

Maintenance Dredging of Queensland Ports Review of 2018 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 was prepared on 29 March 2018 and provided to DTMR. The schedule specifically considered opportunities to minimise both the extent and footprint of dredging activities.

During 2018 maintenance dredging was undertaken at the following ports:

- Gladstone
- Bundaberg
- Weipa
- Amrun
- Townsville
- Cairns
- Karumba

This maintenance dredge program is now complete.

This document summarises the outcomes of the 2018 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 2019.

Gladstone	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge) Other dredgers (Grab)
Dredge Volume	Brisbane: 211,102 m ³ Grab: 30,580 m ³
Dates	Brisbane: 14/11/2018 to 17/12/2018 Grab: 24/02/2018 to 15/09/2018
Dredge Location	Brisbane: Berths, swing basins, inner and outer channels Grab: Boyne River Mouth
Permit compliance	No non-compliances.
Environmental incidents	No reportable incidents.
Environmental complaints	No complaints received
Seagrass	<p>Grab: The monitoring program was designed around the DES common conditions appropriate to the size of the campaign and based on the known Benthic Photosynthetic Active Radiation (BPAR) or light thresholds of seagrasses in the POG area. This included visually observations, spot checks and using an adaptive management flowchart to guide decision making.</p> <p>No impacts to seagrass were identified from dredging activity.</p> <p>Brisbane: A BPAR monitor is deployed at the seagrass meadow within the potential zone of influence of maintenance dredging plumes. 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.</p> <p>This is supported by ongoing ambient seagrass monitoring programs that map and monitor the health of meadows.</p> <p>No impact was detected from the 2018 campaign.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-gladstone.aspx</p>
Water	<p>Grab: The monitoring program was designed around the DES common conditions appropriate to the size of the campaign. This included daily visual plume (impact detection) monitoring with adaptive management rules and actions. This was supported by spot check impact detection turbidity monitoring upstream, downstream and at sensitive receptors with an adaptive management flow chart to feed back into the visual plume monitoring adaptive management.</p> <p>No impact to water quality was detected.</p> <p>Brisbane: Real time turbidity monitoring is undertaken inside and outside the potential “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).</p> <p>No impact was detected from the 2018 campaign.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-gladstone.aspx</p>

Gladstone	
Sediment	<p>Grab: Sediment Quality was assessed using the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) and NAGD, was found to be suitable for placement on land. The ASSMP included protocols for testing, treating and validating any PASS in line with DES guidelines. Nil PASS was detected in the sediments brought to land, therefore no treatment or validation testing was required.</p> <p>Brisbane: 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.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-gladstone.aspx</p>
Turtles and dugongs	<p>Indirect impacts to these species are mitigated through the management of water quality and seagrass meadows during maintenance dredging activities.</p> <p>Direct impacts are mitigated through controls documented in EMPs. These include fitting of turtle exclusion devices where possible, visual observation, dredge management, retrieval and reporting protocols.</p> <p>Grab: No impacts to marine megafauna from dredging or transit to placement area.</p> <p>Brisbane: No interactions or incidents.</p>
Biosecurity	<p>The PoG LMDMP has a five (5) yearly Marine Pest Survey schedule, due next in 2019/2020. 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).</p> <p>GPC is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.</p> <p>Grab: No marine pests identified during activity.</p> <p>Brisbane: No marine pests identified during activity.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-gladstone.aspx</p>

Bundaberg	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	51,272 m ³
Dates	26/03/2018 to 30/03/2018
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	<p>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.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-bundaberg.aspx</p>
Water	<p>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.</p> <p>No water quality impact was detected from the activity.</p>
Sediment	<p>Sediment Quality assessment against the NAGD 2009 was last conducted in 2014 and found to be suitable for placement at sea.</p> <p>GPC displays monitoring reports on our website: http://www.gpcl.com.au/Pages/maintenance-dredging-bundaberg.aspx</p>
Turtles and dugongs	<p>Indirect impacts to these species are mitigated through the management of water quality during maintenance dredging activities.</p> <p>Direct impacts are mitigated through controls documented in EMPs. These include fitting of turtle exclusion devices where possible, visual observation, dredge management, retrieval and reporting protocols.</p> <p>No impacts to marine megafauna from the activity.</p>
Biosecurity	No marine pests identified during activity.

Townsville	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge) Other dredgers (Grab)
Dredge Volume	Brisbane: Nov 2018 (102,135m ³), July/Aug 2018 (274,000m ³) Grab: Jan/Feb 2018 (2,260m ³)
Dates	
Dredge Location	Brisbane: Nov 2018 (Inner Harbour, Berths 1, 4, 9, 10, between Berths 4 & 6 and the outer harbour – arrival channel.), July/Aug 2018 (Platypus channel berth 11, and the outer harbour) Grab: Berth 3
Permit compliance	Fully compliant with State and Commonwealth approvals
Environmental incidents	No reported incidents
Environmental complaints	No reported complaints
Seagrass	Seagrass monitoring within Cleveland Bay was undertaken in October 2018. With verbal confirmation that many dugong feed trails were again seen throughout the monitoring meadows. The report will be made available on POTL website once finalised and provided to DoEE. – as per our S19 deed of agreement.
Water	<p>Marine water quality monitoring was undertaken 4 times during the year for locations within, adjacent to or within the surrounding receiving environment (Ross River, Ross Creek, Cleveland Bay). Samples were analysed for suspended solids, nutrients and metals. Results were similar to previous years sampling. Results showed nutrient input via Ross River, and nutrient and metals input via Ross Creek.</p> <p>Turbidity and PAR data was also collected in 2018 at several underwater locations within Cleveland Bay. The preliminary report shows that Turbidity results appear to be influenced by climatic events, with seasonal variation evident. These results in turn influence the seabed PAR readings. Strong correlations between turbidity (NTU) and the light attenuation coefficient (a parameter derived from PAR and surface solar exposure data) indicate strong relationships between these parameters. Correlations between turbidity and total suspended solids were also explored, however no strong relationships between these parameters were identified.</p> <p>In 2018 a number of real time water quality buoys were deployed in Cleveland Bay to measure turbidity, pH, temperature and electrical conductivity. The real time continuous data that is being generated is helping to understand the ambient water quality conditions in Cleveland Bay. A water quality dashboard is being finalised to display the data on POTL's website.</p> <p>Monitoring was undertaken during maintenance dredging and placement activities in July/August. The buoys were positioned 1km from the edge of the DMPA; and in two bays on Magnetic Island. There were no changes to NTU levels recorded in this time, all recorded to be within the normal background levels throughout both maintenance dredging and placement activities.</p> <p>Results have contributed to the Dry Tropics Partnerships for Health Waters – Waterway Health Report Card, which is due for release in early April 2019.</p>
Sediment	<p>A Sediment Sampling and Analysis Plan (SAP) was undertaken in 2017 – as per the 5-yearly requirement under the NAGD 2009. All material, except that in Berths 2, 3, 7 and 8, has been approved for unconfined sea placement as per the NAGD 2009.</p> <p>A targeted SAP of berths 2, 3, 7 and 8 was undertaken in 2018, the final report is pending.</p>
Turtles and dugongs	No interactions with TSHD Brisbane
Biosecurity	<p>Formal marine biosecurity monitoring within the inner harbour undertaken. Ad-hoc visual observations on vessels removed from the harbour (for cleaning/repairs).</p> <p>POTL is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.</p>

Weipa

Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	591,875m ³
Dates	05/04/2018 – 30/04/2018
Dredge Location	
Permit compliance	<p>A dredging incident occurred within the Port of Weipa on the 22nd April 2018 which involved one dredge run of the dredging work being undertaken outside of the approved dredge area (500m³); but within the existing navigation channel. An ICAM investigation completed by NQBP concluded that it was very unlikely environmental harm was caused and recommended several corrective actions.</p> <p>In response to this, in November 2018, DoEE issued a caution notification for contravention of the Sea Dumping Permit SD 2009/1382. The Department confirmed it was satisfied that “the incident was unlikely to have caused substantive environment impacts” and informed that no further action would be taken.</p>
Environmental incidents	See above
Environmental complaints	Nil.
Seagrass	<p>Most recent seagrass survey was completed in November 2018, reports are currently being finalised. The 2017 surveys found seagrasses within the Weipa area to be in a strong condition.</p> <p>Preliminary results from the 2018 surveys indicate seagrasses remained in a strong condition with distribution likely to be similar to previous years. In particular it was noted that <i>Enhalus acoroides</i> meadows showed good coverage, prolific flowering and minimal leaf burning with dugong feeding trails throughout. All seagrass reports are available on request or on the NQBP website.</p>
Water	<p>Whilst not required as part of current approval obligations, NQBP commenced voluntary ambient marine water quality monitoring in January 2018. This program is ongoing and includes in-situ real-time loggers alongside 6-weekly vessel-based laboratory sampling. Reports for the 17/18 period are currently being finalised.</p> <p>Preliminary results from 2017/18 data from the high frequency sea floor mounted loggers continue to demonstrate an important coastal process both along the east coast Ports and Weipa – that wave pressure (swell and tide) continues to be the main drivers of suspended sediment concentrations in the water column, well above local water quality guidelines.</p>
Sediment	Sediment Characterisation Study completed in March 2018 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 <i>Brisbane</i> . Mitigation measures such as turtle deflectors and spotter records were assessed as compliant during the Internal Environmental Audit completed during the works.
Biosecurity	<p>NQBP undertake an ambient Early-Detection Monitoring Program of settlement plates within the Weipa marine port area. Mid-2017 a single detection of an Asian Green Mussel was identified in the Weipa area (Amrun). The monitoring program was ramped up to response mode and was maintained at this level throughout the full 2018 dredge campaign. No further detections have since been found, monitoring continues.</p> <p>The TMR Risk Assessment completed prior to commencement of this years’ campaign also included details regarding vessel inspections and low level of risk prior to commencement.</p> <p>NQBP is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.</p>

Amrun	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	~42,038m ³
Dates	01/05/2018 to 04/05/2018
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	<p>The first maintenance dredging campaign for the Port commenced on 01 May 2018 and was completed on 04 May 2018 in accordance with sea dumping permit number 2017/3722. RTAW must ensure that no more than 92,000 cubic metres (in-situ) of material derived from maintenance dredging of the Amrun berth pocket and departure channel is loaded and dumped. The dredge volume for the 2018 maintenance dredge campaign was ~42,038m³ with ~49,917m³ remaining available for the 2019 and 2020 dredge campaigns. All material was disposed at the approved designated disposal site with dump tracks recorded by GPS for all dump runs with material evenly distributed over the disposal site. RTAW's annual compliance report for 2018 (EPBC 2010/5642) notes compliance with the Port Maintenance Dredge Management Plan and permit 2017/3722. This report can be located at the following link within tables 4 and 7 respectively</p> <p>http://www.riotinto.com/documents/Amrun_annual_compliance_report_2018.pdf</p>
Environmental incidents	Nil incidents were recorded
Environmental complaints	Nil complaints were recorded
Seagrass	A small area of seagrass has been 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	<p>Dredging & disposal operations occurred over 4 days and therefore water quality impacts would be temporary (short term) and of a shorter duration than those experienced naturally in the wet season where background water quality turbidity levels can exceed 200 NTU. 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. The Port Maintenance Dredging Water Quality Report can be viewed at the following link:</p> <p>http://www.riotinto.com/documents/Amrun_maintenance_dredge_water_quality_report_2018.pdf</p>
Sediment	As above
Turtles and dugongs	Nil interactions or observations were recorded during dredging or placement operations of either the TSHD <i>Brisbane</i> or <i>Willunga</i> -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. RTAW have an established marine pest surveillance program which forms part of the monitoring arrangements defined in the RTAW Port Maintenance Dredge Management Plan (Commonwealth and State).

Cairns	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge) Willunga (Grab Dredge)
Dredge Volume	Brisbane - 513,858 in-situ m ³ , 321,497 dry tonnes, 834,503 wet m ³ Willunga - 3,889 in-situ m ³ , 3,407 dry tonnes, 4,355 wet m ³
Dates	Brisbane - 11/08/18 to 06/09/18 and 29/10/18 to 3/11/18
Dredge Location	Brisbane - Channel Willunga - Portions of Inner Port wharves (1 to 8) and Marlin Marina (northern).
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 Return for the Environmental Authority (EA) submitted during September. Nil non-compliance issued by regulatory agencies.
Environmental incidents	Nil incidents.
Environmental complaints	Nil complaints.
Seagrass	Cairns Harbour and Trinity Inlet Long Term Seagrass Long Term Monitoring Program – annual survey completed by James Cook University, TropWater, during October (helicopter) and December (vessel) 2018. Quarterly PAR light data collection and seed viability surveys continued.
Water	Water quality verification under the LTSDSDMP or EMP not required during the period, and program for Trinity Inlet inner port areas continued periodically, with outcomes consistent with long-term trends. Dry season data collection at one of the sites for the CSDP was inclusive of the late October maintenance-dredging period.
Sediment	Sediment Analysis Plan (SAP) – implemented between April and August for the Channel, Inner Port, Marina, and Navy Base areas. No detection of contaminants exceeding NAGD guideline limits, some required Phase III for certain areas (2 marinas) above screening guidelines levels) and material ultimately 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 <i>Brisbane</i> or <i>Willunga</i> -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 2018 period. Ports North is also partnering with Biosecurity Queensland and other Queensland Port Authorities in an early warning pilot study.

Karumba	
Dredge Type	<i>Brisbane</i> (Trailing Suction Hopper Dredge)
Dredge Volume	508,841 in-situ m ³ , 205,427 dry tonnes, 547,788 wet m ³
Dates	05/05/18 to 19/07/18 73 day campaign, however low productivity (around 40%) due standby for single tide 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 within annual forecast. Annual Return for the Environmental Authority (EA) submitted during July. 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 2018.
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 2018, with sustained very good seagrass meadows present, and continued high biomass and seed bank stability.
Water	Water quality verification under the LTMMP or EMP not triggered or required during the period. No significant wet season events in the months preceding the 2018 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 <i>Brisbane</i> or <i>Pacific Conquest</i> 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 2018 period.