

SEAGRASS MONITORING PROGRAM

SUMMARY

Large seagrass meadows flourish in the shallow areas of Cleveland Bay, with 11 of the 16 species of seagrass found in the Great Barrier Reef growing in Cleveland Bay. Seagrass beds are extensive in the eastern portion of Cleveland Bay, with smaller meadows occurring across the Strand, Kissing Point, Pallarenda Beach, and some bays fringing Magnetic Island. Seagrasses provide food and shelter for many marine animals and in Cleveland Bay are important foraging habitat for threatened species such as dugongs and turtles and economically important fishery species. Similar to land-based plants, different seagrasses have different preferred habitats and different tolerances to periods of low light, warm water, availability of nutrients and impact by physical damage (e.g. by herbivory).

The Port of Townsville has an established seagrass monitoring program at various locations across Cleveland Bay and southern Halifax Bay. This monitoring program – the long-term seagrass monitoring program (LTSMP) - has been undertaken at least annually since 2007 with James Cook University's TropWATER team. The focus of the seagrass monitoring program is to assess and monitor seagrass distribution, abundance and seasonality surrounding Townsville, Cleveland Bay and Magnetic Island over time, enabling assessment of changes in the extent and condition of the individual meadows. From 2019-2024, the Port expanded the seagrass monitoring program as part of monitoring required for the Channel Upgrade capital dredging project.

The long-term monitoring data is one of the key strengths of the program and enables more effective assessments of the condition of seagrasses relative to their historical variability. By monitoring an extensive array of seagrass meadows across Cleveland Bay, the annual assessment allows comparison of individual meadow scale changes into a wider local context (i.e. whole-of-bay changes) as well as within a wider context of regional or state-wide seagrass change by direct reference to monitoring conducted using the same methods in other Queensland locations (e.g. identify seagrass change due to region-wide events - La Niña climate etc).

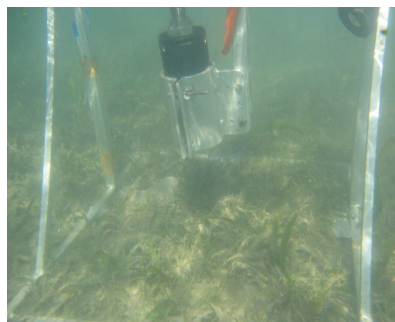
MONITORING REGIME

The seagrass monitoring program utilises the established monitoring techniques for seagrasses across the Queensland wide seagrass monitoring programs. Annual assessments of seagrass meadows are undertaken in September – November utilising boat and helicopter surveys to assess the condition and species of more than 25,000 hectares of seagrass meadows. The seagrass monitoring is undertaken at 12 identified seagrass meadows from Cape Cleveland to Shelley Beach, and around the southern and southeastern sides of Magnetic Island.

Three principal indicators of seagrass condition are assessed at each survey being:

1. seagrass above-ground biomass (grams dry weight per metre square (gDWm²));
2. species composition; and
3. meadow area (ha).

These are assessed by helicopter (intertidal meadows) or boat-based video camera drops (shallow subtidal meadows) or towed video camera transects (deep water meadows).



INSIGHTS FROM THE SEAGRASS MONITORING PROGRAM

The first seagrass survey in 2007 identified large and continuous seagrass meadows in Cleveland Bay, most commonly in lower intertidal and shallow sub-tidal areas. As detailed in the 2007 Report - *Port of Townsville seagrass baseline survey report – 2007-2008* - the best quality shallow seagrass meadows occurred as shallow beds near Cape Cleveland, the Strand, Cape Pallarenda and around Magnetic Island. The dominant species in shallow waters include *Halophila ovalis*, *Halodule uninervis*, *Zostera muelleri* and *Cymodocea serrulata*. The reef flats surrounding Magnetic Island support areas of *Thalassia hemprichii*.

As shown in the attached images, the biomass and extent of seagrass meadows changes each year due to a variety of factors including flooding, cyclones, temperature and seagrass resilience.

In recent years the observed decline in most seagrass meadows is attributable to a combination of simultaneous and successive system-wide meteorological influences. Modelling has identified photosynthetically active radiation (PAR) and seabed temperature as the most significant environmental variables influencing seagrass above-ground biomass. The monitoring has identified that the decline in seagrass biomass was due to a range of cumulative climate events and system wide pressures across the Townsville Region and bay area over recent years, including:

- Extensive, record-breaking flooding and above average rainfalls in 2018/19, 2021/22 and 2022/23 wet seasons;
- Tropical cyclones in January 2021 (TC Kimi), February/March 2021 (TC Niran), December 2023 (TC Jasper) and January/February 2024 (TC Kirrily);
- Extreme temperatures/marine heatwaves reported for the GBR region in 2019 (hottest year), Feb 2020 marine heat wave, 2021/2022 and 2023/2024 summer elevated marine temperatures.

The assessment has also identified that seagrasses in Townsville still had satisfactory spatial coverage, good species composition and the presence of higher light requiring species in subtidal meadows provides a good foundation for future recovery.

As Cleveland Bay is a naturally turbid environment and experiences natural fluctuations in light and turbidity, the fact that seagrass habitat persists in this environment indicates a degree of adaptation and resilience to these conditions.

Seagrass reports are available on the Port's website at this link: [Environmental Monitoring | Port of Townsville](#). The Healthy Waters Partnership for the Dry Tropics has prepared an ArcGIS StoryMap about seagrass in Cleveland Bay.

For further information please see the following link: [Learn | Healthy Waters Partnership Dry Tropics](#)

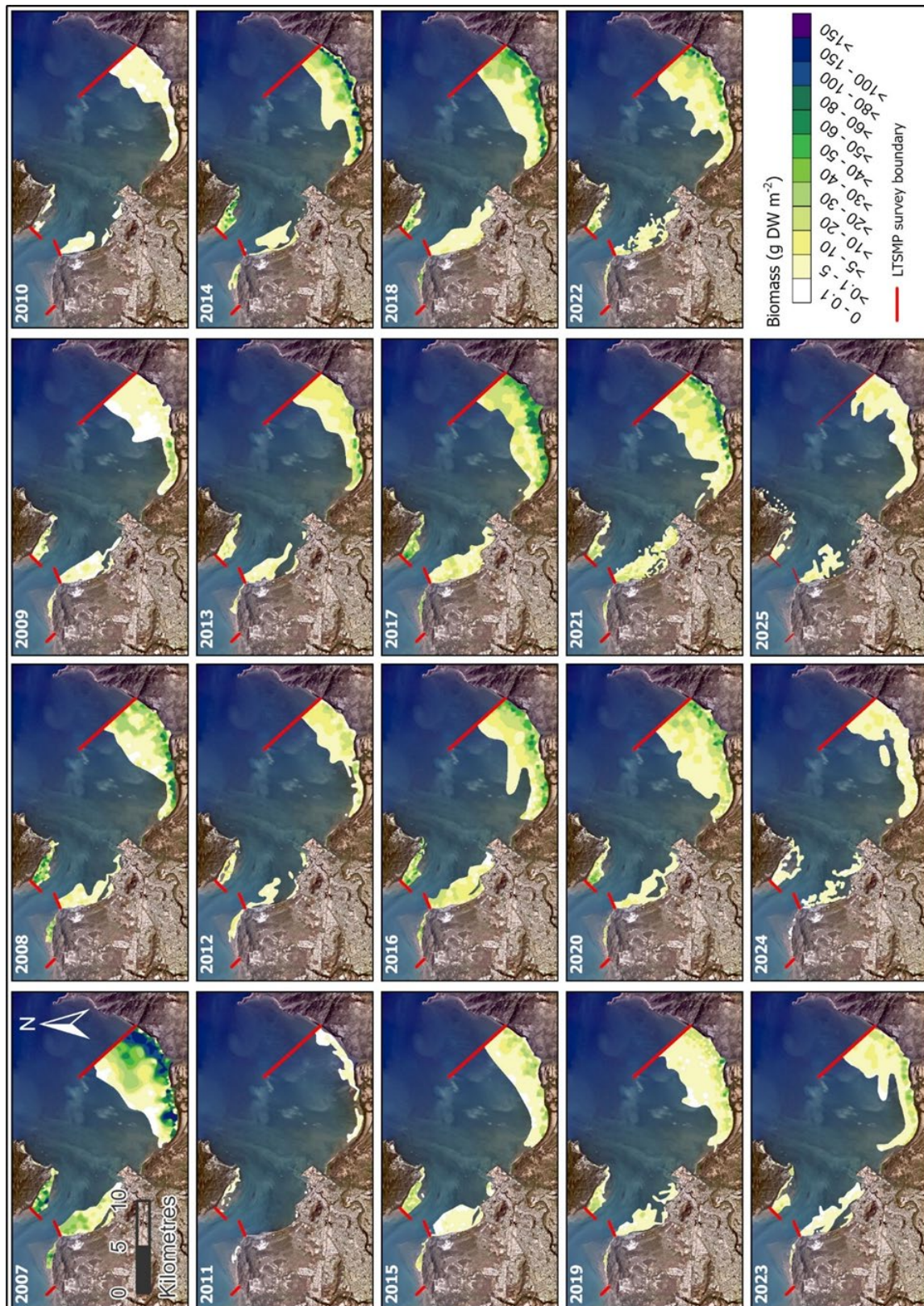
Comparison of seagrass meadow above ground biomass (gDWm²) and meadow extent – 2007 - 2025

Figure 1: Port of Townsville Seagrass Monitoring Program 2025. CU TropWATER Publication 26/1