

Standard Operating Procedure (SOP) #7

Downloading and Uploading Data from/to a Garmin® GPS

Version 1.01 (March 21, 2022)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.0	4/11/2019	Mark Wasser	SOP #6 split into #6 and #7 for consistency and ease of use	Migrated from AP version, made specific to FTPC, SOP #7 content now stand alone	n/a
1.01	3/21/2022	Kim Weisenborn	Updated method for installing DNRGPS software. Added footnotes to clarify references.	Users can no longer access the networked server (I:\ drive).	1.0

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

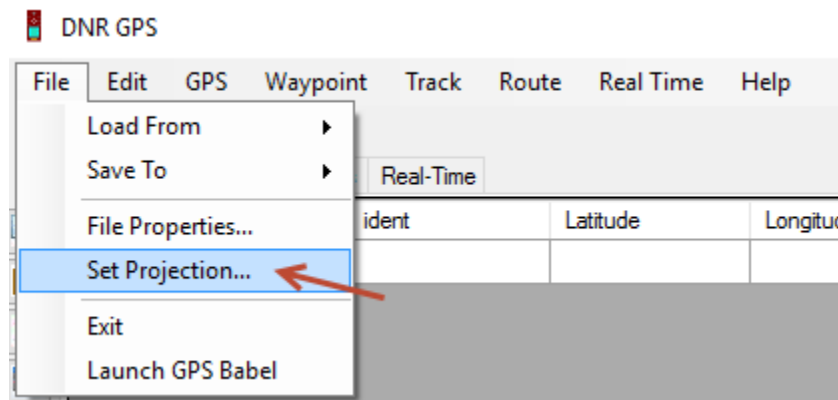
Purpose


This SOP describes how to download/upload Global Positioning System (GPS) data using DNRGPS, free software that is the NPS Pacific Island Network (PACN) standard for incorporating Garmin® GPS data into a GIS. This SOP may be used for any Garmin® GPS model that can average a waypoint and collect track logs. The data transfer process utilizes DNRGPS software version 6.1.0.6.

Installation and Setup of DNRGPS Software

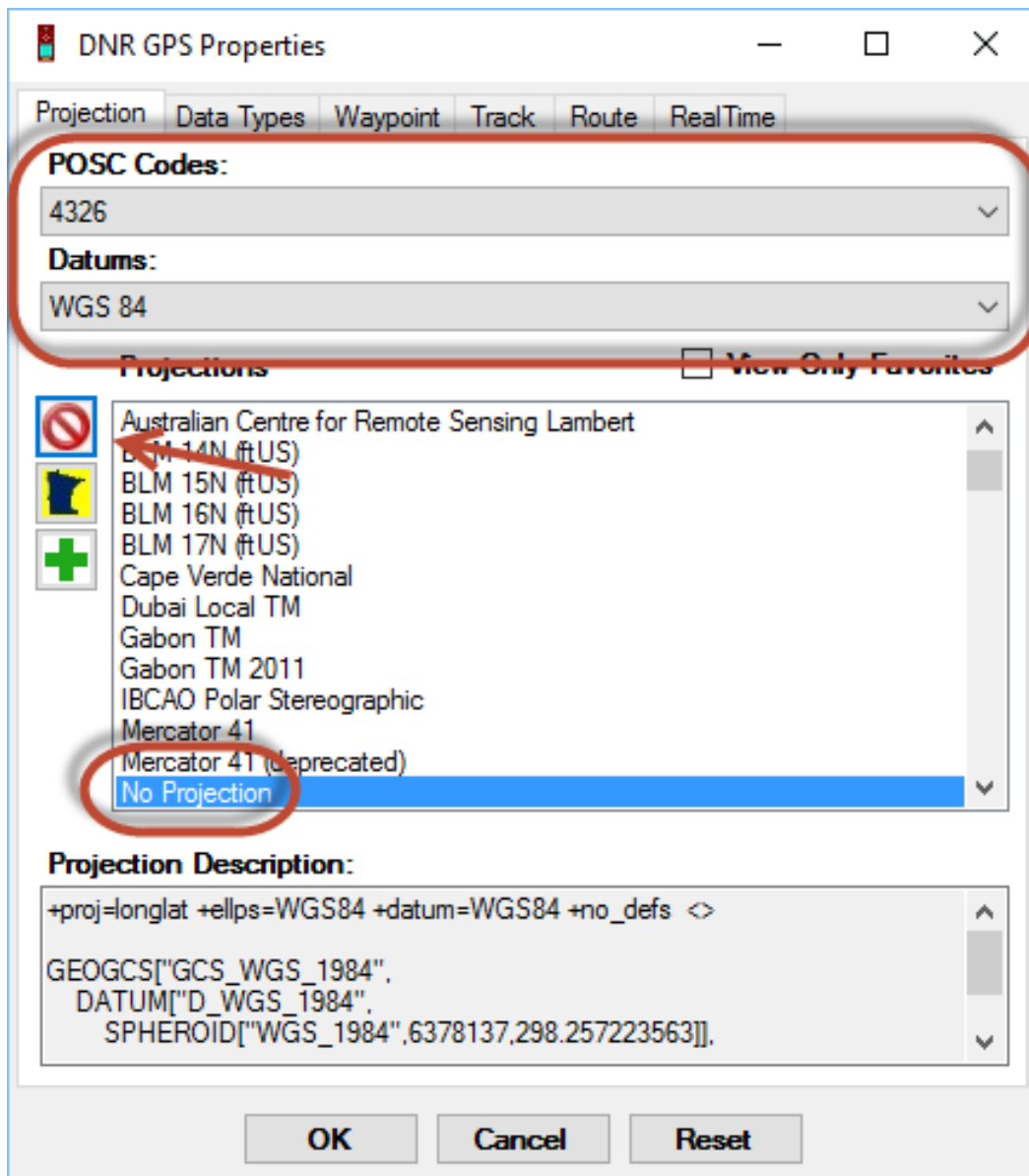
1. If DNRGPS 6.1.0.6 is installed on your computer, skip to step 7. If DNRGPS 6.1.0.6 is not installed on your computer, proceed with installation according to the steps below.
2. If a previous version of DNRGarmin (DNRGPS predecessor) or DNRGPS exists on your computer, start from Step 3. If there is no previous DNRGarmin software on your computer, start from Step 5.

3. Uninstall any previous versions of DNRGarmin by using the Start → Control Panel → Add/Remove Programs function.
4. When uninstallation is finished, perform a search on local drives for all files named “dnrgarmin”. If found, delete them. Note: Failure to completely remove any earlier versions can cause problem running the current version of DNRGPS software.
5. To download and install the current version of DNRGPS, contact the PACN GIS Specialist for access to the software, or you may download the software directly from the [Minnesota Department of Natural Resources](https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html)¹. Under the *Download Program* header, choose the latest version (currently “DNRGPS for ArcMap® 10.2+ (40MB)”).
6. Once you have downloaded the latest version (as a ZIP folder), extract the folder and its contents. The extracted folder should be named “dnrgps”. Copy this folder to the desired location on your hard drive. If you have Admin Privileges on your computer, the preferred directory is C:\Program_Files\. If you do not have permission to copy to that directory, anywhere on your local physical drive is acceptable. Once the folder has been copied, it is recommended you enter the folder, create a shortcut to the “dnrgps.exe” application file, and place that shortcut on your desktop or somewhere it is readily available.
7. Open DNRGPS by running the executable file named *dnrgps.exe*. Once the program is open, go to File → Set Projection.

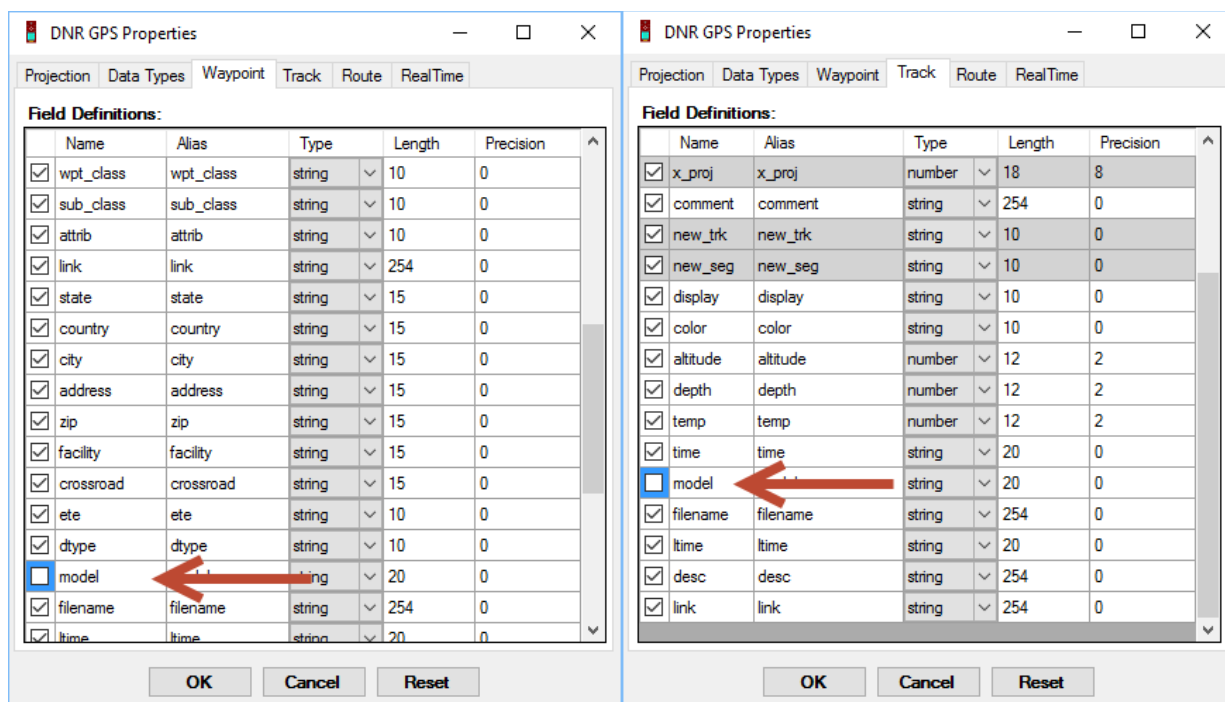


8. For Datum select *WGS 84* from the drop down menu. (**Always use WGS 84 datum.**) Set the projection to *No Projection* (POSC Code = 4326). To do this, click on the icon of a red circle with a slash through it . This will select *No Projection*. Click OK to finish.

¹ Minnesota Department of Natural Resources, <https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html> (accessed 21 March 2022).



9. Next, go to Waypoint → Waypoint Properties. On the Waypoint tab, scroll through the list of Field Definitions and uncheck the box next to *Model*. Click on the Track tab and uncheck the same box on that list, and then click OK. DNRGPS is now configured and ready to use.

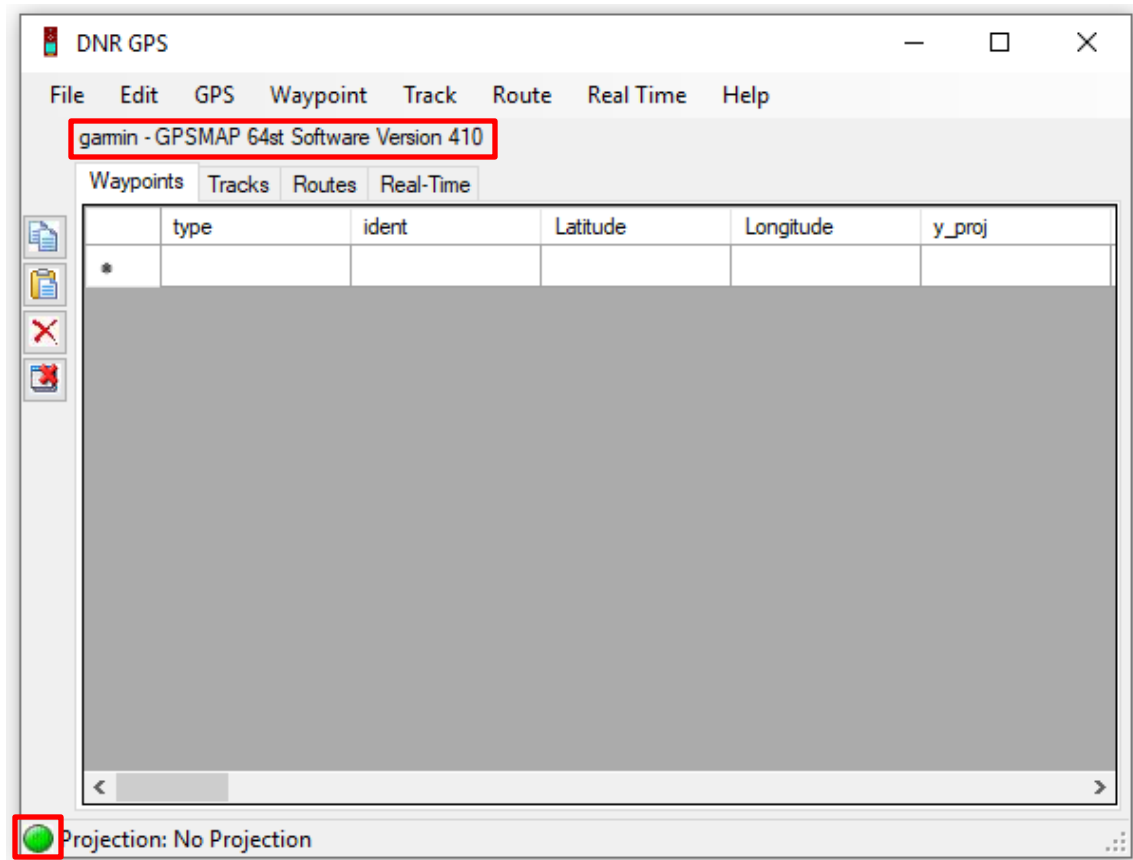


Connect Garmin® GPS Unit to DNRGPS

1. Attach the Garmin® Cable to a USB port on your computer. The standard Garmin® Cable is a USB A-Male (standard “USB plug”) to Mini-B.
2. Attach the other end of the Garmin® Cable to the back of the Garmin® GPS.
3. Once connected, the GPS will power on, cycle through a startup screen that says ‘Saving all tracks, waypoints, etc. to GPS files/folders’, and then display a screen that displays

GARMIN with a USB icon  below the Garmin® text.

4. As a general rule of thumb, wait to open DNRGPS for 10-15 seconds after the GPS unit is plugged in and displaying the USB interface screen described above.
5. Open/Run DNRGPS. If you have successfully connected the GPS unit, the make and model will be listed directly under the file and edit menus in DNRGPS (see graphic below). A green circle at the bottom left hand corner of the program window next to the Projection information also indicates the GPS is connected and recognized. A red circle means it is not. If the GPS unit is not recognized, close DNRGPS and repeat steps 1-4.

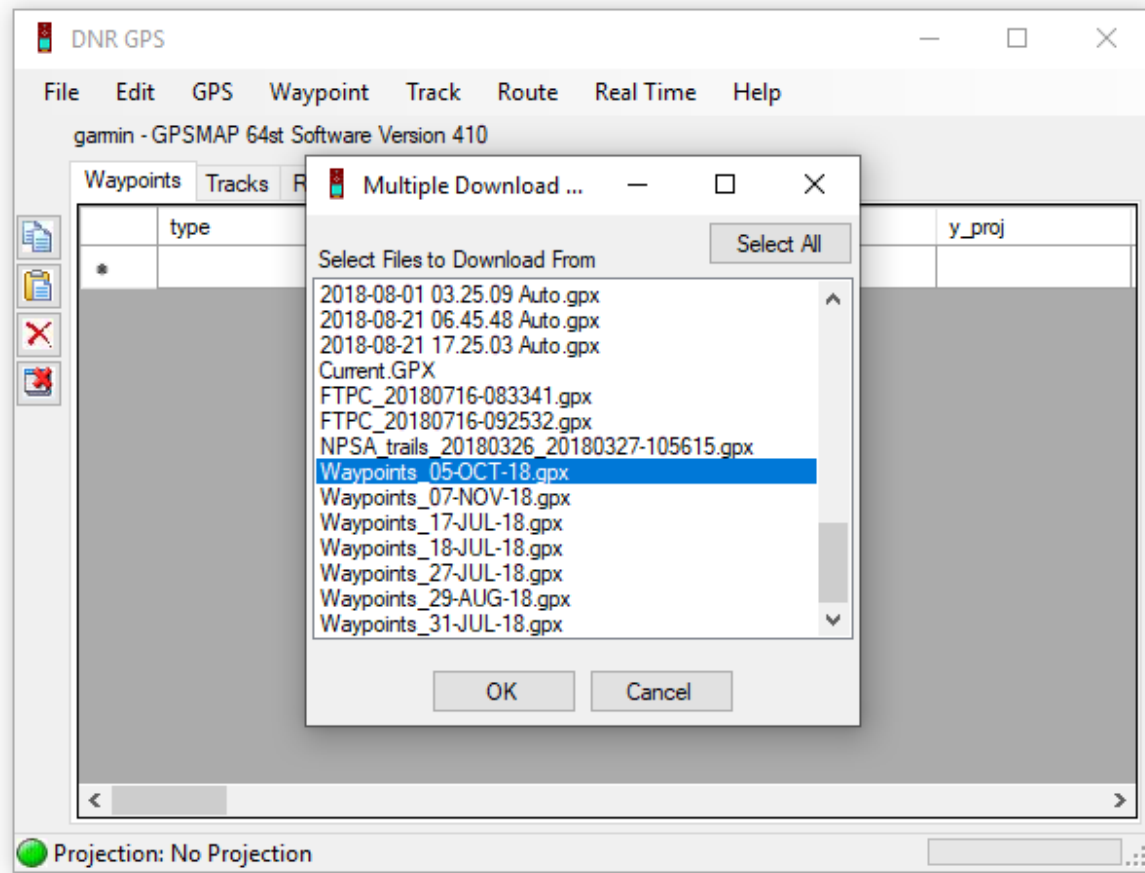


6. If the GPS unit is successfully connected, you are now ready to download or upload data between a Garmin® GPS unit and your computer.

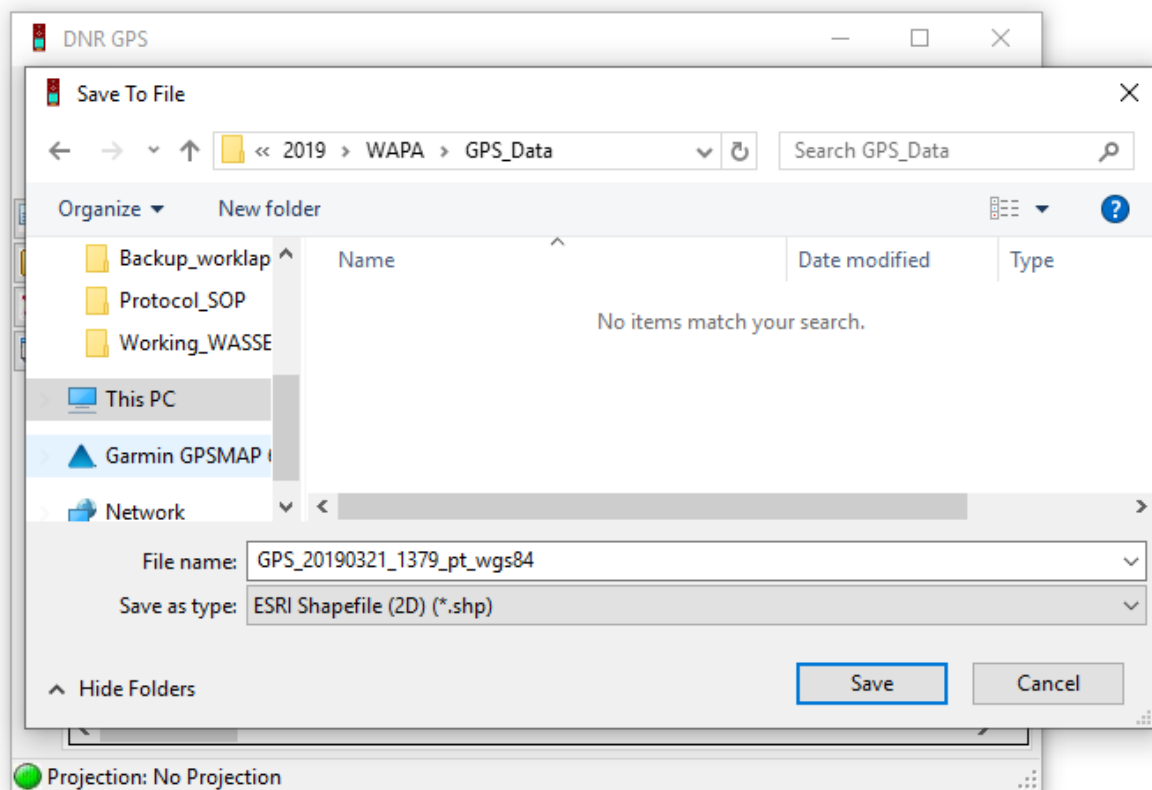
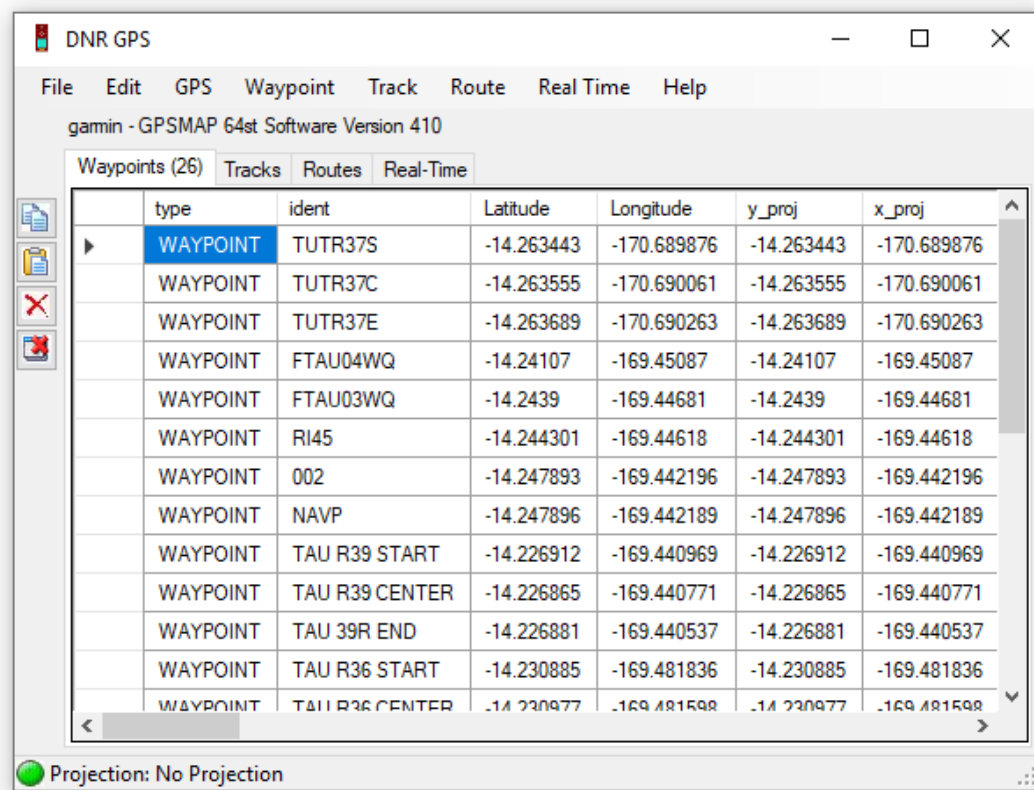
Downloading GPS Data from a Garmin® GPS Unit

GPS waypoints and tracks collected in the field can be downloaded from a Garmin® GPS unit using the following steps:

1. Launch/Run the DNRGPS application, and make sure the GPS is connected properly as described above.
2. To download waypoints, go to Waypoints → Download. A window will pop up containing all the groups of points and tracks in your GPS unit. All these files end in the extension 'gpx'. Scroll down until the file names start with *Waypoints*.



3. Newer Garmin® GPS units automatically save groups of waypoints together by the day the waypoints were recorded. The default naming convention used by Garmin® is “Waypoints_DD-MMM-YY.gpx”, and the files are sorted accordingly starting by day of the month. Find the days containing the waypoints needed for download and select the file. Multiple files can be selected by holding ctrl or shift keys, same as in Windows. Click OK. A list of waypoints will populate the screen, and a dialog box will come up that says, ‘download complete’. Click OK. The list of waypoints from the selected waypoint groups is now visible. Values in the ‘ident’ column indicate the name waypoints were given when created with the GPS unit.

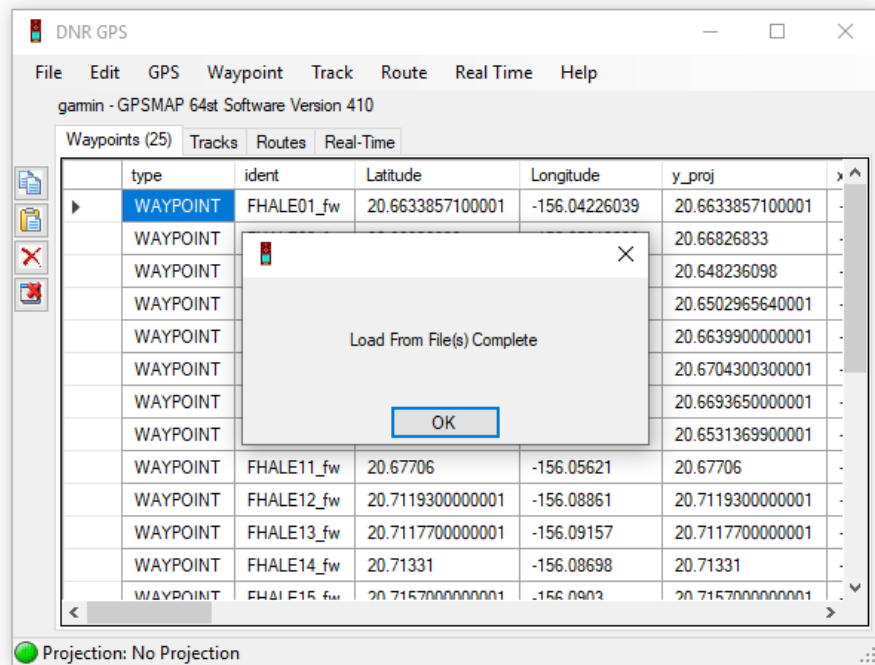
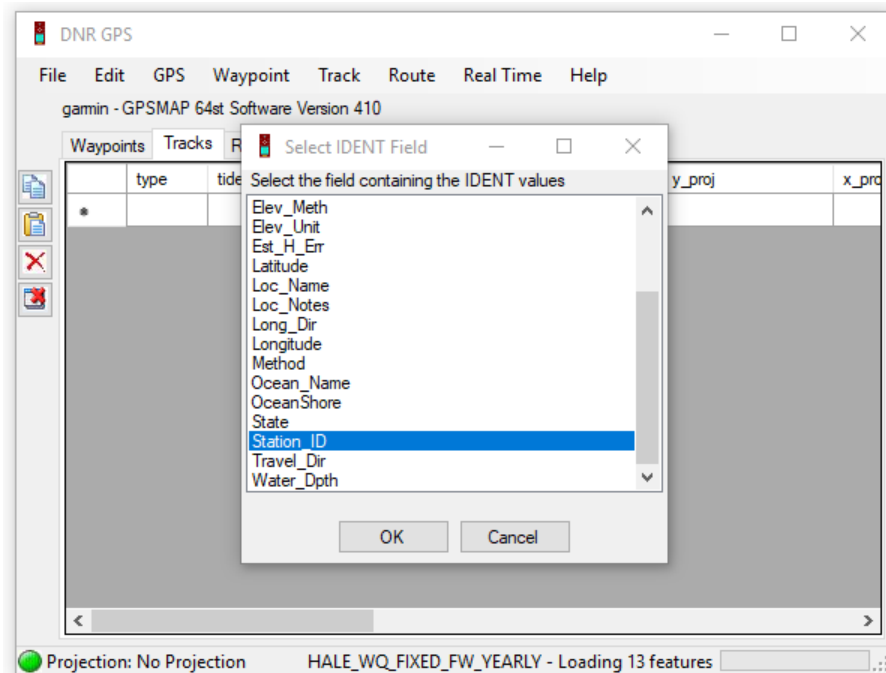


4. To save the waypoints displayed as a shapefile, select File → Save To → File. By default, all waypoints in the list will be saved. To save only selected waypoints from the list, manually select the desired rows before saving. A dialog box will appear prompting to select a destination and name for the file. Select the desired destination and name for file and select *ESRI Shapefile (2D)* from the Save as Type dropdown menu. Click Save.
5. To download Track Logs, go to Tracks → Download. Another window will pop up containing all the groups of points and tracks in your GPS unit. All these files end in the extension 'gpx'. Scroll down until the file names start with *Track*. Track Log files are named "Track_YYYY-MM-DD_HHMMSS.gpx" by default when saved in the GPS, unless they are renamed (See SOP #6 Using Garmin® GPS Units, for information about renaming track logs *before* downloading). Select the desired Track Logs and click OK.
6. All records from the Track Logs selected will now be tabulated (this may take a few seconds). To save the waypoints displayed as a shapefile, select File → Save To → File. By default, all Track Log records in the list will be saved. To save only selected Track Log records from the list (not recommended), manually select the desired rows before saving. A dialog box will appear prompting to select a destination and name for the file. Select the desired destination and name for file and select *ESRI Shapefile (2D)* from the Save as Type dropdown menu. Click Save. A new dialog box will appear and prompt to select a shape type. Select *Line (multi-part)*. This breaks the shapefile up into multiple line features based on the different time periods the Track Log(s) were recorded.


Uploading GIS Data into a Garmin® GPS Unit

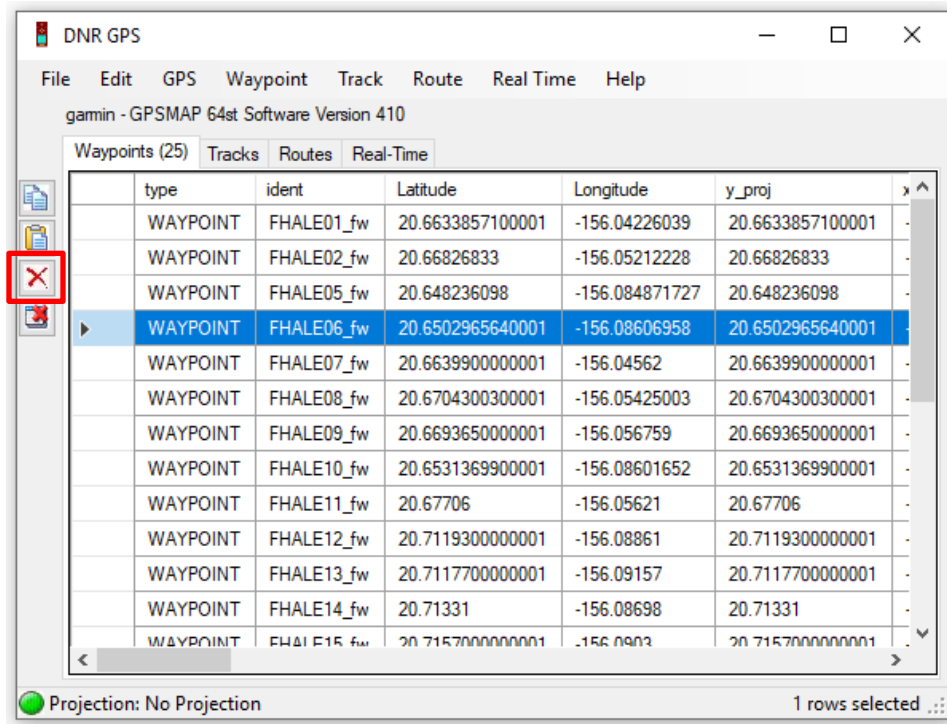
GIS data (point, line, polygon, shapefiles) can be uploaded into the Garmin® GPS unit to be used as background map features or locations to navigate to. *Note: Before attempting to upload data, be sure you have completed steps 7 and 8 from the section of this SOP titled “Installation and Setup of DNRGPS Software”. Failure to do so may result in your data not uploading correctly.*

1. Connect the GPS to a computer (see section “Connect Garmin® GPS unit to DNRGPS” above) and launch DNRGPS.
2. Double check the projection information [WGS84 datum, No Projection, POSC = 4326] is correct in DNRGPS. (See step 7 of “Installation and Setup of DNRGPS Software” section above.)
3. Go to File → Load From → File. Select *Shapefile* as Files of Type. Navigate to the appropriate directory and select the desired shapefile. Click Open.
4. A dialog box may open and prompt you to define the Identify [IDENT] field. The value in the IDENT field is what will be displayed as the waypoint name in the Garmin® GPS unit. Select the appropriate field from the shapefile, if necessary (likely *Station_ID* for most sampling site points). Click OK.

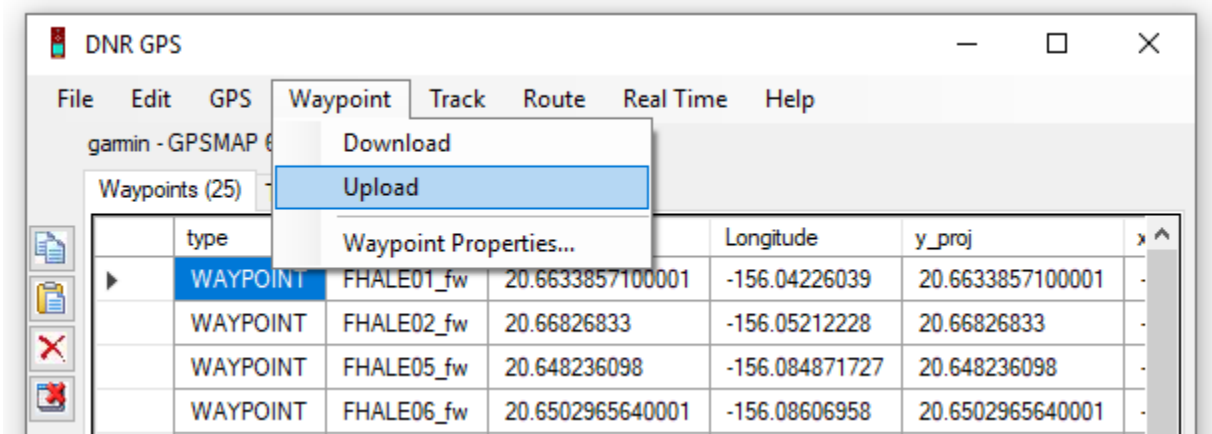


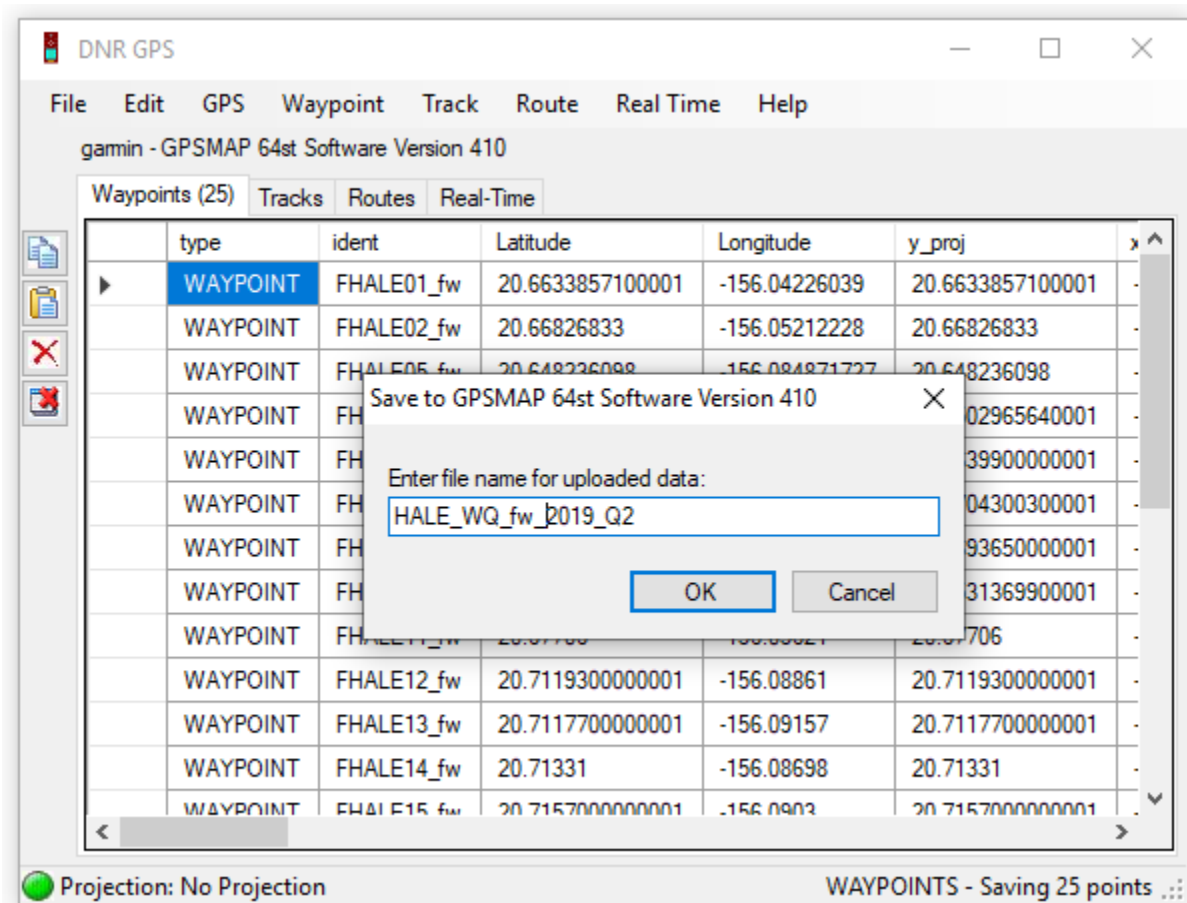
Data will be transferred into DNRGPS, and a list of record will populate the main program window. A dialog box will open and indicate the loading of data is complete. Click OK.
Note: The data are not uploaded into the GPS unit until the next step is completed.

- Once the waypoint list has been populated, specific records can be removed from the list before uploading by selecting individual rows (records) and pressing the delete key or clicking on the delete button .



- Once the list of records is satisfactory, go to Waypoint → Upload. After selecting upload, a dialog box will appear with a prompt to assign a name the GPX file being created for upload. (The set of records being uploaded will be tracked as a group internally by the Garmin® GPS unit as a GPX file, but the naming does not matter otherwise for practical purposes). Name the waypoint group as desired and click OK. A pop-up window will provide a notification when the upload is complete.





Note: Checking the GPS unit to confirm data uploaded properly prior to starting field work is strongly recommended. To do this, disconnect the GPS unit from the computer, power it on, and find a waypoint from the uploaded group (see the “GPS Field Procedures” section of SOP #6 Using Garmin® GPS Units).

Other Trouble Shooting Tips

If you have an earlier version of the DNRGarmin (or DNRGPS) program on your machine you must uninstall it before installing the new version. Uninstall previous versions by using the Start → Control Panel → Add/Remove Programs tool (for DNRGarmin) or deleting the entire DNRGPS folder – likely named “dnrgps” (for DNRGPS).

For other installation errors please refer to [Minnesota DNR Help](https://maps1.dnr.state.mn.us/dnrgps/index.html)² page or contact the PACN GIS Specialist at (808)985-6184.

² Minnesota DNR Help, <https://maps1.dnr.state.mn.us/dnrgps/index.html> (accessed 21 March 2022).