ArcGIS Online

Visualizing Data:
Tutorial 3 of 4

2014

Created by:
Julianna Kelly

Contents of This Tutorial

The Goal of This Tutorial

In this tutorial we will learn about the analysis tools that ArcGIS Online has to offer. By just creating a map to visualize the data can definitely aid in finding the story the data holds. But just visualizing a basic map, just looking at the raw data on the map can sometimes mislead you. By using analysis tools, you can better see the story and maybe even use the tools to answer specific questions you may have about the data. We will explore all of these ideas within this tutorial, Tutorial 3, as well as Tutorial 4. Before we get started, it is important to note that there is more than one way to get the same results, especially when it comes to using these analysis tools. Another important note is that for the purpose of this course, ensure that you check how many credits will be used for the analysis you choose. Each analysis should only use about 1 credit or less. For more information on credits, see Tutorial 1 or the ArcGIS Online help. Keeping this in mind, let's start by introducing you to some of the analysis tools.

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.

By doing this tutorial, you will learn the basics of ArcGIS Online analysis tools and how to use them.

Quick Access

A Brief Introduction to Some Tools

Data Enrichment

Enrich Layer

This tool can add useful information and statistics to the layer you select. Some examples of information are as follows: Household Income, Marital Status, Population Totals, Spending Totals, Tenure, etc. Using this tool is quite expensive in credits. For example it can use up 74 credits just for analysis on 140 records. It may be wise to acquire your own supplementary information for cost and efficiency purposes. For more information on this tool, follow this link:
http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_A8FF14C40E6049ADB45BA2124F5D702D

Manage Data

Field Calculator

This tool is coming soon. It will allow you to replace the information in the column of the selected data file with new information based on a formula you create. You can also create a new column of information in the chosen data file based on a formula you create. An example of using this tool would be if your data file holds data for road networks. Within this data you have a column for maximum speed and the distance of each line segment. You can use this tool to create a new column that will give the amount of time it would take to traverse each line segment based on the distance and the speed from the other columns. For more information on this tool, follow this link:
http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm

Dissolve Boundaries

This tool requires a polygon layer. For this tool, you have the option of either merging areas that have overlapping or are adjacent boundaries into one area, or you can merge areas with the same field value into one area. This tool also gives you the option to summarize information from the merging areas by using statistics such as: sum, average, minimum, maximum, and standard deviation. For more information on this tool, follow this link:
http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_5A5BE432AC8F46D89BD446327098ACBB

Extract Data

This tool enables you to save selected information from a data file into a new file of one of the following formats: CSV, Geodatabase File, a zipped KML File, a zipped Shapefile (.shp). The tool will extract all information within the defined study area. The study area can either be made up of entire features that are in the boundary defined, or out of portions of the features within the boundary defined. This tool can be very useful for cleaning the file into information you deem necessary, as well as excellent for converting the file into a different format. For more information on this tool, follow this link: http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_5A5BE432AC8F46D89BD446327098ACBB

Merge Layers

To use this tool, you must have two layers and they must both be the same feature type. This tool combines two layers into one new layer. You have the option to modify fields of the output layer. You can rename the fields, remove fields, or match a field from one of the layers to the other. This tool can be especially useful if you acquire data that is contained in multiple zip files based on region. By using this tool, you can combine them into one file, which may be preferred for analysis purposes. For more information on this tool, follow this link:
http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_5A5BE432AC8F46D89BD446327098ACBB

Overlay Layers

This tool is very similar to “Merge Layers”. This tool needs two layers to function, however, these layers do not need to be of the same feature type. There are three different ways you can overlay the layers. The first option is by Intersection. The output for this method is only the features that overlap or intersect. The next method is Union. For this method, the output is a layer of features that contains features from both layers. Both layers must be polygon layers for this to work. The last option is Erase. The output for this method will only contain the features that do not overlap. For more information on this tool, follow this link:
http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_5A5BE432AC8F46D89BD446327098ACBB

Find Locations

Find Existing

This tool finds existing features in a layer based on a condition (or rule) you make. The conditions could be as follows: find features that are within a distance of those in a different layer, find features that contain the same attributes as those in a different layer, or features that intersect those in a different layer. For more information on this tool, follow this link: http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_60545275DD404D9F95F5BD1E7A5F42E2

Derive New

This tool is similar to the previous tool except that instead of finding existing features, it derives new features. The conditions for this tool could create new features as follows: features within a distance of features from a chosen layer, features that must contain features from a chosen layer, features that are completely within features from a chosen layer, or features that overlap features from a chosen layer. For more information on this tool, follow this link: http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_60545275DD404D9F95F5BD1E7A5F42E2

Find Similar

This tool finds features that are similar to features from another layer. You can base this similarity on fields from the layer you are comparing to. You can also show the results of all locations which would be listed most similar to least similar or by the top features of which you choose how many. For more information on this tool, follow this link: http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm#ESRI_SECTION1_60545275DD404D9F95F5BD1E7A5F42E2

Outline of Process

Manage Data

1) Add Data to New Map
2) Dissolve Boundaries
3) Filter Conservation Areas
4) Extract Ontario Conservation Areas
5) Publish Ontario Conservation Areas

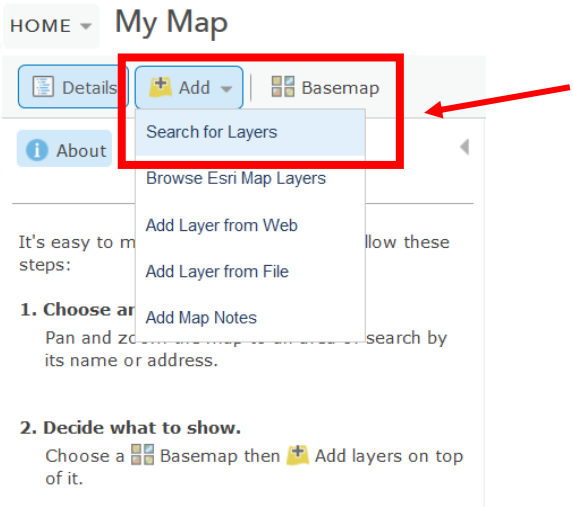
Find Locations

1) Find Existing Ontario Conservation Areas Within 1km of a Contaminated Site
2) Edit and Save the Map

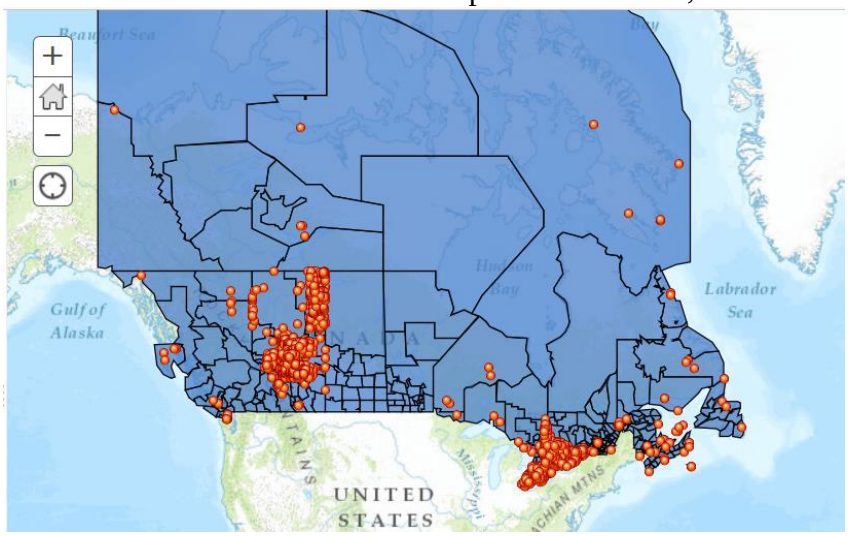
Tools: Managing Data

Step 1

First we will go to a new map. Then add the Ontario .shp file, the contaminated sites .shp file, and the boundary .shp file. See Tutorial 2 to learn how to import data to ArcGIS Online. You can access these files by choosing "Add"-> "Search For Layers" and choose to search for files within "My Content" and uncheck the box for searching within the extent shown on the map.

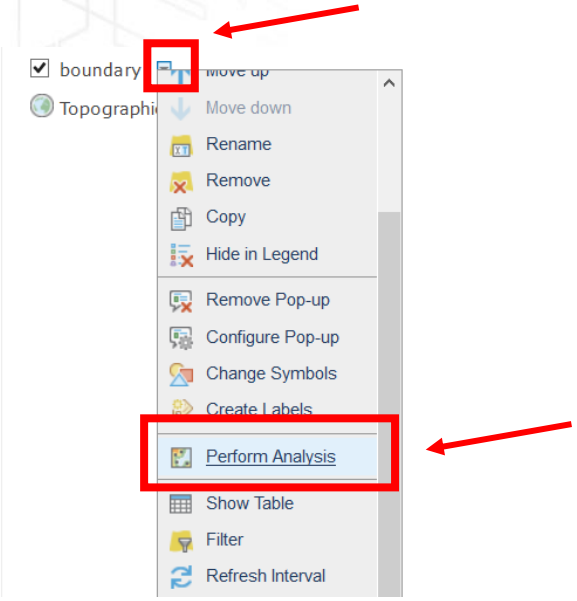


Once you have the files on the map, rearrange them so that the boundary file is on the bottom. This ensures that the points are visible, see the image below.



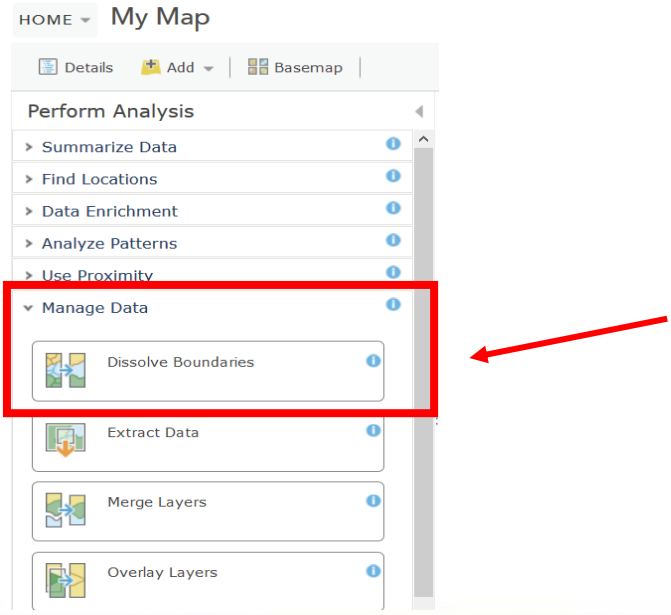
Step 2

We are using the boundary file to give us reference for our data. We are going to merge the boundaries on our Boundary file so that the only boundaries displayed are the provincial boundaries. Click the icon next to the boundary file in the Details ->Content Window. From here choose “Perform Analysis”.



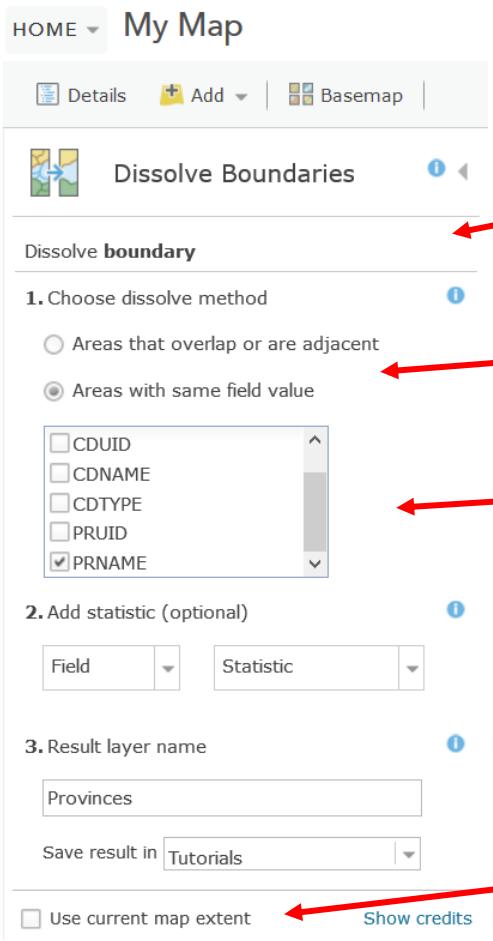
Step 3

Next, choose “Manage Data” -> “Dissolve Boundaries”



Step 4

We will now fill in the necessary information to complete this tools analysis.



First we will choose the dissolve method. We want all areas that are in the same province to merge into one area.

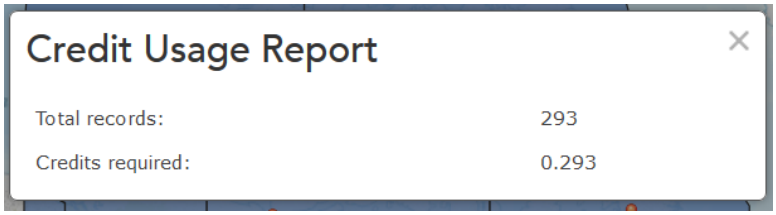
Choose "Areas with the same field value".

Check the box marked "PRNAME". This is the field that hold the province name.

We want this tool to work on all the features in our boundary layer, not just the boundaries displayed in the map. Make sure the check box is unchecked.

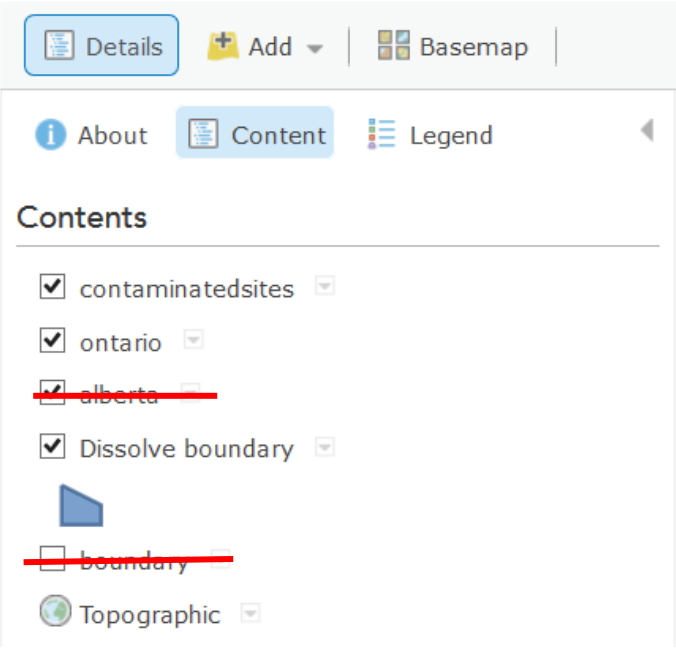
Step 5

Before we press the "Run Analysis" button, click on "Show Credits". The number of credits this tool will use for the data we chose is under 1. So we will continue with the tool, and press the "Run Analysis" button.



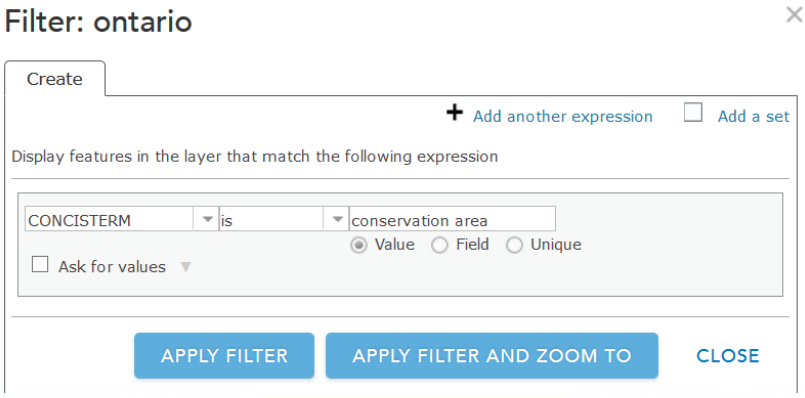
Step 6

Now that we have the boundaries we want, rather the provincial boundaries, remove the original boundary file and any extra files you may have. Once you have done this, you should only have the contaminated sites layer, the Ontario layer, and the dissolved boundary layer.



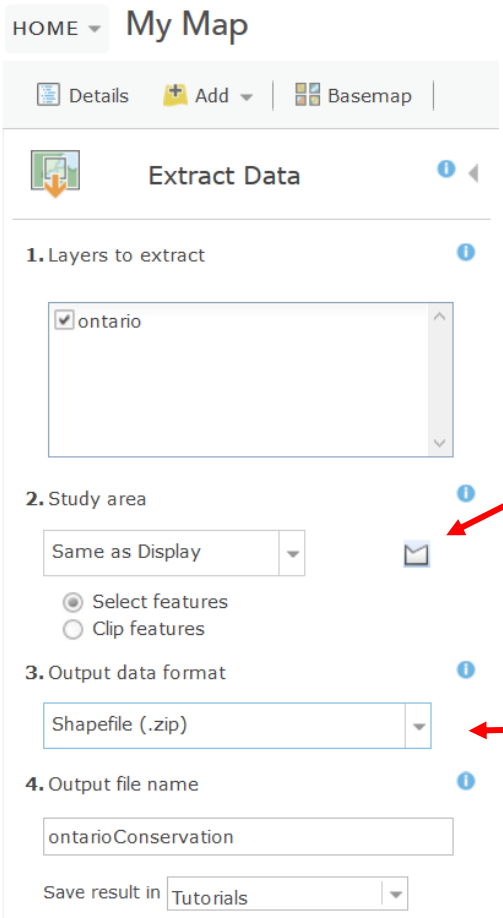
Step 7

Now we will work with the Ontario layer. We want to use this layer for the locations that are Conservation Areas. Now, this layer has many other locations than the one we want. To only show the Conservation Areas, we must filter this layer. To do this, click on the layer and choose “Filter”. “CONCISTERM” is the column that holds the type of area, we want to choose “conservation area”. Then apply the filter.



Step 8

We will now extract this filtered data into a new Shapefile. On the Ontario layer, go to “Perform Analysis” -> “Manage Data” -> “Extract Data”.

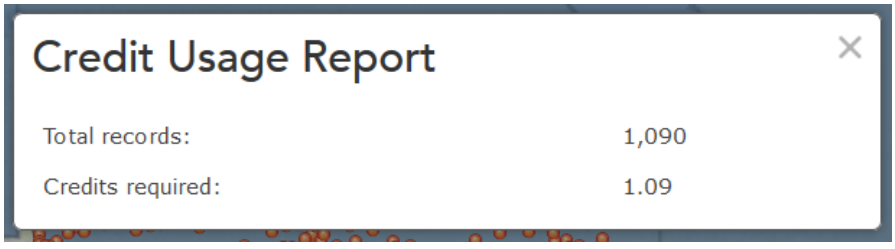


Select the study area to be “Same as Display”, and choose “Select features”. Make sure that the map is zoomed so that all of the conservation area points are visible bore you perform the analysis.

Select Shapefile as the output format.

Step 9

Before you press the button, check the “show credits”. Using this tool on the data we chose uses about 1 credit. Since this is very close to 1, we shall continue with the analysis.



Step 10

If you notice, the new layer was not added to the map. This is because we have not yet published it. To publish this layer, go to my content and view this new layer's details. Click on "Publish". You will have to give this layer a name and a tag. I will use "ontarioConservation" as the name of this layer.

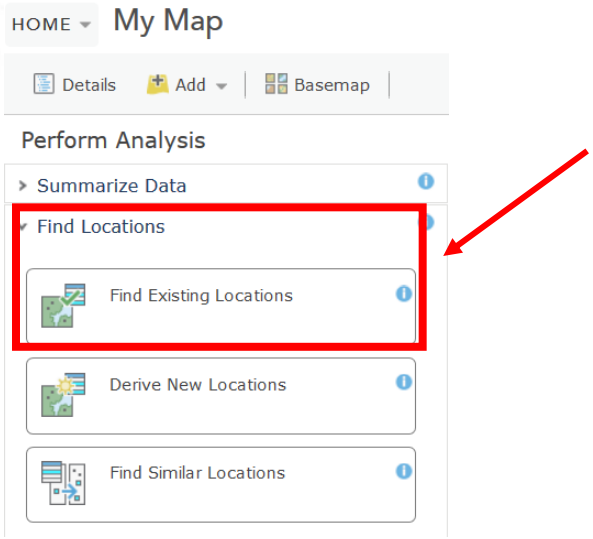
Step 11

Once you have published the layer, add it to the map. Remove all layers that we will not need now. The layers you should have in your map are: ontarioConservation, dissolved boundaries, and contaminated sites.

Tools: Find Locations

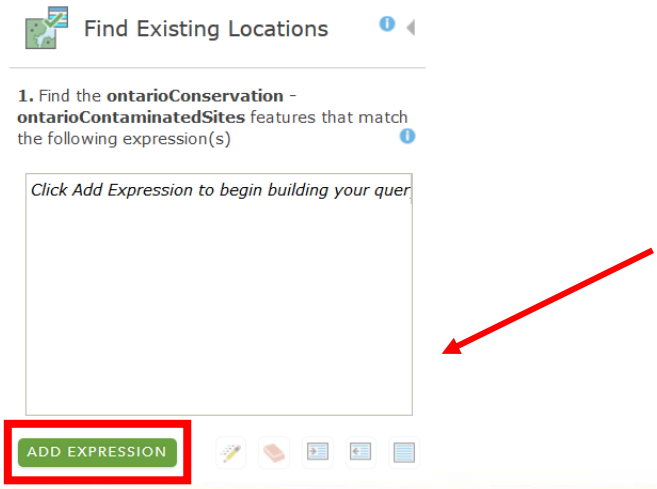
Step 1

Now we will use the “Find Existing” tool to find conservation areas that are within a distance of contaminated sites. From visualizing the map before we do this analysis, what do you think we will discover? Will there be a lot of conservation sites near contaminated sites? Click on the ontarioConservation layer and choose “Perform Analysis” -> “Find Locations” -> “Find Existing Locations”.



Step 2

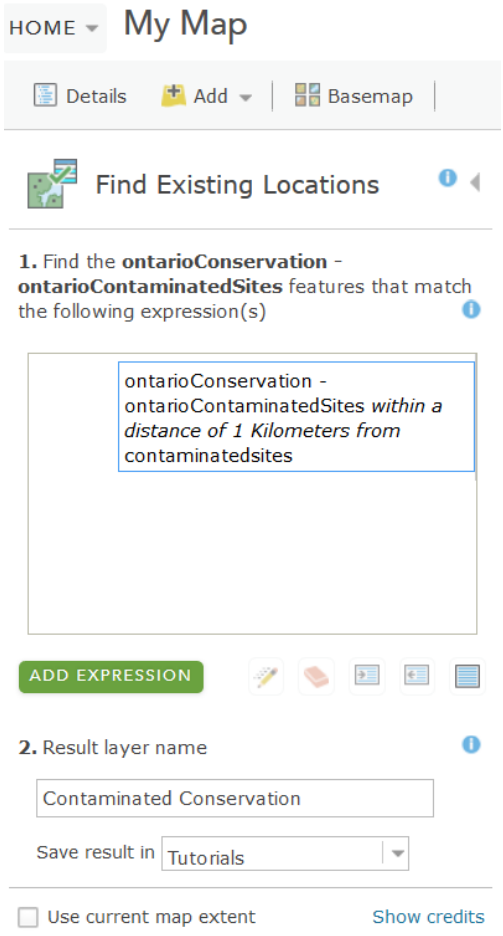
First we want to add the expression that will determine which locations this tool will find.



The expression we want is as below. We want this tool to select conservation areas (from our ontarioConservation layer) that are within a distance of say, 1km from the contaminated sites. Once you have this expression, click “Add”

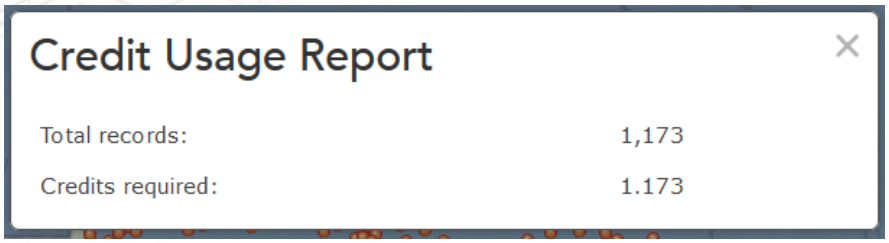
Step 3

Just as you did with other tools, name your new layer, and make sure the “Use current map extent” is NOT selected.



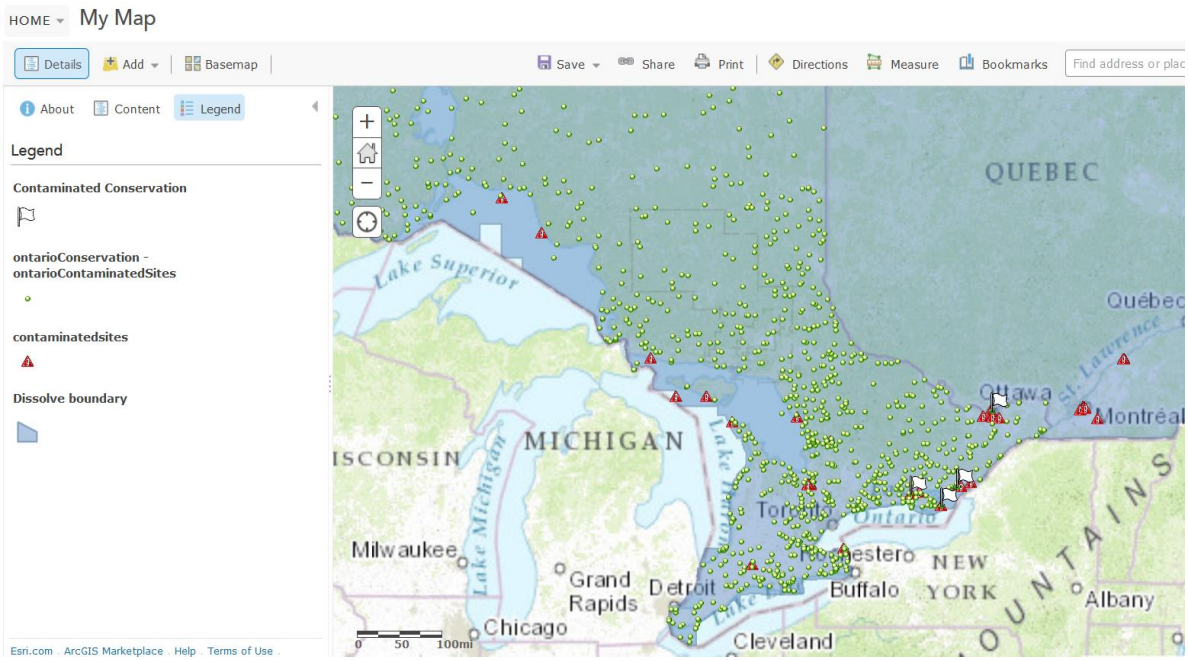
Step 4

Before you run the analysis, check how many credits are being used. This tool with this data uses about 1 credit and is not much over 1. So we will continue. Now run the analysis.



Step 5

Now we have a better visualization of the data. To make the differentiation between layers more clear, change your symbols, change the transparency of the boundaries to be less transparent, and change the order of the layers to make sure the point locations are above the boundaries. Save your map. What do you make of the map? What conclusions can you reach with this visualization?



Bonus: Conclusions and Explorations

For this section, remember to be careful of how many credits you use. If you find that your analysis will use an excessive amount of credits (over 1), limit the number of records you analyze. To do this, zoom in to a smaller number of records in the map. Then ensure that the box marked "Use Current Extent" is checked.

Exploration 1

Research contaminated sites. Is the 1km distance from a conservation area too far for a contaminated site to be considered unsafe? Should the distance be larger or smaller? Experiment by changing the distance. Compare your results.

Exploration 2

Explore the other areas in the Concisterm column of the Ontario .shp file. Are there another areas other than Conservation Areas that may be interesting to try instead? Choose another Area type and run the analysis again. Compare your results.

Conclusions

Initially with the raw data, a story may be apparent. After analyzing the data, is there a significance in the connection between contaminated sites and conservations areas? Is there a story in the analyzed data?

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.

Julianna Kelly

Geographic Information Systems – Algonquin College
Bmath Major in Statistics – Carleton University

kell0537@algonquinlive.com