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MANUAL OVERVIEW

All lotic AIM data (including photos and GPS coordinates) will be collected electronically using an iPad (see here for requirements). Lotic AIM data collection utilizes two main iPad applications: The Stream and River Assessment Hub (SARAH) application, which is a custom-built FileMaker GO data application, and Collector for ArcGIS. SARAH is used to record all lotic AIM field data, while Collector is used to navigate to point coordinates and to record basic field visit information such as the evaluation status. This field visit information is then synced to the Office Webmap to facilitate design management.

Other programs used for electronic data collection include ArcGIS Companion, Box, and Microsoft Teams. ArcGIS Companion is an ESRI application that allows users to view ArcGIS Online Content on a tablet and should be used to prepare trip maps if no computer is available. All photos taken with SARAH will be uploaded to a Box folder. To view and search these photos on the iPad, crews can use the Box app. Microsoft Teams will serve as a way for crews to share files and communicate with project leads, crew managers, and the National AIM Team during the field season.

This manual will detail how to set up and use each of the above applications. Figure 1 outlines the overview of the process from how to download and set up applications, communicate with the AIM team, prepare electronic maps before leaving for a field trip, and finally collect and submit field data.

If questions still remain after reading this protocol and reviewing the frequently asked questions appendix, please reach out to your contract lead, BLM Project Lead, or State Lead. If you need additional support, please contact the appropriate National AIM Team member:

- Design related questions: Nicole Cappuccio (ncappuccio@blm.gov; 303-236-6112)
- General project coordination and implementation support: State Lead and Kate Lunz (klunz@blm.gov; 303-236-0473)
- Field data collection questions (e.g., SARAH and protocol): Logan Shank (lshank@blm.gov; 303-236-1161)
- Technology and applications questions (e.g., Teams, Collector, Box, Companion): Jacob Shipman (jshipman@blm.gov; 303-236-0476)
- If someone from the list above is not available and there is an immediate issue please contact Jennifer Courtwright (jennifer.courtwright@usu.edu; 985-502-7530), Nicole Cappuccio, or Scott Miller (swmiller@blm.gov; 720-545-8367)

HOW TO USE THIS MANUAL

This manual is organized by workflow so that it can be easily referenced throughout the season. Crews are the primary target audience and this manual is not recommended to be read from cover to cover. Rather, use the clickable table of contents to find the appropriate section. Each main section in the table of contents is also hyperlinked in Figure 1, which gives a summary of the electronic data collection workflow.
Download and Set Up Apps
Tools: Apple Store and AIM website
Apps: Collector, Companion, FileMaker Go, SARAH, Box, Teams, USB Drive Software
Completed once at the start of season

Share Files and Communicate with Team Members
Teams
Throughout the field season

Prepare Maps for Field Visits
Add and Remove Base maps
iTunes, Teams or USB Drive (Recommended)
Ideally completed once at start of season but depends on storage space.
Create a Trip Map
Office Webmap via Desktop computer or Companion on an iPad
Before each trip
Take Your Trip Map Offline
Collector
Before each trip
Field Evaluate and Collect Data
Collector and SARAH
During each trip
Backup Data
Collector, SARAH, USB Drive, Teams
At least every two reaches
Submit Final Data
Collector and SARAH
After each trip

Figure 1. Summary of the electronic data collection and management workflow. For each step utilized applications and frequency of completion are specified.
DOWNLOAD AND SET UP APPS

Overview

iPads and data collection applications should be set up two weeks prior to field training so that crews can use the device and follow along during pre-training videos. The time needed to set up a device varies, but may take one hour for the first device. Prior to downloading applications, iPads should be double checked to ensure they have the proper iOS and settings. Six applications need downloaded from the Apple Store and then SARAH needs downloaded from the AIM website. Several of the applications require log in information before they can be used, and SARAH needs additional set up after downloading. SARAH may also need updated throughout the field season.

Review iPad Setup and Settings

- Ensure you have iOS of 13 or more. If not, go to settings, “General” and then “Software Update” to update your iOS. If your device only supports iOS 12, please contact the National AIM team for more information.
- Ensure your iPad has a data plan and is celluarly enabled. You will not be able to take GPS coordinates otherwise.
- Ensure you have a waterproof case for your iPad.
- The iPad battery lasts for approximately one reach worth of data collection and iPads will overheat if the temperature gets above 95 degrees. Therefore, care should be taken to maximize battery life and keep iPads out of direct sunlight.
- Review Your Settings
  - You may want to consider locking the screen orientation to landscape mode because SARAH functions best in this orientation.
  - Ensure you know how to save battery life by adjusting screen brightness, setting airplane mode on, and turning off Bluetooth.
  - Note that battery saving settings such as turning the screen off after 1 minute will need to be reset when running any processes that take a long time because most iPad processes only run when the screen is on and active.

Download Applications

Use the Apple App Store to download the following applications:
- Collector for ArcGIS (NOT Collector Classic)
- ArcGIS Companion
- Microsoft Teams
- SanDisk iXpand Drive
- FileMaker GO 17 (NOT 18)
- Box
- Recommended but not required
  - Adobe PDF reader
  - Email specific application
Download SARAH from the AIM website AFTER downloading Filemaker Go app:
1. Using Safari web browser on the iPad, go the Crew Hiring and Equipment page of the AIM website to download SARAH.
2. Click the download link on the website.
3. Open your “Files” app on your iPad and locate the “Downloads” folder. Confirm that there is a zipped SARAH file in this location.
4. Click and hold the zipped SARAH file. When the popup of options appears, choose “Uncompress”.
5. Click and hold on the unzipped SARAH file. When the popup of options appears, choose “Share”. Note the uncompressed file will have the FileMaker Go logo.
6. In the following window, scroll to the right until you locate “Copy to FileMaker Go”. If you do not see “FileMaker Go” as an option, you may need to click “more”.
7. Clicking the “Copy to FileMaker Go” will then download SARAH into the Filemaker Go application and open up the app to the main menu.

Sign Into Applications

Box
The National AIM team has created a Box account for crews, crew managers, and project leads to use to search and view reach photos. The account username is aim.aquatics@gmail.com and the password is stonefly2020. Do not enable notifications.

Microsoft Teams
1. If you already have a Microsoft Teams account, sign-in and skip to Step 3.
2. If you do not have a Teams account, open the Teams app and click “Sign up for free”. Follow the on-screen steps to create an account. Once you have created a free Microsoft Teams account, sign into the app.
3. Once you have signed into Teams, send Kate Lunz (klunz@blm.gov) an email with your Microsoft Teams username, and she will then add you to our Lotic AIM Field Work Team.
The user MUST sign into their Teams account on an iPad or computer before sending Kate their username.

4. Once you have been added to the Lotic AIM Field Work Team, you will get an auto generated email from Microsoft sent to the email linked to your Teams account letting you know that you have been added to a Team. Do NOT launch teams from this email link. Instead launch the teams app and find the menu stack in the upper left-hand corner of the screen.

5. Scroll down until you see “Accounts and Orgs”. Locate “DOI (Guest)” and click it.

6. In the next window, a popup will ask “Redeem invite to DOI?”. Hit “Redeem”. It will ask you to log into your teams account again. After you have logged in again, click “Open” to open the page in Teams. When it asks to “Switch to DOI”, hit “OK”.

7. As an external guest to the DOI network, you will be forced to review your Terms of Use. Click “Guest Access” to open the Terms. Then hit “Accept”.

8. You are now signed into Teams.

Collector and Companion

1. Set up a geoplatform account following these instructions. Send you username to Jacob Shipman (jshipman@blm.gov) to get added to the AIM Lotic AGOL Group.

2. Locate and open “Collector for ArcGIS”. Once the app opens, select the button for “Sign in with ArcGIS Enterprise”. In the popup window asking for your Enterprise URL, enter “geoplatform.maps.arcgis.com” and hit “ok”.

3. A new screen will appear with a blue button to sign into Geoplatform.gov’s Enterprise ArcGIS Online (AGOL) account. Click this. On the following page, enter the Geoplatform username and password that you set up above and hit ok. Be patient as it may take a while to actually complete the log in request and may not look like it is doing anything.

4. Locate “ArcGIS Companion” and launch the app. Once the app opens, hit the “Sign in” button at the bottom of the screen.

5. On the following screen, select “+ Add account”. A popup should appear near the bottom of the screen asking if you want to sign in with ArcGIS Online or ArcGIS Enterprise. Select “ArcGIS Enterprise”.

6. The following screen will ask for your ArcGIS Enterprise Organization URL. Enter “geoplatform.maps.arcgis.com” and hit Next in the upper right-hand corner of the screen. The next window that will launch will be the Geoplatform Enterprise Log Screen. Click the “GeoPlatform.gov Registered Account” and sign in using the same credentials as above. Be patient as it may take a while to actually complete the log in request and may not look like it is doing anything.
Disabling Collector Auto-Sync
The first time users open Collector they should disable auto-sync. Auto-Sync is a feature in Collector that tries to automatically sync maps and data continuously. This works great if you are in an urban environment; however, it presents some issues when you are working in the backcountry. When you do come across cell service, you do not want your Collector app to choke itself trying to send and receive new data. Syncing is covered later in this document; however it should be noted that syncing should only occur when the user has a strong, stable, reliable internet connection.

1. On the main screen of Collector, locate the “Account” icon in the upper left-hand corner.
2. In the popup, scroll down until you locate “Download & Sync”. Click this.
3. In the next popup, make sure that “Auto-Sync” is turned off. While on this page, you may also want to turn off “Wi-Fi Only” if you intend on syncing data using your cellular provider. Note if this is turned on, you will be forced to only sync data when you are connected to a WiFi signal.
Setting Up SARAH

Register SARAH
Each device must be registered with the National AIM Team every year to enable data submission. To register the device, click the “Register Device” button on the main menu. Fill out the form (shown below) and click register. You should receive an email notifying you that your request was received. You will receive a second email once your device has been approved. Note you should NOT need to redo the registration if you download a new version of the app during the field season.

Updating Dropdowns
Each year SARAH dropdowns are updated with a revised list of PointIDs and Vegetation Lists. Dropdowns should be updated prior to collecting any data. To update dropdowns, simply click the “Update Dropdown” button on the main menu while connected to the internet AFTER registering your device. You should receive a message back indicating whether the updates were successful. If you receive a message that “Additional Permissions Required”, try to register your device again. Updating dropdowns does not delete or modify any already collected data so it can be done throughout the field season if needed. Each time you download a new version of SARAH you must update dropdowns.

Testing Registration and Dropdowns
To test if the registration process worked and if your dropdowns are updated, you can try collecting “Test or Fake Data”.

1. Select “Collect Data” from the Main Menu. Select and desired indicators.
2. Then you will be taken to the verification of SARAH. If your dropdowns were updated, you should now have a list of projects and PointIDs for the season in your Project and PointID dropdowns. You may also want to verify your veg species list is populating with your state’s list of species.

3. Once you have verified the dropdowns are populating, select “Test or Fake Data” as the Project and PointID and then exit back to the Main Menu. Then click the “Upload Data via Wifi” button. If your registration, worked you should get a success message. If you get a message that says “Additional Permissions Required” then there is a problem with your registration and you should try to register the device again.

**Update SARAH throughout the Season**

Throughout the field season you may need to download new versions of SARAH to fix application quirks. The most recent version of SARAH can be found on the AIM website [here](#). Crews will also receive notification of these updates via Microsoft Teams so it is important to check Teams frequently. The following explains how to download a new version of your SARAH application as needed:

1. Check your current version number of SARAH to see if you need to update it. The version of SARAH is in the file name. For example, “SARAH_v204.fmp12” is version 2.04. You can also view the version of SARAH that you are using by clicking on the Filemaker app file. A start up screen will appear with the SARAH, BLM, and NAMC logos. In the lower right-hand corner, there should be a version number with a prefix of “v”. Always make sure you are using the most up to date version.

2. **Submit final data** for all reaches within your current version. This is critical because you will delete the app in the next step which deletes all associated data that you have collected to date (except backup XML and csv files).

3. You should only have one version of SARAH on your iPad at a time to prevent confusion so before downloading a new version you should delete your old version. Do not delete your old version if your app is corrupted and is not allowing any further data collection or final data submission. **After submitting final data for all reaches, delete your current version of SARAH.** From the main menu of SARAH, click exit app. Go to the device tab and find the file folder labeled “SARAH”. Click the paper with the check mark in the upper right. This should then change the screen so you can select files. Next select the SARAH file folder and click the trash can in the upper left.
4. Download the new version of SARAH using the directions above and then double check that version number is correct.
SHARE FILES AND COMMUNICATE WITH TEAM MEMBERS

Overview
Microsoft Teams will be used throughout the field season to share files and communicate with team members. The chat feature can be used to send messages to anyone within a given state or to anyone on the National AIM Team. This means that State leads, project leads, contract leads, crew managers, and crew members will all need to have access to Teams.

General Teams Information:
Within the Lotic Field Work Team directory, each state has its own channel, in addition to a WRSA channel, a Boating channel, and a General channel. Within each state channel there are several tabs:

- **Post**: Commonly referred “Chat”, this tab can be used as a communication tool to chat with others associated with Implementation of Lotic AIM please see below for more information.
- **Files**: The Files tab within each Channel is essentially a “Sharepoint file explorer” nested into the Teams application. See the below “Project Folder” section for more information on the structure and files to store and access on Teams.
- **Crew Sharepoint**: This is only needed for use on iPads, but will access the same files in the Teams File folder, but you will have more functionality to interact with those files.
- **BLM SharePoint**: For BLM users ONLY and links to the National AIM SharePoint.

Teams Channel and File Organization

- **General Channel**: This channel is set up for communication with the National Lotic AIM Team. The AIM Team will use the “Post” tab to send out general information and updates that apply to all users. The “Files” tab will be used to store:
  - Critical Documents and Tools file that links to many of the needed protocols and tools for 2020 Lotic AIM Implementation.
  - Error Log
  - Computed Indicators

- **State Channels**
  - Base maps
  - Vegetation and Geomorphic Guides
  - Project specific folder contains
    - **Data summaries and photos**: This folder is intended to be used to organize and store Data Summaries (aka data CSVs) and if desired Photos and other data/information. If using this location for more than data summaries, we recommended implementing a file organization structure to keep these files tidy. An example is a folder for each “Trip” with subsequent folders for each “Field visit” utilizing both Point ID and Stream Name in the folder name.
    - **Mid and End Season Checks**: Should be used to store Check-In and Project Close-Out notes, files, any photos, and any other documents that are pertinent to these meetings.
    - **MIM**: This folder should be used to organize, back up and store MIM data sheets if the crew is collecting MIM data.
    - **Other Files**: This folder should be used for crews to organize and store files not directly related to one of the other folders.
Teams Chat

- Each channel has its own chat.
  - The general channel chat should be used for everything that is nationally applicable.
    - The National AIM team will use this for field updates. For example: “We had a server go down, for any data and photos submitted yesterday (May 1st) please resubmit”.
    - You can also post questions to the national AIM team, or photos. For example: “This link no longer works, can someone point me to the correct one”.
  - State channels should be used for any project or state level communication. For example: “We’re seeing a lot of reaches that look like this (Post photo) and we want to see if others are having trouble identifying bankfull in these systems”.

- To tag a specific person type “@” and then start typing their email or name. This sends them an email to let them know they were tagged in a post.
- Be professional, all posts are recorded by the BLM, as are all emails.

Teams Maintenance on iPads

- When documents are opened or shared in Teams, the application creates data caches on your iPads memory which serve little purpose and slow down your iPad. We recommend clearing the cache as part of your pre or post trip process.
- To Clear Teams Cache:
  1. Open Teams and click the “Stack” icon in the upper left-hand corner of your screen.
  2. On the pane that appears on the left side of your screen, select “Settings”. Under General, select “Data and Storage”
  3. Finally click “Clear app data”.

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PREPARE MAPS FOR FIELD VISITS

Overview
Field crews will use the Collector application and provided map layers to efficiently navigate to sample reaches and to track what points have and have not been visited throughout a field season. This section goes through the steps to prepare and use these tools and maps. The instructions below assume that trips were planned and the Trip column has been filled out in the Points Layer. For guidance on how to plan trips, please refer to the Evaluation and Design Management Protocol.

Base maps are a map layer provided to the crew (viewed via Collector app) that integrates many different layers into one. This integrated layer provided by the BLM is much more informative than the default base map on the Office Webmap. Most of the base maps provided will contain information such as BLM land ownership, road layers, topographic layer, gate, etc. These base maps are provided to help a crew navigate to points. The base maps are formatted as Vector Tile packages (.tpk or .vtpk) to save space on the iPad. They can be downloaded to the iPad ideally once at the beginning of the field season, but it may depend on available iPad storage and the spatial extent of your trip. Because of space limitations, we also provide instructions to delete base maps from the iPad throughout the season.

In addition to base maps, Points, Field Visit, and NHD layers need to be available offline for crews to navigate and record field visit information. So that crews can easily visualize exactly which points to visit, crews should subset the west wide Points layer by filtering by a specific trip to create a “trip map”. A trip map simply refers to a map that only displays the points that a crew intends to visit during a given field “trip”. Crews can prepare their trip maps using a computer or the Companion application. Then they take these trip maps offline using Collector so they can record field visits while at a reach.

Add Base Maps
Crews will be supplied with tile package or vector tile package base maps that were created by each BLM state for their field crews to use while navigating in the back country. The user will need to download these base maps and add them to Collector. There are two ways that a user can add base maps to their iPad for use in Collector:

1. USB thumbdrive (Recommended)
   o Requires a lightning compatible flash drive, but all base maps should be loaded onto the external drive at the beginning of the season.
   o Ideal for crews that are working across large areas or will be working in areas with poor cell service/WiFi accessibility so that base maps can be switched out at any time during a field trip.

2. Teams
   o Requires very good cell service to download new maps.
   o Ideal for crews that have good cell service/WiFi accessibility.

Option 1: USB Drive (recommended)
1. Most iPad compatible USB drives will require you to download their software to interact with data on the USB drive. In the example below, a SanDisk USB drive is used, so the
SanDisk “iXpand Drive” application was downloaded. The first time you plug your USB drive into your iPad, it should give you a pop up prompting you to download their software.

2. Plug the USB drive into a computer (or iPad) and transfer the Base map Vector Tile Package (.tpk or .vtpk) to the device from Teams (or other file location). A folder was created called “Base maps” on the USB to store base maps in since there will be other data and information for the field season stored on this USB drive. When you are done, safely disconnect the USB drive from the computer or iPad.

3. If you used the iPad to transfer these files then skip to step 4, if you used a computer to transfer these files first plug the USB drive into your iPad and open your USB drives file management app (in my case, SanDisk “iXpand Drive”).

4. Click Copy Files and on the following screen hit “Copy Files From iXpand Drive”

5. Navigate the file structure on your USB drive and locate the base maps you added.

6. Click the base map or maps that you want to transfer to your device and then click “Copy to iPad” at the bottom of the screen. You will get a pop up that says it cannot transfer the base map to your Photos app. Click Ok.

7. When your download is complete, it will give you another popup saying that it was successful. You can now close this application.

8. Open the Files application on your iPad and make sure you have the “On My iPad” directory open. There should be a folder called “iXpand Drive” in this directory along with the “Collector” folder. Select the “iXpand Drive” folder and then the “Downloads” sub folder.

9. Click and hold the file for the base map you want to add to Collector. In the dropdown, select “Move”. A popup will appear asking where you want to move the base map to. Select the “Collector” folder and hit “Move.”

Option 2: Teams

1. Within the Teams app, locate the AIM Lotic Field Work (2020) Team.

2. Locate your state’s Channel and click the “Files” tab. Next open the “Base maps” folder.

3. Identify the base map you want to download.

4. Click the three dots to the right of the base map and select “Send a copy.” A popup will appear saying “Downloading”. This might take 15-20 mins to download per base map. **DO NOT** let you iPad go to sleep or the download will say it lost internet and quit.

5. When the download completes, a window will popup asking what you want to do with the file. Select “Save to Files”.

6. In the next popup, it will ask you where you want to save your file. Under “On My iPad” select the “Collector” folder. Save the Vector Tile Package base map (.tpk or .vtpk) here by hitting the “Save” button in the upper right-hand corner of the popup.

7. Repeat steps 4-6 to add any additional base maps.

8. You now have a Vector Tile Package (.tpks or .vtpks) on your iPad for offline use.

Remove Base Maps

If the crew is working over a large geographic area and utilizing multiple base maps, storage space on the iPad may become a concern. In order to remove maps, it is important to understand how Collector stores base maps. Initially, when the Vector Tile Package (.tpk or .vtpk) is loaded into the iPads “Collector Documents” folder, each tpk or vtpk will appear as its own file. Once you launch Collector for the first time and open the loaded base maps, the files will be moved into a newly
created folder called “base maps” and stored in folders with nonsense alpha numeric unique IDs. Follow the instructions below to remove unnecessary base maps from the device.

Files App
1. Using your iPad, locate the Files App and open it.
2. By default, the app should launch and display content “On My iPad”. If it does not, locate the blue “< Locations” button in the upper left-hand corner of the screen and select “On My iPad”.

3. Select the “Collector” folder and then select the “base maps” folder.
4. Collector stores the Base maps you uploaded as .tpk’s or .vtpk’s in folders using a nonsense alpha numeric unique ID style naming system. Click through each folder until you locate the base map you want to remove. Remember the folder name and go back to the base maps folder.

5. Locate the folder associated with the base map you just identified and hold down on the folder for approx. 3 seconds until a popup window appears. Select delete.

6. You have now deleted your Base map from Collector but not the device.
7. Click the “< Locations” button and select “Recently Deleted”.
8. In the following window, click and hold the files you want to delete and select “Delete Now”.

9. The base map has now been completely deleted from the device.

10. Alternatively, if you want to delete all of the base maps on the device, use the same process in Step 5 to delete the “base maps” folder.

Create a Trip Map

Trip maps should display only the points that a crew intends to visit during a given field “trip”. Trip maps should include at least the following layers so that they can be edited offline during the trip: Points, Field Visits, and the AIM NHD layer used for your project. The points and field visits will help know which points are on your trip and tracking the field outcomes. The NHD is symbolized by stream size category to help with moving the point or reach set up. There are two ways to prepare trip maps. One can use a computer to access and edit the Office Webmap or one can use ArcGIS Companion on a tablet to access and edit the webmap. The following guidance focuses on Companion since most crews will not have access to a computer but the steps for a computer are very similar.

General Use of ArcGIS Companion

ArcGIS Companion is an ESRI application that allows users to view ArcGIS Online Content on a tablet. This app can be visually overwhelming, so this guidance will focus only on what the user is required to know in order to set filters on maps for use in Collector.

Below is a screenshot of the main screen of Companion once you are signed in.
First, we will cover the Groups Page. Click the Groups Page icon at the bottom of whatever page you are on in Companion. The Groups Page displays a list of every group your profile belongs to.

Click “BLM Natl Lotic AIM”. This opens a tablet version of the Lotic AIM AGOL group that you may have interacted with on a computer.

Finding and Saving Webmaps in ArcGIS Companion

1. Users can also find the Webmaps by clicking “Content” in the blue ribbon on the top of the Groups page, locating the “Filter” icon, and selecting a content type of “Maps”
2. Open the “BLM AIM Lotic 2020 Field Eval Map”. This will open the Webmap description page. Click “Open” near the top of the page and in the popup select “Map Viewer”

3. The webmap will launch within the Companion application.
4. Locate the Filter button for the Points layer and set a filter for your desired trip. In the example below, a filter was set so that only points that were identified for “Trip 2” were displayed. Note that a second filter may need to be set on project if multiple crews are using the same trip name.

5. Once a filter is set, hit “apply and zoom to”. This filters the map so that only the 5 points that are on “Trip 2” are displayed.

6. Next identify and add your NHD and any additional layers that you want to take offline. Click the “Add” button and select “Search for Layers”. Click “My Content” and switch to “My Groups”. In the Layer Search Bar, type “NHD Tile”. Scroll through the list and add the NHD Vector Tile associated with your project by clicking the “+” icon.
7. If you are done adding layers, proceed to the next step. If not, use the Layer Search Bar to locate any additional layers that you will require while offline.
   a. Note that layers must be offline enabled to be taken offline. (i.e. not every layer in the Lotic AIM Group can be taken offline using Collector).
8. Hit “Save” at the top of the screen and select “Save as”

9. In the popup, name the filtered map something logical. In this example, the map is could be called “Trip 2”. Make sure the “Save In Folder” is your Geoplatform Profile name.
   a. Note: The same AGOL account used to save the filtered map in Companion should also be used in Collector.

10. Hit “Save Map” and then hit “Done” to close the map. Hit the “X”s in the upper left hand corner of the screen to exit back to the main page of Companion, or double click home and swipe up to close the app.
Take Your Trip Map Offline

Before a crew leaves service for a given trip, the crew should use Collector to take the trip map they created with Companion offline so that they can navigate and record field visits without internet connection. Creating an “offline area” or “offline map” essentially means creating a “cache” of the Points and Field Visits services for a given area that can then be used offline and synced when cellular service is obtained. For the lotic workflow presented in this document, the terms “offline area”, “offline map” and “trip map” can be used synonymously.

General Use of Collector for ArcGIS
Prior to taking a trip map offline, users should orient themselves to the layout of Collector’s Main Menu. When you are familiar with Collectors layout, proceed to the following section.

- Above is a screenshot of the main screen of Collector once you are signed in.
  - **Current**: This displays the last map that you opened in Collector.
  - **On Device**: This is a list of all maps that you have downloaded onto your device to take offline.
  - **My Maps**: This is a list of maps that you have saved to your Geoplatform User Account (in this case, lshank_geoplatform content). Examples of this include maps filtered by trip and saved so that only a subset of Points are displayed on the map within Collector.
  - **Groups**: This is a list of all AGOL Groups that your profile belongs to. Clicking a group, for instance the BLM Natl Lotic AIM Group, you will see all maps that are part of the group. *Note that only Field Eval maps are set to be taken offline.*
How to Take Your Trip Map Offline

1. To take a trip map offline, open Collector and locate the “My Maps” section on the main page. Find the map that you just saved, and click the three dots. Next click “Add Offline Area”.
   a. Note: If this option is not available, it means you did not properly create your trip map. Make sure you created your trip map based off the “FIELD EVAL” map and not “Office Eval” map.

2. In the popup, ensure the points on the map are the points you intended to take offline. Next click the “Level of Detail”. The smaller the level of detail, the larger the file size the map will be on the iPad. If you plan to use side loaded base maps provided by the BLM, choose the “metropolitan” level of detail for the default base map since you will be replacing it with a better resolution map. Users can also take as many maps as they want offline, so if you have 3 clusters of points to visit during your trip, you can create 3 separate “offline areas” of the same map.

3. Note that layers that are taken offline are controlled by the layers in the trip map that you save using Companion not in the “Add Offline Area” Collector window. The layer stack in this window turns on or off layers only for data visualization purposes. This does not control which layers are taken offline.
   a. Example: Even though Field Visits is turned off in the image below, if the user takes that “area” offline, Field Visits will still appear in the offline map.
4. Select “Download Area” when you are ready.
5. To take more areas offline from that same map, find the three dots in the upper right-hand corner of the screen and add another offline area.

**Updating Offline Areas**
You should update your offline area whenever you come across internet service if the project lead or crew manager has made any edits to the points layer.

1. To do this, obtain internet service.
2. Then click the three dots next to the “Offline Area” you want to update
3. Click sync and your map should say it was updated “just now”.

**Removing an Offline Area**
You may remove offline areas after each trip to save space or to stay organized.

1. Launch Collector and locate your “Offline Areas” in the “My Device” section.
2. Click the “>” next to the map that you want to remove “Offline Areas” for.
3. Click the three dots next to the “Offline Area” you want to remove.
4. From the dropdown list, select “Remove Offline Area”. In the following popup, confirm that you want to remove this offline area. Note that any un-synced edits will be lost.

5. You have now removed an “Offline Area” from your device.

Error Logging
If an issue is encountered while using Collector, for instance the app is not downloading offline areas or is automatically closing, enable Error Logging and replicate the issue.

1. To do this navigate to the main screen of Collector and click your account icon in the upper left-hand corner of your screen. In the following window, scroll down and select “Troubleshooting”.

2. Next to “Logging” ensure that the slider bar is blue indicating “On”.

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3. When Logging is turned on, go into Collector and replicate what you did to receive the error the first time. Once you encounter your error, return to the “Troubleshooting” page and click “Logs”.

4. The “Log” page does what its name implies and keeps a log of Collectors communications with the server and its geodatabases. If you need the National AIM Teams assistance interpreting the logs, click the “export” button, and specify to send the logs in an email to Jacob Shipman (jshipman@blm.gov).

5. When you are done or if you are not encountering any errors, you should leave “Logging” off.
FIELD EVALUATE AND COLLECT DATA

Overview
Crews use Collector to navigate to points. Once at a point, the reach is evaluated to determine if it is sampleable and this information is recorded as a field visit within Collector (see design management step 5 for more information on sample statuses). These field visits can be edited at any time. All field data is recorded in SARAH. SARAH has a specific workflow and layout to facilitate data collection. Checks and warnings may prevent users from moving on or entering data of poor quality.

Navigate to a Point in Collector
Crews can load the BLM provided base maps into Collector to navigate to a point and can also get directions to a point if cell service can be obtained. To do this:

1. Open Collector and locate the map that contains the point you want to visit. Click it to open it. The map will launch to the area that you took offline.
2. To turn on a base map, click the three dots in the upper right-hand corner of the screen and select “base maps” from the dropdown.
3. Click on one of the base maps to turn it on. You can also toggle back and forth between base maps using this screen.
4. To get directions to the point, locate the Point that you want to visit and click it. In the Point Attributes that pop up on the left side of the screen, scroll to the bottom. Click the “Directions” button. This will send the Points coordinates to another app such as Apple Maps or Google Maps for navigation. Note that this feature requires cell service to identify a route.

Create a Field Visit in Collector
Each time you visit a point in the field you will need to create a field visit in Collector. To do this:

1. While at the point, click the associated point on the map from the Points Layer. Scroll down and click the “Field Visits” button.
2. Next hit “Add”.

3. Choose a status from the available options. Ensure you are standing in the middle of the stream at the F transect and ensure your location displayed on the map matches. If not, you can move the crosshairs manually. However the user should use the GPS coordinates by default.

4. Fill out all of the required information to document your field visit.
5. **DO NOT** hit “Update Point” after you have recorded your F transect coordinates. This will move your Field Visit point away from the F transect to wherever you are when you click the button.

6. When you are done recording your Field Visit, hit the “Submit” button in the upper right-hand corner of the screen.

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**Editing a Field Visit in Collector**

You may need to edit a field visit. For example, you may need to add number of macroinvertebrate or water quality jars or indicate the date data was submitted as final. To do this:

1. Launch the map containing the Point that you visited. Click the point and scroll down to the bottom of the attribute list and click “Field Visits”.

2. Click the recorded Field Visit. Scroll to the bottom of the attribute list and locate the “Edit” button.

3. Click the “Edit” button and make the edit. When you are finished hit “Submit”.

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![Image of editing a field visit in Collector](image-url)
General SARAH Use

1. To open SARAH, open the “FileMaker Go” app
   a. Go to the Device tab
   b. Click on the file folder icon labeled “SARAH” with the most recent version number.
      The version number of the app in the screen shot below would be 2.04.
   c. If the app opens at a previous reach or different screen, exit out to the main screen
      using the provided “Main Menu” buttons before proceeding with data collection.

2. Once inside the app, SARAH is designed to run in landscape orientation, and the main menu
   has the below options to navigate. Buttons are in the general order that you would use them,
   going from data collection to data submission.
Collect Data = Initiate a New Site/Reach (most common option!)
View/Edit Previous = Search for an existing site/reach
Upload Data via Wi-Fi = Backup your data from the iPad to the National AIM Team’s online server
View Upload Status and Confirm Final Data = This button should be used to confirm that the National AIM Team received your data via Wi-Fi and to submit your data as final.
View Site Summaries = View summaries of your data
View Site Photos = Photos can be viewed using this button or within the Box app
Exit App = Will take you to file storage within the app so that you can view exported photos, app files, and xml and csv backup files
Register this Device = Each device must be registered each year with the National AIM Team to enable data submission.
Update Dropdowns = Each year SARAH dropdowns are updated with a revised list of SiteIDs/PointIDs or values. Dropdowns should be updated prior to collecting the first site/reach of data.

3. To return to the main menu of the SARAH app from any screen, tap the BugLab logo in the upper left next to the text “Main Menu”
   - “Finish Site” will mark and run “Final QA/QC”
   - Return to Main Menu and Finish later using “View/Edit Previous”

Collect Data and View Edit Previous
You can collect all data within one session and run final QA/QC data checks or you can exit back to the main menu at any time without running the final QA/QC data checks. To return to the site/reach and finish data collection, use the “View Edit” previous button with appropriate filters. You can use as many or as few filters as you want but always make sure to double check that you are returning to the appropriate site/reach and that there are not multiple records with the same SiteID/PointID. To view all sites/reaches that match your filters, use the < > arrows at the top to switch between records.
   - Troubleshooting tips:
     o If you accidently start a data collection record by mistake, select “Test or Fake Data” as the Project and exit back to the main menu.
     o If you selected the wrong contingent indicators to collect, flag indicators that you are not collecting as not collected. DO NOT ENTER FAKE DATA. If you need to collect additional indicators that were not selected, you will need to start the reach over again.

Entry Assistance
   - For field data collection to proceed quickly, the fields, tabs, and buttons are given in the suggested workflow.
   - To quickly navigate between fields (boxes), you can click the blue “Next” button that appears above the keyboard or you can click the return/enter button on the keyboard.
• Dropdown menus will automatically jump to the next field after a selection is made.
• SARAH has several buttons that will populate several fields at once to assist with repetitive data entry. For example, there is a “No Pieces” button for large wood and a “No land use” or “No development” button for human influence. These buttons fill in 0s for any blank fields for a given transect.
• If an entire transect is not collected or most of a transect is not collected, there is a “Flag Not Collected” button that appears in the upper left-hand corner next to the main menu when you are on the bank page. Selecting this will automatically flag all unpopulated data at that transect as “N” for not collected.

![Main Menu](Image)

General Layout/ Workflow
Navigating major screens and pages within a reach:
1. Indicator selection:
   o Consult your project lead and the lotic Office Eval Webmap for which indicators you are measuring
     ▪ Select any contingent indicators that you are collecting
   o Three protocol modifications are also available
     ▪ Alaska which collects only 5 pebbles per transect
     ▪ Adding additional bank stability plots to match MIM protocols
     ▪ Collecting data at only a subset of core indicators- select indicators to collect by checking the boxes that appear on the left side of the page
   o Make sure that you select the correct indicators or modifications because you cannot return to this screen

![Add/Remove Contingent Indicators](Image)

Warning: you will not be able to return to this page so make sure your selections are correct. If you accidently select indicators that you are not collecting, leave them blank and flag them as not collected. DO NOT FILL IN FAKE DATA! If you need to select additional indicators, note this ASAP and start the site over again with a new record in the app.
2. Verification page:
This must be filled out first and all fields on the first page must be completed! The comments page (access via the arrow at the bottom of the page) can be filled in during this time or revisited at the end of the reach. Information recorded in the Verification page of SARAH should match what the crew recorded in the Field Visits layer using Collector (especially the date collected!).
- PointIDs associated with a project should be found in the PointID dropdown. If a PointID does not appear in this dropdown, update your dropdowns. In rare circumstances, PointIDs can be added manually using the “+” button. **TAKE SPECIAL CARE TO ENTER POINT IDS CORRECTLY!!!** Additionally, if PointIDs are added manually, ensure that they are also appearing in Collector. If they are not contact the project lead to ensure they have filled out the targeted point form.

3. Additional pages:
Once the verification page is filled out you can move on to other pages in any order. In general, each page represents a set of protocols that are generally implemented together. The current page is highlighted in blue. In general navigating from one page to another will initiate missing data checks. However, navigating between ‘Transect,’ ‘Large Wood,’ and ‘Photos’ will not initiate missing data checks.

4. Submenus:
Within a page, you have submenus. For example, within transects the page you have up to 7 submenus with the active submenu highlighted in blue. Additionally on the transects page, you have a transect bar on the left to navigate among transects. The active transects is displayed in a lighter color. Side channels will appear under the ‘Bank’ protocol tab once you select “Collect XA Data” in the lower right-hand corner of the screen.
Intermediate transects will appear as a second column of buttons next to the main transect buttons if thalweg is not being collected (above). If thalweg is collected, intermediate transects can be accessed via a separate button on the thalweg page (below).

Transects will always be labeled with their transect letter (A-K), Intermediates will be labeled with their two adjacent main transect letters (AB, BC, CD, etc.) and side channels will be labeled with an X before its associated main transect letter (XA, XB, XC, etc.).

5. Workflow:
   - **Verification** - Must fill out all fields before filling out any other pages
     - Sampling comments can be filled out at any time during sampling, and will reappear on the final QA/QC page prior to finishing the reach.
• **WQ** - All information should be filled out at once
• **Bugs** - may be filled out at any time but once you start this page you must fill in all fields except number of jars used.
• **Transects**
  o Has three different workflow options:
    - **Physical habitat only** - Example use - If in a three-person crew, one person can do visual estimates on paper (entering data into the app later) while the other two do all other transect data collection.
    - **Visual estimates only** - Example use - While one person is doing bugs and water quality, another can be doing visual estimates. Once bugs are complete, the crew can switch to collecting “PHAB only” or “All transect data” if the crew member doing visuals did not finish before the bugs were done.
    - **All transect data** - Example use - Bug data collection was very quick and the crew decided to do PHAB and visuals together in one pass.

  o Within each of the workflow options, data can be collected in any order but all data at a given main transect (e.g. A) or intermediate transect (e.g. A-B) should be collected before moving on to the next transect. Otherwise the app will warn you that you have missing data, but you may return to enter it later.
  o You cannot jump to an intermediate transect before collecting data at the corresponding main transect.
  o You may jump between a transect and either the Large Wood page or the photos page without having any missing data checks run.
  o **Bank stability** - this should typically be collected within the transects workflow. However, if the more bank stability plot modification is selected, this will appear as a separate pass and tab not associated with transects.

• **Flood prone width** - can be collected at any time
• **Large wood, slope and pools** - can be collected at any time.
• **Photos** - can be taken at any time and can switch between any page and photos without missing data checks running

**SARAH QA/QC Checks**

**Missing data**

• Missing checks are run according to the above workflow.
• PointID, Sample Status, pool survey status, reach length surveyed for pools, and whether slope was collected are all required fields prior to exiting a reach regardless of where in the workflow you are.
If the record was entered by accident, select “Test or Fake data” as the project and PointID.

- If there are no missing values, no window appears and the app will proceed to the next page or transect.
- If there are missing values, they will be flagged in red and remain red until filled in. You can proceed without filling them in, by clicking “continue to next page”.

- Any values still missing at the end of the reach without a proper “N” flag for “not collected” will be flagged again on the final QA/QC page before finishing the site/reach.
- Missing data checks on transects only warn you of missing data the first time you try to change transects but missing fields remain red.
- Verification page fields are not optional, but if they are all filled out and it still won’t let you move on to transects, try moving on to WQ first and then jump to transects.
- If an entire transect is not collected or most of a transect is not collected, there is a “Flag Not Collected” button that appears in the upper left-hand corner next to the main menu when you are on the bank page. Selecting this will automatically flag all unpopulated data at that transect as “N” for not collected.

**Legal values**

- Certain fields have very specific ranges of possible values. For example:
  - pH cannot be <0 or >14.
  - Canopy cover cannot be <0 or >17.
- If you enter a value that is not within the range of legal values, the app will not let you leave the field without changing the value.

**Typical values**

- Certain fields (particularly water quality) have ranges that are not very likely to occur in nature. For example:
  - pH can be <6 or >8.5 but it is pretty unlikely
- If you enter a value that is not within the range of typical values, the app will flag the value in yellow and you will get a pop window that tells you the “typical” range of values for the field.

- You can move on without changing the value but you should think carefully about whether your value makes sense.
- For water quality fields, you should recalibrate before deciding on a final value.
• If you choose to leave the value, you should flag the value and make a comment as to why you left the value.

**Cross validation**

• These are logic checks based on the protocol. For example:
  o Wetted width cannot be greater than bankfull width
  o Bank height cannot be greater than bench height

• You cannot leave the field without changing the value.

**Final QA/QC page**

• **Outlier checks**
  o At the end of a reach, the app calculates the mean and standard deviation of bankfull width, bankfull height, and bench height across all transects.
  o Bankfull width and height and bench height should be determined using relatively continuous surfaces throughout the reach. Therefore, there should be minimal variation in these measurements.
  o Any values that are outside 2 standard deviations of the mean are flagged with hyperlinks.
  o For any outliers that appear, think back to the channel dimensions at the transect. Was there a constraining feature such as a hillslope that caused the channel to change shape partway throughout the reach? Verify that you did not use a local feature that was not continuous throughout multiple transects to determine channel dimensions.
  o Re-measure, omit, or flag the value if you do not feel confident in the measurement.
  o Note reasons for any remaining outliers in the final confirmation page.
Final missing data checks
- Any remaining missing data will be flagged with a hyperlink that will take you back to the field to fill it in.
- Any data that was not collected should have the appropriate flag “N” (see below). Note that 0s are data to and should be filled in.
- Fields that have “N” flags will not be flagged as missing in this final check.
- Make sure if slope or pools were not collected that they are recorded as such in the dropdowns on each respective pages.
- If one or more transects of PHAB were not completed, classify the reach as “partial” and note how many transects of PHAB were not collected and the reach length for PHAB. This reach length is used for calculating sinuosity and should match the corresponding bottom of reach and top of reach coordinates.

Indicator specific checks and automatic calculations
- Verification
  - Reach length and transect spacing is computed by averaging the five typical bankfull widths. The number of thalweg stations and the location of the middle station are also based on the computed reach length.
    - Because this is such an important field, there is an outlier check to make sure that these values are correct. If flagged, please check over these values carefully before proceeding and consider if your values are “typical” of the reach.
  - The point coordinates are compared to the original design coordinates and if they are more than the allowable moving distance a warning pops up.
  - The elevation of the point coordinates should be recorded in meters and a warning will pop up to check the units if elevation is greater than 4000.
- WQ/Bugs
  - The sampling area and total area sampled for benthic macroinvertebrates is automatically calculated based on the style of sampler net and the collection method that the user selects.
  - If it has been more than 7 days since the recorded YSI calibration date, the app will warn you that you need to calibrate or provide a comment.
  - Adding additional instrument ids (WQ-sonde) is possible, but should only be done if the desired value is not in the dropdown menu. Extreme care should be taken to enter data in the same format every time so that data can easily be tracked an analyzed.
  - All YSIs should have the capability for collecting temperature corrected conductivity values so if “No” is selected for “Temp Corrected?” you will receive a warning that a comment should be provided. As a general note, Temperature Corrected Conductivity is the same as Specific Conductance.
- Transects
  - Bank angle is automatically subtracted from 180° if the angle is obtuse. Do not perform this calculation in your head, or you will receive a warning message.
  - Substrate
    - Non-measureable substrate types are automatically defaulted to the desired alpha numeric values as follows:
      - Fine = 1 (too small to measure)
- Sand = 2 (too small to measure)
- Bedrock = 4097 (too large to measure)
- Hardpan = 4098 (compacted fines, but acts like bedrock)
- The app checks to make sure there are at least 5 pebbles collected from the “wetted” channel or “dry-middle”. If there are not enough it will warn you, and add the number of additional pebbles needed to the top of the screen. Replace the -99 value with the approximate location. The location must be unique. If the distance from the left bank is exactly the same as a previous pebble but upstream or downstream add a “.1” to the value.
- There is an “All wet” button on substrate that auto-populates the location with “wet”. If the transect is flagged as dry on the “bank” page, then an “All dry button” also appears with similar functionality.
- **Visually**
  - The total % cover of each vegetation layer (canopy, understory, ground) can’t exceed 100. Therefore, the app will not allow the user to enter two 4s or a 3 and a 4 for the same layer. If this is accidently done, a pop window will appear and you can only move on after changing the value that was most recently entered.
  - If veg type is “None”, 0s populate for the cover categories.
- **Floodprone height**
  - Floodprone height is automatically calculated when the user enters the max water depth in the flood-prone width layout. If the floodprone width is > 3 times the bankfull width, the user may tap the “Set Max” button to automatically calculate the max floodprone width.
  - Floodprone width must be greater than bankfull width.
- **Slope**
  - Slope is calculated by subtracting the Start and End Heights. This can result in both positive and negative values, so make sure you are working in a consistent direction for each Pass.
  - When you tap the “Finish or add new pass” button, individual shots are summed and checks are run to see if multiple passes are within 10% of one another. If the first two passes are within 10%, it will not let you add a third pass.
  - At the end of slope, the two passes within 10% are averaged to get the Mean Elevation Change and then this number is converted to m and divided by the Slope Reach Length (automatically calculated as the distance between the start and end transects) to get the Percent Grade for the reach. The Mean Elevation Change, Slope Reach Length, and Percent Grade are displayed so that the user can double check that these summary statistics are reasonable.
  - Note you must press the “Finish or add new pass” button at the end of slope data collection to generate the final slope statistics explained above, and you will get an error if you try to run the final QA checks for the reach before doing so.
- **Pools**
  - Pools are checked to make sure the maximum depth is greater than 1.5 times the tail depth, as required to be a qualifying pool.
  - Pool reach length is automatically filled in with the total reach length if “Collected” is selected or 0 if “Not Collected” is selected.
Pool tail fines are also checked to ensure that the sum of the number of <2 mm intersections and non-measurable intersections or the sum of the number of < 6 mm intersections and non-measureable intersections is less than 50. Additionally the number of < 2mm intersections must be ≤ the number of < 6 mm intersections.

Once you start a row within the pool tail fines grid, you must fill out <2 mm, <6 mm, and Non-Meas.

- Large Wood
  - Tapping the “plus” button will add one to the measurement in the cell allowing easy tally of large wood.
BACKUP DATA

Overview
Data from Collector and SARAH should be backed up as frequently as possible but at a minimum after every two reaches. If internet service can’t be obtained this frequently, USB drives should be used as an external backup until internet service can be obtained. Backing data up serves two purposes: A) It ensures that all of data from Collector and SARAH can be recovered even if something happens to the iPad and B) It syncs data to the Office Webmap and National AIM Team servers so that project leads, crew managers, and the National AIM Team can view this preliminary data. Syncing maps in Collector and updating dropdowns in SARAH also ensures that the crew is getting the latest information about reaches prior to visiting them.

Collector
Sync Field Visits to the Office Webmap
1. To sync Field Visit data after every two reaches, obtain internet service. Then open the “On Device” section of Collector on your iPad.
2. Note that maps with outstanding data on the iPad that have not been synced will display the number of local edits (i.e. field visits). Click the three dots next to a map.
3. In the popup list, select “Sync”.
   a. If the device syncs correctly, the “refresh” icon displaying the last sync date should state “Just Now”.
   b. If the sync fails, there will be a red exclamation mark.
      i. Click the three dots next to the map that failed to sync and review the “Sync failure message”.
      ii. If you are just driving back from the field and turned turn Airplane mode off, the app may not immediately recognize that it has service again. If you receive a failure message that related to not having network connectivity, force close Collector and reopen it. If you have service Collector should now recognize it and allow you to sync.
Manually Backing Up Collector Data to a USB Drive

Field visit data is recorded both in SARAH and Collector and includes minimal data (e.g. evaluation statuses and coordinates). Therefore, backing up Collector data to USB Drives is generally not necessary even if syncing after every two reaches is not possible. However, instructions are provided below incase users would like to backup their Points and Field Visits in this manner.

1. Points and Field Visits are stored in a geodatabase within a Collector folder under your iPads files. This is the file that you backup to your USB drive but it can be tricky to navigate to.
2. First ensure that the USB Drive is connected to your iPad. Next open the “Files” app on your iPad and open the “Collector” folder.
3. Locate your user folder. This folder will start with the username you are using to sign into Collector, followed by an alpha numeric code. Open this folder. In the following folder, open the “Maps” folder.
4. Inside this folder, you will see folders named with alpha numeric codes. You will have one folder here for each Offline Area you make in Collector. There is no easy way to identify which folder contains which map. If you are looking for one in particular, you can open each folder and see the thumbnail jpg that is stored and displayed in Collector.
5. Within each of the “Offline Areas” folders along with the jpg thumbnails, there is another folder with an alpha numeric UID name. Open this. Next locate the file called “p13” and open it.
6. Within the folder called “p13” you will notice a few files. As you can see, the largest file in this folder is likely the .tpk base map. We do not want this file. The only file that we want to backup is the file that ends with a “.geodatabase” extension.
7. Click and hold the file with the “.geodatabase” extension and then select “Compress”. This will create a .zip file of your selection in the same folder. Now select the zip file you just created and click and hold it. From the dropdown list, select “Share”.
8. In the “Share” popup, where it shows the list of apps on the device, scroll to the right until you see the three dots that say “More”. Click this. In the next window, scroll down until you see “iXpand Drive” and select this.
9. This will launch the “iXpand Drive” app and it will ask where you want to save the file. Click the “Create New Folder” button and create a folder to store all Collector Backups. Once you determine where to save this file, hit “Save Here” at the bottom of the screen.
10. You have now backed up a geodatabase containing the Points and Field Visit features that you took offline in your map. If you device dies or you accidentally delete something, you can send this zipped geodatabase export to Jacob Shipman (jshipman@blm.gov) to ensure that these features are updated on the Webmap.
   a. Note that it is also recommended that users go back into the “Files” app and delete the zip file that you created.
   b. Feel free to rename the zipped folder to something you can remember more easily. It may be further advantageous to create a categorical folder structure where you move the zipped files to in order to organize things by trip.
Automatic Data Backup on iPad
Data is automatically backed up on the iPad after running the final QA/QC checks or after exiting back to the main menu. This process should take a minute or less. If it is taking more, see the troubleshooting section below. Note that there is no save button within a reach because data are automatically saved when you enter data in a field. However, if the app crashes while entering data on a page, data on the current page may be lost.

- Backups of data are in the form of XML files that are named with the Point ID, unique database ID, and the date the backup was created. A new backup file is created for each day that you edit that reach’s data. Backups of data remain on the iPad even after data has been confirmed as final and deleted from the main database.
- A csv with data summary data is also automatically generated and saved with the iPad device ID. Csvs are over written every time data is edited, and all reaches from the field season should appear in them regardless of whether the data has been confirmed as final and deleted from the main database.
- Backups XMLs and csvs can be accessed using the “Exit App” button described below.
- Troubleshooting Tips
  - The automatic backup process should take a minute or less.
    - If it is taking more than 10 minutes, make sure the screen was active for the whole 10 minutes. You can change the timeout duration by going to “settings”, “general”, “auto lock”, and selecting “Never”.
    - If you still get a never-ending spinning wheel, swipe up to close the app and try entering and exiting the reaches again after moving to a different window within the reach. Additionally, check to make sure that a backup was created by going to the “View all Backups” button within the “View Upload Status and Confirm Final Data” button.

Upload Data via Wi-Fi
Upload data via Wi-Fi as frequently as possible, preferably daily after every reach but at a minimum every 2 reaches. As soon as you get internet, backup all collected data to date to the National AIM Team’s online server by clicking the “Upload Data via Wi-Fi” button on the main menu. You must re-upload data via Wi-Fi after any edits are made. You will receive a pop-up window indicating whether the backups were successfully received or not. You have the ability to back up your photos at this time or later when you have a better connection. All uploaded photos should appear within Box within a few hours but at most within a day.

- Troubleshooting Tips
  - If the data upload process takes more than 30 minutes, you likely have a slow internet connection and may want to wait until a better connection is available. Additionally, uploading data more frequently will lessen the amount of data
transferred each time you upload and therefore can also lessen the time it takes to upload.

- If you get a failure message for 1 or more backups, try submitting data again with a different or better internet connection.
- If there are errors with XML data, use “View Upload Status and Confirm Final Data” button within SARAH to determine which files did not upload. Follow the manual backup instructions below for the file(s).
- If there are errors with photos, identify which photos were not uploaded successfully by reviewing uploaded photos on Box. Log into https://account.box.com/login or the Box application on an iPad with aim.aquatics@gmail.com as the username and stonefly2020 as the password. If photos are missing, follow the manual backup instructions below for the file(s).

Manual Backup of SARAH Files

If there are any errors with backing up or submitting data using the SARAH app, you should upload the unbacked up files to Teams. If poor internet is the likely cause of your errors, you will likely have difficulty backing up to Teams as well. If this is the case and you are trying to backup more than two reaches, it is recommended that you back up your data to a USB drive until you can get better internet.

**Step 1- Exporting Photos**

If you are manually backing up photos, you will need to first click on the “View Site Photos” button on the main menu. Then click “Export All”.

**Step 2- Viewing Files**

1. The next step in manually backing up SARAH data is understanding SARAH file structure. To view all app related files, click the “Exit App” button on the main menu. This should take you to a file viewer.
2. In general, this screen should show you 4 types of files:
   a. SARAH application (file folder icon)
      i. Clicking on this file takes you to the main menu screen where you can access the application. This file also is a database that stores all raw data that hasn’t been submitted as final.
   b. csv files
      i. Local copies of data summaries. The crew is responsible for manually backing these files up on Teams for their Project Lead or Crew Manager to review.
   c. XML files
      i. Back up files containing all data from a given reach. These files remain on the iPad even after final data is submitted and should NEVER be deleted!
   d. Any exported photos
      i. Reach photos that have been exported using the “View Photos” button on the main menu can be found here. Photos remain in this window even after deleting data from the main database. Photos may need to be deleted periodically from this screen manually to prevent app file size from getting too large.
   e. SARAH_config.txt – This file contains your device registration information and should NEVER be deleted.

3. Unless you have major app corruption issues, you should only need to upload any individual XMLs and photos that failed to backup. If you have major app corruption issues, we recommend uploading the SARAH application which contains all data including photos.
   a. If you can’t find the files you are looking for, make sure you have selected “device” on the bottom of the screen rather than “recent”.
   b. NEVER delete files from this screen unless you have uploaded them to the Microsoft Teams or are told to by Logan.

**Step 3- Uploading Files to Teams**

1. To upload files to Microsoft Teams from the main FileMaker Go screen, select the paper with the check box in the upper right-hand corner of the screen. Then click the upload button (box with the arrow).
2. Select the “Save to files”. In the popup, create a folder for your Data summaries under for iPad files using the “new folder” button in the upper right-hand corner.

3. Next open Microsoft Teams and navigate to your states Channel and navigate to the Data summaries and Photos folder. Click the add button at the bottom of the screen and find the file that you just saved.

4. Some users may not have this add button. If that is the case, click “More” and select the Crew Sharepoint. Select “Open In Browser”. This will launch your iPads internet browser and redirect you to your states external Sharepoint site. Sign in using your Teams credentials. These are the same files you see in Teams using the “Files” tab.
5. Navigate to the folder you want to upload files to and select “Upload” then “Files”. This may need to be done twice in order to respond. In the following popup, select “Browse”. This will redirect you to your iPads “Files” app. Select the files or folder you want to upload and hit upload.

6. Close out of Sharepoint and return to your states Channel in Teams. Go to the “Files” tab and ensure that your upload is in the folder you specified.

**Step 4- Uploading Files to a USB drive**
If internet access is a concern and the upload to Teams did not work, consider backing up to a USB drive.

1. Ensure that your USB drive is connected to your iPad. Launch “File Maker GO” but do not open SARAH. Make sure that you are on the “Device” tab of File Maker GO.
2. Click the checkmark in the upper right-hand corner of your screen. Next select all of the files that you want to transfer to the USB Drive. When your selection is made, locate and click the “Share” button in the upper left-hand corner of the screen.

3. In the “Share” popups list of apps, scroll right until you see the three dots that says “more”. From the following list, select “iXpand Drive”.

4. This will launch “iXpand Drive” app and it will ask where you want to save the file(s). Click the “Create New Folder” button and create a folder to store all SARAH Exports. Feel free to structure this folder however you want in order to stay organized. The National AIM Team recommends backing up in folders organized by “Trip” and then “PointID” or “Stream Name”. When your folder is set up how you want, hit “Save Here” at the bottom of the screen.

**Step 5- Notify the NOC of any SARAH Upload Issues**
Send an email to Logan Shank (lshank@blm.gov) detailing the issue and the location of the xmls or photos. Make sure to include the Point ID, date of the backup, and date and time you tried to submit the data, as well as any other useful information about quirks in the data collection process that might have caused the issue.
SUBMIT FINAL DATA

Overview
Crews should submit final data using the SARAH and Collector applications as soon as the trip is finished and internet connection can be obtained. After submitting data in SARAH, crews should upload their data summary to Teams so that project leads and crew managers can review it. Then crews should edit their field visit in Collector to indicate that final data was submitted and then resync this data to the Office Webmap.

Confirm Final Data in SARAH

1. Click the “View Upload Status and Confirm Final Data” button. This will take you to a screen that has a list of all reaches collected throughout the field season.
2. Make sure all desired data edits have been made and all backups were successfully uploaded via Wi-Fi. If all backups were not successfully uploaded, see the troubleshooting directions within the data backup section. You will get an error if you try to mark data as final and all backups and photos have not been uploaded!
3. Check the final data button next to the desired point.
4. Then click the “Confirm Final Data and Delete Checked” button. Note that you must have internet connection for this to work! This step is irreversible, will remove the raw data from the FileMaker database, and edits for this reach will no longer be able to be made. Deleting the raw data from the iPad prevents the database from getting too large and causing app quirks. You will still be able to access the data summary, any exported photos, and any backup XML files or csvs. If you have completed the above steps, click Yes.
You should then get the following confirmation message with a count of the number of reaches submitted as final data:

<table>
<thead>
<tr>
<th>Final Sites Uploaded and Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 out of 1 final sites have been uploaded to the server and deleted from your device.</td>
</tr>
</tbody>
</table>

**Upload Data Summary to Teams**
Follow directions in [Step 3 of “Manual Backup of SARAH files”](#) above to upload the Data summary csv to Teams.

**Edit and Resync Field Visits in Collector**
Follow directions in [Edit Field Visits in Collector](#) and [Sync Field Visits to the Office Webmap](#) sections above to edit field visits in Collector to indicate that final data was submitted and then resync this data to the Office Webmap.
APPENDIX A. FREQUENTLY ASKED SARAH QUESTION AND TROUBLESHOOTING

1. **Q:** I accidently clicked on data collection and am not ready to enter data but I can’t get back to the main menu.
   **A:** To get back to the main menu, you need to continue through the indicator selection page and then select “Test/Fake Data” as the project and Point ID. Select that pools and slope were not collected. Then exit the Reach to the Main Menu.

2. **Q:** I selected the wrong contingent indicators.
   **A:** If you selected the wrong contingent indicators to collect, flag indicators that you are not collecting as “not collected.” DO NOT ENTER FAKE DATA. If you need to collect additional indicators that were not selected, you will need to start the Reach over again.

3. **Q:** What Point ID do I use for targeted reaches?
   **A:** Project leads should add the latitude and longitude of the point, reason why it is being sampled and any sampling stipulations using National AIM teams Targeted Point Forms to either request new or existing targeted points be added to your design. Once Targeted PointIDs are generated, the crew will need to update dropdowns in SARAH.

4. **Q:** I can’t get off of a page because of the missing data checks or other QC checks.
   **A:** Go to the appropriate missing data or QA/QC section above that matches where you are stuck and determine why you can’t move on. In general, missing data checks should never prevent you from moving on. Exceptions are PointID, Sample Status, pool survey status, reach length surveyed for pools, and whether slope was collected, which are all required fields prior to exiting a reach regardless of where in the workflow you are. You must complete all fields on the WQ or bug pages once you start them, except for the number of bug jars used. Never enter fake data to move on to the next screen. If you did not collect data, make sure to flag data as “N” for not collected. QA/QC checks should only prevent you from moving on if you entered an illegal value. The message should tell you what legal values are for the field. If all else fails, double click the home button and swipe up to exit the app and then try going back into the app and the reach again.

5. **Q:** I get a spinning wheel of “death” that never stops. What should I do?
   **A:** If it is taking more than 10 minutes, make sure the screen was active for the whole 10 minutes. You can change the timeout duration by going to “settings”, “general”, “auto lock”, and selecting “Never”. If you still get a never-ending spinning wheel, double click the home button and swipe up to close the app and try entering and exiting the reach again after moving to a different window within the . Additionally, if the spinning wheel occurred when you tried to exit a reach, check to make sure that a backup was created by going to the “View all Backups” button within the “View Upload Status and Confirm Final Data” button. If a backup was not created and all attempts to enter and exit the reach again don’t fix the problem, call Logan Shank (303-236-1161) ASAP to troubleshoot!

6. **Q:** How and when do I backup my data?
A: Your data are automatically backed up on the iPad via XML files every time you exit a reach. However, we additionally require you to back up your data via the internet (4G or Wi-Fi), using the upload data via Wi-Fi button. This should be done after every reach if cellular service/Wi-Fi allows but at a minimum should be done after every 2 reaches. Note that there is no save button within a reach because data are automatically saved when you enter data in a field. However if the app crashes while entering data on a page, data on the current page may be lost.

7. Q: What do I do if I get a failure message when I try to upload data?
A: Try again with a different or better Wi-Fi connection. If you still get a failure message, go to the “View all Backups” button within the “View Upload Status and Confirm Final Data” button to view which backups failed to upload. Make note of the PointID and date the backup was created. Then go to “exit app” to find the XML file with that Point ID and date. Upload this xml file to your project folder on Microsoft Teams and then send Logan Shank (lshank@blm.gov) an email detailing issue. Make sure to include the PointID, date of the backup, and date and time you tried to submit the data, as well as any other useful information about quirks in the data collection process that might have caused the issue.

8. Q: How and when do I confirm my data as final?
A: You can confirm your data as final after you have meet with your project lead or supervisor to review your data summaries and field tracking sheet. Then make sure all desired data edits have been made. To confirm the data as final, click the “View upload status and confirm final data button”. Find the desired reach and make sure all backups have been uploaded via Wi-Fi. If so, check the final data button next to the desired reach. Then click the “Confirm Final Data and Delete Checked” button. This step is irreversible, will remove the data from the Filemaker database, and edits for this reach will no longer be able to be made.

9. Q: When is it OK to delete data?
A: You should be confirming data as final after all desired edits have been made, and after you have confirmed that all backups for the reach have been successfully uploaded. This confirmation does three things:
   o It deletes the raw data from the iPad.
   o It sends a message to the National AIM Team that further QC and analysis can be done on the data.
   o It prevents the Filemaker app from taking up too much memory/space, which could start to cause app malfunctions.
You will still be able to access the data summary, any exported photos, and any backup XML files or csvs. Never delete the backup XML files or csvs. You may want to delete exported photos at some point to prevent Filemaker app size from getting too large.

10. Q: What do I do if my iPad cracks or is overheating?
A: If your iPad cracks, make sure that you keep it as waterproof as possible. Put packing tape over the crack to keep water out and to keep the glass in place. Call your supervisor to let them know what happened ASAP to determine if a replacement iPad is needed.
If your iPad starts to overheat, you may notice that it starts to get slow and quirky. You may be in danger of losing data.
If you have a waterproof case, cool the iPad off by placing it carefully on top the stream or splashing it with water. Make sure the case is still watertight before attempting this (check that the gasket is still intact, there are not cracks or breaks in the case, and all plugs units are closed off).

If you do not have a waterproof case, try shutting the screen off and keeping the iPad screen facing down in the shade.

11. Q: How long do the iPad batteries last and how do I save battery life?
   A: Battery life is approximately equal to the data collection time at a single reach (6-8 hours).
   To save battery life:
   - Close unused apps on a regular basis to conserve battery life.
     - Click the “Home” button twice and “flick” or “swipe” up for each app you want to close.
     - Keep screen brightness as low as possible.
     - Turn Wi-Fi and Bluetooth off whenever Wi-Fi or GPS is not needed.

12. Q: What do I do if the iPad GPS is not working or I get a message saying the coordinates have poor accuracy?
    - Double check that Wi-Fi is on. No Wi-Fi connection is necessary, but Wi-Fi must be enabled to take a GPS coordinate.
    - If GPS coordinates still cannot be obtained using the iPad due to low accuracy/signal, an external GPS may be used, but these external GPS coordinates must be entered into SARAH.

13. Q: What do I do if I get an error message saying that the file has been corrupted and must be repaired?
    A: This message means the data you collected to date is likely still intact but can only be retrieved by the National AIM Team. You should send all unbacked up data to the National AIM Team ASAP and you will need to continue data collection using a fresh download of SARAH. To do this, follow the following steps:
    - You should swipe up to close Filemaker. Reopen Filemaker. It should take you to the screen where you can view all app related files.
    - Find the app file. It should be a file folder that says “SARAH”.
Using Wi-Fi, upload this file to your project folder on the Microsoft Teams (see instructions under Backup Data section of this document for further instructions).

Upload the xml and csv files for all reaches that had not yet been confirmed as final data to your project folder on the Microsoft Teams.

Then send Logan Shank an email detailing 1) what you were doing on the app just prior to the corruption message 2) which reaches had not been submitted as final data yet but were completed 3) which reaches you were still collecting data on and will continue collecting data in a fresh version of the app.

Download a fresh version of SARAH but do NOT delete the corrupted version from your iPad. Use this fresh version for all subsequent data collection. Do not repeat data that you had already collected in the previous version if you were more than 20-30% finished with the reach before it corrupted.

14. Q: How do I tell if I have the most recent version of SARAH?
   A: The version number appears in the file name. For example, “SARAH_v136.fmp12” is version 1.36. Additionally, the version appears on the start-up page. To access this page, click “exit app” from the main menu to get to the BLM logo and start up screen below. The version number can be found on the lower right-hand corner of the screen with a “v” in front of it. The most recent version of SARAH can be found on the AIM website here. Additionally, crews can check General channel of the Lotic AIM Field Season (2020) Microsoft Team for any recent messages from the National AIM team indicating what the latest version of the app should be.