

## ***Maintenance Dredging of Queensland Ports Review of 2021 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 2021 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 2021, maintenance dredging was undertaken at the following ports:

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

This maintenance dredge program is now complete.

This document summarises the outcomes of the 2021 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. Detections of this species were also recorded in 2021. 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 2022.

Bundaberg	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
<b>Dredge Volume</b>	88,522 m <sup>3</sup>
<b>Dates</b>	25/03/2021 - 03/04/2021
<b>Dredge Location</b>	Berths, swing basins, inner and outer channels
<b>Permit compliance</b>	No non-compliances
<b>Environmental incidents</b>	No reportable environmental incidents
<b>Environmental complaints</b>	No complaints received
<b>Seagrass</b>	<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: <a href="https://www.gpcl.com.au/maintenance-dredging-bundaberg">https://www.gpcl.com.au/maintenance-dredging-bundaberg</a></p>
<b>Water</b>	<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>
<b>Sediment</b>	<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: <a href="https://www.gpcl.com.au/maintenance-dredging-bundaberg">https://www.gpcl.com.au/maintenance-dredging-bundaberg</a></p>
<b>Turtles and dugongs</b>	<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>
<b>Biosecurity- Pests</b>	<p><b>Marine</b> No marine pests identified during activity.</p>

Townsville	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i> Other dredges (Grab Dredge & mini cutter suction)
<b>Dredge Volume</b>	<i>Brisbane</i> : 259,138m <sup>3</sup> Grab Dredge: 9,398m <sup>3</sup> Mini cutter-suction: 700m <sup>3</sup>
<b>Dates</b>	<i>Brisbane</i> : 05/04/2021 to 22/04/2021 Grab: 13/05/2021 to 04/06/2021 Mini cutter suction: 10/10/2021 to 10/10/2021, and 30/10/2021 to 03/11/2021
<b>Dredge Location</b>	<i>Brisbane</i> : Platypus and Sea Channels, Inner and Outer Harbours Grab: Ross Creek Mini cutter suction: Berth 9 and 10
<b>Permit compliance</b>	As per incident below
<b>Environmental incidents</b>	1 TSHD incident – placement of unauthorised material at sea (in DMPA) – DES & DAWE notified: Material not currently authorised for placement at sea (berths 7 and 8) was dredged and placed in the Port's DMPA in early April 2021. No environmental harm was caused by the incident.
<b>Environmental complaints</b>	No reported complaints.
<b>Seagrass</b>	Seagrass monitoring within Cleveland Bay was undertaken in September and October 2021. The report will be made available on Port's website once finalised. The 2020 report is available at the link below: <a href="https://www.townsville-port.com.au/environment/monitoring/monitoring-in-cleveland-bay/">https://www.townsville-port.com.au/environment/monitoring/monitoring-in-cleveland-bay/</a>
<b>Water</b>	Marine water quality monitoring was undertaken four times during 2021 at 31 locations 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. <a href="https://drytropicshealthywaters.org/">https://drytropicshealthywaters.org/</a>  Turbidity and PAR data was collected in 2021 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 <a href="https://www.townsville-port.com.au/environment/monitoring/monitoring-in-cleveland-bay/">https://www.townsville-port.com.au/environment/monitoring/monitoring-in-cleveland-bay/</a>
<b>Sediment</b>	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. New SAP Sampling was undertaken in November 2021, the SAP IR is pending, due for submission to DES and DAWE in February 2022.
<b>Turtles and dugongs</b>	Visual observations were undertaken during dredging. Dredge logs reports were provided, no interactions with marine mega fauna occurred.
<b>Biosecurity</b>	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 was detected again 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.

Weipa	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
<b>Dredge Volume</b>	322,833m <sup>3</sup>
<b>Dates</b>	26/04/2021 to 18/05/2021
<b>Dredge Location</b>	Port of Weipa - South Channel, Inner Harbour and Berths
<b>Permit compliance</b>	Compliant with State and Commonwealth approvals
<b>Environmental incidents</b>	No reported incidents
<b>Environmental complaints</b>	No reported incidents
<b>Seagrass</b>	Annual seagrass monitoring was conducted in the Port of Weipa between the 20 <sup>th</sup> and 24 <sup>th</sup> of August 2021. Monitoring in 2021 found seagrasses in the Port of Weipa were in overall good condition. Meadow biomass, area and species composition were similar to monitoring undertaken in 2020. Total area of seagrass meadows in the region closest to the port (Intensive Monitoring Area (IMA)) continued to be above the long-term average.
<b>Water</b>	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 2021 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 2021 maintenance dredging program did not influence the regional turbidity of the area.
<b>Sediment</b>	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.
<b>Turtles and dugongs</b>	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.
<b>Biosecurity</b>	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).

Karumba	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i> and Bed Levelling vessel <i>Pacific Conquest</i>
<b>Dredge Volume</b>	<i>Brisbane</i> – 100,165 in-situ m <sup>3</sup>
<b>Dates</b>	<i>Brisbane</i> – 19/05/2021 to 5/06/21 and <i>Pacific Conquest</i> 25/05/21 to 7/06/21
<b>Dredge Location</b>	<i>Brisbane</i> - Channel
<b>Permit compliance</b>	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.
<b>Environmental incidents</b>	Nil incidents.
<b>Environmental complaints</b>	Nil incidents.
<b>Seagrass</b>	Long Term Seagrass Long Term Monitoring Program – annual survey completed by James Cook University, TropWater, during October. Continued recovery was noted since the flood event decline in 2019
<b>Water</b>	Water quality verification under the LTDSMP or EMP not required during the period, and no campaign specific sampling conducted.
<b>Sediment</b>	Sediment Analysis Plan (SAP) – five yearly SAP process implemented in March 2020. No events recorded within intervening period likely to have caused a change in contaminant status.
<b>Turtles and dugongs</b>	Nil interactions or observations recorded during dredging or placement operations of the <i>TSHD Brisbane</i> activity.
<b>Biosecurity</b>	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 2021 period.

Cairns	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i> <i>Willunga</i> (Grab Dredge)
<b>Dredge Volume</b>	<i>Brisbane</i> – 428,858 in-situ m3, 303,376 dry tonnes, 719,724 wet m3 <i>Willunga</i> – 31,407 in-situ m3, 27,296 dry tonnes, 35,175 wet m3
<b>Dates</b>	<i>Brisbane</i> – 10/06/2021 to 04/07/2021 <i>Willunga</i> – throughout year
<b>Dredge Location</b>	<i>Brisbane</i> - Channel <i>Willunga</i> - Portions of Inner Port wharves (1 to 12), Navy Base and Marinas.
<b>Permit compliance</b>	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.
<b>Environmental incidents</b>	Nil incidents.
<b>Environmental complaints</b>	Nil incidents.
<b>Seagrass</b>	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.
<b>Water</b>	Water quality verification under the LTSDMP or EMP not required during the period, and no campaign specific sampling conducted.
<b>Sediment</b>	Sediment Analysis Plan (SAP) – implemented during May 2021 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.
<b>Turtles and dugongs</b>	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.
<b>Biosecurity</b>	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 2021 period via the SAP process, however ongoing observations of the black scar oyster were made, and two detections of Asian Green Mussel from two separate sources were reported in September and remain subject of ongoing surveillance to determine if any further presence has occurred. Implementation of Biosecurity Q-SEAS program continues to be enacted

Gladstone	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
<b>Dredge Volume</b>	239,228m <sup>3</sup>
<b>Dates</b>	02/10/2021 – 04/11/2021
<b>Dredge Location</b>	Berths, swing basins, inner and outer channels
<b>Permit compliance</b>	No non-compliances
<b>Environmental incidents</b>	One (1) record keeping anomaly was communicated to the Department of Water and Environment (DAWE) under the Sea Dumping Approval (SD2018/3762) where the TSHD plotted an erroneous dump run which did not reflect the actual material disposed lawfully within the East Banks Sea Disposal Site (EBSDS).
<b>Environmental complaints</b>	No complaints received
<b>Seagrass</b>	<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: <a href="https://www.gpcl.com.au/maintenance-dredging-gladstone">https://www.gpcl.com.au/maintenance-dredging-gladstone</a></p>
<b>Water</b>	<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: <a href="https://www.gpcl.com.au/maintenance-dredging-gladstone">https://www.gpcl.com.au/maintenance-dredging-gladstone</a></p>
<b>Sediment</b>	<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: <a href="https://www.gpcl.com.au/maintenance-dredging-gladstone">https://www.gpcl.com.au/maintenance-dredging-gladstone</a></p>
<b>Turtles and dugongs</b>	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

	<p>or re-commence activity and 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 was identified from the activity.</p>
<p><b>Biosecurity- Marine Pests</b></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: <a href="https://www.gpcl.com.au/maintenance-dredging-gladstone">https://www.gpcl.com.au/maintenance-dredging-gladstone</a></p>

Brisbane	
<b>Dredge Type</b>	Trailing Suction Hopper Dredge (TSHD) <i>Brisbane</i>
<b>Dredge Volume</b>	98,000m <sup>3</sup>
<b>Dates</b>	Brisbane – 28/12/20 to 23/03/21, 08/07/21 to 30/09/21
<b>Dredge Location</b>	Brisbane River
<b>Permit compliance</b>	Fully compliant with all State Approvals (Environmental Authority, Marine Park Permit and Allocation of Quarry Material).
<b>Environmental incidents</b>	Nil incidents were recorded.
<b>Environmental complaints</b>	Nil complaints recorded in regard to maintenance dredging operations or activities.
<b>Seagrass</b>	Port of Brisbane Seagrass Monitoring Program - annual survey undertaken by BMT in July and August 2021. Six seagrass species were recorded ( <i>Cymodocea serrulate</i> was detected for the first time). 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. <a href="https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/">(https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</a>
<b>Water</b>	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. <a href="https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/">(https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</a>
<b>Sediment</b>	Annual Sediment Sampling and Analysis Plan (SAP) – undertaken in June 2021. 43 samples across 4 zones plus reference and placement sites. All sediment determined to be suitable for unconfined ocean disposal. Nickel and OCP concentrations continuing to decline. <a href="https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/">(https://www.portbris.com.au/Sustainability/Planet/Research-and-Monitoring/)</a>
<b>Turtles and dugongs</b>	Nil interaction with dredging.
<b>Biosecurity</b>	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.