

Piscataqua Watershed Data Explorer

User Guide

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Prepared for:

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Background

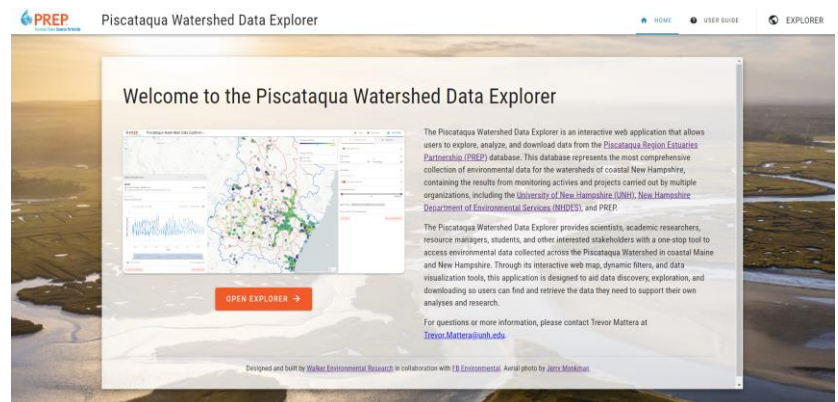
The Piscataqua Watershed Data Explorer is an interactive web application that allows users to explore, analyze, and download data from the [Piscataqua Region Estuaries Partnership \(PREP\)](https://data.prepestuaries.org/) database. This database represents the most comprehensive collection of environmental data for the watersheds of coastal New Hampshire, containing the results of monitoring activities and projects carried out by multiple organizations, including the [University of New Hampshire \(UNH\)](https://www.unh.edu/), [New Hampshire Department of Environmental Services \(NHDES\)](https://www.nhdes.org/), and PREP.

The Piscataqua Watershed Data Explorer provides scientists, academic researchers, resource managers, students, and other interested stakeholders with a one-stop tool to access environmental data collected across the Piscataqua Watershed in coastal Maine and New Hampshire. Through its interactive web map, dynamic filters, and data visualization tools, this application is designed to aid data discovery, exploration, and downloading so users can find and retrieve the data they need to support their own analyses and research.

For questions or more information, please contact Trevor Mattera at Trevor.Mattera@unh.edu.

Website

To begin using the Piscataqua Watershed Data Explorer, visit the home page at <http://data.prepestuaries.org/data-explorer/>. There you will find the same background information shown above, along with some options for more information.



To view Frequently Asked Questions related to the Data Explorer or access a link to this User Guide, click the USER GUIDE tab in the top right corner of the page.

 **USER GUIDE**

To access the Data Explorer, click the EXPLORER tab in the top right corner of the page or the orange OPEN EXPLORER button in the center of the page.

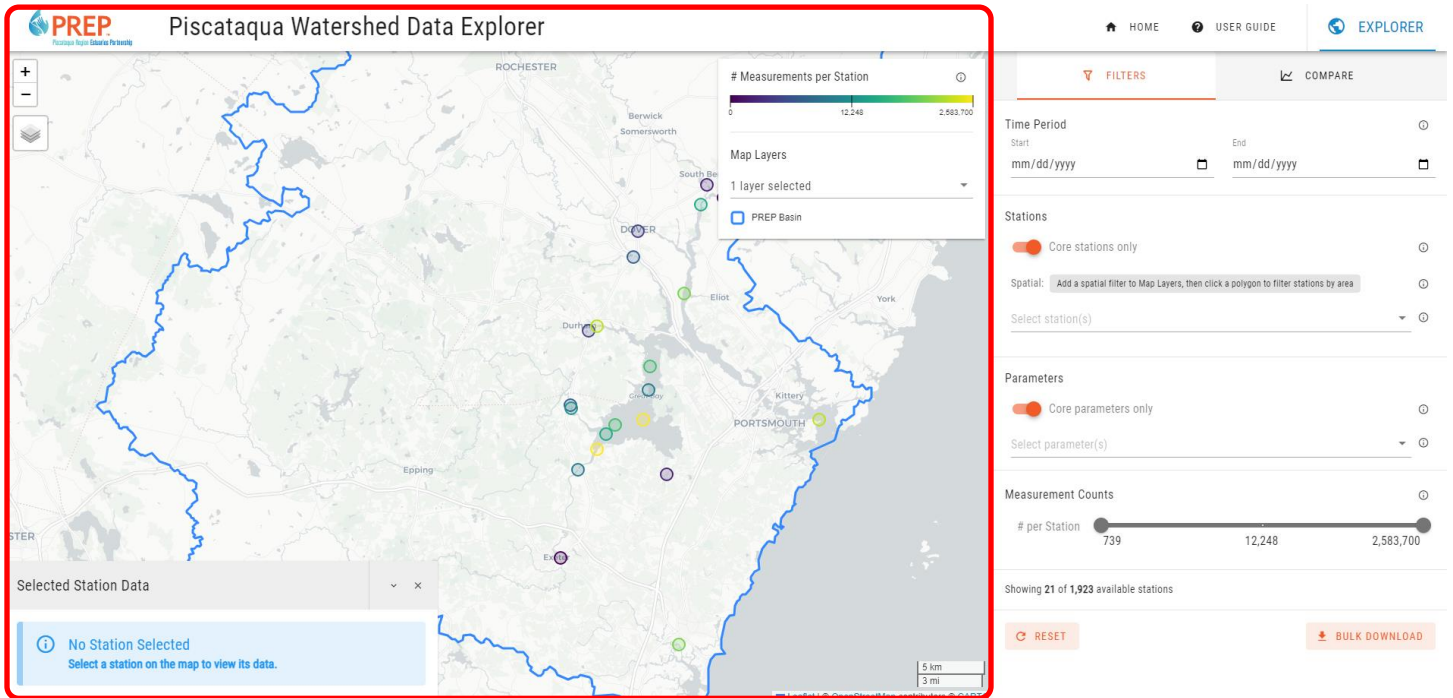
 **EXPLORER**

OPEN EXPLORER →

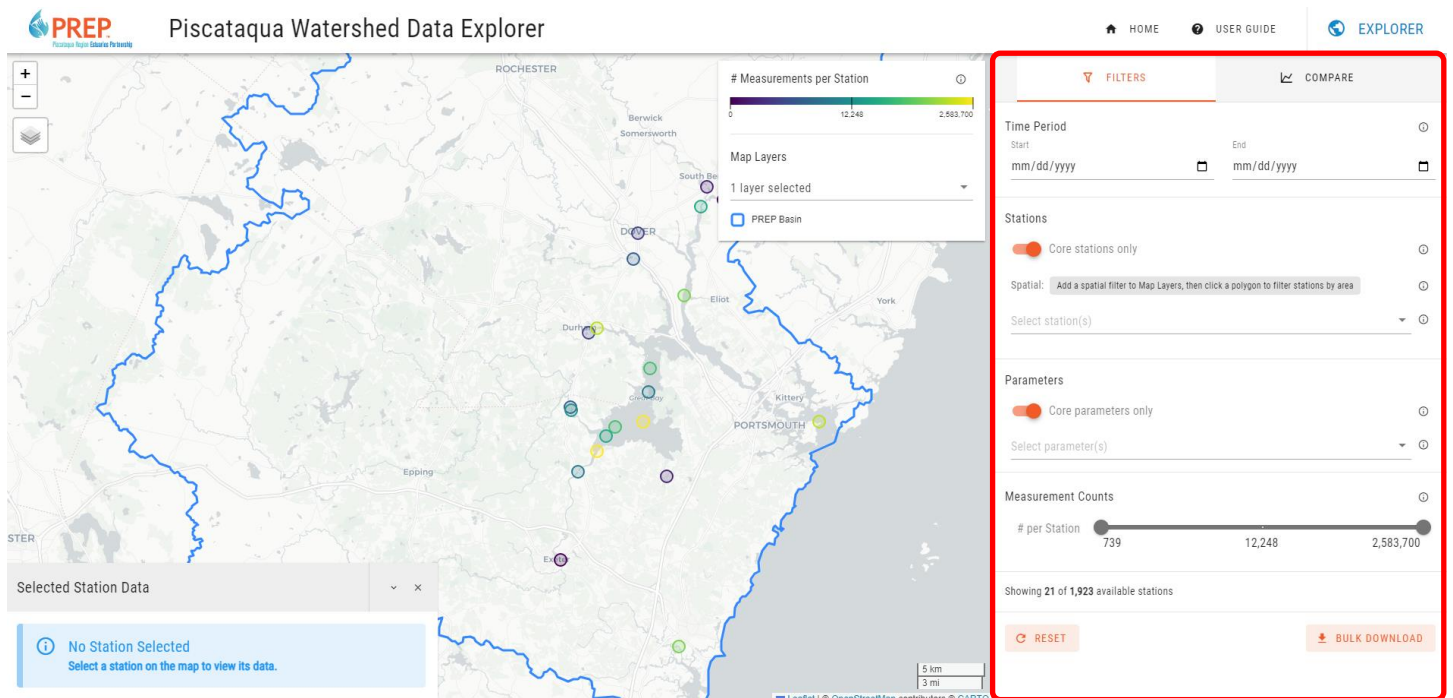
Getting Started

Once the Data Explorer is opened, you will see a page that contains a map on the left and numerous data filtering and visualization options to the right. Key sections of the Data Explorer that are referenced throughout this User Guide are classified below.

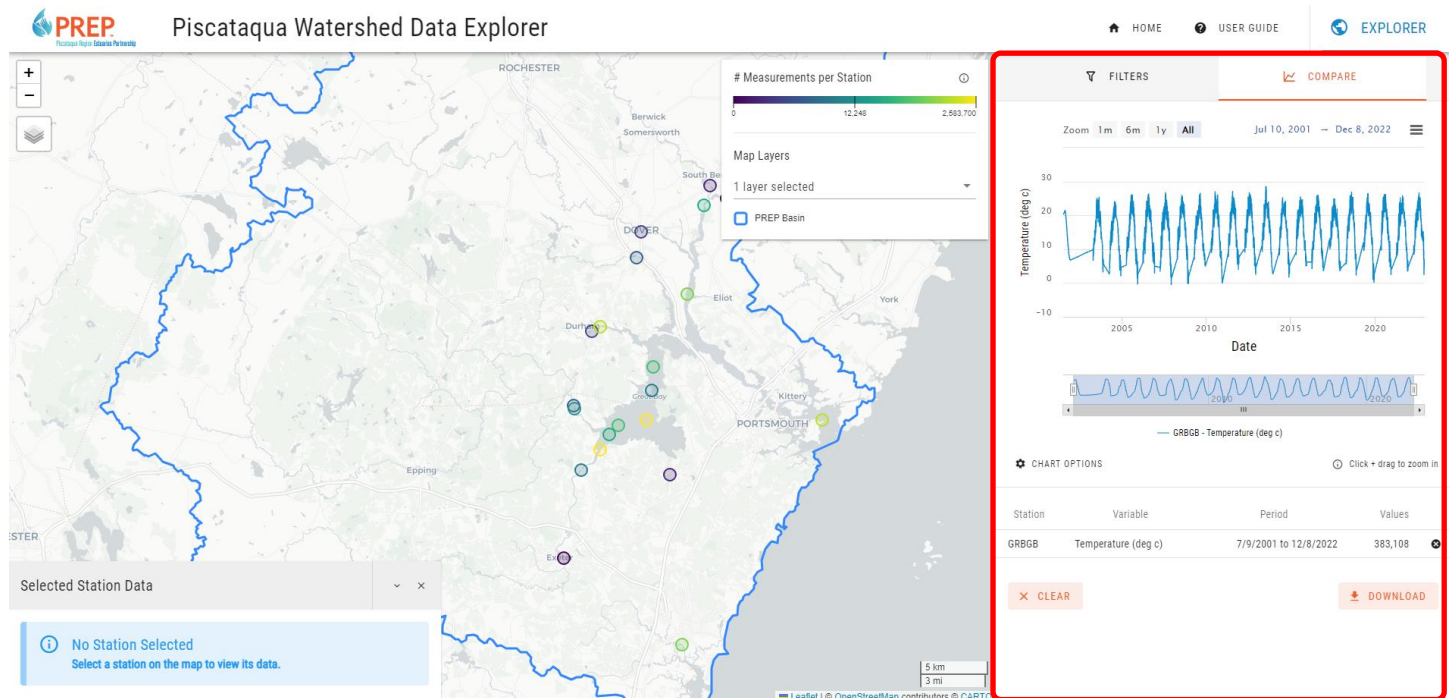
Map



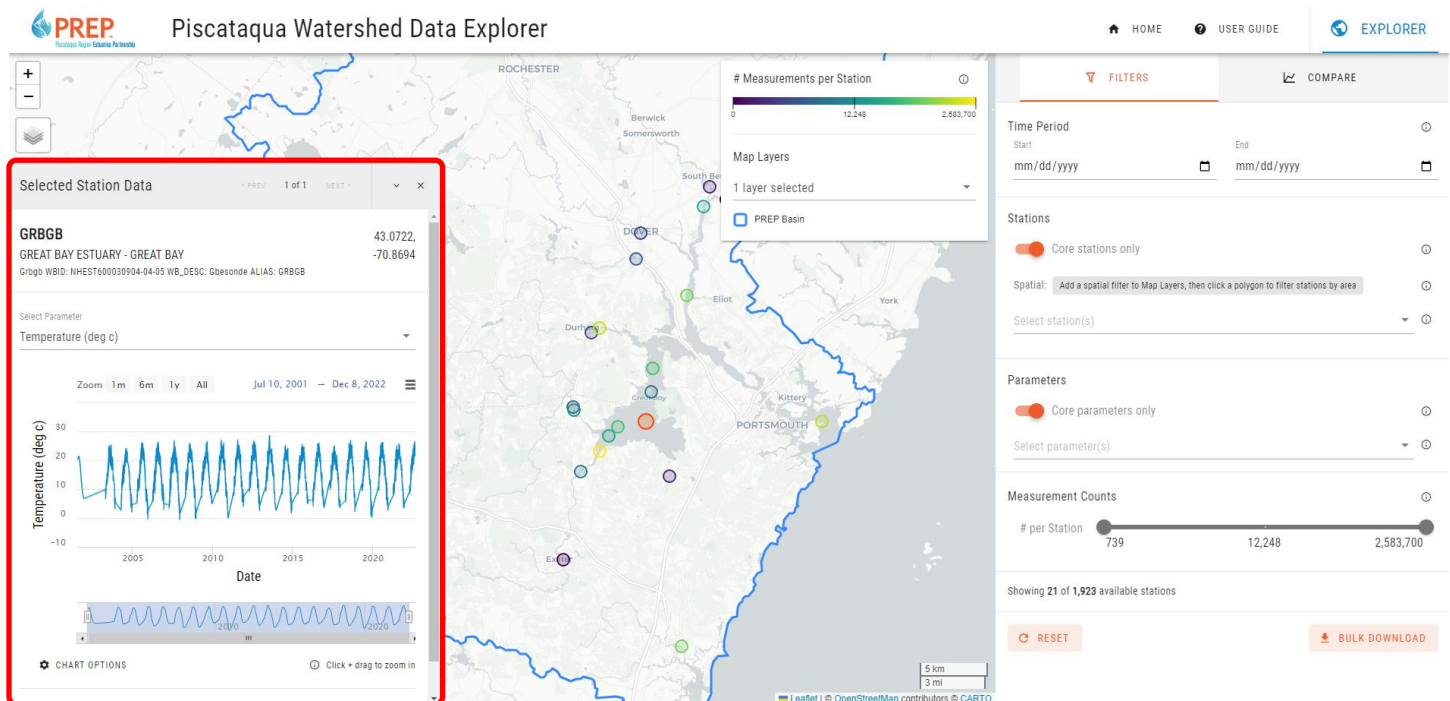
FILTERS Tab



COMPARE Tab



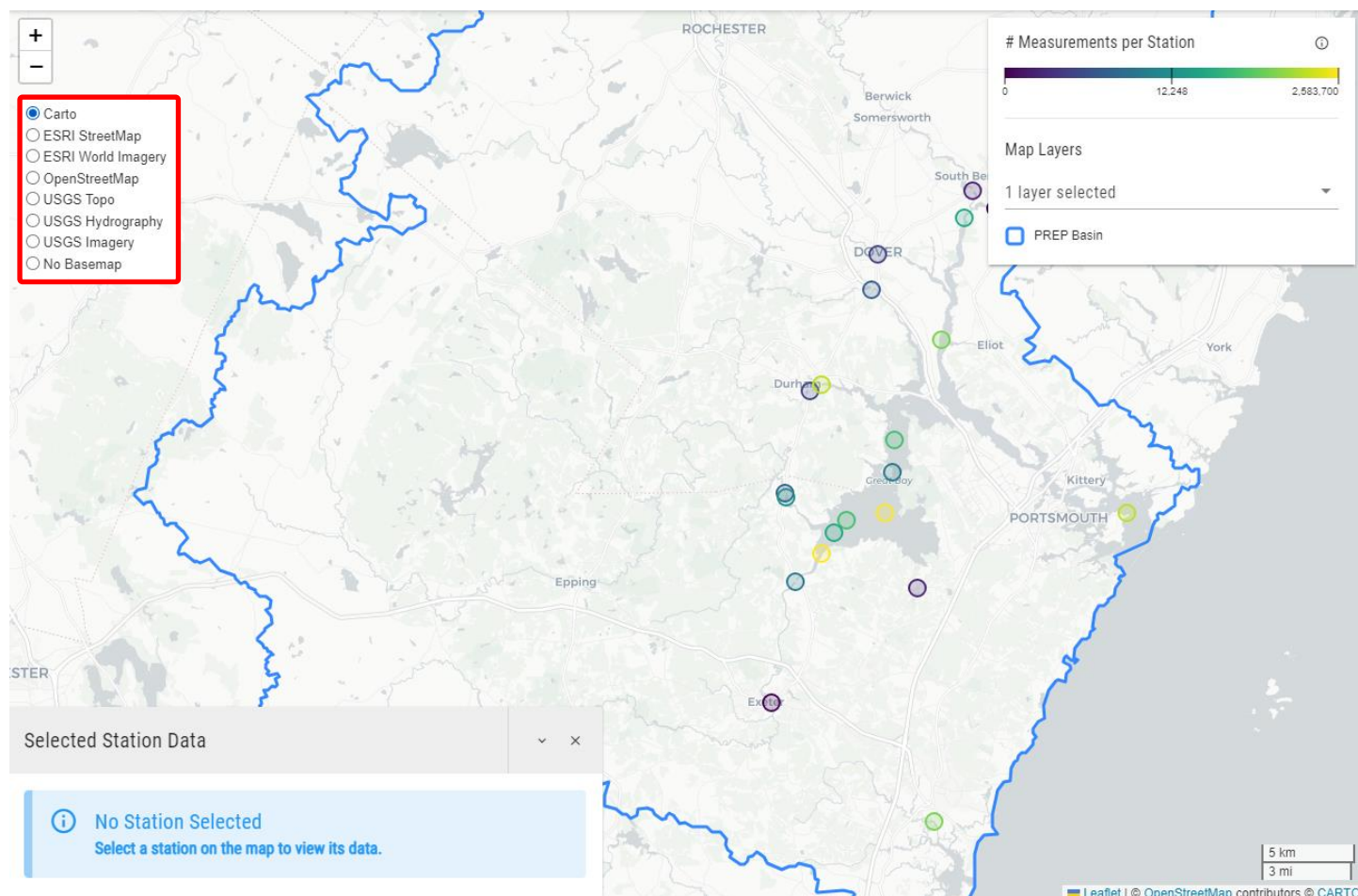
“Selected Station Data” Pop-Up



Adjusting the Map

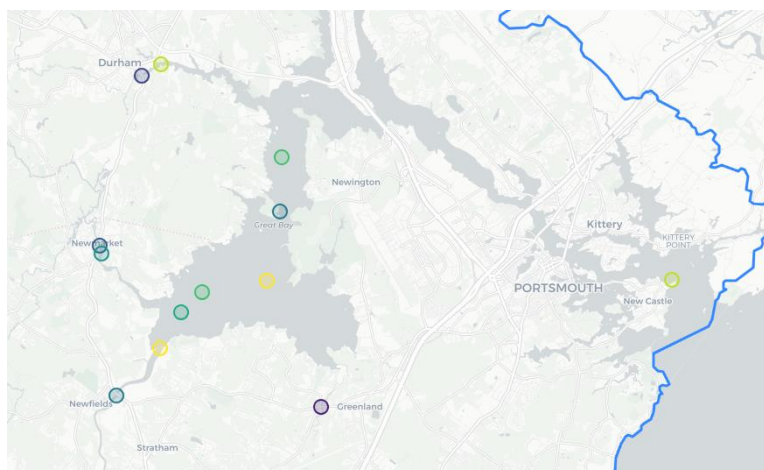
Basemap

To change the basemap displayed in the background of the Explorer, hover over the layer icon in the top left corner of the map and select a new basemap.

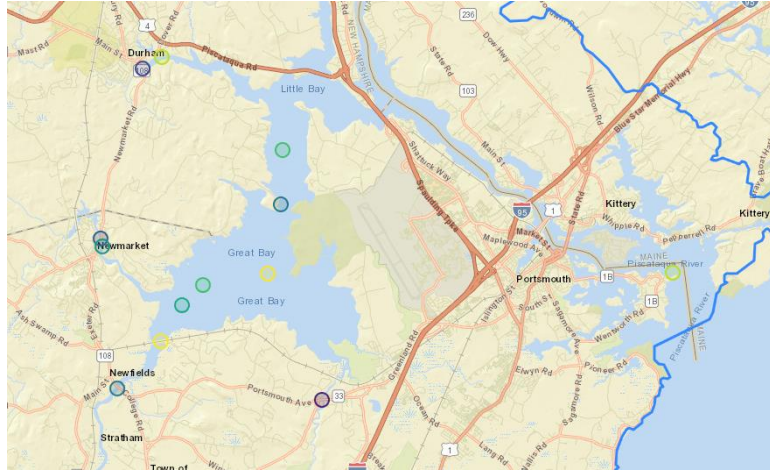


There are seven different basemaps to choose from, as well as the option for no basemap. The seven basemap options are:

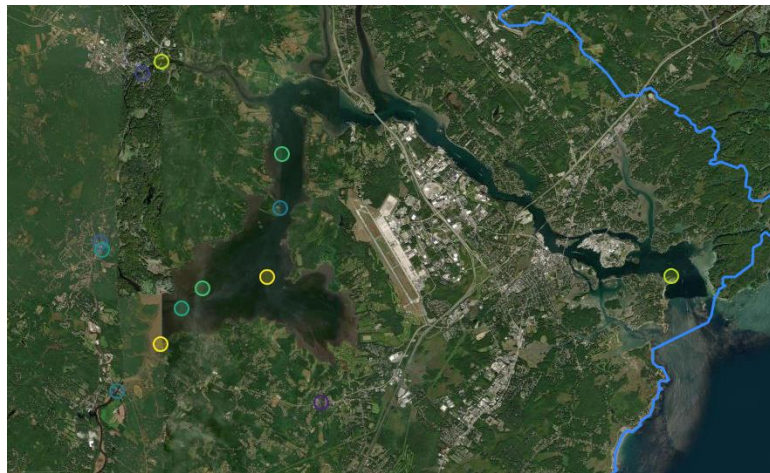
1. Carto



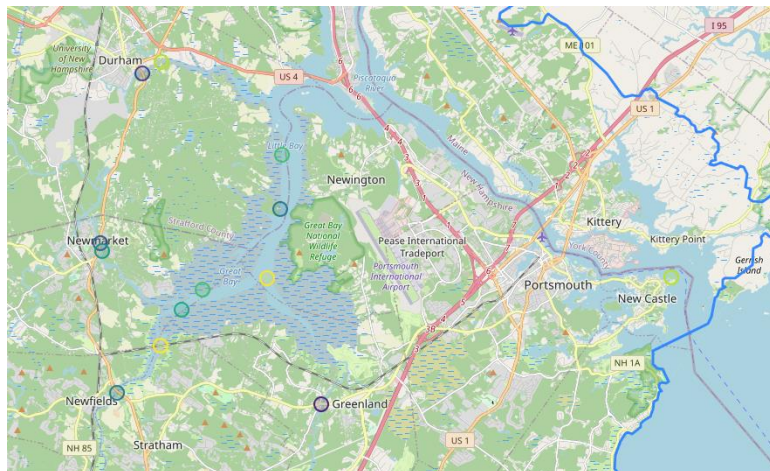
2. ESRI StreetMap



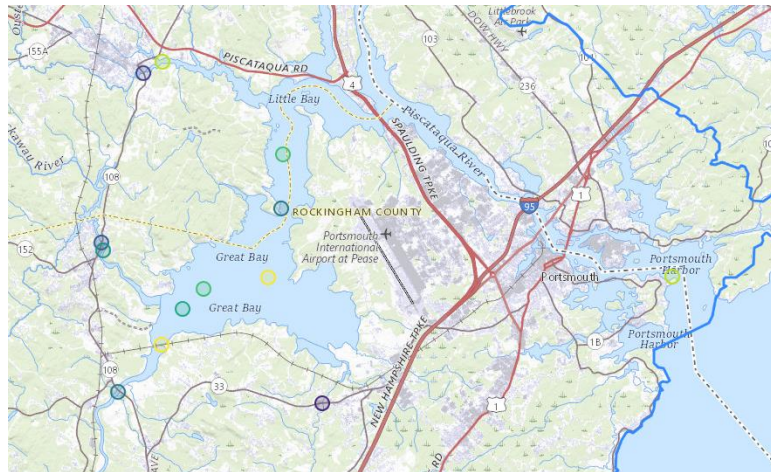
3. ESRI World Imagery



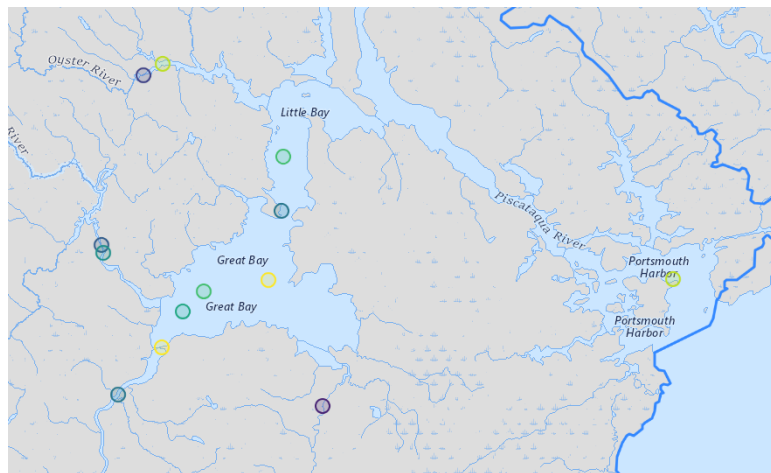
4. OpenStreetMap



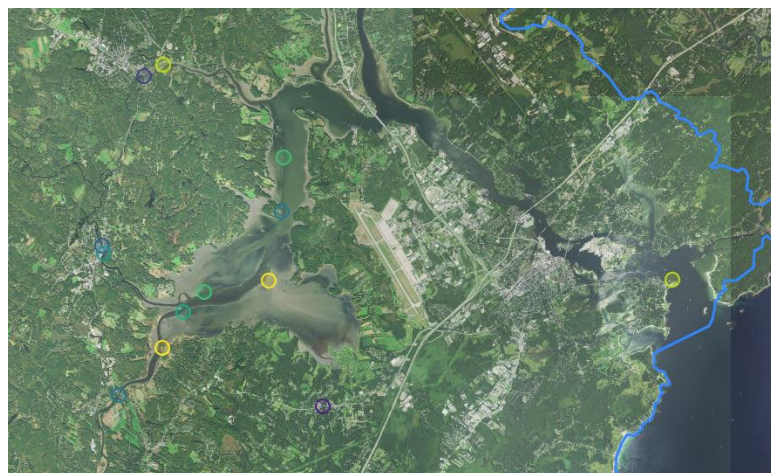
5. USGS Topo



6. USGS Hydrography

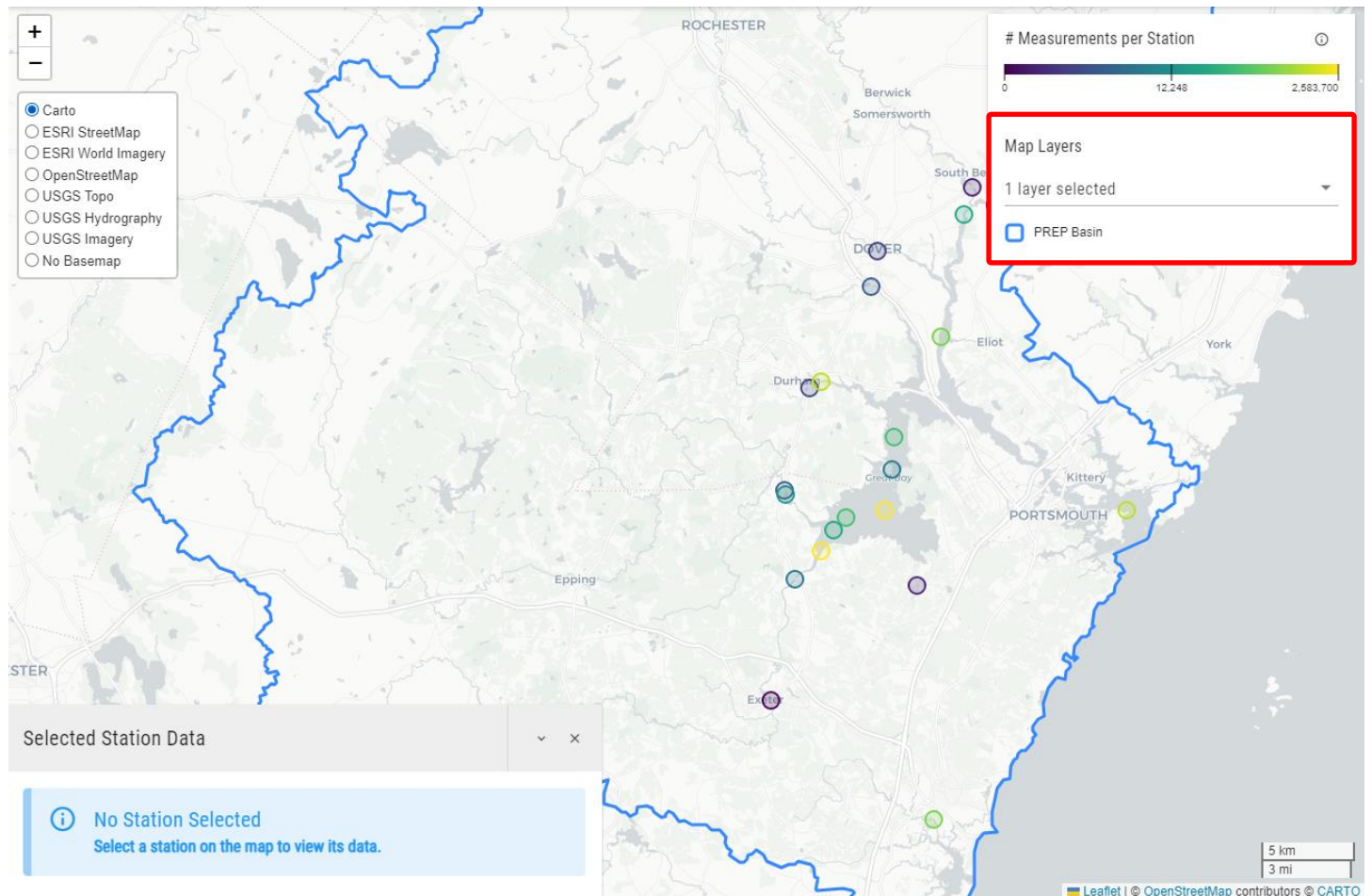


7. USGS Imagery



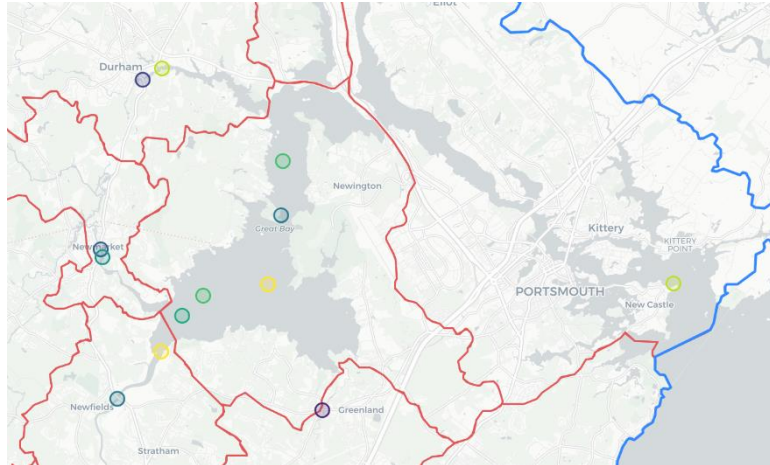
Map Layers

To add layers to the map, open the Map Layers drop down menu available under the “# Measurements per Station” color bar in the top right corner of the Map and click on the boxes next to the layer names.

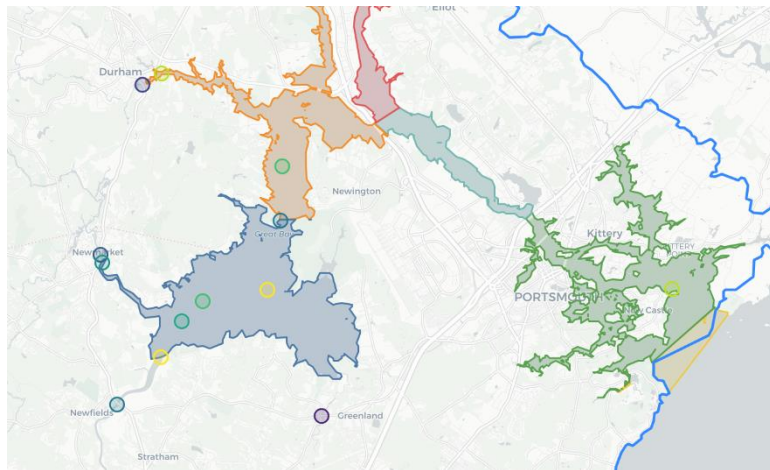


There are six different layers that can be added to the map in addition to the “PREP Basin” layer that is automatically displayed by default. These six layers are:

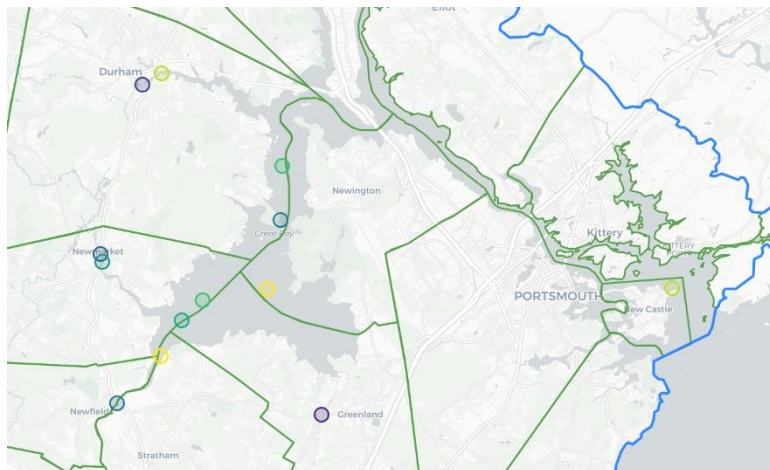
1. HUC12 Basins



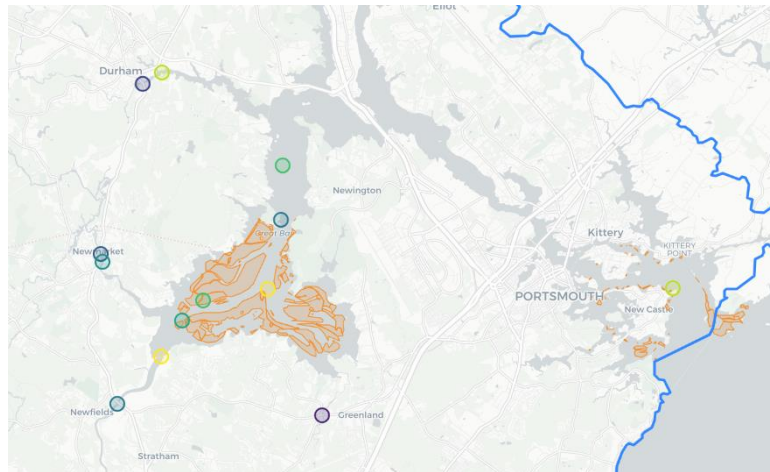
2. Waterbody Regions



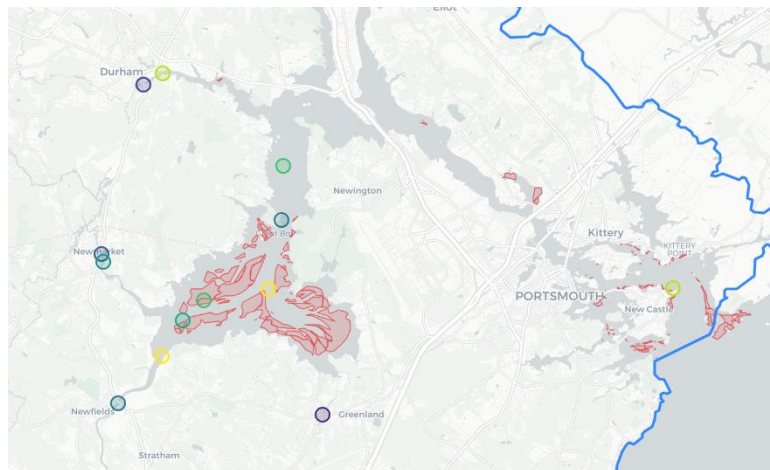
3. Towns and Municipalities



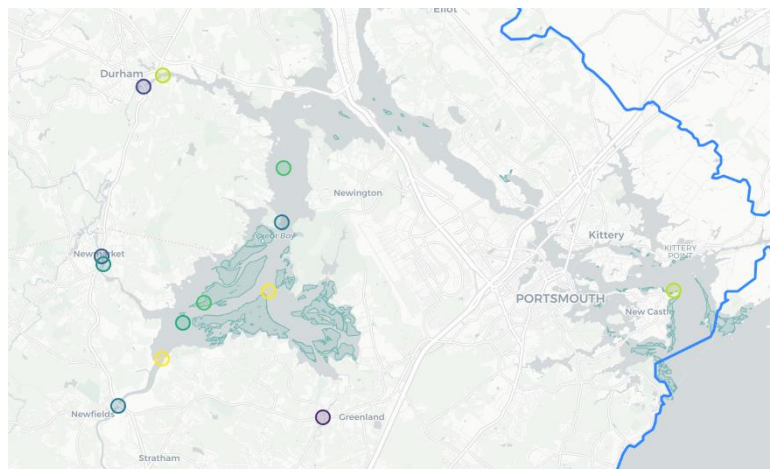
4. Eelgrass (2010)



5. Eelgrass (2015)



6. Eelgrass (2021)



Filtering Data

Data in the Data Explorer can be filtered through numerous options available in the FILTERS tab. These options include Time Period, Stations, Parameters, and Measurement Counts.

Time Period

To filter data by time period, enter a date in the “Start” and/or “End” fields.

Dates can also be entered in the “Start” and “End” fields using the calendar drop-down menus.

Note that this filter ignores data gaps (e.g., it may show stations with no data on the map if there are data both before and after the specified time period).

To remove values from the “Start” and “End” fields, click the “X” that appears next to the calendar icon when you hover your mouse over the fields.

Time Period

Start

01/01/2023

X

End

mm/dd/yyyy

Time Period

Start

01/01/2023

X

End

mm/dd/yyyy

January 2023

↑

↓

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

Clear

Today

Click a polygon on the map to filter stations by area

Stations

To filter data by station, use the drop-down menu to select the desired station(s) in the “Select station(s)” field.

To remove values from the “Select station(s)” field, click the “X” that appears on the right side of the field once at least one value is selected. Stations can also be removed individually by clicking the “X” next to their name.

If you already know the names of your desired stations, you can type them directly into the “Select station(s)” field to quickly filter the list of stations in the drop-down menu. In addition to station name, this search function also works for station alias, waterbody description, and waterbody ID.

Stations

☒ Core stations only

Spatial: Add a spatial filter to Map Layers, then click a polygon to filter stations by area

GRBGB X

- ☐ **GRBCML**
GREAT BAY ESTUARY - COASTAL MARINE LABORATORY
Grbcmi WBID: NHEST600031001-11 WB_DESC: Coastlab ALIAS: GRBCML
- ☒ **GRBGB**
GREAT BAY ESTUARY - GREAT BAY
Grbgb WBID: NHEST600030904-04-05 WB_DESC: Gbesonde ALIAS: GRBGB
- ☐ **GRBGBE**
GREAT BAY ESTUARY - GREAT BAY EAST
Grbgbe WBID: NHEST600030904-04-05 WB_DESC: ALIAS: GRBGBE
- ☐ **GRBGBW**
GREAT BAY ESTUARY - GREAT BAY WEST
GREAT BAY ESTUARY - GREAT BAY WEST
- ☐ **GRBLR**
GREAT BAY ESTUARY - LAMPREY RIVER

great bay estuary - great bay|

- ☐ **GRBGB**
GREAT BAY ESTUARY - GREAT BAY
Grbgb WBID: NHEST600030904-04-05 WB_DESC: Gbesonde ALIAS: GRBGB
- ☐ **GRBGBE**
GREAT BAY ESTUARY - GREAT BAY EAST
Grbgbe WBID: NHEST600030904-04-05 WB_DESC: ALIAS: GRBGBE
- ☐ **GRBGBW**
GREAT BAY ESTUARY - GREAT BAY WEST
GREAT BAY ESTUARY - GREAT BAY WEST

GRBGB|

- ☐ **GRBGB**
GREAT BAY ESTUARY - GREAT BAY
Grbgb WBID: NHEST600030904-04-05 WB_DESC: Gbesonde ALIAS: GRBGB

NHEST600030904-06-19|

- ☐ **GRBAP**
GREAT BAY ESTUARY - ADAMS POINT
Grbap WBID: NHEST600030904-06-19 WB_DESC: Gbcw-02, Adamspt ALIAS: GRBAP
- ☐ **GRBULB**
GREAT BAY ESTUARY - UPPER LITTLE BAY
Grbulb WBID: NHEST600030904-06-19 WB_DESC: ALIAS: GRBULB

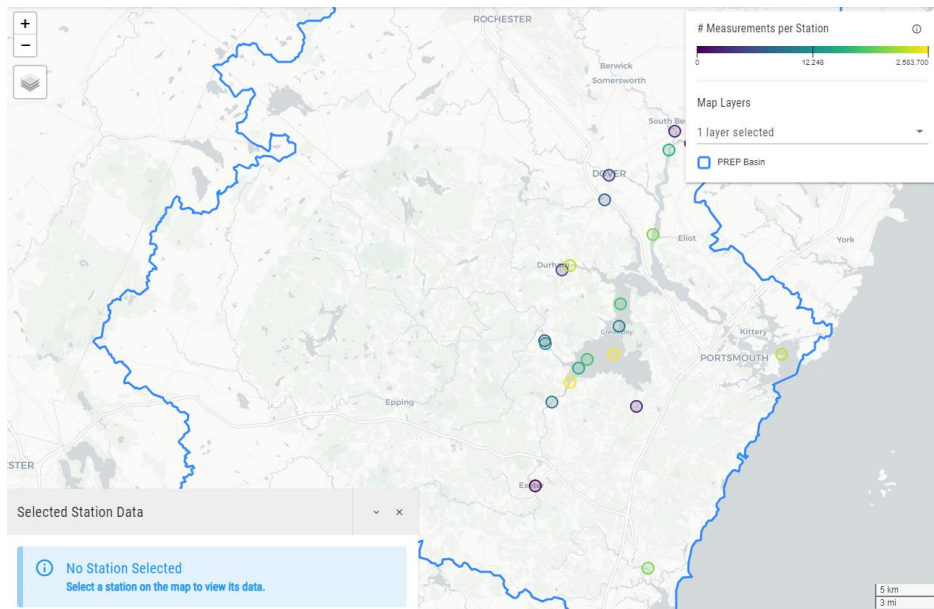
By default, only the 21 core stations identified by PREP are shown initially on the map.

Stations

☒ Core stations only

Spatial: Add a spatial filter to Map Layers, then click a polygon to filter stations by area

Select station(s)



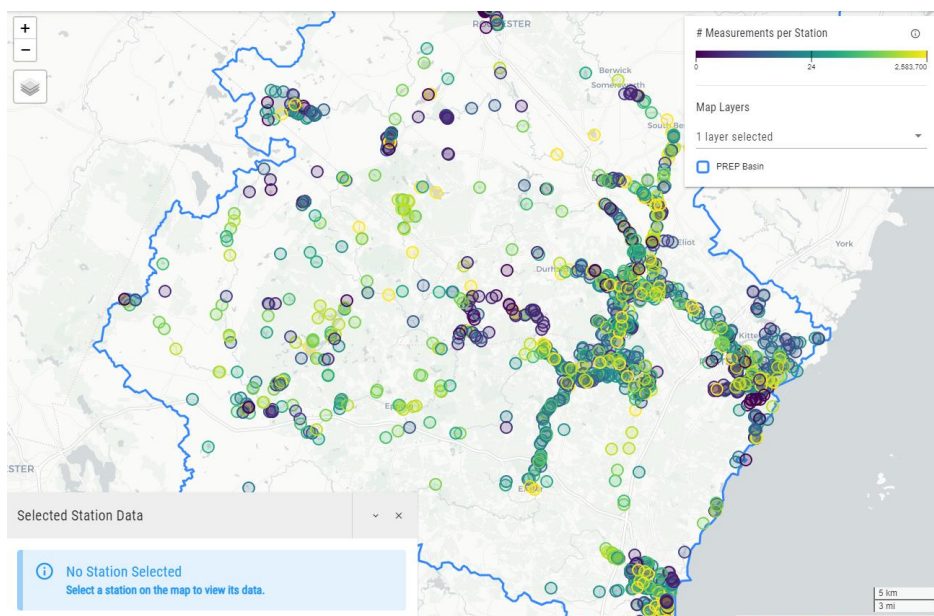
To show all stations on the map, toggle the “Core stations only” button off.

Stations

☐ Core stations only

Spatial: Add a spatial filter to Map Layers, then click a polygon to filter stations by area

Select station(s)



Spatial Filter

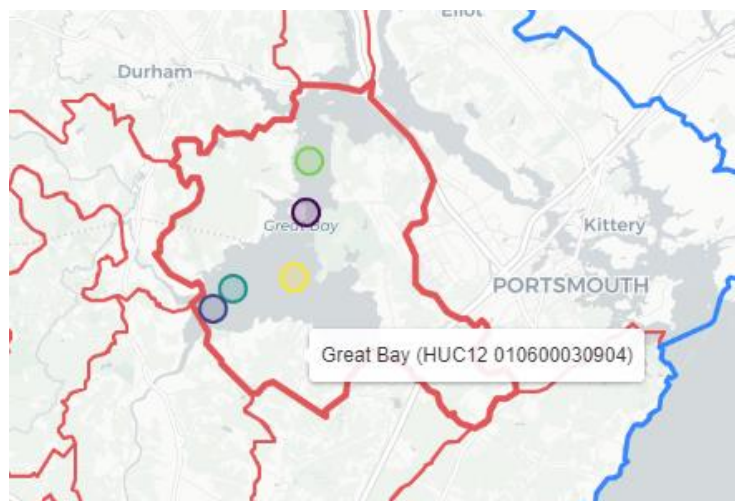
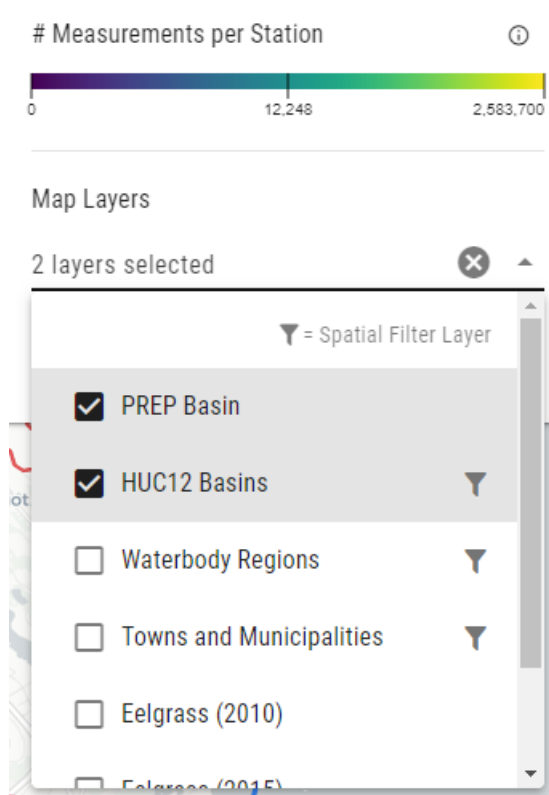
To filter data using a Spatial Filter Layer, select one of the map layers with a filter icon next to the name to add it to the map. These layers can be found in the Map Layers drop down menu available under the “# Measurements per Station” color bar in the top right corner of the Map.

The three available Spatial Filter Layer are:

1. HUC12 Basins – Hydrologic Unit Code basins with 12 digits.
2. Waterbody Regions – Six geographic regions within the Great Bay – Piscataqua River estuary complex.
3. Towns and Municipalities – Boundaries for municipalities within the PREP basin.

Once a Spatial Filter Layer is on the map, you can filter for stations that fall within a feature by clicking on that feature. All other stations outside of this feature will disappear, and the selected feature will be displayed with a thicker border. The name of the feature that is being used to filter the data will appear in orange within the FILTERS tab under the Stations section. Multiple Spatial Filter Layers can be displayed on the map at the same time, but only a single feature within these layers can be used to filter data at one time.

To clear a spatial filter, simply apply a different spatial filter or click on the “X” next to the name of the feature being used for filtering. To remove a Spatial Filter Layer from the map, simply uncheck the layer in the Map Layers drop down menu.



Stations

☒ Core stations only

Spatial: HUC12: Great Bay (010600030904) X

Select station(s)



Parameters


To filter data by parameter, use the drop-down menu to select the desired parameter(s) in the “Select parameter(s)” field.

To remove values from the “Select parameter(s)” field, click the “X” that appears on the right side of the field once at least one value is selected. Parameters can also be removed individually by clicking the “X” next to their name.

If you already know the names of your desired parameters, you can type them directly into the “Select parameter(s)” field to quickly filter the list of parameters in the drop-down menu.

Parameters

☒ Core parameters only

Chlorophyll a (rfu) 

- ☒ Chlorophyll a (rfu)
- ☐ Chlorophyll a, corrected for pheophytin (ug/l)
- ☐ Chlorophyll a, uncorrected for pheophytin (ug/l)
- ☐ Coliform, fecal (mpn/100ml)
- ☐ Enterococcus (mpn/100ml)
- ☐ Nitrogen, dissolved organic (mg/l)

Parameters

☒ Core parameters only

chlorophyll a 

- ☐ Chlorophyll a (rfu)
- ☐ Chlorophyll a, corrected for pheophytin (ug/l)
- ☐ Chlorophyll a, uncorrected for pheophytin (ug/l)

By default, 26 core parameters identified by PREP are shown initially in the “Select parameter(s)” drop-down menu.

Note that the number of parameters displayed in the “Select parameter(s)” drop-down menu changes if any filters are applied to the data, including the “Core stations only” button.

Parameters

☒ Core parameters only

Select parameter(s)

- ☐ Blue-green algae (cyanobacteria), phycocyanin (ug/l)
- ☐ Chlorophyll a (rfu)
- ☐ Chlorophyll a, corrected for pheophytin (ug/l)
- ☐ Chlorophyll a, uncorrected for pheophytin (ug/l)
- ☐ Coliform, fecal (mpn/100ml)
- ☐ Enterococcus (mpn/100ml)

To show all parameters in the “Select parameter(s)” drop-down menu, toggle the “Core parameters only” button off.

Parameters

☐ Core parameters only

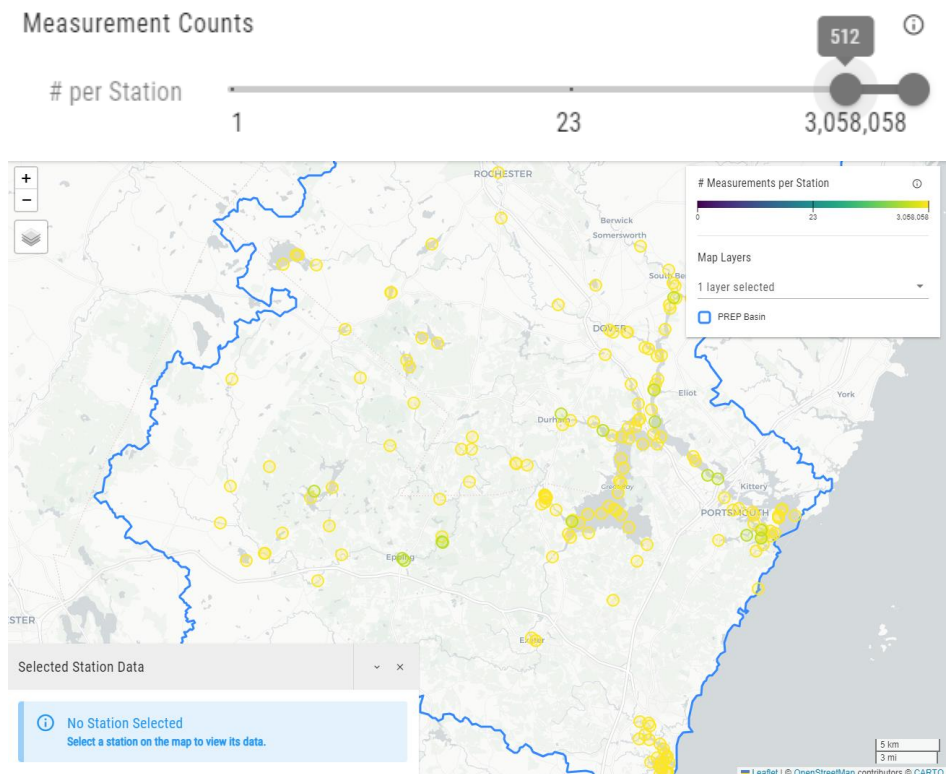
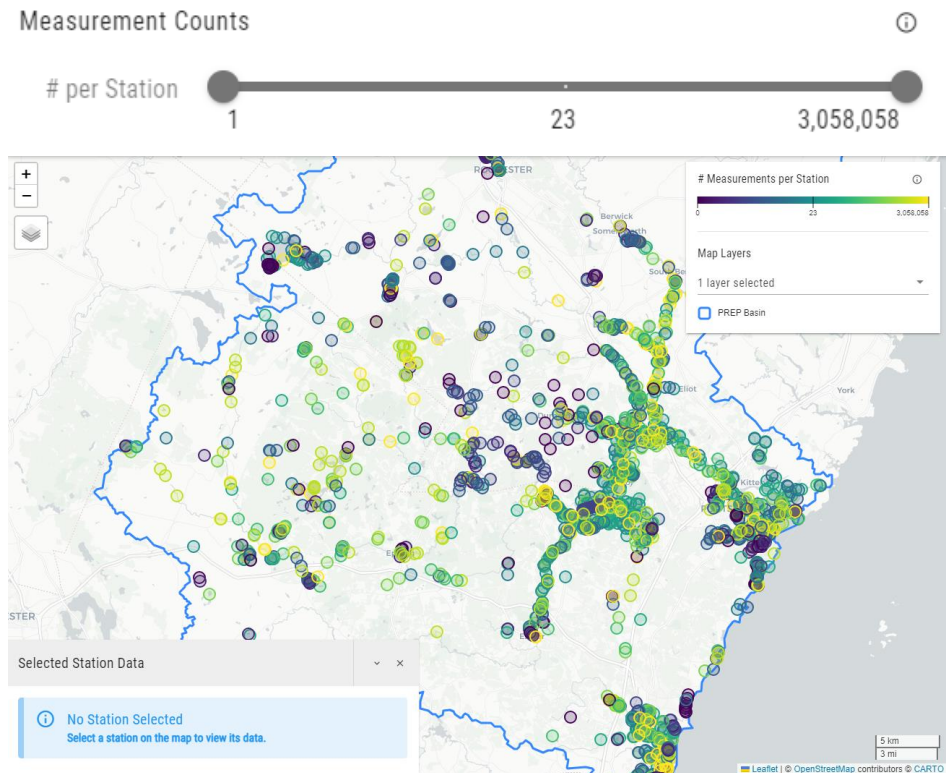
Select parameter(s)

- ☐ 1,1,1-Trichloroethane (ug/l)
- ☐ 1,2-Dichlorobenzene-D4 (%)
- ☐ 1,2-Dichloroethane-D4 (%)
- ☐ 1,4-Dioxane (ug/l)
- ☐ 1,4-Dioxane-D8 (%)
- ☐ 2-Chlorotoluene (ug/l)

Measurement Counts

To filter data by measurement counts, adjust the buttons on the “# per Station” slider at the bottom of the FILTERS tab. Similar to the map, this slider dynamically updates depending on the other filters applied to the data.

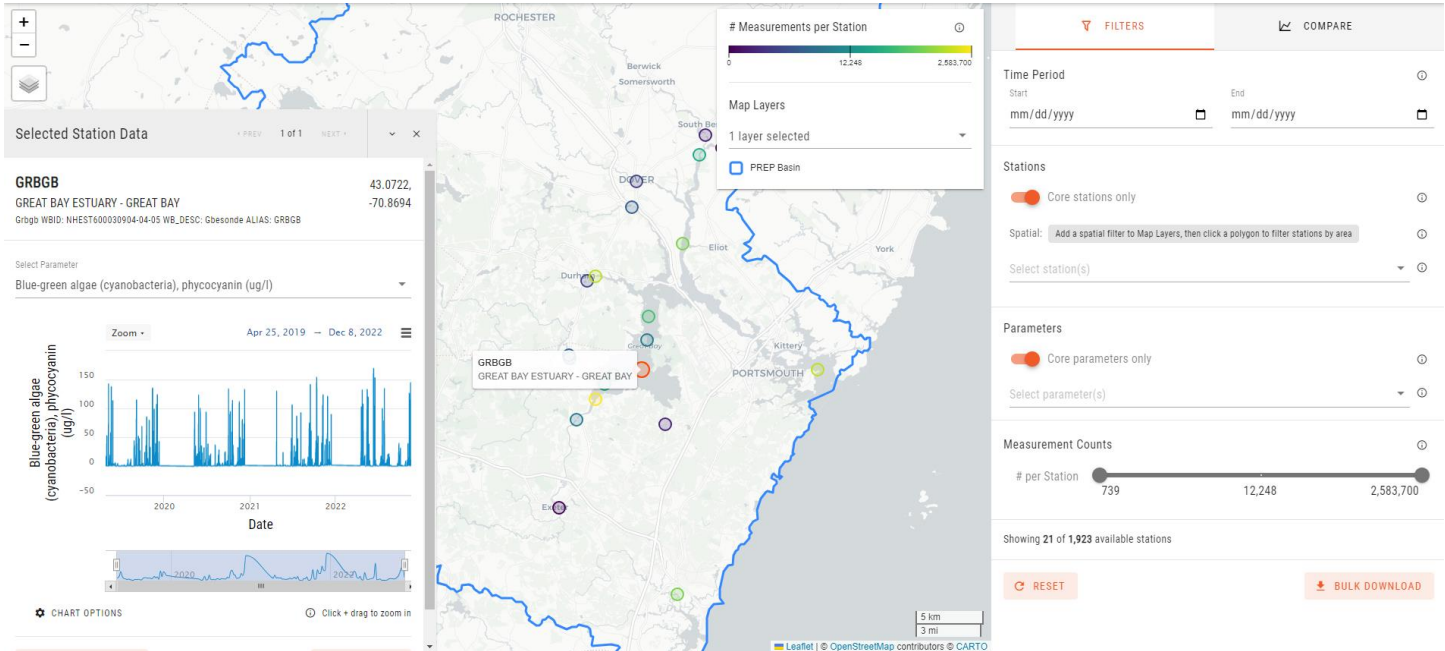
Note that the slider filters data by percentile and is therefore non-linear (i.e., the value displayed in the middle of the bar represents the median number of observations for the data shown on the map).



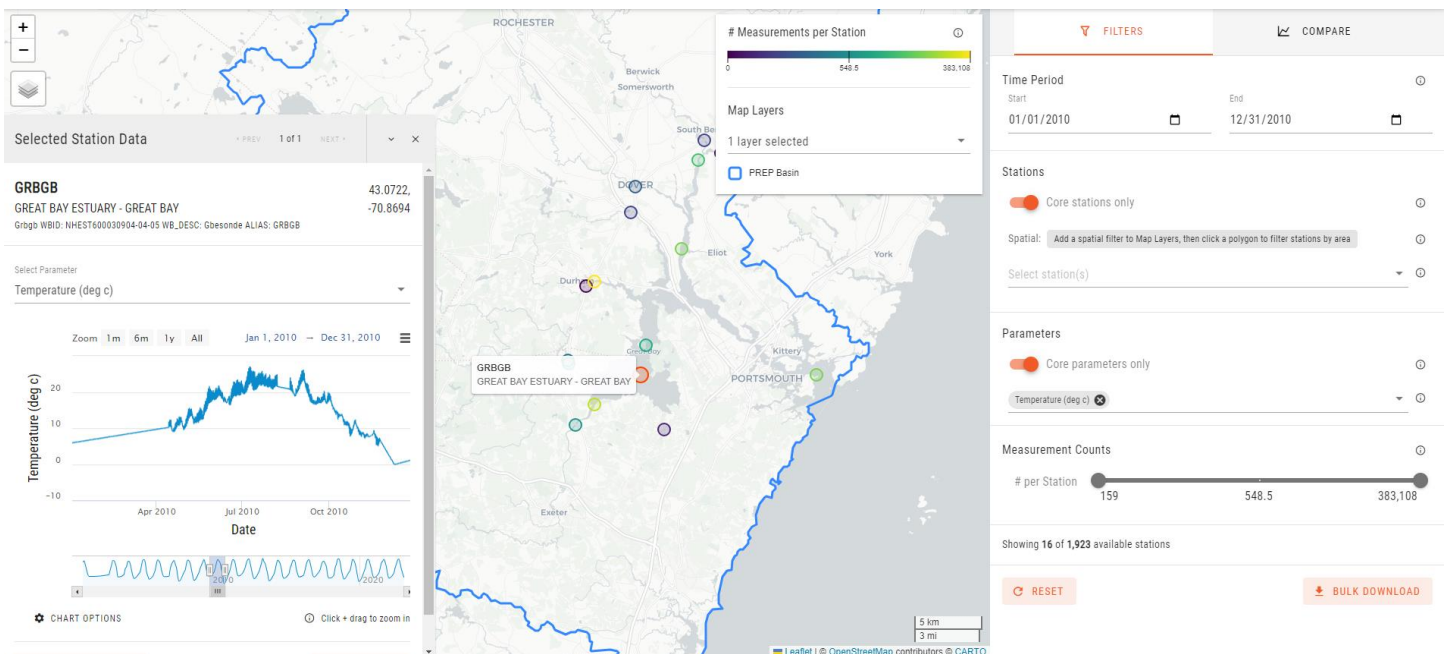
Visualizing Data

“Selected Station Data” Pop-Up

To visualize data, simply click on any station shown on the map and the “Selected Station Data” pop-up will open with a timeseries plot showing data at your selected station. By default, the plot will show all data for the first parameter in alphabetical order at that station.



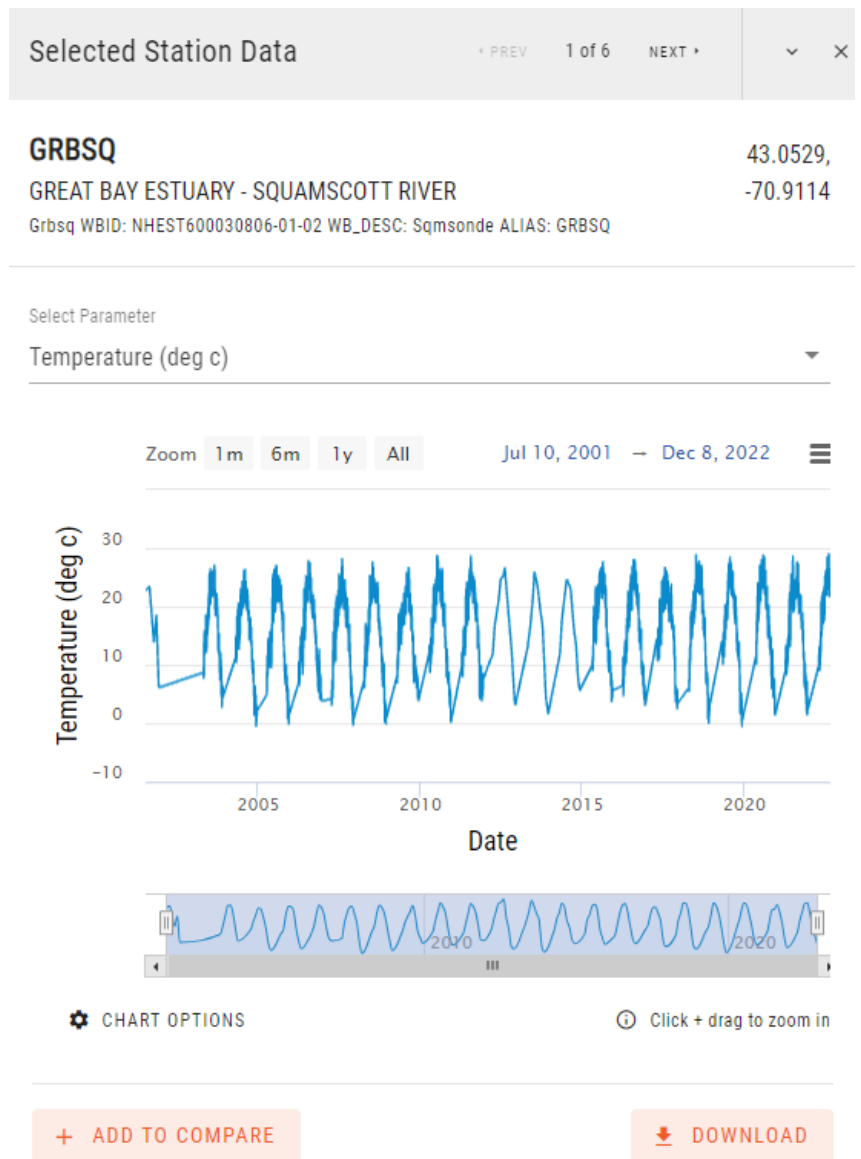
If you have already selected a time period and/or parameters of interest in the FILTERS tab, the plot will initially show data within that time period for the first parameter you selected.



Pop-Up Features

Within the “Selected Station Data” pop-up, there are a few features that are designed to help users identify and visualize data.

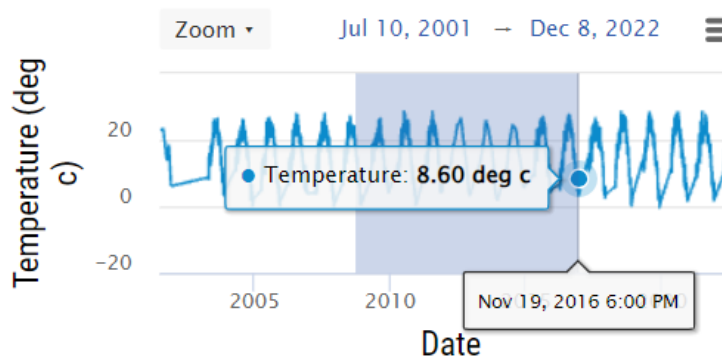
- If there are multiple stations stacked on top of each other, users can toggle between stations in the group by clicking the PREV and NEXT buttons at the top of the pop-up.
- The station alias, along with other important metadata including station name, waterbody ID, waterbody description, and station coordinates, are displayed at the top of the pop-up.
- In addition to the “Select parameter(s)” field in the FILTERS tab, users can change the parameter being displayed on the timeseries plot using the “Select Parameter” field within the pop-up.
- The CHART OPTIONS button in the bottom left corner of the timeseries plot allows users to adjust the y-axis of the plot to a log scale and/or “lock” the plot to the time series fields in the FILTERS tab using the “Lock to Time Period” button. If selected, the “Lock to Time Period” button makes it so the zoom of the timeseries plot automatically adjusts when the “Start” and/or “End” fields in the FILTERS tab are adjusted. When de-selected, the timeseries plot will remain at its current zoom when the “Start” and/or “End” fields in the FILTERS tab are adjusted.
- The menu icon in the top right corner of the timeseries plot allows users to view the plot in full screen or print or download the plot.



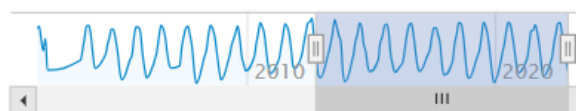
Adjusting Timeseries Plot Zoom

The zoom of timeseries plots can be adjusted in five different ways:

1. Clicking and dragging your mouse on the plot to select the area you would like to zoom in on.



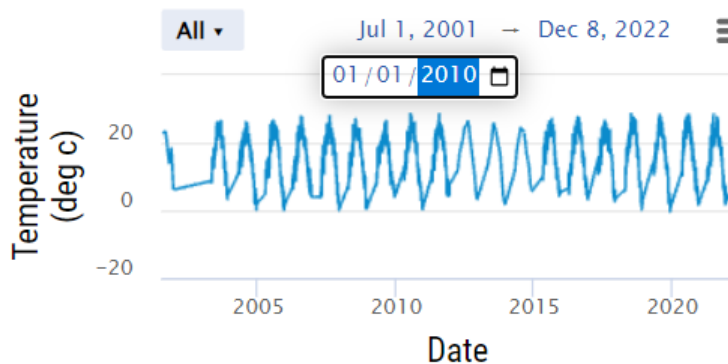
2. Adjusting the sliders on the context chart directly below the plot to specify the time period you would like to zoom in on.



3. Select the desired zoom interval (e.g., 1 month, 6 months, 1 year) from the drop-down menu in the top left corner of the plot area.



4. Manually input the time period of interest in the fields directly above the plot.



5. Adjust the start and end dates for the two fields in the Time Period section of the FILTERS tab while the “Lock to Time Period” button for the plot is turned on.

Time Period

Start 01/01/2023

End mm/dd/yyyy

Exporting Data from the Pop-Up

Data from the “Selected Station Data” pop-up can be exported in two different ways:

To export the data internally within the web application to the COMPARE tab, click the ADD TO COMPARE button in the bottom left corner of the pop-up. Regardless of the zoom of the plot, the entire timeseries for the selected parameter at that station will be added to the COMPARE tab.

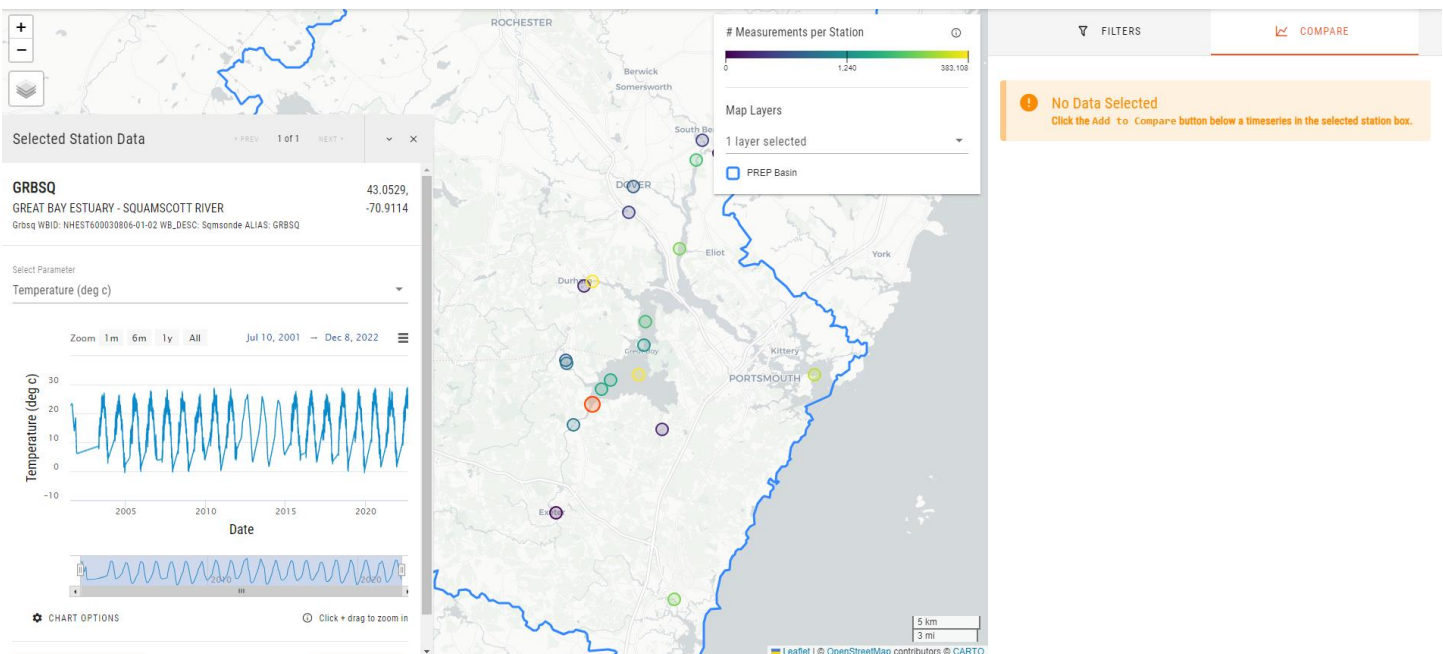
+ ADD TO COMPARE

To export the data as a CSV file to your computer, click the DOWNLOAD button in the bottom right corner of the pop-up. Regardless of the zoom of the plot, the entire timeseries for the selected parameter at that station will be included within the CSV file.

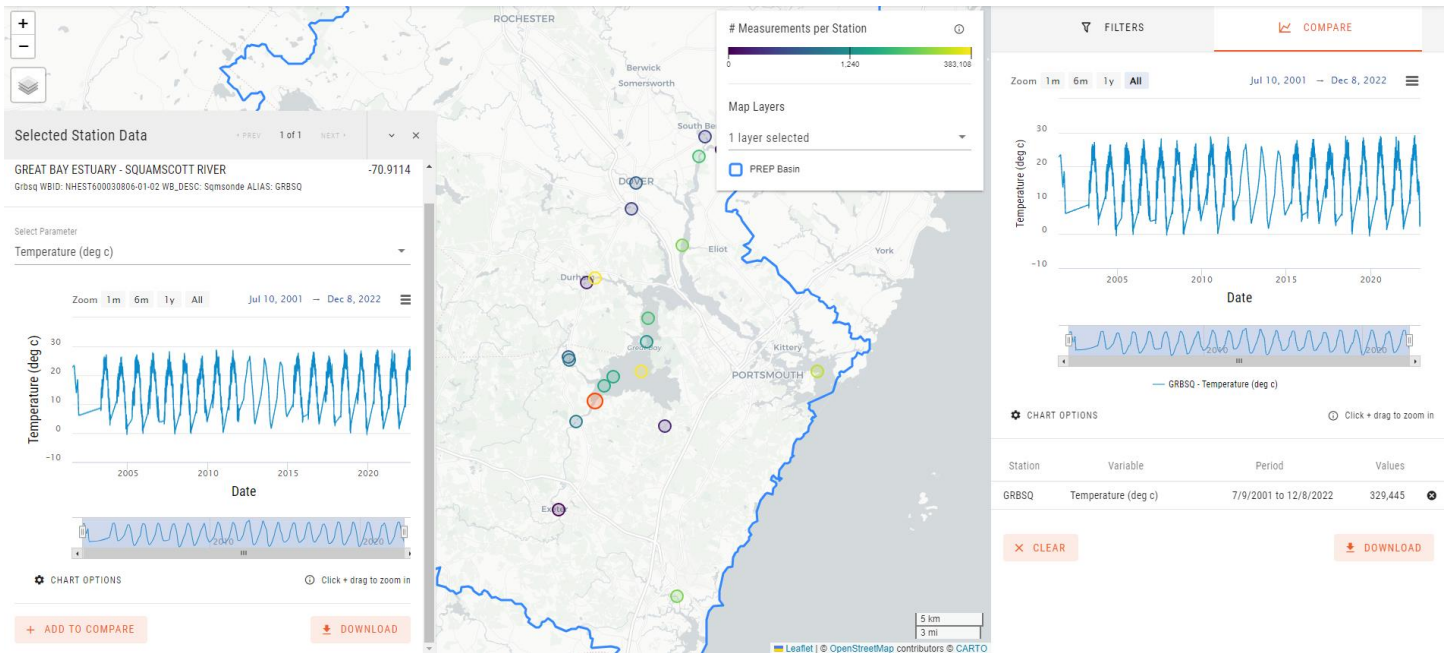
↓ DOWNLOAD

COMPARE Tab

To add data to the COMPARE tab, you need to view the data within the “Selected Station Data” pop-up first and then click the ADD TO COMPARE button.



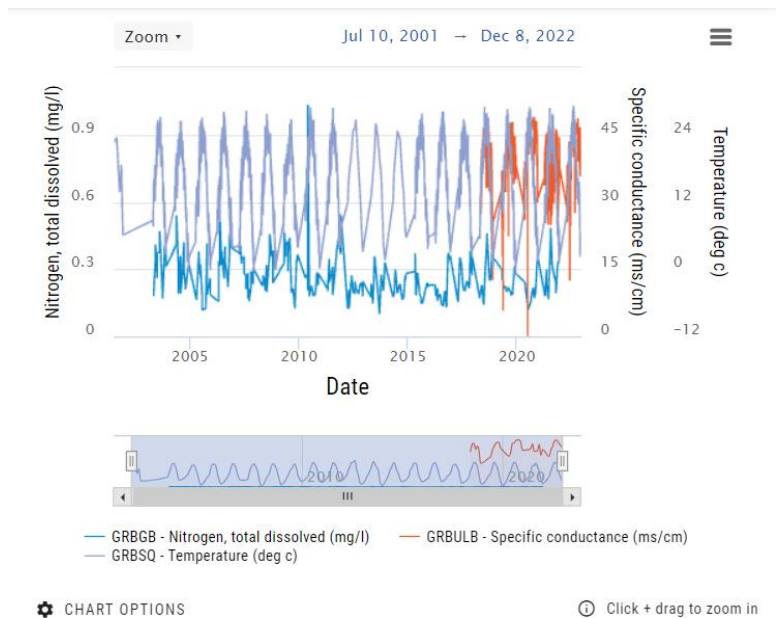
After you hit the ADD TO COMPARE button, the timeseries data for that station and parameter will appear on the COMPARE tab to the right of the map.



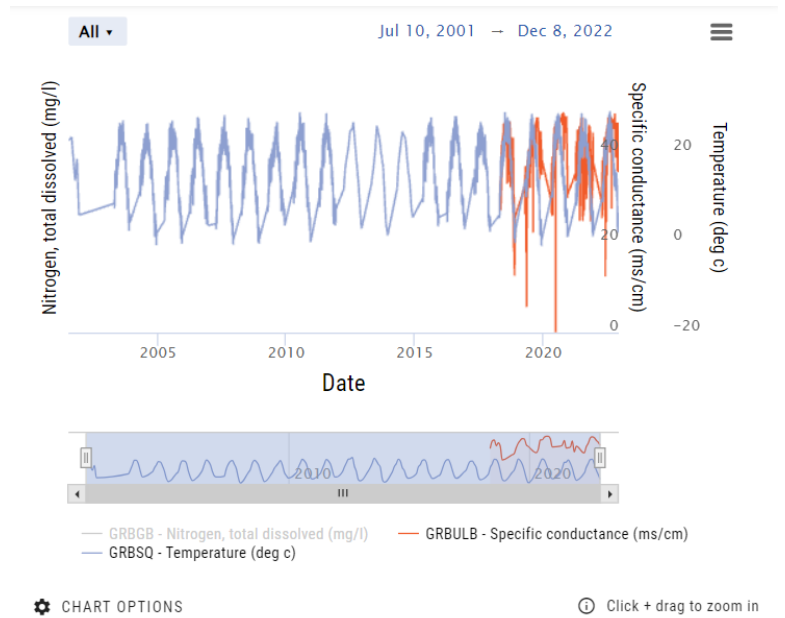
Tab Features

Within the COMPARE tab, there are a few features that assist users with comparing different data timeseries:

- An unlimited number of parameter/station combinations can be added to the timeseries plot, with each combination symbolized with different colors as displayed in the legend below the plot.
- For each new parameter that is added to the COMPARE tab, a new y-axis will be created that is unique to that parameter.
- The CHART OPTIONS button below the plot on the left and the menu button above the plot on the right have the same functionality as the identical buttons in the "Selected Station Data" pop-up (see the Pop-Up Features section above).
- The zoom of timeseries plot can be adjusted in the same manner as the timeseries plot in the "Selected Station Data" pop-up (see the Adjusting Timeseries Plot Zoom section above).



- Specific parameter/station combinations can be temporarily hidden from the timeseries plot by clicking on the name of the combination in the legend to toggle it on and off the plot (see GRBGB – Nitrogen, total dissolved (mg/l) in the plot on the right).



- All parameter/station combinations currently available within the COMPARE tab are displayed in the table below the timeseries plot, with station alias, variable, time period, and number of values shown.
- To remove an individual parameter/station combination from the COMPARE tab, click the “X” at the end of the corresponding row.
- To remove all data from the COMPARE tab, click the CLEAR button in the bottom left corner.

Station	Variable	Period	Values
GRBSQ	Temperature (deg c)	7/9/2001 to 12/8/2022	329,445 ✕
GRBGB	Nitrogen, total dissolved (mg/l)	5/5/2003 to 12/7/2021	311 ✕
GRBULB	Specific conductance (ms/cm)	5/4/2018 to 12/8/2022	110,503 ✕

✕ CLEAR

Exporting Data from the Tab

Data from the COMPARE tab can be exported through the built-in download function.

To export data within the COMPARE tab as a CSV file to your computer, click the DOWNLOAD button in the bottom right corner. Regardless of the zoom of the plot, the entire timeseries for all parameter/station combinations currently available within the COMPARE will be included within the CSV file.

↓ DOWNLOAD

Bulk Download

As stated at the top of the window, bulk downloads can only be performed for a single parameter for up to one year of data at a time.

 BULK DOWNLOAD

Bulk Download

×

Choose a parameter and enter a time period to download all data for the current set of filtered stations. You may download up to 1 year of data at a time.

Filtered Stations: 21 (as shown on map)

Parameter

Select parameter

Time Period

Start

mm/dd/yyyy

End

mm/dd/yyyy

DOWNLOAD

CLOSE

Parameter

Select parameter

Blue-green algae (cyanobacteria), phycocyanin (ug/l)

Chlorophyll a (rfu)

Chlorophyll a, corrected for pheophytin (ug/l)

Chlorophyll a, uncorrected for pheophytin (ug/l)

Coliform, fecal (mpn/100ml)

Enterococcus (mpn/100ml)

Parameter

chlorophyll a

Chlorophyll a (rfu)

Chlorophyll a, corrected for pheophytin (ug/l)

Chlorophyll a, uncorrected for pheophytin (ug/l)

Once a parameter has been selected, enter dates in the “Start” and “End” fields in the Time Period section that correspond to a one-year period.

The one-year period that is chosen can span across multiple calendar years.

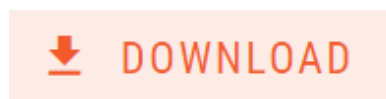
Like the similar fields in the FILTERS tab, the dates can be entered directly or by using the calendar drop-down menu.

The screenshot displays the 'Time Period' section of a web application. It shows three examples of date selection:

- Example 1:** Start: 01/01/2010, End: 12/31/2010. Both fields have calendar icons.
- Example 2:** Start: 07/01/2010, End: 06/30/2011. Both fields have calendar icons.
- Example 3:** Start: 01/01/2010 (with a dropdown menu open), End: mm/dd/yyyy. The dropdown menu shows 'January 2010' and a calendar grid with the 1st highlighted. The Start field has a clear (X) button.

The background shows a map with a green location pin and a '5 km' scale bar. A 'CLOSE' button is visible in the top right of the interface.

Once the parameter and time period have been selected, press the DOWNLOAD button in the bottom left corner of the window to export the data as a CSV file to your computer.



If you click download and no parameter is selected, you will receive this error message.



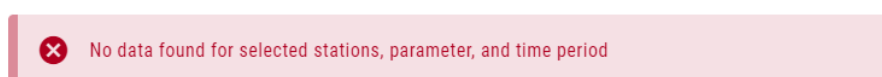
If you click download and no time period is selected, you will receive this error message.



If you click download and a time period longer than one-year is selected, you will receive this error message.



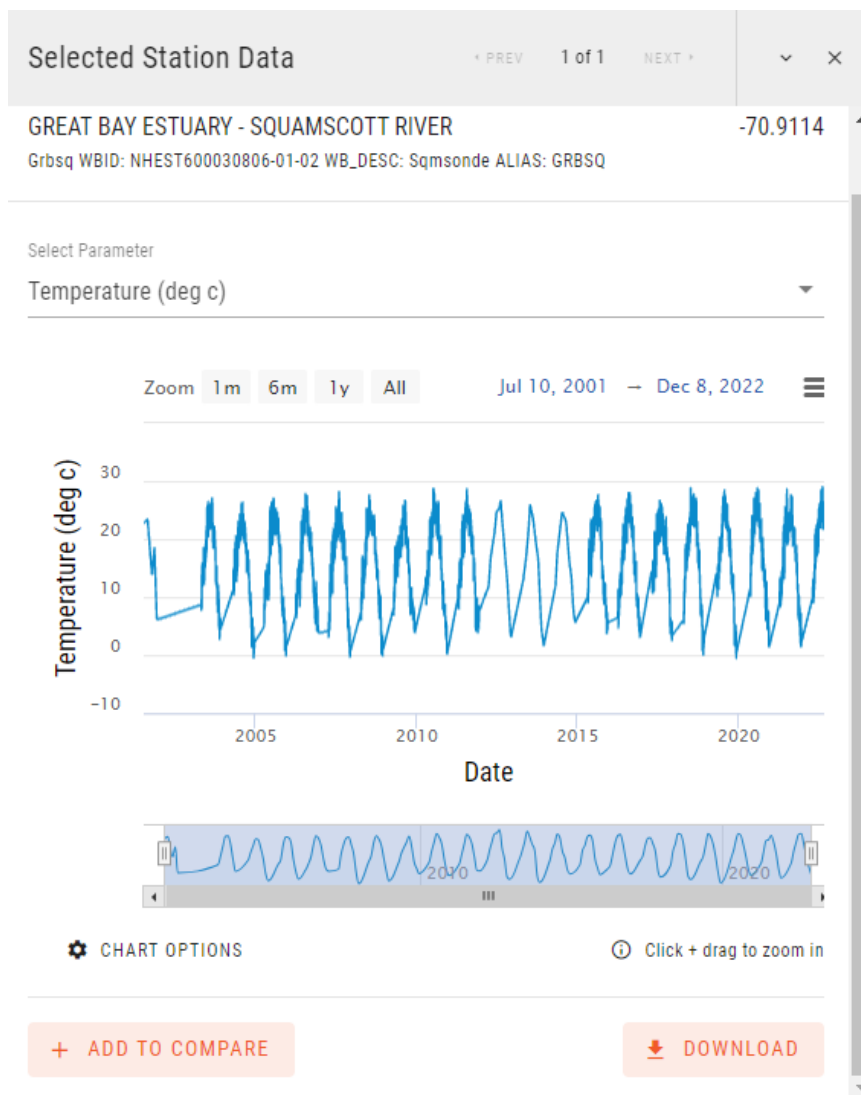
If there are no data available for the station/parameter/time period combination that you selected in the bulk download window, you will receive this error message when you click download.



Selected Station Download

To download data from the station selected in the “Selected Station Data” pop-up, click the DOWNLOAD button in the bottom right corner of the pop-up. This will download the data as a CSV file to your computer.

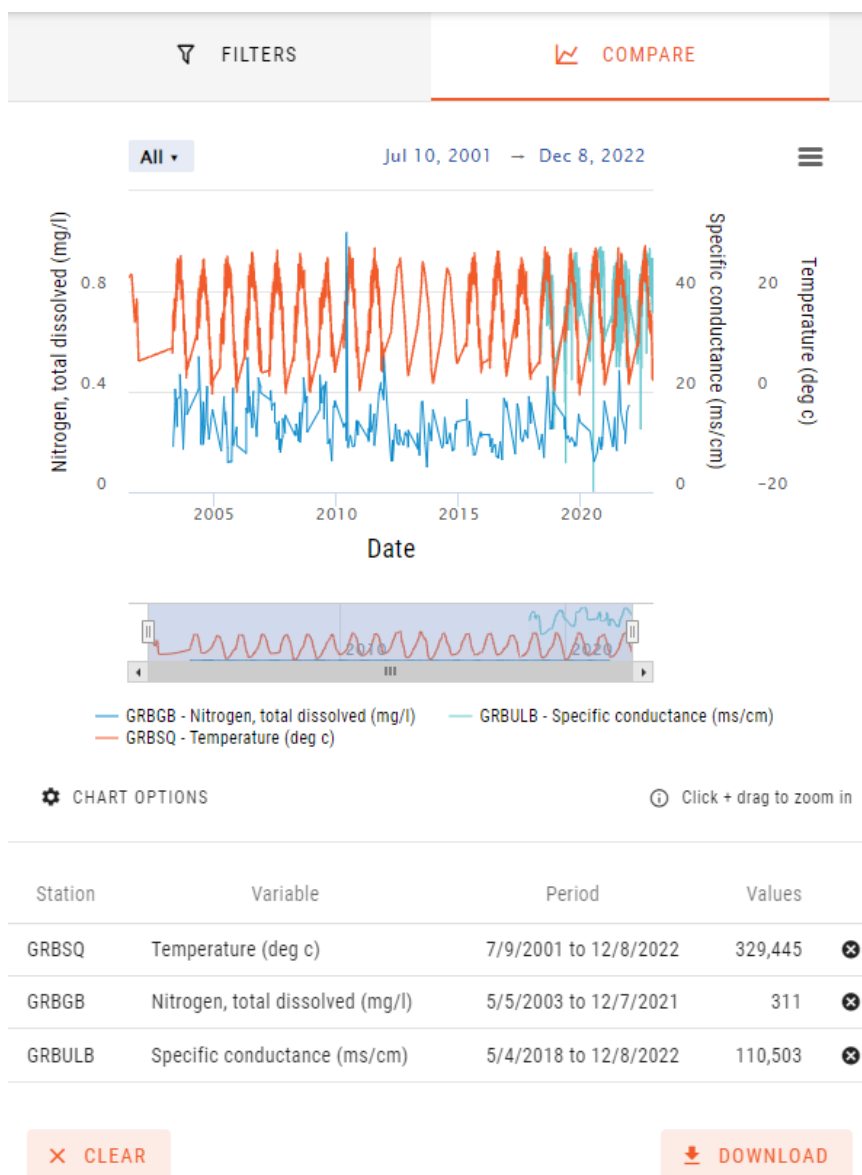
Regardless of the zoom of the plot, the entire timeseries for the selected parameter at that station will be included within the CSV file.



Compare Download

To download data from COMPARE tab, click the DOWNLOAD button in the bottom right corner. This will download the data as a CSV file to your computer.

Regardless of the zoom of the plot or any parameter/station combinations that are temporarily hidden from the plot, the entire timeseries for all parameter/station combinations in the COMPARE tab will be included within the CSV file.



Download File Format

In addition to general information about the Data Explorer, the download timestamp, and the database reference, all download files contain three tables. These three tables are:

1. Sampling Features Table (Stations) – Metadata on the stations included in the download.
2. Results Table (Sampling Metadata) – Metadata on the sampling programs that generated the data included in the download.
3. Timeseries Values Table (Measurements) – Values for the data included in the download.

For more information on these tables and the columns presented in the download files, please visit <https://www.odm2.org/>.