

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:

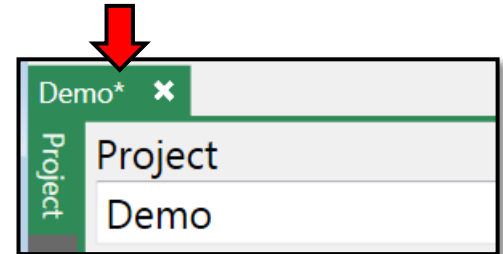
- Manages all surveying methods approved by USDA Forest Service Handbook, FSH 2409.12, Chapter 50, Area Determination.
- Real-time GPS surveys:
 - GPS Walk (Breadcrumb)
 - GPS Angle Point (Take5)
- Real-time surveys:
 - Direction Distance Traversing
 - Radial (example: Island Exclusions)
 - Corridors (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 and 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

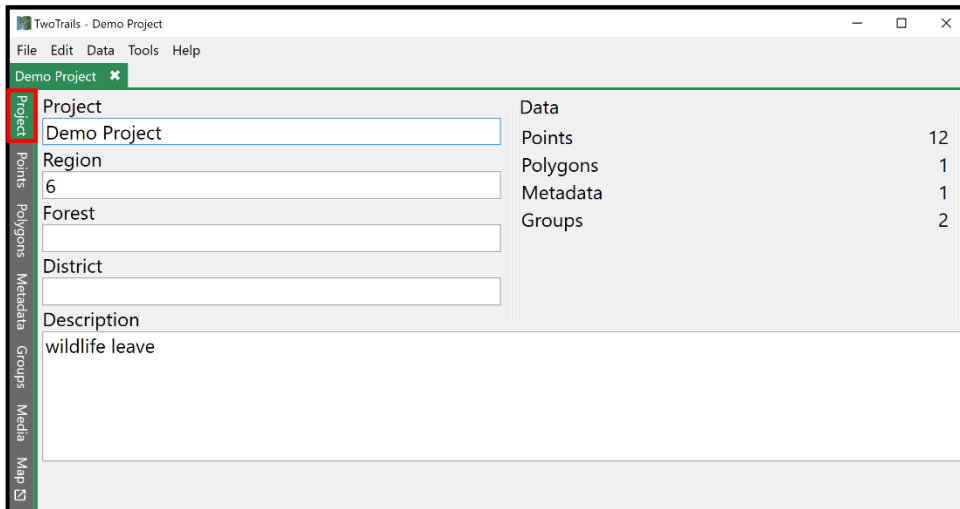
- File -> Open
- Shortcut: Ctrl + O
- Drag and Drop TTX or importable file type into the TwoTrails Window

Creating a Project

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

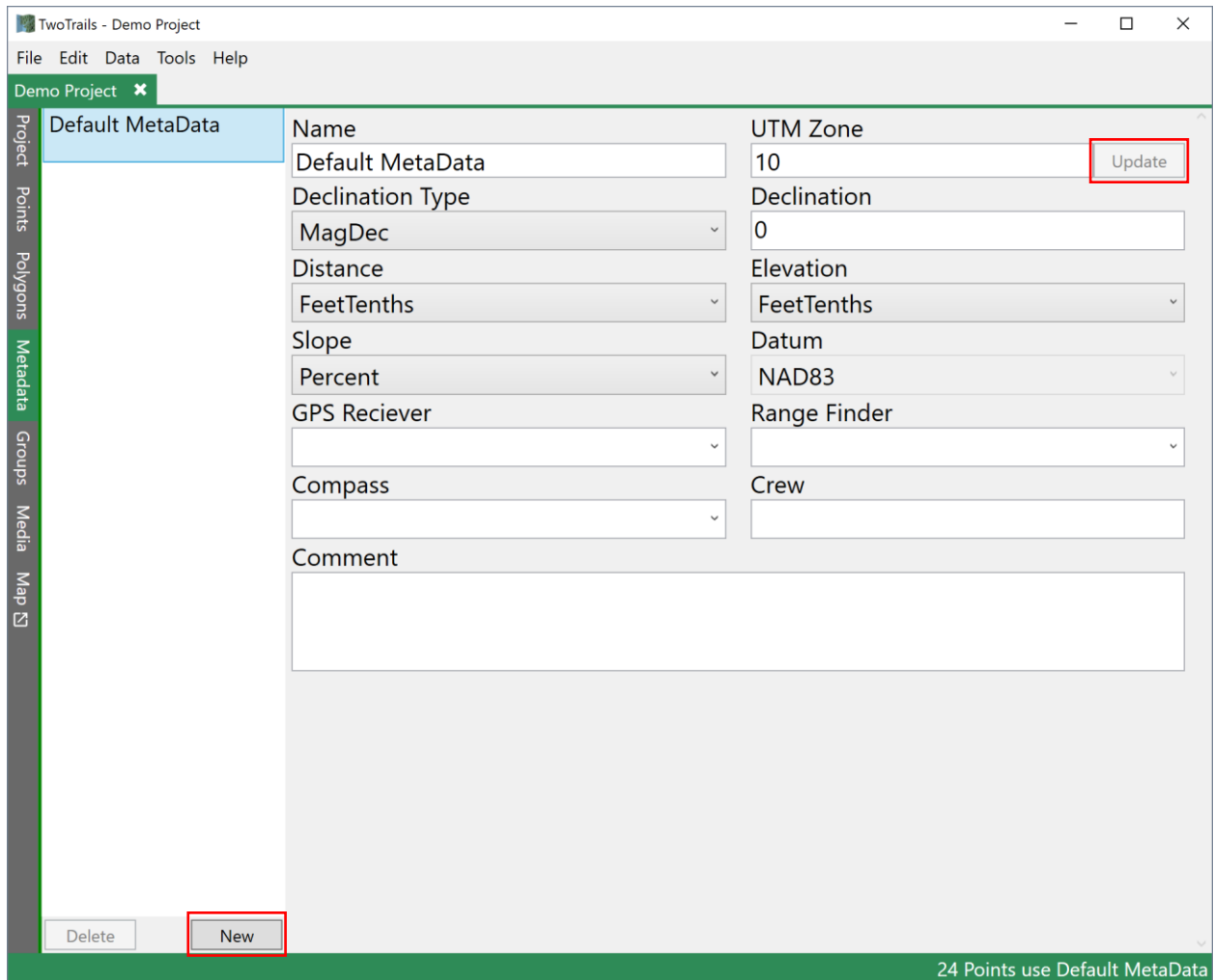
Project

- 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.

The screenshot shows the 'TwoTrails - Demo Project' window. The 'Polygons' tab is active, showing a list with 'Poly 1' selected. The form for 'Poly 1' contains the following data:

Field	Value
Name	Poly 1
Accuracy (Meters)	6.01
Start Index	1010
Increment	10
Created On	3/7/2018 11:08:23 AM
Description	
Area (Ha)	0.6869
Area (Ac)	1.6974
Polygon Perimeter (M)	314.911
Polygon Perimeter (Ft)	1033.170
Poly Line Perimeter (M)	306.467
Poly Line Perimeter (Ft)	1005.468

The 'Polygon Area-Error Summary' section shows:

Category	Value
GPS Contribution*	
Ha	0.1893
Ac	0.4677
Err Ratio**	27.554%
Traverse Contribution	
Ha	0.0000
Ac	0.0000
Error	0.000%

At the bottom of the form, there is a 'Details' button. At the bottom of the interface, there are 'Delete' and 'New' buttons. The 'New' button is highlighted with a red box. The status bar at the bottom right indicates '12 Points in Poly 1'.

- 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.

Accuracy Information

MTDC RangeFinder / Tape

Make: Trimble Model: Geo 7X Accuracy: 6.01

Ext Ant	SBAS	Positions	Glionass	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

Cancel OK

Points

Modify Points

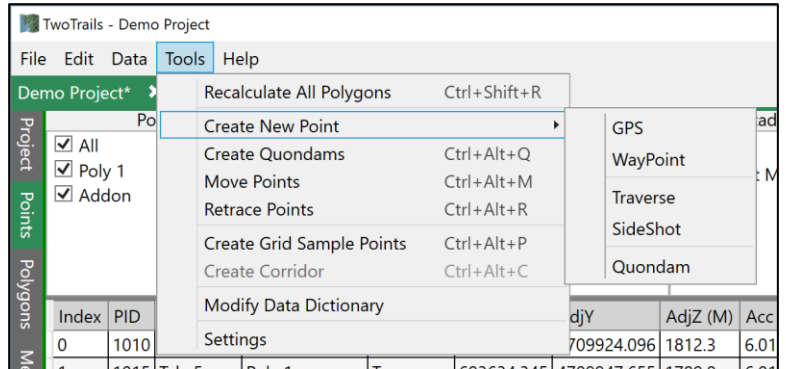
- To modify one or more points simultaneously, first select them in the points view. Then located in the right panel, enter the new value of the property you want changed.
- TwoTrails PC auto adjusts polygons as you edit points. The changes made to area/perimeter/error will be updated without the need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

The screenshot displays the TwoTrails software interface. At the top, there is a menu bar with 'File', 'Edit', 'Data', 'Tools', and 'Help'. Below the menu bar is a toolbar with icons for various functions. The main window is titled 'TwoTrails - Demo Project'. A 'Points Filter' dialog is open, showing a grid of points with columns for Index, PID, OpType, Polygon, OnBound, AdjX, AdjY, AdjZ (M), Acc (M), and QndmLink. The 'Property Editor' panel is also open, showing a 'Default' section with fields for PID (2010), Polygon (Addon), Index (0), Metadata (Default Met), Group (Main Group), OnBound (checked), UnAdjX, UnAdjY, UnAdjZ, Man Acc, Fwd Az, Back Az, Slp Dist, Slp Ang, Qndm Link (1020), and Comment. An 'Extended' section is also visible at the bottom of the Property Editor.

Index	PID	OpType	Polygon	OnBound	AdjX	AdjY	AdjZ (M)	Acc (M)	QndmLink
0	1010	Take5	Poly 1	True	693626.368	4709924.096	1812.3	6.01	True
1	1015	Take5	Poly 1	True	693634.345	4709947.655	1789.8	6.01	False
2	1020	Take5	Poly 1	True	693671.84	4709983.891	1779.1	6.01	True
3	1025	Take5	Poly 1	True	693683.082	4709973.794	1771.18	6.01	True
4	1030	Take5	Poly 1	True	693718.25	4709945.915	1765.1	6.01	True
5	1035	Take5	Poly 1	True	693725.329	4709927.886	1767.66	6.01	True
6	1040	Take5	Poly 1	True	693726.452	4709907.247	1767	6.01	True
7	1045	Take5	Poly 1	True	693707.288	4709896.712	1768.7	6.01	False
8	1050	Take5	Poly 1	True	693680.121	4709888.176	1784.2	6.01	False
9	1055	Take5	Poly 1	True	693666.516	4709874.832	1795.6	6.01	False
10	1060	Take5	Poly 1	True	693647.359	4709883.746	1796.1	6.01	False
11	1065	Take5	Poly 1	True	693625.231	4709915.729	1799.4	6.01	False
0	2010	Quondam	Addon	True	693671.84	4709983.891	1779.1	6.01	False
1	2015	SideShot	Addon	True	693683.514	4709993.687	1779.1	6.01	False
2	2020	Quondam	Addon	False	693683.082	4709973.794	1771.18	6.01	False
3	2025	SideShot	Addon	True	693709.479	4709989.034	1771.18	6.01	True
4	2030	Quondam	Addon	False	693718.25	4709945.915	1765.1	6.01	False
5	2035	SideShot	Addon	True	693733.924	4709964.595	1765.1	6.01	True
6	2040	Quondam	Addon	False	693725.329	4709927.886	1767.66	6.01	False
7	2045	SideShot	Addon	True	693737.521	4709927.886	1767.66	6.01	False
8	2050	Quondam	Addon	True	693726.452	4709907.247	1767	6.01	False
9	2060	Quondam	Addon	True	693725.329	4709927.886	1767.66	6.01	False
10	2070	Quondam	Addon	True	693718.25	4709945.915	1765.1	6.01	False
11	2080	Quondam	Addon	True	693683.082	4709973.794	1771.18	6.01	False

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.

Retrace

Target Polygon: Poly 1

Insert Location: End Beginning After Point

Boundary: Inherit On Off

Poly 1	1010 (Take5)	<input checked="" type="radio"/> Fwd <input type="radio"/> Single <input type="radio"/> Rev	1060 (Take5)	+	-
Poly 1	1060 (Take5)	<input type="radio"/> Fwd <input type="radio"/> Single <input checked="" type="radio"/> Rev	1020 (Take5)	+	-

Cancel Create

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.

Create Grid Sample P... — □ ×

Polygon Retrace ▾

Start Point 3010 (Quondam): 1040 (Take5) ▾

UOM Distance FeetTenths ▾

Grid Interval X Y

100 100

Tilt Y Axis (-45° ↔ +45°) 25

Sample Percent ▾ 0

Boundary Buffer 10

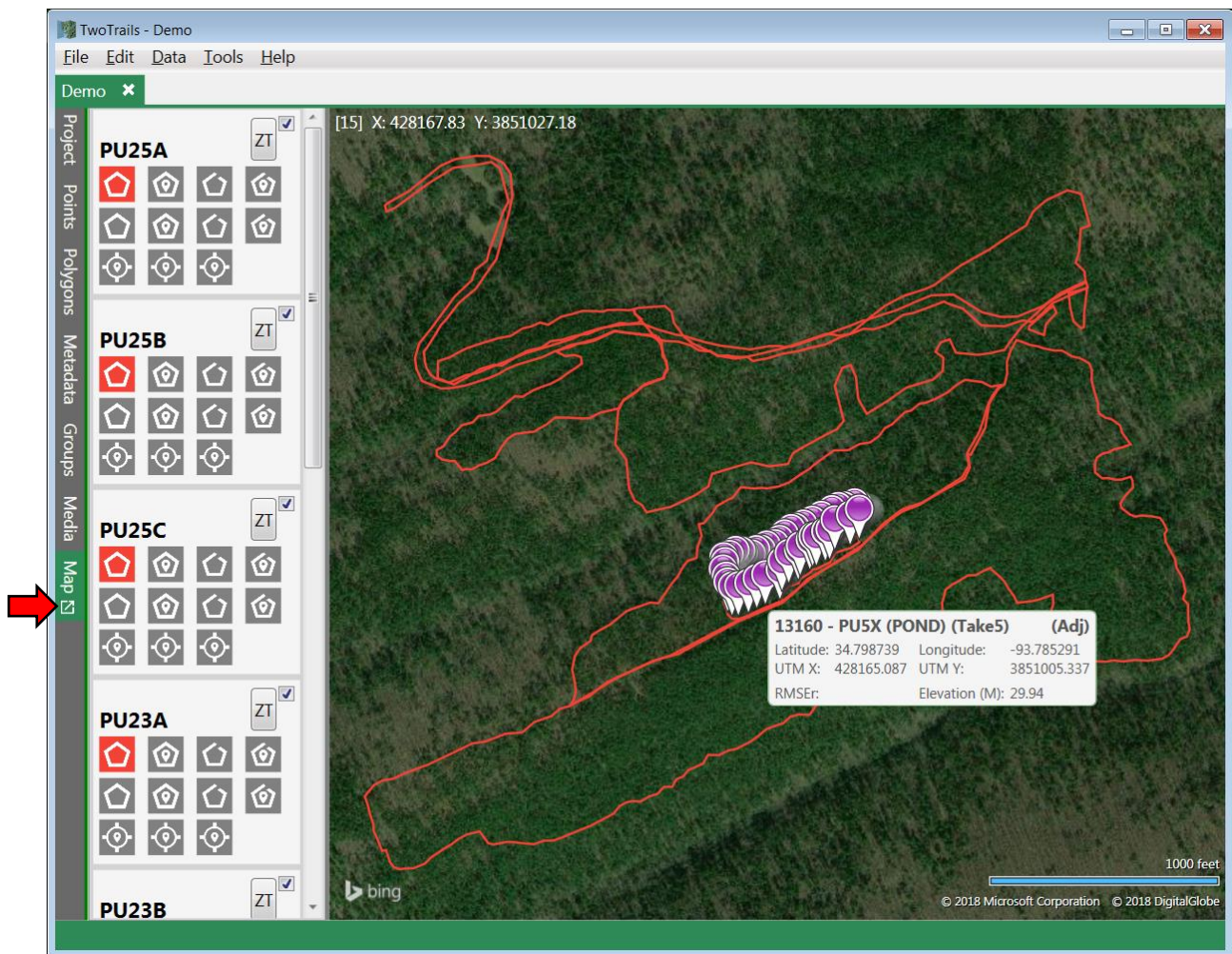
Delete Existing Plots

Close Generate

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.

The screenshot shows a software interface with two main windows: 'Map - Demo' and 'TwoTrails - Demo'.

Map - Demo: Displays a satellite map with a purple polygon and several points. A tooltip for a point shows the following information:

13180 - PUSX (POND) (Take5) (Adj)
 Latitude: 34.799084 Longitude: -93.784793
 UTM X: 428211.852 UTM Y: 3851043.297
 RMSEr: Elevation (M): 30.32

TwoTrails - Demo: Shows a data table with the following columns: Index, PID, OpType, Polygon, OnBound, AdjX, AdjY, AdjZ. The table contains 44 rows of data.

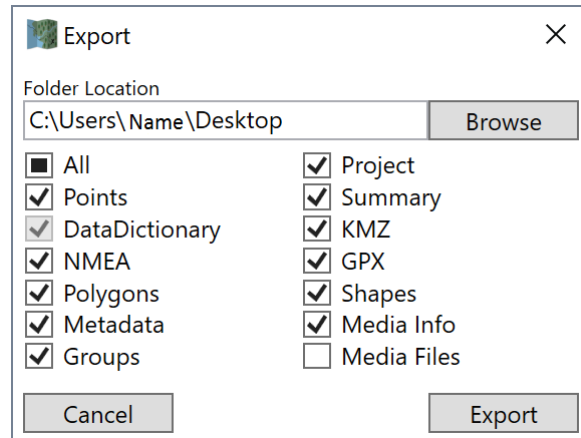
Index	PID	OpType	Polygon	OnBound	AdjX	AdjY	AdjZ
21	13110	Take5	PUSX (POND)	True	428109.631	3851029.603	29.83
22	13120	Take5	PUSX (POND)	True	428111.25	3851023.12	30.27
23	13120	Take5	PUSX (POND)	True	428108.557	3851013.345	30.33
24	13130	Take5	PUSX (POND)	True	428112.604	3851003.856	29.57
25	13130	Take5	PUSX (POND)	True	428114.675	3850996.046	29.21
26	13140	Take5	PUSX (POND)	True	428120.502	3850990.641	29.39
27	13140	Take5	PUSX (POND)	True	428128.861	3850990.658	29.69
28	13150	Take5	PUSX (POND)	True	428142.442	3850994.287	30.03
29	13150	Take5	PUSX (POND)	True	428153.583	3851000.382	29.82
30	13160	Take5	PUSX (POND)	True	428165.087	3851005.337	29.94
31	13160	Take5	PUSX (POND)	True	428184.5	3851011.686	30.11
32	13170	Take5	PUSX (POND)	True	428187.439	3851023.268	30.07
33	13170	Take5	PUSX (POND)	True	428196.578	3851033.462	29.94
34	13180	Take5	PUSX (POND)	True	428209.194	3851037.524	29.96
35	13180	Take5	PUSX (POND)	True	428211.852	3851043.297	30.32
36	13190	Take5	PUSX (POND)	True	428224.837	3851051.134	29.83
37	13190	Take5	PUSX (POND)	True	428228.627	3851055.566	30.11
38	13200	Take5	PUSX (POND)	True	428233.576	3851056.117	30.16
39	13200	Take5	PUSX (POND)	True	428245.626	3851062.198	30.23
40	13210	Take5	PUSX (POND)	True	428251.329	3851064.518	30.36
41	13210	Take5	PUSX (POND)	True	428258.384	3851077.498	30.01
42	13220	Take5	PUSX (POND)	True	428279.024	3851083.485	30.52
43	13220	Take5	PUSX (POND)	True	428290.933	3851091.326	30.22

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

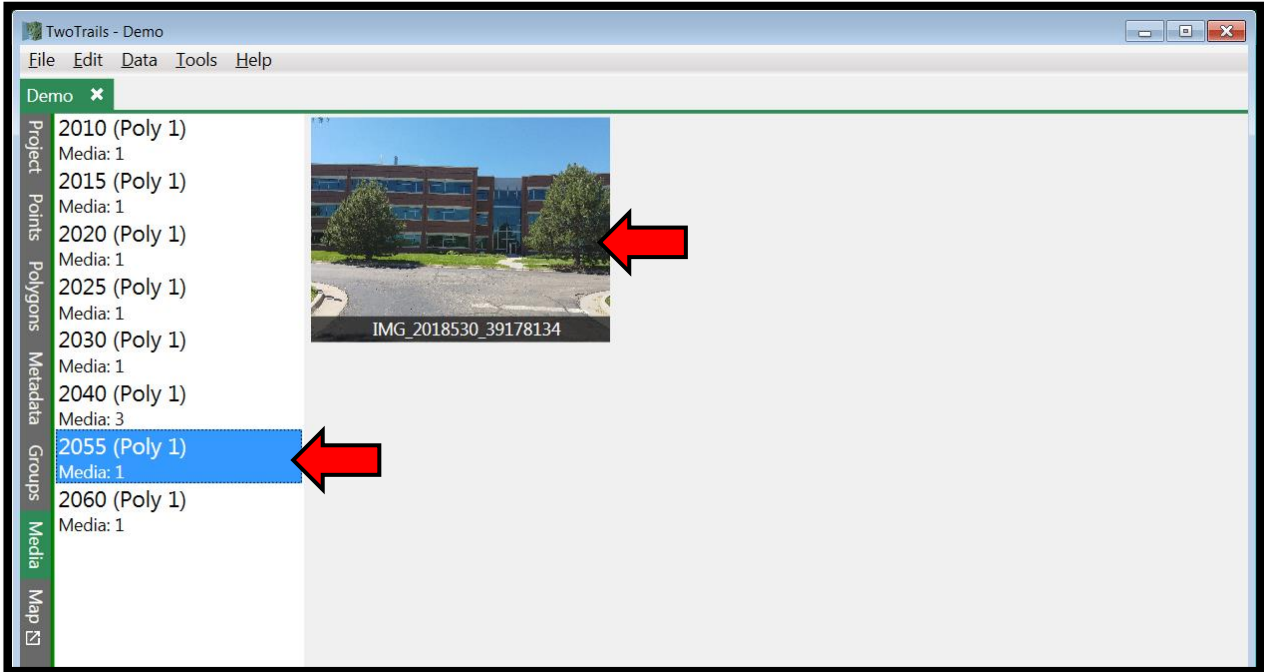
- Points (CSV)
- Data Dictionary (CSV)
- NMEA (CSV)
- Polygons (CSV)
- Metadata (CSV)
- Groups (CSV)
- Project (TXT)
- Summary (TXT)
- Google Earth (KMZ)
- GPS Exchange (GPX)
- Shapes (GIS: SHP, PRJ, DBF, SHX)
- Media Info (CSV)
- Media Files (JPG, BMP, TIFF, GIF)



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.

