

Cairns - Marine Plant Assessment for Smith's Creek and Wharf 8 potential Port Infrastructure Sites - June 2021



Reason, CL, McKenna, SA & York, PH.

Report No. 21/31

Cairns - Marine Plant Assessment for Smith's Creek and Wharf 8 potential Port Infrastructure Sites - June 2021

Report No. 21/31

[Centre for Tropical Water & Aquatic Ecosystem Research](#)
[\(TropWATER\)](#)

James Cook University
PO Box 6811
Cairns Qld 4870

Phone: (07) 4232 2023

Email: carissa.reason@jcu.edu.au

Web: www.tropwater.com

Information should be cited as:

Reason, C.L., McKenna, S.A., & York, P.H. 2021, 'Cairns - Marine Plant Assessment for Smith's Creek and Wharf 8 potential Port Infrastructure Sites - June 2021', JCU Publication 21/31, Centre for Tropical Water & Aquatic Ecosystem Research, Cairns.

For further information contact:

Carissa Reason

Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER)

James Cook University

carissa.reason@jcu.edu.au

PO Box 6811

Cairns QLD 4870

This publication has been compiled by the Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), James Cook University.

© James Cook University, 2021.

Except as permitted by the *Copyright Act 1968*, no part of the work may in any form or by any electronic, mechanical, photocopying, recording, or any other means be reproduced, stored in a retrieval system or be broadcast or transmitted without the prior written permission of TropWATER. The information contained herein is subject to change without notice. The copyright owner shall not be liable for technical or other errors or omissions contained herein. The reader/user accepts all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using this information.

Enquiries about reproduction, including downloading or printing the web version, should be directed to carissa.reason@jcu.edu.au

Acknowledgments:

We wish to thank the James Cook University TropWATER staff for their invaluable assistance in the field.

1. Background & Scope

Ports North are planning various infrastructure developments within Cairns Harbour. The proposed new wharf at Smith's Creek #2 and the proposed new jetty at Smith Creek # 3 are associated with the Cairns Marine Precinct. The pile moorings in the southern part of Smith's Creek are proposed to replace pile moorings which have to be removed to facilitate the development of Smith's Creek #3. Also proposed is an extension of wharves #7 and #8. Ports North are seeking the status of marine plants within the proposed works footprints. TropWATER (JCU) was commissioned to complete marine plant surveys at four locations for the proposed Cairns Marine Precinct Wharf Extension within the Harbour as outlined in Figure 1. The survey specifically set out to examine the presence and/or absence, and extent of marine plants (seagrasses and macro-algae) growing within the proposed construction envelope (Figure 1).

Objectives of this scope of works were to:

- Determine the presence, distribution and density of seagrasses and marine macro-algae that may occur within the area of interest;
- Provide a review of existing datasets including previous seagrass and macrobenthic survey results;
- Provide a written report and GIS layers of the presence, distribution and density of seagrasses and macro-algae within the area of interest.

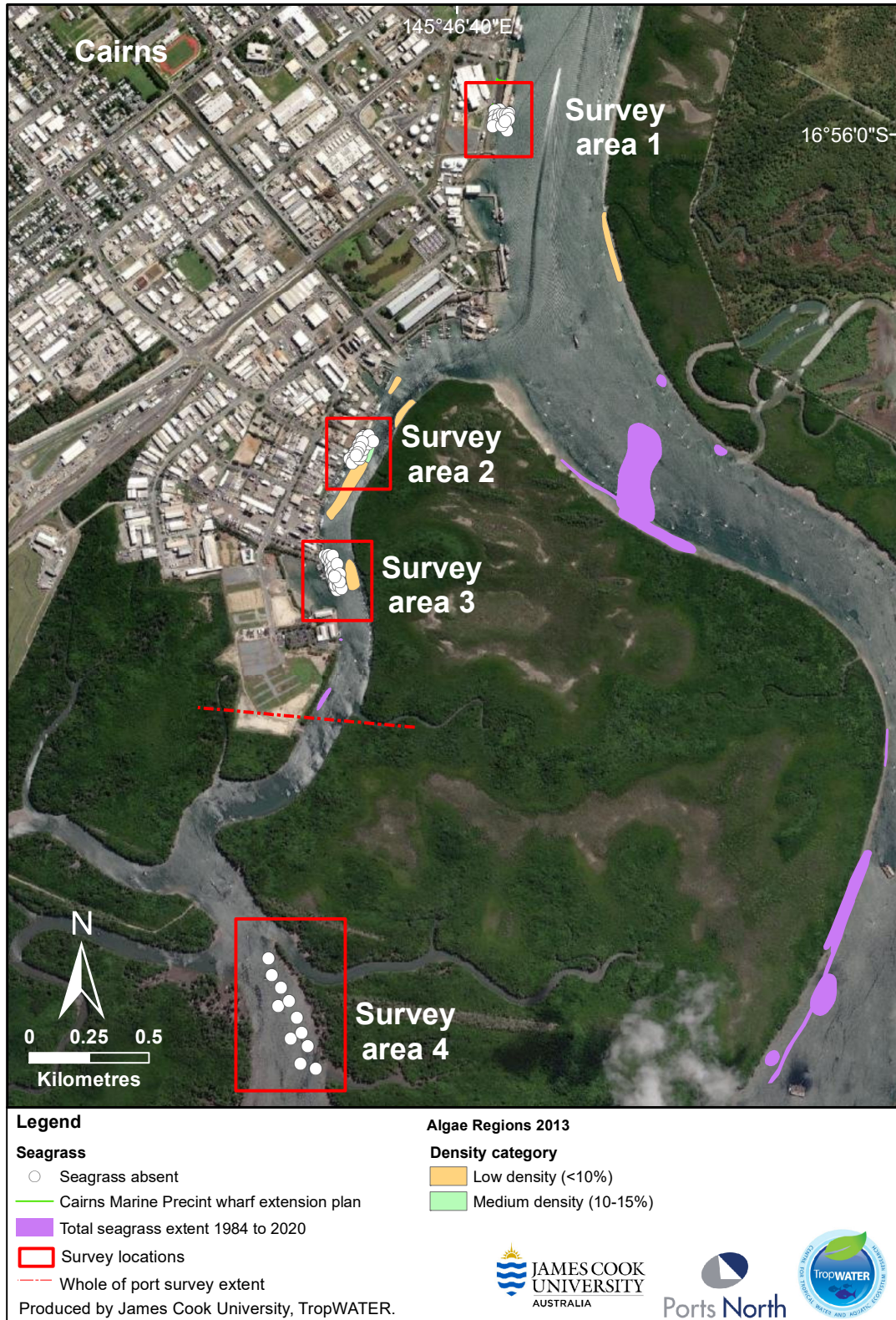


Figure 1. Map showing seagrass extent from 1984 to 2020, 2013 algae extent, and the sampling sites at the four survey areas of proposed wharf extension work.

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 Cairns Harbour area (Reason et al. 2020). These standard methods are based on the JCU TropWATER seagrass program for baseline assessments and monitoring in the Cairns area and for other areas of Queensland including the ports of Townsville, Mackay/Hay Point, Weipa, Gladstone, Abbot Point, Karumba and Thursday Island (McKenna et al. 2021a, York & Rasheed 2021, Smith et al. 2020, Smith et al. 2021, McKenna et al. 2021b, Scott & Rasheed 2021, Wells et al. 2019).

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

1. Digital camera mounted to a drop frame 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 functional groups present (Figure 2a & b);
2. Van Veen sediment grab (grab area 0.0625 m²) captured a sample of the upper seafloor sediment to confirm species/habitat type seen on the screen (Figure 2c).



Figure 2. Benthic habitat assessments using (a & b) live digital camera and (c) Van Veen sediment grab.

At each survey site information on marine plants (specifically seagrass and algae) was collected. Information collected at each site included;

- Seagrass presence/absence biomass, percent cover, species composition and distribution;
- Macro-algae presence/absence, percent cover and categorised into functional groups; erect macrophytes, erect calcareous, filamentous, encrusting, turf mat;
- 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 one GIS layer was created in ArcGIS to describe the habitat in the survey area:

- Habitat characterisation survey sites – site (point) data containing percent cover of seagrass species and algae functional groups, depth below mean sea level (MSL), sediment type (based on visual estimates), latitude and longitude from GPS fixes, sampling method and comments;

3. Results & Discussion

Benthic habitat surveys in the areas of interest (Figure 1) were conducted on the 16th June 2021. Eighty- three camera drops and 127 adjacent sediment grabs were conducted within and around the identified survey areas (Figures 1, 3-6). Camera drop survey sites were approximately 10 to 30 meters apart in the three wharf extension locations; survey area 1 to 3 (Figure 3-5), and 50 to 100 metres apart in survey area 4 (Figure 6).

No seagrass or macro-algae was recorded at any of the camera drop sites or collected in adjacent sediment grabs. Non-habitat forming benthic micro-algae was recorded on rocks near survey area 1; sites 31 to 33 (Figure 3 & 7), and near survey area 2; sites 4 to 6 and 13 - 16 (Figure 4). All sites are outside the direct footprint of the proposed Cairns Marine precinct extension works, except for site 13 that had non-habitat forming benthic micro-algae present (Figure 3 & 4). Across all sites the substrate was predominantly mud as verified from grab samples with a few sites that had a higher portion of rock and sand (Figure 8).

The total seagrass extent from 1984 to 2020 shows no seagrass present in the proposed wharf extension footprints. The 2013 macro-benthic survey found medium to low density of turf mat, filamentous and erect macrophytic marine algae nearby but not within the proposed wharf extension footprints (McKenna et al. 2013). The area around survey area 4 (Figure 1) has not been previously surveyed for marine plants as it is outside the Ports North annual monitoring and broadscale seagrass monitoring survey boundaries (completed approximately every three years).



Figure 3. Location of survey sites at Survey area 1, with site numbers, noting absence of marine plants.

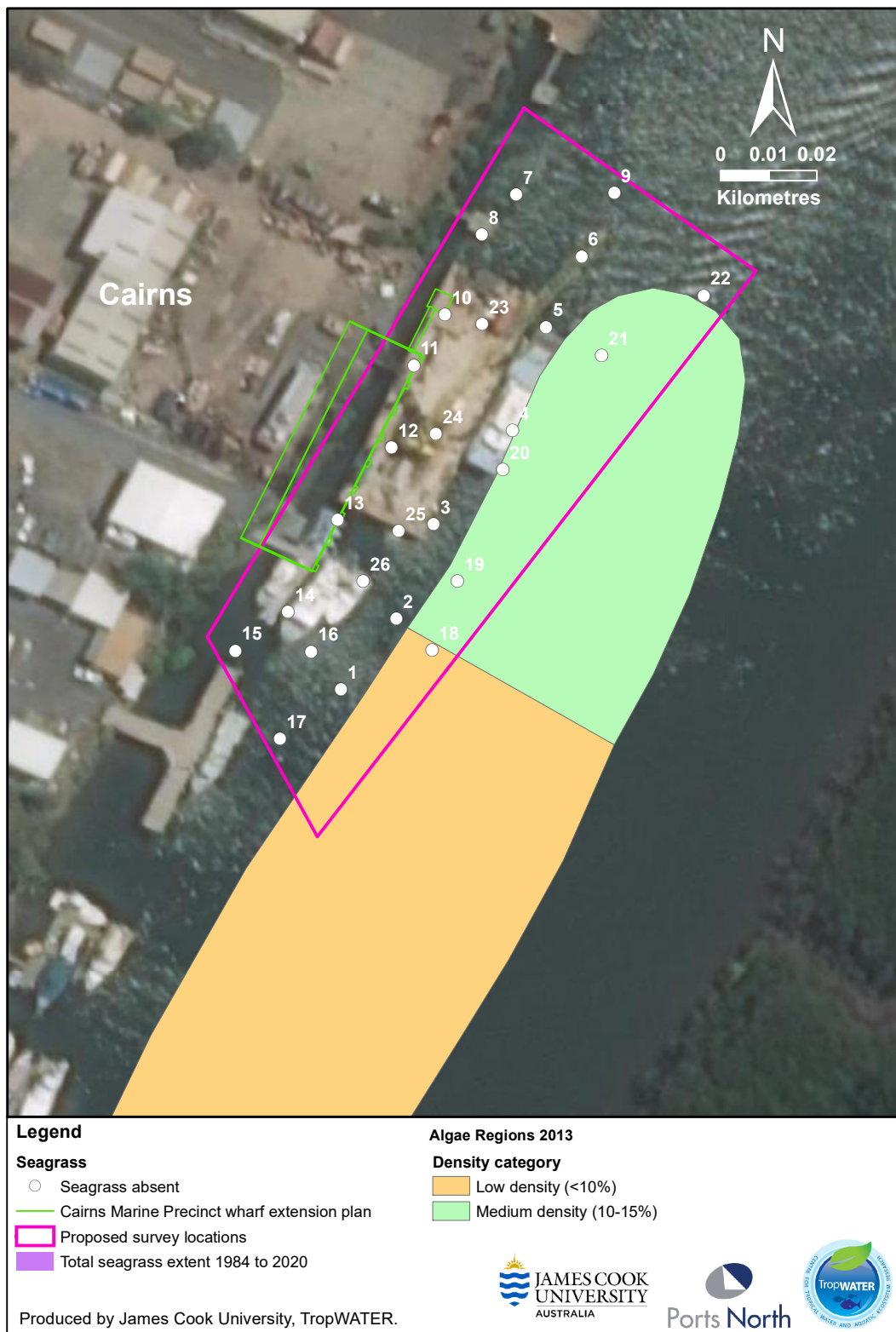


Figure 4. Location of survey sites at Survey area 2, with site numbers, noting absence of marine plants.



Figure 5. Location of survey sites at Survey area 3, with site numbers, noting absence of marine plants.

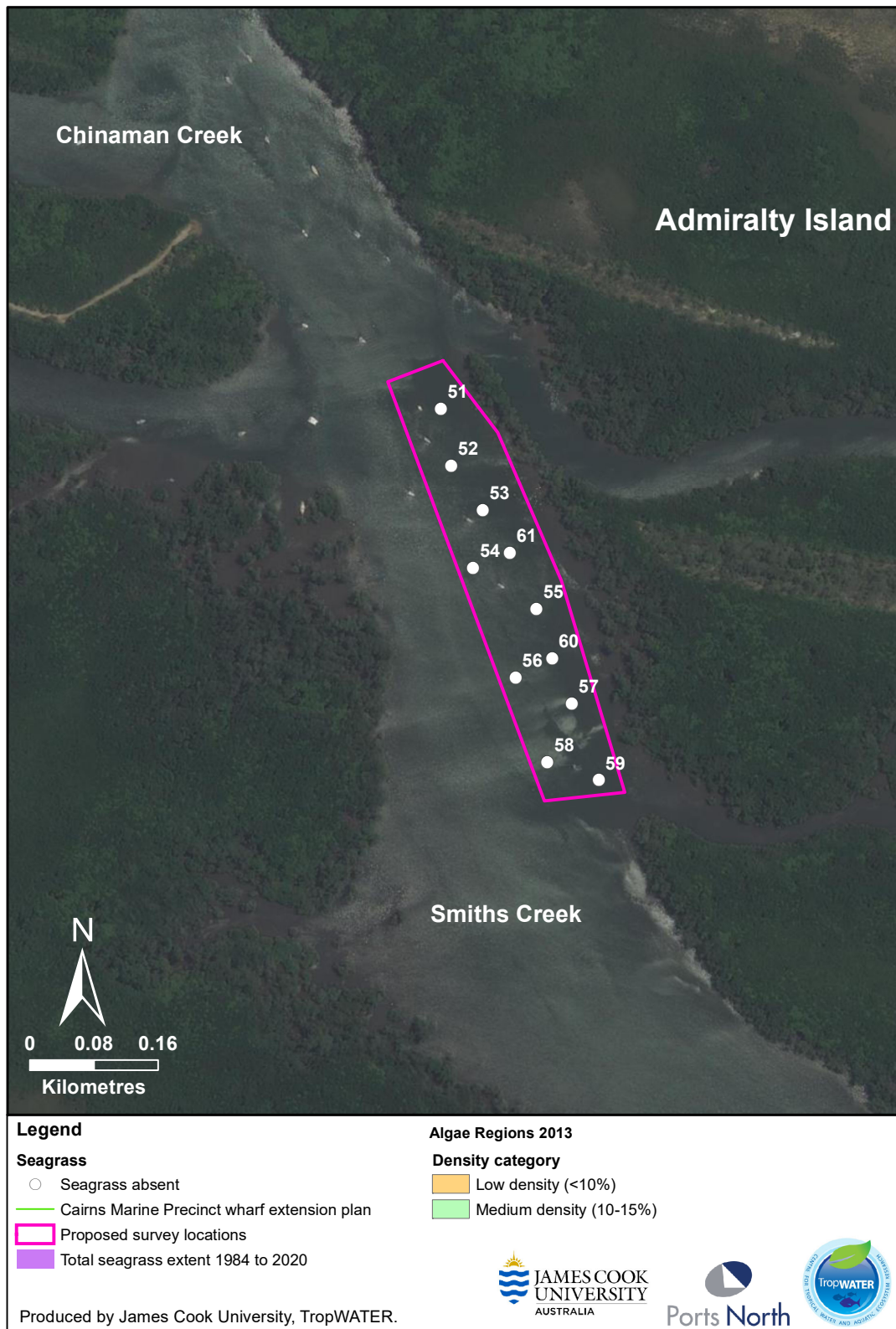


Figure 6. Location of survey sites at Site 4, with site numbers, noting absence of marine plants.



Figure 7: An example non-habitat forming benthic micro-algae on rocks at site 31.

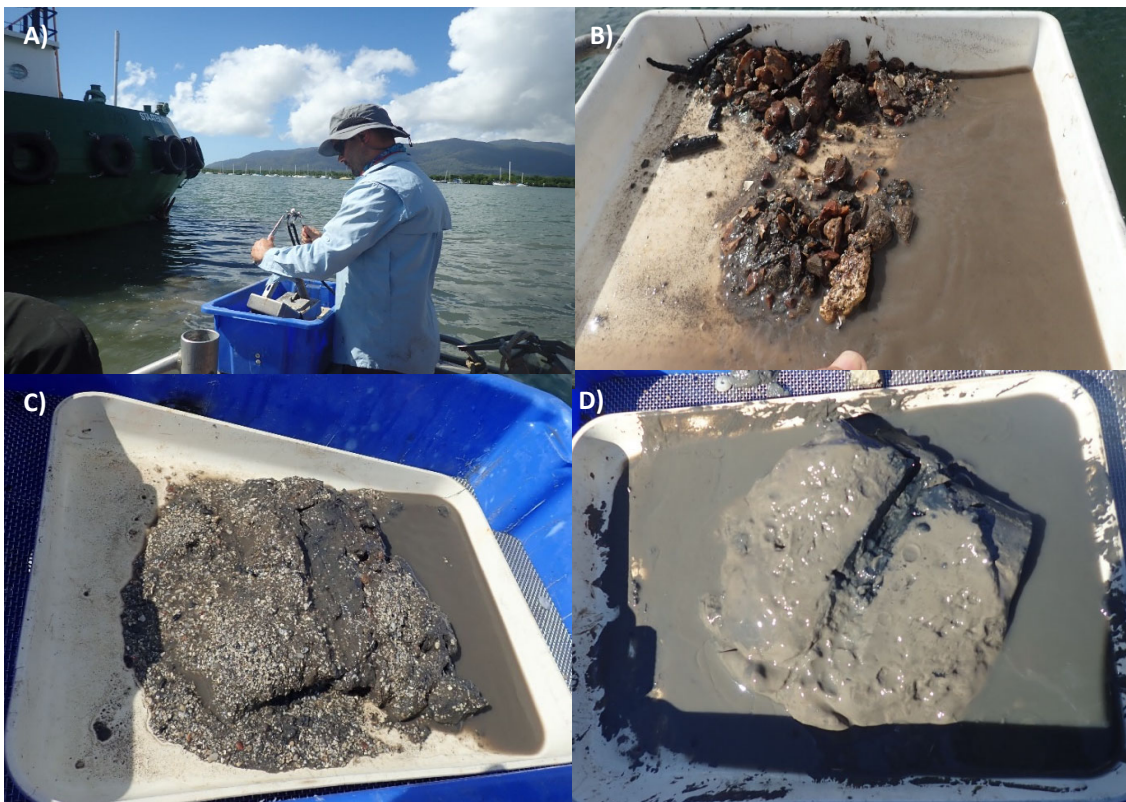


Figure 8: A) Collecting samples using the Van veen sediment grab B) a predominantly rock sample and C) a sample with sand and mud and D) the majority of sites sediment consisted of mud.

4. References

McKenna SA, Rasheed MA, Sankey, T. & Tol S.J. 2013. Benthic macro-invertebrates of Cairns Harbour and Trinity Inlet: baseline survey – 2012/13. JCU Publication, Centre for Tropical Water & Aquatic Ecosystem Research Publication 13/17, Cairns, 33 pp.

McKenna S, Wilkinson J, Chartrand K, and Van De Wetering C 2021a. 'Port of Townsville Seagrass Monitoring Program: 2020,' James Cook University Publication, Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), Cairns.

McKenna SA, Van De Wetering C, Wilkinson J & Rasheed MA 2021b. 'Port of Abbot Point Long-Term Seagrass Monitoring Program - 2020', Centre for Tropical Water & Aquatic Ecosystem Research, Cairns.

Reason C. L., Smith T.M. & Rasheed M. A. 2021. Seagrass habitat of Cairns Harbour and Trinity Inlet: Cairns Shipping Development Program and Annual Monitoring Report 2020. JCU Publication, Centre for Tropical Water & Aquatic Ecosystem Research Publication 21/09, Cairns.

Scott AS & Rasheed MA 2021. Port of Karumba Long-term Annual Seagrass Monitoring 2020, Centre for Tropical Water & Aquatic Ecosystem Research Publication Number 21/05, James Cook University, Cairns, 28 pp.

Smith TM, Reason, CL, McKenna, SA & Rasheed, MA 2020. 'Port of Weipa long-term seagrass monitoring program, 2000 - 2020'. Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER) Publication 20/58, JCU Cairns, 49pp.

Smith T.M., Reason C., McKenna S. and Rasheed M.A. 2021. Seagrasses in Port Curtis and Rodds Bay 2020 Annual long-term monitoring. Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER) Publication 21/16, James Cook University, Cairns, 54 pp.

Wells, J.N., Rasheed, M.A. & Coles, R.G. 2019. 'Seagrass Habitat in the Port of Thursday Island: Annual Monitoring Report 2019. Centre for Tropical Water & Aquatic Ecosystem Research, JCU Publication 19/27, Cairns, 43 pp.

York PH and Rasheed MA 2021. 'Annual Seagrass Monitoring in the Mackay-Hay Point Region – 2020', JCU Centre for Tropical Water & Aquatic Ecosystem Research Publication 21/20, Cairns. 42pp.