

# Getting to know your GPS

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# Types of GPS receivers (units)

## ▶ Many different styles and brands

- **Garmin** – used by many in our field. Very popular by “everyday user”
- **Magellen** – Vehicle navigation systems, has several types of handheld navigation devices
- **Trimble** –Used by Surveyors. Very reliable
- **DeLorme** – Several types of handheld devices (*Earthmate – aerial imagery plus topo*) produces mapping softwares, atlas, etc.
- **Others** – TomTom, Lowrance, Navstar, Cobra

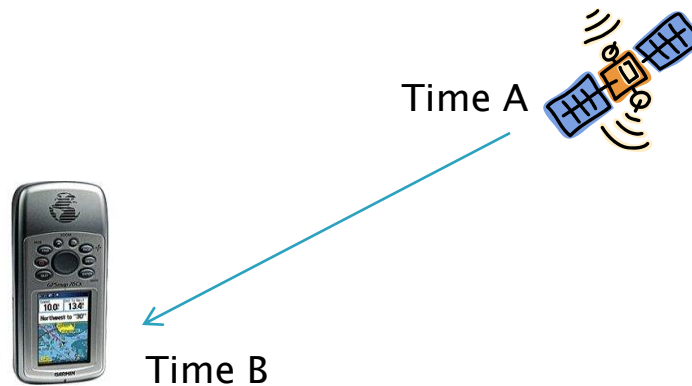


# 3 “Grades” of GPS units

- 1. Recreational Grade GPS – \$100–\$800**
    - Accurate to within 3 –5 meters
    - Great for recreational navigation,
  - 2. Mapping Grade GPS – \$3,000 – \$10,000**
    - Accurate to within 1 meter (3 feet)
    - Used for field scale surveys (wetland boundaries)
    - Used by some Governmental Agencies
  - 3. Survey Grade GPS – \$10,000 +**
    - Most accurate – within 10 cm
    - Used for Engineering Applications (building roads, bridges, etc.)
- ▶ The higher the price the more “bells & whistles”
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# What do the Grades all have in common?

- ▶ All gather the same information –some more accurate than others
- ▶ The GPS receiver compares the time a radio signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is.



- ▶ With distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit.
- ▶ A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude).



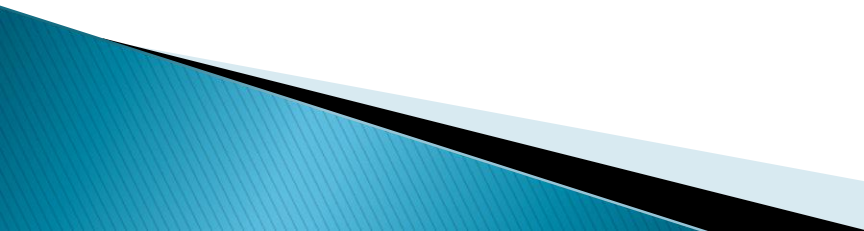
- ▶ Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.



# Now that I have a GPS, what do I do with it?

- ▶ Let's turn it on!
  - When you are outside, most receivers work best when you lay it flat so your receiver can pick up numerous satellites. Might take a few seconds.
  - Most units now work with cloud cover, however you may receive a slow reading (or poor reception) on a cloudy day, in the middle of a forest under a dense canopy cover, or in a canyon.

# Now that I have a GPS, what do I do with it?

- ▶ When enough satellites have been gathered you will get a **Location** reading – we will go over the different types a bit later.
  - ▶ What else do you see on the satellite screen?
    - GPS Accuracy. The lower the number, the better the accuracy!
    - Elevation
    - Some have Speed
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# Main Menu

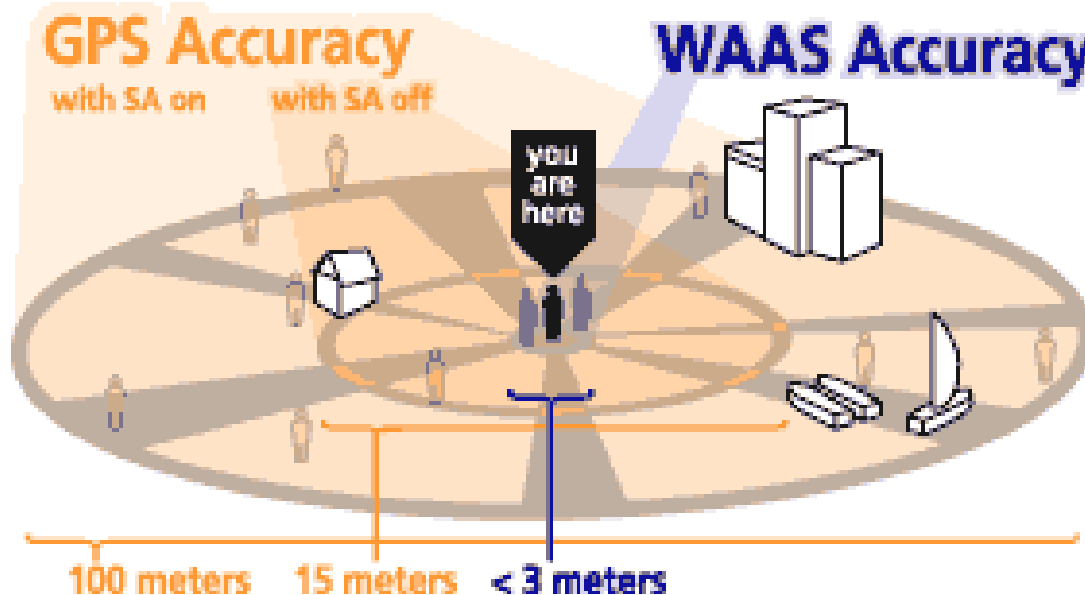
- ▶ Main Menu can be found on some units by turning the GPS unit on, GPSmap 76 – press Menu & Menu, Etrex – press down on the toggle
- ▶ Scroll or move your arrows up and down to see all of the options you have.
  - Map
  - Compass
  - Trip Computer
  - Where To?
  - Mark Waypoint
  - Setup
  - Elevation
  - Sun & Moon
  - More

# Main Menu

- ▶ Let's make sure your GPS is getting the best Satellite coverage and Accuracy possible.
- ▶ On the main menu screen find **Setup and press enter.**
  - Under **General** or **System** find WAAS
    - Click Enabled if you're GPS has it. If not, that's ok!

# WAAS?

- ▶ **WAAS – Wide Area Augmentation System**
  - It's a system of satellites and ground stations that provide GPS signal corrections, giving you up to five times better position accuracy.
  - Provides Better cover availability



# Location & Position Format

- ▶ Let's go back to **Setup Mode**
  - Find **Position Format, Units or Location & press Enter**
  - Location Format, Units or Position Setup will most likely be in:
    - UTM UPS
    - hddd.dddd° or another form of Degrees, Minutes, Seconds
    - Other options, but top two are most commonly used

# UTM

- ▶ UTM – Universal Transverse Mercator
  - 1 000 meter increments
- ▶ You may have a reading that looks like this on your Satellite view:

13 T 0346590  
4959986

- ▶ The 13 T represents the zone you are in.
- ▶ The top set of numbers, **0346590**, represent a measurement of East–West position, within the zone, in meters. This is called an easting. The numbers increase as you move east. This would read as “Three hundred forty six thousand, five hundred ninety meters east.
- ▶ The bottom set of numbers, **4959986**, represent a measurement of North–South position, within the zone, in meters. This is called a northing. The numbers increase as you move north.

# Latitude / Longitude

- ▶ In a full circle there are 360 degrees. Each degree is split up into 60 parts, each part being  $1/60$  of a degree.
- ▶ These parts are called minutes. Each minute is split up into 60 parts, each part being  $1/60$  of a minute. These parts are called seconds.
- ▶ So, the angle of 40 degrees, 20 minutes, 50 seconds is usually written this way:
  - $40 + (20 * 1/60) + (50 * 1/60 * 1/60)$
- ▶ That is, we have 40 full degrees, 20 minutes – each  $1/60$  of a degree, and 50 seconds – each  $1/60$  of  $1/60$  of a degree.

Work that out and you will get a 40. 34722 decimal number of degrees.

# Latitude / Longitude

## ▶ Latitude / Longitude

- (hddd.dddd°) Decimal Degrees = 42.59387°  
-108.55235°
- (hddd°mm.mmm') Degrees, Minutes = 42°35.6322  
-108°33.141
- (hddd°mm'ss.s") Degrees, Minutes, Seconds = 42°35'37.932"  
-108°33'8.46"

# Location and Position Format Datum

- ▶ Now that we know what Position Format we are in (UTM or Latitude / Longitude) we need to set a Datum.
- ▶ In order for our Coordinates to be positioned correctly we need to be in the correct Datum. We don't want to have our Datum set to *Indian Thailand* when we are in Wyoming!
- ▶ Lot's of choices, best to stick with NAD 83 or WGS 84. These are most current for our area /region and correspond best to mapping software. Most users we would be working with are set to these Datum.
- ▶ Map Datum will be in the same screen and Location Format or Position Format.

# Waypoints

## ▶ What are Waypoints?

- If you want to mark a location such as a new sampling site, or you want to go on a hike but want to remember where the car is, you can store a point in your GPS.
- If you take a lot of Waypoints, you can download the points onto your computer and integrate them with other mapping programs.
- Good Source of Documentation! Can tell you things later on besides just coordinates. Elevation, the date of when you took the Waypoint and how far away the point is from your current location.

# Creating Waypoints

- ▶ Let's Go back to Main Menu
- ▶ Some may have the option on Main Menu to **Mark Waypoint**.
  - For Oregon 550t – Press Save & Edit to change name. To come back to the Waypoint, go to **Where To?** or **Waypoint Manager**
- ▶ Some may need to go to the map (GPS map 76 – press Page).
  - Hold down the **Enter** button until the **Mark Waypoint Screen Appears**.
    - If you want to change the name press **Enter** and move the Rocker Key up and down for desired numbers and letters.
  - Use the rocker to scroll down to **Ok** to Mark Waypoint.
  - Come back to Waypoint later on and use same method to Delete Waypoint.

# Creating Waypoints

- ▶ For Garmin Extrex – Press and hold **Enter** on the side of your Garmin. Highlight the name if you would like to change it and press **Enter** to enter new info. Press **Ok** when done.
- ▶ For Garmin GPS Map 60csx and Garmin 12 – Press and hold the **Mark Key**. Use the rocker to change the name and press **Enter**. Press **Ok** to accept the new waypoint.

# Tracks

## ▶ What are Tracks?

- If you have walked or driven a path and you want your GPS to store this path, this would be a Track.
  - “Breadcrumbs” marking where you have been.
- You can walk the perimeter of a field and find the acreage or walk a road and find the distance.
- Have to make sure you are starting with a new track. Some units automatically track.
- You can download the tracks onto your computer and use integrate them with other mapping programs.

# Creating Tracks

## GPSmap 76, 60CSx

- ▶ Clear any tracks you don't want saved in Tracks
- ▶ Start Walking!
- ▶ When done, in Main Menu Press **Tracks** and **Enter**
- ▶ Press **Save** to save the Track you built.

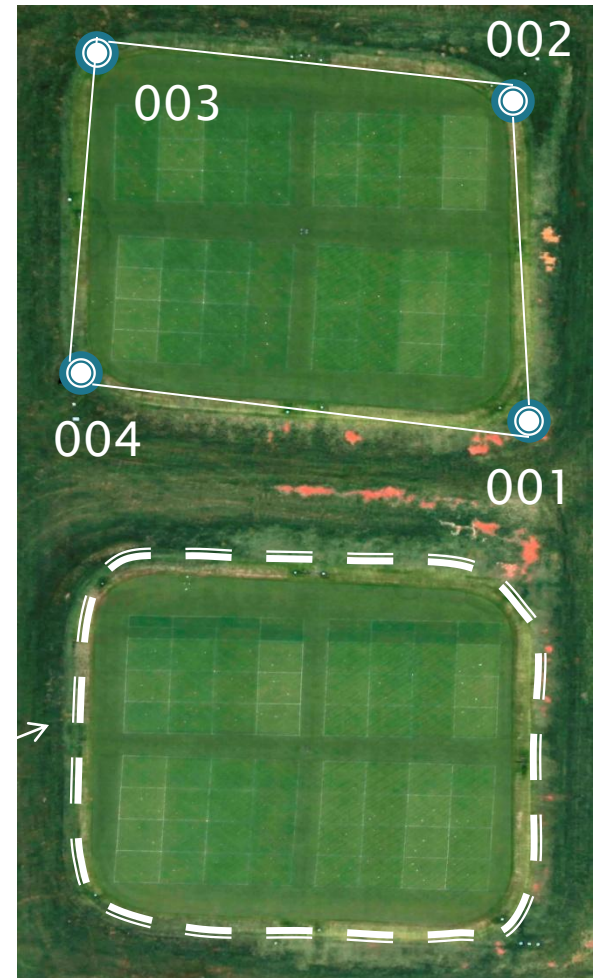
## Oregon 550t

- ▶ Clear any tracks you don't want saved in Tracks
- ▶ Start Walking!
- ▶ In Main Menu Press **Track Manger** and then **Current Track**
- ▶ Press **Save Track**

# Routes

- ▶ Routes are similar to Tracks but are created by Waypoints.
  - The GPS connects the Dots (001, 002, 003, 004)
- ▶ Good for measuring area and length.


Track




# What else can we do with our GPS?

- ▶ **Goto or Where To Function**
- ▶ Handy function when you need to find a stored location quickly and want to know how far it is.
  - In Oregon 550t – Where To Function is on Main Menu. Press Waypoints and find the Waypoint that is stored you want to Go to.
  - In GPSmap 76 and other Garmins – Press **Menu Menu**. Press **Points** and **Enter**. Press **Waypoints** and **Enter**. Find the Waypoint you would like to “Go to” and Press **Enter**. Use the Rocker Key and scroll down to **Goto** and press **Enter**.

# What else can we do with our GPS?

- ▶ Compass
  - ▶ Trip Computer
    - Ground Speed & Distance Traveled
  - ▶ Some have Cameras
  - ▶ Elevation – accuracy can vary widely!
    - Compare to paper map when possible
  - ▶ Sunrise / Sunset
  - ▶ Stopwatch
  - ▶ Hunt & Fish
    - Some will tell you “Best” and “Good” Times to Fish!
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# The Future of GPS

- ▶ More satellites are becoming available through agreements with other nations
  - ▶ More WAAS satellites provide better accuracy and coverage availability
  - ▶ GPS receivers are getting better power consumption, more user friendly and easier to transport
  - ▶ More “bells & whistles”
- 

# Some things to consider

## ▶ Software

- **MapSource** – If a map doesn't show up in your mapping screen, consider looking into purchasing MapSource or talk to a partner that may have it.
- **Terrain Navigator**
- **Topo USA**

## ▶ Ask Questions!!

# Thank You!!

## Questions?!?

