



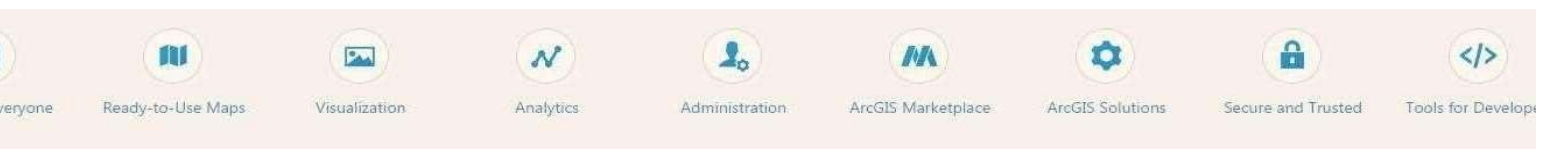
Mapping Without Limits

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 (commonly called AGOL) 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 organizational version.



Setting Up

While you can make maps and applications using ArcGIS Online without an account, your creations will not be saved. For the purpose of this guide, we will log in using your University of Waterloo account. Since you are apart of this institute, you will be provided with an ESRI Organizational Account, expanding your toolset and available storage space in AGOL (ArcGIS Online).

- Go to <https://www.arcgis.com> and click on Sign In.
- At the bottom of the page, click on "Your ArcGIS organization's URL". Enter *uwaterloo* and sign in with your UW account.
- After logging in your profile, you can start using ArcGIS Online.

In this guide, we are going to learn how to create basic maps by using different features such as adding layers, changing the symbology of the layers, as well as creating and sharing web applications. Once you have finished this tutorial, you will have a good understanding of the main functions of ArcGIS Online and can start creating simple maps. You will learn how to utilize online data available through ArcGIS online as well as uploading data from multiple sources.

Note: While the layers and links mentioned in this guide are accurate at the time of publication, resources online break or get changed constantly. If you find that a link does not work or a layer displays different data than this tutorial presents, it is best to search your link or layer online to find a more up-to-date resource. If this fails, please contact Eva Dodsworth at edodsworth@uwaterloo.ca for assistance.

Getting Started

To begin, click the Map link at the top toolbar, next to Scene, on ArcGIS Online. This will pull up a new blank map named “Untitled map” (upper-left corner of Figure 1).

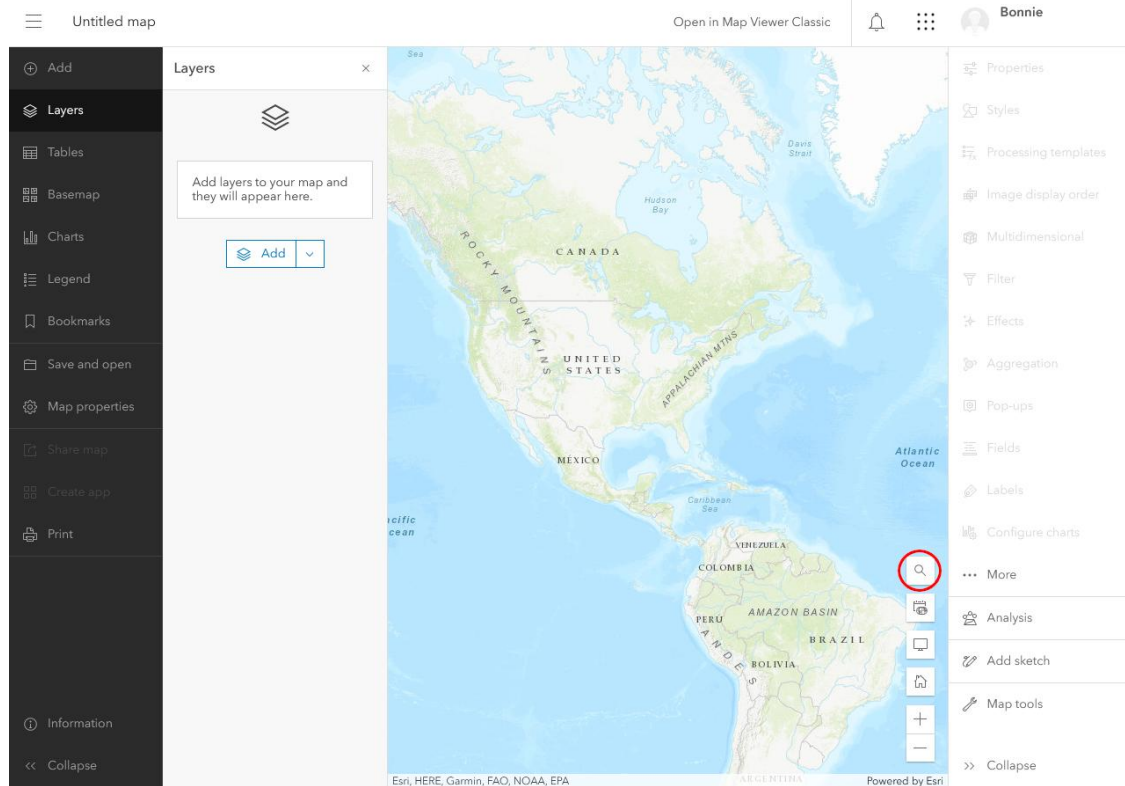


Figure 1 - Default Map Viewer

Take a moment to become familiar with the different parts of your map. Left of the title is a dropdown menu for navigating through ArcGIS Online (the ≡ icon). The top-right-hand corner of the page is your account username with a dropdown menu for account settings. Beside that are the various ArcGIS apps, notifications, and the ability to open Map Viewer in an older layout.

The left sidebar is comprised of two parts: the dark half contains all the major settings, and the light half goes into depth of those settings when clicked on. You can expand and collapse the left and right sidebar using the double arrow button on the bottom. >>

The **Add button** provides a dropdown menu with different options for adding data. The **Tables** button lets you add non-spatial spreadsheets. The **Basemap** button allows you to choose from 17 different styles of map that will underlie your data (Topographic is the default). **Charts** let you visualize layers of data. **Legend** explains what different layers represent when added to the map. The **Bookmarks**

tool lets you to save a location by recording the extent and position on the map, allowing you to switch between multiple places.

The **Save and Open** button will update and save your map as you progressively add more features to your project. The **Share Map** button pops up a dialog box giving various options for distributing your map. **Print** takes a snapshot of the map and its peripheral info for printing.

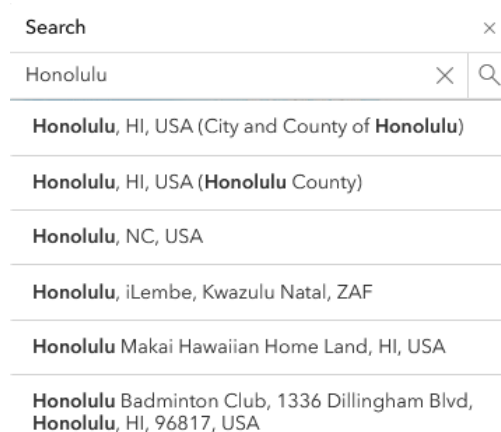
The right sidebar provides different actions you can take upon your map and future layers. **Properties** and **Effects** lets you change how layers visually appear. **Analysis** lets you analyse the data in different ways. **Edit** and **sketch** allow you to change and create features in a layer respectively. **Map Tools** lets you find the direction between two points with **Directions**, the distance between two points with **Measurement**, and the XY coordinates of a point with **Location**.

Afterwards, you may want to use the **Search box** to find an address or a place (circled in Figure 1). Navigating the map is 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 Hawaii's capital, Honolulu. You will be using data primarily from the ArcGIS Online server and the City and County of Honolulu's Open Data Catalogue (<http://honolulu-cchnl.opendata.arcgis.com>).

The first step in working with your map will be to choose a location to work in. To search for an area, click the search icon and a search box will appear. Since we will be using Honolulu, type Honolulu in the box and select "Honolulu, HI, USA (City and County of Honolulu)" (Figure 2).



The image shows a search interface with a text input field containing 'Honolulu'. Below the input field is a list of search results. The first result is 'Honolulu, HI, USA (City and County of Honolulu)', which is highlighted. Other results include 'Honolulu, HI, USA (Honolulu County)', 'Honolulu, NC, USA', 'Honolulu, iLembe, Kwazulu Natal, ZAF', 'Honolulu Makai Hawaiian Home Land, HI, USA', and 'Honolulu Badminton Club, 1336 Dillingham Blvd, Honolulu, HI, 96817, USA'.

Search
Honolulu
Honolulu, HI, USA (City and County of Honolulu)
Honolulu, HI, USA (Honolulu County)
Honolulu, NC, USA
Honolulu, iLembe, Kwazulu Natal, ZAF
Honolulu Makai Hawaiian Home Land, HI, USA
Honolulu Badminton Club, 1336 Dillingham Blvd, Honolulu, HI, 96817, USA

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 press "Zoom to". Figure 3 displays the map extent that covers the City of Honolulu.

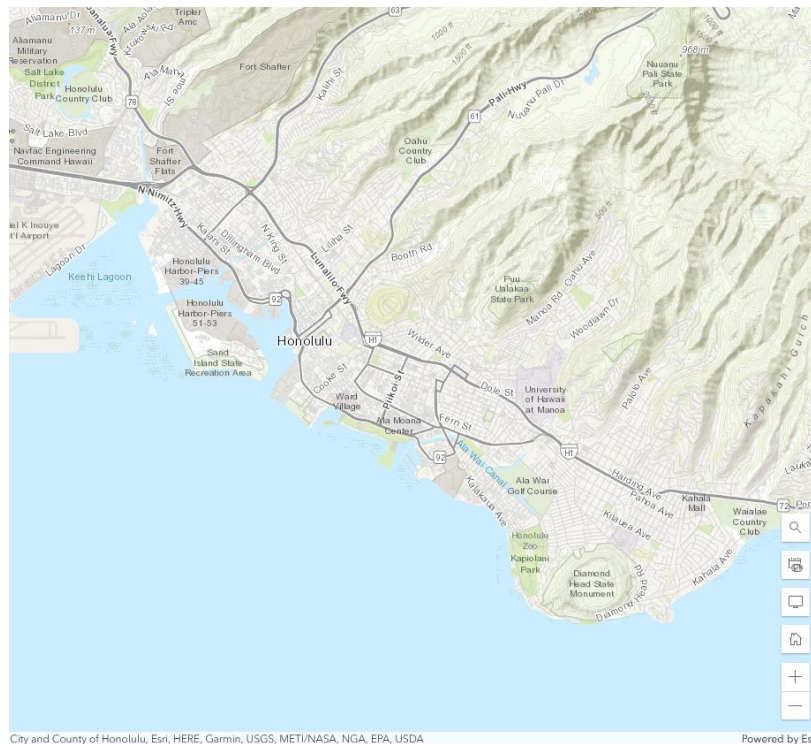


Figure 3 - City of Honolulu View Extent

On the left bar, click on “Save and Open”, then “Save as” 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). The saved map can be found in the main hub of AGOL under Content -> My Content. By default, it will save in your home folder.

×

Save map

Title

Parks and Tourist Attractions in Honolulu

Folder

Tags

Honolulu ×

Hawaii ×

Oahu ×

Tourism ×

Parks ×

Add tags

Summary

A map displaying parks and popular tourism attractions in Honolulu.

Characters left: 1981

Save Cancel

Figure 4 - Save Map Pop-up Field

Creating New Data

Now that you have a set location, you can start adding features to your map. To do this, you need to create a sketch layer, which function as editable layers in the map. Click the “**Add**” menu and choose “**Create Sketch layer**” (Figure 5). This opens a menu on the right side of the screen (Figure 6).

Figure 5 – Add Dropdown Menu – Create Sketch Layer

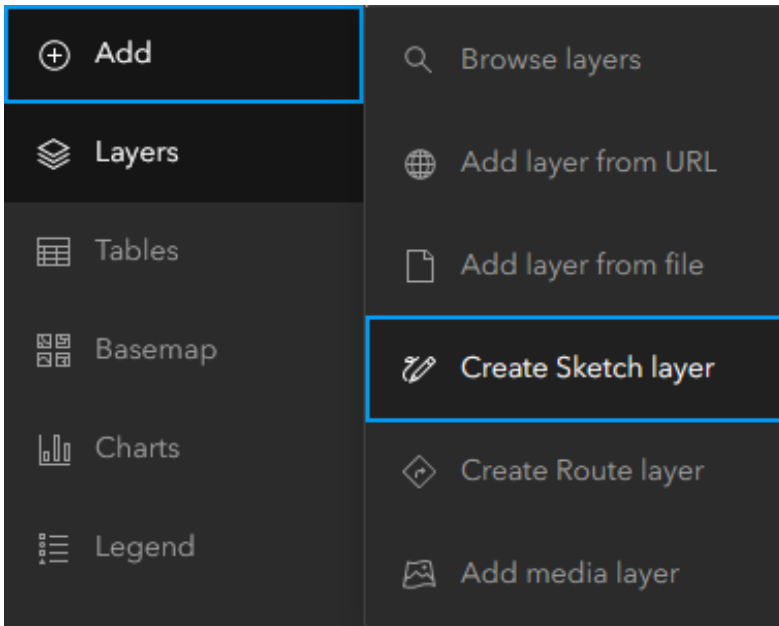
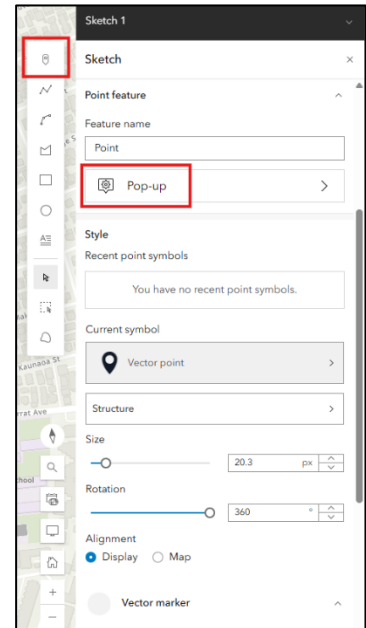


Figure 6 – Point Creation Menu



This new menu on the right contains tools for creating four basic features: **Points** (referred to as stamps), **Lines**, **Polygons**, and **Text**. You will start by creating a **Point feature**. **Stamp** should already be selected by default but can also be chosen with the pointed icon to the left of “Sketch”. Zoom into the Diamond Head State Monument on the Southeastern part of the island and place a stamp there.

To name a stamp, select it using the mouse cursor icon below the Text option, click **Pop-up and enable pop ups**. From here you can name the point (Title), add a description (Text), and add an image to go along with it (Add Content > Image). 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 (Figure 7). If you want to change the appearance of your marker, go back, click “**Vector Point**” under Current Symbol and choose from the various menu options and colors (these options would be good to explore for future reference).

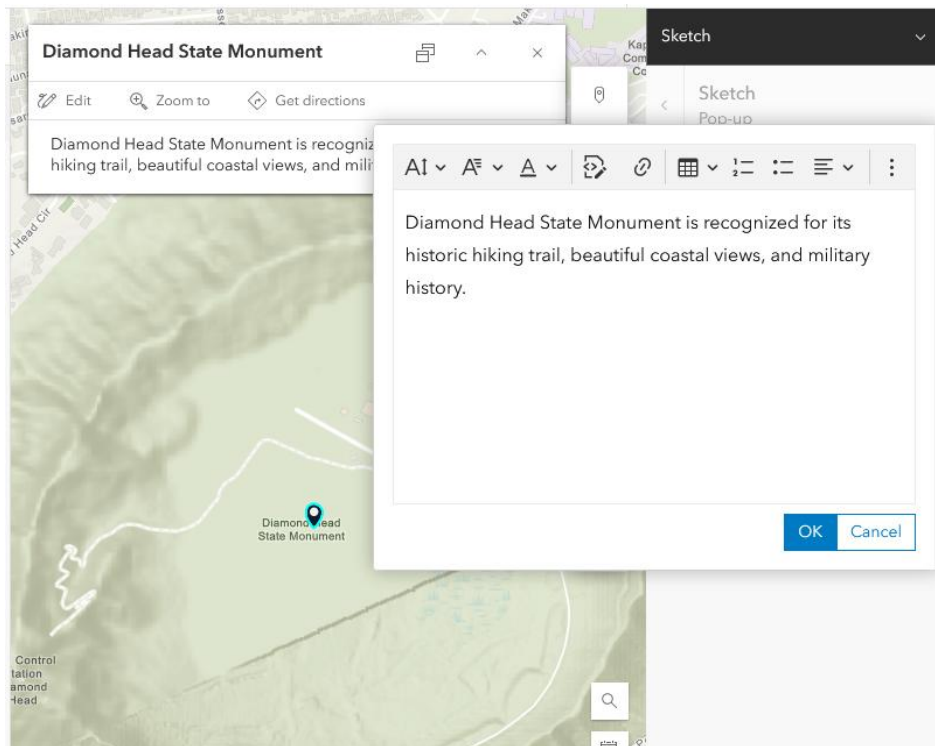


Figure 7 – Editing Pop-Up Description for Point

There are numerous options for adding an Area (also known as a polygon), but the most commonly used tool is “Polygon”. This tool allows you to draw each vertex of your feature with a click of the mouse (double-click to finish your drawing and close the polygon) or to hold down the mouse and draw the shape by hand. Choose this tool (Figure 8) from the right menu where stamps and selection were chosen (fourth from the top) and draw an area around Honolulu Zoo (Figure 9).

Figure 8 – Polygon Creation Menu

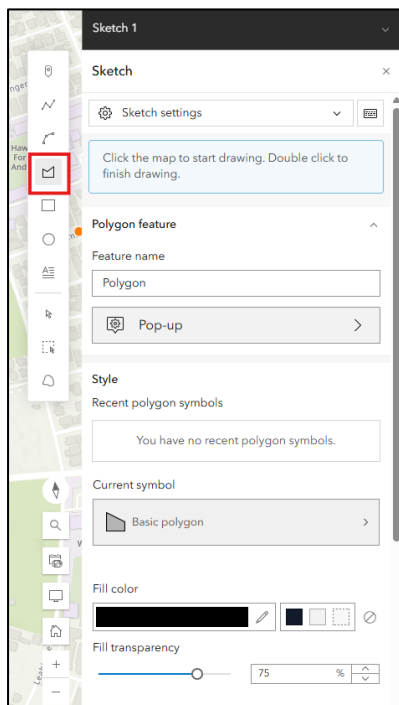


Figure 9 - Honolulu Zoo Polygon



Polygons can also be selected and have pop-ups enabled. Add details to the zoo like in Figure 10.

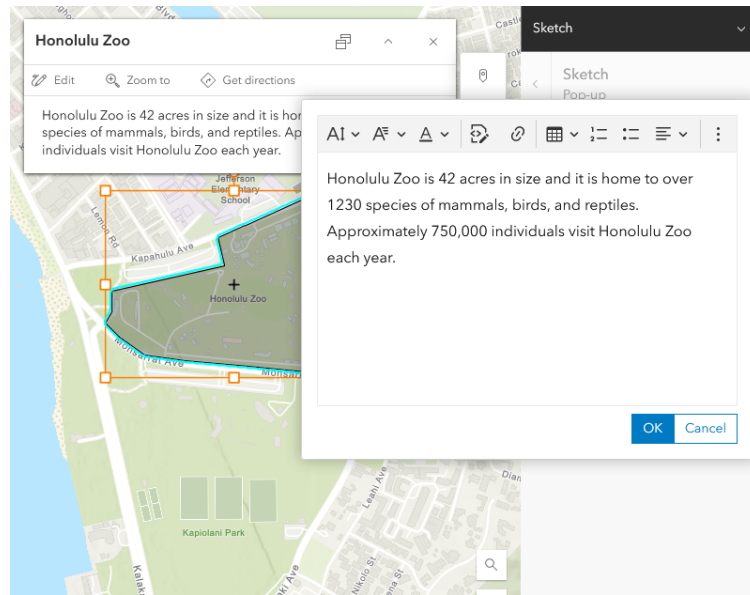


Figure 10 - Editing Pop-Up Description for Polygon

Next, you will add a path using a Line feature. As with polygons, lines can also be created point-by-point or drawn freehandedly. Choose one of these options and draw a path from the Kapiolani Community College (north of the zoo) to Ala Wai Golf Course (northeast of Diamond Head - you can draw the route any way you please, as long as you follow established roadways/pathways in Honolulu). Features can be named without creating a pop-up as well. Here, select the path and name it using the option above the pop-up menu (Figure 11).

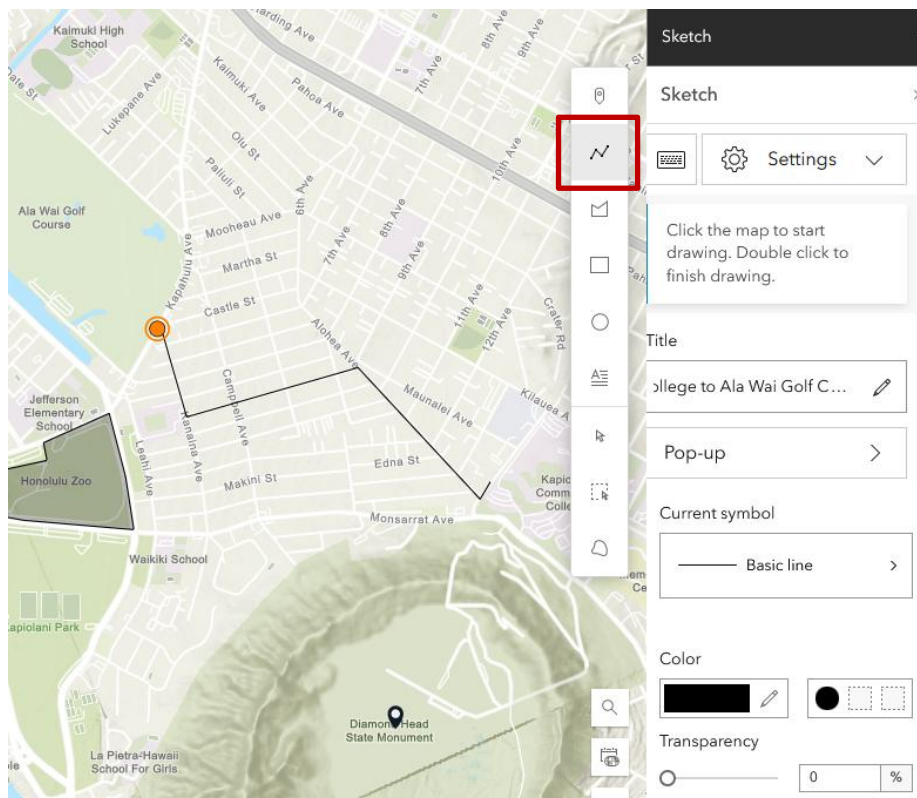


Figure 11 - Line Drawing from Kapiolani Community College to Ala Wai Golf Course

You can change the symbol or edit vertexes for any of the features you have created. Since the features you 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 be useful.

Adding Pre-existing Data

Using Sketch Layer, you created your own data layers 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 by clicking on “**Add**” and choosing “**Browse Layers**” (Figure 12). Next select “**My Content**” dropdown menu and select “**ArcGIS Online**” (Figure 13). In the search box, type in “County Parks (Oahu)” and press Enter. Click the “+ Add” button of the first result (Figure 14).

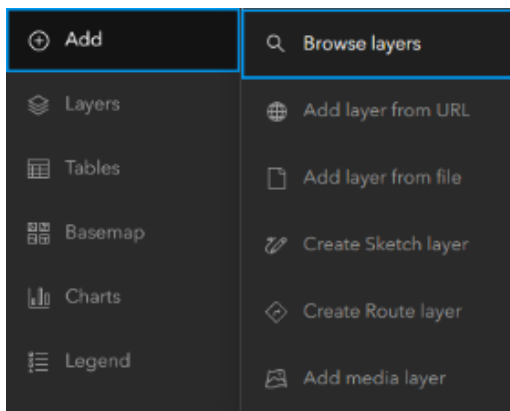


Figure 12 – Add Dropdown Menu – Browse Layers Dropdown Menu

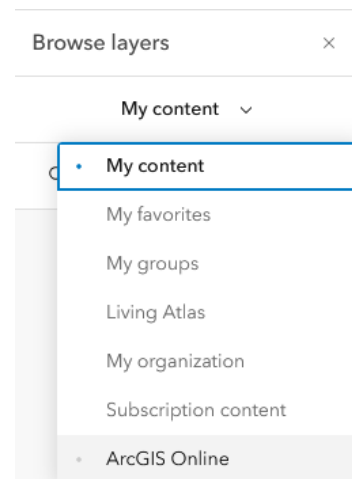


Figure 13 – My Content

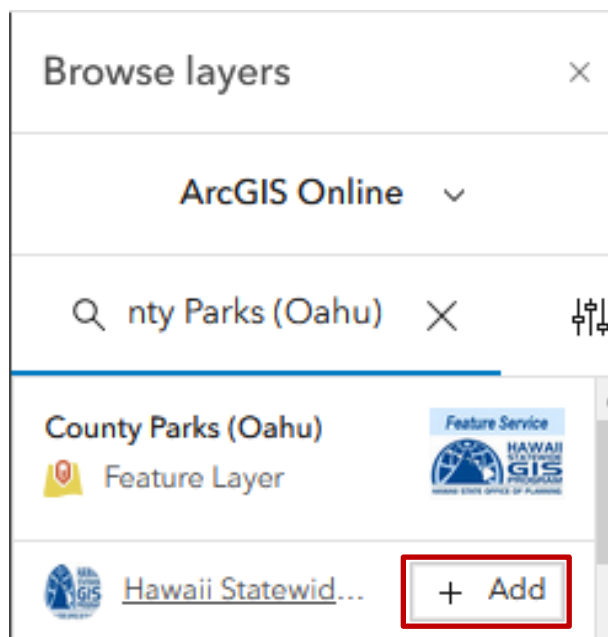


Figure 14 – Oahu County Parks Layer from ArcGIS Online

This new layer should be added to the **Layers** category on the left and several polygons should now populate the city. Next, we will explore the properties of this layer and change its appearance. To access the properties menu, find the layer in the left menu and click ... beside it. This will drop down several options. Click **"Show Properties"**. This will open a menu on the right similar to when creating sketches.

From here, select **Styles**, Figure 15 (second button on the right-hand side toolbar). The first option (1 - *Choose attributes*) allows us to change the appearance based on an attribute of the polygons, and the second (2 - *Pick a style*) lets us change the appearance uniformly. For now, we will choose the second option. Select **"Style options"** and now it presents a coloured box described as **Symbol style**. The Menu from Figure 16 should pop up. Click the Fill colour change the colour of the polygons. Figure 16 shows changing the colour of the parks to orange. The outline of the polygons as well as transparency are also able to be edited here.

Figure 15 – Style Editing Options

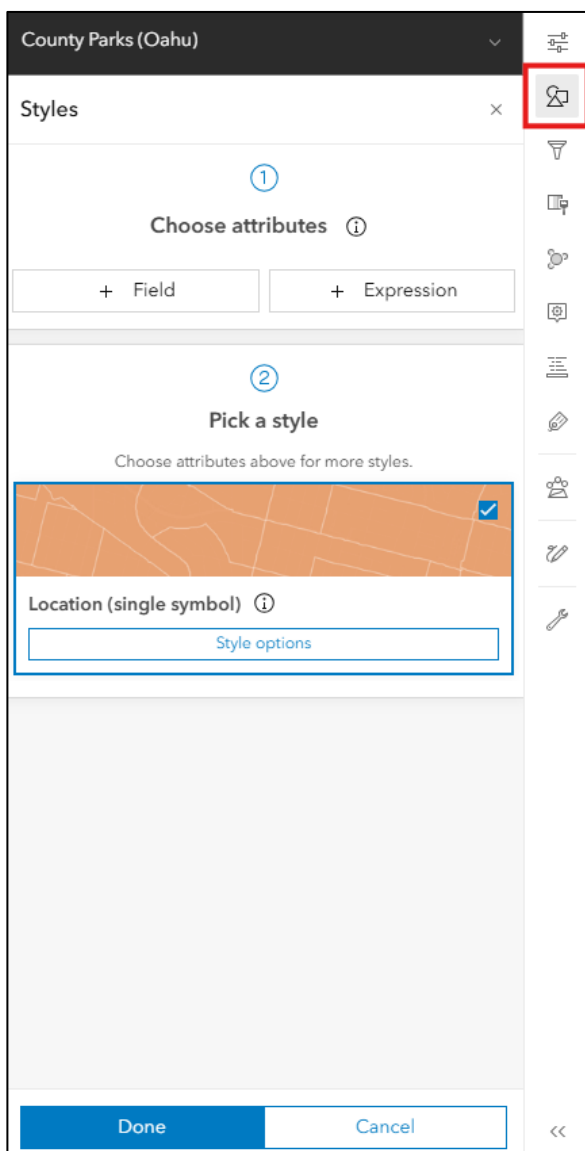
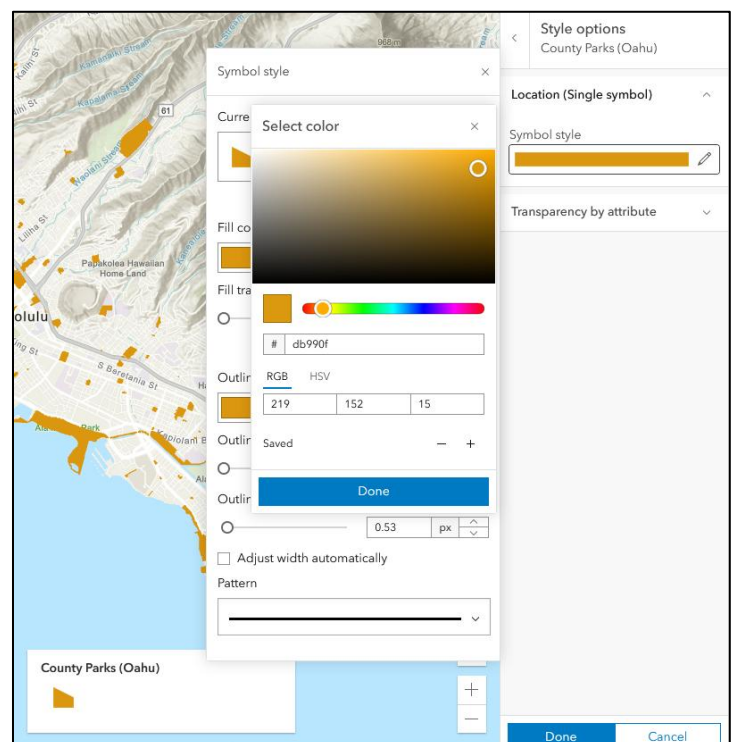


Figure 16 - Change Style Window



Another method for adding data is through a hosted web service. Click on the “**Add**” dropdown menu and choose “**Add layer from URL**”. In the dialog box, enter the following URL (Figure 17):

https://geodata.hawaii.gov/arcgis/rest/services/SoH_Imagery/Vivid_2022/ImageServer

You should then click Add to Map. This imagery service is provided by the State of Hawaii. Please note that sometimes copyright restrictions on imagery make it so that you can only view it up to a certain view level: once you have zoomed in too close, it will stop drawing.

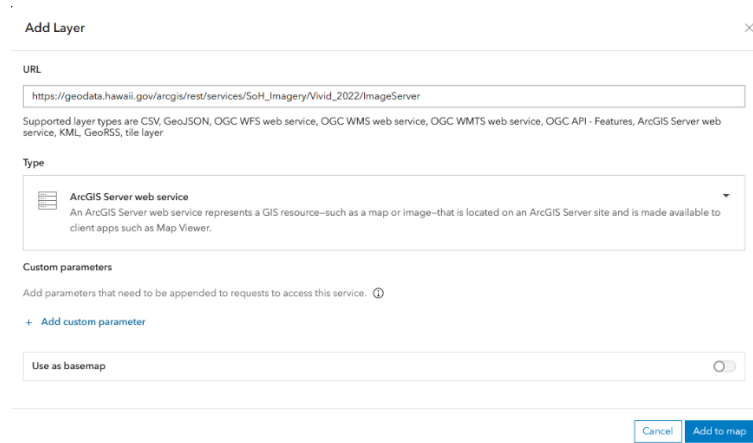


Figure 17 - Add Layer from Web Window

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.

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:

<https://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 because a Shapefile is made up of several different files all with the same name but different file extensions, such as .dbf, .prj, .xml, and others. All files must be present for a Shapefile to be useable.

On the Honolulu Open Geospatial Data portal main page: <http://honolulu-cchnl.opendata.arcgis.com/>, scroll to the bottom of the page and select “**Parks and Recreation**” (Figure 18).



Figure 18 - Honolulu Open Geospatial Data Portal Main Page

Do a key word search for “**Streams**” and select the Streams – Intermittent Dataset (Figure 19).

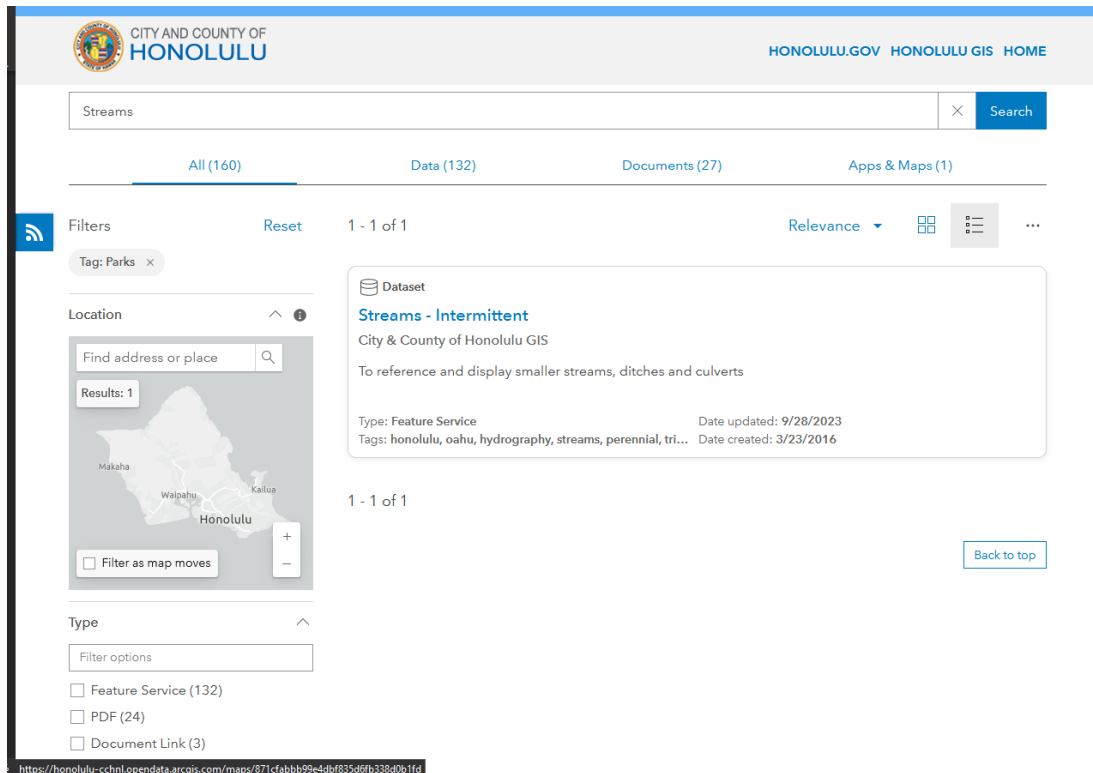


Figure 19 - Honolulu Open Geospatial Data Portal Results Page

Once the data page opens, you can preview the data. This page lets you preview the data on the map in spatial format and in tabular format by clicking on the Table icon (circled in Figure 20). For more information on the data itself, you can click View Full Details. For now, click on **Download**.

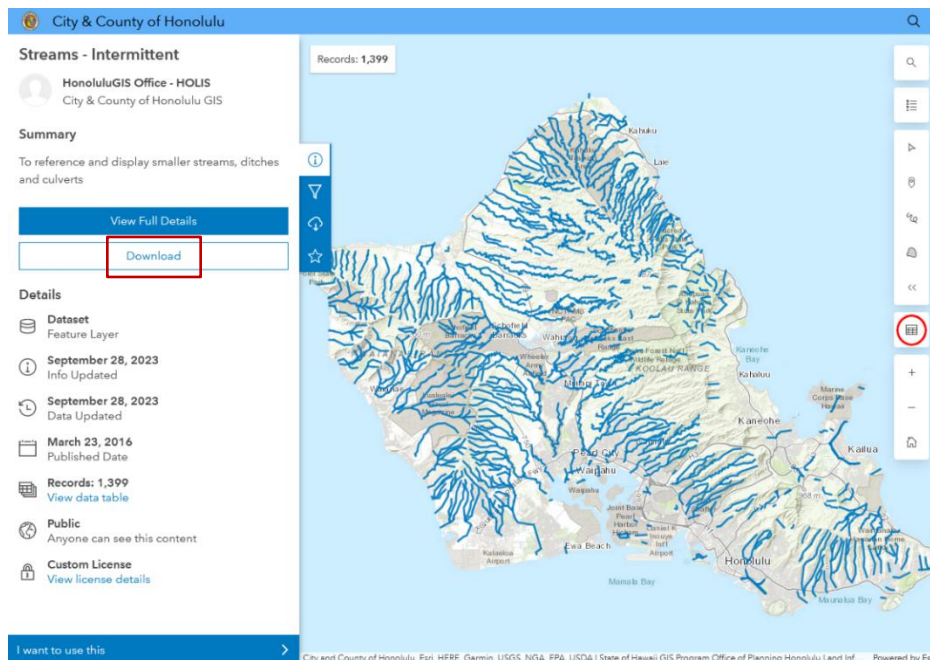


Figure 20 – Streams Preview Page

After clicking **“Download”**, a dropdown menu will show up on the left side of the page (Figure 21). This will give you many options to save the data, such as CSV, KML, GeoJSON and Geodatabase. To download the data specifically in Shapefile format, click on the **“Download”** button under **“Shapefile”**. The file is delivered in zipped (.zip) format. This data includes information about streams and rivers across the island of Oahu.

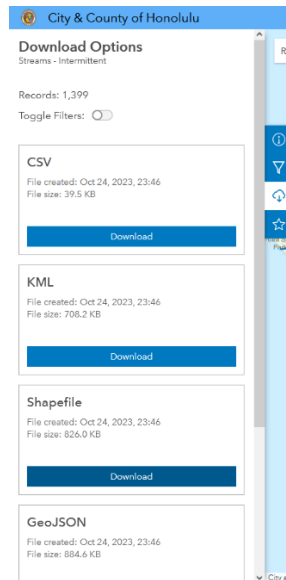


Figure 21 – Download as Shapefile

Go back to your map. From the **Add** menu, choose **“Add Layer from File”**. This will open a menu as seen in Figure 22, giving you the option to choose a file from your device as well as several cloud hosts. Select **“Your Device”** and choose the zip file you just downloaded. The newly imported layer has now been uploaded to Contents > My Contents as well as added to the map (you may need to zoom out or pan the map to see the features). You can click on a Stream feature to reveal a pop-up window with more information about it.

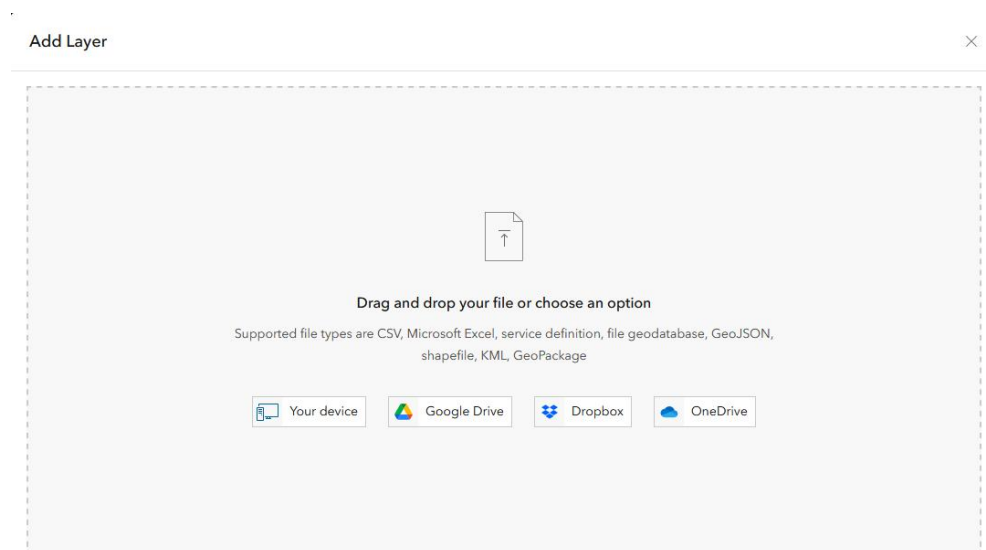


Figure 22 - Add Layer from File Window

Next, we will edit the style of the streams to be coloured based on attribute. From the **Layer** menu, once again choose ... > Show Properties > Styles > + Field. This will open a selection of attributes the stream feature holds. Select “trib_nam”, the attribute describing the tributaries each stream belongs to. The map should be coloured similarly to Figure 23. The “Legend” option on the leftmost menu will show you what each colour represents.

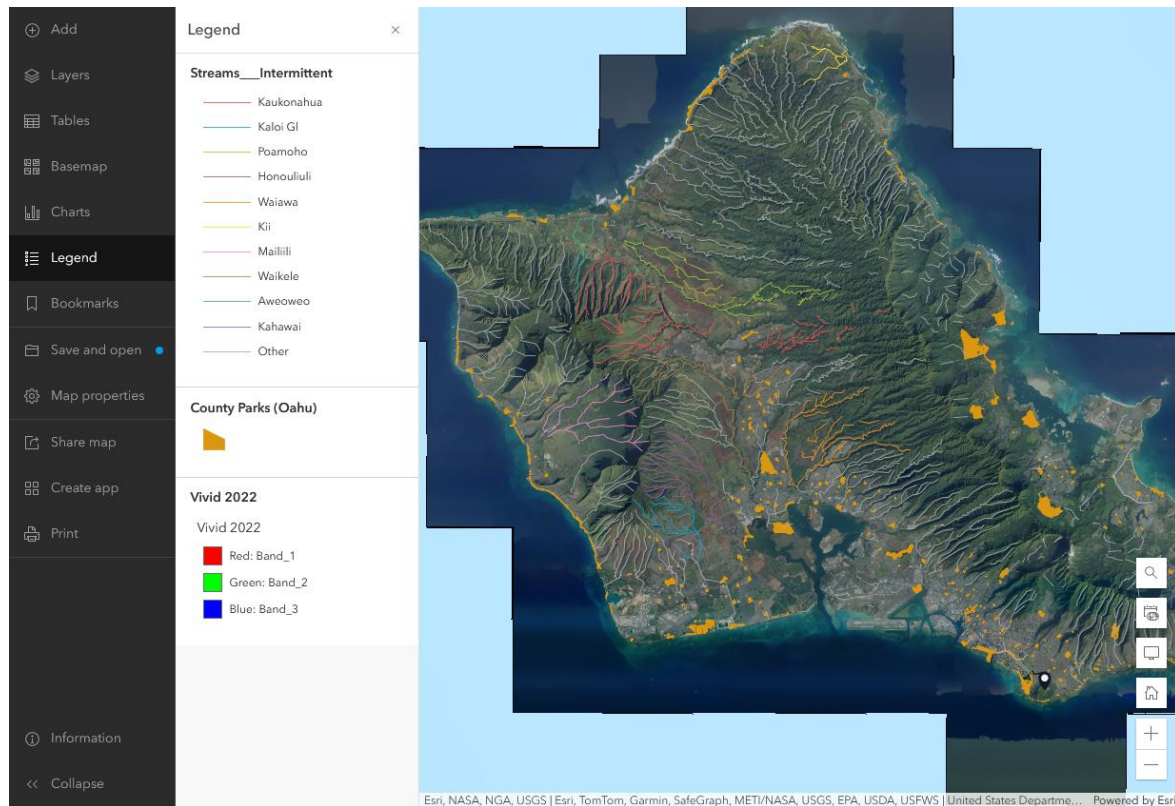


Figure 23 – Symbolized Tributaries

Tabular Data

As you may have noted while adding the “Streams” Shapefile, one of the options under import is importing data in 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 Honolulu Open GeospatialDataCatalogue ([Honolulu Open Geospatial Data](#)) and search for the “Electric Vehicle Charging Station (EVCS)” layer (Figure 24). Click on it. Make sure the file type is set to CSV and download the file. CSVs can be imported the same as shapefiles.

You will be likely prompted with two options when importing. Select to ‘Create a hosted feature layer and add it to the map’. The hosted feature layer consumes ESRI service credits dependant on their size. In turn, ESRI allows you utilize their tools, including editing, on this layer. The second option, ‘Upload the file as an item and add it to the map’, can be useful in certain situations where you only need temporary layers.

With tabular data you will need to define the latitude and longitude attributes. In this case, those values are **y_coord** and **x_coord** respectively. X & Y will be selected by default. Be sure to change this, as those coordinates are in a different projection system to what AGOL uses (WGS 84), which will result in projection errors.

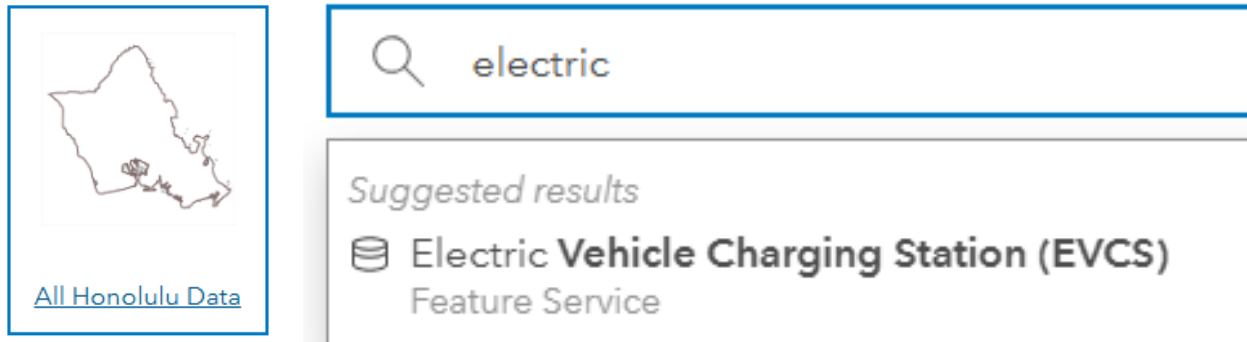


Figure 24 – Honolulu Open Geospatial Data Portal (2)

After the CSV file has been imported, your map will look like Figure 25. The Change Style pane is automatically generated on the left side of the page. Select the attribute to **“Show location only”** and the drawing style to **“Location (Single symbol)”**. Each coloured dot represents a charging station located in Honolulu. You may change the feature, such as Symbol (color, fill, and outline), Transparency, and Visible Range, by clicking on **“Style Options”** in the Location (Single symbol) tab.

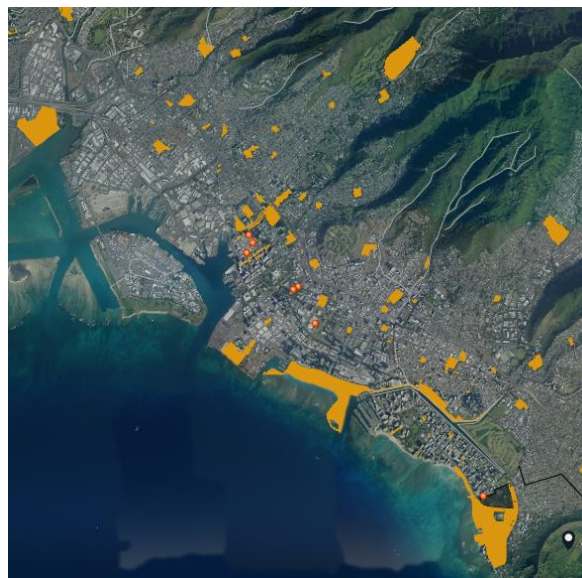


Figure 25 – CSV Data on Map as Points

KML Files

Although not mentioned in the Add Layer from File dialog, **KML (Keyhole Markup Language)** files can be added to your maps from Content (ArcGIS Online). Google created this file format and used it in their popular **Google Earth Pro** 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, click the ≡ icon in the top-left corner and choose Content (Figure 26). This page contains all the items you have created in ArcGIS Online.

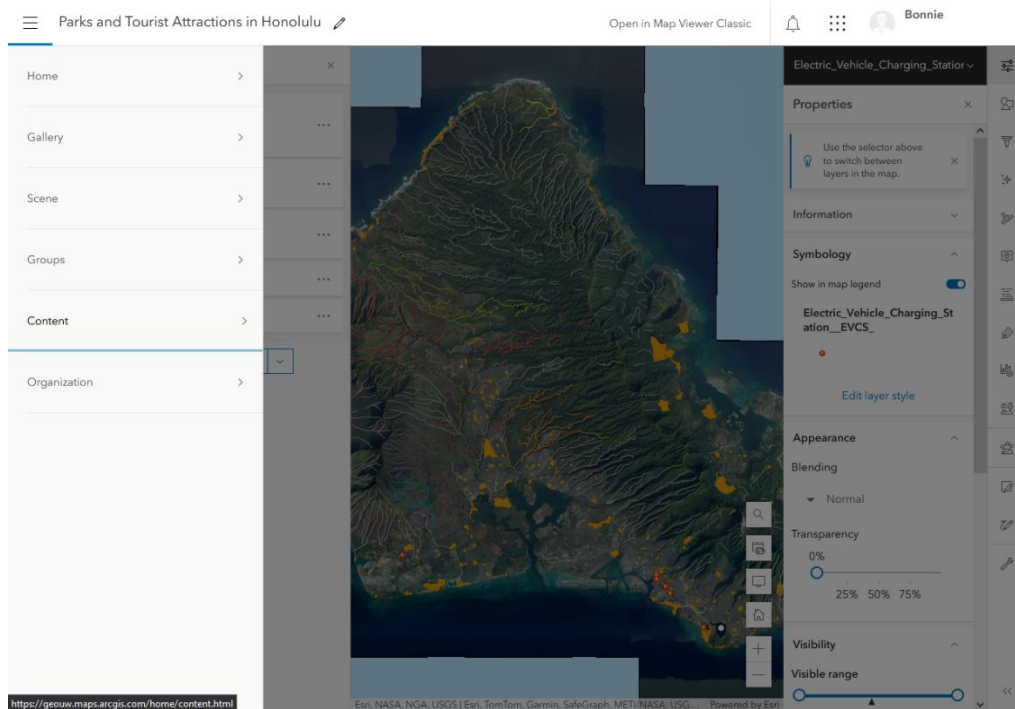


Figure 26 – ArcGIS Online Content Page

Click on “+ New Item” (Figure 30) and browse “Your device” for the *Existing_Bike_Facilities.kml* file you just downloaded. The menu will be identical to the one found in Figure 22.

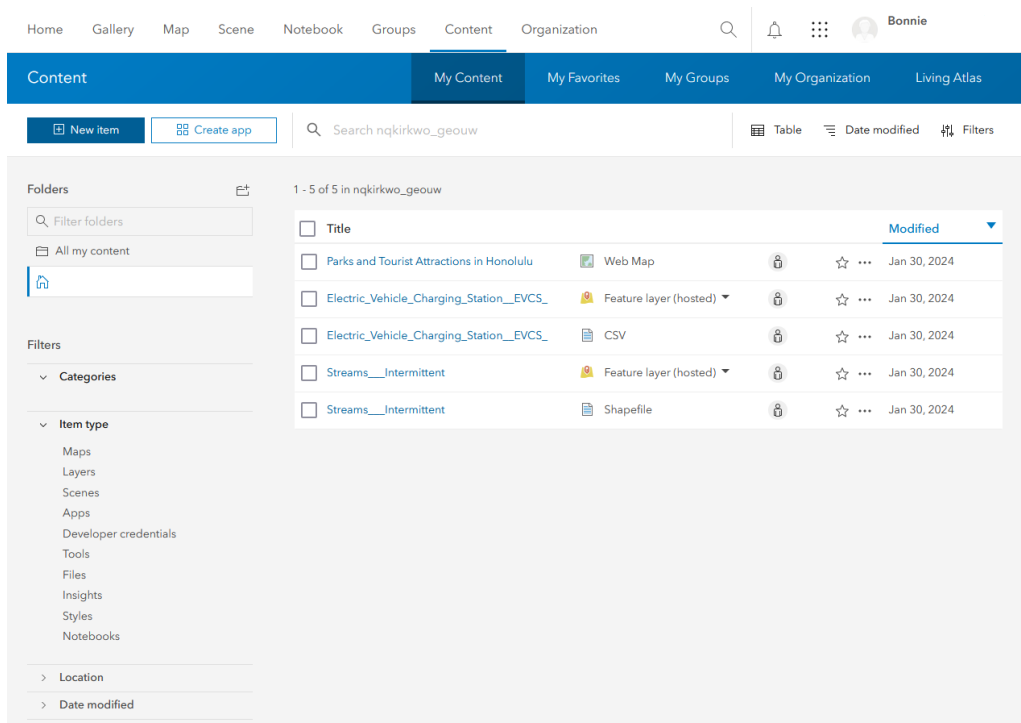


Figure 27 – ArcGIS Online Content Page

The New item dialog box that pops up gives the option to add Tags, which helps your item get found in searches. Type the words “Honolulu” and “Bikes” as two separate entries and click “Save” (Figure 27).

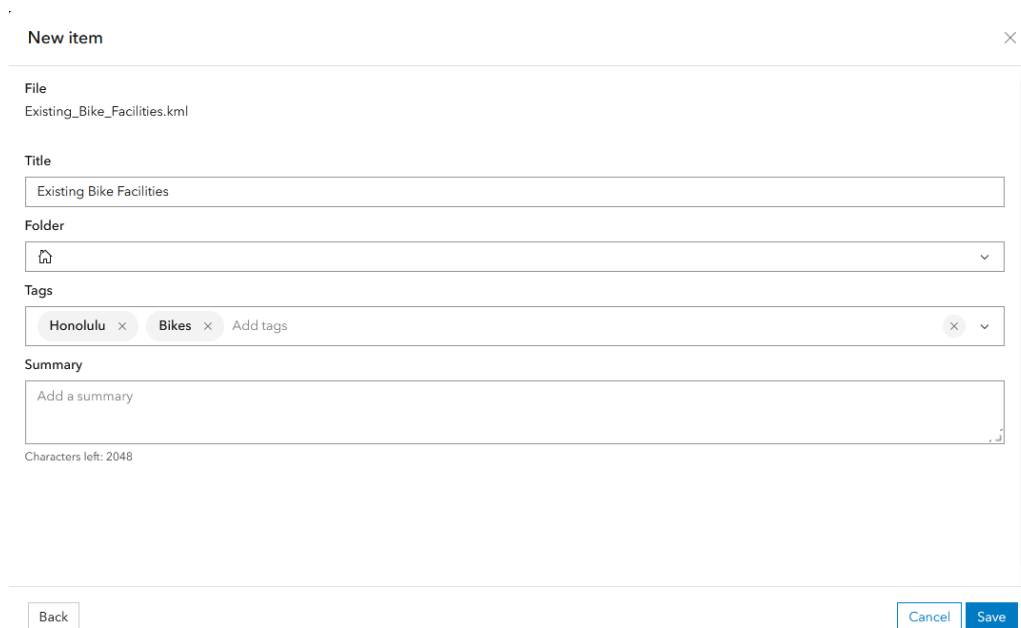


Figure 28 – New Item Description Pop-up Window

Once the KML has finished uploading, the item description page will appear showing the details of your newly added layer (Figure 29). This page can be reached at any time by clicking the item on the My Content page.

Figure 29 - Layer Description Page

Though not necessary now, from this page we can change the level of access via the “**Share**” button on the right. Figure 30 shows different options of how the data can be shared. If you want others to view the data, select Everyone (public).

Figure 30 - Share Option Pop-up Window

Go back to the Map Viewer page where the new KML layer will appear in Add > Browse Layers > My Content.

Editing and viewing attribute information

Uncheck all the layers except for 'Electric Vehicle Charging Stations'. Your goal is to add 2-3 charging stations to the Electric Vehicle Charging Stations layer.

In the Change Style section, select **"Location (Single symbol)"** under 'Select a drawing style' (Figure 31).

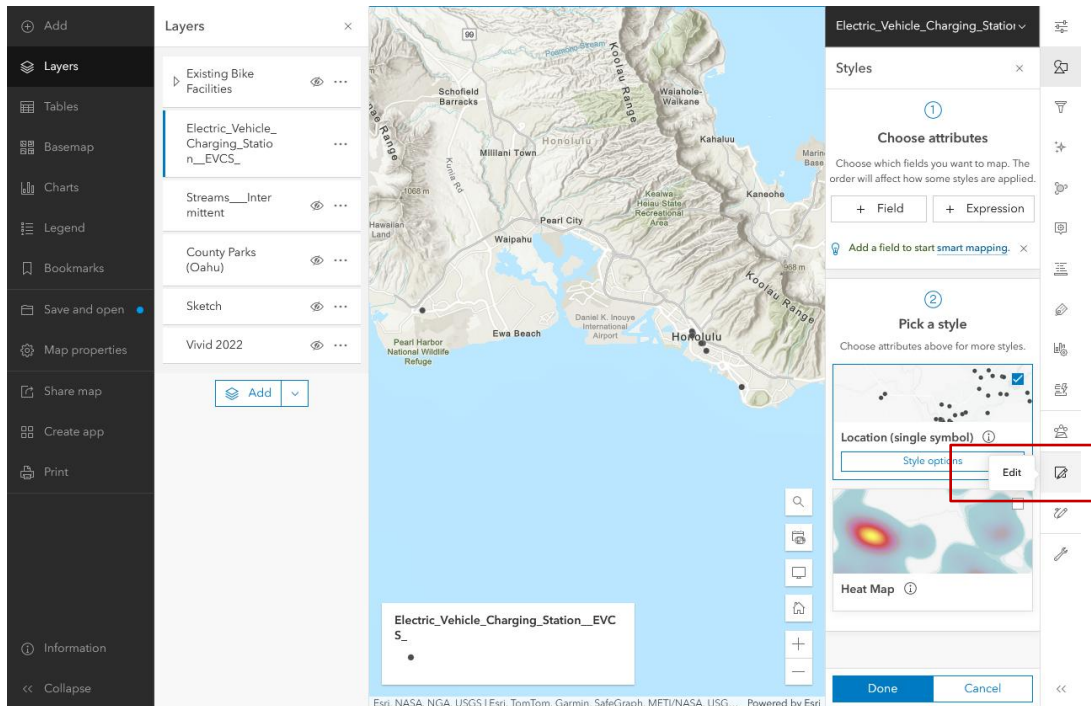


Figure 31 – Map with Change Style Pane

Then select the **"Edit"** button on the bottom right (depicting a pencil and a box) to start adding charging stations to your file.

Click on “**New Feature**” (Figure 32). Then, select charging station points to the parking lots at Aloha Stadium and Diamond Head or any other landmark. If you do not see anything below ‘Create Features’, save and reload your map.

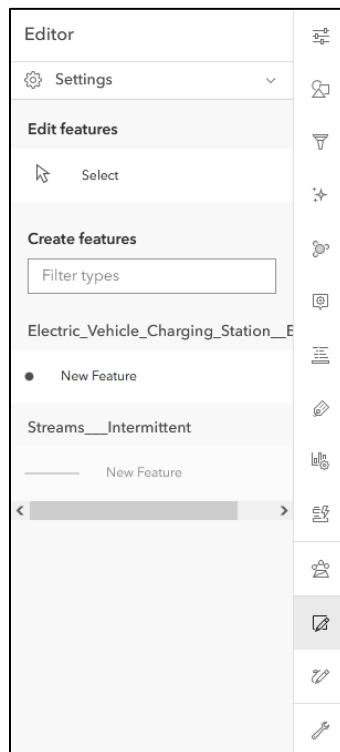


Figure 32 – Edit Features Pane

Once you have chosen a landmark, click on it to place your point and fill in the following: Label the **Name** as the particular landmark and the **Location** as the name of the neighbourhood. In practice, the rest would also be filled in, but *they can be left blank for this demonstration* (Figure 33).

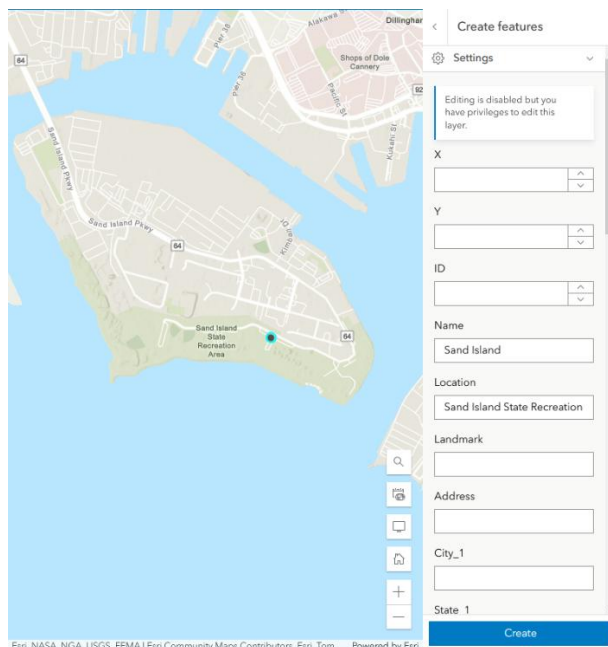


Figure 33 – Feature Description Pop-up Window

Lastly, rename the **Layer** into “Charging Stations” by clicking the three dots beside the layer name in the Layers pane (Figure 34, same as how you opened the layer properties). This time, select “Rename”. Enter “Charging Stations” in the pop-up window and click “OK” (Figure 35).

Figure 34 – Layer Options

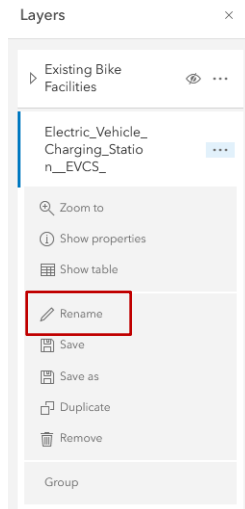
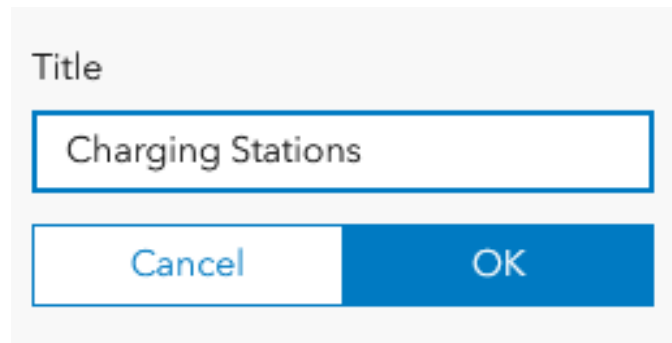


Figure 35 – Renaming



Customizing Your Layers

Under the Contents tab on the left hand side, you should now see several 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. Options will vary by layer.

Let's use some of the menu options to tidy things up a bit. First, Rename the layer “Vivid 2022” to “Oahu Aerial 2022”. Finally, open its Properties and change the Transparency of the ‘Oahu Aerial 2016’ layer to 50% (Figure 36).

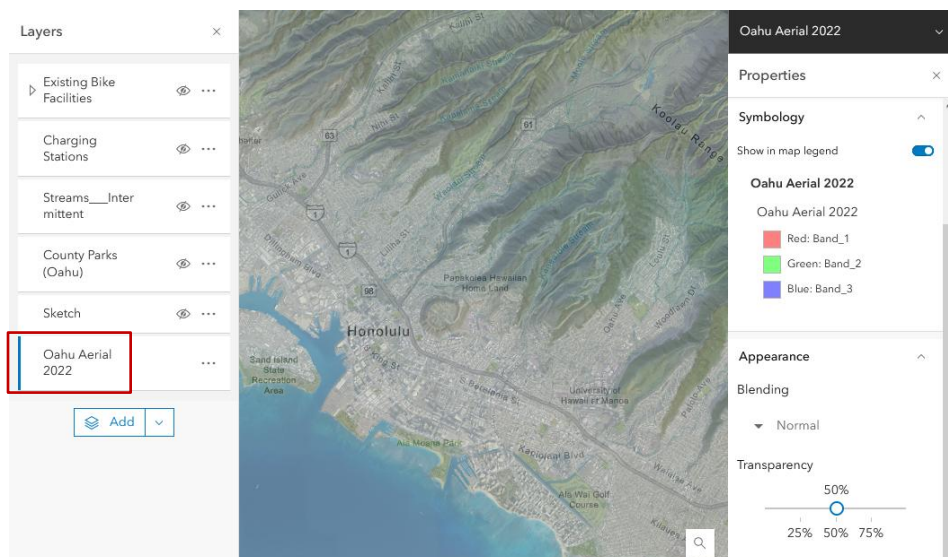


Figure 36 – Transparency Pop-up with Map

One last customization you'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. In the Properties menu, scroll down below transparency to find Visibility. Change the dropdown on the left for in closer than: to 1:40,000 (Town). Figures 37 and 38 show the difference of a layer being out of and within range. Notice how much easier it is to read the map at this scale when the aerials are hidden from view.

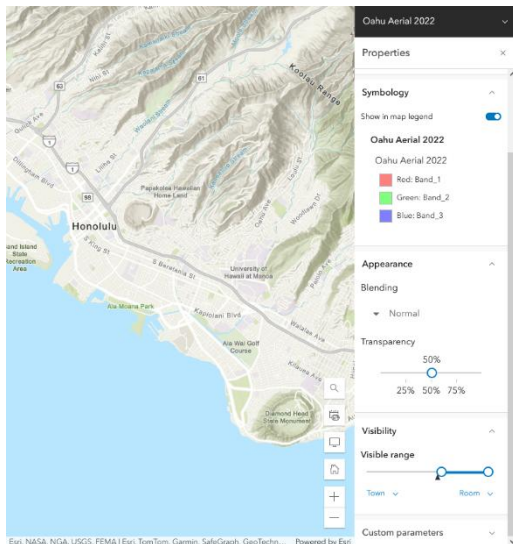


Figure 37 – Outside Visible Range

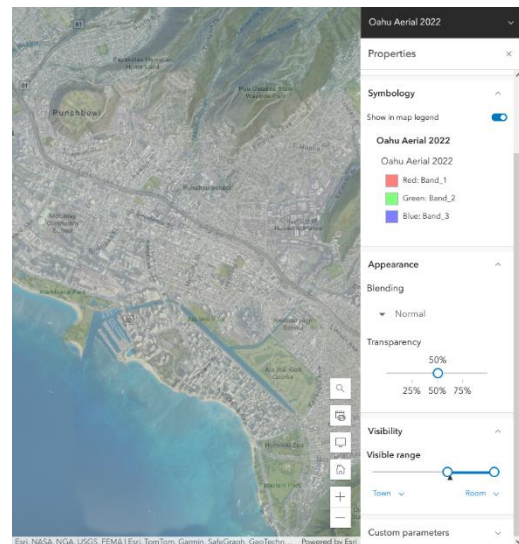


Figure 38 – Within Visible Range

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, 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. A brief overview of the types of analysis you can perform are included at the end as an optional addendum.

Accessing the Attribute Table

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

The attribute table can be selected in the same ... dropdown as Properties or Renaming, under “Show Table” (Figure 39).

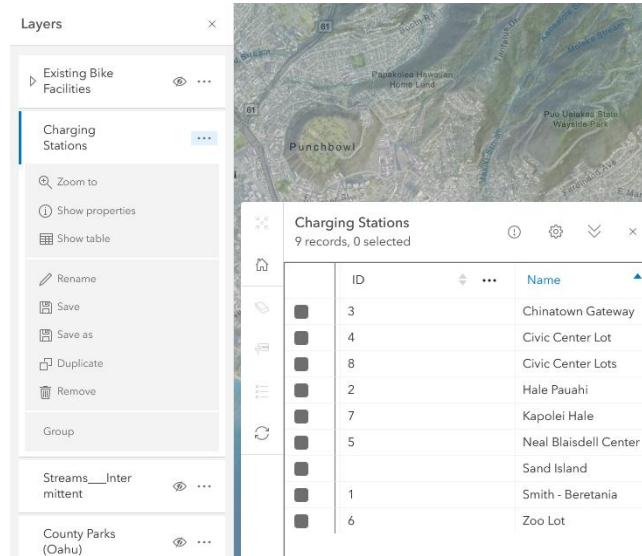


Figure 39 – Attribute Table

You can sort the table based on different columns by clicking the arrows to the right of the attribute. Figure 39 shows the Charging Stations sorted by Name instead of ID. Clicking it once sorts it descending, clicking it again reverses it to sort ascending, and clicking it a third time resets the sort.

Sharing Your Map

Up to this point, your map has been saved to your ArcGIS Online 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.

You can share directly from the map by saving the most current changes and then clicking "Share Map" (On left side dark column). You can also share your map from the homepage under the "My Content" page on the Web Map Details page. Select **Manage Sharing** and choose **Everyone (Public)**, the link to your map will be accessible to anyone.

Web Maps can also be embedded into websites directly; however, it requires you to view the map in the older Classic Map Viewer. To do this, click Open in Map Viewer Classic in your map view, click Share, then "Embed in Website" (map needs to be public for this option to be accessible. From here you can create an HTML code you can copy into another website (Figure 40).

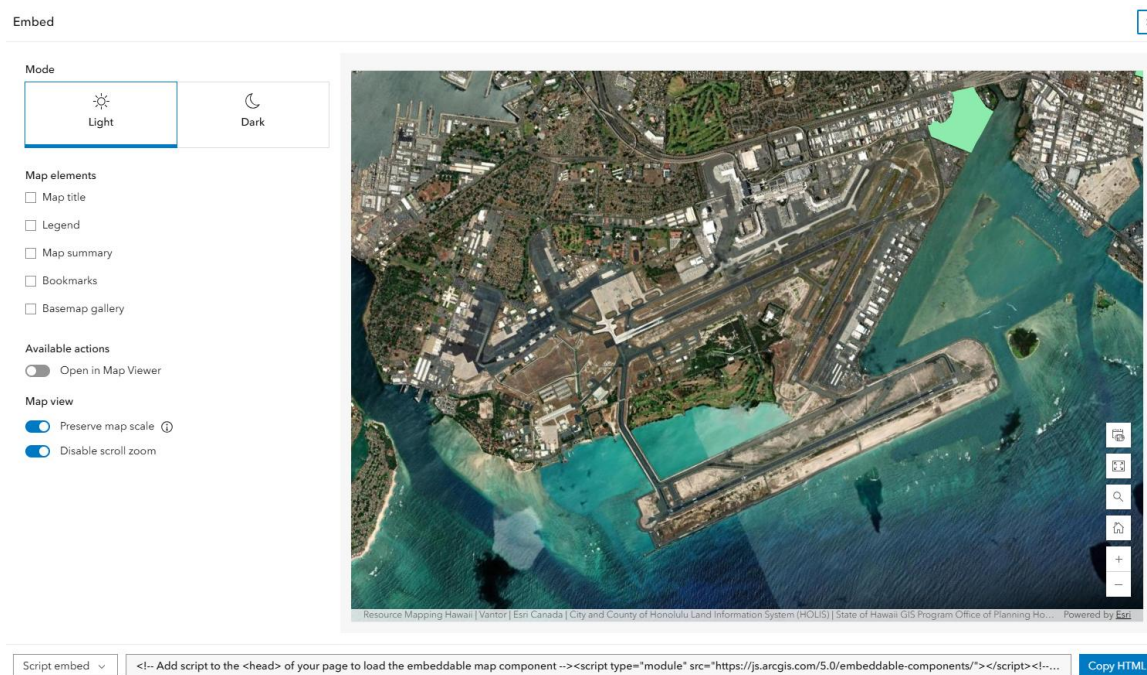


Figure 40 - Embed in Website Options

The option to make a Web Application is slightly more involved, but still relatively easy to set up. To do this, open the map's details page via "My Content" (In AGOL Homepage). On the right hand side press the down arrow UNDER the *Open ArcGIS Pro* button. Select "Create app" and "Instant Apps".

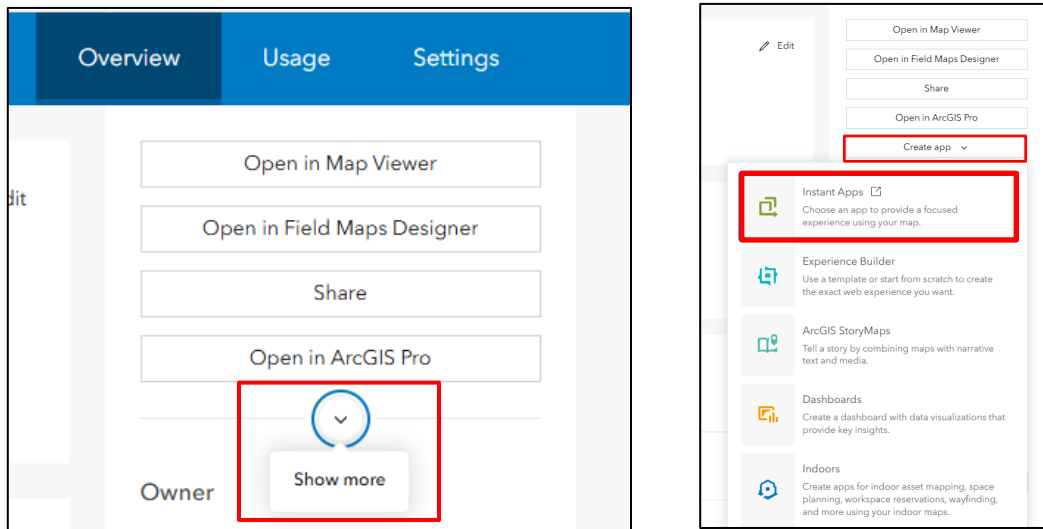


Figure 41 – Web Map Description Page

Here we will be selecting to create a Instant App. This option should open a 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 how each template is used.

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. Enter the information for your web application as seen below (Figure 42), and then click Done.

Create app - Basic (Media Map) ×

Give your app a title

Parks and Tourist Attractions in Honolulu ×

Add tags

Honolulu × Hawaii × Oahu × Tourism ×

Parks × Add tags × ▼

Save in folder

▼

Close Create app

Figure 42 - Create a New Web App Pop-Up Page

At this point, some important information appears on the screen. Both the web map and the web application are shared. Afterwards, a page like Figure 43 should appear.

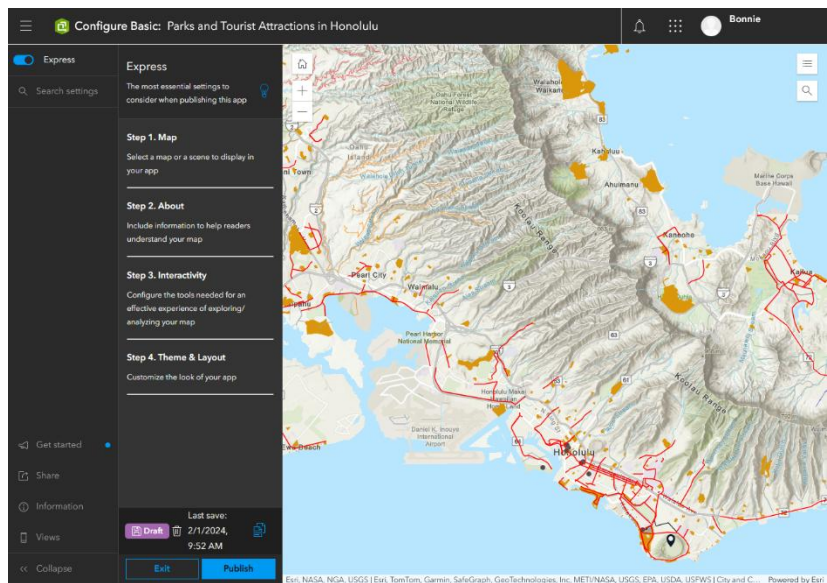
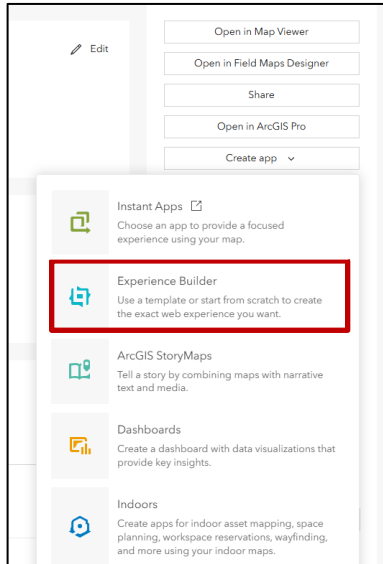


Figure 43 – Web App Configuration Page



Bonus: Esri Experience Builder

One popular option that offers users to design dynamic, customizable websites integrating maps, data and interactive widgets is the Experience Builder. You may have seen this option through the 'Create Web App' in the previous section. (Figure 41)



This can also be opened through Google by searching ESRI Experience Builder

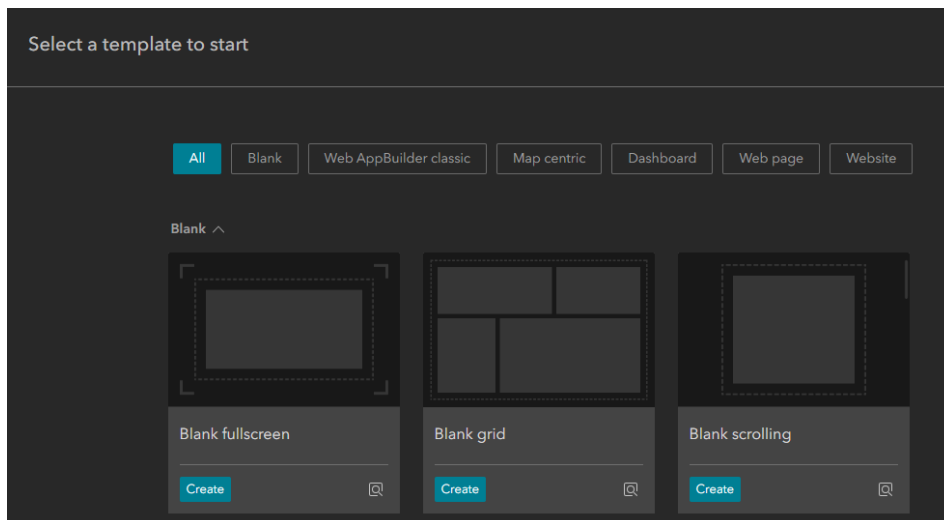
With the ESRI experience builder, you can create both 2D and 3D experiences, connect multiple maps and data sources to build dashboards, story-like presentations or entire web portals all without needing to learn code.

This Bonus portion of the guide will focus on introducing the core fundamentals of Experience Builder, such as adding content (maps, text, widgets, etc.), configuring interactivity, and publishing your finished site to share.

Note: ESRI Experience Builder is only available to ArcGIS organizational accounts (not public/free accounts). If you are apart of a university, you likely have access through your institution.

Getting Started

Open the Experience Builder through the 'Create Web App' drop down in the Overview page of an ArcGIS Online web map. Alternatively, open it through a [Google search](#).

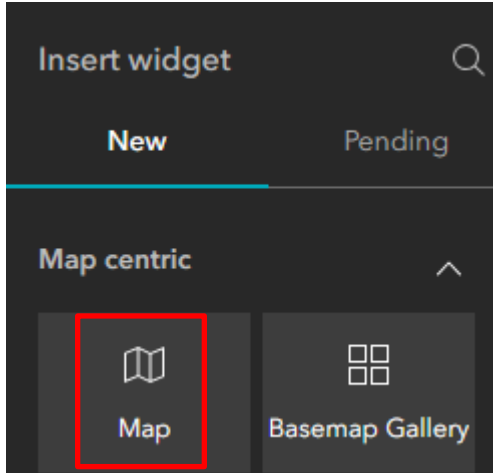


Create a new Experience and select the Blank Fullscreen template or one of your choosing.

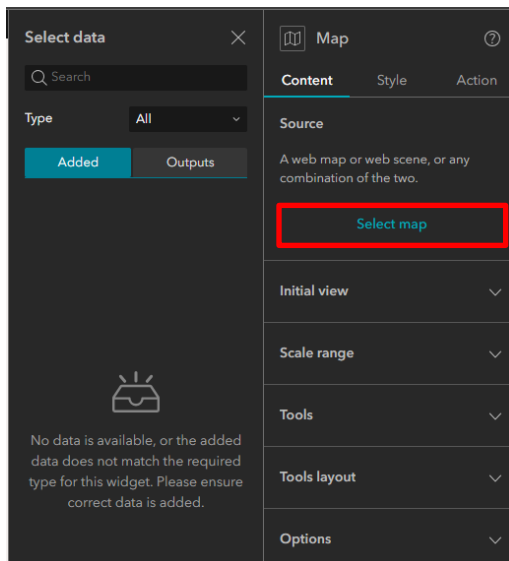
If it's your first time creating a new Experience, you may be prompted with a getting started guide. It will give you a brief introduction to the UI and icons. Take a few minutes to familiarize yourself with the tools available.

Adding a map

If you've gone through the tour, you should recognize the left panel, where you can Insert widgets, including your map. Go ahead and drag to insert the map you created in this tutorial or any one of your choosing.



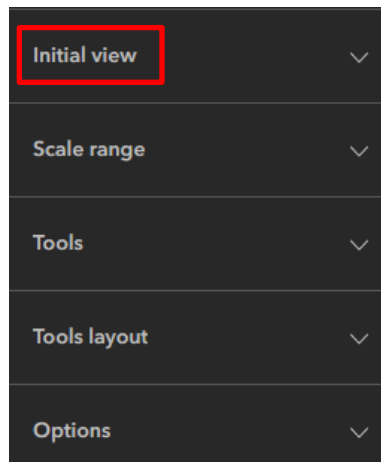
If you opened Experience Builder from a search engine, you would need to add your map in as a content. Your right panels will show the properties of your currently selected item.



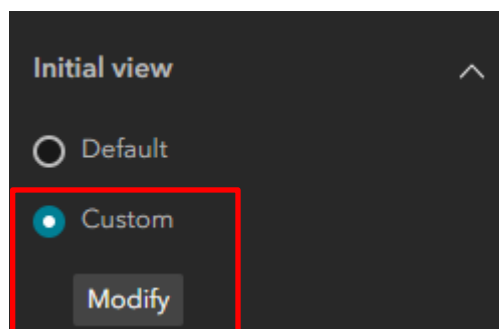
Click on your blank map and select a new source for it. **On the bottom of the ‘Select data’ pane,** click the **‘Add new data’** button. Find a map of your choosing and bring it into the Experience Builder. You can also add more data through the data tab on the left panel as well.



You should now see your map embedded within the Experience along with any layers that was contained in your web map. You can resize and reposition it freely on the page. Explore the options on the map pane to freely customize your map scene.



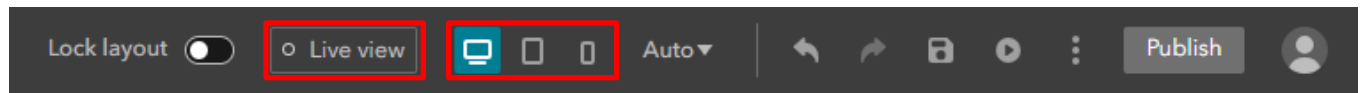
Open the **Initial view** drop down. As the name suggest, this setting lets you modify the initial view the user will see when first opening your map. Select “Custom” and hit “Modify”. Zoom to your desired location and save.



Bringing your attention back to the left panel, bring a ‘Text’ widget onto your project. Use the search bar for quicker access if needed.

Experiment with other widgets under the page element to give your viewers more context to your web map. Keep in mind these widgets will follow the user as they explore your web map.

To see what it would look like as a viewer, bring your attention to the top panel. Here, you can select **Live view** and the device type of the user. You can also save, preview, and publish your web app here. Hover over the icon to bring a brief overview text of the icon.



Adding Interactivity with Widgets

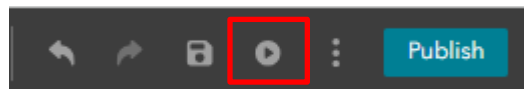
A web app's key appeal is its interactivity. Experience Builder's main strength is its ability to create these dynamic interactions. We will go very briefly go through two commonly used widgets.

Button Widget

A button widget can be used to link to layers, sections/pages of your map, or external links. Search for and drag the **Button** element from the **Insert widget** panel on the left. Click on the button to view its pane. For this simple example, try setting a link to any website of your choice. Simply click 'Set link' and insert an URL into the appropriate box.

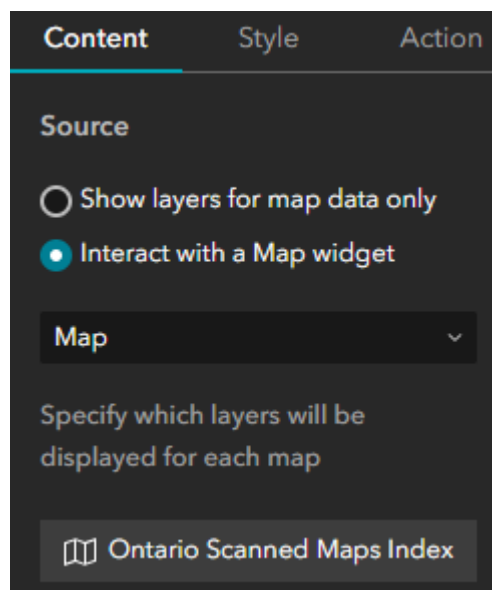


To test your button, save your Experience and open its preview in the top ribbon. Explore the button's property panel to edit its aesthetics and functionality.



Map Layer widget

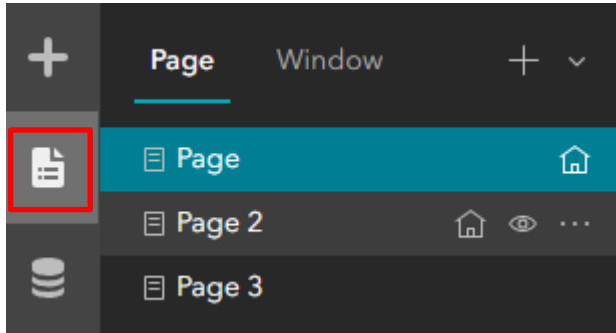
This widget allows you to toggle visibility between layers in your map, thus requiring a data source. After dragging into your Experience, explore its properties. By default, it will use whatever layers you currently have on your map. You can edit this through the 'Source' section in the content panel. Take some time to explore the other panels.



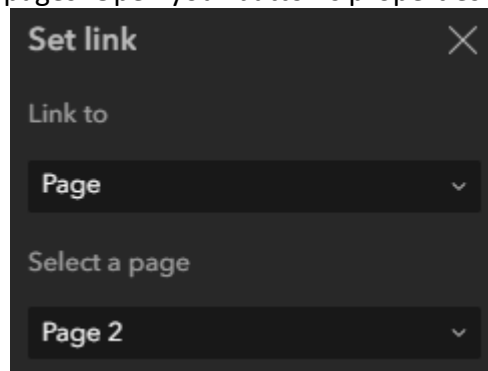
The Experience Builder offers a lot more than what is shown in this quick showcase. If you want a more in-depth guide of widgets, ESRI has tutorials for each of their widgets online.

Adding new pages

In Experience Builder, you are not limited to one page. Click the page icon on the left panel. Here, you can new pages to your web app. You may also choose from full screen or a scrolling page.



One way to link your pages together is to use the **Button** element as a direct access to your other pages. Open your button's properties panel and set the link to your other pages.



Wrapping Up

Experiment with different templates, link multiple maps or data sources, and try connecting widgets to bring your spatial data to life.

Wrapping Up

ArcGIS Online provides an easy way for users to create and share maps. When compared with an organizational account, the free public account has some limitations. 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. Even with the public account, you probably would have noticed that there are many other features of this mapping platform that were not 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, templates, 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>

Optional: Spatial Analysis

ArcGIS Online allows you to do analysis on your spatial data right from your browser. While not as powerful or densely featured as ArcMap, ArcGIS Pro, or other GIS software like QGIS, the convenience and accessibility of AGOL spatial analysis makes it a useful tool for the budding GIS technician. Spatial analysis can be done by users with a licensed account.

In AGOL, spatial analysis occurs in the Map screen, which is the same screen you accessed during the tutorial. The Analysis button is found on the right side, with a button depicting three circles above a rectangle (Figure 46).



Figure 46 - The toolbar containing 'Analysis'

Many kinds of analysis are available from AGOL. They are organized into functional categories. Complete documentation of the analytical tools can be found at <https://doc.arcgis.com/en/arcgis-online/analyze/use-analysis-tools.htm> but a concise description of some useful **Tools** are below:

Summarize Data

- Aggregate points: If you have a point feature and a polygon feature, running this tool will tell you how many points are within the polygon, and provide aggregate statistics about the points within the polygons.
- Join features: If you have two features that are related by attribute (ex. They share a field/column, such as the IDs every point is assigned and a real world object has the same ID in both feature layers) or related by space (ex. They occupy the same location in both feature layers), then you can “join” them together so that you can access the information of both features inside of one.
- Summarize nearby: Finds and selects the features that are a defined distance from your desired feature.
- Summarize within: If you have two layers, and one of them is a polygon layer, you can calculate the statistics of the features that are spatially within the polygon areas.

Analyze Patterns

- Find hot spots: If you have a polygon feature and a point feature, this tool will generate a polygon feature showing a comparison of which polygons have more points – effectively a density map with defined polygon boundaries. This output identifies “hot spots” where spatial events (ie. Points) occur more frequently in the time frame that the points exist in.
- Find point clusters: If you have a point feature layer, this tool will classify them based on their spatial distribution.
- Interpolate points: If you have a point feature layer, this tool will generate the calculated interpolated value of areas in between points. For example, this is useful if you want to generate a temperature map using the recorded temperatures at select weather monitoring stations.

Use Proximity

- Create buffers: This tool will make a polygon feature that shows a set distance around your input feature.
- Find closest: This tool will look for the nearest feature from within the layer to the selected feature.

Optional: Templates

For the times where you want to jump-start the development of your web map or web application, templates of common products are available for your use.

Templates are formatted as web applications. You will need creation privileges, which is given by default to users with the Creator user type within an organization. Consult Service Credits & Permissions/Roles to learn more about roles in AGOL in the final section below.

- 1) Templates are available once you choose to create a Web App (Figure 47). Select your template, preview it, and change the properties of it to suit your needs.
- 2) You can download an existing template and modify it with your data to suit your purpose. See the templates at <https://www.arcgis.com/home/group.html?id=2f0ec8cb03574128bd673cefab106f39&overview#overview> for a list of templates that may be useful to you.
- 3) You can code an original template using the application base available from ESRI at <https://github.com/Esri/application-base-js>. Note that application programming is beyond the scope of this tutorial appendix, though many Javascript resources are available by ESRI under their developers' page.

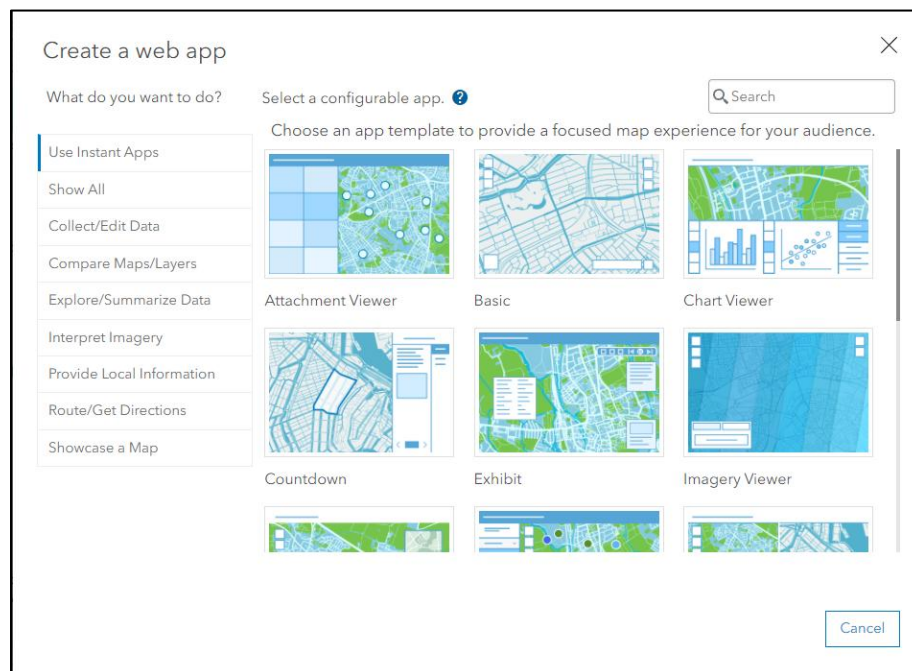


Figure 47 - The templates available by default for a web map

Optional: Service Credits & Permissions/Roles

You may need to specify to your aiding technician what permissions and roles you might need. Use this key to figure out what user role and permissions are right for you.

- Viewer – Viewers cannot create, edit, analyze, or distribute data available on an organization’s account, but are able to see it. This is typically what role you will need should you require secure access to data but are not affiliated with the organization.
- Editor – Editors have access to the data and editing functions on data. However, this does not extend to the Editor the ability to create datasets, perform analysis, or share their work (or any work they were given access to). This role is useful for persons assigned with maintenance of already existing datasets.
- Creator – Creators can access and edit data, as well as create new datasets, share data (ex. Export to website, change ArcGIS Online permissions to who can view data, etc.), and perform analysis. This role is useful for people who are members of a project and are developing new data and products.
- GIS Professional – The GIS Professional role has the same abilities as a Creator, but also has access to ArcGIS Pro (the desktop client meant to pair with ArcGIS Online).

Other user types exist, such as Field Editor and Insight Analyst. These user roles are specific to other ESRI applications and are outside the scope of this tutorial.

Also note that these roles and permissions are set by default. Your aiding technician may be able to add custom permissions to your role based on the needs of your project. Discussing your project needs with the technician is the best way to determine the user role and permissions that are best for you.

Service Credits (credits, for short) are ESRI’s method of quantifying and monetizing ArcGIS Online’s hosting and geoprocessing power. Certain intensive operations, such as geocoding, require credits, which are purchased and pooled for use. Furthermore, hosting layers on ESRI’s AGOL servers will incur credit costs once a threshold of memory is passed. It is wise to ask your aiding technician about your organization’s credit pool and to plan ahead to ensure that your project does not exceed the resources available to your organization.

ArcGIS Online: Using StoryMaps

ArcGIS Online offers many unique Web Apps that can further manipulate data, help with data acquisition, and overall improve the mapping experience. Web Apps such as Storymaps that allow for dynamic map presentations that is not possible in a standard ArcGIS Pro Layout. StoryMaps allows users to display maps alongside text and imagery in a presentation format. The StoryMaps app can be accessed from the waffle icon in ArcGIS online or by searching for [ArcGIS StoryMaps](#) through your search engine:

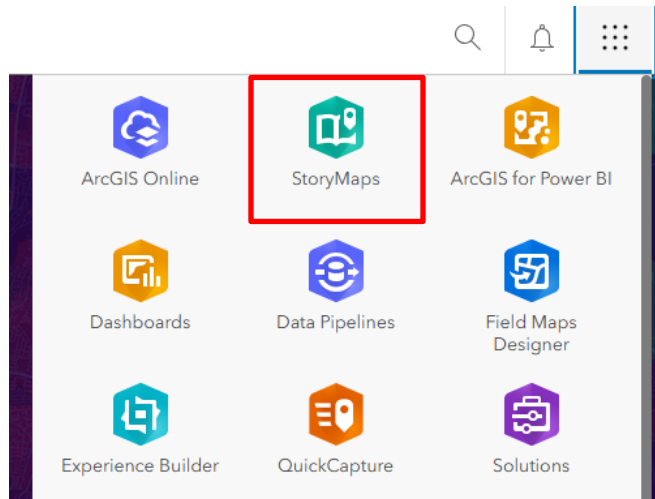


Figure 49: waffle icon leading to Web App list on Arc Online

Once StoryMaps is selected, the user will be brought to the home page of the app. This page allows users to view current StoryMaps from their groups and organization, make changes to StoryMaps, or create a new Story map. The home page also includes a set of quick links that offer tutorials, and example maps for users to view.

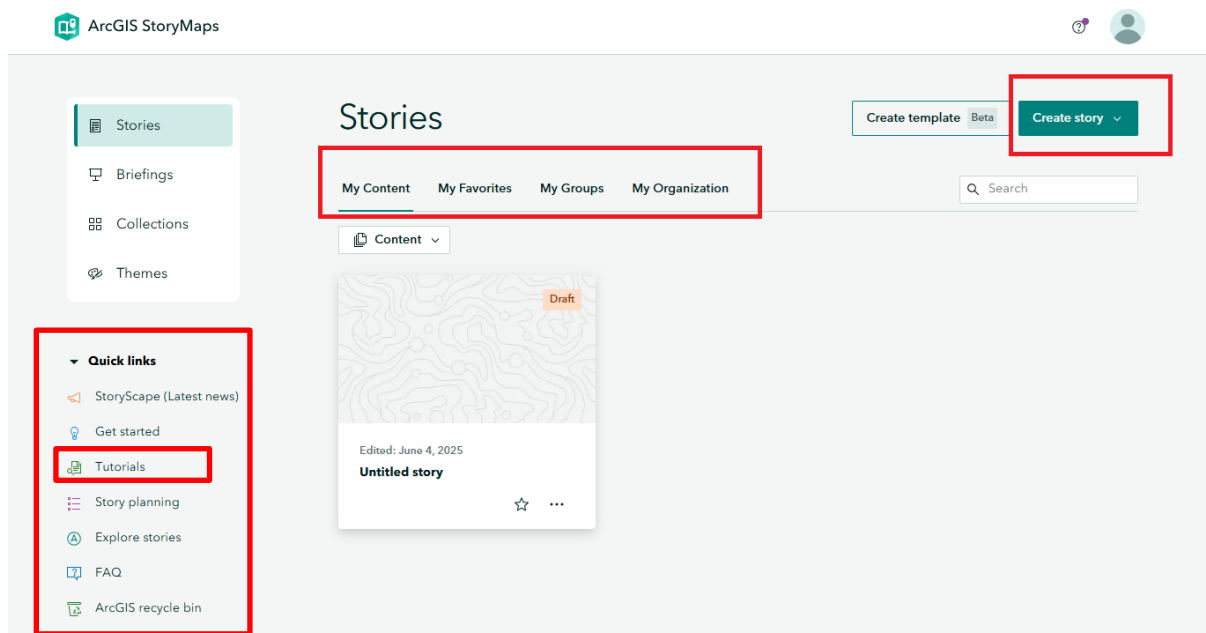


Figure 50: Home page of the StoryMaps Web App

Once you create a new story, you will be brought to your title and the option to add new features

to your story under a plus button labelled *Tell your story...*

This button is used to add any feature into your story; the features are categorized by several headers:

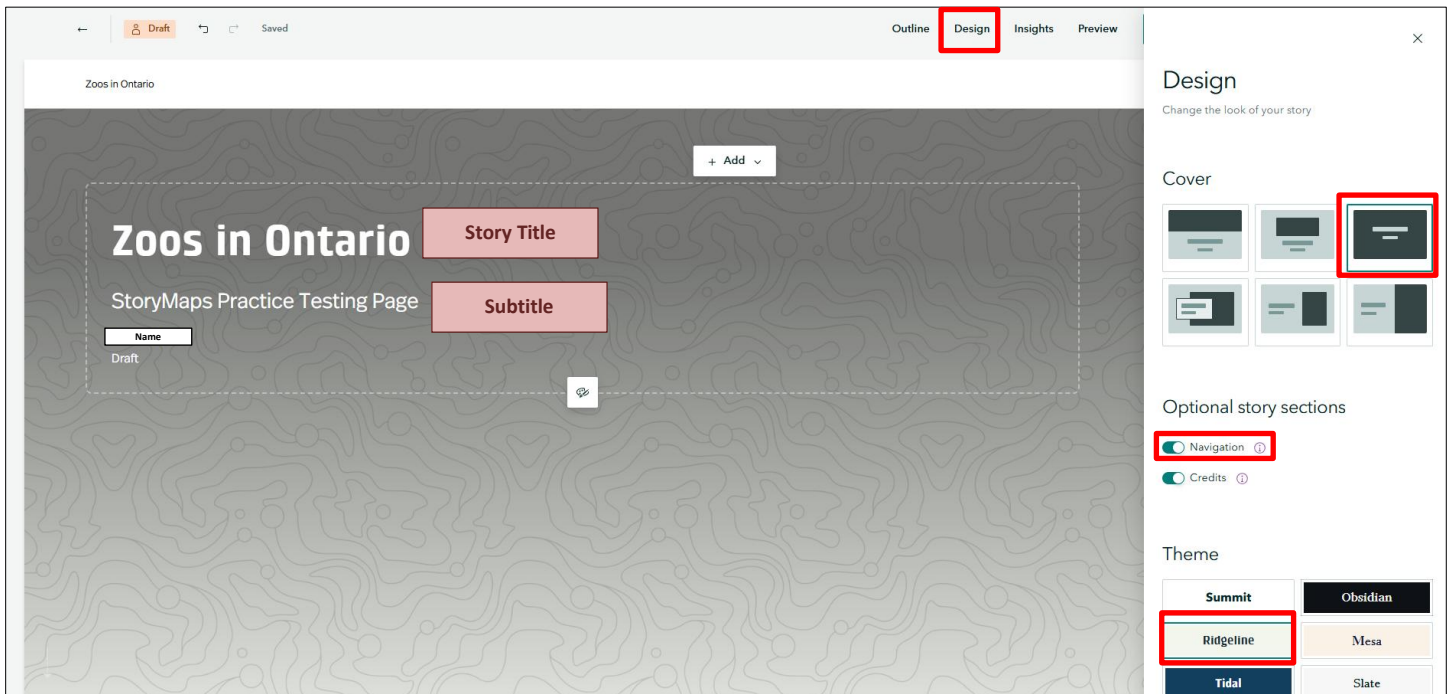
- **Basic:** includes features like text, buttons, separators for spacing, and code to add to the Story Map.
- **Data Visualization:** The data visualization section allows you to add spatial data and other visualizations, web maps can be added, charts, infographics, and data tables. Only web maps can be added as maps.
- **Media:** The media group contains inserts for images, videos, audio, and embedded links. There are some additional features like timelines and swipes, these interact with images and can allow viewers
- **Immersive:** this section features two options to select. The **Sidecar** allows users to add a background map with text and imagery alongside it, the text can be navigated and scrolled through while the map remains static. The second option is a **map tour**; this tool allows users to add a map with point data or create one from scratch. The map tour lets users create points on an interactive map that can be navigated.

StoryMaps offers many unique features that can be valuable to your map and presentation based on the message your map is conveying. The app gives you the capability to tell an engaging and powerful story alongside your map data and create a presentation that viewers will remember.

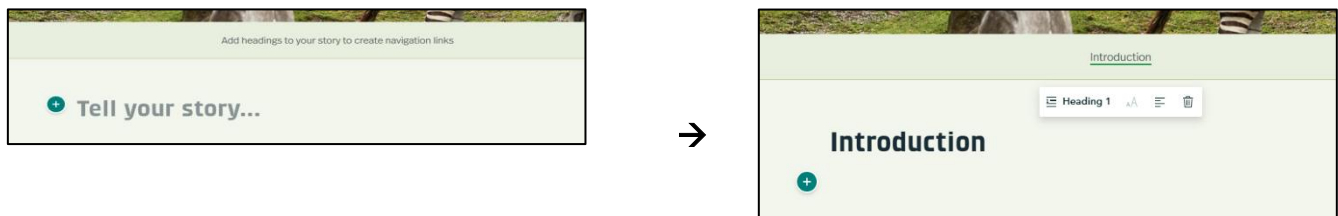
Instructions:

To begin, give your story a title. Under **Story Title** name of the story to be **“Zoos in Ontario”**, and under **Start with a short introduction or subtitle**, add a subtitle like **“StoryMaps Practice Testing Page”**

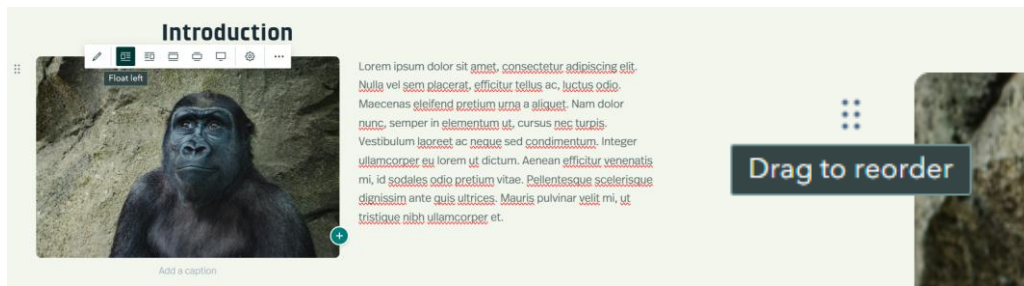
On the top toolbar, select **Design**. On this page you can change the look of your story. For this project select **Full-size** for the **Cover**, toggle-on navigation, and **Ridgeline** as the **Theme**.



On the text block click on the **+Add** button and select **Image or video**. Insert the image file, Title_Cover_Image. Scroll down and next to **Tell your story...** click on the **+**. Select Text and a text box will appear. Click on **Paragraph** and change it to **Heading 1** and rename the header to **“Introduction”**. Once typed you can see that the “Introduction” heading has been added to the navigation panel.



Click on the paragraph text box below the header and insert some text. Next to the written text click on the **+** and under Media select Image. Upload the image Introduction_Image. Once the image is uploaded, we can adjust the image formatting. Select Float Left and drag the six dots so that the image left to the text.



ArcGIS Online StoryMaps: Tools and Features

Map Tour:

When creating a map tour, the app gives you three options on how to create it.

- Start from scratch: allows you to start with a blank map and add points as you need.
- Upload photos: lets you add photos to quickly create a tour, if the added photos are geo-tagged then they will be appended to a point at the photo's location.
- Start with a feature layer: select from available ArcGIS Online point layers to import to the map tour

After choosing what kind of map tour you would like to create, you are given another decision for the layout of your tour. StoryMaps lets users customize their map tour based on preferences of the map itself, or the media tied to each point on the tour. Both options are **Guided tours**, meaning that viewers will view the locations in the order they have been provided. The other options are listed as **Explorer tours**, these options allow viewers to see the tour stops in any order, in either a list or grid format. For the following steps and example imagery, the map tour will be made from scratch and have a map-focused layout.

Select a map tour layout



Guided tour

Readers scroll through descriptions of each location in sequential order, ideal for a small set of places.



Media focused



Map focused

Explorer tour

Readers explore locations in any order from an overview list or grid. They may also scroll or click through descriptions of each place, best for tours with many locations.



List

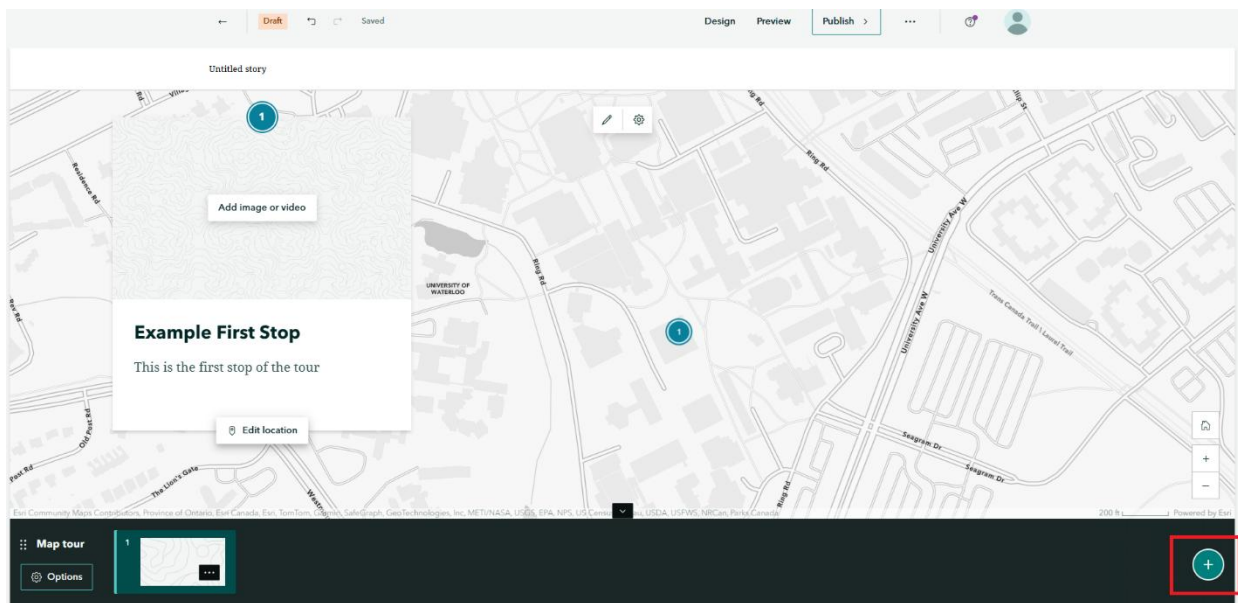


Grid

Instructions for Map Tour Example:

Click on  and below **Immersive** click on **Map tour**. For this exercise select **Map focused** and **Start from scratch**.

Map Tour (cont.):



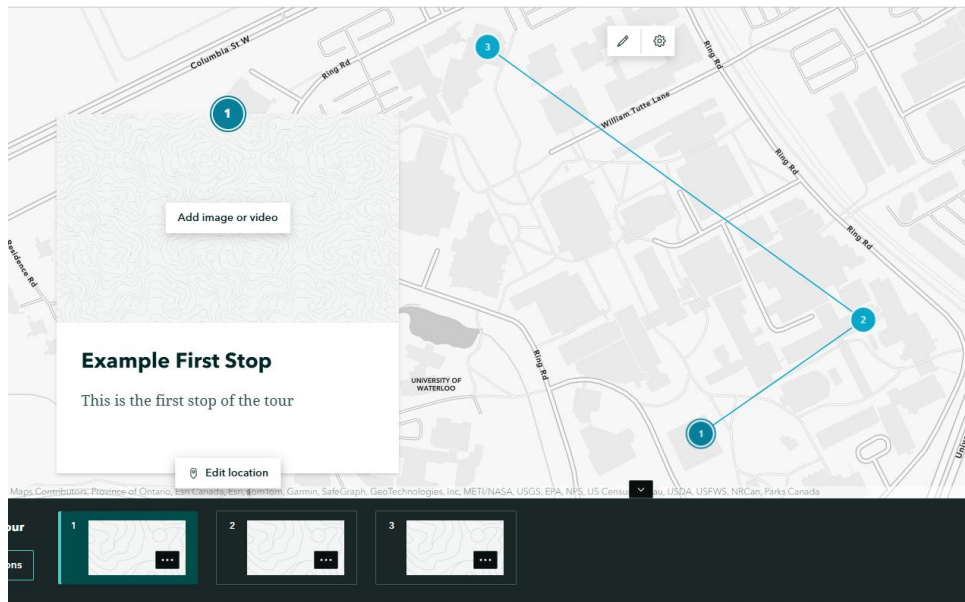
This is how your map tour should appear in your story map once created. The example first stop box on the left will become the list of points. Each point can have an attached image, title, description, and a location on the map. When there are multiple points in the map tour, the box will scroll as the map pans to each new point.

Similarly to powerpoint, the bottom black bar will show a list of all points on the map tour that can be rearranged into any order. The order of points in the black bar will be the same order that they

will appear in when viewers scroll on the map.

To add points, click the green plus button in the bottom right of the screen. Once points are added, users must add locations to them. When choosing the location of your tour stop, you can set the zoom level to the current zoom your map is in when placing the point, or to a standard zoom that is defined in the map pane's settings.

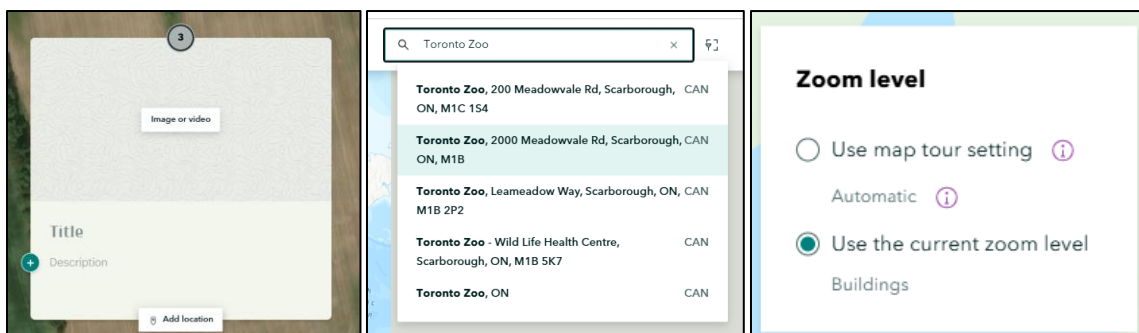
Once your points have been given locations, they will appear on the map with their order number and stop title when hovered. Points will connect to each other on the map based on their order.

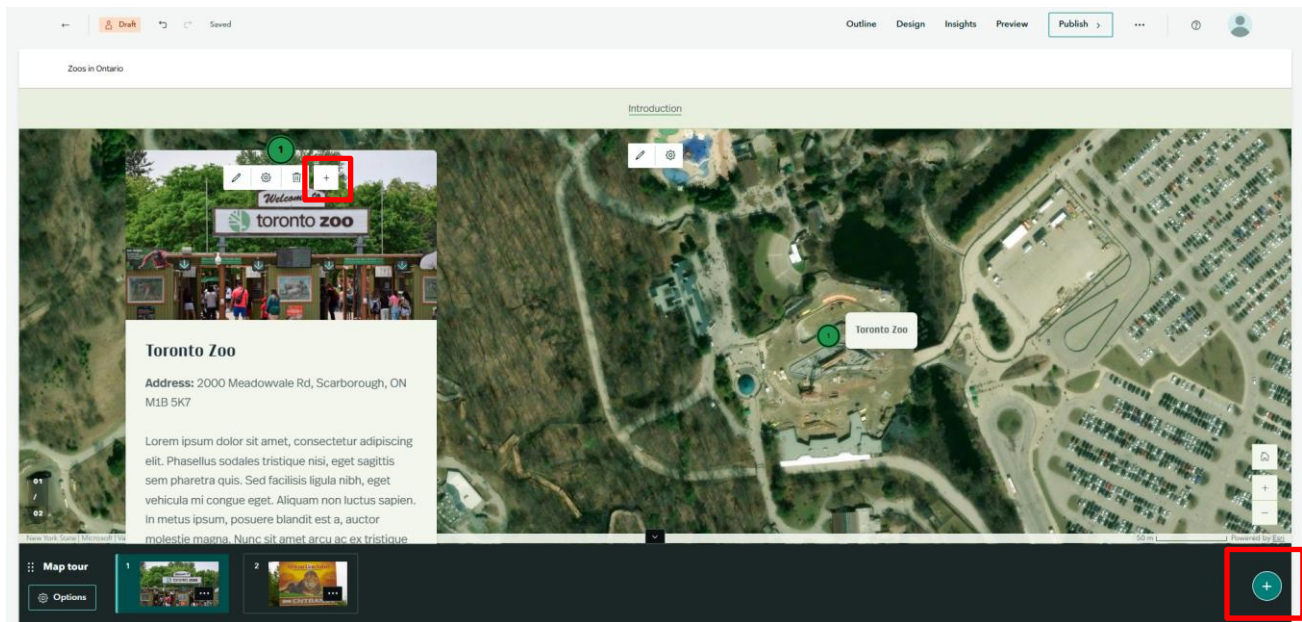


This example figure now has several stops with locations that are combined on the map. Once viewers have scrolled through the map tour the entire pane will scroll down and reveal the next portion of the story.

Instructions for Map Tour Example:

The first stop is the Toronto Zoo. Select the **Image or video** button and upload the image Toronto_Zoo_IMG. On top of the Image select  to provide the proper Attributions. Close out of the settings and click on **Add location**. Then in the top right corner search for the **“Toronto Zoo”**. Also adjust the zoom settings under **Zoom level**. Select the **Save** button on the bottom right corner.





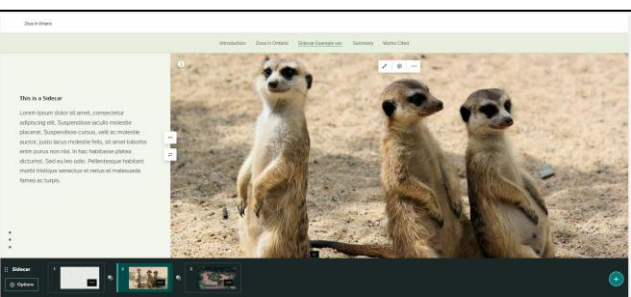
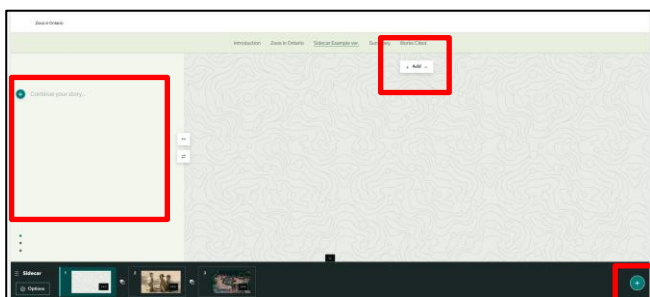
To add more images to the SAME slide press on the (+) button. Once you are done creating the first slide, you can add more slides clicking on the (+) in the Bottom right corner.

Sidcar

The sidcar works similarly to the map tour with the bottom black bar and scrolling to support multiple images / features. The sidcar splits the screen into a text window and a media window. The media window has several options, users can add a map pane, charts, infographics, and images. With the bottom black bar there is the same feature to rearrange the scrolling order of each window. The sidcar allows for much more text to be displayed for each slide, whereas a map tour only has a brief description. Users can go into greater detail on their story and individual components in a sidcar.

Instructions for Sidcar Example:

Click on (+) and below **Immersive** click on **Sidcar**. For this exercise select **Docked**. The **Sidcar** templates are very similar to how you would edit a **Map Tour**. Click on (+ Add) to insert your media of choice and the left panel can include headers and text.

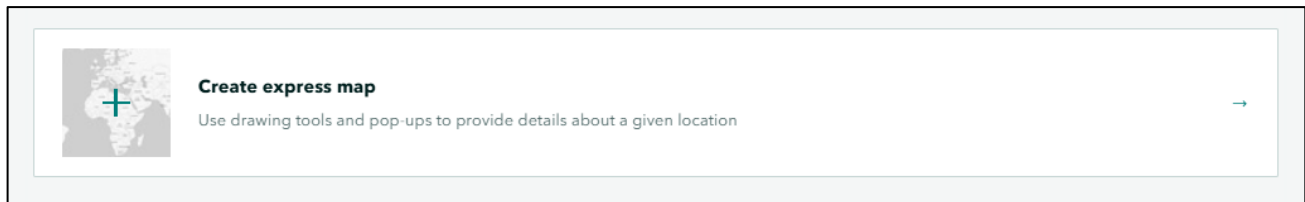


Express Map

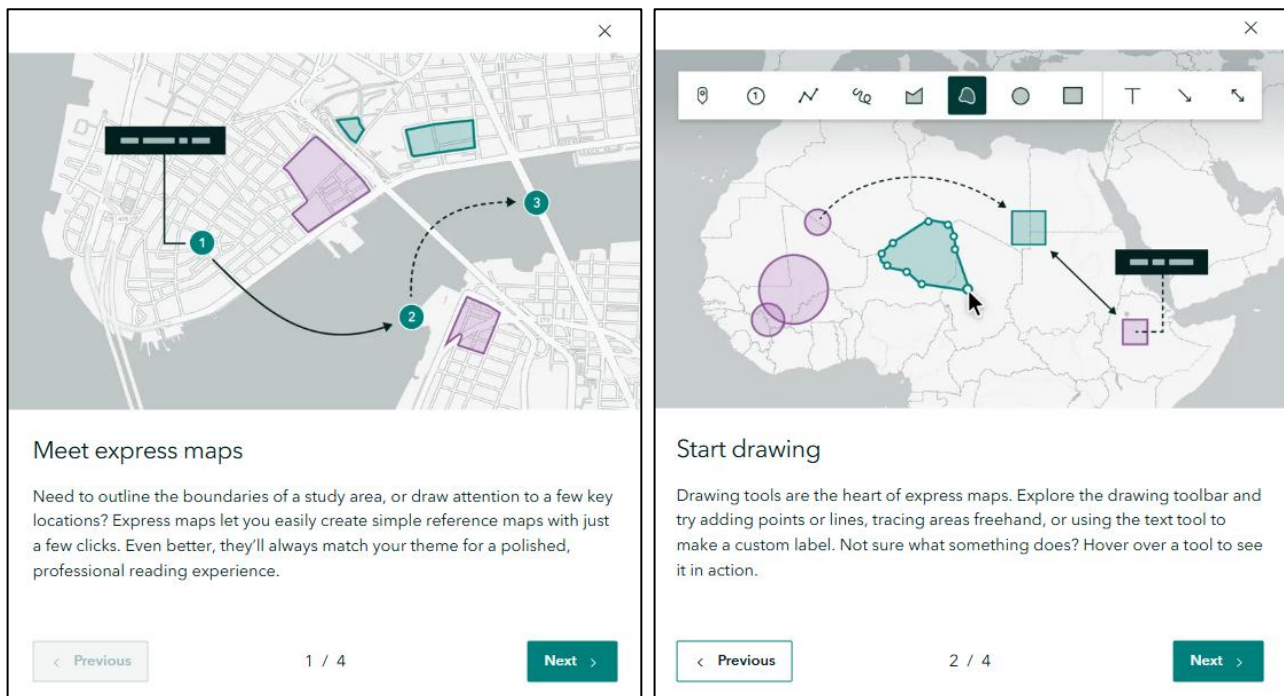
An Express Map lets you create a simple interactive map within the Story Maps builder rather than needing to create a separate map file in advance. This built-in tool allows you to easily add points, lines, polygons, with the addition of text and arrows right on the screen

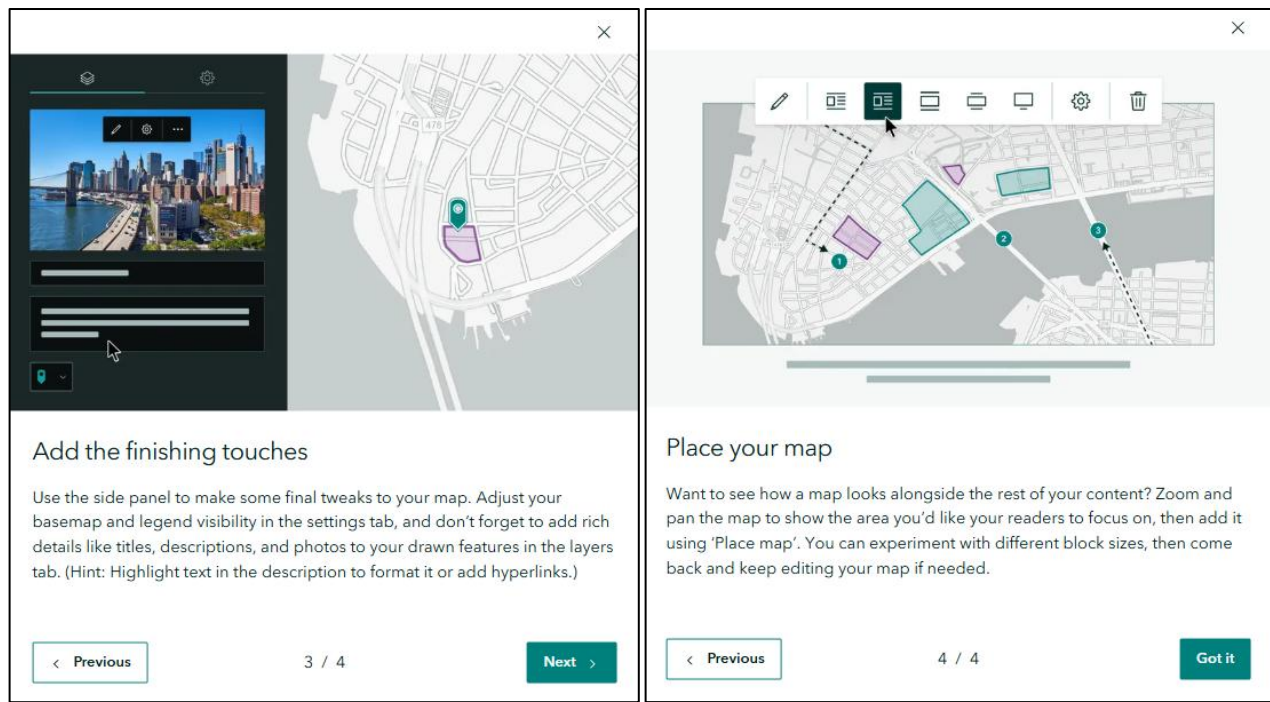
Instructions for Express Map Example:

Click on  and below **Data Visualization** click on **Map** and then select **Create express map**.

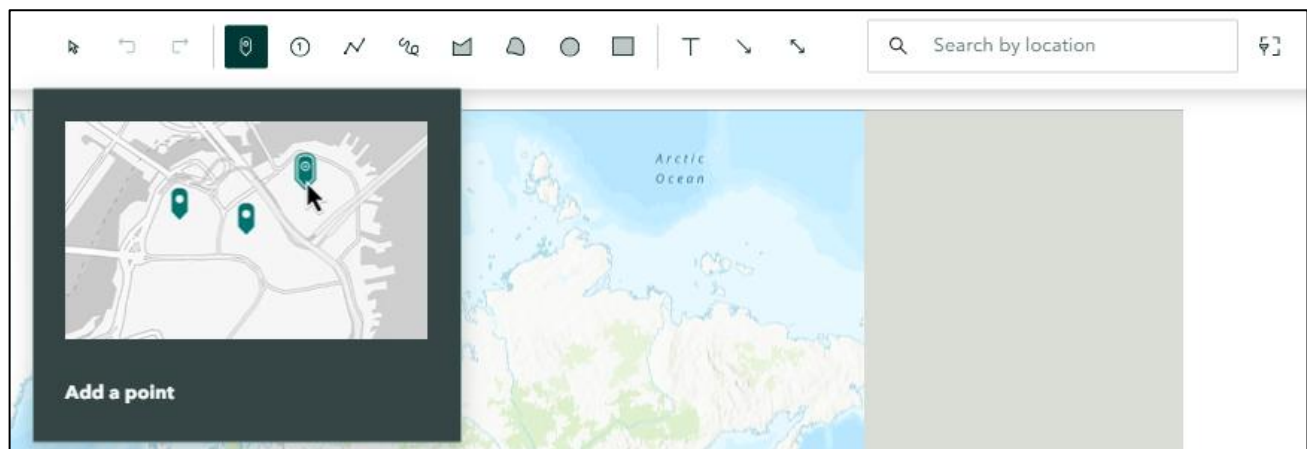


Have a look at the helpful express map introductory pop-up.





On the top right corner, the toolbar here will show the tools you need to add/draw features. Hover over each icon to learn the function of each tool.



This example will use the Toronto Zoo again. Using the freehand tool trace the West Caucasian Tur Exhibit. If the layer does not look good, press on the trash can button on the bottom. Add an image, title, and text to your feature layer

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