

Welcome!

Welcome to MERMAID Documentation page. Here we will walk you through the steps of using MERMAID Collect and explain in details its features and functionalities.

MERMAID is an open-source application that collects and manages real-time data on coral reef health, developed in partnership between the WCS, WWF, and Sparkgeo.

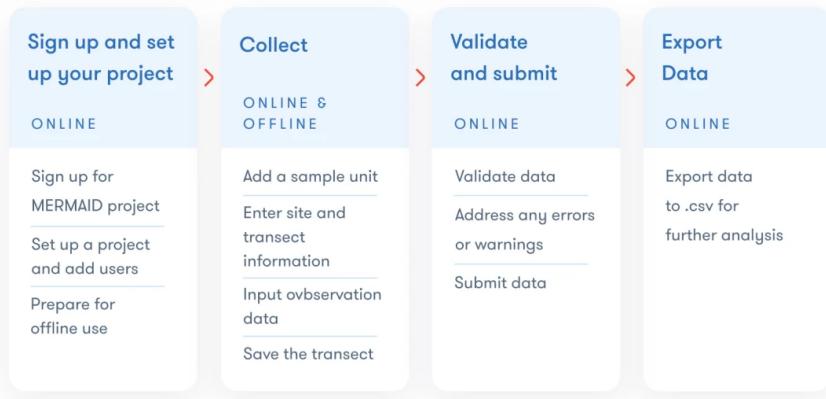
With MERMAID, scientists input their observations straight into the platform using the [Collect tool](#). MERMAID does the job of tagging and sorting data, avoiding duplicates, standardizing scientific names and summarizing critical indicators.

We save you time so you can save coral reefs!

MERMAID joins you in the field with its offline capabilities, but it stands apart from Excel or other databases, like Access, because it requires virtually zero post-entry data clean up!

Users can select reef fish and coral names from a standard list of taxa with only a few keystrokes; MERMAID will autocomplete the rest. Selecting names means saving time typing in species names or cleaning up typos of misspelled species names.

MERMAID also allows you to calculate reef fish biomass while you type, or see your total coral cover as soon as you have finished entering a transect. When you have finished collecting data, it can be exported to standard field reports (CSV/Excel) and can soon be used to create graphs or other reports.



The MERMAID workflow:

1. Sign up and set up a project

- a. Sign up for an account
- b. Set up a project and add users
- c. Prepare for offline use

2. Collect data

- a. Select a transect type
- b. Enter site information
- c. Enter management regime
- d. Include benthic cover and fish species
- e. Complete and save the transect

3. Review and submit

- a. Review and submit data
- b. Address any errors and warnings

4. Export and analyze data

a. Export to .csv for further analysis

b. Analyze directly using `mermaidr`

Getting started

SIGNING UP

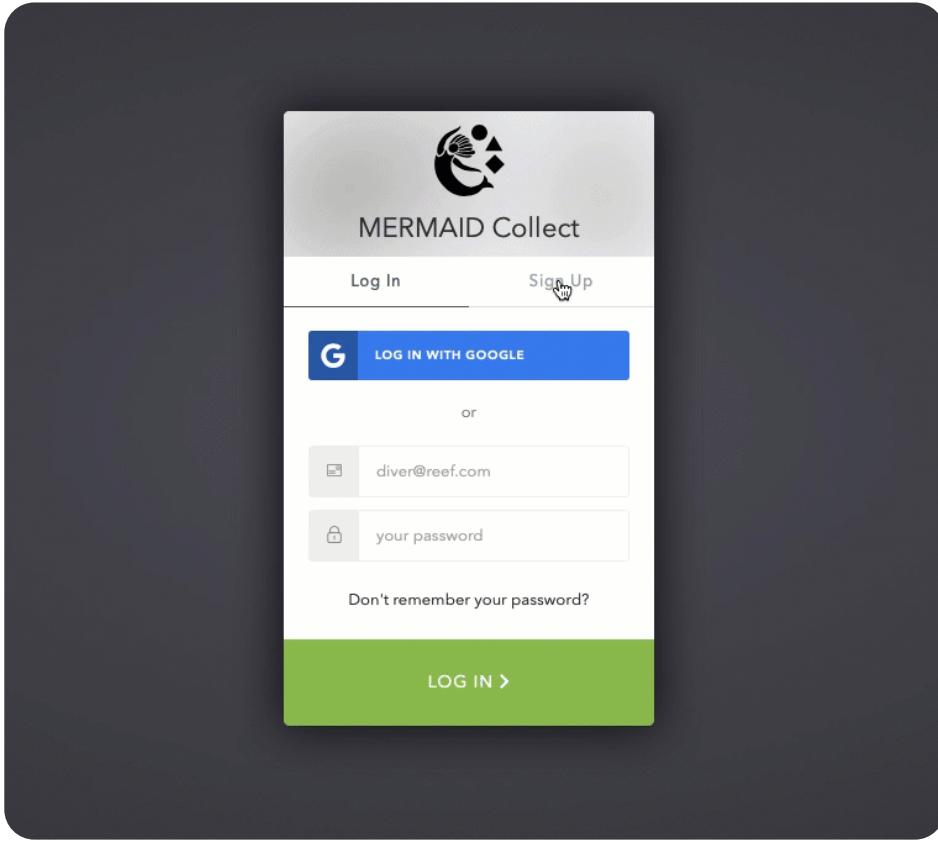
To use MERMAID, you need to register or sign up at
<https://collect.datamermaid.org>.

You can 'sign up with Google' to use an existing Gmail account and associated password, or enter a different email and create a password specific to MERMAID. Your account will be linked to your email.

Only users who have a MERMAID account can be added to a project and collect data on MERMAID

MERMAID is only officially supported on Google Chrome and Firefox browsers, and may not function with other browsers, like Explorer or Edge.

After signing up you will receive a confirmation email to verify your new account. You can access your profile information by clicking on the avatar in the upper right corner of any page. Here you can view and change your email and name.



If you forget your unique password for MERMAID, click 'Don't remember your password?' on the login page to receive an email with a link to reset your password.

If you signed up for MERMAID using Google and forgot your Gmail password, you must reset your password through Gmail.

SETTING UP A NEW PROJECT

A project consists of transect observation records that are collected within a set of sites that have defined management regimes. Each project includes users who can collect and view data. **A new project can only be created while online.** To create, click the green 'Start Project' button.

1. Details:

A name is required for every new project. All other information can be added or edited later

1 Details 2 Add users 3 Select Sites 4 Select Management 5 Data Sharing 6 Review

Name *
Project Name

Notes

Organizations

Cancel Next

2. Add Users:

1 Details 2 Add users 3 Select Sites 4 Select Management 5 Data Sharing 6 Review

Enter email of user to add...

Name	Role
julia.brand@mail.mcgill.ca	admin

Showing 1 of 1 records Records 1 - 1 of 1

Cancel Back Next

Enter the email addresses for users involved in the project and select their roles. **All users must be signed up for a MERMAID account before they can be added to a project.**

The project creator is automatically the administrator ('admin') of the project. Other users will default to the collector role when added and can be changed to admin or read-only by selecting the appropriate role from the dropdown. Additional users can be added or deleted by the administrator after a project is created.

The scope of each role is as follows:

- **Read-only:** user can only view, export, and analyze data in the analysis tools, but cannot collect new observations.

- *i.e. a project manager who is in charge of writing reports or analyses but is not collecting data in the field*

- **Collect:** user can view, export, and analyze data, and collect new observations. Once a transect is submitted, the user can no longer edit or delete observations.
 - *i.e. a member of the project team who is tasked with collecting data*

- **Admin:** user has full administrative privileges to add and edit observations during collection and after transects have been submitted. Admins can also delete observations.
 - *i.e. typically one person designated as the lead of the project*

If a user must leave a project or reaches the end of their position, their data can be transferred to other users within a project. This can be done within a project by using the lefthand admin toolbar. Simply select ‘transfer sample units’, then indicate the user from the project to whom you would like to transfer the collect records. Users can also be removed from a project on this page. **If a user still has active collect records on their “collecting” page, be sure to transfer records prior to removing them from the project.**

3. Select Sites:

Name	Project	Country	Reef Type	Reef Zone	Exposure
1000	RHM Alor 2021	Indonesia	fringing	fore reef	sheltered
1001	RHM Alor 2021	Indonesia	fringing	fore reef	sheltered
1002	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1003	RHM Alor 2021	Indonesia	fringing	fore reef	sheltered
1004	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1005	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1006	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1007	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1008	RHM Alor 2021	Indonesia	fringing	fore reef	exposed
1009	RHM Alor 2021	Indonesia	fringing	fore reef	exposed

Showing 10 records. Records 1 - 10 of 4089 [View all](#) [X](#)

This is an optional step that allows you to choose from sites that are already in the MERMAID system. These may be sites that you or your organization are monitoring and have used before in previous surveys.

If you are surveying new sites they must be added after creating your new project. Select “Skip” at the bottom of the page to move on.

The Search bar allows you to filter the list by site name, country, or project name. Click the check box next to any site you would like to add to your project, then click the “**Copy selected to Project**” button at the bottom of the page. A map at the bottom of the page also displays where the site is located with a red dot.



How to add a new site after creating a project

There are two ways to add a new site to a project after it is created:

- Under “**Sites**” in the left toolbar within a project, add a new site at the top of the page

- Within a transect, enter a new site in the site field with the “+” button and fill in all details

4. Select Management Regime:

Name	Year Est.	Open Access	Periodic Closure	Size Limits	Gear Restrictions	Access Restrictions	Species Restrictions	No Take
<input checked="" type="checkbox"/> A'a Island - Exclusive access	2017		✓			✓		
<input type="checkbox"/> Access restrictions						✓		
<input type="checkbox"/> Access restrictions						✓		
<input type="checkbox"/> Access restrictions						✓		
<input type="checkbox"/> Adavac_LMMA						✓		
<input type="checkbox"/> Adavac_open		✓						
<input type="checkbox"/> Ahus 10 - Fished		✓						
<input type="checkbox"/> Ahus 10 - Fished		✓						
<input type="checkbox"/> Ahus 11 - Fished		✓						
<input type="checkbox"/> Ahus 11 - Fished		✓						

Showing 10 records. Records 1 - 10 of 946 < >

Cancel Back Skip Copy selected to project

This is an optional step that allows you to choose from management types that are already in the MERMAID system.

A **management regime** categorizes the regulations and restrictions placed on an area in which a survey site is located. These may be management regimes for sites that you or your organization are monitoring and have used in previous surveys. You can save time by selecting and adding these sites to your project here.

If you are surveying sites with a new management regime, or if your site's management regime has changed, it must be added after creating your new project. Select “Skip” at the bottom of the page to move on.

The ‘Filter’ bar allows you to search the list by management name, secondary name, year established, or project name. Click the check box next to any management type you would like to add to your project, then click the “**Copy selected to project**” button at the bottom of the page.

How to add new management after creating a project

There are two ways to add new management to a project after it is created:

1. Under “**Management Regimes**” in the lefthand toolbar within a project, add a new management regime and navigate with the “New MR” button at the top of the page
2. Within a transect, enter a new management regime in the management field at the top of the page by clicking the “+” button, and fill in all details

5. Data Sharing:

The screenshot shows the 'Data Sharing' step of a six-step project setup process. The steps are numbered 1 through 6: Details, Add users, Select Sites, Select Management, Data Sharing, and Review. The 'Data Sharing' step is currently active. On the left, there's a note about data sharing: "Data is much more powerful when shared. Given the urgent need for global coral reef conservation, MERMAID is committed to working collectively as a community and using the power of data to help make faster, better decisions. Coral reef monitoring data is collected with the intent of advancing coral reef science and improving management. We recognize the large effort to collect data and your sense of ownership. While not required, we hope you choose to make your data available to fuel new discoveries and inform conservation solutions." Below this note are dropdown menus for 'Fish Belt' (set to 'Public Summary'), 'Benthic: PIT, LIT, and Habitat Complexity' (set to 'Public Summary'), and 'Bleaching' (set to 'Public Summary'). There's also a checkbox for 'This is a test project'. At the bottom of the form are 'Cancel' and 'Back' buttons on the left, and a green 'Next' button on the right.

MERMAID is committed to working collectively as a community of researchers and reef managers to use the power of data to make faster, better decisions. Coral reef monitoring data is collected with the intent of advancing coral reef science and improving management. We recognize the large effort to collect data and your sense of ownership. While not required, we hope you choose to make your data available to fuel new discoveries and inform conservation solutions.

Choosing a data policy for your project determines how much of your

project's data can be shared with other users to facilitate global collaboration and understanding of coral reef health via future global dashboard features in MERMAID. It can be chosen for fish belt data and for benthic data, which can have different levels of sharing. Your data policy level can be changed at any time after creating a project.

The three policy levels are:

- **Public summary** – Collected observations are private, but site-level summary statistics are public, along with metadata for the project, protocol, and site. *This option is the default.*
- **Public** – All collected observations are public.
- **Private** – Collected observations and site-level summary statistics are private, but metadata for project, protocol, and site, including site location and type and count of sample unit at each site, are public.

If you are creating a project to practice using MERMAID or train others, you can indicate this with the checkbox at the bottom of the page. Data added for a test project will be omitted from all public reporting.

6. Review

Summary for Rocky Cove

Organizations

Project Users

julia.brand@email.mcgill.ca

Data Sharing

Fish Belt:

Public

Benthic LIT, PIT, and Habitat Complexity:

Public Summary

Bleaching:

Public Summary

Sites

1001

1003

1005

Management Regimes

A'a Island - Exclusive access

Access restrictions

Ahus 10 - Fished

Ahus 1 - MPA

Create project

Review the summary of all the users, sites, management regimes, and

data sharing that you selected for your project.

You can delete any of these selections by clicking the red “x” next to their names, and you can return to each page to add additional information by selecting “Back” at the bottom or by clicking the page tabs at the top.

An admin can add additional users, sites, and management regimes and change the data sharing after a project is created by using the left-hand toolbar within a project.

Click “**Create project**” to complete your new MERMAID project!

THE PROJECTS PAGE

Name	Countries	Number of Sites	Offline Ready	Data Sharing	Copy Project
2016 bleaching surveys	Fiji	11		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	
2016_Vatu-i-Ra Conservation Park	Fiji	12		Fish Belt: Private Benthos: Public Summary Bleaching: Public Summary	
Belize Glover's Atoll 2020	Belize	31		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	
Belize Glover's Atoll legacy	Belize	31		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	
Kenya CRCP legacy	Kenya	116		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	
Madagascar WCS MACMON 2015-6	Madagascar	74		Fish Belt: Private Benthos: Public Summary Bleaching: Public Summary	
Mermaid Cove	Indonesia	5		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	
Rocky Cove	Indonesia	3		Fish Belt: Public Benthos: Public Summary Bleaching: Public Summary	
Tanzania CRCP surveys	Tanzania	106		Fish Belt: Public Summary Benthos: Public Summary Bleaching: Public Summary	

The Projects page lists all the projects you have created in MERMAID or have been added to as a collector or read-only user.

Click the left-hand “MERMAID” icon or the right-hand “Projects” icon in the header/navigation bar of any page to go to your main Projects page at any time.

Project details can only be edited while online.

If you are an admin for a project, you can edit the project by clicking on the project name and choosing a section to edit in the left toolbar. Here, you can change project info, remove or add additional users, create new sites and management regimes, and change your data sharing setting.

PREPARING FOR OFFLINE USE

Before heading to the field, there are a few steps that must be followed to ensure you are able to enter data offline.

Be sure to follow each step carefully prior to your expedition:

- 1.** Make an account
- 2.** Click the “refresh” icon in the footer to make sure you have the most up-to-date version of the app
- 3.** A project admin must create the project
- 4.** The project admin must add all other users to the project. Optionally, copy or add sites and management regimes before going to the field
- 5.** **Ensure that the cloud icon to the right of each project in the project list that you will use offline is green.** If it is not green, click the grey icon or simply click on the project to enter it to make sure data is available offline.
- 6.** Test offline access by turning off your Wi-Fi, restarting Chrome, and entering test data into your project

Collecting data

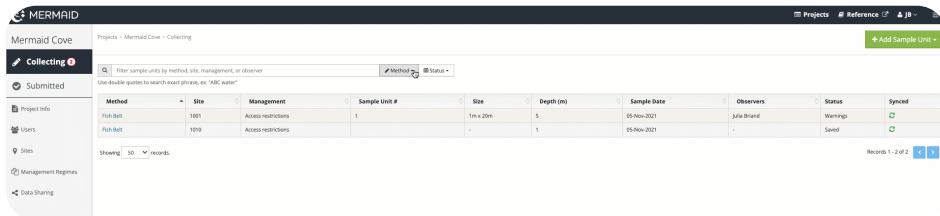
Just like Excel, MERMAID joins you during data collection in the field with its offline capabilities.

THE COLLECT PAGE

The ‘Collect’ page is where you can add new sample unit observations and view other observations that you have already collected and saved but not yet submitted.

Select a project from your list to enter the project’s “Collect” page.

The red number next to the “Collecting” tab in the left-hand toolbar indicates the number of records you have collected and saved but not yet submitted.



Method	Site	Management	Sample Unit #	Size	Depth (m)	Sample Date	Observers	Status	Synced
Fish Net	1001	Access restrictions	1	1m x 20m	5	05-Nov-2021	Julia Brand	Warnings	<input checked="" type="checkbox"/>
Fish Net	1010	Access restrictions	-	-	1	05-Nov-2021	-	Saved	<input checked="" type="checkbox"/>

Only users with ‘Collector’ or ‘Administrator’ roles can collect and submit new observations; ‘Read-only’ users cannot collect records.

The “**Method**” button at the top of the page will display collected records by sample method; check the methods you would like displayed.

The “**Status**” button at the top of the page will display collected records by their validation status: saved, validated, warnings, or

errors.

- An observation row will be highlighted in **white** if a record has been saved but not validated
- A row will be highlighted in **purple** if it has been saved and validated and no errors or warnings were identified
- A row will be highlighted in **red** if it was saved and an error(s) was found; a row will be highlighted in yellow if it was saved and a warning(s) was found.

Observations can be added both online and offline, but they can only be validated and submitted when connected to the internet.

ADDING NEW SITES AND MANAGEMENT REGIMES

The left-hand toolbar lists a project's info, users, sites and management regimes, and data sharing. Here you can add a new site or management regime directly to a project when online. Admins and collectors can use the “new site” and “new management” functions.

Adding a new site

Navigate to the “Sites” tab and select “New Site”

A new site requires a name, country, coordinates, and details on the exposure, reef type, and reef zone. The name can be the site’s common name or unique ID. When all details have been added, save the site.

In the “Sites” tab you can choose “**Copy sites from other projects**” to add existing sites and their metadata from other MERMAID projects. You can also add a site directly from an observation page by

clicking the ‘+’ sign next to the site dropdown field.

Name	Reef Type	Reef Zone	Exposure
1001	fringing	fore reef	sheltered
1003	fringing	fore reef	sheltered
1005	fringing	fore reef	exposed

Showing 50 / records. Records 1 - 3 of 3

Allen Coral Atlas : F
Satellite Coral Reef Mosaic
Shallow Lagoon
Back Reef Slope
Deep Lagoon
Outer Reef Flat
Outer Reef Edge
Pelecypods
Plateau
Roof Crest
Rock
Shadow Lagoon
Sheltered Reef Slope
Small Reef

When online, a new site created by one user is shared across the project with all other users and available for them to use in observations. If you know the sampling sites within your project in advance, it is easiest to add them while online before going to the field.

New sites can be created offline, and then will be synced when back online.

New sites with matching metadata that are created offline by different users within a project can be merged when users are back online. If multiple new sites have identical coordinates, they will be flagged as **duplicate sites**. If this happens, you will see a warning under the “Sites” tab that says “Duplicate Sites”. When you navigate into the “Sites” tab, you will see a notification at the top of the page that the project appears to have duplicate sites. Click “Resolve” to decide whether to merge the duplicate sites or keep them separate.

This project appears to have duplicate sites. Merge

Filter sites by name, reef type, zone or exposure
Use double quotes to search exact phrase, as: "ABC water"

Name	Reef Type	Reef Zone	Exposure
1000	fringing	fore reef	sheltered
1001	fringing	fore reef	sheltered
1010	fringing	fore reef	exposed
1011	fringing	fore reef	exposed
Indonesia1	fringing	channel	exposed
Indonesia2	fringing	channel	exposed

Showing 50 records.

Records 1 - 6 of 6

Allen Coral Atlas ⓘ
Satellite Coral Reef Mosaic
Geomorphic Analysis

A dialog box will show you which sites are considered duplicates. Here you can decide whether to keep one site and merge it with the duplicate sites, or to edit a site and change the metadata to indicate that they actually are separate, unique sites. **Unique sites must have different coordinates.**

If you choose to keep a site, the sites that will be merged with the site you chose to keep will be highlighted in red. Select “OK” to confirm.

Select site to keep?

	<input type="checkbox"/> Keep this site <input checked="" type="checkbox"/> Edit site	<input type="checkbox"/> Keep this site <input checked="" type="checkbox"/> Edit site
Name	Indonesia2	Indonesia1
Latitude	-17.809	-17.809
Longitude	178.72	178.72
Map		
Exposure	exposed	exposed
Reef Type	fringing	fringing
Reef Zone	channel	channel
Notes*		

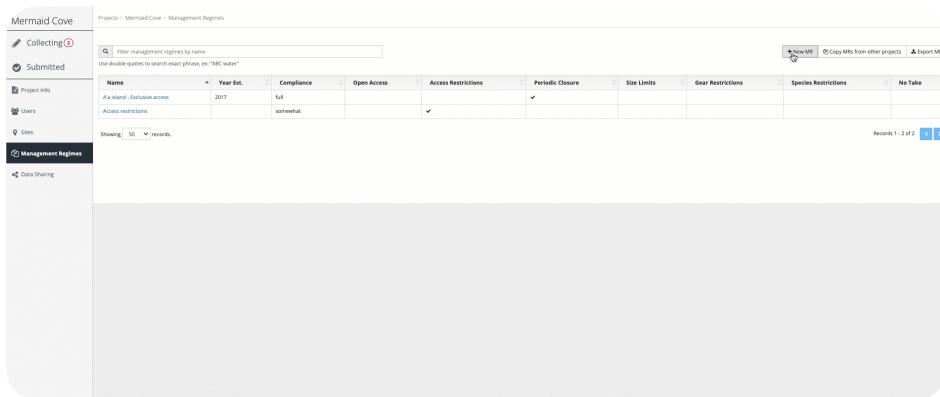
* Site notes will be combined into the site being kept.

When sites have been merged, the sites will be updated with the single merged site, and this merged site will automatically be

assigned to all sample units that were using the duplicate sites. All observation data will be preserved.

Adding a new management regime

Navigate to the “Management” tab and select “New MR”



The screenshot shows the 'Management Regimes' page for the 'Mermaid Cove' project. The left sidebar has 'Collecting' and 'Submitted' status filters, and a 'Management Regimes' tab which is selected. The main area shows a table with one row:

Name	Year Est.	Compliance	Open Access	Access Restrictions	Periodic Closure	Size Limits	Gear Restrictions	Species Restrictions	No Take
Az Island - Exclusive access	2017	full	somewhat	<input checked="" type="checkbox"/>					

Below the table, it says 'Showing 1 of 1 records.' and 'Records 1 - 2 of 2' with a 'Next' button. There are also 'New MR', 'Copy MRs from other projects', and 'Export MRs' buttons at the top right.

A new management regime requires a name and year established. All other details are optional, but "Open Access" is the default. When you are finished, save the management regime. You can also delete the management with the “delete this record” button at the bottom. In the “Management Regimes” tab you can also choose “**Copy MRs from other projects**” to add existing management regimes and their metadata from other MERMAID projects. You can also add a management regime directly from an observation page by clicking the ‘+’ sign next to the management regime dropdown field.

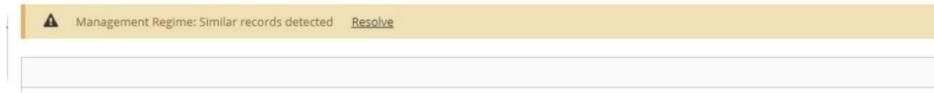
When online, a new management regime created by one user is shared across the project with all other users and available for them to use in observations. If you know the management regimes within your project in advance, it is easiest to add them while online before going to the field. Management regime details can be edited after creation if needed.

New management regimes can be created offline, and then will be synced when back online.

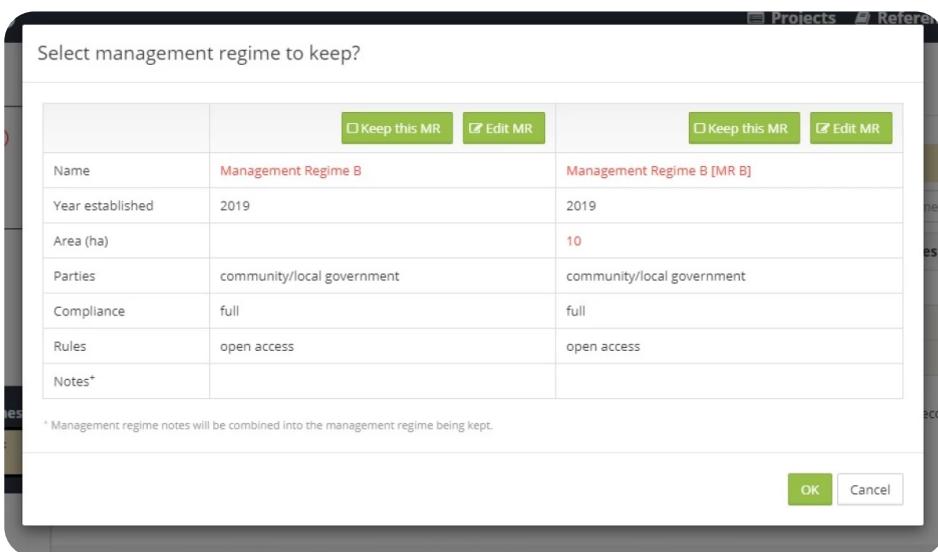
If multiple management regimes with identical names are created offline by different users within a project, and are assigned to the same site, they will be flagged as **duplicate management regimes**.

If this happens, you will see a warning under the “Management Regimes” tab that says “Duplicate management regimes”. When you navigate into the “Management Regimes” tab you will see a notification at the top of the page that the project appears to have duplicate management regimes. You will also see this warning at the top of the sample unit that has the duplicate management regimes.

These management regimes can be merged or kept separate when users are back online. Click “Resolve” in the Management Regimes tab to decide whether to merge the duplicate management regimes or keep them separate.

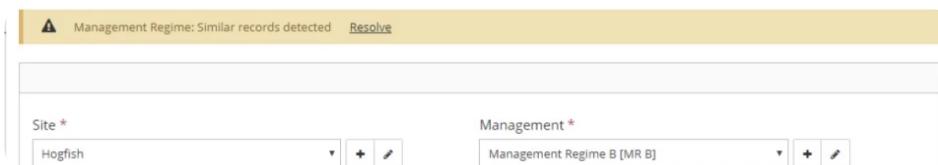


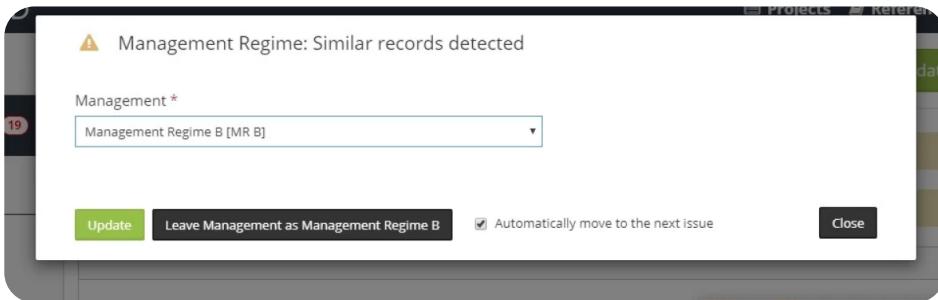
A dialog box will show you which management regimes are considered duplicates. Here you can decide whether to keep just one management regime or to edit a management regime and change the metadata to indicate that they actually are separate, unique management regimes. Unique management regimes must have different names.



If you want to keep just one management regime, select the “Keep this MR” button. The duplicate management regimes(s) that will be merged with the management regime you choose to keep will be highlighted in red. This merged management regime will now be assigned to all sample units that had been associated with the duplicate management regime. All observation data will be preserved. If you want to keep both management regimes, select “cancel” and ignore all warnings of duplicate management regimes.

A duplicate management regime can also be changed to another existing management regime within the transect using the “Resolve” button next to the warning; you can select a different management regime from your list if you accidentally assigned the duplicate management regime. You cannot merge duplicate management regimes from the transect, however, and must complete this process in the “Management Regimes” tab as described above.





ENTERING A TRANSECT

When you're ready to enter new data for a project, click "**Add Sample Unit**" at the top right of the Collect page and select a sample unit.

There are currently five types of sample units available on MERMAID: reef fish belt transects, coral point intercept (PIT) transects, coral line intercept (LIT) transects, habitat complexity transects, and bleaching quadrat collections. These transects are similar to methods described in the [Coral Reef Monitoring Protocol for Assessing Marine Protected Areas](#) (Ahmadia et. al 2013) (Appendix 2).

After selecting a transect type, you must **fill in all required fields**,

marked with a red asterisk. Sites and Management Regimes that you added before or after creating your project will appear in the dropdown, and you can edit an existing site with the pencil icon or enter a new site with the “+”.

Optional transect information includes reef slope, visibility, current, relative depth, tide, and any notes.

The screenshot shows the 'Collecting' module for the 'Mermaid Cove' project. The left sidebar shows 'Submitted' status. The main form contains fields for Site, Management, Sample date, Sample time, Depth, Transect Number, Label, Transect length surveyed, Width, Fish size bin, Reef Slope, Visibility, Current, Relative depth, and Tide. Buttons for 'Save', 'Validate', and 'Submit' are at the top right.

Each transect requires at least one ‘observer’, defined as the person or people who collected the transect observations. This is a required field, and you can choose from a dropdown list of users associated with your project. To remove an observer, click the red ‘x’.

The screenshot shows the 'Collecting' module for the 'Mermaid Cove' project. The left sidebar shows 'Submitted' status. The main form includes fields for Relative depth, Tide, Notes, Observers (with an 'Add observer' input), and Observations (with a table for Fish name, Size, Count, Biomass, Total biomass, and Total abundance). A 'Delete this record' button is at the bottom.

Once all required fields are completed, you can save the transect.

When online, you can validate and submit the transect.

Offline, only the 'Save' button will appear.

Deleting a Transect

If you wish to delete a transect, click the "delete this record" button at the bottom of any transect page. This will permanently remove the record and its observations from MERMAID, so be sure that you want to remove it.

TRANSECT TYPES

Fish belt transect

The fish belt transect records observations of fish abundance.

Each transect requires a transect number, length surveyed (m), and transect belt width (options: 2m, 5m or 10m). Users can select how fish sizes are estimated underwater, using 1cm, 5cm or 10cm size bins. The “label” field can be used to indicate a special type of fish belt transect, such as long-swim.

Mermaid Cove

Projects > Mermaid Cove > Collecting > Fish Belt

Save Validate Submit

Collecting

Submitted

Project info

Users

Sites

Management Regimes

Data Sharing

Sample date * 2021-11-5

Depth * 1 m

Transect Number *

Label

Transect length surveyed * m

Width *

Fish size bin *

Reef Slope

Visibility

Current

Relative depth

Tide

Notes

Observations are recorded at the bottom of the page.

Mermaid Cove

Projects > Mermaid Cove > Collecting > Fish Belt

Save Validate Submit

Collecting

Submitted

Project info

Users

Sites

Management Regimes

Data Sharing

Relative depth deep

Tide low

Notes

Observers

Add observer *

Julia Briand

Observations

Use Tab to duplicate observation, use Enter to add row

	Fish name *	Size *	Count *	Biomass (kg/ha)
+ Add row				Total biomass (kg/ha) 0.0 Total abundance 0

Delete this record

After typing any three letters of an observed fish family, genus, or species, MERMAID will provide a **predictive dropdown** with names. This ensures all spelling is correct and consistent. Select the fish family, genus, or species to use for an observation by using the ‘up’ or ‘down’ arrow keys or entering more letters so that there is only one choice and press the Enter or Return key to select a name.

All fish names come from Fishbase. They can be found in the “Reference” icon at the header of any page. A new fish family, genus, or species can be proposed to the MERMAID science team for

approval and addition. Biomass will automatically be calculated in the last column.

To prevent errors in data entry, MERMAID will flag the following with warnings and errors:

- Total biomass less than 100 kg/ha or greater than 2,000 kg/ha
- Total fish count less than 10
- Total observations less than 5

NAVIGATION TIP

Navigating through the observation fields is similar to navigating in Excel: use the ‘tab’ keys to move across to the Size and Count (abundance) columns; at the end of a row, press “Enter” to create a blank row and enter a new fish observation; press “Tab” at the end of a row to duplicate fish species from the last row.

Benthic line transect (LIT)

This transect records observations of benthic cover from a benthic line intercept transect.

Each transect requires a transect number and the surveyed length (m).

The screenshot shows the MERMAID software interface for a 'Benthic LIT' transect under the 'Mermaid Cove' project. The left sidebar shows navigation links for 'Project Info', 'Users', 'Sites', 'Management Regimes', and 'Data Sharing'. The main form has the following fields:

- Site ***: 1001
- Management ***: Access restrictions
- Sample date ***: 2021-11-25
- Sample time**: (empty field)
- Depth ***: 2 m
- Transect Number ***: 1
- Label**: (empty field)
- Transect length surveyed ***: (empty field) m
- Reef Slope**: (empty dropdown)
- Visibility**: (empty dropdown)
- Current**: (empty dropdown)
- Relative depth**: (empty dropdown)
- Tide**: (empty dropdown)
- Notes**: (large text area)

At the top right, there are buttons for 'Save', 'Validate', and 'Submit'.

Enter the benthic observations from the transect at the bottom of the form.

The screenshot shows the MERMAID software interface. At the top left is a dropdown menu labeled 'Observers' with 'Add observer *' and a list item 'Julia Brand'. Below it is a section titled 'Observations' with a note 'Use Tab to duplicate observation, use Enter to add row'. It contains a table with columns: 'Benthic attribute *', 'Growth form', and 'Length *'. A red '+' icon is located at the bottom right of the table. At the very bottom of the interface, there is a footer bar with links: 'Help', 'Terms', 'Contact', 'Changelog', and 'Credits'.

MERMAID will **predict** the benthic attributes after you type the first three letters. This ensures all spelling is correct and consistent. Select the benthic attribute by using the ‘up’ or ‘down’ arrow keys or entering more letters so that there is only one choice, and press the ‘Enter’ or ‘Return’ key to select a name.

Growth forms can be selected from the dropdown list or predicted by typing. The total length and percent cover of each benthic attribute will automatically be calculated at the bottom of the rows.

Indo-Pacific benthic attributes are included in this version of MERMAID. They can be found in the “Reference” icon at the header of any page. *New benthic attributes can be proposed to the MERMAID science team for approval and addition.*

NAVIGATION TIP

Use the ‘tab’ keys to move across to the attribute, growth form, and length columns. At the end of the row, press ‘Enter’ to create a blank row and add a new benthic attribute observation. If the same attribute is observed but with a different length, press the ‘Tab’ key at the end of the row to duplicate the benthic attribute in the next row.

Benthic point transect (PIT)

This transect records observations of benthic cover from a benthic point intercept transect (PIT) survey.

Each transect requires a transect number, the surveyed length (m), and the interval between point observations (m). E.g., points counted every 50 cm can be entered at 0.5m in the “Interval size” box.

The screenshot shows the 'Mermaid Cove' project page with the 'Collecting' tab active. The main area contains several input fields:

- Transect Number: 1
- Transect length surveyed: 1 m
- Interval start: 1 m
- Interval size: 0.5 m
- Reef Slope: dropdown menu
- Visibility: dropdown menu
- Current: dropdown menu
- Relative depth: dropdown menu
- Tide: dropdown menu
- Notes: large text area

At the top right are buttons for Save, Validate, and Submit.

Enter the benthic attribute observed at each point at the bottom of the page.

The screenshot shows the 'Observations' section of the MERMAID interface. It features a table for entering data:

Interval *	Benthic attribute *	Growth form

Below the table is a red 'Delete this record' button. At the bottom of the page, there is footer text: '©2022 MERMAID v1.2.1' and navigation links: Help, Terms, Contact, Changelog, Credits.

MERMAID will **predict** the benthic attributes after you type the first three letters. This ensures that all spelling is correct and consistent. Select the benthic attribute by using the ‘up’ or ‘down’ arrow keys or entering more letters so that there is only one choice and press the ‘Enter’ or ‘Return’ key to select a name.

Growth forms can be selected from the dropdown list or predicted by typing. Indo-Pacific benthic attributes are included in this version of MERMAID. They can be found using the “Reference” icon at the header of any page. *New benthic attributes can be proposed to the MERMAID science team for approval and addition.*

The number of rows should equal the total number of expected points based on your transect length and interval size. You will receive a

warning if the number of entered rows does not match this.

The percent cover of each benthic attribute along the transect will automatically be calculated and displayed at the bottom of the rows.

NAVIGATION TIP

Use the ‘tab’ keys to move across to the attribute, growth form and length columns. At the end of the row, press ‘Enter’ to create a blank row and add a new benthic attribute observation. If the same attribute is observed but with a different length, press the ‘Tab’ key at the end of the row to duplicate the benthic attribute in the next row.

Habitat complexity

This transect records observations of benthic habitat complexity on a scale of 0 to 5, based on the methodology proposed in Wilson et al. (2007) and described in Darling et al. (2017) and Gurney and Darling (2017) (Appendix 2).

To enter a habitat complexity transect, you will need to provide a transect number, the surveyed transect length (m), and the interval between complexity observations (m). E.g. assessing complexity every 5 m can be entered at ‘5 m’ in the “Interval size” box.

The screenshot shows a web-based data entry interface for a 'Habitat Complexity' transect. The left sidebar has a 'Collecting' tab selected, showing 0 entries. Other tabs include 'Submitted', 'Project Info', 'Users', 'Sites', 'Management Regimes', and 'Data Sharing'. The main form area is titled 'Mermaid Cove' and contains fields for 'Transect Number' (set to 1), 'Label', 'Transect length surveyed' (set to 100), 'Interval size' (set to 5), 'Reef Slope', 'Visibility', 'Current', 'Relative depth', 'Tide', and 'Notes'. There are also dropdown menus for 'Label', 'Interval size', 'Current', and 'Tide'. At the top right are buttons for 'Save', 'Validate', and 'Submit'.

Enter the habitat complexity score at each interval at the bottom of the page. You must have as many rows of observations as you do intervals in the transect length.

NAVIGATION TIP

Use the ‘tab’ keys to move across the interval and habitat complexity score columns. At the end of the row, press ‘Enter’ to create a blank row and add the next complexity observation. If the same habitat complexity is observed at the next interval, press the ‘Tab’ key at the end of the row to duplicate the row.

Coral Bleaching

This sample unit is a rapid assessment field method that can be used to quantify coral bleaching.

This sample unit is a rapid assessment field method that can be used to quantify coral bleaching, based on [the methodology](#) proposed by McClanahan and Darling (2016). Users record observations of coral bleaching as percent bleached and percent coverage of benthic types.

To enter a coral bleaching transect, you will need to start with your quadrat size.

Mermaid Cove

Projects - Mermaid Cove - Collecting - Bleaching

Collecting 0

Submitted

Project Info

Users

Sites

Management Regimes

Data Sharing

Quadrat size *

Label

Visibility

Relative depth

Current

Tide

Notes

Observers

Add observer *

Save Validate Submit

Observations are entered for ‘colonies bleached’ as percentages, and as percent coverage of benthic attributes.

Mermaid Cove

Projects - Mermaid Cove - Collecting - Bleaching

Submitted

Project Info

Users

Sites

Management Regimes

Data Sharing

Relative depth

Tide

Notes

Observers

Add observer *

Julia Brand

Observations - Colonies Bleached

Use Tab to duplicate observation, use Enter to add row

Benthic attribute *	Growth form	Normal	Pale	0-20% bleached	20-50% bleached	50-80% bleached	80-100% bleached	Recently dead
+ Add row								

Observations - Percent Cover

Use Tab to duplicate observation, use Enter to add row

Quadrat	Hard coral, % cover	Soft coral, % cover	Macrolives, % cover
+ Add row			

Delete this record

© 2020 MERMAID v1.2.1 Help Terms Contact Changing Order

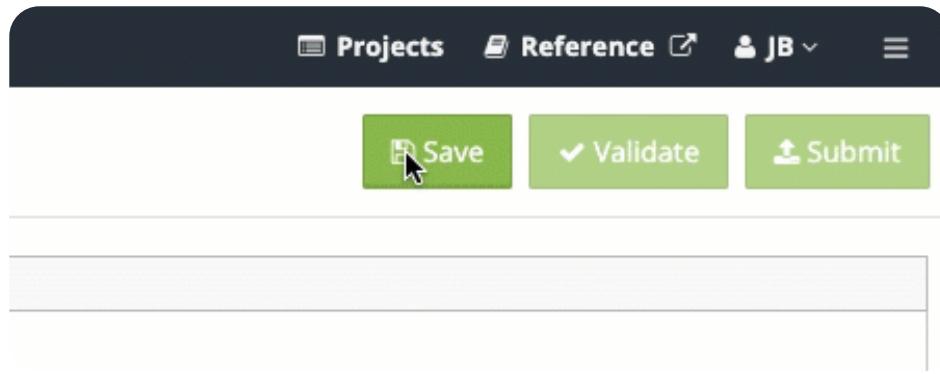
NAVIGATION TIP

Use the ‘tab’ keys to move across the colonies bleached and percent cover columns. At the end of the row, press ‘Enter’ to create a blank row to add the next complexity observation. If the same bleaching or percent cover is observed at the next interval, press the ‘Tab’ key at the end of the row to duplicate.

SAVING A TRANSECT

Once you enter any new information into a transect you can save it using the button in the upper right corner of the page.

The save button is bright green when there is new information to be saved. If the button is gray and says “saved”, you have already saved the transect and there is no new information to be saved.



After saving, you can always return to the transect to add or change data and information and resave.

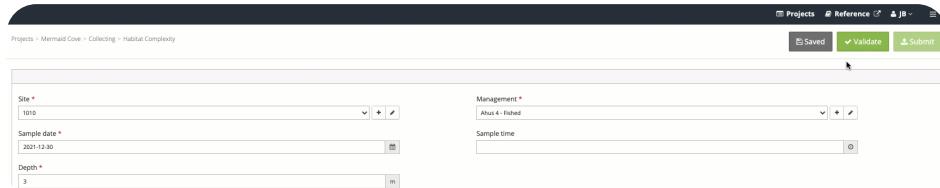
If you try to navigate away from a page with unsaved information, you will see a warning on the screen that you have unsaved data – choose “No” to stay on the transect and save; choose “Yes” to leave the transect unsaved.

Validating data

After your data has been saved, it can be validated. Validation is the “proof-reading” of the sample unit information and observations. This is where mistakes and errors are caught and brought to your attention to correct.

Validation can only be done online.

After saving a transect, **click the activated green “Validate” button to validate your transect.**



The screenshot shows a software interface for managing transects. At the top, there are navigation links: 'Projects', 'Reference', and 'JB'. Below these are three buttons: 'Saved' (grayed out), 'Validate' (green), and 'Submit' (grayed out). The main area contains several input fields: 'Site' (1010), 'Management' (Area 4 - Fished), 'Sample date' (2021-12-30), 'Sample time' (empty), and 'Depth' (3 m). The 'Validate' button is highlighted in green, indicating it is active.

After successfully validating a transect the validate button will be grayed out and the option to submit your data will be activated in green.

After validating, you will receive one of the following notifications:

A. Success!

Nice work, your sample unit was validated successfully! There are no errors with the data and it is ready to submit.

B. Warnings

The screenshot shows the MERMAID software interface for data entry. The main area is a form titled "Collecting" under "Mermaid Cove". The form contains various input fields for transect data, such as Site (1001), Management Area (A's Island - Exclusive access [Special Management Area]), Sample date (2021-11-5), Sample time, Depth (1), Transect Number, Label, Transect length surveyed, Width (2m), Fish size bin (10), Reef Slope, Visibility, Current, Relative depth, Tide, and Notes. On the left, there is a sidebar with links for Submitted, Project Info, Users, Sites, Management Regimes, and Data Sharing. At the top right, there are buttons for Projects, Reference, and Job, along with "Saved", "Update", and "Submit" buttons.

An orange warning(s) will appear at the top of the page if MERMAID identifies a potential issue in your transect information or data.

You can decide whether the issue is accurate for your data. If the issue was due to an entry mistake, you can change the information by clicking “resolve” in the warning message at the top of the page. This will bring up a modal window where you can add or change the information. Click “update” to incorporate your changes in the transect.

Some warnings require more than one field changes, such as in the observation section, and the modal will direct you to scroll to the fields within the record.

After addressing warnings, resave the transect and validate again. Repeat the process for any additional warnings that are identified. If you don't believe a warning is accurate for your transect, you can disregard it and submit the transect.

C. Errors

A red warning message will appear if MERMAID identifies an error in a transect's information or observations. Errors must be resolved before a transect can be submitted. To address the error click "resolve" in the error message. This will bring up a modal window where you can add or change the information. Click "update" to incorporate your changes in the transect.

You can also scroll down to the field in your transect with the warning and edit within the record. After resolving all errors, resave the transect and validate again. Repeat the process for any additional errors that are identified.

D. Submit data

When you are finished entering data for a transect, you can 'submit' the transect.

After submitting data, admin users can still edit the transect or return a transect to the observer, so make sure your data are finalized and clean before submitting as a collector! **Submitting data can only be done when online.**

To submit data, select the green box in a validated transect that says "**Submit**".

The screenshot shows the MERMAID software interface. At the top, there's a header with the MERMAID logo, the project name "Mermaid Cove", and navigation links for "Projects", "Reference", and "Help". Below the header, a toolbar has buttons for "Saved", "Validated", and "Submit". The main content area is titled "Collecting" with a red notification badge showing "1". It contains several data entry fields: "Site *", "Management *", "Sample date *", "Depth *", and "Transect Number *". On the left, a sidebar lists "Project info", "Users", "Sites", "Management Regimes", and "Data Sharing".

Submitting data moves it from the "Collect" page to the "Submitted" page. This shares your observations with the other users in the project. Within the "Submitted" page, admins can edit or delete transects or return them to their original observers for further editing.

If you are a read-only member on a project you can see data once it has been submitted and you can export it, but you cannot edit this data while it is in MERMAID.

Accessing Data

EXPORT TO CSV

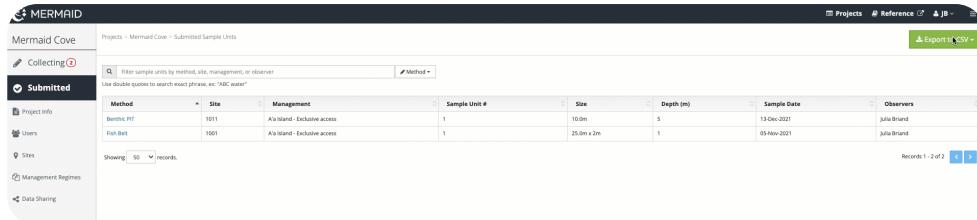
Submitted transects can be exported to a tabular format in a .csv file for further analysis by clicking the ‘Export to CSV’ button.

Data can only be exported when online and after transects have been submitted.

Select which sample unit records you would like to download. All records of each sample unit type will be combined into a single spreadsheet.

This will begin downloading a .csv to your computer. All user levels (admin, observer, and read-only) can export data from a project.

Questions? You can reach out to us when online via the Contact link at the bottom of any page.



The screenshot shows the MERMAID software interface with the following details:

- Header:** Projects - Mermaid Cove > Submitted Sample Units
- Left Sidebar:** MERMAID, Collecting (1), Submitted (highlighted), Project Info, Users, Sites, Management Regimes, Data Sharing.
- Search Bar:** Filter sample units by method, site, management, or observer. Method dropdown is set to "Method".
- Table:** Submitted Sample Units

Method	Site	Management	Sample Unit #	Size	Depth (m)	Sample Date	Observers
Benthic PIT	1011	A'a Island - Exclusive access	1	10.0m	5	13-Dec-2021	Juli Brund
Rain Belt	1001	A'a Island - Exclusive access	1	25.0m x 2m	1	05-Nov-2021	Juli Brund

- Bottom:** Showing 50 records, Records 1 - 2 of 2, CSV export button.

R PACKAGE

MERMAID has a helpful R package for accessing and importing your data.

Although Excel or similar programs work for basic analyses, for larger datasets or more sophisticated analyses, many scientists use programs like R. `mermaidr` is an R package specifically for working with MERMAID data, and enables you to access your data from MERMAID, compile datasets from multiple MERMAID projects, and ingest new data into MERMAID.

For more information and detailed instructions on usage, please visit the [package website](#). A helpful list of package functions can be found [here](#). An example of using the `mermaidr` package for analysis is demonstrated [here](#).

If you are new to the R programming language, our [new R users guide](#) is a great place to start! If you find yourself stuck, please don't hesitate to [ask for help](#).

API

All access to MERMAID data, including that done by `mermaidr`, the MERMAID web application, and the dashboard, is done through an [Application Programming Interface](#) (API). If you need custom access to data, for example because you are creating a map or writing your own tool, you can use API documentation [here](#) as a guide. The documentation includes a getting started page on [how to use the Insomnia API client](#) file included with the MERMAID API code repository to access all API endpoints.