

## Route Planning 101

I may not be the ideal person for presenting this little lesson in route planning, there are many other better and more successful rally riders but because I periodically include the planning stage in my ride reports I commonly get asked questions about this subject.

My hope is that this post can be added to with other riders who want to clarify, add to or even show other methods and thereby make a very useful resource for new riders – at least one that will be useful until this generation of software is obsolete.

### In This Lesson

- Learn Latitude and Longitude Basics
- Learn the shorthand versions of Latitude and Longitude and the conversions
- Manually enter some waypoints to Streets and Trips
- Export waypoints to GPSU
- Export waypoints from GPSU to a GPS
- Make a CSV or TXT file for manipulation of waypoints
- Import a CSV, XLS or TXT file to Streets and Trips
- Make a CSV file acceptable for direct import into GPSU
- Import a CSV file Direct into GPSU for export to a GPS

### So here we go:

We are going to use several types of software – this is what I use, not necessarily the best but many of the concepts are the same, and some of the basic information is, well..... basic!

Basic Information: Get to know your new friends Lat and Lon ([Latitude and Longitude](#)). Just remember Latitude lines are parallel. These are equidistant and about 69 miles apart with 90 north of the equator and 90 south. Longitude run north and south from pole to pole. Unlike Latitude (which are like horizontal slices of the earth) these all meet at the north and south pole so they are not parallel to each other. They are about 69 miles apart at the equator but get closer together the farther you get from the equator (since they all meet at the poles). These are also called Meridians and the one that passes through Greenwich, England is known as the prime meridian. The opposite side of the world in the Pacific Ocean is the International Date Line. Unlike Latitude there are 180 of these going east, and 180 west of the Prime Meridian and meeting at the International Date Line (gee, a total of 360 degrees in a circle, how did that ever happen?)

Latitude and Longitude are calibrated in Degrees – yes each one is a single Degree – so 90 degrees north, south, and 180 each east and west covers the world. Each degree consists of 60 minutes (′), each minute 60 seconds (″). No we are not telling time – this is how the world is calibrated..... (don't you remember your geometry??)

Here is where it gets a bit tricky – your GPS usually uses displays this as Degrees Minutes Decimal and would display N39° 45' 30" W119° 15' 20" would end up being N39°45.500' W119°15.333'. What this is doing is shortening the nomenclature by creating a decimal equivalent for the seconds and adding it to the minutes. Since there are 60 seconds in a minute 30 seconds is 0.500 minutes, 20 seconds is 0.333 minutes. Whatever the seconds just divide by 60 to get the decimal equivalent for minutes – then add that decimal equivalent to the minutes.

Streets and Trips and some programs take that even another step by only calling out Degrees Decimal. This shorthand makes N39°45.500 W119°15.333 = N39.7583° W119.2556°. Once again this was shortened by taking 45.500 minutes and dividing it by 60 (60 minutes in a degree), and 15.333 divided by 60 to get 0.2566°. I actually set up a spreadsheet to make quick conversions by entering the degrees minutes and seconds in separate cells and then having it convert to degrees decimal. It is a pretty easy spreadsheet to set up.

The screenshot shows an Excel spreadsheet with columns A through J and rows 1 through 27. The spreadsheet is organized into sections for Latitude and Longitude conversions. The 'Latitude' section (rows 1-14) includes input fields for Direction (N), Degrees (35), and Minutes (10.327), and a 'Results Here' cell. The 'Longitude' section (rows 1-14) includes input fields for Direction (W), Degrees (114), and Minutes (42.649), and a 'Results Here' cell. The 'Streets and Trips' section (rows 8-14) shows the conversion of the input values into decimal degrees: Latitude = 35.1721167 and Longitude = 114.710817. A thick orange horizontal bar is present between rows 16 and 17. The spreadsheet also includes a 'GPS Coordinates' section (rows 23-26) and another 'Streets and Trips' section (rows 19-22).

	A	B	C	D	E	F	G	H	I	J
1		Latitude						Longitude		
2		GPS Coordinates						GPS Coordinates		
3	Direction	N			Known		Direction	W		
4	Degrees	35			Here		Degrees	114		
5	Minutes	10.327					Minutes	42.649		
6										
7										
8		Streets and Trips				Results		Streets and Trips		
9	Degrees	+	35.1721167		Here		Degrees	-	114.710817	
10										
11	Direction	+					Direction	-		
12	Degrees	35					Degrees	114		
13	Minutes	10					Minutes	42		
14	Seconds	19.62					Seconds	38.94		
15										
16										
17										
18		Latitude						Longitude		
19		Streets and Trips				Known		Streets and Trips		
20	Degrees	+	35.1721167		Here		Degrees	-	114.710817	
21										
22										
23		GPS Coordinates						GPS Coordinates		
24	Direction	N			Results		Direction	W		
25	Degrees	35			Here		Degrees	114		
26	Minutes	10.327					Minutes	42.64902		
27										

Finally, there is another shorthand that is used that you will run into. North, South, East and West, are replaced with "+" and "-". For Latitude, North is "+" and South is "-", and for Longitude, East is "+" and West is "-". The "+" is usually not displayed but the "-" is displayed while the Degree notation is not displayed. So now my N39.7417° W119.2556° becomes 39.7417 -119.2556.

Have you followed all this??? Here is what to remember. The United States is in the Northern Hemisphere and is West of the Prime Meridian – so all of our Lat/Long will be positive Latitude/negative Longitude. If you enter a point into your mapping program and it plots a point in India – you probably screwed up a sign.

OK – now we know some basics. When plotting out a set of way points your task will be different depending on how the waypoints are delivered to you from the rallymaster (RM). The common methods are as follows:

Manually – they will give you a location that you have to look up on a map.

Coordinates – The RM will give you coordinates, maybe as a line item on the Rallybook.

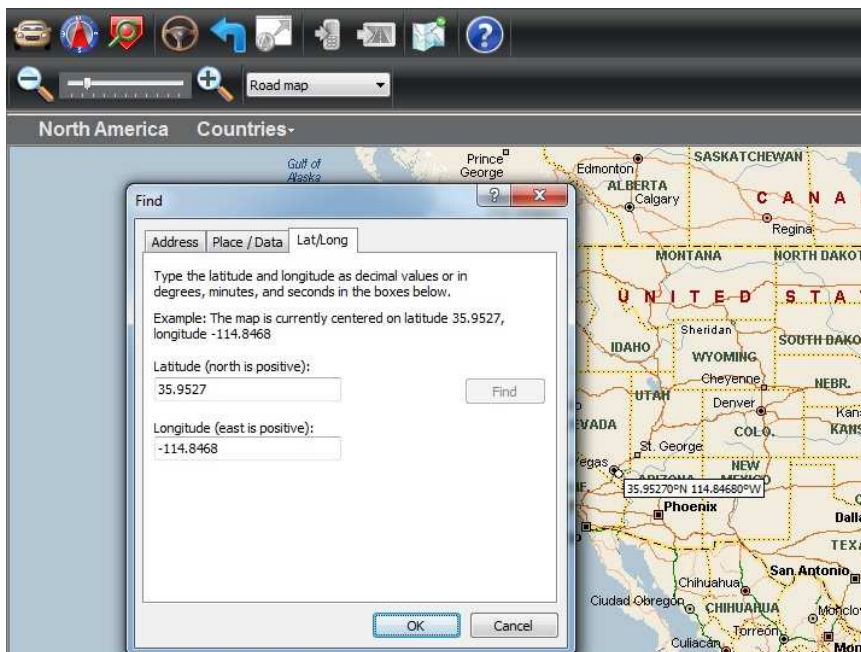
Digital File – The RM will provide a file in possibly several formats.

I am going to use the locations for the Nevada portion of the “Tour of Honor” self directed rally. The locations are provided on the website and here are the locations for Nevada:

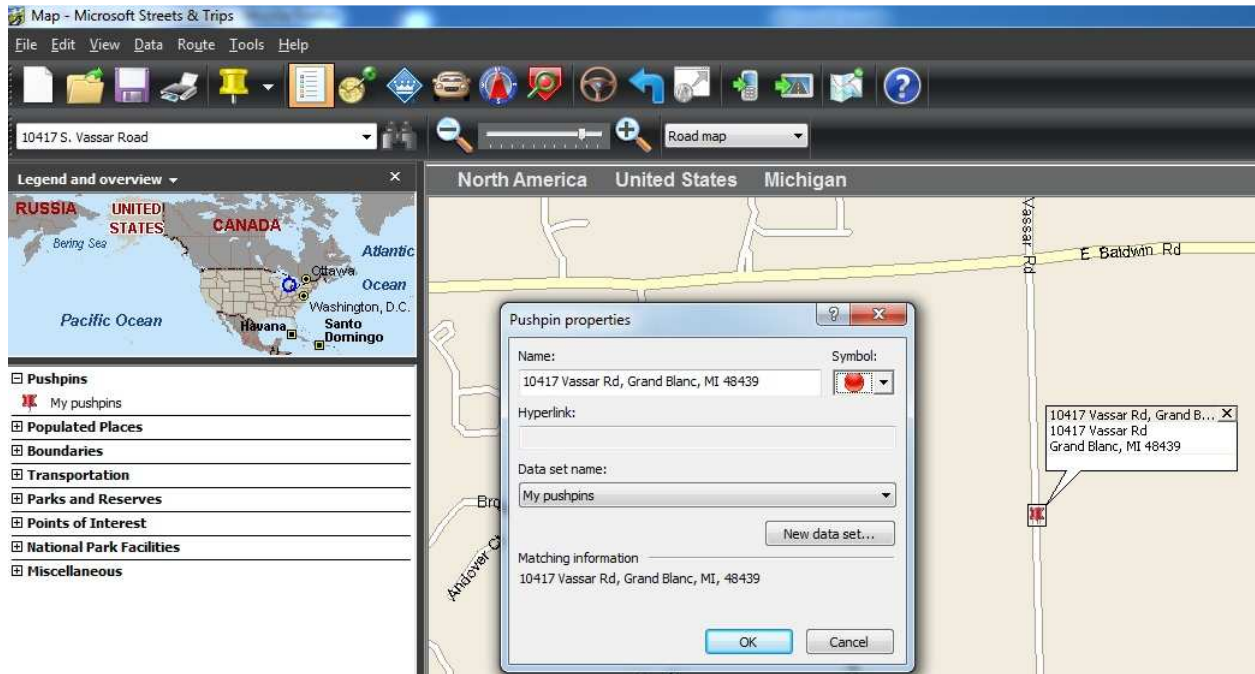
Boulder City	Rocks Memorial	35.9537	-114.8468
Carson City	Vietnam War Mem	39.1684	-119.7533
Elko	Elko City War Mem	40.8332	-115.7628
Ely	White Pine War Mem	39.2476	-114.8894
Hoover Dam	Dam Builders Mem	36.0153	-114.7369
Tonopah	Army Air Field WWII	38.0602	-117.2214
W. Wendover	509 <sup>th</sup> Grp Monument	40.7371	-114.0570

I use Streets and Trips and with a short list such as this with nice easy Lat/Lon provided I would be most tempted to put them in manually, so lets do that.....

On Streets and Trips I call up the “Find” option from the “Tools” menu and click on the Lat/Lon tab to bring up the input for lat lon. Then I enter that and hit “Find” and it locates it on the map.



From here I just hit "OK" on the box and a pushpin is placed at the location and I can then change that name to something short I can recognize on my GPS by left clicking on the pushpin and opening the properties box:



The final with the seven waypoints looks something like this.

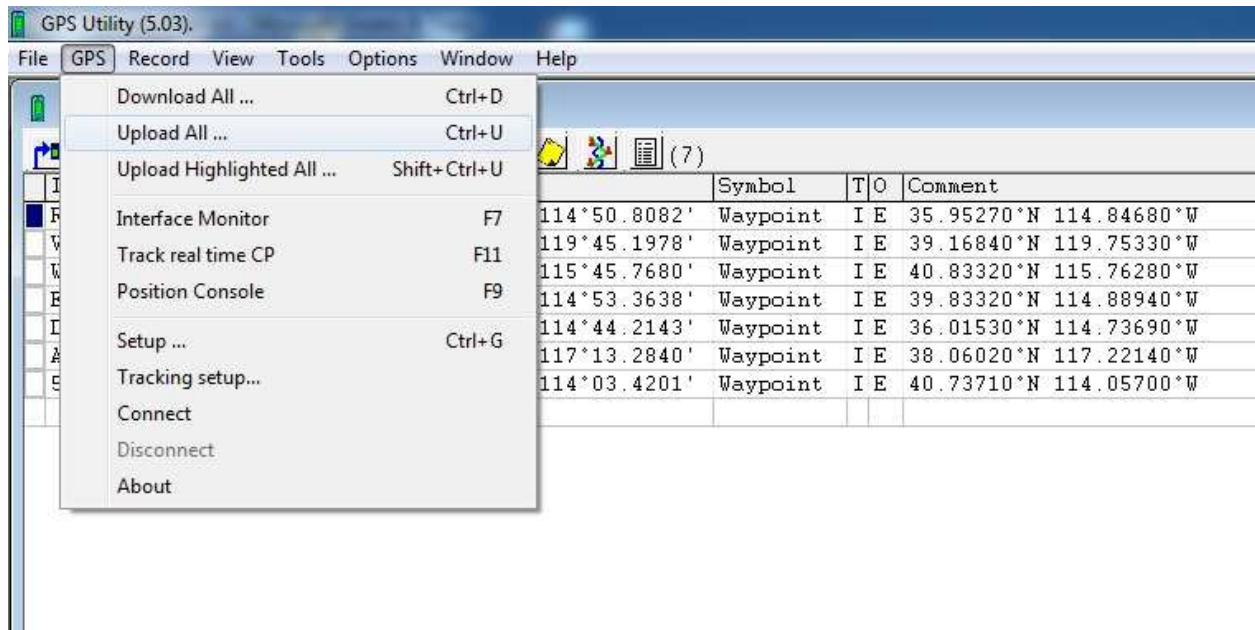


From here things are fairly easy. I simply give this Streets and Trips file a name and save it. Then I call up GPSU (GPS Utility – a Freeware program available on the internet), and then open the Streets and Trips file I just saved.

**NOTE – THOSE USING NEWER GPS UNITS LIKE NUVI'S AND STREETS AND TRIPS 2010 OR NEWER.** There is the ability for Streets and Trips to detect your GPS Unit and download your Waypoints direct to that unit from Streets and Trips. I like using GPSU because it handles a myriad of file types and knowledge of using it can be very handy in a pinch.

Once GPSU is opened I select to open a file and navigate to my Streets and Trips file (select Streets and Trips (.est) file type from the pulldown box). At this point I will be asked what all I want to import. I uncheck Everything except “Pushpins” so all I am loading into GPSU is the waypoints. From here you can see that they are imported as Degrees, Minutes, Decimal. I save this file (as a gps file) just for later use. Then as you can see here – with my GPS already attached to the computer by USB cable I simply select to “Upload” to my GPS from GPSU. This is almost instantaneous and you will hear an audible report from the GPS.

Now the points are in my GPS and will be listed in the “Waypoints” section. Now I am ready to go and ride right up to the sites and capture my bonuses.



Lets do this another way. I will use the same list of bonuses from the Tour of Honor but we will skip the Streets and Trips step and just go direct to GPSU. This is where we have to use Excel. Most programs

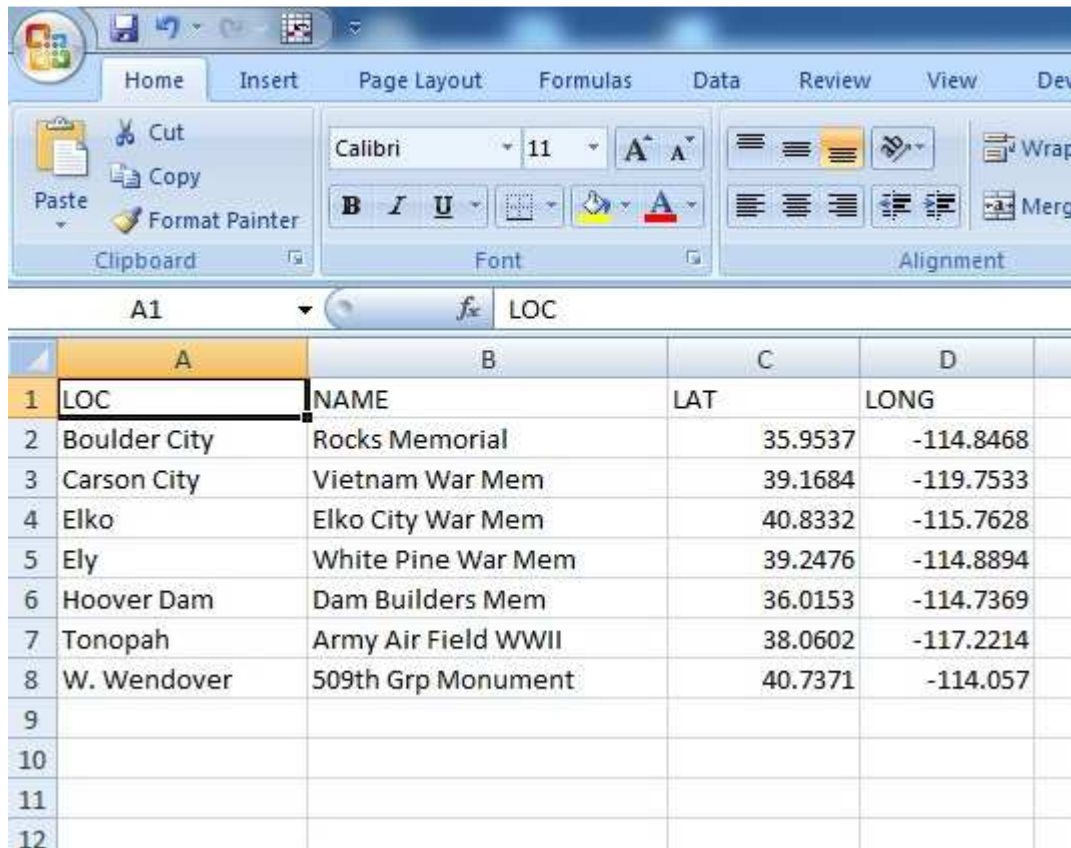


including Streets and Trips and GPSU have the ability to handle basic TXT (Text) and [CSV \(Comma Separated Variable\)](#) files. These are very basic files where each line is an entry. Since there are several pieces of data on each line they should be placed in order and separated by a special character – normally a comma. These files can be generated with a simple text generator like “notepad” “word” and my favorite “excel”.

For instance a TXT version of the TOH files would look something like this:

```
LOC,Name,Lat,Long
Boulder City,Rocks Memorial ,35.9537,-114.8468
Carson City,Vietnam War Mem,39.1684,-119.7533
Elko,Elko City War Mem,40.8332,-115.7628
Ely,White Pine War Mem,39.2476,-114.8894
Hoover Dam,Dam Builders Mem,36.0153,-114.7369
Tonopah,Army Air Field WWII,38.0602,-117.2214
W. Wendover,509th Grp Monument,40.7371,-114.0570
```

In Excel it would look like this



The screenshot shows the Microsoft Excel interface. The ribbon includes Home, Insert, Page Layout, Formulas, Data, Review, View, and Developer. The Home ribbon is active, showing options for Clipboard (Cut, Copy, Paste, Format Painter), Font (Calibri, size 11, bold, italic, underline, text color, background color), and Alignment (wrap, merge). The active cell is A1, containing the text 'LOC'. Below the ribbon is a spreadsheet with the following data:

	A	B	C	D
1	LOC	NAME	LAT	LONG
2	Boulder City	Rocks Memorial	35.9537	-114.8468
3	Carson City	Vietnam War Mem	39.1684	-119.7533
4	Elko	Elko City War Mem	40.8332	-115.7628
5	Ely	White Pine War Mem	39.2476	-114.8894
6	Hoover Dam	Dam Builders Mem	36.0153	-114.7369
7	Tonopah	Army Air Field WWII	38.0602	-117.2214
8	W. Wendover	509th Grp Monument	40.7371	-114.057
9				
10				
11				
12				

I particularly like this because it can easily be manipulated and customized. Get accustomed to using excel – it will bring benefits well beyond rallying.

Either format will import directly into Streets and Trips using the “Import” wizard from the “Data” menu. Very nice is that 2010 Streets and Trips will import direct from Excel. If you have an older version of

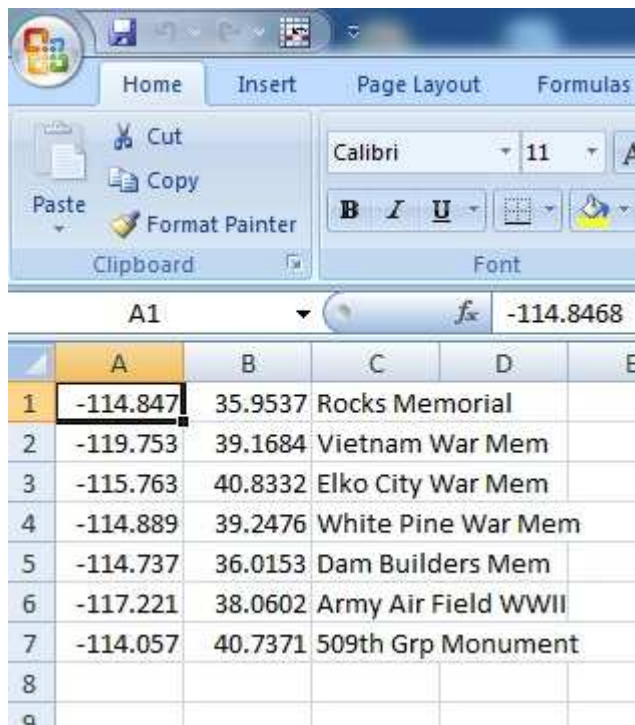
Streets and Trips you will need to save the file (from excel) as a CSV file. This is easier for a long list of waypoints than entering each manually.

What I have been trying to do is not do any routing here – just getting waypoints from paper into my GPS (could even just enter each one separately in the GPS – but that is time consuming). I have been going from Streets and Trips to GPSU to my GPS. Now lets just cut out the mapping program.

GPSU can handle MANY file formats, Streets and Trips, Mapsource, Street Atlas, and TXT. Yes it can handle a TXT or CSV file but this program is not as flexible as the Import Wizard in Streets and Trips. You must set up the file in a specific manner. That format is as follows:

Longitude,Latitude,Name

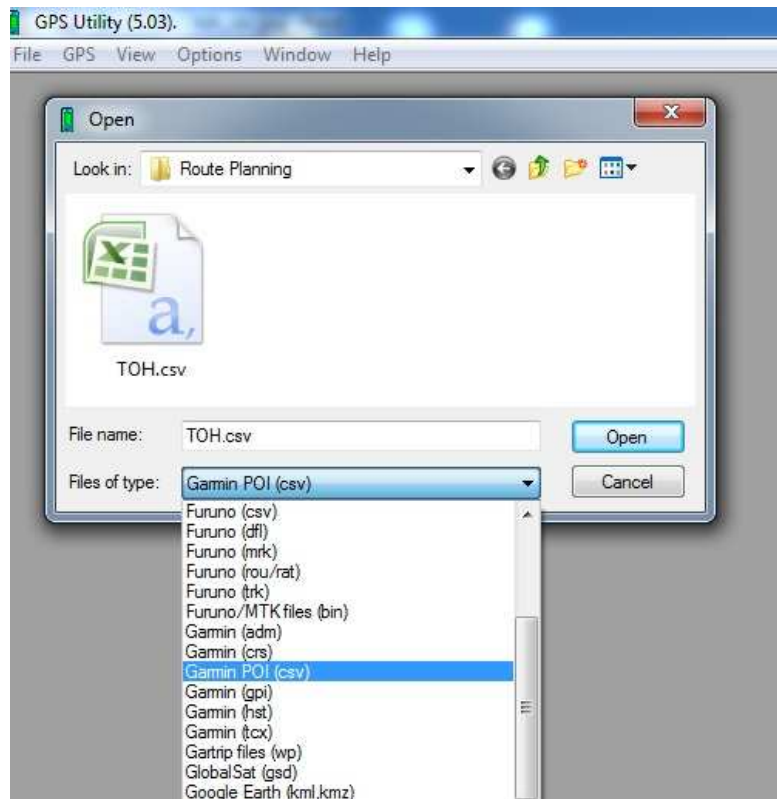
So what I am going to do is take my excel file and make a quick change to format it this way and save it as a CSV file. NOTE: THERE CANNOT BE ANY TITLES IN THE FILE. That file looks like this:



The screenshot shows the Microsoft Excel interface. The ribbon includes Home, Insert, Page Layout, and Formulas. The Font section shows Calibri font, size 11, with bold, italic, and underline options. The active cell is A1, containing the value -114.8468. Below the ribbon is a table with the following data:

	A	B	C	D	E
1	-114.847	35.9537	Rocks Memorial		
2	-119.753	39.1684	Vietnam War Mem		
3	-115.763	40.8332	Elko City War Mem		
4	-114.889	39.2476	White Pine War Mem		
5	-114.737	36.0153	Dam Builders Mem		
6	-117.221	38.0602	Army Air Field WWII		
7	-114.057	40.7371	509th Grp Monument		
8					
9					

This Imports direct into GPSU using the “Open” command from the file menu. From the list of file formats use the “Garmin POI(csv)” option. It will load direct into GPSU if formatted correctly. Then you simply upload to your GPS unit.



We will get into more detail about routing and making/importing more detailed files. Hopefully this lesson has taught you something about manipulating your data, how it is read by the different programs and devices and will prepare you for making more informative files.

Hope this has been helpful

Brian R.