuadahary Sanctuary (West Bengal)
Gandhi Sagar Sanctuary (Madhya Pradesh)	Bibhutibhushan Sanctuary (West Bengal)

3.1.4 Alteration of PA Boundaries (Table 3.4)

Alteration of the boundaries of a national park is allowed vide Section 35(5) of the Act, which specifies that a resolution of the state legislature is required for any such alternation. For sanctuaries, Section 24:2(a) of the Act provides for deleting portions of notified area.

Additions to the area of parks and sanctuaries are usually aimed at making the existing area more ecologically viable, or to bring under protection a contiguous area of ecological significance. The migratory paths of certain wild animals may be added so as to ensure their protection over their entire range. Areas may also be added to act as a buffer to the existing area.

Deletion of an area, on the other hand, is usually a way of eliminating or reducing pressures detrimental to the well being of the park. An area with intense human pressure or an area where there are difficulties in acquisition of land or extinguishing of rights can often be excluded to safeguard the overall interests of the park or sanctuary. Unfortunately, in the recent past this clause has been used to accommodate commercial and infrastructure projects at the cost of the protected area.

Out of 47 national parks and 188 sanctuaries that responded to the survey, 7 (15%) and 20(11%) respectively reported alteration of the boundaries. In case of national parks, area was added to the PA on 5 instances and deleted in 2 cases. 10 sanctuaries reported addition of area while 11 reported deletion.

(In the old survey, 9(26%) of the 35 national parks and 16 (9%) of the 179 sanctuaries responding, reported alteration. Of the parks, which had such a change, there was addition of area in 6 and deletion in 5 – this included 2 parks in which area was both added and deleted. Of the 16 sanctuaries that reported alteration, 10 reported an addition of area and 6 a deletion).

It emerges from the data that the predominant reason for addition of area was to make the protected area ecologically more viable. Deletion of area was usually done due to failure to settle or extinguish local private rights over the area in question or because the government decided to initiate a development/commercial project, such as a hydro power plant or mining.

Limitations of the Data

The data reflect only formal alterations of boundary and do not include information concerning areas still to be acquired or under illegal occupation. Many of the parks and sanctuaries have reported such areas. Though areas still to be acquired or under illegal occupation are a part of the park or sanctuary, in practice they are not under the control of park authorities and, as such, for the purposes of management can be

considered as deleted areas till such time as they are acquired or the encroachments are cleared.

3.2. Zoning in PAs (Table 3.5)

The division of national parks and sanctuaries into a buffer zone (BZ) and a core zone (CZ) or *sanctum sanctorum*, is usually prescribed as essential to the proper management of these areas. It is an important way of reconciling the often conflicting demands of conservation and human activities, by allowing restricted activities in the BZ while keeping out most human uses from the CZ.

Of over-riding and primary importance is the need for each individual reserve to adopt a 'Core-buffer-multiple use surrounds' structure, wherein a restricted forest i.e. buffer surrounds the core insulating it from an outer multiple use area, the last comprising forests and villages where land use practices are compatible with wildlife conservation. While protection must be enforced in the core-buffer area, the multiple use surrounds should be subjected to rapid multilateral eco-development capable of enhancing the agricultural, pastoral and forest productivity of the area and to provide supplemental alternative resources. This is the only way in which compatibility of each area with the others can be brought about (Indian Board for Wildlife, 1983).

Among the parks and sanctuaries responding, at least the following four types of zoning practices were found

- Where both the buffer and core zone are inside the notified park/sanctuary.
- Where the park/sanctuary is designated the core zone, and an area surrounding it or adjacent to it, but outside the notified park/sanctuary, is considered a buffer zone.
- Where a national park is designated the core zone and sanctuary surrounding it or adjacent to it is designated as buffer zone.
- Where the notification designates both the core zone and the buffer zones, but only the core zone has been taken

over for management as park/sanctuary while the buffer zone remains outside the managed area.

Out of 39 national parks and 164 sanctuaries that responded to this question, 20 (51%) national parks and 36 (22%) sanctuaries reported the presence of zonation.

(In the previous survey, 18 (38%) of the 48 national parks and 41 (19%) of the 221 sanctuaries responding, reported the existence of zoning).

Limitations of the Data

At least for some of the parks and sanctuaries, zoning might not be required as there is no human population or human activity in and around the area.

The existence of a core zone in a park or sanctuary does not necessarily mean that it actually functions as a *sanctum sanctorum* for wildlife. In fact, in a number of parks and sanctuaries, villages and tourist facilities, among others, are located within the core zone.

3.3 Interstate/International Boundaries or Other Vulnerable Areas (Table 3.6)

The existence of inter-state boundaries or other vulnerable areas sometimes create special problems in the management of national parks and sanctuaries.

Interstate boundaries near the park or sanctuary prevent the wildlife staff from properly protecting the areas as poachers and other persons involved in illegal activities can slip across the border. The officials of one state do not ordinarily have the authority to operate within another state, unless prior permission is taken. Such borders can also lead to problems of interstate cooperation in habitat management. These problems could be even greater in the case of international boundaries.

Of the 207 PAs responding, 27(13.04%) reported that their boundaries were contiguous with an interstate or international boundary. Of these, 7 (3.38%) were PAs that were situated on an international border. The major problems arising out of having a

PA on a border were reported to be illegal use of forest resources, poaching, grazing, illicit felling etc. In addition, it was reported from Dampa Tiger Reserve, Mizoram, that the Chakmas from across the border in Bangladesh were indulging in illegal jhuming in the PA, while in the case of Asola Sanctuary, Delhi, it was reported that people from across the border in Haryana were involved in illegal mining activities in the PA. Only in one case viz. Barnadi Sanctuary in Assam, was there reported to be no major or special problem because of the border with Bhutan

(Comparable data from the earlier survey indicates that of the 47 national parks and 202 sanctuaries responding, 11 (23%) and 48 (24%) respectively reported the existence of interstate boundaries and other vulnerable areas creating special problems.)

3.4 Management Plan (Table 3.7)

The drawing up of management plans can be considered a crucial first step in the proper management of parks and sanctuaries. Apart from the plan itself, which ideally gives a framework within which protection of the area has to be enforced and monitored, the data collection and research that should precede the formulation of a plan is an important source of information on the area and a baseline from which to evaluate the subsequent 'health of the area'.

Ideally, the management plan should fit into the overall land use planning of the region, taking into account the relevant environmental, social and economic parameters relevant to both the park/sanctuary as well as the adjacent areas. Within the ambit of the park itself, the management plan should identify the major objective of the park/sanctuary, assemble comprehensive background data, establish the relationship of different factors to each other, identify the priority areas and strategies for protection and management, and indicate suitable locations for buildings and facilities. The plan should seek to ensure that the management requirements, goals and objectives, are considered carefully before initiating action and that planning is done

with a long-term perspective in mind, thus protecting the park from the effects of piecemeal and *ad hoc* management practices.

Of the 42 national parks and 178 sanctuaries responding, 18 (42.85%) parks and 63 (35.39%) sanctuaries reported the existence of management plans. Of the PAs reporting the existence of management plans, only 7 (16.66%) parks and 18 (10.11%) sanctuaries reported that their management plans had been approved. Of the 139 PAs that reported that they did not have any management plans, only 17 (12.23%) reported that a management plan was being prepared.

(Comparable data from the earlier survey indicates that of the 52 national parks and 208 sanctuaries responding (extended data base), 25 (50%) of the parks and 65 (31%) of the sanctuaries reported the existence of management plans. Only 5 (9.61%) national parks and 18 (8.65%) sanctuaries stated that their plan had been approved)

A comparison shows that 20 PAs that had reported the existence of management plans in the earlier survey, did not have a management plan at present. Of these, only in the case of Pench Tiger Reserve, Madhya Pradesh and Point Calimere Sanctuary, Tamilnadu, was it reported that a management plan was in the process of being formulated.

Data in the current survey is available for 10 PAs that had reported that their plans had been approved in the earlier survey. The management plan for only one PA viz. Sanjay Gandhi National Park, Maharashtra, out of these 10 PAs had reportedly been approved. The management plans for the others were either not prepared (4 PAs) or had not been approved (5 PAs).

In all the other areas management was carried out, in so far as it was, on an *ad hoc* basis with an annual perspective, rather than a five or ten yearly one.

Limitations of the Data

The data only indicate the existence of management plans and not their comprehensiveness or appropriateness. Judging from copies of management plans sent in for many of the areas it appears that, but for a few exceptions, these plans are little more than a budget with a general introduction. Moreover, in some cases the plans cited are old, and it is unclear whether and how they are being followed at present.

The data on approval of management plans are obviously scanty, but from field visitors' experience it appears that a majority of the plans which are made have never been approved, and the required budgetary allocations in full, and in time, are not always forthcoming.

3.5 Separate Budget (Tables 3.8 and 3.9)

As an important indicator of management practices, the existence of a separate budget for each national park and sanctuary was queried. Not having a separate budget implies that the expenditure on the park or sanctuary comes out of the larger budget for the forest/wildlife division, without funds being exclusively allocated for expenditure on the park or sanctuary. This might also mean having very little funds or no funds at all, to spend on the park or sanctuary. It then becomes difficult to plan ahead and take up long-term projects, and the park directors' financial powers are greatly limited.

Of the 235 PAs that responded to the survey, 161 (68.51%) gave details of their budgetary allocations and expenses. The overall trends for average allocations and expenditure for a three-year period (1997-98 to 1999-2000) were as follows:

	<i>Budgetary Difference (%) between Year 2 and Year 1</i>	<i>Budgetary Difference (%) between Year 3 and Year 2</i>
<i>Plan Funds Allocated PA</i>	20.68%	35.82%
<i>Plan Funds Spent</i>	15.36%	31.73%
<i>Non Plan Funds Allocated</i>	3.84%	26.76%
<i>Non Plan Funds Spent</i>	13.64%	16.57%

In all cases, growth of expenditure was less than the growth in the allocation of funds, except for growth of non plan expenditure between Year 2 and Year 1, which was over 10% greater than the growth in allocation.

The lowest plan funds allocation for a single year in the three years for which data was asked for was reported to be Rs. 7,000.00 in the case of Tal Chhappar Sanctuary, Rajasthan. The other PAs that had very small budget allocations of plan funds (less than Rs. 25,000 per annum) in either of the three years that data was asked for were Hazaribagh and Parasnath Sanctuaries, Jharkhand; Jaikwadi Sanctuary, Maharashtra; Intanki National Park and Fakim, Puliebadze and Rangapahar Sanctuaries, Nagaland; Kotgarh Sanctuary Orissa; and Ramnabagan Sanctuary, West Bengal.

The highest plan funds allocation for a single year in the three years for which data was asked for was reported to be Rs. 1,56,84,000.00 for Bandipur Tiger Reserve, Karnataka. The other PAs that reportedly had substantial allocations of plan funds (more than Rs. 50,00,000.00 per annum) in either of the three years that data was asked for were Venkateswara National Park, Andhra Pradesh, Namdapha Tiger Reserve, Arunachal Pradesh, Kaziranga National Park, Assam, Sukhna Lake, Chandigarh, Indravati Tiger Reserve, Chattisgarh, Bhadra Tiger Reserve, Karnataka, Wayanad Sanctuary, Kerala, Sanjay Gandhi National Park, Maharashtra, and Grizzled Squirrel Sanctuary, Tamil Nadu.

16 (9.93%) PAs reported that their plan allocations had at least doubled i.e; a budgetary increase of 100% or more between the 1st and the 2nd year for which financial data was asked for. Of these, all except 6 PAs, i.e; Dibru Saikhowa National Park, Assam, Lippa Asrang Sanctuary, Himachal Pradesh, Hazaribagh Sanctuary, Jharkhand, Wayanad Sanctuary, Kerala, Sanjay Gandhi National Park, Maharashtra, and Grizzled Squirrel Sanctuary, Tamil Nadu, reported a

negative trend or decline in their budget allocations between the 2nd and 3rd years for which financial data was asked for.

64 (39.75%) PAs reported that their plan allocations had declined between the 1st and the 2nd year for which financial data was asked for. Of these, only 31 PAs reported a subsequent increase in plan funds allocation while only 10 PAs reported that they had been able to regain the level of funding that they had or a 100% or more increase in plan funds allocation between the 2nd and the 3rd years for which financial data was asked for.

70 (29.78%) PAs reported that they had received extra budgetary funds from various sources. While most PAs had tapped on central government funds, 10 (14.28%) reported that they had received funds from the World Bank (India Ecodevelopment Project and/or State Forestry Projects). Only one PA, Kaziranga in Assam, reported receipt of funds from an NGO viz. from the WWF sponsored Tiger Conservation Programme. Trishna Sanctuary in Tripura reported receipt of UNDP funds. The level of funding ranged from as little as Rs. 10,000 or less from sources such as the state governments to Rs. 50,00,000.00 or more from sources such as the World Bank Aided Forestry or India Ecodevelopment Projects in various states, Project Tiger, or the District Rural Development Agencies. The PAs that had received substantial extra budgetary funding were Ventateswara National Park and Pulicat and Pocharam Sanctuaries in Andhra Pradesh, Dibru Saikhowa National Park, Assam, Sukhna Lake, Chandigarh, Indravati Tiger Reserve and Achanakmar and Tamore Pingla Sanctuaries in Chattisgarh, Great Himalayan National Park, Himachal Pradesh, Pench National Park, Maharashtra, Bandhavgarh, Pench and Van Vihar National Parks and Gandhisagar and Noradehi Sanctuaries in Madhya Pradesh, Chandka Dompada Sanctuary, Orissa, Khangchendzonga National Park, Sikkim, and Indira Gandhi National Park, Tamil Nadu.

A list of central and state sector schemes pertinent to the wildlife sector is given in annex 1.

(Comparable data from the earlier survey showed that of the 51 national parks and 205 sanctuaries responding, 34 (67%) and 116 (57%) respectively, reported having separate budgets.)

Limitations of the Data

Without a detailed analysis of the actual expenditure on each park or sanctuary, something that has not been attempted in this report, it is not possible to conclude that areas with separate budgets get a higher level of funding than those without it. However, barring exceptional cases, it can generally be argued that separate budgets are desirable and are one of the essential instruments of long-term planning for parks and sanctuaries.

3.6 Number of Visitors to the PA (Table 3.10)

PA managers and other policy makers are increasingly turning to eco tourism to justify continued support to PAs. Most PA management plans have sections on tourism and state tourism departments have been enthusiastically marketing PAs, particularly those that harbour charismatic species like tigers and rhinos.

However, uncontrolled tourism can potentially be a source of pressure on the PA. This section describes the number of people visiting PAs. A distinction has been made between tourists and pilgrims as a number of PAs have reported a large influx of pilgrims, particularly during local festivals.

Of the 235 PAs responding, 84 (35.7%) reported visits by tourists. Though a majority of PAs did not respond to this question, it is likely that many of them also had visitors. However, in a number of such cases it is likely that though there were visitors, there was no mechanism to maintain records of these.

The lowest number of visitors (1) was reported from Sonai Rupai sanctuary in Assam, while Mookambika sanctuary in Karnataka reported the highest number (15,05,000). The average number of visitors per PA works out to 59,780. The highest number

of visitors in a single day (4,00,000) were reported from Jaikwadi sanctuary in Maharashtra.

Pilgrims reportedly visited 22(9%) PAs. The highest number of pilgrims (5,00,000) were reported from Grizzled Squirrel Sanctuary in Tamil Nadu, while Brahamgiri Sanctuary in Karnataka reported the lowest (2). The average number of pilgrims from the PAs that reported their presence was 81,125.

3.7 Regulation of Entry (Table 3.11)

Given the need to restrict or regulate various types of human pressures on PAs, including pressures by tourists and pilgrims, it is important that PAs regulate the entry of people so that their numbers can be managed. It is also important to ensure that animals are not disturbed at night and that visitors to the PA do not take in or bring out any prohibited items.

3.7.1 Entry into the PA by Vehicles:

The entry of vehicles into the PA is particularly problematic as not only do these vehicles cause noise and air pollution but also, sometimes, run down wild animals. Vehicles can also be used for illegal activities within the PA.

166 (70.63%) of the PAs reported that they could be entered by a vehicle from one or more points on their boundary. Of these, 117 (70.48%) PAs reported that some or all such entry points were being manned. 12 (7.22%) PAs reported that their vehicular entry points were not manned. 8 (3.4%) PAs reported that they did not have any vehicular entry points.

3.7.2 Entry into the PA on foot:

Many PAs are close to towns or cities and are, consequently, subject to a large amount of visitors on foot. Also, in PAs that harbour animals potentially dangerous to human beings, it is important to regulate or restrict travel by foot.

165 (70.21%) of the PAs reported that they could be entered on foot. Of these, 57 (34.54%) PAs reported that some or all such entry points were being manned. 28 (16.96%) PAs reported that

they did not man any foot paths going into the PA. Only 3 (0.02%) PAs, viz. Bir Mahas Sanctuary, Punjab, and Sundarban National Park and Senchal Sanctuary, West Bengal, reported that they had no entry points on foot.

3.7.3 Permits for Entry on Vehicles:

72 (30.63%) of the PAs reported that they issued permits for the entry of vehicles into the PA. Of these, there were 5 (6.94%) PAs that had not responded to the question on whether they had any vehicular entry points. These PAs were, Dibru Saikhowa National Park, Assam, Udanti Sanctuary, Chattisgarh, Nagarahole National Park, Karnataka, Baghmara Sanctuary, Meghalaya, and Great Himalayan National Park, Himachal Pradesh. In addition, one PA, ie; Khangchendzonga National Park, Sikkim, reported that it did not have any vehicular entry points.

3.7.4 Permits for Entry on Foot:

52 (22.12%) PAs reported that they issued permits for entry of people on foot into the PA. Of these, there were 9 (17.3%) PAs that did not respond to whether they had any entry points on foot for people entering the PA.

3.8 Thoroughfares Passing Through PAs (Table 3.12)

Public thoroughfares in national parks or sanctuaries are potential sources of disturbance to these areas. They could also be seen as creating a situation where poaching, spread of disease by passing cattle, and problems created by increased quantum of visitors entering the park or sanctuary would become difficult to control. A busy highway, apart from contributing to vehicular pollution, could also make it difficult to ensure that habitat is not destroyed or other unauthorised activities do not take place.

17 (36.17%) national parks and 62 (32.97%) sanctuaries reported the existence of a public thoroughfare. Of these, 10 (12.65%) PAs reported the existence of national or state highways.

The three PAs that reported a very high level of disturbance due to such thoroughfares were:

Wild Ass Sanctuary, Gujarat, reported that there were 3 lakh trips of trucks per annum to transport 30 lakh tonnes of salt that is produced in salt factories operating inside the PA

Kalatop Khajjiar Sanctuary, Himachal Pradesh, reported that around 25,000 to 30,000 light vehicles alone pass through the PA each year, especially in the tourist season

Badarma Sanctuary, Orissa, reported that there was constant bus and truck traffic in the PA. Each minute, atleast one truck or bus is reported to pass through the PA. There is no estimate of light vehicles that pass through the PA in addition to the above.

(Comparative from the earlier survey showed that of the 47 national parks and 204 sanctuaries responding, 22 (47%) and 117 (57%) respectively, reported the existence of a public thoroughfare.)

13 of the PAs that reported the existence of a thoroughfare in the earlier survey, did not do so in this one.

3.9 Antipoaching or Flying Squads (Table 3.13)

Poaching of animals has increasingly become one of the major threats to wild populations, especially of commercially valuable species like rhino, tiger, leopard, elephant, crocodile, musk deer, snow leopard and many others. A large number of poachers are mobile and have sophisticated weapons and equipment. In order to counter their threat, it is important for PAs to maintain or have access to specialized anti poaching squads that are properly equipped and trained.

97 (41.27%) PAs reported that they had anti poaching or flying squads, while 113 (48.08%) PAs reported that they did not have any such squads. The maximum number of squads reported were 23, from Indira Gandhi National Park in Tamil Nadu.

(Comparative data from the earlier survey shows that 66 (25.19%) PAs reported that they had antipoaching squads, while 29 (11.06%) PAs did not report any such squads.)