South-East Gulf of Carpentaria: Leichhardt River to Gore Point (Wernadinga coast)

Australia

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E	A	A	F	1	4	9

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 *:

Compiler 1

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2. Date this sheet was completed *:

DD/MM/YYYY

06/09/2019

3. Country *:

Australia

4. Name of the Flyway Network site *:

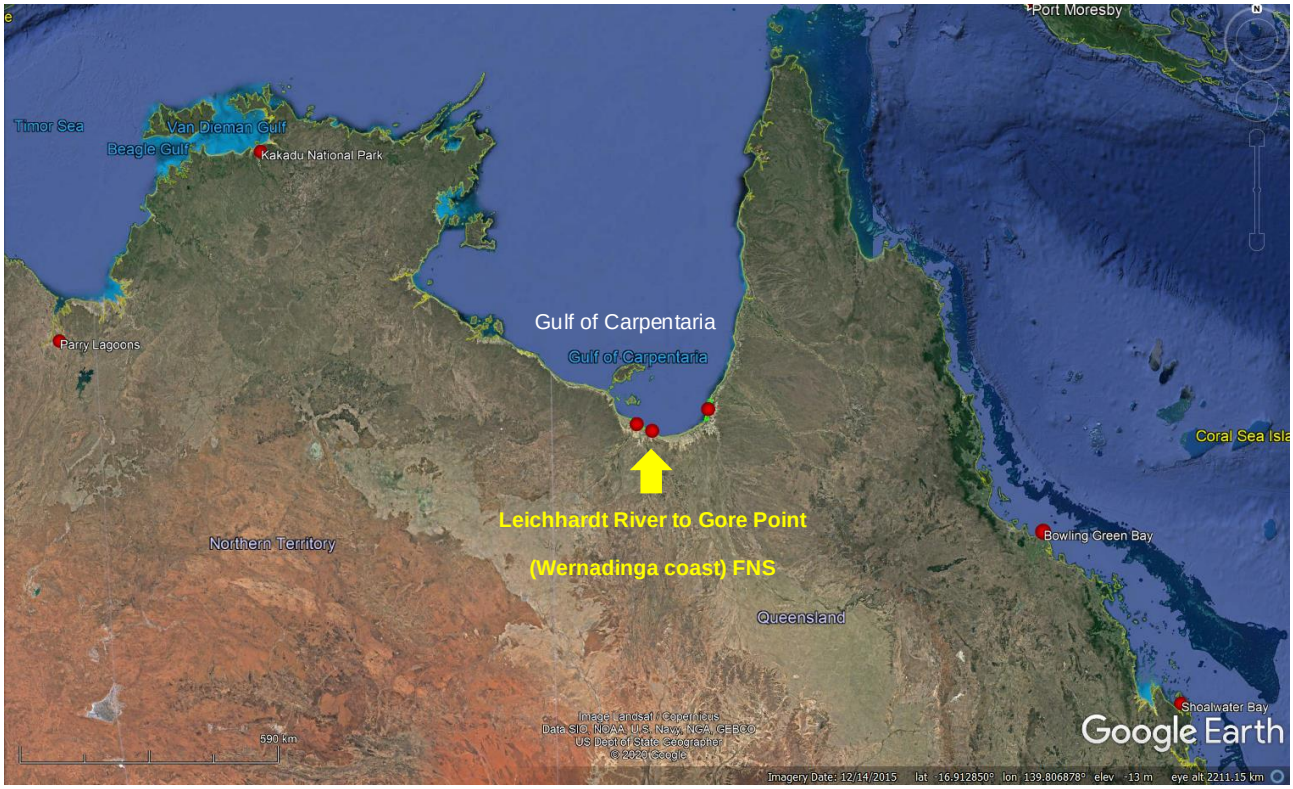
Accepted English transcription of the Site's name.

South-East Gulf of Carpentaria: Leichhardt River to Gore Point (Wernadinga coast)

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.

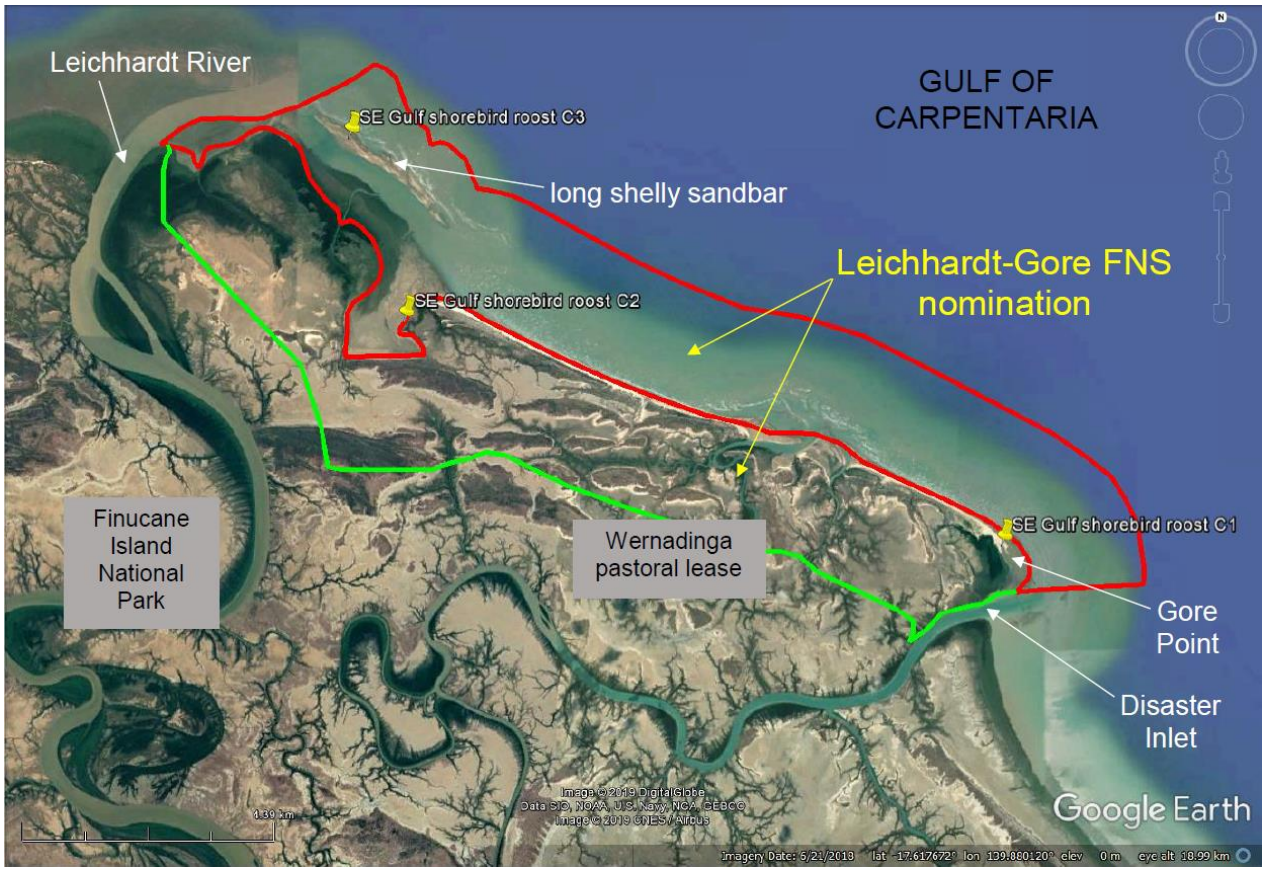
Map 1a. Location Map – North East Australia (South-East Gulf of Carpentaria: Leichhardt River to Gore Point (Wernadinga coast) and existing Flyway Network Sites (FNS's)



Map 1b. The Gulf of Carpentaria - Leichhardt-Gore (Wernadinga coast) Flyway Network Site and the two other Gulf of Carpentaria FNS's.

Map 2a Marine and Landward components of the SE Gulf of Carpentaria: (Leichhardt-Gore) (Wernadinga coast) Flyway Network Site.

Showing site boundary (landward green and red seaward polygon) & shorebird roosts (C1, C2, C3: yellow pins).



Map 2b SE Gulf of Carpentaria: Leichhardt-Gore Flyway Network Site

Map 2c. Map of the Finucane Island National Park ((https://wetlandinfo.des.qld.gov.au/wetlandmaps/?extent=139.338,-18.142,140.162,-17.357))

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.

Approximate centre of site: -17.609856°S 139.882452°E
Western limit of shore: -17.571829°S, 139.802852°E.
Eastern limit of shore: -17.641574°S, 139.945539°E.
Location: The site is 40 km east-north-east of the township of Burketown.

Description of site boundary:

The site includes coast and intertidal flats, extending east-south-east for approximately 18 km along the Gulf of Carpentaria, Queensland, Australia, from the mouth of the Leichhardt River to Gore Point.

The site comprises Queensland state waters and a narrow seaward strip of the Wernadinga pastoral lease (Queensland cadastral designation 3SP181805). It is adjacent to the north-eastern corner of Finucane Island National Park (442 NPW906). The site lies in country with which the Gkuthaarn and Kukatj People, who are Indigenous Australians, have traditional connections. Accordingly, the site has been nominated jointly by AJM Pastoral, which is the Wernadinga pastoral leaseholder, and by the Gkuthaarn and Kukatj People as represented by the Carpentaria Land Council Aboriginal Corporation.

The site extends from the eastern edge of the channel of the Leichhardt River sea-mouth, east and south along the coast to the northern edge of the channel of the sea-mouth of Disaster Inlet, which lies immediately south of Gore Point. It extends 2 km to seaward of the cadastral boundary, which separates leasehold land from Queensland state waters, along the full length of the cadastral boundary. It therefore includes the un-named shelly sandbar that is an island about 3 km long and up to 200 m wide, running south-east from the Leichhardt sea-channel; it lies up to 400 m offshore and roughly parallel to the coastline. The site also includes land and tidal channels to landward for 2 km, along the full length of the cadastral boundary, except where this would overlap with Finucane Island National Park, the Park being excluded. The two abovementioned estuary channels also are excluded.

The larger South-East Gulf of Carpentaria shorebird area is a near-continuous area of shorebird habitat extending for about 550 km along the Gulf coast. The Leichhardt River to Gore Point section is in the centre-west of this larger area and its western edge is about 8 km east-south-east of the eastern edge of the Nijinda Durlga (Tarrant) Flyway Network Site.

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

The site is at, or near, sea-level. Surrounding areas are of similar low elevation: sand/shell ridges landward of the line of the highest astronomical tide are at best only one or two metres higher.

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.

Approximately 7080 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.

The site comprises undisturbed intertidal flats of sand and mud, mangrove forest, tidal creeks, salt marsh (bare salt flats) and beaches and island-bars of shell fragments and sand, adjacent to a major river estuary. It supports feeding by migratory shorebirds, with up to 13,000 (more usually 5,000 to 8,000) of at least 22 species using the site's three high-tide roosts, including seven Australian threatened species (e.g. Far Eastern Curlew *Numenius madagascariensis* and Lesser Sandplover

Charadrius mongolus) and internationally important numbers of Great Knot *Calidris tenuirostris*, Red Knot *Calidris canutus* and Greater Sandplover *Charadrius leschenaultii.*

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.

Source and scope of data

Count data in this section of the nomination refer only to the nominated site, which is the Leichhardt River to Gore Point section (Maps 2a, 2b) of the larger South-East Gulf of Carpentaria shorebird area. Within this site lie high tide roosts (Roosts C1, C2 and C3: Maps 2a, 2b in Item 5 above) that were labelled as such by the Queensland Wader Study Group in 1999 (Driscoll 2001). Roosts C1 and Roost C2 lie on the long beach in the site and Roost C3 is on a long shelly sandbar. The site is remote from human settlement, inaccessible by land, and requires use of a boat or aircraft for survey purposes. Accordingly, it has been surveyed for waterbirds neither frequently nor regularly. To date, nine ground-level surveys have been conducted, in most if not all cases at high tide:

	Survey date	Lead organisation	Roosts included
1	21 March 2013	Queensland Wader Study Group	C1, C2 & C3
2	1 April 2013		C1, C2 & C3
3	4 March 2015	Carpentaria Land Council Aboriginal Corporation	C3
4	29 April 2015		C3
5	31 August 2015	Queensland Wader Study Group	C1
6	17 February 2016	Carpentaria Land Council Aboriginal Corporation	C3
7	6-7 September 2017		C1 & C3
8	8-11 April 2018		C3 *
9	30 May 2018		C1

* With aerial views of roosts C2 and C1.

Surveys relevant to the nomination therefore cover five calendar years, all within the last seven years, and all four of the migration seasons (southward, with 2 surveys in August & September; non-breeding, which was the February survey; northward, with 5 surveys in March-April; and Arctic-breeding season, with 1 survey in May). Some surveys were outside the main period when shorebirds are normally

present in high numbers. Most of the surveys did not include all three of the principal high-tide roosts known in this nominated site: only two of the surveys covered all three roosts.

EAAFP Criterion a/2:

The site meets Criterion a/2 because it supports seven threatened species of migratory waterbird as shown in the following table. There have been multiple records and substantial numbers of each species at the site: none of the records were 'accidental' or of vagrant birds.

Status codes: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; Near Threatened = NT; LC = Least Concern . Status in Australia refers to *The Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act): No. of records at site is from 9 surveys. Details of Maximum number counted are in Annex 4.

English name of species	Scientific name of species	IUCN Red List status	Listed in Appendix I of CMS	Status in Australia (EPBC Act)	No. of records at site	Maximum number counted
Far Eastern Curlew	*Numenius madagascariensis*	**EN**	Yes	CR	9	286
Great Knot	*Calidris tenuirostris*	**EN**	Yes	CR	8	7,051
Curlew Sandpiper	*Calidris ferruginea*	NT		CR	6	62
Red Knot	*Calidris canutus*	NT		EN	8	2,000
Lesser Sandplover	*Charadrius mongolus*	LC		EN	7	580
Greater Sandplover	*Charadrius leschenaultii*	LC		VU	8	1,432
Bar-tailed Godwit [#]	*Limosa lapponica*	NT		VU/CE	7	300

[#] Two subspecies of Bar-tailed Godwit (*baueri* and *menzbieri*) occur in Australia and both are listed as threatened under Australia's EPBC Act. Subspecies *baueri* (Vulnerable) predominantly occurs in eastern Australia [1] and New Zealand; *menzbieri* (Critically Endangered) in north-western Australia. Count data generally do not distinguish between the subspecies as field identification is difficult. Anecdotal information from QWSG expeditions and the compiler indicates that both subspecies occur in the SE Gulf of Carpentaria, and as both are threatened, clearly criterion a/2 is met for this species and for at least one of its subspecies.

NOTE. The criterion is based on the Partnership Document Annex IV, and informed by the Strategic Framework for identifying Ramsar Sites (https://www.ramsar.org/sites/default/files/documents/library/cop11-res08-e-anx2.pdf) which states (item 124) that threatened status as defined in national endangered species

[1] http://www.birdsindanger.net/pdfs/Bar-tailed%20Godwit%20%28western%20Alaskan%29.pdf

legislation and/or international frameworks such as the IUCN Red Lists may be applied. Furthermore, items 125 and 126 of the Framework indicate that the Criterion is non-quantitative; it provides no numerical threshold for the numbers supported in the site concerned—likewise the EAAFP version of this Criterion.

EAAFP Criterion a/5:

The site does not meet Criterion a/5 because the total number of migratory shorebirds counted within the site boundary has not exceeded 20,000 in any of the nine ground surveys conducted to date. The highest total was 13,130 migratory waterbirds on 21 March 2103. QWSG aerial survey data for the whole of Zone C usually includes extensive shorebird habitat outside the boundary of the nominated site and thus cannot be used here to test Criterion a/5. (Aerial totals for all of Zone C exceeded 20,000 migratory shorebirds once: 26,000 birds on 20 September 1998—see Appendix 1 in Driscoll 2001).

EAAFP Criterion a/6:

The site meets Criterion a/6 because it regularly supports at least 1% of the Flyway population of at least one—in fact, three—species of migratory waterbird. The EAAFP reference for 1% thresholds at date of nomination is the 5th edition of Waterbird Population Estimates, published by Wetlands International (2012) and accessible online at http://wpe.wetlands.org/search .

Great Knot *Calidris tenuirostris*

record	*maximum count*	*date*	*source*	*No. of roosts in the survey*
1	7,051	21 March 2013	QWSG data	3
2	5,094	1 April 2013	QWSG data	3
3	4,800+	4 March 2015	CLCAC data	1
4	3,000	17 Feb. 2016	CLCAC data	1

The 1% threshold of WPE5 is 2,900 birds [2]. Criterion a/6 is met for Great Knot.

Red Knot *Calidris canutus*

record	*maximum count*	*date*	*source*	*No. of roosts in the survey*
1	1,391	21 March 2013	QWSG data	3
2	2,000	17 Feb. 2016	CLCAC data	1

The 1% threshold of WPE5 is 1100 birds [3]. Criterion a/6 is met for Red Knot.

[2] The more recent 1% threshold of Hansen *et al.* (2016) is 4250, which may be considered for inclusion in the next update of Waterbird Population Estimates by Wetlands International.

[3] The more recent 1% threshold of Hansen *et al.* (2016) also is 1100 birds.

Greater Sandplover *Charadrius leschenaultii*

record	*maximum count*	*date*	*source*	*No. of roosts in the survey*
1	1432	21 March 2013	QWSG data	3
2	1022	1 April 2013	CLCAC data	3

The 1% threshold of WPE5 is 790 birds [4]. Criterion a/6 is met for Greater Sandplover.

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.

Type G (intertidal mud, sand and salt flats); Type I (mangrove swamps); Type E (sand shores); and Type F (estuarine waters, tidal creeks).

12. Jurisdiction *:

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

Within the State of Queensland, the Department of Natural Resources, Mines and Energy has administrative jurisdiction over land tenure, including state (marine) waters. The Department therefore has jurisdiction over the entire area of the Flyway Network Site.

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.

The State Waters in the site are not actively managed but are under the jurisdiction of the Department of Natural Resources, Mines and Energy.

Contact: Department of Natural Resources, Mines and Energy
61 Mary Street, Brisbane, Queensland 4000
PO Box 15216, CITY EAST QLD 4002
13 QGOV (13 74 68) business hours.

Leasehold land within the site is managed by the leaseholder, AJM Pastoral.

Contact: AJM Pastoral,
Burleigh Station,
via Richmond QLD 4822.

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.

[4] The more recent 1% threshold of Hansen *et al.* (2016) is 2000 birds, but its inclusion is awaiting an update of Waterbird Population Estimates.

Bamford, M.J., Watkins, D.G., Bancroft, W., Tischler, G. & Wahl, J. 2008. Migratory Shorebirds of the East Asian-Australasian Flyway; Population Estimates and Important Sites. Wetlands International – Oceania.

Blackman, J.G., Perry, T.W., Ford, G.I., Craven, S.A., Gardiner, S.J. & De Lai, R.J. 1999. Characteristics of Important wetlands in Queensland. Environmental Protection Agency, Queensland. pp. 282-284.

CSIRO (2009) Water in the Flinders-Leichhardt region, pp 187-274 in CSIRO (2009) Water in the Gulf of Carpentaria Drainage Division. A report to the Australian Government from the CSIRO Northern Australia Sustainable Yields Project. CSIRO Water for a Healthy Country Flagship, Australia. xl + 479pp

Driscoll, P.V. 2001. Gulf of Carpentaria wader surveys 1998-9. Report by Queensland Wader Study Group and Australasian Wader Studies Group to Queensland Environmental Protection Agency, 84 pp. & appendices.

Driscoll, P. in prep. Shorebird Surveys in the South East Gulf of Carpentaria. Report on 2013 surveys, in preparation for the Australasian and Queensland Wader Study Groups.

Duke, N., Kovacs, J.M., Griffiths, A.D., Preece, L., Hill, D.J.E., van Oosterzee, P., Mackenzie, J., Morning, H.S. and Burrows, D. 2017. Large-scale dieback of mangroves in Australia's Gulf of Carpentaria: a severe ecosystem response, coincidental with an unusually extreme weather event. Marine & Freshwater Research 68 (10): 1816-1829.

Hansen, B.D., Fuller, R.A., Watkins, D., Rogers, D.I., Clemens, R.S., Newman, M., Woehler, E.J. and Weller, D.R. 2016. Revision of the East Asian – Australasian Flyway Population Estimates for 37 listed Migratory Shorebird Species. Unpublished report for the Department of the Environment. BirdLife Australia, Melbourne.

Garnett, S. 1983. Report on the fifth aerial survey of migrating wading birds between Weipa and Milingimbi, 9-13 February 1983. Stilt 4: 15-17.

Jaensch, R. 2013. New tools for development of the Flyway Site Network: An integrated and updated list of candidate sites and guidance on prioritisation. Report to Partnership for the East Asian – Australasian Flyway, 96 pp.

Lane, B.A. & Davies, J. 1987. Shorebirds in Australia. Nelson, Melbourne.

Sattler, P.S. & Williams, R.D. 1999. The conservation status of Queensland's bioregion ecosystems. Environmental Protection Agency, Brisbane.

Wetlands International, 2012. Waterbird Population Estimates, Fifth Edition. Summary Report. Wetlands International, Wageningen, The Netherlands.

Information in the following sections is drawn from several sources including Blackman *et al.* 1999.

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 site is in the south-east quarter of the Gulf of Carpentaria and is part of the Gulf Plains biogeographic region (Sattler & Williams 1999). It is a flat landscape on marine and alluvial sediments, with micro-relief formed by shelly beach ridges (active; or stranded inland) just a few metres in height.

The marine area is shallow with extensive areas, some more than 1 km wide, of mud and/or sand exposed at lowest tides. Typically, there is just one high tide each day although double tides of low amplitude occur one or two days per month. Maximum tide height exceeds 4 metres (data for Albert River mouth, 5 km to the west of the site). The coastline is defined by mangroves and beach structures; on this part of the Gulf coast it seems that sand is dominant, rather than mud. More than half of the site, westwards from Gore Point, is dominated by a discontinuous beach ridge. Near the western end of the site and running eastwards from the sea channel of the Leichhardt River, lies a major bar-island composed of sand and shell fragments, about 3 km long and up to 200 m wide. Some sections in the western part of the bar remain exposed on high spring tides. Mangrove forest occurs on the mainland coast parallel to the sandbar and in recent years, young mangroves have spread across the separating channel (up to 400 m wide) to the sandbar (a 2004 satellite image shows a clear channel but the

sandbar is now connected to the mainland by a zone of mangroves). The coastline is backed by extensive, mostly bare, hyper-saline flats that extend many kilometres inland and that may be partly inundated by spring tides and during storms, or fully inundated by monsoonal or cyclonic rainfall. The flats are traversed by many tidal waterways; some creeks are purely tidal but others originate far inland and bring fresh water to the coast – in large quantities in the case of the Leichhardt River.

The climate is hot (often over 30° C) and humid with high rainfall in summer-autumn (December–March) but with little or no rain in other seasons and slightly cooler temperatures (see Bureau of Meteorology online climate data, Burketown). The area is subject to cyclones (on average about one or two per year); wind and storm surges with the cyclones may cause significant changes to coastal landforms.

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 catchment area within about 100 km of the site is part of the Gulf Plains bioregion (https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/bioregion-gulf-plains-gup/), is mostly flat to gently-sloped and is traversed by numerous creeks and rivers, passing through broad alluvial plains and marine salt flats before reaching the coast. The Leichhardt River has a basin area of 32,878 square kilometres and a mean annual discharge of 2,179 gigalitres. The main land-use is rangelands grazing of beef cattle, with several mining areas in the uppermost parts of the catchment. Human population in the catchment is very low, except at the mining town Mount Isa (population ca. 22,000), 340 km south of the site. Climate in this part of Australia's wet-dry tropics is predominantly Koeppen Type BSh: hot semi-arid climate with hot summers and warm to cool winters, with some or minimal precipitation.

17. Hydrological values:

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

Mangroves in the site help stabilise the sediment and protect the coast from the severe impacts of storms and cyclones. Large quantities of sediment sourced inland are deposited in and near the site by Gulf Plains rivers. There are two major dams in upper parts of the Leichhardt catchment, which have been impacting river discharge and sediment load since 1958 and 1976.

Water use from the catchment is currently 5% of average surface water availability, however "if the future sees full allocation of entitlements, changes to the high flow threshold exceedance are likely, which could have negative environmental impacts" (CSIRO 2009).

18. General ecological features:

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

The benthic fauna of the site's intertidal flats has not been systematically documented.

Mangrove forests in the Gulf vary in width, structure and species. In, and adjacent to the western part of the site, mangroves show zonation from seaward *Avicennia*, to interior tall *Rhizophora* and/or *Bruguiera* species, and with low thickets of *Ceriops* typical of the landward and most saline zones.

Above highest astronomical tide, the beach ridges may support diverse communities of grasses, vines, shrubs and low trees.

Salt flats are extensively bare, apart from algal mats, but in some areas support dense swards of marine couch *Sporobolus virginicus* and short chenopod (samphire) plants.

Ecosystem services provided by the site to humans include:

- Fish, crab and prawn resources (for commercial fisheries and Indigenous & recreational fisher-people)
- Coastline protection (mangroves)
- Carbon sink (mangrove forest).

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)

See item 18.

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)

At least 22 species of migratory shorebird have been recorded using the site (Annex 4) and additional species are likely to occur less regularly or as vagrants. Across the entire South-East Gulf of Carpentaria, 16 migratory waterbird species have been recorded in internationally important numbers (Bamford *et al.* 2008; Jaensch 2013); for some of these species, numbers reach 1% of the individuals in the population only when tallied across the whole South-East Gulf shorebird area. Total numbers of migratory shorebirds can exceed 20,000 in some survey sections (Garnett 1983; Driscoll 2001; Driscoll in prep.).

Three species of Asian-breeding migratory tern have been confirmed as occurring in the site, in small numbers: Common Gull-billed Tern *Gelochelidon nilotica*, Common Tern *Sterna hirundo* and White-winged Tern *Chlidonias leucopterus* (Annex 4). Both occur elsewhere in the wider SE Gulf, the latter in large numbers (R. Jaensch pers. obs.). Some of the Little Tern *Sternula albifrons* present in the site may be migratory birds of the subspecies *sinensis* but identification to separate individuals from the resident subspecies is difficult in the field. It is possible that other migratory species of tern also occur.

Also recorded in the site is a suite of other waterbirds (e.g. other shorebirds, terns, herons) that breed in Australia and undertake only regional movements within Australasia, some as far as New Guinea, e.g. Black-winged Stilt *Himantopus himantopus*. The largest non-migratory shorebird in the site is the Beach Thick-knee *Esacus magnirostris*. High numbers of Pied Oystercatcher *Haematopus longirostris* occur (up to 70 on 17 February 2016: CLCAC data). The site's mangroves support a distinct forest bird community of several species such as White-breasted Whistler *Pachycephala lanioides*.

Estuarine Crocodiles *Crocodylus porosus*, Dugongs *Dugong dugon* and other marine fauna typical of tropical Australian waters inhabit the coast at and/or near the site.

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:

No -people live permanently in the site. The Gkuthaarn & Kukatj (Indigenous Australian) Peoples maintain connections to the site through their historical occupation and cultural traditions. The Gkuthaarn & Kukatj and other Indigenous Peoples of the region have strong spiritual associations with the Gulf coastal country and continue to harvest some of its plant and animal resources. These values

are reinforced through activities of the Normanton Land and Sea Rangers, a program of the Carpentaria Land Council Aboriginal Corporation (CLCAC), and through educational programs in local schools.

European association with the site has been limited, partly because there is no road-vehicle access to the site due to tidal creeks surrounding the areas immediately landward of the site. Fishing activities in the site occur seasonally, including recreational and small-scale commercial fishing but presently these do not seem to pose a significant threat to the site's migratory waterbirds.

Owing to the remoteness of the site, harsh climate and weather conditions, lack of permanent human residents, and low levels of harvest of natural resources, the ecological character of the site is not significantly linked to human interactions.

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)

Typical of the whole region, the nominated site holds material and non-material values for local Indigenous People—the Gkuthaarn-Kukatj People.

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:

Marine waters and coast seaward of the lease boundary are owned by the State Government of Queensland.

The landward section of the Flyway Network Site is part of the 'Wernadinga' pastoral lease, and the leaseholder is AJM Pastoral.

b) In the surrounding area:

The area immediately landward of the site is Queensland pastoral leasehold land ('Wernadinga' station) and the leaseholder is AJM Pastoral.

At its western side the site adjoins Finucane Island National Park, owned by the State of Queensland.

These land areas and adjacent marine waters are traditionally occupied by the Gkuthaarn & Kukatj People. Much of it is subject to a Native Title (non-exclusive use) claim that has not yet been formally determined.

23. Current land (including water) use:

a) Within the Flyway Network site:

Seasonally, some recreational fishing and occasional commercial fishing occur within the site, but more so in the adjacent estuaries.

Indigenous use of land/sea resources occurs across the Gulf Plains region.

A narrow zone of land with small areas of plants that may be grazed by cattle occurs in the site, but this area is isolated from the rest of the cattle station by tidal creeks, mudflats and wetlands.

The whole of the flyway site is zoned Rural under the 2008 Carpentaria Shire Planning Scheme. The intent of the Rural Zone is to avoid or minimize adverse impacts on the environment or adjacent and nearby Rural Activities.

Any review of the Planning Scheme could more fully recognise the values of the site.

The majority of the flyway site (with the exception of some isolated dunes) is located within the mapped Erosion Prone Area where development is limited unless it is coastal dependent, temporary, or essential infrastructure and is also required to avoid and minimise impacts (https://www.qld.gov.au/__data/assets/pdf_file/0025/68434/b-d-m-erosion-prone-area-plan.pdf).

b) In the surroundings/catchment:

As for (a) but with addition of cattle grazing at a larger scale, and seasonal tourism. More significant levels of recreational fishing from residents of and visitors to Burketown occur outside the site, in the more accessible Albert River system.

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:

A major episode of die-back of mangroves occurred in the Gulf of Carpentaria in 2015-16 (Duke et al. 2017), with some dieback in tall mangrove forest in or near the western part of the site; it is not known if this has affected, or will affect, shorebird use of the nearby intertidal flats. Otherwise, there are no factors presently operating within the site that have been identified as affecting the site's ecological character.

b) In the surrounding area:

The impact on the ecological character of the site from dams on the Leichhardt River (see item 16) is not objectively known.

Rubber vine (*Cryptostegia grandiflora*) infestations in the strand-beach country and associated wetlands may reduce or degrade habitat for some waterbirds, but do not directly impact the main intertidal and beach-roost habitats of the migratory shorebirds that are the foundation of this nomination.

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.

There are no formal protected areas over any part of the site but it is adjacent to Finucane Island National Park, owned and managed by the State of Queensland.

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?:

No.

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

As has been the practice with the previous two Flyway Network Site designations in this part of the Gulf, a management plan usually is developed once the site has been designated.

d) Describe any other current management practices:

None at present.

26. Conservation measures proposed but not yet implemented:

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

The Normanton Land & Sea Rangers have an ongoing, informal cooperative arrangement with Wernadinga station to document biodiversity and support natural resource management, including in the coastal zone. Surveys of shorebirds and other waterbirds, searching for marine turtle nesting areas, inventory of freshwater wetlands and assessment of wetland condition, have occurred recently and/or may occur in the future.

27. Current scientific research and facilities:

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

There have been two major expeditions (1998-9 and 2013) by Queensland Wader Study Group (QWSG) to survey migratory waterbirds along the South-East Gulf of Carpentaria coast and a short smaller-scale survey by QWSG in 2015 (Driscoll 2001; Driscoll in prep.; P. Driscoll & A. Keates pers. com.).

The Gangalidda & Garawa Rangers based in Burketown made several visits to the sandbar-island Roost C3 from 2015 to 2017 and some waterbird count data were obtained. The Normanton Land & Sea Rangers, supported by a waterbird survey expert, visited the site in September 2017 and May 2018 and conducted some shorebird surveys.

Apart from several, earlier, broad-scale aerial surveys (e.g. Garnett 1983; Lane & Davies 1987) there have been few other systematic investigations. No professional or amateur ornithologists live in the site or in nearby areas to landward.

Logistical challenges to accessing the site include boating in shallow waters and following safe work procedures in crocodile habitat; consultation with all stakeholders is essential and access to the site from the landward side is subject to permission of the leaseholder. Accordingly, opportunities for future scientific research are limited. However, this should not discourage further studies of shorebirds, their food and other ecological requirements at this site.

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.

Through the past activities of regional (catchment-based) organisations for natural resource management, including Southern Gulf Catchments, awareness of migratory shorebirds in the South-East Gulf of Carpentaria has been raised. Presently, this is being extended by CLCAC to Indigenous communities through its Land and Sea Ranger program. Birds Queensland, through the Queensland Wader Study Group, and BirdLife Australia through its long-term shorebird study programs, continue to promote the international importance of the South-East Gulf of Carpentaria.

29. Current recreation and tourism:

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

Small-scale seasonal visitations to the site and/or nearby rivers occur for recreational fishing.

Logistical challenges to access the site include distance from nearest public boat ramp (about 50 km by river and sea), boating in shallow waters and following safe procedures in crocodile habitat; access from the landward side is subject to permission of the leaseholder. Accordingly, opportunities for future development of ecotourism here are limited although Indigenous-led tours are being provided closer to Burketown, with possibilities of viewing shorebirds at the edge of the Tarrant Flyway Network Site.

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	☒ tropical cyclones sometimes alter coastal landforms	☐	☒ tropical cyclones may sometimes alter coastal landforms

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

The site is remote from human settlements other than Burketown, which 40 km west-south-west. There are no roads or formed vehicle tracks into the site and there is no economic land-use in the site other than small-scale, recreational and commercial fishing (seasonal, and minimal during the closed season, October-February, and for most of the Wet season, December to March).

Increased recreational boating in the site, if that occurred, could possibly disturb shorebirds at some of the high tide roosts, particularly if people often landed on the beaches. Disturbance caused by these activities during March-April could put birds to flight and thereby deplete the shorebirds' fat reserves and reduce the capacity of shorebirds to successfully complete their upcoming migration to NE Asia. If disturbance was ever documented as being a concern, an awareness program and signage could address the issue.

A number of mines (e.g. silver-lead-zinc), some active but others inactive, are situated over a wide area up to 350 km inland in catchments of the Leichhardt and other rivers that flow to the coast at or near the nominated Flyway Network Site. These mines include dam structures designed to retain tailings from mining operations, but exceptional rain events have sometimes caused significant spills from tailings dams in northern Australia. Mineral pollution from a spill could potentially impact wetlands and their biota, such as invertebrate food consumed by shorebirds at the coast, including possibly the nominated Flyway Network Site.

The present and potential impacts of climate change on the site are not understood adequately. Dieback of mangroves in the Gulf of Carpentaria in 2015-2016 has been linked to several possible causes including drought (Duke *et al*. 2017) but potential impacts on benthic fauna and shorebirds that feed on them have not been confirmed. Rise in sea-level has potential to alter roosting sites for shorebirds, especially at the sandbar roost in the site.

In this region, infestations of weeds such as rubber vine *Cryptostegia grandiflora* and calotrope *Calotropis procera* occur in vegetation communities in land zones immediately landward of the coast but are not known to significantly impact migratory shorebirds.

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

(From the Partnership Text)

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

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

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

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

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

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

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

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

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

Annex 2: Ramsar Classification System for Wetland Type

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

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

Marine/Coastal Wetlands

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

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

C -- **Coral reefs**.

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

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

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

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

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

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

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

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

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

Inland Wetlands

L -- **Permanent inland deltas**.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Zg -- **Geothermal wetlands**

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

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

Human-made wetlands

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

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

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

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

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

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

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

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

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

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

Annex 3: IUCN Protected Areas Categories System

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

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

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

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

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

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

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

VI Protected area with sustainable use of natural resources. Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.

Annex 4: List and maximum number of migratory waterbird species counted in the Flyway Network Site from Leichhardt River to Gore Point, South-East Gulf of Carpentaria.

The table lists species of migratory shorebird counted in the site, from nine surveys of one or more of the roosts within the site, as conducted Queensland Wader Study Group or Carpentaria Land Council Aboriginal Corporation, from March 2013 to May 2018 (see details above). The maximum number counted from among the nine surveys is shown; this may be a total across three roosts (C1, C2 & C3) for surveys on 21 March and 1 April in 2015; otherwise from only one or two of these roosts.

Species	Scientific name	Max. count	Date
Bar-tailed Godwit	*Limosa lapponica*	300	4 March 2015
Black-tailed Godwit	*Limosa limosa*	898	7 September 2017
Broad-billed Sandpiper	*Calidris falcinellus*	10	21 March 2013
Common Greenshank	*Tringa nebularia*	15	7 September 2017
Curlew Sandpiper	*Calidris ferruginea*	62	31 August 2015
Far Eastern Curlew	*Numenius madagascariensis*	286	31 August 2015
Great Knot	*Calidris tenuirostris*	7,051	21 March 2013
Greater Sandplover	*Charadrius leschenaultii*	1,432	21 March 2013
Grey Plover	*Pluvialis squatarola*	43	1 April 2013
Grey-tailed Tattler	*Tringa brevipes*	45	1 April 2013
Lesser Sandplover	*Charadrius mongolus*	580	21 March 2013
Little Curlew	*Numenius minutus*	16	21 March 2013
Marsh Sandpiper	*Tringa stagnatilis*	12	21 March 2013
Oriental Plover	*Charadrius veredus*	1	21 March 2013
Pacific Golden Plover	*Pluvialis fulva*	3	21 March 2013
Red Knot	*Calidris canutus*	2,000	17 February 2016
Red-necked Stint	*Calidris ruficollis*	1,689	21 March 2013
Ruddy Turnstone	*Arenaria interpres*	1	1 April 2013
Sanderling	*Calidris alba*	197	21 March 2013
Sharp-tailed Sandpiper	*Calidris acuminata*	194	21 March 2013
Terek Sandpiper	*Xenus cinereus*	37	1 April 2013
Whimbrel	*Numenius phaeopus*	76	31 August 2015
Common Tern	*Sterna hirundo*	90	8 April 2018
Common Gull-billed Tern	*Gelochelidon nilotica*	2	29 April 2015
White-winged Tern	*Chlidonias leucopterus*	6	1 April 2013

English and scientific names follow BirdLife International (DataZone).

This Site Information Sheet was reviewed according to the adopted nomination process to EAAF Flyway Network Site (link). If you have relevant inquiries about the site, please contact Science Officer (science@eaaflyway.net).

Reviewed by:

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We would like to recognize their invaluable contribution with the technical inputs and corresponsive quality in the process of the finalization of the Site Information Sheet