Ports North

LONG-TERM MAINTENANCE DREDGING MANAGEMENT PLAN

PORT OF CAPE FLATTERY

JUNE 2019

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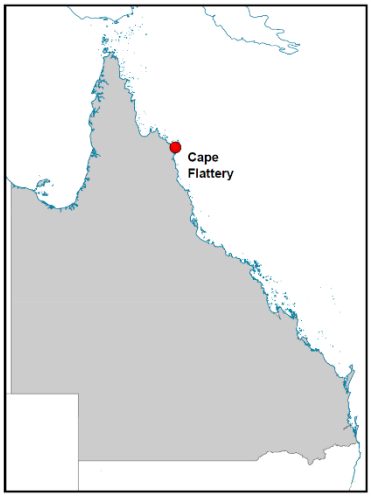
1. Introduction



Cape Flattery lies on the East coast of Australia's Cape York Peninsula, approximately 220km north of Cairns and abuts the World Heritage listed Great Barrier Reef Marine Park.

Operated since 1967, the Cape Flattery Mine Site covers a lease of around 63 km² and has an estimated resource of over 200 million tonnes of silica sand.

Cape Flattery Silica Mines is a world class producer of silica sand and a wholly owned by Mitsubishi Corporation.

Founded in 1967, the mine was purchased by Mitsubishi in 1977 and in 1987 a deep water jetty was brought into operation. Cape Flattery Silica Mines employs over 80 people.

Cape Flattery Silica Mines is a global exporter of silica sand and has the highest production of silica sand for any mine in the world.

Maintenance dredging is not presently conducted at the port, and this Plan provides a description of the port and its values, and then outlines the process, consistent with the QLD MDS, if conduct of such maintenance were required in the next 5 to 10 years.

1.1. Purpose, Objectives and Scope

The purpose of this Long-term Maintenance Dredging Management Plan (LMDMP) is to document the strategy for managing natural sediment accumulation if ever required at the Port of Cape Flattery, in a way that ensures the safe and efficient operation of the Port and the ongoing protection of local environmental values and the Outstanding Universal Value (OUV) of the GBRWHA.

The LMDMP strategy has been developed to achieve the following objectives;

- Ensuring that maintenance of navigable depths does not adversely impact upon local environmental values, including the Outstanding Universal Value of the GBRWHA.
- Detailing a robust, transparent long-term planning approach to managing port sediment
- Outlining operational, planning, consultation and monitoring arrangements to inform stakeholders.
- Provide a framework for maintenance dredging of the Port consistent with the Queensland Maintenance Dredging Strategy.

The LMDMP relates specifically to the Port of Cape Flattery and the associated maintenance of the ship loader berth.

1.2. LMDMP Review Timeframe and Process

The LMDMP has a long term (5-10 year) focus incorporating continual improvement processes, and in the event that a need for conduct of maintenance dredging is determined, consultation with the regulatory

agencies with jurisdiction over the respective approval processes will inform the review timeframe and process of any changes to this plan.

1.3. Policy Context

The plan is aligned with the:

i. **The Reef 2050 Long-term Sustainability Plan (Reef 2050 Plan)** was released by the Australian and Queensland governments in March 2015 and is the overarching framework for protecting and managing the Reef until 2050. The Plan sets clear actions, targets, objectives, and outcomes to drive and guide the short, medium, and long-term management of the Reef. The Reef 2050 Plan includes a number of port related actions that make clear the need for port authorities to understand the sedimentation characteristics of their ports, avoid and reduce impacts of sediment management where possible, and establish sustainable long-term management arrangements.

This LMDMP is consistent with the strategic objectives of the Reef 2050 Plan which seek to ensure Great Barrier Reef World Heritage Area (GBRWHA) port's adopt a long-term approach to the planning, consultation, monitoring and reporting of maintenance dredging activities.

ii. ***Queensland's Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports*** provides a framework (refer Figure 1) for management of maintenance dredging at ports and requires ports within the GBRWHA to develop and implement long-term maintenance dredging management plans.). The framework builds on the current regulatory requirements to ensure the ongoing protection of the Reef's values and the continued operating efficiency of ports within the GBRWHA.

This LMDMP fulfils the expectations of the Queensland's Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports in terms of long-term maintenance dredging management plans.

Figure 1 The Long term Maintenance Dredging Management framework (MDS Framework, 2017)

iii. ***The Ports Australia Environmental Code of Practice for Dredging and Dredged Material Management*** sets out a number of environmental principles that Australian ports meet when undertaking dredging and disposal of dredged material. The principles have been defined on the basis of ecologically sustainable development principles.

This LMDMP has been developed to ensure alignment with the environmental principles of the Environmental Code of Practice for Dredging and Dredged Material Management.

iv. **The National Assessment Guidelines for Dredging (NAGD)** established a scientific assessment framework to determine if dredge material is suitable for ocean disposal. The Guidelines include an assessment framework that is applied to ensure the impacts of dredged material loading and disposal are adequately assessed.

This LMDMP requires the adoption of the NAGD should any disposal of maintenance material at sea be considered.

1.1. Legislation Pertaining to Maintenance Dredging

Maintenance dredging programs at the Port of is subject to Commonwealth and Queensland government laws. The relevance of particular legislation and approvals processes that apply to a proposed dredging project are assessed in the initial planning stage of any proposed campaign, and depend upon the specific nature of each proposed dredging program. The following legislation may be relevant:

i. **Environment Protection (Sea Dumping) Act 1981**: applies when dredged material is proposed to be placed at sea.

ii. **Environment Protection and Biodiversity Conservation Act 1999**: triggered when a development proposal, which could include maintenance dredging, has the potential to have a significant impact on MNES

iii. **Great Barrier Reef Marine Park Act 1975:** dredging or placement of material inside the Marine Park requires a permit issued by GBRMPA.

iv. **Queensland Planning Act 2016***:* approvals for operational works and environmental authorities (EAs) related to maintenance dredging.

v. **Queensland Marine Parks Act 2004:** some port operational works at the Port occurs within the GBR Coast Marine Park and approvals may be required depending upon the specific location of the activity proposed.

vi. **Queensland Environment Protection Act 1994:** regulates activities that may impact upon environmental values and/or cause environmental harm.

vii. **Queensland Sustainable Ports Development Act 2015:** mandates master planning for priority ports and their surrounding land and marine areas including areas potentially used for the placement of maintenance dredging material.

viii. **Queensland Coastal Protection and Management Act 1995**: provides for the regulation of dredging, tidal works and other activities in the coastal zone, particularly in coastal management districts and erosion prone areas. Additionally, the Act regulates the removal of material from tidal water, such as may occur with maintenance dredging, which typically requires a development permit.

ix. **Queensland Fisheries Act 1994:** regulates activities that may impact upon both fisheries resources and also fisheries habitats. A series of departmental policies and guidelines outline the requirements for approvals that address social, cultural, commercial, and recreational use of the fisheries resource. Where dredging activity is likely to affect such fisheries habitats, resources or values, a development permit is typically required.

1.2. Existing Maintenance Dredging Approvals

There are no present approvals in place for the conduct of maintenance dredging at the Port of Cape Flattery. Any maintenance works would be conducted as "maintenance of a lawful structure" under the *Coastal Protection and Management Act/Regulations.*

In the event that more comprehensive maintenance works were to be considered, there may be consideration under a number of State and Federal approvals that would be necessary if maintenance dredging (extraction and removal from tidal waters) or disposal (extraction and placement on land or other areas under tidal waters) were to be contemplated at the Port.

The identified likely approval triggers are:

- Environmental Authority (EA) - Undertake maintenance dredging of navigational infrastructure
- Operational Works (Tidal Works) - Disposal of dredged material below high-water mark
- Marine Park Permit - Maintenance Dredging and Disposal in Marine Park
- Sea Dumping Permit - Maintenance Dredging and Disposal at sea.

Due to the nature of the seafloor, open coastal setting, and positioning of the Jetty in sufficient depth of water, there has been no historical need for maintenance dredging activity, and hence no current approvals prevail.

Certain activities can be conducted as an authority under the *Transport infrastructure Act 1994*, allowing maintenance of existing lawful structures such as the approach and berth pocket.

1.3. Roles and Responsibilities of Port Authority and Port Customer

There are a number of roles beyond that undertaken b ports north which influence the demand for and interest in maintenance dredging for the channel and port areas, which are expanded on through the following section, so as to place into context the various responsibilities.

1.3.1. Port Authority

Ports North is a government owned corporation that reports to two Government Shareholding Ministers (Minister for Transport and Main Roads and the Treasurer). A Board of Directors oversee the governance and direction of the organisation. As the declared port authority for the Port under the *Transport Infrastructure (Ports) Regulation 2016,* Ports North is responsible for the maintenance of port facilities including shipping channels and berth pockets. As such, Ports North would be the holder of all permits related to maintenance dredging at the Port.

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 the Environmental Management System, which is based on the international standard ISO 14001.

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 Cape Flattery includes all land under the Land Use Plan, and all waters within designated port limits.

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 Science (DES) are responsible for ensuring compliance with this Act. Ports North's operation of the port does not provide any umbrella approval 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.

Conduct of the regular hydrographic survey program rests with Ports North's Surveyor, who, in liaison with the Regional Harbour Master considers the outcomes of periodic surveys of the berth, to inform Planning and Infrastructure staff on the likely need for maintenance works. Overall supervision of dredging or bed levelling, and any contract between Ports North and a contractor would be managed by Planning & Infrastructure section, and the Hydrographic Surveyor would likely oversees the day to day supervision of the contract.

Oversight of the environmental management inclusive of approvals compliance, EMP, and monitoring programs rests with the Environment Manager who also provides coverage of stakeholder engagement in regard to approval agencies, and to interested and affected parties in conjunction with staff from the Corporate Services section where applicable. Port Operations staff and the Port Pilots engage regularly with the CFSM staff.

1.3.2. Port Users

Ports North operation of the Port does not provide any "umbrella approvals" for the individual activities of port users. Port activities carried out by the port user, CFSM Pty Ltd 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 Science (DES) are responsible for ensuring compliance with this Act. Ports North strongly promote the need for environmental compliance to all tenants, and 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.

1.3.3. Queensland Maintenance Dredging Schedule

The maintenance-dredging schedule for QLD ports is now a process that arises from the development of the statewide schedule that was reviewed under the MDS. The schedule is developed annually in accordance with a QLD Ports Association (QPA) procedure (QPA 2017) which requires each Port to define its maintenance dredging requirements and complete a port specific environmental risk assessment for maintenance dredging. The statewide maintenance-dredging schedule takes into account:

- The volume of material to be dredged at each port (hence dredging duration)
- The urgency of maintenance dredging required by individual ports (i.e. the degree of siltation, safety issues and schedule of deeper draft ships that may visit the port)
- Any permit specific issues (e.g. permit availability and conditions)
- The need to optimise dredge operation (e.g. avoid backtracking between ports)

- Opportunities to minimise the dredging duration at each port. Dredge operation is expensive and operational efficiency is a key management objective.
- Important ecological and environmental timings.

This process is generally completed in the first quarter of the year once wet season effects (e.g. cyclones, floods) to both environmental values and siltation levels are understood, and the scale of sediment deposition, or forecast deposition becomes clearer. The schedule, through negotiation between the Queensland Port Authorities, is provided to TMR and published on their website in accordance with the requirements of the MDS.

To date this requirement has not been require for Cape Flattery, and is not forecast to be applicable in coming years.

At the end of the year, annual reporting on outcomes is provided to TMR for completion of the process.

2. Port Locality, Setting and Shipping

The Port of Cape Flattery is managed by Ports North. The port limits are defined (refer Figure 3) in the regulations of the *Transport Infrastructure (Ports) Regulation 2005.* The port includes the waters adjacent to the Cape and adjacent coastlines.

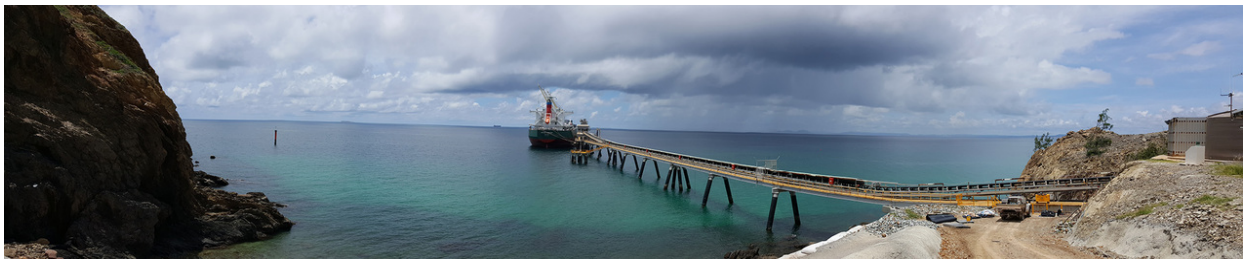


Figure 2 Coastline view of Wharf

2.1. Port Navigational Infrastructure

Cape Flattery (14° 59'S, 145° 21·08'E) is situated 29 miles north of Cooktown. The port has been established solely for the export of silica sand from Cape Flattery Silica Mines Pty Ltd (CFSM), a wholly owned subsidiary of the Mitsubishi Corporation. The mine is the largest exporter of silica sand in the world, 2.4 million tonnes being exported in 2015/2016. The port has a single berth serviced by a travelling ship loader for the export of sand; all vessels berth starboard side to. Cape Flattery is a compulsory pilotage area. The sand mine operated by CFSM is a surface mining operation. The mine covers a lease of around 6,500 ha. CFSM lease the marine infrastructure from Ports North and, under the leasing agreement, are responsible for the maintenance and operation of these marine facilities. Ports North does not have any staff based in the port.

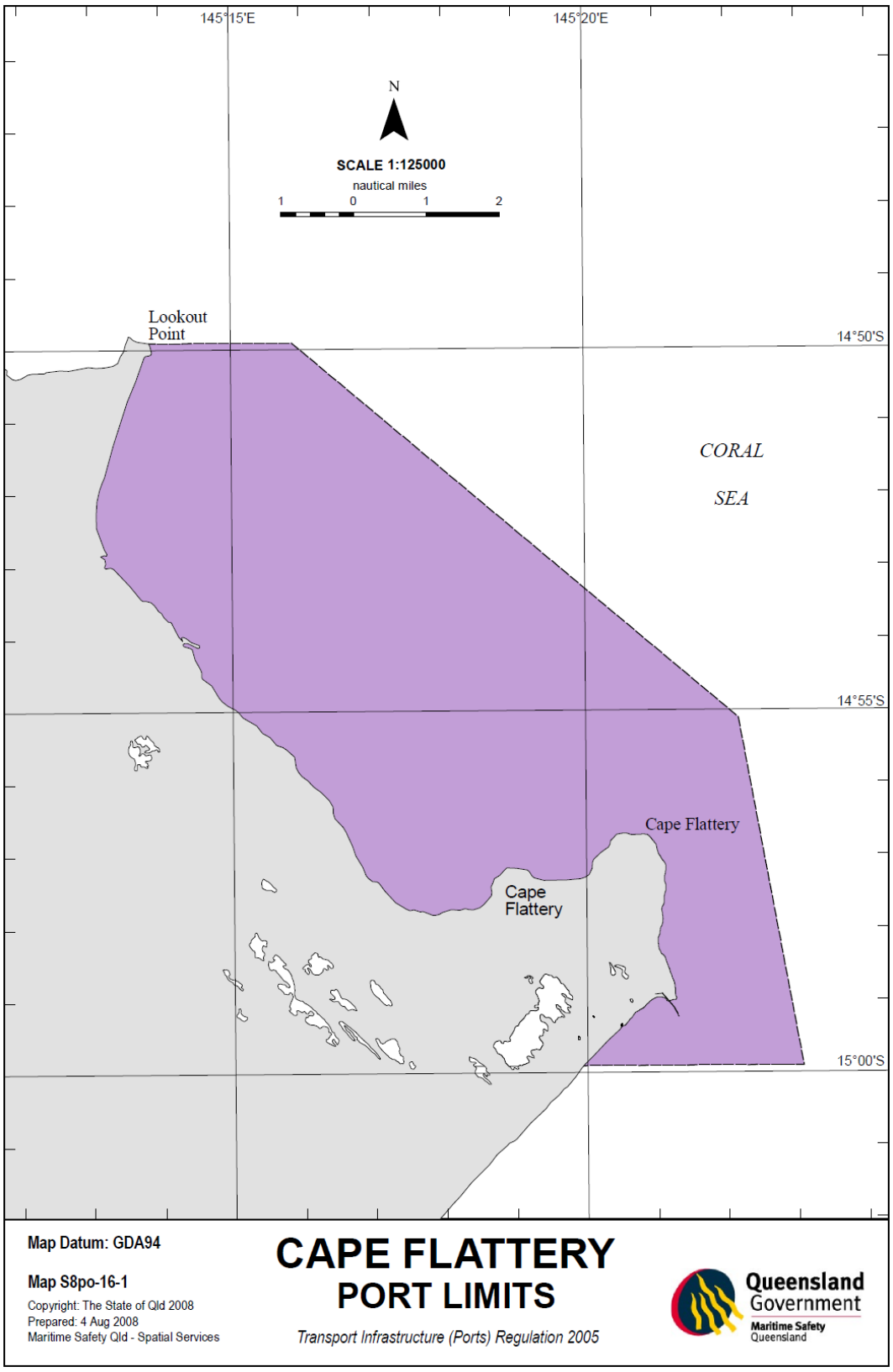


Figure 3 Port Limits

2.2. Channel and Swing Basin

There are no designated entrance channel or swing basin infrastructure, due to the orientation of and presence of natural deep water offshore from the headland.

2.3. Berth Information

Cape Flattery is an open roadstead wharf close to a rocky shore (as shown in Figure 2). There are strong currents which flow past the wharf in a north-south direction, the strength of which is governed mainly by the strength of the prevailing winds.

This is situated at the southern tip of Cape Flattery off a rocky headland. As shown in Figure 4 and Figure 5, the wharf area runs in a 140° direction for 200 m and the wharf itself continues off this access in a 150° direction for 210 m. There are two separate dolphins, the seaward dolphin is situated 65 m from the end of the wharf and is connected by a 'flying fox' cable car arrangement, and the shore dolphin is connected by a short access ramp. There are six breasting dolphins along the wharf face. A ship loader is situated on the wharf and traverses the length of the wharf face. Minimum required air draft is 14.5 m. A conveyor system with a maximum loading rate of 2000 tonnes per hour (average gross rate 1300 t/h) links the ship loader and the stock pile ashore. All vessels berth starboard side to. Engines must be kept on standby and all crew are required to remain on board at all times. The berth is fitted with 17 quick release hooks for the mooring lines. Vessels should use a minimum of fourteen good ropes when securing; the use of wires is not permitted. Depth alongside is 14.1 m

The wharf is situated on the southern point of the Cape Flattery headland and runs out to sea for some 500 metres in a SSE direction, 250 metres of trestle approach and 250 metres of operation deck. The wharf is laid at 12.5 degrees into the prevailing SE wind. The normal set of the drift is below half a knot towards the NE. Hence the prevailing wind will push a vessel positioned parallel with the structure against the wharf while the drift tries to hold it off.

The operation deck is 220 metres long and has a minimum depth of 24 metres of water. The minimum air draft of the traversing ship is 14 metres. There are 5 breasting dolphins and 3 mooring dolphins. There are a total of 17 quick release hooks. Port pilots are used for all berthing and deberthing. The anchorage and pilot boarding station is in the bay at the North of Cape Flattery headland.

1.1. Service Jetty

There is a small service jetty and ramp situated in the bay north of Cape Flattery. This jetty is privately owned by the mining company, and is used for servicing the mine and wharfage for the two lines launches with limited tug capability. These are provided by the company to assist in running lines to the main wharf when berthing ships

Berthing is carried out with the use of 2 workboats only. There are no facilities at the wharf - it is a remote operation.

This means no fuel, fresh water or rubbish removal. As the port is within the Great Barrier Reef there should be no discharge of sewerage or rubbish while at berth. There is only a limited use of telephone available. Seamen are not allowed to leave the vessel while it is holding at berth.

1.2. Anchorage Area

The seabed in the vicinity of the offshore berth consists of rocky slate therefore anchors should be utilised only in an emergency and whilst berthing. An anchorage in good weather conditions is available in depths of 27 m on the line of the leads to the west side of the two-way route through the Great Barrier Reef approximately 2.5 miles to the NNE of the offshore berth.

An off shore anchorage is located at Ada Bank in position latitude 15° 0.9' S, longitude 145° 27.9' E. This anchorage is to be used by vessels awaiting to enter the port. Ships at anchor in the pilotage area are to maintain a continuous listening watch on VHF channel 6. Ships are not permitted to immobilise engines whilst in the pilotage area.

1.3.Tidal restrictions

There are no tugs at the port so to facilitate berthing the ship's anchors will be used extensively. Masters should ensure that the anchor capstans and controls are in good order and confirm that external bridge communications are working.

Ships should have no less than fourteen ropes in good order. When the south easterlies are blowing a strong northerly tidal flow tends to push the ship off the berth when fully loaded. Under these conditions it is advisable to use additional mooring lines. The lines boats have limited tug capability which is restricted to specific operating parameters when berthing vessels during light northerly wind conditions. Ships gangways must be turned in for all berthing operations.

1.4. Under keel clearance

The master is to ensure that the ship maintains a minimum under keel clearance of at least one metre whilst alongside the berth; this may require loading operations to be adjusted to suit under keel clearance conditions.

1.5. Maximum Vessel Size

The maximum dimensions of ships acceptable at this port are 195 m length overall and 32.2 m beam. Ships of greater length will be assessed on an individual basis by the Regional Harbour Master (Cairns). Ships cannot exceed 80 000 DWT due to wharf structural limitations at Cape Flattery.

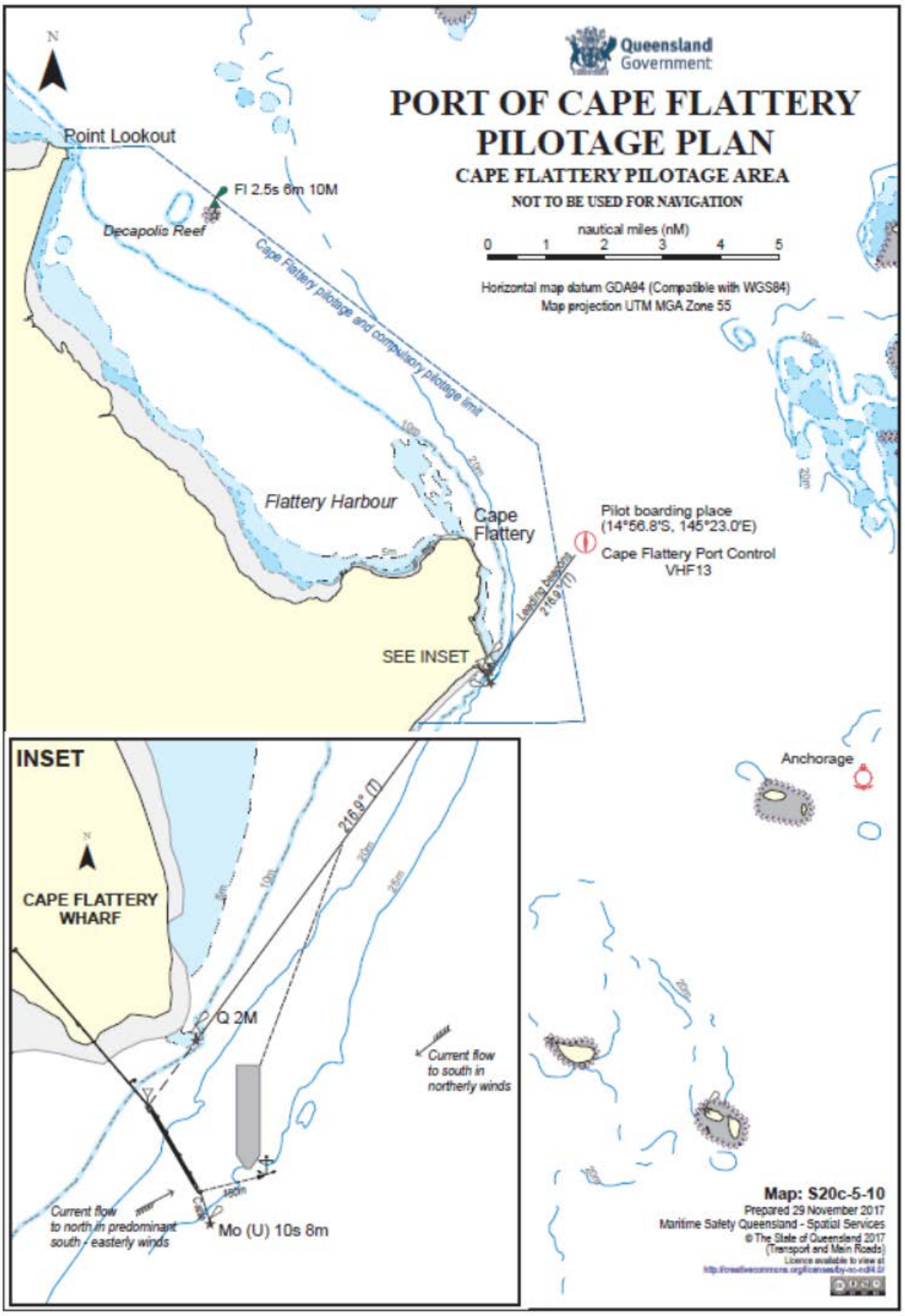


Figure 4 Pilotage Plan and Infrastructure

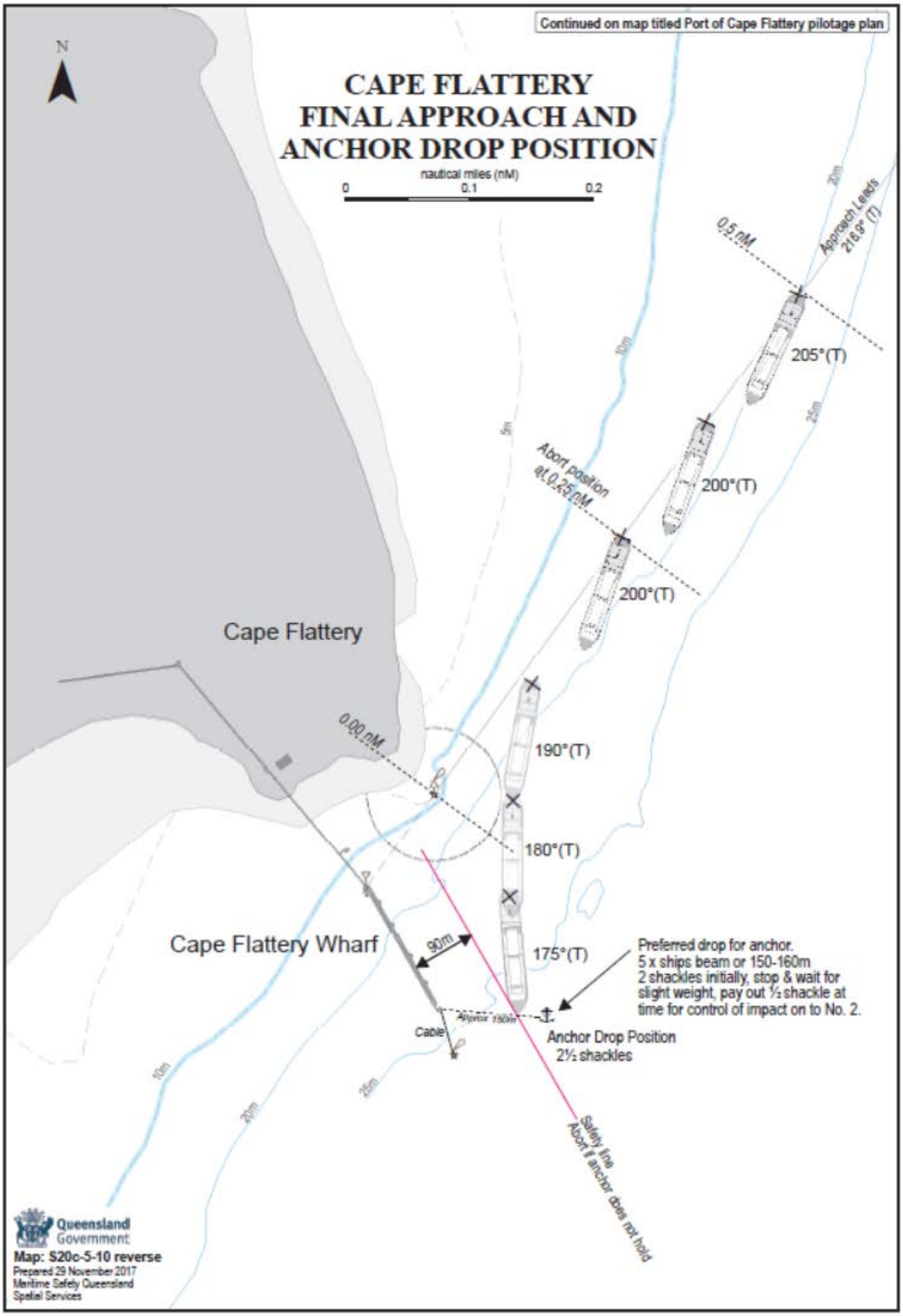


Figure 5 Approach and Anchorage

1.6. Adverse weather conditions

The prevailing winds tend to be easterly to south easterly. Although calmer conditions occur during the winter months, they may become very difficult during the summer months when the sea breeze augments the prevailing south easterlies.

A tropical cyclone watch message is issued when a cyclone or potential cyclone is expected to affect conditions in the area within the next 48 hours and is reviewed every three hours. An extreme weather event-warning message is issued when a cyclone or potential cyclone is expected to affect conditions in the area within the next 24 hours and is reviewed every three hours. Weather charts, satellite images, warnings and reports from the Bureau of Meteorology. In the event of a cyclone threat the Regional Harbour Master will take action to ensure the safety of shipping by establishing an emergency control centre (ECC) at the Cape Flattery Silica Mines main office.

Figure 6 Silica Sand Conveyor and Stockpile

All movements will be carried out during daylight hours only.

The maximum wind speed for berthing when the wind is not from a northerly direction is 25 knots.

When the lines boats are not available and the wind is from the north, the maximum permissible wind speed for berthing is five knots and current less than 0.2 knots. When the lines boats are available and the wind is from the north, the maximum permissible wind speed for berthing is 12 knots (gusting to 15 knots) and current less than 0.4 knots. Workboats must have a bollard pull of at least 12 ton and the pilot must be endorsed for northerly wind conditions.

When east to southeasterly gale force winds are forecast for the period a vessel may be alongside, the Regional Harbour Master will carry out a risk assessment prior to confirming that a vessel will berth. Should the weather conditions deteriorate unexpectedly while a vessel is alongside a further risk assessment may be undertaken by the Regional Harbour master. If wind gusts exceed 40 knots engines are to be on standby. Moorings are to be tended at all times. Loading operations may continue.

1.7. Approaches and Danger

All vessels will berth starboard side alongside. Entrance through the reef for larger vessels can be made via Grafton Passage (east of Cairns) or by any other recommended passage. Dangers at and adjacent at the port include:

Decapolis Reef: dries 1.52 metres at low water, lies 113° (T), 2.9 miles from Lookout Point.

Four Foot Rock: lies 273° (T), 0·8 miles from Decapolis Reef beacon.

'Jedda' wreck: lies 203° (T), 1·1 miles from Decapolis Reef beacon.

Sim Reefs: on the northern side of the recommended track, lies 013° (T) to 033° (T) from Decapolis Reef distance 2.2 miles.

A sand bar: extends in a north, northwesterly direction from Cape Flattery for approximately two nautical miles.

1.8. Past Dredging History

Since construction of the Jetty and Ship Loader to facilitate the Cape Flattery Silica Mine there has been no requirements for the conduct of maintenance dredging, bed levelling or any other seafloor maintenance activity. The natural deep-water location, ad coastal hydrodynamics are sufficient mechanisms to avoid the need for maintenance dredging. Extreme weather events have not been known to cause any adverse change to berth depths to trigger the need for dredging.

3. Port Environmental Values

The Port of Cape Flattery and surrounding port limits comprise of a diverse range of ecosystems. Habitats of significance include the Great Barrier Reef World Heritage Area, Crystal Creek, Blackwater Creek, foredunes, sandy beaches, rocky shores, mangrove, and tidal wetlands, seagrass meadows and coral reefs. These habitats support a range of flora and fauna, including a number of threatened and/or migratory species.

Environmental values are mapped for the Port of Cape Flattery in Figure 7 below.

The Port is in or partly within the GBRWHA (listed as a World Heritage Area in 1981). The GBRWHA is listed based on it meeting four World Heritage criteria for OUV:

- Natural beauty and natural phenomena (Criterion (vii)).
- Major stages of the Earth's evolutionary history (Criterion (viii)).
- Ecological and biological processes (Criterion (ix)).
- Habitats for conservation of biodiversity (Criterion (x)).

Of the important environmental values present in the region, three are considered to contribute significantly to the OUV of the GBRWHA. These are:

- Internationally recognised migratory shorebird nesting and roosting sites;
- Transit and aggregation/calving area for the east-coast population of humpback whales, near the northern extent of their migration path,
- A high diversity of coastal sand dune species north and south of the Cape.

3.1. Marine Parks, World Heritage Area, and Areas of Significance

The Great Barrier Reef World Heritage Area covers the waters to the low water mark along the coastline. The Port of Cape Flattery itself is not included within the World Heritage Area; however its port limits are within the area. The Great Barrier Reef Marine Park is also located along the coastline. The Port and immediate surrounding waters around the headland are outside the limits of the marine park; however the remaining port limits within Flattery Harbour are identified within the General Use Zone and the area adjoining the coastline within the Habitat Protection Zone under the Great Barrier Reef Marine Park Zoning Plan 2003. Decapolis Reef, which is located in the north-eastern limits of the Port is within the Marine National Park Zone.

The federal government has identified a number of endangered species within the area which are listed on the respective *EPBC* registers. There are no RAMSAR sites within port limits.

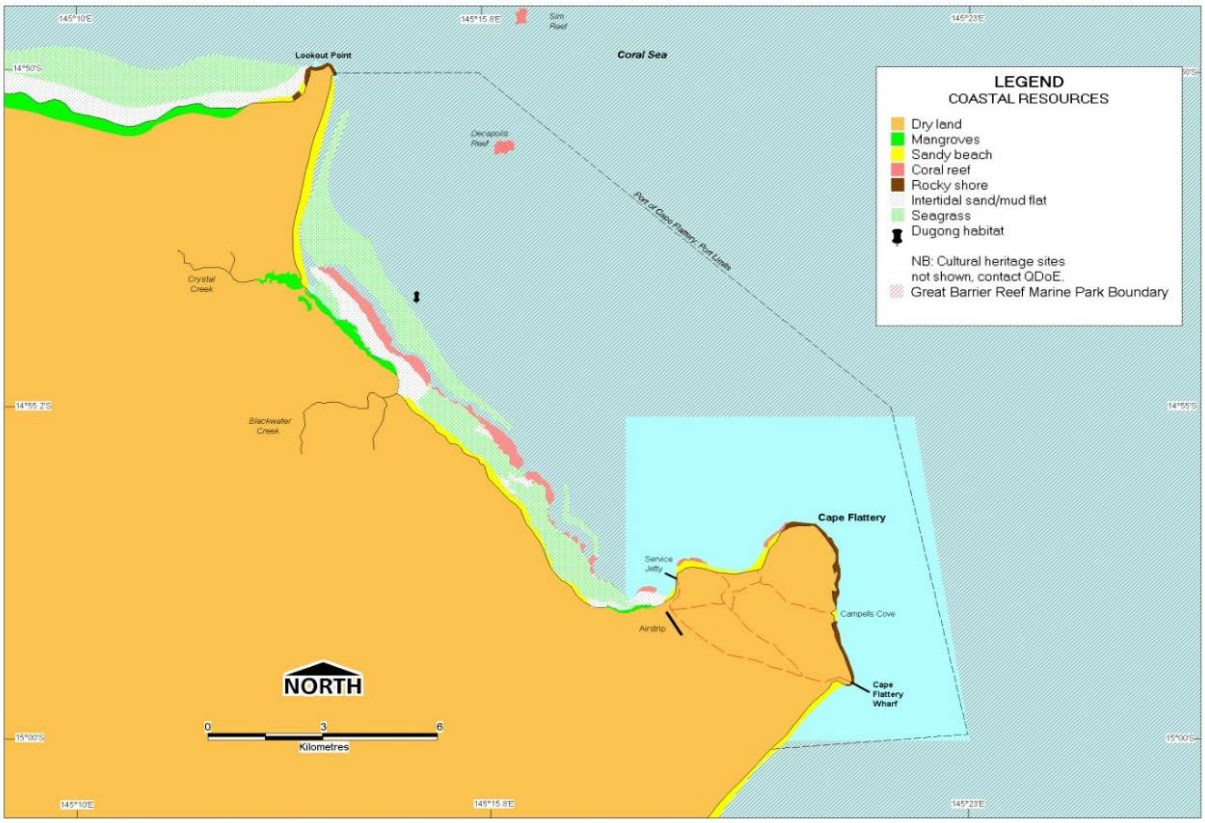


Figure 7 Coastal Resources

3.2. Natural Hazard Risk and Resilience

The Port of Cape Flattery is within an area identified as subject to bushfire risk and erosion hazard.

3.3. Social and Economic Values

The Port of Cape Flattery is located on the east coast of the vast and sparsely populated Cape York Peninsula. Cairns is the nearest city, with Hope Vale and Cooktown the closest towns. The port is presently used to export silica sand from the adjacent mine area.

Community needs and interests: Indigenous representation is strong in this community. The local economy is dominated by the mining industry, which provides employment. Grazing is also a part of the regional economy and landscape. Government is the main employer in the region, along with a growing nature-based tourism sector. The Port of Cape Flattery and surrounding port limits harbour a diverse range of ecosystems, including the Great Barrier Reef World Heritage Area.

Economic value:

Direct Impacts of Port related industries: $9 Million

Direct impact of Port dependent industries: $34 million
Flow-on and total Impacts: $43 million (GVA $37m)

(Based on the report *Economic Impact 2013/14 by Cummings Economics* on behalf of Ports North)

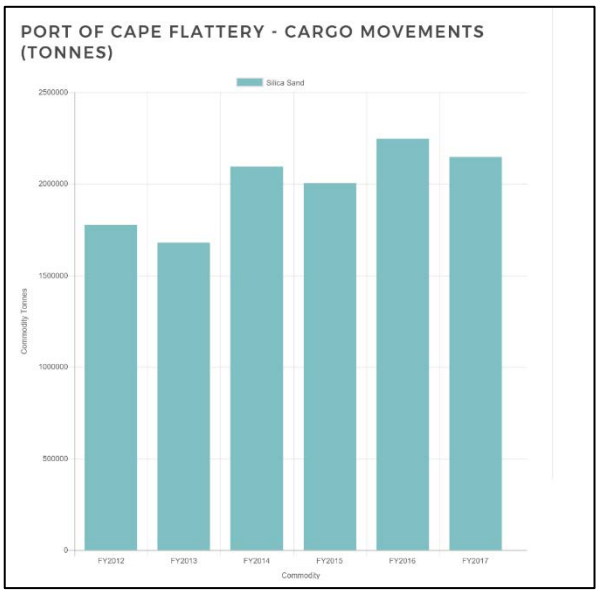


Figure 8 Cargo Movements (2010 to 2017)
(Source: Ports North 2017/18 Annual Report)

3.4. Cultural Heritage Places and Values

The Cape Flattery mining leases cover land owned by the traditional owners of the Yuuru Peoples (consisting of the Dingaal, Nguurruumungu, and Thanil clan groups).

There are known areas of cultural heritage significance in or adjacent to the port, predominantly in the dune areas to the south of the Cape that were identified in the 2001 cultural heritage survey.

Potions of the adjacent areas, including the small areas of strategic port land are subject to the active Native Title Claim (Cape York United #1).

Apart from the archaeological sites found, no other specific places of cultural heritage value were identified on Port landholdings. The land is part of the traditional land of the Dingaal and Nguurruumungu peoples and as such remains of importance to them.

3.5. European History and Historical Significance

The first local European settlement in the region was at Cooktown (Cook's Town at the time) in 1873, which was prompted by the need for a port to service a new goldfield near the Palmer River on Cape York. By 1874, the population had grown to 2500 and the demand for land for crops and grazing in the neighbouring area to support the township followed. Cape Flattery however was not used by Europeans until 1968 when the silica sand mine was first established. The present offshore loading facility was constructed in the late 1980s. Although the mine site is on Aboriginal landholdings, the port land was excluded from these landholdings and Lots 9 & 10 is held as freehold land by Ports North.

3.6. Coastal Environment

Inter-tidal habitats closest to the Port consist of sandy beaches, boulder beaches and low rocky platforms, and includes hermit crabs, snails on the sandy shores, barnacles snails, rock oyster, limpets and chitons on boulder beaches, and mussels, barnacles, oysters and cnidarians on rocky platforms. Sandy beaches to the north of the Port also provide important turtle nesting areas.
Seagrass meadows are located in the inter-tidal areas north of Cape Flattery and Point Lookout. Dugongs have been recorded off Cape Flattery, particularly in the northern regions of port limits as well as various turtle species.
Coral reefs in the port area include both inshore reefs and coastal fringing reefs, with fringe reeds supporting typical reef species assemblages. Narrow coastal fringing reefs front part of the north-facing portion of Cape Flattery and much of the east facing part of Flattery Beach which extends to Point Lookout.
Deep offshore areas from Cape Flattery are generally worked by prawn trawlers.

3.7. Rocky Shores

Inter-tidal habitats closest to the port facilities consist of sandy beaches, boulder beaches and low rocky platforms. Figure 9 shows an example of such shore line. Fauna includes hermit crabs and snails on the sandy shores; barnacles; snails; rock oysters; limpets and Chitons on interstices and on undersides of boulders at boulder beaches; and mussels, barnacles, oysters and cnidarians (including anemones) on rocky platforms. Sandy beaches to the north of the Port also provide important turtle nesting areas.

The rocky shore supports several species of barnacles, the common rock oyster, gastropods, and Chitons. The common rock oyster *Saccostrea cucullata* is abundant along the entire intertidal rocky shoreline in the port. All species of barnacles were more abundant on the south end of the rocky shore. The communities on the rocky shores do not appear to be different to other rocky shores in the GBR Marine Park (Ayling et al, 1997).

Figure 9 Rocky headland of Cape Flattery

3.8. Seagrass

Seagrasses have one of the highest net primary production rates of any natural system and as a consequence they are a major food source for a variety of protected species including turtles (especially Green) and dugongs. In addition, seagrasses provide a breeding and nursery ground for fish, prawns and crabs and helps to stabilise coastal sediments, as well as to trap and recycle nutrients.
Seagrass mapping has indicated extensive beds on inter-tidal areas north of Cape Flattery (Figure 5). Approximately 1100 ha of seagrass including eight species from two families, were located between Cape Flattery and Lookout Point. Of these, three types of seagrass meadows representing three different habitats were identified. Dense inshore meadows do not extend further or deeper than 7.5 m below Mean Sea Level. Deeper waters have not been extensively examined for the presence of seagrass. The dense inshore seagrass meadows suggest that these waters are periodically naturally turbid as a result of re-suspension of sediments by cyclones and strong winds. Deepwater surveys of the Great Barrier Reef Marine Park lagoon indicate that seagrass, particularly *Halophila ovalis, Halophila spinulosa* and *Halophila decipiens,* may occur in the deeper

waters within the port limits under favourable conditions (Coles *et al* 2000 & De'ath *et al* 2000). Small patchy seagrass beds are commonly found near the fringing reefs and on sandy areas of reef flats.
Seagrass species composition varies according to depth, shelter and sediment type. Dense growth of *Cymodocea serrulate* and *Cymodocea roundata* was found in a survey in 1996 (Ayling et al, 1997) in a sheltered intertidal site near the mouth of Crystal Creek. *Thalassia hemprichii* was the dominant species on the fringing reef platform. *Halodule* and *Halophila* species were dominant in deeper areas. *Halophila* species are able to cope with low light intensities which typically occur in deeper areas and turbid waters.

3.9. Marine Fauna

A diverse range of marine life occurs within waters of the region. Some of these, including the dugong and several species of sea-turtle species, have special conservation status and are recognised as threatened or endangered and are protected by legislation (EP Act and EPBC Act).

Dugongs have been recorded offshore in the Cape Flattery area, with more frequent sightings in areas to the north of the port limits. The presence of more extensive seagrass areas north of Point Lookout, however, suggests that the port area itself is not likely to be a significant dugong habitat.

In all, five species of turtle have been recorded in the waters of the region. These include the green turtle (*Chelonia mydas*), flatback turtle (*Natator depressus*), hawksbill turtle (*Eretomochelys imbricatta*), leatherback turtle (*Dermochelys coriacea*), and loggerhead turtle (*Caretta caretta*). Loggerhead turtles are listed as endangered. The turtle species designated as "vulnerable" include the Green, Leatherback, Hawksbill and Flatback. The Department of the Environment, Water, Heritage and the Arts (DEWHA) website (www.environment.gov.au) notes a number of threatened and migratory species in this North Queensland region. The blue whale is another endangered marine species noted in the region.
Limited assessment of port waters has recorded fin-fish and crustacean species of commercial importance, especially over seagrass beds within the port limits. Coral reef areas (mainly fringing reefs) in the Port also support typical reef species assemblages.

3.10. Coral Reefs

A full baseline benthic survey of the port waters was conducted in 1996 which is documented in *PCQ Monograph No. 5* by Ayling et al (1997). Much of the information below has been taken from the results of this detailed study.
Coral reefs in the port area include both inshore reefs and coastal fringing reefs. The inshore reefs are Decapolis Reef measuring 850 m x 650 m and Four Foot Rock (located around 1 kilometre to the north west of Decapolis Reef) that is only around 50 m across. The total area of inshore reef within port limits is around 60 ha (Ayling et al, 1997).
Narrow coastal fringing reefs front part of the north facing portion of Cape Flattery and much of the east-facing part of Flattery Port Beach, which extends to Point Lookout. A total length of about 12.3 km of fringing reef occurs within port limits, with an overall area of about 265 ha. The outer edge of these fringing reefs reaches sand in a depth of 3- 5 m below AHD.
Hard corals were abundant on both inshore and fringing reefs with almost 50% cover, but were lower on rocky reefs with only 5% cover. Hard coral communities were dominated by acroporid corals. Soft corals were on fringing reefs with 12% cover, but were much less abundant on inshore and rocky reefs. The rocky reefs were similar to rocky reefs in other tropical coastal areas and were dominated by *Sargassum* algal forests and turfing algae. Sponges were moderately common on fringing reefs (3% cover) but rare on inshore and rocky reefs.
Ayling et al (1997) reported that the rich inshore and fringing reefs present in the Port of Cape Flattery are likely to undergo major natural fluctuations in coral cover due to wave surge from cyclones and strong wind

episodes, coral bleaching by high water temperature during calm summer periods and freshwater inundation caused by heavy rain.

3.11. Fisheries and Aquaculture

The deep offshore areas from Cape Flattery are regularly worked by prawn trawlers. DEEDI publishes catch statistics for the various fisheries on the Coastal Habitat and Resources Information System (CHRIS) website (www.chrisweb.dpi.qld.gov.au/CHRIS). The interactive maps on CHRIS indicate the inshore area north and south of Cape Flattery is very productive from a fisheries perspective with the inshore (<20 km of the coast) trawl fishery catch of tiger prawns alone worth somewhere in the vicinity of $1 - $5 million per annum. Recreational fishers in the area catch primarily Mackerel species and Big Mouth Nannygai (a snapper).
There is no Fish Habitat Area (FHA) within port limits. The nearest FHA is to the north of the port at Starcke Point (Ngulun) and extends from Look-out Point to the Cape Melville National Park. The size of the FHA is 29 853 ha.

3.12. Coastal Vegetation

Mangrove wetlands are a feature of the port area and are the dominant type of vegetation along sheltered foreshore areas with sand/mud substrate between Cape Flattery and the mouth of Blackwater Creek.
Mangrove wetlands are a feature of the port area and are the dominant type of vegetation along sheltered foreshore areas with sand/mud substrate between Cape Flattery and the mouth of Blackwater Creek. A thin mangrove strip fronts about 5.4 km of the Flattery Port beach, with about 1.25 km of mainly *Rhizophora* spp. (Red Mangroves) along the southern corner of the beach (5 ha). The remainder of the beach also contains red mangroves in the vicinity of the two creek mouths (approximately 85 ha) (Ayling et al. 1997).
Mangrove and tidal wetlands, situated at the confluence of flows from the land and sea, are highly productive systems and contribute many services including water filtration, sediment stabilization, coastal protection, wildlife habitat and contribute organic matter as food for many species. Their protection is covered in the *Fisheries Act 1994.*. Under the *Fisheries Act* (Section 8), a “marine plant” includes tidal plant usually growing on or adjacent to tidal land, whether living, dead, standing or fallen or a plant prescribed under a regulation. It applies in land within the limits of the State waters.
The foredunes of the ocean beach area between the mouth of Blackwater Creek and Lookout Point support different plant assemblages including creepers such as *Ipomoea pes-caprae* and grasses such as *Spinifex sericeus*. *Casuarina equistifolia* and species of Pandanus are found on foredunes, which experience small sand movements.

Figure 10 Dunes and Heathlands around Cape Flattery.

3.13. Terrestrial Fauna and Birdlife

Migratory bird species, especially Waders, utilise the inter-tidal habitats of the Port. Large roosting populations of the endangered Little Tern (*Sterna albifrons*) have been recorded in the area (CYPLUS, 1995b). It is highly likely that other bird species visiting the Cape Flattery area may be listed under the provisions of the *State*

Nature Conservation Act 1992 and/or the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.
The Cape Bedford – Cape Flattery area supports a diversity of wildlife including three rare skinks, one of which (*Ctenotus rawlinsoni*) is only known for sandy heathlands of the Cape Flattery dune fields (Australian Heritage Commission, database records). Ecological monitoring indicates that the inter-tidal beaches are used by a broad variety of species of birds covered by international agreements (e.g. JAMBA and CAMBA) during the October to May period (Ayling et al., 1997). Fauna surveys indicated 78 species of birds were present in the Cape Flattery area. Fourteen species of amphibians and six species of mammals also identified.

3.14. Natural Amenity

The area has a diversity of natural features such as rocky headlands, dune-fields, rare plant communities such as heath-lands and wetlands resulting in an area of significant natural amenity.

Many of the beaches in the area have high scenic values and are used for recreational purposes like camping and fishing. The marine area of Cape Flattery contains coral reefs, fringing reefs, seagrass meadows and mangrove communities. These areas are important for the continued existence of fish, prawns, turtles and other marine and terrestrial species. The remoteness of the relatively pristine environment provides a great incentive for commercial and recreational fishing, pleasure boating and scientific research.
The Cape Flattery-Cape Bedford area in general has natural conservation significance because it contains Gegenwalle (Counter-wall) dunes and extensive areas of large elongate parabolic dunes. Due to low development of the area, a large component of the dune field is of high wilderness quality. Dune lakes in the region contain a unique faunal assemblage.

3.15. Water Quality

Because of the remoteness of the port, the lack of industry in the region and the low impact of a sand mine on water quality, there is little contaminant load on the local marine waters. Consequently, there has been little need for any detailed water quality monitoring program at the port or in neighbouring waters.

Limited data suggests that the water clarity near the port facilities is normally high and concentration of suspended solids is low because there are no major rivers or sources of fine sediment, which could resuspend, except during cyclonic events. Fringing reefs (reefs on rocky shorelines) in the GBR region are in general subject to periodic very high natural levels of turbidity caused by the re-suspension of coastal sediments from prevailing SE winds and storm events. Port activities (which can affect siltation regimes) are unlikely, however, to contribute to any adverse effect on these coral reefs (Ayling et al, 1997). This is because of the relatively undisturbed nature of the Cape York Peninsula and geographical isolation of Cape Flattery and the low level and risk associated with port activities provides near-pristine water quality conditions in the port area (Hilliard et al, 1997).

Nutrient levels are likely to be very low, based on data obtained for Cooktown (Hilliard, R.W., et al, 1997). The turbidity is typically very low and the dissolved oxygen typically high throughout the year, as there are no major rivers or sources of fine sediments available for re-suspension. Turbidity however would be expected to increase significantly under wave action.
The salinity range of port waters is 34 to 36 g/l and the surface water temperature range is 22 ^{0}C to 29 ^{0}C (Hilliard et al, 1997).

3.16. Sediment Quality

Marine sediments close to the port consist primarily of white silica sands (quartz) with little heavy mineral content. There is little current data available on contaminants levels in the sediment. Sediment quality at the

port, however, is unlikely to contain any significant levels of contaminants typically associated with ports located in rivers because of low shipping volume, its isolated location and distance from major catchments. The historic use of Tributyl-tin (TBT) as an anti-fouling on ships may have introduced small quantities of TBT into the benthos in the berth areas as paint and other detritus flakes from the hulls of berthing vessels. Any works in the port involving the disturbance of sediment should include a preceding sediment contaminant investigation to ensure that the material is suitable for relocation in the proposed receiving environment.

4. Consultation and Key Issues

In the event that maintenance dredging is contemplated and the oversight and input on management of dredging and placement is required, the approach outlined under the NAGD (CoA 2009) will be utilised. This guidance sets out the development of a Technical Advisory and Consultative Committee (TACC) being a necessary component to assist in the consultation process required for a Sea Dumping Permit application. The NAGD states that:

"The TACC is intended to assist ports and other proponents and Determining Authority to access local knowledge and reconcile various stakeholder interests."

The TACC is intended to:

- provide continuity of direction and effort in protecting the local environment
- support communication between stakeholders
- assist in the establishment of longer term management arrangements, including reviewing the development and implementation of management plans and monitoring programs
- review dredging and dumping activities in accordance forecast plans and programs
- make recommendations to the port authority and regulators as necessary or appropriate.

4.1. Identification of Interested and Affected Parties

Through engagement with port users, community for a range of purposes over recent years (such a land use plan consultation, demand studies, new trade start up, and response to issues) the following entities are identified as having potential interests in present and future port maintenance activities;

- Cook Shire Council
- Cape Flattery Silica Mines Pty Ltd
- Queensland Department of Transport and Main Roads
- Recreational fishers
- Commercial fishers
- Great Barrier Reef Marine Park Authority

4.2. Consultation

As there is no present or planned application for a Sea Dumping Permit, there is no present TACC because there is no dredging of sufficient scope to trigger the requirements.

Establishment and consultation with a TACC would occur during the design phase of any future dredging activities. The TACC should be consulted on:

- Proposed program specifics such as the location of dredging and disposal sites and the timing and duration of dredging and associated activities
- Results of the risk assessment of potential impacts to values and proposed mitigation and management controls
- Scope of program monitoring and reporting requirements.

Therefore, to date there has been no need for consultation on the concept of maintenance dredging, nor any outcomes of that consultation that can be recorded.

5. Sediment Assessment

Outlined in this section is a description of the nature of the sediment and detail of how it interacts with port operations, in the past present and future. This demonstrates a thorough understanding of regional and local processes, understanding of properties (physical, chemical and biological) and informs the subsequent sections on the justification and proposed sediment management solutions.

5.1. Port Sediment

Marine sediments at the port consist primarily of white silica sands (quartz) with little heavy mineral content. There is little current data available on contaminants levels in the sediment. Sediment quality at the port, however, is unlikely to contain any significant levels of contaminants typically associated with ports located in rivers because of low shipping volume, its isolated location, and distance from major catchments. The historic use of Tributyl-tin (TBT) as an anti-fouling on ships may have introduced small quantities of TBT into the benthos in the berth areas as paint and other detritus flakes from the hulls of internationally arriving vessels however the likelihood is considered very low. Works involving the disturbance of sediment should be preceded by a sediment contaminant investigation to ensure that the material is suitable for relocation in the proposed receiving environment.
The generally consistent fine to coarse grained sands, an absence of contributing sources of contamination, suggest the material has characteristics that make them well suited for relocation within the adjacent marine environment and ensure they are kept within the prevailing coastal processes.

5.2. Minimizations of Sediment Accumulation and Dredging Need

To date, consideration of maintenance dredging has not been needed, and hence examination of rates of accumulation, or the need to reduce or avoid dredging have not been required. The open coastal setting, and optimal location of the jetty indicate that conduct of maintenance dredging activities can be minimised.

5.3. Maintenance Dredging and Disposal Requirement

A number of extreme weather events have occurred in the vicinity of Cape Flattery since the commencement of operations, including those more recent events of Cyclone Ita (2014) and 2015 Cyclone Nathan (2015), resulting in damage to mine and jetty infrastructure including the jetty. At those times loss of approach and berth depth was not noted as a major constraint and operations were able to continue. The location is not influenced by sediment contributions from river flood events, and hence, there is no correlation between such events and the need for dredging.

5.4. Examination of Reuse, Recycle and Disposal Option

Evaluation of options to reduce recycle or reuse sediments has, and is unlikely to warrant consideration under the present hydrodynamic and coastal process regime, until such time as an event, or long-term trend creates a situation where bed depth impinges on wharf operations. A structured approach set out in the NAGD (EA, 2009) and the QLD MDS (TMR, 2017) would be enacted in such a case, so as to inform the respective approval applications and campaign design if needed.

5.5. Selection of Future Dredging Strategy

The preferred option for management of sediment over the 5 and 10 year horizon, in the absence of any extreme weather event or change in coastal processes that causes accumulation that impinges on berth or approach depth, will be the status quo. If the status changes, future exploration of bed levelling or minor dredging works to remove material at key locations would potentially be needed. Based on status of the facility, the likelihood of such dredging need is rated as extremely low.

6. Risk Assessment Framework

Potential environmental impacts from dredging and disposal of dredged material include:

- increased turbidity and reduced light availability (i.e. light attenuation);
- ecological impacts (direct and indirect) due to disruption of the bed e.g. on benthic fauna communities, sea grasses and corals;
- contaminant release (including impacts associated with extraction or disturbance of acid sulfate soils) impacting on water quality;
- increased sedimentation affecting sessile flora and fauna;
- modifications to physical and habitat processes resulting from changes to bed topography (depth, channel profiles), hydrodynamics (current, wave action);
- changes to habitat features and process upon which fisheries depend; • the introduction or spread of pest species; and
- direct (harm) and indirect (e.g. behavioural) impacts on other aquatic fauna, including migratory species and protected species.

The risk and extent of direct and indirect impacts on environmental values is influenced by a range of factors, such as the:

- volume of material being dredged;
- sediment characteristics including the presence of elevated levels of contaminants;
- duration and timing of the dredging campaign;
- dredging, transport and disposal methods, and
- proximity of sensitive receptors.

A certain level of additional environmental impact is unavoidable within a dredging footprint or a new disposal area. This is less of an issue for maintenance dredging activities as the works occur within areas of existing and repeated disturbance. Although it is likely that floral and faunal recolonisation may occur within previously dredged areas between maintenance events, further impacts on these communities are rarely regarded as key considerations in the assessment of maintenance dredging applications. This is primarily due to those impacts being largely unavoidable and that recolonising biota is well-adapted to surviving within dynamic benthic habitats.

Depending on the scale and frequency, dredging and dredge material placement activities have the potential to adversely impact on sensitive environmental receptors, social or cultural values associated with the Port.

Impacts can occur over a short or long term and can be direct or indirect. Dredging related impacts can result from:

- the direct removal of benthic habitat in the vicinity of the dredged area
- smothering of benthic organisms in offshore dredge placement locations
- changes to marine water quality from increased turbidity and sedimentation
- mobilisation of contaminants released from dredged sediments
- collisions and disturbance from vessel movements
- increased noise and lighting from dredge vessel operations.

Prior to a dredging campaign a risk assessment of potential impacts to environmental, social or cultural values will be undertaken. The assessment will help to determine the level of potential harm that environmental, social, or cultural values are at from the proposed dredging program. The assessment will assist in refining where management measures to avoid, reduce, or mitigate impacts are needed. Identified measures can then be incorporated into revisions of a Maintenance Dredging Environmental Management Plan (EMP).

7. Identification and Treatment of Key Risks

Ports North is committed to minimising and managing potential impacts from dredging and dredge material relocation as far as practicable.

Based on the results of the initial risk assessment based from Section 5 above, and established best practice; a set of key management strategies and actions to minimise the impact from dredging and dredge material relocation operations would be identified and incorporated into the delivery of any future considerations for maintenance dredging.

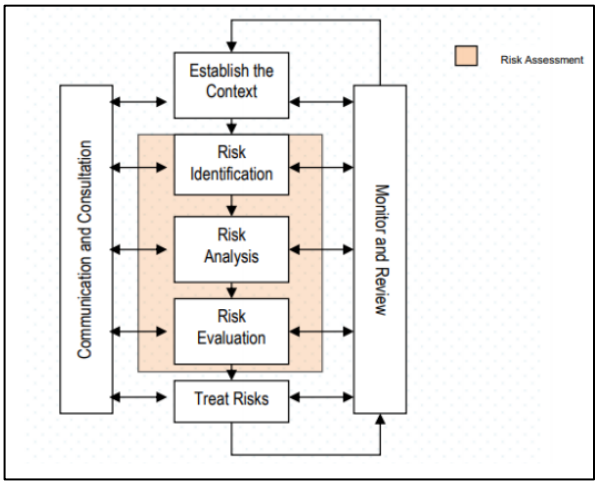


Figure 12 Risk Management Process

These measures should, if necessary, be supplemented, and enhanced with the inputs from the adaptive monitoring program. The primary component will be the implementation of an EMP for each campaign either developed by the contactor, or by Ports North and to which the contractor adheres.

8. Environmental Management

Environmental management of maintenance dredging (if required) will follow an approach to provide a repeatable structure for planning and executing maintenance dredging activities at the port.

This process would provide certainty for staff, TACC members (if established), community, and regulators around how dredging activities will be planned and managed. This will also be key to supporting long-term permit applications. Stakeholder consultation will occur throughout planning including during any dredging program design, execution and ongoing monitoring and management.

The approach follows processes outlined in relevant key policy documents. These include the:

- The National Assessment Guidelines for Dredging (NAGD) assessment framework for ocean disposal
- Queensland Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports
- Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Dredge Material at Sea.

Steps to plan and prepare each dredge campaign will address the following:

- Identification of Port navigation needs, risks and sediment management approaches
- Dredging program design, execution and control
- Monitoring and management

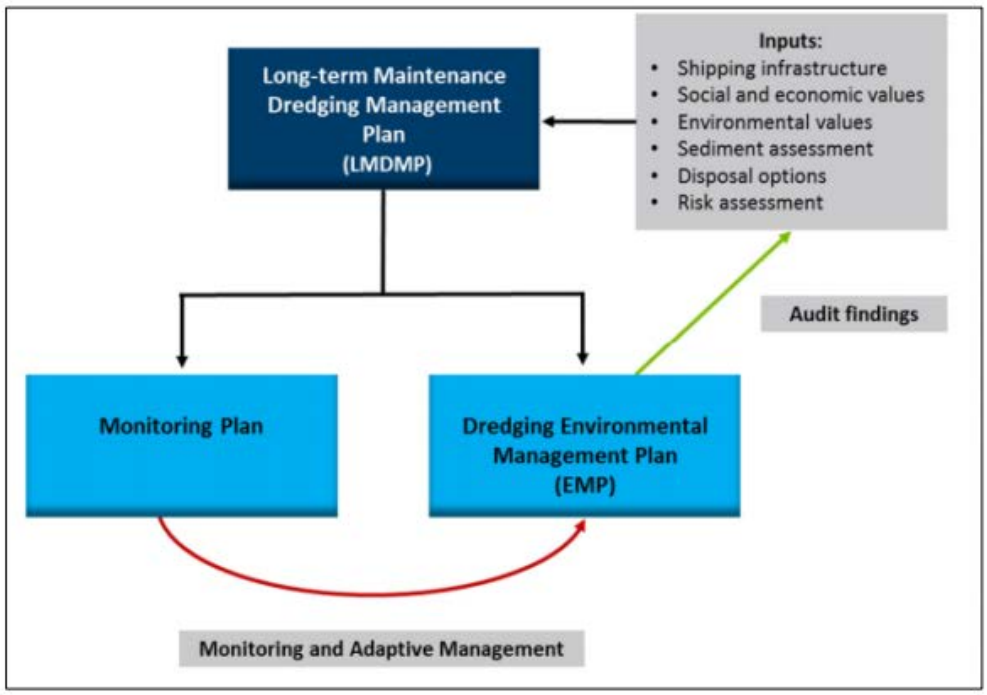


Figure 13 Dredge Management and Monitoring elements (DMS, 2016)

8.1. Operational Control

The operational control by Ports North, may include the contract with the dredging operator, and the EMP, as described below;

An EMP provides the operational practices required for dredging activities to meet environmental standards. The EMP forms the operational control document to ensure all site specific environmental issues are adequately addressed. The EMP would cover all aspects of the dredging operations specific to the campaign and contain:

- Location and description of the activities
- Timing of the dredging operations
- Measures to meet permit conditions
- Standard management measures relating to:
- Waste management
- Ballast water management
- Bunkering of fuel
- Vessel washdown
- Adaptive management measures relating to:
- Water quality
- Marine fauna
- Climate conditions
- Operation and incident reporting
- Emergency procedures and contacts
- Records and Auditing

8.2. Adaptive Management

Adaptive management provides for continuous monitoring, evaluation and adjustment of management response measures based on inputs from the likes of real-time monitoring, campaign records, and environmental conditions. An approach similar to that depicted in Figure 14 would be the likely structure of such a management process.

Based on an understanding of acceptable environmental conditions and thresholds for impact a series of response levels (triggers) can be established and then monitored to ensure that conditions that may produce environmental harm are avoided or ceased before impacts occur.

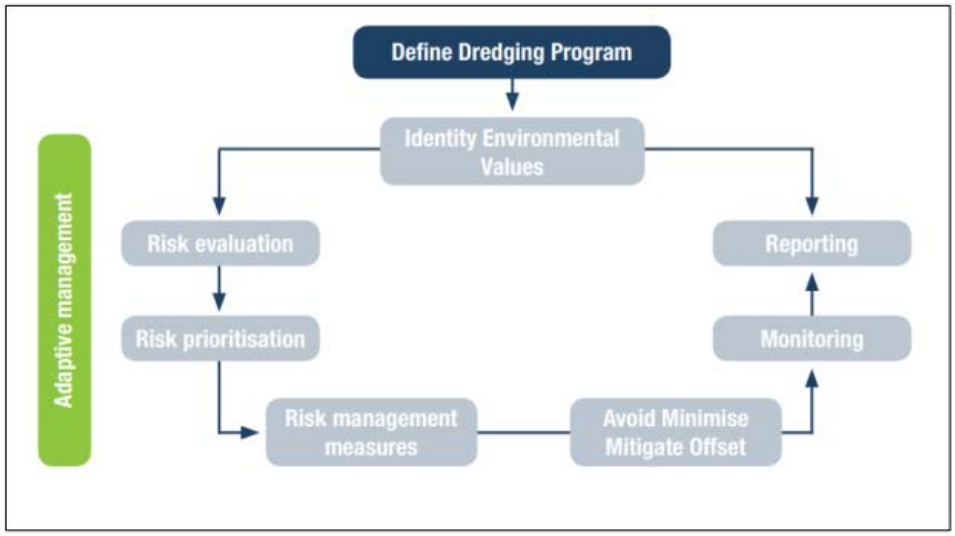


Figure 14 Adaptive Management and Risk Assessment Process (Ports Australia, 2016)

Adaptive monitoring would likely be implemented for a maintenance dredging campaign if it were ever needed. The program could include real time collection and analysis of data to detect impending environmental harm and undertake corrective action if they were necessary. This approach is a key step in impact avoidance and management. An adaptive monitoring and management program would focus on water quality, weather conditions, and marine fauna (mammals and turtles) as these are the above identified key values at the port potentially subject to the effects of a campaign if it were ever needed. Responses to monitoring results would be required if trigger events occur, and the nature of the response would be commensurate with the level of environmental risk.

8.3. Navigational Needs, Risks and Sediment Management

Identification of navigational requirements in the offshore environment of the port is key to identifying whether maintenance dredging is likely to be required. Periodic monitoring (bathymetric surveys) of the offshore infrastructure of the port includes the berth and approach is conducted by Maritime Safety QLD on a two yearly basis, utilising the hydrographic survey vessel 'QG Norfolk" on it's passage around the QLD coast, checking on status of TMR facilities. This monitoring maps sediment distribution within key offshore operational areas of the port. Data from the monitoring will also be able to identify changes in sediment dynamics over time. A copy of the latest Survey, conducted in 2017 is appended for reference (Refer to

Section 12). Outcomes of such survey are assessed by Ports North's surveyor, MSQ and in consultation with the Regional Harbour Master (Cairns) the declaration status confirmed, and any need for intervention (such as bed levelling or dredging) is determined. To date, no such intervention has been required.

Where sediment accumulation may create a potential or future navigational hindrance, a risk assessment will then be undertaken. The aim of the assessment is to determine the level of risk posed to the ongoing safe operation of the Port. The level of risk can then be used to trigger the timing of the further phases of the dredge management framework.

Should an immediate or future navigational risk at the Port being identified, it is necessary to determine the appropriate response in terms of the type of sediment management activity required.

Baseline monitoring data will be required to inform this phase. Up to date information regarding sediment volumes, quality, and contamination may be needed. The specific data required includes:

- Sediment Sampling and Analysis Plan (SAP) results. The process for undertaking sampling and analysis of sediments is described the NAGD (CoA 2009). It is likely that this stage in the process could be negated, given the very clean and pristine nature of this section of the coast, and the absence of contaminating activities at the site, due to the handling of bulk clean sand.
- Bathymetric survey data.

8.4. Sediment Management Options

Depending on the scale of sedimentation and level of navigational risk posed a range of management options could be applied. These need not necessarily be stand-alone actions and could be deployed sequentially to reduce and then remove the risk. Measures include:

A. **Bed levelling:** using a drag bar, high spots of sediment accumulation can be removed and reduced by shifting them into lower lying depressions in channels and berths. This can help to maintain a suitable declared depth. Rarely is this a long-term solution but it can be used to alleviate immediate risks or to prolong the period between major dredging activities.
B. **Hopper dredging:** often considered the more traditional dredging method, use of a trailing suction hopper dredge (vessel) where sediment is collected in the hopper of the vessel and placed at a designated location. This method is necessary for removing larger volumes and areas, but unlikely to be effective or logistical feasible for Cape Flattery
C. **Cutter Suction Dredge:** utilised where stiffer seafloor conditions are encountered, and there is a need to be able to send material via a pipeline to an adjacent area or to land.

Based on the historical absence of sediment accumulation, and sandy nature of the seafloor, option (A) would be the most likely future method.

8.5. Dredging Program Design, Execution, and Control

Should it be determined that dredging is required then the next stages from the sediment management framework is the design of the dredging program and obtaining of relevant approvals.

Where the need for maintenance dredging and dredge material disposal is identified, planning for all aspects of the program needs to be undertaken. This may include:

- Timing and duration of the dredge program
- Location of dredging areas and volumes
- Equipment needs and standard procedures for suitable dredge
- Identification and assessment of potential impacts to values at dredging and disposal sites
- Mitigation and management measures (including adaptive management) to address potential impacts to values
- Operational controls.
- Monitoring requirements.

All three input elements of the framework, including consultation, monitoring and supporting studies, will aid in the design of individual dredging programs. Additionally, standard dredging procedures and guidelines will need to be incorporated into the design.

8.6. Marine Pests

Introduced marine species are species translocated to regions outside their natural range, typically by the passage of vessels nationally and internationally. Where these species present a threat to human health or environmental and economic values, they are termed a 'pest'. Outbreaks of marine pests are an obvious possible risk at Ports trading with international clients. Translocation of marine pests may occur via:

- Ballast water - used to control the trim and draft of a vessel;
- Fouling - encrusting organisms via fouling of vessels (*e.g.* hulls, propellers, intake grates etc.).

Any dredging plant or equipment contracted to undertake dredging works will be required to comply with marine pest protocols, including National and Queensland bio-Security requirements in relation to ballast water and marine pest management, this includes the National System for the Prevention and Management of Marine Pest Incursions, in particular the National Biofouling Management Guidance for Non-Trading Vessels.

The equipment typically used of dredging activity is generally based in Queensland and works in Queensland waters, hence a lower translocation risk, due to the operation in Australian water only and compliance with National standards.

9. Monitoring Framework

Existing monitoring arrangements for the Port of Cape Flattery are limited to the initial baseline studies from the mid-1990s to early 2000's and some periodic monitoring events since that time. Due to the nature of the port operations and commodities exported, along with the setting and coastal hydrodynamics, regular ambient monitoring of parameters is not considered warranted, and addressed by condition assessment as and when needed. In the event that a dredging or bed levelling operation is required, the scale of that activity will inform the nature and scale of water, sediment, flora, or fauna monitoring before, during or after such activity. Monitoring would be informed by the aspects and impacts evaluation of the works, and could include monitoring of dredging plumes and sediment transport during dredging, along with evaluation of the health of the seagrass meadows and understanding hydrodynamics to help predict any potential impacts.

Ports North would oversee the implementation of the works specific reactive monitoring plan, with each component being undertaken by appropriately trained staff or qualified marine scientists.

The environmental monitoring plan would aim to:

- Assess the works relative to past studies to place those outcome sin the context of long-term ambient environmental health of the Port and nearby sensitive receptors;
- Detect any impacts from maintenance dredging, both immediately after dredging campaigns and over time;
- Respond to real time environmental conditions during maintenance dredging to prevent serious environmental harm
- Collect data that will be used to drive continual improvement

These aims will be met through the implementation of a tiered approach to monitoring**.** The approach may include ambient, impact and adaptive monitoring. Results from each tier of the monitoring program will be used to inform the relevant stages of the dredging management framework.

From evaluation of potential aspects and impacts of and subsequent management options, monitoring elements for the works and longer term could consider periodic:

- Investigation of marine flora or fauna studies to verify status of locations based on change since last survey;
- Studies to support or inform any application for approvals to initiate any maintenance dredging activity.

Figure 15 Bulk Carrier at Berth- showing shiploader and wharf

10. Performance Review and Governance

A range of measures are enacted to ensure that the process for management of maintenance dredging (if it were required) at the port, and the objectives of this plan are addressed. This includes a range of mechanisms

outlined below (inclusive of record keeping, auditing, and performance correction etc,) to ensure management effectiveness of this Plan and how well it addresses the objectives, indicators, compliance performance, and reporting obligations such that it incorporates a process to enable continuous improvement. The following sections expand on those measures.

The *Environmental Code of Practice for Dredging And Dredging Material Relocation* (Ports Australia 2016) identifies that 'transparent and open information sharing is important to improve knowledge and to understand community values, client needs and government expectations. Communication and reporting is an important component of this, to demonstrate performance and provide for community accountability'.

In fulfilment of this principle, reporting under this Plan will involve:

- regular engagement with identified stakeholders to determine the need for or parameters of any dredging or sea floor management requirements;
- Indications of any possible upcoming dredging activities.

Where any future approvals have conditions that require performance review or record keeping, any such records will be generally inclusive of:

- permit number
- permit start and expiry dates
- locations and type of material dredged
- volume dredged at each location
- disposal locations used
- disposal method used.

10.1. Record Keeping

In the event that dredging activities are required, the appointed contractor and or Ports North (or their contractors) will keep records which detail:

- the times and dates of when each material disposal run is commenced and finished
- the position (by GPS) of the vessel at the beginning and end of each dumping run with the inclusion of the path of each dredge material relocation run
- the volume of dredge material (in cubic metres) dumped for the specific operational period. These records will be retained for audit purposes
- detail of any spill of oil, fuel or other potential contaminant, details of remedial action and monitoring instigated as result.
- details of any marine mega fauna observations during dredging activities
- time and duration of any alterations to the program, including stop work actions, as a result of any environmental mitigation measure.

Post the dredging program, Ports North will;

- undertake a bathymetric survey of the dredged area and dredge material placement site
- within a suitable period after the completion of the bathymetric survey provide a digital copy of the final survey results to the relevant regulatory agencies,
- continue monitoring as per this plan and approval conditions,
- Report on outcomes as required under the QLD MDS Annual reporting requirements; and
- Consider outcomes of the works and above records in the planning for proceeding year's works.

10.2. Auditing

This plan is intended to demonstrate commitments to the long-term management of maintenance dredging and placement activities. The plan is supported by a range of prior studies, and builds on past Environmental Management Plans for the port location and in conjunction with any campaign records. Periodic auditing of a number of aspects of both components of this plan, and approval requirements (when granted) would be implemented. Internal audits of EMP implementation, notifications, checklists, and volume records may be enacted so as to demonstrate management effectiveness and compliance.

10.3. Non-Conformance and Corrective Action

To ensure Management and Board are fully informed as appropriate, of the risks associated with maintenance dredging, reporting is undertaken in accordance with the Risk Management Framework (Section 7).

Reporting to regulatory authorities is undertaken in accordance with the conditions of statutory authorities relevant to maintenance dredging described in the EMP (Section 10).

Periodic reporting and management review under the Ports Australia Guidelines is also required.

Through the Queensland Ports Association, Ports North participates in comparative analysis and coordinated maintenance dredging reporting to TMR in accordance with Principal 8 of the MDS and communicates with the TACC (Section 4).

10.4. Internal and External Reporting

Events such as incidents, complaints, and monitoring exceedances result in investigations to determine root cause and corrective action. The processes for responding to non-conformances are detailed in the respective EMP's. Reporting to regulatory authorities is undertaken in accordance with the conditions of statutory authorities relevant to maintenance dredging as described in the EMP.

Corrective actions ensure that the organisation mitigates the reoccurrence of environmental incidents, complaints, and monitoring exceedances and ensures continuous improvement of dredging operations. Corrective actions identified to manage the dredging operations are detailed for each potential risk category in the respective EMP's. This incorporates monitoring undertaken under the Environmental Monitoring program.

10.5. Access to Reports and Data

The current approved version of the LMDMP, and if needed, the EMP and Monitoring Programs are to be on the internet for public access. In accordance with Principal 16 of the MDS, relevant documents or summary's provided to the TACC (if such is enacted) will be made available, along with reporting components required under the MDS are provided to enable demonstration of the coordinated maintenance dredging reporting to TMR in accordance with Principal 8 of the MDS.

Monitoring and data analysis provides the information required to inform the risk assessment framework, adaptively manage operations, and demonstrate compliance. Data management process ensures quality assurance and quality control. Reporting of data to regulatory authorities is undertaken in accordance with the conditions of statutory authorities relevant to maintenance dredging and is described in the respective

EMP's or as per approval condition requirements. Monitoring reports and data are held internally, or as per published reports that are to be made accessible via the external website commensurate with the type of report and its intent.

Ports North may facilitates meetings with the TACC (if such is established) where the outcomes of monitoring programs are reviewed and discussed, and a data access request process is established where such information is requested by external entities on environmental monitoring data and reports.

10.6. Continual Improvement and Changes to the LMDMP

This LMDMP will be reviewed and updated at least once each 5 years, or when one of the following occurs:

- when permit conditions have been changed or amended or new permits issued
- when monitoring results report substantially different impacts than were predicted, or
- if an incident occurs that poses a significant risk to effective future management of dredging activity.

The current approved version of this LMDMP will be maintained on the Ports North website – www.portsnorth.com.au.

10.7. Publication and Accessibility

Publish approved versions of the LMDMP and its associated management documents are to be available for use by internal staff via the Ports North intranet, and the relevant documents for external access, via the Port North external website www.portsnorth.com.au for public access for the duration of the LMDMP.

11. Supporting Information and References

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12. Appendix 1 - Hydrographic Survey