

Mapping with GPS

Use of waypoints (Activity 9) and track logging (Activity 12) allows creating lists of geographic coordinates that correspond to a given geographic object (tree, well, path, field, city, house, etc.). Successful transferring of waypoints and/or tracks to a GIS environment allows overlaying these data with other layers of data for the given area.

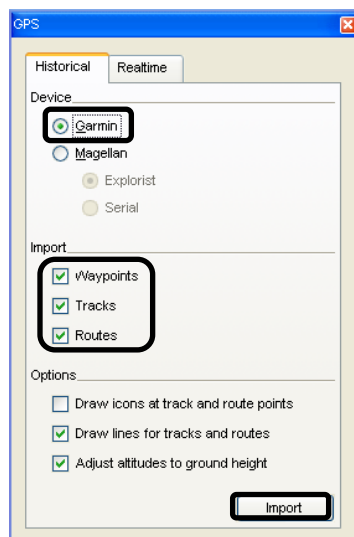
Explorer's Guide

Before You Start

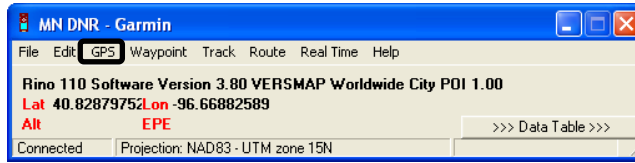
Describe you partner what is the difference between a waypoint and a track and how you can record both using the GPS receiver available.

Learning by Doing

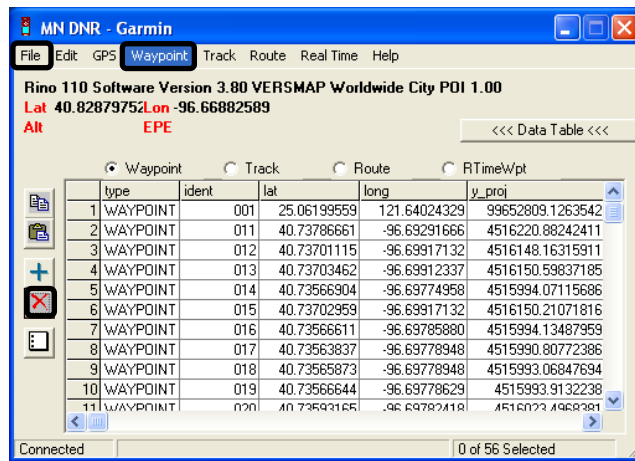
1. While outside, use instructor guidance to establish 5-10 waypoints for a given type of geographic objects (trees, cars, flags, fire hydrants, etc.). Make sure you mark each waypoint while following all necessary safety precautions.
2. Using tracking options, walk around perimeter of the designated area (field, lawn, parking lot, etc.). Do NOT save the track in the end of your path.
3. Download the collected data in Google Earth software using the following steps:
 - a. Connect your GPS receiver to the using proper connecting cable.
 - b. Turn on the GPS unit and assure proper interface setting (GARMIN).
 - c. Open Google Earth Pro software and use Tools > GPS to import your data as shown below.
 - d. By default, the imported data are placed under Places on the left side panel. View the waypoints and tracks.



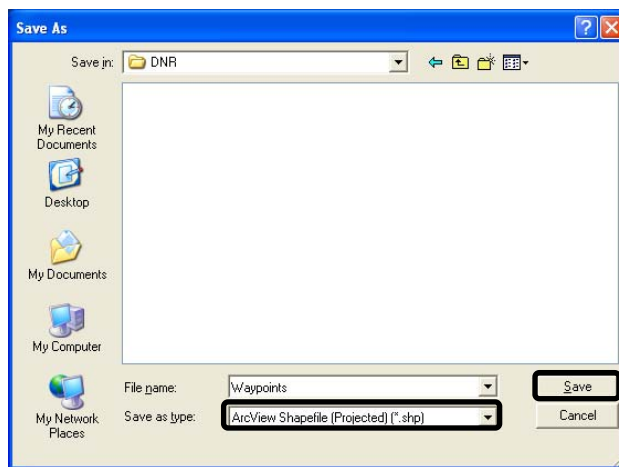
4. Repeat the same task using DNRGarmin and ArcGIS software through the following steps:
 - a. Connect your GPS receiver to the using proper connecting cable.
 - b. Turn on the GPS unit and assure proper interface setting (GARMIN).
 - c. Start *ArcMap* and *DNRGarmin* software. Click *GPS > Open Port* to connect to the GPS receiver (make sure the receiver is connected to the proper port).



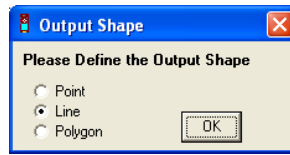
- d. In MN DNR - Garmin use *Waypoint > Download* to access all the waypoints collected. Use delete button to delete unnecessary waypoints after selecting them. You could edit your waypoints in DNR software or later using ArcGIS software.




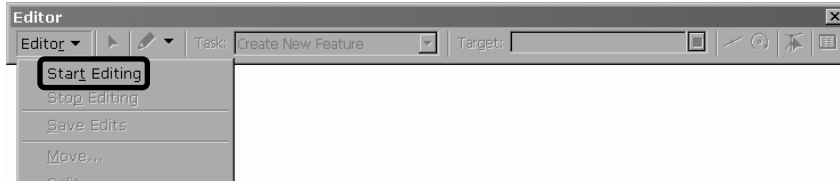
- e. Save waypoints as an ArcView shapefile. Close *DNRGarmin* software.



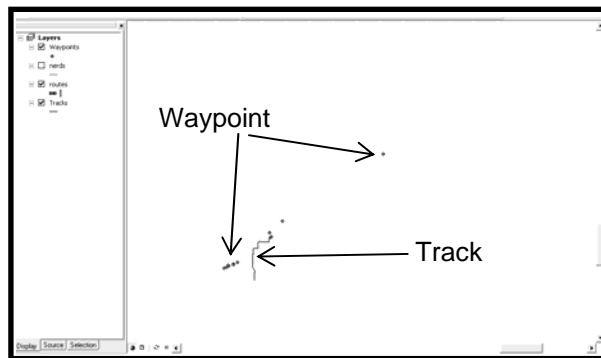
- f. Similarly download tracks using *Track > Download* option and save the tracks to a shapefile. When saving you will be prompted to choose the type of shapefile as shown below. For a path, line option is most suitable. Close *DNRGarmin* software.



- g. In ArcMap, add waypoints and the track using the add layer  icon.
- h. Activate waypoints (as shown in the example below). Right click to open attribute table. Use editor toolbar to start editing the attribute table, if needed. Delete unnecessary columns. Click stop editing once you finish editing.



- i. Save your ArcGIS project in the directory specified by your instructor.



How Does It Work

Data stored inside a GPS receiver has marginal value to many end users. However, when these data are integrated with other data layers in a GIS environment, some serious analysis can take place. Surveyors, scientists, farmer advisors, and other professionals systematically perform the same process to solve their tasks.

Additional Challenge

Integrate your waypoints and/or tracks with other ArcMap data layers provided by your instructor. See if you can display your data along with roads, water streams, towns, aerial images, etc.

Interesting to Know

Collecting GPS data is a required skill for numerous professionals and hobbyists.

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