

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

See **ADVANCED INSTRUCTIONS** below for a more in-depth walk through. Review these instructions prior to monitoring. Take readings for annual populations, new populations, and populations that have changed in size. Take new GPS readings of stable, perennial plant populations every 2-3 years.

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.)
- 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)

To Take a Reading (see Figure 1 for where to take readings in the population):

- Press **PAGE** button 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. POC GPS units are set up to read in the coordinate system **Decimal Degrees** with datum **WGS84** (if you don't know the current settings on your unit view the “Check/Adjust Settings” section below in the Advanced Instructions).
- 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.



Figure 3: The buttons as they appear on the GPS Etrex unit.

ADVANCED INSTRUCTIONS FOR USING A GARMIN ETREX

Things to Know about the Garmin eTrex Unit:

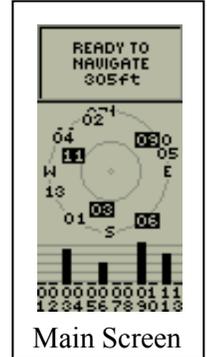
- Screens: The Etrex has four main screens, and you can flip between them with the PAGE button.

- **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

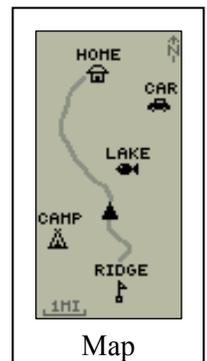
- **Second Screen – Map**

- 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 shows 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



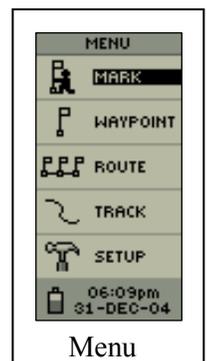
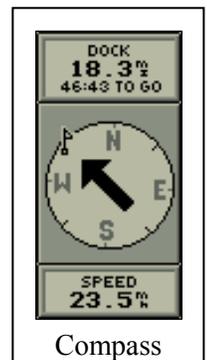
- **Third Screen – Compass**

- Top of the compass shows your direction of travel (when moving)
- Can show the direction of a waypoint and the distance to that point
- UP/DOWN buttons will allow you to flip through display options at the bottom of the screen
 - 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** (aka coordinate system)
 - **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)
 - **System** allows you to see the unit’s software
- Types of data: POC has preferred ways for you to collect this data (see below), but if you have collected GPS using one of the other coordinate systems or datums, indicate this on your monitoring form and we will convert.
 - **Coordinate systems** are different formats used for recording a location (aka POSITION FRMT)
 - **Decimal degrees (e.g. hddd.ddddd)** (POC’s preferred coordinate system)
 - Degree Minute Second (e.g. hddd°mm'ss.s")
 - UTM (e.g. ddddd)
 - Minute Decimal (e.g. hddd°mm.mmm)
 - **Datum** is the way the data are projected onto the earth (aka MAP DATUM)
 - **WGS-84** (POC’s preferred datum)
 - NAD-27 (Conus)
 - 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 units may come with rechargeable batteries, so don’t throw batteries away
 - POC provides an extra set of batteries with each unit. Just in case!

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

- Press **PAGE** button until you reach the **MENU** screen
- Using the **UP/DOWN** buttons, highlight “**SETUP**” and then press the **ENTER** button (see Figure 1); again using the **UP/DOWN** buttons, highlight “**UNITS**” and then press the **ENTER** button.
- 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 (this is Decimal Degrees and the requested format for POC)
- Select “**MAP DATUM**”, and using the **UP/DOWN** buttons highlight “**WGS 84**” (requested format for POC) 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**

Use GPS to Locate a Population from Previously Collected GPS Points or Create a Waypoint:

In order to relocate your population using GPS, you will need to enter the coordinates from a previous monitoring form into the GPS unit which you will bring into the field.

POC transforms all GPS data into WGS-84, decimal degrees, which should minimize the need to re-set your unit. However, you may wish to locate populations using readings in a different datum, in which case you must ensure that your GPS unit is set up for the correct datum of the coordinates you enter. Follow directions below.

To enter coordinates written on the monitoring form into the GPS unit:

- Check the unit's setup menu to see what coordinate system and datum the GPS unit is currently set to.
- Adjust the coordinate system (aka POSITION FRMT) and datum (aka MAP DATUM) so they match the coordinate system and datum of readings you are using. See "Check/Adjust Settings" and "Types of Data" above.
- From the MENU screen highlight "**MARK**" and press the **ENTER** button
- Scroll down **DOWN** until the reading at the bottom is highlighted, press **ENTER**
- Highlight subsequent digits in the coordinate number by using 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 and press **ENTER** to change the number.
- Scroll to the next number you want to change, repeat. Go through all the numbers until the reading is correct.
- Once finished, scroll down to highlight **OK** and press **ENTER**. When back at the Mark Waypoint screen, scroll up to select **OK** again. This will save 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 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 number of meters shown above is the distance to your waypoint.

The GPS Compass does not function in the same way as a conventional compass. It is not sensitive enough to detect which direction you are facing initially though it will provide a helpful direction once you are moving across the landscape. For this reason, **use an actual compass to tell you which direction to go before you begin.**

Example: Looking at the compass screen on the GPS unit, I see that the arrow is pointing straight to "N" with a distance of 6.66 m, indicating that I need to walk 6.66 m 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 begin moving North while watching my GPS compass screen. I begin to see that my 'distance to population' is decreasing, so I know I'm moving in the correct direction.