Information Sheet on EAA 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 Flyway Partnership Secretariat. Compilers should provide an electronic (MS Word) copy of the Information Sheet and, where possible, digital versions (e.g. shapefile) of all maps.

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

a)

EAAF SITE CODE FOR OFFICE USE ONLY:

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2. Date this sheet was completed*:

DD/MM/YYYY

xx/07/2005

3. Country*:

Australia

4. Name of the Flyway Network site*:

Accepted English transcription of the Site's name.

Currawinya National Park

5. Map of site*:

The most up-to-date available and suitable map of the wetland should 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.

The site's centre is located at approximately: Longitude 144°29′ E, Latitude 25°50′ S.
Decimal: -25.83333, 144.48333 (lat, long)

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

The major lakes are between 119-132 m ASL.

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.

151,300 ha

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.

Currawinya National Park is a Ramsar listed park and contains one of the richest and most diverse samples of wetlands in inland Australia, consisting of a mosaic of low dunefields, lakes, claypans and saltpans, dissected tablelands and low hills. Numerous plant and animal species are at the extremes of their natural distribution here, and the site includes uncommon plant communities and habitat for rare and endangered species.

The park was the first of a number of reserves acquired to ensure the conservation of the biodiversity of mulga-land communities, a bioregion, which had previously been poorly represented.

The wetlands of the park act as a flood control mechanism and a drought refuge for birds and wildlife, with the site consistently supporting up to 100,000 waterbirds from 41 species. Of particular importance is the presence of Lakes Numalla and Wyara within the park, with no other wetland complex in arid or southern Australia thought to constantly support such large populations of waterbirds (Paynter, 1998).

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 remote location and large area of this site make regular counting difficult, but also contribute to continued habitat health. Therefore, whilst the published counts are over 10 years old and no repeat counts are available, it is assumed that the site does regularly support similar numbers of the species listed below.

Currawinya National Park meets the network criteria in that:

- It regularly[#] supports > 1% of the individuals in the population of a species of migratory shorebird. (Refer to table below)

Popular English Name	Scientific Name	Minimum Population Estimate*	1% Criteria	Count	Count Date(s) #	Reference
Sharp-tailed Sandpiper	*Calidris acuminata*	160 000	1 600	2 000	05-02-83	AWSG (digital database)

* Minimum Polulation Estimates from Wetlands International (2002).

The majority of sites in the East Asian – Australasian Flyway do not have sufficient count data to meet the Ramsar guidelines for defining the term "regularly supports". Allowance has been made for sites in remote areas where regular count information cannot be collected, and it is accepted that single counts can help establish the relative importance of the site for a species (Ramsar Convention Bureau 2000; Bamford *et al* 2006). Thus for the East Asian – Australasian Flyway, Currawinya is considered to have met the 1% criterion on the basis of a single count.

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 site is an inland wetland and includes wetland types: N, O, P, R, Q and Ts.

12. Jurisdiction*:

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

Territorial jurisdiction is with the Queensland Environmental Protection Agency (State).

Functional jurisdiction is with the Queensland Parks and Wildlife Service.

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.

Environmental Protection Agency, PO Box 15155, CITY EAST, QLD, 4002.

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 Department of Environment and Heritage. (1999) *Information Sheet on Ramsar Wetlands – Currawinya Lakes (Currawinya National Park)* [online] Available: http://www.deh.gov.au/cgi-bin/wetlands/search.pl?smode=RAMSAR [09/02/04].

Australian Nature Conservation Agency. (1996) *Directory of Important Australian Wetlands. Second Edition*. ANCA: Canberra.

AWSG: Australasian Wader Studies Group database. Birds Australia, Melbourne, Australia.

Bamford, M., Watkins, D., Bancroft, W., Tischler, G. And Wahl, J. (In Press). Migratory Shorebirds of the East Asian – Australasian Flyway: Population Estimates and Internationally Important Sites. Wetlands International Global Series, and International Wader Studies. Wetlands International – Oceania. Canberra, Australia.

Buckland, S.T., Anderson, D.R., Burnham, K.P and Laake, J.L. (1993) *Distance Sampling - Estimating abundance of biological populations*. Chapman and Hall, London.

Cottingham, P. (1999) *Scientific Forum on River Condition and Flow Management of the Moonie, Paroo, Bulloo and Nebine River Basins*. Report prepared for the Queensland Department of Natural Resources (Cooperative Research Centre for Freshwater Ecology: November 1999).

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Gasteen, W. (1985) Currawinya National Park:Mulga Lands Biogeographic Region. In *Background Information for the Mulga Lands Biogeographic Region*. Report to Queensland National Parks and Wildlife Service, Brisbane.

Gasteen, W. (1985) *The Currawinya Lakes National Parks Proposal*. Unpublished report to the Queensland National Parks and Wildlife Service.

Geeves, J. and Thomas, M. (1992) Bird Observations for Lake Numalla and Lake Wyara - Currawinya National Park, south-west Queensland. *The Queensland Naturalist* 31 (5-6): 114-118.

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Kingsford, R.T. (1995) Occurrence of high concentrations of waterbirds in arid Australia. *Journal of Arid Environments*. 29: 421-425.

Kingsford, R.T. and Porter, J.L. (1994) Waterbirds on an Adjacent Freshwater Lake and Salt Lake in Arid Australia. *Biological Conservation*. 69: 219-228.

Leggett, R. (1992) A report of freshwater fish and water quality at Eulo and other sites in south-west Queensland. *The Queensland Naturalist*. 31 (5-6): 119-122.

Ley, A.J. and Davie P. (1995) Birds of Currawinya National Park, South-west Queensland. *Sunbird* 25(2): 31-43.

Page, M.J., Newlands, L. & Eales, J. (2002) Effectiveness of three seed-trap designs. *Australian Journal of Botany*. 50(5):p.587-594.

Paynter, A. (1998) *Currawinya National Park Resource Document*. Department of Environment, Brisbane, Queensland.

Purdie, R.W. (1985) *Currawinya Key Area, Mulga Lands Biogeographic Region*. Unpublished Report, Queensland National Parks and Wildlife Service.

Queensland Parks and Wildlife Service (1999) *Currawinya National Park – Management Plan*. [online] Available: http://www.epa.qld.gov.au/publications?id=200 [09/02/04].

Queensland Parks and Wildlife Service (2001) *Visitor Information – Currawinya National Park*. [online] Available: www.env.qld.gov.au [09/02/04].

Ramsar Convention Bureau. (2000). Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands. Ramsar Convention Bureau, Gland. www.ramsar.org/key_guide_list_e.htm

Robins, R. (1999) Clocks for Rocks: An Archaeological Perspective on the Currawinya Lakes in R.T. Kingsford (ed.) *A Free-flowing River: The Ecology of the Paroo River*. National Parks and Wildlife Service: Sydney. pp. 150-178.

Robins, R.B. (1993) *Archaeology and the Currawinya Lakes: Towards a Prehistory of Arid Lands of Southwest Queensland*. Faculty of Environment Sciences, Griffith University, Brisbane.

Timms, B.V. (1997) *A study of the wetlands of Currawinya National Park - A report to the Queensland Department of Environment - July 1997*. Department of Geography and Environmental Science: The University of Newcastle.

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Watts, R.J. (1999) Biodiversity in the Paroo River and its wetlands. In R.T. Kingsford (ed.) *A Free-flowing River: The Ecology of the Paroo River*. National Parks and Wildlife Service: Sydney. pp. 13-22.

Wetlands International (2002). Waterbird Population Estimates – Third Edition. Wetlands International Global Series No.12, Wageningen, The Netherlands. ISBN 90 5882 012 2

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.

Currawinya National Park consists of a mosaic of low dunefields, lakes, claypans and saltpans. These occupy a central strip between rugged hills and scarps to the north and west, which rise 50m or more above the surrounding sand plains. Although the numerous lakes and swamps are scattered across alluvial areas of uniform relief and similar geological age, some are freshwater and others, often quite close and divided by only low levees, are salt or strongly brackish.

The rugged hills and scarps on the north of the park represent the southern extension of Hoods Range. This range mostly consists of deeply weathered sediments of the Cretaceous Winton Formation, which, in some places, are overlain by remnants of the Tertiary Glendower Formation quartz sandstones. Associated with these are fresh sediments of the Winton Formation with a thin silcrete cover (Dawson and Boyland, 1974). A small area of granite, of Middle Devonian age, is present at the foot of the Range. Dissected tablelands and low hills occur to the east, south and west of Lakes Wyara and Numalla, rising 50m or more above the surrounding sand plains. An extensive dissected tableland, with steep escarpments, rubble

slopes and occasional isolated mesas, occurs to the west of Lake Wyara, with associated low hills to the west and south of the lake. The area consists of Tertiary Glendower sediments, frequently silicified, overlying fresh or chemically altered Cretaceous Winton Formation sediments, which are often exposed. The undulating plains and low hills associated with the tablelands consist of the remnants of the Tertiary Glendower Formation sediments, interspersed with superficial Quaternary silcrete gravel deposits (Dawson and Boyland, 1974). Soils associated with the ranges and hills are predominantly lithosols and very shallow red earths, which often have a surface cover of silcrete stones and boulders. The soils on the associated plains are predominantly shallow to moderately deep, red earths and loamy red earths, with silcrete frequently present on the surface and through the profile. A mosaic of low dunefields, lakes, claypans and salt pans occupies a wide central strip of the area between Hoods Range and the western tablelands while extensive sand plains occupy much of the remaining area to the south and east. The sand plains and dune fields are mostly composed of aeolian sands, derived from Tertiary and Cretaceous sandstones, which overlie Quaternary alluvial deposits. The latter mostly consist of clay and are exposed in the pans and lakes, and in the drainage lines, which traverse the sand plains. The soils on the plains are predominantly shallow to moderately deep, sandy red earths in which hard pans are common. The low dunes consist of very deep, red sandy earths, with grey and brown clays in the associated claypans and saltpans.

The two major lakes in the area are separated by only three kilometres of Quarternary sand deposits, but have completely different catchments. The saline Lake Wyara receives water from Werewilka Creek, whose tributaries drain the Willies Range (about 50km NNE of Lake Wyara) and the western slopes of Walters Range (NNW of Boorara Homestead). Paroo River flood water has reached Lake Wyara four times in 108 years. (Timms B., 1999). The freshwater Lake Numalla in contrast, receives water from Boorara Creek, which drains the eastern slopes of Willies Range and the western slopes of the Hoods Range (N and NE of Boorara homestead respectively) and from Carwarra Creek, a waterway of the Paroo River system, every 0.8 years (Timms B., 1999) which drains the southern and eastern slopes of the Hoods Range. The lakes are permanent water bodies except during extreme drought. They are the focus of drainage from the surrounding areas for most of the time, although in extremely wet periods surplus water from Lake Numalla may flow south and into the Paroo River Channels. During periods of exceptional drought both lakes have dried and did so at the beginning of 2005. Other smaller semi-permanent lakes within this system include Lake Kaponyee (north and south), Lake Yumberarra and Lake Karetta. The first is fresh while the latter two are brackish. The soils of the lakes are mostly grey clays, which frequently have a crusted surface. On the eastern sides of Lake Wyara and larger saltpans, fringing crescentic dunes are present. They are composed of recent sand blown from the exposed lake beds and have soils of deep, gypseous and calcareous sand. The flatter areas fringing the dunes have strongly alkaline grey clay soils.

The remaining lands of the National Park consist of alluvial plains mostly associated with the Paroo River and its local tributaries. These are derived from Quaternary alluvial deposits, mostly of clay, and consist of steep-sided, braided channels interspersed with flat plains, with minor areas of poorly drained swamps. The gradients of the Paroo floodplain are low, with a drop of about 15m from the north of old Caiwarro homestead to Hungerford, a distance of about 60km. The soils associated with the floodplains are predominantly alluvial grey clays frequently subject to scalding, and minor areas of texture-contrast soils. A few springs and numerous permanent waterholes also occur mostly associated with the Paroo River channels. Remnants of mound springs occur in the Hoods Range area to the east of Lake Numalla, on alluvial plains or old alluvial areas now covered with sand. Generally all that remains of the springs are dry circular depressions often with a raised lip.

The park was originally two pastoral properties, Currawinya and Caiwarro. Both properties were heavily grazed under their leases until 9 May 1991, when the park was gazetted.

Climate: The general area has a very dry hot climate with a marked summer maximum rainfall. The average rainfall at Currawinya is 276 mm per annum, rising to 292 mm at Hungerford in the southeast and 282 mm at Thargomindah in the northwest. Daily average temperatures in January at Thargomindah, the nearest centre where detailed records are available, are 36.4^{o}C (maximum) and 23.3^{o}C (minimum), while in July they are 18.9^{o}C (maximum) and 5.6^{o}C (minimum}.

16. Physical features of the catchment area:

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

17. Hydrological values:

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

The area has a combination of terminal lakes and flow-through areas (Paroo River channels), with the floodplains of the Paroo River occurring in the south-eastern section. It acts as a flood control mechanism for the area, and a drought refuge for wildlife. The area contains one of the richest and most diverse samples of wetlands in inland Australia. Waterbird populations exhibit boom and bust periods in response to flows on dryland river systems (Cottingham, 1999). The Currawinya wetlands, along with many other western river catchments, depend on water from local and regional rainfall and runoff, stream inflows and river floods (Cottingham, 1999).

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.

Currawinya National Park contains excellent examples of the typical vegetation of southwestern Queensland, such as mulga *Acacia aneura* communities on the tablelands, low hills and associated plains, mulga-poplar box *Eucalyptus populnea* communities on the sand plains, and gidgee *Acacia cambagei* communities on the alluvial flood plains (Purdie, 1985). Shrubland and woodland communities dominated by yapunyah *Eucalyptus ochrophloia* or turpentine mulga *A. brachystachya* which are restricted in their distribution in south-western Queensland (though more common further south) also occur on the alluvial plains and the tablelands and low hills respectively.

Other communities contain species that are at the extremes of their natural distribution, such as lancewood *A. petrea* and black box *E. largiflorens*. A number of plant communities are important because they are uncommon, for example samphire low shrublands and sedgelands dominated by *Cyperus gymnocaulis*. These occur mainly in the area of dunefields and associated lakes and claypans. Rare species such as *Melaleuca densispicata* and *Maireana pyramidata* also occur in the area.

Lake Numalla is variously fringed by black box low woodlands, belalie *A. stenophylla* open shrublands and sedgelands dominated by *Cyperus gymnocaulis*. Areas of saline flats on the edge of the lake support samphire low open shrublands. Boobialla *Myoporum acuminatum* shrubs are commonly associated with all the lake communities, in areas upslope of the most recent water level.

The vegetation surrounding the saline Lake Wyara is a complete contrast to that associated with Lake Numalla. The muddy flats and lower slopes of the fringing dunes support dense samphire low shrublands in which *Lawrencia glomerata* and pig face *Sarcozona praecox* may be common. On the eastern side of the lake, various samphires form distinct bands progressively upslope from and run parallel with the shore. At the northern end of Lake Wyara an open woodland of large river red gum *E. camaldulensis* trees are present at the foot of the fringing dune on what is probably a very old, exposed shoreline. Lake Wyara supports abundant halophilic macrophytes (salt tolerant water plants), plankton, and epiphytic algae and these provide the nutrition basis for water birds.

The alluvial flats and drainage channels associated with the dunefields and sand plains, and with the Paroo River, generally support yapunyah and/or gidgee woodlands and open woodlands. A low shrub layer of lignum *Muehlenbeckia cunninghamii*, some swamp canegrass and scattered creek wilga *Eremophila bignoniiflora* and belalie shrubs are often present with

yapunyah in swampy areas, while lignum fuchsia *Eremophila polyclada* may be present in areas flooded less frequently. River red gum woodland or open woodland may fringe the main channels of the Paroo, particularly along permanent waterholes.

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)

The area contains excellent examples of plant communities, which, although dominated by species widespread throughout the Mulga Biogeographic Region, are most typical of, and common in, the southwestern part of the region. These include mulga, bastard mulga and western dead finish communities on the tablelands, low hills and associated plains; mulga-poplar box communities on the sand plains; and gidgee communities on the alluvial flood plains.

Two species which have a more restricted distribution within the mulgalands, but which are widespread outside it in other States, reach the peak of their development in the Currawinya area. These are yapunyah and turpentine mulga. In Currawinya, excellent examples of scrubland and woodland communities dominated by yapunyah or turpentine mulga occur on the alluvial plains and the tablelands respectively.

The area also contains representatives of a number of vegetation types, which are of special biogeographical value because their dominant species are at the extremes of the natural ranges of distribution. Poplar box and leopardwood are at the western and southwestern limits of their ranges respectively. Lancewood, which is restricted to the Mulga Biogeographic Region, is at the southwestern limits of its range on Currawinya. Communities dominated by black box represent the northern inland limits of its range in Australia.

A number of communities in the key area are important because they are uncommon in the mulgalands and Queensland due to their habitat requirements. They mostly occur in the area of dunefields and associated lakes and claypans and include the samphire low shrublands to low open or sparse shrublands, the budda shrublands and the sedgelands dominated by *Cyperus gymnocaulos*. Rare species and communities include the shrub *Melaleuca densispicata*, which forms groves that are locally common on the lower slopes of dunes near saltpans and claypans. Black bluebush *Maireana pyramidata* is a low shrub which is extremely rare in Queensland, and the low shrublands which occur on the western side of Lake Numalla are far to the north-east of its main range, and are the most easterly populations in Queensland. Inland belah *Casuarina pauper* also just extends into Queensland where it is relatively rare. The tall shrublands and low open woodlands on the western slopes of the Hoods Range represent the most eastern

occurrence of the species in Queensland. In contrast the scattered wilga *Geijera parviflora* plants, which are associated with the inland belah, are at the western extremes of the species' range in Queensland. The black bluebush and inland belah in Currawinya National Park may represent relict populations, or a rare occurrence in Queensland, of suitable habitats.

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)

Lakes Wyara and Numalla are very important sites for waterbirds in Australia. Kingsford and Porter (1994), reported that in March 1988, total numbers of waterbirds probably exceeded 280 000. No other wetlands in arid or southern Australia are thought to consistently support such high numbers of waterbirds, while only the wetlands of the Northern Territory in the dry season, Lake Eyre North (South Australia), Lake Galilee (Queensland) and Lake Gregory (Western Australia) have comparable numbers.

Up to 59 species of waterbird have been recorded from Currawinya National Park. All of these species occur at Lake Yumberarra, while Kingsford and Porter (1994) recorded 41 species from Lakes Wyara and Numalla. Though more species have been recorded at Lake Numalla (39) than Lake Wyara (31), numbers on Lake Wyara greatly exceed those on Lake Numalla.

The lakes are thought to be the most important dry refuge habitat in Australia for the freckled duck *Stictonetta naevosa*. Of an estimated total population of 19,000, mean estimates of 2,400 plus or minus 1,000 (0-9,700) and 1,200 plus or minus 500 (0-5000) have been recorded for Lakes Numalla and Wyara respectively (Kingsford and Porter, 1994).

In common with Lake Bindegolly to the north, these lakes are significant breeding sites for waterbird species. Australian pelicans *Pelecanus conspicillatus*, black swans *Cygnus atratus*, red-necked avocets *Recurvirostra novaehollandiae*, Caspian terns *Steerna caspia*, cormorants *Phalacrocorax* spp. and silver gulls *Larus novaehollandiae* have been recorded breeding on islands of Lake Wyara, while pied cormorants *Phalacrocorax varius*, white-necked Heron *Ardea pacifica*, Australian white ibis *Threskiornis molucca*, royal spoonbills *Platalea regia*, yellow-billed spoonbills *Platelea flavipesand* Pacific black ducks *Anas superciliosa* have been recorded breeding around Lake Numalla, where extensive reedbeds in some areas provide excellent protected sites (Gasteen,1985). Other avian species recorded include raptors (whistling kite *haliastar sphenurus*, wedge-tailed eagle *Aquila audax,* little eagle *Hieraaetus morphnoides*, swamp harries *Circus approximans)* and various parrots (Bourke's parrot *Neopsephotus bourki,* Australian pink cockatoo *Cacatua leadbeateri).*

The area is comparatively rich in wildlife due to the wide variety of habitats present and generally permanent waterbodies. The periodically inundated alluvial flats and drainage channels which support lignum, swamp canegrass and *Cyperus gymnocaulos*, provide suitable habitat for Australian crakes *Porzana fluminea* and other fauna. Over 180 species of birds have been recorded (Purdie, 1985; Geeves and Thomas, 1992), as well as 15 species of frogs, five species of fish (Leggett, 1992), Krefft's river *Emydura krefftii* and snake-necked *Chelodina longicollis* tortoises and other reptiles.

The Currawinya lakes system, in conjunction with other permanent and semi-permanent waters in southwestern Queensland such as Lakes Bullawarra, Bindegolly and Toomaroo, also form part of an inland route to southern Australia for migratory waders. Eighteen migratory bird species protected under the Japan-Australia and/or China-Australia Migratory Bird Agreements occur at Currawinya National Park alone, namely the great egret *Ardea alba*, glossy ibis *Plegadis falcinellus*, black-tailed godwit *Limosa limosa*, common greenshank *Tringa nebularia*, red-necked stint *Calidris ruficollis*, sharp-tailed sandpiper *Calidris acuminata*, curlew sandpiper *Calidris ferruginea*, marsh sandpiper *Tringa stagnatilis,*Caspian tern *Sterna caspia*, white-winged black tern *Chlidonias leucopterus* and rainbow bee-eater *Merops ornatus*, ruddy turnstone *Arenaria interpres interpres*, oriental plover *Charadrius veredus*, fork-tailed swift *Apus pacificus*, Latham's snipe *Gallinago hardwickii*, wood sandpiper *Tringa glareola* and white-bellied sea eagle *Haliaeetus leucogaster*.

Currawinya is rich in marsupial species being within the edge several distribution ranges. It is just within the northern limits for the western grey kanagaroo *Macropus fuliginosus,* and the western limit of the koala *Phascolarctos cinereus* and brush-tailed possum *Trichosurus vulpecular.* Other kangaroo species and also smaller marsupial species, usually nocturnal, are also found within the site.

The site hosts various amphibian species including species from the seldom seen burrowing frogs grouping including the water-holding frog *Cyclorana platycephala,* trilling metal-eyed frog *Neobatrachus centralis* and holy cross toad *Notaden bennetti.*

A wide variety of crustaceans, evolved to cope with the arid conditions and the ephemeral nature of water bodies, are supported within Currawinya. These include fairy shrimps *Branchillella spp,* copepods (*Boeckella robusta* and *Calamoecia zeidleri)* and shield shrimps (*Triops spp).*

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:

Aboriginal

Aboriginal people have a strong affiliation with Currawinya National Park, as evident in personal accounts and the physical remains of occupation (archaeological sites) found in the park. An important series of aboriginal sites occur in the area. Two sites have been dated, one at 400 years Before Present and the other at 1600 years Before Present. Stone arrangements, native wells and dams, trees with areas of bark removed (for canoes, shields etc.), evidence of huts, stone artefacts, quarries and burial grounds are evident. Artefact scatters are ubiquitous, and around streams and springs their density dramatically increases. Around Lake Numalla and to the east artefact scatters appear clumped around claypans and some mound springs. Currawinya and its river and wetland environments are traditionally areas of great significance to Aboriginal people. There is a long history of association between Aboriginal people and the Paroo River and its lakes and floodplains (Robbins 1999). The exact location of tribal boundaries is still to be confirmed.

Archaeological evidence indicates that certain areas within the park may have been occupied about 11 000 years ago (Robins 1993). The park provides excellent opportunities for the involvement of Aboriginal people in the management and interpretation of such sites and offers park visitors the chance to increase their awareness of Aboriginal culture.

There are three Native Title Claims over the Park.

Post-European

Currawinya National Park incorporates the areas of two former pastoral properties, Currawinya and Caiwarro. These properties originally occupied much larger areas, and included all or part of neighboring properties. Currawinya was first occupied for pastoral use in 1865, and Caiwarro in 1864. In 1924, the two properties were amalgamated under the Paroo Pastoral Company, although they continued to be managed as separate units. Caiwarro homestead was abandoned and demolished in 1971. Management was moved to Currawinya homestead, and the two leases were formally amalgamated as Currawinya in 1974.

Little remains of the homestead complex at Caiwarro, as the majority of the buildings have been damaged by flood and subsequently demolished. However, the site offers the opportunity to examine the layout of the homestead area and surrounding yards. This reflects the social stratification amongst managers, jackaroos, stockmen and servants on properties in previous

years. The Caiwarro ruins also present an opportunity to observe construction techniques of the time (1890s), most notably the brick and pisé construction which was common in the area.

The park also contains relics, which demonstrate pastoral practices of early settlers, such as sheepyards and runs used by shepherds before the property was fenced, and fences which demonstrate early fence building techniques. A small amount of old machinery, such as the pump used to draw water from the Paroo River to irrigate a fodder-growing area on Caiwarro, remains on the park and is of cultural heritage significance.

Scenic and aesthetic values

The Australian outback is renowned for its open spaces and desolate natural beauty. In the midst of a harsh, semi-arid environment, dominated by extensive sandplains and rocky, residual ranges, Currawinya's lakes, river and wetlands provide areas of both stark visual contrast and great beauty and tranquility, which are not common in the region.

Recreation and tourism

Straddling major roads leading to Cunnamulla, and to Bourke and Wilcannia in New South Wales, Currawinya National Park is becoming a major tourist attraction in the Eulo–Hungerford–Thargomindah area. The remote and arid landscape of southwestern Queensland has contributed to the popularity of protected areas within the region.

Visitation to southwestern Queensland is steadily increasing. In 1994–95, 208 000 Australian visitors were attracted to the western Queensland area, with 78 000 of these visiting southwestern Queensland. An additional 3000 international visitors were recorded during the same period (Queensland Tourist and Travel Corporation, January 1996).

Currawinya provides opportunities for visitors to participate in a number of nature-based recreation activities, which are not widely available in the general area. The park provides an outback setting in which visitors can pursue popular recreational pursuits such as camping, bushwalking, nature observation (particularly birdwatching) and nature photography, and at the same time enjoy a sense of adventure in a reasonably remote area.

Economic values

Statistics provided by the Queensland Tourist and Travel Corporation (January 1996) show that during 1994–95 direct tourism expenditure in southwestern Queensland totalled $17.4 million.

Visitation to Currawinya National Park is currently estimated at 2000 visitors a year. This number has increased, and is likely to continue to increase in future years, further

supplementing the economies of local rural centres located en route to the park, such as Hungerford, Eulo, Thargomindah, Bourke and Cunnamulla. Expenditure in the local communities is likely to be for accommodation, transport, food and beverages, shopping and other incidentals.

Research and scientific values

The diversity of landforms and vegetation types within Currawinya National Park provides the area with a high potential for the development of reference sites, which will aid the management of pastoral properties in the area. The provision of information on pasture condition and trend in the absence of domestic stock and on trends in populations of the dominant tree and shrub species may have broadscale land management implications. The park also offers great opportunities for research into geomorphologic processes associated with inland lake systems, the ecology of native bird species, particularly waterbirds, and the general ecology of inland lakes and mulga communities. Research that is carried out on Currawinya National Park can also aid in the management of the park. The pastoral history and Aboriginal use of or associations with the Currawinya area warrant further investigation and documentation.

Education and interpretation values

National parks offer visitors not only the chance to enjoy nature-based recreational pursuits but also an opportunity to gain knowledge of the native plants, native animals and natural processes associated with a region. The park provides an ideal natural resource for formal and informal education. School groups, tertiary institutions, local community members and interest groups can use the park to study the processes associated with inland wetland systems, other characteristic semi-arid landforms, and native plant and native animal ecology, particularly that of waterbirds and macropods. Public appreciation of the cultural importance of the area can be increased by reference to historic pastoral activities, Aboriginal culture and places associated with areas such as the mound springs and the Granites.

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:

The site is a National Park and is therefore estate of the Queensland Environmental Protection Agency.

b) In the surrounding area:

The surrounding area is leasehold, occupied by private individuals and pastoral companies for grazing purposes. The Hungerford Town Common, which is administered by the Bulloo Shire Council, also abuts part of the southern boundary of the park.

23. Current land (including water) use:

a) Within the Flyway Network site:

Conservation management, tourism, recreation, scientific study and education of school groups. Only low-level use is made of the national park due to its remoteness and the low population of the region however this is increasing. Aboriginal groups with traditional affiliations to the area have been identified.

b) In the surroundings/catchment:

Extensive grazing properties, which predominantly run sheep, with some cattle, surround the park and occur within its catchment. The Hungerford Common, which abuts part of the southern boundary, is used for the grazing of cattle and horses. Generally speaking, the surrounding properties are timbered rangelands where grazing occurs over natural environments. Mulga is often pulled or cut as drought fodder for sheep and cattle.

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/Present: Disturbance from its previous use as a pastoral lease is still evident. However it was in relatively good condition when it was purchased. Management as a national park will gradually allow the area to revert to its natural state. Feral pigs and other feral animals cause minor disturbance, but control measures are taken to mitigate this. Excess numbers of natural wildlife are expected to be lowered by reducing the

number of artificial watering points that are a historical relict of the time when the area was a pastoral holding. The major threat in the catchment is overgrazing and soil erosion. *Potential:* Overgrazing in the catchment and associated soil erosion may have implications for sediment deposition in the lakes.

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.

Currawinya was gazetted as a National Park in 1991, occupying a total area of 148 000ha. A year after its gazettal, an additional area including the boundaries of Lake Wyara was added, increasing the conserved area to the current 151 300ha. Dedication of the area as a National Park provides the highest level of protection for conservation of wildlife habitat values that is available in Queensland under the Queensland *Nature Conservation Act 1992*.

Currawinya National Park is also listed under the Ramsar convention as a Wetland of International Importance. A management plan has been prepared for the park, which incorporates Ramsar values. The management plan includes strategies for management of natural and cultural resources and recreation and tourism. Strategies include but are not limited to control measures for feral animals, potential pest species and weeds, restriction of tourist access to sensitive sites, consultation with neighbouring landholders, procedures for fire management and monitoring and surveying of natural resources, in particular, rare and threatened species.

Lakes Numalla and Wyara have also been included in the Directory of Important Wetlands in Australia.

Water extraction from the Paroo River poses a serious threat to the integrity of the Currawinya wetlands. The signing of the Paroo River Agreement in 2003 should minimise and manage threats relating to water extraction.

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?:

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

d) Describe any other current management practices:

26. Conservation measures proposed but not yet implemented:

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

The park management plan was produced in February 2001 and a number of guidelines and actions detailed in the plan are yet to be implemented. Some of the more notable conservation measures yet to be implemented are outlined below:

Sedimentation Study (Lake Wyara): The complex network of lakes, rivers and wetlands within Currawinya National Park are amongst the most significant wetlands in Australia, supporting at times more than 250,000 waterbirds. Sedimentation threatens their ecology and hydrology. Continued deposition of sediments within Lake Wyara, the largest of the Currawinya lakes, will result in the formation of a land bridge from the mainland to its breeding islands, consequently putting the thousands of birds which breed on these islands at risk of predation and inundation. A submission for funding will be made for a project to determine the extent and rate of sediment build-up, establish baseline data for future monitoring and make management recommendations. Community awareness strategies will focus on the significance of the wetlands at Currawinya and of the arid region in general, threats to these wetlands (eg. sedimentation) and improved management approaches.

Bird Hides (Lake Numalla): A proposal is drafted towards gaining funding to install a bird hide on the edge of Lake Numalla to facilitate appreciation and education of a range of waterfowl and their habitats in arid Australia.

Bilby Enclosure: To enhance education and awareness of this threatened species.

Currawinya Woolshed Complex: The potential exists to develop the Currawinya Woolshed towards visitor management and environmental education, encompassing threatened and significant species in arid Australia.

The management plan also recommends establishment of a scientific research base on the park, as the provision and maintenance of suitable infrastructure are likely to attract continuing research to the park.

27. Current scientific research and facilities:

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

The University of Newcastle is collecting information on the geomorphology and hydrology of the wetlands, together with an assessment of the physicochemical characteristics of the waters and their invertebrate populations. Data collection began in 1987 and was compiled into a report to the Queensland Department of Environment in July 1997. Professor Brian Timms continues to collect data on an intermittent basis.

The University of Newcastle is undertaking a project which aims to reconstruct changes in vegetation and climate over the last 50 000 to 100 000 years within the Paroo and Warrego River catchments, by looking at the palaeo-environmental record preserved in lake and associated lunette dune sediments.

In the past, park staff regularly conducted bird surveys on the major lakes within the park and have records of species presence and abundance.

The QPWS is studying bilby ecology associated with their reintroduction into the centre of its former geographical range in Australia.

Since 1991, the QPWS have conducted annual aerial surveys from helicopters over Currawinya National Park as part of its macropod monitoring program. This program has employed line transect methodology (Buckland et al.1993) that is significantly more robust to variations in sightability than standard fixed-wing methods. The surveys involve direct counts of all macropods and other large visible species including emus, feral goats, pigs and stray livestock. The Currawinya survey block includes eight 80km east-west transect lines that have been placed systematically 10km apart covering the north-south extent of the national park. Sampling intensity within each block is approximately 2.5%. The block is surveyed once annually between May and July.

The University of Queensland, Gatton Campus is coordinating and/or supervising a number of research projects on Currawinya National Park. They are outlined below:

Vegetation Monitoring

In 1992 when Currawinya was gazetted, a monitoring program was set up to measure the effect of management strategies on vegetation. Vegetation monitoring sites were set up for the three dominant vegetation types on the park; Sandplain Mulga, Dunefields and Alluvials. The sites were also set up under three grazing regimes; off-park (domestic, feral and native grazing), on-park (native and reduced feral grazing)and exclosures (no grazing pressure). These sites have been measured at least annually for 11 years. This data provides insights into the effects of management strategies, restoration potential and seasonal impacts. The continuation of this monitoring program is essential and will provide useful data for the long-term vegetation dynamics and management in the mulga lands.

Woody Weed Removal Trial

Woody shrubs have increased significantly in density in Australian rangelands, including within Currawinya National Park, most noticeably since the early 1970s. This may be attributed to the increase in grazing pressure, lack of fire and climatic condition. In 1993, shrubs were removed from plots in two vegetation communities at Currawinya National Park (Sandplain Mulga and Dunefields) under three grazing regimes (on-park, off-park and exclosure). This project has shown that attempting woody shrub control can help achieve restoration outcomes but only if grazing pressure is also managed. The continued monitoring of these sites will provide more long term information about the dynamics of these systems in the absence of woody weeds.

Seed Rain Trial

Seed rain is the seed that is dispersed from standing vegetation in an area. It is proposed that by quantifying seed rain the regenerative capacity of the system can be measured. This is because the seeds being dispersed in an area will primarily determine the next generation of plants that germinate. Thus this method can potentially measure current and future conditions and biodiversity. Prototype seed traps have been specifically designed to measure seed rain in Australian rangelands and their performance evaluated (Page *et al*. 2002). This project seeks to determine if these seed traps can adequately measure seed rain and if the data collected can be used to indicate rangeland condition and biodiversity status. If successful, this method has significant potential as a cost effective, scientific tool and as an indicator of future change. In addition, such information can be linked to quality assurance for rangeland productions systems. Traps are being deployed in 2004, complimenting the vegetation and woody weed monitoring projects mentioned above.

Fire and Seed Banks

Fire has been an integral factor in the evolution of many Australian ecosystems, but has declined markedly since European settlement. Land managers are now aware that fire is a potentially useful tool to help restore ecosystems, manage endangered species and promote biodiversity. However, there is generally insufficient information to determine the most

appropriate fire regime for specific ecosystems. Experimenting with fire *in situ* is time consuming, expensive and may result in undesirable outcomes. As such, a method of determining the ecological effects of different burning regimes before actually burning would be useful. This study is being undertaken on Currawinya National Park in south west Queensland's mulga lands. In this region, fire has been absent from the system for a prolonged period and degradation is evident. It is thought that fire may assist in controlling woody weed populations and improving biodiversity. We are comparing the response of the seed bank to the artificial application of heat and/or smoke, and burning in situ. The results will not only provide information about seed dormancy and response to fire but will also allow us to assess if it is possible to simulate the ecological effects of fire before burning. This may assist in achieving conservation and restoration objectives in Australia's rangelands.

Bilby Release Projects

Extinction rates of native terrestrial fauna in Australia have been amongst the highest in the world and strong evidence suggests that feral animals and livestock have been a significant factor in their demise. The distribution of the bilby once covered over 70% of Australia but today populations have decreased due mainly to cat and fox predation and disease. The management of this species is now centred on captive breeding and reintroduction programs. The QPWS with support of the Wildlife Preservation Fund of Queensland, Save the Bilby Fund and QPWS have constructed a 25 square kilometre predator and feral animal proof enclosure on Currawinya National Park in south west Queensland. This provides a unique opportunity for research. We are designing and undertaking a range of projects relating to the reintroduction program on Currawinya including two PhD projects which have begun and are detailed below:

Survival of an Australian icon: reintroduction theory and population dynamics of the bilby This provides a unique opportunity to test reintroduction theory and monitor population dynamics. This project will use radio telemetry to determine the survival, habitat preference, burrow range and diet of the reintroduced population. The preferred invertebrates in the diet of the reintroduced bilbies will be determined through faecal analysis and compared with invertebrate surveys. In addition the effect of supplementary feeding on the population dynamics and behaviour of reintroduced bilbies will be investigated. This contributes to the knowledge of bilby ecology, by providing information on their response to different habitat types and climatic conditions in southwest Queensland.

The greater bilby Macrotis lagotis as an ecosystem engineer in semi-arid habitats in southwestern Queensland

The reintroduction of bilbies on Currawinya National Park in 2004 in the predator free enclosure will provide the basis for this investigation. The aim of this project is to determine the spatial distribution of bilby burrow systems and identify spatial associations between soil

properties, vegetation and burrows. In addition the effect burrowing by bilbies has on: (i) distribution and concentration of soil nutrients (ii) spatial pattern in plant communities (iii) relative abundances of different plant species (iv) seed production by plants (iii) relative abundance of invertebrates and small vertebrates will be investigated. A comparison between the reintroduced population and the wild population at Astrebla Downs National Park will assess the effect of the presence of exotic predators (cats and foxes) on the structural complexity of bilby burrow systems.

Vegetation Dynamics and Seed Rain in the bilby Enclosure

In 2003, vegetation monitoring sites were set up inside the new enclosure with matched sites outside. The aim of this project is to measure vegetation change in relation to the removal of grazing pressure and predators. This will be related to bilby diet and success. In 2004 seed traps were set up inside and outside the bilby enclosure in conjunction with the vegetation sites. These will act as a guide to the seed load available to the bilby while providing valuable insights into restoration and vegetation dynamics in the absence of grazing pressure.

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.

Interpretive panels have been installed at Lakes Numalla and Wyara. The information on these signs illustrates the biological importance of the lakes, the relevance of them being listed as "Wetlands of International Importance, especially as waterfowl habit" under the Ramsar Convention, and the sound use of these lakes as recreational opportunities.

An information shelter has recently been constructed adjacent to the Eulo-Hungerford road, at the entrance to the ranger's office. Information on the interpretive panels outlines the park values and provides a general orientation of the park.

Interpretive panels have been erected at the Currawinya woolshed complex to provide interpretation of the "Save The Bilby" campaign and bilby research on the park.

Limited interpretation activities occur at the park, including ranger-led slide shows and tours available on request for special interest groups.

29. Current recreation and tourism:

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

Currently, only minor use of the park for recreation and tourism occurs due to the remoteness of the site and lack of tourist infrastructure. As mentioned previously, the park visitation is estimated to be 2000 people annually, however this number is expected to substantially

increase as interest in regional tourism expands. Bush camping sites exist within the national park suitable for self-sufficient campers bringing food, water, fuel, medical supplies and vehicle spares. The collection of firewood is not permitted and camping permits for use of the existing sites are required. Also in the national park are the parks office (formerly the Currawinya Homestead), water tanks and bores and a built accommodation facility for organised groups at the Currawinya Woolshed Complex. Access to and within the park is by unsealed roads which may become impassable in the wet. Additionally, some areas within the park are accessible only by four-wheel drive. There is no mobile phone coverage.

Encouraged tourist activities are low-impact and nature based, including camping, swimming, canoeing, kayaking, walking, birdwatching, wildlife observation and photography. Fishing is permitted in some areas however live bait bought into the park must be caught in the area adjacent to the park. Motorised boats and jet skis are not permitted on any lake. Meals are available at Hungerford however fuel and groceries can only be obtained by prior arrangement with the Royal Mail Hotel. The Royal Flying Doctor Service operates in the area. (Queensland Parks and Wildlife Service, 2001)

Tourists to the park include the local community, commercial operators (approximately eight operators provide tours/activities within the park), school groups (between one and four school groups annually) and other individuals or groups exploring or passing through the region. The peak tourist season is during the winter months due to the extreme high temperatures reached in summer. (Walker, 1998)

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.

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 recognised 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.