

# Seagrass Data Viewer User Guide

*Maine Department of Environmental Protection*

## Purpose

This guide provides the user with detail of navigating and using the [Maine DEP Seagrass Data Viewer](#). If you have questions or need assistance, please email [cheyenne.adams@maine.gov](mailto:cheyenne.adams@maine.gov).

## Acknowledgements

This document was prepared by John Fisher and Cheyenne Adams.

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# Description

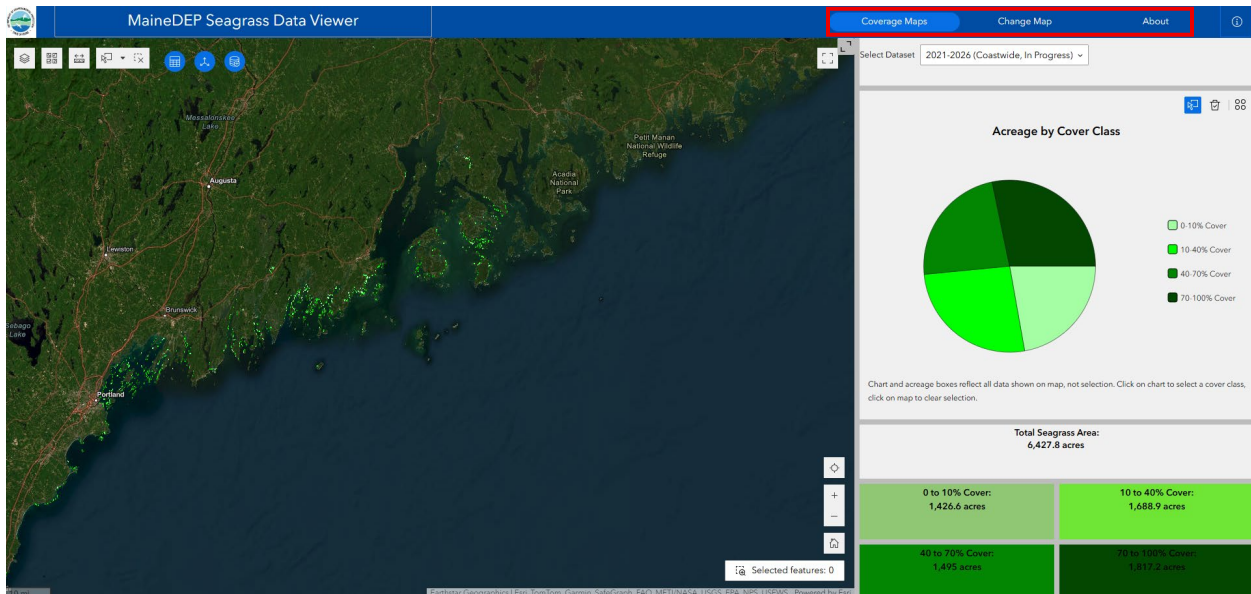
This data viewer is intended to allow the user to view where recent and historically mapped seagrass beds (also referred to as beds or polygons) are distributed and also view how the beds have changed over time along the coast. The data viewer displays seagrass coverage data and a change analysis generated by the Maine Department of Environmental Protection (DEP), as well as historical eelgrass (a seagrass species) coverage data generated by the Maine Department of Marine Resources (DMR). The DEP’s Marine Vegetation Mapping Program (MVMP) now manages the ongoing, coastwide survey, which includes five regions that are surveyed on a rotating annual basis.

## Layout and General Function

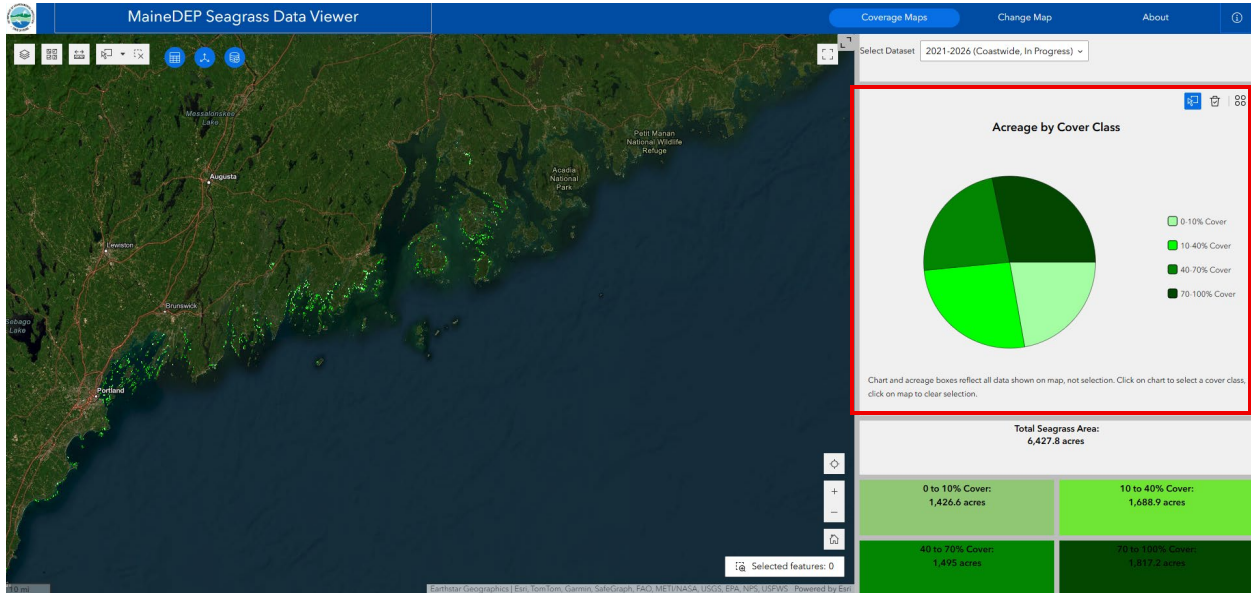
*As you use the data viewer, you can hover your cursor over most buttons to see hover text with the button name and/or a brief description of what it does.*

**Splash screen:** Click the info icon  in the top right corner of the screen at any time to re-open the splash screen.

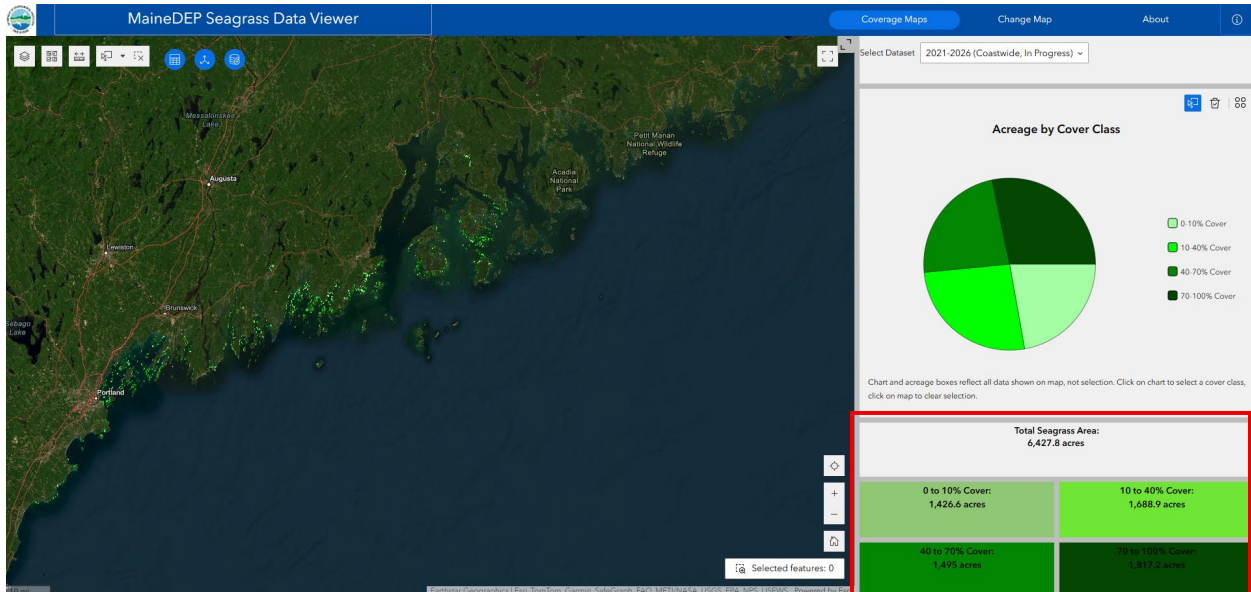
**Pages:** The data viewer is composed of three pages: Coverage Maps, Change Map, and About. Navigate between the three pages by clicking the buttons highlighted in the red box below. The Coverage Maps page opens by default, but the general layout and functions are the same on the Change Map page. The [Coverage Maps](#) and [Change Map](#) pages are described in more detail below. The About page features additional MVMP programmatic information and a description of the change analysis methods, and links to the source data displayed in the data viewer.





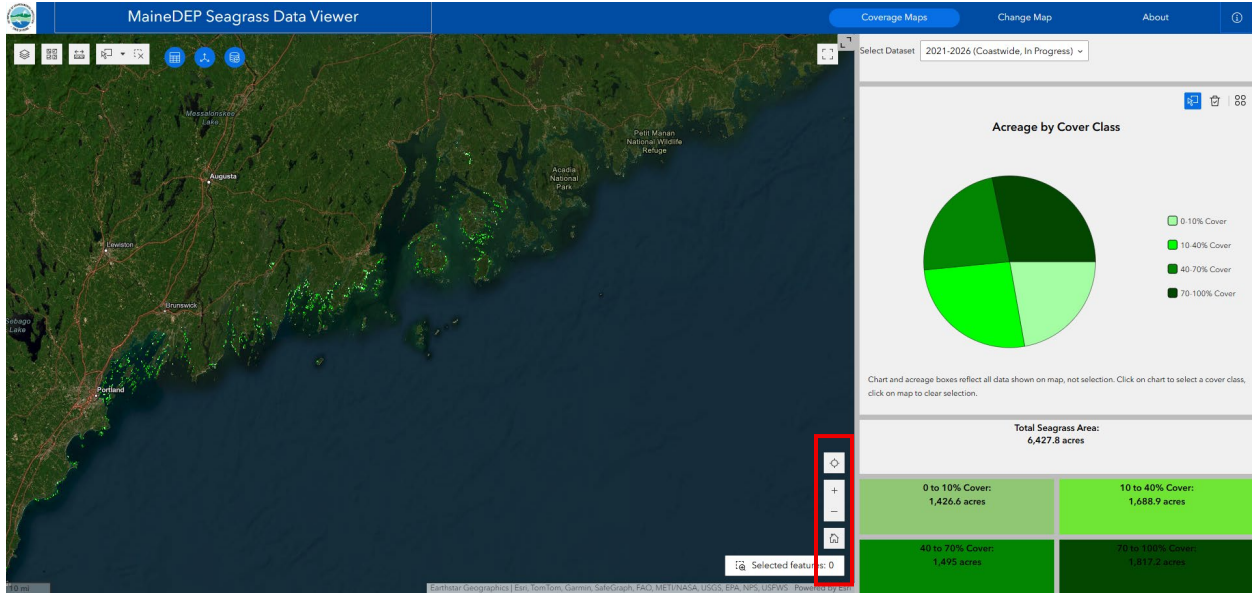
**Pie Chart:** On both the Coverage Maps and Change Map pages, the pie chart (highlighted in red box below) displays the proportion of each seagrass category within the current map view. Hover your cursor over each pie chart slice to view the percentage in each category.



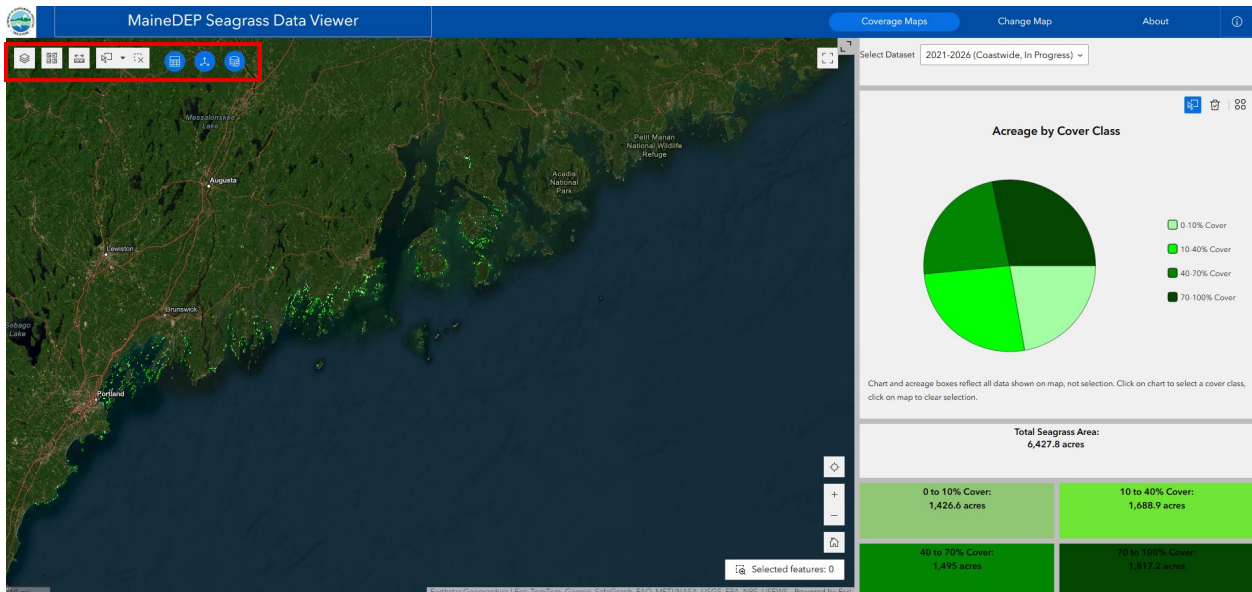
**Acreage Boxes:** On both the Coverage Maps and Change Map pages, the dynamic text boxes (highlighted in red box below) display the total acreage and acreage of each seagrass category within the current map view.



**Map Navigation:** On both the Coverage Maps and Change Map pages, use the map navigation buttons in the bottom right corner of the map (highlighted in red box below) to zoom  or return to the original view . You can also double click to zoom in or use a scroll wheel on your mouse to zoom in/out. Click and drag on the map to pan.

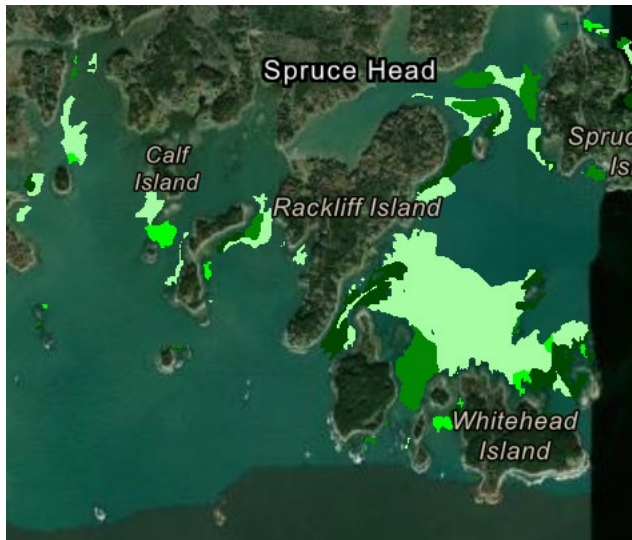


**Additional Tools:** On both the Coverage Maps and Change Map pages, the tool bar in the top left corner of the map (highlighted in red box below) contains several tools described in detail in below sections (from left to right): [Layers](#), [Basemap](#), [Measure](#), [Select and Clear selection](#), [Attribute Table](#), [Coordinates](#), and [Add Data](#).

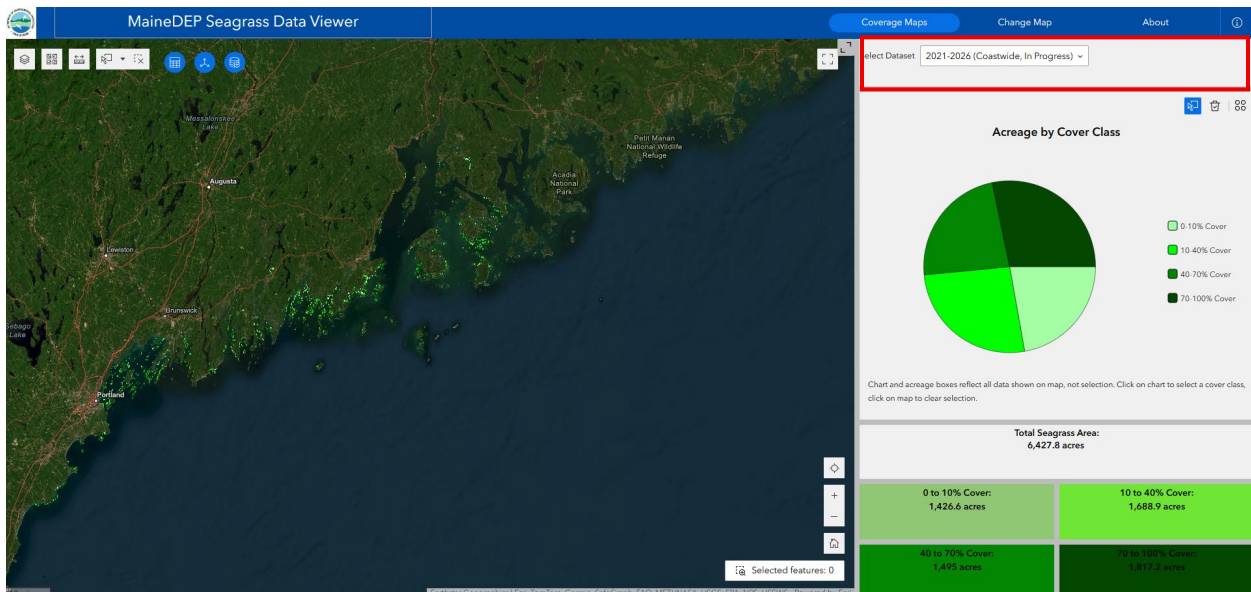


# Coverage Maps Page

The Coverage Maps page includes seagrass coverage datasets from both DEP and DMR. DEP coverage data span ongoing, coastwide mapping efforts that began in 2021, plus Casco Bay surveys in 2013 and 2018. Historical DMR coverage data includes two coastwide collections in the 1990s and 2000s. The most recent coastwide dataset is displayed by default when the data viewer opens. The coverage maps show the location of the seagrass beds as well as the percent cover of each bed, which is represented as different shades of green (darker green indicates a higher percent cover class).



Use the Select Dataset drop down menu (highlighted in red box below) to view the different available datasets on the map. This is set to the most recent coastwide dataset by default.

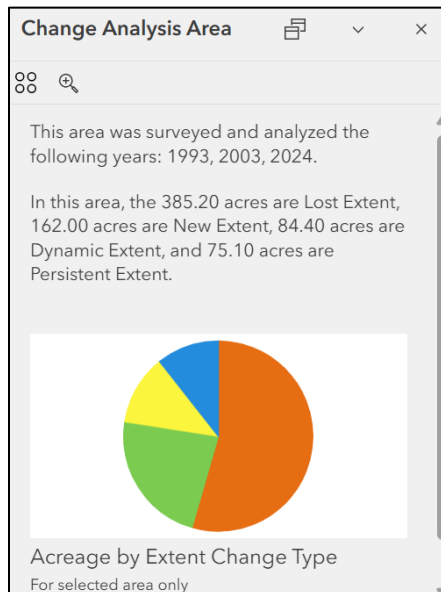


# Change Map Page

The Change Map includes four change type categories, which are based on an analysis of all available survey datasets within each area (including historical DMR data). The map is broken down into several areas based on the dates the various areas were surveyed, which is displayed as gray lines (areas) labelled with a list of years (analysis dates) on the map. There is inconsistent overlap between historical and recent survey areas, and therefore analysis areas vary in both size and which survey year datasets were included in the analysis. The change analysis assessed seagrass bed extent only, no condition change analysis (i.e. gain or loss of percent cover) was conducted. The analysis was only conducted for areas that have recent survey data available.




To find more information and summary statistics for an area, click within the area to open the pop-up window. The pop up gives the year(s) surveyed, the total acreage of lost beds, new beds, recovered or recently established beds (dynamic), and beds that have been present in all surveys (persistent). Note that the [larger pie chart](#) on the right-hand side of the data viewer continues to displays the proportion of each change type category within the current map view.



## Make the Map Full Screen

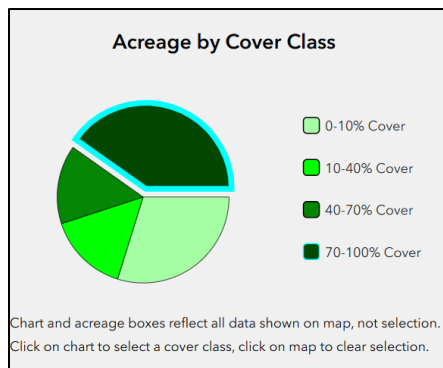
Use the partial square  in the top right corner of the map to make the map full screen .

Use the X button  in the top right of the full screen map, or the escape key, to return to the original layout.

## Pie Chart Selection

*When using pie chart selection, it is important to note that the acreage boxes will NOT reflect the selection but rather will continue to reflect all beds shown in the current map view. To view acreage for a selection of beds, see the Statistics option in [Attribute Table Actions](#) section below.*

Click on any slice of the pie to select that category.



The beds in that category will then be highlighted in light blue on the map.



To clear the selection, click the trash icon  in the top right corner of the pie chart.

# Pop-ups



Click on any bed displayed within the map to view additional information about that bed within the pop-up window.

Seagrass Coverage	
Polygon_ID	697
Bed_Name	441
ACRES	9.165981
HECTARES	3.709341
Orth_Cover	2
Cover_Pct	10-40% Cover
Field_Ver	N
Video_YN	N
Video	
Species	
Comment	
YEAR	2024




Click the X at the top right of the pop-up or anywhere within the map to close the pop-up window, or click on a different bed to open the pop-up window for that bed.

The pop-up window displays information from the attribute table for that specific bed. The pop-up windows in the Coverage Maps page (example above) include the fields Polygon\_ID (individual cover class polygon), Bed\_Name (contiguous bed, often comprised of multiple different cover class polygons), Acres, Hectares, Orth\_Cover (scale of 1-4 percent cover with 4 corresponding to the highest percent cover category), Cover\_Pct (percent cover categories: 0-10%, 10-40%, 40-70%, and 70-100%), Field\_Ver (whether or not the bed was field-verified), Video\_YN (whether or not a video file is available from field-verification), Video (the video file name, if available), species (only available for field-verified beds), any comments, and the year and region of the associated mapping effort. Not all mapping efforts produced the same attribute data, and therefore some fields are blank for some beds.





The pop-up windows in the Change Map page (example below) include the fields ChangeType, ChangeTypeDescription, Acres, and SurveyYearsAnalyzed (the survey years that were available to include in the analysis for that area).

ChangeType	Persistent Extent
ChangeTypeDescription	Persistent Extent: Areas of seagrass presence in all surveys, recent and historical.
Acres	1.73
SurveyYearsAnalyzed	1995, 2005, 2023

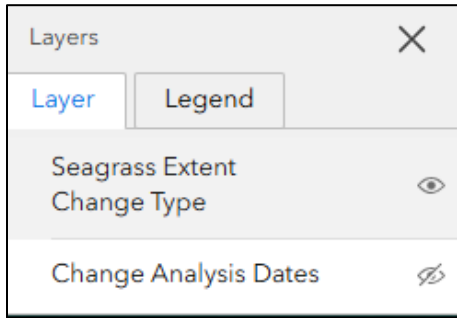
## Layers Tool

The layers button  in the toolbar in the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to turn layers on/off for display in the map. Click the eye icon  to the right of each layer name to toggle the layer off, and click again on the closed eye  to toggle the layer back on.

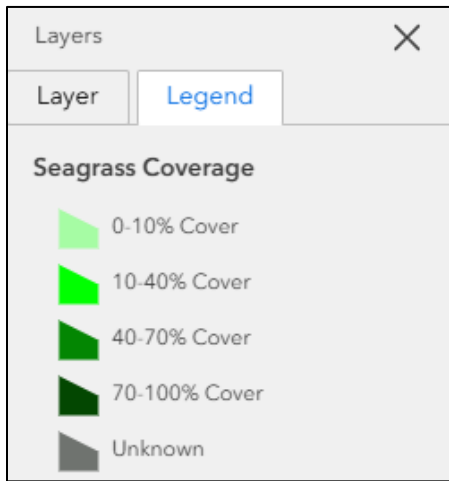
The Coverage Maps page includes the Seagrass Coverage layer, and also the aerial orthoimagery used in the creation of these seagrass distribution maps. Scroll down to see additional imagery layers. The imagery layers are turned off by default because they can load slowly.

Layer	Legend
Seagrass Coverage	
Maine Orthoimagery Coastal Midcoast 2023	
Maine Orthoimagery Coastal Casco Bay 2022	
Maine Orthoimagery Coastal South Coast 2021	
Maine Orthoimagery Coastal Casco Bay 2018 (Imagery Layer)	


The Change Map page includes the seagrass polygons by change type layer (Seagrass Extent Change Type), and a layer that shows the different change analysis areas and the survey years that were available to include in the analysis each area (Change Analysis Dates).

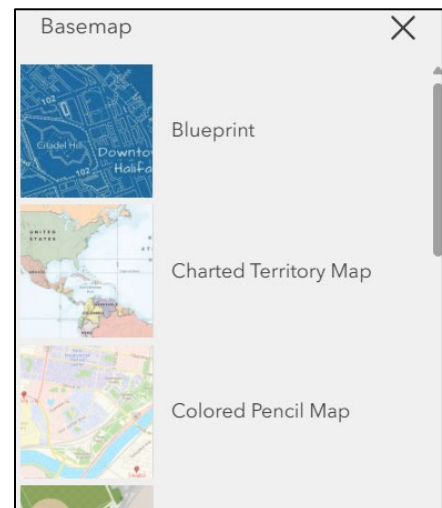


The Layers Tool drop down also has a legend tab. Click on the legend tab to view the legend, which is most useful when the map is in full screen mode and the pie chart is not visible.





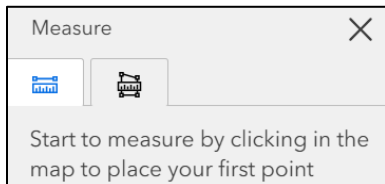
## Basemap Tool

The basemap button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to change the base map. From the drop-down menu, click the desired basemap.

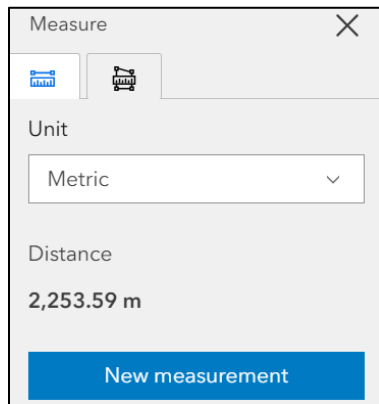



# Measure Tool

The measure button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to measure distance and area on the map. The distance measure tab  is active by default (highlighted in light blue below) when the measure tool is opened.

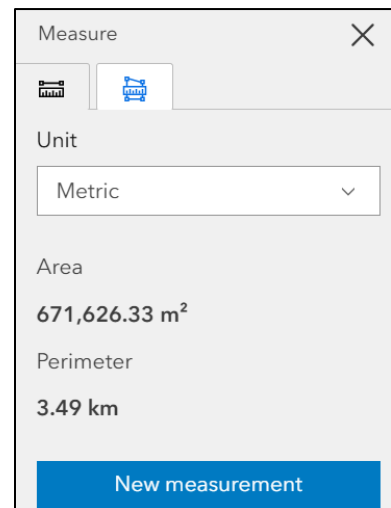


To use this tool, once it is active, click at the start of what is to be measured, then click again to create the second point. The measurement can either be continued in other directions by clicking again to create more points, or it can be deactivated by double clicking. When in use the tool will calculate the distance in whatever units are chosen from the drop-down box.




Click the area measure tab  to activate area measure (highlighted in light blue on the right). To use this tool, start by clicking on the map to create a point, then continue clicking to make the desired shape to cover the area being measured. Double click to end the measurement. The tool will then give the area and perimeter in the chosen units.

Once finished measuring, click the X in the top right corner of the Measure tool dialog box to close the tool and clear measurements on the map. You will then be able to use the cursor to pan around the map again.






# Select Tool

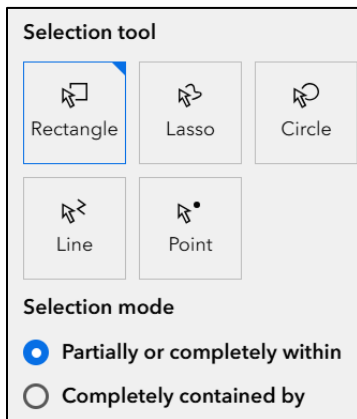
When using the select tool it is important to note that the acreage boxes and pie chart will NOT reflect the selection but rather continue to reflect all beds shown in the current map view. To view acreage for a selection of beds, see the Statistics option in [Attribute Table Actions](#) section below.


The select button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to select features on the map. Click the select button to activate it and then click a feature on the map to select it, or click and drag to select all features within the resulting selection rectangle. Selected features are highlighted with a light blue outline (shown below for polygon on the left).




To the right of the selection button is the clear selection button  that will deselect the actively selected features. You can also click anywhere on the map to clear the current selection.


Click the down arrow  on the right side of the select button  to change the select tool settings. You can choose to select by using different shapes (Rectangle, Lasso, Circle, Line, or Point) and also if a feature must be completely contained by the selecting shape in order to be selected ('Completely contained by' selection mode option), or only partially contained by the selecting shape in order to be selected ('Partially or completely within' selection mode option).



Click the select tool  again to turn it off. You will then be able to use the cursor to pan around the map again.





# Attribute Table



The attribute table button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) opens a table that displays attribute information for all beds shown in the current map view. The table columns are equivalent to fields described in the [Pop-ups](#) section above. Each column can be sorted in ascending or descending order by clicking the column name.




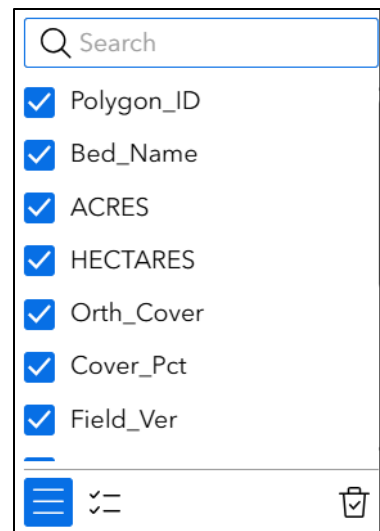
The screenshot shows a dialog box titled "Attribute Table" with a close button in the top right. Below the title bar, the text "Seagrass Coverage" is displayed. To the right of this text are four icons: a filter icon, a clear selection icon, a show/hide columns icon, and an actions icon. Below these icons is a table with the following data:

Polygon_ID	ACRES	HECTARES	Orth_Cover
216	0.513567	0.207833	4
196	27.827218	11.261275	3
215	0.316542	0.128100	3
203	42.842234	17.337637	4
97	0.032834	0.013287	3

The toolbar     in the top right corner of the table dialog box has buttons described below (from left to right): Show selection, Clear selection, Show/hide columns, and [Actions](#). The [Actions](#) button has a dedicated sub-section due to the extensive functionality.

The show selection button  will filter the table to only include those polygons that are currently selected. The clear selection button  will unselect any selected records. These two buttons are only available after a selection is made. Polygons can be selected with the [Pie Chart Selection](#), [Select Tool](#), or in the attribute table by clicking on a row to select that polygon. Click a selected polygon again to unselect.




The show/hide columns button  allows for columns to be toggled on and off in the table by checking/unchecking the box to the left of each column name in the drop-down menu (shown to the right). At the bottom of the drop-down menu, there are buttons




The screenshot shows a drop-down menu for column selection. It has a search bar at the top. Below the search bar, there is a list of columns with checkboxes next to them, all of which are checked:

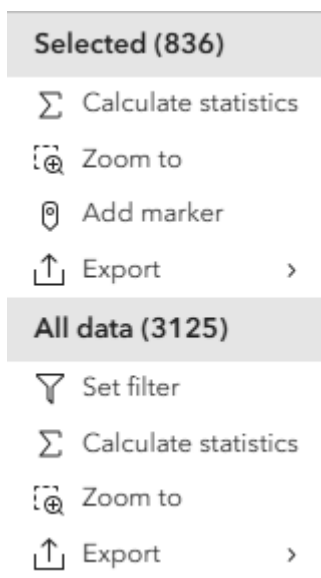
- Polygon\_ID
- Bed\_Name
- ACRES
- HECTARES
- Orth\_Cover
- Cover\_Pct
- Field\_Ver

At the bottom of the menu, there are two buttons: a filter icon and a trash icon.

to show all column checkboxes , show only selected column checkboxes , and clear the column checkbox selection  ..

## Attribute Table Actions:

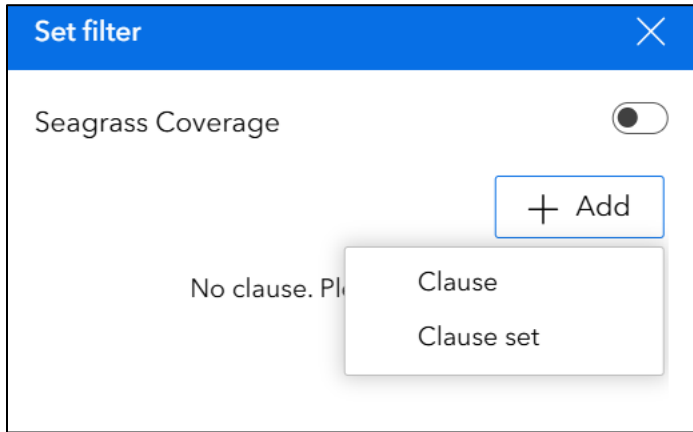
The action button  dropdown includes separate menus for all data shown in the current map view (All data) and for the selected polygons only (Selected). The Selected menu is only available after a selection is made (selections can be made with the [Pie Cart Selection](#), [Select Tool](#), or [Attribute Table](#)). The Statistics, Zoom to, and Export options are the same for the Selected and All data menus, while the Add marker and Set filter options are unique to the Selected and All menu, respectively.




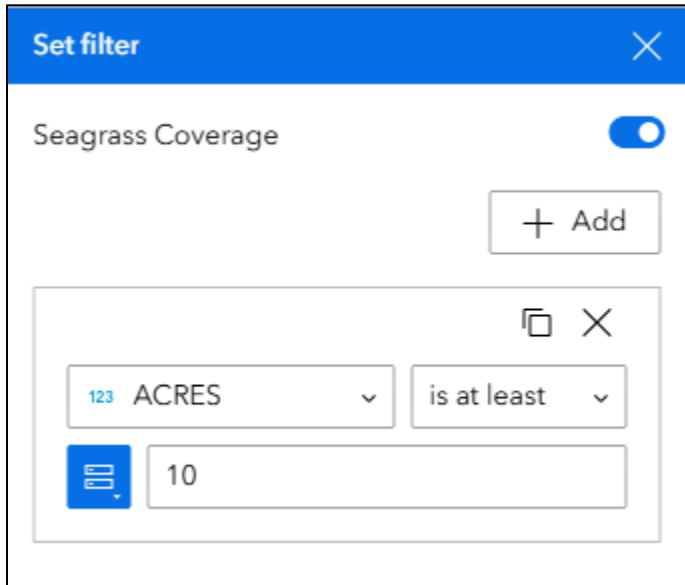
**Add Marker:** The Add marker action is unique to the Selected menu and adds a blue pin on the map at the centroid of each selected polygon. These markers/pins will persist after the selection is cleared.



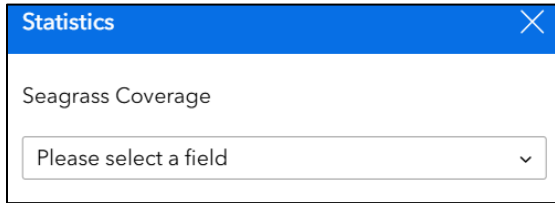
**Set Filter:** The Set filter action allows for clauses to be defined by which to filter the dataset shown in the current map view. Click the Add button to create a new clause or clause set. Unless you are familiar with clause sets, it is recommended to use a single clause.



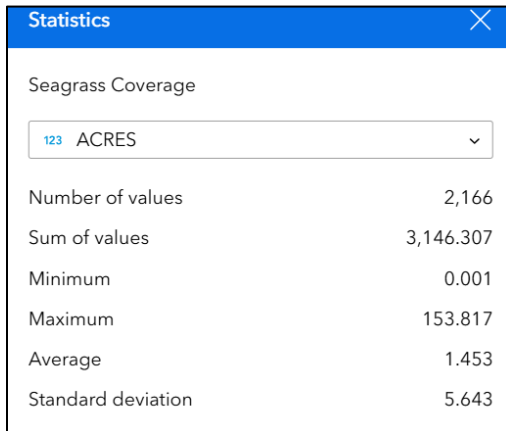
To create a clause, use the drop-down arrow next to OBJECTID to choose the column/field to filter by, use the drop down next to “is” to choose the operator, and enter the desired value in the empty box. Click the toggle icon  in the top right corner of the Set filter box to turn the filter on. The example below will filter for all polygons that are at least 10 acres in size.



**Statistics:** The Statistics action shows summary statistics for a column/field. Use the drop-down menu to select the column to calculate statistics for.



After selecting a field, the tool will populate values for the number of values, the sum of the values, min/max, average, and standard deviation. The statistics represent data shown in the current map view, either all data or just the selected data depending on which menu the action was selected from.







**Zoom to:** The Zoom to action changes the map extent (zoom and pan) to center the view on the data of interest. If this action is clicked from the All data menu, the map view will center on all data in the current dataset (similar to the original view when the data viewer is opened). If this action is clicked from the Selected menu, the view will center on the selected records only.

**Export:** The Export action creates a file for download and downloads it to your browser's downloads folder after a file format is selected from the drop-down menu shown below. Downloaded data are either all data shown in the current map view (from All data menu) or only selected data (from Selected menu).




## Coordinates Tool


The coordinate button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to hover the cursor over the map to display the coordinates for that location .

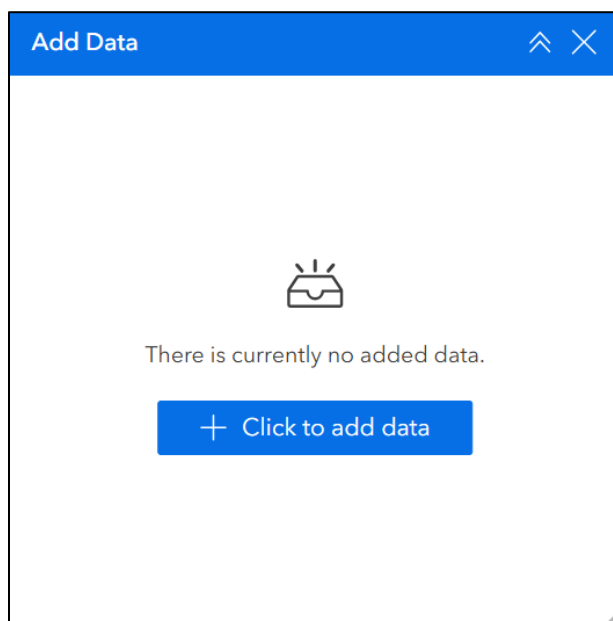
The button to the left of the coordinates  allows a point to be placed on the map to find the coordinates at that point. The coordinates can be copied to the computer's clipboard using the button to the right of the coordinates .

The drop-down arrow shows the map coordinate system

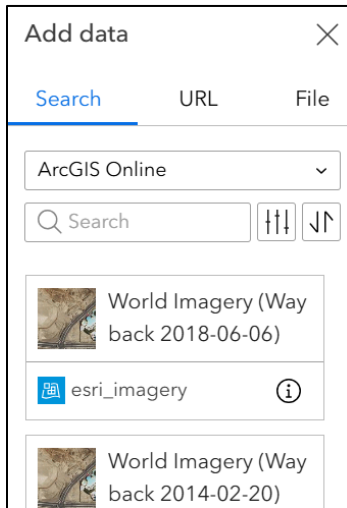
. This map widget only utilizes one coordinate system, which is the standard for web mapping applications.

## Add Data tool



The add data button  in the toolbar on the top left of the map (highlighted in red box in [Layout](#) section above) will allow you to import data from ArcGIS Online/Living Atlas, a URL, or a file. After clicking the tool, the pop-up window will appear. Click the 'Click to add data' button.

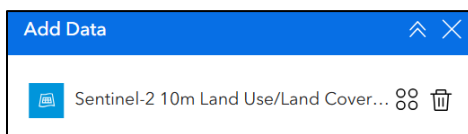


Choose your data source from the three tabs near the top (online search, URL, or file upload).

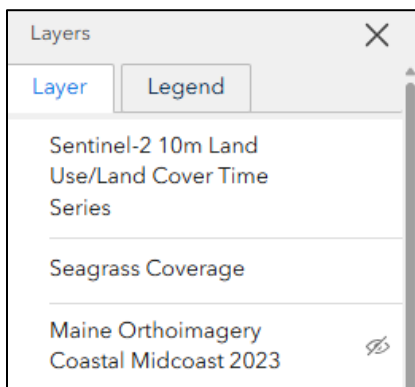


**Search:** If performing an online search, select between ArcGIS Online or Living Atlas in the top drop-down box. Both online catalogs have a variety of publicly available data layers, but in general ArcGIS Online will be more comprehensive and Living Atlas will be less cluttered. Search for the layer of interest by typing in the search bar, click the layer to be added to the map, and then click ‘Done.’ 1 Selected ^ Done

The new layer is now shown in the Add Data dialog box, where it can have actions performed on it with the actions button  (similar to those described in the [Attribute Table Actions](#) section) or deleted with the trash can button .






The added layer will also be included in the Layer tool, where visibility can be toggled on/off.





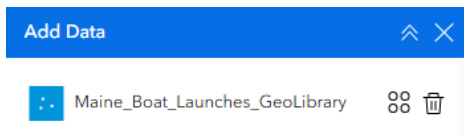
**URL:** Web services can be added to the map from many sources by selecting the URL tab at the top of the dialog box. To add a service from the [Maine GeoLibrary](#), for example, the Type in the dialog box should be left unchanged from the default ArcGIS Server Web Service.

Type

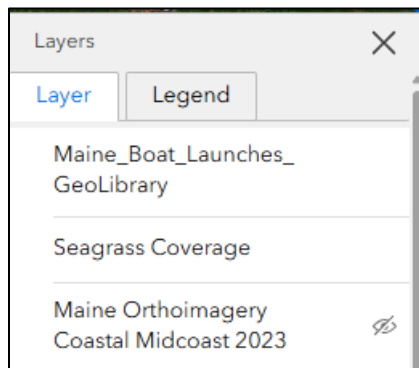


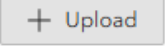



Then navigate to the [Maine GeoLibrary](#) in a separate web browser window or tab, find the layer you are interested in, and click the REST button  to the right of the layer name. Copy and paste the URL into the URL section of the Add Data dialog box, click 'Add'  and then 'Done' .

The new layer is now shown in the Add Data dialog box, where it can have actions performed on it with the actions button  (similar to those described in the [Attribute Table Actions](#) section) or deleted with the trash can button .



The added layer will also be included in the Layer tool, where visibility can be toggled on/off.



**File:** If uploading a data file, select the File tab and click upload , navigate to the desired file in your file explorer, and then click 'Done' . The new layer is now shown in the Add Data dialog box, where it can have actions performed on it with the actions button  (similar to those described in the [Attribute Table Actions](#) section) or deleted with the trash can button  (see screenshot above) The added layer will also be included in the Layer tool, where visibility can be toggled on/off (see screenshot above).