Port of Karumba

ENVIRONMENTAL

MANAGEMENT

PLAN

2014

Ports North

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DOCUMENT CONTROL		PREPARED and APPROVED	RELEASED
Version 0	Edits made to reflect transition from Ports Corporation Queensland to Far North Queensland Ports Corporation Ltd Effective 1 July 2009	Environment Manager	July 2009
Version 1	Update to Agencies	Environment Manager	August 2012
Version 2	Update to format	Environment Manager	December 2013
Version 3	Updated agency references and 2013 Seagrass map	Environment Manager	July 2014
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1 INTRODUCTION

Far North Queensland Ports Corporation Limited (FNQPC) trading as Ports North, manages five trading ports and four community ports throughout northern Queensland.

This Environmental Management Plan (EMP) is prepared to identify potential impacts and outline environmental management measures developed for operations at the port to ensure environmental safeguards are in place to minimise the risk of impacts to the natural environment.

All personnel involved in activities on port land and certain activities aboard vessel within the port area are required to demonstrate a general environmental duty of care throughout any such operations, and are required to comply with the measures below, unless a variation is approved in writing by Ports North.

Ports North, as the port authority for the Port of Karumba, has very tight environmental controls in place at the port to ensure that no environmental harm occurs during port operations, maintenance or developments. Best practice measures are used to ensure high environmental standards in the operations.

This EMP is to be read in conjunction with the applicable "Port Rules and Notices" that also apply at the Port for such operation. Refer to www.portsnorth.com.au for most up to date information.

The local Port Supervisor monitors operations to ensure that these measures are fully implemented. Ports North staff and port users involved in operations, including loading and unloading product across the wharves are required to protect the environment under the applicable legislation, including the *Transport Infrastructure Act 1994*, and the *Environmental Protection Act 1994*. The appointed operators are required to comply with the requirements of Ports North's Environment Policy and management measures specified below.

2 LOCATION

The Port of Karumba is one of the trading ports managed by Ports North. The port is located on the coastline of the Gulf of Carpentaria in north-west Queensland (see Figure 1).

The port limits (shown in Figure 2) are defined in the regulations of the *Transport Infrastructure (Ports) Regulation 2005.* The port includes the lower Norman River and stretches along the coastline.

The port activities are concentrated along the southern bank in the lower reach of the Norman River, at a latitude of 17°28' S and longitude of 140°48' E, with no intensive port activity occurring outside this area. This EMP applies to the port area, including port limits at Karumba.

2-1 Port Locations

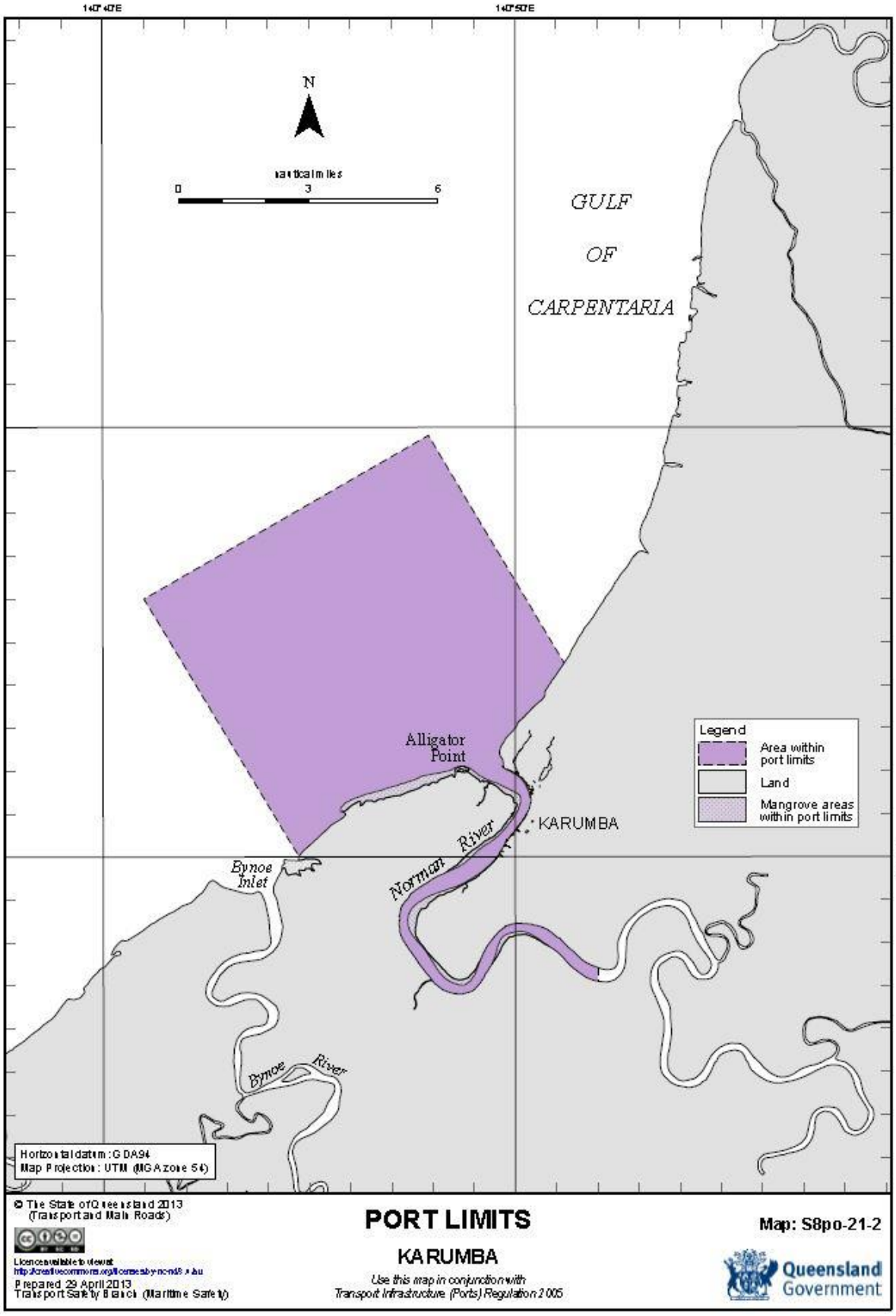


Figure 2-2 Location of Port and Port Limits

3 DESCRIPTION OF ACTIVITIES

The commercial facilities at the Port of Karumba are dominated by the main export of lead and zinc concentrate by Minerals and Metals Group Pty Ltd (MMG) from the Century Mine. The main import into the port is petroleum products. Karumba supports a large seafood and tourism industry, with recreational fishing being a major seasonal focus.

Most of the port facilities such as wharves, storage facilities and the cattle loading facilities are privately owned and not on Strategic Port Land, so they are not under the direct control of Ports North.

The port serves the north-west Queensland minerals province and the Gulf commercial fishing industry, with the main product exported from the port being lead, zinc, cattle with new export opportunities being sought to support regional development.

3.1 Location of Infrastructure and Buildings

The location of key buildings and infrastructure are documented in our Infrastructure Plans, which are internal documents. A map of the infrastructure of the Port can be provided to government agencies on request. Ports North includes these maps in the Emergency Response Plan for the Port. Ports North has land holdings of Strategic Port Land in Karumba and the details of these are provided in the complementary document "Port of Karumba- Land Use Plan". The two largest land holdings in the port are Lot 42 on RP 710167, which is undeveloped land of around 50 ha near Karumba Point, and around 10 ha of land leased to MMG Pty Ltd for concentrate dewatering and shipment. Ports North has an office in Yappar St in Karumba, which houses the Port Supervisor's office and local equipment, a boatshed and workshop within the Maritime Safety Queensland (MSQ) facility. Other port facilities include the channel infrastructure, and small loading wharves.

3.2 Channels

There is one access-shipping channel to Karumba. The dredged component of the channel is around 7 kilometres long, 60 metres wide (toe-to-toe) and has a gazetted minimum depth of 3.4 metres below Lowest Astronomical Tide (LAT). The total channel length, including sections that do not require regular dredging to achieve the gazetted depth, is 12 – 15 kilometres long. The fairway beacon is located at 17^{o}25.644' South and 140^{o}43.408' East.

3.3 Anchorage

There is no designated shipping anchorage within port limits, apart from some storm moorings. The cyclone mooring for MMG is located at 17 degrees 8.1 minutes south, 139 degrees, 34.9 minutes east.

There is a roadstead area for the concentrate export vessels to moor for materials transfer that is approximately 40 km from the port. The location of the roadstead is between the following four coordinates:

17 degrees 10 minutes south, 140 degrees, 29 minutes east
17 degrees 9 minutes south, 140 degrees, 30 minutes east
17 degrees, 19minutes 5 seconds south, 140 degrees 39 minutes east
17 degrees, 20 minutes 5 seconds south, 140 degrees 38 minutes east.

4 OVERVIEW OF PORT ENVIRONMENTAL MANAGEMENT

It is our policy is to manage our ports in a pro-active manner to minimise any impacts from port operations or new developments. We have a structured environmental program that involves environmental assessment, monitoring, protection and rehabilitation. It strives for continual improvement in the control of port and port user activities to maintain a healthy port environment. The detailed environmental policy, procedures and practices are documented in its Environmental Management System, which is consistent with the AS/ NZS ISO14001 standard. Ports North has an Environmental Management Framework and associated Policy, which provides a mechanism for continually improving operations and practices (refer **Appendix A**). All activities carried out at the port under Ports North's direct or indirect control need to comply with this Policy. Ports North also subscribes to the policy aspirations identified in the Environment Policy for Queensland Ports.

This Environmental Management Plan for the port is complementary to, and consistent with, the Environment Policy that is documented in its Environmental Management System and on its web site.
Under the Environmental Management System, new projects undertaken on strategic port land will require a project-specific Environment Management Plan to be developed by the proponent and then approved prior to commencement of the project. This plan must address the potential environmental issues from the project during construction, as well as and EMP for ongoing operations that outlines actions needed to minimise operational impacts. Our environment staff can supply a standard checklist of potential issues and will work with a project proponent to determine the environmental issues that need to be addressed.
To assess the overall state of the port environment or to detect any changes occurring, Ports North maintains regular scientific monitoring of key environmental values such as seagrass condition and trend, and results from such monitoring are made accessible via the organisations website.

5 DOCUMENT USE AND REVIEW

This Environmental Management Plan (the Plan) for the Port of Karumba has been developed to document in detail the environmental areas of significance within the Port of Karumba and the current environmental management practices and controls used to protect and enhance the port environment.

This Plan will be used in determining environmental standards for the on-going development and operation of the port. This Plan is designed to complement the *Port of Karumba Land Use Plan* to ensure that any development at the port is carried out in an environmentally sustainable manner and in a manner consistent with the planned strategic development of the area.

This Plan is also intended to provide a reference document for current and potential users of the port, government agencies and local communities. This Plan is not a statutory document and is not required by legislation.

The following sections provide general principles, controls and management strategies which must be adhered to at all times by staff and the Operator (including its sub-contractors) involved to reduce potential impacts.

The following information is presented in this document:

- Section 2 presents the key legislation and policies that need to be considered in port operations and developments.
- Section 3 provides a general description of the environmental values at the Port and surrounding areas, including areas designated as an environmental buffer.
- Section 4 describes potential industry or operational impacts in the port and presents the environmental control measures to be employed to manage those risks.
- Appendices document specific management plan components applicable to;
    - Ballast water management.
    - Vessel Maintenance and Repair
    - Wharf Operations

This Plan will be reviewed and updated as needed to ensure that it reflects any significant changes that may occur within the port. It will be completely reviewed at least every six years and a new document issued.

Ports North will seek community, industry and relevant government agency feedback on any major changes to this Plan and will incorporate external feedback where appropriate. Minor changes to the Plan will be carried out throughout the life of the Plan and these minor revisions will not necessarily be subject to external consultation. Examples of minor changes not requiring consultation are changes in the description of goods handled in the port, legislation changes, property lot subdivisions or number changes or other minor changes in the Land Use Plan, changes to port limits or the incorporation of new environmental information. Major changes to this document that would be externally consulted include any changes to the declared land use zones.

6 IMPLEMENTATION

Port users will be responsible for ensuring requirements of this EMP are implemented for the duration of their particular activity, and will be responsible for monitoring the environmental management of day-to-day activities. A separate site specific EMP may also be required, which should ensure consistency with this overall Port EMP. Each port user is required to ensure that all personnel working onsite are aware of their environmental responsibilities and the importance of the EMP, and will be responsible for the regular inspection of the adequacy of all environmental controls as is the case with health and safety requirements.

7 RESPONSIBILITIES AND CONTACTS

The following roles within these operations and specific responsibilities are noted as follows;

Ports North Environment Manager	Incident recording and reporting
Ports North Port Supervisor	Customer and stakeholder liaison Supervision

8 GENERAL ENVIRONMENTAL, SAFETY OR COMMUNITY IMPACTS

To minimise impacts on social and environmental aspects of operations, the following management measures shall be adopted:

- All site personnel will be advised of their responsibilities for reporting any potential or actual environmental harm in accordance with the *Environmental Protection Act 1994*;
- The Port Supervisor is to be notified of any safety or environmental incidents and complaints that occur immediately;
- An Incident Form will be completed and remedial actions will be monitored;
- Port users are required to record all details of any complaints received and to notify the Port Supervisor including details of the action taken to rectify the situation; and,
- Port North's Port Supervisor will consult with relevant stakeholders prior to commencement of operations.

9 INDUCTION

All personnel working onsite must attend an induction or 'tool box' by the Port Supervisor prior to commencing works or activities. The induction will cover relevant provisions from this EMP, including:

- Performing work duties with minimal impact on the existing environment;
- General environmental duty of care;
- Incident recognition and reporting;

Port Supervisor will maintain a diary record of the completed inductions (i.e. date, time, who attended).

10 LEGISLATIVE REQUIREMENTS

State Legislation

Ports North has responsibilities conferred on it by State legislation (*Transport Infrastructure Act 1994 and Transport Operations* (*Marine Pollution*) *Act 1994*) for the safe and efficient management of the port and its infrastructure, and for managing pollution from shipping activities. The jurisdiction of Ports North at the Port of Karumba includes all land under the *Land Use Plan*, and all waters within designated port limits, as defined under the *Transport Infrastructure (Ports) Regulation 2005* (see Figure 2-2). The geographical extent of this Plan applies only to the area under that jurisdiction.

Transport Infrastructure Act 1994

Ports North is the port operator for the Port of Karumba as declared under the *Transport Infrastructure Act 1994.* Requirements of the Act are affected by the "Port Rules" and "Port Notices".

Environmental Protection Act 1994

Under the *Environmental Protection Act 1994* (EP Act), consideration of the environmental duty of care, and duty to notify is required at all stages of operations by all staff (Section 316 of the EP Act). The basic principles of the EP Act should be understood by all staff.

Under the *Environmental Protection Regulation 2008*, some actions may be classed as an Environmentally Relevant Activity (ERA) and hence the activity may require specific Department of Environment and Heritage Protection (DEHP) approval.

Port activities carried out by either port users or operator must comply with all relevant government legislation. The key State legislation for protection of the environment is the Queensland *Environment Protection Act 1994.* The Queensland Department of Environment and Heritage Protection (DEHP) is responsible for ensuring compliance with this Act. Ports North has an approval to operate the port as the port authority under the *Transport Infrastructure Act.* However, this does not provide any umbrella approvals for the individual activities of port users. Port users are required to hold all the relevant environmental authorities or licences issued by state administering agencies for their day-to-day activities, which might include environmentally relevant activities such as stockpiling, loading or unloading in bulk, fuel or chemical storage, sewage treatment, aquaculture or boat repair and maintenance.

Significant new developments in the port are likely to require approval under the *Sustainable Planning Act 2009.* For projects proposed on Strategic Port Land (Strategic Port Land is land owned by Ports North that has been designated as land required for port purposes and approved as such by the Minister for Transport. Strategic Port Land is listed in the Land Use Strategy and Plan.), Ports North is the Assessment Manager under the *Act*. Further information is provided in the Land Use Strategy.

Another piece of key State legislation that could affect port development or operation is the *Fisheries Act 1994.* It should be noted that under this Act, marine plants, which include seagrass, mangroves, saltmarsh and other tidal plants, may not be removed, damaged or even trimmed without a permit from Queensland Department of Agriculture Forestry and Fisheries (DAFF). The *Act* also prohibits work in a declared fish habitat area without a permit, although no such areas were proclaimed in the port at the time of writing.

State Planning Policies

The *State Coastal Management Plan* was published by the EPA in August 2001, with subsequent amendments including those in 2012. This Plan seeks to protect and manage Queensland's coastal resources. In considering assessable developments on Strategic Port Land, Ports North will have regard to this plan in its decision-making as Assessment Manager under the *Sustainable Planning Act 2009.*

Commonwealth Legislation

Projects that may have an impact on issues of national environmental significance could require assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Examples of triggers of the Act include impacts on World Heritage areas; Ramsar wetlands of international significance; nationally threatened species and communities listed by the Commonwealth; migratory species protected under international agreements; nuclear actions; or Commonwealth marine environment. Such projects will need to be referred to Environment Australia by the project proponent to determine if Commonwealth approval is required. The disposal of dredged material at sea (outside internal State waters) is covered by the *Environment Protection (Sea Dumping) Act 1981.*

11 THE PORT ENVIRONMENT

All port facilities and Strategic Port Land at the Port of Karumba are located on the Norman River in the south-east of the Gulf of Carpentaria. The port is situated in a typical monsoonal tropical environment with hot, wet summers and hot, dry winters. Environments that have high ecological status surround it. These include large stands of mangroves, saltflats and seagrass beds. The area is important as a nursery ground for fisheries and contains important habitat for migratory birds.
Water quality is naturally variable, with large variations in salinity, temperature and turbidity depending upon weather conditions and river flow. Karumba is a significant tourist destination attracting visitors interested in recreational fishing, bird watching and wilderness experience. It is also used by many commercial fishermen.
A description of the prevailing conditions and the environmental resources and values are provided below to place the port operations or development in context of the local environment.

11.1 Climate and Coastal Conditions

The average annual rainfall at Karumba is 922mm, and it experiences a tropical monsoon climate with a pronounced wet season from December to March, with generally dry conditions for most of the rest of the year. The cyclone season in the region extends from December to April. Severe cyclones, with a central pressure less than or equal to 970 hPa, pass within 100 km of Karumba at a frequency of once every 40 years, based on Bureau of Meteorology data.
Karumba normally experiences relatively strong south-easterly winds in the dry season and weaker north-east to north-westerly onshore winds in the wet season.
Tides at Karumba occur typically once per day, with an extreme range during spring tides of up to 4.7m. Prolonged periods of off-shore winds may also influence the tidal level greatly, with drops in level of up to 1 metre being recorded.
In normal weather, wave heights are typically below 1 metre in-shore, with the wave action increasing with distance from the shore. Higher waves will tend to occur more frequently in winter.
Like other Gulf rivers, the Norman River moves large amounts of suspended material into the Gulf. The intertidal and sub-tidal zones remain turbid throughout the year.
The Norman River catchment covers approximately 50,000 sq km² of the gulf savannah lands, and represents about 2.9% of the total Queensland catchment area. Catchment land use is dominated by extensive beef cattle grazing, remote un-developed land reserves, with minimal urban or industrial use. The adjacent Bynoe River to the south has smaller catchment area and comparable land use.

11.2 Areas of Environmental Significance

Coastal areas surrounding Karumba include salt flats, mangrove communities, extensive intertidal flats and shallow sub-tidal seagrass beds. These habitats are extremely productive and support a high diversity of animals and plants including some species which are valuable to commercial fisheries and some which have high conservation value. Figure **Error! Reference source not found.** hows the general distribution of the main environmental resources at Karumba. State conservation reserves or marine parks are minimal in this section of the Gulf, and represented by the Bynoe-Morning Inlet Fish Habitat Area gazetted over the coastline to the south-west of the Bynoe River mouth in 2012, and is partly coincident with the western boundary of port limits. There are no listed World Heritage areas or Conservation reserves within or near the port area, nor Marine Parks. There are no listed RAMSAR areas however the region does feature in the Directory of Important Wetlands of Australia due to the high value seasonal wetlands of the Karumba and adjacent gulf region.

There are no threatened ecological communities in the area recorded in the *EPBC Act* database. However, there are a large number of recorded threatened and migratory species in the region. Department of Environment's *EPBC Act* database notes that twelve threatened species could occur

in the Karumba region, including six species of turtle (Loggerhead Turtle and the Olive/Pacific Ridley Turtle are the only endangered turtle species), two species of whale, two species of shark, freshwater Sawfish and Red Goshawk.

There are 40 migratory species currently noted in the database as likely to occur in the region. Ten are marine species (including turtles, Dugong and Salt Water Crocodile) and 30 are bird species.

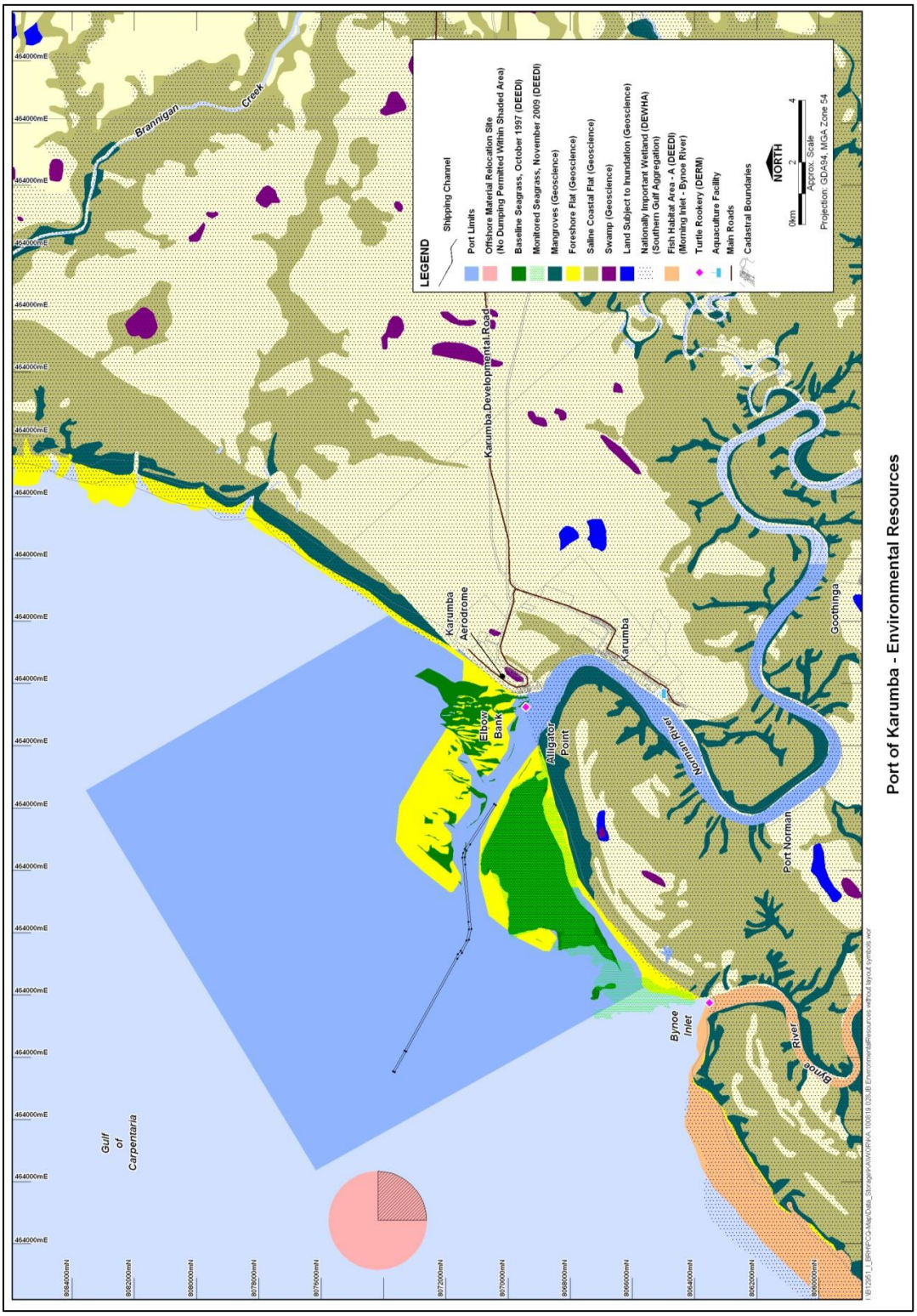


Figure 11-1 Environmental Resources

11.3 Cultural Heritage

A full cultural heritage assessment of port land (excluding the lease issued to the former Pasminco Century Mine Limited (PCML) now MMG, was commissioned in July/August 2002 by Duke & Collins Pty Ltd in partnership with the Gkuthaam Aboriginal Corporation. The information below has been taken from this report. The MMG lease area was previously surveyed as part of the EIS for the Pasminco Century Mine project.

11.3.1 Cultural Heritage Places and Values

During the 2002 survey, the Gkuthaam Traditional Owners did not identify any specific sites or areas of significance on the port land surveyed. However, a known burial ground is 6-7 kilometres north of the port at the current site of the Karumba Gun Club. Other sandy sites in the area may also contain sub-surface burials. It was recommended that, if future earth disturbing works are planned for any PCQ land holdings, then a prior archaeological program of sub-surface test probing or excavation should be carried out to determine if burials or other cultural materials are present

11.3.2 European History

The first European discovery of the Gulf of Carpentaria was made by the Dutch Captain Willem Janz in the "*Duyfken*" in 1606. In 1802, Matthew Flinders sailed past the area during his circumnavigation of the continent. A number of exploration parties studied the area from 1845 to 1862 and noted good pastoral land in the region.

By May 1867, settlement had begun and the town of Norman (now Normanton) was proclaimed in 1868. The town acted as the port for the region. The town of Karumba was initially known as Norman Mouth, then Kimberley and finally was changed to Karumba around 1887. In these early days, it was a telegraph station and the base for a barge service to ferry produce from Normanton to ships waiting outside the bar of the Norman River. The population of Karumba remained low until World War Two, when Karumba was used as a base for an RAAF squadron. In the mid 1960s, the town became the base for a large prawning fleet. The town now has a large tourism and recreational fishing industry, with the port exporting lead and zinc concentrate from the MMG Century Mine project, live cattle, seafood and general cargo.

11.3.3 Historical Significance

There are no structures of known historical significance listed under the *Queensland Heritage Act 1992* on land owned by Ports North at Karumba.

The port itself is of regional historical significance for its importance to the north Queensland during World War II, and for the extensive expansion of the Northern Prawn Fishery in the 1960-80's. The infrastructure in the port has changed to meet the changing industry needs and no existing buildings or structures were found in the cultural heritage study to be historically significant.

Figure 11-3 Discarded WWII fuel drums on bank of Norman Rv

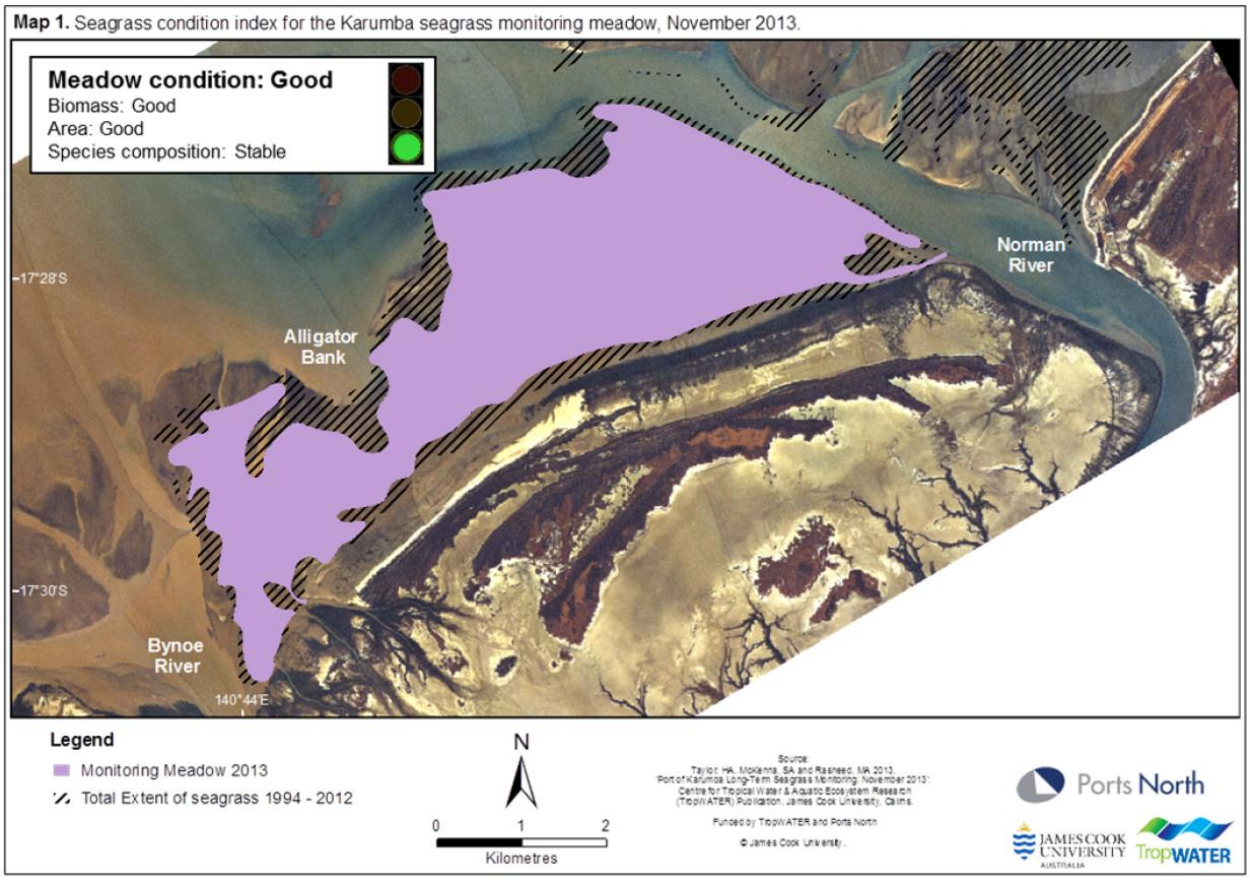
11.4 Seagrass

Seagrass plays a vital role in coastal ecosystems. It provides food and shelter for diverse organisms. It provides a nursery ground for juvenile fish, prawns and crabs and helps to stabilise coastal sediments, as well as to trap and recycle nutrients. In the gulf region seagrass beds can survive entirely immersed in seawater and can typically be found in waters less than 4 metres depth due to the influence of regular high turbidity restricts natural light penetration and hence restricts growth. Seagrass in the Karumba area have been monitored since 1994 when the former Ports Corporation commissioned the former Queensland Department of Primary Industries (QDPI) to commence detailed biannual quantitative monitoring of seagrass beds within port limits, which continued over a seven year period. These surveys provided an indication of typical seasonal and annual variations occurring. Ports North now commissions the Marine Ecology Group at James Cook University for annual monitoring. This program is one of the most extensive seagrass monitoring programs undertaken in Queensland, providing valuable information on the natural variability in seagrass meadows. This long-term annual seagrass monitoring has been continued as an on-going indication of the environmental health of the port.

Meadows are mostly high biomass with *Halodule uninervis* being the dominant species since monitoring began in 1994. *Halophila ovalis* also occurs with the *H. uninervis* along Alligator Bank at the mouth of the Norman River (Carter *et al* 2012).

Seagrass meadows show variations between seasons and years, reflecting changes in environmental conditions. Reductions in seagrass can occur due to natural events such as cyclones and floods or due to human influences. The area of seagrass in Karumba varies between 954 and 1600 hectares at the end of winter (October). There is no trend showing any long-term decrease in seagrass area, with large annual variations being attributed to flood events that may occur in some years. The seagrass beds have shown a capacity to recover when favourable conditions occur.

Regular monitoring is conducted on meadows located on the southern bank (Alligator Bank) at the mouth of the Norman River (Figure 11-4) and periodic checking of the more variable meadows on the northern banks (Elbow Banks) adjacent to Karumba Point.



11-4 Seagrass distribution in Monitoring Meadows at Karumba in late 2013

11.5 Marine Fauna

Dugongs have been observed in aerial surveys of the Karumba region and their feeding trails have been noted throughout local seagrass beds. Dugongs are long lived herbivorous marine mammals which have high conservation value and can grow to about three metres long and weigh up to 400 kg. Sea turtles including Green, Loggerhead, Flatback, Hawksbill and Olive Ridley turtles have been recorded from the southern Gulf of Carpentaria and probably inhabit coastal waters around Karumba.

There is little information relating to the number of cetaceans in the south-east Gulf. Dolphins have been sighted in the entrance channel and it is likely that inshore species such as Irrawaddy River dolphins, Indo-Pacific Humpback dolphins and Bottlenose dolphins inhabit coastal and estuarine areas, including port waters, near Karumba (Marsh, 1994). The Karumba region does not appear to have any special significance for dolphins or whales (Dames & Moore & WBM Oceanics, 1996).

All the above marine mammals and reptiles have high conservation status and all, except bottlenose dolphins, have been prescribed in the schedules of the Queensland Nature Conservation Regulation (Wildlife) 1994 as either 'rare' or 'vulnerable'. Saltwater crocodiles, which have been prescribed in the schedules of the Nature Conservation Regulation (Wildlife) as 'vulnerable', are relatively common in wetland areas around Karumba, including the Norman River.

11.6 Intertidal Sand and Mud Flats

Broad intertidal sand flats extend for distances of 3-10 km from the beach line to shallow subtidal areas on both sides of the mouth of the Norman River (Figure 3). Sparse populations of gastropod molluscs live on the surface sediments of this area.

During the dry season, up to 30-40m of mud banks along the edges of the Norman and the Bynoe Rivers may be exposed during spring low tides. Juvenile prawns are abundant over the riverbanks during ebb flows. Gastropod molluscs and crabs may be present on the upper banks adjacent to mangroves, while mudskippers and other species of gobies are obvious on lower sections.
From past sampling from the banks of the Norman River, sediments were dominated by crabs, amphipods and polychaete worms.
These animals are particularly important as prey items for many of the species that are exploited commercially (e.g. prawns, bottom-feeding fish).

11.7 Fisheries and Aquaculture

Commercial, Aboriginal subsistence and recreational fisheries are conducted in the waters of the south-east Gulf of Carpentaria and in the Norman and Bynoe rivers. Commercial fisheries include prawn trawling, coastal net and line fishing and crab pot fisheries. Trawling is not permitted in the waters of either the Norman or the Bynoe Rivers.
Four species of prawns - the banana, brown tiger, blue endeavour and the blue-leg king prawn - are fished commercially in the south-east Gulf. All four species spawn offshore and give rise to larvae that migrate into 'nursery' grounds, usually seagrass beds or mangrove areas, in shallow coastal areas where they feed and grow. After three months in these nursery grounds, juveniles migrate offshore into the fishing grounds where they feed and grow for at least another three months before attaining commercial size.
Coastal and estuarine species targeted by commercial fishers and Aboriginal communities engaged in traditional subsistence fishing include barramundi, threadfin salmon and mud crabs. Barramundi are taken in gill nets and by line along the tidal reaches of rivers and on the coastal flats, except during the summer closure between November and February. At the start of each wet season, maturing males migrate down the rivers to spawn with resident females in outer estuaries and over tidal flats outside river mouths. Juvenile barramundi, which develop from larvae about 28 days after hatching, migrate up the rivers and creeks where they spend the first three to five years of their life. Larvae and juveniles feed on plankton while adults feed on prawns and fish.
Two species of threadfin salmon, king and blue salmon, are taken in the Gulf. King salmon comprises the second largest catch, behind barramundi. King salmon appear to spawn near the mouths of estuaries and possibly further offshore and feed on a variety of prey including prawns, lobsters, crabs, octopus, squid and fish.
Mud crabs inhabit the mud banks and mangrove fringes along creeks and rivers where they feed on worms, bivalve and gastropod molluscs and other crabs. Mud crabs are also caught for commercial or recreational purposes.
One aquaculture venture has been established at Karumba, to support restocking activities by community groups in the Karumba region.
In addition to species commonly taken by commercial fishers, recreational fishers also target grunter, mackerel, flathead, bream and queenfish. Most recreational fishing takes place around Karumba and in the lower reaches of the Norman River, although in recent years the fishery has tended to move further offshore. The recreational fishery is of high commercial importance to the local community with around twenty-five thousand visitors, whose primary purpose is fishing, coming to Karumba each year. Indigenous fishing activities are usually conducted closer to the communities to the north and to the west of Karumba as well as further upstream near Normanton.

11.8 Soil and Terrain

The township of Karumba is located on the coastal marine plain, which is 10 to 30 km wide along the Gulf coast and rises to about 10 m above mean sea level at its highest point. The port area is flat and is bordered by extensive areas of low gradient sand and mud flats. Areas of the townships can be periodically flooded during major storm events.

The soils in Karumba are highly saline, often silty clays. Acid sulphate soils are highly likely to occur in the marine clays underlying the sandy topsoil layers throughout the port area.

11.9 Coastal Vegetation

Mangroves are the predominant type of vegetation along the more protected shorelines at the mouths of the Norman and the Bynoe Rivers and along the banks of these rivers for many kilometres or more upstream. They also form a fringe of coastal vegetation on accreting shorelines immediately behind the lower sand flats to the north and to the west of the mouth of the Norman River within the Port Limits of Karumba.

The area of mangroves has been estimated by Poiner et al (1994) at around 11 km^2 in the Karumba coastal areas, around 42 km^2 in the Norman River and around 10 km^2 in the Bynoe River. The coastal fringe of mangroves is dominated by *Avicennia marina*. The tidal creeks behind the coastal fringe typically support a diverse range of mangrove and salt-marsh fauna.

Mangroves in the Karumba area provide important habitat for a variety of animals including mud crabs, prawns, fish, birds and saltwater crocodiles. Research carried out by CSIRO indicates that the juveniles of the white banana prawn) occur almost exclusively in mud-mangrove habitats.

Certain areas of vegetation have been designated as Environmental Buffer Areas in the Land Use Plan as discussed further in 11.13.

For several years, Ports North and its predecessor have supported weed control and revegetation efforts on vacant port land including control of Chinee Apple and Rubber Vine. This activity is managed under separate EMP.

11.10 Terrestrial Fauna and Birdlife

The wetland areas near Karumba are part of the Southern Gulf Plains. This area is one of three principal regions in Australia visited by migratory shorebirds between August and April each year, and an area of international conservation significance that has preliminary listing on the Register of the National Estate. Karumba is at the centre of a 200 km stretch of coastline from Snake Creek to Gore Point. The area supports a very high abundance of shorebirds and is regionally significant. From surveys conducted from 1981 to 1984, Garnett (1987) estimated that this area on average supports 122,000 shorebirds in summer and 23,000 birds in winter.

The conservation status, determined primarily from the Action Plan for Australian Birds, for most of the bird species was rated as 'secure' in Queensland (Poiner et al, 1994). The conservation status of the beach stone-curlew (*Burbinus neglectus*) which inhabits the extensive mudbanks of the Gulf and the little tern (*Sterna albifrons*) which feeds over coastal areas adjacent to the mouth of the estuary, however, is rated as 'vulnerable'.

11.11 Natural Amenity

The Southern Gulf Plains is considered to be 'one of the largest, most diverse and least fragmented natural wetland aggregations in Australia' (Australian Heritage Commission, database records). The 30 km of wetlands extending inland from Karumba provide visitors with excellent bird watching opportunities and the possibility of seeing saltwater crocodiles in the wild. These natural features and its remoteness result in the area having very high wilderness value.

Karumba also has the only beach in the Central Gulf Savannah that is accessible by road. The beach consequently is highly valued as a recreational resource, particularly by the large numbers of visitors who travel to Karumba for the excellent fishing. During peak holiday periods (Easter and May to August) the town's population may double to about 1400 people.

11.12 Water and Sediment Quality

The waters offshore from Karumba are generally very turbid due to the relatively shallow water depths and fine silts which are continually mobilised and remain in suspension. Turbidity is increased from freshwater run-off from the Norman and Bynoe Rivers. Water turbidity is particularly high during the wet season, with levels up to 560 mg/l occurring in waters of the port (rivers and Gulf). Levels in the dry season tend to be lower. Turbidity measurements are documented in Karumba Dredging – Draft Environmental Impact Assessment (Dames & Moore and WBM Oceanics, 1996).

Sediment quality prior to commencement of the Pasminco port operations are documented in Karumba – 1994 Baseline Environmental Monitoring, prepared by Dames & Moore in 1995. Metal levels were below levels recommended in new ANZECC/ARMCANZ (2000) Water Quality Guidelines. With a lead and zinc concentrate export operation in the port sediment quality contamination is a major potential risk issue for the lower Norman River. Marine sediment testing is carried out by MMG under conditions of the environmental licence issued for the facility. The Queensland DEHP monitors compliance with those conditions and applicable guideline levels. Past sediment testing has indicated that no significant increase in heavy metals has occurred since the commencement of the concentrate exports.

As a requirement of the approvals for channel maintenance dredging, Ports North is required to monitor sediments within the channel each 5 years, as outlined in Section 13.18

Ports North may undertake monitoring of water and sediment as part of its monitoring program for the port.

11.13 Port Environmental Buffer Areas

The Land Use Plan identifies any port land that has been allocated as environmental or general buffer area. Ports North has a limited land holdings in Karumba and these are mostly cleared lots spread through the township and surrounded by privately owned commercial facilities. Because of this there are no SPL areas allocated for environmental buffer purposes.

Lot 42 on RP 710167 is bordered by Carron St and the Norman River. It is designated as future port area. Because the local school is close to this lot, an area of general buffer has been included on two sides of the lot to provide some separation from the neighbouring school and residential uses. This general buffer area will be used to minimise any impact from the activity on the port land and could include open parkland, vegetation barriers or other means as agreed with the Carpentaria Shire Council prior to any development of the land. Any Environmental Management Plans prepared for new developments on this Lot must consider and minimise potential impacts on the neighbouring school and residential area.

There are large areas of mangroves along the Norman River opposite the Karumba township. This vegetation has a significant environmental value, but is outside the jurisdiction of the Land Use Plan and is not covered in this Plan.

We intend to protect and enhance the ecological values of these two areas by not restricting infrastructure development on them and ensuring suitable management measures are in place for their on-going protection.

12 POTENTIAL IMPACTS TO SENSITIVE AREAS

The dominant sensitive environmental areas adjacent to the Port are fringing mangroves, the seagrass meadows, and intertidal mudflats. Extensive noise or air quality sensitive residential development are minimal and absent from the immediate adjacent area, with commercial port related land use development the dominant use of the port operation area.

Foreshore intertidal mudflats and surrounding coastal wetlands are host to numerous species of resident and migratory wading birds, many with international conservation significance. Extensive

areas of savannah grasslands and remanent marine and terrestrial vegetation surround the port and township.

13 ENVIRONMENTAL MANAGEMENT MEASURES

As detailed in our Environment Policy, we strive for ecologically sustainable operations and development of its ports, which is consistent with Queensland Transport's "Environmental Policy for Queensland Ports". This may result in the setting of higher environmental standards on operations or new developments than required by environmental legislation or licences. This is achieved through a detailed environmental assessment of all proposed projects on port land or in waters within port limits and auditing of both our operations and those of port use activities.

We will require a detailed Environmental Management Plan (initial construction phase, and then for ongoing operations phase) to be prepared by new port users, or project proponents as part of the approval process for any new development. This Plan should be developed in consultation with the Corporation. Larger projects will require preparation of a formal Environmental Impact Statement (EIS).

To assess the overall state of the port environment or to detect any changes occurring, we also undertake regular scientific monitoring of key environmental values. Results from these monitoring programs are made publicly available.

13.1 Management and Enforcement

The Port Supervisor is an authorised officer under the *Transport Infrastructure (Ports) Regulation 1994* and may issue directives to vehicles and vessels to ensure the safety or efficient operation of the port or to enforce port regulations or the requirements of *Transport Operations (Marine Pollution) Act* with regard to discharges from vessels.

The Supervisor will respond to oil spills in the port and may board vessels for sampling purposes during an investigation of a spill.

Penalties for contravention of a port notice or legal direction of the Port Supervisor can be applied. In addition to the controls Ports North is able to enact under the Port Rules and Notices, the Department of Environment and Heritage Protection (DEHP) oversees environmental regulation of port users and their activities. This regulation includes licensing activities in the port and any monitoring of compliance with licence conditions.

13.2 Emergency Response

As port operator we have a statutory responsibilities and powers under the *Transport Infrastructure Act 1994* to maintain the safety and security of the port. This Act gives the port authority the power to control movement of vessels in the port, to inspect ships or to move ships moored or goods left against the authority's direction.

We have developed an Emergency Response Plan that covers situations such as cyclones, marine incidents, bomb threats, fire, explosion or fatalities. Copies of the Response Plan are held at the Port office, by the Regional Harbour Master and by a number of port users and other key agency contacts.

Where a non-marine incident is caused through the activities of a port user on port land, the initial response is the responsibility of the port user, with notification required to the Port Supervisor. If the incident has the potential to escalate beyond the boundaries of the port user's responsibility, we maintain the right to initiate external resources and response agencies to assist in reducing the impact of the incident on other port users.

13.3 Cyclone Procedures

Detailed cyclone procedures are provided in the Port Emergency Response Plan and are consistent with Queensland Transport's Maritime *Cyclone Contingency Plan for Port of Karumba*.

13.4 Wharf Procedures

Wharf Bulk Loading Operation, the following actions are to be enacted:

- Before commencement of operations, the holes in the wharf are blocked to ensure that no material will fall into the water from the wharf;
- At the end of the operation, the operator is required to sweep and scrape up any residue from the wharf;
- If a final clean-up of the wharf is required and water from a hose is used, the water is to be pushed ashore across the access ramp onto a grassed area onshore that either absorbs the water or provides filtration.
- No water is to be discharged into the river unless it has been filtered by the grass.

Lay By Areas

- A designated area may be established for vehicle or equipment laydown and only the designated area shall be used to ensure actions to manage the site can be focused;
- Users of the lay-by area are required to use the same clean-up measures as on the wharf;
- Use of a road sweeper (wet or dry sweeping, depending on conditions), or a bobcat with broom or similar equipment may be required;
- If loading in heavy rain, operator will need to clean up any solid waste more regularly so as to ensure the maximum solids content and any mud collected on vehicle wheels is picked up to prevent any escape to stormwaters or into port waters.

Storage and Handling

Products may be loaded onto vessels and the controls required for this activity are:

(a) Ships must use a cargo net to load so as to minimise the risk of a load falling into the river;

(b) Any material that may become wind borne, is to be covered with tarpaulins in higher wind conditions;

(c) If any produce accidentally falls into the river, it will need to be recovered by the ship crew or loading operator;

(d) At the completion of loading, the operator is responsible for manually cleaning up any loose material from the loading area.

The wharf may not be used for storage of products for any extended period, and is only to be used for moving products when the ship has berthed.

13.5 Management of Oil Spills

Oil spills in port waters could result from a variety of sources including groundings, collisions and sinking of vessels; illegal discharges from vessels; accidents when transferring waste oil to storage facilities on shore and accidents when refuelling vessels.
To reduce the risk of oil spills occurring, Maritime Safety Queensland (Queensland Transport) ensures the safety of navigation, including the provision of navigation aids. Pilotage services for the

arrival and departure of ships greater than 50m in length from the port are provided so as to reduce the risk of human error.
The Port of Karumba is equipped for smaller spills of oil and the Port Supervisor is responsible for provision of the "first strike" response to an oil spill within the Port through close co-ordination with local Maritime Safety Queensland staff. MSQ can provide additional resources out of Cairns, or other centres, for larger spills.
The response plan for an oil spill is documented in the *First Strike Oil Spill Response Plan- Port of Karumba,* which was developed and is regularly updated. This plan is complementary to the *Queensland Coastal Contingency Action Plan,* and the *National Plan to Combat the Pollution of the Sea by Oil and other Noxious and Hazardous Substances* (National Plan) for larger spills.

13.6 Stormwater Quality and Protection

Potential Impacts

The primary environmental impacts associated with existing port operations are potential releases of water contaminants into the adjacent stormwater systems or the adjacent waterway. Release of particulate matter, nutrients and bacterial coliforms into the water column may affect adjacent areas (e.g. flora) by promoting excess algal growth, or human health impacts from faecal coliforms, sedimentation or reduction of light penetration through the water. Natural water quality conditions within the Norman River are close to pristine, and are seasonally variable due to the high natural turbidity and major inputs to the Norman River Catchment.

Management

Ports North has only a few land holdings in the port which are distributed through the township. Stormwater management in Karumba is under the control of the local council and the low population and low development activity have not justified any special stormwater controls in the township. Drains are typically unlined. Stormwater discharge points are located at a number of points along the township foreshore and at the Karumba Point.

For areas of SPL, locations of stormwater drains and other services are recorded on Ports North's engineering drawings. Elevations throughout the port are also contained on these maps.

As a matter of policy, best practice stormwater management devices will be installed in any future major developments of port land.

MMG loads lead and zinc concentrates on to its barge the "*Wunma*" at its Karumba port facility. To minimise spills from the barge loading operation, the equipment is fitted with sensors to halt loading if the conveyor fails. Spillage trays are fitted to catch any spillage that could potentially occur if material is lost from the conveyor. The conveyor is fully enclosed to minimise losses due to wind or rain. The loadout conveyor is fitted with a telescopic spout that will be below the deck of the barge and is fitted with a limit switch to stop the raising of the spout above the deck of the barge. Interlocks are fitted that ensure that the barge is correctly in place before loading commences.
The barge itself is purpose built for the operation and is fully enclosed except for the hatch where material is loaded or unloaded. The material is distributed within the barge using internal systems. The barge hull is double skinned to minimise the risk of sinking or escape of material in the event of an accident during transit.
MMG conducts routine analyses of sediment in the port area with samples taken from a number of sites covering an area that includes upstream and downstream of Karumba, the dredged channel and the offshore roadstead where materials transfer will take place. Monitoring has not shown any elevated levels of lead or zinc in sediment.

13.7 Management of Discharges from Shore-based Industries

Several drains from industrial activities discharge into the river and minor quantities of hydrocarbons and other pollutants could potentially enter the waters of the port along these drains.

A now decommissioned slipway was operational in Karumba and sandblasting of ships' hulls was carried out for a number of years. Although these activities are no longer carried out, run-off from any contaminated areas of the site may have potential to include tri-butyl tin (TBT) from the antifouling paints used on ships, lead from lead-based paints or oil and grease. This land is currently privately owned and some remediation of the land was carried out in 2001.

Live cattle exports represent a significant industry for the port. Prior to being loaded on livestock carriers, up to 1100 cattle are penned in holding yards adjacent to the offloading wharf on the Norman River for up to two days. This facility is privately owned and operated. Following loading of cattle on livestock carriers, manure from the yards and races is collected and transported to nearby properties where it is used as fertiliser. The facility operators manage the impact of the operation by limiting the maximum number of cattle in the holding yards at any one time and by ensuring that wastes do not enter the river.

At the MMG facility, the first flush of rainwater is collected in settlement ponds and reprocessed in the site's water treatment plant clarifier. Treated water from the site is preferentially used to irrigate land at the nearby Morr Morr pastures. If the pastures are unable to take the irrigation water, the site is licensed by the DEHP to discharge to the Norman River.

The Department of Environment and Heritage Protection provides the environmental authority for discharges from shore-based industry and determines the appropriate environmental standards for these discharges to protect environmental values. Apart from the MMG facilities, there is little industry currently on port land at Karumba.

13.8 Contaminated Land

Certain land uses throughout the history of the port may have included activities known as Notifiable Activities (as described in the QLD *Environmental Protection Regulation, 2009*), which include certain Environmentally Relevant Activities (ERA's), may have had the potential to cause contamination of the land and groundwater below. Such uses may also have included much older activities that occurred prior to the commenced of stronger environmental regulation in the mid-1990's. Sites with actual or potential contamination may be listed on the QLD Environmental Management Register (EMR), and such a listing doe's not automatically mean there is environmentally harmful or health impacting conditions on the site, more so that prospective development and disturbance, and existing day to day operations need to mindful of the possibility of disturbing contaminants. Uses that typically give rise to contamination include areas used for fuel storage, abrasive blasting and painting, slipway activity, bulk storage of chemicals or minerals and waste handling/treatment facilities. Ports North may require an "Entry Report" to be compiled at the start of a new land use or lease on a site so as to ensure an adequate baseline of contamination status is documented. At the end of such use or lease, an "Exit" contamination report may be required for comparison to the "Entry" baseline condition so as to verify the potential impact of the vacating use, and determine any such clean up or remediation actions. Development of sites listed on the EMR needs to be informed on the contamination status so as to ensure that any actual contamination can be appropriately managed, and that any movement of soil from a site listed on the EMR is managed via a "Disposal Permit" issued by DEHP, and any other requirements under the QLD *Environmental Protection Act, 1994*.

13.9 Waste Management

Potential Impacts

Un-controlled release of waste from operations may impact the nearby environment, namely the Norman River, and also present a visual impact.

Management Measures for Waste

Prior to commencement of loading operation, actions noted above for the Wharf Procedures are to be reviewed, so as to ensure appropriate planning for waste to be captured, and cleaned up.

General Refuse

Potential wastes generated from on-board the vessel or trucks are likely to be minimal and consist of minor volumes of waste generated by the crew.
Ensure there is no contamination of surrounding environments.
Waste removal should go to waste bins available adjacent to the wharf, and the to an approved landfill facility unless other conditions apply.
Quarantine or Regulated waste is to be removed and disposed via suitably approved waste contractor through contact with AQIS or Bio-Security Queensland.

Marine Waste and Contaminants

There is little demand for waste to be offloaded from bulk ships in the port and the waste facilities currently provided in the port to bulk ships is limited to general garbage (which excludes quarantine waste). This service is provided to ships by an independent waste contractor on a “user-pays” basis. Garbage collection facilities for recreational or other commercial users of the port are provided at the public boat ramp. Oily waste collection facilities for small craft are facilitated by transfer of waste oil drums to the local council transfer facility. Fishing boats and smaller craft will typically not have sewage holding facilities and may be a source of contamination in the port waters.

13.10 Management of Ballast Water Discharges

With over 200 species of exotic marine organisms known to have been introduced into Australian waters, the introduction of foreign marine organisms through ships' ballast and hull fouling is a major concern for Australia.

The Port of Karumba typically receives some overseas ship visits each year from places of origin in South East Asia, primarily related to export of live cattle, as well as occasional shipment of lead or zinc to SE Asia markets by MMG. Hence foreign ballast water may include sources in Singapore, Taiwan, Hong Kong, Philippines, Japan and Indonesia.

In risk studies carried out and documented in the PCQ *Ecoports Monograph No. 14* (“Ballast Water Risk Assessment – 12 Queensland Ports. Stage 5 Report – Executive Summary & Synthesis of Stages 1-4”), the Port of Karumba was found to have a low relative risk of the introduction of pest species from overseas ports, based on normal voyage patterns. Prior to 1994, only Australian vessels utilised port facilities at Karumba. With the commencement of cattle exports in 1994, shallow draft (<4m) livestock carriers started to utilise port facilities. Each carrier holds about 1,000 tonnes of ballast water that is discharged during the approach to the port and within the port itself. Ballast water discharges are potentially the most environmentally significant input from ships into the Port of Karumba. The source ports of ballast water include ports in Indonesia and the Philippines. These countries’ ports often have similar marine environments to that in Karumba so there is, therefore, a risk that foreign marine organisms could at some future time be introduced to Karumba if no ballast water controls or management was used. The risk assessment study commissioned by PCQ (Hilliard and Raaymakers, 1997) found that the risk of importing organisms to Karumba was only low to

moderate. There is a possibility for secondary transposition of exotic marine pest species from other Australian ports.

As part of the port environmental monitoring, a marine baseline survey and surveys for exotic organisms in the port to detect the presence of any pest species was completed in 1999 and no pest species were found. It is intended to carry out follow up surveys for pest species on a regular basis, at a frequency to be agreed on a national basis. This detailed monitoring is being supplemented by inspection every three months of 'larval traps' installed in the port, which provide for early detection of any encrusting species in the port.

MMG's operations utilise barges to transport lead and zinc concentrates to bulk carriers at a "roadstead" in the Gulf of Carpentaria. Ballast water from the bulk carriers may be discharged in the Gulf waters as the ship is loaded, but none is discharged within or close to the port.

The Australian Quarantine and Inspection Service (AQIS) is the government agency as part of the Commonwealth Department of Agriculture, responsible for prevention of foreign marine organisms into Australian waters. AQIS has introduced controls on ballast water discharge. Ships with ballast water that are considered a high risk for introduced marine species and which have not exchanged ballast water mid-ocean are now not allowed to discharge into Australian waters (up to 12 nautical miles offshore). A Ballast Water Management Plan is provided in Appendix 1.

13.11 Cattle Exports

Cattle exports began in 1994 from the Port of Karumba. The typical operation involves the cattle being trucked to a holding yard on non-SPL land at the port. Here they are inspected by AQIS for their quality of health prior to shipping and any necessary controls taken. The animals have access to water and feed at the yards and on the ship. Past monitoring and observation of possible impacts of cattle exports on water quality within the river during loading operations has shown it to be negligible. Specific environmental management for this operation has been developed and is implemented by the private operator of the facility, independent of Ports North.

13.12 Vessel Cleaning and Slipway Operation

There are no slipways or vessel cleaning facilities currently operating in the port. Slipways represent a major potential source of contamination if not properly managed. Because of the high environmental importance of the port area vessel cleaning or slipways would not be considered appropriate unless certain pollution control infrastructure was included. Recommended actions in the ANZECC "*Anti-fouling and In-Water Hull Cleaning and Maintenance Guidelines, 2012,* will be required for any proposed in water works. Guidance is provided at www.marinepests.gov.au

Due to the potential for discharge of marine pests, and paint residues, including TBT and other antifouling paints, hull cleaning is not permitted within the Port of Karumba.

Any hull maintenance works for small to medium size works conducted via use of tides to position vessel on the shoreline for careening will be required to utilise tarpaulins to contain and capture all material removed from the hull of vessel, and for all material to be removed from within the tidal zone, prior to the next incoming tide.

In water hull or propeller works will need an approval from DEHP and Ports North operations staff.

13.13 Acid Sulphate Soils

Because the port land is of low elevation, there is a risk of acid sulphate soils being present in the area. Acid sulphate soils contain pyrites or iron sulphide. While they remain undisturbed, they do not have any detrimental impacts. However, if the soils are exposed to the air, the iron sulphide will be oxidised to form sulphuric acid. Any water run-off from the exposed acid sulphate soils will reduce the pH of the receiving waters and release iron and aluminium from the soil into the water body.

Acid sulphate soils have not been identified to-date in the port area. However, if any significant soil disturbance is occurring for a project on port land, Ports North will require testing for the presence of acid sulphate soils. Disturbance of acid sulphate soils should be avoided where possible. If disturbance cannot be avoided, the appropriate treatment of the soil must be determined. If acid sulphate soils are present, a management plan for the acid sulphate soils must be developed prior to commencement of works. As part of any development application, testing for the presence of acid sulphate soils in the area of any planned significant soil disturbance is required.

13.14 Air Quality

Potential Impacts

Air quality and noise has not been a traditional problem in Karumba due to the low population and lack of industrial activity. The limited data available show background airborne dust levels of 31 – 52 µg/m^2 daily average and annual average dust fall-out rates of 22- 30 mg/m^2/day. These results were obtained in baseline environmental monitoring for the Pasminco Century Mine Project in 1994 (Dames & Moore, 1995).

The only significant industrial discharge to air in the port is from the dewatering and stockpiling activities at the MMG facility which is licenced by the DEHP for control of any emissions to the atmosphere from the site. All conveyor systems in the plant are all fully enclosed and dust laden air that may arise at transfer points and within the storage shed are collected and fed through dust scrubbers. The main discharge point is the Rotary Kiln stack, which disperses hot exhaust gases produced from the drying of the concentrate. MMG carries out air quality monitoring in Karumba and monitoring results meet DEHP air quality conditions. A small power station is located on the MMG site and is owned and operated by Karumba Power Pty Ltd to provide 2.7 MW of power for the site via a diesel-powered generator with the exhaust normally vented through the Rotary Kiln to improve the dispersion of exhaust gases.

Dust monitoring is conducted by MMG at and adjacent to the site, including at Karumba Point so as to determine any dust deposition and to verify levels of lead and zinc within the surrounding township, including rainwater tanks.

Vessel or truck operations at the port have minimal potential to generate visible exhaust emissions or to have potential to cause nuisance impacts to nearby sensitive receptors.

Management

Port operators are to visually monitor emission levels through observation on a daily basis.

All equipment is to be maintained and operated in accordance with maintenance requirements.

Lessees are required to obtain and maintain compliance with emissions conditions under relevant licences and approvals under the *Environmental Protection Act*.

13.15 Noise

Potential Impacts

Noise from loading may occur however the activity is occurring in a working port area and has potential to disturb the amenity of surrounding areas, including noise sensitive areas such as residential areas. There are only a few isolated houses surrounding the port. These are sufficiently far from the wharf area to ensure noise should not be a concern. Infrequent or high volume noise is typically a cause for complaint, especially outside normal working hours.

Ambient noise levels within the Port of Karumba are expected to be generally at a low background level with some influence from vehicles transiting through the Port area. Minimal impact is normally expected on nearby sensitive receptors.

Past noise monitoring of loading operation indicated noise was of little concern. Movements of semi-trailers and other wharf activities create the most noise.

Management

There are few noise monitoring results available, however the Century Project – Draft Impact Assessment (Dames & Moore, 1994) documents LA90 background noise levels in the Karumba township and port area as 38 – 43 dB(A) at night and 39 – 51 dB(A) during the day.
The diesel power generators at the MMG have acoustic enclosures to reduce noise. Since the commencement of the operations in Karumba, the noise environment has not significantly changed although the noise from the facility has been audible on some occasions at night at a local caravan park, when background noise levels are lower. MMG installed a plant silencer to reduce noise levels from the plant and noise levels from have met DEHP's requirements.

Noise levels from port activity are not considered to cause nuisance because of the distance from the closest neighbours. No noise controls are generally recommended or required.

- All noise complaints shall be recorded and reported to the Superintendent as soon as practical.
- Mitigation measures will be developed as required to address complaints received.

13.16 Hazardous or Flammable Goods

Potential Impacts

The principal legislation dealing with the handling of dangerous cargoes in port areas is the *Transport Operations (Marine Safety) Act 1994* and the *Transport Operations (Marine Safety) Regulation 1995*. All handling of dangerous goods within Karumba port limits are expected to comply with the Australian Standard ASTM 3846 "Storage, Handling and Transport of Dangerous Goods in Port Areas", which provides recommendations for the minimum acceptable handling requirements.
Large storage facilities for petroleum products are located in Yappar St in the township of Karumba. These facilities are on privately owned land with privately owned wharf facilities, which are not under the direct control of Ports North. These fuel products are imported by ship and sent out to customers by truck. The facility is licensed by the DEHP and the Carpentaria Shire Council.
MMG has diesel storage tanks on their port site and is licensed to store around 270 000 litres. The majority of the storage is located on Yappar St next to its port facility. The diesel is used mainly to fuel the diesel powered generators on the site. The facility is refuelled by truck from the main fuel storage facility in town.
Both facilities are required to comply with the Australian Standard AS1940-1993 under their licences issued by the Carpentaria Shire Council.
Apart from petroleum products, there is no regular import of hazardous goods or explosives into the port. Any new imports of dangerous goods products in significant volumes would require a risk assessment before it would be authorised by PCQ.
Minor refuelling of vessels is carried out in the Port. This refuelling can only be carried out under a Fuel Permit issued by the Port Supervisor. Conditions associated with the Permit have been developed to minimise any safety or environmental risks.
Before any new imports of dangerous goods through the Port could be considered, a risk assessment would need to be carried out. The requirements for such cargoes are detailed in the *Transport Operations (Marine Safety) Act* and the *Transport Operations (Marine Safety) Regulation*. The Australian Standard AS3846, *The Handling and Transport of Dangerous Cargoes in Port Areas,* documents the requirements and recommendations for safe handling and transport of dangerous goods in port areas. The standard provides the minimum acceptable safety requirements for port facilities and their operating practices.

13.17 Flora, Fauna and Natural Amenity

Potential Impacts

Development of the township has resulted in the removal of areas of the original vegetation, including mangroves, from the banks of the Norman River over time. In the overall context of development in the Karumba area, however, the extent of the loss of natural vegetation due to developments on port land is considered to be negligible.

In the event that further coastal land is purchased for port expansion, appropriate environmental impact assessments of any proposed development, including alternatives, will be conducted. In conducting any impact assessments, Ports North will consult with all relevant stakeholders and statutory authorities (e.g. Carpentaria Shire Council, DAFF DEHP and State Development).

Preservation of the natural amenity of the area is an essential component of the EMP for the Port of Karumba. Obviously, the presence of wharves and infrastructure needed to process and load lead and zinc concentrates, transfer cattle and seafood, and to offload petroleum products and general cargo from vessels, impacts on the natural amenity of the area.

One of the most significant impacts on the natural amenity of the area is debris that is regularly washed or deposited on to the foreshore. Dome of the debris comes from material that has been placed deliberately to stabilise the river bank. The continuing removal of rubbish and debris is an essential step in the program to improve the amenity of the area. Ports North may also assist community groups to undertake regular clean-ups of garbage in other areas of the port. The Land Use Plan has designated areas of conservation value on port land as Environmental Buffer Area. These areas and their environmental values are documented in 11.13. This Environmental Management Plan seeks to protect these designated areas from inappropriate development.

The potential impact of development in areas adjacent to the environmental buffer zones are considered in project impact studies, to minimise any significant adverse impacts, such as a possible deterioration in the quality of stormwater run-off. Developments will have due regard to the flora and fauna values documented in this Plan.

Loading operations are to occur on an establish hardstand and wharf area, and as such are unlikely to impact resident flora or fauna. In the event that wildlife does occur in the area, practical and reasonable measure should be used to move on such wildlife, or alter timing of loading operations so as to avoid. Direct contact impacts of vehicles with fauna such as cassowary are to be avoided.

Mitigation Measures

Avoid and prevent injury to all wildlife during loading. In the event of a sick or injured animal, the Operator shall notify the Port Supervisor who will follow up with Environment Manager on 07 4052 3820 and the Queensland Parks and Wildlife Service (1300 360 989).

13.18 Dredging

Potential Impacts

Ports North is responsible for maintaining navigable depth in the Port of Karumba shipping channel and undertaking such maintenance activities when required. Historically, dredging of the berth areas in the Norman River has not been required due to the naturally deep water and current flows. Most activity is required in the shipping channel which may require maintenance dredging as often as every two years. A greater frequency could be required after an abnormal flood event in the region. Dredged material is relocated to a sea disposal site.

Mitigation Measures

A ten year Sea Dumping Permit (SD2011/1882) and associated Long Term Management and Monitoring Plan (LTMMP) was approved in 2013. Details are accessible at www.portsnorth.com.au/environment .

Bed levelling is also used at the conclusion of dredging to remove high spots, or on its own as a method to reduce the frequency of channel dredging. Bed levelling moves the deposited material to natural deep holes in the channel. Evidence to-date indicates that this practice has been successful, both in being cost-effective and in having minimal environmental impacts due to the short term of operations. Ports North may carry out monitoring of dredging or bed levelling operations, which could include monitoring of dredging plumes and sediment transport during dredging. This is complemented by the long term monitoring of the health of the seagrass meadows and understanding hydrodynamics of the area to help predict any potential impacts.
To manage any potential impacts from the on-going dredging, a Technical, Advisory and Consultative Committee (TACC) has been set up to provide advice to Ports North. Membership of the TACC includes representatives from DEHP, DoE, DAFF, CSIRO as well as representatives from a number of local Karumba organisations.

Ports North has developed a comprehensive environmental monitoring and management programme in consultation with the Technical Advisory and Consultative Committee. The routine monitoring carried out during the dredging operation has included:

- Analysis of sediment from the area to be dredged each 5 years to ensure there are no elevated levels of contaminants;
- Aerial surveillance of the dredging plume and actual measurements of turbidity over seagrass meadows;
- Monitoring the species composition and abundance of seagrass on an annual basis;
- Monitoring the position of the dredge at all times using GPS equipment. This ensures accurate and even placement of materials at the relocation site; and;
- Hydrographic surveys of the dredge channel and offshore relocation site before and after dredging.

Due to the presence of important fisheries nursery habitats, dredging is restricted to the period between the beginning of May and the end of September to avoid dredging during the summer period of fisheries reproductive activity and high biological productivity.

<u>Monitoring Outcomes</u>
Aerial surveillance and turbidity measurements have not shown any adverse impact of dredging, or the dredge plumes generated, on key marine resources such as the seagrass meadows. This has further been confirmed by the long-term monitoring of the seagrass meadows.

Experiments have been carried out by the former Ports Corporation of Queensland regarding the responses of seagrass to light attenuation. This has provided a much better understanding of physiological responses to this stress. The studies have shown that the local seagrasses are tolerant of low light conditions (90% attenuation) for relatively long periods (months).

Hydrographic surveys have shown the relocation site to be stable and analysis of the benthic community of organisms indicates that it is rapidly recolonised by the kinds of fauna that were there previously. The benthic fauna re-colonisation rate in the dredged channel is less than that at the relocation site, which is to be expected due to the major change in the sea floor. This is the only likely environmental change that has been identified as being caused by the dredge activity, but is limited to the channel itself.

13.19 Cultural Heritage

Potential Impacts

The area has been previously disturbed whereby the likelihood of uncovering a cultural heritage item is minimal. Loading operations on sealed operational hardstand area and wharf, hence potential for observation of cultural items is unlikely.

Mitigation Measures

- Any new development works will be required to conduct a due diligence evaluation consistent with prior to any disturbance of undeveloped port lands;
- All onsite personnel are responsible for reporting any potential cultural heritage items or objects, particularly during earthworks
- If a cultural heritage item is found (excluding human skeleton remains, which are to be reported to the police), works in the immediate area of the find shall cease and Ports North will be advised. The Traditional Owners and State Environment Department shall be contacted by Ports North Environment staff.

14 MONITORING

The above evaluation of potential aspects and impacts of activities at the port and subsequent management options give rise to the following monitoring elements to be implemented in addition to those matters outlined in the LTMMP for maintenance dredging at this port:

Impact	Specifics	Required Yes / No	Justification
Air Quality	Odour	Yes	Record and monitor trends in complaints Liaise with DEHP to verify and ensure compliance by port operators
	Dust	Yes	Record and monitor trends in complaints Liaise with DEHP to verify and ensure compliance by port operators
Noise	From plant, equipment or trucks	Yes	Record and monitor trends in complaints Liaise with DEHP to verify and ensure compliance by port operators
Water Quality	Monitor site for presence of discharge to waterways/stormwater	Yes	Nil discharge direct to stormwater, or waterway. Correct work practices to halt discharges Monitor dredging and bed levelling consistent with triggers in the Long Term Management and Monitoring Plan.
Waste	Deposition on wharf, road, layby area	Yes	Regular checking and clean-up, regular clearing of stockpiles or bins
Flora	Seagrass	Yes	Implement Long Term surveys to ensure trends in general ecological health of the port area is understood.

15 AUDITING

Ports North staff may conduct an environmental audit in accordance with this EMP at any time during operations. Port Users must keep a copy of any relevant environmental licence, permit or approvals and records required under this EMP, onsite at all times. The Port Supervisor may also inspect the works at any time to ensure all commitments are been implemented.

16 GLOSSARY

the Corporation	Far North Queensland Ports Corporation Limited (FNQPC)
dB(A)	decibels (A – weighted), which is a measure of noise intensity
DEHP	Department of Environment and Heritage Protection
EPBC Act	Commonwealth's Environment Protection and Biodiversity Conservation Act 1999
QT	Queensland Department of Transport

17 REFERENCES

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Appendix A Environment Policy

Ports North

Environment Policy

Ports North is responsible for nine Port locations including trading Ports of Cairns, Mourilyan, Cape Flattery, Karumba and Skardon River), community Ports (Thursday Island and Quintell Beach) and non-trading Ports (Cooktown and Burketown).

Ports North strives to operate a viable business that considers financial, environmental and social impacts by identifying and implementing initiatives that promote excellence in environmental management at these Ports.

To demonstrate environmental leadership, Ports North will:

- Implement and maintain an environmental management system to meet the standard set by AS/NZS ISO14001:2004, as a tool for continual improvement in environmental performance;
- Comply with relevant environmental laws, regulations, policies, procedures, and standards;
- Identify, assess and minimise risk and potential impacts of Port activities;
- Integrate environmental considerations and principles of sustainable development into management processes and decision making.
- Maintain emergency, fire protection, security systems and infrastructure to protect the environment;
- Strive to use resources efficiently, minimise waste and prevent pollution;
- Apply sufficient and appropriate people and resources to achieve this Environmental Policy;
- Define, measure and report regularly against objectives and targets to review the effectiveness of performance; and
- Communicate this Policy to staff and stakeholders to build collaborative relationships to promote superior environmental outcomes.

The Chief Executive Officer and Senior Management are responsible for providing the leadership to support effective implementation of this Policy and for ensuring all Ports North's staff, contractors and those engaged by the organisation are required to comply with this Policy.

This Policy will be regularly reviewed following legislative or organisational changes, or at a minimum of every two years, to ensure it reflects the nature and potential impacts of Port activities and services.

Chris Boland
Chief Executive Officer
July 2014

Port of Cairns | Cape Flattery | Karumba | Mourilyan | Skardon River | Quintell Beach | Thursday Island | Burketown | Cooktown

Appendix B Incident Report Form

FNQPC ENVIRONMENTAL INCIDENT REPORT FORM

This form is to be completed for any environmental accident or incident.
Please Note: THIS FORM IS TO BE FILLED IN AFTER THE EVENT.
AT THE TIME OF THE INCIDENT PLEASE CALL EITHER

- Port Supervisor
- Operations Office Cairns – (07) 40512558 or 0419 657 350
- Environment Manager – (07) 40523820 or 0439 723 008

Once completed, please forward to
Environment Manager, FNQPC Ltd, PO Box 594, Cairns Q, 4870. Ph: 4052 3820, Fax: 4052 1493

Event Details				
		Please Circle		
Incident (release or harm to environment occurred)			**Near Miss** (no release to environment or harm)	
When:	.....	Date _ _ /_ _ / _ _	Time am/pm	Location details:
Reported BY:	.....	Date _ _ /_ _ / _ _	Time am/pm	
Reported TO:	.....	Date _ _ /_ _ / _ _	Time am/pm	

Description	
Describe clearly the circumstances leading to the accident/incident, and the accident/incident itself. As far as possible verify the facts recorded, and identif witnesses.	
Type	**If Spill – Approx Quantity**
Cause/Circumstance	
Name	**Position**
Organisation	**Telephone**
Signature	**Date**

FNQPC Environmental Incident Report Form.doc

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Prevention: *To be completed by Manager/Supervisor*		
Method of Cleanup;		
Equipment Used		
Method and Location of Waste Disposal		
Existing Measures in Place to prevent or Minimise this type of event;		
Follow Up:		
Measures to be implemented to prevent this occurring again?		
Name		Signature
Position	Date	Organisation

Close Out: *To be completed by Environment Section*
Recorded in Register?
Follow Up Letter Sent to Company
Feedback provided to Reporter?

FNQPC Environmental Incident Report Form.doc

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Appendix C Ballast Water Management Plan

PORT DETAILS

Port facilities are located in the lower reaches of the Norman River and consist of a few small wharves, and the bulk mineral concentrate terminal operated by MMG. Other facilities within the port include boat ramps and floating pontoon and commercial vessel moorings. The Norman River is situated at latitude 17°28' South, 147°50' East, in the southern Gulf of Carpentaria. There is one access-shipping channel to Karumba. The dredged component of the channel is around 7 kilometres long, 60 metres wide (toe-to-toe) and has a gazetted minimum depth of 3.4 metres below Lowest Astronomical Tide (LAT). The total channel length, including sections that do not require regular dredging to achieve the gazetted depth, is 12 – 15 kilometres long. The fairway beacon is located at 17°25.644' South and 140°43.408' East. There is no designated shipping anchorage within port limits, apart from some storm moorings. The cyclone mooring for MMG is located at 17 degrees 8.1 minutes south, 139 degrees, 34.9 minutes east. There is a roadstead area for the concentrate export vessels to moor for materials transfer that is approximately 40 km from the port.

APPROVAL FOR BALLAST WATER DISCHARGES

The Australian Quarantine and Inspection Service (AQIS)-DAFF are responsible for determining any conditions imposed on the discharge of ballast water taken up in a foreign port. All ships are required to comply with AQIS regulations or orders. Ballast water controls were commenced in July 2001 which prohibits the discharge of any ballast water deemed to be a high risk in Australian waters. A Decision Support System has been implemented by AQIS to quantify the risk of a ballast water discharge based on a number of factors, including environmental conditions in the port of the ballast water origin.

Discharge of high-risk ballast water is not authorised in port waters and discharge can only occur in an area specifically designated or approved by AQIS for this purpose. If AQIS should authorise any discharge of a designated high-risk ballast water in port waters, such as for an emergency situation, Ports North requires notification of this from the ship and AQIS to allow the volume and location to be recorded for future port surveys.

If a ship wishes to discharge sediment from ballast storage tanks, sediment should only be deposited in a designated place approved by AQIS on arrival. Due to the sensitive marine environment in Karumba, there are no suitable areas for discharge of sediment within the port limits.

Ships travelling from other Australian ports are requested to carry out the discharge of ballast waters as far as practical outside port waters to help prevent the secondary transposition of exotic marine species.

PORT FACILITIES FOR BALLAST WATER

The technology to effectively treat ballast water is not yet commercially proven or readily available and the port does not currently have any holding or treating facilities for ballast water.

NORMAL LOCATION OF BALLAST WATER DISCHARGES

Ships should discharge ballast water in open waters as far offshore as possible, leaving the minimum amount of ballast water for discharge in the port consistent with safety. The main discharges of ballast water in the port will typically occur at the ship's berth as loading is carried out, as well as in the shipping channel on the way.

CONSIDERATIONS IN DETERMINING A LOCATION FOR A BALLAST WATER DISCHARGE

Under ballast water controls introduced by AQIS in July 2001, the discharge of high-risk ballast water is not allowed within 12 nautical miles of the coast. AQIS encourages the mid-ocean exchange of

ballast water to reduce the risk of introduction of foreign marine species as a practical way to reduce the risk of introducing foreign marine species into Australian waters.

Given the high ecological and commercial value of the area, it is important that no exotic marine pests are imported through ballast water or by other means. The entire port area is considered to be an environmentally sensitive area and there are no areas in the port or close to the port that are suitable for the discharge of even moderate risk ballast water.

If a ship has moderate risk ballast water and has not exchanged ballast water adequately mid-ocean, Ports North does not allow it to be discharged within or close to the Port of Karumba. However, as AQIS is the agency responsible for ballast water management, they will decide if any ballast water can be discharged within Australian waters and where the discharge is permitted.

BALLAST WATER UPTAKE LOCATIONS

Water quality in the Norman River is good. Most of the port area should be generally suitable for ballast water uptake, although the water tends to have a high sediment load near the coast. In choosing an uptake point, shipping should note that the township of Karumba uses septic systems and there could be a risk of seepage into the local river systems and that MMG discharges treated waste water from its site at times during the year.