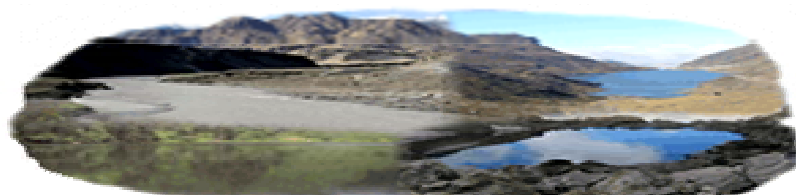


Chapter 6



WETLANDS OF SIKKIM

Sikkim, a small state in the Eastern Himalayas has only natural inland wetlands belonging to the category lakes/ponds. The state has 227 high altitude lakes (wetlands) which are basically small and shallow. Most of it are fed by glaciers and considered sacred. The lakes are popularly called as *Chhokha* or *Tso* or *Chhona* (in Bhutia), *Chho* (in Lepcha) and *Pokhari* or *Jheel* or *Tal* (in Nepali).

Distribution of Wetlands in Sikkim

Mapping for the state of Sikkim was done on 1:50 000 scale using IRS LISS II data of 1992/93. SOI maps on 1:50 000 scale were used for preparing base maps. In all 160 wetlands greater than the minimum mapping unit (2.25 ha) were delineated which occupy an area of 1985 ha. 69 wetlands got frozen during the winter as manifested on

Table 6.1 Distribution of Wetland in Sikkim					
Wetland Category	Wetland Class	No. of Wetlands	Wetland Area (ha)	Water Spread (ha)	
				Post-M	Pre-M
Natural	Lake/Pond	160	1985.00	1985.00	1749.50
<2.25 ha	-	67	-	-	-
Total		227	1985.00	1985.00	1749.50
Source : - Wetlands of India, Nation-wide Wetland Mapping Project, sponsored by MoEF, Space Application Centre (ISRO, Ahmedabad – June 1998)					

Note : Number of Wetlands frozen in Pre-monsoon 69
M = Monsoon

the pre-monsoon season imagery. The water spread of the wetlands decreased from 1985 ha to 1749.50 ha during the pre-monsoon season. In addition, there are 67 wetlands smaller than the minimum mapping unit.

District-wise Distribution of Wetlands

There are four districts in the state, viz, North, East, West and South. As mentioned earlier the state has only lakes/ponds type of wetlands. The detailed information about wetland distribution is given in the table below.

North Sikkim has the highest number of wetlands in the state (135 nos.) occupying an area of 1807.50 ha. However, during pre-monsoon season the area estimated is 1592.25 ha due to freezing of many of the lakes. East and West districts have 14 and 11 wetlands occupying an area of 120.75 ha and 56.25 ha respectively. There is no reduction in the area during pre-monsoon seasons. In South district no wetlands could be delineated.

Table 6.2 District-wise status of Wetlands of Sikkim (Note : M = Monsoon)					
District	Wetland Class	No. of Wetlands	Wetland Area (ha)	Water Spread (ha)	
				Post-M	Pre-M
1. East Sikkim	Lakes/Ponds	14	120.75	120.75	100.7
	< 2.25 ha	3	-	-	-
2. West Sikkim	Lakes/Ponds	11	56.50	56.50	56.50
3. North Sikkim	Lakes/Ponds	135	1807.75	807.75	1592.25
	< 2.25 ha	64	-	-	-
4. South Sikkim	-	-	-	-	-
Total		227	1985.00	1985.00	1749.50
Source : - Wetlands of India, Nation-wide Wetland Mapping Project, sponsored by MoEF, Space Application Centre (ISRO, Ahmedabad – June 1998)					

Turbidity

Majority of the wetlands in Sikkim have low turbidity (107 in post-monsoon and 60 in pre-monsoon). This is primarily due to the fact that most of these wetlands (lakes) are located in the high Himalayas and are of glaciatic origin. During the post-monsoon season, 29 wetlands exhibited moderate and 24 high turbidity. The turbidity status is shown in the table below.

Table 6.3: Turbidity Status in Wetlands of Sikkim (Note : M = Monsoon)

Wetland Class	Turbidity					
	Low		Moderate		High	
	Pre-M	Post-M	Pre-M	Post-M	Pre-M	Post-M
Lakes/ponds	60	107	3	29	14	24

Source : - Wetlands of India, Nation-wide Wetland Mapping Project, sponsored by MoEF, Space Application Centre (ISRO, Ahmedabad – June 1998)

MAJOR WETLANDS IN SIKKIM

The wetlands listed below are amongst the most productive & biologically rich ecosystems and are also amongst the most endangered.

➤ **Khecheopalri Wetland**

Centered in a dense forest, Khecheopalri Lake is located at West Sikkim at an altitude of 1700 m. It is cirque type and is considered as one of the most sacred lakes by the Sikkimese people both by the Buddhists and the Hindus (Jain *et al.* 1999 and 2000 and Jain, 2000). The lake is subjected to high influx of tourists and number of pilgrims. It is accessible by a motorable road right up to the lake area. The lake watershed has mixed broad leaved forests and agricultural land with a total area of 12 sq. km. having two villages which includes 91 ha area specifically as the lake watershed. Significant land use cover change during past four decades has resulted in its deterioration. Heavy sediment loads have been recorded which is posing big threat.



➤ **Tsomgo (Chhangu) Wetland**

It is situated at an altitude of 3660-3700 m in an alpine area on the way to Nathula about 40 km away from Gangtok. The lake is oval in shape, about 1 km long, 22 ha in size and is considered sacred by the local people. This lake remains frozen during the winter months till mid- May. This wetland is a lake complex joined by some other water bodies Manju-I and Manju-II. It has also varied biodiversity in terms of flora and fauna. It is subjected to high influx tourists.



➤ Gurudongmar Wetland

It is a complex of three glacial water bodies situated in North Sikkim at an altitude of 5180 meters having an area of 40 hectares. It is one of the largest lakes with 1.8 km circumference. It is a sacred water body opened for regulated tourism. It is the north flowing moraine dammed lake and one of the potentially dangerous glacial lakes in the Sikkim Himalaya. It is a pristine glacial wetland which is subjected to pressures of encroachment, siltation, thin vegetal cover, unplanned tourism. This is a typical high altitude wetland a source of fresh water.



➤ Phedang Tso Wetland Complex

It is situated in Kupup in East District at an altitude of 4400-4600 meters and is alpine in character. It is 45 hectare in area and a source of water for Jalkata power station in Bhutan and is surrounded by defence installations and road networks. Threats posed are tourism influx, excess field exercises by army and civilians around the lake, grazing, avalanches and shrinkage in area. It also serves as means of domestic water supply to army and local populations. Numbers of water fowls use the water body for nesting and transit.

➤ Menmoitso and Hangu Complex

These twin wetland habitats are situated in East Sikkim with an area of 42 ha and 58 hectares. It is in the conifer forest mixed with *Ascer*, *Viburnum*, *Prunus*. It is a typical habitat for trout fish. Hangu is a swampy typical Wetland area suitable for variety of Avifauna. In 1962, the Chinese attacked Indian camp here killing more than 200 Indian soldiers.

➤ Tamzey Wetland Complex

This wetland complex is situated near Chola pass at Tamzey valley at an altitude of 4200-4600 meters having an area of 35 hectares. During past 40 years all matured fir trees have been removed from this area to meet the defense purposes during Chinese aggression. The area is subjected to threats like poor regeneration, heavy population, shrinkage in area, grazing. etc. These threats also cause problem of contamination of water supply to Gangtok town.

➤ Tembao Wetland Complex

It is situated in North Sikkim at an altitude of 4400 meters having an area of 15 hectares. This wetland burst out in December 1998 because of which it came in to prominence. It has good wildlife and is subjected to threats of shrinkage, catchment degradation, poor vegetal cover, traditional grazing, rapid formation of marine gullies, and excessive use of hot springs. In spite of its smaller size, it is a significant Wetland which needs protection.

Table 6.4 Index of Wetlands Sites in Sikkim

SL. No	WETLAND SITES	DISTRICT	Approx. Area in ha	Remarks
1.	Chholamu lake	North	25	Cold desert, source of Teesta river.
2.	Gurudokmar Tso	N	40	Sacred lake, open for regulated tourist.
3	Dongkyong Tso	N	4	-do-
4	Gyamtsona Tso	N	3	Remnants of Testhy sea.
5	Thepla Tso	N	4	-do-
6	Lashar Marsh Land	N	45	Swampy land wide spread water course.
7	Green lake	N	0.5	Glacial lake remnant.
8	Pema Lhatso	N	3	A strip of land passes through the lake in KNP.
9	Muleting Tso	N	22	A glacial lake reported to have under ground passage to Tibet in KNP.
10	Chopta Tso	N	4	A wide spread fresh water in the form of marsh.
11	Heegyathang Tso	N	3	On the peak of Hee-gyanthang village in middle Dzongu
12	Tembao Tso	N	15	A glacial lake at Menmoisamdong incidentally burst out in the month of December 1998.
13	Singkam Tso	N	3	Fresh water in Rhododendron forest above Lachung Hot spring.
14	Lava Tso	N	5	Above Youmthang between Kalap in Lachen and the tail reaches at Phunikhomo.
15	Youmesamdong Tso	N	22	A fresh water lake at Samdong hot spring.
16	Phunikhom Tso	N	3	Just above Phunikhomo and extends up to Namdasa.
17	Chomzomoi Tso	N	9	A famous lake above Lachung FRH waterfall erstwhere the Chogyal of Sikkim used to trek.
18	Tsingo Tso	N	2.5	In a deep moraine rocky valley towards Thankerla now known as Katau.
19	Youm Tso	N	2	A partial glacial lake attached to the rocks highly regarded as sacred by the Lachungpas located in between Chuba and Thoklung RF.
20	Patala Tso	N	4	A glacial lake with falling debris and boulder.
21	Ghemtsobhuk Tso	N	2	A deep valley dark lake near in the mountain moraine.
22	Phegi-sevo Tso	N	5	A sacred lake near Khorala.
23	Tsothang Tso	N	3	Near tree line in Dombang valley.
24	Thosakhom Tso	N	4	A fresh water lake near tree line above Chakung.
25	Thosamam Tso	N	2.5	Thosa lower lake Chakung.
26	Kasturiorar Tso	N	1.5	A small lake in saddle of mountain above Tsonakmo above Kabi.
27	Nak Tso	N	6	A black lake below rocky outcrop the source of Bakcha chu.
28	Thingchim Pokhori	N	2	A small Pokhori above Tingchim village the irrigation and water sources of down villages
29	Panz Pokhocri	N	6	A set of small lakes numbering five c. 6-7 km from Nak Tso.
30	Hans Pokhocri	N	2.5	A shallow backwater lake below Chola near Tamze Check post and forms one of the sources of Gangtok water supply and a permanent halting place of Bramminy ducks.
31	Anda Zeel	East	3	An egg shaped lake near Tamze check post and also is the source of Tatechu.
32	Chochempheri lake	E	3	Marshy area with perennial water abounds with valued aquatic medicinal herbs.
33	Upper Bedang Tso	E		
34		E	4	Situated above main Bedang Tso at Kupup. The Army instillation around it. Siltation high.
35	Upper Nmnag	E	2	Surrounded with medicinal shrubs.
36	Yip Tso	E	0.25	A peculiar characteristic small pond inside Kyongnosla Alpine sanctuary having medicinal value of treating skin diseases
37	Yakla Tso	E	2	A small lake
38	Nathula Tso	E	2	On the way to Nathula
39	Sherathang Marsh	E	45	The valley is marshy land with sporadic boughs and swaps.

40	Tsomgo Tso	E	35	A famous tourist spot at a distance of 35 km from Gangtok at an elevation of .c12000 feet.
41	Menmoi Tso	E	42	A big lake in the surroundings of the conifer forest mixed with Ascer, Viburnum, Prunus, Forest. A pol of trout fish habitat.
42	Phedang Tso	E	45	The source of Jalkata power station in Bhutan surrounded by defance installations and road net works.
43	Upper Zelepla Tso	E	2	A moraine lake
44	Lower Zelepla Tso	E	3	-do-
45	Tsonakmo Tso	E	1.5	-do-
46	Tsonam Tso	E	1	-do-
47	Lampokhori	E	52	A elongated lake spreading from north to south direction near Bhutangla
48	Nathang Tso	E	4.5	A high altitude lake
49	Pangolakkha Tso	E	2	A small dark lake
50	Rachela Tso	E	4	A muddy lake at Rachela
51	Aritar Pokhori	E	2.5	A semi natural lake improved by the locals as tourist spot
52	Sang Tsokha	E	1	A small pond in Fambunglho WL sanctuary with red fishes and is in the process of dwindling stage.
53	Nagini Pokhori	South	1.5	This is the only water sources of Mamring south Sikkim
54	Khepalri Tso	West	45	A scared lake of West Sikkim and has become the tourist interest. The lake is surrounded with rich oak forest.
55	Lampokhori	W	15	A longitudinal lake located in KNP famous for halting place of migratory avi-life
56	Doot Pokhori	W	3	A white lake in the pockets of moraines
57	Rakta Pokhori	W	2.5	Bloody lake in the moraines of mountains scree
58	Serum Tso	N	3	In Dombang valley
59	Bhosa Tso	N	2	In Dombang valley
60	Yabukphycha Tso	N	0.25	A small perennial lake attached to hard rocky hill near Chukungring
61	Lakso Tso	North	7	Old grazing place.
62	Sangla Tso	North	19	Behind lake Gurudikmar from Lachung side.
63	Lower Namnag Tso	East	3	Situated in alpine area and water birds halted here.
64	Upper Sherathang Pokhori	East	2.5	The lakes have been disturbed due to high intensity of biotic interferences.
65	Lower Sherathang Pokhori	East	3	-do-
66	Lungtse Pokhori	East	6	Secluded in the mountain, the lake has clear water body and is surrounded by rich flora. Birds attack here for halting during long flight.
67	Upper Nathula Pokhori	East	2	This is situated near IB line and not much disturbances is observed here.
68	Upper Manju lake	East	2	This is ituated just below Tsomgo Sherathnag road and salitation rate is very high dur to road construction and maintenance. But this lake invites regular halting station of Brahminy Ducks and other water Birds. Even trout fishes are also reported here.
69	Lower Manju lake	East	3	-do-
70	Kal or Moi Pokhori	West	4	A holy lake partly damaged due to falling debris from the hillside. This lake has religious sanctity as visitors visit this lake from Nepal as well as from Sikkim.
71	Palay Pokhori	West	2.5	The shape of the pokhori appears to be more of cock. The lake is situated in the mountain scree.
72	Hans Pokhori	West	3	This lake serves as halting place for ducks during their long flight.
73	Seto panior kanchi or dunge Pokhori	West	4	The colour of this lake appears to be whitish and is pocketed in a small high altitude area.
74	Thula jumlay	West	6	A twin lakes jointed by a small passage of water and belief to be sacred.
75	Laximi Pokhori	West	6	A sacred lake believed to fulfill wishes.
76	Nir Pokhori	West	3	A blue colour lake with perennial water sources. These lake are fed by Rathong glaciers.
77	Kal Pkhori	West	3.5	A dread lake with black appearance and believed to be the hurrying lake of the area.
78	Mujur Pokhori	West	5	The shape of the lake looks like a peacock elongated with tapering tail in the run. This is located in the mountain glacial area.
79	Ram Laxaman Pokhori	West	7	Two medium size lakes nearby each other. It is located in a secluded area in the Himalaya.

80	Jyamto Pokhori	West	2	A lake is situated in the mountain side surrounded by an array of rocks and boulders.
81	Ome-Tso or Dut Pokhori	West	5	A milky and creamy appearance water body sunken in the valley regarded as very sacred by the Buddhists and Hindus both.
82	Bhale Pokhori	West	2.5	this lake also looks like a cock having a small head and spread tail.
83	Pakla Pokhori I	East	3	This lake is located in alpine area surrounded with rich flora and is also a place for resting of waterfowl during long flight.
84	Pakla Pokhori II	East	3.5	At the same place of Pokhori I
85	Thegu lake	East	5	Situated in alpine areas and is occasional resting place or waterfowl. There are reports of trout fish and is partly disturbed due to loose soil.
86	Nathang Pokhori II	East		This lake is located above Nathang village and provides water source for the village.
87	Taren Pokhori	East	2	Birds visit here especially for halting during their long flight.
88	Dokra lake I	East	1	This lake is situated near the army camp.
89	Dokra lake or Sarder lake	East	2	-do-
90	Karpo lake I	East	2	It is located in a small valley with falling debris around it.
91	Karpo lake II	East	4	This is situated above lake I and has similar problems of biotic factors.
92	Nakchok Jor Pokhori I	East	12	This lake is situated on the way to Tamze below the roads. The colour of the lake appears to be dark and is a safe place for halting of waterfowl.
93	Nakchok Pokhori II	East	3	-do-
94	Chola Pass Pokhori I	East	2	This lake is situated almost in the saddle of Chola pass and provides main halting place for birds.
95	Chola Pass Pokhori II	East	2.5	-do-
96	Sophula Pokhori	East	3	Located in the mountain area.
97	Goru Pokhori	East	2.5	This is located in alpine area with silt falling from the above.
98	Chokhato lake	East	2	In alpine zone
99	Rebay Kha Tso	East	4	The shape of the lake is like Tortoise.
100	Thomkha lake	East	3	It is hidden in the mountain valley and is difficult to approach.
101	Phonakhko lake	East	2	In a saddle with water colour bluish and upper area is fragile and loose.
102	Manju I	East	3	Manju lake I
103	Manju II	East	4	Manju lake II
104	Manju III	East	6	Manju lake III
105	Yakla Tso I	East		Yakla I
106	Yakla Tso II	East		Yakla II
107	Yakla Tso III	East		Yakla III
108	Hangu wetland	East	580	Wetland with swampy area good for water habitat. In 1968 the Chinese attacked a heavy bomb and killed more than 200 Indian jawans here.
109	Upper Nathula Tso	East	6	Near IB line occasional halting of waterfowls. Highly sensitive zone.
110	Thegu Tso I	East	3	Frequented by locals for collection of minor forest products and Brahminy ducks halted and take breed here. Altitude 3900 m.
111	Burum Tso	East	3	Located in KAS facing western boundary.
112	Tsonak Tso I	East	5	It is located on the way to Tamze near Tsonak Tso a place for halting birds but frequently disturbed by the porters.
113	Neola Tso	East	6	On the way to below Kupup Nathang road. A very quiet and still lake in the alpine area.
114	Kuthang Wetland in KNP	North	200	A huge wetland spread in a broadleaved forest with still water rich in aquatic life but not identified. During Musk deer trap demolition expedition observed ungulate visiting of the area.
115	Donkyong lake	North	15	The lake is situated on the right of Teesta river on the way to Chholhamo and Gurudokmar. The lake is rich in waterfowl visitors. It is also a place for the waterhole for domesticated sheep. The lake is divided by a small band in the middle.

Note: The area shown is ocular observation only