

Maintenance Dredging of Queensland Ports Review of 2020 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 2020 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 2020, maintenance dredging was undertaken at the following ports:

- Cairns
- Weipa
- Townsville
- Mackay
- Bundaberg
- Gladstone
- Brisbane

This maintenance dredge program is now complete.

This document summarises the outcomes of the 2020 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.

It should be noted that in 2020, the marine pest species White Colonial Sea Squirt (*Didemnum perlucidum*) was detected at a number of Ports throughout Queensland. The fecundity of this species limits potential eradication options however QPA will continue to work with BSQ for any further management measures that may be required.

The outcomes of this review will be considered and incorporated into the maintenance dredging schedule for 2021.

Bundaberg	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	66,221 m ³
Dates	10/04/2020 -17/04/2020
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 PoB LTMMMP monitoring for seagrass, benthic and particle size analysis assessment at the disposal site is undertaken every five (5) years with the last survey carried out in 2020. Initial communications with sampling specialist indicate good coverage of seagrass within and around the spoil ground.</p> <p>GPC expect finalisation of the report in early 2021 and will display this monitoring report on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg</p>
Water	<p>A water quality monitoring program has been designed and implemented to ensure water quality does not deteriorate as a result of maintenance dredging and thus to protect sensitive receptors in the area. The whole suite of WQ physico-chemical parameters is collected in real-time by a multiparameter sonde. Turbidity data is used in conjunction with an adaptive management framework that prompts evaluation and management actions.</p> <p>No water quality impact was detected from the activity.</p>
Sediment	<p>Sediment quality against the NAGD 2009 was last conducted in 2019 and found to be suitable for placement at sea.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg</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 and includes visual observations with protocols on when to stop activities, wait, and re-commence activity, plus guidance on reporting.</p> <p>No impacts to marine megafauna was identified from the activity.</p>
Biosecurity	No marine pests identified during activity.

Cairns	
Dredge Type	<i>Brisbane</i> (Trailing Suction Hopper Dredge) <i>Willunga</i> (Grab Dredge)
Dredge Volume	<i>Brisbane</i> – 139,309 in-situ m3, 135,696 dry tonnes, 313,748 wet m3 <i>Willunga</i> – 43,071 in-situ m3, 39,875 dry tonnes, 48,240 wet m3
Dates	<i>Brisbane</i> – 20/4/20 to 1/5/20
Dredge Location	<i>Brisbane</i> - Channel <i>Willunga</i> - 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 Return and Annual Fee for the Environmental Authority (EA) submitted. 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) 2020. PAR light data collection and seed viability surveys continued.
Water	Water quality verification under the LTSDMP or EMP not required during the period, and no campaign specific sampling conducted.
Sediment	Sediment Analysis Plan (SAP) – implemented between February and March 2020 for the Channel, Inner Port, Marina, and Navy Base areas. No detection of contaminants exceeding NADG guideline limits, and material 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 <i>TSHD 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 2020 period. Implementation of Biosecurity Q-SEAS program enacted, with detection of one non-priority marine pest (Black Scar Oyster) occurring.

Weipa	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	355,953 m ³
Dates	04/05/2020 to 28/05/2020
Dredge Location	Port of Weipa - 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	<p>Annual seagrass monitoring was conducted in the Port of Weipa between the 29th August and 3rd of September 2020. Monitoring in 2020 found seagrasses in the Port of Weipa were in overall good condition.</p> <p>All monitoring meadows were in good or very good condition for all three indicators measured; biomass, area and species composition with the exception of species composition in A6 which decreased to satisfactory. Total area of seagrass meadows in the region closest to the port (Intensive Monitoring Area (IMA)) was above the long-term average for the fifth consecutive year. Seagrass cover across the whole port (including Pine River Bay, Embley and Mission Rivers) was higher than any other survey since monitoring began in 2000. Dugong feeding trails were observed throughout seagrass meadows in the port.</p>
Water	<p>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.</p> <p>The data showed that during the 2020 maintenance dredging program, the turbidity was generally controlled by the natural conditions (tidal currents and wind/wave conditions), with higher turbidity occurring during periods with larger waves. The Port of Weipa 2020 maintenance dredging program did not influence the regional turbidity of the area.</p>
Sediment	A Sediment Characterisation Study was completed in March 2018 as per the 5-yearly requirement under the NAGD 2009. The sampling confirmed compliance of maintenance dredge material to the NAGD and continued suitability for ocean disposal at the current approved Dredged Material Placement Area.
Turtles and dugongs	Nil interactions or observations recorded during dredging or placement operations. Mitigation measures such as turtle deflectors and spotter records were assessed as compliant during the Internal Environmental Audit completed during the works.
Biosecurity	<p>No marine pests identified during activity.</p> <p>In early 2020, the marine pest species White Colonial Sea Squirt (<i>Didemnum perlucidum</i>) was detected within adjacent Port facilities of Amrun. Whilst this species has not been confirmed within the Port of Weipa, throughout 2020, multiple detections of this species along other locations on the Queensland coastline was confirmed by Biosecurity Queensland. The fecundity of this species limits potential eradication options however NQBP continue to work with BSQ for any further management measures that may be required.</p> <p>Specific management measures were implemented during dredging activity at Weipa to minimise the incursion of marine pest species (Dredge Environmental Management Plan).</p>

Townsville	
Dredge Type	Brisbane (Trailer Suction Hopper Dredge) Other dredges (Grab Dredge)
Dredge Volume	Brisbane: 499,086m ³ Grab Dredge: 1930m ³
Dates	Brisbane: 1/06/2020 to 29/06/2020 Grab: 16/03/2020 to 17/06/2020 (intermittent)
Dredge Location	<i>Brisbane</i> : Platypus and Sea Channels, Inner and Outer Harbours Grab: Berth 4, Berth 8 and Ross Creek
Permit compliance	No non-compliances.
Environmental incidents	No incidents.
Environmental complaints	No reported complaints.
Seagrass	Seagrass monitoring within Cleveland Bay was undertaken in September and October 2020. The report will be made available on Port's website once finalised. The 2019 report is available at the link below: https://www.townsville-port.com.au/environment/cleveland-bay-monitoring/
Water	Marine water quality monitoring was undertaken 4 times during 2020 at locations within or adjacent to the receiving environment (Ross River, Ross Creek, Cleveland Bay). Samples were analysed for suspended solids, nutrients and metals. Results were similar to previous years. Results have contributed to the Dry Tropics Partnership for Healthy Waters Annual Report Card. https://drytropicshealthywaters.org/ Turbidity and PAR data was collected in 2020 at several underwater locations in Cleveland Bay. Two real time water quality buoys in Cleveland Bay also measured turbidity, temperature and electrical conductivity throughout the year, including during maintenance dredging and placement activities. NTU levels were within the ambient levels throughout maintenance dredging and placement activities. Data from these buoys is available on a water quality dashboard on Port's website https://www.townsville-port.com.au/environment/cleveland-bay-monitoring/
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. In 2020 sediment quality in Ross Creek was assessed against NAGD 2009 guidelines and was determined not suitable for placement at sea.
Turtles and dugongs	Visual observations during dredging. No interactions with dredges.
Biosecurity	Port of Townsville is partnering with Biosecurity Queensland and other Queensland Port Authorities on the Queensland Seaports eDNA Surveillance (Q-SEAS) marine pest pilot program. The White Colonial Sea Squirt was detected in the Townsville Marine Precinct (TMP) as part of this program. All users of TMP were informed and measures and monitoring put in place to minimise potential spread of this marine pest. Throughout 2020, multiple detections of this species along other locations on the Queensland coastline was confirmed by Biosecurity Queensland. The fecundity of this species limits potential eradication options however PoTL continue to work with BSQ for any further management measures that may be required.

Gladstone	
Dredge Type	<i>Brisbane</i> (Trailer Suction Hopper Dredge) <i>Saibai</i> (Cutter Suction Dredge)
Dredge Volume	<i>Brisbane</i> : 255,986 m ³ <i>Saibai</i> : 186,055 m ³
Dates	<i>Brisbane</i> : 08/09/2020 - 12/10/2020 <i>Saibai</i> : 18/05/2020 – 07/11/2020
Dredge Location	<i>Brisbane</i> : Berths, swing basins, inner and outer channels <i>Saibai</i> : Marina
Permit compliance	No non-compliances
Environmental incidents	No reportable environmental incidents
Environmental complaints	No complaints received
Seagrass	<p>Light is monitored in real time at a seagrass meadow within the potential zone of influence before, during and after dredging. The light monitoring, in conjunction with an adaptive framework flowchart, prompts evaluation and management actions to protect seagrass.</p> <p>This is supported by an annual seagrass monitoring program that maps and monitors the health of meadows.</p> <p>No impact was detected from the 2020 campaign.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>
Water	<p>TSMD - Real time turbidity monitoring is undertaken inside and outside the potential zone of influence as determined by modelling of maintenance dredging plumes and used in conjunction with an adaptive management framework that prompts evaluation and management actions.</p> <p>CSD - Real time turbidity monitoring is undertaken on decant waters along with grab samples to verify Total Suspended Solids and measure metal / TBT concentrations. These measurements are used in conjunction with an adaptive management flowchart that prompts evaluation and management actions.</p> <p>No impact was detected from the 2020 campaigns.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>
Sediment	<p>In line with the long-term monitoring schedule in the PoG 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: https://www.gpcl.com.au/maintenance-dredging-gladstone</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) 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.</p> <p>No impacts to marine megafauna was identified from the activity.</p>
Biosecurity	<p>The PoG LMDMP has a five (5) yearly Marine Pest Survey schedule, last conducted by the Department of Agriculture and Fisheries (DAF) in 2019-2020.</p> <p>The survey confirmed, no detections of invasive marine pests. GPC is continuing their involvement in an annual integrated ports program with DAF in 2021.</p> <p>GPC expect finalisation of the report in early 2021 and will display this monitoring report on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>

Mackay	
Dredge Type	Brisbane (Trailing Suction Hopper Dredge)
Dredge Volume	123,870m ³
Dates	13/12/2020 to 24/12/2020
Dredge Location	Port of Mackay – berths, swing basins and siltation trench
Permit compliance	Compliant with all State and Commonwealth approvals
Environmental incidents	Nil incidents were recorded
Environmental complaints	Nil complaints were received
Seagrass	<p>Annual seagrass monitoring was conducted in the Port of Mackay and Hay Point in October 2020. Monitoring found seagrass in the deep-water survey block off Mackay and around Keswick Island were in average to good condition, with a substantial reduction in area for the deep-water seagrasses off Hay Point compared to the very high levels observed last year (i.e. back to levels more typically observed in previous years). Coastal seagrass around Dudgeon Point also declined compared to 2019 levels. There was an abundance of turtles identified at the Keswick Island survey locations.</p> <p>Long-term trends for the Mackay Hay - Point region indicate regular annual occurrence of the colonising species <i>Halophila decipiens</i> between July and December and the occasional occurrence of <i>Halophila spinulosa</i> within the greater port limits (York et al. 2015). For the remainder of the year their populations remain dormant in the form of a seed bank. Annual surveys in the port region over the last fifteen years as part of the NQBP/JCU seagrass monitoring partnership have found significant inter-annual variability in both the spatial extent and above-ground density of seagrass in the area.</p>
Water	NQBP completed ambient marine water quality monitoring prior to, during and post the maintenance dredging program. Satellite derived turbidity data was also used to monitor any potential dredge plume. No management actions were required and no impacts (dredge related plumes) on sensitive receiving environments were observed.
Sediment	A Sediment Characterisation Study was completed in December 2018 as per the NAGD 2009. The sampling confirmed compliance of maintenance dredge material to the NAGD and suitability for ocean disposal at the current approved Dredge Material Placement Area.
Turtles and dugongs	Nil interactions or observations were recorded during dredging or placement operations. Mitigation measures such as turtle deflectors and spotter records were assessed as compliant during the Internal Environmental Audit completed during the works.
Biosecurity	<p>No marine pests identified during activity in December 2020.</p> <p>In March 2020 the marine pest species White Colonial Sea Squirt (<i>Didemnum perlucidum</i>) was detected within Mackay Port. Throughout 2020 multiple detections of this species along the Queensland coastline was confirmed by Biosecurity Queensland. The fecundity of this species limits potential eradication options however NQBP continue to work with BSQ for any further management measures that may be required.</p> <p>Specific management measures were implemented during dredging activity at Mackay to minimise the potential spread of this species (Dredge Environmental Management Plan).</p>

Brisbane	
Dredge Type	Brisbane (Trailing Hopper Suction Dredge)
Dredge Volume	430,150m ³
Dates	Brisbane – 20/12/19 to 6/03/20, 3/07/20 to 5/09/20
Dredge Location	Brisbane River
Permit compliance	Fully compliant with all State Approvals (Environmental Authority, Marine Park Permit and Allocation of Quarry Material).
Environmental incidents	Nil incidents were recorded.
Environmental complaints	Nil complaints recorded in regard to maintenance dredging operations or activities.
Seagrass	<p>Port of Brisbane Seagrass Monitoring Program - annual survey undertaken by BMT in July and August 2020. Consistent with previous years, although only four of five seagrass species were recorded (<i>Halodule univervis</i> not 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.</p> <p>(https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</p>
Water	<p>Triennial dredging turbidity monitoring was undertaken in February 2020. The monitoring found that the dredging activity created larger plumes than the dredged material disposal. Plumes remained within both dredging areas and the dredged material placement area and there was no impacts on sensitive receptor sites. (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</p>
Sediment	<p>Annual Sediment Sampling and Analysis Plan (SAP) – undertaken in August 2018. 43 samples across 4 zones plus reference and placement sites. All sediment determined to be suitable for unconfined ocean disposal.</p> <p>(https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</p>
Turtles and dugongs	Nil interaction with dredging.
Biosecurity	<p>Brisbane underwent out-of-water refit in Cairns in November 2020. Inspection of the hull and associated areas detected no marine pests of concern. Fresh antifoul paint was applied.</p> <p>In January 2020 the marine pest species White Colonial Sea Squirt (<i>Didemnum perlucidum</i>) was detected at the Port of Brisbane. Throughout 2020 multiple detections of this species along the Queensland coastline was confirmed by Biosecurity Queensland. The fecundity of this species limits potential eradication options however PBPL continue to work with BSQ for any further management measures that may be required.</p>