



# INTRO TO USING CONSUMER-GRADE GPS WITH GIS

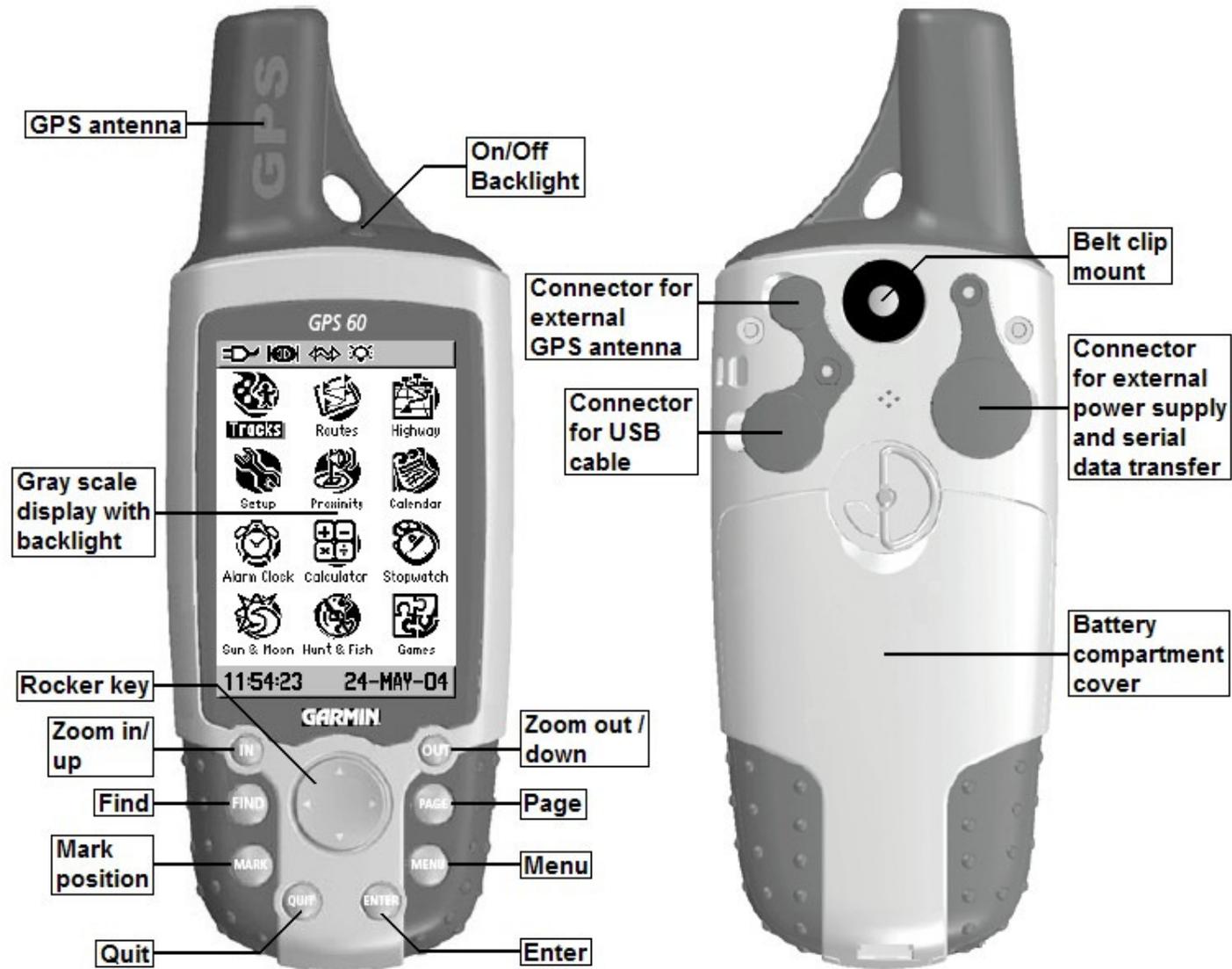
Leslie Pelch, VCGI, 2013

# The Garmin GPS 60



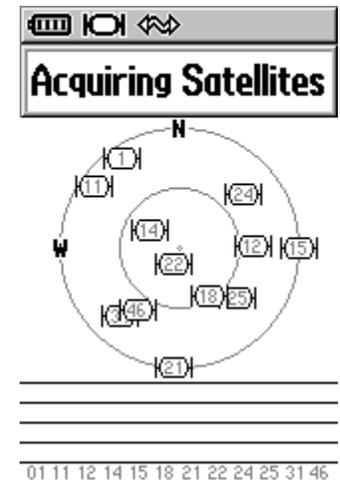
- \$150 in 2010
- Accurate to about 30 ft
- Can edit attributes a bit
- Can download, transform, and use with GIS!

# Buttons and Others Features



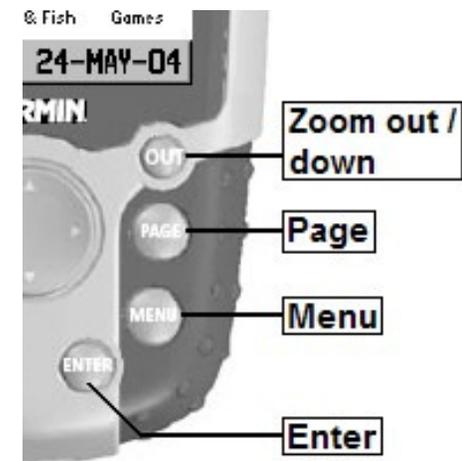
# Using the Garmin GPS 60

- Turn on your receiver
- If you are using it inside, “turn off the gps”
- While unit is trying to “acquire satellites” push the menu button and then the enter button to choose “use with GPS off”
- This way the unit won’t beep at you about having a weak signal
- GPS doesn’t work inside!



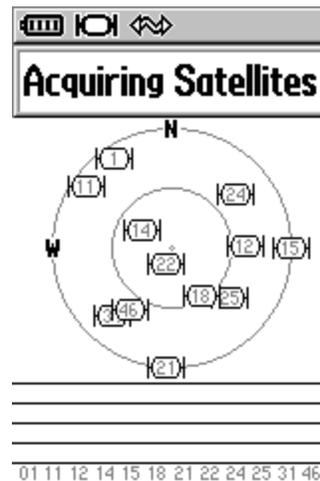
# Using the Garmin GPS 60

- There are 5 main pages, move among them using the page key. When on any particular page, pushing the menu button will display a relevant set of options and settings for that page. Pushing the quit button allows you to back up a step at any time.
- Satellite page was where we started



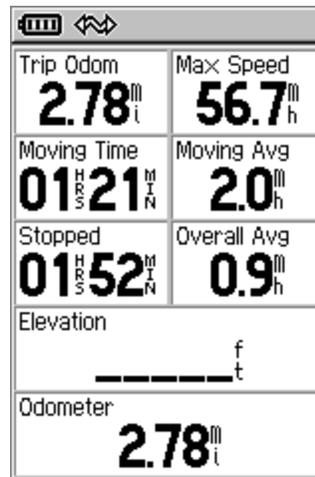
# Using the Garmin GPS 60

- Satellite Page - shows locations of satellites above you, signal strength, and whether receiver is "locked on" (if so, satellite icon and bar will be solid black). Once receiver is locked on to 3 satellites, your location will be indicated at the top of this page.



# Using the Garmin GPS 60

- Trip Computer - various bits of information relevant to most recent use of the unit (you can change what information is displayed here by pushing the menu button).

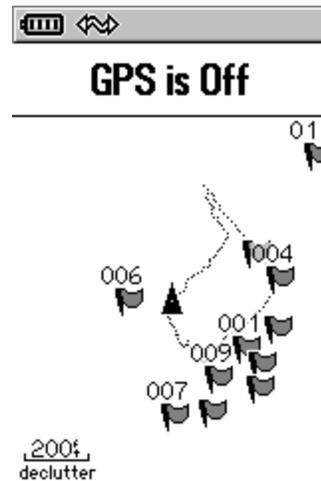


The screenshot shows the Trip Computer screen on a Garmin GPS 60. The screen is divided into several sections. At the top left, there are icons for battery level and signal strength. The main display area is a grid of data points. The first row shows Trip Odom (2.78 miles) and Max Speed (56.7 miles per hour). The second row shows Moving Time (01:21 hours:minutes:seconds) and Moving Avg (2.0 miles per hour). The third row shows Stopped (01:52 hours:minutes:seconds) and Overall Avg (0.9 miles per hour). Below this is an Elevation section with a horizontal bar and a vertical scale labeled 'f' and 't'. The bottom section shows the Odometer (2.78 miles).

Trip Odom	Max Speed
<b>2.78</b> <sup>m</sup> <sub>i</sub>	<b>56.7</b> <sup>m</sup> <sub>h</sub>
Moving Time	Moving Avg
<b>0121</b> <sup>H</sup> <sub>R</sub> <sup>M</sup> <sub>I<sup>S</sup><sub>N</sub></sub>	<b>2.0</b> <sup>m</sup> <sub>h</sub>
Stopped	Overall Avg
<b>0152</b> <sup>H</sup> <sub>R</sub> <sup>M</sup> <sub>I</sub> <sup>S</sup> <sub>N</sub>	<b>0.9</b> <sup>m</sup> <sub>h</sub>
Elevation	
_____ f t	
Odometer	
<b>2.78</b> <sup>m</sup> <sub>i</sub>	

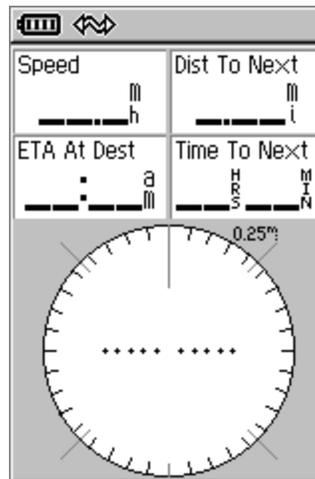
# Using the Garmin GPS 60

- Map - if your receiver does not have any data saved on it this will be pretty blank. Eventually you will see your waypoints and tracks depicted here, use the in and out buttons to zoom in and out.



# Using the Garmin GPS 60

- Navigation/Compass - this page is somewhat misleading since it often looks like a compass, but these units do not actually have built-in compasses. They can only indicate direction when you are moving!



# Using the Garmin GPS 60

- Main Menu - lots of options here



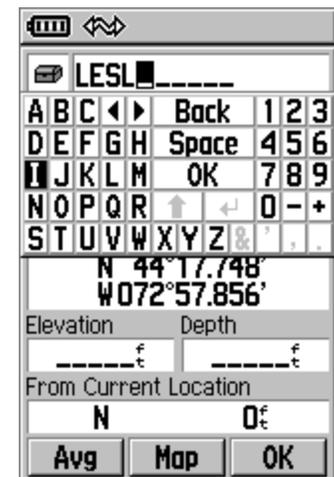
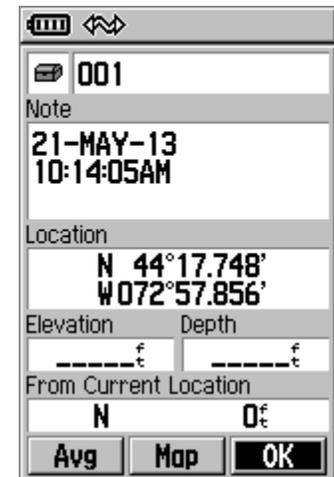
# Collecting Waypoints and Tracks

- Page to the Satellites page - push the menu button and choose "use with satellites on" by pushing the enter button.
- Wait while the receiver locks on to at least 4 satellites and notice the locations of the satellites as well as the signal strength.
- Once the receiver has locked on to 4 satellites you can collect a point by simply pushing the mark button (you can be on any page when you do this).



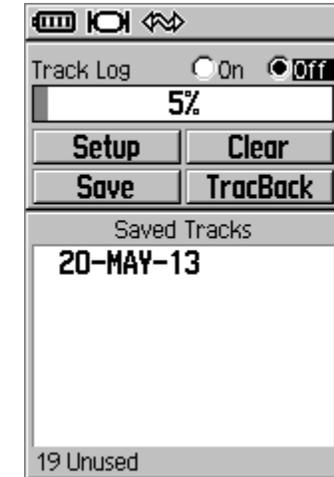
# Collecting Waypoints and Tracks

- Once you have pushed the mark button you will see the attribute data that has been created for that point, as well as the coordinate location.
- Highlight the various attributes by using your rocker key to move amongst them.
- You can edit this information by highlighting information, pushing enter, and then editing (it is tedious).
- You could change the name of the point you collected to reflect your initials followed by 1.
- Highlight "OK" and press enter to save the point.



# Collecting Waypoints and Tracks

- Now let's make sure our "Tracks" option is turned on and cleared out before we collect data
- Page to the Main Menu
- Highlight "Tracks" and press enter
- If the % is not zero highlight "clear" and press enter
- If there are any named tracks highlight them, press enter and choose delete.
- Highlight and choose "setup" to set the method of collecting your track
- Then push the enter and quit buttons a few times to get back out to the main Track page.
- highlight "on" and press enter.



# Collecting Waypoints and Tracks



- Keep in mind that waypoints are collected by pushing the mark button and then the OK button
- Tracks are being collected any time they are set to “on” when the GPS is on.
- If you leave Tracks on when you turn the GPS off, they will be on as soon as you turn the unit back on, collecting tracks and filling up your memory.

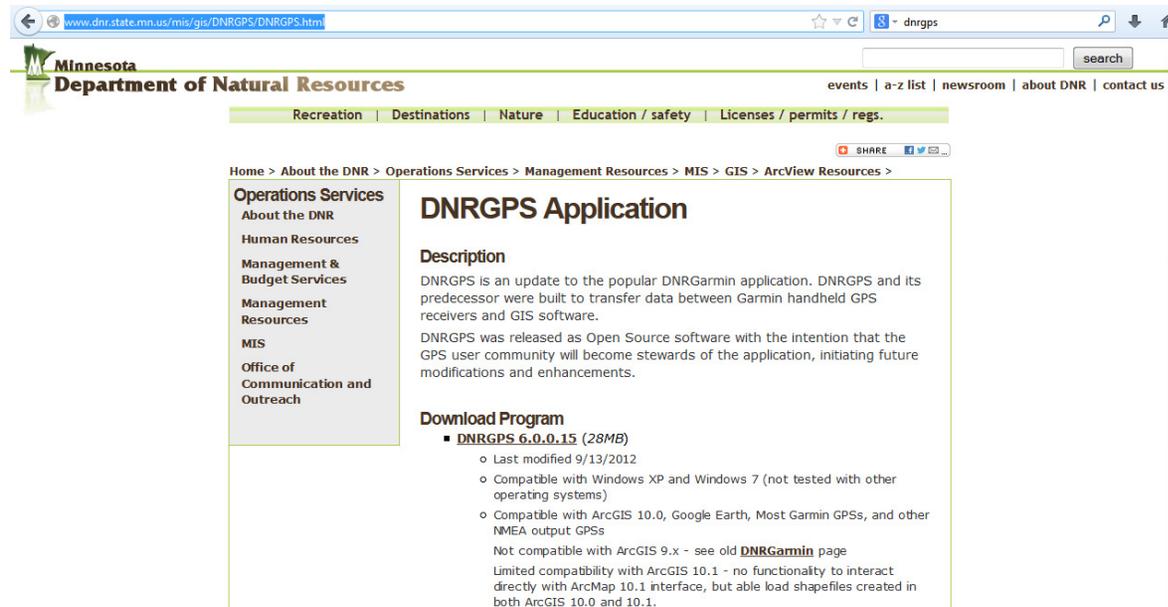
# What To Do With Waypoints and Tracks You Have Collected?



- Download them onto your computer in various formats:
  - ▣ KML for use with Google Earth and Google Maps
  - ▣ Shapefile for use with ArcGIS and QGIS (and other GIS software) and online applications
  - ▣ GPX for use with ArcGIS, QGIS, other GPS units, and some online applications

# How Can You Download and Transform Into Different Formats?

- DNRGPS – a free software available from the Minnesota Dept. of Natural Resources
- <http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html> or google it



The screenshot shows a web browser window displaying the Minnesota Department of Natural Resources website. The page title is "DNRGPS Application". The navigation menu includes "Recreation", "Destinations", "Nature", "Education / safety", and "Licenses / permits / regs.". The main content area is titled "DNRGPS Application" and contains a "Description" section and a "Download Program" section. The "Description" section states that DNRGPS is an update to the popular DNRGarmin application, designed to transfer data between Garmin handheld GPS receivers and GIS software. It is an Open Source software intended for the GPS user community to become stewards of the application. The "Download Program" section lists the version "DNRGPS 6.0.0.15 (28MB)" and provides details about its compatibility with various operating systems and GIS software.

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Department of Natural Resources

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Management Resources  
MIS  
Office of Communication and Outreach

## DNRGPS Application

**Description**

DNRGPS is an update to the popular DNRGarmin application. DNRGPS and its predecessor were built to transfer data between Garmin handheld GPS receivers and GIS software.

DNRGPS was released as Open Source software with the intention that the GPS user community will become stewards of the application, initiating future modifications and enhancements.

**Download Program**

- **DNRGPS 6.0.0.15 (28MB)**
  - Last modified 9/13/2012
  - Compatible with Windows XP and Windows 7 (not tested with other operating systems)
  - Compatible with ArcGIS 10.0, Google Earth, Most Garmin GPSs, and other NMEA output GPSs

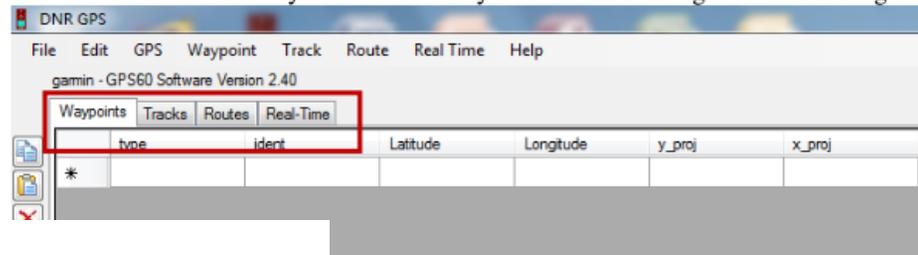
Not compatible with ArcGIS 9.x - see old [DNRGarmin](#) page

Limited compatibility with ArcGIS 10.1 - no functionality to interact directly with ArcMap 10.1 interface, but able load shapefiles created in both ArcGIS 10.0 and 10.1.

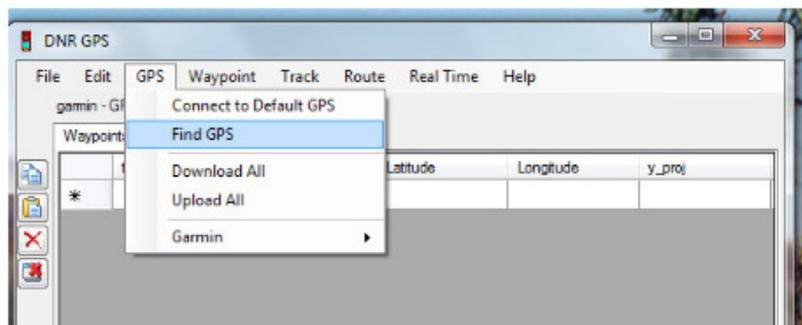
# Using DNRGPS

- ❑ Download and install the program
- ❑ Connect your GPS unit to your computer via the cable provided (make sure GPS is turned on)
- ❑ Open DNRGPS

If DNR GPS is able to find your GPS receiver you will see something like the following:



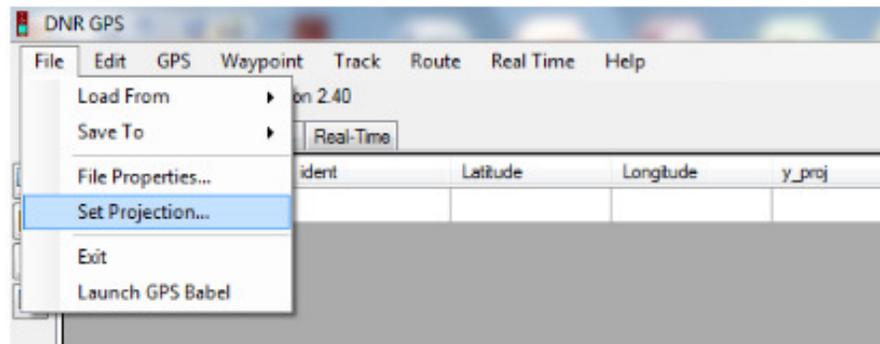
If it cannot connect, you may need to click on "GPS" and then choose "Find GPS" to force it to search its various ports and find where you have plugged in the GPS.



# Using DNRGPS

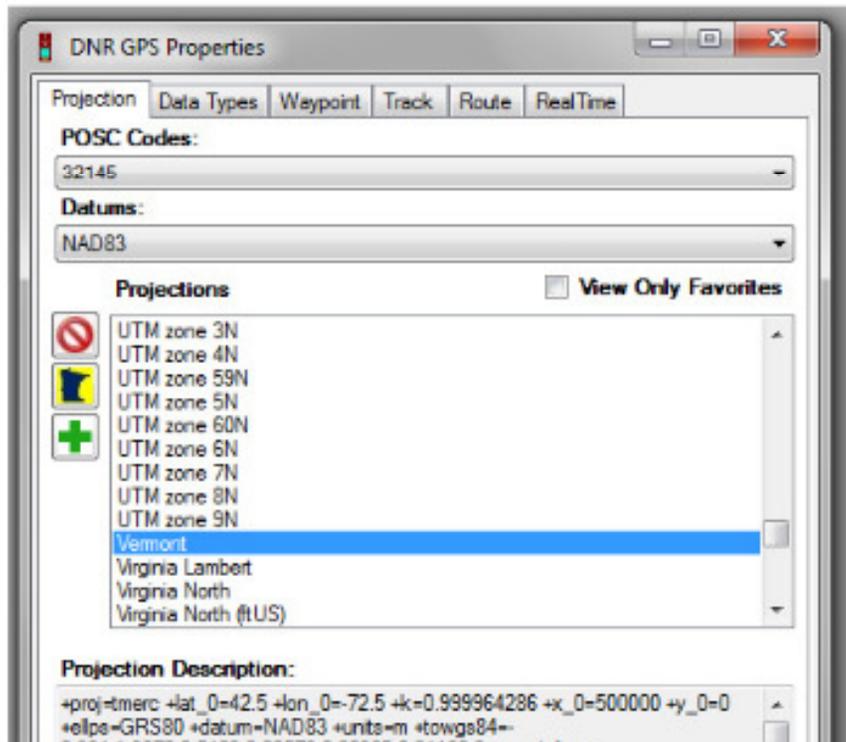
- Once DNRGPS has found your GPS, you need to set the Coordinate System in which you want it to project data.
- In Vermont, we will use VT State Plane NAD83 Meters

Click on the File menu and choose "Set Projection"



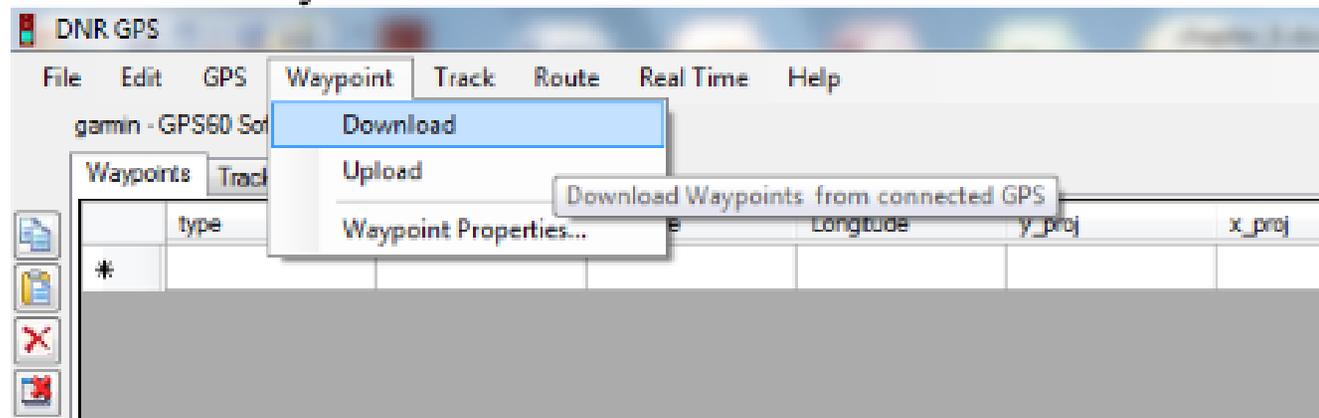
# Using DNRGPS

In the section for POSC Codes, type 32145 then push **Enter** on your keyboard. You will see that the NAD83 Vermont projection is chosen. Click OK to select it and close this properties box.



# Using DNRGPS

From the WAYPOINT menu, select DOWNLOAD. When the download is complete, you will see a box that says "Download Complete" confirming the number of waypoints you have successfully downloaded.

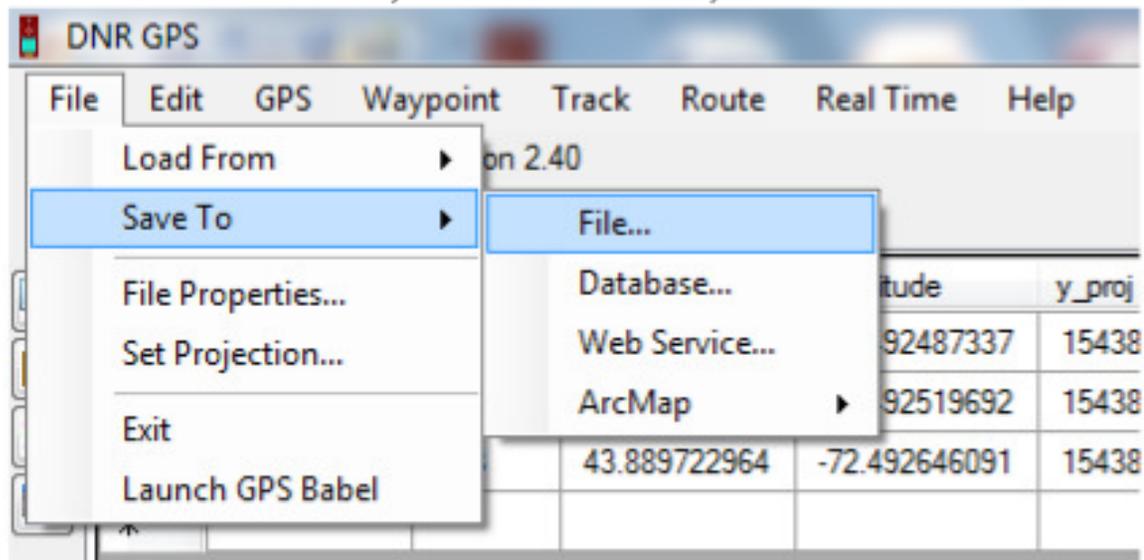


. Click on the OK BUTTON.



# Using DNR GPS

- . You can now output the data in a variety of different formats: Shapefile and KML (for use in Google Earth and Google Maps) being two of the most useful.
- . Go to the **FILE** menu, select **SAVE TO**, and select **FILE....**



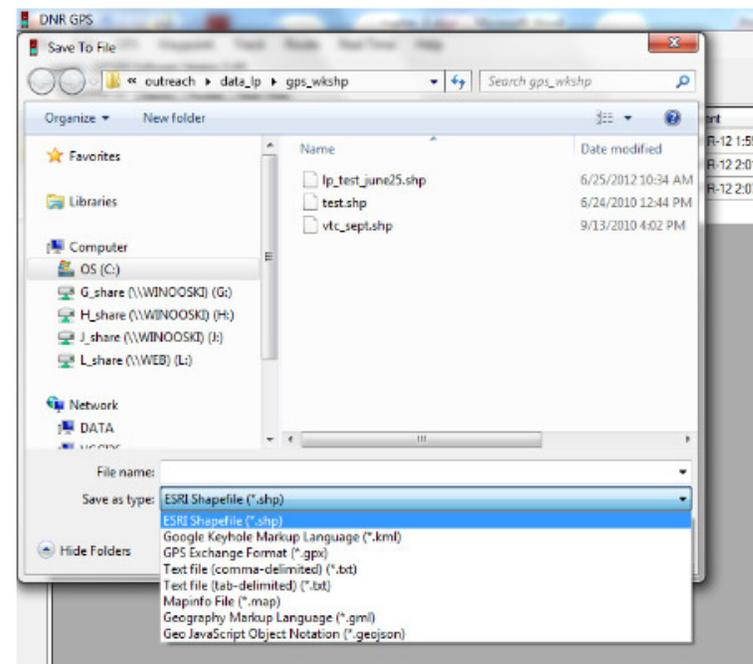
# Using DNRGPS

Click on the **SAVE AS TYPE:** dialogue to select **ESRI shapefile (\*.shp)**.

Navigate to the directory your instructor has indicated.

Name the file and Click on the **SAVE BUTTON**.

Click on the **OK BUTTON** when the dialogue appears that informs you the file was successfully written.



# Using DNRGPS



- Use the same procedures to save to KML or GPX
- Simply choose a different “Save as Type” option

# Using GPS Data



- With Online Applications
  - ▣ KML for Google Maps
  - ▣ Shapefile or GPX for VT Natural Resources Atlas
  - ▣ Shapefile for VCGI Interactive Map Viewer
- With Desktop Software
  - ▣ Shapefile , GPX, or raw data with QGIS (plugin allows you to download directly)
  - ▣ Shapefile or GPX for ArcGIS or QGIS
  - ▣ KML for Google Earth