

ArcGIS Field Maps App Instructional Manual  
IC eDNA Monitoring Program



Photo Credit: ESRI

U.S. Fish and Wildlife Service, Region 3

Contact: Ross Ruehmann, [ross\\_ruehmann@fws.gov](mailto:ross_ruehmann@fws.gov)

**Document Information:**

IC eDNA Monitoring Program  
ArcGIS Field Maps App Manual  
Manual Number 1  
2025 QAPP

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## 1.0 ArcGIS Field Map App Basics and Setup

### 1.1 Connect iPad to GNSS Receiver

To connect the GNSS receiver to the iPad device, go to settings under the iPad device and under “Bluetooth”, select the GNSS receiver to connect to (see below). Make sure the GNSS receiver is turned on.

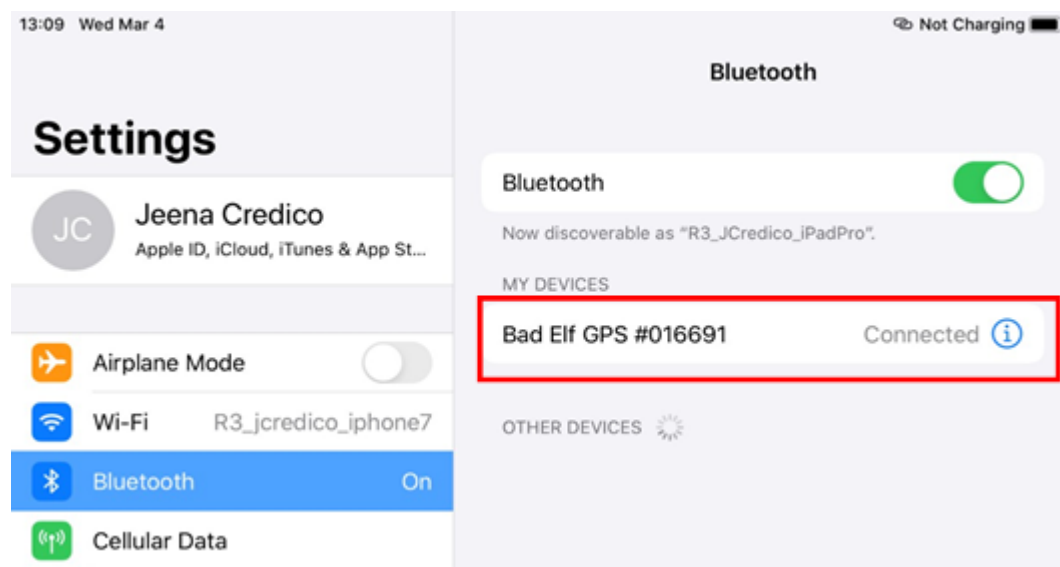


Figure 1. A screenshot of iPhone Bluetooth settings selecting the Bad Elf GPS device.

### 1.2 Field Maps App Login

A U.S. Fish and Wildlife Service ArcGIS Online (AGOL) account is needed to utilize the ArcGIS Field Maps app (field maps app) for eDNA sampling. If an account is needed, use the following link for instructions to activate your ArcGIS Online account (See “Getting Started on ArcGIS Online” Header): ([FWS Geospatial Services Information – ArcGIS Online](#)) (link to the ArcGIS Online FWS Geospatial Services Information website).

Next, contact Ross Ruehmann or Jeena Koenig to be added to the “FWS Great Lakes Region 3 FAC Invasive Carp eDNA Collection” AGOL group.

- 1) To log in, open the field maps app on your device.
- 2) The field maps app menu will provide two options for logging in (see below). Select the “Sign In with ArcGIS Online” option.



Figure 2. The initial sign in screen for ArcGIS Field Maps.

- 3) Select “Continue” to allow the Field Maps App to use [arcgis.com](https://arcgis.com) to Sign In (see image below).

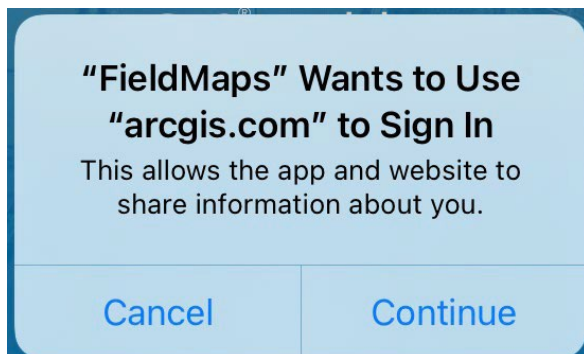


Figure 3. Permission screen to continue to sign in to Field Maps using ArcGIS.com.

- 4) Sign in with your ArcGIS organization’s URL as the login method. From there, a sign in screen will appear for you to enter a URL → “FWS” should be entered into the blank box and then select “Continue” (see below).

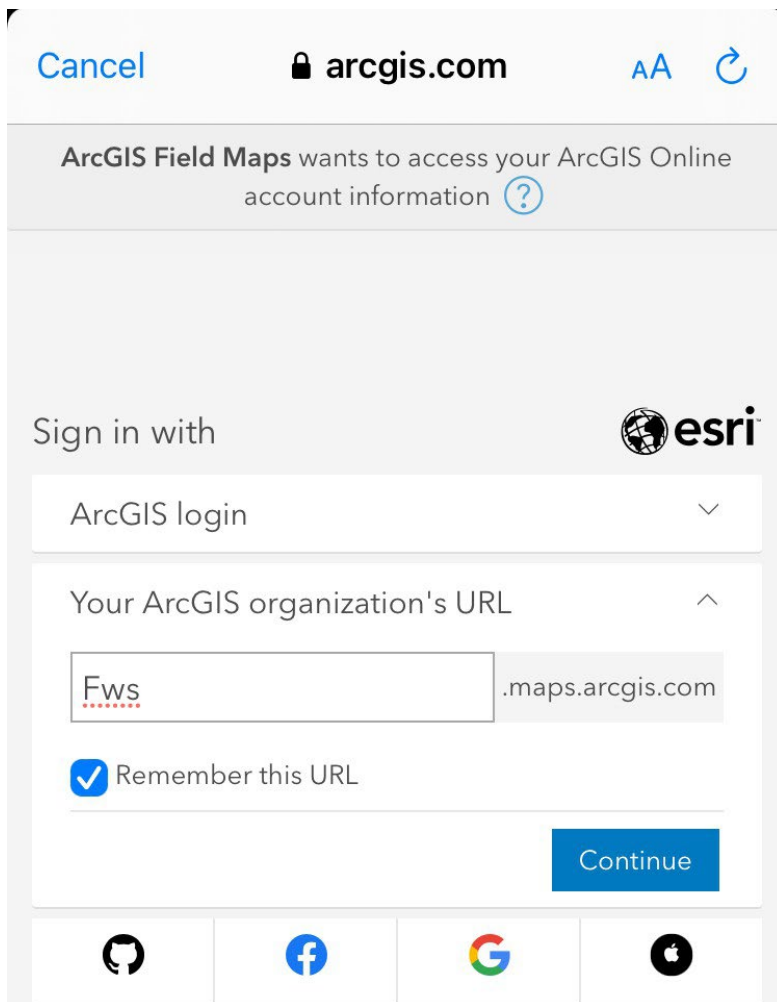


Figure 4. Sign into ArcGIS using your organization's URL.

- 5) Next, sign in using your U.S. Fish and Wildlife Service credentials by selecting the blue U.S. Fish and Wildlife Service button (see image below).

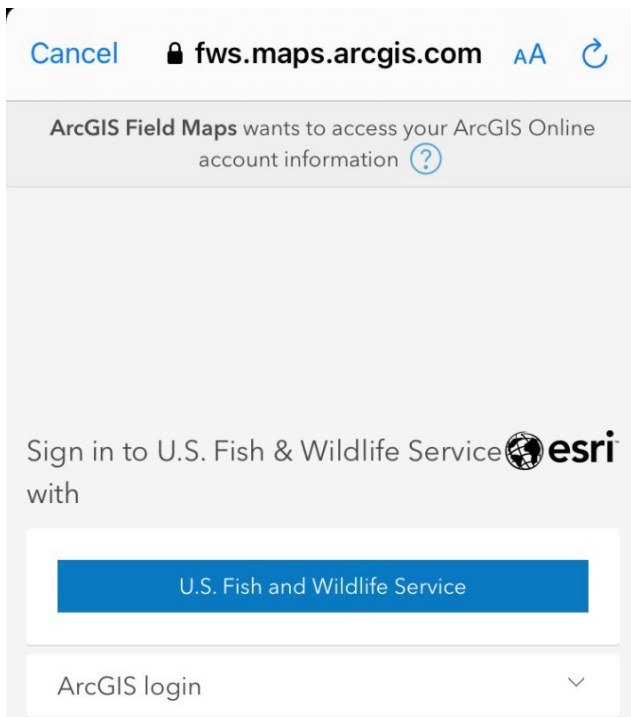


Figure 5. Sign into ArcGIS using your U.S. Fish and Wildlife Service credentials.

- 6) The U.S. Department of the Interior (DOI) login will appear and the U.S. Fish and Wildlife Service (FWS) DOI account and password should be entered to sign in (see image below).

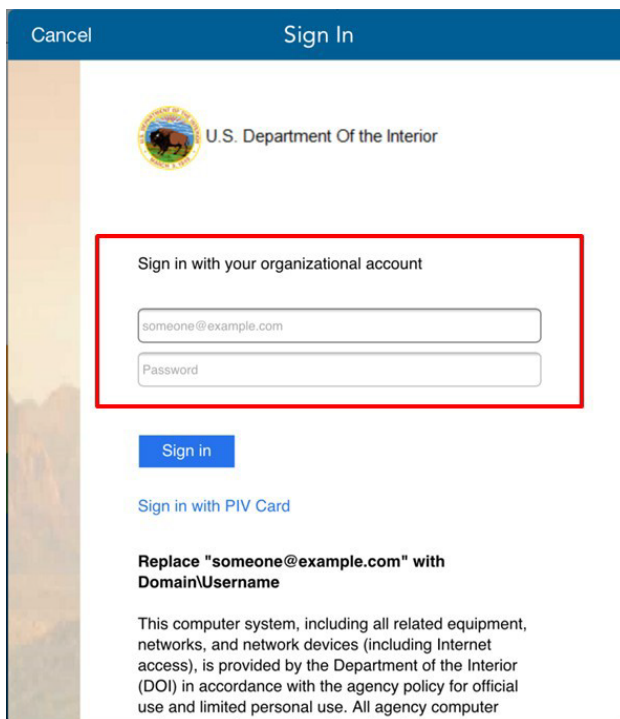


Figure 6. The U.S. Department of the Interior credential sign-in page.

- 7) Select the sign in with Microsoft Authenticator at the bottom of the DOI Additional security screen (see image below).

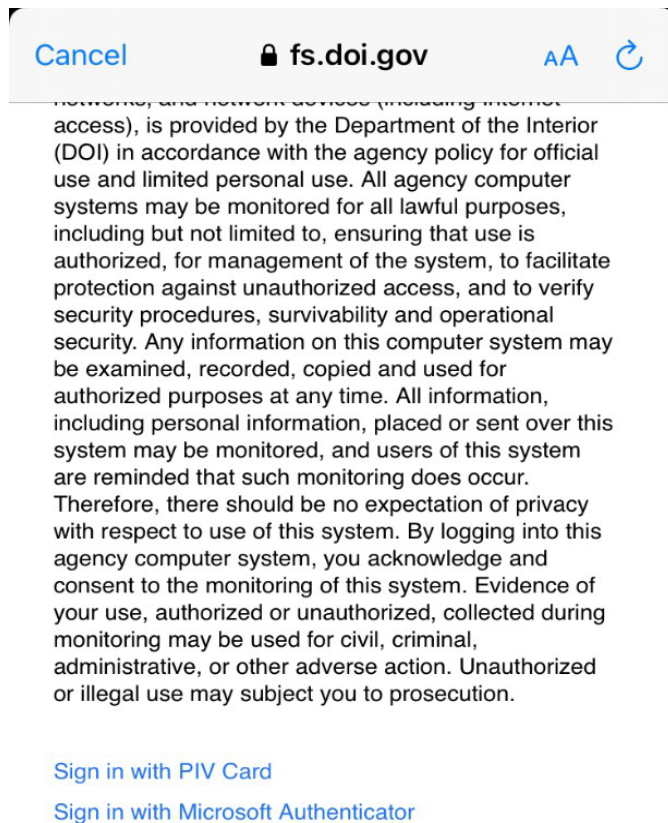


Figure 7. Select the Sign in with PIV Card option from the additional DOI security screen.

- 8) Open the [Microsoft Authenticator app](#) (link to the Microsoft Authenticator App) on your mobile device to approve the sign in.
- 9) A DOI terms of use window will appear – Review and accept the DOI Terms of Use to access the FWS ArcGIS Platform (see image below).

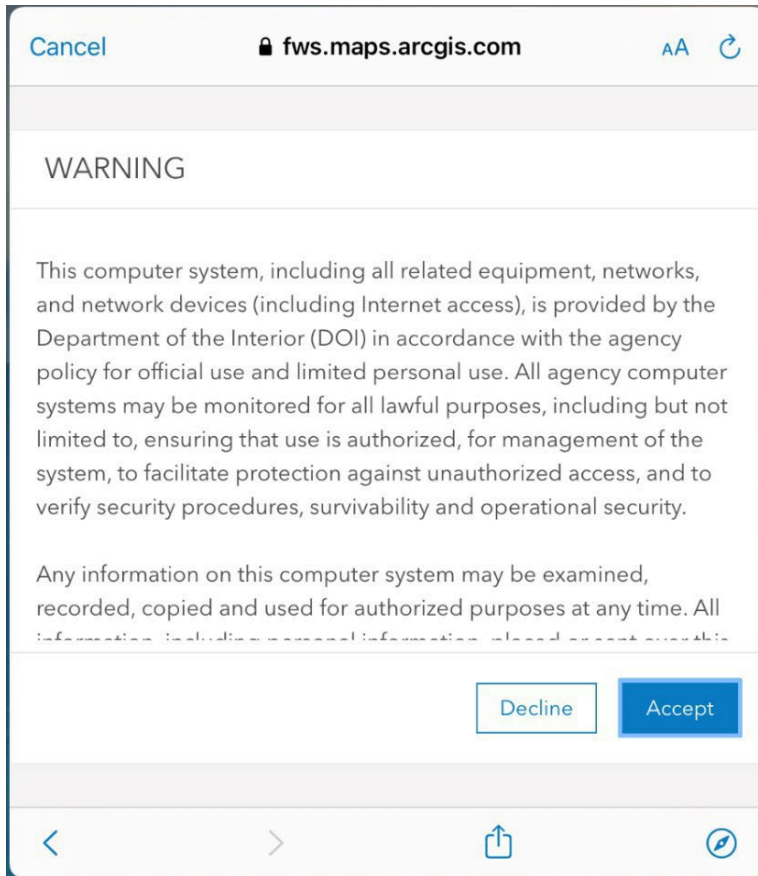


Figure 8. The DOI terms of use disclaimer on ArcGIS.com.

The main menu will appear after logging in and should include the FWS Great Lakes Region 3 FAC Invasive Carp eDNA Collection AGOL Group (see image below). The Fisheries eDNA Sampling Map used for data collection will be under this group (see second image below).

**Two pop-up window boxes** may appear on first accessing the field maps app.

- 1) If cellular data is not enabled, it should be allowed.
- 2) The field maps app should be allowed to access location while using the app. You can also set the apps to use your location by going to iPad settings >Privacy>Location Services>Set field maps app to either “While Using” or “Always for Location”.



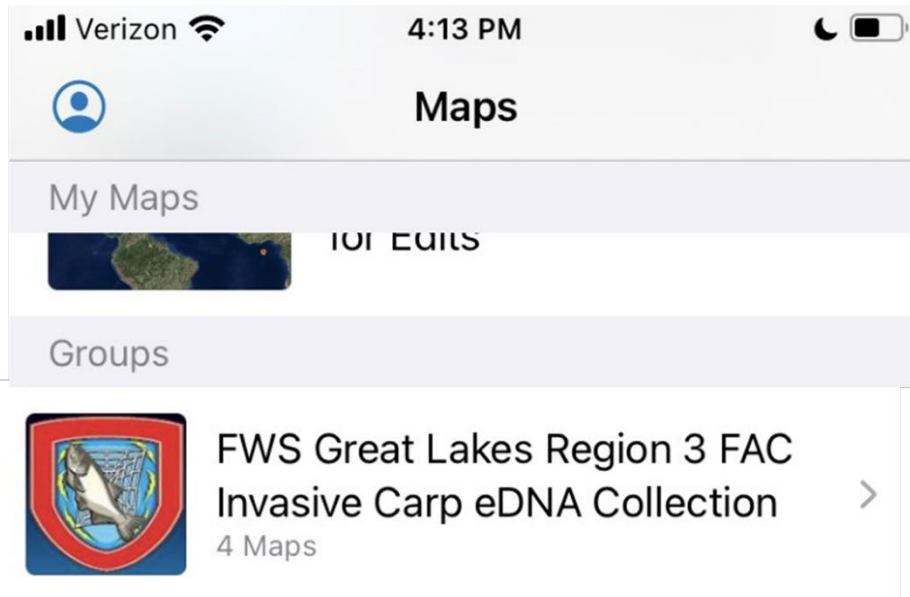


Figure 9. FWS Great Lakes Region 3 FAC Invasive Carp eDNA Collection group within ArcGIS.

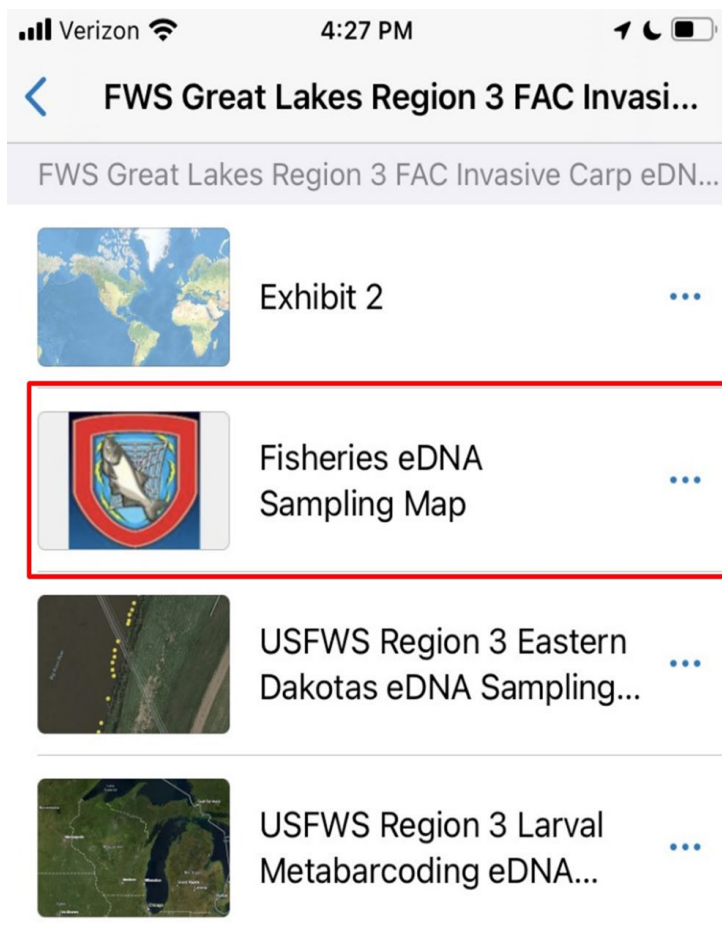


Figure 10. Select the Fisheries eDNA Sampling Map option within the FWS Great Lakes Region 3 FAC Invasive Carp eDNA Collection group.

## 1.3 Field Maps App Settings

- 1) Select the Profile Icon (person icon at in the upper-left corner of screen) (see image below).

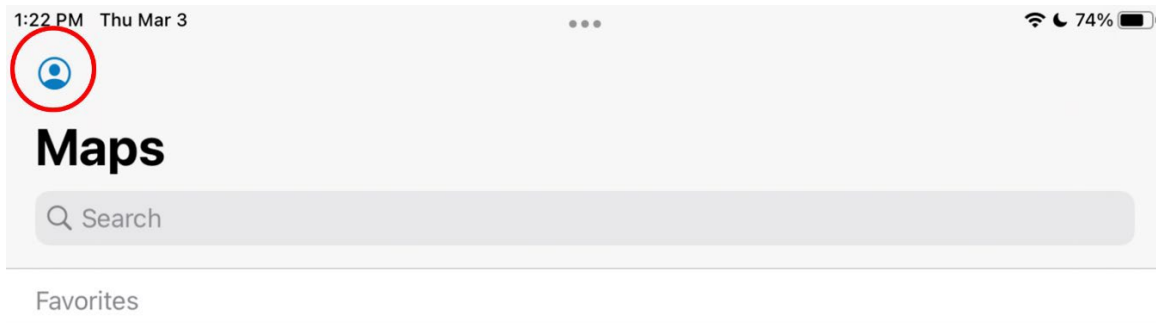


Figure 11. Profile icon within the ArcGIS Field Maps app.

- 2) In the Profile window, select the Collection Settings option (see image below).

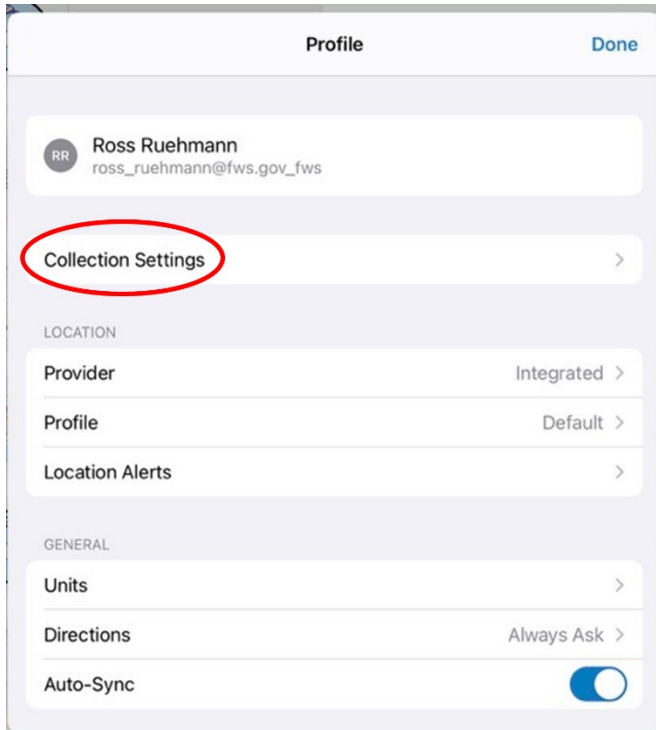


Figure 12. Within the user profile window, select the collection settings underneath your name.

- 3) Make sure the Accuracy is set to 30 feet and snapping is enabled (toggle should be set to blue under the Snapping setting) (see image below).

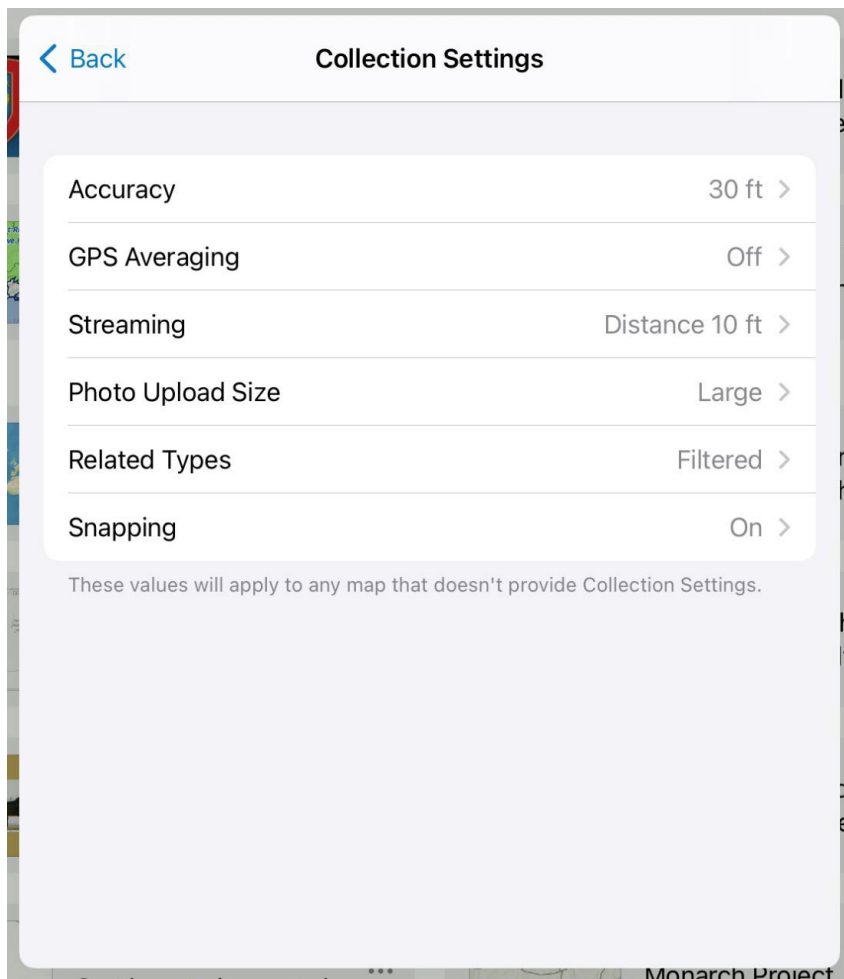


Figure 13. The collection settings tab depicts accuracy, GPS averaging, streaming, photo upload size, related types, and snapping values.

If the location accuracy doesn't meet the requirements set in the collection settings window, the GPS accuracy at the top of the collection map will report in red the number of feet or meters of accuracy the unit is currently acquiring (see image below).

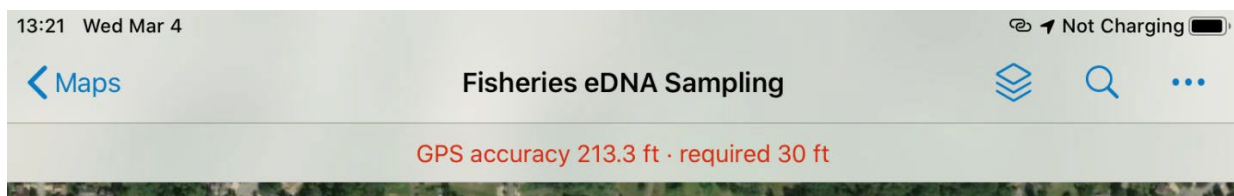


Figure 14. The Fishing eDNA Sampling ribbon should now show that the required 30ft accuracy setting is in use.

If this accuracy error shows up on your map, when a point is collected it will state no valid location. A point can be collected by selecting Add Point and choosing “Use Poor Location”. This action is **not recommended** unless absolutely necessary. Make sure to check your Bad Elf unit connection to your device first (**refer to Section 1.1 and Section 1.3**).

- 4) Go back to the profile menu, select the Provider option.

- 5) The default provider is set to Integrated, select Bad Elf to set Location provider to your Pad Elf Pro+ Bluetooth device, make sure it states below Bad Elf, LLC device is connected (see image below). If connecting to Bad Elf for first time in field maps, select “Add” to add Bad Elf device as a location provider and leave the default antenna height. See Section 1.1 if Bad Elf is not connected.

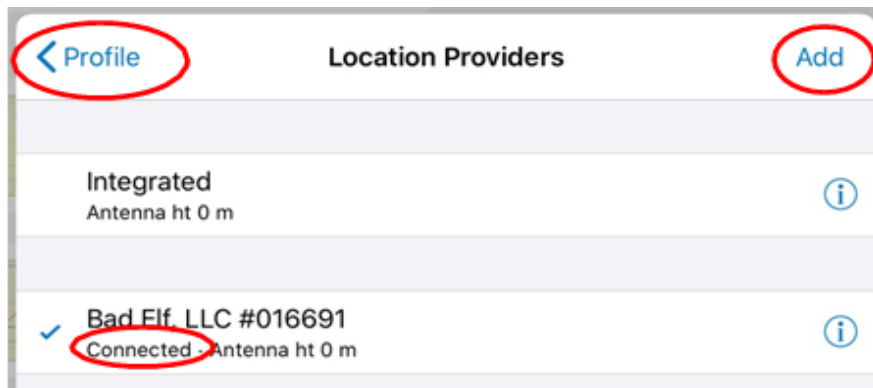


Figure 15. Use the Location Providers tab to add your Bad Elf device as a location provider and ensure it is connected.

- 6) Next, navigate back to the Profile menu and enable Auto-Sync under the General group (toggle should be blue) (see image below).



Figure 16. The general group under the Profile menu indicating auto-sync is enabled.

- 7) Select Cellular Data option under the Profile menu. Make sure Sync and Update is enabled (toggle is blue) and Downloads is enabled (toggle is blue).



Figure 17. The Cellular Data option under the Profile menu indicating that sync and update and downloads are enabled.

- 8) Go back to the Profile menu. Select the Troubleshooting option under the Profile menu. Make sure Logging is enabled (toggle is blue).

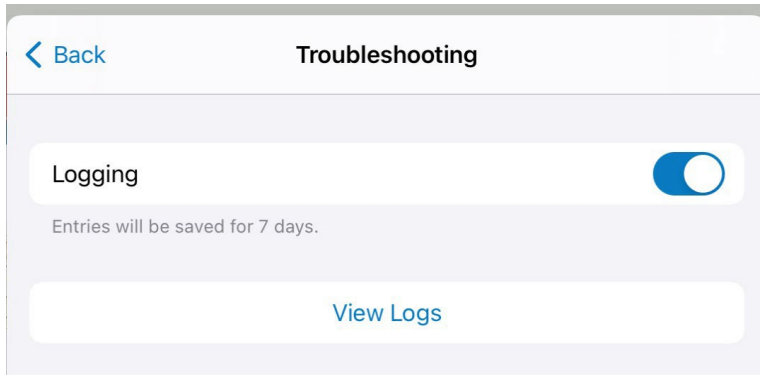


Figure 18. The Troubleshooting option under the Profile Menu indicating that Logging is enabled.

- 9) Select the View Logs option under the Troubleshooting setting to bring up the Field Maps App log list. Select the share option in the upper-right corner of the Log menu to export logs to attach when reporting an issue (see image below). The [invasive carp eDNA app Microsoft reporting/feedback form](#) (link to the Invasive Carp eDNA Microsoft feedback form) can be found under the Microsoft forms app or under the ArcGIS Resources page on the R3 eDNA Program SharePoint site.

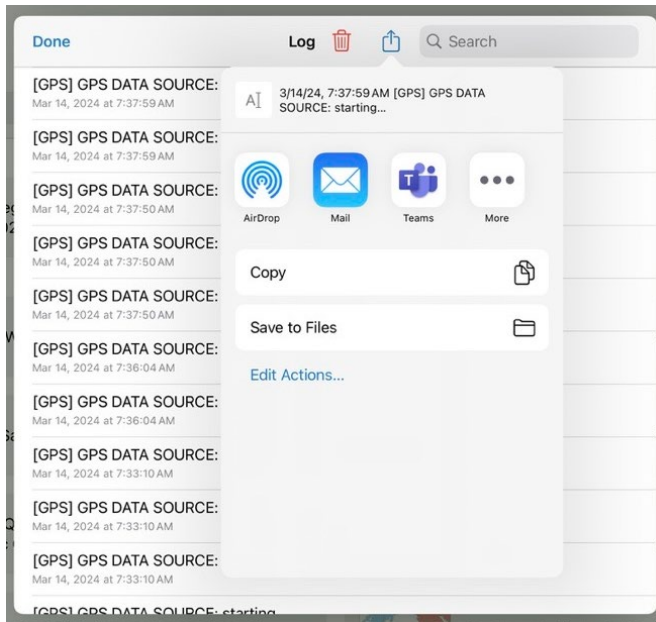


Figure 19. The Field Maps Log List under the View Logs option allows you to export logs to several different platforms.

## 1.4 Main Interface of Online Web Map

The Fisheries eDNA Sampling Map can be opened by tapping on the map thumbnail image. Two pop-up window boxes may appear on first accessing the online web map. 1) If cellular data is not enabled it should be allowed, and 2) the field map app should be allowed to access location while using the app.

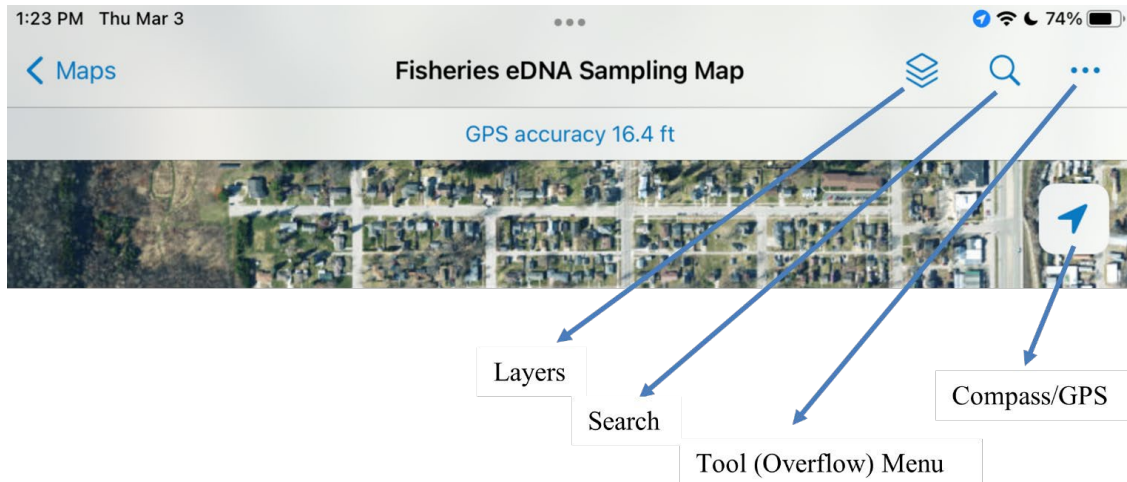


Figure 20. The Fisheries eDNA Sampling Map ribbon has featured buttons such as layers, search, tool (overflow) menu, and compass/GPS accessible in the upper right-hand corner of the ribbon.

The main interface for the Fisheries eDNA Sampling map has an assortment of tools in the top Overflow menu bar (see image below).

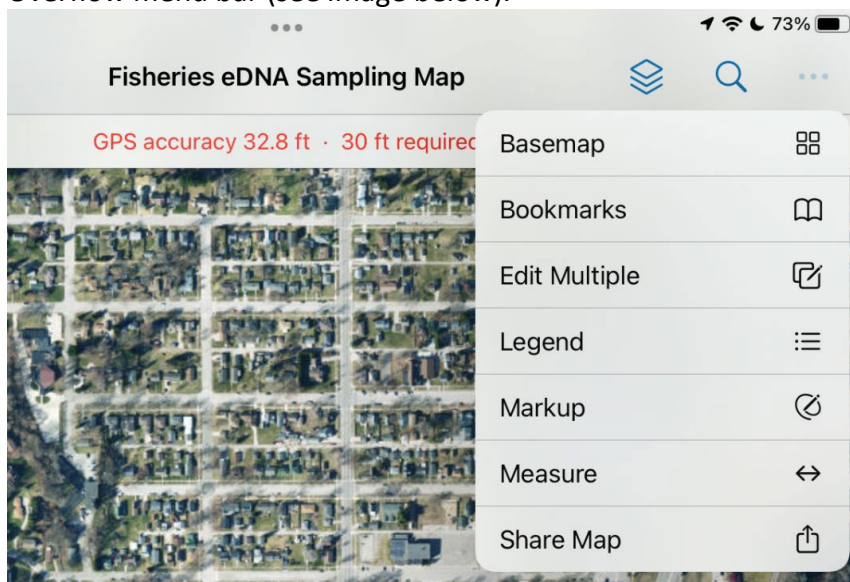


Figure 21. By selecting the tool (overflow) menu button, a drop down menu expands with additional tools such as the basemap, bookmarks, edit multiple, legend, markup, measure, and share map.

#### 1.4.1 Measure Tool

- 1) Select the Measure Tool from the Tool Overflow Menu (see image above).
- 2) Tap the Add Point option under the measure sub-menu to add points to the map to measure distance. Use the more options menu under the measure sub-menu to undo adding a point (see image below).



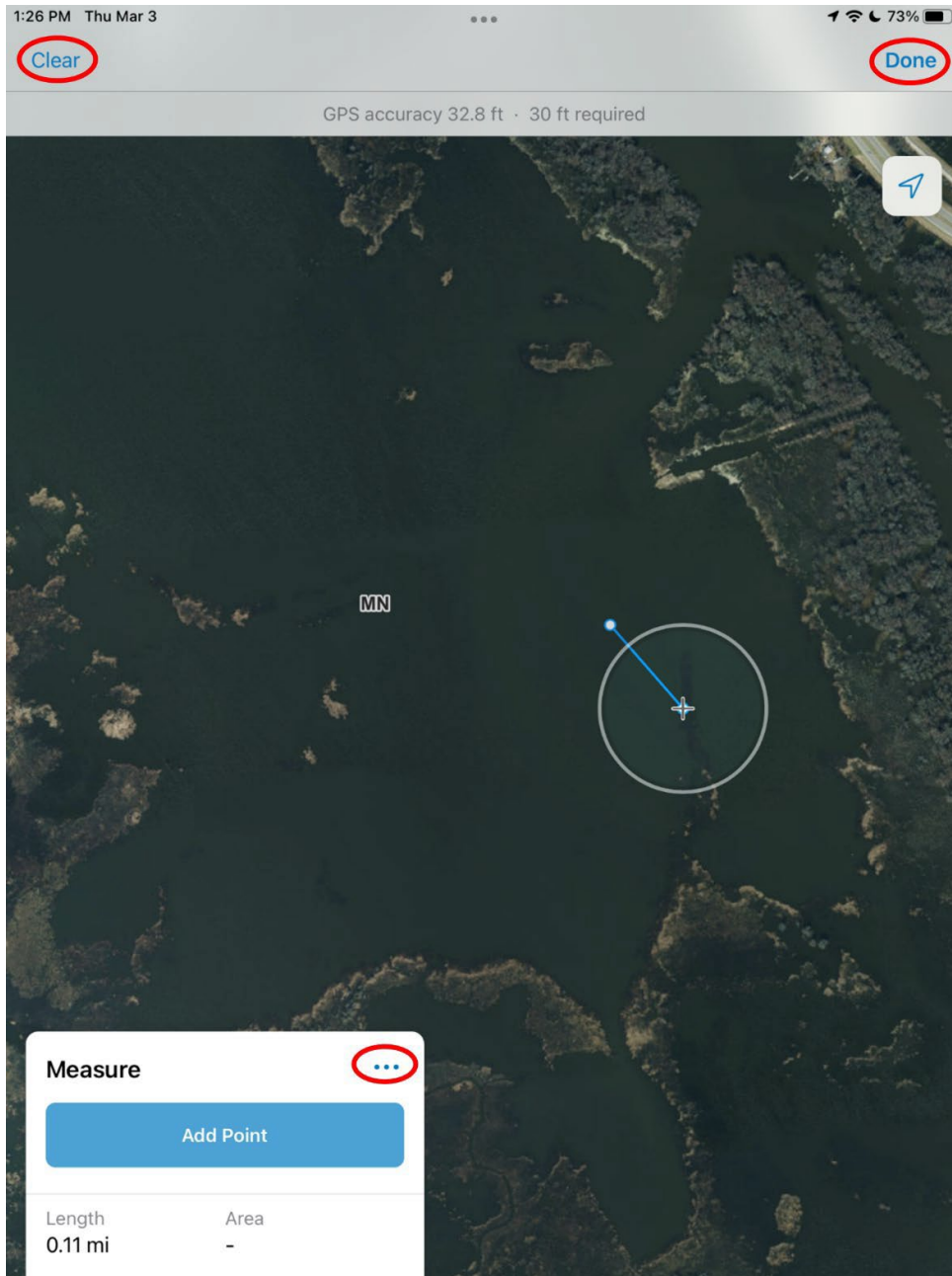


Figure 22. The Measure sub-menu allows for points to be added to the map.

- 3) Connect the last add point to measure for area and select close area from the measure sub-menu (see image below). When finished with the measure tool, select “Clear”, then “Done” (see image above).

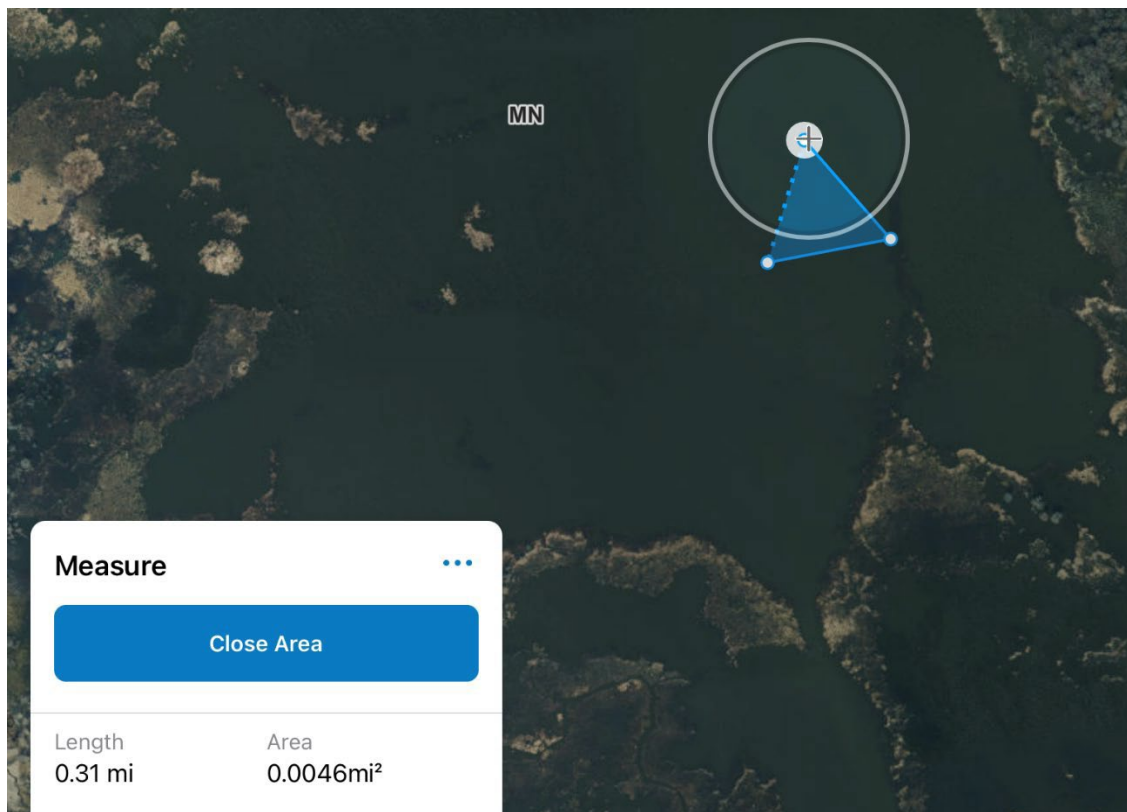


Figure 23. Within the Measure tool, distance can be measured between points.

### 1.4.2 Markup Tool

Use the Markup tool to draw point or line annotations on the map to share or keep on device for future reference. Markup layers can be used in any map and are user specific. **Please note the points, lines, and areas are not feature layers and should not be used to store data.**

- 1) Select the Markup tool from the Tool Overflow Menu.
- 2) Add a Markup Layer or rename a Markup Layer under the Markup Layers option (see below).

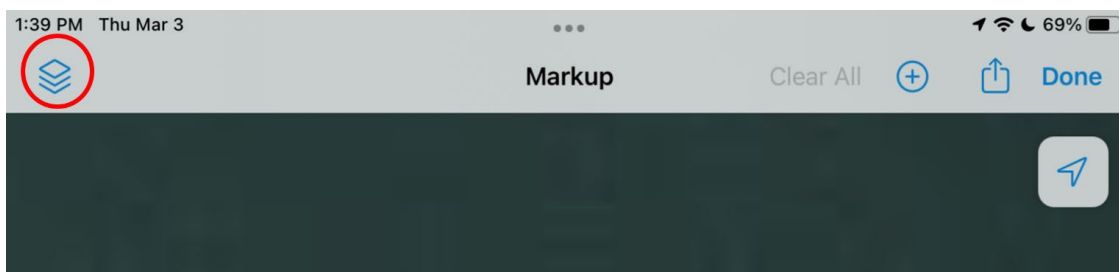


Figure 24. To add or rename a Markup Layer, click the highlighted stacked squares in the upper left-hand corner of the Markup Layer options.

- 3) Use the Plus icon to add a point feature to the map. Scroll up on the pop-up screen and select "Add a Label" to label the point and tap under Notes to add a note about the point. Use the top ribbon menu to delete the feature, add an arrow to the feature, or



change the point color. Select “Done” when finished (see image below).

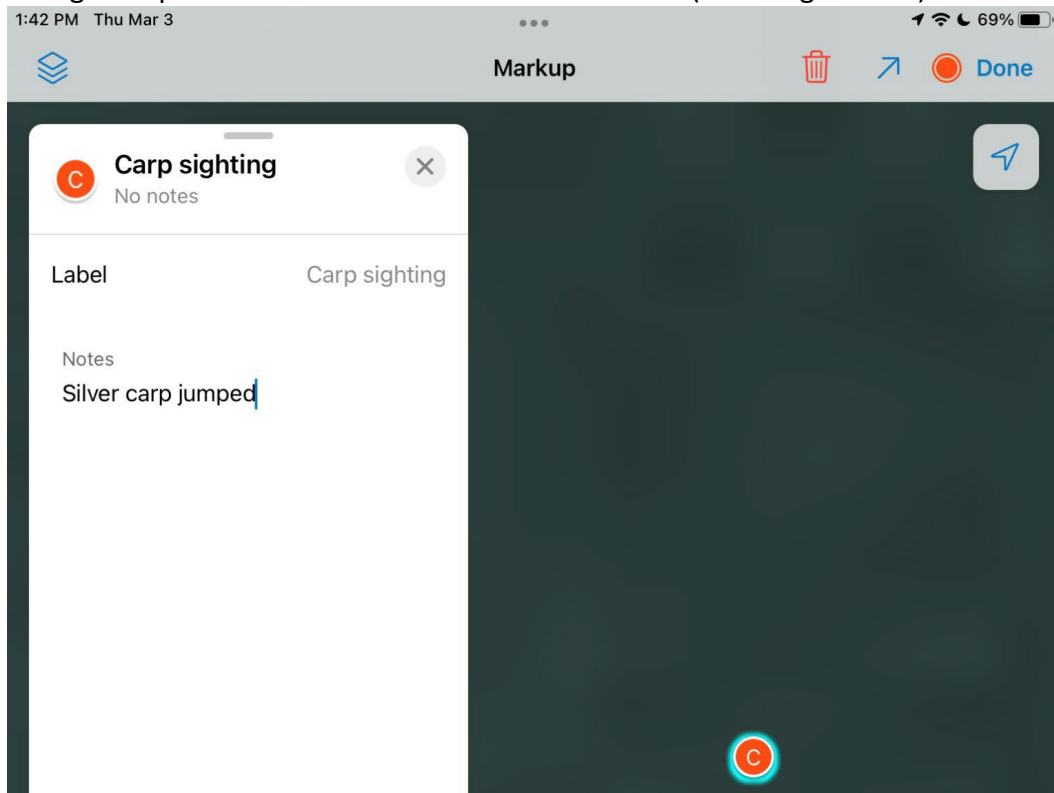


Figure 25. Labels and Notes can be added to a point feature.

- 4) Draw on the map screen instead of selecting the plus icon to add a line or polygon to the map (see image below).

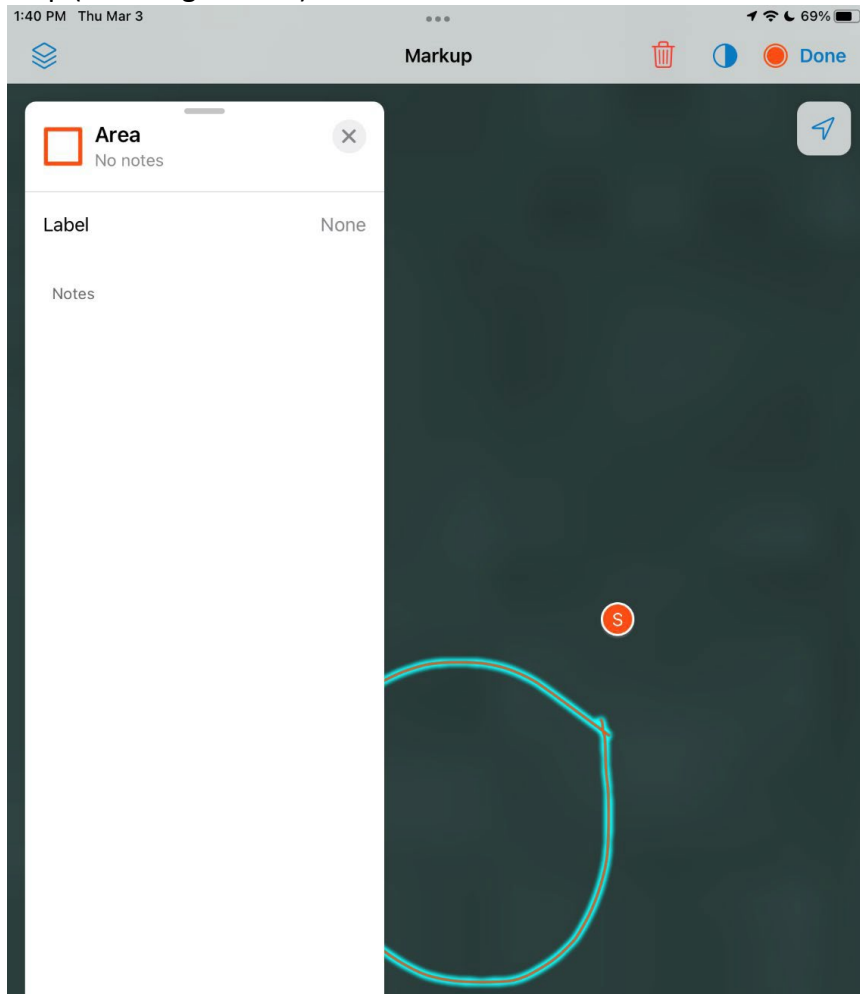


Figure 26. Another way to add a line or polygon to the map is to draw your area on the map.

- 5) Select the “Share” icon in the top ribbon when finishing adding Markup features to take a Screenshot Image or share the Markup Layer externally (see image below).

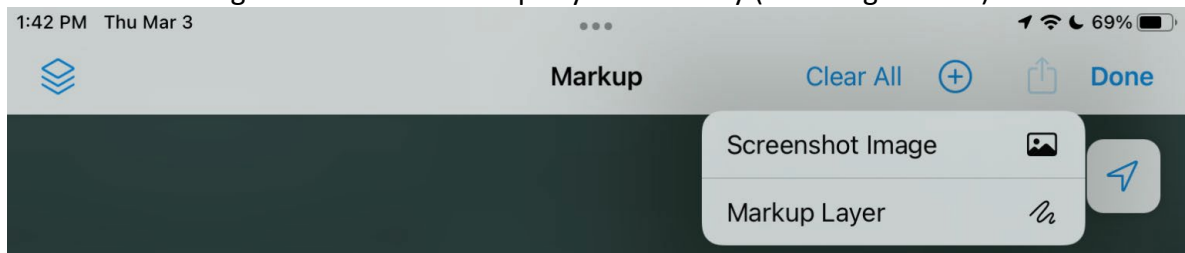


Figure 27. The share icon within the Markup ribbon offers several options such as Screenshot image or markup Layer within the dropdown menu.

## 1.5 Setting up Device for Offline Use

There will be sample sites where cellular service is not readily available, and data will need to be collected offline. **All data should be collected in offline mode.** If the device is outside of cellular or Wi-Fi range, it is not possible to switch between online and offline data collection.

- 1) Download a basemap by selecting the three point (Overflow) menu icon on the Fisheries eDNA Sampling Map. Select “Add Offline Area (see below).

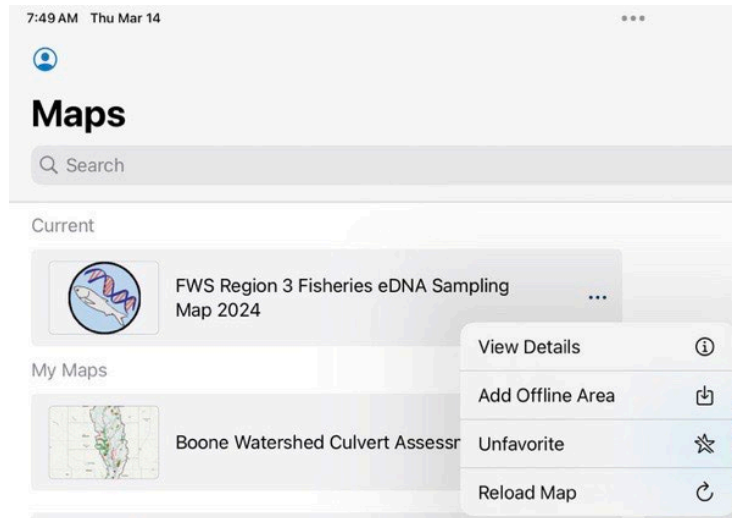


Figure 28. The three point (Overflow) menu icon will display a pop-up menu with additional options including View Details, Add Offline Area, Unfavorite, and Reload Map.

- 2) Choose your work area by zooming into the entire area where the samples will be collected or use the bookmark tool to zoom to an area of interest. **Note: You will not be able to add a point outside of the work area. Make sure work area defines the entire sampling area.** The square box on your map shows the extent of the offline map based on the level of detail selected (see images below).

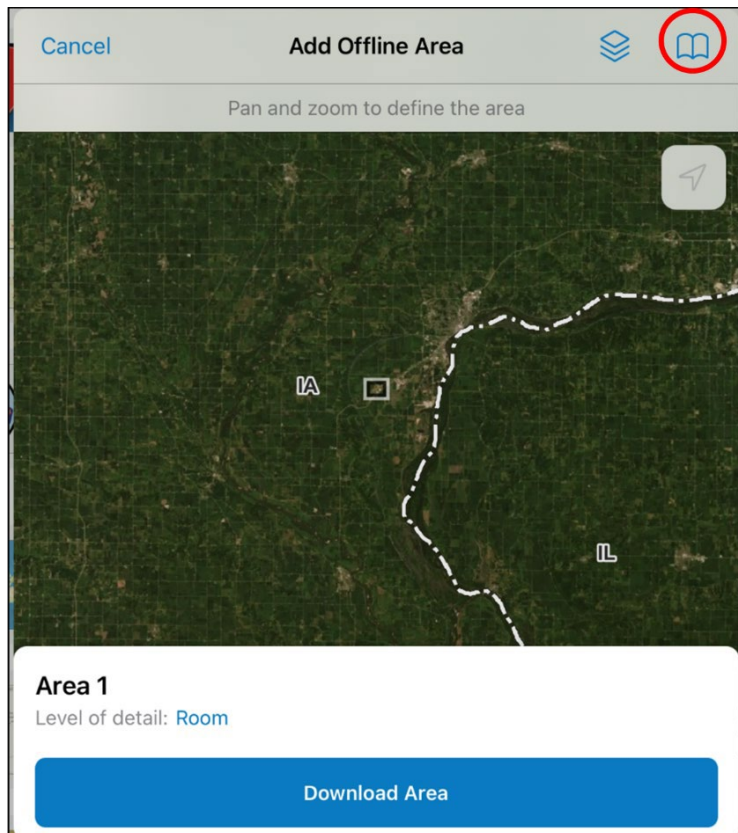


Figure 29. Within the Add Offline Area, zoom into your selected area or select the Bookmark icon in the upper right-hand corner.

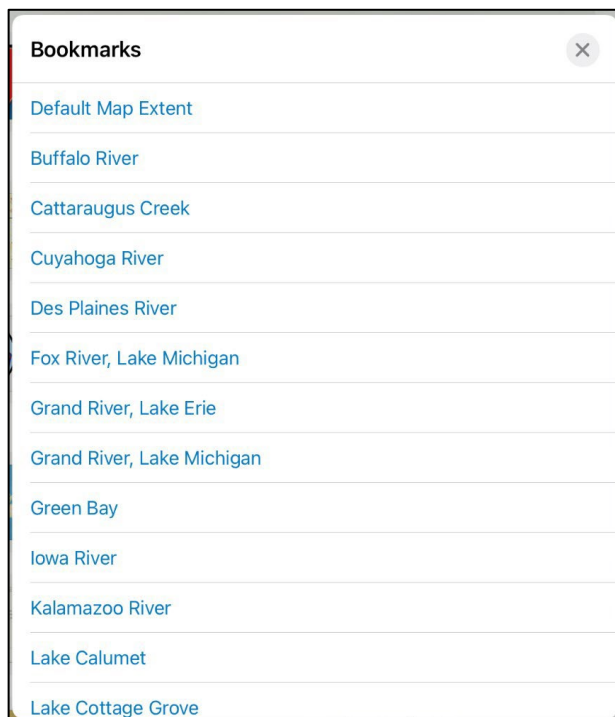


Figure 30. The Bookmarks tool also shows areas of interest instead of zooming on the map.

- 3) After the work area has been defined, select the level of detail by tapping on the blue icon room (see image below) to set the display resolution of the basemap. **Don't select beyond town level** or the basemap image will be too pixelated to use for collection (see image below). Check the estimated download size to ensure that the device has enough storage space to save the basemap.

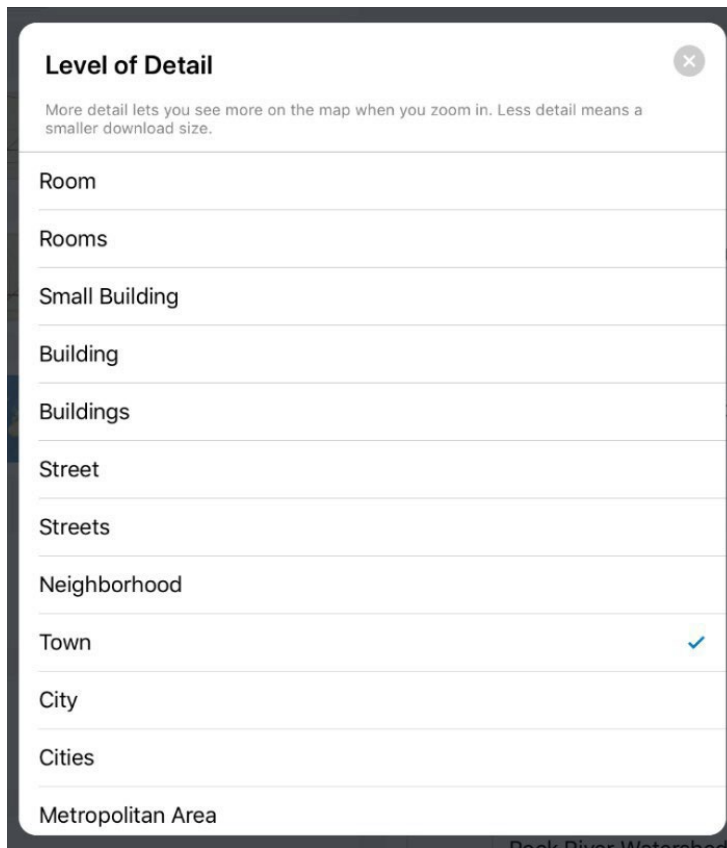


Figure 31. The Level of Detail menu offers several levels from Room up to Metropolitan Area, to set the display resolution of the basemap.

- 4) Once defined, select “Download Area” to store the offline area on your iPad device (see image below).

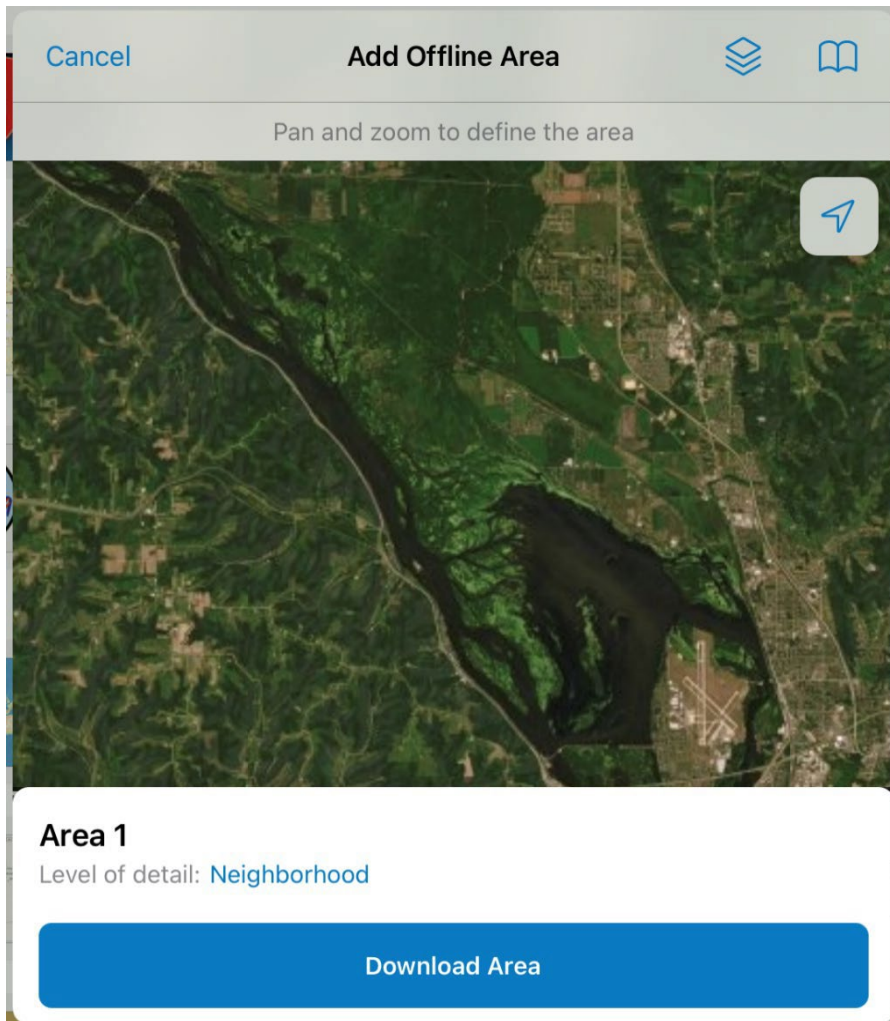


Figure 32. Store the offline area to your iPad by selecting the Download Area button within the Add Offline Area tool.

- 5) Once the offline area is downloaded, the collection method will be automatically set to offline use.
- 6) Select the three-point (Overflow) menu icon next to the offline map area to rename the area to the desired site name (see image below).

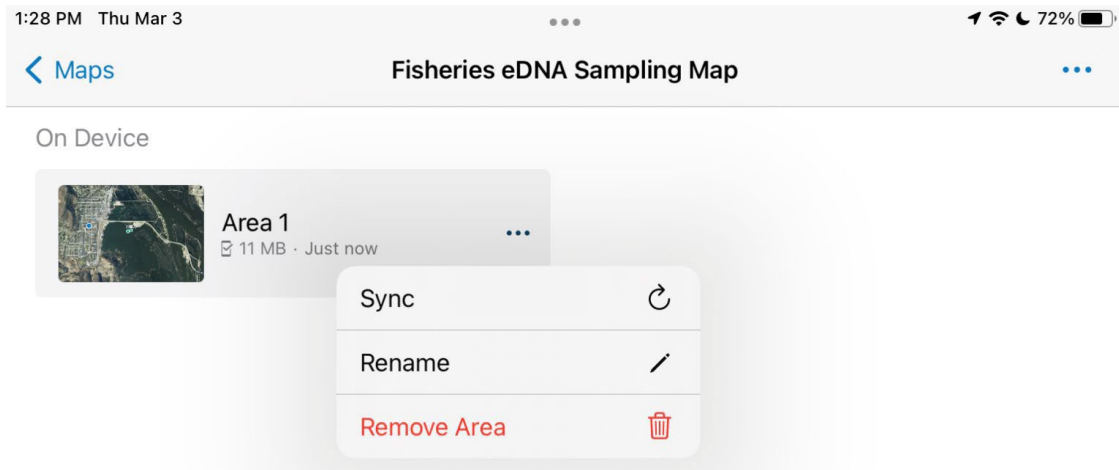


Figure 33. Rename the area by clicking on the three point (Overflow) menu on the desired area.

- 7) If needed, select the three-point (Overflow) menu icon in the upper-right corner of the window to download more offline areas (see image below).

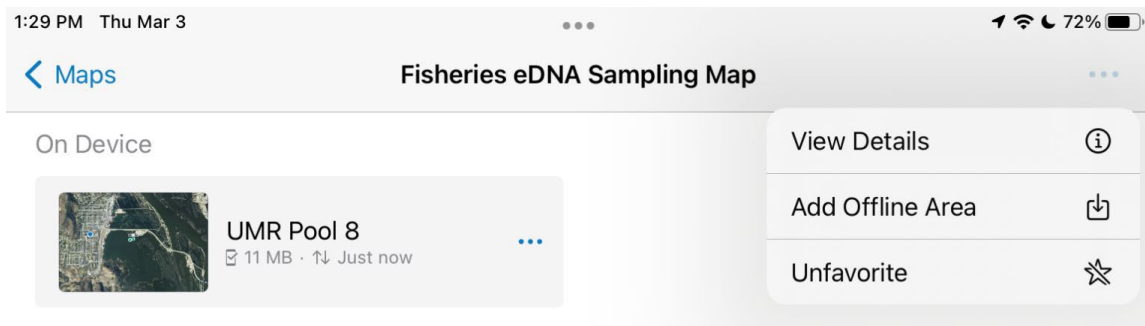


Figure 34. Use the three point (Overflow) menu within your map to download additional Offline Areas.

- 8) Before going out in the field, tap and open the Offline Area needed for data collection in the field.

**Note:** If an error pops up stating another offline area cannot be downloaded, try logging out and logging back into the field map app. If the issue persists, try restarting your iPad device. The restart should fix the issue, unless the offline areas have exceeded the amount of available device storage.

## 2.0 Using ArcGIS Field Maps App in the Field

### 2.1 Collecting eDNA Sample Points

- 1) Use the “Collect New Feature” icon to record a sample point, which can be opened by tapping on the plus symbol on the lower-right side of the map screen (see image below).

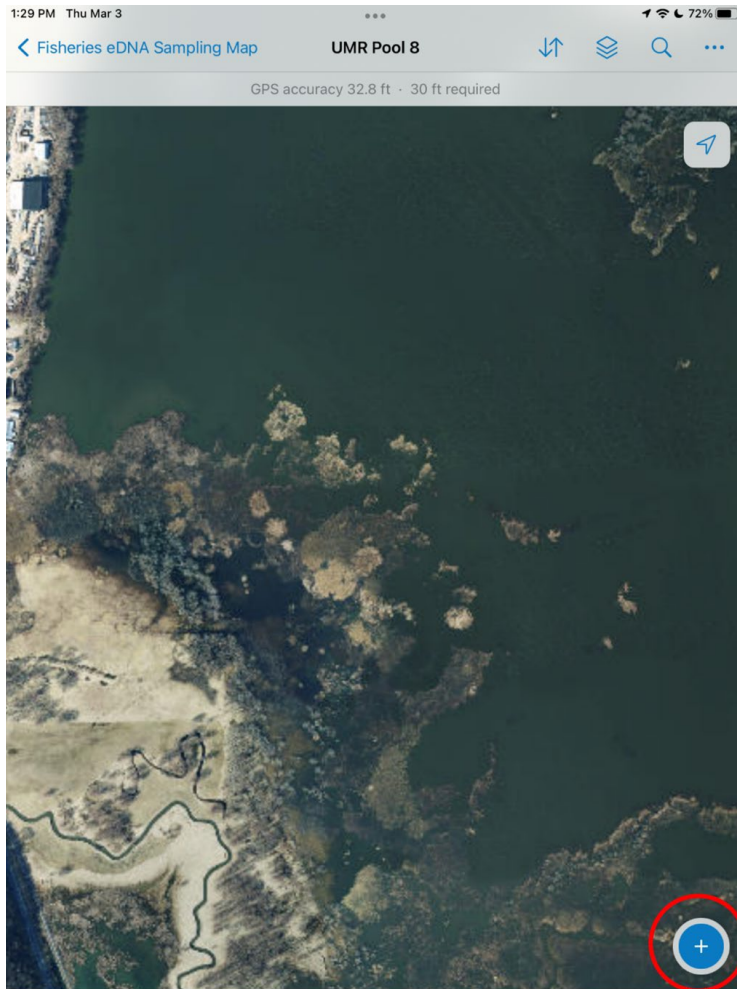


Figure 35. Use the highlighted plus sign in the lower right corner to collect a new feature.

- 2) Select the Basin being sampled. **Note: If the wrong Basin is selected, the point will need to be discarded and a new point created to select the correct Basin. The waterbody list name does not automatically re-populate when a different Basin is selected in the form view.**
- 3) The fields for the point can then be edited by selecting each of the field names (see image below). In some cases, if the comment field is opened but nothing is entered, an error may appear when closing out of the comment field box. If this is the case, entering a space in the comment field box will allow for the field to be closed.



10:32 AM Thu Mar 21

44%

Cancel

Collect

Submit

GPS accuracy 114.8 ft · 30 ft required

43.825977°N 91.259767°W

Update Point

SITE LEVEL DATA \*

SAMPLE LEVEL DATA \*

Regional Unique ID

8 characters long

Date Collected

No Value

Blank \*

No Value

Figure 36. Additional data such as Site Level Data, Sample Level Data, Regional Unique ID, Date Collected, and Blank can all updated for each point.

10:35 AM Thu Mar 21

Collect Submit

La Crosse FWCO: 24001012  
43.825977°N 91.259767°W

SITE LEVEL DATA \*

Sampling Station ID Code  
La Crosse FWCO

State  
Wisconsin  
Use state reference layer.

Basin \*  
Upper Mississippi River  
If incorrect basin is selected, discard point and add a new point.

Waterbody  
Wisconsin River

Site Name

Start Temperature (F)  
54.3  
Fahrenheit, one decimal place.

End Temperature (F)

Fahrenheit, one decimal place.

SAMPLE LEVEL DATA \*

Regional Unique ID  
24001012  
8 characters long

Date Collected  
3/21/24

Blank \*

Figure 37. An example of additional data completed for point La Crosse FWCO 24001012.

- 4) Once all the information has been filled out, the submit button in the top right should be selected to upload the sample point to the web map (see above).
- 5) If the Estimated Accuracy window appears for the Bad Elf device, select OK and continue collection (see below).

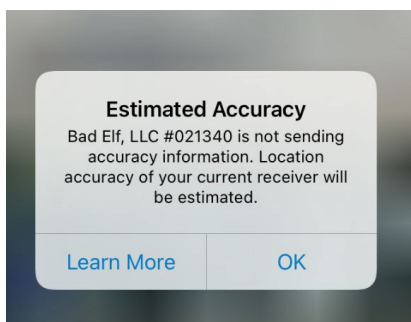


Figure 38. The Estimated Accuracy pop-up window will alert the user if the Bad Elf is not sending accuracy information.

**Important!** Please make note of any environmental conditions that may affect the quality of samples in the comments field. Also, please make note if not all samples could be collected and identify the sample numbers. Comments field is limited to 500 characters so be concise.

- 6) If the coordinates for the sample point need to be updated, select the Update Point icon before selecting submit. If your GPS has lost reception or you clicked on the map at some point, you will need to update your location using the GPS icon in the top right-hand corner (see image below).

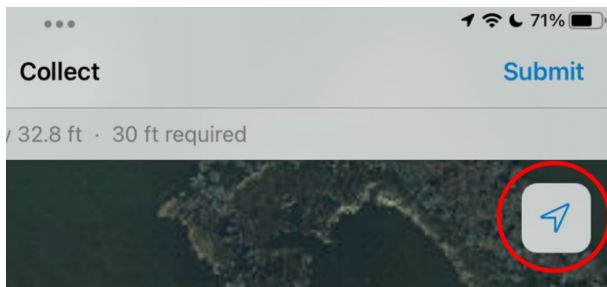


Figure 39. To update coordinates, select the Update Point (arrow) icon.

- 7) The Update Point Icon will appear when you size down the data collection window by holding and dragging your finger down on the gray bar (see image below).

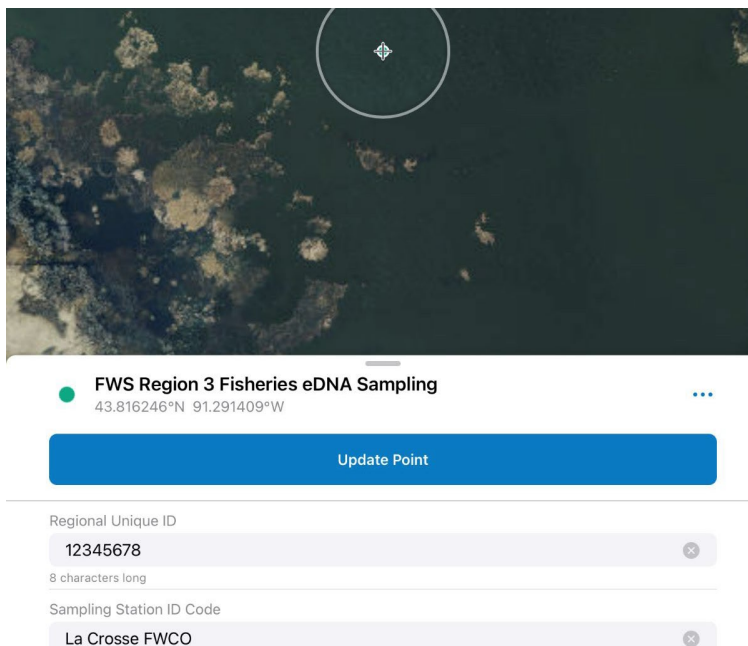


Figure 40. Scale down the data collection window by dragging down the gray bar.

- 8) If the sample data is being collected offline, the sample point will only save to the device. The sample data can be uploaded to the web map later when the device is within cellular range.
- 9) To upload the data, the three-point (Overflow) menu icon on the offline area should be selected and then Sync should be selected under the menu options to sync the points to the online web map (see image below).

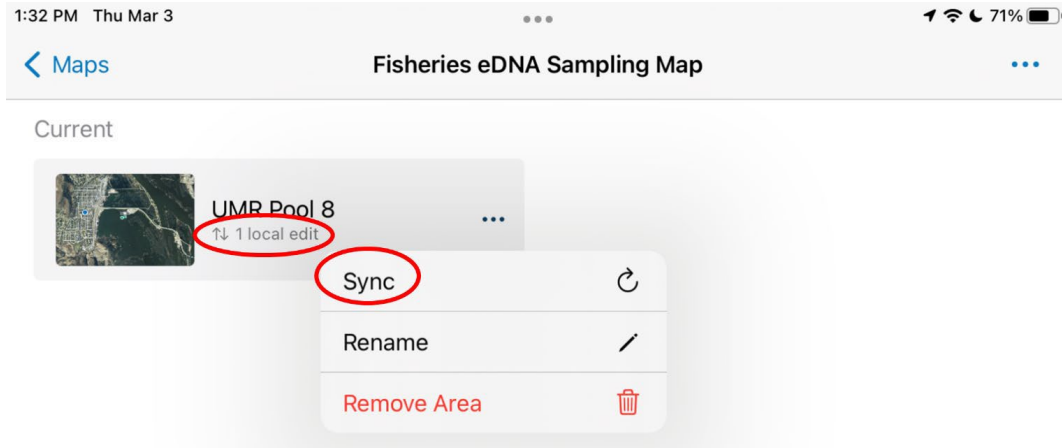


Figure 41. Uploading the data will require accessing the Sync feature within the three point (Overflow) drop down menu of the desired offline area.

Gray text below the offline area being used will report how many points have been collected to the device and need to be uploaded to the web map (see image above).

- 10) Data may also be synced in the map by using the sync icon in the offline map (see images below).



Figure 42. An example of the sync icon.

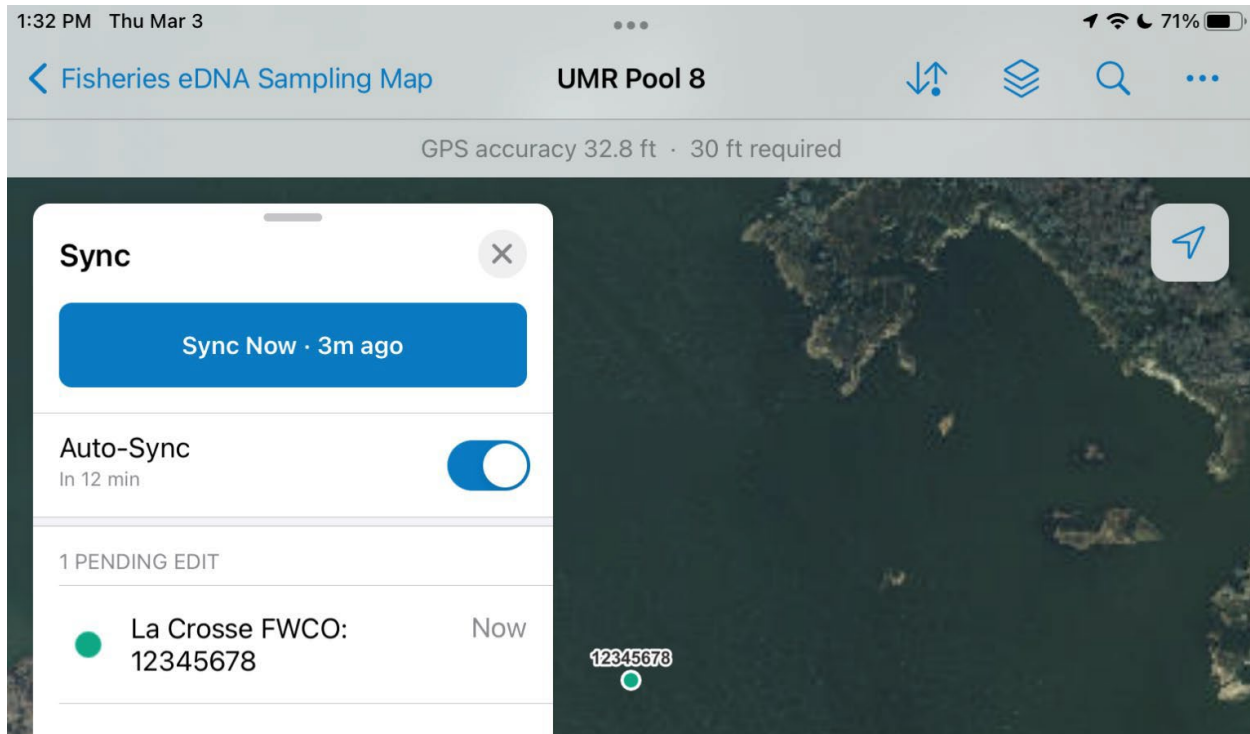


Figure 43. Within the desired offline area sync tool, auto-sync is displayed as enabled.

11) Auto sync may be enabled using the sync icon within the offline map (see above).

## 2.2 Editing eDNA Sample Points

Sample points can be edited or deleted after the sample point has been submitted in the field maps app.

- 1) To edit the sample point, the point must be tapped on (selected) to open the feature form (see image below).

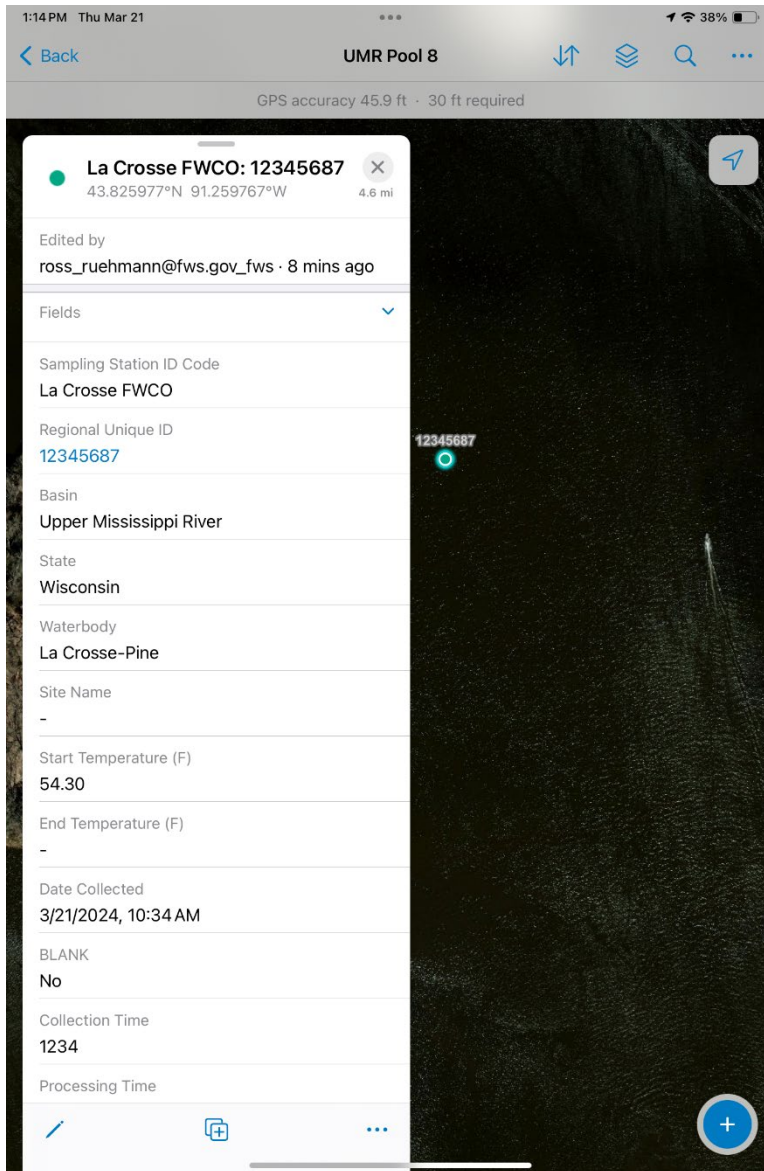


Figure 44. The feature form window will appear when selecting the point.



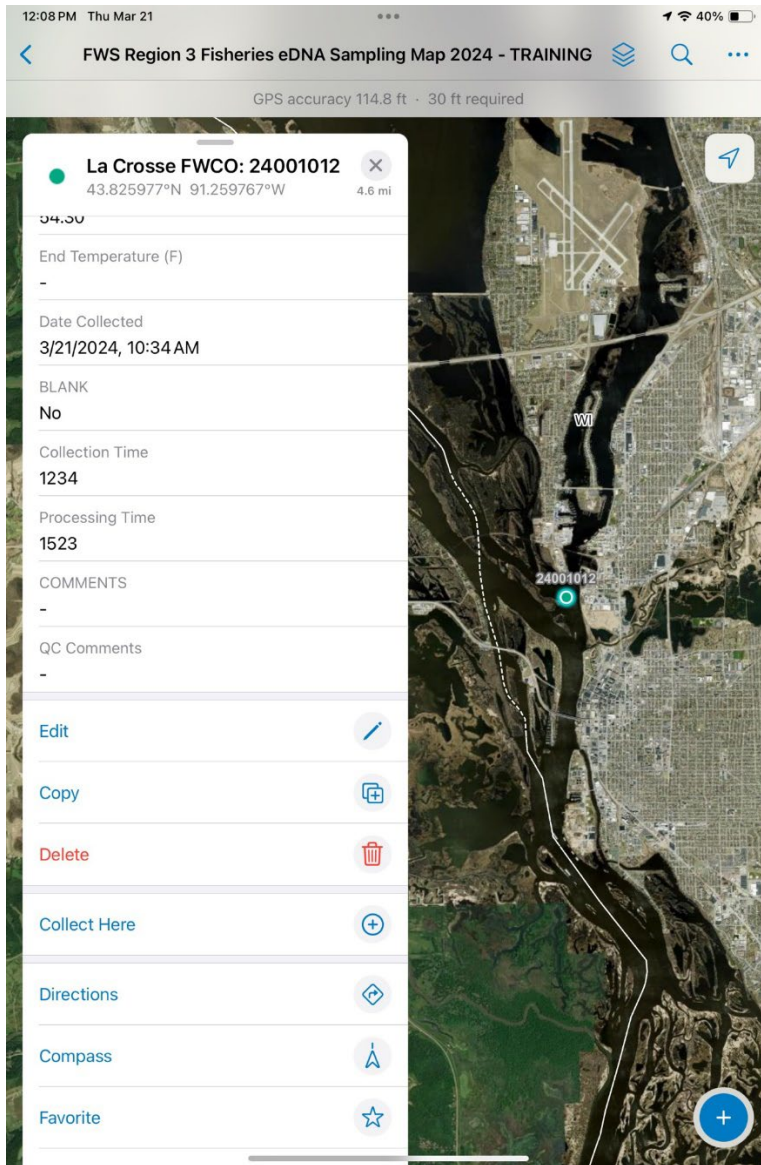


Figure 45. Scroll down in the feature form to access the edit, copy, or delete options.

- 2) Scroll down in the form to expand editing options. The copy option can be used to copy attributes at your current location for a new point. The Collect Here option creates a point at the same location as the current point but does not copy attribute data.
- 3) For blanks, use the copy option to copy over sample data information and then move the point using the map window buffer with cross to place point on top of corresponding sample point (see image below). Once the cross in the buffer window has been placed near the point, snap the point to the corresponding sample point once the point turns orange with a white halo around it by releasing the buffer window. Next, select update point to snap the blank to the corresponding sample point.

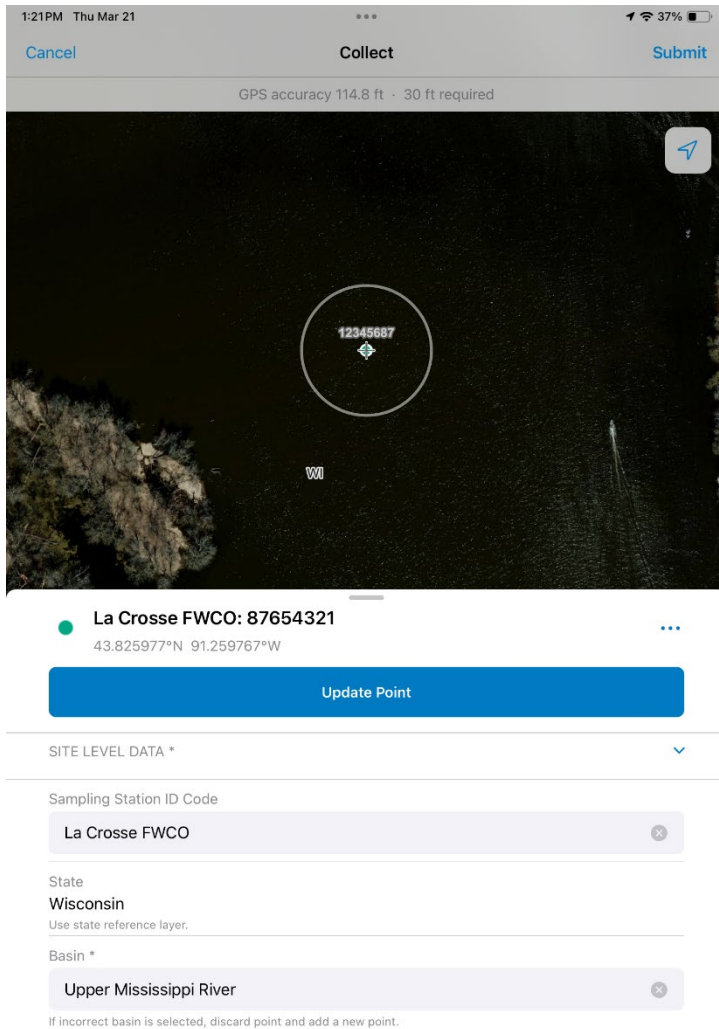


Figure 46. Placing a copied point on top of a blank point.

**Note:** Ensure snapping is enabled under your profile in the Field Maps app.

4) To unsnap points, tap on the points to edit (see image below).



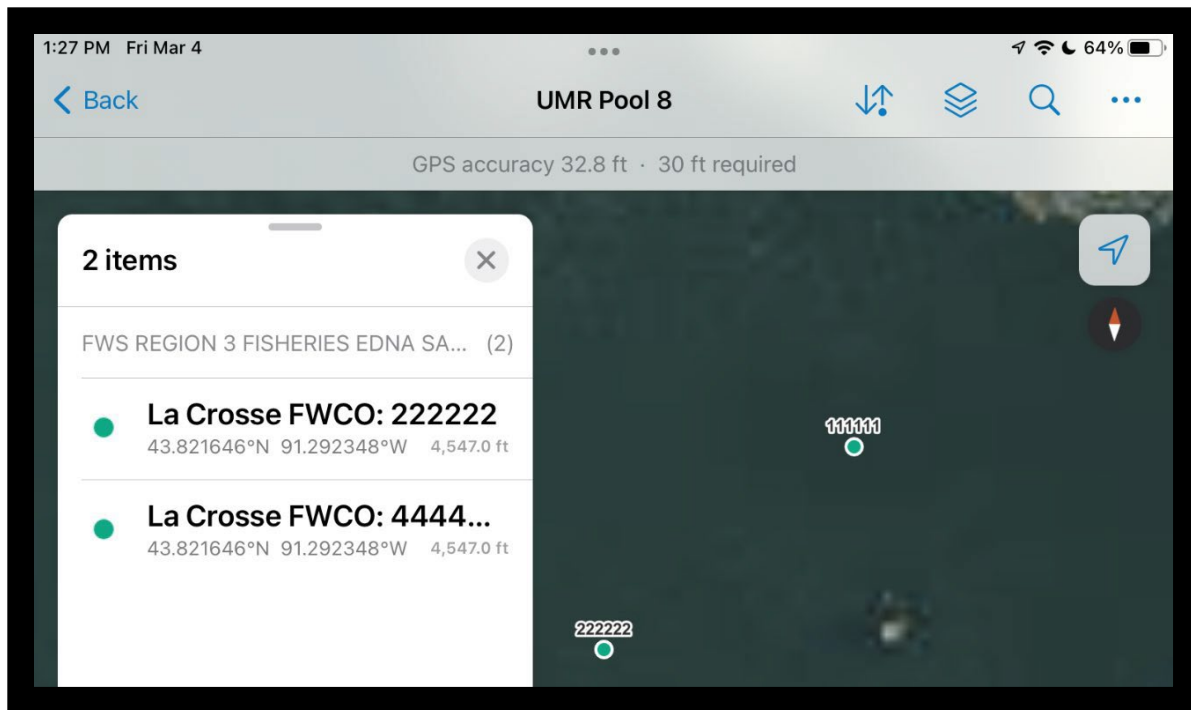


Figure 47. Select the desired points to disable snapping.

- 5) Next, tap on the point of interest to expand the point attribute window and select edit at the bottom of the window and use the map window buffer and update point tools to change the location of the point.
- 6) To batch edit points, select the three-point (Overflow) menu icon in the upper-right corner (see below) and select “Edit Multiple”.

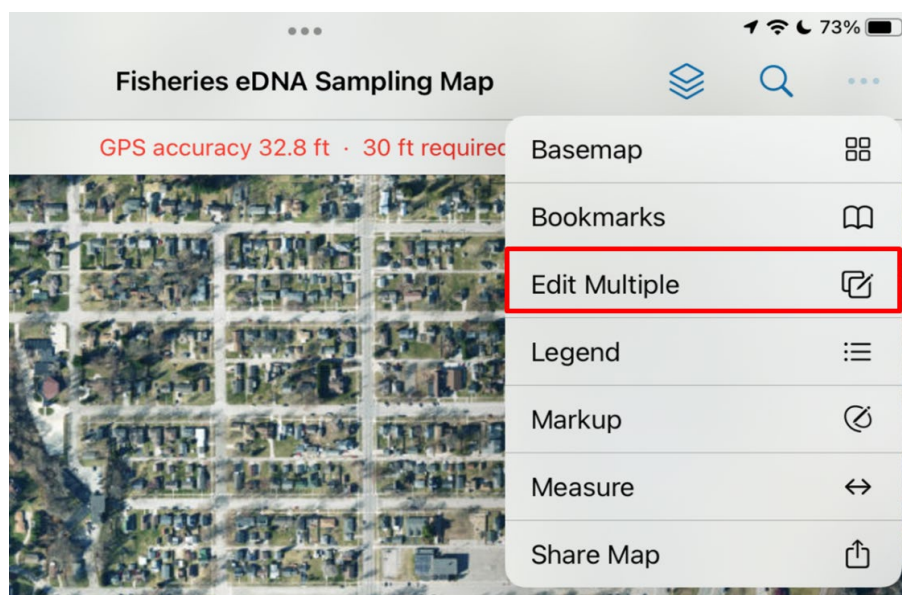


Figure 48. Use the three point (Overflow) menu icon to select the Edit Multiple tool.

- 7) Next, select the points on the map you would like to batch edit and select “Continue” to batch edit or cancel to exit (see image below).

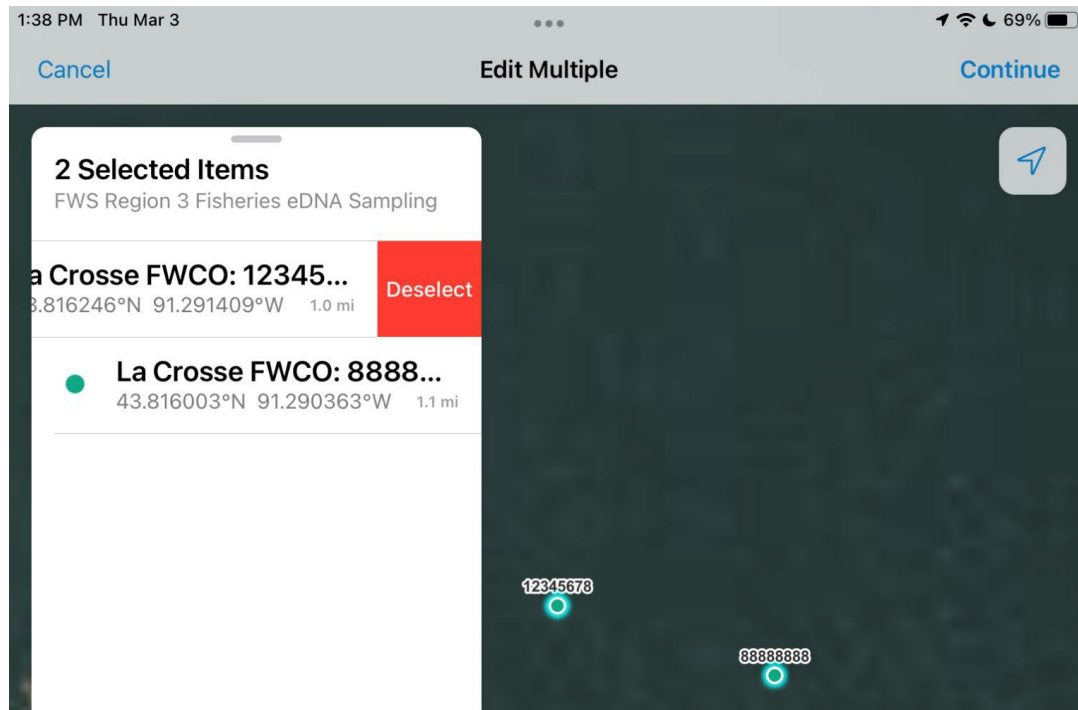


Figure 49. In the Edit Multiple tool, swipe left on a point and click deselect to deselect the point.

- 8) You can deselect any point by swiping to the left and selecting “Deselect” (see image above).
- 9) After selecting Continue, you can batch edit the points selected (see image below). Multiple values under a field means there are different values entered for this field. Values that appear as text under a field mean all selected points have the same value. Blank values or entries without values mean there has been no value entered for this field for the points selected.

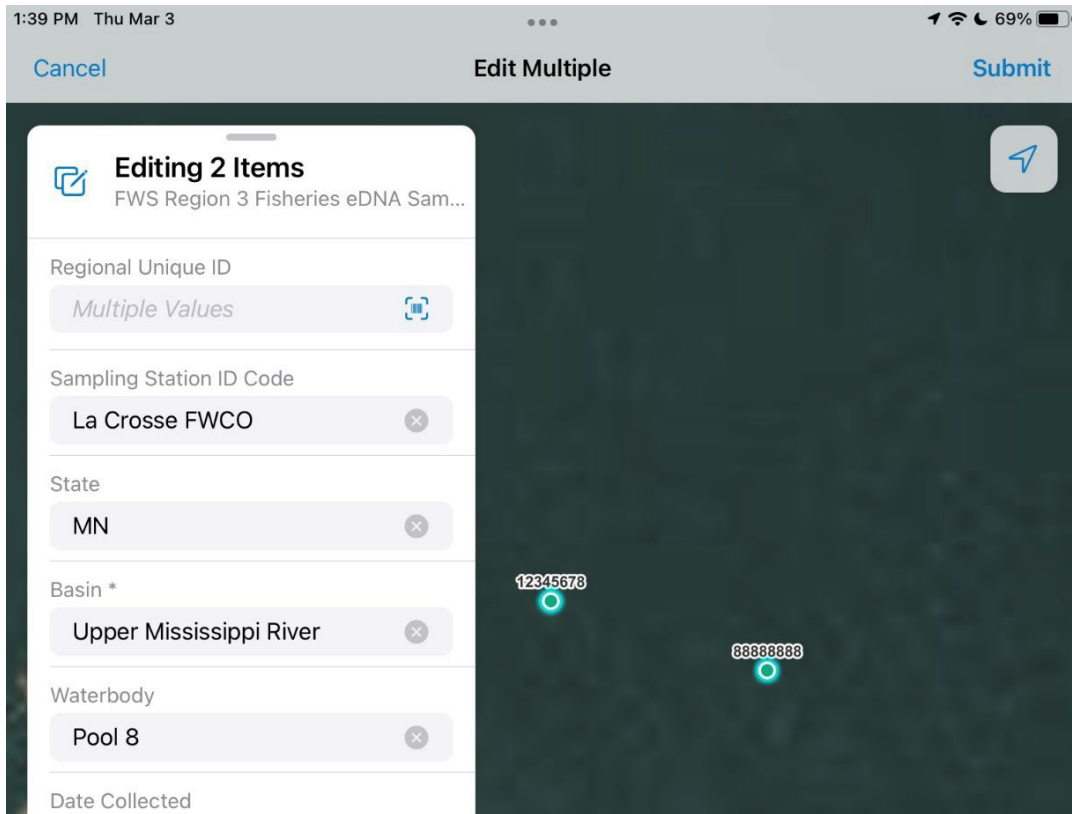


Figure 50. Batch editing multiple points in the Edit Multiple tool.

## 3.0 Troubleshooting

### 3.1 Microsoft Form

- 1) If an issue occurs, try restarting the Field Maps application and/or restart the iPad.
- 2) If the GPS becomes disconnected, you can select the GPS accuracy banner to try to reconnect (see below).

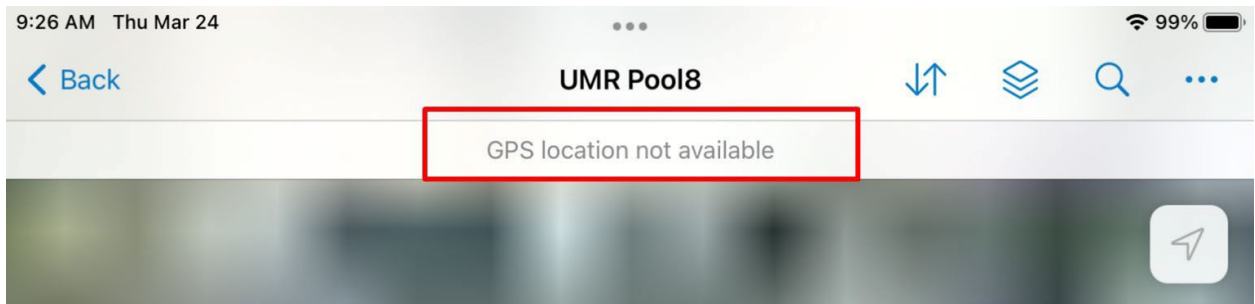


Figure 51. “GPS location not available” will appear in the ribbon if the GPS becomes disconnected.

- 3) If troubleshooting the issues does not work, please log the issue using the invasive carp eDNA app Microsoft reporting/feedback form which can be found under the Microsoft forms app or under the ArcGIS Resources page on the R3 eDNA Program SharePoint site. Please make sure to attach your log files to the form.
- 4) An automated email will be sent to the eDNA database coordinator and all eDNA leads. When the issue is resolved, please use the SharePoint list to change the issue status to resolved and input the solution under the resolution field of the SharePoint list.

## 4.0 Post Processing of eDNA Data and iPad Device

### 4.1 Switching from offline collection to online collection on iPad device

Sample data should always be synced to the online web map after data collection before switching the iPad back to online collection mode (**refer to Section 2.1**). Refer to **Appendix A** for QA/QC of eDNA data.

- 1) “Current” should appear above the offline area if the data is being collected in offline mode (see below).

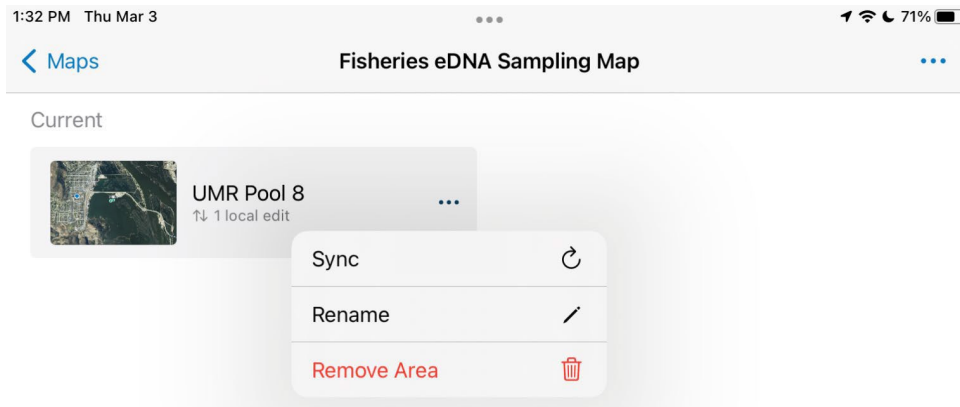


Figure 52. Fisheries eDNA Sampling Map grouping showing current offline areas where data is being collected in offline mode.

- 2) To change back to online mode, the three-point (Overflow) menu icon next to the offline area should be selected (see above). Select the “Remove Area” to switch back to online collection.

**Note:** Offline Areas can no longer be saved and stored to your device for future use if switching from offline collection to online collection.

**Note:** If keeping device in offline mode, make sure to sync offline areas before going out in the field if previously collected points need to be cleared from the map (Coordinate with Ross Ruehmann to have points cleared from the map after QA/QC of the data (refer to **Appendix A**).