Creating Web Apps for Beaver Dam Censusing Using Aerial Imagery

By Chad Garlick – February 2020

ArcGIS Online
To create a web app for beaver dam censusing, the creator(s) of the web apps and surveys must have an ArcGIS Online account. If you have an ArcGIS login, you can use those credential to log into the ArcGIS Online website. You can find it here: https://www.arcgis.com/home/index.html

If you don’t have an ArcGIS login, contact your administrator to inquire about access.

Create Survey for Collection Data
We use Survey 123 Connect to create our surveys for beaver dam censusing. In order to create a survey to start the beaver dam census collection process, Survey 123 Connect must be installed.

2. When Survey 123 Connect is installed, open the program and sign in using an ArcGIS login. Logging in here allows for the surveys to be published to the ArcGIS Online account being used.

3. Once logged in, click on “New Survey” to begin creating a new survey. Give your new survey a relevant title. When naming the surveys, try to be very specific. When publishing surveys to ArcGIS Online, the surveys will be uploaded as Feature Layers, just like shapefiles and other layer files. In this example, I used “Survey_California_LakeTahoe,” being very specific about
what area the survey is for, and that it is a survey. This helps to quickly find and determine which feature layers are actual surveys in the ArcGIS Online content. Click “Create Survey.”

4. When the new survey opens, there are two windows that open up: a Survey 123 Connect window and an Excel spreadsheet. The Survey 123 Connect window will be somewhat empty, because a survey hasn’t actually been created yet. The Excel spreadsheet is where the survey
gets created. So, make sure the Excel spreadsheet is now visible. You will notice that the spreadsheet has four different sheets: Survey, Choices, Settings, and Types.

5. The “Survey” sheet is where the survey gets created. In this example, we will create a very basic survey to help census beaver dams quickly. We want two basic questions that the end user will answer as they are censusing for beaver dams: What type of feature is it? and how certain are you of this decision? We start out with labeling the questions. Under the “label” field (column C), start labeling as you want them to be seen on the survey itself. In this case, we use “Feature Type” and “Certainty.” Input these in the “label” column.

6. Next, in the “name” field (column B), we give these questions their field names as they will appear in the resulting database. This means no spaces or unique values. In our case, we will just add an underscore to the Feature Type label, and Certainty will stay the same.
7. The next option is “type.” This field tells Survey 123 how the question will be answered: input a number, input text, select from a list, etc. When inputting these surveys in an ArcGIS Online web app, the type automatically defaults to “select from a list.” So, this is what we will use. “select_one” is the XLSForm type that we will choose and either “Feature_Type” or “Certainty” is what we will use as the list of choices to choose from, which we will determine in the next step. So enter “select_one Feature_Type” and select_one Certainty” as the two “types.”

8. Click on the “choices” sheet at the bottom of the excel worksheet. In this sheet, we will determine the options that can be chosen in the list. In the “label” field (column C) we will name the options in the lists for each question as they will be seen in the survey. Our first question is Feature Type. The two answers we want to be able to choose from are “Active Dam” and “Inactive Dam.” Input these in the label field under the defaulted options already there.
9. Next, the “name” field (column B) is the same as the “survey” sheet. It is the field name that will appear in the resulting database, again meaning no spaces or unique values. So, we will just add an underscore to Active Dam and Inactive Dam.

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10. Next, the “list_name” is used to determine which question these answers pertain to. In this case, Active Dam and Inactive Dam are answers to our “Feature Type” question. So, we will use the “name” option on the “survey” sheet to fill in this option for the question being asked.

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11. We will repeat this process for the “Certainty” question. Our three options for answers are: Low, Medium, and High.

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12. Save the spreadsheet and close Excel. You should now see the survey in the Survey 123 Connect window. To upload this survey to ArcGIS Online, click the Publish button. Then, click the “Publish Survey” button.
National Hydrography Dataset – Downloading Datasets and Creating Perennial Layers

Along with the surveys that we create, we also use the National Hydrograph Dataset (NHD) for the drainage network and associated hydrography data to census beaver dams at the HUC 8 scale.

1. The NHD dataset needs to be downloaded from the USGS National Map Downloader found here: https://viewer.nationalmap.gov/basic/#productGroupSearch

2. In the “Datasets” tab, check “Hydrography (NHDPlus HR, NHD, WBD)” to start filtering for the product you need.

3. In the Hydrography tab, select “National Hydrography Dataset (NHD)” as the Subcategory. Then, choose “HU-8 Subbasin” as the Date Extent. Finally, for the File Format choose “Shapefile.”
4. If you know the HUC-8 USGS watershed ID, you can simply enter that number in the search box under the “Advanced Search Options” (You may need to click the “Advanced Search Options” link to open the search box). Once you enter the id number, click the “Find Products” button to see the available products for that watershed.

5. If you don’t know the watershed ID, you can use the map on the right side of the screen to scroll and find the exact watershed you are looking for. Once found, simply click on the watershed on the map to highlight it. Once highlighted, click on the “Find Products” button to see the available products for that watershed.
6. Once in the Products tab, you will see the products for the watershed selected. Click the “Download” link to download the products.

![TNM Download](image)

7. Once the file is downloaded and unzipped, some processing needs to be done to create the perennial network which is used for the dam censusing. The NHD Network Builder Tool was designed for this process. It is part of the Riparian Condition Assessment Tools (RCAT) Toolbox. Documentation on running the NHD NBT can be found [HERE](#).

Once the perennial network is created, upload it to ArcGIS Online using one of two ways:

**Upload via ArcGIS Pro:**

1. Open ArcGIS Pro and login to the same account that the files will be uploaded to on ArcGIS Online. Now, add the NHD perennial network to a new map. Change the symbology of the line to a bright color that is easily seen over aerial imagery (such as a bright yellow) and a width of 1 pt.
2. Click on the “Share” tab and then click the “Web Layer” button.
3. Give the layer an appropriate name along with a summary and tags.
5. Click “Analyze” and let it finish analyzing.
6. Click “Publish.”

Upload via ArcGIS Online (Must be a zipped file):

1. Locate the NHD perennial network shapefile on your computer.
2. Highlight all eight items associated with the shapefile. Zip these files.
3. Go to ArcGIS Online (https://www.arcgis.com/home/index.html) and login.
4. Click on the “Content” tab at the top of the page.
5. Click “Add Item,” then “From my Computer” from the dropdown list.
6. Click on “Choose File” and then navigate to your newly created zipped file containing the perennial network.
7. Make sure “Shapefile is selected under contents and then give it a Title and Tags. Click “Add Item.”
Creating the Web App on ArcGIS Online

Once the survey and the perennial network have been completed and uploaded to ArcGIS, the web app can be made.

1. Go to ArcGIS Online (https://www.arcgis.com/home/index.html) and sign in using the button at the top of the page. Once you are logged in, make sure you are in the “Content” tab.

2. You will see the new Feature Layer at the top of the list. If you don’t, click the “Modified” header to sort by most recent. To make sure everybody has access to this Feature Layer, make sure it is shared with everyone, represented by a picture of the Earth. If it is a silhouette of a person, click on it and choose “Everyone (Public).”

3. Click on the link for the new Feature Layer to open the “Overview” page for that layer. Click on the blue button that says “Open in Map Viewer” on the right side of the screen.
4. You now see the perennial network on a map. The next thing we need to do is set our basemap. Click the “Add” dropdown and choose “Search for Layers.” Click on the “My Content” dropdown and choose “ArcGIS Online.”

5. In the search bar, type “imagery” and click on “World Imagery (Clarity)” which is made by ESRI. At the bottom of the new extended window, click “Use as Basemap.”
6. Click back on the “ArcGIS Online” dropdown and choose “My Content.”

7. In the Search Bar, type the name of the survey that was created earlier with Survey 123 Connect, if you don’t see it in the list. Once you find the survey, click on the “add” button that looks like a “+” to add it to the map.
8. Click on the “Details” tab at the top left of the page. You want the Survey as the top layer so it shows up on top of the NHD perennial network once points get added. If it is not, hover over left of the checkmark for the survey layer until three dots show up. Click and drag to arrange the layer above the NHD perennial layer. Click “Save” and save your map.

9. Center the NHD perennial layer in the middle of the map. Click on the “Share” button.
10. In the “Share” window, check “Everyone (public)” so everybody has access to the web app. Click the “Create a Web App” button (If a window pops up saying “Update Sharing” click on the blue button at the bottom that say “Update Sharing”).

11. In the “Create a New Web App” window, select “Basic Viewer” from the options. Then, click “Create Web App” button. Give the web app a Title and click “Done.”
12. When configuring the web app, we want it to be as concise as possible. So, we will turn off most options. Under the “Options” tab, we want to turn off Basemap Gallery, Map Details, Display layer list, and Print Tool. Turn on Display Editor and keep Share Tools on as well. Under the “Specify active tool at app startup,” select “Edit” from the dropdown list. Under the “Search” tab, turn off Enable search tool. Click Save. Click Close.

You will now be able to find the new web app in the content tab of ArcGIS Online.