Ramsar Information Sheet

Published on 2 February 2025

India

Khachoedpalri wetland

Designation date	15 July 2024
Site number	2560
Coordinates	27°21'06"N 88°11'01"E
Area	172,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Khachoedpalri Wetland is a representative example of a temperate Himalayan High Altitude Wetland Ecosystem (consists of permanent water body representative in the region, peatland (unique) and temperate forests) that supports regionally significant biodiversity. Located in the northeast Indian state of Sikkim, and part of the Indian Eastern Himalaya, this 172-hectare wetland in the Dhupuk Reserve Forest , Gyalshing district, Sikkim supports complex ecological communities, including 682 species representing 5 kingdoms, 196 families, and 453 genera. Among these species, waterbird diversity is notable, due largely to Khachoedpalri's position along the Central Asian Flyway. Migratory birds, such as the critically endangered Baer's Pochard (Aythya baeri) and Common Merganser (Mergus merganser), use Khachoedpalri's central lake as a resting site and breeding ground on their Trans-Himalayan journeys. In terms of its characteristics, Khachoedpalri's central lake is one of a few standing water features of its size and depth in the temperate zone of India, which occupies less than 10% of India's total land area. As such, Khachoedpalri also supports a number of other species at critical stages in their life cycles as well, including poorly documented amphibian populations. The wetland's surrounding temperate forest of Evergreen Oaks and Chestnuts serves to further shelter key populations, providing critical refuge during what can be volatile mountain conditions. Khachoedpalri is a wetland of international significance and is key to maintaining temperate biodiversity in India.

Further, this wetland ecosystem provides significant hydrological and other ecosystem services and forms an important habitat and layover site for 11 reported species of waterfowl including the critically endangered Baer's Pochard (Aythya baeri) as well as the Ruddy Shelduck (Tadorna ferruginea), Tufted Duck (Aythya fuligula), Commom merganser (Mergus merganser), Common Teal (Anas crecca) and Mallard (Anas platyrhynchos) . Among mammals, the reported list includes regional endemics like the Assamese macaque (Macaca assamensis) -(NT), Red Panda (Ailurus fulgens)- (EN), Himalayan Black Bear (Ursus thibetanus)- (VU) and Goral (Nemorhaedus goral). These mammals depend on this wetland for food and habitat during most part of their lifecycle.
Hence, the wetland is proposed for recognition and designation as Ramsar site under Criteria 1,2,3 and 4 of the Ramsar Convention.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency: FOREST AND ENVIRONMENT DEPARTMENT, GOVERNMENT OF SIKKIM

Postal address: CONSERVATOR OF FOREST (E&SC), ROOM NUMBER-315, D BLOCK, FOREST SECRETARIAT, DEORALI, GANGTOK, SIKKIM-737101, INDIA.

National Ramsar Administrative Authority

Institution/agency: Ministry of Environment, Forests and Climate Change, Government of India

Postal address: Ministry of Environment, Forest and Climate Change
Government of India, Indira Paryavaran Bhawan
Jorbagh Road, New Delhi - 110 003
INDIA

2.1.2 - Period of collection of data and information used to compile the RIS

From year: 2000

To year: 2023

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish): Khachoedpalri wetland

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<1 file(s) uploaded>

Former maps: 0

Boundaries description

The Khachoedpalri wetland lies in the Gyalshing District (erstwhile West District), Sikkim at an altitude of around 1700 m above MSL (The wetland watershed elevation is 1700m to 2375m). The bounding extent of Khachoedpalri Wetland is approximately (88.170967, 27.342518), (88.196838,27.364168). It is located in the Dhupuk reserve forest which administratively falls under the Yuksum forest range, Gyalshing Territorial Forest Division. (The Khachoedpalri wetland includes the Khachoedpalri lake, the surrounding peatland and the portion of the temparate forests of Dhupuk reserve forests which forms the immediate catchment of the Khachoedpalri lake).

The Gyalshing district in which the proposed site lies is surrounded by the Mangan, Soreng, and Namchi districts of Sikkim on its northern, southern, and eastern sides respectively. On the western side of Gyalshing district, lies Nepal. However, the aerial distance of the proposed site to the nearest international boundary of Nepal itself is around 11 km.The GIS map prepared clearly depicting the location of the proposed site is enclosed.

2.2.2 - General location

a) In which large administrative region does the site lie? GYALSHING DISTRICT, SIKKIM, INDIA

b) What is the nearest town or population centre? GYALSHING DISTRICT, SIKKIM, INDIA

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes ○ No ◉

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ○ No ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 172

Area, in hectares (ha) as calculated from GIS boundaries: 171.669

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Freshwater Ecoregions of the World (FEOW)	Himalayan Biogeographic Region

Other biogeographic regionalisation scheme

-

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

☑ Criterion 1: Representative, rare or unique natural or near-natural wetland types

Hydrological services provided	Khachoedpalri wetland provides critical hydrological services to both species populations and human communities in Sikkim, India. The wetland attenuates floods from runoff during the monsoon season and recharges groundwater supplies in the dry-winter season. In doing so, it promotes productive soils, reduces landslides, and siltation. The wetland plays a significant role, especially in terms of soil, moisture and nutrient retention, storage and discharge of water, water purification, climate regulation through regulation of temperature, precipitation & humidity, flood control, protection from landslides, soil erosion, providing fresh water for drinking, agriculture, and livestock etc.
Other ecosystem services provided	Khachoedpalri wetland is one of the largest, if not the largest, temperate Himalayan peatland of its kind. In terms of biodiversity, the wetland supports over 682 identified species, including rare and endemic species, including migratory birds such as Baer's Pochard (Aythya baeri). As a peatland, this wetland also supports climate mitigation through carbon sequestration. The site has great natural, scenic, cultural and religious importance and hence, it is one of the significant tourism attractions in the state of Sikkim.
Other reasons	Khachoedpalri wetland is a temperate Himalayan high altitude wetland ecosystem which consists of unique peatland and a representative permanent lake within. Little information is known on the extent of related ecosystems in India, though the ecosystem services they provide are clearly reported in global literature. Peatland occupies approximately 14.57 ha of Khachoedpalri basin with peat structured into three discrete strata: (1) mat peat, with 45–93% organic matter and 89–218 cm thick; (2) debris peat, with 13–83% organic matter content and 93 to 262 cm thick; and, (3) gyttja layer (lake bottom), with 30–70% organic matter.Depth-wise carbon dating (14C) suggests that peat in the upper strata approaches 580 years in age, while the middle and lower strata range between 120 to 780 years and 1410 to 2970 years, respectively. Peat evolution has proved dynamic, with remote sensing surveys revealing peatland expansion between the 1960s and 1990s.

☑ Criterion 2 : Rare species and threatened ecological communities

Optional text box to provide further information	The wetland acts as an important habitat and layover site for 11 reported species of waterfowl by providing the resting, feeding, roosting, and breeding site. Reported ducks (Anatidae) include the critically endangered Baer's Pochard (Aythya baeri) . The species Cinnamomum impressinervium (VU) in the IUCN Red List is also found in this site. Among mammals, the reported list includes regional endemics like Red Panda (Ailurus fulgens)- (EN) and Himalayan Black Bear (Ursus thibetanus)- (VU) . These mammals depend on this site for food and habitat during most part of their life cycle.

☑ Criterion 3 : Biological diversity

Justification

The wetland supports complex ecological communities, including 682 species representing 5 kingdoms, 196 families, and 453 genera. Nearly 30 chromists have been identified (13 families, 25 genera, 28 species) as well as 20 fungi (10 families, 14 genera) and two bacteria (2 families, 2 genera). The vegetation of this habitat are broadly classified into two vegetative communities such as Temperate Sphagnum Bog; and, Warm-temperate Moist Deciduous Forest
Khachoedpalri's temperate bog communities persist upon a floating Spaghnum mat (Sphagnum nepalense, S. palustre) populated by Ericaceous species, primarily from the genus Vaccinium (V. dunalianum, V. nummularia, V. vacciniaceum). Several Sedges (Carex filicina, C. eleusinoides, C. insignis) and Rushes (Juncus effuses, J. inflexus) also inhabit highly saturated zones Several species of algae and phytoplankton have been identified by genera, namely Mougeotia, Scenedesmus, Ulothrix, and Zygnema. Several copepods and planktonic rotifers are identified by genera: Alonella, Asplanchna, Brachionus, Chydorus, Cyclops, Cypridopsis, Daphnia, Didinium, Eudorina, Mesocyclops, Nauplius, Philodina, and Sida spp.
The warm-temperate forest surrounding Khachoedpalri wetland is characterized by Evergreen Oaks, Chestnuts and Laurels, which are a unique forest type in the Eastern Himalayan region. Notable canopy species include Quercus lamellosa, Quercus pachyphylla, Castanopsis hystrix, Castanopsis tribuloides, and a variety of Cinnamon and Bay Trees. The understory includes a rich herbaceous layer that includes nearly 50 orchids species (24 genera), making it an incredibly unique and productive ecosystem.
In terms of animal communities, The wetland acts as an important habitat and layover site for 11 reported species of waterfowl by providing the resting, feeding, roosting and breeding site. Reported ducks (Anatidae) include the critically endangered Baer's Pochard (Aythya baeri) as well as the Ruddy Shelduck (Tadorna ferruginea), Tufted Duck (Aythya fuligula), Goosander (Mergus merganser), Common Teal (Anas crecca) and Mallard (Anas platyrhynchos).
Among mammals, the reported list includes regional endemics like the Assamese macaque (Macaca assamensis) -(NT), Red Panda (Ailurus fulgens)- (EN), Himalayan Black Bear (Ursus thibetanus)- (VU) and Goral (Nemorhaedus goral). These mammals depend on this site for food and habitat during most part of their life cycle.

☑ Criterion 4 : Support during critical life cycle stage or in adverse conditions

Optional text box to provide further information

The wetland acts an important habitat and layover site for 11 reported species of waterfowl by providing the resting, feeding, roosting and breeding site. Reported ducks (Anatidae) include the critically endangered Baer's Pochard (Aythya baeri) as well as the Ruddy Shelduck (Tadorna ferruginea), Tufted Duck (Aythya fuligula), Goosander (Mergus merganser), Common Teal (Anas crecca) and Mallard (Anas platyrhynchos). The species Cinnamomum impressinervium (VU) in the IUCN Red List also found in this site.
Among mammals, the reported list includes regional endemics like the Assamese macaque (Macaca assamensis) -(NT), Red Panda (Ailurus fulgens)- (EN), Himalayan Black Bear (Ursus thibetanus)- (VU) and Goral (Naemorhedus goral). These mammals depend on this site for food and habitat during most part of their life cycle.

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / MAGNOLIOPSIDA	*Cinnamomum impressinervium*	☑	☑	☑	VU	☐		The wetland supports this plant during the entire life

The species Cinnamomum impressinervium is VU in the IUCN Red List and hence is applicable for Criterion 2.

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Others																	
CHORDATA / MAMMALIA	*Ailurus fulgens*	☑	☑	☐	☐	☑	☐	☐	☐				EN	☑	☐	Schedule I of IWPA,1972	Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
CHORDATA / AMPHIBIA	*Duttaphrynus himalayanus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		provides food and habitat during most part of the lifecycle
CHORDATA / MAMMALIA	*Macaca assamensis*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		Provides food and habitat during most part of the life cycle. Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
CHORDATA / MAMMALIA	*Martes flavigula*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Provides food and habitat during most part of the life cycle. Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
CHORDATA / MAMMALIA	*Naemorhedus goral*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
CHORDATA / MAMMALIA	*Petaurista magnificus*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		Provides food and habitat during most part of the life cycle. Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
CHORDATA / MAMMALIA	*Ursus thibetanus*	☑	☑	☐	☐	☑	☐	☐	☐				VU	☑	☐	Schedule I of IWPA,1972	Provides food and habitat during most part of the life cycle. Provides food and habitat during most part of the life cycle. Especially Provides refuge during drought and acts as wintering site
Birds																	
CHORDATA / AVES	*Anas crecca*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Anas platyrhynchos*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Aythya baeri*	☑	☑	☐	☐	☑	☐	☐	☐				CR	☐	☑		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Aythya fuligula*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Gyps himalayensis*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Indicator xanthonotus*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Lophotriorchis kienerii*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Mergus merganser*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Nisaetus nipalensis*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		winter resting, feeding, roosting and breeding site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA / AVES	*Spelaeornis caudatus*	☐	☑	☐	☐	☑	☐	☐	☐				NT	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Tachybaptus ruficollis*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site
CHORDATA / AVES	*Tadorna ferruginea*	☐	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐		winter resting, feeding, roosting and breeding site

1) Percentage of the total biogeographic population at the site

3.4 - Ecological communities whose presence relates to the international importance of the site

<no data available>

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

The peatland's species are broadly classified into two vegetative communities: (1) Temperate Sphagnum Bog; and, (2) Warm-temperate Moist Deciduous Forest. The warm-temperate forest surrounding Khachoedpalri wetland is characterized by Evergreen Oaks, Chestnuts and Laurels, which are a unique forest type in the Eastern Himalayan region. Notable canopy species include Quercus lamellosa, Quercus pachyphylla, Castanopsis hystrix, Castanopsis tribuloides, and a variety of Cinnamon and Bay Trees. The understory includes a rich herbaceous layer that includes nearly 50 orchids species (24 genera), making it an incredibly unique and productive ecosystem.
Khachoedpalri's temperate bog communities persist upon a floating Spaghnum mat (Sphagnum nepalense, S. palustre) populated by Ericaceous species, primarily from the genus Vaccinium (V. dunalianum, V. nummularia, V. vacciniaceum). Several Sedges (Carex filicina, C. eleusinoides, C. insignis) and Rushes (Juncus effuses, J. inflexus) also inhabit highly saturated zones (Biate and Agrawala 2018; Hajra and Verma 1996). The peatland occupies approximately 14.57 ha of Khachoedpalri's basin with peat structured into three discrete strata: (1) mat peat, with 45–93% organic matter and 89–218 cm thick; (2) debris peat, with 13–83% organic matter content and 93 to 262 cm thick; and, (3) gyttja layer (lake bottom), with 30–70% organic matter (Jain et al. 2004b). Depth-wise carbon dating (14C) suggests that peat in the upper strata approaches 580 years in age, while the middle and lower strata range between 120 to 780 years and 1410 to 2970 years, respectively (Jain et al. 2004b). Peat evolution has proved dynamic, with remote sensing surveys revealing peatland expansion between the 1960s and 1990s (Fig. 4; Jain et al. 2004b).

Phytoplankton density is reported from 0.75 9 104 units l-1 to 5.57 9 104 units l-1 in the bog and 4.84 9 104 units l-1 to 19.45 9 104 units l-1 in the lake conditions; zooplankton density ranged from 0.70 9 104 units l-1 to 2.20 9 104 units l-1 in the lake (Jain et al. 2005b). Several species of algae and phytoplankton have been identified by genera, namely Mougeotia, Scenedesmus, Ulothrix, and Zygnema. Several copepods and planktonic rotifers are identified by genera: Alonella, Asplanchna, Brachionus, Chydorus, Cyclops, Cypridopsis, Daphnia, Didinium, Eudorina, Mesocyclops, Nauplius, Philodina, and Sida spp. (Roy and Thapa 1995, 1999; Venu et al. 1990; Murray and Rousselet 1906).
Woody taxa like Rhododendron (Rhododendron griffithianum) and Viburnum (Viburnum erubescens) are found in mesic zones toward the peatland's margin (c. 60 m from the lake) (Justice 1992). Among these species, waterbird diversity is notable, due largely to Khachoedpalri's position along the Central Asian Flyway. Migratory birds, such as the critically endangered Baer's Pochard (Aythya baeri) and Common Merganser (Mergus merganser), use Khachoedpalri's central lake as a resting site and breeding ground on their Trans-Himalayan journeys.
The wetland acts as an important habitat and layover site for 11 reported species of waterfowl by providing the resting, feeding, roosting, and breeding site. Reported ducks (Anatidae) include the critically endangered Baer's Pochard (Aythya baeri) as well as the Ruddy Shelduck (Tadorna ferruginea), Tufted Duck (Aythya fuligula), Common merganser (Mergus merganser), Common Teal (Anas crecca) and Mallard (Anas platyrhynchos).

The site provides significant ecosysystem services especially to the surrounding local communities. Khachoedpalri is a sacred natural site and pilgrimage destination for diverse communities of Sikkim. Hence, this site also has huge cultural and religious significance as mentioned at 4.4 and 4.5 and hence is one of the major tourist attractions in the state of Sikkim.

4.2 - What wetland type(s) are in the site?

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Lakes and pools >> Tp: Permanent freshwater marshes/ pools	KHACHOEDPALRI LAKE	1	8.06	Representative
Fresh water > Marshes on peat soils >> U: Permanent Non-forested peatlands	KHACHOEDPALRI PEATLAND	1	14.57	Unique

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
Warm moist temperate deciduous forest	149.37

(ECD) Habitat connectivity	The habitat of proposed site including the wetland and its non-wetland habitat are are fully connected without any break or disturbance. Further, the proposed site is also fully connected with the surrounding reserve forest without any break.

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/MAGNOLIOPSIDA	*Castanopsis purpurella purpurella*	Native range: Nepal to S. China and N. Indo-China
TRACHEOPHYTA/MAGNOLIOPSIDA	*Castanopsis tribuloides*	Native range: W. Central Himalaya to Indo-China. Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Cinnamomum bejolghota*	Native range: NE. Nepal to China and Indo-China. Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Cinnamomum tamala*	Native range: Himalaya to China and Indo-China. Conservation Status: Not Evaluated
TRACHEOPHYTA/MAGNOLIOPSIDA	*Eurya cerasifolia*	Native range: Himalaya to S. Central China and Indo-China Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Eurya japonica*	Native range: China to Korea and Vietnam, Central & S. Japan.
TRACHEOPHYTA/MAGNOLIOPSIDA	*Lithocarpus elegans*	Native range: E. Himalaya to S. Central China and Malesia. Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Lithocarpus pachyphyllus*	Native range: Nepal to S. Central China and Myanmar
TRACHEOPHYTA/MAGNOLIOPSIDA	*Machilus edulis*	Endemic to Eastern Himalaya. Native to India (Sikkim and Arunachal Pradesh) and Bhutan
TRACHEOPHYTA/MAGNOLIOPSIDA	*Magnolia campbellii*	Native range: E. Nepal to S. Central China Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Symplocos dryophila*	Native range: Nepal to China and Indo-China Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Symplocos glomerata*	Native range: E. Nepal to S. China and Peninsula Malaysia Conservation Status: Least Concern
TRACHEOPHYTA/MAGNOLIOPSIDA	*Symplocos lucida*	Native range: Indian Subcontinent to Central China and Indo-China, Philippines Conservation Status: Least Concern

Invasive alien plant species

Phylum	Scientific name	Impacts
TRACHEOPHYTA/MAGNOLIOPSIDA	*Ageratum houstonianum*	Actual (minor impacts)
TRACHEOPHYTA/MAGNOLIOPSIDA	*Bidens pilosa*	Actual (minor impacts)
TRACHEOPHYTA/MAGNOLIOPSIDA	*Parthenium hysterophorus*	Actual (minor impacts)

4.3.2 - Animal species

<no data available>

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
A: Tropical humid climate	Af: Tropical wet (No dry season)

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 1700

a) Maximum elevation above sea level (in metres): 2400

Entire river basin ☐

Upper part of river basin ☑
Middle part of river basin ☐
Lower part of river basin ☐
More than one river basin ☐
Not in river basin ☐
Coastal ☐

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

The lake lies in the Rathang chuu (stream) basin, which is a tributary of river rangeet, which again is the tributary of Teesta river.

4.4.3 - Soil

Mineral ☐
Organic ☑
No available information ☐

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes ○ No ◉

Please provide further information on the soil (optional)

In terms of soils, peat and sandy loam dominate local horizons, the latter exhibiting a profile of 13–14% clay, 36–40% silt, and 47–50% sand (Jain et al. 2000; ISRIC 2018). Soil bulk density ranges from 0.074 to 0.917 g m-3 with organic matter varying significantly with distance from the basin's center.

4.4.4 - Water regime

Water permanence

Presence?	
Usually permanent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	
Water inputs from precipitation	☐	No change
Water inputs from surface water	☐	No change
Water inputs from groundwater	☐	No change

Water destination

Presence?	
To downstream catchment	No change
Feeds groundwater	No change

Stability of water regime

Presence?	
Water levels largely stable	No change

(ECD) Connectivity of surface waters and of groundwater: The lake is mainly fed by rainfall and surface runoff from seasonal inlets and springs in the catchment areas . The surplus water drains out from the lake outlet as surface flow.

4.4.5 - Sediment regime

Significant erosion of sediments occurs on the site ☐
Significant accretion or deposition of sediments occurs on the site ☐
Significant transportation of sediments occurs on or through the site ☐
Sediment regime is highly variable, either seasonally or inter-annually ☐
Sediment regime unknown ☑

(ECD) Water turbidity and colour: Low, clear

(ECD) Light - reaching wetland: Light reaches the wetland as the lake lies in open area.

(ECD) Water temperature: 14.3 degree centigrade (seasonal and diurnal variability is there)

4.4.6 - Water pH

Acid (pH<5.5) ☐
Circumneutral (pH: 5.5-7.4) ☑
Alkaline (pH>7.4) ☐
Unknown ☐

Please provide further information on pH (optional):

The PH is acidic to neutral

4.4.7 - Water salinity

- Fresh (<0.5 g/l) ☑
- Mixohaline (brackish)/Mixosaline (0.5-30 g/l) ☐
- Euhaline/Eusaline (30-40 g/l) ☐
- Hyperhaline/Hypersaline (>40 g/l) ☐
- Unknown ☐

(ECD) Dissolved gases in water

Dissolved oxygen percentage- 44.5%
Dissolved oxygen concentration- 3.64ppm

4.4.8 - Dissolved or suspended nutrients in water

- Eutrophic ☐
- Mesotrophic ☐
- Oligotrophic ☑
- Dystrophic ☐
- Unknown ☐

Please provide further information on dissolved or suspended nutrients (optional):

Total dissolved solids-10 ppm
Nitrates- 0.0 mg/l
Phosphates- 0.0mg/l

(ECD) Redox potential of water and sediments	217.4mVORP
(ECD) Water conductivity	21 micro second/cm

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ◉ ii) significantly different ○

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Fresh water	Water for irrigated agriculture	High
Fresh water	Drinking water for humans and/or livestock	High
Wetland non-food products	Peat	High
Biochemical products	Extraction of material from biota	Low
Genetic materials	Medicinal products	Medium

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Storage and delivery of water as part of water supply systems for agriculture and industry	High
Maintenance of hydrological regimes	Groundwater recharge and discharge	High
Erosion protection	Soil, sediment and nutrient retention	High
Pollution control and detoxification	Water purification/waste treatment or dilution	High
Climate regulation	Local climate regulation/buffering of change	High
Climate regulation	Regulation of greenhouse gases, temperature, precipitation and other climactic processes	High
Hazard reduction	Flood control, flood storage	High

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	High
Spiritual and inspirational	Spiritual and religious values	High
Spiritual and inspirational	Inspiration	High
Spiritual and inspirational	Cultural heritage (historical and archaeological)	High
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	High
Scientific and educational	Educational activities and opportunities	High
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High
Scientific and educational	Major scientific study site	High
Scientific and educational	Type location for a taxon	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High
Soil formation	Sediment retention	High
Soil formation	Accumulation of organic matter	High
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	High
Nutrient cycling	Carbon storage/sequestration	High
Pollination	Support for pollinators	High

Other ecosystem service(s) not included above:

Habitat for wild animals and birds including the migratory birds

Within the site: 25000 to 60000/yr

Outside the site: 300- 500 approx

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes ○ No ○ Unknown ◉

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland ☑

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland ☑

Description if applicable

Khachoedpalri is a sacred natural site and pilgrimage destination for diverse communities of the Sikkim Himalayas. In the Bhutia language, “Khachoe” means “in the middle” and “palri” means “lotus”,thus Khachoedpalri means “in the middle of the lotus”. The lotus is one of the eight Auspicious Symbols in Buddhism and symbolizes the enlightened mind, which rises immaculate out of the muck of egotism and ignorance. Before the relatively recent Vajrayana Buddhist influence, the animistic Lepchas worshipped the lake as a location of spiritual power emanating from the plants, animals and geography. About 300 years ago, the establishment of the Khachoedpalri Gompa transformed Khachoedpalri into a sacred Buddhist site. However, the mixture of animism and Buddhism, in both cognition and practice, became clear as we spoke with Bhutia-Lepcha villagers and Buddhist monks.There are several myths about the lake which are all based in the belief that the lake’s waters contain both healing and wish-giving powers. Because Sikkim is state governed by the Buddhist principles of social interdependency and non-violence, religious tolerance is practiced. Religious sacred sites within Sikkim are protected under the 1991 special provision of the article 371(f) of the Indian Constitution. According to this article, the government has the obligation to protect previously established religious places from damage or encroachment by any other religions.

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples ☑

Description if applicable

• By the early 2000s, Khachoedpalri was an established destination for both domestic and international visitors (Chiron 2013; Maharana et al. 2000). Around 8000 domestic and 2000 international tourists visited the lake in 2000, with around 25,000 total visits in 2010 (Tambe et al. 2008; Jain et al. 2004a, b). State officials recognized the need for additional infrastructure as well as decentralized management of the state's wetland resources. In 2006, Pokhri Sanrakshan Samithi (Lake Conservation Committee) involving the local village people of Khachoedpalri (as per the gazette notification no.355/F, dated 31.07.2006 of the Government of Sikkim) was also constituted which is functioning under the administrative jurisdiction of Gyalshing Territorial Division.As per the notification, the community was empowered to collect conservation fees (Rs. 10 person−1) with profits evenly divided among local stakeholders and Forest Department of Government of Sikkim . From 2010 to 2011, the Japan International Cooperation Agency (JICA) under the Sikkim Biodiversity and Forest Management Project further supported the state's ecotourism guidelines and policies (Government of Sikkim 2012; Watabe 2011).

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland ☑

Description if applicable

Khachoedpalri is a sacred natural site and pilgrimage destination for diverse communities of the Sikkim Eastern Himalayas. In the Bhutia language, "Khachoe" means "in the middle" and "palri" means "lotus",thus Khachoedpalri means "in the middle of the lotus". The lotus is one of the eight Auspicious Symbols in Buddhism and symbolizes the enlightened mind, which rises immaculate out of the muck of egotism and ignorance. Before the relatively recent Vajrayana Buddhist influence, the animistic Lepchas worshipped the lake as a location of spiritual power emanating from the plants, animals and geography. About 300 years ago, the establishment of the Khachoedpalri Gompa transformed Khachoedpalri into a sacred Buddhist site. However, the mixture of animism and Buddhism, in both cognition and practice, became clear as we spoke with Bhutia-Lepcha villagers and Buddhist monks.There are several myths about the lake which are all based in the belief that the lake's waters contain both healing and wish-giving powers. Because Sikkim is state governed by the Buddhist principles of social interdependency and non-violence, religious tolerance is practiced. Religious sacred sites within Sikkim are protected under the 1991 special provision of the article 371(f) of the Indian Constitution. According to this article, the government has an obligation to protect previously established religious places from damage or encroachment by any other religions.

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Provincial/region/state government	☑	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	☐	☑

Provide further information on the land tenure / ownership regime (optional):

The proposed site entirely falls within the Dhupuk reserve forest, which is under the administrative control of Gyalshing Forest Territorial Division, Forest & Environment Department, Government of Sikkim.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:	Office of Divisional Forest Officer (Territorial), Gyalshing Territorial Division, Gyalshing District, Sikkim. Pokhri Sanrakshan Samithi (Lake Conservation Committee) involving the local village people of Khachoedpalri (as per the gazette notification no.355/F, dated 31.07.2006 of the Government of Sikkim) was also constituted which is functioning under the administrative jurisdiction of Gyalshing Territorial Division.
Provide the name and/or title of the person or people with responsibility for the wetland:	Sh.Kshitij Saxena IFS, Divisional Forest Officer (Territorial), Gyalshing Territorial Division, Gyalshing District, Sikkim.
Postal address:	Divisional Forest Office, Gyalshing Territorial Forest Division, Tikjuk, Rabdentse, Gyalshing District, Sikkim, India-737111.
E-mail address:	dfotgyalshing@gmail.com

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Tourism and recreation areas	Low impact	Low impact	☑	☑

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Recreational and tourism activities	Low impact	Low impact	☑	☑

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Invasive non-native/ alien species	Low impact	Low impact	☑	☑

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Garbage and solid waste	Low impact	Low impact	☑	☑

Geological events

Factors adversely affecting site	Actual threat	Potential threat	Within the site	In the surrounding area
Avalanches/landslides	Low impact	Low impact	☑	☑

5.2.2 - Legal conservation status

Global legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
World Heritage site	Khangchendzonga World Heritage Site (mixed category) is adjacent to the proposed site	https://whc.unesco.org/en/list/1 513/	partly

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Dhupuk reserve forest	Dhupuk reserve forest		whole
Notification No.70/Home/2001, dated 20.09.2001 specifying various natural sites including KHACHOEDPALRI wetland under India's Provisions of the Places of Worship (Special Provision) Act of 1991 as enforceable under Article 371F of the Indian Constitution.	KHACHOEDPALRI wetland	http://www.sikkimforest.gov.in/docs/sacred%20natutal%20sites.pdf	partly

5.2.3 - IUCN protected areas categories (2008)

Ia Strict Nature Reserve ☐

Ib Wilderness Area: protected area managed mainly for wilderness protection ☐

II National Park: protected area managed mainly for ecosystem protection and recreation ☐

III Natural Monument: protected area managed mainly for conservation of specific natural features ☐

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention ☐

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation ☐

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems ☐

<no data available>

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
Catchment management initiatives/controls	Implemented
Improvement of water quality	Implemented
Hydrology management/restoration	Implemented
Habitat manipulation/enhancement	Implemented
Re-vegetation	Implemented
Soil management	Implemented
Land conversion controls	Implemented
Faunal corridors/passage	Implemented

Species

Measures	Status
Control of invasive alien plants	Implemented

Human Activities

Measures	Status
Management of water abstraction/takes	Implemented
Regulation/management of wastes	Implemented
Livestock management/exclusion (excluding fisheries)	Implemented
Fisheries management/regulation	Implemented
Harvest controls/poaching enforcement	Implemented
Regulation/management of recreational activities	Implemented
Communication, education, and participation and awareness activities	Implemented
Research	Partially implemented

Other:

1.Felling and clearing of surrounding forest/vegetation is strictly prohibited mainly as per the Sikkim Forest Act, 1988, Forest Conservation Act, 1980 and the various rules & regulations made there under.
2. Causing pollution in the wetland and the surrounding areas is strictly prohibited
3. Adequate arrangements for solid waste management in the wetland and its surroundings are in place

5.2.5 - Management planning

Is there a site-specific management plan for the site? In preparation

Has a management effectiveness assessment been undertaken for the site? Yes ○ No ◉

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes ○ No ◉

URL of site-related webpage (if relevant): http://www.sikkimforest.gov.in/soer/Wetlands%20of%20Sikkim.pdf

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No, but a plan is being prepared

Further information

1. Measures for the protection, soil moisture conservation, afforestation/regeneration, joint forest management, wildlife management, ecotourism, etc.(for the entire catchment area proposed in the proposal)
2. Lake conservation plan for protection and conservation of the wetland duly involving the local villagers for better planning and management of the lake.(for the wetland area only)

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Proposed
Water quality	Proposed
Soil quality	Proposed
Plant community	Implemented
Plant species	Proposed
Animal community	Proposed
Animal species (please specify)	Proposed
Birds	Proposed

Forest and Environment Department, Government of Sikkim monitors the implementation of activities in the proposed site.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

1. Alexander R.O' Neill et al (2020) "Establishing ecological baselines around a temperate Himalayan peatland", Wetlands Ecol Manage. https://doi.org/10.1007/s111273-020-0910-7.
2. Acharya TG (2005) A short biography of four Tibetan lamas and their activities in Sikkim. Bull Tibetol 41(2):49–76

3. Acharya C, Dokham ASG (1998) Sikkim: a hidden holy land and its sacred lakes. Bull Tibetol 3:1015

4. Acharya BK, Vijayan L (2015) Butterfly diversity along the elevation gradient of Eastern Himalaya, India. Ecol Res 30:909–919. https://doi.org/10.1007/s11284-015-1292-0

5. Badola HK, Subba JB (2012) Kangchendzonga biosphere reserve—Central Himalaya, India. In: Palni LMS, Rawal RS, Rai RK, Reddy SV (eds) Compendium on Indian biosphere reserves progression during two decades of conservation. G. B Pant Institute of Himalayan Environment and Development, Kosi-Katamaral, pp 133–142.

6. Balikci A (2008) Lamas, shamans and ancestors: village religion in Sikkim. Koninklijke Brill Nv, Leiden

7. Bart D (2006) Integrating local ecological knowledge and manipulative experiments to find the causes of environmental change. Front Ecol Environ 4(10):541–546. https://doi.org/10.1890/1540-9295(2006)4[541:ILEKAM]2.0.CO;2

8. Bechtold WA, Scott CT (2005) The forest inventory and analysis plot design. In: Gen. Tech. Rep. SRS-80. Southern Research Station, Forest Service, U.S. Department of Agriculture, Asheville, North Carolina, United States,pp 37–52. https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs080/gtr_srs080-bechtold001.pdf. Accessed 26 Jan 2019
9. Bhatt JP, Manish K, Pandit MK (2012) Elevational gradients in fish diversity in the Himalaya: water discharge is the key driver of distribution patterns. PLoS ONE 7(9):e46237. https://doi.org/10.1371/journal.pone.0046237
10. Bhatta LD, Ning W, Udas E, Agrawal NK, Ranabhat S, Basnet D (2018) Wetlands in the Himalaya: securing services for livelihoods. International Centre for Integrated Mountain Development (ICIMOD), Kathmandu. https://www.indiaenvironmentportal.org.in/files/file/icimodWetlands.pdf. Accessed 26 Jan 2019
11. Biate DL, Agrawala DK (2018) KHACHOEDPALRI lake and its surrounding forest. Forest, Environment & Wildlife Management Department, Government of Sikkim and Sikkim Himalayan Regional Centre, Botanical Survey of India, Gangtok
12. Bose PN (1989) Notes on the geology and mineral resources of Sikkim. In: Risley HH (ed) The gazetter of Sikkim. Nature Conservation Foundation, Gangtok, pp 59–65
13. Cao B, Zhang T, Wu Q, Sheng Y, Zhao L, Zou D (2019) Permafrost zonation index map and statistics over the Quinghai-Tibet Plateau based on field evidence. Permafrost Periglac 30(3):178–194. https://doi.org/10.1002/ppp.2006
14. Chatterjee A, Blom E, Gujja B, Jacimovic R, Beevers L,O'Keeffe J, Beland M, Biggs T (2010) WWF initiatives to study the impact of climate change on Himalayan high altitude wetlands (HAWs). Mt Res Dev 30(1):42–52

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<1 file(s) uploaded>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<no file available>

iii. a description of the site in a national or regional wetland inventory
<1 file(s) uploaded>

iv. relevant Article 3.2 reports
<no file available>

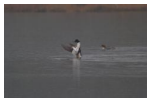
v. site management plan
<no file available>

vi. other published literature
<1 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

KHACHOEDPALRI WETLAND (*Dibyendu Ash, 16-03-2017*)



Common merganser (*Dibyendu Ash, 16-03-2017*)

KHACHOEDPALRI WETLAND (*Alex O Neill, 31-10-2023*)

6.1.4 - Designation letter and related data

Designation letter
<1 file(s) uploaded>

Date of Designation: 2024-07-15