

## **CHAPTER - 3: METHODOLOGY**

### **3.1. Introduction**

Conservation priorities and strategies are based upon understanding and assessments of general ecology of the concerned species. Mammalian carnivore study interest dates back to the origin of humans. Snow leopards in particular have not been well studied due to their inhospitable terrain and challenging climatic conditions where they are found. With a limitation of literature on snow leopard research, the present study was aimed at assessing the conservation status and distribution of snow leopard and towards mitigation of snow leopard-human conflicts in the unexplored areas of western Himalaya using basic techniques.

Due to remote, steep and rugged high altitude areas, infrastructure is poor in most of the Trans-Himalaya of these three states therefore, all field activities were carried out in the form of field surveys and involved camping in different areas (above 3000 m) of Kargil, Himachal Pradesh and Uttarakhand, one field survey was usually 05-20 days.

#### **3.1.1. Study Period**

The present study was initiated in April, 2008 with an aim to identify potential snow leopard habitats in the Western Himalaya. Field work in Uttarakhand and Himachal Pradesh was conducted from April to November, 2008 and Kargil work was conducted from April, 2009 to December, 2012 (Data could not be collected in 2010 due to natural disaster, heavy cloud burst in Ladakh). The study area was divided into extensive and intensive study sites based on available resources and primarily surveyed for snow leopard signs, co-predators and prey species and interface with human. Based on the literature review and the prior knowledge of the experts, sites were identified for conducting sign surveys which were followed by interventions towards mitigation of snow leopard-human conflicts in Kargil, Jammu and Kashmir.

#### **3.1.2. Equipment Used**

Basic equipment were used during the study e.g. Garmin GPS-72 GPS (for the locations and navigation) was used to record the location of direct and indirect evidence of target animals, villages, kills, starting and ending points of trails. Suunto Vector was used to record temperature, elevation and compass purposes. Nikon 8X50

binocular and Nikon 8309 Prostaff Spotting Scope 16X-48X-65 MM 25X Angled Eye Piece were used for scanning landscapes, observing animals during vantage sampling. Bushnell Sport 850 4x 20mm laser rangefinder was used to measure distance during sampling. A digital camera of Panasonic Lumix FZ200 was used to take photographs of animals, landscapes, indirect evidence and other associated objects.

### **3.1.3. Field Work Schedule**

The entire (intensive) study area, Kargil (1000 km<sup>2</sup>) was systematically covered once in two months during the study period. Each trail and vantage point were monitored once in two months for signs and sightings. Trail monitoring and scan sampling was done in the mornings. Extensive study sites, Uttarakhand and Himachal Pradesh were surveyed once and all the data was collected in single time efforts. For snow leopard – human interaction assessment questionnaire surveys were carried out in both intensive (Kargil) and extensive (Uttarakhand and Himachal Pradesh) study sites.

### **3.2. To Determine Conservation Status and Distribution of Snow leopard and Co-Predators**

Snow leopard Information Management System (SLIMS) developed by Jackson and Hunter (1996) and further refined by McCarthy et al. (2008), a standardized approach widely used in snow leopard research, were followed to determine occurrence and distribution of snow leopard, co-predators and their prey. SLIMS are designed for ease-of-use, presence-absence surveys are a scientifically valid approach to determine the general status of snow leopards in broad geographic areas. Assuming it is impossible (or at least impractical) to survey entire regions, the surveys rely upon the presence of snow leopard sign at strategic search locations.

### **3.3. To Assess Occurrence and Estimate Density of Prey Species**

Population distribution and behaviour of prey influence the quality of a predator's habitat and the health of predator populations. Therefore, knowledge about the prey species of any predator is a must to understand the ecology of the predator. As the area is undulating in nature, to ensure uniform coverage of the entire study area, vantage points were selected to estimate abundance of prey species (Chundawat, 1992; Bhatnagar, 1997; Namgail, 2006; Namgail et al., 2004; Ale, 2007 and Suryawanshi et. al., 2012). In addition, observations were recorded while surveying

trails/transects. This helped in gathering information about group size of ungulates, preferred habitats and support sign – survey dataset.

#### **3.4. To Assess Food Habits of Snow leopard**

During the study period, scats were collected on all trails/transects and opportunistically wherever they were encountered. Random searches were also carried out on trails (Anwar et al., 2011). Food habits were investigated after species identification using DNA based analysis (Janecka et al., 2008; Karmacharya et al., 2011).

#### **3.5. To Assess Snow leopard-Human Conflicts**

The increasing interface between humans and large carnivores is resulting in a world-wide escalation of large carnivore-human conflicts (Madhusudan and Mishra,2003; Treves and Karanth,2003; Maheshwari et al., 2014). Carnivores often cause serious economic losses. Livestock depredation by snow leopard has been reported throughout its range (Bhatnagar et al.,1999; Hussain, 2003; Oli et al.,1994; Jackson and Hunter,1996; Mishra, 1997; Jaypal, 2000; Jackson et al.,2003; Sathyakumar and Qureshi, 2002;Maheshwari et. al., 2010a and b;Li et al.,2013; Suryawanshi et al., 2013; Sathyakumar et al., 2016). Inadequate understanding of ecological and social issues of such conflicts makes the resolution of such conflicts more critical. Keeping this in view, information gathering of snow leopard-human conflicts was made an integral component of the study.

**Plate 3a: Field work in the form of expeditions.**



**Plate 3b: Camping site in the snow leopard habitat in Uttarakhand.**

