

The Aquatic eDNA Atlas Project: eDNA Sample Site Field Mapping User Guide



USDA Forest Service
Research & Development
Rocky Mountain Research Station
Air, Water, & Aquatic Environments Program and the
National Genomics Center for Wildlife and Conservation

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[Field sample collection](#) is the foundation of the eDNA Atlas project. The sample point network is designed to minimize field effort and maximize detection efficiency. Points represent the sample site locations systematically spaced at 1-km intervals along rivers and show which locations have already been sampled and those that need samples collected. Collecting samples at the designated points with unique IDs allows the data to be stored efficiently in a database and shared with cooperating agencies and the public. This guide is designed to help users plan their field collection efforts by using the ArcGIS Online (AGOL) mapping portal.

Four strategies are described here specifically for using the AGOL portal to help plan field sampling work. It's likely that a combination of these methods will be required to meet the user's needs. Experienced GIS users will likely employ other methods as well to support their field planning efforts.

Note that in all these methods the attribute **eDNA_ID** will be necessary information for labeling the field samples before they are sent to the lab. It's important to record these IDs carefully.

- 1) [Download a geodatabase of sample points for the user's area of interest.](#)
- 2) [Download map coordinates to Excel spreadsheet or CSV file.](#)
- 3) [Download or print PDF maps for the user's project area.](#)
- 4) [Download the entire eDNA Atlas Geodatabase and work locally with ArcGIS software to plan the field effort.](#)

See the more [detailed User Guide](#) for tools and features of the eDNA Field Sampling Grid AGOL map.

Download a set of sample points for the user's area of interest

A user may select and download sample points using the following steps.

Start the AGOL map portal

Western U.S.

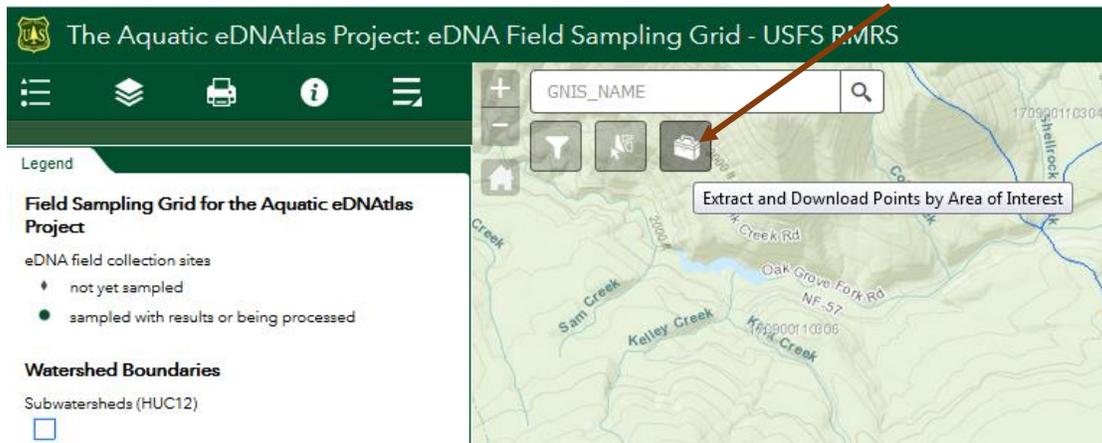
<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=f2e1cd032dbc43709dfa6d7013ca3fc8>

Eastern U.S.

<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=5ed6fe1f7833491ebc3f62b44eece224>

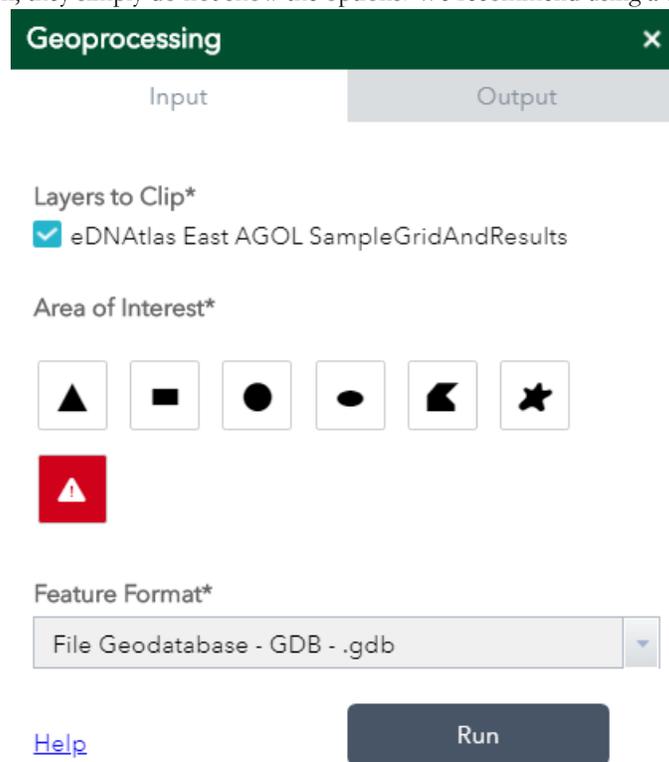
Pan and zoom to your area of interest. Grid points will not display without zooming in.

To choose grid points to download, select the Geoprocessing tool that allows you to Extract and Download Points by area of Interest.

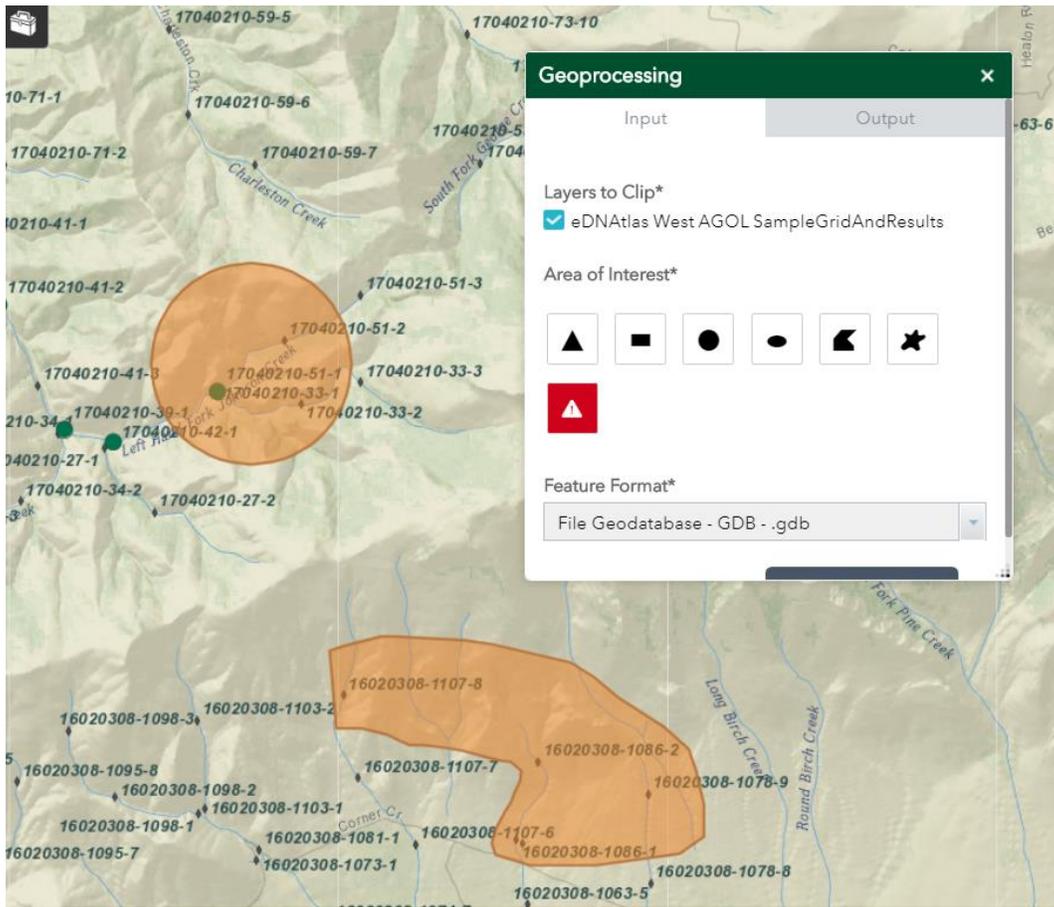


Then select a shape format such as the polygon tool for choosing points.

Please note that due to security settings, there are issues displaying some buttons and widgets using Internet Explorer and these buttons might be blank. The buttons function, they simply do not show the options. We recommend using a different browser.



Use the tool to capture the points within your area(s) of interest.



The tool will operate on both sampled (dark green circles) and un-sampled (gray diamond) points and will clip the features encompassed by the tool. Any filters you might have applied to view the map will not filter those points when extracting them using the Geoprocessing tool and all grid points within the area of interest will be downloaded.

Notes:

- You can click on the Extract and Download Points... window and drag to move it out of your way if necessary.
- You can create more than one polygon to select different areas.
- If using a triangle, circle, or oval, the area you click and drag will be in the center of the drawn triangle, circle, or oval.
- If using a square or rectangle, the area you click and drag will be one side of the square or rectangle.
- To clear drawn polygons click the red trash can icon

Choose the Feature Format to download. File Geodatabase is recommended so the field names that are exported will not be truncated, as will occur with shapefile format.

Feature Format*

File Geodatabase - GDB - .gdb

Choose the Run button.



The Geodatabase will be downloaded according to the browser's default options.

With the sample points on a desktop computer, users can overlay the points with other data to generate maps for field use.

Notes about attributes:

- The fields DD_X and DD_Y or UTM_X and UTM_Y are important for navigating to the grid sample sites with a GPS unit. Users should export these coordinates to a format that can be imported by their specific GPS device. The Field_UTM_Easting and Field_UTM_Northing (or Field_DD, depending on the coordinate system used by those who previous took samples) attributes will be populated if the sites have been sampled previously.
- The attribute **eDNA_ID** will be necessary for labeling the field samples before they are sent to the lab. It's important to record these IDs carefully.
- Other attributes in the table such as PublicLand, eDNA_Slope, and Elev_m may identify sites inappropriate for the target species
- See the [general metadata](#) for a full list of attributes and definitions.

Download Map Coordinates to Excel Spreadsheet or CSV file

A user may export all of the attributes and coordinate data for non-sampled points in a specific 8-digit HUC using the following steps.

Start the AGOL map portal

Western U.S.

<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=f2e1cd032dbc43709dfa6d7013ca3fc8>

Eastern U.S.

<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=5ed6fe1f7833491ebc3f62b44eece224>

Open the attribute table by clicking the arrow at the bottom of the map.



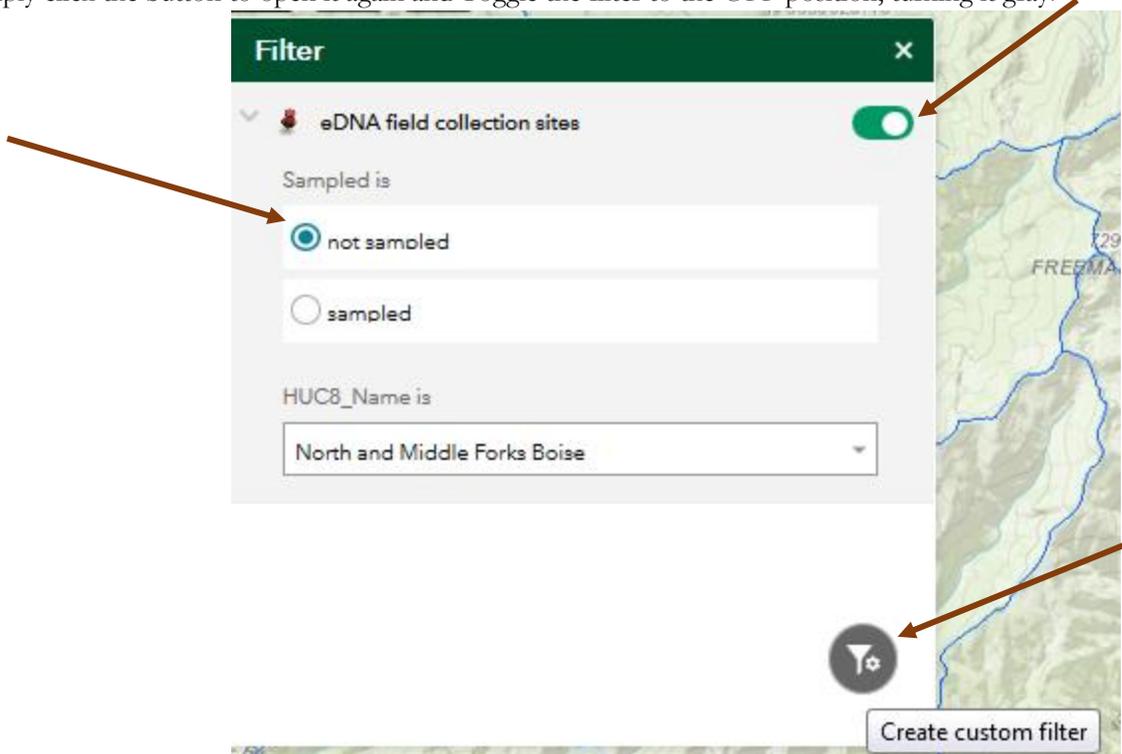
Select the Filter button in the upper left-hand corner of the map attribute table.

Wait a few moments for the HUC_Name to populate from the table. Use the drop-down box to select the HUC 8 Name or type the first few letters to search.

The non-sampled points are selected by default. If the HUC you chose is larger than average, the map extent might not show the grid points and you'll need to zoom in.

Toggle the filter to the ON position, turning it green. Once active, you can close the Filter window.

Simply click the button to open it again and Toggle the filter to the OFF position, turning it gray.



Please note that the HUC8_Name field often takes several moments to populate. Be patient and click directly on the drop-down arrow for the field options or to start a search.

If you would like to create your own filter, see the [ESRI help document for this tool](#).

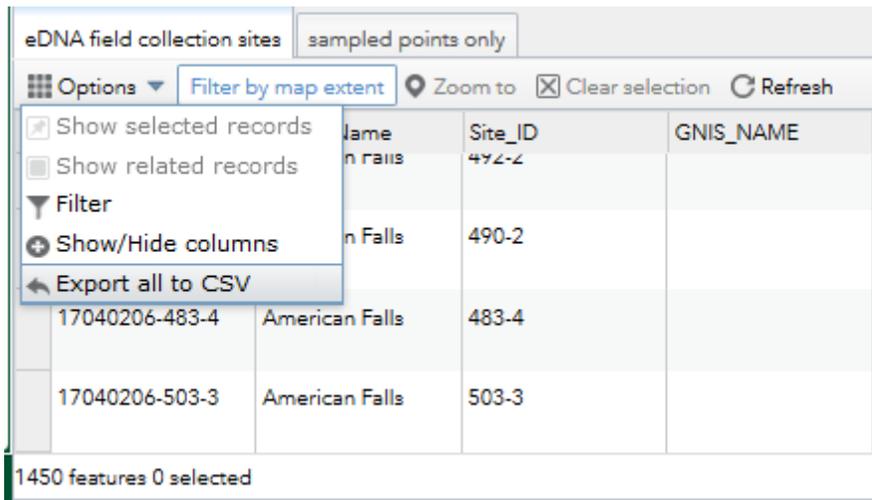
Once you toggle the filter on, the map will zoom to the chosen HUC after a few moments.

Open the Attribute Table by clicking the arrow at the bottom of the map.



Choose Options/Export all to CSV. You also have the option to select records and only export those once selected.

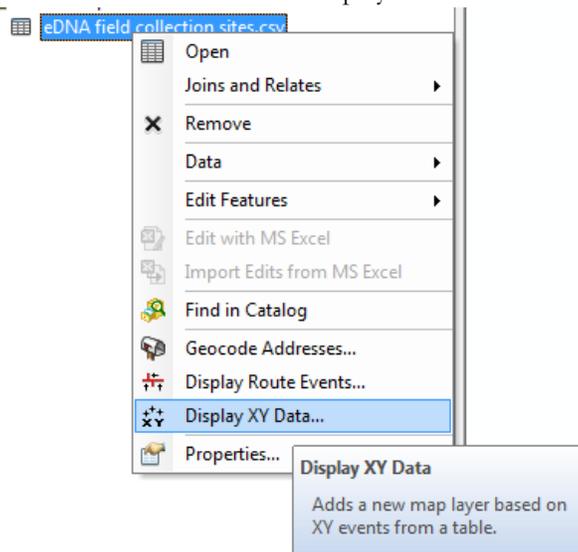
Due to limitations, only 1000 records can be selected or exported to CSV. If your study area has more than 1000 grid points, [use another method](#) to download.



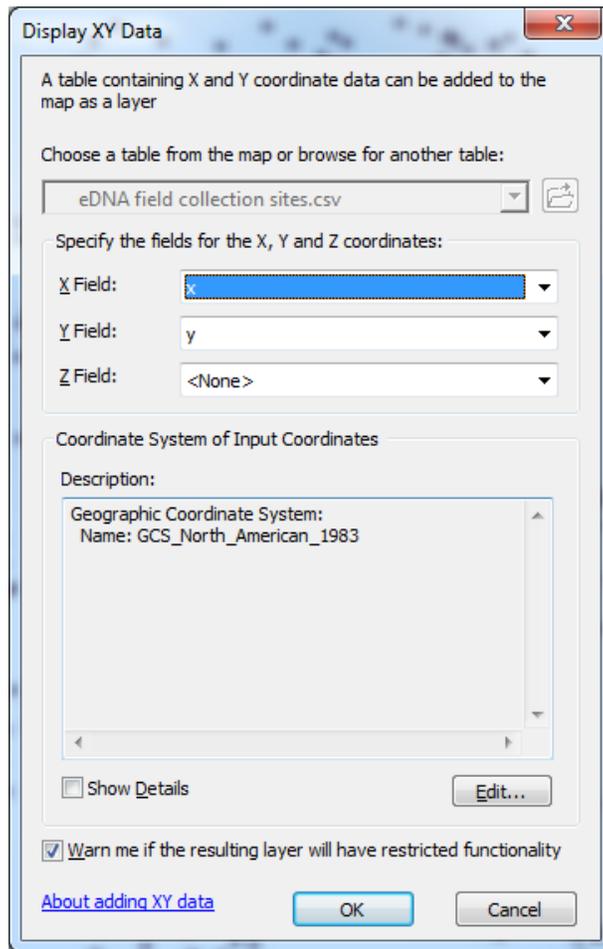
Click OK when prompted and Save the CSV file to your local hard drive.

Open an ArcMap document and add the CSV file as a layer.

Right-click on the CSV file in the Table of Contents and choose Display XY Data...



In the Display XY Data window, choose x for the X Field, y for the Y Field and GCS_North_American_1983 for the coordinate system. Click OK.



Right-click on the resulting Events layer and choose Data/Export Data... to save the point layer.

Download or Print PDF Maps

A user may download or print PDF maps from the ArcGIS Online map view.

Start the AGOL map portal

Western U.S.

<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=f2e1cd032dbc43709dfa6d7013ca3fc8>

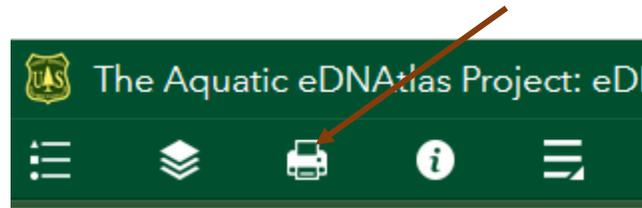
Eastern U.S.

<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=5ed6fe1f7833491ebc3f62b44ecce224>

Left click on the map and drag to pan. Use the zoom tool to navigate to the area of interest. The **eDNA_ID** label is displayed when zoomed in to help users identify which point in the sampling grid should be associated with their collected sample.

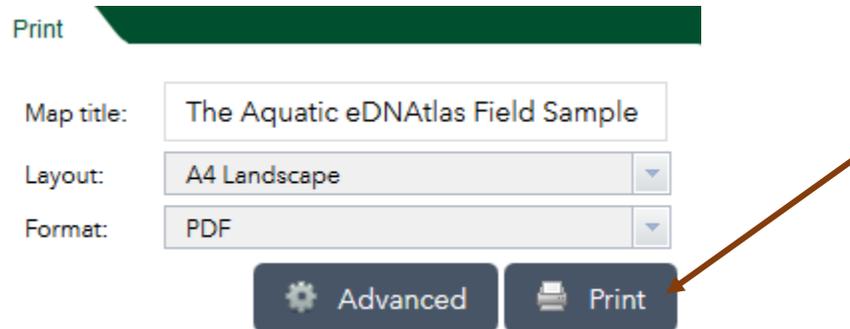
You have the option to turn on watershed boundary layers or road layers, in the **Layer List panel** as well as add your own layers to the map before printing using the **Add Data Layer panel**. The basemap can be changed to a topo map or other background. You can also filter points by attributes using the **Filter button**. Please see the [detailed User Guide](#) for information on how to use those tools.

Select the Print panel.

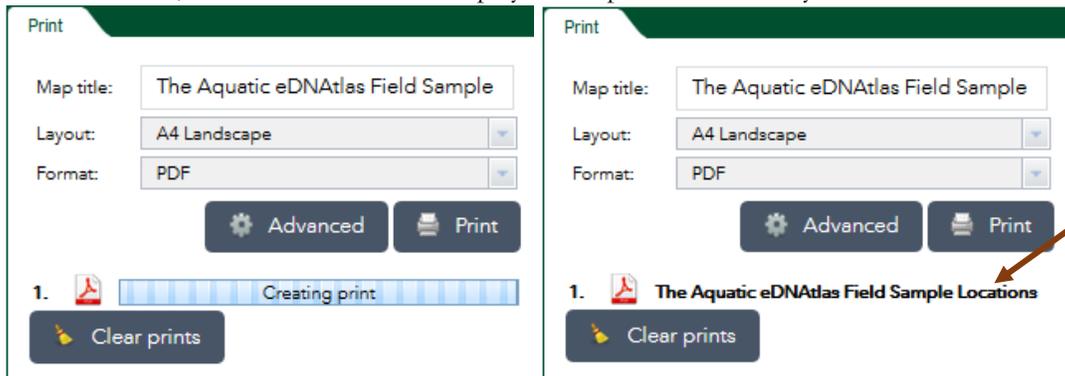


Note that this tool points to an ESRI print service and on occasion it takes several moments to load.

Choose any custom options and select Print. If printing more than one map, edit the title to include appropriate information.



When the extraction is finished, select the file name to display the map in a new tab in your browser.



Please note that the result is a temporary file and you will need to save the PDF to your local hard drive.

The default PDF created is in Landscape layout and includes things like the date, scale, and a Legend. You can modify these outputs by clicking the “Advanced” button.

You can also use the drop-down Layout and Format options to change those outputs. See this [ESRI document](#) for more information on possibilities.

Example Field Map:

The Aquatic eDNA Atlas Field Sample Locations



7/26/2018, 8:56:41 AM

eDNA field collection sites

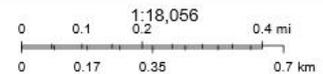
• not yet sampled

● sampled with results or being processed

⚡ National Forest System Roads closed to motorized uses

— National Forest System Roads

— Paved Road



U.S. Forest Service Enterprise Map Services Program. Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp., The USDA Forest Service makes no warranty.

US Forest Service Rocky Mountain Research Station - <https://www.fs.fed.us/rm/boise/AWAE/projects/aquatic-eDNAAtlas.html>
Young, M.K., D.J. Isaak, M. Schwartz, K. McKelvey, D. Nagel, T. Franklin, S. Greaves, J. Dwyer, K. Pilgrim, G. Chandler, S. Wollrab, K. Carim, T. Wilcox, S. Parkes-Payre, and D. Horan. 2018. Species occurrence data from the aquatic eDNA Atlas database.

It is a known ArcGIS Online issue that all symbology may not print. If you have added watersheds or your own layer, be aware they may appear on the map but not appear on the printed legend.

Download the Aquatic eDNA Atlas GeoDatabase

A user may download the entire eDNA Atlas Geodatabase and work locally on a desktop computer to generate maps and coordinates to support field sampling efforts.

Visit the eDNA Atlas Project website. Home page - <https://www.fs.fed.us/rm/boise/AWAE/projects/the-aquatic-eDNAAtlas-project.html>

The Field sampling FAQs page has field data collection information and a link to the entire zipped database.

<https://www.fs.fed.us/rm/boise/AWAE/projects/eDNAAtlas/field-sampling-protocol-FAQ.html>

Questions about this User Guide, or need trouble-shooting ideas? Please contact [Sharon \(Parkes\) Payne](#)