

Seamap Australia Data Acceptance Guidelines



Contents

Introduction	1
1 Community Contribution	1
1.1 Marine Seafloor Habitat Data	2
1.2 Ancillary Data	2
2 Preparing your data	3
2.1 General Requirements	3
2.1.1 Hosting Data.....	3
2.1.2 Metadata.....	3
2.1.3 Licensing.....	4
2.2 Core Habitat Data Requirements.....	4
2.3 Advanced Habitat Data Requirements (specifically for NBHL inclusion).....	5
2.4 Ancillary Data Requirements	7
3 Submitting Your Data.....	7
4 Supporting Documents and Resources	8

Introduction

Seamap Australia is an ongoing program providing nationally focused baseline marine seafloor habitat data. Established and maintained at the Institute for Marine and Antarctic Studies (IMAS), University of Tasmania, Seamap Australia is governed by a Steering Committee that represents the broad community of users across Australia. Seamap Australia provides three primary resources:

- The [Seamap Australia National Benthic Habitat Classification Scheme](#);
- The [Seamap Australia National Benthic Habitat layer](#) (NBHL), a nationally synthesised and uniformly classified seafloor habitat data product; and
- The [Seamap Australia data portal](#) which brings together seafloor habitat and ancillary data in an interactive web mapping platform.

Seamap Australia collates disparate data from Australian seafloor habitat mapping collections at a wide range of scales, synthesising the data to produce a single continental-scale National Benthic Habitat Layer (hereafter NBHL) uniformly classified under the Seamap Australia National Benthic Habitat Classification Scheme (hereafter Seamap Australia HCS). The Seamap Australia data portal provides a mapping interface for visualisation of habitat datasets along with tools to increase their discoverability and access and ensuring accurate metadata and attribution. Habitat data is presented alongside a curated selection of supporting (ancillary) data to meet a range of user needs, with a primary focus on decision-making for marine managers.

The Seamap Australia team annually process new data acquired through community contributions for inclusion on the Seamap Australia website and to update the Seamap Australia NBHL with the latest available information. Contributed data is assessed for readiness to meet quality and technical product requirement criteria. This document presents the guidelines for acceptance of habitat data into the Seamap Australia NBHL, and the selection process for curated ancillary content.

1 Community Contribution

Seamap Australia relies on contributions and access to data from the Australian marine science community. Three types of data are curated by, and presented in the Seamap Australia data portal:

1. Seafloor habitat data presented in its native (source) classification;
2. The Seamap Australia National Benthic Habitat Layer (NBHL) product, synthesised from contributed disparate habitat datasets;
3. Ancillary data that value adds by increasing portal users' ability to understand or interpret seafloor habitat data displayed on the Seamap Australia website, including its derivation and provenance. May also include other spatial visualisations which can be directly used to facilitate and support marine management such as management boundaries, environmental and anthropogenic pressures, distribution of research effort etc.

Data types 1 and 3 above rely exclusively on community contributions. Type 2 is synthesis product of national interest that is generated by the Seamap Australia team and is only made possible by community contributions.

The broad steps for contributing habitat data to Seamap Australia are illustrated below. Contributors should use these guidelines to prepare and submit their data (see [Section 3](#)). Data will be assessed by the Seamap Australia team (and in some cases the Seamap Australia Steering Committee) and published in the appropriate manner as stipulated by criteria documented in these guidelines (see Section.



Figure 1: Process for submitting new habitat data

1.1 Seafloor Habitat Data

Contributions of seafloor habitat data can fall into two categories:

- habitat data that *does not* meet the specific requirements for inclusion in the NBHL (see [Section 3.3](#)), but can be made discoverable, accessible, and visualised as a stand-alone mapping layer; and
- habitat data *meeting* the specific NBHL data quality requirements, which will be published as above and additionally be assimilated into the NBHL.

Both types provide a valuable resource for end users by contributing to a large centralised collection of seafloor habitat data with associated metadata and provenance information, delivered in a standardised format by a single, well-known source.

1.2 Ancillary Marine Data

Ancillary data increases the value proposition of Seamap Australia by providing supporting information (in the form of mapping layers) facilitating users to:

- understand the derivation and provenance of habitat data; and
- improve decision making processes related to using or managing the marine estate.

Providing a rapid spatial overview of currently available bathymetry and habitat observation data (i.e. potential ground-truthing sources) can facilitate gap analyses and enable recommendations for investment in additional data collection or desktop processing of existing data. Ancillary data of particular interest to Seamap Australia are the raw data sources used to derive seafloor habitat mapping products, including:

- bathymetry, collected by a range of agencies and aggregated to AusSeabed¹;
- geomorphology or geomorphometry maps; and

¹ Seamap Australia is not a repository for bathymetry data, but may display aggregated summaries of bathymetry survey coverage, and a selection of 'featured' bathymetry datasets.

- observation data used to ground-truth habitat maps, such as BRUVs (GlobalArchive), benthic habitat imagery such as AUV, drop camera, ROV (SQUIDLE+), and sediment grabs (Geoscience Australia's Marine Sediments Database).

Other ancillary data that may be aggregated and presented by Seamap Australia with a targeted purpose to facilitate decision-making includes:

- authoritative management/jurisdictional boundaries
- pressures on the marine environment (including anthropogenic sources and disturbance events)
- biodiversity and ecosystem syntheses
- ecological and seafloor features
- national-scale oceanographic layers

2 Preparing your data

All data contributed to Seamap Australia must comply with FAIR (Findable, Accessible, Interoperable, Reusable) data principles. This applies irrespective of if data is hosted locally by Seamap Australia (see [Section 3.1.1](#) below) or hosted externally by a contributor's organisation and curated in the Seamap Australia data catalogue. The preferred method for providing access to visualisations of ancillary (non-habitat) data is via partner's data infrastructure operating as part of the federated Australian Ocean Data Network (AODN). In most cases, this will be via Open Geospatial Consortium (OGC) Web Map Services (WMS).

2.1 General Requirements

2.1.1 Hosting Data

Where contributors of ancillary data do not have access to hosting services, there is capacity for Seamap Australia to store and publish through the IMAS Data Portal where appropriate (acting as data custodian and respecting the ownership, attribution and licensing specified by the contributor/owner). If you would like to discuss publishing your data using the IMAS Data Repository, please contact us at IMAS.DataManager@utas.edu.au.

Habitat data contributions, and accompanying metadata records, will always be hosted locally by Seamap Australia to improve data portal performance and enable visualisations and access to be delivered in a standardised format. In the case of contributing organisation that maintain their own hosting services, provenance information on Seamap Australia will maintain links to the point-of-truth metadata records and collect metrics on data access (available upon request).

2.1.2 Metadata

Data contributed to the Seamap Australia data portal must be accompanied by descriptive **metadata**. Ideally (especially in the case of ancillary data), this metadata will already be published online. If online metadata is not available, we request that a metadata record be generated at the time of data contribution. IMAS hosts and maintains a web app enabling users to create and submit ISO standard metadata records for publication via the [IMAS Data Catalogue](#) (which is additionally harvested by external aggregation services, including [AODN](#) and [Research Data Australia](#)). This publishing service is

available to all Seamap Australia habitat data contributors, and may be available for ancillary data contributors upon request (see [Section 4](#)).

Minimum required metadata elements include:

- abstract (a description of the contributed dataset, not the project)
- investigator / Responsible Party names and contact details
- the Intellectual Property owner (typically the PI's organisation)
- license (typically Creative Commons by Attribution)
- data collection methodology
- spatial and temporal extent

Additional useful (optional) metadata elements include a preferred data citation, supporting resources or web links, parameter descriptions, and data quality and processing statements. If source data that contributed to the habitat classification (e.g. species-level point identification) is available, this should be attached to or otherwise linked to (e.g. in [OBIS](#)) from the metadata record.

Metadata can be supplied two ways:

- If your metadata is already published online, simply provide the DOI or permalink to the existing metadata record.
- Complete the minimum metadata elements via the [Contributing Data](#) page of the Seamap Australia website, or (recommended) consider generating a full ISO metadata record. In the case of habitat data, an ISO metadata record will be created on your behalf. Please contact us by email at IMAS.DataManager@utas.edu.au if you require assistance with creating or publishing metadata records.

2.1.3 Licensing

Habitat data that is to be assimilated into the NBHL must be in the public domain or specifically licensed under [Creative Commons Attribution 4.0 International](#) to ensure backwards compatibility with the existing NBHL license.

Ancillary data, and habitat data that is not designated for assimilation into the NBHL, must be in the public domain or licensed such that it can be freely displayed in the Seamap Australia data portal (we recommend an unrestrictive [Creative Commons](#) license to maximise reuse and discoverability).

2.2 Core Habitat Data Requirements

All seafloor habitat datasets contributed to Seamap Australia must meet the following requirements:

1. The majority of the data falls within the Australian Exclusive Economic Zone. (While IMAS may provide hosting for Australian-relevant Antarctic seafloor habitat data, due to practical constraints on mapping with polar projections we are unable to display these on the Seamap Australia data portal).
2. In addition to the 'native' habitat classification applied to your data, we *encourage* contributions to include attribute column(s) applying the Seamap Australia National Benthic Habitat Classification scheme (see [Section 2.3](#)) to avoid ambiguity.
3. Irrespective of the above, the dataset must employ a single, consistent classification scheme which avoids non-deterministic or ambiguous terms (e.g., seagrass 1 and seagrass 2) and does

not mix geomorphology with substratum or substratum with biogenic classes (mixed classifications are acceptable, but e.g. where a scheme classifies biogenic classes in some areas, it should not switch to geomorphological classifications in others). Where possible, supply explanatory notes for the scheme (or reference a document if available). The Seemap HCS is designed hierarchically to facilitate crosswalking from most commonly-used classification schemes including (but not limited to) CATAMI, NISB, CMECS, CBiCS, EUNIS. Note, that, while the Seemap HCS does not characterise biotopes or morphotypes, it can accommodate biotopic and morphological classifications at some level of the scheme.

4. The data uses a valid spatial coordinate system defining the extent of the survey area.
5. The data is to be quality controlled by the provider prior to contribution to ensure that there are no classification errors and that the geometry is valid (e.g. no null, empty, or non-simple geometries).
6. The data should be contributed in vector format (preferably ESRI Shapefile). Raster data may be accepted at the discretion of the Seemap Australia Team, but it will be translated into vector format.
7. Submissions must be accompanied by metadata describing the dataset (see [Section 2.12](#)).

All data meeting these core criteria will be published to the Seemap Australia portal as stand-alone habitat layers. Only datasets that meet the additional **acceptance criteria** specified below may be incorporated into the Seemap Australian National Benthic Habitat Layer.

2.3 Advanced Habitat Data Requirements (specifically for NBHL inclusion)

The Seemap Australia NBHL is a national authoritative source of habitat data and endeavours to be transparent, accurate, and communicable based on trusted and up-to-date data. While we aim to be inclusive, minimum quality standards must be met for data to be considered for inclusion in the NBHL in order to maintain the integrity of the national asset.

To request that your data is considered for inclusion into the Seemap Australia NBHL, please first prepare your data according to the requirements in the previous [Section 2.2](#) then additionally assess it against the following criteria.

Acceptance criteria for the Seemap Australia National Benthic Habitat Layer:

1. The ex-situ data has been acquired using an established and community-endorsed form of data collection (see the [NESP Field Sampling Manuals](#) as a starting point). This may include satellite remote sensing platforms; aerial remote sensing platforms (including large and small format aerial photography which may be aeroplane or drone based); acoustic remote sensing platforms (including single beam acoustics, multibeam acoustics, sidescan sonar).
2. There is documented evidence that the habitat classification has received some degree of ground-truthing validation² to ensure that the classifications are accurate at the time of data

² In the absence of other habitat data for a region, exceptions may be made for non-validated data. For example, remotely sensed acoustic data for which the top level Seemap Australia substratum classification (Hard/Soft/Mixed) has been applied. Exceptions will be made at the sole discretion of the Steering Committee and assessed on a case-by-case basis.

collection. These ground-truthed methods are listed in [Appendix 2](#) for each level in the Seamap Australian hierarchy for substratum classification.

3. Ground-truthing has been conducted using a recognised form of physical sampling (e.g. benthic grabs, sediment grabs, diver-based visual surveys); or remotely sensed imagery or video (e.g. camera-equipped Remotely Operated Vehicle (ROV) or Autonomous Underwater Vehicle (AUV), drop camera, towed camera, Baited Remote Underwater Video (BRUV), Benthic Observation Survey System (BOSS) etc.). See [Appendix 2](#).
4. *Either* the Seamap Australia National Benthic Habitat Classification Scheme has been applied to the data and is embedded as an attribute in the dataset; *or* if the Seamap Australia HCS has not been adopted that there is a clear pathway to translate from the native classification scheme to the Seamap Australia HCS.
5. That the highest resolution (furthest down the Seamap HCS hierarchy) classification for both biota AND substrata has been applied where possible.
6. That the purpose of the data collection is appropriate for use to extract benthic habitat data from, and that information on the scale and resolution of the data is supplied.
7. That any documentation or reports that detail the purpose of the mapping, the data collection methods and the data processing techniques be provided if available. This includes the methods for collecting the field validation data and associated evidence of where the ground-truthing has occurred across the habitat-classified spatial dataset.
8. That a data custodian has been nominated as a point of contact to answer any questions outstanding from the data following its submission.

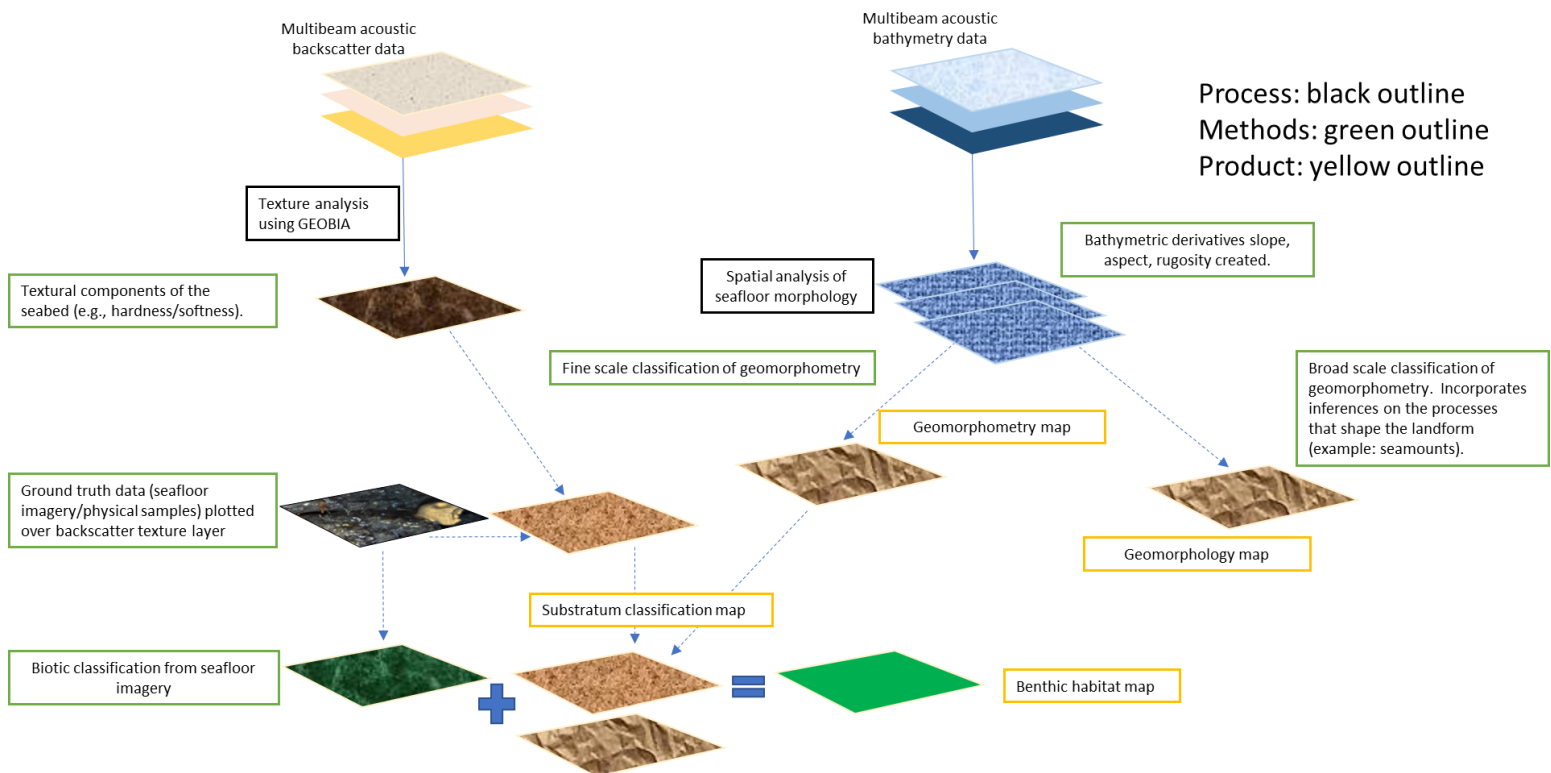


Figure 2. [placeholder] process for getting from remote sensed acoustic data to validated benthic habitat maps.

If the dataset overlaps other data that already exists within the NBHL, a prioritisation criteria will be applied to select the data to be assimilated or retained in the national layer. In general, priority is given to data that is newer (more recently collected), and/or higher spatial resolution, and/or employing more accurate methodology or with more comprehensive ground-truthing, and/or where habitat has been classified to a finer taxonomic grouping. These technical criteria are described in full in the accompanying document [Updating the Seamap Australia National Benthic Habitat Layer](#).

All candidate habitat datasets will be assessed by the Steering Committee and judged against the above criteria to ensure that they comply with the standard to be assimilated into the Seamap Australia NBHL. This process will be called a '*versioning event*' and will be completed **once per year**. Superseded versions of the NBHL will be retained in the public domain for transparency. The most recent version of the NBHL will always represent the most current and accurate state of benthic habitat knowledge.

The application of specific acceptance criteria permits the Steering Committee to:

- a) verify if the data complies to the mission of Seamap Australia and meets the data quality standards (including FAIR principals). The Steering Committee must reach consensus regarding data to be accepted for assimilation into the NBHL prior to a *versioning event*.
- b) help to establish transparent expectations to communicate to data providers as to what data meets the accuracy, quality and completeness of data provided to Seamap Australia.

2.4 Ancillary Data Requirements

Ancillary data includes all non-habitat data that may be supplied for visualisation purposes through the Seamap Australia data portal. The strongly preferred method for providing access to visualisations of ancillary data is via partner's data infrastructure delivering Web Map Services (see [Section 1.2](#)). Stability and reliability of external data services will be considered when assessing suitability of ancillary data for adding to the Seamap Australia data catalogue.

Additionally, the following ancillary data content criteria will be assessed:

- The relevance of the data to Seamap Australia target end users.
- The context of the data, if any, in relation to seafloor habitat data.
- Is the data currently openly available and hosted on a repository meeting FAIR data principles?

3 Submitting Your Data

Once you've assessed your data against the relevant criteria documented in the previous sections, please visit <https://seamapaustralia.org/contribute> to make a submission. This web form can be used for *all* contributions (includes existing online ancillary datasets). The Seamap Australia team will assess your submission and be in touch.

4 Supporting Documents and Resources

Links to other documents of interest to data contributors:

- Process methodology for updating the Seemap Australia National Benthic Habitat Layer
- Seemap Australia National Benthic Habitat Classification (visual guide [here](#), registered vocabulary API [here](#))
- [Seemap Australia web form](#) for lodging a data contribution
- Best practice guidelines for generating benthic habitat maps
- [IMAS Data Submission Tool](#) (for generating ISO 19115-3 metadata records to be hosted by IMAS)

Version	Revision Date	Author	Action
Draft	05/02/2022	Emma Flukes	Developed
Draft	20/06/2021	Vanessa Lucieer/Peter Walsh	Developed
Version 1	22/06/2022	Vanessa Lucieer	For endorsement by the Steering committee at meeting #1
Version 1.1	01/07/22	Emma Flukes	Logic + structural edits, alignment with other outputs
Version 1.2	04/08/22	Emma Flukes	Incorporated suggestions from Parks Aus, some questions still to be resolved
Version 1.3	24/08/22	Emma Flukes	Accept tracked changes and add appendices

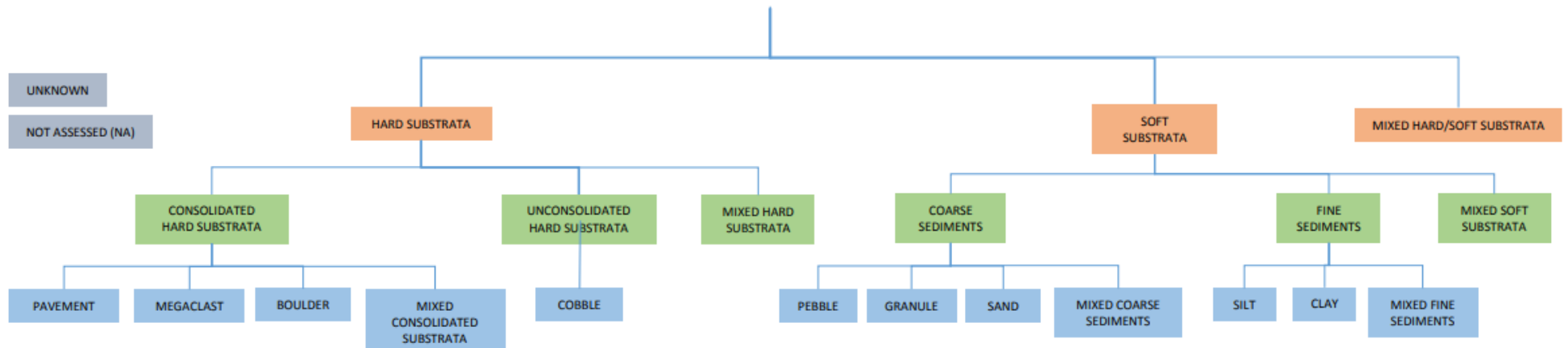
Appendix 1. Seamap Australia – Data Contribution form

This form is an example of the content to be collected via the [Seamap Australia data contribution web form](#). To be removed from this document once the web form is completed.

Dataset Title	
Data Type	
<input type="checkbox"/> Seafloor Habitat <input type="checkbox"/> Ancillary	
Hosting	
<input type="checkbox"/> Externally hosted (FAIR compliant) <input type="checkbox"/> Requires hosting	
For hosted services:	
Web Map Service:	
Web Feature Service (optional for ancillary data):	
Link to metadata record:	
For data requiring hosting...	
<i>You can leave any of the following fields blank if they are included in your metadata record. If you don't have a metadata record and would like IMAS to publish one for you, please create a record at https://data.imas.utas.edu.au/submit/</i>	
Abstract (describe the data, not the project):	
Point of Contact for the data (Name, organisation, email):	
License (Creative Commons preferred, must be Creative Commons Attribution 4.0 International for habitat data assimilated with the National Marine Habitat Layer):	
Data collection methods and processing (include published references where available):	
Start Date:	End Date

Appendix 2. Ground truth methodologies for Seamap Australia substratum component.

Substratum Component



Level 1	Validated through multibeam bathymetry topographic variable generation and multibeam backscatter incident angle modelling
Level 2	Soft substrata: sediment sample data (grab and box corer). Hard substrata: imagery or video data from any platform.
Level 3	Imagery or video data analysis (collected via any platform: see below) for hard substrata. Sediment sample data for soft substrata followed by particle size analysis.

Glossary term	Definition
Multibeam bathymetry topographic variables	<p>MBES bathymetric data will be processed to characterise and classify the seafloor in terms relevant to the distribution of benthic habitats and to help in the understanding of the spatial and temporal distribution of marine habitats. The combination of topography (bathymetry) and textural surfaces (backscatter) provide an excellent reference dataset for research and management of Australian marine seafloor habitats. Geomorphological analysis can be used to classify the multibeam bathymetry data and define the extents of particular habitat types such as seagrass beds, rocky reef, and sand plains. We recommend the use of the national standardised benthic habitat classification nomenclature as documented by Seamap Australia (Butler et al. 2017). Importantly, this classification system includes other established and developing national classification schema such as CATAMI (Althaus et al. 2015) and Geoscience Australia’s Classification and Glossary of Seabed Geomorphology</p> <p>https://www.nespmarine.edu.au/sites/default/files/PUBLIC/FieldManuals_NESPMarineHub_Chapter3_MBES_v1.pdf</p>
Multibeam backscatter	<p>The backscatter Geotiff can be interpreted into a sediment distribution and habitat map using one of two automated segmentation methods:</p> <ol style="list-style-type: none"> 1. Image-based segmentation (e.g., using e-Cognition (www.ecognition.com)) where the image is segmented into regions of similar backscatter characteristics and using the bathymetric data to identify these boundaries and transition zone. These segments are then classified as surface features, backscatter intensity patterns of sediment/habitat distribution etc. 2. Signal based segmentation (e.g., using ENVI (www.esriaustralia.com.au/envi) where changes in the backscatter intensity, with increasing grazing angle from nadir, are analysed to classify the data. <p>https://www.nespmarine.edu.au/sites/default/files/PUBLIC/FieldManuals_NESPMarineHub_Chapter3_MBES_v1.pdf</p>
VIDEO/ IMAGE PLATFORM Autonomous Underwater Vehicles (AUV)	<p>Please refer to the Marine Biodiversity Hub Marine Sampling Field Manual Chapter 4 on AUV image data collection.</p> <p>https://auv-field-manual.github.io/</p>
VIDEO/ IMAGE PLATFORM Benthic Baited Remote Underwater Video (BRUV)	<p>Please refer to the Marine Biodiversity Hub Marine Sampling Field Manual Chapter 5 on BRUV image data collection.</p> <p>https://benthic-bruvs-field-manual.github.io/</p>
VIDEO/ IMAGE PLATFORM Remotely Operated Vehicles (ROVs)	<p>Please refer to the Marine Biodiversity Hub Marine Sampling Field Manual Chapter 10 on ROV image data collection.</p> <p>https://rov-field-manual.github.io/</p>
VIDEO/ IMAGE PLATFORM Panoramic drop camera	<p>A Marine Sampling Field Manual is currently under development for this platform.</p>
VIDEO/ IMAGE PLATFORM Towed Imagery	<p>Please refer to the Marine Biodiversity Hub Marine Sampling Field Manual Chapter 7 on Towed Imagery data collection.</p> <p>https://towed-imagery-field-manual.github.io/</p>
SEDIMENT SAMPLER Grabs and Box corers	<p>Please refer to the Marine Biodiversity Hub Marine Sampling Field Manual Chapter 9 on Grab and Box corer sediment data collection.</p> <p>https://grabs-and-boxcorers-field-manual.github.io/</p>