Exercise – Displaying GPS Data

Note:

GPS receivers record data automatically and simultaneously. Depending on the receiver model most of this data is saved in some form until intentionally deleted or overwritten. With the unit turned on an individual selects a location and stops at that location. The GPS user marks the location as a waypoint. (For some purposes you may want to cross validate your GPS waypoints by using a data sheet to record manually the static-type data that is displayed in the GPS receiver for the location.)

When all points have been recorded the user may view their locational features as related to the collected points shown in the GPS. Most of the time, extensive users of GPS will want to export the waypoints and related captured information in the GPS to computers or other devices in formats and outputs that suit specific needs such as shapefiles, comma delimited, UTM, Lat Long, etc.

Exporting of GPS data is conducted normally by using free or commercial software or software included with the device to prevent having to manually record GPS information into the desired system. Due to time constraints we will use Excel to import data collected by a GPS into ArcGIS. This data has been converted from Latitude/Longitude to UTM coordinates. The conversion is a simple step as explained below:

In this exercise you will work with an existing GPS dataset to display GPS data in ArcMap. The data are GPS waypoints recorded that for purposes of this exercise theoretically represent the number of dwellings counted by a census official at a location of interest.

Step 1: Using Excel, create a table to import onto ArcMap. The first row must be column names, like "Longitude" and Latitude" and the following rows will be your GPS waypoint data. The first column should be the waypoint numbers, and the second latitude, the third longitude. Enter your data, make sure that you put latitude and longitude in the right columns! Also make sure that you put a –sign in front of your longitude numbers! (western hemisphere) When you are done, you can save the file in your workspace in .dbf format. (ArcGIS 9.2 can directly import excel spreadsheets without conversion to a DBF file)

- Open the Excel Spreadsheet titled NYC_UTM.xls found in the c:\un\exerciseGPS\ directory.

- Name column A "LOC" for location, column B LAT" for Latitude, column C LONG for "Longitude", and column D "DW" for dwellings.

	LOC	LAT	LONG	DW
1	LOC	LAT	LONG	DW
2	1ST	40.75158	-73.96755	27
3	1STUN	40.75102	-73.96805	56
4	42ND	40.74880	-73.96952	11
5	42ND2ND	40.75003	-73.97198	88
6	42ND3RD	40.75155	-73.97612	34
7	42NDN3RD	40.75080	-73.97420	7
8	45TH1ST	40.75048	-73.96835	66
9	45TH2ND	40.75157	-73.97098	22
10	45TH3RD	40.75220	-73.97313	22
11	45TH3RDF	40.75352	-73.97475	40
12	GCNTL	40.75155	-73.97560	88
13	UNHQ	40.75082	-73.96742	97
14	UNHQ2	40.75082	-73.96748	97

- o Note: Most GPS data must be converted from latitude and longitude to UTM. There are many ways of doing this manually or automatically. Automated conversion tools can be found online for free. Some work directly with the GPS allowing for automated conversion to various formats when uploading GPS data from a GPS to you computer or GIS platform.

- Once you have entered the column fields save the file in the **c:\un\exerciseGPS\ directory** as NYC_UTM.dbf (DBF 4) from the **File -> Save As -> File name** navigate to (DBF 4).

- Click "**Save**", "**O.K**", and "**Yes**" and Close the Excel document. Click "**No**"-You do not need to save the changes.

- **Open ArcMap document exerciseGPS.mxd found in the c:\un\exerciseGPS\ directory**.

- To bring in the GPS data, pull down the "**Tools**" menu and select "**add XY data**". Browse to your .dbf file, select it and click **Add**. Make sure the correct columns (longitude and latitude) are associated with the X and Y fields.
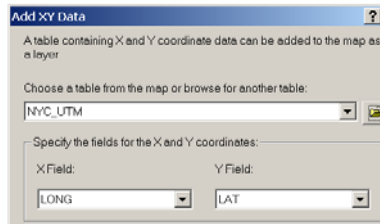

- o Note: (If you cant see your points, turn off the layers and change the color of your points by right-clicking on the point symbol in the legend.

Getting the points in the right place is dependent on the projection and the datum of the GPS!

- In this case the Datum of the GPS is GCS Nad 83.

- Click "**Edit**" to select a predefined coordinate system and select **Geographic Coordinate Systems**(GCS) **-> North America -> select North American Datum 1983.prj** and click "**Add**" and "**O.K**" in the Spatial Reference Properties window and **O.K.** in the Add XY Data window.

- To check your selected coordinate system, right click on the layer and select "**Properties**" the "**Source**" tab.

Step 2: Feature display layer properties for dwellings. To get a better idea of the number of dwellings that are represented by each point we can look at the dwelling density in the map layout.
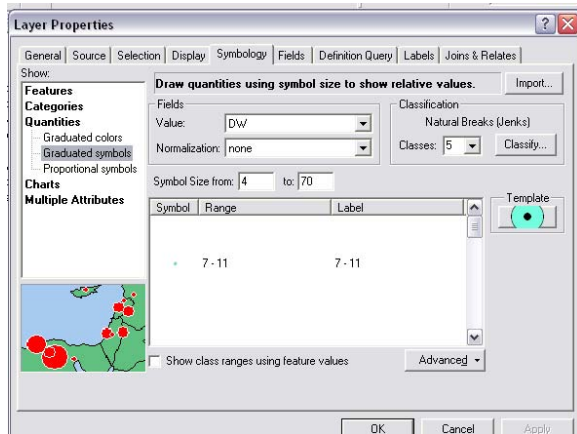
- Right click on the layer and select "**Properties**" if not already open. Select "**Symbology**".
- In the Show box on the left of the Layer Properties window select **Quantities -> Graduated symbols**.
- In "**Fields**" click the "**Value**" drop down menu and select "**DW**".

    - Change the symbol size from 4 to 70. Select O.K. The results should be similar to the illustration below.

Thanks to

ESRI and GeoEye
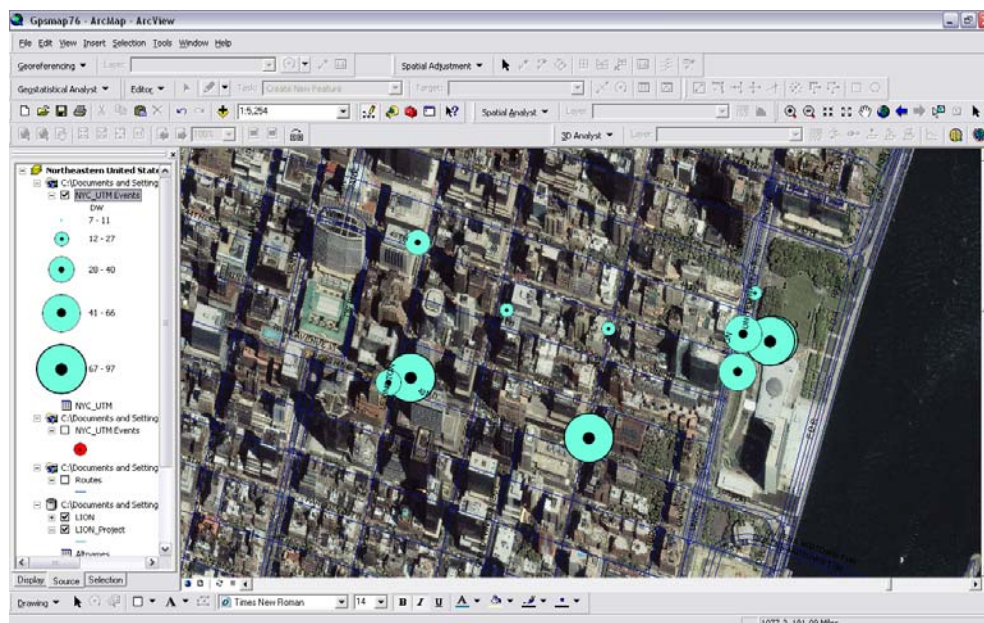
for data and materials for this exercise.

Data note: data was modified to fit the scenario of this exercise.