

ArcGIS Online

Overview

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

Setting Up

Although ArcGIS Online can be used without setting up an account, it also means not being able to save your maps and applications. For the purpose of this guide, we will set up a free Esri Global Account, which you can use to access not only ArcGIS Online but all of Esri's training resources. Go to <http://www.arcgis.com> and click on **Sign In** at the top-right corner of the page. At the bottom left of the page, click on **Create a Public Account** and fill in the necessary info. Once you've created your account (which includes receiving a verification email), sign in to ArcGIS Online.

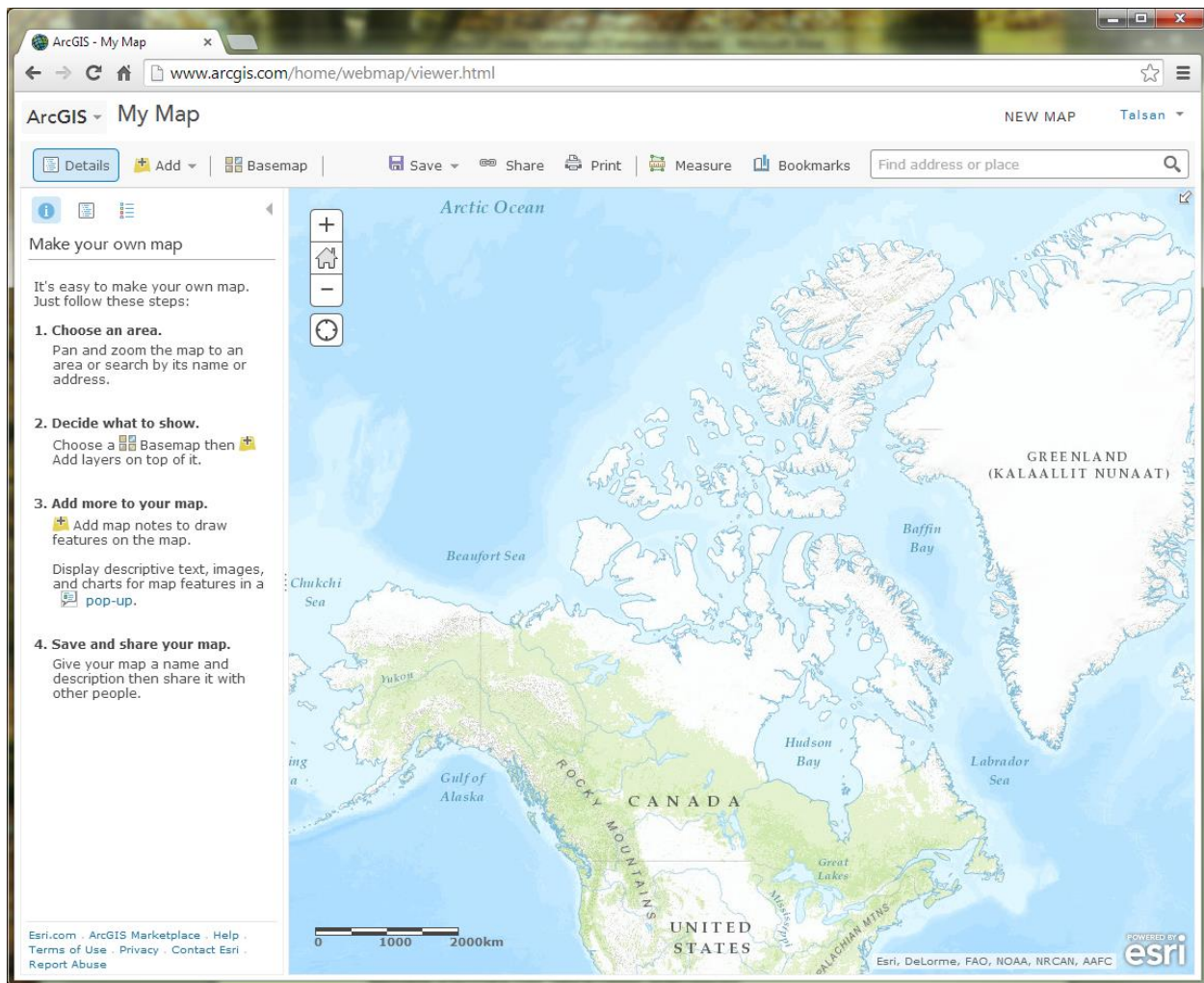
Note: The prominent, orange-coloured "30-Day Free Trial" button on the ArcGIS Online landing page is intended for organizations, not individuals; therefore, be sure to create a public account rather than an organizational one.

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

Getting Started

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

Along the top of the map are several buttons that allow you to do various things within your map. The **Add** button provides a dropdown menu with different options for adding data. The **Basemap** button allows you to choose from 9 different styles of map that will underlie your data (Topographic, the default, is shown below).

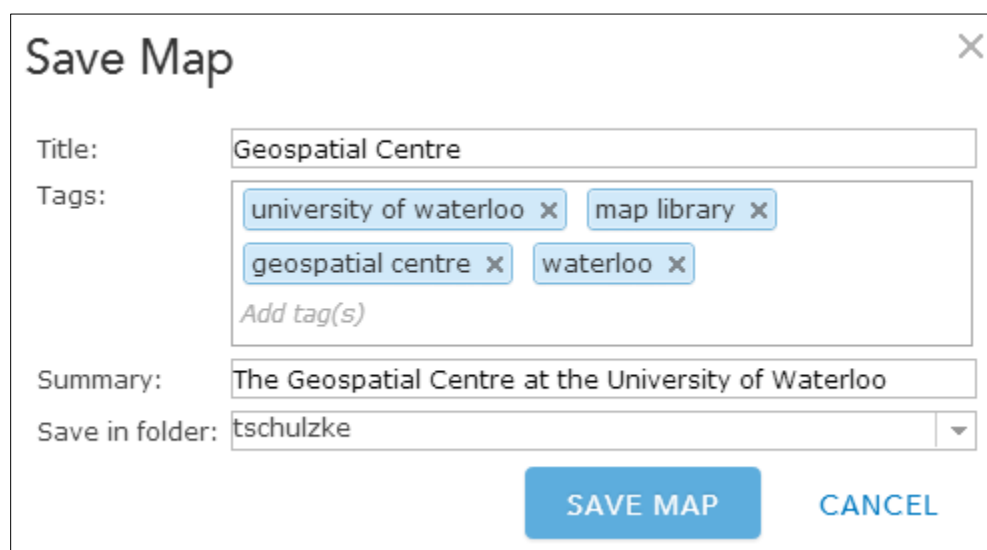


The **Save** button lets you save the map as you add features to it. **Share** pops up a dialog box giving various options for distributing your map. **Print** takes a snapshot of the map and its peripheral info that can then be printed. You can also get **Directions** from A to B and **Measure** distances, areas, or latitude-longitude coordinates. And if there's a certain place you want to be able to quickly return to on the map, create a **Bookmark** of that location, which records the extent and position of the map. But in order to get to that place the first time, you may want to use the **Search** box to find an address or a place. Navigating the map is relatively easy: click and drag to **Pan** the map and **Zoom In and Out** using the scrollwheel on your mouse.

Picking a Location

The first step in working with your map will be to choose a location to work in. For this guide, we will use the University of Waterloo main campus. In the **Search** box, begin typing **university of waterloo** and choose the result at 200 University Ave.

At this point, let's take a moment to **Save** the map and give it some information. Note that the map extent will also be saved, so make sure you like the zoom level. Click on either the **Save** or **Save As** option and name the map. You can use the information below to populate the fields or come up with your own **Title** (something short but descriptive), **Tags** (keywords that are used for searching purposes), and **Summary** (a brief description of what the map is or what it shows).

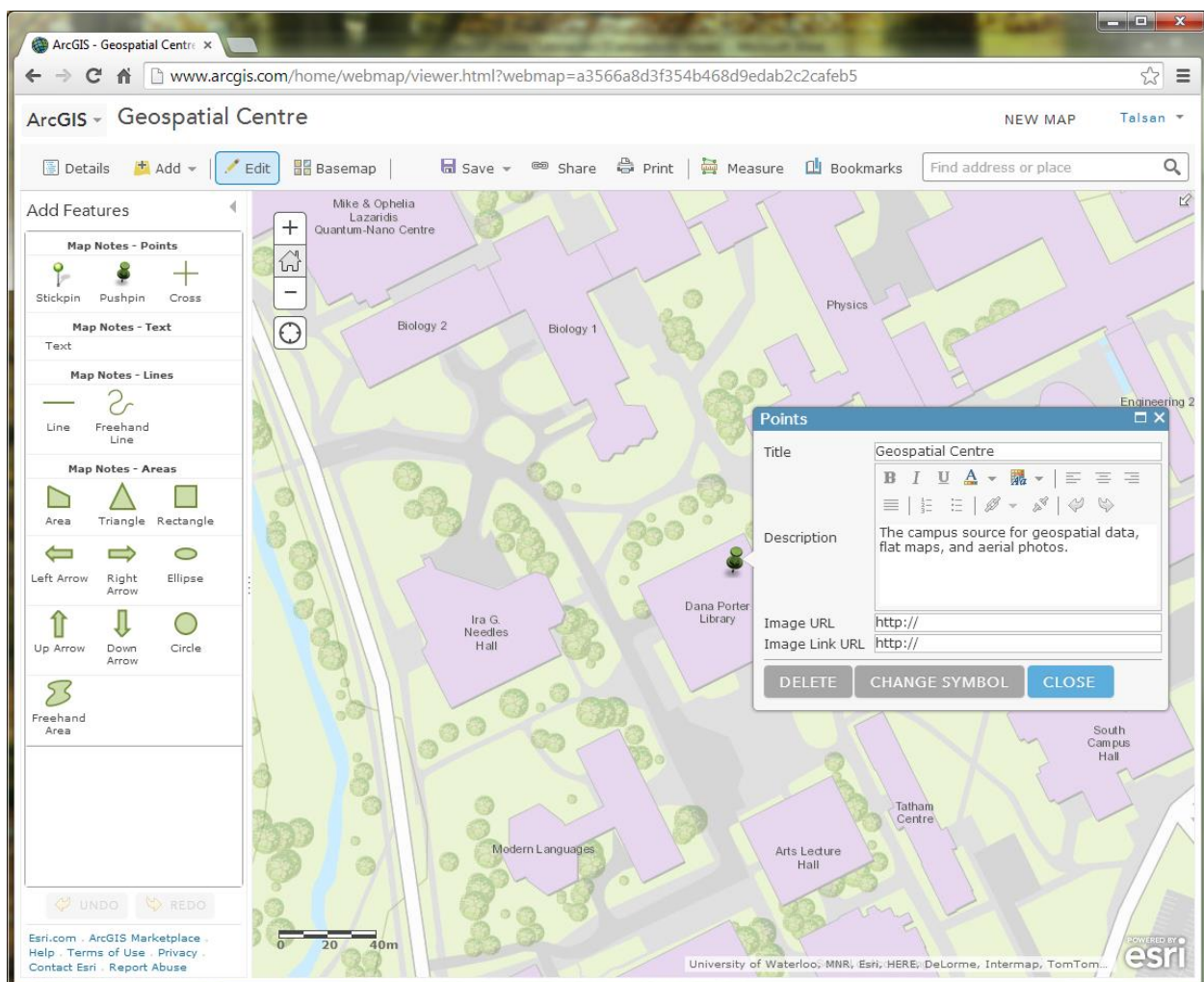
A screenshot of a 'Save Map' dialog box. The title bar says 'Save Map' with a close button (X) on the right. The form has four main sections: 'Title' with a text input field containing 'Geospatial Centre'; 'Tags' with a container showing four tags: 'university of waterloo', 'map library', 'geospatial centre', and 'waterloo', each with a close button (X), and a text input field below with the placeholder 'Add tag(s)'; 'Summary' with a text input field containing 'The Geospatial Centre at the University of Waterloo'; and 'Save in folder' with a dropdown menu showing 'tschulzke'. At the bottom right are two buttons: 'SAVE MAP' and 'CANCEL'.

Creating New Data

Now that we have a location, we can start to add features to our map. To do this, we need to **Add Map Notes**, which function as editable layers in the map. Click the **Add** menu and choose Add Map Notes. This pops up a dialog box, which allows you to name your notes and choose

from several different templates for different applications. For now, just keep the default settings and click **Create**.

You will notice that the **Details** pane on the left automatically changes to the **Edit** pane, which contains tools for creating four basic features: Points, Text, Lines, Areas. We'll start by creating a point feature using the **Pushpin**. Click on the point tool, then zoom into the Dana Porter Library (DP) on the university campus. Click on the northeast corner of the building to place your Pushpin marker. Name the point **Geospatial Centre** and leave the description blank. If you want to change the appearance of your marker, click **Change Symbol** and choose from the various menu options and colors (these options would be good to explore for future reference).



There are numerous options for adding an **Area** (also known as a polygon), each of which you can experiment with, but probably the most commonly used tool is **Area**, which 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). Choose this tool and draw an area around the Peter Russell Rock Garden as shown below.



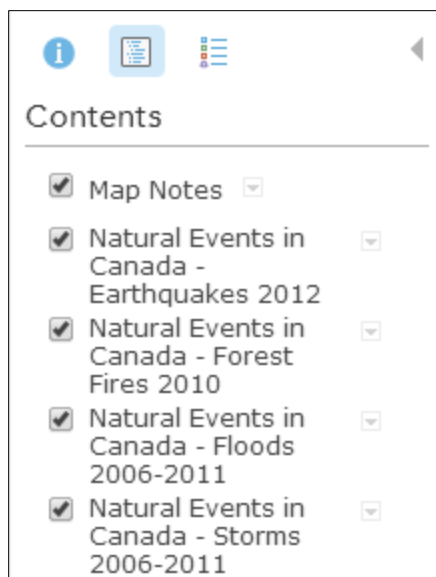
When the callout box appears after you've created the area, enter the information as seen below.

Next we'll add a path using a **Line** feature. There are two options for this: **Line** and **Freehand Line**. The former lets you draw each vertex with a click of the mouse; the latter requires you to click and hold while you draw your segment freehand. Choose one of these options and draw a path from the library to the rock garden (you can draw the route any way you please, as long as you follow established paths on campus). Name the path **Library to Rock Garden** and click Close.

As with the point marker, you can change the symbol for any of the features you create. Because the features we have created so far have a space for Name and Description, we will not cover the **Text** feature. However, if you simply wanted to add a Text note to your map, this would be a useful tool.

Adding Pre-existing Data

With the **Map Notes**, we created our own data layers right inside the map. But sometimes the data you need already exists. ArcGIS Online has several ways of adding data to your map. The easiest way is to search for data from the **Add** menu. Click on Add and choose **Search for Layers**. In the search box, type **canada natural events** and hit enter. A result is returned that can be previewed by clicking on the name of the layer or added directly to the map by clicking the Add link. Add the layer to your map and click **Done Adding Layers** below the results list.



You'll notice under the Contents tab that this layer actually contains four different event types: **Earthquakes 2012**, **Forest Fires 2010**, **Floods 2006-2011**, **Storms 2006-2011**.

These layers are open data and can be used for visualization and analysis. You can view information about the data by clicking on a feature to reveal a pop-up window. Because there are no instances of the first three event types in the Waterloo area, you can uncheck those ones and leave **Storms** checked.

Another method for adding data is through a hosted web service. Click on the **Add** dropdown menu and choose **Add Layer from Web**. In the dialog box, enter the following URL:

http://gisdata.region.waterloo.on.ca/ArcGIS/rest/services/imagery/Aerials_2012/ImageServer, then click **Add Layer**. This imagery service is provided by the Regional Municipality of Waterloo and is particularly useful because the ArcGIS Online satellite imagery is currently out-of-date and missing several newer buildings on campus.

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

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

Uploading Data Files

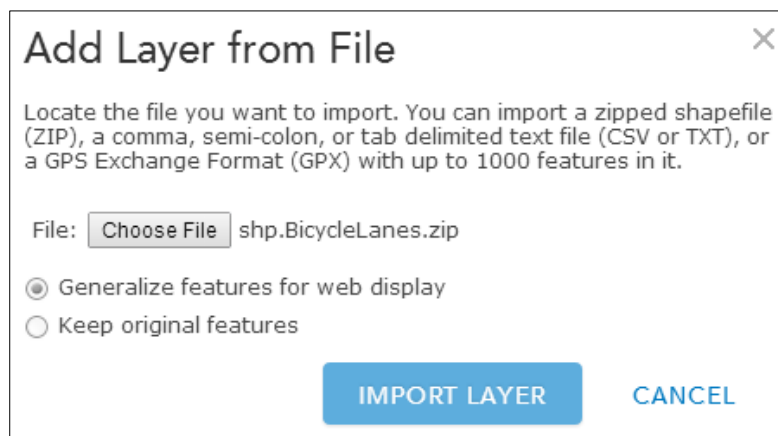
For this section, we are going to utilize the City of Waterloo's Open Data Catalogue, which features datasets available to the public for general use (see the [Open Data Waterloo User Licence](#) for details). To access the data, go to <http://cityofwaterlooopendata.cloudapp.net/>.

Shapefiles

We'll begin with one of the most common geospatial data formats, the **Shapefile** (.shp). Although 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 zipped format in order to be read properly. This is due to the fact that a shapefile (singular) is actually made up of several different files (plural) all with the same name but different file extensions. By itself, the .shp file is incomplete.

In the City of Waterloo Open Data Catalogue, scroll (if necessary) to the **BicycleLanes** layer and click on it. The data viewer lets you preview the data in tabular format (Data View), spatial format (Map View), and plotted format (Bar Chart and Pie Chart). In the top-right corner of the viewer, change the **Download as** dropdown from CSV to **Shape**, then click Download. The file is delivered in zipped (.zip) format.



From the **Add** menu, choose **Add Layer from File** and use the **Choose File** button to upload the **shp.BicycleLanes.zip** file you just downloaded. Accept the default selection to **Generalize features for web display** and then click **Import Layer**. The newly imported layer is now visible in the Contents pane as well as on

the map (you may need to zoom out or pan the map to see the features). As with the Canada Median Age layer, you can click on a bike path feature to reveal a pop-up window with more information about that segment.

Tab Delimited Files

As you may have noted while adding the bike lanes shapefile, one of the options for downloading data is **CSV**, or Comma Separated Values. 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).

In the Data Catalogue, click on the Data link in the top-left corner of the page to return to the main list of data. Scroll to the **PlacesofWorship** layer and click on it. Make sure the file type is set to **CSV** and download the file. With CSV and TXT files, you can use the standard Add Layer from File method or you can simply **drag and drop** the file on the map (be sure to drop it on the map and not the Contents pane).

Note: If lat-long data is automatically detected in a file (column names may prevent ArcGIS Online from recognizing those fields), ArcGIS Online will automatically plot the

points using those locations. However, if the location data is stored as addresses, you will be prompted to set up the **geocoding** parameters, which includes choosing a **Country** and assigning **Field Names** to the appropriate data type (i.e. Address, City, Postal, etc.). The **World Address Locator** (found at the bottom of the Country dropdown list) is a sophisticated geocoder built by Esri and is especially useful if your list contains addresses from more than one country. The dialog for setting up geocoding is shown below and acts much like the other **Add Layer from File** options.

Add CSV Layer

Locate features using: ☐ Latitude/Longitude ☒ Address

Country: World

Review the location fields. Click on a cell to change it.

Field Name	Location Fields
Name	Not used
Address	Address

ADD LAYER **CANCEL**

GPX Files

Outdoor enthusiasts will probably be familiar with **GPX** files, which store location information that can be used in GPS devices. However, GPX files go beyond GPS use in the field; they are often imported and exported using various geospatial software, and they can be shared fairly easily because of their relatively small file size.

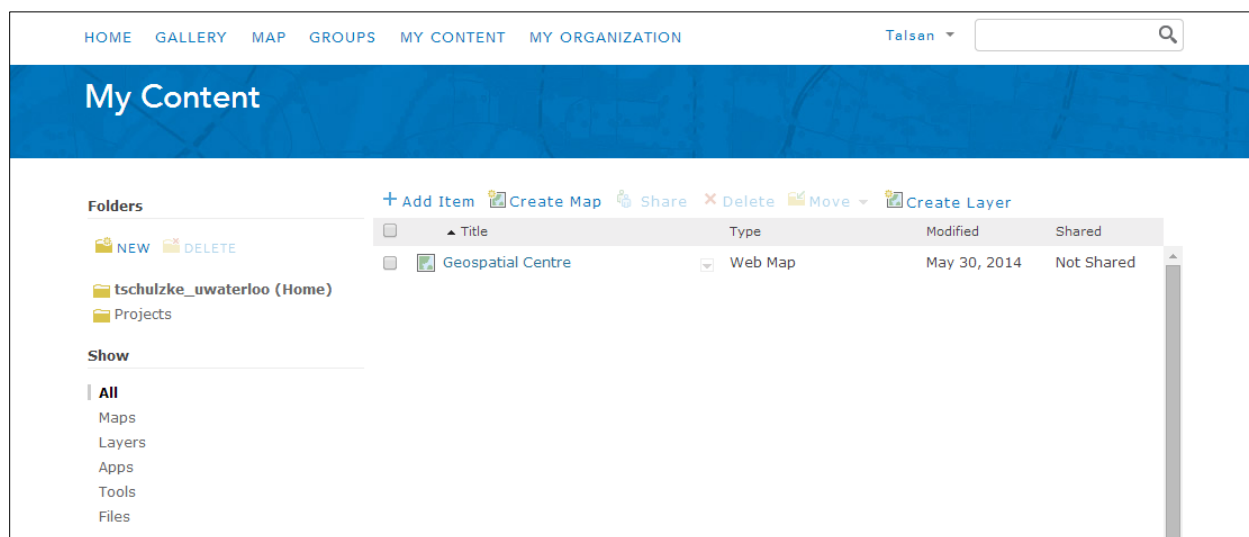
The City of Waterloo Open Data Catalogue does not currently offer GPX files; therefore, we will visit <http://www.topofusion.com/gpx.php> for the sake of illustrating the capability. On the TopoFusion page, choose the **Download Fantasy Island data in GPX format** link and save the file. As with the CSV file, you can drag and drop the **FantasyIsland.gpx** file onto the map to add the layer. The map will probably zoom to the layer (in Tucson, Arizona) by default, but because this was added for illustrative purposes, click on the gray arrow next to the **Map Notes** layer and choose **Zoom to** (this and other functions will be described in more detail later on).

KML Files

Although they are not mentioned in the Add Layer from File dialog, **KML** files can also be added to ArcGIS Online and used in your maps. This popular file format (Keyhole Markup Language)

was created by Google and is used in their popular Google Earth application. The City of Waterloo's Open Data Catalogue offers their data in KML format.

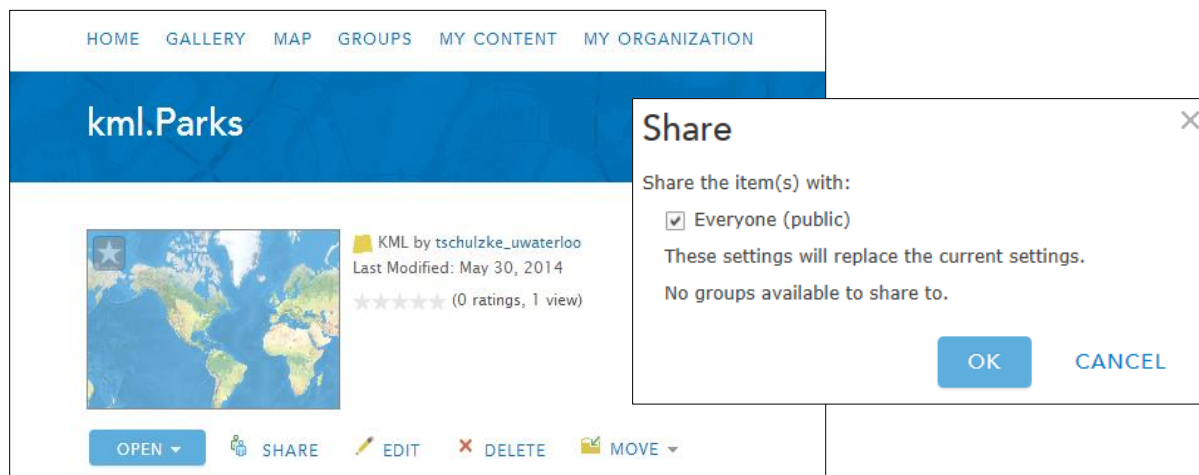
From the Data Catalogue, click on the **Parks** layer, change the file type to **KML** and click **Download**. From the Save location, right-click on the **kml.Parks.zip** folder and choose **Extract All....** From your map window, go to the **ArcGIS** dropdown menu (may also say Home) in the top-left corner and choose **My Content**. On this page, you'll see all the items you create in ArcGIS Online. Above the list of items, click on **+ Add Item** and browse to the **kml.Parks.kml** file you just extracted.



The **Add Item** dialog also requires you to add **Tags** to your new item, which help your item get found in searches. Type the words **waterloo** and **parks** in the box (use the Tab key to add additional tags), and when everything looks like the image on the left, click **Add Item**.

Once the KML has finished uploading, the item description page will appear showing the details of your newly added layer. Before you can add the KML to your map, however, you will need to **Share** it with the public.

Under the thumbnail image, click Share, then check the box to **Share the item(s) with: Everyone (public)** and click **OK**.

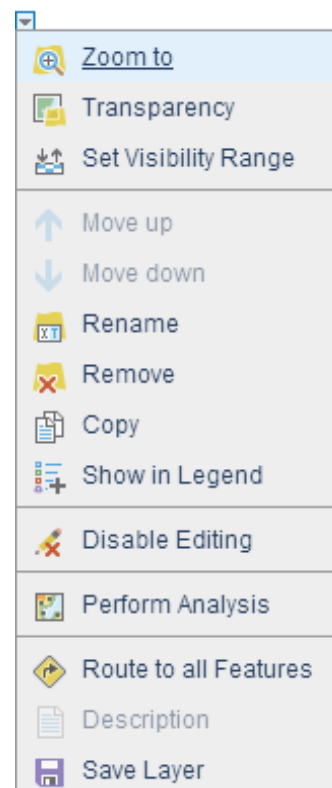


Use the link along the top of the page to go back to the **My Content** page where you will now see your **kml.Parks** item listed. To the right of each item name is a **small gray arrow**. Click the arrow next to **kml.Parks** and choose **Add to Map**, which will add the parks in Waterloo to the map we've been working with.

Customizing Your Layers

Under the **Contents** tab of your map's **Details**, you should now see nine layers and a basemap (Topographic). You will also notice that to the right of each item is a **small gray arrow**. Clicking the arrow reveals a dropdown menu showing the various actions you can perform on a given layer. Click the arrow next to one of the layers and you will see options such as **Zoom to**, **Transparency**, **Set Visibility Range**, and so forth. The options vary by layer, so what can be done with one layer may not be possible with another.

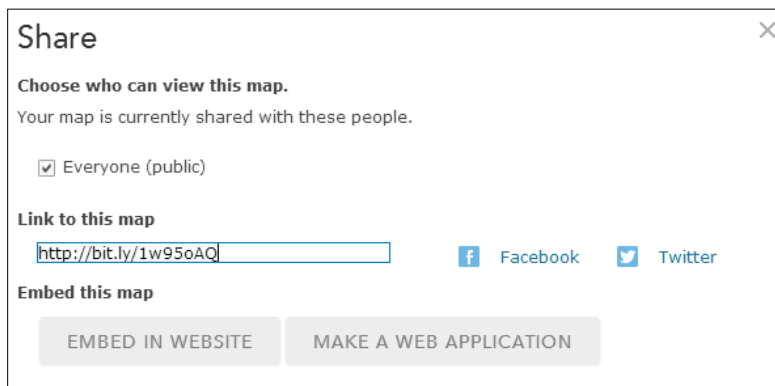
Let's use some of the menu options to tidy things up a bit. First, **Rename FantasyIsland** and **PlacesofWorship** to put a space between the words. Next, Rename **shp** to **Waterloo Bike Lanes**, **kml.Parks** to **Waterloo Parks**, and **Aerials_2012** to **Waterloo Aerials 2012**. Finally, change the **Transparency** on Waterloo Aerials 2012 to **50%**. You can also optionally remove the three event types that aren't being used.



One last customization we'll perform is **Set Visibility Range**. This allows you to control which layers are visible at various zoom levels. Since the aerial imagery is of little use when zoomed out too far to see much detail, we'll set the visibility range so it doesn't show past a certain extent. Click on the menu next to **Waterloo Aerials 2012** and hover over Set Visibility Range. Change the dropdown for **In closer than:** to **1:40,000 (Town)**. Now zoom out on the map until the aerial imagery disappears. Notice how much easier it is to read the map at this scale when the aerials are hidden from view.

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

Sharing Your Map

A screenshot of the 'Share' dialog box in ArcGIS Online. The dialog has a title bar 'Share' with a close button. It contains the following sections: 'Choose who can view this map.' with the text 'Your map is currently shared with these people.' and a checked checkbox for 'Everyone (public)'; 'Link to this map' with a text input field containing 'http://bit.ly/1w95oAQ' and buttons for 'Facebook' and 'Twitter'; and 'Embed this map' with two buttons: 'EMBED IN WEBSITE' and 'MAKE A WEB APPLICATION'.

Up to this point, your map has been saved to your free ArcGIS Online public account. But 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**. You can also share your map from the **My Content** page or the **Web Map** details page. After checking the box to share with **Everyone (public)**, the link to your map will be accessible to anyone you share it with, and the quick sharing links via **Facebook** and **Twitter** are enabled.

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

Share

Embed in Website

Copy and paste HTML to embed in website

<iframe width="500" height="400" frameborder="0" scrolling="no" marginheight="0" marginwidth="0" src="http://www.arcgis.com/home/webmap/embedViewer.html?webmap=c82c83608e8e4fa7bedaa60004874c48&extent=-180,10.1744,-18.5882,78.1773"></iframe>
<small>View Larger Map</small>

Small

300x260

Medium

500x400

Large

940x600

Custom

Width 500

Height 400

☐ Show zoom control.

☐ Show scale bar.

☐ Show legend.

☐ Show description.

☐ Show location search.

☐ Show basemap selector.

☒ View Larger Map

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

Share

Make a Web Application

Click a template's thumbnail to preview it or click its links to download it to your computer or publish it to the web.

Basic Viewer

Chrome - Twitter

Edit

Elevation Profile

Filter

Find, Edit, and Filter

Finder

Legend

1 2 3

< Back

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For this map, we'll use the **Basic Viewer** template as a way to share our web map outside of the ArcGIS Online viewer where we created it. Click the dropdown menu under the thumbnail image and choose **Publish**. Enter the information for your web application as seen below, and then click **Save and Publish**.

Share

Make a Web Application

Fill in the information below to save and publish your web application. View the item details of this web mapping application to see the URL to the application.

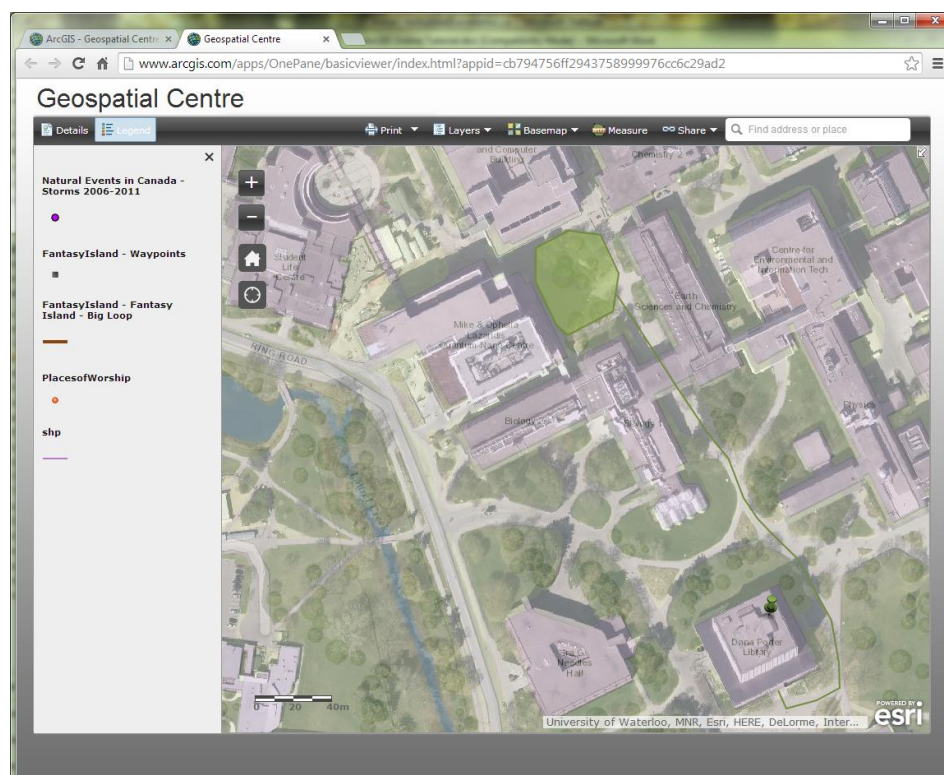
Title:

Tags: [Add tag\(s\)](#)

Summary:

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

Open the application to see what you've created. If you want to make changes to the default settings (which will look something like the image below), go back to your **My Content** page and select the web application, then click on **Configure Application**.



Wrapping Up

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

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

This guide created by Talsan Schulzke, GIS Specialist, May 2014

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