



## Waypoint Plus and the Waypoint Express Extension

### Downloading Garmin GPS waypoints using Waypoint Plus and the Waypoint Express Extension for ArcView

Downloading Garmin GPS coordinates and importing them into ArcView in the proper projection is a two-step process. First you need to download your data from the GPS unit using Waypoint Plus (shareware available at <http://www.tapr.org/~kh2z/Waypoint/>). Then you can import them into ArcView using an extension developed by PRBO (available at <http://www.prbo.org/tools/gps/gps.htm>). Here's how:

1. Turn on the Garmin GPS unit and connect it to the computer's serial port (probably COM1) using the PC interface cable.
2. Launch Waypoint Plus and go to the *File – Configuration – Modes* menu. Set the coordinates to either **UTM** or **Decimal Degrees** and units to **meters**. Then go to the *File – Datum* menu and select either **North America 1927 mean (NAD27)** **North America 1983 (NAD83)**, or **WGS84**. UTM NAD83 is preferred unless you know that you need to work in another datum. Make a note of the coordinate system and datum that you select since you will need this information later.
3. Go to *GPS – Port* and make sure the port is set to **COM1** (or whichever port you are using).
4. Select *Waypoints – Download* or *GPS – Download* from *GPS – Waypoints* to download your waypoints. Save the waypoints as a **comma-delimited text file** (*File – Save – Waypoint*). Make sure to note where you save your waypoint file.
5. Make sure you have the following files in your `esri\avgis_30\arcview\ext32` directory: **waypoint\_express.avx** and **wpt\_utmzones\_namerica.bmp (bitmap)**.
6. Launch ArcView and load the Waypoint Express extension (from the *File – Extensions* dialog). Select *Waypoint Express – Waypoint → Shapefile* and follow the prompts:
  - Use the file dialog box to navigate to the **text file** that you created in Waypoint+.
  - Select the **coordinate system**. Alternatively, you can look at the text file and note the code after “WP” at the beginning of each line under the header, which will be either “D” or “UTM” depending on the coordinate system.
  - If you are working in UTM's, you will be asked for a **UTM zone**. If you don't know what zone you are in, select *Show Map* from the dialog. You can also find the zone by looking at the text file. The zone number (followed by a letter, which you don't have to worry about) is located before the x and y coordinates on each line of text.
  - Select the **datum**. Again, this is the same as what selected in Waypoint+. The datum is also specified in the header of the text file.
  - Give a **directory path and a name** for your output shapefile. Consider including the datum and coordinate system within the file name for easier file management.
7. Once the shapefile is added to the current project you can begin to overlay other shapefiles and images relevant to your project.


**NOTE:** If you get an error message at any point while using this extension please open the text file that you created and make sure that you are inputting the correct information.



## Uploading coordinates to Garmin GPS units using ArcView and Waypoint Plus

If you have only a few points, it's easiest to enter them directly into a GPS unit by creating a new waypoint and manually editing its coordinates. Alternatively, you can enter your coordinates into Waypoint Plus (shareware available at <http://www.tapr.org/~kh2z/Waypoint/>) using the **Create Waypoint** feature (select *Waypoints – Create Waypoint*) and then upload them to the Garmin unit (select *Waypoints – Upload*). This is slightly faster if you are near a computer.

If you have an ArcView point **shapefile or a dbf file** containing coordinates, you can also export the entire file to Waypoint Plus using the Waypoint Express extension and then uploading them to your Garmin unit through Waypoint Plus. Here's how:

1. Turn on the Garmin GPS unit and connect it to the computer's serial port (probably COM1) using the PC interface cable.
2. Determine the UTM zone and datum for your coordinates (e.g., Zone 10, NAD83) and make sure you have `waypoint_express.avx` in your `esri\avgis_30\arcview\ext32` directory (download from <http://www.prbo.org/tools/gps/gps.htm>). If you are working with a datum other than NAD27, NAD83, or WGS84 contact [dstralberg@prbo.org](mailto:dstralberg@prbo.org) before you continue.
3. Launch ArcView and load the **Waypoint Express** extension from the *File – Extensions* dialog.
4. Add the **point shapefile** to the view window. If you are working with a **dbf file**, you need to convert it to a shapefile first (add it to the project as a table, then go to the view and select *View – Add Event Theme*, select the table and its x and y coordinates, and once it appears in the view go to *Theme – Convert to Shapefile*). Select the points that you want to upload to Garmin using the select tool  (no more than 500 total).
5. Make sure that your attribute table contains a unique ID (up to six characters long) by which you can recognize each point (e.g., PALO01).
6. Go to the *Waypoint Express – Shapefile → Waypoint* and follow the prompts.
  - Select the **theme** that contains the points you want to upload.
  - Select the field that contains the unique **ID** (see #5).
  - Input the **coordinate system, zone** if UTMs (select *Show Map* if you don't know your zone), and **datum**.
  - Name your **Waypoint text file** (comma-delimited text) and pathname when prompted.
7. Turn on your Garmin GPS unit and connect it to your computer's serial port. Go to *GPS – Port* and make sure the port is set to **COM1** (or whichever port you are using).
8. Launch Waypoint Plus and go to the *File – Configuration – Modes* menu. Set the **coordinate system** of the file you just made to and units to **meters**. Then go to the *File – Datum* menu and select the datum that corresponds with your data points (**North America 1983, North America 1927 mean** or **WGS 84**). It is important that you do this *before* the next step to ensure that maintain the correct coordinates.



9. Go to *File – Open* and open your Waypoint Plus text file. To view and check your waypoint file, go to *Waypoints – List Waypoints*. Make sure that the coordinate system, UTM zone (if the coordinate system is in UTM's you should see a letter appended to the zone number), easting/northing coordinates, and Waypoint IDs look correct. (If necessary, clear out old waypoint files using *File – Clear – Waypoints* before opening a new file).
10. Select *Waypoints – Upload* and watch your points being uploaded to the GPS unit. If you see them on your GPS unit, you're done!

### Troubleshooting:

If some or all of your GPS points don't upload, try checking the following:

1. Is your GPS unit turned on and set to the Garmin receiver mode? (As opposed to real-time differential correction mode). If not, you may need to exit Waypoint Plus and restart after turning on your GPS unit.
2. Are your site codes (IDs) unique in their first 6 characters? Waypoint Plus will only read in the first six characters, so if you have multiple points with the same first six characters, only one will be uploaded.
3. Does your Waypoint Plus text file have the proper header? Check the parameters below.

### Waypoint Plus files:

If you are unsuccessful at converting your shapefile or dbf to a Waypoint Plus text file using the ArcView extension, you may do it manually in a text editor like WordPad. Or you may edit it after exporting from ArcView. Here's what it should look like:

#### First Line / Header (Datum Parameters)

NAD83: Datum,North America 1983,GRS 80,0,-1.6E-7,0,0,0

NAD27: Datum,North America 1927 mean,Clarke 1866,69.4,-0.37264639,-8,160,176

WGS84: Datum,WGS84,WGS84,0,0,0,0,0

#### Remaining Lines

1. If your coordinate system is UTM:

```
WP,UTM,<ID>,<Zone>,<Easting(X)>,<Northing(Y)>,<MM/DD/YYYY>,<HH:MM:SS>,<MM/DD/YYYY>  
<HH:MM:SS>
```

2. If your coordinate system is Decimal Degrees:

```
WP,D,<ID>,<X-coord>,<Y-coord>,<MM/DD/YYYY>,<HH:MM:SS>,<MM/DD/YYYY> <HH:MM:SS>
```

For example, a UTM Zone 10 NAD83 file might look like this:

```
Datum,North America 1983,GRS 80,0,-1.6E-7,0,0,0  
WP,UTM,N1,11,420744.7,4037886.6,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N2,11,416572.5,4038808.8,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N3,11,415520.0,4041649.1,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N4,11,421769.4,4035246.3,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N5,11,415684.7,4041640.4,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N6,11,420344.8,4037706.3,26-Feb-03,15:48,26-Feb-03 15:48  
WP,UTM,N7,11,419948.3,4038500.8,26-Feb-03,15:48,26-Feb-03 15:48
```