ArcGIS Field Maps App Instructional Manual
IC eDNA Monitoring Program

Photo Credit: ESRI

U.S. Fish and Wildlife Service, Midwest and Northeast Regions
Contact: Jeena Koenig, jeena_koenig@fws.gov

Document Information

IC eDNA Monitoring Program
ArcGIS Field Maps App Manual
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1.0 ArcGIS Field Map App Basics and Setup

1.1 Optional: Connect iPad to GNSS Receiver

GNSS receivers (Bad Elf device) are only needed if the iPad does not contain a GPS chip or if going to an area with a poor GPS signal.
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 (Figure 1). Make sure the GNSS receiver is turned on.

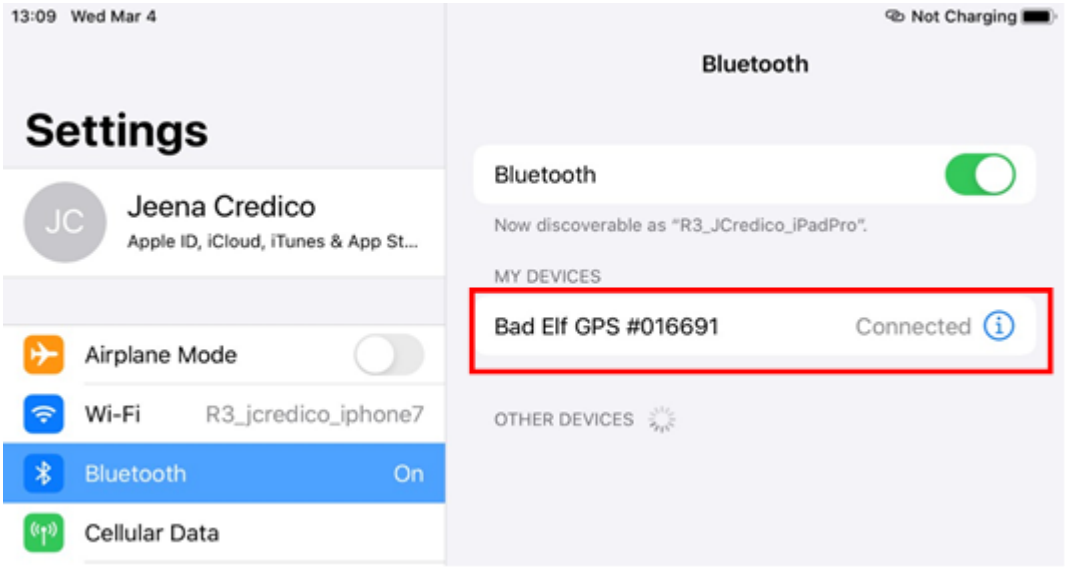

Figure 1. A screenshot of iPhone Bluetooth settings selecting the Bad Elf GPS device.

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). Make sure all users have a FWS Editor role in AGOL and ensure the training for the role is complete.
Next, contact 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 (Figure 2). 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 to Sign In (Figure 3).

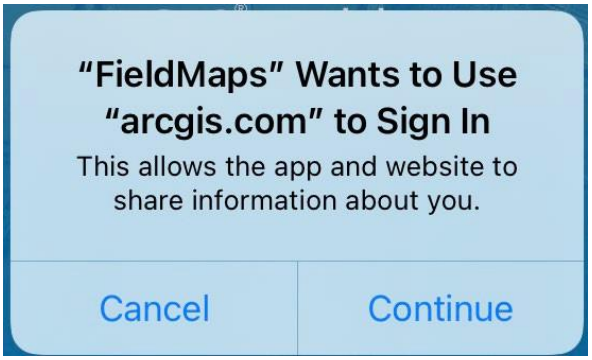

Figure 3. Permission screen to continue to sign in to Field Maps using ArcGIS.com.

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 a “FWS” should be entered into the blank box and then select “Continue” (Figure 4).

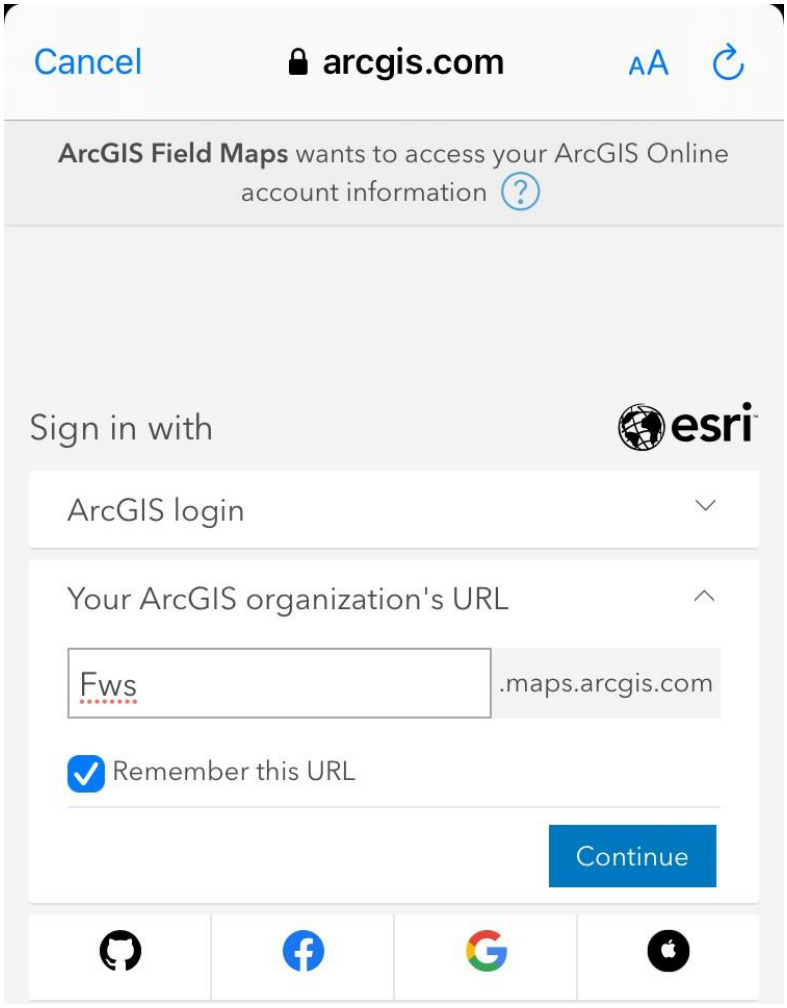

Figure 4. Sign into ArcGIS using your organization's URL.

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

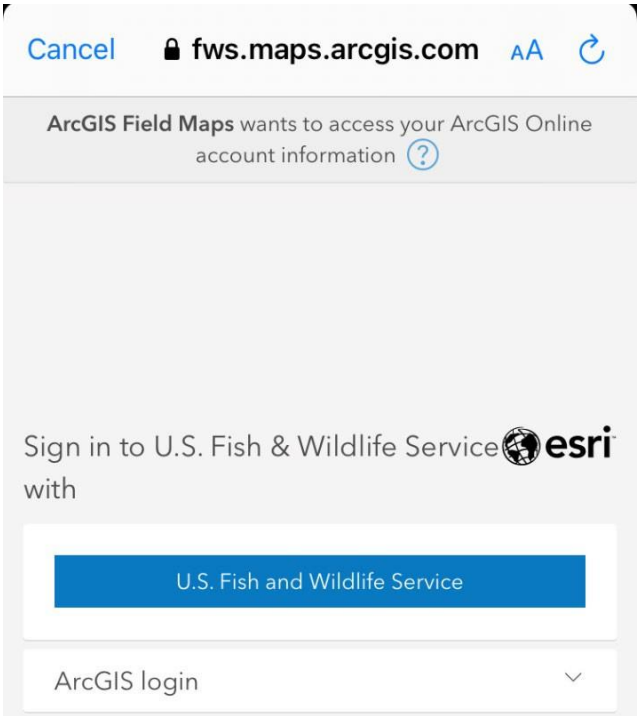

Figure 5. Sign into ArcGIS using your U.S. Fish and Wildlife Service credentials.

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 (Figure 6).

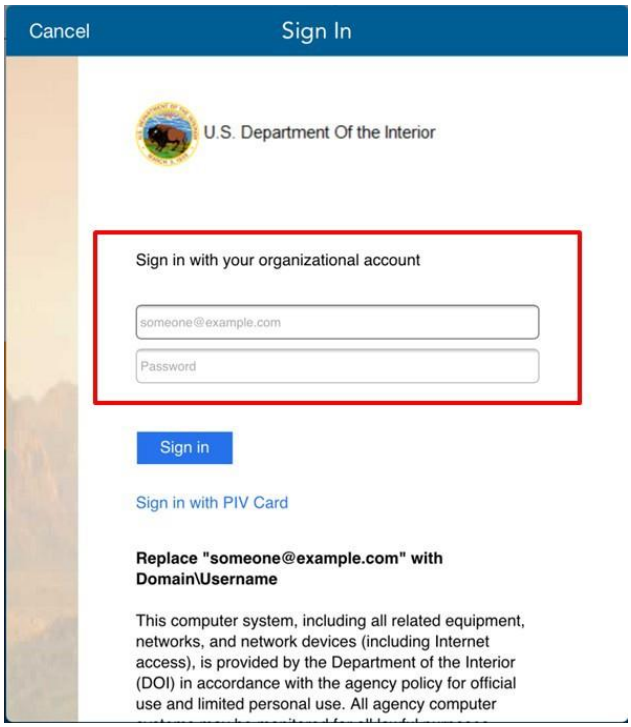

Figure 6. The U.S. Department of the Interior credential sign-in page.

7) Select the sign in with Microsoft Authenticator at the bottom of the DOI Additional security screen (Figure 7).

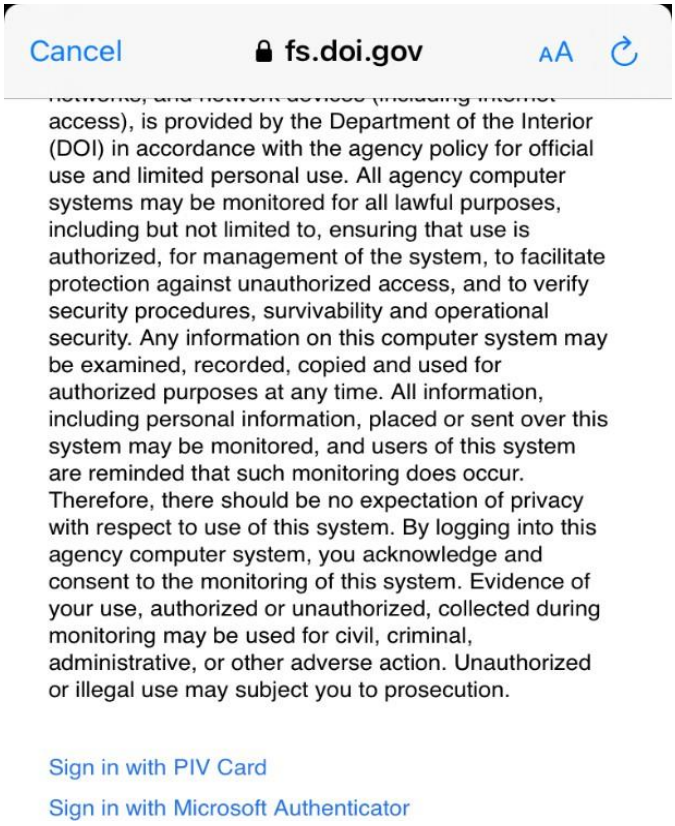

Figure 7. Select the Sign in with PIV Card option from the additional DOI security screen.

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 (Figure 8).

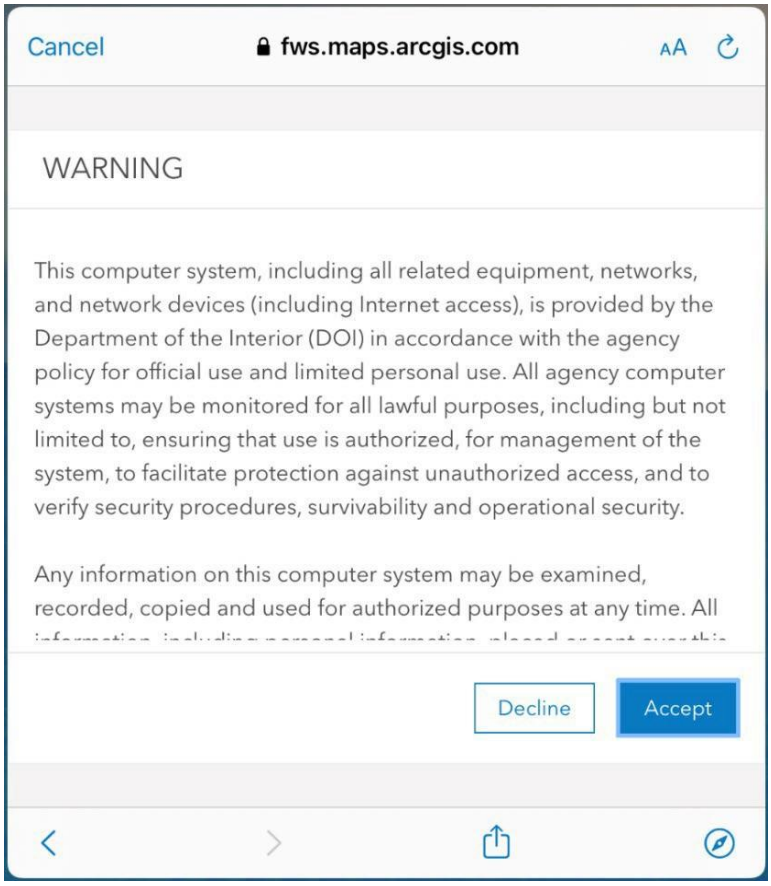

Figure 8. The DOI terms of use disclaimer on ArcGIS.com.

The main menu will appear after logging in and should include the FWS Midwest and Northeast Regions FAC Invasive Carp eDNA Collection AGOL Group (Figure 9). The Fisheries eDNA Sampling Map used for data collection will be under this group (Figure 10).

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”.

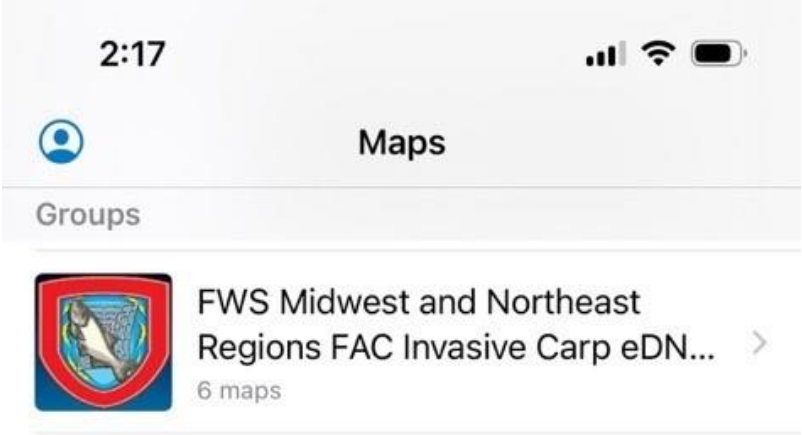

Figure 9. FWS Midwest and Northeast Regions FAC Invasive Carp eDNA Collection group within ArcGIS.

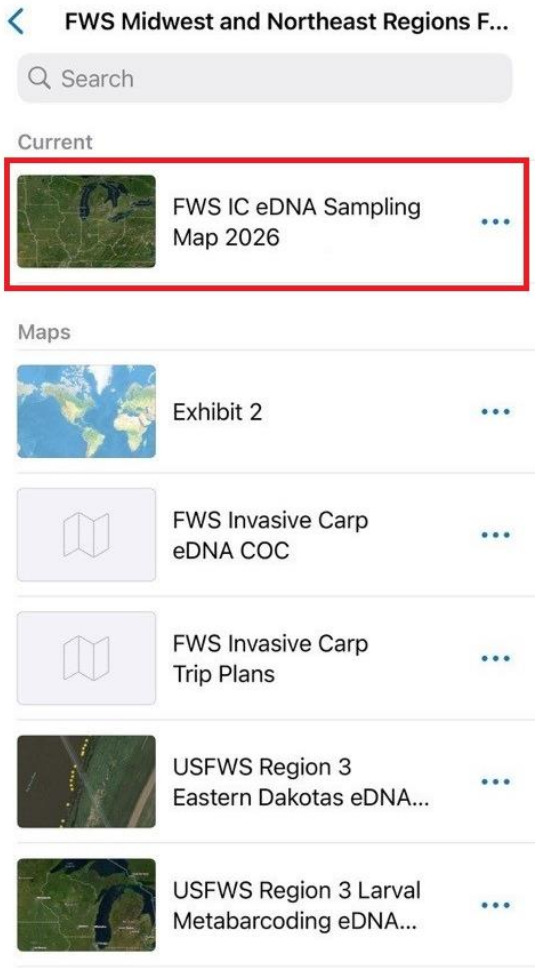

Figure 10. Select the FWS IC eDNA Sampling Map 2026 option within the FWS Midwest and Northeast Regions FAC Invasive Carp eDNA Collection group.

1.3 Field Maps App Settings

1) Select the Profile Icon (person icon at in the upper-left corner of screen) (Figure 11).

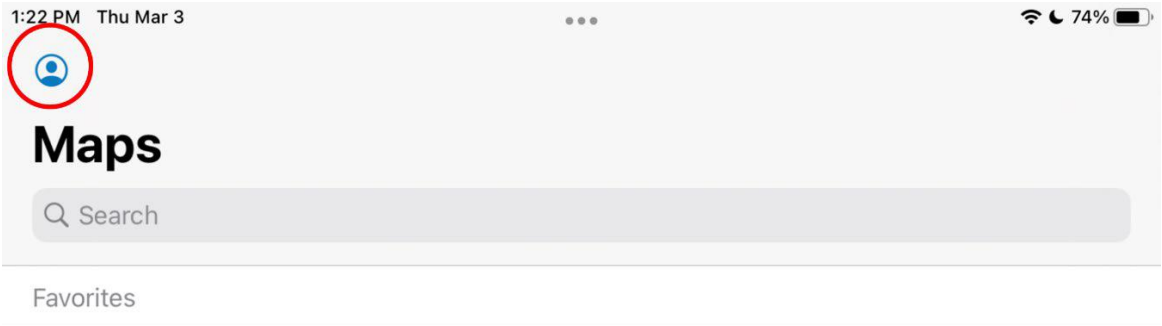

Figure 11. Profile icon within the ArcGIS Field Maps app.

2) In the Profile window, select the Collection Settings option (Figure 12).

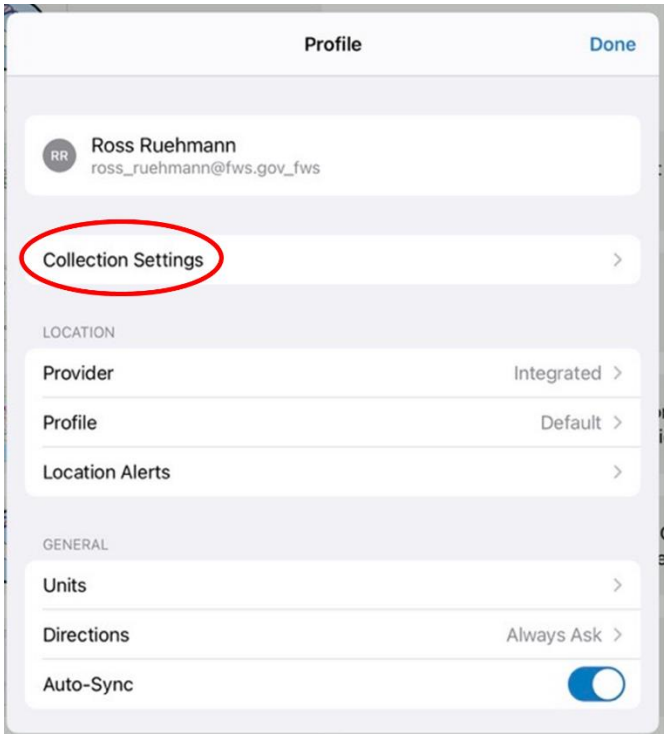

Figure 12. Within the user profile window, select the collection settings underneath your name.

3) Make sure the Accuracy is set to 60 feet and snapping is enabled (toggle should be set to blue under the Snapping setting) (Figure 13).

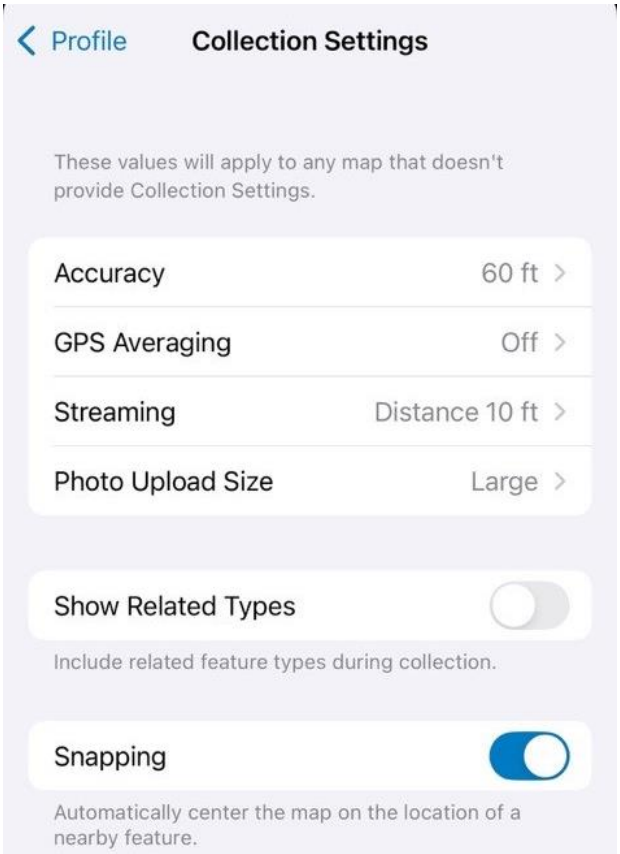

Figure 13. The collection settings tab depicts accuracy, GPS averaging, streaming, photo upload size, related types, and snapping values.

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 (Figure 14).

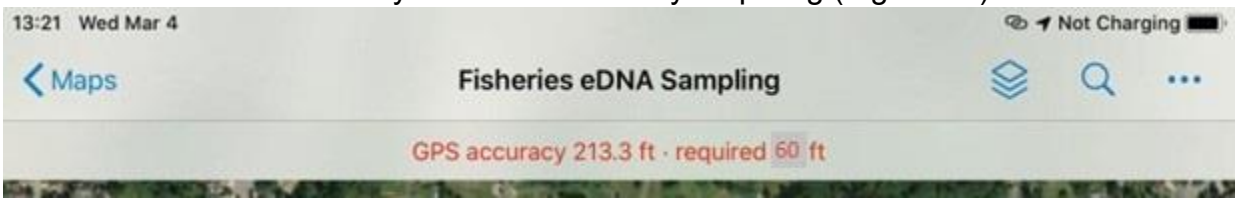

Figure 14. The Fishing eDNA Sampling ribbon should now show that the required 60 ft accuracy setting is in use.

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 iPad connection (Cellular Service) and if needed connect a Bad Elf device to improve location accuracy **(refer to Section 1.1 and Section 1.3).**

4) Go back to the profile menu, select the Provider option. **Note: Steps 4-5 are only needed if your iPad device does not have an internal GPS chip or if running into issues with location accuracy.**

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 (Figure 15). See Section 1.1 if Bad Elf is not connected.

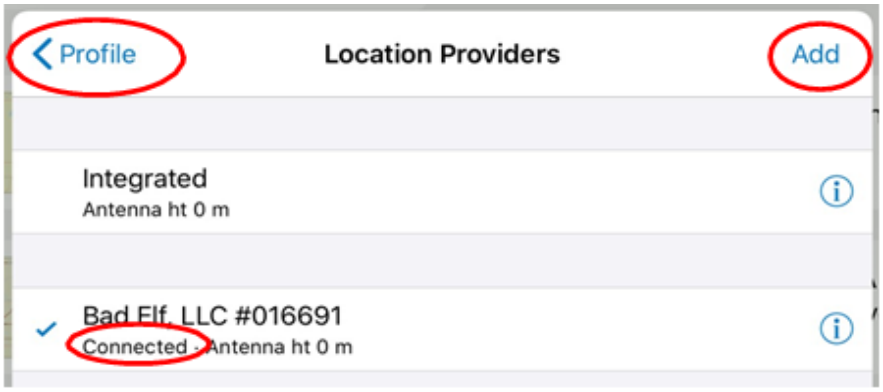

Figure 15. Use the Location Providers tab to add your Bad Elf device as a location provider and ensure it is connected.

6) Next, navigate back to the Profile menu and enable Auto-Sync under the General group (toggle should be blue) (Figure 16).

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).

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).

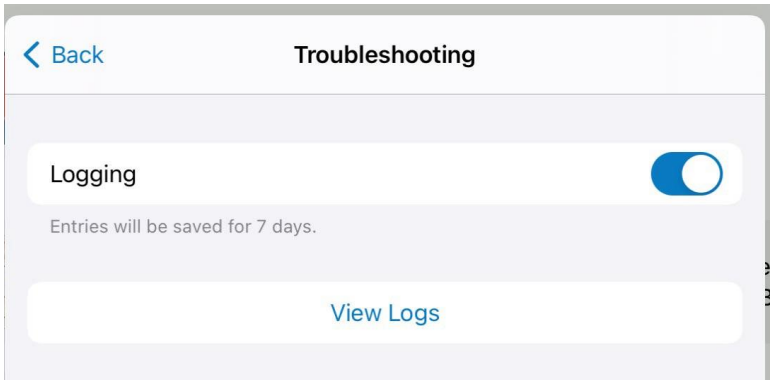

Figure 18. The Troubleshooting option under the Profile Menu indicating that Logging is enabled.

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 (Figure 19). 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.

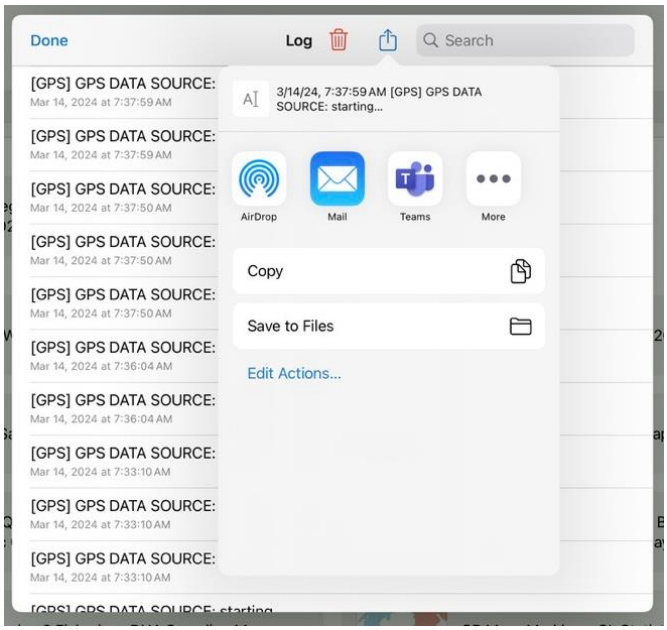

Figure 19. The Field Maps Log List under the View Logs option allows you to export logs to several different platforms.

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.

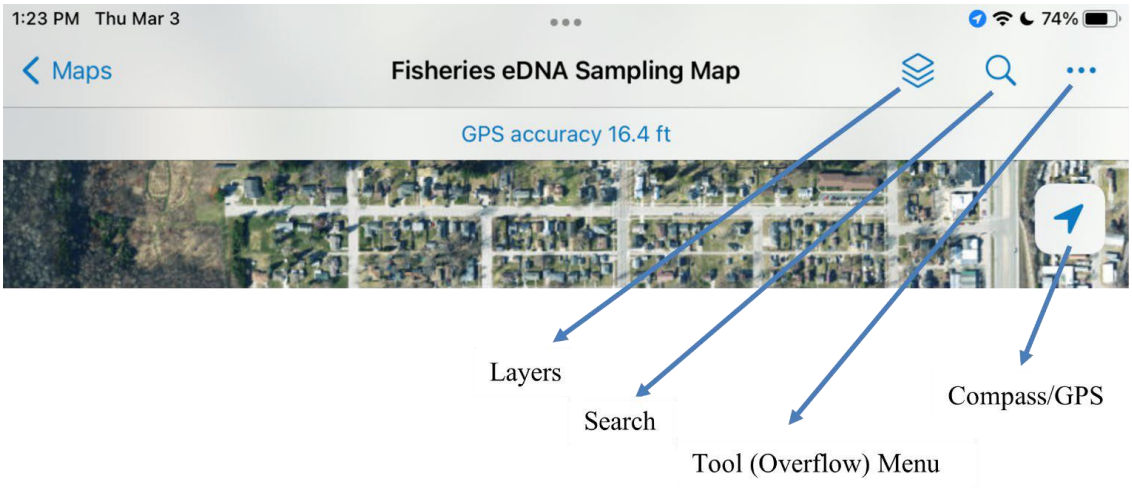

Figure 20.The Fisheries eDNA Sampling Map ribbon has featured buttons such as layers, search, tool (overflow) menu, and compass/GPS accessible in the upper right-hand corner of the ribbon.

The main interface for the Fisheries eDNA Sampling map (Figure 20) has an assortment of tools in the top Overflow menu bar (Figure 21).

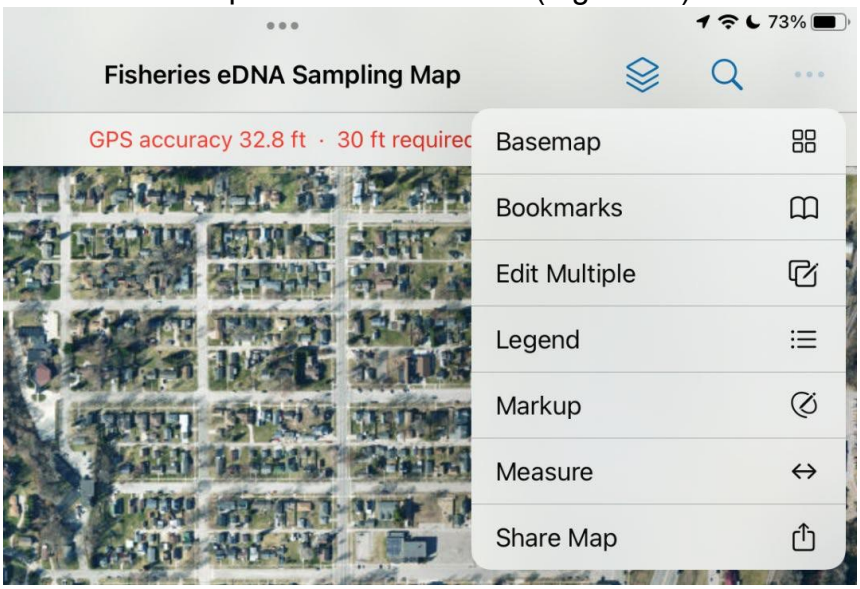

Figure 21. By selecting the tool (overflow) menu button, a drop down menu expands with additional tools such as the basemap, bookmarks, edit multiple, legend, markup, measure, and share map.

1.4.1 Measure Tool

1) Select the Measure Tool from the Tool Overflow Menu (Figure 21).
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 (Figure 22).

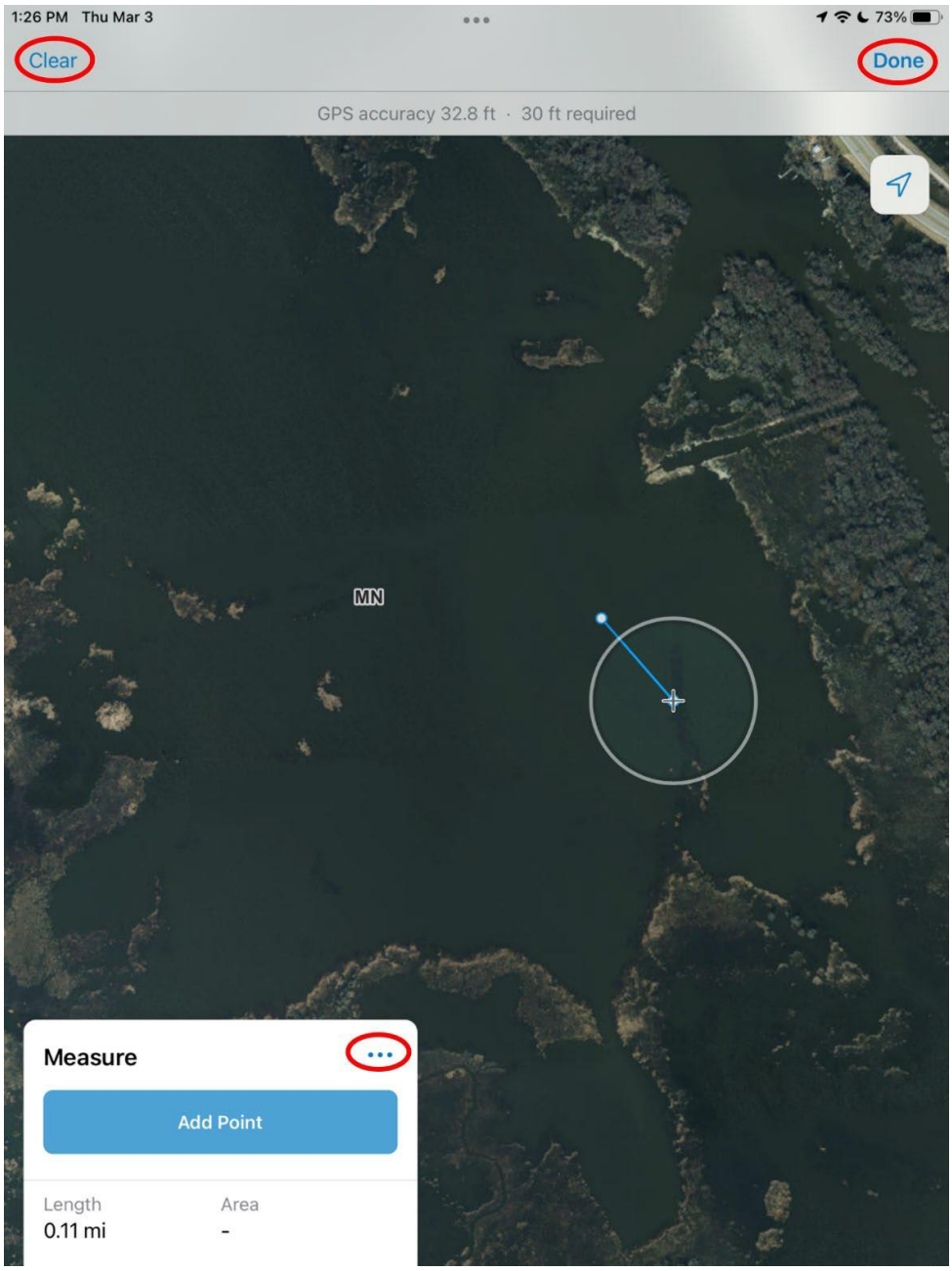

Figure 22. The Measure sub-menu allows for points to be added to the map.

3) Connect the last add point to measure for area and select close area from the measure sub-menu (Figure 23). When finished with the measure tool, select “Clear”, then “Done” (Figure 22).

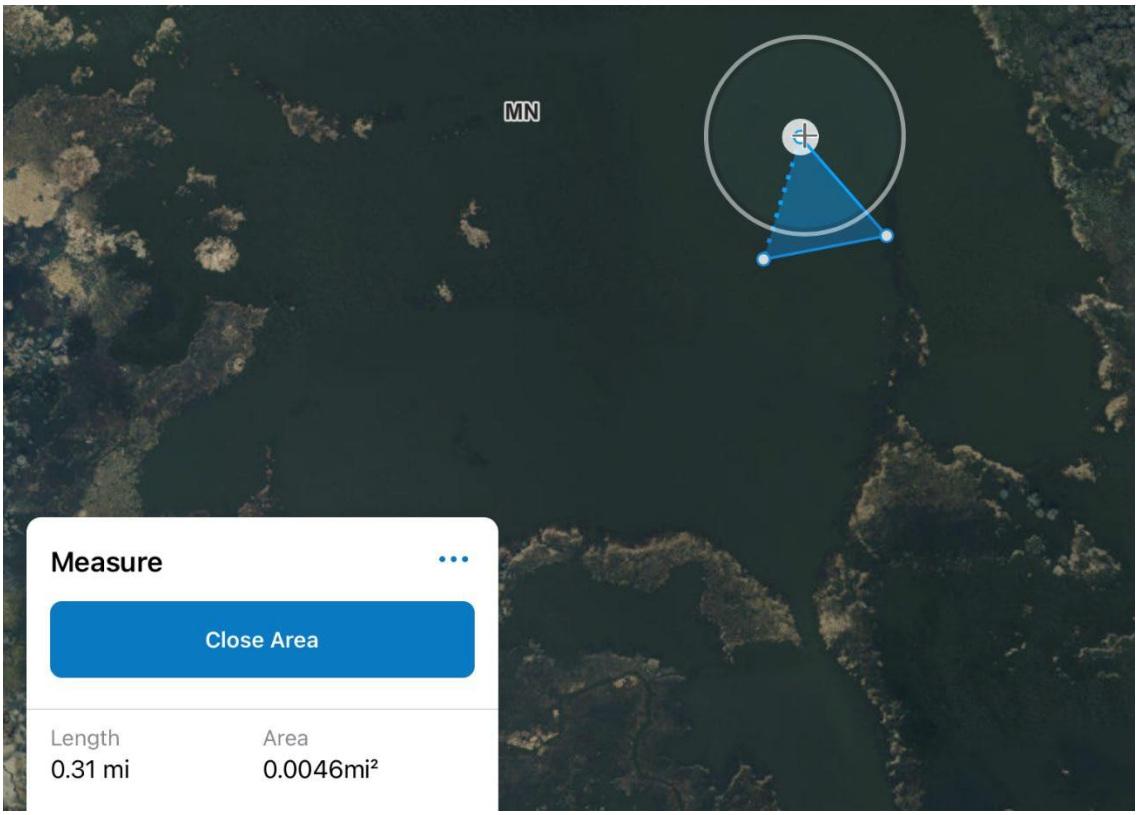

Figure 23. Within the Measure tool, distance can be measured between points.

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 Personal Markup tool from the Tool Overflow Menu.
2) Select a point type from the Choose a Type menu. Draw or Tap on the map to create a point on the map. Use the ribbon menu to delete the feature, add a note

to the feature, or change the point color or name of point. Select “Close” when finished (Figure 25).

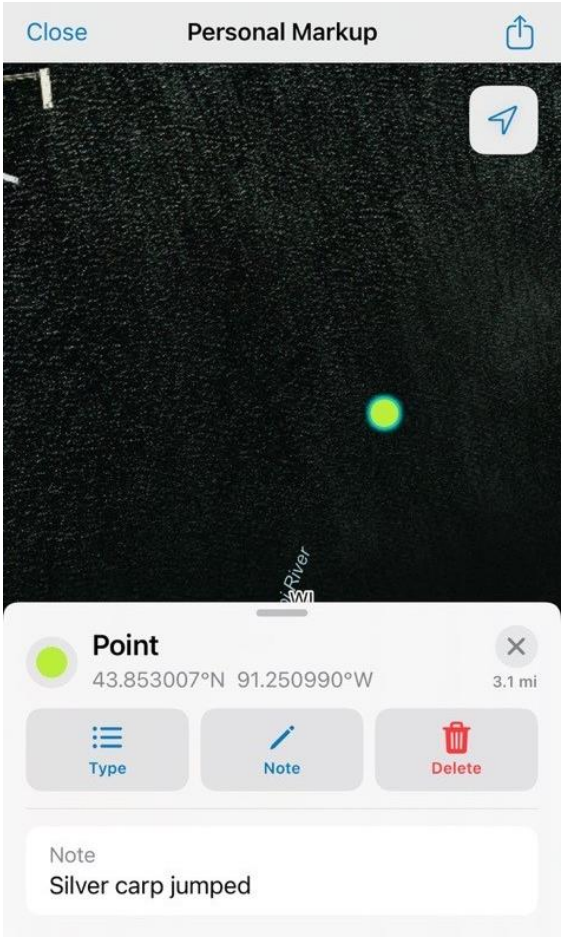

Figure 24. Labels and Notes can be added to a point feature.

3) Long tap on the map with a point selected to add a line or polygon to the map (Figure 26).

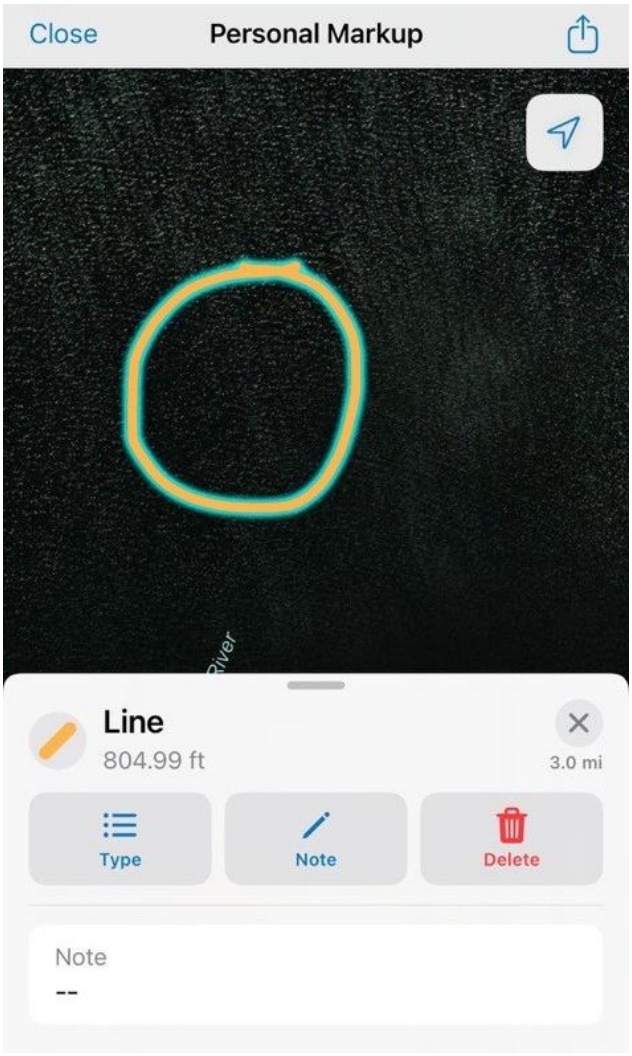

Figure 25. Another way to add a line or polygon to the map is to draw your area on the map.

4) Select the “Share” icon in the top ribbon when finishing adding Markup features to take a Screenshot Image or share the Markup Layer externally (Figure 27).

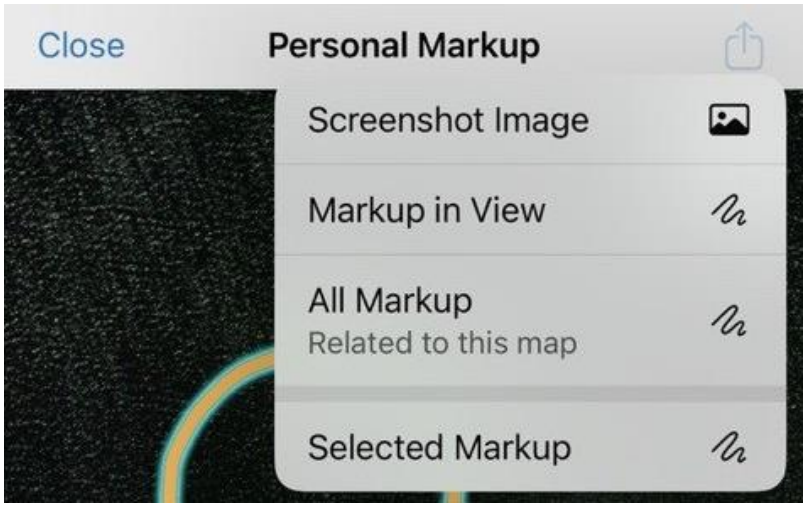

Figure 26. The share icon within the Markup ribbon offers several options such as Screenshot image, Markup in View, All Markup, or Selected Markup within the dropdown menu.

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 an offline map by selecting the three point (Overflow) menu icon on the Fisheries eDNA Sampling Map. Select “Add Offline Area (Figure 28).

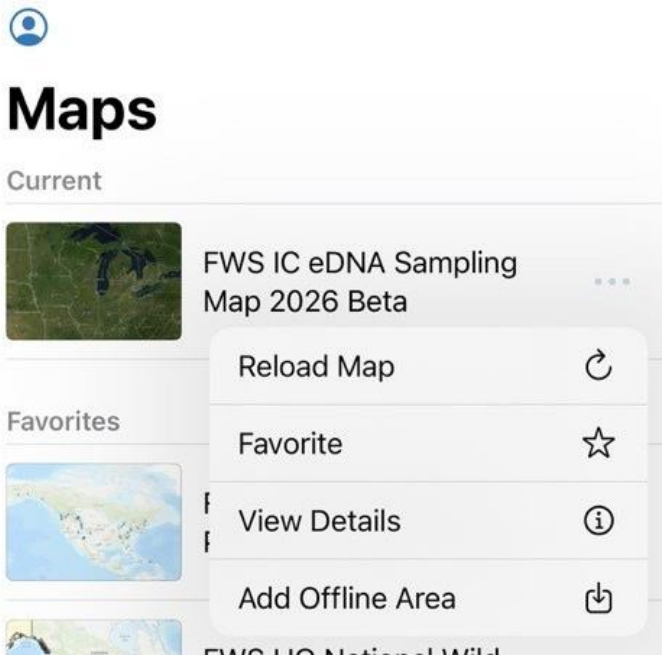

Figure 27. The three point (Overflow) menu icon will display a pop-up menu with additional options including View Details, Add Offline Area, Favorite, and Reload Map.

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 (Figure 29 and Figure 30).

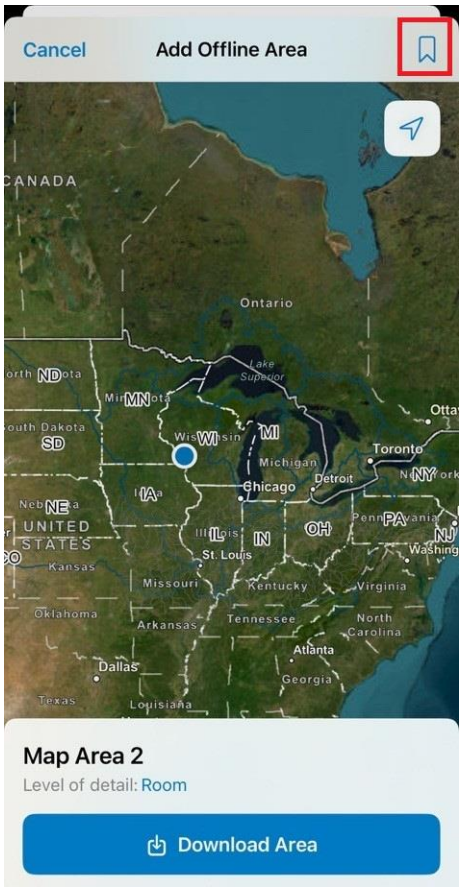

Figure 28. Within the Add Offline Area, zoom into your selected area or select the Bookmark icon in the upper right-hand corner.

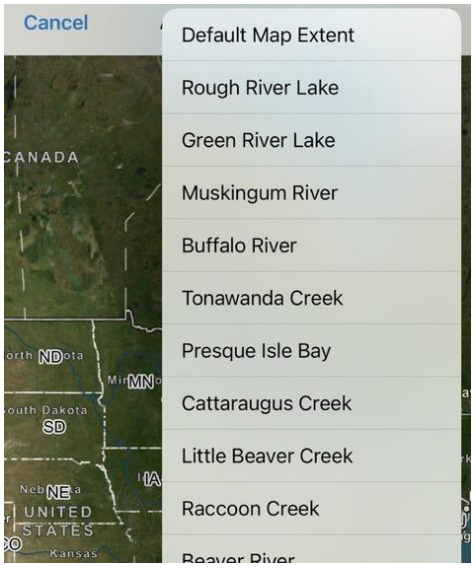

Figure 29. The Bookmarks tool also shows areas of interest instead of zooming on the map.

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 (Figure 31). Check the estimated download size to ensure that the device has enough storage space to save the basemap.

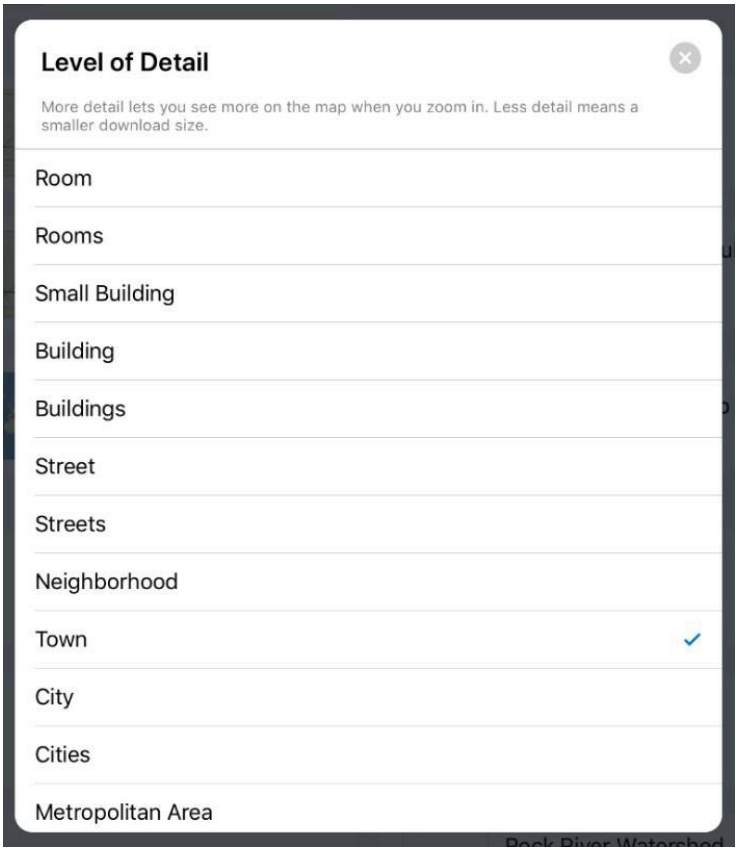

Figure 30. The Level of Detail menu offers several levels from Room up to Metropolitan Area, to set the display resolution of the basemap.

4) Once defined, select “Download Area” to store the offline area on your iPad device (Figure 32).

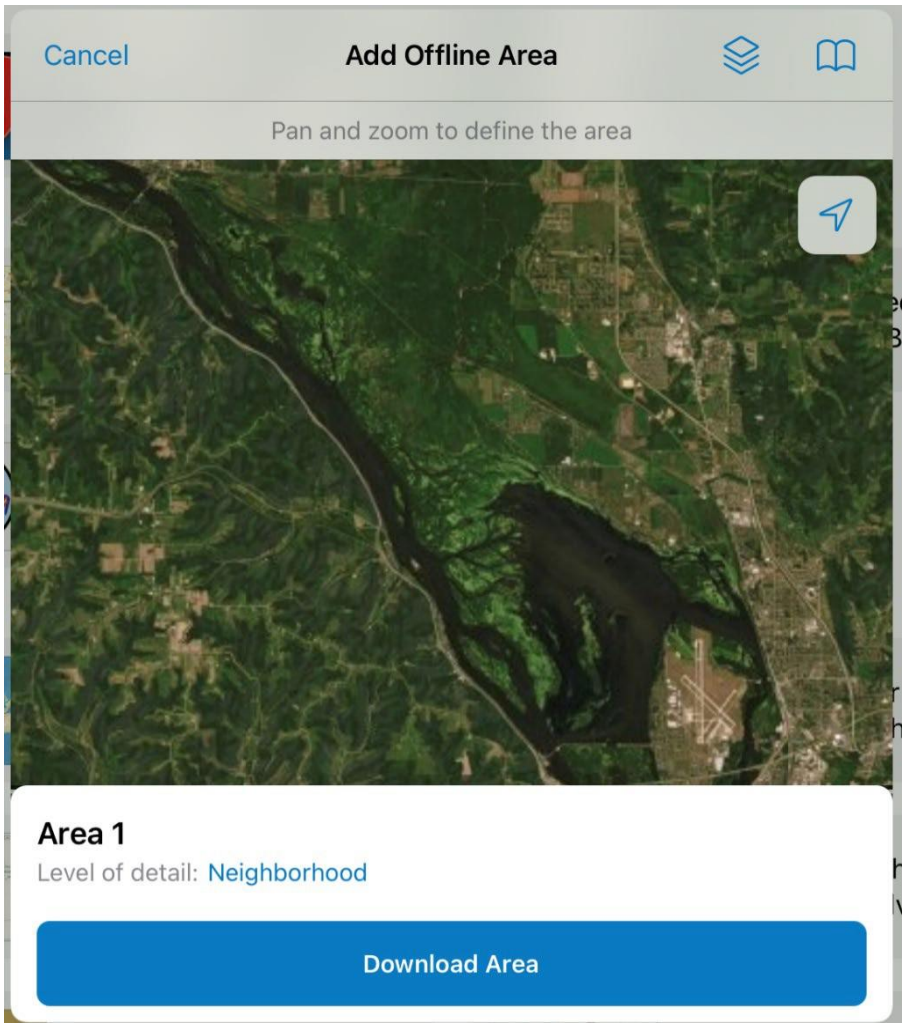

Figure 31. Store the offline area to your iPad by selecting the Download Area button within the Add Offline Area tool.

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 (Figure 33).

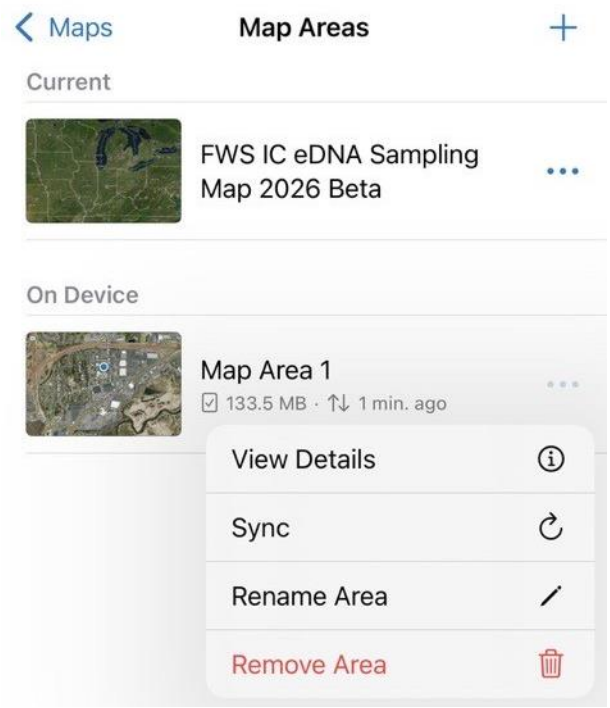

Figure 32. Rename the area by clicking on the three-point (Overflow) menu on the desired area.

7) If needed, select the plus icon in the top menu in the upper-right hand corner of the window to download more offline areas or use the three-point icon (overflow) menu on the online map to download another offline area (Figure 34).

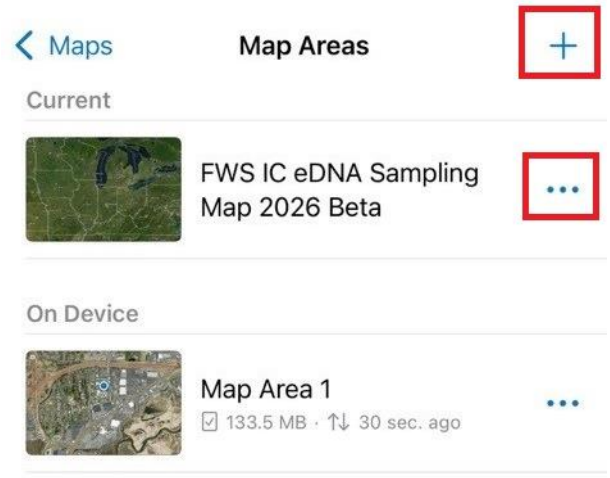

Figure 33. Use the plus icon in the top menu or the three point (overflow) menu next to the online map within the Map Areas Window to download additional Offline Areas.

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 (Figure 35).

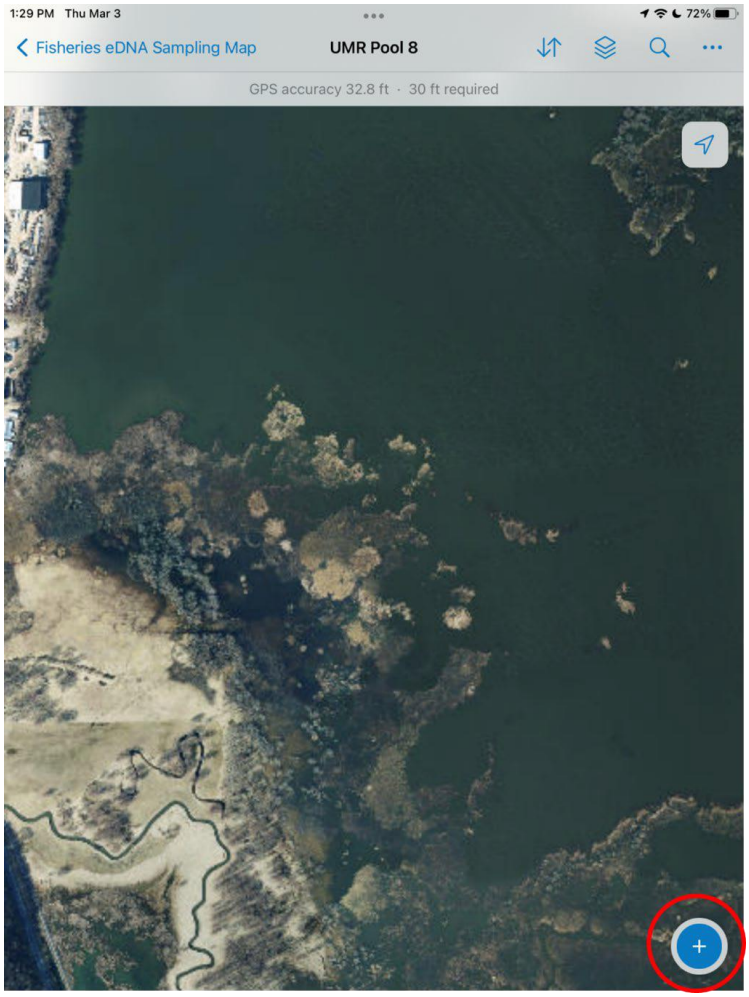

Figure 34. Use the highlighted plus sign in the lower right corner to collect a new feature.

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) Ensure the correct sampling protocol is selected (non-traditional sampling fields will not appear otherwise). The eDNA Monitoring of Invasive Carps is selected by default.
4) Use the location name key **to determine what to select for Waterbody and ensure to fill out the corresponding Site Name if applicable**
5) The fields for the point can then be edited by selecting each of the field names (Figure 36). 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.

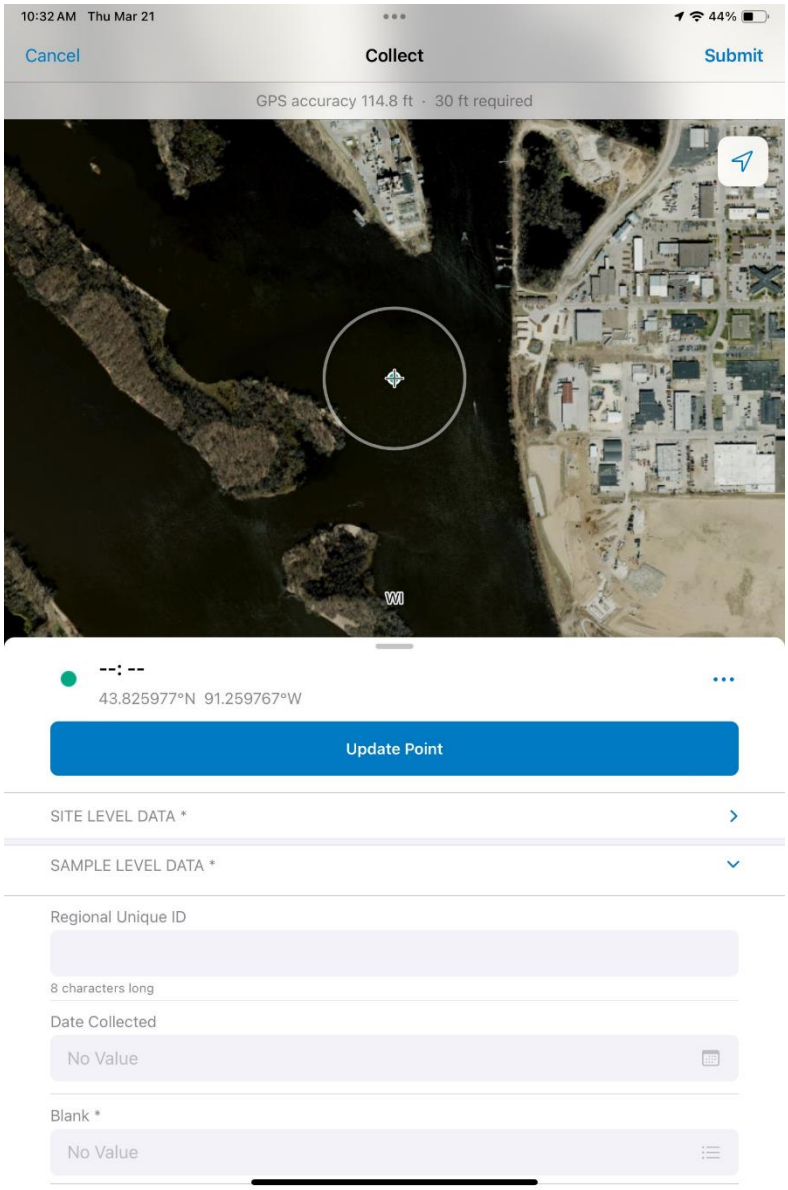

Figure 35. Additional data such as Site Level Data, Sample Level Data, Regional Unique ID, Date Collected, and Blank can all updated for each point.

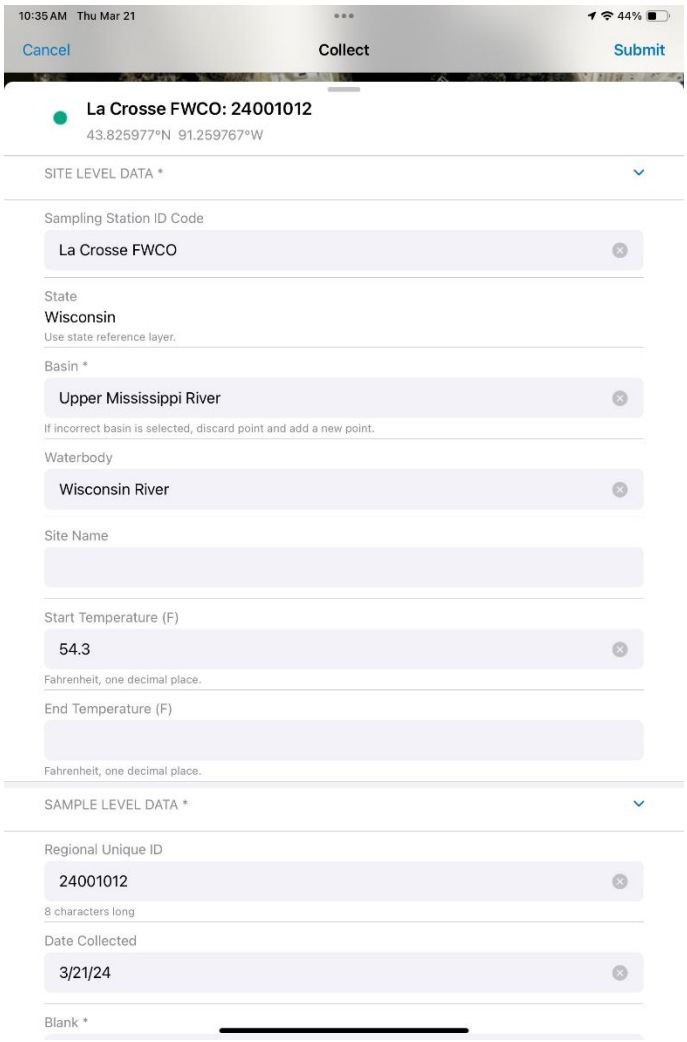

Figure 36. An example of additional data completed for point La Crosse FWCO 24001012.

6) 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 (Figure 37).

7) If the Estimated Accuracy window appears for the Bad Elf device, select OK and continue collection (Figure 38).

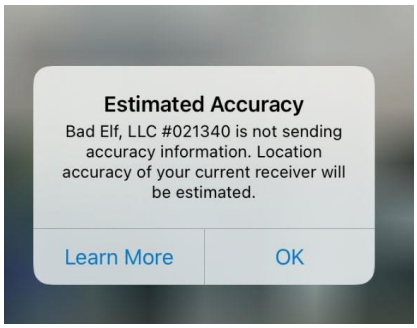

Figure 37. The Estimated Accuracy pop-up window will alert the user if the Bad Elf is not sending accuracy information.

Important! Please make note of any environmental conditions that may affect the quality of samples in the comments field. Comments field is limited to 500 characters so be concise.

8) 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 (Figure 39).

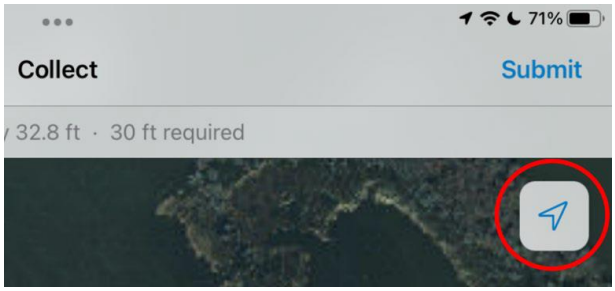

Figure 38. To update coordinates, select the Update Point (arrow) icon.

9) 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 (Figure 40).

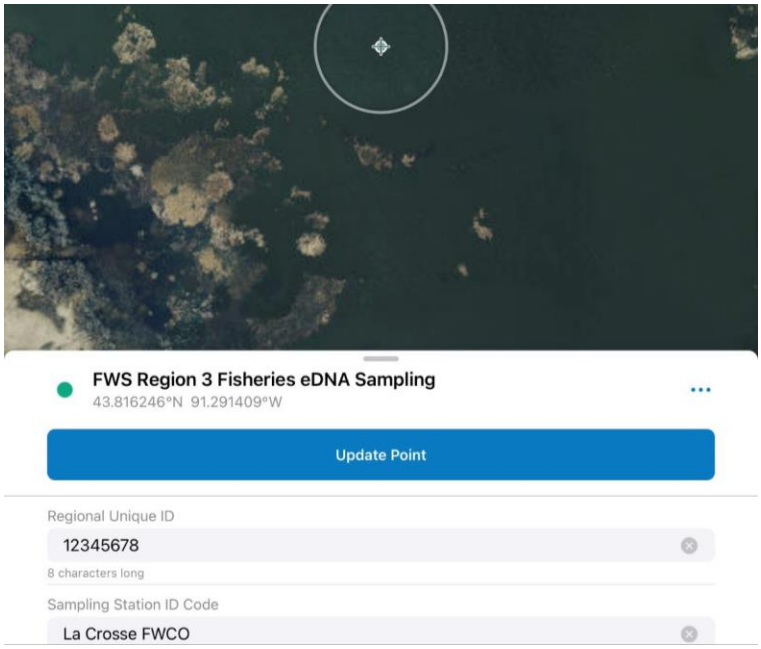

Figure 39. Scale down the data collection window by dragging down the gray bar.

10) 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.

11) 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 (Figure 41).

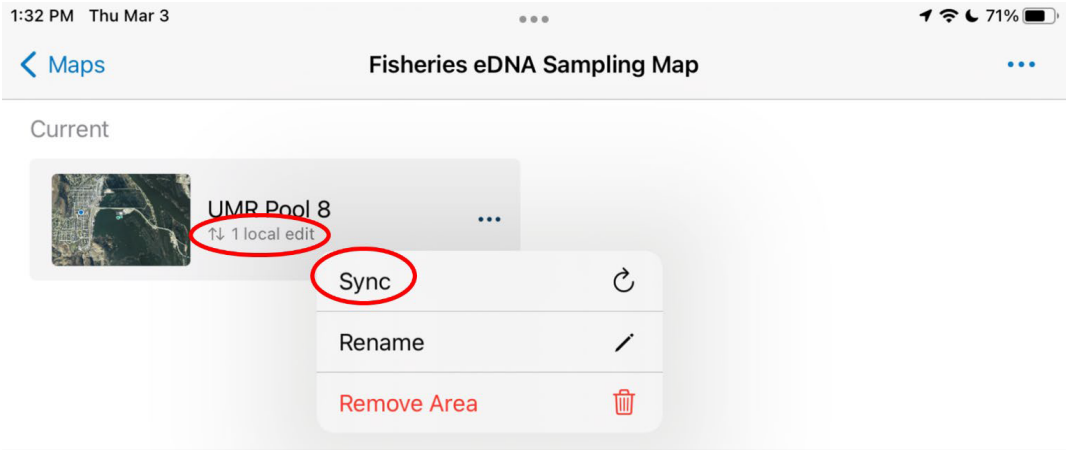

Figure 40. Uploading the data will require accessing the Sync feature within the three point (Overflow) drop down menu of the desired offline area.

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 (Figure 41).

12) Data may also be synced in the map by using the sync icon in the offline map (Figure 42).

Figure 41. An example of the sync icon.

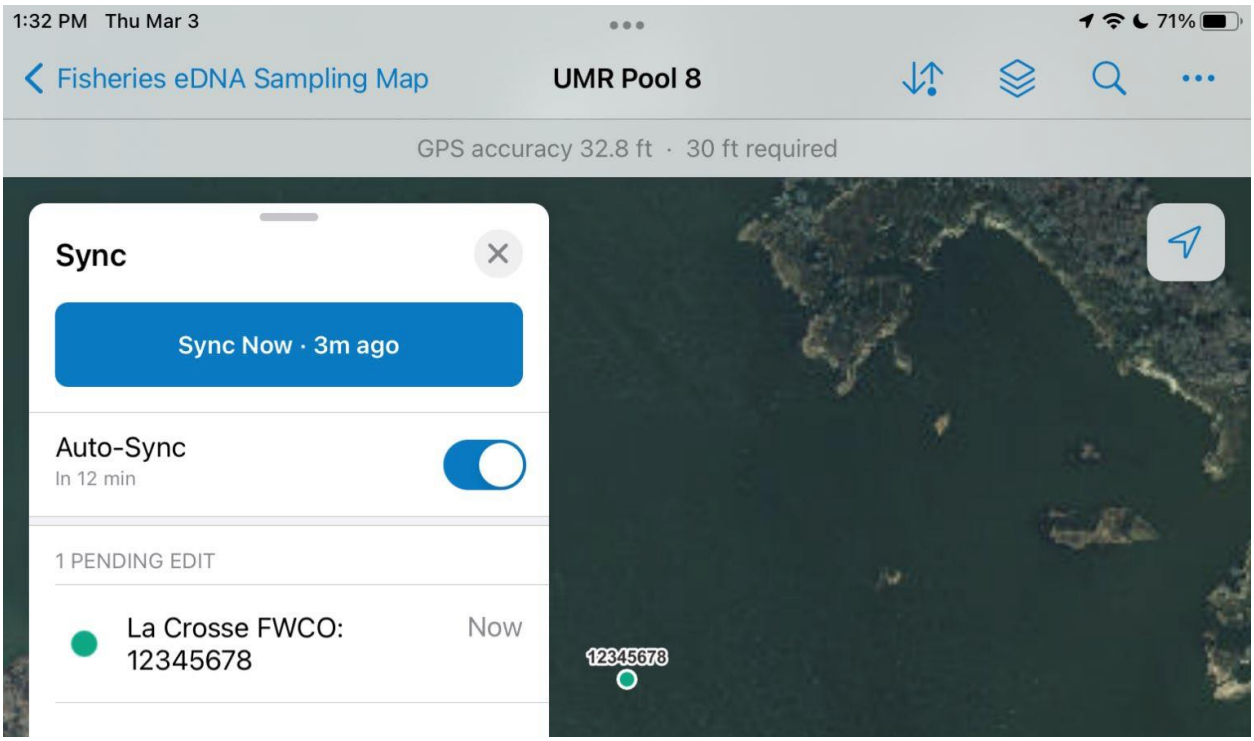

Figure 42. Within the desired offline area sync tool, auto-sync is displayed as enabled.

13) Auto sync may be enabled using the sync icon within the offline map (Figure 43).

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 (Figure 44).

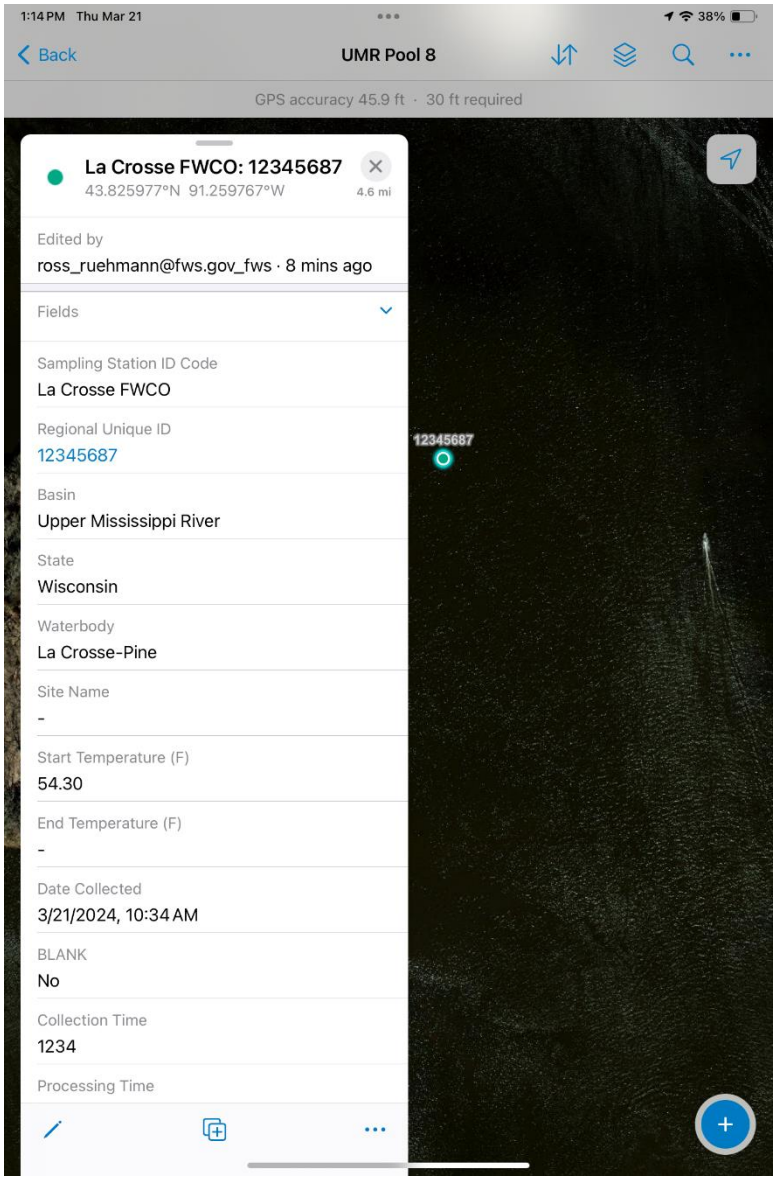

Figure 43. The feature form window will appear when selecting the point.

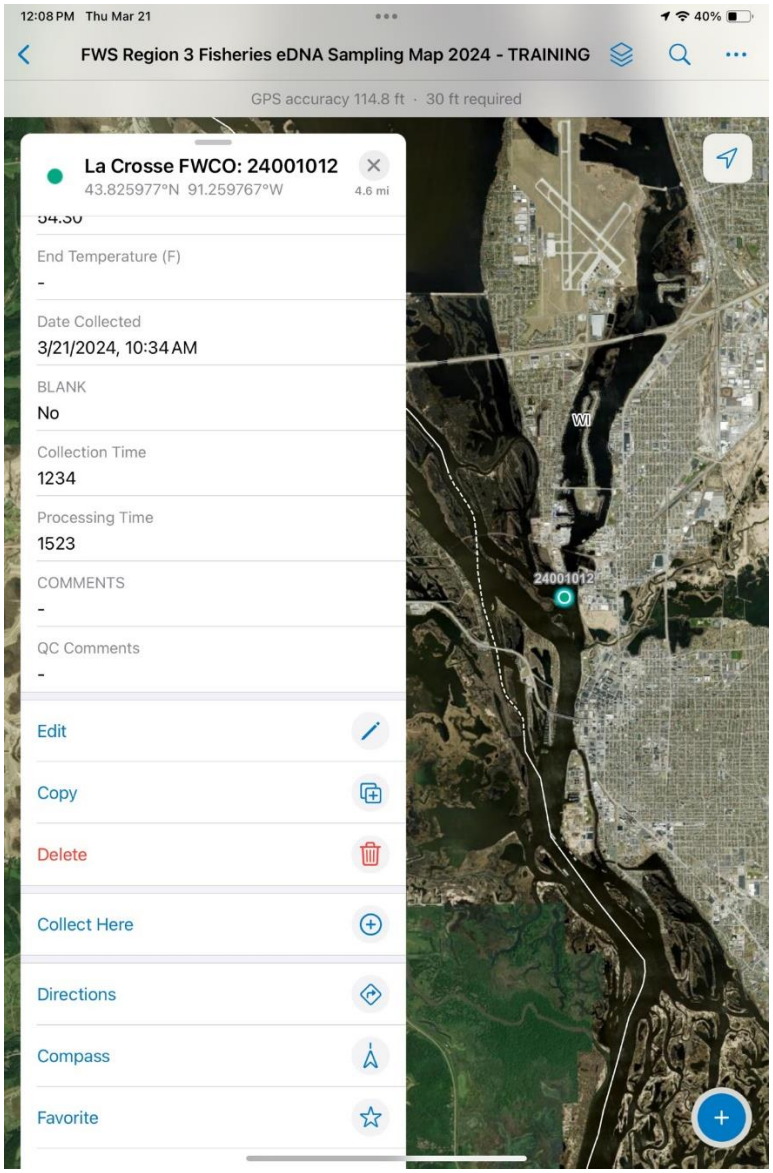

Figure 44. Scroll down in the feature form to access the edit, copy, or delete options.

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 (Figure 45).

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 (Figure 46). 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.

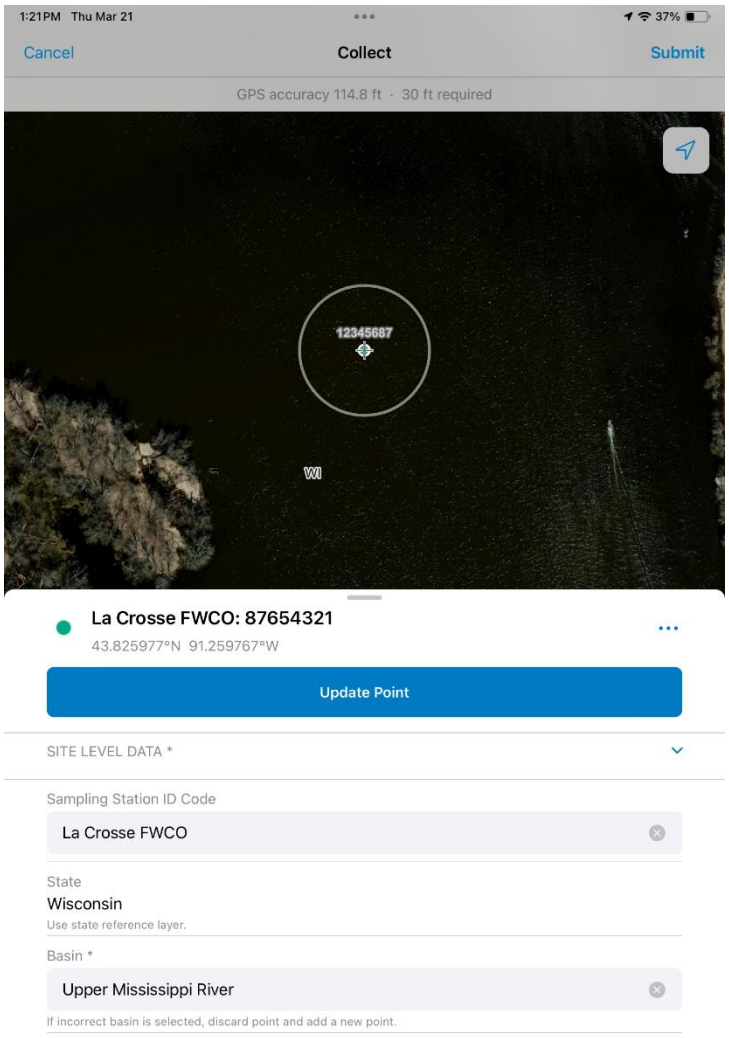

Figure 45. Placing a copied point on top of a blank point.

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

4) To unsnap points, tap on the points to edit (Figure 47).

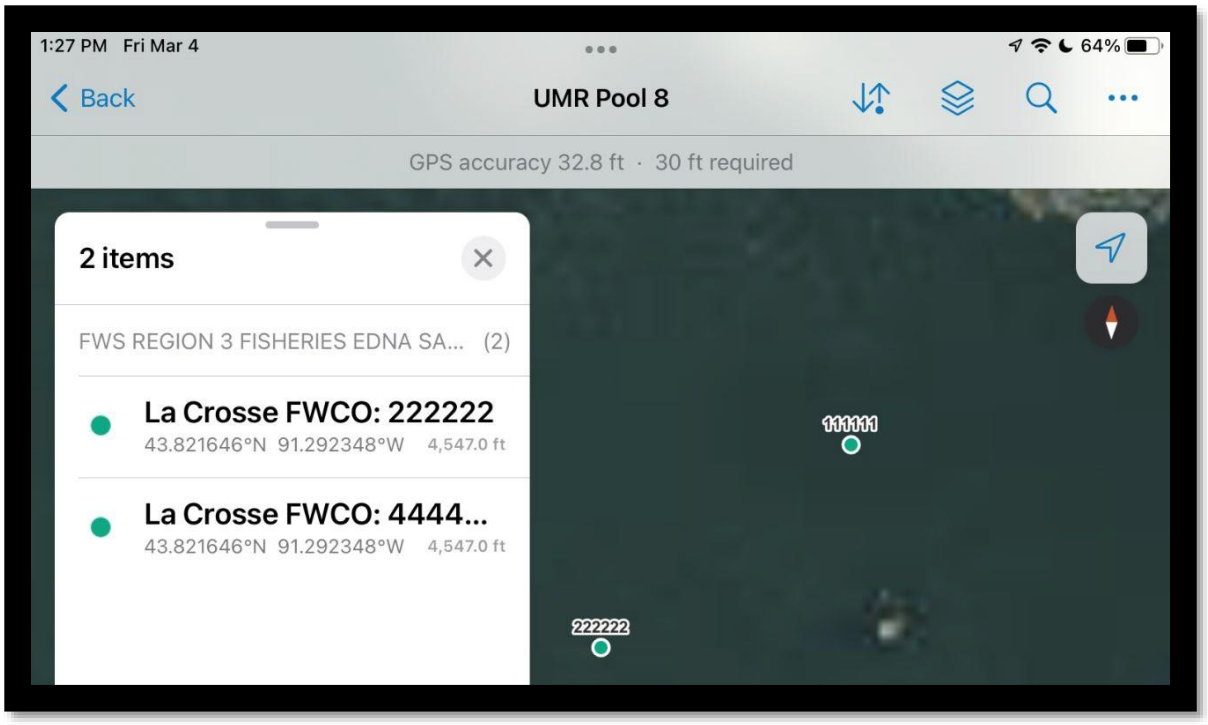

Figure 46. Select the desired points to disable snapping.

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 (Figure 48) and select “Edit Multiple”.

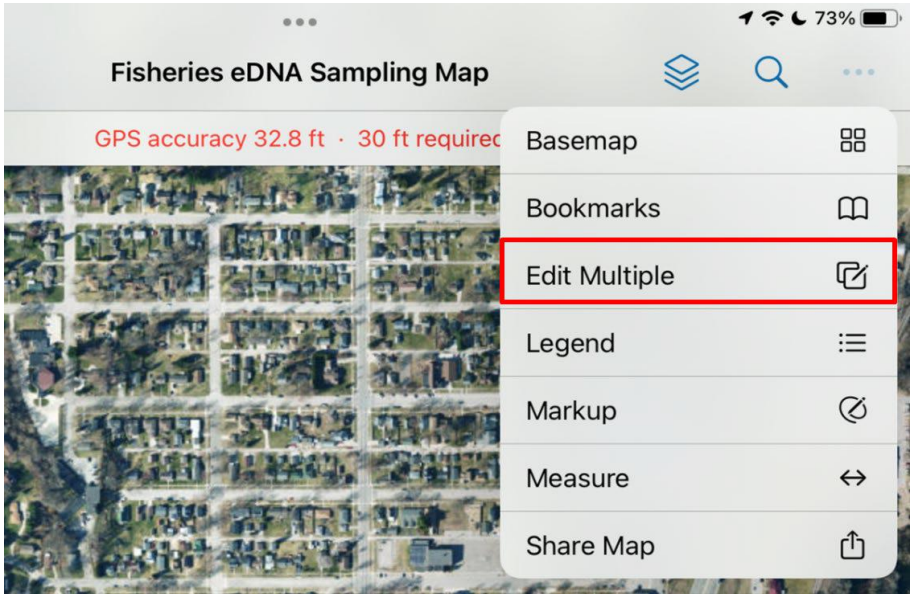

Figure 47. Use the three point (Overflow) menu icon to select the Edit Multiple tool.

7) Next, select the points on the map you would like to batch edit and select “Continue” to batch edit or cancel to exit (Figure 49).

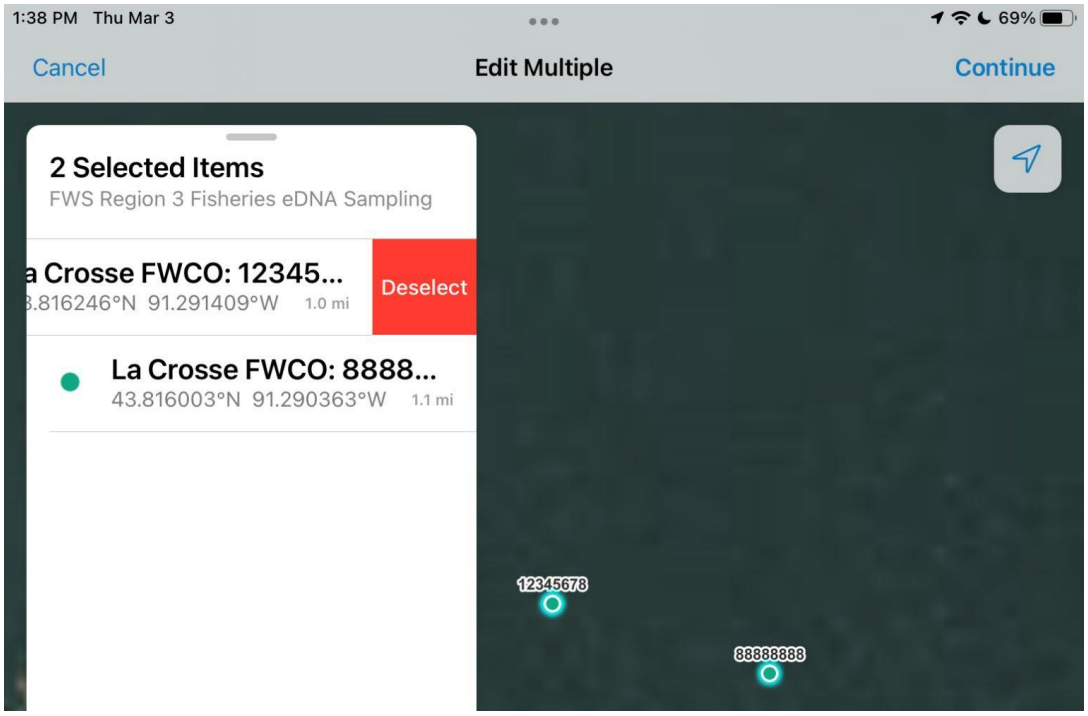

Figure 48. In the Edit Multiple tool, swipe left on a point and click deselect to deselect the point.

8) You can deselect any point by swiping to the left and selecting “Deselect” (Figure 49).

9) After selecting Continue, you can batch edit the points selected (Figure 50). 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.

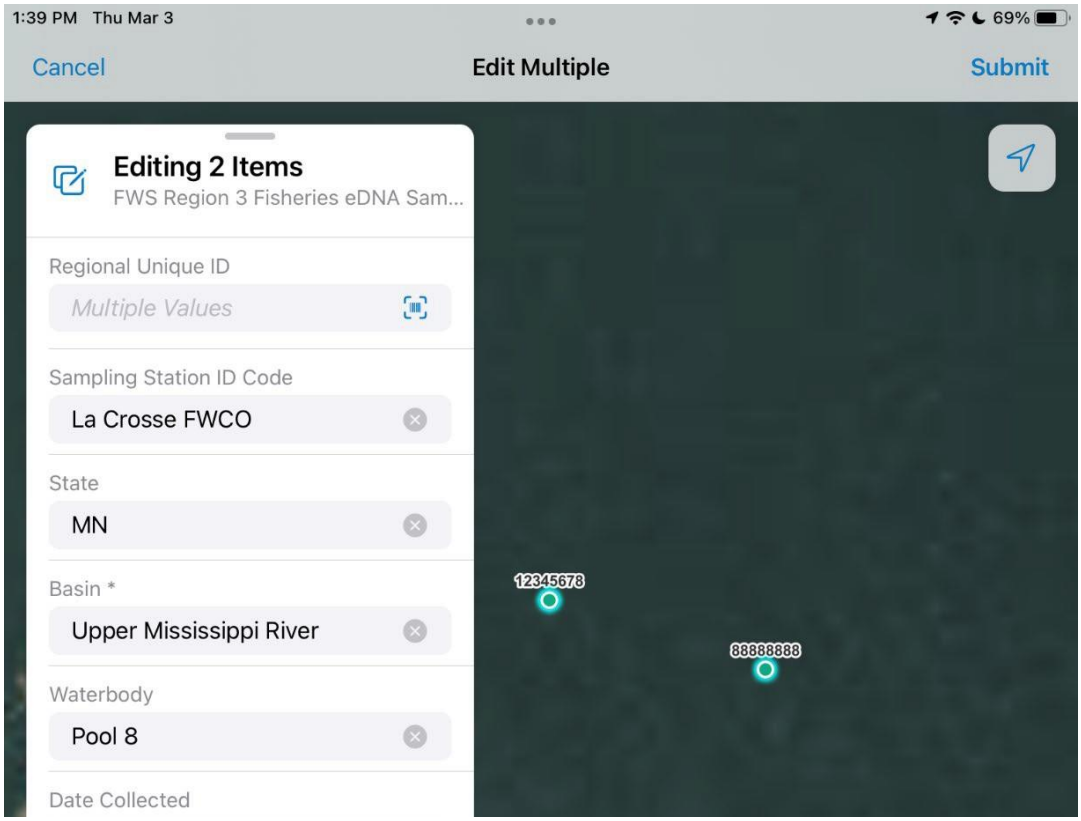

Figure 49. Batch editing multiple points in the Edit Multiple tool.

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 (Figure 51).

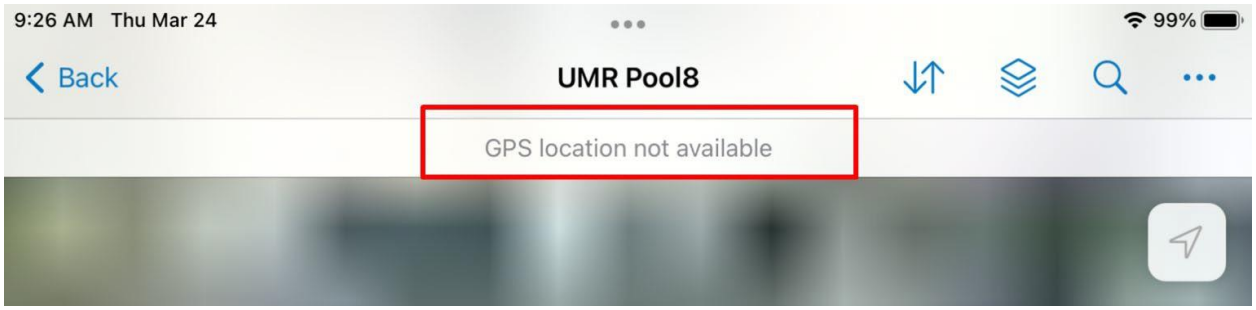

Figure 50. “GPS location not available” will appear in the ribbon if the GPS becomes disconnected.

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 (Figure 52).

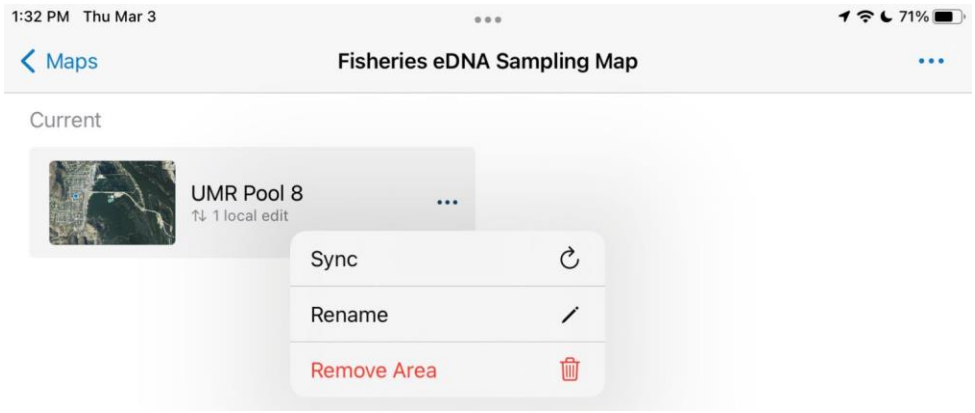

Figure 51. Fisheries eDNA Sampling Map grouping showing current offline areas where data is being collected in offline mode.

2) To change back to online mode, the three-point (Overflow) menu icon next to the offline area should be selected (Figure 52). 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 Jeena Koenig to have points cleared from the map after QA/QC of the data (refer to **Appendix A).**