

Creating Hosted Feature Services Class – Exercise 1:

Exercise: Publish services to ArcGIS Online

An environmental consultant agency has an ArcGIS Online organizational site to support collaboration across sectors.

Imagine that you are a member of the agency's impact assessment team. You started a new construction site project that will require some content and expertise from other agency sectors. Your team has been given a tile package of the site's soil makeup and a zipped shapefile of wetlands in that area. Because multiple people and teams need to access this content, you have decided to publish these items as services for use as web layers.

Estimated completion time: 20 minutes

To complete course exercises, you need the following:

- ArcGIS 10.2 for Desktop or ArcGIS 10.3 for Desktop (Basic, Standard, or Advanced)
- ArcGIS Online Organizational Account
 - Publisher role or [equivalent \(FWS personnel are automatically assigned publisher account\)](#)
 - Approximate number of service credits consumed: 5 (based on current service credit rates; rates subject to change) – FWS and NPS have unlimited credits except for geocoding

Step 1: Verify Data

- Please check to confirm the folder C:/student/PublishAGOL is found on the computer – please contact the instructor if this folder is not present.

Step 2: Sign in to ArcGIS Online

The first step to publish content to ArcGIS Online is to sign in to your organizational site.

Open a browser (preferable Chrome).

Type **www.arcgis.com/home**.

Note: ArcGIS Online is a dynamic website, so the interface shown in graphics may differ slightly from what you see on screen.

At the top of the ArcGIS Online web page, click Sign In.

Enter your organizational account user name and password.

Click Sign In.

Once you sign in, the organization's home page typically appears.

Step 3: Publish a feature service

Once you have signed in, you will add a zipped shapefile to the site and publish it as a feature service.

Click My Content.

The My Content page is your storage space for items you have added to the site or created. You can add files here, and, if they are the appropriate file type, you can publish these files as services.

In My Content, under Folders, click New.

In the Create a Folder dialog box, type **PublishAGOL**, and click Create.

You will use this folder to store all content created during this course.

Open the PublishAGOL folder.

Click Add Item, and choose to add an item from your computer.

In the dialog box, next to the File field, browse to **Wetlands.zip** from the **..\Student\PublishAGOL** folder on your computer.

Wetlands.zip is a zipped shapefile. Because this is a file that can be published as a service and used as a web layer, the option to publish this file as a hosted layer appears in the dialog box. Unlike CSV or TXT files, zipped shapefiles already have the geographic location configured in the file so ArcGIS Online does not need to geocode the file before publishing the layer.

Confirm that the option to Publish **This File As a Hosted Layer** is checked.

Leave the default Title.

In the Tags field, type **training, Idaho, wetlands, impact assessment**.

Press Enter.

Click Add Item.

Note: It may take a few minutes for the zipped shapefile to publish. If you encounter an error that the service name already exists, rename the Wetlands.zip file by adding your initials to the file name. Then try publishing it again.

While you are waiting for the service to publish you can click the metadata button and then the validate button. This will give you a list of required metadata items for valid metadata. You can click on the yellow items and it will take you to the place where the metadata needs to be updated and once you update these fields – the items will be grey. When you are done looking at the metadata click save and close.

Once the file has successfully published, the item's details appear. The item details page provides descriptive information about an item, including the content type, access and use constraints.

Step 4: Edit the item description

You will complete the item's details to help other site members understand what this information represents.

In the item details page, click Edit.

The Title, Summary, and other fields are now editable, allowing you to enter information into each of these fields.

In Windows Explorer, navigate to **..\Student\PublishAGOL**.
Double-click **WetlandsItemDetails.txt**.

Copy and paste the Summary, Description, Access and Use Constraints, and Credits information from the text file to the item's details.

Some of the remaining item properties (Editing, Export Data, Sync, and Track Edits) enable or disable users from editing and exporting the service. This service is only used for querying, which means that people need to look at the information and its properties but not change or add any information. Which, if any, of these properties should be enabled?

Under properties, confirm that the Editing, Export Data, Sync, and Track Edits fields are unchecked.

Click **Save**.

Now go back into the metadata tab and use the validate button and click each of the yellow items to add the required metadata to pass the validation. Use your best guess when filling out the fields. You should also notice the information in the items details page has been added into the appropriate sections of the complete metadata. Once the metadata has passed validation – save and close the metadata.

FWS will be requiring a minimum description, access and use constraints and validated metadata for publically shared services and this information will also be added automatically to the FWS Open Data Site and data.gov – see the AGOL requirements for published Items One-Pager.

Step 5: Open the feature service

Once the item's details are complete, you will open the service to confirm that it successfully published.

In the item details page, click Open, and choose to add the layer to a *new* map. The ArcGIS Online map viewer opens and the feature service displays as a feature layer in the map. This layer represents wetlands located in and around McCall, Idaho.

In the contents section in the left window of the map select the  change style button which shows up when you move you mouse over it

Under **Choose An Attribute To Show**, click the down arrow and select **Show Location Only**.

Click **Done**.

Click one of the wetland areas.

A pop-up window appears with information about the wetland, including the FID number, attribute, wetland type, and acreage.

You have successfully published the feature service; now you will publish a tiled map service.

Step 6: Publish a tiled map service

Now you will return to My Content to add the next item and publish it as a tiled map service.

At the top of the ArcGIS Online map viewer, click **Home**, and choose **My Content**.

In My Content, open the **PublishAGOL** folder.

Click **Add Item**, and choose to add an item from your computer.

Browse to **Soils.tpk** from **..\Student\PublishAGOL**.

Soils.tpk is a tile package. Because this is an item that can be published as a service and used as a tiled map layer, the option to publish this file as a tile layer appears in the dialog box. Unlike CSV or TXT files, tile packages already have the geographic location configured in the package so ArcGIS Online does not need to geocode the package before publishing the service.

Confirm that the option is checked to Publish This File As a Tile Layer.

Provide a title and tags:

- Title: **Hydrologic soil groups**
- Tags: **training, Idaho, soils, impact assessment**

Click **Add Item**.

Note: If you encounter an error that the service name already exists, rename the Soils.tpk file by adding your initials to the file name. Then try publishing it again. Once the file has successfully published, the item details page for the Hydrologic soils group tiled map service appears. Tile packages have a set of properties that can be completed before the package is created. When these properties are completed, the information is transferred to the item's details for both the uploaded tile package and the published service.

Step 7: Open the tiled map service

Because the item's details are already complete, you will open the service to confirm that it published successfully.

In the item details page, click Open, and choose to add the layer to a *new* map.

If prompted, click **Yes** to open the map.

The ArcGIS Online map viewer opens the tiled map service as a tile layer in the map.

In the Details pane, click **Show Contents of Map** .

Under Contents, click Hydrologic soil groups, then Runoff potential.

There are four different soil types represented in the Hydrologic soil groups service: A, B, C, and D. These four categories can be used to measure runoff potential. Soils categorized as A generally have low runoff potential and soils categorized as D usually have high runoff potential.

Click one of the soil areas on the map.

Because this is a tile layer, it represents a picture of the data. This means that you cannot query the underlying information like you can with the feature layer.

Step 8: Review items

You have finished publishing services to the site. Next you will review the different content types you have added.

Go to **My Content**

Open the **PublishAGOL** folder.

You see four new items, two named Hydrologic soil groups and two named Wetlands. These items represent the items you added (Shapefile and Tile package) and the services you published as layers (Features and Tiles). After sharing the services they can be accessed and reused in multiple maps and applications.

If you are continuing to the next exercise or the following optional step, leave your browser window open.

Step 9: Prepare a map to publish as a service in ArcMap

You can also publish feature and tiled map services from map documents which gives the service greater flexibility and an analyze step for improving the service. In this step, you will publish a feature service using an ArcMap map document.

Open ArcMap.

Open **ConstructionSite.mxd** from your **..\Student\PublishAGOL** folder.

Note: If a Hardware Acceleration window appears, click No. Hardware acceleration can improve the drawing performance for some map layers, but you will not need it for this exercise. The map displays a blue polygon representing the construction site.

From the **File** menu, choose **Map Document Properties**. Notice the document properties have been filled in for you and saved as part of the .mxd. You can fill in the description here (recommended) or fill out the description once the service has been created.

Close the Map Document Properties dialog.

From the **File** menu, choose **Sign In**.

In the ArcGIS Sign In dialog box, enter your ArcGIS Online organizational account user name and password.

From the **File** menu, choose **Share As > Service**.

In the **Share as Service** dialog box, leave the default, and click **Next**.

Under Choose a connection, choose **My Hosted Services** (<organization name>) is set, leave the change the service name to ConstructionSite(your initials), and click **Continue**.

The Service Editor dialog box appears. This is where you can determine what type of service you will create, its capabilities, item description, and more.

In the Service Editor dialog box, click **Capabilities**.

This service item information will need to be updated with information about the site, including construction manager and contact information. The site will also be queried by multiple members of the impact assessment team. What type of service should you publish (feature service or tiled map service)?

In the **Capabilities** tab, check **Feature Access**, and uncheck **Tiled Mapping**.

Click the **Feature Access** tab.

For **Operations Allowed**, choose **Query** and **Update**.

Click the **Item Description** tab.

In Windows Explorer, navigate to `..\Student\PublishAGOL`.

Double-click **AccessAndUse.txt**.

Copy and paste the **Access and Use Constraints** from the text file to the Item Description tab.

Step 10: (Optional) Analyze and publish a service from ArcMap

Now, you will analyze the map document to make sure that it is ready to be published as a service.

In the top right of the Service Editor dialog box, click **Analyze**.

Minimize the Service Editor dialog box by clicking the up arrow in the upper right.

ArcMap analyzes the map for potential issues it may have publishing the service or with the service itself. The Prepare window classifies these issues as Errors, Warnings, and Messages. When analyzing this potential feature service, ArcMap identified one error: you cannot publish a [basemap](#) as a service, because it already is a service.

In the Prepare window, right-click the error, and choose **Remove Layer**.

The basemap is removed from the map.

In the Service Editor dialog box, click **Analyze** to re-analyze the map.

No errors, warnings, or messages are indicated.

Click **Publish**.

Note: It may take a few minutes for the feature service to publish. A message appears to confirm that your service finished publishing.

Click **OK**.

The construction site feature class has been published as a feature service. You can open it as a feature layer in the ArcGIS Online map viewer to confirm that it published successfully.

Exit ArcMap without saving changes.

Return to your browser window and go to **My Content**.

Publishing services from ArcGIS for Desktop automatically places the items in your root folder. You will need to move these items to the PublishAGOL folder.

Under Folders, click the root folder <user name> (Home).

Check the two items titled **ConstructionSite**.

Click **Move** and choose **PublishAGOL**.

If you are continuing to the next exercise, leave your browser window open. Otherwise, close it.

Creating Hosted Feature Services Class – Exercise 2:

Exercise: Publish tiled map services to ArcGIS Online

An environmental consultant agency has an ArcGIS Online organizational site to support collaboration across sectors.

Imagine that you are a member of the agency's impact assessment team. You started a new construction site project that will require some content and expertise from other agency sectors. Your team has been given panchromatic imagery of the area, you have decided to publish these items as services for use as web layers.

Estimated completion time: 20 minutes

Step 1: Verify Data

Please check to confirm the folder C:/student/PublishAGOL/McCall_images is found on the computer – please contact the instructor if this folder is not present.

Please also confirm you have the McCall_images.mxd in the PublishAGOL directory and it does not have .doc at the end - remove the .doc for the file is named McCall_images.mxd if needed.

Step 2: Publish imagery as a tiled service in ArcMap

Open ArcMap.

Open **McCall_image.mxd** from your **..\Student\PublishAGOL** folder.

Note: If a Hardware Acceleration window appears, click No. Hardware acceleration can improve the drawing performance for some map layers, but you will not need it for this exercise.

From the **File** menu, choose **Map Document Properties**. Notice the document properties have been filled in for you and saved as part of the .mxd. You can fill in the description here (recommended) or fill out the description once the service has been created.

Close the Map Document Properties dialog.

From the **File** menu, choose **Sign In**.

In the ArcGIS Sign In dialog box, enter your ArcGIS Online organizational account username and password.

From the **File** menu, choose **Share As > Service**.

In the **Share as Service** dialog box, leave the default, and click **Next**.

Under Choose a connection, choose **My Hosted Services** (<organization name>) is set, **rename** the service to McCall_Image(your initials), and click **Continue**.

It is important to follow a suggested naming convention as you cannot use the same name on multiple services. Please see the FWS sharing Public Services for more information on naming and sharing public items in ArcGIS Online.

The Service Editor dialog box appears. This is where you can determine what type of service you will create, its capabilities, item description, and more. **Close** the empty prepare dialog box for now if it pops up here - but keep the Service Editor dialog box open..

In the Service Editor dialog box, click **Capabilities**.

What type of service should you publish (feature service or tiled map service)?

In the **Capabilities** tab, ensure that **Tiled Mapping** is checked.

(Please note that Feature Services are limited to Vector Data, you cannot publish imagery or other Raster Data as Feature Services. Tiled Mapping is your only option.)

In the Service Editor dialog box, click **Caching**.

Here you can set the Maximum and Minimum scale levels.

Pull the green slider bar to the greatest Maximum and Minimum scale levels (0-19).

At the bottom of the **Caching** dialog box, click the **Build cache manually after the service is published** radio button. **This will publish your Tiled Mapping services much more quickly because the caching will be performed on the AGOL server rather than on your local computer and then distributed across the network - please ALWAYS use this feature when available!!!!**

In the Service Editor dialog box, click **Item Description**.

In Windows Explorer, navigate to `..\Student\PublishAGOL`.

Double-click **AccessAndUse.txt**.

Copy and paste the **Access and Use Constraints** from the text file to the **Access and Use Constraints** window in the **Item Description** dialog.

In the Service Editor dialog box, click **Sharing**.

In the **Sharing** dialog, make sure that only **My Content** is checked, you do not want to share this content at this time.

Now, you will analyze the map document to make sure that it is ready to be published as a service.

In the top right of the Service Editor dialog box, click **Analyze**.

You may see several errors in the analyze window. You will need to learn how to work through these errors to work with creating services. For errors that say "high" - you cannot publish the service until you have cleared the error.

If you get the high error "Layer's data source uses wavelet compression" click the + button to expand the items or right click and select **expand all items**

Right click one of the “Layer’s data source uses wavelet compression” high errors and select **help**. You can now read about wavelet compression - you will note that in the future it’s better to use .TIFF and .JPEG that has not been compressed.

Right click the item group “Layer’s data source uses wavelet compression (4 items)” and select **mark as an exception**

Right click the high error “Your service will use the WGS 1984 Web Mercator (Auxiliary Sphere)” and select help. It is highly recommended ALL services are created in the WGS 1984 Web Mercator projection!

Right click the medium error “MIXED tile format recommended to cache a map with raster layers” and select **Use Mixed Cache Tile Format**. You can also read the help to find more information about this error (suggested).

Right click data frame (default is **Layers**) and select properties, then go to the **Coordinate System** tab. Select **Projected Coordinate System, World, WGS 1984 Web Mercator (auxiliary sphere)** and select ok.

Right click “Map is being published with data copied to the server using data frame full extent” and select **mark as an exception**.

Close the Analyze dialog (Prepare window) and select the **Analyze** button again from the Service Editor dialog. You will notice that there should only be one high and one medium with status “exception” and one Low unresolved exception “Layer draws at all scale ranges (4 items).

You can safely now close the Analyze (Prepare window).

Click **Publish**.

Note: It may take a few minutes for the Tiled Map Service to publish.

A message appears to confirm that your service has published successfully. Please contact an instructor if it takes more than 5 minutes or you do not receive this message.

Click **OK**.

The McCall imagery has been published as a Tiled Map Service. You now need to configure the caching tiling in ArcGIS Online.

Leave ArcMap open.

Step 3: Configure tile caching in ArcGIS Online

Open a browser (Chrome is preferred).

Type www.arcgis.com/home

If you are not already signed in, click sign in and enter your account user name and password.

Go to **My Content**.

Publishing services from ArcGIS for Desktop automatically places the items in your root folder. You should move these items to the PublishAGOL folder.

Under Folders, click the root folder <user name> (Home).

Check the boxes for the two items titled **McCall_image(your initials)**.

Click **Move** and choose **PublishAGOL**.

Go to the folder **PublishAGOL** by clicking on it in the left under folders

Click on **McCall_image(your initials)** - the Tile Layer. This should open the Layer Description page.

Scroll down to Properties and look at Tiles.

The status will be 0% of the tiles are available. You will need to configure the tiles.

Click on **Manage Tiles**.

In the **Manage Tiles** dialog you will see the available scales to the left and their status to the right.

Select the scales that you would like to be available for this Tiled Map Service by checking the boxes to the left. For this exercise select **1:144,448 1:36,112 and 1:9,028** and click **Create Tiles**.

You will be asked whether you are sure, click **Yes**.

Please observe the larger scales require more storage and note that this uses credits (however, FWS and NPS have unlimited credits).

The tile creation process may take several minutes. You can watch the progress in the **Manage Tiles** dialog. (This is actually much quicker than creating the tiles on your computer and uploading them to ArcGIS Online across the internet.) Please note you can actually close this window now as these tiles are being created on the ArcGIS Online Servers using their resources.

Close the tile dialog and you will see a "building tiles" message in the McCall_imageCL description box.

Do not close your browser session.

Step 4: Comparing the Service to the original Images

While you are waiting click on **metadata** and update the sections of metadata using the **validate** button until you see the message **your document is valid** and then **save and close** the metadata.

The tiles should now be created.

To view your Tiled Map Service in ArcGIS Online:

In the McCall_Image(initials) Description page click **Open** and **add layer to new map**

The visibility of your layer will be limited by the cache scales that you set. It will not be visible panned out beyond 1:144,448 or zoomed in more than 1:4,514

To view your Tiled Map Service in ArcGIS:

You can either open the service in ArcGIS by clicking **Add Data > My Hosted Services**

OR, you can open it from ArcGIS Online by opening the pull down menu next to **OPEN** on the McCall_Image(initials) Description page and select **Open in ArcGIS for Desktop**.

A downloaded file will appear in the lower left corner of the browser window, **item.pitem**

Click on **item.pitem** and your Tiled Map Service will be added to the ArcMap project that is already open.

You can compare the service with the imagery stored locally by turning the service off and back on.

Please note that ArcMap does not obey the same scale limits as ArcGIS Online.

Creating Hosted Feature Services Class – Exercise 3:

You really want to make a map of all of the hot springs in the nation and make it available to people to crowd source information about the hot springs (edit the data) on the map.

The data came from a 1980 NOAA

report: <http://www.ngdc.noaa.gov/hazard/data/publications/Kgrd-12.pdf>

This data was used to create a shapefile.

Step 1: Prepare a map to publish as a service in ArcMap

In this case you want to make the service editable and you want the service to be fast and have additional fields for data collection. In this step, you will publish a feature service using an ArcMap map document.

Open ArcMap.

Open a blank ArcMap document

Use the **add data** button to add the hot_springs.shp from the C:/student/PublishAGOL directory

To improve the speed of the service, you will set the map to the Web Mercator Projection

In the ArcMap table of contents, right-click the data frame name (the default is Layers) and choose Properties

Click the Coordinate System tab.

Click Projected Coordinate Systems > World > WGS 1984 Web Mercator (Auxiliary Sphere).

You will need more fields for data entry

In the ArcMap table of contents, right-click the layer name (hot_springs) and select open attribute table.

In the upper left corner of the table select the table options icon down-arrow and add field.

Add the Name: **Comment** and use the drop-down to change the type to text.

Change the Field Properties Length from 50 to **255** and click ok

Using the same method add one more field name: **Verified**, Type: **Text**, Length: 50.

What other types of fields might be added for this effort? They should be added here prior to creating the Service.

Close the table.

You will need to create symbology for editing

Right click the layer name (hot_springs) select properties and select symbology tab.

Click **Categories** and change the Value Field to **TEMP_CAT**

Click the **Add All Values** and change the Label names to **Unknown, Boiling, Hot, Warm** for the blank, B, H, W. Remove the heading "**TEMP_CAT**" by clicking on it and selecting delete.

Click the **Add All Values** and change the Label names to **Unknown, Boiling, Hot, Warm** for the blank, B, H, W. Remove the heading "**TEMP_CAT**" by clicking on it and selecting delete.

Change the **Color Ramp** to be more colorful. Change the size of the symbols to **8 point** by double clicking them. Note you should also set symbol sizes for different zoom levels if you are doing this for the field.

In the Editor menu, select **Editor, Stop Editing**

Click **File, Map Document Properties** and fill in the following information:

Title: Test Hot Springs Edit Service

Summary: Hot springs training data.

Description: hot springs training data from Thermal Springs List for the United States, NOAA 1980 report

Tags: test, hot springs, training

Author: (your name and contact info)

Credits: Thermal Springs List for the United States, NOAA 1980 source

(please note if this dataset is to be shared or public more information is needed.

Click OK to close the Map Document Properties dialog box

Click File and **Save** - save your map to the **c:\student** directory in case there is an issue.

Step 3: Publish Editable Feature Service in ArcMap

From the **File** menu, choose **Sign In**.

In the ArcGIS Sign In dialog box, enter your ArcGIS Online organizational account username and password.

From the **File** menu, choose **Share As > Service**.

In the **Share as Service** dialog box, leave the default, and click **Next**.

Under Choose a connection, choose **My Hosted Services** (<organization name>) is set, **rename** the service to HotSprings(your initials), and click **Continue**.

It is important to follow a suggested naming convention as you cannot use the same name on multiple services. Please see the FWS sharing Public Services handout for more information on naming and sharing public items in ArcGIS Online.

The Service Editor dialog box appears. This is where you can determine what type of service you will create, its capabilities, item description, and more. **Close** the empty prepare dialog box for now if it pops up here - but keep the Service Editor dialog box open..

In the Service Editor dialog box, click **Capabilities**.

What type of service should you publish (feature service or tiled map service)?

In the **Capabilities** tab, ensure **Tiled Mapping** is **unchecked** and **Feature Access** is **checked**.

Click **Feature Access** and select **Create, Delete, Query, Sync, and Update**. Note these options can also be selected online once the Service is created. Note Sync is needed to allow use by ArcGIS Collector.

Click **Sharing** and select **Everyone (public) and your Bureau**

Click the **Analyze** button and right click and select help if you want more information on any of the errors. Medium and Low do not need to be fixed so close the Analyze box.

Click **Publish**. The publishing process should take a few minutes and then you will see a dialog box that says **The service has been published successfully**.

Click OK

Step 4: Accessing the Service in ArcGIS Online

Open a browser (Chrome is preferred).

Type www.arcgis.com/home

If you are not already signed in, click sign in and enter your account user name and password.

Go to **My Content**.

Publishing services from ArcGIS for Desktop automatically places the items in your root folder.

Under Folders on the left, make sure the root folder <user name> (Home) is highlighted.

You can click **Modified** to sort by the last files modified. Note when creating a service a Feature Layer or Tile Layer is created alongside a Service Definition file. Esri tells us the Service Definition file is no longer needed so you may delete this file.

Click on the **hotsprings(your initials)** file to open the service description page and select **Edit**

At the bottom of the page enable **Export Data** and **Track Edits - Keep track of who created and last updated features**. Leave all the other boxes blank.

Click **Save** at the bottom of the page.

Back in the Layer description page click **Open, Add Layer to Map with Full Editing Control**

In the Layer did not draw completely box select **Don't show this message again for this layer** and click **OK**

Zoom into Warm Spring on the farthest West island of the Aleutian Islands in Alaska and click on the hot spring

In the dialog window click the **edit** button and add some comments to this hot spring. This can be viewed and accessed by Mobile devices at this time and as it's shared public anyone can add data or edit. Use Groups to restrict access. Close

In the add features screen on the left select the symbol under Hot and then click a point on the map to create the new Hot Spring.

Note there is a lot you can do with the default Esri Map and dialog. The next two exercises take you through creating a web map and web mapping application.