National Coral Reef Monitoring Program Data Visualization Tool

User Guidance

National Oceanic and Atmospheric Administration (NOAA)
Coral Reef Conservation Program (CRCP)

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ArcGIS Online Geoplatform User Access

Users will access the National Coral Reef Monitoring Program (NCRMP) Visualization Tool Hub by navigating to https://ncrmp.coralreef.noaa.gov/ in their web browser. No software downloads or installations are necessary to use the Tool.

Hub Elements

NCRMP Homepage

The NCRMP Data Visualization Tool homepage acts as a centralized location housing each of the NCRMP dashboards, including climate, benthic (Atlantic, Pacific), fish (Atlantic, Pacific), and socioeconomic. The homepage also contains context for NCRMP and the Coral Reef Information System (CoRIS), contact information for the same, and a footer with required links.

Figures 1 and 2 provide an overview of the NCRMP homepage layout with components numbered 1-5. These include:

1. A running header with a title, the top tab options (Figure 1, white box 1, upper left),
2. Some introductory text (Figure 1, green box 2, center header)
3. The six themed dashboards (Figure 1, yellow box 3, center page body),
4. The about and contact text (Figure 2, blue box 4, bottom page body) and
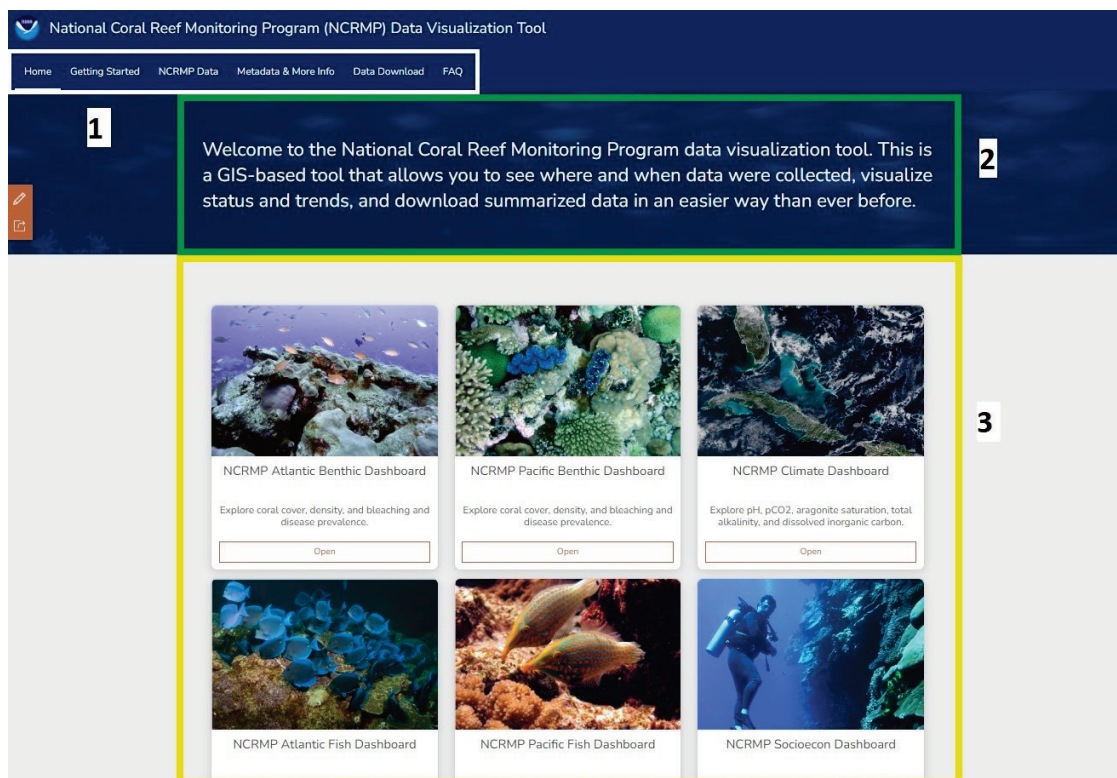5. The footer (Figure 2, red box 5, center bottom).

Figure 1 Upper portion of NCRMP Homepage layout and user interface with labeled components for further description
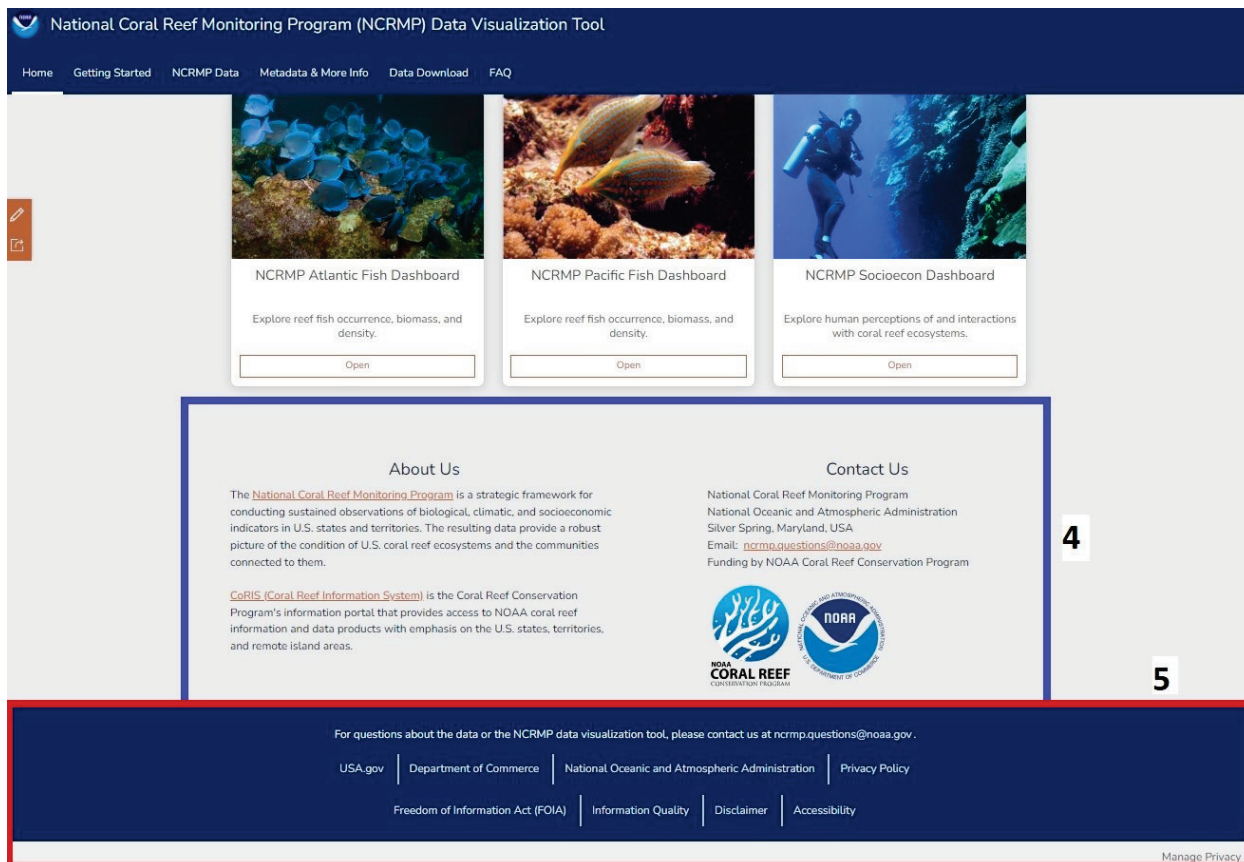
Figure 2 Lower portion of NCRMP Homepage layout and user interface with components labeled for further description

The central portion of the NCRMP homepage (Figure 1, yellow box 2) is the gallery of cards linking to each of the NCRMP theme dashboards. This is where most interactions with the homepage will occur. There are six thematic dashboards in total, including benthic (Atlantic, Pacific), fish (Atlantic, Pacific), socioeconomics, and climate. Once a user clicks a card, the chosen theme dashboard opens in a new browser window. Opening the NCRMP Theme Dashboard in a new browser window allows users to open multiple dashboards at once in a single browsing session.

The footer (Figure 2, red box 5), which exists at the bottom of every user-facing page of the site, contains contact information, links to agency websites, relevant disclaimers, and the accessibility page.

Description of NCRMP Hub Pages

There are six tabs located in the upper left-hand corner of the NCRMP homepage (Figure 1, white box 1). This menu bar, acting as the main mode of navigation across the site and as a quick reference for the site's content, is comprised of the Home, Getting Started, NCRMP Data, Metadata & More Info, Data Download, and FAQ tabs. There is another page hosted on the Hub site not featured in the tabs menu: Accessibility, which is only accessed via the link in the footer.

Home Tab

The Home tab redirects users to the home page. This same functionality is shared by the NOAA logo at the top left of the header and the site title directly adjacent.

Getting Started

The Getting Started tab functions as an overview of what the tool is capable of and the provenance of the data. This is achieved via a mix of text, screenshots of the dashboards, and download tool, and links to more information.
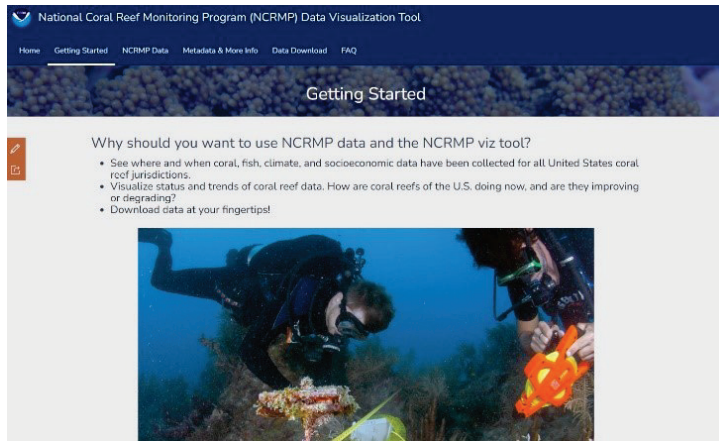

Figure 3 The upper portion of the Getting Started tab

NCRMP Data

The NCRMP Data tab houses information on how the data were collected and provides links to documentation and data access. This tab is organized into sections divided by the four themes. "Jump to" links at the top of the page allow for quick navigation to a theme of interest.
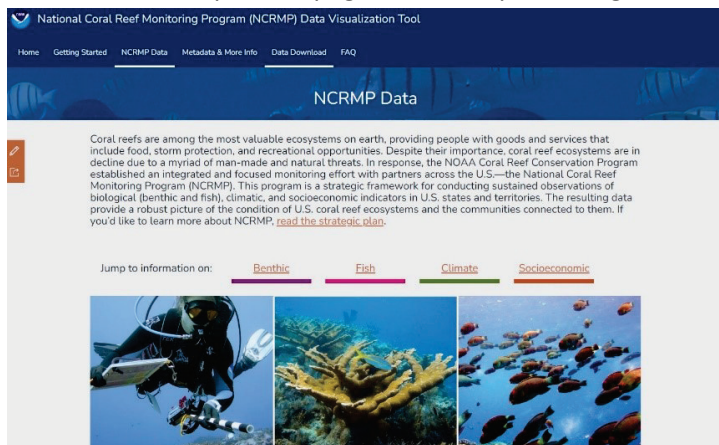

Figure 4 The top of the NCRMP Data tab

Metadata and More Information

The Metadata and More Information tab is a repository of documentation PDFs for Areas of Interest and the Data Dictionary. Also found on this tab, the Metadata section contains links to methods documents and XMLs, again organized by themes.
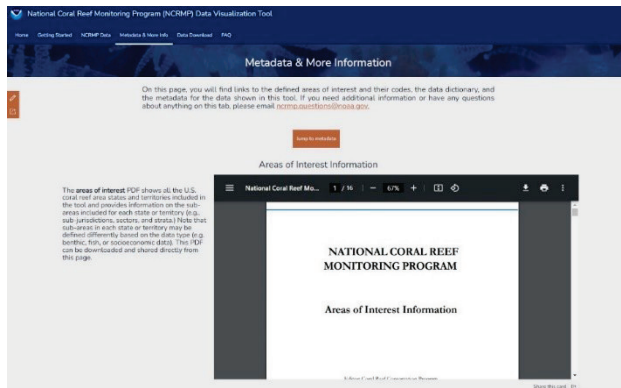
Figure 5a (left) The top of the Metadata & More Info tab. PDFs are embedded in the site and can be downloaded, printed, and shared from this page. Figure 5b (right) All metadata links are divided by theme.

Data Download

The Data Download tab contains an embedded dashboard, which functions as the data download portal, and instructions for its use.
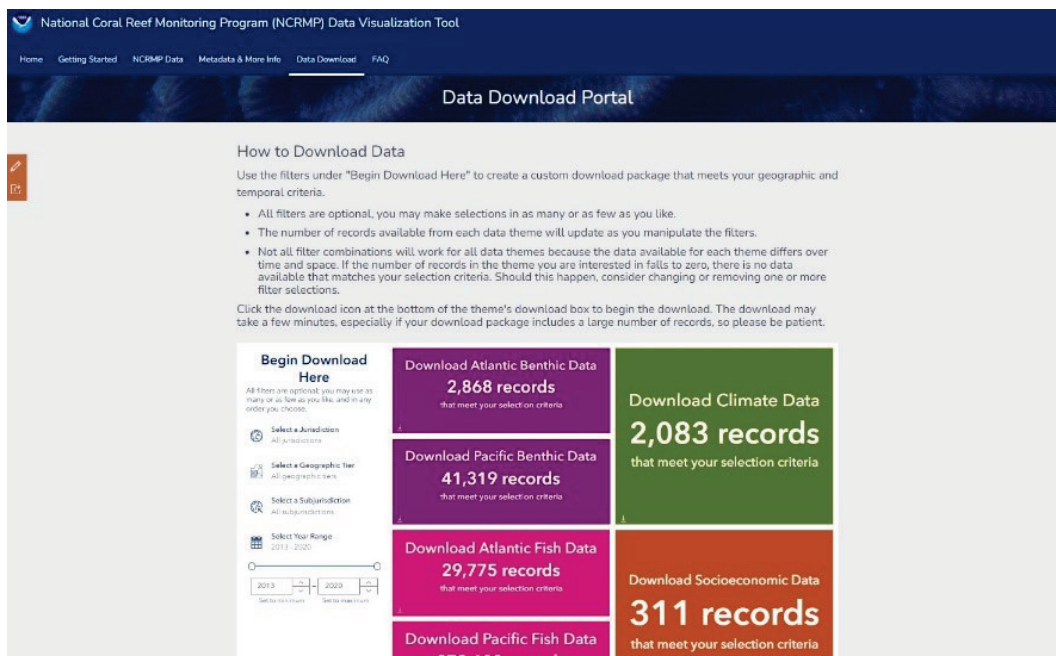

Figure 6 The Data Download tab, showing the layout of instructions on, and an embedded form of, the data download dashboard

FAQ

The FAQ tab contains frequently asked questions and their answers, the latter obscured until the accordion for its corresponding question is opened.
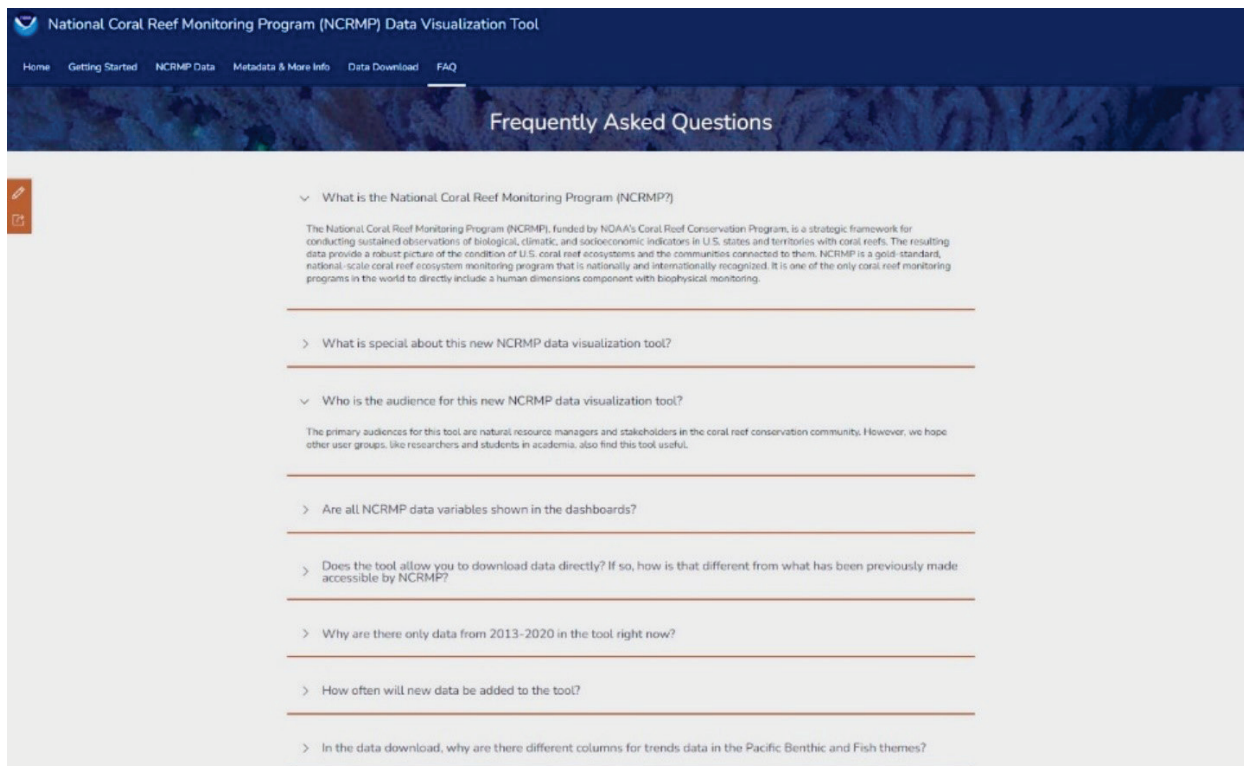
Figure 7 The FAQ page, with some questions expanded to show their answers

Accessibility

A final, hidden Accessibility "tab" provides a disclaimer regarding the limitations of Esri's ArcGIS Online platform with respect to full compliance with accessibility standards. This page is accessed via a link titled "Accessibility" on the footer, which runs across the bottom of each page.

Figure 8 The Accessibility page, with the link used to access it highlighted with a red box

Universal Dashboard Elements

Welcome Splash Screen

When you first open any of the dashboards on the Home tab of the tool, a welcome screen (i.e., splash page) (Figure 9) appears with important information about the dashboard. This includes a brief overview of the dashboard application, recommended 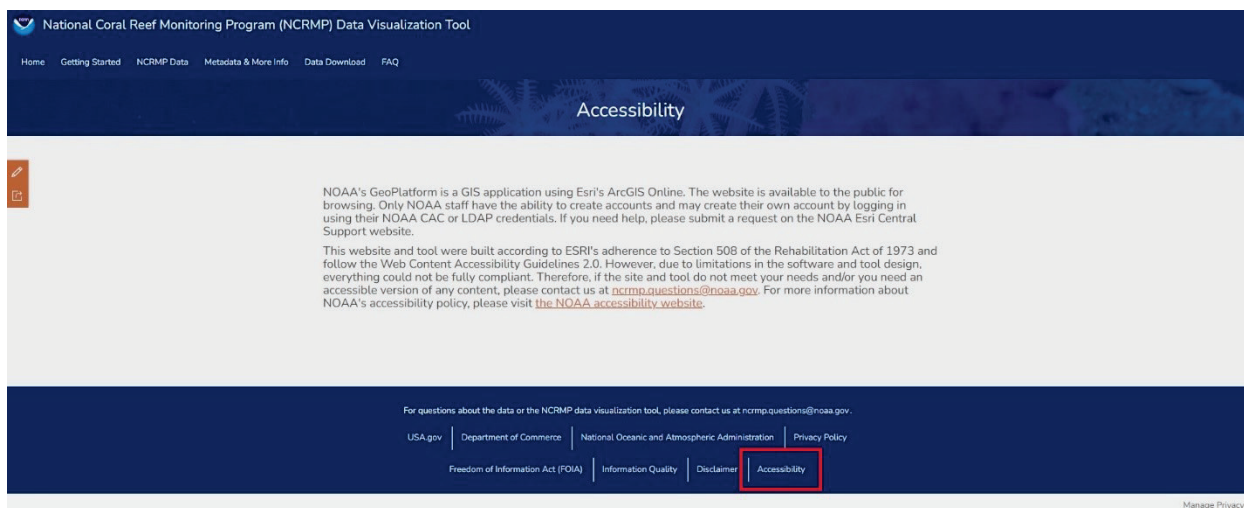screen size and resolution for best results, as well as how to resize various elements of the dashboard to view them on smaller screens. Additionally, the bottom portion of all splash pages have a reference to the 'Help' button that will direct the user to a quick help page for further guidance. Exit the Welcome screen by clicking anywhere outside it.
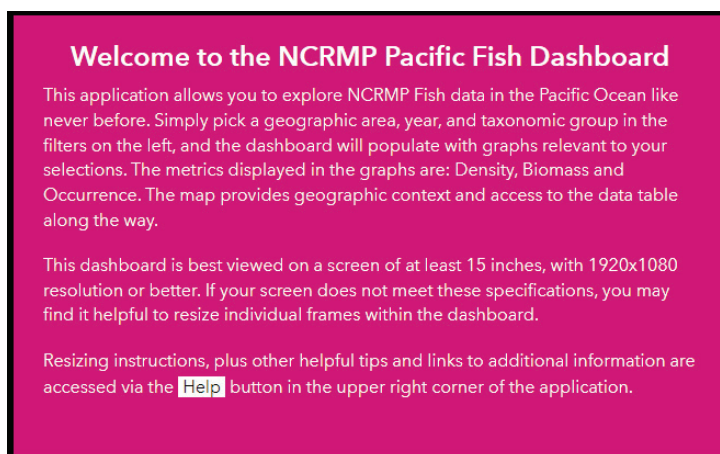
Figure 9 Welcome splash page example. Each splash page differs within the context of each dashboard.

Help Splash Screen

The Help splash screen (Figure 10) is accessed by clicking the Help button in the Welcome screen or in the upper right of the dashboard. The Help screen contains system requirements, some basic tips for interacting with the dashboard, and links to supporting content on the Hub. Exit the Help screen by clicking anywhere outside it.

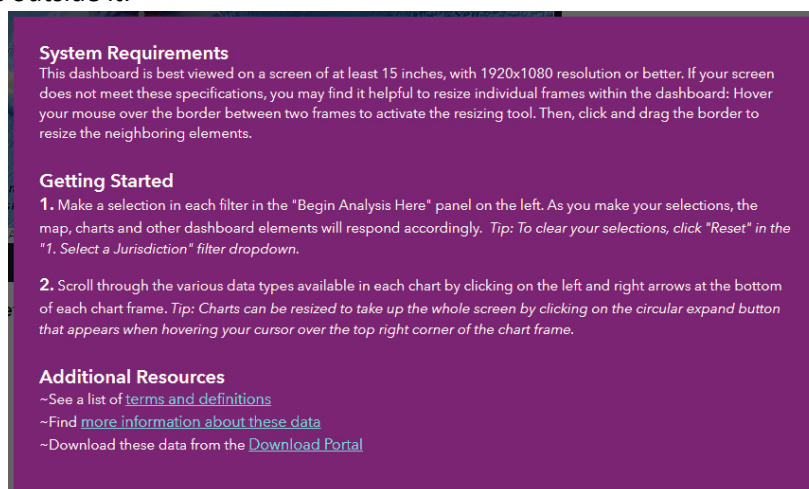**Figure 10 Help splash page example. Each splash page differs within the context of each dashboard.**

Accounting for Screen Size

It is understood that users will approach the Theme Dashboards through computers with widely varied screen sizes, resolutions, and scales. While ArcGIS Online Dashboards do have some very basic adaptability design, the software is not flexible enough to produce a reasonable experience for users with screens of less than 15", and with a resolution less than 1920x1080 scaled to 125% or greater. As a work around, all elements on the dashboards with the exception of the sidebar can be resized with the resizing tool.

1. Hover mouse pointer over the border between two elements to activate the resizing tool. When the mouse pointer changes shape to opposing arrows separated by two parallel vertical lines, this indicates the resizing tool has been activated.
2. Click and drag the mouse left/right/up/down to resize the neighboring objects.

Additionally, all elements on the dashboard (with the exception of the sidebar) can be expanded to full screen by clicking on the expand icon in the top right corner of the element.

Resetting a Dashboard

Once users have completely explored data with certain filter settings, the sidebar filters must be reset to start a new analysis. To do this, go back to the first filter on the sidebar, and in the dropdown menu, click the Reset button (Figure 11, black box). This resets all the filters. Each filter can also be individually reset in this same manner. Users reset the map by clicking the home button in the map frame.
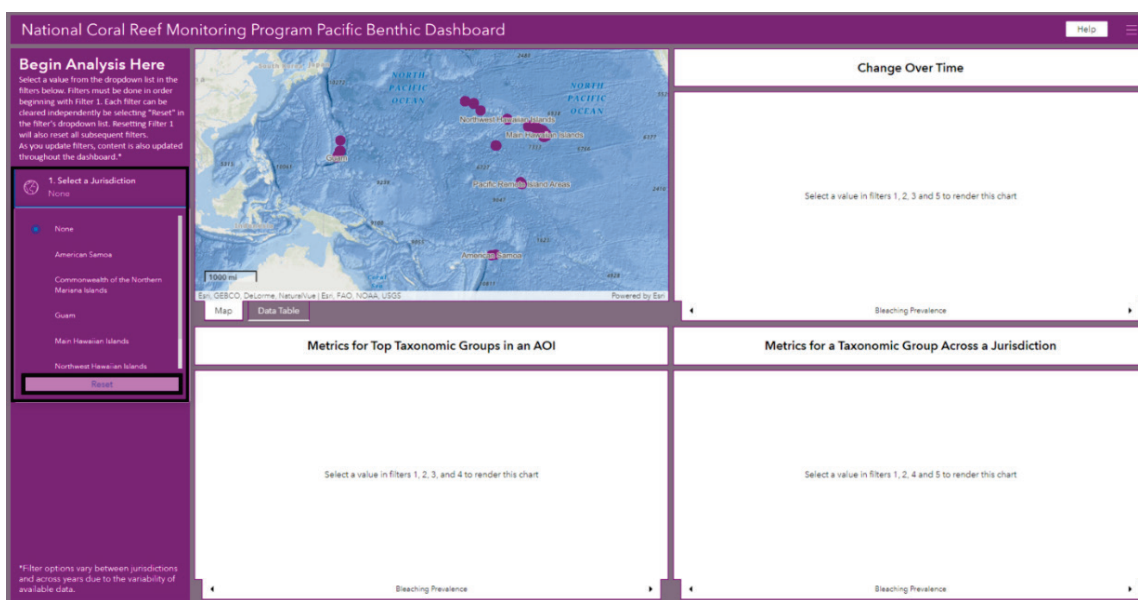
Figure 11 An example of how to reset the Pacific Benthic dashboard filters once a user finishes an initial data visualization.

Benthic and Fish Dashboards

The Pacific and Atlantic Benthic and Fish Dashboard are almost identical in layout. Therefore, this section speaks to the functionalities of all four of the Benthic and Fish dashboards. There are five basic elements to the Fish and Benthic dashboards, for both the Pacific and Atlantic basins (Figure 12).

Figure 12 The Pacific Fish Dashboard, showing all the major components in the four Fish and Benthic dashboards.

- The **Sidebar and filters** are positioned on the left side of the dashboard. The top language on the sidebar indicates where to begin the analysis process and the bottom language provides disclaimers. The main part of the sidebar houses several filters that once set will populate the dashboard charts, map, and data table(s).
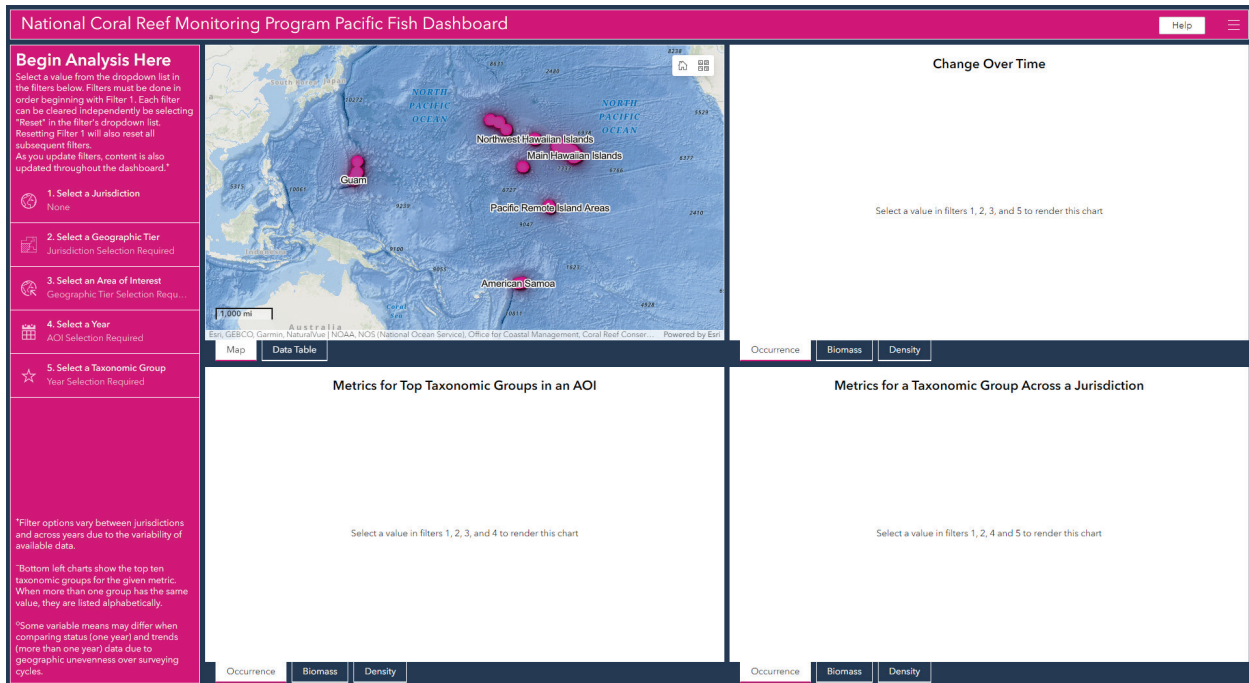- The **Charts** will initially display instructions for populating each chart. Once filters are set on the sidebar, all charts will automatically populate with data. The three chart frames each have a stack of three charts, each displaying a different metric visualized in the same way. The top right charts show the change in each metric over time. The bottom left compares the metrics across a range of taxonomic groups, and the bottom right compares them across a geographic area.
  - Access additional charts in the stack by clicking the tab for the metric. If you are using a small screen to view the dashboard, this navigation may appear as arrows at the bottom corners of the chart instead of tabs (Figure 13).
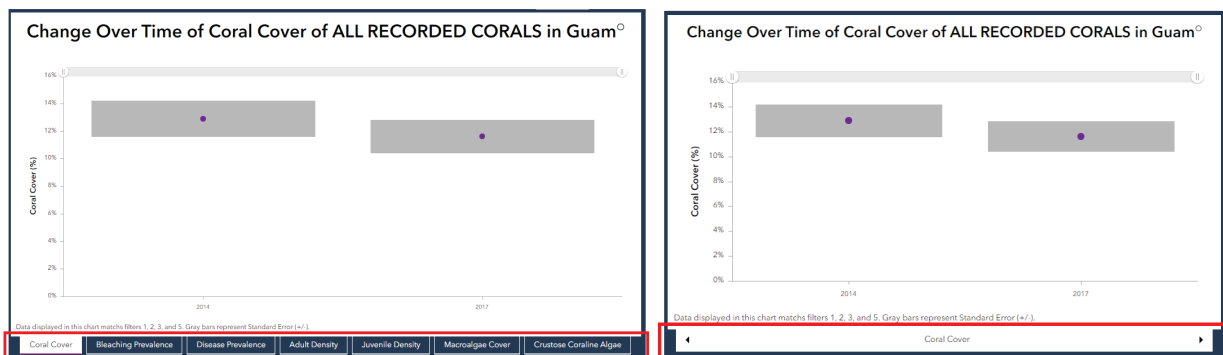

Figure 13 Accessing the charts in a stack will be accomplished either via tabs or arrows, depending on your screen size.

- The **Map** allows visualization of the areas of interest and the sites where the data were collected. There is also a **Data Table** stacked underneath the map which provides a tabular representation of all available metrics.
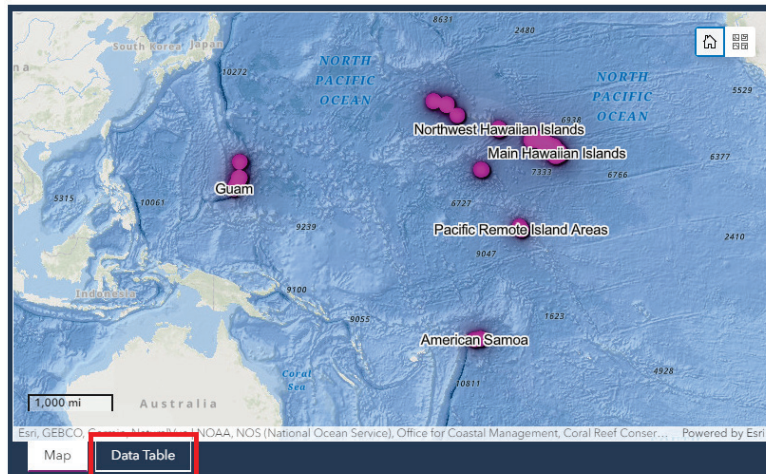
Figure 14 Map frame of the Pacific Benthic dashboard. Note the Data Table tab, circled here in red.

Benthic and Fish Filters

Filters should be set in order, beginning with Filter 1 and proceeding downward. All filters can be reset at the same time by resetting Filter 1, or by clicking the reset button at the bottom of each filter's dropdown list. Particulars of the filters are shown in Figure 15.

Figure 15a (left) Filters on the Pacific Fish Dashboard. 15b (right) Dropdown list of Filter 1 on the Pacific Fish Dashboard.

- **Filter 1.** (Globe icon) *Select a Jurisdiction*: List of Jurisdictions appears in alphabetical order. Making a selection in this filter affects the available options in all subsequent filters. The map

responds to selections in this filter by limiting the Jurisdiction shown on the map to only the selected one.

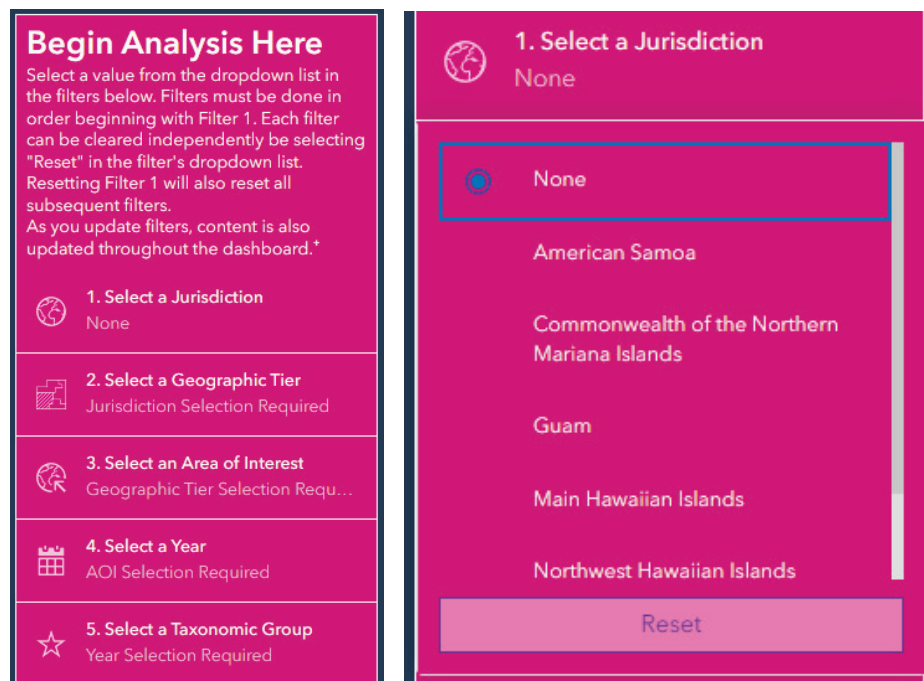- **Filter 2.** (Parcel icon) *Select a Geographic Tier*: Users choose from a dropdown list to select either Jurisdiction, Subjurisdiction, Sector, or Strata. Making a selection in this filter affects the available options in all subsequent filters.
- **Filter 3.** (Globe with arrow icon) *Select an Area of Interest*: Users choose from a dropdown list derived from the selections made in the first two filters. Making a selection in this filter affects the available options in all subsequent filters.
- **Filter 4.** (Calendar Icon) *Select a Year*: A dropdown list of years data are available appears under the filter. Users must choose only one year. Options available in the dropdown list are limited by the user's selection in the previous filters. Making a selection in this filter affects the available options in the last filter.
- **Filter 5 (Benthic).** (Star icon) *Select a Taxonomic Group*: A dropdown list of *Genus species* names appears as well as an ALL RECORDED CORALS option. Options available in the dropdown list are limited by the user's selection in the previous filters. Once this filter is set, all charts and data tables will be populated automatically.
- **Filter 5 (Fish).** (Star icon) *Select a Taxonomic Group*: A dropdown list of Common fish names and the associated *Genus species* appears as well as an ALL RECORDED FISH and several ALL RECORDED (trophic level) options. Options available in the dropdown list are limited by the user's selection in the previous filters. Once this filter is set, all charts and data tables will be populated automatically.

Benthic and Fish Charts

The charts in the Fish and Benthic Dashboards are sorted into 3 frames, called stacks. Stack 1 contains charts depicting change over time of various variables. Stack 2 displays the top ten taxonomic groups of
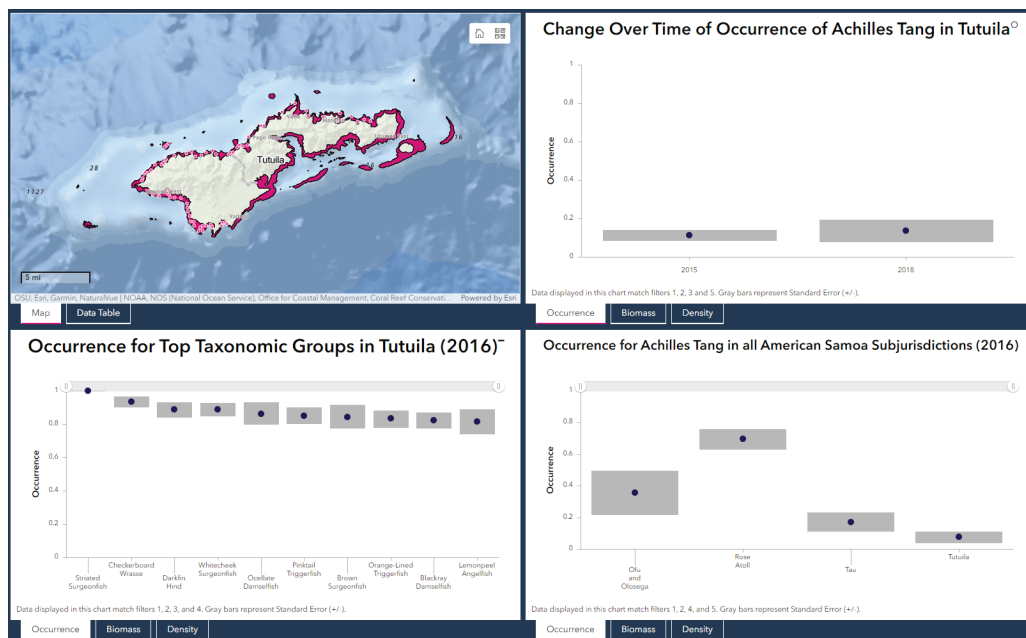

Figure 16 Example of the charts on the Pacific Fish dashboard in their fully populated state.

various variables. Stack 3 depicts the value of various variables in all sub-areas of interest within a jurisdiction. An example of the charts in their fully populated state is shown in Figure 16.

All charts in the Benthic and Fish Dashboards are populated by changing the filter settings. Upon initially opening a dashboard, text appears where charts will be populated explaining what filters need to be selected by the user before the chart is rendered. The charts are dependent only on the filters; they are not affected as a user zooms/pans the map. The charts show standard error (SE) as a gray box indicating deviations from the value, which are displayed as points (Figure 17, red boxes).
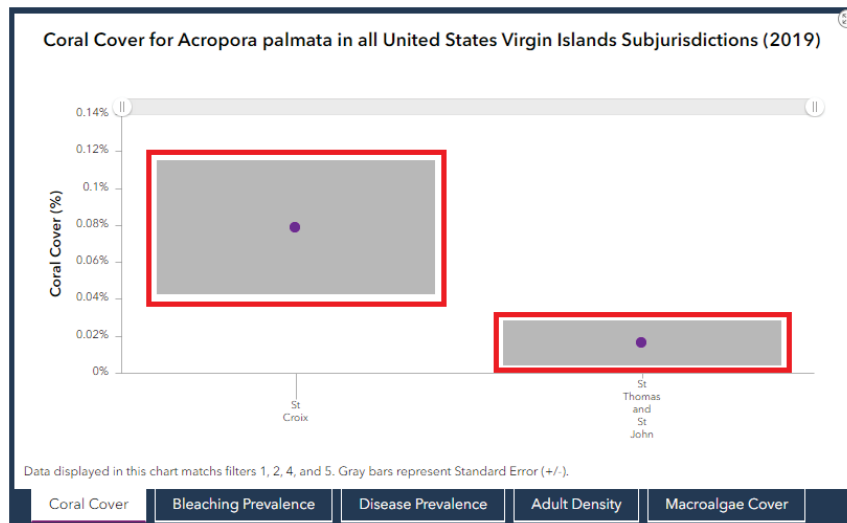

Figure 17 Example chart from the Atlantic Benthic Dashboard. Each data point (purple point) and the associated SE bar (gray rectangle) are highlighted in red.

Not all metrics are available for all filter combinations; charts will display a "no data" message if the user's filter selections eliminate all data that could otherwise be displayed in the chart. Each of the three chart stacks displays different aspects of the available variables as indicated by the dynamic title above each chart stack. The dynamic title will change as filters are updated to better represent what geography, taxonomic group, and/or year is being represented in the chart.

Benthic Chart Stacks

The NCRMP Benthic Dashboard has seven variables represented in each of the three chart stacks – five of which are specific to corals and two related to other benthic substrates. Note that some metrics are only available on the Pacific dashboard.

Benthic Variables	
Coral-specific Variables	*Other Benthic Cover Types*
Percent Coral Cover (±SE) Percent Bleaching Prevalence (±SE) Percent Disease Prevalence (±SE) Juvenile Density (±SE) (Pacific region only) Adult Density (±SE)	Percent Macroalgae Cover (±SE) Percent Crustose Coralline Algae Cover (±SE) (Pacific region only)

Fish Chart Stacks

The NCRMP Fish Dashboard has three variables represented in each of the three chart stacks – occurrence data, which was summarized the same way across regions, and biomass and density, which were summarized differently regionally.

Fish Variables
Occurrence (±SE)
Biomass in kg/177m² (±SE) (Atlantic region only)
Biomass in g/m² (±SE) (Pacific region only)
Density in n/177m² (±SE) (Atlantic region only)
Density in n/m² (±SE) (Pacific region only)

Example: Pacific Benthic Dashboard Analysis

Filter Settings

- Set filter 1 to "Pacific Remote Island Areas,"
- Set filter 2 to "Subjurisdiction,"
- Set filter 3 to "Wake,"
- Set filter 4 to "2017,"
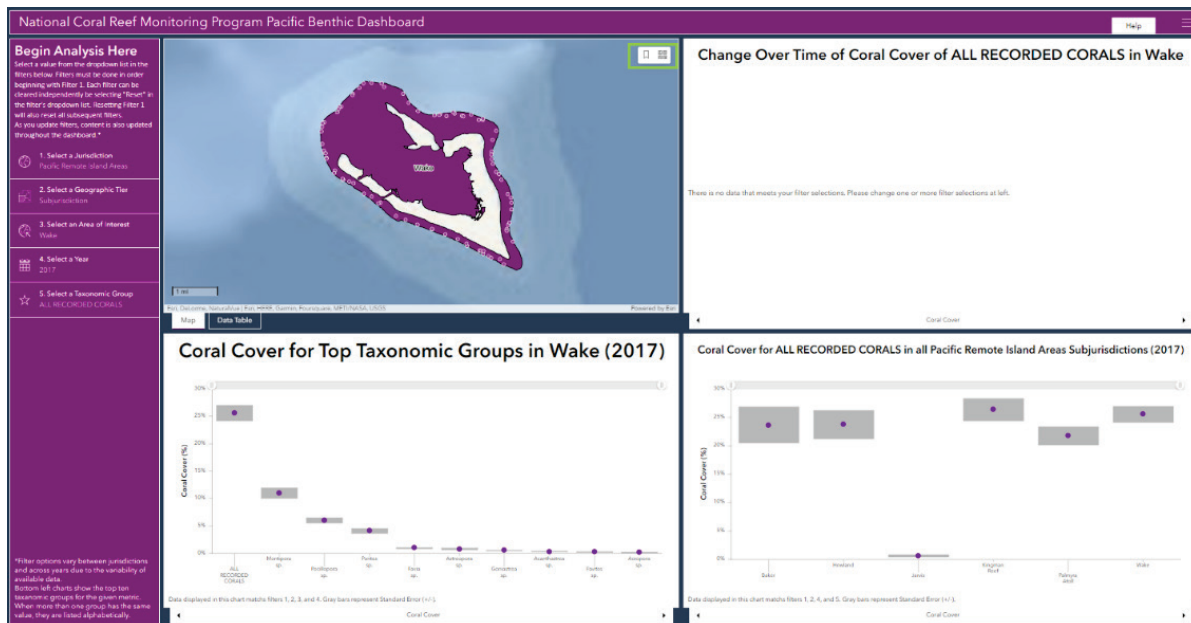- Set filter 5 to "ALL RECORDED CORALS"

Figure 18 Example of data visualization once filter options are set to the Pacific Remote Island Areas, Subjurisdiction, Wake, 2017, and ALL RECORDED CORALS.

Analysis Results – Map and Data Table

With filters set, the map now displays the geographic area to which the data is relevant, as well as sampling locations as points.

The map has 2 tools in the upper right corner that users may find useful (Figure 18, green box). Clicking the Home button will return the map to its default appearance. The second tool allows you to change the basemap to show the benthic data in different spatial contexts and with different visual contrasts. For instance, the Firefly Imagery Hybrid basemap provides a dark background (Figure 19, green box).
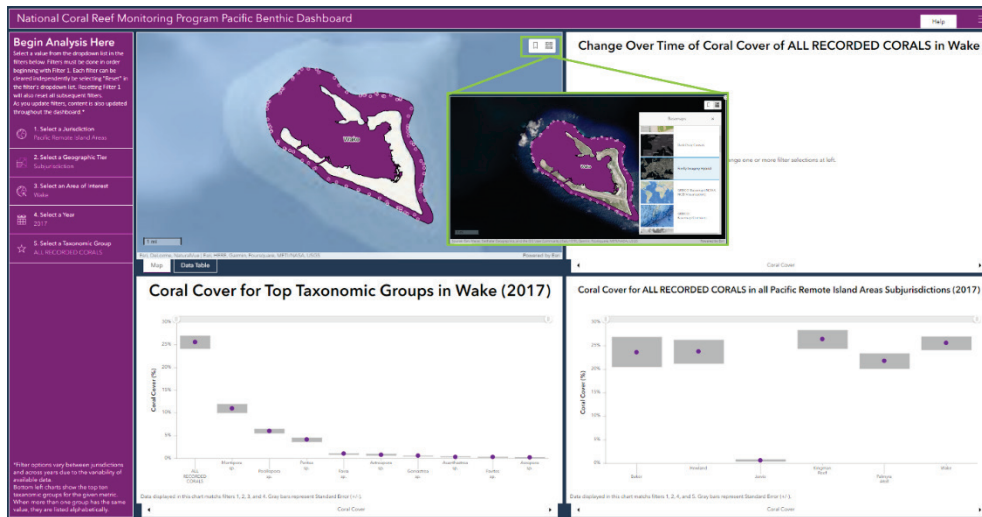

Figure 19 Example of map visualization once a basemap option is selected. The green inset box shows the Firefly Imagery basemap has been chosen.

The user can also click on the data table tab located at the bottom of the map frame to the right of the map tab (Figure 20). Once clicked, this shows the data available for the selected area of interest, species, and year. It provides the number of samples represented for both cover and demographic metrics as well as numeric values for mean and standard error for each available metric.
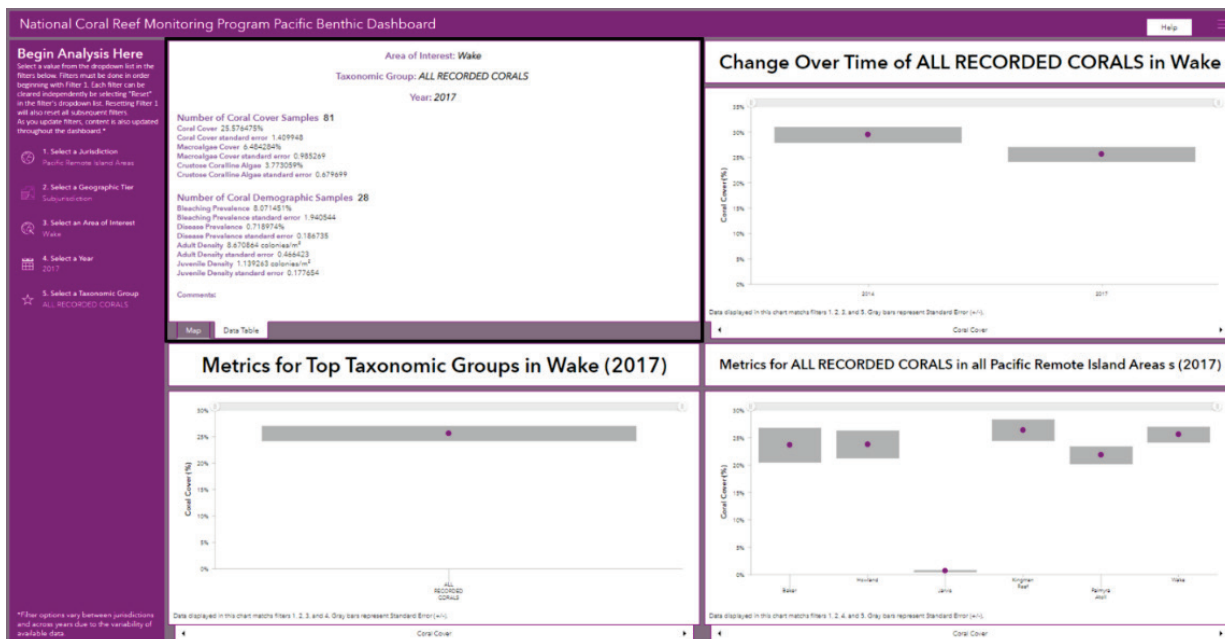

Figure 20 Example of the data table available once filter options are set and data are displayed.

Analysis Results – Charts

All three chart stacks have a chart for each metric. In the Pacific, those metrics include coral cover, bleaching prevalence, disease prevalence, macroalgae cover, adult density, and crustose coralline algae. Each stack can be toggled through by using the arrows to the left or right of each chart name at the bottom of the charts (Figure 21, yellow boxes). Depending on your screen size, these may also display as individual tabs, such as those below the map frame (Figure 13).
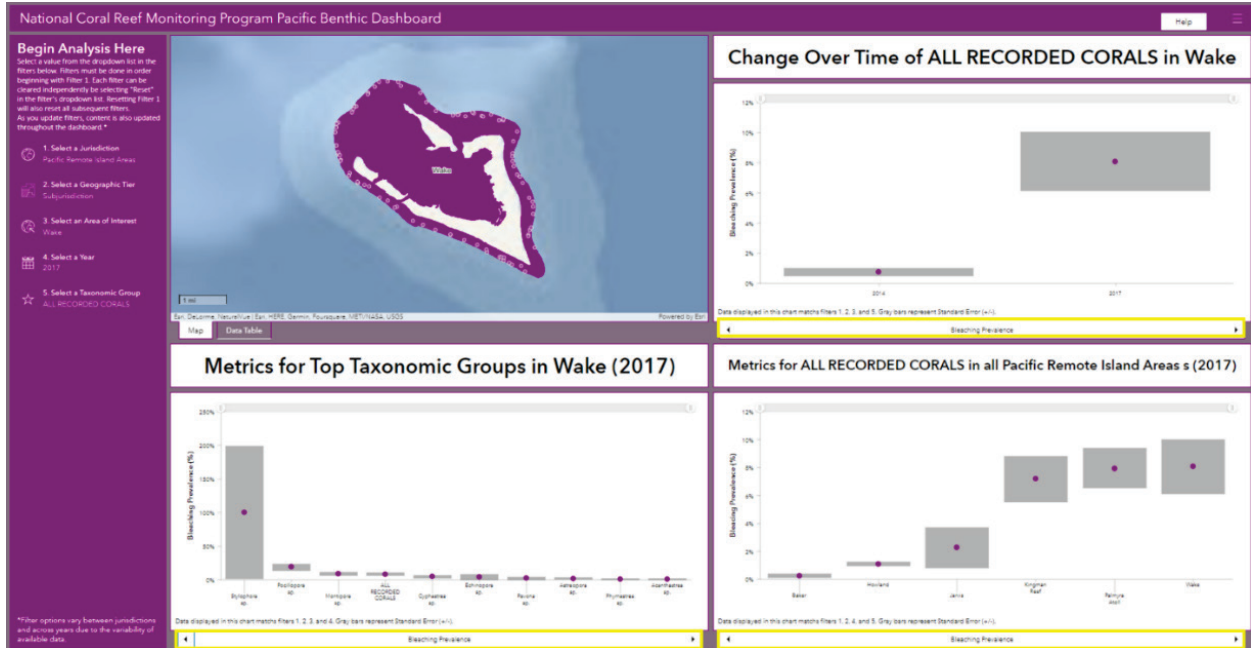

Figure 21 Example of how to toggle through chart stacks in each of the three chart groups. The yellow boxes indicate the chart exchanger bar, with arrows on each side to navigate among the charts for each group.

All charts are displayed as point data with a relative representation of standard error depicted as solid gray bars. The bottom left chart shows the value of the stated metric for the top ten taxonomic groups in the Wake Subjurisdiction (in 2017) when ranked by that metric. The bottom right depicts metrics for ALL RECORDED CORALS in all Pacific Remote Island Area Subjurisdictions in 2017. The top right chart allows for visualization of ALL RECORDED CORALS in the Wake Subjurisdiction over time, comparing the sampling year chosen in our filter selection to all other available sampling years. In the example, the metric 'bleaching prevalence' is displayed on all three chart stacks (Figure 21). Clicking the upper right corner of any chart brings the chart frame to full screen so the user can have a better look at the data (Figure 22). The user can then change this chart back to its standard size by clicking the icon again.
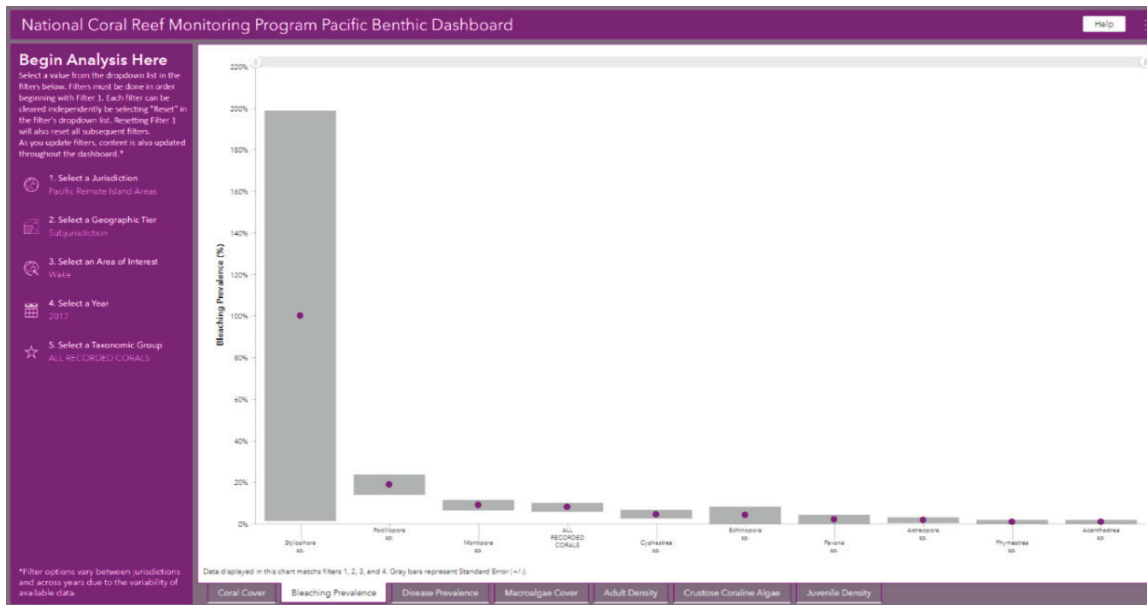
Figure 22 Example of a NCRMP Fish Dashboard expanded to full screen so detailed visualizations of each chart can be made.

Climate Dashboard

Unlike the other three theme dashboards, all indicator widgets and charts on the Climate Dashboard are initially populated with data for the entire map extent, but manipulating the filters updates what data is shown in the map, charts, and data table.
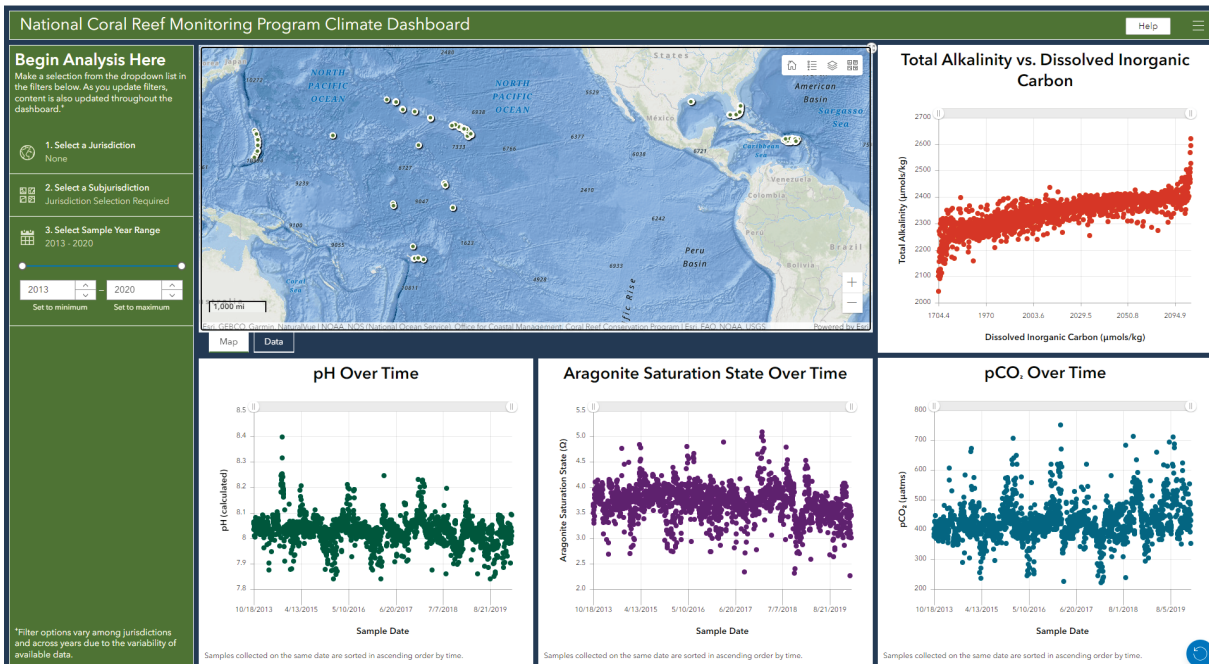

Figure 23 The Climate dashboard, showing all major elements.

There are four basic elements to the Climate Dashboard (Figure 23).

- The **Sidebar and filters** are positioned on the left side of the dashboard. The top language on the sidebar indicates where to begin the analysis process and the bottom language provides

disclaimers. The main part of the sidebar houses several filters that influence the range of data shown in the dashboard charts, map, and data table(s).

- The **Charts** will initially display data for all NCRMP Climate Sites across all jurisdictions. They will respond accordingly when the filters on the sidebar are set.
- The **Map** allows visualization of the climate sites and color-coded visualization layers for each of the variables in the climate theme. There is also a **data tab** stacked below the map (Figure 24). Once you click on the tab, a series of indicator boxes are shown with minimum and maximum values for each variable.
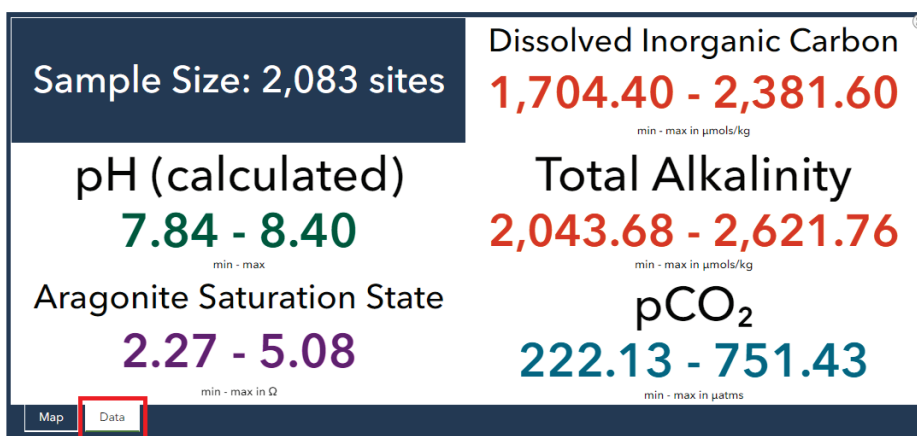

Figure 24 The Data Table is stacked below the map. It is accessed by clicking on the Data tab, highlighted here in red.

Climate Filters

Some considerations for filtering climate data:

- Filter 2 is dependent on Filter 1. Filter 3, however, can be set even if Filters 1 and 2 are not.
- Setting Filter 1 and Filter 2 will have an impact on the available options in Filter 3, so while Filter 3 is not dependent on 1 and 2, it is responsive to them.
- Resetting Filter 1 will also reset Filter 2, but Filter 3 must be reset independently.

Given these complex and varied dependencies, it is possible to confuse the dashboard and cause an error when setting the filters. If this occurs, the dashboard will freeze. When this happens, users must refresh the dashboard with the reload button on their browser, or with the reset button built into the dashboard (lower right corner) (Figure 25).

- **Filter 1.** (Globe icon) *Select a Jurisdiction*: List of Jurisdictions appears in alphabetical order. The map responds to selections in this filter by filtering the data and zooming to the selected Jurisdiction. Making a selection in this filter affects the available options in all subsequent filters. The filter can be reset by clicking the reset button at the bottom of the filter's dropdown list.

Figure 25 Reset button in the lower right corner of the Climate dashboard.

- **Filter 2.** (Quadrant icon): *Select a Subjurisdiction*: Users choose from a dropdown list based on the user's first order choice (Jurisdiction). The map responds to selections to this filter by filtering the data and zooming to the selected Subjurisdiction. Making a selection in this filter affects the available options in the last filter. The filter can be reset by clicking the reset button at the bottom of the filter's dropdown list.
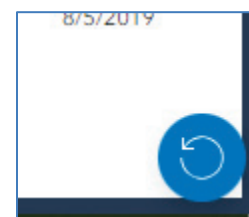
- **Filter 3.** (Calendar icon): *Select Sample Year Range*: Consists of two inputs: one for minimum year and one for maximum. By setting these two inputs users set this filter to a range of years. Users define these inputs either through the input windows or the slider. Reset this filter by clicking on "set to minimum/maximum" below the input windows.

Climate Map

In addition to the default map layer showing only the location of each sampled site, each of the variables in the charts in the Climate Dashboard (as well as some other variables represented in the database) also has a thematic layer in the map portion of the Climate Dashboard. These thematic layers show a color-coded representation of the data in a geospatial context (Figure 26).
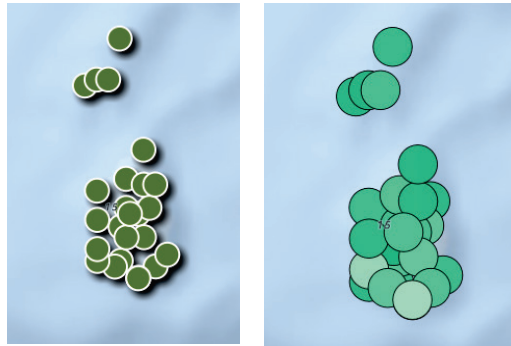

Figure 26 Climate Sites shown on left, and the pH thematic layer on right for the same geographic area.

Clicking on the map Layers List reveals a dropdown list of all available thematic layers (Figure 27a). Toggle layers on/off by clicking on the eye symbol to the left of each layer in the list. Keep in mind that if more than one layer is turned on, only the upper most layer will be visible on the map. A legend for each thematic layer can be accessed by clicking on the Legend icon directly to the left of the Layers List icon (Figure 27b).
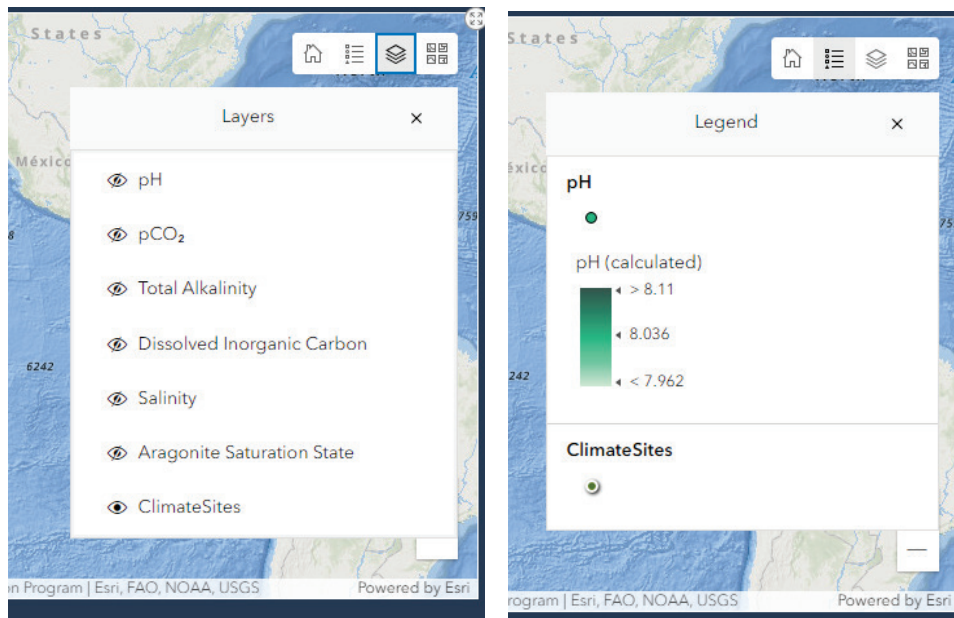

Figure 27 (a, left) shows the Layer List, displaying all available thematic layers; (b, right) shows how the Legend will change when a thematic layer (pH in this case) is turned on.

Climate Charts

All charts in the Climate Dashboard are populated with all available climate data by default. The data displayed in the charts responds to the filters and as a user pans/zooms the map. This is different from the other dashboards where the charts are dependent only on the filters. Because they respond to both the filters and the map extent, it is possible to confuse the charts by setting Filters 1 and/or 2 and then panning/zooming the map to an area that doesn't match. Should this happen, it is best to reset the dashboard with the Reset button in the lower right of the dashboard (Figure 25). Unlike Fish and Benthic charts, there is no standard error displayed on any Climate charts.

Example: Climate Dashboard Analysis

Filter Settings

- *Set filter 1 to "Florida,"*
- *Set filter 2 to "Florida Keys,"*
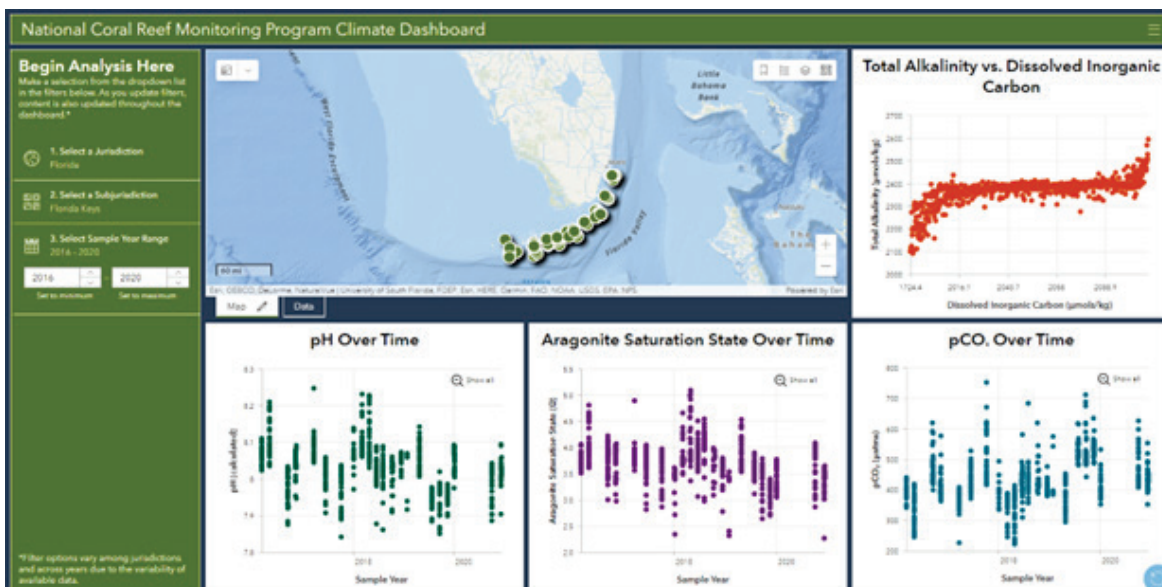- *Set filter 3 to "2016 - 2020"*

Figure 28 Example of the NCRMP Climate Dashboard data visualization once filter options are set to Florida, Subjurisdiction, Florida Keys, 2016 - 2020.

Analysis Results - Map

The map is zoomed to the specific Subjurisdiction, the Florida Keys, and the charts are now populated with data for the selected Subjurisdiction and range of years (2016 - 2020) (Figure 28).

The map has four tools in the upper left corner that users may find useful (Figure 26, yellow box). The basemap selector allows users to change the basemap to show the climate data in different spatial contexts and with different visual contrasts. Unique to the Climate Dashboard map, other layers are available to view by clicking of the layers button. For each variable (e.g., pH, Total Alkalinity) in the Climate Theme, a thematic layer is present for viewing within the map. If we click on the pH layer (eye icon) and turn off the climate site (closes eye icon), and click to open the legend icon as well, users can

see the legend for the pH layer indicates that lighter colors represent lower pH values, while darker colors represent relatively higher pH values (Figure 27b).

Clicking on a pH data point in the map opens a pop-up displaying information on pH for that climate site (Figure 29, red square). The user can also toggle the climate sites back on (click the eye icon in the layer list again) and click the same point to get a pop-up with all the data for that climate site sampling effort.
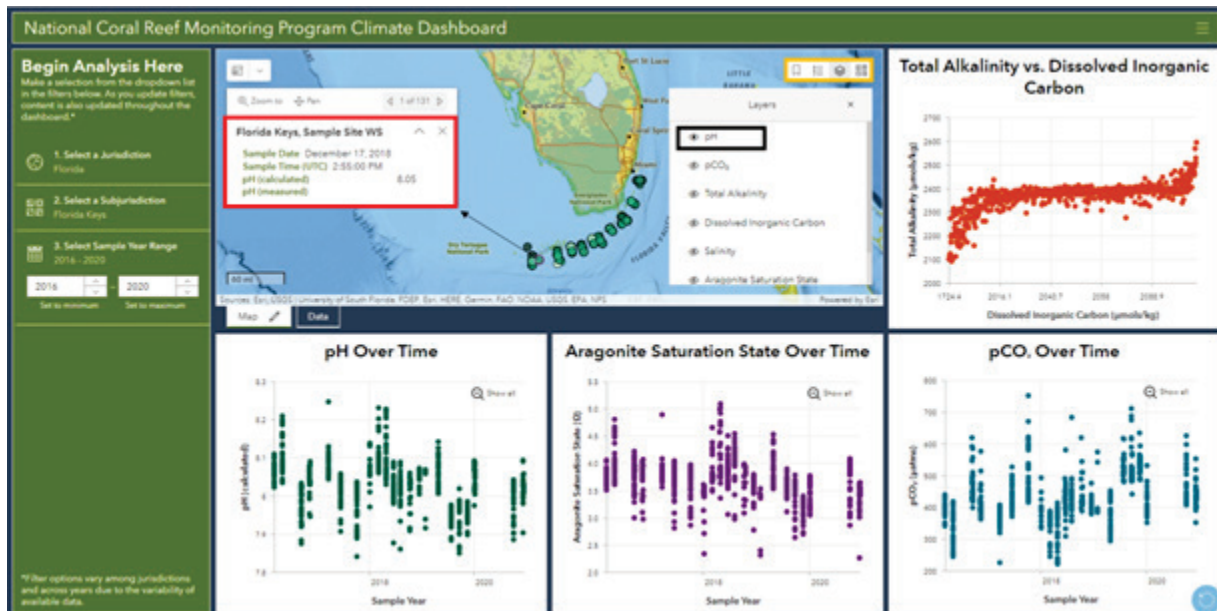

Figure 29 Example of map tools (orange box), including a 'layers' tab to view thematic layers (black box – pH), a 'legend' for thematic layer interpretation, and a 'pop-up' that is displayed when a user clicks on one of the thematic layer points (red box).

Analysis Results – Charts

Each chart has a title at the top, with the climate variable on the Y-axis and time on the X-axis. The exception is the upper right-hand chart where DIC is plotted against Total Alkalinity. By clicking the expand button in the upper right corner of the chart, users bring a chart to full screen to have a better look at the data (click the upper-right corner again to close) (Figure 30).
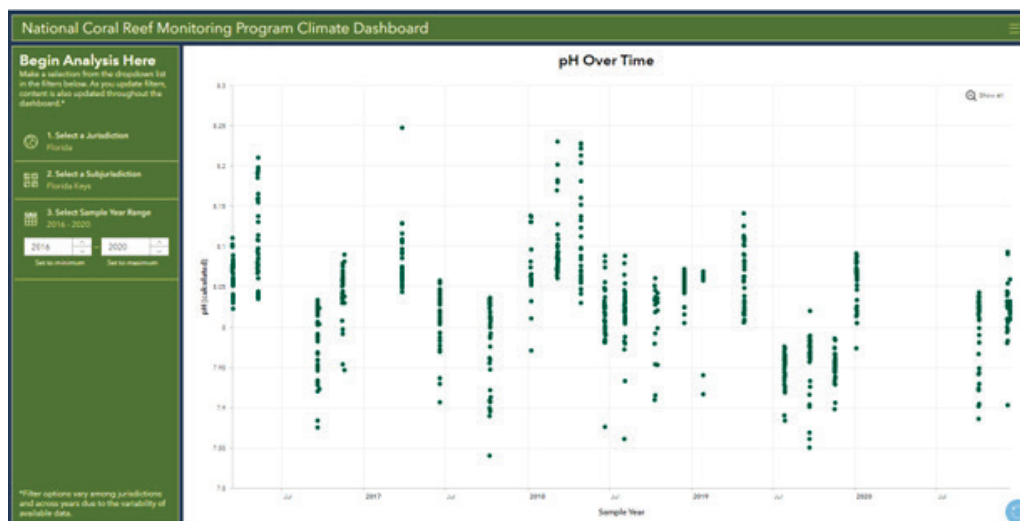

Figure 30 Enlarged chart. Click the resize button in the upper right corner of the chart to shrink back to default size.

Hovering your mouse pointer over a point on a chart activates a small popup showing the sample date and measurement (Figure 31, red square).
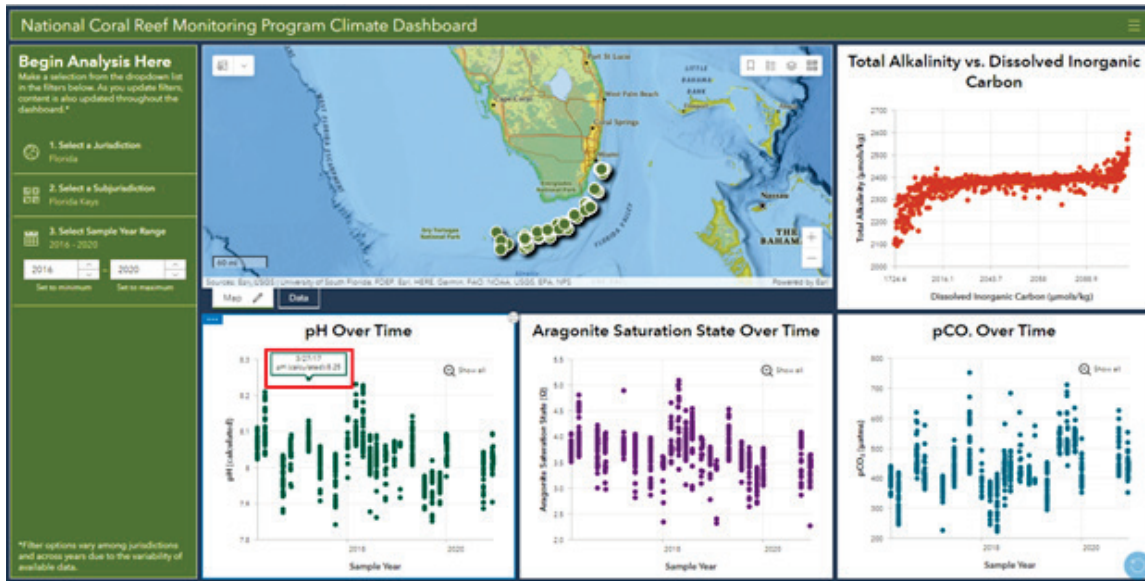
Figure 31 Hover function (red box) when a user scrolls over a point in the chart. Each hover box indicates the date the data were collected, and the value for the climate variable.

Lastly, if the user clicks on a chart point (Figure 32, red square), the point becomes larger on the chart and flashes the corresponding point in the map pick for several seconds (Figure 32, yellow box).

Figure 32 Flash point function when a user clicks on a chart point. The map portion that is geographically relevant to the data point in the map will flash pink once for a couple of seconds.

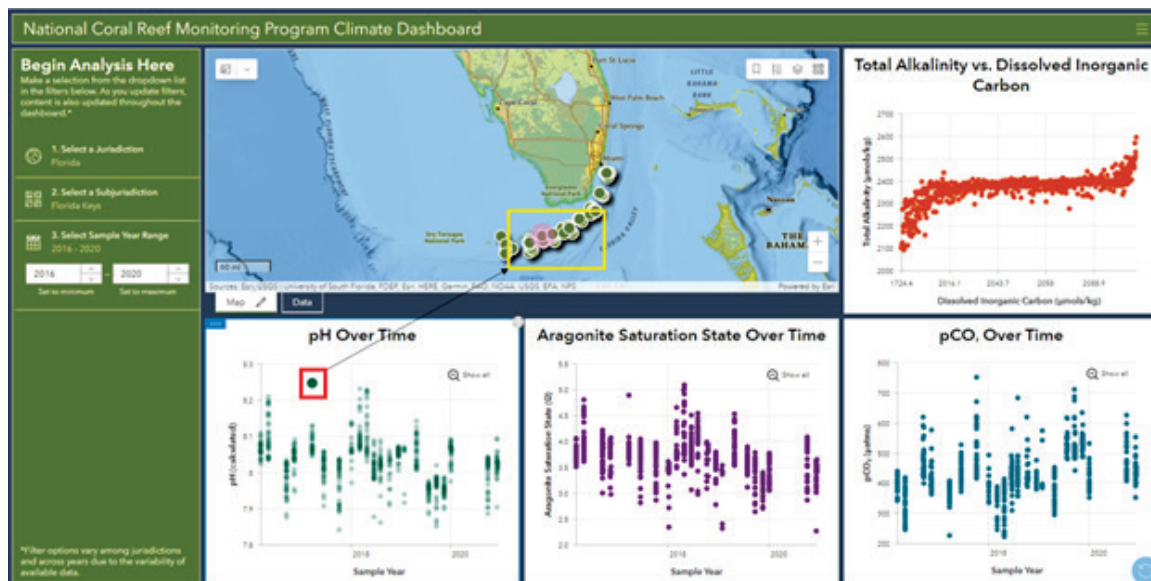# Socioeconomic Dashboard

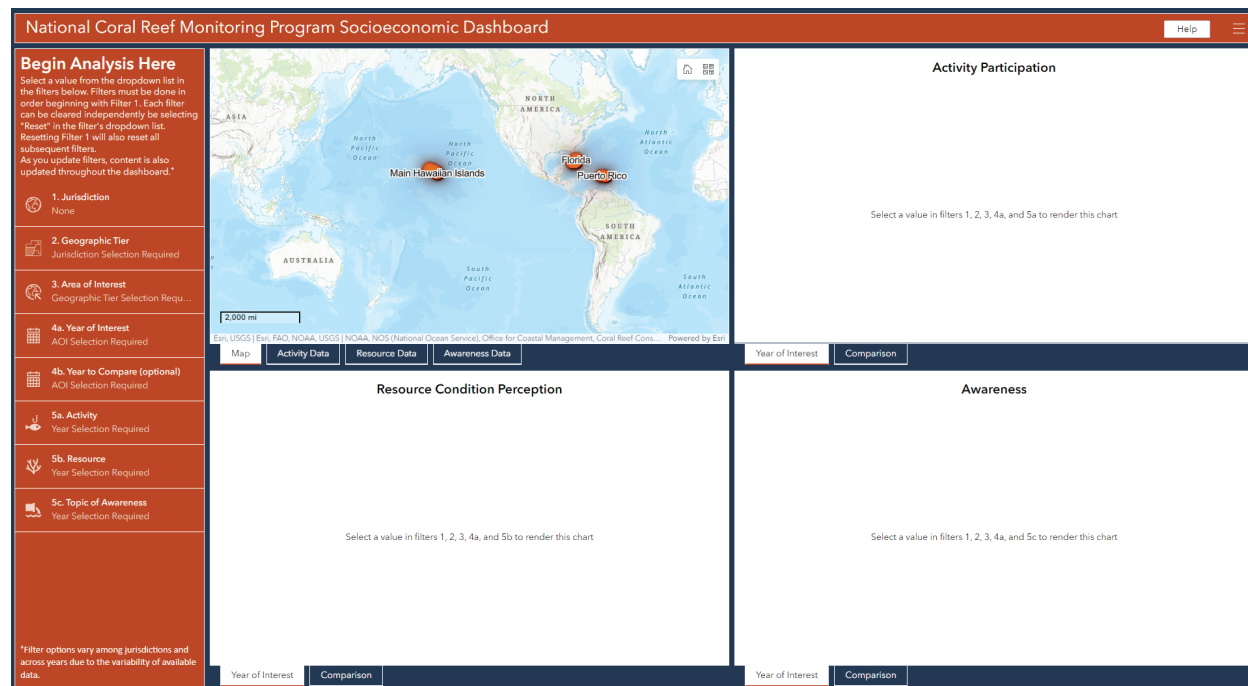There are five basic components to the socioeconomic dashboard.

Figure 33 Socioeconomic dashboard, showing all major components.

- The **Sidebar and filters** are positioned on the left side of the dashboard. The top language on the sidebar indicates where to begin the analysis process and the bottom language provides disclaimers. The main part of the sidebar houses several filters, that once set, will populate the dashboard charts, map, and data table(s).

- The **Charts** will initially display instructions for populating each chart. Once filters are set on the sidebar, all charts will automatically populate. There are two tabs for each chart stack, one for Year of Interest and one for a Comparison between two years. Some Jurisdictions have two years of data at this time and comparisons can be made, while other areas of interests only have one year of data. Additional years of data will be added making this chart more functional in the future.

- The **Map** allows visualization of where the socioeconomic surveys occurred. A **data table** frame for each variable (activity data, resource data, and awareness data) can be viewed by clicking on the respective data table tab.

Socioeconomic Filters

Filters need to be set in order, beginning with Filter 1 and proceeding downward through Filter 4a. Filter 4b is optional. Filters 5a, 5b and 5c can be set in any order, but only after Filters 1-4a are set. All filters can be reset at the same time by resetting Filter 1, or by clicking the reset button at the bottom of each filter's dropdown list.

- **Filter 1** (Globe Icon) Select a Jurisdiction: List of Jurisdictions appears in alphabetical order. Making a selection in this filter affects the available options in all subsequent filters. The map responds to selections in this filter by removing all Jurisdiction shapes except the selected one.

- **Filter 2** (Parcel Icon) Select a Geographic Tier: Users choose from a dropdown list to select either Jurisdiction, Subjurisdiction, or Sector. Making a selection in this filter affects the available options in all subsequent filters.
- **Filter 3** (Arrow point to Earth Icon) Select an Area of Interest: You choose from a dropdown list limited by the selections made in the first two filters. Making a selection in this filter affects the available options in all subsequent filters.
- **Filter 4a** (Calendar Icon) Select a Year: A dropdown list of years for which data are available appears under the filter. Users must choose only one year. Options available in the dropdown list are limited by the user's selection in the previous filters. Making a selection in this filter affects the available options in all subsequent filters.
- **Filter 4b** (Calendar Icon) Select a Year to Compare: This filter is optional. If left blank, the Comparison tab of each chart stack will only have one of the two possible charts populated. A dropdown list of years for which data are available appears under the filter. Users must choose only one year. Options available in the dropdown list are limited by the user's selection in the previous filters.
- **Filter 5a** (Fishing Icon) Select an activity: A dropdown list of activities appears. Making a selection in this filter causes the charts in the Activity Participation chart stack to populate.
- **Filter 5b** (Coral Icon) Select a resource: A dropdown list of resources appears. Making a selection in this filter causes the charts in the Resource Condition Perception chart stack to populate.
- **Filter 5c** (Bucket Icon) Select a threat: A dropdown list of threats appears. Making a selection in this filter causes the charts in the Awareness chart stack to populate.

Socioeconomic Charts

The charts in the Socioeconomic Dashboard are separated into 3 frames each with a stack of two charts. The first chart in each stack is Year of Interest and the second is Comparison. Navigate between the charts in a stack with the tabs at the bottom of the chart frame. All charts and their titles in the Socioeconomic Dashboard are populated by changing the filter settings; upon initially opening a dashboard, text appears where charts will be populated explaining what filters are needed before the chart is rendered. The charts and titles are dependent only on the filters and are not affected as a user zooms/pans the map. Once the appropriate filters are set the charts will populate.

Example: Socioeconomic Dashboard Analysis

Filter Settings
- *Set filter 1 to "Main Hawaiian Islands,"*
- *Set filter 2 to "Subjurisdiction,"*
- *Set filter 3 to "Hawaii,"*
- *Set filter 4a to "2015,"*
- *Set filter 4b to "2020,"*
- *Set filter 5a to "fishing,"*
- *Set filter 5b to "number of fish,"*
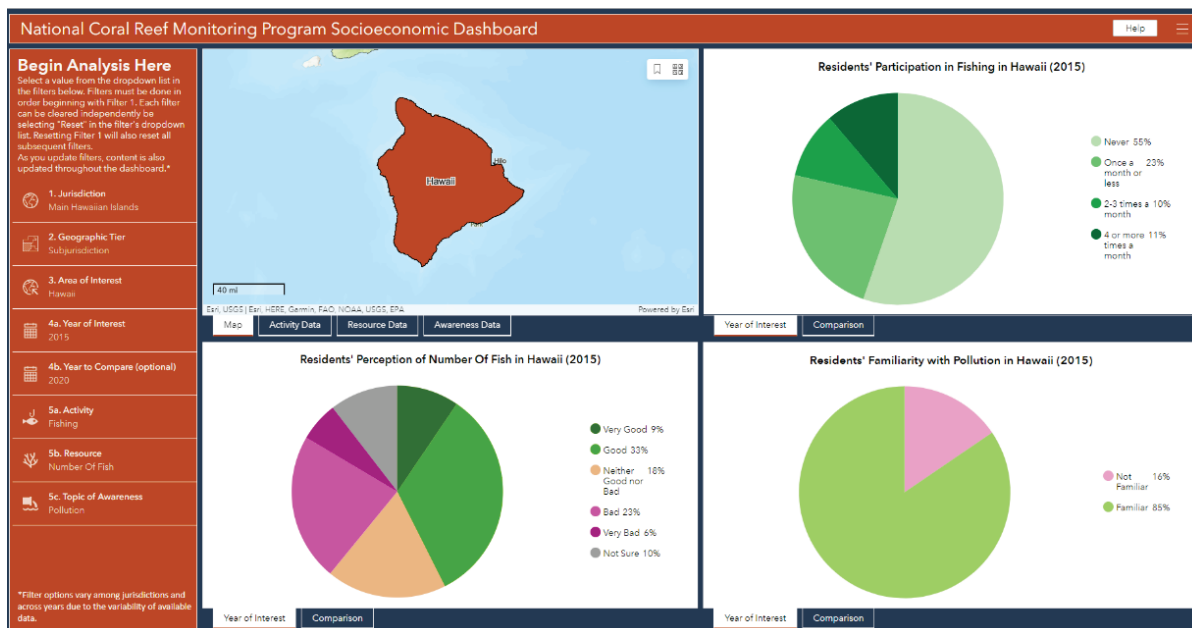- *Set filter 5c to "pollution"*

Figure 34 Example of data visualization once filter options are set to Hawai'i, Subjurisdiction, Hawai'i, 2015 as the 'Year of Interest,' and 2020 as the 'Year to Compare,' 'Activity' to fishing, 'Resource' to number of fish, and Topic of Awareness,' to pollution.

Analysis Results - Map

Within the map portion, we now see where data were collected, the island of Hawai'i. The map has two tools in the upper left corner that you may find useful (Figure 35, yellow box). Clicking the Home button returns the map to the default extent. The second tool allows you to change the basemap to show the socioeconomic data in different spatial contexts and with different visual contrasts (Figure 35, red box). For instance, the GEBCO basemap provides depth contours.
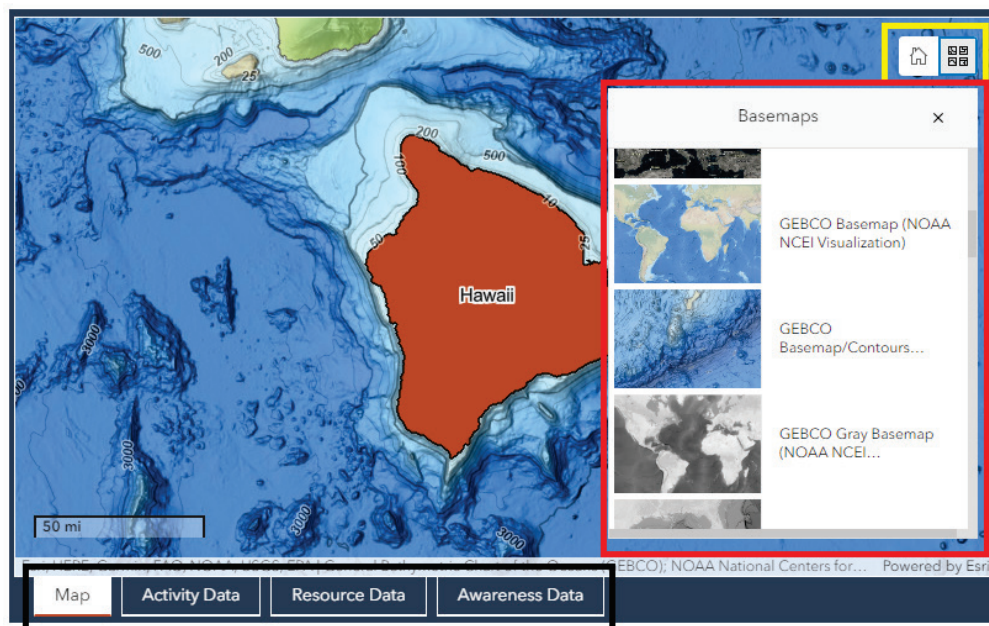

Figure 35 Example of map tools (orange box), including a Home tool and a basemap layer menu, where the user may choose from a diverse group of basemaps to optimize the visualization of spatial data.

The user can also toggle between the map tab and the tabs to the right (Figure 35, black box). These tab options (i.e., activity data, resource data, awareness data, respectively) allow users to view the data table associated with each target socioeconomic metric in tabular format.

Analysis Results - Charts

Each pie chart has a title on the top that is dynamically generated when filters are selected. By clicking on the comparison tab at the bottom of each chart, the user can view the data for both 2015 ('Year of Interest' from filter 4a) and 2020 ('Year to Compare', filter 4b). Clicking the upper right corner of the chart brings it to full screen so the user can have a larger view (Figure 36).
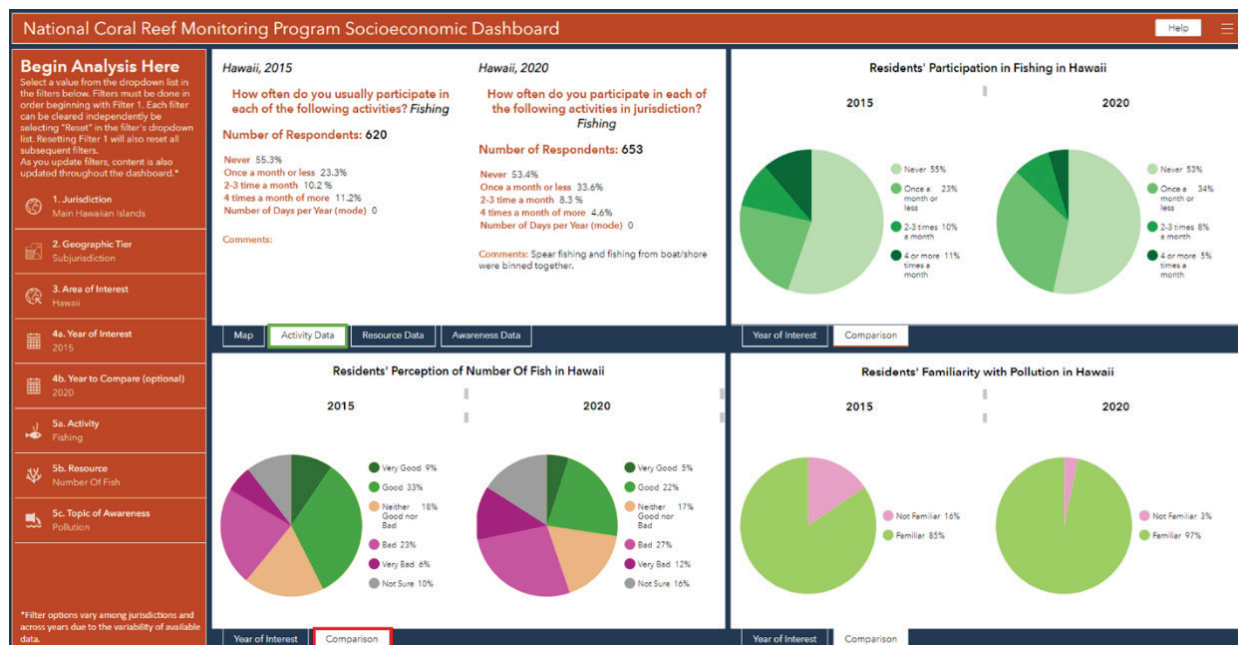

Figure 36 Example of data table (green box) for the metric activity, in this case fishing for Hawaii in 2015. A year to compare was also available and chosen in the sidebar filter choices, shown (red box).

Data Download

The Data Download Dashboard is embedded in the Data Download Portal Hub page. The dashboard is accessed by clicking on the Data Download item on the hub menu ribbon (Figure 37a), or by clicking on the link in the Help splash screen in all theme dashboards (Figure 37b).
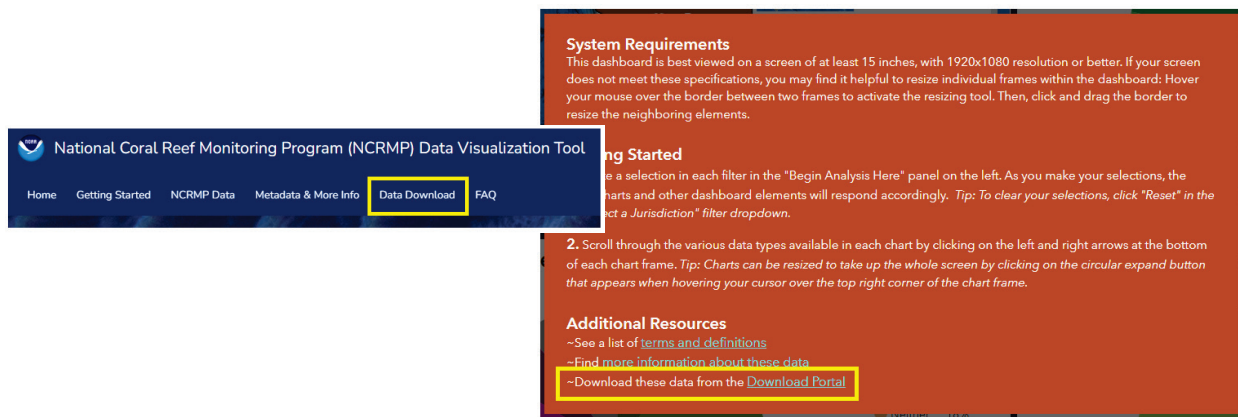
Figure 37 The Data Download page of the hub can be accessed in two ways: clicking the Data Download tab on the hub menu (above), or clicking the Download Portal link on the Help splash page of all 6 data dashboards (at right).

This dashboard allows users to download all data for each theme, or a subset of the data of their choosing utilizing the filters in the left sidebar (Figure 38, red box).

Data Download Filters

The filters on this dashboard can be set in any order (Red box in Figure 38). Users are not required to make selections in all filters in order to download data; they have the option to set some, all, or none. Filters in this dashboard must all be reset individually; there is no option to reset all filters at once.

- **Filter 1.** (Globe Icon) *Select a Jurisdiction*: List of Jurisdictions appears in alphabetical order. As users manipulate this filter, the number of available records will automatically update in each of the Download Boxes. Making a selection in this filter affects the available options in the Subjurisdiction filter. The filter can be reset by clicking the reset button at the bottom of the filter's dropdown list.
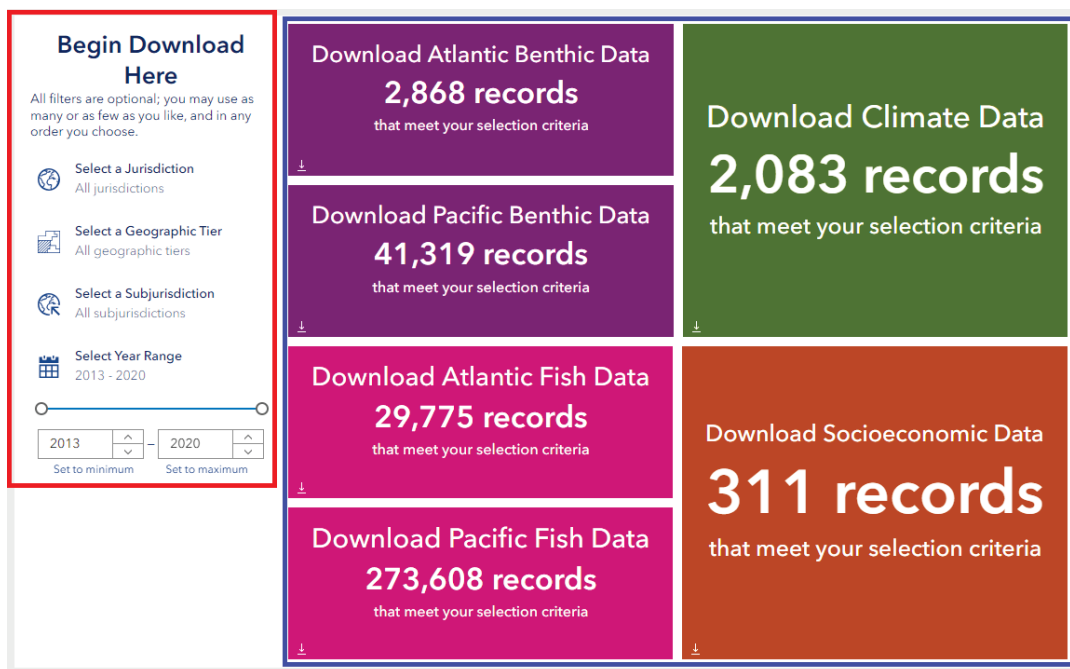

Figure 38 Screenshot of the Data Download Dashboard (with color-coded indicator boxes inserted for reference and explanation). This dashboard is embedded in the Data Download Portal hub page.

- **Filter 2.** (Parcel Icon) *Select a Geographic Tier*: Users choose from a dropdown list to select either Jurisdiction, Subjurisdiction, Sector, or Strata. Selections in this filter do not affect available options in any other filter. As users manipulate this filter, the number of available records will automatically update in each of the Download Boxes. The filter can be reset by clicking the reset button at the bottom of the filter's dropdown list.
- **Filter 3.** (Arrow Point to Earth Icon) *Select a Subjurisdiction*: List of Subjurisdictions appears in alphabetical order.
  - o This filter is most easily set after Filter 2 is set, but can be utilized alone. If Filter 3 is set before Filter 2, and the subsequent selection in Filter 2 disagrees with the selection in Filter 3. For example, if Filter 3 is set to Aguijan in the Northern Mariana Islands, and then Filter 2 is set to Florida), this filter will automatically reset.
  - o Selections in this filter do not affect available options in any other filter. As users manipulate this filter, the number of available records will automatically update in each of the Download Boxes.
  - o The filter can be reset by clicking the reset button at the bottom of the filter's dropdown list.
- **Filter 4.** (Calendar icon): *Select Sample Year Range*: Consists of two inputs: one for minimum year and one for maximum, which can be set via the input windows or the slider. As users manipulate this filter, the number of available records will automatically update in each of the Download Boxes. Reset this filter by clicking on "set to minimum/maximum" below the input windows. Selections in this filter do not affect available options in any other filter.

Download Boxes

The Data Download Boxes are indicator widgets with the download function enabled (Blue box in Figure 38). The number of records available shown by default is the total number of records in the database. As users manipulate the filters in the dashboard, the number of available data records that meet the filter criteria will automatically update in the center of these boxes.

Not all themes have data available for all filter areas of interests/year combinations. When the number of available records counter falls to zero, it is because no records exist for the theme that match all the filter criteria. In these cases, such as the example shown in Figure 39, users are encouraged to reset, change, or broaden their filter selections one at a time to determine which filter is limiting the records.
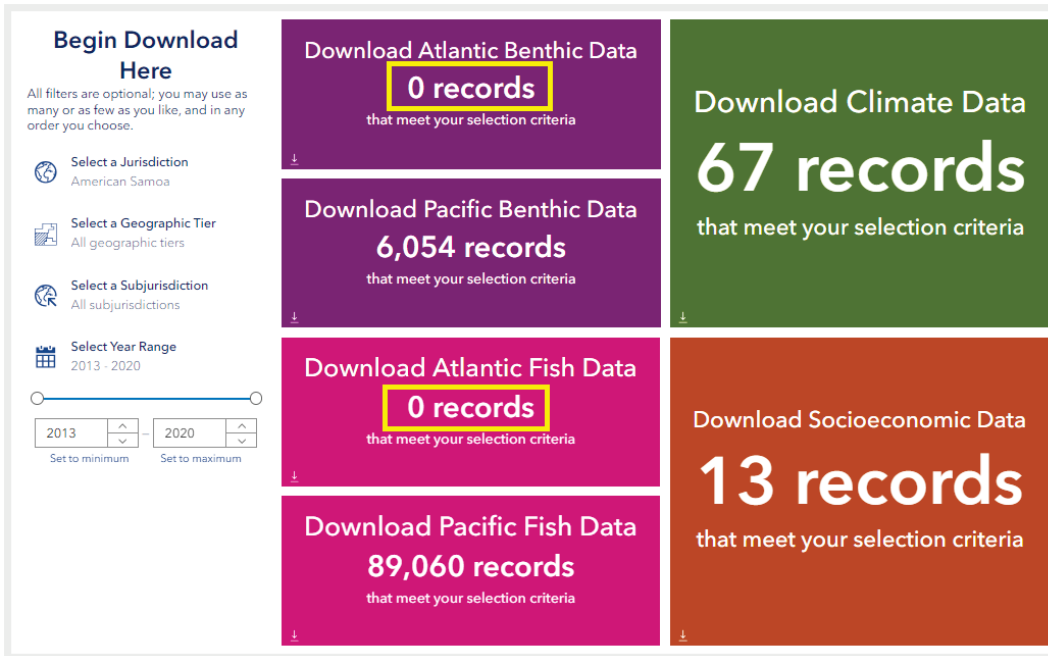
Figure 39 Not all themes have data for all filter combinations. In this example, the Atlantic Benthic and Atlantic Fish show zero records (yellow boxes), which is reasonable since the Jurisdiction filer is set to American Samoa, which is in the Pacific.

To download the available records, users should click on the small download icon at the bottom left of their desired theme's download box (Figure 40). Downloaded files are in .csv format and consist only of the data table; no geospatial component is included in the data download.
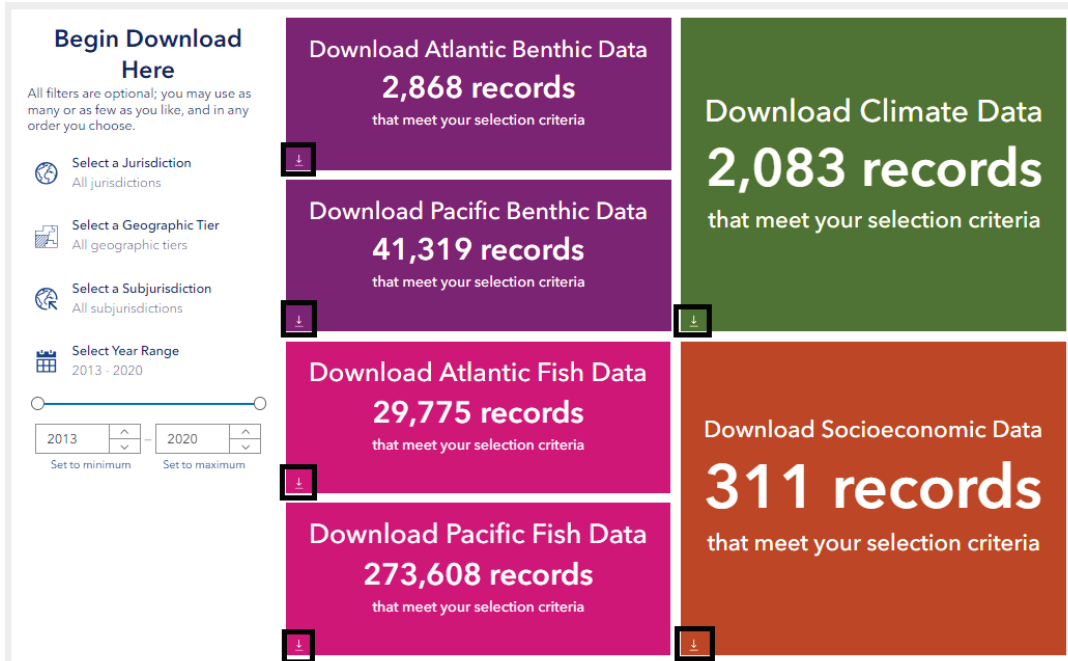

Figure 40 To download data, click the download icon in the lower left corner (black boxes) of the dataset of interest.

This concludes the user guidance for all sections of the NCRMP Data Visualization Tool. For further assistance, please contact us at ncrmp.questions@noaa.gov.