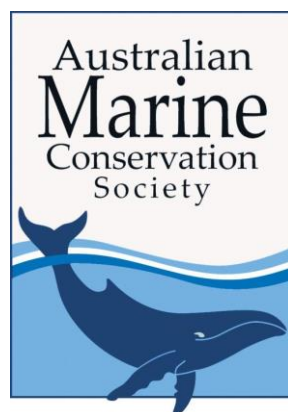


The Values of the Caley Valley Wetlands



“The density of birds was astonishing, the highest I have ever seen in any wetland. It was immediately clear that this was an extraordinary haven for wildlife”

Professor Callum Roberts (2013)



Executive Summary

Background

The Caley (Kaili) Valley Wetlands (the Wetlands) is a large, intact coastal wetland system located on the central Queensland coast approximately 25 kilometres (km) northwest of Bowen. The Wetlands cover an area of approximately 5,154 hectares (ha) and represents one of the few remaining intact wetland systems between Townsville and Bowen supporting valuable habitat and a wildlife corridor for a range of threatened flora and fauna species.

The Wetlands are a modified natural system that comprises of four out of the five main wetland systems within the Great Barrier Reef catchment, including - Estuarine, Lacustrine, Palustrine, and Riverine. There are at least six threatened native flora species within the Wetlands, remnant vegetation to the south that provides valuable habitat and a wildlife corridor of state significance, which connects the Wetlands to National Parks to the east and west.

The Wetlands support significant populations of waterbirds with over 40,000 birds and 154 bird species recorded. The wetlands provide habitat for at least 22 species of migratory shorebirds and greater than 0.1 per cent of the flyway populations of the Red-necked Stint and Sharp-tailed Sandpiper and habitat for threatened migratory species such as the Australian Painted Snipe, Little Tern, Australian Cotton Pygmy-goose and the Eastern Curlew. The Wetlands also provides breeding habitat for at least 24 species and is the largest and most northerly coastal nesting area for the Black Swan.

The habitats of the Wetlands also provide a diverse range of resources for a number of threatened fauna species, including:

- At least 10 species of waterbirds and shorebirds, including four migratory and six non-migratory species.
- Saltwater Crocodile, a non-avian wetland-dependent species.
- Several marine turtle species, including the Green Turtle, Loggerhead Turtle and Flatback Turtle, which feed and nest near the Wetlands.
- Dugong and Snubfin Dolphins are also known to or likely to inhabit adjacent waters.
- Other terrestrial species that potentially utilise the Wetlands or adjacent areas, including the Squatter Pigeon, Black-throated Finch, Northern Quoll, Coastal Sheathtail Bat, Water Mouse, Single-striped Delma, and Koalas.



Green Turtles feed and nest near the Wetlands. *Credit AMCS.*

Ownership

Abbot Point comprises of land designated as Strategic Port Land (SPL), owned by the North Queensland Bulk Ports Corporation which includes the Port of Abbot Point, and the Abbot Point State Development Area (APSDA). The Wetlands falls almost entirely within the APSDA and adjoins the Abbot Point international port facility. Almost all the properties that comprise the Wetlands are owned by the Coordinator General.

Ramsar values

The Wetlands is recognised as a nationally important wetland, under the Directory of Important Wetlands Australia (DIWA), and also meets the criteria for being recognised as a Ramsar wetland of international importance.

Through assessing previous studies on the Caley Valley Wetlands and the Abbot Point area, the Wetlands is likely to meet at least seven out of the nine Ramsar criteria, easily satisfying its potential for nomination. The Wetlands:

- Shows an outstanding example of wetlands on a tropical prograding coast.
- Supports endangered species
 - 24 endangered Australian Painted Snipe representing 2.3 per cent of the total population.
- Supports populations of animal species important for maintaining biological diversity
 - Provides one of Queensland's largest and most northerly coastal nesting areas for Black Swans.
- Supports animal species at a critical stage of the life cycle
 - Family groups of the endangered Australian Painted Snipe.
- Regularly supports 20,000 or more waterbirds
 - 41,088 recorded in dry season (June 2012), 21,077 in wet season (March 2012).
- Regularly supports 1 per cent of a population of one species of waterbird
 - Approximately 350 Little Tern species out of the estimated population of 3,000.
 - 2.3 per cent of the Australian Painted Snipe population.
 - Greater than 1 per cent of the total population of Purple Swamphens.
- Important source of food for fishes, spawning ground, nursery and/or migration path
 - Barramundi, Oxeye Herring and Longfin Eel, utilise both fresh and saltwater habitats to complete their life cycles, and are found in the Wetlands area.

Current and Future Development

The Port of Abbot Point was built in the north east corner of the Wetlands in the 1980s. There is currently one terminal (T1) which is under a 99 year lease to Mundra Port Pty Ltd, a subsidiary of Adani, and operated by Abbot Point Bulk Coal Pty Ltd, a subsidiary of Xstrata. T1 has an export capacity of 50 Megatonnes of coal per annum (Mtpa). In 2013/2014 T1 exported 22.89 Mtpa of coal (45 per cent of its capacity).

The scale of proposed port expansions at Abbot Point Coal Terminal is enormous. Two major terminal expansions have been approved for the area, referred to as Terminal 0 and Terminal 3. A third terminal (T2) proposed for the area has been withdrawn by BHP. Two additional developments, Abbot Point Expansion Project (AP-X) and Waratah Coal terminal, have also been proposed for south of the Caley Valley Wetlands. Combined these port expansion projects will create one of the world's largest ports across the Caley Valley Wetlands and on the doorstep of the Great Barrier Reef.

The proposed port expansion poses the greatest threat to the Wetlands and are likely to further remove parts of the Wetland habitats, increase noise and pollution in the area, and threaten the survival of many important species, such as the endangered Painted Snipe.

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Biological significance

Shallow waters and wetlands provide up to 40 per cent of global renewable ecosystem services, and remarkably they only cover 1.5 per cent of the earth's surface (WetlandCare Australia 2008).

Not only do wetlands buffer the impact of pollutants entering rivers, streams and the Great Barrier Reef, they also support a high level of biodiversity, provide flood control, groundwater discharge and water purification (WetlandCare Australia 2008). The most significant impacts on coastal systems from coastal development, in the Great Barrier Reef catchment, have been the loss of coastal wetlands with an estimated 70 to 90 per cent already lost (GBRMPA 2009).

The Caley (Kaili) Valley Wetlands (the Wetlands) is a large, intact coastal wetland system located on the central Queensland coast approximately 25 kilometres (km) northwest of Bowen. The Wetlands cover an area of approximately 5,154 hectares (ha) and are listed under the Directory of Important Wetlands in Australia (DIWA). The Wetlands are a slightly modified natural system that represent one of the few remaining intact wetland systems between Townsville and Bowen and support a wide range of habitats for critical bird species.

Environmental Values

The Caley Valley Wetlands is recognised as a nationally important wetland, under the Directory of Important Wetlands Australia (DIWA) on the basis of the following criteria:

1. It is a good example of a wetland type occurring within a biogeographic region in Australia;
2. It is a wetland that plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex;
3. It is a wetland that is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail;
4. The wetland supports one per cent or more of the national populations of any native plant or animal taxa; and
5. The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level.

The site provides an outstanding example of wetlands on a tropical prograding coast (SEWPAC 2010a). Permanent water, a wide range of wetland habitats, very rich food resources and sheltered roosting and breeding sites cause the site to be exceptionally important for waterbirds. The importance of the site is such that it meets criteria for identifying wetlands of international importance adopted by the Ramsar Convention (e.g. 1a, 1c, 2a, 2c) (SEWPAC 2010a), however is yet to be recognised.

Wetland types

The Wetlands is located on a low-lying prograded coastal plain west of the Don River delta (SEWPAC 2010a). It comprises a complex continuous wetland aggregation of intertidal mudflats, sand flats, estuary channels, mangroves and saltmarshes under tidal influence in its western extent, and predominantly non-tidal, freshwater marshes within an artificial bund in its eastern extent (BAAM 2012a; SEWPAC 2010a). It occurs within an area substantially altered by clearing and ongoing pressures from agricultural activities, such as grazing. Although the vegetation is modified it represents a key fauna movement corridor of state significance (BMT WBM 2010).

The Wetlands comprise of four out of the five main wetland systems within the Great Barrier Reef catchment (refer to Figure 1), including: Estuarine (brackish waters at the marine-freshwater interface), Lacustrine (lakes and dams), Palustrine (marsh or swamp) and Riverine (rivers or deepwater habitats in a channel). A very small percentage of the Wetlands is artificial and modified. Refer to Table 1 below.

Table 1. Wetland System Statistics

System	Area (km ²)	% wetlands area	% total area
<i>Total</i>	36.5	100.0%	70.9%
<i>Artificial and highly modified</i>	0.1	0.3%	0.2%
<i>Estuarine</i>	24.3	66.5%	47.2%
<i>Lacustrine</i>	0.1	0.3%	0.2%
<i>Palustrine</i>	11.9	32.6%	23.1%
<i>Riverine</i>	0.1	0.3%	0.2%

Based on 2009 wetland mapping. There are approximately 8 lacustrine/palustrine wetlands in this region. Areas do not include marine or estuarine waters but do include estuarine wetland vegetation (e.g. mangroves and tidal flats). (source: WetlandInfo 2013a)

BMT WBM (2012) identified six broad functional zones in their baseline report based on landform types, salinity characteristics and vegetation communities (refer to Figure 2):

1. Coastal Zone - located on the western side of the Wetlands and is comprised of marine habitat types.
2. Western Estuarine Zone - located down-slope of the western (outer) bund and comprised of estuarine vegetation, tidal flats and creeks.
3. Hypersaline Zone - located between the western (outer) and causeway (inner) bund, and contains a mosaic of natural saltpan and degraded wetland habitat.
4. Wetland Basin Zone - forms the majority of the Wetlands and is comprised of a shallow lagoon with fringing saltmarsh vegetation.
5. Saltwater Creek Zone - contains permanent freshwaters and riparian vegetation (including mangroves).
6. Terrestrial Zone - contains small ephemeral streams as well as terrestrial ecosystems (i.e. woodlands and grasslands).



The Caley Valley Wetlands. Credit Abbot Point Action Group.

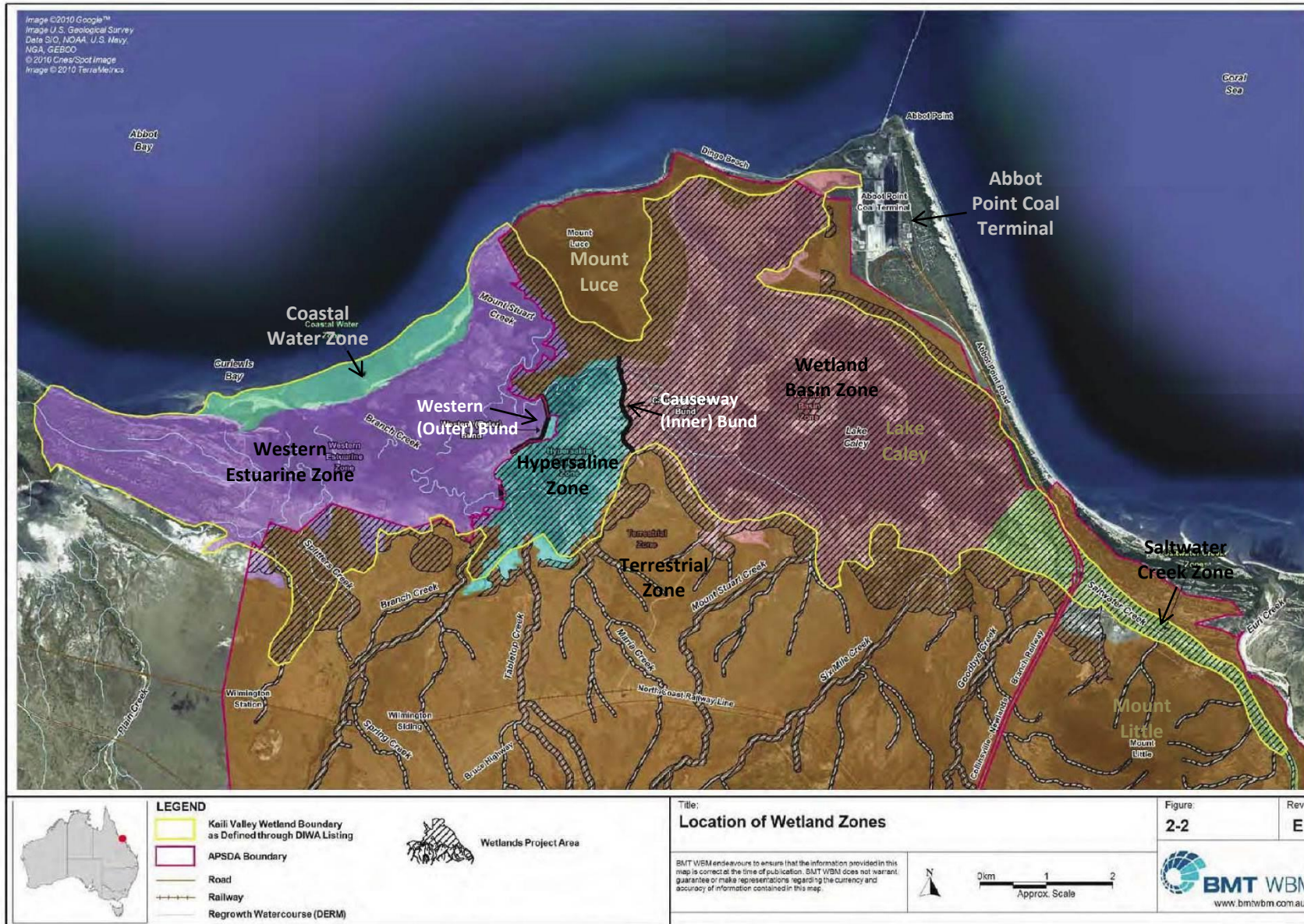


Figure 2. Location of Wetland Zones (source: BMT WBM 2012)

Hydrodynamic Processes

The region has a tropical monsoon climate with distinct wet and dry seasons. The average annual rainfall at Bowen is 1096 mm. December to March tend to be the warmest and wettest, while the driest months occur in August and September.

Freshwater to the Wetlands is provided by runoff from the Salisbury Plain and the slopes to the south and south east from Mount Roundback and Mount Little (BMT WBM 2012). During the wet season there is a reversible movement of freshwater and brackish waters westwards from the Wetlands and into Curlewis Bay (BMT WBM 2010). GHD surveys (2009) reported that in the wet season the Wetlands can be 18 km long and 6 km wide, and cover an area of approximately 5,000 ha.

During the dry season tidal movements dominate the system with much of the Wetlands drying out with very limited inflow (BMT WBM 2010). One of the few permanent non-tidal waterbodies in the Wetlands is known as Lake Caley (or Kaili) and during extended dry periods groundwater may be the predominant source of water (BMT WBM 2010).

Tidal exchange occurs via Mount Stuart and Branch Creeks in the western sections, and possibly Saltwater Creek in the eastern section of the Wetlands (BMT WBM 2010). Three artificial bunds influence the hydrology of the Wetlands, including the western (outer) bund, causeway (inner) bund, and eastern bund near the rail crossing on Abbot Point Road (BAAM 2012a). Tidal flushing is somewhat constrained by the western and causeway bunds (refer to Figure 2). The western (outer) bund was constructed to improve habitat for waterfowl by duck shooters in the area, and the causeway (inner) bund incorporates a water delivery pipeline to the Port of Abbot Point and vehicle access (BMT WBM 2010).

Water Quality

Surface water quality is largely driven by the fluvial hydrology, groundwater and tidal influences, with other influences from treated water runoff from the Port of Abbot Point located to the north of the Wetlands, and runoff from the elevated dunes and ridges within the Abbot Point Coal Terminal which enter the Wetlands from the east (BMT WBM 2012; GHD 2009). BMT WBM (2012) reported a salinity gradient within the Wetlands, resulting in the creation of marine, hypersaline brackish and freshwater waterbodies.

Groundwater Quality

Studies by PB (2009) note the following groundwater conditions in the Wetlands:

- Likely to be shallow groundwater levels;
- High correlation between surface elevation and groundwater levels, with groundwater levels predicted to range between 0-2 m below ground surface;
- Close proximity to coast means groundwater likely to be at freshwater/saltwater interface; and
- Combination of a density difference at freshwater/saltwater interface and shallow gradients are the dominant hydraulic features controlling groundwater movement and water levels.

Licensed bores are located within the vicinity of the Wetlands with the groundwater water quality guidelines being exceeded at bores on land adjacent to the northeast corner of the Wetlands (where the Port of Abbot Point is located) (BMT WBM 2012). Analytes that exceeded relevant water quality guidelines were total arsenic, aluminium, cadmium, chromium, copper, lead, manganese, nickel and zinc. GHD (2009) also considered iron and sulphate concentrations elevated and may be associated with

infiltration of runoff contaminated from coal stockpiles, leakage of APCT settlement ponds into groundwater and/or a natural occurrence related with acid sulphate soils or marine sediments.

Flora

South of the Wetlands hosts a mosaic of remnant forest and cleared grazing lands, with most of the lowland areas cleared of native vegetation in favour of introduced grass species for cattle grazing (BMT WBM 2012). Remnant vegetation covers steeper areas (e.g. Mount Roundback), and patches of scattered trees occur along the banks of the numerous small creeks that drain into the Wetlands (BMT WBM 2012). Between Mount Curlewis and Mount Little the fringing coastal vegetation is largely intact with the exception being around Abbot Point Coal Terminal (APCT) (BMT WBM 2012).

This remnant vegetation provides a valuable habitat and wildlife corridor for a range of flora and fauna species. A large portion of the Wetlands and the remnant vegetation along Branch Creek south of the Wetlands is mapped as State Significant Corridor Vegetation, connecting Wetland to Mount Aberdeen National Park 40km southwest of Bowen. The largely intact coastal vegetation also provides relatively good habitat connectivity between the Wetlands and Cape Upstart National Park. However, there is poor connectivity in a direct line (north to south) between the Wetlands and the ranges due to extensive clearing for grazing (BMT WBM 2012) (Refer to Figure 3).

The clearing of lands and growth of weeds, which in some parts are the dominant vegetation, represent key pressures to native vegetation.

Six threatened flora species have been identified as known to or likely to occur within the Wetlands (PB 2009 and BAAM 2012a). These include:

- *Aristida granitica* – perennial grass with potential to occur given Abbot Point is within the species range and there is possible suitable habitat within the Wetlands (PB 2009). Listed as Endangered under the NC Act and EPBC Act, and not yet assessed by the IUCN.
- *Eucalyptus raveretiana* – recorded on the banks of Salt Water Creek by Chris Hansen of Hansen Botanical Assessments Pty Ltd in December 2008 (PB 2009). Listed as Vulnerable under the NC Act and EPBC Act, and not yet assessed by the IUCN.
- *Croton magneticus* Airy Shaw – small tree or shrub known to occur with one existing record located at Abbot Point (DERM 2010 and BAAM 2012a). Listed as Vulnerable under the NC Act and EPBC Act, and not yet assessed by the IUCN.
- *Leucopogon cuspidatus* – dwarf to small shrub with potential to occur given Abbot Point is within the species range and there is possible suitable habitat within the Wetlands (BAAM 2012a). Listed as Least Concern under the NC Act and Vulnerable under the EPBC Act, and not yet assessed by the IUCN.
- *Ozothamnus eriocephalus* – woody shrub with potential to occur given Abbot Point is within the species range and there is possible suitable habitat within the Wetlands (BAAM 2012a). Listed as Vulnerable under the NC Act and EPBC Act, and not yet assessed by the IUCN.
- *Taeniophyllum muelleri* – minute epiphytic orchard with potential to occur given Abbot Point is within the species broad distribution and there is possible suitable habitat within the Wetlands (BAAM 2012a). Listed as Least Concern under the NC Act and Vulnerable under the EPBC Act, and not yet assessed by the IUCN.

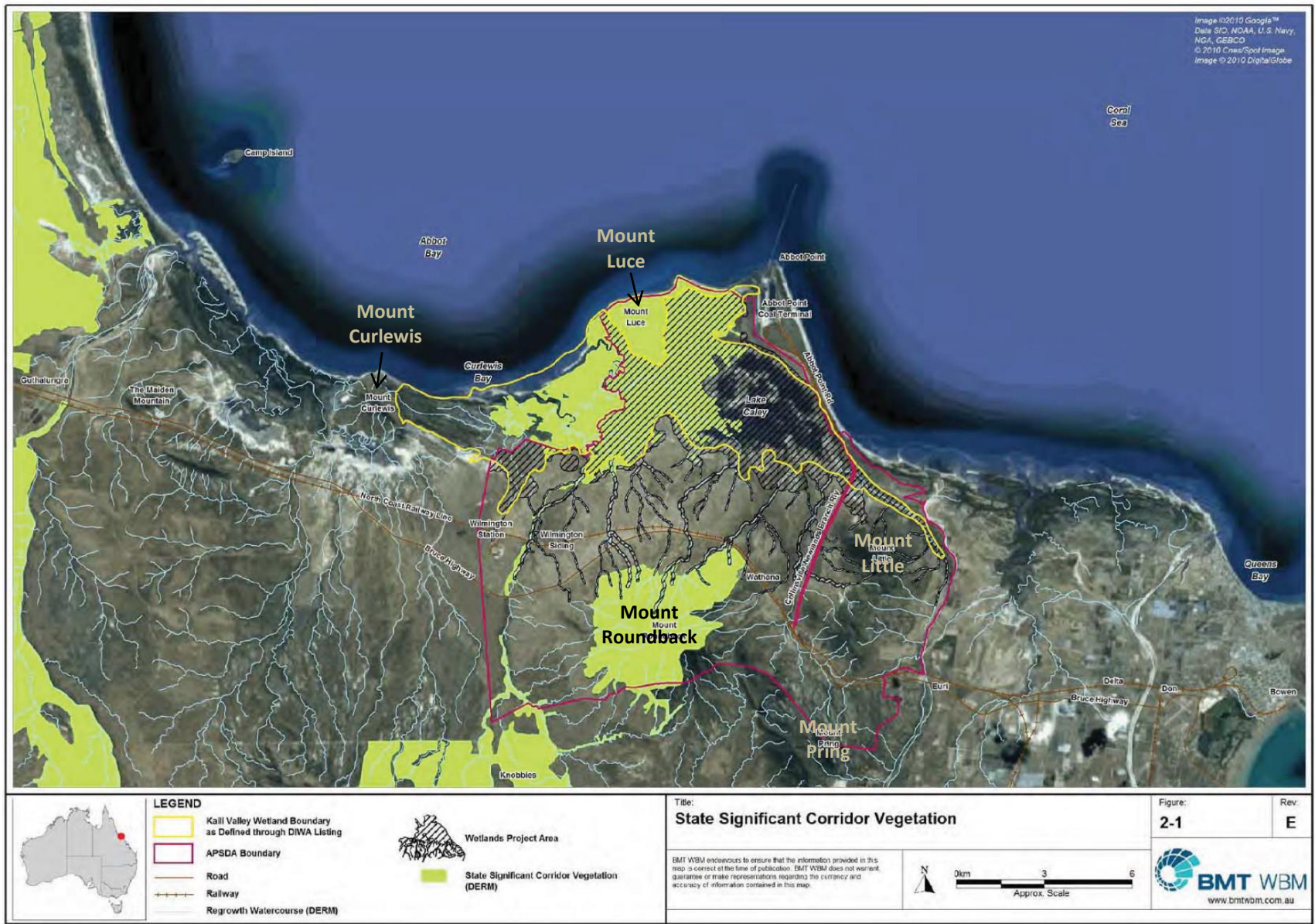


Figure 3. State Significant Corridor Vegetation (source: BMT WBM 2012)

Estuarine Habitats

Since the construction of the western (outer) bund in the 1950's, approximately 46 ha of mangrove forest have been lost from Estuarine Habitats and replaced with saltpan habitat, as a result of alterations to tidal hydraulics associated with the western bund (BMT WBM 2012; GHD 2010). Mangroves occur mainly on the western side of the site associated with three tidal channels flowing into Curlewis Bay (SEWPAC 2010a).

BMT WBM (2012) recorded the Milky Mangrove (*Excoecaria agallocha*) as the dominant mangrove species in the portion of Saltwater Creek Zone within the Wetlands where there are low salinity waters. By contrast, species such as Red Mangrove (*Rhizophora stylosa*) and Yellow Mangrove (*Ceriops tagal*) which co-dominate in the Western Estuarine Zone, were generally confined to areas with salinities near full marine conditions. Grey Mangrove (*Avicennia marina*), which has a wide salt tolerance, was recorded in both the Western Estuarine Zone and Saltwater Creek Zone (SEWPAC 2010a; BMT WBM 2012).

Dominant estuarine habitat is the saltmarsh and saltpan areas occurring landward of mangrove forests (BMT WBM 2012). Salt pans typically have very low cover of vascular plants (trees, shrubs, grasses), although salt tolerant benthic algae can form a crust. SEWPAC (2010a) recorded halophytic scrub-shrub species (saltmarsh) on the landward margins of these salt pans, including *Halosarcia halocnemoides*, *H. indica*, *H. pergranulata*, *Suaeda arbusculoides*, *Tecticornia australasica*, *Sarcocornia quinqueflora*, and *Sporobolus virginicus* (SEWPAC 2010a; BMT WBM 2012).

Palustrine and Lacustrine Habitats

Field observations in the BMT WBM (2012) October 2010 – November 2010 study suggest that Mangrove Clubrush (*Schoenoplectus littoralis*) represented the dominant macrophyte species within standing waters (SEWPAC 2010a; BMT WBM 2012).

Rivers and Streams

During BMT WBM (2012) surveys, Saltwater Creek was observed to have relatively homogenous vegetation along much of its length which was dominated by a mix of Weeping Teatree (*Melaleuca leucadendra*), Milky Mangrove (*Excoecaria agallocha*) and White-flowered Black Mangrove (*Lumnitzera racemosa*). There are also scattered Forest Red Gum (*Eucalyptus tereticornis*).

Introduced species of tree, shrub and vine weeds occurred in the mid-storey, with Prickly Acacia (*Acacia nilotica*) (Declared Class 2 Pest Plant - DAFF), Rubber Vine (*Cryptostegia grandiflora*) and Parkinsonia (*Parkinsonia aculeata*) (Declared Class 2 Pest Plant - DAFF) representing the most abundant mid-storey species (BMT WBM 2012).

Groundcover species included a variety of herbaceous weeds and grasses, with dense stands of the samphire, *Tecticornia australis* and Marine Couch in low lying areas along the banks.

Thickets of reeds and sedges, particularly Mangrove Clubrush and Water Chestnut (*Eleocharis dulcis*), dominated the littoral zone of Saltwater Creek. The submerged aquatic Water Thyme (*Hydrilla verticillata*) formed dense masses, with the introduced Curly Pondweed (*Potamogeton crispus*) sub-dominant. Giant Water Lily (*Nymphaea gigantea*) was widespread throughout Saltwater Creek and Swamp Lily (*Ottelia ovalifolia*) was moderately abundant (BMT WBM 2012).

SEWPAC (2010a) also reported beds of emergent grasses such as spiny mudgrass (*Pseudoraphis spinescens*) and *Cynodon dactylon* and smaller sedges such as *Cyperus zollingeri* and *Cyperus scaber* may also be present, particularly on the landward edge of the site. Other species present include *Nymphaea*

gigantea, *Nymphoides indica*, *Persicaria subsessilis*, *Marsilea drummondii*, *Ottelia alismoides* and *Pseudoraphis spinescens*. All species are either not listed or listed as Least Concern by the NC Act.

Other flora adjacent to the Wetlands

Seagrass

Extensive seagrass meadows have been mapped within Abbot Point port limits and are the dominant benthic habitat, as shown in Figure 4 (Abbot Point EMP 2010). These meadows are likely to play important ecological roles including providing food for endangered and threatened species such as dugong and turtles, and a nursery for commercial fish species.

A seagrass survey at the Port of Abbot Point of coastal and deepwater seagrass conducted between June 2010 and September 2011 indicated that seagrasses are in a vulnerable state (McKenna and Rasheed 2011). Significant losses of coastal seagrass density and distribution have been observed and the cumulative impacts of natural stressors combined with the increased level of impact from port activities and development are putting seagrass at a heightened risk of further loss (McKenna and Rasheed 2011).

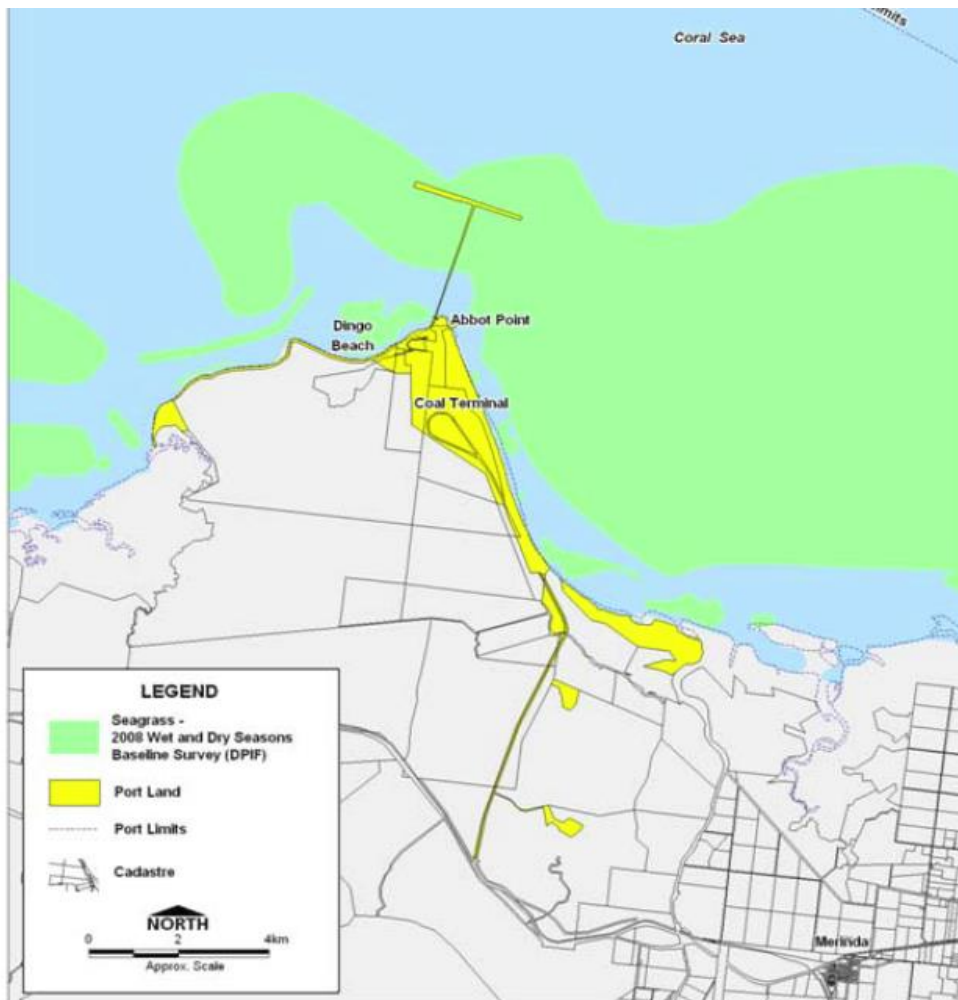


Figure 4. Seagrass distribution at Abbot Point (source: Abbot Point EMP 2010).

Fauna

The habitats of the Wetlands provide a diverse range of resources for a number of fauna species. A range of threatened species have been reported or are known to occur in and adjacent to the Wetlands. These include:

- At least 10 species of waterbirds and shorebirds, including four migratory and six non-migratory species.
- Saltwater Crocodile, a non-avian wetland-dependent species.
- Several marine turtle species, including the Green Turtle, Loggerhead Turtle and Flatback Turtle that feed and nest adjacent to the wetland.
- Dugong and Snubfin Dolphins are also known to or likely to inhabit adjacent waters.
- Other terrestrial species that potentially utilise the Wetlands or adjacent areas, including the Squatter Pigeon, Black-throated Finch, Northern Quoll, Coastal Sheath-tail Bat, Water Mouse, Single-striped Delma, and Koalas.



Waters adjacent to the Caley Valley Wetlands provide seagrass and habitat for dugongs. *Credit AMCS.*

Migratory and Resident Birds

The Wetland has high values for waterbirds and supports significant populations of both migratory and resident shorebirds. Coastal and estuarine habitats, together with salt pans, represent feeding and roosting areas and important breeding and dry season areas for a range of migratory and resident shorebird species.

BMT WBM (2012) identified a number of factors that maintain the Wetlands habitat values for migratory and non-migratory shorebirds. These include: habitat diversity and connectivity, habitat condition, tidal processes, lack of human activities and hydrology.

The Wetlands support a significant population of waterbirds with greater than 20,000 recorded (maximum survey count 41,088 in the dry season 2012 and 21,077 in the wet season 2012 (BAAM 2012b)), and boasts records of more than 154 species and breeding habitat for at least 24 species (BirdLife Australia's Atlas of Australian Birds 2012).



Many species like this Osprey rely on connection between habitats for survival. *Credit Anton Neilson.*

Migratory Shorebirds

Most migratory wetland species breed in northern China, Mongolia, Siberia and Alaska during June and July and then migrate to Australia, a distance of up to 26,000 km for the non-breeding season (SEWPAC 2009; BMT WBM 2012). During their non-breeding phase they inhabit the southern hemisphere, arriving in Australia in October and feeding mainly on intertidal invertebrates at low tide. In April, these birds fly from their Australian feeding grounds to breed in the tundra areas of the northern hemisphere (SEWPAC 2009).

Under the EPBC Act a person must not take an action that has, will have, or likely to have a significant impact on a listed migratory species. The Wetlands are known to provide important habitat for at least 22 species of migratory shorebirds (22 recorded during BMT WBM (2012) surveys and ~24 recorded in BAAM (2012a) surveys). The Wetlands provides habitat to greater than 0.1 per cent of the flyway populations of the Red-necked Stint and Sharp-tailed Sandpiper, an important population of Latham's Snipe and the

threatened Australian Painted Snipe, Little Tern, Australian Cotton Pygmy-goose and Eastern Curlew (BMT WBM 2012 and BAAM 2012a).

Australian Painted Snipe (*Rostratula australis*)

- BAAM (2012a) survey reported a total count of 24 Australian Painted Snipe with family groups observed, suggesting breeding activity. The total represents 2.3 per cent of the species' total population in Australia, at between 1,000 and 1,500 mature individuals (BirdLife Australia 2012). This makes the Wetlands an important site for the species in Australia.
- Area of occupancy has decreased by over 50 per cent in three generations, with a continued reduction in numbers exceeding 20 per cent over two generations (BirdLife Australia 2012). BirdLife Australia (2012) stated that the "*Caley Valley Wetlands, south of Abbot Point, is typical of habitat preferred by APS and is considered by the Recovery Program to be of very high international significance for the species*".
- Listed as Vulnerable under the NC Act, Endangered Migratory shorebird species under the EPBC Act, and Endangered by the IUCN.
- Listed under the China-Australia Migratory Bird Agreement (CAMBA).



The Caley Valley Wetlands provides important habitat for the endangered Painted Snipe. Less than 1500 of these birds remain. *Credit: Rick Shu*

Little Tern (*Sterna albifrons*)

- Recorded in several studies carried out in the Wetlands and is the only migratory wader species that has been recorded in internationally significant numbers within the Wetlands.
- BMT WBM (2012) survey observed a high abundance of Little Tern (~350 individuals). The current estimated breeding numbers in Australia is 3,000 mature individuals (SEWPAC 2011b) indicating that the population within the Wetlands meets internationally significant numbers (≥ 1 per cent) under Ramsar criteria (BMT WBM 2012).
- BMT WBM (2012) stated that “the Wetlands may represent an internationally significant location for this species” and “most of the Wetlands project area would provide suitable feeding and breeding areas for this species”. It is expected that habitat usage will vary over time, responding to changes in food and wetland hydrology (BMT WBM 2012).
- Listed as Endangered under the NC Act, Migratory Marine under the EPBC Act, and Least Concern by the IUCN.
- Listed under the Japan-Australia Migratory Bird Agreement (JAMBA), CAMBA, Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA), and under the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Australian Cotton Pygmy-goose (*Nettapus coromandelianus albipennis*)

- BAAM (2012a) surveys observed this species in the Wetlands with lakes providing suitable breeding habitat and drought refuge for this species (BMT WBM 2012).
- Listed as Near Threatened under the NC Act, Migratory Wetland under the EPBC Act, and Least Concern by the IUCN.

Eastern Curlew (*Numenius madagascariensis*)

- Relatively small numbers utilise intertidal saltmarsh and mudflats within the intertidal zone in the far west portion of the Wetlands (BAAM 2012a). BMT WBM (2012) survey also observed one or two individuals further into the Wetlands.
- Listed as Near Threatened under the NC Act, Migratory Wetland shorebird under the EPBC Act, and Vulnerable by the IUCN.
- Listed under JAMBA, CAMBA, ROKAMBA, and under the Bonn Convention.

Latham's Snipe (*Gallinago hardwickii*)

- The entire global population of Latham's Snipe is thought to migrate to Australia for the austral summer. Latham's Snipe arrives in northern Australia from July to November.
- The Wetlands supports ≥ 18 individuals (BAAM (2012a) survey estimated 54 individuals).
- Listed as Least Concern under the NC Act, Migratory Marine shorebird under the EPBC Act, and Least Concern by the IUCN.
- Listed under JAMBA, CAMBA, ROKAMBA, and under the Bonn Convention.

Sharp-tailed Sandpiper (*Calidris acuminata*)

- Over 90 per cent of the global Sharp-tailed Sandpiper population spends the non-breeding season in Australia. Small numbers arrive in northern Australia during mid-August, with large numbers in early September.
- The Wetlands supports ≥ 0.1 per cent of the



Sharp-Tailed Sandpiper. Credit Peter Beasley.

flyway population (BAAM (2012a) survey recorded 0.75 per cent). Largest survey count of 1,199 individuals (BAAM 2012b).

- Listed as Least Concern under the NC Act, Migratory Marine shorebird under the EPBC Act, and Least Concern by the IUCN.
- Listed under JAMBA, CAMBA, ROKAMBA, and under the Bonn Convention.

Red-necked Stint (*Calidris ruficollis*)

- Breeds during June on the tundra in Siberia and west Alaska before migrating to Australia for the austral summer. Over 80 per cent of the global population reside in Australia during the non-breeding season.
- The Wetlands supports ≥ 0.1 per cent of the flyway population (BAAM (2012a) survey recorded 0.38 per cent). Largest survey count of 1,224 individuals (BAAM 2012b).
- Listed as Least Concern under the NC Act, Migratory Marine shorebird under the EPBC Act, and Least Concern by the IUCN.
- Listed under JAMBA, CAMBA, ROKAMBA, and under the Bonn Convention.

Resident Waterbirds and Shorebirds

In addition to the migratory species, numerous species of resident waterbirds and shorebirds have been recorded within the Wetlands (BMT WBM 2012). The more estuarine/brackish and freshwater sections of the Wetlands represent important waterfowl feeding, roosting and breeding areas. Waterfowl can be extremely abundant east of the causeway (inner) bund in the wet season, with thousands of individuals recorded.

At least six threatened resident waterbird species were recorded or are likely to occur in the Wetlands:

Black-necked Stork (*Ephippiorhynchus asiaticus*) (BMT WBM 2012)

- Adults and juveniles were recorded at a variety of locations within the Wetlands. BAAM (2012b) recorded 12 individuals in March surveys.
- Near Threatened under the NC Act.

Beach Stone-curlew (*Esacus magirostris*) (BMT WBM 2012)

- BAAM (2012b) February surveys observed 3 individuals in the Wetlands.
- Vulnerable under the NC Act.

Freckled Duck (*Stictonetta naevosa*) (BMT WBM 2012)

- The Wetlands support potential drought refugia and breeding habitat for this species.
- Near Threatened under the NC Act.

Radjah Shelduck (*Tadorna radjah*)

- One record reported during BAAM (2012b) February and June surveys.
- Near Threatened under the NC Act.

Sooty Oystercatcher (*Haematopus fuliginosus*)

- A pair was observed foraging at western end of Dingo Beach by BAAM (2012a) June surveys.
- Near Threatened under the NC Act and endemic to Australia.

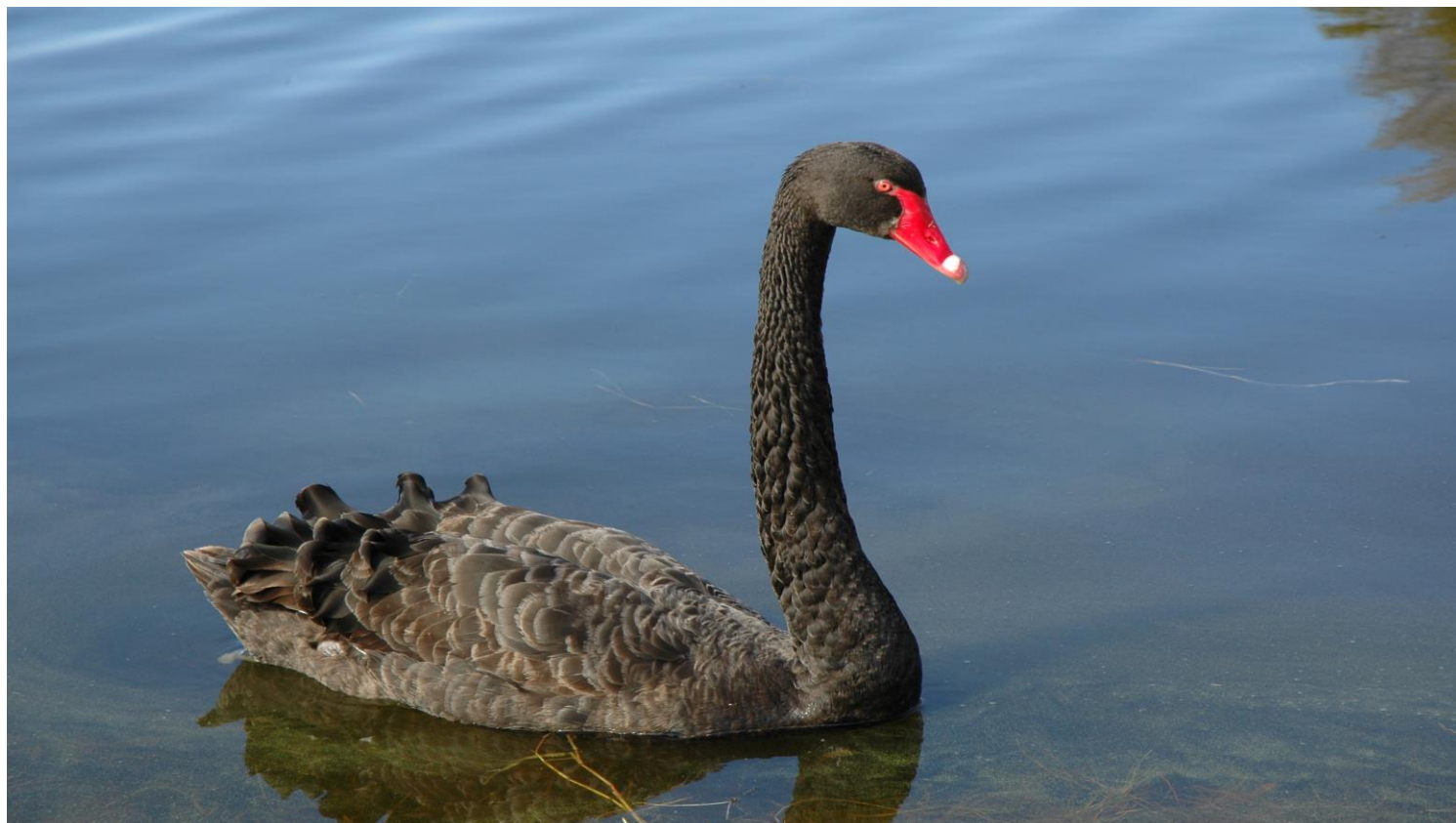
Lewin's Rail (*Lewinia pectoralis*)

- One record by BAAM (2012b) February surveys. Seldom observed to inhabit vegetated wetlands (Bird 2010).
- Near Threatened under the NC Act.

Other significant numbers of waterbirds recorded within the Wetlands:

Black Swans (*Cygnus atratus*)

- 986 adults and 478 cygnets recorded during BAAM (2012b) surveys, and 444 individuals including breeding pairs recorded by GHD (2010), indicating one of Queensland's largest and most northerly coastal nesting areas for the Black Swan.



The Caley Valley Wetlands is one of Queensland's largest and most northerly coastal nesting areas for the majestic Black Swan.
Credit Richard McLellan WWF-Australia

Grey Teal (*Anas gracillis*)

- In large aggregations - 270 individuals recorded by GHD (2010), and 6,312 recorded by BAAM (2012b) June surveys.

Pacific Black Duck (*Anas supercilliosa*)

- 314 individuals recorded by GHD (2010), and 4,169 recorded by BAAM (2012b) in June surveys.

Magpie Goose (*Anseranus semipalmata*)

- 135 individuals recorded by GHD (2010), and 1,063 recorded by BAAM (2012b) March surveys.

Wandering Whistling-duck (*Dendrocygna acuate*)

- 163 individuals, including breeding pairs, recorded by GHD (2010), 2,813 recorded by BAAM (2012b) March surveys, and a flock of 60 along with Grey Teal, Pacific Black Duck and Plumed Whistling-duck (*Dendrocygna eytoni*) recorded by BMT WBM (2012).



Wandering Whistling Ducks breed in the Caley Valley Wetlands. *Credit Anton Neilson.*

Australian White Ibis (*Threskiornis molucca*)

- Nests found in wetlands by BMT WBM (2012), and records of 123 individuals observed during BAAM (2012b) February surveys.

Oriental Darter (*Anhinga melanogaster*)

- Numerous nests and young recorded by BMT WBM (2012).

Little Black Cormorant (*Phalacrocorax sulcirostris*)

- 1,539 recorded by BAAM (2012b) and BMT WBM (2012) located them in trees overhanging Saltwater Creek.

Australian Pelican (*Pelecanus conspicillatus*)

- ~100 observed roosting on small sand islands in the hypersaline area east of the causeway (inner) bund by GHD (2010) in the wet season, and 323 recorded by BAAM (2012b) in March 2012 including 80 chicks found on an island in the Wetlands.



Australian Pelicans migrate depending upon food availability. *Credit AMCS.*

During BAAM (2012a) surveys a total number of 29 species of shorebirds were recorded at Abbot Point, including the following:

Red-capped Plover (*Charadrius ruficapillus*)

- In large numbers of 191 individuals recorded by GHD (2010) in the wet season, 712 recorded by BAAM (2012b) in February 2012, and BMT WBM (2012) also recorded high numbers in Wetlands.

Australian Pratincole (*Stiltia isabelle*)

- 14 recorded by BAAM (2012b) June surveys.



Red-capped Plover. Credit Peter Beasley.

Fish

No fish species currently recorded in the Wetlands are listed as threatened under EPBC Act or NC Act, and none are considered threatened or near threatened under IUCN Red List.

The Wetlands support a broad range of fisheries habitats. Important fish habitats within the Wetlands project area include the main drainage of Saltwater Creek and Lake Caley. The Western Estuarine Zone, which is largely located outside the Wetlands project area, contains a range of habitats important to fisheries species. Connectivity between the Western Estuarine Zone and Wetlands project area is restricted by the two bunds (BMT WBM 2012).

Based on surveys by GHD (2010) and BMT WBM (2012) 25 fish species in the Wetlands have been recorded, including estuarine and freshwater representatives. An additional four fish species are known from the wider Don River basin and are expected to occur in the Wetlands.

One introduced species has been recorded within the study area, namely the Eastern Gambusia (*Gambusia holbrooki*). The Eastern Gambusia is declared a pest species under the *Fisheries Act 1994* and *Fisheries Regulation 1995* (BMT WBM 2012).

Many fish species found within the Wetlands, such as Barramundi (*Lates calcarifer*), Oxeye Herring (*Megalops cyprinoides*) and Longfin Eel (*Anguilla reinhardtii*), utilise both fresh and saltwater habitats to complete their life cycles. Many of these species are catadromous, spawning in marine environments and spending the rest of their life-cycle in estuarine and freshwater environments. Species such as Moses Perch (*Lutjanus russelli*) spends the majority of their adult life as a reef-associated species, whereas juveniles utilise coastal wetlands as nurseries (BMT WBM 2012).

Mammals

In and around the Wetlands, over 23 species of mammals have been recorded (23 by BMT WBM (2010) surveys and 26 by GHD (2009) surveys). Five of these are introduced species with the remainder listed as Least Concern except for the Short-beaked Echidna (*Tachyglossus aculeatus*), which is listed as Special Least Concern under the NC Act (BMT WBM 2010).

Amphibians

Eleven native frog species and the introduced Cane Toad (*Rhinella marina*) have been recorded by BMT WBM (2012) within the Wetlands. All of these species are currently listed as least concern under the NC Act and are not listed under the EPBC Act. Based on BMT WBM (2012) research, the Wetlands do not contain potential habitat for other threatened frog species known from the wider region. Most of these species utilise terrestrial environments as adults, and breed in ephemeral ponds, creeks and non-saline palustrine environments.

Reptiles

The most abundant reptiles were skinks and snakes (GHD 2009). Within and adjacent to the Wetlands there have been more than 20 species of non-aquatic reptiles recorded (22 by BMT WBM (2010) and 26 by GHD (2009)), including the threatened Dunmall's Snake (*Furina dunmalli*) which favours terrestrial habitats (BMT WBM 2010). The species is listed as Vulnerable under the NC Act and EPBC Act, and Vulnerable by IUCN.

Turtles

Two species of freshwater turtles have been recorded in the Wetlands (BMT WBM 2012 and GHD 2009). These include the Snake-necked turtle (*Chelodonia longicollis*) and Cann's Long-necked turtle (*Chelodina rankini* formally *Chelodonia canni*) are listed as least concern under the NC Act. A third species *Elseya* sp. (possibly *irwini*) was observed (but not captured) in Saltwater Creek upstream of the Abbot Point Access Road bridge in the BMT WBM October 2010 – November 2010 survey.

Green Turtles (*Chelonia mydas*) and Flatback Turtles (*Natator depressus*), both listed as vulnerable under the EPBC Act and the NC Act, were noted as nesting along the beach between Abbot Point and Euri Creek (Bell 2003). However, BMT WBM (2012) states these species have not been recorded in the Wetlands project area to date, but may nest in Curlewis Bay within the boundary of the Wetlands (but outside the APSDA).



Threatened Flatback and Green turtles nest at the beach between Abbot Point and Euri Creek to the east of the Wetland and are believed to nest within the northwest boundary of the Wetland. Credit AMCS

Bell (2003) undertook a twelve month Marine Turtle study at Abbot Point (refer to Figure 5). He reported:

- A total of 49 Green Turtles and one Loggerhead Turtle were captured within foraging and courtship areas.
- Green turtle population comprised of 27 per cent adults, 12 per cent pubescent and 61 per cent pre-pubescent (juvenile).
- *Halodule uninervis* was the only seagrass species found in the mouths of six foraging Green Turtles.
- Small population of Green Turtles (<50 turtles) utilise sub-tidal rocky reef that parallels beach for ~2.5km south from Abbot Point, as foraging and resting habitat.
- Small population of Green Turtles reside inside and adjacent to the mouths of Saltwater and Euri Creeks.
- A transect of the beach between Abbot Point and Euri Creek revealed:
 - 9 nesting turtle tracks recorded (3 Green Turtle; 6 Flatback Turtle)
 - No evidence of feral animal predation on nests.
 - Four Green Turtles (3 juvenile and 1 adult) caught in Euri Creek, two adults and 1 juvenile observed but not caught.
 - One dugong and one adult Green Turtle sighted ~150m offshore immediately adjacent to Abbot Point coal loading facility.

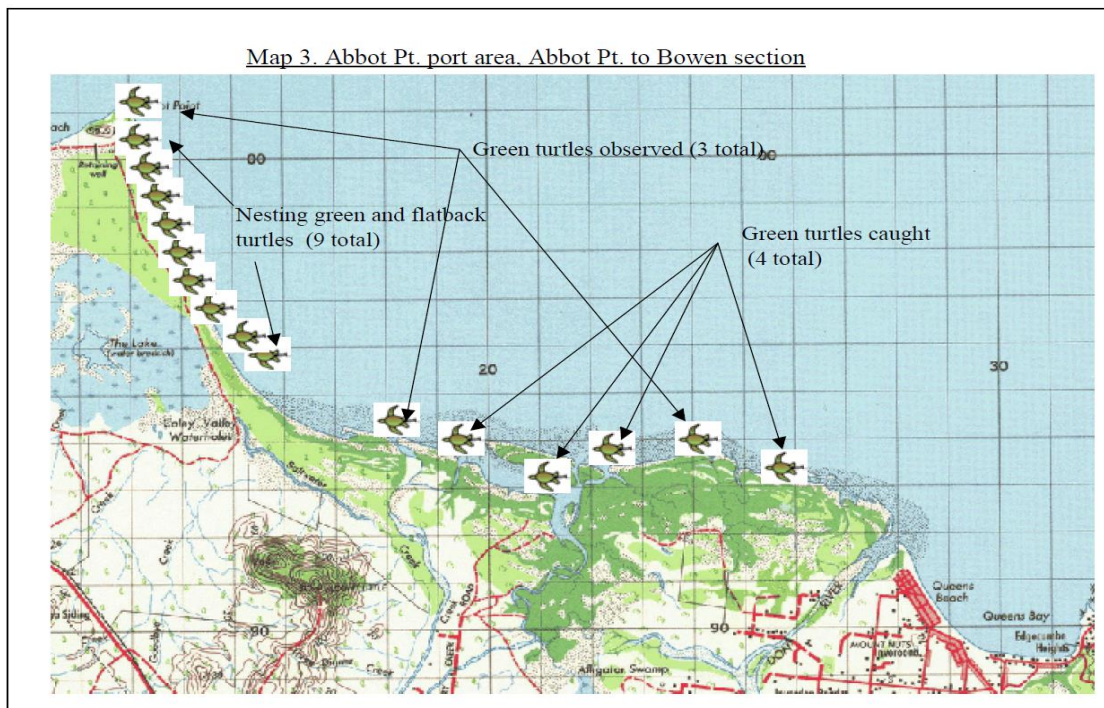


Figure 5. Locations of turtles found during surveys of Abbot Point (source: Bell 2003)

Saltwater Crocodile

BMT WBM (2012) surveys did not detect any evidence of recent Saltwater Crocodile activity within the Wetlands; however evidence has been recorded in the downstream section of Goodbye Creek on the eastern side of the Wetlands (PB 2009). The Saltwater Crocodile (*Crocodylus porosus*) is listed as migratory marine under the EPBC Act and vulnerable under the NC Act. BMT WBM (2012) states that the Wetlands are not considered to represent high quality habitat for this species.

Other Terrestrial Fauna

Threatened species

Studies of the Wetland region have also noted the presence of the:

Single-striped Delma (*Delma labialis*)

- Large legless lizard, listed as vulnerable under the EPBC Act and NC Act, and Vulnerable by the IUCN.

Black-throated Finch (*Poephila cincta*)

- One pair observed near Splitter's Creek during PB (2009) studies.
- Endangered under the NC Act and EPBC Act, and endemic to Australia.

Squatter Pigeon (*Geophaps scripta scripta*)

- Numerous records from previous surveys including BAAM (2012) surveys.
- Vulnerable under the NC Act and EPBC Act.

Several other threatened species were identified as occurring or likely to occur in or adjacent to and in the Wetlands, including:

Northern Quoll (*Dasyurus hallucatus*)

- One of the five known isolated populations of northern quolls in Queensland is centred in the Townsville/Bowen area. Survey work by Woinarski et al. (2008) suggests that the Townsville/Bowen population is one of the three most important. Recent and impending extinction of quoll populations in the Northern Territory and Western Australia makes this population important for the conservation of the species, and is also significant as they have survived the cane toads (Burnett 2008).
- Wildlife Online database (2013) shows that 43 Northern Quoll have been reported within the Whitsunday Regional Council boundary.
- The Quoll Seekers Network has stated that recent sightings have been reported for the areas surrounding the Caley Valley Wetlands, including Bogie (07/05/2013) and one South in Bloomsbury (24/02/2013), one from Benholme (14/11/2012), Crystal Brook (29/02/2013), and quite a few from further north in the Alligator Creek region close to Townsville (*Personal communications* May 2013).
- Least Concern under the NC Act, Endangered under EPBC Act, and Endangered by the IUCN.

Coastal Sheathtail Bat (*Taphozous australis*)

- Vulnerable under NC Act, not listed under the EPBC Act, and Near Threatened by the IUCN.

Water Mouse (*Xeromys myoides*)

- Vulnerable under the NC Act and EPBC Act, and Vulnerable by the IUCN.

Koala (*Phascolarctos cinereus*)

- Widespread Koala habitat in the Brigalow Belt North bioregion, within which Abbot Point is located. Thirteen confirmed records in the Whitsunday Regional Council Local Government Area, with two within a 25 km radius of the Wetlands (Abbot Point CIA 2013).
- Least Concern under the NC Act, Vulnerable under the EPBC Act, and Least Concern by the IUCN.

Dugong (*Dugong dugon*)

- Wildlife Online database (2013) states that 32 Dugong have been reported within the Whitsunday Regional Council boundary.

- Extensive seagrass meadows surveyed in the area which play an important ecological role providing food for dugong.
- Vulnerable under the NC Act, Migratory Marine under the EPBC Act, and Vulnerable by the IUCN.

Australian Snubfin Dolphin (*Orcaella heinsohni*)

- Likely to occur offshore to Abbot Point due to suitable habitat. Wildlife Online database (2013) states that 6 Australian Snubfin Dolphins have been reported within the Whitsunday Regional Council boundary.
- Near Threatened under the NC Act, Migratory under the EPBC Act, and Near Threatened by the IUCN.



The shy and elusive snubfin dolphin, which is native to Northern Australian waters, is likely to occur in the waters surrounding Abbot Pt and the Caley Valley Wetland. *Credit: Christy Harrington/ Murdoch University*

Introduced species

Within the Wetlands area feral pigs are the most abundant and destructive feral animal in the Wetlands. Also present are wild dogs, Rabbits, Red Fox, Black Rat, House Mouse, Goat, Common Starling and Cane Toad (GHD 2010; BMT WBM 2012). Feral cats, Common Myna and Asian House Geckoes are also likely to inhabit the Wetland. Common Myna and Common Starlings are aggressive birds which compete with native species for nest hollows and food (BMT WBM 2012).

RAMSAR – wetlands of international importance

Ramsar sites are listed under the Convention on Wetlands because of their international importance in one or more areas, which may include ecology, botany, zoology, limnology or hydrology (Refer to Appendix B for detailed criteria) (SEWPAC 2010b).

Current Ramsar sites in Queensland (WetlandInfo 2013):

- Moreton Bay
- Bowling Green Bay
- Currawinya Lakes
- Shoalwater Bay and Corio Bay
- Great Sandy Strait

The Caley Valley Wetlands are likely to meet several of the criteria for Ramsar listing as outlined in the below table.

Table 2. Criteria for identifying Wetlands of International Importance.

Ramsar Criteria	Equivalent DIWA criteria	Caley Valley Wetlands	Criteria met
Group A of the Criteria. Sites containing representative, rare or unique wetland types			
Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.	1, 2	Some areas are considered to be in near natural condition. None of wetland types are considered unique or rare in the drainage division. The site provides outstanding representative examples of intertidal marshes on a prograded tropical coast. However, it is uncertain whether this is significant at a bioregional scale. (BMT WBM 2012)	Possibly/Likely
Group B of the Criteria. Sites of international importance for conserving biological diversity			
Criteria based on species and ecological communities			
Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	5	Internationally important Australian Painted Snipe (internationally recognised endangered waterbird) found in the area. Total count of 24 recorded during BAAM 2012a June survey represents 2.3% of the species' total population in Australia.	Confirmed. Wetland proven to support vulnerable and endangered species.
Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	N/A	Black Swan (<i>Cygnus atratus</i>) - one of Queensland's largest and most northerly coastal nesting areas.	Likely. EPA (2006) considers that the site plays an important role in maintaining biological diversity in the region, by providing one of Queensland's largest and most northerly coastal nesting areas

			for Black Swans (<i>Cygnus atratus</i>) and one of the most important post breeding concentration areas for waterfowl in eastern Queensland. (BMT WBM 2012)
Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.	3	Australian Painted Snipe was recorded in 'family groups' during the BAAM 2012a June survey, where a total of 24 were counted.	Likely. The Lake is thought to provide an important refugia value during drought conditions. However, no studies have made a definitive assessment of the refugia values and functions at broad biogeographic scales. (BMT WBM 2012)
Specific criteria based on waterbirds			
Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.	N/A	Total count of 41,088 wetland birds during dry season and total count of 21,077 in wet season (BAAM 2012b).	Likely. There are specific statistical measures for assessing whether a site 'regularly' supports a species. There are too few bird count data (in time and at whole of site scales) to assess this criterion. (BMT WBM 2012)
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.	4	The current estimate for the number of breeding Little Terns in Australia is 3,000 (SEWPAC 2011b). The population of approximately 350 within the study area can therefore be considered a significant population. (BMT WBM 2012) Internationally important Australian Painted Snipe (internationally recognised endangered waterbird) found in the area. Total count of 24 recorded during BAAM 2012a June survey represents 2.3% of the species' total population in Australia. ≥1 per cent of the total population for Purple Swamphen (<i>Porphyrio porphyria melanotus</i>) (Australia).	Possible. As for criterion 5. While Little Tern was observed to meet the 1% criterion in the BMT WBM October 2010 – November 2010 surveys, there is a need to assess whether such abundances are supported on a regular basis. However, in order to meet this criterion, internationally significant numbers would need to be recorded three out of any five year period. There is insufficient data to confirm whether this criterion is met by the Wetlands. Few broad scale bird surveys have been undertaken across the entire study area thus far, hence there is inadequate data to determine quantitative patterns in natural variability in waterbird abundance at this scale (BMT WBM 2012).
Specific criteria based on fish			
Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.	4 (fish only)		No. The Wetlands does not support a high level of fish diversity. (BMT WBM 2010)

<p>Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.</p>	<p>N/A</p>	<p>Barramundi (<i>Lates calcarifer</i>), Oxeye Herring (<i>Megalops cyprinoides</i>) and Longfin Eel (<i>Anguilla reinhardtii</i>), utilise both fresh and saltwater habitats to complete their life cycles, and are found in the Wetland area.</p>	<p>Possible. Wetland values are constrained by presence of bund and water quality degradation. Estuarine creeks likely to support nursery habitat for species of fisheries significance, although lack of connectivity to freshwater areas limits values (at a bioregional scale) (BMT WBM 2012).</p>
<p>Specific criteria based on other taxa</p>			
<p>Criterion 9: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.</p>	<p>N/A</p>	<p>Northern Quoll species sightings have been recorded around the Wetlands suggesting it is likely used as a habitat corridor for the Townsville/Bowen population.</p>	<p>Unsure. At present no species within the Wetlands are known or likely to be endemic to the region, nor have abundances exceeded the 1 per cent population criterion for non-avian species.</p>



The Caley Valley Wetlands looking east. Credit Abbot Point Action Group.

Site Location and History

The Caley (Kaili) Valley Wetlands is a large coastal wetland system located on the central Queensland coast approximately 25 kilometres (km) northwest of Bowen. The Wetlands cover an area of approximately 5,154 hectares (ha) and located within the Don River Basin, which forms part of the

Brigalow Belt Region. The Wetlands fall within the Whitsunday Regional Council, the Bowen Shire and the NQ Dry Tropics NRM Group (refer to Appendix C for further details).

Site Ownership

The ownership of Abbot Point comprises of land designated as Strategic Port Land (SPL) and the Abbot Point State Development Area (APSDA) shown in Figure 6. The land to the North and East of the APSDA is SPL, which is owned by the North Queensland Bulk Ports Corporation.

Some of the land within the APSDA is still privately owned, but the majority is owned by the Coordinator General, the Minister for Economic Development, through Economic Development Queensland, and the North Queensland Bulk Ports Corporation.

The Wetlands falls almost entirely within the APSDA and adjoins the Abbot Point international port facility (refer to Figure 6). Almost all the properties that comprise the Wetlands are owned by the Coordinator General.

Current land use

On site there is extensive grazing (now excluded from Wetland) and the Abbot Point Coal Loading facility (an international port). In the surrounding areas there is extensive cattle grazing and a large coal facility and associated infrastructure located to the north of the site (SEWPAC 2010a).

Several residential dwellings exist within and adjacent to the wetland, most of which are owned by the local graziers (BMT WBM 2012).

Social and Cultural Values

Traditional Owners

The Wetlands lies within the traditional homelands of the Juru people (NQDT 2011). The Abbot Point EMP (2010) stated that there are three Aboriginal cultural heritage sites listed for the Abbot Point Area, which are a fish trap, artefact scatter and a shell midden.

Recreation and Tourism

The lake was formally an important water fowl hunting area for the local community (SEWPAC 2010a). Access constraints limit recreation and tourism activities associated with the Wetland. It is not promoted as an area of interest to tourist and not known to represent a key bird watching area or important fishing area for charter operators (BMT WBM 2012).

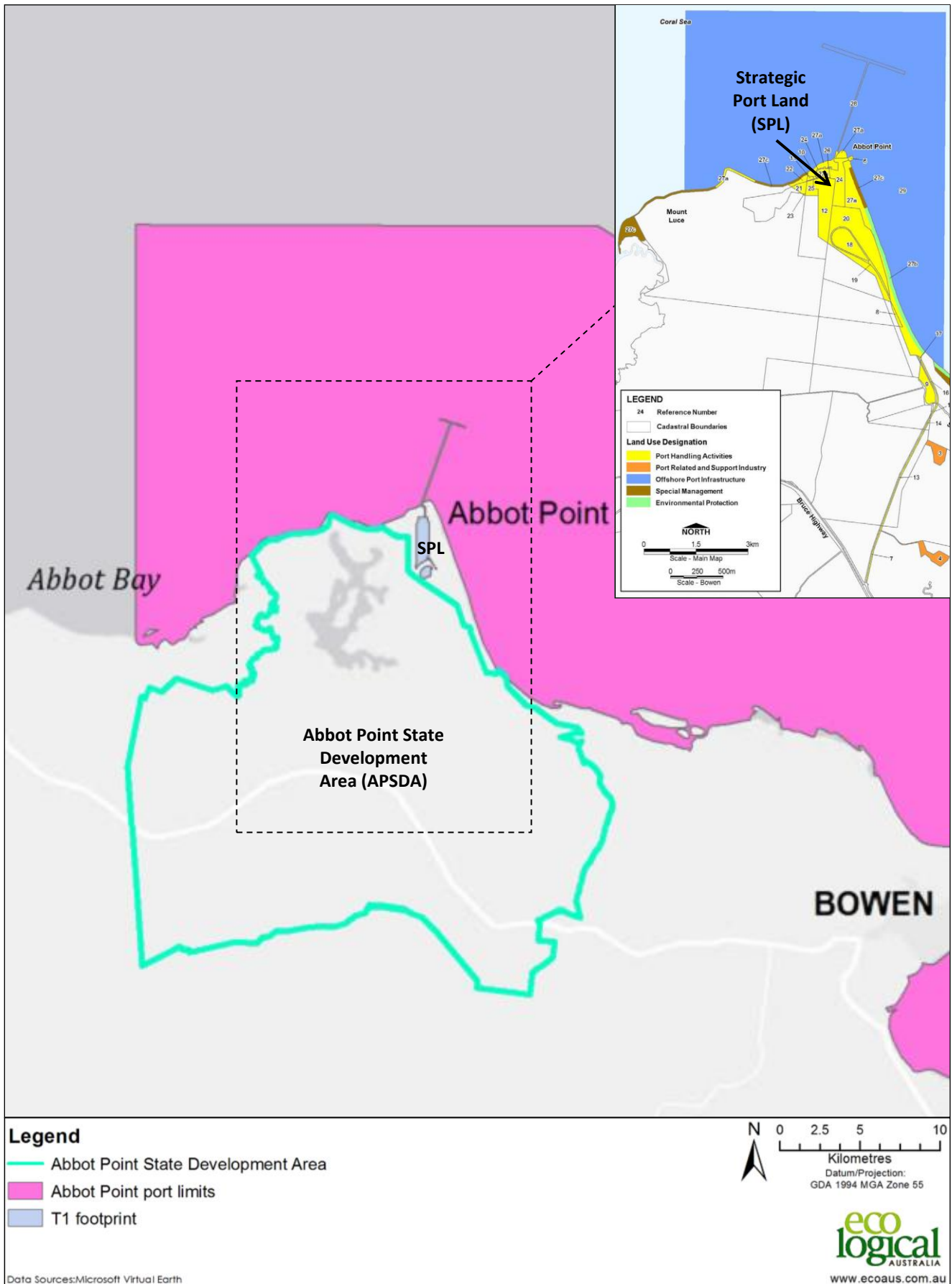


Figure 6. Abbot Point State Development Area and Port Limits (source: CIA 2013).

Fisheries Resource Values

The Wetlands itself is not known to represent an important fishing area for commercial fishing activities. However, it potentially provides a large area of breeding and nursery habitat for important commercial species, one of those being Barramundi (*Lates calcarifer*) (BMT WBM 2012).

Immediately adjacent to the Wetlands is a range of marine habitats (seagrass, reefs, etc) of potential fisheries significance. BMT WBM (2012) analysed commercial catch data for the entire Abbot Point area for period 1998-2003, analysis showed that finfish catches were dominated by mackerel species, which together represented 49 per cent of the total catch. Of the mackerel catch, 49 per cent were spotted mackerel, followed by Spanish Mackerel (29 per cent of catch), unspecified (20 per cent of catch) and Grey Mackerel (6 per cent of catch). The shark fishery represented ~41 per cent of the total finfish catch, whereas cod (predominantly Coral Trout) represented 3 per cent of the total catch. All other finfish species represented less than 2 per cent of the total finfish catch. Shellfish catches were more evenly distributed among species than finfish. In terms of prawns, Tiger Prawns represented the highest proportion (~41 per cent) of the total shellfish catch, followed by King Prawns (15 per cent), Endeavour Prawns (4 per cent) and Banana Prawns (3 per cent). Mud Scallops represented 22 per cent of the total shellfish catch, while bugs (11 per cent) and saucer scallops (3 per cent) represented smaller proportions of the total catch.

Human Modifications

Development

Port of Abbot Point Coal Terminal

The Port of Abbot Point is located 25 km north of Bowen and is located in the top north east corner of the Caley Valley Wetlands. It came in to operation in 1984 (NQBP 2012). The Port comprises of rail in-loading facilities, coal handling and stockpiling areas and a single trestle jetty (T1) and conveyor connecting to two offshore berths and two ship loaders, all 2.8 km offshore (NQBP 2012). The current export capacity of the port is 50 Mtpa, however the actual amount of coal exported from Abbot Point Port is significantly less than this. In 2013/2014 T1 exported 22.89 Mtpa of coal (45 per cent of its capacity).

The scale of proposed port expansions at Abbot Point Coal Terminal is enormous (Figure 7). Two major terminal expansions have been approved for the area, referred to as Terminal 0 and Terminal 3. A third terminal (T2) proposed for the area has been withdrawn by BHP. Two additional developments, Abbot Point Expansion Project (AP-X) and Waratah Coal terminal, have also been proposed for south of the Caley Valley Wetlands. Combined these port expansion projects will create one of the world's largest ports across the Caley Valley Wetlands and on the doorstep of the Great Barrier Reef.

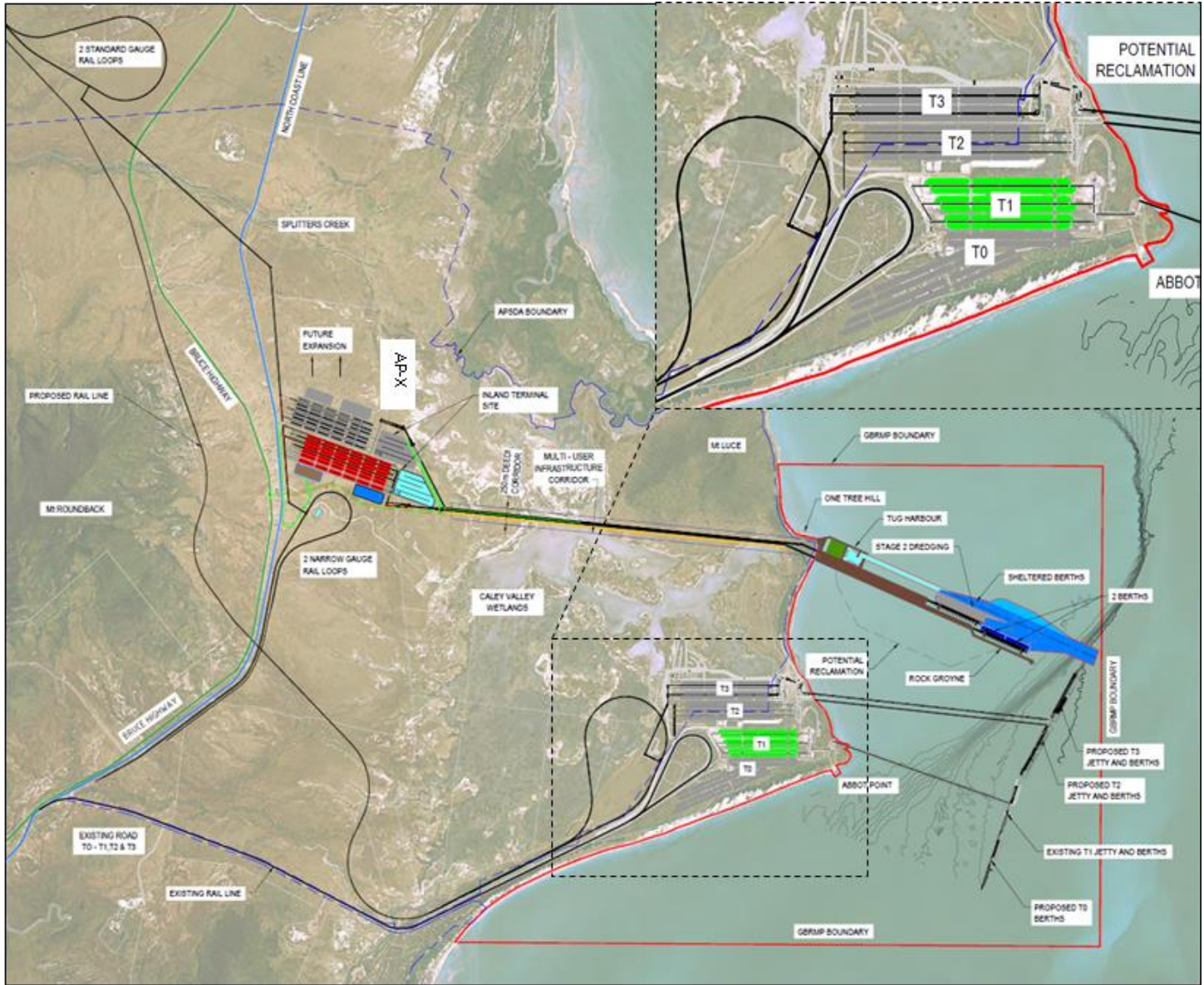


Figure 7. Abbot Point expansion projects - T0-T3 and AP-X (source: Aurecon 2012)

Below is a brief overview of the proposed terminals.

- Terminal 0 (T0)
 - o Proposed by Indian Adani Group, is adjacent to its existing Terminal 1 at the Port of Abbot Point. The 70 Mtpa expansion has approval from the Federal and Queensland Government.
- Terminal 2 (T2)
 - o Proposed by BHP Billiton Metcoal, this 60 Mtpa expansion proposal has been withdrawn by the proponent.
- Terminal 3 (T3)
 - o Proposed by GVK Hancock – a joint venture between Indian resources company, GVK and Gina Reinhart’s Hancock Coal- this 60 Mtpa expansion proposal has approval from the Federal Minister for Environment and the Coordinator General.
- Abbot Point Expansion Project (AP-X)
 - o Alternative expansion project to previous proposals which included the Multi-Cargo Facility (MCF) and the T4-T9 proposal. Preferred proponents are being shortlisted and concept plan A for the first stage shows the proposed location of terminal to the south of the Wetlands and a multi user corridor across the Wetlands.
- Waratah Coal
 - o Waratah Coal Pty Ltd proposes to construct a new coal export facility for the export of up to 240 million tonnes of coal per year, at the Port of Abbot Point. This proposal was to occur south of the wetlands, with infrastructure across the wetlands. Recently Waratah has lodged an application with State Government to be preferred developer of Terminal 2 instead. Neither have approval to date.

The existing port places a number of real and potential risks for the Caley Valley Wetlands and their wildlife. The enormous expansion proposed for the port would increase these risks. Below is a summary of key impacts from the existing and proposed port developments.

Water Quality and Dust

Sediment and nutrient increases from changed land use has resulted in lower water quality in creeks and groundwater. These include direct land use impacts such as the erosion of grazed lands, and indirect impacts such as the erosion of channel bed and banks have contributed to the decline of creek and groundwater quality, which has also contributed to elevated pollutant levels (BMT WBM 2012). Dissolved oxygen, essential for aquatic fauna, is also likely to have declined as increased nutrients from the catchment are washed into creeks during storm events triggering algal blooms. A dense mat of algal growth was identified in the BMT WBM (2012) survey, covering the majority of the substrate. Treated surface water runoff from the Abbot Point Coal Terminal (APCT) located to the north is likely to affect water quality, and runoff from the elevated dunes and ridges within the APCT which enter the Wetlands from the east (GHD 2009).

Dust originating from industrial areas may also be a potential source of pollutants. Stormwater (and dust) from future industrial and infrastructure development within the APSDA post development will be the key mechanism for transporting diffuse pollutants to the waterways with nutrients, sediments and gross pollutants being the primary pollutants of concern (BMT WBM 2012). Coal dust and leachate have the potential to alter water chemistry and in extreme cases poison or smother organisms.

Invasive species

There is the potential for invading exotic species through over 60 bulk carriers per year visiting the area, discharging approximately 30,000 tonnes of ballast water per carrier per visit (SEWPAC 2010a). Studies have been undertaken on the ballast water of 23 bulk carriers which were tested and found to have 57 taxa of marine organisms (SEWPAC 2010a). It is estimated that most of the ballast water discharge in Queensland waters occurs at Hay Point, Abbot Point and Weipa (SEWPAC 2010a).

Light Pollution

Artificial lighting or “ecological light pollution” can have serious impacts on both terrestrial and aquatic fauna and flora (Deda et al 2007).

Fauna

Light pollution is known to confound animal navigation, change competitive interactions, alter predator-prey relations, and affect an animal’s physiology (Deda et al 2007).

Marine turtles are dependent on visual brightness cues for orientation and are disrupted by artificial lighting close to nesting beaches which can have serious impacts on hatchling survival, discouraging adult females from nesting, and affect female turtles searching for nest locations (Deda et al 2007; Kamrowski et al 2012). Female nesting turtles avoid illuminated beaches, thereby nesting in less illuminated and shaded parts, which can affect the number and sex ratio of hatchlings produced (Deda et al 2007).

Artificial light is known to attract migratory and non-migratory birds at night, particularly on foggy or cloudy nights (Deda et al 2007). Petrels and shearwaters are very sensitive to artificial lights with fledglings attracted to lights during their first flight to sea, causing some to fall to the ground with fatal injuries (Le Corre et al 2002). Day active predatory birds and reptiles will forage under artificial lights (Longcore and Rich 2004) providing a competitive advantage which may have detrimental effects to existing and new predator-prey interactions (Wildlands CPR 2007).



Near-shore lighting at Abbot Point could cause sea turtle hatchlings to become disoriented when they are trying to make their way to the ocean, reducing their chances of survival. *Credit: Kjersti Joergensen*

Flora

Plants use darkness to manage their metabolism, development and life programmes (Deda et al 2007). Trees need to adjust to seasonal alterations, and artificial light hinders this and can keep various trees from losing their leaves by light pollution (Deda et al 2007).

Noise

Excessive and loud intermittent noise can cause flight responses in fauna such as shorebirds or avoidance of areas in the vicinity of its source. The effects of disturbance vary among shorebird species with the Eastern Curlew being the most readily disturbed (QPWS 2005). Shorebirds use up critical energy when they take flight due to disturbance which means they might not gain enough condition for migration and/or breeding (QPWS 2005). Repeated disturbance also exacerbates this problem. For migratory birds disturbance is most critical during March/April before they migrate, and in September/October when they return and are recovering from the long flight (QPWS 2005). Resident shorebird species are sensitive to human disturbance, predation by cats, dogs and feral pigs which may reduce breeding success (QPWS 2005). There is potential for noise associated with the port facility to disrupt wildlife (SEWPAC 2010a).

Traffic

Many wetland fauna species are sensitive to pedestrian and vehicle traffic. Frequent disturbance of nesting birds may lead to abandonment of the nest and wader birds will lose condition if they are unable to feed undisturbed. Furthermore, motor vehicles may directly damage eggs and ground dwelling chicks that are unable to move from their nests. BMT WBM (2012) field surveys identified tyre marks adjacent to the important Little Tern nesting area at the mouth of Mount Stuart Creek, adjacent to the Wetlands.

Bund walls

There are two major bund walls in the Wetland, causeway (inner) bund and western (outer) bund. One of the barriers (known as the outer bund) is located across Mount Stuart Creek. The outer bund is thought to have been constructed to improve habitat values for waterfowl. The outer bund partially isolates the site from tidal influences, and is likely to impede the movement of aquatic fauna such as fish. This appears to have resulted in localised mangrove die-back of approximately 46 ha (BMT WBM 2012). The bund wall was built in the 1950's by duck shooters wanting to alter the area for hunting. The wall is less than a metre high and broken in many places, with water flowing over the wall in the wet season. The inner bund is located east (upstream) of the outer bund, and incorporates a water delivery pipe line to the Port of Abbot Point and vehicle access (GHD 2009). The effects of the inner bund on wetland hydrology, water quality and ecology have not been investigated in detail to date (BMT WBM 2012). The western (outer) and causeway (inner) bunds have modified the ecological character of the Wetlands through:

- Changing tidal hydraulics and associated water quality modifications – including salinity levels immediately down-slope of the western (outer) bund are greater than seawater;
- Changes to vegetation communities - including mangrove dieback immediately west of the western (outer) bund;
- Restricting aquatic fauna movement patterns; and
- Barrier for fish movement between sea and Wetlands, and within – limiting habitat values to species that migrate between freshwater and marine in life-cycle (e.g. barramundi) (BMT WBM 2012)



The proposed expansion at the Port of Abbot Point will further remove parts of the Wetland habitats, increase noise and pollution in the area, and threaten the survival of many important species. *Credit APAG*

Land clearing

Since European settlement, the Wetlands area has been extensively cleared of open forest and woodlands in favour of grassland for grazing, resulting in the loss of and fragmentation of habitats. Clearing is likely to have resulted in reductions in the diversity of fauna of the area, particularly those species which are forest and woodland specialists. It also makes the fauna residing within the remaining patches of forest and woodland more prone to predation or displacement by more aggressive species.

Grazing

Much of the cleared areas of the Don River catchment have been converted to grazing lands for cattle. Inappropriate grazing regimes have led to severe impacts on the beach scrub communities at the southern part of the Wetland. These have also been isolated by an access road and rail link to Abbot Point coal loading facility (SEWPAC 2010a).

Until recently (2011), cattle were able to access wetland habitats, which is likely to have resulted in a range of pressures to vegetation communities, such as increased weed infestations, land degradation through compaction and erosion, and high nutrient loads from cattle waste. Cattle have now been excluded from lands owned by the Coordinator General, which includes large parts of the Wetlands (BMT WBM 2012).

Weeds

Weeds displace endemic flora by out-competing them for space, light and nutrients. Numerous non-endemic plant species (i.e. weeds) have been recorded in the Wetlands. Heavy infestations of introduced pasture grasses were recorded, including Guinea Grass (*Megathyrsus maximus*) and Buffel Grass (*Pennisetum ciliare*), by BMT WBM (2012) surveys.

Fourteen plant species listed under the Land Protection (Pest and Stock Route Management Act 2002) and Weeds of National Significance (WONS) have been recorded in the Wetlands (BMT WBM 2012). BMT WBM (2012) recorded dense infestations of Rubber Vine (*Cryptostegia grandiflora*) and Prickly Acacia (*Acacia nilotica*) (both WONS) around the margins of the Wetlands and along the banks of Saltwater Creek. Lesser infestations of Parkinsonia (*Parkinsonia aculeata*), Mimosa Bush (*Acacia farnesiana*), Lantana (*Lantana camara*), Brazilian Nightshade (*Solanum seafortianum*), Noogoora Burr (*Xanthium pungens*) and Buffel Grass (*Pennisetum ciliare*) all of which are serious environmental weeds (SEWPAC 2010a and BMT WBM 2012).

Feral Animals

Feral pigs are the most abundant and destructive feral animal in the Wetlands. They destroy vegetation, modify land through trampling, and are potential predators to ground nesting birds. BMT WBM (2012) surveys located footprints in a number of locations along Saltwater Creek and on mudflats of Branch Creek. Rabbits, Red Fox, Black Rat, House Mouse, Common Starling and Cane Toads have also been recorded in the Wetlands. Feral cats, Common Myna and Asian House Geckoes are also likely to inhabit the Wetland. Common Myna and Common Starlings are aggressive birds which compete with native species for nest hollows and food (BMT WBM 2012).

Recommended next steps

Further research

This report is only a preliminary study into the international significance of the Caley Valley Wetlands based on the small pool of existing research. The majority of the surveys undertaken on the Wetlands were inadequate in reporting on seasonal variations, vegetation community structure, fauna distribution and habitat usage, and water quality of the Wetlands. Few broad scale surveys have been undertaken across the entire study area, providing inadequate data to determine quantitative patterns in natural variability and species abundance.

Further research needs to be undertaken to collate past and present surveys of the Wetlands including assessments completed for development impact studies and those undertaken by conservation and interests groups in the area. The general consensus from previous studies of the Wetlands is the need for a detailed broad scale survey across the entire site conducted throughout several times of the year to encompass seasonal and natural variability. This research is greatly needed before the real and potential impacts of any port expansion projects can be assessed for approval.

Conclusion

The Caley Valley Wetlands represents one of the few remaining intact wetland systems between Townsville and Bowen, supporting a valuable habitat and wildlife corridor for a range of threatened flora and fauna species. The Wetlands are both nationally and internationally important as they provide breeding and feeding habitats for a significant number of waterbirds including at least ten that are threatened.

One of the major concerns for the Wetlands is the proposed expansion of the Port of Abbot Point. Proposed port developments are likely to further remove parts of the Wetland habitats, increase noise and pollution in the area, and threaten the survival of many important species.

Through the assessment of previous surveys on the Caley Valley Wetlands and the Abbot Point area, the Wetlands is likely to meet at least seven out of the nine Ramsar criteria, easily satisfying its potential for nomination. The Caley Valley Wetlands is internationally significant and its qualification for Ramsar listing makes it an inappropriate location for the proposed port expansions.

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APPENDIX A – DIWA Criteria

DIWA Criteria for determining nationally important wetlands

The Directory not only identifies nationally important wetlands, it provides a substantial knowledge base of what defines wetlands, their variety, and the many Flora and Fauna species that depend on them. In addition, it contains information about their social and cultural values and some of the ecosystem services and benefits they provide. It is a valuable tool for managers and others interested in Australia's important wetlands.

Criteria for determining nationally important wetlands

The criteria for determining nationally important wetlands in Australia, and hence their eligibility for inclusion in the Directory, are those agreed to by the ANZECC Wetlands Network in 1994.

A wetland may be considered nationally important if it meets at least one of the following criteria:

1. It is a good example of a wetland type occurring within a biogeographic region in Australia.
2. It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex.
3. It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail.
4. The wetland supports 1% or more of the national populations of any native plant or animal taxa.
5. The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level.
6. The wetland is of outstanding historical or cultural significance.

Application of the criteria to individual wetland sites involves a degree of subjectivity. Not only may certain aspects of a site's significance be interpreted differently by different investigators, but information gaps often exist which make it difficult to judge whether or not a site meets a particular criterion.

Adoption of a bioregional approach to listing sites in the Directory is seen as one way of reducing the difficulty in applying the criterion relating to a system's uniqueness or representativeness. The Natural Resource Policies and Programs Committee in 2008 agreed to adopt the Australian Drainage Divisions system, along with IMCRA for marine ecosystems, as the best fit national regionalization approach for aquatic ecosystems.

Directory Wetland classification system

The wetland classification system used in the Directory identifies 40 different wetland types in three categories:

- A. [Marine and Coastal Zone wetlands](#)
- B. [Inland wetlands](#), and
- C. [Human-made wetlands](#).

This system was agreed to by the then ANZECC Wetlands Network in 1994. It is based on that used by the Ramsar Convention in describing Wetlands of International Importance, but was modified slightly to suit the Australian situation in describing wetlands of national importance.

A. Marine and coastal zone wetlands

1. Marine waters - permanent shallow waters less than six metres deep at low tide; includes sea bays, straits.
2. Subtidal aquatic beds; includes kelp beds, seagrasses, tropical marine meadows.
3. Coral reefs.

4. Rocky marine shores; includes rocky offshore islands, sea cliffs.
5. Sand, shingle or pebble beaches; includes sand bars, spits, sandy islets.
6. Estuarine waters; permanent waters of estuaries and estuarine systems of deltas.
7. Intertidal mud, sand or salt flats.
8. Intertidal marshes; includes salt-marshes, salt meadows, saltings, raised salt marshes, tidal brackish and freshwater marshes.
9. Intertidal forested wetlands; includes mangrove swamps, nipa swamps, tidal freshwater swamp forests.
10. Brackish to saline lagoons and marshes with one or more relatively narrow connections with the sea.
11. Freshwater lagoons and marshes in the coastal zone.
12. Non-tidal freshwater forested wetlands.

B. Inland wetlands

1. Permanent rivers and streams; includes waterfalls.
2. Seasonal and irregular rivers and streams.
3. Inland deltas (permanent).
4. Riverine floodplains; includes river flats, flooded river basins, seasonally flooded grassland, savanna and palm savanna.
5. Permanent freshwater lakes (>8 ha); includes large oxbow lakes.
6. Seasonal/intermittent freshwater lakes (>8 ha), floodplain lakes.
7. Permanent saline/brackish lakes.
8. Seasonal/intermittent saline lakes.
9. Permanent freshwater ponds (<8 ha), marshes and swamps on inorganic soils; with emergent vegetation waterlogged for at least most of the growing season.
10. Seasonal/intermittent freshwater ponds and marshes on inorganic soils; includes sloughs, potholes; seasonally flooded meadows, sedge marshes.
11. Permanent saline/brackish marshes.
12. Seasonal saline marshes.
13. Shrub swamps; shrub-dominated freshwater marsh, shrub carr, alder thicket on inorganic soils.
14. Freshwater swamp forest; seasonally flooded forest, wooded swamps; on inorganic soils.
15. Peatlands; forest, shrub or open bogs.
16. Alpine and tundra wetlands; includes alpine meadows, tundra pools, temporary waters from snow melt.
17. Freshwater springs, oases and rock pools.
18. Geothermal wetlands.
19. Inland, subterranean karst wetlands.

C. Human-made wetlands

1. Water storage areas; reservoirs, barrages, hydro-electric dams, impoundments (generally >8 ha).
2. Ponds, including farm ponds, stock ponds, small tanks. (generally <8 ha).
3. Aquaculture ponds; fish ponds, shrimp ponds.
4. Salt exploitation; salt pans, salines.
5. Excavations; gravel pits, borrows pits, mining pools.
6. Wastewater treatment; sewage farms, settling ponds, oxidation basins.
7. Irrigated land and irrigation channels; rice fields, canals, ditches.
8. Seasonally flooded arable land, farm land.
9. Canals

Directory of Important Wetlands in Australia data

Wetlands data have been received from:

- Environment ACT - [ACT references](#)
- NSW Department of Conservation and Environment - [NSW references](#)
- NT Department of Infrastructure Planning and Environment - [NT references](#)
- Qld Environmental Protection Agency - [Qld references](#)
- SA Department of Environment and Heritage - [SA references](#)
- Tas Department of Primary Industries, Water and the Environment - [Tas references](#)
- Vic Department of Sustainability and Environment - [Vic references](#)
- WA Department of Conservation and Land Management - [WA references](#)

(source: SEWPAC 2011c)

APPENDIX B – Ramsar Criteria

Ramsar Criteria for identifying Wetlands of International Importance

Under the Ramsar Criteria, wetlands should be selected for the Ramsar List on account of their international significance in terms of the biodiversity and uniqueness of their ecology, botany, zoology, limnology or hydrology. In addition, the Criteria indicates that in the first instance, wetlands of international importance to waterbirds at any season should be included on the Ramsar List.

Guidance on the application of the Criteria for identifying Wetlands of International Importance is provide under the Ramsar Convention's [*Strategic Framework for the List of Wetlands of International Importance, edition 2009*](#).

Group A of the Criteria. Sites containing representative, rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B of the Criteria. Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

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

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on waterbirds

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.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Specific criteria based on other taxa

Criterion 9: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

(source: SEWPAC 2011a)

APPENDIX C – Wetland Details

Details of the Caley Valley Wetlands

Attribute	Details
Name:	Abbot Point – Caley Valley Wetlands ¹
Area type:	DIWA nationally important wetland ¹ DIWA Old reference No. BBN001QL, New reference No. QLD001.
Level of importance:	National – Directory ²
Location:	The site extends about 18 kilometres from Mt Curlewis in the west to Euri Creek in the east and about 6 kilometres from Bald Hill in the north to Caley Valley homestead in the south. Its centre is at 19 degrees 55' 22" S, 148 degrees 02' 25" E and is about 21 kilometres north northwest of Bowen. ²
Centre point coordinates:	19° 55' 22" S, 148° 02' 25" E ³
Total area:	51.5 km ² ⁽¹⁾ or 5,154 ha ⁽²⁾
Biogeographic region:	Brigalow Belt North ² Don River Basin which forms part of the Brigalow Belt Bioregion.
Shire:	Bowen ²
Elevation:	Less than 20m AHD. Most of the area is less than 5m AHD. ²
Other listed wetlands in same aggregation:	None ²
Wetland type:	A1: Marine waters – permanent shallow waters less than six metres deep at low tide; includes sea bays, straits. A5: Sand, shingle or pebble beaches; includes sand bars, spits, sandy islets. A6: Estuarine waters; permanent waters of estuaries and estuarine systems of deltas. A8: Intertidal marshes; includes salt-marshes, salt meadows, saltings, raised salt marshes, tidal brackish and freshwater marshes. A9: Intertidal forested wetlands; includes mangrove swamps, nipa swamps, tidal freshwater swamp forests. A10: Brackish to saline lagoons and marshes with one or more relatively narrow connections with the sea. A11: Freshwater lagoons and marshes in the coastal zone. C1: Water storage areas; reservoirs, barrages, hydro-electric dams, impoundments (generally >8 ha). (A = Marine and coastal zone wetlands; C = Human-made wetlands) ²
Criteria for inclusion in DIWA:	1: It is a good example of a wetland type occurring within a biogeographic region in Australia. 2: It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex. 3: It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail. 5: The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level. ²

	(See Appendix A – Criteria for determining Nationally Important Wetlands for more information)
Regulatory authorities:	The Coordinator-General on behalf of the Queensland Government is the assessment manager for material change of use development applications within the APSDA. Whitsunday Regional Council is the assessment manager for all assessable development under the Sustainable Planning Act 2009 for the part of the Wetlands outside the APSDA and for assessable development other than material change of use in the APSDA. Majority of Abbot Point is owned by the Coordinator-General, the Minister for Economic Development, through Economic Development Queensland, and the North Queensland Bulk Ports Corporation.
Drainage divisions:	North East Coast ¹
Drainage basins:	Don (3,736.2 km ²) ¹
Drainage sub-basins:	Don River ¹
Regional NRM bodies:	NQ Dry Tropics (140,874.2 km ²) ¹ website: http://www.nqdrytropics.com.au/
Local Government areas:	Whitsunday ¹
Climate zones:	Tropical ¹
Bioregions:	Brigalow Belt (BRB) ¹
Bioregion provinces:	Bogie River Hills Townsville Plains ¹
IBRA bioregions:	Brigalow Belt North (BBN) ¹
IBRA subregions:	Bogie River Hills Townsville Plains ¹
Marine bioregions:	Lucinda-Mackay Coast (LMC) ¹
IMCRA region:	Northeast Province (Lucinda-Mackay Coast meso-scale bioregion) ³
Regional plans:	Mackay, Issac & Whitsunday ¹
World Heritage Areas:	Great Barrier Reef (318,587.1 km ²) ¹
Ramsar internationally important wetlands:	None ¹
DIWA nationally important wetlands:	Great Barrier Reef Marine Park Southern Upstart Bay ¹
National parks:	None ¹
Marine parks (Queensland):	Great Barrier Reef Coast Marine Park ¹
Great Barrier Reef catchments:	Great Barrier Reef catchments ¹
Conservation parks:	None ¹
State forests:	None ¹
Forest reserves:	None ¹
Resources reserves:	Abbot Bay Resources Reserve ¹
Timber reserves:	None ¹
Fish habitat areas:	None ¹
Nature refuges:	None ¹
Freshwater biogeographic provinces:	Central ¹
Aquatic Conservation Assessments (AquaBAMM):	Great Barrier Reef catchment ¹
Wetland (aquatic ecosystem)	Coastal and sub-coastal floodplain grass, sedge, herb swamp

type – conceptual models:	Coastal and sub-coastal floodplain lake Coastal and sub-coastal non-floodplain grass sedge and herb swamp Coastal and sub-coastal non-floodplain tree swamp—Melaleuca spp. and Eucalyptus spp. Coastal and sub-coastal saline swamp ¹
Wetland (aquatic ecosystem) type—management profiles:	Coastal and sub-coastal floodplain lakes and non-floodplain soil lakes (PDF, 3.2 MB) Coastal and sub-coastal tree swamps (PDF, 2.3 MB) Coastal grass-sedge wetlands (PDF, 1.3 MB) Mangrove wetlands (PDF, 1.1 MB) Saltmarsh wetlands (PDF, 0.9 MB) ¹
Groundwater dependent ecosystem type—conceptual models:	None ¹
Healthy Waterways conceptual models:	None ¹
Water resource planning areas:	None ¹
Aquatic ecosystem monitoring programs:	Aerial surveys of waterbirds in eastern Australia Groundwater water level network Long term historical trend water quality monitoring data Queensland wetland mapping Surface water monitoring network ¹
Wetland soil indicator case studies:	None ¹
Great Barrier Reef wetland management case studies:	None ¹
Area specific conceptual model case studies:	None ¹
EPP (Water) scheduled environmental values and water quality objectives:	None ¹
Back on Track actions for biodiversity:	NQ Dry Tropics ¹
Related legislation/policies:	View information about legislation and policies ¹

(source: ¹WetlandInfo 2013; ²SEWPAC 2010a; ³BMT WBM 2012)