

## INTRODUCTION

India is one of the twelve mega diversity countries in the World divided into 10 Biogeographical regions based on the landmass and species distribution. The State of Jammu & Kashmir falls under the Western Himalayan and Trans-Himalayan Biogeographical region of India and at the intersection between the temperate Palaearctic and tropical Oriental Biogeographic regions of the World. Owing to the enormous diversity of habitat types, great altitudinal span of the mountains and climatic variations, besides wetlands and water bodies, Jammu & Kashmir, encompasses a diversity of plant and animal species, many of which are endemic to this area.

Jammu and Kashmir (32° 17' - 37° 05' N and 72° 31' - 80° 20' E) is bounded on the north by China (Karakoram mountains), on the east by Tibet, and on the south by Himachal Pradesh and Punjab and on the west by Pakistan and Afghanistan. This hilly State is divided into three geographical regions namely, the Kashmir Valley, the Ladakh region and the Jammu region. The higher regions are covered by Pir Panjal, Karakoram and the inner Himalayan ranges. The State has a geographical area of 22.22 million ha (6.8% of India's geographical area). The capital city is Srinagar but in winters the administration offices move to Jammu.

Agriculture is the mainstay of the State's economy. Paddy, wheat and maize are the major crops. Barley, bajra and jowar are cultivated in some parts. Gram is grown in Ladakh (Mathew 2003). Kashmir handicrafts have always been a byword for excellence. This sector provides employment to about 0.2 million people. Kashmir carpets earn substantial foreign exchange (Mathew 2003). The 300 km long Srinagar-Jammu National Highway is the only major surface link between the Kashmir Valley and the rest of the country. Kashmir is internationally known for its beauty and is a favourite tourist destination. The main tourist centres are Srinagar, Pahalgam, Gulmarg and Sonamarg. Hindu pilgrim centers of special importance include Amarnath and Vaishno Devi.

The average annual rainfall and temperature is in the range of 600 to 800 mm and 15 °C to 17.5 °C respectively. The climatic conditions vary from subtropical in the Jammu region to cold and arid in Ladakh.

The total population of the State is 10.07 million (2001 census) which is 1.0% of the country's population. Nearly 75% of the people live in the villages. The population density is 45 persons per sq. km, which is very low in comparison with other states. This is due to the large uninhabited cold desert area in Ladakh.

The Greater and Trans-Himalaya (1500 to 6,000 m) consisting of the Kashmir valley and Ladakh high altitude region in Jammu and Kashmir, is a source of many major rivers, for example, the Jhelum, and the Indus, which start from this region, but much of it is internally drained where the rivers end in vast lakes and marshes. These Inland wetlands particularly marshes and peat lands in the Himalayan region absorb and hold huge quantities of fresh water which they release slowly during both dry and wet seasons, thus preventing floods and providing sufficient water for the sustenance of millions of people. Wetlands of J & K particularly Dal and Wular lakes, Hokersar, Haigam, Shalabugh, Mirgund wetland reserves in the Kashmir valley and Tso-morari, Tso-Kar, Chushul and Hanlay marshes in the Ladakh region, besides supporting many species of wetland plants, animals and insects provide critical habitat for the life cycles of ducks, geese, swans and many other waterfowl species. Such lakes and marshes, mostly fresh water and saline respectively, are important as wintering and breeding grounds for diversity of waterfowl such as the endangered Black-necked Crane *Grus nigricollis*, Grey lag goose *Anser anser*, Bar-headed Goose *Anser indicus* and Great Crested Grebe *Podiceps cristatus* Mallard, Blunt-winged Warbler and Ferruginous Duck *Aythya nyroca* besides a variety of other waterfowl.

The important wetlands are Wular lake, Hokersar, Haigam, Shalabugh, Mirgund wetlands in Kashmir and Tso-morari, Tso-kar, Chushul and Hanley in Ladakh and Surinsar and Mansar in Jammu. The wetlands of Kashmir valley are important wetlands for both resident and migratory waterfowl. These wetlands are also major wintering area for a variety of migratory ducks and geese and extremely important breeding area for These wetlands are also important for long distance migrants as a stopover site for feeding and resting. Many water birds occur in huge numbers in the wetlands of Jammu and Kashmir, much above the 1% population threshold determined by Wetlands International (2002).

### **Vegetation**

Broadly, Jammu and Kashmir has five types of vegetation, namely Sub-tropical Dry Evergreen, Himalayan Moist Temperate, Himalayan Dry Temperate, Subtropical Pine, and Sub-alpine and Alpine Forests. The recorded forest area is 2.02 million ha which constitutes 9.08% of the geographical area of the State. Forests are largely distributed in the Kashmir Valley and the Jammu region. Leh and Kargil are devoid of forest vegetation. This area is cold desert. Dense forest and open forest account for 11,84,800 ha and 9,38,900 ha respectively (Ministry of Environment and Forest 2001). The total number of districts in the State is 14. The western districts of the State have more forest cover with dense and open forests, while Gilgit and Ladakh have no forest cover as detailed by

IBAs of Jammu and Kashmir		
IBA site codes	IBA site names	IBA criteria
IN-JK-01	Chushul Marshes	A1
IN-JK-02	Dachigam National Park	A1, A2, A3
IN-JK-03	Dehra Gali (DKG) Forest	A1, A2
IN-JK-04	Gulmar Wildlife Sanctuary	A1, A2, A3
IN-JK-05	Haigham Rakh (Marshes)	A1, A4iii
IN-JK-06	Hanle Plains (Hanle River Marshes)	A1
IN-JK-07	Hemis National Park	A3
IN-JK-08	Hirapora Wildlife Sanctuary	A1,A2
IN-JK-09	Hokarsar	A1, A4iii
IN-JK-10	Kistwar National Park	A1, A2, A3
IN-JK-11	Lachipora Wildlife Sanctuary	A1, A2
IN-JK-12	Limbar Valley Wildlife Sanctuary	A1, A2, A3
IN-JK-13	Mirgund Jheel and Reserve	A1, A4i
IN-JK-14	Overa-Aru Wildlife Sanctuary	A1, A2, A3
IN-JK-15	Pangong Tso	A1, A3
IN-JK-16	Ramnagar Wildlife Sanctuary	A1
IN-JK-17	Shallabugh Conservation Reserve	A4iii
IN-JK-18	Tso Kar Basin	A1
IN-JK-19	Tso Morari Lake and Adjacent Marshes	A1, A4i
IN-JK-20	Wular Lake and Associated Marshes	A1, A4iii
IN-JK-21	Gharana Wetland Reserve	A4iii

the Forest Survey of India report of 2001. Rasi, Punch, Muzaffabad, Kathua and Jammu have more forest cover than Ladakh, Gilgit, Baramula, Anantnag (Ministry of Environment and Forest 2001).

### IBAs and Protected Areas

Jammu and Kashmir has a long history of wildlife and forest protection. Jammu & Kashmir has been the pioneer state in the field of conservation and has had a network of wildlife protected areas (Game Reserves) from the time of the erstwhile Maharajah of the state. These game reserves were covered by the then Game Preservation Act 1852 which is now revised and updated as J&K Wildlife Protection Act of 1978 (Amended 2002). Some of the sanctuaries were established nearly 100 years ago, mainly to protect the catchment of important lakes and to provide good hunting for the Maharajah. Since then the State Government has notified about 16000 sq. km. under the Protected Area Network (PAN) which is

15.6% of the total geographical area of the State comprising 5 National Parks, 14 Wildlife Sanctuaries and 35 Conservation Reserves. The Protected Areas (PAs) includes 2762 sq km (12.76% of the forest area, out of 20230 sq km of total forest area) and the remaining area of 13150 sq km is high altitude cold desert area of Ladakh. It is remarkable to note that at the national level, 4.8% of the total geographical area is under the PAN. Thus percentage coverage of PAs in J&K is nearly 3 times more than the national average. J&K has got the largest number of PAs in the country i.e. 53. In terms of the geographical coverage of the PAs also, the State is the 2<sup>nd</sup> largest State only after Gujarat (J&K Wildlife protection Department, 2010).

Of the Pas, the Dachigam National Park is of special ecological significance as it harbors the last viable population of the endangered Kashmir Red Deer or Hangul.. Wular lake, situated in the Baramula district, comprising an area of 8,900 ha, is one of the important wetlands of international importance which was declared as one of the first six Ramsar Sites in Indian in 1990. Of the four national parks, three have been identified as IBAs. Of the 16 wildlife sanctuaries, eight are IBAs. Of the 21 Important Bird Areas (IBAs) identified in Jammu and Kashmir in 2004, 11 fulfill Ramsar criteria.

#### **Potential IBA Areas**

Based on the sixteen years of bird-watching experience along the length and breadth of the state, the co-authors (Khursheed and Suhail), have identified the following areas of avi-faunal significance which have a potential of being declared as the Important Bird Areas:

1. Jasrota Wildlife Sanctuary
2. Lolab Valley
3. Gurez Valley
4. Aharbal-Kausar nag Forests -
5. Chandanwari-Frislan Forests
6. Shikargah Conservation Reserve, Tral
7. Zanskar valley

#### **AVIFAUNA**

Jammu and Kashmir lies in the Western Himalayas Endemic Bird Area (EBA 128) where 11 Restricted Range species have been listed by Statterfield et al. (1998). Because of great altitudinal variations and differing physiogeographical regions, Jammu and Kashmir has three biomes: Biome-5 (Eurasian High Montane-Alpine and Tibetan), above c. 3,600 m; Biome-7 (Sino-Himalayan Temperate Forest), mainly between c. 1,800 to 3,600 m; and, Biome-8 (Sino-Himalayan Subtropical Forest), between c. 1,000 and 2,000 m. The Eurasian

### List of threatened birds in Jammu and Kashmir

<b>Critically Endangered</b>		
White-rumped Vulture	<i>Gyps bengalensis</i>	IN-JK-02, 16
Slender-billed Vulture	<i>Gyps tenuirostris</i>	IN-JK-16
Egyptian vulture	<i>Neophron percnopterus</i>	IN-JK-02, 08,
<b>Vulnerable</b>		
Marbled Teal	<i>Marmaronetta angustirostris</i>	IN-JK-20
Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i>	IN-JK-05, 09, 20
Greater Spotted Eagle	<i>Aquila clanga</i>	IN-JK-06
Eastern Imperial Eagle	<i>Aquila heliaca</i>	N-JK-02
Western Tragopan	<i>Tragopan melanocephalus</i>	IN-JK-03, 10, 11, 12
Cheer Pheasant	<i>Catreus wallichii</i>	IN-JK-12
Sarus Crane	<i>Grus antigone</i>	IN-JK-13
Black-necked Crane	<i>Grus nigricollis</i>	IN-JK-01, 06, 15, 18, 19
Kashmir Flycatcher	<i>Ficedula subrubra</i>	IN-JK-02, 03, 04, 08, 14
<b>Near Threatened</b>		
Darter	<i>Anhinga melanogaster</i>	IN-JK-20
Ferruginous Pochard	<i>Aythya nyroca</i>	IN-JK-05, 19, 20

High Montane (Alpine and Tibetan) Biome is mainly distributed in the Ladakh region, especially in the Changthang plateau. The Sino-Himalayan Temperate Forest type habitat is present in most of the IBAs in the State.

In the Kashmir Valley, many protected areas support restricted range species and some waterbodies support large congregations of migratory waterbirds. These restricted range species occur mainly in Temperate Coniferous or Broadleaf Forest, Sub Alpine Forest and Montane Grasslands. For example, the Kashmir Flycatcher *Ficedula subrubra* which is one of the globally threatened species is found between an altitude of 1,800 m to 2,700 m in the Temperate Mixed Broadleaf Forest, especially where there is dense growth of Parrotia (Stattersfield et al. 1998). Other similar species, namely, the Tytler's Leaf Warbler *Phylloscopus tytleri*, White-throated Tit *Aegithalos niveogularis* and White-cheeked Tit *Aegithalos leucogenys* are found between 1,500 m to 3,600 m in Pine, Oak, Mixed and Deciduous Forests. White-throated Tit can be seen easily in rhododendrons and willow scrub, near the tree line, and White-cheeked Tit, besides in the habitats already mentioned, can be seen in riverine tamarisk scrub. Similarly, other restricted range species which can be seen in or near the Valley are the Kashmir Nuthatch *Sitta cashmirensis*, Spectacled Finch *Callacanthus burtoni* and Orange Bullfinch *Pyrrhula aurantiaca*. These finches are found in

the open Coniferous Forest, Mixed Forest, Deciduous Forest and occasionally birch (Statterfield *et al.* 1998).

The Changthang region in Ladakh is an important breeding ground for waterbirds. Apart from hosting the largest breeding congregation of Bar-headed geese *Anser indicus* in India, the Changthang region also supports the largest population of the endangered Black-necked Crane *Grus nigricollis* in India. During a study on the breeding ecology of the Black-necked crane, Pfister (1998) recorded 12 sites in the Changthang region as breeding sites for this endangered species and counted 38 cranes. In a subsequent survey of Changthang in 2001, 42 cranes were counted with 10 breeding pairs in the Changthang region (S. A. Hussain pers. comm. 2003).

Another IBA site in Ladakh is the Hemis National Park, which is important for all the high altitude birds of the Western Himalayas. About 80 bird species are found in the Park and 50 of them breed there.

Changthang is a huge area and all the wetlands and other important spots (e.g. Sumdo near Puga) are included in this IBA. There are many small wetland sites which are important breeding grounds for water birds, but those individual sites do not fulfil IBA criteria, so the whole Changthang plateau as a whole could be considered as one IBA. This does not mean that the individual wetlands are not important. All the sites are part of the IBA and should be well protected. Dr. Otto Pfister has suggested that the Changthang region could be divided into three areas, from the conservation point of view. These areas are: Pangong Tso region (i.e. northern Changthang Wilderness Area - including Pangong Tso, Chushul, Harong and Lungparma), Hanle region (i.e. eastern Changthang Wilderness Area, including Hanle plain, Lalpari, Staglung and Fukche) and Tsomoriri region (i.e. western Changthang Wilderness Area, including Tso-Kar plain, Puga, Tsomoriri and Chumur).

The Jammu region has mixed types of forest. Udhampur, Jammu, Kathua, Riasi, Punch, Mirpur are some districts of the region which are very important for the species of Biome-7. Detailed studies have not been conducted and very little is known about the birds here, except for a couple of quick surveys by Baba (Wildlife Warden) in 1999-2000.

### **Threatened Species**

In Jammu and Kashmir, historically, 18 globally threatened species have been recorded (BirdLife International 2001), such as the Siberian Crane *Grus leucogeranus* from Leh, White-headed Duck *Oxyura leucocephala*, Lesser White-fronted Goose *Anser erythropus* from Wular Lake, Baikal Teal *Anas formosa*

from Mirgund reservoir, Marbled Teal *Marmaronetta angustirostris* from Wular Lake and Mirgund reservoir, and Pallas's Fish Eagle *Haliaeetus leucoryphus* from Wular Lake, Haigam Rakh, Leh, Hokarsar, Chushul, Marbul pass, Tso-Moriri Lake and Hanle. The Greater Spotted Eagle *Aquila clanga* was also reported from Badwara (BirdLife International 2001) and the Eastern Imperial Eagle *Aquila heliaca* from Kashmir Valley. The Cheer Pheasant was reported from Limber Wildlife Sanctuary and Kishtwar National Park. The Sarus Crane

#### Threatened species for which Jammu and Kashmir is important

*Grus antigone* was reported from Kathua district, at Kishanpur Garuna Wetland Reserve (Choudhury et al. 1999, Sahi 1993, Sundar 1999). Eastern Stock Pigeon *Columba eversmanni* was reported from Limber Wildlife Sanctuary (Javed 1992). Some of these species are still reported from the State, but birds such as the Siberian Crane, the White-headed Duck, the Lesser White-fronted Goose, the Marbled and Baikal Teals have not been reported recently.

In the recent years, eleven globally threatened species have been recorded from the IBAs in Jammu and Kashmir. Most of the species are widespread such as Pallas's Fish Eagle, Eastern Imperial Eagle, Oriental White-backed Vulture *Gyps bengalensis* and Greater Spotted Eagle. The Black-necked Crane is found in the Changthang plateau in small numbers, their main population is in Tibet and c. 300 individuals were seen in Bhutan (BirdLife International 2001). Along with neighbouring Himachal Pradesh, Jammu and Kashmir is extremely important for the long-term survival of the Western Tragopan *Tragopan melanocephalus* and the Cheer Pheasant *Catreus wallichii*. Probably, the main breeding population of the Kashmir Flycatcher *Ficedula subrubra* is found in this State. It has been recorded as breeding in Overa Wildlife Sanctuary (Price and Jamadar 1990) and in Dachigam National Park (Khursheed Ahmad unpublished).

#### **Pallas's Fish-Eagle *Haliaeetus leucoryphus* Vulnerable**

This species which is recorded as Vulnerable was once very common in the valley of Kashmir. It has probably declined, although the recent dearth of records is partly the result of reduced accessibility (BirdLife International 2001). This bird has been reported from the Wular lake in the past (Unwin 1897; Loke 1946; Ludlow and Kinnear 1933-1934); Haigam Rakh (Scott *et al.* 1989); Leh, Ladakh (Ludlow and Kinnear 1933-1934); Hokarsar (Scott *et al.* 1989; Khursheed Ahmad *Pers. comm.* 2007), Srinagar, Chushul (Meinertzhagen 1927); Tso-Moriri lake, Ladakh (Osmaston 1925) and Hanle (Oberholser 1900). Now it is reported only from Haigam Rakh, Hokarsar, and Wular Lake and associated marshes.

### **Western Tragopan *Tragopan melanocephalus* Vulnerable**

The Western Tragopan is classified as Vulnerable because its sparsely distributed small population is declining and becoming increasingly fragmented in the face of continuing forest loss and degradation throughout its restricted range (BirdLife International 2001). This species has been reported from Wular (Knox and Walters 1994); Lolab Valley (Lawrence 1894 and Baker 1921-1930); Limber Wildlife Sanctuary (Kaul 1989, Qadri *et al.* 1990, Javed 1992, Akhtar *et al.* 1994); and Kishtwar National Park (Ward 1906-1908). In J&K, the bird has historically been distributed only along the Pir Panjal Range (which borders the valley with Himachal) and not towards the inner Greater Himalayan Range (Suhail unpublished 2011).

### **Cheer Pheasant *Catreus wallichii* Vulnerable**

The Cheer pheasant's small population is naturally fragmented because it lives in small patches of successional grassland. Human population pressure, hunting and changing patterns of land use are resulting in its decline, qualifying it as Vulnerable (BirdLife International 2010). This bird has been reported from the Kishtwar National Park (Ward 1906-1908) and the Limber Wildlife Sanctuary.

### **Black-necked Crane *Grus nigricollis* Vulnerable**

This species has a small, declining population as a result of the loss and degradation of wetlands, changing agricultural practices and increased human activity in its breeding and wintering grounds. These factors qualify it as Vulnerable (BirdLife International 2010). Between 70-75 individuals are seen at present in the Ladakh region, with about 10 breeding pairs.

### **Kashmir Flycatcher *Ficedula subrubra* Vulnerable**

This migratory flycatcher has a small, declining population and breeding range, which is also severely fragmented as a result of the destruction of temperate and mixed deciduous forests. It therefore qualifies as Vulnerable (BirdLife International 2001). The bird is reported from Lolab Valley, Dachigam National Park (Gauntlett 1972; Ahmad Khursheed 1999), and 15 ringed, April-July 1989 (BNHS ringing data); Rampur-Rajpur valley, above Wular lake, "many pairs" (Bates and Lowther 1952), Overa Wildlife Sanctuary, (Jamdar 1987, Price and Jamdar 1990), and Pahalgam. It is confirmed from four IBAs. It has however,



### Restricted Range species

been recorded as breeding in Overa Wildlife Sanctuary (Price and Jamadar 1990) and in Dachigam National Park in 2003 (Khursheed Ahmad unpublished).

In the Western Himalayas (Endemic Bird Area 128), the main habitats are the Temperate coniferous or Broadleaf Forest, Sub-Alpine Forest and Montane Grassland. These habitats have 11 Restricted Range bird species between elevations of 1,500 m to 3,600 m. Of these 11 restricted range species, four are globally threatened (Stattersfield *et al.* 1998, BirdLife International 2001). In Jammu and Kashmir ten are found, except the Himalayan Quail *Ophryisia superciliosa* (thought to be extinct) which was distributed in long grass and brushwood on steep hillsides and was reported from Uttaranchal 100 years ago. Other Restricted Range species in Jammu and Kashmir are the Western Tragopan in the dense undergrowth in Coniferous, Mixed and the Oak Forests at altitudes between 1,350 m (in winter) to 3,600 m; Cheer Pheasant on steep grassy slopes, Open Coniferous or Deciduous Forests, appears to like early successional habitats at altitudes between 1,400 m and 3,500 m; the Brooks Leaf Warbler *Phylloscopus subviridis* has not been reported from any of the IBAs from its habitat of Coniferous and Mixed Forest in drier, cooler areas at altitudes between 2,100 m to 3,600 m; the Tytler's Leaf Warbler *Phylloscopus tytleri* is reported from Dachigam National Park in Coniferous forest, dwarf willows and birches near the tree line between altitudes of 2,400 to 3,600m. Kashmir Flycatcher (*Ficedula subrubra*) is widely distributed, down to the south of India in Tamil Nadu, Kerala and in Sri Lanka. In Jammu and Kashmir, it is reported from Dachigam National Park (Gauntlett 1972; Ahmad 1999), Dehra Gali in Jammu (Tahir Shawl *pers. comm.* 2003), Gulmarg Wildlife Sanctuary, Overa-Aru Wildlife Sanctuary and Hiranagar (Tahir Shawl *pers. comm.* 2003) in the Temperate Mixed Broadleaf Forest, especially where there is dense growth of *Parrotia* between altitudes of 1,800 to 2,700 m. The White-cheeked Tit *Aegithalos leucogenys* has not been reported from any of the IBAs. Similarly, the White-throated Tit *Aegithalos niveogularis* has not been reported from any of the IBAs, nor is the Spectacled Finch *Callacanthus burtoni*, the Orange Bullfinch *Pyrrhula aurantiaca* has been reported from Dachigam National Park in Open Coniferous and Mixed Forest between 1,600 m (in winter) and 2,700 m to 3,300 m. Kashmir Nuthatch *Sitta cashmirensis* reported from Overa-Aru Wildlife Sanctuary is also reported being sighted from Dachigam National Park's subalpine meadow at c. 3300 m in Dagwan (Khursheed Ahmad unpublished 2003).

### Endemic Bird Area 128: Western Himalayas

Western Tragopan <i>Tragopan melanocephalus</i>	IN-JK-03, 10, 11,12
Cheer Pheasant <i>Catreus wallichii</i>	IN-JK-12
Tytler's Leaf-Warbler <i>Phylloscopus tytleri</i>	IN-JK-02, 14
Kashmir Flycatcher <i>Ficedula subrubra</i>	IN-JK-02, 03, 04, 08, 14
Kashmir Nuthatch <i>Sitta cashmirensis</i>	IN-JK-14, 02
Orange Bullfinch <i>Pyrrhula aurantiaca</i>	IN-JK-02, 14

### Biome

Ladakh also lies in Biome-5 (Eurasian High Montane-Alpine and Tibetan) where BirdLife International (undated) has identified 48 species that represents the bird assemblages of this biome. Based on the checklist of Pfister (2004), 25 species are found here. In or near the Changthang area, thick stands of *Hippophae rhamnoides* and other vegetation in the Markha and Chang Chu valleys provide important habitat for large numbers of wintering passerines such as Goldenstart's Redstart *Phoenicurus erythrogaster*, Common Great Rosefinch *Carpodacus rubicilla*, Streaked Great Rosefinch *C. rubicilloides*, Black-throated Thrush *Turdus ruficollis*, Stoliczka's Tit-warbler *Leptopoeile sophiae*, Robin Accentor *Prunella rubeculoides* and Brown Accentor *Prunella fulvescens* (Mallon 1987,1989).

### THREATS AND CONSERVATION ISSUES

As elsewhere in the country heavy human biotic interference and overexploitation of forests has had an adverse impact on Wildlife and their habitats. Human-Wildlife conflicts at its peak in these days are a result of intensive biotic interferences in the protected areas. Thus the victim is the Wildlife in general and the threatened and endemic species, in particular. Among the several endangered species inhabiting this region, the Hangul or Kashmir Red deer, which is endemic to Kashmir, Musk deer and Markhor, Cheer Pheasant, Western Tragopan, Black necked Crane are highly endangered and require immediate management and conservation inputs.

Wildlife conservation in general and Endangered species particularly Hangul conservation has had been given priority in the Management plan even in the first one drafted in 1971 by Collin Holloway. The population of Hangul in Kashmir has reduced from an estimated 2000 individuals in 1947 to about 140-170 individuals at present (Qureshi *et al.* 2009; Ahmad Khursheed *et al.* 2009). Livestock grazing is a major problem of all the protected areas and IBAs in this

State. Even in the prestigious Dachigam NP, a sheep farm is present. Despite repeated attempts by the wildlife Department to relocate this farm outside the national park, this step has not been successful. Other problems include the lack of coordination between the many different departments that hold stakes in the Park (Animal Husbandry, Hospitality and Protocol, PWD, Irrigation and Water Works, Electricity, Telephones, Agriculture and Fisheries). Disturbance to wildlife is also caused by visitors driving noisily along the 5 km stretch of road to the VIP lodge at Draphama (Gruisen 1983). At present, the army and paramilitary forces have a base inside the National Park who not only occupy the accommodation meant for the frontline staff but also cause disturbance to the Hangul habitats particularly during its breeding season. In Ladakh, unplanned developmental activities are the main concern in the Changthang region. Alteration of marshes by willow plantation and construction of roads is directly affecting the breeding grounds of the endangered Black-necked Crane. Increasing settlements near the crane's nesting habitats have resulted in an increase in the feral dog population, a major predator on crane eggs in Changthang.

In Gulmarg, the tourist industry depends on the surrounding forest for fuel wood. The forest also suffers, like most sanctuaries of Jammu and Kashmir, from the invasion of nomadic graziers in certain months.

Overa, Lardi and Dahwatoo villages, with a total human population of nearly 4500 are situated close to the southern boundary of the Overa-Aru Wildlife Sanctuary. A constant vigil is required to prevent encroachment in the Sanctuary (Suhail 2000). This IBA suffers massive grazing pressure during the summer months from local and nomadic graziers. Firewood collection is another major problem due to the increase in human population. All villagers stock large amounts of dry wood to see them through winter. During dry summer months, forest fire is another problem. Many times fires are started by graziers to remove dry unpalatable coarse grasses, which are inedible.

Overall the key threats to birds and the biodiversity of the State are habitat encroachment, overgrazing by livestock, tourism, firewood collection and forest fire.

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## CHUSHUL MARSHES

IBA CRITERIA : A1 (Threatened Species)  
PROTECTION STATUS : Not officially protected

<b>IBA Site Code</b>	IN-JK-01
<b>State</b>	Jammu and Kashmir
<b>District</b>	Leh, Ladakh
<b>Coordinates</b>	33° 35' 03" N, 78°45' 00" E
<b>Ownership</b>	State Wildlife Department
<b>Area</b>	1,500 ha
<b>Altitude</b>	4,385 m
<b>Rainfall</b>	75 mm
<b>Temperature</b>	-30 °C to 30 °C
<b>Biogeographic Zone</b>	Trans-Himalaya
<b>Habitats</b>	Aquatic, Flooded Valley Grassland

### GENERAL DESCRIPTION

The Chushul Marshes lie within Changthan, east and west of Chushul village near the Chinese border. The habitats consist of shallow ponds, marshes, borax plains and wet meadows in a broad sandy valley. Springs and streams flowing down into the Valley from the Ladakh range create the ponds and marshes. Some streams terminate on the sandy plains in stagnant pools which become more

saline as they evaporate. Others carry enough water to flow into the Pangong Tso. Most of the ponds and marshes remain frozen from November to March. The principal vegetation consists of species of Hydrilla, Myriophyllum in the ponds and Carex, other sedges and grasses in the marshes. The surrounding steppe is dominated by Caragana.

#### AVIFAUNA

The wetland is an important breeding area for several species of waterfowl, such as the Great Crested Grebe *Podiceps cristatus*, Ruddy Shelduck *Tadorna ferruginea*, Lesser Sand Plover *Charadrius mongolus*, Common Redshank *Tringa totanus* and Common Tern *Sterna hirundo*. Three pairs of Black-necked Crane *Grus nigricollis* inhabit the Chushul marshes, of which two pairs are consistently breeding at Tsigul Tso and Tso Nyak (Hussain and Pandav 2001; Rauf Zargar *pers. comm.* 2003). Some pairs of Bar-headed Geese *Anser indicus* also breed here. The Tibetan Sandgrouse *Syrrhaptes tibetanus*, and Tibetan Partridge *Perdix hodgsoniae* representing Biome-5 occur on the surrounding dry plains.

#### Vulnerable

Black-necked Crane *Grus nigricollis*

#### OTHER KEY FAUNA

The other important fauna of the site include Tibetan Wild Ass *Equus kiang*, Tibetan Argali *Ovis ammon*, Blue Sheep or Bharal *Pseudois nayaur* and Tibetan Gazelle *Procapra picticaudata* (Rauf Zargar *pers. comm.* 2003).

#### LAND USE

- Urban settlements
- Nature conservation and research
- Agriculture

#### THREATS AND CONSERVATION ISSUES

- Urbanization
- Livestock grazing
- Feral dogs
- Distribution to birds
- Soil erosion

The wetland lies within the proposed High Altitude Cold Desert National Park in east Ladakh. Human activities in the area are increasing. Livestock grazing in and around the wetlands poses a threat to the vegetation and causes soil erosion.

Yaks regularly wade out in shallow waters and disturb the nesting birds. Permanent human settlements cause contamination of the water, brooks are diverted for agriculture which drains the marshes, and increased garbage production attracts ravens *Corvus corax* which, together with the semi-feral dogs (locally called Yankis), prey on small mammals, eggs and nestlings of waterfowl.

Freshwater marshes are rare in Ladakh; they are thus a focal point for human beings as well as wildlife, particularly during spring and summer, and during autumn for migratory birds. Caragana bushes are collected by local people to feed livestock. During religious festivals, people use these wetlands and there is increased diversion of water channels for domestic use (Rauf Zargar *pers. comm.* 2003).

#### **KEY CONTRIBUTORS**

Rauf Zargar, Bivash Pandav and S. A. Hussain

#### **KEY REFERENCE**

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#### **GENERAL DESCRIPTION**

Dachigam National Park, about 20 km from Srinagar, was established in 1910 as a hunting reserve by the Maharaja of Kashmir. After the merger of Jammu



## DACHIGAM NATIONAL PARK

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas), A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest)

**PROTECTION STATUS:** National Park, established since 1981

<b>IBA Site Code</b>	IN-JK-02
<b>State</b>	Jammu and Kashmir
<b>District</b>	Srinagar and Anantnag
<b>Coordinates</b>	34° 12' 10" N, 74° 51' 36" E
<b>Ownership</b>	State Wildlife Department
<b>Area</b>	17,125 ha
<b>Altitude</b>	1,642-4700 m
<b>Rainfall</b>	32 mm to 546 mm
<b>Temperature</b>	-2 °C to 32°C
<b>Biogeographic Zone</b>	North West Himalaya 2A
<b>Habitats</b>	Alpine Moist Scrub, Himalayan Moist Temperate, Alpine MoistPasture

and Kashmir with independent India in 1948, the management of the Park was handed over to the erstwhile Game & Fisheries Department and subsequently to the Wildlife Protection Department which then emerged as separate department independent of the Forest Department.

Dachigam National Park (141 km<sup>2</sup>) ranging from 1700 m. to 4700 m. elevation (Anonymous 1985; Ahmad *et al.* 2009) lies between 34 ° 05'' 00' N and 34° 10'' 32' N and 74° 53'' 50' E and 75° 09'' 16' E (Ahmad *et al.* 2009) in the Zaskar mountain range of North-West Himalayan Bio-geographic zone (2A) (Rodgers *et al.* 2000).

Dachigam National Park is roughly rectangular in shape *ca.* 22.5 km. long and 8 km. wide, and covers roughly half of the catchment area of Dal lake (Holloway & Wani 1971). The valley begins as a broad and narrow bent passage at its entrance facing north-west direction and ends at its south eastern end at Nagberan and at its eastern end at Marsar meadows. The Himalayan mountain ranges including Dachigam National Park are a part of the great Zaskar Range which forms the north-west branch of the Central Himalayan Axis, bifurcating near Kullu (Himachal Pradesh) and terminating in the high twin peaks of Nun Kun (7,135 m) ((Lydekker 1876; Holloway & Wani 1971). The fold of this mountain range has undulating narrow gullies, and broader outer gullies locally known as 'Nar'. There are two steep ridges, one rising from near Harwan Reservoir and the other to the east of New Thir, which form the natural boundaries of the National Park (Holloway & Wani 1971; Kurt 1978). Dachigam National Park exhibits a variety of vegetational types manifested by habitat, form and density of dominant species and controlled by a number of factors including microclimatic conditions prevailing due to the changing aspects of the undulating terrain habitat conditions, exposure, altitude and above all, the degree of biotic interference (Singh and Kachroo 1978).

The forests of this Park serve as a major catchment area of the world famous Dal lake, and a source of drinking water supply to the residents of the Srinagar. The main Dagwan river which is the source of the drinking water originates from Marsar Lake in the Upper Dachigam and is fed throughout its course by a complex of mountain streams draining through numerous gullies (Kurt 1978) till it drains into Harwan Reservoir.

The importance of Dachigam as a catchment area of the Dal lake was recognized by the erstwhile Maharaja nearly a century ago, who moved ten villages to protect the forest cover, hence its name Dachigam (dachi = ten, gam= villages).

Dachigam National Park assumes a great ecological, aesthetic and socio-economic significance as being the only area where the last surviving population of the highly endangered and endemic deer of the Kashmir – The Kashmir Stag or Hangul, besides the endangered Musk deer, Brown bear (*Ursus arctos*) Snow leopard and diverse flora and fauna. Dachigam National Park has had been inhabiting the largest extant population, of the critically endangered Kashmir Red deer or Hangul *Cervus elaphus hanglu* The Hangul which is endemic to Kashmir and once distributed widely in the mountains of Kashmir has reduced drastically during the recent past owing to habitat degradation and poaching due to indiscriminate biotic interferences. At present the viable population of Hangul around 140-170 individuals is now restricted to Dachigam National Park and its adjoining protected areas (Qureshi *et al.* 2009; Ahmad Khursheed *et al.* 2009).

Owing to protection for the last 90 years, the vegetation of Dachigam NP presents a strong contrast with that outside. Despite the fact that there is some pressure of graziers in the Park, the vegetation is more or less intact. The mountain slopes of Dagwan valley and the catchment areas of various nullahs sustain the almost pristine vegetation. Six major types of vegetation have been recognized. The low lying areas, from 1,700 to 3,000 m, have a complex mixture of vegetation types, with broad leaf mesophyll forests of *Acer caesium*, *Morus alba*, *Ulmus* spp., *Rhus succidiadiana*, and *Juglans regia*, *Parrotiopsis jacquemontiana* and a variety of conifers such as Deodar *Cedrus deodara*, Blue Pine *Pinus wallichiana*, Spruce *Picea smithiana* and Fir *Abies pindrow* growing in an altitudinal sequence (Holloway 1970; Singh and Kachroo 1978). The upper reaches, from 3,000 to c. 4,700 m, comprise a vegetation gradient of a subalpine forest community followed by scrub vegetation of Birch *Betula utilis* and Rhododendron *Rhododendron* spp. interspersed with herb-rich grasslands and meadows above 3,300 m. This zone gradually merges into the zone of permanent snow, which is above 3,500 m (Holloway 1970; Singh and Kachroo 1978; Ahmad *et al.* 2009).

#### **AVIFAUNA**

Dachigam NP is very rich in high altitude birds. Before insurgency started in 1989, it was very popular with birdwatchers and researchers. A total of 145 species have been recorded (Katti 1989), while Hussain (1989) has recorded 107 species during the BNHS Bird Migration Project. Many of the birds were ringed, so the identity has been confirmed. Ahmad Khursheed (1999) has recorded a total of .....species in the lower Dachigam area of the National Park.

**Critically Endangered**

Oriental White-backed Vulture *Gyps bengalensis*?

**Vulnerable**

Eastern Imperial Eagle *Aquila heliaca*

Kashmir Flycatcher *Ficedula subrubra*

**Endemic Bird Area 128: Western Himalayas**

Tytler's Leaf-Warbler *Phylloscopus tytleri*

Kashmir Flycatcher *Ficedula subrubra*

Orange Bullfinch *Pyrrhula aurantiaca*

Kashmir Nuthatch *Sitta cashmirensis*

**Biome-5: Eurasian High Montane (Alpine and Tibetan)**

Himalayan Griffon *Gyps himalayensis*

Grandala *Grandala coelicolor*

Tickell's Warbler *Phylloscopus affinis*

Red-mantled Rosefinch *Carpodacus rhodochlamys*

Red-fronted Rosefinch *Carpodacus puniceus*

**Biome-7: Sino-Himalayan Temperate Forest**

Koklass Pheasant *Pucrasia macrolopha*

Himalayan Monal *Lophophorus impejanus*

Himalayan Rubythroat *Luscinia pectoralis*

Streaked Laughingthrush *Garrulax lineatus*

Variiegated Laughingthrush *Garrulax variegates*

Long-billed Bush-Warbler *Bradypterus major*

Western Crowned Warbler *Phylloscopus occipitalis*

Rusty-tailed Flycatcher *Muscicapa ruficauda*

Fire-capped Tit *Cephalopyrus flammiceps*

Simla Crested Tit *Parus rufonuchalis*

Green-backed Tit *Parus monticolus*

Bar-tailed Tree-Creeper *Certhia himalayana*

Yellow-breasted Greenfinch *Carduelis spinoides*

Yellow-billed Blue Magpie *Urocissa flavirostris*

This site is perhaps very important for the globally Vulnerable Kashmir Flycatcher *Ficedula subrubra*. Kashmir Flycatcher *Ficedula subrubra* has been observed in Dachigam National Park's Mixed woodland habitats predominated by *Rubinia pseudoaccacia* plants (Ahmad Khursheed 1999). It has personally been observed in the courtship behaviour by Khursheed Ahmad in 2003 in the mixed woodland habitat near Sheep breeding farm (Khursheed Ahmad *unpublished*). This migratory flycatcher has a small, declining population and breeding range, which is also severely fragmented, as a result of the destruction of Temperate, Mixed Deciduous Forests (BirdLife International 2001). It has been recently found wintering in moderate numbers in Mukurthi NP (IBA) in Tamil Nadu (Zarri and Rahmani in press).

Dachigam lies in the Western Himalayas Endemic Bird Area (EBA 128) where Stattersfield et al. (1998) have listed 11 Restricted Range species. Three have been found here till now but more are likely to be present.

Dachigam represents two biomes: Biome-5 Eurasian High Montane (Alpine and Tibetan) above c. 3,600 m, and Biome-7 Sino-Himalayan Temperate Forest, between c. 1,800 m and 3,600 m. BirdLife International (undated) has prepared a list of biome species. Out of the 48 Biome-5 species, seven are found here. Similarly, 13 species of Biome-7 are found here, out of 112.

Ahmad (1999) has seen purely migratory species such as Northern Pintail *Anas acuta* and Mallard *Anas platyrhynchos* on June, 20 1998, at the Harwan Reservoir inside the Park. While there are many records of breeding of Mallard in Kashmir (Bates and Lowther 1952) the sighting of Northern Pintail in summer, so far away from its known breeding range is interesting.

Of the pheasants, Himalayan or Impeyan Monal *Lophophorus impejanus* and Koklass *Pucrasia macrolopha* are present. The Himalayan Snowcock *Tetraogallus himalayensis* is also reported (Rodgers and Panwar 1988). Among the breeding species are the Kashmir Flycatcher *Ficedula subrubra*, Orange Bullfinch *Pyrrhula aurantiaca* and Tytler's Leaf-Warbler *Phylloscopus tytleri*. The Oriental White-backed Vulture *Gyps bengalensis* is recorded from this IBA, and Eastern Imperial Eagle *Aquila heliaca* also can be seen during the migratory season. Himalayan Golden Eagle *Aquila chrysaetos* and Lammergeier *Gypaetus barbatus* are easily seen here.

#### **OTHER KEY FAUNA**

The most important mammal of Dachigam National Park is the Hangul or the Kashmir Stag *Cervus elaphus hanglu*. Owing to political upheavals after India's Independence in 1947 and later on insurgency from 1989 onwards, Hangul

population has drastically declined-, both due to poaching by para-military personnel and due to habitat deterioration. At Present Dachigam National Park serves as the only abode for the genetically viable Hangul population estimated to be around 140-170 individuals in Dachigam National Park and its adjoining protected areas. Along with the Hangul, there are 15 other known species of mammals (Department of Wildlife Protection 1985).

The Himalayan Black Bear *Ursus thibetanus* (Kurt 1979) is widely distributed but the Brown Bear *Ursus arctos*, is uncommon and found only in Upper Dachigam (Kurt 1979; Gruisen 1983). Dachigam National Park is also reported to inhabit the highest density of Asiatic Black Bear in India (Sathyakumar *et al.* 2001). Himalayan Musk Deer *Moschus chrysogaster* and Serow is an uncommon are the other uncommon ungulates inhabiting the higher reaches of Dachigam. There is no recent record of Snow Leopard *Uncia uncia*, although Holloway (1970) reports seeing one. However, the Leopard *Panthera pardus*, the major natural predator of Hangul and other animals, is quite common. Himalayan Yellow-throated Marten *Martes flavigula*, Beech Marten *Martes foina*, Himalayan Weasel *Mustela sibirica*, Jungle Cat *Felis chaus*, Golden Jackal *Canis aureus* and Red Fox *Vulpes vulpes* are some of the smaller predators. The Long-tailed Marmot *Marmota caudata* and Himalayan Mouse Hare *Ochotona roylei* forms their main prey, along with birds.

Of the seven species of Langurs recently described by Groves (2001), Nepal Langur *Semnopithecus schistaceus* is found in Dachigam. They move around in large troops, often of 60 or more (Gruisen 1983).

Small Indian Civet ( ) has recently been recorded in Dachigam National Park (Samina *et al.* 2010).

#### **LAND USE**

- Nature conservation and research
- Ecotourism and nature education
- Watershed conservation

#### **THREATS AND CONSERVATION ISSUES**

- Over-grazing
- Unregulated tourism
- Lack of coordination among different departments having interests in the Park
- Poaching

Dachigam is vital not only as a refuge for the Hangul, but also as an undisturbed catchment area for the Harwan Reservoir, which is the main freshwater supply for Srinagar and contributes major water supply to the Dal lake.

There are no longer any permanent settlements within the Park. An estimated 10,000 sheep and 5,000 water buffalo belonging to Chopans, Gujjars, Bakarwals and Banyaris used to graze on the alpine pastures in summer, and wood and grass was collected by local villagers (Kurt 1978, 1979). Such practices have since been stopped, although livestock from a Government Sheep Breeding Farm, established on land excised from the former Sanctuary in 1961, along with livestock of the adjoining villagers besides Gujjars and nomadic Backarwaals continues to occupy the Dagwan pastures of Upper Dachigam in summer (Qureshi *et al.* 2009; Ahmad *et. al* 2009; Department of Wildlife Protection 1985). It is recognized as the main and long outstanding problem, and can only be solved by its removal. In the meantime, with funds from the Dal Development Board, a chain-link fence has been erected around the farm to prevent sheep from grazing on the southern slopes of Lower Dachigam. However, large quantities of grass are still cut from within the Park for winter fodder. Other problems include the lack of coordination between the many different departments that hold stakes in the Park (Animal Husbandry, Hospitality and Protocol, Public Work Department, Irrigation and Water Works, Electricity, Telephones, Agriculture and Fisheries), and the disturbance to wildlife caused by visitors driving noisily along the 5 km stretch of road to the VIP lodge at Draphama (Gruisen 1983).

Presently, the army has a base inside the National Park. Visitors have to take permission from the Chief Wildlife Warden. In order to save the Hangul and the Park, it is essential that the army is made aware of this.

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Rashid Y. Naquash, M. S. Bacha, and Khursheed Ahmad

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## DEHRA GALI (DGK) FOREST

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas)

**PROTECTION STATUS:** Not officially protected

<b>IBA Site Code</b>	IN-JK-03
<b>State</b>	Jammu and Kashmir
<b>District</b>	Poonch and Rajouri
<b>Coordinates</b>	33° 34' 00" N, 74° 24' 00" E
<b>Area</b>	1,800 ha
<b>Altitude</b>	1,650 - 2,396 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	- 4 °C to 25 °C
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Himalayan Wet Temperate, Sub Tropical Pine Forest, Sub Tropical Broadleaf Forest

### GENERAL DESCRIPTION

This IBA site on the lower hills of the Pir Panjal Range is located about 32 km northeast of Rajouri town and 190 km from Jammu city. The area falls in the temperate region and experiences heavy snowfall in winter, while summer is moderate.

## AVIFUANA

Not much information on the bird life is available but as the habitat is still suitable, it could be an excellent IBA (Shawl 1997). Intisar Suhail (*pers. comm.* 2003) has seen the Kashmir Flycatcher *Ficedula subrubra*, a globally Vulnerable species, according to BirdLife International (2001). Another species of special conservation concern is the Western Tragopan *Tragopan melanocephalus*. The Himalayan or Impeyan Monal *Lophophorus impejanus* is also found here, perhaps in considerable numbers.

### Vulnerable

Western Tragopan *Tragopan melanocephalus*  
Kashmir Flycatcher *Ficedula subrubra*

### Endemic Bird Area 128: Western Himalayas

Western Tragopan *Tragopan melanocephalus*  
Kashmir Flycatcher *Ficedula subrubra*

## OTHER KEY FAUNA

The area exhibits a rich and diverse faunal composition: Himalayan Black Bear *Ursus thibetanus*, Brown Bear *Ursus arctos*, Himalayan Musk Deer *Moschus chrysogaster*, Leopard *Panthera pardus*, Himalayan Yellow-throated Marten *Martes flavigula*, Beech Marten *Martes foina*, Himalayan Weasel *Mustela sibirica*, Jungle Cat *Felis chaus*, Jackal *Canis aureus*, Red Fox *Vulpes vulpes*, Long-tailed Marmot *Marmota caudata* and Himalayan Mouse Hare *Ochotona roylei*.

## LAND USE

- Agriculture
- Grazing

## THREATS AND CONSERVATION ISSUES

- Illegal felling
- Grazing
- Poaching
- Land encroachment

As the area is remote, not much is known about the specific threats. Like most of the sites in Jammu and Kashmir, this site also suffers from the problem of overgrazing, illicit cutting of trees, poaching and encroachment.

### **KEY CONTRIBUTORS**

Tahir Shawl and Intesar Suhail.

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## GULMARG WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas), A3 (Biome-5: Eurasian High Montane, Biome-7: Sino-Himalayan Temperate Forest)

**PROTECTION STATUS:** Wildlife Sanctuary, established in March 1987

<b>IBA Site Code</b>	IN-JK-04
<b>State</b>	Jammu and Kashmir
<b>District</b>	Baramulla
<b>Coordinates</b>	34° 15' 48" N, 74° 13' 23" E
<b>Ownership</b>	State
<b>Area</b>	13,925 ha
<b>Altitude</b>	2,400 - 4,300 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Himalayan Wet Temperate, Alpine Moist Scrub, Alpine Moist Pasture

### GENERAL DESCRIPTION

As the name indicates, the Sanctuary surrounds the famous tourist resort of Gulmarg. It was proposed to be a biosphere reserve in 1981, but that did not work out, so the Department of Wildlife Protection declared it a Sanctuary in 1987. The Sanctuary lies on the northeast side of the Pir Panjal Range, c. 50 km

southwest of Srinagar. It encompasses the upper catchment area of Ferozpur Nullah and the forests that surround the Gulmarg meadow. It is bounded to the north by the Jhelum Valley Forest Division, to the south and west by Poonch and Pir Panjal forest divisions, to the east by Drang village. The terrain is steep, becoming precipitous in the upper reaches of Ferozpur Nullah. The underlying rocks are predominantly Panjal volcanics, with well exposed acidic lava flows. Shale, limestone, slate and quartzite occur throughout the tract (Department of Wildlife Protection 1987; Bacha 2002).

Gulmarg Wildlife Sanctuary consists of sub-alpine forests of Blue Pine (*Pinus wallichiana*), Silver Birch (*Betula utilis*) and Silver Fir (*Abies pindrow*). Blue Pine forest is dominated by *Pinus wallichiana* which at places is mixed with the stands of Spruce (*Picea smithiana*), Yew (*Taxus wallichiana*) and Maple (*Acer cappadocicum*). This type of forest occurs mainly at lower altitudes on dry aspects of the slopes (Bacha 2002). Silver Fir is restricted to mountain folds and moist aspects. At lower levels, it is associated at some places with *Pinus wallichiana*, *Taxus wallichiana* and *Picea smithiana*. Birch extends from 3,000 to 3,500 m, and is distributed in the mountain folds and shady sites bordering alpine slopes. At lower altitudes, the forest joins stands of Silver Fir (Bacha 2002).

The vast alpine meadows have mainly herbaceous vegetation of *Inula*, *Primula*, *Potentilla*, *Corydalis*, *Gentiana*, *Rumex* and *Polygonum* species. In and around the meadows of Gulmarg village, many bulbous plants that were introduced, e.g. Iris, Narcissus, Daffodils, Jonquils, and Lupins, have become naturalized.

#### AVIFAUNA

There is no recent checklist of this site. A number of birds appear in the official lists (Department of Wildlife Protection 1987) but these records need to be confirmed. Osmaston (1923) has recorded 76 species from Gulmarg area. Based on this old checklist, 14 species of Biome-7 (Sino-Himalayan Temperate Forest) and four of Biome-5 (Eurasian High Montane- Alpine and Tibetan) are found here. Among the threatened species, only Kashmir Flycatcher *Ficedula subrubra* is confirmed.

Himalayan Snowcock (*Tetraogallus himalayensis*) is regularly seen. Himalayan or Impeyan Monal (*Lophophorus impejanus*) and Koklass Pheasant (*Pucrasia macrolopha*) were reported from this site (Ifshan Deewan and M. S. Bacha, pers. comm. 2003).

### **Vulnerable**

Kashmir Flycatcher *Ficedula subrubra*

### **Endemic Bird Area 128: Western Himalayas**

Kashmir Flycatcher *Ficedula subrubra*

### **Biome-5: Eurasian High Montane**

Himalayan Griffon *Gyps himalayensis*

Himalayan Snowcock *Tetraogallus himalayensis*

Ibisbill *Ibidorhyncha struthersii*

Tickell's Warbler *Phylloscopus affinis*

### **Biome-7: Sino-Himalayan Temperate Forest**

Himalayan Monal *Lophophorus impejanus*

Koklass Pheasant *Pucrasia macrolopha*

Himalayan Pied Woodpecker *Dendrocopos himalayensis*

Himalayan Rubythroat *Luscinia pectoralis*

Indian Blue Robin *Luscinia brunnea*

Streaked Laughingthrush *Garrulax lineatus*

Variiegated Laughingthrush *Garrulax variegates*

Large-billed Leaf-Warbler *Phylloscopus magnirostris*

Western Crowned Warbler *Phylloscopus occipitalis*

Simla Crested Tit *Parus rufonuchalis*

Spot-winged Crested Tit *Parus melanolophus*

Green-backed Tit *Parus monticola*

White-cheeked Nuthatch *Sitta leucopsis*

Bar-tailed Tree-creeper *Certhia himalayensis*

### **OTHER KEY FAUNA**

The area is noted for its wildlife. Large mammals recorded during a brief survey in 1979 include Rhesus Macaque (*Macaca mulatta*), Brown Bear (*Ursus arctos*), Asiatic Black Bear (*Ursus thibetanus*), Red Fox (*Vulpes vulpes*), Leopard (*Panthera pardus*) and Himalayan Musk Deer (*Moschus chrysogaster*) (Green 1979, 1986). According to document of the Department of Wildlife Protection (Bacha 2002) Markhor (*Capra falconeri*) are also found in this Sanctuary.

### **LAND USE**

- Tourism and recreation
- Nature conservation and research
- Grazing

## **THREATS AND CONSERVATION ISSUES**

- Unrestricted tourism
- Grazing
- Cable car
- Amusement park
- Collection of fuelwood

Gulmarg tourist industry depends on the surrounding forest for fuel wood. The forest also suffers, like most sanctuaries of Jammu and Kashmir, from invasion of nomadic graziers in certain months.

## **KEY CONTRIBUTORS**

IBA Team and workshop participants

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## HAIGAM (RAKH) WETLAND CONSERVATION RESERVE

**IBA CRITERIA:** A1 (Threatened Species), A4iii (<sup>3</sup> 20,000 waterbirds)

**PROTECTION STATUS:** Wetland Conservation Reserve

<b>IBA Site Code</b>	IN-JK-05
<b>State</b>	Jammu and Kashmir
<b>District</b>	Baramullah
<b>Coordinates</b>	34° 17' 15" N, 74° 35' 46" E
<b>Ownership</b>	State Wildlife Department
<b>Area</b>	1,400 ha
<b>Altitude</b>	1,580 m
<b>Rainfall</b>	900 mm
<b>Temperature</b>	25 °C to 30 °C
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Aquatic, Riverine Vegetation, Himalayan Secondary Scrub

### GENERAL DESCRIPTION

Haigam Rakh (marshes) is a permanent shallow freshwater lake with a maximum depth of 1.25 m located in Jhelum Valley. Perennial streams feed it, but the water table falls in late summer, reaches the lowest in autumn and rises again in early winter. Dissolved oxygen can reach very low levels in summer. The



surrounding area is predominantly paddy fields and marshes with some pastures that get flooded after heavy rain.

Haigam is named after a village of the same name. It is c. 40 km from Srinagar, the state capital. It was notified as a game reserve for duck shooting as far back as 1945. Earlier the area was about 1,400 ha, with reed beds of about 400 ha (Holmes and Parr 1988) but now the total reserve has shrunk to 725 ha.

Most of the lake is covered with a dense growth of reeds and other emergent vegetation. Dominant species include *Typha angustata*, *Phragmites communis*, *Phalaris arundinacea*, *Sparganium erectum*, *Sparganium ramosum*, *Scirpus lacustris* and *Scirpus palustris* (Kaul *et al.* 1980, Kaul 1982). In open areas there are various floating leaf species such as water lilies *Nymphaea stellata* and *Nymphaea alba*, Fringed Water Lily *Nymphoides peltata* and Water Chestnut *Trapa natans* (Kaul *et al.* 1980). The vegetation is rooted in the bottom of shallower areas or on a floating mat of roots and silt (Holmes and Parr 1988). 183 species of phytoplankton have been recorded. Rows of willow have been recently planted at the perimeter of the lake, which is surrounded by paddyfields, orchards and moist pastures.

#### AVIFAUNA

Haigam Rakh is the largest remaining reedbed area in the Kashmir Valley and it is of major ornithological importance (Holmes and Parr 1988). It is particularly important for migratory species and marshland breeding species. Densities of the Little Bittern *Ixobrychus minutus*, Water Rail *Rallus aquaticus*, Common Kingfisher *Alcedo atthis* and the Clamorous Reed Warbler *Acrocephalus stentoreus* are particularly high (Holmes and Parr 1988; Homes and Hatchell 1999). The area is important for autumn migrants, with 45% of the species recorded being passage migrants and/or winter visitors.

Haigam Lake is a major wintering area for migratory ducks, particularly the Common Teal *Anas crecca*, Northern Pintail *Anas acuta*, Eurasian Wigeon *Anas penelope*, Mallard *Anas platyrhynchos*, Gadwall *Anas strepera*, Northern Shoveller *Anas clypeata* and Common Pochard *Aythya ferina*. The lake is also an extremely important breeding area for a variety of species such as Little Grebe *Tachybaptus ruficollis*, Little Bittern *Ixobrychus minutus*, Little Egret *Egretta*

#### **Vulnerable**

Pallas's Fish-Eagle *Haliaeetus leucoryphus*

#### **Near Threatened**

Ferruginous Pochard *Aythya nyroca*

*garzetta*, Water Rail *Rallus aquaticus*, Common Moorhen *Gallinula chloropus*, Pheasant-tailed Jacana *Hydrophasianus chirurgus* and Whiskered Tern *Chlidonias hybridus*. Large numbers of hirundines and wagtails also use the reed beds as a roosting and moulting area. During the recent BNHS-MoEF Avian Influenza monitoring and surveillance study (2005-07) Khursheed Ahmad has recorded considerable population of waders dominated by White Wagtail *Motacilla alba* (794), Yellow wagtail *Motacilla flava* (794), Citerine wagtail *Motacilla citreola* (159) and Grey wagtail *Motacilla cinerea* (40) in Hygam Wetland. The wetland is also important for long distance migrants as a stopover site for feeding and resting.

Many water birds occur in huge numbers, much above the 1% population threshold determined by Wetlands International (2002). More recent records are also available of surveys conducted by Khursheed Ahmad (2005-07) under BNHS-MoEF Project on "Surveillance and Monitoring of Avian Influenza in Wintering Birds of India (Rahmani *et al.*. 2008 unpublished report). Based on published information (Scott 1989), the following species occur much above their 1% biogeographic population (Total seen in Haigam: 1% threshold numbers): *Anas crecca* (7,000 : 4,000), *Anas platyrhynchos* (25,000 : 750), *Anas penelope* (3,000 : 2,500), *Anas querquedula* (4,000 : 2,500) and *Anas strepera* (4,000: 1,500).

Holmes and Parr (1988) also found that the very local Swinhoe's Reed Warbler *Acrocephalus concinens*, now named the Blunt-winged Warbler (Grimmett *et al.* 1999) breeds in Haigam Rakh in small numbers, often near isolated willow trees. They found about 10 territories and caught fledged young ones in July-August 1983.

Bates and Lowther (1952) have recorded breeding of the Ferruginous Duck *Aythya nyroca* in the smaller vales of Kashmir, particularly at Haigam, but Holmes and Parr (1988) could not find any evidence of breeding.

During BNHS-MoEF Avian Influenza monitoring and surveillance study (2005-07) Khursheed Ahmad has recorded a huge concentration of species such as Northern Pintail (9,524), Eurasian Wigeon (1587), Mallard (9937), Gadwall (7937), Northern Shoveller (15,873), Common Teal (15873), Red Crested Pochard (3175) and Common Pochard (12698) in Hygam Wetlands reserve. These waterfowl concentrations were highest during the months of February (Rahmani *et al.*. 2008 unpublished; Khursheed unpublished). Khursheed Ahmad also has reported sighting of Western Marsh Harrier *Circus aeruginosus* (08 birds), Osprey *Pandion haliaetus* (02) and Peregrine Falcon *Falco peregrinus*

(02) birds in Hygam Wetland reserve during 2005-07 (Rahmani *et al.*. 2008 unpublished; Khursheed unpublished).

Haigam provides a vital staging area for many passage migrants including at least 18 species of shorebirds and several trans-Himalayan passage migrants. Pallas's Fish-eagle *Haliaeetus leucoryphus* has not been seen in the last 10 years (M. S. Bacha *pers. comm.* 2003), although earlier Scott (1989) reported that up to five individuals were resident.

Since shooting was stopped in 1995-96, there has been a steady increase in the population of waterfowl and other birds at Haigam-Rakh. At least, the government figures show this. For example, taking peak figures of different years, in 1996, only 1,530 birds were counted, which increased to 1,69,305 in 1998, and 3,80,165 in 2002 (Bacha 2002). Even if the figures are not absolutely correct, there is no doubt that Haigam-Rakh easily qualifies A4iii criteria.

#### **OTHER KEY FAUNA**

Mammals include Common Otter *Lutra lutra* and Golden Jackal *Canis aureus*. The lake also supports a rich fish fauna.

#### **LAND USE**

- Agriculture
- Water management
- Nature conservation and research

#### **THREATS AND CONSERVATION ISSUES**

- Siltation
- Agricultural intensification and expansion in surrounding areas
- Urbanisation

The entire wetland is protected as a conservation reserve by the Department of Wildlife. Reed cutting is permitted, but hunting of waterfowl has been stopped since 1995-96 and there has been a marked increase in the number of waterfowl.

The principal threats are siltation, encroachment due to agriculture and urbanization. Encroachers have now been arrested and evicted. Steps are being taken by the Forest Department to control eutrophication and weed infestation. Facilities are being built to cater to tourists and birdwatchers. The State Government has asked the Central Government to include Haigam Rakh in the National Wetland Conservation Programme.

## **KEY CONTRIBUTORS**

M. A. Parsa and M. S. Bacha, Khursheed Ahmad

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## HANLE PLAINS (HANLE RIVER MARSHES)

**IBA CRITERIA:** A1 (Threatened Species)  
**PROTECTION STATUS:** Not officially protected

<b>IBA Site Code</b>	IN-JK-06
<b>State</b>	Jammu and Kashmir
<b>District</b>	Leh, Ladakh
<b>Coordinates</b>	32° 47' 60" N, 79° 00' 00" E
<b>Ownership</b>	State/ Private
<b>Area</b>	8,000 ha.
<b>Altitude</b>	4,250 - 4,350 m
<b>Rainfall</b>	76 mm
<b>Temperature</b>	-40 °C to 30 °C
<b>Biogeographic Zone</b>	Trans-Himalaya
<b>Habitats</b>	Riverine Vegetation, Flooded Valley, Grassland, Alpine Moist Pasture

### GENERAL DESCRIPTION

These marshes are located west and north of Hanle village in Ladakh, near the border with China. They are partly state owned and partly under the Hanle Buddhist monastery. The habitat is a complex of fast flowing streams, stagnant

pools, saline marshes, seasonally flooded marshes, and bogs along the Hanle river, 45 km south of its confluence with the Indus river. The wetlands are frozen from November to April and are fed by snowmelt in summer.

The freshwater pools shelter species such as Hydrilla, Myriophyllum, Potamogeton, and an edible aquatic lichen

### AVIFAUNA

The area is an important breeding ground for various waterfowl including the Black-necked crane *Grus nigricollis*. There is a recent report of three breeding pairs of Black-necked crane in the Hanle marshes and one in Lal Pahari (Rauf Zargar *pers. comm.* 2003). This site is also an important breeding area for the Ruddy Shelduck *Tadorna ferruginea* and the Lesser Sand Plover *Charadrius mongolus*. During autumn migration many birds pass through this site, including the globally threatened Greater Spotted Eagle *Aquila clanga*. It uses the plain as the last staging site before crossing the Himalayan range (Pfister 2001).

#### Vulnerable

Greater Spotted Eagle *Aquila clanga*  
Black-necked Crane *Grus nigricollis*

### OTHER KEY FAUNA

The slopes above Hanle plain are an important habitat of Tibetan Wild Ass or Kiang *Equus kiang*. In 1995-96 the first Tibetan Gazelle *Procapra picticaudata* was seen here after 35 years of regional extinction. The Tibetan Wolf *Canis lupus chanco* and Red Fox *Vulpes vulpes* are also found. Besides, Weasel Mustela sp. Blue Sheep or Bharal *Pseudois nayaur*, Argali *Ovis ammon*, Marmot *Marmota* sp. and Woolly hare *Lepus oiostolus* are commonly found.

### LAND USE

- Water management
- Local recreation (no tourist permit is issued to this area)
- Grazing

### THREATS AND CONSERVATION ISSUES

- Disturbance to birds
- Grazing
- Urbanization
- Plantation

The area is used for grazing domestic livestock and for water supply to Hanle village. The human population in the Valley is increasing, and correspondingly the livestock population, intensifying the grazing on the valley and use of water for high-altitude agriculture. Packs of semi-feral dogs roam the region, taking a heavy toll of small mammals, and nestlings, including unfledged Black-necked Cranes. The dog numbers should be controlled, if the Black-necked Crane has to be saved.

Various parts of the marshes have been fenced for large-scale plantations of Willow, under the supervision of the Plantation Department (not the Forest Department). With the increasing influx of Tibetan refugees, their camps are growing bigger and bigger. Regular practice firing by the army and Indo-Tibetan Border Police disturb the tranquility of the site (K. Srivastava *pers. comm.* 2000).

#### **KEY CONTRIBUTORS**

Otto Pfister and Rauf Zargar

#### **KEY REFERENCE**

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## HEMIS HIGH ALTITUDE NATIONAL PARK

**IBA CRITERIA:** A3 (Biome-5: Eurasian High Montane)

**PROTECTION STATUS:** National Park, established in February 1981

<b>IBA Site Code</b>	IN-JK-07
<b>State</b>	Jammu and Kashmir
<b>District</b>	Ladakh
<b>Coordinates</b>	34° 01' 11" N, 77° 32' 00" E
<b>Ownership</b>	State Wildlife Department
<b>Area</b>	4,10,000 ha
<b>Altitude</b>	3,140 - 5,854 m
<b>Rainfall</b>	110 mm
<b>Temperature</b>	- 40 °C to 25 °C
<b>Biogeographic Zone</b>	Trans-Himalaya
<b>Habitats</b>	Alpine Dry Pasture, Riverine, Vegetation, Alpine Moist Scrub

### GENERAL DESCRIPTION

Hemis National Park (NP) is located in the Trans-Himalayan Ladakh district on the south bank of the Indus river. It extends from the southern side of the Indus Valley, southwards across the Zaskar Range as far as the Tsarap Chu and eastwards to the Buddhist monastery Hemis Gompa, after which the Park is



named. The Markha and Rumbala Valleys and the Zanshar river are located within the Park.

The present area of the Park is 4,10,000 ha, comprising a 1,25,000 ha core area and 2,85,000 ha buffer zone. Further extensions to the Park totaling 65,000 ha are recommended (Mallon and Bacha 1989).

Hemis is wholly mountainous in character. The core area (Alam Nullah and lower Chang Chu) lies in a band of hard limestone and other sediments that have been raised and tilted almost vertically, then deeply incised by a series of gorges. The terrain is rugged to the extreme with a high proportion of cliffs, screes and exposed rocks. It is isolated, with only a few passes crossing the main watersheds. The Markha and adjacent Sumdah Blocks comprise the catchment areas of the Markha, Rumbak, Shang and Sumdah rivers, all of which drain north into the Indus. The area covered by these two blocks consists of narrow valleys with short gorge sections. Gently sloping alluvial fans form a short section of stone desert along the south bank of the Indus between its confluences with the Zanskar and Rumbak. The upper Chang Chu (or Karnak) Block lies above 4,000 m. Here the landscape is different from the rest of the Park, and typical of the eastern plateau of Ladakh. The valley is broad, with a level floor up to 1 km wide, and bounded by open hills with relatively few cliffs. Shun-Shadi, which encompasses the Niri Chu and Shun catchment, is a remote and sparsely inhabited block lying above 3,800 m. The terrain is exceptionally rugged, with deep gorges, cliffs and steep broken slopes. There are two small lakes, unusual features in the mountains of central Ladakh (Mallon and Bacha 1989).

Hemis is the largest Protected Area in the Indian Himalayas. Its large size and altitudinal ranges, from valley floors to mountain peaks, ensure that it is fully representative of the Trans-Himalayan ecosystem of central Ladakh. Important features are the remnant patches of juniper scrub and riverine woodland, the Snow Leopard *Uncia uncia* and associated prey populations, with an uninhabited and little-disturbed core area (Mallon and Bacha 1989). This PA has been selected as one of several Snow Leopard Reserves under a project launched by the Government of India, aimed at conserving this rare species, its prey populations and its fragile mountain habitat (Ministry of Environment and Forests 1988).

Much of central Ladakh is high altitude desert (Dhar and Kachroo 1983) characterized by sparse grassland and herbaceous vegetation on mountain slopes, with shrublands and patchy forest at the base of the valleys. The vegetation of the park is described by Mallon and Bacha (1989), and further details given in Fox *et al.* (1986).

Trees are sparse and isolated, or as small open assemblies on hill slopes, and thin strips of riverine woods in common with the rest of Ladakh. The core area and the proposed Zaskar Gorge Block contain some of the best remaining fragments of a type of steppe juniper forest formerly common to many parts of central Asia. Characteristic species are *Juniperus macropoda* and *J. indica*, which occur as scattered trees on cliffs and high slopes up to 4,250m, and form patches of open scrub in a few localities. Thin strips of riverine woodland are most extensive in the Chang Chu catchment. Principal species are *Salix karelinii* and *Myricaria squamosa*, with a few poplars *Populus euphratica*, birch *Betula utilis*, juniper and willows *Salix* spp. The vegetation thins out above 4,500 m, with a few alpine species persisting to 5,000 m and above. Chundawat (1990) has given a list of 314 plant species recorded in the catchment of Rumbak Nullah.

#### AVIFAUNA

Almost all the high altitude birds of the Western Himalayas are found in the Hemis NP. Till now, 80 species have been recorded, of which about 50 breed in the Park. The Park does not have any globally threatened or restricted range species but many Biome-5 (Eurasian High Montane- Alpine and Tibetan) species have been recorded. This extensive Park is perhaps the best representative of Biome-5.

Thick stands of *Hippophae rhamnoides* and other vegetation in the Markha and Chang Chu Valleys provide important habitat for large numbers of wintering

#### **Biome-5: Eurasian High Montane**

Himalayan Griffon *Gyps himalayensis*  
Himalayan Snowcock *Tetraogallus himalayensis*  
Tibetan Partridge *Perdix hodgsoniae*  
Ibisbill *Ibidorhyncha struthersii*  
Brown-headed Gull *Larus brunnicephalus*  
Tibetan Sandgrouse *Syrrhaptes tibetanus*  
Snow Pigeon *Columba leuconota*  
Grey-backed Shrike *Lanius tephronotus*  
Robin Accentor *Prunella rubeculoides*  
Brown Accentor *Prunella fulvescens*  
Guldenstadt's Redstart *Phoenicurus erythrogaster*  
Stoliczka's Tit-Warbler *Leptopoeile sophiae*  
Red-mantled Rosefinch *Carpodacus rhodochlamys*  
Streaked Great Rosefinch *Carpodacus rubicilloides*  
Common Great Rosefinch *Carpodacus rubicilla*  
Yellow-billed Chough *Pyrrhocorax graculus*

passerines such as Guldenstadt's Redstart *Phoenicurus erythrogaster*, Great Rosefinch *Carpodacus rubicilla*, Eastern Great Rosefinch *C. rubicilloides*, Black-throated Thrush *Turdus ruficollis*, Stoliczka's Tit-Warbler *Leptopoeile sophiae*, Robin Accentor *Prunella rubeculoides* and Brown Accentor *Prunella fulvescens* (Mallon and Bacha 1989).

Unusual passage migrants include first records in Ladakh of Southern Grey Shrike *Lanius meridionalis*, Spotted Flycatcher *Muscicapa striata* and Orange-flanked Bush Robin *Tarsiger cyanurus*. There are no extensive wetlands in the Park, but a few species of ducks have been seen on the Zanskar river in spring and migrating teal *Anas crecca* in the Markha and Chu Valleys (Mallon and Bacha 1989).

#### **OTHER KEY FAUNA**

Hemis NP is famous for its population of the Snow Leopard which is of relatively high density, especially in the core area. The total population is estimated at 75-120 individuals, being most numerous in the Chang Chu catchment of the core area, mainly because its prey population is also high. Bharal or Blue Sheep *Pseudois nayaur* is present (1.3 animals per sq. km) in some valleys. The total population is estimated at 2,600-5,000. *Urial Ovis orientalis* is restricted to the northern part of the Park, where 226 animals were recorded in 1984. An isolated herd of 20-22 Tibetan Argali *Ovis ammon hodgsonii* lives in the vicinity of Ganda La, the pass between the Rumbak and Markha valleys. These are descendants of a small group which wandered into the area in the 1980s, the limit of the normal range of this species being in the Taglang-La region, some 75 km to the east (Bacha 1985; Fox *et al.* 1986; Mallon and Bacha 1989).

Another interesting species, widespread in suitable forest habitats in the plains, is the Wild Dog *Cuon alpinus*. A separate race *laniger* distributed from Altai mountains to Manchuria (Prater 1980) is found in Hemis.

Another major predator is the Tibetan Wolf *Canis lupus chanco*, which is widespread in the alpine and other flat areas. It is also a different race from what we see in the Indian plains. Lynx *Lynx lynx* has been reported but it presumably very rare.

Smaller predators are Red Fox *Vulpes vulpes*, Weasel *Mustela altaica*, Stone Marten *Martes foina*, and Pallas Cat *Otocolobus (Felis) manual* which feed on birds and small mammals such as the Large-eared Pika *Ochotona macrotis*, Woolly Hare *Lepus oiostolus* and Himalayan Marmot *Marmota himalayana*. Common Otter *Lutra lutra* has been reported (Mallon and Bacha 1989).

Amphibians are not recorded in this area, but reptiles are known to be represented by three species of lizard: *Agama himalayana* (numerous), *Scincella ladacensis* (sparsely distributed) and *Phrynocephalus theobaldi*, which is restricted to the stony desert in the northern of the park (Mallon and Bacha 1989).

#### **LAND USE**

- Tourism and recreation
- Nature conservation and research

#### **THREATS AND CONSERVATION ISSUES**

- Road construction
- Poaching (not a major problem)

The Park has some 1,600 residents distributed among 23 settlements, but there are no permanent settlements in the core area. In addition, people from outside the Park use its resources, particularly for grazing. Most residents are engaged in both agriculture and pastoralism, while those in the upper Chang Chu follow a semi-nomadic existence typical of the eastern plateau of Ladakh. Less than 1% of the Park's total area is cultivated, the main crops being barley and peas. All families own some domestic livestock. Traditional grazing rights are respected, preventing degradation of pastures from overgrazing. Trees, where available, and shrubs are used for timber, fuel and winter fodder. *Artemisia*, *Caragana* and *Acantholimon* shrubs are commonly used for fuel, and *Aconogonum tortuosum* and *Stachys tibetica* as winter fodder. Animal dung is also used for fuel, precluding its use as fertiliser on fields or pastures (Mallon and Bacha 1989).

Immediate objectives are to develop the Park infrastructure, eliminate current land use and disturbance in the core area, and develop strategies in consultation with local people for managing resources in the buffer zone for the benefit of residents, but without detriment to the habitat. A reduction in grazing, and the establishment of fuelwood plantations are high priorities. It is suggested to extend both the core and buffer zones, and to designate the whole area as a biosphere reserve (Rauf Zargar and M. S. Bacha *pers. comm.* 2003)

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## HIRPORA WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas)

**PROTECTION STATUS:** Wildlife Sanctuary, established in 1987

<b>IBA Site Code</b>	IN-JK-08
<b>State</b>	Jammu and Kashmir
<b>District</b>	Shopian
<b>Coordinates</b>	33° 30' to 33° 42' N, 74° 33' to 74° 43' E
<b>Ownership</b>	State Wildlife Department
<b>Area</b>	341.25 Sq km
<b>Altitude</b>	2,557 - 4,745 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Himalayan Wet Temperate, Himalayan Moist Temperate, Himalayan Secondary Scrub

### GENERAL DESCRIPTION

Hirpora, a reserved forest within Shopian Forest Division, was notified as a sanctuary in 1987. It lies in the Pir Panjal Mountain Range, 70 km south of Srinagar. It is bounded to the north by Lake Gumsar, northeast by Hirpora village,

east by Gurwatan forest, south by Bhagsar Gali and to the west by Pir Panjal Pass (Department of Wildlife Protection, J&K, 2006). The Sanctuary was set up mainly to protect Markhor, *Capra falconeri*, but it benefits other high altitude wildlife. The slopes are gentle to moderately steep on the eastern side of the Pir Panjal divide, and precipitous, with many cliffs, to the west and south.

Five main vegetation types can be distinguished, namely (i) Blue Pine *Pinus griffithii* forests in dry and exposed aspects, with Silver Fir *Abies webbiana* and Spruce *Picea smithiana*; (ii) Silver Fir forests, with Blue Pine and Spruce, which forms the largest component of the vegetation and is confined to cooler, moister aspects; (iii) Evergreen (e.g. *Juniperus* spp.) or Deciduous (e.g. *Rosa* spp.) scrub in the middle and lower zones, respectively; (iv) Birch *Betula utilis* forest, with an understorey of *Juniperus* spp. and *Rhododendron campanulatum*; and (v) Alpine meadows (Department of Wildlife Protection 1987).

#### **AVIFAUNA**

Earlier, the Department of Wildlife Protection (1987) had listed only 39 bird species, but as per the latest checklist prepared by the department (Suhail unpublished, 2010) there are 109 species of birds in the sanctuary. Rashid Y. Naqash (*pers. comm.* 2003) has recorded Himalayan or Impeyan Monal *Lophophorus impejanus* and Koklass Pheasant *Pucrasia macrolopha*. Four species of vultures namely the Himalayan Griffon Vulture *Gyps himalayensis*, the Eurasian Griffon *Gyps fulvus*, the Lammergeier, *Gypaetus barbatus* and the endangered Egyptian Vulture *Neophron percnopterus* are found here (Suhail unpublished, 2010) Among the globally Threatened species, Kashmir Flycatcher *Ficedula subrubra* is definitely found here.

#### **OTHER KEY FAUNA**

Hirpora Wildlife Sanctuary along with Limber/Lachipora (Kajinag area) has a distinction of harboring major part of the remaining viable population of Markhor *Capra falconeri*. These areas have the best possibility of population recovery of Markhor. They are seen as having potential source population for conservation and restocking of the species in the rest of its range (Ranjitsinh *et al.* 2005). This is why the Government of Jammu & Kashmir under the guidelines of the Central Empowered Committee of the Supreme Court of India has recently launched the 'Markhor Recovery Project' in the sanctuary. This has been done to mitigate the possible ill effects of the construction of the famous Mughal Road which passes right through the sanctuary.

The subspecies of Markhor found in the area is *C. falconeri cashmiriensis* (Prater 1980). This subspecies has horns that diverge less, and in old males, show two complete twists or spirals. Before the enactment of the Wildlife Protection Act

1972, Markhor was one of the most prized 'game animals' of the State, along with the Goral *Nemorhaedus goral*. Musk Deer *Moschus chrysogaster* is also reported from the Sanctuary (R. Y. Naqaush *pers. comm.* 2003). Brown Bear *Ursus arctos* is found in the alpine and subalpine regions, while Asiatic Black Bear *U. thibetanus* is found at lower altitudes and is widespread. Other species are: Red Fox *Vulpes vulpes*, Common Otter *Lutra lutra*, Yellow-throated Marten *Martes flavigula* and Royle's Pika *Ochotona roylei*.

#### **LAND USE**

- Grazing
- Agriculture



## HOKARSAR

**IBA CRITERIA:** A1 (Threatened Species), A4iii (<sup>3</sup> 20,000 Waterbirds)

**PROTECTION STATUS:** Wetland Conservation Reserve

<b>IBA Site Code</b>	IN-JK-09
<b>State</b>	Jammu and Kashmir
<b>District</b>	Budgam and Srinagar
<b>Coordinates</b>	33° 59' 48" N, 74° 56' 08" E
<b>Ownership</b>	Department of Wildlife Protection
<b>Area</b>	1,375 ha
<b>Altitude</b>	1,580 m
<b>Rainfall</b>	550 mm
<b>Temperature</b>	8 °C to 20 °C
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Seasonal Marsh

### GENERAL DESCRIPTION

Hokarsar, a renowned waterfowl reserve, lies c. 10 km west of Srinagar on the Srinagar-Baramulla highway, on the banks of the Jhelum river. It is fed by the perennial Doodhganga river tributary, which makes its way through village Hajibabh, situated on its southeast, to meet the Jhelum river. Another stream

called Sukhang enters the area near village Narabal on the northwest which ultimately drains directly into the Doodhganga near Sozeith village. The water table depends upon the discharge from the Doodhganga spill channel. In recent years, the water from this channel has been diverted for cultivation, resulting in reduced supply to Hokarsar Lake. Moreover, due to deforestation in the catchment area, silt is brought down by the river, threatening the very existence of this important waterfowl habitat. The lake reaches a maximum depth of 2.5 m in spring during snowmelt and a minimum of 0.7 m in autumn.

The vegetation ranges from submerged, attached, free floating to emergent. Shallow areas support thick stands of Typha and Phragmites. *Trapa natans*, *Nymphoides peltatum*, *Nymphoides candida* and *Nymphoides stellata* occur in the open water areas. At least 156 species of phytoplankton have been recorded, with *Chlorophyceae* predominating. There are many floating gardens in the lake. Plantation of *Salix alba* has been taken up along the shoreline, while rice is grown in the surrounding areas. These crop fields also provide foraging areas for birds.

#### AVIFAUNA

Hokarsar is an important wetland for both resident and migratory waterfowl. Hussain (1989) counted 64 species in and around the wetlands during bird ringing studies. The lake is particularly important as a wintering area for migratory ducks and geese, and as a breeding area for herons, egrets and rails. Up to 25,000 wintering ducks have been recorded at one time; the common species being Greylag Goose *Anser anser* (10,000), Ruddy Shelduck *Tadorna ferruginea* (100), Common Teal *Anas crecca* (10,000), Northern Pintail *Anas acuta* (15,000), Eurasian Wigeon *Anas penelope* (7,000), Mallard *Anas platyrhynchos* (15,000), Garganey *Anas querquedula* (3,000), Gadwall *Anas strepera* (5,000), Northern Shoveller *Anas clypeata* (5,000), Common Pochard *Aythya ferina* (10,000), White-eyed or Ferruginous Pochard *Aythya nyroca* (1,000) and Red-crested Pochard *Rhodonessa rufina* (2,000). Many of these species are found in much greater numbers than the 1% of biogeographic population threshold determined by Wetlands International (2002). More recent records are also available. During BNHS-MoEF Avian Influenza monitoring and surveillance study (2005-07) Khursheed Ahmad has recorded a huge concentration of wintering ducks such as Northern Pintail (1,000), Cotton Teal (1892), Eurasian Wigeon (2270), Mallard (21622), Gadwall (21622), Northern Shoveller (54,054), Common Teal (8108), Red Crested Pochard (200), Common Pochard (5405) besides White-eyed or Ferruginous Pochard *Aythya nyroca* (50) in Hokarsar Wetland reserve. These waterfowl concentrations were highest during the months of February (Rahmani *et al.* 2008 unpublished report; Khursheed unpublished). Khursheed Ahmad also has reported sighting of Western Marsh Harrier *Circus aeruginosus* (14),

Caspian Tern *Sterna caspia* (135), Black bellied Tern (10) and vulnerable Pallas's Fish-Eagle *Haliaeetus leucoryphus* (01) in Hokersar Wetland reserve during 2005-07 (Rahmani *et al.*. 2008 unpublished; Khursheed unpublished).

Breeding species include the Little Grebe *Tachybaptus ruficollis*, Little Bittern *Ixobrychus minutus*, Grey Heron *Ardea cinerea*, Black-crowned Night Heron *Nycticorax nycticorax*, Little Egret *Egretta garzetta*, Water Rail *Rallus aquaticus*, Common Moorhen *Gallinula chloropus* and Pheasant-tailed Jacana *Hydrophasianus chirurgus*. A small number of Common Crane *Grus grus* is also seen in some years.

Among the globally threatened species, Pallas's Fish-Eagle *Haliaeetus leucoryphus* is resident (Scott 1989).

The Department of Wildlife Protection of the Jammu and Kashmir Government conducts annual waterfowl surveys (Bacha 2002). According to this survey report, on January 12, 2002, more than 3,70,000 birds were counted. There has been considerable increase in the waterfowl numbers since shooting was stopped.

**Vulnerable**

Pallas's Fish-Eagle *Haliaeetus leucoryphus*

**Near Threatened**

Ferruginous Pochard *Aythya nyroca*

**OTHER KEY FAUNA**

The Common Otter *Lutra lutra* is common in the lake, and other mammals known to occur in the Reserve include the Red Fox *Vulpes vulpes* and Jackal *Canis aureus*. The lake supports rich fish fauna including *Cyprinus carpio*, *Crossocheilus* sp., *Barbus conchoni* and *Gambusia affinis*.

**LAND USE**

- Fishing
- Harvesting of reeds in summer
- Paddy cultivation in the surrounding areas

**THREATS AND CONSERVATION ISSUES**

- Siltation
- Encroachment
- Disturbance to birds
- Agricultural intensification
- Poaching

Silt deposition has reduced the depth and surface area of the water, especially during summer months, thus the edges are either exposed to encroachment for paddy cultivation or willow plantations by the locals. It is felt that the lake has shrunk to one third of its former size. Various proposals have been made for the management of the lake, including the cutting of weeds, dredging, raising of bunds, diversion of the Doodhganga spill channel to reduce siltation, and erection of a perimeter fence.

Fishing and harvesting of reeds also disturbs the birds. Cutting of reeds is particularly destructive to breeding birds, but some control of reeds is also required. In recent years, cultivation of mushrooms has started along the northern boundary.

The main threats are increased siltation, eutrophication and the encroachment of agricultural land into the marshes peripheral to the lake. Fertilizer run-off from the nearby agricultural land into the lake accelerates the rate of eutrophication. The lake receives a heavy load of silt from the Doodhganga catchment area, and the expanses of open water are decreasing in size as the lake silts up and the reed-beds expand.

Encroachment is also becoming a major threat to the site. Poaching by influential people still occurs, especially with the connivance of police and high government officials. For example, in March 1998, 20 influential poachers went on a killing spree for almost 15 days. The forest guards who resisted were shunted out. However, due to media vigilance and pressure on the Department of Wildlife Protection following the incident, this may not happen again.

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## KISTWAR NATIONAL PARK

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas), A3 (Biome-5: Eurasian High Montane - Alpine and Tibetan; Biome-7: Sino-Himalayan Temperate Forest)

**PROTECTION STATUS:** National Park, established in 1981

<b>IBA Site Code</b>	IN-JK-10
<b>State</b>	Jammu and Kashmir
<b>District</b>	Doda
<b>Coordinates</b>	33° 37' 12" N, 76° 12' 30" E
<b>Ownership</b>	State
<b>Area</b>	40,500 ha
<b>Altitude</b>	1,700 - 4,800 m
<b>Rainfall</b>	827 mm
<b>Temperature</b>	-7 °C to 35 °C
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Himalayan Temperate, Himalayan, Moist Temperate Forests, Himalayan, Secondary Forest, Alpine Moist Scrub, Alpine Dry Pasture

### GENERAL DESCRIPTION

This high altitude national park is named after the old town of Kistwar, in Doda district. It is located c. 40 km northeast of Kistwar. Like most of the protected areas in Kashmir, Kistwar NP forms the catchment area of many rivers and

streams (nullahs). The important ones are Kiyar, Nanth and Kibber nullahs, all draining southwest into Marau river which joins the Chenab river just above Kistwar town. The Marau drains the western slopes of the Bramah and Nun Kun ranges. The Park is bounded to the north by the Rinnay river, south by Kibber Nullah catchment, to the east by the main divide of the Great Himalayas and to the west by Marau river.

The terrain is mostly precipitous, rough and rugged. Moderate to very steep slopes are seen, mostly covered with thick forests. The slopes are broken by rocky cliffs, which form ideal habitats for the Himalayan Ibex *Capra sibirica*. Due to its latitude, high altitudes, high ridges and narrow, deep forest-covered valleys, the climate is extreme. Winters are extremely severe, and in some areas winter rains are common, although most precipitation is in the form of snow. Strong winds enhance the extreme cold in winter.

Kistwar NP has 13 main vegetation types, from alpine grasslands, to mixed coniferous forests, to Oak-Fir forests. Broadleaf forest occurs in the nullahs and cool damp aspects. Silver Fir *Abies pindrow* occurs in pure stands, but also mixed with Deodar *Cedrus deodara* and Kail. In general, Silver Fir and Spruce *Picea wallichiana*, mixed with Cedar *Cedrus deodara* and Blue Pine *Pinus griffithii*, are predominant from 2,400 m to 3,000 m. The main forest types are: Moist Deodar Forest, Western Mixed Coniferous Forests, Moist Temperate Deciduous Forest, Low-level Blue Pine Forest, West Himalayan Upper Oak Forest, Chilgoza Pine Forest, Dry Deodar Forests, Parrotia Scrub Forests, West Himalayan High Level Dry Blue Pine Forest, West Himalayan Sub-alpine Birch/Fir Forest, Sub-alpine Pasture, Birch-Rhododendron Scrub Forest and Alpine Pastures (Anon. undated).

#### **AVIFAUNA**

No detailed study has been conducted on the AVIFAUNA of the Park. Scott *et al.* (1988) during their 'Kashmir Expedition' have recorded 78 species of birds, including the Himalayan or Impeyan Monal *Lophophorus impejanus* and Koklass *Pucrasia macrolopha*. The globally threatened Western Tragopan *Tragopan melanocephalus* has also been reported. Recently, an injured bird was found by the forest officials which was later released (Department of Wildlife Protection, undated). M. M. Baba (*pers. comm.* 2003) has prepared a checklist of 115 species, which includes many species found in Biome-5 (Eurasian High Montane - Alpine and Tibetan) and Biome-7 (Sino-Himalayan Temperate Forest).

#### **OTHER KEY FAUNA**

Kistwar is famous for its high altitude fauna, from the elusive Snow Leopard *Uncia uncia* to the commoner Himalayan Ibex. During a census in 1999 by the

### Vulnerable

Western Tragopan *Tragopan melanocephalus*

### Endemic Bird Area 128: Western Himalayas

Western Tragopan *Tragopan melanocephalus*

Biome-5: Eurasian High Montane

Himalayan Griffon *Gyps himalayensis*

Snow Partridge *Lerwa lerwa*

Himalayan Snowcock *Tetraogallus himalayensis*

Snow Pigeon *Columba leuconota*

Alpine Accentor *Prunella collaris*

Red-mantled Rosefinch *Carpodacus rhodochlamys*

### Biome-7: Sino-Himalayan Temperate Forest

Koklass Pheasant *Pucrasia macrolopha*

Himalayan Monal *Lophophorus impejanus*

Himalayan Pied Woodpecker *Dendrocopos himalayensis*

Variiegated Laughingthrush *Garrulax variegatus*

Slaty-blue Flycatcher *Ficedula tricolor*

Fire-capped Tit *Cephalopyrus flammiceps*

Green-backed Tit *Parus monticolus*

White-cheeked Nuthatch *Sitta leucopsis*

Pink-browed Rosefinch *Carpodacus rhodochrous*

White-browed Rosefinch *Carpodacus thura*

Brown Bullfinch *Pyrrhula nipalensis*

Red-headed Bullfinch *Pyrrhula erythrocephala*

Spotted-winged Grosbeak *Mycerobas melanozanthos*

Yellow-billed Blue Magpie *Urocissa flavirostris*

staff of the forest department, 612 ibex were found in Kibber, Nath and Kiyar areas. Brown Bear *Ursus arctos* occurs mainly in sub-alpine and alpine regions, while the Eurasian Black Bear *Ursus thibetanus* is found in the lower reaches, where the Leopard *Panthera pardus* is also found. The Himalayan Musk Deer *Moschus chrysogaster*, Indian Muntjak *Muntiacus muntjak*, Serow *Nemorhaedus sumatraensis*, Goral *Nemorhaedus goral* and Wild Boar *Sus scrofa* are some of the ungulates. The Kashmir Stag or Hangul *Cervus elaphus hanglu* is also reported, especially during winter. Bharal or Blue Sheep *Pseudois nayaur* is found in the alpine regions, where it is the main prey of the Snow Leopard. There are reports of Markhor *Capra falconeri*. Common Langur has now been split into seven species (Groves 2001). Of these, the Himalayan Grey Langur *Semnopithecus entellus ajax* is found in Kistwar.

The most important areas for wildlife are considered to be the Kiar and Kibber valleys. Hangul is reported to occur in Kiar, but only in the severest of winters when animals are thought to migrate from the Dachigam, 100-150 km to the northwest. Goral is reported to occur around Sondar and Sirshi, Ibex in the Bramah area and snow leopard in Upper Kiar (Scott *et al.* 1988).

#### **LAND USE**

- Nature conservation and research

#### **THREATS AND CONSERVATION ISSUES**

- Encroachment
- Poaching
- Grazing
- Hychoelectric Power station

Before 1948, commercial logging was rampant, with almost no control by the Forest Department. After the merger of the state with the Indian union, the Forest Department took control and unrestricted tree cutting came to halt, only scientific logging was done. This also ceased with the establishment of the Park (Bacha 1986).

The disturbance from graziers and their livestock is high, but the need to control it is recognized. Encroachment and poaching are persistent problems. Asiatic Black Bear and Rhesus Macaque cause damage to crops, while Leopard and Brown Bear kill livestock (Kurt 1976; Bacha 1986; Scott *et al.* 1988) creating resentment against the Park. The problem of Man-animal conflict has to be addressed to gain the support of the local people.

There are plans for a hydroelectric dam at Hunzal, on the Marau river, which would not only inundate large areas of forest but pose a considerable threat to wildlife from the inevitable road construction and import of thousands of labourers (Gaston 1982, M. A. Parsa *pers. comm.* 2003).

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M. S. Bacha, Rahul Kaul, M. M. Baba and Peter Garson.

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## LACHIPORA WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas)

**PROTECTION STATUS:** Wildlife Sanctuary, established in March 1987

<b>IBA Site Code</b>	IN-JK-11
<b>State</b>	Jammu and Kashmir
<b>District</b>	Baramulla
<b>Coordinates</b>	34° 13' 31" N, 74° 21' 48" E
<b>Ownership</b>	State
<b>Area</b>	9,350 ha
<b>Altitude</b>	1,630 - 3,300 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Sub-tropical Pine Forest, Alpine Moist Pasture

### GENERAL DESCRIPTION

Lachipora Sanctuary is named after village Lachipora, which lies within the catchment fringing the protected area (Bacha 2000). The Sanctuary lies c. 90 km west of Srinagar and occupies the north bank of the River Jhelum. It is bounded to the north by Kakau Forest in Langet Forest Division, to the south by

Maidan Forest, to the southeast by the River Jhelum, to the west by the ceasefire line and to the east by Bagna and Limber Forests (Department of Wildlife Protection 1987).

The terrain is montane, with gentle to steep slopes, sometimes broken by huge rocky cliffs. In the upper reaches, the folds are thrown into a number of inaccessible undulations, enclosing narrow gullies, locally called nars (Bacha 2000).

Lachipora was established as a sanctuary primarily to protect the Markhor *Capra falconeri* (Department of Wildlife Protection 1987). As the elevation varies from 1,600 to 3,300 m, the vegetation also varies from broadleaf forest through coniferous forests to alpine grassland/meadows. The broadleaf forest consists of Horse Chestnut and Birch, woodlands of *Aesculus indica*, *Juglans regia*, *Acer cappadocium* association, *Betula utilis* and *Abies pindrow*. The coniferous forests have pure Deodar *Cedrus deodara* stands, dotted with isolated *Pinus griffithii*. Blue Pine forests are just the reverse with *P. griffithii* dominating and scattered *C. deodara*. The Silver Fir woodland, found on steep dry slopes up to 3,500 m consists of *Abies pindrow*, *Picea smithiana* and *Pinus griffithii*, with scattered *Betula utilis* in the higher reaches. The alpine meadows pastures, above the tree line, are locally called margs by graziers. The dominant vegetation is herbaceous, with stunted bushes and isolated trees in folds. Primula, Potentilla, Caltha, Inula, Gentiana, Anemone and Corydalis are some of the common genera. Woody clumps consist of Rhododendron and Junipers.

#### AVIFAUNA

The Department of Wildlife Protection (1987) has prepared a bird checklist. Most noteworthy is the Western Tragopan *Tragopan melanocephalus*. Himalayan or Impeyan Monal *Lophophorus impejanus* and Koklass Pheasant *Pucrasia macrolopha* are also reported, along with the Chukar Partridge *Alectoris chukar*. No work has been done on the AVIFAUNA of this area, but as Lachipora is adjacent to Limber Valley and Gulmarg (both IBAs), the bird life is very similar. This area is selected as an IBA due to the presence of a healthy population of the globally threatened Western Tragopan.

#### Vulnerable

Western Tragopan *Tragopan melanocephalus*

**Endemic Bird Area 128: Western Himalayas**

Western Tragopan *Tragopan melanocephalus*

### **OTHER KEY FAUNA**

Lachipora is one of the last refuges in India of the Markhor. It also has good population of Goral *Nemorhaedus goral*. Himalayan Musk Deer *Moschus chrysogaster* is also found in the higher reaches but as it is hunted for its musk pod, it is quite elusive and uncommon. Among the bear species, both Brown Bear *Ursus arctos* and Asiatic Black Bear *Ursus thibetanus* are found, with the former confined to alpine regions. The Leopard *Panthera pardus* is widely distributed, especially around villages, where it does considerable damage to livestock. Not much information is available on smaller mammals, reptiles and other fauna.

### **LAND USE**

- Human settlements
- Agriculture
- Grazing

### **THREATS AND CONSERVATION ISSUES**

- Forest grazing
- Forest wood collection

There are 11 villages within the catchment area of Katha Nilnag, of which Lachipora is the largest. The villagers own fields and orchards, and they have rights of grazing, collecting timber and medicinal plants in the Sanctuary. Unsustainable exploitation of the natural resources from the Sanctuary by the local people is the biggest issue. The severity of floods in 1995 proves that the forest is under severe biotic pressure. Alternate arrangements for fuel wood and fodder have to be made if exploitation is to be minimized. As the Sanctuary is close to the ceasefire line between India and Pakistan, presence of army and para-military forces puts additional pressure on the wildlife. The State Department of Wildlife Protection has come up with a management plan for the Sanctuary, to tackle some of these issues (Bacha 2000).

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M. S. Bacha and workshop participants

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## LIMBAR VALLEY WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas), A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest)

**PROTECTION STATUS:** Wildlife Sanctuary, established in March 1987

<b>IBA Site Code</b>	IN-JK-12
<b>State</b>	Jammu and Kashmir
<b>District</b>	Baramulla
<b>Coordinates</b>	34° 8' 32" N, 74° 22' 18" E
<b>Ownership</b>	State
<b>Area</b>	4,375 ha
<b>Altitude</b>	2,300 - 4,000 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Sub-tropical Pine Forest, Himalayan, Wet Temperate, Alpine Moist Pasture

### GENERAL DESCRIPTION

Limbar Valley Wildlife Sanctuary derives its name from the Limbar Nala that drains it and Limbar village that lies in its lower catchment. It is about 74 km northwest of Srinagar, on the Srinagar-Uri national highway. It is bounded to the north by Bhurji Forest in Langet Forest Division, to the south by the River Jhelum, east by Katha Forest and to the west by Salamabad Forest.

Earlier it was a game reserve, but in 1987, it was notified as a wildlife sanctuary with a core area of 1,200 ha. It comprises the entire catchment of Limbar Nala, that flows almost north to south. Limber Nala joins the Jhelum River near Pringal village.

The topography of this Sanctuary consists of steep slopes, broken by precipitous cliffs in the upper reaches of the valley. Extensive avalanches and landslides are characteristic of the upper valleys.

Limbar Valley WLS contains several floral types. The Coniferous forest consists of Deodar *Cedrus deodara* dominated forest, with *Parrotiopsis jacquemontiana* and *Viburnum grandiflorum* understorey; Blue Pine forest dominated by *Pinus griffithii*, with stands of Deodar, Silver Fir *Abies pindrow* and Spruce *Picea smithiana*; and the third type is Silver Fir forest, with some Pine and Spruce. Broadleaved forest consists of Chinar *Platanus orientalis* stands near the village Limbar, Walnut *Juglans regia* wood cover and stands of Horse Chestnut *Aesculus indica* near the riverine belt of Viji (Mithawani area). The tree line along the gentle alpine slopes supports Birch *Betula utilis*, with isolated trees of Horse Chestnut, Silver Fir and Walnut. Juniper *Juniperus recurva* and *Rhododendron anthopogon* grow at higher elevations.

The Alpine meadows have a rich herbaceous ground cover of genera *Inula*, *Caltha*, *Primula*, *Potentilla*, *Corydalis*, *Gentiana*, *Anemone*, *Myosotis* and *Polygonum* (Bacha 1999).

#### AVIFAUNA

Limbar Valley is one of the most important sites for the globally Endangered and Restricted Range Western Tragopan *Tragopan melanocephalus* and Cheer Pheasant *Catreus wallichii*. According to the Department of Wildlife Protection (Bacha 2000), the average density of Western Tragopan in the potential areas is 5 birds/ sq km, with an approximate population of 156 to 170 birds. In more suitable areas, the density is 6 birds/ sq km, perhaps the highest in the world. This site was selected as an IBA because of the presence of these two threatened species.

Koklass Pheasant *Pucrasia macrolopha*, Himalayan or Impeyan Monal *Lophophorus impejanus*, Himalayan Snowcock *Tetraogallus himalayensis* and Chukor *Alectoris chukar* are also present. Among raptors, Golden Eagle *Aquila chrysaetos*, Oriental Hobby *Falco severus* and the Lammergeier *Gypaetus barbatus* are frequently seen (Javed 1992). Many Restricted Range and Biome-restricted species are also seen here. Javed (1992) identified 74 species during

two surveys in 1988 and 1989. Hussain *et al.* (1989) during bird ringing studies, ringed 70 species.

Limbar Valley lies in the Western Himalaya Endemic Bird Area (EBA 128), where Stattersfield *et al.* (1998) have listed 11 Restricted Range species. Of these, two have been found here, both with significant populations.

The Limbar Valley has two biomes: Biome-5 Eurasian High Montane (Alpine and Tibetan) from above c. 3,600 m, and Biome-7 Sino-Himalayan Temperate Forest, between c. 1,800 m and 3,600 m. BirdLife International (undated) has prepared a list of biome species. Out of the 48 Biome-5 species, two are found here, both widespread and common. Similarly, eight species of Biome-7 are

**Vulnerable**

Western Tragopan *Tragopan melanocephalus*  
Cheer Pheasant *Catreus wallichii*

**Endemic Bird Area 128: Western Himalayas**

Western Tragopan *Tragopan melanocephalus*  
Cheer Pheasant *Catreus wallichii*

**Biome-5: Eurasian High Montane**

Himalayan Griffon *Gyps himalayensis*  
Himalayan Snowcock *Tetraogallus himalayensis*

**Biome-7: Sino-Himalayan Temperate Forest**

Himalayan Monal *Lophophorus impejanus*  
Streaked Laughingthrush *Garrulax lineatus*  
Variegated Laughingthrush *Garrulax variegates*  
Fire-capped Tit *Cephalopyrus flammiceps*  
Simla Crested Tit *Parus rufonuchalis*  
Spot-winged Crested Tit *Parus melanolophus*  
Green-backed Tit *Parus monticolus*  
Yellow-billed Blue Magpie *Urocissa flavirostris*

found, out of 112 listed by BirdLife International. As detailed research on the birds of Limbar Valley has not been conducted, many more species of these biomes are likely to be present.

#### **OTHER KEY FAUNA**

The area is one of the few remaining refuges of the Markhor *Capra falconeri* in Jammu and Kashmir. Limber WLS along with Hirpora Wildlife Sanctuary in south Kashmir have a distinction of harboring major part of the remaining viable population of Markhor, *Capra falconeri*. These areas have the best possibility of population recovery of Markhor. They are seen as having potential source population for conservation and restocking of the species in the rest of its range (Ranjitsinh *et al*, 2005). The subspecies *cashmiriensis* here has horns which diverge less, and in an old male, show two complete twists or spirals (Prater 1980). Limbar Valley is also famous for its population of Asiatic Black Bear *Ursus thibetanus* and Brown Bear *Ursus arctos*. The former is found in steep forested hills, which abound in Limbar Valley. Like all animals of the temperate hilly regions, it also undertakes altitudinal movement, depending upon season. In winter it can be seen as low as 1,525 m, much below its normal range of 3,000-4,000 m. The Brown Bear is found in the alpine pastures of the Limbar Valley, above 4,000 m and never comes down. It hibernates in winter.

Among ungulates, the Himalayan Musk Deer *Moschus chrysogaster* is found, but due to fear of poaching, it is very elusive and not easy to see. Another quite common ungulate is Goral *Nemorhaedus goral*. Leopard *Panthera pardus* is its main natural predator. Himalayan Mouse Hare *Ochotona roylei* is extremely common and forms the main food of the Red Fox *Vulpes vulpes*. Himalayan Yellow-throated Martin *Martes flavigula* is one of the smaller predators.

Among the primates, Rhesus Macaque *Macaca mulatta*, and Common Langur *Semnopithecus entellus* are present. The Common Langur has been recently divided into seven species (Groves 2001) and the species found in Limbar Valley would be either *S. schistaceus* or *S. ajax*.

#### **LAND USE**

- Human settlement
- Nature conservation and research
- Tourism and recreation

#### **THREATS AND CONSERVATION ISSUES**

- Grazing
- Unsustainable exploitation of the natural resources by the local population



Limbar Valley was established as a sanctuary primarily to protect the Markhor *Capra falconeri cashmiriensis*. Under the Central Government sponsored Schemes, the Department of Wildlife Protection, Jammu and Kashmir Government has prepared a plan for enhanced protection of wildlife and for restoration of degraded habitats (Bacha 1999). It is proposed that the Sanctuary be demarcated into zones, with the upper uninhabited section of Limbar Valley forming a core area of about 1,200 ha kept free from disturbance (including graziers). The core would be surrounded by a buffer zone where eco-development activities would be taken up to minimize the dependency of the local people on forest resources (Bacha 1999).

Besides these administrative measures, it is also necessary to conduct surveys and detailed studies on select species of this IBA. Presently, even a detailed checklist of birds is not available. The two rare pheasant species which have significant populations in this IBA should be monitored on a long term basis.

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M. S. Bacha and M. A. Parsa

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## MIRGUND JHEEL AND RESERVE

**IBA CRITERIA:** A1 (Threatened Species), A4i (31% biogeographic population)

**PROTECTION STATUS:** Wetland Reserve

<b>IBA Site Code</b>	IN-JK-13
<b>State</b>	Jammu and Kashmir
<b>District</b>	Budgam
<b>Coordinates</b>	33° 46' 57" N, 74° 45' 51" E
<b>Ownership</b>	State
<b>Area</b>	300 ha
<b>Altitude</b>	1,580 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Flooded Valley Grassland, Freshwater Swamp, Himalayan Secondary Scrub

### GENERAL DESCRIPTION

Mirgund jheel is a shallow freshwater lake with associated reed beds and riverine marshes on the river Jhelum. The lake is fed by the local runoff and two nullhas. Much of the wetland dries out during the summer, and the water level fluctuates

considerably according to the local runoff. The depth of the water varies between 0.1 m and 0.5 m. Large areas of Willow (*Salix alba*) have been planted on the periphery of the lake (Scott 1989). Earthen bunds have been constructed to maintain the water level, and also to control siltation.

The area has extensive reed beds and marshland. The open waterspread has floating communities of *Nymphaea candidia* and *Nymphaea stellata*. The wetland is surrounded by paddy fields, pastures and plantations. All these habitat types provide foraging grounds for birds.

### **AVIFAUNA**

This IBA is an important wintering and staging ground for thousands of migratory waterfowl. These include: the Common Teal *Anas crecca*, Northern Pintail *A. acuta*, Eurasian Wigeon *A. penelope*, Mallard *A. platyrhynchos*, Gadwall *A. strepera*, Northern Shoveller *A. clypeata* and Common Pochard *Aythya ferina*, Little Grebe *Tachybaptus ruficollis*, Little Bittern *Ixobrychus minutus*, Little Egret *Egretta garzetta*, Water Rail *Rallus aquaticus*, Common Moorhen *Gallinula chloropus*, Pheasant-tailed Jacana *Hydrophasianus chirurgus* and Whiskered Tern *Chlidonias hybridus* are said to breed in the marshes. Many birds occur in much larger numbers than their 1% population threshold determined by Wetlands International (2002).

This site has been selected because it could be the northwestern most range of Sarus Crane in India. Another reason is the presence of very large numbers of migratory and resident birds. The third reason is its potential to become a very important bird sanctuary of the Kashmir Valley.

Three to four Sarus cranes *Grus antigone* are reported to have been regularly seen here (M. R. Dar *pers. comm.* 2003-) which however has not been confirmed by other bird-watchers. There has not been any recent confirmed record of Sarus Crane in Mirgund During several regular visits to the Wetland between 2005-2007 (Khursheed unpublished). As such the statement in the original IBA book that Mirgund Wetland could be the northwestern most range of Sarus Crane in India, is hereby categorically rejected with the consensus of all the expert ornithologists of the area.

### **OTHER KEY FAUNA**

Not much is known about other fauna, except that the ubiquitous Golden Jackal *Canis aureus* occurs here. A variety of fishes such as *Cyprinus carpio*, *Barbus conchoni* and *Gambusia affinis* are found in the jheel.

### **LAND USE**

- Agriculture
- Nature conservation

### **THREATS AND CONSERVATION ISSUES**

- Siltation
- Agricultural intensification and expansion
- Encroachment

The Department of Wildlife Protection, Jammu and Kashmir protects the lake as a reserve for waterfowl. Parts of the marsh have been fenced to prevent damage to marshy areas by cattle. Earthen bunds have been constructed to maintain water levels. Proposals have been made to fence the entire area and plant water chestnut *Trapa natans*. Earlier, regulated hunting of waterfowl was allowed, but now it has been stopped. However, the birds are not being monitored. If effective conservation measures are taken, this IBA could become one of the most important waterfowl refuges of northern India.

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M.A. Parsa and Mr. Dar, Khurseed Ahmad

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## OVERA-ARU WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species), A2 (Endemic Bird Area 128: Western Himalayas), A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest)

**PROTECTION STATUS:** Wildlife Sanctuary, established in 1981

<b>IBA Site Code</b>	IN-JK-14
<b>State</b>	Jammu and Kashmir
<b>District</b>	Anantnag
<b>Coordinates</b>	34° 11' 18" N, 75° 18' 40" E
<b>Ownership</b>	State
<b>Area</b>	51,100 ha
<b>Altitude</b>	2,100 m - 5,425 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Himalayan Dry Temperate, Alpine, Moist Scrub, Alpine Dry Scrub

### GENERAL DESCRIPTION

Overa-Aru Wildlife Sanctuary is one of the most important protected areas of Jammu and Kashmir. It lies within the distributional range of the highly endangered Hangul *Cervus elaphus hanglu*, at present found only in Dachigam National Park. It is linked with Dachigam through the Lidder Forest. Overa-Aru

Wildlife Sanctuary is named after two villages of the same name. Overa gets its name from Overa Nullah or stream that flows through it, while Aru is a favourite destination for trekkers (Suhail 2000).

Like the other sanctuaries of Jammu and Kashmir, Overa-Aru is an old sanctuary, declared under Dogra rule in 1945. At that time, it covered only 32 sq. km, and was later enlarged to 392 sq km in 1981 when the Aru forest was included. The same order also designated the area as a Biosphere Reserve of 424 sq. km under the Man and Biosphere Programme, but finally the State Government declared the whole area as a Wildlife Sanctuary (Suhail 2000).

The Overa-Aru WLS is rich in a number of lakes (locally called sars) and glaciers which feed numerous streams and nullahs that flow through the villages situated near the periphery of the Sanctuary. With a pre-Independence tradition of conservation awareness, the state Government of Jammu and Kashmir keenly protects Overa-Aru as a source of water for drinking and irrigation.

The following vegetation types can be distinguished in Overa. Riverine or deciduous forest below 2,300 m, with *Aesculus indica* and *Juglans regia* dominant, with other riparian associates, such as *Fraxinus*, *Morus alba*, *Robinia*, *Ulmus*, *Padus cornuta*, *Rhus succedanea* and *Pyrus lanata*. Coniferous Forest from 2,300 m to 3,000 m, dominated by Silver Fir *Abies pindrow* on moist aspects and Blue Pine *Pinus griffithii* on dry aspects. Other associates are *Betula utilis*, *Picea smithiana*, *Ulmus walliciana*. Alpine or Birch forest from 3,000 m to 3,500 m, dominated by *Betula utilis*, and associated with *Rhododendron campanulatum* and *Juniperus* spp. The ground cover comprises of herbs such as *Rumex patientia*, *Primula*, *Pedicularis*, *Anemone* and *Corydalis*. The alpine scrub and rocky faces from 3,500 m to 3,800 m, bear *Juniperus recurva* and *Rhododendron anthropogon* and herb species *Stachys sericea*, *Sieversia elata* and *Veronica melissaefolia* (Suhail 2000).

#### AVIFAUNA

Of 117 bird species recorded in or near Overa Sanctuary, 89 breed within its boundaries. These are listed by Price and Jamdar (1990). Recently, Intesar Suhail (*pers. comm.* 2003) has reported 113 species of birds, including new records. Both Himalayan or Impeyan Monal *Lophophorus impejanus* and Koklass Pheasant *Pucrasia macrolopha* are present, but the Western Tragopan *Tragopan melanocephalus* has not been seen, despite the Sanctuary being within its range (Rodgers and Panwar 1988).

Price and Jamdar (1989, 1990, 1991) have found eight species of sympatric warblers breeding in Overa. They are Tytler's Leaf Warbler *Phylloscopus tytleri*,

**Vulnerable**

Kashmir Flycatcher *Ficedula subrubra*

**Endemic Bird Area 128: Western Himalayas**

Tytler's Leaf-Warbler *Phylloscopus tytleri*

Kashmir Flycatcher *Ficedula subrubra*

Kashmir Nuthatch *Sitta cashmirensis*

Orange Bullfinch *Pyrrhula aurantiaca*

**Biome-5: Eurasian High Montane (Alpine and Tibetan)**

Himalayan Griffon *Gyps himalayensis*

Himalayan Snowcock *Tetraogallus himalayensis*

Snow Pigeon *Columba leuconota*

Tickell's Warbler *Phylloscopus affinis*

Olivaceous Leaf-Warbler *Phylloscopus griseolus*

**Biome-7: Sino-Himalayan Temperate Forest**

Koklass Pheasant *Pucrasia macrolopha*

Himalayan Monal *Lophophorus impejanus*

Himalayan Pied Woodpecker *Dendrocopos himalayensis*

Streaked Laughingthrush *Garrulax lineatus*

Variiegated Laughingthrush *Garrulax variegates*

Rusty-tailed Flycatcher *Muscicapa ruficauda*

Slaty-blue Flycatcher *Ficedula tricolor*

Fire-capped Tit *Cephalopyrus flammiceps*

Simla Crested Tit *Parus rufonuchalis*

Rufous-bellied Crested Tit *Parus rubidiventris*

Spot-winged Crested Tit *Parus melanolophus*

Greenbacked Tit *Parus monticolus*

Bar-tailed Tree-Creeper *Certhia himalayana*

Yellow-breasted Greenfinch *Carduelis spinoides*

Yellow-billed Blue Magpie *Urocissa flavirostris*

Tickell's Leaf Warbler *P. affinis*, Orange-barred Leaf Warbler *P. pulcher*, Humes' Yellow-browed Warbler *P. inornatus*, Pallas's Leaf Warbler *P. proregulus*, Large-billed Leaf Warbler *P. magnirostris*, Greenish Leaf Warbler *P. trochiloides* and Large-crowned Leaf Warbler *P. occipitalis*. In addition, the Strong-footed Bush-warbler *Cettia fortipes* also breeds in Overa. Jamdar and Price (1990) found that the Simla Black Tit *Parus rufonuchalis* and Rufous-bellied Crested Tit *P. rubidiventris* also breed sympatrically in Overa. A third Biome-7 species, Crested Black Tit *Parus melanolophus*, also breeds commonly in the Sanctuary, and is abundant close to the tree line (Price and Jamdar 1990). Recently, Kashmir Flycatcher *Ficedula subrubra* has been found wintering in Avalanche in the Nilgiris, Tamil Nadu (an IBA) (Zarri and Rahmani in press). Overa could be an important breeding site for this flycatcher.

#### **OTHER KEY FAUNA**

About 20 large and medium mammals are found in Overa (Suhail 2000). Kashmir Deer or Hangul is the commoner and better known of the two races of European Red Deer, *Cervus elaphus*, found within Indian limits (Prater 1980). Kurt (1978) estimated about seven Hangul. Presence of Hangul was confirmed by the latest census conducted by the South Kashmir Wildlife Division of the Department of Wildlife Protection. A total of 11 Hanguls (3 males, 6 females, and 2 fawns) were seen inside the Sanctuary (Suhail 2000). Indirect evidence (droppings and hoof-marks) shows that the Hangul is fairly well distributed in this area. In winter, it moves to Hakarhaji, Poshpathri, Gumri and Kanjkoot areas, while in summer it ascends to the higher areas of Chhumani and Munwarsar (Suhail 2000). In 2003 only four Hanguls were sighted (R. Y. Naquash *pers. comm.*)

The Musk Deer is found in the higher reaches (>2,300 m) of the Sanctuary. The exact number is not known as it is elusive and crepuscular. The Brown Bear *Ursus arctos* is uncommon, and confined to higher mountains such as the Kolahai. The Eurasian Black Bear *Ursus thibetanus* is much more common all over the Sanctuary. As it raids crops, particularly maize, it is a problem in some areas. The Snow Leopard *Uncia uncia* has not been reported from Overa-Aru, but the Common Leopard *Panthera pardus* is fairly common in and around the Sanctuary.

According to the separation of Langurs into 7 species by Groves (2001), the species found in Overa-Aru would be *Semnopithecus schistaceus*, named Nepal Langur by him.

Rhesus Macaque *Macaca mulatta* is also found in the Sanctuary and forms the major prey of the Leopard. Yellow-throated Marten *Martes flavigula*, Red Fox *Vulpes vulpes*, Jungle Cat *Felis chaus* and Leopard Cat *Prionailurus bengalensis* are some of the smaller predators.



Not much is known about reptile and fish fauna of this IBA. Suhail (2000) has listed 18 species of butterflies, including four rare ones listed in the IUCN Red Data Book.

#### **LAND USE**

- Nature conservation and research
- Eco-tourism and recreation

#### **THREATS AND CONSERVATION ISSUES**

- Deforestation
- Bush fires
- Unrestricted tourist facilities
- Grazing by livestock
- Firewood collection

Overa-Aru WLS forms the spectacular backdrop of Kashmir's famous tourist spot, Pahalgam. In order to maintain this tourist spot, it is necessary to protect the forest all around it, and there is no better way than to protect it under a sanctuary status. Some peaks in and around the sanctuary are popular with rock climbers and trekkers.

Overa, Lardi and Dahwatoo villages, with a total human population of nearly 4,500, are situated closed to the southern boundary of the Sanctuary. Constant vigil is required to prevent encroachment in the Sanctuary. Overa-Aru suffers from severe grazing pressure during summer from the livestock of local and nomadic graziers. Firewood collection is another major problem due to increase in the human population in recent decades. All villagers stock huge amounts of dry wood to last through winter. Fire during the summer months is another problem. Many times these fires are started by graziers to remove dry unpalatable coarse grasses.

Overa-Aru is home to the highly endangered Kashmir Stag or Hangul, the State Animal of Jammu and Kashmir. It is also one of the largest wildlife sanctuaries of the Kashmir region. Earlier Overa-Aru had suffered extensive deforestation and removal of understorey, but this has been controlled to a large extent. Overgrazing that had lead to the almost complete disappearance of food plants palatable to wild ungulates has been stopped (R. Y. Naquash *pers. comm.* 2003).

In order to maximize the potential of Overa for Hangul and other wildlife, the Department of Wildlife Protection (Suhail 2000) suggested the following measures: (i) massive afforestation with fruit bearing trees and wild species; (ii) fire line development in six compartments; (iii) fencing in certain areas to prevent

entry of livestock; (iv) waterhole development in certain areas (e.g. Satragi, Gumri, Kopra) that suffer scarcity of water for many months in a year, and that are frequented by Hangul; (v) research and monitoring; (vi) compensation for any damage to livestock or crop by wild animals; (vii) publicity and awareness by establishing nature clubs at Aru and Veersiran villages, and (ix) promotion of eco-tourism, nature trekking, bird watching and rock climbing.

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Nitin Jamdar, Intesar Suhail and R. Y. Naquash.

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## PANGONG TSO

**IBA CRITERIA:** A1 (Threatened Species), A3 (Biome-5: Eurasian High Montane)

**PROTECTION STATUS:** Wildlife Reserve Area, established in 1987

<b>IBA Site Code</b>	IN-JK-15
<b>State</b>	Jammu and Kashmir
<b>District</b>	Leh, Ladakh
<b>Coordinates</b>	33° 49' 60" N, 78° 34' 60" E
<b>Ownership</b>	State
<b>Area</b>	65,000 ha (1/3rd in India, the rest in China)
<b>Altitude</b>	4,218 m
<b>Rainfall</b>	76 mm
<b>Temperature</b>	- 40 °C to 20 °C
<b>Biogeographic Zone</b>	Trans-Himalaya
<b>Habitats</b>	Marshes

### GENERAL DESCRIPTION

Pangong Tso is a long, narrow, brackish lake spanning the Indian/Chinese border, in a valley in the upper drainage basin of the Indus river, at the east end of the Karakoram Range. Only the westernmost one-third of the lake lies in Indian territory. It is a chain of four interconnecting lakes, formed by natural damming

of the valley. Five rivers fed by perennial springs and snowmelt flow into the Indian portion of the lake. The runoff from the west end of the lake flows northwest into the Shyok river, a tributary of the Indus. There are some brackish to saline marshes near the western end, with adjacent wet meadows.

The lake has been suggested as a Ramsar site due to its biological, cultural and geological values (Chatterjee *et al.* 2002). It is the largest and most brackish wetland in the cold desert ecosystem of the Trans-Himalaya. A fossil freshwater mollusc *Lymnea auricularia* was discovered in ancient lacustrine clay deposits above the present level of lake, providing evidence that earlier it was a freshwater lake (Sharma 2000).

Due to its extreme salinity, Pangong Tso does not have any vegetation in the deeper parts, but at the margins and marshy areas, typical, steppe vegetation is seen. Sedges and grasses are found towards the northern and eastern sides. The surrounding plateau and hills support low thorn scrub and perennial herbs.

#### **AVIFAUNA**

Pangong Tso is an important breeding area for a variety of waterfowl, including Ruddy Shelduck *Tadorna ferruginea*. The Bar-headed Goose *Anser indicus* occurs in significant numbers on migration and could be breeding there. It is also a significant staging ground during the autumn migration.

Although, the globally endangered Black-necked Crane *Grus nigricollis* does not breed here (Pfister 1998), nearby Chushul is a very well-known breeding and staging area, with 3-4 breeding pairs. Pangong Tso could be their staging and foraging ground, especially on the marshes on the fringe of this lake (O. Pfister *pers. comm.* 2003).

#### **OTHER KEY FAUNA**

The surrounding hills and plateau support a rich assemblage of Himalayan and Tibetan wildlife, including the Wild Ass *Equus kiang*, Snow Leopard *Uncia uncia*, Great Tibetan Sheep *Ovis ammon hodgsoni*, Ladakh Urial *Ovis orientalis* (now considered a subspecies of *Ovis ammon*), Blue Sheep *Pseudois nayaur*, Tibetan Gazelle *Procapra picticaudata*, Tibetan Wolf *Canis lupus chanku*, and Red Fox *Vulpes vulpes*. Himalayan Mouse Hare *Ochotona roylei* and Himalayan Marmot *Marmota himalayana* are very common, and form the main prey for smaller carnivores and raptors.

**Vulnerable**

Black-necked Crane *Grus nigricollis*

**Biome-5: Eurasian High Montane (Alpine and Tibetan)**

Himalayan Griffon *Gyps himalayana*

Tibetan Snowcock *Tetraogallus tibetanus*

Himalayan Snowcock *Tetraogallus himalayensis*

Tibetan Partridge *Perdix hodgsoniae*

Solitary Snipe *Gallinago solitaria*

Ibisbill *Ibidorhyncha struthersii*

Tibetan Sandgrouse *Syrrhaptes tibetanus*

Snow Pigeon *Columba leuconota*

Long-billed Calandra-Lark *Melanocorypha maxima*

Rosy Pipit *Anthus roseatus*

Yellow-billed Chough *Pyrrhocorax graculus*

Alpine Accentor *Prunella collaris*

Robin Accentor *Prunella rubeculoides*

Brown Accentor *Prunella fulvescens*

Stoliczka's Tit-Warbler *Leptopoeile sophiae*

Guldenstadt's Redstart *Phoenicurus erythrogaster*

Grandala *Grandala coelicolor*

Tickell's Warbler *Phylloscopus affinis*

Olivaceous Leaf-Warbler *Phylloscopus griseolus*

Wallcreeper *Tichodroma muraria*

Tibetan Snowfinch *Montifringilla adamsi*

Black-headed Mountain-Finch *Leucosticte brandti*

Streaked Rosefinch *Carpodacus rubicilloides*

Red-fronted Rosefinch *Carpodacus puniceus*

Great Rosefinch *Carpodacus rubicilla*

Plain-backed Snowfinch *Pyrgilauda blanfordi*

Hodgson's Mountain-Finch *Leucosticte nemoricola*

### **LAND USE**

- Grazing
- Nature conservation and research
- Tourism

### **THREATS AND CONSERVATION ISSUES**

- Over-grazing
- Unrestricted tourism

The State Government intends to declare an area of 400,000 ha in eastern Ladakh as a High Altitude Cold Desert National Park. The existing Pangong Reserve would be incorporated within this Park.

Local people graze their yaks and horses on the marshes and meadows, and harvest the grasses for fodder. The current level of grazing already exceeds the carrying capacity of the land, and is resulting in soil erosion. Domestic livestock causes some disturbance to nesting birds. The local people, being Buddhist, do not kill cranes or any wildlife, but their livestock graze very close to the nesting birds. This could be regulated through their cooperation.

### **KEY CONTRIBUTORS**

Otto Pfister, Rashid Raza, S. A. Hussain and Bivash Pandav

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## RAMNAGAR WILDLIFE SANCTUARY

**IBA CRITERIA:** A1 (Threatened Species)

**PROTECTION STATUS:** Wildlife Reserve Area, established in 1987

<b>IBA Site Code</b>	IN-JK-16
<b>State</b>	Jammu and Kashmir
<b>District</b>	Jammu
<b>Coordinates</b>	32° 44' 48" N, 74° 52' 00" E
<b>Ownership</b>	State
<b>Area</b>	1,275 ha
<b>Altitude</b>	131- 186 m
<b>Rainfall</b>	1,100 mm
<b>Temperature</b>	5 °C to 46 °C
<b>Biogeographic Zone</b>	Semi-Arid
<b>Habitats</b>	Tropical Dry Deciduous Forest

### GENERAL DESCRIPTION

This is a very old sanctuary, established on Ramnagar ridge by the erstwhile Maharaja of Kashmir, nearly 5 decades ago. It is situated north of Jammu city. The Jammu-Srinagar national highway passes through the western side of the Sanctuary. The Sanctuary is roughly wedge-shaped and located in the Kar Nullah which ultimately drains into Tawi river. The topography ranges from gently

undulating to very steep cliffs. The forest is a part of the Lower Siwaliks, hence it is important for many Biome restricted species. An important shrine of Mata Vaishno Devi is located close to the Sanctuary, and visited by millions of pilgrims, but due to neglect of this area by the Forest Department, most of the visitors are not aware that they are near a Sanctuary.

The area is covered with mixed scrub forest with occasional Chir Pinus trees. The vegetation of the Sanctuary as per the revised classification by Champion and Seth (1968) comes under the major group “Subtropical Northern Mixed Dry Deciduous Forests”. A variety of Subtropical broadleaf trees and shrubs are found in the Sanctuary, dominant among them being *Acacia modesta*. Some of the species found in this Sanctuary are *Acacia arabica*, *Acacia catachu*, *Adhatoda vasica*, *Adina coardifolia*, *Aegle marmelos*, *Albizia lebbeck*, *Bauhinia purpurea*, *Bombax ceiba*, *Dalbergia sissoo* and *Ziziphus mauritiana*.

### AVIFAUNA

Based on preliminary investigations, 37 species of birds have been found in this Sanctuary. Among pheasants, Red Junglefowl *Gallus gallus*, Kaleej Pheasant *Lophura leucomelanos* and Peafowl *Pavo cristatus* are notable. Grey Francolin *Francolinus pondicerianus* is quite common. The species of conservation interest are Oriental White-backed Vulture *Gyps bengalensis* and Slender-billed Vulture *G. tenuirostris*. This site has been selected as a potential habitat for Sino-Himalayan Subtropical Forest biome species. In India, it is the westernmost point of this type of forest.

#### Critically Endangered

Oriental White-backed Vulture *Gyps bengalensis*  
Slender-billed Vulture *Gyps tenuirostris*

### OTHER KEY FAUNA

This dry deciduous forest harbours Leopard *Panthera pardus* as the major predator. Despite disturbance, it survives due to its nocturnal habit and elusive nature. Its main natural prey species are Barking Deer *Muntiacus muntjak*, Cheetal *Axis axis*, Wild Boar *Sus scrofa* and Nilgai *Boselaphus tragocamelus*. Jackal *Canis aureus* and Jungle Cat *Felis chaus* are smaller predators. Non-human primates recorded are Rhesus Macaque *Macaca mulatta* and Common Langur *Semnopithecus entellus*. According to the new classification of Langurs by Groves (2001), the ‘new species’ found in Ramnagar would be *S. ajax*.



## **LAND USE**

- Nature conservation

## **THREATS AND CONSERVATION ISSUES**

- Livestock Grazing
- Encroachment

Over-grazing by livestock is the major problem and the pressure increases during winter when nomadic Gujjars and Bakerwals come down from the higher reaches with their herds of goats and sheep. To provide food to goats, lopping of palatable species is rampant, resulting in total degradation of the forest. As the Sanctuary is close to the growing Jammu city, it is under constant threat from encroachment. Due to degradation of the habitat, streams run dry just after the monsoon. There is no natural source of water as most of the pools have silted up or been occupied by itinerant graziers.

Fortunately, the Forest Department is able to control incidents of fire and poaching.

The Sanctuary is almost surrounded by villages, especially on its southern side. Eco-development activities need to be initiated to reduce anthropogenic pressure on the forest resources (Hussein 1999-2000). The villagers should also be involved in joint forest management.

Thousands of people enjoy walking in the Sanctuary every day, but they do not contribute to its upkeep in any way. They could be asked to pay and also be involved in its protection.

## **KEY CONTRIBUTOR**

Tahir Shawl

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## SHALLABUGH CONSERVATION RESERVE

**IBA CRITERIA:** A4iii (≥ 20,000 waterbirds)

**PROTECTION STATUS:** Conservation Reserve

<b>IBA Site Code</b>	IN-JK-17
<b>State</b>	Jammu and Kashmir
<b>District</b>	Srinagar
<b>Coordinates</b>	34° 10' 00" N, 74° 42' 00" E
<b>Ownership</b>	State
<b>Area</b>	700 ha
<b>Altitude</b>	1,580 m
<b>Rainfall</b>	Not available
<b>Temperature</b>	Not available
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Freshwater Swamp, Himalayan Secondary Scrub

### GENERAL DESCRIPTION

Close to Srinagar town, in the Kashmir Valley, lie the Shallabugh marshes. They are fed by the Sindh river and local snowmelt. The depth of the water varies from 0.3 to 2.0 m, and the water level fluctuates considerably according to the rainfall. Large areas of the lake dry up between September and March.

The area has extensive reed beds of *Phragmites communis* and *Typha angustata*, and rich growth of *Nymphaea candida* and *Nymphaea stellata* in open water areas. Lemna forms mats over the surface in some areas while adjacent areas have willow plantations and paddy fields. The area is thus of great importance for waterfowl.

#### **AVIFAUNA**

The area is an important staging and wintering ground for migratory Anatidae, and a breeding area for a variety of waterfowl. Over 150,000 ducks and geese have been recorded at one time (Rashid Naqash *pers. comm.* 2003). The site qualifies in A4iii criteria. Detailed studies have not been conducted, but the available information shows that it attracts species such as Common Teal *Anas crecca*, Northern Pintail *A. acuta*, Eurasian Wigeon *Anas penelope*, Mallard *Anas platyrhynchos*, Garganey *Anas querquedula*, Gadwall *Anas strepera*, Northern Shoveller *Anas clypeata*, Common Pochard *Aythya ferina*, White-eyed or Ferruginous Pochard *Anas nyroca*, and Red-crested Pochard *Rhodonessa rufina*. Many species breed in the extensive marshes, but detailed records are not available. More recent records of sightings of these species in 2008-09 in huge concentrations in end of January and throughout the February months in Shallabugh Wetlands are available (Khursheed unpublished).

#### **OTHER KEY FAUNA**

The only major mammal is the Common Otter *Lutra lutra* which is found in almost all the large wetlands of the Kashmir Valley. Red fox *Vulpes vulpes* and Golden Jackal *Canis aureus* are found in the surrounding agricultural land and forests. These marshes are also rich in fish fauna but not much information is available.

#### **LAND USE**

- Agriculture
- Fisheries

#### **THREATS AND CONSERVATION ISSUES**

- Siltation
- Agricultural intensification and expansion
- Use of fertilizers and pesticides
- Illegal grazing and encroachment

Like other wetlands of the Kashmir Valley, Shallabugh also suffers from over-fishing, infestation by weeds and pollution. Besides the usual anthropogenic pressures/threats, biomedical wastes from the Sher-e-Kashmir Institute of Medical Sciences disposed off in Anchar ends up in Shallabugh. However, the entire

wetland is protected as a conservation reserve by the Department of Wildlife Protection, Government of Jammu and Kashmir.

Surrounding areas are almost entirely agricultural. The principal threats are siltation eutrophication and encroachment of agricultural land. Run-off from adjacent agricultural land has greatly increased the rate of eutrophication.

**KEY CONTRIBUTOR**

Rashid Y. Naqash, Khursheed Ahmad

**KEY REFERENCE**

None

## TSO KAR BASIN

**IBA CRITERIA:** A1 (Threatened Species)

**PROTECTION STATUS:** Wildlife Sanctuary, established in 1987

<b>IBA Site Code</b>	IN-JK-18
<b>State</b>	Jammu and Kashmir
<b>District</b>	Leh, Ladakh
<b>Coordinates</b>	33° 17' 60" N, 78° 00' 00" E
<b>Ownership</b>	State
<b>Area</b>	10,000 ha
<b>Altitude</b>	4,530 m
<b>Rainfall</b>	70 mm
<b>Temperature</b>	- 40 °C to 32 °C
<b>Biogeographic Zone</b>	Trans-Himalaya
<b>Habitats</b>	Aquatic

### GENERAL DESCRIPTION

Tso Kar Basin is the basin of a former large freshwater lake (Chatterjee *et al.* 2002). It lies between the Zaskar range in the southwest and the Ladakh range in the northeast, south of the Indus river. It is called Tsokar, meaning white lake, because of the white salt efflorescence found on the margins due to the evaporation of highly saline water. The waterspread has contracted into two

principal waterbodies, Startsapuk Tso, a freshwater lake of about 300 ha to the south, and Tso Kar itself, a hypersaline lake of 2,200 ha to the north. The lakes are frozen over from November to April. Startsapuk-Tso is fed by perennial springs and snow, and attains a maximum depth of 3 m in July and August, when it overflows northwards into Tso Kar. The basin is surrounded by peaks rising to over 6,000 m.

The presence of freshwater mollusc *Lymnea auricularia* fossils proves that it was a freshwater lake in the past (Sharma 2000). The present lake is a remnant of a large freshwater lake of nearly 13,600 ha.

In the less saline parts of the basin, the pools have aquatic vegetation including *Potamogeton* and *Hydrilla* spp. These plants die in winter, and form floating mats of vegetation in spring. The adjacent freshwater marshes and damp meadows support a mixture of *Carex* and *Ranunculus* spp. The arid steppe vegetation of the surrounding areas is dominated by species of *Astragalus* and *Caragana*.

#### AVIFAUNA

Tso Kar Basin is one of the most important breeding areas of the Black-necked Crane *Grus nigricollis* in India (Pfister 1998). O. Pfister (*pers. comm.* 2003) observed two breeding attempts, one in 1996 near its eastern shore (one egg), and again in 1997 at the northern shore (two eggs), but both nests were flooded due to rising water levels by the end of June. In 2002, a nest with two eggs was found in the northeastern part of Tso Kar Lake, but they were lost due to unknown reasons. A breeding pair near Startsapuktso (freshwater lake in the Tso Kar plains) has been more successful in raising two chicks each in 2000 and 2001, and was found breeding in 2002 also (Pankaj Chandan *pers. comm.* 2002).

This IBA is also the major breeding area for Crested Grebe *Podiceps cristatus*, Bar-headed Geese *Anser indicus*, Ruddy Shelduck *Tadorna ferruginea*, Brown-headed Gull *Larus brunnicephalus* and Common Tern *Sterna hirundo*. During autumn migration, the Tso Kar Basin becomes an assembling place for local breeding birds as well as a major staging spot for migrants, and congregations of thousands of birds can be observed.

#### Vulnerable

Black-necked Crane *Grus nigricollis*

## **OTHER KEY FAUNA**

Wild Ass Equus kiang and Tibetan Argali *Ovis ammon hodgsoni* forage on the slopes and meadows, while Tibetan Wolf *Canis lupus* and Red Fox *Vulpes vulpes* occur in the surrounding plains. In addition, evidence of the endangered Snow Leopard *Uncia uncia* has been recorded.

## **LAND USE**

- Tourism.
- Nature conservation and research

## **THREATS AND CONSERVATION ISSUES**

- Grazing
- Tourism
- Cutting of aquatic vegetation

A major threat to the wetland comes from an intensification of grazing between November and May, particularly by sheep, horses and yaks. The nomads leave the basin in May to return in November. Earlier, the area was undisturbed from June to October, which also happens to be the breeding time of the Black-necked Crane. Grass was allowed to grow, and was harvested only in October. Due to increase in human and livestock populations, the traditional use of land is being disturbed, putting increasing pressure on the marshes and grazing lands.

It has been proposed that the status of the Reserve be upgraded to that of a Sanctuary. The basin lies within the boundaries of the proposed High Altitudinal National Park (400,000 ha) in eastern Ladakh.

The greatest long-term threat comes from unregulated tourism, which brings in non-degradable garbage (Rauf Zargar *pers. comm.* 2003). This can be tackled only through strong legislation and implementation.

## **KEY CONTRIBUTORS**

Otto Pfister, Pankaj Chandan and Rauf Zargar

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## TSO MORARI LAKE AND ADJACENT MARSHES

**IBA CRITERIA:** A1 (Threatened Species), A4i (31% biogeographic population)

**PROTECTION STATUS:** Not officially protected

<b>IBA Site Code</b>	IN-JK-19
<b>State</b>	Jammu and Kashmir
<b>District</b>	Leh
<b>Coordinates</b>	32° 52' 60" N, 78° 19' 00" E
<b>Ownership</b>	State
<b>Area</b>	c. 20,000 ha (including adjacent marshes)
<b>Altitude</b>	4,650 m
<b>Rainfall</b>	75 mm
<b>Temperature</b>	- 40 °C to 30 °C
<b>Biogeographic Zone</b>	Trans-Himalaya Habitats: Aquatic, Alpine Moist Pasture

### GENERAL DESCRIPTION

Tso Morari in eastern Ladakh is the largest of the high altitude Trans-Himalayan lakes situated entirely within Indian territory. The lake formerly had an outlet to the south, but has now become landlocked, because of which the water is now brackish to saline. The lake is fed by streams and snowmelt from two major stream systems, which create extensive marshes when they enter the lake. The

lake is frozen from November to April. Small islands near the north and south ends are important for breeding waterfowl. The lake is bounded by mountain ranges with peaks exceeding 6,500 m. On the north and east sides, the lake is bounded by the hills of the Tibetan cold desert. The western side is bordered by steeper peaks exceeding 5,500 m. The Pare Chu river, which originates about 40 km upstream of the lake, flows along the southern side. Between Tso Morari in the north, and the Pare Chu in the south, lies the Nuro Sumdo wetland, covering an area of about 2,000 ha (Mishra and Humbert-Droz 1998).

There does not appear to be any vegetation in the deeper parts of the lake, but shallow areas have some Potamogeton. Various species of sedge and rushes grow in the marsh, notably Carex. Caragana and Astragalus spp. characterize the steppe vegetation. Juncus thomsonii and Leontopodium sp. are also found.

### AVIFAUNA

Tso Morari is thought to be the one of the most important breeding sites for waterfowl in Ladakh. The lake has the best known and most important breeding ground of the Bar-headed geese *Anser indicus* in Indian territory (Pfister 1998, in press) and supports significant breeding populations of other species such as the Crested Grebe *Podiceps cristatus*, Ruddy Shelduck *Tadorna ferruginea*, Lesser Sand Plover *Charadrius mongolus*, Brown-headed Gull *Larus brunnicephalus* and Common Tern *Sterna hirundo*. The Black-necked cranes *Grus nigricollis* stage regularly on the marshes. During autumn migration, the Lake serves as an important staging area for multitude of waterfowl, including Near Threatened Ferruginous Pochard *Aythya nyroca*. River Tern *Sterna aurantia* is among the 200 species of birds reported by Otto Pfister.

During a 10 day survey between 19 and 28 July, 1996, Mishra and Humbert-Droz, (1998) found 34 bird species, including 14 waterbirds that breed in the area. At least 3 Black-necked Cranes and 826 Bar-headed Geese (62% goslings) were sighted in Tso Morari and Nuro Sumdo marshes. According to Wetlands International (2002), 1% biogeographic population threshold of the Bar-headed Goose is 560. Thus these wetlands harbour more than the threshold. A breeding colony with 250 adults and chicks of Brown-headed Gull, a Biome-5 species (Stattersfield et al. 1998) was also found by Mishra and Humbert-Droz (1998).

While the Nuro Sumdo area is important for Black-necked Crane, Tso Morari is an extremely important breeding area for Bar-headed Geese (Mishra and Humbert-Droz 1998).

**Vulnerable**

Black-necked Crane *Grus nigricollis*

**Near Threatened**

Ferruginous Pochard *Aythya nyroca*

**OTHER KEY FAUNA**

Large mammal fauna includes the Snow Leopard *Uncia uncia* in the surrounding mountains, the Wild Ass *Equus kiang* and Tibetan Wolf *Canis lupus chanku* on the plateau. Blue sheep *Pseudois nayaur* and Nayan or Great Tibetan Sheep *Ovis ammon hodgsoni* are found on the hillsides. Weasel *Mustela* sp, Himalayan Marmot *Marmota himalayana*, Red Fox *Vulpes vulpes*, and Woolly Hare *Lepus oiostolus* are also seen (Rauf Zargar *pers. comm.* 2003).

**LAND USE**

- Agriculture
- Transport
- Tourism
- Urban settlements

**THREATS AND CONSERVATION ISSUES**

- Disturbance to birds
- Agricultural intensification and expansion
- Urbanization
- Livestock Grazing

This area used to be closed to tourists and the general public due to its proximity to the international border, but since 1994 it has been opened up. Mishra and Humbert-Droz (1998) have listed the conservation problems that are now appearing due to increasing tourist pressures. Korzok, the only village situated near the lake has become an important tourist centre. Apart from being one of the highest inhabited places in the world, the village has an important Buddhist monastery. The village consists of about 75 households, largely belonging to a semi-nomadic pastoral tribe Changpa. They do not hunt animals but their large herds of domestic animals (goats, sheep, cattle, horses, donkeys, yaks and cattle-yak hybrids) graze in the marshes and meadows of the wetlands.

A road from Leh, 200 km northwest of Korzok, runs more than 5 km along the edge of Tso Morari. The people of Leh want to establish hotels for tourists in these marshes (Rauf Zargar *pers. comm.* 2003). The Indo-Tibetan Border Police

(ITBP) have established bunkers. Increased movement of ITBP personnel has increased anthropogenic pressures. In addition, several government establishments exist in Korzok. Tourists now camp beside the marshes, disturbing the breeding birds, and non-degradable garbage litters the place. Although tourism is restricted to the short summer, this is also the breeding time of the birds (Mishra and Humbert-Droz 1998).

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## WULAR LAKE AND ASSOCIATED MARSHES

**IBA CRITERIA:** A1 (Threatened Species), A4iii  
(<sup>3</sup> 20,000 waterbirds)  
**PROTECTION STATUS:** Not officially protected

<b>IBA Site Code</b>	IN-JK-20
<b>State</b>	Jammu and Kashmir
<b>District</b>	Baramulla
<b>Coordinates</b>	34° 25' 60" N, 74° 42' 00" E
<b>Ownership</b>	State
<b>Area</b>	c. 2,400 ha
<b>Altitude</b>	1,580 m
<b>Rainfall</b>	550 mm
<b>Temperature</b>	1 °C to 24 °C
<b>Biogeographic Zone</b>	Himalaya
<b>Habitats</b>	Freshwater Swamp, Riverine Vegetation, Flooded Valley Grassland, Himalayan Secondary Scrub

### GENERAL DESCRIPTION

Wular Lake and its associated marshes lie on the floodplains of the River Jhelum in the Kashmir Valley. It is gratifying that the Ramsar Convention which came into force in 1975 included India as a contracting party in October 1981 and in

1990, among other sites, Wular lake was one of the initial six wetlands in India included in the Ramsar Sites. It originally occupied an area of 20,200 ha but has now shrunk to a mere 2,400 ha. The lake has an elliptical boundary, with a maximum length of 16 km and width of 7.6 km. It is about 34 km northwest of Srinagar, 3 km from Sopore town.

The name Wular is derived from the Sanskrit word *Volla*, meaning turbulent, a reference to the high waves one encounters while crossing the lake during certain months. Wular was one of the largest freshwater lakes of South Asia. It plays an important role in the hydrology of the Kashmir Valley, due to its huge capacity to absorb the annual flooding.

The Wular Lake is surrounded by high altitude mountain ranges on the northeast and northwest sides. Due to its particular topography, Wular lake faces strong winds.

There is considerable dispute about the size of this lake. As per the Directory of Wetlands of India, the area has been shown to be only 189 ha, while the Survey of India maps indicate the lake area to be 5,870 ha in winter of 1978. According to a study, the area at maximum flood level has decreased from the original 27,300 ha to 17,000 ha. The revenue records show that the lake area is 13,000 ha (Baba, undated).

Wular Lake is heavily overgrown with macrophytes. The margins are covered with Typha, while Phragmites, *Nymphoides pellata*, *Nymphoides alba*, *Nelumbo nucifera* and *Trapa natans* cover the shallow zones. Villagers harvest some of these species for food. *Salvinia* and *Lemna* cover the surface. A total of 82 species of phytoplankton, and 50 species of zooplankton have been reported. The shallows parts also bear stands of Willow (*Salix alba*).

#### AVIFAUNA

The lake was known to be an important staging and wintering ground for migratory birds. Eighty-eight species, including many forest species, have been identified in and around the lake (Baba, undated). The Pallas's Fish-Eagle *Haliaeetus leucoryphus* that was common here (Loke 1946) has now disappeared and was not reported by Baba (undated). The surrounding forests still have populations of Koklass Pheasant *Pucrasia macrolopha* and Himalayan or Impeyan Monal *Lophophorus impejanus*.

Although there has been a drastic decline in the number of waterfowl due to increased disturbance, even now thousands of ducks and geese visit the lake. The main ones are: Greylag Goose *Anser anser*, Ruddy Shelduck *Tadorna*

*ferruginea*, Common Teal *Anas crecca*, Northern Pintail *A. acuta*, Eurasian Wigeon *A. penelope*, Mallard *A. platyrhynchos*, Garganey *A. querquedula*, Gadwall *A. strepera*, Northern Shoveller *A. clypeata*, Common Pochard *Aythya ferina*, White-eyed or Ferruginous Pochard *A. nyroca*, Red-crested Pochard *Rhodonessa rufina* and Pygmy Goose or Cotton Teal *Netta coromandelianus*. White Stork *Ciconia ciconia* is a passage migrant. Brown-headed Gull *Larus brunnicapillus* is very common. Little Grebe *Tachybaptus ruficollis*, Little Bittern *Ixobrychus minutus*, Grey Heron *Ardea cinerea*, Little Egret *Egretta garzetta*, Water Rail *Rallus aquaticus*, Common Moorhen *Gallinula chloropus*, and White-breasted Waterhen *Amaurornis phoenicurus* are resident species.

More recent records are also available. During BNHS-MoEF Avian Influenza monitoring and surveillance study (2005-07) Khursheed Ahmad has recorded a sizable numbers of wintering ducks dominated by Common Pochard (11,000), Mallard (794), Gadwall (400), Red Crested Pochard (50) and White-eyed or Ferruginous Pochard *Aythya nyroca* (20) besides Western Marsh Harrier *Circus aeruginosus* (06), Caspian Tern *Sterna caspia* (100), Black bellied Tern (40) and Brown headed Gull (05) in Wular Lake (Rahmani *et al.*. 2008 unpublished report; Khursheed unpublished).

This site easily qualifies for A4iii criteria as it holds more than 20,000 waterfowl on a regular basis and also it is one of the important migratory stopover sites for many long-distance migrants.

Nearly a hundred years ago, Lesser White-fronted Goose *Anser erythropus* was also reported (Ward 1906-1908). Probably, it still occurs in small numbers among the thousands of Greylag Geese. Another species reported earlier and likely to occur even now is the Marbled Teal *Marmaronetta angustirostris*. There is a specimen in the British Museum (Natural History) of this species shot here in 1923 (BirdLife International 2001). As this species occurs among the multitudes of other waterfowl, it is likely to be easily missed, and might be still found in Wular.

Wular is also one of the few IBA sites where the Near Threatened Lesser Grey-headed Fish-Eagle *Ichthyophaga humilis* is reported (Baba, undated). This species was earlier called Himalayan Grey-headed Fishing Eagle *Ichthyophaga nana* (Ali and Ripley 1987). It is considered Near Threatened by BirdLife International (2001) as it has declined all over its range, especially in India due to destruction of riverine wetlands, increasing human disturbance and use of pesticides.

### Vulnerable

Marbled Teal (old record) *Marmaronetta angustirostris*

Pallas's Fish-Eagle (old record) *Haliaeetus leucoryphus*

### Near Threatened

Darter *Anhinga melanogaster*

Ferruginous Pochard *Aythya nyroca*

Lesser Grey-headed Fish-Eagle *Ichthyophaga humilis*

## OTHER KEY FAUNA

Common Otter *Lutra lutra* is reported to be present. Wular lake supports a huge fishing industry. Six species of endemic Schizothoracid fish have been reported (Baba, undated). They are being replaced by the introduced *Cyprinus carpio*.

## LAND USE

- Fisheries
- Water management
- Tourism and recreation
- Grazing
- Agriculture

## THREATS AND CONSERVATION ISSUES

- Siltation
- Urbanization
- Excessive fishing
- Pollution
- Multi-departmental control

The lake has shrunk to a quarter of its original size due to siltation from surface runoff and the denuded catchment area. It is also contaminated with domestic and industrial waste.

The Wular lake has been designated as a wetland of international importance, especially as a waterfowl habitat, for the following reasons: (i) It diminishes the fury of floods, being a natural storage reservoir of flood waters, and regulates the water regime of the Kashmir Valley; (ii) The lake along with its interconnected satellite wetlands, is a suitable wintering ground for a number of waterfowl; (iii) It supports a large fishery, contributing about 60% of the fish yield of Kashmir; (iv) The lake sustains about 15,000 families living around it, providing fish, Singhara (*Trapa* sp.), Lotus (*Nelumbo* sp.) stem and other economically important products.



The Wular Lake has great social, economic and cultural values for the people of the Kashmir Valley. But this puts tremendous pressure on the natural ecosystem, more so with increase in human population and pollution. Around 8,000 fishermen are dependent on this lake.

Vast areas of the catchment zone have been encroached upon by people for cultivation. Willow has been planted to supply wood for cricket bats and wickerwork industry. Siltation resulting from deforestation in the catchment area is another problem. The Directorate of Soil Conservation is working to reduce siltation. Untreated sewage is discharged into the lake, resulting in eutrophication. On top of these problems, the Wular is heavily infested with *Salvinia* and *Potamogeton*. These weeds clog the waterways and channels and increase siltation rates. Although fishing is under the control of the Fisheries Department, they either have no actual control, or do not want to control the misuse of fine mesh nets. All these problems show that if we have to save Wular Lake and sustain the harvesting of its rich resources, and also attract waterfowl, an integrated approach among various government departments is necessary.

Flash floods are a major problem, created mainly due to deforestation. People living around Wular have realized the importance of flood control by good vegetation cover. People of Garoora village have regenerated 100 acres of forest patch on the bank of the lake after they repeatedly suffered flash floods. After the forest was regenerated, the fury of floods has abated. This example needs replication all around the Lake.

Recently the state government has decided to constitute a Wular Development Authority on the lines of development authorities for other tourist resorts of the valley. Although a committee has been appointed to formulate a blueprint for the role and mandate of the proposed development authority, but it is to be seen that howfar the conservation requirements of this important wetland are addressed while handing over the control to such a development authority.

#### **KEY CONTRIBUTORS**

M. M. Baba, A. Wani and Khursheed Ahmad

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## GHARANA WETLAND RESERVE

**IBA CRITERIA:** A4iii (³ 20,000 waterbirds), Data Deficient  
**PROTECTION STATUS:** Not officially protected

<b>IBA Site Code</b>	IN-JK-21
<b>State</b>	Jammu and Kashmir
<b>District</b>	Jammu
<b>Coordinates</b>	32° 50' 28" N, 74° 35' 04" E
<b>Ownership</b>	State
<b>Area</b>	300 ha
<b>Altitude</b>	400 m
<b>Rainfall</b>	1,100 mm
<b>Temperature</b>	4 °C to 46 °C
<b>Biogeographic Zone</b>	Semi-Arid
<b>Habitats</b>	Aquatic

### GENERAL DESCRIPTION

The Gharana wetland is important for migratory birds and more than 20,000 birds are seen during winter. It is located about 30 km from Jammu city, extending to the Pakistan border west of Gharana village. This wetland is 8 km from Ranbir Singhpora town. The State Government owns the Indian part of the wetland. The wetland has tremendous conservation and educational importance for the

entire Jammu region being the only site to attract migratory ducks, waders and wetland associated species every year. Wintering population of Bar-headed Geese in Gharana makes J&K the only state to have both breeding and wintering populations of this ecologically intriguing migrant. The site has also been identified by the BNHS as one of the key sites for avian flu surveillance.

#### **AVIFAUNA**

Gharana wetland is an important wintering ground for migratory waterbirds, and other wetland associated species. Some of the key species are Grey-lag Goose *Anser anser*, Ruddy Shelduck *Tadorna ferruginea*, Common Teal *Anas crecca*, Northern Pintail *A. acuta*, Eurasian Wigeon *A. penelope*, Garganey *A. querquedula*, Gadwall *A. strepera*, Northern Shoveller *A. clypeata*, Common Pochard *Aythya ferina*, White Stork *Ciconia ciconia*, Painted stork *Mycteria leucocephala*, Common Crane, *Grus grus*, Demoiselle Crane *Grus virgo*. Little Grebe *Tachybaptus ruficollis*, Little Egret *Egretta garzetta*, Common Moorhen *Gallinula chloropus*, and White-breasted Waterhen *Amaurornis phoenicurus* are resident species. (Ashfaq Ahmed Zarri Pers observations)

There is a need to conduct winter bird surveys. More than 2000 Bar-headed Geese *Anser indicus* were recorded in 2004 (T. Shawl and I. Suhail pers. comm 2004) and 2-3 thousands have been recorded wintering every year during 2005 onward till wintering season 2009-10 (Ashfaq Ahmed Zarri personal observations).

#### **OTHER KEY FAUNA**

The mammalian fauna of the wetland environs includes Nilgai *Boselaphus tragocamelus* and Wild Boar *Sus scrofa*.

#### **THREATS AND CONSERVATION ISSUES**

- Disputes regarding administrative control with local community
- Crop damage and lack of compensation mechanisms
- Management interventions by Wildlife Department strongly opposed by the locals
- Military activities
- Invasive species
- Poaching
- Unregulated water supply

Being located on the border, shelling by security forces across the border is a constant problem. The wetland is infested with Water Hyacinth *Eichhornia crassipes* and Typha. While the latter may not be an issue as it is a native plant, the former is one of the most pernicious invasive weeds of India and has destroyed

many wetlands. Flocks of Bar-headed geese and other migratory species damage the crops of the adjoining farming community leading to intense opposition to the Wildlife Department's management interventions including regulation of water supply, dewatering, creation of mounds for species such as cormorants etc.

Due to lack of administrative control of the Wildlife Department and frequent attempts to scare the birds by use of crackers by villagers, populations of migratory species seems to have drastically declined as observed throughout the winter of 2010-11 (Ashfaq Ahmed Zarri personal observations) in comparison to the previous years.

**KEY CONTRIBUTOR**

Tahir Shawl

**KEY REFERENCE**

None available