

Maintenance Dredging of Queensland Ports Review of 2022 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 2022 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 2022, maintenance dredging was undertaken at the following ports:

- Bundaberg
- Townsville
- Weipa
- Amrun
- Kurumba
- Cairns
- Gladstone
- Brisbane

This maintenance dredge program is now complete.

This document summarises the outcomes of the 2022 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.

Bundaberg	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	55,528 m ³
Dates	15/04/2022 - 25/04/2022 and 05/09/2022 - 06/09/2022
Dredge Location	Berths, swing basins, inner and outer channels
Permit compliance	No non-compliances
Environmental incidents	No environmental incidents
Environmental complaints	No complaints received
Seagrass	<p>The Port of Bundaberg LTMMP 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. The study showed the presence of a large deep-water seagrass meadow within and outside the spoil ground. No differences were found in seagrass biomass and sediment particle size distribution between inside and outside the sea placement site. Infauna communities were more diverse and abundant outside the spoil ground, however no relationship with increasing distance from the spoil ground was found. Therefore, the study showed no evidence of dredge spoil placement impacts on seagrass and benthic communities occurring outside the placement site.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg</p>
Water	<p>A water quality monitoring program has been designed and implemented prior, during and post maintenance dredging operations to ensure water quality does not deteriorate as a result of maintenance dredging plumes and thus to protect sensitive receptors in the area. Turbidity is collected and in the dredging phase data screened against developed turbidity triggers. The monitoring is paired with a tailored adaptive management framework ensuring appropriate actions are taken when turbidity levels reach the above mentioned triggers.</p> <p>No water quality impact was detected from the activity.</p>
Sediment	<p>Sediment Quality assessment following the NAGD was last conducted in 2019, with sediments within the dredge footprint found to be suitable for sea placement.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-bundaberg</p>
Turtles and dugongs	<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. Indirect impacts to these species are mitigated through the management of water quality during maintenance dredging activities.</p> <p>No impacts to marine megafauna were identified from the activity.</p>
Biosecurity- Pests	<p>Marine No marine pests identified during activity.</p>

Townsville	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	398,050m ³
Dates	13/09/2022 to 09/10/2022
Dredge Location	Platypus Channel, Outer Harbours, Inner harbour, and authorised Berth pockets
Permit compliance	Two on board observations were undertaken As per incidents below
Environmental incidents	Two (2) incidents – 1) Deceased Turtle sighted with vessel strike/crush injuries; and 2) Grease balls washing up on Townsville beaches. DES and DCCEEW were both notified of the incidents.
Environmental complaints	One (1) complaint received – a member of the public made a complaint about grease balls washing up on a Townsville Beach.
Seagrass	Seagrass monitoring within Cleveland Bay was undertaken in September and October 2022. The report will be made available on Port's website once finalised in early 2023. The 2021 report is available at the link below: https://www.townsville-port.com.au/environment/monitoring/monitoring-in-cleveland-bay/
Water	26 routine marine water monitoring sites were sampled in March, June, August and November 2022 within or adjacent to the receiving environment (Ross River, Ross Creek, Cleveland Bay, Inner Harbour, Outer Harbour, Platypus and Sea Channels). 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. The 2021 Report card can be found here: https://drytropicshealthywaters.org/2021-report-card/ Turbidity and PAR data was collected in 2022 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/monitoring/monitoring-in-cleveland-bay/
Sediment	In line with the NAGD 2009 guidelines, sediment quality is assessed every five (5) years. The sediment sampling and analysis plan was undertaken in late 2021 and authorised in early 2022. All material, except that in Berths 3, 5, 8, ex berths 6/7, and Ross Creek was authorised for unconfined sea placement. Should any material from Berths 3, 5, 8, ex berths 6/7, and Ross Creek need dredging, the Port has sufficient land placement areas to cater for this material. 216 routine marine sediment monitoring sites were sampled in June and October 2022 in and adjacent the Port's receiving environment. This grab sampling aids in monitoring trends and sediment status between the 5 yearly SAP programs.
Turtles and dugongs	Marine fauna visual observations were undertaken during dredging and placement conditions, as per the Port's permit conditions, and the dredge EMP requirements.
Biosecurity	Port of Townsville is partnering with Biosecurity Queensland and other Queensland Port Authorities on the Queensland Seaports eDNA Surveillance (Q-SEAS) marine pest monitoring program. The White Colonial Sea Squirt continues to be sighted in the Townsville Marine Precinct (TMP) and has been confirmed by e-DNA analysis on Berth 11 piles in 2022.

Weipa	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	808,800m ³
Dates	1/05/2022 to 18/06/2022
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 complaints
Seagrass	Annual seagrass monitoring was conducted in the Port of Weipa during August and September 2022. The report will be made available on NQBP's website once finalised. The 2021 report is available at the link below: https://nqbp.com.au/_data/assets/pdf_file/0023/38543/Weipa-seagrass-monitoring-2021.pdf
Water	NQBP completed ambient marine water quality monitoring prior to, during and post 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 2022 maintenance dredging program, the turbidity was generally driven by the natural conditions (tidal currents and wind/wave conditions). The Port of Weipa 2022 maintenance dredging program did not influence the regional turbidity of the area.
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 Albatross Bay Dredged Material Placement Area. A new Sediment Characterisation Study will be completed prior to the 2023 maintenance dredging campaign.
Turtles and dugongs	Visual observations were undertaken and recorded in dredge logs. Nil interactions or observations recorded during dredging or placement operations.
Biosecurity	No marine pests identified during activity. Specific management measures were implemented during dredging activity at Weipa to minimise the incursion of marine pest species (Dredge Environmental Management Plan).

Amrun	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	29,129 m ³
Dates	23/05/2022 to 25/05/2022
Dredge Location	Amrun Approach and Berth Pocket
Permit compliance	Compliant with state and Commonwealth approvals
Environmental incidents	No reported incidents
Environmental complaints	No reported complaints
Seagrass	Seagrass populations around Amrun are located within Boyd Bay, outside the area of impact and no monitoring is required under the long term dredge management plan
Water	<p>Visual observations and satellite imagery collected during dredging identified the plume was localised around the dredge vessel.</p> <p>No vessel-based monitoring is required under the dredge management or environmental management plans based on the volume dredged.</p>
Sediment	A Sediment Characterisation Study was completed in 2017 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 Amrun Material Placement Area. A new Sediment Characterisation Study will be completed prior to the 2023 maintenance dredging campaign.
Turtles and dugongs	Visual observations were completed and recorded in dredge logs. Nil interactions or observations were recorded during dredging or placement operations
Biosecurity	All vessels underwent a marine pest risk assessment prior to mobilising to site in which all vessels were assessed as low risk. No marine pests were identified during dredging activities.

Karumba	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i> and Bed Levelling vessel <i>Pacific Titan</i>
Dredge Volume	<i>Brisbane</i> – 103,810 in-situ m3
Dates	<i>Brisbane</i> – 9/06/2022 to 7/7/2022 and <i>Pacific Titan</i> 20/06/2022 to 9/7/2022
Dredge Location	<i>Brisbane</i> – Channel including amended alignment for the established navigational area
Permit compliance	New 10-year Sea Dumping Permit resolved with the Commonwealth and an amended Environmental Authority (EA) resolved with the State during May 2022. All works compliant and consistent with Environmental Authority, 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	Long Term Seagrass Long Term Monitoring Program – annual survey completed by James Cook University, TropWater, during October. Continued robust and productive meadows were again observed and in some area at near record density or biomass
Water	Water quality verification under the EA was not required during the period, and campaign specific sampling conducted.
Sediment	Sediment Analysis Plan (SAP) – five yearly SAP process implemented in March 2020, along with specific sampling of the channel bend navigation area so as to inform application process. No events recorded within intervening period likely to have caused a change in contaminant status.
Turtles and dugongs	Nil interactions or observations recorded during dredging or placement operations of the <i>TSHD Brisbane</i> activity.
Biosecurity	Benthic surveys were completed in 2020, with no detections within the areas to be dredged or at the DMPA as set out in the Sediment Analysis Plan. There were no detections or reports of actual or suspect material during 2022 period.

Cairns	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i> <i>Willunga</i> (Grab Dredge)
Dredge Volume	<i>Brisbane</i> – 501,860 in-situ m3, <i>Willunga</i> – 41,277 in-situ m3,
Dates	<i>Brisbane</i> – 11/07/2017 to 13/07/2022 then 7/8/2022 to 2/9/2022 <i>Willunga</i> – throughout year
Dredge Location	<i>Brisbane</i> - Channel <i>Willunga</i> - Portions of Inner Port wharves (1 to 12), Navy Base and Marinas.
Permit compliance	New 10-year Sea Dumping Permit and Marine Park Permit, including a new DMPA location were resolved with the Great Barrier Reef Marine Park Authority during February 2022, 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 September (helicopter) and October(vessel). PAR light data collection and seed viability surveys continued.
Water	Water quality verification under the LTMDMP or EMP was required during the period, with campaign specific sampling conducted to validate the hydrodynamic model and address year one.
Sediment	Sediment Analysis Plan (SAP) – implemented during April 2022 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 detections of actual or suspect material during 2022 period via the SAP process, however ongoing observations of the black scar oyster were made. Implementation of Biosecurity Q-SEAS program continues to be enacted, with the September 2021 detection of Asian Green Mussel remaining subject of ongoing surveillance, with no detections reported.

Gladstone	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	211,726m ³
Dates	11/10/2022 – 15/11/2022
Dredge Location	Berths, swing basins, inner and outer channels
Permit compliance	No non-compliances
Environmental incidents	No environmental incidents.
Environmental complaints	No complaints received
Seagrass	<p>Light is monitored in real time at a seagrass meadow within the zone of influence before, during and after dredging. During the dredging phase, light values as a 14 day rolling average are screened against a light requirement threshold developed through field and laboratory studies. The light monitoring program is incorporated into an adaptive management plan which follows a multi staged approach allowing to implement management responses to reduced light conditions as a result of dredging operations to occur before potential environmental harm to seagrass meadows and sensitive receptors occur.</p> <p>This is supported by a comprehensive annual seagrass monitoring program that assesses the health of seagrass meadows through three (3) key metrics: surface area, biomass and species composition.</p> <p>No impact was detected from the activity with environmental factors such as ambient light levels and tidal state (high or low tide around midday) found to be the main drivers in light changes.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>
Water	<p>Real time turbidity monitoring is undertaken at a compliance and support site whose locations have been determined by maintenance dredging plumes modelling and impact assessment. During dredging, turbidity at the compliance site is screened against developed triggers. Adaptive management steps have been developed ensuring appropriate procedures and actions are undertaken when turbidity reaches such triggers in turn ensuring potential environmental harm from dredging related turbidity plumes is identified, assessed, prevented or minimised.</p> <p>No water quality impact was detected from the activity with environmental factors such as tidal cycles and winds appearing to be the drivers behind turbidity patterns in line with historical data and maintenance dredging 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 PoG LMDMP long-term monitoring schedule and the NAGD, sediment quality in the main channels is assessed every five (5) years. The sediment quality was assessed in 2017 following the NAGD and found to be suitable for sea placement.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>
Turtles and dugongs	<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. Indirect impacts to these species</p>

	<p>are mitigated through the management of water quality during maintenance dredging activities.</p> <p>No impacts to marine megafauna was identified from the activity.</p>
<p>Biosecurity- Marine Pests</p>	<p>As per PoG LMDMP long-term monitoring schedule, a survey to identify any marine pests within the PoG is undertaken every five (5) years. In 2019-2020 GPC in conjunction with Department of Agriculture and Fisheries (DAF) carried out monitoring within the harbour and at the offshore spoil placement site. Results from the monitoring and related samples collected showed no marine pests detections.</p> <p>GPC displays monitoring reports on our website: https://www.gpcl.com.au/maintenance-dredging-gladstone</p>

Brisbane	
Dredge Type	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
Dredge Volume	320,980m ³
Dates	Brisbane 13/09/2021 – 14/04/22
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 regards to maintenance dredging operations or activities.
Seagrass	Port of Brisbane Seagrass Monitoring Program – the annual survey undertaken by BMT from the 30 th June to the 5 th of July. The results show a broadscale and very significant subtidal retraction in the seagrass meadows at Fisherman Islands. This is likely due to the major flooding in March 2022, and the associated sediment loading and reduced light availability. A similar retraction was noted after the 2011 and 2013 floods and although the seagrass did recover, it took a number of years. The Port of Brisbane continues to work with various catchment management stakeholders to address the causes of excessive sediment generated in rain events. Seagrass reports can be viewed on the Port's website: (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)
Water	Triennial dredging turbidity monitoring was last 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/)
Sediment	Sediment Sampling and Analysis Plan (SAP) – was undertaken on two separate occasions during March and August as a result of the floods. 37 and 35 samples were taken across 4 zones plus reference and placement sites. All sediment determined to be suitable for unconfined ocean disposal. Nickel concentrations were relatively high, likely due to the floods. Of interest, OCP concentrations were not elevated whereas they had been following previous floods. (https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)
Turtles and dugongs	Nil interaction with dredging.
Biosecurity	In January 2020 the marine pest species White Colonial Sea Squirt (<i>Didemnum perlucidum</i>) was first detected at the Port of Brisbane. This species of marine pest has been detected in subsequent sampling campaigns.