

FOR 240 – Lab 8 Assignment
Using GPS to Collect Spatial Data of Forest Management
Introduction to Computing in Natural Resources

In this lab, we are going to use the GPS to collect timber cruising data. I do not require you to conduct a real timber cruising. However, you do need to select one 1/10-acre square plot on or close to campus and each plot should contain at least 3 trees. I will divide all the students into 5 groups. The students in one group should work together to finish this lab. The following equipment/software will be used:

1. Garmin Etrex Legend GPS unit (Note: basic principles apply to any unit in Etrex range, but no area calculation option is available for basic Etrex model)
2. GPS data transfer cable
3. GPS Record Worksheet
4. A USB drive to copy your shapefiles

What you need to do are as follows:

1. Identify a plot with three or more trees.
2. Mark boundary of a plot using a GPS unit (see attachments).
3. Create a centerline of a skidding trail (route) by connecting a point outside the plot and a point within the plot (see attachments).
4. Mark locations of trees (see attachments).
5. Transfer your data from GPS to desktop PC using ArcGIS MxGPS 9x. I suggest you create a directory FOR240\Lab8 before transferring the data (see attachments).
6. Generate a map which should have tree locations, a skidding trail, and a plot boundary (see attachments). **This map should be finished individually.**

Please provide me a typed **summary report** that should address your experience of GPS data collection and data transfer. **A map** that outlines the plot with tree locations and a skidding trail also needs to be attached to your report by the beginning of our lab next week.

1. Getting started with a GPS receiver

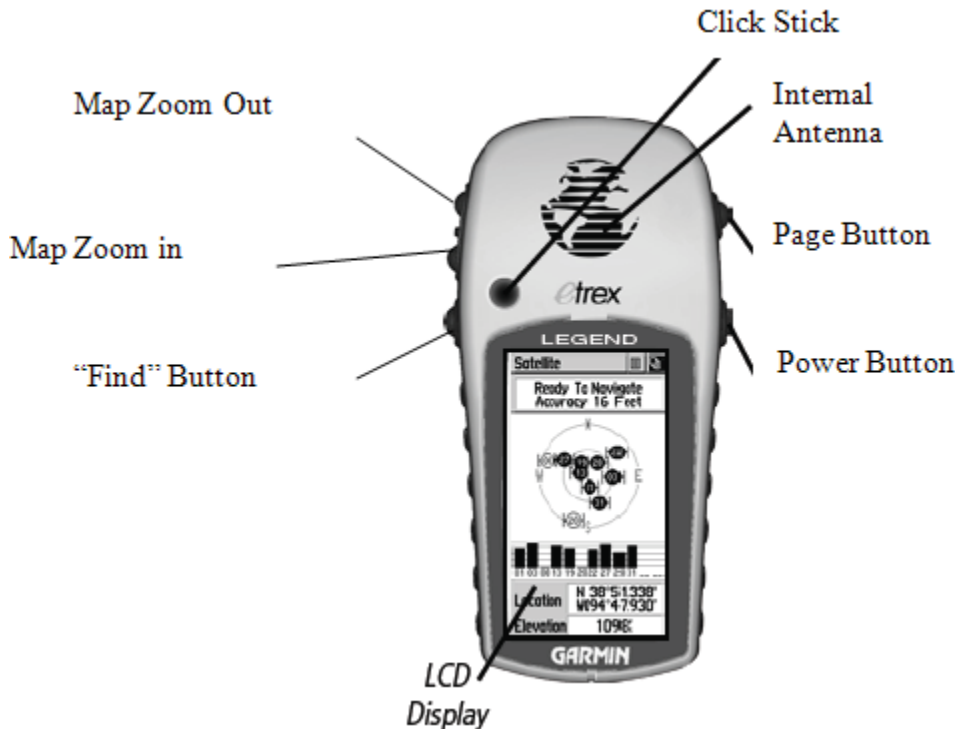


Figure 1. GPS unit.

Go to your starting point – i.e., the boundary or a corner point of a plot.

- Switch on GPS unit by pressing the **Power** button (lower button right hand side)
- Press the **Page** button (upper button right hand side) to see the **Satellite** page
- Wait until the unit is **Ready to Navigate**.

2. Mark boundary of a plot

- Click the **Page** button to open the **Main Menu** and select the **Tracks** icon. Click the **Click Stick** to enter into next page.
- Set the **Track Log** to **on** by moving the cursor to the **on** button and hit **Click Stick**. Make sure that the **Track Log** is clear at this point by moving the cursor to the **Clear** button. You do not want extraneous data in the log when you begin collecting your track data.
- Navigate back to the Satellite page.
- For polygon data: begin at an easily recognizable spot and walk around the boundary of the plot. Be sure to follow the contour of the plot as closely as you can. When you reach the end of your polygon, open the **Main Menu** and select the **Tracks** icon using **Click Stick**.
- Set the **Track Log** to **off** by moving the cursor to the **off** button and hit the **Click Stick**.

- Move the cursor to the **Save** button and hit **Click Stick**. In the popped up dialogue, select saving **Entire Log**.
- You can use default name which looks like “24-FEB-09”.

3. Create a centerline of a skidding trail

Follow the same procedures as you create the boundary of a plot. Set the **Track Log** to **on**, and **Clear the Track Log**. The only difference is that you hold the GPS unit and walk along the skidding trail. You can walk from a point outside of the plot to a point inside of the plot. Keep in mind that when you walk to the end point, set the **Track Log** to **off** and then **Save** it.

4. Mark locations of trees

Follow the steps to measure location of one tree. You can measure as many tree locations as you can by repeating the procedures.

- **Press in and hold the click stick for 2 seconds**. This will make the Mark Waypoint page appear (Fig. 2).
- With the **OK** option highlighted, **press on the click stick** to record and save the waypoint. The waypoint is automatically assigned a sequential 3-digit number. Record this number at your worksheet and write memo for it.
- Repeat the above two steps to mark other waypoints.
- When you finish all the locations, turn off the GPS and go back to the computer lab.



Figure 2. Mark waypoint page

5. Data transfer

- Connect the GPS data transfer cable to the serial port of a PC. Connect the other end to the data connector on the back of the GPS unit (Fig. 3)



Figure 3.

- Open ArcGIS 9.3 on your desktop and turn on your GPS unit.
- Go to the top menu and click **Tools** -> **Extensions**, check MxGPS 9x in the popped up dialogue.
- Click **View**-> **Toolbars**, check MxGPS 9x. Now the tool is shown in the interface of ArcMap.
- Click **GPS Unit** -> **Download**. Select **Get Waypoints from GPS**. Click **OK**, when you see a pop up message.

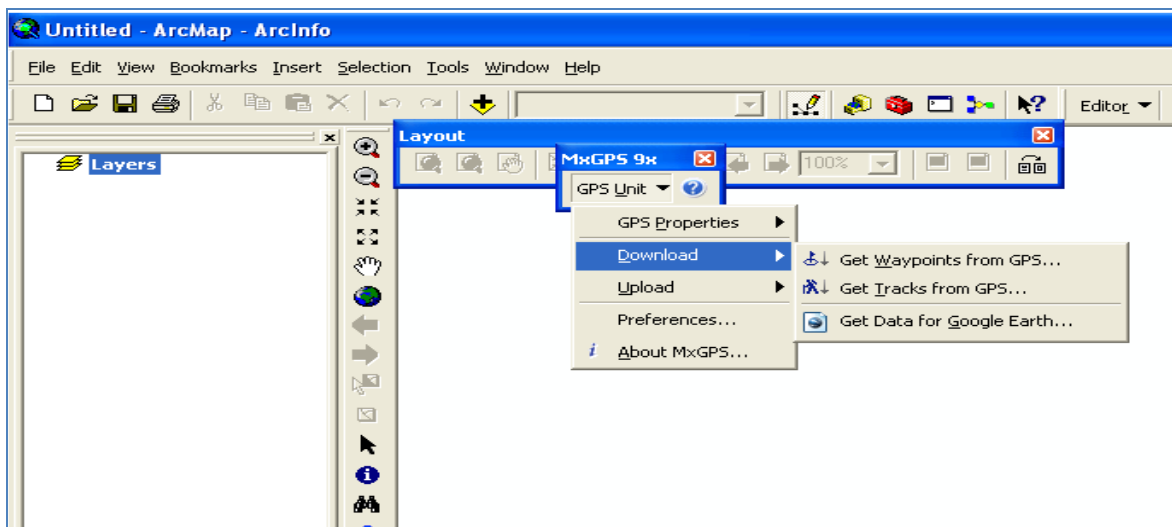


Figure 4.

- Click the first button in Figure 5. All the points you just created are shown in the list table (Figure 6). Select all the points, and then click **Save** (Figure 7). You can

save your files in the directory you created. The file was also added into ArcMap automatically (Figure 8).

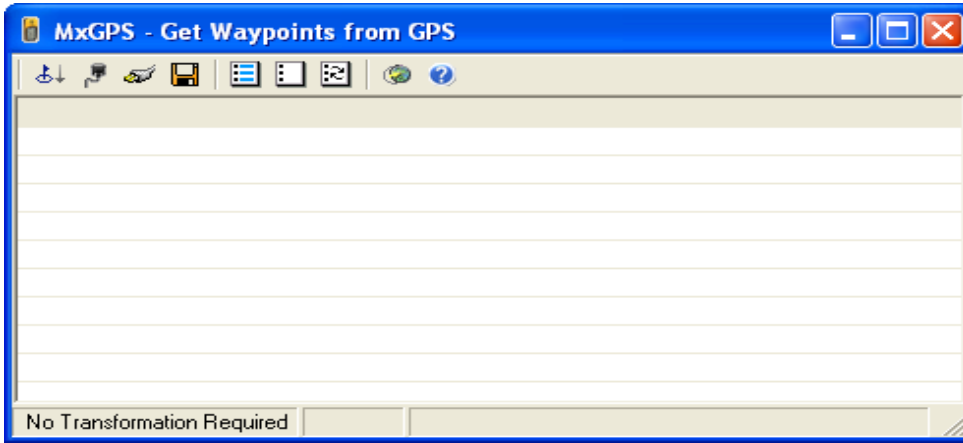


Figure 5.

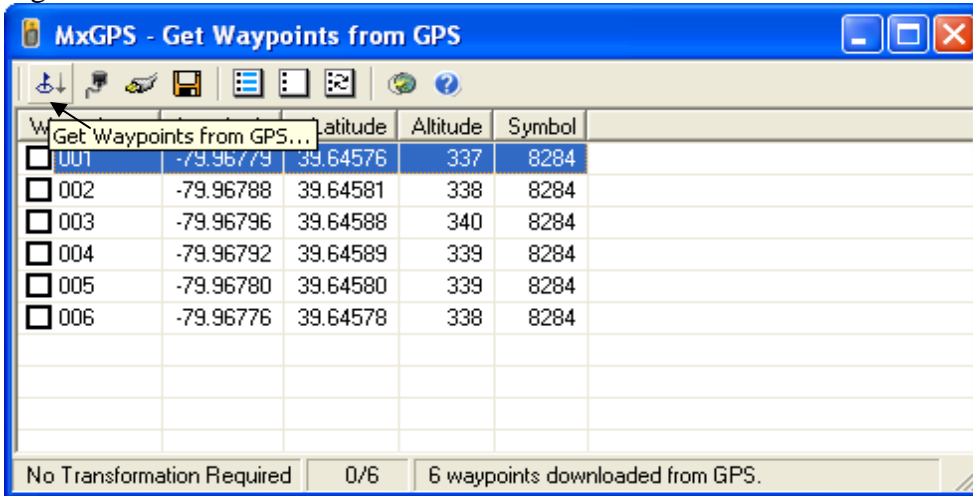


Figure 6.

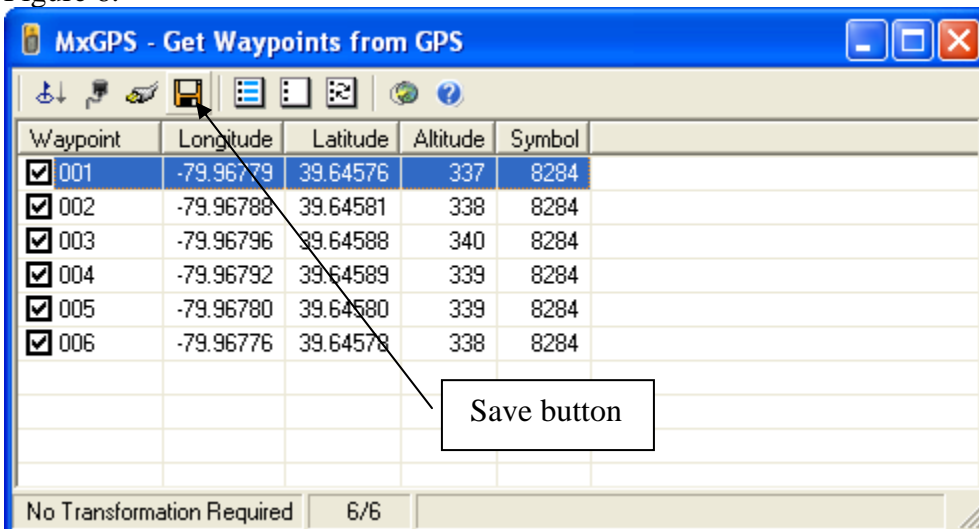


Figure 7.

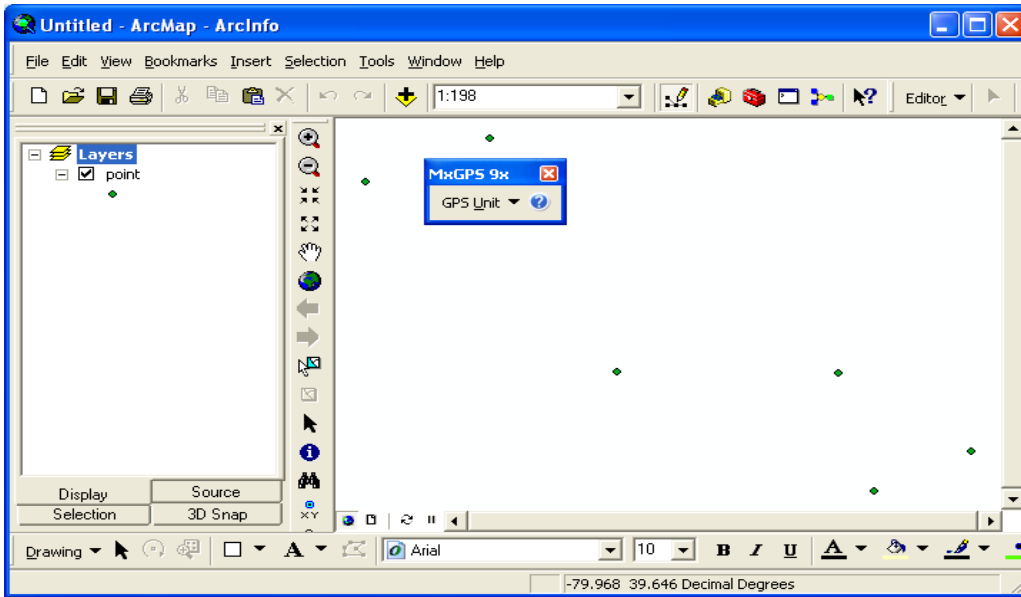


Figure 8.

- Repeat the same procedure to download Tracks from GPS. See Figure 9 and 10. When all the data is transferred, **disconnect** the GPS unit with your PC. The students in one group can go the directory and **copy** all the files to your own USB Drive and work on your own map.

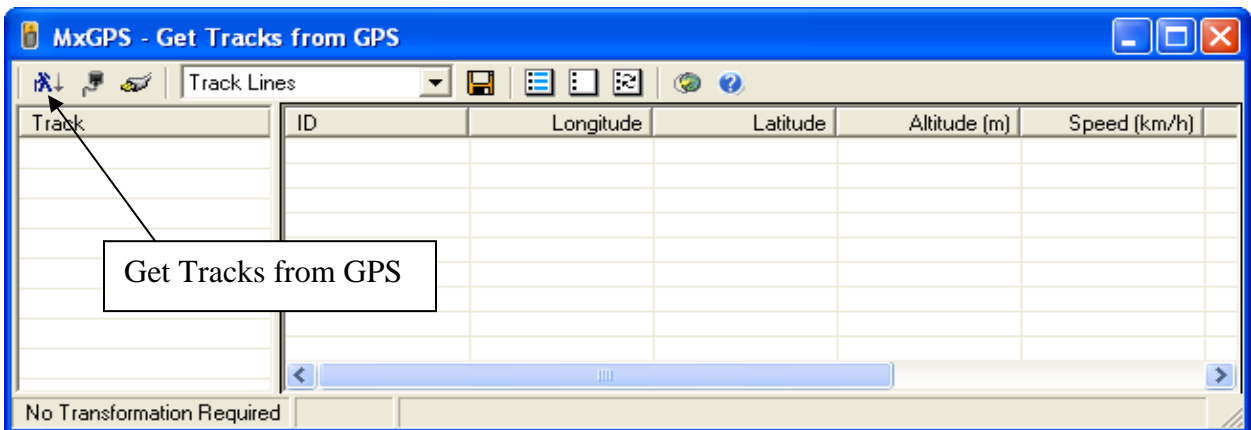


Figure 9.

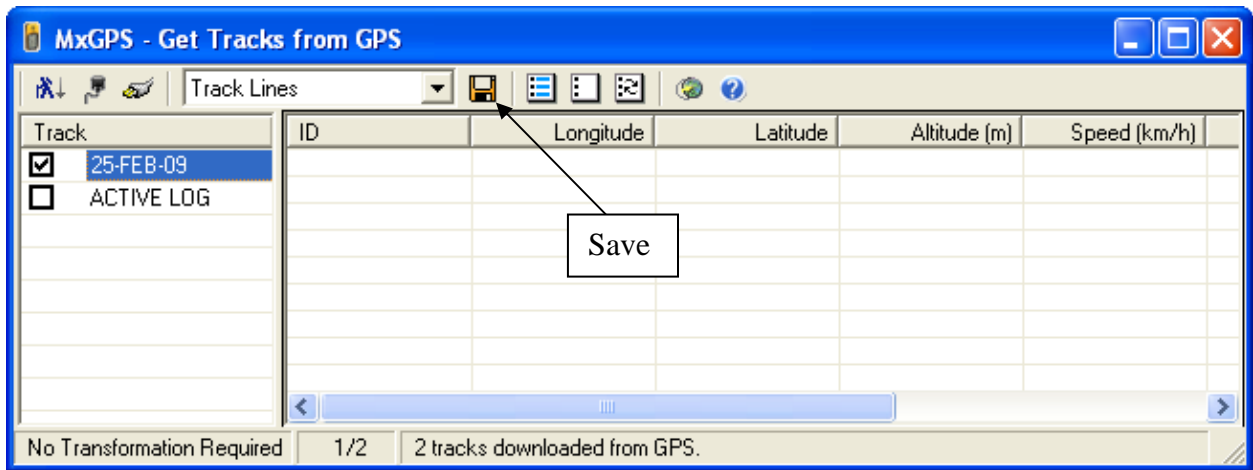


Figure 10.

6. Generate a map

Copy all the data from your USB drive to your PC in the directory FOR240\Lab8 on your desktop. Open ArcMap, and Click **Add** button which looks like a **plus** sign on the top menu. Navigate to the folder where you saved your file and add all the data into ArcMap.

- Click “**View**” on the top menu and then “**Layout View**”
- Click “**Insert**” on the top menu and add all the necessary elements of a map such as “**Title**”, “**Legend**”, “**North Arrow**”, and “**Scale Bar**”. Arrange the position of the elements and make a nice map. Figure 11 is an example of a map.

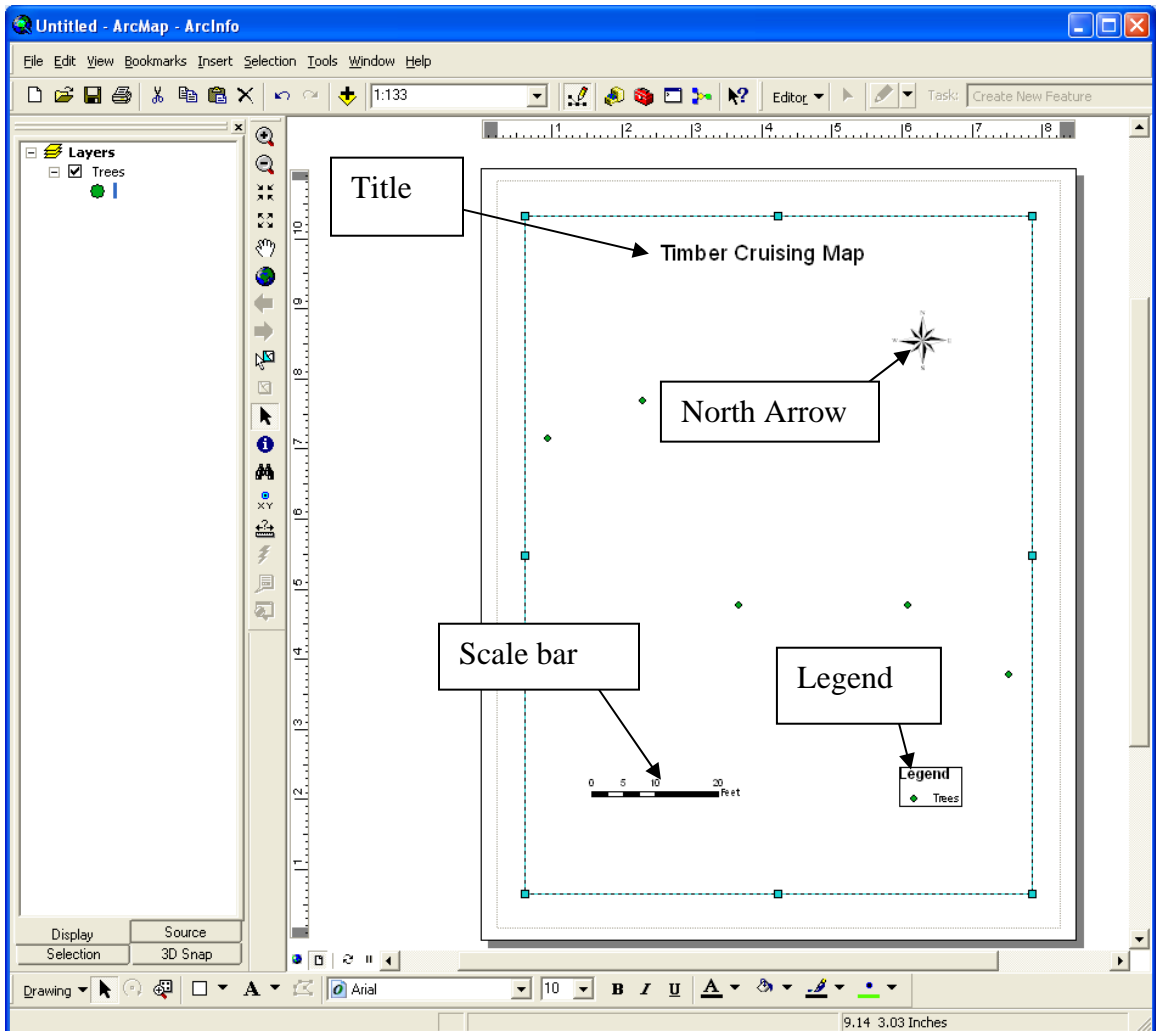


Figure 11.

- When you finish your map, click **File -> Export Map**. Save you file to your own folder and print it out. Everyone should hand in a printed map together with your report. A black and white map is ok for this lab.

