Maps, Mapping, and Geospatial Technologies

Title: Creating Web Maps and Web Apps!

Due Date: February 20, 2023 at 11:59 pm

Required Resources:

- An internet enabled computer
- Ability to access this link: https://geo.pacioos.hawaii.edu/geoserver/ows?service=wfs&version=2.0.0&request=GetCapabilities

Purpose:

The purpose of this lab is for you to get hands-on experience creating a web map and application in ArcGIS Online. You will get hands on experience using a web feature service (WFS) to load data into your map and refresh your tasks from previous assignments to symbolize and apply labels to data. As you complete the lab exercise today, think about how you could use this in future projects, especially considering the elements of what makes a good web map.

You will also notice that there are fewer cues in the exercise – you can always reach out with any questions (jxsigm@rit.edu), but I would like to challenge you to learn more about the software and the methods, tools, and operations to complete your tasks.

Learning Objectives:

- Create a web map in ArcGIS Online
- Load feature layers from a Web Feature Service
- Create an "Express App" in ArcGIS Online

Deliverables:

This week, your primary deliverable will be a web app created in ArcGIS Online. There are additional questions which should be submitted as a write-up. Upload your write up to the lab assignment on myCourses. All the tasks below should be included in the same word document (or PDF). Name your write-up using this convention before posting:

[your last name]_Week5_lab.docx

Don't forget to include the link to your web app in the write up!!!

Grading:

This assignment will be graded out of **25** points. The number of points for each task is noted in the description of each task.

Task 1: Building a Web Map and Creating a Web App

For this task, you will create a map in ArcGIS Online and use the Instant Apps function to create a web application. Instead of adding shapefiles, we are going to use a **web feature service (WFS)** to load data into the map. This removes the burden of having to create data, but also removes the ability to update the data. Keep that in mind as you create your map. As we discussed in the lecture, this is a method to create a web map (and app!) with limited – if any - coding required.

For this lab, we are going to use an available WFS hosted by the Pacific Islands Ocean Observing System (https://geo.pacioos.hawaii.edu/geoserver/ows?service=wfs&version=2.0.0&request=GetCapabilities). You will notice the **GetCapabilities** parameter at the end of the link. This is used by the WFS to generate a metadata document describing the service as well as valid operations and parameters. We will use this link to determine what layers are available and load them into our map.

1. Copy the link above into a web browser. You should see an XML document that has the top-line element of `<wfs:WFS_Capabilities>`. If you do not, you may need to use a modern web browser (e.g., Chrome, Firefox, Edge).

2. Read the first few elements, including the `<ows:ServiceIdentification>` and `<ows:Keywords>`.

   Question 1: What is the title of the service?

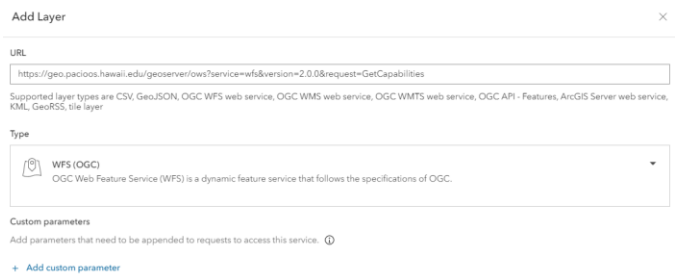
3. Using the Find menu (or Control + F, etc.), search for **Dive Site Popularity – Guam**. You should find a `<FeatureType>` element with a title matching above. This is an example of a feature layer served out by the service.

   Question 2: What is the abstract of the Dive Site Popularity – Guam feature layer?

4. Go to the RIT ArcGIS Online site (https://ritarcgis.maps.arcgis.com/home/index.html) and select Map.

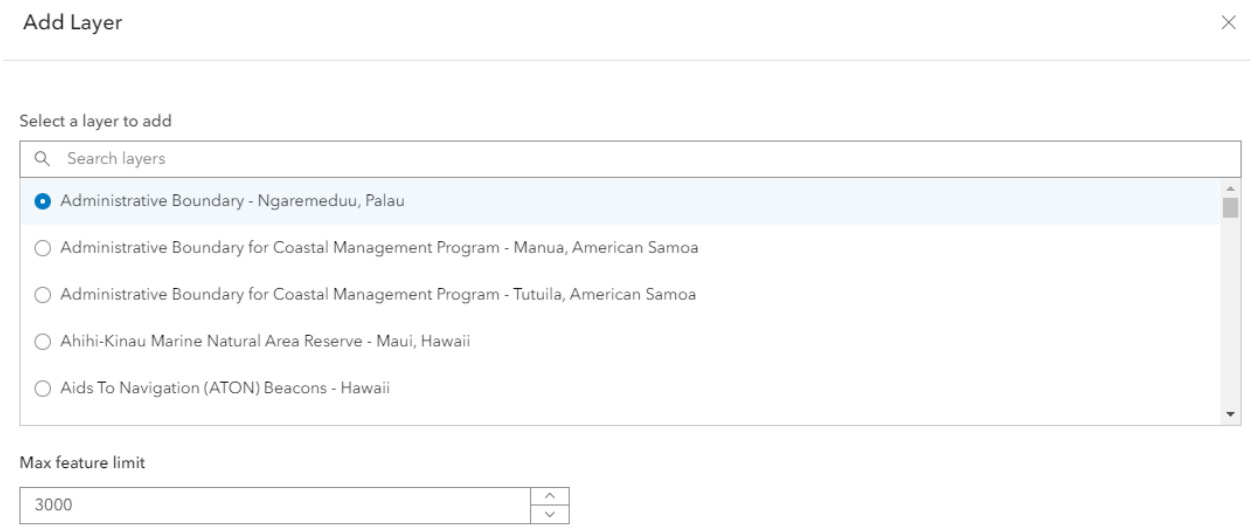
5. Choose a basemap. Throughout the exercise, feel free to change it if you like.

6. In the Add Layers window, choose the drop-down and select **Add Layer From URL**. Copy and paste the WFS link into the URL text box. You should see something like this:



   Select **Next.**

7. The WFS will provide a list of all the layers available and should look something like this:



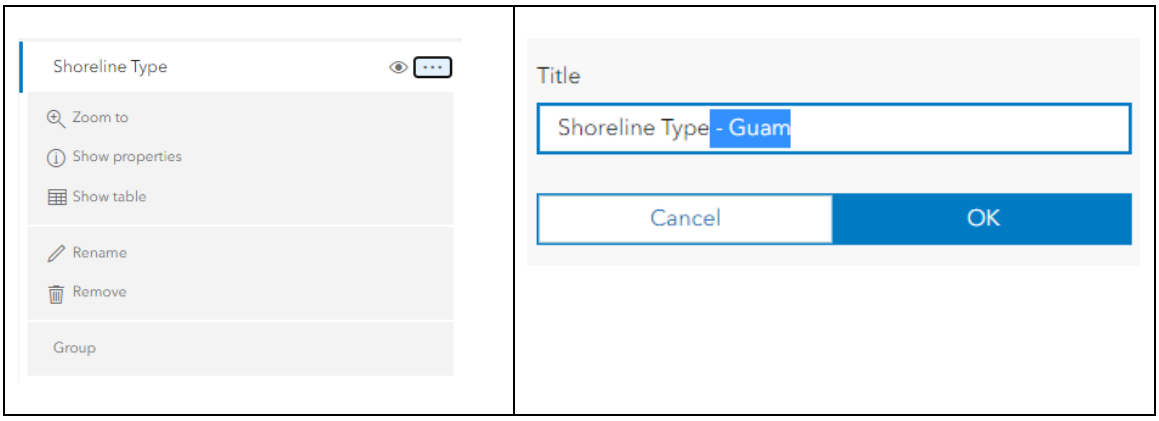
8. Search for the following layers and add them to the map using the **Add to Map** button (one at a time – you will have to repeat steps 5-6 for each):

    a. Dive Site Popularity – Guam
    b. Roads – Guam
    c. Coastal Features – Guam
    d. Shoreline Type – Guam

9. As a note – if you were developing your own application, you could write specific requests to access each individual layer without having to go through this process. While we are using a "no-code" approach, there are some tradeoffs in being bounded by the application you are using.

10. Once all four layers have been added, drag and drop them so that the Dive Site Popularity layer will be drawn first, followed by Coastal Features, Roads, and then Shoreline Type.

11. Using the "…" menu, rename each layer by removing "- Guam". For example:



12. Apply the following symbology rules to each layer but be creative in your style choices. Remember that the map should inform the user and not overwhelm or confuse them! Remember to select "Style Options" to change colors, etc.

    a. Coastal Features: Types (unique symbols) using Type as selected attribute
    b. Dive Site Popularity: Heat Map using POP field as selected attribute
    c. Roads: Location (single symbol)
    d. Shoreline Type: Types (unique symbols) using shore_type as selected attribute

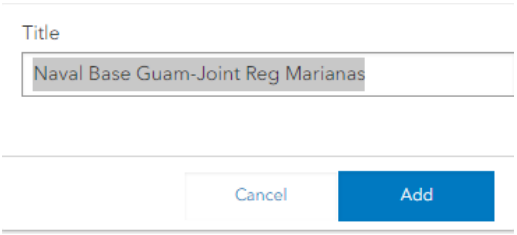
13. Click the map around the area where the heat map is highest. You should see a pop up with Attribute Information from the Dive Site Popularity Layer.

    Question 3: What is the value of the POP attribute for features in the high area of the heat map? Is it what you expected?

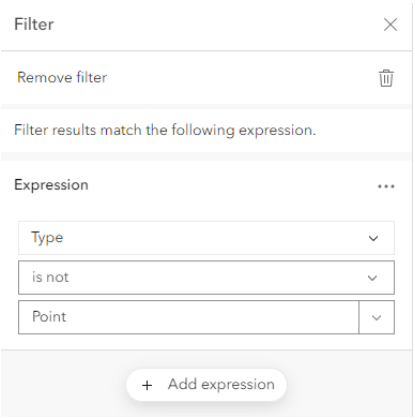
    Question 4: Based on the heat map, can you determine where diving is more popular in Guam? If so – where?

14. Zoom into the area of high popularity (Hint: It's near the Naval Base). Select Bookmarks from the left hand menu. Select "Add bookmark". Give the bookmark the title "Naval Base Guam-Joint Reg Marianas". Select Add.

    Select 3-4 other areas on the map and create bookmarks. These can be other areas with dive sites, specific coastal features, or areas in Guam. Be sure to name those areas with specific titles (not "Bookmark 2").

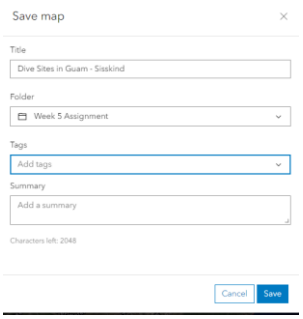


15. Let's add labels to our Coastal Features layer. Make sure the layer is selected and choose "Filter" from the right hand menu. We are doing this so that generic features do not clutter our map. Set the expression to match below:



16. Now select Labels and choose to Enable Labels using Type as the label field. Feel free to be creative with your labels using the Edit Label Style window.

17. Okay – our map is almost ready! In the "Save and open" menu, give your map the following title: **Dive Sites in Guam – {Your Last Name}** and save in a new folder called **Week 5 Assignment** (you may need to create a new folder).



18. In the left hand menu, select "Create App". We are going to use ArcGIS Online's *Instant Apps Builder* to create a basic web app to host your map. Select the Instant Apps option.

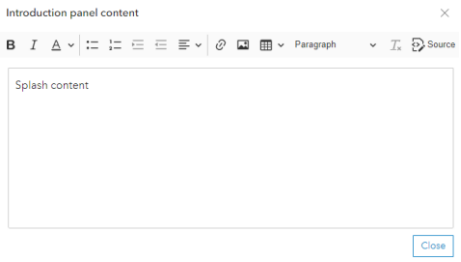
19. A new window should open with suggested templates. Select "Allow views to interact with your data" to narrow down the options. For this lab, we will be using the **Sidebar** app. Feel free to preview other templates.

20. Once you "choose" a template, keep the same title of your map (**Dive Sites in Guam – {Last Name}**). Select Create App. It may take a few seconds or a minute for your app to load.

21. The app starts in "Express" mode. ArcGIS Online developed this to provide a quick way to create your app and laid it out in simple steps. We are going to do a bit more exploring, so turn off express mode in the upper left and select "Continue" when asked if you want to turn off express mode.

22. Select "About" from the left hand side. This will provide users information about the map.

    a. Select App Details and select to add an Introduction Panel. Give it a title and update the content (you may need to choose the "edit" from the right hand side menu). Use the answer from a previous question to provide a description of what the map shows (something like…how this map shows popularity of dive sites?). Make sure to include a citation of where the data is coming from.



    b. Add a cover page as well! Give your app a creative title and subtitle. Get as creative as you want with the background color or an image.

23. Select "Sidebar" from the menu.

    a. You can choose to have it on the left or right side of the window.

b. The following panels should be selected to be visible in your sidebar: **Legend, Layer List, Bookmarks,** and **Basemap Gallery**. All other options should not be selected.

24. Select "Interactivity from the menu".

    a. In "Explore/Navigate", make sure the scale bar is turned on by selecting that option.

    b. In "Modify", you can choose to change the selection fill color or have the basemap toggle on the map (not required).

    c. In "Share", select the screenshot option and turn off Export to PDF and Social Sharing.

25. Select "Theme & Layout".

    a. In Layout, experiment with the "Panel Size" and select whichever you prefer.

    b. In Theme, get as creative as you want with fonts and background colors.

    c. In Position Manager, you can get as creative as you want as to where the tools appear in your app.

26. You did it! Select Publish and Confirm.

27. Change share settings and select "Edit Group Sharing". Select your class group to share your app. Select Save.

    a. You may get a note to share your map as well (which makes sense – how could you share the app without the map!). Select "Update".

Question 5: Identify the three elements of a web app in your application:
Basemap:
Operaitonal Layer(s):
Interactive Elements/Tools:

Question 6: Write a short observation statement (~100 words) about your web application. What did you enjoy most about creating it? What did you wish was different? Did you like the no-code approach or would you have preferred more control? What about using data from a WFS – pros/cons about using "someone else's data"?

Finally – make sure you include a link to your map in your write up. Click on the Share menu and choose "Launch". Copy the link in the new window.