An Ecological Study of Pastoralism in the Khangchendzonga National Park, West Sikkim

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The Mountain Institute

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Executive Summary

This study is an attempt to address the concerns raised about the sustainability of pastoralism and its peaceful coexistence with wildlife in the third highest mountain ecosystem of the world – "The Khangchendzonga". Located in the Eastern Himalayas, and spanning varying ecozones from sub-tropical to arctic (2020 – 8598 meters) it is the most significant biodiversity hotspot of India. Guru Padma Sambhava, who is worshipped by the Sikkimese Buddhists, is considered to have blessed this landscape and Mt. Khangchendzonga is revered as the guardian deity of the region.

The rich ethnic mix of the local communities residing adjacent to the Khangchendzonga National Park gives rise to a diverse assemblage of livestock including sheep, cows, buffaloes, yak, yak hybrids and pack animals and their associated pastoral systems. Data were collected by conducting interviews, village meetings, remote sensing and habitat surveys in the alpine pastures. These data were analyzed to model the diverse pastoral systems using the six dimensions of social, cultural, ecological, economical, political and legal sustainability. Based on the outputs of this six dimensional modeling a pastoral management plan has been prepared which proposes a phased removal of the yak and female yak herders, allow regulated herding of the sheep and pack animals and also deliberates on the diverse strategy to achieve the same. This study reconfirms the fact that eco-friendly options are equitable and also make good business sense in the long run.

Also during the course of the study critical habitats of Blue Sheep, Musk Deer and Medicinal Plants were identified and demarcated. In order to provide livelihood options to the villagers living in the remote villages adjacent to the National Park, 3 new trekking trails and 27 camping sites were designated. In order to reduce the impacts of trekking, the code of conduct for tourism was also given a legal basis with the preparation of the Sikkim Wildlife Trekking Regulations.

In an increasing democratized world where restoring wilderness to wild lands does not make good political sense, the results of this case study demonstrate the importance of a strong political will for nature conservation. This study tries to bring about a better understanding of the ecology of the alpine landscape and the dynamics of pastoralism to ensure effective conservation management of these unique and fragile mountain environments.

Since this study is being conducted jointly in partnership with the Forest Department and local NGOs, the implementation of the research findings are already underway through policy changes and action on the ground. All this has resulted in the study actually resulting in conservation action.

Chapter 1 Background

"An Ecological Study of Pastoralism in the Khangchendzonga National Park, West Sikkim" is an initiative of the Indo Swiss Project Sikkim (ISPS), Animal Husbandry, Livestock, Fisheries and Veterinary Services Department (AHLFVS), Forest, Environment and Wildlife Management Department and The Mountain Institute – India (TMI-India).

The Khangchendzonga National Park is the highest ecosystem in the country and the third highest in the world. It was carved out of notified Reserve Forests in 1977 and has a total area of 1784 sq. km. It has an altitudinal variation of 2020m – 8598m and the climate is characterized by a long monsoon followed by a long winter. This is the land blessed by the second Buddha – Guru Padmasambhava and is revered as a sacred landscape by all.

In montane ecosystems the villagers practice a mixed livelihood strategy earning their income from agriculture, horticulture, animal husbandry and other tertiary occupations. Livestock such as yak, sheep buffalo, cow and goats have been grazing in the forests and alpine meadows of the state. Hence during the beginning of the twentieth century when the forests of the state were demarcated, the *khasmahal* and *goucharan* forests were specifically set aside to meet the fodder and firewood demands of the villagers. However with increasing human and livestock population these forests were no longer able to meet the demands of the villagers. Hence even fodder resources of the Reserve Forests were utilized to meet the growing demands of this increasing livestock population.

Subsequently in 1996 the State Government in order to reduce this degradation banned the practice of open grazing in the Reserve Forests of South and West Sikkim. As a consequence of this ban, open grazing of cattle reduced considerably and more than 10,000 cattle and 500 herders were phased off from the sub tropical and temperate forests by 2003. However the numbers of yaks and sheep in the temperate and alpine forests reduced only to a limited extent. These ex cattle herders subsequently pressurized the Forest Department as to why it was going slow on the eviction of yaks in the alpine forests. Subsequently in 2004 there was a conflict between the yak herders and the Forest Department when their eviction was initiated.

The genesis of this study lies in this conflict, wherein it was realized that a sound understanding of the ecology of the temperate forests and alpine meadows and the impacts of pastoralism was needed to ensure effective management of these unique and fragile environments. It is with this objective that the present research study titled "An ecological study of pastoralism in the Khangchendzonga National Park, West Sikkim" was conducted by The Mountain Institute with Mr. Sandeep Tambe as the Principal Investigator.

The vision of the study is to provide a scientific basis for the long term conservation of both biodiversity and the related livelihoods of the alpine landscape to promote sustainable development in the state. A win-win situation wherein both nature, culture and the livelihoods of the people is conserved.

Process or Methodology

Admiring Giant Rhubarb

Team Camping at Areylungchok

Collecting soil samples for analysis

Habitat Sampling

Fodder and Soil Samples for analysis

Collecting fodder plant samples for analysis

Pellets, Scats and Droppings being analysed at the Wildlife Institute of India

Nutrient Analysis of Fodder Plants being carried out at Wildlife Institute of India

Collection of Herbarium Specimens

Scaling the Narsing Glacier at 14,000 feet

Collecting Musk Deer Pellets at Areylungchok

Field Survey Team Members

Preparing Leech Repellent Paste from *Timbur*

Photo Documentation of Biodiversity

Chapter 2 Introduction

Introduction

Sikkim is a small mountainous state in the Eastern Himalayas extending approximately 114 km from north to south and 64 km from east to west and having a total geographical area of 7096 sq km. It is a multi-ethnic state, broadly the population can be divided into Tribal and Non-Tribal groups. There are 166 Panchayats and 453 Revenue Blocks, 4 districts, which comprise of 32 Assembly Constituencies. As per the 2001 census of India, the total population of the state is 5,40,493, whereas in 1991 it was 4,06,457 only. Decadal population growth has gone up for 1991-01 to 32.98% as in 1981-91 it was only 28.47%. The overall density of population in the state is 76 per sq. km.

A total of 5,064 households, with a total population of 21,888 (2001 Census of India) of which about 75% are tribals, live adjacent to the Khangchendzonga National Park. The villages are located in the altitude zone of 5000 – 9000 feet in West and North Sikkim.

Objectives of the Study

1. To delineate the broad habitat types within the temperate and alpine zones
2. To characterize the vegetation within various habitat types and use by major faunal groups
3. To assess the habitat condition with respect to biotic pressure
4. Work in partnerships to build local human capacity in the fields of vegetation survey, systematic botany, remote sensing and GIS

Questions for the Study

1. What are the distinct habitat types within each ecological zone?
2. What is the relative extent of each category?
3. Current use of forest resources and their impact?
4. Which habitats had maximum biotic pressure and wildlife use?
5. What are the key forage species available during lean season for domestic and wild ungulates?
6. What is the nutrient availability in the top 5 Graminoid species?
7. Which are the sensitive ecological zones?
8. What is the Economics of the pastoralism enterprise?
9. What is the Local people's perception for the long-term conservation of the habitats?

Study Area

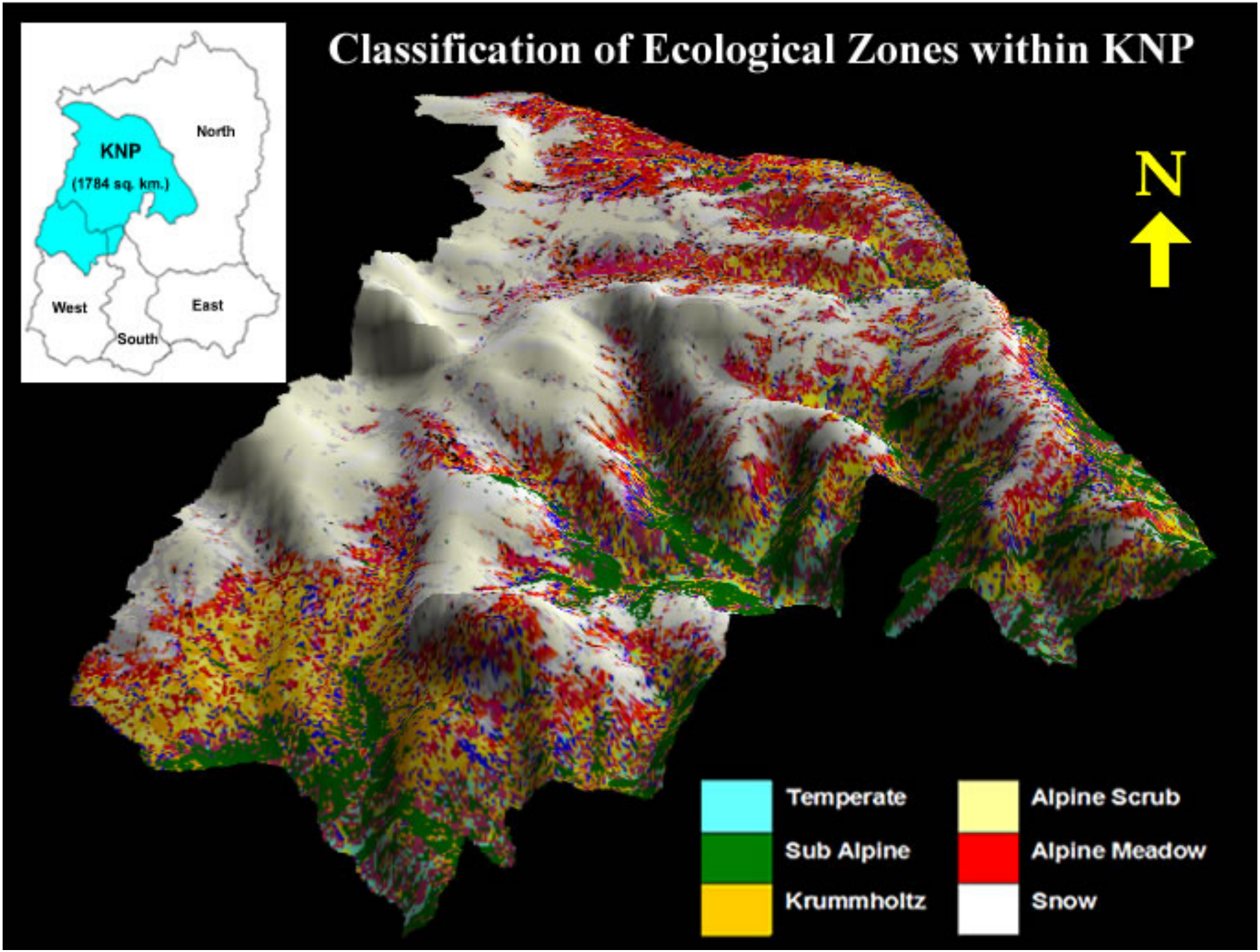
Temperate and Alpine Forests of the Khangchendzonga National Park, West Sikkim

Process or Methodology

The Mountain Institute functions as a bridge between the villagers, NGOs, the Forest Department and the Government of Sikkim. Together they are working towards reducing the threats to wildlife and its habitat from unregulated pastoralism, unplanned tourism and poaching, promoting sustainable livelihoods, institutionalizing people's participation in conservation and advocating for policy changes in the Khangchendzonga Landscape.

This study is an applied, action research and the dream is to not only prepare, but also to simultaneously implement the conservation management plan. The Investigator had the triple advantage of getting scientific support for the research from the Wildlife Institute of India, having the mandate from the Forest Department to mould the research findings into enabling policy changes and then actually implementing these on the ground in partnerships with forest field staff, local NGOs, tourism field staff, JFMCs and EDCs.

1. We used a combination of remote sensing data and Survey of India toposheets to categorize various ecological zones. Existing trails were used to verify the habitat types and vegetation communities within.
2. Assistance was taken from a group of local resource persons having experience of sheep herding, yak herding, local NGOs, trekking support staff and wildlife staff.
3. The survey route was decided in such a way that it covered the seasonal livestock camps, tourist camps, core area of KBR, wetlands, traditional grazed pastures, traditionally ungrazed pastures, glaciated and non-glaciated valleys.
4. We stopped at regular intervals along the survey route to delineate distinct habitat types, followed by assessment of vegetation composition and past and present grazing patterns and threats if any. For quantification of vegetation in each habitat, we used random square quadrates of 1m x 1m for herbaceous ground flora and 5m x 5m for alpine scrub and 10m x 10m for sub alpine forest.
5. Soil samples in important ecological zones, plant specimens for un-identified taxa for herbarium preparation and later identification, samples of important fodder species for nutrient analysis and pellets, scats and droppings of wildlife were collected. These were sent to Wildlife Institute of India, Government of India, Dehradun for analysis.
6. Interaction workshops with the local community at Yuksam and Labdang were held to discuss the recommendations in detail and take their feedback and suggestions.
7. Audio visual documentation of the whole process was also carried out.
8. A total of 4 treks (spanning 41 days) were conducted to survey the temperate and alpine habitats at an average altitude of 14,000 feet. Vegetation data was collected from a total of 40 sample sites (10 plots each).
9. Also 7 advocacy presentations to community leaders, NGOs and policy makers and 6 press releases in the local newspapers were given for wider dissemination.
10. The findings of this study were framed in the format of a government notification and the processing of the same for government approval was also facilitated.


Classification of Ecological Zones within KNP
KNP
(1784 sq. km.)
North
West
East
South
N
Temperate
Sub Alpine
Krummholtz
Alpine Scrub
Alpine Meadow
Snow

Wildlife Habitats


Temperate Oak Forest


Sub Alpine Fir Forest


Rhododendron Thicket


Juniper Scrub


Rhododendron Scrub


Herbaceous Meadow


Marsh Meadow


Kobresia Sedge Meadow


Morainic Environs


Rock and Cliff


Riverine

Yak Grazing Sensitive Plants


Allium prattii (Dandu)


Kobresia duthiei (Bhalu buki)


Pleurospermum sp. (Seto cheeru)


Pleurospermum sp. (Shyamphul)


Heracleum sp. (Ganer)


Saussurea bracteata (Thulo dudhe jhaar)

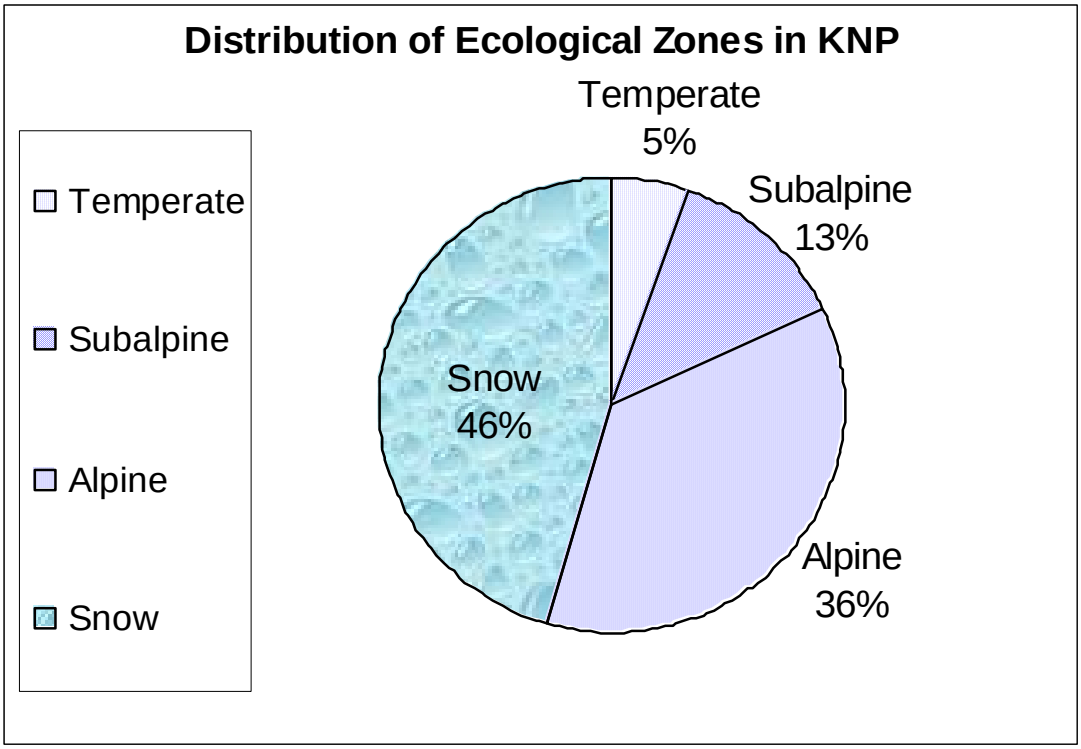

Selenium tenuifolium (Cheeru)

Chapter 3 Habitat Study

Habitat: The term habitat is referred to in this report to mean broad category of landscape units with distinct sets of floral and faunal assemblages, which could serve as a unit for conservation management. e.g. the zone between natural tree line and alpine scrub indicates a zone of stunted rhododendron forest (Krummholtz) which supports certain faunal groups such as Himalayan Musk Deer and Blood Pheasant. It also represents a transition zone between subalpine and alpine habitats with significant ecological functions.

Broad Habitat Types: The major habitat types are determined by altitude and rainfall and also terrain features like aspect, slope and exposure. These elaborate transformation of these landscape units one after the other can be observed along a linear transect upstream up to the glacier and also the telescoping of these landscapes units can be seen as one ascends the ridges and mountain tops. Minor landscape types like marsh meadows, sandy lake bed, river courses etc are determined by their proximity to drainage features likes lakes and rivers.

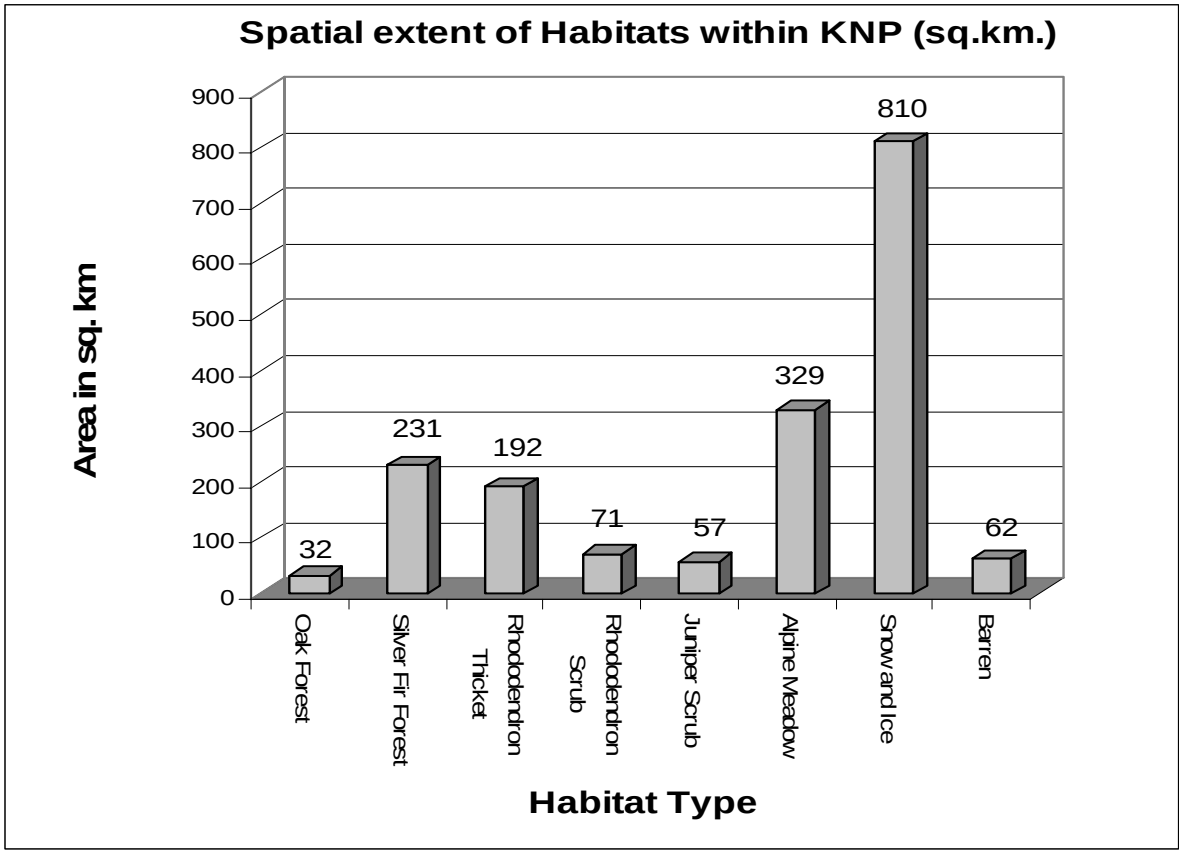
Based on Remote Sensing and SOI toposheets and earlier experience of team members the following habitat types were delineated:Temperate forests adjacent to villages: This includes the secondary scrub around villages, cardamom plantations, livestock camping grounds and forest from where NTFP's and bamboo is extracted, Mixed Oak Forest, Hemlock Forest, Sub Alpine Silver Fir Forest, Rhododendron Thicket, (Krummholtz Zone), Alpine Scrub, Alpine Meadows, High Altitude Lakes, Moranic Environs, Inaccessible rocky and cliff areas, Riverine Habitats and Special Habitats (Caves, Tallus, Big bouldery areas etc)

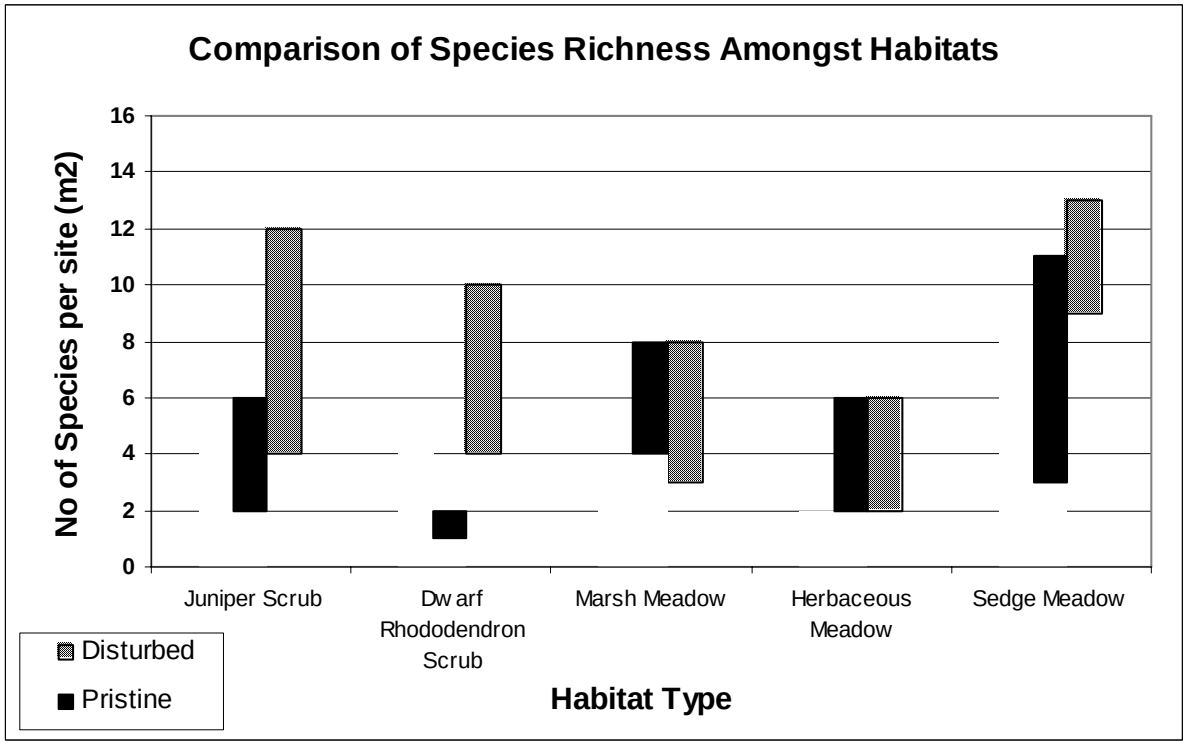


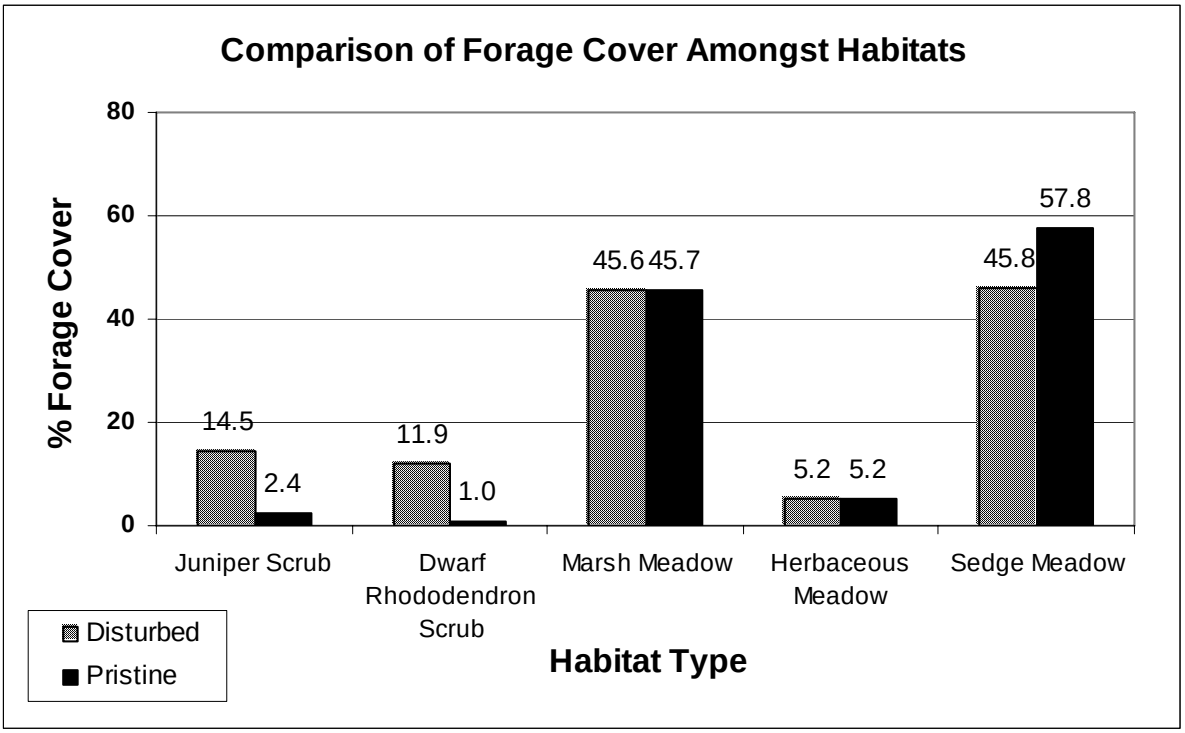
Broad Habitat Types						
Ecological Zone	**Broad Habitat Types**	**Terrain Features**	**Vegetation Communities**	**Dominant Species**	**Biotic Pressure**	**Wildlife Use**
Temperate	**Temperate Broadleaf Forest**	1700m – 2600m	Evergreen Oak Forest	*Quercus pachyphylla, Quercus lamellosa, Acer sp.*, Dwarf bamboo, *Rhododendron grande, Machilus sp.*	Trekking, Seasonal herders camp	Red Panda, Satyr Tragopan, Himalayan Black Bear, Goral, Cuckoo, Owls
Temperate	**Temperate Conifer Forest**	2800m – 3300m	Hemlock Forest	*Tsuga dumosa, Rhododendron falconeri, Quercus pachyphylla, Acer sp.*, Dwarf bamboo	Trekking, Seasonal herders camp	Red Panda, Satyr Tragopan, Himalayan Black Bear, Goral, Serow, Yellow Throated Marten
Sub Alpine	**Sub Alpine Forest**	3100m – 3800m	Abies – Rhododendron forest	*Abies densa, Rhododendron hodgsonii, R. cinnabarinum, R. Thompsonii, R. barbatum, Sorbus foliolosa, Betula utilis, Prunus cornuta*	Firewood collection especially of Rhododendron by herders and trekking support staff.	Musk Deer, Himalayan Tahr, Serow, Satyr Tragopan, Himalayan Monal, Yellow Throated Marten
Alpine	**Rhododendron Thicket (Krummholtz)**	3600m – 4200m	*Rhododendron wightii – R. fulgens, Rhododendron lanatum, Rhododendron campanulatum*	*Rhododendron wightii, R. fulgens, Rhododendron lanatum, Rhododendron campanulatum*	Firewood collection especially of Rhododendron by herders and trekking support staff.	Musk Deer, Himalayan Tahr, Blood Pheasant, Satyr Tragopan, Himalayan Monal

Alpine	**Alpine Scrub**	3700m – 4400m North and West Aspect	Juniper Scrub	*Juniperus recurva, Juniperus indica, Rhododendron lepidotum*	Firewood collection especially of Juniper by herders and trekking support staff, Collection of branches for incense, grazing by herders and setting fire to large patches with an intention to increase fodder availability	Blue Sheep, Himalayan Tahr, Musk Deer, Voles, Himalayan Monal, Red Fox
		3900m – 4400m South and East aspect	Dwarf Rhododendron Scrub	*Rhododendron anthopogon, R. setosum, R. lepidotum*	Firewood collection by herders and trekking support staff	Nesting habitat for birds like Finches, Pipits, Accentors etc
Alpine	**Alpine Meadow**	4300m – 4700m Lake basin, River courses	*Deschampsia* Marsh Meadow	*Deschampsia cespitosa* (Chamrey)	Camping by Trekkers and disposal of solid waste (garbage) also sacred sites for pilgrimage	Blue Sheep Snow Partridge, Himalayan Monal, Accentors, Pipits, Grandala, Snow Leopard, Snow Partridge and Snow Cock
		4300m – 4700m	Mixed Herbaceous Meadow	*Potentilla peduncularis* (Namle Jhaar)	Heavy grazing and trampling by yaks and sheep	
		4300m – 4800m	*Kobresia* Sedge Meadow	*Kobresia capillifolia* (Sun buki), *Carex nigra* (Harkat), *Festuca valesiaca* (Rani buki)		

Alpine	**Moranic Environs**	4200m – 4800m Glaciated Valleys along lateral and terminal moraines	*Potentilla fruticosa* and *Rhododendron lepidotum*	*Potentilla fruticosa, Rhododendron lepidotum, Kobresia capillifolia, Bistorta vaccinifolium*	Moderate grazing and trampling by yaks and sheep	Blue Sheep Snow Partridge, Himalayan Monal, Accentors, Pipits, Grandala, Snow Partridge, Snow Cock, Snow Leopard, Pika
Alpine	**Rocks and Cliffs**		Sparse vegetation	Mostly mosses, lichens, *Kobresia capillifolia, Juncus sp.*	Nil	Golden eagle, Choughs, Buzzards, Rock chats, Thrushes, Snow pigeon, Snow Partridge, Snow Cock, Blue Sheep during summer
	Riverine	Adjacent to river course	Willow Thicket on banks, *Myricaria* Scrub on River Bed and Mosses and Lichen on rock	*Salix sikkimensis, Sorbus sp., Myricaria rosea, Oxyria digyna, Epilobium wallichianum, Polygonum sp.*	Camping by tourists resulting in spread of garbage and human excreta	Thrushes, Blood Pheasant, White capped Redstart, White Throated Dipper
	Special Habitats		Caves, Caverns, Den trees, Snag, Rocky Overhands, Crevices	*Kobresia Kobresia capillifolia* (Sun buki), *Carex sp., Juncus sp.*	Camping by trekking support staff, poachers, sheep herders and sacred sites for pilgrimage	Himalayan Black Bear, Red Fox, Pika and shelter during inclement weather for Blue Sheep


Spatial extent of Habitats within KNP (sq.km.)
Area in sq. km
900
800
700
600
500
400
300
200
100
0
32
231
192
71
57
329
810
62
Oak Forest
Silver Fir Forest
Rhododendron Thicket
Rhododendron Scrub
Juniper Scrub
Alpine Meadow
Snow and Ice
Barren
Habitat Type


Comparison of Species Richness Amongst Habitats
No of Species per site (m2)
16
14
12
10
8
6
4
2
0
Juniper Scrub
Dwarf Rhododendron Scrub
Marsh Meadow
Herbaceous Meadow
Sedge Meadow
Disturbed
Pristine
Habitat Type



The species richness increases with disturbance especially in scrub habitats, however the proportional increase in fodder availability is substantially less. In terms of fodder quality, the Sedge and Marsh Meadow are the only habitats with adequate forage cover. However due to heavy snowfall these alpine habitats are not accessible during peak winter.

Pastoral Systems

Yak herding

Yaks

Sheep Herding

Flock of Sheep

Dzo

Herd of Dzo

Important Fodder Plants

Kobresia capillifolia
(Sun buki)

Festuca valesiac
(Rani buki)

Kobresia duthiei
(Bhalu buki)

Kobresia sp.
(Ghodey Buki)

Rheum acuminatum (Khokim)

Heracleum sp. (Ganer)

Selenium tenuifolium (Cheeru)

Pleurospermum sp. (Shyamphul)

Myrsine africana (Kurkure)

Rubus paniculata
(Kanre Lahara, Teen Patey)

Polygonum polystachyum
(Rani Thotney)

Threats and Impacts

Profuse regeneration of *Picrrorhiza kurrooa* (*Kurki*) near the drying kilns (*Bhattis*) at Pairey Jhareni

Poisoned Himalayan Griffon Vulture at Yambong

Solid waste (Garbage) from Trekkers

Snare for Musk Deer above Rungdung

Snare for Blue Sheep at Yangze

Status of Sub Alpine Pastures at Yambung

Status of Yak Winter Pastures at Naya Patal

Fire burnt Juniper Scrub Habitat at Chonrigang

Demand for *Rhododendron* Firewood by Herders

Camping next to Samiti Lake (Sungmoteng Tsho)

Chapter 4: Evolution and Sustainability of Pastoral Systems

Sheep Herding *(Banpala sheep)*
The semi-nomadic shepherds mostly Gurungs have been following this traditional livelihood since ages. Sheep is raised mainly for wool and meat. The wool from the indigenous breed of sheep known as *Banpala* is woven into *Bhurkasan* (mattress), *Radi* (blanket) and *Lukuni* (jacket) using the traditional handlooms and Majito *(Rubia cordifolia)* as the natural dye. The male sheep are slaughtered for meat in religious ceremonies and social functions.

In late spring the sheep herders used to migrate (*umbole*) to the high altitude pastures and return (*undole*) to their villages by late autumn. The sheep herders have tremendous traditional knowledge of the alpine flora and fauna. During summer these herds reach out to the alpine pastures, and the caretaker stays in flimsy makeshift sheds made of plastic and poles. The sheep are grazed in the adjoining meadows every morning and return before sunset. *Heracleum* (Ganer), *Allium prattii* (Dandu), *Selenium tenuifolium* (Cheeru), *Kobresia capillifolia* (Sun buki), *Deschampsia cespitosa* (Chamrey), *Kobresia duthiei* (Bhalu buki) are the preferred fodder plants. Major impacts in the alpine ecoregion include poaching of globally endangered wildlife and use of Rhododendron and Juniper firewood.
The farmers who practiced mono cropping of paddy in summer then, used to invite these herders to manure their fields which were left fallow in winter. Even rations were provided by the paddy farmer and a unique symbiosis existed between the nomadic sheep herders and the sedentary paddy farmers. Sheep farmers receiving shelter, fodder and ration and the paddy farmer manure for his paddy crop.

However their numbers have shown a sharp decline over the years, due to loss of winter pastures in the form of paddy fields due to intensive farming practices (multi-cropping etc) adopted now. With this reduced access to winter pastures, the sheep herder was forced to reduce his herd size drastically. Hence these herds are nowadays forced to spend the winter in the large cardamom and fallow fields adjoining to the villages. Large Cardamom farming and trekking tourism serves as an alternate source of income for these ex-sheep herders. Presently there are 17 herder families owning about 1000 sheep from the villages of Dhoopi, Narkhola, Karjee, Yangtam, Rungdung, Chung, Melli and Sardung in West Sikkim.

Yak Herding
Yaks are exotic to the alpine meadows of West Sikkim, and prior to 1975 only the royal herd of the king (*Chogyal)* of Sikkim was there. It was only in the middle of the twentieth century that the yak herding livelihood was imported from Eastern Nepal to the pastures of the Khangchendzonga landscape. These yak herders practiced subsistence level pastoralism and also carried out trans-border trade with the remotest villages of Nepal bartering rice, salt and other rations with butter. These yak herders had a diversified livelihood strategy and soon purchased land in the remote border villages.

Yaks are raised mainly for milk and meat. The yaks are milked only once, and a better part of the day is spent in churning the milk for butter and curdling it for cheese (*Churpi*). The fresh cheese is left to dry above the community fireplace. After dehydration for a couple of months it becomes stone hard, and is then sold as hard cheese (*Supari)*. Butter and hard cheese are the two

main marketable products of this dairy trade. Impacts in the alpine ecoregion include use of Rhododendron and Juniper firewood in large quantities, poaching of wildlife, smuggling of endangered medicinal plants like *kurki, jatamanshi, bikh etc* for trade, trampling by yaks causing landslides, presence of ferocious dog disturbing ground nesting birds and smaller mammals.

They use the alpine pastures for 6 months and artificial temperate pastures for the remaining 6 months. By late autumn the yak herds start migrating down and cross the high altitude passes to reach the safety of the sub-alpine and temperate pastures. Once these passes get snowed, it is difficult to cross over and ascertain the well being of the herds. The yak herds take over the temperate pastures which were earlier vacated by the cattle and yak hybrids during their down migration. The winter pastures for the yaks are mostly the Sub Alpine Fir and Temperate Oak forests. These exist in the Singalila Range at Kalijhaar, Gosha, Chewa Bhanjyang, Phalut, Singalila etc and the oak forests at Nayapatal, Deoningaley Dhaap. Due to a scarcity of ground forage during this time, heavy lopping of fodder trees is done. Also feed supplementation with concentrates is done selectively for the milking animals.

With the merger of Sikkim into India, developmental activities accelerated and opened new opportunities for contractors and builders in infrastructure development projects. They hired caretakers who tended to their livestock in the tough alpine terrain while they took advantage of this new opportunity being the only creditors in these remote border villages. Soon some of them purchased land in the adjoining towns to gain access to better education, health and communication facilities, joining the mainstream and leaving the traditional farmers and sheep herders with their subsistence livelihoods far behind.

With globalizations and better communication in the 1980's, there was a bigger market for dairy products extending beyond the borders of Sikkim, in to Darjeeling district of West Bengal. Other than butter even "hard cheese" found a ready market now, making the dairy business very profitable. Soon some of the yak herders started playing an active role in village and state level politics and became quite influential.

Subsistence levels of pastoralism with many herders owning few yaks is giving way to commercial ranching with few herders owning large herds of yaks. Numbers have started declining only recently with law enforcement by the Forest Department. Presently there are 20 herder families owning about 1,081 yaks from the villages of Chongri, Uttarey, Darap, Begha, Tshoka, Melli and Pelling in West Sikkim.

Pack Animals Herding (Dzo and horse)

The resultant sterile male from a cross between a male yak and a female upland cow, is the Dzo and is used as a pack animal. The first Dzo was brought from Holong in Nepal in 1971.Owing to its high utility in this terrain, they are highly prized and valued by their owners. During the long monsoon season, these Dzo's graze freely in the alpine pastures in a semi-wild state, without a caretaker. Only when the tourist season begins from September onwards, are they brought down from these heights. They are used to carry the camping gear and rations of the trek groups. Each Dzo can carry upto 60 kgs load on very steep slopes. These trekking parties comprise mostly of foreign tourists or those from West Bengal. It is the magnificent vistas of the razor-edged Singalila range, the Rhododendron flowering and the alpine flora, which draws them here. Currently there are 200 families owning 375 pack animals from the villages of Yuksam, Chung, Tshoka, Chongri, Sindrabung and Uttarey in West Sikkim.

Evolution of Pastoral Systems in the Khangchendzonga		
	Temperate and Sub Alpine Forests (2500-3500 m)	**Moist Alpine Meadows (4200– 4800 m)**
Evolutionary Status	**Summer:** Cows and Buffalos **Winter:** Light snow cover	**Summer:** Sheep **Winter:** Heavy snow cover
Present Status (2006)	**Summer:** Yak Hybrids **Winter:** Yaks	**Summer:** Yak and some Sheep **Winter:** Heavy snow cover

Trend in Livestock within KNP					
Livestock Type	**1950**	**1975**	**2000**	**2004**	**2005**
Sheep (Banpala)	11,000	12,900	2,000	1,036	1,000
Cow	100	600	100	50	45
Yak (and hybrid)	200	200	1,400	1,248	1,081
Pack Animal (Dzo and horse)	50	60	175	350	375
Total Livestock Nos.	**11,350**	**13,960**	**3,725**	**2,689**	**2,504**
Total Livestock Biomass (metric tonnes)	**261**	**380**	**239**	**211**	**193**

Sustainability of Pastoral Systems

A six dimensional model was used to study the sustainability of the various pastoral systems. The pastoral systems were ranked based on their social, cultural, economic, ecological, political and legal sustainability. The social sustainability was found out from the equity of benefit sharing. The conservation values and negative impacts on wildlife and their habitat determined the cultural sustainability. The profits or returns was an indicator of the economic sustainability, while the carrying capacity study of the pastures indicated the ecological sustainability. The state policy indicated the political sustainability and whether this livelihood was permitted under the law of the land was a measure of its legal sustainability.

Ecological Sustainability

The fodder availability for the livestock is abundant during the summer months in the alpine pastures. However it is the long harsh winter when heavy snow covers the winter pastures that really tests the resilience of the man and beast alike. Unlike in the Trans-Himalaya which is characterized by much lesser precipitation, the moist meadows of KNP receive heavy snowfall making it difficult for the livestock to access natural forage. This is the time when the herder has to dig deep into his pockets to provide supplementary feed especially to the milking animals.

This essentially means that the livestock numbers are regulated by the availability of forage and feed during the long winter months.

Stocking Density in the Alpine Meadows				
Pasture Name	**Ecoregion**	**Area (ha)**	**Livestock Units (LU)**	**Stocking Density (LU / ha)**
Yambung	Sub Alpine	1120	563	0.50
Boktok	Alpine	994	112	0.11
Pangding	Alpine	979	76	0.08
Cheur Pangsu	Alpine	1305	92	0.07
Teen Taale	Alpine	900	111	0.12
Upper Dzongri	Alpine	3876	224	0.05
Daphey Bheer	Alpine	1120	83	0.07
Thangsing	Alpine	4930	541	0.11

Yak is an animal of the cold desert (Tibet), where the alpine meadows are available throughout the year since there is very little snowfall in winter. Unlike that in West Sikkim during winter the heavy snowfall in the alpine pastures forces the yaks to the temperate forests of Oak and Silver Fir during winter. However there is hardly any natural ground fodder available in these winter pastures, forcing the herder to chop down large forested areas to promote grass growth and do extensive lopping of trees. The heavy precipitation, coupled with steep slopes and trampling by yaks (that are heavy animals) results in heavy soil erosion and within a few years the opening turns into a stone and rock desert.

Sheep Herding: The sheep herds descend down to the farmers fields during winter. So the impacts associated with the yak herding in the temperate forests during winter are not there. The perception of the villagers is that since the impacts of sheep herding is limited, if the sheep herders can be made aware to stop poaching and reduce firewood use then at the current stocking levels, this is a sustainable practice. The sheep herders with their immense traditional knowledge and regular visits to the alpine meadows can infact serve as an excellent group for possible partnership with the Forest Department to patrol and conserve these meadows. They can be trained to become a part of the "Sikkim Himal Force" and in lieu of this service towards conservation they may be allowed to graze *Banpala* sheep in the designated alpine pastures. The sheep herders can monitor the temperate and alpine forests during the monsoons.

Pack animals (dzo and horse) are a major source of livelihood for the villagers and are engaged in trekking tourism as pack animals. They can be allowed to graze in the alpine forests in lieu of the condition that they provide service in conservation by becoming a part of the "*Himal Rakshak* Force". The pack animal operators can monitor the temperate and alpine forests during

spring and autumn. Recently the numbers of pack animals, especially horses have shown a rapid increase, the villagers felt that some kind of regulation is needed to restrict their numbers and also make their ownership equitable with a ceiling on the numbers owned per family. Also the villagers were of the opinion that compared to the dzo, the horse had higher impacts, and it should not be preferred.

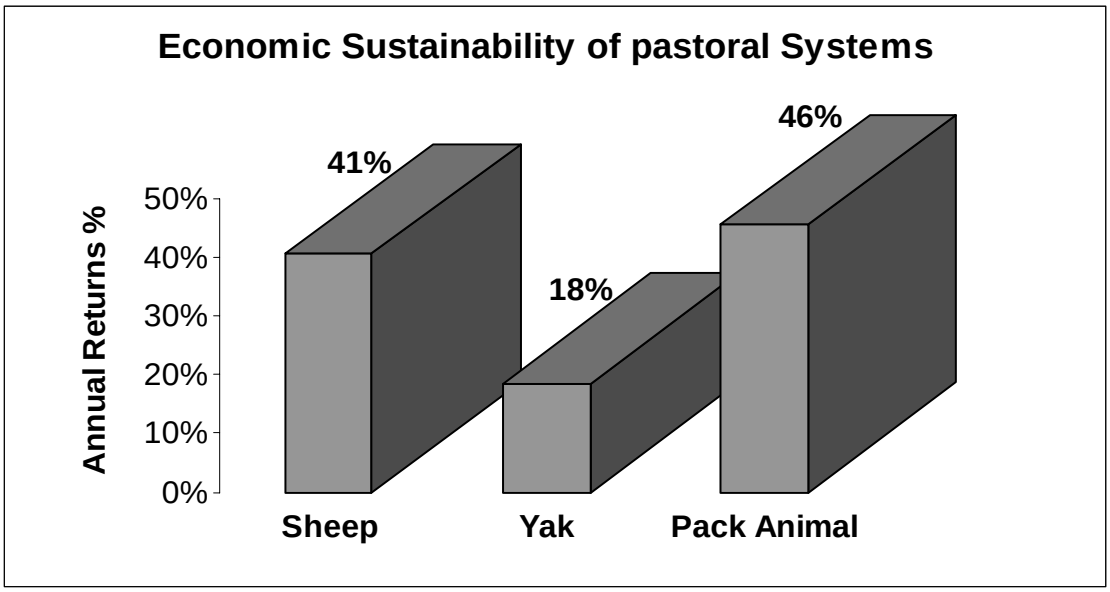
Social Sustainability			
Livestock Type	**No of Herders**	**Normalized** (Social Equity)	**Annual Profit per herder in Rs.**
Sheep	16	0.080	52,590
Yak	9	0.045	96,058
Pack Animal	200	1.000	6,840

Pairwise Ranking of Impacts on Forests and Wildlife						
	Yak Herding	**Sheep Herding**	**Firewood Collection from Forests**	**Fodder Collection from Forests**	**Hunting / Forest Fire**	**Medicinal Plant Extraction**
Yak Herding	X	Yak Herding	Yak Herding	Yak Herding	Yak Herding	Yak Herding
Sheep Herding		X	Sheep Herding	Sheep Herding	Sheep Herding	Sheep Herding
Firewood Collection			X	Firewood Collection	Firewood Collection	Firewood Collection
Fodder Collection				X	Hunting / Forest Fire	Medicinal Plant Extraction
Hunting / Forest Fire					X	Medicinal Plant Extraction
Medicinal Plant Extraction						X
Grand Total	**5**	**4**	**3**	**0**	**1**	**2**

Justification

- Yak herder and his yaks stay within the forests all around the year. They also set fire in Juniper forests, do hunting of wildlife and extraction of medicinal plants. They use enormous amounts of firewood. Though sheep herder also do hunting and medicinal plant extraction, but they do not set fire to forests and impacts of sheep is much less.

- Yaks need to evicted by the government from inside the forests. Another strategy to reduce the yak sheds is to carry out afforestation along their migration route and their *Kharkas* which will automatically reduce their numbers.



Six Dimensional Sustainability Model of Pastoral Systems							
Livestock Type	**Social**	**Cultural**	**Economic**	**Ecological**	**Policy**	**Legal**	**Relative Sustainability Index**
Sheep	0.080	-0.778	0.891	1.000	0.500	0.000	1.693
Yak	0.045	-1.000	0.406	0.000	0.000	0.000	-0.549
Pack Animal	1.000	-0.111	1.000	1.000	1.000	1.000	4.889

The model indicates that the pack animal is most sustainable followed by sheep and that yak herding is unsustainable in West Sikkim. Due to the unavailability of the natural winter pastures for the yaks in West Sikkim, large temperate forests have been degraded specially in Yambong, Chewabhanjyang, Kalijhaar, Naya Patal and Thulo Dhaap. The Yaks in Sikkim are best conserved in their natural home - the cold desert of Tso Lhamu, Muguthang and Lhasar in North Sikkim by the villagers of Lachen and Thangu. It was also found that more than the ecological carrying capacity the socio-economic issues like equity, ownership and benefit sharing were given much more importance at the village level while assessing the sustainability of the pastoral systems.

Also there is a need to have a regulation on the pack animals with a ceiling on the numbers owned per family, and only regulated grazing in select pastures should be permitted taking adequate care that the conservation zones are not impacted. The horse whose numbers have increased only lately should be slowly phased off and the Dzo preferred as a pack animal.

Important Medicinal Plants

Aconitum ferox (Bikh)

Aconitum spicatum (Bikhma)

Allium prattii (Dandu)

Bergenia purpurascens (Pakhanbhed)

Bistorta sp.(Pothi Rambu)

Lomatogonium sp. (Mahaguru)

Nardostechys grandiflora (Jatamanshi)

Orchis latifolia (Panchamle)

Anemone polyanthes (Bhutkesh)

Rheum acuminatum (Khokim)

Saussurea gossipiphora (Mykopila)

Picrorhiza kurrooa (Kurki)

Lomatogonium sp. (Sharmaguru)

Monsoon Magic (Floral Diversity)


Saussurea tridactyla (Mykopila)


Potentilla fruticosa (Simte Phool)


Cyananthus lobatus (Ghanti Phool)


Geranium donianum (Methi Phool)


Potentilla coriandrifolia


Corydalis meifolia


Lagotis cashmeriana (Gidhapankhi)


Corydalis cashmeriana


Rhododendron anthopogon (Sunpate)


Androsace sarmentosa


Spiraea arcuata (Shikre Phool)


Eriophyton wallichii (Buke Phool)


Rhodiola sp.


Rhododendron lepidotum


Meconopsis villosa (Sisney Phool)


Androsace densissima


Meconopsis horridula (Blue Poppy)


Veronica lanuginosa


Saxifraga engleriana


Anaphalis sp.

Chapter 5: Status of Temperate and Alpine Ecoregion

The temperate and alpine rangelands are called *Kharkas* by the yak herders and *Charan* by the sheep herders.

Important Fodder plants

Alpine Ecoregion

Kobresia capillifolia (Sun buki), Festuca valesiaca (Rani buki), Kobresia duthiei (Bhalu buki), Kobresia nepalensis (Thulo Sun Buki / Kesari buki), Kobresia sp. (Ghodey Buki), Juncus sp. (Suire buki), Allium prattii (Dandu), Heracleum sp. (Ganer), Selenium tenuifolium (Cheeru), Rheum acuminatum (Khokim), Carex nivalis (Dharkhare), Carex nigra (Harkat), Poa alpina (Bonchu), Phleum alpinum (Doodhe Jhar), Calamogrostis filliformis (Jou jhar), Poa sp.(Dubo), Deschampsia cespitosa (Chamrey), Pleurospermum sp. (Shyamphul) etc

Temperate and Sub Alpine Ecoregion

Heracleum sp. (Ganer), Selenium tenuifolium (Cheeru), Rubus paniculata (Kanre Lahara, Teen Patey), Myrsine africana (Kurkure), Thamnocalamus aristatus (Rato Ningalo), Khaptari, Polygonum polystachyum (Rani Thotney), Chiplay etc

Nutrient analysis of important fodder plants					July end collection		
Local Name	**Scientific Name**	**Non Detergent Fiber**	**Acid Detergent Fiber**	**Lignin**	**Ash**	**Nitrogen**	**Crude Protein**
		(NDF) %	**(ADF) %**	**%**	**%**	**N %**	**CP %**
Ganar	*Heracleum sp*	58.08	42.31	16.44	0.43	3.18	19.87
Sun Buki	*Kobresia capillifolia*	70.71	32.86	8.25	0.28	3.04	18.99
Rani Thotney	*Polygonum polystachyum*	38.48	34.15	19.83	0.26	2.95	18.47
Chiplay		24.94	33.96	17.25	1.53	2.81	17.59
Rato Ningalo (Dwarf bamboo)	*Thamnocalamus aristatus*	15.26	36.63	9.80	1.75	2.65	16.53
Shyamful	*Pleurospermum sp.*	16.05	25.47	14.91	1.70	2.53	15.83
Cheeru	*Selenium tenuifolium*	39.82	15.20	17.75	0.28	2.53	15.83
Khokim	*Rheum acuminatum*	63.30	42.36	19.56	0.46	2.42	15.13
Bhalu Buki	*Kobresia duthiei*	68.07	29.73	3.33	0.54	2.36	14.77
Karey Lahara (Teen patay)	*Rubus paniculata*	46.39	18.34	7.61	0.24	2.22	13.89
Thulo Sun Buki / Kesari buki	*Kobresia nepalensis*	67.02	31.04	3.90	1.73	2.11	13.19
Ghodey Buki	*Kobresia sp.*	67.08	32.98	22.04	1.25	2.11	13.19
Dharkharey	*Carex nivalis*	67.70	34.33	6.85	0.08	2.11	13.19
Khaptari	(Dwarf bamboo)	68.70	36.08	15.02	4.53	1.97	12.31
Suirey	*Juncus sp.*	73.04	37.00	65.19	0.08	1.86	11.61

Kurkure	*Myrsine africana*	40.39	29.24	16.12	1.93	1.86	11.61
Harkat	*Carex sp.*	69.41	32.00	7.27	0.06	1.69	10.55
Rani Buki	*Festuca valesiaca*	74.01	37.23	6.15	1.54	1.55	9.67

Important medicinal Plants

Alpine Ecoregion

Aconitum ferox (Bikh), Aconitum spicatum (Bikhma), Bistorta sp.(Pothi Rambu), Orchis latifolia (Panchamle), Picrorhiza kurrooa (Kurki), Nardostachys grandiflora (Jatamanshi), Allium prattii (Dandu), Lomatogonium sp. (Sharmaguru), Lomatogonium sp. (Mahaguru), Saussurea gossipiphora (Mykopila), Rheum acuminatum (Khokim), Bergenia purpurascens (Pakhanbhed), Anemone polyanthes (Bhutkesh), Rheum nobile (Kenjo, Padamchal) etc

Status and distribution

The range from Labdang - Kasturi Urar - Areylungchok and from Rungdung - Kasturi Urar - Relli top - Khola urar is very rich in medicinal plants, being traditionally free from yak grazing and medicinal plants collection. Other ranges in the KNP are grazed and commercial medicinal plant collection has taken place in the past.

Impacts of pastoralism

Rangeland maximizing strategy

The fact that the yak herders had in the past carried out habitat manipulation by converting various wildlife habitats like the Juniper Scrub in the alpine zone and the Oak, Hemlock and Fir forests in the temperate and sub alpine zones, into man-made pastures is an indication that there was a scarcity of ground fodder. The herders managed over stocking by converting other habitats with limited fodder availability into artificial pastures by resorting to “slash and graze” and heavy lopping to meet their fodder demand. Their strategy was to maximize the growth of fodder grasses by reducing the cover of trees, woody thickets and shrubs.

Regeneration of valuable trees

Important fodder trees like *Acer sp. (Kapase), Machilus sp. (Kawla), Litsaea sp. (Pahenle), Quercus pachyphylla (Bante), Quercus lamellosa (Buk) and Schefflera impressa (Bhalu Chinde)* in the winter meadows are so heavily lopped that they are almost branchless and have twisted, gnarled branches that do not produce fruits or seeds. This adversely affects the natural regeneration of these valuable trees.

Plants Sensitive to Yak Grazing

Annual or biannual, tall, palatable, nutrient rich herbs, which are also important food plants for mountain ungulates (e.g. Musk Deer) have become locally extinct in heavily grazed areas. Some sensitive plants found only in pastures never grazed by yaks are *Heracleum sp. (Ganer), Allium pratti (Dandu), Selenium tenuifolium (Cheeru), Kobresia duthiei (Bhalu buki), Saussurea bracteata (Thulo dudhe jhaar), Pleurospermum sp. (Seto cheeru)* and *Pleurospermum sp. (Shyamphul).*

Chapter 6: Recommendations and Government Initiatives

1. **Keep Traditionally Pristine areas out of Bounds for all Livestock**
   Accordingly 3 conservation zones have been planned:
   - Areylungchok Musk Deer Conservation Zone 27 sq. km
   - Lampokhri Medicinal Plants Conservation Zone 15 sq. km
   - Yongjethak Blue Sheep Conservation Zone 56 sq. km

2. **Evict all the Yak Herders in West Sikkim (ongoing)**
   - In 2004, 1,248 yaks (including hybrids) owned by 26 households
   - In 2005, 1,081 yaks (including hybrids) owned by 21 households

   Incase any yak herder wants to leave his yaks free inside the KNP in a wild state, then that should be permitted, provided that there is no herder associated with these yaks.

3. **Institutionalize People's Participation through *Himal Rakshaks* (Honorary Mountain Guardians)**
   - Involve pack animals owners, sheep herders, trekking support staff, ex-herders, ex-hunters, NGOs etc in conservation with duties, benefits, powers and capacity building.

4. **Initiate Community Based Trekking Ecotourism as an Alternate Livelihood for the Ex-herders**
   - Singalila Ecotourism Promotion Zone with 3 new trekking trails, 27 camping sites prepared, resulting in Rs 6 lakhs income for ex-herders at Yambong in 2005 (www.yambong.com)
   - Shift the camping site right next to Samiti Lake (Sungmoteng Tsho) to Lamune
   - Sikkim Wildlife Trekking Regulations 2005 needed to regulate the negative impacts of trekking enterprise and make the benefit sharing equitable.

State Government Initiatives (Gazette Notifications)

Based on the recommendations of this study the State Government has made the following policy changes:

- Sikkim Wildlife (Regulation of Trekking) Rules 2005 (Appendix I)
- Guidelines for the Appointment of Himal Rakshaks (Appendix II)
- Singalila Ecotourism Promotion Zone (Appendix III)
- Yongjethak Blue Sheep Conservation Zone (Appendix IV)
- Lampokhri Medicinal Plants Conservation Zone (Appendix V)
- Areylungchok Musk Deer Conservation Zone (Appendix VI)

These notifications can also be downloaded from the website: www.tmi-india.org

SIKKIM

GOVERNMENT GAZETTE

EXTRAORDINARY
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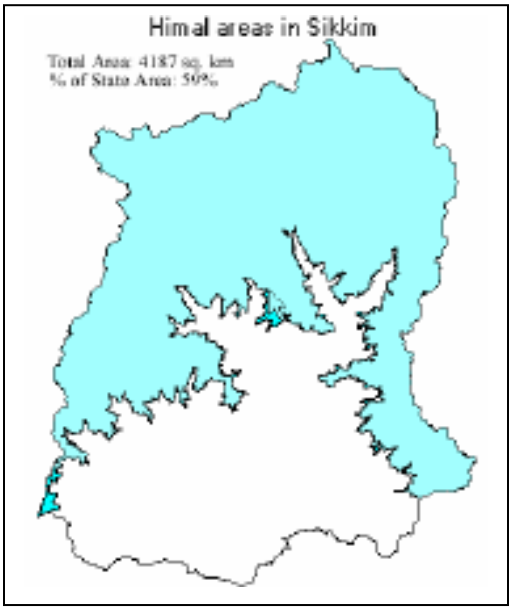
GOVERNMENT OF SIKKIM
OFFICE OF THE PCCF-cum-Secretary
Department of Forest, Environment & Wildlife Management
Forest Secretariat, Deorali, Gangtok –737102, Sikkim

No:888/FEWMD **Dated:10/02/06.**

Guidelines for the Appointment of *Himal Rakshak*

The Need:

(1) About 59% of Sikkim (4,187 sq. km) lies above 3000 meters and most of this is classified as Reserve Forests. This sub-alpine and alpine landscape of the Sikkim Himalayas locally referred to as *Himal*, has a unique ecosystem and cultural and wildlife values associated with it. It is a repository of unique, globally significant wildlife like the Snow Leopard, Musk Deer and Black Necked Crane and also provides an ideal habitat for their survival. The *Himal* also forms the headwaters of important perennial rivers and conserving this water bank is essential for the survival of thousands of villagers who live at the lower elevations. Improved ecological health of this ecosystem translates to sufficient water in the streams even in the lean season, which sustains agricultural and horticulture crops, directly translating to food and health security of the villagers living down stream. The *Himal* is also a repository of valuable medicinal plants, which form the basis for the indigenous systems of medicine. Most of the peaks, lakes, rivers and caves here are considered sacred and are visited by pilgrims to pay homage.



Present Status, Gaps and Challenges:

(2) Though most of lower and middle hill forests have been brought under the Joint Forest Management (JFMC/EDC) network, the upper hill forests of the Himalayas, inspite of determined efforts, still continue to be under inadequate management, beset with threats and need urgent interventions. The main threats being unregulated grazing, unplanned trekking tourism, hunting and trapping of wild animals, smuggling of medicinal and aromatic plants and lack of awareness amongst the security forces. Effective conservation of the *Himal* by forest staff alone is very difficult due to its high altitude, remoteness, tough terrain, harsh climate and limited resources

available. Further lack of adequate infrastructure and facilities make every patrolling visit more like an expedition, with a large contingent of support staff and resultant high attendant costs.

The Strategy:

(3) Hence it is proposed to enlist the support of the villagers, practicing traditional subsistence livelihoods in the high altitudes of the Himalayas, in conservation management. Such villagers, who are willing, shall be recognized as *Himal Rakshaks* (Honorary Mountain Guardians) and their capacity building done. This will result in a more effective, participatory "on ground" conservation of the *Himal* jointly with the Forest Department. Since it is their traditional livelihoods which compel the *Himal Rakshaks* to access the *Himal*, these livelihoods will be permitted in a regulated manner, provided they perform their duties and responsibilities.

Legal Status:

(4) Section 4(1) of the Wildlife (Protection) Act 1972 empowers the state government to appoint
   a. A Chief Wildlife Warden
   b. Wildlife Wardens
   [(bb) Honorary Wild Life Wardens]
   c. Such other officers or employees as may be necessary for the purposes of the Act. *Himal Rakshaks* can be appointed on a honorary basis, under sub-section (c) of section 4 of the Act read in conjunction with clause (b) of section 33, read with sub-section (8) of section 35 and sub-section (2) of section 36A of the Wildlife (Protection) Act, 1972 (53 of 1972). Under section 59 of the aforesaid act, such *Himal Rakshaks* shall be deemed to be public servants within the meaning of section 21 of the Indian Penal Code.

(5) The legal status, land tenure and ownership of the *Himal* shall remain unchanged.

Criteria for Selection:

(6) The following criteria should be kept in mind while assessing the suitability of a person as a *Himal Rakshak*. (a) Bonafide resident of the state of Sikkim. (a) Genuine concern for wildlife conservation. (b) Personal record free of any current involvement in any activity detrimental to the interests of nature and wildlife conservation. Any person involved in commercial exploitation of wildlife should not be considered. (c) Personally visit the *Himal* regularly in the normal course of his lifestyle (d) Willingness to render support to the official machinery. The nature of the livelihood is traditional and has been carried out since generations. (e) The livelihood is of subsistence level and for bonafide personal use and not for any commercial purpose. (f) This livelihood is the sole basis for the sustenance of the household. (g) The sensitive habitats / strict conservation zones are not disturbed. (h) Any other regulation that may be assigned by the concerned divisional forest officer or any other high authority.

Yak (and Hybrid Yak) herders from the districts of West, South and East Sikkim are not eligible for selection under this criterion, since there is no cold desert in these districts, which is the only natural home for the yak in the state.

An important point to bear in mind is the identification of *Himal* areas prone to threats or close to sanctuaries, national parks and conservation reserves. Selection of persons as *Himal Rakshak*s must be related to such high altitude problem areas because it is these areas which need priority attention and where public participation is needed most.

Procedure for Appointment, Performance Appraisal and Termination:

(7) These guidelines for the appointment of Himal Rakshaks should be approved by the State Government.

(8) When recommending any person for such appointment, the criteria laid down in paragraph 6 above must be kept in mind.

(9) It is very important that the right persons are selected for appointment as *Himal Rakshaks*. The selection process would involve an initial selection by the concerned JFMC/EDC jointly with the concerned Ward Panchayat and forwarded to the concerned Divisional Forest Officer who shall

verify whether the criteria for selection has been adhered to or not. He shall then forward the names of suitable persons to the Chief Wildlife Warden of the state for onward appointment.

(10) The appointment of any Himal Rakshak should in the first instance be generally for a period of one year. Thereafter on the recommendation of the concerned Divisional Forest Officer, it may be renewed for a period not exceeding 2-3 three years at a time.

(10) Each Himal Rakshak should be issued an identity card having his signature and photograph duly attested by the concerned divisional forest officer.

(11) The performance of the Himal Rakshaks shall be reviewed annually by the concerned divisional forest officer jointly with the concerned JFMC/EDC and the Gram Panchayat. In the absence of such appraisal, the appointment of the Himal Rakshak shall be automatically renewed for the next year.

(12) The divisional forest officer may at his/her discretion, terminate the appointment of any Himal Rakshak at any time, it he/she does not perform his duties and responsibilities or carries out any activity detrimental to the interests of nature and wildlife conservation.

Duties and Responsibilities:

(13) The main duty and responsibility of a Himal Rakshak is to assist whole heartedly in wildlife conservation work with regard to the following matters:

a. Control of poaching and clandestine trade in wild animals and products / articles thereof
b. Detection of offences under the Wildlife (Protection) Act and the rules made thereunder.
c. Preventing damage to the habitat of wildlife
d. Preventing smuggling of medicinal and aromatic plants for trade
e. Preventing instances of bio-piracy by tourists and others
f. Reducing the negative impacts from unplanned trekking tourism
g. Carrying the message of conservation to the people and enlisting their public support for nature and wildlife conservation
h. Carrying our biological surveys and monitoring
i. Render assistance to the forest personnel during their visits to the *Himal*
j. Any other matter related with the conservation of wildlife, which may be entrusted by the concerned Divisional Forest Officer.

Powers:

(14) The *Himal Rakshak* shall report to the concerned JFMC/EDC and the concerned divisional forest officer and under section 59 of aforesaid Act he/she shall be deemed to be a public servant within the meaning of section 21 of the Indian Penal Code. Protection for action taken in good faith is provided under section 60 of the Act.

(15) With a view of making the *Himal Rakshak*s useful and effective it is necessary that the following specific powers under the Wildlife (Protection) Act 1972 should be delegated to them: (a) Powers of entry, search, seizure and detention under section 50 for prevention and detection of offences under the Act.

(16) Apart from the above, the State Government may delegate any other power under the aforesaid Act, as it may consider necessary.

Benefits and Capacity Building:

(17) The Himal Rakshaks shall be permitted to continue their existing livelihood in the Himal in a regulated manner provided they perform their duties and responsibilities. The State Government is however not liable to pay any monetary remuneration to the Himal Rakshaks, in lieu of their service.

(18) The State Government should recognize outstanding work or service rendered by a Himal Rakshak. Such recognition can be by way of a letter of commendation, or a certificate signed by the Forest Minister or Forest Secretary. Cash awards could also be considered for suitable cases.

(19) The Forest Department shall in partnership with reputed NGOs and others seek to build the capacity of the Himal Rakshaks in conservation management. This would include trainings and support for collection of data in prescribed formats on status, distribution and threats to wildlife and their habitat.

Cooperation:

(20) If the circumstance warrant, the departmental staff should provide all possible help and assistance. However no staff or vehicle support can be provided to Himal Rakshaks as a matter of course.

(21) Just as it is expected that the Himal Rakshaks should assist the forest personnel, it is equally essential that the Forest Department should take all possible steps to associate the Himal Rakshaks in their work. This can be achieved best by fostering a spirit of mutual trust and confidence.

T.R. Poudyal, IFS
Principal Chief Conservator of Forests cum Secretary
Department of Forest, Env. and Wildlife Management
Government of Sikkim
File No: 250/WLC/F/05

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GOVERNMENT OF SIKKIM
Forest, Environment and Wildlife Management Department

SIKKIM WILDLIFE (REGULATION OF TREKKING) RULES, 2005

No:887/FEWMD **Dated:10.2.06.**

In exercise of the powers conferred by sub-section (1) and clause (h) of sub-section (2) of section 64, of the Wildlife (Protection) Act, 1972 (Act No. 53 of 1972), the State Government hereby makes the following rules, namely:-

1) Short title, extent and commencement

(1) These rules may be called the Sikkim Wildlife (Regulation of Trekking) Rules, 2005.
(2) They extend to the whole of the Sikkim.
(3) They shall come into force on the date of publication in the official gazette.

2) Definitions

(1) (a) **"Acts"** means the Wildlife (Protection) Act, 1972.
(b) "**biodegradable material**" includes all those materials that decompose naturally in nature, but excludes all paper products;
(c) "**compounding officer"** means the person appointed by the State Government under section 54 of this Act;
(d) "**environment"** includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property;
(e) "**environmental pollutant"** means any solid, liquid or gaseous substance in such concentrations as may be, or tend to be injurious to environment;
(f) "**environmental pollution"** means the presence in the environment of any environmental pollutant;
(g) "**wildlife area"** for the purpose of these rules means area notified as Sanctuary, National Park, Biosphere Reserve or Conservation Reserve;
(h) "**government"** means the Government of Sikkim;
(i) "**non-biodegradable material**" includes all those materials that are not biodegradable materials;
(j) **"State**" means State of Sikkim.
(k) "**trekking service provider"** includes porters, pack animal operators, cooks, guides, their assistants and all other support staff;
(l) "**trekking company"** means the person who at the time the offence or contravention was committed, was in charge of, and was responsible to the company for the conduct of the business of the company that had organized the trekking;
(m) "**trek manager"** means the trekking company that has organized the trek, or in its absence the group leader of the trekking party or in the absence of both of these, the trekker himself;

(n) **"water body"** includes lakes, ponds, rivers, streams and glaciers.

(2) Words and expressions used herein but not defined, but defined in the Act shall have the meanings respectively assigned to them in the Act.

3) Actions prohibited in wildlife area

(1) Within a wildlife area a trekker, trekking service provider or trekking company shall not:

(a) use firewood;
(b) damage or cut shrubs or thickets;
(c) dispose non-biodegradable material within wildlife area;
(d) pollute water body;
(e) collect plants or their parts;
(f) be accompanied by stray dogs or pet animals;
(g) feed, shout, tease, chase, disturb or molest wild animals;
(h) play loud music or use loud speakers;
(i) deface or damage rocks, tree trunks or government infrastructure or facilities;
(j) camp outside designated campsites;
(k) trek outside designated nature trails;
(l) defecate within 100 meters of any water body;
(m) camp within 500 meters of the periphery of any lake;
(n) cause environmental pollution;
(o) defile sites of religious and cultural significance such as sacred mountains, lakes, rocks, caves and shrines or
(p) commit any other act that may be injurious to forests, water bodies, plants, animals or disturb the natural tranquility of such sites or become a nuisance to fellow trekkers.

(2) A trek manager shall:

(a) engage trekking service providers who are genuine Sikkim subjects and possess the Certificate of Identification.
(b) engage pack animals owned by genuine Sikkim subjects who possess the Certificate of Identification
(c) provide adequate cooked food for the trekking service providers while in a wildlife area and ensure that they do not use firewood;
(d) obtain a permit and pay prescribed fees before entering a wildlife area;
(e) register at the forest/wildlife checkpost before entering a wildlife area;
(f) bury the biodegradable materials responsibly in designated sites while in a wildlife area;
(g) arrange to carry sufficient kerosene and LPG for heating and cooking purposes

(3) A trekker, trekking service provider or the trek manager shall not leave any non-biodegradable material in wildlife area during a trek, and such materials shall be declared at the forest/wildlife checkpost both before and after the trek.

(4) The pack animal operator shall arrange for fodder for the pack animals and ensure that they do not graze freely in wildlife areas.

(5) No person shall sell liquor, drugs or other intoxicants within a wildlife area.

(6) No person shall carry out any research or study within a wildlife area without the prior permission of the Government.

4) Penalties

(1) Whenever a trekker or a trekking service provider or a trekking company contravenes or attempts to contravene or abets the contravention of sub-rules 1 or 2 of Rule 3, an offence would be deemed to have been committed and the concerned trek manager shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused.

(2) Whenever a trekker or a trekking service provider or a trekking company contravenes sub-rule 3 of Rule 3, an offence would be deemed to have been committed and the concerned trek manager shall be punishable with fine which shall not be less than one thousand rupees but may extend to fifteen thousand rupees and the fine so collected shall be used to restore the wildlife area to its original state.

Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty-five thousand rupees and the concerned trekker or trekking service provider or trekking company shall be banned from trekking or organizing trekking in the wildlife areas of the State for a period of five years.

(3) Whenever any pack animal operator contravenes sub-rule 4 of Rule 3, an offence would be deemed to have been committed and the concerned pack animal operator shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused.

Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the pack animal operator and his pack animals shall be banned from entering the wildlife areas of the State for a period of five years.

(4) Whenever any person contravenes sub-rule 5 of Rule 3, an offence would be deemed to have been committed and the person shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees.

(5) Whenever any person contravenes sub-rule 6 of Rule 3, an offence would be deemed to have been committed and the person shall be punishable with a fine which shall not be less than ten thousand rupees but may extend to twenty thousand rupees and the person shall be henceforth banned from entering the wildlife areas of the state.

5) Detection of such offences

(1) Other than forest officers, the Ecodevelopment Committees (EDC), Joint Forest Management Committees (JFMC) shall be authorized to detect offences under these rules and arrest the offender if there is reason to believe that he will abscond.

(2) Any person arrested under sub-rule (1) shall be handed over forthwith to the nearest forest/wildlife office.

(3) Registered Non Governmental Organizations (NGOs) and the trekking service providers shall be authorized to detect offences and inform the nearest forest/wildlife office.

6) Reward

(1) The compounding officer may order reward to be paid to a person who renders assistance in the detection of the offence or apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money.

(2) The compounding officer may meet up the expenditure incurred for detecting the offence and apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money.

7) Rules to apply in addition to other laws

These rules shall apply in addition to the laws relating to forests, environment, wildlife and biodiversity.

T. R. Poudyal, IFS
Principal Chief Conservator of Forests –cum- Secretary
Department of Forest, Environment & Wildlife Management
Government of Sikkim
File No: 250/WLC/F/05

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GOVERNMENT OF SIKKIM
Office of the PCCF-cum-Secretary
Department of Forest, Environment and Wildlife Management
Forest Secretariat, Deorali, Gangtok –737102, Sikkim

No:892/FEWMD **Dated: 10/2/06.**

Singalila Ecotourism Promotion Zone

In exercise of the powers conferred by clause (b) of section 33, read with sub-section (8) of section 35 and sub-section (2) of section 36A of the Wildlife (Protection) Act, 1972 (53 of 1972), clause (d) of section 76 of Indian Forest Act 1927 (16 of 1927), and clause (i) of sub-section (2) of section 83 of the Sikkim Forests, Water Courses And Road Reserve (Preservation And Protection) Act, 1988 (6 of 1988), the State Government hereby makes the following notification:-

1. Background and Need

It is essential to have zonation of protected areas for their effective management. Protected Areas should be zoned according to values in smaller pockets not necessarily as large cores, but a mosaic of smaller, manageable cores, spread in an area with tempered human use. Other zones for incentive programmes such as community based ecotourism need to be defined and set aside. The smaller cores should act as 'source' populations for sustaining wildlife populations of endangered species outside.

2. Aims and Objectives

With an objective to promote sustainable community based ecotourism with minimum negative impacts and provide incentives to the local community from conservation, the Singalila ecotourism promotion zone is being defined and set aside in West Sikkim district. The Singalila ecotourism zone comprises of 4 approved treks and 27 designated camping sites.

3. Criteria for designating nature trails and camping sites

Existing nature trails and camping sites have been preferred. Three new round trekking trails Everest Singalila, Yambong Singalila and Areylungchok Dzongri are being promoted in order to reduce the impacts along the already overcrowded Khangchendzonga Base Camp trek. Camping right on the bank of high altitude lakes and in areas of critical conservation importance is to be discontinued.

4. Existing status, threats and gaps

Community based Ecotourism is an important source of seasonal income for the villagers residing in remote areas. The impacts of unmanaged tourism are accelerating the rate of destruction in areas, which were once regarded as inaccessible. The negative impacts of unplanned tourism like deforestation due to the use of firewood, unhygienic sanitation, garbage accumulation, smuggling of plants and animals have to be regulated and at the same time the benefits arising from this enterprise equitably shared. Unplanned tourism also threatens sensitive and biologically important high altitude wetlands.

Unplanned tourism related pressure on the forest in terms of the firewood used for heating and cooking purposes has been more distinctly visible at some camping places. Water runoffs along the trail due to continuous trampling by the pack animals are bringing about soil loss along the trail and in the pasturelands. Lack of proper garbage management system by the tourists, Himalayan Mountaineering Institute (HMI) trainees and their support staff in this high altitude tourist destination has led to continuous accumulation of garbage on the route up to Goecha La, HMI base camp and the surrounding sacred lake area. Another concern is the stray dogs, which accompany these trekking groups and prey on the ground nesting birds and lesser mammals. The pack animals e.g. horses, dzos and yaks used in the tourism enterprise compete with the wild herbivores for accessing the limited fodder resources in the summer pastures.

Due to the limited accommodation in the trekkers huts most of the tourists do camping in tents and toilet tents are widely used. Since campsites are not designated this has resulted in camping and setting up of toilet tents as per convenience. The porters and other support staff often defecate in the adjoining forests resulting in a spread of pollution. There is a shortage of permanent, functional, alpine toilets with running water facility in the camping sites. Also the pack animals do not have shelters at the designated camping sites.

5. Baseline Habitat Survey during the summer of 2004 and 2005

Habitat surveys were conducted during the summer of 2004 and 2005 covering the Everest Singalila Trek, Yambong Singalila Trek, Khangchendzonga Base Camp Trek and the Areylungchok Dzongri Trek. During this survey critical wildlife habitats were identified at Yongzokdrak, Lampokhri, Areylungchok, and Narsing for Blue Sheep, Medicinal Plants, Musk Deer and Himalayan Tahr respectively. Subsequently consultations with the villagers was organized at Yuksam, Nambu and Labdang based on which these trekking routes have been finalized, ensuring minimum impact to wildlife sensitive habitats and at the same time providing alternative livelihoods to the local community.

6. Boundaries

The Singalila Ecotourism Promotion Zone in West Sikkim district shall comprise of four approved treks namely Khangchendzonga Base Camp, Yambong Singalila, Areylungchok Dzongri and the Everest Singalila and comprise of the designated nature trails and designated camping sites.

7. Designated Nature Trails and Designated Campsites for ecotourism

The following treks are operational within Khangchendzonga National Park, Barsey Rhododendron Sanctuary and adjoining Reserve Forests in West Sikkim. The Khangchendzonga Base Camp is a trek operational since a long time, while the Yambong-Singalila, Everest-Singalila and Areylungchok-Dzongri are relatively new. The designated nature trail and camping sites need to be notified to ensure that the trekkers stick to the designated trails. They can switch from one trail to another only at the intersection points of the two trails. The following treks, nature trails and campsites are being notified in the Singalila Ecotourism Promotion Zone in West Sikkim.

Trek No.	Trek Name	Designated Nature trails in forest area	Designated Campsites in forest area
1	**Khangchendzonga Base Camp Trek Entry Point:** Yuksam **Exit Point:** Yuksam	Existing nature trail starting from Yuksam and passing sequentially through Sachen, Bakhim, Tshoka, Phedang, Dzongri, Doring Taar, Chonrigang, Koktshurung, Thangsing and Lamune and back Only day treks are permitted to Dzongri Top, Lampokhri (Lam Tsho), Sungmoteng Tsho (Samiti Lake) upto Teen Kune Pokhri, Tshoka to Gunsa / Jamlingang, and from Koktshurung to Phedang (lower route)	Sachen, Bakhim, Tshoka, Phedang, Dzongri, Doring Taar, Chonrigang, Koktshurung, Thangsing and Lamune
2	**Yambong-Singalila Trek Entry Point:** Nambu **Exit Point:** Yuksam And vice versa	The nature trail from Rimbi to Dechenphuk (Neytham) and from Chongri passing sequentially through Nayapatal, Lower Yambong, Upper Yambong,	Dechenphuk (Neytham),Nayapatal, Lower Yambong, Upper Yambong Gomathang,

		Daphey bheer, Gomathang, Pangding, Chonrigang and then to Dzongri where it joins the Khangchendzonga Base Camp trek Only day treks are permitted to Lachmi Pokhri	Pangding
3	**Everest – Singalila Trek Entry Point:** Hee Bermiok, Hilley, Soreng **Exit Point:** Uttarey, Nambu or Yuksam and vice versa	The nature trail from Hee Bermiok and passing sequentially through Samma Taar, Barsey, Jorbotey, Kalijhaar, Phalut, Chewabhanjyang, Chitrey, and then to Dechenphuk (Neytham) where it joins the Yambong – Singalila trek or drop down to Uttarey village The nature trail from Hilley to Barsey and from Buriakhop (Soreng) to Barsey and then joining the above trail	Hilley, Samma Taar, Barsey, Jorbotey, Kalijhaar, Phalut, Chewabhanjyang, Chitrey
4	**Areylungchok – Dzongri Trek Entry Point:** Labdang **Exit Point:** Yuksam **Only one way trek is permitted, starting from Labdang**	The nature trail from Labdang and passing sequentially through Kasturi Urar, Khola Urar / Chamrey and then to Thangsing where it joins the Khangchendzonga Base Camp trek. This trek passes through the wildlife sensitive habitats namely the Areylungchok musk deer conservation zone and the Lampokhri medicinal plants conservation zone. Pack animals (horses, dzos and yaks) are not permitted on this trek. Lighting fire or cooking food is permitted only at the designated campsites	Kasturi Urar (above Labdang) Khola Urar /Chamrey

8. Ecotourism Promotion Plan

(A) Ecotourism Promotion Initiatives

(1) Publicity of these regulations by installing adequate signages at Yuksam, Labdang, Nambu, Uttarey, Hee Bermiok, Hilley, Barsey and near the trekkers huts, camping sites and conservation area.

(2) Informing the travel agents, herders, pack animal operators, panchayats, JFMC/EDC and local NGOs about these regulations.

(3) Publicity of these regulations by taking out press release and launching a website of the forest department.

(4) Provide feedback forms and also web enabled feedback to the trekkers so that they can provide feedback on their trekking experience.

(5) Training and capacity building of travel agents, herders, panchayats, JFMC/EDC and local NGOs about these regulations.

(6) Designating the boundaries of the camping sites on the ground and providing basic amenities in the camping sites like running water, alpine toilets, kitchen cum porters barrack and pack animal shelters.

(7) These ecotourism promotion initiatives should be incorporated into the existing schemes and programmes of the Khangchendzonga National Park and Khanghendzonga Biosphere Reserve in order to provide adequate funds for implementation of this zonation and conservation management plan.

(8) The Tourism Department may also support in the promotion and development of the Singalila Ecotourism Zone in West Sikkim.

(B) Ecotourism Regulations

(1) Movement of visitors and support staff is prohibited outside the designated nature trails and designated camping sites.

(2) Lighting of fire, cooking and "hot lunch" is not permitted on day treks.

(3) Movement of pack animals (horses, dzos and yaks) is prohibited into notified conservation zones.

(4) Movement of pack animals (horses, dzos and yaks) is prohibited on day treks.

(5) The "code of conduct" or conservation code for trekking in forest areas has been notified by the State Government under the "Sikkim Wildlife (Regulation of Trekking) Rules 2005". The punishment and penalty for violation of the same has also been detailed therein.

(6) These ecotourism regulations shall be enforced by the forest officers in coordination with the Ecodevelopment and Joint Forest Management Committees.

(7) Other than forest officers, the Ecodevelopment Committees (EDC), Joint Forest Management Committees (JFMC), registered Non Governmental Organizations (NGO), Himal Rakshaks and the trekking service providers shall be authorized to detect offences under these rules and arrest the offender if there is reason to believe that he will abscond. Any person so arrested shall be handed over forthwith to the nearest forest/wildlife office.

(8) These provisions shall apply in addition to the laws relating to forests, environment, wildlife and biodiversity.

T. R. Poudyal, IFS
Principal CCF cum Forest Secretary
Department of Forest, Environment and Wildlife Management
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Department of Forest, Environment and Wildlife Management
Forest Secretariat, Deorali, Gangtok –737102, Sikkim

No: 891/FEWMD **Dated: 10/02/06.**

Yongzokdrak Blue Sheep Conservation Zone

In exercise of the powers conferred by sub-section (8) of section 35 of the Wildlife (Protection) Act, 1972 (53 of 1972) the State Government hereby makes the following notification:-

1. Background and Need

It is essential to have zonation of protected areas for their effective management. Protected Areas should be zoned according to values in smaller pockets not necessarily as large cores, but a mosaic of smaller, manageable cores, spread in an area with tempered human use. Other zones for incentive programmes such as community based ecotourism need to be defined and set aside. The smaller cores should act as 'source' populations for sustaining wildlife populations of endangered species outside.

2. Aims and Objectives

Conservation of the globally endangered Blue Sheep (*Pseudois nayur*) population – the flag ship species of the high altitude alpine ecosystem, and its habitat along with other high altitude flora, fauna, glaciers and alpine ecosystems at Yongzokdrak in West and North Sikkim by declaring 56 square kilometers of the Khangchendzonga National Park (3.14% of the total area of KNP) as the Yongzokdrak Blue Sheep Conservation Zone (YBSCZ).

3. Conservation Importance and Values

Located at the northern tip of the Onglaktang valley, due north of Sungmoteng Tsho (Samiti Lake), beyond Jemathang, one has to cross the 4800m high Gochela pass to descend into the Yongzokdrak meadows. These meadows are hidden between glaciers and form amongst the last refuge for the globally endangered Blue Sheep in West Sikkim. Yongzokdrak is the sacred rock (*Naydo*) of Sikkim (notified by the Sikkim Government) and Guru Padmasambhava meditated here on the way to Tibet. These are amongst the best summer pastures in KBR with a high abundance of nutritious fodder like *Sun buki (Kobresia capillifolia)* and *Harkat (Carex sp.).* There is abundant supply of water too, in the form of a number of small lakes. This meadow is bounded by Talung glacier towards the North, Pandim mountain towards the east, Kabur Mountain towards the west and the Forked Peak towards the South.

The presence of abundant and nutritious fodder plants coupled with abundant water availability make them the most valuable summer pastures of KNP. No wonder these meadows are packed with horses, dzos and sheep during summer. These meadows are an ideal habitat of the globally threatened Blue Sheep and other high altitude flora and fauna.

This habitat is also critical for the apex predator of the Himalayas - the snow leopard (*Uncia uncia)*, wolf (*Canis lupus),* Himalayan yellow throated marten (*Martes flavigula),* Himalayan golden eagle (*Aquila chrysaetos),* Lammergeier (*Gypaetus barbatus),* Snow partridge (*Lerwa lerwa),* Snow pigeon (*Columba leuconata),* Tibetan snowcock (*Tetragaolus tibetanus)* and others.

4. Baseline Habitat Survey during summer of 2005

Vegetation sampling was conducted during late July and August based on 10 (1 X 1 meter quadrate) sample plots with the sampling stations at Panchpokhri. This alpine landscape can be categorized as follows:

S. No.	Landscape Property	Value
1	Habitat Type	Sedge Meadow
2	Aspect	North east
3	Biotic Pressure by pack animals (horses and dzos)	Traditionally grazed by sheep and over the last ten years
4	% vegetation cover	95 %
5	% cover of palatable plants	75% dominated by *Sun buki (Kobresia capillifolia)*
6	Species richness (no of species per sample plot of $1m^2$)	7
7	Valuable fodder plants	*Sun buki (Kobresia capillifolia)* and *Harkat (Carex nivalis)*
8	Evidence of key wildlife (direct and indirect evidence)	Blue Sheep, direct sighting
9	Valuable medicinal plants	*Bhutkesh (Anemone sp.)* and *Sharmaguru (Lomatogonium sp.)*

At Samiti Lake, (Sungmteng Tsho) there is a trekkers hut of the Tourism Department. Samiti Lake and its environs are prime habitat for the blue sheep. We found about ½ kg of pellets of blue sheep right inside this trekkers hut. During inclement weather the blue sheep have been using this hut specially during the trekking off season.

In 2005 there were about 80 pack animals (Dzos and horses) and 200 sheep grazing in these rich meadows during summer. Also the survey team came across two herds of blue sheep at Chetruke and Panch Pokhri having a total population of 52, including 8 lambs in this conservation zone.

During the winter habitat survey in January 2006 the survey team came across two herds of blue sheep at Lamune and Zemathang having a total population of 50 in this conservation zone.

5. Existing legal status, threats and gaps

The Yongzokdrak Blue Sheep Conservation Zone (YBSCZ) falls within the Khangchendzonga National Park which is notified under the Wildlife Protection Act -1972 and the globally endangered Blue Sheep (*Pseudois nayur*) is the flagship species, which is protected under schedule I of Wildlife Protection Act-1972. But just assigning high legal protection status is not sufficient unless the existing threats are reduced and gaps plugged.

Many mountain ungulate populations, important prey of carnivores, are being depleted and lost due to competition with livestock, as well as hunting for meat. Overgrazing by dzo, horses and domestic sheep and presence of sheep herders during summer are the current threats from pastoralism. Overstocking rangelands with livestock is causing vegetation degradation, which threatens the sustainability of pastoral production as well as the survival of wildlife populations. There are increasing linkages between local persecution of wildlife and the larger illegal wildlife trade. Seasonally migrating livestock herds, as well as livestock imported into the region for the tourism enterprise pose a serious risk of spreading exotic diseases to wildlife. Also unplanned tourism threatens sensitive and biologically important high altitude wetlands.

During the Winter Habitat Survey conducted in January 2006, the survey team came across a trap laid for snaring blue sheep using salt as bait at Yangzee.

The impacts of these threats can be seen by observing the behaviour of Blue Sheep which have become very shy and the whole herd bolts at the slightest hint of human presence.

There are a number of glaciers originating from the Gochela, Kabur, Pandim, Narsing and Tingchen Khang. The affects of global climate change can be detected in the retreat of these glaciers, and now there are huge boulders, stones and chunks of ice along the glaciated valleys.

The glaciers have receded not only up the valley but also almost half way up the mountain face.

6. Boundaries

Declaring this area within the KNP, with the following borders as a Yongzokdrak Blue Sheep Conservation Zone

North Starts from the ridge on the northern flank of Talung glacier and continues due east along the north eastern flank of Talung glacier

East Starts from the north eastern flank of Talung glacier and continues along the ridge westwards till it reaches the Gochela pass from where it proceeds due south along the ridge trekking trail above Gochela pokhri, Jemathang, Teen kune Pokhri till it reaches Sungmoteng Tsho (Samiti Lake)

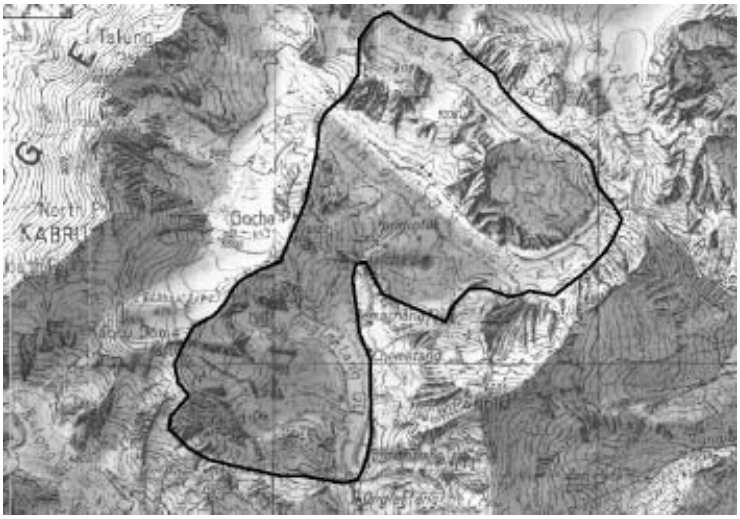
South From Sungmoteng Tsho it follows the outlet of the lake till it meets the Prek chu river and then moves due west along the ridge till it scales the Forked Peak.

West From Forked Peak it follows the ridge due north till it reaches Kabur Dome peak, from where it moves due west and descends behind Kabur dome into the Talung glacial valley and follows it till it reaches the base of Gochela peak. From here it follows the 5200 m contour and joins the northern flank of the Talung glacier.

Total Area 56 square kilometers (3.14% of the total area of KNP)

This conservation zone includes the areas around Samiti lake, Jemathang, Onglaktang glacier, Teen Kune Pokhri, Gochela Mountain, Pandim Mountain, Kabur Dome Mountain, Forked Peak Mountain, Chetruke, Panch Pokhri, Yongzokdrak and Talung glacier.

7. Map of the conservation Zone



8. Key Issues in the Conservation Management Plan

(A) Conservation Initiatives

(1) Publicity of these regulations by installing adequate signages at Yuksam, and near the trekker's huts, camping sites and the conservation zone.

(2) Informing the travel agents, tour operators, trekking service providers, herders, panchayats, JFMC/EDC, Himal Rakshaks and NGOs about these regulations.

(3) Capacity building of field staff of forest department, travel agents, herders, pack animal operators, Himal Rakshsaks, Panchayats, JFMC/EDC and local NGOs.

(4) Annual census / survey of the population, distribution and status of blue sheep and other indicator flora and fauna in this conservation zone shall be conducted.

(5) Encourage focused conservation and recovery programs for endangered species

(6) Regular patrolling jointly with the local community, JFMC/EDC and Himal Rakshaks especially during monsoons and winters should be conducted to ascertain instances of poaching, status of other threats and controlling them.

(7) Setting up of a wildlife intelligence network
(8) Involvement of reputed NGOs in wildlife research, conservation and monitoring
(9) These conservation initiatives should be incorporated into the existing schemes and programmes of the Khangchendzonga National Park and Khangchendzonga Biosphere Reserve in order to provide adequate funds for implementation of this zonation and conservation management plan.

(B) Conservation Regulations

(1) The conservation regulations shall be enforced by the forest officers in coordination with the Ecodevelopment Committees (EDC), Joint Forest Management Committees (JFMC) and Himal Rakshaks.
(2) Other than forest officers, the Ecodevelopment Committees (EDC), Joint Forest Management Committees (JFMC), registered Non Governmental Organizations (NGO), Himal Rakshaks and the trekking service providers shall be authorized to detect offences under these rules and arrest the offender if there is reason to believe that he will abscond. Any person so arrested shall be handed over forthwith to the nearest forest/wildlife office.
(3) Movement of pack animal (horses, dzos and yaks) beyond Lamune [towards Samiti Lake (Sungmoteng Tsho)] is prohibited.
(4) The trek from Samiti – Jemathang – Teen Kune Pokhri – Gochela Pass is permitted only upto Teen Kune Pokhri. Movement of tourists and support staff is permitted only up to Teen Kune Pokhri.
(5) No camping by tourists is permitted within this conservation zone.

(C) Legal provisions and penalty

(1) Owners of pack animals (horses, dzos and yaks) who enter into this conservation zone shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused. Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the concerned pack animal operator shall be banned from entering in the forest areas of the state for a period of five years.
(2) If tourists or their support staff trek beyond Teen Kune Pokhri or camp within the conservation zone then the concerned travel company organizing the trek or in its absence the group leader of the trekking party (hereinafter referred to as “trek manager”) shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused. Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the concerned “trek manager” shall be banned from trekking or organizing trekking in the forest areas of the state for a period of five years.
(3) The compounding officer shall include all forest officers not below the rank of a block officer. The compounding officer may order reward to be paid to a person who renders assistance in the detection of the offence or apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money. The compounding officer may meet up the expenditure incurred for detecting the offence and apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money.

(4) These provisions shall apply in addition to the laws relating to forests, environment, wildlife and biodiversity.

T. R. Poudyal, IFS
Principal CCF cum Forest Secretary
Department of Forest, Environment and Wildlife Management
Government of Sikkim
File No: 250/WLC/F/05

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SIKKIM

GOVERNMENT GAZETTE

EXTRAORDINARY
PUBLISHED BY AUTHORITY

Gangtok Friday 10th February, 2006 No. 37

Government of Sikkim
Office of the PCCF-cum-Secretary
Department of Forest, Environment and Wildlife Management
Forest Secretariat, Deorali, Gangtok –737102, Sikkim

No: 890/FEWMD **Dated: 10/02/06.**

Lampokhri Medicinal Plants Conservation Zone

In exercise of the powers conferred by sub-section (8) of section 35 of the Wildlife (Protection) Act, 1972 (53 of 1972) the State Government hereby makes the following notification:-

1. Background and Need

It is impractical to have large National Parks with no zonation, where essentially the entire area is considered as a 'core zone'. Protected Areas should be zoned according to values in smaller pockets not necessarily as large cores, but a mosaic of smaller, manageable cores, spread in an area with tempered human use. Most of the valuable medicinal plants have restricted populations and are now showing signs of recovery. This *insitu* germplasm could be used as a source of planting material for *exsitu* cultivation of these valuable medicinal plants to sustain livelihoods in future.

2. Aims and Objectives

Conserving the wild germplasm and the habitat of valuable and endangered medicinal plants along with other high altitude flora, fauna and wetlands at Lampokhri (near Thangsing) in West Sikkim by the declaration of 15 square kilometer of the Khangchendzonga National Park (0.84% of the total area of KNP) as the Lampokhri Medicinal Plants Conservation Area (LMPCZ). It envisages the creation of *insitu* field gene banks of inter and intra specific diversity of medicinal plants across the alpine zone of the Greater Himalayas in the Eastern Himalayas.

3. Conservation Importance and Values

The Lampokhri area is in the south eastern corner of the Onglaktang valley having a western aspect. This area around Lampokhri (near Thangsing), Chonrigang, Sano Taar, Dalle Pokhri, Chamrey, Khola Urar, Khola Jhareni, Thulo Jhareni, Danra Jhareni and Pairey Jhareni is extremely rich in insitu germplasm of valuable medicinal plants like *Kurki, Jatamanshi, Panchamla, Bikh, Bikhma, Bhutkesh, Pakhanbhed, Rambu, Dandu* and others. A few plants of *Bikhma* were found only here. Pellets of musk deer were found near the *urars* (caverns) at Upper Chonrigang and Sano Taar.

4. Baseline Habitat Survey during summer of 2005

Jhareni is a ridge between Aralungchok and Lampokhri, with abundant water availability since it is criss-crossed by three streams namely Khola Jhareni, Thulo Jhareni and Pairo Jhareni. It is covered with rich Silver Fir forests and Rhododendron thickets. This ridge is specially a treasure-house of valuable medicinal plants. The most profuse regeneration of *Kurki* was inside the yak sheds and in the *urars* nearby. Local resource persons inform that the *gothala* collect *Kurki* and store it in the yak shed and the

nearby *urars* are used to dry it in makeshift *Bhattis*. The seeds that got scattered in the process, are now germinating.

There is also abundant growth of valuable medicinal plants like *Bikh*, *Panchamla, Pakhanbhed, Dandu, Jatamanshi* and *Bhutkesh* also many other endangered plants were also found here.

5. Existing legal status and threats

The Lampokhri Medicinal Plants Conservation Area (LMPCZ) falls within the Khangchendzonga National Park which is notified under the Wildlife Protection Act -1972. The biggest threat to the medicinal plant population is from illegal collection and smuggling by the yak herders. Also grazing on the vegetative and sexual parts of these herbs by yaks during summer adversely impacts the reproduction cycle of these plants. As they are not able to complete their life cycle and consequently natural regeneration is hampered. During the habitat survey conducted in the summer of 2005, the yak herder with yak sheds at Chonripaley and Jhareni had just been evicted. However there is grazing pressure from dzos and horses especially at Chongripaley, Lampokhri and Chamrey.

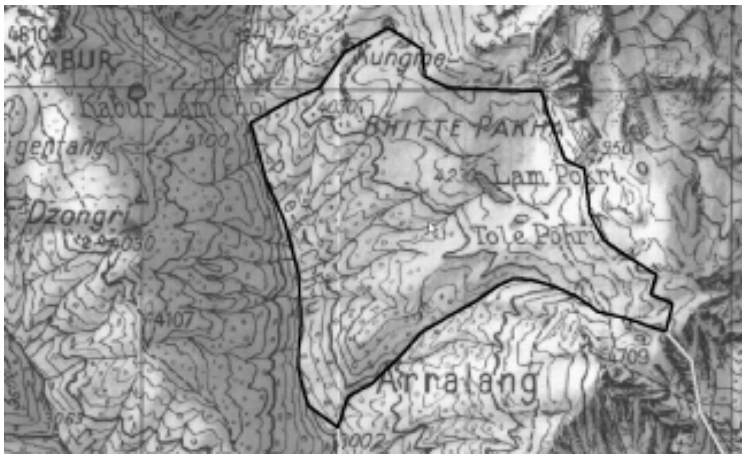
6. Boundaries

Declaring this area within the KNP, with the following borders as Lampokhri Medicinal Plants Conservation Zone (LMPCZ)

North Neer pokhri stream
East 6000 meter contour
South Khola Urar stream (is contiguous with the northern boundary of the Aralungchok Musk Deer Conservation Zone)
West Prek Chu river
Total Area 15 square kilometers (0.84% of the total area of KNP)

This conservation area includes the areas around Lampokhri (near Thangsing), Chonrigang, Sano Taar, Dalle Pokhri, Chamrey, Khola Urar, Khola Jhareni, Thulo Jhareni, Danra Jhareni and Pairey Jhareni.

7. Map of the conservation Area



8. Conservation Management Plan

(A) Conservation Initiatives

(1) Ethnobotanical studies in partnership with Bare Foot botanists (BFBs) from local communities. Documentation of all plant taxa occurring in this medicinal plants zone with herbarium records, systematic estimation of plant populations and regeneration, distribution patterns, association, micro habitat and use patterns needs to be carried out.
(2) Encourage focused conservation and recovery programs for endangered medicinal plants like *Aconitum spicatum (Bikhma)* and others.
(3) Regular patrolling jointly with the local community, trekking service providers, JFMC/EDC and Himal Rakshaks especially during monsoons and winters should be conducted to ascertain instances of illegal collection and smuggling of medicinal plants and the status of other threats.

(4) Setup a wildlife intelligence network.

(5) Involvement of reputed NGOs in medicinal plants research, conservation and monitoring.

(B) Conservation Regulations

(1) Movement of pack animal (horses, dzos and yaks) beyond Thangsing into Chonrigang, Lampokhri, Chamrey, Khola Urar and Aralungchok is prohibited throughout the year.

(2) Movement of pack animal (horses, dzos and yaks) beyond Labdang into Kasturi Urar, Patey Bhanjyang, Sukey Pokhri, Aralungchok and Khola Urar is prohibited throughout the year.

(3) For tourists entering from Thangsing, only day trek is permitted from Thangsing to Lampokhri. Movement of tourists and support staff is permitted only up to Lampokhri. No camping by tourists within this conservation zone is permitted.

(4) For tourists entering from Labdang on the Aralungchok-Dzongri trek, camping is permitted only at Kasturi Urar and Khola Urar. Pack animals (horses, dzos and yaks) are not permitted on this trek. Lighting fire or cooking food is permitted only at the designated campsites.

(C) Legal provisions and penalty

(1) Pack animal (horse, dzo and yak) operators or yak herders who enter into this conservation zone shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused. Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the concerned pack animal operator or yak herder shall be banned from entering in the forest areas of the state for a period of five years.

(2) If tourists or support staff violate the conservation regulations then the concerned travel company organizing the trek or in its absence the group leader of the trekking party (hereinafter referred to as “trek manager”) shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused. Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the concerned “trek manager” shall be banned from trekking or organizing trekking in the forest areas of the state for a period of five years.

(3) The compounding officer shall include all forest officers not below the rank of a block officer. The compounding officer may order reward to be paid to a person who renders assistance in the detection of the offence or apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money. The compounding officer may meet up the expenditure incurred for detecting the offence and apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money.

(4) These rules shall apply in addition to the laws relating to forests, environment, wildlife and biodiversity.

T. R. Poudyal, IFS
Principal CCF cum Forest Secretary
Department of Forest, Environment and Wildlife Management
Government of Sikkim
File No: 250/WLC/F/05

SIKKIM

GOVERNMENT GAZETTE

EXTRAORDINARY
PUBLISHED BY AUTHORITY

Gangtok Friday 10th February, 2006 No. 36

GOVERNMENT OF SIKKIM
Office of the PCCF-cum-Secretary
Department of Forest, Environment and Wildlife Management
Forest Secretariat, Deorali, Gangtok –737102, Sikkim

No: 889/FEWMD **Dated: 10/02/06.**

Areylungchok Musk Deer Conservation Zone

In exercise of the powers conferred by sub-section (8) of section 35 of the Wildlife (Protection) Act, 1972 (53 of 1972) the State Government hereby makes the following notification:-

1. Background and Need

It is impractical to have large National Parks with no zonation, where essentially the entire area is considered as a 'core zone'. Protected Areas should be zoned according to values in smaller pockets not necessarily as large cores, but a mosaic of smaller, manageable cores, spread in an area with tempered human use. Other areas for incentive programmes such as community based tourism need to be established. The smaller cores should act as 'source' populations for sustaining populations of endangered species outside.

2. Aims and Objectives

Conservation of the Musk Deer (*Moschus chrysogaster*) population – the flagship species of the high altitude alpine ecosystem, and its habitat alongwith other high altitude flora, fauna, and alpine ecosystems at Areylungchok in West Sikkim by declaration of 27 square kilometer of the Khangchendzonga National Park (1.51% of the total area of KNP) as the Areylungchok Musk Deer Conservation Zone (AMDCZ).

3. Conservation Importance and Values

The steep rocky ridge of Areylungchok located between the Rathong chu and Relli rivers has been traditionally free from grazing by both sheep and yaks and also collection of medicinal plants. Steep rocky cliff, shortage of water, heavy wind and snow and severe cold all play a vital role in this area being free from livestock grazing pressure. The lower reaches of this ridge along the Onglaktang valley has extensive Rhododendron thickets which give way to Alpine scrub (Rhododendron and Juniper) in the middle reaches. The upper reaches have a limited extent of alpine sedge meadows.

This area has a population of musk deer and blue sheep and is also important from the point of view of studying the impacts of pastoralism, since it has a very limited grazing history by domestic livestock. Valuable medicinal plants like *Sharmaguru, Mykopila, Bikhma, Jatamanshi, Bhutkesh, Pakhanbhed, Dandu* and *Khokim* were also abundantly available. Tussock forming grasses like *Bhalu buki* and *sun buki* formed large meadows. This unique vegetation is not available in other parts of KBR. Availability of other fodder plants like *Ganar, Cheeru, Suire, Teeure, Khokim* and *Dandu* further enrich the value of these meadows. The presence of a number of *urars* (caverns) provides cover from inclement weather for wild ungulates. During winter when there is a shortageof winter pastures, these meadows play an important role in providing the much needed fodder during the lean season.

4. Baseline Habitat Survey during summer of 2005

Vegetation sampling was conducted during late July and August based on 30 (1 X 1 meter quadrate) sample plots with the sampling stations at Ghumney, Surgey Danra and Dhurd. This alpine landscape can be categorized as follows:

S. No.	Landscape Property	Value
1	Habitat Type	Tussock forming Sedge Meadow
2	Aspect	South west
2	Biotic Pressure	Very limited history of grazing or collection of medicinal plants traditionally. Status is pristine.
3	% vegetation cover	75 %
4	% cover of palatable plants	58% (dominated by *Bhalu buki (Kobresia duthiei))*
5	Species richness	(no of species 5.5 per sample plot of $1m^2$)
6	Valuable fodder plants	*Bhalu buki (Kobresia duthiei), Kesari buki (Kobresia nepalensis), Sun buki (Kobresia capillifolia), Rani buki (Festuca vallesiac), Suire buki (Juncus sp.), Ganer (Heracleum sp.), Kenjo (Rheum nobile), Harkat (Carex nivalis) and Shyamphul (Pleurospermum sp.)*
7	Evidence of key wildlife (direct and indirect evidence)	Musk Deer, Blue Sheep, Himalayan Tahr, Snow Partridge and Himalayan Monal
8	Valuable medicinal plants	*Bikh (Aconitum ferox), Khokim (Rheum acuminatum), Dandu (Allium wallichi,) Bhutkesh (Anemone polyanthes)* and *Jatamanshi (Nardostachys grandiflora)*

Rocky ledges were also present which act as shelter for blue sheep during heavy snowfall. It is also an important Himalayan Tahr habitat. These meadows serve as a critical winter pasture for them. Should be given highest conservation importance and kept free from competition from domestic livestock. Also these meadows are limited in extent.

Feeding signs of musk deer on the nutrient rich inflorescence (flowers) of *Ganar* and *Khokim* at Ghumne and Danra Jhareni was found. Pellets and hoof marks of musk deer were found at Upper Chonrigang and Khola Urar. Above Chonripaley we came across hoof mark of musk deer and pellets of blue sheep. Pellets of snow partridge (*Larewa)* and Himalayan Monal (*Danphe)* were abundantly available.

The team also came across five traps in the ridge above Rungdung village which were subsequently demolished by the park authorities. Also there are unconfirmed reports of a sheep herder from Dhoopi to have indulged in poaching of musk deer at Areylungchok in the same year.

5. Existing legal status and threats

The Areylungchok Musk Deer Conservation Zone (AMDCZ) falls within the Khangchendzonga National Park which is notified under the Wildlife Protection Act -1972 and the flagship species here is the globally endangered Musk Deer (*Moschus chrysogaster*) which is protected under schedule I of Wildlife Protection Act-1972. Adult males have a pod under their abdominal skin which is valued for its scent. The musk deer is persecuted for its valuable pod using trained dogs as well as setting traps. The main threat to the musk deer is from hunting by laying traps and also using hunting dogs by sheep herders from Dhoopi village and professional hunters from Karjee village. There are increasing linkages between local persecution of wildlife and the larger illegal wildlife trade. Unplanned tourism also threatens this sensitive and shy animal.

6. Boundaries

Declaring this area within the KNP, with the following borders as a Areylungchok Musk Deer Conservation Zone**.**

North	Khola Urar stream (is contiguous with the southern boundary of the Lampokhri Medicinal Plants Conservation Zone)
East	Follows the source of the Khola Urar Stream, crosses the ridge and again follows the stream till it meets with the 3000m contour
South	Follows the 3000 meter contour

West Follows the 3000 meter contour till it meets the Khola Urar stream
Total Area 27 square kilometers (1.51% of the total area of KNP)

This conservation area includes the areas around Khola Urar, Surgey Danra, Ghumne, Shyarbey, Chongripaley, Sukey Pokhri, Dhurd, Mool Dhunga, Patey Bhanjyang, and Kasturi Urar.

7. Map of the conservation Area

8. Key Issues in the Conservation Management Plan

(A) Conservation Initiatives

(1) Publicity of these regulations by installing adequate signages at Yuksam, Labdang and near the trekker's huts, camping sites and the conservation zone.

(2) Informing the travel agents, tour operators, herders, panchayats, pack animal operators, trekking service providers, Himal Rakshaks, JFMC/EDC and NGOs about these regulations.

(3) Capacity building of field staff of forest department, travel agents, herders, pack animal operators, Himal Rakshaks, Panchayats, JFMC/EDC and local NGOs.

(4) Annual census / survey of the population, distribution and status of musk deer and blue sheep and other indicator flora and fauna in this conservation zone shall be conducted.

(5) Encourage focused conservation and recovery programs for the musk deer.

(6) Regular patrolling jointly with the local community, JFMC/EDC and Himal Rakshaks especially during monsoons and winters should be conducted to ascertain instances of poaching and status of other threats and controlling them.

(7) Setting up of a wildlife intelligence network

(8) Involvement of reputed NGOs in wildlife research, conservation and monitoring

(9) These conservation initiatives should be incorporated into the existing schemes and programmes of the Khangchendzonga National Park and Khangchendzonga Biosphere Reserve in order to provide adequate funds for implementation of this zonation and conservation management plan.

(B) Conservation Regulations

1) Movement of pack animal (horses, dzos and yaks) beyond Thangsing into Chonrigang, Lampokhri, Chamrey, Khola Urar and Areylungchok is prohibited throughout the year.

2) Movement of pack animal (horses, dzos and yaks) beyond Labdang into Kasturi Urar, Patey Bhanjyang, Sukey Pokhri, Areylungchok and Khola Urar is prohibited throughout the year.

3) For tourists entering from Thangsing, only day trek is permitted from Thangsing to Lampokhri. Movement of tourists and support staff is permitted only up to Lampokhri. No camping by tourists within this conservation zone is permitted.

4) For tourists entering from Labdang on the Areylungchok-Dzongri trek, camping is permitted only at Kasturi Urar and Khola Urar. Pack animals (horses, dzos and yaks) are not permitted on this trek. Lighting fire or cooking food is permitted only at the designated campsites.

(C) Legal provisions and penalty

(1) Pack animal (horse, dzo and yak) operators or yak herders who enter into this conservation zone shall be punishable with a fine which shall not be less than five thousand rupees but may extend to ten thousand rupees apart from the compensation for the damage caused. Provided that in case of a subsequent offence the fine shall not be less than ten thousand rupees and may extend to twenty five thousand rupees apart from the compensation for the damage caused and the concerned pack animal operator or yak herder shall be banned from entering in the forest areas of the state for a period of five years.

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(3) The compounding officer shall include all forest officers not below the rank of a block officer. The compounding officer may order reward to be paid to a person who renders assistance in the detection of the offence or apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money. The compounding officer may meet up the expenditure incurred for detecting the offence and apprehending the offender out of the sum of money accepted as fine not exceeding twenty percent of such money.

(4) These rules shall apply in addition to the laws relating to forests, environment, wildlife and biodiversity.

T. R. Poudyal, IFS
Principal CCF cum Forest Secretary
Department of Forest, Environment and Wildlife Management
Government of Sikkim
File No: 250/WLC/F/05

Some Mountain Heroes

Buddhi Lal Subba

Nima Tashi Bhutia

Laku Tshering Bhutia

Padam Bahadur Gurung

Phupu Tshering Bhutia

Kinzong Sherap Bhutia

Chewang Bhutia

Til Bahadur Subba

Tshering Uden Bhutia

The Mountain Institute - India : Our Mission

To ensure the sustainable future of the mountains and the people. The Mountain Institute's (TMI) mission is to conserve mountain environments, improve mountain livelihoods and support mountain cultures. TMI's vision is to contribute to a world where mountains and mountain people are valued and understood as integral and important to all the ecosystems and to the human populations that live within them and where thriving mountain communities prosper in ecologically rich mountain environments.

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