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Department of Transport
Port Hedland Spoilbank Marina Development
Assessment of potential impacts upon migratory waterbirds

BACKGROUND

The Department of Transport is proposing to develop a marina at the base of the Spoilbank, a sandy peninsula created by dredging of the harbour at Port Hedland (Figure 1). The proposal includes:

- A marina basin, berth facilities (up to 80 pens), boat launching area and entrance channel.
- Capital dredging works resulting in up to 900,000 m³ of dredge spoil, and dredged to a maximum depth of -2m chart datum (-6m AHD). Dredge spoil will be used onsite as fill material to raise the finished ground level prior to landscaping - no ocean disposal of dredge material will occur as part of this proposed action (Please note: no activities are proposed to occur in Commonwealth waters or marine areas).
- Breakwaters, revetments and sand trap.
- Parking facility, amenities (public and pen holders) and public open space.

Port Hedland lies in a region with nearby sites of international significance for migratory waterbirds, such as the Port Hedland Salt Works (Bamford *et al.* 2008), and therefore risk to waterbirds from the proposed marina development has been identified as a concern. To investigate this risk, Bamford (2011) undertook an assessment of the importance of the Spoilbank for migratory waterbirds based on survey data collected in spring 2008, autumn 2009, and spring 2010 from the Port Hedland area as part of a study of waterbird usage of the Pretty Pool area, just east of Port Hedland. This review formed the basis for an RPS (2014) report on the importance of the Spoilbank for migratory (and other) waterbirds, and the risk posed by the (then) proposed marina development. The RPS review was able to include the results of an additional waterbird survey (spring 2011) carried out for the Pretty Pool Development (Bamford 2012). Also included in the RPS review were the results of a Bennelongia (2011) study which involved waterbird counts in the region from 18km west to 9 km east of Port Hedland, including the Spoilbank area. Because of the Bamford (2012) and

Bennelongia (2011) studies, there is abundant information on the distribution and abundance of waterbirds in the Port Hedland area.

The RPS (2014) review considered the proposed marina development as it was planned at the time, using available data on waterbirds and their conservation listings in 2014. There have been slight changes to the development proposal, but there have also been changes to the conservation listings of some waterbird species. Therefore, the Department of Transport, in the process of investigating the marina proposal, commissioned Bamford Consulting Ecologists to provide a brief and updated review of the significance of the Spoilbank area for waterbirds, and in particular the scope provided for this work requested comments on the following:

- Whether habitat critical to the survival of any waterbird species occurs in the project area.
- Critical times/seasons that waterbirds could be roosting/nesting in the project area.
- Provide an updated review of waterbird records in the vicinity of the project area.
- Assess the proposal's potential to have a significant impact on these species.
- Provide recommendations for targeted survey work, monitoring and management actions that could be implemented to mitigate potential impacts to the species.



Figure 1. Proposed marina development at the base of the Spoilbank.

REVIEW OF DISTRIBUTION AND ABUNDANCE OF WATERBIRDS IN THE PORT HEDLAND AREA

Bamford (2012) and Bennelongia (2011) provide an extensive dataset on waterbird distribution and abundance in the Port Hedland area, and the records are summarised in Table 1. Maximum counts are presented here for the purpose of comparing between the Spoilbank/Cemetery Beach area and the region. This information is useful in addressing the questions raised by the Department of Transport. Spoilbank/Cemetery Beach are combined in Table 1 as Bamford did not always distinguish between these two areas, whereas Bennelongia always made this distinction. Bamford did separate the Spoilbank from Cemetery Beach in some field notes (March 2009 and November 2010) and Table 2 provides maximum count data just for Spoilbank where available.

Bennelongia counted only waterbirds listed as migratory under legislation and only waterbirds defined as shorebirds (members of the families Scolopacidae (sandpipers) and Charadriidae (plovers). Bennelongia also had a large number of unidentified waterbirds of which an unknown proportion would have been migratory species. These unidentified waterbirds were not in the Spoilbank or Cemetery Beach areas.

The region surveyed by Bamford (2012) was smaller than that surveyed by Bennelongia (2011), but in both cases the numbers of individuals and of species were much lower in the Spoilbank/Cemetery Beach area than in the region. Bamford recorded just 14.7% of listed waterbirds in the Spoilbank/Cemetery Beach area, and only 4% of the non-listed species. The low proportion of non-listed birds was because of very large numbers of ducks on the Port Hedland sewage ponds which have since been de-commissioned. Bennelongia found a slightly higher proportion (17.6%) of listed waterbird species in the Spoilbank/Cemetery Beach area, but this figure is almost certainly exaggerated due to the unknown number of listed but unidentified waterbirds observed outside the Spoilbank/Cemetery Beach area. Considering Spoilbank data only, Bamford recorded just 6.9% of listed waterbirds and only 0.42% of the non-listed species, while Bennelongia record just 4.3% of listed waterbird species, with this figure almost certainly exaggerated due to the large number of unidentified waterbirds not on the Spoilbank.

Both the Bamford and Bennelongia studies therefore found waterbird numbers to be low on the Spoilbank (and the adjacent Cemetery beach). Bamford concluded that the tidal flats from Pretty Pool and to the east were the most important foraging areas in the immediate region, and that key roosting sites were just east of Pretty Pool, from around the mouth of Two Mile Creek to Six Mile Creek. He also commented on the important of the now de-commissioned sewage ponds for a range of (mostly non-migratory) waterbird species. Bennelongia found a similar distribution, with high counts from Pretty Pool to Six Mile Creek.

In addition to count data, Bamford (2012) made some general observations on waterbirds on the Spoilbank. It was noted that waterbirds aggregated at high tide on the western base of the Spoilbank, and also gathered around shallow pools in this area. This area accounted for some of the larger counts of waterbirds on the Spoilbank, such as 24 Great Knot (28/03/2009), and 70 Bar-tailed Godwit and 25 Greater Sand-Plover (9/10/2010). During aerial surveys, roosting waterbirds were also seen on the end of the Spoilbank, with a count of 100 'medium to large shorebirds' (probably Bar-tailed Godwit and Great Knot) on 19/10/2008, and a count of 150 Silver Gulls on 9/10/2010. These birds tended to be on small sandbars just off the end of the

Spoilbank due to high levels of human activity, even at high tide (when anglers and vehicles were effectively marooned on the end of the Spoilbank). Disturbance was identified as a concern for waterbirds throughout the area surveyed by Bamford.

SPECIES OF CONSERVATION SIGNIFICANCE

Species of conservation significance are indicated on Tables 1 and 2, with details given in Appendix 1. Most (26) significant species are listed as Migratory, and six of these Migratory species have additional Threatened listings: four being Critically Endangered, one Endangered and one Vulnerable. These Migratory species that now also have Threatened listings have been subject to population declines due to habitat loss in their migration route in East Asia. In addition, one species (the Fairy Tern) not listed as Migratory is listed as Vulnerable.

Bamford *et al.* (2008) estimated numbers of migratory waterbird species in the Gascoyne/Pilbara area and these are compared with the highest counts obtained in the Port Hedland studies in Table 3. In most cases the numbers in Port Hedland are insignificant, but for a few species the numbers are of interest. Species with around 10% or greater of the estimated number in the Pilbara/Gascoyne recorded around Port Hedland include: Bar-tailed Godwit (9.0%), Whimbrel (10.6%), Grey-tailed Tattler (11.8%), Sanderling (73.0%) and Greater Sand-Plover (15.2%). Of these, the Sanderling is of note as the Port Hedland region number is close to the 1% criterion for the species in the entire East Asian/Australasian Flyway (Bamford *et al.* 2008). The Spoilbank/Cemetery Beach area, however, supports much lower proportions of all these species, although it may have occasional value as a roost site which could change with levels of human activity.

Most of the listed Migratory species breed in the northern hemisphere in the northern spring/summer, and therefore numbers tend to be lowest in the southern hemisphere winter and highest from about September to April. Bamford and Moro (2011) found that on Barrow Island off the Pilbara coast, some waterbird numbers peaked in spring and/or autumn, corresponding to migration periods, but that the abundance of both migratory and non-migratory species also varied with regional conditions. For example, inland rainfall corresponded with low numbers of many waterbird species on the island.

CONCLUSIONS WITH RESPECT TO SCOPE QUESTIONS

The scope provided by the Department of Transport identified a number of key questions relevant to possibly impacts of the marina proposal upon waterbirds, especially migratory waterbirds. These are discussed below.

Does habitat critical to the survival of any waterbird species occurs in the project area? The Spoilbank is not critical to the survival of any waterbird species in the Port Hedland area, but it may help support current numbers in the area. Roosting by many waterbirds, including some listed Migratory species, occurs at both the base of the Spoilbank, and towards the end. Disturbance of roosting waterbirds on the mainland was identified as a concern by Bamford (2012), who noted disturbance caused by pedestrians, anglers, dogs and vehicles using beaches. The Spoilbank has the characteristics of an ideal roosting area, being low, unvegetated, close to foraging areas and almost surrounded by water. Disturbance levels on the Spoilbank are

already quite high, due largely to anglers, which may explain why some of the records of roosting birds were located on small islands just off the Spoilbank. The Spoilbank also has the characteristics of an ideal breeding site for species such as the Crested and Fairy Terns, Migratory and Vulnerable respectively, but it is not known if they would breed in the area even if disturbance levels were reduced.

Are there critical times when waterbirds could be roosting/nesting in the project area? There are strong seasonal patterns in the biology of many waterbird species. Migratory species such as sandpipers (Scolopacidae) and some plovers (Charadriidae) can be expected to be most abundant from about September/October to April, although small numbers will be present over the winter months. They would use the Spoilbank for roosting and some foraging. If Crested Terns and Fairy Terns attempted to nest on the Spoilbank, they would do so in late winter/spring and in summer respectively.

Updated review of waterbird records in the vicinity of the project area. This is provided in detail above. Within the Port Hedland area, the coastline from Pretty Pool to Six Mile Creek, east of Port Hedland itself, is of most importance for waterbirds, with foraging along the tidal flats in this area, and roosting on beaches where access by people is limited. The sewage ponds that have now been de-commissioned were very important for mostly non-migratory waterbird species (ducks, herons, stilts and avocets); it is not known if the new sewage ponds have similar value. The Port Hedland area overall supports moderate proportions of regional (Pilbara/Gascoyne) populations of several migratory waterbird species, but proportions making use of the Spoilbank are low. However, this may reflect the levels of disturbance currently experienced on the Spoilbank.

Assess the proposal's potential to have a significant impact on waterbird usage of the Spoilbank. The marina proposal affects an area at the base of the Spoilbank where some waterbird roosting occurs, notably around a pool or lagoon. This area would be lost to the development. Numbers of birds using this specific location were noted on two occasions (28/03 2009 and 9/10/2010) in Bamford field notes and the highest numbers (24 Great Knot, 70 Bar-tailed Godwit and 25 Great Sand-Plover) represent small proportions of the numbers of these species present in the Port Hedland area. Usage of the location for roosting also appeared to be intermittent. The direct impact of loss of the lagoon and shoreline at the base of the Spoilbank would be small, as it would see the loss of only a small roosting area used by a small number of birds. However, the roosting area might be better used if disturbance was reduced, but this applies to other locations in the Port Hedland area. The marina proposal may also provide opportunities for roost site creation and reduction of disturbance, which are discussed below.

Recommendations for targeted survey work, monitoring and management. The proposed marina will only directly impact a small area used for roosting by small numbers of waterbirds, including listed Migratory species. Disturbance rather than habitat loss has been identified as a major concern for waterbirds in the Port Hedland area, with the possible exception of the loss of the old sewage ponds, and the marina proposal may provide the opportunity for the reduction of disturbance. The marina could also be used in the creation of roosting areas protected from disturbance, such as sheltered beaches and small islands of dredge spoil.

The lagoon/pools at the base of the Spoilbank are probably favoured for roosting because they are somewhat sheltered and may be difficult to access by pedestrians. It is not known if a

similar area could be created as part of the marina earthworks and dredging. The entire Spoilbank has the characteristics of a good roosting area for many waterbirds, and a breeding area for a few species (Crested Tern, Fairy Tern, Pied Oystercatchers, Red-capped Plovers), but usage is currently limited by high levels of human activity. Management of human access, such as restricting access to parts of the Spoilbank, would probably result in increased numbers of waterbirds using the site. Such management of access could be included in the marina development plans.

Unless patterns of waterbird usage of the Spoilbank and the Port Hedland area have changed dramatically since 2011, there is no particular need for repeat surveys. However, such patterns may have changed. It would also be interesting to know if the valuable function of the old sewage ponds has been replaced by the new ponds located on the outskirts of town. Surveys to determine current patterns of distribution and abundance of waterbirds in the Port Hedland area would best occur in October and/or March to be consistent with previous surveys. There may be local birdwatchers who can undertake such surveys.

Table 1. Maximum counts of each waterbird species from Bamford (2012; surveys in October 2008, March 2009, October 2019 and November 2011 from the Spoilbank to the mouth of Six Mile Creek) and Bennelongia (2011; survey in April 2011 from 17km west to 9km east of Port Hedland). Counts are presented for the region and for the Spoilbank/Cemetery Beach area only. Bennelongia counted only migratory shorebirds. Species indicated by shading are listed as migratory or of other conservation significance (at August 2019). Conservation listings are given in Appendix 1.

Species	Maximum regional count		Maximum count Spoilbank and Cemetery Beach	
	Bamford	Bennelongia	Bamford	Bennelongia
Plumed Whistling-Duck	1900		-	
Pacific Black Duck	350		-	
Grey Teal	150		-	
Hardhead	42		-	
Australasian Grebe	5		-	
Hoary-headed Grebe	1		-	
Lesser Frigatebird	11		10	
Pied Cormorant	65		1	
Little Pied Cormorant	17		-	
Australian Pelican	21		-	
Black-necked Stork	1		-	
Eastern Great Egret	9		1	
Eastern Reef Egret	3		-	
White-faced Heron	1		-	
Striated Heron	3		-	
Little Egret	6		-	
Glossy Ibis	1		-	
Straw-necked Ibis	2		-	
Australian White Ibis	30		30	
Royal Spoonbill	4		-	
Eurasian Coot	10		-	
Eastern Osprey	3		1	
Brahminy Kite	1		1	
Eastern Curlew	2	1	-	
Bar-tailed Godwit	300	448	70	82
Whimbrel	5	37	1	4
Little Curlew	27	1	-	
Marsh Sandpiper	20		-	
Common Sandpiper	6	2	1	
Grey-tailed Tattler	133	588	100	170

Common Greenshank	10	4	-	1
Ruddy Turnstone	45	115	10	18
Great Knot	210	281	24	47
Red Knot	-	42	-	
Sanderling	146	5	10	1
Sharp-tailed Sandpiper	40	-	-	
Curlew Sandpiper	30	5	-	
Terek Sandpiper	5	62	-	2
Red-necked Stint	500	455	20	89
Broad-billed Sandpiper	10	1	-	
Pied Oystercatcher	24		2	
Sooty Oystercatcher	2		4	
Beach Stone-curlew	1		-	
Black-winged Stilt	76		-	
Red-necked Avocet	5		-	
Grey Plover	10	5	1	1
Red-capped Plover	200		-	
Lesser Sand Plover	25	48	-	
Greater Sand Plover	182	303	25	9
Pacific Golden Plover	1	-	1	
Black-fronted Dotterel	6		-	
Masked Lapwing	2		-	
Silver Gull	1410		150	
Fairy Tern	100		-	
Gull-billed Tern	6		-	
Caspian Tern	33		4	
Whiskered Tern	500		-	
Crested Tern	5		-	
Common Tern	1		-	
Lesser Crested Tern	4		4	
Unidentified shorebird		1,845	-	
N species listed	27	18	13	10
N species not listed	32	NA	7	NA
Total count listed species (not including unidentified birds)	1,886	2,403	277	424 (103)
Total count not listed species	4,777	NA	193	NA

Table 2. Maximum counts on the Spoilbank only of each waterbird species from Bamford (2012; surveys in October 2008, March 2009, October 2019 and November 2011 from the Spoilbank to the mouth of Six Mile Creek) and Bennelongia (2011; survey in April 2011 from 17km west to 9km east of Port Hedland).

Species	Maximum count Spoilbank	
	Bamford	Bennelongia
Brahminy Kite	1	
Bar-tailed Godwit	70	19
Whimbrel		4
Common Sandpiper	1	
Grey-tailed Tattler	1	3
Ruddy Turnstone	6	11
Great Knot	24	42
Sanderling		1
Red-necked Stint		23
Pied Oystercatcher	2	
Sooty Oystercatcher	4	
Grey Plover	1	
Greater Sand Plover	25	
Pacific Golden Plover	1	
Silver Gull	13	
Caspian Tern	2	
N species listed	9	7
N species not listed	4	NA
Total count listed species	131	103
Total count not listed species	20	NA

Table 3. Maximum counts of significant waterbirds from Bamford (2012) or Bennelongia (2011) compared with maximum estimated populations (where available) on the Pilbara/Gascoyne coast from Bamford *et al.* (2008).

Species	Maximum count Port Hedland area	Maximum count Spoilbank/Cemetery Beach	Pilbara and Gascoyne coast population estimate
Lesser Frigatebird	11	10	NA
Glossy Ibis	1	-	NA
Eastern Osprey	3	1	NA
Bar-tailed Godwit	448	70	5,000
Eastern Curlew	2	-	200
Whimbrel	37	4	350
Little Curlew	27	-	NA
Marsh Sandpiper	20	-	NA
Common Greenshank			1,000
Common Sandpiper	6	1	1,000
Grey-tailed Tattler	588	170	5,000
Ruddy Turnstone	115	18	2,500
Great Knot	281	47	5,000
Sanderling	146	10	200
Terek Sandpiper	62	2	1,000
Curlew Sandpiper	30	-	30,000
Sharp-tailed Sandpiper	40	-	NA
Broad-billed Sandpiper	10	-	7,000
Red-necked Stint	500	89	25,000
Grey Plover	10	1	500
Pacific Golden Plover	1	1	100
Lesser Sand Plover	48	-	2,000
Greater Sand Plover	303	25	2,000
Caspian Tern	33	4	NA
Fairy Tern	100	-	NA
Crested Tern	5	-	NA
Common Tern	1	-	NA

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Appendix 1. Waterbirds recorded in the Port Hedland area (Bamford 2012; Bennelongia 2011) indicating conservation listings (Cons). Explanations of conservations listings are given below.

Family	Species	Cons
Phalacrocoracidae (cormorants)	<i>Phalacrocorax melanoleucos</i> Little Pied Cormorant	
	<i>Phalacrocorax varius</i> Pied Cormorant	
	<i>Phalacrocorax carbo</i> Great Cormorant	
Fregatidae (frigatebirds)	<i>Fregeta ariel</i> Lesser Frigatebird	Mig.
Pelecanidae (Pelicans)	<i>Pelecanus conspicillatus</i> Australian Pelican	
Ciconiidae (storks)	<i>Ephippiorhynchus asiaticus</i> Black-necked Stork	
Ardeidae (Herons, Egrets, Bitterns)	<i>Egretta novaehollandiae</i> White-faced Heron	
	<i>Ardea modesta</i> Eastern Great Egret	
	<i>Ardea garzetta</i> Little Egret	
	<i>Ardea sacra</i> Eastern Reef Egret	
	<i>Butorides striatus</i> Striated Heron	
Threskionithidae (Ibises and spoonbills)	<i>Plegadis falcinellus</i> Glossy Ibis	Mig
	<i>Threskiornis Molucca</i> Australian White Ibis	
	<i>Threskiornis spinicollis</i> Straw-necked Ibis	
	<i>Platalea regia</i> Royal Spoonbill	
Anatidae (Dabbling Ducks)	<i>Dendrocygna eytoni</i> Plumed Whistling-Duck	
	<i>Anas gracilis</i> Grey Teal	
	<i>Anas superciliosa</i> Pacific Black Duck	
	<i>Aythya australis</i> Hardhead	
Podicipedidae (grebes)	<i>Tachybaptus novaehollandiae</i> Australasian Grebe	
	<i>Poliiocephalus poliocephalus</i> Hoary-headed Grebe	
Rallidae (crakes and rails)	<i>Fulica atra</i> Eurasian Coot	
Accipitridae (hawks and eagles)	<i>Pandion cristatus</i> Eastern Osprey	Mig
	<i>Haliastur indus</i> Brahminy Kite	
	<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	
Scolopacidae (sandpipers)	<i>Numenius madagascariensis</i> Eastern Curlew	Mig; Cr End
	<i>Limosa lapponica menzbieri</i> Bar-tailed Godwit	Mig; Cr End
	<i>Numenius minutus</i> Little Curlew	Mig
	<i>Numenius phaeopus</i> Whimbrel	Mig

	<i>Tringa nebularia</i>	Common Greenshank	Mig
	<i>Tringa hypoleucos</i>	Common Sandpiper	Mig
	<i>Tringa brevipes</i>	Grey-tailed Tattler	Mig
	<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mig
	<i>Arenaria interpres</i>	Ruddy Turnstone	Mig
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mig
	<i>Calidris tenuirostris</i>	Great Knot	Mig; Cr End
	<i>Calidris alba</i>	Sanderling	Mig
	<i>Calidris ruficollis</i>	Red-necked Stint	Mig
	<i>Calidris ferruginea</i>	Curlew Sandpiper	Mig; Cr End
	<i>Xenus cinereus</i>	Terek Sandpiper	Mig
	<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Mig
Burhinidae (Stone-curlews)	<i>Esacus neglectus</i>	Beach Stone-curlew	
Haematopodidae (Oystercatchers)	<i>Haematopus longirostris</i>	Pied Oystercatcher	
	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	
Charadriidae (Plovers & Dotterels)	<i>Pluvialis fulva</i>	Pacific Golden Plover	Mig
	<i>Pluvialis squatarola</i>	Grey Plover	Mig
	<i>Charadrius ruficapillus</i>	Red-capped Plover	
	<i>Charadrius mongolus</i>	Lesser Sand Plover	Mig; End
	<i>Charadrius leschenaultii</i>	Greater Sand Plover	Mig; Vul
	<i>Elseyornis melanops</i>	Black-fronted Dotterel	
	<i>Vanellus miles</i>	Masked Lapwing	
Recurvirostridae (Stilts and Avocets)	<i>Himantopus himantopus</i>	Black-winged Stilt	
	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	
Laridae (Gulls, Terns)	<i>Sternula nereis</i>	Fairy Tern	Vul
	<i>Gelochelidon nilotica</i>	Gull-billed Tern	
	<i>Chlidonia hybrida</i>	Whiskered Tern	
	<i>Sterna hirundo</i>	Common Tern	Mig
	<i>Sterna caspia</i>	Caspian Tern	Mig
	<i>Sterna bengalensis</i>	Lesser Crested Tern	
	<i>Sterna bergii</i>	Crested Tern	Mig
	<i>Larus novaehollandiae</i>	Silver Gull	

Mig. Migratory under EPBC Act; Schedule 5 of the WABC Act.

Vul: Vulnerable under EPBC Act; Schedule 3 of the WABC Act.

End: Endangered under EPBC Act; Schedule 2 of the WABC Act.

Cr End: Critically Endangered Under EPBC Act; Schedule 1 of the WABC Act.

EPBC Act: Federal *Environment Protection and Biodiversity Conservation Act (1999)*.

WABC Act: Western Australian *Biodiversity Conservation Act (2016)*.