CHAPTER - 9

MAMMALS

Mammals being the most charismatic of all animals, their presence variety and numbers attract the attention of even common people. Therefore they attract more conservation interests than any other taxa. Mammals are the members of higher trophic levels hence they are more susceptible to any changes in the ecosystems. Many mammalian species act as indicator or flagship species for ecosystems in which they dwell. Effective management and monitoring of any ecosystems therefore require an understanding of the composition of mammal communities. Protected area of Purna Wildlife Sanctuary of Dangs district is believed to be under immense anthropogenic pressure (Worah, 1991) and required a study with special reference to distribution of mammalian species. Hence the present study was therefore carried out to know the assemblage of mammal species in Purna Wildlife Sanctuary.

9.1 METHODOLOGY

Present study was carried out between October-2001 to December 2002 to estimate diversity and abundance of mammals in PWS. The survey of mammals was carried out using transect survey and interview based surveys. Data collection was done by a team of three to four individuals involving a scientist, research fellows, and local trackers. A total of 430 man-days were spent for the mammal study in PWS. Study involved identification of mammals based on direct sightings or indirect evidences and enumeration of diversity in terms of species richness and their abundance. The study also carried out interview based surveys in the sanctuary to gain knowledge on past and present distribution of mammals of PWS.

9.1.1TRANSECT SURVEY: Total 21 permanent transects of varying length (minimum of 2 to maximum 11.8 km) were laid randomly in all the five ranges. Five permanent line transects each in four ranges (Singhana, Kalibel, Baripada, Bhenskhaatri) and one transect in Ahwa West Range were laid (Annexure **9.1**). Transects were walked starting from early morning hours to some time throughout day. Apart from marked transects a total of 53 general line transects of 2 km length were also walked randomly to ensure the adequate sampling in the entire sanctuary area. In all including marked and general transects, a total of 215 transects were walked. During transect surveys species were identified on direct sightings and indirect evidences such as footprint, dropping or calls. The information such as time, compartment number, and habitat types were also recorded. Estimating encounter rates is a simple and useful way of providing a measure of abundance of mammals. The following formula was used for deriving the encounter rate. The encounter rates were calculated for only those species that were directly observed on transects.

$$\text{Encounter rate} = \frac{\text{No. of direct observation of individuals of a species}}{\text{Total length of transects walked}}$$

9.1.2 INTERVIEW BASED SURVEYS: Local people including trackers, forest dwelling herders, elderly villagers, forest officers, forest guards, beat guards and watchmen were interviewed to gain knowledge on past and present status of several mammal species in PWS.

9.2 RESULTS AND DISCUSSION

Total 23 species of 15 families, belonging to seven orders of mammals were recorded in present study (Annexure **9.2**) through direct sightings on transect or by confirmed indirect evidences. Of these records 11 species were arboreal and 12 species were of terrestrial mammals. Due to very low number of direct sightings, density of various mammalian species could not be calculated. However, encounter rate of animals was enumerated. A total of 16 species of mammals were recorded through direct sightings, 3 species were recorded by indirect evidences on transects and 4 species were recorded by confirming on the basis of interviewing

local people and forest officers. Details of number of direct, indirect sightings and encounter rate are given in Table. 9.1.

9.2.1 PRIMATES:

Surprisingly Purna Wildlife Sanctuary has assemblage of three species of primates. This is the only place in Gujarat where distribution range of two sympatric species of macaques such as Rhesus Macaque and Bonnet Macaque overlap. Among these primates, Rhesus Macaque was the highest encountered species. Hanuman langoor is relatively less common, a total of 20 individuals were observed directly in six troops during entire study period. Bonnet Macaque was believed to be non-existing in Gujarat state, though their existence is known to the local people Singh (2001). It is locally known as "Khar Shemtya". Present study is the first authentic report of having seen a troop of eight individuals of Bonnet Macaques. They were seen on the steep, rocky hill- slope just above the source of Girmaal waterfall (20º58'13"N latitude and 73º 43'15" E longitude) on 19th December 2001.

9.2.2 HERBIVORES:

Among herbivores, Sambar has been recorded occasionally near Vansda National Park, Waghai and Purna Sanctuary up to 1948. Local people and field staff reported observation of Sambar and Chital in the interior forests between Kalibel and Pimpri in compartment no. 183 to 190, south of Purna Sanctuary (Anon 2002). However no direct or indirect evidences of Sambar and Chital were recorded from PWS in the present study. Presence of relatively smaller herbivores such as Barking deer and Four-horned antelope, which are adapted to undisturbed habitats with steep slopes, are recorded through direct and indirect evidences in the present study.

9.2.3 CARNIVORES:

Existence of tiger in PWS has been reported as recent as 1993. The Census record of Forest Department has reported six tigers in 1989 and five tigers in 1993. However subsequent census has shown absence of tigers from PWS. However the last direct observation of a tiger by a forest officer was in 1982-83 when Lt. Dr. Shankar Maloth observed a tigress with two cubs near Mahal (Anon 2002). Leopards have been sighted thrice in the present study, which include sighting with cubs, suggestting that a breeding population of leopards exist in PWS.

The Sloth bears were abundant in Javda, Jamanpada, and Mahal in Dangs (Worah, 1991). The hunting records maintained by Shri Digveerendrasinhiji of Vansda Princely State could confirm existence of Sloth bear in Dangs as recent as first quarter of last sanctuary. According to their records total 19 animals were killed between 1914 to 1917, included 15 leopards, one hyena and one Sloth bear. The smooth Indian otter once common has not been recorded in the present study. Two sightings of hyena and presence of active dens suggest that a breeding population of Striped Hyena exist in PWS. However indirect evidences of Rusty Spotted Cat, Jungle Cat, and two species of civets suggest declining trends in their populations.

9.2.4 SPECIES LOSS/LOCAL EXTINCTION:

Information gathered from District Gazetteers, Forest working plan (1996), Management plan for Purna Wildlife Sanctuary (2002), Worah (1991) and interviewing local elderly villagers and forest officers suggests that there were more number of mammalian species existed in Dangs/PWS in the past than today. The species absent from PWS today includes Tiger, Wild dog, Sloth bear, Smooth Indian otter, Sambar, Chital and an endemic species of Dang, Giant Squirrel.

Analysis of records of mammalian species that existed in PWS in the past and not recorded in the present study shows, that majority of the species that are locally extinct from PWS were terrestrial. However, comparatively a small number of arboreal species have been lost from the sanctuary (Figure. 9.1).

The higher rate of loss of terrestrial mammal species could possibly be due to various reasons. Forests of PWS are situated on most undulating mountain ranges having steep slopes falling in Western Ghats. Such habitat is less likely to support higher density of large herbivores such as

chital and sambar. Chital and Sambars being large bodied animals are less adapted to such habitats and generally prefer continuous undisturbed forest floor with gentle slope or flat plateau. The most suitable habitats for Chital and Sambar in PWS area are either currently under agriculture or facing severe disturbance (Worah, 1991). Such anthropogenic activities have resulted in fragmentation and loss of contiguity of forest floor available to wild herbivores in Dangs. Apart from habitat fragmentation, Chital and Sambar are large bodied diurnal animals and less adapted to escape from poachers especially in habitats with steep slopes and dense forests. Hunting is a part and parcel of Dangi culture (Anon. 2001). Hence combination of immense hunting pressure, habitat fragmentation and loss of habitat seems to be the reasons for their extermination from Dangs.

Compared to Chital and Sambar, herbivores such as Barking deer and Four-horned antelope are still existing in the sanctuary. These relatively smaller sized herbivores can adapt to undisturbed habitats on steep slopes. These two wild herbivores are surviving in PWS with a very low density suggesting a non-viable population. Their successful survival further support Worah (1991) that most of the undisturbed forest patches are located on the steep slopes in Dangs (Worah, 1991). Such habitats are inaccessible to human beings thus does not pose hunting pressure on species, which are adapted for climbing steep slopes such as Barking deer and Four horned antelope.

Chital and Sambar are major natural prey species for tigers and wild dog (Preter, 1971; Johnsingh, 1983). Decline in wild herbivore population, loss of habitat and poaching could be the possible reason for extermination of tiger and wild dog from PWS. However the extinction of Sloth Bear, Otter and Giant Squirrel from Purna could also be due to excessive poaching and loss of habitat.

Major reason for comparatively small number of arboreal species loss could be due to less hunting pressure on them and availability of good habitats on steep slopes which are inaccessible to human beings. However species such as primates are not hunted due to religious sentiments. Nocturnal shy behavior and small size of carnivores such as civets and rusty spotted cat could be the reason for their presence. However, rodents and insectivores such as squirrel and shrews are much smaller in size and have higher breeding rate, therefore they are likely to cntinue their survival in the sanctuary.

The arboreal species, which have long been surviving through hunting pressure, seem to be adapted to the habitats of PWS. However their number is decreasing due to competition with needs of local people who hunt their prey species and exploit biological resources unsustainably. Populations of many mammal species are thriving below their viable population size in PWS. Their existence is ensured only until their habitats and food are secured and maintained undisturbed.

Informations provided by local elderly villagers have revealed that Dangi people used to kill primates and porcupine to collect their alimentary canals (gut). These organs are burnt and resulting smoke is believed to control disease outbreak like pleague. The logic explained by the elderly villagers was that the primates and porcupine feed on various plant leaves, fruits and roots, many of them having medicinal value and the extracts of each are accumulated in the alimentary canal hence it acts as a best medicine. The antler of Sambar is also used for curing burns, swelling, and skin diseases by Dangis. The explanation with similar logic was also given for the use of antlers as Sambar rub their antlers on various trees with medicinal values and the extract of each tree bark gets accumulated in the antlers. Hence might as well use antlers than looking for various medicinal plants.

Whether above mentioned animal organs are effective enough or not, the way Dangi people were using primitive and shortcut method of using medicinal plants certainly has its roots in evolution of our knowledge base of medicinal plants and their use.

Table-9.1. Details of species recordeds through direct sightings and indirect evidences and their encounter rate in Purna Wildlife Sanctuary.

Sr. No	Species	Scientific Name	# of Direct sightings	# of Indirect Evidences Record	Interview Base	Encounter rate**
1	Hanuman Langoor	*Presbytis entillus*	20 (6 T)	4		0.033
2	Rhesus Macaque	*Macaca mulatta*	493 (37T)	69		0.817
3	Bonet Macaque	*Macaca radiata*	8	2		0.013
4	Leopard	*Panthera pardus*	3	177		0.005
5	Stripped Hyena	*Hyaena hyaena*	2	97		0.003
6	Jackal	*Canis aureus*	0	0	1	
7	Indian Fox	*Vulpes benghalensis*	0	0	1	
8	Rusty Spotted Cat	*Felis rubiginosa*	0	14		
9	Jungle Cat	*Felis chaus*	2	45		0.003
10	Palm Civet	*Peradoxurus hermaphroditus*	0	15		
11	Small Indian Civet	*Viverricula indica*	0	33		
12	Common Mongoose	*Herpestes edwardssi*	0	0	1	
13	Barking Deer	*Muntjacus muntjac*	15	147		0.025
14	Four Horned Antelope	*Tetracerus quadricornis*	4	11		0.007
15	Wild Bore	*Sus scrofa*	3	65		0.005
16	Indian Hare	*Lepus nigricallis*	14	284		0.023
17	Indian Porcupine	*Hystrix indica*	1	0		0.002
18	Large Brown Flying Squirrel	*Petaurista phillipensis*	3	12		0.005
19	Five Stripped Squirrel	*Funambulus pennati*	9	28		0.015
20	Three Stripped Squirrel		1	0		
21	House Rat	*Rattus rattus*	0	0	1	
22	Indian Tree Shrew	*Anathana ellioti*	8	5		0.013
23	Indian Flying Fox	*Pteropus gaganteus*	2	0		0.003

T= Total number of troops observed.

** =Encounter rate is the number of animals found per kilometer of transects walk.

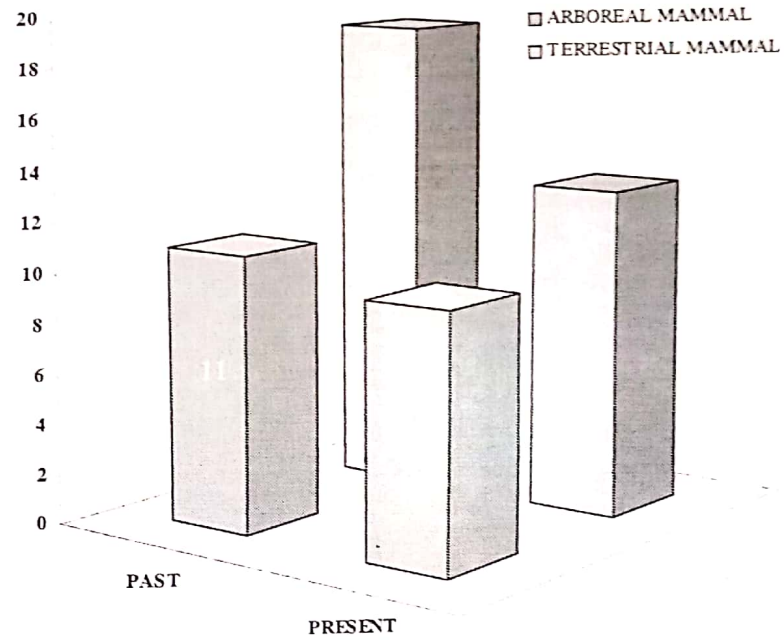

Figure 9.1. Comparison of number of arboreal and terrestrial mammalian species in past and present.