MONTANA
Department of Transportation

ENVIRONMENTAL FIELD INVENTORY MANUAL

DATA COLLECTION FOR MDT'S BIOLOGISTS

A SYSTEMATIC MANUAL FOR GIS DATA COLLECTION USING FIELD MAPS

Preparing the iPad for Offline Data Collection

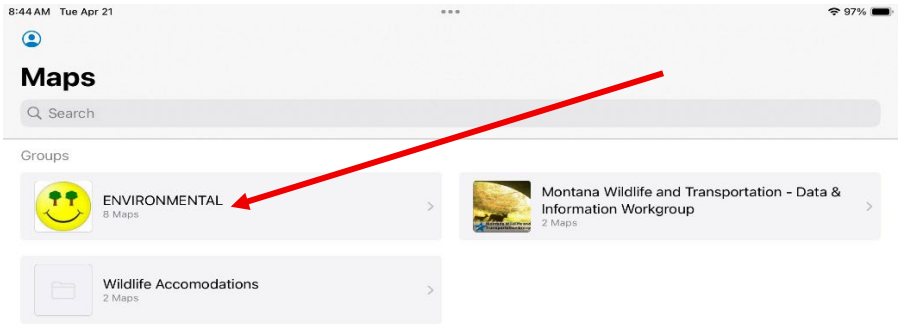
This next portion must be completed with a Wi-Fi Connection

These steps will need to be completed in the office prior to going out in the field. You will use the **MDT Wi-Fi MontanaMobility** connection when at the office. Your Wi-Fi connection at home (or anywhere) will work as well.

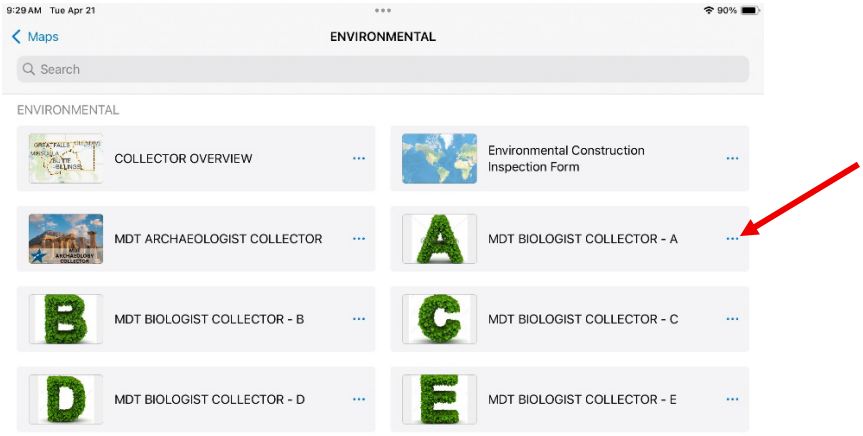
1. Turn on the iPad.
2. Clear all existing apps by double tapping the Home button, this will come in handy later.
3. Connect to the Wi-Fi Network.
    a) Go to the **Settings App**, Choose **Wi-Fi** from the **Settings Menu**, verify the Wi-Fi is turned on.
    Choose a network: Tap on the desired network under the list of available Wi-Fi Networks.
        i. Use the ***MontanaMobility*** Wi-Fi Network when in the HQ building. It should automatically connect with no need for a password.
            1. You can also use the **MDT-Guest-Registered** Wi-Fi which uses your U#### and normal windows password to log in.
            2. **Accept** the End User Agreement.
            3. This will open the Montana.gov website.
4. Open the **Field Maps** app on the iPad.
5. Click the **Sign in with ArcGIS Online** button:
    a) A dialog box will pop up. Click the **Your ArcGIS organization's URL** button.
    b) Next, type in **mdt** to the text box to complete the path **mdt.maps.arcgis.com**. Click **continue**.
    c) In the new dialog box click the **MDT** button.
    d) Enter your **state email** in the sign in dialog box.
    e) In the next SITSD dialog box login with your **U####** and **windows password**.

Downloading Offline Maps

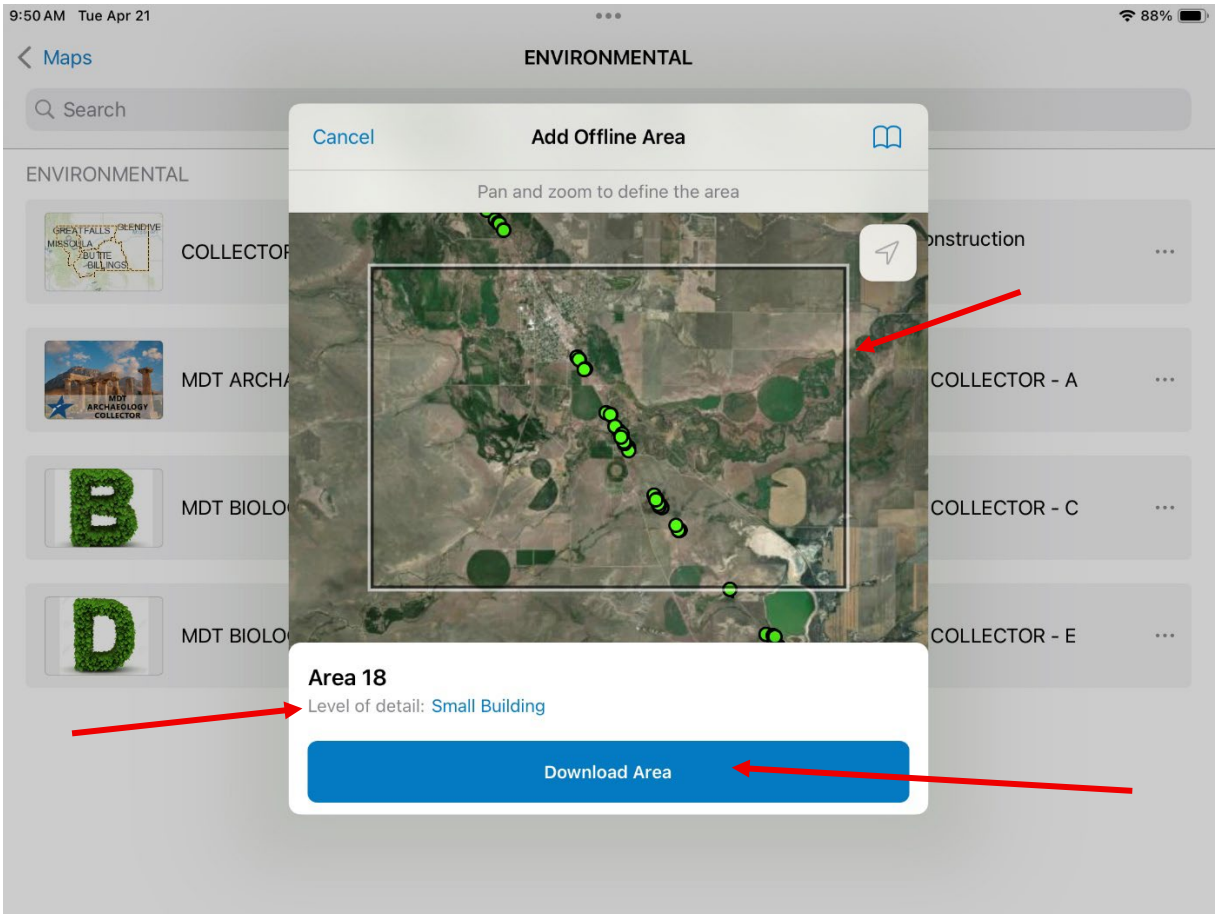
1. After signing in to Field Maps, the home screen will open.
2. Click on the **Environmental** maps tab



3. This will bring up all the Environmental Maps. The maps A-E are the maps you can download offline maps on, for a total of 5 maps you can have offline at one time.
4. Click on the **three dots** next to one of the maps, A-E.
   Note: If there are not 3 dots next to a map and it says "Offline areas" instead you will first need to delete the data that was previously downloaded. Be sure you have synced data and verified that the data exists in ArcGIS Online before moving on. *See page 16 below for instructions on syncing data.*

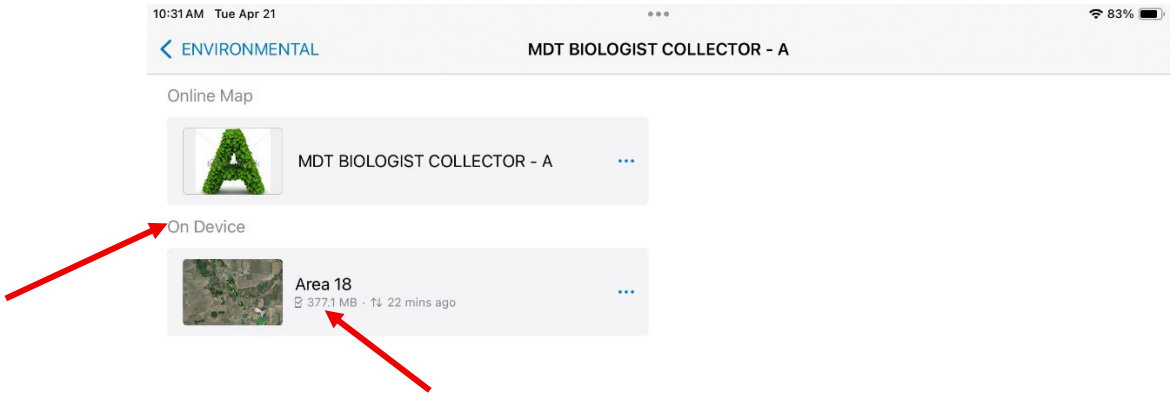


5. Click **Add Offline Area** when box pops up.
6. This will bring up an Add Offline Area box
    a) There are several choices for the **Level of Detail**. The best fit for size, detail, and download of the map seems to be Small Building or Building. This will give a box about 5 miles by 5 miles. If you have a longer project, use two or more maps (e.g. A and B) to get the entire project length in two or more offline maps.
    b) Make sure to zoom in until the aerial map changes to a more detailed map. You will notice the change (there is only one change in aerial map detail as you zoom in and out), once it changes the detail remains on the map. The aerial map has labels for some towns, some streams, and has all the previous delineations on the map. The previous delineations are downloaded with the Offline Map.
    c) The **box** shown on the aerial is the map area to be downloaded. This box disappears if you zoom in far enough, but it is still present, just off the area shown in the Add Offline Area box. Make sure the entire area you want to work in offline exists on your map(s). You cannot collect data outside of your work area (s) downloaded.
    d) Click **Download Area** button to download the selected area.



e) Depending upon the size of the area and the connection speed, this could take some time to download (several minutes). Sometimes the download will time out (Download Failed) and you will need to try and download again. If this happens more than one or two times your map may be too large to download offline. If this occurs adjust your Level of Detail in the steps above and repeat download instructions.

f) Once the offline area is downloaded the screen below will pop up and it will show that your offline area is **On Device**. It will also show the **size**. It seems like anything over 800ish MB is too large to download.



f) Your area(s) are now on the iPad for use in the field. Check to make sure the entire area you want to work in is covered by your offline map(s). **Once the areas are on the iPad for offline use, before you leave the office make sure to disconnect from the Wi-Fi otherwise your areas will not be available for use in the field.** If you do accidentally forget to turn off Wi-Fi, go to a Wi-Fi area and disconnect.

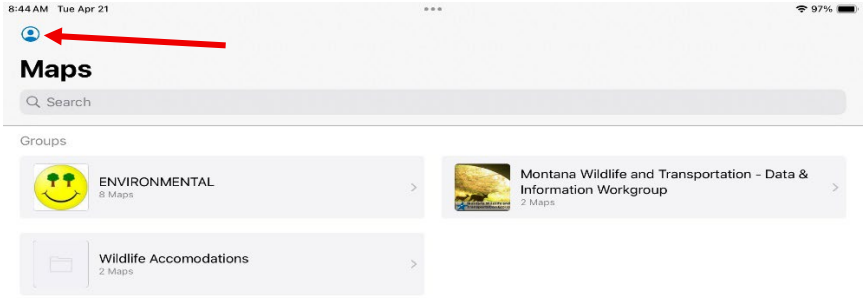
Connecting to the GPS receiver

1. Turn on the **Geode GPS Receiver**.
2. Go to Bluetooth under the Settings App on the iPad. Make sure Bluetooth is on. Look for the Geode ###### under My Devices. The ###### is the SN number on the back of the Geode receiver, but should be the only one in the area, and the only one under My Devices. The Geode should show a solid blue light in the Bluetooth location once paired successfully. If you don't see a solid blue light, repeat the pairing process. See diagram below for the light indicators on the Geode. If you have an antenna, plug that into the port and try and get the antennae/receiver in an open spot (head, shoulder, back) for better reception.
3. Close the **Settings** app on the iPad.



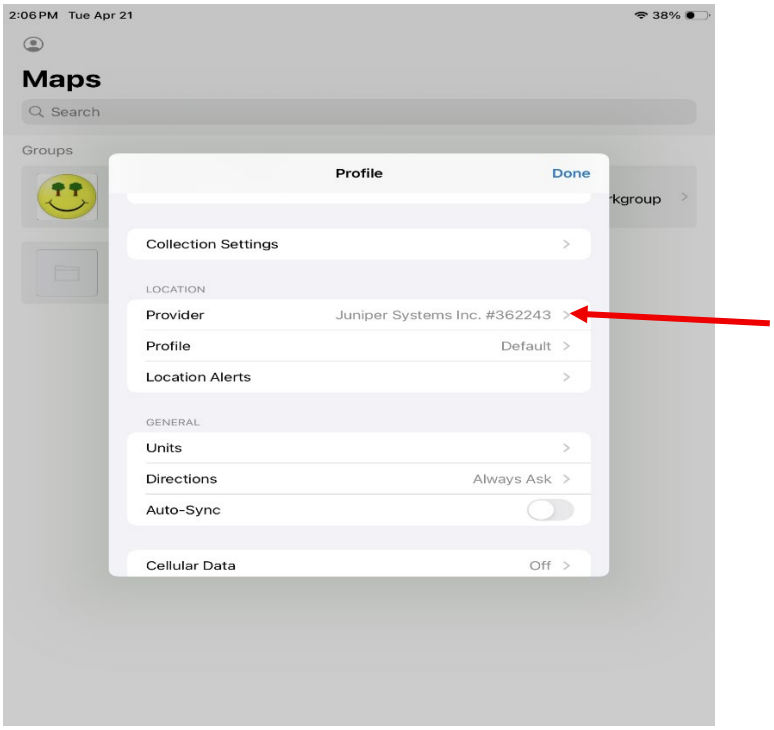
Field Maps Settings

1. Next you need to set the Provider in the Filed Maps App. Click the **Profile Icon** in the upper left corner of the Field Maps App home screen.

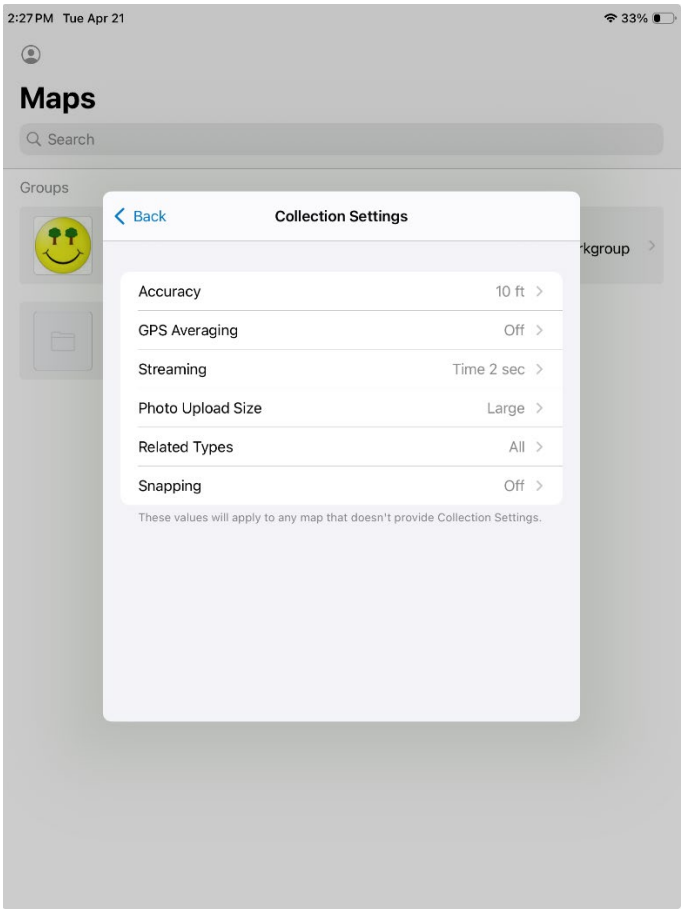


Click the **>** on the far right of the **Provider** line. Select Add in upper right of the Location Providers dialog box that pops up. The Juniper Systems Inc. #xxxxxxx should show up, click to add in the Locations Providers dialog box. Make sure the check mark is next to the Juniper Systems Inc. xxxxxx, not Integrated Receiver. It will want you to set the antennae height in meters. Set it to approximately the height of the antennae, does not need to be super accurate. Juniper Systems Inc. xxxxxx will show up on the Profile screen if it is selected correctly as shown in the picture below.

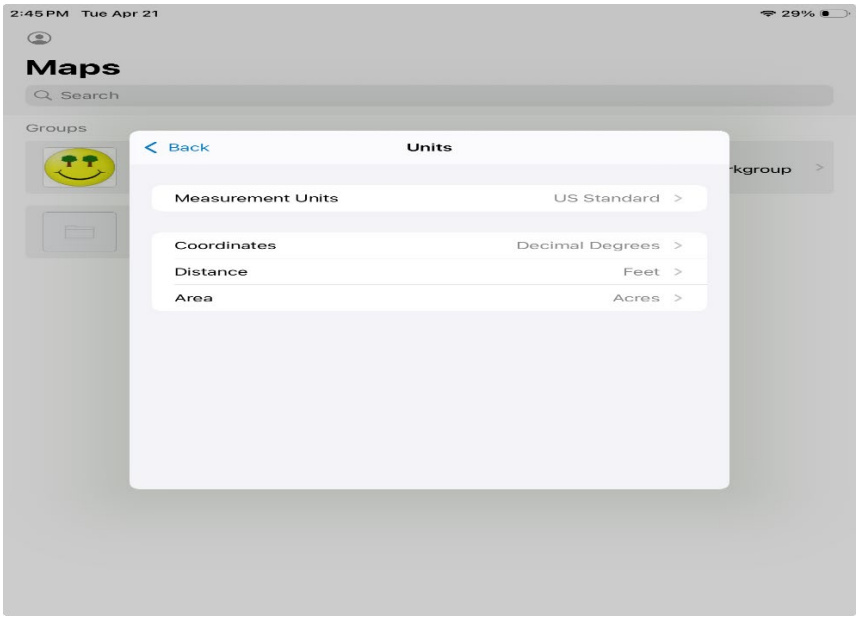
Note: *The Integrated antennae listed in Location Providers is only accurate to 16 feet, so we do not want to use that.*



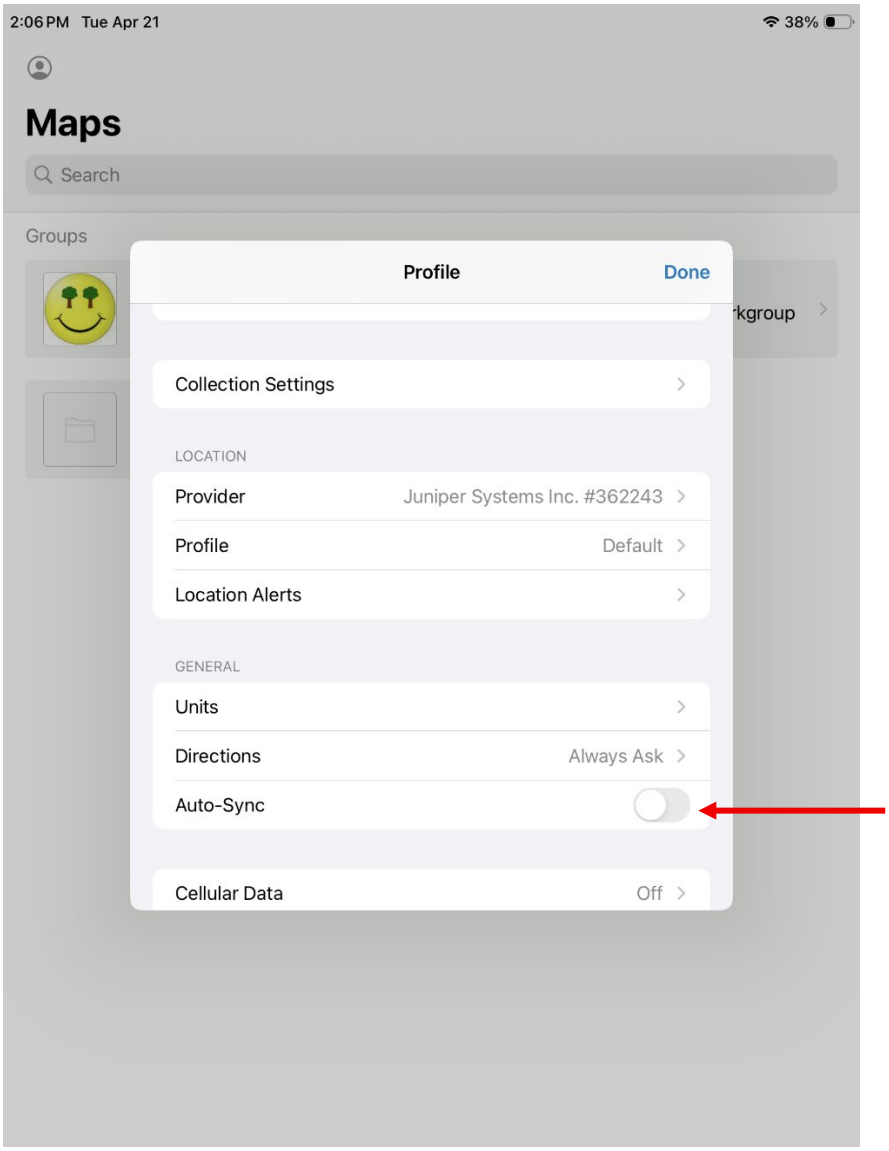
2. Select the Collection Settings in the Profile dialog box shown above. Set the **Accuracy** to 10 feet so that if the Provider we set above reverts to the Integrated Receiver no point will be collected. If this happens you will have to reset the Provider. Set **GPS Averaging** to off. Set **Streaming** to Time 2 sec. Set **Photo Upload Size** to Large, turn on **Show Related Types** so it shows All like below, leave **Snapping** off.



3. Click Units > in the Profile dialog box. Set the units as shown below.



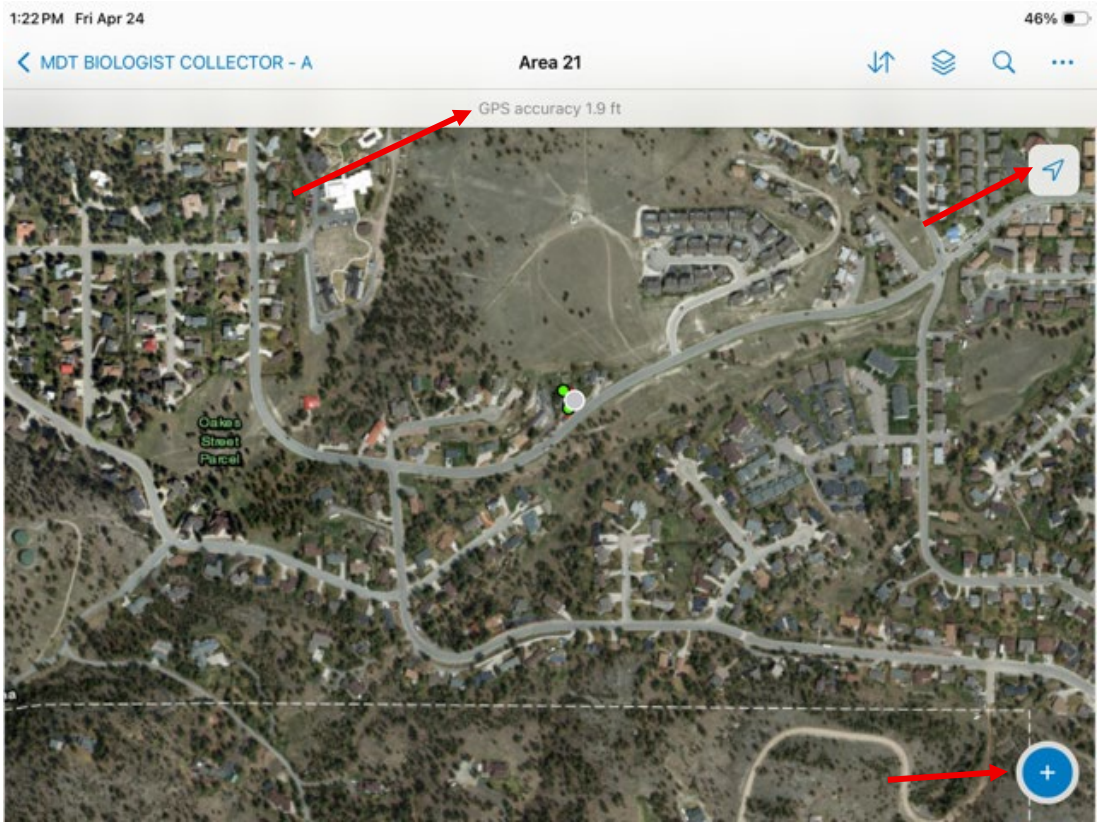
4. Make sure the **Auto-Sync** button is Off in the Profile dialog box as shown below.



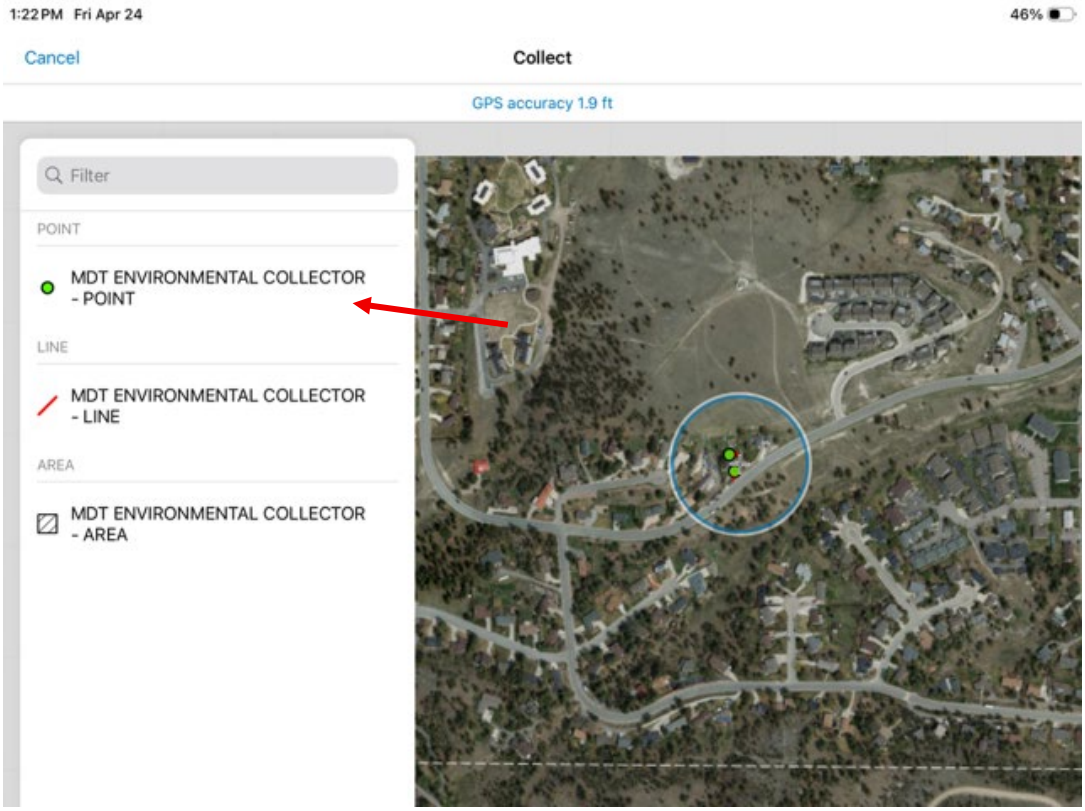
Collecting Data in the Field

Collecting a Point

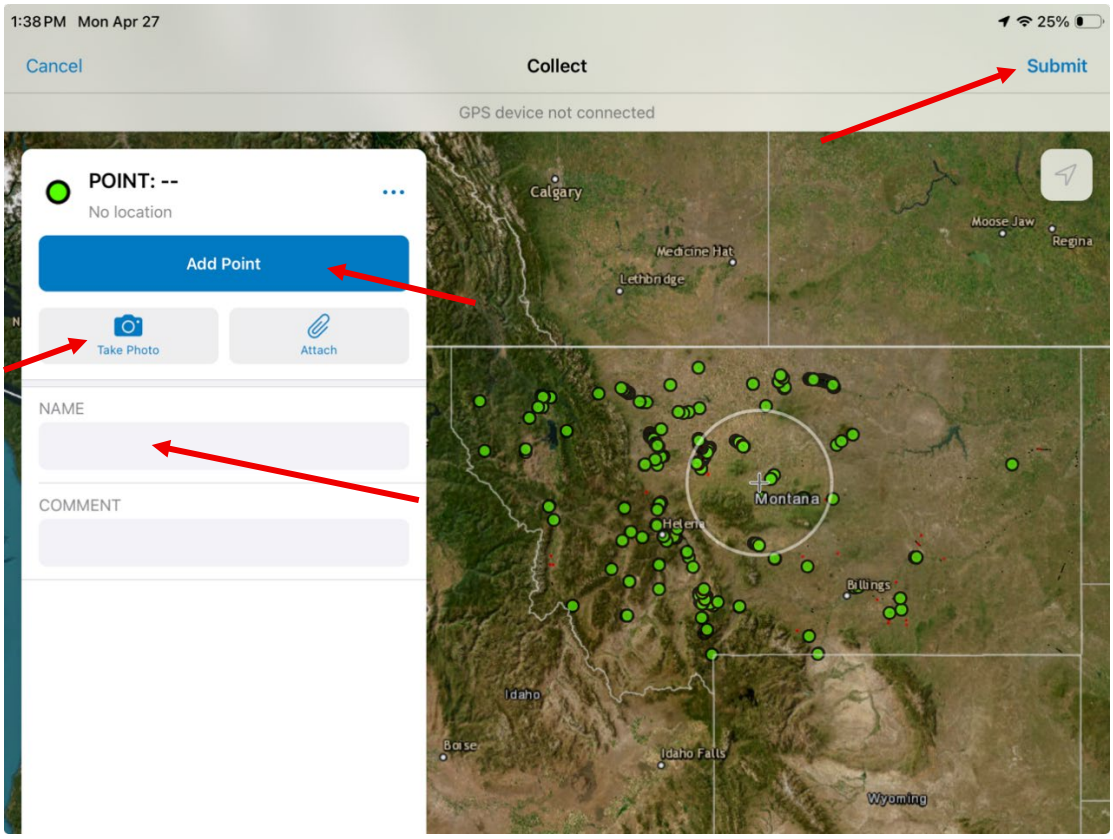
1. When you arrive at the desired location to collect data turn on the Geode Receiver and connect as shown above in the Connecting to the GPS Receiver section above. Your settings should stay with your profile, but you can double check those. Open the offline map you saved for the project in the Field Maps app. Allow the Field Maps App some time to acquire satellites by having the receiver/antennae out in the open with a clear view of the sky. Most of the satellites are to the south.
2. View the **GPS accuracy** in the upper portion of the screen. This should be sub-meter (3.3 feet) to meet ACOE requirements for delineation.
3. Tap on the **arrow button** in the upper right of the map screen; this will pan and center the map to your location.
4. Tap the + **icon** on the lower right-hand side of the app to expand the Collect a New Feature menu.



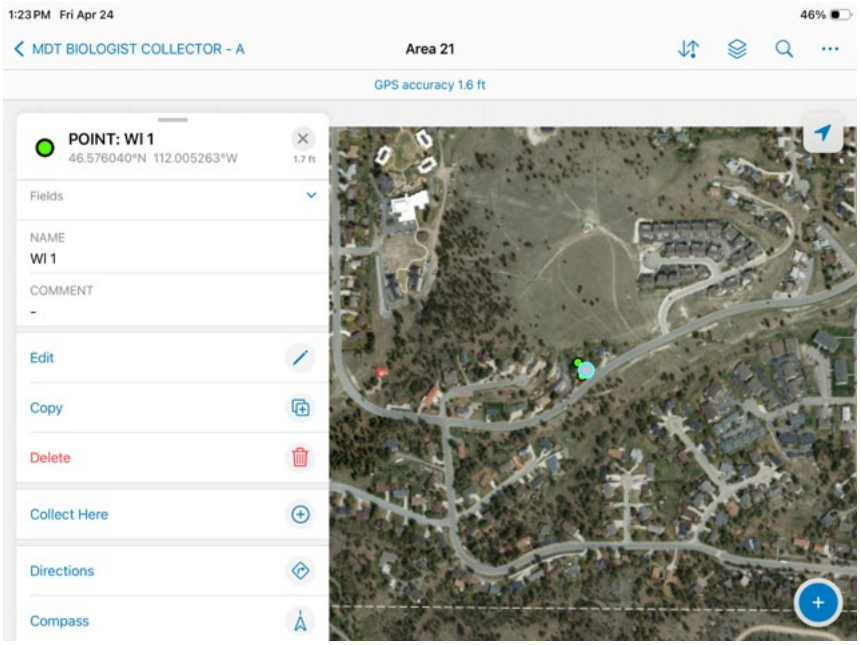
5. Once you tap the + in the lower right corner it brings up the collect a feature menu as shown below. This is where you select Point, Line, or Area to collect.
6. Click on **Point**.



7. When you click on the point selection the screen below shows up. Click the **Add Point** button to add a point where you want the point location. You can also N**ame** the point by clicking in the space below name, a keyboard will appear, and you can name it. Add a photo associated with the point by clicking **Take Photo;** tap use photo or retake photo on the photo screen. When you are done click **Submit** in the upper right to record the point.



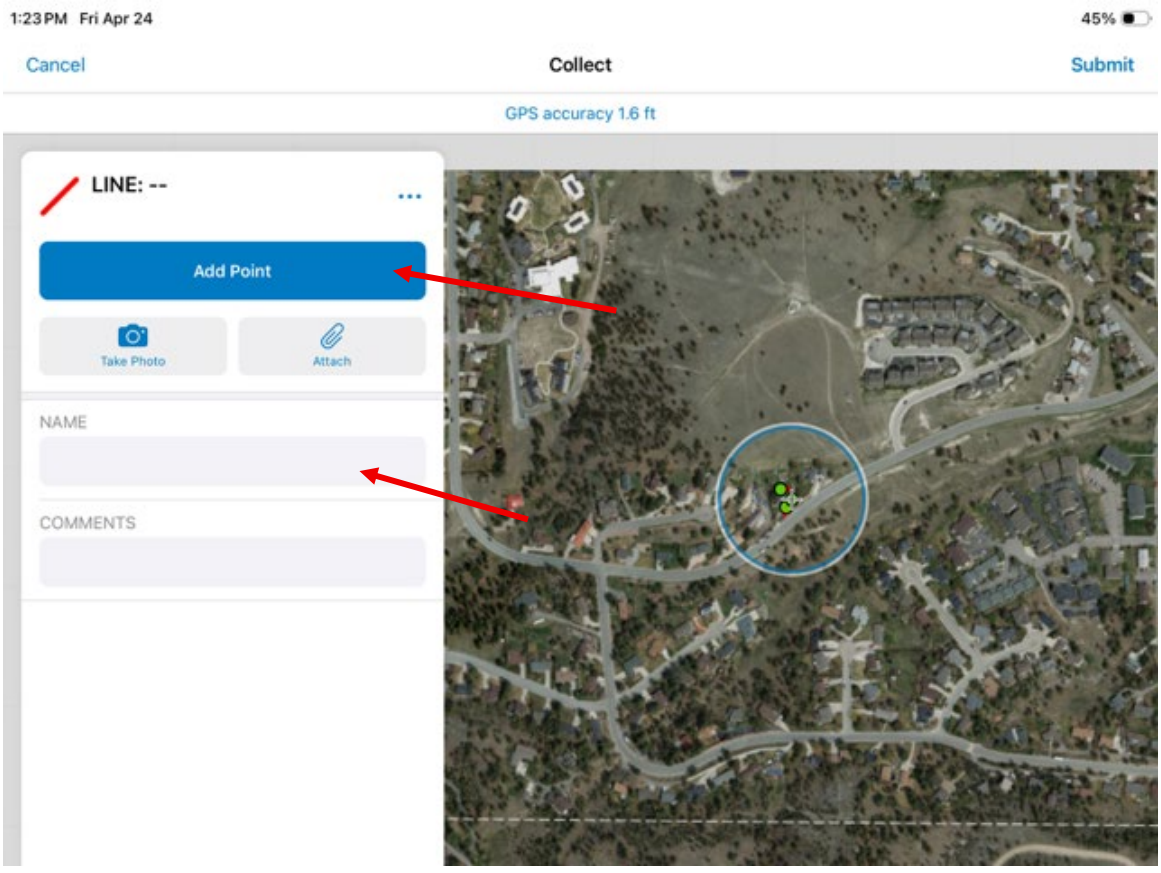
8. The screen below will appear allowing you to see the name. You can edit or delete the point here; the point will be highlighted in bright green on the map. If you click Edit in the screen below you can Take a Photo or edit the location of the point. If you edit the point, you have to click Update.


1:23 PM Fri Apr 24
46%
MDT BIOLOGIST COLLECTOR - A
Area 21
GPS accuracy 1.6 ft
POINT: WI 1
46.576040°N 112.005263°W
1.7 ft
Fields
NAME
WI 1
COMMENT
-
Edit
Copy
Delete
Collect Here
Directions
Compass

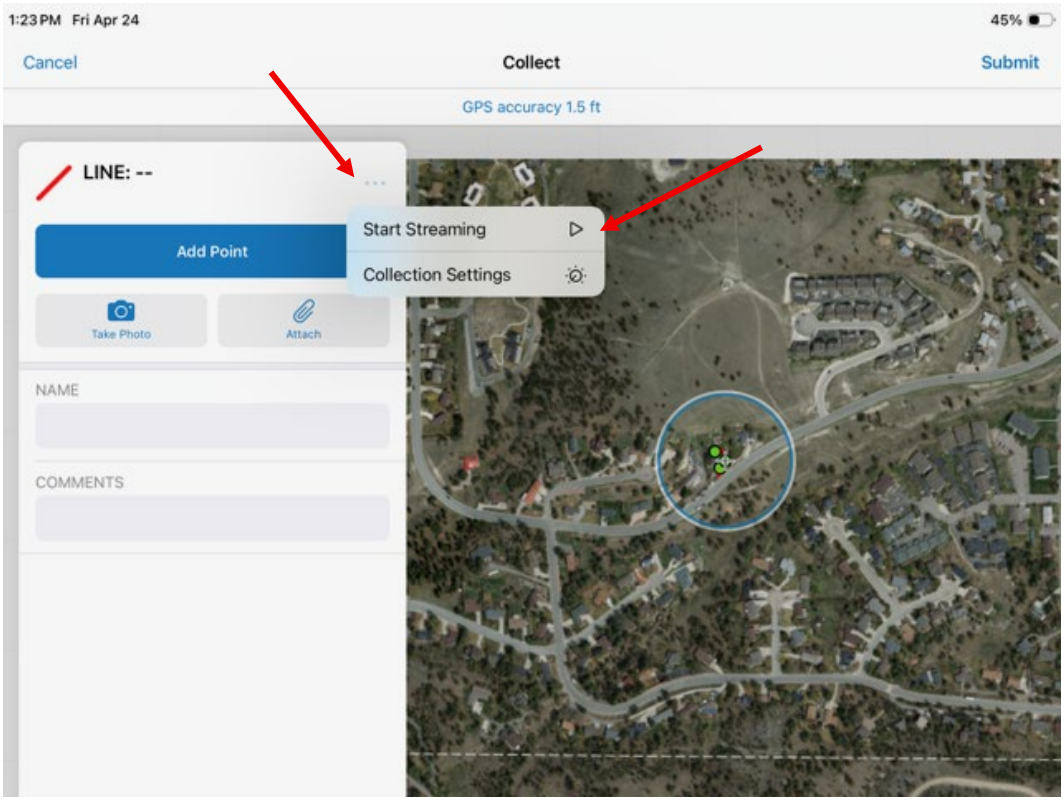
Collecting a Line

Follow the same steps as in Step 1 and 2 in Collecting a Point.

1. Tap on the **arrow button** in the upper right of the screen; this will pan and center the map to your location.
2. Tap the + **icon** on the lower right-hand side of the app to expand the Collect a New Feature menu. Choose the Line layer to collect from the menu.
3. Click **Add Point** to add a point on the Line.
4. Fill in the **Name**.
5. You can also add a photo associated with the line by clicking **Take Photo** just like with a Point.
6. You can walk the line and add each individual point by clicking Add Point each time you want to add a point

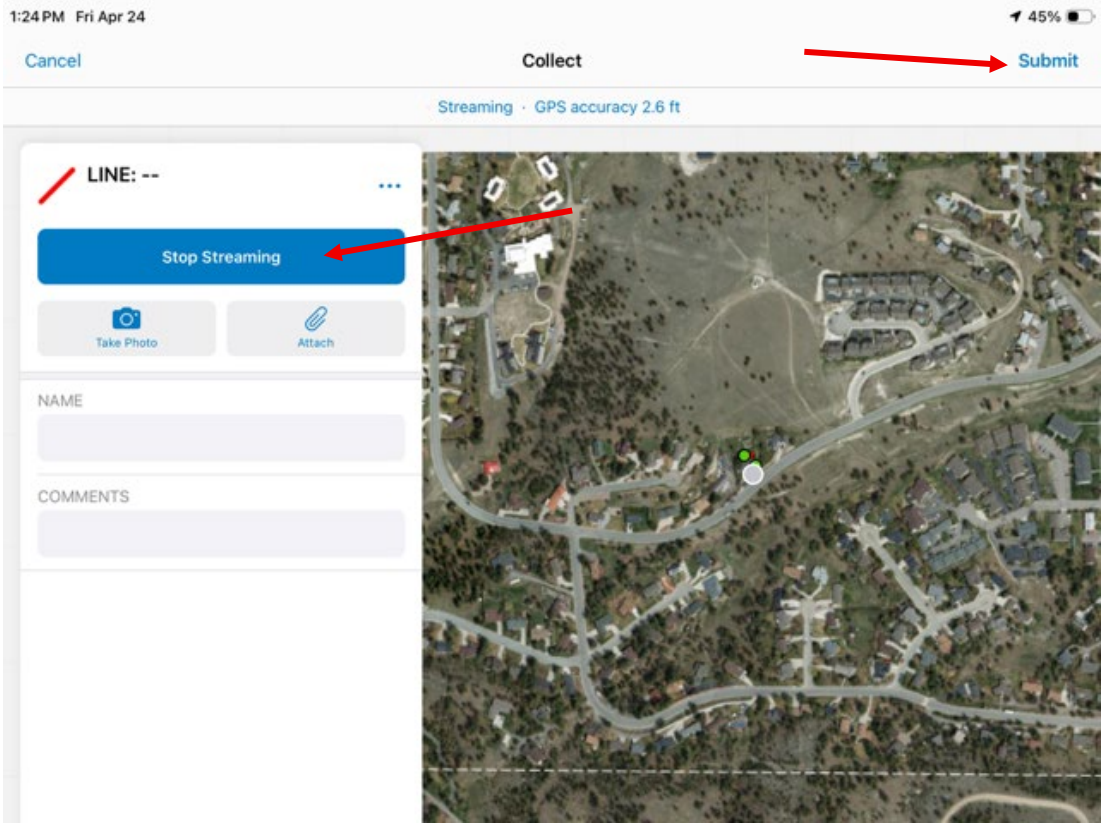


7. You can also stream (with both a line and an area) where the app takes a point every 2 seconds (or whatever time interval you have set the Collection settings to) as you are walking. To access the streaming click the **three dots** next to the Line at the top of the Line menu. This will also allow you to access Collection Settings if you need to adjust any of those. Click **Start Streaming** to start streaming



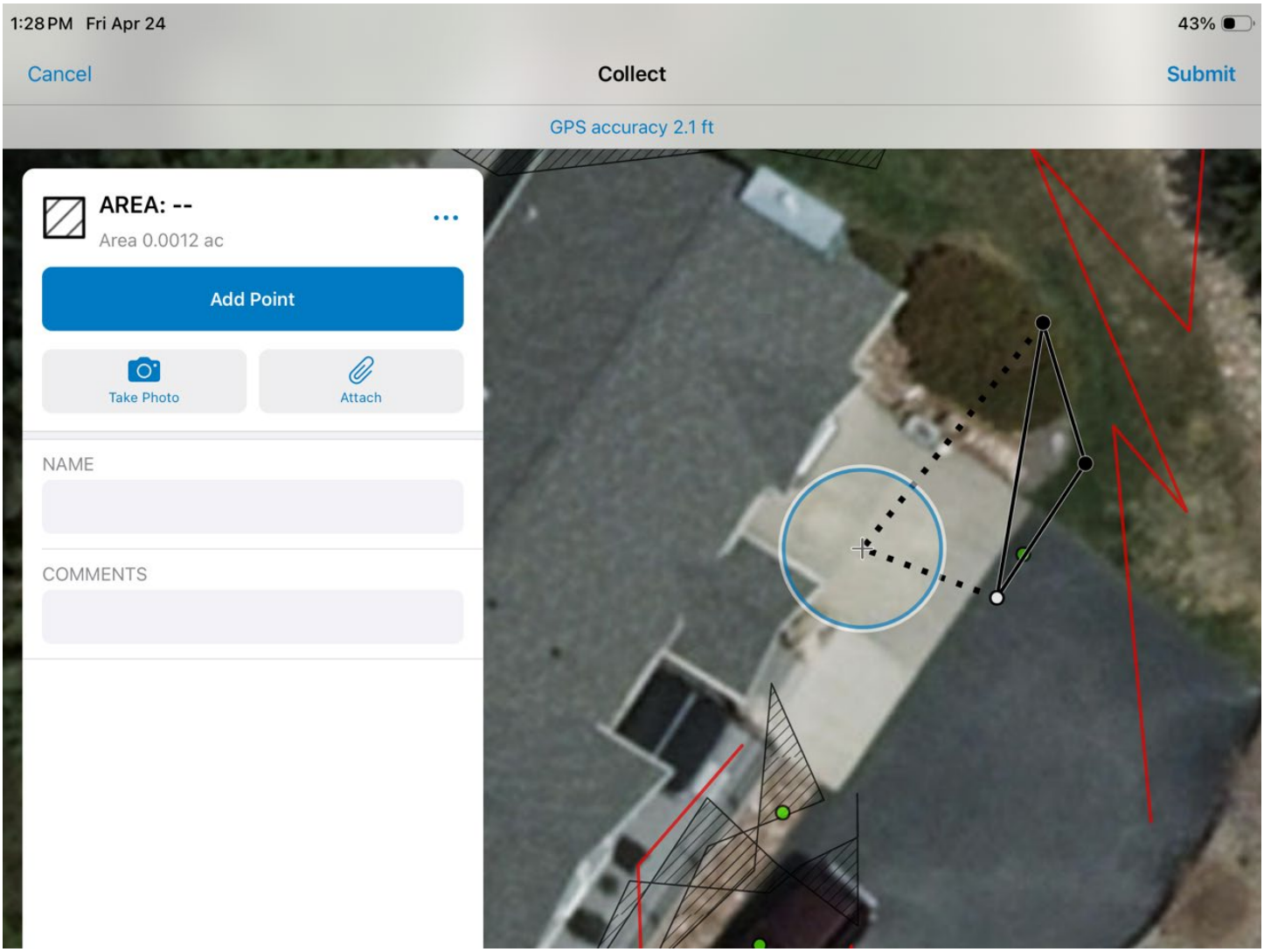
8. To stop streaming walk around something you don't want to collect, pause to take a picture, or end the line you are collecting hit the **Stop Streaming** button. You can hit Start Streaming again once you want to start the line collection again.

9. When finished, click **Submit**. Once you click submit a similar screen will pop up to when you submit a point, allowing you to see the name, edit, delete, and the line is highlighted on the map.



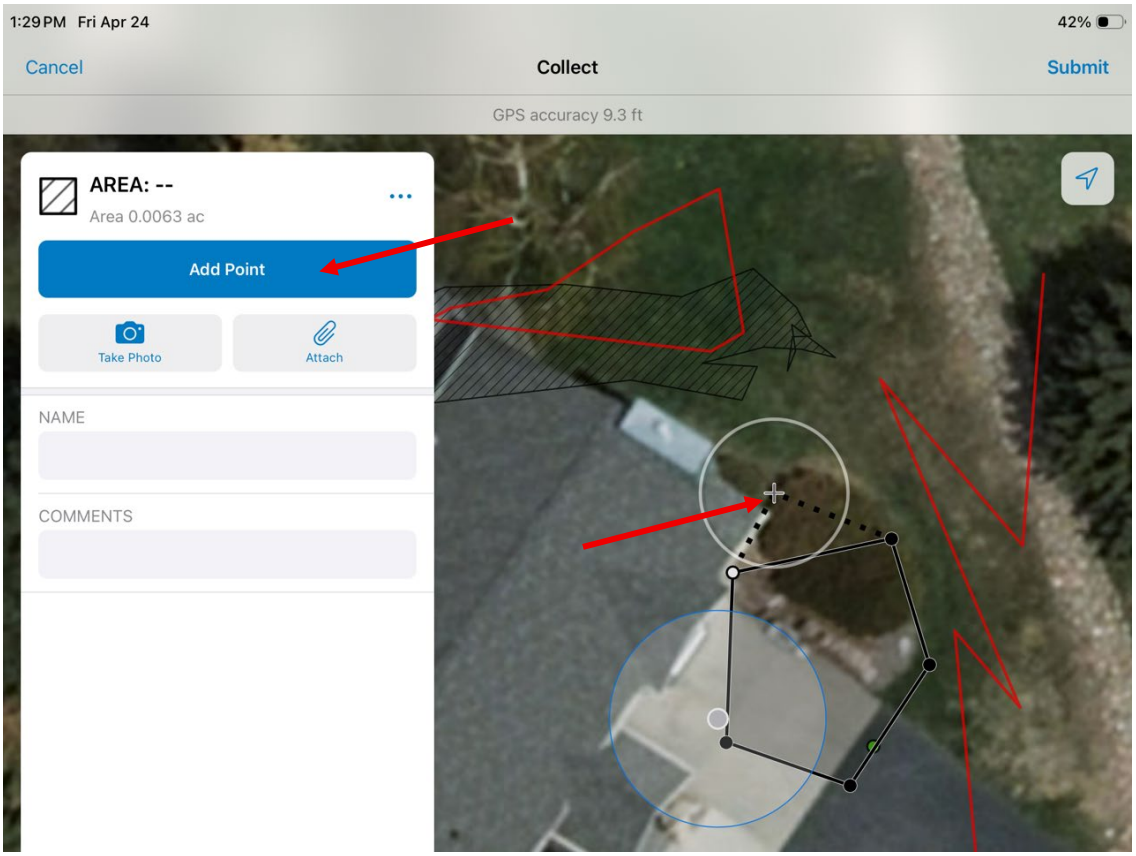
Collecting an Area

1. Use the same process above under Line for collecting an area including starting and ending streaming, or you can collect one point at a time. However, for Collecting an Area, when you select 'End Streaming', the area boundary will snap your last point collected to your starting point to complete the perimeter.
2. Make sure when you are streaming (line or area) to watch the map to make sure you continue streaming through the feature. The map will move along and continually collect points as you move leaving a solid line on the map of collected points. If the unit stops collecting while streaming for whatever reason you want to notice right away, especially if doing a large area or long line so you are not walking without collecting any data. As you can see below the area (actually the points that make up the area) that have been collected show up as solid points (black with the last point collected showing as white below) with a solid line closing the area. The point not yet collected (+ shown below) and the potential closed area is shown as a dotted line. I am not in streaming mode below, but it will look the same whether you are streaming or collecting one point at a time.



Collecting a point (in a Line or Area Collection as well) without walking to that point

1. Stop streaming if you are and move the map (by touch) so that the **+ for a new point** to collect lines up to where you want it. Click **Add Point** to add this new point without walking to it. Keep in mind that this point is not going to be accurate, that is it is not lined up where the receiver/antennae are. This can be useful though if you can't get to a desired location for whatever reason. You can then walk to the next location for collection and continue.



What to do if you have collected a point, line or area in error:

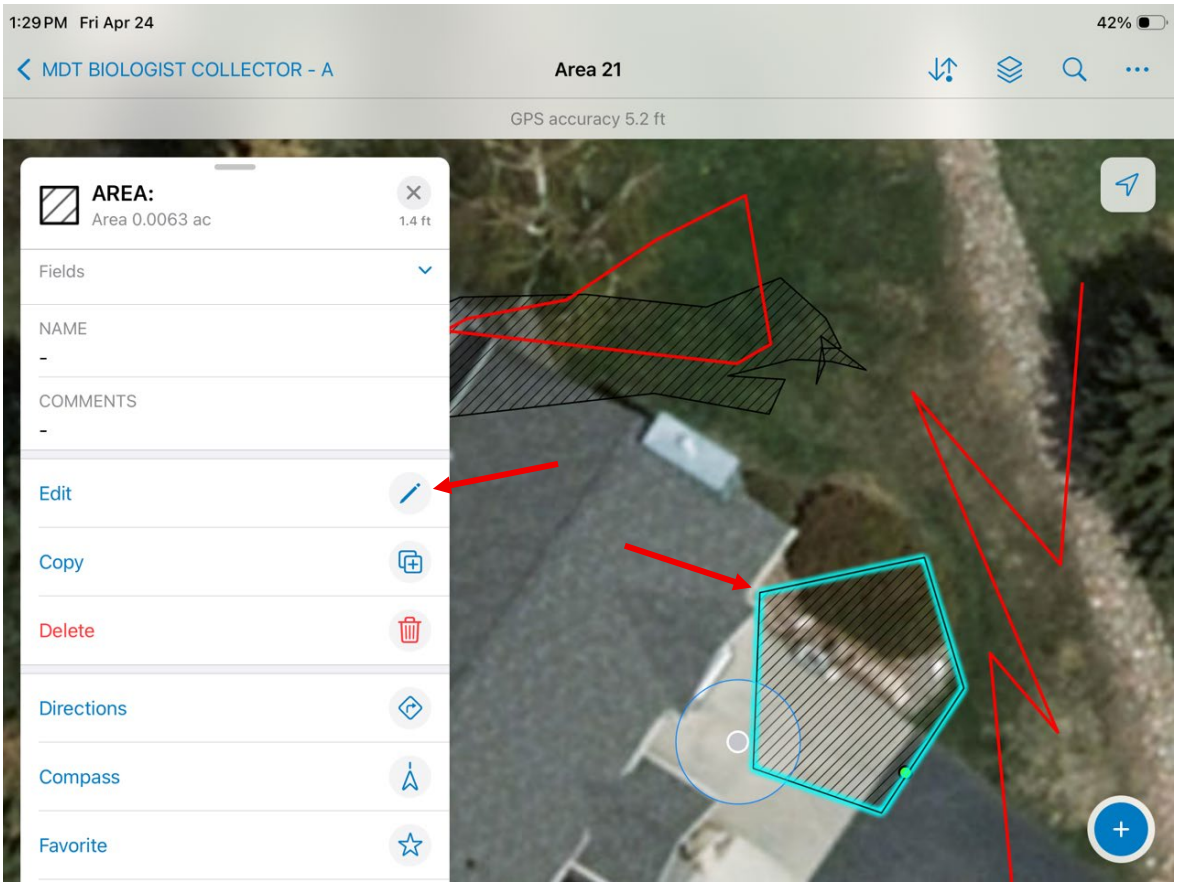
a. To Delete the point, line, or area captured before you have submitted, hit the Cancel button in the upper left.

b. If you want to delete a feature once you have submitted, follow the directions below for Editing a Feature After Collection and hit Delete in the menu on the left.

c. A Discard collection? window will appear, tap Discard.

Editing a Feature After Collection

Tap on a feature in the map. It will then be **highlighted** in the map as shown below and bring up the menu on the left. If you click edit it will make all the vertices show up and they can be moved by simply using your finger. Keep in mind this will not be accurate, e.g. not a collected point, but is useful at times. Tap **Update** when done making an edit.



How do I save the data collected or edited?

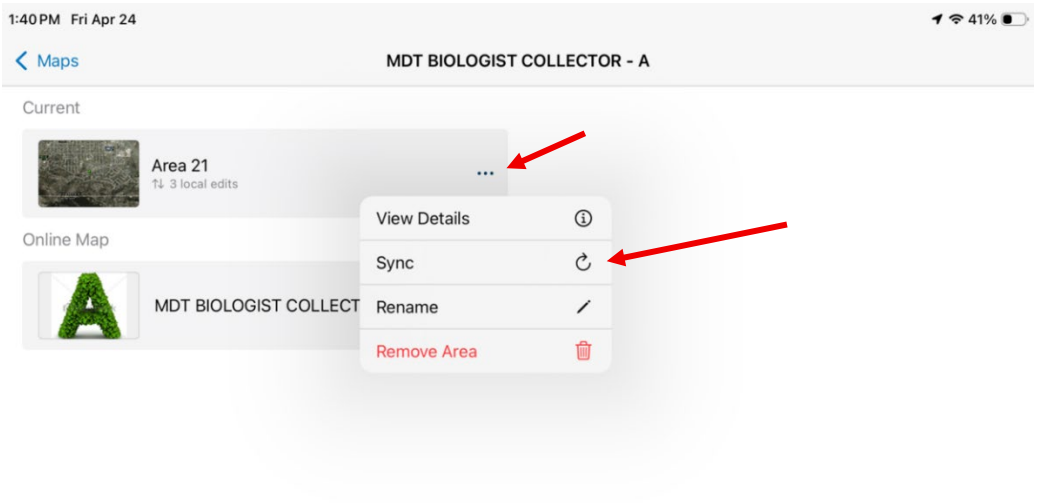
- As soon as you hit the **Submit** button the data has been saved, essentially Submit is the equivalent to Save. However, the data is only saved on the mobile iPad and to save it to ArcGIS Online, you will need to Sync the map. Make sure to check your features as you collect them out in the field to ensure the data has been collected as you intended to collect it.

Battery

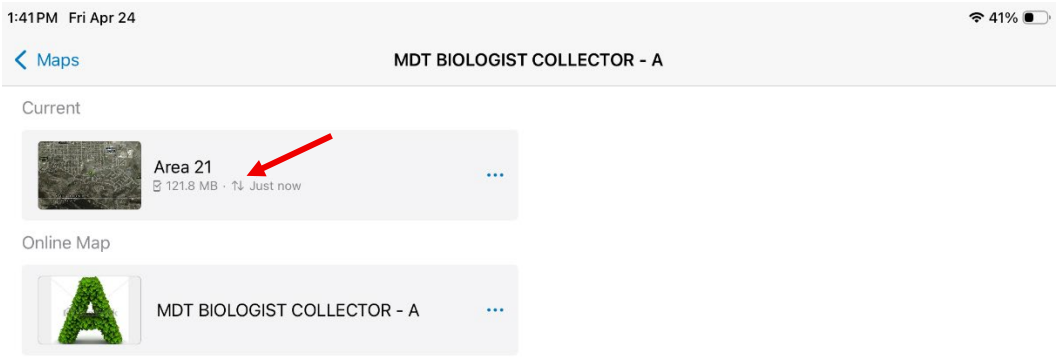
- The iPad uses battery fairly quickly, especially if it is hot. Charge the iPad at every opportunity in the car, moving locations, at lunch, etc. If it is a long day you may need to connect your iPad to the external battery to continue working. The Geode receivers seem to hold a charge better than the iPad, but you may want to charge that at lunch as well.
- Heat will also shut down the iPad. Keep in the shade when it is hot out. Standing the iPad up on edge so the least amount of sun hitting it will also help with the heat.

Syncing Back in the Office

1. Connect to Wi-Fi. Open the Field Maps App.
2. Navigate to the appropriate map you used for offline collection.
3. Tap the **three dots** on the right side of the map. Click **Sync**.
4. You will see the number of features you have collected.



5. After Syncing make sure you check the delineation map to make sure your data has been loaded on to the map. I have never had an issue with this but always check. After syncing successfully, the area (offline map) will look as below with the two arrows.



6. Once verified, click remove area shown in red in the map under Step 4 above.

Call Paul with any questions 406-431-0911.