

Title: Science Under Sail Australia Citizen Science Seagrass and Coral Spatial Mapping on the GBR Data

Description:

This data was collected to improve and expand spatial monitoring of benthic habitat types (coral, seagrass, algae and sediment types) across the GBR.

The project was jointly funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.

Data was collected over four sampling seasons (2019, 2020, 2022 and 2023) by Science Under Sail Australia (SUSA) and it's citizen science volunteers.

Rapid benthic habitat assessments were carried out using drop camera that projected a live feed video of the benthos to a monitor on the primary research vessel and also by snorkellers deployed from a smaller vessel who filmed the benthos with a GoPro (photos of sites are available directly through SUSA (See Contact Information)).

Site data includes the following fields: *date, time, vessel, survey method, latitude and longitude, seagrass species present, percent cover of seagrass present, percent cover of coral, percent cover of algae and sediment type.*

In more recent years, data collected has been improved to include separation of coral types into *Hard* and *Soft Coral* (and their relative percentage covers), as well as separating Hard coral into Branching, Massive, Plate and Encrusting (2023 data only). *Algal Type* has also been included as part of the 2023 dataset in addition to *Benthic Fauna*.

Acronyms for seagrass species as well as sediment type are used within the dataset. They are as follows:

Seagrass:

HO: *Halophila ovalis*

HS: *Halophila spinulosa*

HT: *Halophila tricostata*

HU: *Halodule uninervis*

CR: *Cymodocea rotundata*

CS: *Cymodocea serrulata*

SI: *Syringodium isoetifolium*

ZM: *Zostera muelleri*

Sediment Type:

SR: Sandy Rock

RS: Rocky Sand

S: Sand

MS: Muddy Sand

SM: Sandy Mud

M: Mud
MR: Muddy Rock
RM: Rocky Mud
R: Rock

Author:

Science Under Sail Australia (SUSA)<o:p></o:p>

Contact Information:

Science Under Sail Australia (SUSA)
Dr James Udy
james@scienceundersail.com.au

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Spatial Extent:

The coordinates of the northernmost, southernmost, easternmost and westernmost sites are listed below, delineating spatial extent:

North: -16.88176, 146.00711

South: -25.1888, 152.80711

East: -16.88176, 145.89253

West: -25.1888, 152.80711

Temporal Extent:

19/08/2019 to 06/10/2023

Projection Information:

WGS 1984

QA/QC:

Observations were made by citizen scientists under the supervision of trained marine scientists. As with all data collection, there is some observer variation, however, this was mitigated through QA/QC using video footage and collected hand samples to verify species identification and percent covers. This was validated by several people following in-situ field observations.

Places we are aware the data is likely to have variability are:

1. ***Zostera muelleri*** (ZM) and ***Halodule uninervis*** (HU) can easily be mistaken for one another, particularly when viewed solely with the drop camera. Snorkelling species identifications are likely to be more accurate as a hand sample is collected for inspection of rhizomes and leaves.

2. The *Halophila ovalis* (HO), *Halophila decipiens* (HD), and *Halophila capricorni* (HC) complex is always referred to as '**HO**' as all these subspecies of *Halophila* have similar leaf morphologies and are difficult to differentiate without inspecting under a microscope.
3. **The limitations of determining sediment type** remotely using the drop camera results in sediment type sometimes being described as sandier than it possibly is. To determine sediment type with the drop camera, the camera is dropped solidly into the sediment while watching the live feed. The resulting sediment plume, the depth to which the camera sinks, and if mud sticks to the lens are used to determine the sediment type. However, we are aware that hard-packed mud can sometimes be mistaken for muddy sand. The snorkel observations of sediment are considerably more accurate as a hand sample is collected and assessed.
4. **Percent covers** of seagrass, algae, and coral (living only) are determined as an average of the percent of the benthos that they occupy during the period of observation for a site. For drop camera surveys, the average is the percentage cover over a thirty-second to one-minute benthic video. For snorkel surveys, percentage cover is the average of what is observed during a single duck dive. Videos are collected during both forms of sampling, and, as part of our QA/QC process, 3+ representative photos are stored for each site to demonstrate the homogeneity or heterogeneity of the site.
5. **1% cover** represents presence of that species in the sampling area: it is not an accurate measure of 1% cover. However, percent cover observations of $\geq 2\%$ are best estimates of percent cover with procedure as described above. Percent covers are measured as 1%, 2%, 5% and in increments of 5% from 5% cover through to 100%.
6. As our data collection processes improved with experience and time, more accurate data was collected. As such, earlier datasets contain a less-full complement of data than in later years. Examples of the enhanced dataset include: defining coral by Hard (branching, encrusting, plate, massive) and Soft and giving percentage cover for each, defining algae by type (Filamentous, Turf, Encrusting, Calcareous, Erect Macro) and identifying benthic invertebrates observed.
7. **Depths** in this dataset are observed depths only. They have not been corrected for time in the tide cycle, nor have they been adjusted to account for the *Platform* depth variation ('Velella' (0.5m) and 'Tender' (0.1m)) which accounts for where the depth sounder is located on the hull of each vessel. *Platform* and *Time* have been provided in most instances should you wish to adjust depth to be chart datum.

Usage Constraints:

This data is available to be used for research and educational purposes. When using this dataset, you should reference *Science Under Sail Australia* and acknowledge that

data collection was *'funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.'*

Related Resources:

A science communication document summarising this project forthcoming through Science Under Sail Australia's website and other locations TBA
(<https://scienceundersail.com.au>)

Update Frequency:

As this funded project is finalised/completed, no further updates are predicted to occur unless inaccuracies are discovered, or amendments need made to the dataset.

Tags: GBRF, Great Barrier Reef Foundation, Reef Trust, Science Under Sail Australia, Science Under Sail, SUSA, Seagrass, Great Barrier Reef, GBR, Coral, Algae, Sediment, Citizen Science