High Altitude Ramsar Sites in Nepal: Criteria and Future Ahead

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Abstract

This article is based on the study conducted by DNPWC with support from WWF Nepal for the declaration of high altitude Ramsar sites. The Ramsar criteria, threats and proposed activities for the newly declared high altitude wetlands are summarized, which will support in management of the wetlands. It also spells out the major indicators/criteria like biogegraphic location, endemism and religious/cultural significance that were assessed to declare as Ramsar sites. Added values of these wetlands are considered as storehouse of fresh water that requires to be maintained not only for downstream users but also for the conservation of biodiversity and improve livelihood linkages. The future actions will support in designing and implementing programs/projects for interested/potential conservation partners and local NGO/CBO/Governments for the management of Ramsar sites.

1. Ramsar sites

With the success of declaring four wetlands - for the first time in high altitude - as Ramsar Sites in Nepal, the total number has become eight. These sites were proposed by the Government of Nepal on 26 Feb 2007 to Ramsar Secretariat and was officially declared as Ramsar sites on 23rd September 2007. The remaining four are in the lowland tarai. For the wetlands in the mid hills, a proposal on Maipokhari has been approved by the Cabinet on 30 Sep 2007 (13th Bhadra 2064) to recommend Ramsar declaration.

The new high altitude wetland sites are:

Ramsar site No.1695 The Rara lake (Western development region, Karnali Zone, Mugu district, Rara VDC) is only about 4 hour walk from Mugu district headquarter, Gamdadi.

Ramsar site No.1694 Phoksundo Lake (Mid-Western development region, Karnali Zone, Dolpa district, Ringmo V DC) is about 2 days walk (about 30 km) from the district and park headquarter Dunai. Dunai is the nearest town from where it takes two days walk to reach Phoksundo Lake.

Ramsar site No.1693 Gosaikunda and Associated Wetlands (Central development region, Bagamti Zone, Rasuwa district, Dhunche and Syafru VDCs) is about one and half days walk.

Ramsar site No.1692 Gokyo and Associated Wetlands (Eastern development region, Sagarmatha Zone, Solukhumbu district, Khumjung VDC-2) is about two days walk from park headquarter Namche (another two days to reach from district headquarter Salleri).

2. Ramsar Criteria and Justification

There are eight criteria, out of which at least one should be fulfilled for the declaration of Ramsar sites. These criteria will be monitored to evaluate the health of the sites in future.

The Ramsar criteria that justifies the declaration of high altitude wetlands are described below:

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Group A: Sites containing representative rare or unique wetland types

Criteria 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region

All four high altitude wetlands lie in the Paleoartic biogeographic region in central Himalaya.

Rara lake of Rara National Park (NP) is largest lake in Nepal (1,061 ha water body and total Ramsar area is 1,583 ha including catchment of lake Rara) at an altitude of 2,900m. It provides water to the Karnali river, one of the four major rivers of Nepal.

Phoksundo lake of Shey-phoksundo NP is the second biggest (494 hectares as water body) and the deepest fresh water lake of Nepal (DHM 2004). This lake is the important source of water for the Thuli Bheri River of Nepal. The water about 500 m south of the lake forms the majestic fall, the largest (167m) in Nepal (Upreti 1989).

Gokyo lake system of Sagarmatha NP (196.2 ha as water bodies covered by 19 lakes with 7,770 ha catchment area) is one of the highest (between 4,710- 4,950 m altitude) lakes in the world, encompasses the highest national park in the world where four of the world's seven highest mountains are located such as Mount Everest (8,848m), Lhotse (8,510m), Lhotse Shar (8,383m) and Cho Oyo (8,189m) (SNP 2004). The lake is located at the base of Cho Oyo (the seventh world's highest mountain) and head of the Dudh Koshi River (Milk River), one of the major tributaries of Saptakoshi River in Nepal. It feeds from Nogzumpa glacier, the longest and one of the most active glaciers in Nepal.

Gosainkunda lake system of Langtang NP (54 ha as water bodies covered by 16 lakes with 1,030 hectare as the catchment) is an important sources of water for the famous Trisuli river of Nepal (Karki 2007), which forms a major tributary of Narayani River, one of the 4 major River systems of Nepal (RECHAM,HAF & EMRC JV 2005).

All these four major river system of Nepal ultimately feeds to the mighty Ganges river in India providing irrigation, hydropower and other industrial uses downstream.

Group B: Sites of International importance for conserving biological diversity

Criteria based on species and ecological communities

Criteria 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities

The four sites have unique floral and faunal assemblages with number of rare and vulnerable fauna and flora species over time (Karki and Thapa 2001, Karki et al 2005, Karki 2006, Karki 2007a, Karki 2007b, Basent 1998, Basnet 2004, Chalise and Kyes 2005, Ghimire et al 2000, HMG 1999, Inskipp 1989, Jackson 1979, Kaphley 2005, Yonzon 1990) (table 1a and b).

Table 1a. List of endangered and vulnerable fauna with conservation status

SN	Vernacular and Scientific name	IUCN	GoN	CITES	Rara	Pho	Gos	Gok
1	Snow Leopard *(Uncia uncia)*	EN	P	I		✓	✓	✓
2	Musk Deer *(Muschus chrysogaster)*	LR\nt	P	I	✓	✓	✓	✓
3	Wood Snipe (*Gallinago nemoricola)*	VU			✓			✓
4	Red Panda(*Ailurus fulgens)*	EN		I	✓	✓	✓	
5	Cheer Pheasant *(Catrius wallichii)*	EN		I	✓			

Table 1b. List of threatened flora with Conservation status

SN	Vernacular and Scientific name	GoN	IUCN	CITES	CAMP	Rara	Pho	Gos	Gok
1	Panchoule *(Dactylorhiza hatagirea)*	*	En	II		✓	✓		
2	Jatamanshi *(Nardostachys grandiflora)*	✓**	Vu	II		✓	✓	✓	
3	Kutki (Neopicrorhiza scrophulariflora)		Vu	-		✓	✓	✓	✓
4	Satuwa *(Paris polyphylla)*		Vu	-		✓	✓		
5	Laghupatra *(Podophyllum hexandrum)*		Vu	II		✓	✓		
6	Louth salla *(Taxus wallichiana)*	✓**	En	II		✓			
7	Bikh (*Aconitum spicatum)*		Vu	-		✓	✓	✓	
8	*Ceropegia sp*			II		✓			
9	Okhar (*Juglans regia)*+	✓***	NT	-		✓			
10	Sugandhawal *(Valeriana jatamansii)*	✓**	Vu	-		✓			
11	Talispatra (*Abies spectabilis)*	✓**	LR/lc	-		✓			
12	Pakhanbed *(Bergenia ciliata)*		CT	-		✓	✓		
13	*Jhyau (Lichen spp.)*	✓**		-		✓			
14	Karkati Shringi *(Pistacia chinensis)*			-		✓			
15	Jangali Painyu *(Prunus carmesina)*		R	-		✓	✓		
16	Silajit (Rock exudate)	✓		-		✓			
17	Chiraito (Swertia multicaulis)		DD	-			✓	✓	
18	Kapase phul *(Saussurea gossipiphora)*		-	-			✓		
19	Kyashar *(Meconopsis horridula)*		-	-			✓		
20	Himalayan Poppy (*Meconopsis dhwojii)*		NT(gl)	-					
21	Bhutkesh *(Heracleum lallii)*		EN(gl)	-				✓	
22	*Jurinea dolomiaea*		NT	-				✓	
23	Padamchal *(Rheum australe)*		VU	-				✓	
24	Padamchal *(Rheum moorcroftianum)*		NT	-				✓	

+ Okhar of National forests only. *Ban for collection, use, sale and distribution, transportation and export, ** Banned for export except processed with permission of department of forests, *** Banned for transportation, export and felling for commercial purpose; Gl=Global, CITES=Convention on international trade on endangered species (flora and fauna), IUCN=World Conservation Union (En=endangered, Vu=Vulnerable, LR/NT=Low risk, Near threatened, DD=Data deficient), GoN=Government of Nepal (P=Protected and kept on annex), CAMP=Conservation Assessment Management planning, Rara=Rara Lake, Pho=Phoksundo, Gos= Gosaikunda and Associated Wetlands, Gok=Gokyo and Associated Wetlands

Criteria 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region

The wet alpine pasture, moraines and damp river/stream banks along the **Rara** lake area including Karnali River catchments are the natural habitats for endemic plant species such as Nirbishi (*Delphinium himalayai*). Kyasar (*Meconopsis regia*), Primula poluninii (terrestrial) and Cirsium flavisquamatum (aquatic) are potential endemic species have to be found in the catchment. Endemic Amphibian Rara paha (Paa rarica Dubois and Matsui 1983) is found in Lake Rara (2900-3020m) and also reported to be found in Annapurna Conservation Area. In Rara it is scarce (Shah and Tiwari 2004).

Gokyo and associated wetland has wet alpine pasture, moraines and damp river/stream banks along the lake area including Dudh Koshi River catchments and are natural habitats for many endemic species of plants such as Ghans (*Kobresia fissiglumis*), Ghans (*K. gandakiensis*), *Pedicularis poluninii*, and *P. pseudoregelina*.

The **Gosaikunda and associated wetland**s the center of endemism in the central Himalayan region and studied well compared to the other region with about eight endemic plant species in the catchment. Following 6 endemic plant species occur in the catchment-Himalayan Poppy (*Meconopsis dhowjii*), Golden Primerose (*Primula aureata*), Bhutkesh (*Heracleum lalii*), *Pedicularis pseudoregeliana*, Suryamukhi (*Cremanthodium nepalense*), and *Rhododendron cowanianum* (Joshi and Joshi 1991, Shrestha and Joshi 1996).

Criteria 4: **A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.**

Rara lake is resting site of at least 49 species of water birds including Bar-headed Goose (*Anser indicus*)-Passage migrant, Common teal (*Anas crecca*)-Winter visitor, Tufted duck (Aythya fuligula)- Winter visitor, Common merganser (*Mergus merganser*)- Winter visitor, Northern pintail (*Anas acuta*)-Passage migrant with breeding by Ruddy Schelduck (*Tadorna ferruginea*)-Possibly passage migrant, Eurasian woodcock (*Scolopax rusticola*) - resident and Brown dipper (*Cinclus pallasii*)-resident (Chaudhary 2003, Giri 2005).

Gokyo provides fresh water for the Dudhkoshi River where Endemic fish Psilorhynchus homaloptera is reported from the Dudhkoshi drainage at an altitude of 2,950m.

Specific criteria based on fish

Criteria 7: **A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity**

Out of eight endemic fish species found in Nepal, three of them - snow trout, Asala macha (*Schizothorax macropthalus, S. nepalensis, S. raraensis*) - are found in Rara lake. The distinct features of these endemic fish are due to internal fin structure and size.

Criteria 8: **A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend**

Dytiscid beetle, mayfly (Ephemeroptera) and caddis fly larvae are well represented aquatic fauna. Water shrimp (*Gammarus sp.*), Aquatic beetles, hemipterans, snail (*Limnea and Planoribs*) and ram's horn (*Planorbis*) are abundant and serve as food for snow trout and migratory wildfowl.

3. Biogeographic region:

Rara and Phoksundo lake lies in Western Himalayan Temperate Forest (88) and Gokyo and Gosaikunda wetlands lie in Eastern Himalayan Alpine Meadows (112).

4. Pressures and conservation measures

The study shows that the pressures on the four sites are almost similar.

Grazing: The regulation on grazing has been slowly uncontrolled as a result large number of sheep, goat, cow and buffalo are seen grazing in the margin of lake and catchment area and the defecation is directly reached or washed in to the lake which is the major source of pollution in Rara lake. Similar grazing exists from mild to heavy in other three Ramsar sites. Regulation by park with the help of buffer zones is being implemented after the improvement of security situation.

Overuse of Timber and Non-timber Forest products: The district headquarter, Mugu is also partially dependent on the timber and fuel wood use from the catchment of Rara lake. Traditional illegal commercial collection of Guchi Chyau (Morchella sp.) by local people in Rara (creates pressure to the biodiversity during its collection season after rain) is leading to the loss of NTFPs in catchment of Rara. The Rara lake site and Phoksundo catchment are more dependent for timber and fuel wood resources compared to Gokyo and Gosaikund areas (KMTNC 2004, LNP 2002, SNP 2004, SPNP 2007). Alternatives such as iron/steel frames for door and windows panels are being initiated for developmental infrastructures.

Pollution: The main sources of pollution are human waste and domestic sewages of the park, army personnel, tourist and associated team members, and defecation by livestock. Being the major tourists' destinations some of environmental and socio-economic problems have also been identified. The fuel wood collection and solid waste from the visitors during the festivals creates environmental consequences whereas visitors refusing to employ local residents as porter, guide and service providers creates socio-economic problems which needs to be taken care through the training and other capacity building and entrepreneurship development supports (KMTNC 2004, LNP 2002, SNP 2004, SPNP 2007).

5. Current recreation, tourism and wise use- livelihood options

The **Rara lake** is the most popular destination of the tourist visiting Rara NP. The highest number of tourist in 1997/98 was 560 individuals, which was declined to 5 in 2004/05. In 2005/06, the number was increased to 28. In order to promote domestic and international visitors, Rara festival was organized in early 2007. (Durga Poudel, Park Warden, Personal Communication).

Phoksundo lake side provides camping site to tourists visiting **Ringmo** village and other settlements, which are famous for observing the Bonpo culture on the way to upper Dolpa. The lake is one of the favoured destinations of the tourist visiting Shey-Phoksundo NP. Till 2000, the number of tourist visiting to the Park used to be around 500 but the number has been drastically reduced afterwards. The Ringmo festival 2007 has shown some hope of increment and the trend is visible.

The **Gokyo** Lake is one of the touristic destination on the way to Everest base camp. There are 8 hotels beside the lake, which provides lodging and camping site to tourists visiting the Mt. Everest and other peaks. Some tourist with special interest in flowers, glaciers and cultural/tradition also visit the area. The Park has received about 18,000 tourists in 1997/98 which has increased up to almost 26,000 in 2000/01 and started decreasing then (about 19,600 in 2001/02). At least 25% of the tourist visiting the Park visits Gokyo area (DNPWC, WWF, CETED 2005). The trekking route passes through the Gokyo and also goes towards Lobuche (east) and Thame (west).

The four hotels of **Gosaikunda** provide basic food and lodging to tourists visiting **Helambu or Dhunche.** People usually enjoy the sight seeing and cultural festivals. Observation of plants, animals such as Red Panda(Ailurus fulgens), birds of the lower catchment and hiking to the ridge are among the preferred activities by visitors. About 25-30 % of the tourist visiting Langtang NP also visits Gosaikunda area. The highest number of tourist visiting to the Park is 13,166 in 2000/01 which has dropped down and reached to almost 5,000 now.

6. Follow up and future activities:

For the conservation of the four new Ramsar Sites, various activities are proposed as follows (DNPWC/WWF/CETED 2005, 2006, 2007):

Rara Lake

- Demarcation of NP and BZ
- Preparation of Management Plan
- Measures to reduce crop damage by wildlife especially wild boar
- Promote grazing right to the local people within the buffer zone
- Promote use right of Nigalo to the buffer zone residents
- Conduct research, specifically on ecology of endemic fish species, endemic frog Pa (*Paa rarica*), geology of Lake, status of wetland birds with particular emphasis on breeding and resident species, ecological and conservation oriented study of endangered mammals species.

Phoksundo Lake:

- Intensive study of the floral and faunal richness and endemism of the lake area,
- Hydrological study to define the depth of Phoksundo lake

- Evaluate the socio-ecomnomic and ecological impacts (welfare of local community and biodiversity)
- Eco tourism
- Wetland management,
- Implementation of management plan

Gokyo and associated wetland

- Provide proper sanitation for the hotels
- Provision for drinking water supply,
- Manage Garbage disposal,
- Alternative energy to discourage the use of firewood for hotels, tourists and porters
- Eco tourism
- Conservation of Pang (Meconopsis sp.) flower
- Regular monitoring of Nogzumpa glacier Melting
- Build resilience of community to adapt with climate change

Gosaikunda and associated wetland

- Prepare wetland management plan
- Conservation of Dupaghang cave as a place of importance for the cremation of Jhakris
- Promote traditional grazing
- Provide alternative energy to reduce the use of firewood
- Control the killing of animal for meat purpose above Lauribinayak area
- Collection, separation, storage, and proper disposal of garbage's from Hotel to avoid the pollution towards the lake areas.
- Promote recognition of cultural and religious significance
- Eco tourism

Conclusion

Declaring Ramsar sites are not the solution to conservation of significant wetlands. However, once the sites are declared as Ramsar, it will be considered as wetlands of international significance and the Government will have an obligation for its conservation together with conservation partners and local communities.

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