

## **SM 4: Using a PAD to Find Sampling Sites and Record Data**

A personal accessory device (PAD or iPad) can be used to locate sampling sites, take photographs, and record data for the Monarch Conservation Science Partnership (MCSP) monitoring effort. Use of the iPad will require access to a web-based geospatial viewer (ArcGIS on-line [AGOL]) produced by Environmental Systems Research Institute (ESRI), and two installed applications: Collector and Survey123. This document supplements SOP 5 on data management and explains how to gain access to AGOL, download previously established spatial data, navigate with the iPad to data collection sites, and record and save those data.

### ***Topic Directory***

Click on one of the topics listed below to get related instructions:

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## ArcGIS Online (AGOL) Sign Up

**Please note that the FWS is retiring the old accounts created from the Google form. For example, “richard\_easterbrook\_fws”, is no longer a valid account. Follow the steps below to Sign up for a new account if you do not already have one.**

*USFWS Staff Only (i.e., has a @fws.gov email) —*

Go to <http://fws.maps.arcgis.com/home/>.

Select “Sign In” in the upper right-hand corner.

Select the “Using your U.S. Fish and Wildlife Service Account” option (Figure SM-4.1). You will automatically be logged into AGOL using single sign-on (SAML).

Your user name is your FWS email address with “\_fws” added to the end (e.g., richard\_easterbrook@fws.gov\_fws).

Your password is your FWS active directory password.



Figure SM-4.1.

*Non-USFWS Staff—*

**Sponsor** = A USFWS employee. **Collaborator** = A non-USFWS employee or volunteer/intern without an USFWS active-directory account.

A USFWS employee must sponsor a collaborator in order for a USFWS collaborator AGOL account to be created. As such, both the sponsor and the collaborator must follow the steps outlined below to create the collaborator’s AGOL account. The creation of an AGOL account is necessary for the collaborator to have access to the Monarch Group’s survey maps and forms. Collaborators will only be able to join organizational groups, edit existing features, and share within the organization.

Existing AGOL accounts with another organization (e.g., university) will also work. Existing AGOL account holders will skip Step 1 and go to Step 2 below. Ensure the AGOL account visibility is set to Everyone (public) to allow Richard Easterbrook to locate the account and add it to the Monarch Group.

**Sponsor and Collaborator–** To initiate the collaborator’s USFWS sponsored AGOL account creation, the sponsor will visit the USFWS AGOL account webpage; Google form link below. The sponsor must communicate with the collaborator to enter the requested collaborator information and submit the form upon completion.

<https://docs.google.com/a/fws.gov/forms/d/1vA7FrKib3QgpRc6qlm958a21M4OHQgOyPXVy40FLaNc/viewform>

Sponsor and Collaborator– Once an account creation conformation email has been received, either the sponsor or the collaborator should email Richard Easterbrook at [richard\\_easterbrook@fws.gov](mailto:richard_easterbrook@fws.gov) to request for the collaborator’s AGOL account to be added to the Monarch AGOL group.

Collaborator– Once Richard has provided access to the AGOL Monarch Group he will notify either the collaborator or the sponsor. The collaborator should then follow the remaining steps below to make sure access to the Group’s AGOL page is available. If you cannot access the Monarch Group’s AGOL page, email Richard Easterbrook at [richard\\_easterbrook@fws.gov](mailto:richard_easterbrook@fws.gov) with the details of the difficulties you are having.

Go to <http://fws.maps.arcgis.com/home/>

Select ‘Sign In’ in the upper right-hand corner of the screen (Figure SM-4.2)



Figure SM-4.2.

Select the ‘Using your ARCGIS Account’ option, enter your Username and Password, and click ‘Sign In’ (Figure SM-4.3)

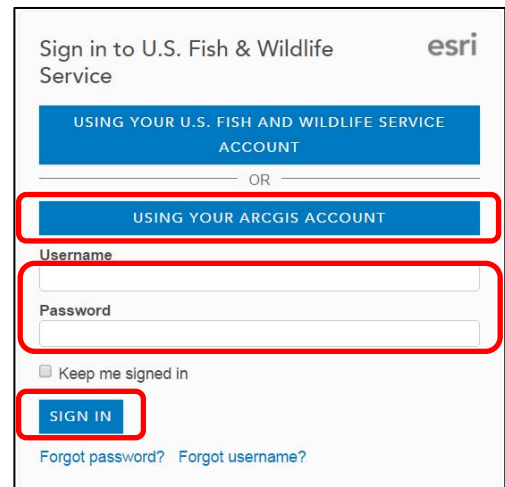


Figure SM-4.3.

Select the ‘Groups’ tab at the top of the screen (Figure SM-4.4)

Click on the ‘Monarch 2017’ Group (Figure SM-4.4)

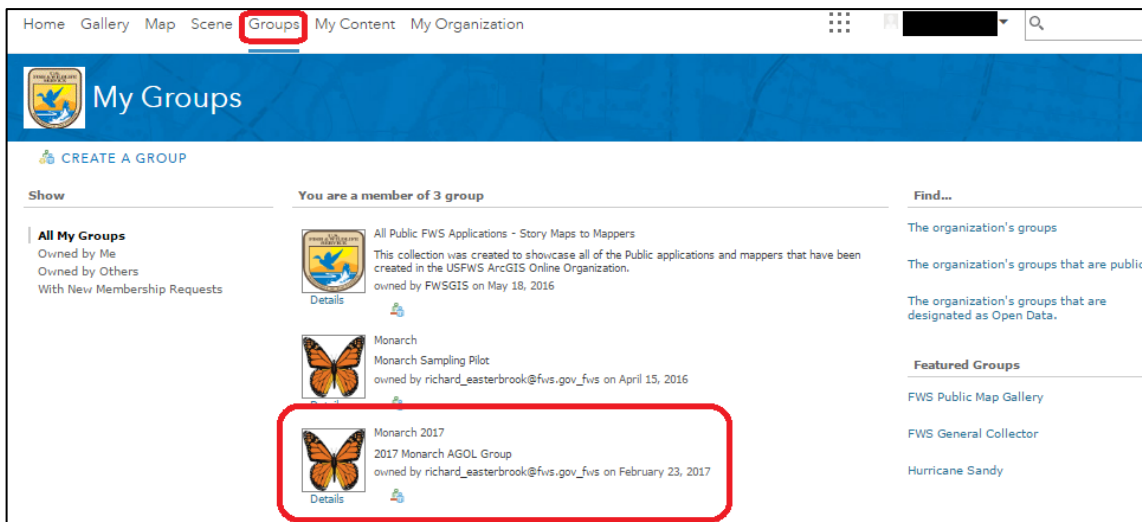


Figure SM-4.4.

The content shared with this AGOL Group (i.e., Web Maps and Feature Layers) is displayed. The image below shows just the Web Maps in the Monarch Group. These maps can be opened in either the AGOL map viewer or ArcGIS on Desktop (See Figure SM-4.5)

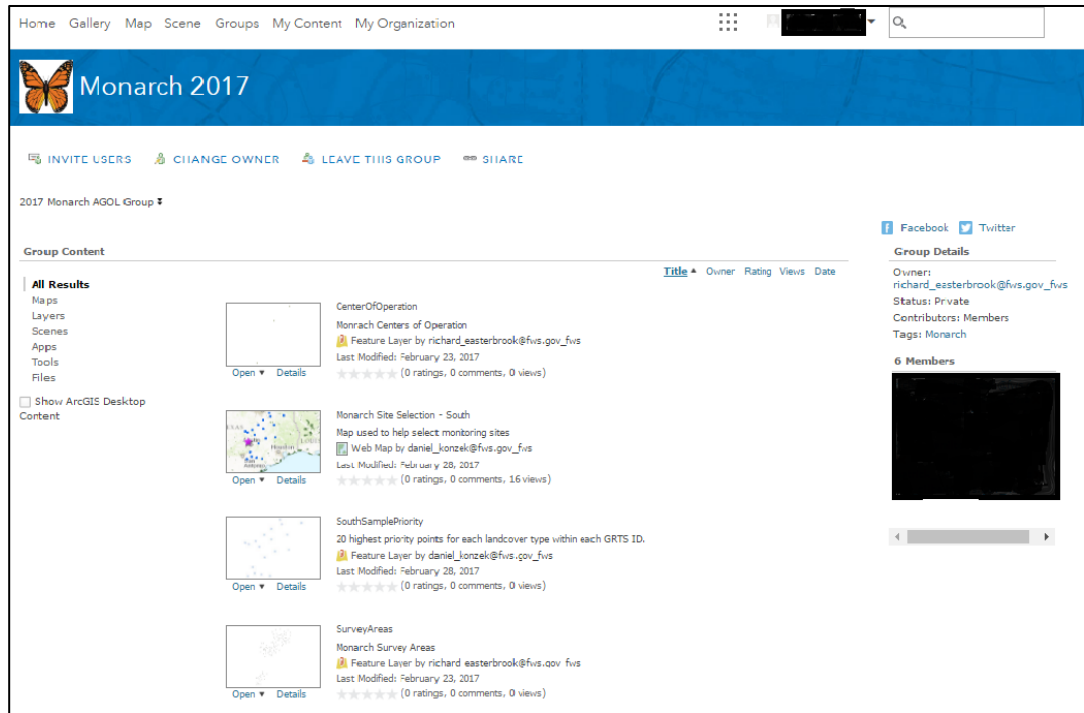


Figure SM-4.5.

### ***Bad Elf GPS***

PADS with cellular plans have built-in GPS units. The iPads issued to FWS crews in 2017 have cellular plans and do not make use of 'Bad Elf' devices.

PADS which are only able to connect to the internet through Wi-Fi do not have built in GPS units. These PADS require an external GPS unit to be able to navigate and record locations.

### ***Lightning Plug—***

Plug the GPS unit into the Lightning port. Please note that these GPS units come with an adapter (Figure SM-4.6) so they'll fit while the PAD is in its Lifeproof case. **Take special care not to loose this small adapter.**



Figure SM-4.5.

Open the Bad Elf application and verify that the unit is recognized and satellites are being tracked (Figure SM-4.7). Depending on your location on the earth and proximity to buildings/tall objects, the iPad may take up to 5 minutes to be recognized and begin tracking satellites. The iPad cannot be used if the Bad Elf unit is not working. If it appears the unit is not being tracked, remove and then plug the lightning plug back in and restart the process.

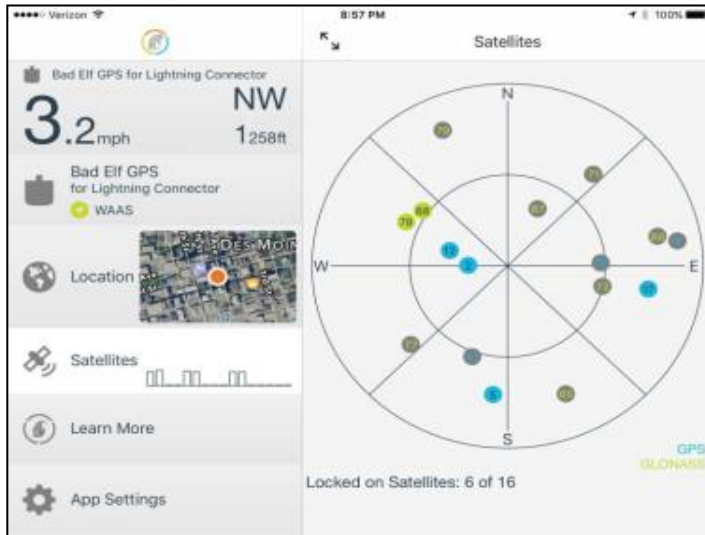


Figure SM-4.7.

*GPS Pro (Bluetooth)—*

Turn on the GPS unit (Figure SM-4.8) by pressing the **Power Button**.

Pair the iPad with the Bad Elf GPS Pro (Figure SM-4.9).

Turn on the iPad's Bluetooth option

Settings

Bluetooth – Ensure that Bluetooth is turned-on and paired with the correct device

Accept the pairing on the GPS unit.

Open the Bad Elf app, and verify that the Bad Elf unit is recognized and satellites are being tracked (Figure SM-4.7).

Depending on your location on the earth and proximity to buildings/tall objects, the iPad may take up to 5 minutes to be recognized and begin tracking satellites.

The iPad cannot be used if the Bad Elf unit is not working. Ensure that steps 1-3 above were followed.



Figure SM-4.8.

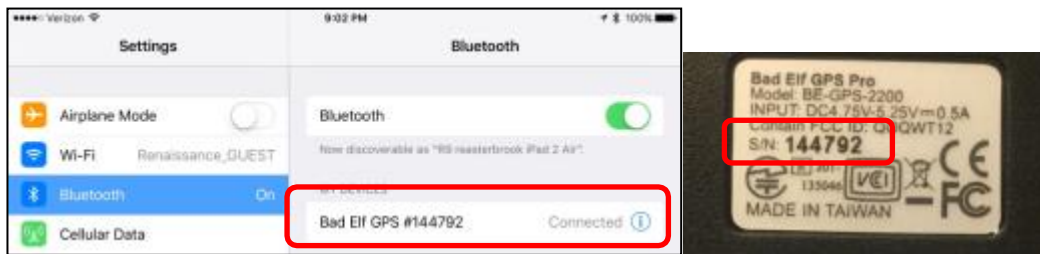
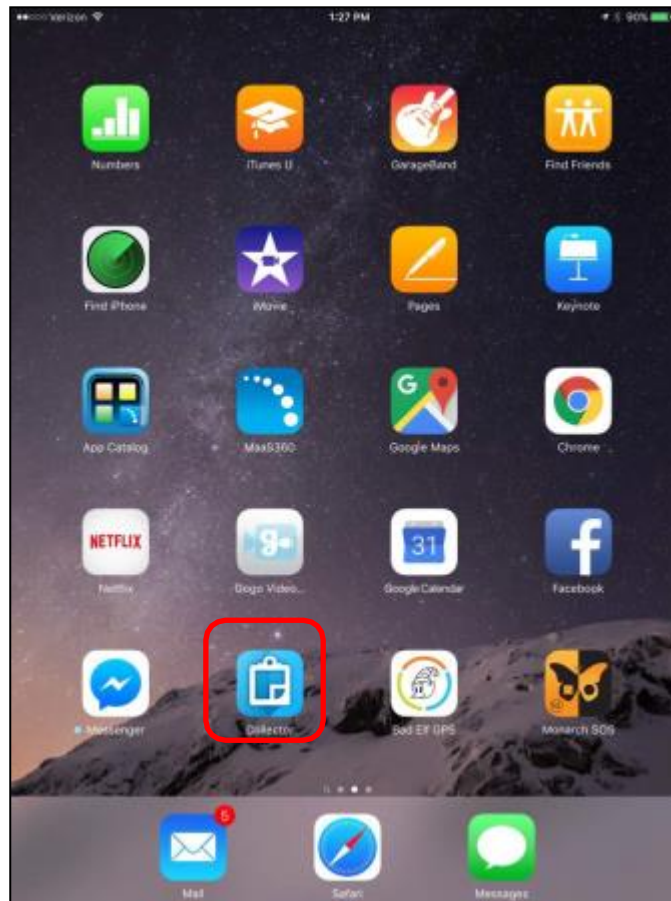


Figure SM-4.9.

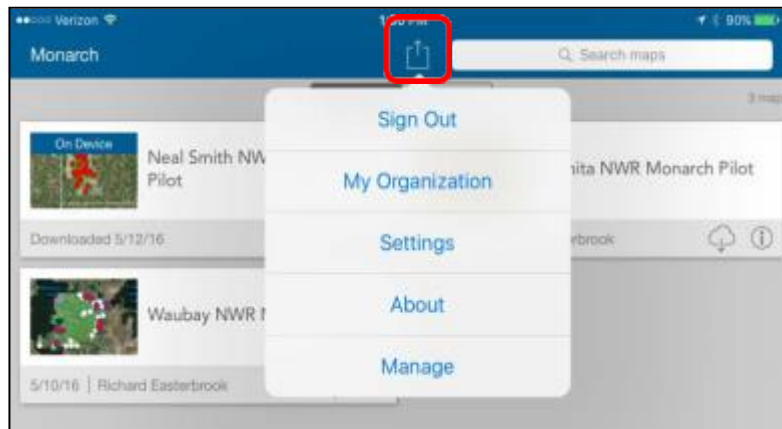
## **ESRI Collector Application**

*Collector—*  
Open the Collector application.



Log on using your FWS AGOL (or other AGOL Organization) provided credentials.

## Menu Quick Reference Guide—



**Sign Out** – Sign out of Collector

**My Organization** – Provides your ArcGIS Online Organization information

**Settings** – Collector application settings

Units of Measurement

Imperial

Metric

Map Download and Sync

WiFi Only

WiFi or Cellular

Collection Style

Single

Continuous

Collection Options

Filter Related Types

Navigation and directions

Use Navigator for ArcGIS

Preferred Attachment Size

Actual (Full)

Small

Medium

Large

Extra Large

Synchronization


Push/Pull

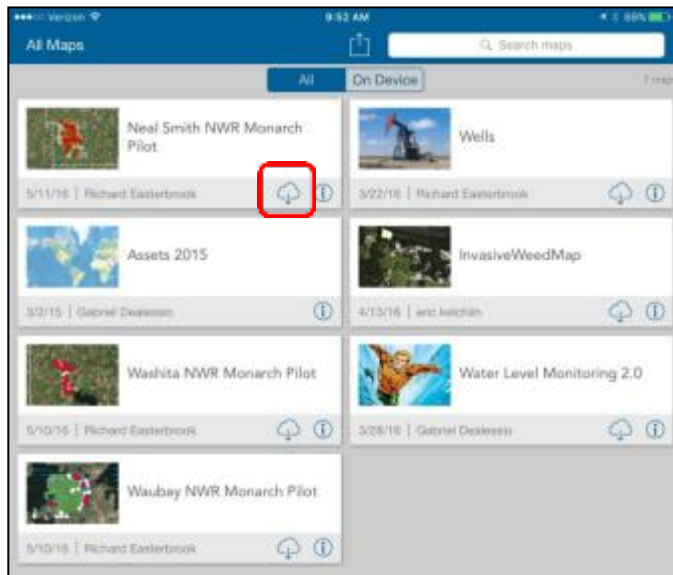
Push Only

**About** – Information about the Collector application on the device

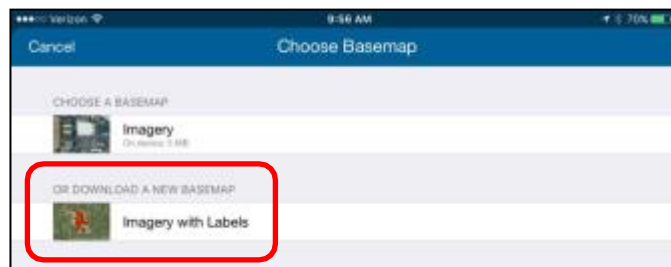
**Manage** – Manage (remove) the maps and basemaps loaded on the device

*Download a Map onto your Device*—The Collector application is usable in a disconnected environment (i.e., no cell service or WiFi). This requires that a local copy of the AGOL map be downloaded onto the device (e.g., iPad). This should be done initially and anytime you want to see ‘others’ content after syncing with AGOL.

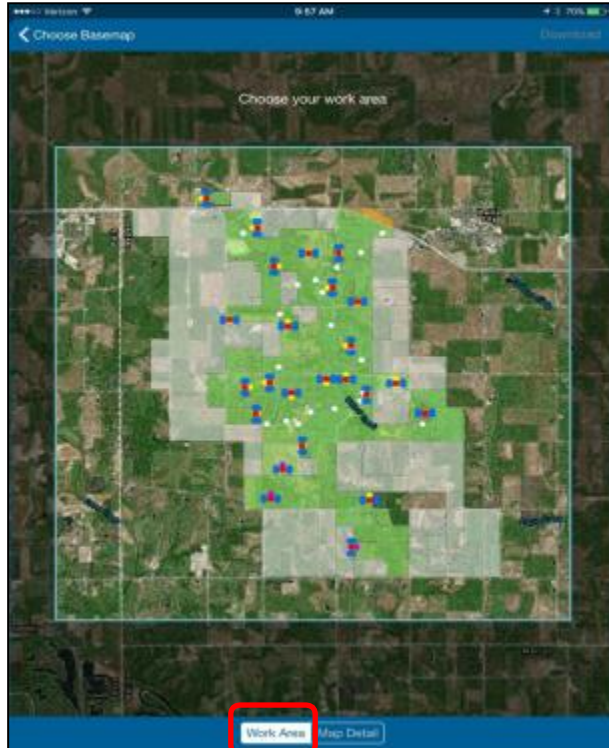
Select the download button  on the ‘NWR Monarch Pilot’ map.



Choose a Basemap. If this is the first time downloading this map, then choose the ‘or Download a New Basemap’ option. If the basemap is already on the device, then choose the existing basemap.



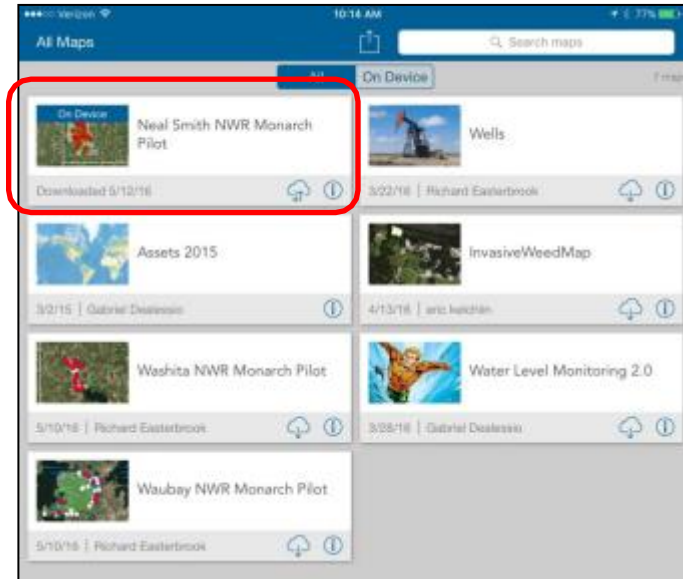
Select the **Work Area** tab and zoom in and out on the area to be downloaded. It is not necessary to have the whole refuge in the work area. The user can download only that portion of the map in which they will be working.



Select the **Map Detail** tab and zoom in and out to select the scale/detail of the map downloaded. The Map Detail tab only controls the level of detail at which can be seen on the map. The whole Work Area will be downloaded. Pay special attention to the estimated size of the download. If the file size is too large (> 200 mB) and/or the WiFi/cellular service is poor, map download may fail or take a very long time.



Select Download in the upper right-hand corner of the app. Once complete you'll see that the map is now On Device.






Open the map on the device.

*Map Quick Reference—*



**Maps** – Goes to the **Map Gallery**.

**My Location** tool - Uses your device's GPS to show your location on the map. The icon changes to show the state of the GPS. The  icon indicates that your location does not display on the map. Once your location is turned on, the  icon indicates your location displays on the map and is kept centered. As you move, the map moves on the screen to keep your location centered on the screen. Once you pan the map while your location is displayed, the  icon indicates that your location is displayed on the map but isn't kept centered. As you move, your location displayed on the map moves on the screen and can even move outside the visible part of the map. *When you don't need to see your location on the map, **turn off 'My Location'**. This saves the battery by turning off not just the display of your location, but also the GPS. If the map tracks your location, it continues to do so when location is not displayed on the map, turning on the GPS when needed. If you're collecting data, the GPS turns back on as needed to get collection locations.*

**Bookmarks** tool - Goes to previously defined areas of interest. These include **Bookmarks** defined on the map and **My Places** that you've stored in your device.

**Layers** tool - Displays the layers in the map and allows you to turn features on and off. While this changes which features are visible and display on the map, it doesn't change the data in the map, or change the map as it's viewed by other users.

**Search** tool - Searches for a place-name, address, coordinate location, or feature.

**Measure** tool - Draws lines and shapes on the map, and calculates their lengths and areas in a variety of measurement units.

**Basemaps** tool - Changes the basemap to another one that is either online or on your device. The basemap, also called a reference or background map, provides the information displayed under the interactive features.

**Map** - The map appears here, including a basemap and features. You can pan, zoom in, and zoom out to see other areas.

**Collect New** tool – **Adds a feature**.

For more information, please refer to: <https://doc.arcgis.com/en/collector/ios/collect-data/quick-reference.htm>.

*Adding Road Plot Corners—*

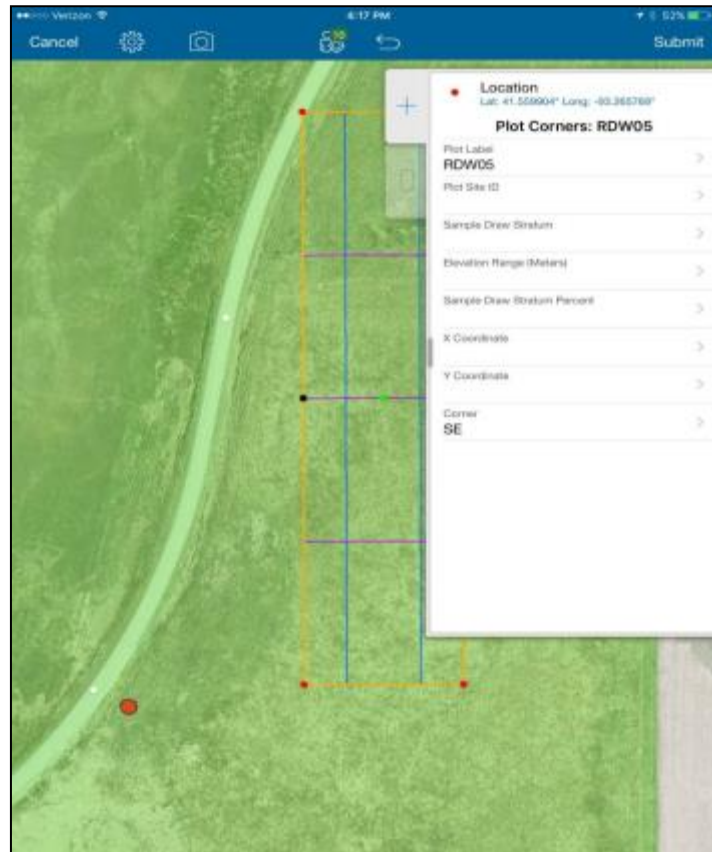
Tap the **Collect New** icon.

Select **Plot Corners** from the menu.

The new Plot Corner will be placed at the current GPS position.

Fill-out the **Plot Label** (from the Sample Draw feature class) and **Corner** fields (i.e., NW, NW, SE, SW)

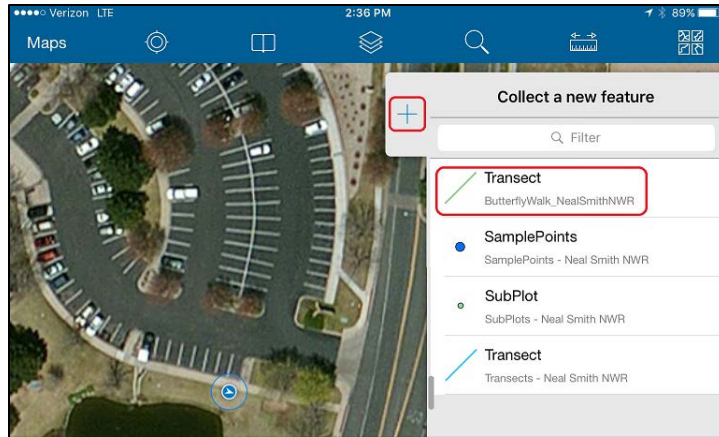
Tap on **Submit**.




*Adding Transects through the Collector application—*

Tap the **Collect New** icon  on the right side of the screen.


Select **Transect** from the menu.




To draw a transect line in the Collector app, you need to provide the app with a start and end point of the transect line.

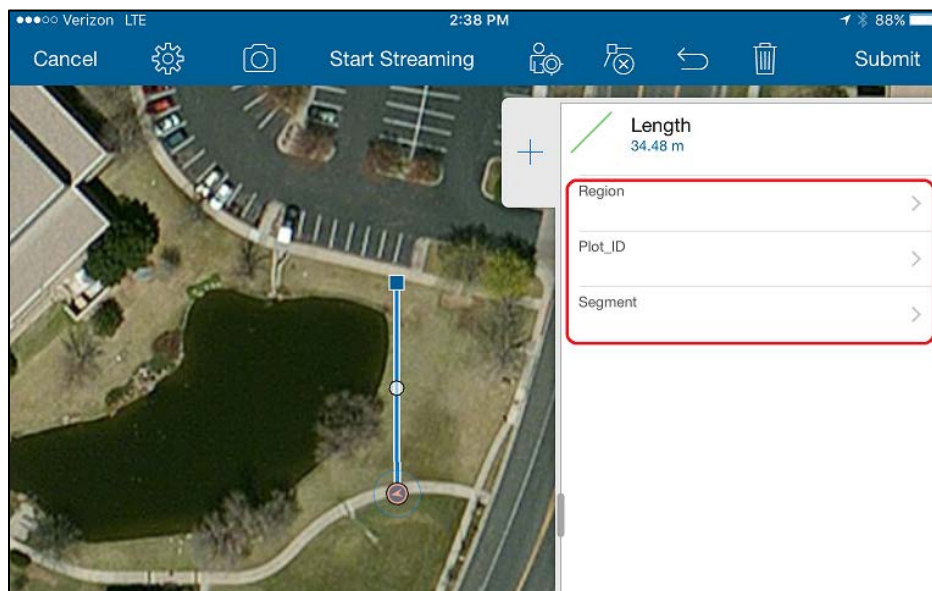
You can either select **My Location**  on the top bar to use your location on the map (represented by a blue dot) as a transect start point, or tap the screen to place a start point at a different location. A start/end point will be indicated on the map as a red dot.


In the field, walk to the end point of the transect line and select **My Location** again to use your location on the map as a transect end point, or tap the screen to place an end point at a different location. The transect line will automatically be drawn.

In the event you mis-assign a transect start or end point, select **Undo**  to go back a step or


**Delete**  to completely delete the transect and start over. Both are found on the top bar.


Once the transect line has been drawn, assign the necessary metadata to it by selecting and filling out the metadata fields in the **Transect** menu; Region, Plot\_ID, and Segment per the image below.

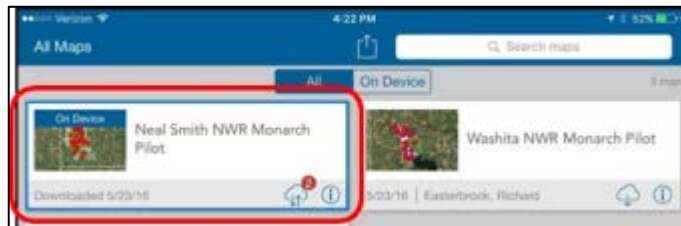


Select **Submit**  in the top, right corner of the screen to add the transect line permanently to the Collector map and make it viewable to others.

*Submitting Additions/Edits—*

The **All Maps** window will display any additions/edits that need to be synced, using a red number, over the Sync icon .

Tap on the Sync  icon to move you changes into AGOL.



## **Monarch Inventory Feature Service**

*Point Feature Classes*—Each dark bullet below represents a layer of information in the map which can be turned on & off. The white, sub-bullets list the features/information available for each point within a layer of information.

### **Plot Centroid (PlotCent)** – Center of Sample Plot

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Site ID

SdStratum – Sample Draw Stratum

ElevRange – Elevation Range (Meters)

SdStratPct – Sample Draw Stratum Percent

Xcoord – UTM X Coordinate

Ycoord – UTM Y Coordinate

NVC\_MACRO – NVC Macro

ECOLSYS\_LU – NVC Ecological System

GlobalID – GUID

### **Plot Corners (PlotCorner)** – Corner Points of Sample plot

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Site ID

SdStratum – Sample Draw Stratum

ElevRange – Elevation Range (Meters)

SdStratPct – Sample Draw Stratum Percent

Xcoord – UTM X Coordinate

Ycoord – UTM Y Coordinate

Corner – Corner Identifier

### **Sample Draw (SampDraw)** – USGS Sample Draw Point

PlotSiteID – Unique Site ID

Xcoord – UTM X Coordinate

Ycoord – UTM Y Coordinate

SdStratum – Sample Draw Stratum

PlotLabel – Refuge Plot Label

GlobalID – GUID

### **20 Meter Transect** – 20 Meter Transect Lines

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Plot Site ID

### **75 meter Transect** – 75 Meter Transect Lines

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Plot Site ID

### **Rapid Assessment Design Line** – 20 Meter Rapid Assessment Design Line

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Plot Site ID

*Polygon Feature Class—*

**Sample Plot (Plot)** – 75-meter x 300-meter Sample Plot

PlotLabel – Refuge Plot Label

PlotSiteID – Unique Plot Site ID

SdStratum – Sample Draw Stratum

ElevRange – Elevation Range (Meters)

SdStratPct – Sample Draw Stratum Percent

SHAPE\_Length - Length

SHAPE\_Area – Area

**Survey123 Application**

The Survey123 application by ESRI will be used to digitally record data collected in the field. Similar to the Collector app, users will download a local copy of survey(s) while they have either WiFi or cell service, fill-out the survey on the iPad while in the field, and then submit the information when they have service coverage. For more information on Survey123, please visit <http://doc.arcgis.com/en/survey123/>.

*Download Surveys—*

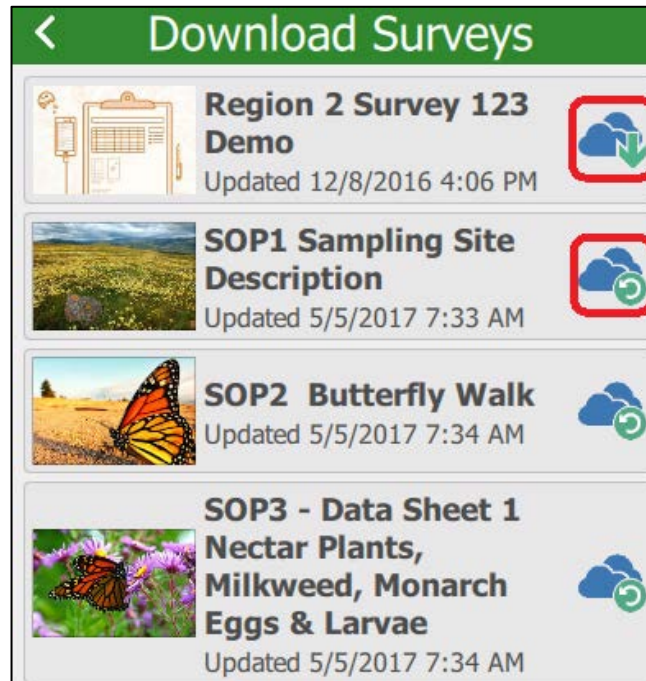
Open the Survey123 application.

Sign in using your AGOL user name and password.

Select the Menu icon in the upper right corner;

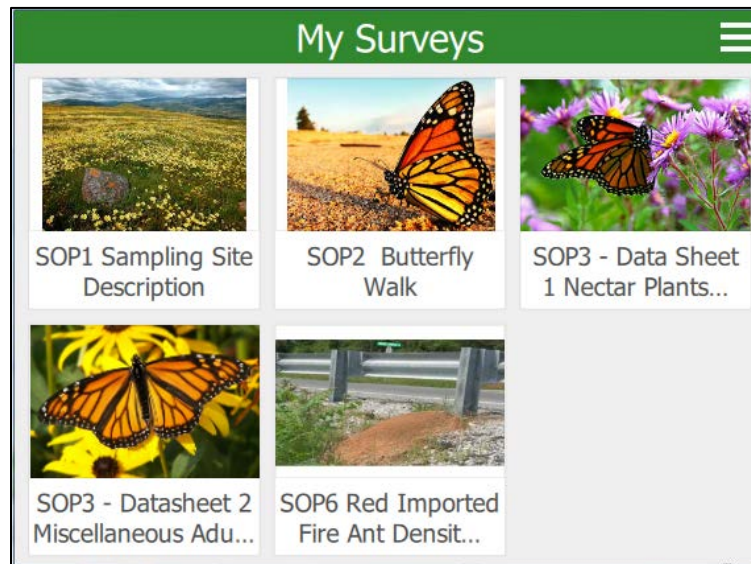


Select the surveys to download from those available in the **Download Surveys** window by tapping on the **Download** icon; cloud with a green arrow pointing straight down. Choosing the **Refresh** icon, blue cloud with a white arrow going counter clockwise, on an already downloaded survey will replace the locally-saved survey with the latest update.




### Complete and Submit Surveys—

Select the back arrow in the upper right corner to return to the **My Surveys** gallery on the device.



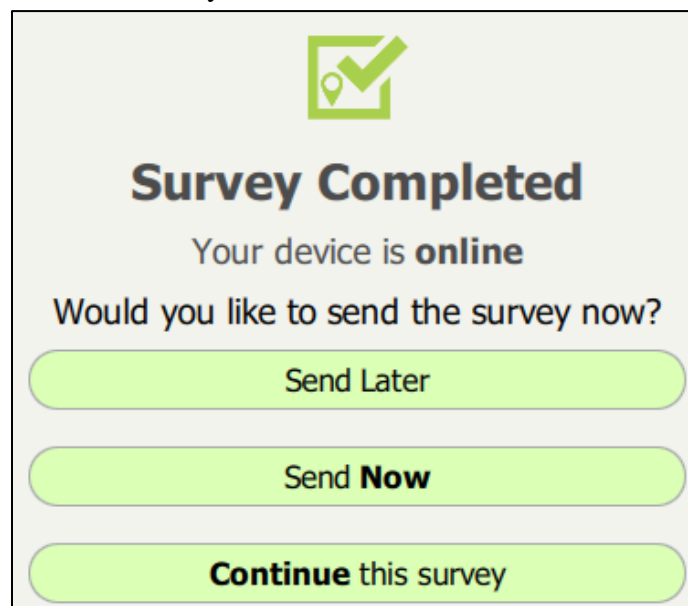
Select any of the downloaded surveys to open it.

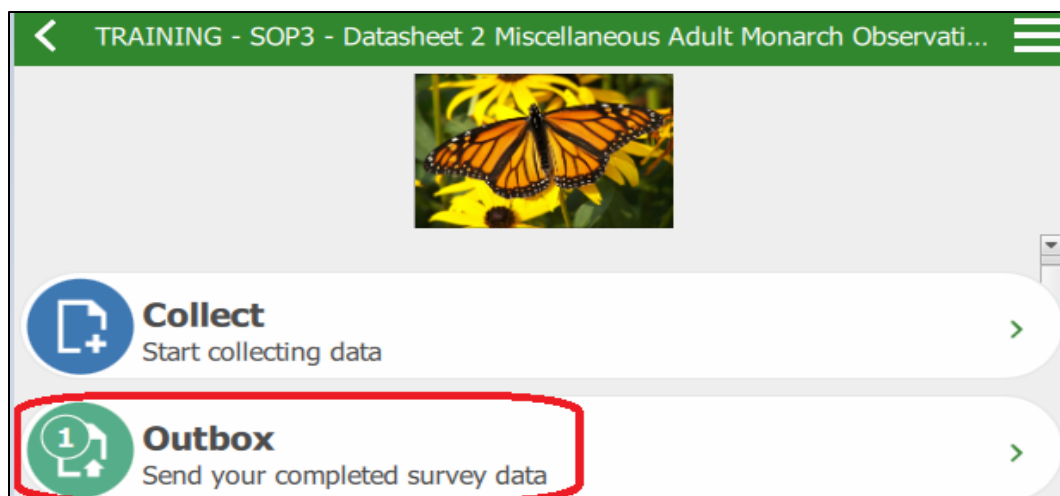
Tap on **Collect**  to start entering information into the survey.

Once complete, **Submit** the survey by tapping on the check mark in the lower right-hand corner of the application .

Select **Send Later** if the survey is not complete (e.g., End Time is not filled-out) or if your device is not online at the time. This survey will remain in the **Outbox** until submitted. **These surveys must be manually submitted once your device is again online. They will not automatically submit.**

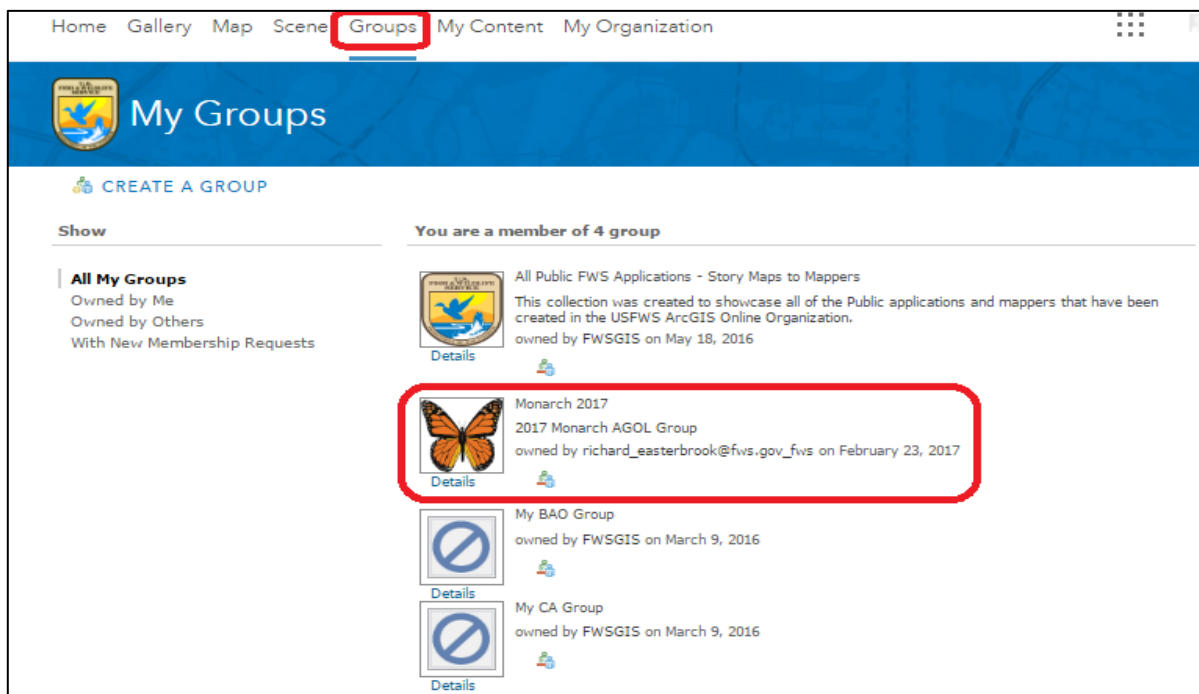
Select **Send Now** to submit the survey to AGOL.






*Viewing and Editing Submitted Data*— All of the data collected using the Survey123 and Collector application in the field using the iPads can be viewed and edited in ArcGIS Online. The data a person records and submits through Survey123 can also be viewed and edited through Survey 123, but only the data/surveys submitted through the user’s account will be viewable

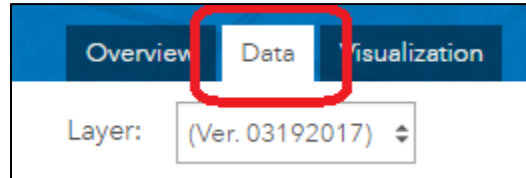
*Viewing and Editing Data in AGOL*—Sign In to AGOL (<http://fws.maps.arcgis.com/home/>) using you FWS Enterprise Account. Go to the “Groups” menu item and you'll see the "Monarch" Group. This Group contains the maps, surveys and feature layers.



Open the Feature Layer of the survey data you want to view by clicking on the feature layer's title. (Feature Layers are indicated by this image )



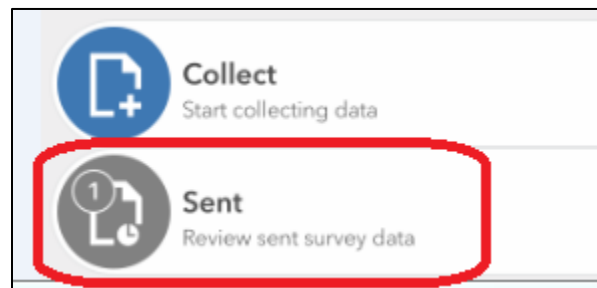
Select the “Data” tab at the top of the page.



All of the submitted data for that particular survey is viewable and editable from this webpage. Because the data is editable from this webpage, take caution while on it so as to not inadvertently change submitted data. If a data is selected and deleted, **THERE IS NO WAY TO RECOVER THE DATA**. The data will have to be re-entered and submitted through Survey123. In the event the data was recorded directly into Survey123 in the field, there will be no paper copy of the data to refer to for data reentry.

(Ver. 03192017) (3 features, 1 selected)							
ObjectID	GlobalID	Monitoring Area	Verified Plot Type	GRTS Master Ce...	GRTS Draw Point	Plot Label	
1	60b61b0f-acee-4ad0-b516-92cc55f022e6	Balcones Canyonlands NWR	Protected Grassland	000093	000012	PRG-000093-000012	
2	6782d604-f620-470e-...	Belmont	Unprotected	011612	000002	URC-011612-000002	

*Viewing and Editing Data in Survey123*—Through Survey123, the only surveys a person will have access to edit are those that they have submitted. Submitted surveys are accessed by first selecting the survey from the home page, and then selecting the “Sent” icon from the bottom of the survey’s page.



From the list of submitted surveys, select the survey whose data you wish to edit. **IMPORTANT: Do Not select the ‘Empty’ button in the bottom right corner of the list of sent Surveys.** Doing this will remove all of your submitted surveys from your iPad. You will no longer have access through Survey123 to the AGOL data from those deleted forms.



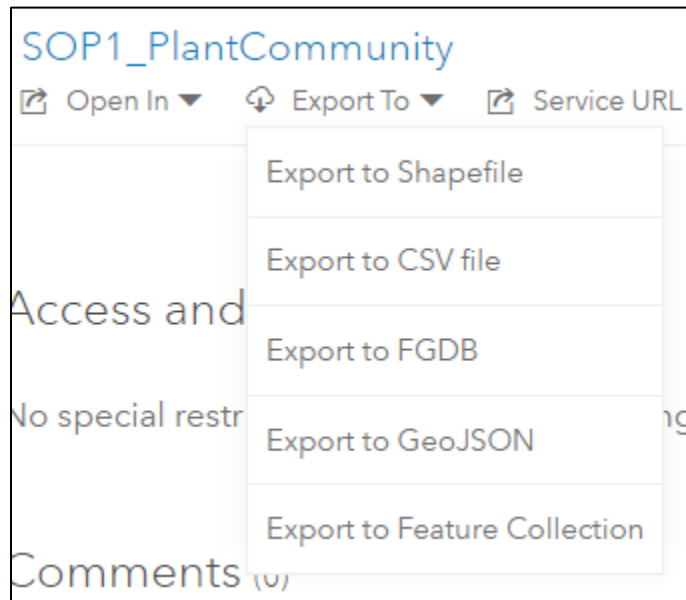
Edit the data in the selected survey, and resubmit the survey per the normal procedure.

*Exporting the Survey Data*—From the Monarch Group home page:

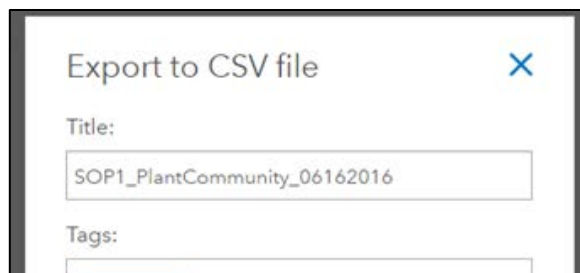
Select the 'Details' option from below the image of the survey feature layer's data you want to export.



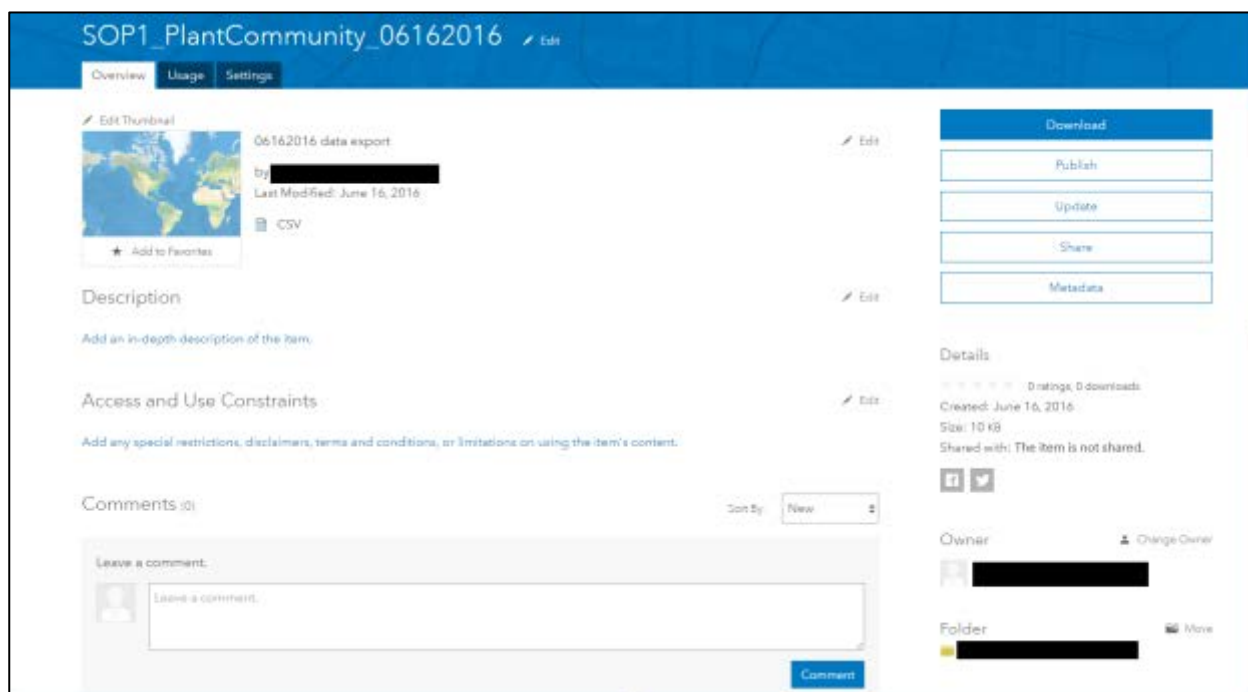
Select the format you want the exported data in from the 'Export To' dropdown menu; CSV to open the data in Excel.



Fill out the *Title*, *Tags*, and *Summary* fields in the window that pops up; *Tags* are keywords which can be used to quickly locate the exported data in the future. Each field must have an entry to be able to export the data. Select 'Export' when ready.



Once the export is complete, you will automatically be taken to the exported data's page in your content.



All exported data will be moved to your content and stored for future use. In the future, the exported data can be found by selecting 'My Content' from the menu bar at the top of the page. To download the exported data, select the blue 'Download' button in the upper right-hand corner of the screen.

### Survey123 Form Specific Instructions

Instructions on how to download survey123, login, download forms, and manage data are found in the Survey123 section of SM4.

These instructions include how to enter data into Survey123 forms using an iPad. They assume that the user is familiar with the pertinent Standard Operating Procedures (SOPs) and data sheet metadata.

For all SOPs—

The following fields are common to all SOP1, SOP2, SOP3, and SOP6 Survey123 forms:

The screenshot shows a mobile application interface for 'SOP1 Sampling Site Description'. At the top, there is a green header with a close button (X) on the left and a menu icon (three horizontal lines) on the right. Below the header, there is a block of instructions: 'Instructions: Please fill out the shaded blocks on a paper form even if entering data directly into an electronic application. REMINDER: Do not enter data from two or more separate days of monitoring into a Survey123 form. For each visit to a plot done on a different day, fill out and submit a separate Survey123 form even if those different visits are part of the same overall monitoring trip to a site.' Below the instructions are several form fields: 'Monitoring Area \*' (a dropdown menu), 'Plot Identification' (a section header), 'Sampling Stratum \*' (a dropdown menu), 'GRTS Master Cell ID \*' (a text field), 'GRTS Draw Point \*' (a text field with a note 'must be 6 digits (include leading zeros)' and a value of '000000'), 'Plot Label' (a text field with a value of '--000000'), 'Visit Date \*' (a date picker), 'Visit Start Time \*' (a time picker with a note '(24-hr) For example 23:55. End time located at the bottom of the form' and a value of ':'), 'Observer \*' (a text field with a note 'Full Name'), 'Recorder \*' (a text field with a note 'Full Name'), and 'National Vegetation Cover Information' (a section header) with 'Plot's NVC Macrogroup \*' (a text field). At the bottom right, there is a green bar with a white checkmark icon.

**Monitoring Area:** Select your Monitoring Area from the dropdown list.

**Sampling Stratum:** Select you Sampling Stratum from the dropdown list.

**GRTS Master Cell ID:** Once a Monitoring Area is selected above, a list of GRTS Master Cell IDs are generated. Select your GRTS Master Cell ID from the list.

**GRTS Draw Point:** Enter your 6 digit GRTS draw point. Ensure that leading zeros remain if your GRTS Draw Point is less than 6 digits (e.g. 000123 not 123).

**Plot Label:** Automatically generated from your prior GRTS Master Cell ID and GRTS Draw Point entries. Non-editable.

**Visit Date:** Select your visit date from the calendar.

**Visit Start Time:** Enter your start time in a 24 hour format (e.g. 14:25=2:25 pm).

**Observer:** Autocomplete field type. Begin typing the observer's name or select from the dropdown list. May also select "Other" which will then create a new field called "Specify Other" in which you will type the observer's name that was not on the list.

**Recorder:** Autocomplete field type. Begin typing the recorder's name or select from the dropdown list. May also select "Other" which will then create a new field called "Specify Other" in which you will type the recorder's name that was not on the list.

**Are Disturbances Observed:** Select "Yes" or "No" (If "Yes" is selected, then additional questions will appear).

**List of Disturbances:** If "Yes" was selected for the "Are Disturbances Observed" question, then a list of possible disturbances will appear. The default value is "No" for each disturbance. For each disturbance observed, change the answer to "Yes".

**Comments:** Complete as required.

**Visit End Time:** Enter your end time in a 24 hour format (e.g. 14:25).

## SOP1 Sampling Site Description Form—

Verizon LTE 8:22 AM 100%

### SOP1 Sampling Site Description

Are Transects in Collector for ArcGIS? \*

If transects are not in ArcGIS Collector, then X, Y coordinates will need to be manually entered.

Yes  No

#### Transect Coordinate System

X Y Coordinate System Used  
Projected

Datum  
WGS84

UTM Zone  
UTMZone\_11

1 of 16

#### Transect Coordinates

Transect Number  
2 digits (01-16)  
01

Transect ID  
PRG-000093-000023-01

Start Point X  
12657893.9876

Start Point Y  
111253689.987

End Point X  
12677849.8576

End Point Y  
111253756.98756

Plot Photos

Unique fields for SOP1 include:

### ***National Vegetation Cover Information***

**Plot's NVC Macrogroup:** Autocomplete field type.

Begin typing the NVC Macrogroup or select from the dropdown list. The ArcGIS Online webmap titled "Survey Areas 2017" can be used in Collector for AGOL (PC) to identify this information.

**Plot's NVC Ecological System:** Autocomplete field type. Begin typing the NVC ecological system or select from the dropdown list. The ArcGIS Online webmap titled "Survey Areas 2017" can be used in Collector for AGOL (PC) to identify this information.

**Is this plot in the expected ecological system:** Select "Yes" or "No".

**If No, What is the actual ecological system at the plot's center:** If the answer to the above questions is "No", then this field will appear and you will begin typing the NVC ecological system or select from the dropdown list

**Are Transects in Collector for ArcGIS:** Select "Yes" or "No". This question ensures that we have the correct geospatial coordinates to accurately georeference data collected for each transect.

**X Y Coordinate System Used:** If the answer to the above question is "No" then this field will appear. Select whether your coordinates are Geographic (Latitude, Longitude) or a Projected (UTM) coordinate system. This information should be available from your GPS unit.

**Datum:** Select the datum used for the coordinates that will be entered.

**UTM Zone:** If "Projected" was selected for the "X Y Coordinate System Used" question above, select which UTM Zone for the collected coordinates.

**Transect Number:** Select which Transect you will be adding X Y coordinates for from the dropdown list.

**Transect ID:** Automatically generated from previous answers. Not editable.

**Start Point X:** Enter the X coordinate for the starting point of the transect.

**Start Point Y:** Enter the Y coordinate for the starting point of the transect.

**End Point X:** Enter the X coordinate for the ending point of the transect.

**End Point Y:** Enter the Y coordinate for the ending point of the transect.

**Note: The group of questions regarding Transect Start and End points is a repeatable group. Tap on the arrow to begin entering data for subsequent transects. At any time, you can tap the back arrow to look at previous Transects and make edits.**

**First (Second, Third, Fourth) Subplot ID (location of photo x):** Enter the Subplot ID that you will be taking a photo from.



**Photo x:** Click on the camera icon to take a photo directly from the iPad. This embeds the photo into Survey123 (this does not store the photo in the iPad). The photo can then be viewed as an attachment to the feature in AGOL.

**Site Plant Community Checklist questions:** The default for each of the questions in this group is "No". Change the answer to "Yes" as required.

*SOP2 Pollard Butterfly Walk—*

Unique fields for SOP2 include:

**Starting Wind Speed Category:** Select the category from the dropdown list.

**Starting Sky Category:** Select the category from the options on the form.

**Temperature Unit:** Select "Celsius" or "Fahrenheit"

**Start Temperature in Shade:** Type in the temperature.



**Monarch Observation Information (Repeatable Group)**

**Segment Number:** Select the Segment. If “Other” than another field will appear titled “Specify Other”.

**Total Number of Butterflies with Uncertain ID Observed:** Type in a number.

**Number of Monarchs Observed from 0 – 2.5 m Distance (by behavior):** Type in the numbers of Monarchs observed in the appropriate behavior fields.

**Number of Monarchs Observed from 2.5 – 5 m Distance (by behavior):** Type in the numbers of Monarchs observed in the appropriate behavior fields.

**Total Number of Monarchs Observed:** This field will be automatically calculated from your entries above and is not editable.

**Acronym of Plant Species Used by Monarch for Nectaring (1, 2, 3):** Autocomplete field type. Begin typing the plant name or select from the dropdown list. Type the 6 digit acronym, scientific name, or common name.

**Repeat *Monarch Observation Information (Repeatable Group)*:** Tap on the “+” sign to repeat the above group of questions up to the “Segment Number” question. This allows you to begin entering data for another segment in the same form by creating a related table within the feature. Tapping on the “X” symbol will delete the current entry (confirmation message will pop-up before entry is deleted). Tap on the arrows to navigate to other entries to check your entry or make revisions.

**End Wind Speed Category:** Select the category from the dropdown list.

**End Sky Category:** Select the category from the options on the form.

**Were temperatures between 21-30° C (70-87° F) and wind speeds less than ~ 12 mph:** Select “Yes” or “No.”

**What percentage of the walk was grass so high that you had trouble observing monarchs out to 5 meters:** Select the appropriate percentage from the options in the form.

*SOP3 Data Sheet 1 Nectar Plant, Milkweed, Monarch Eggs & Larvae—*

Unique fields for SOP3 include:

**Tier 1 or Tier 2:** Select which tier survey you will be completing. USFWS data collectors select Tier 2.

**Temperature Unit:** Select “Celsius” or “Fahrenheit”

**Start Temperature in Shade:** Type in the temperature.

**U.S. Fish and Wildlife Service Region:** Select which USFWS Region the survey is taking place in. This selection is used to generate a list of Nectar Plants and Milkweed Plants later in this survey.



**Plant and Monarch Eggs/Larvae Information (Repeatable Group)**

**Transect Number:** Select the Transect from the dropdown list.

**Subplot Number:** type in the 3 digit number of the subplot you will be monitoring (**Ensure 3 digits are entered e.g. 013** not 13). As described in SOP3, observations of milkweed between subplots should be collected. In this case you will enter the subplot number in the following way “#.#”. For example, the space between subplots eighteen and nineteen would be recorded as “18.19”.

**Nectar Plant Data**

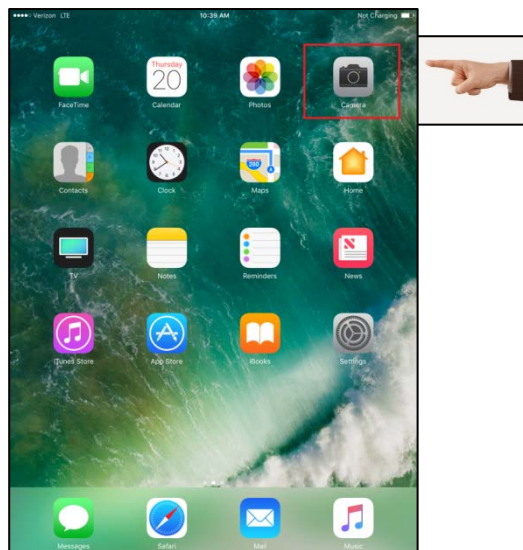
**Are Nectar Plants Present:** Select “Yes” or “No”.

**Nectar Plant Species X:** If “Yes” is selected above, this field will appear. Autocomplete field type. Begin typing the plant name or select from the dropdown list. Type the 6 digit acronym, scientific name, or common name.

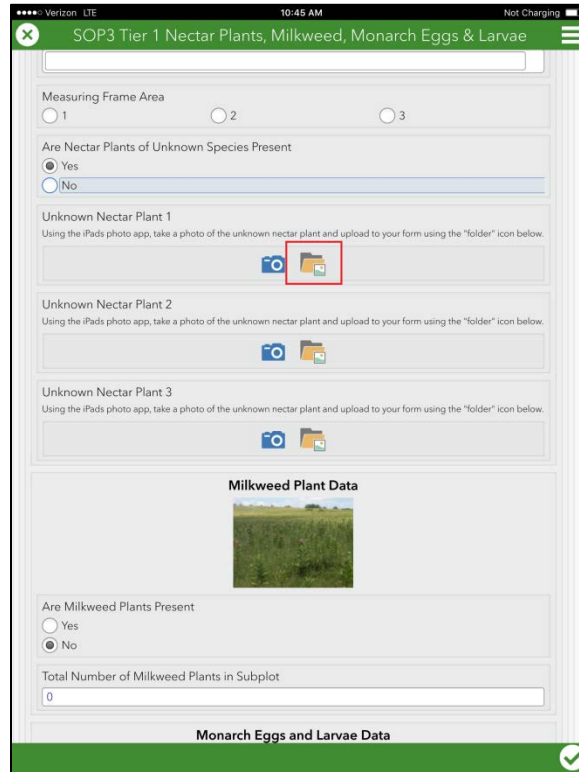
**Measuring Frame Area:** Select which measuring frame area the plant was first identified in. Once an option is selected, another set of “Nectar Plant Species” and “Measuring Frame Area” fields will appear and should be used for subsequent nectar plant species observed. You will be able to enter up to 20 nectar plant species in this way.

**Are Nectar Plants of Unknown Species Present:** Select “Yes” or “No”.

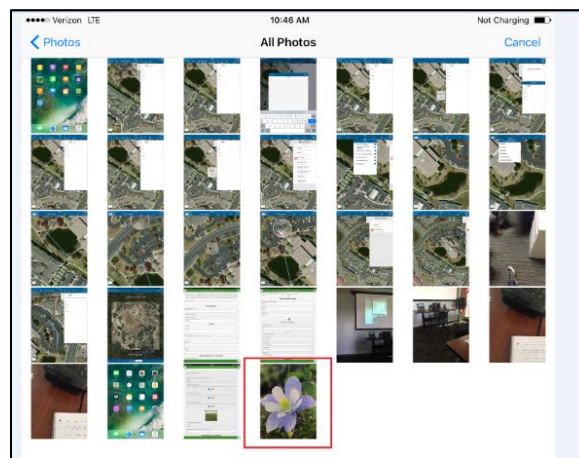
**Unknown Nectar Plant 1 – 3:** If “Yes” is selected above, these 3 fields will appear. You will use your iPad’s camera app to take a picture of the unknown nectar plant(s). Do this by tapping the home button on the iPad and selecting the iPad camera app:



Take a clear photo of the unknown nectar plant. Using the iPad camera app ensures that the photo is stored on the iPad and can be readily accessed for future training and identification purposes from the iPad. The photos will also be embedded in the feature as attachments which can be viewed in ArcGIS Online. Tap the “Home” button on the iPad, and re-open the Survey123 app. Your current Survey will still be open and active. Tap the “Upload Picture” folder icon:



Navigate to and select the photo that you just took from your iPad photos:



Repeat these steps to add photos of up to 3 unknown nectar plants for each subplot.

### **Milkweed Plant Data**

**Are Milkweed Plants Present:** Select “Yes” or “NO”.

**Milkweed Plant Species X:** If “Yes” is selected above, this field will appear. Autocomplete field type. Begin typing the plant name or select from the dropdown list. Type the 6 digit acronym, scientific name, or common name.

**Measuring Frame Area:** Select which measuring frame area the plant was first identified in. Once an option is selected, another set of “Milkweed Plant Species”, “Measuring Frame Area”, and “Number of Milkweeds” fields will appear and should be used for subsequent Milkweed plant species observed. You will be able to enter up to 5 Milkweed plant species in this way.

**Number of Milkweeds:** Type in the number of Milkweed plants observed for each species.

**Total Number of Milkweed Plants in Subplot:** This is an automatically calculated field that cannot be edited.

### **Monarch Eggs and Larvae Data**

**Are immature Monarchs Present:** Select “Yes” or “No”.

**Number of Monarch Eggs:** If “Yes” is selected above, this question will appear. Enter the number of Monarch Eggs observed.

**Number of 1<sup>st</sup> – 3<sup>rd</sup> Instars Found:** Enter a number.

**Number of 4<sup>th</sup> Instars Found:** Enter a number.

**Number of 5<sup>th</sup> Instars Found:** Enter a number.

**Comments:** Type out any useful comments regarding your observations for the current subplot.

Number of 4th Instars Found  
0

Number of 5th Instars Found  
0

Comments  
Write any useful observations about nectar plants, milkweeds, or immature Monarchs. Adult Monarchs should be noted below.

**Repeat “Tier 1 Plant and Monarch Eggs/Larvae Information (Repeatable Group)”** Tap on the “+” sign to repeat the above group of questions (Transect, Subplot, *Nectar Plant Data*, *Milkweed Plant Data*, and *Monarch Eggs and Larvae Data*.) This allows you to begin entering new data for the next subplot in the same form by creating a related table within the feature. Tapping on the “X” symbol will delete the current entry (confirmation message will pop-up before entry is deleted). Tap on the arrows to navigate to other entries to check your entry or make revisions.

**End Temperature in Shade:** Type in the temperature.

**Total Number of Transects Monitored:** Enter the total number of transects monitored in this form.

**Total Number of Subplots Monitored:** Enter the total number of subplots monitored in this form.

*SOP3 Data Sheet 2 Miscellaneous Monarch Observations—*  
**Miscellaneous Adult Monarch Observation (Repeatable Group)**



**Are Miscellaneous Adult Monarchs Present:** Select “Yes” or “No”. Selecting “Yes” will cause additional questions to appear. This group of questions should be completed each time you observe an Adult Monarch or multiple Monarchs exhibiting the same behavior.

**Time Observed:** Enter the time observed in a 24 hour format.

**Monarchs Observed by Behavior:** Select the behavior of the first Monarch observed from the dropdown list.

**Total No. of Monarchs Observed Demonstrating This Behavior:** Enter the total number of Monarchs observed exhibiting this behavior.

**Location of the Observer When Monarch Spotted:** Record the subplot # the observer was in when the monarch was observed; #.# if the observer was in between subplots

**Plants Used by Adult Monarchs for Nectar:** Autocomplete field type. Begin typing the plant name or select from the dropdown list.

**Nectaring Monarch Observation**

Regarding "Location of the Observer when Monarch Spotted," record the subplot # the observer was in when the monarch was observed; #.# if the observer was in between subplots. If the observer was not in a subplot or on a transect line when the nectaring monarch was observed, record a "0" for the observer's location and do not fill out the "Compass Bearing Monarch is from Observer" or "Distance Monarch is from Observer" columns. Record the "Plant Species" under all circumstances and the "Subplot Number Monarch Observed Inside Of" when applicable.

Location of the Observer When Monarch Spotted

Plants Used by Adult Monarchs for Nectar

Was the Nectaring Monarch Observed Inside of a Subplot?

If Yes: Subplot Number Monarch Observed Inside Of

If No: Compass Bearing Monarch is from Observer

If No: Distance Monarch is from Observer (meters)

◻ 2 of 3 ◻

**Was the Nectaring Monarch Observed Inside of a Subplot:**

**If Yes: Subplot Number Monarch Observed Inside Of:** Enter the subplot number.

**If No: Compass Bearing Monarch is from Observer:** Enter the compass bearing from your location to the Monarch.

**If No: Distance Monarch is from Observer (meters):** Enter the distance in meters that the Monarch is from the Observer.

**Repeat *Miscellaneous Adult Monarch Observation (Repeatable Group)*:** Tap on the “+” sign to repeat the above group of questions up to the “Are Miscellaneous Adult Monarchs Present” question. This allows you to begin creating a related table within the feature layer with records for each Miscellaneous Adult Monarch(s) Observed exhibiting a behavior. Tapping on the “X” symbol will delete the current entry (confirmation message will pop-up before entry is deleted). Tap on the arrows to navigate to other entries to check your entry or make revisions.