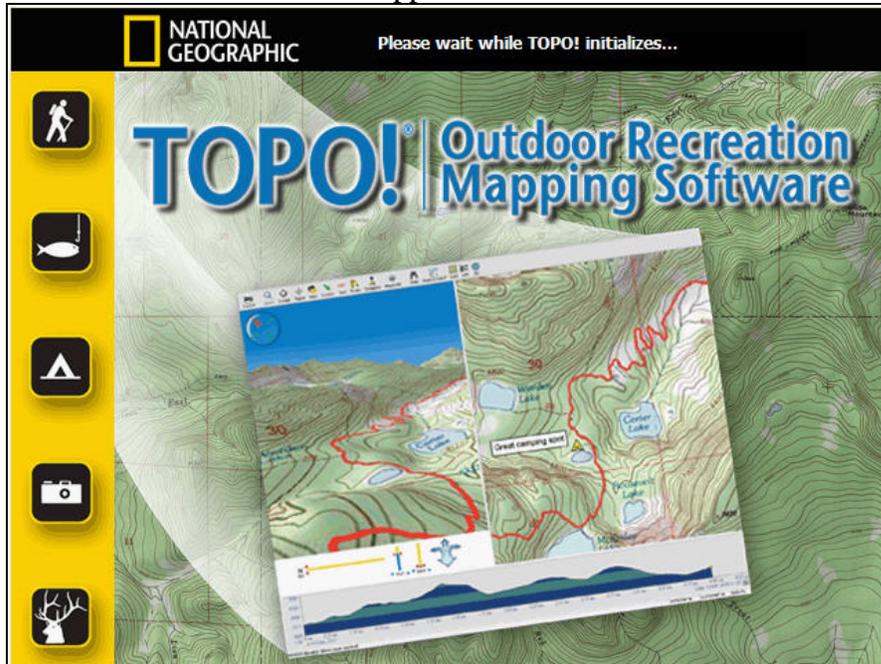


National Geographic TOPO! Demo

A. Getting started

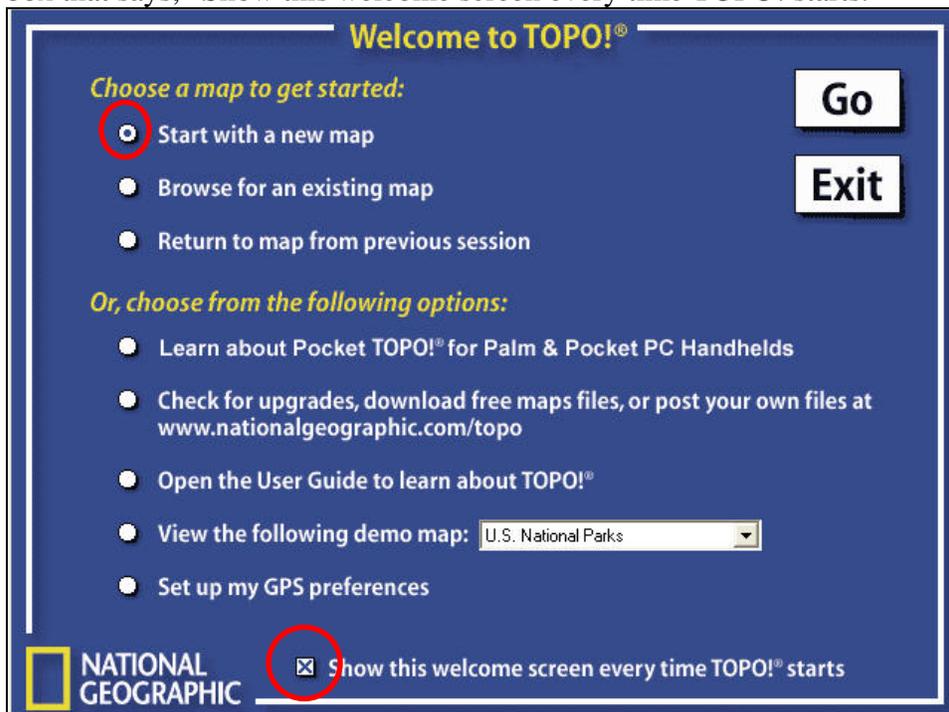
1.) Open TOPO! by double-clicking on the icon.

The initialization screen will appear.



2.) Next a welcome screen will pop up. **Start with a new map.**

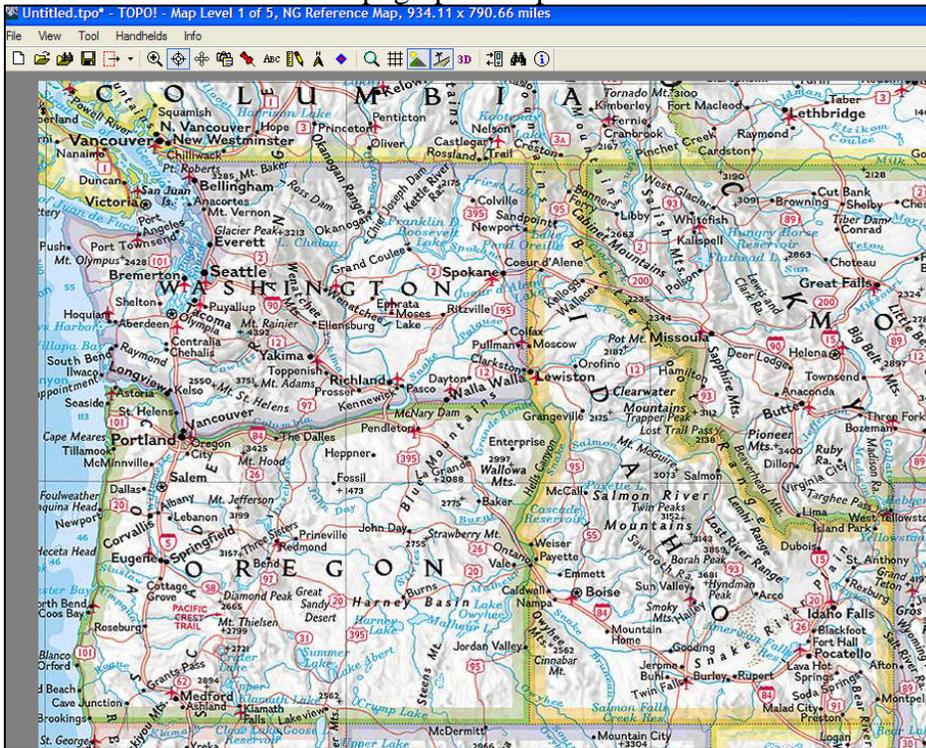
You can have this screen come up every time you open TOPO! or you can uncheck the box that says, "Show this welcome screen every time TOPO! starts."



If you had “Start with a new map” selected, a US map will pop up.
3.) Click the state you are interested in working with (e.g., Idaho).



You will see an overview topographic map of Idaho draw.



Read the top bar to see that this is Map Level 1 of 5. Level 1 is called the Reference Map.

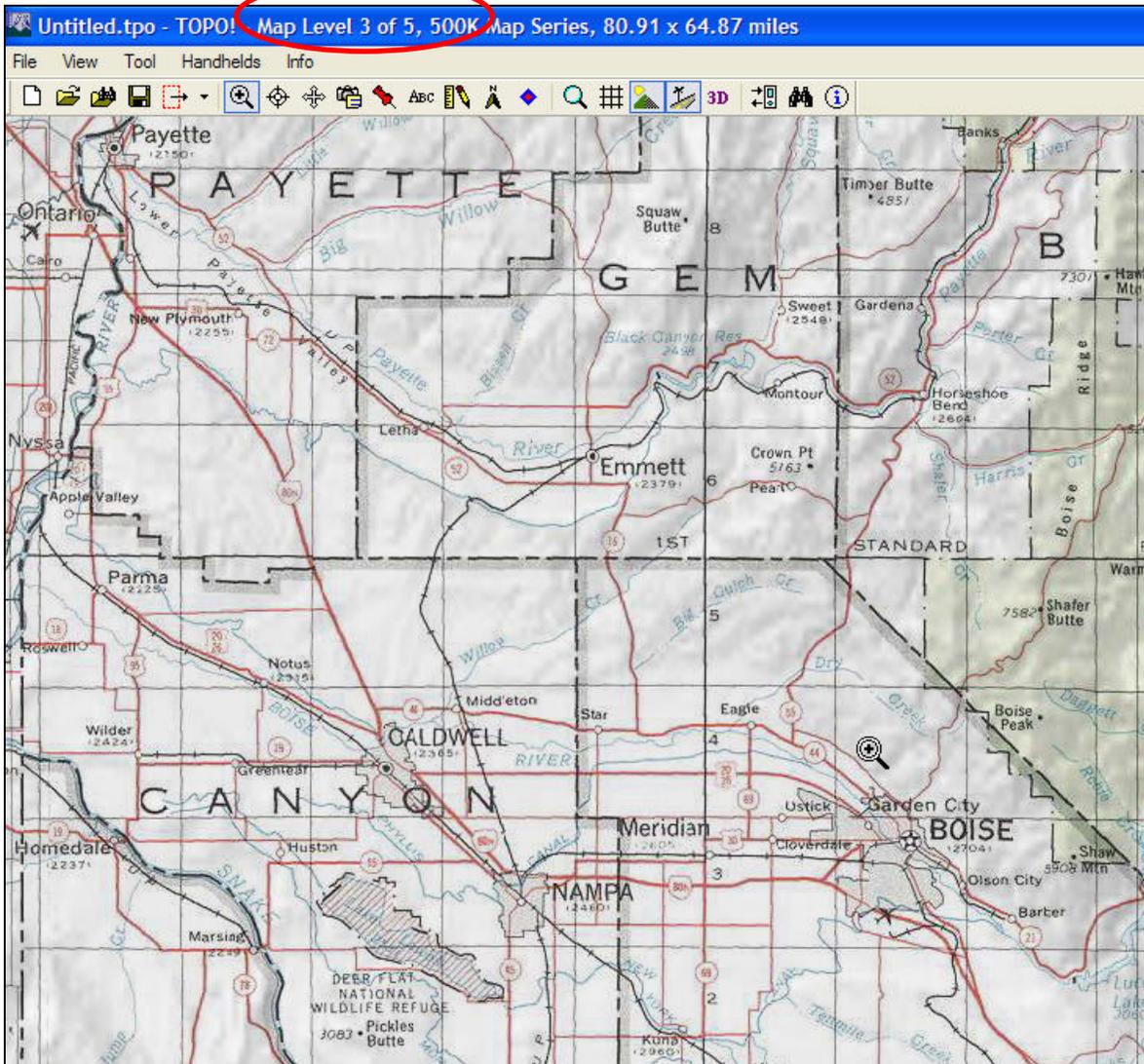


Just below the blue bar you will see drop down menu titles and a variety of buttons in a toolbar. We will cover most of these.

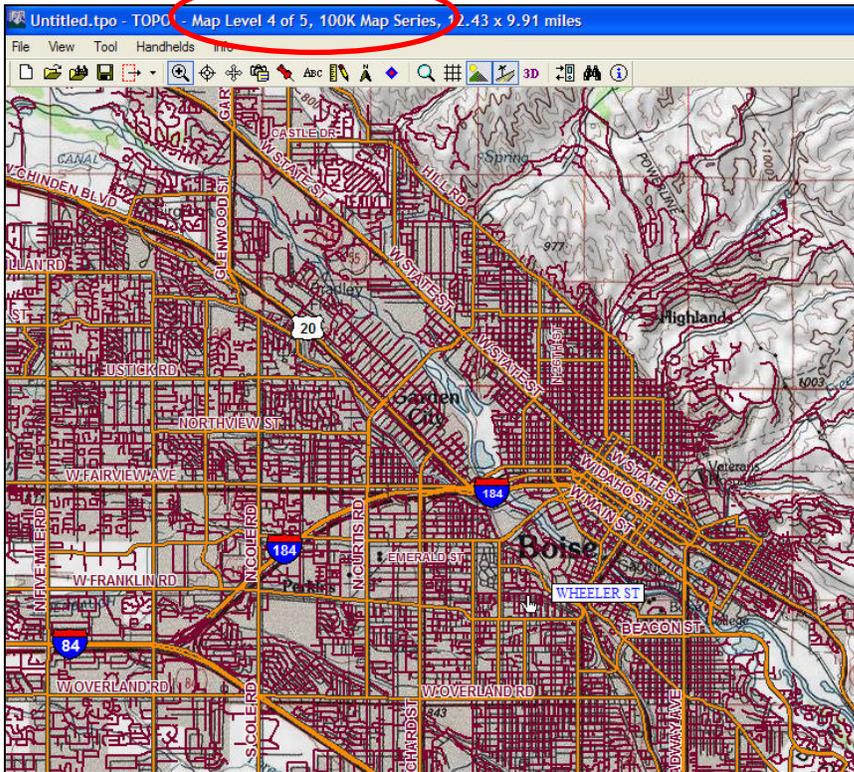
4.) Click on the **zoom tool** which looks like a **magnifying glass**.



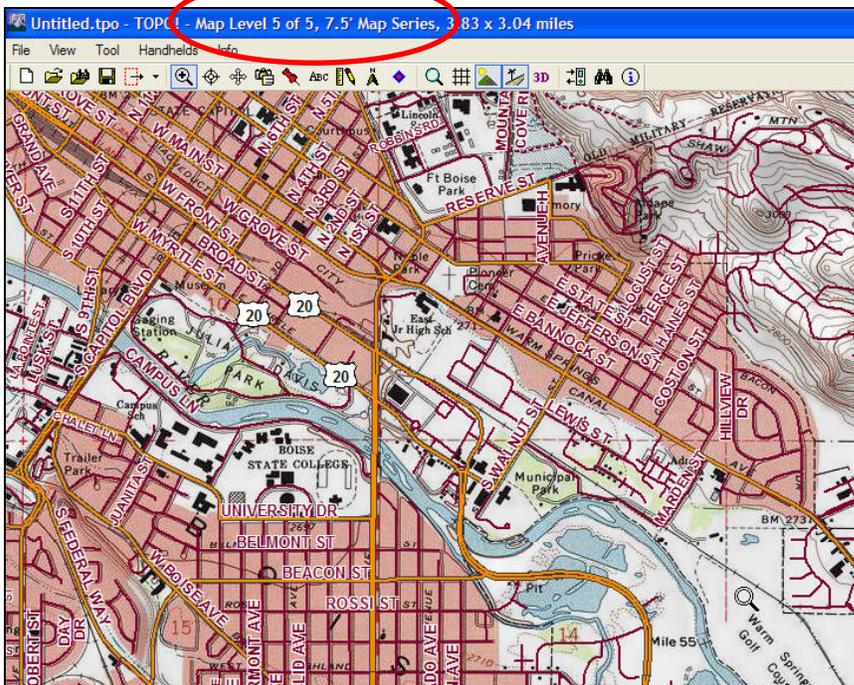
5.) Zoom into Boise by clicking on Boise. Click again. Now you should be at Map level 3 of 5. Notice that the blue bars states level 3 has a resolution of 1:500,000.



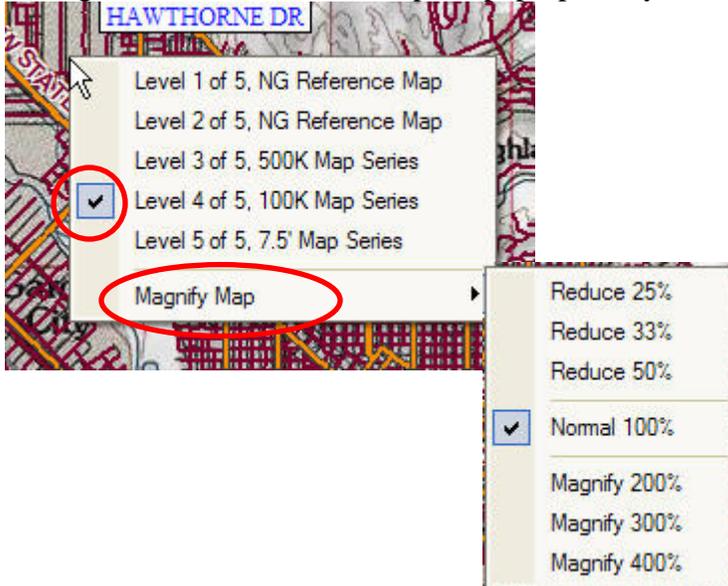
6.) Click again to Map level 4. Notice we are now viewing 1:100,000 scale maps.



7.) Click one more zoom level near Park Center Blvd. to show the 1:24,000 scale map (the same resolution as a 7.5 minute USGS quad map).



8.) Right mouse click on the map. A pop-up tells you the map scale and magnification.



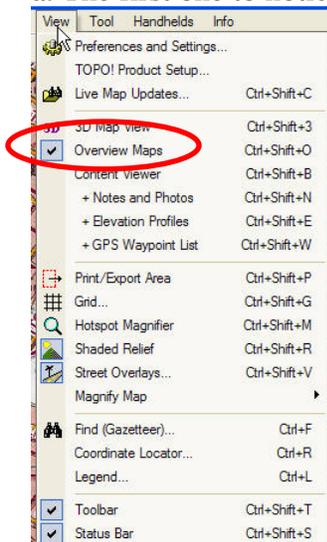
Map level and magnification may be changed quickly this way. Keep in mind the zoom tool changes map level which will take you from a course to a fine resolution (more detail, more contour lines). Magnify Map just zooms you into the map at the resolution that is set. Its like putting your face closer and closer to a paper map. It doesn't give you more detail necessarily because the resolution is only as good as the scanned paper map.

B. View Menu

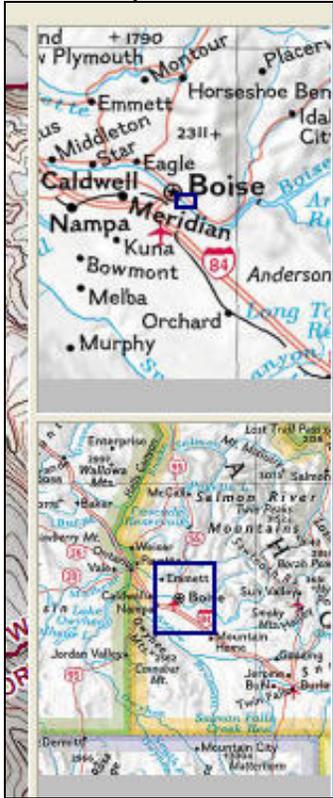
Now that we are zoomed into our location, we will go through some of the drop-down menus and buttons. Click on View to see the list of items available. Its logical to start with Preferences and Settings but before we do that, let's take a look at some of the view defaults that are "turned on" for this project. A view is active when it is preceded by a grey box (and may have a check mark).

1.) Review Defaults

a. The first one to notice is **Overview Maps**.

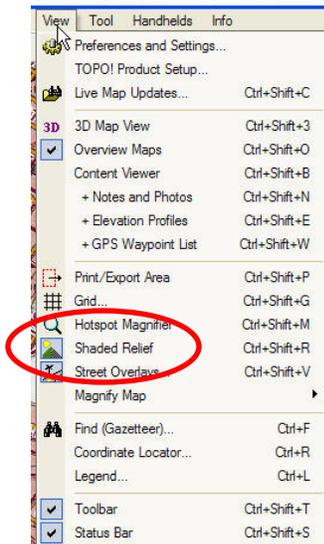


Overview maps are two maps on the right side of your main window. They both use the Map level 5, NG Reference map background. The top map shows the small area you are currently viewing at the 1:24K scale. The bottom map uses less magnification to show the vicinity of the area of interest similar to the area chosen at 1:500K.

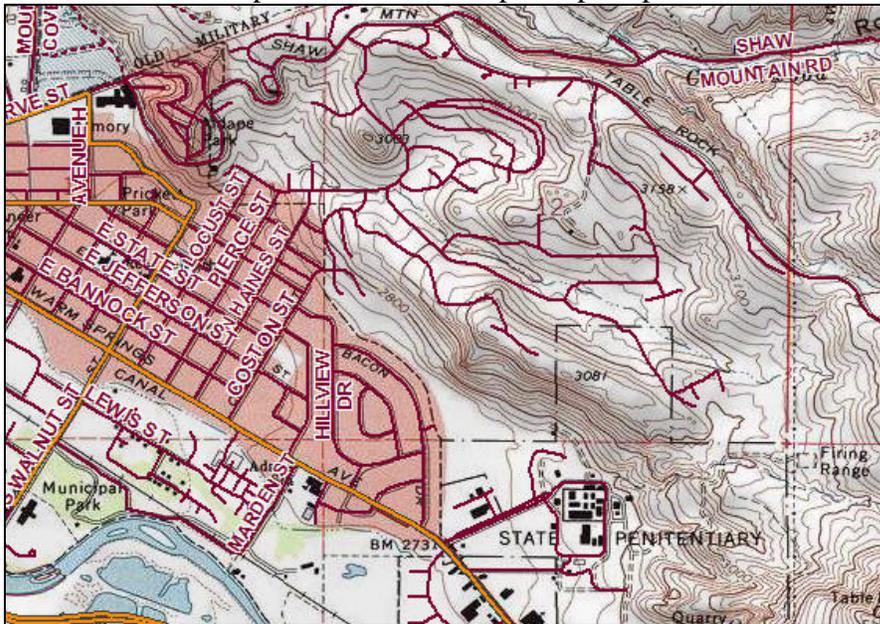


You can turn your overview maps on or off in the **View** menu.

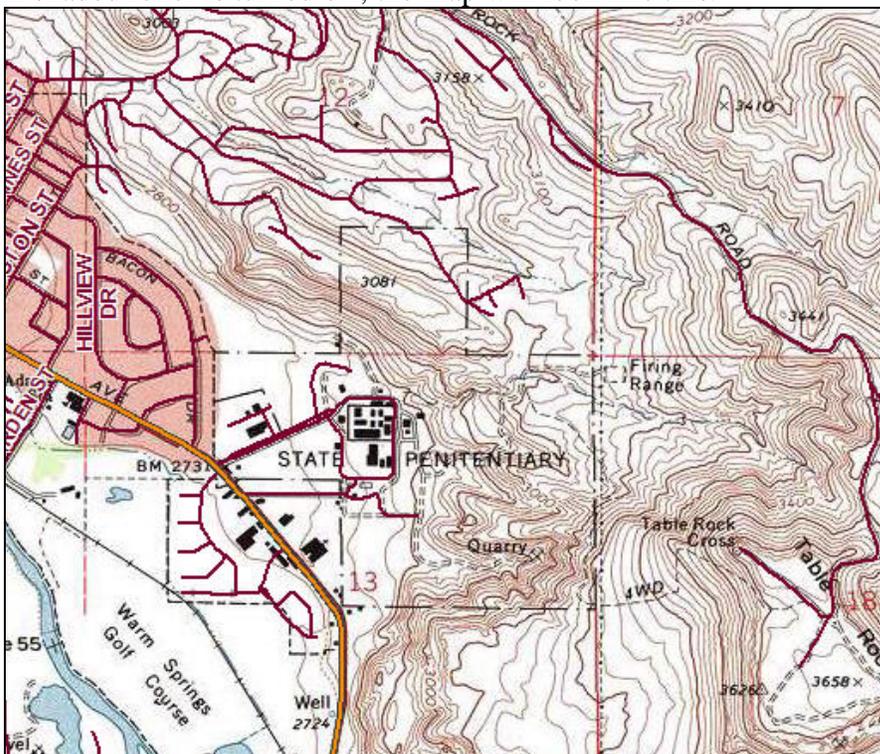
b. The next view item that is turned on is **Shaded Relief**.



This is what the map looks like with topo map draped over a shaded relief map.



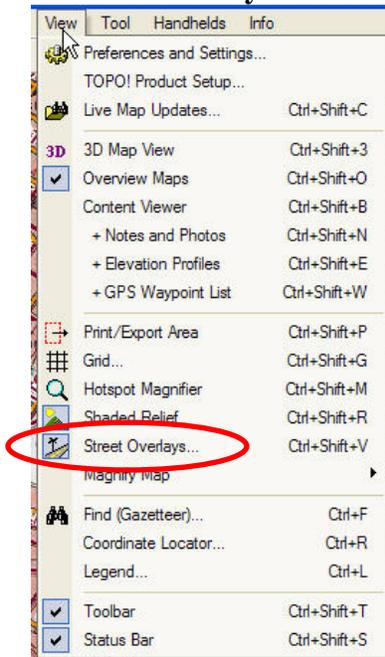
If shaded relief is turned off, the map will look like this.



Q: Why would you turn off shaded relief?

A: There may be times when you want to print a map in black and white or photocopy a color map and shaded relief may distort contour lines on the map.

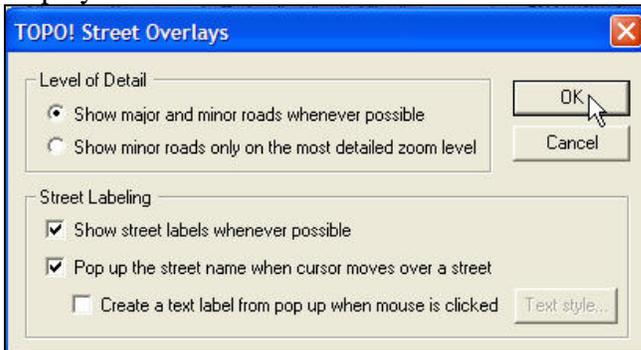
c. **Street Overlays** are also turned on.



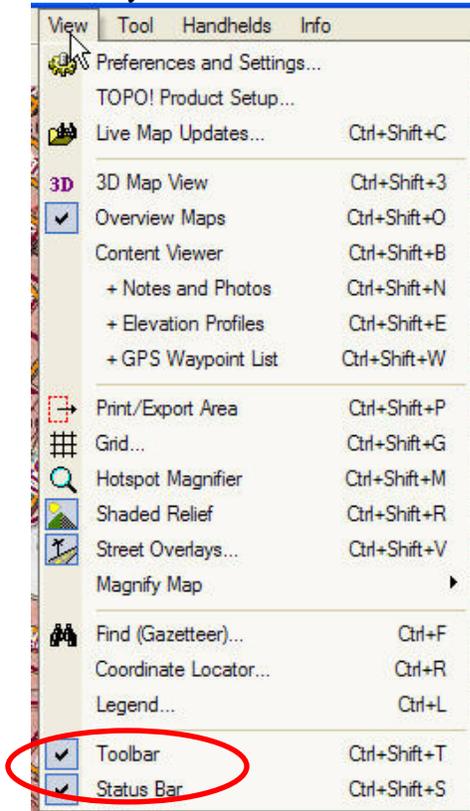
Take a look at the map. Notice road names are showing. If I hover the cursor over an unlabeled road, a label pops up for those roads as well.



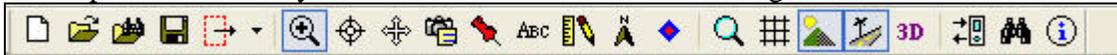
Are your roads on? If not, click **Street Overlay**. You have optional settings for the display.



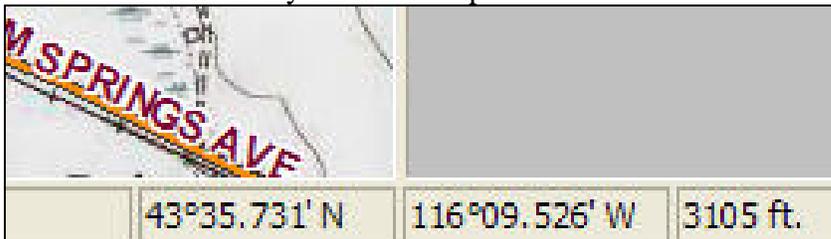
d. Lastly we have **Toolbar** and **Status Bar** turned on.



Mentioned earlier, the **Toolbar** is located below the drop-down menu items at the top of the map window. I may refer to these tools as buttons throughout the demo.

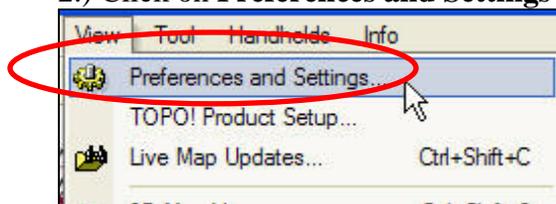


The **Status Bar** displays coordinates and elevation in the bottom right corner of the map window for wherever your cursor is positioned.

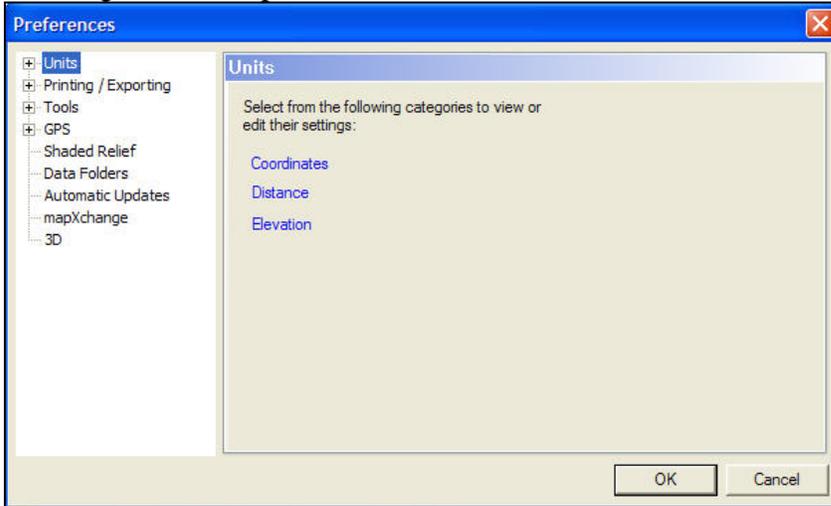


Now we will go through the other **View** options.

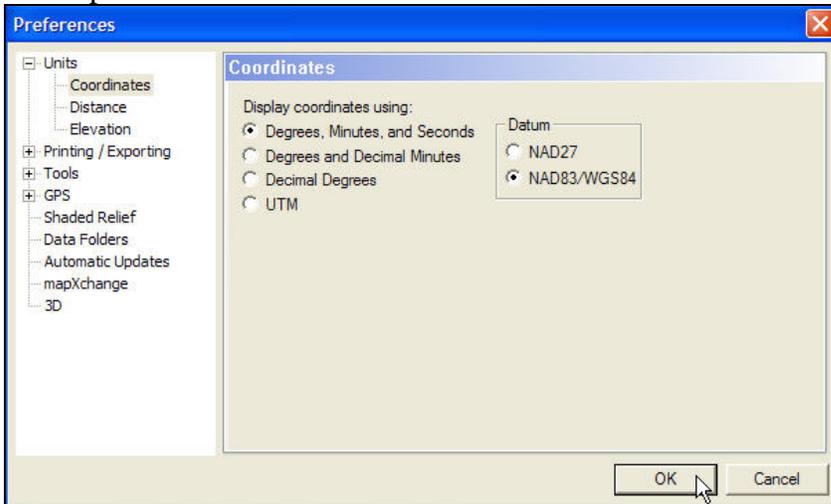
2.) Click on **Preferences and Settings**



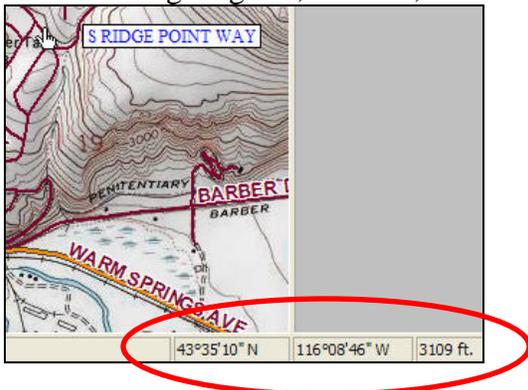
There are many settings to adjust in this dialog box. Click on **Units** and expand the subcategories to set preferences for **Coordinates**, **Distance**, and **Elevation**.



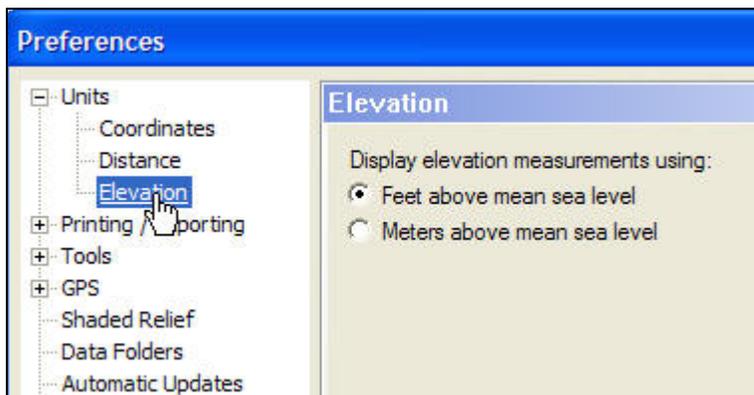
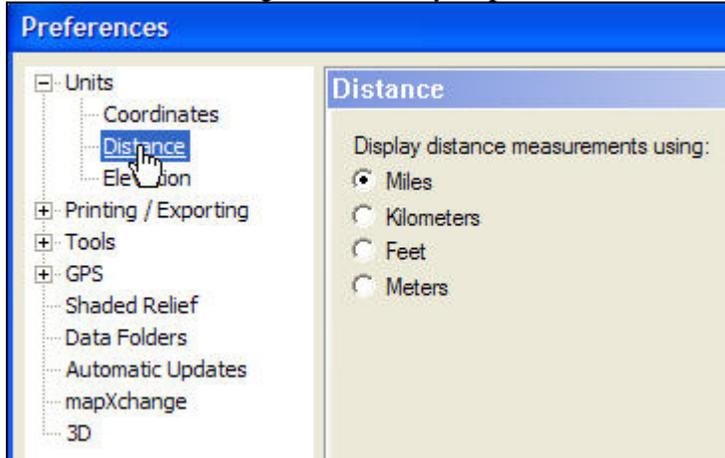
Click on **Coordinates** and change the display setting to Degrees, Minutes, Seconds and the map datum to NAD83/WGS84. Click OK.



Notice as your cursor hovers over locations, the coordinates are displayed in the status bar in lat/long: degrees, minutes, and seconds.



Go back to **View | Preferences and Settings**. You can change the **Distance** and **Elevation** measuring to the units you prefer to work in.

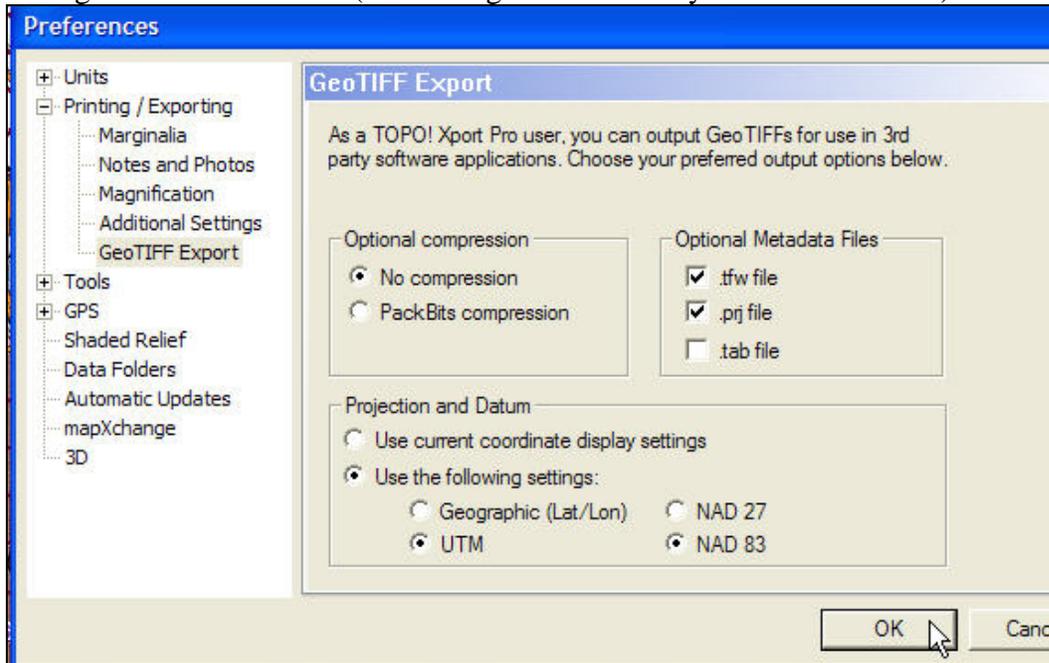


Printing/Exporting preferences offer many modification choices. Click on **GeoTIFF Export**.

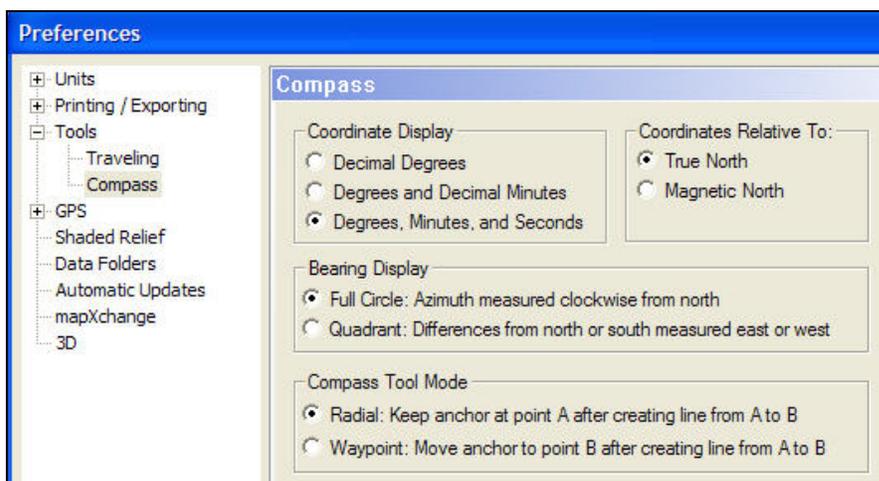
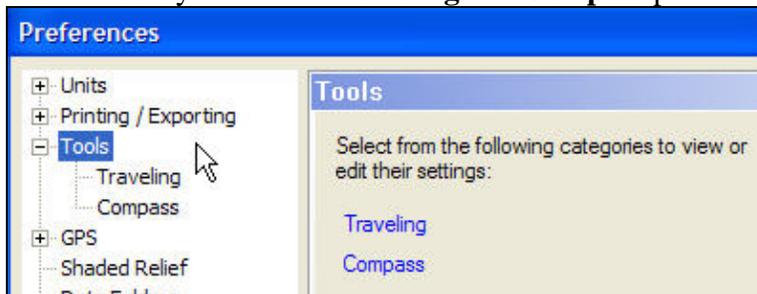


A GeoTIFF is a georeferenced .tiff image. That means unlike an image that is not georeferenced (like a .jpg perhaps), it is tied to a location on the earth. The ability to create geotiffs is one of the most useful applications of the TOPO! software. This means .tiff images created here can be brought into ArcMap and used with other GIS data. I will show you that at the end of this demo.

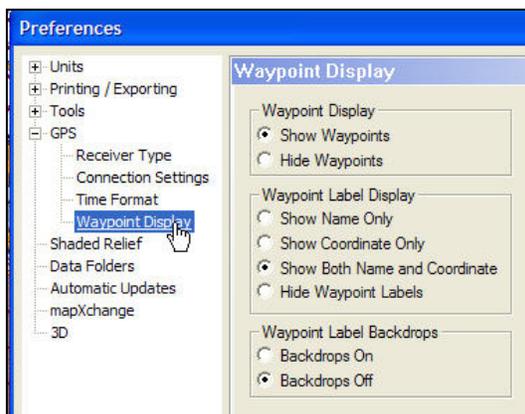
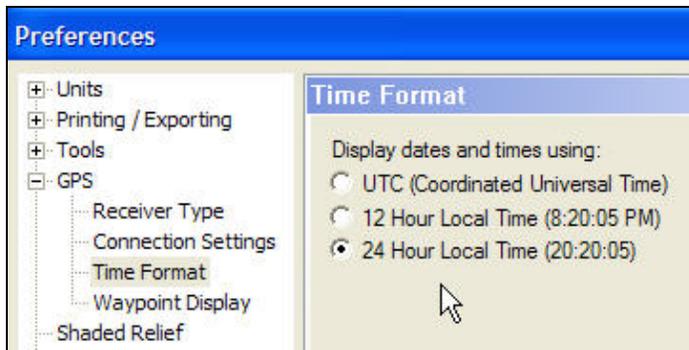
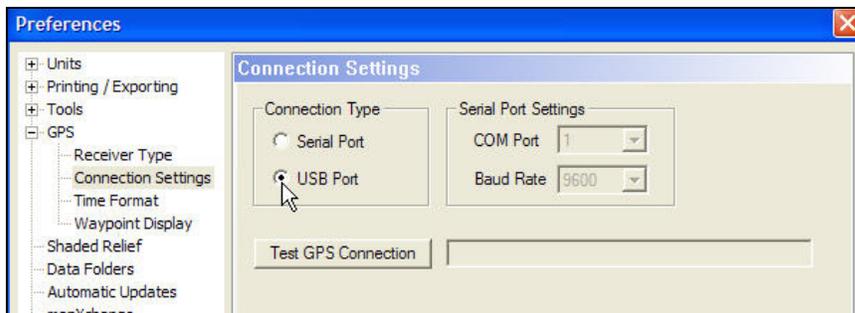
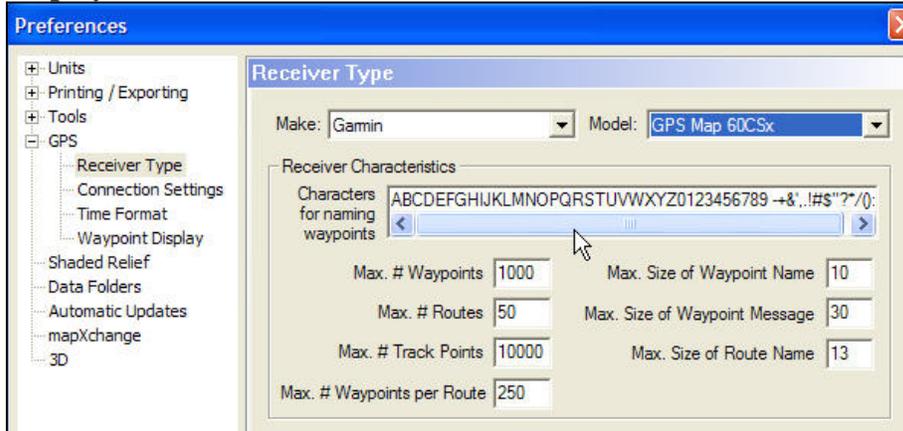
Let's set up the preferences for GeoTIFF. Keep the default setting of **No compression**. Check **Optional Metadata Files** of .tfw and .prj. Choose the **Projection and Datum** settings UTM and NAD83 (this setting should match your other GIS data).



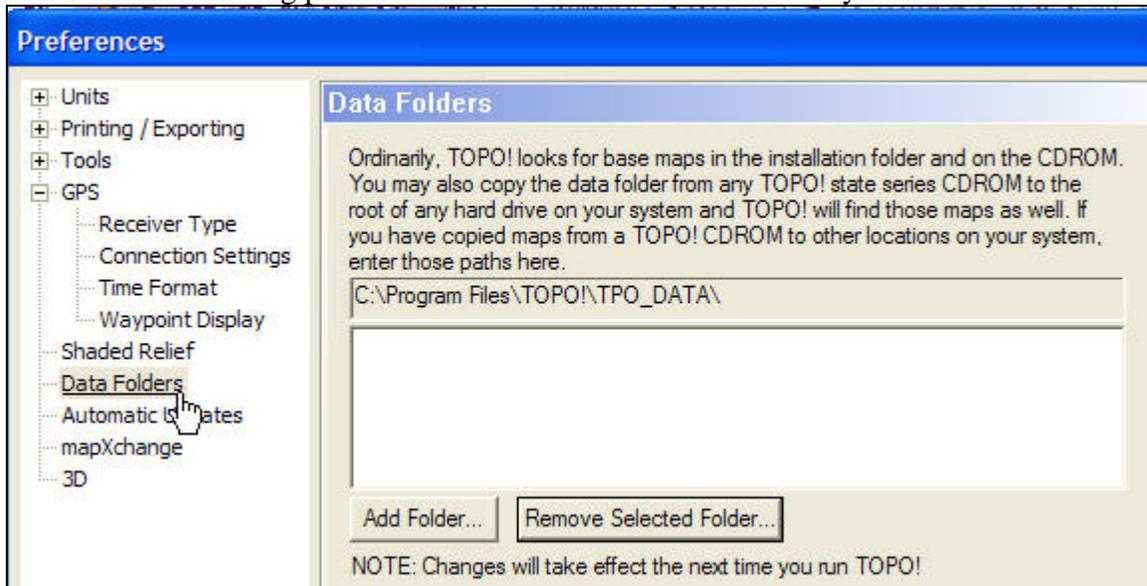
Under **Tools** you can set **Traveling** and **Compass** preferences on your own.



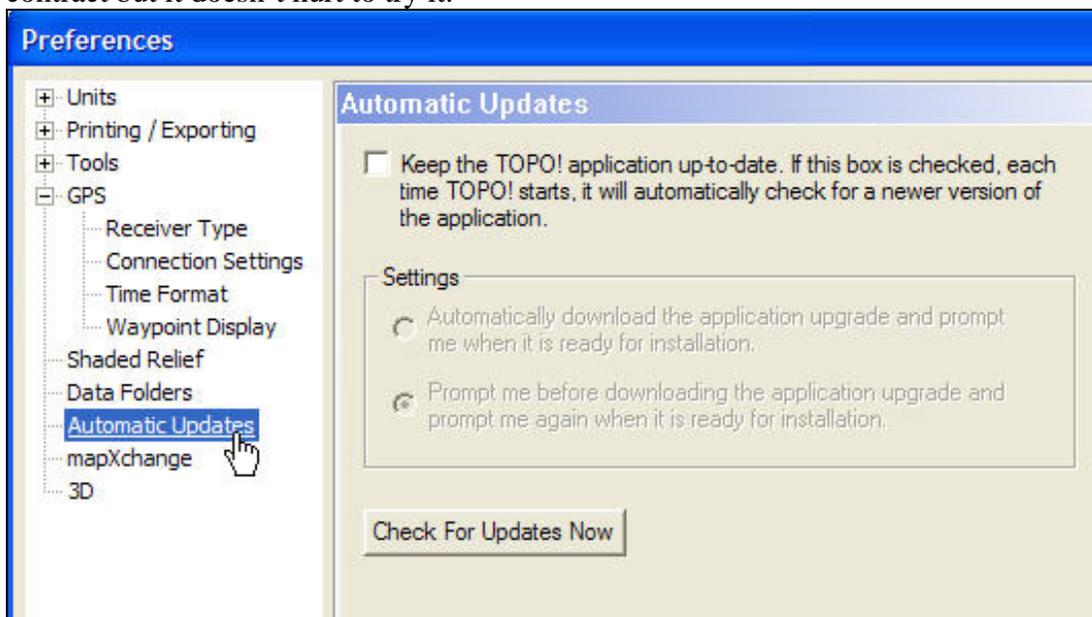
Under **GPS** you may set your **Receiver Type**, **Connection**, **Time** setting and **Waypoint Display**. I will show the use of a GPS receiver toward the end of this demo.



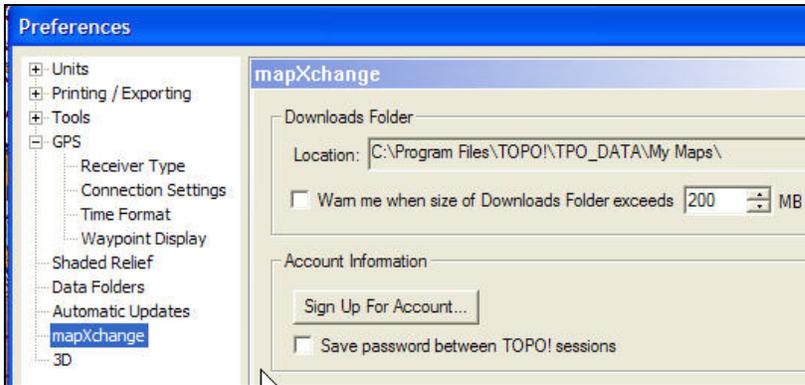
You can also explore options for **Shaded Relief** on your own. The **Data Folders** setting gives you the opportunity to redirect TOPO! to look on your hard drive for maps. When the external hard drive is connected to your computer, you should have no problems viewing all the maps at the various scales. If there is an occasion where you don't want to (or can't) travel with your external hard drive, you can copy folders to your hard drive instead and this setting points the software to look in the location you indicate.



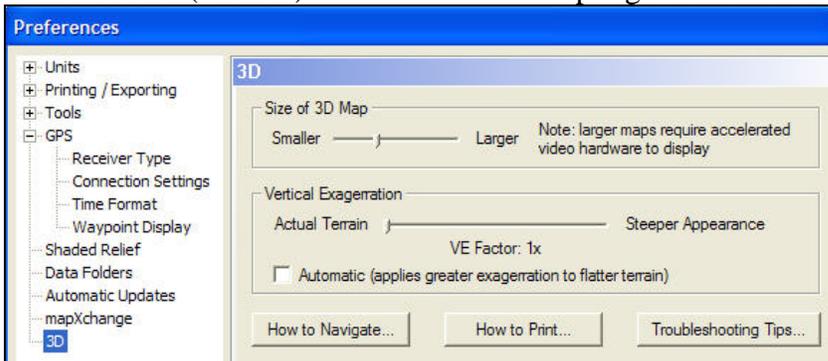
Next is a setting for **Automatic Updates**. I don't know if those are included in our NPS contract but it doesn't hurt to try it.



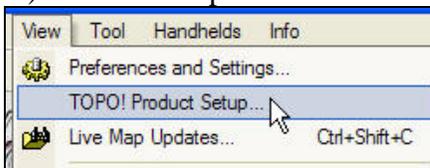
MapXchange is a site that has free downloadable, up-to-date trail and recreational maps you can open, edit and save. See <http://www.nationalgeographic.com/topo> for more information on mapXchange.



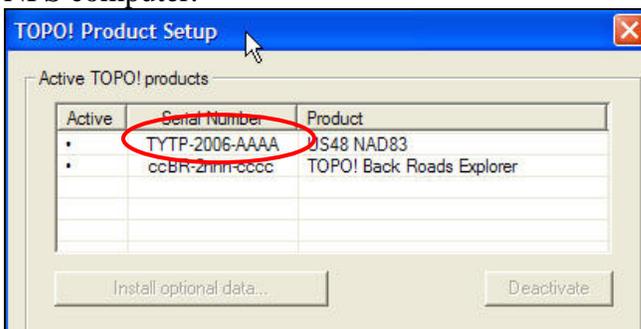
3D is a useful (and fun) tool in TOPO. Accepting the defaults is fine.



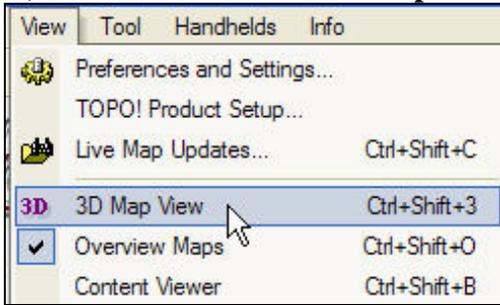
3.) The next drop down item under view is **TOPO! Product Setup**



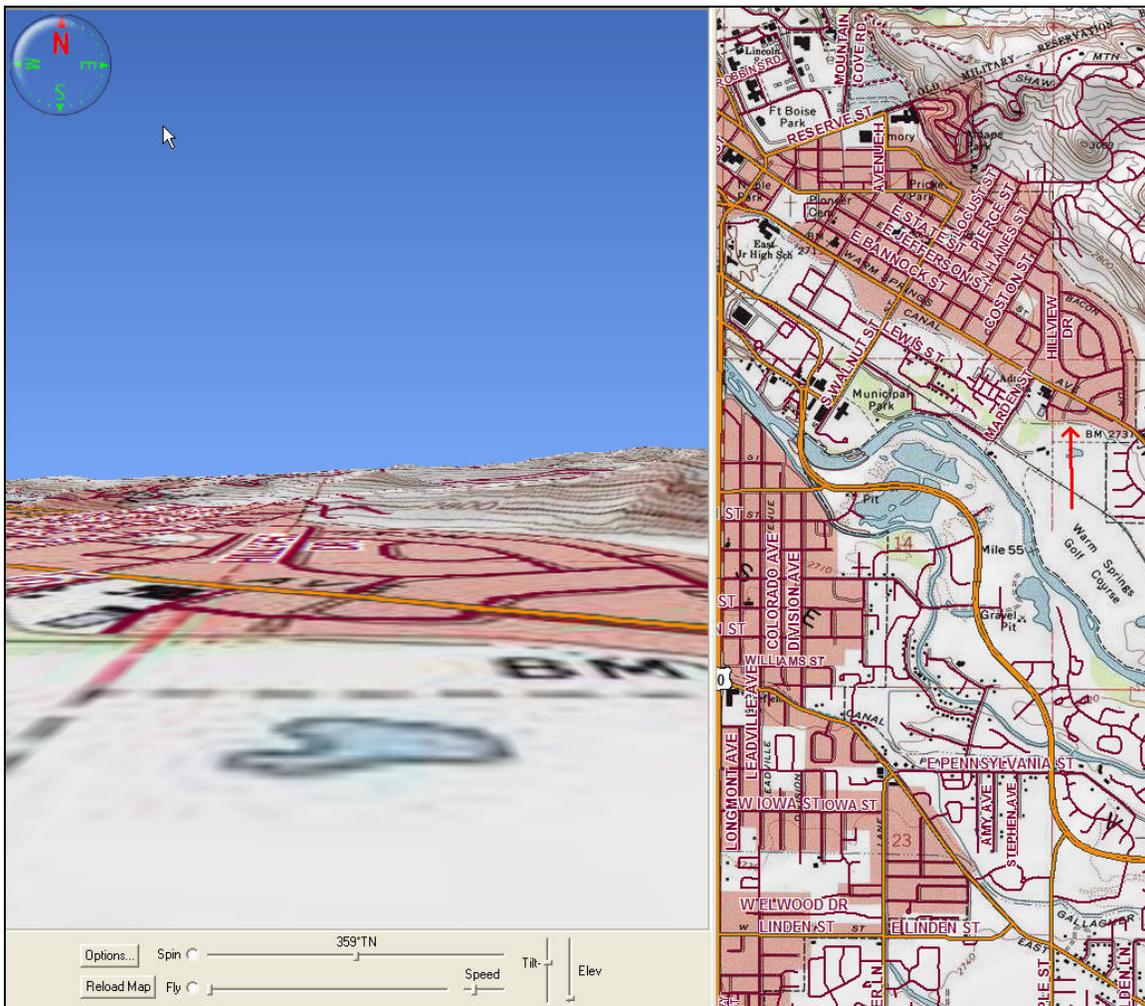
This window shows you the serial number for the NPS contract license with National Geographic. This is good to know in case you want to install the software on another NPS computer.



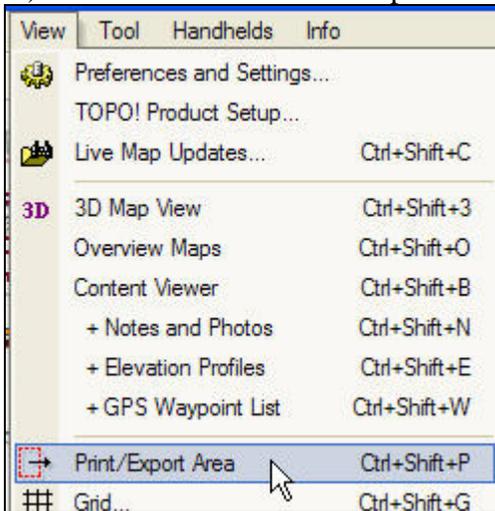
4.) Next let's look at the **3D Map View**.



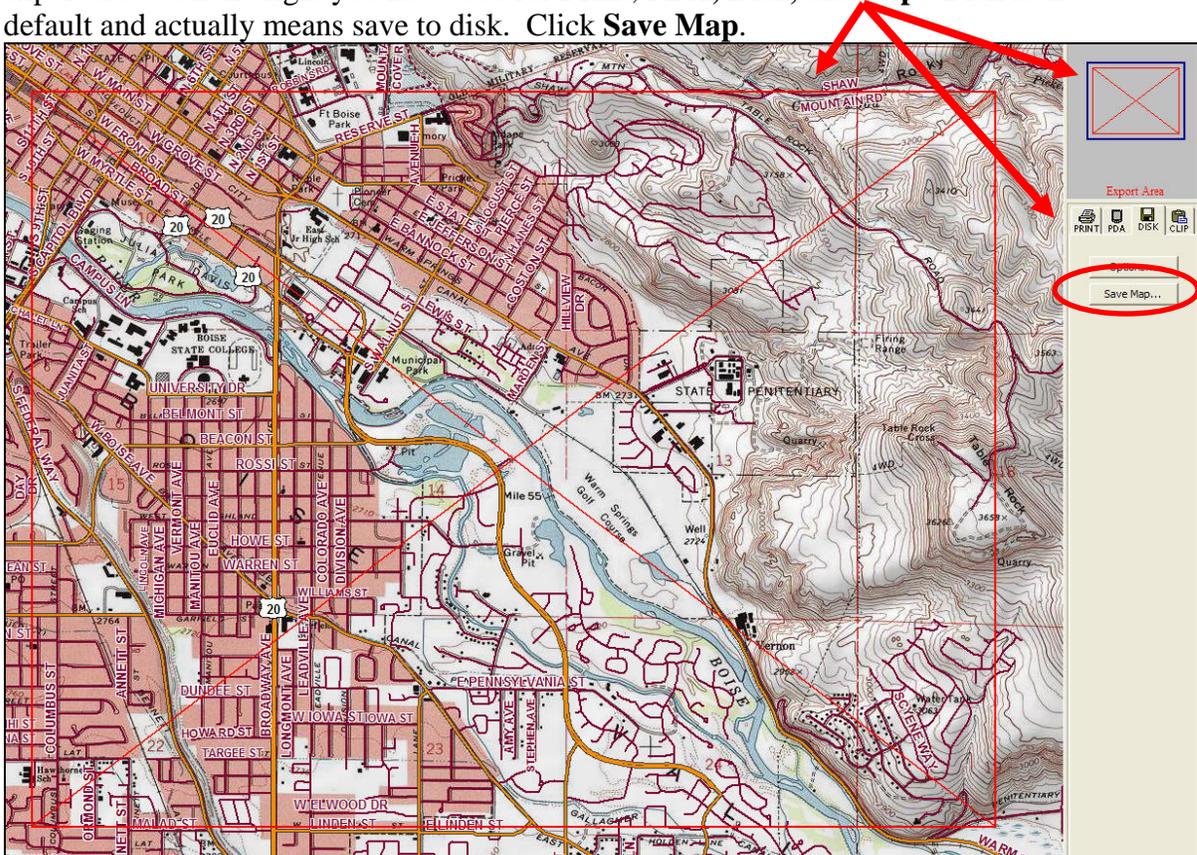
Your screen will split and show you the 3D view of the location of your cursor. A red arrow shows the view direction. Adjust the tilt and the elevation. Spin the location. We will create a route later to view a fly through. To turn the 3D image off, click the 3D button. 



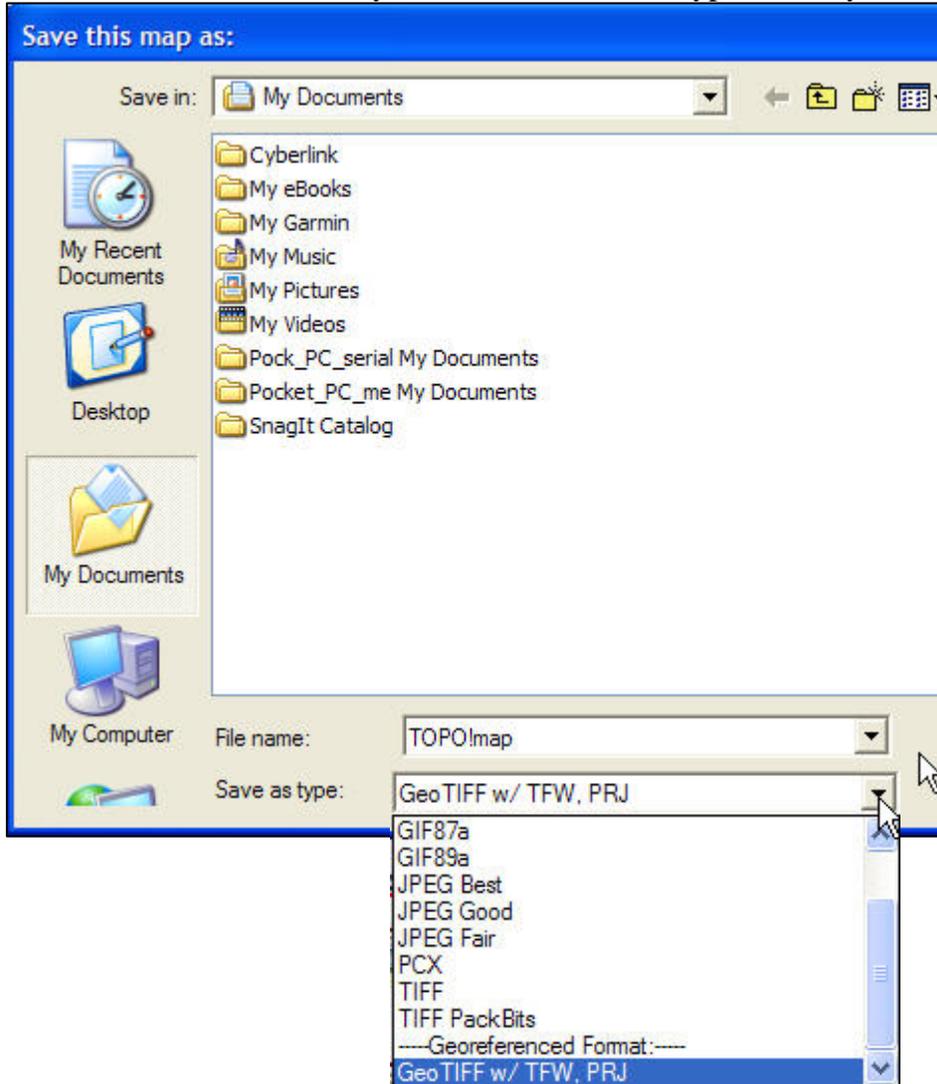
5.) Next View item we will explore is **Print/Export Area**.



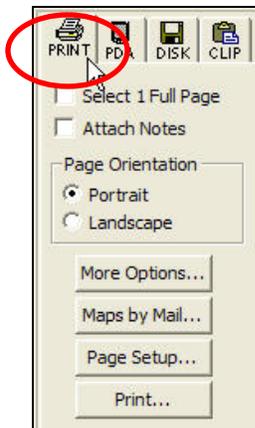
A red box will form around the area you are “zoomed in” to and that indicates the print or export area. On the right you have tabs for **Print, PDA, Disk, and Clip**. **Disk** is the default and actually means save to disk. Click **Save Map**.



Here you can choose what type of file to save to. Remember we set our preferences for **GeoTIFF** and here is where you can save to that file type. Name your file.

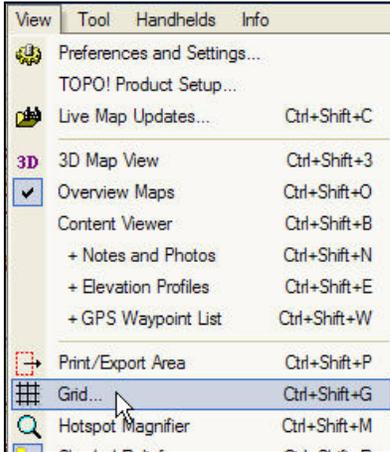


Next click on the **Print** tab. Many options to change here. I will demo of a print later.



To turn the print box off, click the **Print/Export** button. 

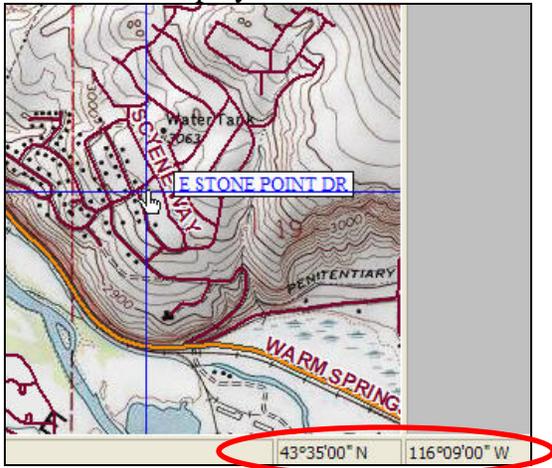
6.) Next click on **Grid** in the View menu.



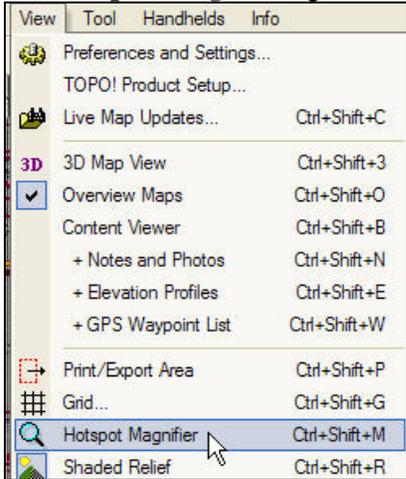
A grid can be added to your map view and your printed map. Keep the default settings for Lat/lon but change the grid line to a more visible line.



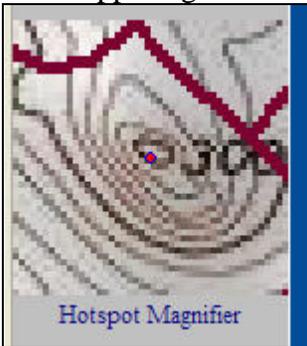
A lat/long grid will appear on your map. Put your cursor on a corner to see the coordinates displayed in the Status Bar below.



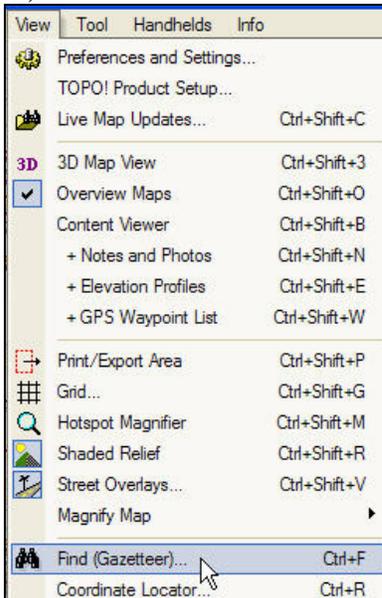
7.) **Hotspot Magnifier** gives an overview map of a chosen area on the main map.



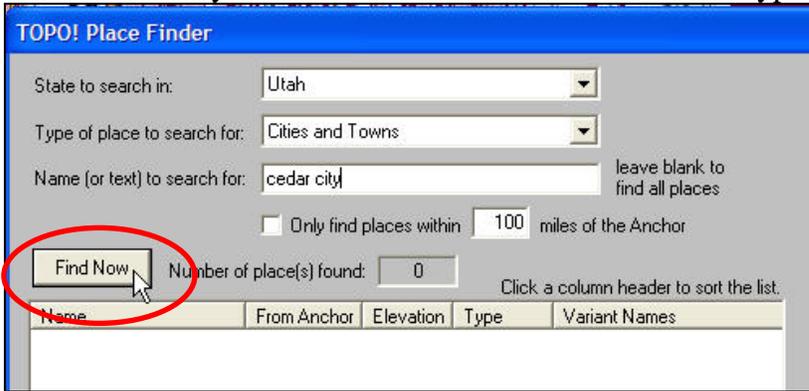
Click on **Hotspot Magnifier** and then on a location on your map to view a hotspot map in the upper right corner of your map window.



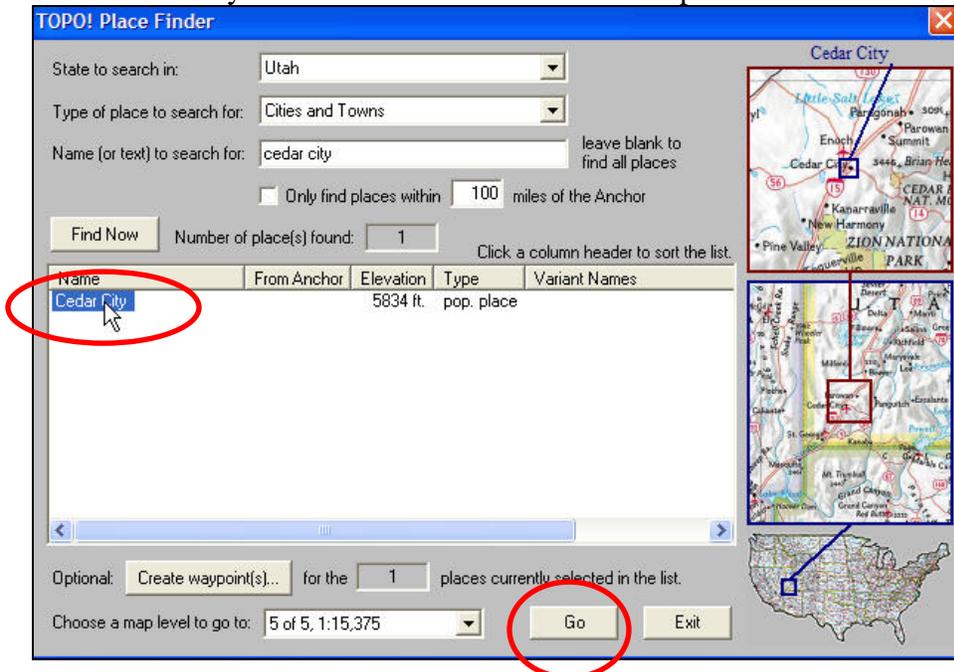
8.) Click on the **Find** menu item.



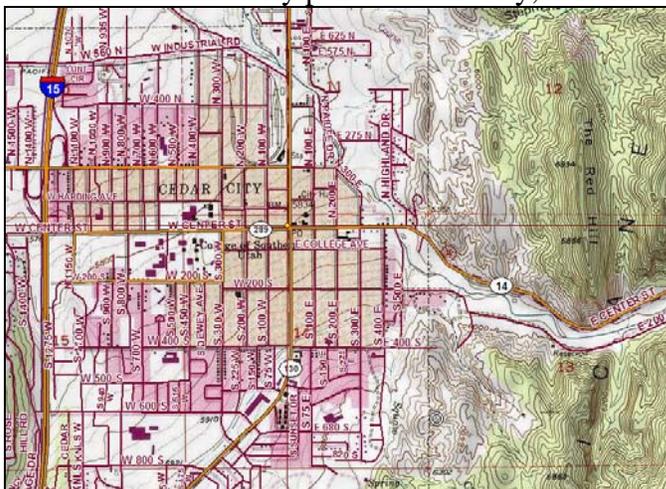
Choose Utah as your state. Choose Cities and Towns and type in Cedar City. Find Now.



Click on the city name and notice the overview maps. Click Go.



You will automatically pan to Cedar City, UT.



Now let's search for parks in CA. Choose California and Parks – City, State and National. Click **Find Now**.

TOPO! Place Finder

State to search in:

Type of place to search for:

Name (or text) to search for: leave blank to find all places

Only find places within miles of the Anchor

Find Now Number of place(s) found: Click a column header to sort the list.

Name	From Anchor	Elevation	Type	Variant Names

Click on Lassen Volcanic National Park to see overview maps and then click **Go**.

TOPO! Place Finder

State to search in:

Type of place to search for:

Name (or text) to search for: leave blank to find all places

Only find places within miles of the Anchor

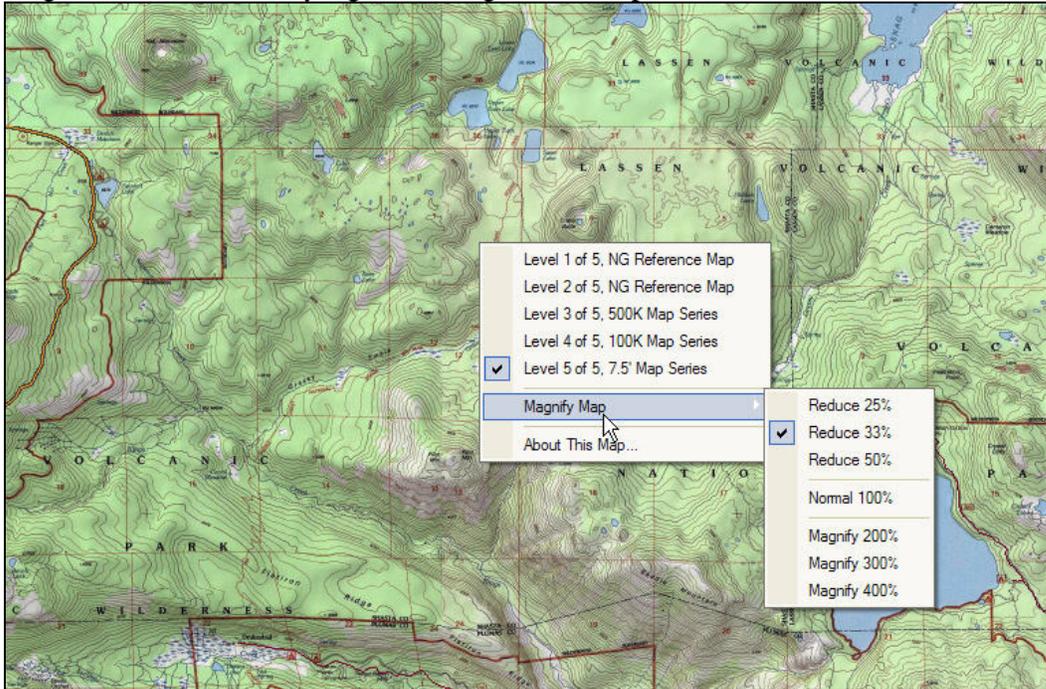
Find Now Number of place(s) found: Click a column header to sort the list.

Name	From Anchor	Elevation	Type	Variant Names
Las Juntas Park			park	
Las Lomas Park			park	
Las Palmas Park			park	
Las Palmas Park			park	
Las Posadas State Forest			park	
Las Tunas State Beach			park	
Lassen County Fairgrounds			park	
Lassen Volcanic National Park			park	
Last Chance Meadow Research Natural Area		1150 ft.	park	
Lasuan Mall			park	
Laurel Canyon Park			park	

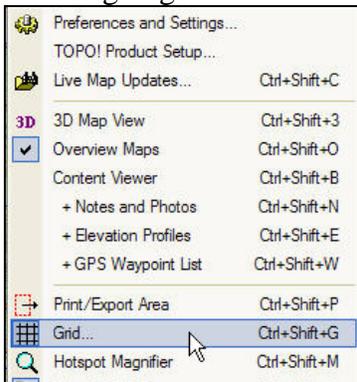
Optional: for the places currently selected in the list.

Choose a map level to go to: **Go** Exit

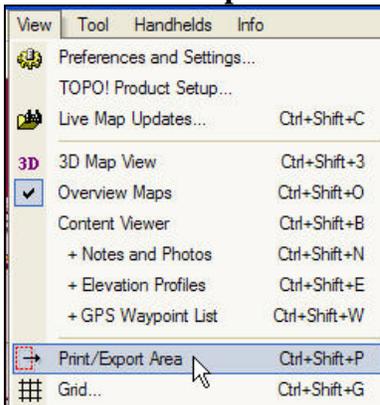
At 100% magnification, its hard to see the park. Right-click to change your magnification to 33% by right clicking on the map.



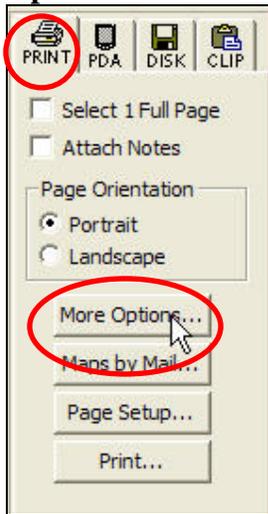
We are going to create a map now so let's add a lat/long **Grid**.



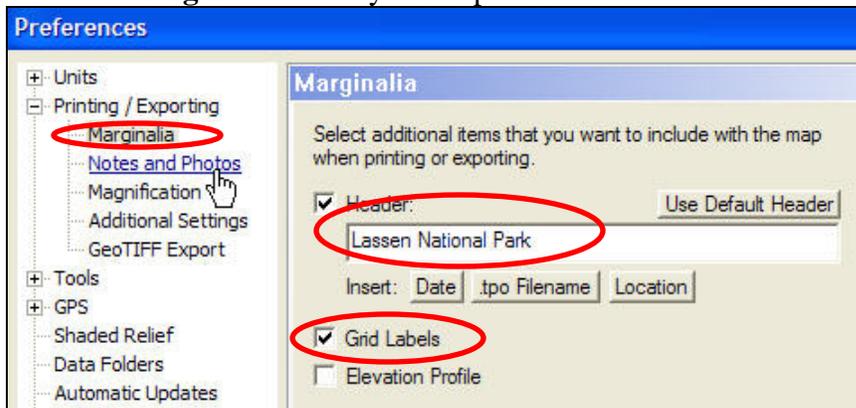
Choose **Print/Export Area**.



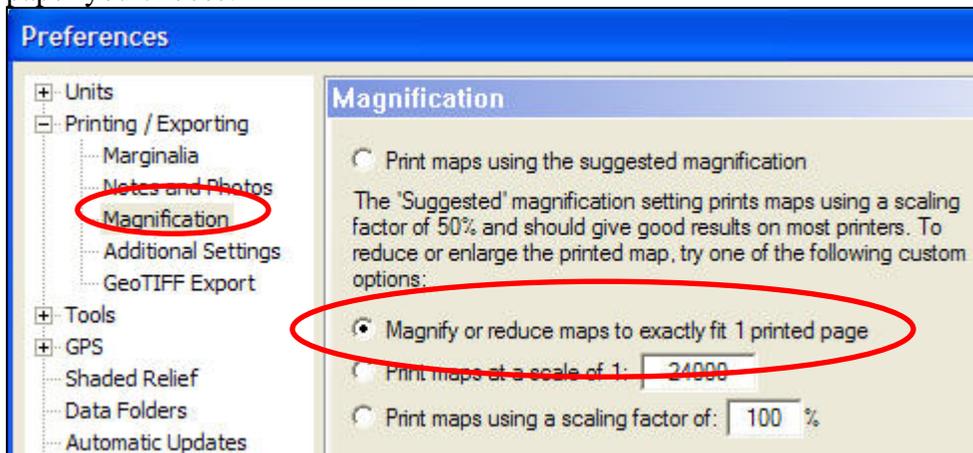
See the red print area box on your map? Click on the **Print** tab and then on the **More Options** button.



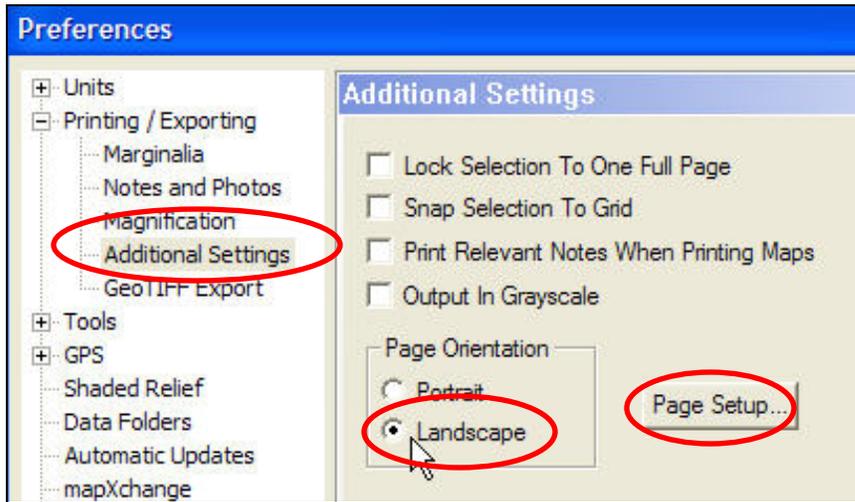
Click on **Marginalia**. Give your map a title. Make sure **Grid Labels** are checked.



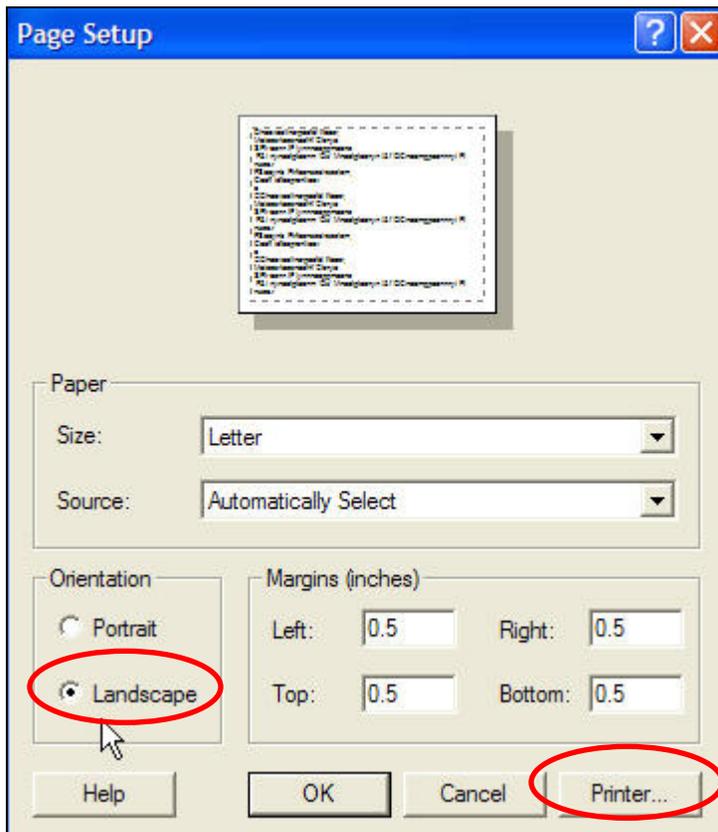
Click on **Magnification**. Choose **Magnify or reduce maps to exactly fit 1 printed page**. This insures the area your have chosen with your red box will print on the size paper you choose.



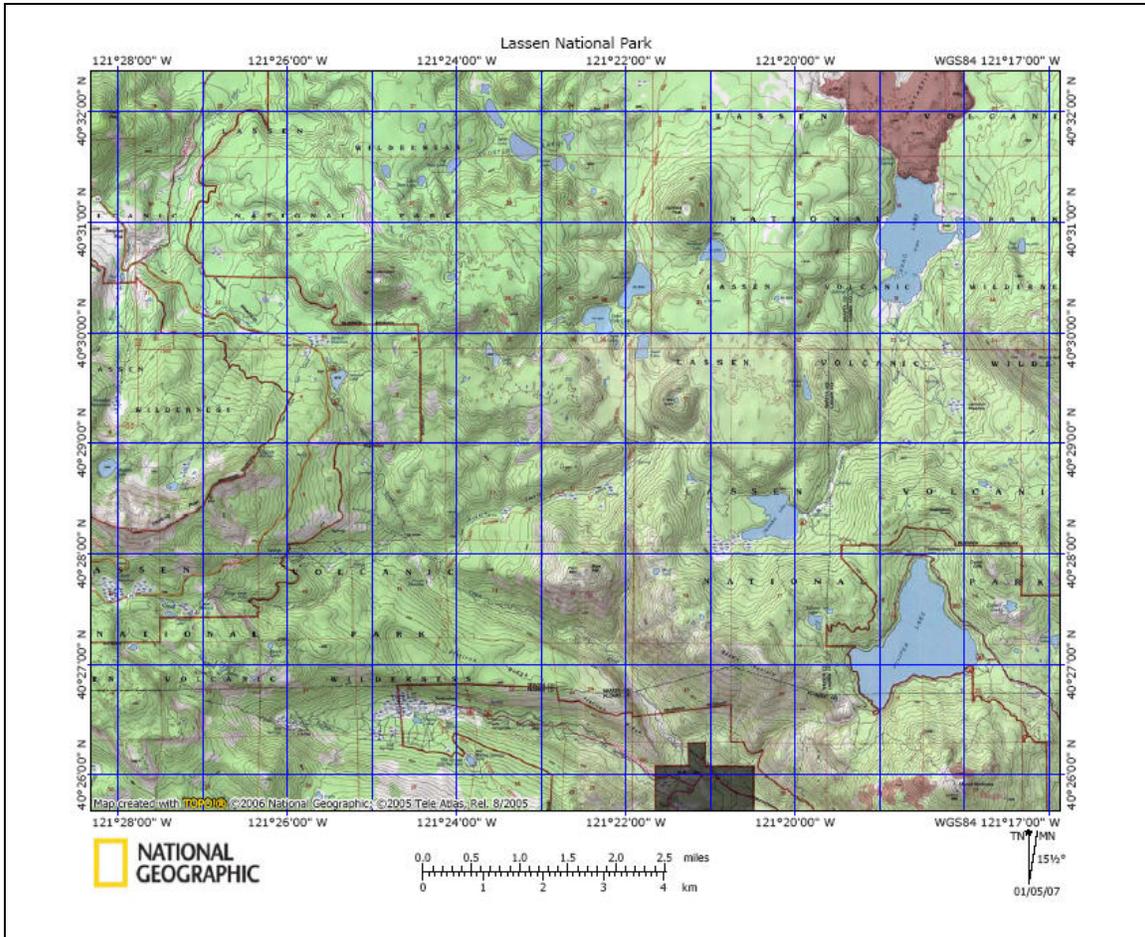
Click on **Additional Settings** and change the page orientation to **Landscape**. Click on **Page Setup**.



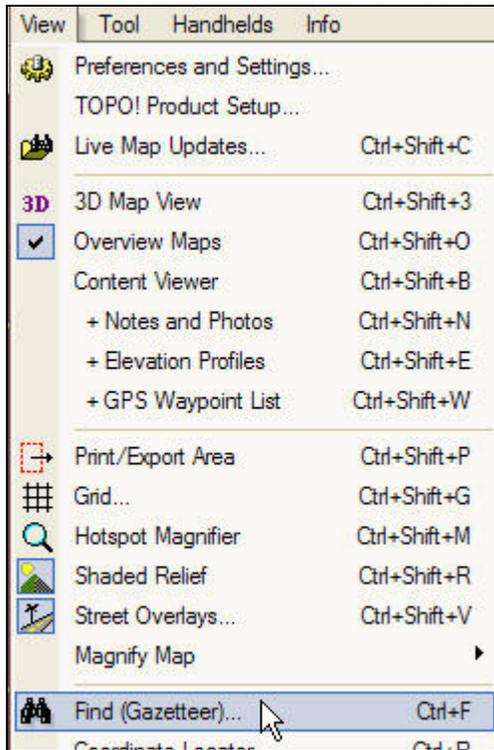
Make sure the printer is set to **Landscape** also. Click on **Printer**. If you have PDF, choose it as your printer. If not, you will need to choose a printer you have access to (not an option today).



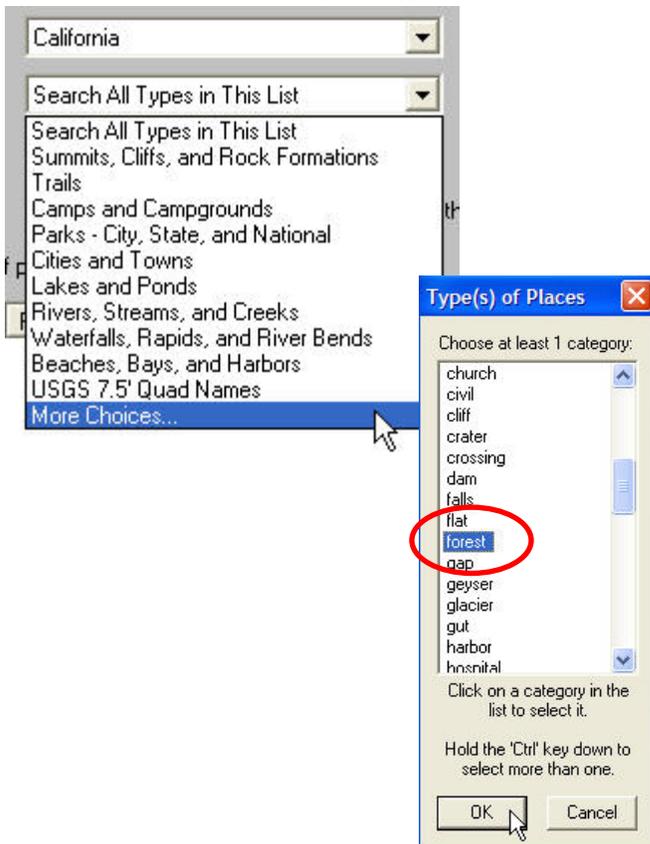
Here is what a printed map will look like. Notice the scale bar, title, and north arrow. All that is missing is author and date and all the elements of GSTOP (Geospatial Standard Operations on Incidents) have been met in this map. The lat long grid is also printed with labels along the margin.



Let's do one more search in CA before moving on. **View | Find.**



This time choose **More Choices...** and **forest**.



Type in Stanislaus and **Find Now**.

TOPO! Place Finder

State to search in:

Type of place to search for:

Name (or text) to search for: leave blank to find all places

Only find places within miles of the Anchor

Find Now Number of place(s) found: Click a column header to sort the

Name	From Anchor	Elevation	Type	Variant Names
Stanislaus National Forest			forest	

Now type in national for name and **Find Now**. All the National Forests in CA are listed.

TOPO! Place Finder

State to search in:

Type of place to search for:

Name (or text) to search for: leave blank to find all places

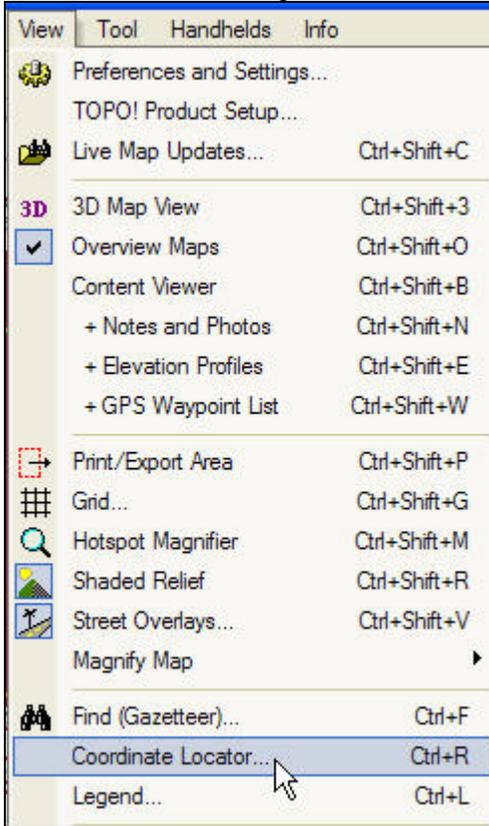
Only find places within miles of the Anchor

Find Now Number of place(s) found: Click a column header to sort the list.

Name	From Anchor	Elevation	Type	Variant Names
Angeles National Forest			forest	
Angeles National Forest			forest	San Bernardino National
Calaveras Bigtree Nation...			forest	
Cleveland National Forest			forest	
Lassen National Forest			forest	
Los Padres National Forest			forest	
Los Padres National Forest			forest	
Mendocino National Forest			forest	California National Forest
Modoc National Forest			forest	
National Childreaus Forest		7560 ft.	forest	
Plumas National Forest			forest	

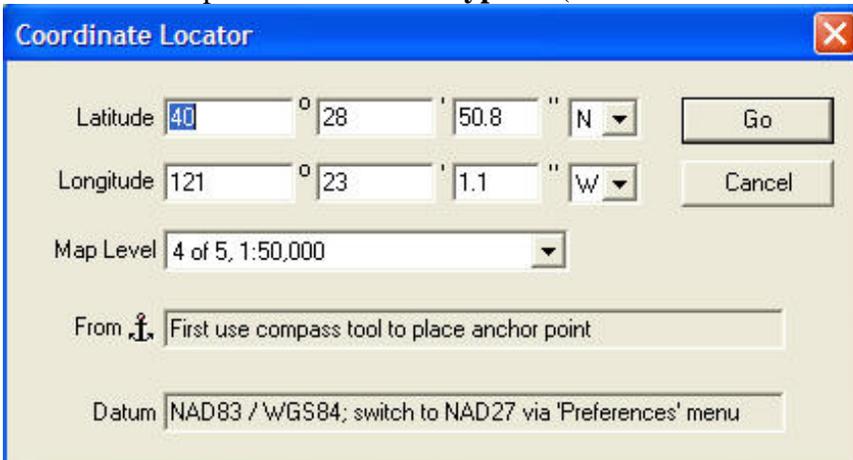
This can be helpful, for instance, if you are unfamiliar with the Forest Service lands in CA. Can you think of other searches that might help you prepare for the places you are dispatched to?

9.) When you open the **Coordinate Locator** tool the coordinates that are displayed are for the center of the map. The **Coordinate Locator** tool allows you to center your map to a set of given coordinates in Degrees, Minutes, and Seconds. Keep in mind that the coordinate type can be changed in **Preferences and Settings** to Degrees, Decimal Minutes, Decimal Degrees or UTM Easting and Northing.

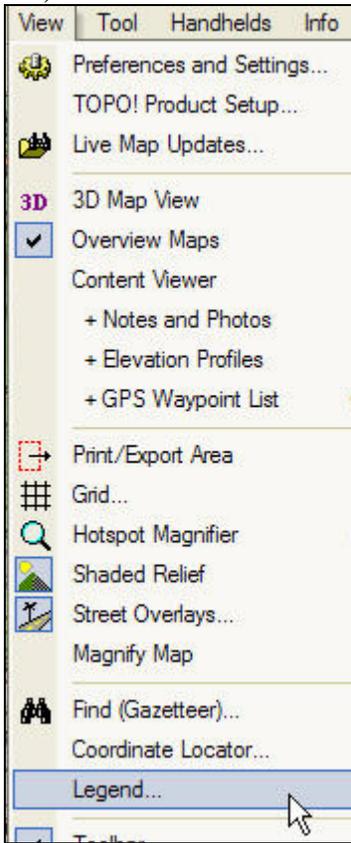


If you use the **Compass** tool first to place an anchor point on the map, you will also get direction and distance to that center point. We will use the **Compass** tool again in just a few minutes.

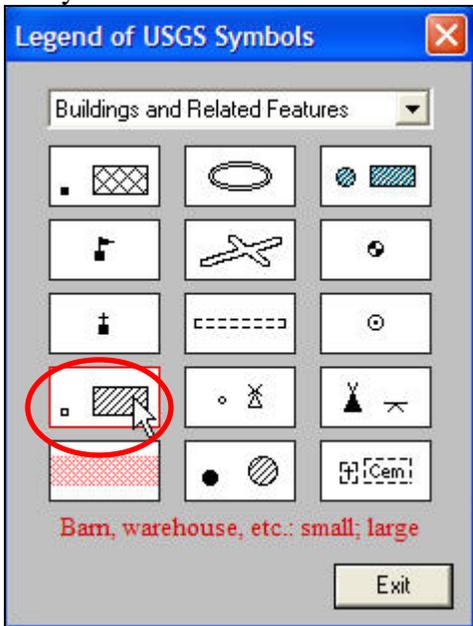
Note: To reverse this process (i.e. get coordinates for a point on the map) either hover the cursor over the point or create a **Waypoint** (this tool will be covered shortly).



10.) The last menu item under View is **Legend**.



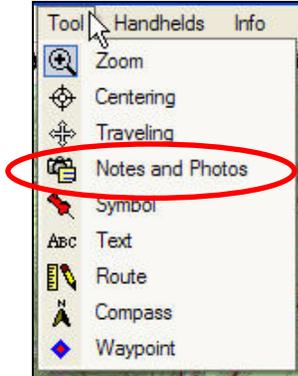
Use your cursor to hover over USGS map symbology to find out the meaning.



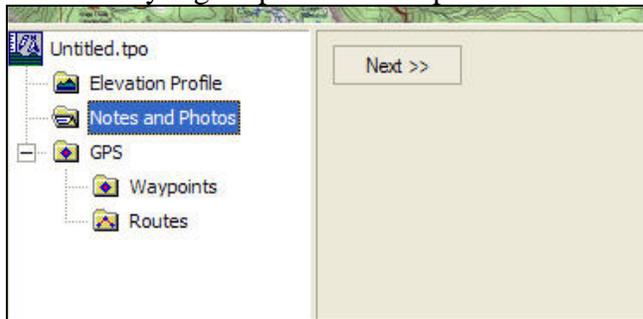
C. Tools Menu

Lets take a look at the **Tools** dropdown menu next. We have used the **Zoom** tool already. Click on the **Centering** and **Traveling** tools to practice using them on the map.

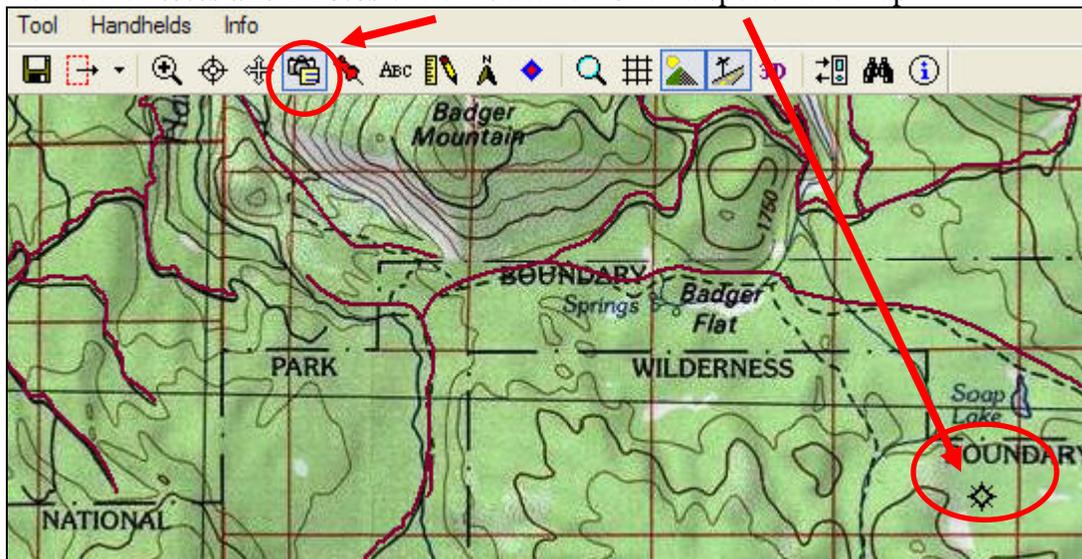
1.) Next click on **Notes and Photos**.



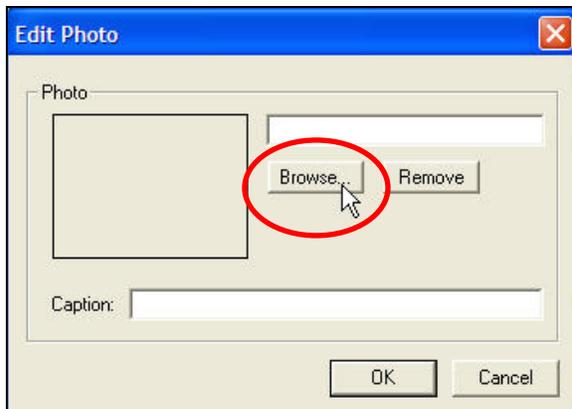
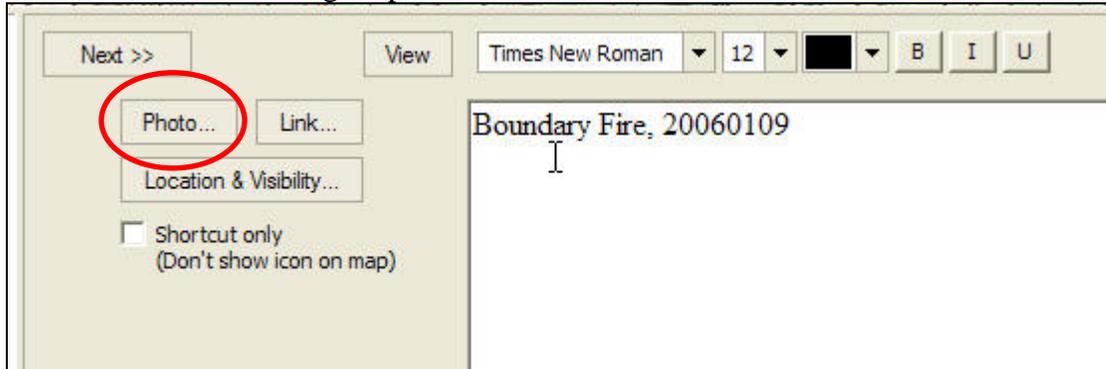
With this tool you can annotate the maps with custom photos, notes, links to websites and documents. When you place a note on the map, the note is displayed in the notes pane and as an icon on the map. A single note may contain text, photos, and a link. TOPO! can link any digital photo to a map.



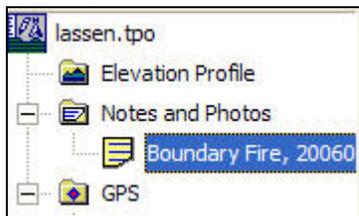
Notice the **Notes and Photos** button is active. Click a spot on the map.



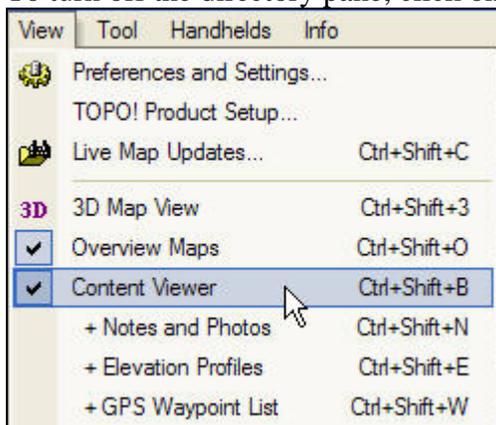
In the dialog box below you can type a **Note**. Clicking on the **Photo** button, you can browse to and attach a digital photo.



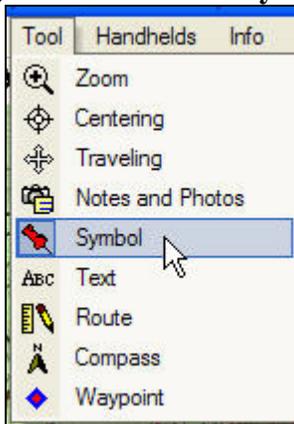
The Note is listed in the directory below and a note icon appears on the map.



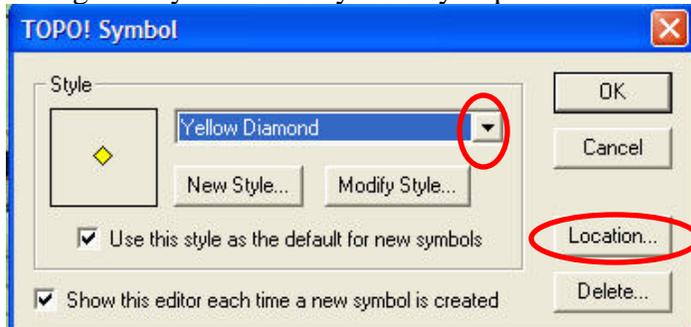
To turn off the directory pane, click on **View** and turn off **Content Viewer**.



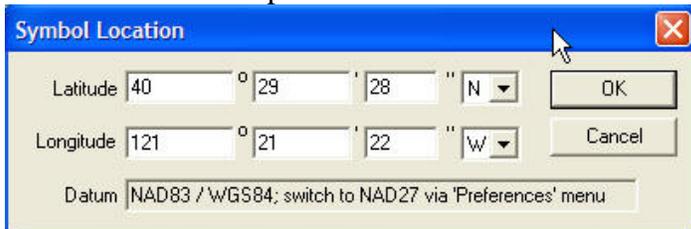
2.) Next click on the **Symbol** tool. Click somewhere on your map to add a symbol.



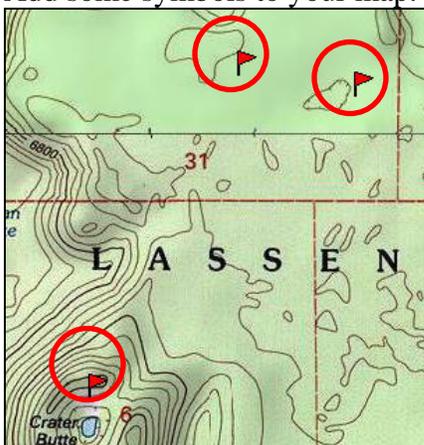
Change the symbol to a style that you prefer. Click on **Location**.



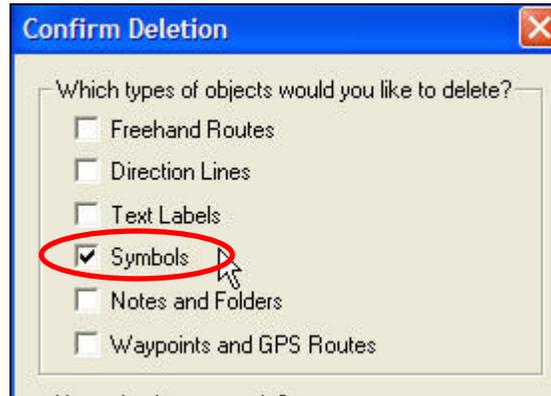
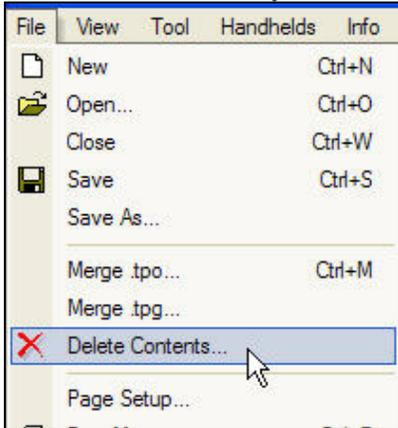
This is the current location of the symbol. You can edit this if you like and the symbol will move on the map.



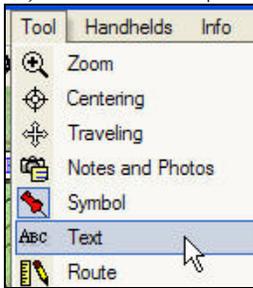
Add some symbols to your map.



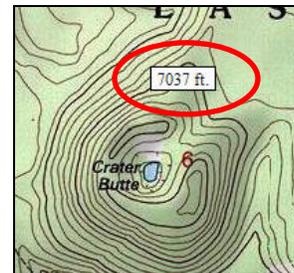
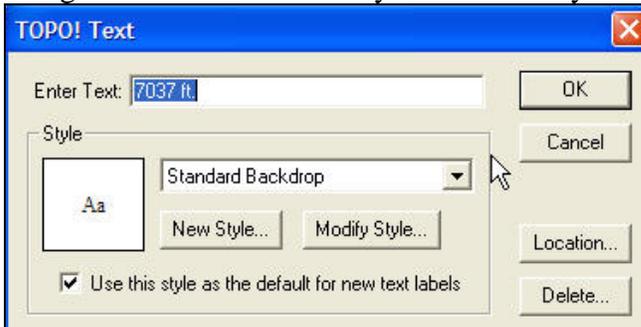
If you don't like where you put your symbols, you can delete them. **File | Delete Contents.** Choose **Symbols**. Notice the other objects you can delete from here.



3.) Click **Tools | Text**.



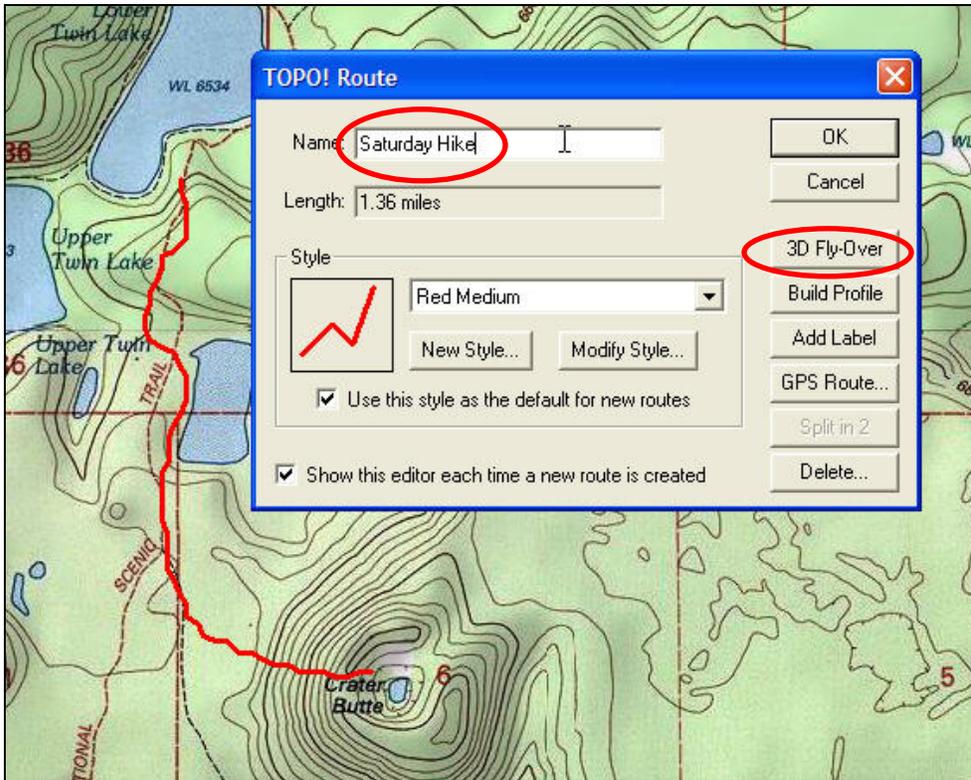
By default the elevation will be your text. You can change this to anything you like though. You can add as many text boxes as you like to your map.



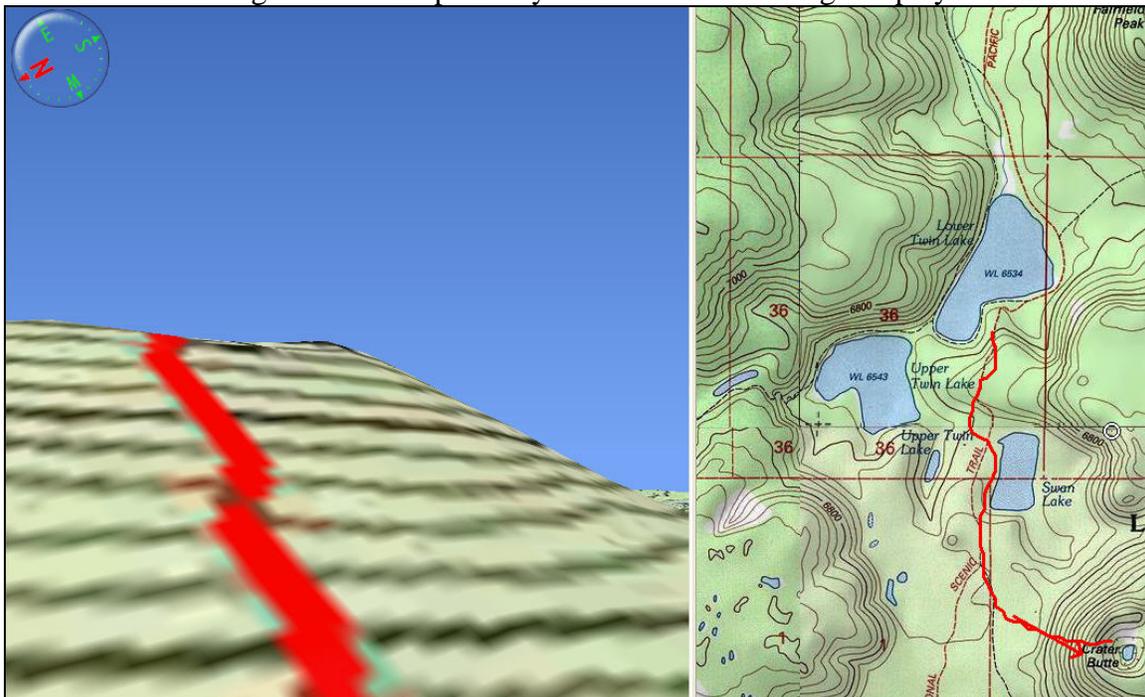
4.) Next choose **Tools | Route**



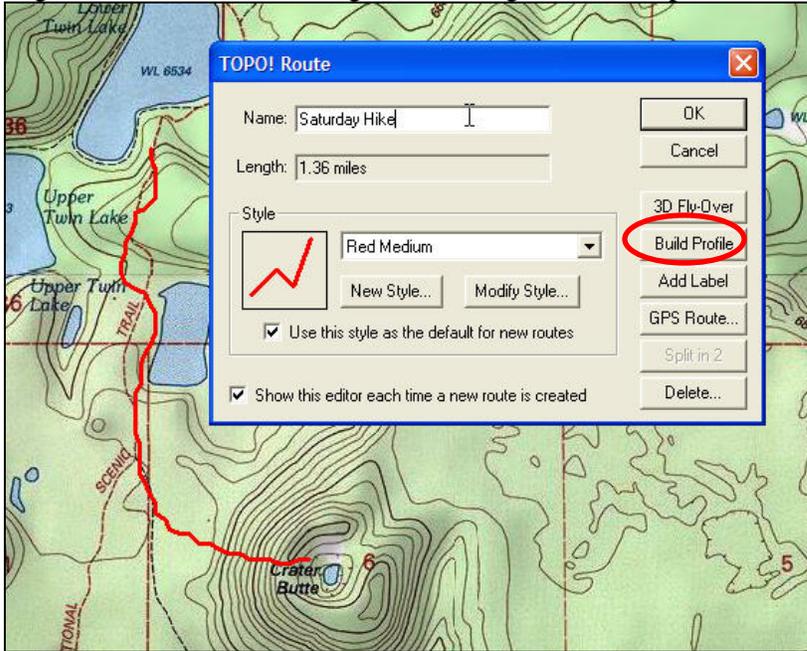
Use the tool to freehand draw a route. The route window pops up when you are finished. You can **Name** your route, find out the length, or change the style. Click on **3D Fly-Over**.



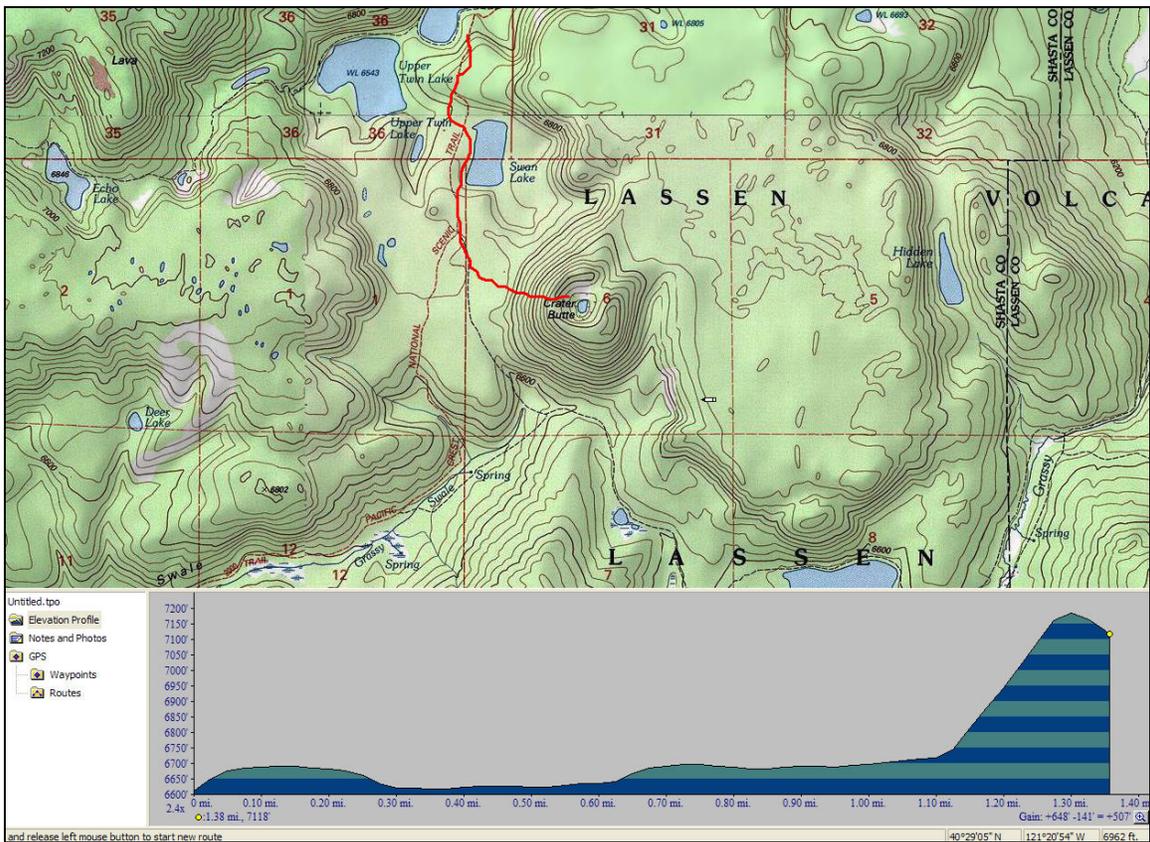
Red arrow on the right shows the path of your route and 3D image displays on the left.



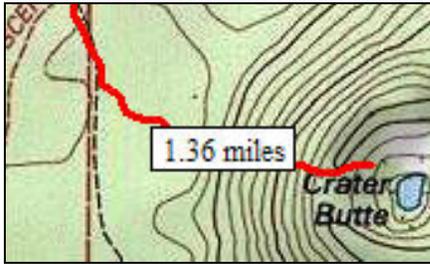
Right-click on the route to get the dialog box back up. Click **Build Profile**.



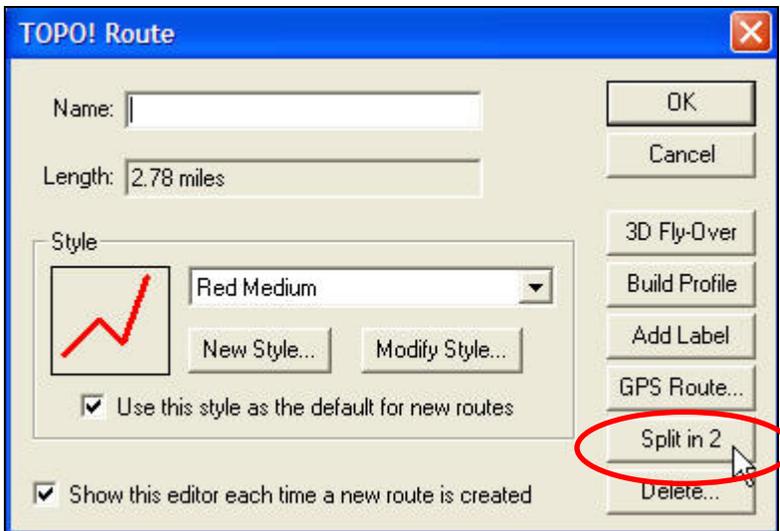
See elevation profile below. This can be useful to when trying to determine view obstructions.



Simply hover your cursor over the route line and distance (in this case mileage) is displayed in a pop-up window.



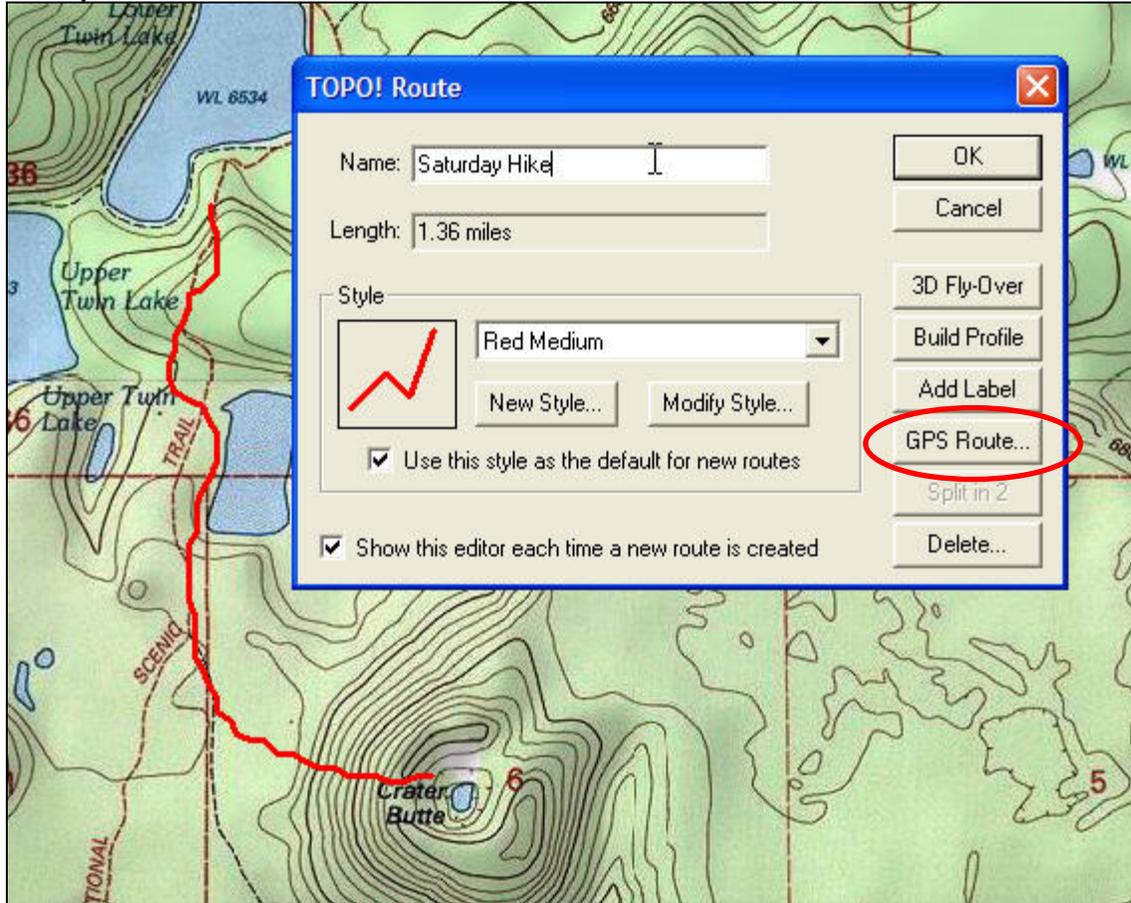
Right-click at a point along the route where you would like to split it into 2 routes. Click the **Split in 2** button.



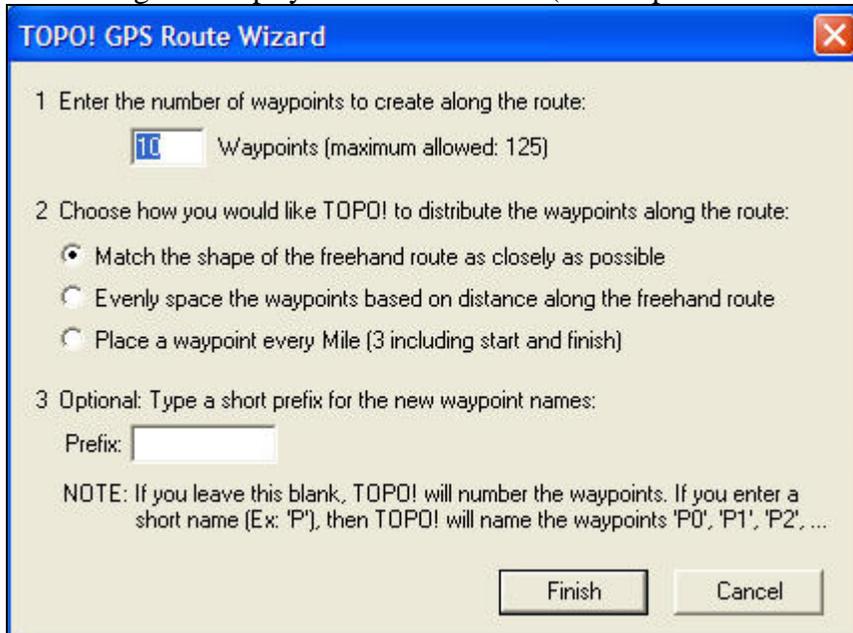
Hovering the cursor over each segment will display the length of that line.



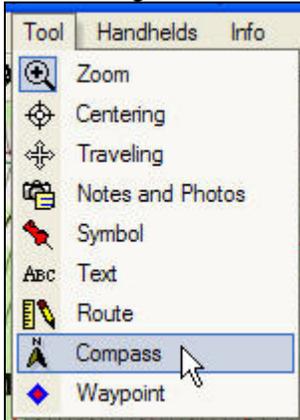
Finally, create a GPS Route...



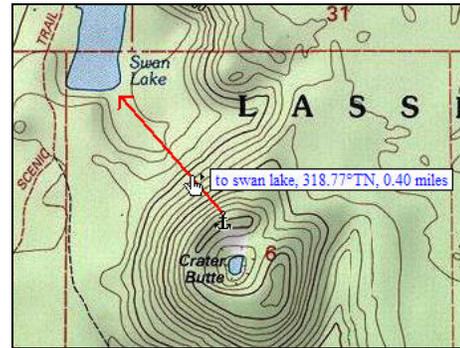
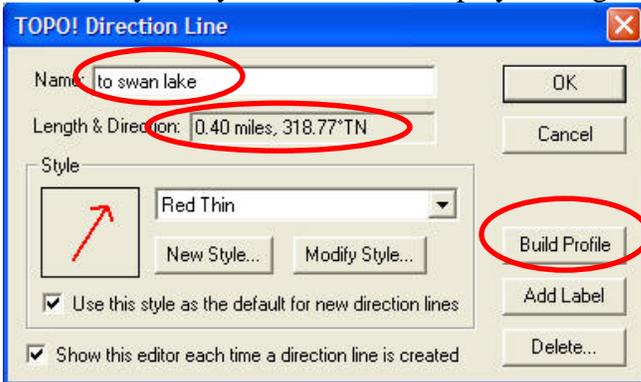
This dialog box helps you create the route (made up of individual waypoints).



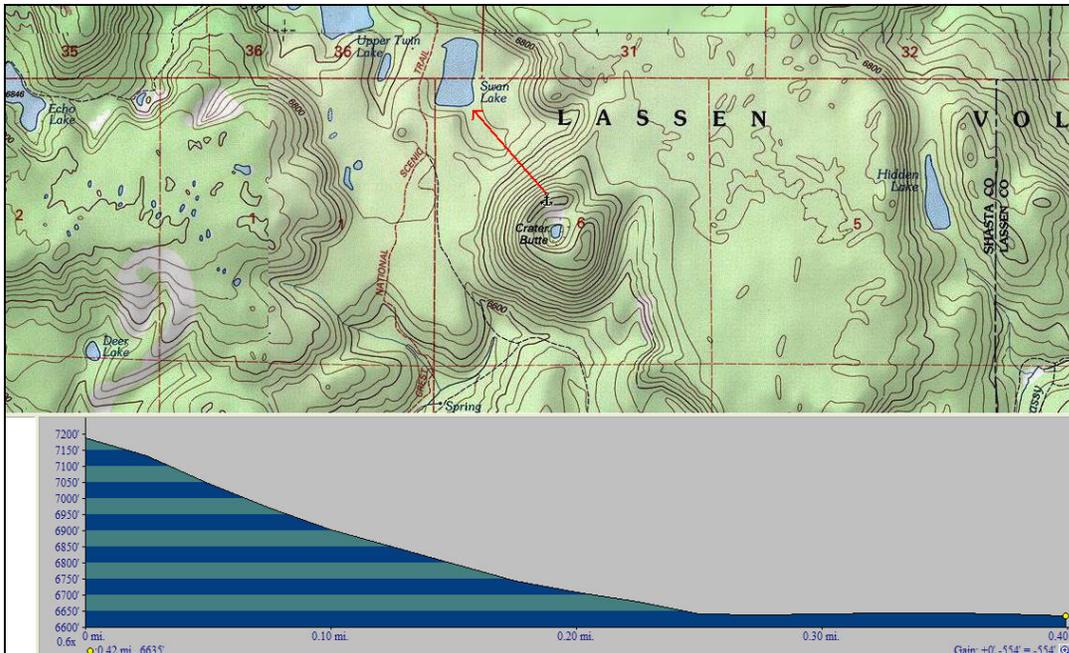
5.) Moving on to the Compass tool. Click on **Tools | Compass**.



Click a location on the map (anchor) and a second location. You can **Name** this vector and modify its style. Notice the display of length and direction.



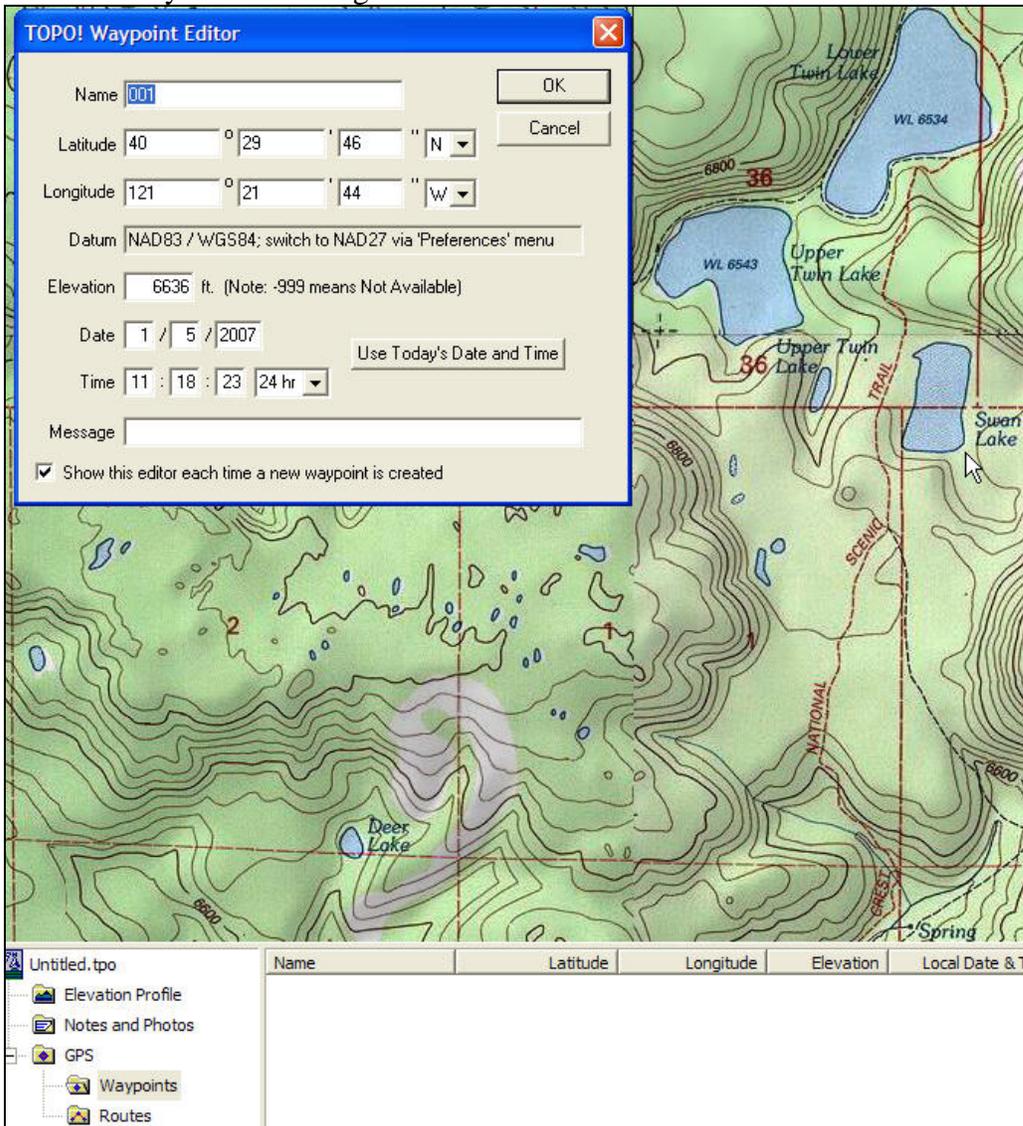
You can also **Build a Profile** to determine elevation and/or view obstructions.



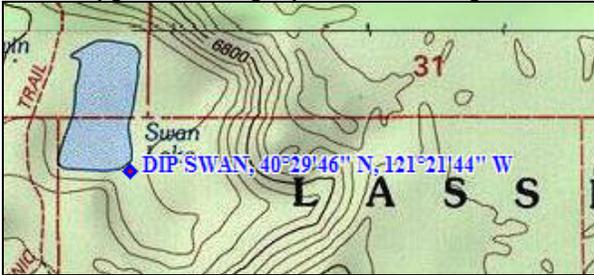
6.) Click on **Tools | Waypoint**. Click on map to create a waypoint.



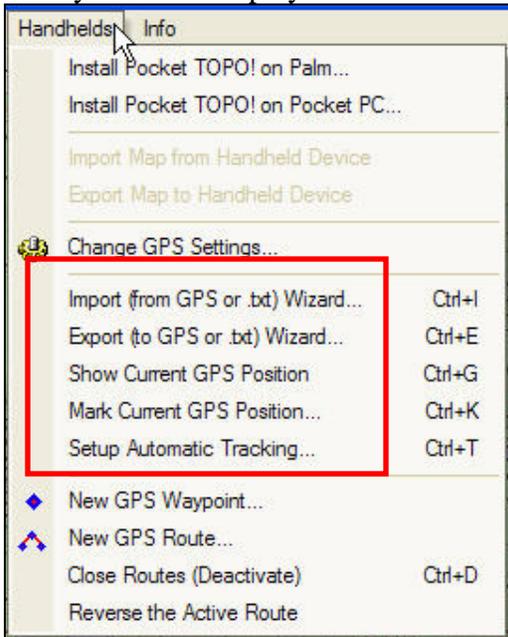
You can rename the waypoint here. Notice the Datum is consistent with how preferences were set early on. A message or comment can also be inserted here.



The waypoint is displayed on the map with label and coordinates.



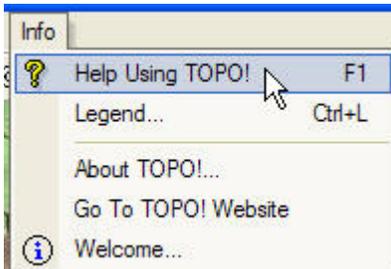
You can **Import** waypoints, tracks and routes from your GPS to your TOPO! map. You can also **Export** waypoints and routes up to your GPS receiver from your map. This is done by directly connecting the GPS to the computer that is running TOPO! or can be done with GPS .txt files that reside on your hard drive. You can also do real-time tracking of GPS location. **Mark Current GPS Position** will store your location as a waypoint on the map. **Setup Automatic Tracking** gives you three options for how you want your track displayed and recorded.



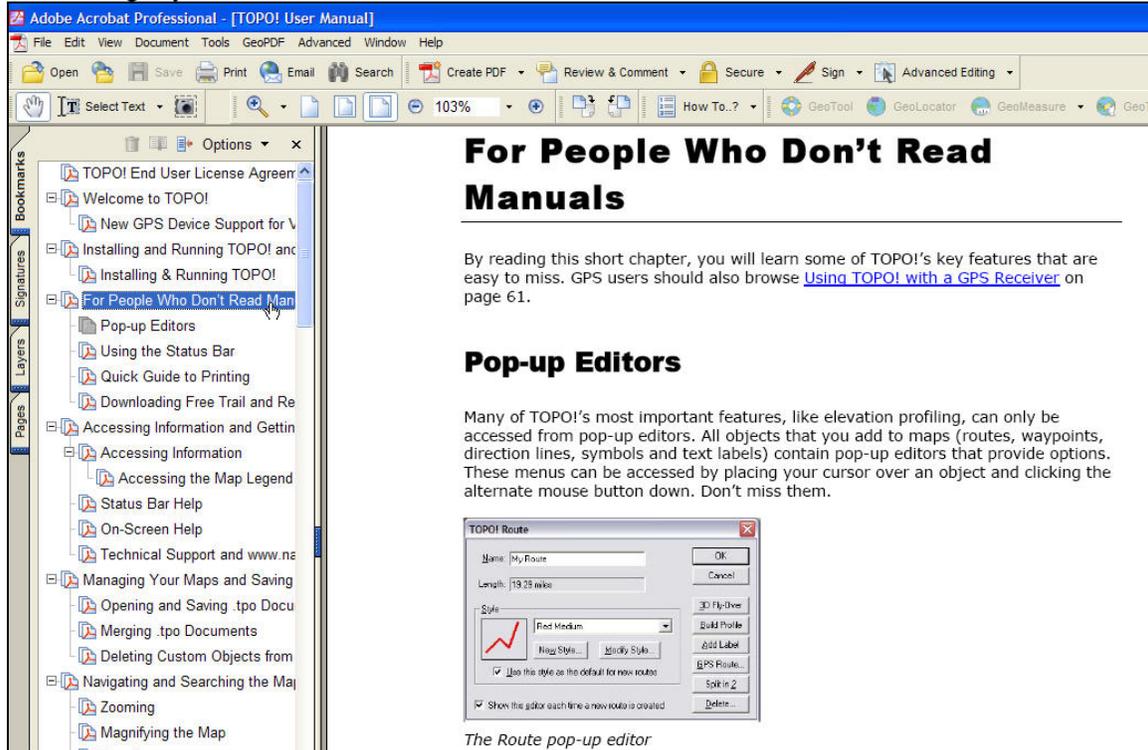
I will now demo upload and download with a GPS.

C. Info

The last menu is **Info**. The help document is fairly thorough and should be used often.

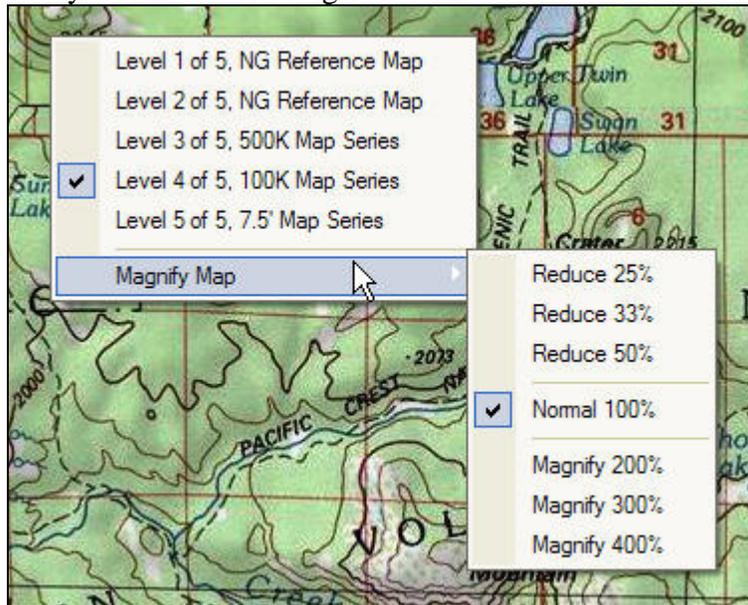


They even have a section called “For People Who Don’t Read Manuals” that covers the basics to get you started. No excuses!



D. GeoTIFF export and use in ArcGIS

1.) Pan/zoom to an area in Lassen National Park. Use the 1:100K map scale and make sure you are at 100% magnification.



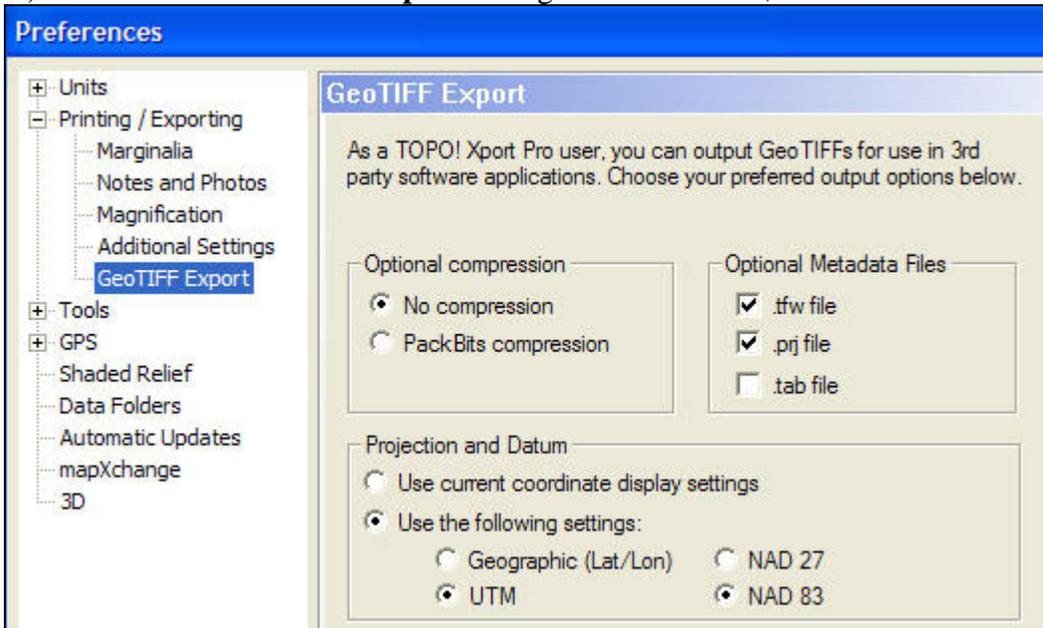
2.) Click on **Print/Export Area** from the View menu or the Toolbar.



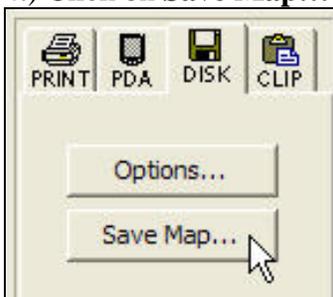
Red box should appear across map and Export Area is shown. Click on **Disk** tab and **Options** button.



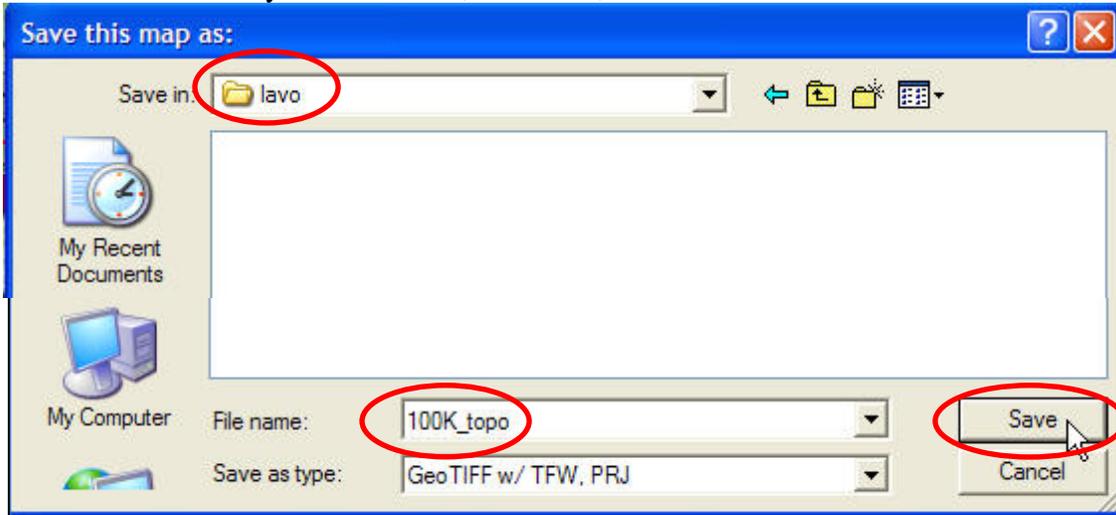
3.) Double check **GeoTIFF Export** settings. Choose UTM, NAD 83.



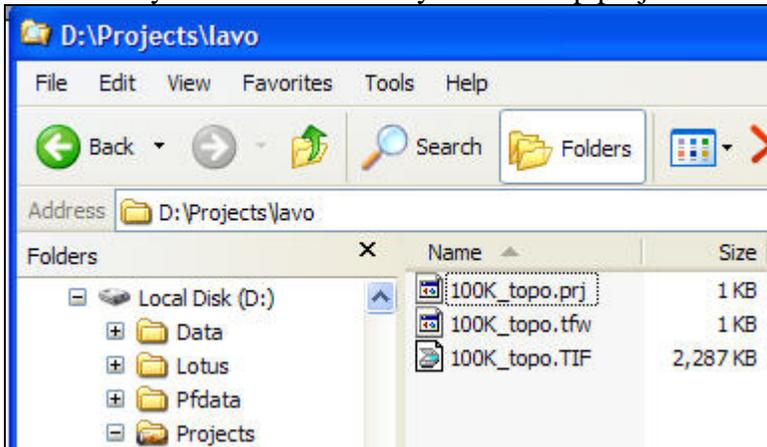
4.) Click on **Save Map...**



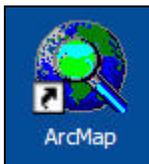
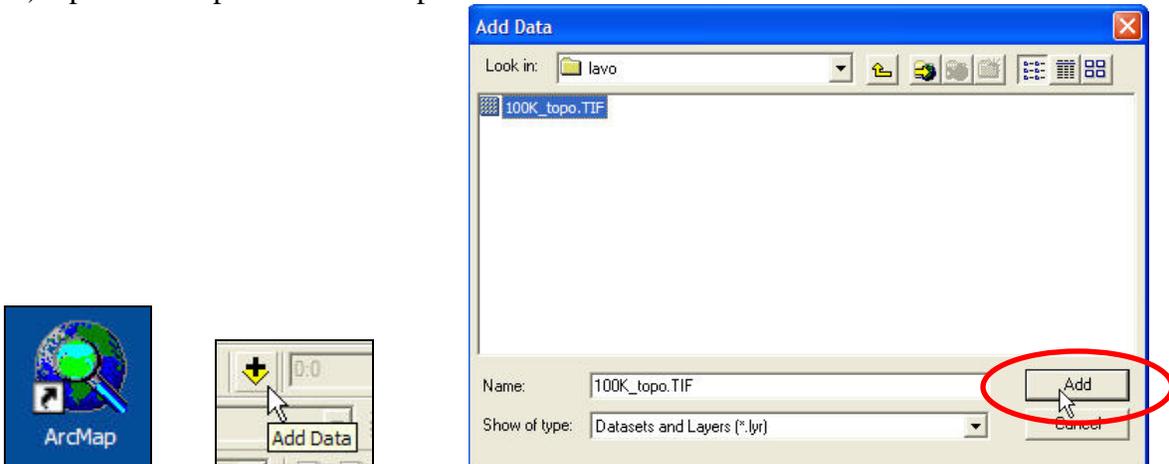
Browse to folder on your hard drive, name file, save.



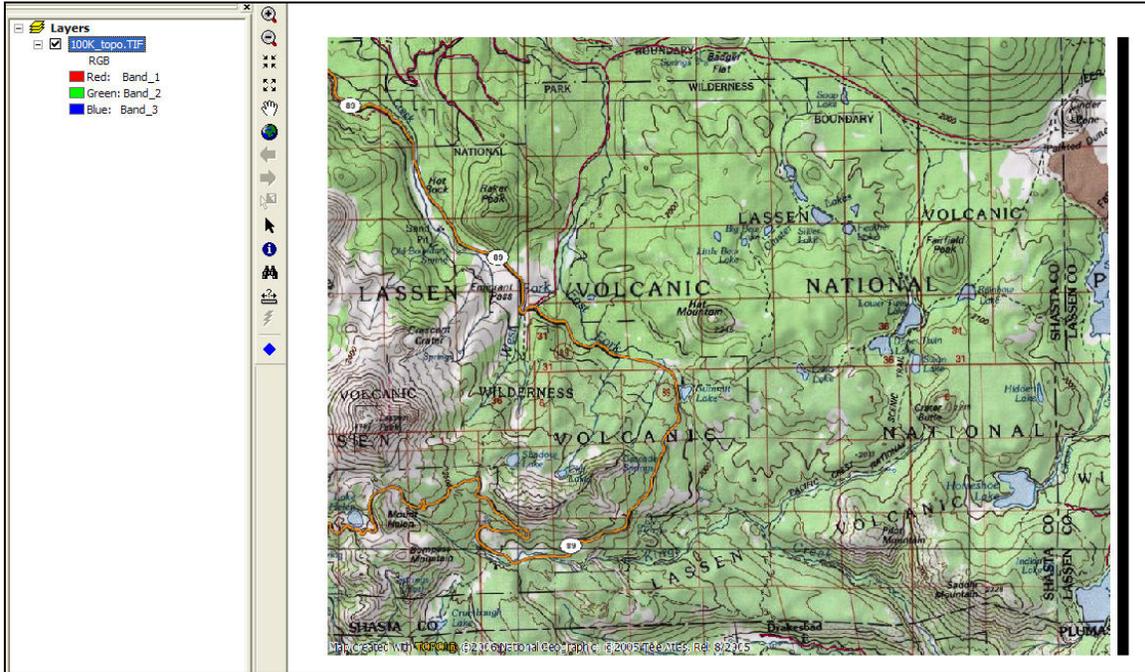
Check to see the files that were created on your hard drive. You will need to know the location so you can add them to your ArcMap project.



5.) Open ArcMap and a new Map Document. **Add Data.**



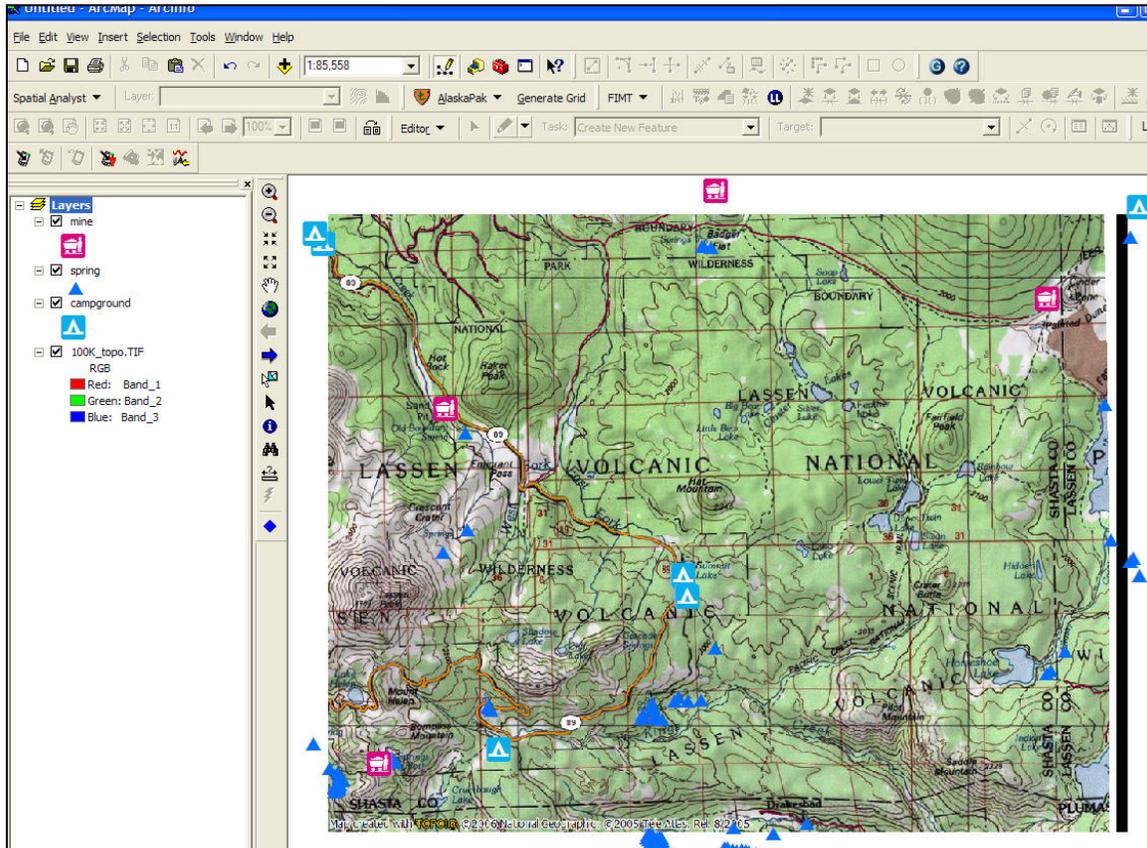
The image will draw in your data view.



Right-click on .TIF in the table of contents, and look at **Properties**. The **Source** tab shows **Spatial Reference** as a projection of **UTM, Zone 10N** and datum of **NAD83**. This is the same projection and datum as other LAVO GIS data.

Layer Properties	
General Source Extent Display Symbology	
Property	Value
Bottom	4477850.4598849472
Spatial Reference	NAD_1983_UTM_Zone_10N
Linear Unit	Meter (1.000000)
Angular Unit	Degree (0.017453292519943295)
False_Easting	500000
False_Northing	0
Central_Meridian	-123
Scale_Factor	0.9996
Latitude_Of_Origin	0

Here is an example where mines, springs and campgrounds were added to the data view.



NOTE: You may see shifts in data (i.e. things don't line up perfectly) when using 1:500K and 1:100K topo GeoTIFFs. In most cases, park data was digitized at a scale of 1:24,000 or better (or collected with GPS). Using the 7.5 minute maps will get you the best results for small format maps (e.g., 8.5x11) as long as the area of interest isn't too large and makes the contours unreadable.

For questions regarding TOPO! software or this document, please contact Kathie Hansen, 608-263-7689, kathie_hansen@nps.gov or Doug Stephen, 303-969-2947, doug_stephen@nps.gov.