Pyu Lake

Myanmar

EAAF NETWORK SITE CODE FOR OFFICE USE ONLY:

E	A	A	F	1	5	5

Site Information Sheet on East Asian-Australasian Flyway Network Sites (SIS) – 2017 version

Available for download from https://eaaflyway.net/about-us/the-flyway/flyway-site-network/

Categories approved by Second Meeting of the Partners of the East Asian-Australasian Flyway Partnership in Beijing, China 13-14 November 2007 - Report (Minutes) Agenda Item 3.13

Notes for compilers:

1. The management body intending to nominate a site for inclusion in the East Asian - Australasian Flyway Site Network is requested to complete a Site Information Sheet. The Site Information Sheet will provide the basic information of the site and detail how the site meets the criteria for inclusion in the Flyway Site Network. When there is a new nomination or an SIS update, the following sections with an asterisk (*), from Questions 1-14 and Question 30, must be filled or updated at least so that it can justify the international importance of the habitat for migratory waterbirds.

2. The Site Information Sheet is based on the Ramsar Information Sheet. If the site proposed for the Flyway Site Network is an existing Ramsar site then the documentation process can be simplified.

3. Once completed, the Site Information Sheet (and accompanying map(s)) should be submitted to the Secretariat. Compilers should provide an electronic (MS Word) copy of the Information Sheet and, where possible, digital versions (e.g. shapefile) of all maps.

1. Name and contact details of the compiler of this form *:

Compiler 1

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2. Date this sheet was completed *:

DD/MM/YYYY

25/05/2023

3. Country *:

Republic of the Union of Myanmar

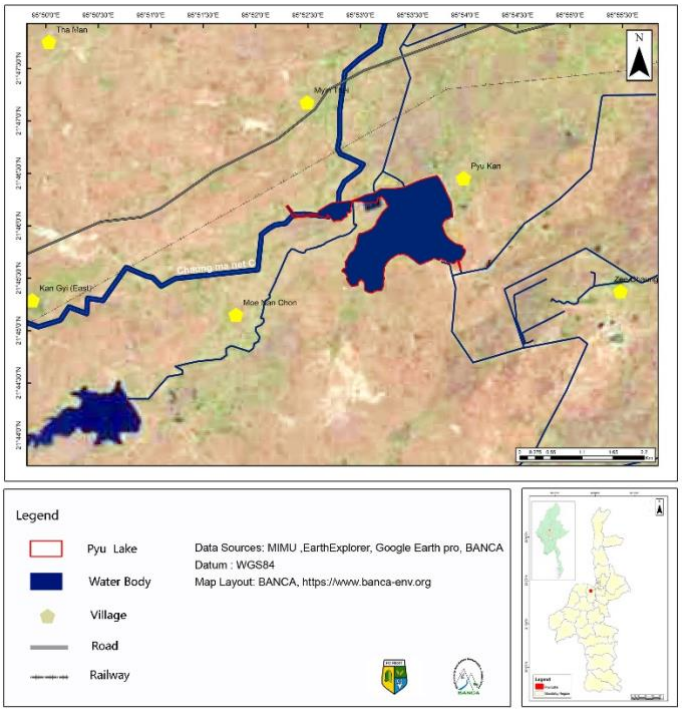
4. Name of the Flyway Network site *:

Accepted English transcription of the Site's name.

Pyu Lake

5. Map of site *:

The most up-to-date available and suitable map of the wetland should also be appended to the SIS (only in digital format and shape file). The map must clearly show the boundary of the site. Please refer to the "Digitising Site Boundaries in Google Earth" file linked here.



6. Geographical coordinates (latitude/longitude, in decimal degrees) *:

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

N21.768, E95.891

7. Elevation *: (in metres: average and/or maximum & minimum)

105-111 m

8. Area *:

The total area of the site, in hectares. If the areas of discrete site units are known, please also list each of these together with the names (or labels) used to identify and differentiate these units.

The Pyu Lake is a 1,900 ha waterbody, which stores water from the Kinda Dam, and it supplies water to surrounding agricultural land through irrigation canals.

9. General overview of the site *:

A brief (two sentences) summary of the site, mentioning principal physical and ecological functions, and its importance for migratory waterbirds.

Pyu Lake is located in Tada-U township, Mandalay Region, which is the Central Dry Zone of Myanmar. It is a permanent waterbody now largely fed with water from the upstream Kinda dam on Pang Laung river. It is of vital role for migratory waterbirds and agriculture for near villages. Pyu Lake annually supports the Critically Endangered (CE) Baer's Pochard (*Aythya baeri*). It supports up to 40 waterbird species, with total waterbird numbers of at least 5,200 birds in recent years.

10. Justification of Flyway Site Network criteria *:

Please provide waterbird count information (with year of latest count) that demonstrates that the site meets the criteria of the Flyway Site Network (Annex 1). That is:

- it regularly supports > 20 000 migratory waterbirds; or,
- it regularly supports > 1 % of the individuals in a population of one species or subspecies of migratory waterbird; or,
- it supports appreciable numbers of an endangered or vulnerable population of migratory waterbird
- it is a "staging site" supporting > 5 000 waterbirds, or > 0.25% of a population stage at the site.

A listing of the populations of migratory waterbirds covered by the East Asian – Australasian Flyway Partnership and the 1% thresholds is attached (Annex 3).

The "staging site" criterion is particularly difficult to apply and application of this should be discussed with the Secretariat. Also note that some species have several populations that are very difficult to distinguish in the field.

EAAFP Criterion: A wetland should be considered internationally important it supports

appreciable numbers of an endangered or vulnerable population of migratory waterbird.

Pyu Lake qualifies for EAAF Flyway Network Site designation under the criterion for two globally threatened migratory waterbird species). These are the Critically Endangered (CR) Baer's Pochard (*Aythya baeri*) and the Vulnerable (VU) Common Pochard (*Aythya ferina*), both of which have been present in all five most recent years of counts.

Species/population	1% threshold (from CSR1[1])	2016	2017	2018	2021	2022	Average 2016-2022
Baer's Pochard	15	12	3	4	2	2	4.6
Common Pochard	3,000	26	11	5	3	50	22.8

11. Wetland Types *:

List the wetland types present (see Annex 2). List the wetland types in order of their area in the Flyway Network site, starting with the wetland type with the largest area.

Inland Wetland

O - **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.
P - **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.

Human made wetland,

2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).
3 -- **Irrigated land**; includes irrigation channels and rice fields.
4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).
6 -- **Water storage areas**; reservoirs/barrages/dams/impoundments (generally over 8 ha).

12. Jurisdiction *:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Ministry of Agriculture/Dept. of Environment, etc.

Territorial: Government of Mandalay Region, Tada-U township
Functional: Department of Irrigation and Water Utilization Management

13. Management authority *:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland and the title and/or name and email address/phone number of the person or persons in this office with direct responsibility for managing the wetland.

1. Office of Government of Mandalay Region
2. Nature and Wildlife Conservation Division, Forest Department, Ministry of Natural Resources, Environmental Conservation (MONREC) (email: nwcdfdmof@gmail.com),

3. Irrigation and Water Utilization Management Department, Ministry of Agriculture, Livestock and Irrigation (MOALI),

4. Department of Fishery, Ministry of Agriculture, Livestock and Irrigation (MOALI).

[1] https://www.wetlands.org/download/24099/

14. Bibliographical references *:

A list of key technical references relevant to the wetland, including management plans, major scientific reports, and bibliographies, if such exist. Please list Web site addresses dedicated to the site or which prominently feature the site, and include the date that the Web site was most recently updated. When a large body of published material is available about the site, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies.

1. Aguilar L. (2021) *Guidance on mainstreaming gender under the Ramsar Convention on Wetlands.* Gland, Switzerland: Secretariat of the Convention on Wetlands.
2. Aung, T.D, T.Z. Naing, S. Moses, L. Win, A.M. Tun, T.S. Zaw & S. Chan. 2016. *An assessment of the wintering population of Baer's Pochard in central Myanmar.* Biodiversity And Nature Conservation Association report to Wildfowl & Wetlands Trust. 48 pp.
3. Aung, T.D, T.Z Naing, S. Moses, L. Win, A.M Tun, T.S. Zaw, M.T.Htet, K.T.T.Cho and R. Hearn 2017. *Monitoring on the status of Baer's Pochard in Pyu Lake and Paleik Inn, central Myanmar.*
4. BANCA (2018): *Strengthening on the capacity of civil society for conservation of Baer's Pochard in Pyu Lake, central Myanmar. R*eport to Wildlife Conservation Society (WCS).
5. Aung, T.D, T.S. Zaw, L.Win, S. Moses, M.T Zaw, P.E. Nyein, Nike 2019. The Study of Baer's Pochard in central Myanmar. Biodiversity And Nature Conservation Association report. 31pp.(*unpublished*)
6. Davidson, N. C. & Mclnnes, R. J. (2020): Draft report on conservation of biodiversity and improved management of protected areas in Myanmar: Assessment of Myanmar wetlands currently qualifying for waterbirds for designation under Ramsar Criteria 2, 5 and 6
7. Davies, J., Sebastian, A.C. & Chan, S. (2004): *A Wetland Inventory for Myanmar.* Ministry of Environment Japan.
8. Lunn.Z, Chan. N (2021): *Fish diversity and Fisheries survey in the Paleik Lake and surrounding areas in February 2021*. Unpublished report to BANCA.
9. Markus Ihalainen & Bimbika Sijapati Basnett : **CIFOR.org/gender-climate**
10. Myanmar Bird And Nature Society (2019): *Identifying Priorities for Wetland Conservation in Myanmar's Dry Zone.*
11. RIS form of Paleik Lake. BANCA - November 2020
12. Win, L, Zaw, T.S, Nyein, P.E, Aung, T.D (2017). *Community based conservation of Baer's Pochard in Pyu Lake*. Unpublished report to Biodiversity And Nature Conservation Association.
13. Yu Ito, Anders S. Barfod (2014): *An updated checklist of aquatic plants of Myanmar and Thailand.* Biodiversity Data Journal.
14. Zaw, T.S, Win, L, Zaw, M.T.H, Aung, T.D (2020): *Report on the status of non-breeding Baer's Pochard at key sites in central Myanmar. Biodiversity And Nature Conservation Association unpublished report.*
15. http://datazone.birdlife.org/species/factsheet/baers-pochard-aythya-baeri on 31/05/2023.

15. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The inflow of Pyu Lake is mainly from the Kinda dam of Pang Laung river. The water source is used for agriculture located in central Myanmar Dry Zone. Pyu Lake, entirely, is open water type and water loss usually happens in drought years. The soil type of Pyu Lake is clay. The water depth is less than 10 meters.

16. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

Pyu Lake is a permanent open water type. The season is tropical monsoon climate type that generally can be divided as from March to May as summer, June to September as rainy and November to February as northern winter seasons.

17. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Pyu Lake located in the dry zone is connected with the Kinda Multipurpose Dam which was located in the upstream since 1987-88. Once the water level of Pyu lake used to be very shallow, especially in the dry season but the level became stable after connected with the Kinda dam (3.9 metres). Therefore, the water level in the lake depends on the water discharge from the upstream Kinda Dam. The lake is managed by the Irrigation and Water Utilization Management Department (IWUMD) and used for agriculture through the irrigation canals. Lastly, the lake is connected with Ayeyarwady river through the irrigation canals and tributary network in the downstream.

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Flyway Network site, and the ecosystem services of the site and the benefits derived from them.

The Pyu Lake function as the artificial wetland ecosystem for species-diverse and rich population of aquatic flora and fauna. Marginal vegetation and algae are grown in surface area. It also provides rice and crop cultivation for food and fish, as protein, to local people. Hence, the Pyu Lake is fundamental to access natural and biological resources of an inland wetland ecosystem in central Myanmar.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the SIS.*

(Please add here the species which do not come under sec no 14)

This habitat includes Nymphaea (water lily) and *Ottelia cordata (*Dandy*)*. The Marginal vegetation type such as *Typha angustifolia* and algae are grown in Pyu Lake. These plants function as water cleaning, provide food and hiding place or shelter for waterbirds and aquatic animals.

Typha angustifolia and *Ottelia cordata* habitats are mainly feeding ground of Baer's Pochard and other diving ducks. *Typha angustifolia* is a traditional food for local people, prepared like noodles.

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 10. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the SIS.*

(Please add here the species which do not come under sec no 14)

Pyu Lake is one of only two remaining wetlands (the other being Paleik Lake) in Myanmar which continue to regularly support a non-breeding population of Baer's Pochard. The Pyu Lake has always been providing the wetland ecosystem services of habitats to species such as Baer's Pochard (Critically Endangered), Common Pochard (Vulnerable) and other migratory diving duck speciesdue to their abundance food of aquatic invertebrates such as worms, molluscs and crustaceans, as well as the high population of Common Coot (*Fulica atra*). Total of 28 fish species are found in Pyu Lake.

Typha angustifolia provides roosting area for waterbirds including species such as Common Crane (*Grus grus*), Black-headed Ibis (*Threskiornis melanocephalus*), Glossy Ibis (*Plegadis falcinellus*), Asian Openbill (*Anastomus oscitans*), Garganey (*Spatula querquedula*), as well as suitable nesting habitat for Common Moorhen (*Gallinula chloropus*).

21. Social, economic and cultural values:

a) Describe if the site has any general social, economic and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

Economically important species in this habitat include various fish species, e.g. *Notopterus notopterus*, *Osteobrama belangeri*, *Rohita rohita*, *Wallago attu*, and *Heteropneustes fossilis*, and *Typha angustifolia*. There is a traditional fishing practice in local villagers. The villagers have practiced fishery without using boats because of traditional belief. They fish by use of inflated motor car tires. In Pyu Lake, local people start to cultivate rice after water is discharged from the Kingda dam in May (continued until October). Fishing often takes place between February and April when the water level inside the wetland has decreased from 1 to 2 metres. Aquatic plants such as *T. angustifolia* are collected and burnt in the dry season.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? (Double-click the checkbox to check and choose "Checked" under "Default Value" from "Check Box Form Field Options" window)

Yes

If yes, tick the box ❑ and describe this importance under one or more of the following categories:

I. Sites which provide 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. Sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
III. Sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples: X
IV. Sites where 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:

22. Land tenure/ownership:

a) Within the Flyway Network site:

Government of Mandalay Region

b) In the surrounding area:

The land is state-owned but some villagers have certain rights of tenure of paddy fields and rights associated with auctioning the use of ponds.

23. Current land (including water) use:

a) Within the Flyway Network site:

Department of Irrigation and Water Utilization Management, Tada-U Township, Mandalay Region (for water distribution)

b) In the surroundings/catchment:

Human settlement, paddy plantation and seasonal crop growth

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) Within the Flyway Network site:

Past: Before the establishment of the Kinda dam, Pyu Lake was dependent on rainfall for water. There was not enough water for distribute to agriculture fields.
Present: After the establishment of the Kinda dam, Pyu Lake is connected by canals and has enough volumes of water to distribute to the agriculture fields.
Potential: Due to sedimentation, the habitat quality of Pyu Lake is being degraded and the lake is gradually becoming shallower.
Non-native Tilapia *Oreochromis niloticus* and Vermiculated Sailfin Catfish *Pterygoplichthys disjunctivus* are both presumed to negatively affect ecosystems of the lake. These species, which are increasing in number, and abundance also compete for food and habitat with native fish species and thereby can change the ecosystem of Pyu Lake (Fish diversity and Fisheries survey in the Pyu Lake, 2021).

b) In the surrounding area:

No factors affecting the site's ecological character are found.

25. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Flyway Network site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

Pyu lake has not been nominated yet, neither the national category nor legal status of protected areas.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate, see Annex 3):

Ia ; Ib ; II ; III ; IV ; V ; VI ; N/A

c) Does an officially approved management plan exist; and is it being implemented?:

N/A

If yes, is it being implemented?: If no, is one being planned?

It is planned to develop a management plan.

d) Describe any other current management practices:

Ministry of Natural Resources and Environmental Conservation had formulated the Mandalay Region Wetlands Conservation Committee. Details of the current management practices as below-

- Annual wintering survey and Asian Waterbird Census,
- Education awareness activities on migratory waterbird species and law enforcement in public,
- Identification of priority inland wetlands to conserve the species and habitats.

BANCA has emphasized implementation of monitoring of migratory waterbirds in Pyu Lake since 2016. The local conservation group, Shwe Kan Tharyar Nature Conservation Association was established to conserve the biodiversity of Pyu Lake by the Biodiversity and Nature Conservation Association (BANCA), under the guideline of the Forest Department.

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

- Ongoing official nomination process as a Ramsar site by the Head of Ramsar Administrative Authority, Forest Department.
- Plan to develop a management plan for Pyu lake.

27. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

A Climate Change and Venerability Assessment on Pyu lake was implemented for the conservation of Bear's Pochard and long term sustainable of wise use of wetlands. The assessments showed that the habitat is strongly exposed to climatic changes in the dry season, i.e. increased evaporation due to higher temperatures and extended droughts. These can result in lower water levels with the shrinkage of the suitable area of habitat for migratory waterbird species.

28. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The local people recognize and understand about the importance of conservation migratory bird species and vital role of wetland. The local villagers and students from seven villages nearby Pyu lake have attained a greater awareness of bird and wetland conservation by means of the information shared about Baer's Pochard conservation and wetland status through dissemination of booklets on waterbirds of Pyu lake and wetland conservation talks. Recently, the Shwe Kan Thayar Nature Conservation Association has been working for the wetland conservation in Pyu Lake.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Domestic visitors are low in number.

30. Threats *:

Which of the following threats is present historically – when the threat stopped but the effects are still there (H), currently (C) or potentially (P)?

	Historically	Currently	Potentially
Residential and commercial development			
housing and urban areas			
commercial and industrial areas			
tourism and recreation areas			P
Agriculture and aquaculture			
annual and perennial non-timber crops	H	C	P
wood and pulp plantations			
livestock farming and ranching	H	C	P
marine and freshwater aquaculture			
Energy production and mining			
oil and gas drilling			
mining and quarrying			
renewable energy			
Transportation and service corridors			
roads and railroads			
utility and service lines			
shipping lanes			
flight paths			
Biological Resources Use Fishing and harvesting aquatic resources: Illegal Fishing, some fishermen use electric shock equipment in Pyu Lake.			
hunting and collecting terrestrial animals	H	C	
gathering terrestrial plants			
logging and wood harvesting			
fishing and harvesting aquatic resources	H	C	P
Human intrusions and disturbance			
recreational activities			P
war, civil unrest and military exercises			
work and other activities			
Natural system modifications			

fire and fire suppression			
dams and water management/use	H	C	P
other ecosystem modifications			

Invasive and other problematic species and genes
Invasive non-native/alien species: Tilapia (*Oreochromis niloticus*) population is increase in Pyu Lake. This process lead to the competition of food and place for native species.

invasive non-native/alien species	H	C	P
problematic native species		C	P
introduced genetic material			

Pollution
Household sewage and urban waste water: Some villagers are throw their rubbish into Pyu Lake.

household sewage and urban waste water	H	C	P
industrial and military effluents			
agricultural and forestry effluents	H	C	P
garbage and solid waste	H	C	P
air-borne pollutants			
excess energy			

Geological events

volcanoes			
earthquakes/tsunamis			
avalanches/landslides			

Climate change and severe weather

habitat shifting and alteration			
droughts		C	P
temperature extremes		C	P
storms and flooding			

Please write here any additional threats and comments/queries you have on the threats.

During the bird migration season (from January to April), most local communities use poison (by mixing Potassium Cyanide and seeds from the buds of Water Hyacinth (*Eichhornia crassipes*) to hunt migratory bird species especially diving duck species.

Annex 1: Criteria for the inclusion of sites in the Flyway Site Network

(From the Partnership Text)

To be considered for inclusion in the Flyway Site Network, this Partnership adopts the following criteria:

a. Convention on Wetlands (Ramsar, Iran, 1971) criteria for internationally important sites for migratory waterbirds. That is:

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

   Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

   Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

b. The staging criteria as applied under the Asia - Pacific Migratory Waterbird Conservation Strategy. That is:

   i. A staging site should be considered internationally important if it regularly supports 0.25% of individuals in a population of one species or subspecies of waterbirds on migration.

   ii. A staging site should be considered internationally important if it regularly supports 5,000 or more waterbirds at one time during migration.

c. Under exceptional circumstances a site can be nominated if it supports migratory waterbirds at a level or stage of their life cycle important to the maintenance of flyway populations. Justification of such nominations will be considered by the Partnership on a case by case basis.

Annex 2: Ramsar Classification System for Wetland Type

The codes are based upon the Ramsar Classification System for Wetland Type as approved by Recommendation 4.7 and amended by Resolutions VI.5 and VII.11 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

To assist in identification of the correct Wetland Types to list in section 19 of the RIS, the Secretariat has provided below tabulations for Marine/Coastal Wetlands and Inland Wetlands of some of the characteristics of each Wetland Type.

Marine/Coastal Wetlands

A -- **Permanent shallow marine waters** in most cases less than six metres deep at low tide; includes sea bays and straits.

B -- **Marine subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.

C -- **Coral reefs**.

D -- **Rocky marine shores**; includes rocky offshore islands, sea cliffs.

E -- **Sand, shingle or pebble shores**; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.

F -- **Estuarine waters**; permanent water of estuaries and estuarine systems of deltas.

G -- **Intertidal mud, sand or salt flats**.

H -- **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

I -- **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.

J -- **Coastal brackish/saline lagoons**; brackish to saline lagoons with at least one relatively narrow connection to the sea.

K -- **Coastal freshwater lagoons**; includes freshwater delta lagoons.

Zk(a) – **Karst and other subterranean hydrological systems**, marine/coastal

Inland Wetlands

L -- **Permanent inland deltas**.

M -- **Permanent rivers/streams/creeks**; includes waterfalls.

N -- **Seasonal/intermittent/irregular rivers/streams/creeks**.

O -- **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.

P -- **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.

Q -- **Permanent saline/brackish/alkaline lakes**.

R -- **Seasonal/intermittent saline/brackish/alkaline lakes and flats**.

Sp -- **Permanent saline/brackish/alkaline marshes/pools**.

Ss -- **Seasonal/intermittent saline/brackish/alkaline marshes/pools**.

Tp -- **Permanent freshwater marshes/pools**; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.

Ts -- **Seasonal/intermittent freshwater marshes/pools on inorganic soils**; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

U -- **Non-forested peatlands**; includes shrub or open bogs, swamps, fens.

Va -- **Alpine wetlands**; includes alpine meadows, temporary waters from snowmelt.

Vt -- **Tundra wetlands**; includes tundra pools, temporary waters from snowmelt.

W -- **Shrub-dominated wetlands**; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.

Xf -- **Freshwater, tree-dominated wetlands**; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.

Xp -- **Forested peatlands**; peatswamp forests.

Y -- **Freshwater springs; oases**.

Zg -- **Geothermal wetlands**

Zk(b) – **Karst and other subterranean hydrological systems**, inland

Note: "**floodplain**" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

Human-made wetlands

1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**

2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).

3 -- **Irrigated land**; includes irrigation channels and rice fields.

4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).

5 -- **Salt exploitation sites**; salt pans, salines, etc.

6 -- **Water storage areas**; reservoirs/barrages/dams/impoundments (generally over 8 ha).

7 -- **Excavations**; gravel/brick/clay pits; borrow pits, mining pools.

8 -- **Wastewater treatment areas**; sewage farms, settling ponds, oxidation basins, etc.

9 -- **Canals and drainage channels, ditches.**

Zk(c) -- **Karst and other subterranean hydrological systems**, human-made

Annex 3: IUCN Protected Areas Categories System

IUCN protected area management categories classify protected areas according to their management objectives. The categories are recognized by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation.

Ia Strict Nature Reserve

Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

Ib Wilderness Area

Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II National Park

Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III Natural Monument or Feature

Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV Habitat/Species Management Area

Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V Protected Landscape/ Seascape

A protected area where the interaction of people and nature over time has produced an area of distinct charcter with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected area with sustainable use of natural resources

Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.