OziExplorer Training and Help Manual for Use with Soil Resource Stewardship Monitoring Checklist: Cutblock-Level

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Version 2

Starting up

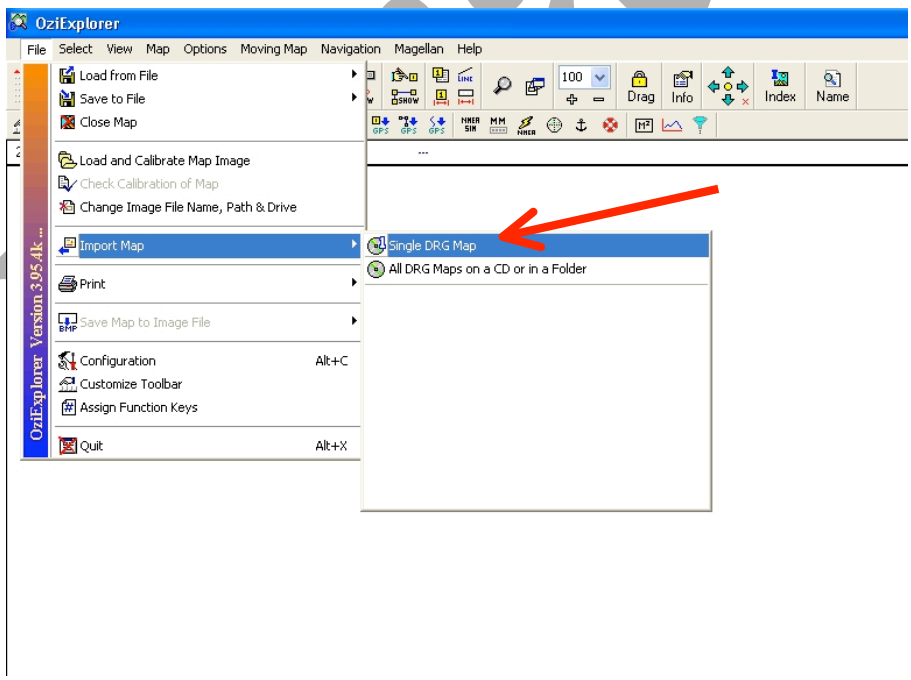
This section will describe how to load a geo-referenced image into OziExplorer software, and use it to: (i) create a GPS soil map used to display soil disturbance, and (ii) complete the Soils Resource Stewardship Monitoring Checklist: Cutblock-Level (FS 1246). This GPS mapping software can be used to determine the size of features, areas, and to prepare a map showing the location of walkthroughs and survey transects. The image will also be useful after field checking for recording information obtained during the field survey and preparing a final soil map for the area.

Loading in the image and OziExplorer Basics

OziExplorer can read several digital image formats as long as they have georeferencing information. Aerial photography and satellite imagery can be pulled from different sources[1] and come in different digital format. This includes geoTIFFs (.tif), TIFF's with world files, JPEG's and ECW's.

Importing a new digital georeferenced image

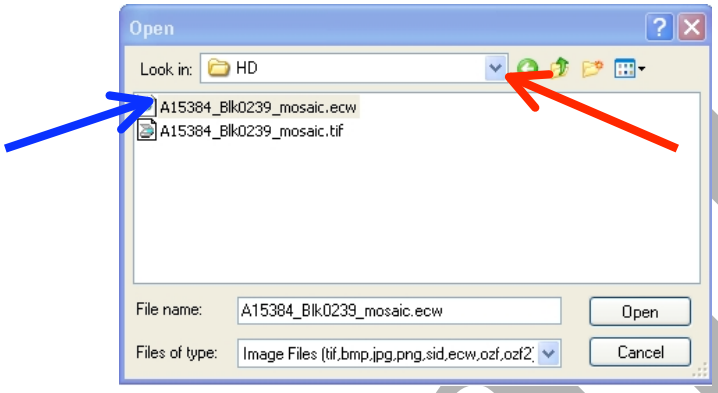
1. To load the image open File> Import Map> Single DRG map.



[1] For government employees, one stop site for aerial photos and satellite images is the image warehouse (map network folder:\\slkbmg\imagery\). To access and search for base maps and related imagery over the internet, go to the Base Map Online Store (http://www.basemaps.gov.bc.ca).

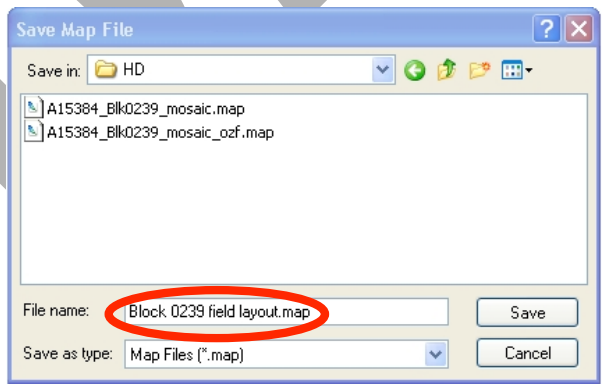
This will initiate a wizard that will guide you through a 3 step process

- **Step 1:** Find the image file of the map you want to import. A navigation window will popup where you can use the dropdown menu to find the image file you want to view. The file containing the georeferencing data (i.e., image properties and GPS coordinates) associated with this image must be located in the same folder (e.g., TSLA12345_CP1_CB1.tif and TSLA12345_CP1_CB1.tfw).. Otherwise, the import will not work.



Once you have found the file choose the Open button.

- **Step 2:** Specify the name and path of the OziExplorer map file you want to create. In a new popup window you can use the dropdown menu to choose where you want to save and what you would like to name the new map file (.map format). After you are finished select the Save button. It is a good idea to keep the map and map image in the same folder so that they are easy to find.



- **Step 3:** Describe import defaults. To fill this in you will need to know some information about the datum[2] and projection system[3] of your image – use to specify

[2] A datum is a mathematical model of the Earth which approximates the shape of the Earth, and enables calculations such as position and area to be carried out in a consistent and accurate manner. Lines of

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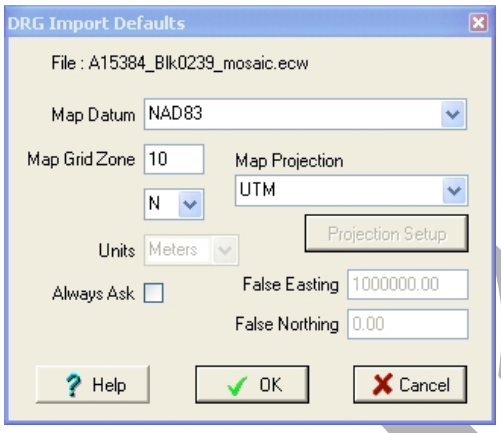
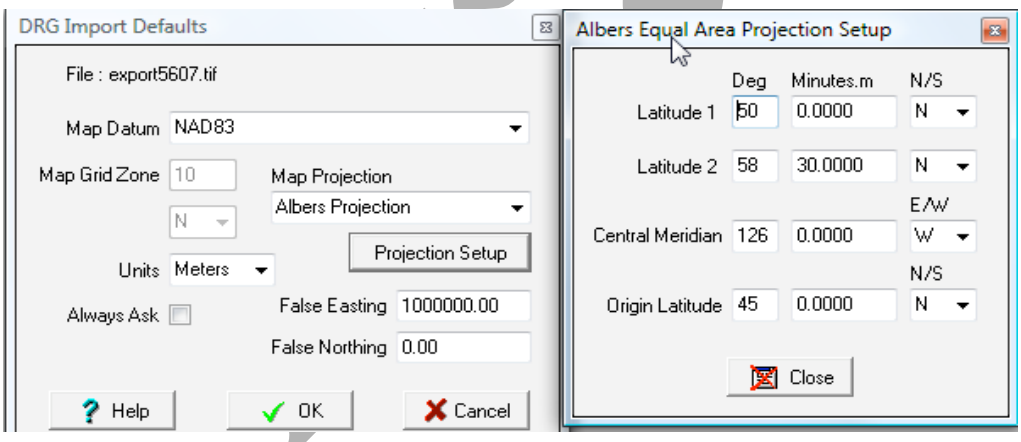
position of image on earth surface. A map projection is a method of showing the 3-D planet earth on a 2-D plane. For this example, map datum was set at NAD83, map projection is UTM and map grid zone is 10.



These options can be changed using the dropdown menus. In case of an image projected in BC albers, select Albers Projection and change settings as indicated below by clicking on the **Projection Setup** button in the DRG Import Defaults window. Select OK when you are done.



You will get a message about not moving the image file. OziExplorer has created a map file which contains the georeferencing information and a ***link*** to the map image. If the map image is moved or deleted the map file will not work. Select Ok and the map will now be displayed.

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latitude and longitude on a map or chart are referenced to a specific map datum. Every chart has a map datum reference.

[3] Universal Transverse Mercantor (UTM) is a projection zone system covering most areas of the world through 60 6° zones between latitudes 80°S and 84°N. BC is spread across 5 grid zones 7-11 http://www.gis.unbc.ca/courses/geog300/lectures/lect3/utm-bc.jpg.

Navigation

You can navigate around the window several ways.

1. Using the Map View window. This is an overview window where you can change your view by moving the display rectangle. Map View mode can be displayed by selecting the Map View button on the Main toolbar .
2. If the image is large enough there will be slider bars on the side of the display.
3. The arrow keys will move the screen display.
4. You can click and drag the map image to view a different section.

Zoom Levels

These can be changed a few ways.

1. The zoom drop-down window on the top menu bar or by the + and – symbols underneath it.

2. There are set zoom level buttons on the Main toolbar
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Loading Tracks and Waypoints

1. To load a previously saved track or waypoint select the Load button

from the main menu and then the desired feature (ex tracks) > Load Tracks From File (Multi).
2. Navigate to the desired file(s) and select Open. To select multiple tracks hold down the shift key and select the first track and then the last track in the list that you want to display. The features should now be displayed on the map. If you can't see a feature type that you loaded then turn the feature "on".

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Showing or Hiding Map Objects

Map objects such as comments, tracks and waypoints can be made invisible even after they are loaded onto the map. This can make the map look less cluttered. Features can be hidden or viewed by selecting View > Hide or Unhide and the target feature. Tracks and routes also have a Main toolbar button that does the same thing.

is the show/hide track button

is the show/hide route button

Configuration

The general setup of OziExplorer can be altered in File > Configuration. Here you can change many settings including the map datum, display units and what folders to look in for maps.

Closing the Map

Before exiting OziExplorer or opening another map first close this map. This will close all track and waypoint files (otherwise they will be open on your next map) and prompt you to save any changes you have made during your session.

1. Choose File > Close Map and follow any prompts the program gives you.

Map View

Map View is the view area window that the image is displayed in. Within the Map View window, the area encompassed by the red box is where you are located on the main screen. You can drag the red box around to go to other portions of the map.

1. Go to View>Show>Map View on the main tool bar. The Map View window will open on the main screen.
2. Left-click on the mouse and hold to drag the red box to zoom in to a new area of interest.

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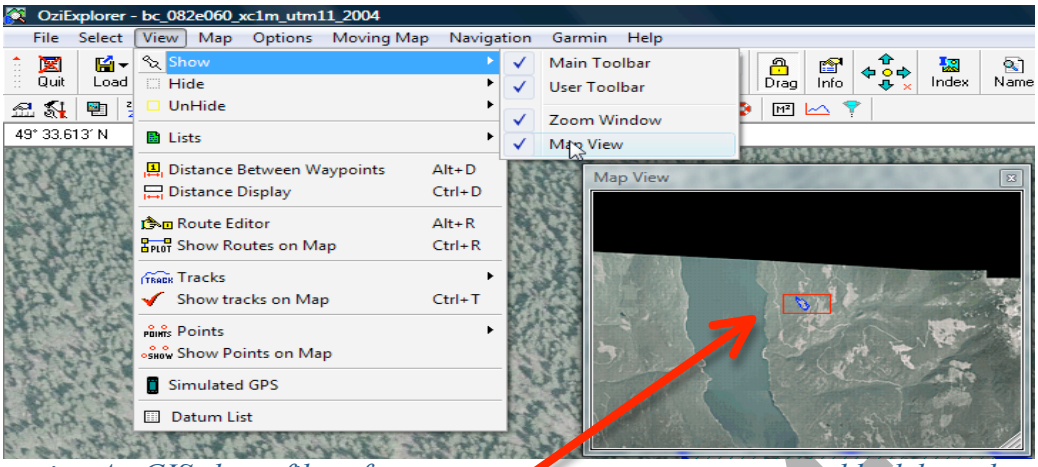
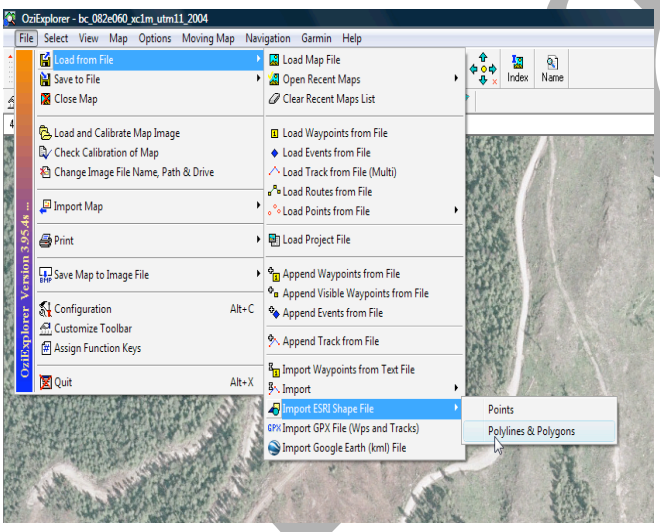
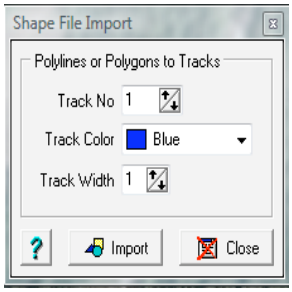


Importing ArcGIS shape files of cutblock boundary and Standards Units

1. Open your OziExplorer map file of the block if not opened already.

2. Go to File>Load from file>Import ESRI Shape file>Polylines and polygons on the main toolbar. A popup window (Shape File Import) will open where you can choose the track number you want it to open as, the track colour, etc.





3. Press Import.

4. A popup window will open for you to choose the polyline or polygon file that you want to open; so navigate to it and press Open.

5. Another popup window will open for you to choose the coordinate system and datum of the shape file. The shape file does not have to be in the same projection as the map file. Refer to **Importing a new digital georeferencing image – Step 3** section for directions.

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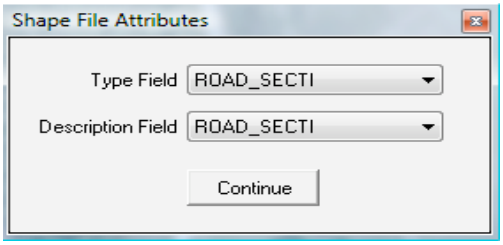
NOTE: The shape files that most people will probably be using from Ministry of Forests and Range are in BC albers projection.

6. Change the Position Format to Albers from the dropdown menu. A popup window will open called "Albers Equal Area Projection Setup". Confirm projection setup data are correct and Press OK.

7. Press OK on the "Shape File Import/Export Options" window.

8. A popup window called "Shape File Attributes" will open. You can choose the type and description of the shape file. You can leave it without choosing anything and put in the type and description later in the **Track Properties** window. Press Continue.



9. The shape file should appear on the map screen (e.g., block boundary).

NOTE: If the shape file either does not appear or the polygon does not sit correctly in the map, then the position format that was chosen is probably incorrect. It is important to know where the shape files came from and the projection and datum information of the original layer file.

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The shape file attributes can be changed just like any other track file by using the **Track Control** window. You must save the shape file as a track file and can manipulate it just as you would any other track files.

Section 1. Estimating lost soil productivity due to access construction

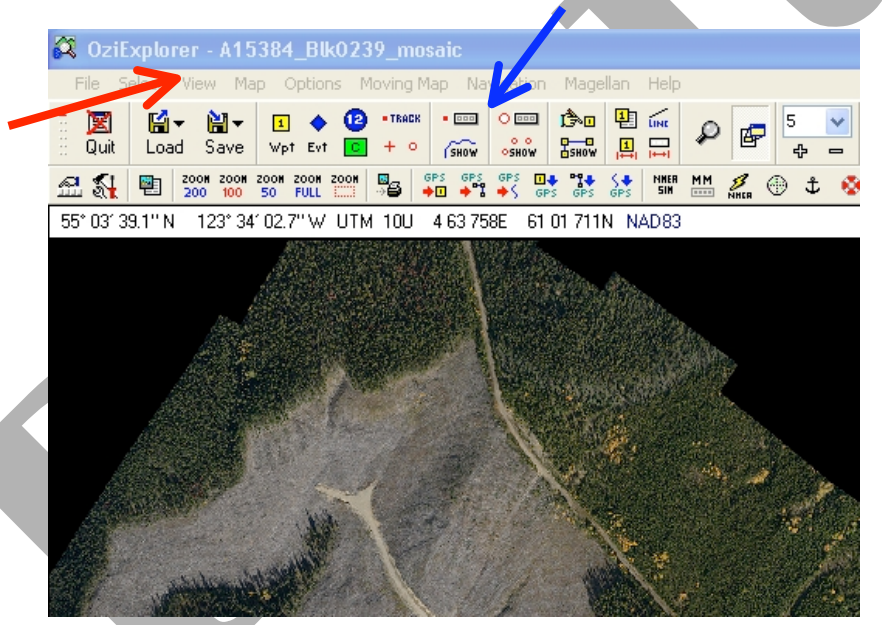
This section describes how to use the track feature to: (i) delineate areas of Permanent Access Structures (PAS) such as roads, permanent spur roads, landings and burrow pits, (ii) do area calculation, and (iii) label these features on the map.

Creating Tracks

1. Start the Track Control by going to View>Tracks>Track control

Or

Select the **Track Control** button from the Main menu.



Proceed to create a track as follows:

2. Start editing tracks by selecting the Create Track Points button on the Track Control.

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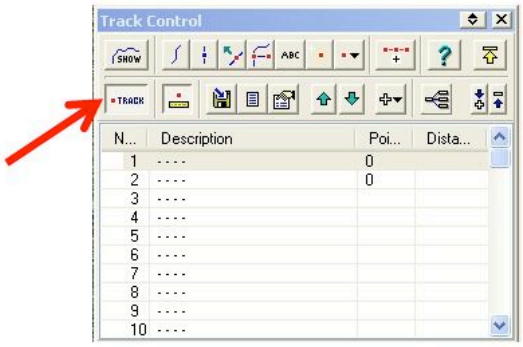
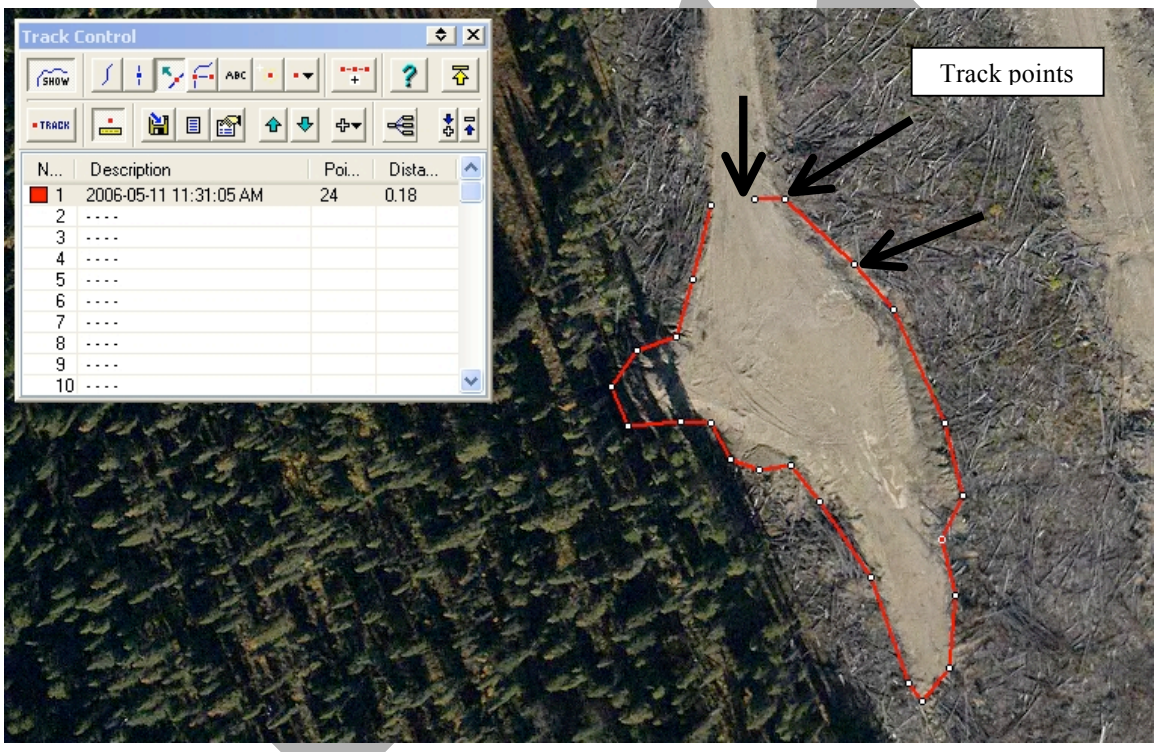
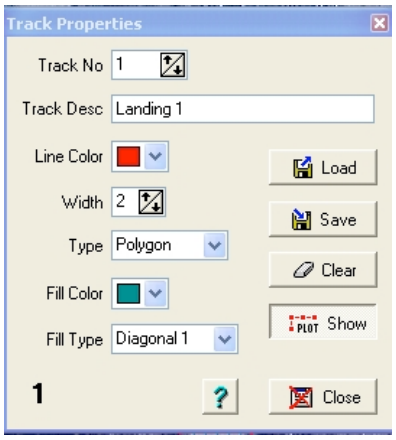


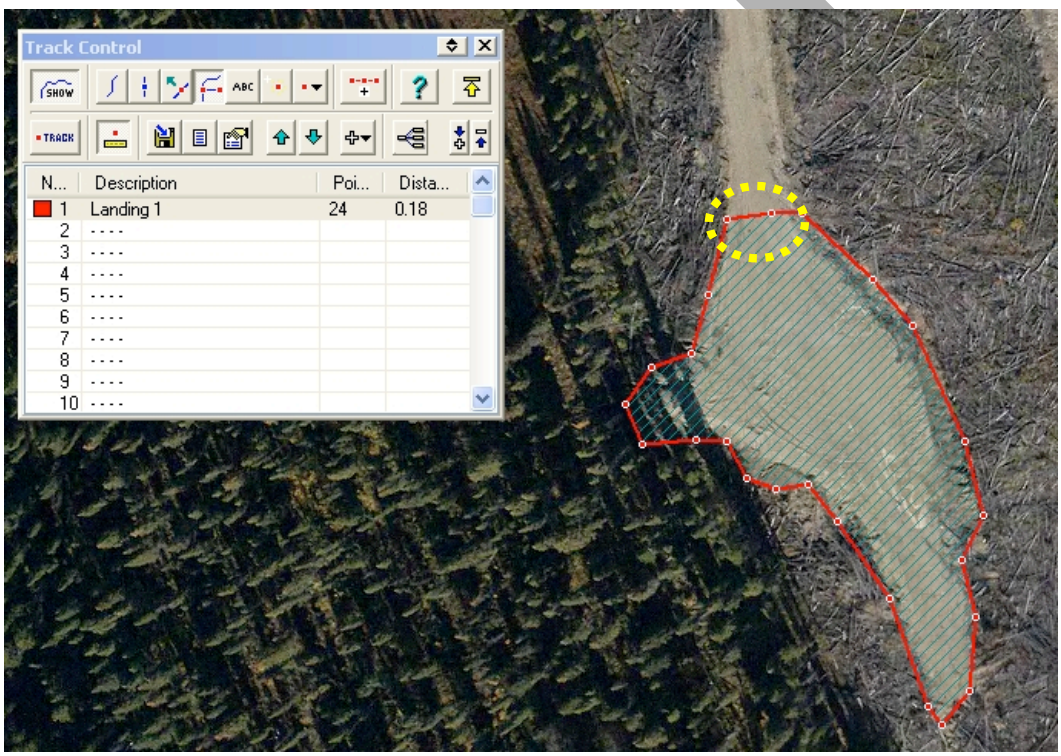
3. Delineate the area on the map using as many points as needed, and clicking the mouse to create each point along the track.



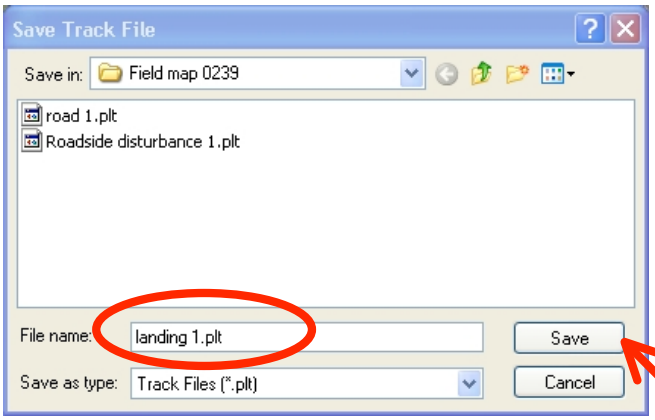
4. To name and save the track and to edit its properties select the Track Properties button .



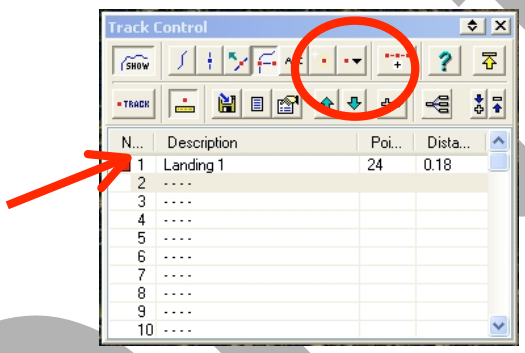
In this example the track is delineating an area which can be represented with a polygon. By selecting polygon as the track type the track is automatically closed (the end point snaps to the start point).



5. After you are finished editing the track properties select the Save button. You will be prompted to find a location for and to name the track file.



6. To create a second track, select a blank track line in the track control (red arrow) and then bring the new (blank) track to the top of the list using the blue arrow button (circled). This makes the blank line the active track. The track in the first position in the track control is *always the active track* and *the active track is the only track that can be edited.*



7. You can now repeat this process to create other tracks.

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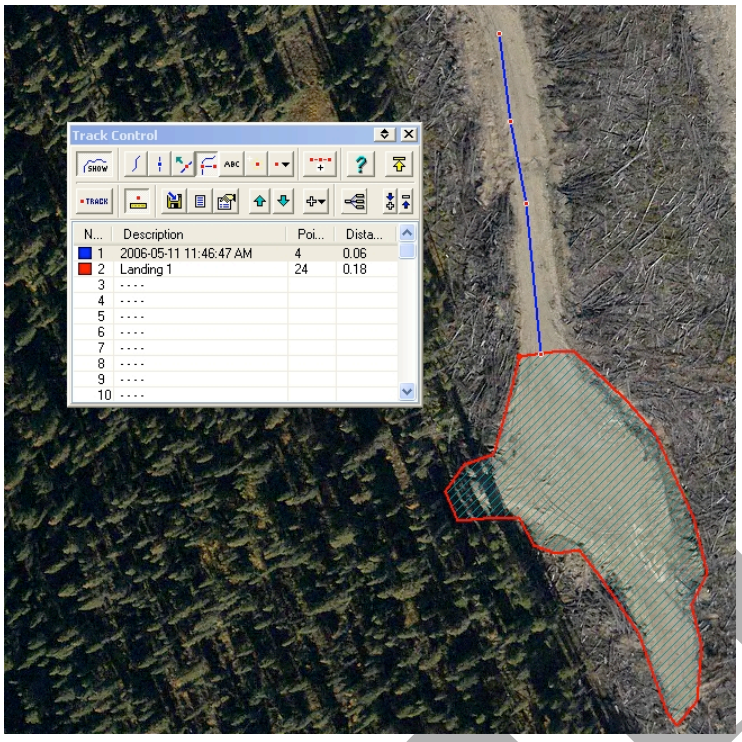

Changing the shape of a polygon

The points used by the track can be manipulated individually to change the shape of the polygon.

1. Select track and make it active by moving it up in the list as explained above.
2. To move a track point, select the **Make Track Point in Box Active** in track

   control window and use mouse to draw a box around the point to be marked as active. A white circle around a track point indicates an active point.

   NOTE: Make sure the **Dragging of Map Objects** button is unlocked.

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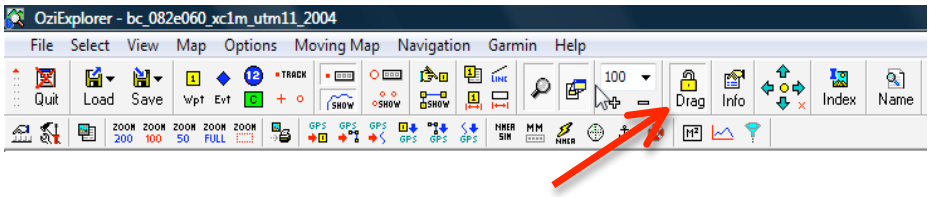


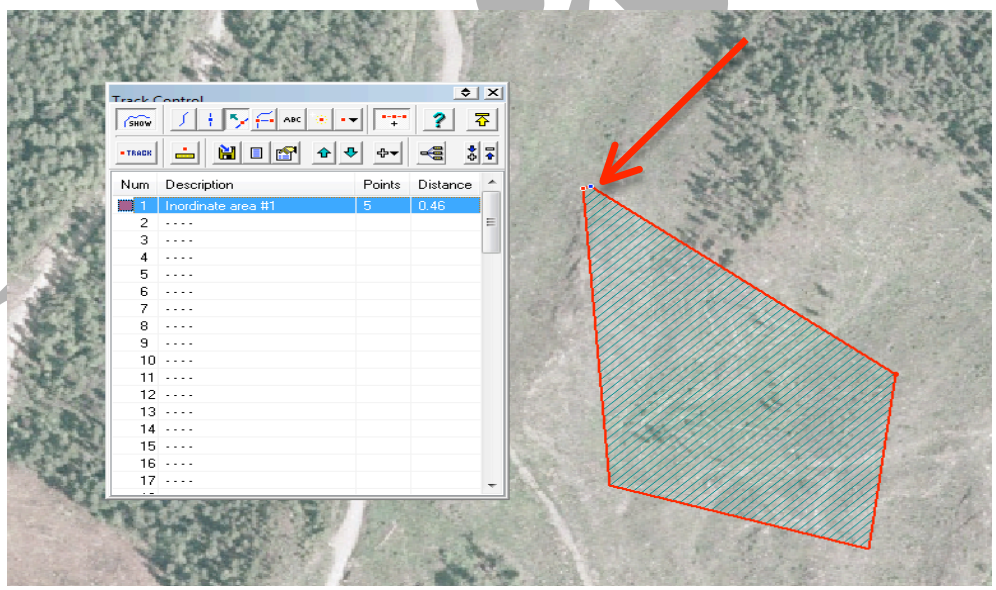
3. Left click on mouse, hold and move track point to its new location.

   Or

   To modify polygon edges, you can also insert a new point between existing track points

4. Select the **Insert a new track point** button in track control window and move the mouse over to an active track point.

5. Hold the **ALT key** down and press the left mouse button. A new track point (blue point) will be created to the right of the selected track point (active red point). The new point can be dragged to a new position as required.

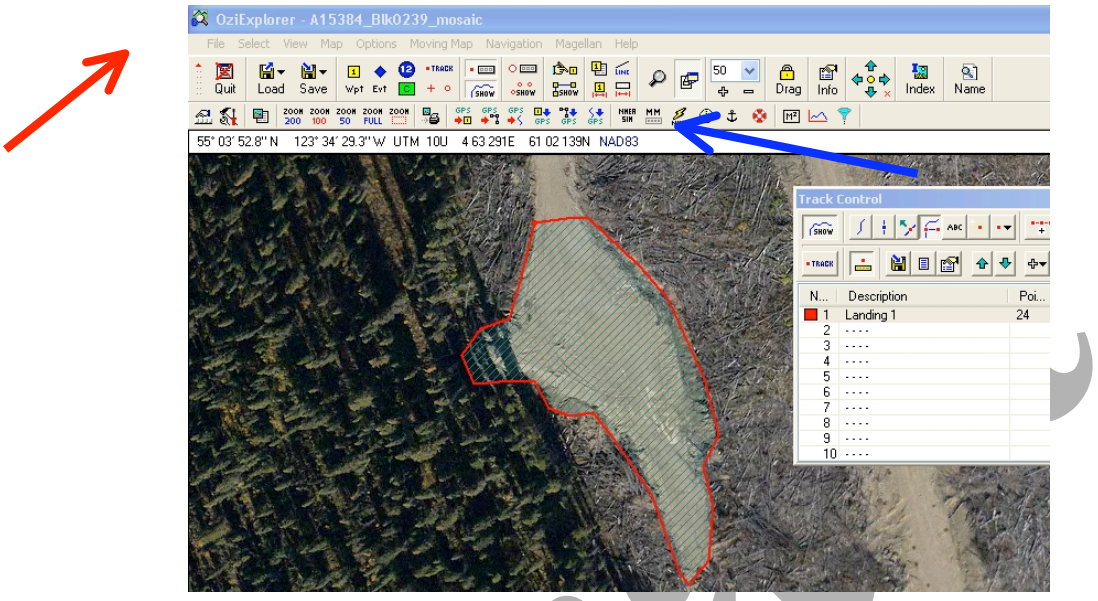


Measuring the Area of a Polygon

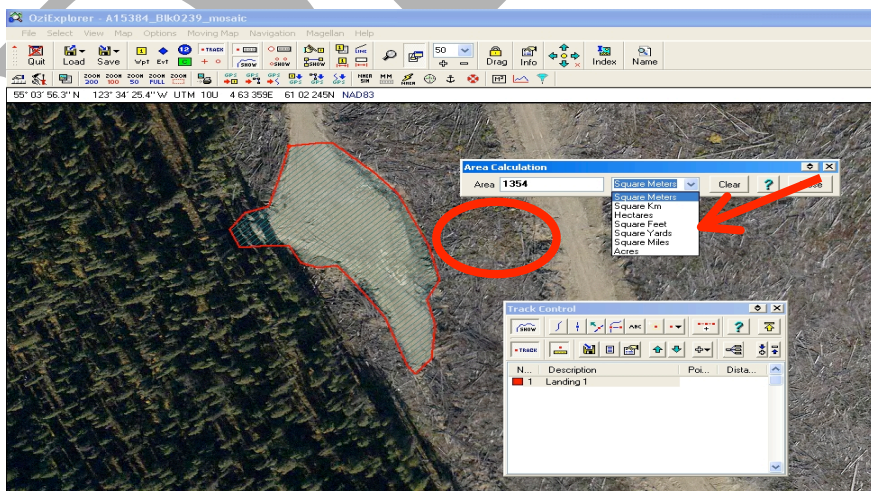
The area you would like to measure needs to be bounded by a polygon track e.g. a landing (see Creating Tracks).

1. Make the target polygon the active track (see step 6 of Creating a Track), here the target polygon is the red Landing polygon.

2. There are two ways to activate the measure tool, by selecting Options > Area Calculation or by selecting the **Measure Area** button on the Main menu .



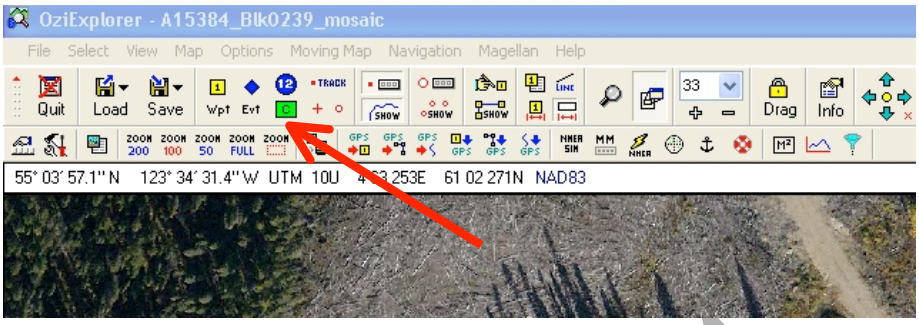
2. A new Area Calculation window will appear. Change the display units to Square Meters by using the dropdown menu. This area measurement should be recorded in section 1.1 of FS 1246.



Creating map labels

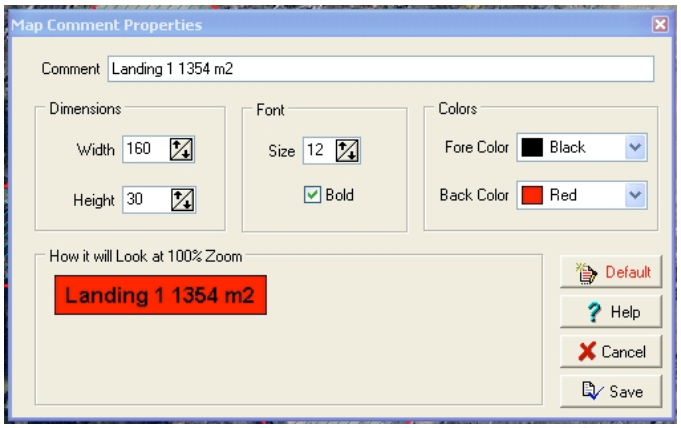
Once the feature has been marked and measured a label should be created on the map. This should include the feature name and size.

1. Press the Position and **Set Map Comments on Map** button from the Main menu.



2. Click near the feature you want to label. This will place a green label on the map.

3. To change the text, double click on the label. This will bring up a Map Comment Properties window where you can change the size of the text and the box, the colour and the comment text.



4. After you have edited the label select the Save button. This will change the appearance of the label on the map.

5. Turn the Comment function off by selecting the Set Map Comments on Map button again.

NOTE: You can edit the position of the label. First unlock the Drag feature (select the Drag button) and then click and drag the label to its new position.

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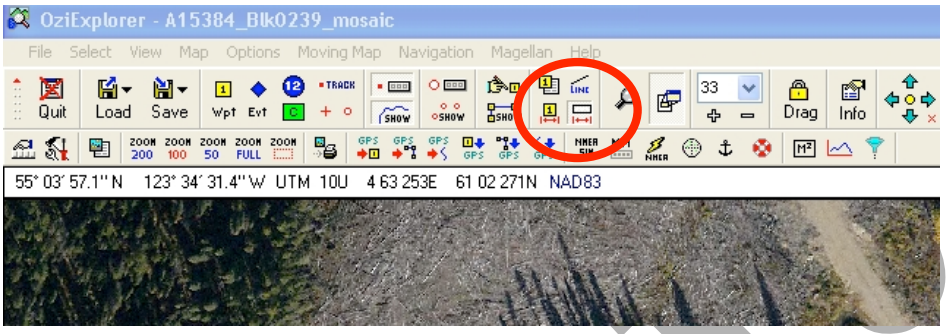
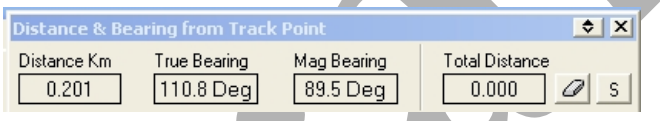
Defining Roads

After determining the area of landings and burrow pits, the area of rehabilitated and un-rehabilitated roads is measured using tracks and the measure distance tool.

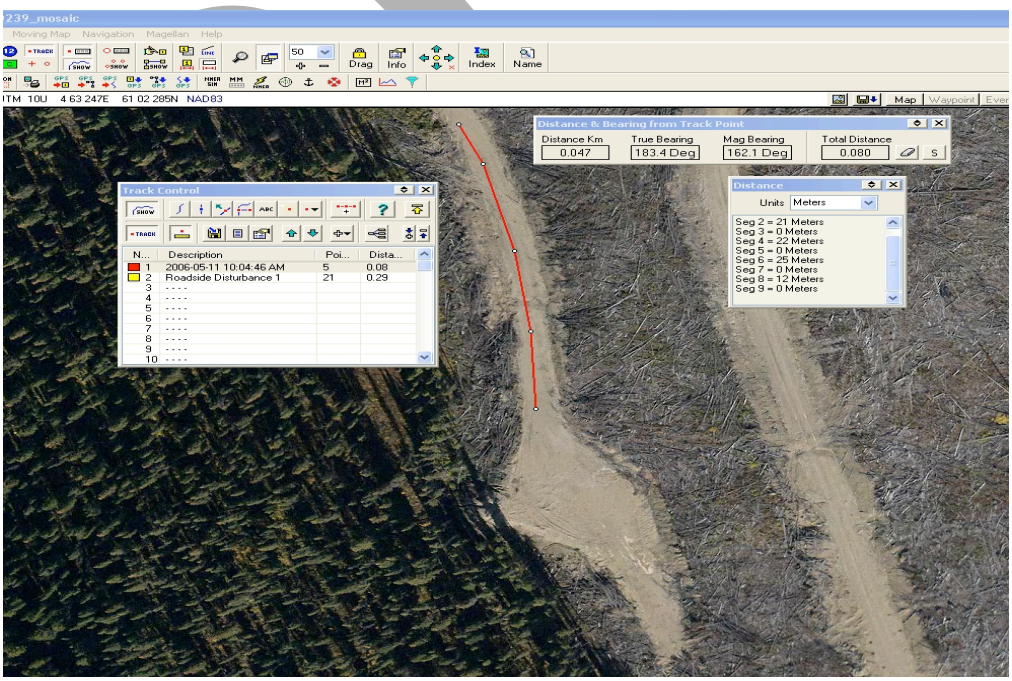
1. Turn on the measure distance tool by selecting the **Distance & Bearing Display** button.



This will bring up a new window.

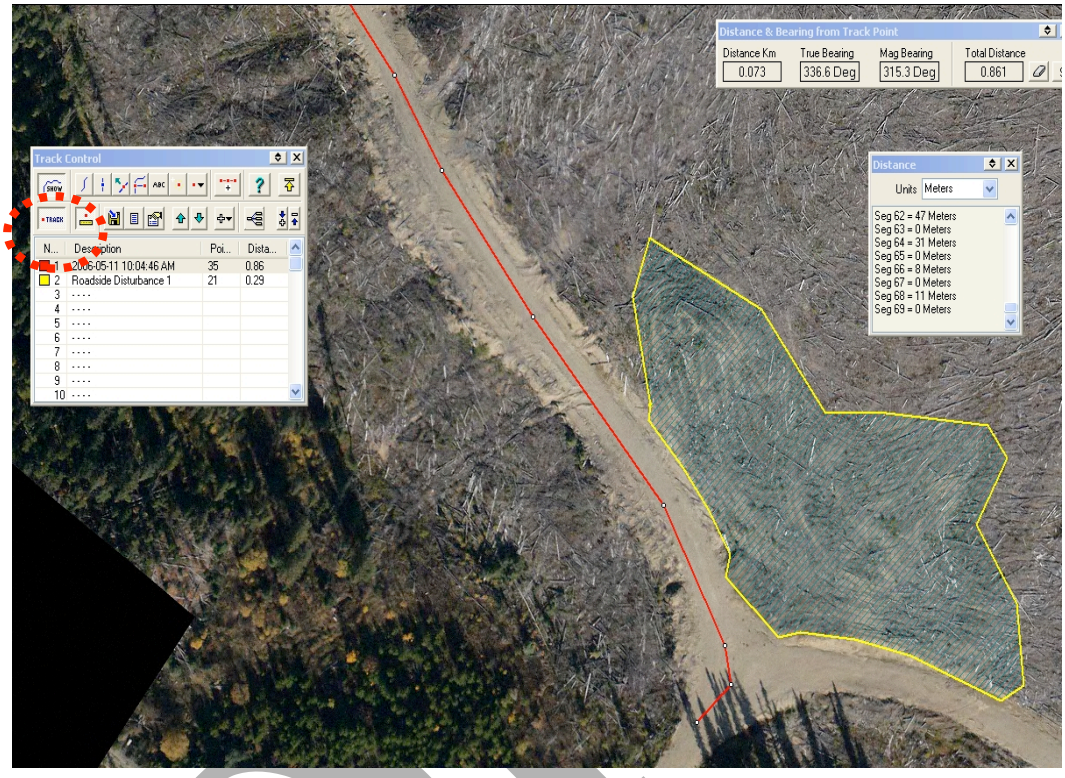


2. Create a new track line feature following on the road (see Creating Tracks).



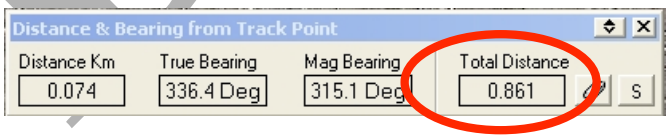
3. Move the screen by using the arrow keys or by dragging the screen (left click and hold then drag the screen) to keep digitizing the feature.

4. Stop when you have reached the end of the feature (ex the road runs out or reaches a block boundary) and turn off the Create Track Points function (use the button on the Track Control Panel).



5. Name and Save the new road track (see Creating Tracks).

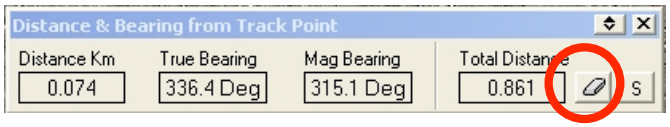
6. Record the Total Distance from the Distance & Bearing Display window. Here the total length of the road track is 0.861 km.



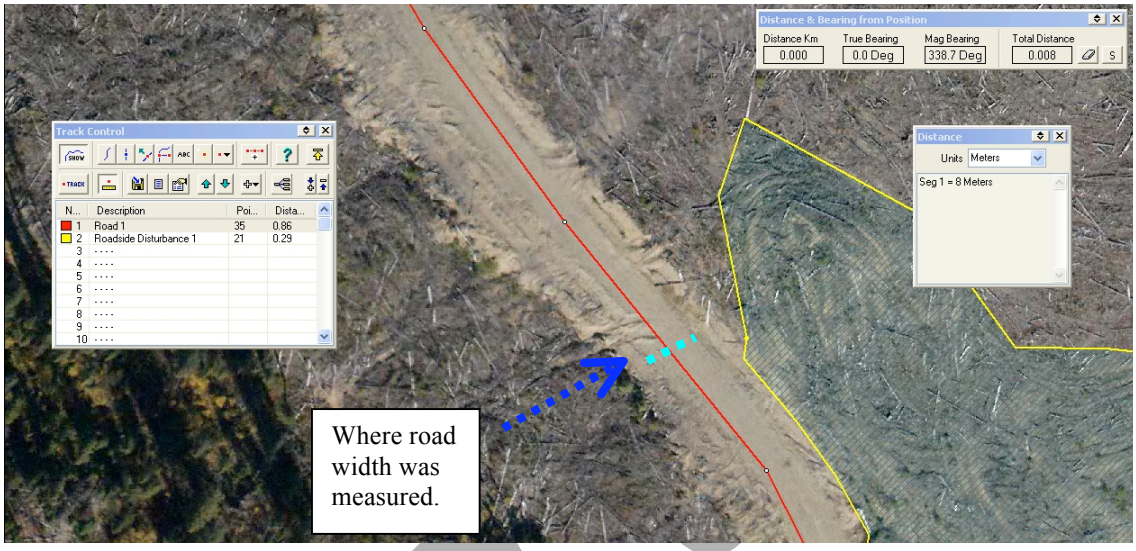
NOTE: Be careful with the distance and with the create track tools enabled. If you click anywhere on the map the distance will be recorded in the total distance and that point will be joined with your existing track. If this happens you will need to delete the track point and re-measure the track distance.

7. You now have the total length of the road section, to get the area you need to measure the width of the road. This can be done with the Distance & Bearing tool or with waypoints (see Creating Waypoints and Calculating Distances). To use the Distance

& Bearing tool make sure the Create Track Points tool is off and then zero the Total Distance. Press the **Eraser** button on the Distance window.



8. Position your cursor over the edge of the road and click, this will be the starting position for the distance measurement. Move to the opposite roadside and click. This new distance will be the width of the road.



9. Calculate the road area (width x length) in metres and record it along with the name of the feature in Indicator 1 and on a map label.

NOTE: On a long section of road you would want to use the average width (take a few measurements and then average them) for your area calculation.

Clearing a Track File

1. To remove a track file from the screen select the Track Properties button and choose clear. This does not delete the track from memory just removes it from the Track Control and the map.

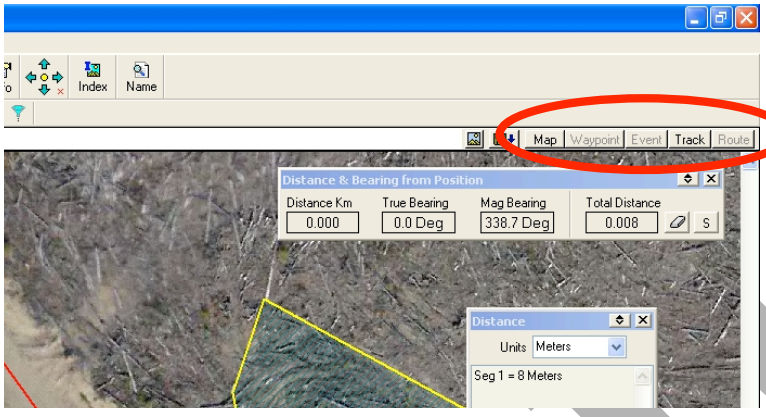
Deleting a Track File

1. Use Windows Explorer to navigate to the desired file and delete it.

Deleting a Track Point

1. Make the target track the Active Track (see step 5 of Creating a Track).

2. Use the Select Points button from the Track toolbar menu to select the point(s) you want to delete.
3. Right click on the target point and choose Delete from the popup menu.
4. To make the change permanent choose the Save Track File button on the Main Menu.



Section 2. Estimating in-block area affected or potentially affected by landslides, drainage diversion or significant erosion from roads, landings or trails.

For this section, delineate disturbed areas with the same procedure as delineating landings and burrow pits from Section 1.

Section 3. Estimating percent of the NAR area affected by disturbance to natural drainage patterns as a result of forestry operations.

For this section, delineate disturbed areas with the same procedure as delineating landings and burrow pits from Section 1.

Section 4. Description of the soil disturbance hazards, areas affected by dispersed soil disturbance, potentially inordinate disturbance, and roadside work areas in the NAR.

For this section, delineate disturbed areas with the same procedure as delineating landings and burrow pits from Section 1.

For section 4.3, create transects using routes made of waypoints.

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Creating waypoints

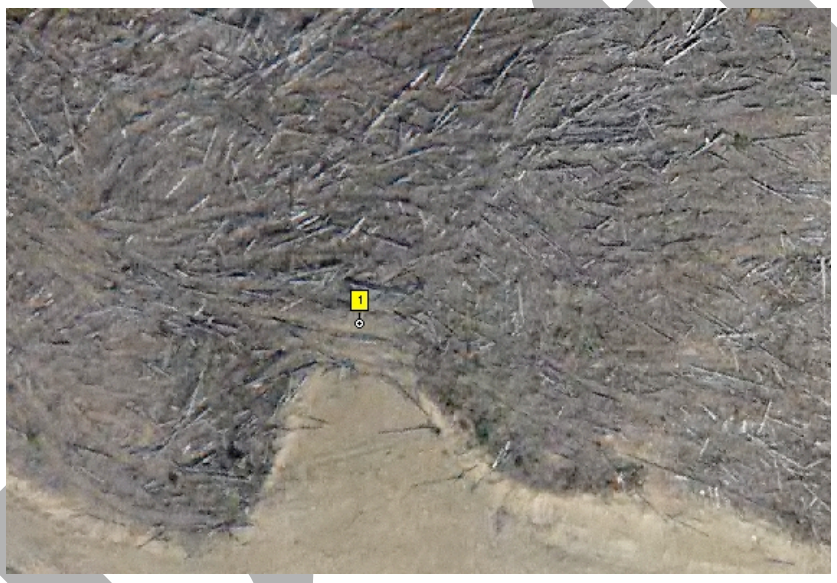
Waypoints are used as a point of reference for GPS, and mark specific locations of interest. For example a Point of Commencement (POC) for a survey could be defined as a waypoint, or any spot of interest along a transect.

To Create a Waypoint

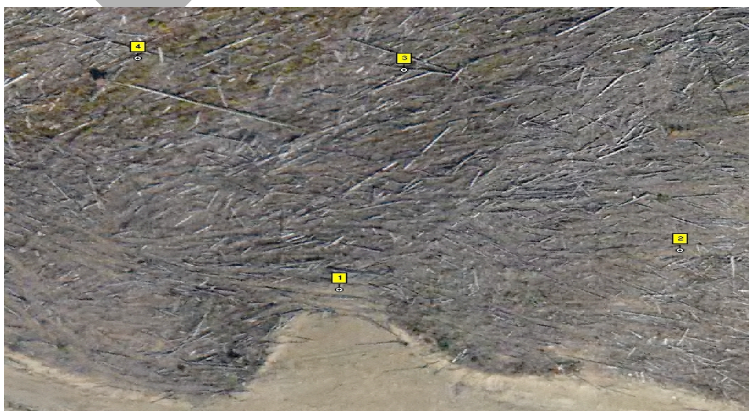
1. Activate waypoint function by clicking on the Waypoint button

. The cursor will now say waypoint.

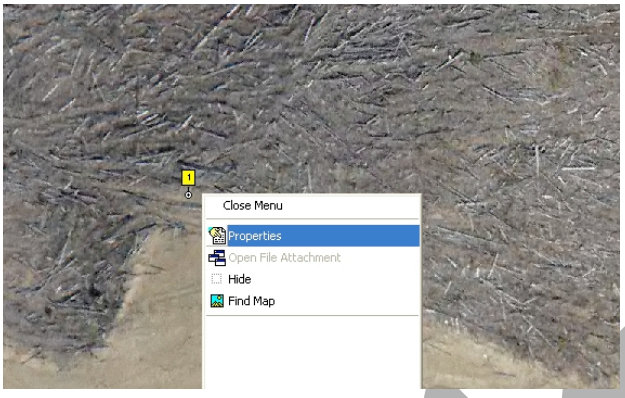
2. Place the cursor on location of interest, and click to create a waypoint. This adds a new waypoint on the map screen.



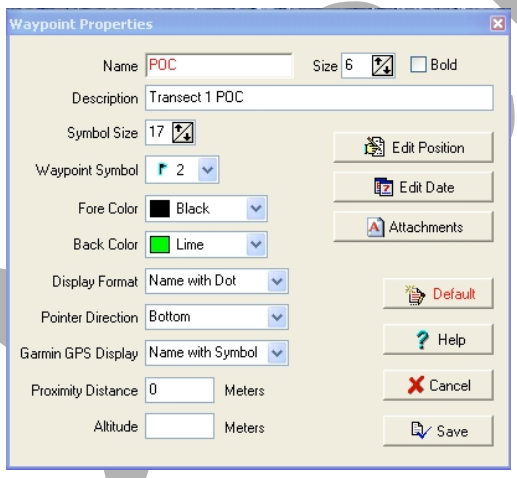
3. Wherever you would like to add a waypoint right click to add a point.



4. To edit the properties of a waypoint right click on the base of the point (not the label). This brings up a popup menu. Select the Properties function.



5. This brings up a window where you can add a name and description and change the colour and style of the waypoint. From this window you can also edit the coordinates and save the waypoint.



6. Selecting the Save button saves the point to the screen.

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To make it permanent select the Save Waypoint File button on the Main menu

. When the text is red, there are changes to the Waypoint file that can be saved.

NOTE: You can change the properties of waypoints by using the Waypoint List.

Deleting Waypoints

1. Right click on the target waypoint.
2. On the pop up menu select Delete. This will clear the waypoint from the screen. To save any changes to the waypoint file select the Save Waypoint File button

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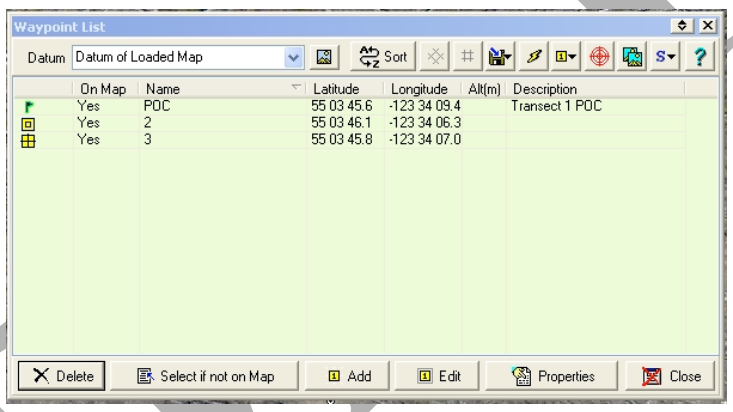
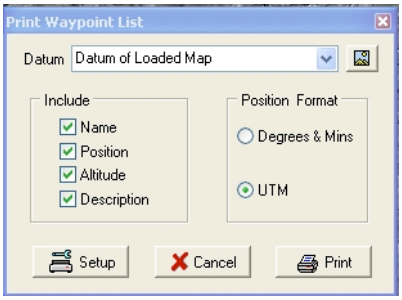
Viewing and Printing the Waypoint List

1. Every time a waypoint is created it is added to a master waypoint list. You can view this list by selecting View > Lists > Waypoints from the Main menu.



This brings up a window showing the coordinates and description of each waypoint. You can edit the properties of each waypoint from this window.

2. To print this list go to File > Print > Print Waypoint List from the Main menu. This brings up a window where you can choose waypoint printing options.



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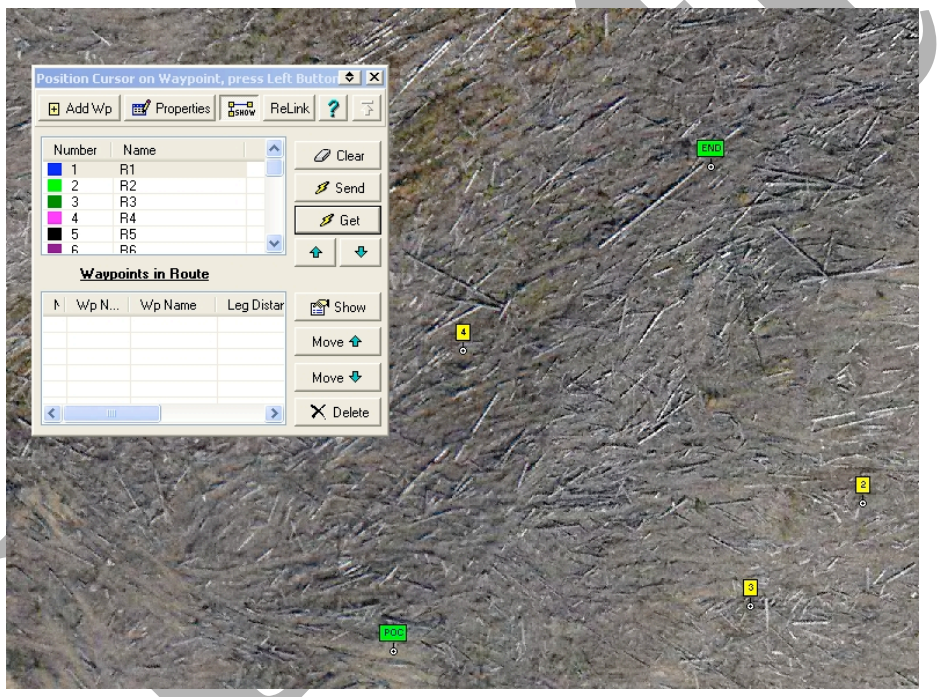
Creating a Route from a set of waypoints

A route is created when waypoints are linked. Routes are used to mark walkthroughs and survey transects under section 4.3. Detailed methods for transect layout are presented in the Protocol for Soil Resource Stewardship Monitoring: Cutblock Level (Curran *et al*. 2009).

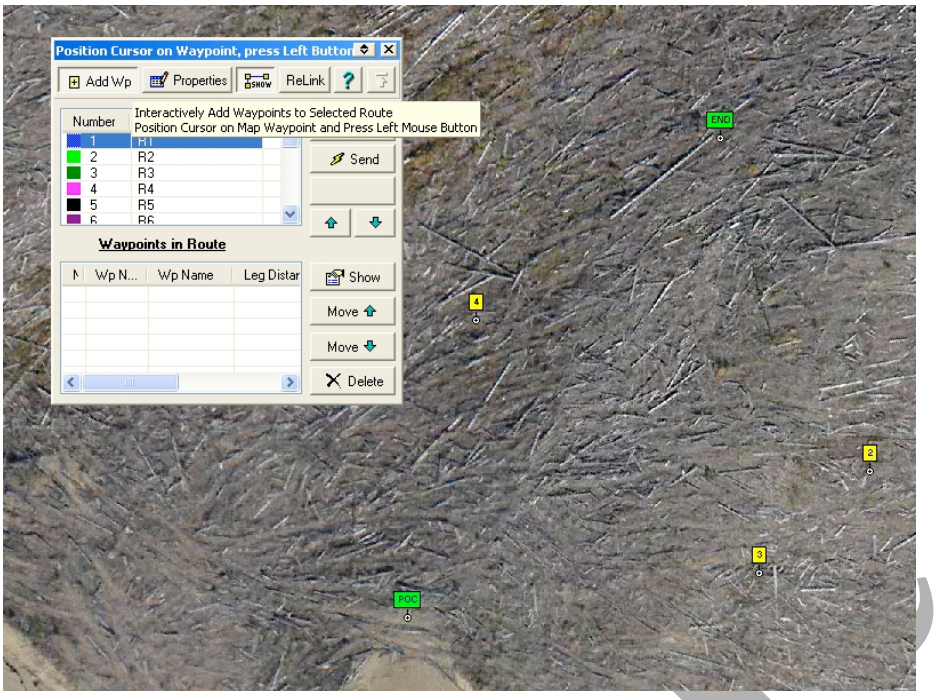
1. Mark POC and each stop (or change of direction) along the path using waypoints as explained under Creating Waypoints.

2. Once the waypoints are displayed on the map, activate the route editor feature under View> Route Editor or by selecting the Show/Hide Route Editor button on the Main menu toolbar.

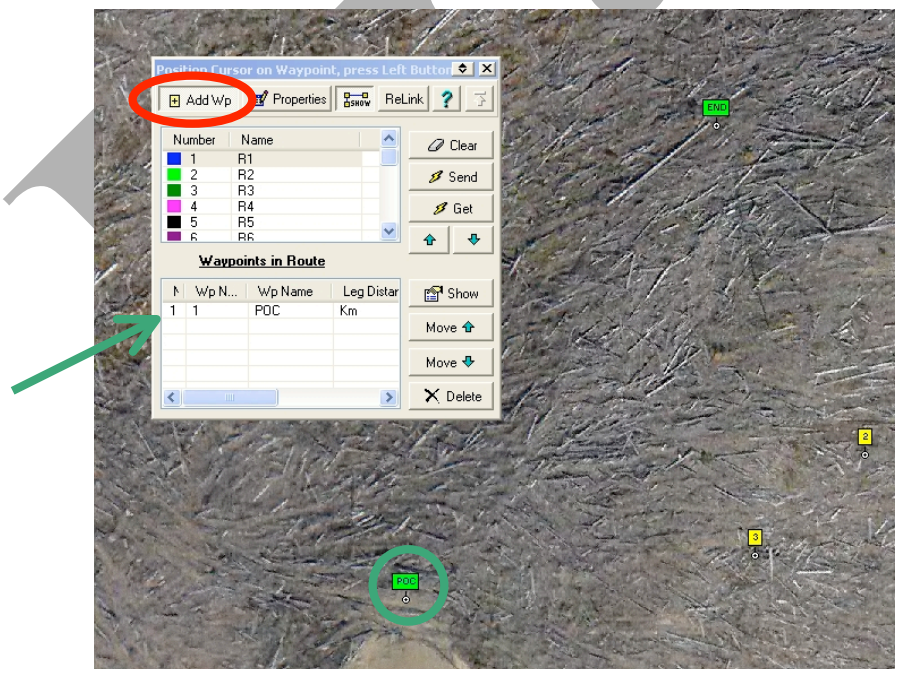


3. Select a route from the upper list (here R1) and depress the Add Wp to add waypoints in a route.

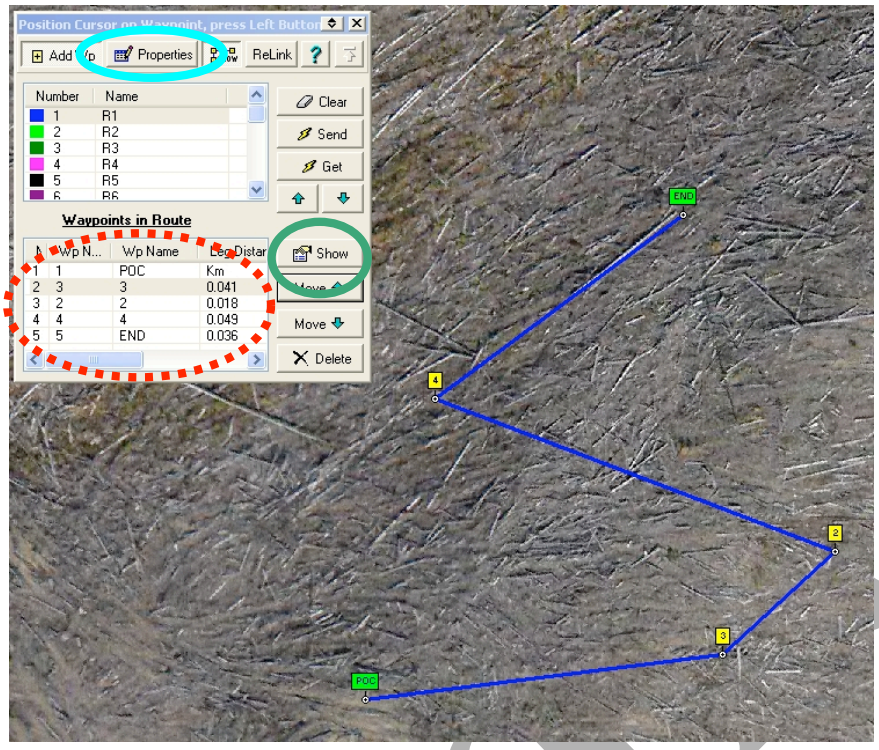
HINT: If you select and hold a button in OziExplorer you will often get a description of what function the button performs. When you do this with the Add Wp button you receive instructions on how to add a waypoint to a route.



4. The Add Waypoint feature allows you to click on top of waypoints to trace a route. To add waypoints to your route position your cursor on first waypoint (e.g., the POC) on the map and then press left button. This will add your waypoint (here the POC) to your route.



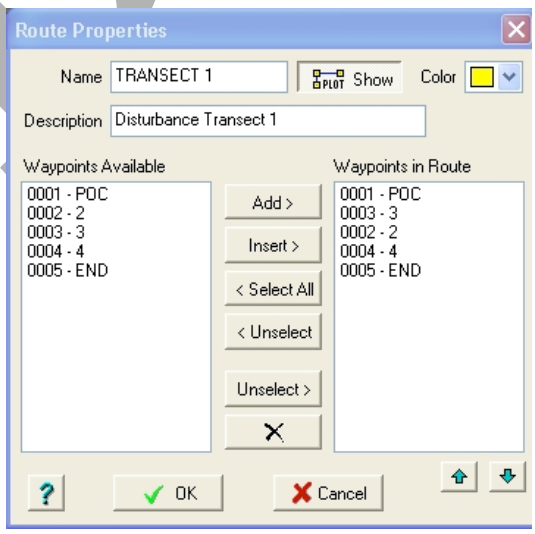
5. Repeat this process with each successive waypoint along the route until you have reached the end of the transect.



The waypoints do not have to be added in numerical order. In this example, waypoint 3 was added to the route before waypoint 2 so that the route path does not cross itself.

6. Save the new route by clicking on the Save Route button Route on the Main toolbar.

7. You can view and edit the route properties by clicking on the **Properties** button Properties at the top of that route editor window. This brings up a new window where you can edit the order and number of the waypoints as well as the transect name, description and colour.



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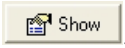
8. A detailed list of the waypoints in the route is generated with the **Show** button 

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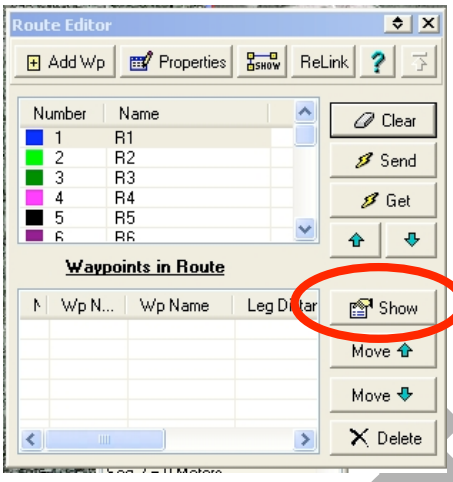

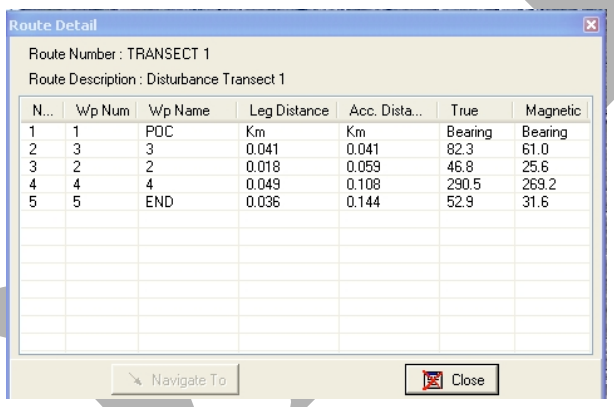

Distance from departure to arrival and between waypoints are also displayed.

Printing

The final field map can be printed directly from OziExplorer. There are many printing options including printing a portion of your map, the whole map or just what is displayed on the screen. These areas can be fitted to a paper size or printed with a scale.

1. Choose File > Print > Print Map Image from the Main menu. This will bring up a window where you can choose what area to print, define a scale (with the drop down list or by typing it in), the orientation of the printed map and if you want waypoints and comments in colour (the rest of the map will be colour anyways).

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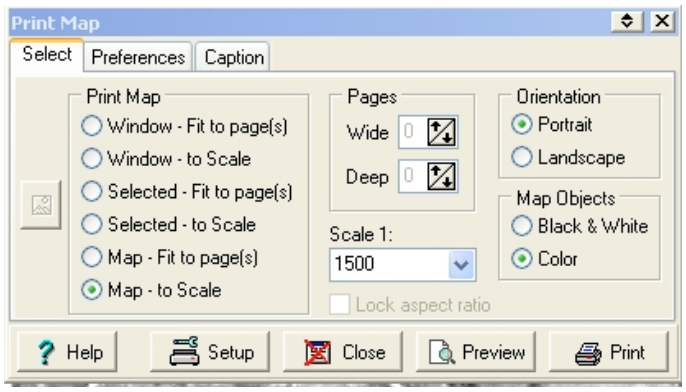
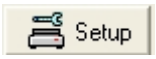
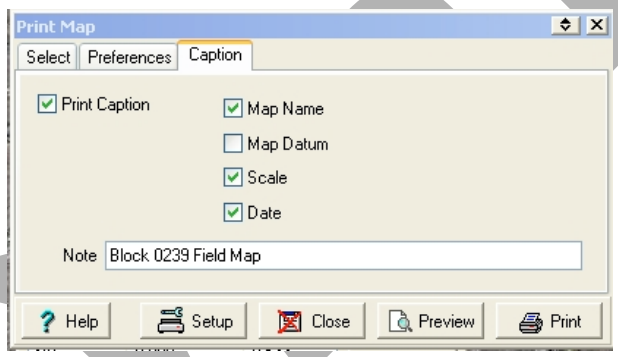


2. Use the Setup button  to choose a printer and page settings.

3. The Caption tab allows you to select what you would like included at the top of your map. Map Name is the file name of your map, scale is expressed as a ratio (you choose the scale on the Select tab). All this information is printed as one line of text at the top of your map. You can add comments in the note box. This will be printed as a second line of text.



4. The Preview button on the Select tab will open a new window (you can change the size of the print preview with the Zoom button).

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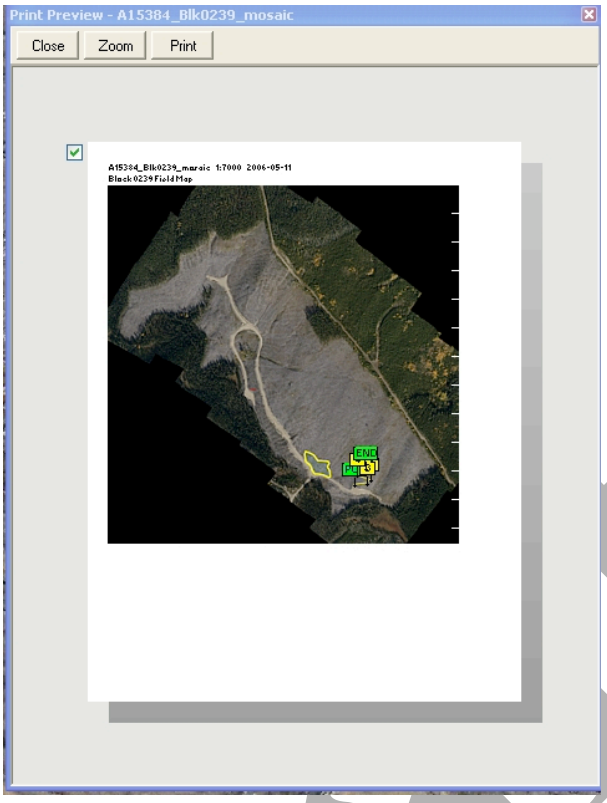

5. When you are ready Select a Print button.

Real-Time GPS Navigation and Data Collection

Once the GPS soil map is ready, it is loaded in a mobile PC either an handheld or portable tablet style for field validation. OziExplorer and its add-on, OziExplorer CE on a Pocket PC are moving map software that allows you to navigate in real-time (or live tracking) with your soil map when connected to a GPS receiver.

The soil map created by the PC version of OziExplorer must be converted before uploading data to the Pocket PC (e.g. HP Ipaq 210). However, tracks and waypoints can be directly transferred to the Pocket PC. The procedure for using OziExplorer CE including activating a GPS, navigating and data capture in the field is detailed in **OziExplorer CE Training and Help Manual** (Chevalier and Dubé 2009). In the following section, we will go over the things you need to know about OziExplorer that runs on a laptop (e.g., Dell mini 9) connected to a Bluetooth GPS navigation receiver.

Adding a Bluetooth GPS Receiver on Windows XP

Unless your laptop has a built-in GPS, you must get a Bluetooth GPS receiver and set it up on your Bluetooth enabled laptop. In Windows XP:

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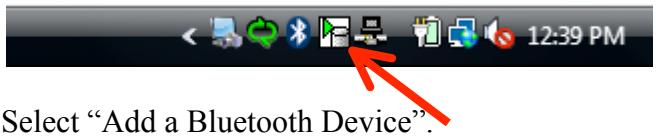
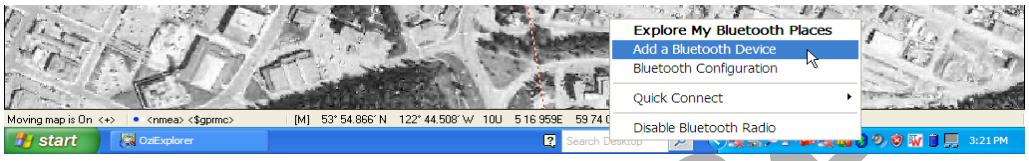
1. Turn your Bluetooth GPS receiver on.

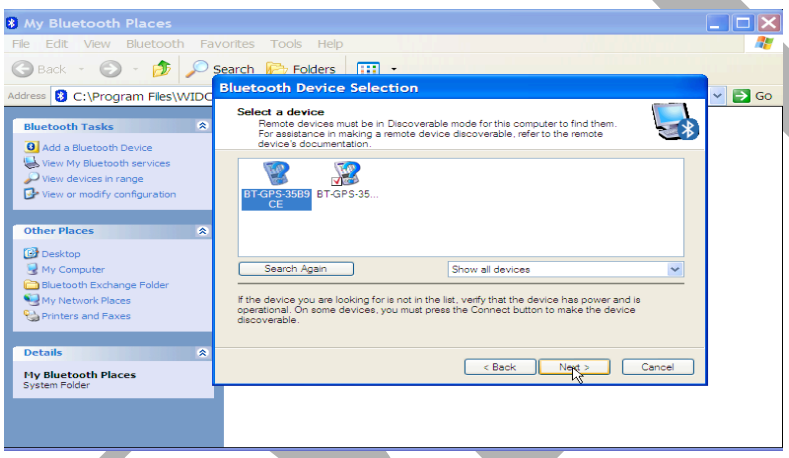
2. Right-click on the Bluetooth icon in the lower-right corner of the screen



3. Select “Add a Bluetooth Device”.

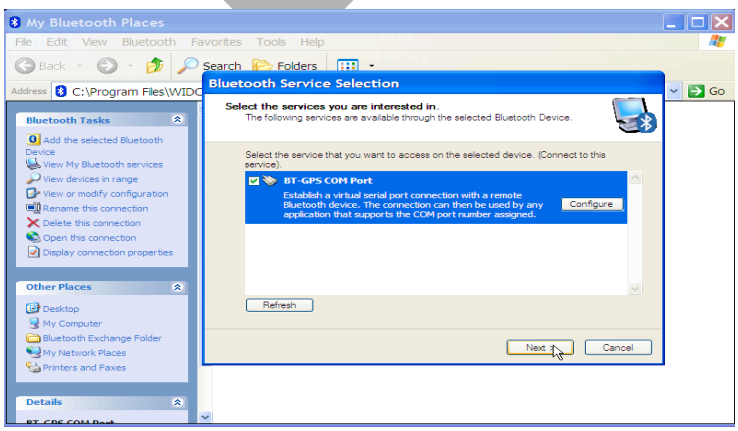


4. Search for your GPS receiver and once discovered, select it from the list and press “Next”.



5. Type the required password found in the GPS receiver documentation and select “Next”.

6. Select your device again and click “Next”.



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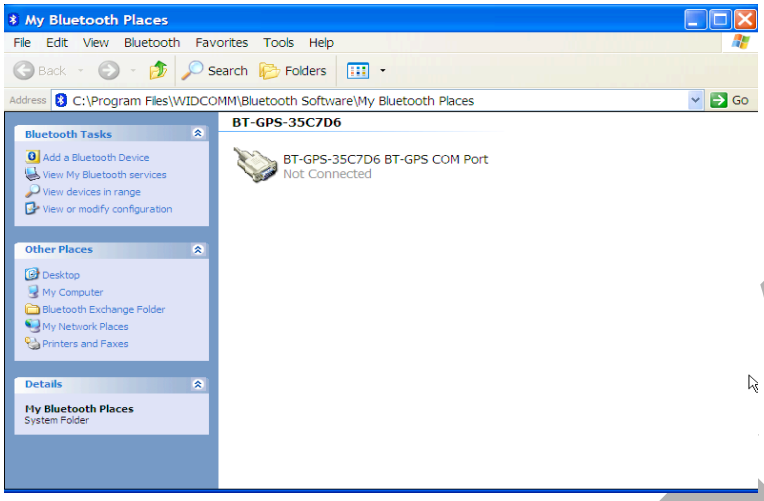
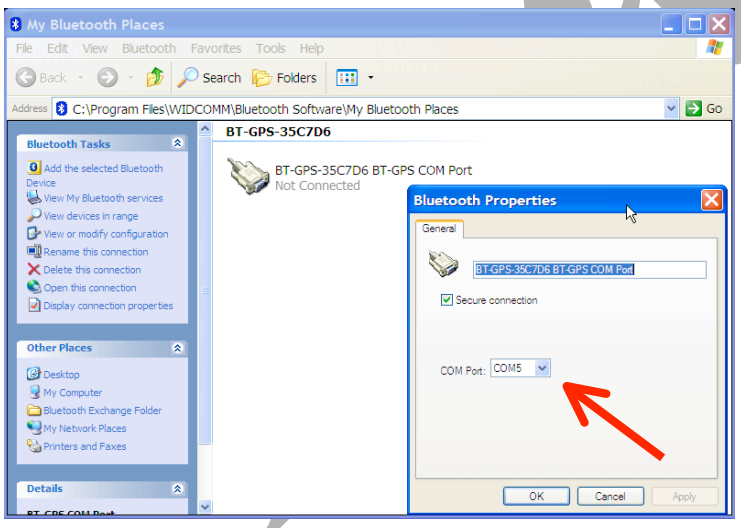
7. In the “My Bluetooth Places” screen, right-click on the device shortcut and select “Properties” from the drop-down menu.



8. The assigned ComPort for your GPS device is indicated there and must be used to configure OziExplorer to use this ComPort (see step 2 below).



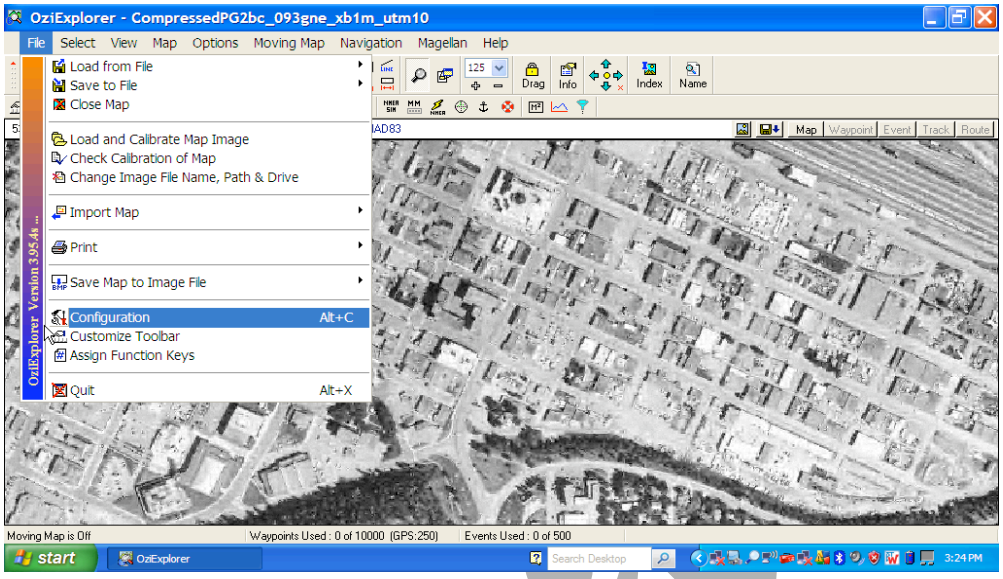
9. Go back to “My Bluetooth Places” screen and double click on your GPS device shortcut to make connection.

10. You are now ready to launch OziExplorer.

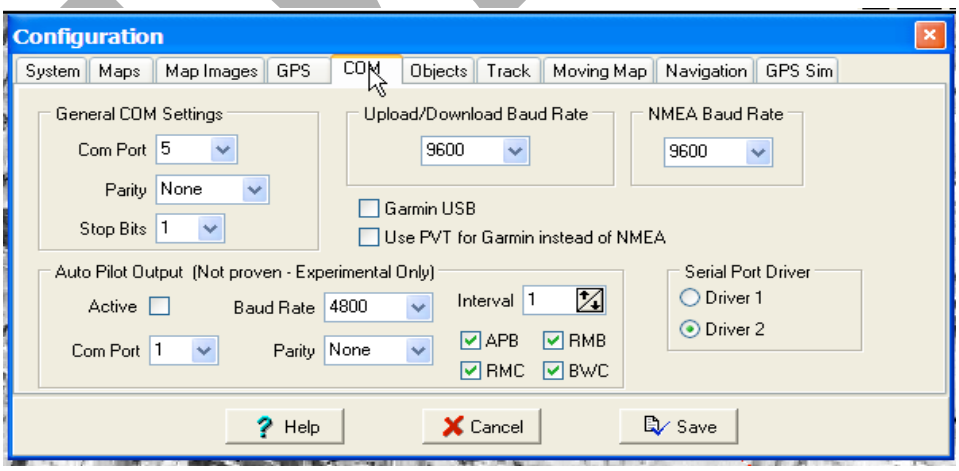
Connecting the GPS receiver to OziExplorer

The GPS need to be connected to the serial port of the PC for real-time navigation. To this end, OziExplorer requires configuring for connecting to the GPS.

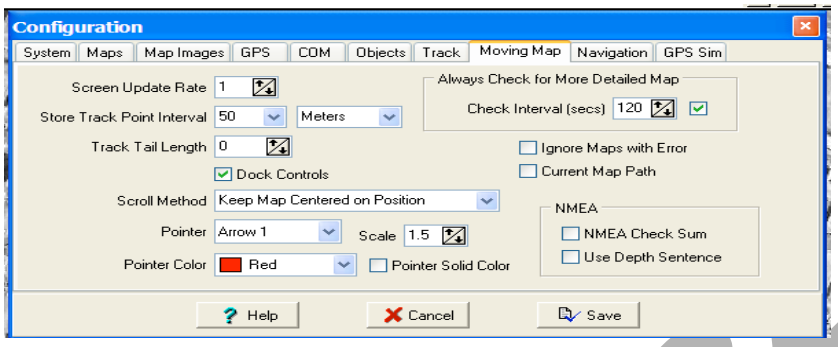
1. On the main menu bar of OziExplorer software, go to File\Configuration.



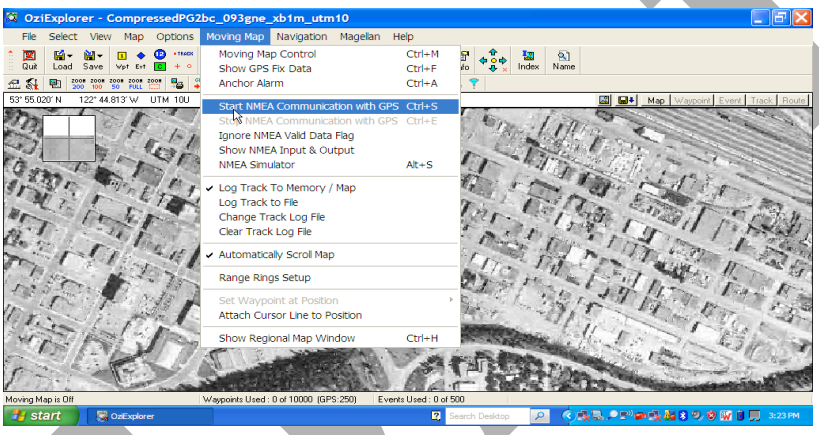
2. Manually configure the COM port and other navigation setting specific to your GPS receiver. The assigned COM port was found earlier (see step of section *Adding a Bluetooth GPS Receiver on Windows XP*). In the example below, the navigation settings are those of the Globalsat BT-359 Bluetooth GPS receiver. In fact, each GPS receiver has its own setting.



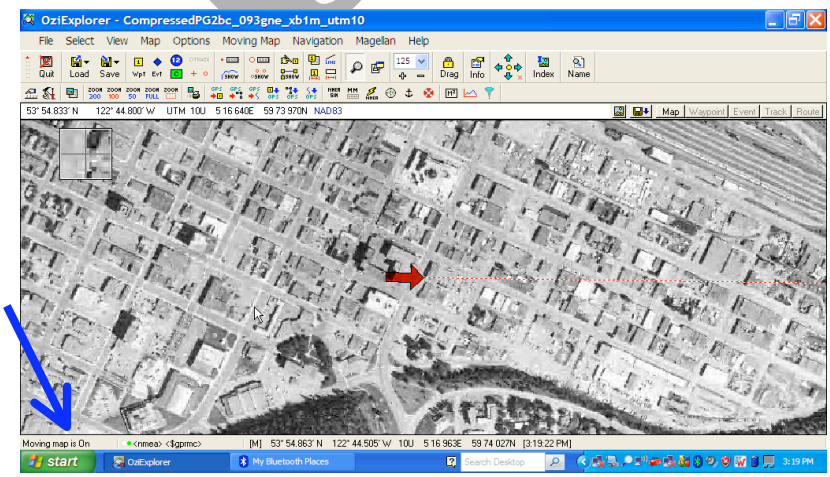
3. Under the moving tab, options can be adjusted to suit your needs. It displays how your location is plotted directly onto the screen while you are navigating in real time. Press the Save button to save your changes.



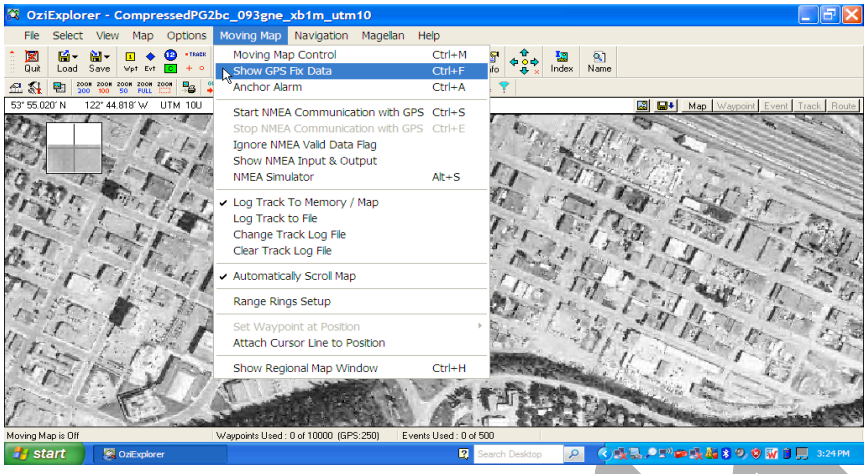
4. On the Moving map menu, select “Start NMEA Communication with GPS” to activate the communication with the GPS (NMEA is a communication protocol used e.g. between GPS and navigation software).



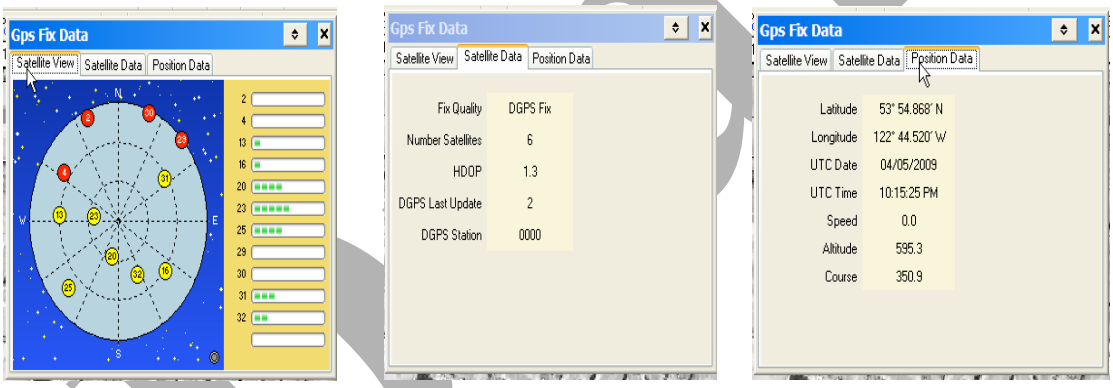
5. The GPS is communicating with OziExplorer when the big red arrow appears on the map and the status line at the bottom of the map shows “Moving Map is On” as indicated by the blue arrow.



6. If you go to Moving Map Menu\Show GPS Fix Data…



7. You get information regarding satellite coverage overhead (**Satellite View** tab) and strength of GPS signal (**Satellite Data** tab), which aids OziExplorer determine your current position (**Position Data** tab).



8. Go back to main screen. You are now ready to start navigating in real-time.