SeaSketch Training Manual

A case study: Marine Spatial Planning in Barbuda

April 2014

This SeaSketch training manual was initially developed by the University of California Santa Barbara (SeaSketch Lab) and Kearns & West in March 2014, for use in training the Hauraki Gulf Marine Spatial Planning Stakeholder Working Group, and for further refinement by the New Zealand Department of Conservation. It was later adapted using a version of the Barbuda Blue Halo Initiative project in SeaSketch to illustrate how SeaSketch may be used to support MSP by more general audiences.

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WHAT IS SEASKETCH?

SeaSketch is a web-based tool developed by the University of California Santa Barbara and used around the world for collaborative marine spatial planning (MSP). As process and planning needs differ from place to place, SeaSketch may be customized to reflect the specific goals and objectives of each planning initiative. It is an application that may be used to collect and visualize spatial information (i.e., "map layers"), and then use this information in the design and evaluation of prospective plans such as sanctuaries (protected areas), mooring and anchorage zones, and shipping zones. The design process is very simple, much like sketching on the back of a napkin, where you may freely explore virtually any potential design. Additionally, each user-generated sketch may be analyzed using built-in reports to understand the potential consequences of the design, such as whether the design meets certain science or policy guidelines. All SeaSketch projects are hosted at www.seasketch.org and each project has been customized to reflect the specific goals and objectives of each planning initiative where the tool is being used.

The Barbuda Training project used in this manual may be found at training-barbuda.seasketch.org. This tool has been adapted from a real-world SeaSketch project (barbuda.seasketch.org) called the Barbuda Blue Halo Initiative, and lead by the Waitt Institute. During a one-year planning process, the Blue Halo Initiative created a comprehensive ocean zoning and sustainable management plan for fisheries that was:

- Based on the best available scientific, social and economic data,
- Heavily engaged stakeholders in the zoning process,
- Minimized impact on fishing livelihoods, and
- Included sanctuary zones (where fishing does not occur) to conserve fish populations and habitats.

For information on how SeaSketch was used for zoning in Barbuda, visit http://goo.gl/dWl5rC. For more general information on the Barbuda Blue Halo Initiative, visit barbuda.waittinstitute.org.

This SeaSketch training project, adapted from the real-world Blue Halo project, may be used for:

- Viewing and exploring spatial data in the nearshore waters of Barbuda.
- Sketching proposals and scenarios for marine spatial planning (MSP),
- Evaluating results or tradeoffs using custom analytical tools, and
- Interacting with others to share ideas, results and related materials (e.g., documents).

All of the major SeaSketch features are listed in Appendix A: SeaSketch at a Glance.

Within this project, you will find more than 70 map layers with information about the Barbuda coastal waters (within 3 nautical miles, or 1 league), organized into three themes: (1) Base Layers, (2) Surveys, and (3) Marxan Models. Under each theme you will find several data layers, each with associated information (metadata) that describe the primary attributes, source, production data, and other relevant details. All datasets include "best available" data, based on authoritative (i.e., government) sources, published, peer-reviewed, or local knowledge data.

You will notice that the Barbuda training project is public facing, just like all other projects on SeaSketch.org. This simply means that anyone who visits SeaSketch.org may discover the Barbuda training project ***but it does not necessarily mean that they can see all of the map layers, sketch plans or participate in the planning process.*** The privacy settings of most SeaSketch features are customizable and need defining by the process-leading group (the planners or lead agency). Importantly, SeaSketch has been designed to let you sketch and explore plans in your own private workspace and, if you choose, share those plans and ideas with other users. You may choose to share ideas with members of a working group within a private workspace (i.e., a "forum") or members of the public. Either way, as a user of the Barbuda training project, you will have control over whom you share your work with.

For more information about SeaSketch, visit mcclintock.msi.ucsb.edu/seasketch or to request help, visit help.seasketch.org.

WHEN TO USE SEASKETCH IN THE MSP PROCESS?

Integration of SeaSketch into the Planning Process

SeaSketch is a powerful tool that serves different functions in different steps of the MSP process, and will be used by different types of users. In a typical MSP process, three main user groups will engage with the SeaSketch tool, although individual users may be included in more than one of these groups.

1. *SeaSketch project administrators* (e.g., Lead Agency Personnel, SeaSketch Staff). This group will be responsible for deploying SeaSketch functionalities according to the needs of "power users".

2. *"Power users"* (e.g., Stakeholder Working Group). This group has privileged access to private data layers, sketching capabilities, discussion forums and surveys. This group may also serve as process-leaders and be on point for determining exactly how SeaSketch will be used during the MSP process. In other words, they may be responsible for choosing from among the different functionalities within the SeaSketch toolbox to inform the structure of or otherwise facilitate the planning and engagement process.

3. *General users*. This group can be invited to participate in the various phases of the MSP by administrators or "power users." This might include the public as a whole (invited to see geospatial information used for the project, such as in the sketching phase of developing options), or key stakeholder groups (for example, who might be invited to submit information via an open or restricted-access survey).

These user groups will engage with SeaSketch at various steps within the MSP process. Key steps include (see also figure 1 below):

- Goal identification
- Information gathering
- Sharing of stakeholder interests, priorities, and areas of expertise
- Coordinating with broader stakeholder constituencies and others
- Developing plan options, evaluating, and building agreement
- Periodic presentation of options to decision-making authorities

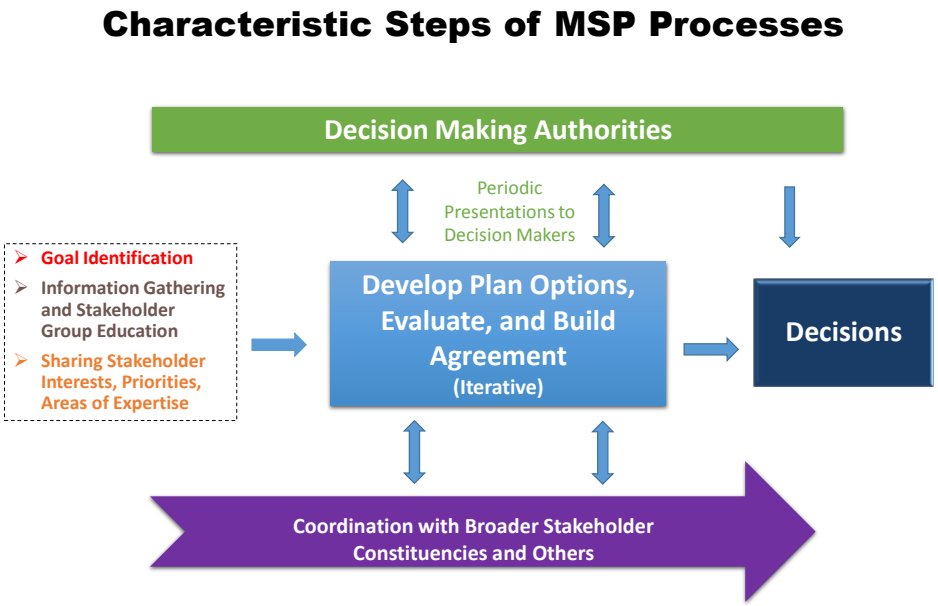


Figure 1: Steps of MSP Process Where SeaSketch is Commonly Used

Each of these key steps, along with the main SeaSketch functions that will be used by power users and others during these steps, is described in additional detail below. Specific instructions on how to actually use SeaSketch are covered in the section of the training manual.

Key Steps

Goal Identification

An early step in any stakeholder-based planning process is for project leads to clarify the project purpose and scope, and to more generally answer the question: "What are we trying to achieve?" Project leads can use SeaSketch data layers to help describe the geographic scope of the project as well as provide an introduction of key ecosystem, socioeconomic, administrative, or other features that will be the focus of stakeholder discussions. Another key step in the goal identification phase is for project leads to be presented with key guidance or sideboards governing the marine planning efforts. This information can come in the form of: guidance from governing laws, regulations, and policies; scientific guidance; and management guidance coming from resource management agencies, among others. SeaSketch can again be used to visually describe or illustrate this guidance, or to explain the guidance via how it has been incorporated into its analytical features.

Key SeaSketch functions used in this step include:

- Defining the default map extent (by administrative users only)
- Creating an authoritative list of map layers (by administrative users only)
- Defining Sketch Classes that may be used to sketch plan elements (e.g., protected areas, aquaculture zones, or other types of plans)
- Creating analytical reports associated with plan elements (by administrative users and geospatial developers only)

Information Gathering and Stakeholder Group Education

Another early step in the MSP process consists of gathering relevant information. Much of this information will be geospatial, and will be uploaded directly into SeaSketch's data layers for ready access by SWG members, the general public, or other interested parties. Exploring these data layers will be a critical means by which stakeholder workshop group members learn about the study region. SeaSketch can also be used to facilitate gathering of new information or metadata about existing information. SWG members may be asked to share information (e.g., in the form of data layers or responding to surveys) for incorporation into SeaSketch.

Key SeaSketch functions used in this step include:

- Surveys to gather spatial and non-spatial information.
- Discussion forums to gather feedback on existing (authoritative) map layers
- Visualizing map layers (i.e., geospatial information).

Sharing Stakeholder Interests, Priorities, and Areas of Expertise

In stakeholder-driven MSP planning processes, it is important for the stakeholder group members involved to engage in mutual education. This involves sharing information about the interests they are representing, the knowledge and expertise that they bring to the table, and priorities of their constituencies. Some of this information is spatial, and SWG members can use SeaSketch maps and other data layers to help present this information to the group.

Key SeaSketch functions used in this step include:

- Surveys may be configured to gather highly structured information such as geographical areas of expertise. Surveys may also be used to indicate the relative value or importance of specific places to SWG members.
- User Profiles may be configured by users to indicate their areas of expertise and affiliations.

Coordinating With Broader Stakeholder Constituencies and Others

Throughout the MSP process, it will be important for SWG members to coordinate with their constituents, each other, and other interested parties. This will involve both sharing information with others to help them track the process as well as soliciting input from others for incorporation into the stakeholder negotiations. The collaborative features of SeaSketch will prove helpful here. In particular, SWG members can use SeaSketch to participate in or create new discussion topics within map-based forums.

Key SeaSketch functions used in this step include:

- Web based: Because SeaSketch is a web-based application, all one needs is a standard web browser and an Internet connection.
- A public URL: The Sea Change project within SeaSketch is open to the public. You are welcome to share this URL with anyone (though some data and forums may be private to you as an SWG member)
- Public Messages and Forums: You may share links (URLs) of public forums to anyone in the general public. In this way, you may engage your constituents directly in the process.
- Private Messages and Forums: Project administrators can create private forums and grant accesses to groups defined within SeaSketch.
- Topics: Users with permission to access discussion forums may start a any discussion topic of their choosing. These discussions may be linked directly to map views, sketches and map annotations.
- Forums may be configured so that messages are moderated. There are also tools for marking messages as “inappropriate content” so that they are flagged for administrators to review and, if necessary, delete.

Developing Plan Options, Evaluating, and Building Agreement

A core role for SWG members will be to work individually, with their constituents, and with other SWG members in an iterative process to: develop plan options in the form of individual plan designs/elements and collections of designs/elements, evaluate them against key criteria and guidelines[1], integrate them with other stakeholder interests, and refine them to foster convergence and agreement building. Here is where you will be using many of SeaSketch's design tools.

Key SeaSketch functions used in this step include:

- Sketching plan elements and collections
- Viewing attributes and conducting reports
- Sharing your ideas and results with others via Forums
- Editing and revising your plans to incorporate feedback received.

SWG members will be able to use SeaSketch in a variety of locations, such as on your personal computer when inventing and sharing options, or in SWG meetings when negotiating and refining these same options in a group setting.

Presentation of Plan Options to Decision-Making Authorities

Throughout the MSP process and especially at the end, there may be occasions requiring presentation of the SWG's products to key decision makers. SWG members can use SeaSketch to provide updates on their progress in developing plan element or collection options, or to present final plan recommendations to decision makers. SeaSketch provides tools that can help SWG members explain the history of development of particular ideas and options, share evaluations and reports, and describe some of the tradeoffs examined that led to stakeholder group recommendations.

Key SeaSketch functions used in this step include:

- Forums may be used to post plans along with text and supporting documents that describe the key elements of the plan.
- Plans are always associated with reports that help users understand the tradeoffs between various proposed plans.

[1] Possible examples include criteria and guidelines from the Network Design Principles and Planning Principles contained in the *MPA Policy and Implementation Plan* (http://www.doc.govt.nz/Documents/conservation/marine-and-coastal/marine-protected-areas/mpa-policy-and-implementation-plan.pdf).

Limitations of Decision Support Tools and Their Role in Environmental Conflict Resolution

As the SWG proceeds through the MSP process, it is also important to recognize that SeaSketch is but one tool contributing to the development of a marine spatial plan. It is a powerful tool in that it:

- is capable of making a large amount of information (primarily spatial) readily available to support the planning process;
- facilitates sharing of ideas with other stakeholder group members, broader constituents, or the general public;
- provides a user-friendly means of developing many options, both publicly within meetings and privately between meetings;
- enables real-time evaluation of these options against key criteria and guidelines;
- facilitates refinement of options through multiple iterations of evaluation; and
- supports agreement building by helping to clarify key preferences, potential conflicts, and tradeoffs for negotiation.

At the same time, SeaSketch, like all decision support tools, has certain limitations that SWG members should be aware of. Key among these:

- Stakeholders should recognize that not all working group members will be equally skilled with the use of computers and the tool in particular, and care should be taken to ensure that individual voices are not lost or drowned out as a result.
- The effectiveness of any MSP recommendations produced will be dependent on the quality of the data contained in the data layers and the analytics used to evaluate plans. Stakeholders should make use of metadata where available and remain keenly aware of data layers considered to be of lower quality or in conflict with other data layers.
- As a GIS-based decision support tool, the primary focus of SeaSketch is on spatial (i.e., mapped) information. Stakeholders should take care not to focus all of their attention on the capacities of SeaSketch and lose sight of other key information (e.g., local knowledge, traditional ecological knowledge, etc.) and other criteria (e.g., addressing multiple stakeholder interests) that may not be incorporated into the tool. In other words, stakeholder should avoid falling into the trap where the model (i.e., the SeaSketch tool in this case) becomes reality. At the end of the day, sustainable, implementable marine plans will need to meet the test of adequately addressing all of the interests involved.

HOW TO USE SEASKETCH?

Exercise 1: The Essentials

In this section, you will learn:

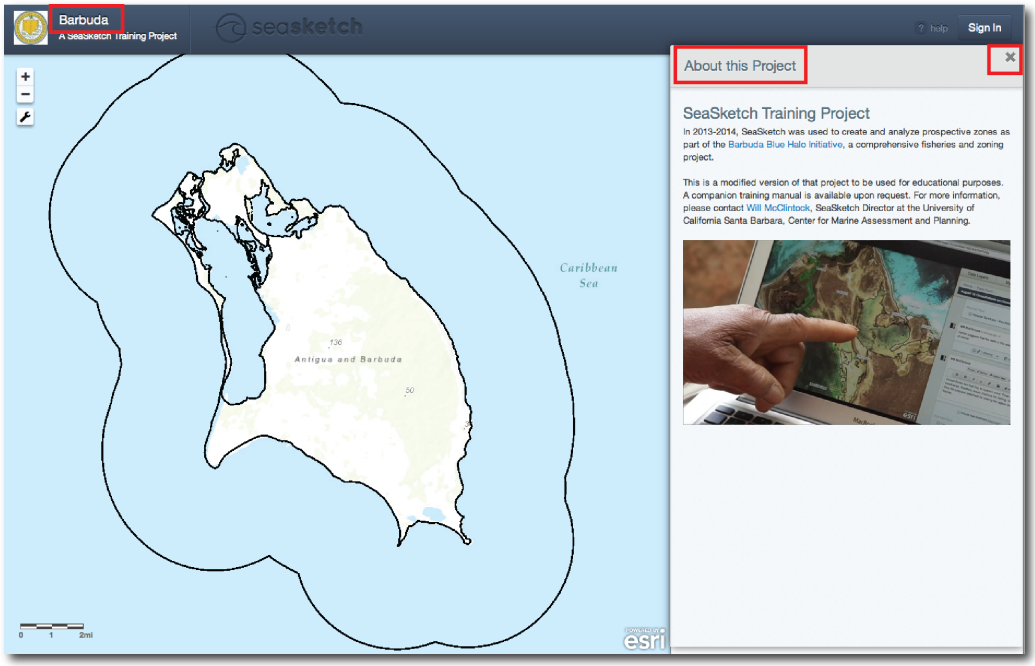
- How to open SeaSketch in a browser and sign in;
- The general layout of the SeaSketch interface, and
- How to navigate the map by zooming, panning, searching for a location and using measurement tools.

Step 1: Accessing SeaSketch

SeaSketch requires a computer with a modern web browser and an Internet connection. The following web browsers are supported: Chrome, Safari (version 7 and up), Firefox and Internet Explorer (version 8 and up). Although you must be connected to the Internet to use SeaSketch, some of your work products may be printed or downloaded for sharing offline.

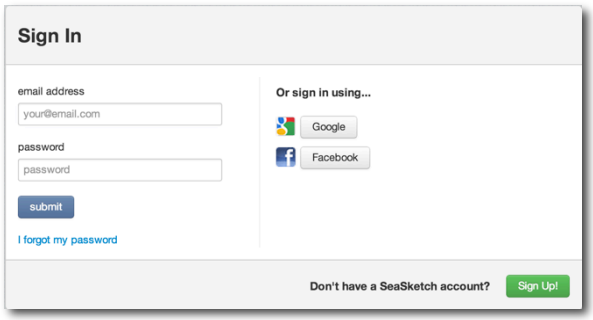
- Open your browser and enter this address into the location bar: training-barbuda.seasketch.org

Remember to enter the web-address into the *URL bar*, not the search bar (e.g., the Google Search bar). You are opening a web site (the Barbuda project), not searching for one. Once you have opened the project in your browser, you will see a map of the Barbuda on the left and a description of the project on the right.

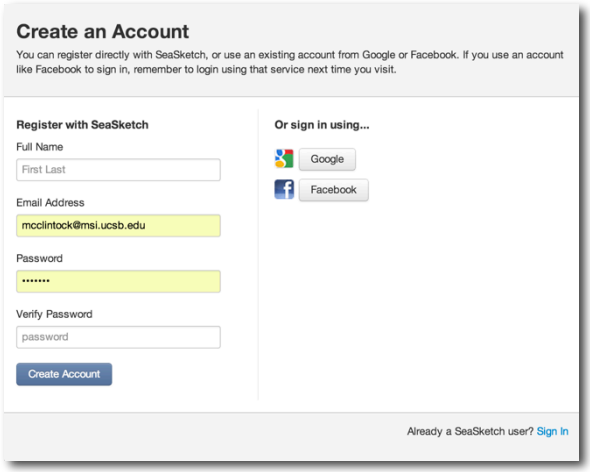


Assuming you have not yet created an account or logged into SeaSketch on your computer, this is the public view of the Sea Change project in SeaSketch. Notice that the "About this Project" side bar contains some basic information and may contain links to other resources. In the top right hand corner of the project description, there is an "X". Click on that "X to close the description of the project. You may always re-open the project description by clicking on the word "Barbuda" in the upper left hand corner of the project.

- Click on the words "Sign In" at the top right corner of the project. You will then see this:



If you like, you may sign in using your existing Google (i.e., "Gmail") or Facebook account and password. (Note that Facebook and Gmail accounts are only used for authentication. There is no link between Facebook/Gmail and SeaSketch.) Or, you may use any other email account but, to do this, you will need to create a SeaSketch account by clicking on the green "Sign Up!" button in the lower left hand corner of the Sign In window.

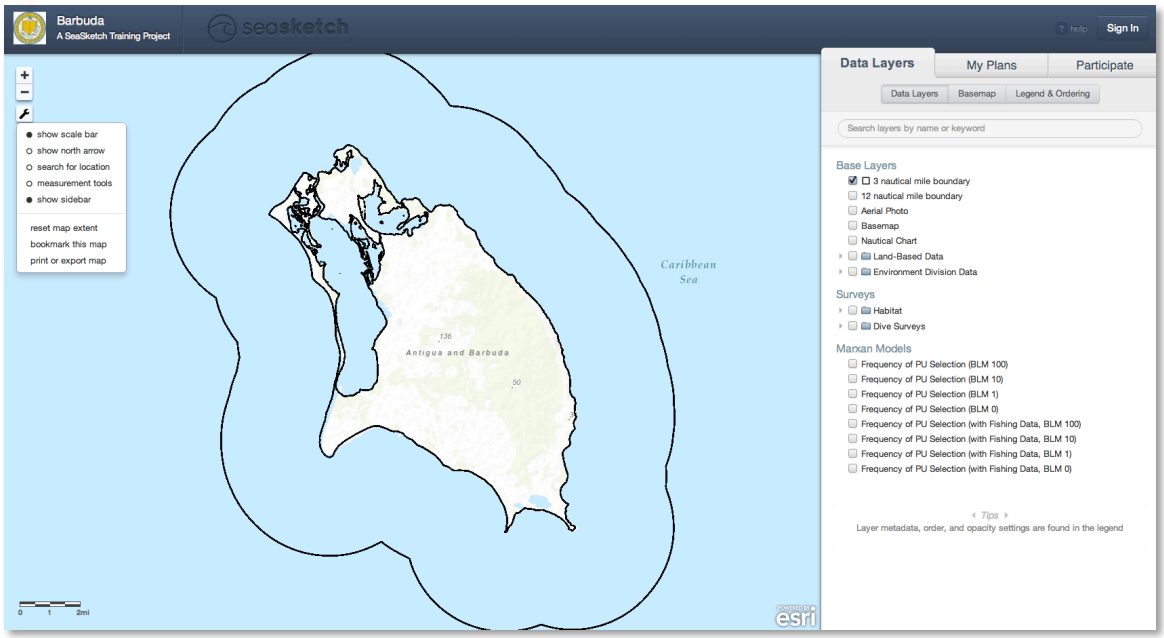


- When creating an account, enter your full name, your email address and any password you choose. (This does not need to be the password that you use to retrieve your email from your email provider.) If you forget your password you may always retrieve it from the system at a later time.

- Once you are ready, return to the Sign In window by clicking the words "Sign In" in the bottom right corner of the screen. Then, sign in!

Important: *If you are working on a computer to which others have access, make sure you log out after each session. Otherwise, others may have access to your work and any privileged information to which you have access.*

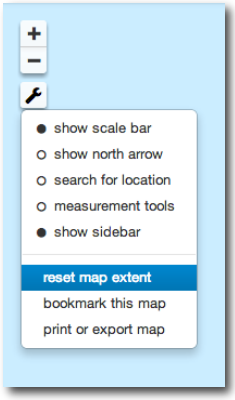
Step 2: Familiarizing yourself with the layout



Upper bar:

Take some time to familiarize yourself with the entire layout of the project. Look at the dark blue bar along the top. On the far left is the project title (Barbuda) that, as mentioned earlier, you may click on to bring back the "About this Project" side bar. To the right of the project title, you will see a subtle "SeaSketch" watermark that is highlighted when you hover over it with your cursor. Clicking on the SeaSketch watermark will bring you to the SeaSketch home page. On the far right of the dark blue bar you will see a help button and your name. You may click on your name to view your default profile or log out.

Map layout:



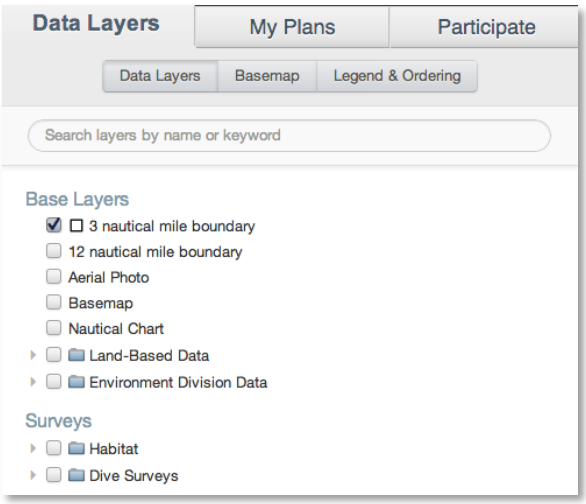
Notice the "+" and "-" buttons in the upper right hand corner of the map. These may be used to zoom in and out on the map. Click on the wrench (spanner) icon to view a list of tools, including:

- **Show scale bar**

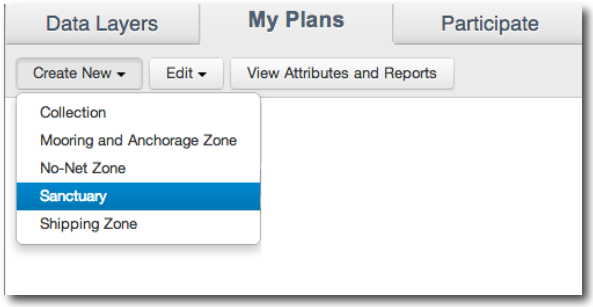
- **Show north arrow**
- **Search for location**
- **Measurement tools** for measuring distances, areas and coordinates.
- **Show sidebar** for showing / hiding the Data Layers, My Plans and Participate Tab. This is particularly useful if you are working on a small computer screen, such as a laptop, and you wish to view the map only.
- **Reset map extent** for returning the default map extent. This is useful when you want to view the entire Hauraki Gulf planning region or if you have simply lost where you are on the map.
- **Bookmark this map**. Bookmarking a map generates a URL that can be shared with others, for example, by email. We will discuss this topic in more detail later. For now, notice that clicking on this tool brings up a window and a URL that you may copy and share with others.
- **Print or export map.** You may also share your maps by printing them as a PNG image or PDF document in a variety of sizes, with or without a legend.

To the right of the map, you will see three tabs: Data Layers, My Plans and Participate. You can click on each tab to view its contents.

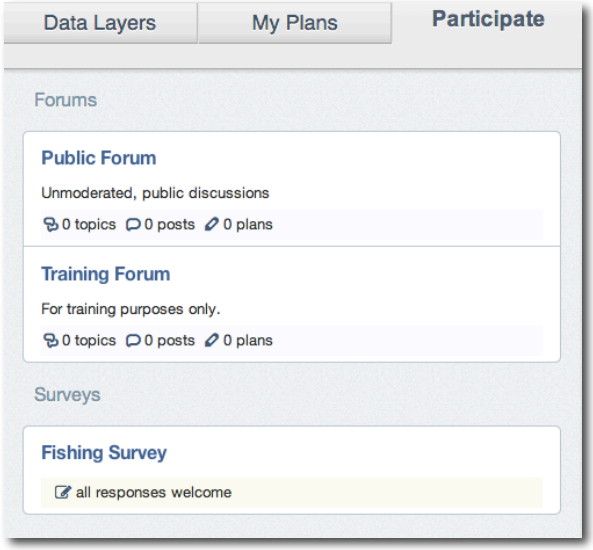
The **Data Layers** tab contains a complete list of authoritative map layers and base maps available to you in this project. Data layers may be individually turned on, inspected and re-ordered on the map whereas base maps will always appear below all other map data.



The **My Plans** tab is blank (empty) by default. This is your own private workspace and, over time, you will begin to see this space fill up with plan elements that you have sketched and copies of those that have been shared with you. Plan elements include Mooring and Anchorage Zones, No-Net Zones, Sanctuaries, Shipping Zones and Collections (i.e., collections of plans).



The **Participate** tab lists the forums and surveys for which you have permission to access. Forums are places to post messages, drawings, plans and files (e.g., documents). Some are public and some are private to designated user groups. Forums are the principal means by which you may collaborate with other users of the Barbuda project in SeaSketch.

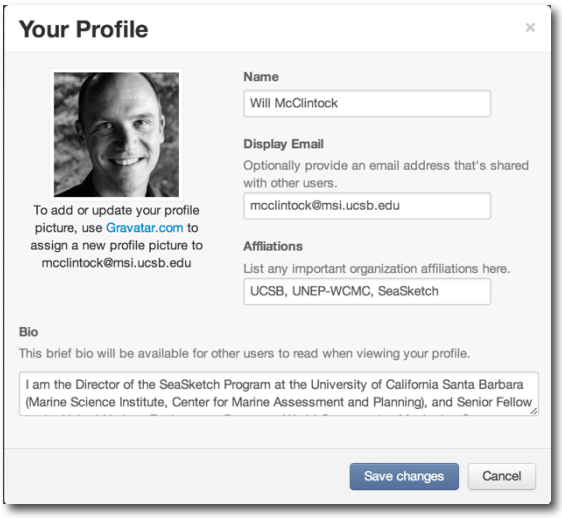


This project also includes a Fishing Survey located below the Forums under the Participate tab. Surveys may be completely open to the public (crowd-sourced) like this one, or they may be private to a designated group of users.

ASSIGNMENT: Fill out your profile

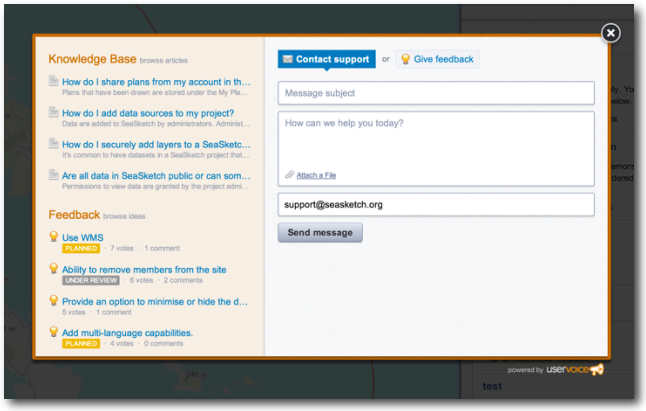
- Click on your name in the top right hand corner of the screen and choose "Edit Profile". This is the information others will be able to see when collaborating with you in SeaSketch.

- If you like, enter an email address that others may use to contact you, list any affiliations you have and write a short biography to help others know who you are.



Step 3: Getting Help

As you begin to use SeaSketch, you may discover that you have questions or are experiencing problems using the tool. There are several ways you can get help.



- To **submit questions and feedback using this tool** click on the "help" button in the top right corner of the project to bring up a window that looks something like this. On the left side of this window is a list of Knowledge Base articles, including commonly asked questions.

  You may browse and/or search these articles. You may also **submit questions and feedback** using this tool. If you have questions or comments, please be sure to provide lots of context. It is also possible to access the SeaSketch help by opening another browser tab and going to seasketch.uservoice.com.

Notice that if you begin typing a word in the "Message Subject" bar, you will automatically begin to search the knowledge base. Try typing the word "profile" and notice that there is one article in the knowledge base on changing your profile picture.

- If you have **general suggestions about the project** (i.e., how SeaSketch was used to support the Barbuda Blue Halo Initiative) please send an email to Will McClintock (will@ucsb.edu) rather than using the SeaSketch help. Messages sent to the SeaSketch Help will go to the technicians who built the tool.

Important: *To accurately trouble-shoot the problem you are having, we need to know the operating system (Windows, Mac) and version you are using, your browser (Internet Explorer, Safari, Chrome, Firefox) and version you are using, and as many other specifics you can provide. The more detail you can provide us, the faster we can help you find a solution to the problem. Details on finding your browser version may be found in the Knowledge Base.*

ASSIGNMENT: Use the Knowledge Base

Using the Knowledge Base articles found under the Help menu, answer the following questions:

- How can you reset your SeaSketch password?

  _____

- How can you change your profile picture?

  _____

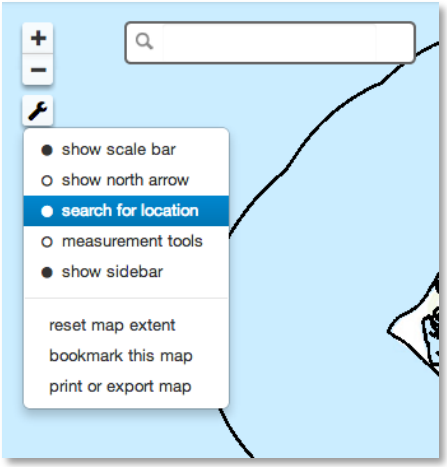
Step 4: Map Navigation

Using a number of different controls, you may pan and zoom to any location on the map.

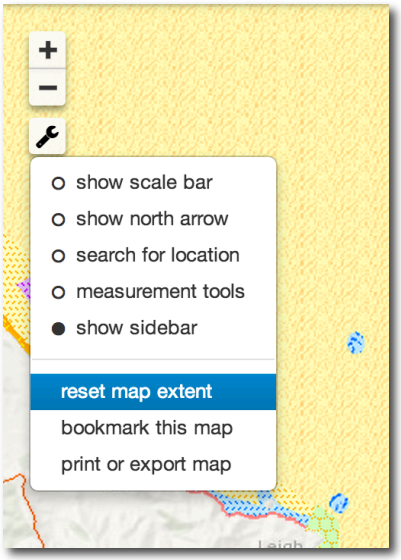
- Try **zooming** in and out using the "+" and "-" buttons in the top left corner of the map. You may also zoom in by holding down the shift key, clicking and dragging your mouse on the map. This will zoom the map to the area you identified on the map. On some computers, the mouse is equipped with a wheel and this too can be used to zoom in and out on the map.

- Try **panning** (moving the map side to side or up and down). To pan, simply click and hold down your mouse button anywhere on the map and move your most left, right, up or down.

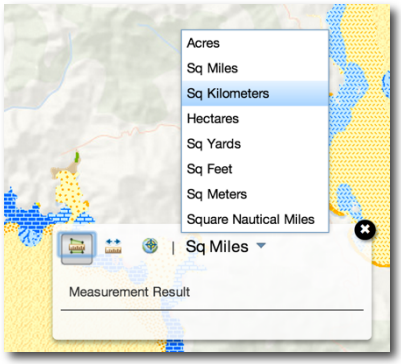
- To **search for a specific location** on the map, click on the tool (spanner) icon and choose "search for location". In the search bar, enter the name of a place you would like to search for and press enter. The map will pan and place a marker on the map if that is a known place name. (Note you man need to zoom out to view your location in a wider geographical context.) To clear the marker off the map, click the "x" next to the search bar. To hide the "search for location" bar, simply click "search for location" again in the tool bar.



- The map extent is the portion of area of a region shown on the map. If you have zoomed in or out or panned to an area on the map, you have changed the map extent. When you wish to return to the default extent (i.e., the view of the entire island of Barbuda), click on the tool icon and choose "**reset map extent**."



- Select "**measurement tools**" under the tool bar to see options for measuring distances (lines), areas (polygons) and location (coordinates).
- Hover your cursor over the three icons to see which tool is which. Try using each of them.
- To begin a measurement, click once on the map. To finish a measurement, double click your mouse on the map. Click on the map in several locations to practice each tool. Experiment with choosing different units of measurement.



ASSIGNMENT: Search for Cocoa Point and Spanish Point

Using the search for location tool*, search for Cocoa Point and answer the following question:

- Is the blue location marker placed precisely at the end of Cocoa Point? _____

Using the search for location tool, search for Spanish Point. Note that, as above, the blue location marker does not land precisely on the end of Spanish point.

- What is the straight-line distance from the tip of Cocoa Point to the tip of Spanish Point? _____

Experiment with changing the units of measurement.

- What are the coordinates in degrees, minutes and seconds (DMS) for the tip of Cocoa Point? _____

When you are done with this exercise, reset your map to the default extent, and hide the "search for location" bar.

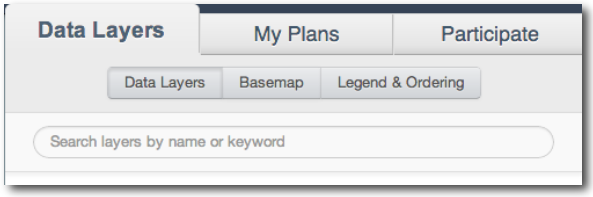
* Remember, if you have entered a location to search, you may need to zoom out to view your location (indicated with a blue maker) in a wider geographical context. SeaSketch will pan (not zoom) to your location. This means if you're zoomed in to a very small geographical location and you conduct a search for, say, Spanish Point, you may end up viewing your location at the scale of the town of Codrington. Zooming out will help you view the location in a larger geographic extent.

Exercise 2: Basemaps and Data Layers

In this section, you will learn:

- About map layers and features,
- How to search for data layers and base maps,
- How to turn on/off layers, change their order and transparency on the map, and view legends,
- How to view metadata,
- About permissions for viewing public versus private layers.

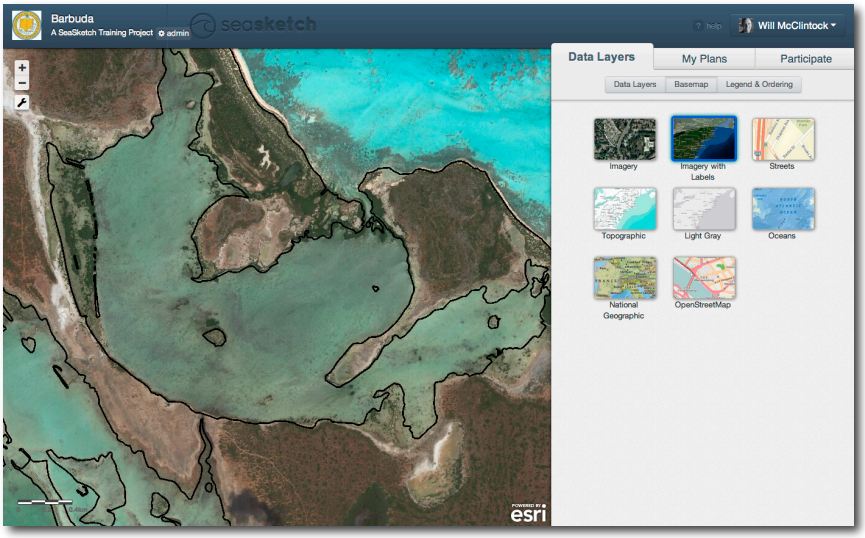
Orient yourself to the Data Layers tab. Notice that if one has full access to the project it will have three buttons: "Data Layers", "Basemap" and "Legend and Ordering". If there are no Sketch Classes set up, one would only see the Data Layers and Participate tabs. Administrators may also choose to restrict sketching to a defined group of users. In that case, only those users with permission to sketch would see the My Plans tab. In this case, anyone from the general public can sketch, so you should see the My Plans tab as in the image below.



"My Plans" will only show up if sketch classes have been configured and you have permission to sketch.

Step 1: Basemaps

- Click on the "**Basemap**" button and notice that you have 8 different basemaps to choose from. Click on each one to see how the map changes. Each of these basemaps has utility, depending on the kinds of information you want to see and what kinds of other data you wish to overlay on top of them.



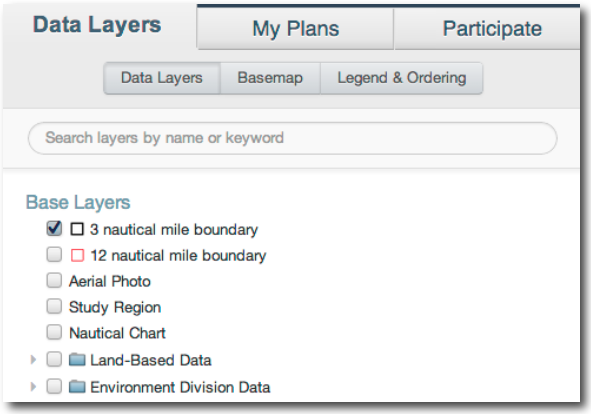
The "Imagery with Labels" basemap is particularly good for identifying particular locations on the coastline that you (e.g., a stakeholder or planner) may be familiar with.

- Zoom in and out notice how the map changes. Sometimes, clouds obscure the coastline at some scales (e.g., zoomed out) but then the clouds disappear at other scales (e.g., zoomed in).
- Restore the map to the default extent.

Basemaps vary in quality, particularly when you consider how they look at different scales. For simplicity, you might just stick with the "Light Gray" or "Topographic" basemaps that display well at all scales. Then, use a different basemap (e.g., "imagery with labels") if you want to view specific features on the land or in the ocean.

Step 2: Data Layers

- Click on the **Data Layers** button under the Data Layers tab. Notice that the data have been organized into categories (Base Layers, Surveys, Marxan Models) and folders.



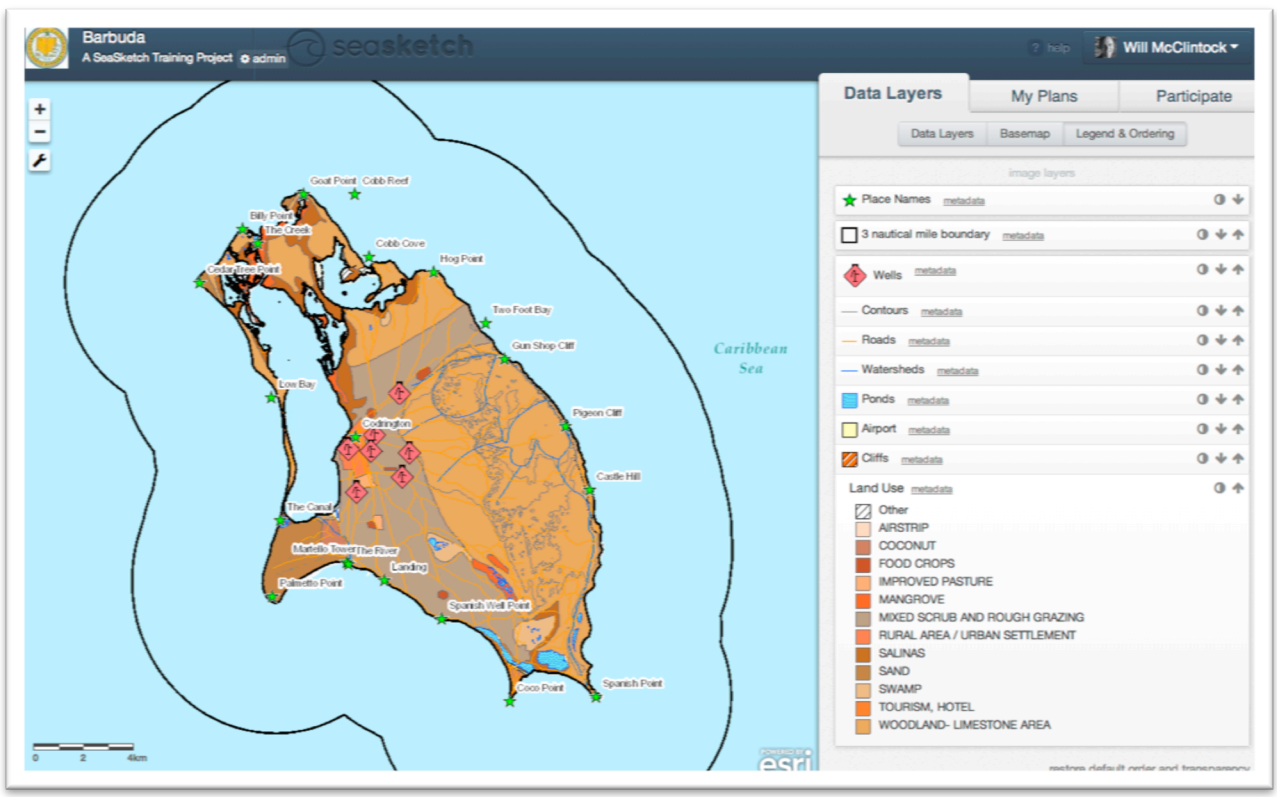
- Click on the arrow next to a folder to expand the list of layers contained within that folder. For example, the Habitat folder contains two layers, "Reef Buffered by 20m" and "Barbuda Ocean Habitats".

- Click the checkbox next to a layer, such as Barbuda Ocean Habitats, to turn it on or off.

Important: *Map layers may be designated private to some user groups and others are completely public. If you are not logged into SeaSketch, you may not see some layers that are visible to you. In this particular project (the Barbuda training project), the Community Surveys data are public only to those in the "Training" group. Please contact Will McClintock (will@ucsb.edu) if you would like to be added to this group.*

- Turn on all of the layers within the "Land-Based Data" folder by clicking on the checkbox next to the folder name.

- Click on the Legend & Ordering button to view the **legend**. Notice that each layer that is turned on will be listed in the legend. All layers turned off will not show up in the legend.

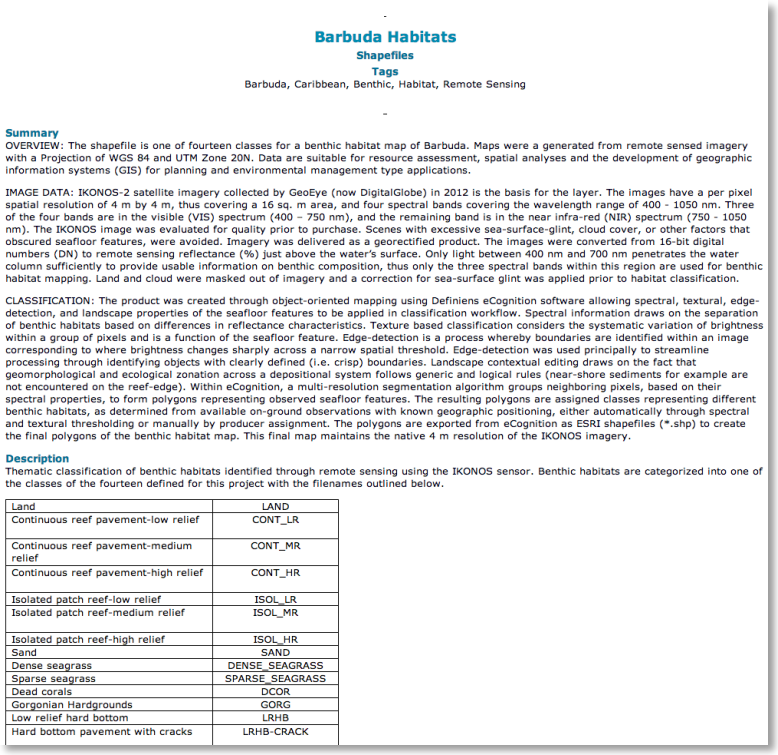


There is a lot to this legend, so take your time to understand it! First, notice that each layer has unique symbols that can help you understand features in that layer. For example, the Food Crops have been symbolized differently from Mangroves to help you distinguish between these two features of a single map layer (the Land Use layer).

- Click on the icon that looks like a circle with white and black halves. This brings up a slider that lets you adjust the **transparency** (or opacity) of a map service (that may contain one or more layers). Adjust the transparency of Land Use layer. Because this layer is part of the same *map service* ad the Wells layer, the transparency will change for Wells, Land Use, and all of the other layers in the same map service. .

- Click on the **down arrow** associated with one of the layers to change the order in which it draws on the map. In the example above, if you wanted to the Roads layer to appear above the Wells layer, you could simply click on the Up arrow on the Roads layer until it appeared above the Wells layer.

- Click on the "**metadata**" link next to a layer name. This will bring up another tab in your browser to show you a description of that layer. In some cases, this information is very rudimentary and in other cases it is very elaborate. For most of the land-based data, the information is rudimentary and useful in discovering who made this dataset (the Organization of American States, Unit for Sustainable Development and Environment). For other data, (e.g., the habitats data) the metadata are much more detailed.



Barbuda Habitats

Shapefiles

Tags

Barbuda, Caribbean, Benthic, Habitat, Remote Sensing

Summary

OVERVIEW: The shapefile is one of fourteen classes for a benthic habitat map of Barbuda. Maps were a generated from remote sensed imagery with a Projection of WGS 84 and UTM Zone 20N. Data are suitable for resource assessment, spatial analyses and the development of geographic information systems (GIS) for planning and environmental management type applications.

IMAGE DATA: IKONOS-2 satellite imagery collected by GeoEye (now DigitalGlobe) in 2012 is the basis for the layer. The images have a per pixel spatial resolution of 4 m by 4 m, thus covering a 16 sq. m area, and four spectral bands covering the wavelength range of 400 - 1050 nm. Three of the four bands are in the visible (VIS) spectrum (400 – 750 nm), and the remaining band is in the near infra-red (NIR) spectrum (750 - 1050 nm). The IKONOS image was evaluated for quality prior to purchase. Scenes with excessive sea-surface-glint, cloud cover, or other factors that obscured seafloor features, were avoided. Imagery was delivered as a georectified product. The images were converted from 16-bit digital numbers (DN) to remote sensing reflectance (%) just above the water's surface. Only light between 400 nm and 700 nm penetrates the water column sufficiently to provide usable information on benthic composition, thus only the three spectral bands within this region are used for benthic habitat mapping. Land and cloud were masked out of imagery and a correction for sea-surface glint was applied prior to habitat classification.

CLASSIFICATION: The product was created through object-oriented mapping using Definiens eCognition software allowing spectral, textural, edge-detection, and landscape properties of the seafloor features to be applied in classification workflow. Spectral information draws on the separation of benthic habitats based on differences in reflectance characteristics. Texture based classification considers the systematic variation of brightness within a group of pixels and is a function of the seafloor feature. Edge-detection is a process whereby boundaries are identified within an image corresponding to where brightness changes sharply across a narrow spatial threshold. Edge-detection was used principally to streamline processing through identifying objects with clearly defined (i.e. crisp) boundaries. Landscape contextual editing draws on the fact that geomorphological and ecological zonation across a depositional system follows generic and logical rules (near-shore sediments for example are not encountered on the reef-edge). Within eCognition, a multi-resolution segmentation algorithm groups neighboring pixels, based on their spectral properties, to form polygons representing observed seafloor features. The resulting polygons are assigned classes representing different benthic habitats, as determined from available on-ground observations with known geographic positioning, either automatically through spectral and textural thresholding or manually by producer assignment. The polygons are exported from eCognition as ESRI shapefiles (*.shp) to create the final polygons of the benthic habitat map. This final map maintains the native 4 m resolution of the IKONOS imagery.

Description

Thematic classification of benthic habitats identified through remote sensing using the IKONOS sensor. Benthic habitats are categorized into one of the classes of the fourteen defined for this project with the filenames outlined below.

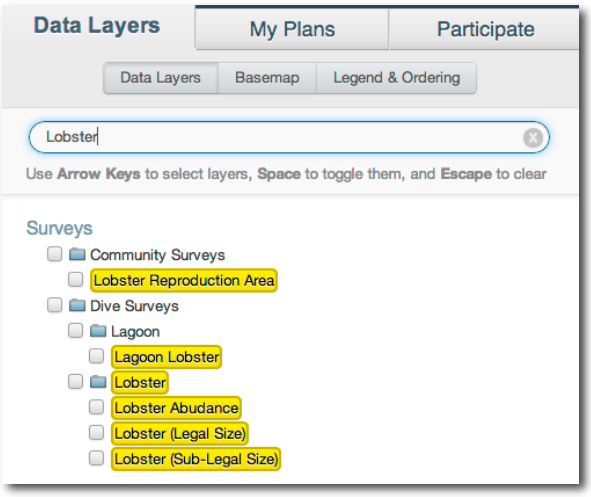
Land	LAND
Continuous reef pavement-low relief	CONT_LR
Continuous reef pavement-medium relief	CONT_MR
Continuous reef pavement-high relief	CONT_HR
Isolated patch reef-low relief	ISOL_LR
Isolated patch reef-medium relief	ISOL_MR
Isolated patch reef-high relief	ISOL_HR
Sand	SAND
Dense seagrass	DENSE_SEAGRASS
Sparse seagrass	SPARSE_SEAGRASS
Dead corals	DCOR
Gorgonian Hardgrounds	GORG
Low relief hard bottom	LRHB
Hard bottom pavement with cracks	LRHB-CRACK

- Close the tab in your browser where the metadata is displayed and return to the map.

- Turn off all of the layers in the folder labeled "Land-Based Data".

- **Search for a map layers** by typing in the name of a layer in the "Search" bar at the top of the Data Layers tab. After you have completed your search, use the "X" icon at the end of the search

bar to clear the contents of the bar and return to the full list of map layers. *Notice you may also use Arrow Keys, the Space Bar and Escape Key as shortcuts to some of these actions*.



ASSIGNMENT: Vegetation in Mercury Bay

What types of ocean habitats are there in Goat Island Flash??

_____

Are there any hard bottom habitat found in the Lagoon?

_____

Who created the Barbuda Ocean Habitats layer?

_____

Hint: Some of the tools you might use for this assignment include the "search for location toolbar", the "search layers toolbar" the legend, and metadata link.

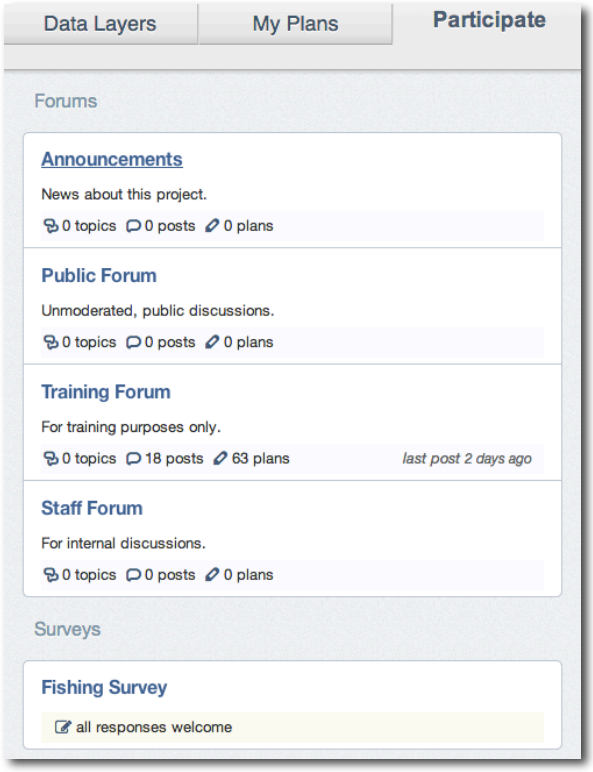
Exercise 3: Participation

SeaSketch has a number of participation features, chiefly,

- Discussion Forums, which enable real-time chat, sharing of plans, and map annotations; and
- Surveys, which allow project administrators to collect information from participants.

Both are found under the **Participate Tab**.

- Click on the Participate Tab and scroll down to see the list of Forums and the list of Surveys available to you.

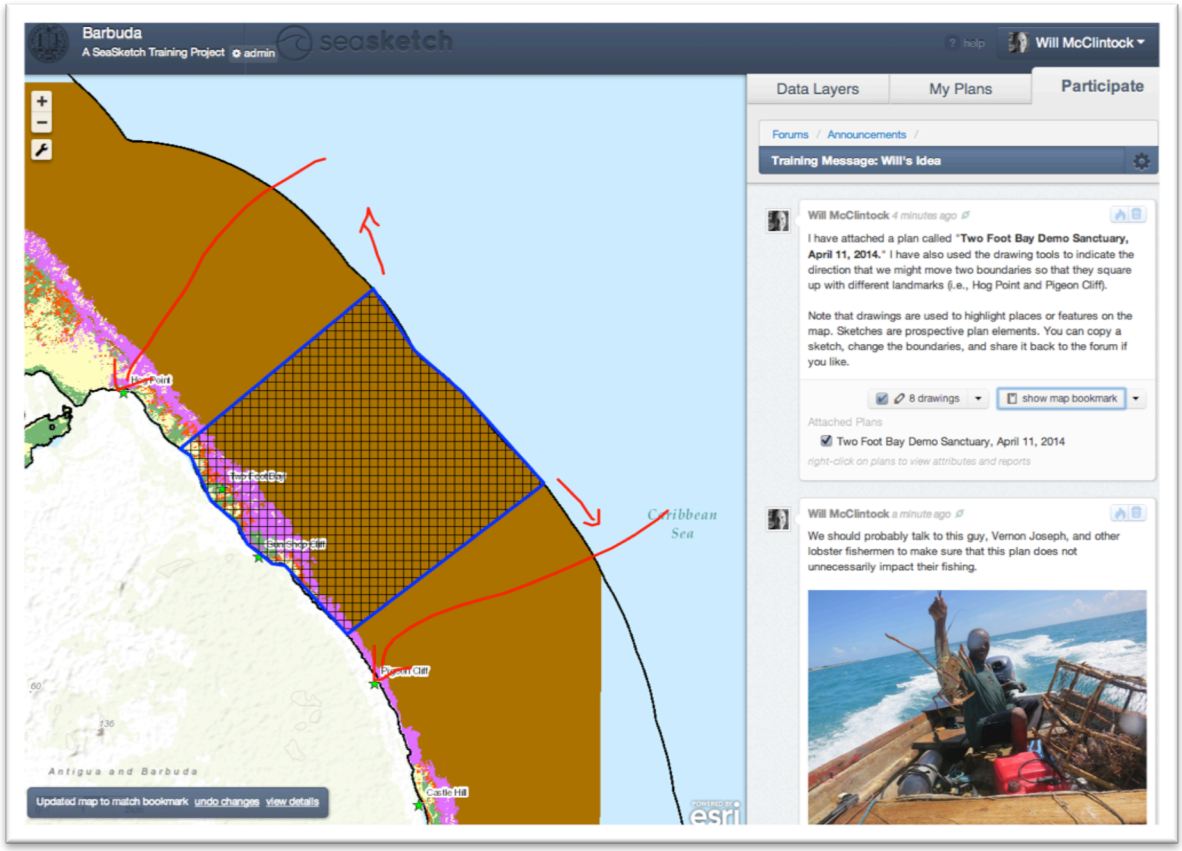


Step 1: Discussion Forums

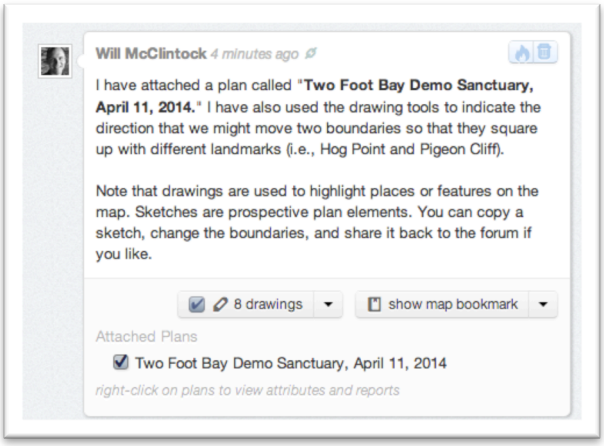
Throughout a typical planning process, you would be encouraged to share your ideas by way of discussion forums. Some forums are open to the public, while others are private to designated groups. In most cases, if you have access to a forum, you will have permission to read and write messages. In some cases, you may only have permissions to read posts (e.g., Announcements).

- Click on the "Announcements" forum under the Participate tab. This is a public forum but only project administrators have write-access. Everyone else can only read messages posted to this forum.

- Click on the topic "Training Message: Will's Idea" and notice that I have created several messages within this topic.



Take a good look at first message, located at the very top of the forum topic. Notice that my message has a time stamp next to my name. (In the image below, the time says that I posted this message some time ago. You are viewing this message at a later date so that time stamp will be different.) Immediately next to the time stamp is a link icon.

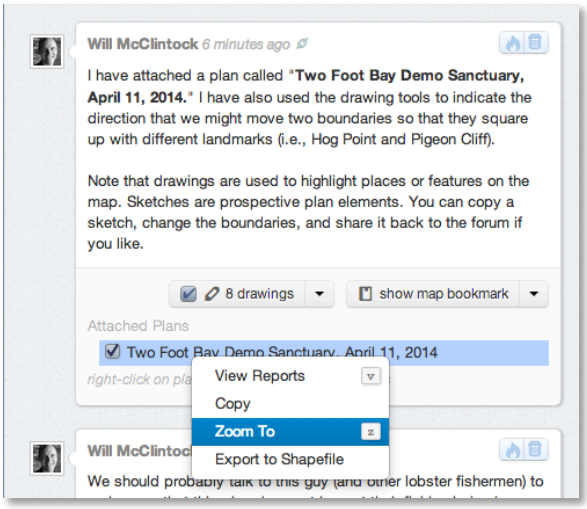


My message includes some text, some drawings and an attached plan. Messages may also include embedded images, hyperlinks and formatted text. Assuming you were not looking at the same place and the same data that I was when I sent this message, it may be difficult to know exactly what I was talking about unless you click "show map bookmark".

- Click "show map bookmark". This will turn on the layers and zoom to the extent I was looking at when I sent this message.

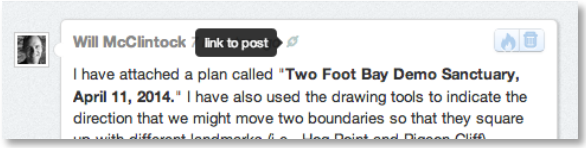
Notice there are "drawings" associated with this message. Turn these drawings on and off. I have drawn lines on the map to highlight certain areas. Drawings may be points, lines and polygons.

- Click on the checkbox next to "Two Foot Bay Demo Sanctuary, April 11, 2014". A polygon, outlined in blue, will appear on the map. If you don't see it, you can always right click on the name of the plan and choose "zoom to" from the popup menu.

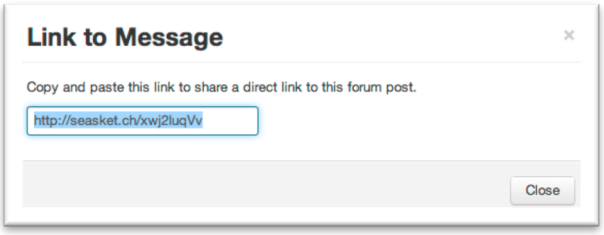


Notice that there are other options in the pop-up menu associated with my attached plan, including "View Reports", "Copy" and "Export to Shapefile". We will discuss these features in a later exercise.

- Hover your mouse over the link icon next to the time stamp and you will see the words "link to post".



- Click on the link icon and a window will pop up that looks something like this:



This URL is a direct link to my message, including drawings and a bookmark.

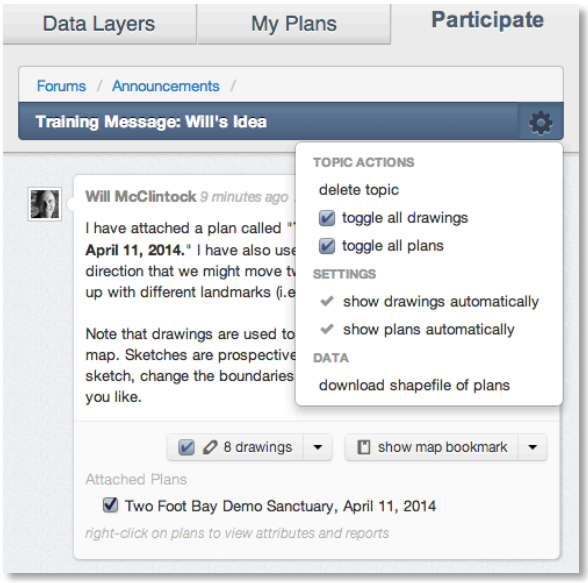
- Copy and paste this URL into another browser tab. Notice that SeaSketch opens directly to my message and turns on all of the drawings and plans included in the post.

This feature is handy if you want to save the message link to a document or if you want to email the link to a colleague.

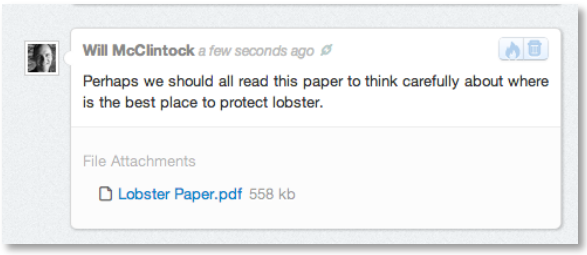
Important Note: *If you send the link to somebody who does not have permission to view the message (i.e., in a private forum) they will not be able to see it. You must be a member of a privileged group to view messages in a private forum. In this case, the "Announcements" forum is public (with read-only access) so anyone in the world is able to read it.*

By default, drawings and attached plans are loaded when you open a forum. If you like, you can toggle on or off all of the drawings and plans in a forum at once.

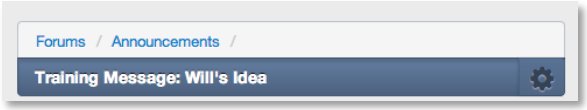
- Click on the gear icon at the top right of the forum topic (e.g., to the right of "Will's Idea" in the image below).
- Toggle all drawings on and off (i.e., show/hide all drawings)



Notice that one can also attach files (documents, PDFs, images, zip files, etc.) to a forum message. At the bottom of any message there is an "Attach Files" option, just as there is an "Attach Plans" option. If you read my third message, you'll see that I've attached a paper about lobster conservation.



- Click on the link to download the paper, if you like!
- Return to the list of Forums. To do so, notice the "bread crumb" at the top of the discussion thread, directly above the forum title. In this case, the "bread crumb" says "Forums / Announcements /". See the example below.
- Click on the word **Forums**.



ASSIGNMENT: Send a message

- Create a new topic in the **Training Forum** by clicking "Create a Topic". Name the topic with your name and the date.
- Zoom to an area you would like to explore and turn on a layer of your choosing. Then, highlight a feature or area on the map using the drawing tools.
- Write a short message, making sure your message includes a map bookmark. Click sends.
- Return to the list of topics in the Training Forum and look for a new message sent by someone else (if there is one) and reply to the message using the tools you have learned.

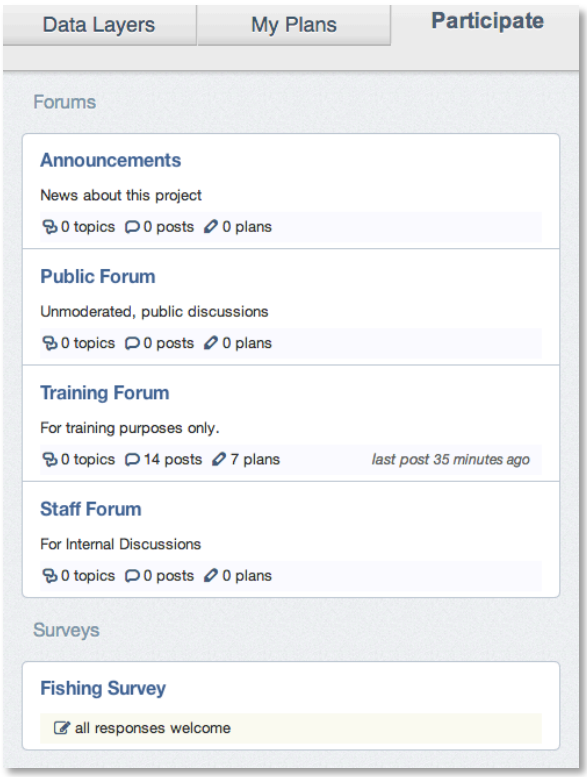
Step 2: Surveys

SeaSketch surveys are issued by project administrators and used to collect information from participants. Example survey questions might include:

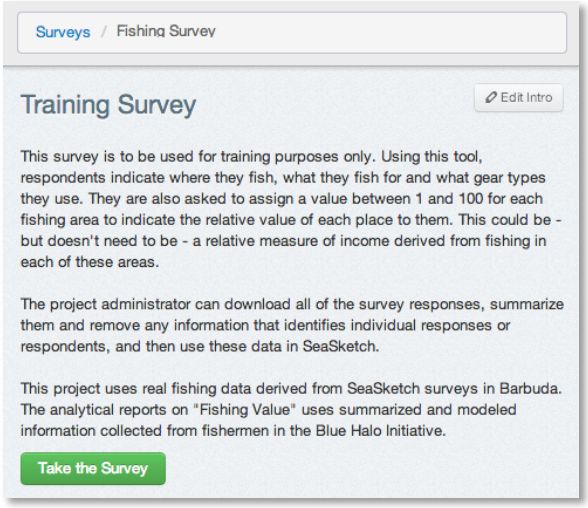
- Where do fish?
- What areas of the ocean do you value the most?
- Where have you seen a whale?

Surveys are listed under the Participate tab and may be open to the public (crowd-sourced) or they may require an invitation. In this section, you will participate in a demonstration Fishing Survey that is open to the public.

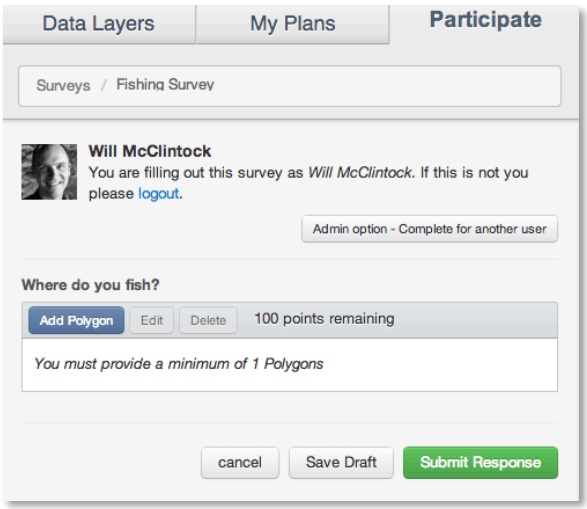
- Click on the Participate tab, and then click on the Fishing Survey link at the bottom.



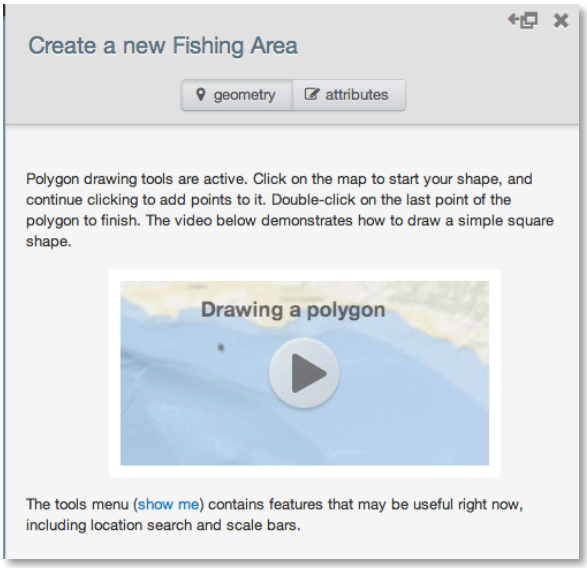
- Click the button that says "Take the Survey"



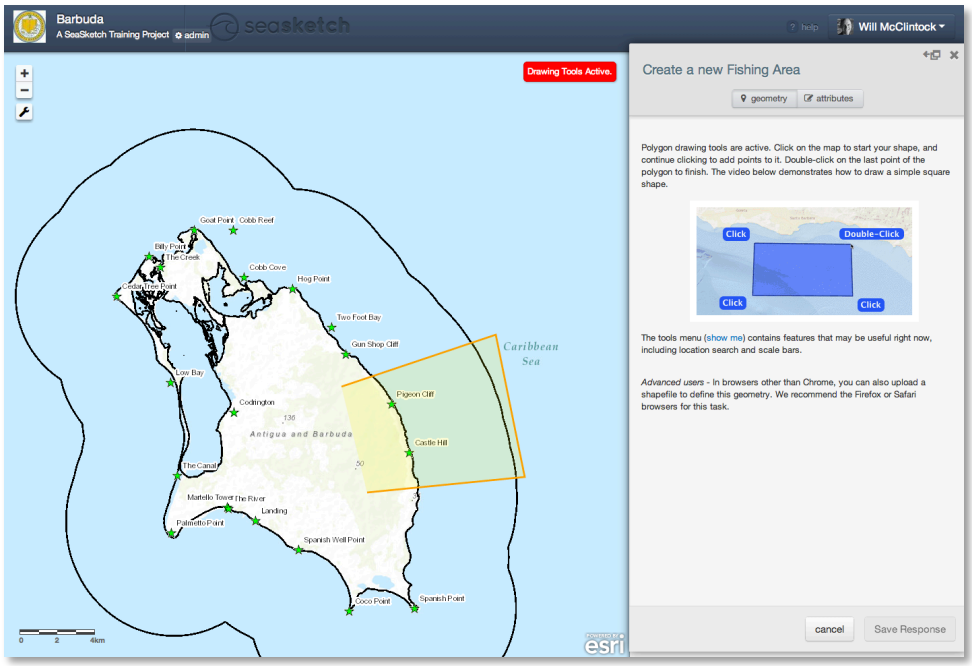
In this survey, you will pretend to be a fisherman and provide information about where you fish, what species you're fishing for, what gear you use, and how valuable each fishing area is to you. This type of fishing survey was used to help define the relative fishing value of areas in and around Barbuda during the Blue Halo Initiative. Later in this training, you will see how these data are analyzed when designing marine protected areas (sanctuaries).



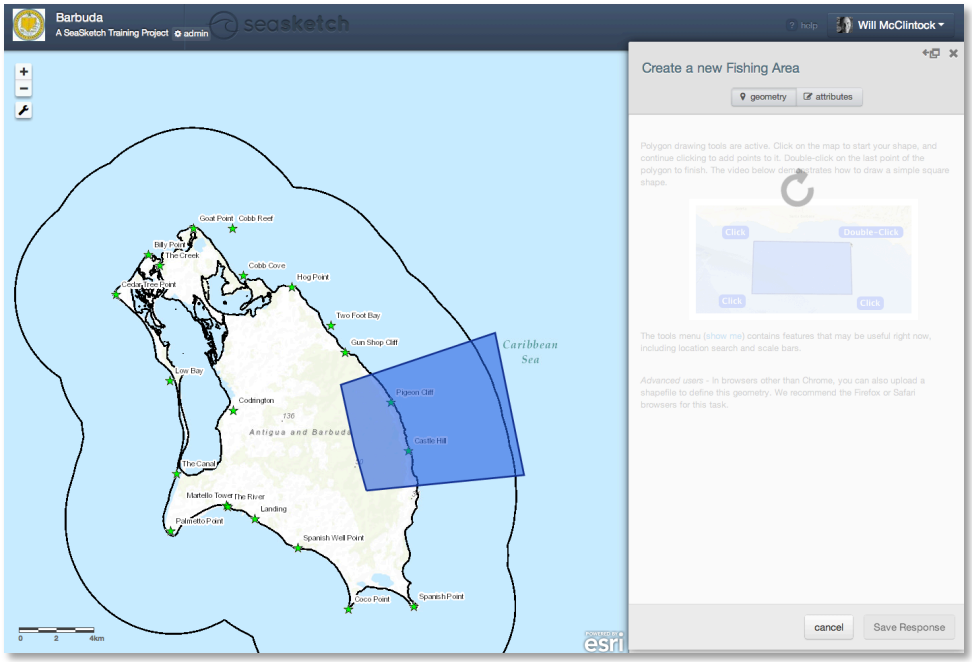
- Click on "Add Polygon" and then notice that there is a video to demonstrate how to draw a polygon. Click the play button to watch the video. *This is important information.*



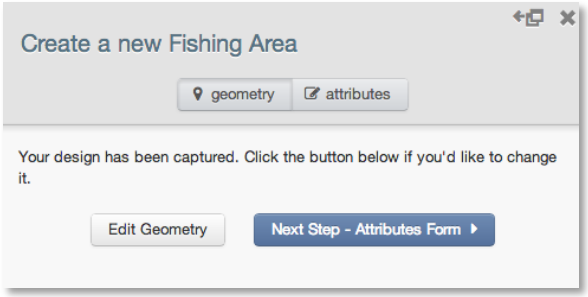
Click once each time you wish to add a vertex (corner) to your polygon. When you are ready to close your polygon, double click. ***It is very important that you do not try to click on top of your first vertex****. Doing so will probably result in a bowtie polygon which is not allowed.*



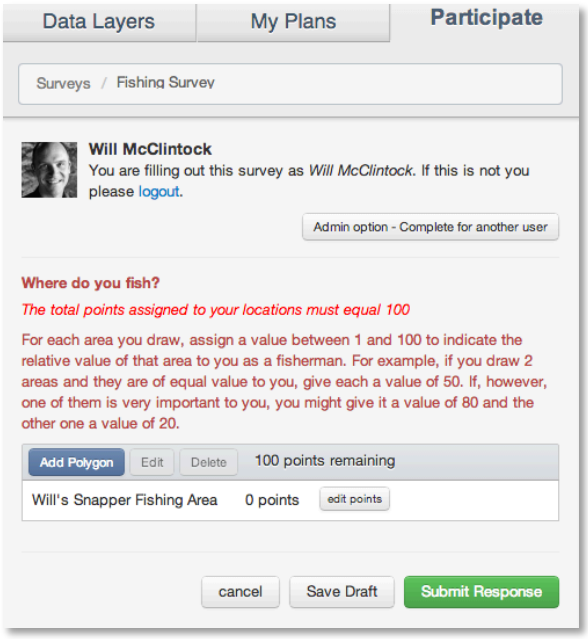
You may try to draw your polygon anywhere. However, this survey was designed to capture information within Barbuda's 3 nautical mile limit. So, although I have started to draw my Fishing Area outside of the 3 nautical mile boundary, and I will finish the polygon on land, SeaSketch will clip the polygon to the 3 nautical mile boundary.



Each area that you draw will have a series of questions associated with it. Some questions you will be required to answer (indicated by an asterisk) and others are optional.



- Once your polygon has been clipped to the study region (3 nm boundary), click "Next Step – Attributes Form" to answer these questions.
- Answer the questions associated with your location and click "Save Response".
- Add another Fishing Area (polygon) as you did above, answering the associated questions.



- Notice that you must assign values for each area that you draw. This is sometimes called the "One Hundred Pennies Exercise" where you are asked to distribute 100 points (or imaginary "pennies") across all of your polygons to indicate their relative value to you. Very important fishing spots, for example, might get 80 points, where less important ones only 20 points. *The total for all areas combined must equal 100*.
- When finished distributing points to fishing areas, click "submit response".

You will be presented with a "Thank you" window with some additional information about a survey. Read the information and click "Close".

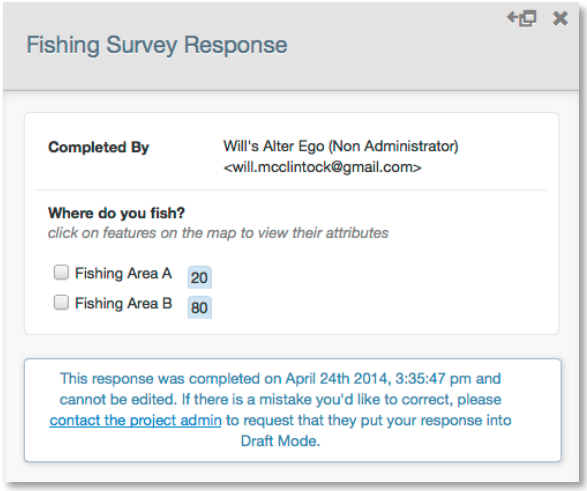
Administrators may view all of the survey responses within SeaSketch and download the responses for visualization and analysis in third party applications (e.g., Microsoft Excel and GIS tools).

The following screenshot shows the single response I have made to the survey. And, because I am an administrator, it also has a link to view all responses.

If all survey responses are to made visible to other users (e.g., the SWG or the general public) the administrator will need to export the responses, summarize them in a third party application (e.g., ArcMap), and then display the results as a map layer in SeaSketch.

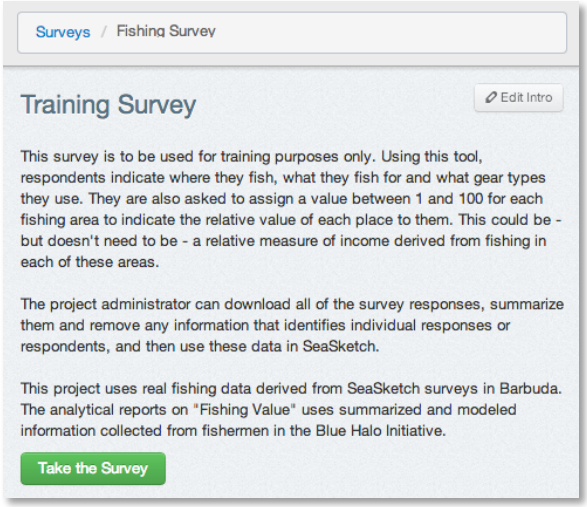
Important Note: *Survey responses cannot be edited once they have been submitted unless a project administrator is contacted and he/she puts the response back into "Draft Mode".*

- Click on the word "complete" next to your survey response.



You should see a link to "contact the project admin". This option may be used if survey respondents wish to edit their survey response. An administrator must be contacted if somebody wishes to edit a survey response.

- To return to the list of Forums and Surveys, click on the word “Surveys” in the “bread crumb” at the top of the Participate tab.



Exercise 4: Sketching Plans

SeaSketch was primarily designed as a planning tool, a means by people with just a little training could sketch prospective spatial plans. In this section, you will be using simple drawing tools to sketch, edit and analyze plans.

Before you get started, it is important to distinguish sketching from drawing. In the previous exercises, you used drawing tools to highlight features and areas on a map and these drawings were included in forum messages. **Drawings**, unlike sketches, cannot be analyzed. When you sketch a plan in SeaSketch, you are actually creating geospatial plans that are evaluated using other kinds of map data.

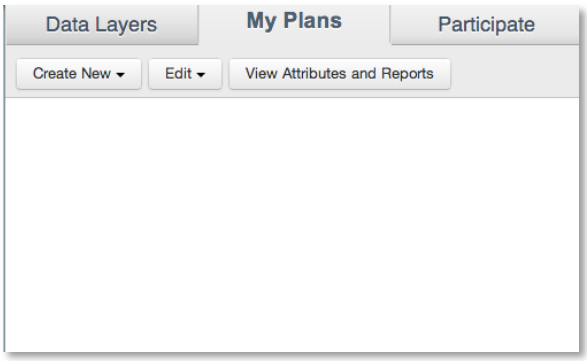
Sketching and refining plans is an iterative process. For example, you may choose to sketch a prospective Sanctuary, evaluate that sketch in terms of size, representation of habitats, and fisheries impact. Based on that evaluation, you may decide to edit the sketch by changing the boundaries, re-evaluate, and so on. This iterative design process is sometimes called “Geodesign”, a process that combines the unencumbered art of design with science-based analytical feedback.

In the Barbuda Training Project, you will be asked to sketch and evaluate plans for Sanctuaries, Mooring and Anchorage Zones, No-Net Zones and Shipping Lanes. You will also be asked to create collections of these zones and evaluate the collection as a complete, prospective plan with multiple zones.

Step 1: Sketching Plans

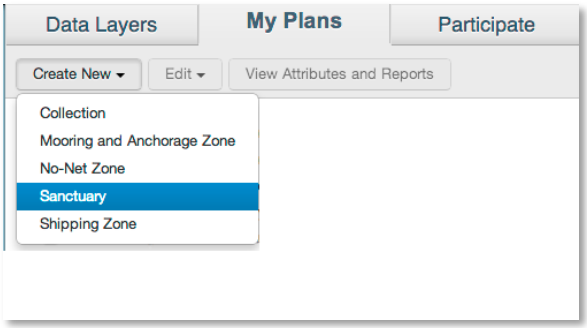
- Restore the map to the default extent and turn off all data layers that are currently turned on, except the 3 nautical mile boundary. (Hint, reset the extent using the tool under the spanner icon.)

- Click on the My Plans tab. By default, you will not see any plans listed here. You haven't yet created any.

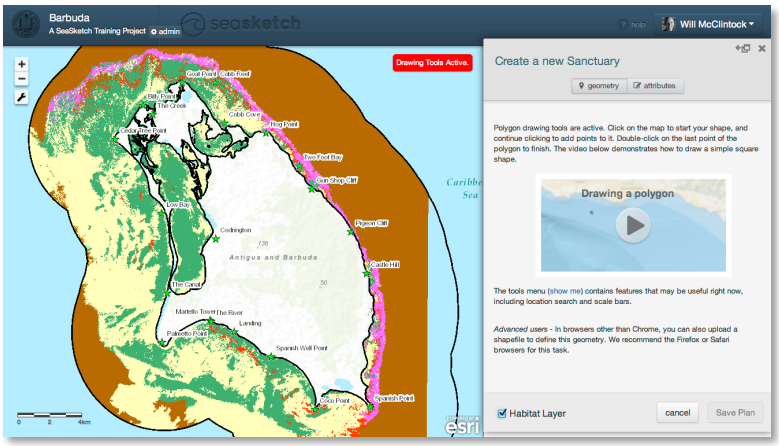


The **My Plans** tab is a workspace private to each user. Think of this as a sandbox where you can create sketches, see what they look like, analyze them and, *when you are ready*, share them with other users. An important part of this process involves playing with designs. You don't need to get anything "right" to begin with. Geodesign involves experimentation, so play around!

- Click "Create New and choose "Sanctuary"

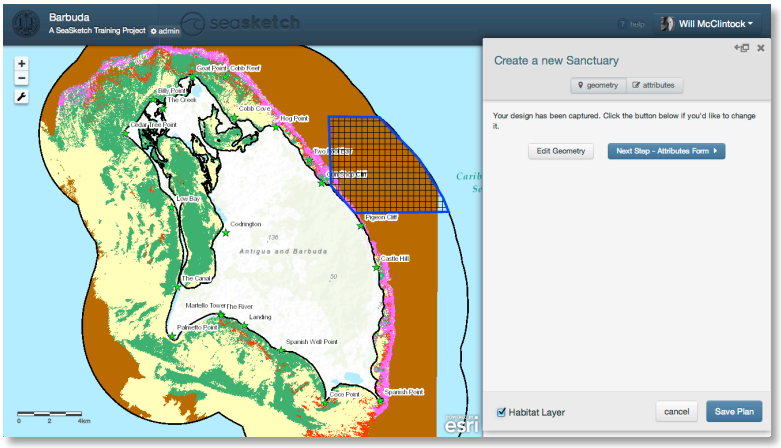


Once you've chosen to begin sketching a plan you may see new map layers appear. In this case, the Habitat Layer has been automatically turned on. This is a **Guide Layer** to help you visualize habitats that may need protection (i.e., it can be used to "guide" your thinking about where to place a sanctuary). You will also notice a red message box saying "Drawing Tools Active".

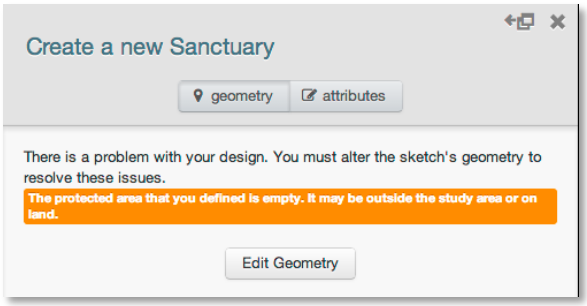


- Click the "play" icon to view a short video demonstration of how to draw polygons (areas) in SeaSketch.
- Following the instructions in the video, draw a simple square somewhere within the 3 nautical mile boundary. This boundary represents the coastal jurisdiction of the Barbuda Council.

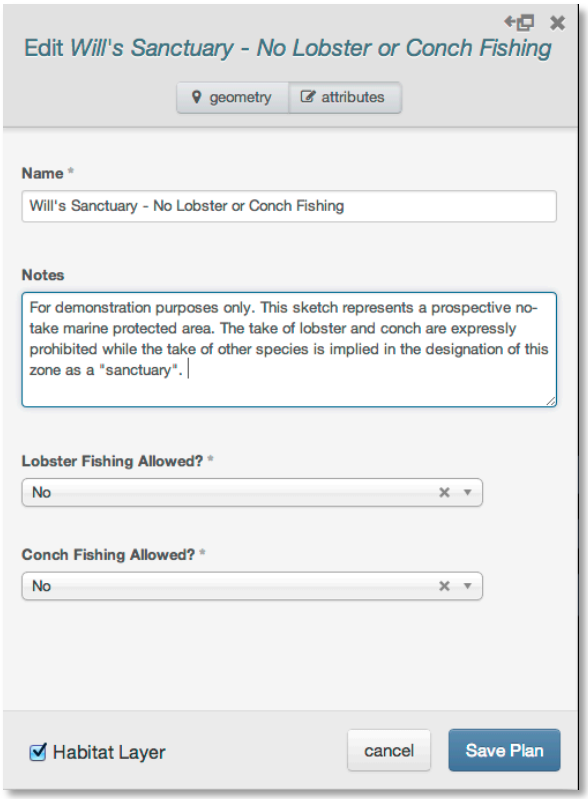
If you draw your polygon such that it overlaps with the 3 nautical mile boundary or if it overlaps with the island, your plan will be clipped to the boundary. In this project, plans can only be for ocean space within the 3 nautical mile boundary. In the image below, the sanctuary sketch has been clipped to 3 nautical mile boundary on both the land and oceanic sides.



If your plan falls completely outside the study region or on land, you will receive a warning and you will need to edit your geometry or create a new one.



- Assuming you have correctly sketched your Sanctuary within the study region, click "Next Step – Attributes Form"



- Give your Sanctuary a name.

In the Barbuda Blue Halo Initiative, all sanctuaries are no-take zones in which the extraction of anything is prohibited. Here, we have simulated a planning process in which sanctuaries may be "partial-take" zones – areas where lobster and/or conch may be extracted but nothing else may be taken.

- For the two questions asking whether lobster and conch fishing will be allowed, choose "no." This indicates that your zone will be a no-take zone. Fishing of any kind is not allowed.

It is always good practice to give your zone a name that will help others identify what it is, should you choose to share it with somebody. In the example above, I have named it "Will's Sanctuary – No lobster

or conch fishing." The name and descriptors are helpful in distinguishing this from other sketches that I or others have drawn.

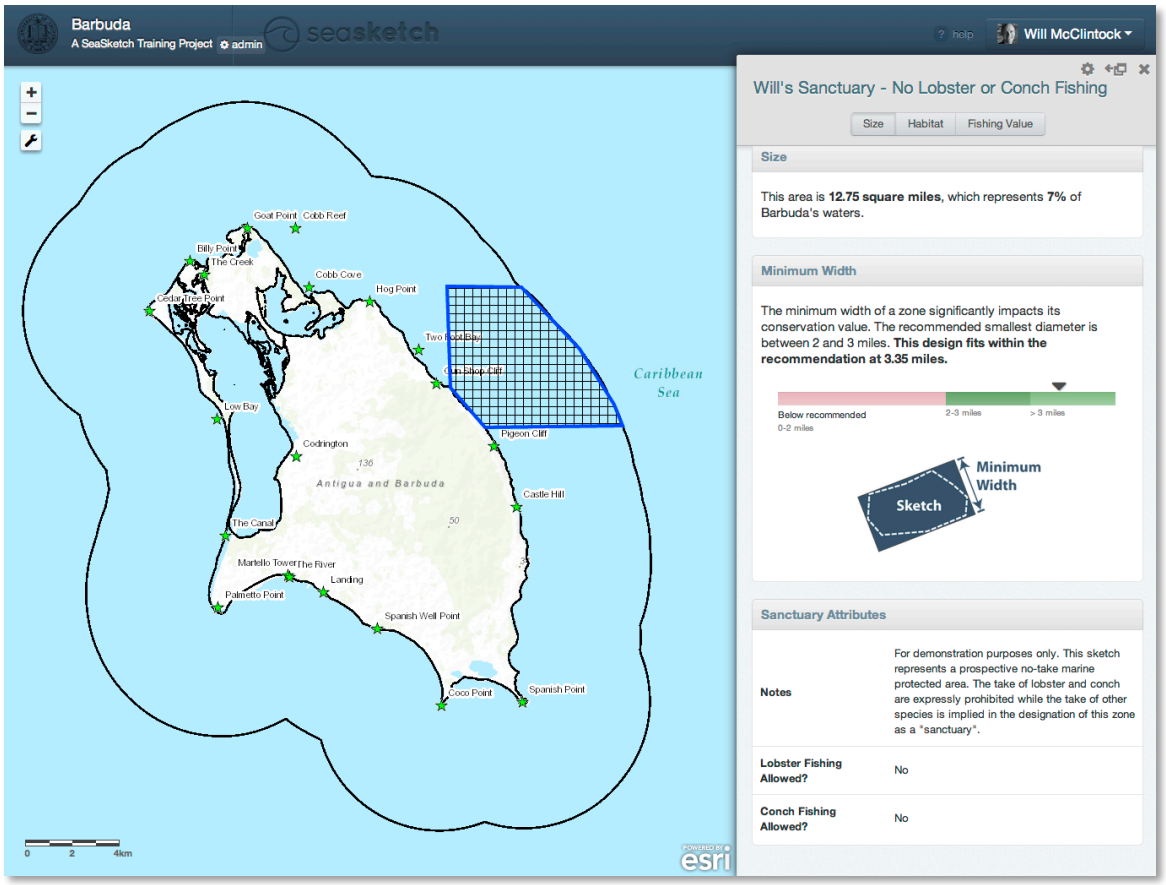
- Click "Save Plan" at the bottom of the attributes form. Your plan will now appear under the My Plans tab.

Congratulations! You have sketched your first plan. Now, you will learn how to analyze that plan.

Step 2. Viewing Attributes and Reports

The goal of this exercise is to help you understand whether your plans meet certain guidelines. For example, does your plan for a Sanctuary meet the minimum width guideline of 2-3 miles? Does your plan for a collection of sanctuaries (i.e., a prospective MPA network) meet the guideline of protecting 33% of each key habitat? Reports are one way to see if your plans are viable.

- Click on the name of your plan for a new Sanctuary to highlight it and then click "View Attributes and Reports". (Alternatively, you can right click on the name of your new Sanctuary and choose "view reports" or type the letter "v".)

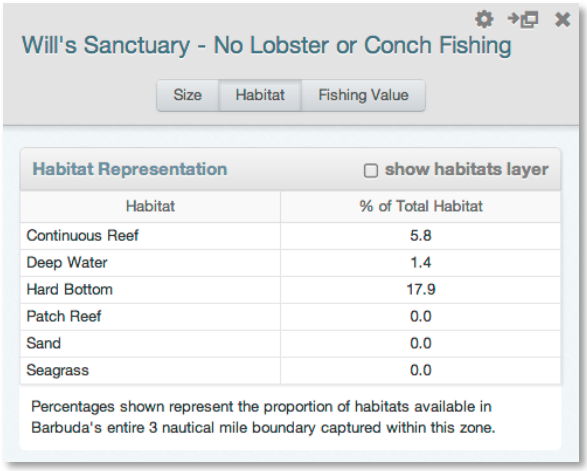


The first time you click "view attributes and reports" for any plan, it may take a few seconds to generate a report. After that, assuming you have not changed the plan in any way, the report will generate much more quickly.

Reports can contain multiple tabs. In the example above, the Sanctuary report includes 3 tabs: Size, habitat and Fishing Value.

The Size report includes information on the total size of the Sanctuary, the diameter of the Sanctuary and any additional attributes (e.g., whether you have allowed lobster and conch fishing and any notes you have included).

- How large is your prospective Sanctuary? _____
- Does it meet the 2-3 mile minimum width guideline? _____
- Click on the Habitat tab.

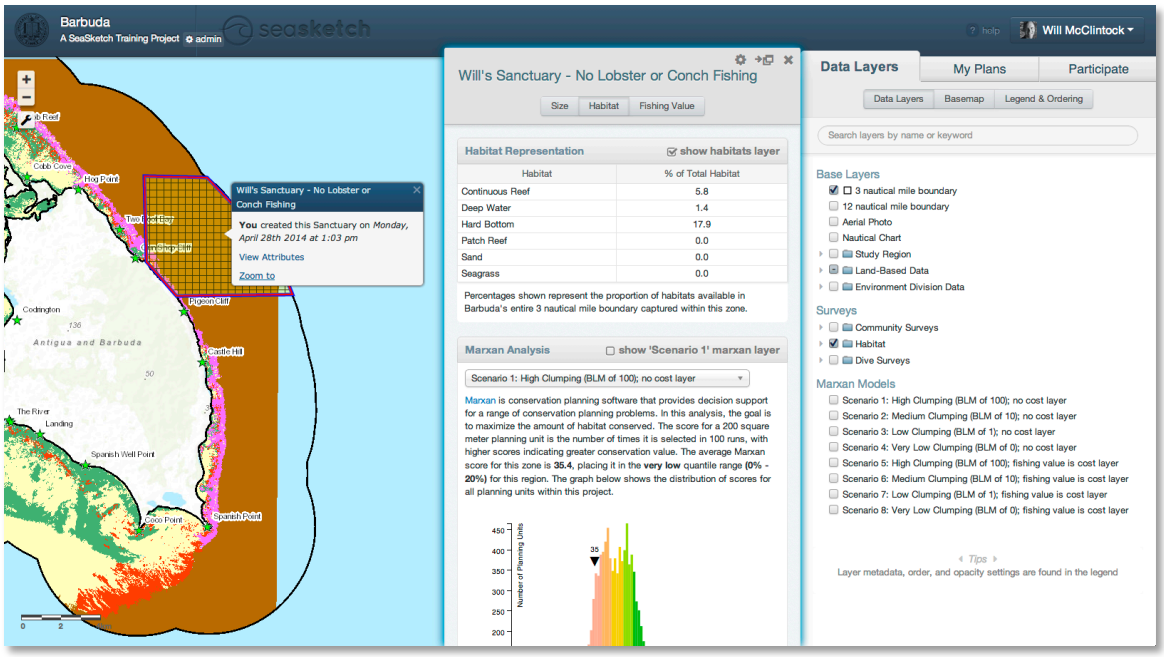


The Habitat report includes information on Habitat Representation, the type and amount of each habitat that would be protected by a Sanctuary in this location. The report above shows that my prospective Sanctuary captures 15.4% of the Continuous Reef habitat in Barbuda waters, 1.4% of "Deep Water", and 17.1% of Hard Bottom habitat. Notice that the Habitat Representation report also includes a links to the habitats layer. By clicking the check box next to the words "show habitats layer" you can view map layer that describe the distribution of ocean habitats within Barbuda's waters.

If you want to view a legend for the layers you just turned on, do the following:

- Move the report window to the side using the icon that looks like this:

- Click on the Data Layers tab, and then click on Legend & Ordering.



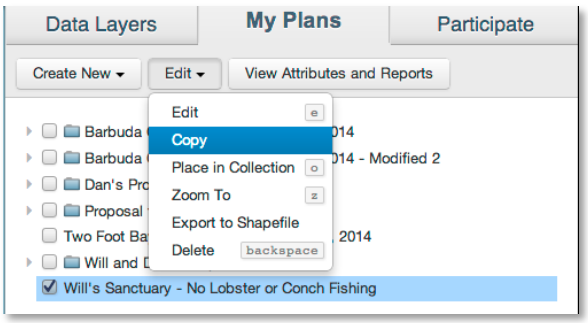
Notice that the Habitat report also includes information about a Marxan Analysis. You will learn how to interpret this report in another section.

- Close the report by clicking on the "X" and return to the My Plans tab.

Step 3: Editing Plans

Now that you know how to sketch plans and evaluate them with reports, you need to know how to refine and improve on them. In this section, you will copy your Sanctuary plan, change it to allow both conch and lobster fishing, and modify the boundaries. Then, you will compare the reports for your "no-take" sanctuary (the original) to your "partial-take" (modified) sanctuary to see how your edits have changed them.

- Under the My Plans tab, click on the Sanctuary plan that you created in the above exercise to highlight it. Then, click on the Edit menu and choose "Copy".

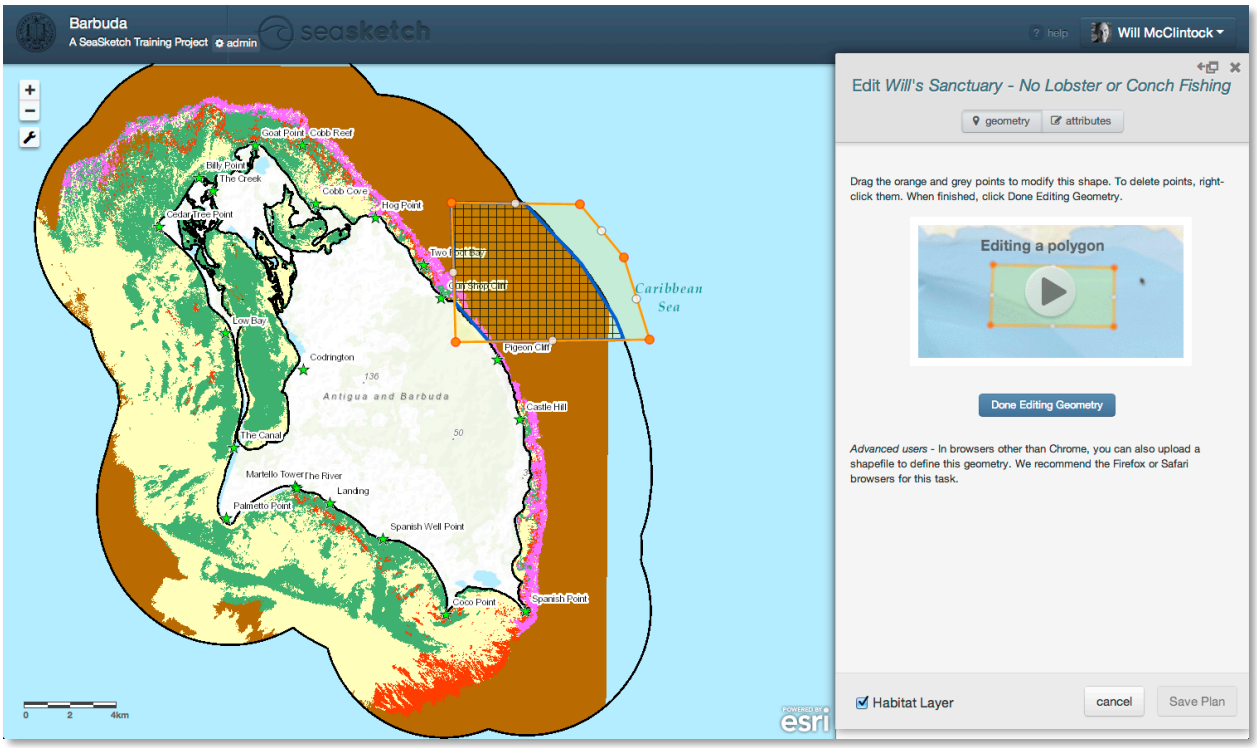


This places an exact copy of your plan under the My Plans tab.

- Click on the copy to highlight it. Then, click on the Edit menu and choose “Edit”.

Notice that you can choose to edit the geometry (shape), the attributes (name, notes, allowed fishing activities) or both. Start editing the geometry by clicking on the button that says “Edit Geometry”.

Notice that your plan has a few orange dots and a few white dots. These are points that you may click on and drag to change the shape of your plan.

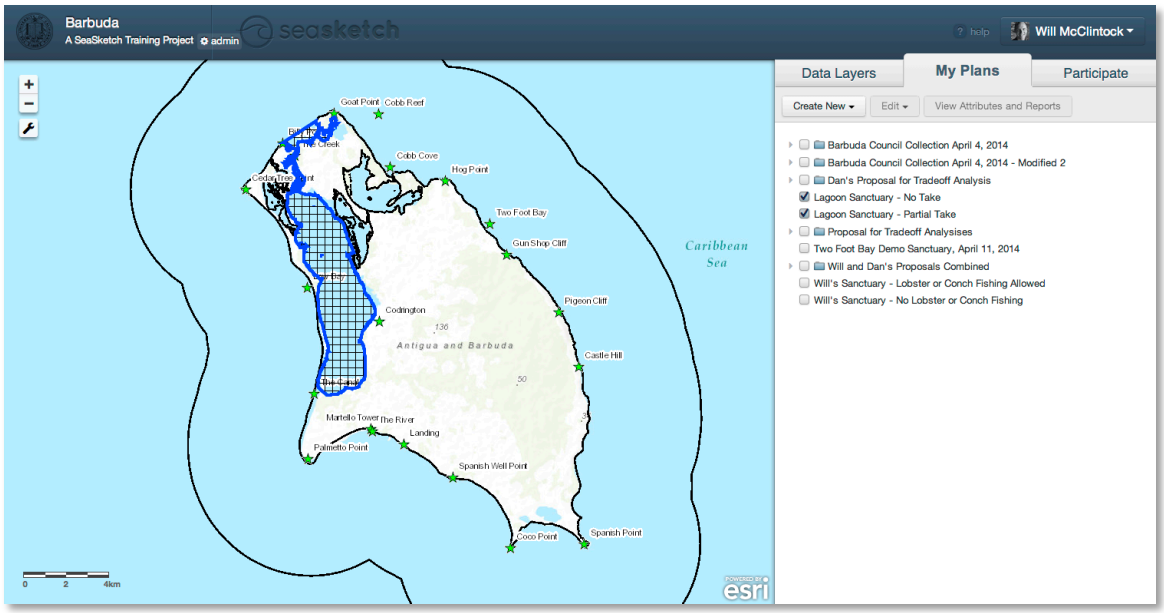


- Click on the Play button to view a short video on how to use these points. If you wish to view the video again, simply click on the video another time.
- Click and drag an orange point to change the boundary of your Sanctuary.
- Click and drag a white point. Notice that when you click and drag a white point, it changes to orange and two new, white points appear on either side of it. In this way, you can create more points and have complete control over the shape of your plan.
- If you right click an orange point you can choose to delete it. Note that white points cannot be deleted except by deleting the orange points on either side of them.
- When you are done changing the shape of your reserve, click “Done Editing Geometry” then click the Attributes button.

- Change “Lobster fishing Allowed?” and “Conch Fishing Allowed?” to **Yes**.
- Change the name to reflect the fact that this prospective sanctuary now allows lobster and conch fishing.
- Click “Save Plan”.

ASSIGNMENT: Create Two Alternate Sanctuaries in the Lagoon

- Using the skills you developed above, draw two alternate sanctuaries in the lagoon. They may cover all or some of the lagoon but the two sanctuaries *should cover the same are*a (i.e., have the exact same geometry) but have different attributes:
    - One of the lagoon sanctuaries should be a no-take zone (that disallows lobster *and* conch fishing).
    - One of the lagoon sanctuaries should allow lobster fishing.
- Make sure that you name them such that you can identify which one is a no-take sanctuary and which one is a partial-take sanctuary.

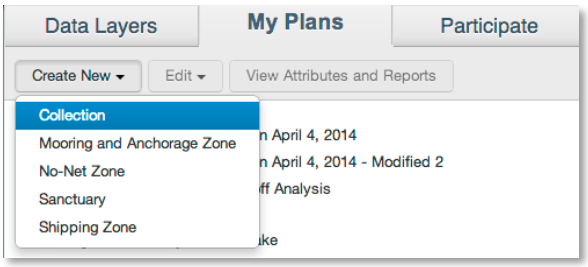


Step 4: Creating a Collection

In the exercises above, you sketched and edited plans for two types of Sanctuaries, a "no-take" sanctuary and a "partial-take" sanctuary that allowed lobster fishing (but no other kind of fishing). SeaSketch may also be used to sketch and evaluate mooring and anchorage zones, shipping zones and no-net zones. A comprehensive plan may include all types of zones.

Collections of zones that constitute a prospective comprehensive plan may sometimes be referred to as "Arrays" or "Networks", particularly when talking about marine protected areas (MPAs) or sanctuaries. You can think of a Collection as a type of folder that includes one or more sketches. Once you have created a Collection and added a few sketches, you can run a report to evaluate the entire group of sketches.

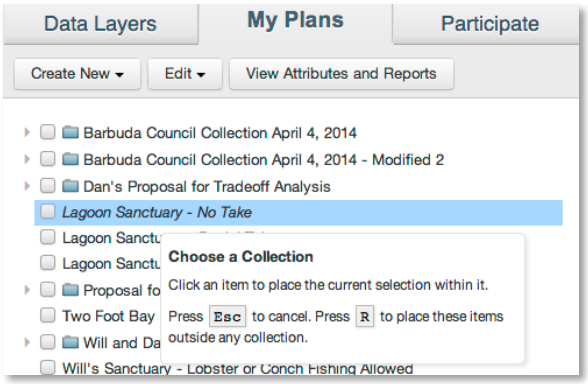
- Under the My Plans tab choose "Create New" and then select "Collection." This type of Collection may include any type of sketch. (Sometimes collections may be restricted to a particular sketch class.) For the purposes of this exercise, we will create a collection of no-take sanctuaries.



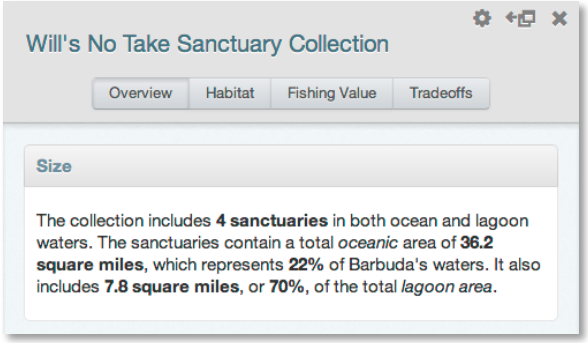
- Name your collection. As with individual plans, it is helpful to identify a Collection with your name and a description (e.g., Will's No Take Sanctuary Collection). Then click, "Save Plan."

- Click on one of the no-take sanctuaries you created to highlight it. Then, click the Edit menu and select "Place in Collection".

Notice that a pop-up window now appears to be associated with your cursor.



- Click on your new Collection. This will place the Sanctuary inside the Collection.
- Repeat these steps to place at least one other no-take Sanctuary inside the Collection as well. If you need to, sketch additional no-take sanctuaries to place in this collection.
    - *Note that in order to be a legitimate plan, your sanctuaries must not overlap in space!* It would not make sense, for example, for a no-take marine sanctuary (that does not allow fishing) to overlap with a partial-take sanctuary (that allows some fishing).
- Click on your Collection and then click "View Attributes and Reports". This report takes a long time to run! If you like, you can close the report and check back later to view the results. Eventually, the overview report should indicate how many sanctuaries are in your collection and the amount of oceanic and lagoon area is protected. In the case below, I have analyzed a collection of 4 sanctuaries.



ASSIGNMENT: Create a New Partial-Take Collection

- Using the skills that you acquired in the above exercise, create a new Collection that includes copies of the no-take sanctuaries you placed in the above collection. *Hint: you can copy the entire collection at once!*
- For each Sanctuary in your collection, change the "Lobster Fishing Allowed?" attribute to "Yes", indicating that you will allow lobster fishing in each of your sanctuaries, but prohibit all other kinds of fishing (including conch). Save your collection and call it something like "My Sanctuaries – Lobster fishing allowed".
- Compare your collections. *Hint: you can compare two reports side-by-side using this icon:*

- Ensure that the values in the "Habitat" report for each collection is identical. In other words, because you only changed the attributes (i.e., Lobster Fishing is allowed), and did not change the geometry of any of the sanctuaries, these habitat reports should look the same.

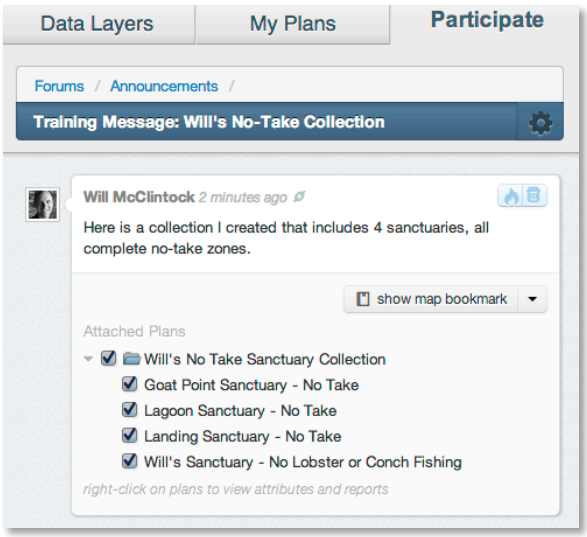
Exercise 5: Collaboration

The Barbuda Blue Halo planning initiative involved quite a bit of collaboration, which is common for many MSP exercises. SeaSketch was been designed to facilitate collaboration, primarily by means of sharing through discussion forums. In this exercise, you will collaborate with others by sharing one of your plans, copying plans from others, editing a shared plan and combining plans into a Collection. You will also discuss differences between your plans and those shared with you in forums.

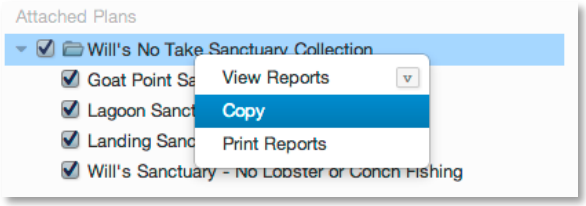
Step 1: Copying a Collection

- Under the Participate tab, find the topic in the Announcements forum called "Training Message: Will's No-Take Collection"

Notice that I posted a message that includes a plan called "Will's No Take Sanctuary Collection". If you click the arrow next to the Collection name, you can see the names of all three zones included in the Collection.



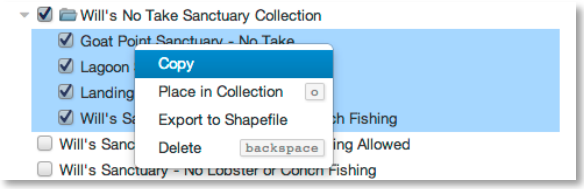
- Right click on the Collection name and choose "copy".



This places a copy of my Collection under your My Plans tab. You can now rename this Collection, add or remove the zones contained in the Collection, modify the attributes and geometries of individual zones. Doing so does not change the Collection that I originally posted.

- Create a new Collection and give it a unique name.

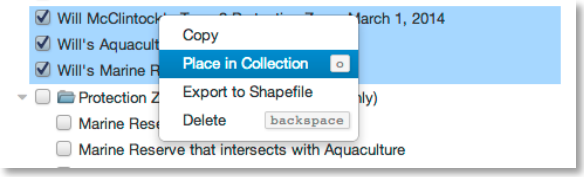
- Hold down the shift key on your keyboard and click on the four Sanctuaries within "Will's No Take Sanctuary Collection".
- Right click on your selection and choose "Copy".



This will place copies of all four of my zones under the My Plans tab, outside of any collection. Now, you will move these into the new Collection that you created above.

Step 2: Combining Zones from Two Collections

- Hold down the shift key on your keyboard and click on the four Sanctuaries you just copied and that now sit outside of any Collection.
- Right click the selected zones and choose "Place in Collection"



- Click on your new, empty Collection to place the four Sanctuaries zones into your Collection.
- Repeat the above steps to add copies of your own zones to the new Collection. (Note your own Collection was created in Exercise 4, Step 4.) They may be a mixture of no-take sanctuaries and partial take sanctuaries, or purely one or the other.
- When finished, you should have a Collection that contains some zones that you copied from my Collection and some zones that you sketched. Mine looks like this:

- Turn on all of the zones in your collection that combines your zones with mine.

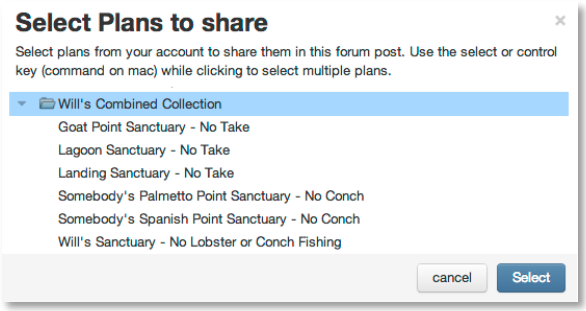
- If any of the zones overlap, modify the boundaries so that they no longer overlap or, if necessary, delete some of the zones. The goal is to have a collection that includes some of your zones and some of my zones, none of which overlap.

When you are finished, you will have a unique collection of zones that were collaboratively designed. This process is sometimes called "collaborative geodesign".

Step 3: Sharing and discussing your Collection

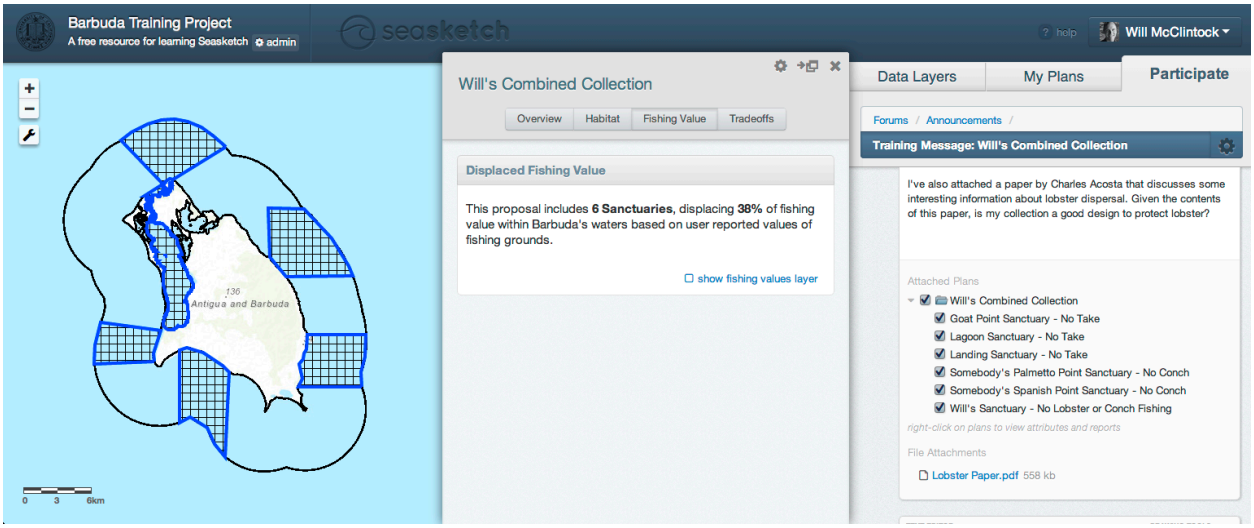
Collections, just like individual plans (sketches) may be shared and discussed in forums. In this section, you will share your collection with other users and begin a dialog about the relative merits of your collection versus those put together by other users.

- Under the Participate tab, click "Training Forum" and then click "Create a Topic".
- Name your topic something to help people understand what you would like to discuss (e.g., Proposed Sanctuary Collection).
- Before typing any text in the body of the message, click "Attach Plans" and select the collection you would like to share with the Forum. Simply click on the name of the collection and the click "select".



- Type a description of your collection to highlight some important facts about it. You may wish to view the report associated with your collection while you write about it. Hint: right click on your collection to view the report, and then use this icon to move the report to the side.

You may want to use bold text, italics or bullet lists to highlight some of the key facts about your collection. If you have any supporting documents (e.g., papers that reinforce your design), you can attach those files to your message.

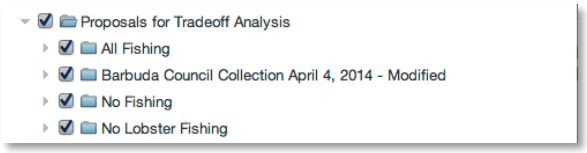


After posting your message and the attached plan, look to see if anyone else has posted a topic in the Training Forum.

ASSIGNMENT: Create a Collection of Collections

In the next exercise you will be learning to compare the tradeoffs between multiple proposals (i.e., collections). To conduct a tradeoff analysis in SeaSketch, you must place each of your collections into a single collection. In other words, you will create a collection of collections!

- Look to see if somebody else has posted a collection to the Training Forum. If they have, copy their collection into your My Plans tab. (If nobody has posted a collection, just use the one that I posted in the Announcements Forum under the topic: "Training Message: Will's combined Collection."
- Create a new collection and name it something like "Proposals for Tradeoff Analysis"
- Move your collection, and one or more collections you've copied from other users, into this new collection. You will then have a collection of collections (i.e., two or more folders within one folder).



Exercise 6: Tradeoff Analysis

In previous exercises, you sketched individual zones (e.g., sanctuaries) and assigned attributes (e.g., no lobster fishing, no conch fishing, etc.), and then placed these individual zones into collections. You evaluated individual zones and collections to get a sense of what habitats they will protect.

In SeaSketch, you can compare sketches and collections to evaluate the relative tradeoffs between the two. In the most simple "tradeoff" analysis, you can simply generate reports for two zones or two collections and compare them side-by-side. This isn't what is usually meant by a tradeoff analysis but it is definitely useful.

For example, the image below shows a comparison between two collections – one called "All Fishing" and one called "Barbuda Council Collection April 4, 2014 – Modified". As you can see, the Barbuda Council collection does a much better job of reaching the 33% protection goal for each of the key habitats in Barbuda. The "All Fishing" proposal falls short of meeting the guideline of 33% protection for Continuous Reef, Deep Water and Hard Bottom habitats.

Exercise 6: Advanced Topics

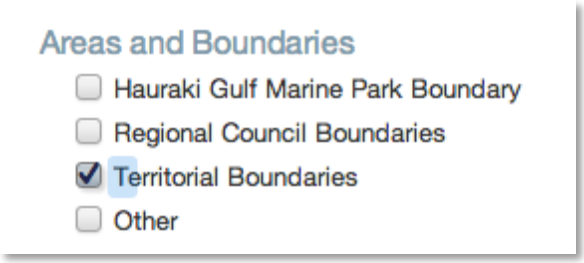
Topic 1: Troubleshooting

From time to time you may experience problems with SeaSketch. As discussed in Exercise 1, Step 3, the Help system in SeaSketch might be used to find answers to questions about how to use SeaSketch. As a general rule of thumb, if you are having trouble with SeaSketch, do the following before using the help system:

- Check to ensure that you still have an Internet connection. SeaSketch is a web-based tool and will not work without an Internet connection. If you have lost your Internet connection, re-establish your connection before continuing to use SeaSketch.

In addition, you should be aware of the following issues and ways to help resolve them.

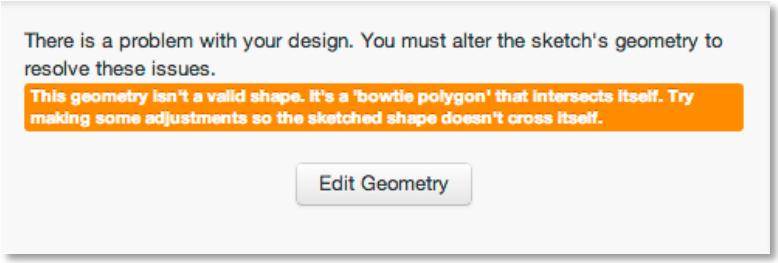
- **Map layers are not loading**. When you click on the checkbox next to a map layer name, you are actually making a request to a remote server to load some data. If the server is overloaded (busy) or if the data are not available (i.e., the map service is "down"), you will see a blue bar appear over the layer name. In the example below, the blue bar is starting to show up for the Territorial Boundaries layer (for a different SeaSketch project). When this happens, you can only wait for the layer to load. If the blue bar continues to show and the layers do not load, please use the Help system to notify the project administrators and let them know the name of the layer that is not loading.



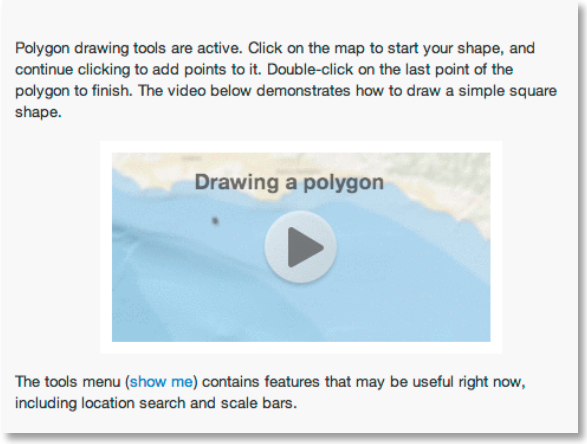
- **Reports are not working**. When you view a report in SeaSketch, you are triggering an analytical service on a remote server. Sometimes the service may not work and, in this case, you need to contact the project administrators using the Help system. Let the administrators know what you were doing (e.g., what kind of plan or sketch you were trying to generate a report for) when the report failed to work.

- **The cursor appears to be stuck to the map.** Sometimes your cursor may appear to get stuck to the map after clicking and dragging on it. In this case, even after releasing the mouse button, the map will move when you move your mouse. To restore SeaSketch to normal behavior, simply refresh your browser.

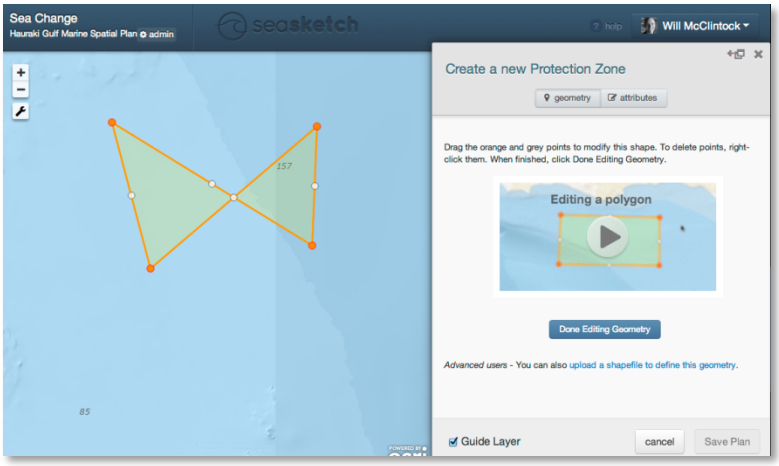
- **This geometry isn't a valid shape**. Sometimes when creating a sketch, you may see a message that says that the geometry isn't valid. This may occur when you are trying to draw a polygon (e.g., a box) and it is overlapping itself.



  - To correct this issue, draw your polygon again and remember to double-click AWAY from the first point to close your polygon.
  - Remember, you can always view the brief video on how to draw a polygon that shows up when you begin to create a new zone.



  - You can also edit the polygon so that the geometry does not overlap itself.



Topic 2: Engaging Constituents and the General Public

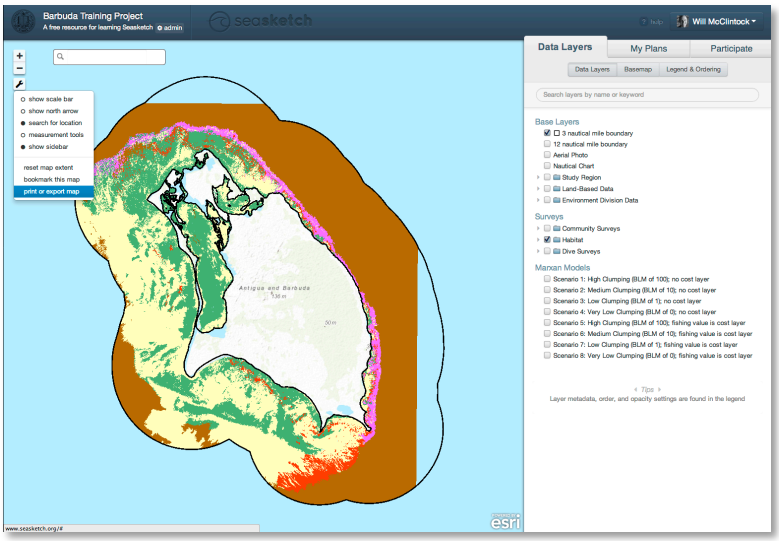
SeaSketch is open to the general public and we encourage you to engage the public in the design, evaluation and discussion about plans. Here are some of the ways you can do so:

Sharing the web address, training-barbuda.seasketch.org. You may share the address to the Sea Change project in SeaSketch with anyone you like. Remember that some functionality may be limited to privileged users. For example,

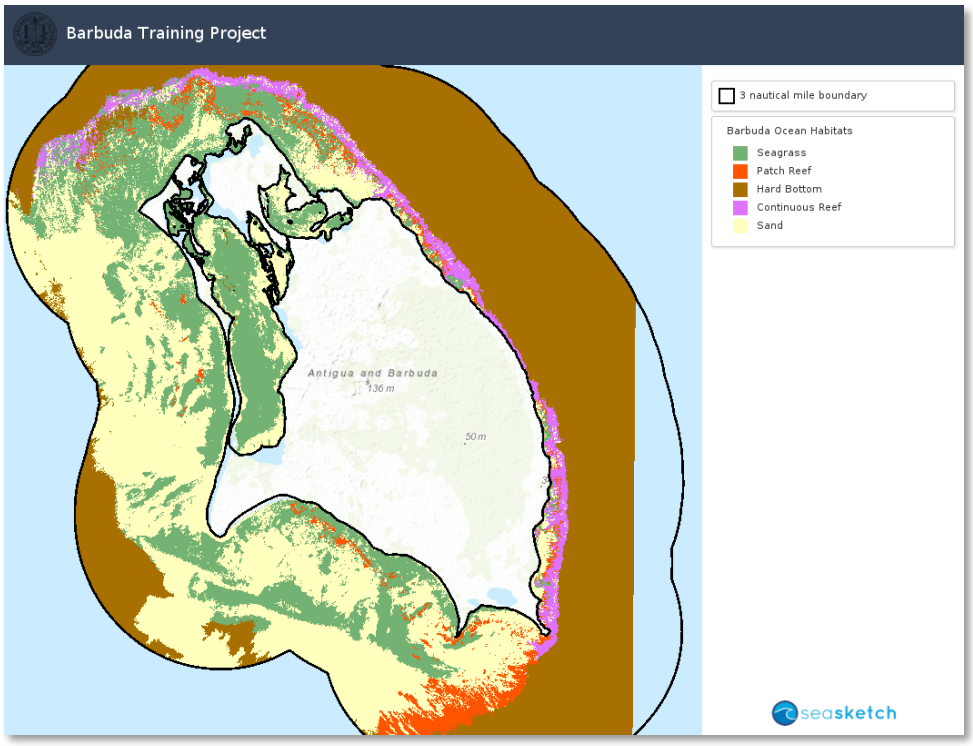
- Some data layers are private to some predefined groups (e.g., staff).
- Some forums are private to some groups (e.g., your class).

So, while the Barbuda Training project in SeaSketch is public, they may not be able to see everything you see, simply because you may be a privileged user.

Printing maps. You may print or save maps in SeaSketch in two formats: PNG and PDF. These may be shared with others via email or in printed form. To save a map as PNG or PDF, select "print or export map" from the tools menu.

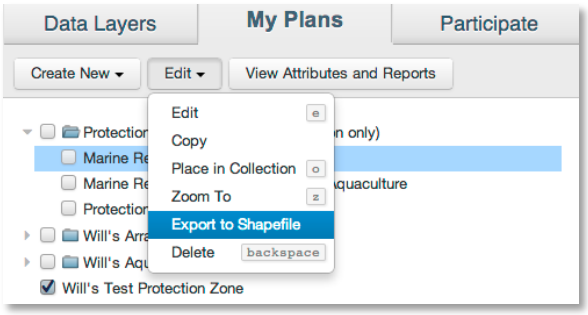


A map will be saved to your computer, most likely in your Downloads folder. Maps may include a legend and will include any plans you have turned on.

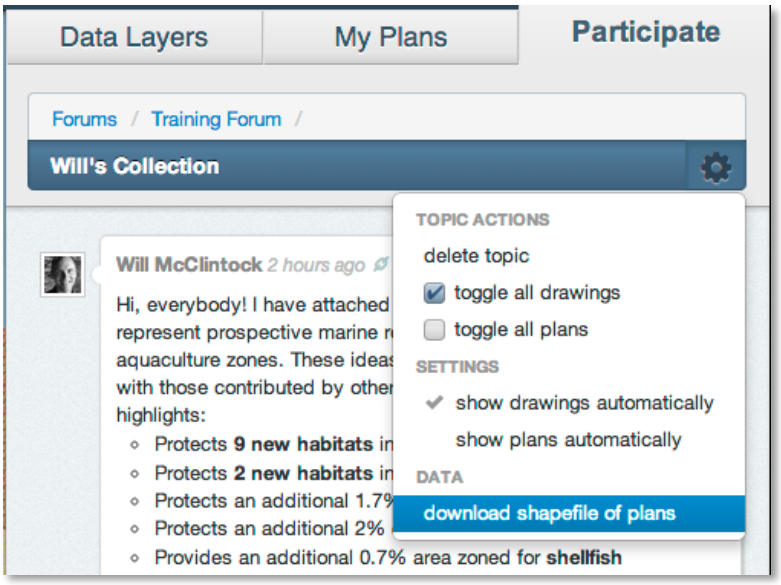


Sharing a plan as a Shapefile. *Advanced users* with experience in geographic information systems (GIS) may wish to download plans as Shapefiles, a format that can be opened with applications such as Esri's ArcMap.

- Individual plans may be exported as Shapefiles by highlighting a plan under My Plans, clicking the Edit menu (or right clicking) and choosing "Export to Shapefile". This will create a compressed (zip) file that contains the Shapefile.



- Additionally, you can download all of the plans in a given Forum by clicking on the cog icon in a forum and choosing "Download Shapefile of Plans."



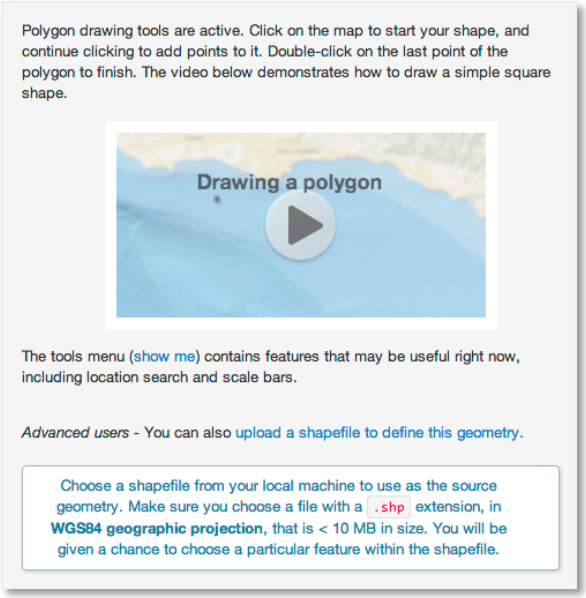
When plans are exported from SeaSketch as Shapefiles, they are unprojected in geographic coordinates (WGS84 datum).

Topic 3: Uploading Shapefiles as plan components

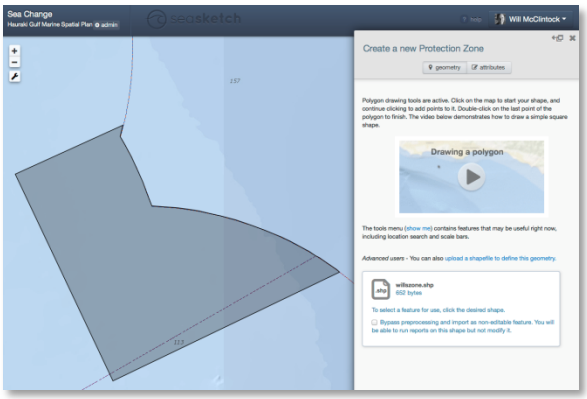
Typically, plan components such as prospective Marine Reserves or Aquaculture Zones are sketched. Those with GIS experience may wish to upload plans from Shapefiles. This is possible but note that complex Shapefiles (i.e., those with many vertexes) may only be uploaded as a non-editable shape. In other words, in order to upload a Shapefile and then edit the vertexes, the Shapefile must contain a relatively low number of vertexes. This number is not fixed so it may take some experimentation to see what can be uploaded as an editable shape.

To upload a plan as a Shapefile, follow these steps:

- You must use Firefox, Safari or Internet Explorer. Currently, this function is not supported in Chrome.
- Save your Shapefile to your hard drive in the unprojected geographic coordinate system, WGS84.
- In SeaSketch, under the My Plans tab, click “create new” and select a zone type (e.g., Protection Zone or Aquaculture Zone).
- Click “Upload a Shapefile to define this geometry and read the instructions. Locate the file with the .shp extension (you can ignore the others), then drag and drop this file onto the map in SeaSketch.



- You may only upload a single geometry at a time. If you have chosen a Shapefile with multiple geometries, you must click on the one that you wish to upload.



- Notice the checkbox, “Bypass preprocessing and import as non-editable feature. You will be able to run reports on this shape but not modify it.” Choose this option for large, complex geometries.

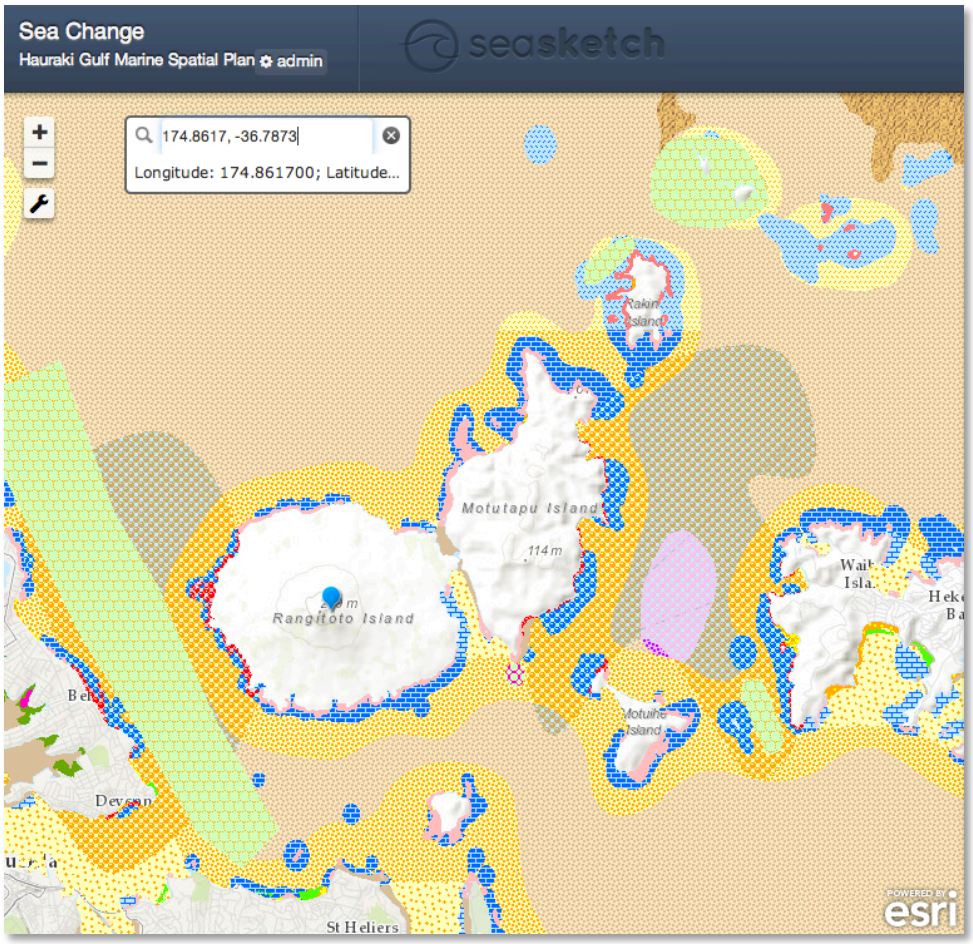
- Follow the normal procedures for completing attributes and saving your plan.

Topic 4: Searching for a location with coordinates

If you know the geographic coordinates for a location and you would like to find it on the map, open the “Search For Location” window under the tools menu (spanner icon).

- Enter coordinates in decimal degrees, longitude first, latitude second (X, Y format) and press enter. Note, you cannot use degrees, minutes, seconds, or degrees decimal minutes. SeaSketch uses the WGS84 datum. If you recorded your coordinates in another datum, the location

SeaSketch finds may not be precise. If this is a concern for you, you must reproject your coordinates using the WGS84 Datum.



Topic 5: Confidentiality Provision

SeaSketch contains a combination of publicly available and private information. Public information may be viewed at seachange.seasketch.org without logging in. Once logged in, additional map layers and discussion forums may be accessible to you if you have been granted permission. You are free to share publicly available information but not private information. In particular, please do not share information from discussion forums that are private to the stakeholder working group (SWG). The project conveners may elect to reinforce or supplement these confidentiality provisions through the use of formal ground rules or process guidelines that would be formally adopted by the stakeholder working group and shared with the public.

APPENDICES

Appendix A: SeaSketch at a Glance

User Groups	• Are configured by SeaSketch project administrator. • One user can be included in multiple Groups. • Self-registered users that haven't been assigned to a group by the project administrator are automatically categorized into the 'Non-Project Self Registered'.
Forums	- Are enabled by the project administrator and can be customized to be: - Readable (by public, administrators only, or by group) - Writeable (by public, administrators only, or by group) - Can be customized so project administrator needs to approve messages before they are published • - Messages be flagged as "inappropriate" and reviewed, deleted or accepted by administrators
Map Layers (geospatial data)	• Accessible to everyone by default. Access can be restricted to specific user groups. • Pop-up boxes with attributes can be customized to display specific attributes including hyperlinks, images (if available)
Reports	Analytical reports may be tied to sketches (also known as plan elements).
Sketch classes	- Also known as "plan elements" such as prospective aquaculture or protection zones. - Are publicly available by default unless access per user group is specified. - May be tied to analytical reports that detail the potential consequences or value of a prospective zone. - Are configured by project administrators.
Surveys	- Can be run within the SeaChange project on SeaSketch or run separately (own project) - Determine length of time survey is accessible - A survey may be open to everyone or by invitation only, require login or not or be entirely anonymous - Surveys can be customized to restrict one single response by user or be unlimited

Appendix B: Glossary

Annotation	Also called a "drawing". Within a discussion forum, users may place points, lines and polygons as a means of calling attention to geographic locations or features. Annotations are to be distinguished from plan elements (aka "sketches"), which are prospective plan elements and may be analyzed. Annotations cannot be analyzed, nor can they be exported from SeaSketch.
Array	A collection of prospective management zones, such as a group of aquaculture zones and/or protection zones.
Collection	Sometimes called an "array" or "network", a collection is two or more zones that have been grouped together, representing a prospective comprehensive plan.
Drawing	
Feature	
Basemap	A map layer upon which all other map layers are placed. In SeaSketch, basemaps are provided by Esri, Inc., and cannot be altered. In other words, the Sea Change project does not have any control over the names, features or cartographic representations in any of the base maps. They are provided, "as is".
Layer	A dataset that describes the distribution of geographic features. In SeaSketch, map layers are found under the "data layers" tab. These are the authoritative datasets provided by the Sea Change project partners.
Map Extent	A map extent is the portion of area of a region shown in a map.
Pan	Panning refers to the horizontal scrolling of an image that is wider than the display. In SeaSketch, you can pan by clicking and holding your mouse button down anywhere on the map, then moving your mouse.
Plans (and plan elements)	A point, line or polygon representing a prospective management plan. In the Sea Change project, these may be prospective Aquaculture Zones, Protection Zones and Collections. Plans may also be referred to as "sketches" and should be distinguished from annotations (aka drawings) than cannot be analyzed.
Reports	Analytical reports generated when a user selects a plan and chooses "view

	attributes and reports". These reports analyze the user-generated plan using a set of data layers and analytical routines. Reports tell the user something about the potential consequences of the plan, such as whether it meets science and/or policy guidelines.
Sketch	This term is sometimes used interchangeably with "plan elements". Using the tools under the My Plans tab, users may sketch prospective plan elements and generate reports on the potential consequences of that plan.
SeaSketch	A software service for marine spatial planning located at www.seasketch.org

Appendix C: MarineMap in California

The Marine Life Protection Act Initiative (MLPAI) was a marine protected area (MPA) planning initiative that took place in California, 2005-2011. During this process, stakeholders were tasked with designing a network of MPAs within state waters that met science and policy guidelines for ecosystem protection.

California was divided into four study regions along the coastline and planning occurred sequentially through these regions. In each study region, there was a group of stakeholders with a broad range of experience and background, and representing various stakeholder interests. Very few had a science or technology background and yet all were tasked with using scientific information and geospatial technology to design a network of MPAs.

Stakeholders used a web-based application called, MarineMap, to (a) visualize geospatial information about the distribution of resources and activities in and around California state waters, (b) sketch and evaluate prospective protected area designs, and (c) share these sketches with other stakeholders. Because MarineMap was a web-based application and very simple to use, it was accessible to anyone with a standard web-browser and an Internet connection. MarineMap was used in stakeholder meetings *and* by individuals, at home and in between meetings where they could explore information, experiment with designs and consult with their constituents.

Stakeholders collaborated with each other – online and in public meetings – to iterate through designs and, ultimately, create between 1 and 3 complete MPA network proposals that signed into law. With little or no modification to the designs, the California Fish and Game Commission accepted stakeholder proposals, in part because *stakeholders* had authored the plans using the best available science, information and technology.

The process of iterative sketching and evaluation is sometimes called “geodesign”, a process that combines science and the unencumbered art of design. The designer – California stakeholders in this case - is free to explore any potential design and receive analytical feedback on the consequences of design. Geodesign is also a means by which one can explore and understand the planning process itself, or the data that are used in making decisions.

Stakeholders in the MLPAI reported that MarineMap was one of the most important tools available in helping design California’s new network of MPAs. SeaSketch capitalizes on the lessons learned from MarineMap and the MLPAI process and represents the next-generation collaborative geodesign tool for marine spatial planning.

You may read more about the use of MarineMap in the MLPAI by visiting this link: http://goo.gl/mmhgqM.