Threats to habitat and wildlife in Changthang and Rupshu areas of Ladakh: a case study at Hanle

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Introduction

Summer and autumn surveys for raptors were conducted in collaboration with the Indian Army from 1997 to 2003; June/July 2008, and July 2009. The main objective of the surveys was to collect distribution and breeding data on raptors, and list all other bird species in Ladakh (Sangha & Naoroji 2005).

Geographical description of the area

Ladakh is a high, cold desert, situated in the western-most Trans-Himalayan region of India, representing the western extremity of the Tibetan Plateau, and having close ecological and cultural affinities with Tibet (Vaurie 1972). The area is extremely arid, rugged, and mountainous and receives less rainfall than eastern Tibet. The 100,000 km^2 area of Ladakh is bordered by the Karakoram range in the north and by the main Himalayan range in the south, the Ladakh and Zanskar ranges running between and parallel to these main mountain ranges **(Fig. 1)**. From its source on the Tibetan Plateau, the Indus River flows north-west between the Zanskar and Ladakh ranges, turning south-west 300 km downstream into northern Pakistan. Eastern Ladakh has several brackish lakes, marshes, barren snow-capped mountains, sand dunes, grasslands, upland bogs, and rivers forming the western extremity of Changthang, the north-western adjunct of the Tibetan Plateau. Altitudes in Changthang average 4,000–5,000 m. Temperatures range from up to 35°C in summer to minus 45°C in winter. Precipitation is less than 100 mm per annum. The flora comprises selected elements from Afghanistan, Siberia, Tibet, and the Himalayan region together with a considerable proportion of endemic species.

Fig. 1. Map of Ladakh.

Significance of conservation in Ladakh

Despite the harsh environmental and climatic conditions, the avifauna of Ladakh is diverse, displaying Palaearctic, Mediterranean, and Chinese influences. Every trip has enthused us with unexpected migrants and little-known high altitude species. Located between the Palaearctic and Indo-Malayan zoogeographic zones, species from both regions are to be found here. The summer months further attract summer visitors and breeders resulting in more than 300 species recorded so far (Pfister 2001). Some of the species that breed in Ladakh include: Black-necked Crane *Grus nigricollis,* Bar-headed Goose *Anser indicus*, Brahminy Shelduck *Tadorna ferruginea*, Great Crested Grebe *Podiceps cristatus*, Common Tern *Sterna hirundo*, Common Merganser *Mergus merganser*, Brown-headed Gull *Larus brunnicephalus*, Lesser Sand Plover *Charadrius mongolus,* and Common Redshank *Tringa totanus*.

During our surveys (Sangha & Naoroji 2005) 122 bird spp. were recorded including 12 spp. of birds of prey—ten diurnal and two nocturnal. In addition, breeding of Upland Buzzard *Buteo hemilasius* in Ladakh was first documented from the Indian subcontinent (Naoroji & Forsman 2001).

Today Ladakh is an important wildlife destination including the eastern plato comprising the established Changthang Wilderness Area (Kitchloo 1997). Its broad principles include, "protecting and restoring the ecosystem; reducing adverse impacts on wilderness introduced by human culture through education and minimum regulation; harmonize wilderness management with adjacent land management activities using proactive processes where all possible constituents are represented, promote wilderness research and monitoring to expand understanding of ecosystem intricacies and maintain ecological integrity; focus management energy and resources on areas where ecosystem components are threatened and to harmonise wildlife management with adjacent

land management activities using proactive processes where all possible constituents are represented," (Kitchloo 1997).

The Ladakhis are innately life respecting, sentient people and sensitive to their environment. Traditionally they have used the natural resources of the region wisely without causing any adverse impact on the environment. However, recent land use changes in the region have already damaged the fragile environment in some areas. It is therefore not surprising that wildlife is becoming scarce even in the remotest areas of Ladakh. For example, Tibetan gazelle *Gazella picticaudata* was abundant, "On the plateau to the south-east of Tso Moriri Lake, on the hills east of Hanle, and in the Indus Valley from Demchok [the frontier village of Ladakh], as far down as Nyima," [Nyoma] (Sterndale 1884). In ten visits, lasting around two weeks, we sighted, only once, on 17 August 2002, three, extremely shy Tibetan gazelle at Hanle **(Fig. 2)**. The Pallas's cat *Otocolobus manul* has also been observed along the north-eastern margin of the marsh at Hanle. The number of breeding pairs of the endangered Black-necked Crane, which have so far bred successfully, is declining (Pfister 1998). The pastures are already degraded and there is continuing heavy pressure on the available pastures. Herdsmen, who earlier co-existed peacefully with wild animals, are becoming hostile and driving wildlife out of some prime natural habitats. The Hanle marsh was formerly the best wildlife habitat in Changthang **(Fig. 3)**.

Livestock take over pastures and marshes

An age-old system of rotational grazing was being practised in Ladakh since aeons. This practice protected the pastures from being overgrazed, besides helping conserve fodder for lean winter months. This system kept the disturbance to the Black-necked Crane's breeding habitats within reasonable limits. Limited livestock grazing is beneficial. It helps to keep the grass short in the crane's breeding areas, eliminating potential cover for predators. Limited grazing activity also helps to up-turn the soil near the droppings and sustains a variety of micro-fauna, thus improving the food availability in the crane's foraging area. Cranes have been observed pecking at, and turning livestock dung (Daniel *et al*. 1987).

Rebo herders, who were once nomadic, have in recent years increased their livestock primarily for high quality Pashmina wool

Fig. 2. Hanle marsh in 1995. The rare Tibetan Gazelle *Gazella picticaudata*, Hanle Valley. Note pristine habitat as opposed to 2009 (see Fig. 8).

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Fig. 3. Hanle marsh in 1995. Prime marsh habitat supporting 5–7 pairs of breeding Black-necked Crane *Grus nigricollis*, and at least 4–5 pairs of breeding Upland Buzzard *Buteo hemilasius*.

production, and have thereby imposed tremendous pressure on the available pastures in Ladakh. For example, the Changthang region of Ladakh holds about 14,000 domestic livestock represented mainly by sheep, goats, yaks, and ponies. These animals directly compete with wild ungulates, mainly the Tibetan wild ass *Equus kiang* (kiang), and also Tibetan- antelope *Pantholopus hodgsoni*, and gazelle.

The increasing domestic livestock population has not only driven wildlife out of prime habitat, but also led to overgrazing of pastures, resulting in wind erosion and desertification. The Rebo today have ceased to practise rotational grazing and are only partially nomadic, having permanent summer camps in prime pastureland, thereby creating additional pressure on the land. Domestic livestock are now invading areas that are not their 'natural' habitat, such as marshes and shallow ponds, as in these areas the vegetation is comparatively still intact. At Hanle and Lal Pahari, domestic livestock have been observed grazing on rushes in knee-deep water creating pressure on the breeding Black-necked Crane, Brahminy Shelduck, Bar-headed Goose and other wetland breeding species. The nomads do not deliberately harm the breeding birds but their frequent movement near the nesting sites sometimes forces the incubating birds to leave the clutch, allowing access to aerial and terrestrial predators (Pfister 1998).

Herders are particularly hostile towards the kiang. They chase them on horseback, away from pastures, and set their dogs upon them. At some places, e.g., between Loma and Hanle, barbed wire fencing has been erected around marshes to keep the kiang off grazing areas **(Fig. 4)**. It seems that in the near future confrontations over pasturage between kiang and the herders might become a major conservation issue. It is well known that kiang nibble only the fresh tips of shoots of grasses, sedges and bushes, and then move on. When a herd of yak, sheep, and goats graze through an area, they literally 'clean shave' the landscape, stripping away, and destroying the sparse vegetation.

Shepherds are also aggressive towards the Golden Eagle *Aquila chrysaetos.* Accessible nests are destroyed, discarding Buddhist values of sanctity of all life, as they perceive the species as a threat to their lambs. Increase in human and livestock population is putting pressure on Golden Eagles during the breeding season due to disturbance. Its habit of only very rarely lifting lambs of domestic sheep and goats does not endear it to the local population. However the pressure on Golden Eagles is primarily during the breeding season. The species has no natural enemies.

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Fig. 4. Hanle marsh in 1997. Fencing of Hanle Valley to keep the Kiang out.

Fig. 5. Draining the Hanle marsh in 1997 for Willow plantation by Forest Department reducing nesting and foraging habitat for Black-necked Crane, and foraging habitat for Upland Buzzard, which used to hunt in the marsh and breed on cliffs surrounding the valley.

Dogs

The large population of commensal dogs attached to settlements and nomads, and the large feral population tended by soldiers (jawans) of the Indian Army and Indo-Tibetan Border Patrol are the biggest threat to the Black-necked Crane. Over the years these canines have multiplied in numbers at most outposts thanks to these free rations. At some outposts as many as 50 dogs have been counted! Egg destruction and chick mortality caused by the dogs represent the biggest threat to the Black-necked Crane population of Ladakh, and are responsible for up to 50 per cent destruction of broods within a productive cycle in Ladakh (Pfister 1998; Col Chacko, *verbally*; and author's observations).

Other human activities

The Jammu and Kashmir government and the Indian Army have inadvertently improved access in Ladakh, particularly throughout Changthang and Rupshu. Motorable tracks have been laid even in extremely remote areas for obvious strategic reasons. This by itself has not had any detrimental effect on the environment. However, road construction work has initiated new development activities in the remotest areas.

Encouraging Tibetan refugees to settle at Hanle is directly creating new threats and disturbances in the area. The Tibetan refugee settlement there has grown in size and numbers thanks to generous foreign aid. The once extensive marsh, drained for agriculture, has shrunk considerably. Furthermore, Hanle River is being diverted to the newly created agriculture fields and willow plantations **(Figs. 5 & 6)**. In Changthang, particularly around Hanle and other marshes, plantations have remained stunted for many years due to salinity of the soil. As more water is diverted, other sections of the marsh will dry up due to lack of sufficient water in the near future. Increased agriculture has also led to fencing of the fields. This rather new practice has fragmented the primary habitat i.e., the marsh, which is vital to the survival of the endangered Black-necked Crane and the Upland Buzzard, as both species depend solely on marshes for foraging, and breeding. Resident populations of these two species are found nowhere else in India except in the Changthang and Rupshu areas of Ladakh. In 2009 only one non-breeding pair was observed instead of the usual four to five pairs, and no Upland Buzzards were breeding on the cliffs surrounding the marsh from which they procured their mammalian prey, primarily rodents, and small birds.

Today Hanle marsh is almost completely dry **(Figs. 7 & 8)**. Some dialogue needs to be initiated between the Ladakh Hill Council, local people, Indian Army and conservation NGOs to ensure that at least 35% of the dried marsh is regenerated into a life supporting, living marsh. This would facilitate breeding of waterbirds and Black-necked Crane during summer as well as being used by a large number of species on migration. All it would mean is diverting water after it has irrigated the grasslands and croplands of the villagers into the remaining portion of the marsh, (before it completely disappears), so that both wildlife and the Rebo benefit. This dialogue should commence as soon as possible.

Fig. 7. A panoramic view of Hanle Valley and salt encrusted Hanle marsh in 2009.

Fig 6. Attempts at small scale cultivation, Hanle marsh, 2009.

Fig. 8. Hanle marsh in 2009. Mostly barren salt encrusted Hanle Valley.

A list of birds in and around Hanle

Little Cormorant *Phalacrocorax niger*. Hanle bridge.
Grey Heron *Ardea cinerea.* Hanle—sparse records.
Bar-headed Goose *Anser indicus.*
Brahminy Shelduck *Tadorna ferruginea.* (Sangha & Naoroji 2005.) Breeding in Hanle.
Gadwall *Anas strepera.*
Mallard *A. platyrhynchos.* (Sangha & Naoroji 2005.)
Garganey *A. querquedula.* (Sangha & Naoroji 2005.)
Common Teal *A. crecca*. (Sangha & Naoroji 2005.)
Common Merganser *Mergus merganser.* 19 at Hanle on 28 August 2000 (Sangha & Naoroji 2005).
Bearded Vulture *Gypaetus barbatus.* Breeding in Hanle.
Himalayan Griffon *Gyps himalayensis.*
Western Marsh-Harrier *Circus aeruginosus*. Hanle, on passage.
Eurasian Sparrowhawk *Accipiter nisus*. Single passage record at Hanle (Pfister 2004).
Upland Buzzard *Buteo hemilasius.* Breeding in Hanle.
Greater Spotted Eagle *Aquila clanga.* On passage.
Golden Eagle *A. chrysaetos.*
Common Kestrel *Falco tinnunculus.*
Merlin *F. columbarius.*
Eurasian Hobby *F. subbuteo.*
Saker *F. cherrug.* Suspected breeding; observed mainly in summer, and carrying prey to rocks.
Tibetan Snowcock *Tetrasgallus tibetanus.* (Pfister 2001.)
Chukor *Alectoris chukar.*
Tibetan Partridge *Perdix hodgsoniae.* Observed one pair with nine chicks on 28 August 2000 along the Hanle/Chumur road (Sangha & Naoroji 2005).
Black-necked Crane *Grus nigricollis.* Endangered. Breeding in Hanle.
Baillon's Crake *Porzana pusilla.*
Common Moorhen *Gallinula chloropus.*
Pacific Golden-Plover *Pluvialis fulva*. Hanle Valley.
Lesser Sand Plover *Charadrius mongolus.* Three birds in breeding plumage at Hanle on 22 July 1999 (Sangha & Naoroji 2005).
Common Snipe *Gallinago gallinago.*
Eurasian Curlew *Numenius arquata.* (Pfister 2004.) Observed at Hanle on 24 July 1999 (Sangha & Naoroji 2005)].
Common Redshank *Tringa totanus.* (Sangha & Naoroji 2005.)
Green Sandpiper *T. ochropus.* (Sangha & Naoroji 2005.)
Common Sandpiper *Actitis hypoleucos.*
Little Stint *Calidris minuta.*
Temminck's Stint *C. temminckii.*
Dunlin *C. alpina.* Single record. (Pfister 2004).
Curlew Sandpiper *C. ferruginea*. Lalpahari & Hanle (Pfister 2004).
Black-winged Stilt *Himantopus himantopus* Hanle plains, (Pfister 2004; Sangha & Naoroji 2005).
Pallas's Gull *Larus ichthyaetus*. Lower Hanle River.
Brown-headed Gull *L. brunnicephalus*. Hanle Valley.
Black-headed Gull *L. ridibundus*. Along Hanle River.
Common Tern *Sterna hirundo*. Hanle Valley, wetlands.
Whiskered Tern *Chlidonias hybridus*. Hanle, in autumn.

Tibetan Sandgrouse *Syrrhaptes tibetanus.* Observed at Pongo village, Hanle on 22 July 1999 (Sangha & Naoroji 2005).
Hill Pigeon *Columba rupestris.*
Snow Pigeon *C. leuconota.*
Oriental Turtle-Dove *Streptopelia orientalis.*
Little Brown Dove *S. senegalensis.*
Common Cuckoo *Cuculus canorus.* (Sangha & Naoroji 2005.)
Pallid Scops-Owl *Otus brucei.* (Pfister 2001.)
Eurasian Eagle-Owl *Bubo bubo.*
Little Owl *Athene noctua.* (Pfister 2004; Sangha & Naoroji 2005).
Alpine Swift *Tachymarptis melba.* (Pfister 2004.)
Common Swift *Apus apus.* (Pfister 2004.)
Pacific Swift *A. pacificus.* (Pfister 2001.)
Common Hoopoe *Upupa epops.* Summer.
Long-billed Calandra-Lark *Melanocorypha maxima.* (Sangha & Naoroji 2005.)
Greater Short-toed Lark *Calandrella brachydactyla.* (Pfister 2004.)
Hume's Short-toed Lark *C. acutirostris.* (Pfister 2004.)
Horned Lark *Eremophila alpestris.* (Sangha & Naoroji 2005.)
Eurasian Crag Martin *Hirundo rupestris.* Lalpahari and Hanle (Pfister 2004.)
Common Swallow *H. rustica.* (Pfister 2004.)
Northern House-Martin *Delichon urbica.* (Pfister 2004.)
White Wagtail *Motacilla alba.* (Pfister 2004; Sangha & Naoroji 2005.)
Citrine Wagtail *M. citreola.* (Pfister 2004; Sangha & Naoroji 2005.)
Grey Wagtail *M. cinerea.* Hanle.
Rufous-tailed Shrike *Lanius isabellinus*. Hanle.
Grey-backed Shrike *L. tephronotus.*
White-throated Dipper *Cinclus cinclus.*
Robin Accentor *Prunella rubeculoides*. Hanle?
Blue Rock-Thrush *Monticola solitarius*. Rare in Hanle (Sangha & Naoroji 2005).
Tickell's Thrush *Turdus unicolor.* Observed in spring in Hanle Valley.
Eurasian Blackbird *T. merula.* Around Hanle. Pfister (2001); Sangha & Naoroji (2005).
Himalayan Rubythroat *Luscinia pectoralis.* Side valleys of Hanle (Pfister 2004).
Bluethroat *L. svecica.* Observed during migration, end August (Pfister 2004).
Grandala *Grandala coelicolor.* One sighting at Hanle.
Desert Wheatear *Oenanthe deserti.* Observed breeding all around the marsh.
Tickell's Warbler *Phylloscopus affinis.* Mainly Hanle & adjoining Lalpahari area (Pfister 2004).
Little Bunting *Emberiza pusilla.* A single sight record from Hanle (Pfister 2001).
Red-headed Bunting *E. bruniceps.* A single sight record from Hanle (Pfister 2004).
Fire-fronted Serin *Serinus pusillus.*
Twite *Carduelis flavirostris.*
Hodgson's Mountain-Finch *Leucosticte nemoricola.*
Black-headed Mountain-Finch *L. brandti.* Observed by Pfister (2004), and by authors in most areas of Changthang including Hanle.
Mongolian Finch *Bucanetes mongolicus.* Recorded breeding by Pfister (2004), and fledged young being fed by adults.
Common Rosefinch *Carpodacus erythrinus.* Two birds seen by us at Hanle on 1 July 2001 represent an eastern extension of its range in Ladakh (Sangha & Naoroji 2005).
Streaked Great Rosefinch *C. rubicilloides.* Sighted solely throughout Changthang.
Common Great Rosefinch *C. rubicilla.* Commonly seen at Loma (Sangha & Naoroji 2005) and occasional resident in eastern Ladakh and sighted also at Hanle (Pfister 2004).
Red-fronted Rosefinch *C. puniceus.* (Pfister 2004.) We observed the species east of and above Hanle and at Chushul.
House Sparrow *Passer domesticus.* (Pfister 2004.)
Tibetan Snowfinch *Montifringilla adamsi.* (Pfister 2004; Sangha & Naoroji 2005.)
Mandelli's Snowfinch *Pyrgilauda taczanowskii.* (Pfister 2004.)
Brahminy Starling *Sturnus pagodarum.* (Sangha & Naoroji 2005.)
Rosy Starling *S. roseus.* (Sangha & Naoroji 2005.)
Black Drongo *Dicrurus macrocercus.* Hanle, end September.
Black-billed Magpie *Pica pica.* Earlier rare but now more frequently observed (Sangha & Naoroji 2005).
Hume's Groundpecker *Pseudopodoces humilis.* Observed breeding with chicks in the Hanle Valley on 22 July 1999 (Sangha & Naoroji 2005).
Red-billed Chough *Pyrrhocorax pyrrhocorax.* (Sangha & Naoroji 2005.)
House Crow *Corvus splendens.* (Sangha & Naoroji 2005.)

Prominent mammals observed in and around Hanle

Snow leopard *Uncia uncial.* Endangered. In the hills around Hanle where Bharal *Pseudois naxaur* kills located by RKN.
Pallas's cat *Otocolobus manul.* Near Threatened. Observed hunting in the Hanle marsh and entering a den at base of cliff bordering the marsh by Pankaj Sharma, our team member on 29 June 2003.
Wolf *Canis lupus.* Observed at least on 3 to 4 occasions in vicinity of Hanle Valley.
Red fox *Vulpes vulpes.* Frequently observed hunting in the Hanle Valley and environs. Occasionally seen also in vicinity of Rebo settlements being chased off by dogs.
Tibetan wild dog *Cuon alpinus.* Endangered.
Tibetan fox *V. ferrilate*. Observed twice with pups on 23 July 1999.
Mountain weasel *Mustela altaica.* Observed around Hanle and other areas of Changthang.
Kiang *Equus kiang.* Commonly seen around Hanle and formerly in Hanle Valley. But drainage of Hanle marsh has resulted in Kiang being restricted to periphery of Hanle Valley.
Tibetan gazelle *Procapra picticaudata*. Near threatened IUCN Red List. Observed and photographed by us along edge of Hanle Valley. Pfister (2004) states encountered and known only from the high plateau region around Hanle Valley.
Blue sheep *Pseudois nayaur* or bharal. Frequently seen in the hills and valleys bordering Hanle marsh and opposite Hanle Gompa or monastery in herds from a few individuals up to over twenty. Two to three kills also observed, probably by Snow leopard.

Other mammals observed in and around Hanle Valley were: Himalayan marmot *Marmota bobak*, Stoliczka's mountain vole *Alticola stoliczkanus*, Woolly hare *Lepus oiostolus*, Plateau pika *Ochotona curzoniae*, Ladakh pika *O. ladacensis.*

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