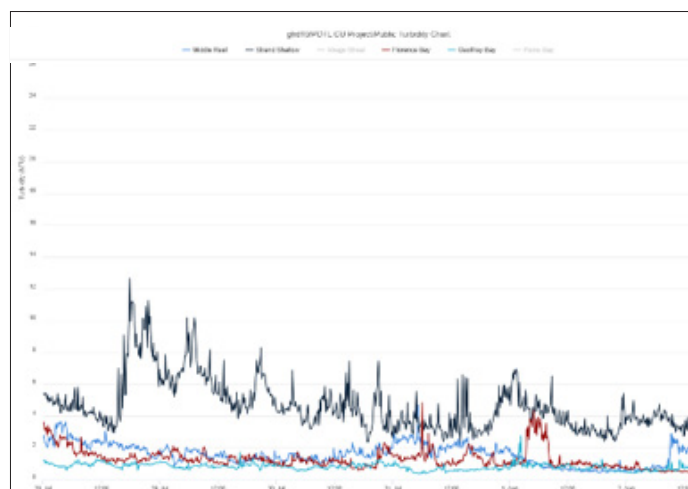


Water Quality Monitoring During Maintenance Dredging

The Port of Townsville carries out maintenance dredging of the shipping channels annually to remove unconsolidated silts, clays and fine sands that build up due to natural processes. To support adaptive dredge management, marine water quality is monitored during maintenance dredging to understand any influence and consider changes to dredging based on observed conditions

DAY TO DAY WATER QUALITY CHECKS

When undertaking dredging, the Port completes a range of monitoring, particularly marine water monitoring, to understand the conditions in Cleveland Bay. The marine water quality information is available in near real time, allowing the Port and dredge operators to be aware of water quality conditions at the time. Weather and prevailing conditions is also reviewed at the time, to understand potential causes for the water quality changes. Where the changes in water quality occur could be influenced by dredging, the Port can review the dredging activities at the time and consider if changes to the operations would help to improve the water quality conditions.



DREDGE CAMPAIGN WATER QUALITY REVIEW

Post dredging, the Port has also undertaken a review of the marine water quality across the dredging campaign to gain further insights into any potential influence from dredging on water quality. In 2025, this review assessed data from six monitoring locations in Cleveland Bay and Halifax Bay (see map inset), including two sites away from any potential influence of dredging (Paluma Shoals, Cleveland Bay) to show any changes that occurred across the whole region. A land based light meter was also utilised to understand when light availability above the water was impacted by cloud or smoke, as this has an impact on the amount of underwater light available also.

Reviewing water quality in terms of underwater light and turbidity before, during and after dredging as well as at locations both close to dredging and far afield allows an assessment of water quality influence from the dredging. In 2025, the Port utilised an external monitoring consultant to review the water quality information and provide independent assessment of the causes of any water quality changes.



KEY FINDINGS

Overall findings in 2025 were that recorded changes in water quality during the maintenance dredge campaign were closely aligned with prevailing regional conditions, with similar trends observed across all locations, including the far-field locations away from any dredging influence. There was no evidence indicating that maintenance dredging activities were driving observed changes in water quality.

Specific outcomes of the review included:

- Underwater light and turbidity levels varied across all monitoring locations before, during and after the maintenance dredge campaign.
- Underwater light and turbidity climate in a shallow bay such as Cleveland Bay is highly variable and readily influenced by climatic drivers such as wind, waves and cloud cover.
- The regional influence of climatic drivers is evident with monitoring locations generally responding in the same manner to climatic influences.
- Underwater light was variable across all locations and times, with decreases in underwater light closely aligned to increases in turbidity and increases in cloud cover and wind and wave activity. Peak levels of underwater light were different across the locations, and were measured before, during and after dredging at different locations.
- The highest average turbidity was recorded at all monitoring locations in September, following the completion of maintenance dredge activities with the highest turbidity measured at the two far field reference locations. These turbidity maximums were aligned with the peak wave height measurements in Cleveland Bay, demonstrating that turbidity increase was a regional scale event driven by wind and wave conditions.
- Overall locations that are shallower (e.g. Strand Shallow, Middle Reef, Paluma Shoals and Cleveland Bay) typically experienced higher turbidity and associated lower underwater light. This is not unexpected as shallower locations are more influenced by wave-induced resuspending of seabed sediments than deeper locations.

MONITORING TO INFORM DREDGING AND PLACEMENT MANAGEMENT

In addition to monitoring water quality for specific dredging campaigns, the Port has undertaken targeted monitoring of turbidity plumes generated from dredging and placement to inform maintenance dredging and sea placement approaches. Key findings from this monitoring work in 2016–2017 included:

- Turbidity plumes from all placement activities were found to remain within the DMPA, with peak turbidity period localised, short lived and remained in the placement area.
- Turbidity plumes from dredging activities largely stayed completely within the channel footprint, and where it did extend outside the channel it was only for a short distance (100–150m). Peak turbidity period from dredging was localised, short lived and remained in the channel.
- Turbidity from both dredging and placement activities were found to return to the background turbidity level within a short timeframe – average of 60mins for both activities.
- Turbidity plumes were found on average to be longer from placement activities than for dredging (600m versus 400m), although the maximum plume length measured was the same for both at 800m in length.



Image credit: AIMS, Joe Gioffre

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