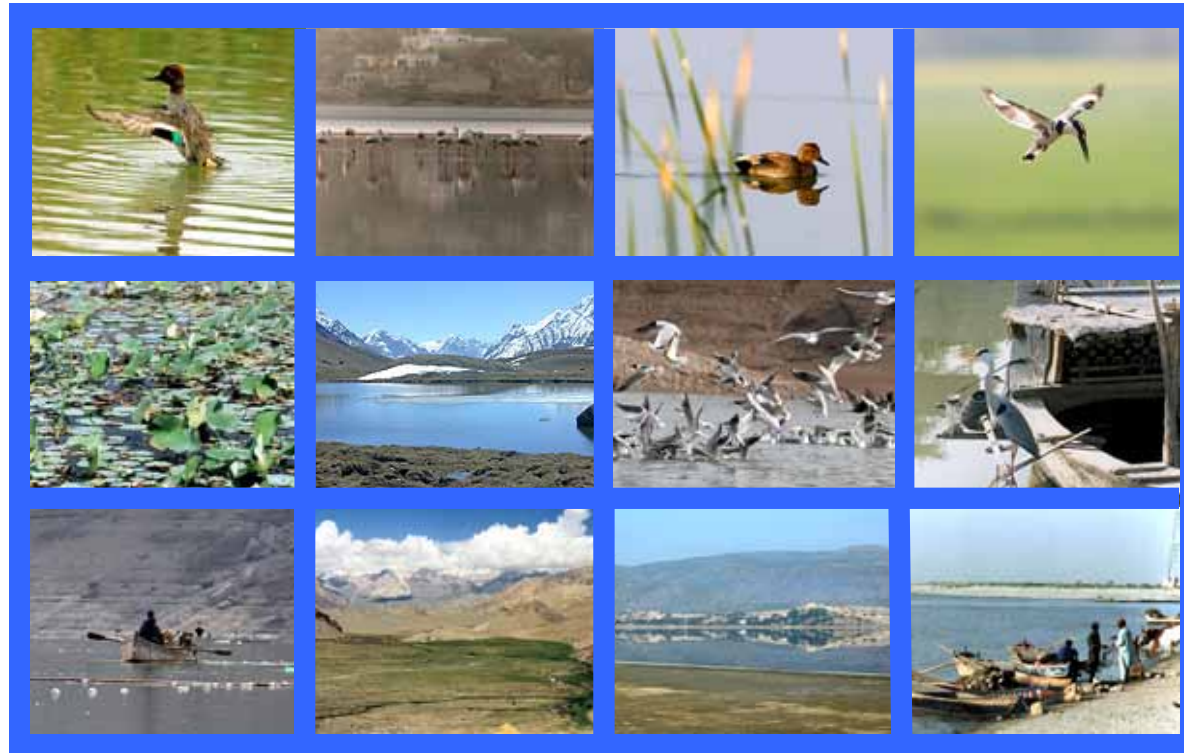


Atlas of Wetlands of Pakistan

Draft Compilation of selected Wetlands



ATLAS OF WETLANDS OF PAKISTAN - Draft
GIS Laboratory, WWF-Pakistan

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Rashid Saleem
Syed Muhammad Raza
Usman Akram

Photo credit: PWP/WWF/Ghulam Rasool/Hassan Zaki/Ahmed Khan

Citation: WWF Pakistan (2008). Atlas of Wetlands of Pakistan, Pakistan Wetlands Programme, Islamabad.

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Pakistan Wetlands Programme

The Pakistan Wetlands Programme (PWP) aims to promote the sustainable conservation of freshwater and marine wetlands and their associated globally important biodiversity in Pakistan. The Programme will create and implement a National Wetlands Conservation strategy. Sustainable wetland conservation measures will be developed at each of the four demonstration sites, carefully selected to represent conditions in four broad wetland ecological zone of Pakistan including coastal wetland zone, arid wetland zone, semi-arid wetland zone and alpine wetland zone.

Pakistan Wetlands Inventory: Pakistan possesses a great variety of wetlands distributed throughout the country. However, the only comprehensive source on the existing resources of wetland ecosystems in Pakistan was the Directory of Asian Wetlands (Scott, D.A., 1989) where only 48 significant wetlands have been discussed. In order to fill the information gap Pakistan Wetlands GIS-based Wetlands Inventory (PWGIS) is being developed under the PWP to serve multiple scientific, decisions making and awareness purposes.

Inventory Approach: Asian Wetlands Inventory guidelines (Finlayson et al., 2002) are being followed to develop multi-scale database at three levels mentioned below:

- 1: 250,000 scale mapping for 170 significant wetlands
- 1:50,000 scale mapping for four PWP demonstration sites and 47 Protected Wetlands designated either under Ramsar Site, National Park, Wildlife Sanctuary, or Game Reserve and
- 1:10,000 scale mapping for at least six selected highly significant wetlands

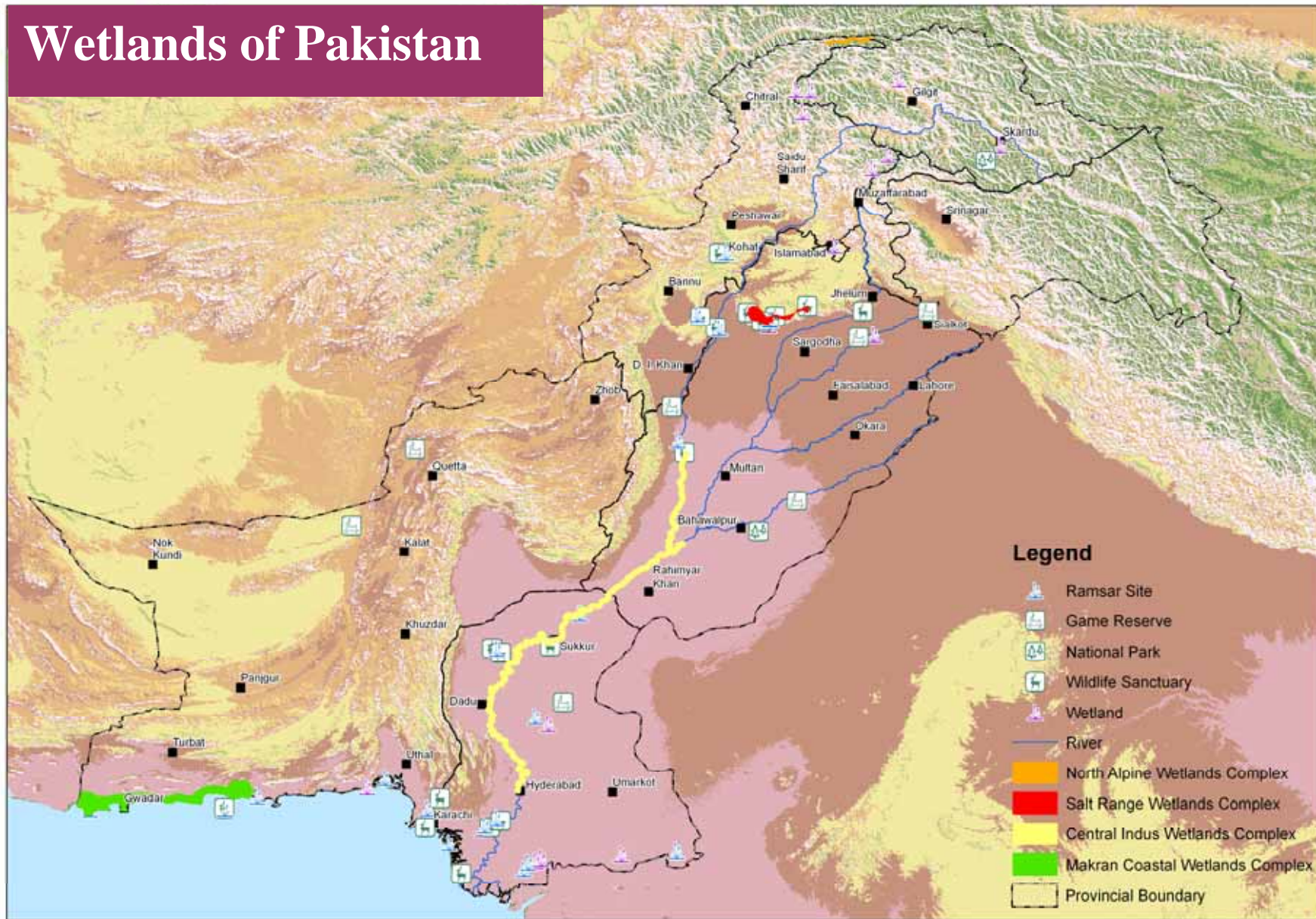
Respectively, ASTER (15m), SPOT (2.5m) and Quickbird (0.6m) satellite images are being used for landcover delineation. FAO's Landcover Classification System (LCCS) was adopted to harmonize the legend at all the scales.

Multi-scale watershed database: A standardised watershed database of Pakistan has been developed that can be used for in situ watershed management and can also be aggregated with global and regional databases (e.g., WWF-HydroSheds, Watersheds of the world).

Sub-basins were delineated from elevation data of the Shuttle Radar Topography Mission (SRTM) for all the country. Watershed and sub-watershed for 150 significant wetlands were delineated based on the high resolution DEM derived from Advance Space borne Thermal Emission and Reflection Radiometer (ASTER) images.

Landcover Mapping and Change Analysis: Landcover studies of 28 out of 47 Protected Wetlands have been completed. Theses studies describe habitats through geographic, physical, and biotic components. Remote Sensing based tools provide efficient means of identifying and delineating vegetation types and their respective densities. Historic data of some selected areas is being acquired for temporal change analysis of highly significant areas.

Wetlands of Pakistan

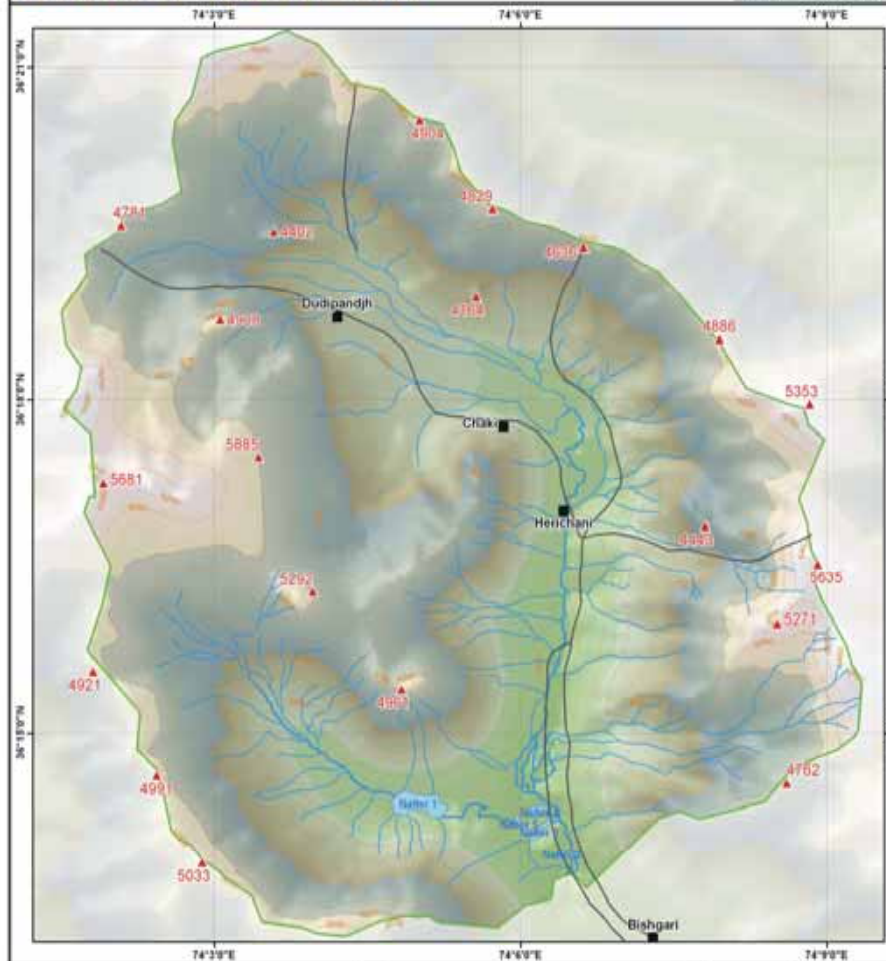


Naltar Lake is Alpine wetland and part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan.

These lakes are formed by the melting of glaciers. Naltar 1 Lake is directly fed by different glaciers whereas rest of the Naltar lakes has an underground inlet.

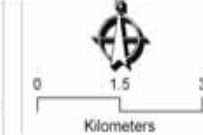


Topographic Map of Naltar Lakes Wetlands Wildlife Sanctuary



Legend

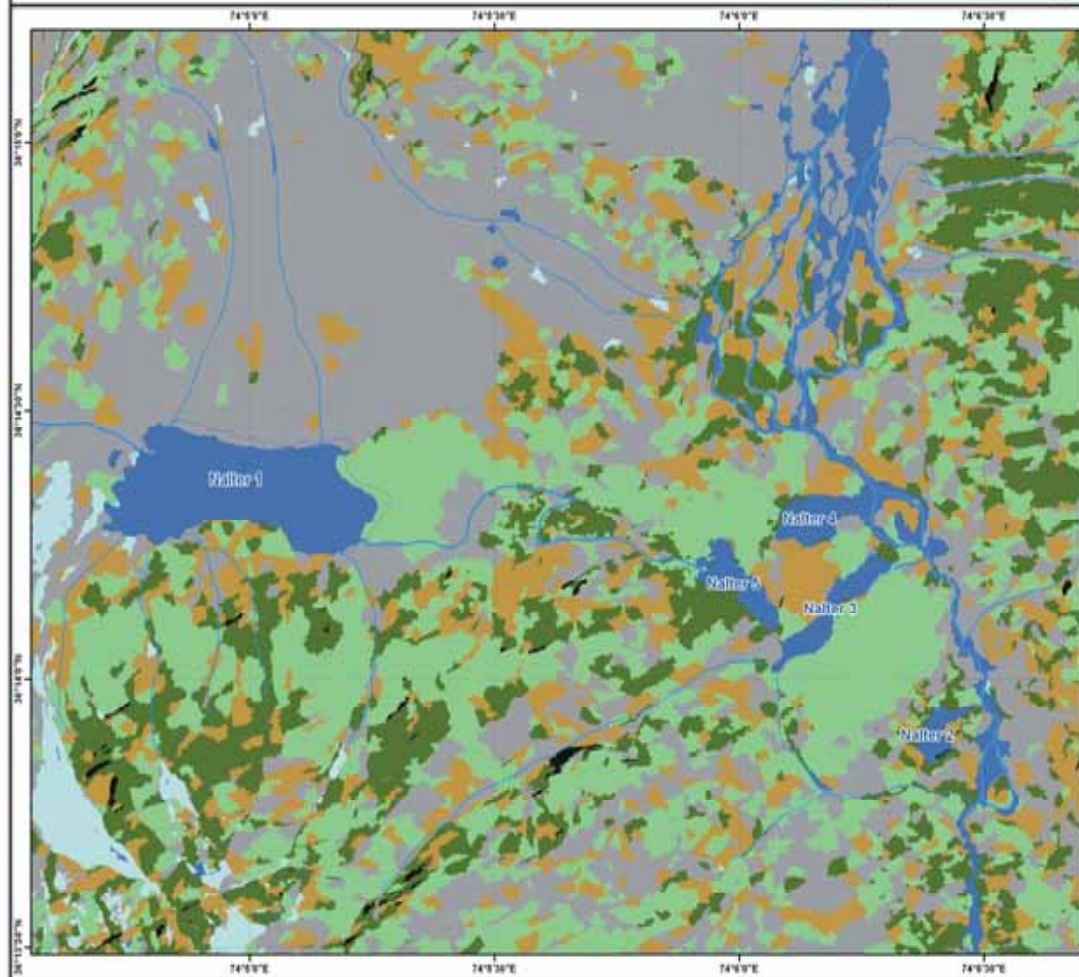
■ Populated Place	Elevation (m)
▲ Spot Height(m)	3,205 - 3,600
— Contour(200m)	3,600 - 4,000
— Road	4,000 - 4,400
— River	4,400 - 4,800
— Stream	4,800 - 5,200
— Water Body	5,200 - 5,600
— Sub Watershed	5,600 - 5,730



Date Issued: 2008
 Satellite Source: SPOT's HRG
 Projection: UTM
 Date of Acquisition: 03 March 2008
 Contour Interval: 200m
 Projection: Geographic Lat/Long
 Datum: Everest
 Survey Map: 1/2004

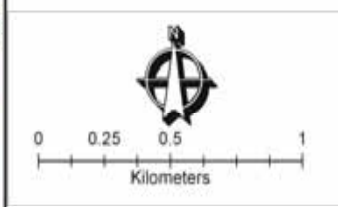


Land Cover Map of Naltar Lakes Wildlife Sanctuary



Land Cover Class

- Bare Soil
- Needleleaved Evergreen High Trees(Conifer)
- Perennial Snow
- Grasses/Shrub(s)
- Bare Rock(s)
- Shadow
- Perennial Water(Standing)/(Flowing)



Data Source:
 Satellite, Sensor: SPOT5, HRG
 Resolution: 5m
 Date of Acquisition: 03 March 2005
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS84
 Survey Map: 1:250k



Naltar Lake is Alpine wetland and part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan.

These lakes are formed by the melting of glaciers. Naltar 1 Lake is directly fed by different glaciers whereas rest of the Naltar lakes has an underground inlet.

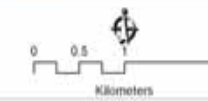


Topographic Map of Hundrup Lake National Park



Legend

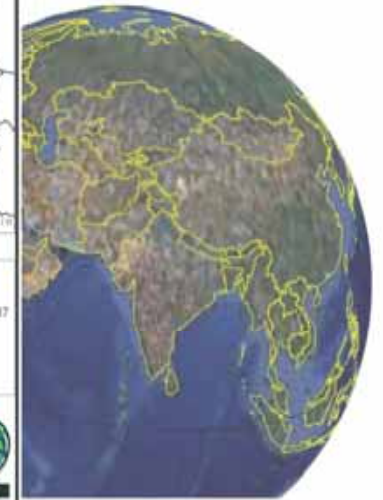
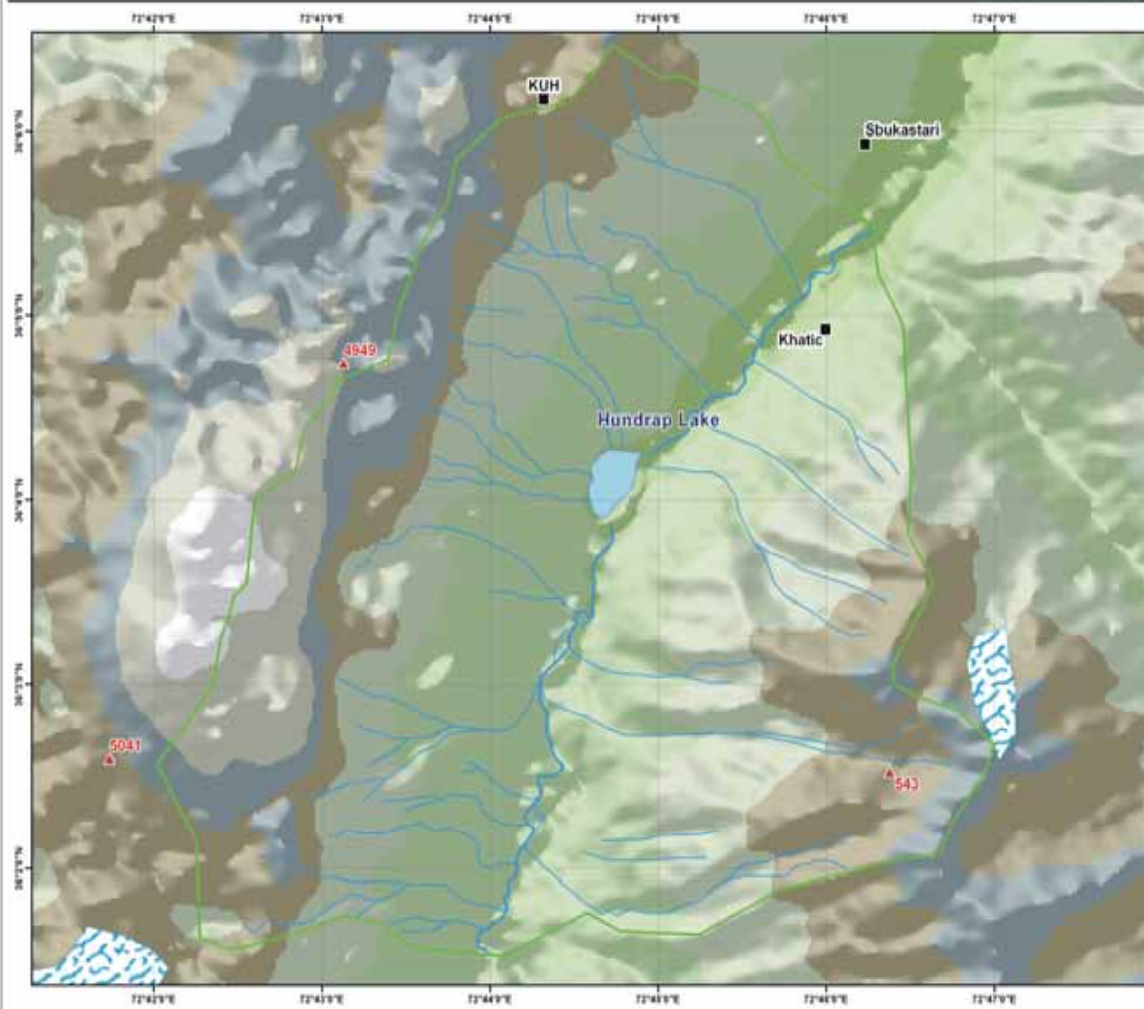
- Populated Place
- ▲ Spot Height (m)
- River
- Stream
- Glacier
- Wetland Boundary
- Sub Watershed



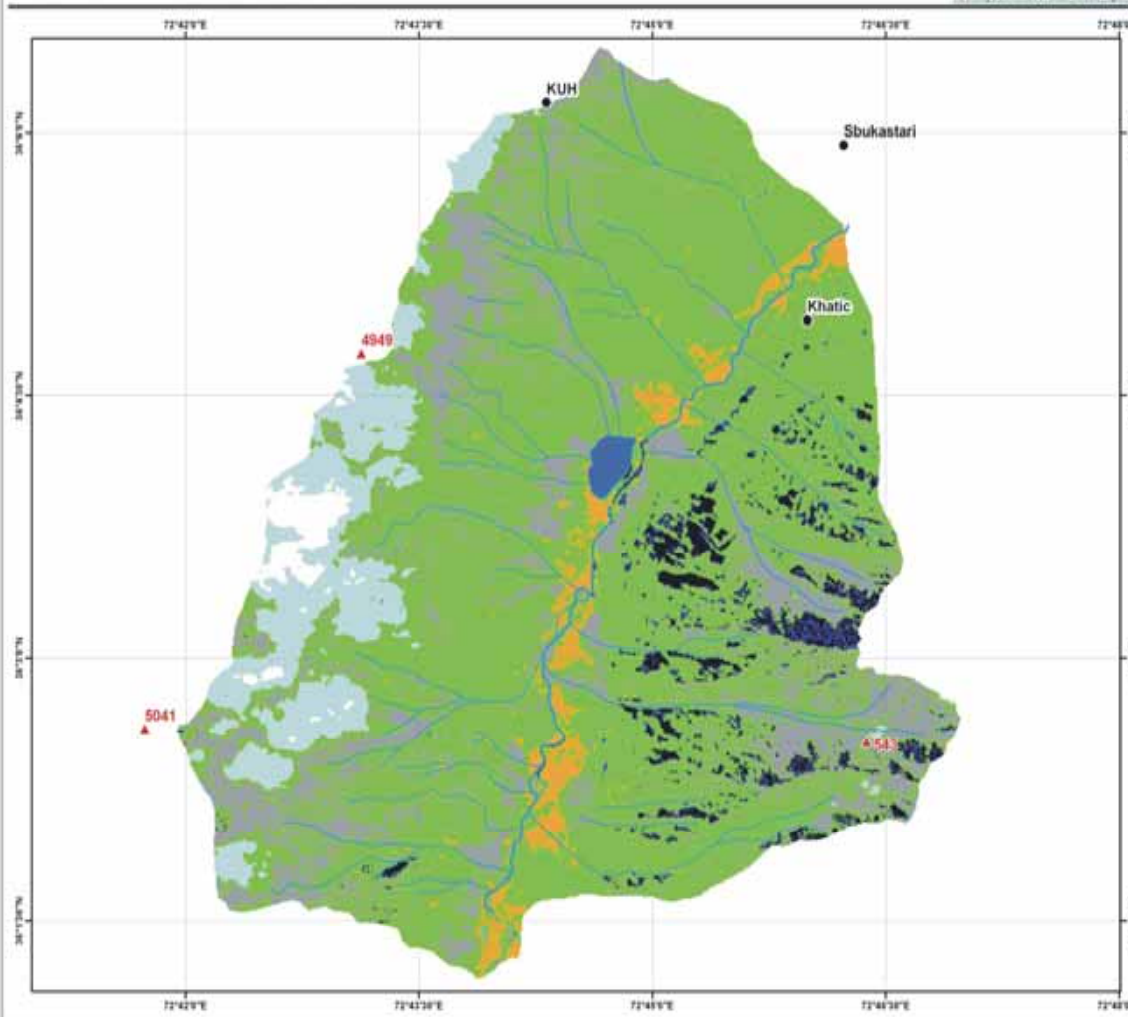
Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 08 September 2007
 Resolution: 16m
 Projection: Geographic (Lat/Long)
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K



Hundrup Lake is physically categorized into Glacial lake and is a part of permanent snow alpine meadows & sub-alpine scrub eco region of Pakistan. Hundrup Lake is located in the west of the District Ghizar. The Hundrup Lake wetland has an east west stretch of 0.43 Km and north south stretch of 0.70 Km. Hundru Lake covers an area about 21ha approximately.

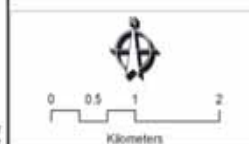


Land Cover Map of Hundrup Lake National Park



Land Cover Class

- Rangeland/Grasses
- Shrubland (Salix)
- Perennial Snow
- Bare Rock(s)
- Regularly Flooded Vegetation (Submerged Vegetation)
- Perennial Natural Waterbodies (Standing)/(Flowing)
- Shadow
- Clouds



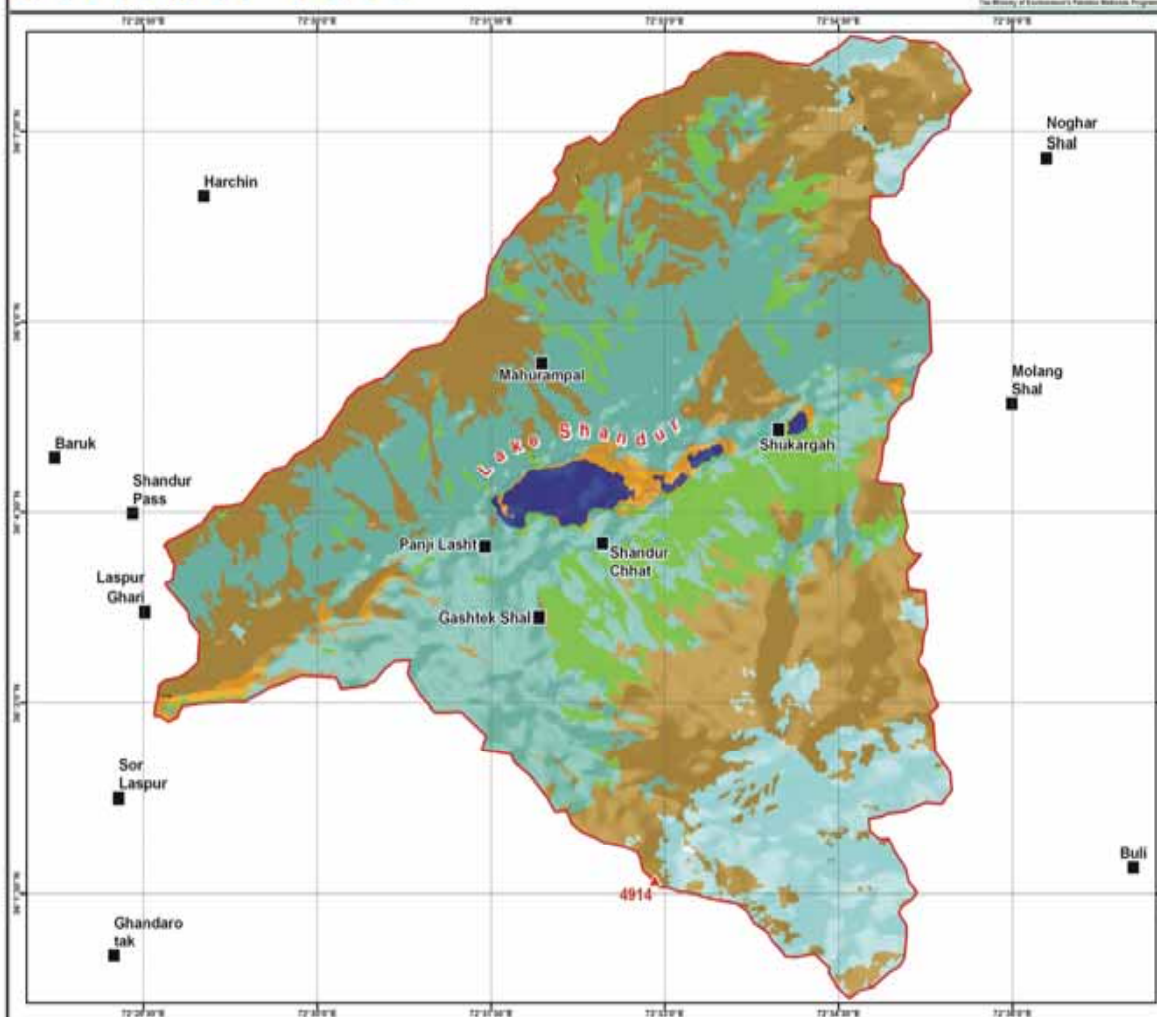
Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 08 September 2007
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Hundrup Lake is physically categorized into Glacial lake and is a part of permanent snow alpine meadows & sub-alpine scrub eco region of Pakistan. Hundrup Lake is located in the west of the District Ghizar. The Hundrup Lake wetland has an east west stretch of 0.43 Km and north south stretch of 0.70 Km. Hundru Lake covers an area about 21ha approximately.

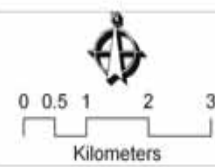


Land Cover Map of Lake Shandur Wetlands National Park



Land Cover Class

	Dense Grasses
	Bare Rock(s)
	Shrubs (Salix)
	Perennial Snow
	Sparse Grasses
	Perennial Waterbodies (Standing)



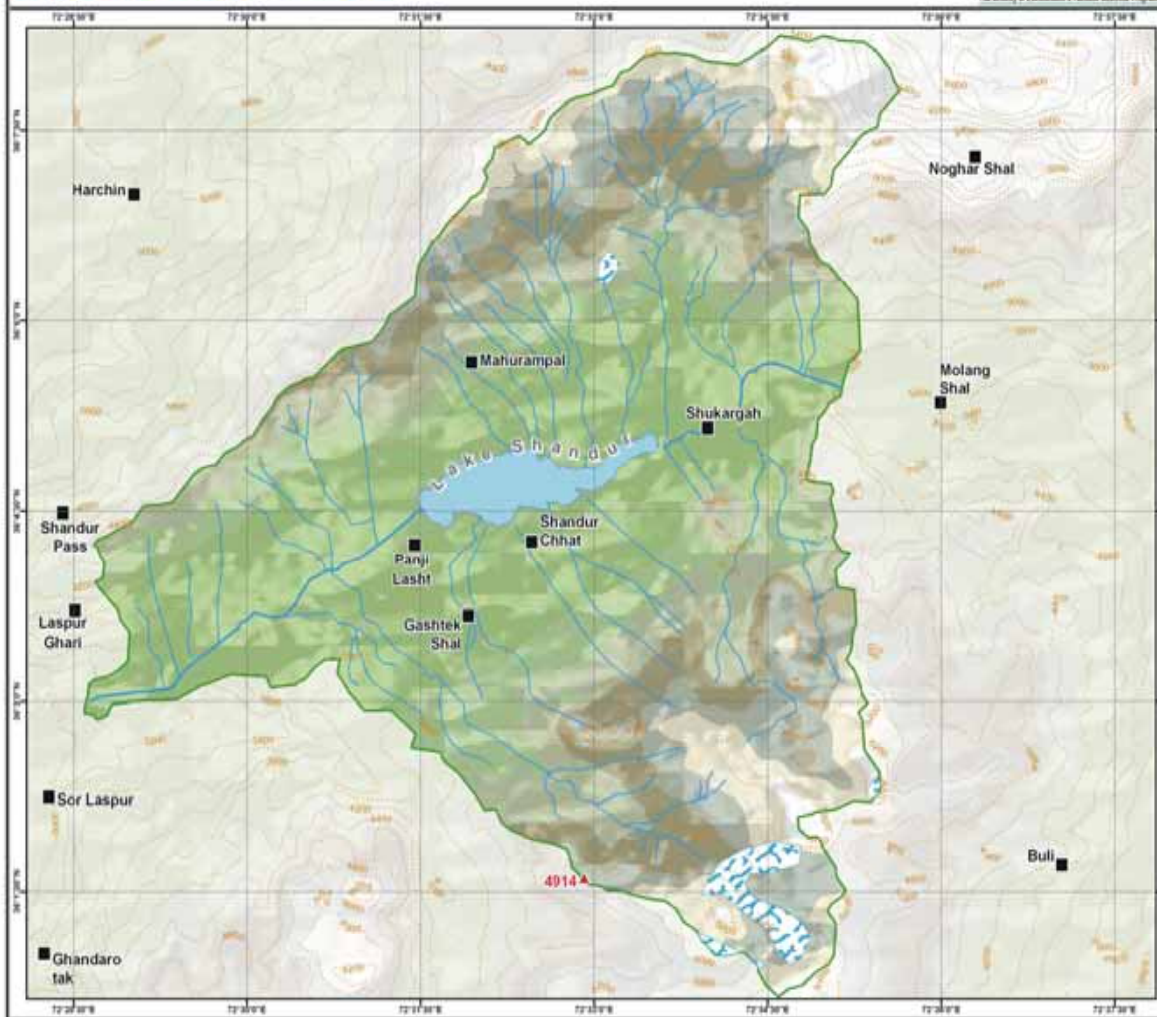
Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 14 September 2007
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Lake Shandur is physically categorized into alpine lake and is a part of Permanent snow, alpine meadows & sub-alpine scrub .eco region of Pakistan. It is located in the west of District Ghizur The Shandur Lake wetland has an east west stretch of 3.19 Km and north south stretch about 5.33 Km. The Shandur Lake wetland covers an area of 184.330 ha.

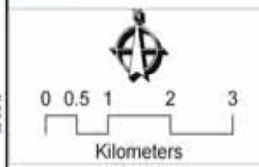


Topographic Map of Lake Shandur Wetlands National Park



Legend

■	Populated Place	Elevation(m)
▲	Spot Heights	2800 - 4,000
—	Contour (200m)	4,000 - 4,200
—	River	4,200 - 4,500
—	Stream	4,500 - 4,750
—	Glacier	4,750 - 5,000
—	Sub Watershed	5,000 - 6,200
—	Waterbody	6,200 - 6,400



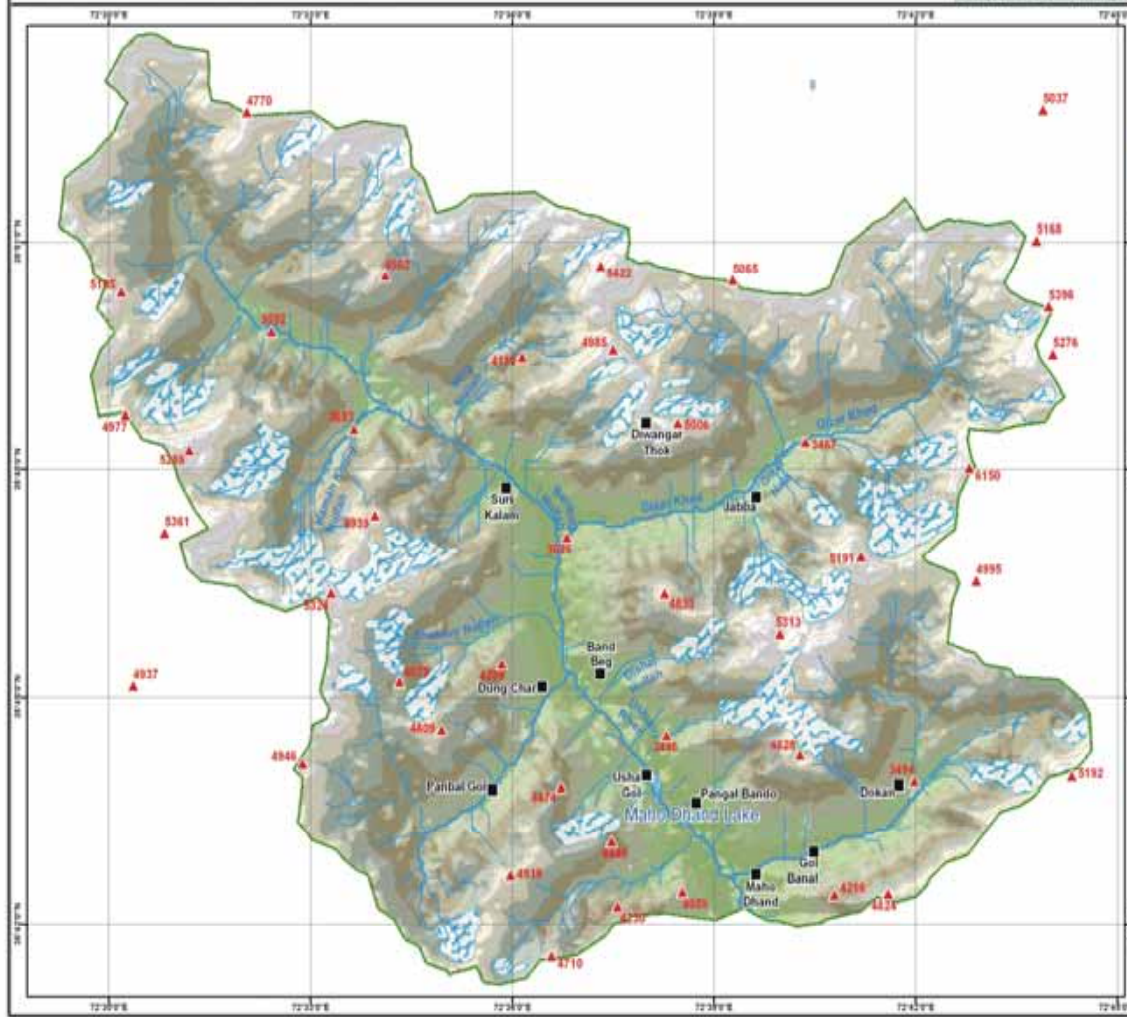
Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 14 September 2007
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Lake Shandur is physically categorized into alpine lake and is a part of Permanent snow, alpine meadows & sub-alpine scrub .eco region of Pakistan. It is located in the west of District Ghizar The Shandur Lake wetland has an east west stretch of 3.19 Km and north south stretch about 5.33 Km. The Shandur Lake wetland covers an area of 184.330 ha.



Topographic Map of Maho Dhand Wetlands Game Reserve



Legend

- Populated Places
- Spot Heights
- River
- Stream
- Contour(200m)
- Glacier
- Sub Watershed
- Water Body

Elevation(m)
2844 - 3200
3200 - 3737
3737 - 4047
4047 - 4314
4314 - 4395
4395 - 4823
4823 - 5548

0 1.5 3 6
Kilometers

Location Map

Legend: Finished (Grey), Sub Watershed (Red Hatched)

Sub Basins: Gomal Sub Basin, Karam Sub Basin, Maho Dhand Sub Basin, Kulu Sub Basin

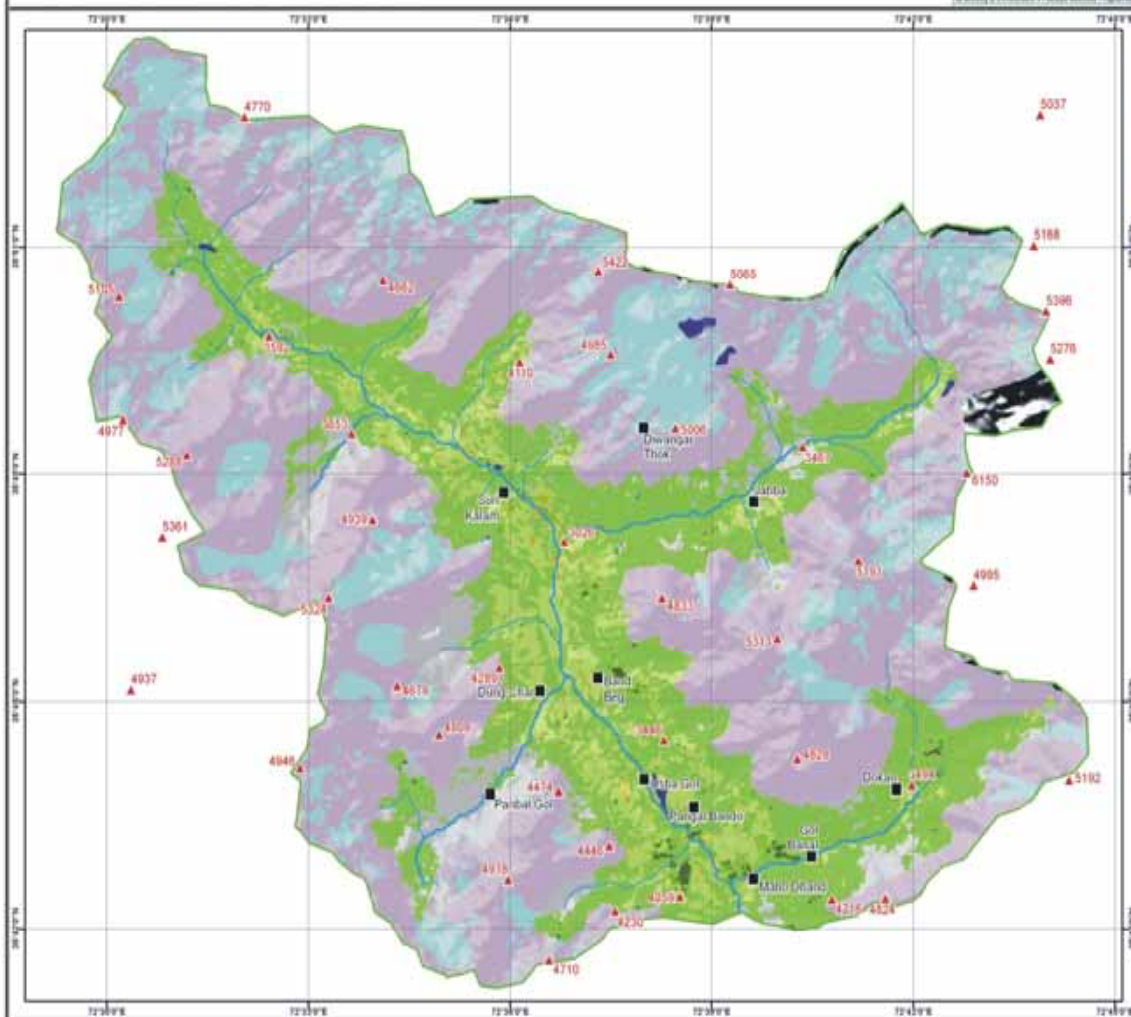
Data Source:
 Satellite: Sensor: Landsat/Terra, ETM+ ASTER
 Date of Acquisition: 08 June 2001/08 Sep. 2007
 Resolution: 30m/15m
 Projection: Geographic (Lat/Long)
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K

Leica
 WWF Goosystems

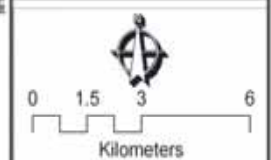
Maho Dhand Lake is physically categorized into Glacial lake and is a part of permanent snow alpine meadows & sub-alpine scrub eco region of Pakistan. It is located in the northern side of the district Swat of NWFP. It is designated as Game Reserve by the Government of NWFP.



Land Cover Map of Maho Dhand Wetlands Game Reserve



Land Cover Class	
	Nonforest Evergreen High Trees/Conifer Forest
	Broadleaf Closed Trees/Broadleaved
	Shrubland
	Planted/Pasture
	Nonforest Deciduous/Agroforestry Park
	Clear to open Grassland/Steppe
	Cloud/Shadow
	High Alpine Zone
	Barren Rocky
	Perennial Snow
	Waterbodies (Ponding)



Data Source:
 Satellite: Sensor: Landsat/Terra, ETM+/ASTER
 Date of Acquisition: 08 June 2001/08 Sep. 2007
 Resolution: 30m/15m
 Projection: Geographic (Lat/Long)
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K



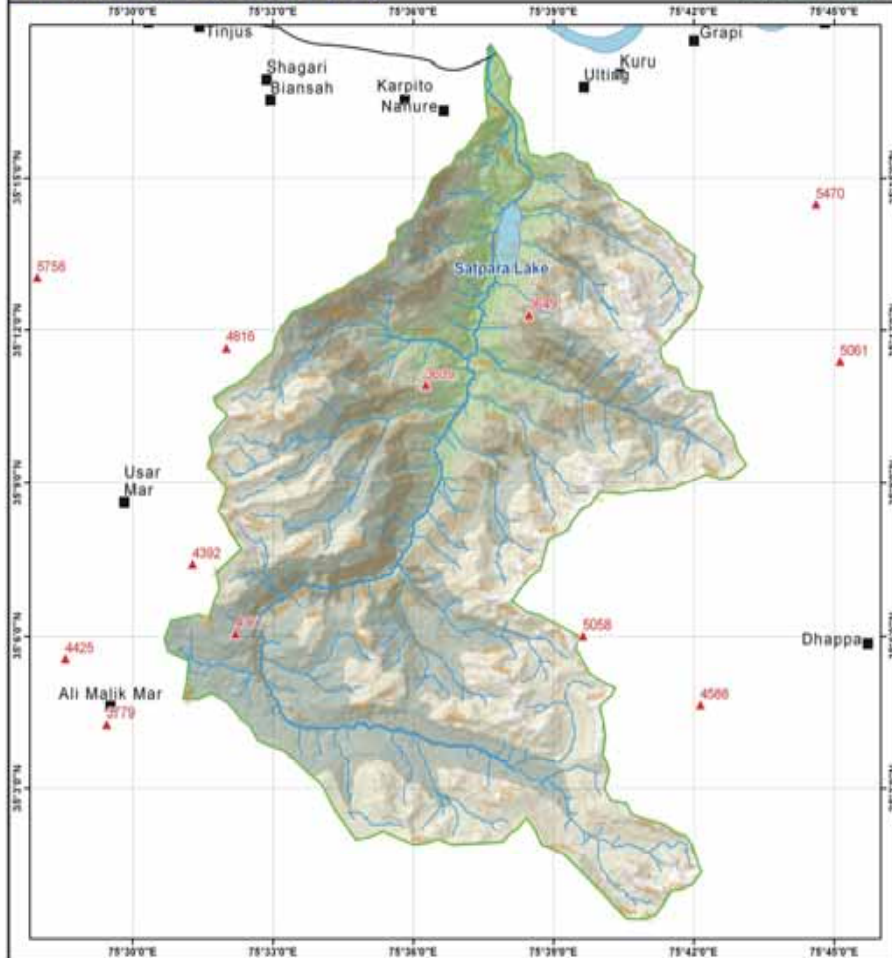
Maho Dhand Lake is physically categorized into Glacial lake and is a part of permanent snow alpine meadows & sub-alpine scrub eco region of Pakistan. It is located in the northern side of the district Swat of NWFP. It is designated as Game Reserve by the Government of NWFP.



Satpara Lake is physically categorized into Glacial Lake and is a part of Steppic forest & alpine dry steppe eco-region of Pakistan. It is located in the district Baltistan of Northern Areas. is a part of tropical thorn forest eco-region of Pakistan. It declared as wildlife sanctuary.



Topographic Map of Satpara Lake Wildlife Sanctuary



Legend

- Populated Place
 - ▲ Spot Height(m)
 - Road
 - River
 - Stream
 - Contour(200m)
 - Water Body
 - Sub Watershed
- | Elevation(m) |
|---------------|
| 2,200 - 2,800 |
| 2,800 - 3,200 |
| 3,200 - 3,600 |
| 3,600 - 4,000 |
| 4,000 - 4,400 |
| 4,400 - 4,800 |
| 4,800 - 5,275 |



Data Source: Satellite, Sensor: Terra ASTER
 Date of Acquisition: 14 September 2007
 Projection: Geographic Lat/Long
 Contour Interval: 200 m
 Survey Map: 1:250K

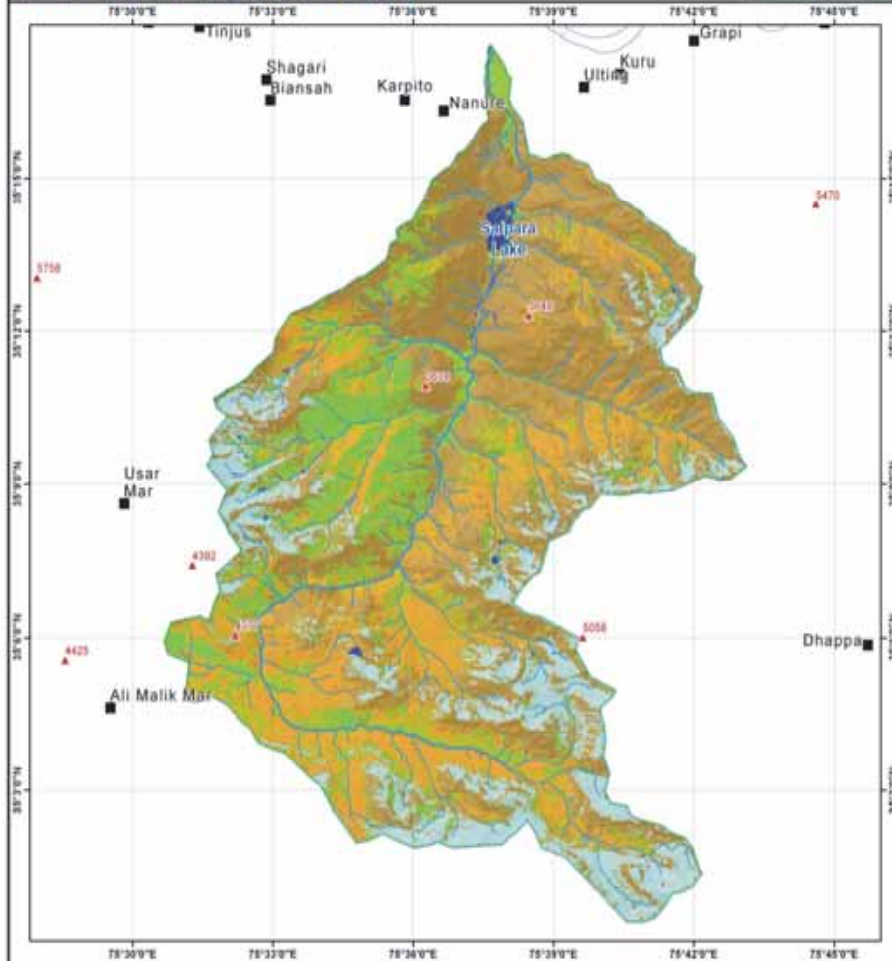
WWF **Leica** Geosystems



Satpara Lake is physically categorized into Glacial Lake and is a part of Steppic forest & alpine dry steppe eco-region of Pakistan. It is located in the district Baltistan of Northern Areas. is a part of tropical thorn forest eco-region of Pakistan. It declared as wildlife sanctuary.



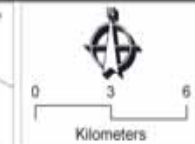
Land Cover Map of Satpara Lake Wetlands Wildlife Sanctuary



Legend

- Sub Watershed
- Land Cover Class**
- Perennial Natural Waterbody Standing
- Perennial Snow
- Shrub(s)
- Bare Rock(s)
- Close to Open Grasses
- Broadleaved Closed Trees

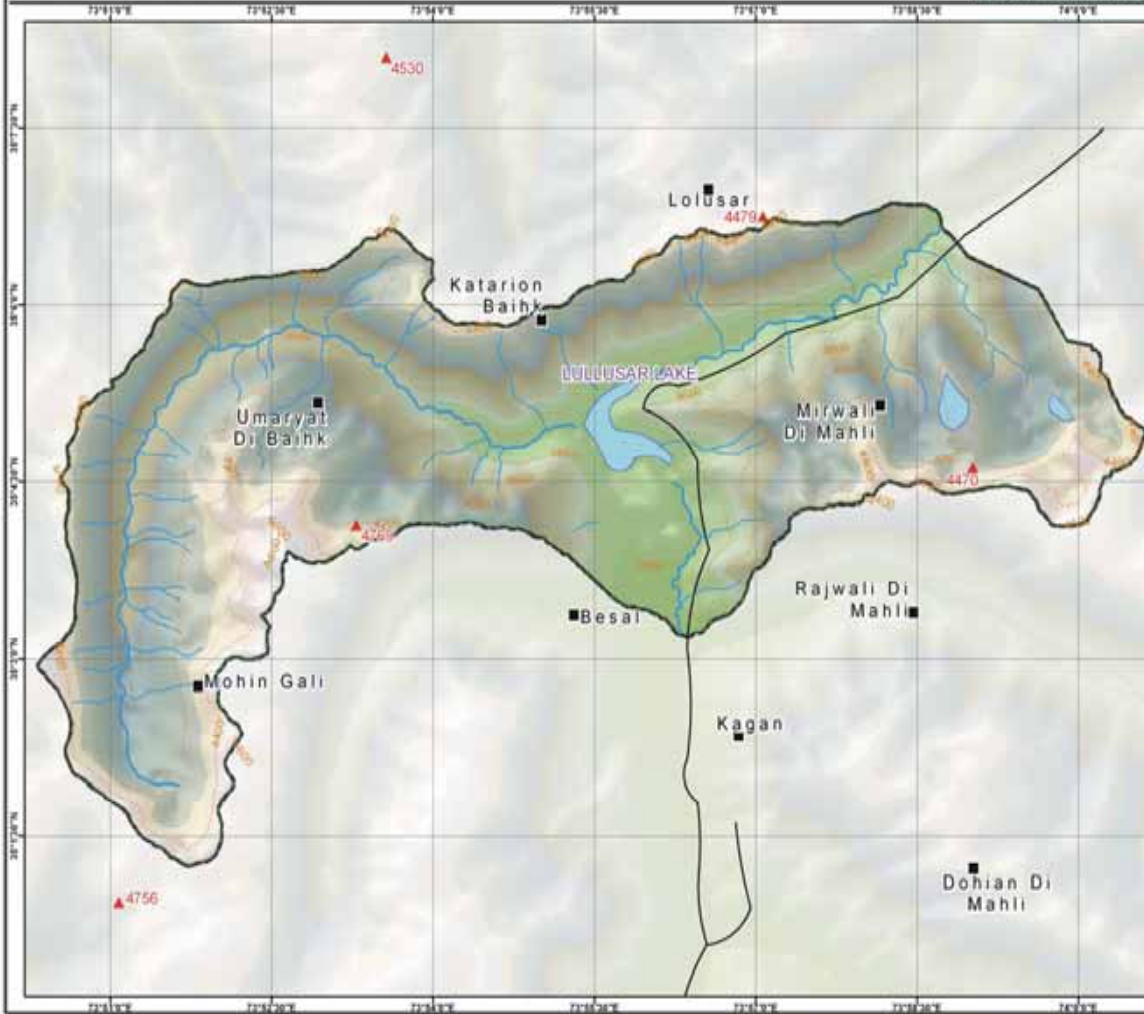
Location Map



Date Source: Satellite: Landsat Thematic Mapper 4/27/99
 Date of Acquisition: 14 September 2007
 Projection: UTM/Zone 38 N/Easting
 Datum: Everest
 Survey Map: 1/2500



Topographic Map of Lullusar Lake National Park



Legend

- Populated Place
- ▲ Spot Height (m)
- Road
- Contour(200m)
- River
- Stream
- Water Body
- Watershed Boundary



Location Map



Data Source:
 Satellite: Sensor Terra ASTER
 Date of Acquisition: 14 September 2005
 Resolution: 30m
 CIGAR DEM, © USGS 2000
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

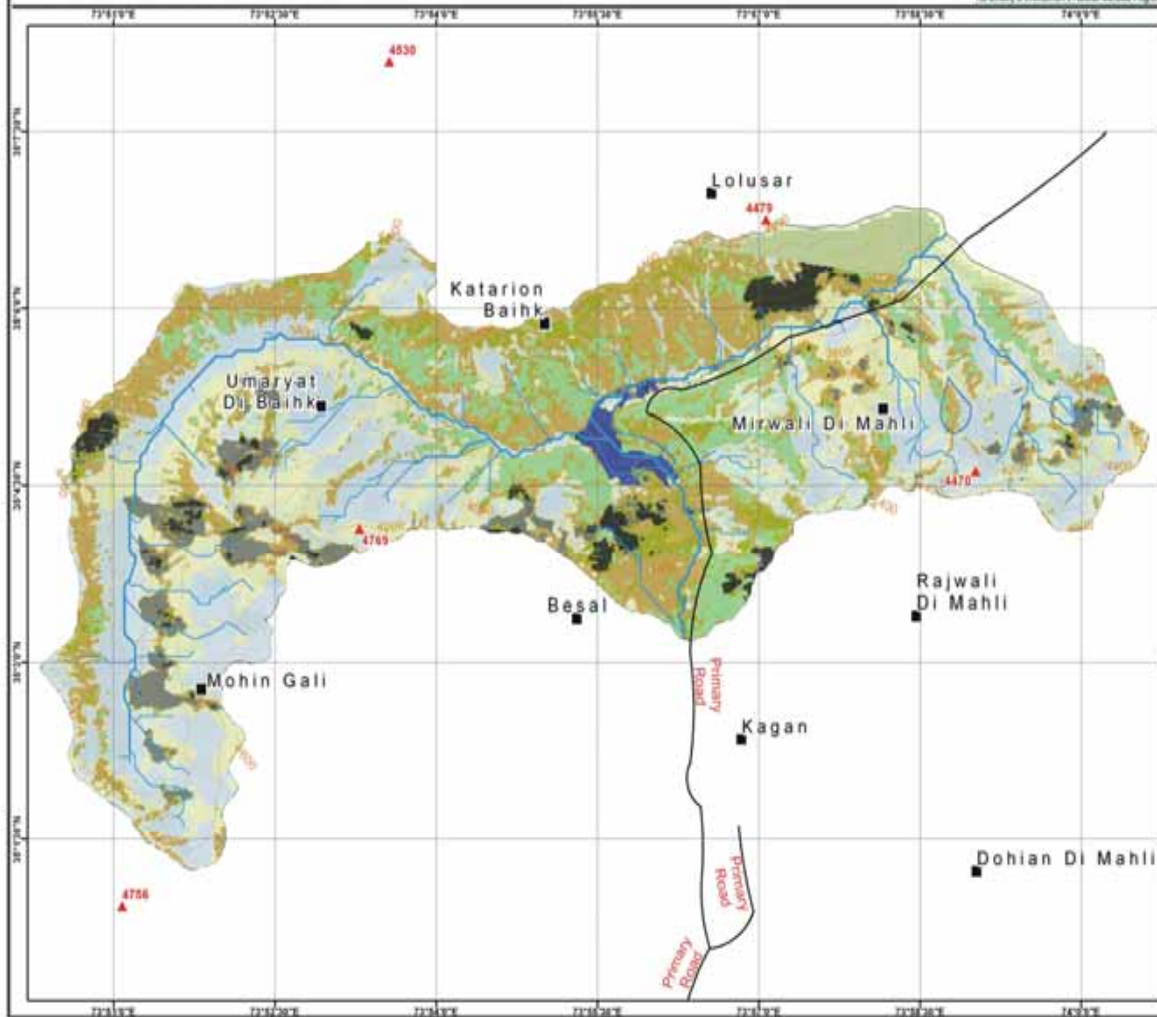


Lullusar Lake is physically categorized into Glacier Lake and is a part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan.

One side of lake is along the road which is under construction. Loads of rocks are being thrown in the lake causing sedimentation. Lake Lullusar is said to be one of the most tranquil spots on the Kaghan Valley, the lake is fenced by snowcapped mountains.



Land Cover Map of Lullusar Lake National Park



Land Cover Class

- Bare Rock(s)
- Artificial Perennial Snow
- Seasonal Snow
- Grasses/Bare Rock(s)
- Shadow
- Shadowed Snow
- Grasses / Shrubs(s) (Shrubs)
- Snow/Clouds
- Perennial Waterbodies (Standing)



Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 14 September 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Lullusar Lake is physically categorized into Glacier Lake and is a part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan.

One side of lake is along the road which is under construction. Loads of rocks are being thrown in the lake causing sedimentation. Lake Lullusar is said to be one of the most tranquil spots on the Kaghan Valley, the lake is fenced by snowcapped mountains.

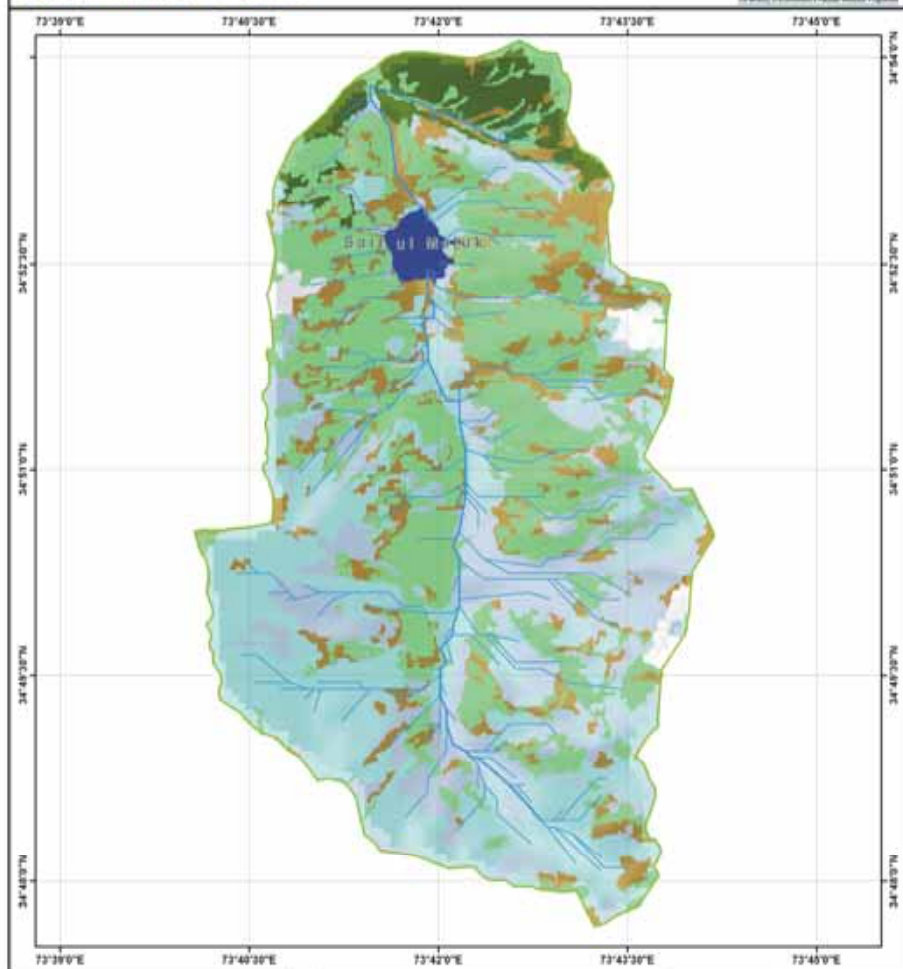


Lake Saif-ul-Malook is physically categorized into Glacier lakes and is a part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan. It is notified as National park under notification no SO (Technical)/ VIII-Gen/2003. it covers an area approximately about 12026 acre.

It is famous all over the world due to its recreational activities. Its approximate length is reported to be 1.2 km, width 0.6 km and average depth 40 m.



Land Cover Map of Saif ul Maluk National Park



Legend

- Sub Watershed
- Land Cover Class**
- Bare Rock(s)
- Cloud
- Needleleaved Evergreen High Trees(Conifer)
- Grasses/Shrub(s)
- Seasonal Snow
- Perennial Snow
- Perennial Natural Waterbodies (Standing)



Indus (Above Tarbela) Sub Basin

Jhelum (above Mangla) Sub Basin

0 1.5 3
Kilometers

Data Source:
Satellite: GeoEye/Terra, ASTER
Date of Acquisition: 14 September 2007
Resolution: 15m
Projection: Geographic Lat/Long
Datum/Spheroid: WGS 84
Survey Map: 1:250K

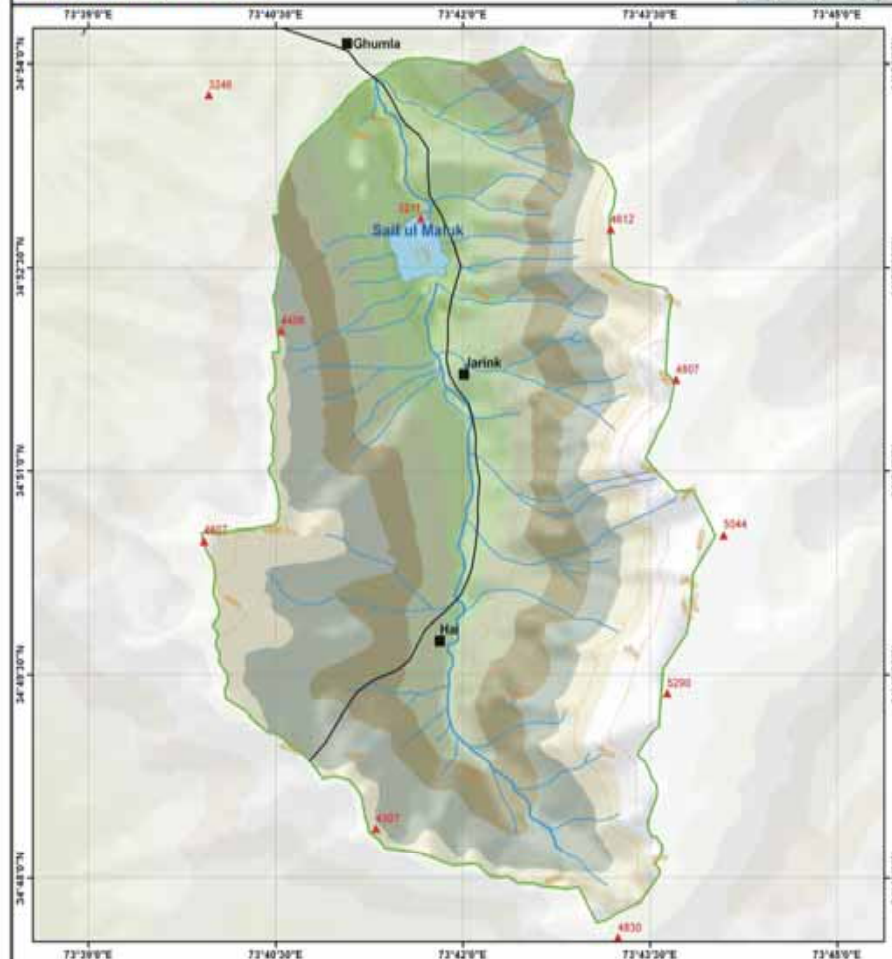


Lake Saif-ul-Malook is physically categorized into Glacier lakes and is a part of permanent snow, alpine meadow and sub alpine scrub eco region of Pakistan. It is notified as National park under notification no SO (Technical)/ VIII-Gen/2003. it covers an area approximately about 12026 acre.

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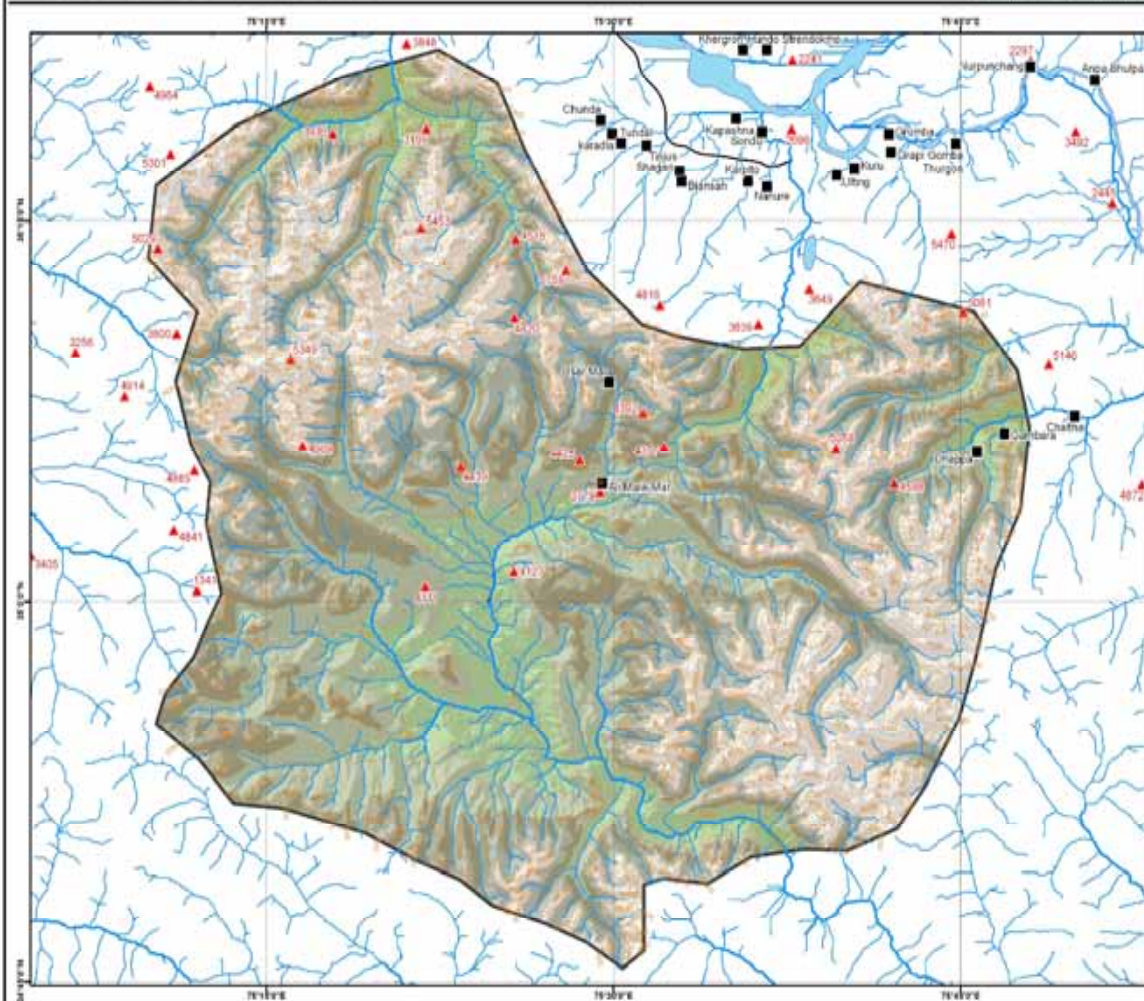
Topographic Map of Saifulmaluk Lake Wetlands National Park



Legend

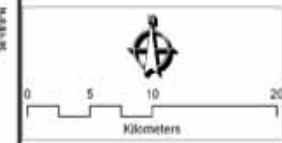


Topographic Map of Deosai Plateau National Park



Legend

■	Populated Place		Elevation(m)
▲	Spot Height (m)		2,950 - 3,715
—	Road		3,715 - 3,900
—	Contour(200m)		3,900 - 4,100
—	River		4,100 - 4,300
—	Stream		4,300 - 4,500
—	Deosai NP Boundary		4,504 - 4,800
—	Catchment		4,800 - 5,375



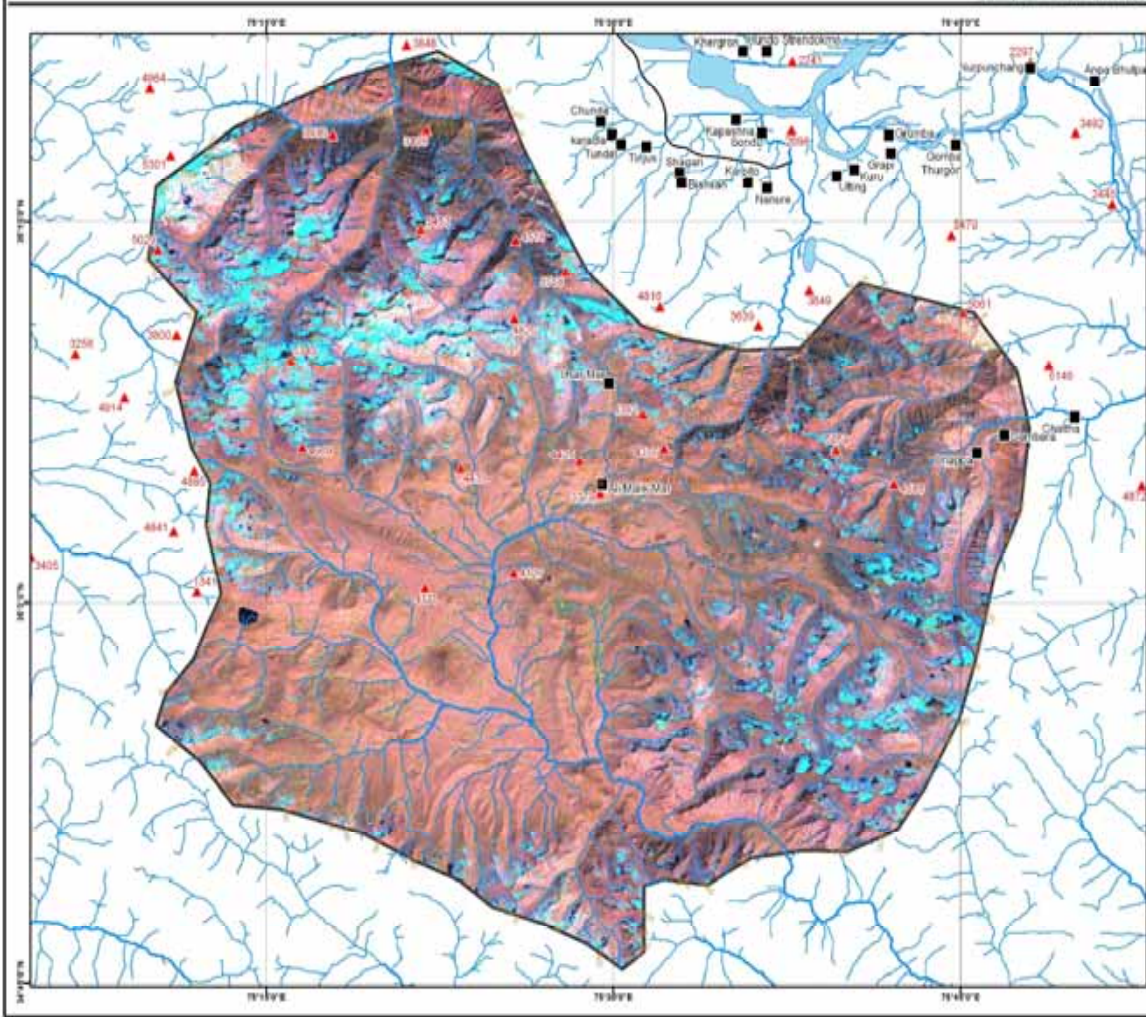
Data Source
 Survey Map: 1:250K
 CIGAR DEM, © USGS 2000
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS84



Deosai Plateau is physically categorized into alpine lakes and is a part of Dry temperate coniferous and Steppic forest & alpine dry steppe eco regions of Pakistan. A high plateau of moorland and swamp with numerous small lakes and ponds, in the upper drainage of the Indus River are the northwestern extremity of the Great Himalayan Range. The wetlands are fed by the snow melt from the surrounding high snow clad meadow alternate with drier stony areas, and there are patches of dwarf willows along the river and streams.

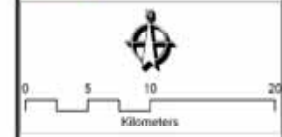


Satellite Image of Deosai Plateau National Park



Legend

- Populated Place
- ▲ Spot Height (m)
- Road
- Contour(200m)
- River
- Stream
- Deosai NP Boundary
- Catchment



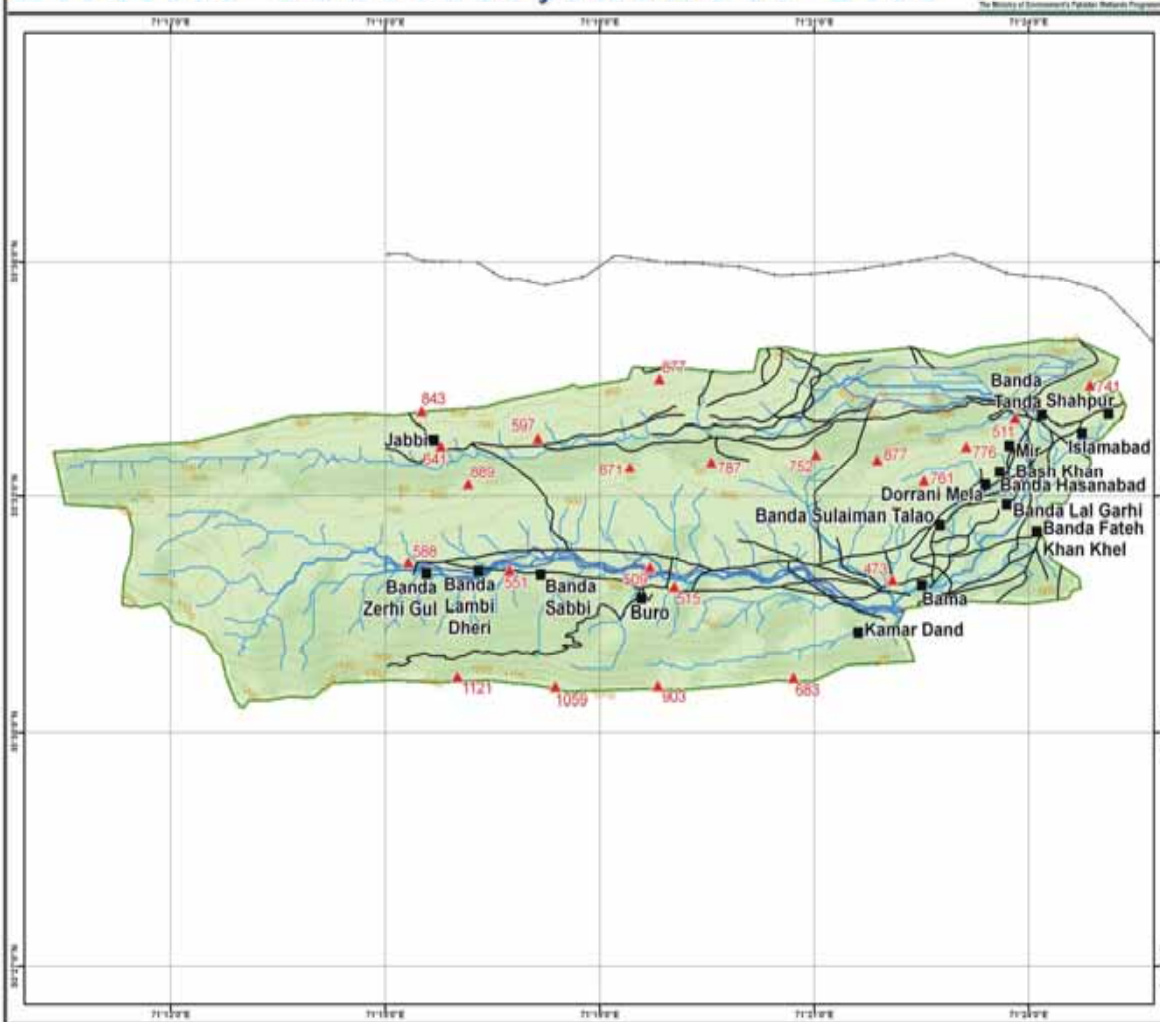
Data Source:
 Satellite: Sentinel LANDSAT, ETM+
 Date of Acquisition: 31 September 2001
 Resolution: 30m
 CGAR DEM, © USGS 2000
 Projection: Geographic Lat/Lon
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Deosai Plateau is physically categorized into alpine lakes and is a part of Dry temperate coniferous and Steppic forest & alpine dry steppe eco regions of Pakistan. A high plateau of moorland and swamp with numerous small lakes and ponds, in the upper drainage of the Indus River are the northwestern extremity of the Great Himalayan Range. The wetlands are fed by the snow melt from the surrounding high snow clad meadow alternate with drier stony areas, and there are patches of dwarf willows along the river and streams.



Topographic Map of Tanda Dam Wildlife Sanctuary/Ramsar Site



Legend

- Proposed Place
- ▲ Spot Height (m)
- Canal
- Road
- Railway
- Contour (Meters)
- River
- Stream
- ▭ River
- ▭ Wetland Boundary
- ▭ Sub Watershed

0 1.5 3 6
Kilometers

Location Map

- ▭ Sub Watershed
- ▭ Wetland

Kabul Sub Basin
Indus (Upper Chagmal) Sub Basin
Indus Plains Sub Basin
Kurram Sub Basin
Soan Sub Basin

Data Source:
 Satellite: GeoEye, Terra, ASTER
 Date of Acquisition: 14 September 2007
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Elevation: WGS 84
 Survey Map: 1:250K

WWF Leica Geosystems ESRI

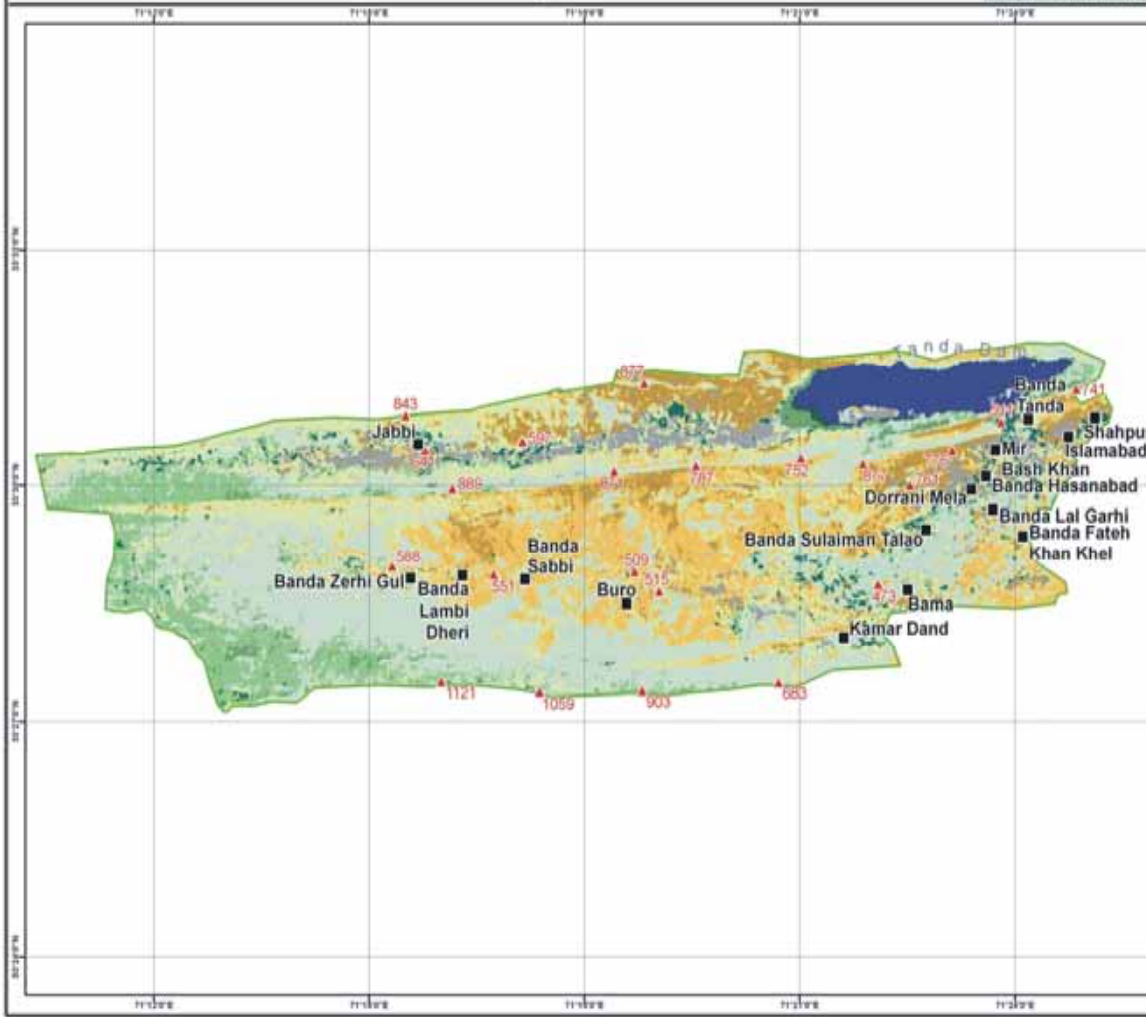
Tanda Lake is physically categorized into mid land lakes and is a part of arid sub tropical eco-region of Pakistan. It is also designated as wetland of international importance by Ramsar International in January 20, 1992. It covers an area approximately 405 ha.

Tanda is a small reservoir in the catchments of Kohat Toi river, bounded by the cultivated area of Shahpur to the south and Bar to the west. In the reservoir area there is very little submerged vegetation and no large areas of marsh vegetation.

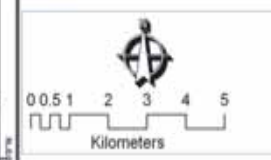
The aquatic vegetation consists of *Cyperus* sp, *Phyla nodiflora*, *Polygonum plebejum*, *P. glabrum*, *Pulicaria crispa* and *Typha angustata*. The natural vegetation of the region is tropical thorn forest intergrading with dry subtropical broad-leaved forest. Dominant species include *Acacia modesta*, *Dodonaea viscosa*, *Adhatoda vasica*, *Withania coagulans*, *Sageretia theezans*, *Rhazya stricta*, *Zizyphus nummularia* and *Z. mauritiana*. *Parkinsonia aculeate*, *Prosopis glandulosa* and *Tamarix dioica* have become naturalized in the area. Much of the natural vegetation around the reservoir has been cleared for agriculture.



Land Cover Class Map of Tanda Dam Wildlife Sanctuary/Ramsar Site



Land Cover Class	
	Surface Irrigated Herbaceous Crops(Agriculture Field)
	Bare Soil
	Sparse Grasses
	Grasses/Shrub(s)
	Non Perennial Waterbodies-Bare Soil
	Shrubs/Bushes
	Sparse Shrub(s)
	Bare Rock(s)
	Semi-Evergreen Woodland/Shrub(s) (Acacia nilotica/Eucalyptus)
	Closed Shrubs On Temporarily Flooded Land(Typha)
	Perennial Waterbodies(Standing)



Data Source:
 Satellite: Sensor:Terra, ASTER
 Date of Acquisition: 14 September 2007
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



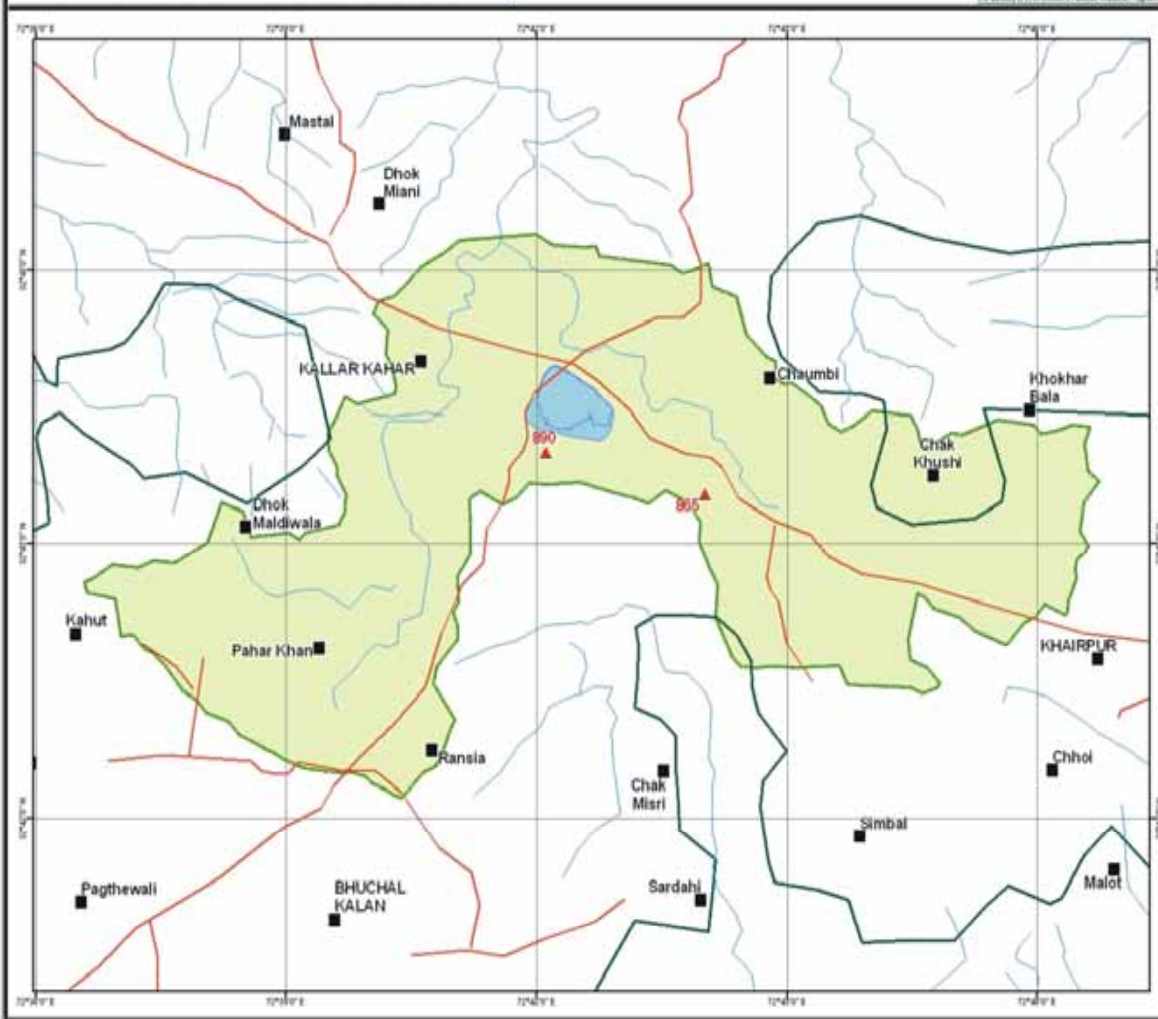
Tanda Lake is physically categorized into mid land lakes and part of arid sub tropical eco-region of Pakistan. It is also designated as wetland of international importance by Ramsar International in January 20, 1992. It covers an area approximately 405 ha.

Tanda is a small reservoir in the catchments of Kohat Toi river, bounded by the cultivated area of Shahpur to the south and Bar to the west. In the reservoir area there is very little submerged vegetation and no large areas of marsh vegetation.

The aquatic vegetataion consists of Cyperus sp, phyla nodiflora, polygonum plebejum, p.glabrum, pulicaria crisa and Typha angustata. The natural vegetation of the region is tropical thorn forest intergrading with dry subtropical broad-leaved forest. Dominant species include Acacia modesta, Dodonea viscosa, Adhatoda vasica, Withania coagulans, Sageretia theezans, Rhazya stricta, Zizyphus nummularia and Z. mauritiana. Parkinsonia aculeate, Prosopis glandulosa and Tamarix diolea have become naturalized in the area. Much of the natural vegetation around the reservoir has been cleared for agriculture.

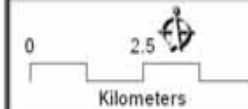


Topographic Map of Kalar Kahar Wildlife Sanctuary



Legend

- ▲ Spot Height(m)
- Populated Place
- Road
- Drainage
- Forest Boundary
- Sub Watershed
- Wetland Boundary



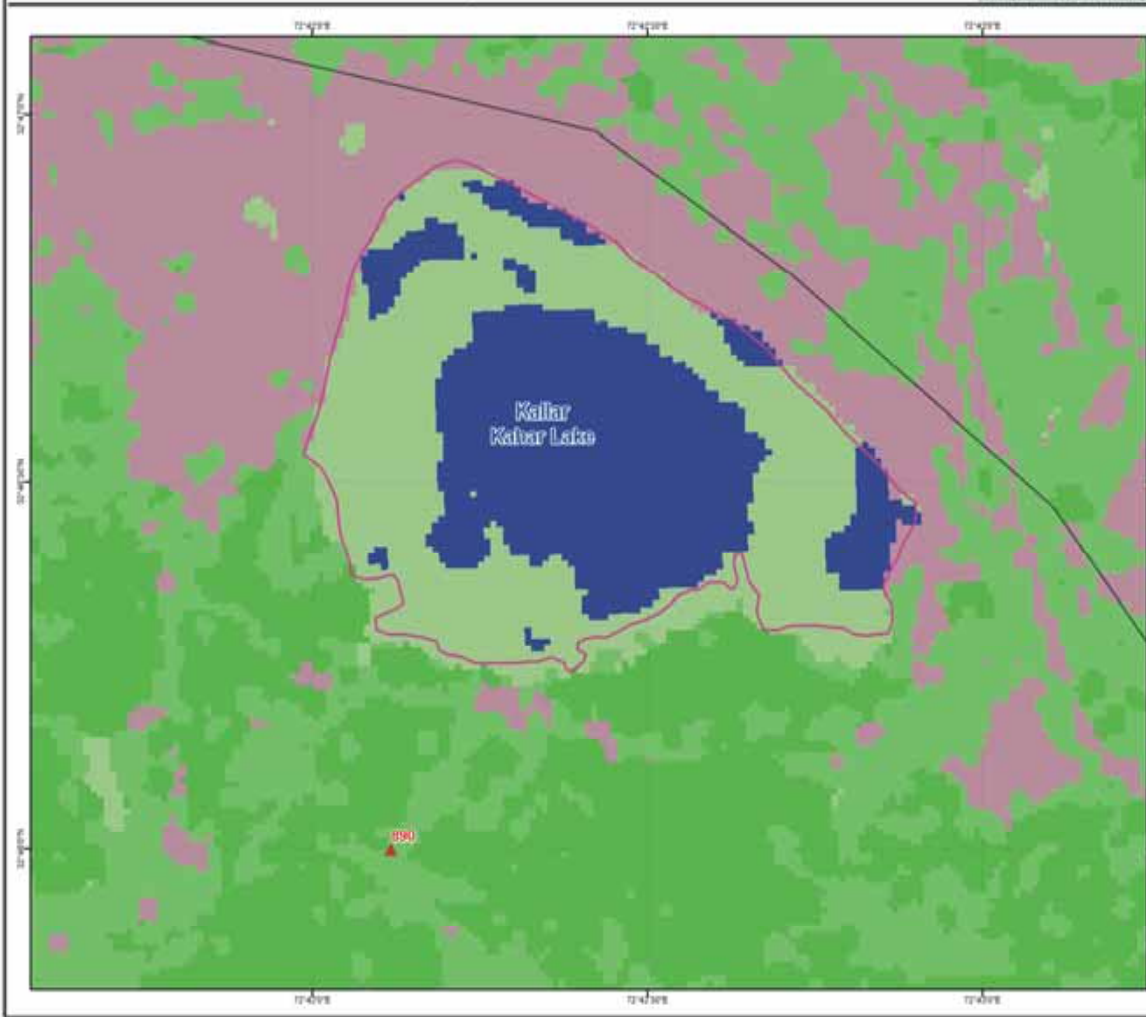
Source: Satellite, Sensor: Terra, ASTER
 Date of Acquisition: 26 September 2008
 Resolution: 15m
 Projection: Geographic
 Survey Map: 1:250K



Kalar Kahar Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Kalar Kahar Wetland was notified as a Game Reserve on 13-02-2002 under the notification No.SOP (WL) 12-22/2001. Kalar Kahar is a small brackish lake in the Salt Range. The lake has been developed by the department of Tourism for recreational boating, and carp have been introduced.

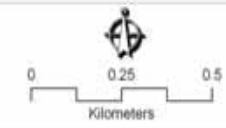


Land Cover Map of Kalar Kahar Lake Wildlife Sanctuary



Land Cover Class

	Bare Soil (Built up Areas)
	Grasses On Permanently Flooded Lands (Herbals/Grasses)
	Broadleaved Deciduous Trees (Crop/Orchards)
	Spars Broadleaved Evergreen Woodland/Grasses (Acacia/Grasses)
	Perennial Waterbodies



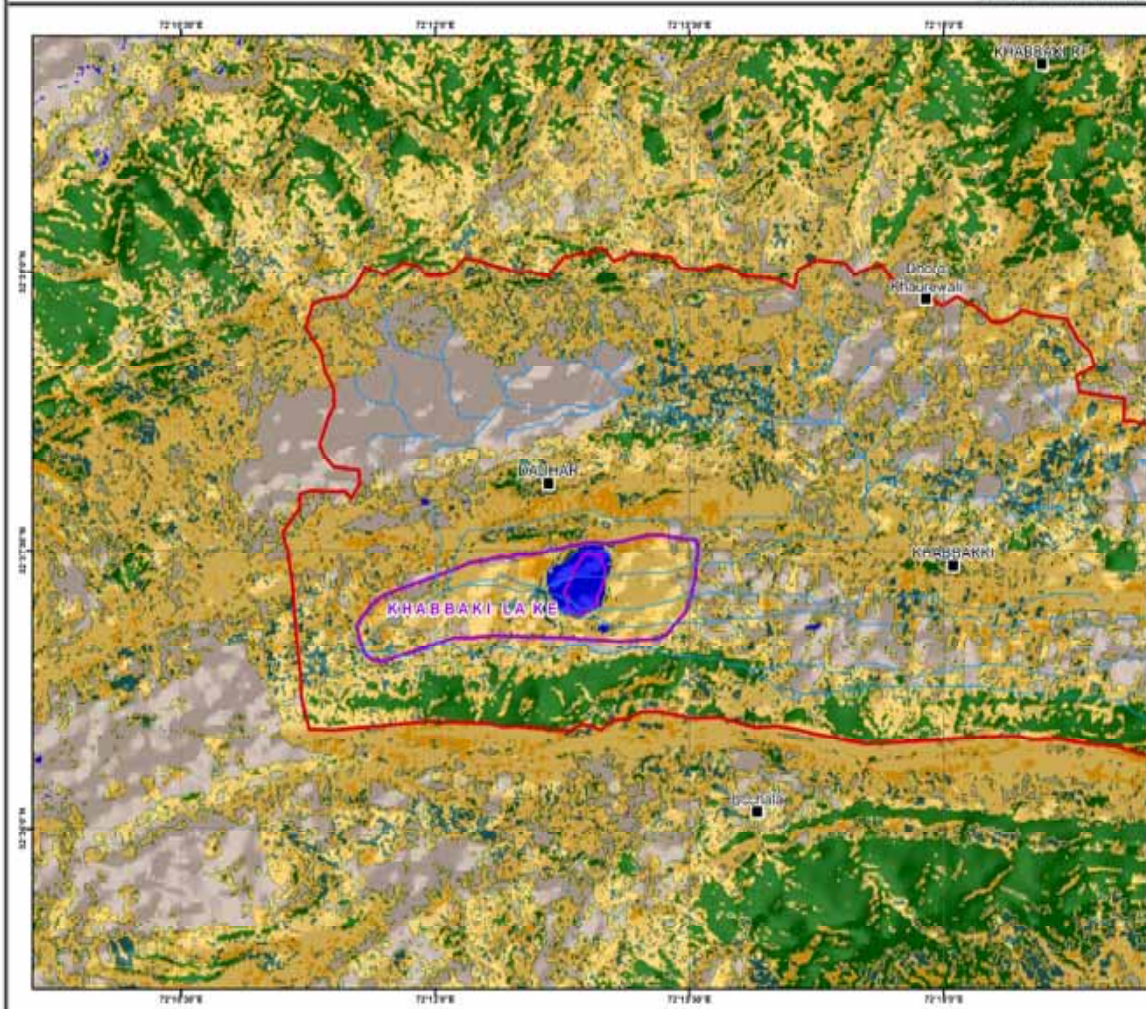
Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 26 September 2006
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Kalar Kahar Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Kalar Kahar Wetland was notified as a Game Reserve on 13-02-2002 under the notification No.SOP (WL) 12-22/2001. Kalar Kahar is a small brackish lake in the Salt Range. The lake has been developed by the department of Tourism for recreational boating, and carp have been introduced.

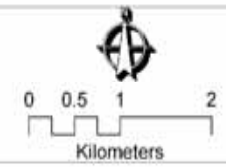


Land Cover Map of Khabbaki Lake Wildlife Sanctuary



Land Cover Class

	Broadleaved Evergreen Woodland (Acacia)
	Surface Irrigated Herbaceous Crops (Agriculture Fields)
	Broadleaved Open Vegetation (Degraded Range Land)
	Shrub(s)
	Bare Soil/Bare Rock(s)
	Perennial Waterbodies (Standing)



Data Source:
 Satellite: Sensor Terra ASTER
 Date of Acquisition: 03 March 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

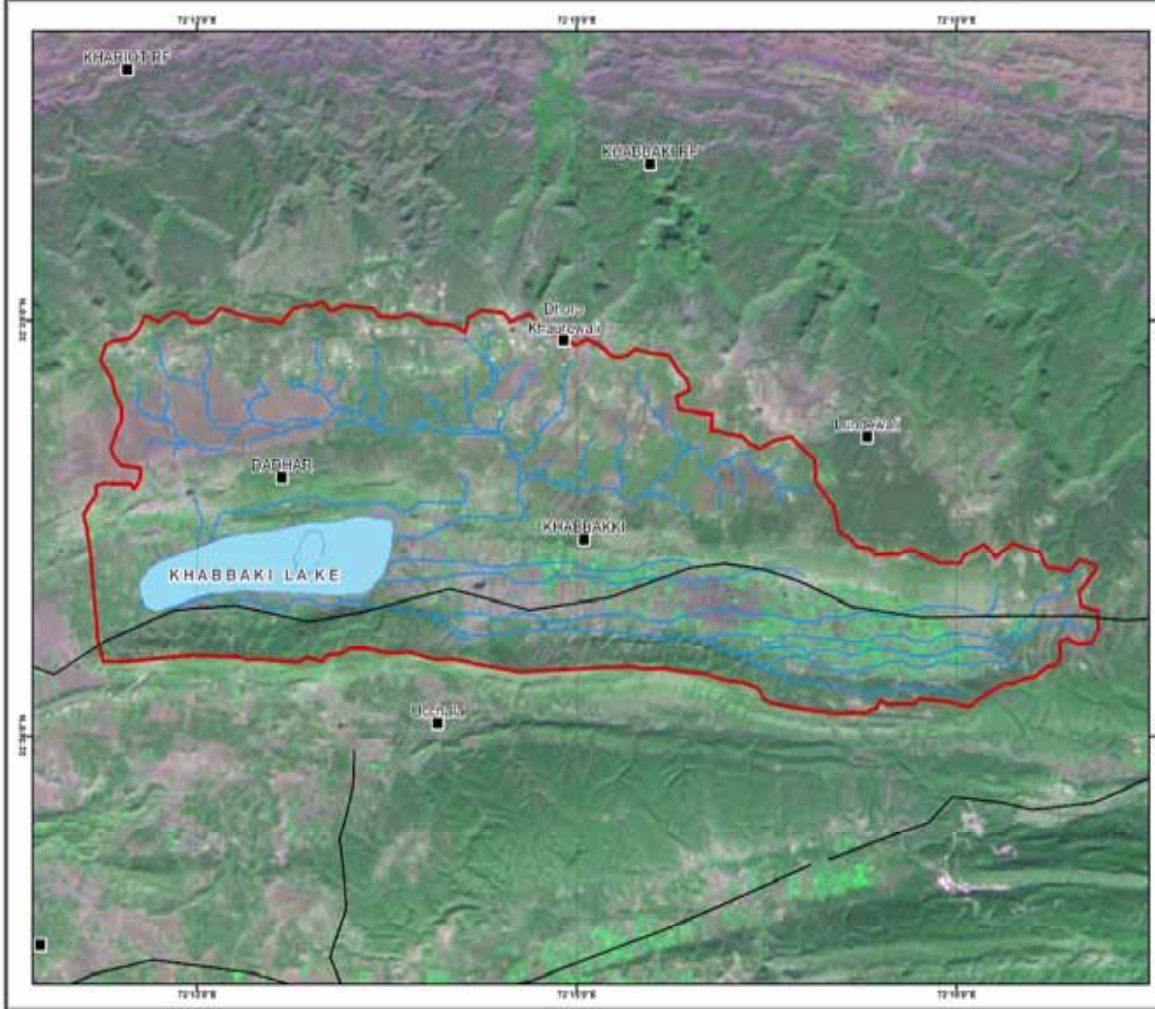


Khabbaki Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Khabbaki Lake was declared as Wildlife Sanctuary, covering an area of 283 hectares, in 1966 by the Punjab Wildlife Department. The area was declared as Wetlands of international significance by the Ramsar International in November 1975. The Wildlife Department de-notified the lake from Wildlife Sanctuary category in 1987; however the lake was again notified as Wildlife Sanctuary on recommendation by the Ramsar Convention monitoring mission in December 1992.

Hydrylla, verticillata, Phragmites karka, Saccharum spontaneum, Typha angustata, Vallisneria Spiralisare, Potamogeton crispus

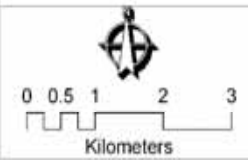


Satellite Image of Khabbaki Lake Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Roads
- Drainage
- ▭ Sub Watershed
- ▭ Wetland Boundary



Location Map
 ▨ Sub Watershed
 ▨ Watershed

Data Source:
 Satellite: Sensor-Terra, ASTER
 Date of Acquisition: 03 March 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

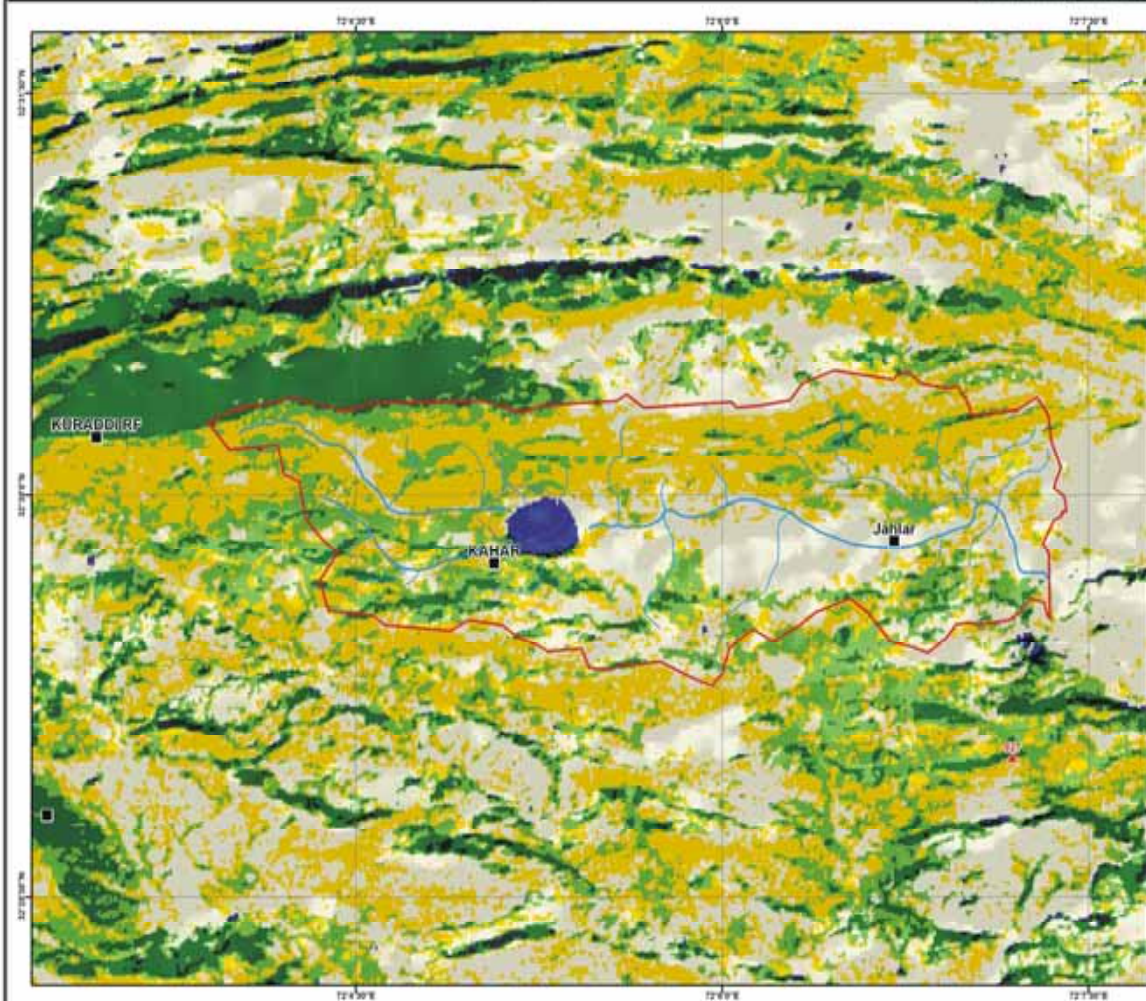


Khabbaki Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Khabbaki Lake was declared as Wildlife Sanctuary, covering an area of 283 hectares, in 1966 by the Punjab Wildlife Department. The area was declared as Wetlands of international significance by the Ramsar International in November 1975. The Wildlife Department de-notified the lake from Wildlife Sanctuary category in 1987; however the lake was again notified as Wildlife Sanctuary on recommendation by the Ramsar Convention monitoring mission in December 1992.

Hydrylla, verticillata, Phragmites karka, Sacchar spontaneum, Typha angustata, Vallisneria Spiralisare, Potamogeton crispus

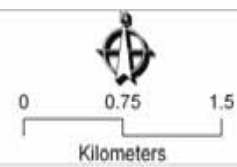


Land Cover Map of Jahlar Lake Wildlife Sanctuary



Land Cover Class

Light Grey	Bare Rock(s)
Light Green	Shrubland
Dark Green	Shade
Yellow	Broadleaved Open Vegetation
Dark Green	Broadleaved Evergreen Woodland
Blue	Perennial Natural Waterbodies (Standing)



Location Map

- Sub Watershed (hatched pattern)
- Watershed (grey fill)

Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 21 September 2008
 Resolution: 15m
 Projection: Geographic (Lat/Long)
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K

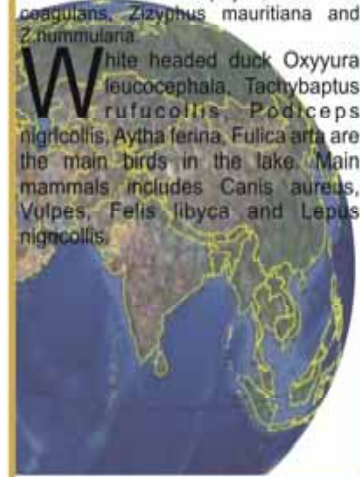


Jahlar Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Lake is notified as Wildlife Sanctuary and also a Wetlands of International Significance by the Ramsar International.

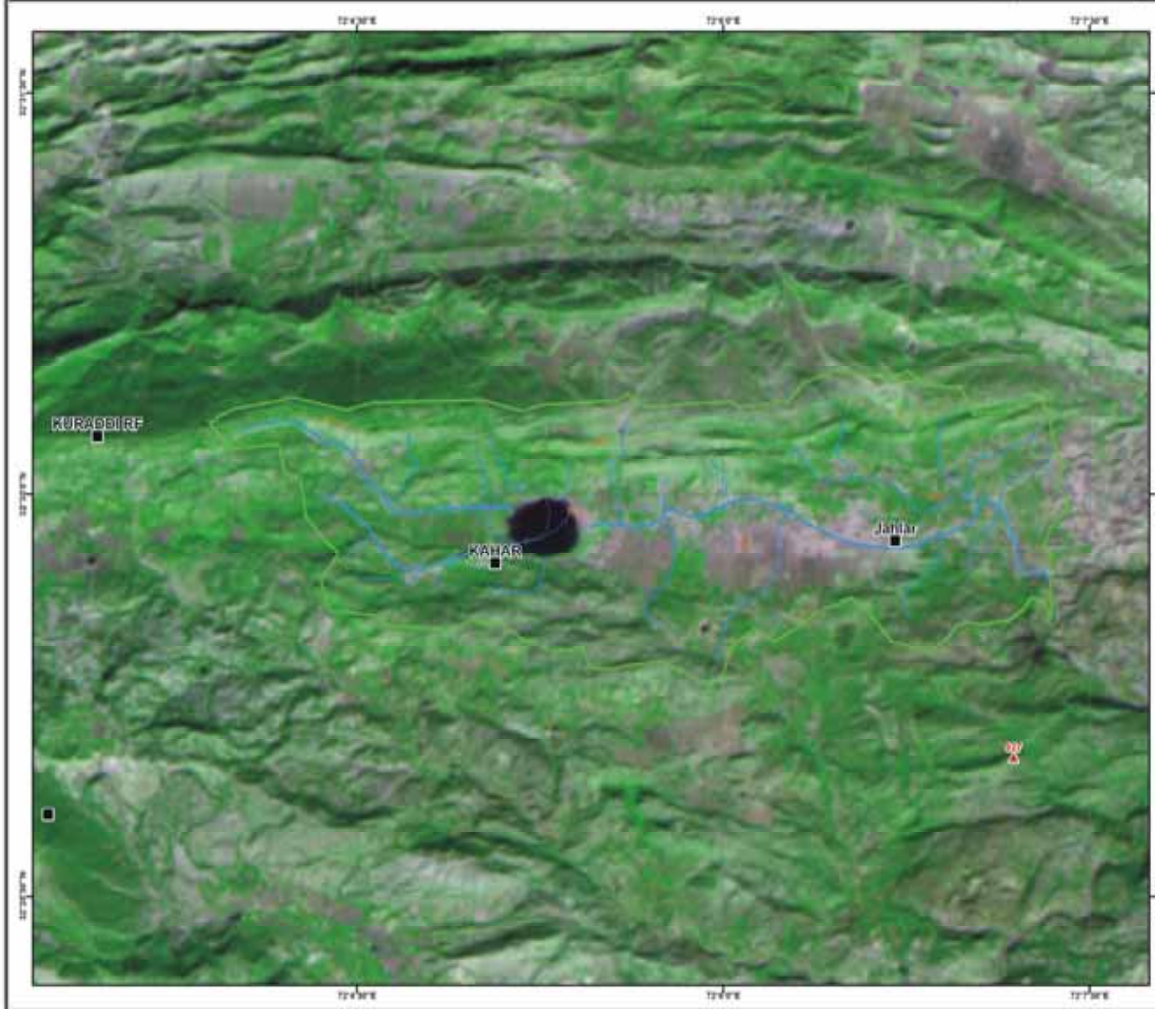
This relatively small lake is brackish to saline lake with little marsh vegetation in the surroundings. The lake is fed by runoff from the surrounding hills of the Salt Range. The depth varies from 0.2m to 6m depending on the amount of rainfall received.

Aquatic vegetation includes *Phragmites karka*, *Hydrilla verticillata*, *Saccharum spontaneum*, *Potamogeton pectinatus*, *Typha angustata*. Natural vegetation includes *Acacia modesta*, *Adhatoda vasica*, *Dodonea viscosa*, *Gymnosporia royleana*, *Olea ferruginea*, *Reptonia boxifolia*, *Tamarix aphylla*, *Withania coagulans*, *Zizyphus mauritiana* and *Z. Rummularia*.

White headed duck *Oxyyura leucocephala*, *Tachybaptus ruficollis*, *Podiceps nigricollis*, *Aythya ferina*, *Fulica arta* are the main birds in the lake. Main mammals includes *Canis aureus*, *Vulpes*, *Felis libyca* and *Lepus nigricollis*.



Satellite Image of Jahlar Lake Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Contour
- Flow
- Stream
- ▭ Wetlands Boundary
- ▭ Sub Watershed

0 0.75 1.5
Kilometers

Location Map

- ▨ Sub Watershed
- ▭ Watershed

Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 21 September 2006
 Resolution: 15m
 Projection: Geographic (Lat/Long)
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K

WWF Leica Geosystems

Jahlar Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. The Lake is notified as Wildlife Sanctuary and also a Wetlands of International Significance by the Ramsar International.

This relatively small lake is brackish to saline lake with little marsh vegetation in the surroundings. The lake is fed by run-off from the surrounding hills of the Salt Range. The depth varies from 0.2m to 6m depending on the amount of rainfall received.

Aquatic vegetation includes Phragmites karka, Hydrilla verticillata, Saccharum spontaneum, Potamogeton pectinatus, Typha angustata. Natural vegetation includes Acacia modesta, Adhatoda vasica, Dodonea viscosa, Gymnosporia royleana, Olea ferruginea, Reptonia boxifolia, Tamarix aphylla, Withania coagulans, Zizyphus mauritiana and Z. nummularia.

White headed duck Oxyyura leucocephala, Tachybaptus ruficollis, Podiceps nigricollis, Aytha ferina, Fulica arta are the main birds in the lake. Main mammals includes Canis aureus, Vulpes, Felis libyca and Lepus nigricollis.



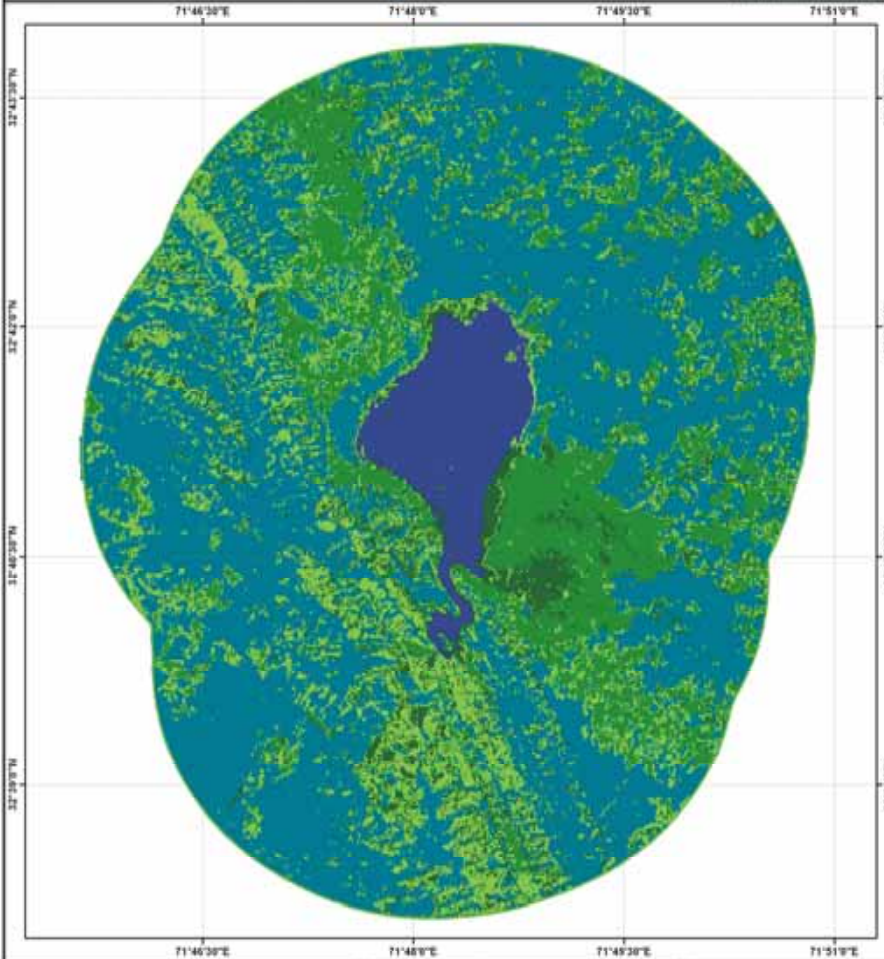
Nammal Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. This Lake is shallow in depth, impounded by a dam at one corner, and fed by a small spring and several intermittent streams rising in the low hills of the Salt Range. The wetland has an east west stretch of 1.87 Km and north south stretch of 4.50 Km.

Aquatic vegetation includes Hydrilla, verticillata, Phragmites karka, Saccharum spontaneum, Typha angustata. Natural vegetation includes Acacia nilotica, Prosopis cineraria, Tamarix aphylla, Salvadora oleoides, Zizyphus mauritiana, Zizyphus nummularia.

Some important birds species includes Tachybaptus ruficollis, Phoenicopterus rubber, E alba, Platalea leucorodia



Land Cover Map of Nammal Lake Wildlife Sanctuary



Legend

- Buffer 3km
- Land Cover Class**
- Herbaceous Crop(s)/Bare Rock(s)
- Grasses/Closed Shrubs On Temporarily Flooded Land(Typha)
- Semi Evergreen Medium High Trees(Mesquite)
- Broadleaved Evergreen Low Trees(Tamarix/Mesquite/Koala)
- Sparse Semi Evergreen Medium High Trees(Mesquite)
- Perennial Waterbodies(Standing)

Location Map

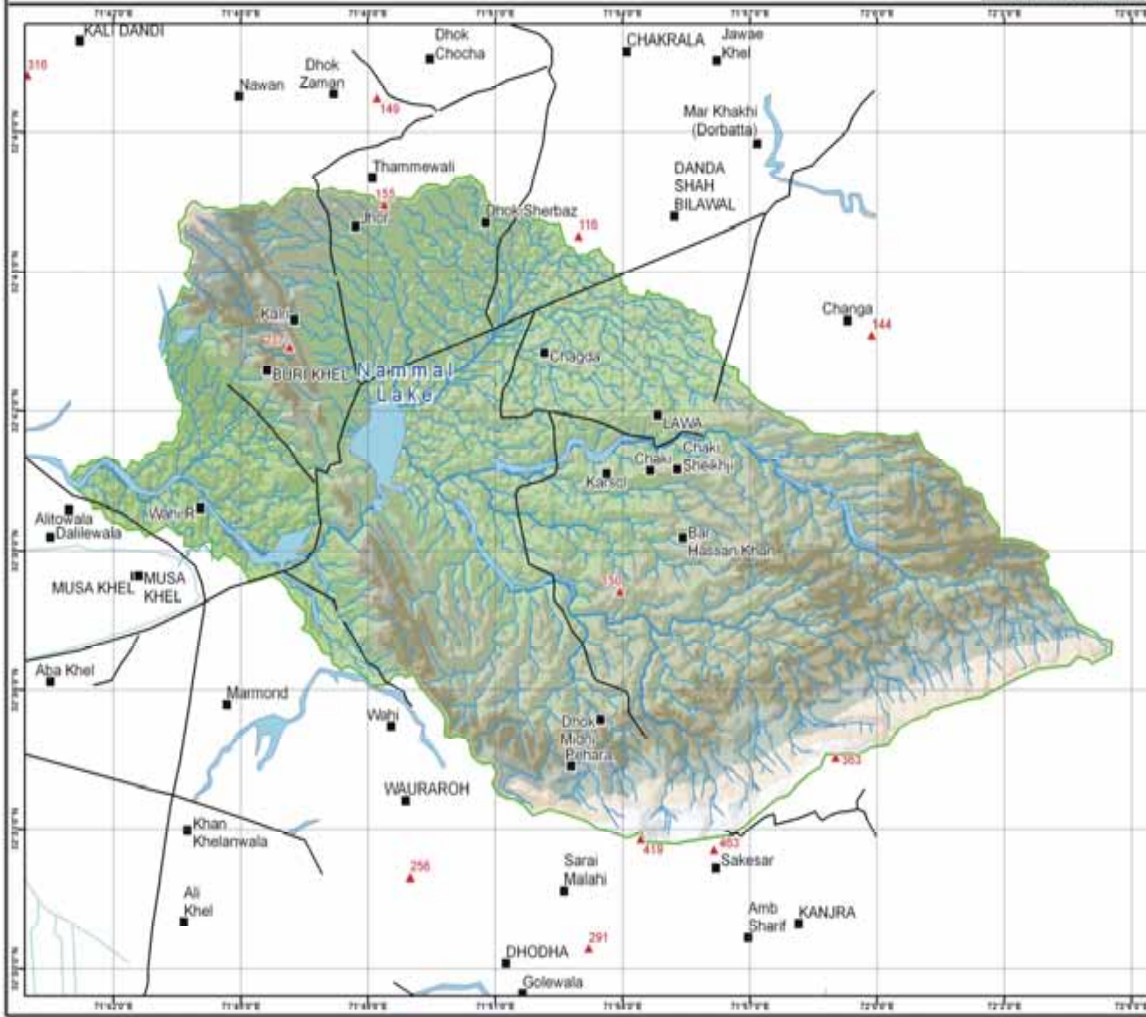


0 1 2
Kilometers

Date Issued: Karachi, Sindh, India, A5758
Date of Approval: 27 October 2006
Resolution: 1:500
Projection: Geographic Lat/Long
Datum: Indian 1960
Scale: 1:25000



Topographic Map of Nammal Lake Wildlife Sanctuary



Legend

Symbol	Description	Elevation (m)
Black square	Populated Place	
Red triangle	Spot Height	200 - 320
White line	Canal	320 - 420
Blue line	Road	420 - 520
Blue line	River	520 - 621
Blue line	Stream	621 - 753
Blue outline	Wetland Boundary	753 - 1,024
Green outline	Sub Watershed	1,024 - 1,424

Scale: 0 1 2 4 6 8 Kilometers

Location Map: Shows the sanctuary's location within the Salt Range Sub Basin, Soan Sub Basin, and Indus (above Chasma) Sub Basin.

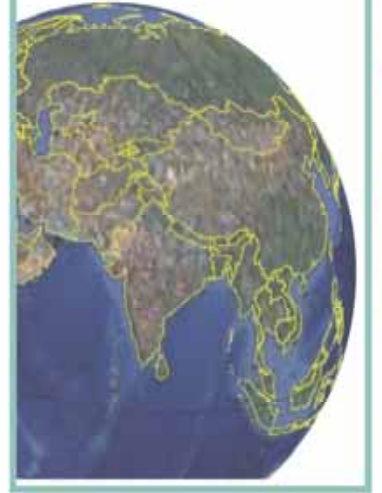
Data Source:
 Satellite: GeoEye, Terra, ASTER
 Date of Acquisition: 21 October 2006
 Resolution: 15m
 CIGAR DEM, © USGS 2000
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

Logos: WWF, Leica Geosystems, ESRI

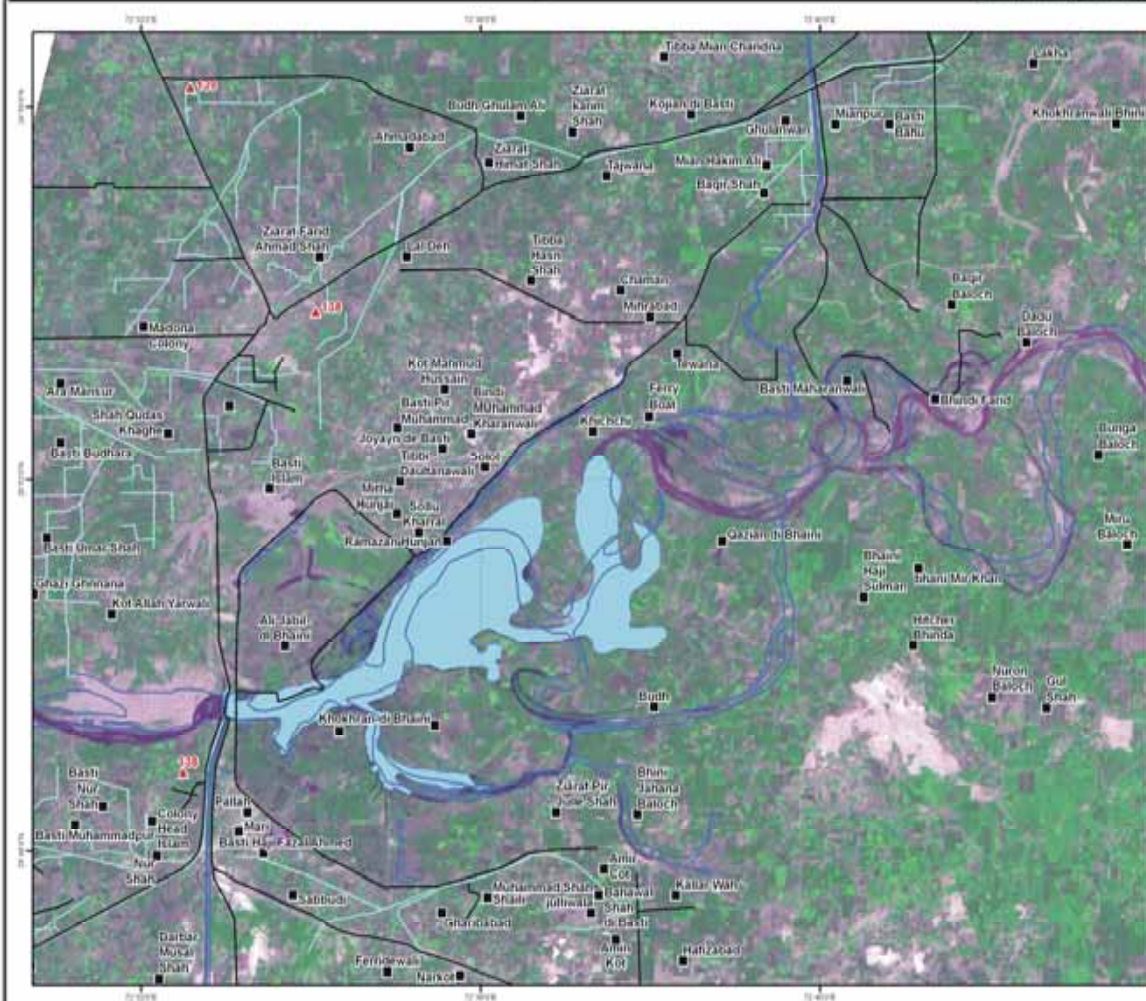
Nammal Lake is physically categorized into mid land lakes and is the part of arid sub-tropical forest eco-region of Pakistan. This Lake is shallow in depth, impounded by a dam at one corner, and fed by a small spring and several intermittent streams rising in the low hills of the Salt Range. The wetland has an east west stretch of 1.87 Km and north south stretch of 4.50 Km.

Aquatic vegetation includes Hydrilla, verticillata, Phragmites karka, Saccharum spontaneum, Typha angustata. Natural vegetation includes Acacia nilotica, Prosopis cineraria, Tamarix aphylla, Salvadoria oleoides, Zizyphus mauritiana, Zizyphus nummularia.

Some important birds species includes Tachybaptus ruficollis, Phoenicopterus rubber, E alba, Platalea leucorodia

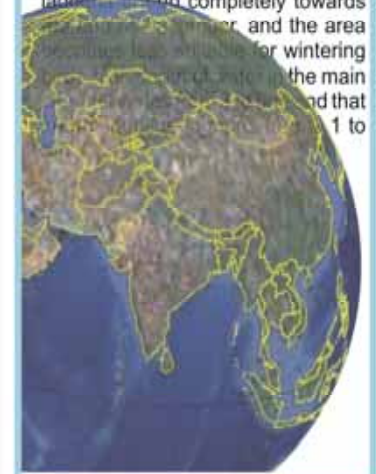


Satellite Image of Head Islam Wildlife Sanctuary

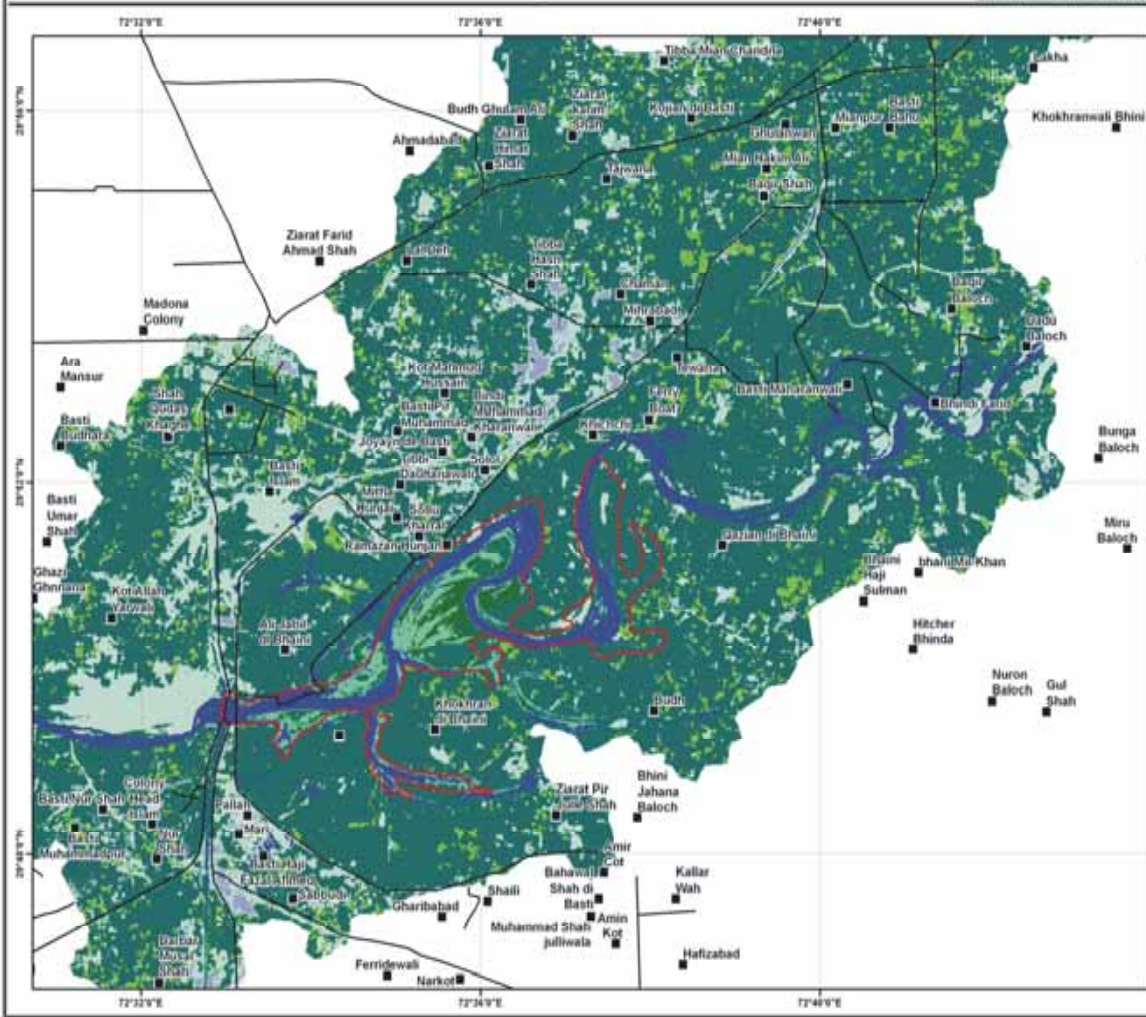


Head Islam is physically categorized into irrigation Barrages and is a part of Sub-tropic pine forest eco-region of Pakistan. It is located in Bahawalpur district of Punjab Province. It is declared as wildlife sanctuary by the wildlife department, Government of Punjab.

Head Islam is water storage reservoir on the Sutlej River, distributing water by canal for irrigation purposes. Two embankments projects out into reservoir and hold back shallow lagoons as the water level in the main river channel falls. As the water recedes, the exposed land is leased for cultivation. The combination of shallow water areas, rich aquatic vegetation wet agricultural land provides excellent habitat for waterfowl during the autumn migration season. However, the lagoons dry up completely towards winter and the area is used for wintering of sheep and goats. The main channel of the river is 1 to 1.5 m deep and 10 to 15 m wide.

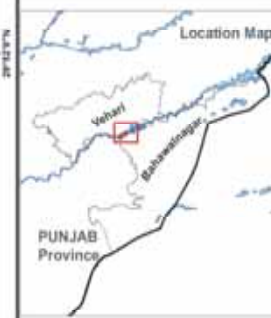
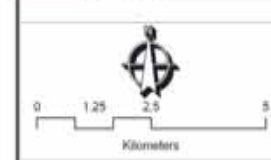


Land Cover Map of Head Islam Wildlife Sanctuary



Land Cover Class

	Surface Irrigated Herbaceous Crop(s) (Agriculture Fields)
	Grasses
	Bare Soil
	Regularly Flooded Vegetation (Submerged Vegetation)
	Closed Shrubs On Temporarily Flooded Land(Typha)
	Perennial Waterbodies (Flowing)
	Now Perennial Waterbodies (Wet Soil)



Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 08 December 2006
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

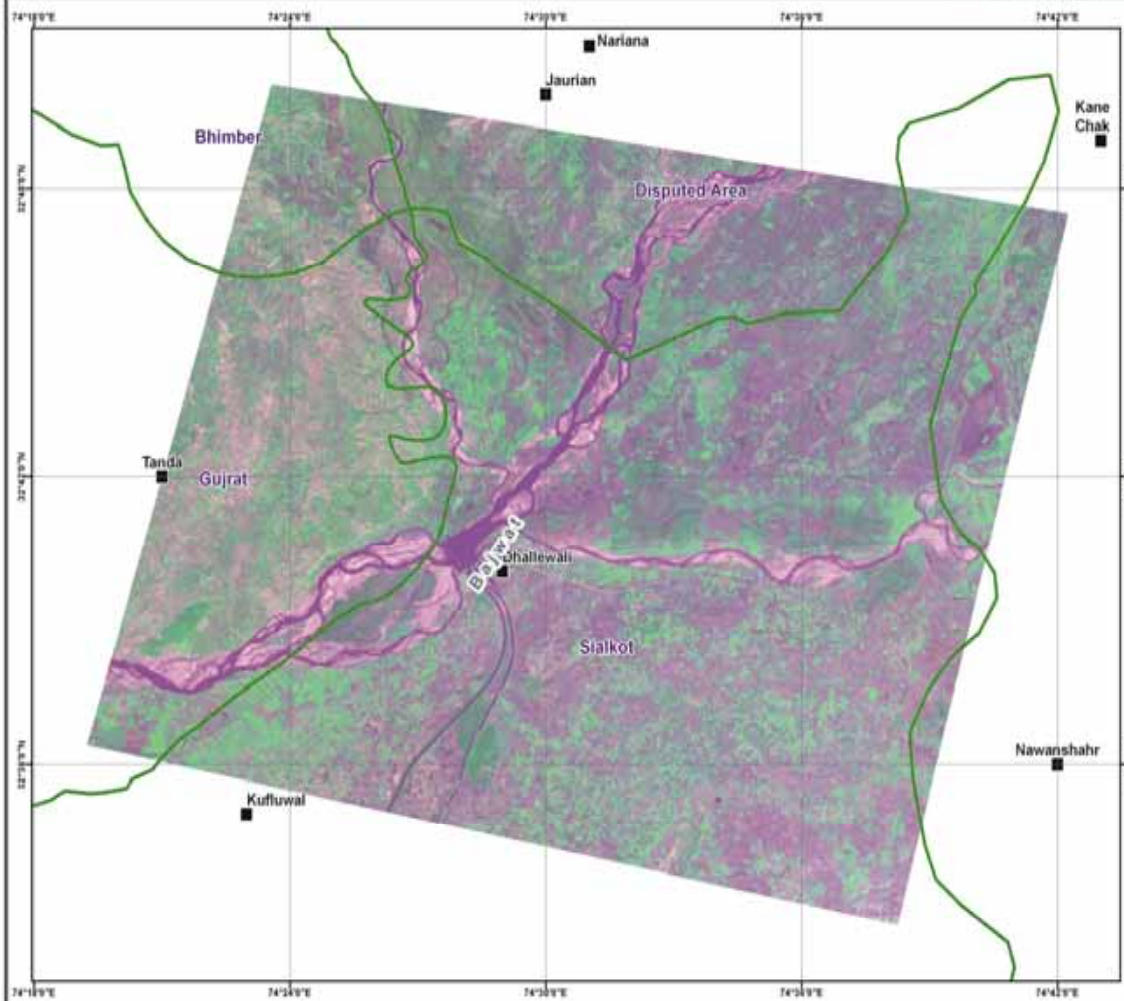


Head Islam is physically categorized into irrigation Barrages and is a part of Sub-tropical pine forest eco-region of Pakistan. It is located in Bahawalpur district of Punjab Province. It is declared as wildlife sanctuary by the wildlife department, Government of Punjab.

Head Islam is water storage reservoir on the Sutlej River, distributing water by canal for irrigation purposes. Two embankments projects out into reservoir and hold back shallow lagoons as the water level in the main river channel falls. As the water recedes, the exposed land is leased for cultivation. The combination of shallow water areas, rich aquatic vegetation wet agricultural land provides excellent habitat for waterfowl during the autumn migration season. However, the lagoons dry up completely towards the end of December, and the area becomes less suitable for wintering birds. The depth of water in the main channel varies from 3 to 6m, and that in the seepage lagoons from 0.1 to 3m.

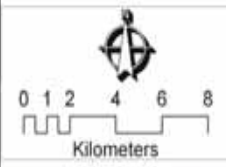


Satellite Image of Bajwat Game Reserve



Legend

- Populated Place
- District Boundary



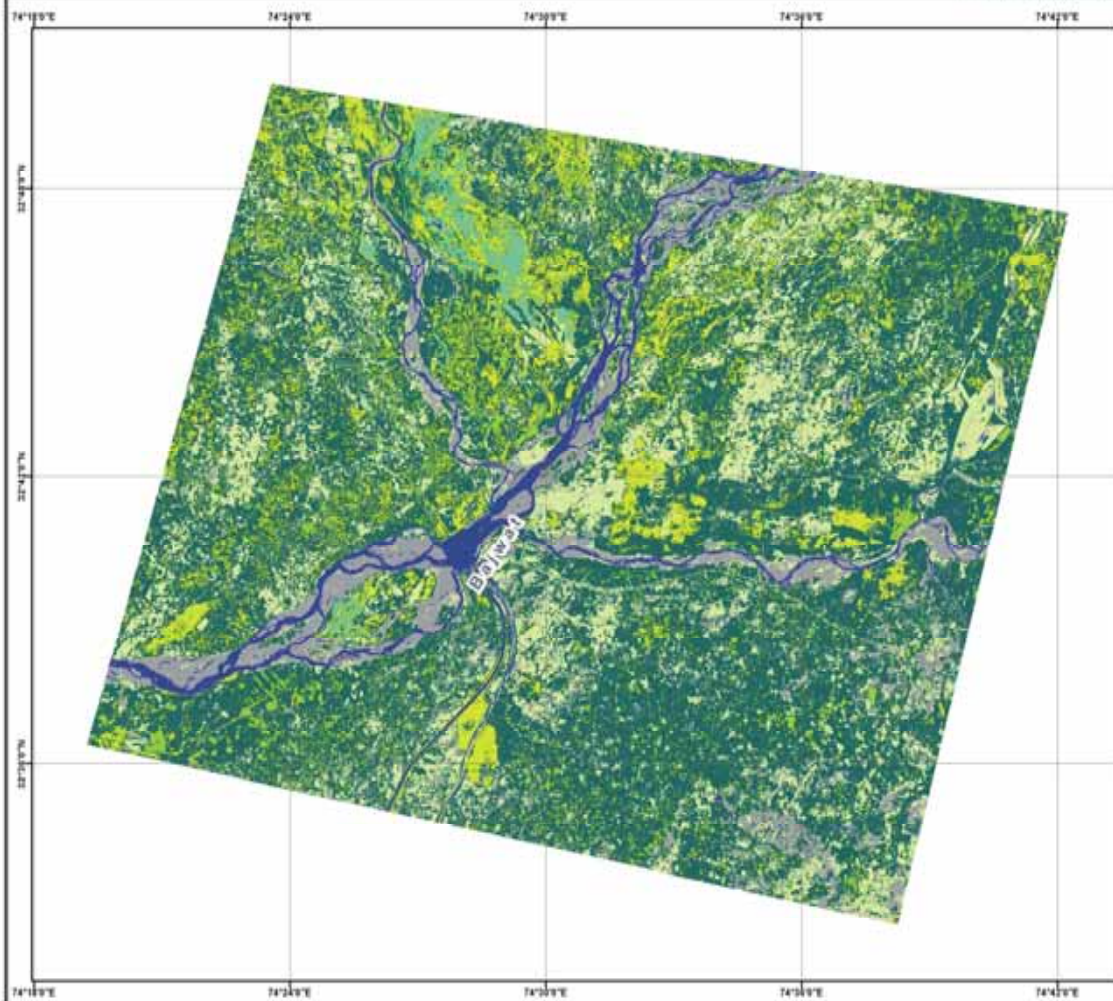
Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 17 December 2008
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



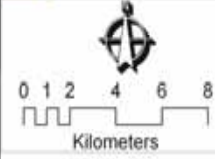
Bajwat is physically categorized into irrigation barrages and is a part of Sub-tropic pine forest eco-region of Pakistan. It is located in north side of the district Sialkot, Punjab Province. It is declared as Game reserve by the Government of Punjab



Land Cover Map of Bajwat Game Reserve



- Legend**
- Herbaceous Crop (s) (Cultivated Fields)
 - Surface Irrigated Herbaceous Crop (s) (Ploughed Fields)
 - Bare Soil
 - Shrub(s)
 - Regularly Flooded Vegetation (Submerge Vegetation)
 - Broadleaved Deciduous Trees
 - Perennial Waterbodies (Flowing)



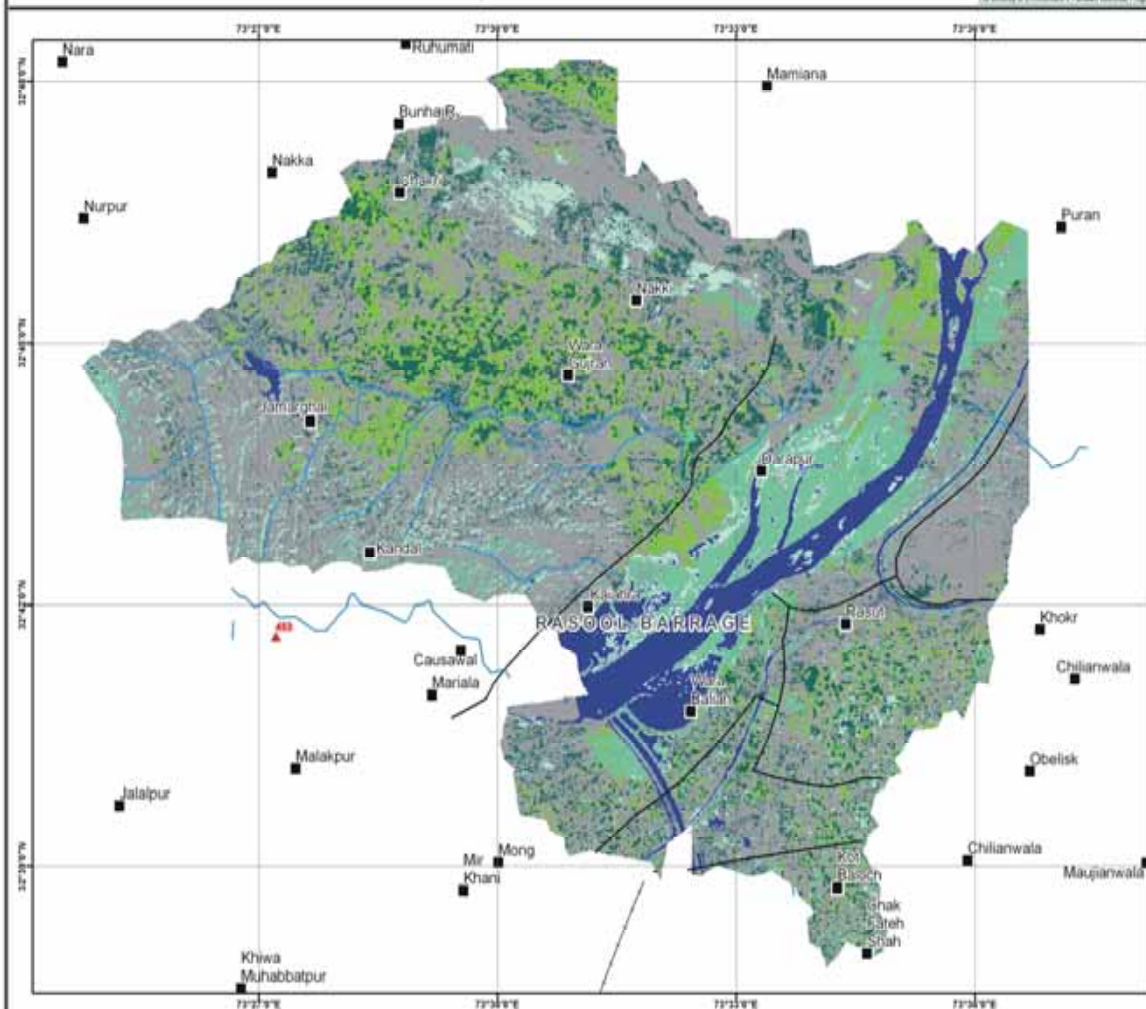
Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 17 December 2006
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Bajwat is physically categorized into irrigation barrages and is a part of Sub-tropic pine forest eco-region of Pakistan. It is located in north side of the district Siakot, Punjab Province. It is declared as Game reserve by the Government of Punjab

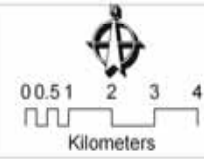


Land Cover Map of Rasool Barrage Wildlife Sanctuary



Land Cover Class

- Surface Irrigated Herbaceous Crops
- Grasses/Shrub(s)
- Non-Perennial Waterbodies
- Regularly Flooded Vegetation
- Bare Rock(s)/Bare Soil(s)
- Perennial Waterbodies(Flowing)



Data Source:
 Satellite: Sensor:Terra, ASTER
 Date of Acquisition: 14 December 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



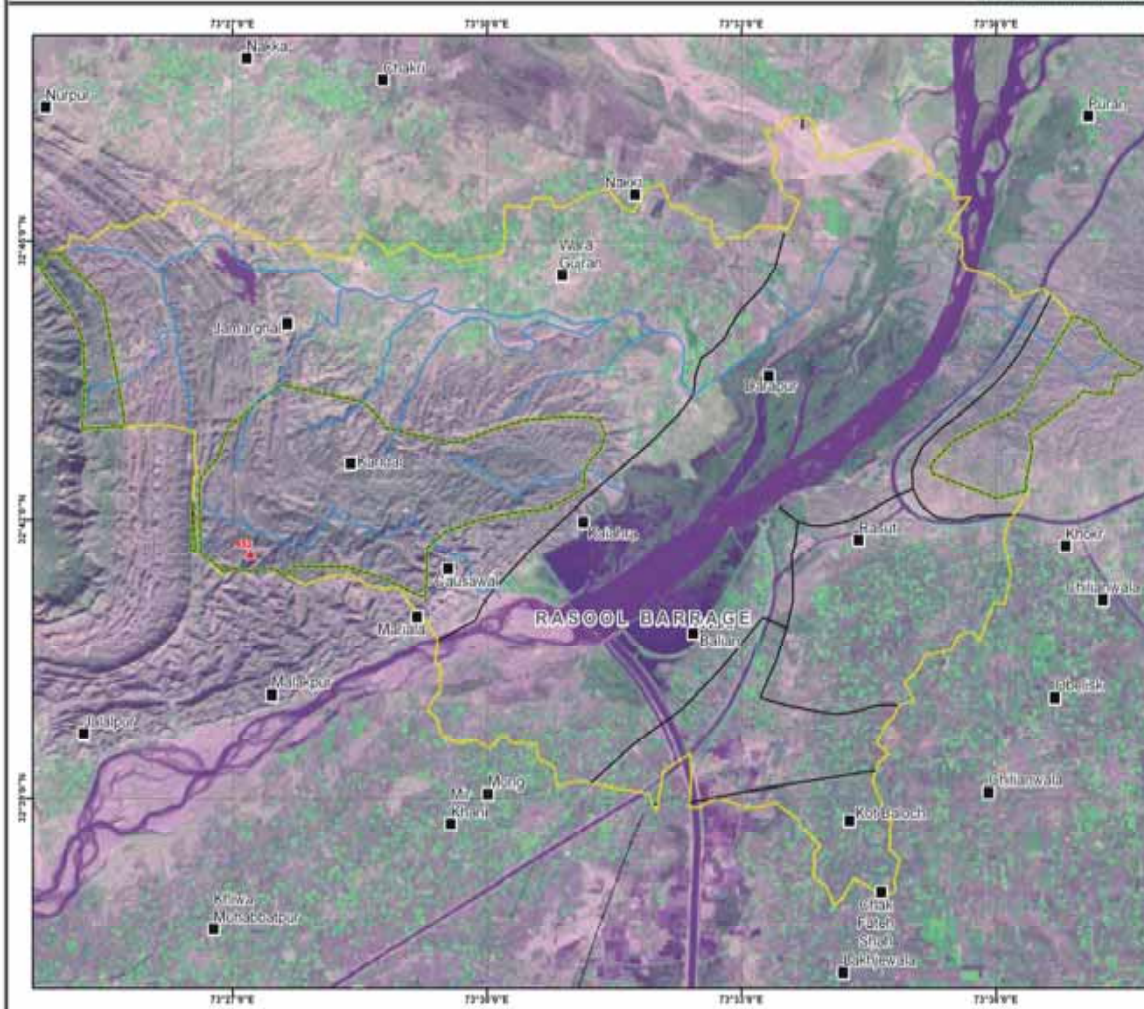
Rasool Barrage is physically categorized into irrigation Barrages and is a part of Sub-tropical pine forest eco-region of Pakistan. It is declared as wildlife sanctuary by Government of Punjab. It covers an area about 1138 ha.

Associated marshes and extensive sand banks, created by the damming of the Jhelum River for irrigation purpose. The water level fluctuates by about 2m, and the maximum depth is 6.5m.

Phragmites karka, Hydrilla verticillata, Nymphaea Lotus, Potamogeton crispus, Typha angustata, Vallisneria Spiralis are the main aquatic vegetation at Rasool Barrage. Subtropical semi-evergreen forest dominated by Olea ferruginea, Acacia modesta, and Dodonea viscosa. Prosopis cineraria, Acacia nilotica, Capparis deciduas, Tamarix aphylla, Zizyphus mauritiana, Zizyphus nummularia, Saccharum spontaneum have been extensively planted along roads and around the agriculture fields.

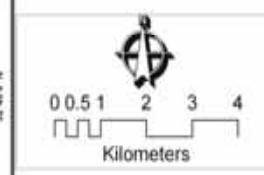


Satellite Image of Rasool Barrage Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Canal
- River
- Railroad
- Drainage
- ▭ Forest Boundary
- ▭ Sub-Subsistence



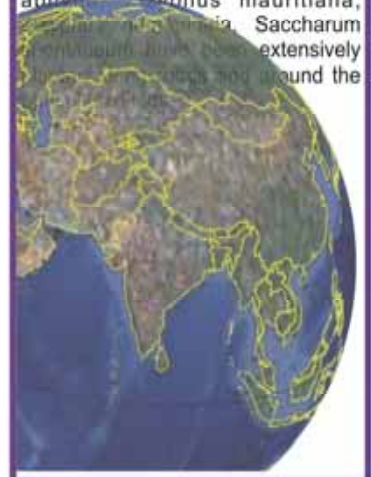
Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 14 December 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



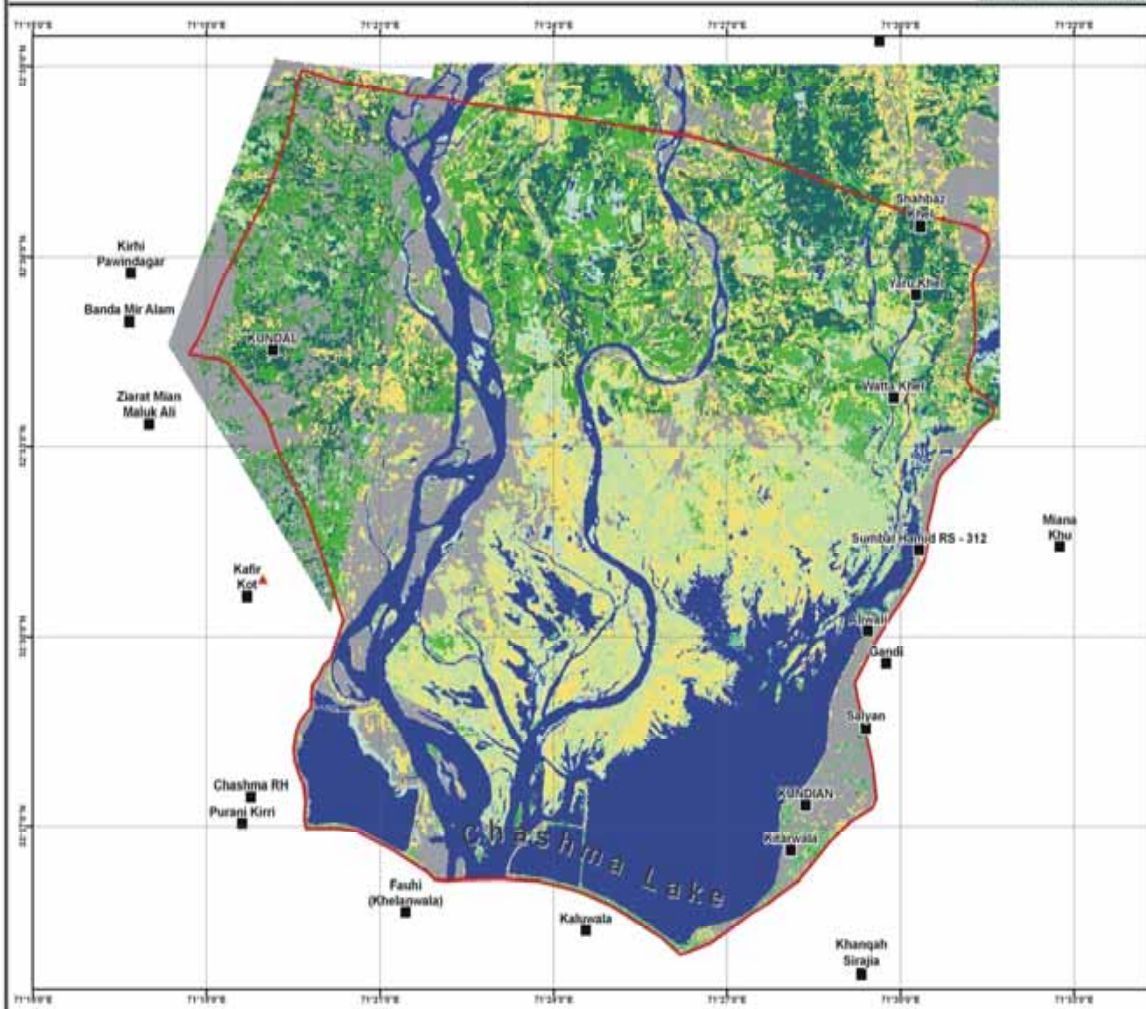
Rasool Barrage is physically categorized into irrigation Barrages and is a part of Sub-tropical pine forest eco-region of Pakistan. It is declared as wildlife sanctuary by Government of Punjab. It covers an area about 1138 ha.

A water storage reservoir with associated marshes and extensive sand banks, created by the damming of the Jhelum River for irrigation purpose. The water level fluctuates by about 2m, and the maximum depth is 6.5m.

Phragmites karka, Hydrilla verticillata, Nymphaea Lotus, Potamogeton crispus, Typha angustata, Vallisneria Spiralis are the main aquatic vegetation at Rasool Barrage. Subtropical semi-evergreen forest dominated by Olea ferruginea, Acacia modesta, and Dodonea viscosa, Prosopis cineraria, Acacia nilotica, Capparis deciduas, Tamarix aphylla, Zizyphus mauritiana, Saccharum spontaneum are extensively found the

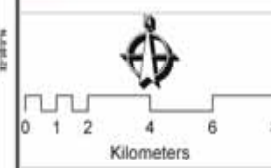


Land Cover Map of Chashma Lake Wildlife Sanctuary



Land Cover Class

- Surface Irrigated Herbaceous Crops (Agriculture 1)
- Surface Irrigated Herbaceous Crops (Agriculture 2)
- Bare Soil
- Evergreen Trees Sparse Grasses/Herbals (Savannah)
- Mix Grasses on Permanently Flooded Land (Wetland/Savannah/Grassland)
- Sparse Grasses on Permanently Flooded Land (Wetland/Savannah)
- Broadleaved Evergreen Low Trees/Classics (Tropical/Wetland/Savannah)
- Waterbodies (Flowing)
- Non Potential Waterbodies (Bare Soil)



Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 13 January 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

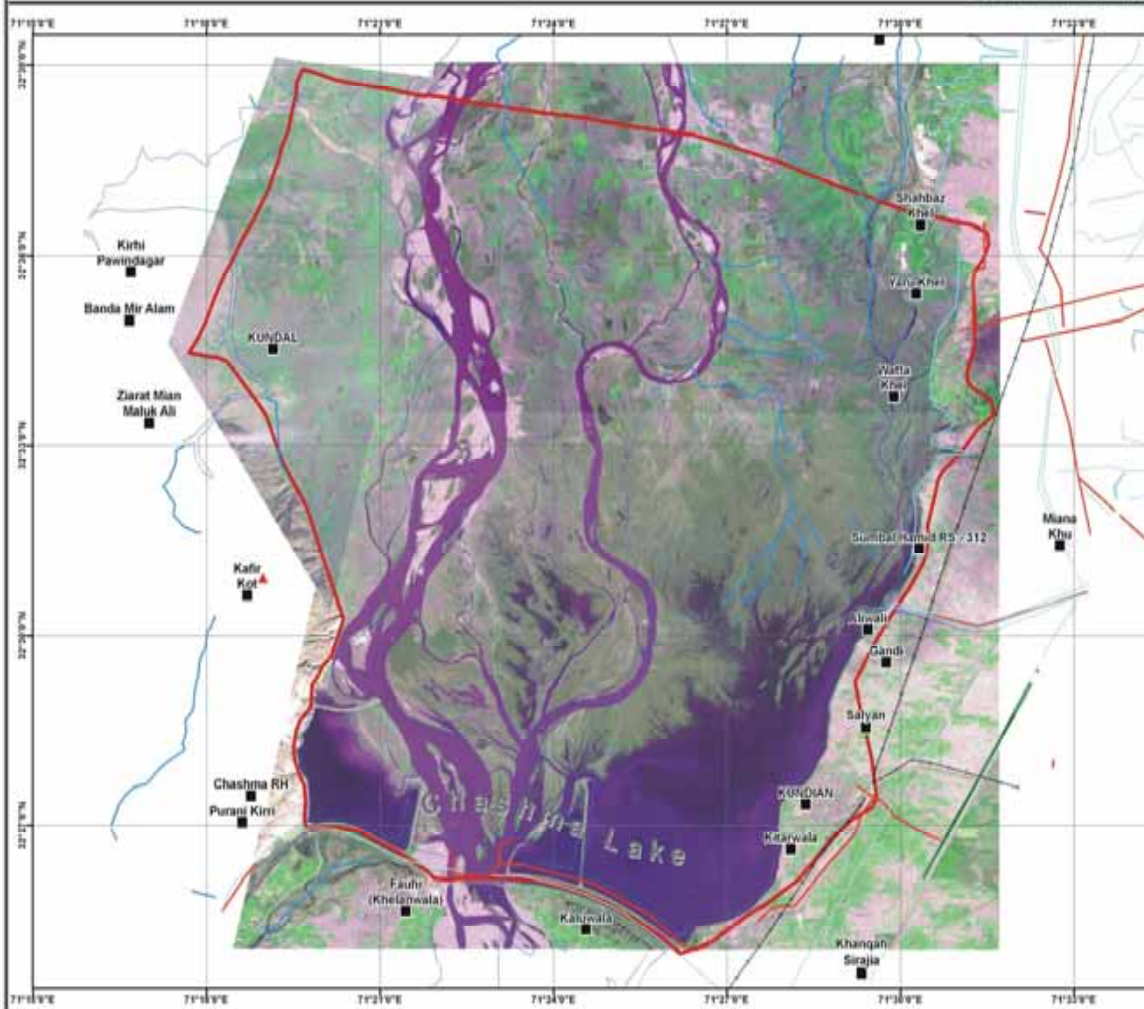


Chashma Lake is physically categorized into Irrigation Barrages and is the part of tropical thorn forest eco-region of Pakistan. The Chashma Barrage is also an officially designated Wildlife Sanctuary since 1974 by the provincial wildlife department of government of the Punjab. The total area of Chashma Barrage Ramsar Site is approx. 341 Km.²

The site comprises a large barrage, a water storage reservoir and a series of embankments which divide the reservoir into five shallow lakes at low water levels. The climate of the area is dry-subtropical and the natural vegetation is a mixture of subtropical semi-evergreen scrub and tropical thorn forest.



Satellite Image of Chashma Lake Wildlife Sanctuary



Legend

- Populated Place
- Spot Height
- Drainage
- Road
- Railroad
- Provincial Boundary
- Canal
- Water Body
- Wetland Boundary

0 1 2 4 6 8
Kilometers

Location Map

Data Source:
 Satellite, Sensor: Terra, ASTER
 Date of Acquisition: 13 January 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

WWF Leica Geosystems ESRI

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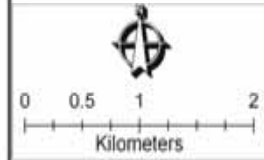


Satellite Image of Taunsa Barrage Wildlife Sanctuary



Legend

- Road
- Rail Road
- Canal
- Wetland Boundary



Data Source:
 Satellite: Sensor-Quickbird, BGIS 2000
 Date of Acquisition: 27 April 2005
 Resolution: 0.6 m
 Projection: Geographic Lat/Long
 Datum: Spheroid: WGS 84
 Survey Map: 1:250K

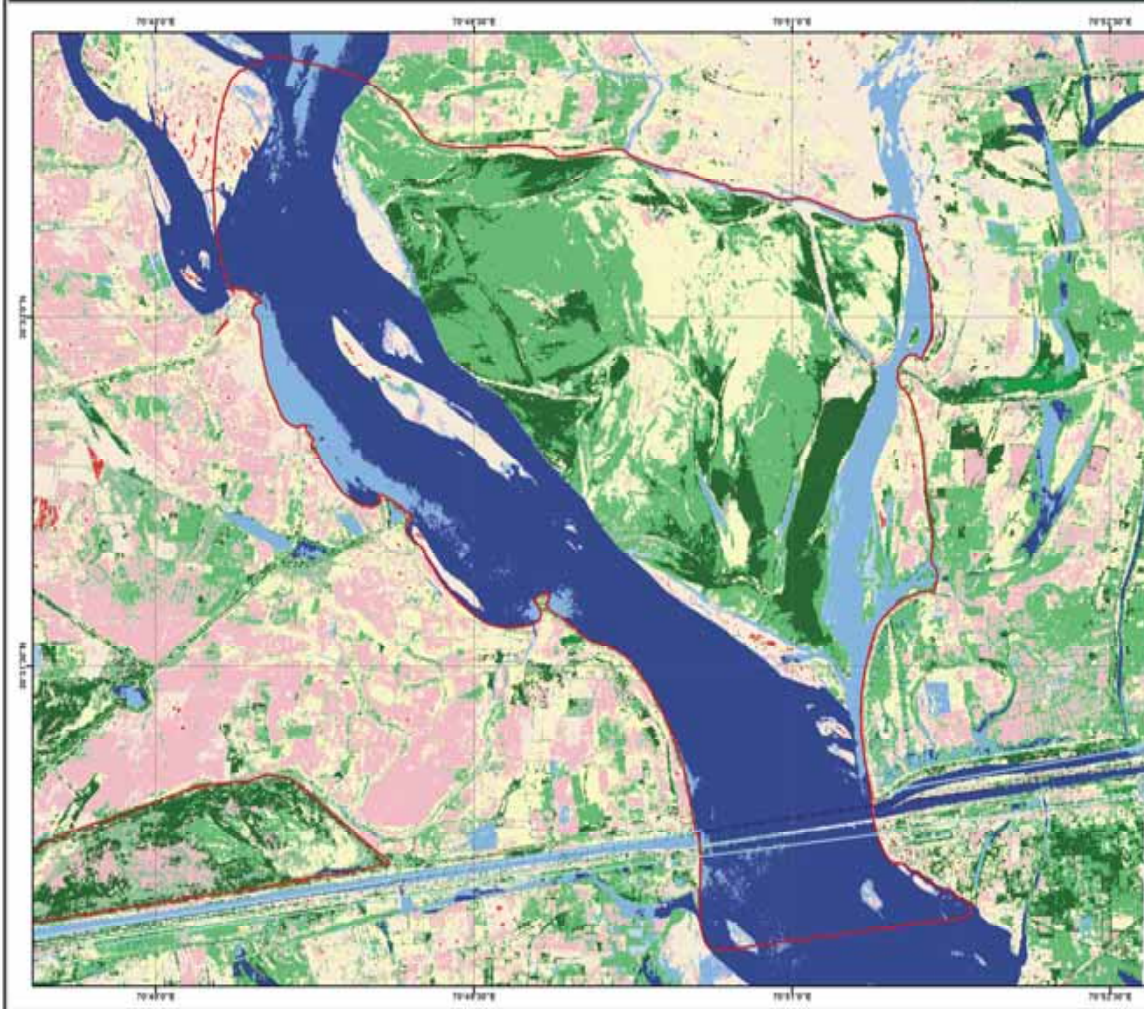


Taunsa Barrage is physically categorized into Irrigation Barrages and is a part of tropical thorn forest eco-region of Pakistan. Taunsa Barrage was constructed in 1959 on River Indus, 18- miles downstream of Chashma Barrage in district Muzaffargarh. It feeds the DG Khan and Muzaffargarh canals. Pond area above Taunsa barrage was declared as wildlife sanctuary in 1972 under Punjab Wildlife Act 1974. It is also one of the 19 Ramsar wetland sites in Pakistan.

Taunsa Wildlife Sanctuary (TWS) was declared under the notification No. SOFT (EXT) XII-8/72 dated: 21-4-98 declaring 16,225-7-18 acres of land as protected area. Afterwards this notification was amended under the notification No. SOF (WL) 12-1/02-II dated: 24-03-99 and 9225 Acres of land were no more part of TWS; this land was given to local people on lease for 99 years. Thus presently TWS covers 7,000 acres of land.



Land Cover Map of Taunsa Barrage Wildlife Sanctuary



Land Cover Class

- Non-Perennial Waterbodies
- Perennial Waterbodies (Flowing)
- Turtal Shallow Non-Perennial Waterbodies
- Closed Shallow On Temporarily Flooded Land (Rice/Lowland Emergent Low Trees/ Grasses/Typha/Taraxacum/Ostracods)
- Bulk Up Areas
- Mead Spines Gravelled On Permanently Flooded Land/Closed Shallow On Temporarily Flooded Land (Rice/Lowland Emergent Low Trees (Sarcobatus/Typha/Sarcus))
- Closed Shallow Free Floating (Pond/Lake)
- Bees Nest
- Grasses
- Impacted Surface Herbaceous (Cyperus)
- Broadleaved Deciduous Trees (Shorea/Sonch/Ostrya)

0 0.5 1 2
Kilometers

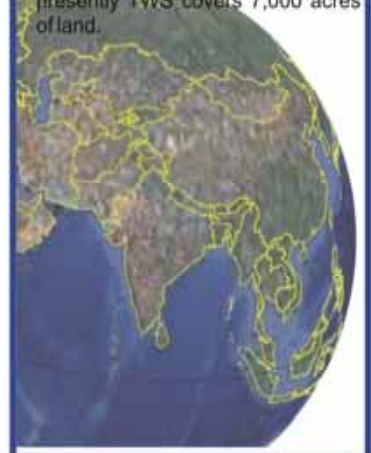
Map showing location relative to Bhakkar, Lailah, Rajanpur, D. G. Khan, Muzaffargarh, Multan, Lodhran, and Vehari.

Data Source:
 Satellite, Sensor: QuickBird, BGIS 2000
 Date of Acquisition: 27 April 2005
 Resolution: 0.6 m
 Projection: Geographic Lat/Long
 Datum: Spheroid: WGS 84
 Survey Map: 1:250K

Leica
 WWF Geosystems ESRI

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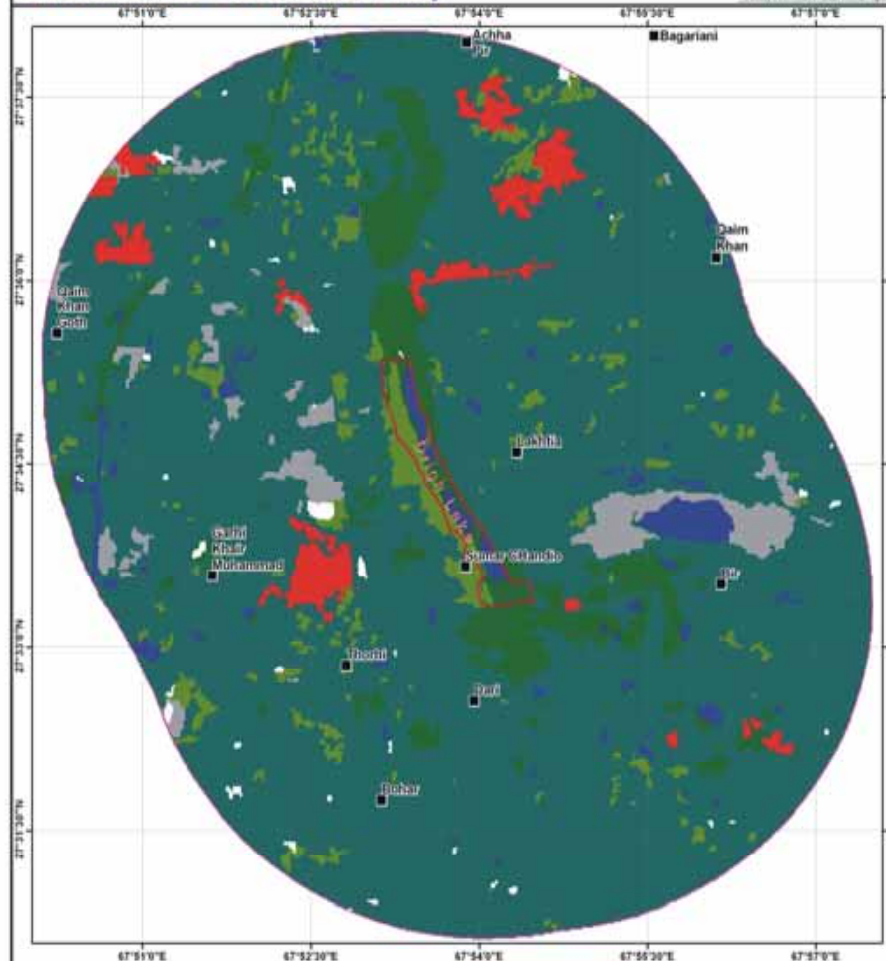
Drigh Lake is physically categorized into rice paddies and is a part of tropical thorn forest eco region of Pakistan. It was declared as a wildlife sanctuary in 1972 under notification No. 26(2) SWL&FT/72, dated 21st October, 1972. It covers an area about 450 hectares. Drigh lake is situated on the silts soils of the Indus flood Plain. Drigh lake lies in shallow depression.

It is partially covered with Typha. Main vegetation at Drigh lake includes Tamarix dioloa, Nymphaea Lotus, Typha angustata, Hydrilla verticillata, Maritimus, Phragmites karka, Potamogeton pectinatus, Najas minor and Scirpus Littoralis are mainly present at Drigh lake.

Wildlife mainly includes Night Heron, Purple Heron, Grey Heron, Darter, Cormorant, Little Egret, Great Egret, Painted Snipe, Mallard, Common Teal, Common Pochard, Garganey, Gadwall, Pintail and Shoveller



Land Cover Map of Drigh Lake Wetlands Wildlife Sanctuary



Legend

- Populated Place
- ▭ Wetland Boundary
- ▭ Buffer Zone

Land Cover Class

- Herbaceous Cropland/Cultivated Fields
- Bare Soil
- Urban Area/Settlements
- Broadleaved Evergreen Low Trees/Tamarix
- Closed Shrub or Temporarily Flooded Land/Typha
- Perennial Natural Waterbodies (Standing)

Location Map

Jhal Magsi, Jacobabad, Khairpur, Dadu, Naushahro Feroze

Scale: 0 2 4 Kilometers

Data Source
Satellite: Spots 4, HRVIR
Date of Acquisition: 15 April 2002
Resolution: 30m
Projection: Geographic Lat/Long
Datum/Zone: WGS84
Survey Map: 1:50K

WWF Geosystems ESRI



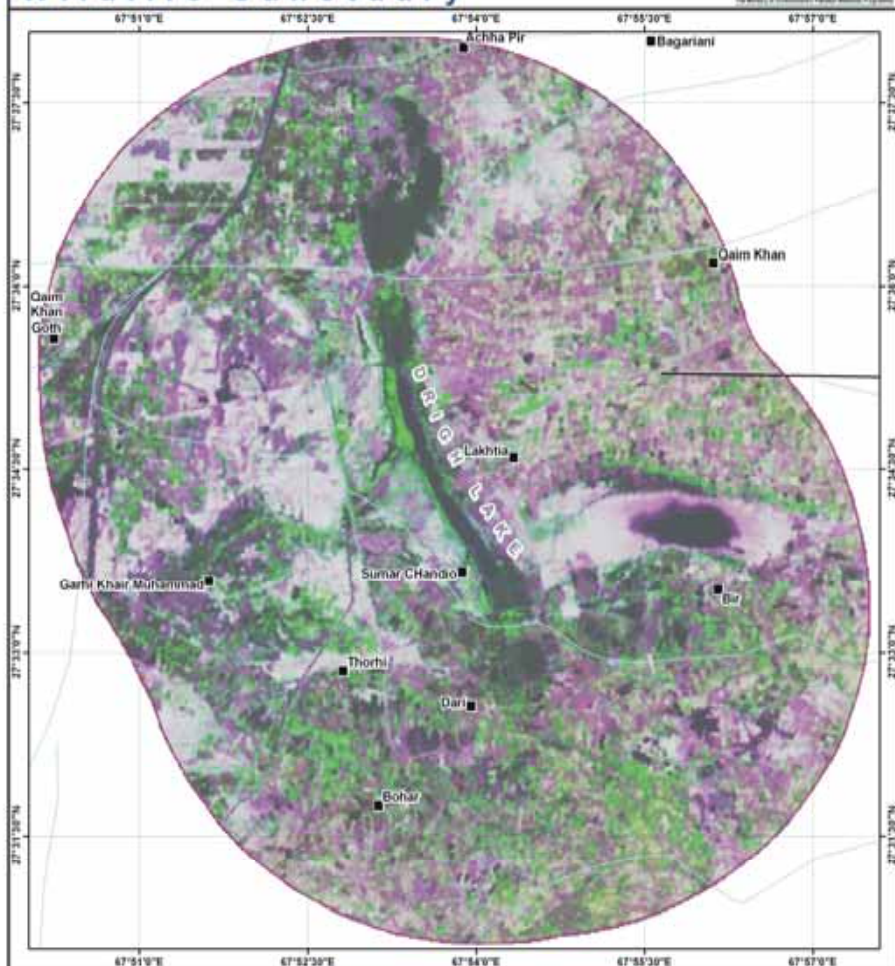
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Satellite Image of Drigh Lake Wetlands Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Canal
- Road
- Drainage
- Wetland Boundary
- Buffer 5km

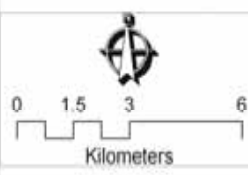
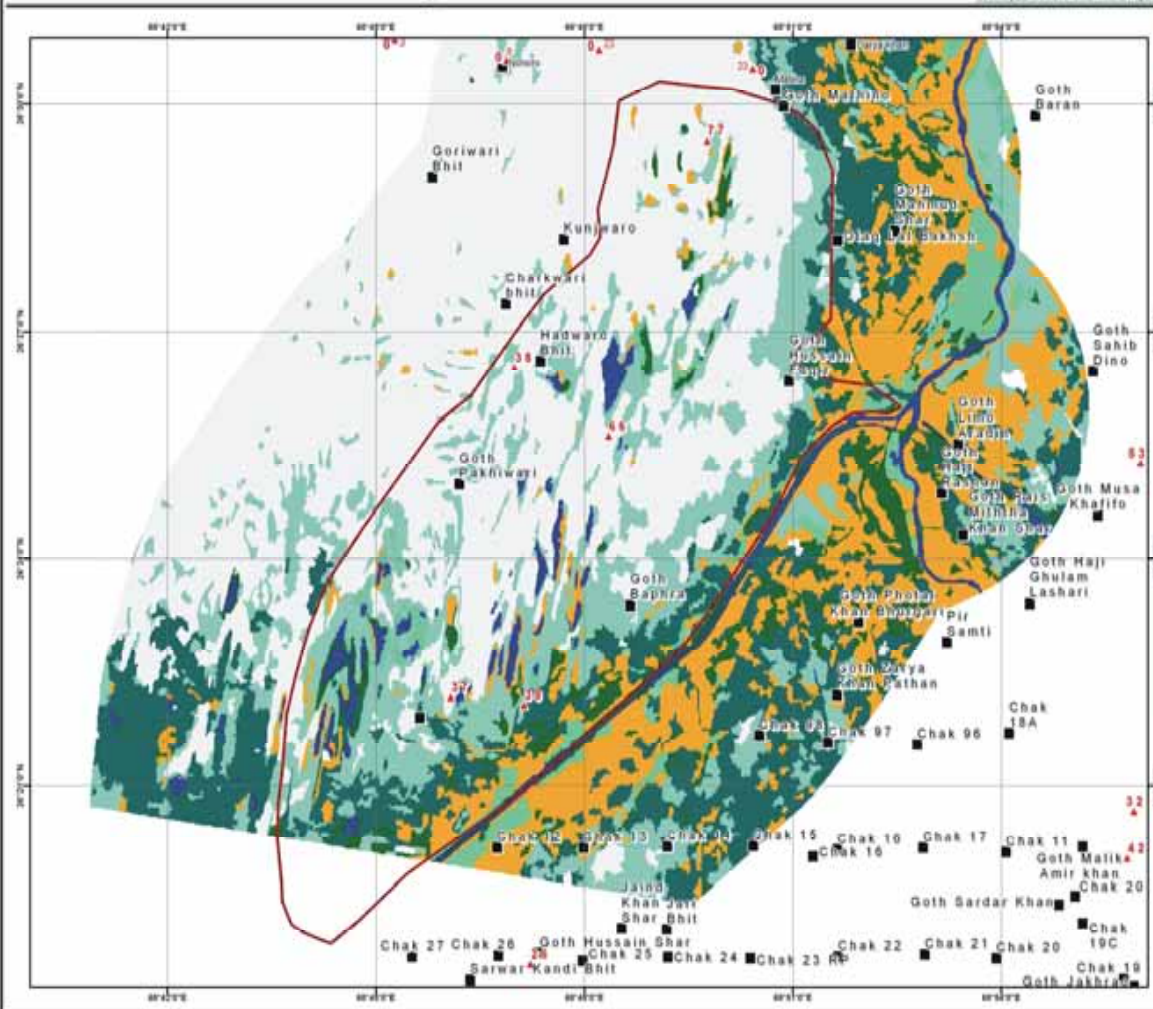


Land Cover Map of Deh Akro-II Complex Wildlife Sanctuary



Land Cover Class

- Waterbodies
- Closed Shrubs on Temporarily Flooded Land (Typha)
- Regularly Flooded Vegetation (Submerged Vegetation)
- Shrubs
- Shifting Sands/Dunes
- Sparse Grasses/Shifting Sands/Dunes (Shrubs/Grasses/Sand Dunes)
- Surface Irrigated Herbaceous Crops (Agriculture Field)



Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 03 March 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Typhoon: WGS 84
 Survey Map: 1:250k



Deh Akro-II complex is physically categorized into oxbow lakes and is a part of tropical thorn forest eco-region of Pakistan. It is declared as wildlife sanctuary by the Government of Sindh under notification No.SOI(MP)S&GAD/WL/4-88 dated 11 May 1988, with having an area 20,243 hectare.

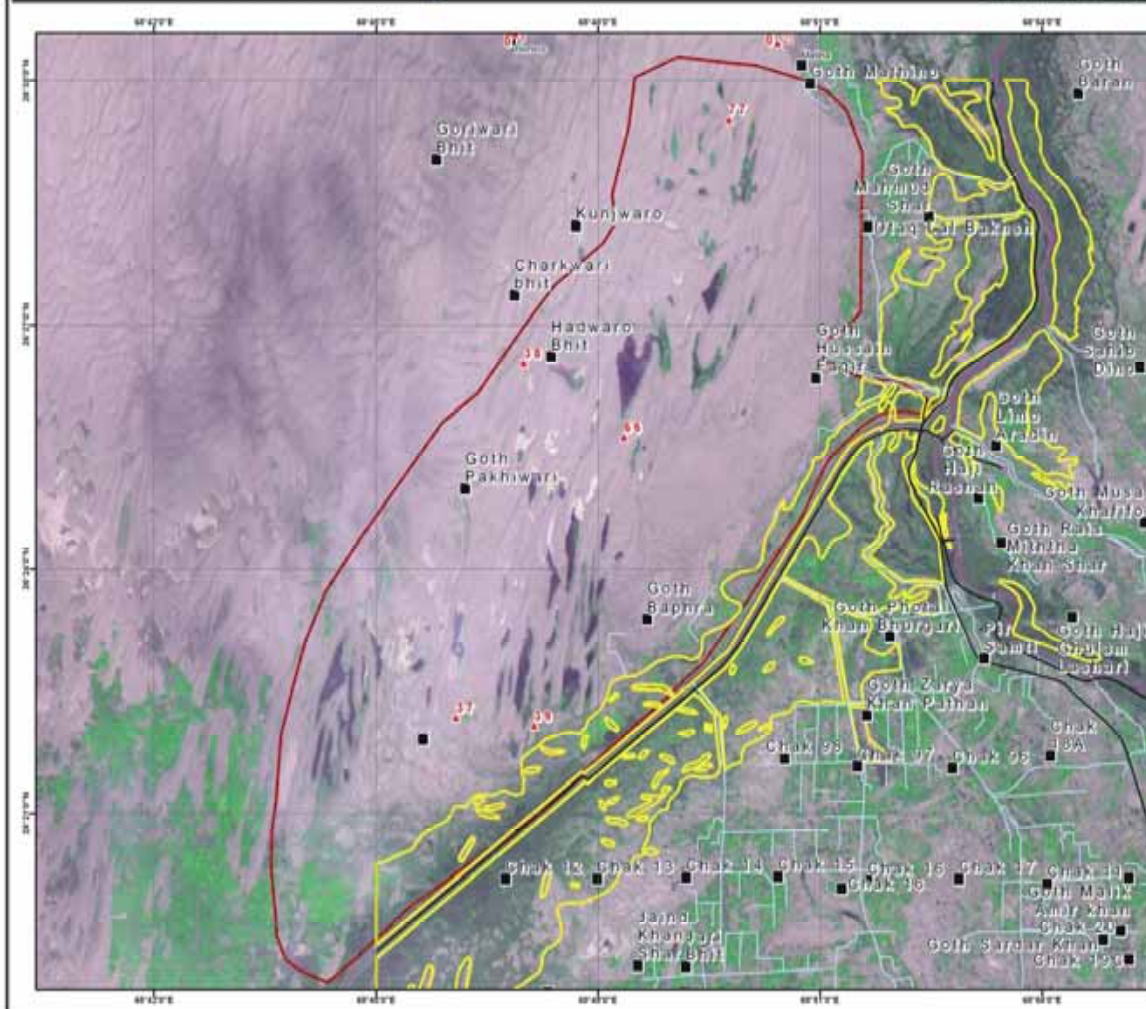
Deh Akro-II complex is typically stable sand desert covered with sand dunes extended in the east-west direction. Sand dunes vary in height from 5 to 10 m. There are typical flat-bottomed valleys between the sand dunes, which contain perennial lakes. There are about 36 lakes. Five lakes are sweet and 31 lakes are brackish.

Prosopis cineraria, Prosopis juliflora, Acacia jacquemontii, Acacia nilotica, Aerva javanica, Salvadora oleoides, Capparis decidua, Cassia italica, Calligonum polygonoides, Aristiblia funiculata, Enpharbia prostrata, Saccharum spontaneum, Saccharum beneolens, Tamarix aphylla, Zizyphus mauritiana, Zizyphus nummularia, Alhagi maurorum, Indigofera nochasterii, phylla podiflora, Typha omingensis, Typha elephantica, Achyranthes aspera, Calotropis procera, Tamarix indica are main vegetation at Deh Akro-II complex.

Wildlife mainly includes Asiatic Jackal, Desert Fox, Jungle Cat, Desert Haro, Desert Hedgehog, Wild Boar, Crested Porcupine, Marsh Crocodile, Monitor Lizard, Indian Cobra, Sand Boa, Marbled Teal, Lesser Whistling Teal, Cotton teal, Common Teal, Pintail, Mallard, shoveller, Common Pochard, Darter, Indian Shag, Little cormorant, Glossy Ibis, Black Ibis, White Spoon-bill, Black Partridge

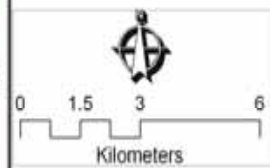


Satellite Image of Deh Akro-II Complex Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Road
- Canal
- ▭ Wetland Boundary
- ▭ Swamps



Data Source:
 Satellite: Sensor: Terra: ASTER
 Date of Acquisition: 03 March 2005
 Resolution: 15m
 Projection: Geographic: Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250k



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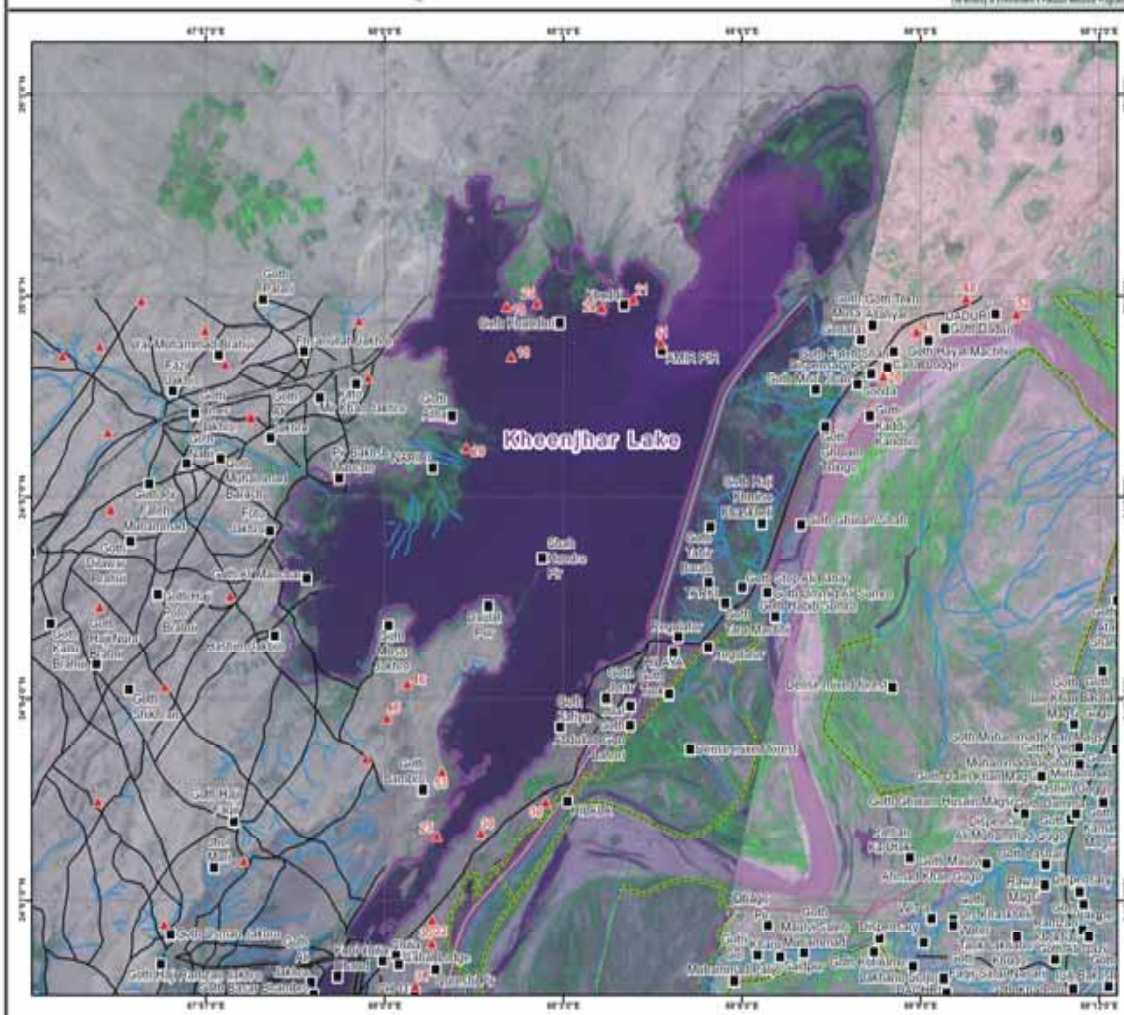
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Prosopis cineraria, *Prosopis juliflora*, *Acacia jacquemontii*, *Acacia nilotica*, *Aerva javanica*, *Salvadora oleoides*, *Capparis decidua*, *Cassia italica*, *Calligonum polygonoides*, *Aristida funiculata*, *Enpharbia prostrata*, *Saccharum spontaneum*, *Saccharum beneolens*, *Tamarix aphylla*, *Zizyphus mauritiana*, *Zizyphus nummularia*, *Ahagi maurorum*, *Indigofera nochstetterii*, *Phyla nodiflora*, *Typha omingensis*, *Typha elephantica*, *Achyranthes aspera*, *Calotropis procera* *tamarix indica* are main vegetation at Deh Akro-II complex.

Wildlife mainly includes Asiatic Jackal, Desert Fox, Jungle Cat, Desert Haro, Desert Hedgehog, Wild Boar, Crested Poron Pine, Marsh Crocodile, Monitor Lizard, Indian Cobra, Sand Boa, Marbled Teal, Lesser Whistling Teal, Cotton teal, Common Teal, Pintail, Mallard, shoveller, Common Pochard, Darter, Indian Shag, Little cormorant, Glossy Ibis, Black Ibis, White Spoon-bill, Black Partridge



Satellite Image of Keenjhar (Kalri) Lake Wildlife Sanctuary



Legend

- Spot Height (m)
- Populated Place
- Roads
- Railway
- Drainage
- Canal
- Protection Band
- Flood Boundary
- Wetland Boundary

0 1 2 4 6
Kilometers

Location Map

BALUCHISTAN
SINDH

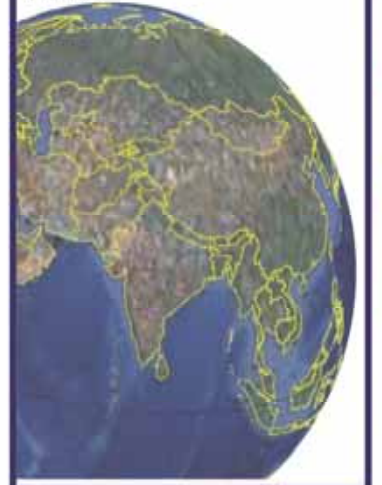
Data Source:
Satellite: Sensor: Terra, ASTER
Date of Acquisition: 13 April 2007 / 20 January 2008
Resolution: 15m
Projection: Geographic Lat/Long
Datum/Spheroid: WGS 84
Survey Map: 1:250K

WWF Leica Geosystems ESRI

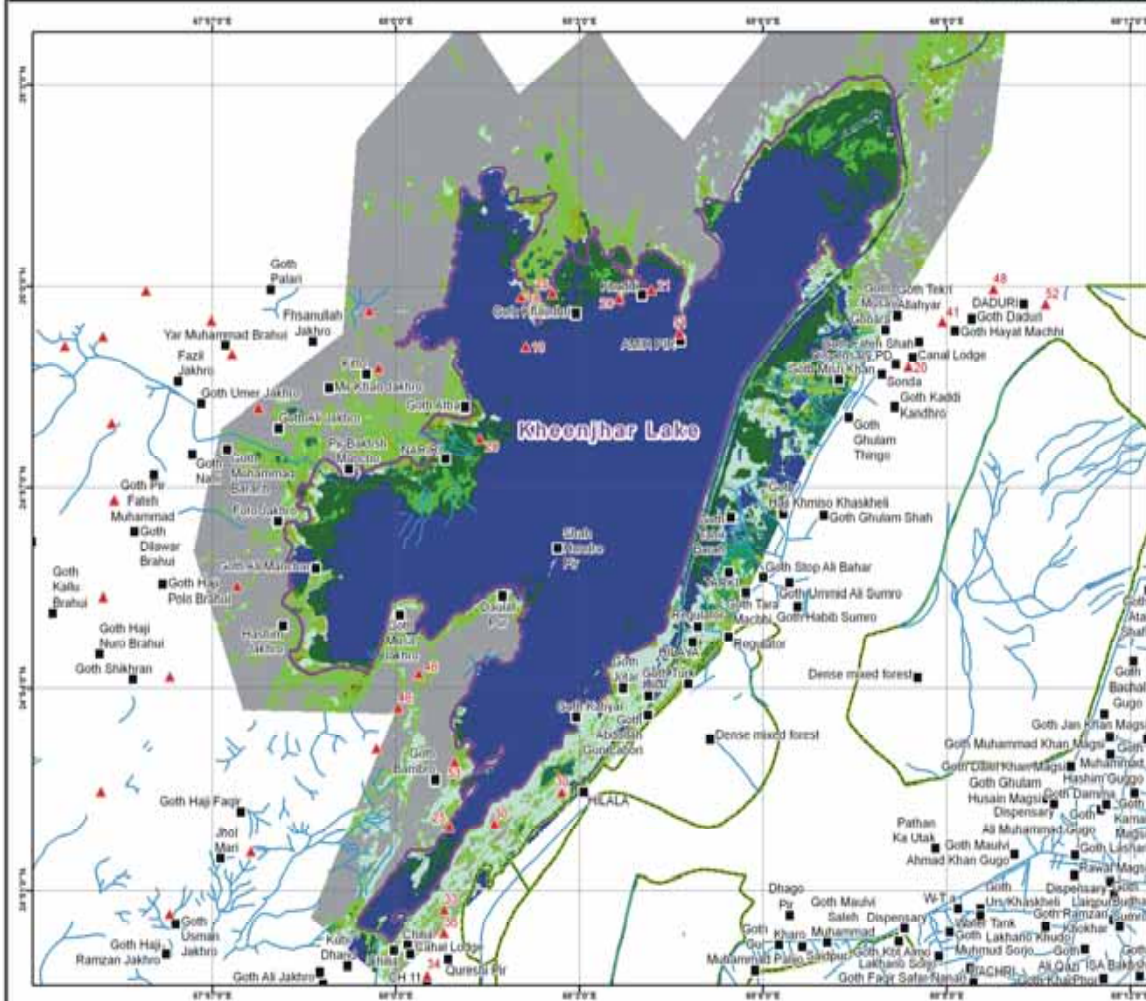
Keenjhar Lake is physically categorized into fresh water seepage lakes and is a part of Tropical thorn forest eco-region of Pakistan. It was declared as Wildlife Sanctuary in 1977 with 5km buffer zone which was initially 1.6 km. Due to its ecological significance it was designated as a Ramsar site under the Ramsar Convention dated 23rd July 1976.

It occupies approximately an area of 14,000ha with 24km length, 6km width, 6m depth and 0.58 million acre water storage capacity.

Keenjhar Lake plays a significant ecological role in the Indus River Basin Ecological System, International Union for Conservation of Nature (IUCN), categorized Keenjhar Lake in category VI i.e. Managed Nature Reserve.

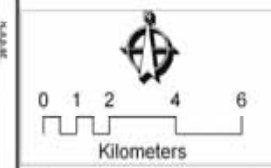


Land Cover Map of Keenjhar (Kalri) Lake Wildlife Sanctuary



Land Cover Class

- Surface Irrigated Herbaceous Crops (Agriculture Fields)
- Grasses/Shrub(s)
- Bare Soil
- Semi-Evergreen Medium High Trees (Mesquite)
- Surface Irrigated Herbaceous Crops (Ploughed Fields)
- Mixed Grasses On Permanently Flooded Land (Saccharum)
- Broadleaved Evergreen Low Trees (Tamaris)
- Shrub(s) On Temporarily Flooded Land(Typha)
- Perennial Waterbodies (Standing)
- Non Perennial Waterbodies (Wet Soil)



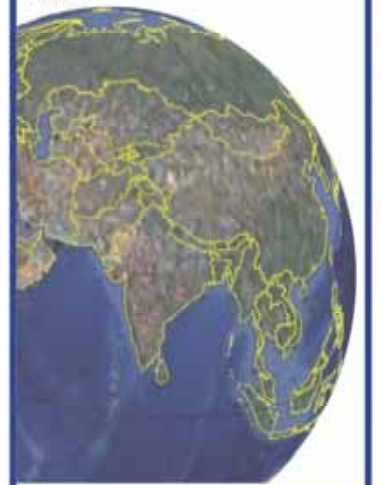
Data Source:
 Satellite: SPOT 5, HRG
 Date of Acquisition: 30 May 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Keenjhar Lake is physically categorized into fresh water seepage lakes and is a part of Tropical thorn forest eco-region of Pakistan. It was declared as Wildlife Sanctuary in 1977 with 5km buffer zone which was initially 1.6 km. Due to its ecological significance it was designated as a Ramsar site under the Ramsar Convention dated 23rd July 1976.

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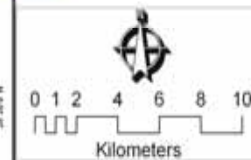


Topographic Map of Hub Dam Wildlife Sanctuary

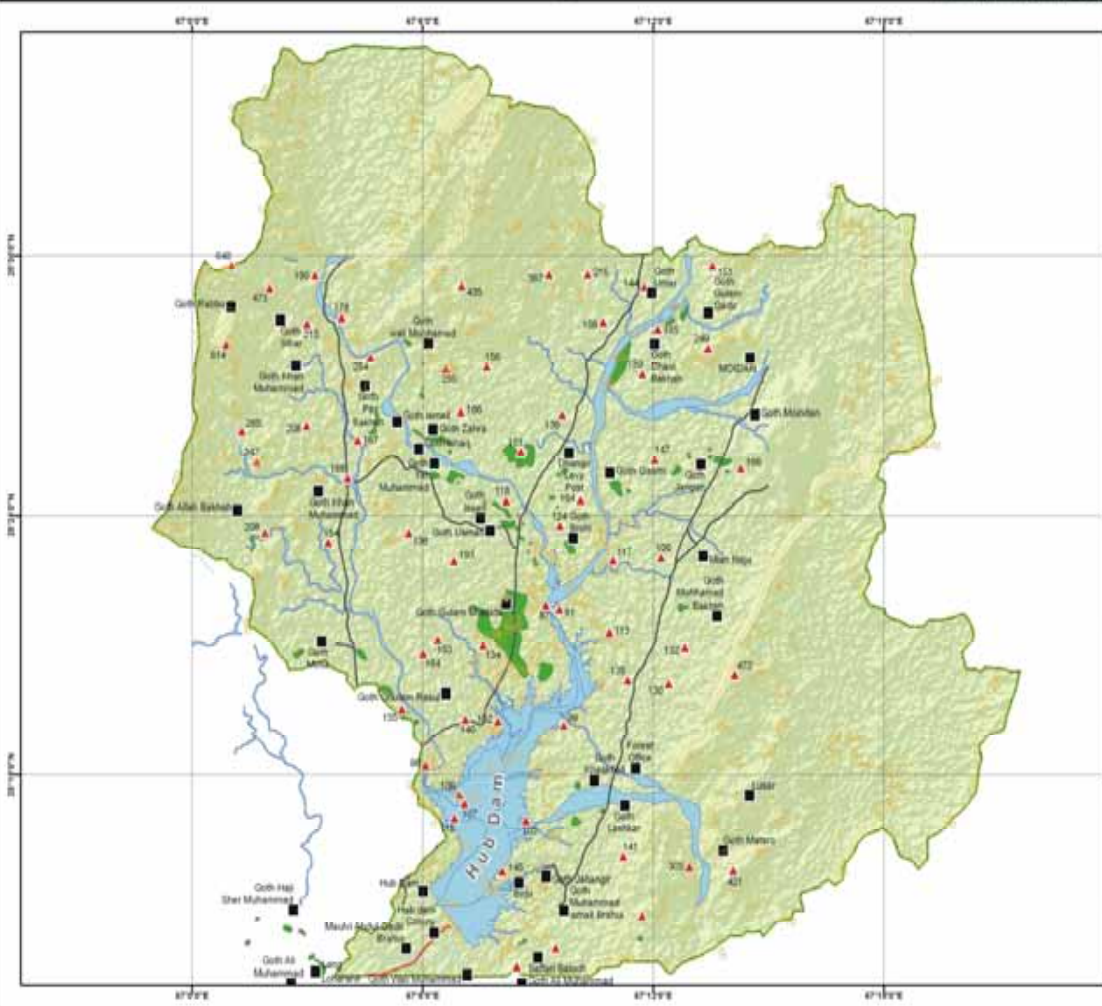


Legend

- Filled Area
- Spot Height (m)
- Canal
- Contour (20m)
- Road
- Water Body
- Cultivated Area
- Wetland Boundary
- Sub-Wetland



Data Source:
 Satellite: Sensor: Terra, AGTER
 Date of Acquisition: 26 December 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K

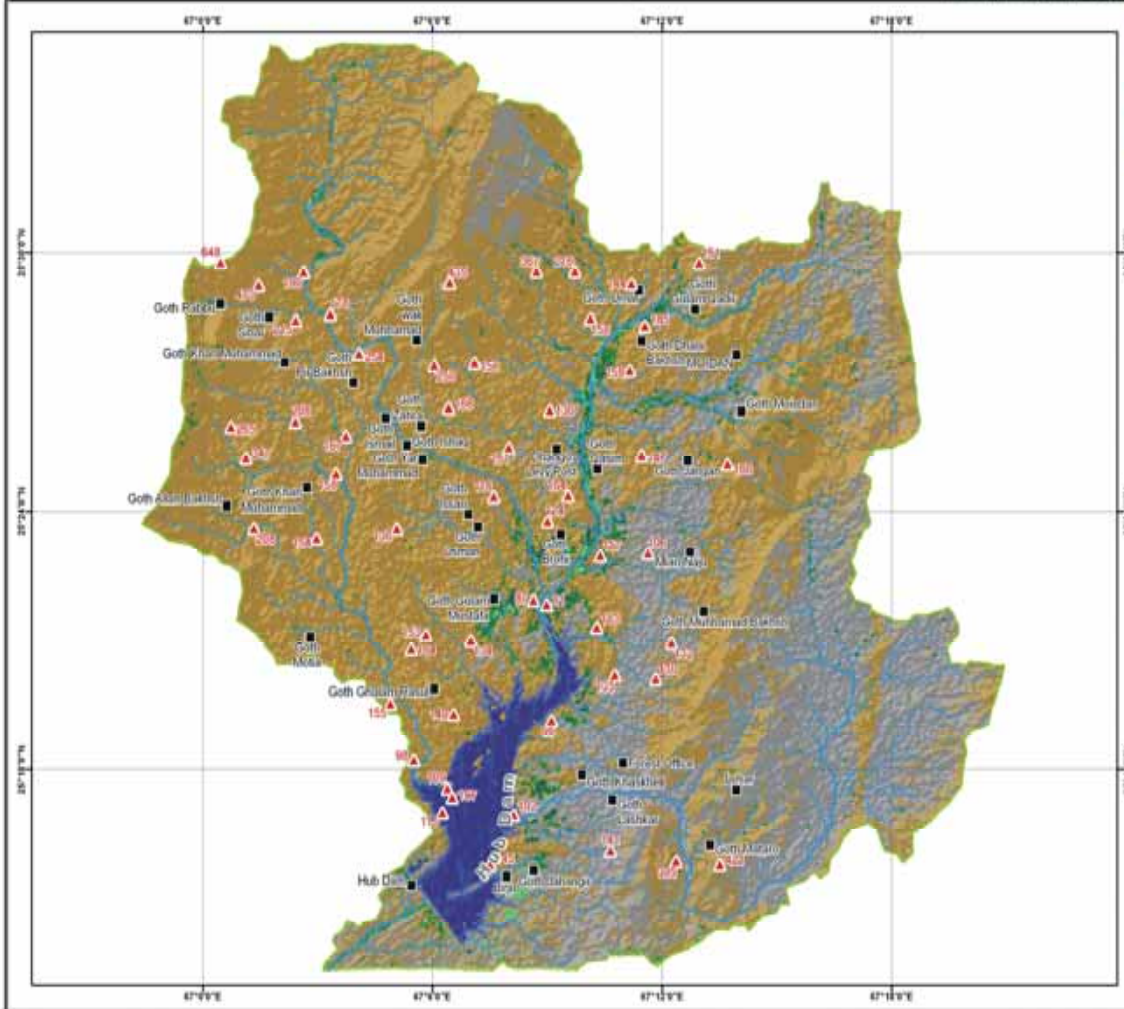


Hub dam is low land lake and physically categorized into low land Ephemeral river class and is a part of arid sub-tropical forest eco-region of Pakistan. The area was declared as wildlife sanctuary by Government of Sindh under notification, WL&FT (SOI-DCF-992/74, in January 1974. Hub Dam was designated a Ramsar wetland site on May 1, 2001 It is about 6.5 km long and was constructed on Hub River in 1981. Total area covered by dam is about 24300 acres with gross storage capacity of 85700 acre feet, where as the protected area is about 27219 hectares.

Different species of wildlife including Marah Crocodile, Monitor Lizard, Indian Cobra, Saw Scals Viper, Micro Geko, Mahsheer Roha Mori Gulfam Thalla Silver Carp and Grass Carp, Shocveller, Red Crested Pochardm Black-necked Crabe, Red necked Crabe, White Pelican, Black-headed Gull, Common Crane and Common Teal are present in this area.

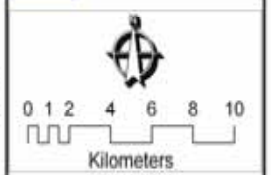


Land Cover Map of Hub Dam Wetlands Wildlife Sanctuary



Landcover Class

	Herbaceous Crop(s) (Agriculture Field)
	Bare Rock(s)
	Semi Evergreen Medium High Trees(Mesquite)
	Bare Soil/Bare Rock(s)
	Broadleaved Evergreen Low Trees(Tamaris)
	Perennial Waterbodies (Standing)

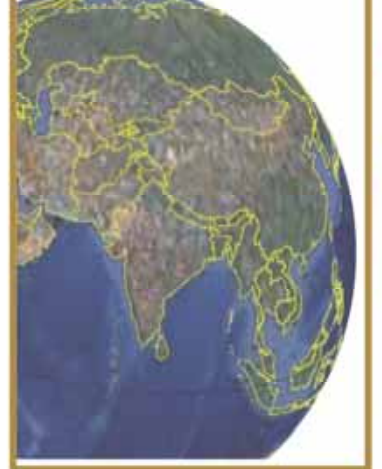


Data Source:
 Satellite Sensor: Terra ASTER
 Date of Acquisition: 28 December 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Schematic: WGS 84
 Survey Map: 1:250K

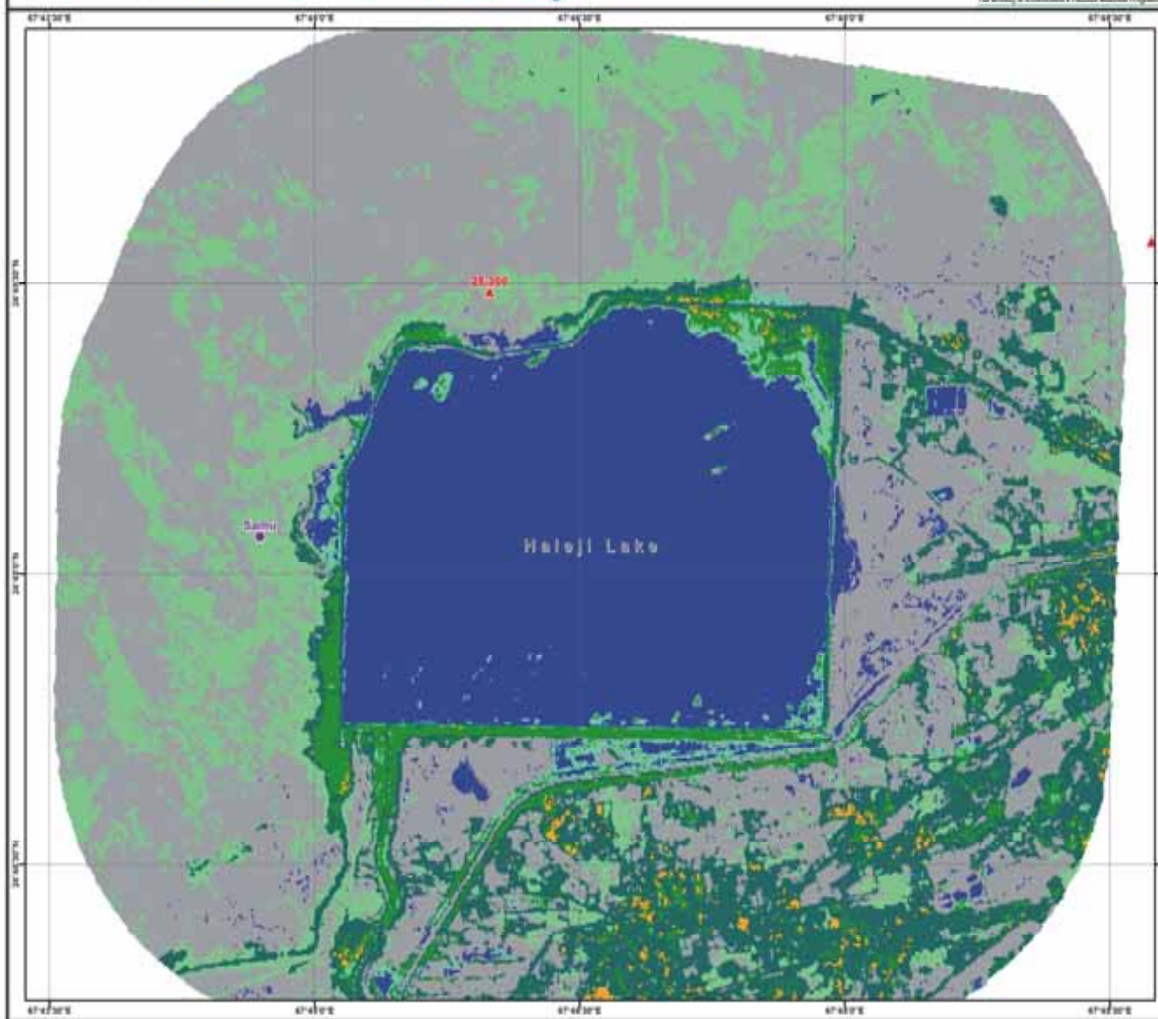


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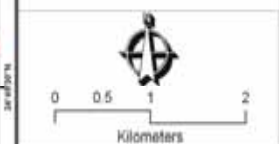


Land Cover Map of Haleji Lake Wildlife Sanctuary



Land Cover Class

Dark Green	Surface Irrigated Herbaceous Crops (Agriculture Field)
Light Green	Dwarf Shrublands (Bushes)
Medium Green	Some Evergreen Medium High Trees (Moaquite)
Orange	Shrublands
Grey	Bare Soil
Light Blue	Regularly Flooded Vegetation (Submerged Vegetation)
Dark Blue	Perennial Natural Waterbodies (Standing)



Data Source:
 Satellite, Sensor: Terra, ASTER
 Date of Acquisition: 22 January 2005
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Haleji lake is a low land lake and physically categorized into low land Ephemeral river class. It is also the part of tropical thorn forest eco-region of Pakistan. Haleji Lake has been declared as Wildlife Sanctuary and later on as a Ramsar wetland site in 1977. A complete perimeter of the lake is about 12 miles. The main water reservoir covers an area of 1704 hectares and the maximum depth of the lake is 17 feet. Water level in the lake is decreasing due to insufficient supply of water from t keenjar lake. There are three islands in the lake.

Main vegetation at Haleji Lake includes Phragmites karka, Typha angustata Ipomoea aquatica Polygonum barbatum, Nymphaea Lotus, Potamogeton pectinatus P. perfoliatus, p. lucens, vallisneria, Spiralis, Hydrilla, verticillata, Najas minor, Limna minor, Ceratophyllum demersum and Myriophyllum spicatum. Ornamental trees such as Acacia nilotica, Ficus sp, Casuarinasp have been planted on the bunds around the lake. Natural vegetation of the are including Acacia Senegal, Tamarix dioica, Commiphora mukul, Prosopis cineraria, Euphorbia caducifolia, Eleusine compressa, Salix, Sagittaria and Salsola.

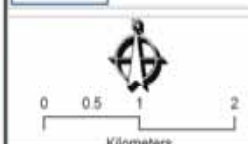


Satellite Image of Haleji Lake Wildlife Sanctuary



Legend

- Populated Place
- ▲ Spot Height (m)
- Road
- Canal
- Drainage
- Protection Bund
- Waterbody
- Wetland Boundary

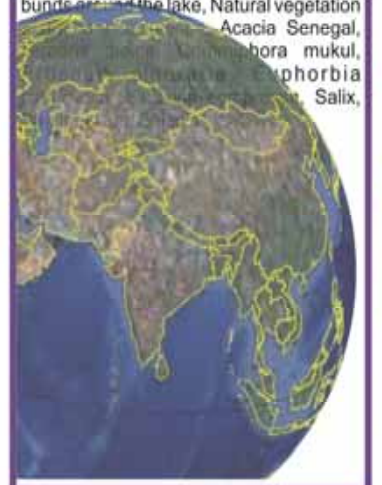


Data Source:
 Satellite: Sensor:Terra, ASTER
 Date of Acquisition: 22 January 2003
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum:Spheroid: WGS 84
 Survey Map: 1:250K

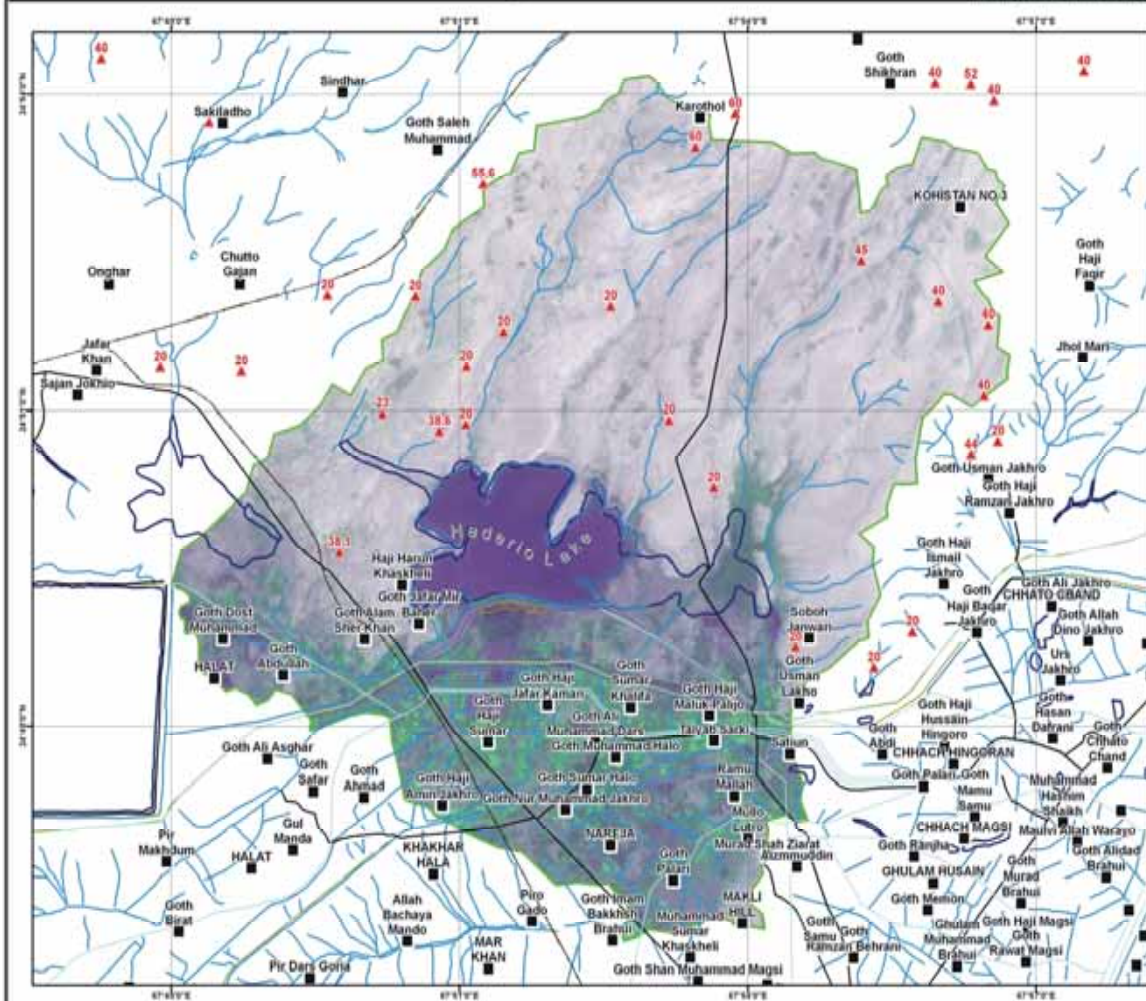


Haleji lake is a low land lake and physically categorized into low land Ephemeral river class. It is also the part of tropical thorn forest eco-region of Pakistan. Haleji Lake has been declared as Wildlife Sanctuary and later on as a Ramsar wetland site in 1977. A complete perimeter of the lake is about 12 miles. The main water reservoir covers an area of 1704 hectares and the maximum depth of the lake is 17 feet. Water level in the lake is decreasing due to insufficient supply of water from the kinjer lake. There are three islands in the lake.

Main vegetation at Haleji Lake includes Phragmites karka, Typha angustata Ipomoea aquatica Polygonum barbatum, Nymphaea Lotus, Potamogeton pectinatus P. perfoliatus, p. lucens, vallisneria, Spiralis, Hydrilla, verticillata, Najas minor, Limna minor, Ceratophyllum demersum and Myriophyllum spicatum. Ornamental trees such as Acacia nilotica, Ficus sp, Casuarinasp have been planted on the bunds around the lake. Natural vegetation

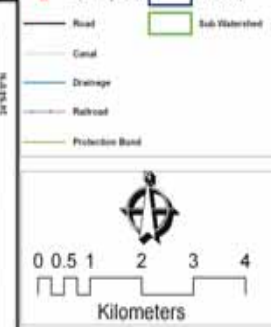


Satellite Image of Hadeiro Lake Wildlife Sanctuary



Legend

- Populated Place
- Spot Height (m)
- Road
- Canal
- Drainage
- Railroad
- Protection Band
- Wetland Boundary
- Waterbody
- Sub-Waterbody



Data Source:
 Satellite: Sensor: Terra, ASTER
 Date of Acquisition: 20 January 2006
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



Hadeiro Lake is physically categorized into low land lakes and is a part of tropical thorn forest eco-region of Pakistan. It is declared as wildlife sanctuary by the Government of Sindh. It covers an area about 1321 hectares.

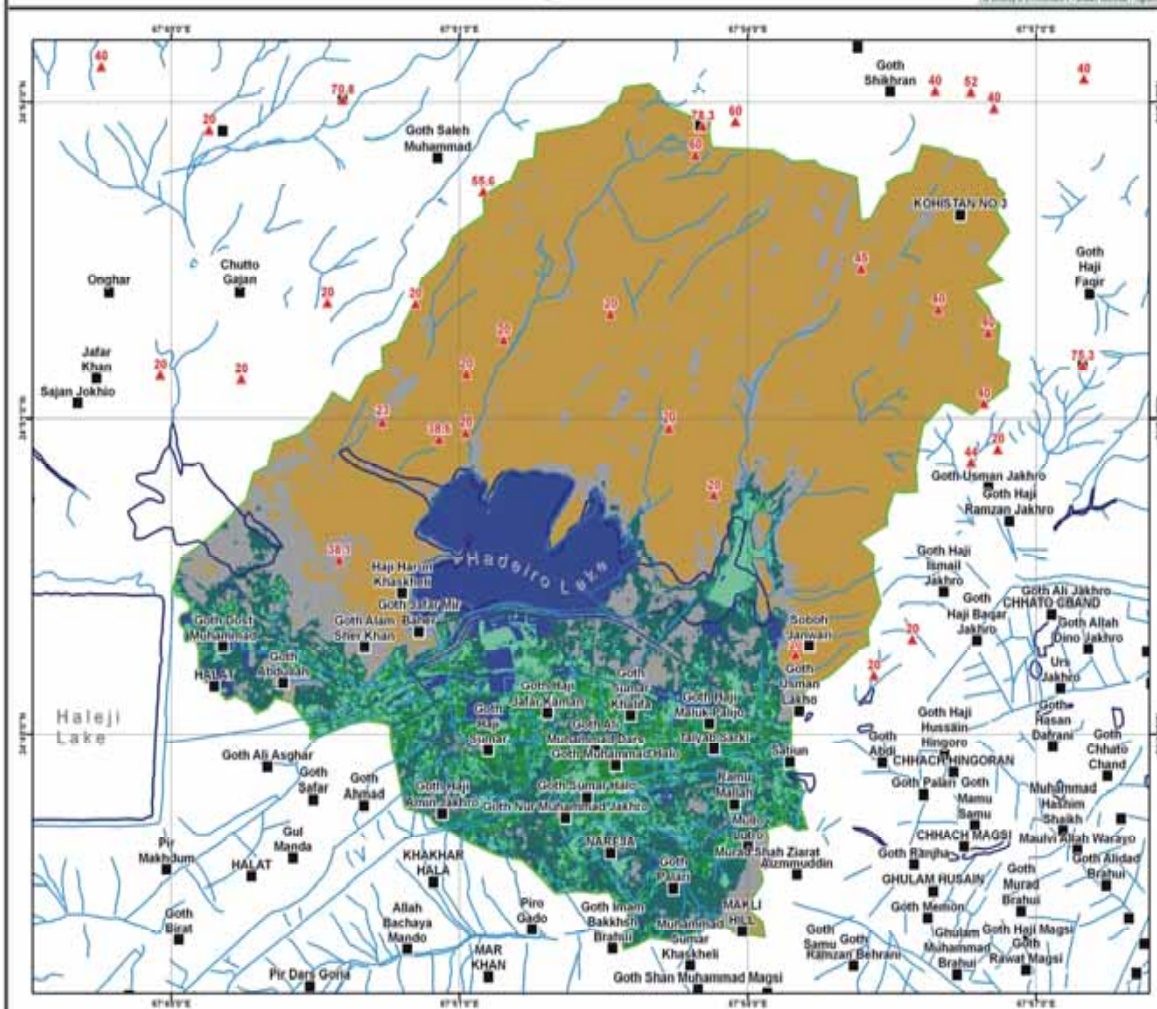
Anatural brackish lake present between Kheenjhar Lake and Haleiji Lake. The maximum depth of the lake is about 1.7 m. The lake is fed by the SLM drain which links up with the Jam branch canal, and several seasonal streams entering on the north side of the lake. There is no outlet of the lake.

Common Teal, Pintail, Mallard, shoveller, Common Pochard, Little cormorant, Black Ibis, White Spoon-bill, Black Partridge, Grey Goose, Common Shelduck

Spotbill Duck, Spoonbill, Common Crane, Curlew, Great Black-head, Black headed Gull, White pelican, Houbara Bustard, Cinerous Vulture.

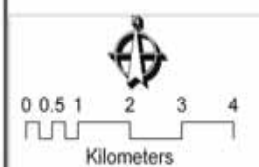


Land Cover Map of Hadeiro Lake Wildlife Sanctuary



Land Cover Class

- Surface Irrigated Herbaceous Crops (Agriculture Field)
- Broadleaved Evergreen Trees (Mesquite/Tamaris)
- Non Perennial Waterbodies (Bare Soil) (Mud Flats)
- Bare Rock(s)/Bare Soil
- Regularly Flooded Vegetation (Submerged Vegetation)
- Perennial Natural Waterbodies (Standing)



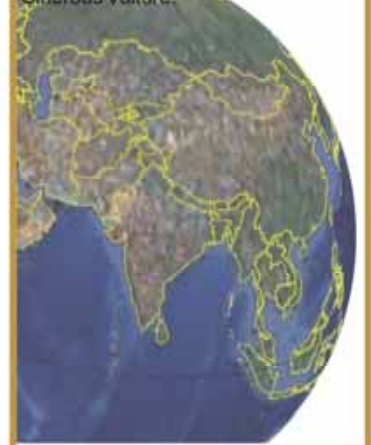
Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 20 January 2008
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: WGS 84
 Survey Map: 1:250K



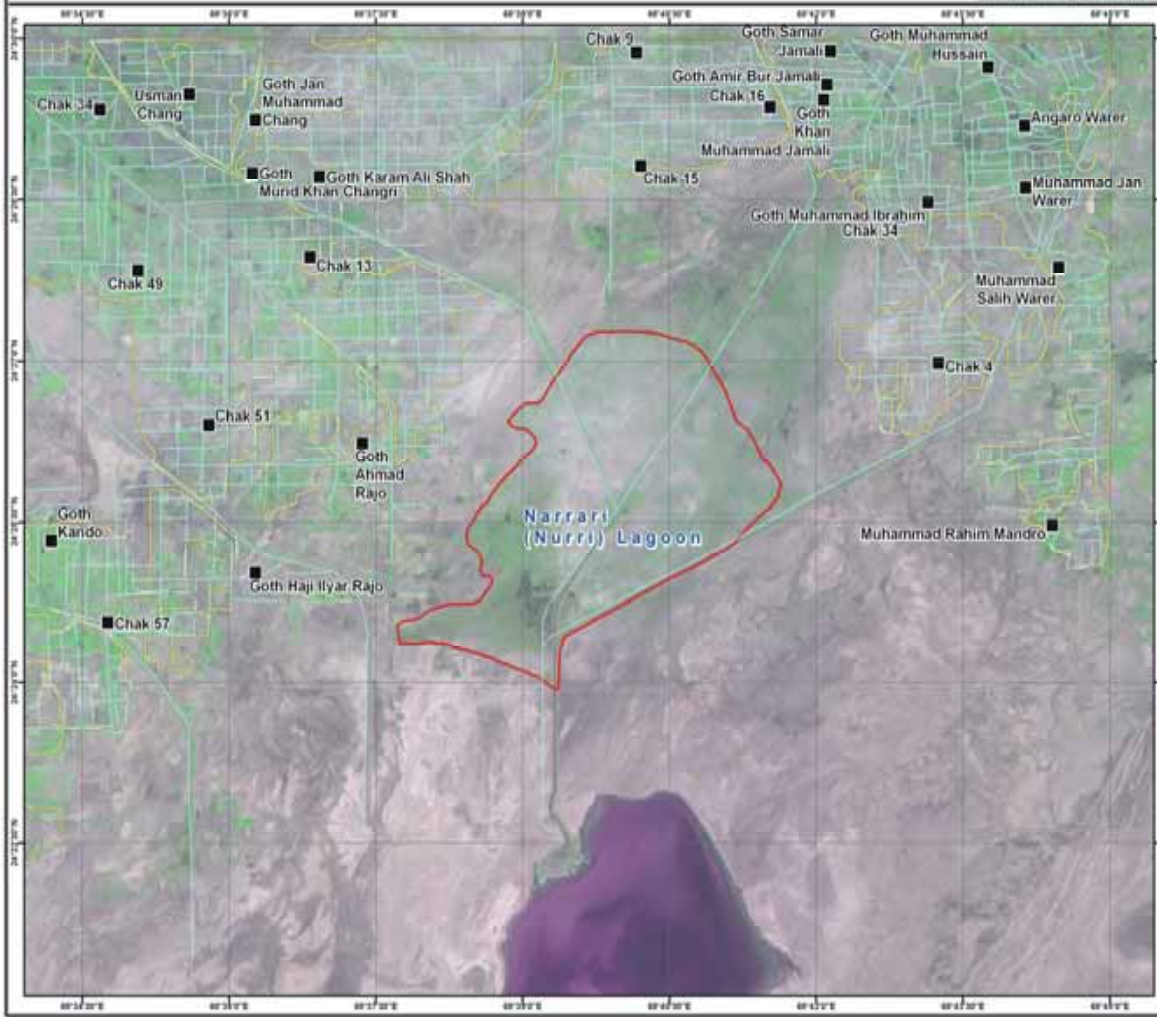
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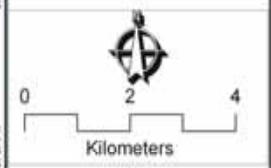
Common Teal, Pintail, Mallard, shoveller, Common Pochard, Little cormorant, Black Ibis, White Spoon-bill, Black Partridge, Grey Goose, Common Shelduck, **S**potbill Duck, Spoonbill, Common Crane, Curlew, Great Black-head, Black headed Gull, White pelican, Houbara Bustard, Cinerous Vulture.



Satellite Image of Narrari (Nurri) Lagoon Ramsar Site



- ### Legend
- Populated Place
 - Canal
 - Road
 - ▭ Cultivated Area
 - ▭ Wetland Boundary



Data Source:
Satellite: Sensor Terra ASTER
Date of Acquisition: 27 February 2008
Resolution: 15m
Projection: Geographic Lat/Long
Datum/Spheroid: (WGS84)
Survey Map: 1:50K

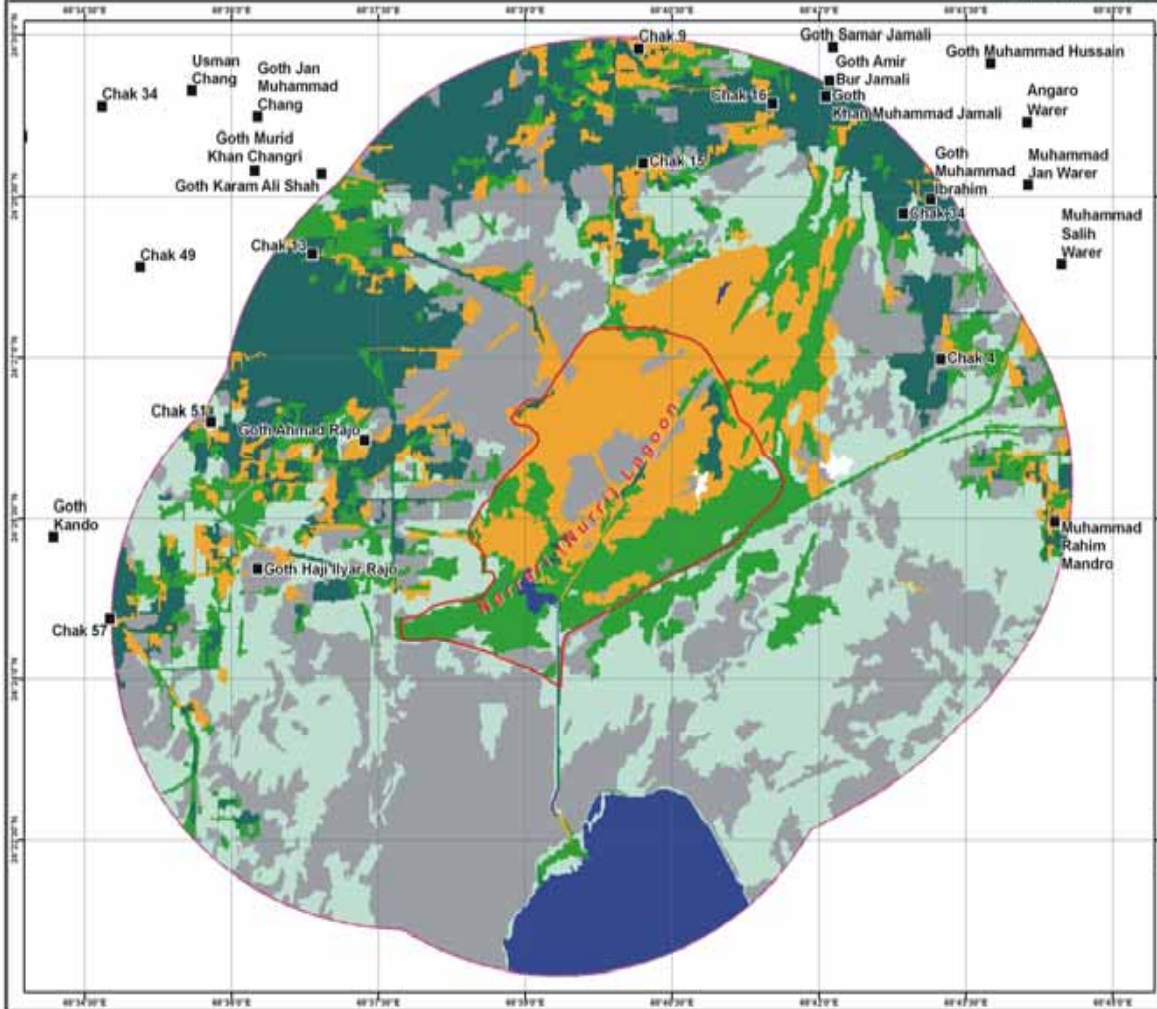


Narrari (Nurri) lagoon is physically categorized into Estuaries and Bays without Mangroves and is a part of tropical thorn forest eco-region of Pakistan. Narrari (Nurri) lagoon declared as a Ramsar wetland site on April 24th, 2001. Narrari (Nurri) Lagoon is present in coastal area of Sindh. Two drains are passing through the Narrari (Nurri) lagoon directly fall into the sea. These drains contain brackish water discharged from sugar mills situated in Badin.

Phragmites, Tamarix, acacia sanigal, Sueda, Prosopis are mainly found in the lagoon area.

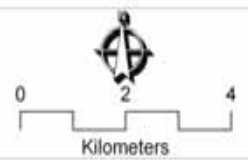


Land Cover Map of Narrari (Nurri) Lagoon Ramsar Site



Land Cover Class

- Broadleaved Evergreen Woodland(Acacia)
- Surface Irrigated Herbaceous Crop(s) (Agriculture Fields)
- Bare Soil
- Non Perennial Waterbodies/ Bare Soil(Mud Flats)
- Shrubs
- Perennial Waterbodies (Standing)

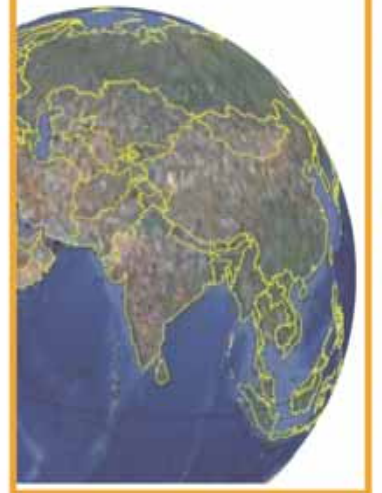


Data Source:
 Satellite: Gender: Terra: ASTER
 Date of Acquisition: 27 February 2008
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: (WGS84)
 Survey Map: 1:50K

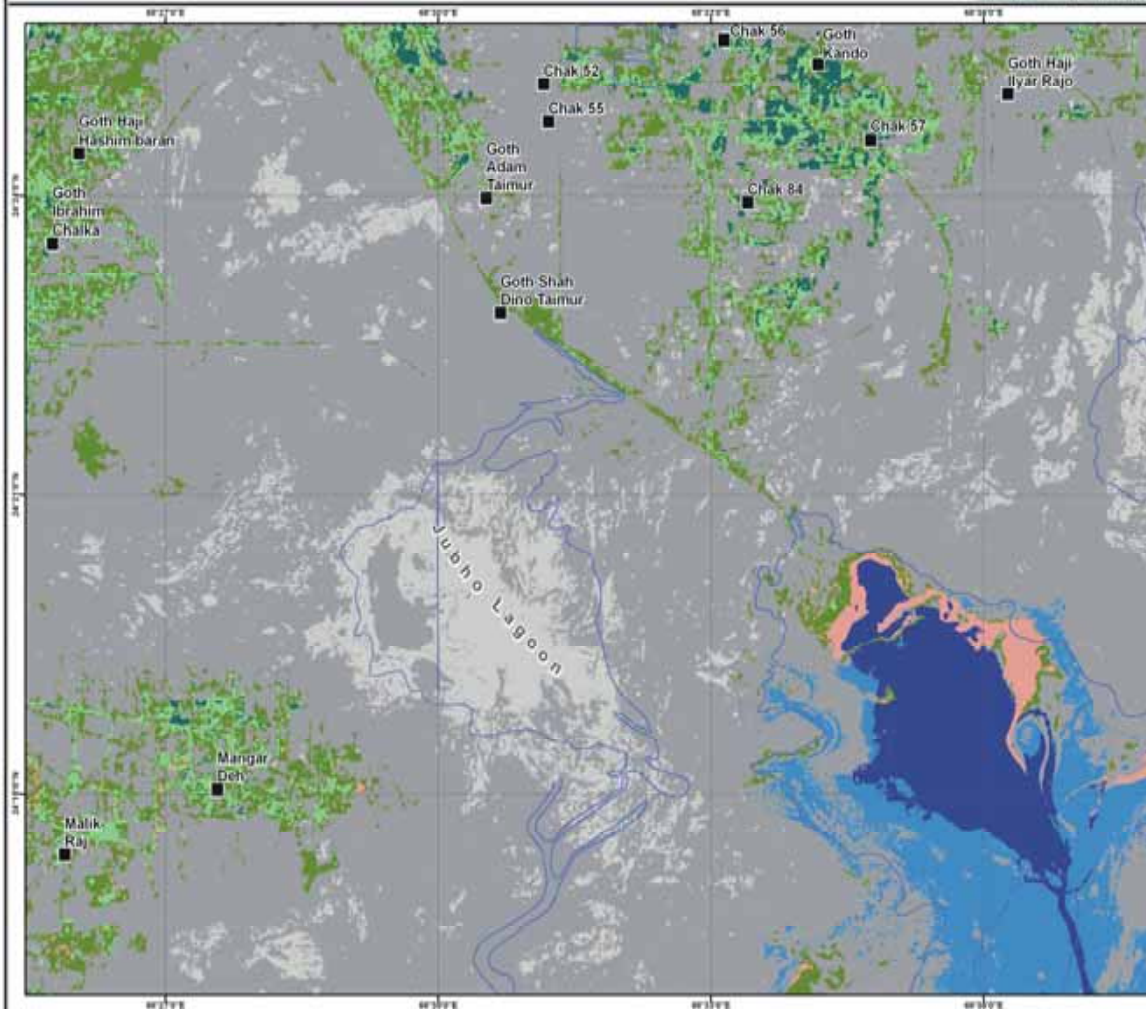


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Phragmitus, Tamarix, acacia sanigal, Sueda, Prosopis are mainly found in the lagoon area.



Land Cover Map of Jubho Lagoon Ramsar Site



Land Cover Class

- Surface Irrigated Herbaceous Crop(s) (Agriculture Fields)
- Close to Open Lichens/ Mosses(Algae)
- Bare Soil / Gilgai (Dry Soil)
- Grasses/Shrub(s)
- Bare Soil
- Non-Perennial Waterbodies
- Broadleaved Evergreen Low Trees(Tamarix)
- Perennial Natural Waterbodies (Standing)(Flowing)



Data Source:
 Satellite: Sensor: Terra: ASTER
 Date of Acquisition: 30 March 2008
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K

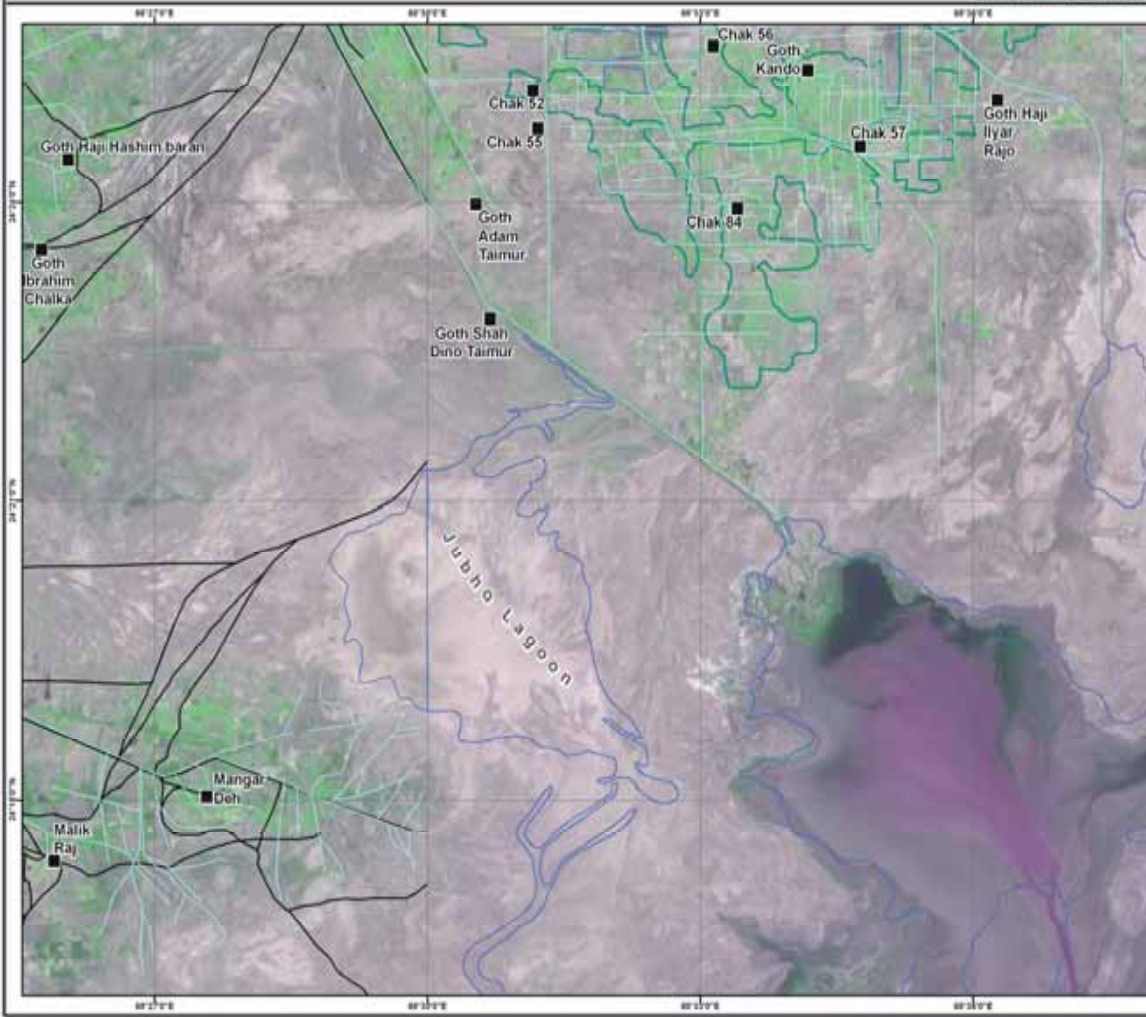


Jubho Lagoon is physically categorized into Estuaries and Bays without Mangroves and is a part of tropical thorn forest eco-region of Pakistan. It is declared as Ramsar wetland of international importance dated April 24, 2001. It covers an area about 706 hectare.

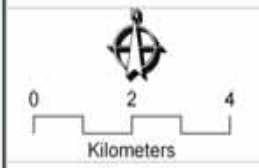
The shallow wetlands provide food and shelter for the migratory water birds. The fishes and crustaceans are also part of it. Few salt tolerant plants and aquatic plants are also found in wetland.



Satellite Image of Jubho Lagoon Ramsar Site



- Legend**
- Populated Place
 - Canal
 - Road
 - Water Body
 - Cultivated Area



Data Source:
 Satellite: Sensor Terra, ASTER
 Date of Acquisition: 30 March 2009
 Resolution: 15m
 Projection: Geographic Lat/Long
 Datum/Spheroid: (WGS84)
 Survey Map: 1:250K



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“Everything is related to everything else, but near things are more related than distant things.”
Tobler’s First Law of Geography

