

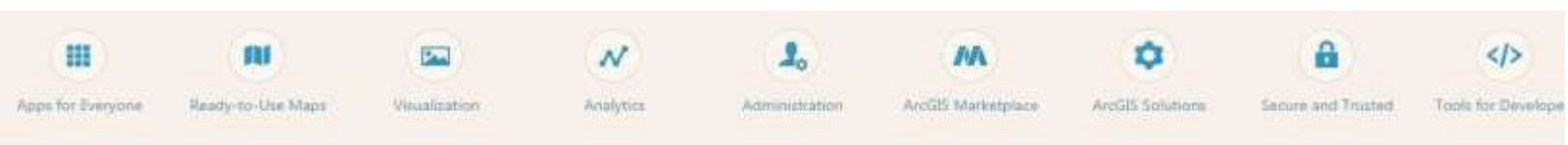
Mapping Without Limits

ArcGIS Online is a Complete, Cloud-Based Mapping Platform

ArcGIS Online

Overview

ArcGIS Online is a web-based mapping and app-building site created by Esri, one of world's leaders in GIS software. In an effort to empower users of all levels to create interactive maps and applications that are easy to share, Esri developed ArcGIS Online platform to realize its vision. With both a free version for lay users and an organizational account for larger enterprises, the functionality is tailored to different mapping and application needs. Not only can users create custom maps using their own data, but they can also publish ready-to-use apps that make sharing information easy and intuitive for their audience. This guide explores the capabilities that come with the free version, which is available to anyone with an Esri Global Account.



Setting Up

Although ArcGIS Online can be used without setting up an account, it also means not being able to save your maps and applications. For the purpose of this guide, we will set up a free Esri Global Account, which you can use to access not only ArcGIS Online but all of Esri's training resources.

- Go to <http://www.arcgis.com> and click on **Sign In**.
- At the bottom left of the page, click on **Create a Public Account** and fill in the necessary information.
- Which will take you to you to your profile and you can start using ArcGIS Online.

In this guide, we are going to learn how to use different features of ArcGIS Online such as creating basic maps, adding in layers, changing the symbology of the layers, creating and sharing web applications. Once you have finished this tutorial, you should have a high understanding of the main functions of ArcGIS Online and should be able to produce simple maps. By using data available online through their server as well as learning how to upload and use your own data from multiple sources.

Getting Started

To begin, click on the **Map tab** along the top of the ArcGIS Online home screen. This will pull up a new blank map named My Map (Figure 1). Take a moment to become familiar with the different parts of your map. Next to the title is a dropdown menu for navigating through ArcGIS Online such as finding a saved map. In the top-right-hand corner of the page is a New Map button that opens a new blank map (you will be prompted to save your current map if it has any unsaved changes). Next to that is your account username with a dropdown menu for account settings. The left sidebar contains the details of your map, including an **About tab**, a **Content tab**, and a **Map Legend tab**.

There are several buttons along the top of the map allowing you to various things with your map. The **Add** button provides a dropdown menu with different options for adding data. The **Base map** button allows you to choose from 10 different styles of map that will underlie your data (Topographic is the default).

The **Save** button lets you save the map as you add features to it and **Share** icon pops up a dialog box giving various options for distributing your map.

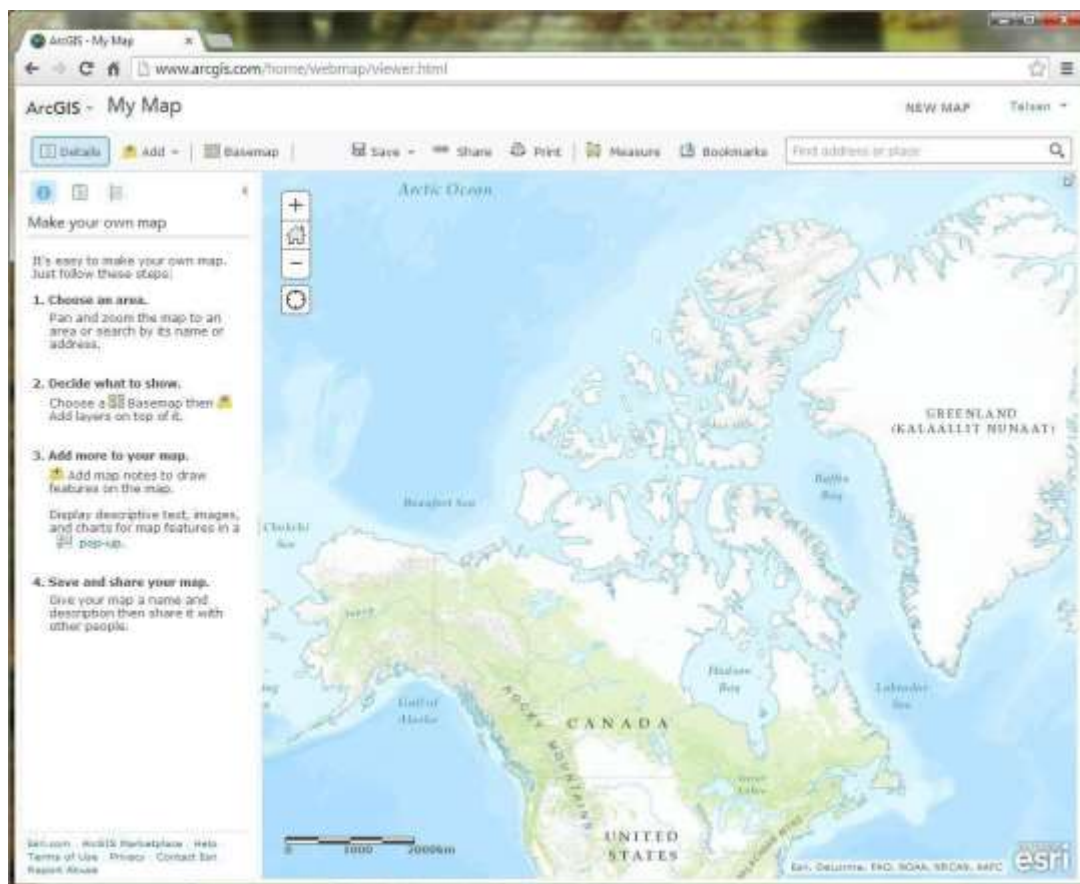


Figure 1 - My Map Viewer

Print takes a snapshot of the map and its peripheral info that can then be printed. By using the **measure area and distance** tool you can get directions from point A to B, measure distances and identify its latitude-longitudinal coordinates. The bookmarks tool allows you to save a location by recording the extent and position on the map, allowing you to switch between multiple places.

Afterwards, you may want to use the Search box to find an address or a place. Navigating the map is relatively easy: click and drag to Pan the map and Zoom In and out using the scroll wheel on your mouse.

Picking a Location

For this tutorial, you will be creating a map that displays various parks and popular tourist attractions located in Honolulu, Hawaii. The capital city of Hawaii is Honolulu, located on Oahu Island, which is one of the eight main islands in Hawaii. You will be using data primarily from the ArcGIS Online server, the City and County of Honolulu's Open Data Catalogue (<http://honolulu-chnl.opendata.arcgis.com>).

The first step in working with your map will be to choose a location to work in. For this guide, we will use **Honolulu, Hawaii**. In the Search box, type in Honolulu and select the **"Honolulu, HI, USA"** option.

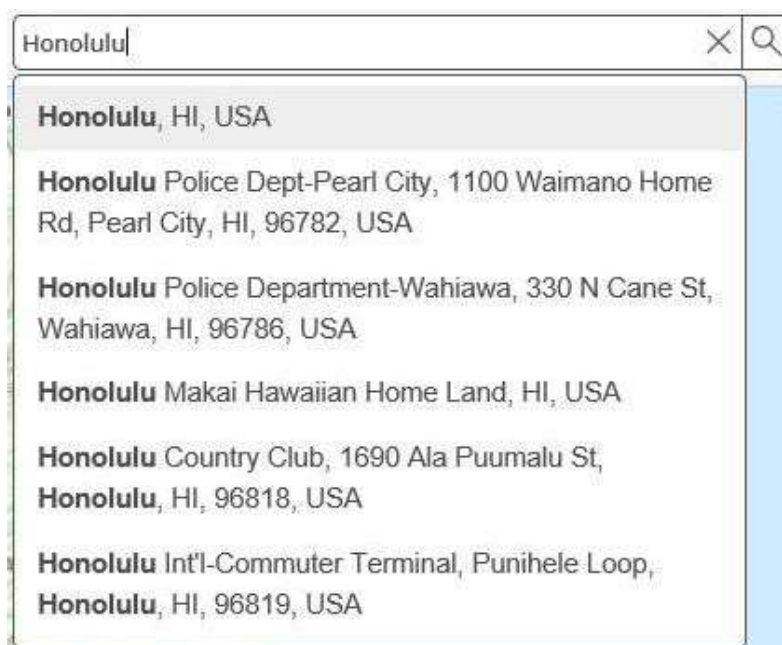


Figure 2 - My Map Search Box

At this point, you should Save the map and give it some information. Note that the map extent will also be saved, so make sure you are zoomed into Honolulu. The image below (Figure 3) displays the map extent that covers the City of Honolulu.



Figure 3 - City of Honolulu View Extent

Click on either the **Save** or **Save As** option and name the map. You can use the information below (Figure 4) to populate the fields or come up with your own **Title** (short, but descriptive), **Tags** (keywords that are used for searching purposes), and Summary (a brief description of what the map is or what it shows). Saved map can be found under **my contents**.

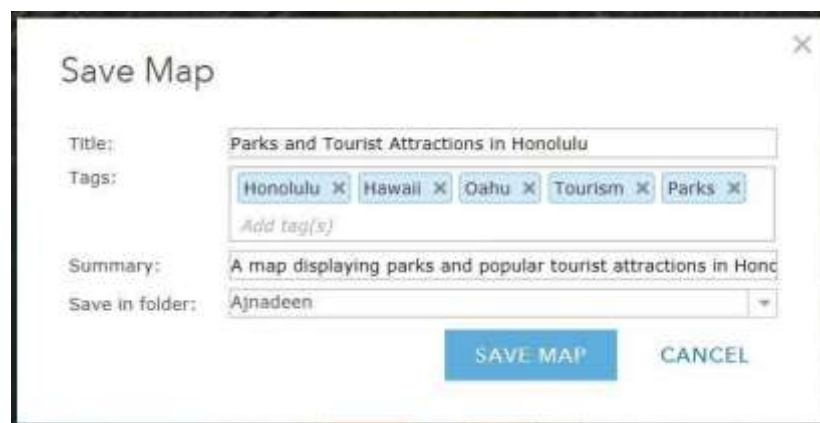


Figure 4 - Save Map Pop-up Field

Creating New Data

Now that we have a set location, we can start adding features to our map. To do this, we need to **Add Map Notes**, which function as editable layers in the map. Click the Add menu and choose Add Map Notes. This pops up a dialog box, which allows you to name your notes and choose from several different templates for different applications. For now, keep the default settings and click Create.

You will notice that the **Details** pane on the left automatically changes to **Edit** pane, which contains tools for creating four basic features; Points, Text, Lines and Areas. We will start by creating a point feature using the Pushpin. Click on the **point tool**, and then zoom into the **Diamond Head State Monument**. After selecting the Pushpin from the point tool, zoom into the Diamond Head State Monument found on the Southeastern part of the island. Name the point Diamond Head State Monument. You can either leave the description blank or fill it in with a brief overview about the site. If you want to change the appearance of your marker, click **Change Symbol** and choose from the various menu options and colors (these options would be good to explore for future reference).

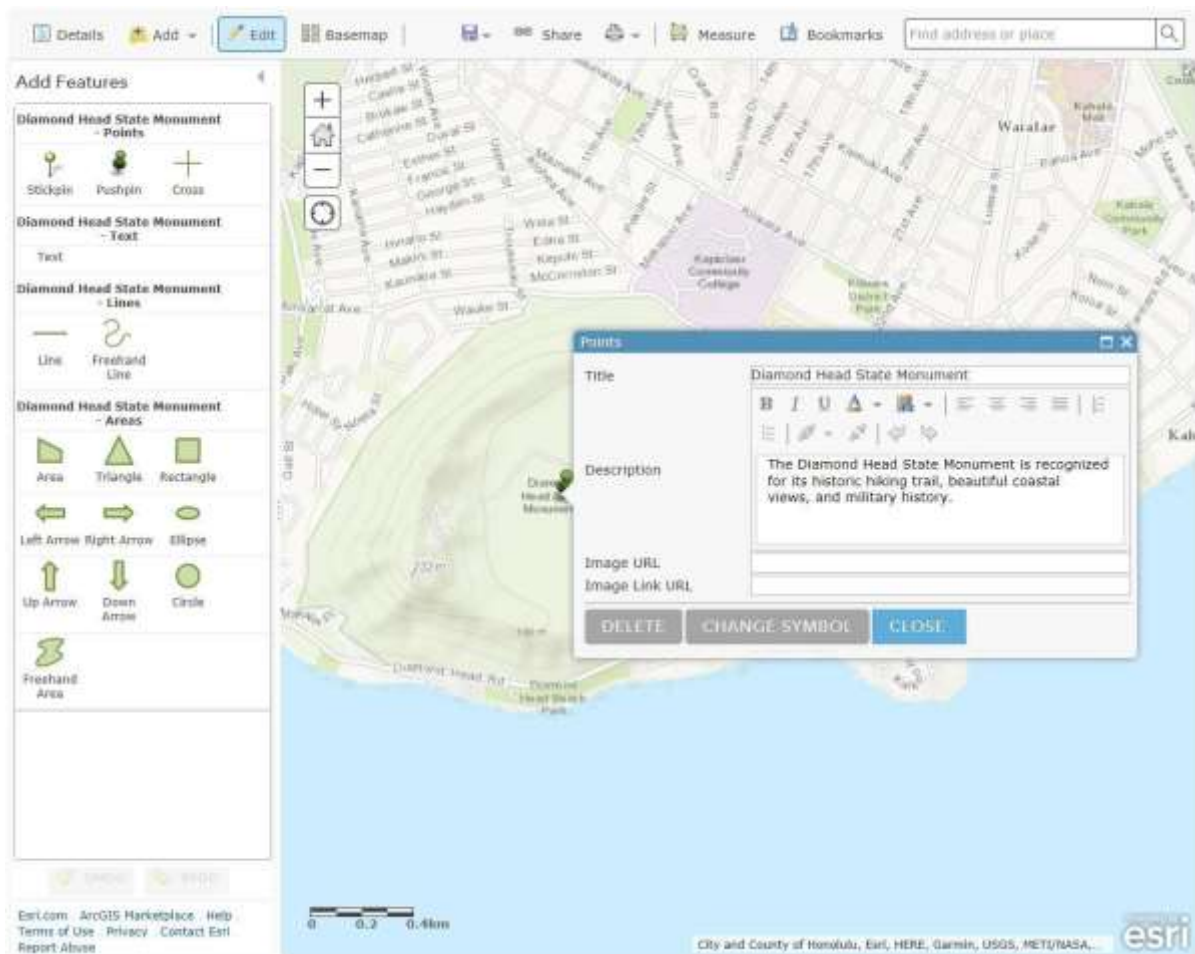


Figure 5 - Adding in Pushpin Feature with Descriptions

There are numerous options for adding an Area (also known as a polygon), but the most commonly used tool is **Area**. Allowing you to draw each vertex of your feature with a click of the mouse (double-click to finish your drawing and closes the polygon). Choose this tool and draw an area around Honolulu Zoo.



Figure 6 - Honolulu Zoo Polygon

When the callout box appears after you have created the area, enter the information as seen below.

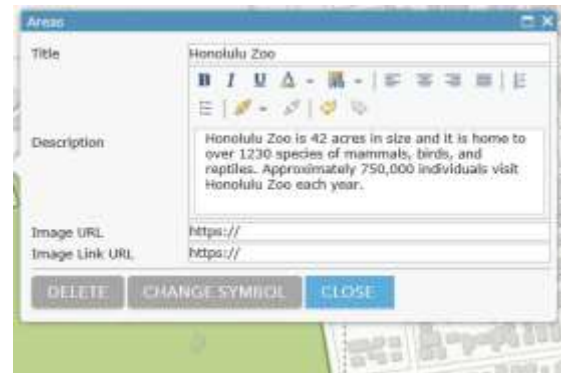


Figure 7 - Polygon Callout Box

Next, we will add a path using a Line feature. There are two options for this: **Line** and **Freehand Line**. The former lets you draw each vertex with a click of the mouse; the latter requires you to click and hold while you draw your segment freehand. Choose one of these options and draw a path from the **Kapiolani Community College to Ala Wai Golf Course** (you can draw the route any way you please, as long as you follow established roadways/pathways in Honolulu). Name the path Kapiolani Community College to Ala Wai Golf Course and click close.

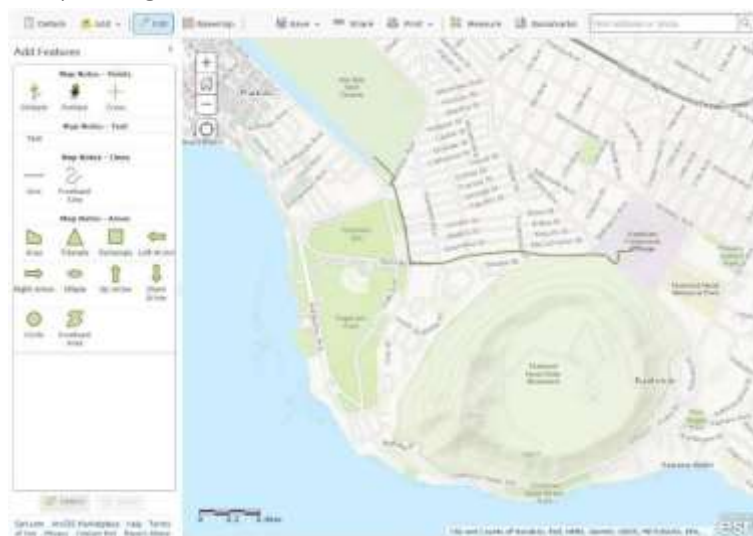


Figure 8 - Line Drawing from Kapiolani Community College to Ala Wai Golf Course

You can change the symbol or edit vertexes for any of the features you have created. Since the features we have created so far have a space for Name and Description, we will not cover the Text feature. However, if you simply wanted to add a Text note to your map, this method could come useful.

Adding Pre-existing Data

With the Map Notes, we created our own data layers right inside the map. However, sometimes the data you need may already exist. ArcGIS Online has several ways of adding data to your map. The easiest way is to search for data from the Add menu. Click on Add and choose Search for Layers. Click on My Content drop down menu and select ArcGIS online. In the search box, type in Honolulu Parks. Choose 'Parks' and then click 'Add to Map' (Figure 9).



Figure 9 - Parks Layer from ArcGIS Online

Navigate to the Details tab and select content. Two layers and a table should be added to your map. Only have the 'Parks - Parks and Recreation Areas' layer unchecked (Figure 10).

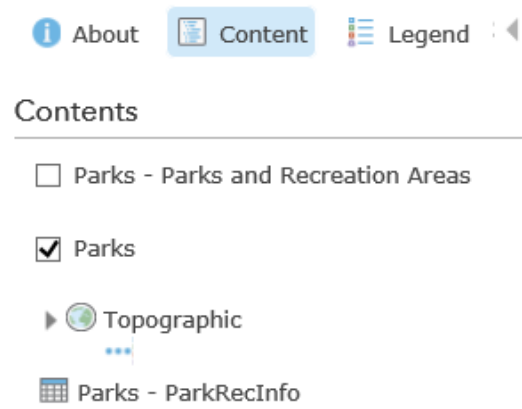


Figure 10 - List of Layers under Content

You can modify the symbology of the 'Parks' layer. Click on Contents and hover your pointer over the Parks where five icons will appear under it (Figure 11).

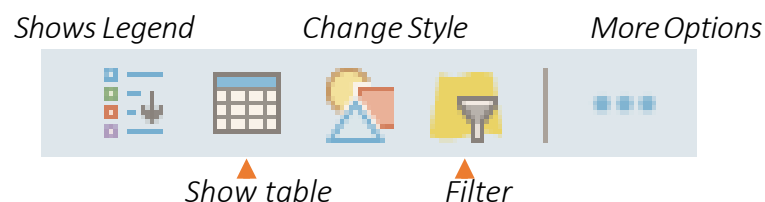


Figure 11 - Close-up Icon Display

- Show legend** will drag down a legend of that specific attribute.
- Show table** will open up the attribute table.
- Change Style** enables you to customize the symbol.
- Filter** allows to you filter out specific features you want to show on the map.

e) **More Options** contains more useful tools that will be described later in this tutorial.

Select the **Change Style** icon. Under “**Choose an Attribute to Show**” leave the option to “**Show location only**”. Under “**Select a drawing style,**” click “**Options.**” Click on **Symbols**, and the pop-up window enables you to change the color of the symbol, transparency, size, and pattern.

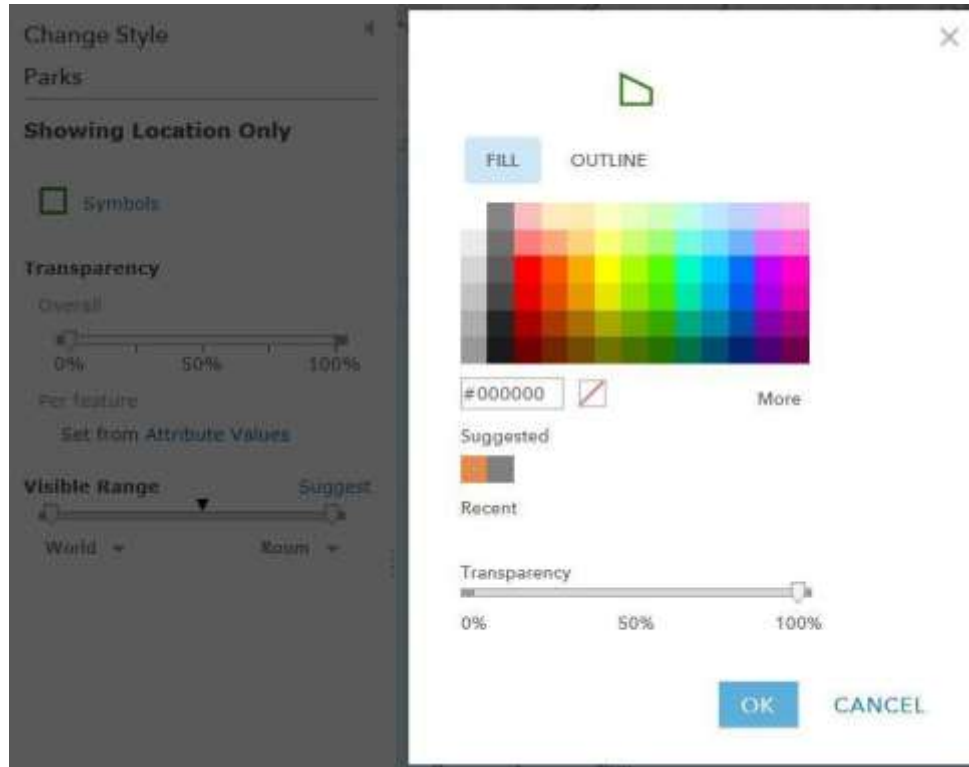


Figure 12 - Change Style Window

Another method for adding data is through a hosted web service. Click on the Add dropdown menu and choose Add Layer from Web. In the dialog box, enter the following URL:
https://geodata.hawaii.gov/arcgis/rest/services/SoH_Imagery/WV2_2016/MapServer.

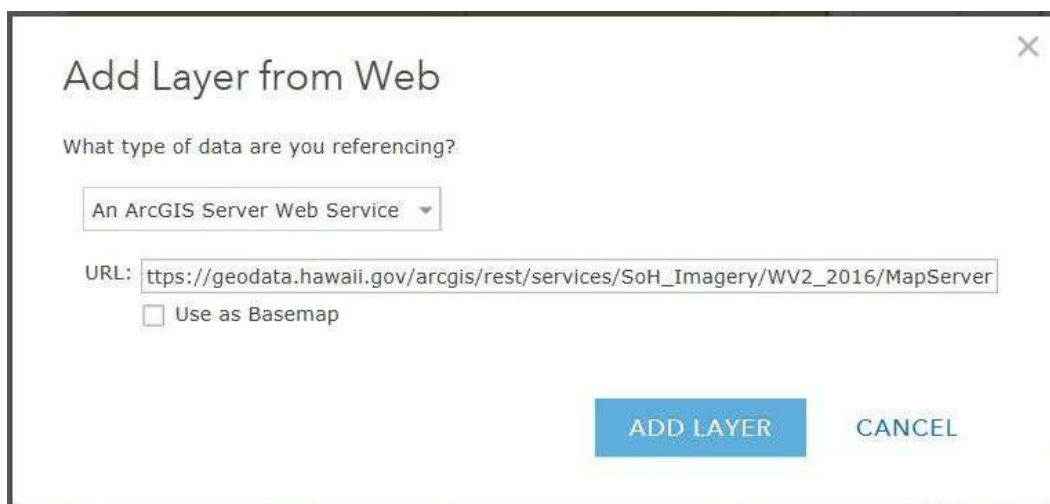


Figure 13 - Add Layer from Web Window

You should then click **Add Layer**. This imagery service is provided by the State of Hawaii. Please note that due to copyright restrictions on this layer, you can only view it up to a certain view level – Once you have zoomed too far, it will stop drawing.

The final method of adding data is to Add Layer from File, which uses your own locally stored data files. There are several file types you can upload: Esri Shapefiles (in zipped format); comma, semi-colon, or tab delimited text files (CSV or TXT); and GPS Exchange Format (GPX); each allows you to upload a maximum of 1000 features.

Note: If you would like to explore the Add Layer from File function another time, you can move ahead to Customizing Your Layers on page 10.



Uploading Data Files

For this section, we are going to utilize the City and County of Honolulu’s Open Data Catalogue, which features datasets available to the public for general use (see the Open Data City and County of Honolulu User License for details). To access the data, go to the following link:

<http://honolulu-cchnl.opendata.arcgis.com/>.

Shapefiles

We’ll begin with one of the most common geospatial data formats, the Shapefile (.shp). The shapefile format was created by Esri, it can be read by virtually any GIS program, including some programs that aren’t primarily intended for GIS such as AutoDesk’s drafting software AutoCAD.

In ArcGIS Online, shapefiles need to be uploaded in a zipped format in order to be read properly. Due to the fact that a shapefile (singular) is actually made up of several different files (plural) all with the same name but different file extensions.

On the City and County of Honolulu website (<http://honolulu-cchnl.opendata.arcgis.com>), select the **Parks and Recreation data category**, which is on the bottom left corner of the page and then search **Parks**. This data includes information about parks, open spaces, and outdoor recreational facilities managed and maintained by the City and County of Honolulu.

The data viewer lets you preview the data on the map in spatial format (Details), in tabular format (Table). In the right corner, click the Download dropdown and select Shapefile (Figure 14). The file is delivered in zipped (.zip) format.

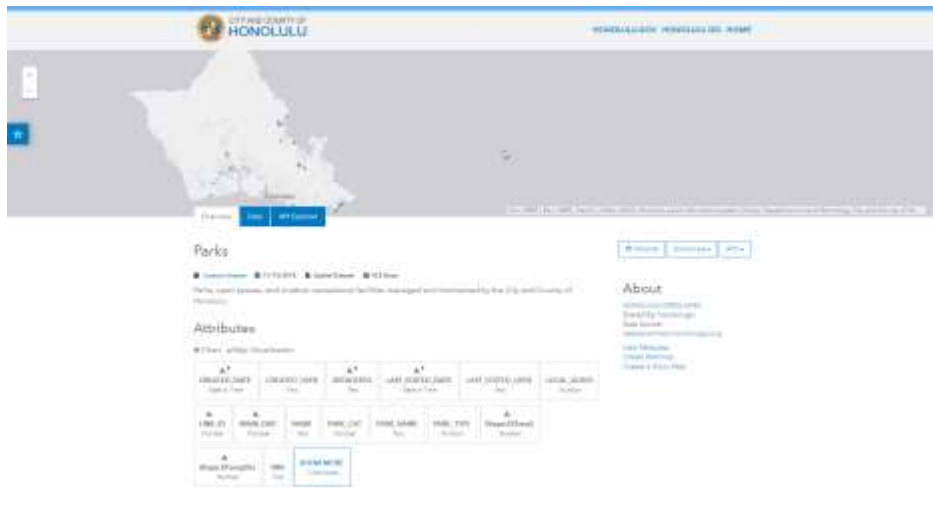


Figure 14 - Parks Download Page

From the **Add** menu, choose **Add Layer** from File and use the Choose File button to upload the **Regional_Parks.zip** file you just downloaded. Accept the default selection to Generalize features for web display and then click **Import Layer**. The newly imported layer is now visible in the **Contents** pane as well as on the map (you may need to zoom out or pan the map to see the features). You can click on a Park feature to reveal a pop-up window with more information about that parks, open space and outdoor facilities.

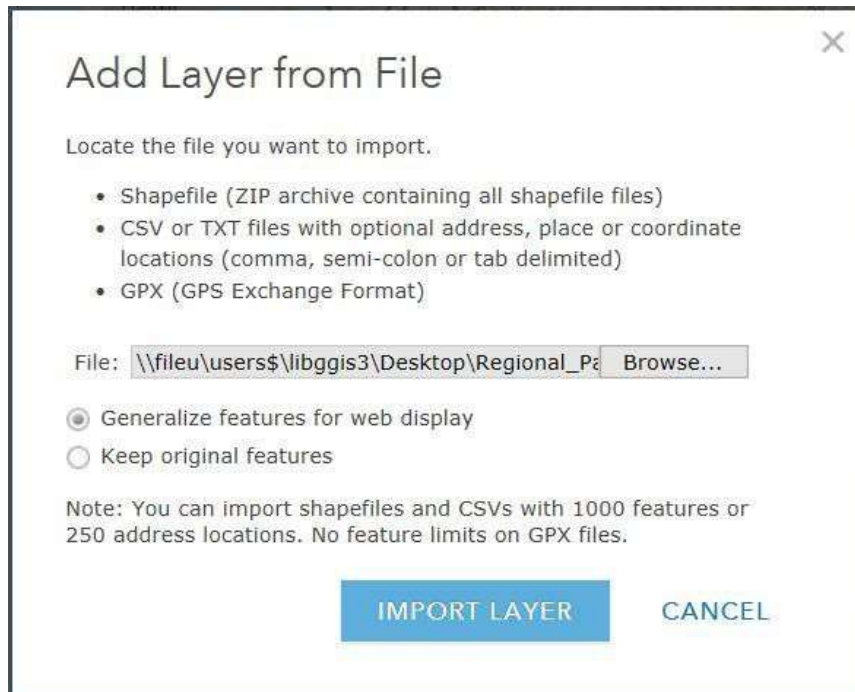


Figure 15 - Add Layer from File Window

After uploading the file, options to change the style of the Parks features appear in the content panel. First, select an **attribute to display** and select **PARK_NAME**. By selecting this, your map will represent the names of the various Parks, open space and outdoor facilities that are located on City of Honolulu. The features can be represented using different features (ex. Color, linewidth, types). Next, select the **drawing style**. Select the first option, **Types (Unique symbols)**. Your map should look similar to the one below.

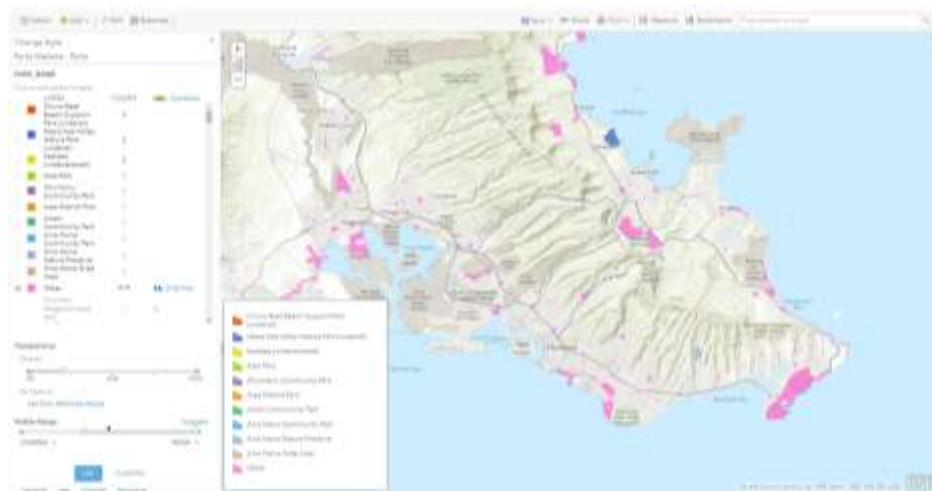


Figure 16 - Parks in Unique Symbology

The various colored polygons represent different parks, outdoor facilities and open space. Take a notice at the legend located at the bottom left corner.

Tabular Data

As you may have noted while adding the Regional Parks shapefile, one of the options under export is exporting data to CSV (Comma Separated Values) file format. When formatted correctly, CSV and TXT files provide tabular information that can be plotted by either physical address or geographic coordinates (i.e. latitude-longitude, or lat-long).

Once again, go to the Data Catalogue on the City and County of Honolulu website (<http://honolulu.cchnl.opendata.arcgis.com/>) and search for the **Universities layer** (Figure 17). Click on it. Make sure the file type is set to **Spreadsheet** (Table) and download the file. With CSV and TXT files, you can use the standard **Add Layer from File** method or you can simply drag and drop the file on the map (be sure to drop it on the map and not the Contents pane).

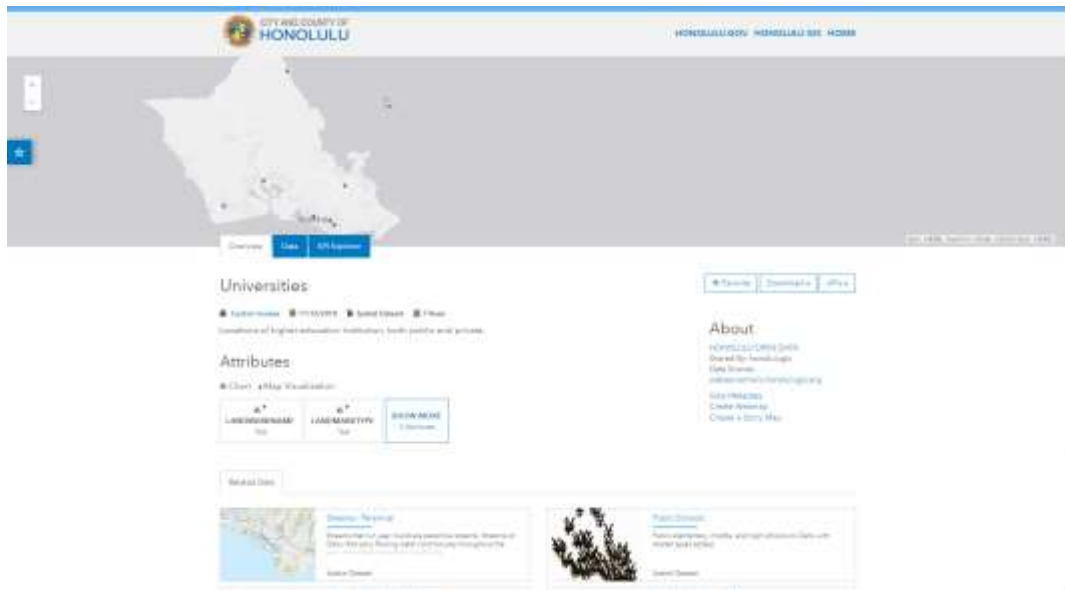


Figure 17 – Universities Layer

Note: If lat-long data is automatically detected in a file (column names may prevent ArcGIS Online from recognizing those fields), ArcGIS Online will automatically plot the points using those locations. However, if the location data is stored as addresses, you will be prompted to set up the geocoding parameters, which includes choosing a Country and assigning Field Names to the appropriate data type (i.e. Address, City, Postal, etc.). The United States Address Locator is a sophisticated geocoder built by Esri and is especially useful if your list contains addresses from more than one country. The dialog for setting up geocoding is shown below and acts much like the other Add Layer from File options.

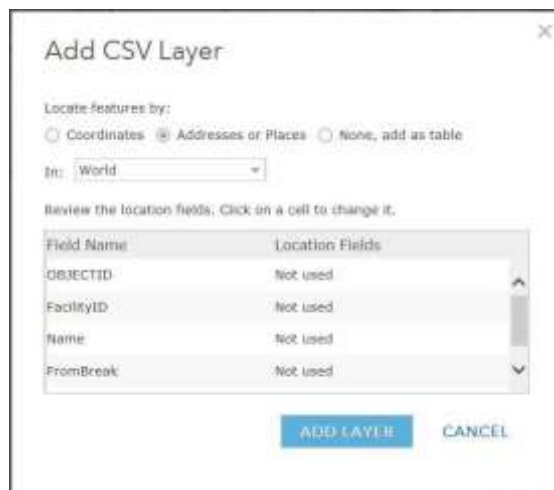


Figure 18 - Add CSV Layer Window

After the CSV file has been imported, your map will look like the image below. Under the layer got **change style**. Select the attribute to **show location only** and the drawing style to **Location (single symbol)**. The different colored dots on the map are the various universities located in Honolulu. You

may change the feature, such as **symbol (color, fill, and outline)**, transparency and visible range by clicking on “**options**” in the **Location (single symbol)** tab.

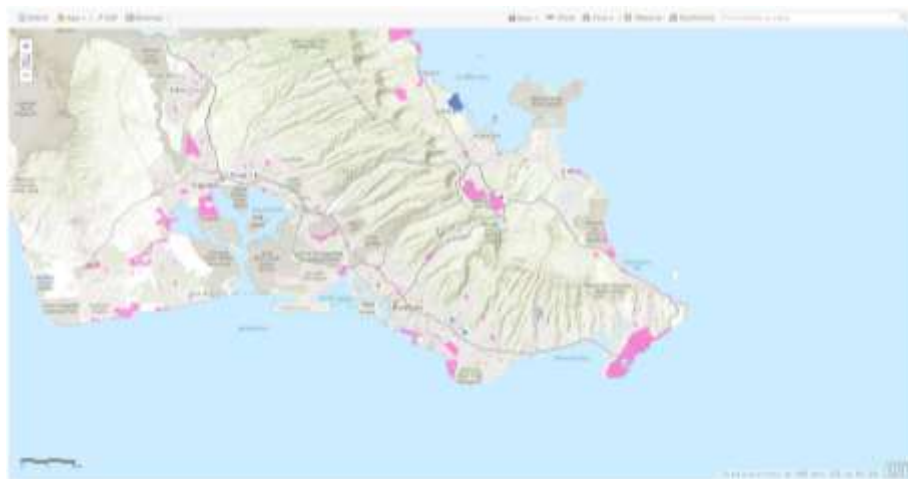


Figure 19 - Map Display of Imported CSV and Parks

KML Files

Although they are not mentioned in the Add Layer from File dialog, KML files can also be added to ArcGIS Online and used in your maps. This popular file format (Keyhole Markup Language) was created by Google and is used in their popular Google Earth application. The City and County of Honolulu’s Open Data Catalogue offers their data in KML format.

From the City and County of Honolulu’s Open Data Catalogue (<http://honolulu-cchnl.opendata.arcgis.com>), search Existing Bike Facilities and download the dataset as a **KML file**. From your map window, go to the **ArcGIS dropdown menu** in the top-left corner and choose **Content**. On this page, you’ll see all the items you’ve created in ArcGIS Online. Above the list of items, click on **+ Add Item** and click add an item from my computer. Where you can browse to the **Existing_Bike_Facilities.kml** file you just extracted.

The Add Item dialog also requires you to **add Tags** to your new item, which helps your item get found in searches. Type the words **Honolulu and Bike Facilities** in the box (use the Tab key to add additional tags) and click **Add Item**.

Once the KML has finished uploading, the item description page will appear showing the details of your newly added layer.

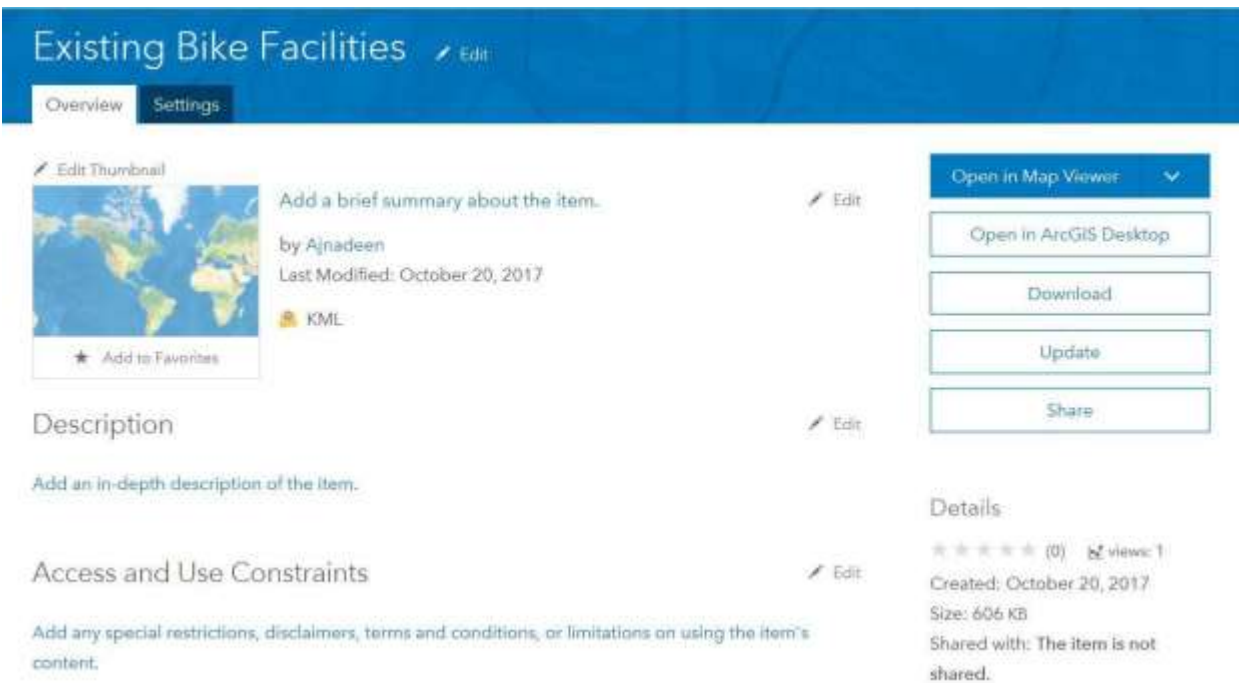


Figure 20 - Map Description Page

Before you can add the KML file to your map, you will need to share it with the public. Click **Share**, then check the box to Share the item(s) with: **Everyone (public)** and click OK.

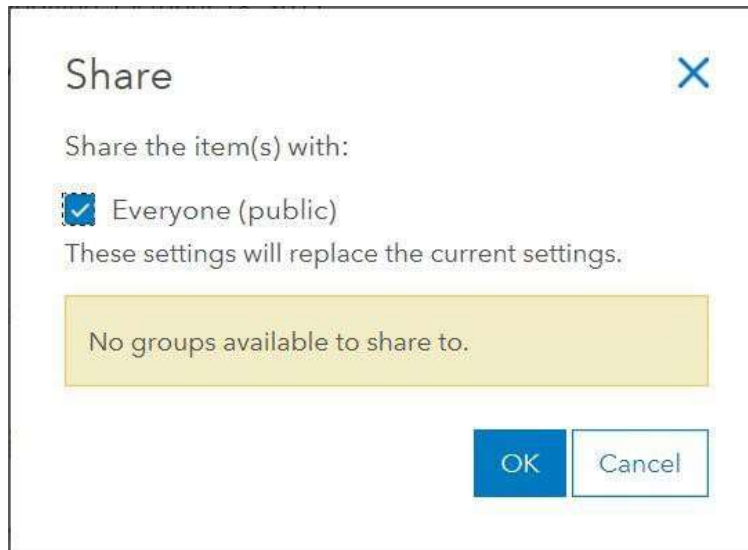


Figure 21 - Share Option Pop-up Window

Go back to the Content page where you will now see your Existing Bike Facilities layer listed in the Content Table.

Editing and viewing attribute information

Turn off all the layers except for the Universities. Let's add 2-3 colleges to the Universities layer. Before starting on the editing go to **universities layer** and select **change style**. Chose the **attribute as LANDMARKNAME** and **Location (single symbol)** have been selected. Then head to the **edit tab** to start adding in colleges or universities. Try locating **Kapiolani Community college** and **Honolulu Community College** or any other college that you wish to add.



Figure 22 - Creation of New Point Features

Once you found the college, click on the dot to place point and fill in the following. Label the **LANDMARKTYPE** as **“College”** and the **LANDMARKNAME** as the **name of the college**. Leave the rest blank. Lastly rename the layer into Universities and Colleges. Finally open up **show table** below the layer and see **the new colleges** that you have added onto the table. Also you can double check through the legend if they have appeared or not (Figure 22).

Customizing Your Layers

Under the Contents tab of your map's Details, you should now see a number of different layers and a base map (Topographic). You will also notice that to the right of each item has 3 blue dots. Clicking the **blue dots** reveal a dropdown menu showing the various actions you can perform on a given layer. The options vary by layer, so what can be done with one layer may not be possible with another.

Let's use some of the menu options to tidy things up a bit. First, **rename WV2 2016 to Oahu Aerial 2016**. Finally, change the **Transparency of the Oahu Aerial 2016** layer to **50%**. You can also optionally remove the event types (layers) that aren't being used.

One last customization we'll perform is **Set Visibility Range**. This allows you to control which layers are visible at various zoom levels. Since the aerial imagery is of little use when zoomed out too far to see much detail, we'll set the visibility range so it doesn't show past a certain extent. Click on the menu next to Oahu Aerial 2016 and hover over Set Visibility Range. Change the dropdown for **in closer than:** to **1:40,000 (Town)**. Now zoom out on the map until the aerial imagery disappears.

Notice how much easier it is to read the map at this scale when the aerals are hidden from view.

Note: ArcGIS Online also has tools that can be used to Perform Analysis on the data you add or create. This functionality is only available on layers where editing has been enabled. Where editing has been disabled (as is the case with Canada Median Age), Perform Analysis will not be an option in the dropdown menu. However, you can still customize the pop-up information on such layers by using the Configure Pop-up option in the menu. Because this guide is intended as an overview of ArcGIS Online, we won't cover the Perform Analysis or Configure Pop-up tools. Nevertheless, feel free to explore these options on your own to see what the possibilities are for you and your data.

Accessing the Attribute Table

Behind each piece of spatial data there is tabular information. Often times this information can be very useful to determine what an ambiguous dataset can be used for, or give you an insight as to what types of analysis you can do with a dataset. For example, a set of address points may also contain information about the type of building it is.

To view the attribute table of a layer, there is a **table icon** under the layer title. Click on it to reveal the **attribute table** (figure 23).

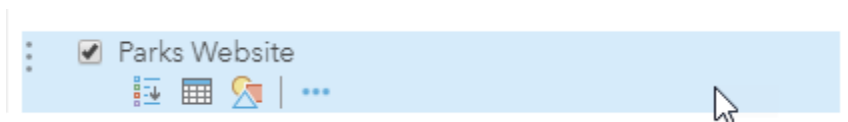


Figure 23 - Table Icon

You can then sort the table based on different columns. Record what entries show up at the top and bottom of the list when you sort the table by each column name.

Sharing Your Map

Share

Choose who can view this map.

Currently, only you can view your map. Before you can link to it or embed it, you need to allow others to view your map.

☐ Everyone (public)

☐ University of Waterloo

Link to this map

<https://www.google.com/maps/@43.65588, -80.27444, 15z>

☒ Share current map setting

Embed this map

EMBED IN WEBSITE

CREATE A WEB APP

Up to this point, your map has been saved to your free ArcGIS Online public account. However, since only you have access to this account, you'll need to Share your map for others to see it. Sharing a map can be done from many different places on the site as well as in many different ways.

Figure 24 - Share Window

You can share directly from the map by saving the most current changes and then clicking Share. You can also share your map from the My Content page or the Web Map details page. After checking the box to share with everyone (public), the link to your map will be accessible to anyone you share it with.

Besides linking to and posting through social media, you can also Embed in Website and Make a Web Application. The option to embed the map in a website provides you with simple configurations that are incorporated into the HTML code seen inside the text box. You then copy and paste that code to embed it in a website.

Embed in Website

Choose the size of your map. [?](#)

W 500 X H 400 ☒ Allow responsive sizing

Copy and paste HTML to embed in website.

```
<style>.embed-container { position: relative; padding-bottom: 80%; height: 0; } .embed-container iframe, .embed-
```

Map Options

Add Symbol

Choose options to display on your map.

☒ Zoom Control ☒ Scale Bar

☐ Home Button ☐ Location Search

☐ Basemap Selector ☐ Map Details


☐ View larger map ☐ Legend

☒ Double scroll zoom

Choose your theme.

☒ Light ☐ Dark

Map Preview



BACK

DONE

Figure 25 - Embed in Website Options

The option to make a Web Application is slightly more involved, but still relatively easy to set up. Click this option to open the dialog box, which features numerous templates for publishing your map as a web application. Click on the thumbnail images and it will give you a brief description of what the template is used for.

For this map, we will use the **Basic Viewer template** as a way to share our web map outside of the ArcGIS Online viewer where we created it. Select **Create App** and then enter the information for your web application as seen below, and then click done.

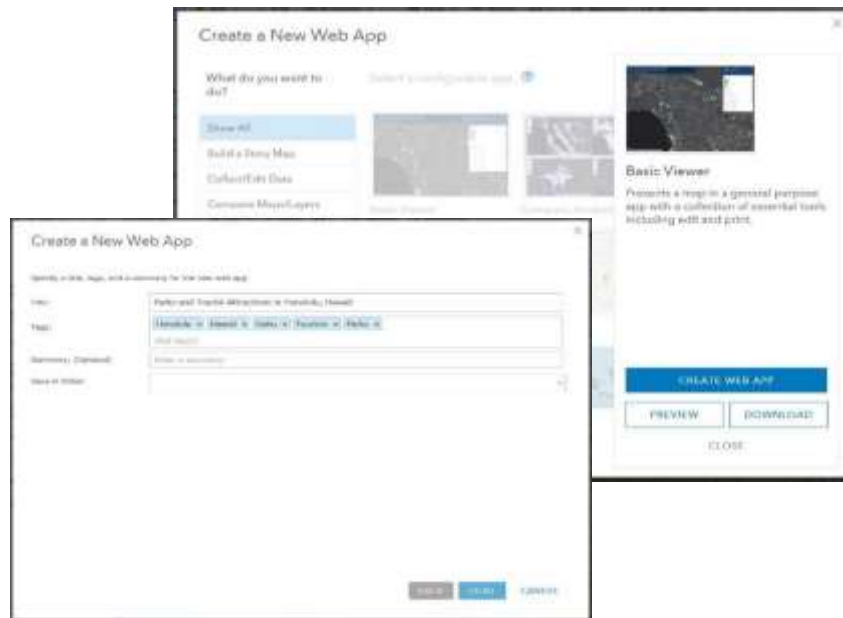


Figure 26 - Create a New Web App Pop-Up Page

At this point, some important information appears on the screen. Although the web map is shared, the web application yet has not. Therefore, you will want to Save and View Item so you can share the web application.

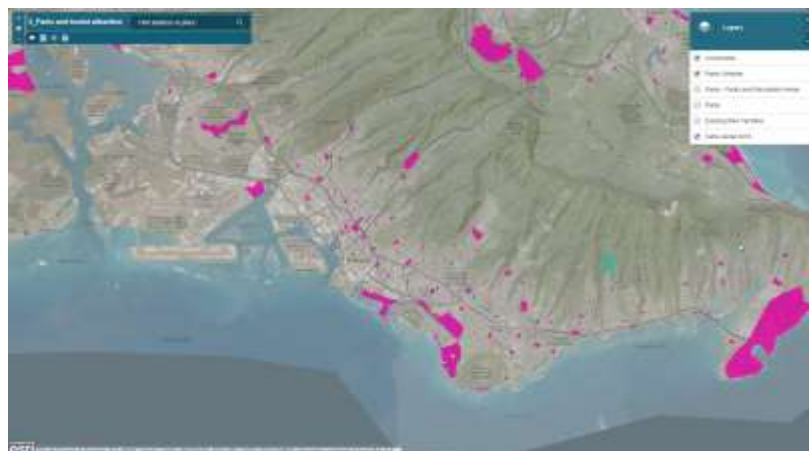


Figure 27 - Web App View of City of Honolulu

Open the application to see what you've created (Figure 27). If you want to make changes to the default settings, go through the tabs on the left to adjust general, theme, splash screen, toolbar, and other settings.

If you are looking to show two different maps for your web application, you may wish to look into using the "Compare Analysis" under the Compare Maps/Layer web app. This web application allows you to compare up to four different web maps you have created. This is useful if you want to display different pathways you have created but do not want all the pathways appearing on one map, giving a cleaner end result.

Start by creating a new map and importing the Oahu 2016 orthophoto (The layer from Web). Create a new path using the Map Notes feature that differs from the path you previously created, but still starts and ends at the same locations. Set your basemap to be the same as your first map and save your map to My Content. Now that we have two maps created, we can create a comparison web app. Click the Share button on the new map you just created and create a web application.

Choose the "Compare Analysis" web app and have your two maps displayed. Enter a description describing the differences between the two paths in the Description box and click save at the bottom of the right hand sidebar. Your changes will be applied instantly, showing the two maps side by side.



Figure 28 - Compare Analysis View

Crowdsourcing with ArcGIS Online

One of the great things that ArcGIS Online offers is the ability for multiple users to contribute spatial data to a public space. Unfortunately, with the free account we cannot create our own crowdsourcing layer (publishing an editable hosted layer is only available to organizational accounts), but we can use an existing layer to demonstrate.

Create a new map and search for the layer “WhatsNearby”. Add this to your new map and save it as ‘Crowdsourcing’. Now that we have a map with an editable layer in it, we can create a crowdsourcing form/app. Create a web app, but this time choose the GeoForm option (Scroll down). Choose the WhatsNearby layer as the editable layer. The default input settings are dropdown (“select”) menus and text, but you may wish to use the other options they give you.

GeoForm BUILDER

1. Start
2. Webmap
3. Layer
4. Details
5. Fields
6. Style
7. Viewer
8. Options
9. Preview
10. Publish

Select Form Fields

Here you can select which fields will be visible to your GeoForm audience, edit the Labels they will see, and add a short Description to help with data entry.

Order	Enabled	Field	Label	Configure
1	<input checked="" type="checkbox"/>	OBSERVID	Observation Number	
2	<input checked="" type="checkbox"/>	OBSERVTYPE	Type of Observation	
3	<input checked="" type="checkbox"/>	DETAILS	Details	
4	<input checked="" type="checkbox"/>	NUMVOTES	Number of Votes	
5	<input checked="" type="checkbox"/>	PUBLICVIEW	Public View	
6	<input checked="" type="checkbox"/>	NAME	Name	
7	<input checked="" type="checkbox"/>	USERID	User Name	
8	<input checked="" type="checkbox"/>	PHONE	Phone	
9	<input checked="" type="checkbox"/>	EMAIL	Email	
10	<input checked="" type="checkbox"/>	SUBMITDT	Date Submitted	
11	<input checked="" type="checkbox"/>	STATUS	Status	

Figure 29 - GeoForm Builder, Select Form Fields Page

Fields such as OBSERVID, NUMVOTES, and USERID can be left out for this tutorial, as the field

names are not descriptive enough for us to enter in correct information. You can disable the fields by unchecking the checkbox in the Enabled column. You can also reorder the fields by clicking and dragging in the Order column. Be sure to add help text to the fields so that the user will know what to put into the fields (ex. “(123) 456-7890” for the phone number help field to prompt the user to enter their phone number in the correct format).

The GeoForm comes with a variety of themes you can choose from. Depending on your audience and the data you are presenting, you may prefer a different theme than the default one chosen. In the final step, you will be able to preview the web app to determine whether or not you wish to change anything. Be sure to try out your web app by entering a few points around Honolulu, Hawaii. Your final app should look similar to the screenshot below.

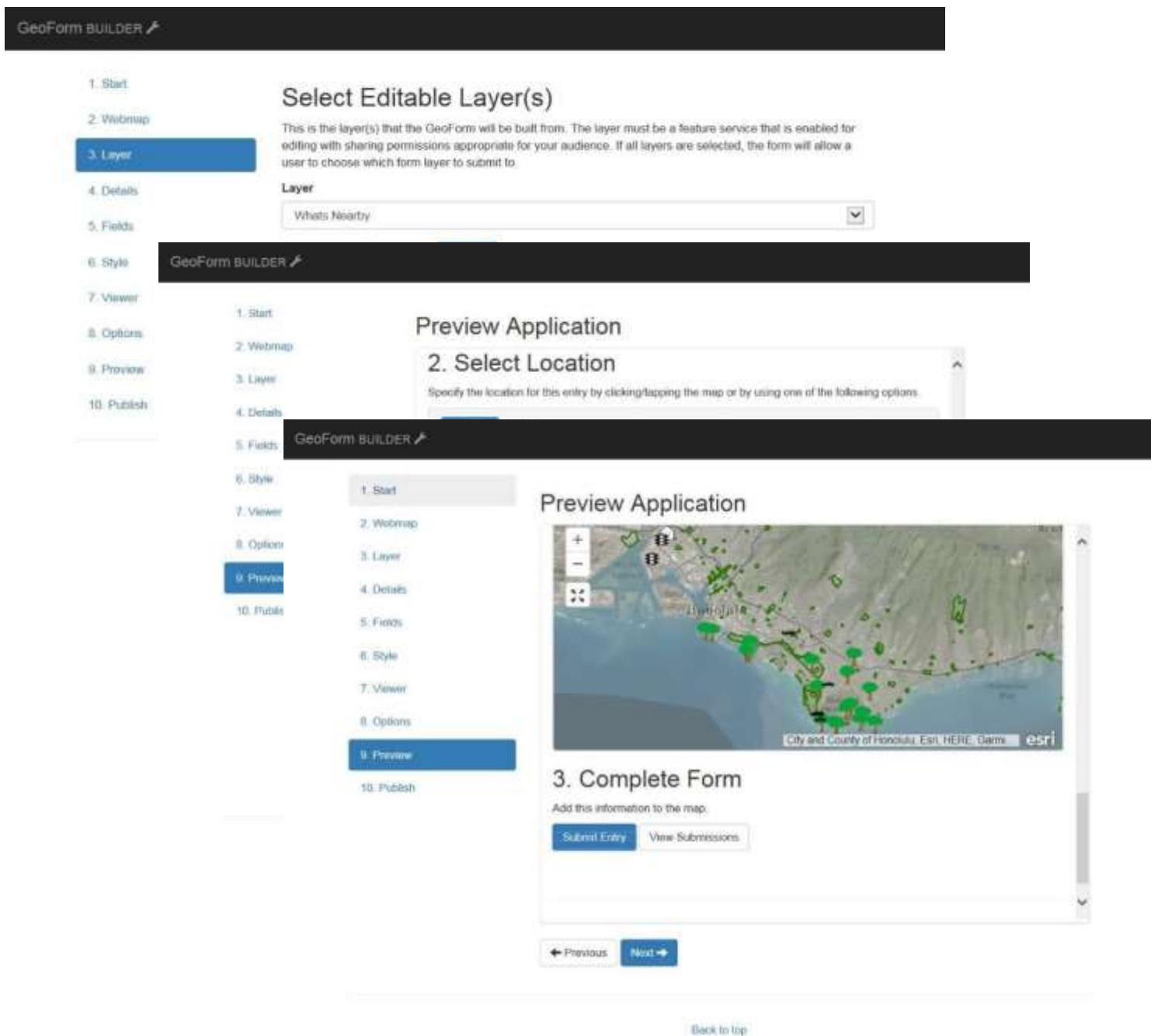


Figure 30 - GeoForm Theme Selection & Completion

Wrapping Up

ArcGIS Online provides an easy way for users to create and share maps. The free public account does, of course, have some limitations, when compared with an organizational account. For example, you cannot upload image files to your My Content folder with a public account, but this functionality is possible with an organizational one. But even with the public account, you probably would have noticed that there are many other features of this mapping platform that weren't covered in this guide. However, this introduction should give you the foundation for continuing to explore the options on your own.

Much of how and what you learn will be by trial-and-error—even with this guide. So take the time to discover the different tools and templates, the data and displays. See how geospatial data can enhance your digital information and make data more meaningful by adding the geographic element!

Reference

Images from <http://www.arcgis.com>

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GEOSPATIAL CENTER
<https://uwaterloo.ca/library/geospatial/>

