

Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9th Conference of the Contracting Parties (2005).

1. Name and address of the compiler of this form:

Compiled by the Western Australian Department of Conservation & Land Management (DCLM) in 2003 and by Jennifer Hale on behalf of DEC in 2009.

FOR OFFICE USE ONLY.

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Designation date

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Site Reference Number

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2. Date this sheet was completed/updated:

March 2009

3. Country:

Australia

4. Name of the Ramsar site:

Eighty-mile Beach, Western Australia

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

- i) the boundary has been delineated more accurately ; or
ii) the boundary has been extended ; or
iii) the boundary has been restricted**

and/or

If the site area has changed:

- i) the area has been measured more accurately ; or
ii) the area has been extended ; or
iii) the area has been reduced**

** **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

This revision of the RIS, re-assessed the site against the existing 6 Criteria as well as applying the recently added criteria for fish and non-avian biota (Criteria 7, 8 and 9).

7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a hard copy (required for inclusion of site in the Ramsar List): X;
- ii) an electronic format (e.g. a JPEG or ArcView image); X
- iii) a GIS file providing geo-referenced site boundary vectors and attribute tables X.

b) Describe briefly the type of boundary delineation applied:

The boundary of the Ramsar site includes the 220 km stretch of Eighty-mile Beach (intertidal mudflats and coast) and Mandora Salt Marsh located 40km to the east (seasonal wetlands and mound springs). The Eighty-mile Beach Ramsar site is not reserved.

Eighty-mile Beach

The boundary of the Eighty-mile Beach section of the Ramsar site is defined by the tidal extent. The western boundary of the Ramsar site follows the extent of Mean Low Water from the southwest corner (Lat 19° 57' 57.24" Long 119° 44' 48.48") to the northeast corner (Lat 19° 1' 41.88" Long 121° 32' 8.16"). The eastern boundary heads south, encompassing 40m above Mean High Water, to the point of commencement in the southwest.

Mandora Salt Marsh

The boundary of the Mandora Salt Marsh section of the Ramsar site follows the southern extent of wetland areas, east from Great Northern Highway (Lat 19° 46' 58.08" Long 121° 3' 30.96") to the southeast corner of the site (Lat 19° 55' 24.96" Long 121° 55' 39.36") and heads north to the northeast corner of the site (Lat 19° 48' 34.56" Long 121° 53' 53.52"). The boundary then follows the northern extent of wetland areas, west to the Great Northern Highway at the northwest corner of the site (Lat 19° 42' 0.72" Long 121° 14' 4.20") and heads south along the Great Northern Highway, to the point of commencement in the southwest.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

The Eighty Mile Beach Ramsar Site is comprised of two discrete units – Eighty Mile Beach and Mandora Salt Marsh.

Eighty Mile Beach

Southwest corner coordinates - Lat 19° 57' 57.24" Long 119° 44' 48.48"

Northeast corner coordinates - Lat 19° 1' 41.88" Long 121° 32' 8.16"

Mandora Salt Marsh

Southwest corner coordinates - Lat 19° 46' 58.08" Long 121° 3' 30.96"

Northeast corner coordinates - Lat 19° 48' 34.56" Long 121° 53' 53.52"
Longitude (approx) 119° 48' E to 121° 32' E Longitude (approx) 119° 48' E to 121° 32' E

9. General location:

The Eighty-mile Beach Ramsar site is located in north Western Australia. The site comprises two separate areas: 220km of beach and associated intertidal mudflats from Cape Missiessy to Cape Keraudren; and Mandora Salt Marsh 40km to the east. The beach and Mandora Salt Marsh are separated by the North Highway. Three pastoral stations lie within close proximity to the

site; Anna Plains, Mandora and Wallal. The northernmost extent of the site is 142 km south of Broome and the southernmost extent 150 km north of Port Hedland. The majority of the site lies within the Kimberley region and the Shire of Broome (resident population of approximately 14,000 in 2006). However, the southern 40km of coastline is within the Pilbara region and the Shire of East Pilbara.

10. Elevation: (in metres: average and/or maximum & minimum)
Sea level (minimum) to 50 m (maximum) (Australian Height Datum)

11. Area: (in hectares)
175 487

12. General overview of the site:

The beach is characterised by extensive intertidal mudflats supporting an abundance of macroinvertebrates, which provide food for very large numbers of shorebirds. The site is considered one of the most important in Australia for numbers of shorebirds supported and is a significant staging area for the East Asian-Australian flyway (Bamford et al. 2008). The beach is also an important nesting site for a number of species of marine turtles (DEC 2008.). Mandora Salt Marsh comprises a series of floodplain depressions dominated by two large seasonal wetlands (Lake Walyarta and East Lake) and a series of small permanent mound springs. The site contains one of only two occurrences of inland mangroves in Australia. Following episodic cyclonic rainfall the marshes become inundated and support continental scale waterbird populations (Halse et al. 2005).

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	•	2	•	3	•	4	•	5	•	6	•	7	•	8	•	9
X		X		X		X		X		X		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

14. Justification for the application of each Criterion listed in 13 above:

Criterion 1: Eighty-mile beach represents the greatest extent of continuous intertidal mudflat in excellent condition within the Northwest (IMCRA) bioregion. In addition, Mandora Salt Marsh contains an important and rare group of wetlands within the arid Western Plateau bioregion (Seminiuk and Seminiuk 2000). In particular the peat mound springs can be considered both bioregionally rare and outstanding examples of this wetland type in Western Australia.

Criterion 2: The site supports the Flatback Turtle (*Natator depressus*) listed as vulnerable under the EPBC Act and data deficient under the IUCN Red List.

Criterion 3: The Mandora Salt Marsh contains temporary and permanent wetlands in an arid bioregion (Western Plateau) and has been recognised as important refugia for biological diversity in arid Australia (Morton et al. 1995). The inland Grey Mangroves (*Avicennia marina*) lining Salt Creek represent the most inland occurrence of this species (Seminiuk and Seminiuk 2000) and the only occurrence in the Great Sandy Desert bioregion. In 1999 a suspected new species of goby (*Acentrogobius* sp. nov.) was collected from Salt Creek in Mandora Marshes (A. Storey pers. comm.). However, the specimen has yet to be officially identified and catalogued.

Criterion 4: The Eighty-mile Beach Ramsar site is considered one of the most important sites for stop-over and feeding by migratory shorebirds in Australia; second only to Roebuck Bay in the total number of migratory species for which it is considered internationally important. Furthermore, Eighty-mile Beach represents the most important site internationally (in terms of total number of individuals) for nine species of migratory shorebird in the East Asian-Australasian flyway (Bamford et al. 2008). Mandora Salt Marsh supports the critical life stage of breeding for at least 13 species of waterbird, including large numbers of Australian Pelicans and

Black Swans (Birds Australia 2008). In addition, the site is significant for the breeding of at least one species of marine turtle (Flatback). This criterion was met at the date of listing and continues to be met.

Criterion 5: Eighty-mile Beach is considered to regularly support in excess of 500,000 birds (Wade and Hickey 2008). Total counts (summer) for a small portion of the 220km intertidal site are generally > 200,000 (Shorebirds 2020 unpublished data). There is a record of 2.88 million Oriental Pratincoles on the beach in February 2004 (Sitters et al. 2004).

Criterion 6: Eighty-mile Beach supports more than 1% of the flyway population (or 1% of the Australian population for resident species) of 21 waterbirds, including 17 migratory species and 4 Australian residents: Greater Sand Plover *Charadrius leschenaultii*, Oriental Plover *C. veredus*, Red-capped Plover *C. ruficapillus* (resident), Grey Plover *Pluvialis squatarola*, Bar-tailed Godwit *Limosa lapponica*, Red Knot *Calidris canutus*, Great Knot *C. tenuirostris*, Red-necked Stint *C. ruficollis*, Sanderling *C. alba*, Sharp-tailed Sandpiper *C. acuminata*, Curlew Sandpiper *C. ferruginea*, Eastern Curlew *Numenius madagascariensis*, Little Curlew *N. minutus*, Common Greenshank *Tringa nebularia*, Grey tailed Tattler *T. brevipes*, Terek Sandpiper *T. terek*, Ruddy Turnstone *Arenaria interpres*, Pied Oystercatcher *Haematopus longirostris* (resident); Oriental Pratincole *Glareola maldivarum*, Black-winged Stilt *Himantopus himantopus* (resident) and Great Egret *Adea alba* (resident).

In addition, surveys of the entire and vast marshes system behind the coast, including Mandora Salt Marsh, revealed high numbers (over 1% levels) for several other waterbirds after cyclonic flooding in 1999-2000 (Halse et al. 2005). Substantial portions of the numbers of some of these species may have occurred within the Ramsar boundary but further analysis of the raw data is needed to identify which data apply to the Ramsar-listed (eastern) portion. Similar flooding has occurred previously, e.g. early 1980s and it is likely that these large numbers of waterbirds occur during all such flood events.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

a) biogeographic region:

Northwest (IMCRA v4 Commonwealth of Australia 2006).

River Basin: 025 Sandy Desert; Drainage Division 12: Western Plateau (Australia's River Basins 1997, GeoScience Australia)

b) biogeographic regionalisation scheme (include reference citation):

Interim Marine and Coastal Regionalisation for Australia (IMCRA) Version 4 (Commonwealth of Australia 2006)

Australia's River Basins (GeoScience Australia 2008)

16. Physical features of the site:

The beach section of the site is a large (220km) linear sand coast. The boundary of the Ramsar site along the beach is defined by the tide, extending from Mean Low Water (MLW) to 40 m above Mean High Water (MHW). The intertidal zone is comprised of a large expanse of intertidal mudflats (up to 4km wide at the lowest tides (Honkoop et al. 2006) and a narrow strip at the landward edge of coarser quartz sands. The site is bounded by coastal dunes to the east.

The beach contains black organic sediments in the intertidal zone in a wide flat expanse. The width of the intertidal mudflats averages approximately 2.6 km but is greater in the north of the site than the south (Pearson et al. 2005). These sediments are of marine origin. The south flowing Leeuwin Current carries carbonate rich sediments to the shoreline where the loss of current velocity causes the sediments to settle out, forming the intertidal mudflats (Pearson et al. 2005). There are a small number of tidal creeks that dissect the beach within the Ramsar site,

along the southern sections. The most significant of these is the paleo-channel of Salt Creek, which contains the only coastal mangrove community in the Ramsar site.

Eighty-mile Beach lies within a macro-tidal region with a gentle tide ranging from an average of 6m to as much as 8m during Spring tides. There are no anthropogenic structures that impact on tidal flows across the site.

The geology of Mandora Salt Marsh reflects alluvial and inland water processes. The floor of the two large wetlands comprises of sand, silt and clay of alluvial origin. The areas to the south of these wetlands that retain water and support paperbark communities are comprised of clay. There are pockets of peat soils (in the mound springs) and the entire wetland area is surrounded by red quartz sand (Geoscience Australia 2008). Soil samples collected from the wetlands indicated that the majority of the site is covered by clay with a salt crust (Graham 1999).

The wetlands of the Mandora Salt Marsh are of estuarine origin and were once part of a large drainage system known as the Wallal Palaeoriver (Storey unpublished). Carbon dating of peat sediments in Eil Eil spring suggest the wetlands formed approximately 7,000 years ago and have been geographically isolated since this time.

The hydrology of Mandora Salt Marsh is not well understood and has not been quantified. Walyarta, East Lake and the Melaleuca wetlands are filled predominantly from rainfall and run-off during the wet season in January – March. Walyarta probably fills seasonally to a depth of < 0.5 m (Storey unpublished), East Lake to a lower depth, and although seasonal flooding of the Melaleuca stands does not occur, the clay soils are likely to be seasonally waterlogged.

Episodically, cyclonic events result in more extensive rainfall and inundation has been known to extend beyond the Ramsar site boundary and west across the Northern Highway. Such incidents were recorded in 1942, 1980, 1982, 1997, 1999 and 2000 and have been linked to yearly rainfall > 800mm (Halse 2005).

Groundwater is a significant component of the hydrology of Mandora Salt Marshes however, the hydrological connections and the ecological water requirements of the wetlands have yet to be determined (Department of Water 2008). What is known is that the mound springs are probably the expression of upwelling from deep within the Broome Sandstone aquifer through fractures in the rock (Seminiuk and Seminiuk 2000). This results in the permanent surface water in these springs despite the low rainfall and high evaporation experienced in the area. Salt Creek is also fed from groundwater and has areas of permanent standing water. This system, however, is not connected to the springs. The groundwater aquifer that feeds Salt Creek is shallow and the exposure to the air concentrates the salinity (Seminiuk and Seminiuk 2000; Graham 1999).

17. Physical features of the catchment area:

The Eighty-mile Beach Ramsar site lies within the Canning Basin and is comprised of predominantly Quaternary age sediments (Geoscience Australia 2008). The region is of low relief, with a gentle slope from east to west.

The climate is semi arid, monsoonal with a prolonged dry season. More than 80% of the rainfall falls in the summer, wet season (December to March). Annual average rainfall at Mandora is very low in the order of 370 mm per year. However, there is high inter-annual variation with annual rainfalls ranging from < 150mm to > 1100mm in the 40 years of records from this site. Temperatures range from warm to hot year round, with average wet season maximum temperatures around 36 °C and average dry season maximum temperatures are slightly cooler between 29 – 35 °C. The site is located in an area with high incidence of tropical cyclones, with > 1 cyclone on average per year. Cyclones often result in significant rainfall and widescale flooding in the Mandora Salt Marsh and surrounding catchment.

18. Hydrological values:

The major hydrological values of the nominated area occur in Mandora Salt Marsh, where the Eil Springs, Grant Spring and Salt Creek are discharge sites for groundwater. These provide a constant freshwater source in an arid environment. They act as an important refugia for biodiversity and are culturally significant to indigenous communities..

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K •
Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U •
Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

G, R, I, E, Sp, Y, Xp, Xf.

20. General ecological features:

The Eighty-mile Beach Ramsar site contains four significant wetland habitats each which support species and communities that are critical to the ecological character of the site.

Intertidal Mudflats

A combination of the low relief topography and the high tidal regime at Eighty-mile Beach provides an extensive intertidal zone. The interaction between the tide and the fine sediments acts in a cyclic way to maintain the habitat, with the soft sediments decreasing the energy of incoming waves and resulting in a low energy depositional environment where fine sediments accumulate (Honkoop et al. 2006). The system has few terrestrial carbon inputs, with minimal mangrove areas and no major surface water flows. The fine sediments carried on ocean currents contain organic matter, which is the building block of productivity in this system. Little is known about primary production in this system and the extent that the system is driven by benthic primary producers that exist on the mudflats remains a knowledge gap.

The mudflats support a diversity and abundance of invertebrates with over 200 taxa recorded (Lavaley et al. 2005). The most abundant taxa collected included a brittle star *Amphiura tenuis* (Amphiuridae), the bivalve mollusc *Siliqua pulchella* (Culteliidae), polychaete worms (Oweniidae), mud shrimp (Coropiidae, Amphipoda), and sandhoppers (Oedicerotidae, Amphipoda). taxa

Eighty-mile Beach is considered one of the most significant sites in Australia for migratory shorebirds. The beach supports a high number and diversity of shorebirds and is an important stop-over and feeding site (see 22 below).

Inland Mangroves

The inland mangroves of Mandora Salt Marsh are unique and represent one of only two such systems in Australia, the other being at Lake Macleod (Johnstone 1990). The mangroves are comprised of a single species (Grey Mangrove) and are most likely a relict from a time when the

site was part of an estuary (Semeniuk and Semeniuk 2000). The major stand lines Salt Creek and consists of stunted adults and saplings. The permanence of this ground water fed system and episodic freshwater flooding are essential for survival of the mangrove community.

Inland Temporary Wetland Systems

Mandora Salt Marsh contains a variety of temporary wetland systems some which may experience seasonal inundation (e.g. Walyarta) and others which may be inundated less frequently (e.g. Paperbark thickets). These wetlands support a variety of vegetation communities including paperbark thickets dominated by *Melaleuca asophila*; samphire dominated by *Tecticornia* spp. and freshwater aquatic vegetation (e.g. Ribbon Weed *Vallisneria spiralis* and the freshwater macroalgae *Chara* sp.).

Freshwater Mound Springs

These typical peat based mound springs, formed by the movement of water through cracks in the Broome Sandstone aquifer (Semeniuk and Semeniuk 2000) are located at Mandora Salt Marsh.. They are characterised by a thick (3 – 4 m) mound of peat accumulated over geological time scales, surrounded by a moat of freshwater. The peat bed is topped by a forest of *Melaleuca* sp. up to 20m in height along with emergent reeds such as *Schoenoplectus formosa*, *Schoenoplectus litoralis*, *Typha domingensis* and *Acrostichum speciosum*. Riparian vegetation surrounding the moat is a dense shrubland dominated by *Acacia saligna* (DEC in prep.).

The permanence of these freshwater wetlands makes them extremely important to biodiversity in the arid environment. They provide habitat for aquatic flora and fauna year round and a source of drinking water for terrestrial animals. They are reliant on good quality, alkaline groundwater to maintain their ecological character and continue to support biodiversity within the site.

21. Noteworthy flora:

Vascular plants are not a significant feature of the beach portion of the Ramsar site. However, a total of 269 species of vascular plants, from 55 families, have been collected from Mandora Salt Marsh. This includes 37 species from the family Poaceae, and nine introduced weeds (Willing and Handasyde 1999).

The site does not contain any threatened flora species. However, in 1999 a new species of Bush Tomato (*Solanum oligandrum*) was recorded at Mandora Salt Marsh (Willing and Handasyde 1999).

22. Noteworthy fauna:

Five threatened species that have been recorded within the boundary of the Eighty-mile Beach Ramsar site, one mammal, two waterbirds and two marine turtles:

- Greater Bilby (*Macrotis lagotis*), listed as vulnerable under the EPBC Act and IUCN Red List. It has been recorded at Mandora Salt Marsh (Graham 1999).
- Nordmann's Greenshank (*Tringa guttifer*) listed as endangered under the IUCN Red List. Single individual recorded once at Eighty-mile Beach in November 2005 (Rogers unpublished data)
- Australian Painted Snipe (*Rostratula australis*) listed as vulnerable under the EPBC Act. Single individual recorded once at Mandora Salt Marsh in 1999 (Birds Australia 2008)
- Flatback Turtle (*Natator depressus*) listed as vulnerable under the EPBC Act and data deficient under the IUCN Red List. Recorded nesting at Eighty-mile Beach (Spotila 2004)
- Green Turtle (*Chelonia mydas*) listed as vulnerable under the EPBC Act and data deficient under the IUCN Red List. Recorded foraging (Pendoley 2005) and potentially nesting (Pendoley 1997) at Eighty-mile Beach.

Eighty-mile Beach is renowned for large numbers of shorebirds and the beach is one of the most important sites for migratory shorebirds in the East Asian-Australasian Flyway (Bamford et al. 2008). Its location makes Eighty-Mile Beach a primary staging area for many migratory

shorebirds on their way to and from Alaska and eastern Siberia (Wade and Hickey 2008). Due to the great length of the beach, total counts from this site are limited to three records of shorebird numbers:

- October 1998 – 465,890 waders (Minton et al. 2003a)
- November 2001 – 472,418 waders (Minton et al. 2003b)
- February 2004 – 2,880,000 Oriental Pratincoles (Sitters et al. 2004)

There are counts for portions of the beach spanning a number of years and all are in excess of 20,000 birds. Summer counts from a sub-site 10 – 60km south of Anna Plains, are consistently > 200,000 birds and winter > 20,000 birds (D. Rogers unpublished data). It is important to note that the site is significant in terms of total waterbird numbers, not only during the summer (non-breeding season), but also during winter. There are populations of both resident birds that are present at the site year round as well as first year migratory birds that remain in Australia (e.g. Great Knot, Bar-tailed Godwit, Eastern Curlew).

The beach is also significant for the role it plays in supporting individual waterbird species. Maximum counts for 20 bird species exceed the 1% population thresholds (Wetland International 2006). In addition, Eighty-mile Beach is considered the most significant site (in terms of numbers of birds) in the South-East Asian Flyway for nine international migratory species (Bamford et al. 2008), indicated by an asterisk in the table below.

Maximum counts for shorebirds recorded in the beach portion of the Eighty-mile Beach Ramsar site:

Species	Count	Date	% of Pop.	Migratory species?	Source
Bar-tailed Godwit*	110,209	Oct 1998	34	Yes	Minton et al. 2003b
Broad-billed Sandpiper	314	Dec 2006	1	Yes	Shorebirds 2020
Common Greenshank	3,880	Dec 2006	6	Yes	Shorebirds 2020
Curlew Sandpiper*	60,000	Unknown	33	Yes	Bamford et al. 2008
Eastern Curlew	709	Oct 1998	2	Yes	Minton et al. 2003b
Great Knot*	169,044	Nov 2001	45	Yes	Minton et al. 2003b
Greater Sand Plover	64,584	Nov 2001	59	Yes	Minton et al. 2003b
Grey Plover	1,585	Nov 2001	1	Yes	Minton et al. 2003b
Grey-tailed Tattler*	14,647	Nov 2001	29	Yes	Minton et al. 2003b
Little Curlew	3,691	Nov-2004	2	Yes	Shorebirds 2020
Oriental Plover*	57,619	Oct 1998	82	Yes	Minton et al. 2003b
Oriental Pratincole*	2,880,000	Feb 2004	100	Yes	Sitters et al. 2004
Pied Oystercatcher	653	Oct 1998	6	No	Minton et al. 2003a
Red Knot*	80,700	Unknown	37	Yes	Bamford et al. 2008
Red-capped Plover	11,453	June 2005	12	No	Shorebirds 2020
Red-necked Stint	60,000	Unknown	18	Yes	Bamford et al. 2008
Ruddy Turnstone	3,480	Oct 1998	10	Yes	Minton et al. 2003b
Sanderling	3,219	Nov 2001	15	Yes	Minton et al. 2003b
Sharp-tailed Sandpiper*	25,000	Unknown	16	Yes	Bamford et al. 2008
Terek Sandpiper*	9,820	Nov 2001	16	Yes	Minton et al. 2003b

Mandora Salt Marsh is considered a significant site for wetland birds, particularly in years of significant inundation (Halse et al. 2005). There are records of large numbers of birds at Mandora Salt Marsh, although surveys are more limited than for the beach portion of the Ramsar site. Surveys in 1997 and 1999 recorded > 20,000 waterbirds within the Ramsar boundary at Mandora Salt Marsh (Graham 1999). Following the extensive inundation of the area in 1999 and 2000 very large numbers of waterbirds were recorded from aerial surveys 480,000 – 490,000

(Halse et al. 2005) although the area surveyed included larger areas of inundated land outside the Ramsar boundary.

The site is also significant for the role it plays in supporting individual waterbird species. Maximum counts for two Australian waterbird species exceed the 1% population thresholds (Wetland International 2006):

- Black-winged Stilt - 10,000 birds recorded in June 1997 (Graham 1999); and
- Eastern Great Egret – 1,200 birds recorded in October 1997 (Graham 1999).

Eighty-mile Beach is considered an important rookery for the threatened Flatback Turtle (*Natator depressus*) (DEWHA 2008c; Spotila 2004; Pendoley 1997). It is estimated that hundreds of females nest in the sandy, low energy beaches during December and January (Pendoley 2005; Spotila 2004).

23. Social and cultural values:

a) Describe if the site has any general social 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:

Eighty-mile Beach and Mandora Marshes are both listed on the Register of the National Estate (IDs 18107 and 19827, respectively) for their natural and cultural values.

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?

If Yes, tick the box **X** 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:

There are at least three indigenous language groups with connections to the land contained within the Eighty-mile Beach Ramsar site the Karajarri in the north, the Nyangumarta in the south and the Ngarla who have been associated with the southern end of the beach. A native title claim has been lodged by the Nyangumarta for 39,931 km², which includes Mandora Salt Marsh and a large portion of Eighty-mile Beach. The matter is before the tribunal and a decision is expected by March 2009 (Office of Native Title 2008).

The importance of groundwater and wetlands for the traditional owners can be summarised as follows (Yu 1999):

- Wetlands and water sources were occupation sites and as a consequence there are a large number of artefacts within close proximity including: middens, pinka (large baler shells) used to

scoop and carry water for drinking, wiluru (like an oil stone) used for sharpening spear heads, axes, and flakes, and kurtanyanu and jungari (grinding stones).

- All water sites are named places (e.g. Walyarta is the indigenous name for the large western lake at Mandora Salt Marsh). There are strong cultural ties and mythological narratives associated with wetlands. For example, most of the permanent water sources are inhabited by powerful water snakes, who have the powers to produce rain, regenerate or damage the country and take people's lives. These permanent water sources are called ngapa kunangkul (living water).

- There is a range of personal connections between traditional owners and wetlands / water sources. Many of the senior members of the communities were born and grew up around these wetlands and so there are historical events associated with them.

24. Land tenure/ownership:

a) within the Ramsar site:

The beach section of the Eighty-mile Beach Ramsar site lies within unallocated crown land, as does a portion of the Mandora Salt Marsh. The majority of the saltmarshes and the surrounding area is pastoral lease. There are four large pastoral leaseholds of relevance to the Ramsar site: Anna Plains, Mandora, Wallal and Pardoo. These leases occupy the land from 40m above high tide mark along the coast. Anna Plains station also covers the majority of the Mandora Salt Marsh site. All pastoral leases in Western Australia issued under the now repealed Land Act 1933 expire on 30 June 2015. Anna Plains has agreed to the exclusion of the Mandora Salt Marsh and this area will be managed for conservation purposes from 2025.

b) in the surrounding area:

Surrounding areas are mostly pastoral leasehold land and unallocated crown land. Agreements have been reached for land adjacent to the Ramsar site along the coast to be excised from the Anna Plains, Mandora and Wallal pastoral leases.

25. Current land (including water) use:

a) within the Ramsar site:

Localised beach-based recreation occurs on Eighty-mile Beach and a Caravan Park is located on Wallal Downs, just behind the dunes. Cattle grazing occurs on the Mandora Salt Marsh. There is seasonal commercial net fishing and offshore pearling. Shallow waters west (seaward) of Eighty-mile Beach constitute the major pearling grounds for sourcing wild live shell for the Broome-based cultured pearl industry, focused on *Pinctada maxima* (Watkins et al. 1997). Mining tenements and exploration licences exist over much of the site.

b) in the surroundings/catchment:

The surrounding land is leased for the grazing of cattle. Mining tenements are held over the majority of the area.

26. 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 Ramsar site:

By virtue of its remote location, limited diversity of adjacent land uses (pastoral and transport corridor) and limited public access, Eighty-mile Beach has fewer threats than comparable sites in southern and eastern Australia (Watkins et al. 1997; Pearson et al. 2005). However, there are still a small number of potential and actual threats that may impact on the ecological character of the Ramsar site.

Recreation within the Eighty-mile Beach Ramsar site is predominantly limited to the area adjacent to the Caravan Park near Wallal Downs pastoral station. However, from this access point, vehicles (4WD and motorcycles) can access the beach and travel some distance north and south. Although the impacts of this activity have not been quantified, there is anecdotal evidence of impacts to coastal sand dunes, migratory shorebirds, turtles and benthic intertidal fauna (Watkins et al. 1997).

Mandora Salt Marsh site is within the Anna Plains Station lease and in 1999, access by cattle was considered to be causing detrimental impacts to the wetlands (Graham 1999). Although some wetlands have been fenced and alternative water supplies provided for cattle (DEC in prep.) others are still accessible by stock. Given the arid zone environment, stock tend to congregate around the permanent freshwater springs causing damage such as trampling vegetation, pugging soft sediments and increasing nutrient concentrations (Graham 1999).

Camels occur at Mandora Salt Marsh in moderate numbers causing similar impacts to cattle, as described above (Graham 1999). Unlike domestic stock grazing, however, this threat will remain post 2015 when the pastoral lease expires. In addition, feral cats are a significant problem at the marsh causing impacts to waterbirds and other native animals (Graham 1999).

b) in the surrounding area:

The major activities in the surrounding area that may impact on the ecological character of the Ramsar site are:

- Agriculture;
- Mining; and
- Climate change.

The Eighty-mile Beach Ramsar site lies within the La Grange groundwater subareas. Current groundwater extraction is limited and estimated to be approximately 4.8 GL/year for stock, domestic and small scale horticultural purposes (Department of Water 2008). There are plans for future horticultural developments in the region and diversification of current pastoral landuse to include a range of more water intensive practices and activities such as irrigated agriculture and aquaculture. This has the potential to affect the ecological character of the site and particularly the groundwater dependant ecosystems such as the mound springs at Mandora Salt Marsh.

Much of the area surrounding the Eighty-mile Beach site is subject to mining tenements or exploration licenses. Although it is unlikely that mining would be permitted within the Ramsar site boundary, mining in adjoining areas has the potential to impact on the site. Of particular concern is the increase in groundwater extraction that would likely occur as a consequence of mining and the associated impacts on the groundwater dependant ecosystems at Mandora Salt Marsh.

Shipping and off-shore petroleum extraction are a potential threat in the event of a major oil spill. This could be expected to have a catastrophic impact on the biota using Eighty Mile Beach, particularly if a spill were to occur in the September to April period, which would significantly impact on international migratory species such as shorebirds and marine turtles (Watkins et al. 1997).

27. Conservation measures taken:

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

The Ramsar site is not reserved.

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

Ia ; Ib ; II ; III ; IV ; V ; VI

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

There is currently no management plan for the site.

d) Describe any other current management practices:

Approximately 30 km of fencing has been erected on Anna Plains pastoral lease to exclude cattle from part of Eighty-Mile Beach and the dune systems (funded by the Commonwealth Coastcare program in 2001). Additional exclusion fencing is being considered (Pearson, pers. comm.).

In 1997, Saunders Spring in Mandora Salt Marsh was fenced to exclude cattle from all but one watering point using funding from the Commonwealth Natural Heritage Trust program. Funding was also obtained to fence Grants Spring, which was completed in 2001.

28. Conservation measures proposed but not yet implemented:

The Department of Environment and Conservation has negotiated with surrounding pastoral leaseholders to add significant terrestrial areas within and adjacent to the site to the conservation estate. These will come into effect in 2015.

29. Current scientific research and facilities:

Eighty-mile Beach has been intensively surveyed for shorebirds by the Australasian Wader Studies Group since 1981, mainly through an ongoing program of shorebird banding expeditions. Numerous shorebird recoveries have been reported from China, Korea and Russia. The expeditions usually include foreign participants, notably researchers from Asian countries of the Shorebird Flyway, receiving training in shorebird study techniques.

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

An educational pamphlet for visitors to Eighty-mile Beach has been jointly produced and colour-printed for Environs Kimberley, Broome Bird Observatory and the Department of Conservation and Land Management with funding support from the Gordon Reid Foundation (Lotteries Commission of Western Australia).

31. Current recreation and tourism:

Eighty-mile Beach is a popular tourist destination for those travelling by road between Port Hedland and Broome. There is limited public access to the beach and no public access to Mandora Salt Marsh (although permission can be sought from pastoral station owners). The main public access to the beach is at the Eighty-mile Beach Caravan Park, which is located adjacent to the Wallal pastoral station. There is also access to the very southern edge of the site at Cape Keradruen. Vehicles are able to access the beach adjacent to the caravan park and four-wheel driving and motorcycle riding on the beach is a popular activity. Other major recreational activities on the beach include fishing and shell collecting.

32. Jurisdiction:

Territorial: The State Government of Western Australia.

Functional: the Western Australian Department of Environment and Conservation and the Western Australian Department of Agriculture

33. Management authority:

Several State Government Agencies are involved in management of the site. The key agency is the Department of Environment and Conservation, because of the Ramsar listing of the site. The contact details for the management office are:

Michael Coote, DEC, 17 Dick Perry Ave, Technology Park, Kensington, WA 6983, Australia, (Tel: +61-8-9219-8714; Fax: +61-8-9219-8750; email: Michael.Coote@dec.wa.gov.au).

34. Bibliographical references:

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

Commonwealth of Australia, 2006, A guide to The Integrated Marine and Coastal Regionalisation of Australia - version 4.0 June 2006 (IMCRA v4.0)

DEC, 2008, Marine Turtle Recovery Plan for Western Australia, Wildlife Management Program No. 45, Department of Environment and Conservation, Perth.

GeoScience Australia, 2008, Australia 1:250,000 Geological Series, Sheet SE S1 -13 Mandora, <http://www.geoscience.gov.au/bin/250dpi?img=125dpi/se5113.jpg> accessed November 29, 2008.

Graham, G., 1999, A land management assessment of Mandora Marsh and its immediate surrounds. Department of Conservation and Land Management of Western Australia.

Halse, S.A., Pearson, G.B., Hassell, C., Collins, P., Scanlon, M.D. and Minton C., 2005, Mandora Marsh, north-western Australia, an arid-zone wetland maintaining continental populations of waterbirds. *Emu*, 105: 115-125.

Honkoop, P., Pearson, G., Lavaleye, M. and Piersma, T., 2006, Spatial variation of the intertidal sediments and macrozoobenthic assemblages along Eighty-mile Beach, North-western Australia. *Journal of Sea Research* 55: 278– 291

Johnstone, R.E., 1990, Mangroves and Mangrove Birds of Western Australia, Records of the Western Australian Museum, Supplement No. 32.

Lavaleye, M., Honkoop, P., Marsh, L., Pearson, G., Piersma, T. and de Goeij, P. (2005). Atlas of the macrozoobenthic fauna. In: *The Long Mud: Benthos and Shorebirds of the Foreshore of Eighty-mile Beach, Western Australia*. Piersma, T., Pearson, G.B. Hickey, R., and Lavaleye, M (Eds). NIOZ-Report 2005-2, Texel. Royal Netherlands Institute for Sea Research, Den Burg.

Minton, C., Jessop, R., and Collins, P., 2003a, Northwest Australia wader and tern expedition 15 September to 17 November 2001. *The Stilt* 43: 55-65.

Minton, C., Jessop, R., Collins, P. and Sitters, H., 2003b, Northwest Australia wader and tern expedition from 1 August to 1 November 1998. *The Stilt* 43: 42-46.

Morton, S.R., Short, J. and Marker, R.D., 1995, Refugia for Biological Diversity in Arid and Semi-arid Australia, Biodiversity Series, Paper No. 4, Biodiversity Unit Commonwealth Department of the Environment, Sport and Territories.

Office of Native Title, 2008, Nyangumarta People: WC98/65, WAD6281/98 http://www.nativetitle.wa.gov.au/claimsPilbara_Nyangumarta.aspx accessed December 2008.

Pearson, G.B., Hickey, R., and Honkoop, P.J., 2005, General description of the study area. In Piersma, T., Pearson, G.B., Hickey, R., and Lavaleye, M (Eds), *The Long Mud: Benthos and*

- Shorebirds of the Foreshore of Eighty-mile Beach, Western Australia. NIOZ-Report 2005-2, Texel. Royal Netherlands Institute for Sea Research, Den Burg.
- Pendoley K., 1997, Sea turtles and management of marine seismic programs in Western Australia, PESA Journal, 25: 8-16.
- Pendoley K., 2005, Sea turtles and the environmental management of industrial activities in North West Western Australia. PhD thesis, Murdoch University
- Semeniuk, C. and Semeniuk, V., 2000, Wetlands of the north western Great Sandy Desert, unpublished, Perth.
- Sitters, H., Minton, C., Collins, P., Etheridge, B., Hassell, C. and O'Connor, F., 2004, Extraordinary numbers of Oriental Pratincole in NW Australia. The Stilt 45: 43-49.
- Skewes, J., 2003, Report on population monitoring counts, 2002. The Stilt 44: 56-63.
- Skewes, J., 2004, Report on the 2003 population monitoring counts. The Stilt 46: 86-96.
- Skewes, J., 2005, Report on population monitoring counts, 2004. The Stilt 48: 54-60.
- Spotila, J.R., 2004, Sea Turtles: A complete guide to their biology, behaviour and conservation, John Hopkins University Press, Baltimore.
- Storey, A. (unpublished), Aquatic fauna and water chemistry of the mound springs and wetlands of Mandora Marsh, north-western Australia.
- Storey, A. W., Halse, S.A. and Shiel, R., 1999, Aquatic fauna and water chemistry. In: A land management assessment of Mandora Marsh and its immediate surrounds. Grahman, G. (ed). Department of Conservation and Land Management of Western Australia.
- Wade, S. and Hickey, R., 2008, Mapping Migratory Wading Bird Feeding Habitats using Satellite Imagery and Field Data, Eighty-Mile Beach, Western Australia. Journal of Coastal Research 24 (3): 759-770.
- Watkins, D., Brennan, K., Lange, C., Jaensch, R. and Finlayson, M., 1997, Management planning for Ramsar Sites in the Kimberley Region of Western Australia. Wetlands International – Oceania, Canberra. Report to the Department of Conservation and Land Management, Western Australia, 1-192.
- Wetlands International, 2006, Waterbird Population Estimates, fourth edition.
- Willing, T. and Handasyde, T., 1999, Vegetation and Flora. In: A land management assessment of Mandora Marsh and its immediate surrounds. Grahman, G. (ed). Department of Conservation and Land Management of Western Australia.
- Yu, S., 1999, Ngapa kunangkul (living water): An indigenous view of groundwater, University of Western Australia, Western Australia.

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