



PDF MAPS FOR SMARTPHONES AND TABLETS

Fire and Aviation Management, National Park Service

INTRODUCTION

Incident mapping often utilizes PDF documents of maps to be created for printing, archiving, and now for the ability to use these products in the field. With the release of Adobe Acrobat 9 a new geospatial feature set was introduced. Geospatial PDF documents contain information such as real world location and/or GIS attributes. The data contained in a geospatial PDF may be accessed and used to locate a specific point or measure a distance/area.

This document outlines one commonly used workflow for viewing, collecting and exporting/sharing data during an incident or while conducting project work in the field. Use the bookmarks in your PDF reader to navigate the sections of this document.

HARDWARE OPTIONS

All cellular devices are by law required to have GPS hardware in them, thus enabling them to use more advanced mapping features of geospatial PDF documents. Phones will automatically have GPS capability. Tablets need to have the ability to subscribe to a wireless carrier in order to have this capability. For example: iPads must be 3G/4G as WI-FI only will result in lower accuracy and only work in areas where Wi-Fi service is available.

The most common operating systems are: Android and iOS.

Every effort has been made to document differences in the applications between these operating systems.

SOFTWARE OPTIONS

QR READERS



QRAFTER: Scanner for iOS devices. Free version does not generate codes.

QR DROID: Most commonly used reader for android devices

MAPPING APPLICATIONS

There are many options but this one is commonly used and has proven to be useful in the field.

PDF MAPS: An application available for android and iOS devices that can read geospatial PDFs. Users can download and open saved maps, pan, zoom, locate yourself on the map using GPS, add placemarks (points) and attributes, plot photos, as well as measure distance and area. Users can then export the created placemarks and associated data to various formats and share with incident or park GIS personnel.

For product information visit the product websites at <http://www.avenza.com/pdf-maps> OR <http://www.pdf-maps.com/>.





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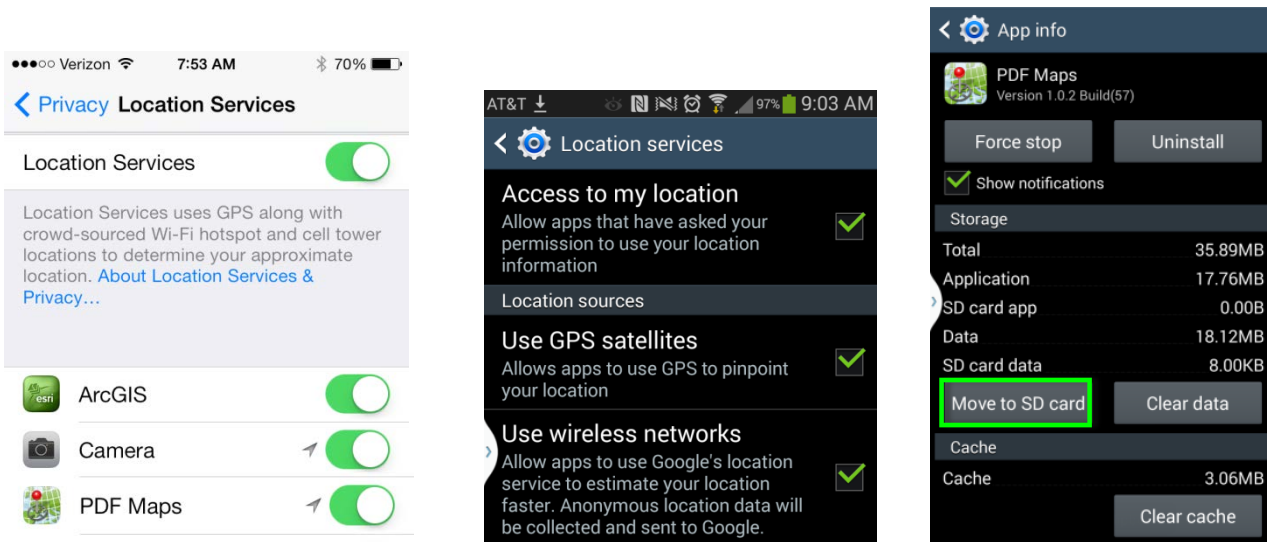
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SOFTWARE INSTALLATION AND SETUP

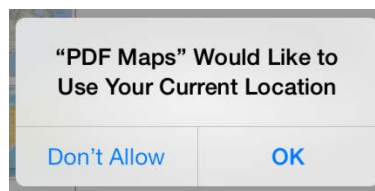
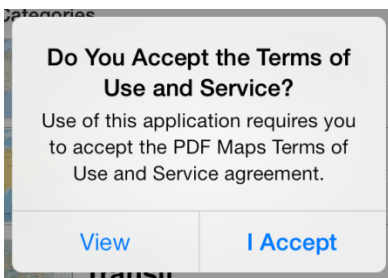
Search for the application using terms 'Avenza' or 'PDF Maps', in either the iOS App Store or the Android Google Play Store. Install the application.



In Android settings and in iOS Privacy settings, under Location, enable the GPS for both PDF Maps and for your camera if you intend to plot photos. Android devices allow for the app to be moved to an SD card if desired.



Upon opening the program for the first use, you will need to accept the **Terms of Use and Service**. If the location services have not been enabled you may be asked to enable them.



COMPATABILITY NOTES:

- Android devices **must** have software version 4.0.3 or higher
- Android devices are recommended to have 1 GB RAM or higher
- iOS devices **must** have iOS 5.0 or later. Compatible with iPhone, iPad, and iPod touch. This app is optimized for iPhone 5.



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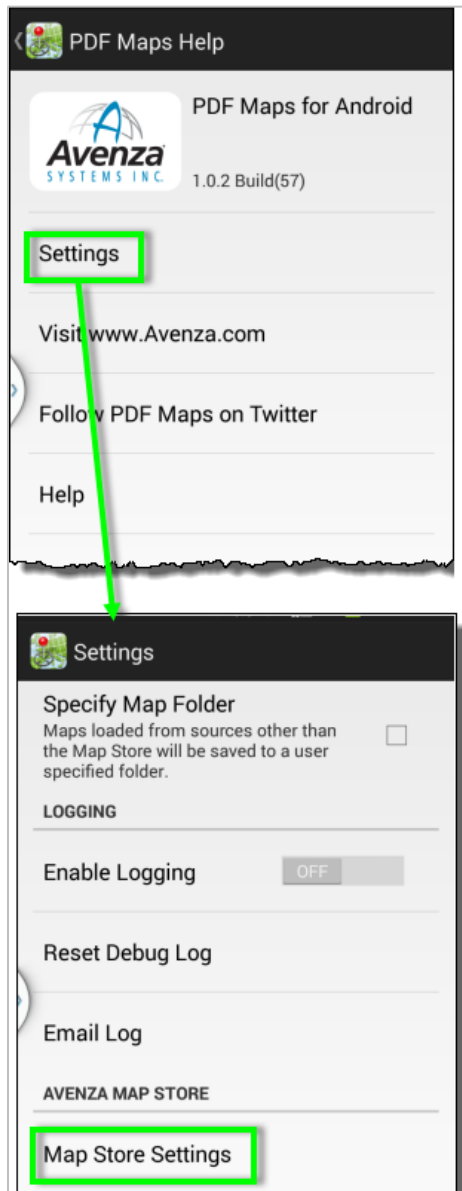
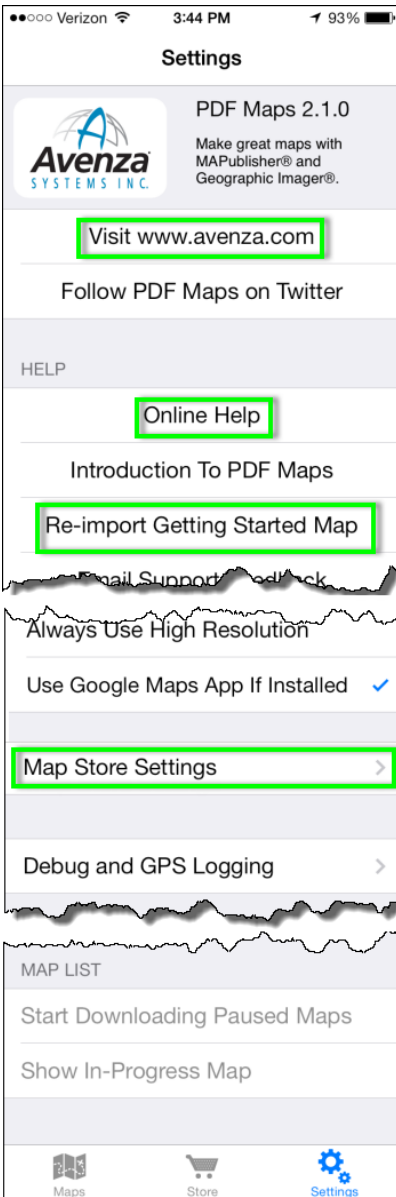
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APPLICATION SETTINGS

Once the application is open, there are three main areas to visit: the maps, the store, and settings. Tap on the gear icon to access the settings page. Android options have this at the top of the screen and iOS has it at the bottom.



The settings include links to the applications website, help as well as map store and GPS logging settings.





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WHERE TO FIND MAPS?

There are many places to find maps and this is a short list of the most commonly used sources.

DROPBOX

Requires an account to post, but not necessarily to view depending on how the link is shared. This is a good solution for maps that have large file sizes.

WEB

NPS Park maps - This site stores a full park general map for most of the parks. www.nps.gov/hfc/cfm/carto-atoz-geopdf.cfm

Many incidents use Google Sites to create a website specifically to distribute maps.

USGS Store: free download of 7.5 and 15 minute maps.

[http://store.usgs.gov/b2c_usgs/usgs/maplocator/\(xcm=r3standardpitrex_prd&layout=6_1_61_48&uiarea=2&ctype=areaDetails&car ea=\\$ROOT\)/.do](http://store.usgs.gov/b2c_usgs/usgs/maplocator/(xcm=r3standardpitrex_prd&layout=6_1_61_48&uiarea=2&ctype=areaDetails&car ea=$ROOT)/.do)

NPS PARK MAPS

This site stores a full park general map for most of the parks.

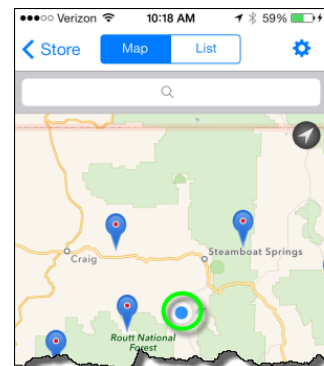
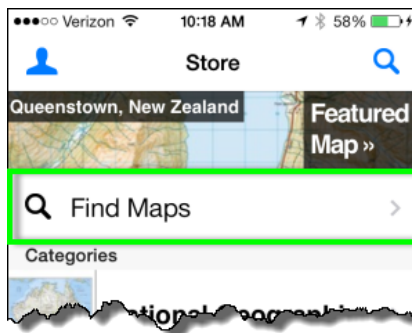
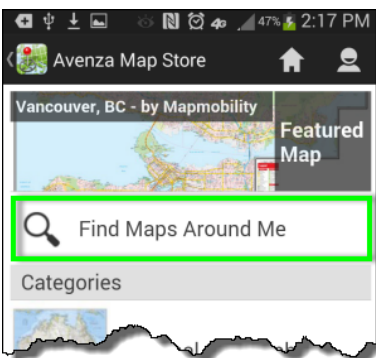
www.nps.gov/hfc/cfm/carto-atoz-geopdf.cfm

AVENZA MAP STORE

PDF Maps has a build in Store that contains maps that are free and available for purchase. Using iOS devices, the store icon is located at the bottom of the screen. On Android devices the store can be accessed via an icon at the top of the screen.




Use the 'Find Maps' option to view available maps. The default view shows maps available near your current position.

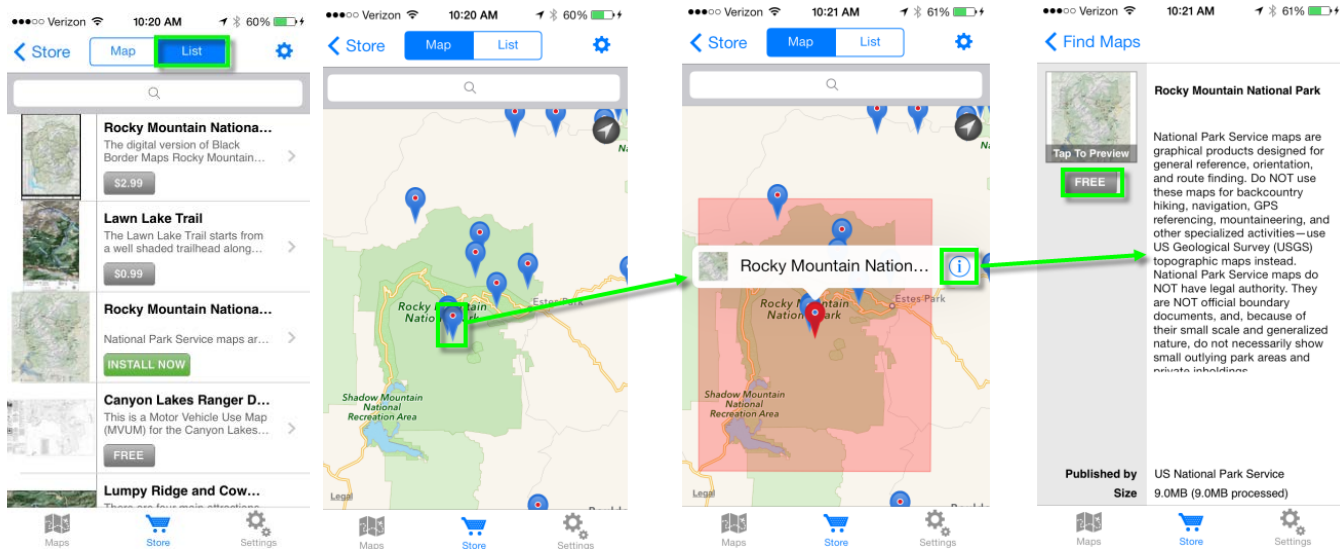




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Select map or list at the top of the screen for the two different ways of viewing available maps. Tap on a blue icon to view the area the map covers. Tap on the  icon for a description, preview, and the cost. Tap the cost or the **Free** button to install the map.



The map will load directly into the application map list. Depending on the size of the map and the strength of the internet or cellular service, this process may happen quickly or take a few minutes.

QR CODES

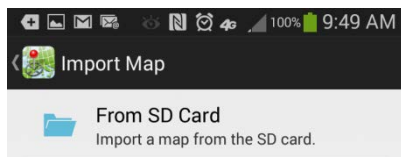


Use these to gain direct access to maps that are stored online using any of the above mentioned methods. Incidents often use this method to direct folks to incident maps. Codes are often found around ICP and on IAPs. When scanned, open the website where the map is stored. The exact process may differ depending of the QR reader used and the site where the map is stored.

ITUNES OR FILE EXPLORER

When connecting an iOS device to the computer with which it synchronizes via iTunes, one can use iTunes to directly download maps to the device.

When connecting an Android to a computer, one can use file explorer to move maps to the device or load to the SD Card from within the application.





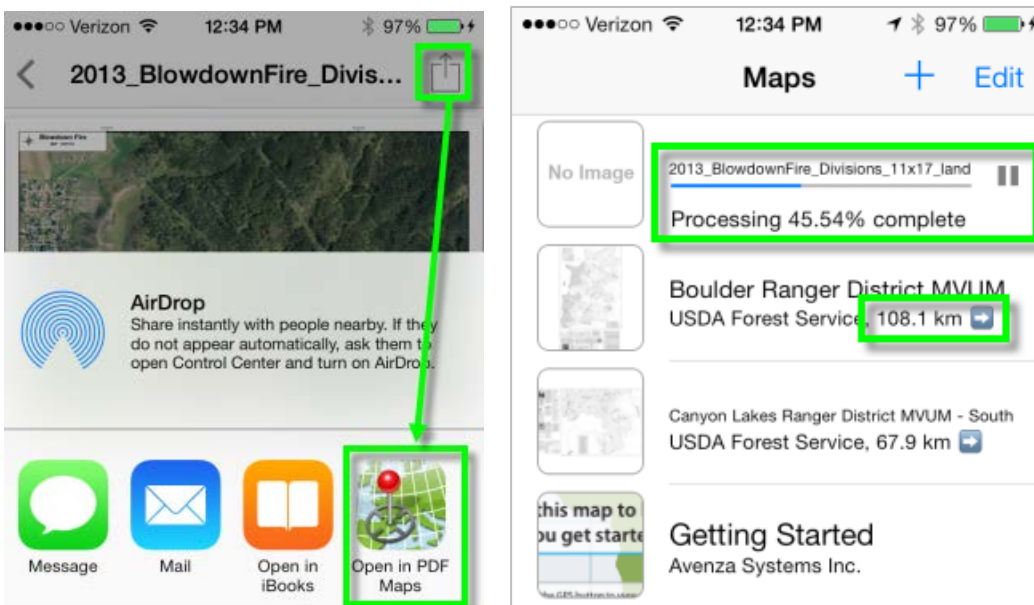
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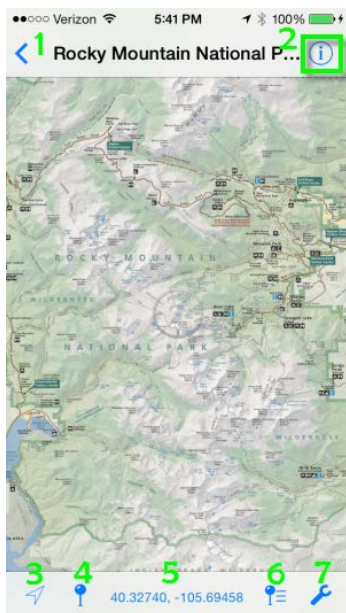
OPENING MAPS

Once a map has been downloaded using any of the methods available, it will either open directly in PDF Maps or in a web browser. If the map opens in a web browser, make sure that you have launched PDF Maps, then return to the browser window and select the option to open in PDF Maps. The document will then be processed by the application. Once the file has been completely processed, the distance from where you are to the map, as well as a directional arrow, will be visible below the map name.

NOTE: If the PDF has been compressed the processing time might be much longer than the download time.



Tap on any completely processed map to open it. The map viewer has the following features:



1. Go back to the list of maps
2. Get more information about the map
3. Location: Solid blue means it's centered on your location, tap to toggle on/off
4. Create a new placemark – drops pin in center of map
5. Display format – defaults to the format of the PDF
6. Map Features: Edit, manage, export placemarks, lines, and tracks
7. Tools: Create a track, measure, plot photos, etc.

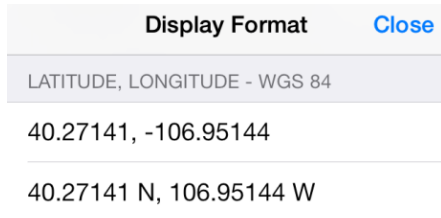


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DISPLAY FORMAT


While viewing a map, tap on the display in the bottom of the screen to select the desired display format. The choices include Latitude/Longitude, UTM, USNG. This is important if you plan on reading coordinates from a created placemark.



PLACEMARKS – CREATE & EDIT

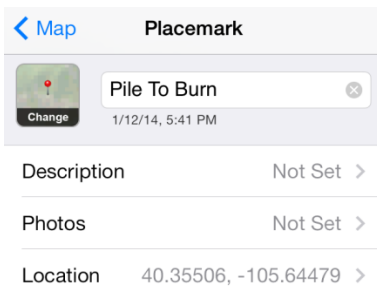
A placemark is a point to which you can add details and photos. To create one, tap on the pin icon on the bottom of the screen. If the map is centered on your current location (a solid blue arrow) then the pin will be dropped where you are located. Otherwise the pin is dropped in the center of the screen.



Edit Placemark: Tap the  icon next to the name to open the details of the placemark.



Tap on the name to change, on the description or photos to add, and on the location to manually enter coordinates.



Move Placemark: Tap on the point and drag it to the correct location.

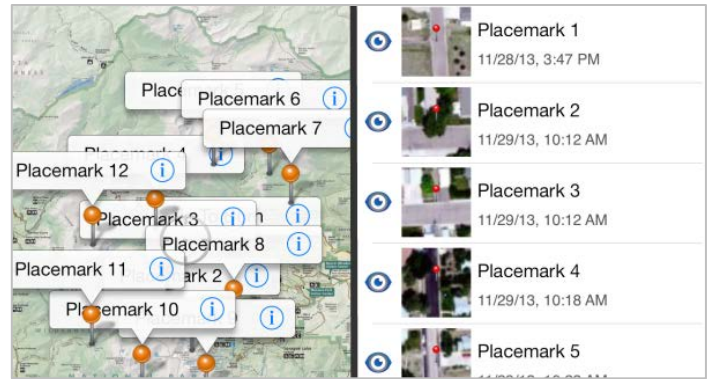
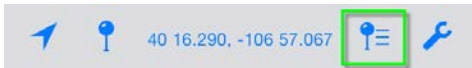


PDF MAPS FOR SMARTPHONES AND TABLETS




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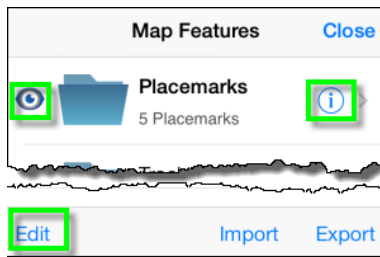
PLACEMARKS – MANAGE

Placemarks can be sorted into folders for organizational purposes. Tap on the Map Features icon, to view created placemarks.

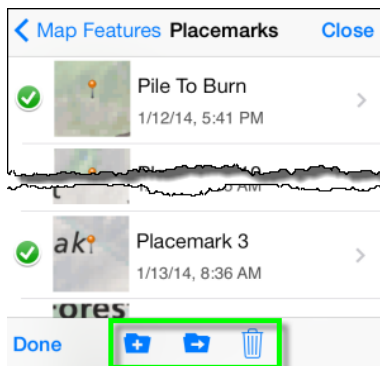


Once your screens begin to look like these, it might be good to organize placemarks. Features can be turned on or off, or organized into folders. This allows for easier exporting as well as the ability to only make certain folders visible.

1. Tap on the Map Features icon  to view existing folders and features.
 - a. Use the  icon to turn visibility on or off.
 - b. The  can be used to view and edit details about the folder such as name, icon, attributes, etc.



2. Tap **Edit** to add or delete folders or features, or to move features between folders.
 - a. Create a new folder or select one to move or delete.
3. Tap on the Placemarks folder to open it and view the existing features.
4. Select some features and then choose one of these options.
 - a. Create a new folder containing the selected features.
 - b. Move the selected features into an existing folder.
 - c. Delete the selected features.



5. Tap on **Done** when finished managing features and folders.



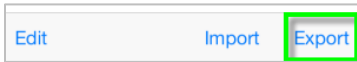
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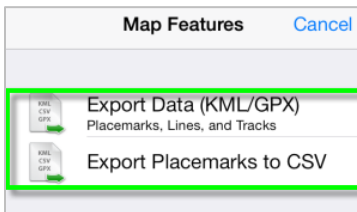
PLACEMARKS – EXPORT

Placemarks can be exported in several formats to be used in the office or shared with a GIS Specialist or a GISS on an incident.

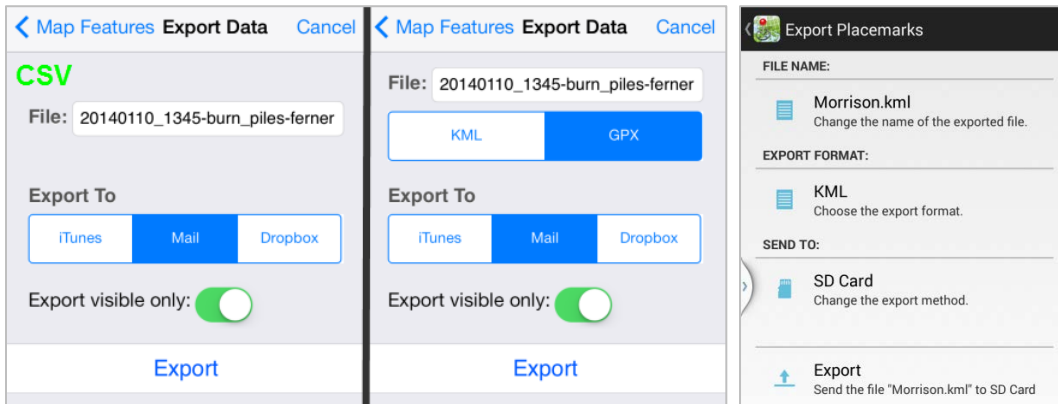
1. Tap on the Map Features icon and make the placemarks to be exported visible.
2. Tap **Export** to open the options screen.



3. Select to export the data in KML/GPX, or CSV format – Ask a GIS Specialist if you are unsure what is best for the current situation.



4. Complete the export options
 - a. Edit the file name to include your last name, the date, and the content.
 - b. Select KML or GPX. (CSV will not give any other option)
 - c. Select how to share the created file. Most common selection is mail. Android devices can also select to send the file to an SD Card.



5. Click **Export** at the bottom of the screen to finish the process.
 - a. If using mail, the mail app used on your mobile device will launch, and the default subject will be the file name.
 - b. If using Dropbox, you will be prompted to log into your account.
 - c. If using iTunes, the file will be exported and be available the next time the mobile device is connected to its home computer.





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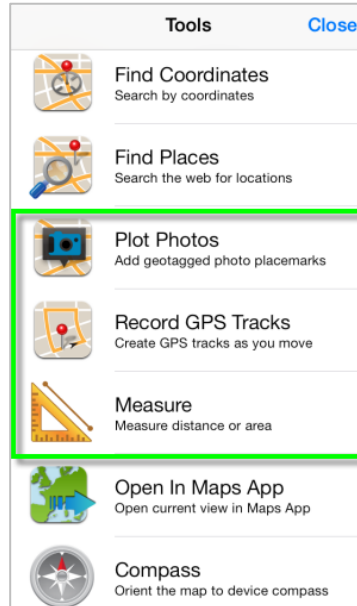
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TOOLS



To view the available tools, tap on the Tools icon which is shaped like a wrench at the bottom of the map screen.

The tools covered in this document are how to Plot Photos, Record GPS Tracks, and Measure distances and areas.



PLOT PHOTOS

Adding photos to a map can help enrich the information that is being exported and shared with others. To share them, export as a KML. Plotting photos is only possible if the location settings are enabled for the camera as described in the settings section.

There are two ways to add photos to a feature:

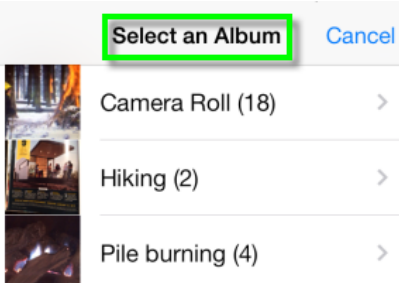
- Take a photo from within the PDF Maps application. (not covered in this document)
- Take photos with the camera app on your device and then add them to the map. This allows for the photo to be accessible outside of the application and often (device dependent) results in higher resolution images.

To add photos that you have taken with the camera application:

1. Tap on Plot Photos in the Tools menu.



2. The device's default photo application will display existing albums (folders). Tap on one to open.





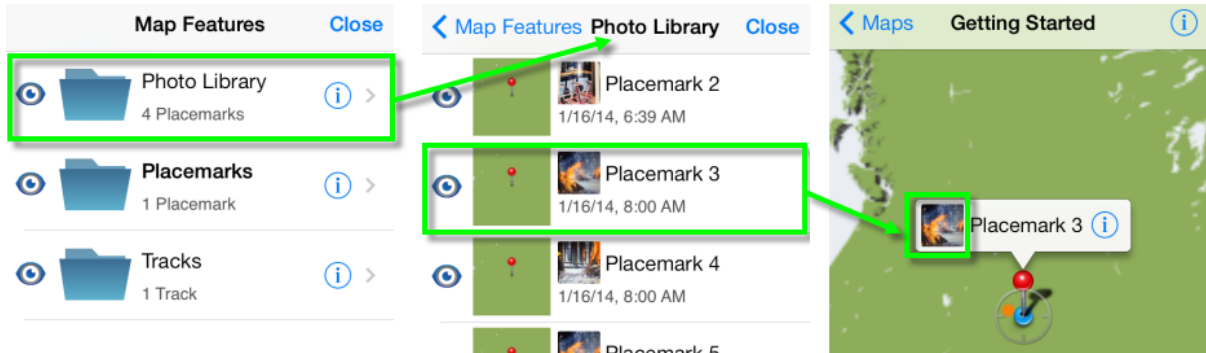
PDF MAPS FOR SMARTPHONES AND TABLETS

Fire and Aviation Management, National Park Service

- Any photos that were taken within the extent of the current map will be visible.
- Tap on the photo(s) to be attached to the map and then tap **Done**.



- Plotted photos can be viewed in the Map Features in the Photo Placemarks folder. Tap on the photo to view it's location on the map. Move the placemarks into more appropriate folders as desired.



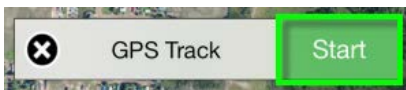
RECORD GPS TRACKS

The Record GPS Tracks tool can be used to create lines on the map based on your movements. Some examples would be to walk a fire break, a new trail segment, or a contingency line.

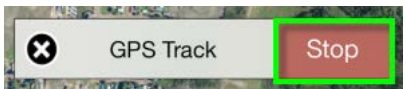
- Tap on the Record GPS Tracks in the tools menu.



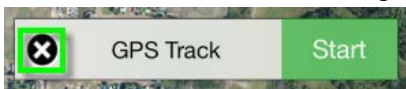
- At the location where you would like to start recording, tap **Start**.



- At the location where you would like to stop recording, tap **Stop**.



- Repeat steps 2 & 3 as often as desired realizing that each time the track collection is stopped it is considered complete.
- Click the X to close the GPS tracking option.

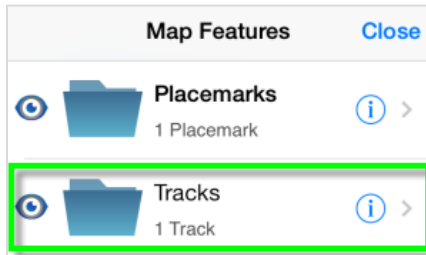


- To view the created track(s) open the Tracks folder in Map Features.

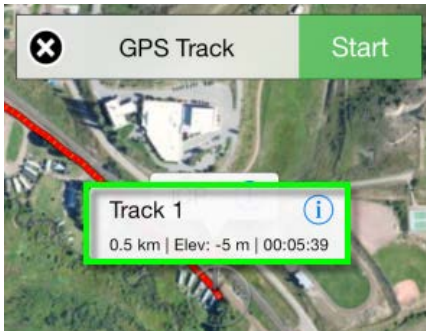


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7. Tap on a track to view the details including travel time, elevation change, and distance recorded. Keep in mind that there might be jumps in speed and elevation as those are dependent on the device having a connection to GPS satellites.





MEASURE

Distances or areas can be measured and the resulting line feature can be saved to the Map Features.


1. Tap on the Measure option in the Tools menu.

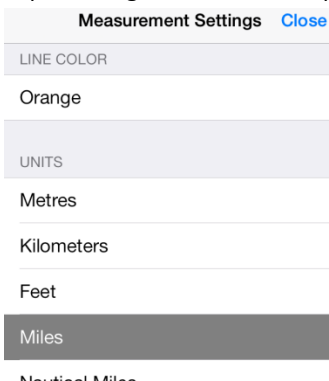


2. The ruler in the bottom screen allows for toggling between area and distance. Tap the icon to switch between the two.

- a. Select  to measure distance
- b. Select  to measure area



3. Tap on the gear icon in the top bar to set the units 

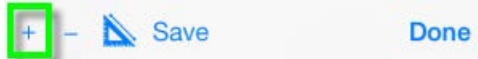




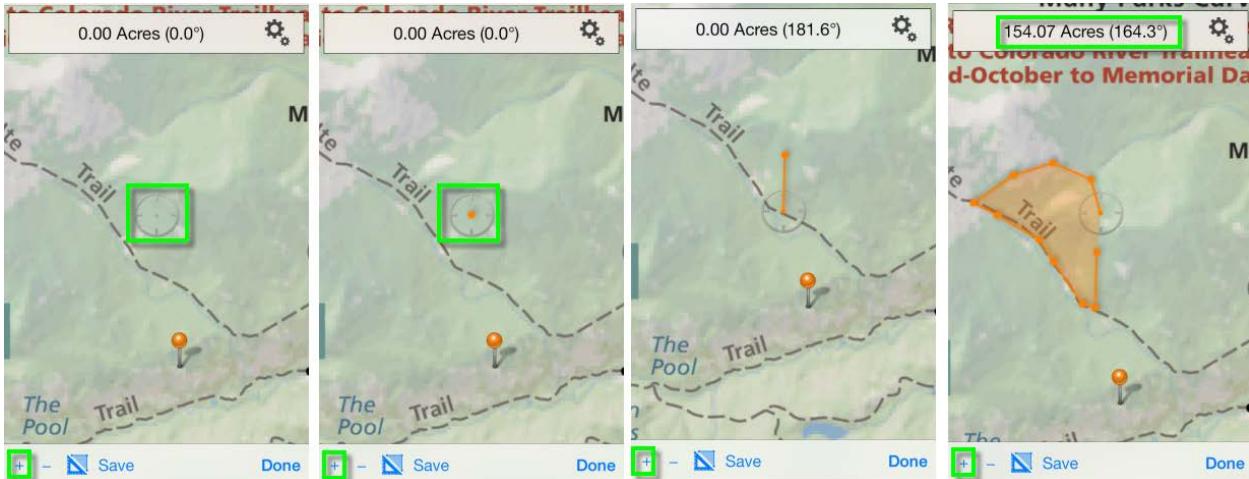
PDF MAPS FOR SMARTPHONES AND TABLETS

Fire and Aviation Management, National Park Service

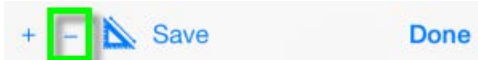
- Center the crosshairs in the map over where you want to start your line or area.
- Tap on the plus to start measuring



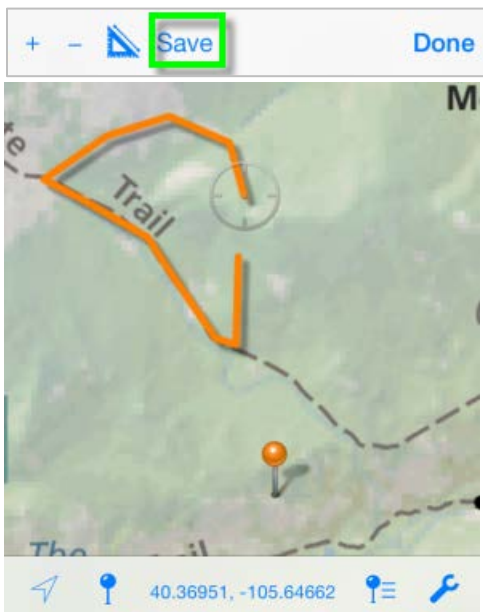
- Move the map so the crosshairs are in a the next place and tap the plus sign again. Continue until the measurement is complete.



- As each point is added note the measurement value at the top of the screen is updated.
- To remove a point tap on the minus sign.



- Tap **Save** to save the line. If you are creating an area it will save the solid orange line and can be converted into a polygon back in the office.



- To stop measuring and not save any additional features tap **Done**.

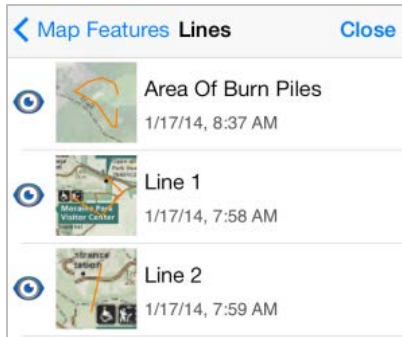




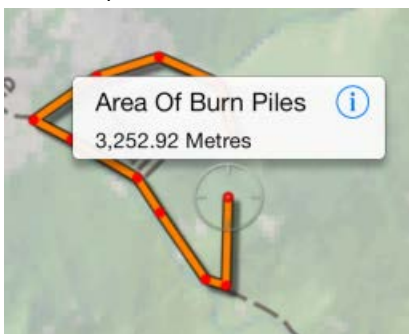
PDF MAPS FOR SMARTPHONES AND TABLETS

Fire and Aviation Management, National Park Service

11. Label any saved lines with more informative names.



12. Note the points created as well as the length of the perimeter drawn are visible.

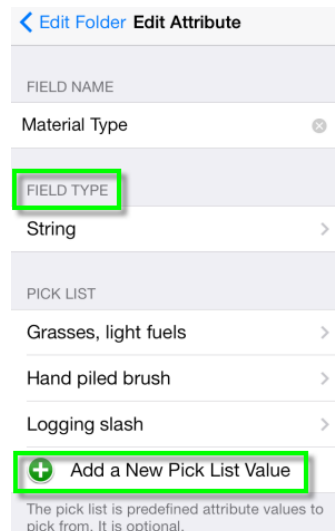
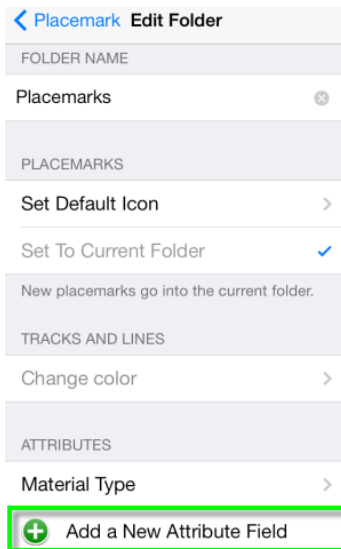
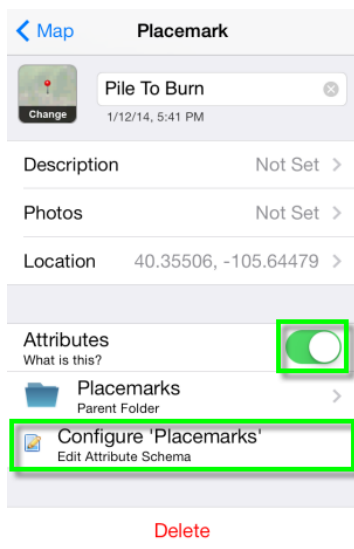


ADVANCED

PLACEMARK ATTRIBUTES

Attributes can be created based on a variety of field types. Once created, they can be used on multiple points within a map.

Turn on the ability to work with attributes and then tap **Configure 'Placemarks'** to add and manage attributes. Tap on **Add a New Attribute Field** to configure the pick list or other field type.

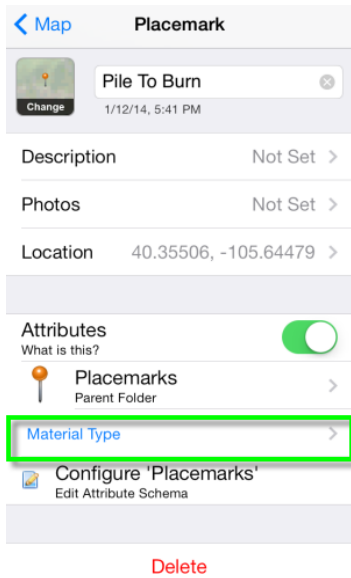




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Fire and Aviation Management, National Park Service

The placemark window will show the attribute and if it's been populated, that will display in smaller text next to the field name.



SYMBOLS

If you prefer actual ICS or other symbols over the default pins they are easy to import.

Create points in Google Earth.

Customize the points by adding in your own icons.

Save as a KML.

In PDF maps, import the KML file.

Once imported, select the pin and move it to the desired location.

QUESTIONS?

For questions or comments relating to this document contact Skip Edel, National Park Service, skip_edel@nps.gov.

This document was prepared by Chris Ferner in 2013 and last updated in February 2014.