Maintenance Dredging of Queensland Ports
Review of 2019 Activities

Queensland ports require routine maintenance dredging to remove sediments that have accumulated in channels, berths and swing basins due to siltation and sediment transport processes. Most ports cannot sustainably function without maintenance dredging. Maintenance dredging has occurred in Queensland since ports were first established.

Most maintenance dredging is carried out by the *Brisbane* which undertakes an annual dredging program of Queensland ports over a period of 6-8 months. The dredge, based in Brisbane and operated by the Port of Brisbane Pty Ltd, was specifically designed and built for Queensland conditions with the vessel applying high standards of environmental management. The environmental management mechanisms are equivalent to the features installed in the latest TSHD models used around the world and ensure environmental impact is minimised during the dredging works.

In accordance with the Queensland Maintenance Dredging Strategy, a high-level schedule of maintenance dredging activities for 2019 was prepared and provided to the Department of Transport and Main Roads (DTMR). The schedule specifically considered opportunities to minimise both the extent and footprint of dredging activities.

During 2019, maintenance dredging was undertaken at the following ports:

- Gladstone
- Bundaberg
- Townsville
- Weipa
- Amrun
- Hay Point
- Cairns
- Karumba
- Brisbane

This maintenance dredge program is now complete.

This document summarises the outcomes of the 2019 dredge program at each of the above ports in relation to timing, volume and outcomes of monitoring. The comprehensive assessment of disposal options for all maintenance dredge campaigns is undertaken as part of each ports Long Term Maintenance Dredge Management Plan.

The outcomes of this review will be considered and incorporated into the maintenance dredging schedule for 2020.

Gladstone	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	231,855 m^3
Dates	14/11/2019-18/12/2019
Dredge Location	Berths, swing basins, inner and outer channels
Permit compliance	No non-compliances
Environmental incidents	No reportable environmental incidents
Environmental complaints	No complaints received
Seagrass	A BPAR monitor is deployed at the seagrass meadow within the potential zone of influence before, during and after dredging. BPAR thresholds have been established for seagrass at the PoG and are applied to maintain growing season light requirements in conjunction with an adaptive management flowchart that prompts evaluation and management actions to protect seagrass. This is supported by ongoing ambient seagrass monitoring programs that map and monitor the health of meadows. No impact was detected from the 2019 campaign. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone
Water	Real time turbidity monitoring is undertaken inside and outside the zone of influence as determined by hydrodynamic modelling of maintenance dredging plumes and used in conjunction with an adaptive management flowchart that prompts evaluation and management actions. Impact detection water quality sites are sampled before, during and after dredging. This includes sampling for metals and Tributyltin (TBT) at near and far field monitoring sites. This is supported by ambient real time water quality monitoring by GPC at sites within the PoG and support for the Port Curtis Integrated Monitoring Program (PCIMP) and Gladstone Healthy Harbour Partnership (GHHP). No impact was detected from the 2019 campaign. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone
Sediment	In line with the monitoring schedule in the LMDMP, sediment quality in the main channels is assessed every five (5) years. The sediment quality was assessed in 2017 using the NAGD 2009 and found to be suitable for placement at sea. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone
Turtles and dugongs	Indirect impacts to these species are mitigated through the management of water quality and seagrass meadows during maintenance dredging activities. Direct impacts are mitigated through controls documented in EMPs. These include fitting of turtle exclusion devices (where possible and including visual observation with protocols on when to stop activities, wait, increase visual observations and commence or re-commence activity and guidance on reporting. No interactions or incidents.
Biosecurity	The PoG LMDMP has a five (5) yearly Marine Pest Survey schedule, last conducted in 2015. None of the species recorded in the 2015 Biosecurity Survey of the PoG are included in the Australian Emergency Marine Pest Plan (EMP Plan) Trigger List. Additionally, none of the species are listed as "high risk" species in either the Introduced Marine Pest or Declared Pest lists on National System for the Prevention and Management of Marine Pest Incursions (NIMPIS). No marine pests identified during activity. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone. GPC is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study, which will meet the 2020 survey requirement.

Bundaberg	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	66,200m^3
Dates	22/03/2019-29/03/2019
Dredge Location	Berths, swing basins, inner and outer channels
Permit compliance	Two (2) turtle strikes occurred during maintenance dredging. Notifications were made to Department of Environment and Science (DES) and Department of Environment and Energy (DoEE) under the notification and reporting conditions of *Environmental Authority (EA) for PoB Dredging EPPR00571913 Section 1 Condition G18* and *Sea Dumping Permit (SD2012/2022) Conditions 18, 19 and 20* respectively. The investigation identified that GPC and PBPL were dredging in accordance with approval requirements and Environmental Management Plans.
Environmental incidents	Two (2) reportable environmental incidents from turtle strikes (refer to Permit compliance).
Environmental complaints	No complaints received
Seagrass	The LTMMP (monitoring schedule) for seagrass, benthic and particle size analysis assessment at the disposal site is scheduled for monitoring every five (5) years with the last survey undertaken in 2015. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg
Water	A water quality monitoring program has been designed and implemented to maintain water quality and protect sensitive receptors in the area. This includes real time turbidity monitoring. No water quality impact was detected from the activity.
Sediment	Sediment Quality against the NAGD 2009 was last conducted in 2014, and found to be suitable for placement at sea. In 2019, Sediment Quality was retested in PoB and GPC is awaiting the results of this sampling program to inform future maintenance dredging programs. GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg
Turtles and dugongs	Indirect impacts to these species are mitigated through the management of water quality and seagrass meadows during maintenance dredging activities. Direct impacts are mitigated through controls documented in EMPs. These include fitting of turtle exclusion devices and includes visual observation with protocols on when to stop activities, wait, and re-commence activity, plus guidance on reporting. Two (2) turtle strikes occurred in the Sea Reach section of the channel on the 25 March 2019 and 29 March 2019 respectively, involving a Loggerhead Turtle and a Juvenile Green Turtle (refer to Permit compliance). No impacts to other marine megafauna was identified from the activity
Biosecurity	No marine pests identified during activity

Townsville	
Dredge Type	Brisbane (Trailer Suction Hopper Dredge) Other dredges (Grab Dredge)
Dredge Volume	Brisbane: May/June 2019 289,680m^3 Sep/Oct 2019 676,997m^3 Grab Dredge: 32,705m^3
Dates	Brisbane: 24/05/2019 to 09/06/2019 and 12/09/2019 to 24/10/2019 Grab: 07/03/2019 to 05/12/2019 (intermittent)
Dredge Location	Brisbane: Platypus and Sea Channels, Inner and Outer Harbours Grab: Berth 8, Berth 11 and Ross River
Permit compliance	No non-compliances, one reportable incident outlined below.
Environmental incidents	One reportable incident – see turtles and dugongs section below.
Environmental complaints	No reported complaints.
Seagrass	Seagrass monitoring within Cleveland Bay was undertaken in September 2019. The report will be made available on POTL website once finalised and provided to DoEE – as per our S19 deed of agreement.
Water	Marine water quality monitoring was undertaken 4 times during 2019 at locations within or adjacent to the receiving environment (Ross River, Ross Creek, and Cleveland Bay). Samples were analysed for suspended solids, nutrients and metals. Results were similar to previous years, with the exception a peak event for suspended solids/turbidity/conductivity during the February 2019 flood event. Results have contributed to the Dry Tropics Partnerships for Health Waters – Waterway Health Report Card, which was released in April 2019. Turbidity and PAR data was collected in 2019 at several underwater locations in Cleveland Bay. The NESP report (WAIMSI, 2019) shows that both turbidity and PAR appear to be influenced by climatic events, with seasonal variation evident. A number of real time water quality buoys were also deployed in Cleveland Bay to measure turbidity, temperature and electrical conductivity. The real time continuous data that is generated is helping to understand the ambient water quality conditions in Cleveland Bay and is also undertaken during maintenance dredging and placement activities. NTU levels were within the ambient levels throughout both maintenance dredging and placement activities. A water quality dashboard has been finalised to display the data on POTL's website.
Sediment	In line with the NAGD 2009 guidelines, sediment quality is assessed every five (5) years. The sediment quality was assessed in 2017 and 2018 and all material, except that in Berths 2, 3, 7 and 8, has been found to be suitable for placement at sea.
Turtles and dugongs	TSHD Brisbane reported a strike of a large loggerhead turtle resulting in a fatality during the Sep/Oct 2019 campaign. Mitigation measures such as turtle deflectors were fitted and the procedure for dredging with regard to marine fauna was being followed during the works.
Biosecurity	POTL is partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.

Weipa	
Dredge Type	*Brisbane* and Oranje (Trailing Suction Hopper Dredges)
Dredge Volume	2,412,685m^3
Dates	04/06/2019 – 13/07/2019
Dredge Location	South Channel, Inner Harbour and Berths
Permit compliance	Compliant with State and Commonwealth approvals
Environmental incidents	No reported incidents
Environmental complaints	No reported incidents
Seagrass	Annual seagrass monitoring was conducted in the Port of Weipa between the 29th August and 2nd of September 2019. Seagrass in all of the monitoring meadows appeared to be in good condition. This included the meadows located closest to port infrastructure and channels in the Embley River as well as seagrass areas further away from the port. There was some evidence of burning of seagrass leaves for the shallowest *Enhalus* meadows which typically occurs in these locations during spring low tides. The team observed the large growing *Enhalus* meadows flowering and also pollen released into the water during the survey. Evidence of dugong feeding activity in the Embley River seagrass meadows was recorded with dugong feeding trails observed in the meadows near Napranum. Overall seagrass meadows in the Port of Weipa remains in good condition.
Water	NQBP completed ambient marine water quality monitoring prior to and during the maintenance dredging program. Data from the water quality monitoring as well as satellite-derived turbidity data was analysed. The data showed that during the 2019 maintenance dredging program the turbidity was generally controlled by the natural conditions (tidal currents and wind/wave conditions), with higher turbidity occurring during spring tides and periods of larger waves and that the Port of Weipa 2019 maintenance dredging program did not influence the regional turbidity of the area.
Sediment	Sediment Characterisation Study was completed in March 2018 as per the 5-yearly requirement under the NAGD. The sampling confirmed compliance of maintenance dredge material to the NAGD and continued suitability for ocean disposal at the current approved material relocation area.
Turtles and dugongs	Nil interactions or observations recorded during dredging or placement operations of the TSHD Brisbane. Mitigation measures such as turtle deflectors and spotter records were assessed as compliant during the Internal Environmental Audit completed during the works.
Biosecurity	No marine pests identified during activity.

Amrun	
Dredge Type	*Brisbane* (Trailing Suction Hopper Dredge)
Dredge Volume	40,826m^3
Dates	15,16,28 and 29 June 2019
Dredge Location	Amrun Port export facility with sea disposal at the following coordinates for the approved disposal ground (Lat 12° 54.77'S; Long 141° 28.88'E)
Permit compliance	Compliant with all State and Commonwealth approvals
Environmental incidents	Nil incidents were recorded
Environmental complaints	Nil complaints were recorded
Seagrass	A small area of seagrass was recorded adjacent to the Boyd Bay beach (north of Boyd Point) with no seagrass found within the Boyd Point to Pera Head area with physical conditions, sediment and prevailing bathymetry unlikely to support seagrass in close proximity to the Port. Based on this and the information presented on water quality, impacts to seagrass are expected to be nil to low.
Water	Boat based turbidity monitoring was completed daily using a hand-held water quality probe that recorded turbidity at five inshore water quality monitoring locations with five readings collected ~1m from the seabed. Based on the data collected plume water quality impacts associated with dredging are assessed as nil to low. All reports associated with dredging for 2019 will be published on the Amrun project website by the 12 August 2020 in accordance with the EPBC (2010/5642) environmental approval condition.
Sediment	Sediment Characterisation Study was completed in September 2017 and confirmed compliance of maintenance dredge material to the NAGD and suitability for ocean disposal at the current approved material relocation area.
Turtles and dugongs	Nil interactions or observations were recorded during dredging or placement operations of either the TSHD *Brisbane* or *Willunga*-tug and barge activity.
Biosecurity	No marine pests identified during activity

Hay Point	
Dredge Type	*Brisbane* (Trailing Suction Hopper Dredge)
Dredge Volume	353,740m^3
Dates	31/03/2019 to 02/05/2019
Dredge Location	Sediment was removed from Port of Hay Point berth pockets, apron and departure path and placed at the Port of Hay Point Dredge Material Placement Area (DMPA).
Permit compliance	Compliant with all State and Commonwealth approvals
Environmental incidents	Nil incidents were recorded
Environmental complaints	Nil complaints were recorded
Seagrass	Annual seagrass habitat surveys around the ports of Hay Point and Mackay were completed between the 1st and 9th October 2019. Seagrass was found at all the monitored areas (Hay Point and Mackay offshore waters, Dudgeon Point to Hay Point coastal meadows and Keswick and St Bees Islands). The seagrass was similar in distribution and abundance to the previous year, perhaps with a slight increase. Typically, *Halodule uninervis* and Halophila ovalis dominated the coastal sites while *Halophila decipiens*, *Halophila tricostata* and *Halophila spinulosa* were found in the offshore locations.
Water	Water quality monitoring was undertaken between 17 February and 30 May 2019. Real-time telemetered surface loggers were deployed at two trigger sites (Round Top and Victor Island) and two control sites (Slade Island and Freshwater Point). Benthic loggers were also deployed at both trigger sites. JCU's ambient benthic loggers also remained at these four sites during the period. Overall, dredging had little impact on turbidity or additional sampled parameters during the Dredge phase.
Sediment	Sediment Characterisation Study was completed in May 2016 as per the 5-yearly requirement under the NAGD. The sampling confirmed compliance of maintenance dredge material to the NAGD and continued suitability for ocean disposal at the current approved material relocation area.
Turtles and dugongs	Nil interactions or observations were recorded during dredging or placement operations
Biosecurity	No marine pests identified during activity

Cairns	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge) Willunga (Grab Dredge)
Dredge Volume	Brisbane - 259,539 in-situ m^3, 177,046 dry tonnes, 531,647 wet m^3 Willunga – 60,420 in-situ m^3, 54,106 dry tonnes, 67,670 wet m^3
Dates	Brisbane – 4/5/19 to 22/5/19 - 18 day campaign
Dredge Location	Brisbane - Channel Willunga - Portions of Inner Port wharves (1 to 12), Navy Base and Marinas.
Permit compliance	All works compliant and consistent with Environmental Authority, Marine Park, and Sea Dumping Permit conditions. Volume dredged was within annual permit limit. Annual Fee for the Environmental Authority (EA) submitted during September, and Annual Return to be submitted by 1 March 2020. Nil non-compliance issued by regulatory agencies.
Environmental incidents	Nil incidents.
Environmental complaints	Nil incidents.
Seagrass	Cairns Harbour and Trinity Inlet Long Term Seagrass Long Term Monitoring Program – annual survey completed by James Cook University, TropWater, during November (helicopter) and December (vessel) 2019. Quarterly PAR light data collection and seed viability surveys continued. Additional survey activity conducted to support the CSDP. End 2019 survey confirmed seagrass remains in sound and robust condition. Annual report due early 2020.
Water	Water quality verification under the LTDSDMP or EMP not required during the period, and program for Trinity Inlet inner port areas continued periodically, with outcomes consistent with long-term trends. Water quality instruments for the CSDP capital dredging Dredge Management Plan installed early and captured the maintenance-dredging period, with nil significant observations noted in respect of water quality.
Sediment	Sediment Analysis Plan (SAP) – implemented in February-March for the Channel, Inner Port, Marina, and Navy Base areas. No detection of contaminants exceeding NAGD guideline limits, and material again assessed as suitable for unconfined at sea placement under permit conditions.
Turtles and dugongs	Nil interactions or observations recorded during dredging or placement operations of either the TSHD Brisbane or Willunga-tug and barge activity.
Biosecurity	Surveys of areas to be dredged as set out in the Sediment Analysis Plan, along with periodic checks of the monitoring devices within the inner port area were conducted, with no detections of actual or suspect material during 2019 period. Ports North is partnered with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study- with first deployment of samplers and plankton assessment in October 2019 confirming nil detection of priority pest species. No biosecurity maters noted in respect of dredge vessels

Karumba	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	131,930 in-situ m^3
Dates	16/07/2019 to 10/08/2019 26 day campaign, with productivity influenced by the single per day tidal constraint.
Dredge Location	Channel
Permit compliance	All works compliant and consistent with Environmental Authority and Sea Dumping Permit conditions. Volume dredged was well within annual forecast. Annual Fee for the Environmental Authority (EA) submitted during July, and Annual Return to be submitted by 1 March 2020. Nil non-compliance issued by regulatory agencies.
Environmental incidents	No incident events attributable to Ports North staff or contractors engaged for operation of dredge vessels or transport and placement of dredged material were recorded during the period January to December 2019.
Environmental complaints	Nil complaints recorded in regard to dredging operations or activities.
Seagrass	Port of Karumba Long Term Seagrass Long Term Monitoring Program – annual survey completed by James Cook University, TropWater, during November 2019, with a change in condition from very good, to very poor seagrass meadow condition and also declines in biomass. These changes are likely due to the prolonged effects of the early 2019 floodwaters within the southern gulf which persisted for nearly three months. Report under compilation and due early 2020
Water	Water quality verification under the LTMMP or EMP not triggered or required during the period. A significant wet season, and extended period of high turbidity waters over the southern gulf for Feb-Apr 2019 which preceded the 2019 dredge campaign.
Sediment	Sediment Analysis Plan (SAP) – implemented in 2015, with no noted events likely to have changed the contamination status of the outer channel area, with all past work confirming suitability for unconfined at sea placement under permit conditions.
Turtles and dugongs	Nil interactions or observations recorded during dredging or placement operations of either the TSHD Brisbane or Bed Level vessel activity.
Biosecurity	Surveys of areas to be dredged as set out in the Sediment Analysis Plan in 2015 verified, with no reports of detections from DAWR or DAF of any actual or suspect material during the 2019 period.

Brisbane	
Dredge Type	Brisbane (Trailing Hopper Suction Dredge) Ken Harvey (Grab Dredge)
Dredge Volume	443,625m^3
Dates	Brisbane – 17/12/18 to 21/03/19, 18/08/19 to 26/08/19
Dredge Location	Brisbane River, North West Channel
Permit compliance	Fully compliant with all State Approvals (Environmental Authority, Marine Park Permit and Allocation of Quarry Material). Department of Environment and Science (DES) undertook a compliance inspection on 8 February 2019 – no non-compliances were recorded.
Environmental incidents	A green turtle was captured by the dredge at 0430 hours on 10 February 2019 whilst dredging in the Outer Bar Cutting. At the time of capture, all turtle exclusion devices were fitted and all procedures for minimising risk of turtle capture were being following. The incident was reported to DES and RSPCA.
Environmental complaints	Nil complaints recorded in regard to maintenance dredging operations or activities.
Seagrass	Port of Brisbane Seagrass Monitoring Program - annual survey undertaken by BMT in July and August 2018. Consistent with previous years, five seagrass species were recorded. Year to year variability in composition and extent of seagrass meadows has continued. Seagrass depth range (SDR) has remained stable at Fisherman Islands since 2018. Overall, there has been a long-term trend of increasing seagrass meadow extent at Fisherman Islands which continues to represent a critical ecosystem component in western Moreton Bay. (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)
Water	Triennial dredging turbidity monitoring last undertaken in 2017 (next due in 2020). Reclamation and dredge material placement area water quality monitoring buoys collecting real-time water quality data for dredge management. Reclamation sediment and water quality monitoring undertaken post dredging (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)
Sediment	Annual Sediment Sampling and Analysis Plan (SAP) – undertaken in August 2018. All sediment determined to be suitable for unconfined ocean disposal. (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)
Turtles and dugongs	One green turtle capture as per environmental incidents.
Biosecurity	Brisbane underwent out-of-water refit in Singapore in September 2018. Relevant inspections and risk assessments and controls implemented. All regulatory approvals obtained for re-entry into Australian waters. PBPL is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.