CHAPTER THREE

GENERAL METHODOLOGY

Since the animals were not radio-collared, the individual wolves were recognized by natural marks. The Nannaj Pack was monitored on an intensive, regular basis from July 1991 to August 1994.

This wolf pack was frequently spotted at a kill between 06:00-07:00 H but rarely after 07:30 H probably because of the disturbance by the people moving in the area.

Kills of the cattle calves were not included in the analysis because of their rare occurrence. Similarly wolves’ predation on the pet dogs was also excluded from data analysis because of small sample size. Therefore, livestock depredation refers to goats and sheep in the entire text. Denning period refers to the period when dens are dug and pups are born. It usually occurs in December and January.

Pups refer to the individuals less than six months of age, subadults or juveniles as 6-7 months old individuals, yearlings as 1-2 years and adults two and more than two years of age. However, it is extremely difficult to distinguish yearlings from adults in the field unless they are observed from very close quarters. The breeding period (December-August) includes denning and post-denning periods (during which the pups are reared till they start hunting on their own).
I used to be in the packs' territory by 06:00 H to look for wolf tracks and fresh droppings in the areas commonly frequented by them. In addition, I also scanned the area with binoculars in order to locate them. Sometimes crows and kites helped to locate the kill and hence the wolves. With the passage of time and experience, it was not difficult to locate the pack on kills. Once the pack was spotted at a kill, a continuous attention was paid to it until the pack members moved away from the kill. Data was collected on sex and age of the kill, biomass left unconsumed and distance of the kill from the protected area where the animal was supposedly killed. The terrain and the vegetation of the site were also recorded.

Similarly for domestic ungulates (goats and sheep), data on age, sex, location and distance of the kill from the protected area of the Sanctuary were recorded.

The weight of each kill left unconsumed and the number of wolves that were known to have fed on the kill with certainty were recorded to compute the mean consumption rate of wolves. It was not always possible to know exactly as to how many wolves were feeding on the carcass particularly at longer distances. I could overcome this problem during 1993 when four and ultimately only two wolves (Alpha pair) were left in the territory. It was possible to locate the pack of four and two wolves (Alpha pair) 11 times on the kills consecutively presuming that there was no kill besides the observed 11 kills made by wolves. Data on kills from 11 such kills was used for calculation of the average consumption by wolves and also food
consumption per day per wolf. The average weight of an adult male Blackbuck was considered to be 36 kg, of female 28 kg, subadult male 28 kg, subadult female 20 kg, yearlings 16 kg and fawn 5.5 kg (Ranjitsinh 1989, Jhala 1991).

To highlight differential predation on the wild (Blackbuck) and the domestic ungulates (goats and sheep), all the kills recorded during the study period were grouped into the following two categories:

1. Non-breeding period
2. Breeding period (denning period and pup rearing period till they learn hunting).

Non-breeding period comprised of eight months from July 1991 to November 1991 (5 months) and from September 1992 to November 1992 (3 months). The breeding period (December 1991 to August 1992) also comprised of total eight months as there was lack of data for one fortnight in February 1992 which was thus excluded from the analysis.

Chi-square, goodness-of-fit and Mann-Whitney U Statistic were used to test differential predation rates of wolves on Blackbuck and livestock and to test the predation on male and female Blackbuck, predation on goats vs. sheep. Kruskal-Wallis one-way analysis of variance was used for difference in predation (all kills) in different seasons of the wolf breeding and also the seasonality in predation patterns on livestock.

For investigating habitat use of wolf, the area was intensively searched for wolf
tracks and signs. The pack was observed directly with binoculars and spotting scope for habitat use. Whenever possible the pack was followed on foot during its movement in different areas. Usually, the pack was spotted in the morning hours around water holes or on Blackbuck kills and followed till it entered a woodlot or shaded area to rest during the day in a secluded area away from human interference. Such areas were later investigated for habitat characteristics.

Dens were located by keeping regular notice on the movement of the pack during December to January. Once a den or rendezvous site was located, care was taken not to disturb wolves by not going close to them at these sensitive sites.

During summer, Blackbuck are dispersed over a large area in low density, but congregate into large herds after it starts raining in June-July. Total count was done during this season because there is less chance of missing animals in the count. The Forest Department staff were also employed during these counts. Simultaneous counts were made for two consecutive days from 07:00 to 08:30 H on 15 July every year.

In different areas of the Sanctuary, elevated spots giving panoramic view of the area were selected for counting animals. The females were classified as adults and sub-adults.

The males were classified on the basis of the length of horns and pelage colour. Males with very short horns were called as yearling males (YM), males with short
horns and no spirals (M4), males with long horns with spirals and light golden pelage (M3), males with long horns having long spirals and rich brown pelage (M2), and black males with long horns and black pelage on the dorsal side (M1) in contrast to the white belly.

Open width transects, each one kilometre long were established in protected grassland plots, plantation and grazing land. The animals on either side of the transect line were counted and grouped into different age and sex classes. The sighting distance for each encounter was recorded. For a group of animals and large herds, distance upto the centre of the herd was measured. The animals that just ran away after starting transect count were also included in the census. On each transect census was done fortnightly.

During young stage, sex identification of juvenile females and males without spikes was difficult but after two years of age, coat colour in males turns darker from the cream colour of females, which goes on increasing in intensity and later becomes rich brown and finally dark black in adult males. In larger moving herds with individuals very close to each other, it was not possible to identify the above mentioned classes both in males and females. During such occasions, the animals were classified as adults and subadults in either of the sexes.

Density/km² in different habitats were computed by using the following formula:
\[ D = \frac{n}{2l} \times w \]

where \( l \) is the length of the transect trail,
\( n \) is the total number of individuals encountered during the census, and \( w \) is the sighting distance.

Every month general field notes on counts of Blackbuck with parameters such as herd-size, age and sex class in each kind of habitat in different parts of the Sanctuary were taken. The groups having individuals more than 20 were referred to as large herds and those having less than 20 animals as small herds. The data was grouped seasonally, and analysed for changes in the herd-size.