

Forestry GIS (fGIS™) is a freeware shapefile editing program, digitizer and GIS data query tool for Windows®. Designed for operational field managers like foresters and wildlife biologists, fGIS has essential tools tailored for precision mapping on a desktop computer. Use fGIS to customize layered views including aerial photos and other imagery, draw map objects, query and search spatial data, annotate maps for printing, and much more. The standalone program is unlimited, producing shapefiles and geo-referenced images compatible with commercial software in an enterprise GIS framework.

Wisconsin foresters built fGIS as a complement to enterprise data managed with more sophisticated GIS software. Although fGIS is not meant to replace comprehensive programs needed by GIS specialists, operational field personnel may find fGIS entirely adequate for their needs. Many power users also appreciate fGIS for its small size, portability to home and field computers, and innovative data tools. It is in use around the world, with a flexible menu system that can be [translated to any language](#).

Supported File Formats

Creates: TatukGIS Project Files (*.ttkgp)

Vector Layer Formats Supported	Read	Write
ESRI® SHP	Yes	Yes
DXF (AutoCAD® MAP)	Yes	Yes
DGN (Microstation®)	Yes	
DLG	Yes	Yes
MapInfo® MIF	Yes	Yes
SQL Coverages – TatukGIS format	Yes	
ESRI® e00	Yes	
TIGER2000/line	Yes	
GML/XML	Yes	Yes
SDTS	Yes	

Pixel Layer Formats Supported Write includes associated world coordinate files.	Read	Write
TIFF (uncompressed)	Yes	Yes
TIFF, GeoTIFF (1, 4, 8 and 24-bit, uncompressed, packbits, group4, LZW)	Yes	
BMP	Yes	Yes
PNG	Yes	Yes
JPEG	Yes	Yes

ECW - ER Mapper® ECW	Yes	
SID - Lizardtech® MrSID	Yes	
BIL	Yes	
ADF (ESRI® DEM Grid "Arc Data Files")	Yes	
WMF (excluding world coordinate file)		Yes
IMG	Yes	
JPEG2000	Yes	
SDTS	Yes	

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fGIS Programmer:

Brian Brown (University of Wisconsin)

fGIS Contributors:

Paul Pingrey (Wisconsin DNR - Division of Forestry)
Donald Monson (Wisconsin DNR - Division of Forestry)
Janel Pike (Wisconsin DNR - Division of Forestry)
Raquel Sanchez (Wisconsin DNR - Northeast Region)

For on-line help, join the fGIS user group at Yahoo.

To check for program updates, click [here](#).

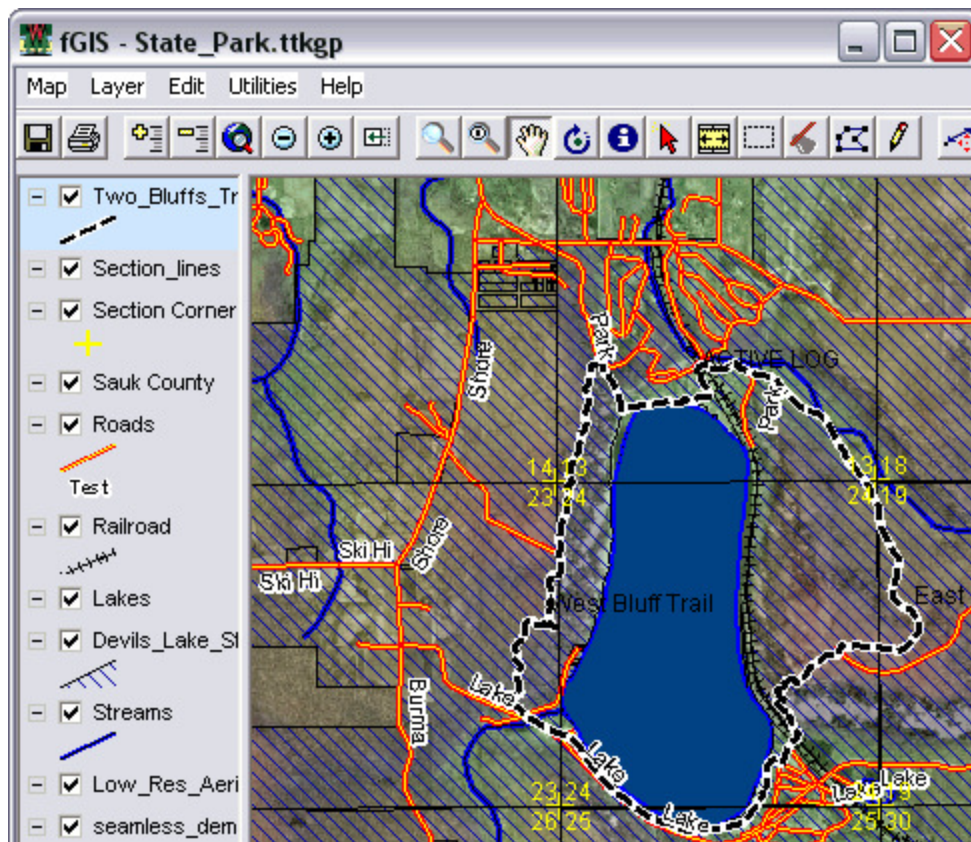
Programmed by Brian Brown (brownb@dnr.state.wi.us)

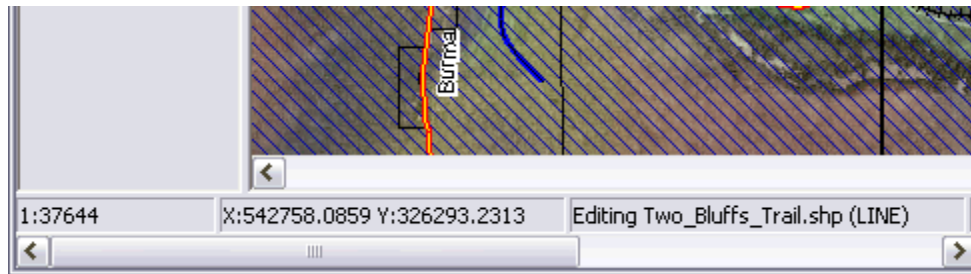
fGIS Help

Quick Start Guide

1. When fGIS first starts, you must open an existing project file (ending in ".ttkqp") **or type in the name of a new map project.** (**Note:** The "default.ttkqp" project that comes with fGIS is actually a Wisconsin Transverse Mercator shapefile with "Welcome to fGIS" as a line label positioned in northern WI. That could cause problems if you add layers using a different projection to the default project. *Since fGIS uses the first loaded layer as the project's base coordinate system,* it is better to type in a new project name and then begin your new project by adding a layer using the desired projection.)
2. Next click the yellow "+" button (the **Add Layer** command) in the menu bar and navigate to a folder containing map layers (geo-referenced images or vector objects representing point locations, lines or areas). Double-click the file you want to add to the view (or hold down the Ctrl or Shift keys to select multiple data files to load). **Loaded layers must all share a common coordinate system if they are to line up.**
3. Double-click a layer name after it is listed in the legend to access the Properties dialog to change the appearance features of the data.

As an example, you might want to download the fGIS [State_Park.zip](#) or [Arborvitae.zip](#) project to experiment with. To save download time, low resolution imagery is provided in the zip files, 2 to 3 MB in size.





To digitize a new shapefile vector layer:

1. Use Edit>New Layer (or right-click the map area and choose New Layer). Pick either a point, line or polygon object layer to create. Keep in mind that before you can create a new shape layer, at least one pre-existing layer (either vector or raster data) must be added to the view. fGIS will use the first layer to establish a world space.
2. Give the new layer a name and save it.
3. If it's not already selected, click on the New Shape Tool (pencil tool). Click points on the map area to define the object. *Be sure to digitize polygon area shapes in a counter-clockwise direction.*
4. Right-click the map area and Stop Editing. Save the edits.
5. In the legend (layer list), double-click the name of the new layer to access properties controls to change how the object is displayed.

When you are done with an edit session, save the fGIS project file.

An fGIS project file keeps:

- A table of contents of all your map layers with a record of where the data are stored
- Whether or not a layer was turned on (visible) when the project was last saved
- The layer properties that you set
- The last zoomed screen view

[Return to the Main fGIS Help Index](#)

fGIS Help

Menu Functions

Map Menu	Layer Menu
Edit Menu	Utilities Menu


Map Menu:

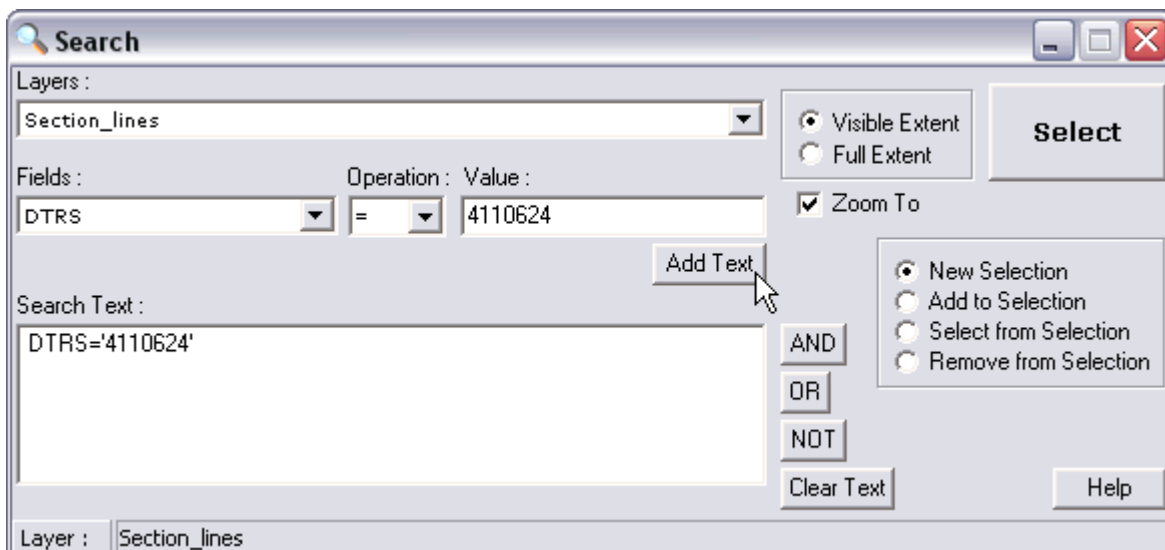
New Project	
Open Project	
Save Project	
Save Project As	
Add Layer	
Remove Layer	
All Layers On	
All Layers Off	
Unhide All Layers	
Zoom to Scale	▶
Search	
Spatial Selection	
Bookmarks	
Layer Projection Units	▶
Scalebar Units	▶
Selection	▶
Background Color	
Use R-Tree Index	
Show Overview Map	
Set Default Data Directory	
New Layer	▶
Export View to Image	
Export Legend To Image	
Print	▶
Exit	

- **New Project:** Navigate to the folder where you want to save the project name. Type in a name and click "Open" to create the project. Project files for fGIS have a ".ttkgp" file extension. (This is the same extension used by the TatukGIS® Viewer and Editor, both of which are also built with the excellent TatukGIS Developer Kernel. There are many differences between fGIS and the unique TatukGIS® products. You might, however, want to look at the [TatukGIS Help PDF](#) for additional insight into some of the common elements such as Properties and Search functions.)

The project file stores the *relative path* to any data layers that are added to the map. This can be useful if you choose to copy your project to a zip folder or CD, enabling another user to easily open the project on their computer if you've included the data files all in one folder or in the same

relative arrangement of folders.

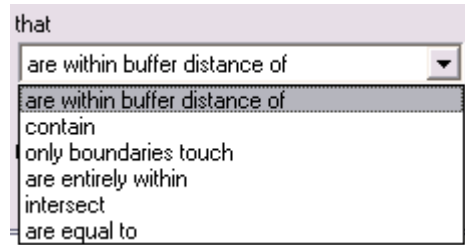
- The first georeferenced layer that you add to a project will establish its base coordinate system (world space). All the layers added to an fGIS project must be in a common coordinate system if they are to line up.
- The fGIS project file saves the paths to data layers, layer display properties, the last zoomed view, whether layers were turned on (visible), and other project parameters.
- **Open Project:** Navigate to an existing project file and double-click the ttkgp file to open it. The project will resume with the last saved view. (You might want to associate ttkgp files with fGIS so you can open them by double-clicking through the Windows file manager. See Windows® Explorer Help if you do not know how to associate file types with programs.)
- **Save Project/Save Project As:** Same functions as other Windows programs.
- **Add/Delete Layer, All Layers On/Off, Unhide All Layers:**
 - Layers can be added/deleted with these commands, or you can use the  buttons on the main toolbar.
 - If you have a lot of layers in a project, the All Layers Off command can be a shortcut if you want to selectively turn individual layers back on. On older computers, the view will redraw more quickly if fewer layers are turned on.
 - Unhide All Layers will redisplay loaded layers in the Table of Contents (Legend). Use the "Hide Layer" command in the Layer Menu if layer names are taking up too much space in a legend.
- **Zoom to Scale** sets the screen view. *The scale of a printed map is set through the [Print function](#) on the toolbar.*
- **Search** will highlight all of a project's vector objects that contain attribute data that match the search criteria. Powerful Boolean search options are available.



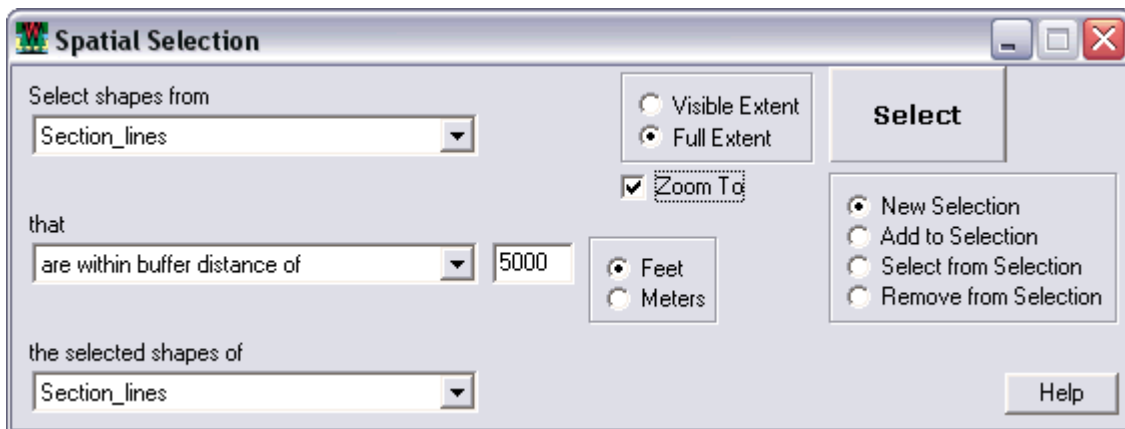
Click the "Add Text" button to place your search criteria into the Search Text box. In this simple example, the map will be zoomed to a Wisconsin Public Land Survey Section located in Township 11, Range 06E, Section 24 (DTRS code 4110624). The data files for this example are available in the [State_Park.zip project example](#).

- **Spatial Selection:** Instead of searching on property attributes, use the Spatial

Selection tool to choose objects from a variety of spatial parameters, including those



Building on the previous Search example (above), the following Spatial Selection would zoom to all Section objects within 5,000 feet of DTRS 4110624.



- **Bookmarks:** Save views centered on designated X/Y values and zoom level.
- **Layer Projection Units:** The two options are Meters (UTM, WTM, etc.) and Feet (State Planes, County Coordinate System, etc.). New projects will default to Meters. This setting will only affect distance and area measurements and calculations.
- **Scalebar Units:** The choices are feet or meters, which will affect the scalebar: e.g.

3000 feet

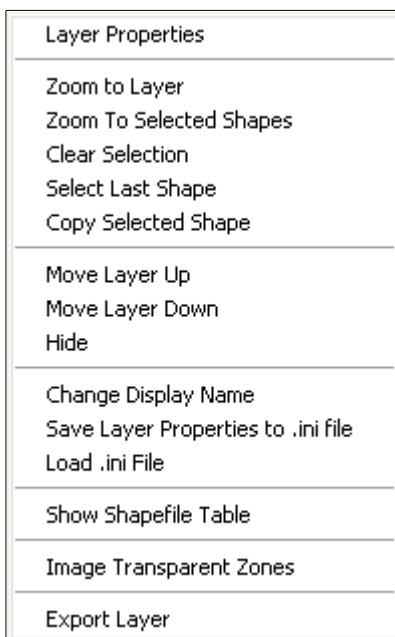
or

500 meters
- **Selection:** Options allow a choice for color and transparency of selected objects. The settings are saved to the project file.
- **Background Color:** The default background is white.
- **R-Tree Index:** The Map > Use R-Tree Index command now saves (and loads) the Use R-Tree Index setting to the .ttkpg project file when the user saves the project. The Use R-Tree Index command (unnecessary for small shapefiles) is now off by default. It can improve handling of large data layers but may cause a long pause when the index file is first created.
- **New Layer:** Add a new point/line/polygon vector layer (for digitizing) here or right-click the work area and select "New Layer" from the pop-up window.
- **Export View** will save the entire workspace view to a geo-referenced JPEG, TIFF, BMP or PNG format image (complete with companion world coordinate files). To save just part of a view to an image file, use the Export Image Tool in the toolbar. Choosing the Export View to Image command opens an options dialog. By increasing the output image size, multiple images in the view can be put into a mosaic. Output image size can also be increased if the view is intended for printing in a publication. Increasing the output feature size will increase the size of labels, points, and lines in the output image.
- **WMF export** in Map > Export View to Image dialog will create a WMF graphics at

screen resolution. The vector layers in WMF images can be resized without loss of quality in drawing programs. WMF images are not georeferenced.

- **Export Legend** will save the layers list (and any legend symbols you've enabled in the Properties dialog) to an image file. Use the legend image in fGIS maps printed with document or illustration programs.
- **Overview Map:** This displays the Overview Map view. Using the right-mouse-click popup menu on the Overview Map, a layer can be added and the extent box color can be changed. The extent box can be used to change the extent of the main map view by left-clicking and dragging in the Overview Map view. The contents of the Overview Map are also saved to the project file. The Overview Map can also be used in the template files (.tpl) used with the Map > Print Map command.
- **Set Default Data Directory:** This command will set the first directory that fGIS look to for data, rather than the fGIS installation directory.

Layer Menu:



- Access [Layer Properties](#) through this menu or by double-clicking the name of a layer in the layer list.
- **Zoom to Layer** will fit the full extent of the selected layer to the workspace. The other functions in this section will zoom to a shape, clear a selection or select the last shape digitized.
- **Move Layer:** Change the order of layers here or by dragging a layer's name up or down in the layer list (i.e., legend or table of contents).
- **Hide Layer:** Useful to save space in the legend (especially if you have loaded an image catalog with many tiles). The Map Menu has an "Unhide All Layers" command.
- Use **"Change Display Name"** to give layers a descriptive label (rather than a "path:\file name") in the legend/layer list. Note: You can also change a display name by right-clicking a layer name in the map legend (when not in the Edit mode).
- **"Save Layer Properties to .ini file"** is used to save a set of display parameters for a layer. A small text file ending in ".ini" is added to the folder where the layer data resides. If you add the layer in a different project, the layer will display with the characteristic appearance defined in the ini file. (If

you change the properties of the layer for a particular project, properties will be read from the project file rather than the ini file.) If you include the ini file with data that you send to someone else, they will be able to open the layer and see it with the display properties you saved.

- **Load .ini File:** This command enables layer properties saved to an .ini file to be used for another layer. Users could create a library of .ini files and load them as new layers are created.
- **Show Shapefile Table** is a database explorer/editor that shows the attributes for all the shapefile objects in a layer. Use it to search for a particular shapefile based on an attribute value. The tool is also extremely useful for updating or changing attribute values as elaborated below. The window can be made full-screen for easy editing of large tables.
 - To change a field value, check the Edit Table box. Navigate to the field you want to change, and use the backspace key to delete a value before typing in a new value. The changes are immediately saved to the shapefile attribute table.

LAYER	ACRES	FEET	DTRS_	DTRS_ID
• PLSS_Section	426	17604	48558	485
• PLSS_Section	424	17550	48559	485
• PLSS_Section	423	17520	48560	485
• PLSS_Section	416	17405	48562	485
• PLSS_Section	399	16982	48568	485
• PLSS_Section	415	17385	48569	485


- If the shapefile attribute table contains any of the following fields, their values can be automatically updated with the Table/Update Shapes Measurements Fields command:

Area Fields: **Acres** or **Hectares**

Length/Perimeter Fields: **Feet**, **Miles**, or **Meters**

Point Coordinate Fields: **X** or **Y**

If the shapefile attribute table does not already contain fields with the above names, but you would like to add the data, then follow these steps:

1. Select the Layer.
2. Start Editing (right-click the work area and choose "Start Editing").
3. Click the Attributes Tool (the  in the toolbar).
4. Click on the shape with the Attributes Tool. The attribute table (data dictionary) opens.
5. Right-click the UID column. Choose "Add Field". Type in ACRES, HECTARES, FEET, MILES, METERS, or (for points objects only) X or Y as the field name and designate the field as a number.

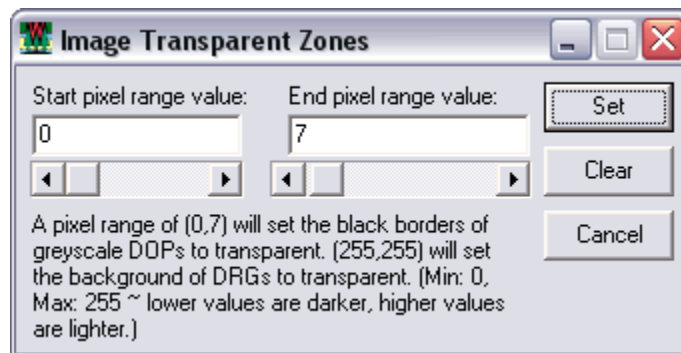
6. Stop editing and save changes.

Next, click "Show Shapefile Table" either from the Layers menu or by right-clicking the layer name. Initially, the new ACRES, HECTARES, FEET, MILES, METERS, X or Y columns are empty. Click **Selection/Select All**. Click **Table/Update Shapes Measurements Fields**. The new field values will then be filled in!

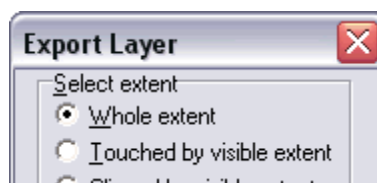
- Use the "Populate" button to change the contents of Text Fields with whatever text you type into the Search/Populate text box. In the example above, all the Layer values have been renamed "PLSS_Section".
- Using the **Selection > Copy Selection** to Clipboard command on the Shapefile Table dialog will copy the selected records to the clipboard in tab delimited format. This format can be pasted into Excel.
- The Filter checkbox on the Shapefile Table dialog will filter the table for the value in the input box for the selected field. For example, to locate all records with an ACRES value of 640, type 640 in the Search field, then Search with Filter enabled.
- The filtered records can be highlighted (selected) on the map with the Selection/Update Selection to Shapefile menu command. This can be very useful in tandem with the main menu's Layer/Export Layer command (below).
- The number of selected records and the record total are displayed on the Shapefile Table dialog (not available if Field/Sort commands are in use).

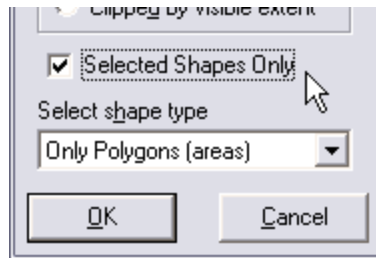
Additional information about this tool can be found or by clicking the Help button in the tool's menu bar.

- **Image Transparent Zones:** Users can set the borders of digital orthophotos and the backgrounds of DRGs to transparent using the Image Transparent Zones dialog.

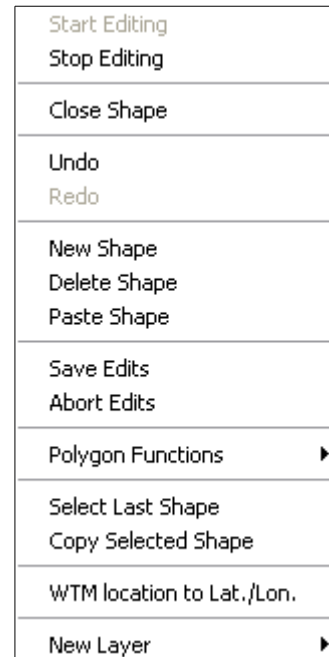
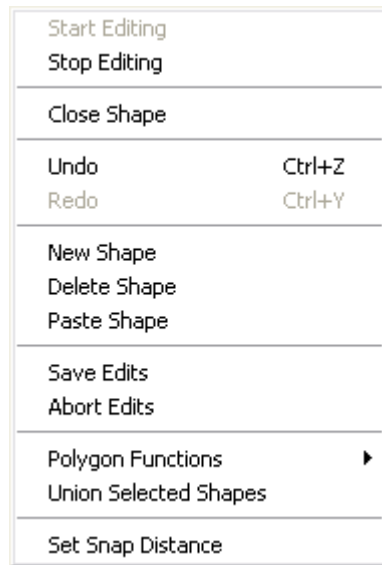



- The "**Export Layer**" function can clip out a part of a vector file. The portion saved can be selected by a number of parameters, including a designated extent or filter based on a query statement. The exported layer will be saved as a shapefile. The Layer > Export Layer command uses the selected layer in the legend.





Edit Menu:



- If accessed from the menu bar, the **Edit Menu** has the appearance shown above-left (some choices will be gray and unavailable, depending on what you are doing). You can also access the Edit Menu by right-clicking the work area. If you do, an Edit Menu like the one above-right will appear at your cursor.
Note that the fGIS status bar turns red when the program is in the edit mode.
- **Start/Stop Editing:** When you start editing, choose the appropriate digitizer or editing tool from the [tool bar](#).
 - If you are digitizing a complex object, but the control point jumps away from the leading position, undo the last action to remove the error and then **hold down the shift key** before clicking the correct leading position. **Always try to digitize polygons in a counter-clockwise fashion, so as to give the polygon's vertices a clockwise winding. This is essential for the Splitter Tool and other polygon editing functions to work properly.** Use Polygon Functions>Fix Polygon Winding if needed to give vertices a clockwise winding.
 - You can modify an object's data attributes table only when you are in the edit mode. Hit the object with the Attributes Tool  to open its data table. Right-click the left column to make changes or add field names. Double-click the right column to adjust field values.
 - **You must click "Stop Editing" and save your work before you can switch layers or make property changes in the legend/layer list.**
- **Close Shape:** Sometimes a polygon shape is left "open-ended" when using the Edit Points tool OR sometimes the user doesn't want to double-click a final point when using the New Shape tool. The Close Shape command closes the polygon shape and enables the Attributes tool.

- **Undo/Redo:** Same functions as other Windows programs.
- **New Shape:** Selects the digitizer tool and readies fGIS to create another shapefile object.
- **Delete Shape:** Works only with selected objects in the active layer.
- **Save Edits/Abort Edits:** Same functions as other Windows programs.
- **Polygon Functions:** (For details, see the [Polygon Editing Tutorial](#).)


1. **Subtract Polygon:** The geometries of all polygons that overlap the selected polygon will be subtracted from the selected polygon. This makes it possible to append polygons to existing polygons or fill in holes between polygons.

2. **Fix Polygon Winding:** Clockwise wound polygons work best with Split Shape Tool, Append Polygon Tool, and Subtract Polygon command. Use Fix Polygon Winding to give vertices the correct order.

4. **Drill Polygon:** The geometry of the selected polygon will be subtracted from the geometry of any polygons that it overlaps. In this manner you can cookie-cutter-in new polygons.

5. **Delete Part:** Individual parts of multi-part polygons can be deleted.

Note: Subtract Polygon and Drill Polygon commands only work with shapes that are selected with the Pick tool.

- **Union Selected Shapes:** Merge multiple objects in the active layer while in the Edit mode. Use the Pick Tool  and Ctrl key to select multiple objects. This command works for lines and polygons.
- **Select Last Shape:** Useful for selecting a shapefile just created, either to drill, subtract (polygons) or delete the object.
- **Copy or Paste Selected Shape:** Shapes can be copied from other layers to the layer being edited. Line objects can only be pasted into line layers, polygon objects into area layers, etc. The shape is copied in WKT (Well-Known Text) format so that users could create or edit a shape in a text editor and paste it directly into the layer. To see the format, copy the shape and paste into a text editor.
- **Set Snap Distance:** The system default distance is 15 pixels. Values greater than 35 are not recommended. (Select the layer to snap to on the fGIS toolbar.)
- **WTM Location to Lat/Lon:** Copies the lat/lon of the position clicked to the Windows clipboard. This tool works only with Wisconsin Transverse Mercator data sets.

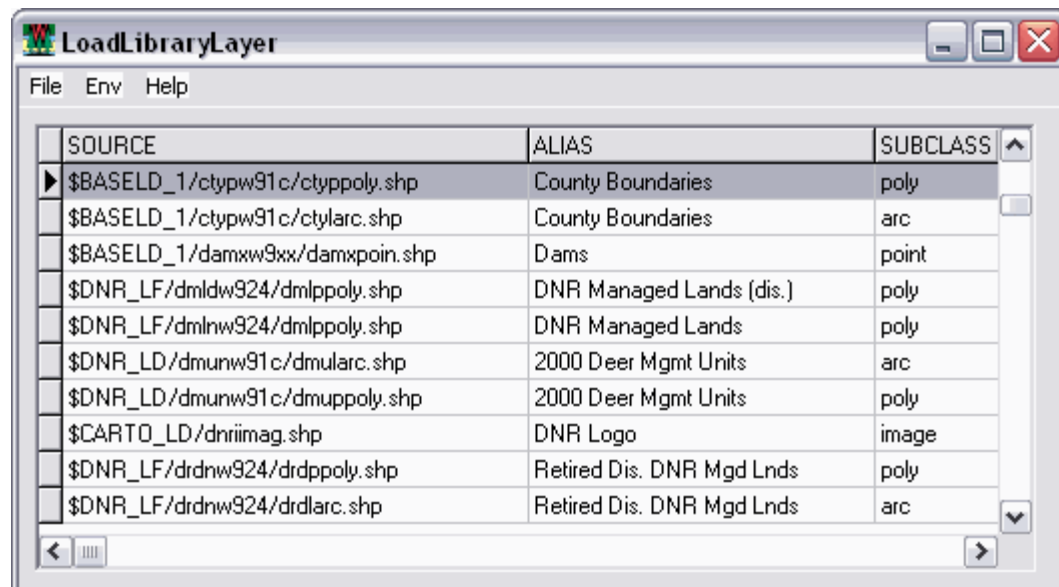
Utility Menu:

Load Library Layer	
Shapefile Projection Utility	
Convert Utility	▶
Join dBase Table to Shapefile	
Join Access Table to Shapefile	
Diagram Designer	

Lat./Lon. Location to WTM
Import XY Text Table to Shapefile
Image Catalog Utility
3-D Viewing ▶
Hyperlink
Search for Township/Range/Section
Routing Utility
Live GPS Utility
Clip Shapefiles
Merge Shapefiles
Buffer
New Shapefile Field Manager
Repath Project File
Generate Cruise Points

- **"Load Library Layer"** simplifies selecting GIS layers. If you have a large collection of enterprise GIS data, the naming conventions often result in cryptic file names. What's more, the layers might be stored in many folders (which also have code names). You can solve the problem of remembering what's where by creating a DBF file with a common alias for each layer and a path to each file. Once you create such a table, just use Load Library Layer and click a shape layer in the table. fGIS will add the layer to your map's table of contents.

Here's an example of a DBF file containing paths and plain language file names:



SOURCE	ALIAS	SUBCLASS
▶ \$BASELD_1/ctypw91c/ctyppoly.shp	County Boundaries	poly
\$BASELD_1/ctypw91c/ctylarc.shp	County Boundaries	arc
\$BASELD_1/damxw9xx/damxpoin.shp	Dams	point
\$DNR_LF/dmldw924/dmlppoly.shp	DNR Managed Lands (dis.)	poly
\$DNR_LF/dmlnw924/dmlppoly.shp	DNR Managed Lands	poly
\$DNR_LD/dmunw91c/dmularc.shp	2000 Deer Mgmt Units	arc
\$DNR_LD/dmunw91c/dmuppoly.shp	2000 Deer Mgmt Units	poly
\$CARTO_LD/dnriimag.shp	DNR Logo	image
\$DNR_LF/drdnw924/drpppoly.shp	Retired Dis. DNR Mgd Lnds	poly
\$DNR_LF/drdnw924/drdlarc.shp	Retired Dis. DNR Mgd Lnds	arc

You can use Load Library Layer/Add Env Variable to set a path to each folder, or you can use Notepad to do the same by creating a file named "env.txt" in your fGIS program folder. Here's a sample environment text file for the first two folders shown above:

```
[ENV]
$BASELD_1=E:\DNR_GIS\dvgislib\wi_tile\base1d_1
$DNR_LF=E:\DNR_GIS\dvgislib\wi_tile\dnr_lf
```

In this example, the shapefiles can be found on the user's E:\ drive in the path as shown. Once the Library Layer file is set up, just click once on the layer you want, and fGIS will load it.

Users can also to select a different env.txt file instead of the one in the /fgis directory by using the Env > Set Env File command on the Load Library Layer dialog. The default env.txt file can also be set in the language.ini file.

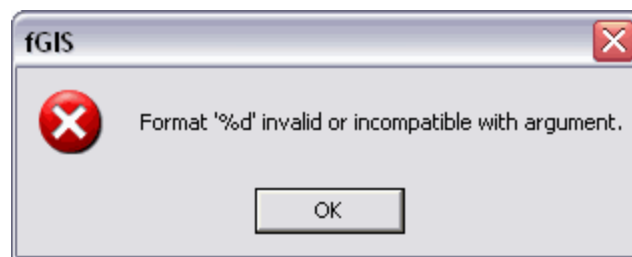
The Load Library Layer dialog can optionally load an .ini file specified in the INI_FILE field of the Layer Table. This field can use environment variables for the path.

When a new Env file is selected with the Env > Set Env File command and the project is saved, the new Env file name will be saved to a file named fgis.ini and used as the default Env file.

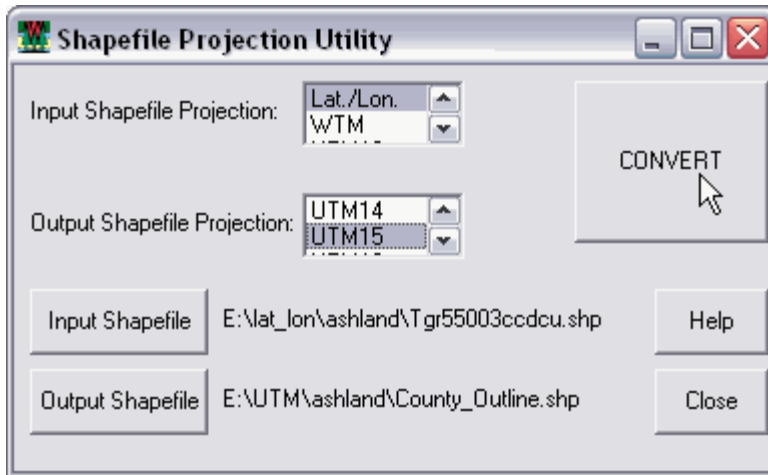
In the Load Library Layer dialog, layer display names can be specified in a field named "Alias" in the layer table, however the names stored in a .ini file will take precedence.

WISCONSIN FORESTERS NOTE: The fGIS distribution zip archive includes an "env.txt" file and a "layrdata.dbf" file, which are based on the layout of the Wisconsin DNR dvgislib data store. The env.txt file assumes that your Wisconsin DNR GIS data is on your local computer in the following path: "**C:\GIS_DATA\dvgislib\wi_tile**". If your data is in a different path (such as a Regional tile), you can edit the env.txt file (use search and replace in Word) to reflect the path you use. *Do not use spaces or the dash (-) character in folder or file names!* If you open layrdata.dbf with Load Library Layer/File/Open command and the shapefile is present, then it will load in fGIS when you click its row in the data table.

Keep in mind that the Wisconsin Regional library tiles do not contain all the layers present in the full Wisconsin tile library directory. If a layer is not present on your local drive, you will get the following message:



- **The Shapefile Projection Utility** converts shapefiles between Geographic (lat/lon), UTM NAD83 and WTM NAD83 coordinate systems. In the following example, a Geographic Census TIGER shapefile is converted to a UTM Zone 15 file:

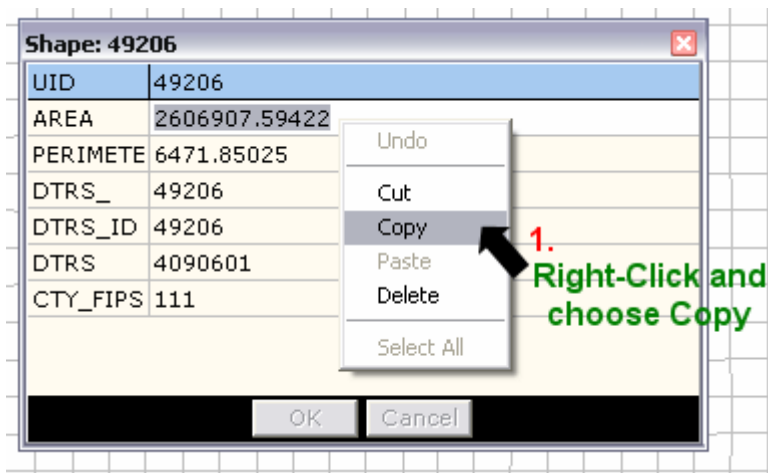


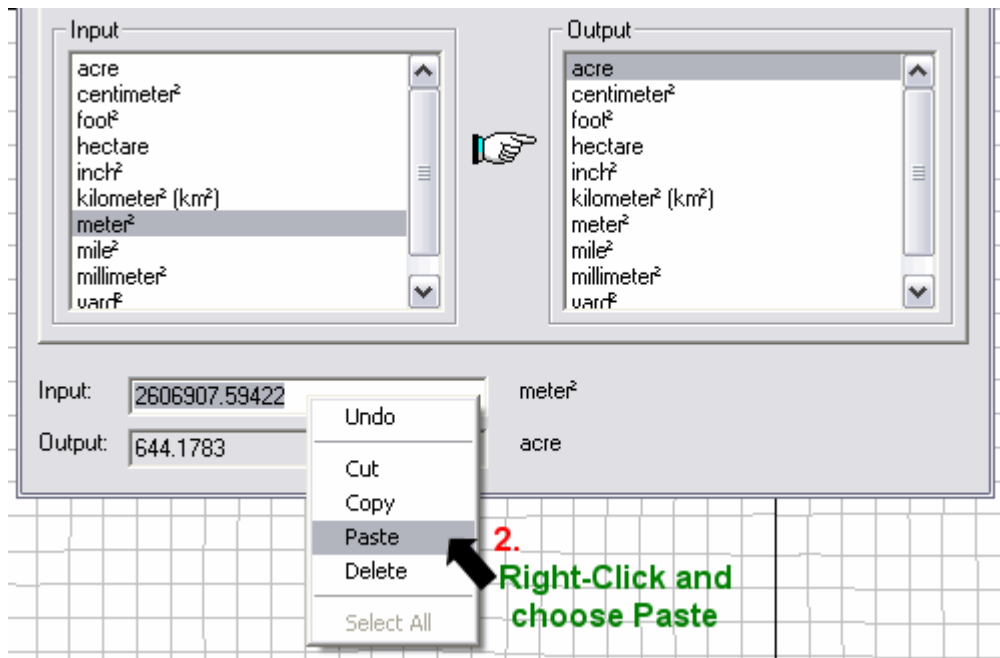
Be sure to organize your shapefiles into folders with logical names. If a source file has a coded name, you might want to change it to plain language as shown in the Output Shapefile above. (Avoid the use of "-" or other non-standard characters in file names and directory names.)

Wisconsin UTM zones numbers are [here](#). [Worldwide UTM zones](#) are included in the fGIS Shapefile Projection Utility.

- **The Convert Utility** interprets unit measurements, translating a value from one unit to any other. Selecting the Convert Utility starts Josh Madison's Convert program (more information about Convert can be found in the convert_readme.txt file in the fGIS system folder). **Exit the Edit mode before using Convert.**

Typically, you'll use convert by (1.) copying a value from an attribute table (click a cell to make it active, then right-click the value and copy). In Convert, (2.) drop the value to be translated into the Input box and read the converted value in the Output box. Use the tabs in Convert to choose the input and output units. The two steps are shown below using a square meter area value from a Wisconsin DNR PLSS section attribute table, changing it to acres.





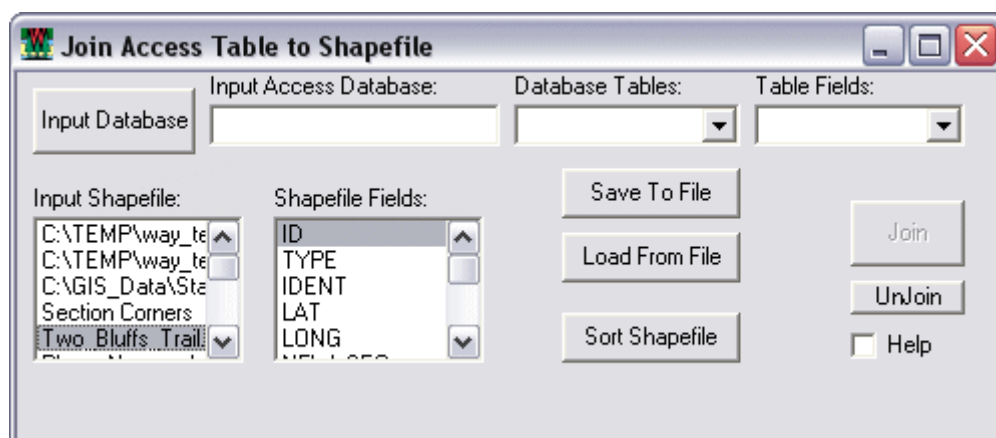
- The **Join dBase Table to Shapefile Utility** can join a dBase table to a shapefile's attribute table based upon a common field from each. The common field names do not need to be identical. The common fields should, however, contain the same type of data.

The join is performed in a one-to-one relationship manner only. Only the first record from the input dBase table in a one-to-many relationship will be joined in the output shapefile.

The join process may take several minutes for very large shapefiles and dBase tables.

Note: Microsoft® Excel tables can be easily exported as dBase files for use in fGIS.

- **Join Access Table to Shapefile:** The Join is a "live" join to the database. The joined fields are visible in the Layer Properties, Attributes Tool, and Search dialogs.



The Sort Shapefile function can improve the quality of an Access table join:

- This function will sort the selected shapefile by the selected attribute field and output it to a new shapefile. *The new, sorted shapefile should be added to the theme (legend or table of contents) in order to take advantage of it for the Access table join in (b).*

- b. Access table records are now sorted by the join field prior to creating the join. The join works best if there is a one-to-one relationship between the records in the shapefile and the Access table, AND if the records in each dataset are sorted by the same field.

An Access table join (created via the Utilities > Join Access Table to Shapefile dialog) can be saved to and reloaded from the project file.

- **Diagram Designer:** Diagram Designer is the print layout module/technical illustration program. Access it either through the Utility Menu or through the prompt when using the Export Image Tool. [Detailed instructions about using Diagram Designer are here.](#)

- **Lat./Lon. Location to WTM:** The Lat/Lon Location to WTM utility is a "Go To" utility that works with WTM, UTM or WGS84 data. If requisite shapefile layers are loaded, it can also serve as a Public Land Survey System locator.

This Public Land Survey System section finder is specific to users with data that contain a DTRS* or DTRSQQ attribute field. Type in the lat/lon of a location and click GO to zoom to that PLSS section. A large red dot is placed at the designated coordinates. The layer containing the DTRS reference data must be specified. The Section, Town and Range information for the lat/lon coordinates are copied to the Windows clipboard.

This tool works with either UTM zones or WTM (Wisconsin Transverse Mercator) data. UTM users can modify the language.ini to display "UTM" text instead of WTM and place their UTM zone at the top of the projection list. For example, if your data is in UTM zone 16, add the following line to the [frmLatLongToWTM] section of the language.ini:

```
frmLatLongToWTM.lbxProjections.Items[0]=UTM,16
```

The dialog checkboxes by Latitude and Longitude add "-" signs to the input coordinates to designate locations in the southern or western hemispheres.

The WTM location to Lat./Lon. command (from the view's right-mouse-click popup menu) will also utilize whatever projection is selected in the Lat./Lon. to WTM form (WTM or any UTM zone). Again, UTM users can modify the language.ini to display "UTM" text instead of WTM, or to place their UTM zone at the top of the projection list.

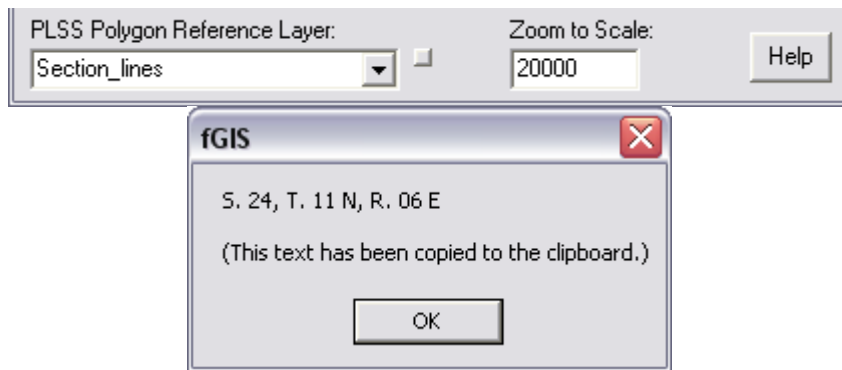
*The **DTRS** code is a seven-digit number that uniquely identifies all PLSS sections in Wisconsin. A '2' in the first digit indicates a range direction of West. A '4' in the first digit indicates a range direction of East. The second and third digits contain the township number (0 through 53). The fourth and fifth digits contain the range number (01 through 20 West, 01 through 30 East). Digits six and seven contain the section number (01 through 36). See the "Section_lines" shape (actually a polygon layer) in the State_Park.zip example.

Lat./Lon. Location to WTM83

☒ Decimal Degrees Latitude: 43.41951 Longitude: -89.73118 ☐ Minimize Window

☐ Degree Minutes Latitude: 43 25.1706 Longitude: -89 43.8708 ☒ Minimize Window

☐ DMS Latitude: 43 25 10.23 Longitude: -89 43 52.24 WTM



- **Import XY Text Table to Shapefile:** This command will create a point shapefile from a comma delimited or tab delimited text table with XY coordinates in decimal degree format.

The text file should be laid out in the following order: ID, X (longitude), Y (latitude), Text. The first row of the table should contain field names (which can be substituted for the "ID, X, Y, Text" variables). Text containing spaces should be enclosed in double-quotes. [See an example text file here.](#)

Click "Import" to create the point shapefile. The Import XY Table to Shapefile dialog adds the new shapefile to the view after creating it.

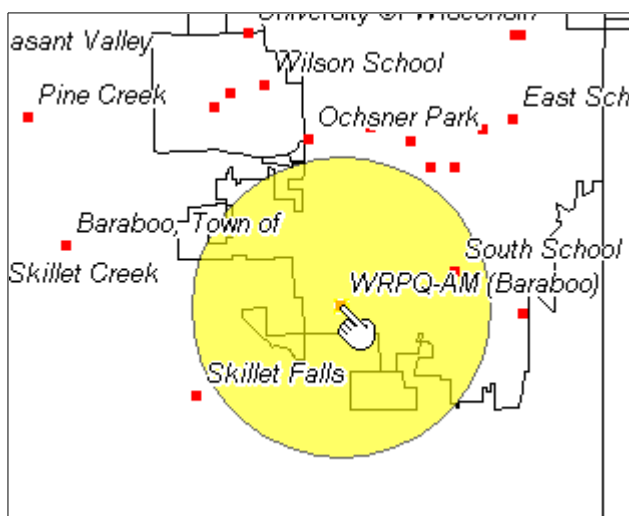
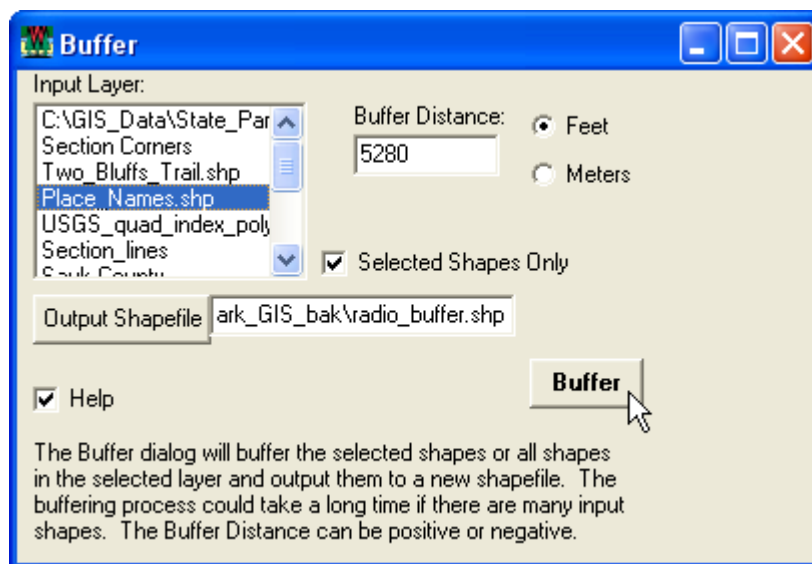
Additional data values can be added to the new shapefile's attributes with the Join DBF or Join Access Table Tools above.

Hint: If you use a simple program like [Waypoint+](#) to download waypoints from a Garmin GPS receiver and save them as comma-delimited text, the "Import XY Text Table to Shapefile" utility in fGIS can create a GPS waypoints shapefile layer. You may need to [project the GPS lat/lon coordinate shapefile](#) to UTM or WTM to align with your other layers.

- The **Image Catalog Utility** dialog (Utilities > Image Catalog Utility) will load all layers in an image catalog and optionally hide them all upon loading. The DNR uses image catalogs to load groups of DRGs. There are also commands to Turn On/Off & Hide/Unhide all image layers as a group.
- See instructions for the **3D Viewing Utilities** [here](#).
- **Hyperlink Utility:** This tool changes the function of the Pick tool to display the file specified by the filename in the Hyperlink field for the shape selected. Images, text documents, web pages, etc. can be used.
- **Search for Township/Range/Section:** This tool requires that an appropriate Public Land Survey System layer with a DTRS attribute is loaded.
- **Utilities > Routing Utility:** The Routing Utility will locate addresses (using the From text and the Find Address button) and find the best route between two addresses (using the Find Route button) in the Routing Layer. The Routing Layer is typically a Road shapefile based upon the US TIGER roads data. Such a layer is available in the State_Park.zip fGIS sample dataset and for WI from the DNR. See dialog for more help. (Attribute names shown in light gray text in the dialog window, set for US TIGER Census road layers, may also be edited.)
- **Utilities > Live GPS Utility [BETA]:** This utility will display the GPS location for a GPS receiver outputting NMEA format data connected to the COM port. The location can optionally be snapped to a line layer to correct for moving features. *This utility has not been tested with moving GPS receivers.* See the dialog for more help.
- **Utilities > Clip Shapefiles:** Use this dialog to clip line or polygon layers to the

boundaries of a polygon layer. Point layers can NOT be clipped using this dialog. To clip out point layers, select the points using the Map > Spatial Selection dialog, then create a new shapefile of the selected points using the Layer > Export Layer dialog.

- **Utilities > Merge Shapefiles:** This dialog can be used to merge multiple shapefiles into a new one. All fields from all input layers will be included in the output shapefile.
- **Utilities > Buffer:** Select a point, line or area object and create an area shapefile around it at a designated radius or width. The following example creates a one-mile circular buffer around the point "WRPQ-AM":



The Buffer utility can also be used to create buffers around multiple selected objects or all the objects in a layer. The buffered area will initially be displayed with solid gray fill, which can be changed through the Properties dialog.

- **New Shapefile Field Manager** dialog to retrieve default attribute table settings. These settings are stored in a file named fgis.ini that is stored in the same directory as fGIS.exe. The New Shapefile Field Manager dialog can also be accessed from the **Utilities > New Shapefile Field Manager** command. An example fgis.ini file to be used with the New Shapefile Field Manager is included (open it in Notepad or other text editor).
- **Utilities > Repath Project File:** This dialog is useful for modifying a project file after data, projects, or directories have been moved.

- **Utilities > Generate Cruise Points:** Select an area object and fill it with either random or systematic points. The generated points are saved as a shapefile, which can be used in fGIS or transferred to a GPS unit for navigation. Other GPS software such as DNR Garmin Tool or OziExplorer would be needed to upload the points to a GPS receiver.

Generate Cruise Points

Generate Cruise Points: Generate random points or a systematic point grid within a selected polygon.

Input Polygon Layer:

Output Shapefile: GIS_bak\cruise_pts.shp

☒ Random ☐ Systematic

of Points to Generate: 100

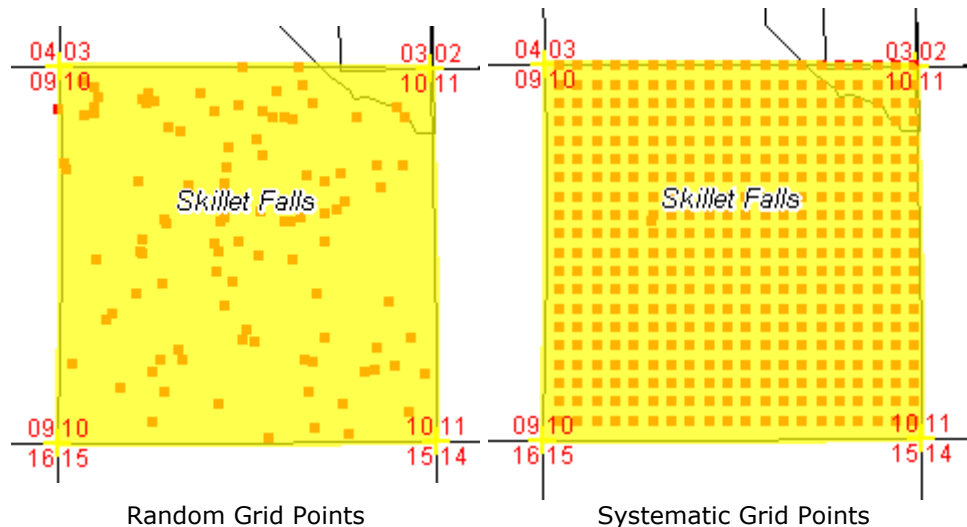
Grid Spacing:

X: 4 Y: 4

☒ Chains ☐ Feet ☐ Meters

☒ Help **OK**

The Generate Cruise Points dialog can be used to create a point shapefile with random or systematic points generated within one selected polygon of the Input Polygon Layer. If more than one polygon is selected then only the first selected polygon will be used.



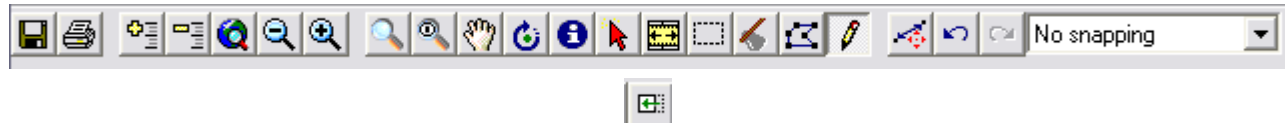
Help Menu:

fGIS Help F1
About fGIS

- F1 will take you to the Help Index.
 - About fGIS shows basic copyright information. The file "license.txt" in the fGIS program folder provides additional details.
-

fGIS Help

Tools



- **Save** 

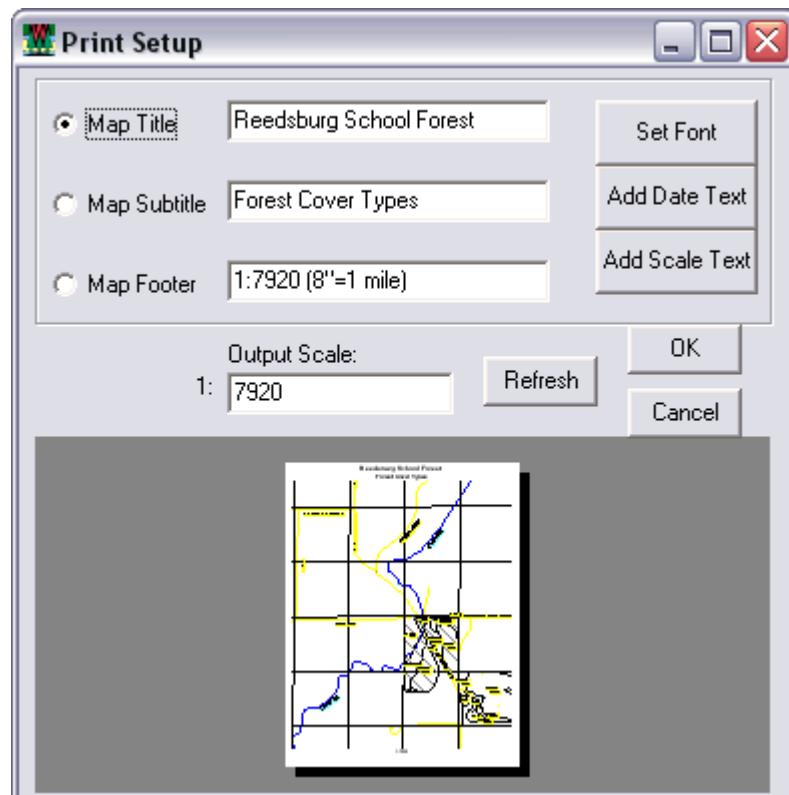
Saves the current project and view. To save the project with a different name (leaving the original intact), use "Save As" from the Map Menu.

- **Print Simple Map** 

After clicking **Print/OK**, fGIS will prompt you for a map title, subtitle and footer to print on the page. You can also specify the scale at which to print and select the fonts used in the map titles and footer. If you wish to print at a scale of eight inches per mile, designate a scale of 1:7920. A print preview is provided.

Hint: Prior to using "Print Simple Map", use the Center Tool to choose a specific point for the map center. That way, if you make subsequent map adjustments, you can repeat the print job with similar boundaries.

Note: Some printer drivers have been found to misalign image and vector layers when map titles/footers are included in a simple print job. If that happens, leave the fields blank.



fGIS offers three additional print options:

- The **Send Map to Word** command (available through the Map>Print sub-menu) will send an image of the view at a user specified resolution and scale to Microsoft® Word. The user is given options to add the map to an existing document (browse to the document) or to create a new document. A Wisconsin DNR MFL Map Header document file is included in the fGIS folder to use if needed. The "Crop" image tool in Word creates a mask around the image without changing the scale or distorting the image. The "Crop" tool is available on the Picture toolbar in Word. (Use View>Toolbars in Word to turn on the Picture toolbar. Apply the Crop tool to the handles in the middle of the picture edges for best results. You might need to move the image back and forth to access the edges.) Also, fGIS adds the map scale (e.g. 1:7920) as text in Word for the user's reference. The Send Map to Word command has been tested on Word 97, 2002 and 2003 with satisfactory results.
- A new dialog includes the previous Simple Map as well as a Template Map printing section, page orientation, and printer setup functions. A template example is included (print.tpl) for advanced users who want to design their own. The template files can be edited in Notepad. (Wisconsin DNR foresters will receive additional print template files from the GIS specialist.)
- A fourth option through the **Export Image** tool will send the map to a technical illustration/page layout module called [Diagram Designer](#). You can add headers, legends, annotations and non-spatial symbols from template palettes in the Diagram Designer module.

• Layer Add/Delete




Add or delete layers to the table of contents with these buttons. When you click the Add Layer button (+), a file browser opens. Navigate to the folder where the data files are located. fGIS will list the files it is capable of opening. You can select more than one file at a time by holding down the Shift or Ctrl keys when you click on file names. The Delete Layer button (-) drops the layer from the table of contents (but does not change the files located on your hard drive).

The Add/Delete Layer functions do not work if you are in the Edit mode. (Stop editing first.)

• Zoom and Position



fGIS provides a number of tools to change the view.

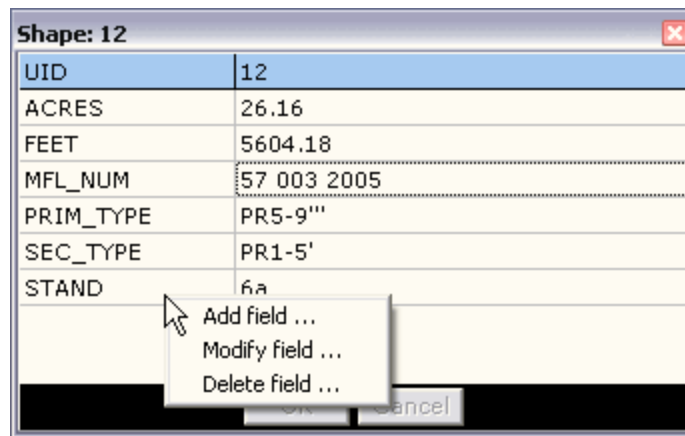
- The first, with a globe, will zoom to the full extent of all loaded layers. (If you want to zoom to the extent of a particular layer, use "Layer/Zoom to Layer" from the menu bar.
- The next two (- and +) zoom out or in with incremental steps.
- The open magnifier is a freeform zoom. Drag a box down and right to zoom in. Drag a box up and left to zoom out.
- The Pan Tool (hand) is used to drag the view to a new position with the mouse.
- The circle tool will re-center the view on any point that you left-click.
- The Prior Extent  tool will take you back to a previous view. Only the previous 10 extents are available. The Prior Extent history is created by the Zoom, Pan and Re-center tools (not from the bottom or right-side slider controls).

- **Attribute** 

The Attribute Tool will display the attribute information (data dictionary) of any object you click in the view. The object will first flash red and yellow, then an attribute table will open. If the object is in the active layer, and if the Edit mode is on, the attributes for the selected object may be changed.

Note: If you are using the Attribute Tool, but are unable to "hit" the object you want, move the target layer containing the object to a higher position in the layers list. Each area layer is somewhat like a pane of glass. You can't hit an object in a lower pane if an object in a higher pane is in the way.

If you are in the Edit mode (right-click the view and click "Start Editing"), you can use the Attribute Tool to change the data values associated with an object. After clicking on an object, a table with two columns similar to the following (with a data dictionary specific to the object) will open:



Shape: 12	
UID	12
ACRES	26.16
FEET	5604.18
MFL_NUM	57 003 2005
PRIM_TYPE	PR5-9'''
SEC_TYPE	PR1-5'
STAND	6.8


Right-click in the left column to change a field label or to add/delete a field. You can also add a new field by right-clicking below the last row. Left-click in the right column change an attribute value. Click OK when finished to save your changes.

- **Pick** 

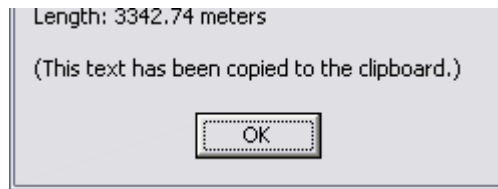
The Pick Tool allows users to select shapes from the active layer in the legend. Selected shapes are highlighted in red. Multiple shapes can be selected by holding down the CTRL key. Selected shapes can be merged with the Union Selected Shapes command in the Edit menu.

- **Measure** 

Click points to form a line or shape. Double-click to view the measurements. Measurements are reported in acres, feet, chains (1 chain = 66 feet) and statute miles.



fGIS	
Area Enclosed:	168.78 acres
Length:	10966.99 feet
Length:	166.17 chains
Length:	2.08 miles
Area Enclosed:	68.30 hectares

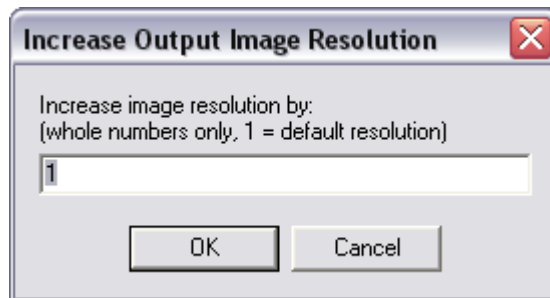


Note: fGIS will produce measurements only for data that is meter-based or feet-based. If you use data with Geographic coordinates (lat/lon coordinates, which are decimal-degree based), fGIS will not generate areas or distances with the measure tool or other shapefile creation or editing functions.

- **Export Image** 

Drag a bounding box to export a geo-referenced image of any portion of the screen view. The Export Image Tool can be used, for example, to clip out an image of just one survey section.

After dragging the bounding box, the following resolution output dialog will open.



The default resolution of 1 will save the image at the screen resolution (which might result in a coarse picture when printed). Increasing the resolution will result in a larger file that may print better, depending on the results you are seeking. (A resolution of 2 is usually optimal for Wisconsin MFL maps, provided you zoom in to fill the view with the PLSS section first.)

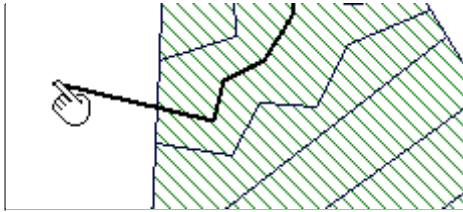
Images can be saved in TIF, PNG, BMP and JPG formats (with the associated world coordinate files). The PNG format is especially useful for maps that do not include raster images like aerial photos, keeping the file size relatively small.

When you use the Export Image Tool, an option will appear to open the image in Diagram Designer, a page layout module. You can [learn more about using Diagram Designer here](#). *[Note: If an image fails to open in Diagram Designer on the first try, repeat the image export a second time using the same file name as in the first go. The image will open in Diagram Designer on the second try. This is a known bug in fGIS, which will be corrected. Also, exported images must be saved in a PNG, BMP or JPG format if they are to be used in the Diagram Designer module.]*

- **Split Shape** 

The **Split Shape Tool** (a tomahawk symbol) divides a polygon or a line into smaller units by drawing a line through it. The Split Shapes Tool updates the area and perimeter/length of each subunit when a polygon or line is divided.





Splitting a Polygon with a Line

(Double-click to complete the procedure.)

One of the easiest methods to digitize forest cover types (or any other land cover polygons) is to first outline an entire parcel, and then use the splitter tool to subdivide the whole into its parts.

Occasionally, you might encounter a polygon that displays a warning that the shape cannot be split when you try to subdivide it. That is caused by some irregularity in the structure of the object's data. If that happens, use the Edit Points Tool to slightly adjust the object, and then try the Split Shapes Tool again.

Warning! A precaution to keep in mind with the Split Shapes Tool: Do not try to follow the boundary of a shape. Since the Split Shapes Tool does not snap to other objects, trying to follow another boundary will result in "orphans" (polygon slivers that you'll need to delete and clean up later). Plan your technique so as to cleanly divide polygons, using more than one split if needed.

Hint: The line object splitter function is useful for cleaning up GPS tracks imported through the DNR Garmin Tool or other GPS programs. **It can be used to snip out extraneous GPS track segments.**

• Edit Points/Select Tool

Select the layer containing objects that you want to edit, then right click the view and choose "Start Editing". Click the Edit Points Tool, and then left-click the object you want to change (or select). Click near the center of the object to avoid changing a vertex on the first click. Move nodes or insert vertices with the Edit Points Tool.

You can also use the Edit Points/Select Tool to delete a shape by first selecting it and then hitting "delete" on your keyboard.

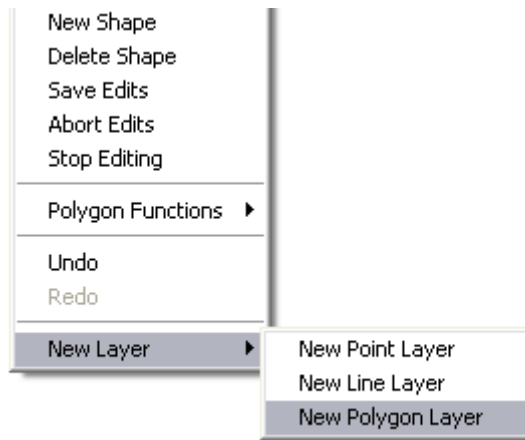
Additional [Polygon Functions](#) that can be used with the Edit Points/Select Tool are listed below.

Note: It's often easiest to digitize a complex shape by first enclosing it in a simple polygon. Then, use the Edit Points Tool to pull the shape to conform with the object being digitized.

• New Shape

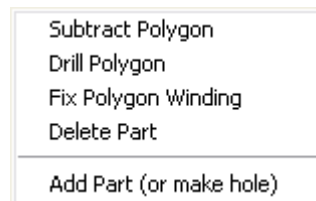
When you are in the Edit mode, click the New Shape Tool to insert another object *in the active layer*. To create a new shape layer, right-click the view and select the appropriate shape category from the menu that opens:





You'll be given options to add feet, acres, meters and hectares to the shape's attribute table.

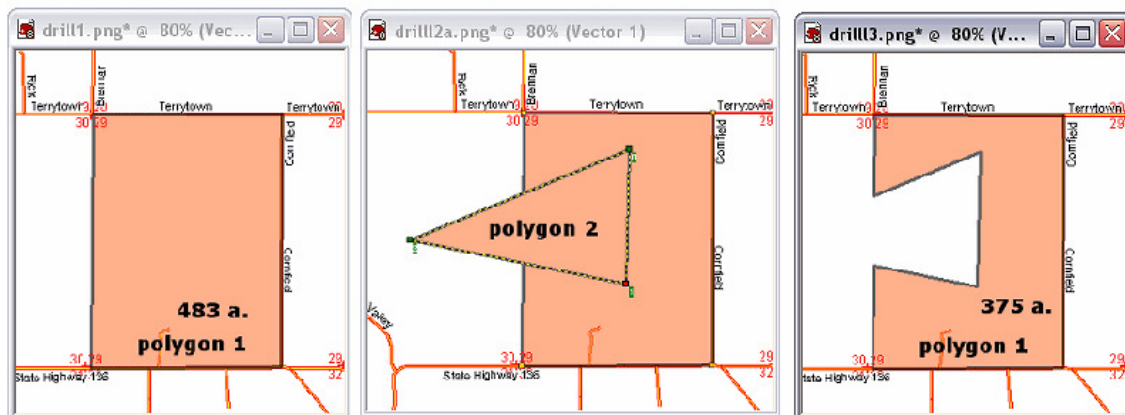
Notice that the Edit Menu includes a **Polygon Functions** option:



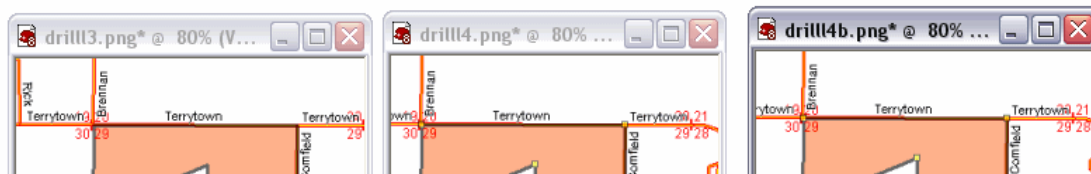
(Note: [See the Polygon Editing Tutorial.](#))

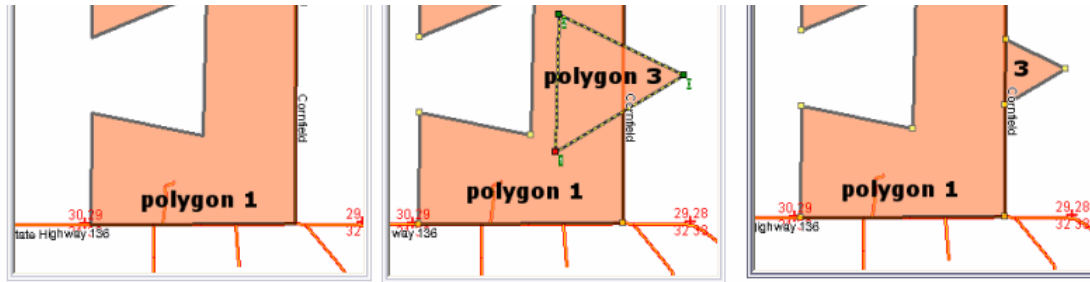
These tools make it possible to digitize complex shapes in fGIS without producing "orphans" or voids between shapes. See the following examples (view sequence left to right):

**If polygon 2 is "drilled" into polygon 1, the area of 2 that overlaps 1 will be subtracted from 1.
Deleting polygon 2 shows the drill effect on 1.**



The "subtract" polygon function, when applied to polygon 3, will delete that portion of polygon 3 that overlaps polygon 1 (handy for preventing polygons from overlapping).





The "**Fix Polygon Winding**" command is used to reorder the vertices of a polygon in a clockwise order. As a routine, you should generally draw polygons in a counter-clockwise direction (which causes the vertices to be numbered clockwise). When vertices are numbered clockwise, the polygon can be split or manipulated in many ways. If you forget, however, and need to fix the winding of the vertices, use the "Fix Polygon Winding" tool.

The "**Delete Part**" removes the selected polygon.

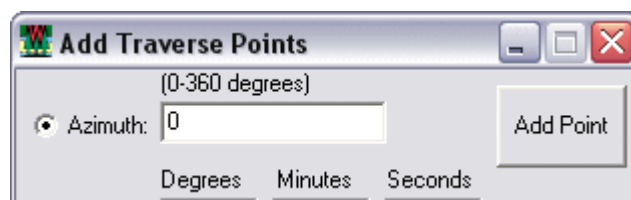
The "**Add Part (or make hole)**" tool is used to make islands, lakes and other donut holes within shapes. To make a hole, first choose to make a New Shape, then click "Polygon Functions>Add Part". **You will immediately see the hole in an underlying polygon if you digitize in a clockwise direction** (opposite the normal procedure, making the vertices wound [numbered] counter-clockwise). *To fill the hole with a lake, the lake should be created in a separate layer by snapping to the edges of the hole.*

Note the significant difference between using Add Part and the Drill or Subtract functions. With Add Part, the user must click that command first and then digitize the hole. If digitized clockwise, the hole appears immediately. If digitized counter-clockwise (the "normal" direction under other circumstances) clicking "Fix Polygon Winding" will make the hole appear.

With the other Polygon Functions, the user first digitizes the new overlapping polygon, then clicks a command to drill or subtract.

• Traverse Tool

Use the Traverse Tool to specify the *direction* and *distance* of the next vertex in a line or polygon. Designate the direction in azimuth degrees or degrees-minutes-seconds, then enter the distance to the point in feet or meters. *In some instances, you may need to move the Add Traverse Points dialog box so it doesn't block the view of the new point you want to add.* The Traverse Tool in fGIS can plot most simple property deeds or layout a precise cruise course (which you could transfer to a Garmin GPS unit with the DNR Garmin Tool).



DMS:

Distance:

☒ Feet
☐ Meters
☐ Rods
☐ Chains

☒ Help

Use the Traverse dialog to add vertices to the current editable shape in the view (or a new point to a point shapefile). A shape is editable if it is currently being digitized and its vertices are visible (or if it has been selected with the Edit Points tool). A new point will be added relative to the current point (which appears in Red). The cursor will actually be moved to the new location, so make sure all dialogs are out of the way!

NOTE: Polygon areas in fGIS are calculated with math functions, but screen resolution and zoom scale will have an effect on the precision of vertex coordinates. The higher the screen resolution (1024x768 is better than 800x600) and the larger the scale (the further in you've zoomed), the more precise the coordinates of vertex points that the user creates will be (and the more accurate the area measurement generated by fGIS).

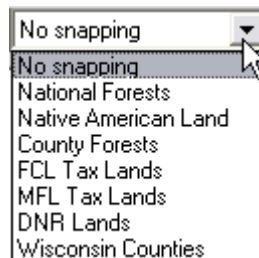
- **Undo/Redo**



Click undo to remove an incorrect vertex or to restore a deleted point when making or editing a shape. The Undo/Redo Tools do not work with any other function.

- **Snap**

When digitizing a shape, you can enable snap to objects in any vector layer by selecting the appropriate layer in the drop-down list. The vector layer names used in the map legend will be displayed as in this example:



The snap layer can be changed at any time. For example, you might start by snapping to a road layer, then snap to a stream when the object you are digitizing approaches objects in the hydro layer. *Note: fGIS only snaps to object vertices.*

fGIS Help

Layer Properties

The **Properties** menu in fGIS is accessed by double-clicking a layer name in the map legend/table of contents. (Note: You must exit the Edit mode before you can access the Properties dialog for a layer.)

fGIS and the freeware TatukGIS Viewer (both built with the TatukGIS DK) share similar property adjustment features. You are encouraged to read the [TatukGIS Viewer Help PDF](#) for additional information and examples about map properties. You might even want to experiment with fGIS project files in the TatukGIS Viewer, which offers a few different features. [You can download a free copy of the viewer here.](#)

- The fGIS vector layer tabs offer *extensive* possibilities for adjusting the display of vector data. Following are basic purposes of each tab:

The screenshot shows the 'Layer' tab of the fGIS Layer Properties dialog. It features several controls: a 'Visible' checkbox which is checked; 'Minimum scale' and 'Maximum scale' fields with 'Default' buttons; 'Transparency' and 'Addition' spinners; a 'Render if match query (must be logical)' dropdown menu; and a 'Legend' text area.

Layer	Renderer	Area	Label	Chart
<input checked="" type="checkbox"/> Visible				
Minimum scale		Maximum scale		
1:15840		Default		
Transparency		Addition		
80		0		
Render if match query (must be logical)				
ACRES>5				
Legend				

The first option you are likely to need from the Layer tab is Transparency. If you are adjusting the properties of an area object, reduce the transparency if you want to see through the object to layers below. You can also set the Area Fill Pattern ([below](#)) to transparent if you want the object's outline to show with no internal fill.

Minimum/Maximum scale sets the zoom levels at which layers display. The visibility checkbox lets you turn off a layer without deleting the layer from the table of contents.

In this example, layer objects will become visible when the scale is 1:15840 or larger and the area of the object is greater than 5 acres.

The Render tab is used for creating thematic maps (different colors, line width,

3 0 0

Start color End color Default color

Start size End size Default size

0.8pt 24.0pt 1.5pt

Render Expression (must be numeric) Round

ACRES 0

labels, area fills, etc.) based on values of data associated with vector objects. See the [TatukGIS Viewer Help PDF](#) for details.

Layer Renderer Area Label Chart

Area Outline Smart size

Pattern Bitmap Color

SOLID SOLID

TRANSPARENT

HORIZONTAL

VERTICAL

FDIAGONAL

BDIAGONAL

CROSS

DIAGCROSS

Symbol Gap Symbol Rotate

6.0pt 0

☒ Include in legend

The center tab will be named "Area" for area objects, "Line" for line objects, or "Marker" for point objects. The sub-option tabs are used to set the basic color, line width, symbol or fill of a vector object.

If you wish to see through an area object, set the pattern to transparent.

You can also set partial transparency through the Layer tab.

Click the lower check box for the object's theme to appear in the map legend under the layer name.

There are a couple ways to add symbols to your maps.



One is to create a point layer, locate points on the map, and then designate a symbol font or bitmap for the points through the fGIS Properties menu (left).

The other is to export an image of your fGIS map to a document, paint or illustration program where you can also add legends and annotations. (The draw function in Microsoft Word® is useful for annotating maps. [Zoner Draw 3](#) and [AutoRealm](#)

Layer Renderer Marker Label Chart

Marker Outline Smart size

Style Size Color

CROSS 70.0pt

Bitmap

Symbol

☐ Include in legend

Font ... Reset

File ...

are a couple free drawing programs to consider.)

The screenshot shows the 'Label' tab selected in a software interface. It features several sub-tabs: 'Label', 'Outline', 'Smart size', and 'Position'. The 'Label' sub-tab is active, displaying settings for 'Width' (150.0pt), 'Height' (75.0pt), and 'Color' (a yellow color swatch). There is a checkbox for 'Use renderer' which is unchecked. Below these are 'Bitmap' (empty), 'Pattern' (TRANSPAREN), and 'Font' (Arial Black). A 'Field' section contains a dropdown menu showing '<:STAND>, <:PRIM_TYP' and an adjacent 'Value' text box. At the bottom, there is a checked checkbox for 'Include in legend'.

The Label tab offers many options for the appearance and location of text labels. Select a field (taken from an objects attributes table) to use for a label from the drop-down box.

Labels can have more than attribute listed and be more than one row high. The following text string in "Field", for example, will list the Stand Number, Primary Timber Type, and (on row 2) the Secondary Timber Type:

```
:#<:STAND>,  
<:PRIM_TYPE>\n<:SEC_TYPE>
```

The image shows a small rectangular label with a green background and yellow text. The text is arranged in two lines: '#9, 011-15°' on the top line and '05-11°' on the bottom line.

The text inside the brackets (e.g., <:STAND>) are attribute names from the object's data dictionary.

See the [TatukGIS Viewer Help PDF](#) for additional details.

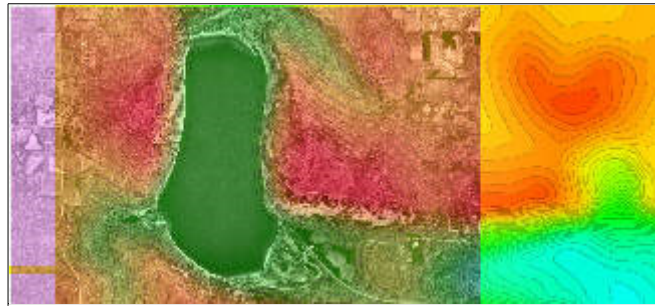
The screenshot shows the 'Chart' tab selected in the software interface. It features sub-tabs: 'Chart', 'Values 1-4', and 'Values 5-8'. The 'Chart' sub-tab is active, displaying settings for 'Style' (PIE) and 'Size' (0.0pt). There is a checkbox for 'Use renderer' which is unchecked. Below these are 'Minimum value' and 'Maximum value' text boxes. At the bottom, there is an unchecked checkbox for 'Include in legend'.

The Chart tab can be used to create a pie or bar chart symbols based on an object's attributes. See the [TatukGIS Viewer Help PDF](#) for details (about 1.4 MB — requires a live Internet connection).

- The Properties menu for raster layers has two tabs: .

If you have two raster images that you'd like to blend, for example,

load them both as layers in fGIS and set the top image transparency, contrast, etc. with the Properties tool. Here's an example of a grayscale aerial photo on the left, blended with a color elevation map (from 3DEM, with red/orange being the highest elevations) on the right. This combination was achieved with the raster layer/pixel settings shown below.



<p>Layer Pixel</p> <p><input checked="" type="checkbox"/> Visible</p> <p>Minimum scale: 1:100000 Default</p> <p>Maximum scale: Default</p> <p>Transparency: 50</p> <p>Addition: 60</p>	<p>As with the Layer tab for vector objects, you can set the minimum/maximum scale at which an object will be displayed. You'll need to experiment with the Transparency and Addition values to get the best appearance.</p>
<p>Layer Pixel</p> <p>Red: 10</p> <p>Green: -10</p> <p>Blue: 10</p> <p>Brightness: 0</p> <p>Contrast: 70</p> <p><input type="checkbox"/> Inversion</p> <p><input type="checkbox"/> Grayscale</p> <p><input type="checkbox"/> Histogram</p> <p>Reset</p>	<p>The Pixel tab provides more raster adjustments as shown, allowing fine adjustment of raster images.</p>

- Comments can be added to the Layer Properties dialog and saved with the project or to the layer.ini file. (Layer Properties dialog > Layer tab > Info section).
- For additional examples of layer.ini files, see the "ini" directory in the fGIS program folder. It includes "ini" properties for use in Wisconsin DNR Managed Forest Law (MFL) maps. Standard point, line and polygon display properties used for MFL maps can be loaded by making a layer active and using the function "Layer=>Load .ini".


fGIS Polygon Editing Tutorial

(Updated for 2005.01.12 build of fGIS)

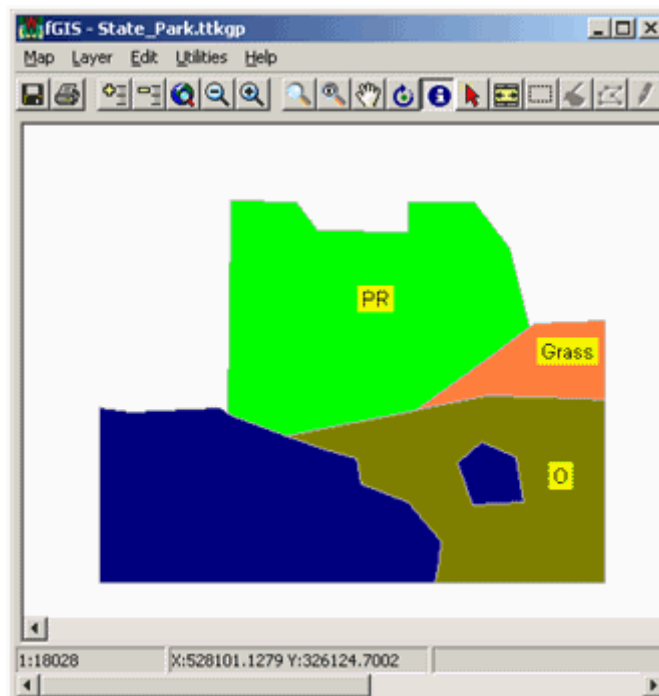
Index:

- A. [Splitting Polygons using the Split Shape Tool](#)**
- B. [Appending Polygons using the Subtract Polygon Command](#)**
- C. [Creating Holes in Polygons and Removing Holes from Polygons](#)**
- D. [Drilling Polygons using the Drill Polygon Command](#)**
- E. [Creating Polygons that are Within other Polygons](#)**

A. Splitting Polygons using the Split Shape Tool

The Split Shape Tool () is used to split existing polygons into smaller polygons.

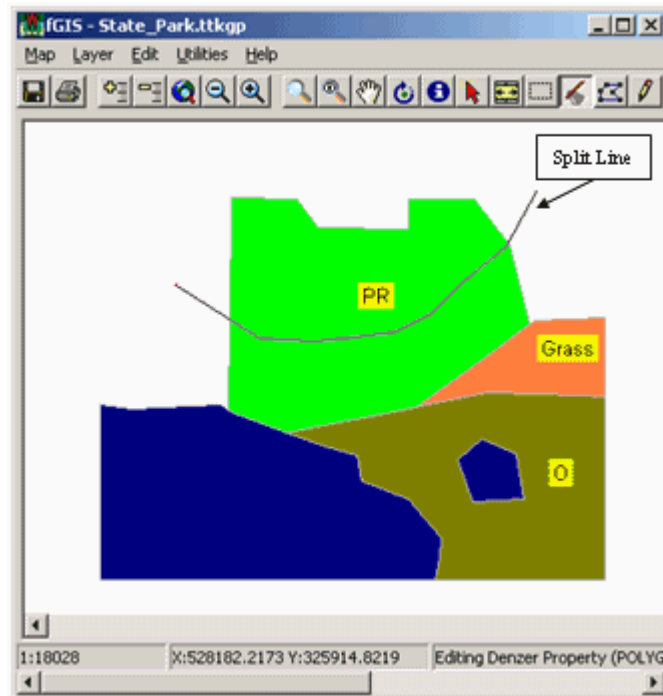
In the following example, the green polygon labeled "PR" (shown below) will be split into two polygons using the Split Shape Tool.



The green polygon labeled "PR" will be split using the Split Shape Tool.

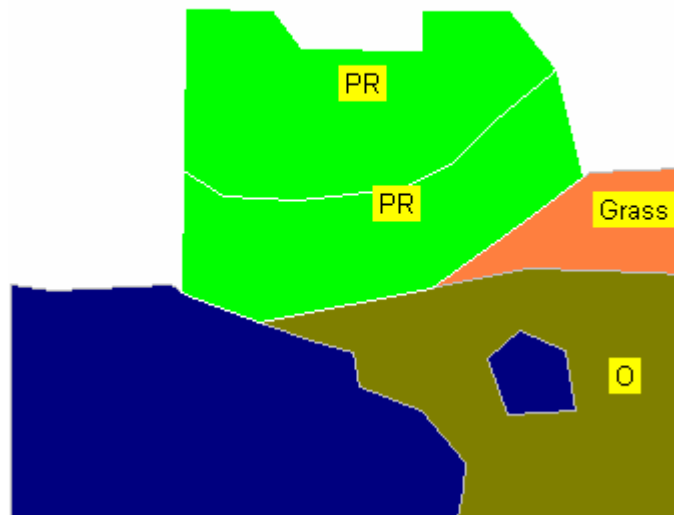
1. Select the **Edit - Start Editing** command to edit the polygon shapefile.
2. Click on the **Split Shape Tool** ()

3. Digitize a **split line** that begins and ends outside of the polygon to be split, as shown below.



To split a polygon, the split line must begin and end outside of the polygon.

4. **Double-click** to end the split line and split the polygon into two polygons.
5. The result of splitting the polygon with the Split Shape Tool is shown below. Notice how the **attributes of the original polygon** have been **copied** to the newly created polygons and that the label is automatically updated.

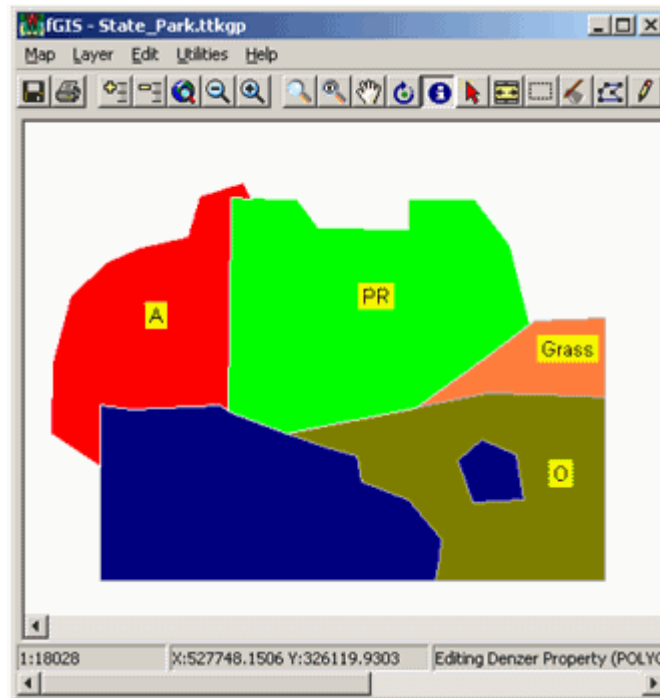


The results of splitting a polygon using the Split Shape Tool.


B. Appending Polygons using the Subtract Polygon Command

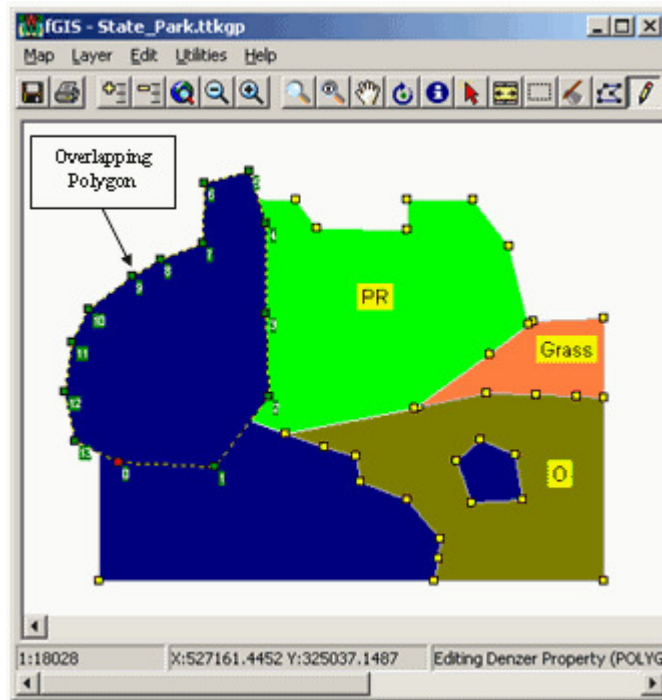
When digitizing polygons that are adjacent to one another, it is often easier to append a new polygon using the Subtract Polygon command, rather than trying to snap the new vertices to the vertices of an existing polygon.

In the following example, the red polygon labeled "A" (shown below) will be appended to the adjacent polygons using the Subtract Polygon command.




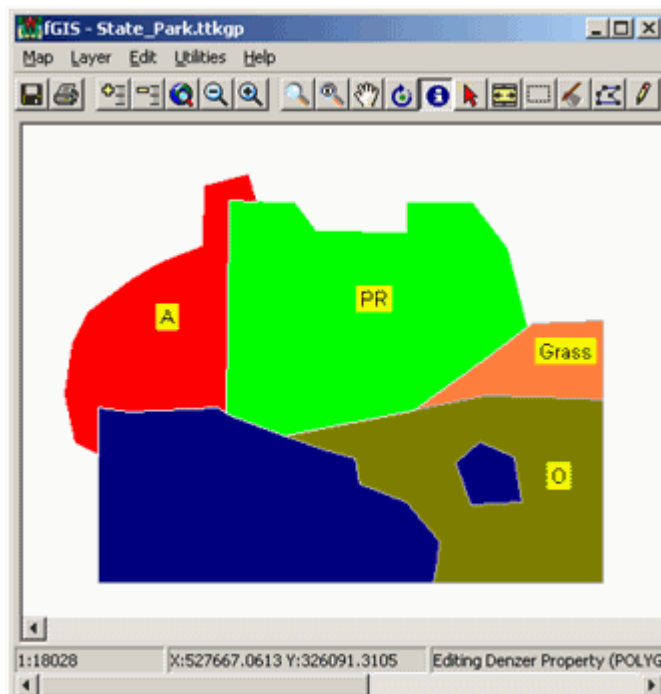
The red polygon labeled "A" will be appended using the Subtract Polygon command.

1. Select the **Edit - Start Editing** command to edit the polygon shapefile.
2. Using the **New Shape Tool** () , digitize a new polygon that **overlaps** the edges of the green and blue polygons as shown below.



The overlapping polygon will be "subtracted" from the polygons that it overlaps.

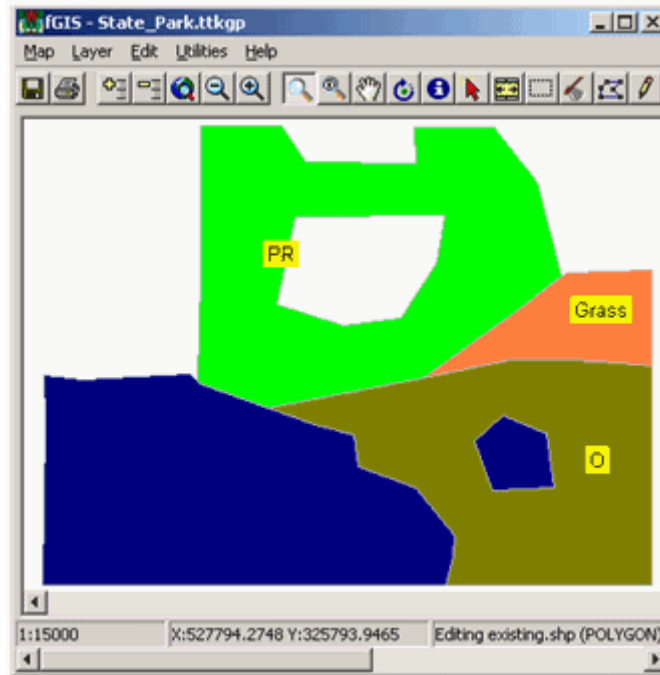
3. **Select** the overlapping polygon using the **Pick** tool ().
4. Select the **Edit - Polygon Functions - Subtract Polygon** command to "subtract" the overlapping polygon from the polygons that it overlaps.
5. The result of "subtracting" the polygon with the **Subtract Polygon** command is shown below. The boundaries of the red polygon labeled "A" are now **coincident** with the boundaries of the adjacent polygons.



The boundaries of the red polygon labeled "A" are now coincident with the boundaries of the adjacent polygons.


C. Creating Holes in Polygons and Removing Holes from Polygons

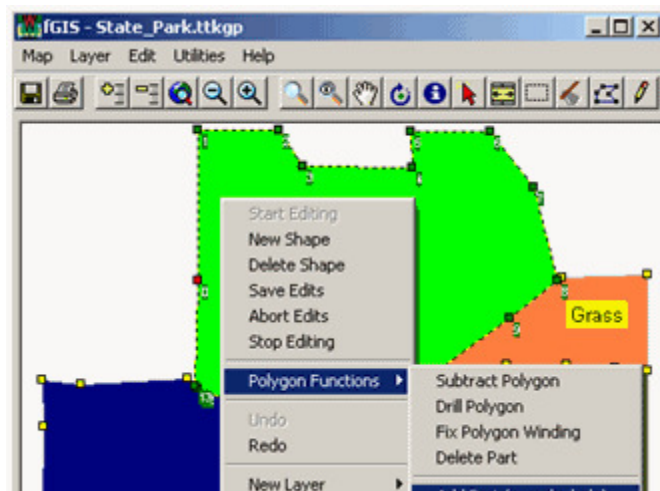
Often it is necessary to create holes in polygons or remove holes from polygons, like the hole shown in the green polygon labeled "PR" shown below.

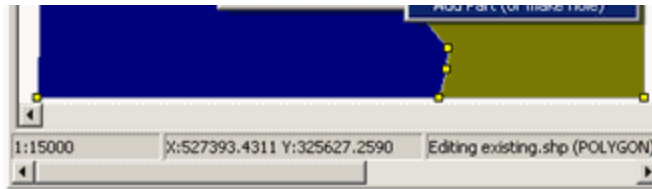


The green polygon labeled "PR" contains a hole.

To **add a hole** to a polygon, use the following procedure.

1. Select the **Edit - Start Editing** command to edit the polygon shapefile.
2. **Select** the polygon to add a hole to using the **Edit Points/Edit Select** tool ()
Note: The polygon is selected when each of its vertices are numbered.
3. **Right mouse click** on the selected polygon where you want to start adding the hole and select the **Polygon Functions - Add Part (or make hole)** command, as shown below. **Note: The Add Part (or make hole) command is only available on the right mouse click popup menu and NOT on the Edit menu.**




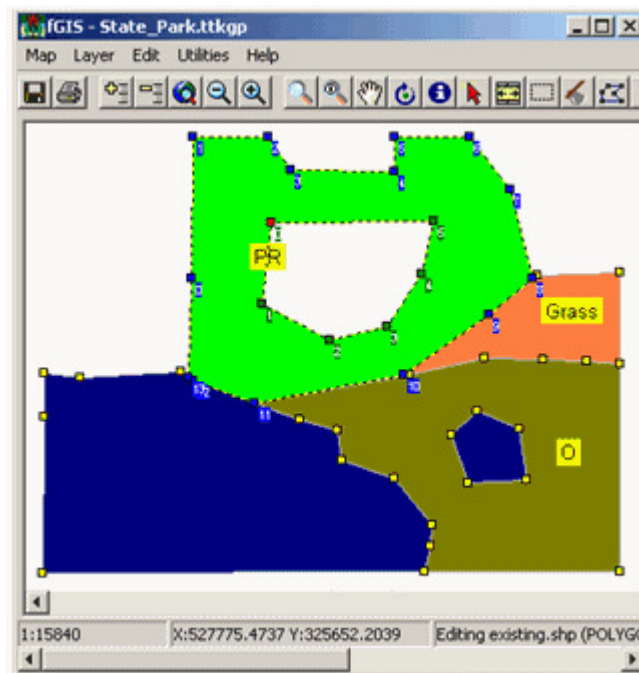


The **Add Part (or make hole)** command is used to make holes in polygons.

4. Now **digitize** the boundary of the hole. **Note: It's best to digitize a hole in the clockwise direction, otherwise the polygon will have to be fixed using the Polygon Functions - Fix Polygon Winding command.**
5. To **finish** digitizing the hole, double-click **OR** select the **Edit - Close Shape** command.
6. **If the hole doesn't appear** when it is digitized, make sure the polygon is still selected and **select** the **Polygon Functions - Fix Polygon Winding** command.

To **remove a hole** from a polygon, use the following procedure.

1. Select the **Edit - Start Editing** command to edit the polygon shapefile.
2. **Select** the **border** of the hole to be removed using the **Edit Points/Edit Select** tool (). **Note: The hole is selected when each of its vertices are numbered and shown in green** as shown below.



The hole in the green polygon labeled "PR" is selected when its vertices are numbered and shown in green.

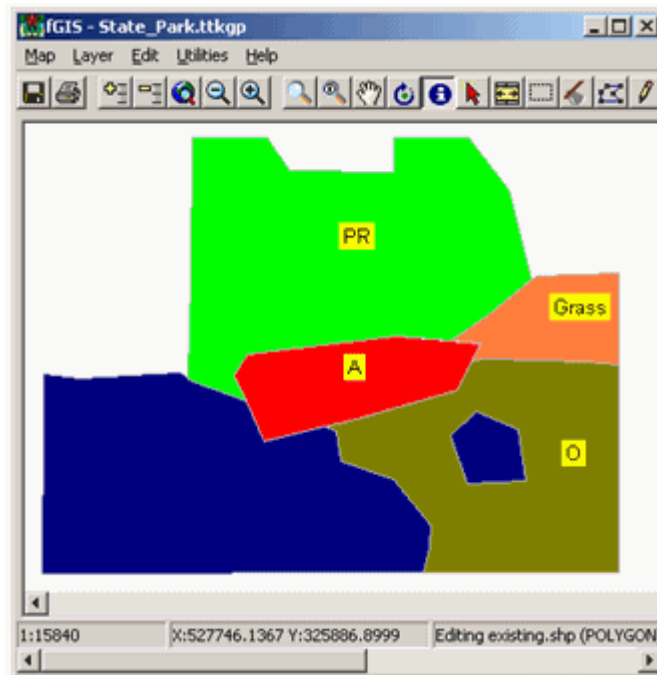
3. Once the hole has been selected, select the **Polygon Functions - Delete Part** command to remove the hole from the polygon.

D. Drilling Polygons using the Drill Polygon Command



When digitizing polygons into areas where polygons already exist, it is often easier to "drill" a new polygon using the Drill Polygon command, rather than trying to snap the new vertices to the vertices of an existing polygon.

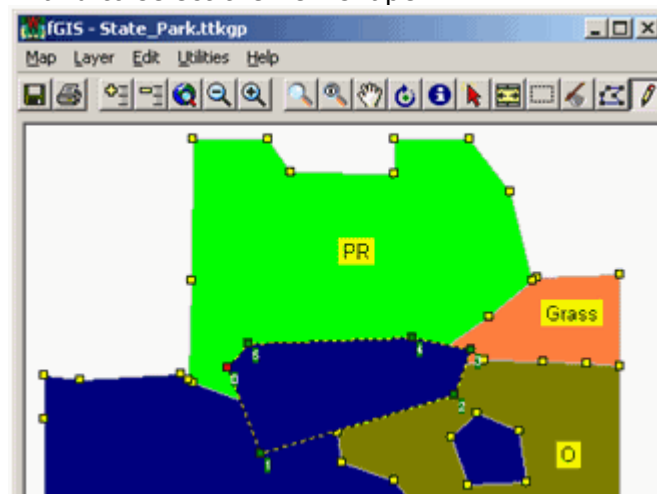
Note: The Drill Polygon command only works with polygons that intersect the borders of polygons they overlap. To "drill" a polygon that is entirely contained within another polygon, first create a hole in the containing polygon, then "snap" a new polygon into the hole.

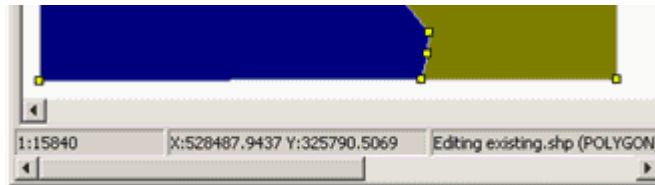
In the following example, the red polygon labeled "A" (shown below) will be "drilled" into the adjacent polygons using the Drill Polygon command.



The red polygon labeled "A" will be drilled into the adjacent polygons using the Drill Polygon command.

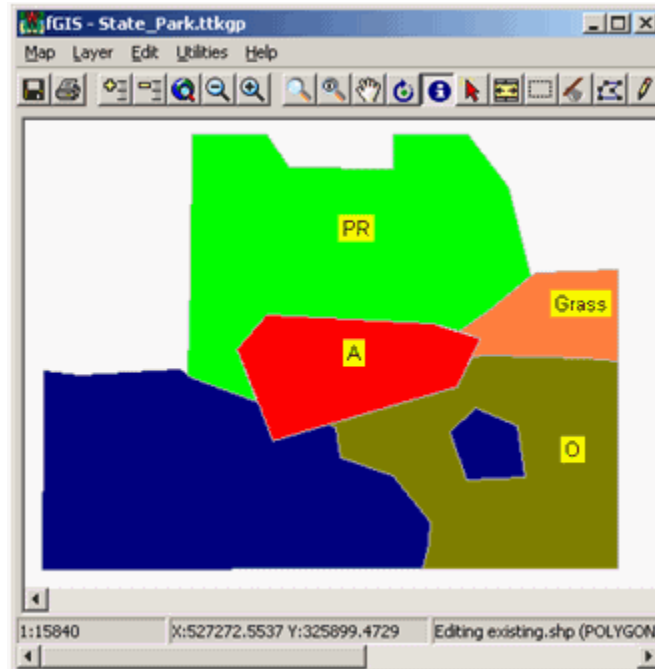
1. Select the **Edit - Start Editing** command to edit the polygon shapefile.
2. Using the **New Shape Tool** () , digitize a new polygon that **overlaps** the edges of the green, blue, brown, and peach polygons as shown below.
3. Select the new shape using the **Pick tool** (). **Note: If the new shape overlaps other shapes entirely (as it does in this example), then use the Layer - Select Last Shape** command to select the new shape.





The overlapping polygon will be "drilled" into the polygons that it overlaps.

4. Select the **Edit - Polygon Functions - Drill Polygon** command to "drill" the overlapping polygon into the polygons that it overlaps.
5. The result of "drilling" the polygon with the **Drill Polygon** command is shown below. The boundaries of the red polygon labeled "A" are now **coincident** with the boundaries of the adjacent polygons.



The boundaries of the red polygon labeled "A" are now coincident with the boundaries of the adjacent polygons.

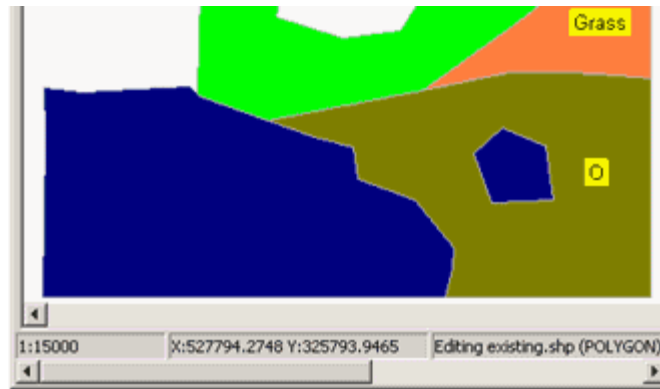
E. Creating Polygons that are Within other Polygons

As mentioned above, the **Drill Polygon** command can **NOT** be used to create polygons that are entirely within the boundaries of another polygon.

To create polygons that are entirely within other polygons, use the following procedure.

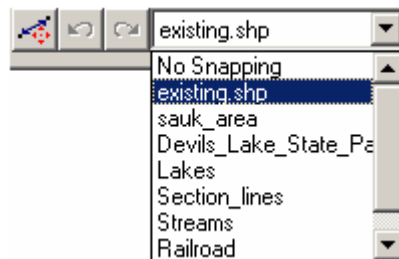
1. First **create a hole** in the underlying polygon **that is the shape of the polygon** you want to create using the procedure mentioned in **C. Creating Holes in Polygons and Removing Holes from Polygons** (above), as shown below.






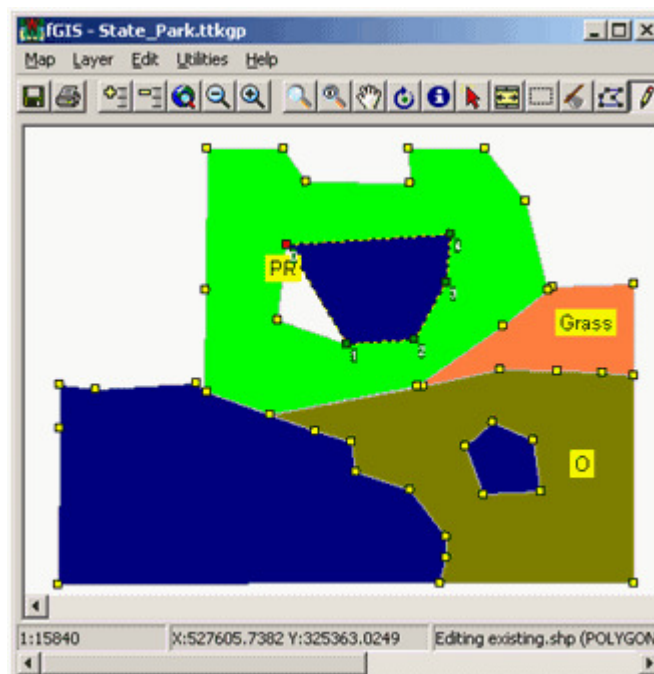
First create a hole in the underlying polygon.

2. **Set the Snapping layer** to the editable layer using **the snap layer listbox**, shown below.



Set the Snapping layer in the snap layer listbox.

3. Then, using the **New Shape Tool** () , digitize a new polygon and "snap" its vertices into the newly created hole as shown below.



The new polygon is being "snapped" into the hole.

(Brian Brown, 1/05)

fGIS Help Index

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fGIS Programmer: Brian Brown (University of Wisconsin)

fGIS Contributors:

Donald Monson - Wisconsin DNR - Division of Forestry
Janel Pike - Wisconsin DNR - Division of Forestry
Paul Pingrey - Wisconsin DNR - Division of Forestry
Raquel Sanchez - Wisconsin DNR - Northeast Region

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Contact Information:

Janel Pike, IS Business Automation Specialist
Wisconsin DNR - Division of Forestry
PO Box 7921
Madison, WI 53707

Programmed by Brian Brown (brownb@dnr.state.wi.us)

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Support for Canadian NTv2 datum conversion as implemented in SHPTRANS was originally based on a program called NADCONV, which was published as part of the Open Geographic Datastore Interface (OGDI) project. The source code for NADCONV was licensed under the following terms:

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