GPS Utility
A User Guide for Educators

Prepared by: The Virginia Geospatial Extension Program

Overview

GPS Utility is an easy-to-use software application that allows you to manage, manipulate and map your GPS information. This is a "point and click" software package.

While there are a number of things that GPS Utility software can do, some of the functions most applicable to extension agents include the following:

- Extension agents can use this software package to **transfer** GPS data between a GPS receiver and a PC.
- GPS Utility can **convert** GPS data to one of several different text formats (i.e. compatible with spreadsheets, ESRI shapefiles, and other GIS compatible formats, etc.).
- The program **converts GPS data** (i.e. waypoints, routes, etc.) between different map datums and many coordinate formats (Lat/Long, UTM/UPS, country grids etc.).
- Information can be **filtered** in various ways and waypoints **sorted** according to specified criteria. Route and track statistics are available and can be transferred into other programs for analysis (i.e. spreadsheet programs).

GPS Utility also has (some very basic) mapping capabilities. This will at least provide you with some confidence that the data that you have collected with your GPS "looks correct" before you begin downloading your data.

GPS Utility works with a variety of GPS receivers. This guide is written to support the Garmin eTrex series. Most Garmin GPS receivers will follow the same protocols. If you are using a different GPS receiver, then refer to the GPS Utility documentation, or contact the Virginia Geospatial Extension Program.

Before Using GPS Utility

The instructions in this handbook assume the following:

1. You have already installed GPS Utility software on your computer (if not, refer to *GPS Utility Installation Instructions*. These instructions have been prepared by the Virginia Geospatial Extension Program, with educators in mind. These step-by-step instructions are available online:
   http://www.cnr.vt.edu/gep/tools.html

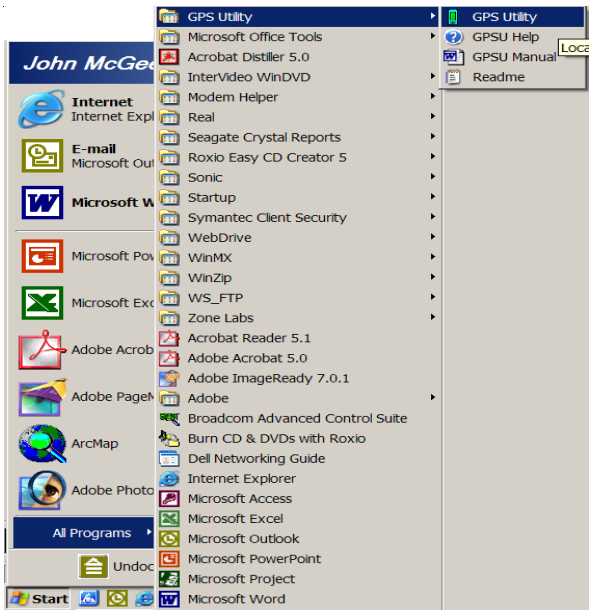
2. You have already collected GPS Data (i.e. waypoints, routes, tracks, etc.), and have stored the GPS data on your GPS receiver (if not, refer to *The Garmin Etrex Legend: An Introductory Handbook for Extension* for additional information and instructions. The Garmin handbook has been prepared by the Virginia Geospatial Extension Program. This customized Garmin handbook is also available online:
   http://www.cnr.vt.edu/gep/tools.html

Virginia Geospatial Extension Program
A partnership between VSGC and VCE

Virginia Cooperative Extension
Knowledge for the Commonwealth
Virginia Tech
Virginia Polytechnic Institute and State University
Virginia State University

Let's Get Started Downloading Waypoints

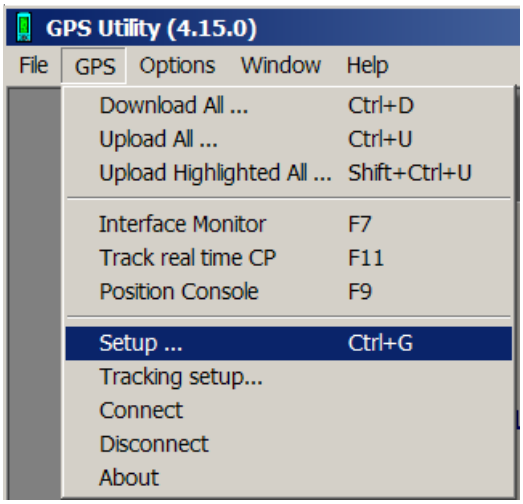
1. Start GPS Utility by selecting it from the Program list on your computer (Figure 1)



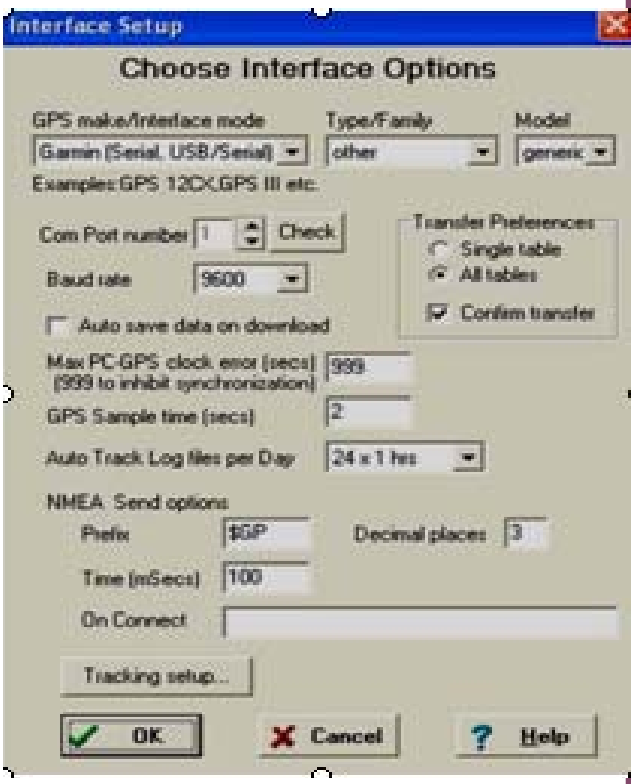
2. Make sure that the GPS Utility software is properly configured to work with your Garmin GPS receiver:

a. Connect your GPS receiver to the computer using the data cable provided with your GPS receiver. Make sure that your GPS receiver is turned on.

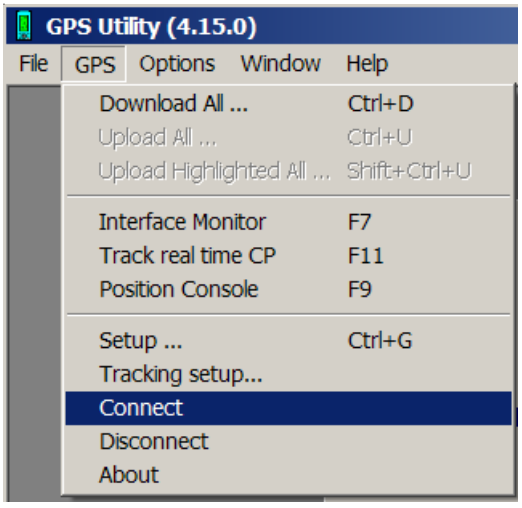
b. Select <GPS> and <Setup> from the GPS Utility software menu interface (Figure 2)



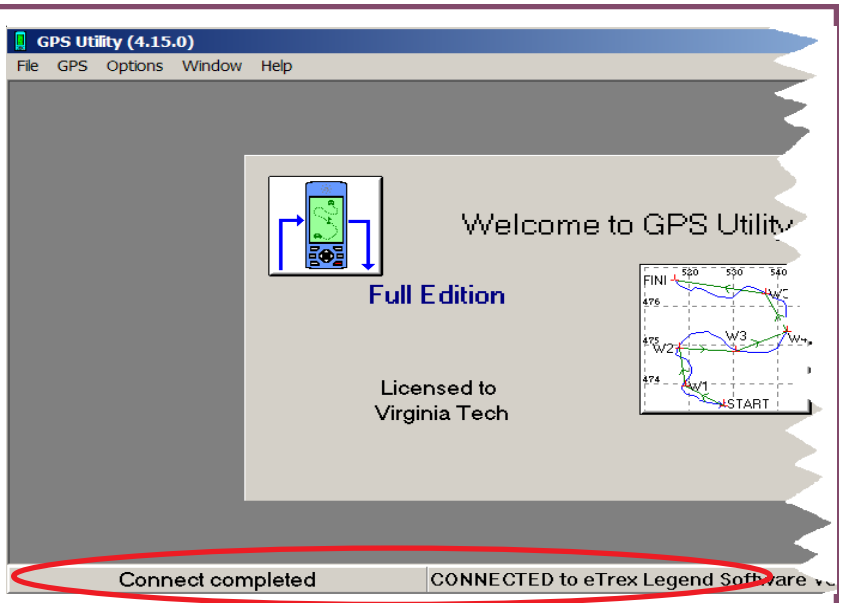
c. The Interface Setup dialogue box will appear. Make (Figure 3). Select the <Garmin (serial)> option. The baud rate should be set to 9600. Click <OK>



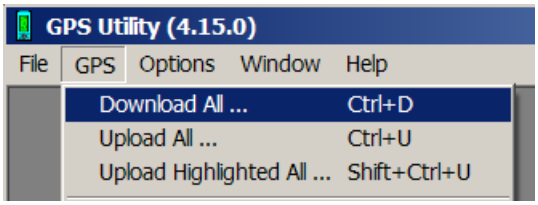
d. Select the <GPS> menu again, and select <Connect>.



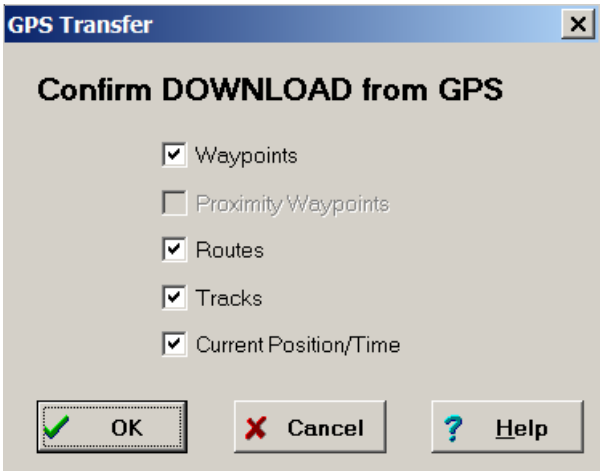
Your GPS should now be properly communicating with your PC through the GPS Utility software. To verify that your GPS receiver is communicating properly, look at the status bar at the bottom of the GPS Utility dialogue box. It should look something like this -->.



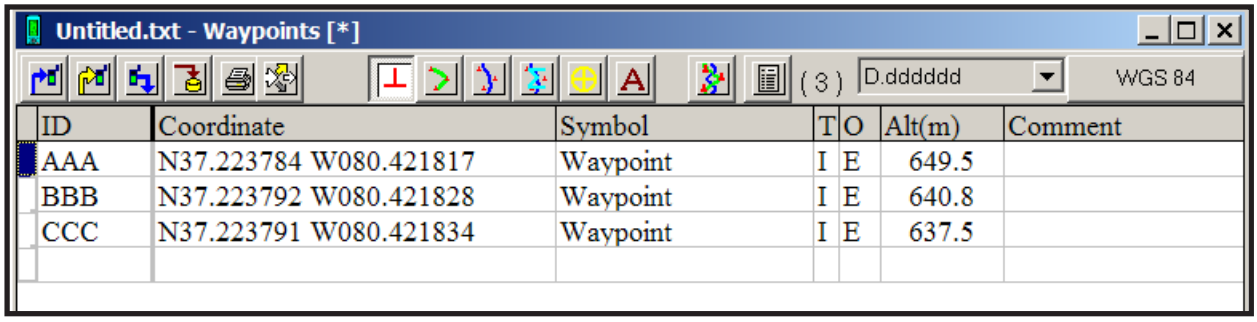
3. In GPS Utility, select the <GPS> menu option, and select <download all>



4. The GPS Transfer dialogue box will appear. You can download "everything" from your GPS at once (and "everything" would include Waypoints, Routes, + Tracks), or you can select the specific items that you need. In this example, I am going to go ahead and download everything.

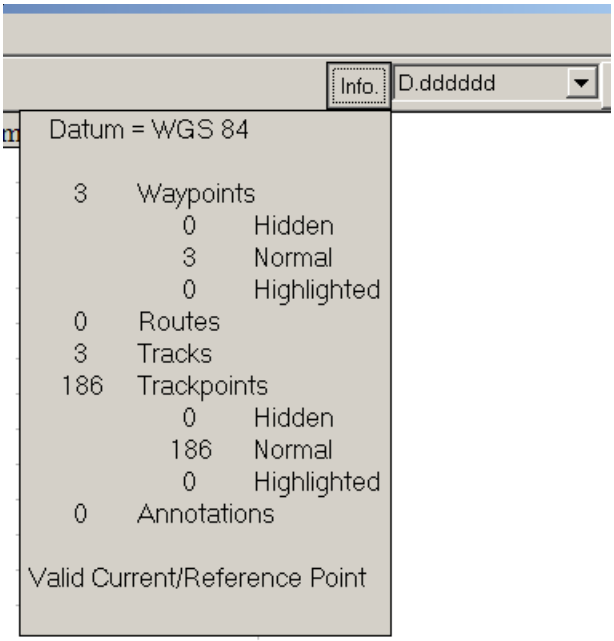


5. After downloading, you should see a database that show data that is being read from your GPS receiver. In this example, there are 3 waypoints that have been saved on the GPS receiver. The names of these waypoints are AAA, BBB, and CCC.

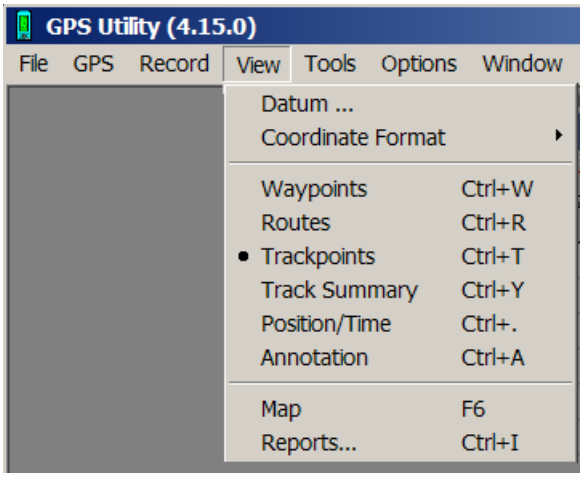


ID	Coordinate	Symbol	T	O	Alt(m)	Comment
AAA	N37.223784 W080.421817	Waypoint	I	E	649.5	
BBB	N37.223792 W080.421828	Waypoint	I	E	640.8	
CCC	N37.223791 W080.421834	Waypoint	I	E	637.5	

Note: The <INFO> button on the status bar provides you with summary information about the data that you have collected with your GPS receiver.



6. If you would like to view the other data that GPS Utility is reading from you GPS receiver, then you should select the <VIEW> menu, and select either <Routes> or <Trackpoints>. Refer to page 7 for a description of Trackpoints



Review of terms:

a. **Waypoints**: These are "virtual points" or marks that you have saved in individually. Waypoints can be assigned customized names (the GPS receiver assigns them numerical names [001, 002] by default).
b. Trackpoints: ***Tracks*** are a previous path of travel. Basically, you turn on your GPS receiver, and it will start to "map your movements" (similar to dropping virtual bread crumbs). ***Trackpoints*** are individual points that are used to create a track (if you connect these points, with a line, you would have a track)
c. Routes: A route is a "path to a destination with intermediate stops along the way". The "stops" along the way are defined by Waypoints. You can define you route in the field, or wait to define a route from existing waypoints when you return to your office.
d. Tracksummary: a log that summarizes your tracks (time and date stamps, etc.)

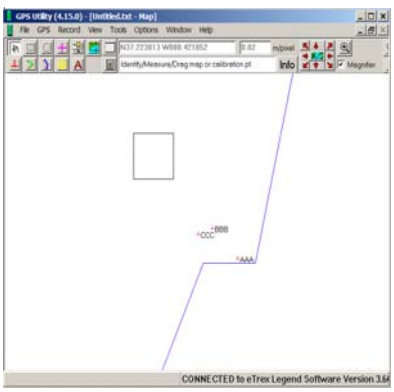
Viewing GPS Data

GPS Utility provides some basic viewing capabilities that enable you to "see" if the data that you have collected "looks correct". I typically use this to verify that waypoints, tracks, etc. "look" correct before downloading the data onto my PC. However, the best (more failsafe) way to verify that your data "looks" correct is to use a (free) software program called USAPhotoMaps (http://www.jdmcox.com) You can not add additional layers of information as a "backgroud" to GPS Utility. However, you can change the colors and symbols associated with waypoints, tracks, etc.

To visually examine your data, click on the <Map button> 

A graphic image of all of your waypoints and tracks should appear. Waypoints are identified (by default) with red crosshairs. Furthermore, their ID number/name should be located near the red cross hairs

In addition, there are some basic map interface tools that you can use to pan around, zoom in, zoom out, etc.

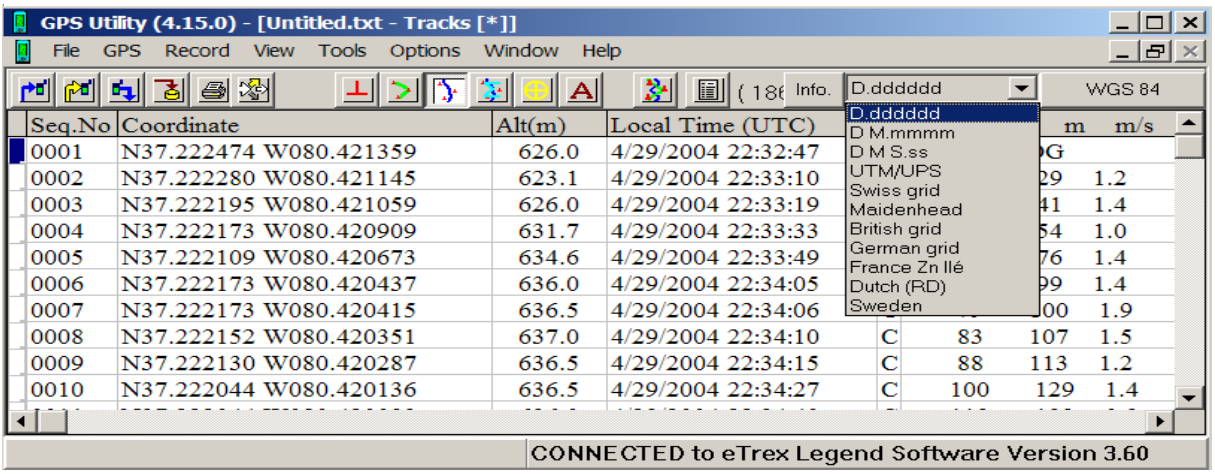


These mapping tools are a bit "clunky" but they get the job done.

Converting data between different coordinate systems

Another nice capability associated with GPS Utility, is the ability to easily convert GPS data from one coordinate system to another (i.e. convert from Lat./Long. DMS to Lat./Long. DD, UTM, etc.)

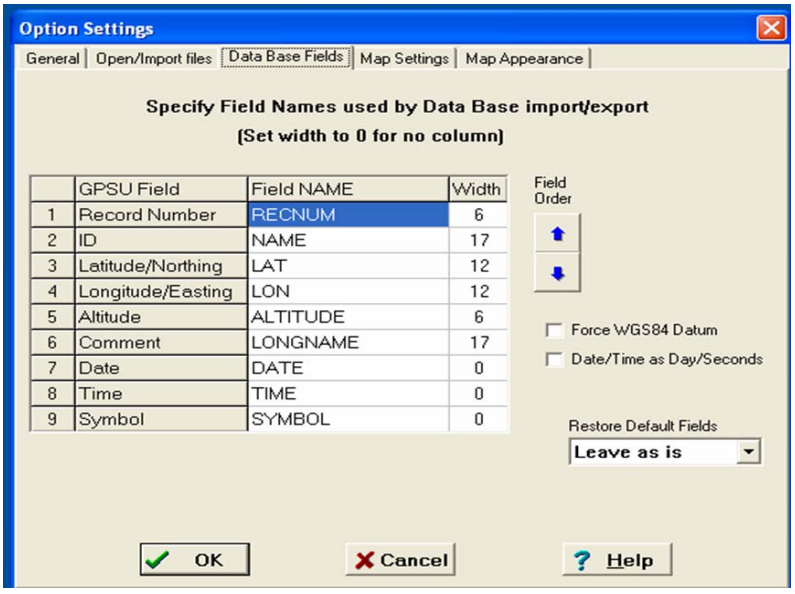
To convert GPS data from one coordinate system to another, simply select your desired coordinate system pulldown menu!



Setting up Your database fields

GPS Utility allows you to set the fields that you would like to appear in the Attributes Table of you data once you have saved it. To do this, go to <Options> and the <Data Base Fields>. The "Options Settings" Dialog Box will appear and you will be on the Data Base Fields tab. A table listing possible fields is visible.

If the "Width" field has a numerical value other than "0", the field will appear in your Attributes table. If "0" is in a field that you would like in your table, you must specify a column width other than "0" so the field will appear. Once you decide what fields you would like, you are ready to save your data!



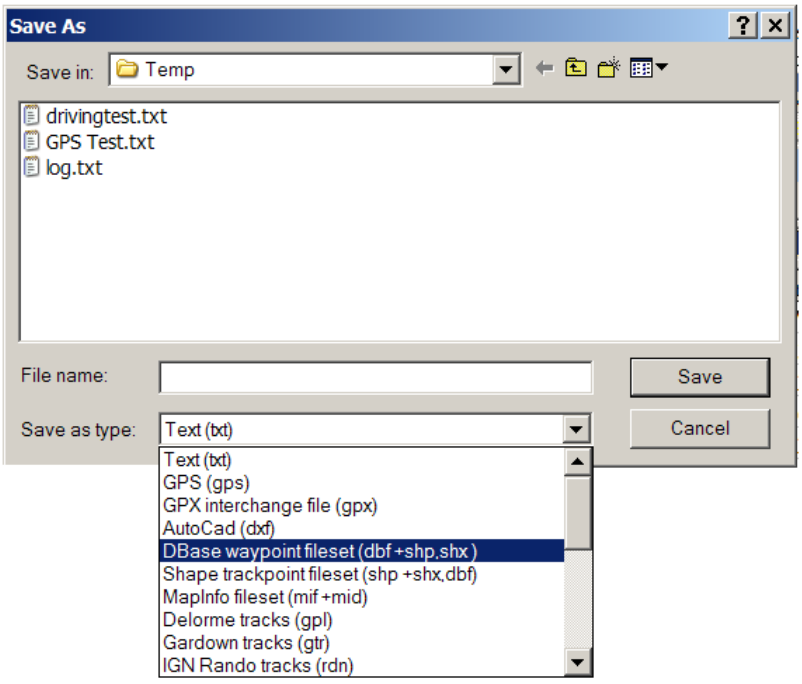
Saving Your data to a PC

You can save the data that you have collected on your GPS receiver directly as a file in your PC as a "GIS readable" file (i.e. shapefile).

1. Make sure the file that you want to save (i.e. Waypoints, Tracks, etc.) is "visible.
2. Under the <File> menu, select <SAVE AS>
3. To save in a GIS compatible format,

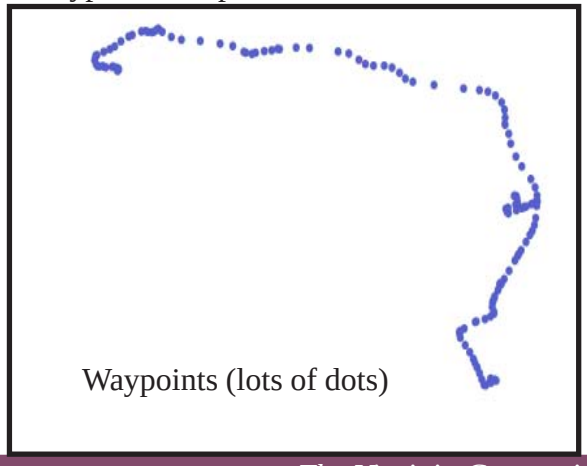
   a. enter a <Filename>

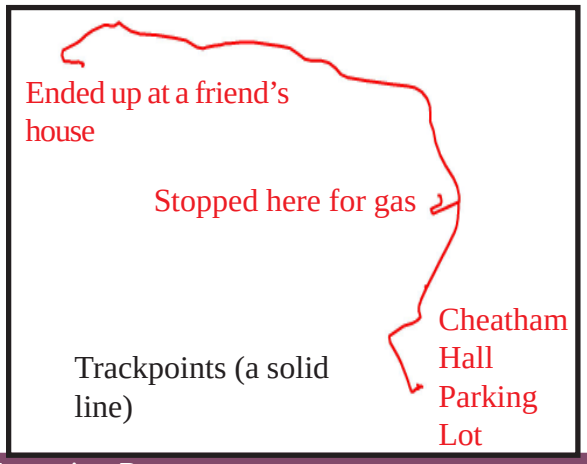
   b. under the <Save As Type>, option, choose either:
   - Dbase Waypoint Fileset- this option saves waypoints, and saves Tracks as a series of points
   - Shape Trackpoint Fileset- this option saves Tracks as a linear feature. Refer to the figure below for a graphic depiction of these two options...



And Presto!. You have created a GIS compatible file from your GPS data!

Waypoints are points, that, when connected, will form a linear track (or a "trackpoint").





Uploading data to your GPS

There are two simple steps to upload data (Waypoints, Tracks and Routes) from GPS Utility into your GPS unit.

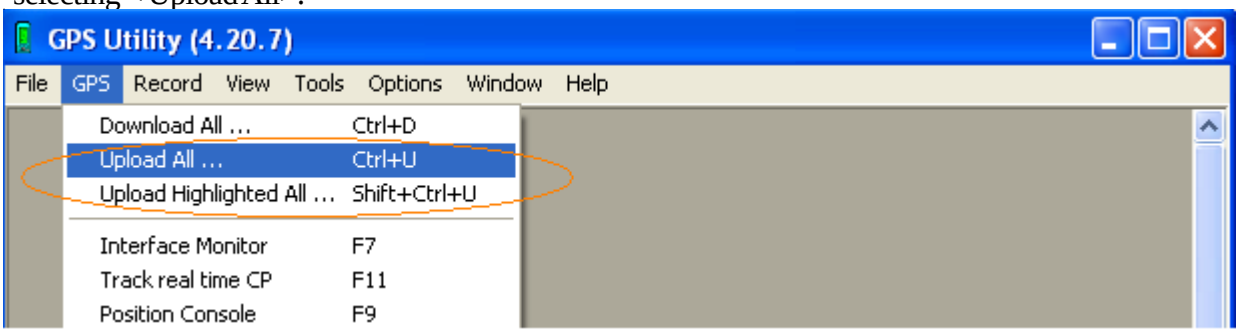
Step 1. Loading Data

The first step is to load your data file into the GPS Utility data table. You will need to retrieve your previously saved data. To do this, go to select the <File> menu, then select <Open>. From the box titled "Open" you can select your data file. Be sure to select correct file type using the "File type" pull down menu. When the data has been loaded in to the Data Table you may edit it before uploading into your GPS unit.

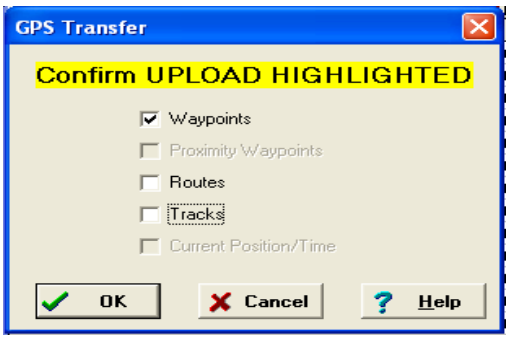
Step 2. Upload data to the GPS

In order to upload data your GPS unit must be connected to your computer and turned on. GPS Utility lets the user select what type of data to upload (Waypoints/Tracks/Routes). To Upload data to your GPS unit select the <GPS> pull down menu or select the upload button on your tool bar.

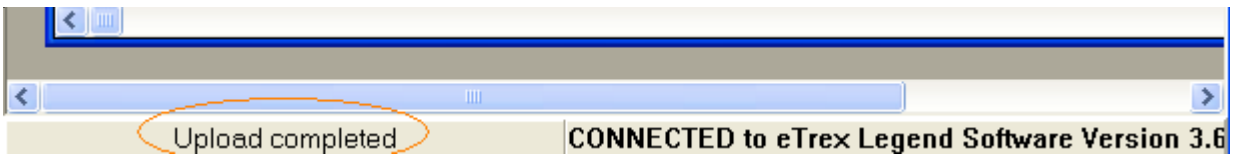
You have the choice of selecting individual points to upload by clicking <Upload Highlighted> (note data must be highlighted before selecting this option) or the other option is to upload all data by selecting < Upload All>.



Regardless of which method of uploading you select, a box should appear to confirm the upload of data. This is also your opportunity to select which type of data to upload (Waypoints/Tracts/Routes). Check only the type of data you wish to upload to your GPS unit and click OK.



The information bar at the bottom of the screen should verify the completion of the upload.



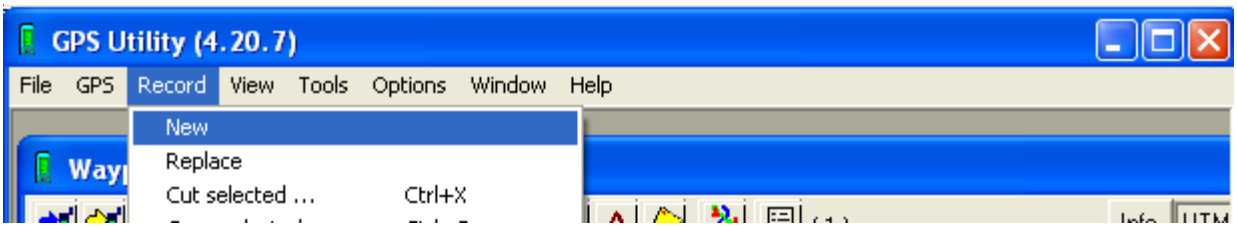
How to Calculate Area and Perimeter

Area and Perimeter Calculations may only be determined from a Track or a Route.

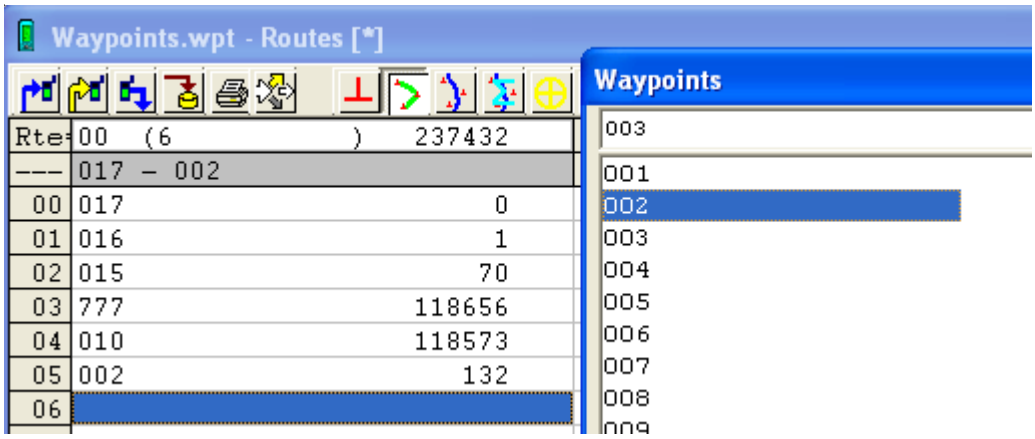
Creating a Route From Waypoints

Download waypoints from you GPS or open an existing file (for more information see previous sections). Open the <View> menu and select <Routes> or select the Route button from your tool bar.

To create a route from your existing waypoints open the <Record> menu and select <New>.

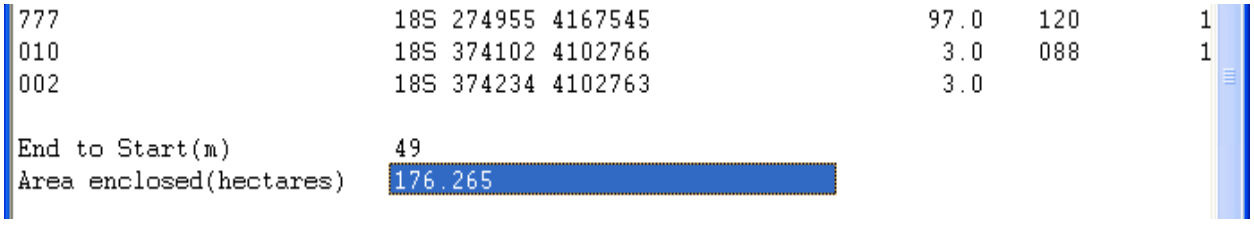


This will bring up a list of waypoints. Waypoints may be added to your route by a single click on each desired point. GPS Utility will close your route automatically so there is no need to start and end at the same point. You should be able to see the points you have added appear on the route data table. When you are finished close the waypoints box.



Calculating Area and Perimeter

To view the calculated area and perimeter of your route open the <View> menu and select <Reports..> This will bring up a report of your route, the start to end distance (meters) and area in hectares can be found at the bottom of the report.



For further informaiton, contact the Virginia Geospatial Extension Program:

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