



NYNJTC GPS Data Collection Standards - 2011

Thank you for your interest in collecting accurate GPS tracks of trails and woods roads for the Trail Conference! The following guidelines describe how to collect the data, what type of data should be collected, and how to transfer the data to the Trail Conference once you are finished. If you have any questions or need clarification, feel free to contact **Jeremy Apgar** at the Trail Conference office [apgar@nynjtc.org or (201) 512-9348 ext. 15].

What kind of GPS should I use? -- GPS Unit Characteristics

1. Most any consumer GPS unit can be used, although a 12 Parallel Channel Unit with advertised 15 meter RMS accuracy and auto track log is preferred. Examples: Garmin 12 Series, eTrex Legend, or GPSMAP Series
2. Use of external antenna is recommended but not necessary for added signal reception.
3. Use of WAAS or DGPS is optional.

What settings should I use? -- Unit Settings (usually found within the setup menu)

1. Set the Datum to WGS84 (use of any other datum by mistake must be noted).
2. Set the Position Format to the UTM (often called 'UTM UPS') Coordinate system for recording waypoints (if set to Lat/Long, the data can still be used).
3. Set the local time zone accordingly.
4. In settings for Tracks, set the Track Log to "Fill" if provided as an option.
5. In settings for Tracks, set the Track Log recording interval to the equivalent of approximately one track point per 10 seconds or 25 feet of travel. The "Auto" setting should not be used, as this often results in a logging interval that is too large, therefore not capturing some of the trail wanderings.

How do I record the track and waypoints? -- Recording Procedure

1. Turn the unit on about 10 minutes prior to starting to allow the unit to get a good satellite fix.
2. Right before marking the first waypoint and beginning the trail, clear the active track log and ensure the track log is on.
3. Walk the trail and mark waypoints at all significant locations, using positional averaging if possible.
4. Keep notes for each waypoint, including EPE/DOP (Please use our **Waypoint Data Worksheet**).
5. After finishing the trail and marking the last waypoint, turn the unit off to stop collecting the track.

What features along the trail should I collect as waypoints? -- Waypoint Determination

1. Initial waypoint at trailhead and/or parking lot.
2. Waypoints at the following locations
 - A) Trailheads- note name of trail, blaze and type (trail, woods road, etc.)
 - B) Trail intersections- note all trail/woods road/road intersections, hike app. 100 yards down side trail taking a waypoint at turn-around
 - C) Viewpoints- note general direction of view and approx. Degree
 - D) Changes in trail surface- note footpath, woods road, unmarked trail, gravel, etc
 - E) Stream crossings- note bridge, type, stream width, condition of crossing
 - F) Gates- type, condition and purpose

- G) Parking- type (roadside vs. engineered), condition and purpose
 - H) Towers- type, condition and purpose
 - I) Significant Buildings or Ruins- type, condition and purpose
 - J) Utility lines- type and see "B" above if traversable
 - K) Water source- type, condition and purpose
 - L) Other monuments or historical features- type, condition and purpose
 - M) Other natural features- glacial erratics, etc.
 - N) Other man-made features- mines, etc.
 - O) Trail condition problems- type
3. Final waypoint at trailhead and/or parking lot.

I've collected trail data...now what do I do? -- Data Disposition

1. If you borrowed a GPS unit from the Trail Conference you can skip **Data Disposition question #2**, unless you would like to download the data and email it to the Trail Conference. In addition, please return the GPS unit to the Trail Conference office as soon as possible. If you are using your personal unit please continue to the next step.
2. Download data from the GPS unit to your computer using EasyGPS (for explicit instructions please see the section titled **Transfer of Data from GPS unit to EasyGPS**). This creates a GPX (.gpx) file of the tracks and waypoints that can be submitted to the Trail Conference office.
3. Each GPX file that is submitted should be accompanied with the completed **Waypoint Data Worksheet** with waypoint numbers and descriptions (for example, see Table 2). The brief narrative section should include all trail names that were GPSed, any trail issues, any deviations from the trail, etc. The **Waypoint Data Worksheet** should contain each waypoint that was collected along with descriptions. This template is preferred, but if you are unable to use the template, you may use a regular word file, put it in the body of the email, or handwrite it.

Table 2: Waypoint Data Worksheet (Fill In the Gray Areas)

<u>Trail Name:</u> Iris Trail (red), Appalachian Trail (white)	<u>Map Name/No:</u> Kittatinny Trails Map #18
<u>Trail Section:</u> entire Iris Trail, section of Appalachian Trail	<u>Park Name:</u> High Point State Park
<u>Blaze/Marking:</u> see above	<u>Weather Conditions:</u> Cloudy
<u>Date Measured:</u> February 23, 2008	<u>GPS Unit:</u> Garmin 12Map
<u>Performed By:</u> Jeremy Apgar	<u>GPS set to UTM/WGS 84?:</u> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no
<u>Exact Downloaded File Name(s):</u> Iris_02232008.gpx, Iris_02232008.doc	
<u>Hours Spent Driving:</u> 0.25	<u>Working Hours (hiking & computer work):</u> 5
<u>Brief Narrative:</u> This is a loop hike starting from the overnight AT parking area near the park HQ on Route 23. I followed the Iris Trail to the trailhead on Deckertown Turnpike, and then returned on the Appalachian Trail, which crosses the Iris Trail on 3 separate occasions.	

Waypoint No.	EPE FT.	Feature Description: Roads, trail crossing, intersection: describe, sketch; shelter, water source, view point, towers, gates, stream crossing, stream size, bridge and description, utility lines, buildings or ruins, mines, other features; trail surface: single path, wood road, rutted, paved	Compass Dir. Of Offshoot / view	Wheel Data S/N Factor:
008	14	Intersection of Iris Trail, Mashipacong Trail, and Appalachian Trail. I followed the Iris Trail to the southeast.		
009	18	Small (~10 feet long) elevated bridge across a flowing stream.		
010	15	Viewpoint from the Iris Trail overlooking Lake Rutherford. The view is to the left of the trail (southeast).	SE	

4. When the data are downloaded to GPX format, the GPX file and the **Waypoint Data Worksheet** can be emailed to **Jeremy Apgar** (apgar@nynjtc.org) with "GPS Data Collection-Trail Name" as the subject.
5. If you wish to examine the data and check its accuracy, you can view the GPX files in Google Earth (for explicit instructions please see the section titled **Viewing Data in Google Earth**). Alternatively, you can download data from the GPS unit to TOPO! software for **personal use ONLY** (for explicit instructions please see the section titled **Transfer of Data from GPS Unit to TOPO Program**). These files can be stored on your home computer and you can use them whenever you want.

Additional Trail Conference Specific Data Protocols

1. Waypoint recording- the following data must be recorded for each waypoint either legibly on a tabular form, on a PDA device, or using an audio recording device and transposing it to tabular form.
 - A) Waypoint number
 - B) EPE or DOP (if this number is consistently low (<30), then it is only necessary to indicate when the EPE is much higher, along with a note in the narrative mentioning the generally low EPE/DOP)
 - C) Description (See waypoint determination above)
 - D) Any unusual conditions that are deemed appropriate
2. Waypoint information sheet should be included with GPS or data files (as word processing document or paper copy) and should include:
 - A) Name of volunteer & volunteer hours
 - B) Name of Map Set
 - C) Name of Trail(s)
 - D) Date of acquisition
 - E) Weather conditions
 - F) Any other notable items

Example Usage of Garmin 12 CX Series GPS for NYNJTC Data Acquisition

1. Turn on unit by pressing and holding red bulb button for several seconds.
 2. Hike while holding unit horizontal to sky (globe symbol facing sky) or using external antenna.
 3. Take waypoints by pressing mark and recording waypoint number. Toggle up to "average" and hit enter. Wait for at least 5 seconds and record last EPE number. Toggle down to "save" and hit "enter". Record any other waypoint information.
 4. When hiking, keep an eye on the "Satellite Status Page"; found by scrolling through the pages with the "Page" key. Keep an eye on the battery life bar on the left. Note any large EPE numbers (EPE > 30 feet) on the waypoint log.
 5. Do not change any of the settings on the unit, as they have been preset to Trail Conference Standards. If any problems develop, notify the GPS Coordinator.
 6. If you must change the batteries, use new AA alkaline batteries (4) and change them quickly. Do not leave the unit without batteries for an extended length of time (> 5 minutes).
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Transfer of Data from GPS unit to EasyGPS (GPX Format) (Necessary format for the Trail Conference)

1. Open EasyGPS by going to Start→Programs→EasyGPS, or look on the desktop for EasyGPS icon.

2. When launched for the first time, a preferences box will appear. If you have previously set up the preferences, skip to step 7.
3. Under the 'My GPS Receivers' tab, click the Add GPS button.
4. Select the manufacturer and model of your GPS unit and click OK. Then select the port for transfer (usually COM or USB) and click OK.
5. You can add any other GPS units at this time. When you are finished, select the GPS unit you wish to transfer and click OK.
6. Choose Edit→Preferences, and navigate to the 'My Coordinate Formats' tab. Click the 'Add Format' button, then Select 'World', 'Universal Transverse Mercator', and 'World Geodetic System 1984', and click OK. You can use this preferences box to add additional GPS units at any time.
7. Turn the GPS unit on and plug it into the computer. There is no specific page the GPS unit must be in.
8. Click the "Receive" button on the main toolbar. Make sure Waypoints and Tracks are checked, and that your GPS unit is correctly shown. Click OK to begin transfer.
9. A progress dialog box appears to show the time remaining for the GPS transfer. After the transfer is complete, your GPS data has been added to the file and is displayed as a simple map.
10. You can add descriptions to the waypoints and tracks on the lower left side of the screen (this is helpful, but not necessary).
11. Next, click the "Save" button on the main toolbar to save the data in the GPS Exchange Format (.gpx). Type in a filename using the name of the primary trail recorded and the date it was recorded. Please do not use spaces in the name, use an underscore in place of a space. A typical file would be named "LongPath_01-24-2011.gpx". The file should also be saved to a folder specifically used for this purpose.
12. Now you are done and can unplug & turn off your GPS unit and close down EasyGPS.

Viewing Data in Google Earth

1. Open Google Earth. To do this, go to Start→Programs→Google Earth, or look on the desktop for a Google Earth icon.
2. On the menu bar, select File→Open. Change the file type to 'Gps (*.gpx *.loc *.mps...)'. Navigate to the folder that contains the previously created GPX file, select the file, and click 'Open'.
3. Make sure Waypoints & Tracks are checked to be imported and click OK.
4. Now you can use the full functionality of Google Earth to explore your data! Turn on the terrain feature to see mountains and valleys. Explore the many other layers of information included with the software. You can even provide your own annotation and save the map as an image (JPG) or Google Earth file (KML).
5. If you create an annotated map, you can provide that to the GPS Coordinator along with the original GPX file and Waypoint Data Worksheet (this is not necessary, but may be helpful in some situations).

Transfer of Data from GPS Unit to TOPO Program (Format for personal/home use ONLY)

1. TOPO Program should be open to generic file with no preexisting data. Example: Northeast.tpo.
2. Turn GPS on and plug into the computer. There is no specific page the GPS unit must be in.
3. Click on - GPS. Click on -Import from (GPS or .txt) wizard-
4. Wizard screen will open saying, "Where is the GPS data you would like to import?" Make sure "In a GPS receiver that is now connected to the PC" is selected and hit next.
5. Import wizard-Final Steps box will open. For 1."Choose the types of objects you would like to download" Click on the waypoints and both tracks boxes.
6. For 2. Make sure that NAD83 or WGS84 is selected.
7. Make certain that appropriate GPS unit is selected.
8. Click Finish and monitor download (Could take 3 – 5 minutes)
9. When complete, click File-Save As-. Select a filename using the name of the primary trail recorded.
10. Click on File-Save (.tpg) File As- Select a matching filename using the name of the primary trail.
11. Please use the .tpo and .tpg files for your own use, and only send GPX files to the GPS Coordinator, unless you would like to attach a TOPO map in addition to the original GPX files.

Transfer of Data to Outside Agencies

1. All data are considered intellectual property.
 2. No data are to be shared with outside agencies without permission of the Executive Director.
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How to download EasyGPS (Windows)

1. Go to <http://www.easygps.com/>
2. On the right side of the page, click on the 'Download EasyGPS' button.
3. This saves a 'SetupEasyGPS.exe' file to your computer. Double-click the file.
4. Follow Directions to complete installation
5. Additional help can be found at the following website: <http://www.easygps.com/help/index.asp>

How to download Google Earth (Windows & Macintosh)

1. Go to <http://earth.google.com/>
2. Click on 'Download Google Earth', and on the next page accept the Terms & Conditions.
3. Once the file saves to your computer, double-click the file and follow the directions to install.
4. Additional help can be found at the following website: <http://earth.google.com/support/>

For Macintosh Users (or Windows Users that have difficulty with EasyGPS):

Transfer of Data from GPS unit to GPSTabel (GPX Format) **(Necessary format for the Trail Conference)**

1. Turn on the GPS unit and connect it via USB.
2. Open GPSTabel from your Applications directory.
3. Make sure Waypoints and Tracks are selected.
4. Under 'Input,' select 'Device', choose Format (GPS type), and choose Device Name (typically usb:).
5. Under 'Output' select 'File' and choose the Format as 'GPX XML.'
6. Click 'File Name' and enter a name that describes the trail and date, and put it in the directory that has been made for this project. Please do not use spaces in the name, use an underscore in place of a space. A typical file would be named "LongPath_01-24-2011.gpx".
7. Click the 'Apply' button, and a pop-up box should show the progress. Once complete, the dialog box at the bottom will say if the procedure was successful.
8. Now you are done and can unplug and turn off your GPS unit and close down GPSTabel.

How to download GPSTabel (Macintosh)

1. Go to <http://www.gpsbabel.org> and click on Downloads along the top.
2. Scroll down to the download for Mac OS X, click on GPSTabel-1.4.2.dmg and save the file.
3. Create a folder in your Applications directory named GPSTabel, double-click the .dmg file, and drag all of the files into the newly-created GPSTabel folder.
4. To start the program, double-click on GPSTabel.

How to download GPSTabel (Windows)

1. Go to <http://www.gpsbabel.org> and click on Downloads along the top.
2. Scroll down to the download for Windows, click on GPSTabel-1.4.2-setup.exe and save the file.
3. Once the file saves to your computer, double-click the file and follow the directions to install.
4. To start the program, double-click on GPSTabel.