

SOP #8: Using Garmin Global Positioning System (GPS) Units

Version 1.0 (November 7, 2018)

Revision History Log: Only changes in this specific SOP will be logged here. For minor changes, version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02). Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, new version number, date of revision, author of the revision; identify paragraphs and pages where changes are made, the reason for making the changes, and the person who approved the revision.

Previous Version Number	New Version Number	Revision Date	Author	Changes Made	Reasons for Change	Network Regional Reviewer Approval

Purpose

This Standard Operating Procedure (SOP) describes how to use a Garmin GPS receiver to navigate to a site and collect field data for the Pacific Island Network Anchialine Pool Monitoring Protocol. This SOP is written specifically for newer Garmin GPS models, but the approach may be used for any other Garmin GPS model or tablets that can average a waypoint and collect track logs. The data transfer process uses DNRGPS 6.1.0.6 software.

Pre-Field Preparation

Equipment

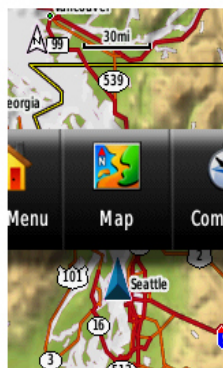
The following equipment should be taken into the field:

- 1) GPS receiver
- 2) Map
- 3) Fresh AA batteries (at least 2)
- 4) Compass with declination adjustment (if desired)
- 5) Waypoint(s) preloaded (if necessary)
- 6) Notebook for recording description of waypoints

Garmin GPS Preparation

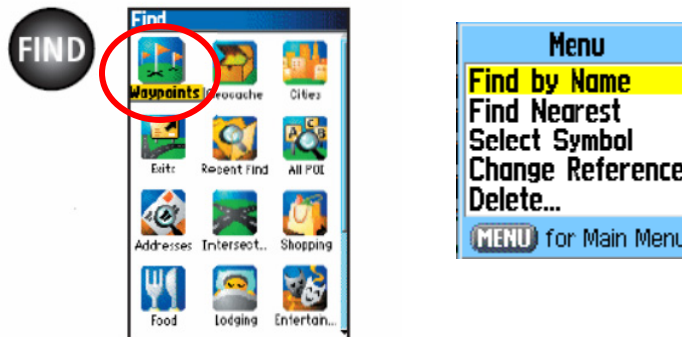
- 1) Read and become familiar with the [Garmin GPS user manual](#), hardware, and software.

- 2) Load freshly charged batteries and have extra charged sets available. Put extra batteries in a water tight “dry bag” or a re-sealable plastic bag.
- 3) Download a fresh Almanac into your Garmin GPS if the unit has not been used for more than 1 week, or if the GPS unit has traveled a distance of 150 miles or more from the last location. A fresh Almanac automatically sets the correct time/date and time zone for your GPS, as well as other local settings acquired from the satellites. To download an Almanac, turn on your Garmin GPS and stand in an open area (i.e., away from buildings, tree canopy, and obstructions) for about 20-30 minutes depending on cloud cover.
- 4) Get familiar with the Buttons, Main Menu page and the Set Up page on your Garmin GPS.



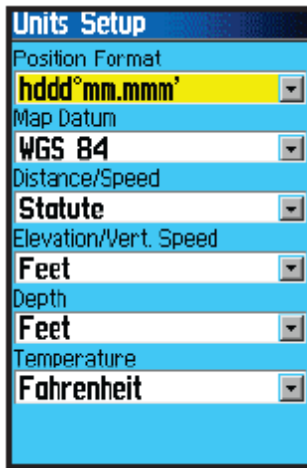
- 5) Make sure your Garmin GPS interface is set correctly. From Main Menu page → Setup → Interface. Select *Garmin* for “Serial Data Format” field.

- 6) Make sure that WAAS is enabled. From Main Menu page → Setup → System. Set “WAAS” field to *Enabled*.
- 7) If necessary, delete old waypoints or tracks from your GPS memory (make sure data has been downloaded and saved on your computer).
 - a) To delete all waypoints, press FIND → Waypoints. Press ENTER, and then press MENU. Select *Delete...* and press ENTER. Select *All Symbols* and press ENTER.
 - b) To delete all tracks, from Main Menu page → Tracks. Press ENTER, and then press MENU. Select *Delete All Saved* and press ENTER. Select *Yes* and press ENTER.



- 8) If necessary, upload GIS data (e.g., shapefiles) to the GPS unit using DNRGPS software (see SOP #9: “Downloading and Uploading Data from/to a Garmin GPS” for instructions).
- 9) If you plan to GPS a line showing where you traverse (i.e., a track), then make sure to set up the Track Log. From Main Menu page → Tracks → Setup. Check the box *Wrap When Full* if you want Track Log records over oldest data with new data, otherwise leave the box unchecked. Set “Record Method” field to *Time*. Set “Interval” (i.e., logging rate for data collection) field to *00:00:05* (5 seconds is the recommended interval for data collection while walking).
- 10) Set the coordinate system. From Main Menu page → Setup → Units. For the field “Position Format”, select *hddd.ddddd* as your waypoints will be collected in LAT/LONG.

Note: Standard unit for Distance, Elevation, and Depth is *Metric* or *Meters* for all PACN islands.



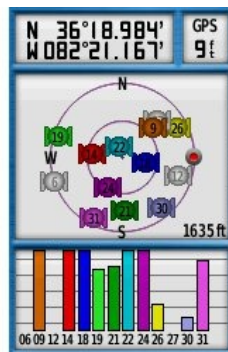
Set the Map Datum. From Main Menu page → Setup → Units. Set “Map Datum” field to either WGS84. This is now the standard datum used by PACN.

- 11) If necessary, check the North Reference setting. From Main Menu page → Setup → Heading. Set “North Reference” field to *True*.
- 12) After using the Garmin GPS in the field, make sure to put the unit in its carrying pack and store in a dry location.

GPS Field Procedures

Data Collection Preparation

- 1) Turn on your Garmin GPS unit. Scroll through the tabs several times to access the Satellite page, then press MENU and select *Use With GPS On*, press ENTER.
- 2) Hold the GPS unit in front of you. Keep it flat and level. Wait for the satellites to appear on the Satellites page. Note: A minimum of 4 satellites is required to ensure data accuracy.

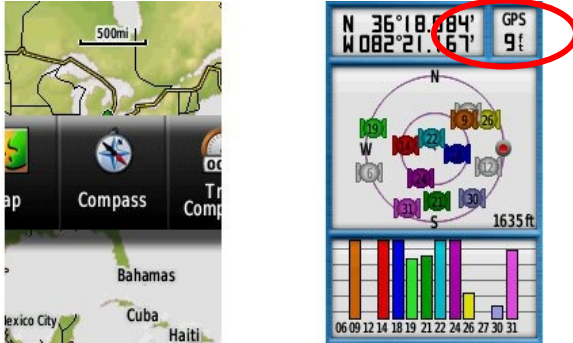


IMPORTANT NOTE: Garmin GPS will collect data regardless of how many satellites are detected and no matter what the GPS positioning quality is. Check the Satellites page before collecting waypoints to ensure signal quality is acceptable. A good rule of thumb is to only collect data when the 3D satellite fix mode signal is shown on the Status bar at

the top of the screen of your GPS unit. Avoid collecting data when Garmin GPS is in 2D fix mode.

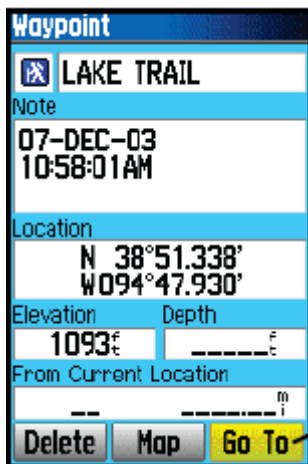


Also, check the Location accuracy error from time to time to ensure the GPS positioning quality when you collect data. Avoid collecting data anytime the accuracy error exceeds 5-6m, unless you are in an area of thick cover and higher accuracy is not attainable.



Navigating To Waypoints

- 1) Press FIND → Waypoints, press ENTER.
- 2) Use the Rocker key (move Up/Down or Left/Right) to enter the name of the waypoint or just select OK. Scroll down the list and select the waypoint that you want to navigate to, press ENTER. Select *Go To* at the bottom of the page and press ENTER.



- 3) The Map page should open automatically (if not, scroll through PAGE tabs several times to access the Map page). Start walking and follow the compass direction on the Map page to navigate to the waypoint.



Collecting Waypoints

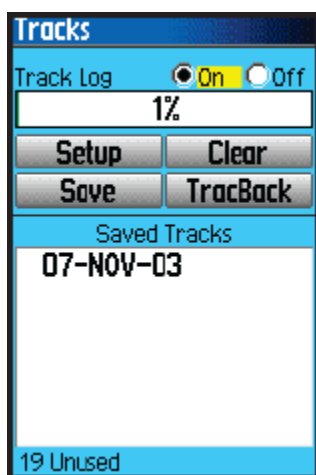
- 1) Stand still at the location where you want to GPS.
- 2) Press and hold the ENTER/MARK button until the Mark Waypoint page appears.

- 3) At the top of the Mark Waypoint page, enter a waypoint name, using the Rocker key.
Tip: To save time in the field, write down any notes/comments about this waypoint into a notebook. You may enter this information later back at the office, after downloading the waypoints into ArcGIS.
- 4) Select OK at bottom of the page and press ENTER.
- 5) Average the location of the waypoint you just collected (this provides higher accuracy). Select Waypoint Manager from the Main Menu, then select the waypoint you just collected. Select Menu and then *Average Location*. If you have moved away since collecting the waypoint, move back so you are physically standing in the location you collected the waypoint. Select *Start*. Follow the on-screen instructions, and ignore any warnings about waiting 90 minutes between samples or not being near the original waypoint. When the confidence status bar reaches 100%, select *Save*.
- 6) Go to your next location and repeat the above steps.

Collecting Tracks

- 1) Turn the Track Log to ON. From Main Menu page → Tracks. Select *On* and press OK.

Also, from Main Menu page → Tracks → Setup Track Log, make sure the box *Wrap When Full* is checked if you want Track Log to record over the oldest data with new data (otherwise leave the box unchecked). If the Track Log shows more than 0%, select *Clear* and press OK to erase old Track Log data (make sure that data has been saved if it is still needed).



- 2) Begin walking and Track Log will start collecting track points (at an interval of every 5 seconds as you walk).
- 3) Turn Track Log to OFF to stop collecting. From Main Menu page → Tracks. Select *Off* and press OK.
- 4) Save your Track Log. Select *Save* and press ok. Name your Track Log using the Rocker key.
- 5) Tip: You may stop Track Log when nearing the beginning point of an area (polygon) you've walked. Track Log will automatically close the polygon even if a track is left open ended.

Other Data Collecting Tips

For more detailed information on data collection with Garmin GPS, download the [User's Guide from Garmin](#).