ArcGIS Online

Visualizing Data:
Tutorial 2 of 4

2014

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Contents of This Tutorial

The Goal of This Tutorial

In this tutorial we will learn the basics of how to create and manage maps. Topics will include such things as importing data, sharing, and customizing your maps. By doing this tutorial, you should feel even more comfortable using ArcGIS Online. This tutorial will prepare you for the analysis work that will be done in Tutorials 3 and 4.

The layout of this tutorial is a step by step walkthrough. There is also a bonus section if you wish to reach ahead and try something interesting.

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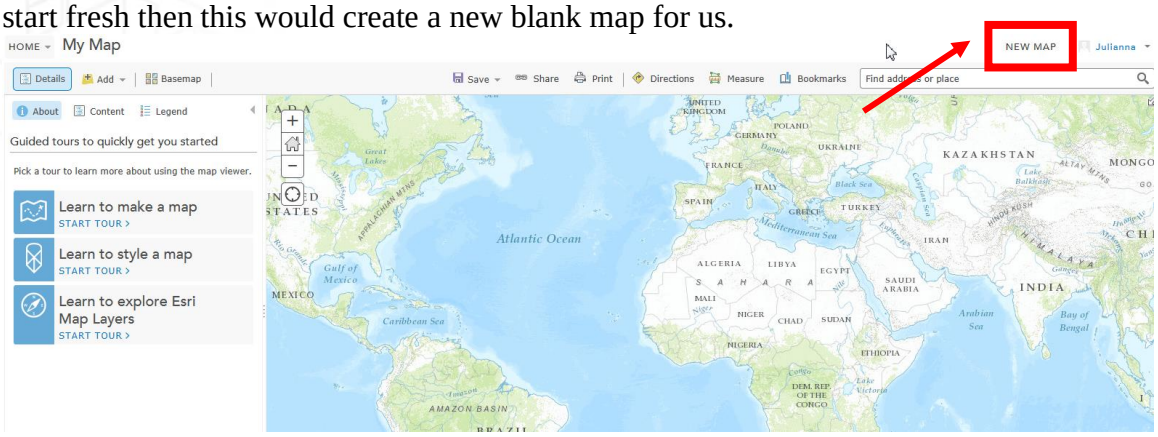
Create a Simple Web Map

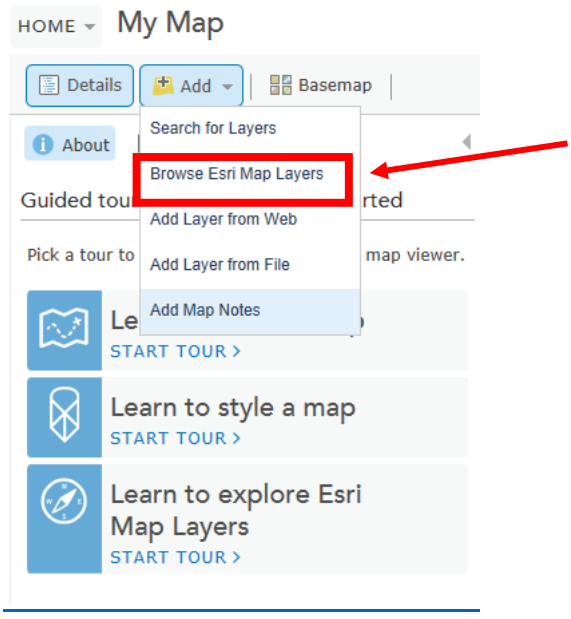
Step 1

First we will create a new map. From the Home page, click on ‘Map’ in the toolbar. You will be brought to a page pictured below. To create a new blank map, click on "New Map" in the top right corner. We already have a blank map, but if we were looking at a map that we have already saved, or wanted to start fresh then this would create a new blank map for us.



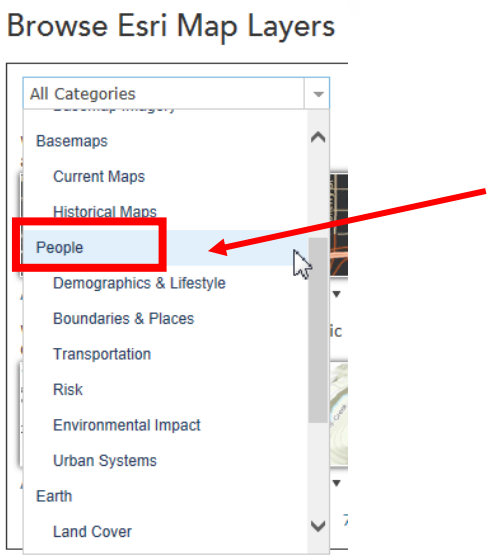
Step 2

Now that we have our blank map, we should add some layers. Click on "Add" and then click on "Browse ESRI Map Layers". ESRI has a large Gallery of data and layers at our disposal. We will use some of these layers to get an idea of what is available.



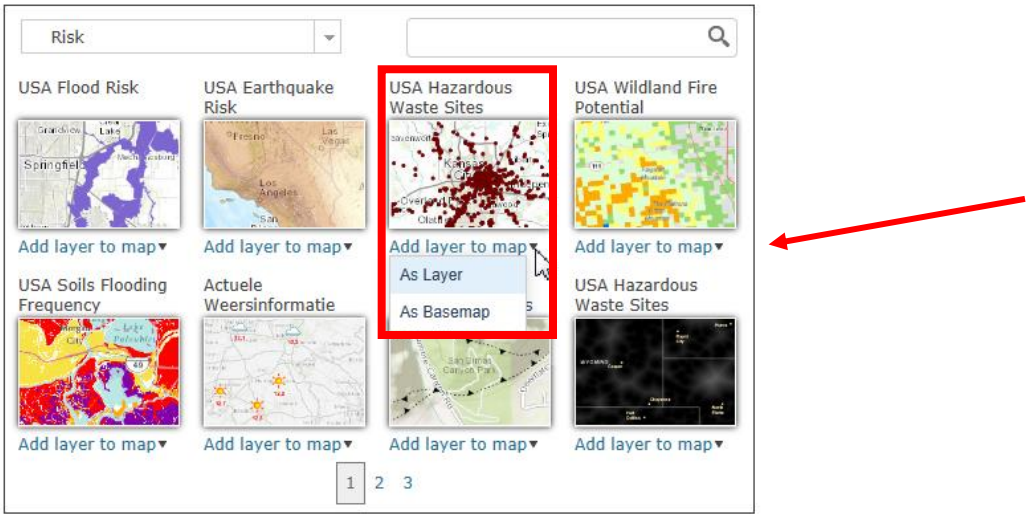
Step 3

There are 3 main types of features that you can have on a map. These are points, lines, and polygons. We will be adding a polygon layer, a point layer and a line layer in this tutorial. The three layers we will choose will all be in the category of "People".



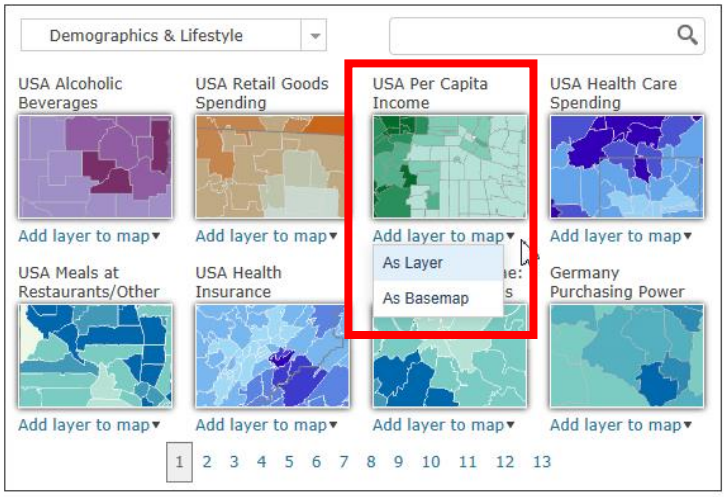
Step 4

Let's first add a point layer. Choose the "Risk" category. The layer we want is the USA Hazardous Waste Sites. Click "Add Layer to Map", and since we want it as a layer and not as our basemap, we will choose "Add as Layer".



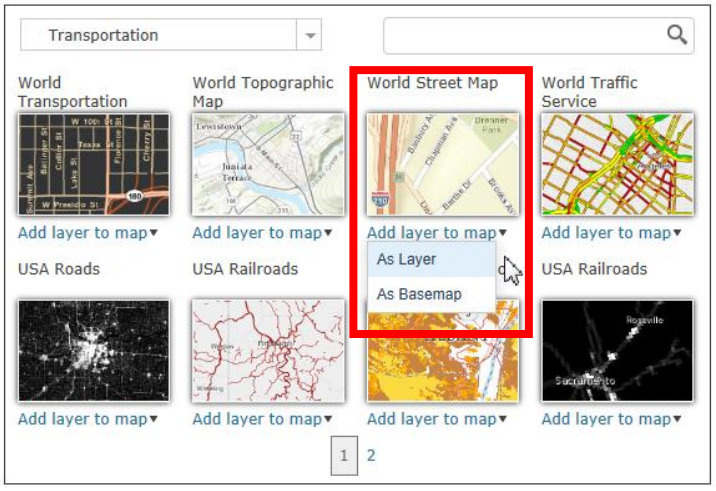
Step 5

Now that we have our point layer, we will add a polygon layer. Polygon layers are very useful as they give you boundaries for visual reference as well as for analysis. The layer we want is under "Demographics & Lifestyle" (see step 2 and step 3 to find this category under ‘People’) and we will add the "USA Per Capita Income" as a layer.



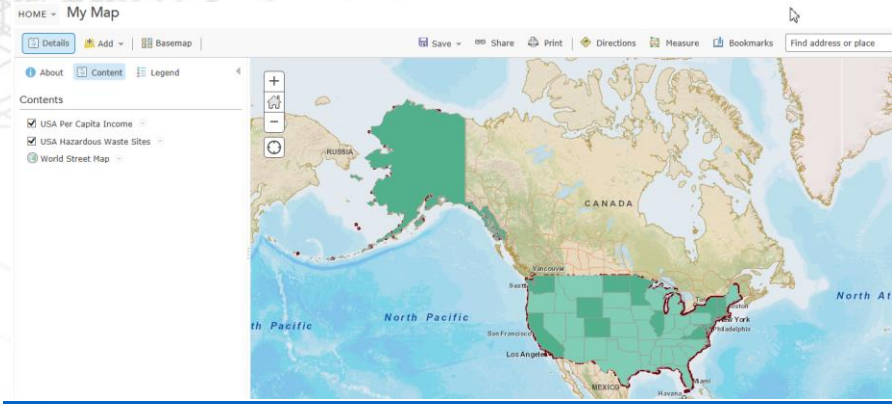
Step 6

Now that we have both a points and polygon layer, we will add a line feature layer. Transportation is one of the most common uses of a line feature. We will choose the "Transportation" category (follow step 3 and step 4 to see this category under ‘People’) and add the "World Street Map". Instead of adding it as a layer, let's add it as our basemap.



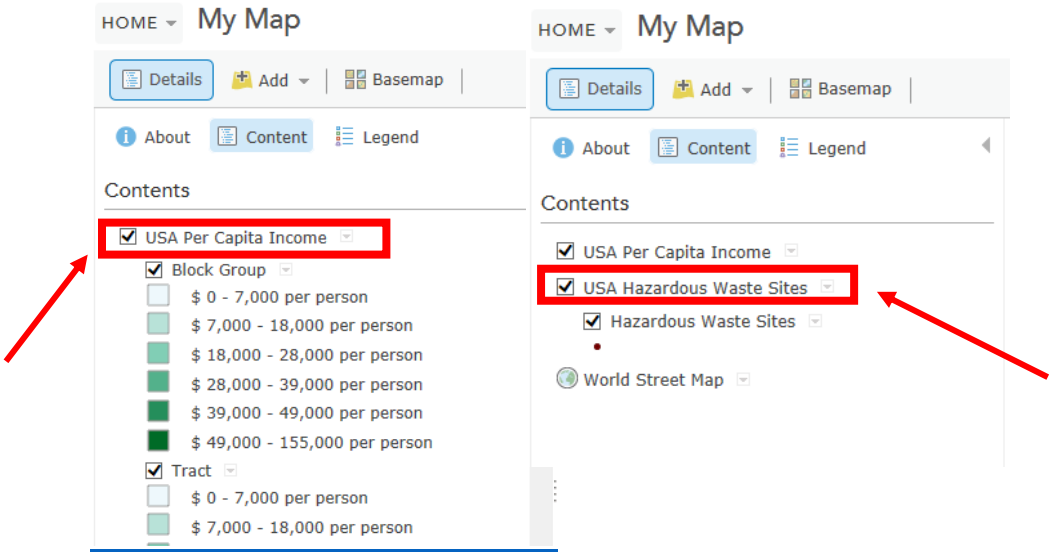
Step 7

We have added all the layers for this map, and your map should look like the one shown below.



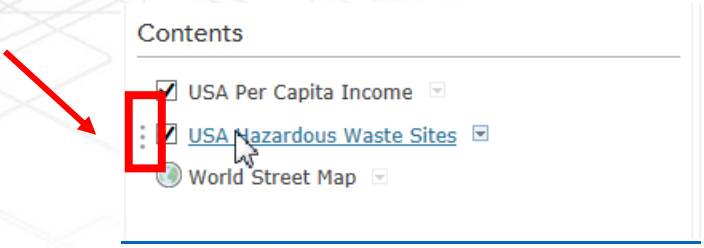
Step 8

Click on the "USA Per Capita Income" layer in the content window. Make note of the symbology of the layer. This layer shows the per capita income of not just the states, but the farther you zoom in to the map, the more detailed the boundaries and per capita income (which is represented with varying shades of green). Click on the "Waste Sites" layer and make note that there is only one symbol for the points of interest (which is a red dot). Now look again on your map. The waste sites are probably not showing in your map. This is because the waste sites are ordered underneath the polygons. We will change this.



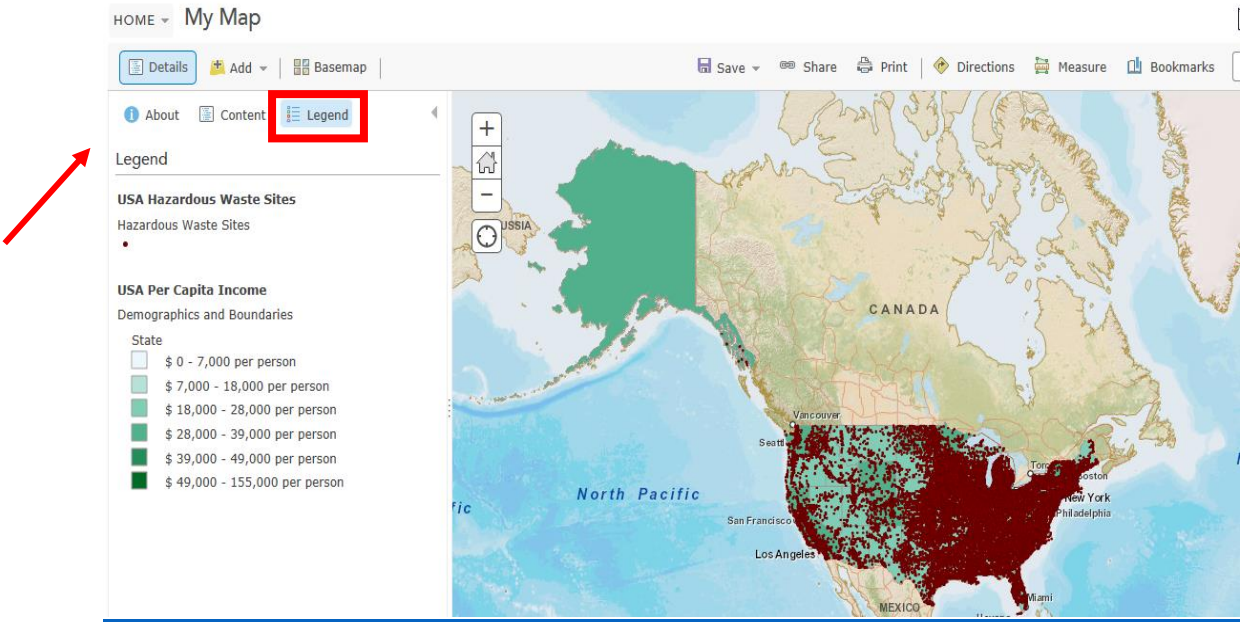
Step 9

If you put your mouse over the "Waste Sites" layer, you will notice three vertical dots on the layer's left. Click these dots and drag the layer above the income layer. Doing this allows you to change the order in which the layers are displayed.



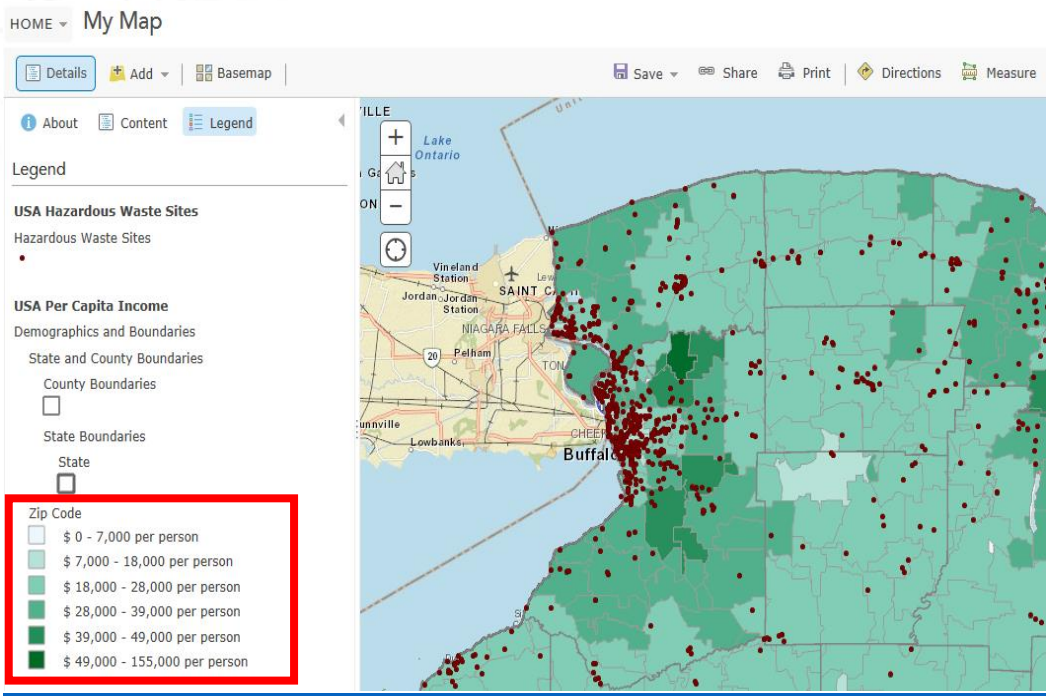
Step 10

Now your map should properly show the waste site points. Click on the 'Legend'. This shows us the legend of features for our map. Look at the legend and use it to understand what your map is representing.



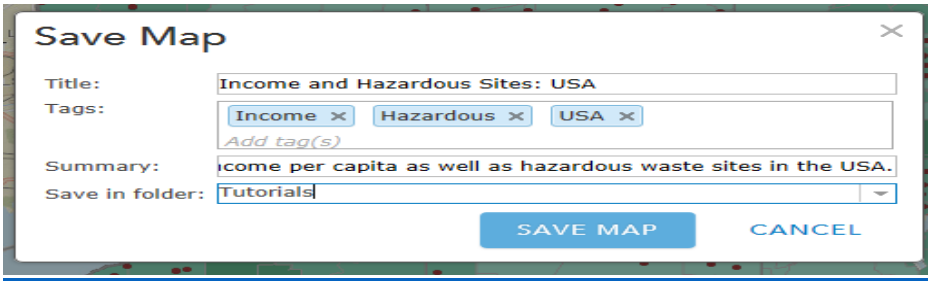
Step 11

Zoom in on a section of the map and notice how the 'USA per Capita Income' boundaries change. As you zoom in closer, the state boundaries displayed in the map are now accompanied by, in this example, the zip code boundaries. The symbology has also changed to show the per capita income for zip codes rather than for states. This change in features is the kind of detail that was described in Step 8.



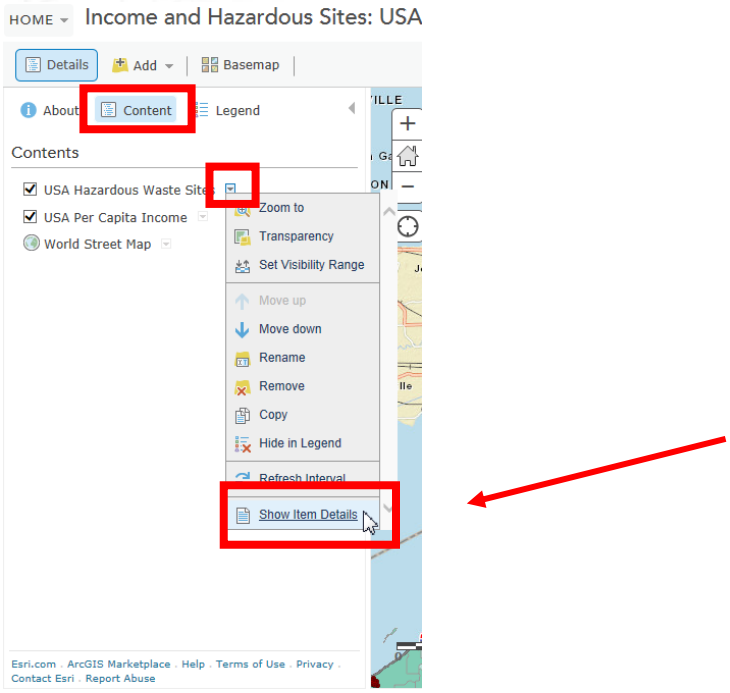
Step 12

Before we go any further, save your map. I have mine in a folder I created called 'Tutorials', but you can save yours in your default folder titled with your username. Don't forget, you must also add your own tags as well as a title and summary for your map.



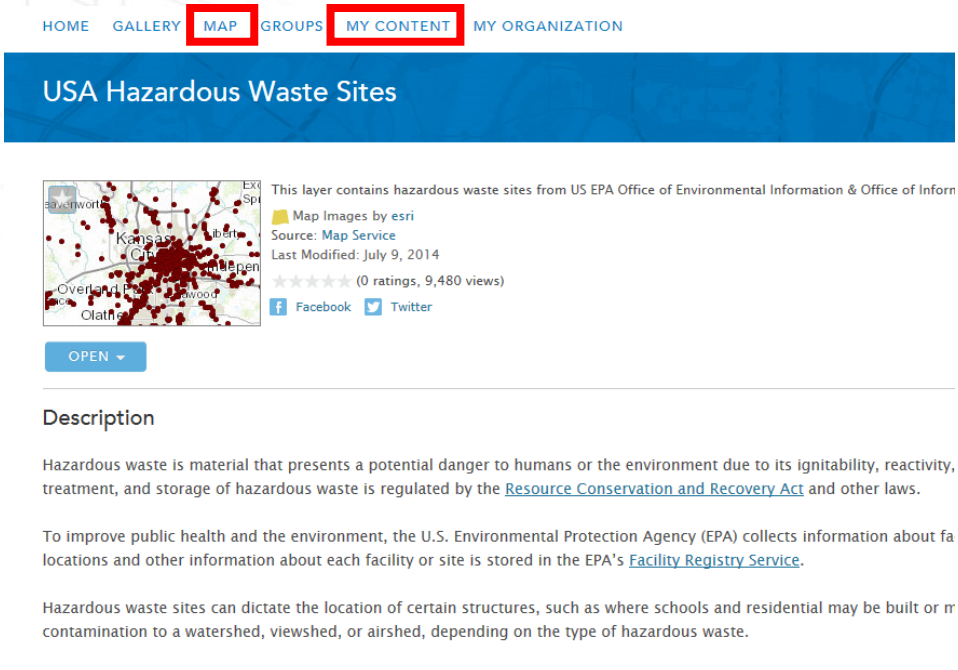
Step 13

In the next section we will customize this map, but first let's learn a little more about it. Metadata is another word for the information about a set of data. It is important to be familiar with the metadata of the data you are using. To look at the metadata of a layer in ArcGIS Online, click on 'Content' and then on the layer in the contents window. Then choose "Show item details". This will bring you to a new page of the layer's metadata.



Step 14

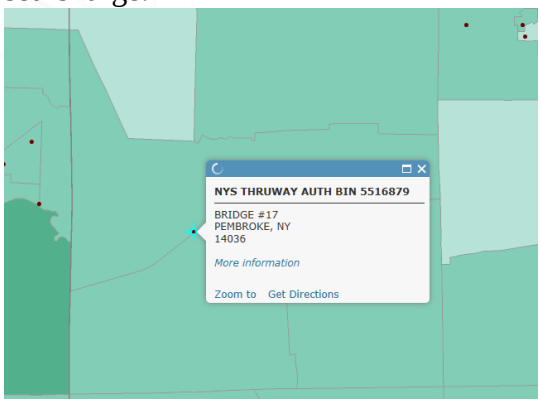
Read this information about your layer. Understand what the layer represents. Do the same for your other layer. When you are finished you can go back to your map by clicking ‘Map’ in the top toolbar. If your map has been saved, you can also find it in your folder by clicking on ‘My Content’.



Customize Your Map

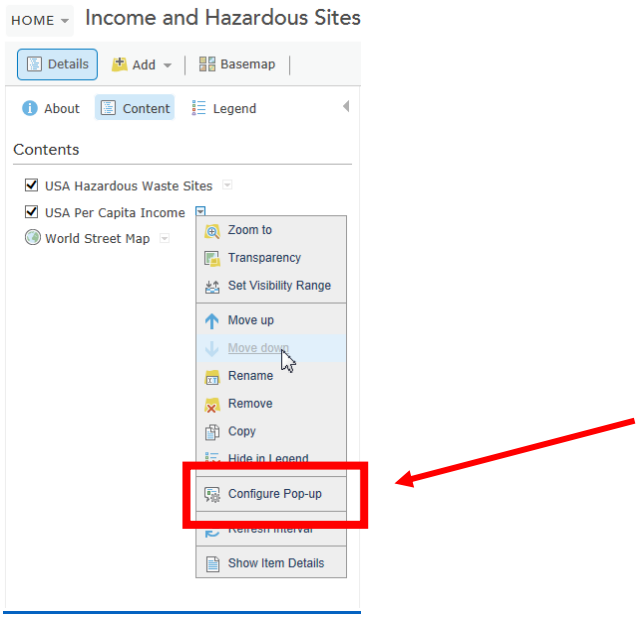
Step 1

We will now customize the map we made. On the map, click on one of the points. You will see a little window with information appear. This is called a pop-up. The pop-up shows specific information that could be found in the data table for that particular feature. For this point, the address of the point is shown. If you click "More Information", it will open a new webpage that has more information about that site. It may take a little while to load, as the data set is large.



Step 2

Let's configure pop-ups for the income layer. Click on the layer in the content window and choose "Configure Pop-up".

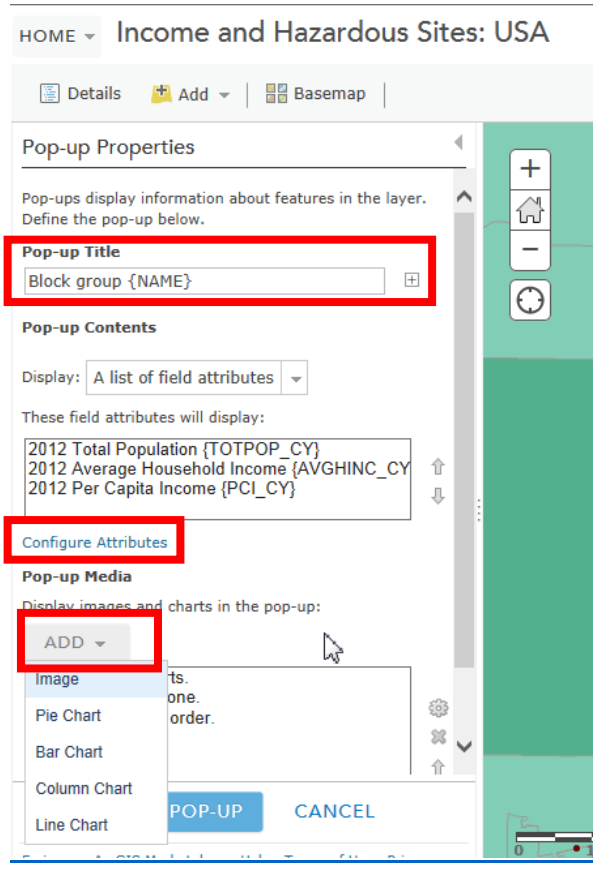


Step 3

Now customize the pop-ups. For the title portion, give it a name. The text within the brackets represents the column name. So when you click on a particular point, it will show the "name" of the feature that the point is representing from the NAME column of the data table. You can choose different columns by clicking on the plus symbol on the right of this text box. In this example I titled my pop-ups as 'Block Group'. I also wanted the name of each group to be in the title when I clicked on the point. So I pressed the '+' and chose the NAME column.

You can also add media within your pop-up such as pictures, charts, etc, by clicking the 'Add' button and choosing an option from the drop-down menu. In this example, I did not include any of this media in my pop-ups.

Now let's choose what information we will list in the pop-ups. Click on "Configure Attributes".



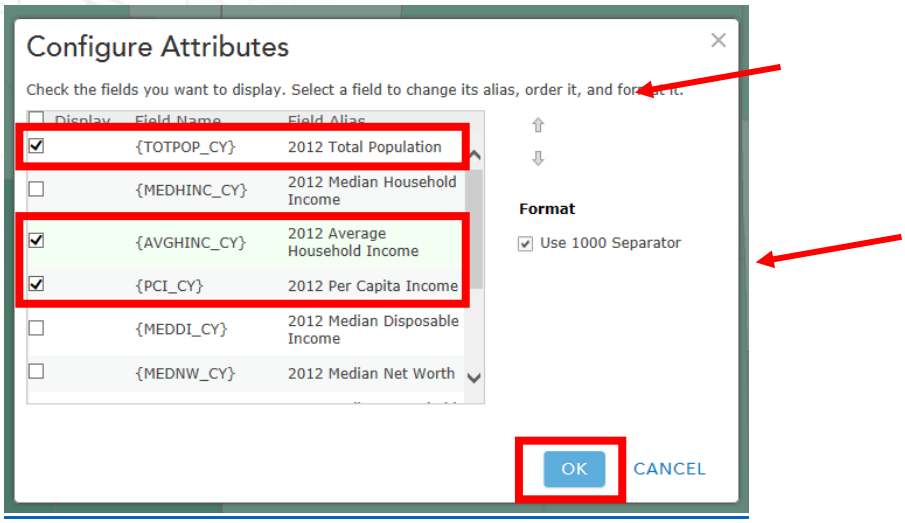
The title of each pop-up. If you want data to appear in the title, click the '+' to choose from the columns. In this case the name is included in the title.

Configure Attributes. This allows you to pick which parts of the data sets you would like to include in your pop-up. See Step 3 for more on choosing the attributes.

The 'Add' button. Clicking this will allow you to add media such as charts to your pop-ups.

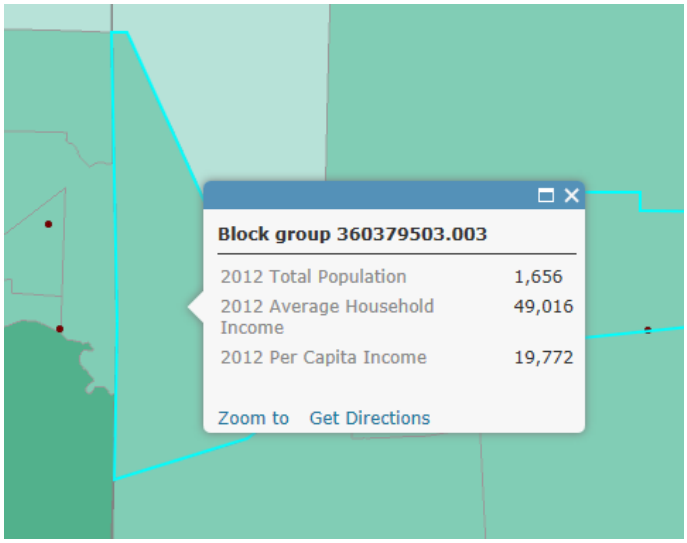
Step 4

Check only the fields that will display ‘Total Population’, ‘Average Household Income’, and ‘Per Capita Income’ for 2012. Then click ok. Click on configure pop-up.



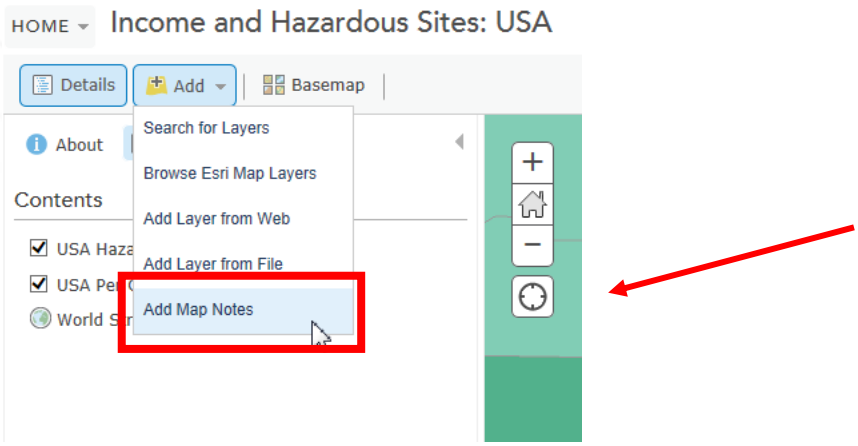
Step 5

You've now created a pop-up. Now let's see what our pop-up looks like. Click on a polygon in your map and understand what is being displayed from what we configured.



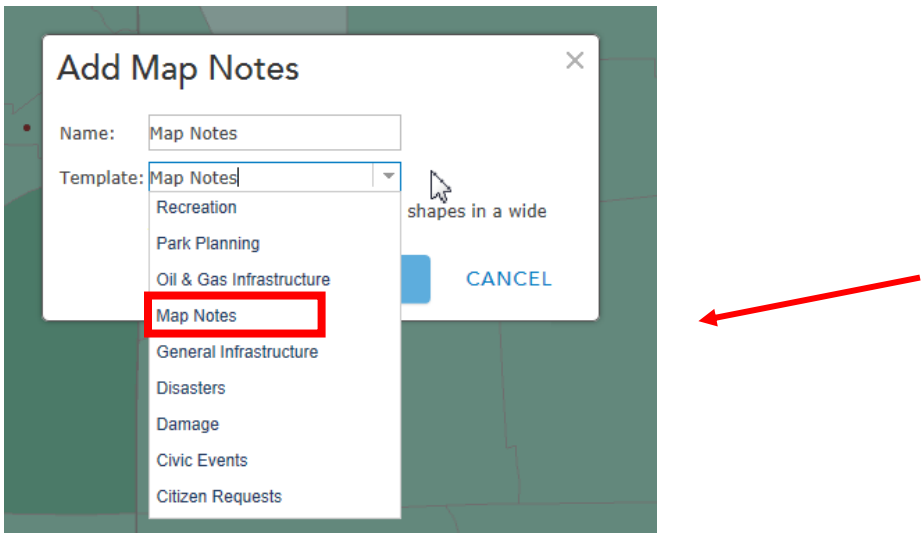
Step 6

Another thing you can do to customize your map is to create map notes. This allows you to create a feature layer dynamically on ArcGIS Online. You can add your own features and add the metadata yourself for each feature. This is very useful for tracking points of interest. If you are out in the field gathering data, you can manually enter the data you gathered directly into the map and save it as a layer. Let's create a map note now to see how it works. Go to "Add" and click on "Add Map Notes".



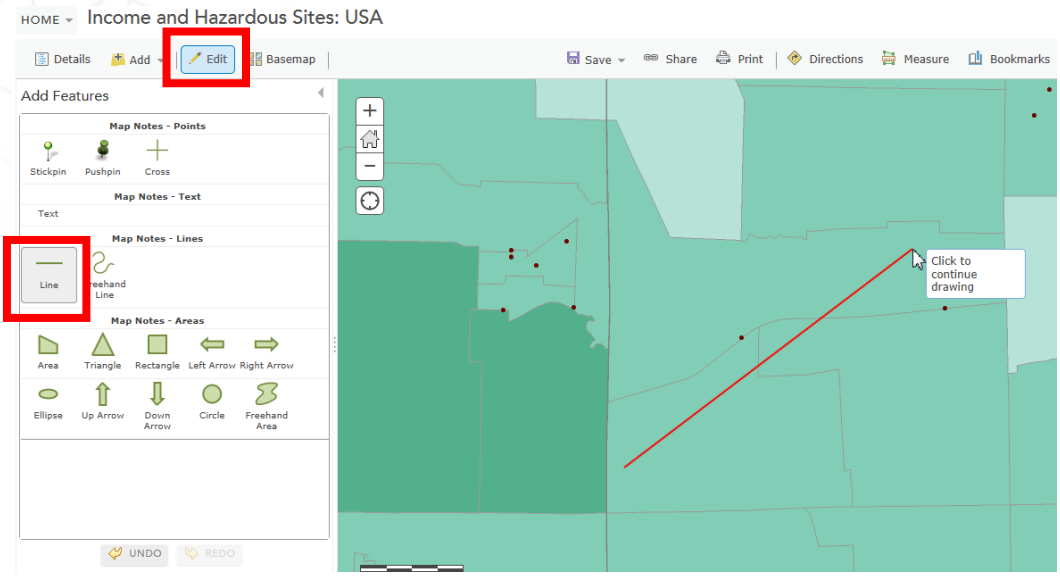
Step 7

Name your layer and choose a template. We will just use the map notes template. Feel free to explore what the other templates have to offer. The map notes template will give you a menu of features you can add, such as lines and points.



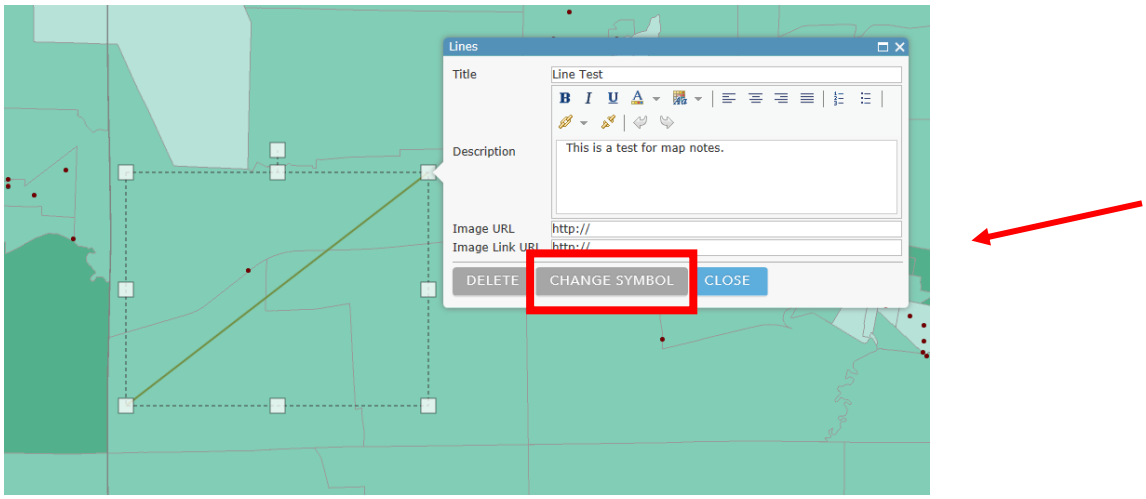
Step 8

Now that we have the menu, we can add a feature. Note that a new tool has been made available to us, the ‘Edit’ tool. This tool is not always available. Some layers cannot be edited, especially layers that have already been created by another user or that have been imported. By default after creating our map notes layer, we are currently using this edit tool. Let's add a line feature. Choose the "Line" and draw a line on your map.



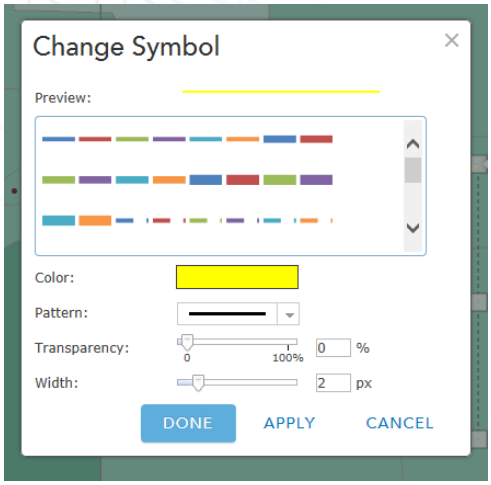
Step 9

Add a title for this line and description. Notice that you can add a URL to this feature. This would be a way to create a link in a pop-up that we saw in Step 1 of Customizing Your Map. Now before we close this window, let's change the symbology. Choose "Change Symbol".



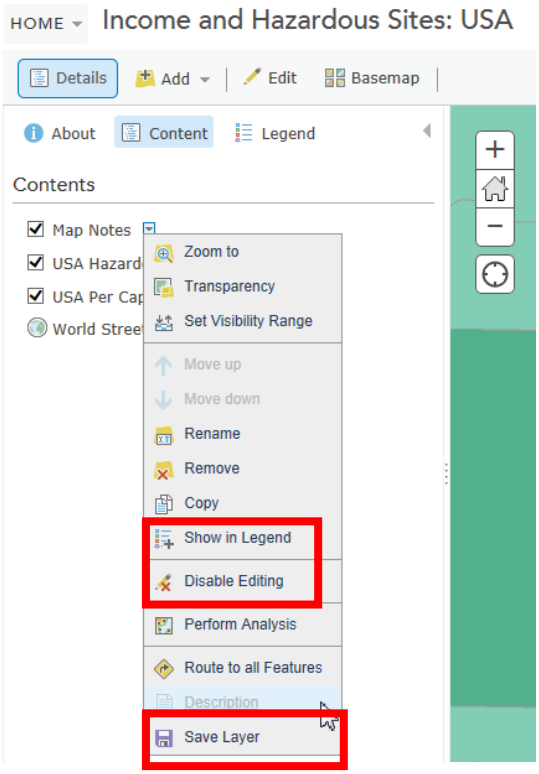
Step 10

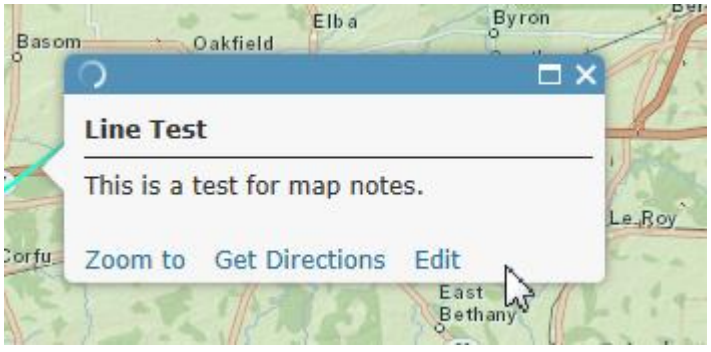
Let's change the colour of the line to yellow so it's a little easier to see. Once you are finished, click done and then close the feature's window. You have now created a map note.



Step 11

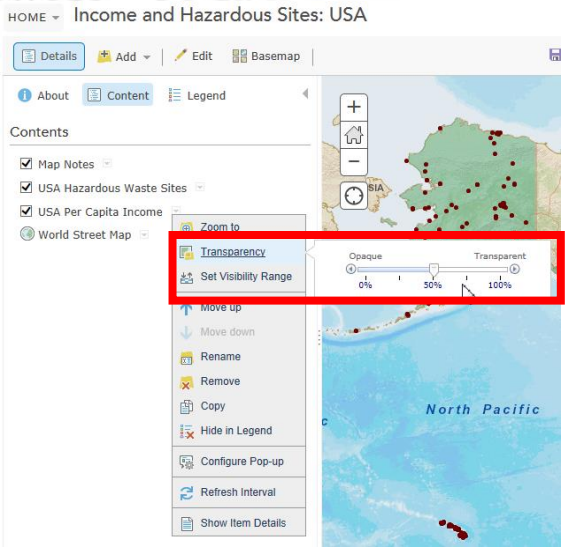
Before we move on, since we are done editing, let's disable editing, show it in the legend of our map, and save the map notes layer. Ensure you are in the 'Content' window and click on the Map Notes layer. Then click on the respective options as displayed below. Now click on the line feature that you created in your map to see what the pop-up looks like. Be patient as it may take a while to load.





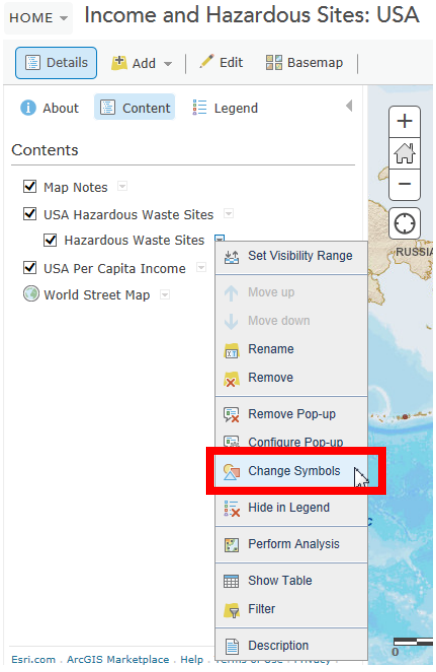
Step 12

We will now finish customizing our map. Let's change the transparency of the income layer so we can see the basemap underneath. Click on the income layer and choose "Transparency". Let's adjust the transparency to 50%.



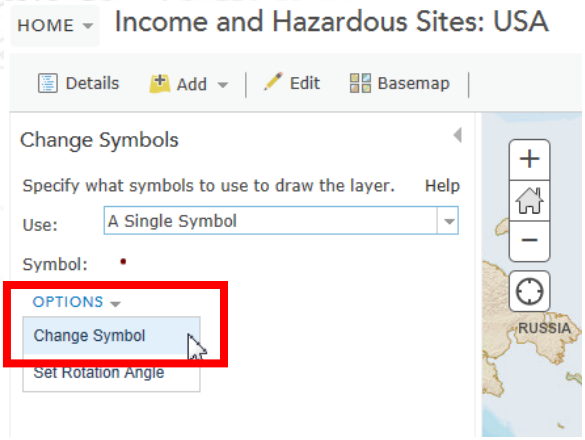
Step 13

Finally, let's change the symbology of the waste sites so that they don't look like a huge clump of a polygon. Click on the layer and choose "Change Symbols".



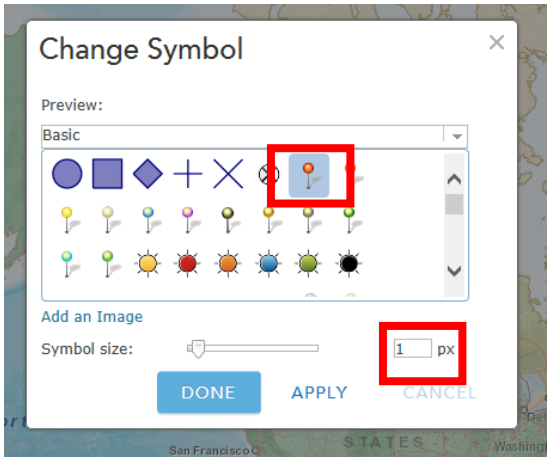
Step 14

We will keep most of the default settings and just click on "Options" and choose "Change Symbol".



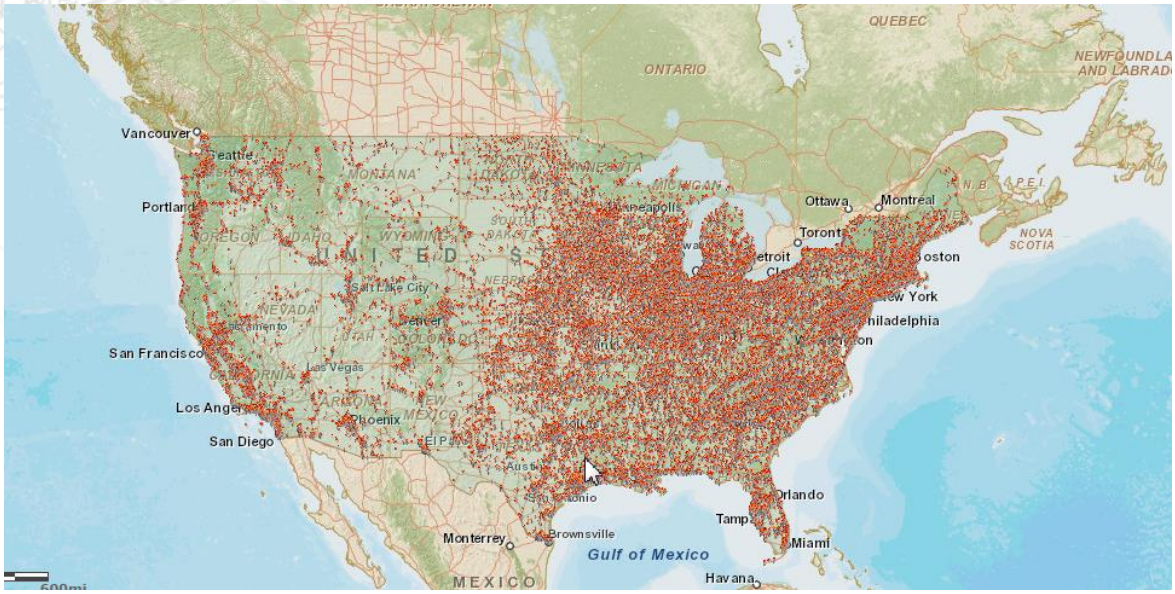
Step 15

Let's choose the red pin as the symbol and change the size from 1px to 5px. This should differentiate the points a little better and make them big enough to see and small enough not to over crowd the map.



Step 16

Your map should now look similar to the one below. Save your map.



Importing Data

Step 1

ArcGIS Online is compatible with many different types of data. You can import data such as Excel files, Shape files, XML files, PDF files, and more. For a full list and specifications see these links:
- http://doc.arcgis.com/en/arcgis-online/create-maps/add-layers.htm
- http://doc.arcgis.com/en/arcgis-online/reference/csv-gpx.htm

We will be importing an Excel file and two Shape files that we will use in Tutorials 3 and 4.

Step 2

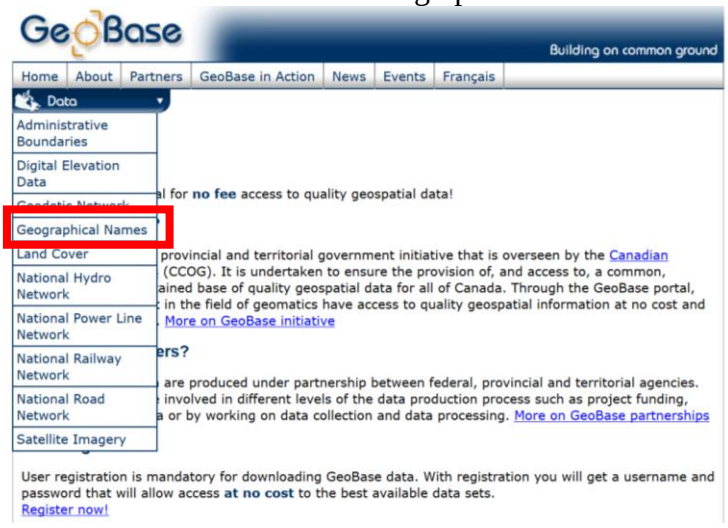
First we will get data that includes conservation areas from a website called Geobase. Geodatabase is a great place to find geographical data sets as it is a reliable source and it will often have an assortment of file formats (shape files, xml files, etc). The Conservation Areas file will be one of the Shape files we will import. Below is a direct link to data:

ftp://ftp2.cits.rncan.gc.ca/pub/geobase/official/cgn/prov_shp_eng/on/

To get to this, let's navigate through Geobase. This is a reliable website with open source data. It is very popular in the GIS field.

Go to this link: http://www.geobase.ca/geobase/en/

Click "Data" and then click "Geographical Names".

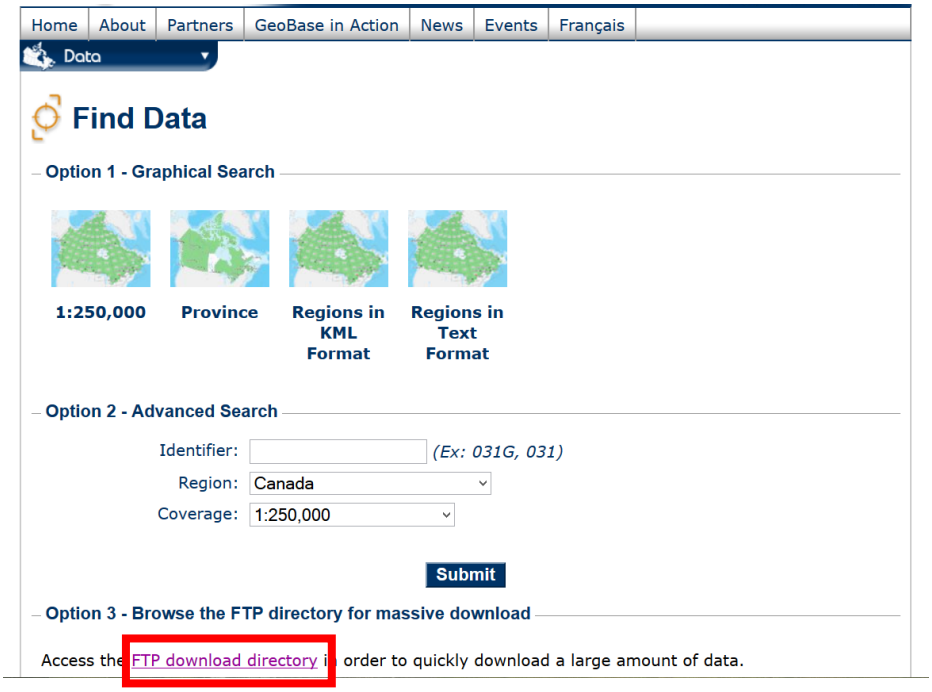


Step 3

If you click on "Description", you will be brought to some metadata for the data. Click on "Download".

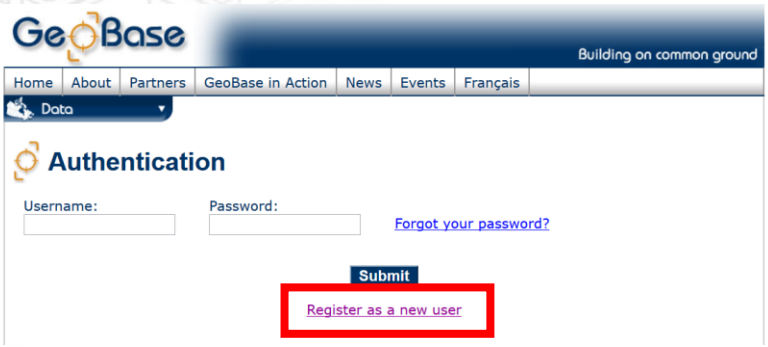
Step 4

We want to download a large amount of data, so click "FTP download directory". This is the direct link to the data.



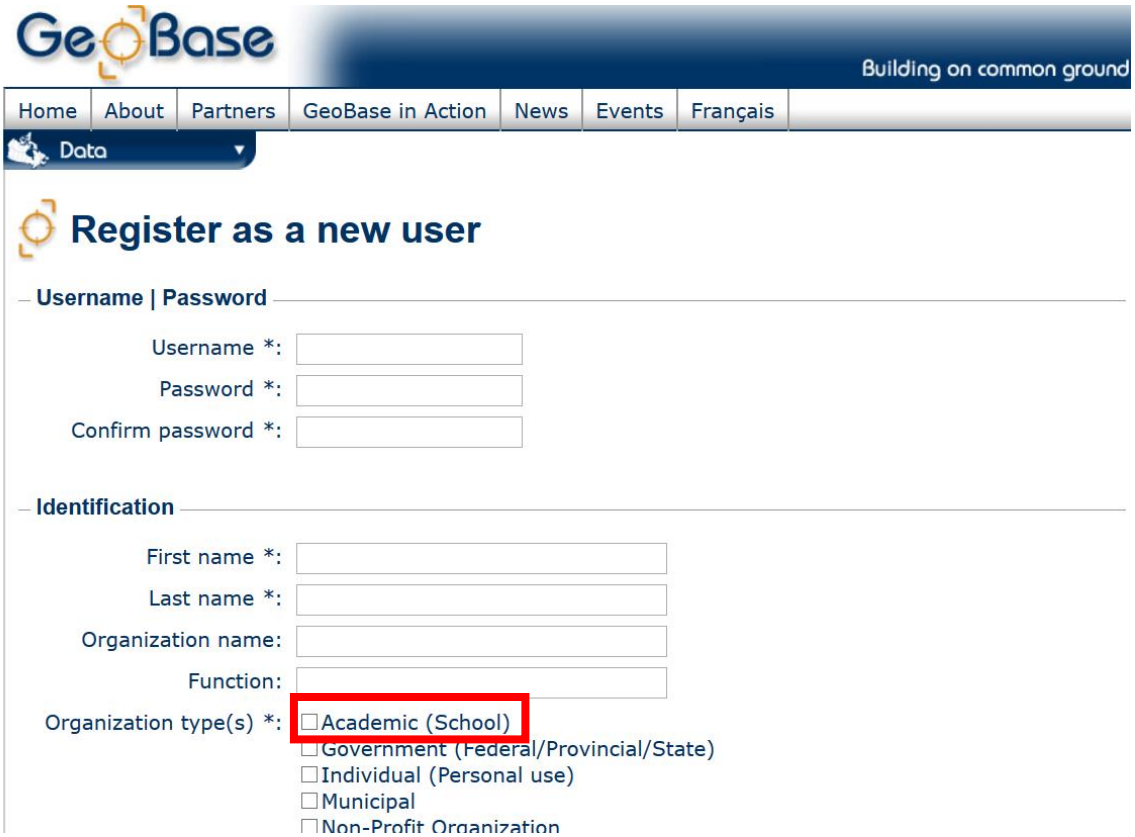
Step 5

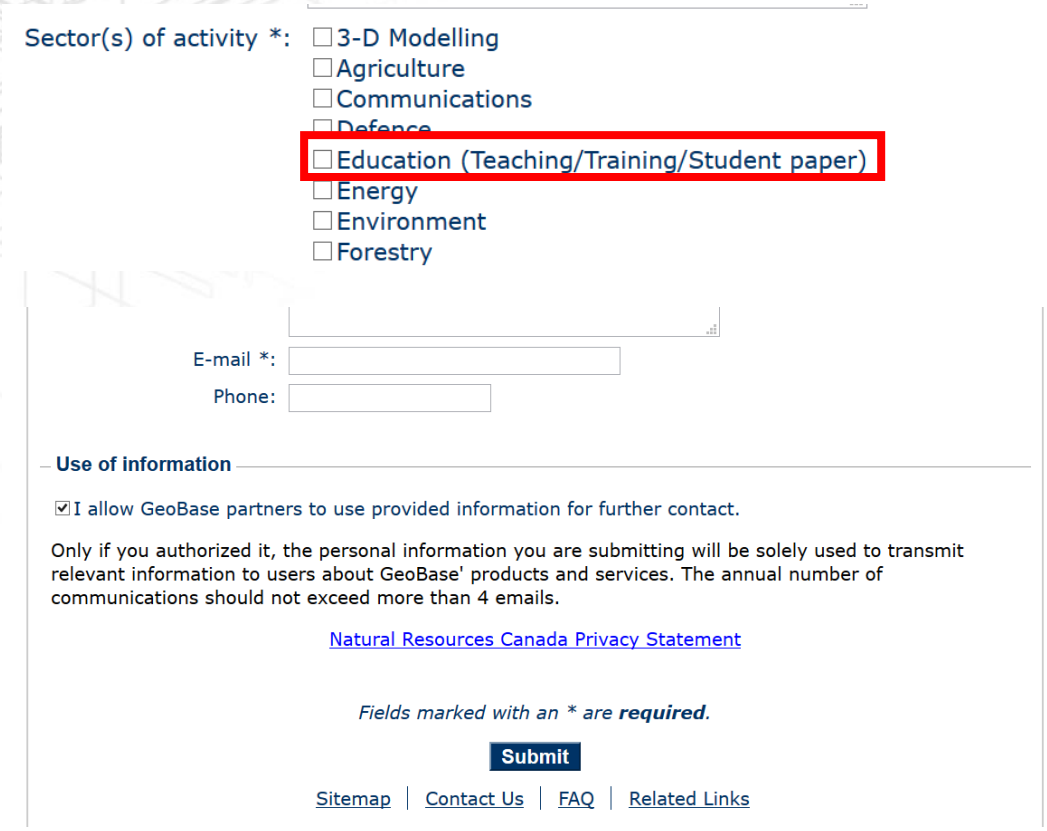
Although Geobase is open source, you do have to sign up for a free account to use it. Click on "Register as a new user".



Step 6

Fill in the necessary information (sections marked with an asterisks). Choose "Academic" as your organization type and "Education" as your sector of activity. We are choosing these because for the purpose of this tutorial we are using Geobase for educational purposes.



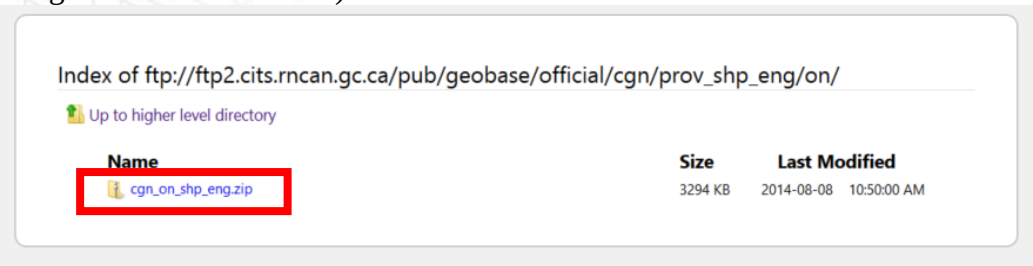


Step 7

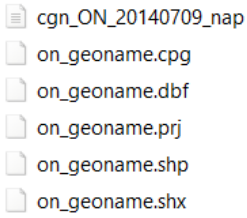
Now we have access to the directory of the data. Click on the folder marked ‘prov_shp_eng’ and then on the folder marked ‘on’. This is the data for Ontario, which we will be focusing on in Tutorials 3 and 4.

Step 8

We are now brought to the zipped Shape file. A Shape file actually has a few other files associated with it, and in order for it to work, the files all need to be together. For this reason, ArcGIS Online only imports Shape files as a zip file. So We will Click on this file (in your case it will be the Ontario file, in this image it is the Alberta file) to download it and we won't extract the files in it.

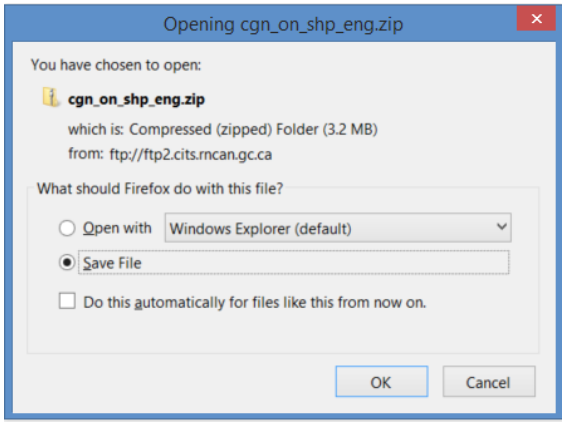


These are a list of the types of files that would be included in the one zip file. Although only one is a '.shp', togther they are all a part of the Shape file are are necessary for the '.shp' file to work.



Step 9

Save the file onto your computer and change the name so that it is obvious to you what this folder contains. I recommend calling it "ontario".



Step 10

Now we will get our boundary Shape file. For this we will use Statistics Canada. Statistics Canada is a great resource. They not only have a huge resource of data you can copy and paste into an Excel document, but they also have an assortment of geography files to choose from.

Go to this link: http://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-i-eng.cfm?year=14

Choose "English", "2014", and "ArcGIS (.shp)

Click "Continue" and save the file. Change the name so that you know what this file contains. I suggest ‘boundary’.

Step 11

Now we will import the Federal Contaminated Sites Data. This will be a CSV file.

The website that more information can be found on this data is as follows: http://www.tbs-sct.gc.ca/fcsi-rscf/home-accueil-eng.aspx

Here is a link to the data we will be using: http://www.davidmckie.com/(David%20McKie,%20May%202,%202012)%20contaminated%20sites%20for%20geocoding.csv

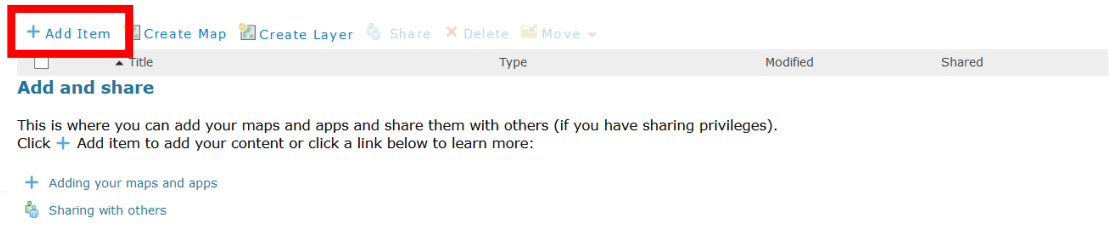
There are different ways to import data, and I encourage you to explore them. We will import this data from an Excel file, which is a popular way to import table data.

Step 12

Now that we have gathered all of our data. Let's start importing it into ArcGIS Online. Go to "My Content". This is where we can import our data to our default folder for later use. The data will then be stored online. Please note that it takes a while for files to be uploaded, so please be patient when importing your files.

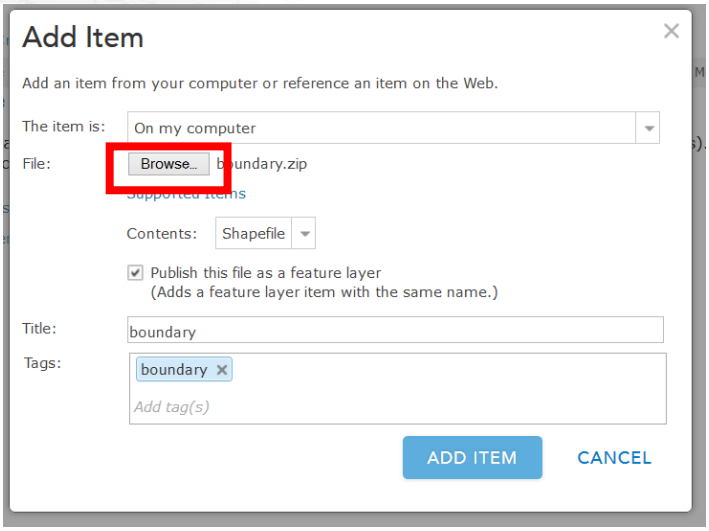
Step 13

Now go to "Add Item".



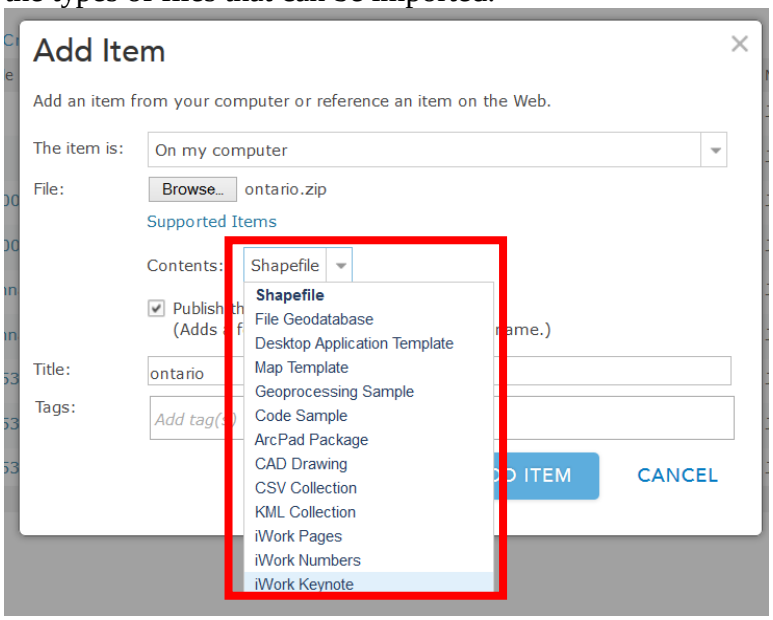
Step 14

Browse to your boundary '.zip' file. You must not unzip this file as you have to import all of the contents at once. The window should automatically use the default "Shapefile" and the box marked "Publish" should be checked. Give your item a relevant title, description, and tags. Then "Add Item".



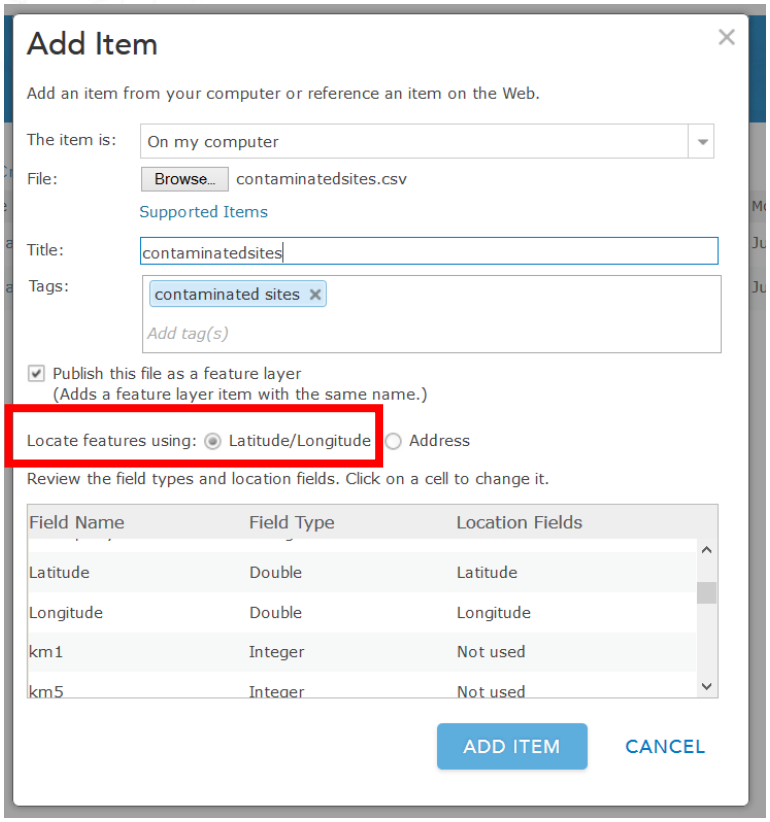
Step 15

We will now follow steps 12, 13 and 14 to add our other Shape file, the "ontario" file. It is important to note that your have to import the '.zip' file in order for the Shape File to work. This image also shows the other options of the types of files that can be imported.

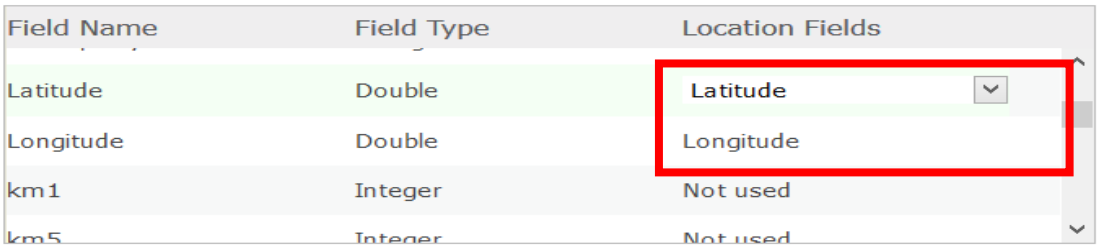


Step 16

Now let's add the CSV file. This is a little different than importing Shape files. Navigate to ‘My Content’ and click on ‘Add Item’. Browse to the contaminated sites file and ensure that the "publish" box is checked. Give your item a relevant title, description, and tags. Since this is a text based file and not a geometry file, we will also have to geocode the file if there is no longitude or latitude present in the table. For more information on geocoding, see the section on geocoding in this tutorial. This data does have longitude and latitude, so we will choose "Locate features using Longitude/Latitude".

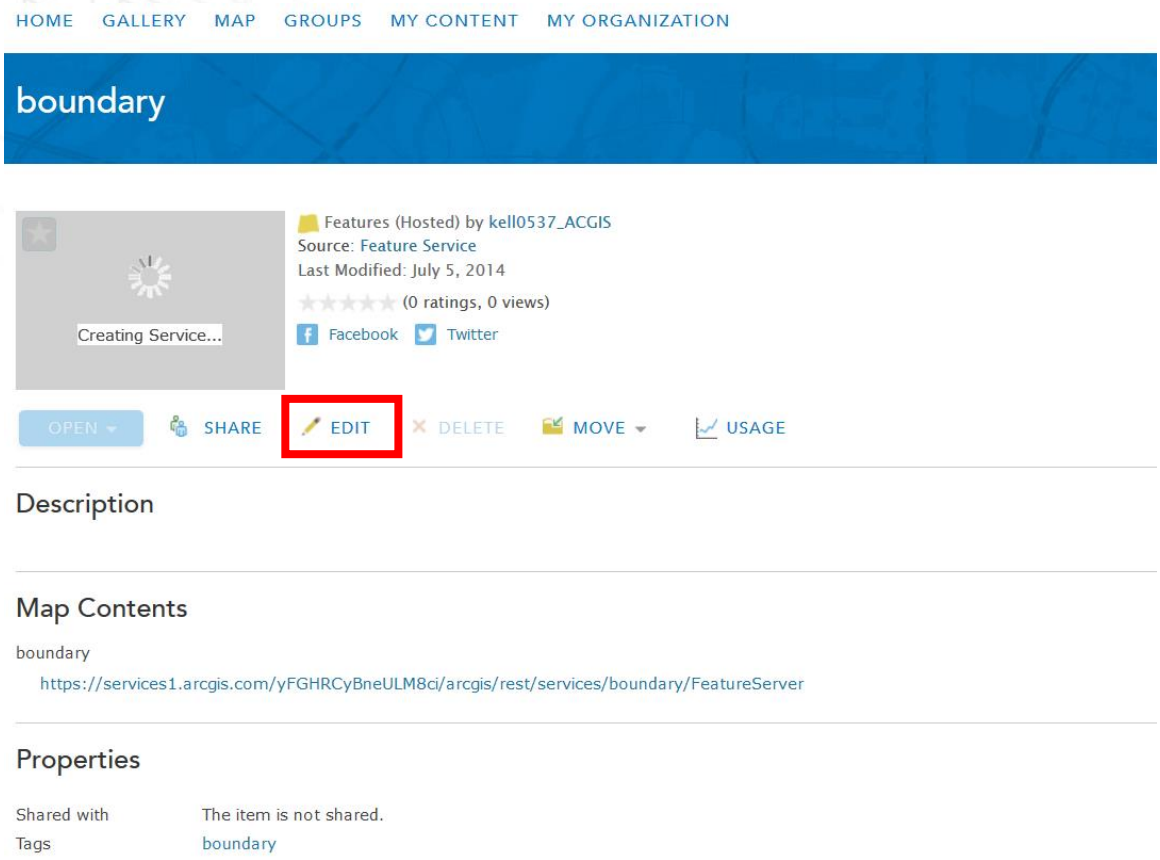


You then have to make sure that the correct column in the data is being referenced by ArcGIS Online by choosing them from the drop-down menu.



Step 17

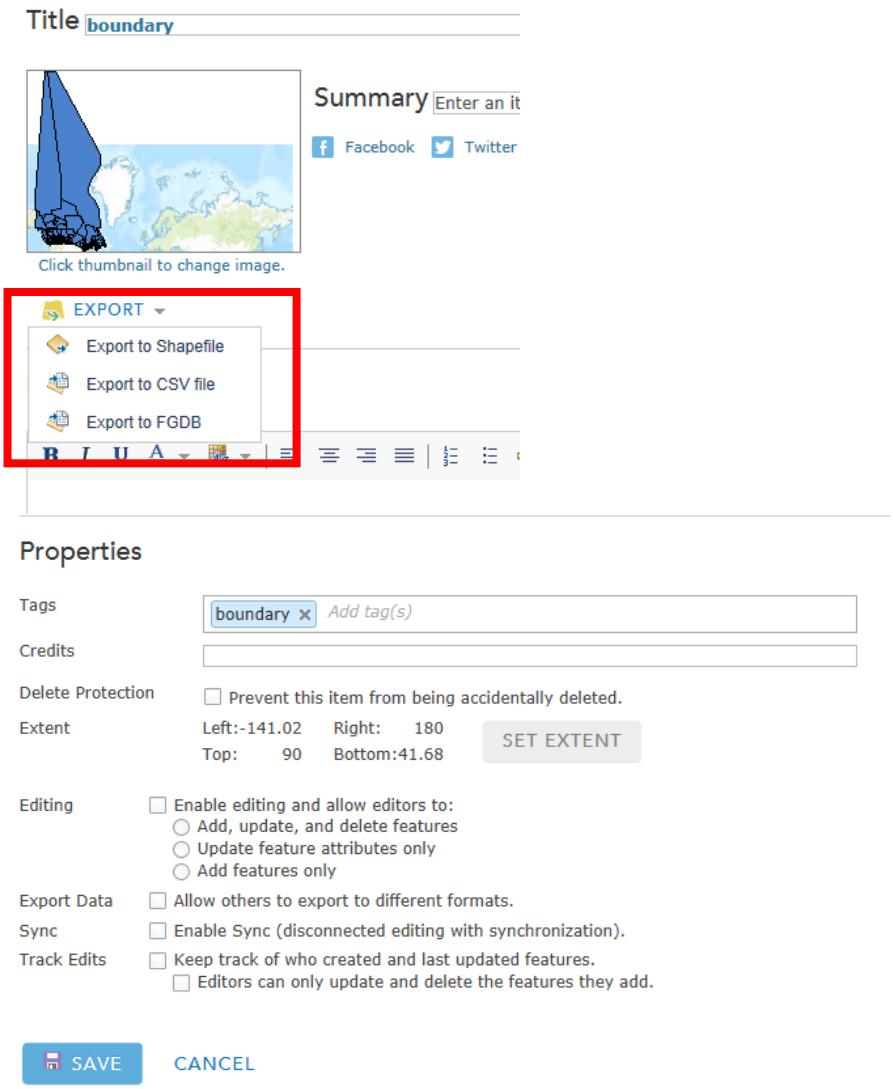
You have officially imported all of the data we need. Click on the boundary layer of type feature layer (not Shapefile) and view its details. Understand what is being expressed in this metadata.
Click "Edit".



Add all the metadata that you can find information for.

Make note that although this data is stored on the cloud now, you can download it again in various formats by clicking "Export".

Change all the settings that you deem appropriate. Make sure you understand what everything does.



Step 18

Before continuing this tutorial, edit and save the metadata for the other layers. In Tutorial 3, we will upload this data to a map, but for now let's move on to the next section and learn about geocoding, sharing, and printing.

Geocoding

Step 1

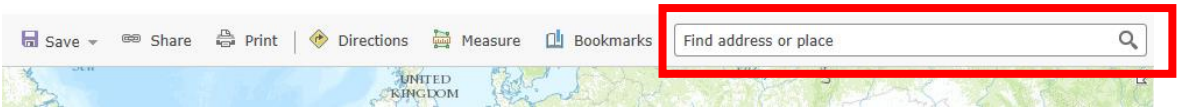
To put this simply, geocoding is the process of finding the geographic XY coordinates of locations given their addresses or some part of their addresses. Geocoding is necessary if you wish to put these locations on a map and you do not already have their XY coordinates.

Step 2

There are two different ways you can geocode. You can use GeoSearch, or you can geocode a file of locations.

Step 3

GeoSearch is essentially the small search bar in the top right corner of the map. Just like Google Maps, if you type in a name of a location or an address, it will find that location to the best of its ability. It will show the location on the map, but it will not save it into a file.



Step 4

The Geocoding Service is a tool that converts an address or postal code, or similar identifier, to an XY coordinate so that it can be plotted on a map. This is different than GeoSearch because you can geocode more than one location at once, and the locations are stored in a file for later use. When we imported our CSV file, this is geocoding.

Step 5

The more address information you include in your text or CSV file, the more accurate the geocoding will be. It is always a good idea to check the locations to make sure they have been given the correct XY coordinates and that they fall onto the appropriate places on a map

To see a full list of criteria for better geocoding with a CSV or text file, see this link: http://doc.arcgis.com/en/arcgis-online/reference/csv-gpx.htm

Step 6

GeoSearch does not use any credits to use. However, geocoding a file does. The rate is 40 credits for 1000 geocodes. So if you have 500 addresses that you have in your text or CSV file and you want them to be displayed as points on a map, then you will use 20 credits.

Step 7

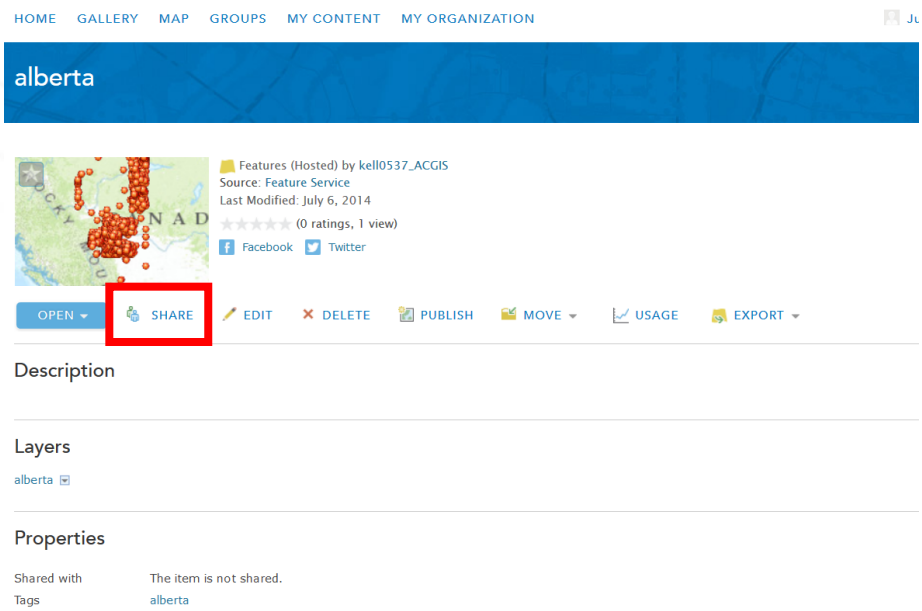
Here are a few more resources for more information on geocoding:

http://www.esri.com/software/arcgis/arcgisonline/credits/geocoding
http://www.arcgis.com/home/item.html?id=305f2e55e67f4389bef269669fc2e284
http://www.esri.com/software/arcgis/arcgisonline/tools/geocoding

Sharing and Printing

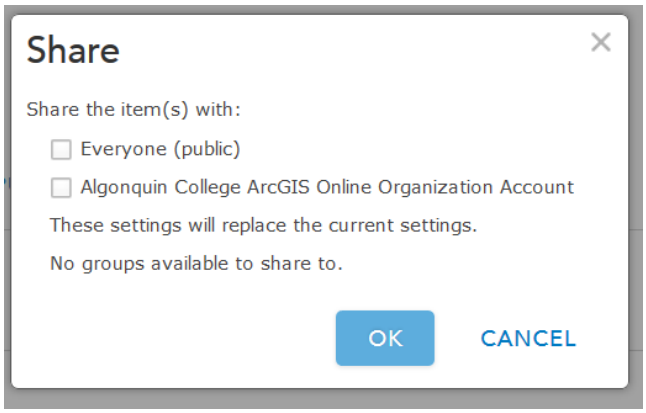
Step 1

There are multiple ways in which you can share and print data from ArcGIS Online. One way is through the metadata of your layer or map. You can share by clicking "Share" on the toolbar.



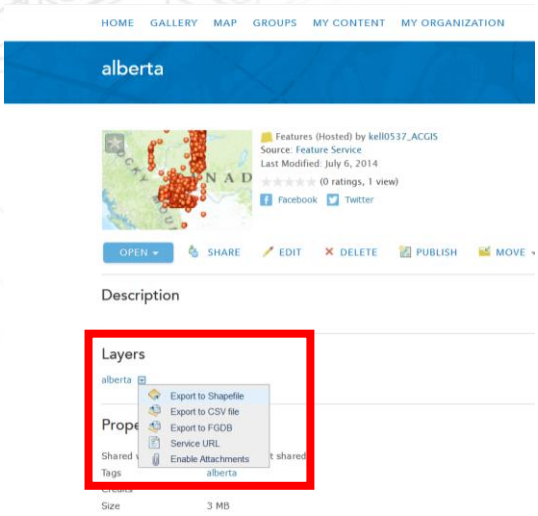
Step 2

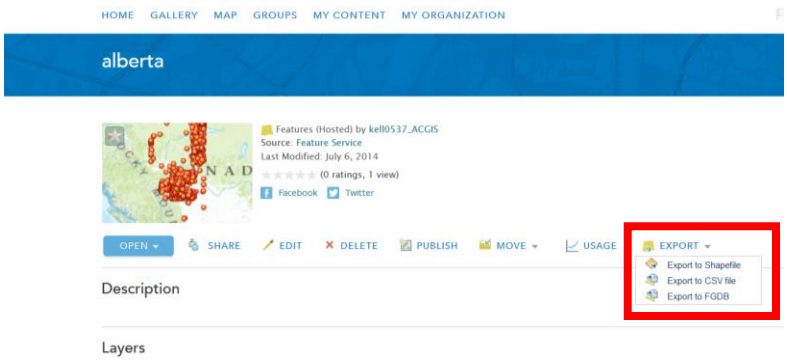
From the share window you can choose to share to everyone, to your organization, or to no one. If you created a group, you can also share to that group.



Step 3

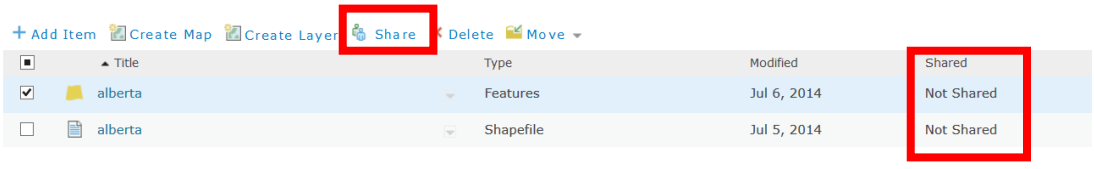
In the metadata, you can "print" the data by exporting it into different formats and download it onto your computer.





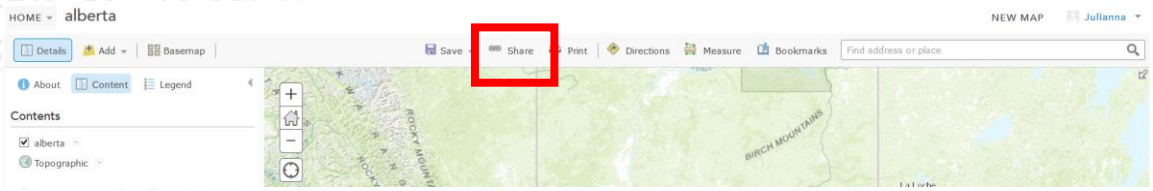
Step 5

You can share items by clicking on the "Share" while you are in Your Content.



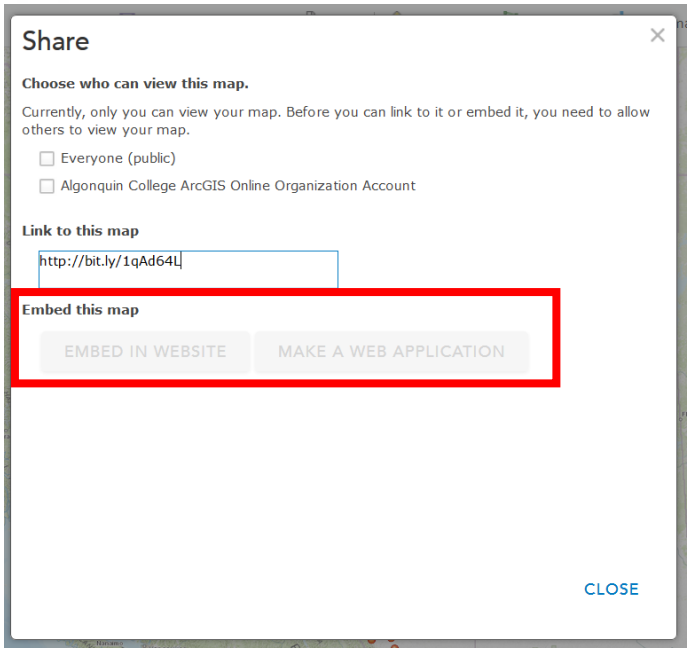
Step 6

You can also share your map while you are viewing it.



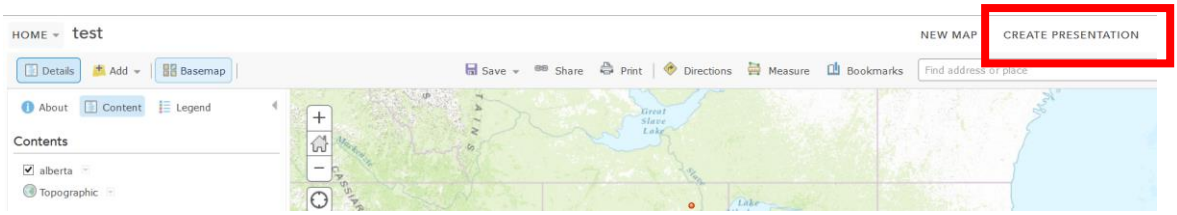
Step 7

The window for sharing your map is a little different though. This is because you can also embed your map in a website or create a web application with your map.



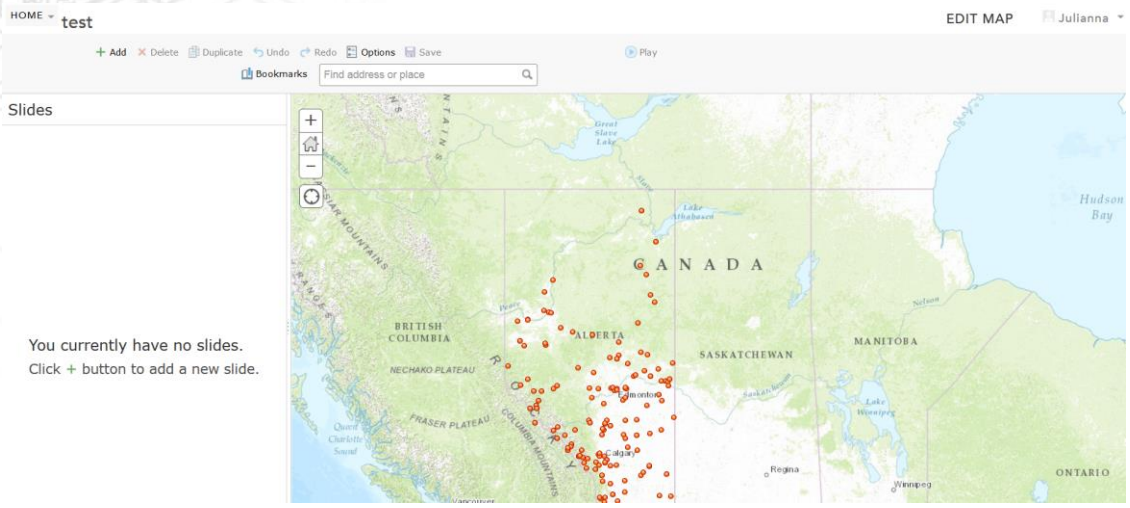
Step 8

Another thing you can do with your map is to create a presentation. While viewing our saved map, you can click on "Create Presentation".



Step 9

Here you can create a slideshow presentation of your map.

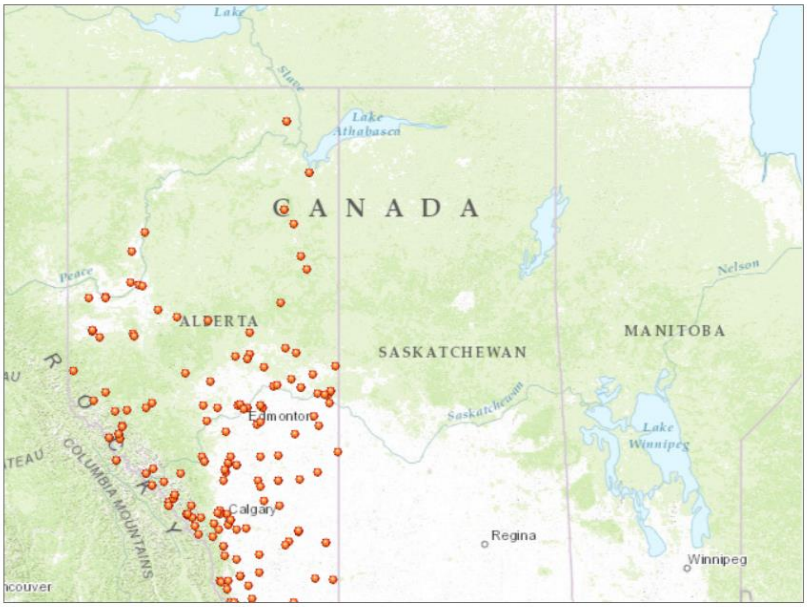


Step 10

If you choose to click "Print" while viewing your map, a new window opens with a printer friendly version of your map.

test

test



Esri, DeLorme, FAO, USGS, NOAA, EPA, NRCAN, AAFC

Bonus: Explore Data and Mapping

Explore ArcGIS Online, try adding different types of data, edit details of your layers, and explore all things you can do to your simple map. Make a new map on your own using different data from ESRI and supplementary data you would like to add. Save your map.

Resources:

ESRI Website:

www.esri.com

ArcGIS Online Help:

http://doc.arcgis.com/en/arcgis-online/create-maps/make-your-first-map.htm

ArcGIS for Professionals:

http://pro.arcgis.com/en/get-started/organizations/introduction.htm

Questions?

Don’t hesitate to ask.

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