

BASIC INSTRUCTIONS FOR TAKING A GPS READING WITH A GARMIN ETREX UNIT*

See below (ADVANCED INSTRUCTIONS) for a more in-depth walk through. Review these instructions prior to going out in the field. Please take readings for annual populations, new populations, and populations that have dramatically changed in size. We suggest taking new GPS readings of even stable, perennial plant populations every 2-3 years to correct for possible past errors and to provide a comparison with past readings.

Buttons:

- POWER allows you to turn the unit on or off.
- PAGE allows you to move through the four different GPS screens
- UP/DOWN allows you to move thru menus, increase or decrease settings, flip through options
- ENTER allows you to select an option or open a menu

To Turn the GPS Unit On/Off:

- Press the **POWER** button. (Please do not forget to turn the unit off whenever it is not in use as the batteries run down quickly. POC uses rechargeable batteries.)
- You will get a message, “**Wait...tracking satellites**”(A good signal needs 4 satellites—takes up to 5 minutes)
- Getting a good signal:
 - **Moving around**, especially in a straight line, helps the satellites locate you faster
 - **If you are under a dense canopy**, it helps to track satellites in a nearby open area first, then bring unit (with the power still on) back to the plant population
- **Accuracy:** GPS unit will show accuracy at the top of the screen when you first turn on the unit
- **Try to get about 3-8m accuracy** in open areas (if the error is a very large number at first, keep the unit on and wait a few minutes for the error to reduce as you walk around)



Figure 1: The buttons as they appear on the GPS unit.

To Take a Reading (see diagram in Monitoring Guidelines for where to take readings):

- Press **PAGE** button again until you return to the **MENU** screen
- Highlight **MARK** using the **UP/DOWN** buttons
- **Hold GPS unit at a place you want to take a reading**, press **ENTER**
- **Record the reading** on the Monitoring Form—**°N is the top line** (7 digit number) and **°W is the bottom line** (7 digit number). The northerly reading corresponds to latitude and the westerly reading corresponds to longitude. The POC Units are set up to read in the **Decimal Degrees** format with datum **NAD27 CONUS** (see p. 3 if you don't know the current settings on your unit).
- If you press **ENTER** when “OK” is selected, the GPS unit will automatically create a Waypoint and give it a title such as 001, 002, 003, etc. It may be helpful to write down this waypoint title, in order to be able to access it later on. This way, you can see the coordinates again if you didn't record them immediately.

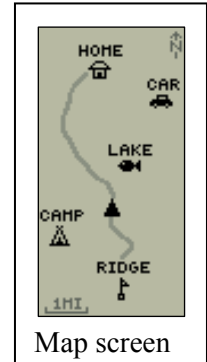
*POC has a few newer model GPS units. Directions to use them are very similar, but there are some differences. If you are borrowing one of these, we will provide a copy of the instructions for that model.

ADVANCED INSTRUCTIONS FOR USING A GARMIN ETREX

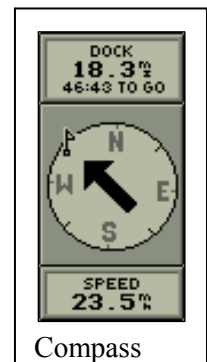
Things to Know about the Garmin eTrex Unit:

- **Screens**

- The GPS unit has 4 main screens and you can flip between them with the PAGE button.
- **First Screen – Main screen**
 - Shows signal accuracy, the number of satellites to which the receiver is connected, and the signal strength of each satellite connection
- **Second Screen – Map**
 - Shows your current position on a map with an arrow pointing north
 - Tracks your movements with a trail
 - Can view the location of waypoints and see the direction you need to travel to reach a point
 - Options:
 - UP button will allow you to zoom out
 - DOWN button will allow you to zoom in
- **Third Screen – Compass**
 - Top of the compass shows your direction of travel
 - Can show the direction of a waypoint and the distance to that point
 - UP/DOWN buttons will allow you to flip through display options
 - Location
 - Sunrise
 - Sunset
 - Trip time
 - Trip odometer
 - Speed
 - Average speed
 - Max speed
 - Heading
 - Bearing
 - Elevation
- **Fourth Screen – Menu**
 - Scroll through the menu with UP/DOWN buttons and push ENTER to open an option
 - **Mark**
 - Mark a waypoint
 - See current fixed location for recording purposes
 - Enter a GPS coordinate to find
 - **Waypoints**
 - View, delete or navigate to a waypoint
 - Think of waypoints as you would a visual marker on a landscape; you can navigate to them or use them as a position reference
 - **Route**
 - Make a route of travel with waypoints
 - **Tracks**
 - Clear, save, or open previous paths of travel
 - Tracks are continually logged while a GPS unit is on and has an accurate reading
 - **Setup**
 - Change the **Time** format
 - Change the **Display** contrast to make the screen easier to view
 - Change the **GPS Units** of measurements (see below in “Types of data”)
 - **Position format**
 - **Map datum**
 - **Units**
 - **North reference**
 - **Interface** allows you to change the GPS data exchange formats if you are using cables to connect your GPS with another unit (e.g. computer)



Map screen



Compass



Menu screen



Waypoints

- **System** allows you to see the unit's software
- **Types of data**
 - **Coordinate systems** are different formats used for recording a location (***) denotes POC's preferred system)
 - **Degree Decimal (e.g. dd.ddddd N) *****
 - Degree Minute Second (e.g. dd°dd'dd.dd" N)
 - UTM (e.g. dddddd)
 - Minute Decimal (e.g. dd°dd.ddd)
 - **Datum** is the way the data are projected onto the earth, sort of like a grid system used as a reference point for measurements (***) denotes POC's preferred system)
 - **NAD 27 *****
 - WGS-84 (NAD-83)
- **Batteries**
 - GPS units use a great deal of power and can drain batteries very quickly
 - Turn off the unit when you no longer need it
 - POC uses rechargeable batteries, so don't throw batteries away
 - POC provides an extra set in each case

To Check/Adjust Settings before Taking a Reading (crucial before recording coordinates):

- **Press PAGE button three times**—you are now in the **MENU** screen
- Highlight **“SETUP”** using the **UP/DOWN** buttons and then press **ENTER**; repeat this process for the next screen when highlighting **“UNITS”**
- There are three settings: **“POSITION FRMT,” “MAP DATUM,” “UNITS”** and **“NORTH REF”**
- Select **“POSITION FRMT,”** and using the **UP/DOWN** buttons highlight **“hddd.ddddd*,”**
- Press **ENTER** to select this option (the default format for POC is Decimal Degrees)
- Select **“MAP DATUM,”** and using the **UP/DOWN** buttons highlight **“NAD27 CONUS,”** press **ENTER**
- Select **“UNITS,”** and using the **UP/DOWN** buttons highlight **“METRIC,”** press **ENTER**
- Select **“NORTH REF,”** and using the **UP/DOWN** buttons highlight **“TRUE,”** press **ENTER**

To Insert a Previous Location or Create a Waypoint:

In order to relocate your population, you will need to **enter the coordinates from a previous monitoring form into the GPS unit. We can provide you with coordinates from previous years.** Please see contact information below if you have questions.

To enter coordinates written on the monitoring form into the GPS unit, first you need to check the unit's settings and adjust them appropriately so they reflect the datum and format of the coordinates.

Make sure that you enter the reading according to the format of the coordinates that you want to find. The three most common formats used are Decimal Degrees, Minutes/Seconds/Degrees, and UTM.

To enter the reading in the correct format, follow the instructions listed above under “Check/Adjust Settings.” The position format called Decimal Degrees is listed as **“hddd.ddddd*”** and uses the map datum called **“NAD27 CONUS.”** **This means that when you set the position format to “hddd.ddddd*” you also need to make sure that the map datum is “NAD27 CONUS.”** The Minutes/Seconds/Degrees format is listed as **“hddd*mm’ss.s”** and also uses the map datum **“NAD27 CONUS,”** and the UTM format is listed as **“UTM/UPS”** and uses the **“NAD83”** map datum.

EXAMPLE 1: The coordinates on the form are in UTM format; you need to make the settings in the unit reflect the “UTM/UPS” position format before you enter the coordinates. Go to MENU/SETUP/ UNITS according to the “Check/Adjust Settings” instructions above. Highlight the “POSITION FRMT” box and select “UTM/UPS” as described in these instructions. The UTM format usually requires a unique datum called “NAD83,” so highlight the “MAP DATUM” box and select “NAD83.”

- From the MENU screen choose “MARK.”
- Scroll down until the reading at the bottom is highlighted, press ENTER
- Highlight each digit in the coordinate number by scrolling with the UP/DOWN button
- Press ENTER at the number you wish to change.
- Scroll up or down to the number you want to replace it with.
- Press ENTER to change the number.
- Scroll to the next number you want to change, repeat. Go through all the numbers, changing those you wish to change.
- Once finished, scroll down to OK.
- Press ENTER when OK is highlighted. This will be your waypoint. Write down the title of the waypoint you created (the number next to the flag), so you can go back to it.
- When you are finished, simply get out of the Edit Location screen by pressing PAGE. You’ve created a waypoint for your coordinates! Go onto the next section.

PLEASE NOTE: When entering UTM/UPS coordinates, the first two digits are “1” and “6”. Do not change this as this represents “16”, the standard UTM zone for Illinois. The actual coordinates starts after the “ T ”.

Tracking Back to an Existing Waypoint (i.e. a waypoint you created):

- Press PAGE button to bring up MENU page
- Highlight WAYPOINTS and press ENTER (you are now in Waypoint Page)
- Select a tab (using UP/DOWN) containing the number (or first letter) of the waypoint you are looking for and press ENTER
- Select the waypoint that you are looking for and press ENTER
- Press UP/DOWN button to select “GOTO” and press ENTER
- The Compass Page appears and you are now ready to be guided back to your starting location. The # of meters shown above is the distance to your waypoint.

The GPS Compass will start moving as you start moving toward your waypoint, **but it does not function in the same way as a conventional compass.** It is not sensitive enough to detect which direction you are facing initially so the arrow points in the appropriate cardinal direction but doesn’t change with respect to the direction you are facing. For this reason, **use an actual compass to tell you which direction is which before you begin.**

EXAMPLE 2: *Looking at the compass screen on the GPS unit, I can see that the arrow is pointing straight at the “N” on the screen with a distance of 6.66 m, indicating that I need to walk 6.66 m due North to find my plant. However, when I look at my own compass, I realize that I am facing South. Therefore, first I adjust my direction by referring to my actual compass and turn to face North. Then I refer to the GPS compass screen.*

Please do not change the setting of the GPS unit without following the directions above. If you are creating a waypoint to be used to locate a population and the last reading is in UTM (used in 2003) we can help you convert this into LAT/LONG so that you can enter a waypoint. Don’t fret, it’s not hard. With any questions please contact the POC Research Assistant: call 847-835-6856 weekdays during business hours.