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Wetlands and Lakes at the Top of the World

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The Hindu Kush–Himalayan Mountains extend 3500 km, cover 3.5 million km², and include parts of 8 countries. They are home to many spectacular lakes and wetlands, a major source of water and regulators of water storage. Eighty-four peaks above 7300 m and innumerable others over 6000 m are interspersed with thousands of lakes and wetlands, some of which are rich in biodiversity and are home to rare species. Whereas the mountains have attracted attention, there is very little documentation on water bodies in the region. Some lakes are above 5000 m. Conservation of these fragile ecosystems is important, particularly in an era of international tourism, climate change, and megaprojects in the region.



The WWF initiative

For the past 4 years WWF has been focusing on high-altitude lakes and wetlands in the Ladakh region of India in the Himalayas. WWF-India is implementing projects with support from the WWF network. The Ladakh region of India, part of the Tibetan Plateau, lies within the state of Jammu and Kashmir and is governed by the Ladakh Autonomous Hill Development Council. This area is also part of the 200 WWF sites that are globally important in terms of biodiversity. In Ladakh, wetlands and lakes between 4000 and 5000 m are located in an area known as Changthang or Rupshu-Kharnak. A striking feature of this area is barren steep slopes with an undulating landscape, where snowmelt streams flow into lakes and ultimately the Indus River. Many lakes and wetlands do not have outlets and thus become brackish.

WWF's area of focus in Ladakh

Ladakh covers an area of approximately 98,000 km². It is bounded on the north by the eastern range of the Karakoram Mountains and the Tibetan Plateau. The altitude ranges from 3000 m (lower Indus and Nubra valleys) to 7600 m (Zanskar and Karakoram ranges). WWF is currently focusing on 3 major wetlands and lakes—Tso Moriri, Tsokar, and Pangong Tso—that are seriously threatened by unorganized tourism. Previously closed to tourism, the area was opened in 1994. Because of a lack of facilities and clear regulations, its fragile ecosystems have been suddenly exposed to pressure from the outside world, with consequent impacts on local resource use.

The 3 Wetland and Lake Areas

Tso Moriri is located in the southernmost part of the Changthang region of Ladakh. This lake is of about 140 km² area and is at 4511 m. Although it is now a closed system, it once had an outlet from the south to the Sutlej River. Therefore the quality of water varies, from fresh to brackish, depending on the freshwater discharge of the 3 streams that feed it. The village of Korzok is located on a small hill near the lakeshore. It is the largest Changpa settlement in Rupshu. About 205 families were recorded in 1995. Some of the villagers cultivate a small plot of land below the village. There is a *gompa* (Buddhist temple) in the village. The streams discharging snowmelt into the lake create an extensive and complex wetland ecosystem that provides feeding and breeding areas for birds, including the highly endangered black-necked crane (*Grus nigricollis*) and bar-headed goose (*Anser indicus*).

Tsokar is located about 160 km southeast of Leh and 50 km northwest of Tso Moriri. It is completely brackish, with salinity exceeding 50 ppt. The lake is of about 20 km² area and very irregular in shape, at an altitude of 4530 m. Tsokar is surrounded by several marshes and meadows, forming a perfect breeding ground for several waterfowl, including very rare species.

Pangong Tso is a huge brackish lake located 100 km east of Leh. This 700 km² body of water, a transboundary lake, straddles India and China. It is also a closed lake, in a spectacular setting surrounded by snow-capped mountains, and looks like a sea. Earlier on, Pangong Tso had an outlet to the Shyok River, a tributary of the Indus from the northwest, now closed due to natural damming. Two streams empty into the lake from the Indian side, forming marshes and wetlands at the edges.

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FIGURE 1 The blue sheep or bharal (*Pseudios nayaur nayaur*), found in the 3 lake areas in Changthang, is considered a low risk, near threatened species. (Photo by Joanna van Gruisen)

Changthang: a unique landscape and people

Ladakh is part of the state of Jammu and Kashmir, with Leh as the administrative capital. The 21,000 km^2 Changthang subdivision is part of Leh district, with high mountains, wide-open valleys, natural grasslands, and snow-fed streams. Stunning natural beauty, rugged mountains, and a harsh climate are major attractions for trekking. South Changthang has several wetlands, lakes, and streams, including the 3 WWF sites (see Box). Changthang is a cold desert, with an average annual rainfall of less than 10 cm. Though there are few people in the area, human settlements have existed for several centuries. The Changpas—people who live in Changthang—are primarily pastoral nomads.

Significance of the region

The Ladakh region has a considerable number of endemic species. About 700 plant species have been recorded, 285 of which are used in traditional Tibetan medicine. These plants have adapted to survive under extreme climatic variations and intensive grazing pressure. Significant mammals include the blue sheep or bharal (*Pseudois nayaur nayaur*, Figure 1), Siberian or Himalayan ibex (*Capra ibex*), Ladakh urial or shapu (*Ovis vignei*), Tibetan argali (*Ovis ammon hodgsoni*), Tibetan antelope (*Pantholops hodgsoni*), Tibetan gazelle (*Procapra picticaudata*), kiang (*Equus kiang*), and Tibetan wolf (*Canis lupus chanku*). Most significant of all is the snow leopard (*Uncia uncia*), a flagship species (Figure 2). About 225 species of birds have been identified. A WWF study recorded 15 breeding pairs of black-necked crane around the Changthang wetlands.

The 3 sites, particularly the Tso Moriri and Tsokar wetlands, host many of these species of flora and fauna. These sites are key staging posts on the migratory routes of various waterfowl. It is no coincidence that most of the biodiversity of this region, a cold desert, is near wetlands and lakes.

Working with people to conserve wetlands on top of the world

The objectives of WWF's initiative are the following:

- To document the significance of the region's ecosystems.
- To identify current and future threats to ecosystems.
- To initiate specific measures that address ecosystem threats, in partnership with local communities and other stakeholders.
- To identify specific sites that qualify as Ramsar sites, protected areas, and World Heritage Sites.
- To raise public awareness about the importance of these sites to the local economy, culture, and spiritual beliefs, by engaging various local organizations, including the military and civil administration.
- To identify gaps in information and knowledge and in monitoring and research, by establishing a field presence and involving scientific and technical organizations.

Although WWF has achieved most of these objectives to date, some will require more time and resources. Several field-level surveys have been conducted to document the flora and fauna, and more work needs to be done. The most significant achievements are listed:

- Presence on the ground: Establishment of a field office in Korzok village at 4600 m near Tso Moriri to conduct field surveys. The office in Leh works with the civil and military administration and tour operators.
- Technical reports: Several field reports have been published to document the biodiversity of the region and identify specific threats to the ecosystem. National- and regional-level consultations have

FIGURE 2 The 3 lake habitats also harbor the endangered snow leopard (*Uncia uncia*), a flagship species. (Photo by Joanna van Gruisen)



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FIGURE 3 The globally threatened black-necked crane (*Grus nigricollis*) is sacred to the local population. The WWF is working in 3 wetlands, the most important breeding grounds for this species outside China. (Photo by Joanna van Gruisen)

been organized to involve all stakeholders in addressing certain threats.

- Ramsar sites: Tso Moriri has been designated a Ramsar site, and preparations are under way to collect relevant information to declare it a World Heritage Site, applying ecological and cultural criteria. Designation of Pangong Tso as a Ramsar site is under way.
- Learning from people: Working with communities is a 2-way process. Learning from people is extremely important, particularly in this area, where the population has developed customs and approaches concerned with sustainable resource use. Most local people are Buddhists; they revere wildlife as a matter of religious belief and custom. For example, the black-necked crane is considered highly sacred (Figure 3). The arrival of this species in summer is considered a very good omen for the year. Tso Moriri is also sacred, and people do not bathe in it or do anything that will pollute the water.
- Building local institutions: Conservation is a long-term endeavor. External institutions can only facilitate initial efforts. Local capacity building to continue the task of protecting sites for the population's own benefit is extremely important. WWF has helped local communities form a Tso Moriri conservation trust at Korzok village. The trust will work with the tourism industry, civil administration, and local government bodies in taking measures to protect these sites.

On the basis of experience to date, conservation activities involving high-altitude areas in India will be further extended to at least 10 more wetlands. Conservation and management plans are being considered for each site. The process of collecting scientific information on the biodiversity of the region is an ongoing activity. Efforts will be made to publish scientific information in the next 2 to 3 years, and partnerships will be formed to build up a database for this area.

A regional initiative

Water resources in this region are vital. The mountains here are a source of some of the great rivers of the world—the Indus, Ganges, Amu Darya, Hilmand, Brahmaputra, etc—and of water for more than 2.5 billion people. Conservation of wetlands requires a regional approach and cooperation among the countries in the region.

WWF is attempting to launch a regional initiative to conserve all the important wetlands in the Himalayas. A regional workshop on conservation of high-altitude wetlands in the Himalayas was jointly organized in Urumqi, China, from 5 to 9 August 2002 by WWF, the Ramsar Convention, and the government of China. Participants from China, Pakistan, India, the Kyrgyz Republic, Nepal, Bhutan, and Tajikistan submitted reports and exchanged information. About 200 wetland sites that could qualify as Ramsar sites were identified during the workshop. Discussion and progress took place on the following aspects:

- Identification of suitable sites for Ramsar listing, World Heritage declaration, and National protected areas.
- Exchange of information and knowledge between countries on experience in conserving high-altitude wetlands.
- Development of a common methodology and identification of wetlands shared by more than 1 country for Ramsar designation.
- Increased regional cooperation in managing wetlands.

A follow-up meeting of the workshop will be held in August–September 2003 to discuss specific actions and explore the possibility of developing a regional training center. Partnerships are being built around the idea that a major regional effort is needed to conserve and protect these unique sites.

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