TwoTrails PC

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Introduction to TwoTrails Timber Cruising Surveying

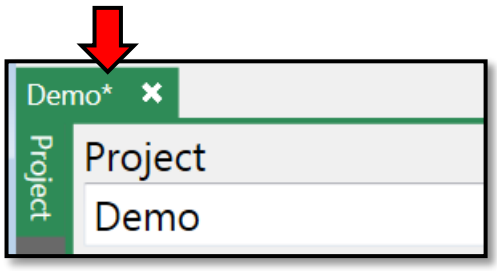
TwoTrails is a timber cruising and timber sales admin surveying package. It is maintained and developed by the Forest Management Service Center. Though it is specifically written for USDA forestry personal, it is freely available to anyone. Many of the program capabilities are shared below:

- Manages all surveying methods approved by USDA Forest Service Handbook, FSH 2409.12, Chapter 50, Area Determination.
- Real-time GPS surveys:
    - GPS Walk (Breadcrumb)
    - GPS Angle Point (Take5)
- Real-time surveys:
    - Direction Distance Traversing
    - Radial (example: Island Exclusions)
    - Corridors (example: Hazard Tree)
- Combined use of multiple survey types:
    - GPS surveys
    - Digitized Information (Shape Files, KML/KMZ, GPX, CSV)
    - Remote sensing information
- Create Grid (Sample) Point sand Navigate to them
- Can use .ttx (Android) and legacy .tt2 (TwoTrailsV2) projects
- Exports:
    - GIS Shape Files
    - KMZ and GPX
    - Project Status and Information
    - CSV's (Points, Polygons, Metadata, NMEA Information, etc..)
- Automatically calculates area-error for comparison with handbook standard
- Live visual mapping with point creation and modification
- Full support to Forest Service personal via Forest Service Management Center (Support to others is available as well when resources allow)

Basic Operation:

There are two main ways the PC application is used. One way is to design a project for field use. The other way is to process incoming data from the field. Multiple projects can be opened at once in TwoTrails. It is a best practice to use a copy of the original data for editing.

Saving Files



- File -> Save
- Shortcut: Ctrl + S
- Do this as your changes are not automatically saved.
- An asterisk will appear after your project's title on the project tab when data has been edited and needs saving.

Opening Files

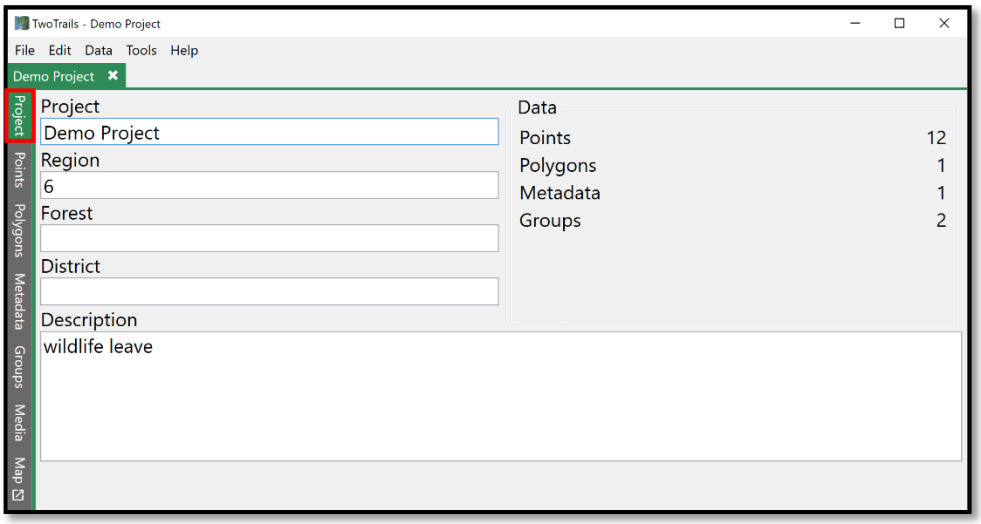
- File -> Open
- Shortcut: Ctrl + O
- Drag and Drop TTX or importable file type into the TwoTrails Window

Creating a Project

1. File -> New
2. Enter the project information as well as filename and location
3. Select **Create**

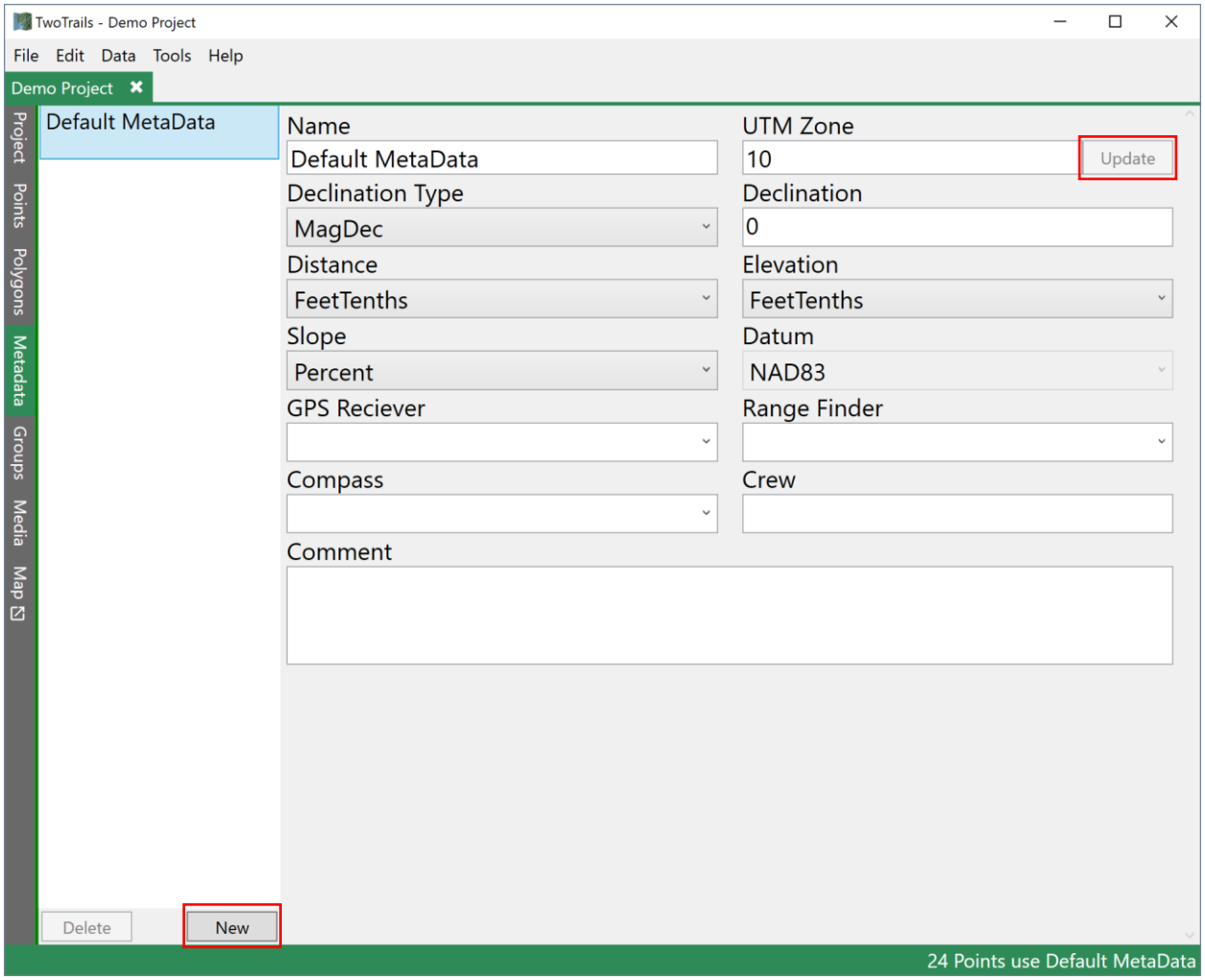
Project

- Project tab contains all the descriptive information about your project.
- On the right side you are able to see the total number of Points, Polygons, Metadata and Groups that are within your project.
-
- Multiple Projects may be opened at one time. Make sure that you are in the correct project before making changes.



Metadata

- Fill default metadata with your project definitions.

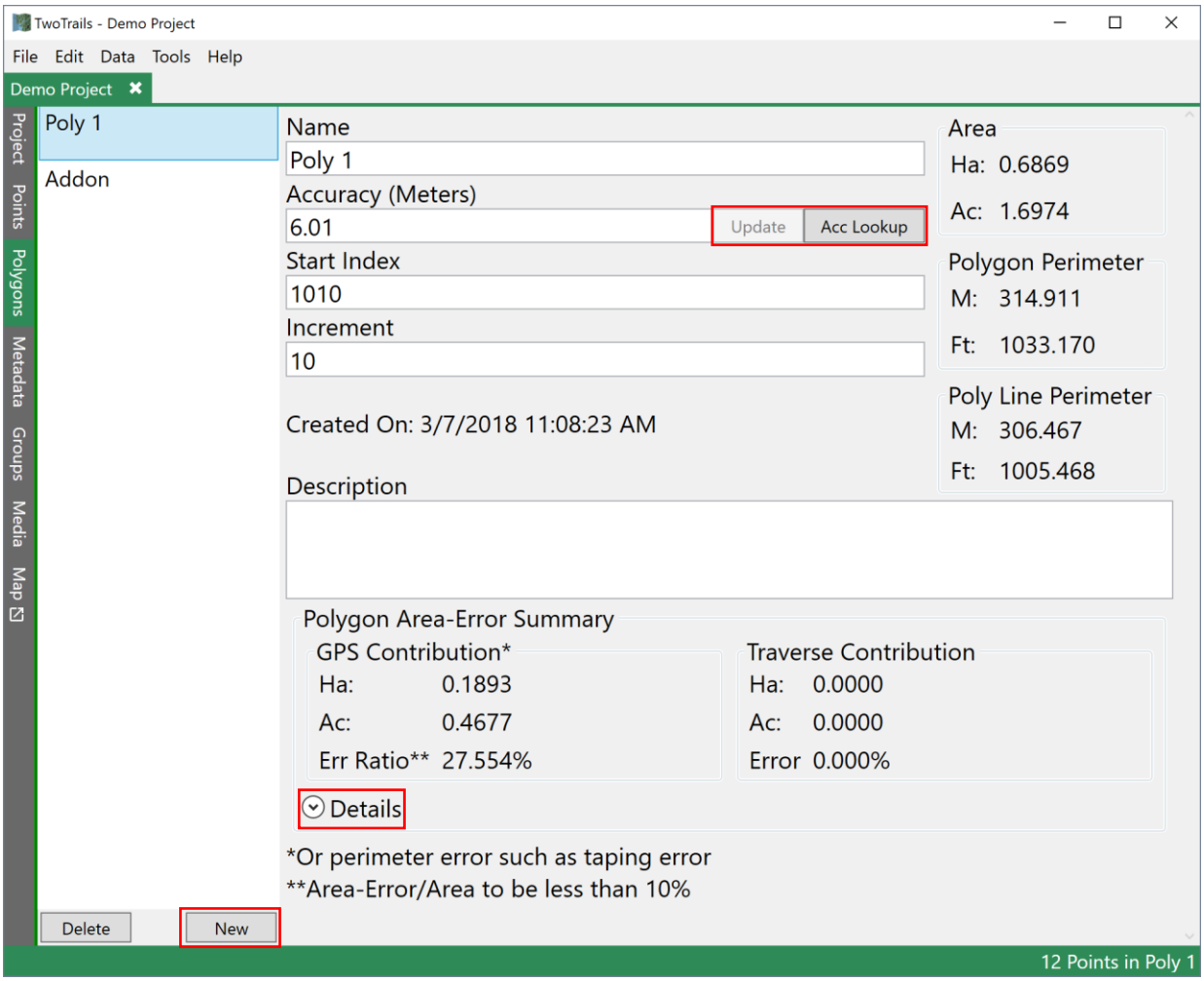


- To create a new metadata profile select **New** on the bottom of the metadata list.
- Points and polygons associated with the metadata are automatically updated with the changes as you edit them except for the UTM Zone. If the UTM Zone is to be changed, then modify the new value and press **Update** to complete the operation.
- When you change a point's metadata definition the point will also be updated automatically.

Polygons

A polygon must be made for each unit. It also used for each feature such as grid points. A project can contain multiple polygons which are displayed in the polygon list. Selecting a polygon in the list allows editing of that polygon.

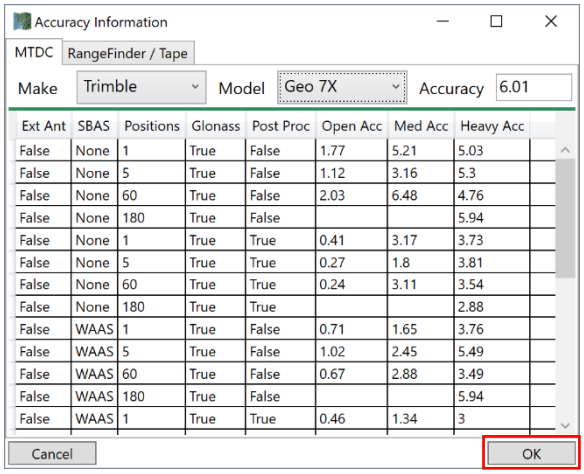
- To create a new polygon select **New** located on the bottom of the polygons list.



- Poly area-error information is located at the bottom of the Polygon form. **Details** shows more information about individual point's errors and individual traversing errors. (This is the same as **How Am I Doing** on the mobile device).

- Fields are initially populated. Modify as appropriate. All information is automatically updated except for the Accuracy. To update the accuracy press **Update**.

- Your measurements specialist should be contacted for accuracy information. The Accuracy can also be changed via the **Acc Lookup** tool. Here you can select your device's make and model and the canopy option that you are collecting your data in. When you are done selecting your accuracy value in the Acc Lookup, press OK.

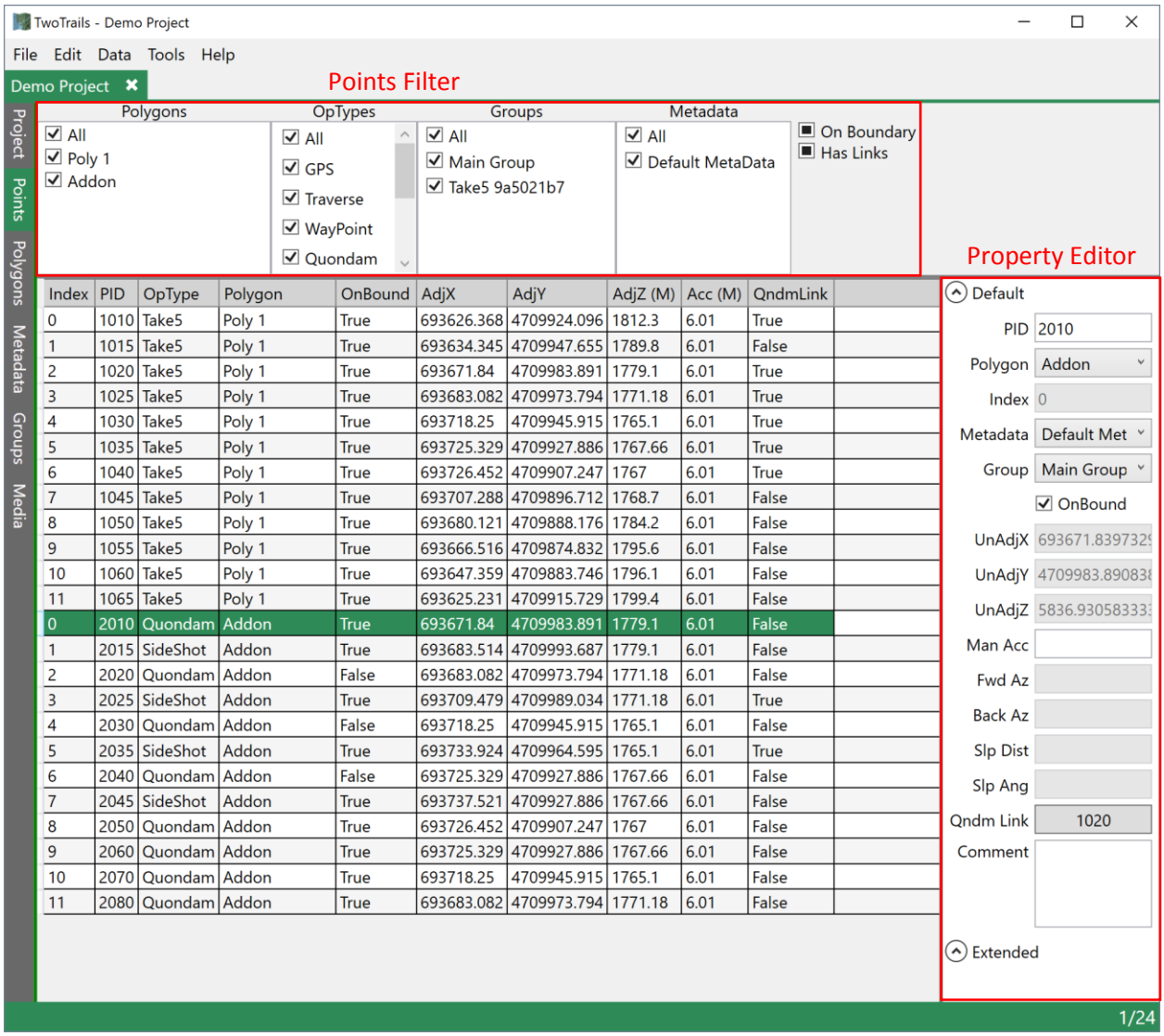


Ext Ant	SBAS	Positions	Glonass	Post Proc	Open Acc	Med Acc	Heavy Acc
False	None	1	True	False	1.77	5.21	5.03
False	None	5	True	False	1.12	3.16	5.3
False	None	60	True	False	2.03	6.48	4.76
False	None	180	True	False			5.94
False	None	1	True	True	0.41	3.17	3.73
False	None	5	True	True	0.27	1.8	3.81
False	None	60	True	True	0.24	3.11	3.54
False	None	180	True	True			2.88
False	WAAS	1	True	False	0.71	1.65	3.76
False	WAAS	5	True	False	1.02	2.45	5.49
False	WAAS	60	True	False	0.67	2.88	3.49
False	WAAS	180	True	False			5.94
False	WAAS	1	True	True	0.46	1.34	3

Points

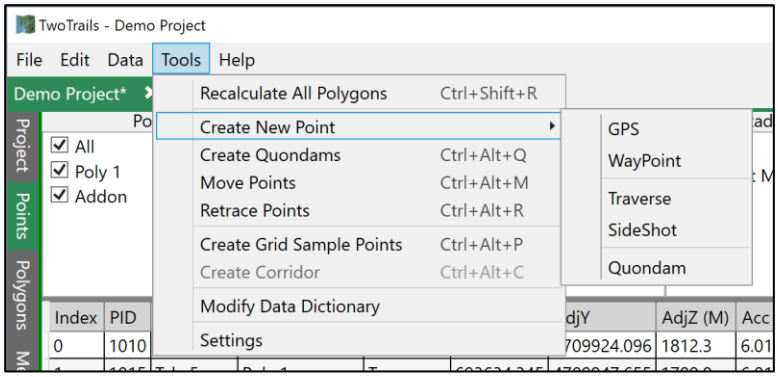
Modify Points

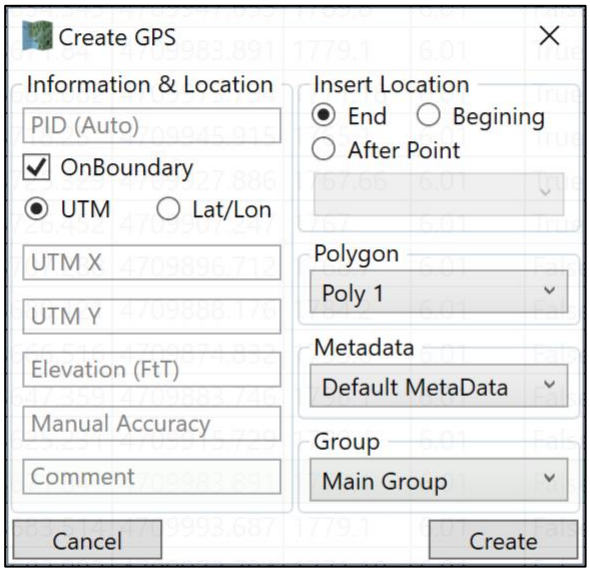
- To modify one or more points simultaneously, first select them in the points view. Then located in the right panel, enter the new value of the property you want changed.
- TwoTrails PC auto adjusts polygons as you edit points. The changes made to area/perimeter/error will be updated without the need to close or save your project or window.

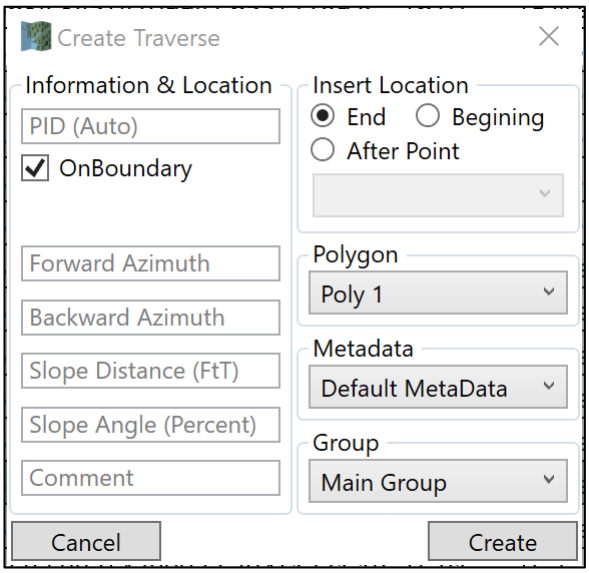


Create Points (Manual Coordinate Entry)

1. To create points, go to Tools -> 'Create New Point' and select the type of point you want to create.
2. Insert location tells the program where to insert the point.
3. In the GPS creation tool, you have the ability to select from UTM or Lat/Lon as the location value. By choosing Lat/Lon, your value will be converted into UTM based on the Metadata that is selected.
4. In the Traverse/Sideshot creation tool, Distance and Angle are based on the Metadata's units of measurement.



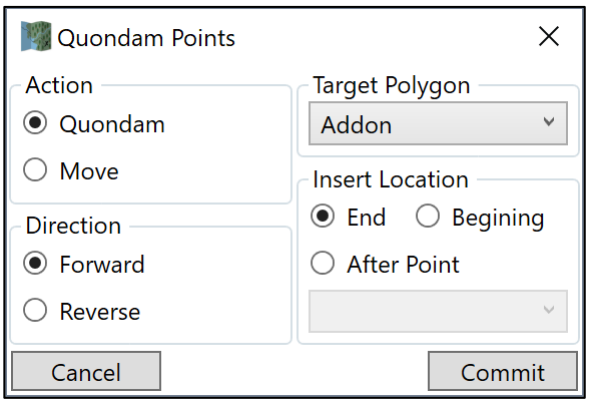




5. Enter the values into form and then select **Create**.

Quondam/Move Points

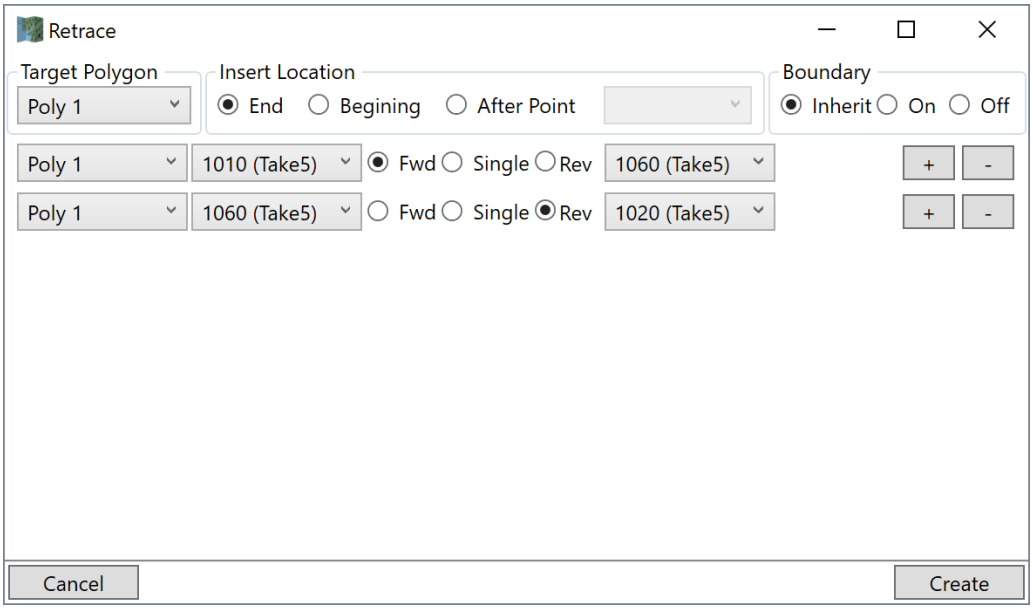
1. To Quondam or Move points first select the points in the list.
2. Go to Tools -> Create Quondams or Tools -> Move Points. (Alternatively you can right click the highlight points and select Quondam or Move)
3. In the window that pops up select the direction to quondam or move the points into the target polygon.
4. Hit Commit to finish.



Retrace Points

The retrace is an efficient method of retracing many segments of points.

1. Go to Tools -> 'Retrace Points'.
2. In the Retrace tool select the Target Polygon into which to insert the quondam points.
3. Then select the location to insert the quondam points in that polygon (Almost always the End) and whether or not the quondam points will inherit their parent's point boundary value.
4. In the section below set the polygon, from which the points will chosen. Then select the start point, the end point and whether the direction will be Fwd (from 1010 toward 1020) or Rev (from 1020 toward 1010). Single will only take one point from the polygon.
5. To add another point segment, click the + symbol on the right of the segment list. Click – to remove a segment.
6. When all segments are created, click Create to commit the changes to the target polygon.



Notes:

- Point segments can be created in a loop with the starting point that is further down the polyline.
  Ex: 1050 -> 1020 in the forward direction would produce a segment: 1050, 1060.., 1010, 1020.
  Ex: 1020 -> 1050 in the reverse direction would produce a segment: 1020, 1010.., 1060, 1050.

Other Point Actions

Delete Points

- To delete one or more points, select them in the points table. Then go to Edit->Delete or press the Del key to delete the point.

Reset Points

- To reset one or more points, select them in the points table. Then go to Edit->Reset Point or press the Ctrl+R to reset the point(s).
- Resetting points will change all their properties to their original state when the project was last opened or saved.
- Selecting Discard all changes will reset all the points in the project to their saved or opened state.

Converting Points

- Certain points can be converted from one type to another.
- Points that can be converted include Traverse <-> SideShot, and Quondam->GPS.
- To convert a point go to Edit->'Convert to XXXX' or right click on a point and select Convert in the menu.

Creating Corridors

- To create a corridor, select all the points that are within the corridor (Take5, GPS, SideShots)
- Then go to Tools->Create Corridor or press Ctrl+Alt+C.
- The corridor will automatically be created and adjusted.

Other Information:

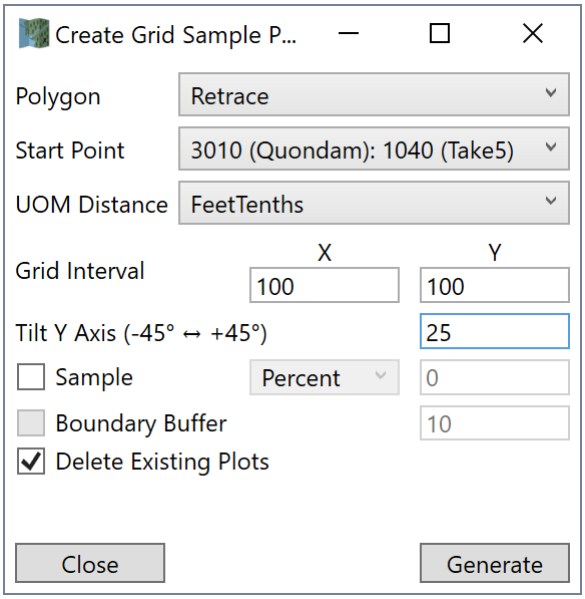
- Data in the points table can be undone/redone using the Edit->Undo/Redo or Ctrl+Z and Ctrl+Shift+Z respectively. Polygons/Metadata/Groups/Media do not have this functionality for the editing and creating.
- You can reverse a section of points by selecting them in the points table and going to Edit->Reverse Points or right clicking on the points and selecting Reverse.

Plot Grid

1. To create Sample Points go to Tools->'Create Grid Sample Points' or press Ctrl+Alt+P.
2. Select the polygon in which you want to place sample points.
3. Select a Start point from the list or leave blank for a random start.
4. Choose the unit of measure for distance then input the distance in the X and Y boxes.
5. You can select to tilt the grid by. (+/- 45 degrees)
6. Next select Generate to create your plots.

Notes:

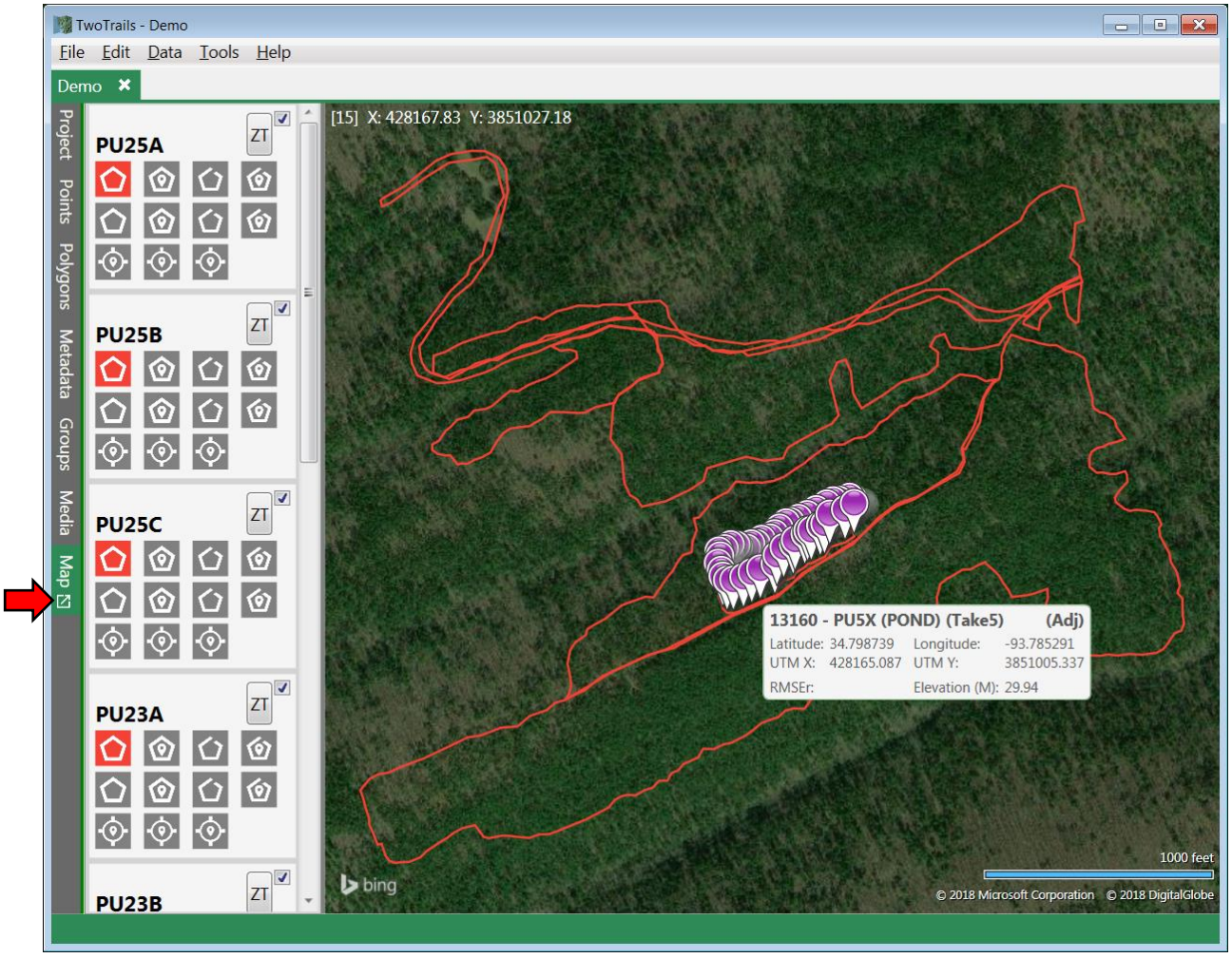
- Delete Existing Plots will delete your old plots and generate new ones in their place. If this is not selected, Plots will be generated in a new polygon.
- Sample is rarely used, but will select either a percentage or amount of points from the total generated points.



Mapping

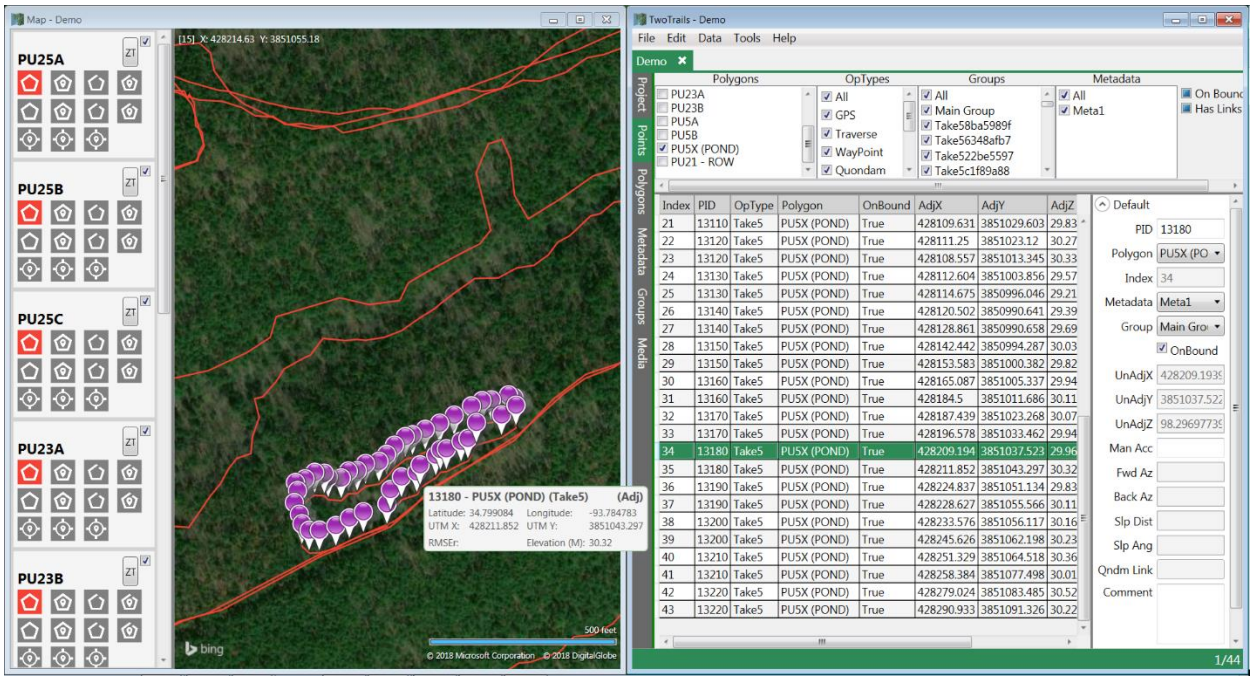
TwoTrails has a built in map that is automatically updated as points and polygons are edited.

- On the left side of the map is the polygons list which contains the individual polygon visual settings. Pressing the icons allows points and lines to become visible.
- From the top left to bottom right the icons are:
    - Adjusted Boundary, Adjust Boundary Points, Unadjusted Boundary, Unadjusted Boundary Points
    - Adjusted Navigation, Adjusted Navigation Points, Unadjusted Navigation, Unadjusted Navigation Points
    - Way Points, Adjusted Misc Points, Unadjusted Misc Points



- The check box in the top right of the individual polygon cards is the master switch which turns all of the points/lines on and off for that polygon.
- The ZT button zooms to an individual polygon filling the entire map.
- The box with an arrow in it on the left tab that says Map allows the map to detach from the main window. This allows the map and points to be visible side by side.

- The Map is live and polygons will change shape as points are created, edited or moved within the project.

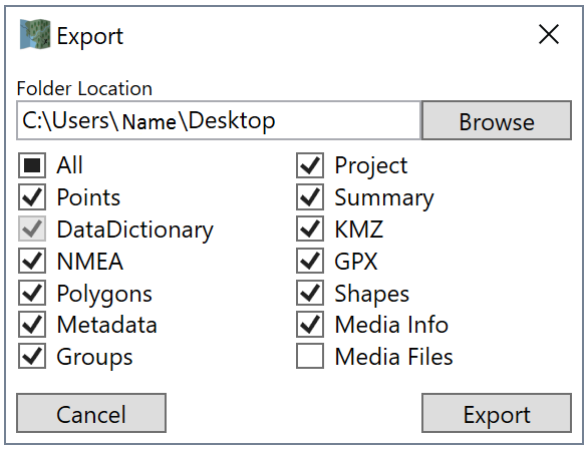


Export

1. To export points go to Data->'Export Project'.
2. Select the output location under 'Folder Location'. (By default it is the location of your project)
3. Select the files you want to export and then press the Export button. A folder will be generated with all your files inside of it.

Exportable File Types

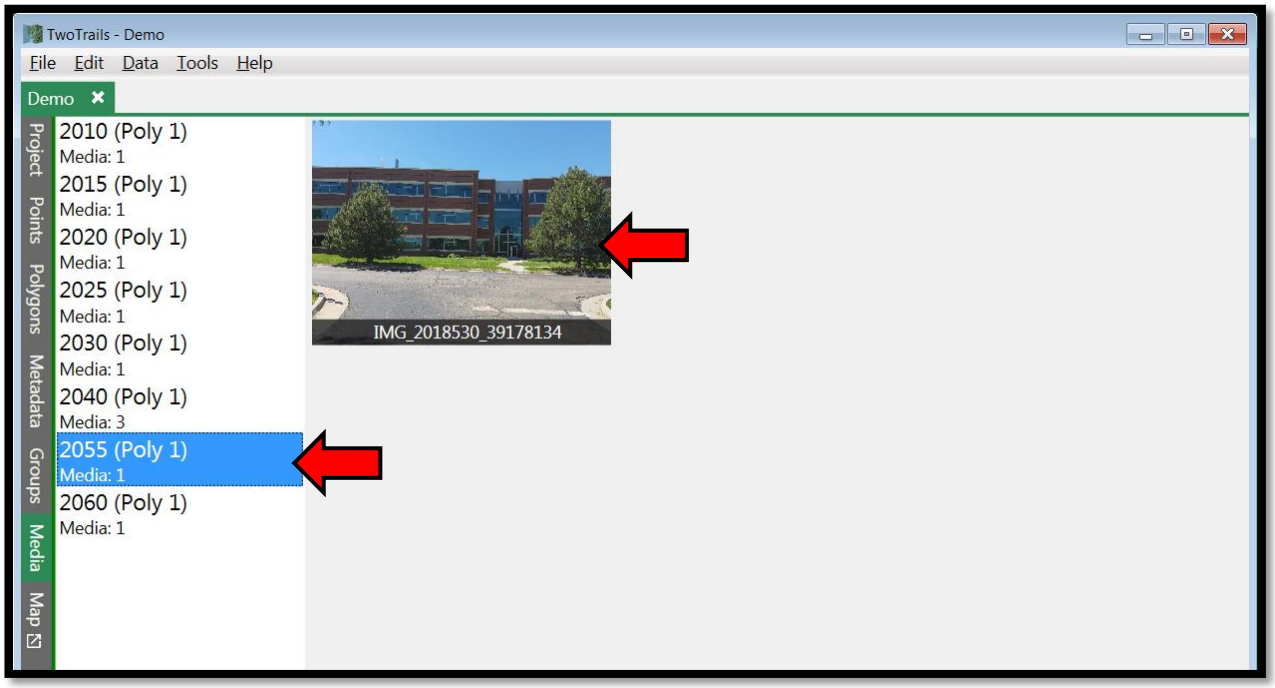
- Points (CSV)
- Data Dictionary (CSV)
- NMEA (CSV)
- Polygons (CSV)
- Metadata (CSV)
- Groups (CSV)
- Project (TXT)
- Summary (TXT)
- Google Earth (KMZ)
- GPS Exchange (GPX)
- Shapes (GIS: SHP, PRJ, DBF, SHX)
- Media Info (CSV)
- Media Files (JPG, BMP, TIFF, GIF)



Media

Viewing Collected Media

- Click the Media Tab on the left of the application. The select on the point which you would like to view media from.



- From there click on the image in the center of the screen to view details about that piece of media.
- Click the X in the top right corner of the image to go back to the image list.