

OCTOBER 2021

PORT OF TOWNSVILLE

# SEAGRASS

MONITORING PROGRAM

## BRIEF REPORT

McKenna SA, Van De Wetering C & Wilkinson J  
Report No. 22/11



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### **Acknowledgments:**

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## KEY FINDINGS

This report summarises the results of the Townsville Channel Upgrade Seagrass Program (CUSP) 2021 dry season (September/October) survey, and builds on the Long-term Seagrass Monitoring Program (LTSMP) established in 2007. Key findings include:

- 1,577 sites were assessed for seagrass in the 2021 dry season (October) survey.
- Seagrass in monitoring meadows were in a good condition with the footprint, species composition and density of seagrass at expected levels for this time of year.
- Seagrass inside the whole-of-port survey limit covered 17,146 ha. About an 18% increase from the same time last year. Of this distribution:
  - LTSMP meadows covered 7,074 ha
  - CUSP meadows covered 4,417 ha
- Ten of the eleven seagrass species that are known to occur in the Townsville region were present in 2021.
- Green sea turtles, dugongs and their feeding trails in seagrass meadows were observed during helicopter and boat-based field surveys indicating a high use of the area by megafauna.
- So far seasonal assessments suggest the seasonal signal in seagrass density and area in Townsville is not as strong or consistent as other areas in tropical Queensland.
- The next seagrass monitoring survey is scheduled for May 2022.





## **BACKGROUND & SCOPE OF WORKS**

The Port of Townsville Limited (PoTL) is upgrading the approach channel as part of their Port Expansion Project. The Channel Upgrade Project (CU Project) is Stage 1 of the long-term plans and involves capital dredging-related activities of the Platypus and Sea channels, and the construction of a reclamation area and temporary offloading facility.

The port is situated in the Great Barrier Reef World Heritage Area, outside of the Great Barrier Reef Marine Park, and supports a diverse range of habitats including significant and productive reefs and seagrass meadows that begin in the intertidal zone and extend down to ~15m below mean sea level.

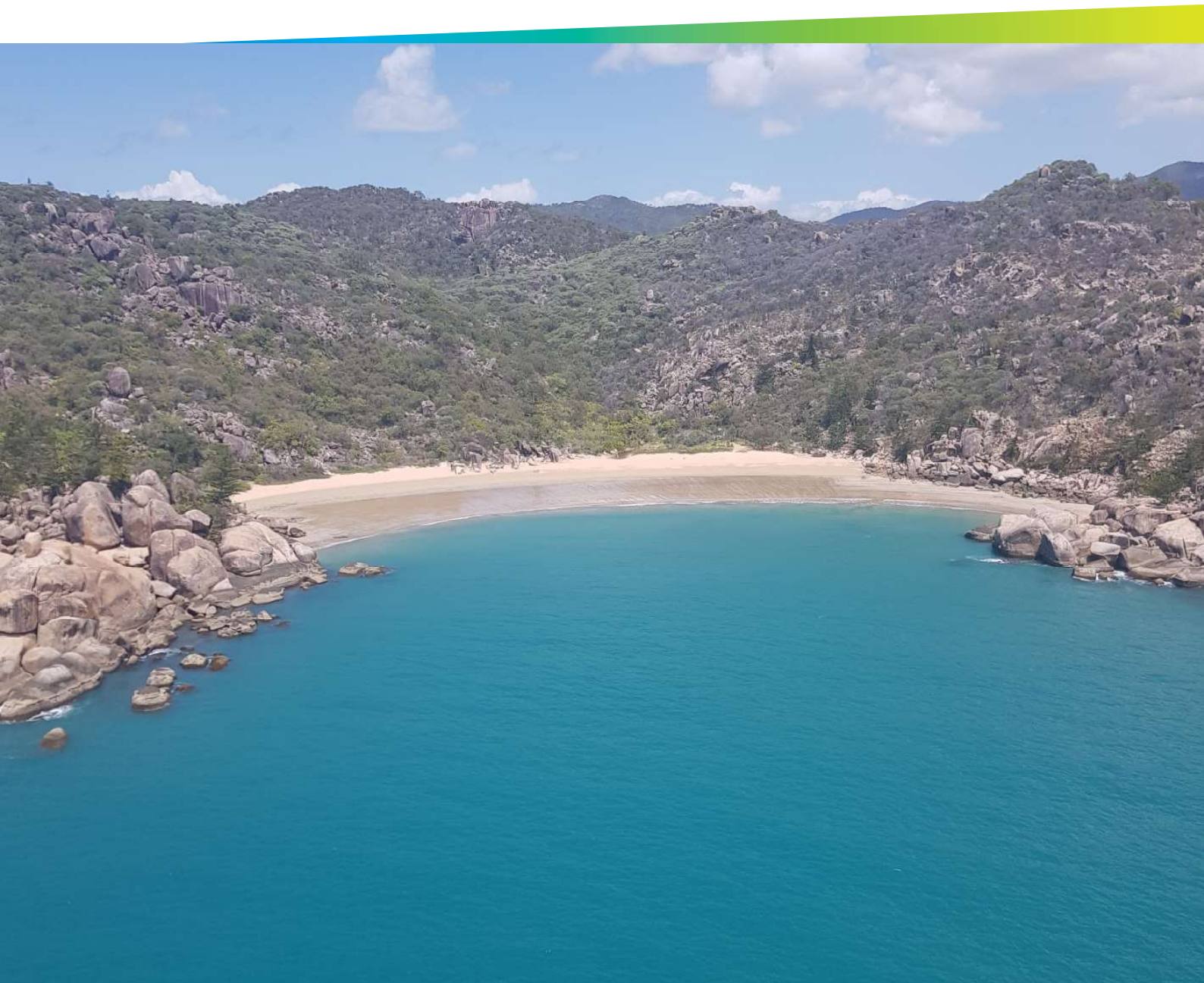
As part of their commitment to the environmental health of the port, and to address regulator conditions outlined for the CU Project, a fit-for-purpose seagrass habitat program was developed in 2019; the Channel Upgrade Seagrass Program (CUSP). This specified monitoring program builds on the established Long-term Monitoring Seagrass Program (LTSMP) and is designed to assess and monitor seagrass habitat surrounding Townsville, Cleveland Bay and Magnetic Island before, during and after the planned works.



The CUSP includes the monitoring meadows that form the LTSMP, and also includes expanded areas of seagrass in assessments to meet regulatory requirements and conditions associated with the CU Project. The CUSP involves:

- Establishing baseline conditions of seagrass communities before project works begin (post-wet season and dry season seagrass conditions);
- Monitoring the condition of seagrass communities before, during and after project works;
- Assessing seagrass condition at selected monitoring meadows bi-annually, and at the whole-of-port scale annually;
- Examining changes in seagrass communities due to project works, climate/weather or natural background changes.

This brief report presents the results of the 3rd dry season CUSP survey and compares the results with previous surveys. A more detailed technical report is also available on the TropWATER or Port websites.





## SAMPLING APPROACH & METHODS

Methods for assessing seagrass in the Townsville region follow those of the established LTSMP and other Queensland ports (Bryant et al. 2016; Wells and Rasheed 2017). The application of standardised methods in Townsville and throughout Queensland allows for direct comparison of local seagrass dynamics with other seagrass monitoring programs in the broader Queensland region.

Seagrass assessments occur twice a year for the CUSP; once in the post-wet season (April/May) when natural environmental conditions are most likely to have impacted seagrass and they can be at their low point in resilience. Then again at the dry season when seagrass are going through a growth period and likely peak in distribution and abundance (September – November).

The CUSP is structured using two levels of monitoring;

- whole-of-port assessments that occur annually in the dry season. It is at this whole-of-port scale that the deep-water highly variable seagrasses between Cleveland Bay and Magnetic Island are assessed.
- monitoring meadow assessments (sub-set of all meadows in the port) that occur bi-annually; post wet season and dry season.

Three indicators of seagrass condition are assessed at each survey: seagrass biomass, species composition and meadow area. These are fundamental indicators used to answer questions relating to seagrass condition, i.e: is seagrass present? What is the spatial footprint of the meadow? How dense is



### INTERTIDAL SEAGRASS

Helicopter survey of exposed banks during low tide – sites are scattered throughout the seagrass meadow and sampled when the helicopter comes into a low hover; <1m from substrate.



### SHALLOW SUBTIDAL SEAGRASS

Boat-based free diving or camera drop surveys – sites are sampled perpendicular to the shoreline approximately every 50 - 500m or where major changes in bottom topography / seagrass community types occur. Sites extend to the offshore edge of seagrass meadows and measure continuity of seagrass communities.



### DEEP-WATER SEAGRASS

Boat-based 'live' camera sled tows – sites are sampled using an underwater camera system towed for approximately 100m while footage was observed on a monitor. Surface benthos was captured in a towed net and used to confirm seagrass, algal and benthic macro-invertebrate habitat characteristics observed on the monitor. The technique ensures that a large area of seafloor was surveyed and integrated at each site so that patchily distributed seagrass and benthic life, typically found in deep-water habitats was detected.



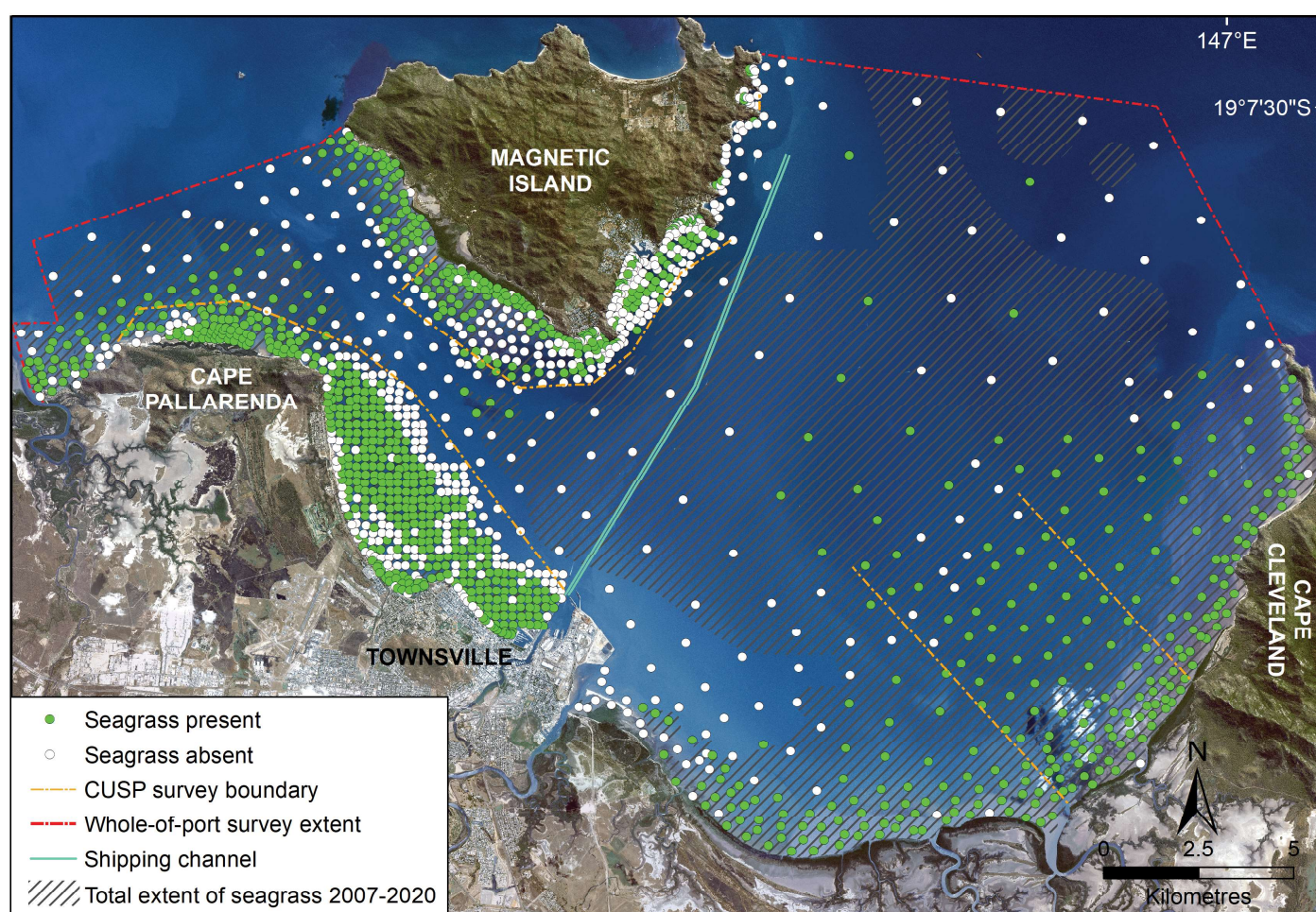


## RESULTS & DISCUSSION

A total of 1,577 sites were assessed for seagrass in the 2021 dry season (Sept/Oct) survey. Seagrass was present at 61% of sites (Figure 1).

Seagrass in monitoring meadows were in a good condition with the footprint, species composition and density of seagrass at expected levels for this time of year measured against baselines.

Seagrass inside the whole-of-port survey limit covered 17,146 ha, an ~ 18% increase in area from the previous year. Much of this increase was due to the highly variable deep-water seagrasses in Cleveland Bay having a larger distribution in 2021 than in 2020. The inshore CUSP monitoring meadows covered 4,471 ha, with individual meadows/meadow sections ranging from ~1.6ha to ~2134 ha (Figures 2 & 3).



**Figure 1:** Seagrass presence / absence in the Townsville CUSP bi-annual monitoring survey October 2021.



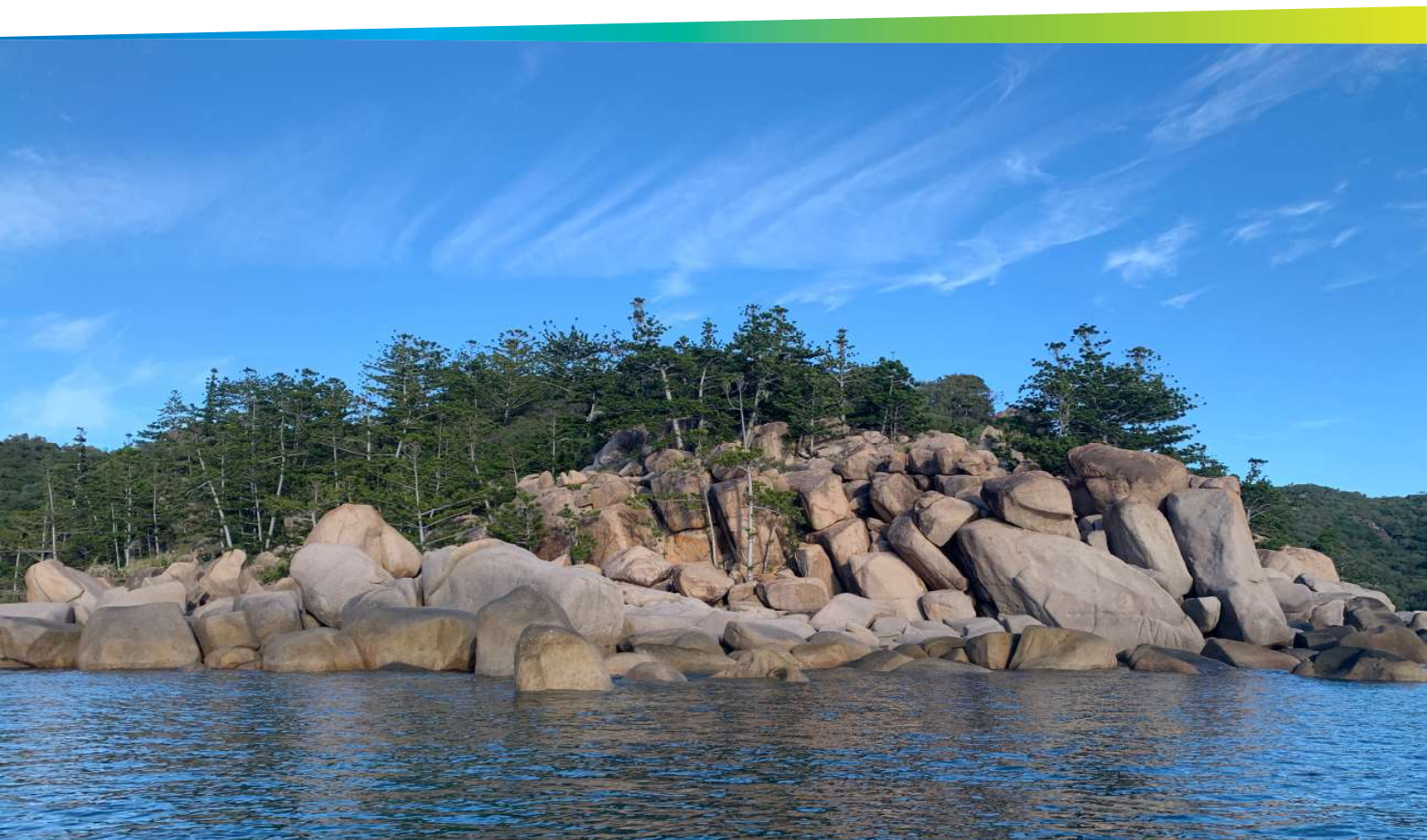
Ten of the eleven seagrass species that are known to occur in the Townsville region were present in 2021. Of note was the sighting of *Halophila tricostata* in the deeper areas of Cleveland Bay (Figure 8). This species has not been recorded in the LTSMP program to date, although has previously been recorded in the region.

The seasonal cycle of seagrass is influenced by a range of stressors such as episodic coastal flooding, cyclones, wind, rainfall and river flow that effect light availability; one of the primary drivers of seagrass condition. For the CUSP monitoring, early results and the original baseline surveys in 2007/2008 (Rasheed and Taylor 2008) suggest that the seasonal signal in seagrass biomass (density) in Townsville seagrasses may not be particularly strong or consistent compared with some other Queensland locations. There appears to be mixed results depending on meadow depth and type (seagrass community), with the clearest seasonal signal occurring in deeper meadows and those dominated by *Halophila* species. For seagrass area, the seasonal signal is slightly stronger than biomass and is mainly driven by growth and expansion of colonising *Halophila* species in the dry season surveys.

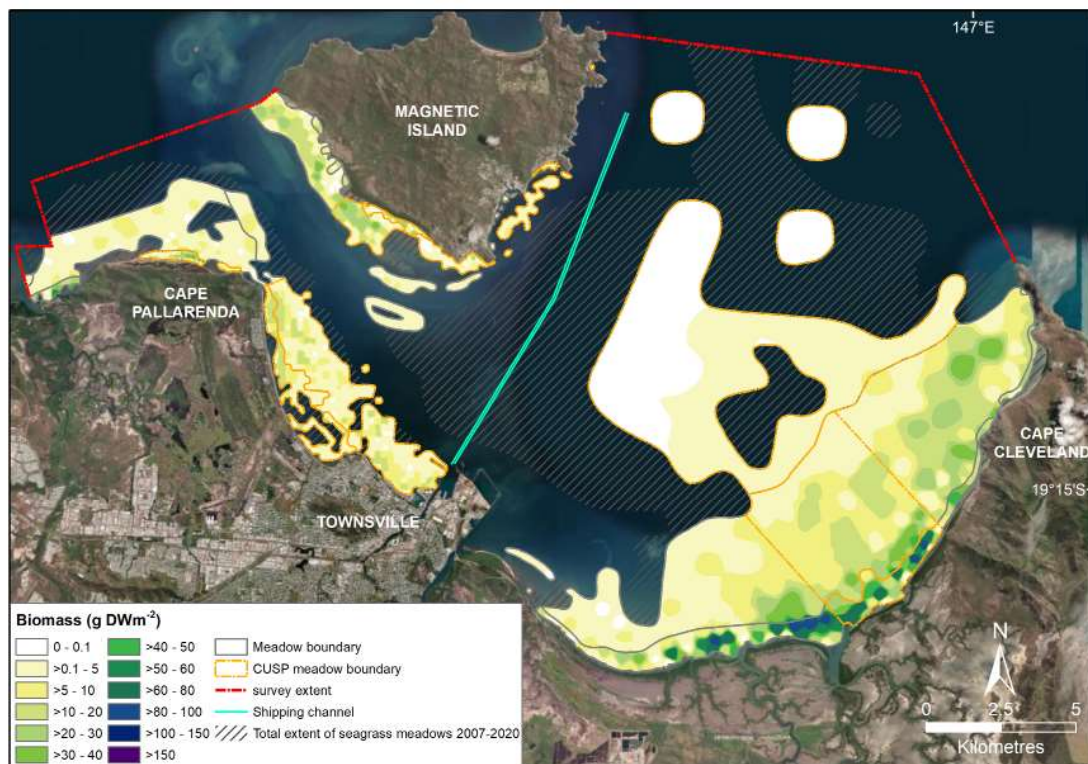
Green sea turtles, dugongs and their feeding trails in seagrass meadows were observed during helicopter and boat-based field surveys indicating a high use of the area by megafauna.

The healthy condition of Townsvill's seagrass indicates they were in a resilient state.

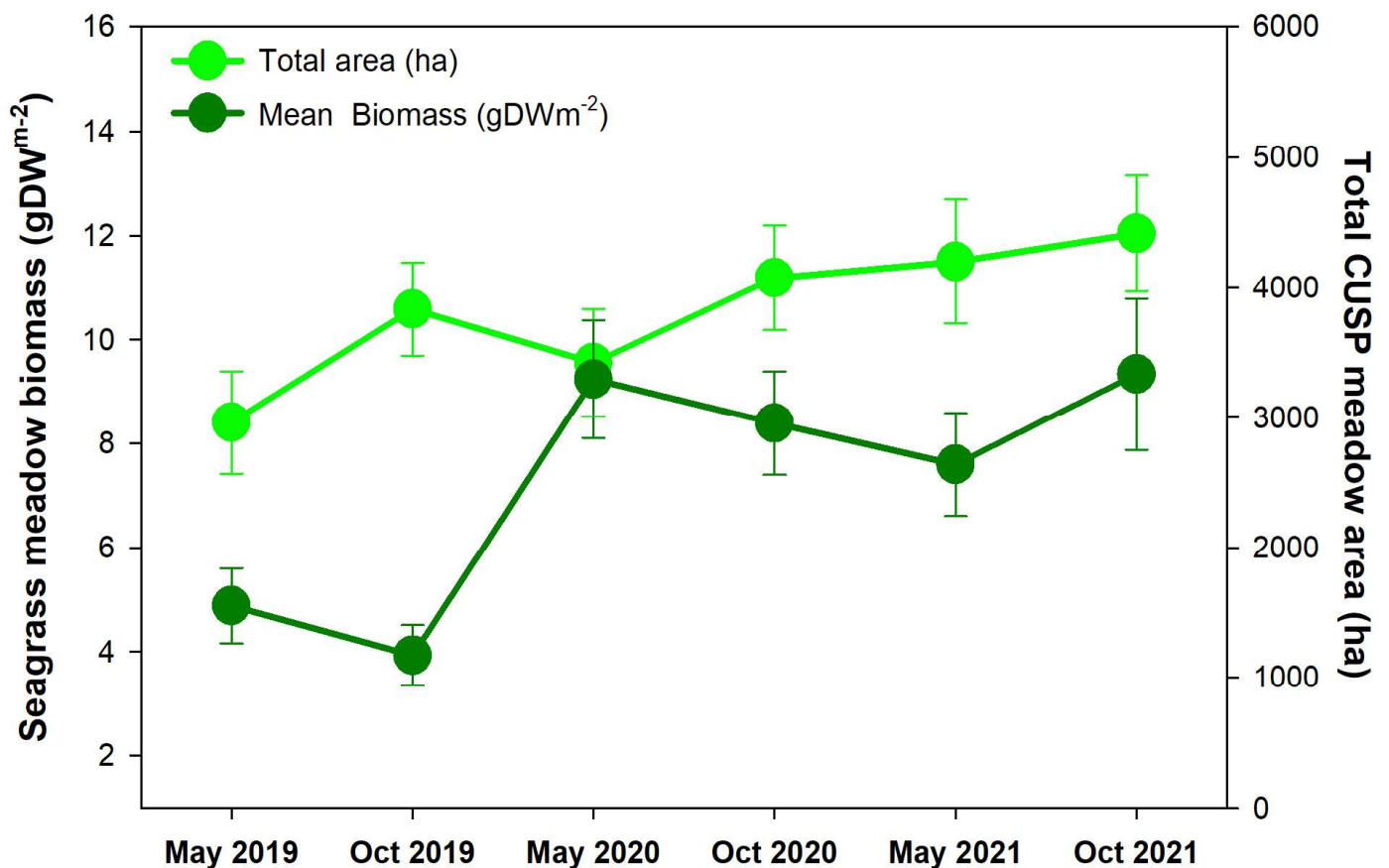
The next survey is scheduled for May 2022 and will onlhy fucus on the reduced scope CUSP monitoring meadows.



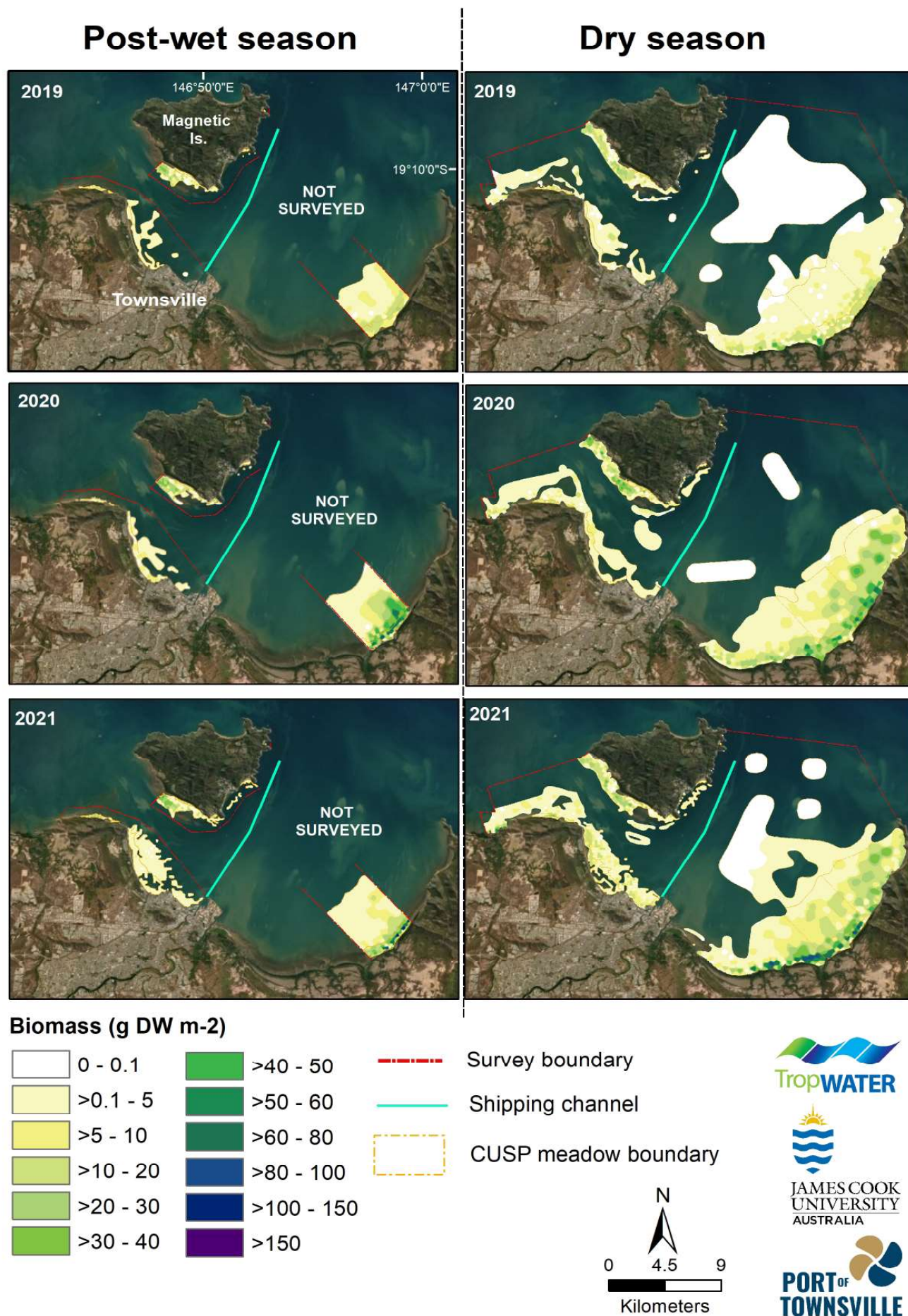




**Figure 2:** Seagrass meadow biomass (g DWm<sup>-2</sup>) and spatial extent during the Townsville CUSP bi-annual monitoring survey October 2021.



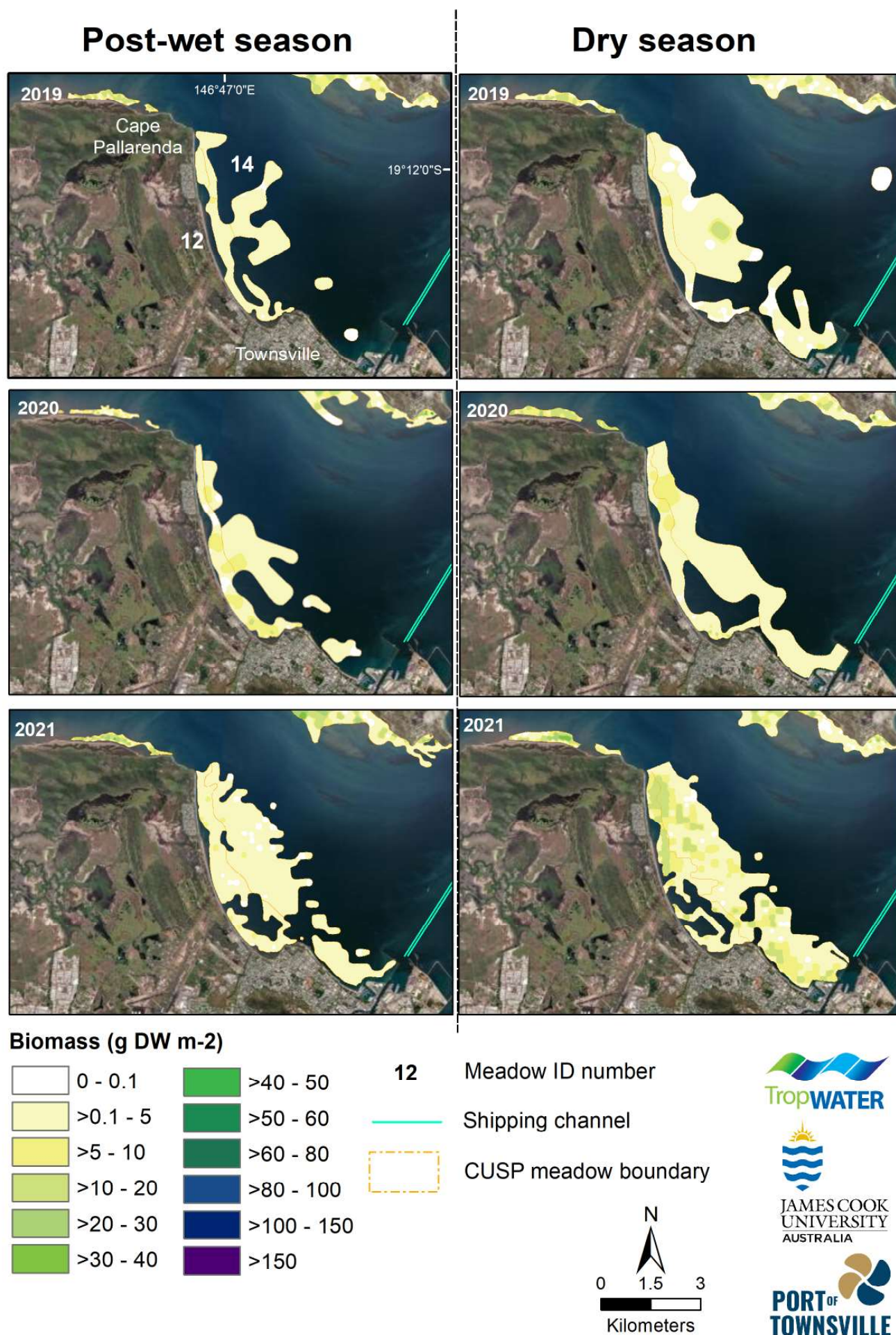
**Figure 3:** Seagrass meadow biomass (g DWm<sup>-2</sup>) and total CUSP meadow area (ha) from May 2019 to October 2021.



**Figure 4:** Comparison of seagrass biomass (g DWm<sup>-2</sup>) and meadow extent from 2019 - 2021 post-wet and dry season surveys.

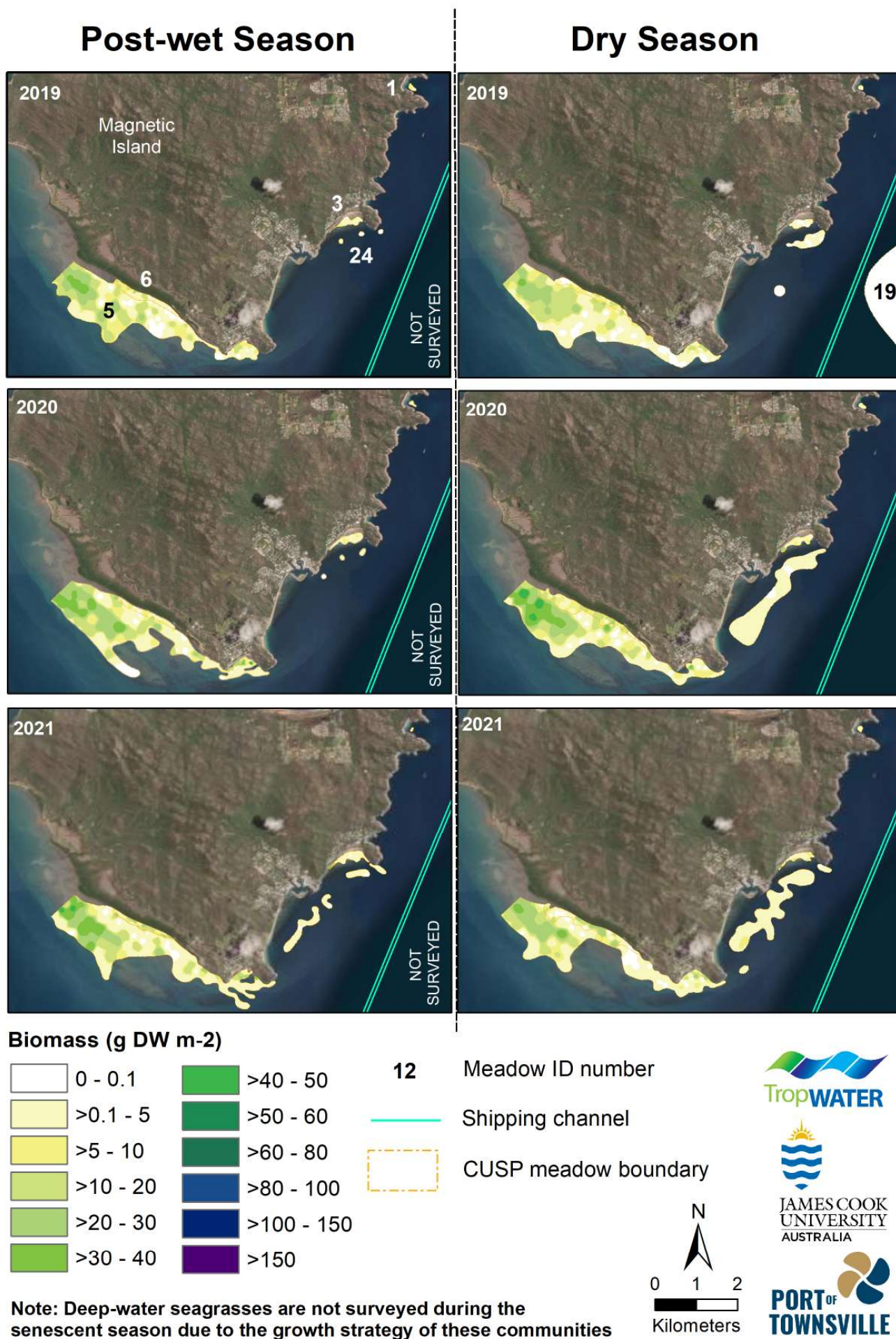
Note: deep-water seagrasses are not surveyed during the post-wet season survey due to the growth strategy of these communities.





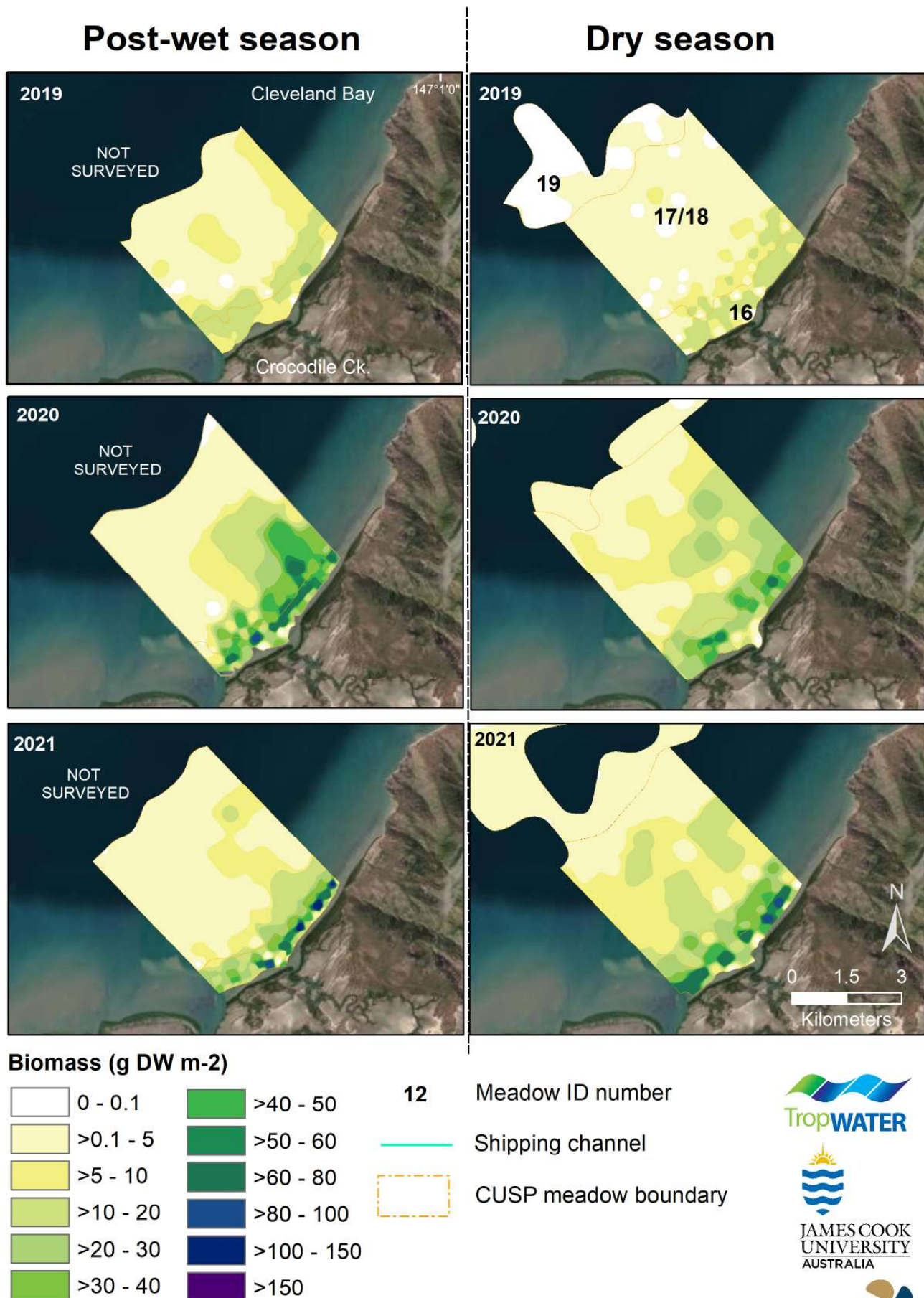
**Figure 5:** Comparison of seagrass biomass (g DWm<sup>-2</sup>) and meadow extent during post-wet and dry season surveys from Shelly Beach to The Strand 2019-2021.





**Figure 6:** Comparison of seagrass biomass (g DWm<sup>-2</sup>) and meadow extent during post-wet and dry season surveys at Magnetic Island 2019 - 2021.





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**Figure 7:** Comparison of seagrass biomass (g DWm<sup>-2</sup>) and meadow extent during post-wet and dry season surveys in the Cleveland Bay meadows 2019 - 2021.





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Bryant, C., Davies, J. and Rasheed, M. 2016. Gladstone Healthy Harbour Partnership 2016 Report Card, ISP011: Seagrass. Centre for Tropical Water & Aquatic Ecosystem Research Publication 16/23, James Cook University, Cairns, 62 pp.

Wells, J. and Rasheed, M. 2017. Port of Townsville Annual Seagrass Monitoring and Baseline Survey: September - October 2016, James Cook University Publication, Centre for Tropical Water & Aquatic Ecosystem Research (TropWATER), Cairns, p. 54.







## HELPFUL INFO

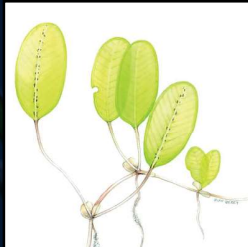
### 2019 APRIL SURVEY 2020 APRIL SURVEY 2021 MAY SURVEY



### 2019 OCT SURVEY 2020 OCT SURVEY 2021 OCT SURVEY



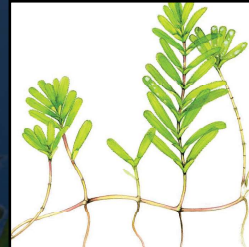
## SEAGRASS IN THE REGION



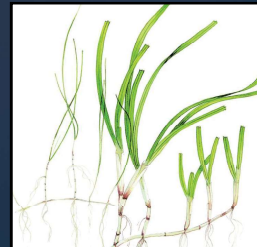
*Halophila ovalis*



*Halophila decipiens*



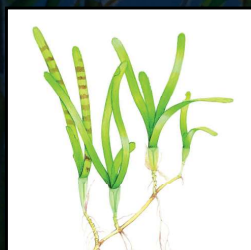
*Halophila spinulosa*



*Halodule uninervis*



*Zostera muelleri*



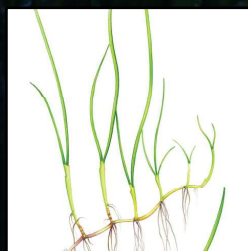
*Cymodocea serrulata*



*Cymodocea rotundata*



*Thalassia hemprichii*



*Syringodium isoetifolium*



*Enhalus acoroides*



*Halophila tricostata*

**Figure 8:** Seagrass species identified in the Townsville region from 1987 to 2021



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