



Weipa Dredge Material Placement Area Marine Macrophyte Assessment 2020

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1. Background & Scope

North Queensland Bulk Ports (NQBP) is looking to move the placement of its current Dredge Material Placement Area (DMPA) in the Port of Weipa (Figure 1). The movement of this area into deeper water is to provide for greater under keel clearance for dredge vessels and to provide additional long term storage capacity. To ascertain information relevant to both Commonwealth and State (Queensland) approval requirements, North Queensland Bulk Ports (NQBP) commissioned the Seagrass Ecology Group at the Centre for Tropical Water and Aquatic Ecosystem Research (TropWATER), James Cook University to conduct marine macrophyte survey within the area covered by the new DMPA. Specifically TropWATER examined the extent of marine plants (seagrass and macro-algae) growing within the footprint of the proposed DMPA (Figure 1).

Objectives of this scope of works were to:

- Determine the presence, distribution and density of marine macrophytes (seagrass and macro algae) that may occur within the area of interest;
- Provide a written report and GIS layers of the presence, distribution and density of marine macrophytes within the area of interest.



Figure 1. Marine macrophyte survey area showing the location of the current DMPA and its proposed shifted location.

2. Sampling approach and methods

The sampling methods followed those used in the established annual seagrass monitoring program and previous whole of port surveys in the Weipa area (Sozou & Rasheed 2018). These standard methods are based on the JCU TropWATER seagrass program for baseline assessment and monitoring in Weipa and for other areas of Queensland including the ports of Cairns, Townsville, Gladstone, Hay Point, Abbot Point, Karumba and Thursday Island.

The following techniques were used to survey marine plants in the survey area:

1. Digital camera mounted to a drop frame that provided a live feed to the surface and incorporated a 0.25m² view of the seafloor from which a researcher could estimate habitat cover, density and species or functional groups present (Figure 2A & B);
2. Van Veen sediment grab (grab area 0.0625 m²) that captures a sample of the upper seafloor sediment to confirm species/habitat type or sediment type seen on the screen (Figure 2C).



Figure 2. Methods used for marine macrophyte habitat assessments using (A & B) live digital camera and (C) Van Veen sediment grab.

At each survey site three camera drops were conducted in approximately 25m² area and information on the presence of marine macrophytes including seagrass and algae was collected. Information collected at each site included;

- Seagrass biomass, percent cover, species composition and distribution;
- Algae type (categorised into functional groups) and percent cover;
- Depth below mean sea level (dbMSL);
- Sediment type;
- Time and position (latitude/longitude) fixes;

All survey data was entered into a Geographic Information System (GIS) database for analysis. From this survey a GIS layer was created in ArcGIS to describe the habitat in the survey area:

- Habitat characterisation survey sites – site (point) data containing the presence and percent cover of each major benthic habitat type, depth below mean sea level (dbMSL), sediment type (based on visual estimates), latitude and longitude from GPS fixes, sampling method and comments.

3. Results & Discussion

The marine macrophyte survey was conducted on the 16th December 2020. Favourable weather and sea state conditions provided excellent water visibility for the assessment of benthic habitats using a live-feed, remote camera (Figure 3). The benthic habitat throughout the entire survey area consisted of open substrate of muddy sediments with no marine plants (seagrass or macro algae) present at any of the assessment sites (Figure 4). A van veen grab was also taken to confirm the sediment type as predominantly mud (see Figure 3).

As part of the NQBP/JCU seagrass monitoring partnership annual surveys in the region have been assessing, mapping and monitoring seagrasses within the port limits for the past 20 years. The baseline survey and subsequent whole of port limit surveys (every 3 years) reveal seagrasses in Weipa are largely confined to intertidal and shallow subtidal, <5m, depths (Sozou & Rasheed 2018). As a consequence the deeper areas within Albatross Bay are not regularly sampled for macrophytes. Specific assessments have been conducted in 2004 and 2011 surveying the deep areas adjacent to the channel for channel widening (Figure 4) (Roelofs et al. 2004, Carter et al 2011). These surveys did not cover the DMPA footprint, however, the seagrass species *Halophila decipiens* was found during the 2004 survey at a single isolated site (Roelofs et al. 2004).

Halophila decipiens is a seasonal and ephemeral species that has exhibited highly variable distribution patterns throughout the Weipa region since the monitoring of the port in 2000 (Sozou & Rasheed 2018). *H. decipiens* takes advantage of favourable light conditions to quickly grow, fruit and set seed within a matter of weeks to months (McMillan 1988, York et al 2015). *H. decipiens* is commonly found in disturbed areas such as dredge spoil grounds and channels that are frequently dredged in other Queensland ports such as Cairns, Gladstone and Hay Point (Chartrand et al 2008, York et al 2015). Its capacity for rapid reproduction enables it to quickly recolonise these areas after disturbances and take advantage of favourable conditions for growth when they occur (Chartrand et al 2008, York et al 2015). It is generally an annual species when it occurs, only present for a few months in a given year. There was no seagrass found in any of the deeper water area surveyed in 2011 (Carter et al 2011). In 2004, *H. decipiens* was found at one site adjacent to the channel midway between beacons 10 and 12 (Roelofs et al. 2004). The depth of that site was 6.2m, the deepest the program has recorded seagrass in the port of Weipa. Given the average depth within the proposed DMPA survey area was 12.2m, it was unsurprising that no seagrass was seen here. While both of these prior surveys found predominantly open substrate bottoms, some macro-algae and benthic forming marco-invertebrate communities were seen in the Albatross Bay region (Roelofs et al. 2004, Carter et al 2011). No such communities were identified within the survey extent of proposed DMPA.

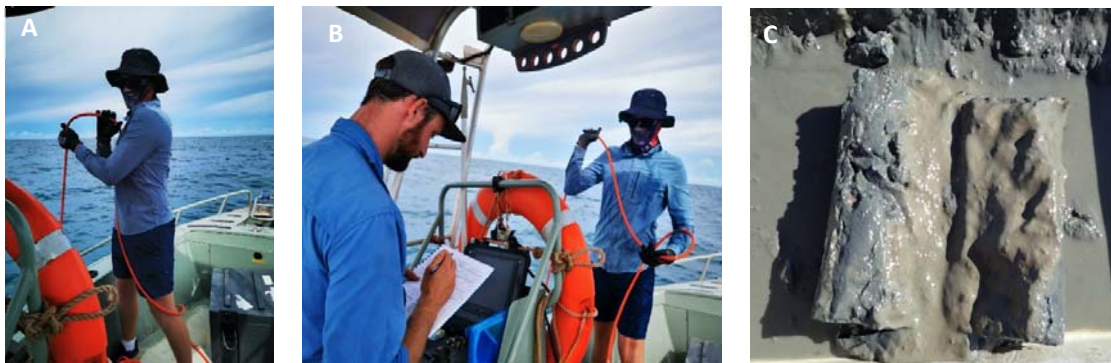


Figure 3. Camera drops (a) were used to survey benthic habitats within the proposed works area and sites were georeferenced on ARCGIS software and assessed from a monitor (b) in the vessel using a live-feed digital camera. Sediment type was confirmed as mud (c) using a Van Veen sediment grab.

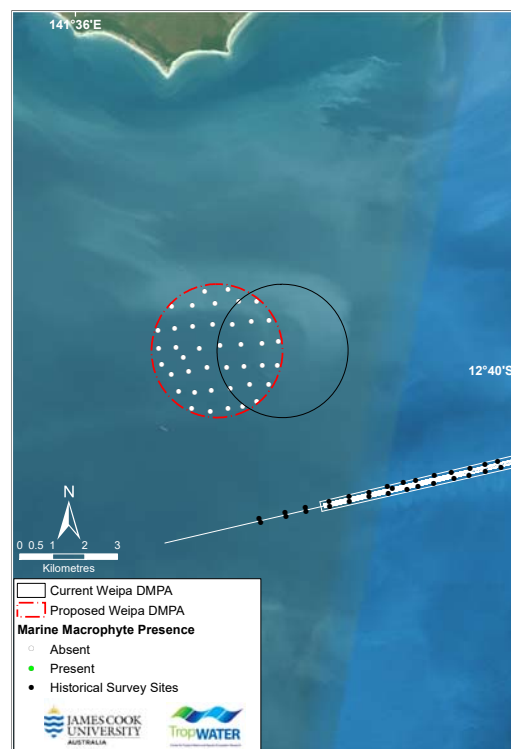


Figure 4. Location and distribution of marine macrophytes (seagrass and macro algae) habitat within the proposed placement of the new Weipa DMPA.

4. References

- Carter, A., McKenna, S.A. & Rasheed, M.A. (2011) Seagrass, algae and macro-invertebrate survey for proposed channel extension in the Port of Weipa. DEEDI Publication. Fisheries Queensland, Cairns, 9pp.
- Chartrand, K.M., Rasheed, M. A., Sankey, T.L. (2008). Deepwater seagrass dynamics in Hay Point – Measuring variability and monitoring impacts of capital dredging. Final Report to the Ports Corporation of Queensland, 43 pp.
- McMillan, C. (1988). "Seed germination and seedling development of *Halophila decipiens* Ostenfeld (Hydrocharitaceae) from Panama." Aquatic Botany **31**(1): 169-176.
- Roelofs, A.J., McKenna, S. and Rasheed, M.A. (2004). Seagrass, algae and macro-invertebrate survey of proposed channel widening in the Port of Weipa. Report to the Ports Corporation of Queensland. (Queensland Department of Primary Industries & Fisheries, Northern Fisheries Centre, Cairns) 7pp.
- Sozou, AM & Rasheed MA 2018, 'Port of Weipa long-term seagrass monitoring program, 2000 - 2017'. Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER) Publication 18/02, JCU Cairns, 45pp.
- York, P. H., et al. (2015). "Dynamics of a deep-water seagrass population on the Great Barrier Reef: annual occurrence and response to a major dredging program." Scientific Reports **5**: 13167.