



**Glenelg Estuary and Discovery Bay
Australia**

EAAF NETWORK SITE CODE FOR OFFICE USE ONLY:

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

Available for download from <http://www.eaaflyway.net/about/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 *:

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DD/MM/YYYY

23/12/2019

3. Country *:

Australia

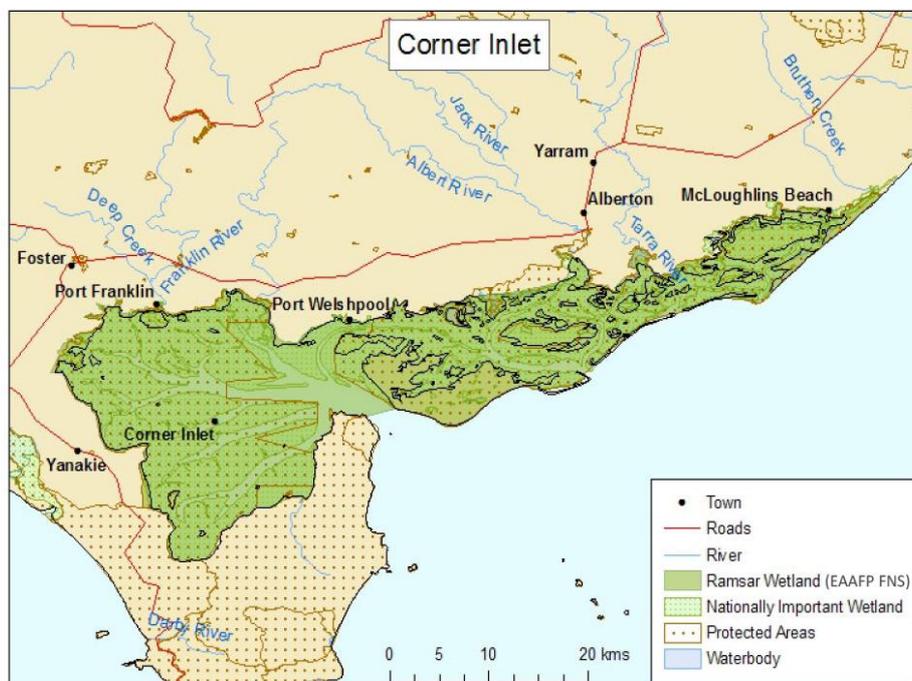
4. Name of the Flyway Network site *:

Accepted English transcription of the Site's name.

Glenelg Estuary and Discovery Bay

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.

Latitude (GDA94): 37° 59'S to 38° 20'S. Longitude (GDA94): 140° 58'E to 141° 24'E.

7. Elevation *:

(in metres: average and/or maximum & minimum)

From less than 10 metres above sea level to the low water mark.

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.

22,289 hectares.

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.

The Glenelg Estuary and Discovery Bay Ramsar Site includes a diverse wetland system located in the southwest corner of the state of Victoria within the South East Coast (Victoria) Drainage Basin. Ninety-five species of waterbird have been recorded within the site, including 24 listed under international migratory bird agreements. Nine species have been recorded breeding in the site, including several beach nesting species such as red-capped plover and little terns (DELWP, 2017a).

Discovery Bay Coastal Park is internationally important for Sanderling (*Calidris alba*). It is also important for the endemic shorebird, Hooded Plover (*Thinornis rubricollis*). The site includes the nationally important wetlands of Glenelg Estuary and Long Swamp (Environment Australia, 2001). The site includes a range of coastal environments including rugged cliffs, extensive beaches, extensive mobile dune fields, wetlands and woodland forest communities (Parks Victoria 2004). The management plan (Parks Victoria 2004) recognises numerous flora and fauna species of conservation value, indigenous cultural values, archaeological sites, education and recreational uses, and impacts such as invasive species and human-use.

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.

The Glenelg Estuary and Discovery Bay Ramsar Site is an internationally important non-breeding area for Sanderling (*Calidris alba*) and has regularly supported more than 1% of the flyway population (DELWP, 2017a).

The site regularly supports 7 listed species listed under the EPBC Act and or IUCN Red List:
Australasian bittern (*Botaurus poiciloptilus*)
Curlew sandpiper (*Calidris ferruginea*)
Fairy tern (*Sterna nereis nereis*)
Hooded plover (*Thinornis rubricollis*)

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.

The wetland types present in order of their area are as follows (DELWP, 2017b):
F – Estuarine waters; permanent water of estuaries and estuarine systems of deltas
E – Sand, shingle or pebble shore; includes sand bars, spots and sandy islets; includes dune systems and humid dune slacks.
G – Intertidal mud, sand or salt flats.
U – Non-forested peatlands; includes shrub or open bogs, swamps, fens.
O – Permanent freshwater lakes (over 8 ha); includes large oxbow lakes.
Tp – Permanent freshwater marshes/pools; ponds (below 8 ha).

H – Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.
Ss – Seasonal/intermittent/saline/brackish/alkaline marshes/pools.
Ts – Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.
N – Seasonal/intermittent freshwater rivers, streams and creeks.
B – Marine subtidal aquatic beds; includes kelp beds, sea-grass beds, tropical marine meadows.

12. Jurisdiction *:

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

Land management: Parks Victoria
State: Victorian State Government

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.

Parks Victoria, Level 10, 535 Bourke Street, Melbourne VIC 3000, contact: info@parks.vic.gov.au
Glenelg Hopkins Catchment Management Authority, PO Box 502, Hamilton, Victoria 3300, contact: ghcma@ghcma.vic.gov.au
DELWP, 8 Nicholson Street, East Melbourne VIC 3104, contact: [136 186](tel:136186)

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.

Australian Wetlands Database. <http://ea.gov.au/water/wetlands/database/>.
Australasian Wader Studies Group (AWSG) and Birds Australia (RAOU) Unpublished Database - from Australian regular count project, 1981-1990. Birds Australia, Melbourne.
Department of Environment, Land, Water and Planning (2017a). Ecological Character Description for Glenelg Estuary and Discovery Bay Ramsar Site. Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
Department of Environment, Land, Water and Planning (2017b). Glenelg Estuary and Discovery Bay Ramsar Site Management Plan. Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
Environment Australia (2001). *A Directory of Important Wetlands in Australia. Third Edition.* Environment Australia. Canberra.

Hewish, M. (1989). *Hooded Plovers, Pied Oystercatchers and a windy weekend at Discovery Bay, Victoria*. *The Stilt* **15**, 24-26.

Murray H.A. & Reside, J. (1994). *Management of the Little Tern in Victoria 1994-95*. Department of Conservation and Natural Resources, Victoria.

OzEstuaries Database. <http://www.ozestuaries.org>. National Land and Water Resources Audit.

Parks Victoria (2004). *Discovery Bay Parks Management Plan*. Parks Victoria, Melbourne.

Watkins, D. (1993). *National plan for shorebird conservation in Australia*. Australasian Wader Studies Group, Royal Australasian Ornithologists Union and World Wide Fund for Nature, RAOU Report no. 90.

Wetlands International (unpublished). *Guidelines for preparation of site nomination documentation for the East Asian-Australasian Shorebird Site Network*. Wetlands International, Oceania, Canberra. <http://www.deh.gov.au/water/wetlands/mwp/guidelines/index.html>

Wetlands International (2002). *Waterbird Population Estimates – Third Edition*. Wetlands International Global Series No.12, Wageningen, The Netherlands. 226pp.

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 coastal landforms of Glenelg Estuary and Discovery Bay Shorebird Site include beaches, coastal cliffs, headlands and dune fields. The coastline is a dynamic high-energy system. The Glenelg River Estuary and Long Swamp is recognised as a nationally important wetland (Environment Australia, 2001). Long Swamp is the largest of several shallow freshwater wetlands fed by a ground water aquifer in the Discovery Bay dune barrier system. The Glenelg Estuary is a large estuarine system (76 km) consisting of the main channel of the Glenelg River and a side lagoon called Oxbow Lake (Australian Wetlands Database).

16. Physical features of the catchment area:

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

The site is significant for a number of geological and geomorphic features; in particular the dune slack system is rare, if not unique within the bioregion (DELWP, 2017a). The site is set in the temperate zone (moderately dry, rainfall dominant winter, warm summer) of south-eastern Australia. The site is set in a the Glenelg Basin of the south Victorian Coastal Plain. The area is underlain by Tertiary limestone resulting in large karst formations.

17. Hydrological values:

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

The Glenelg River Estuary is the only river that discharges into Discovery Bay. The estuary is a modified, wave-dominated estuary (OzEstuaries Database). Smaller streams, such as Johnstones Creek, discharge water into Discovery Bay during periods of high rainfall.

The hydrology of the Ramsar site results from a complex interaction of surface and groundwater expression as well as local rainfall-runoff, particularly in the freshwater wetland and estuary management units. System hydrology is crucial to the functioning of the estuary, and the freshwater wetlands that include ecologically important fens (DELWP, 2017a).

The estuary is a seasonally closed, salt wedge type estuary. During low flow conditions the salt wedge of the Glenelg River often penetrates over 70km upstream.

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.

There are three main vegetation types within this site: coastal dune scrub complexes on sands and limestone headlands, dry and wet heaths and swamps, and mallee and woodland Eucalypt communities.

The invasion of Coastal Tea-tree *Leptospermum laevigatum* and Coastal Wattle *Acacia sophorae* over the last 150 years has greatly impacted the vegetation communities. There are some areas of pine forests adjacent to the site. However, most of the land adjacent to the site is agricultural land under exotic pasture for grazing.

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)

Discovery Bay Shorebird Site has some 320 native plant species recorded, with 27 of these threatened (Parks Victoria 2004).

The site is characterised by three major wetland dependent vegetation types that are critical to defining the character of the Ramsar site. These are (DELWP, 2017b):

1. Coastal saltmarsh associated with the Glenelg Estuary and Oxbow Lake.
2. Freshwater sedgeland and tall marsh vegetation associated with the Long Swamp wetlands.
3. Lake bed macrophytes - submerged macrophyte communities of the permanent lakes.

Threatened flora species and communities present at the site (DELWP, 2017a):

Coastal Saltmarsh

Maroon leek-orchid (*Prasophyllum frenchii*)

Swamp greenhood (*Pterostylis tenuissima*)

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)

Threatened fauna species present at the site (DELWP, 2017a):

Australasian bittern (*Botaurus poiciloptilus*)

Curlew sandpiper (*Calidris ferruginea*)

Fairy tern (*Sterna nereis nereis*)

Hooded plover (*Thinornis rubricollis rubicollis*)

Yarra pygmy perch (*Nannoperca obscura*)

Growling grass frog (*Litoria raniformis*)

Ancient greenling (*Hemiphysalis mirabilis*)

There are also records of 25 bird species listed under the Japan-Australia Migratory Birds Agreement (JAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the China-Australia Migratory Birds Agreement (CAMBA).

Discovery Bay Coastal Park is an important breeding area for the endemic Hooded Plover (*Thinornis rubricollis*) and supports more than 1% of the population (Hewish 1989).

Species	Number regularly supported at Discovery Bay	Minimum population estimate for Australia	1% of minimum population
Hooded Plover	60	5,000	50

Shorebirds that nest on the beach include Hooded Plover *Thinornis rubricollis*, Little Tern *Sterna albifrons*, Pied Oystercatcher *Haematopus longirostris* and Red-capped Plover *Charadrius ruficapillus*. Sanderling use the whole of the coastal strip but there are concentrations around the Glenelg River mouth. Endemic breeding species such as Hooded Plover and Pied Oystercatcher breed just above the spring high tide and adjacent sand dunes where suitable sites occur.

There are 15 native fish species that utilise the Ramsar site for part of their migration to fulfil lifecycle requirements.

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:

Glenelg Estuary and Discovery Bay has a long history of Aboriginal use dating back at least 11,300 years BP. Significant Aboriginal archaeological sites recorded for Discovery Bay include extensive shell middens, earth oven remains and numerous lithic materials such as edge ground axes, basalt grinding stones and flint artefacts. The greatest concentration of middens occurs between the freshwater swamps and the sea at the western end of Discovery Bay. Most sites are within 100m of the beach. Sites near Nelson include ear bones from Mulloway probably taken from the Glenelg River (Parks Victoria, 2004).

Discovery Bay Coastal Park is popular for walking, sightseeing and scenic drives. Numerous recreational activities are undertaken, including: camping, fishing, diving, surfing, water skiing and cycling. There are special areas for dune buggy driving, horse riding and walking dogs on leads.

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)

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:

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:

Land tenure/ownership is as follows (DELWP, 2017a)
Crown land – National Park managed by Parks Victoria in partnership with local stakeholders (13,276 ha)
Crown land – Crown reserve (36 ha)
Crown land – Coastal Park managed by Parks Victoria in partnership with local stakeholders (8,977 ha)

b) In the surrounding area:

23. Current land (including water) use:

a) Within the Flyway Network site:

Conservation and recreation.

b) In the surroundings/catchment:

Private property used for agriculture and pine forests, public land used for forest products and recreation and Victorian coastal waters.

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:

- Recreational activities require careful management to avoid adverse impacts on shorebird habitat and general disturbance to birds, particularly breeding birds. The use of 4WDs and dune buggies and the presence of horses and dogs are of particular concern.
- Pest animals, particularly cats and foxes, require careful management to reduce their impact on breeding birds.
- The invasion of Coastal Tea-tree and Coastal Wattle over the last 150 years has greatly impacted the natural vegetation communities but has not affected coastal areas of importance to shorebirds.
- The steepening of the beach and dune profile is under investigation for links to available nesting and roosting habitats along Discovery Bay beach.
- Long term changes affecting the Glenelg River Estuary, such as clearing of vegetation and erosion upstream of the site, impact on water quality in the river.
- Kentbruck Green Power Hub wind turbine project is a potential threat to the site's ecological character and is undergoing an environment effects statement (EES).

b) In the surrounding area:

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.

Discovery Bay Coastal Park was first proclaimed under Schedule Three of the *National Parks Act* on 26 April 1979 with an area of 8350 hectares. Additions of land in 1981, 1987 and 1997 have increased its

area to 10,460 hectares (Parks Victoria, 2004). Discovery Bay Marine National Park was proclaimed under Schedule Seven of the *National Parks Act* in November 2002.

Discovery Bay Coastal Park and Discovery Bay Marine National Park are managed by Parks Victoria. A management plan for Discovery Bay and other nearby coastal parks was published in 2004 (Parks Victoria 2004). Management plans for marine national parks will be prepared in the near future.

The management plan that covers Discovery Bay outlines an implementation program as follows: 'management programs for the planning area are prepared annually, in accordance with Parks Victoria's Corporate Plan and as a part of statewide prioritised program delivery. The performance of the plan's implementation will be measured and reported on as part of these statewide programs as implemented to June each year'.

The local community is involved in managing the Park with the main groups being: the Friends of the Great South West Walk, the Bridgewater Coast Action Group and the Portland Field Naturalists Club. The local indigenous people are also active in the Park, with the principal groups being: the Gournditch-Mara and the Winda Mara Aboriginal Corporation.

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):

la ; lb ; II ; III ; IV ; V ; VI ; N/A

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

Yes

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

Yes

d) Describe any other current management practices:

Glenelg Estuary and Discovery Bay Ramsar Site Management Plan
 Victorian Waterway Management Strategy (VWMS)
 Glenelg Hopkins Waterway Strategy 2014-2022 (GHWS)
 Ngootyoong Gunditi Ngootyoong Mara South West Management Plan

26. Conservation measures proposed but not yet implemented:

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

27. Current scientific research and facilities:

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

Volunteers conduct a Little Tern monitoring program with the assistance of Parks Victoria. The BirdLife Australia Shorebirds 2020 program conducted summer and winter counts of all shorebirds.

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.

Local schools use the Discovery Bay Coastal Park and are provided with education materials. The Great South West Walk that runs through the Park is used extensively by school groups involved in outdoor education and leadership development training. Notice boards, nature trails, site-specific and fauna-specific (eg. Hooded Plover) information located throughout the site provides education for park visitors.

29. Current recreation and tourism:

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

Discovery Bay is popular for walking, sightseeing and scenic drives. Numerous recreational activities can be undertaken, including: camping, fishing, diving, surfing, water skiing and cycling. There are special areas for dune buggy driving, horse riding and dog walking.

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			
Agriculture and aquaculture			
annual and perennial non-timber crops			
wood and pulp plantations			
livestock farming and ranching			
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 resource use			
hunting and collecting terrestrial animals			
gathering terrestrial plants			

logging and wood harvesting

fishing and harvesting aquatic resources

Human intrusions and disturbance

recreational activities

war, civil unrest and military exercises

work and other activities

Natural system modifications

fire and fire suppression

dams and water management/use

other ecosystem modifications

Invasive and other problematic species and genes

invasive non-native/alien species

problematic native species

introduced genetic material

Pollution

household sewage and urban waste water

industrial and military effluents

agricultural and forestry effluents

garbage and solid waste

air-borne pollutants

excess energy

Geological events

volcanoes

earthquakes/tsunamis

avalanches/landslides

Climate change and severe weather

habitat shifting and alteration

droughts

temperature extremes

storms and flooding

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

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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;** peat swamp 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 character 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

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