



# Fen – Wetland Toolkit

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Mobile Application User Guide

Version 1.0

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# Fen – Wetland Toolkit

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*HDR Data Collection Web-App*

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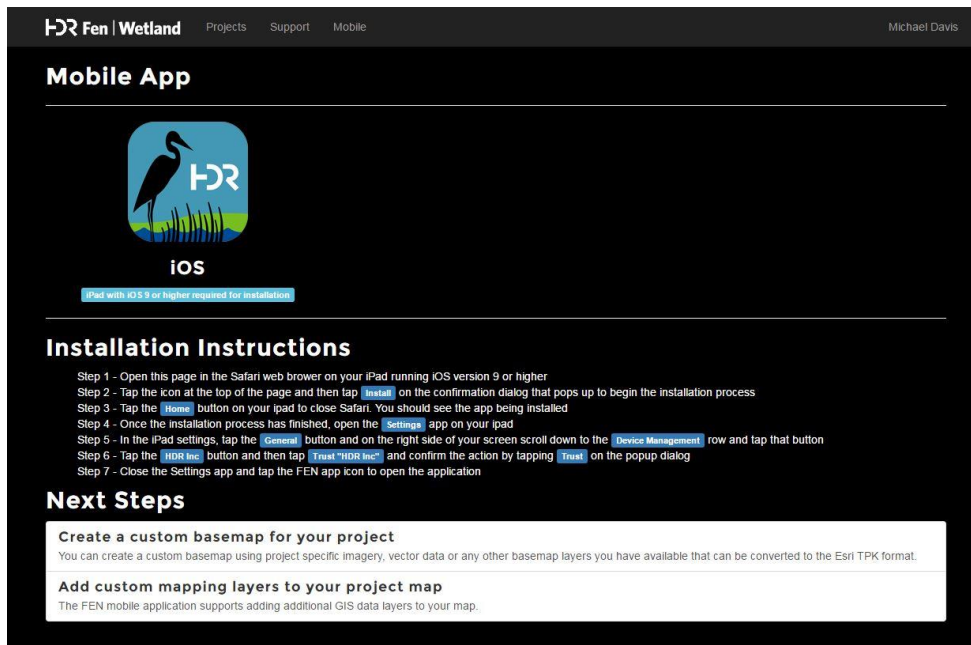
# Background

HDR is providing an iPad-based mobile data collection app for use in wetlands determination. This app features a map-based interface allowing for the collection of wetland, hydrology, and soil information required for creation of USACE Wetland Determination Data Forms.

## Installation & Update

### Downloading the App

1. On the **iPad** open **Safari** (web browser).
2. Navigate to <https://wetland.hdrgateway.com/Home/Mobile>
3. **Log in** using your HDR credentials.
4. Once logged in tap the **Mobile** menu item.
5. Tap the app icon.
6. Tap **Install** when asked if you want to install the app.

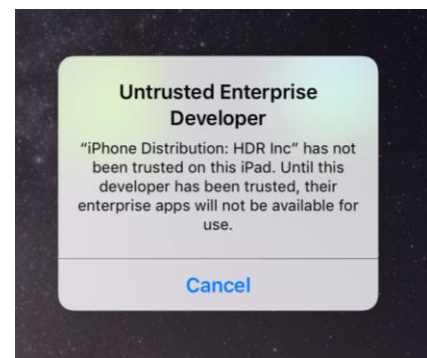


### Trusting HDR

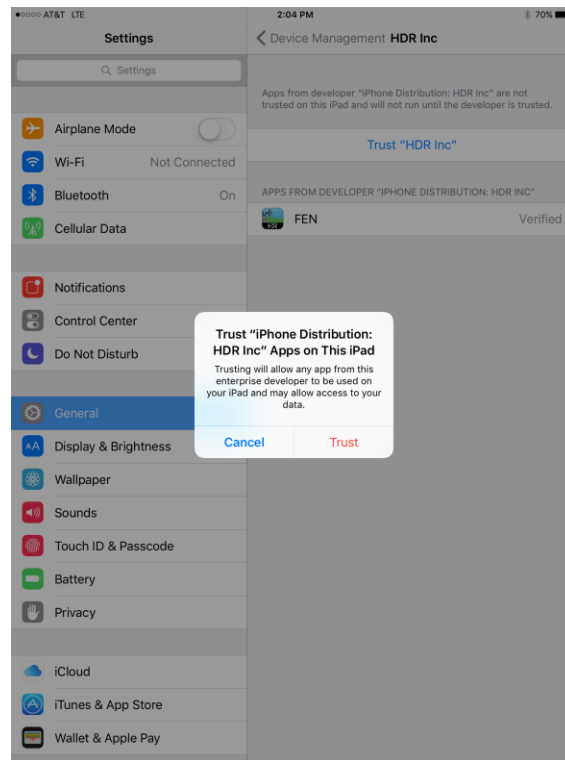
Security restrictions for Enterprise Apps will require you to “Trust” HDR as a developer before you can run FEN on an iPad. You will see an “Untrusted Enterprise Developer” error upon starting FEN Wetland Determination Toolkit for the first time after download.

You must ‘Trust’ this app by doing the following:

1. Press Cancel



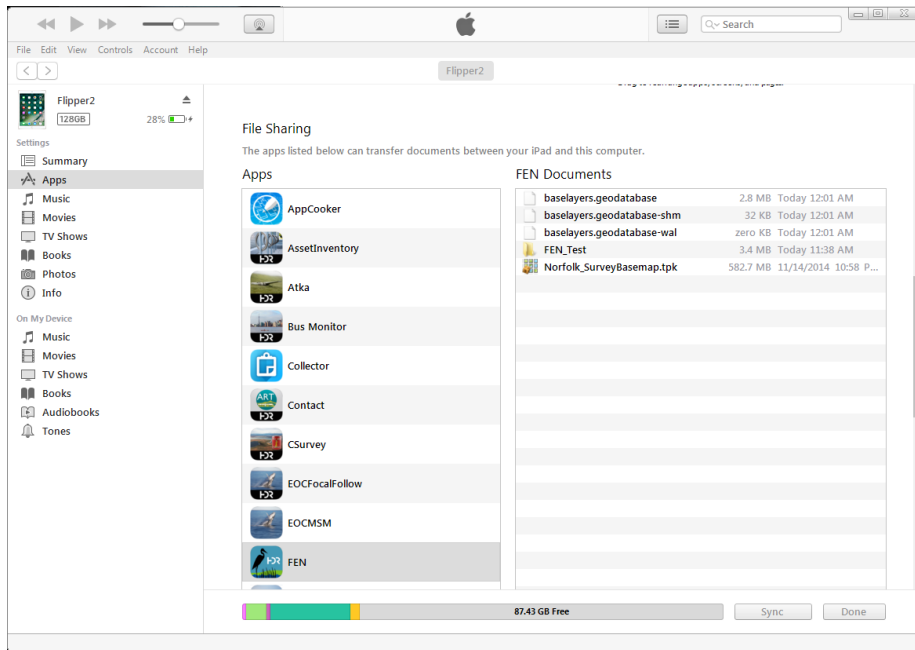
2. Open **Settings**
3. Navigate to **General Settings**
4. Locate and press **Device Management** at the bottom of the list.
5. Click 'Trust HDR Inc'



## Loading Baselayers and Basemaps

Once installed any baselayers (non-editable vector layers) and basemaps (raster tile caches) required for field work can be loaded into the app by doing the following:

1. Plug iPad into a computer with **iTunes** installed.
2. Once the iPad drivers are installed and the device appears in iTunes click the **device** icon.
3. Select "**Apps**" from the side menu in the "Settings" section
4. Scroll down to the "**File Sharing**" section and find the *Fen* app.
5. Click the app icon and a list of files will appear in the "*Fen Documents*" window.
6. Add any required **TPK** files by dragging them into this window.
7. Add any required baselayer **.geodatabase** files by dragging them into this window.
8. Once all copy processes have completed **eject** the iPad and unplug it from the computer.
9. If the app is already running on the iPad it may be necessary to force-quit it (double tap home button, swipe app up off top of screen), and relaunch it by tapping the app icon.
10. Baselayers and Basemaps will now be available in the Layers tab.



The “*Fen Documents*” window also contains folders for each downloaded project containing geodatabase files for collection of field data as well as a Photos folder to store full size versions of images collected in the field. These should not be altered or moved unless instructed to do so by tech support.

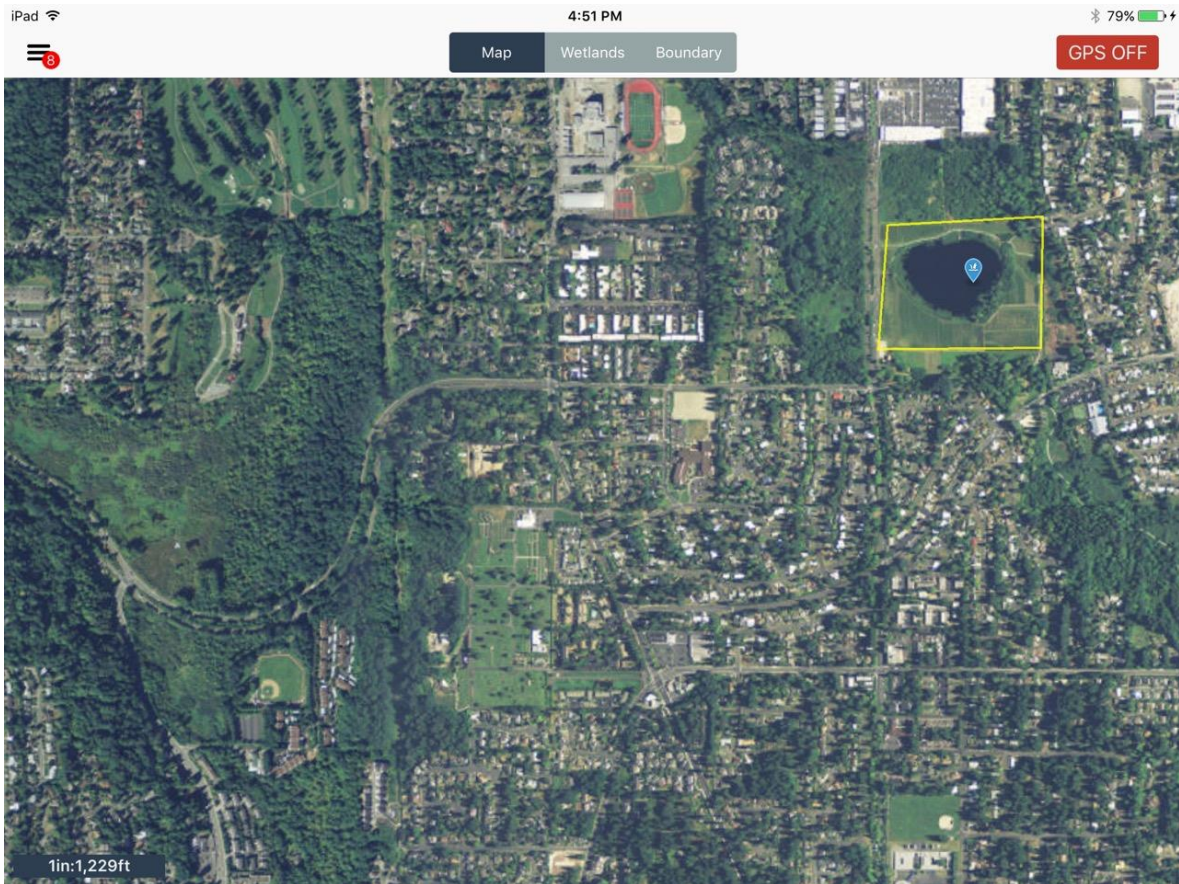
## Updating the App

Updates may be provided periodically to provide additional functionality or to fix reported issues. If asked to update the app follow the exact same procedure listed in the “Downloading the App” section. The updated version of the app will be installed over the existing version and all settings and data will remain in place. Once the app has finished updating it can be re-opened from the iPad home screen.

# App Operation

## App Layout

The *Fen* data collection app uses a simplified layout consisting of a main map view displaying spatial data over aerial imagery or other basemap as well as several tabs across the top of the screen containing different types of data that can be collected. The app also includes a side-menu to access ancillary app functions and settings.



## Side Menu

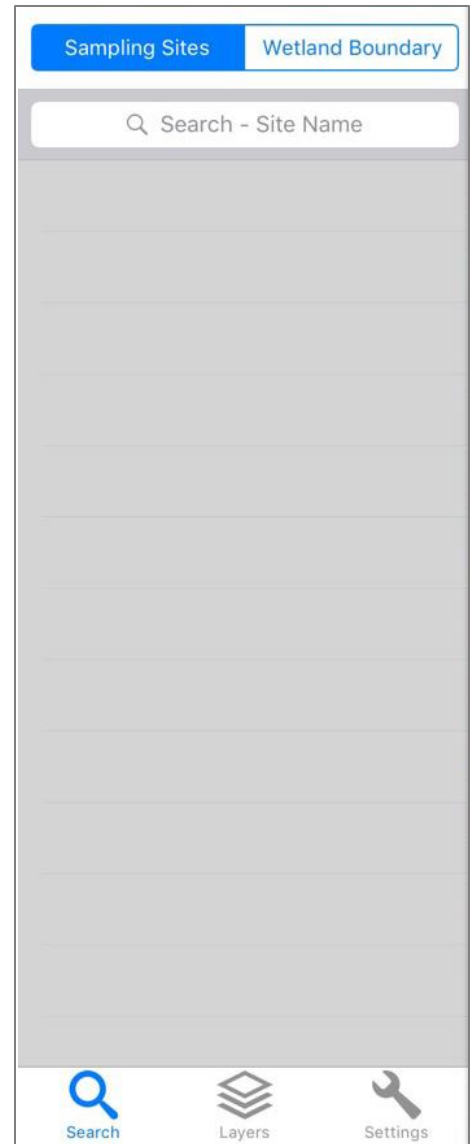
The side menu provides access to ancillary features of the app not directly related to field data collection. This menu appears in the upper left corner of the screen as a series of 3 horizontal bars. A red badge with a white number may appear over the side menu if the device currently has collected data that has not been synchronized to the host server. This number represents the number of new or edited features in the local device database. Tapping the menu icon will open the side menu.

## SEARCH TAB

The search tab helps locate records quickly by searching the entire database of records. The original RI records provided by the Corps can be searched by type (eg. Building) and Field Notes can be searched by the value entered into the name field.

A search will return a table of results. Tapping on of the items in the results table will zoom the map to that feature and highlight it in yellow.

Tapping the small “x” in the search field or tapping Cancel will clear the search results and remove any highlight.





## LAYER TAB

The Layer tab is for controlling the visibility of various layers in the app. Layers will be displayed in one of four categories in the layer table; Editable Features, Basemap Features, Tile Cache Layers, and App Bundle Tile Cache.

### Editable Features

Editable Features include the layers available for data collection. Tap these layers to toggle visibility

### Basemap Features

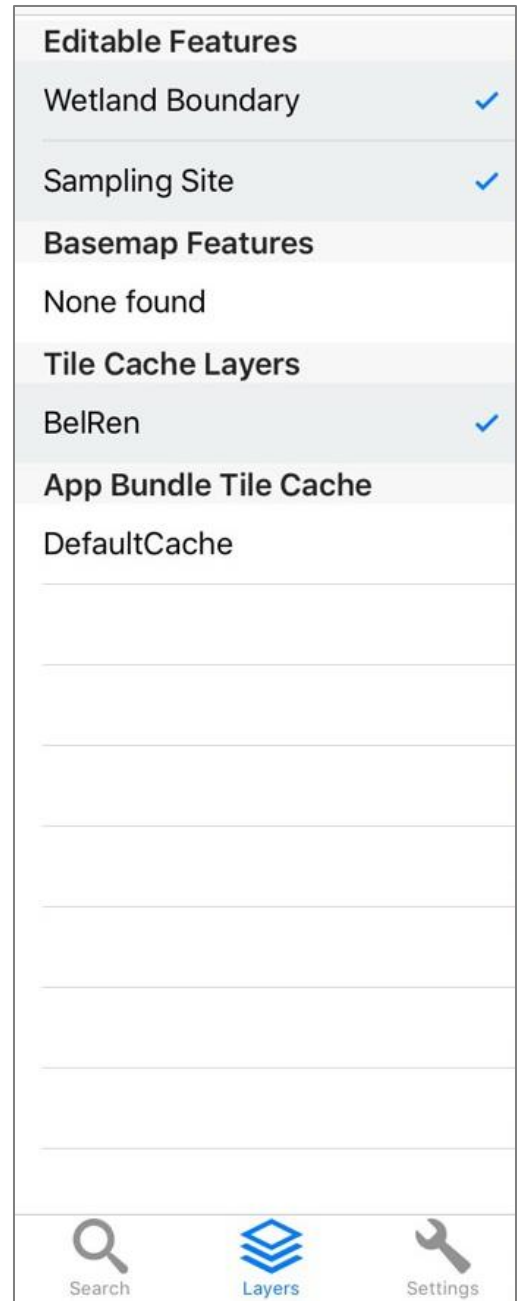
Basemap Features include all the non-editable vector layers included in the app. Tap these layers to toggle visibility

### Tile Cache Layers

Layers in this section include the TPK files loaded onto the iPad via iTunes (see above). All valid TPK files loaded into the App's file sharing window will appear in this section of the menu. Only one tile cache can be displayed at a time. Selecting an item from this section will activate it and turn off the previously selected tile cache.

### App Bundle Tile Cache

This section includes the default global tile cache included with the app.





## SETTINGS TAB

The settings tab contains ancillary app functions.

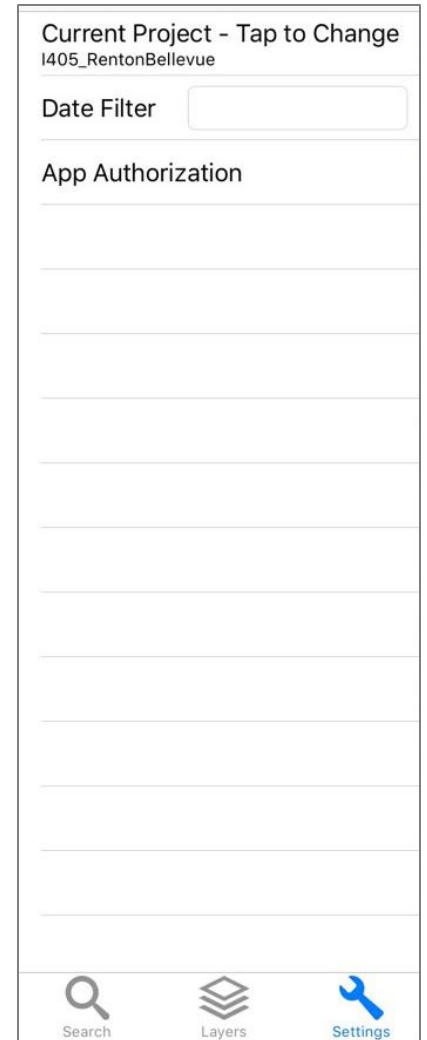
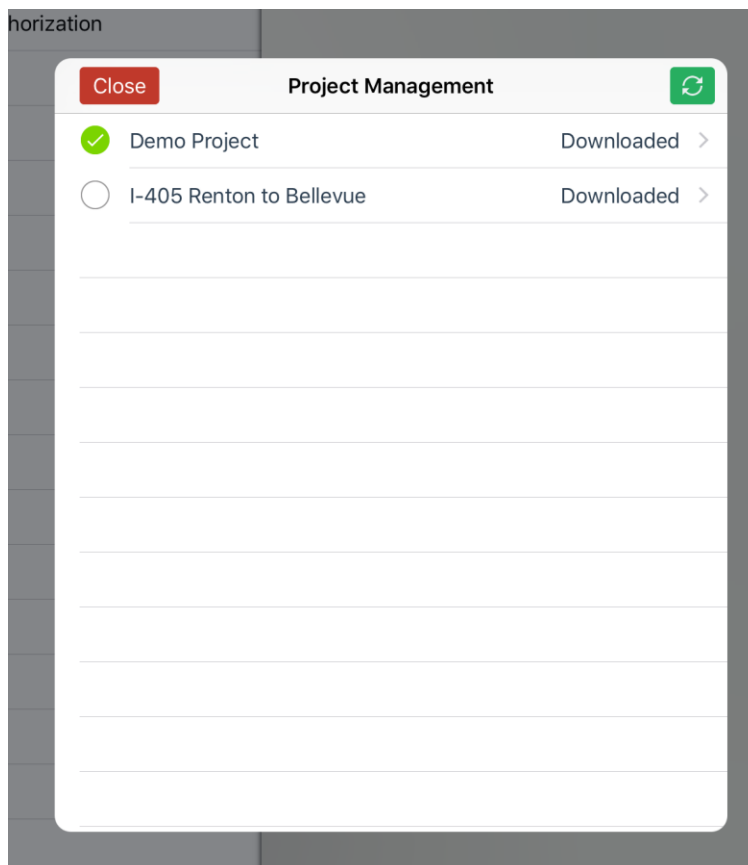
### *Current Project*

This row identifies the project currently active in the *Fen* app. Tapping this row will open the project management window.

### **Project Management Window**

The Project Management Window displays the projects currently available for download and use in *Fen*. Information in this view is updated from a master project database and can be updated by clicking the sync button in the upper right corner.



Projects downloaded and ready for use on the devices are indicated by the “Downloaded” label. A downloaded project can be activated by tapping the white circle on the left edge of the table next to the project name. The current active project is indicated by a green checkmark.



## Refresh Authorized Projects

To refresh authorized projects press the green  symbol in the top right of the project management screen.

### *Activate Project*

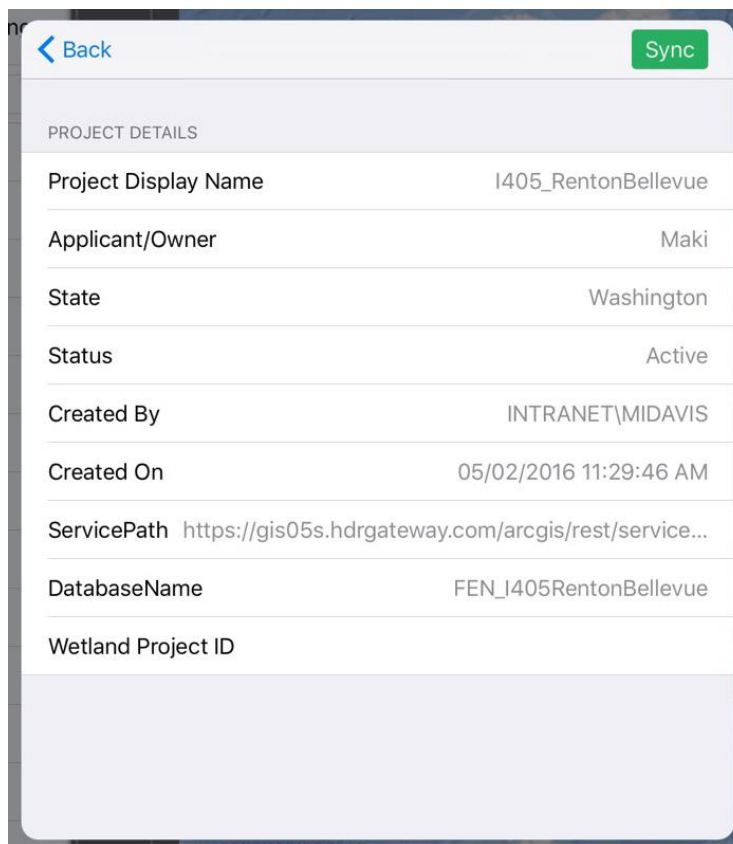
1. Open the project management tab (see above).
2. Tap the blank  symbol for the project you would like to open.
3. Once you see the green  symbol the project has been opened.

### *Project Detail View*

Tapping a project in the Project Management Window will show detailed information in the Project Detail View. This view provides information on the project, and also facilitates download and sync of project data.

A project that has not yet been downloaded to the device will display a green “**Download**” button in the upper right corner.

Once downloaded to the device, the Project Detail Window will display a green “**Sync**” button in the upper right corner. Tapping this button will transmit collected data to HDR servers.



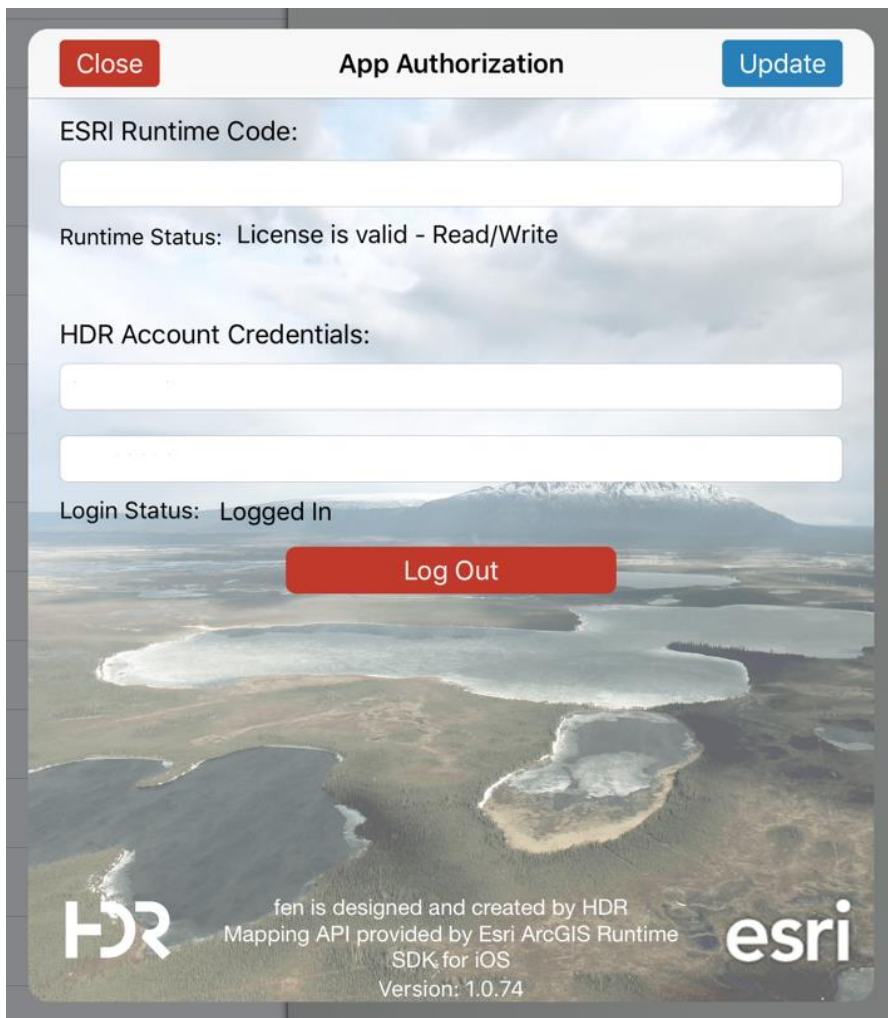
### Date Filter

The date filter is used to limit the data displayed in the map and the list views. Tapping the field will bring up a data chooser. Tapping the X symbol on the right edge of the field will clear the date filter.

### App Authorization

This row provides access to the Authorization Window. This window is used to enter and verify credentials for *Fen* as well as to authorize ESRI Runtime SDK for use.

*ESRI Runtime Code (manual entry)*



Fen will automatically contact HDR servers and download a runtime code. If for some reason you need to override this code it can be manually entered into this field

To validate an ESRI Runtime Code enter it into the field and tap “Update”

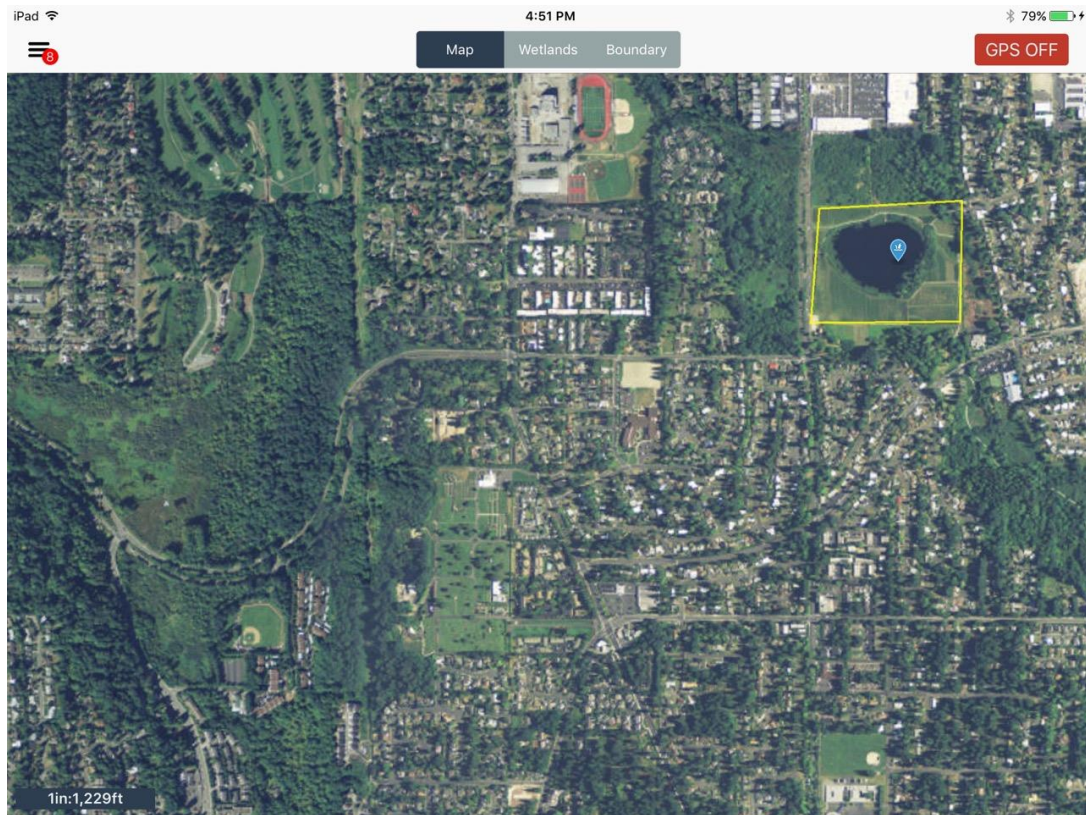
#### *HDR Login*

To login to the FEN app enter your HDR Account Credentials into the “HDR Account Credentials text boxes” (this is the same username and password you use to log into your work computer). Once entered tap “Update” to authenticate.

#### *Log Off*

To log off press the red log out button.

## Map View



The map view is the main spatial interface for the app. It displays editable layers, vector baselayers, as well as a base tile cache. The display of these layers can be controlled in the Layers tab of the side menu.

### Navigation

Map navigation is via a drag-to-pan or pinch-to-zoom action. Double-tapping the screen will zoom in one level, and single-tapping the screen with two fingers at the same time will zoom out one level.

### Location Display

Tapping the GPS button in the upper right corner of the app will toggle location display. This activates the internal iPad GPS or, if connected to an external GPS receiver, activates the connection to the external GPS and activates the data quality status display.

The GPS button will display with a green color when connected to the internal iPad GPS and a blue color when connected to an external receiver.





### Scale Bar

A scale bar is provided in the lower left corner of the map display. This scale bar provides real-time scale information as the map is panned or zoomed. The bar is configured to be 1-inch long on iPad displays and displays the equivalent map distance as measured on the ground.

### Wetland View

#### WETLAND LIST VIEW


Site ID	Is Wetland	Date
SP 8.5L-W	(null)	05/31/2016 05:00 PM
SP 8.5L-U	(null)	05/31/2016 05:00 PM
SP 8.44L-U	(null)	05/31/2016 05:00 PM
SP 8.44L-W	(null)	05/31/2016 05:00 PM
SP 8.4L-W	(null)	05/31/2016 05:00 PM
SP 8.4L-U	(null)	05/31/2016 05:00 PM
SP 8.85L-U	(null)	05/31/2016 05:00 PM
SP 8.7L-U	(null)	05/31/2016 05:00 PM
SP 9.82L-U	(null)	05/25/2016 05:00 PM
SP 9.82L-W	(null)	05/25/2016 05:00 PM
SP 9.68L-U	(null)	05/25/2016 05:00 PM
SP 9.68L-W	(null)	05/25/2016 05:00 PM
SP 10.05R-U	(null)	05/25/2016 05:00 PM
SP 10.05R-W	(null)	05/25/2016 05:00 PM
SP 10.01R-W	(null)	05/25/2016 05:00 PM
SP 10.01R-U	(null)	05/25/2016 05:00 PM

The Wetlands tab provides a list of collected wetland determination sites. This list is sorted in descending order by date, with the newest records on the top of the list.

To access details for the wetland determination site, tap the record.

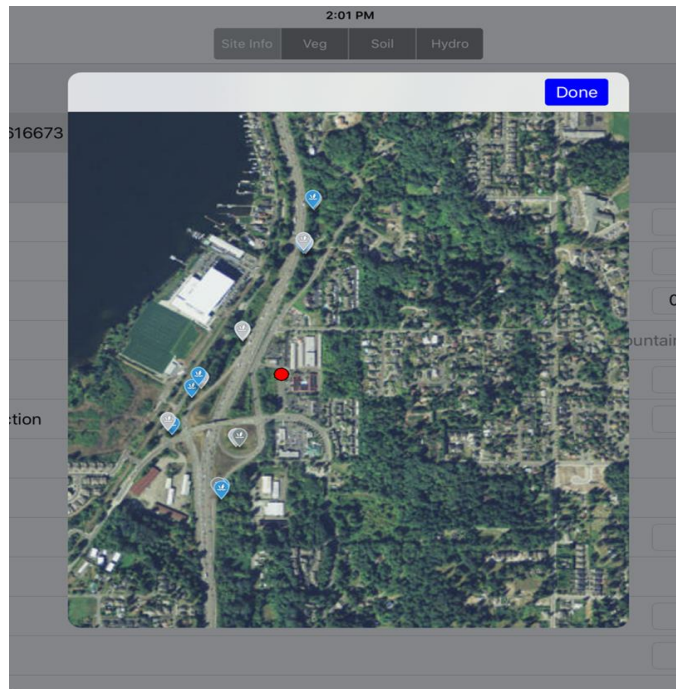
#### WETLAND DETAIL VIEW

##### CREATING A NEW WETLAND SITE

To create a new wetland site press the  button on the Wetland List View page above. This will open a screen where site specific information such as location and site name can be entered for the new site.

### Choosing a Location

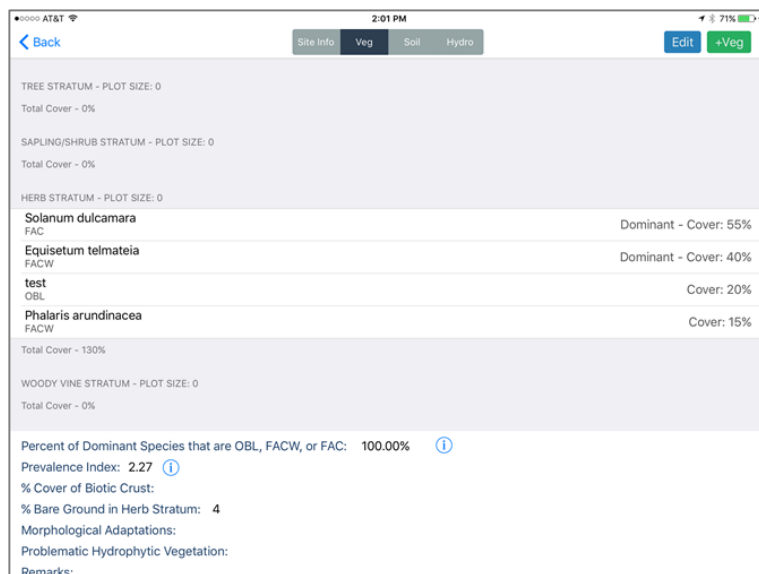
1. To choose a location for a site tap anywhere on the “No Location Selected” bar. A location picker will appear displaying the current GPS location on a map. You can accept the current GPS location or tap anywhere on the map to override the GPS. The selected sample point will appear as a ■ red dot.




### VEGETATION

To find the vegetation section, press the “Veg” button at the top of the wetland detail view screen next to “Site Info”. This will open up a page where vegetation information such as cover, plant stratum, wetland indicators, remarks, or other information can be entered.



To edit general site vegetation information, press the blue Edit button. Enter the required information and tap “Save” to commit the information to the database.



Plant species calculations such as Prevalence Index, or Dominance test will happen on-the-fly as you input species into the vegetation site by using the  (+veg) button.

#### Adding Plants to Wetland Site

To add vegetation to a sample plot:

1. From the  (veg) tab press the green  (+veg) button.
2. Tap anywhere on the “Choose a Species” bar and search for vegetation by either common or scientific name.
3. Tap on the species you would like to add to the site.
4. Select a stratum and absolute cover percentage by tapping the respective tabs in the “add a new species” window.
5. Species should already have a wetland indicator status based on the region. To override this just tap the indicator status button and select the correct indicator.



## WETLAND SITE SOIL INFO

To find the soil section, press the “Soil” button at the top of the wetland detail view screen next to “Veg” or “Hydro”. This will open up a page where soil information such as the breakdown of soil horizon layers, hydric soil indicators, problematic indicators, or other information such as remarks can be entered.

AT&T 2:02 PM 71%

Back Site Info Veg Soil Hydro Edit +Soil

**Soil Profile**

0-8	Matrix Color:10YR 3/2, 90%, Texture:Sandy Loam Redox Color:2.5Y 4/1, 10%, Type:Depletion, Loc:Matrix
8-18	Matrix Color:G1 4/10GY, 100%, Texture:Sandy Loam Redox Color:(null), 0%, Type:(null), Loc:(null)

Hydric Soil Indicators: S4  
Indicators for Problematic Hydric Soils:  
Restrictive Layer (if present...  
Ty...  
Depth: (null) inches  
Remarks:

To edit general site soils information, press the blue **Edit** button. Enter the required information and tap “Save” to commit the information to the database.

Cancel Edit Soil Details Save

Hydric Soil Indicators S4 >

Indicators for Problematic Hydric Soils >

Restrictive Layer Type

Restrictive Layer Depth (in)

Soil Remarks >

### Adding a Soil Horizon

To Add a New Soil Horizon:

1. From the grey **Soil** (soil) tab press the green **+Soil** (+soil) button to add a soil layer.
2. Enter the starting and ending depth of the soil horizon by tapping in the respective text boxes.
3. Enter information regarding redox, color, and texture information by tapping in the respective text boxes.
4. Leave any remarks about the soil layer or press the green **Save** (save) button to save the layer and close the window.

The screenshot shows a mobile application window titled "New Soil Horizon". At the top left is a red "Cancel" button, and at the top right is a green "Save" button. The form contains the following fields:

- Start Horizon Depth (IN): 18
- End Horizon Depth (IN):
- Matrix Color (moist):
- Matrix %:
- Redox Color (moist):
- Redox (%):
- Redox Type:
- Redox Loc:
- Texture:
- Remarks:

## WETLAND SITE HYDROLOGY INFO

To display the wetland site hydrology information press the “hydro” button at the top of the wetland detail view screen. Here the following wetland hydrology variables can be recorded: primary and secondary indicators, information on the water table depth and presence, and other details such as hydrology remarks.

Wetland Hydrology Indicators: A3

Secondary Indicators:

Surface Water Present: Yes

Surface Water Depth (in): 0

Water Table Present: Yes

Water Table Depth (in): 0

Saturation Present: Yes

Saturation Depth (in): 0

Describe Recorded Data:

Hydrology Remarks:

To edit site hydrology information, press the blue **Edit** button. Enter the required information and tap “Save” to commit the information to the database.

Cancel Save

Wetland Primary Hydro Indicators A3 >

Wetland Secondary Indicators >

Surface Water Present (Y/N) No

Surface Water Depth (in)

Water Table Present (Y/N) No

Water Table Depth (in)

Saturation Present (Y/N) Yes

Saturation Depth (in) 0

Recorded Data Description >

HydroRemarks >

## ADDING PHOTOS TO A WETLAND SITE

### To add a photo to a wetland site:

1. From the grey **Site Info** tap on the wetland detail view page, press the blue **Edit** (edit) button.



2. In the edit window, scroll to the bottom and press the black **Add Image** (add image button).
3. The camera will open on the Ipad, from here take a picture of the site.
4. Press the "Use Photo" button to attach the photo to the sample site, or press the "Retake" button at the bottom left of the screen to retake the photo.

### To delete a photo once assigned to the plot

1. From the edit site screen, tap the photo to be deleted and press the red

**Remove**

(remove) button.

The screenshot shows a mobile application interface for editing a wetland site. At the top, there is a status bar with 'AT&T', '3:03 PM', and '77%' battery. Below the status bar, there is a navigation bar with a red 'Cancel' button on the left, a 'Site Info' tab in the center, and a green 'Save' button on the right. The main content area contains several data entry fields and toggle switches:

- Slope (%)
- Subregion
- NWI Classification
- Soil Map Unit Name
- Disturbed Hydro (Y/N) - No
- Disturbed Soil (Y/N) - No
- Disturbed Veg (Y/N) - No
- Problem Veg (Y/N) - No
- Problem Hydro (Y/N) - No
- Problem Soil (Y/N) - No
- Hydrophytic Veg Present (Y/N) - No
- Rapid Test for Hydrophytic Vegetation - No
- Hydric Soil Present (Y/N) - No
- Wetland Non-Vascular Plants - No
- Wetland Hydrology Present (Y/N) - No
- Sampled Area Within Wetland (Y/N) - No
- Summary Remarks

At the bottom of the screen, there is a section titled 'SITE PHOTOS' which contains a large black plus sign icon and the text 'Add Image'.

## Boundary

### ADDING A POLYGON BOUNDARY

1. Navigate to the **Boundary** (boundary) button in map view.
2. In the upper right hand of the screen press the **+** button.
3. On the boundary details page press the “Tap here to create a polygon” bar.
4. Tap to create the vertices of your polygon, once finished press the blue **Done** (done) button.
5. At the boundary details page enter a name, type, or comments (if you haven't already), and then press the green **Save** (save) button to save the boundary.

AT&T 3:28 PM 53%

Cancel Boundary Details Save

LOCATION

Tap here to create a polygon

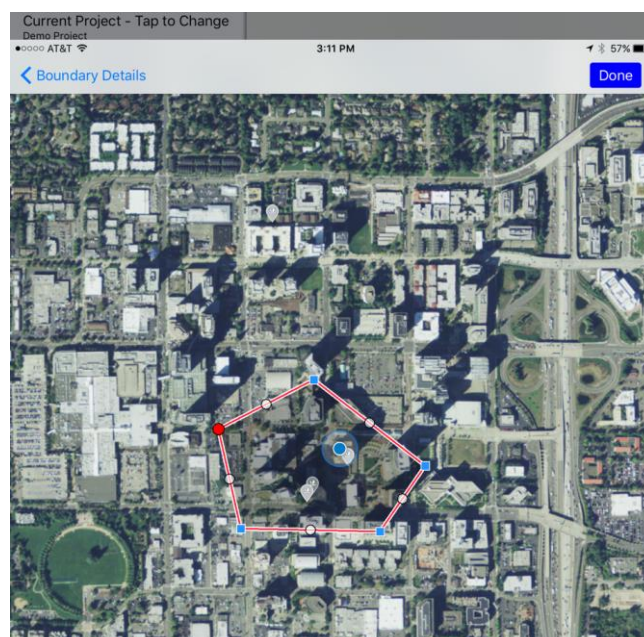
DETAILS

Name

Date 08/11/2016 03:28 PM

Type

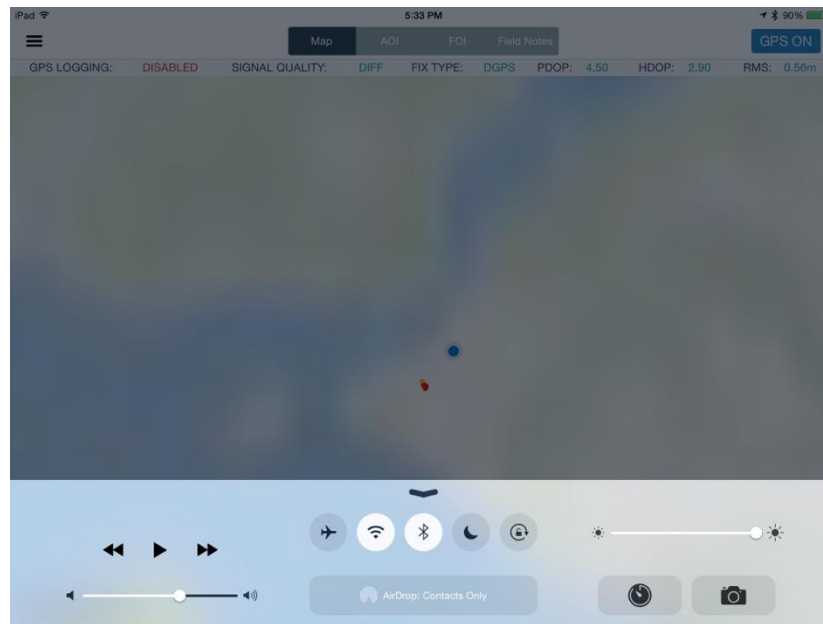
Note



# Troubleshooting

## Bluetooth

External high-precision GPS devices connect to the iPad via Bluetooth. While these connections have proven to be reliable, Bluetooth can experience interference from other devices that operate in the 2.4Ghz spectrum. If you are experiencing trouble with the connection to the external GPS try the following:



Swipe up from the bottom of the screen to display the quick-access toolbar. Find the Bluetooth symbol (center top) and tap it once to turn Bluetooth off, then once more to turn Bluetooth back on. This will force external devices to reconnect.

## Data Sync

Data collected on the device needs to be regularly synchronized to the host server to archive it, and to make it available for other users to review and QC. The app will indicate that new or edited data is stored on the device by displaying a red badge on the icon for the side menu (upper left corner of the map view screen). This red badge indicates the number of un-sync'd new features or edits present on the device.

The sync process can take 2-5 minutes to run under normal circumstances, longer if you have collected a large number of photos since the last sync. If you experience long sync times it may be due to a slow network connection. If you experience trouble when trying to sync or get an error message please check the following:

1. Make sure the iPad is connected to a Wi-Fi network. This can be checked in the Settings app.

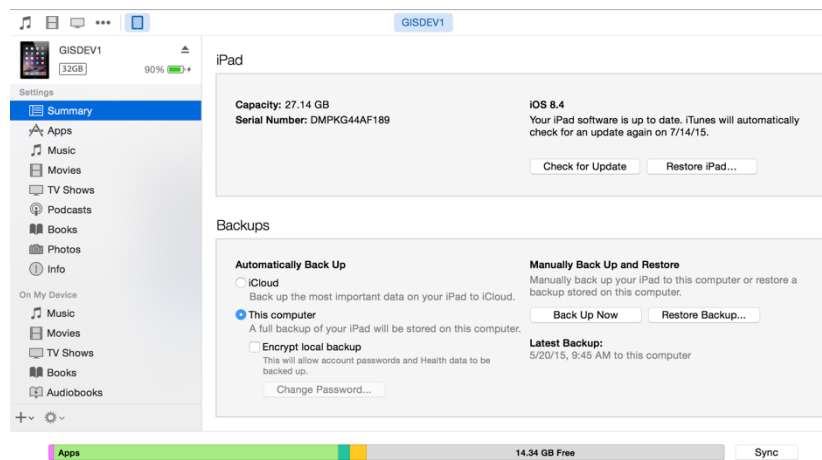
2. Make sure the iPad can access the internet. Do this by opening Safari (web browser) on the iPad and visiting <http://www.google.com> or <https://apps.hdrgateway.com> if you can connect to these sites the app should be able to reach the HDR server.
3. Toggle Wi-Fi off and back on by opening the quick-access toolbar (see Bluetooth troubleshooting) and tapping the Wi-Fi icon once to turn it off, and again to turn it back on.
4. If the above steps fail to fix the issue it may mean there is a network issue somewhere between the wireless access point and the HDR server. It may be necessary to back data up locally and delay sync until network connectivity can be restored. See the backup section under Data Management for details.

## Data Management

### Daily Backup

It is important to back up the iPad daily after field data collection is complete. It is important that you backup your device BEFORE sync'ing data to the server each night. Doing this is easy following the steps below:

1. Connect the iPad to a computer with iTunes installed
2. When the iPad appears in the iTunes side menu choose it
3. Click the Summary tab
4. Find and click the “Back up Now” button



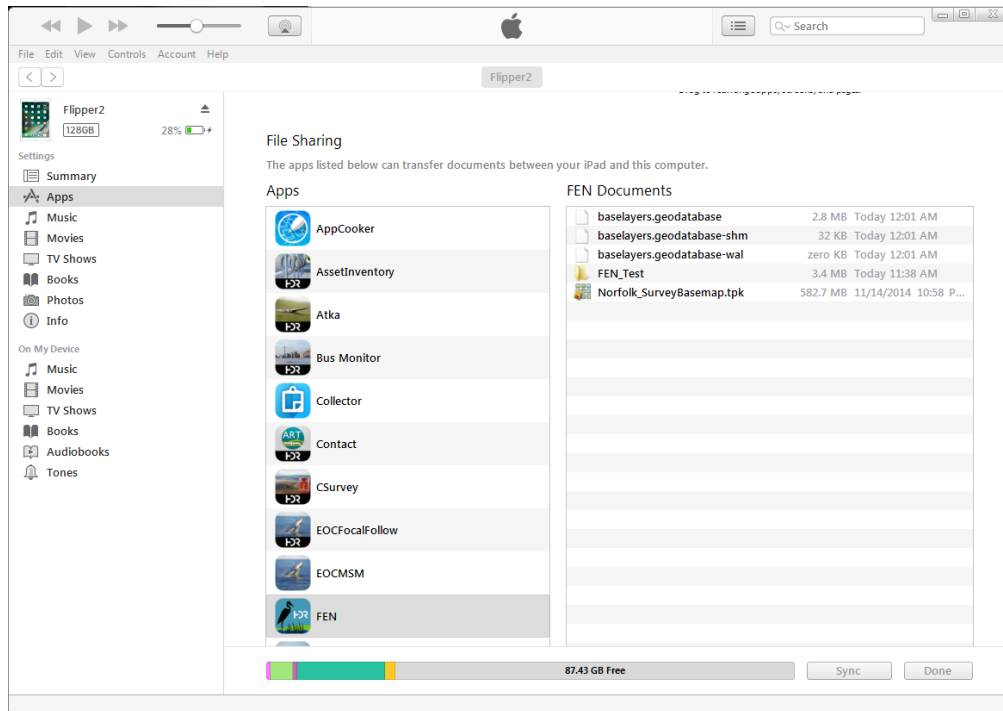
iTunes will then archive the entire contents of the iPad to a backup file. In case of a lost or damaged iPad the backup can be restored to another device and all collected information retrieved.

### Database and Photo Archive

Collected field data is stored in an offline database, and field photos are attached to wetland site are stored as ESRI Geodatabase Attachments. In order to better manage the size of data transfers these images are attached as reduced-resolution versions of the original photo. The full size original photo is stored in the Photos folder for each project. These full size photos can be copied to a desktop computer via iTunes.

To Archive collected data and photos do the following:

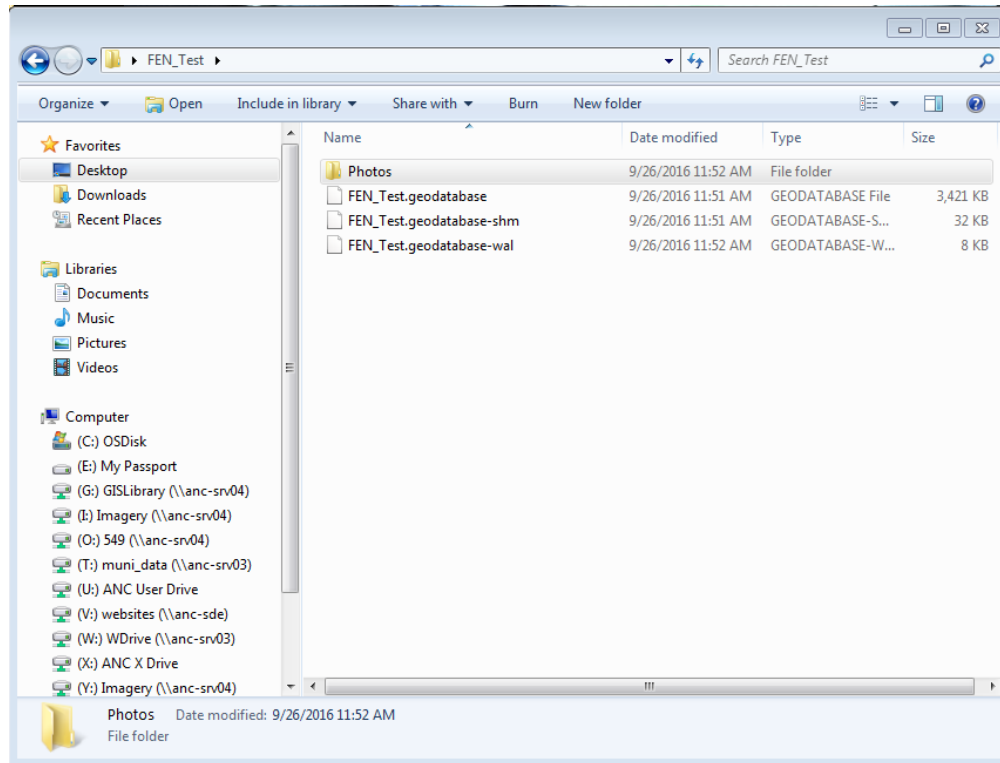




1. Connect the iPad to a computer with iTunes installed
2. When the iPad appears in the iTunes side menu choose it
3. Select "Apps" from the side menu in the "Settings" section
4. Scroll down to the "File Sharing" section and find the Fen app.
5. Click the app icon and a list of files will appear in the "Fen Documents" window.
6. Find the folder for your project folder and click on it
7. Scroll down in the main window until the "Save To" button is visible
8. Click it and save the entire folder to a central location on the computer.

## Database Retrieval

If you experience difficulty syncing data from the app, or other issues prevent normal operation of the data collection app, we may ask you to retrieve the database of collected field data from the device for archive and diagnosis. In this circumstance retrieve a copy of the database from the device by doing the following:



1. Archive the data and photos for your project as described above.
2. Open the project folder you saved to your computer
3. Find the 3 files with your project name titled like this:
  - a. projectName.geodatabase
  - b. projectName.geodatabase-shm
  - c. projectName.geodatabase-wal
4. Send those files to Fen support staff, or follow other instructions as provided.