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City

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ZIP/Postal Code

( )

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FAX registration: 1-905-639-4201

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User Guide

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Third Version: July 1997

Avenza Software Marketing Inc.
3385 Harvester Road,
Burlington, Ontario, Canada
L7N 3N2

MAPublisher Lt for Adobe Illustrator or Macromedia FreeHand system requirements

Macintosh Operating Systems:

- Power Macintosh (recommended) or Macintosh with 68040 (or greater) processor.
- Apple System Software version 7.1 or greater.
- Adobe Illustrator 7 or Macromedia FreeHand 7 (PowerPC only)
- 24 MB minimum of application RAM allocated to Adobe Illustrator / Macromedia FreeHand.
- 2 MB disk space for filters.

Windows Operating Systems:

- 486DX or higher (Pentium recommended).
- Windows 95 or Windows NT version 4 or greater.
- Adobe Illustrator 7 or Macromedia FreeHand 7
- 24 MB minimum RAM (32 MB recommended).
- 2 MB disk space for filters.

Installing MAPublisher Lt

To install the new filters:

1. Insert the MAPublisher Lt CD.
2. Find and double click the MAPublisher Lt Installer/Setup.exe file to start the installation.
3. Follow the prompts to install the MAPublisher Lt plug-in filters/xtras in their respective folders.

You are now ready to launch Adobe Illustrator/Macromedia FreeHand.

Preparing to create a map in Adobe Illustrator / Macromedia FreeHand

The first step is to open and prepare your file by going through the following steps:

- open a new file
- set the document page -- as explained on page 7.
- show the necessary palettes -- Layors / Inspectors etc.
- alter the origin of the rulers -- 0,0 at the bottom left corner of the page is best.
- save the file

NOTE: A basic understanding of Adobe Illustrator/Macromedia FreeHand is assumed throughout this guide. If you are not familiar with Adobe Illustrator or Macromedia FreeHand, you should go through the Adobe Illustrator/ Macromedia FreeHand tutorial prior to using MAPublisher Lt.

To create a new file:

1. Launch Adobe Illustrator/*Macromedia FreeHand*.

   Adobe Illustrator/Macromedia FreeHand automatically opens a new file upon launching. It scans the Plug-ins folder and activates the MAPublisher plug-in filters.

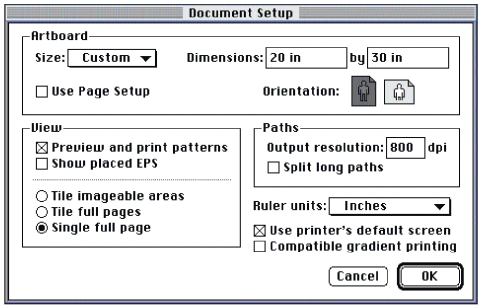
   NOTE: The first time you run a MAPublisher filter you will be prompted to enter the registration key code from the back of the diskette.

To set the document page:

1. Select File → Document Setup.

   The Document Setup window appears.

2. Ensure that Ruler Units is set to Inches.
3. Enter page sizes in the Dimensions fields.
4. Click the radio button beside Tile imageable areas to ensure that the entire document will be printed.



5. Click OK.

MAPublisherLt Import

MAPublisher Lt - Do Import

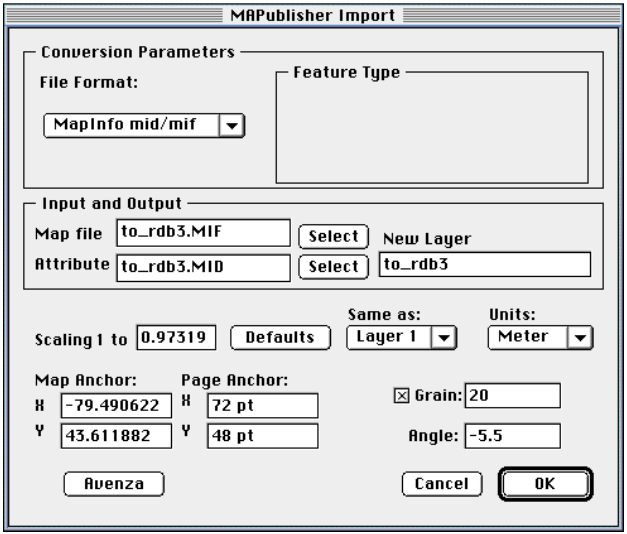
You can import vector data into MAPublisher Lt by using the Import Filter/Xtra. This filter accepts the following file formats:

- Arc/Info Generate
- ArcView Shapefile
- AutoCAD DXF
- MapInfo mid/mif
- USGS DLG
- USGS SDTS

To import vector data:

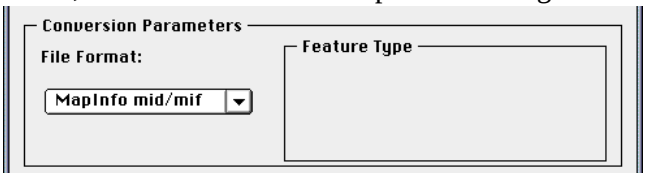
1. Using the Paint Style palette set the **stroke** and **fill**.
2. Select Filter/Xtra → MAPLt Import→ Do Import.

   The MAPublisher Import window appears for you to begin importing.



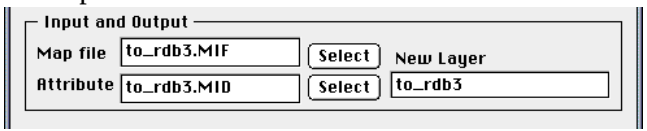
MAPUBLISHER LT IMPORT WINDOW

3. In the Conversion Parameters section, set the File Format to that of the file you want to import. Depending upon the file format you select, the list of available options changes under Feature Type.



File Format	Feature Type
Arc/Info Generate	Point, Line, Area
ArcView Shapefile	n/a
AutoCAD DXF	n/a
MapInfo mid/mif	n/a
USGS DLG	Lines, Areas, Both
USGS SDTS	n/a

4. In the Input and Output section, click Select next to the Map file field to access your desktop. This lets you specify the file you want to import.



NOTE: For MapInfo files, select the mif file firstand the

corresponding mid file will automatically appear in the Attribute field. For ArcView Shape files select the spatial file .shp and the corresponding attributes file .dbf will automatically appear.

MAPublisher automatically creates a new layer based on the name of the file(s) you are importing.

5. In the Input and Output section, enter a layer name in the New Layer field if you wish to change it.

   NOTE: You can rename the layer here or later in the Adobe Illustrator Layers palette.

6. Click Defaults to calculate the exact scale and map anchor of the map to fit within your document size;
   or
   In the Scaling section, enter the scale and map anchor of the map you want to create.

MAPublisher calculates the scale by looking at the current page size (width and height). It determines the extents of the map from the source data and calculates the exact scale required to fit the page size.

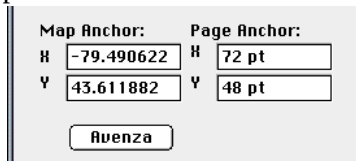
You can then customize your scale by rounding the scale to a number that suits your requirements.

NOTE: The map is made smaller by increasing the ratio (e.g., 1:50000 is smaller than 1:25000); it is made bigger by decreasing the ratio (e.g., 1:50000 produces a larger map than 1:100000).

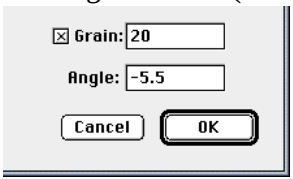
7. Set the Page Anchors. The Page Anchor defines the placement of the map within the page allowing for margins and borders. If you want a border around your finished map (e.g., for aesthetics or a legend) then change the 0/0 positioning (e.g., to 1.5 x 1 inch). This will offset your map elements by that amount from the ruler origin.

   NOTE: If you change your page anchors you may have to re-adjust your scale to make sure that the map still fits inside the page or border.

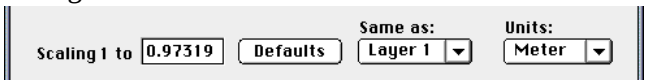
8. Set the Map Anchors. The Map Anchor represents the real world coordinates of the map anchor point (the minimum x and y coordinate values of your map). You may want to adjust these in special circumstances but it is not generally recommended.



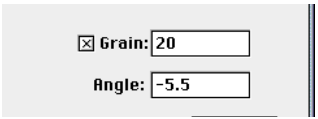
9. Set the Angle field. In the Angle field you can change the orientation of the map from due north by specifying the angle in degrees that you want. For example, specifying -5.5 changes the map angle to 5.5° (clockwise).



10. Leave the Units in the default of your map file unless you want to change the units used for calculations.



11. Click the check box if you want to specify the Grain. This simplifies the line by reducing the number of intermediate points and results in a smoother line. It also makes the file size smaller thus reducing the amount of time to load the data and draw the map.



NOTE: MAPublisher Lt always retains the first and last point of each line.

The default measurement of 0 (no grain) automatically appears for you to modify. The grain is specified in map units. For example, if you specify 20 and your map units are in meters then MAPublisher will retain the points that are at least 20 meters apart.

12. Click OK when you are satisfied with your selections.

The imported map appears.

Geographic Mapping Tools

MAPublisher Lt uses the following menu options for working with GIS Mapping Tools:

MAP Select by Attribute

Choose this option if you want to define selection criteria for isolating specific features by attribute value.

MAP Select by Feature

Choose this option if you want a quick way to select all similar features on a layer.

MAPLt Select by Attribute

The MAPLt Select by Attribute menu option contains the following filters:

- Initial Selection
- Add to Selection
- Remove from Selection
- Select from Selection

All of these filters use the MAPublisher Select by Attribute screen to perform their specific functions; this screen lets you isolate selection criteria for a specific purpose.

For example, you would use this suite of filters if you are drawing a street map and want to identify one way streets. By working with various selection criteria you would be able to isolate the one way streets within a geographic area.

To do this you build arithmetic expressions to define your selection criteria. You make your initial selection by using the Initial Selection filter and then use the other filters to add or subtract from this initial set of data.

SEE: Appendix 1- Selection Operators for an explanation of Math and Logic operators.

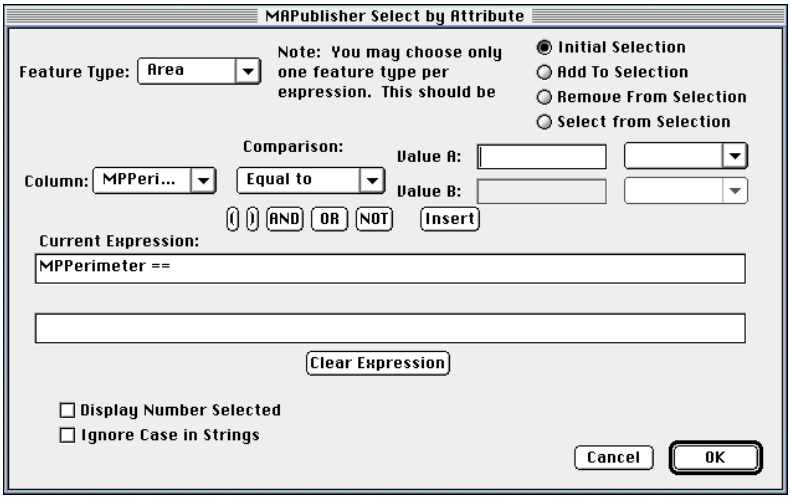
Initial Selection

Use this filter to make your initial selection or to ignore any previous selections and to start again.

To select by attribute:

1. Select Filter/Xtras → MAPLt Select by Attribute → Initial Selection (Radio Button).

   The MAPublisher Lt Select by Attribute window appears.



MAPublisher Lt Select by Attribute window

2. Set the Feature Type (i.e., area, line, point, or text).

   NOTE: You must set the feature type first and may set only one feature type per expression.

3. Set the Column (from the Table of Attribute Values).
   From here you define your criteria by using the pulldown lists and buttons to write your expression.

   NOTE: The pulldown list shows the unique values associated with the selected Column value.

4. Set the Value.
5. Click Insert when you have finished writing the expression.

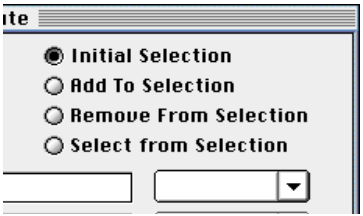
   The expression appears in the Selection Expression section.

6. You can continue to build the expression by adding a logical operator (and, or, not) and inserting additional expressions (modifying the Column, comparison operator, or value).

Window Interface	Description
Current Expression	Shows the current section of the expression you are building
Clear Expression (button)	Erases the expression so that you can start again
Selection Expression (box)	Displays the complete expression you are building
<<< (button)	Lets you scroll to the front of the expression
>>> (button)	Lets you scroll to the end of the expression

Window Interface	Description
Display Number Selected (check box)	Displays the Selection Statistics window which shows the number of features currently selected
Ignore Case in Strings (check box)	Accepts both uppercase and lowercase characters as being the same

NOTE: Click on the button to quickly change the selection mode (Initial Selection, Add to Selection, Remove from Selection, Select from Selection).



7. Click OK when you are satisfied with your selections.

Once you have used the Initial Selection filter, you can use the following filters:

- Add to Selection
- Remove from Selection
- Select from Selection

Add to Selection

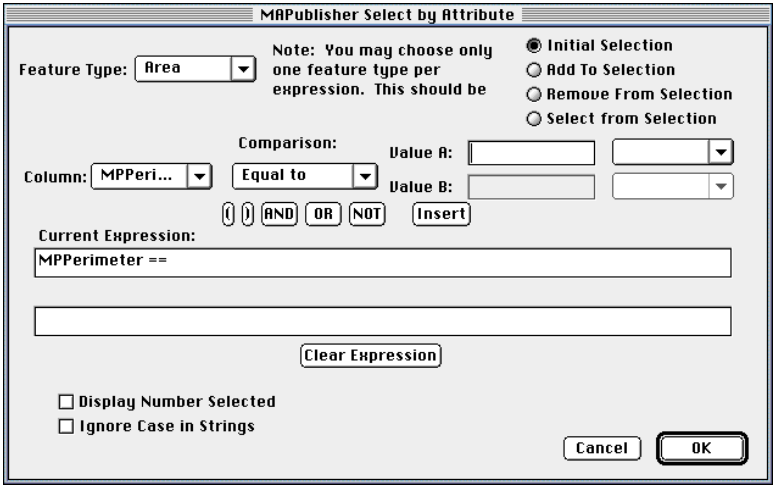
Use this filter once you have selected a set of data (using Initial Selection) and now want to add to that selected data.

For example, if you used “a ” in your initial selection and now want to add “b” then you would use this filter so that the selected set that would remain would be “a +b.”

To select into a selected set of attributes:

1. Select Filter/Xtras → Select by Attribute → Add to Selection (Radio Button).

   The MAPublisher Lt Select by Attribute filter window appears.



MAPublisher Lt Select by Attribute window

2. Set the Feature Type (i.e., area, line, point, or text).

   NOTE: You must set the feature type first and may set only one feature type per expression.

3. Set the Column (from the Table of Attribute Values).
   From here you define your selection criteria using the pulldown lists and buttons to write your expression.

4. Click Insert when you have finished writing the expression.

   The expression appears in the Selection Expression section.

5. Click OK when you are satisfied with your selections.

Remove from Selection

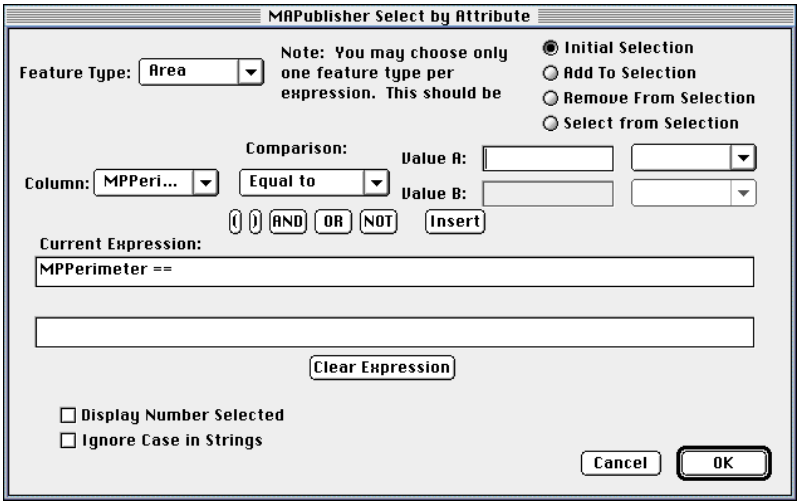
Use this filter once you have selected a set of data (using Initial Selection) and now want to extract from that selected data.

For example, if you used “a + b + c ” in your initial selection and now want only “a” to be removed then you would use this filter so that the selected set that would remain would be “b + c.”

To select into a selected set of attributes:

1. Select Filter/Xtras → MAPLt Select by Attribute → Remove from Selection (Radio Button).

   The MAPublisher Lt Select by Attribute filter window appears.



MAPublisher Lt Select by Attribute window

2. Set the Feature Type (i.e., area, line, point, or text).

   NOTE: You must set the feature type first and may set only one feature type per expression.

3. Set the Column (from the Table of Attribute Values).

   From here you define your selection criteria by using the pulldown lists and buttons to write your expression.

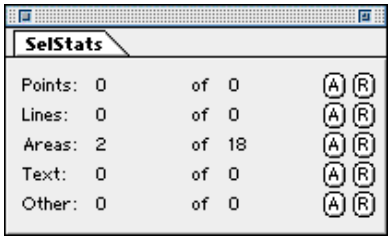
4. Click Insert when you have finished writing the expression.

   The expression appears in the Selection Expression section.

5. Click on Check Box for Display Number Selected (SelStats menu appears in your work area) and/or Ignore Case in Strings (Refers to text case in your expression).

6. Click OK when you are satisfied with your selections.

   SelStats window – click on 'A' to select all features or 'R' to reverse the selection.



Select from Selection

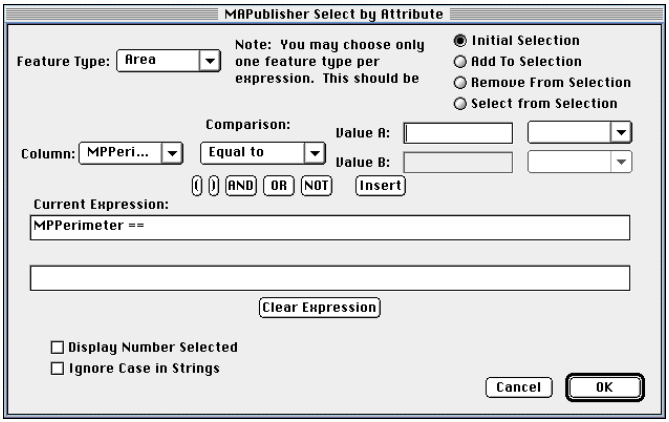
Use this filter once you have selected a set of data (using Initial Selection) and now want to extract only a portion of that data.

For example, if you used “a + b + c” in your initial selection and now want only “a” then you would use this filter to extract “a” so that the selected set that would remain would be “a.”

To select from a selected set of attributes:

1. Select Filter/Xtras → MAPLt Select by Attribute → Select from Selection (Radio Button).

   The MAPublisher Lt Select by Attribute filter window appears.



MAPublisher Select by Attribute window

2. Set the Feature Type (i.e., area, line, point, or text).

   NOTE: You must set the feature type first and may set only one feature type per expression.

3. Set the Column (from the Table of Attribute Values).

   From here you define your selection criteria using the pulldown lists and buttons to write your expression.

4. Click Insert when you have finished writing the expression.

   The expression appears in the Selection Expression section.

5. Click OK when you are satisfied with your selections.

MAPLt Select by Feature

The MAP Lt Select by Feature menu option contains the following filters:

- Reverse Select
- Select All Areas
- Select All Lines
- Select All Points
- Select All Text

Reverse Select

Use this filter once you have selected a subset of one or more features (i.e., area, point, line, text) within a layer to:

- deselect (unselect) what is currently selected, **and then**
- select everything that had not been previously selected

You would use Reverse Select when you want to select features that do **not** meet a set of criteria.

For example, if you have a drainage layer from which you want to select all the areas that are water bodies and not islands:

- use the filter Select By Attribute to select all areas that contain the word “island”
- use Reverse Select to deselect the islands and select all the areas that are water bodies (and not islands)

To Reverse Select:

1. Select Filter/Xtras → MAPLt Select by Feature → Reverse Select.

   All features on your current layer that were previously selected are now deselected and everything else of the same feature type is now selected.

Select All Areas

Use this filter to select all areas on the current layer.

To select all areas:

1. Select Filter/Xtras → MAPLt Select by Feature → Select All Areas.

   All areas on the current layer are now selected.

Select All Lines

Use this filter to select all lines on the current layer.

To select all lines:

1. Select Filter/Xtras → MAPLt Select by Feature → Select All Lines.

   All lines on the current layer are now selected.

Select All Points

Use this filter to select all points on the current layer.

To select all points:

1. Select Filter/Xtras → MAPLt Select by Feature → Select All Points.

   All points on the current layer are now selected.

Select All Text

Use this filter to select all text on the current layer.

To select all text:

1. Select Filter/Xtras → MAPLt Select by Feature → Select All Text.

   All text on the current layer is now selected.

MAPublisherLt Selection Statistics

The Window -- MAPublisher Statistics -- SelStats menu option contains the following filter option buttons:

(R) Reverse Select

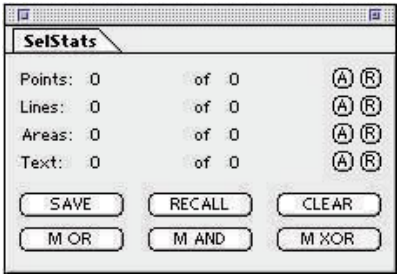
(A) Select All Areas/Lines/Points or Text

SAVE

RECALL

CLEAR

M or / M and / M Xor



Reverse Select

Use this filter once you have selected a subset of one or more features (i.e., area, point, line, text) within a layer to:

- deselect (unselect) what is currently selected, and then

select everything that had not been previously selected

You would use Reverse Select when you want to select features that do not meet a set of criteria.

For example, if you have a drainage layer from which you want to select all the areas that are water bodies and not islands:

- use the filter Select By Attribute to select all areas that contain the word "island"

- use Reverse Select to deselect the islands and select all the areas that are water bodies (and not islands)

SELECTION STATISTICS BUTTONS

Use these buttons to manipulate feature selections on the current layer.

1. Select Window -- MAPublisher Statistics -- SelStats -- SAVE

   All features on the current layer are now SAVED in Memory.

2. Select Window -- MAPublisher Statistics -- SelStats -- RECALL

   All features on the current layer are RECALLED from Memory.

3. Select Window -- MAPublisher Statistics -- SelStats -- CLEAR

   All features on the current layer are CLEARED from Memory.

4. Select Window -- MAPublisher Statistics -- SelStats -- M OR

   All features on the current layer that are both in Memory AND are currently selected.

5. Select Window -- MAPublisher Statistics -- SelStats -- M AND

   All features common to both the currently selected set AND the set in memory.

6. Select Window -- MAPublisher Statistics -- SelStats -- M X OR

   All features excluding those common to both the currently selected set AND the set in memory.

NOTE: See http://www.avenza.com/freezone for a diagram explanation of the above.

MAPublisherLt Export

MAPublisher Lt provides the definitive solution to the production of publication-quality maps by importing map files into Adobe Illustrator or Macromedia FreeHand, both are worldwide standard software in the graphics and printing industries for digital pre-press file management or Adobe Acrobat Portable Document Format (PDF).

For high quality PostScript (EPS) output, you can set printing options, crop marks, trapping; create color separations, calibrate color monitor, convert custom colors to process, and set output resolution.

For PDF document management Avenza provides a MAPublisher PDF Export filter. Export MAP documents with all database attributes intact to Adobe Acrobat PDF – Avenza's JAMbuddy i and Q filters will display and enable querys on that database.

SEE ALSO: Adobe Print Publishing Guide. For Adobe Acrobat information: www.adobe.com

For links to data translators to convert to other GIS data formats see the Avenza web site:

- http://www.avenza.com/link2trans.html

MAPublisher Export

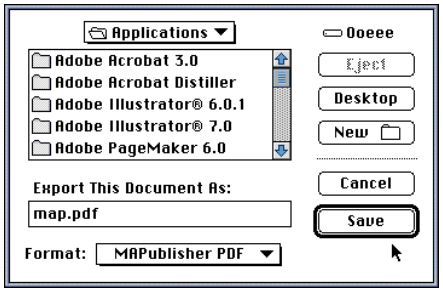
Choose this option if you want to export map files using Adobe Acrobat PDF and JAMBuddy i and Q filters so that later you can view files in Adobe Acrobat Exchange or Reader, whether opened in Netscape Navigator or Microsoft Internet Explorer.

NOTE: Macromedia FreeHand users can export from Select Xtras → MAP Export → MAPublisher PDF.

To export in MAPublisher PDF format from Adobe Illustrator:

1. Select File → Export.

   The Export dialog box appears.



2. Enter the file name you want to save the file under, including the file extension".pdf".
3. Ensure that the file will be saved in the correct folder.
4. Set the file format to MAPublisher pdf.
5. Click Save when you are satisfied with your selections.

Tips

This chapter contains tips and techniques for working with MAPublisher Lt as well as troubleshooting tips for common problems.

Productivity Tips

- Views
- Rotating Feature Text
- Shortcuts

Importing files

- Data does not overlay as expected
- Importing large files is slow
- Vanishing data
- NAN (000)
- When a filter does not appear to work
- Missing data in an Arc/info generate file
- Data does not fit as expected
- Adjusting the map scale for multiple map sheets/tiles

Building legends

- Building a color ramp legend

Other

- Map sheets or tiles that should be adjacent, but are not
- Attribute corruption
- Text style was set but the paint style changed

If you need additional answers to questions

E-mail us at:

- support@avenza.com.

Please have your registration number handy and you'll get prompt attention.

Wishlist

Please let us know about filters or functions that you would like to see incorporated into future upgrades of MAPublisher:

E-mail us at:

- wishlist@avenza.com.

We want to satisfy your mapping needs.

Productivity Tips

Views

You can display your document on–screen in a variety of ways using the View menu commands. For example, you can see a preview of the illustration as you edit, you can view only the outlines of your artwork, or you can preview selected parts of your artwork while displaying the rest as outlines.

Rotating feature text

When rotating more than one text element, the Transform Each Palette menu usually provides the best results. When rotating a single text element, use manual rotation through the toolbox.

Importing Files

MAPublisher automatically imports files onto a new layer. This avoids corruption of data that can occur when different data structures are imported into a single layer.

Data does not overlay as expected

The data imports, but two data sets that should overlay don't. The most common scenario is when data set A is imported first and data set B second, data set A shows up but data set B does not appear or it is off in a corner as a tiny "blip."

When data set B is imported first and data set A second, data set B shows up but data set A does not appear or it is off in a corner as a tiny "blip."

Check the data files for differing projections, zones, NADs or x/y shifts.

SEE ALSO: Other later in this appendix.

Importing large files is slow

Many GIS data files are large and when a series of such files is imported, you may find that the import filter starts to run more slowly. This is because scratch and memory allocations are being used up. The best solution is to periodically save your work, quit out of Adobe Illustrator/ Macromedia FreeHand and then restart. This will free up scratch memory.

Also, you could reduce the minimum number of undos (since they all reside in memory).

A final suggestion is to increase your RAM allocation to Adobe Illustrator / Macromedia FreeHand is the only application open.

WARNING: If the files are very large you may simply run out of scratch memory, then you will have to purchase (and/or allocate) more RAM.

Vanishing Data

If you imported some data and it appeared as selected, but when you deselected the data it seemed to vanish, here are a few things to check:

- You may have inadvertently pressed “cut” or the delete key. Check under Edit in the top menu bar, if the “Undo Clear” is available this means that you just deleted something. Select “Undo Clear,” and the data should return.
- If you didn’t delete the data, another possibility is that because of the order of your layers, your data may be hidden. Try moving the layer in question to the top of the list of layers in the Layers palette, so that it is drawn in front of the other layers.
- Make sure that current layer is available for viewing in the Layers palette, by having a dot in the left hand column under the eye (visualization) and beside the layer.
- Check that you have colors for fill/stroke set in the Paint palette.

NAN (Not a Number)

This mysterious string may show up for the default scale value when you have selected Compute Defaults. Usually this will be accompanied by map anchors displayed as INF which stands for INFinite.These results indicate that the numbers in the file being imported are either so large or so small that the software cannot process the file. You should review your file through a text file editor (DLG, mid/mif and generate files are all ASCII).

Missing Data in an Arc/Info generate file

If any of the cover–ids are equal to zero, the Arc/Info Ungenerate function ignores the associated graphics and does not include them in the generate file.

You can also create custom views of your document, retaining a particular magnification level, layering, and other viewing features for later retrieval. You can even display multiple views of a document at several different magnification levels simultaneously.

NOTE: With any Macintosh application you can take advantage of viewing multiple windows while inside a single document.

Data does not fit as expected

It is very important that you ensure that data used within a single mapped area have the same map projection. If different data sets for a geographic location have differing projections, the chances are high that they will not overlay on import. If you find that imported data from different sources does not fit as expected, it is usually due to dissimilar map projections. If the projections are known, you can ask your data provider to change all data to a common projection.

For more information about map projections there is a link on our glossary web page to the British Columbia Government Ministry of Environment tutorial on map projections:

- http://www.avenza.com/glossary.html

Adjusting the map scale for multiple map sheets/tiles

When importing multiple adjacent maps sheets/tiles, use the Compute Defaults on the tile that is most south and west (lower left). For USGS DLG files this is number “5”. Then, when rounding up the scale, consider the number and area of all the adjacent map tiles involved. For example, four similarly sized adjacent map tiles require that you double the Default Scale Value.

Building legends

Use the “Align” toolbox that is available under “Window” on the main menu to easily tidy up your legend information.

Building a color-ramp legend

You can enhance the look of your maps by using color ramps, rather than random colors, for your legends.

1. Build a vertical set of filled legend elements.
2. Color the first (top) and last (bottom) elements with the two extreme end colors for the ramp.
3. Marquee (select) the complete set of legend elements.
4. Select Filters → Colors → Blend Vertically and the legend set colors will be blended between the two end extreme colors.

Other

Map sheets or tiles that should be adjacent, but are not

When importing adjacent maps sheets/tiles, do the Compute Defaults on the tile that is most south and west (lower left), to find the map anchor and then do not run Compute Defaults again. If you do reset the map anchor, the tiles very likely will display on top of one another or won't line up.

If the adjacent sheets are in adjacent UTM zones, you will need to make sure that they have all been "re–projected" into a common zone to display properly.

Attribute corruption

The most likely cause of attribute corruption (other than the files being corrupted before you got them) is that you have put layers with differing attribute structures into a single layer. As a rule of thumb you should use one layer for each external file that you are importing.

Text style was set but the paint style changed

The paint style is automatically updated by Adobe Illustrator or Macromedia FreeHand to match the currently selected object.

When a filter does not appear to work

Make sure that you have highlighted the desired Layer in the Layers palette and that it is ready for editing and visualization.

This means that black dots should appear in the left hand columns under both the eye (visualization) and under the pencil (locking and unlocking for adding and editing data).

Appendix A - The Graphic Environment

Update portions of a layer or legend

MAPublisher gives you the ability to update portions of a layer or legend by selecting one or more individual map objects based on attribute or color/pattern/symbol (Adobe Illustrator) and then reapplying a new color/symbol. There is no deleting and then re-adding of the relevant map elements/layers.

In practical terms this means that if you added a roads layer/element to your map and then realized that one of your roads line symbols didn't look right, all you need to do is select for that class of road and change the symbol with the palettes. There is no need to delete, recode and redrape your roads.

Redrawing is automatic

Redrawing of the affected map objects is clean and automatic and impacts only the redrawn portion and possibly some immediately adjacent portions of the map. This eliminates the need to wait while the entire map is re-drawn or refreshed. This applies to text as well as to vector data.

Broad selection of fonts

You have a broad and flexible selection of text fonts, styles, sizes and enhancement features (e.g., haloing).

Postscript pattern fills

You can use PostScript pattern fills and complex vector strokes. You can sample colors from images and apply them precisely to vector data.

Complex color treatments

Even with complex colors you can quickly and accurately create color ramps with differing depths/intensity of 10%, 20%, etc. These can be set as individual colors on a palette or as a gradient across mapped features.

Speed drawing

You can easily turn on and off selected layers of a map to speed drawing. This can be done by turning off specified layers, and/or limiting the display of selected layers to simple vectors with all symbology removed.

Not only will this speed the handling of the map, it lets you easily use underlying vectors for reference with no distraction or distortion caused by mapping symbology.

Viewing “generalization” parameters

Viewing “generalization” parameters can be set at any size so that your text will be automatically symbolized by grayed areas for layout (or any other) purposes. This facilitates design and layout and speeds the drawing of highly detailed maps.

Proportional symbology

Symbology is accurately proportional to the map area you have “zoomed” into. What you see is what you get.

Accurate color

Colors displayed on screen accurately reflect the colors as they will be printed. Again, what you see is what you get.

Better symbology

Better symbology (e.g., road treatments and cartographic symbols) is available than from traditional GIS software.

Actual size viewing

In addition to standard zooming and panning capabilities, you can view the details on a map at the actual size at which they will be plotted/printed.

Saving views

You have the option of saving individual “views” to facilitate editing or viewing defined portions of the map. No more searching around for a particular area that you want to display.

Rulers, guidelines and alignment tools

Border rulers with adjustable guidelines and multi-combination alignment tools are available for use in aligning map objects.

Grouping and ungrouping

There is grouping and ungrouping functionality. When items are grouped you still retain the option of separately accessing, querying and otherwise working with the individual components of a map group.

Store related objects

Individual but related map objects can be “stored” together by groups or by layers or both within the graphic file. This provides additional control and support in handling and organizing the map components.

Paste in front or behind

When pasting map objects/elements, you have the option of deciding to paste the new object in ”front” or “behind” the copied elements at the time of pasting.

Appendix B
File Formats

AutoCAD DXF

Computer Aided Design (CAD) is the modeling of physical systems on computers, allowing both interactive and automatic analysis of design variants, and the expression of designs in a form suitable for manufacturing. MAPLt will import AutoCAD12 or earlier format.

To date, modeling has been done almost entirely with proprietary dedicated systems usable only for one form of design.

CAD systems have developed into general purpose tools that understand geometry.

A typical CAD system has a geometry processor with an attached database. Analysis and simulation sit on top of this core, embodied in a host of separate programs which intercommunicate, if at all, only by passing information through the database.

MapInfo mid/mif files

The MapInfo Professional Reference manual states, “MapInfo Interchange Format (MIF) is an ASCII file format that fully describes a MapInfo database. Both graphic and tabular data are exported into MIF files. The graphic data is in a file with a “.mif” extension, and the tabular data is in a file with a “.mid” extension.”

When exporting from MapInfo, you (or your data provider) should specify the type of file export to perform as being MapInfo Interchange Format MIF (default). The export facility will generate both the “.mif” and “.mid” files.

Mif files contain all the vector data and mid files contain all the attribute data. When you select for a mif file, the associated mid file is automatically added to the appropriate entry in the menu. Selecting a mid file instead of a mif file causes the import process to fail.With MapInfo, users often work with longitude and latitude (long/lat) map coordinates. But this tends to distort areas towards the Earth’s poles. Since you are actually creating a flat surface from a sphere, you want to do this with the least amount of distortion.

SEE ALSO: Appendix F - Map Projections for information about various map projections.

SEE ALSO: Appendix G - UTM Zones Table and Map for a table with Central Meridians, longitude ranges and zones for the UTM world grid.

Arc/Info Generate Files

Arc/Info Generate files are ASCII coordinate files created from Arc/Info coverages through the use of the Arc/Info Ungenerate function. Generate is a useful mechanism that allows you to transfer Arc/Info GIS data to MAPublisher Lt. These files contain the user/cover–ids for line, point or polygon features. If you have a unique numeric value or feature code that you wish to use in MAPublisher Lt, simply calculate the user/cover–id to that value or code. For example, if the cover is called lakes, use the Arc/Info command: Calculate Lakes–id = ‘your feature code’. Remember to do this before running the Ungenerate command.

NOTE: If any of the cover–ids are equal to zero, the Ungenerate function ignores the associated graphics and excludes them from the generate file.

ArcView Shape Files

Arcview by E.S.R.I. outputs Shape files. All shape files are file "triplets" with the extensions *.dbf, *.shx, *.shx If you are missing any of these you will not be able to import. All three files must be available to MAPublisher Lt.

For example for a layer/cover named roads you should have: roads.shp, roads.dbf and roads.shx

*NOTE: if you have to transfer these files from one computer and/or operating system, to another then you must *always* use binary ftp tranfer, or the files will be corrupted. We have found that you *can not* rely on the automatic transfer with all ftp utilities. Some do not *recognize* the shape files as being binary and will transfer them as ASCII causing damage to the files.*

USGS DLG and SDTS Files

Digital Line Graph (DLG) and Spatial Data Transfer Standard (SDTS) files are geographic data files provided by the United States Geological Survey (USGS). These data files include information about the USGS planimetric map base categories such as transportation, hydrography, contours (hypsography) and public land survey boundaries. MAPublisher currently imports the Optional distribution format which is usually in meters in the UTM coordinate system. This file format will have the extension ".opt".

SEE ALSO: USGS web site home page:

- http://www.usgs.gov/

Many of the DLG files are large and when a series of such files is imported the import filter runs more slowly. This is because scratch and memory allocations are being used up. The best solution is to periodically save your work, and quit out of Adobe Illustrator and then restart. This will free up the scratch memory. Use the "Same as" option so that you do not have to re–enter your scaling parameters. The inherent geo–referencing of the layer data ensures that data added at any time will geographically match.

Major Attribute Codes United States Geological Survey, Digital Line Graph (DLG) File Format:

Major Code	Base Category
020	Hypsography
050	Hydrography
070	Vegetative Surface Cover
080	Non–vegetative Features
090	Boundaries
150	Survey Control Markers
Transportation Systems	
170	Roads and Trails
180	Railroads
190	Pipelines, Transmission Lines, and Miscellaneous Transportation Features
200	Manmade features
Nonbase Category	
300	U.S. Public Land Survey System

Appendix C - Internet Sites

Since the Internet is always changing with existing sites changing and new ones being added, refer to our web page for the most recent list of relevant Internet sites.

GIS USERS

For Geographic Information System (GIS) users, the appeal of graphics is strong and the increasing ability to discover and share GIS across the Internet is fascinating.

The Internet offers a number of free–access GIS–related Universal Resource Locators (URLs), or sites, from which you can access map and information data sets. And the number is constantly growing. Hop on the Internet and discover a wealth of information.

GENERAL GRAPHICS USER

For the general graphics user, there's general information about countries, states, and places; simple maps of areas (e.g., GIF, PS format); lists and maps of Internet resources (e.g., Gopher/WWW servers) in an area.

Cartographers

For cartographers and geography researchers, there are cartographic/ GIS base map files (e.g., USGS DEMOs, DLGs, TIGER); thematic data of a geographic nature (e.g., census data); and complete GIS data sets (e.g., Arc/Info export files).

These lists are readily available, and there is a comprehensive list of free data sites accessible from the MAPublisher Internet home page at:

- http//www.avenza.com/

Download (File Transfer Protocol — FTP) these files to your hard drive. You can import the major file format types into Adobe Illustrator via MAPublisher, at which point you can manipulate the data to suit your needs.

Free US map data

Department of the Interior – U.S. Geological Survey home page. This is the primary source for Digital Line Graph (DLG) files. A must–have resource is the U.S. Geological Survey Digital Format Standards manual published by USGS.

- http://www.usgs.gov/ – USGS Home page
- http://nsdi.usgs.gov/nsdi/products/dlg.html – Digital products
- http://www.usgs.gov/pubprod/index.html – Products and Publications Listings

CAST

The Centre for Advanced Spatial Technologies (CAST), University of Arkansas.

- http:// www.cast.uark.edu/

Planned free access on the ARKNet statewide network. Among its high–tech offering, CAST maintains a catalog of Arkansas, U.S. national and global data — e.g., GIS data in areas of archaeology, agriculture and population are downloadable as GIF files across the Internet.

Obtain a map of historical land coverage data. Obtain data sets including Environment, Prehistoric and Historic Climate Reconstruction, Historic Census, and Tabular databases.

GMDNCC

The Florida Growth Management Data Network Coordinating Council (GMDNCC). This web site can be found at:

- http://www.cs.fsu.edu/~fldata.

The system provides access to Florida meta data for state, county, and local; data sets; and documents including text, image, spatial data files, etc. Spatial data files require GIS software (e.g., Arc/Info, MapInfo) to view.

The GeoWeb system

Its mission is to provide a service which geographers, GIS users, and the general public can use to locate geographic information that has been made available on the Internet. The GeoWeb can be found by accessing:

- http://wings.buffalo.edu/geoweb/

EROS Data Center

They will be providing FTP access to a variety of USGS digital data sets. Check out:

- http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/ndcdb.html

Reasonably priced data sets

For vector data:

Cypress Geo–Resources at:

- http://www.cyp.com/

For raster data:

Triathlon Mapping Corporation at 604/294–8861 or tmc@helix.net

COMPREHENSIVE LIST

A comprehensive list of GIS sites is available at the following addresses:

- ftp://gis.queensu.ca/pub/gis/docs/gissites.html
- http://www2.ncsu.edu/bae/people/faculty/walker/hotlist/geogis.html
- http://www.hdm.com/gis3.html
- http://web1.digital.net/~mapinfo/

Appendix D - Data Sources

MapInfo data sample (map of Toronto) was provided by DigiMap Data Services Inc., Toronto, Canada. The following definitions are excerpted from the Statistics Canada Catalogue of data products (1992):

Census Metropolitan Area (CMA)

The general concept of a census metropolitan area (CMA) is one of a very large urban area, together with adjacent urban and rural areas which have a high degree of economic and social integration with that urban area.

Census Tract (CT)

The general concept of a census tract is that of a permanent, small urban neighborhood–like or rural community–like area established in large urban–centered regions with the help of local specialists interested in urban and social science research.

Enumeration Area (EA)

An enumeration area (EA) is the geographic area canvassed by one census representative.

Orthophoto TIFF

This orthophoto sample used in the Quick Start Guide was provided by Triathlon Mapping Corporation. An orthophoto is a reconstructed image of an aerial photograph which has ground feature locations that meet standard map accuracies. The image is rectified using the most accurate, intensive cubic convolution algorithm, then registered to a digital elevation model. The image is thereby geo–referenced and can be used as an independent GIS layer or combined with other vector design files.

Appendix E - GIS Backgrounder

FACILITATES QUERIES

A Geographic Information System (GIS) captures, stores, checks, analyzes, and displays geo-referenced data about the earth.

A GIS uses a database management system (DBMS) to store and link data that relates to the same geographic area. This facilitates the following types of queries:

- what if...?
- what is it?
- where is it?
- what spatial patterns exist?
- what has changed since...?

Analytical tool

GIS systems are used by all levels of governments, academia, and businesses for such diverse purposes as monitoring environmental changes, access to timber, census reporting, municipal zoning, land records, mineral resource management, and mapping telecommunications and cable television utilities.

In short, a GIS serves many needs and can be thought of as an analytical tool since it can be used to determine spatial relationships between geographic areas. A GIS contains a database linking spatial data with geographic information and lets you associate information with map features and to create new relationships based on those associations.

Map features

A GIS stores two types of map information: spatial information (which describes the location and shape of geographic features) and descriptive information about those features. A GIS links these two types of data and maintains the spatial relationships between the map features.

Features are portrayed on two-dimensional maps as points, lines, and areas. For example, a map may contain a point representing locational information (such as telephone poles), lines representing linear features (such as roads), and areas representing geographic features (such as lakes).

Points

Usually represented by a symbol or label, a point is a discrete location which is usually too small to be identified as an area or line (e.g., an oil wellhead).

Lines

A line represents the linear shape of a map element which is too narrow to be an area (e.g., a contour line).

Areas

An area is a closed, bounded object which encompasses a homogeneous area (e.g., a park).

Spatial relationships

A map allows you to identify spatial relationships (e.g., a fire tower located inside a park) but it relies on you to derive this information from it.

Labels, symbols, and color

Map attributes are represented by labels, symbols, and color to make it easy to interpret (e.g., rivers are represented with blue lines of varying widths depending upon their size).

GEOGRAPHIC DATA

Since a GIS is a digital map database storing both spatial (graphic) and descriptive (tabular) information, the integration of this information provides an opportunity for analysis and communication.

Data is stored using the Cartesian system (x,y coordinate) as follows:

- points are stored as a single x,y location
- lines are stored as a series of ordered x,y coordinates
- areas are stored as a string of x,y coordinates defining the lines that bound the area

Maps show real-world coordinates that have been projected onto a flat surface.

SEE ALSO: Appendix F - Map Projections for a summary of various map projections that are popular today.

TOPOLOGY

Topology is a mathematical process for determining spatial relationships. It does this by expressing different spatial relationships as lists of features (e.g., an area is defined by the boundary lines).

The primary advantage of this type of data storage is that it is more efficient and permits faster processing of larger data sets.

Layers

Map features can be logically grouped into layers of related information. For example, a map could be layered by rivers, soils, mineral deposits, and municipality. This layering makes it easy to perform analyses that overlay geographic features and combine adjacent areas with similar characteristics.

Attributes

Attributes store descriptive information and are stored as sets of characters (including numbers). An attribute is usually considered tabular data.

Appendix F - Map Projections

This information is published with permission from the U.S. Geological Survey.

A map projection is used to portray all or part of the round Earth on a flat surface. This cannot be done without some distortion.

Every projection has its own advantages and disadvantages. There is no "best" projection. You must select the one that suits your needs, reducing the distortion of the most important features. A map can show one or more—but never all—of the following: true directions, true distances, true areas, true shapes.

Mapmakers and mathematicians have devised almost limitless ways to project the image of the globe onto paper. Scientists at the U.S. Geological Survey have designed projections for their specific needs—such as Space Oblique Mercator, which allows mapping from satellites with little distortion.

NOTE: Refer to the following web page for more information on map projections:

- http://www.utexas.edu/depts/grp/gcraft/notes/mapproj/mapproj.html

This appendix presents information about the following projections which are supported by MAPublisher:

- Albers Equal Area Conic
- Azimuthal Equidistant
- Bipolar Oblique Conic Conformal
- Equidistant Conic (Simple Conic)
- Gnomonic
- Lambert Azimuthal Equal Area
- Lambert Conformal Conic
- Mercator
- Miller Cylindrical
- Oblique Mercator
- Orthographic
- Polyconic
- Robinson
- Sinusoidal Equal Area
- Space Oblique Mercator
- Stereographic
- Transverse Mercator

SEE ALSO: Snyder, John P. 1987. Map Projections: A Working Manual. USGS Professional Paper 1395. Washington, DC. United States Printing office.

Muehreke, Phillip C. 1986. Map Use: Reading, Analysis, Interpretation, Madison, WI: JP Publications.

Albers Equal Area Conic

PRESENTED BY H. C. ALBERS IN 1805.

Used...	by USGS for maps showing the conterminous United States (48 states) or large areas of the United States. It is well suited for large countries or other areas that are mainly east-west in extent and that require equal-area representation. Used for many thematic maps. Maps showing adjacent areas can be joined at their edges only if they have the same standard parallels (parallels of no distortion) and the same scale.
All areas...	on the map are proportional to the same areas on the Earth.
Directions...	are reasonably accurate in limited regions.
Distances...	are true on both standard parallels. Maximum scale error is 1-1/4% on a map of conterminous States with standard parallels of 29-1/2°N and 45-1/2°N.
Scale...	is true *only* along standard parallels.
Map is not...	conformal, perspective, or equidistant.

NOTE: USGS maps of the conterminous 48 states, if based on this projection, have standard parallels 29-1/2°N and 45-1/2°N. Such maps of Alaska use standard parallels 55°N and 65°N, and maps of Hawaii used standard parallels 8°N and 18°N.

Azimuthal Equidistant

Used...	by USGS in the *National Atlas of the United States of America* and for large-scale mapping of Micronesia. Useful for showing airline distances from the center point of projection. Useful for seismic and radio work. Oblique aspect used for atlas maps of continents and world maps for radio and aviation use. Polar aspect used for world maps, maps of polar hemispheres, and the United Nations emblem.
Distances and directions...	to *all* places are true *only* from the center point of projection. Distances are correct between points along straight lines though the center. All other distances are incorrect. Any straight line drawn though the center point is on a great circle.
Distortion...	of areas and shapes increases away from the center point.
Azimuthal	Mathematically projected on a plane tangent to any point on the globe. Polar aspect is tangent only at the pole.

Bipolar Oblique Conic Conformal

PRESENTED BY O. M. MILLER AND W. A. BRIESEMEISTER IN 1941.

Used…	to show one or both of the American continents. Outlines in the projection diagram represent areas shown on USGS Basement and Tectonic Maps of North America.
Scale…	is true along two lines (“transformed standard parallels”) that do not lie along any meridian or parallel. Scale is compressed between these lines and expanded beyond them. Scale is generally good but error is as much as 10% at the edge of the projection as used.
Graticule spacing…	increases away from the lines of true scale but retains the property of conformality except for a small deviation from conformality where the two conic projections join.
Map is…	conformal but not equal area, equidistant, or perspective.
Conic…	Mathematically based on two cones whose apexes are 104° apart and which conjecturally are obliquely secant to the globe along lines following the trend of North and South America.

Equidistant Conic (Simple Conic)

PROTOTYPE BY PTOLEMY, 150 A.D. IMPROVED BY DE L'ISLE ABOUT 1745.

Used...	in atlases to show areas in the middle latitudes. Good for showing regions within a few degrees of latitude and lying on one side of the Equator. (For example, the Kavraisky No. 4 is an Equidistant Conic projection in which standard parallels are chosen to minimize overall error.)
Distances...	are true *only* along all meridians and along one or two standard parallels.
Directions, shapes and areas...	are reasonably accurate.
Distortion...	increases away from standard parallels.
Map is...	not conformal, perspective, or equal area, but represents a compromise between Lambert Conformal Conic and Albers Equal Area Conic.
Conic...	Mathematically projected on a cone tangent at one parallel or conceptually secant at two parallels.

Gnomonic

CONSIDERED TO BE THE OLDEST PROJECTION. ASCRIBED TO THALES, THE FATHER OF ABSTRACT GEOMETRY, WHO LIVED IN THE 6TH CENTURY B.C.

Used...	along with Mercator by some navigators to find the shortest path between two points. Used in seismic work because seismic waves tend to travel along great circles.
Directions...	are true *only* from center point of projection. Any straight line drawn on the map is on a great circle.
Scale...	increases very rapidly away from the center point.
Distortion...	of shapes and areas increases away from the center point.
Map is...	perspective (from the center of the Earth onto a tangent plane) but not conformal, equal area, or equidistant.
Azimuthal	Geometrically projected on a plane. Point of projection is the center of a globe.

Lambert Azimuthal Equal Area

PRESENTED BY LAMBERT IN 1772.

Used...	by the USGS in its *National Atlas and Circum-Pacific Map Series*. Suited for regions extending equally in all direction from center points, such as Asia and the Pacific Ocean.
Areas...	on the map are shown in true proportion to the same areas on the Earth. Quadrangles (bounded by two meridians and two parallels) at the same latitude are uniform in area.
Directions...	are true *only* from the center point.
Scale...	decreases gradually away from the center point.
Distortion...	of shapes increases away from the center point. Any straight line drawn through the center point is on a great circle.
Map is...	equal area but **not** conformal, perspective, or equidistant.
Azimuthal...	Mathematically projected on a plane tangent to any point on the globe. Polar aspect is tangent only at the pole.

Lambert Conformal Conic

PRESENTED BY LAMBERT IN 1772.

Used...	by USGS for many 7.5- and 15-minute topographic maps and for the State Base Map series. Also used to show a country or region that is mainly east-west in extent. One of the most widely used map projections in the United States today. Looks like the Albers Equal Area Conic, but graticule spacings differ.
Conformality...	is retained.
Distances...	are true *only* along standard parallels, but are reasonably accurate elsewhere in limited regions.
Directions...	are reasonably accurate.
Distortion...	of shapes and areas is minimal at standard parallels, but increases away from them.
Shapes...	on large-scale maps of small areas are essentially true.
Map is conformal...	but not perspective, equal area, or equidistant.
Conic...	Mathematically projected on a cone conceptually secant at two standard parallels.

NOTE: For USGS Base Map series for the 48 conterminous States, standard parallels are 33°N and 45°N (maximum scale error for map of 48 States is 2-1/2%). For USGS Topographic Map series (7.5- and 15-minute), standard parallels vary. For aeronautical charts of Alaska, they are 55°N and 65°N; for the National Atlas of Canada, they are 49°N and 77°N.

Mercator

PRESENTED BY MERCATOR IN 1569.

Used...	for navigation or maps of equatorial regions. Any straight line on a map is a rhumb line (line of constant direction).
Directions...	along a rhumb line are true between *any* two points on a map, but a rhumb line usually is *not* the shortest distance between points. (Sometimes used with Gnomonic map on which any straight line is on a great circle and shows the shortest path between two points.)
Distances...	are true *only* along the Equator, but are reasonably correct within 15° of the Equator; special scales can be used to measure distances along other parallels. Two particular parallels can be made correct in scale instead of the Equator.
Areas and shapes...	of large areas are distorted.
Distortion...	increases away from the Equator and is extreme in polar regions.
The map is conformal...	in that angles and shapes within any small area (such as that shown by a USGS topographic map) are essentially true.

cont'd

The map is...	not perspective, equal area, or equidistant. The Equator and other parallels are straight lines (spacing increases toward poles) and meet meridians (equally spaced straight lines) at right angles. Poles are not shown.
Cylindrical...	Mathematically projected on a cylinder tangent to the Equator. (Cylinder may also be secant.)

Miller Cylindrical

PRESENTED BY O.M. MILLER IN 1942.

Used...	to represent the entire Earth in a rectangular frame. This is popular for world maps. It looks like a Mercator but is not useful for navigation. It shows the poles as straight lines.
Avoids...	some of the scale exaggerations of the Mercator but shows neither shapes nor areas without distortion.
Directions...	are true only along the Equator.
Distances...	are true only along the Equator.
Distortion...	of distances, areas, and shapes is extreme in high latitudes.
The map is not...	equal area, equidistant, conformal or perspective.
Cylindrical	Mathematically projected onto a cylinder tangent at the Equator.

Oblique Mercator

DEVELOPED IN 1900-50 BY ROSENMUND, LABORDE, HOTINE ET AL.

Used...	to show regions along a great circle other than the Equator or a meridian, that is, having their general extent oblique to the Equator. This kind of map can be made to show as a straight line the shortest distance between any two preselected points along the selected great circle.
Distances...	are true *only* along the great circle (the line of tangency for this projection), or along two lines parallel to it. Distances, directions, areas, and shapes are fairly accurate within 15° of the great circle.
Distortion...	of areas, distances and shapes increases away from the great circle. It is excessive toward the edges of a world map except near the path of the great circle.
This map is conformal...	but not perspective, equal area, or equidistant. Rhumb lines are curved.
Graticule spacing...	increases away from the great circle but conformality is retained. Both poles can be shown. Equator and other parallels are complex curves concave toward nearest pole. Two meridians 180° apart are straight lines; all others are complex curves concave toward the great circle.
Cylindrical	Mathematically projected on a cylinder tangent, (or secant) along any great circle but the Equator or meridian. Directions, distances, and areas are reasonably accurate only within 15° of the line of tangency.

Orthographic

THE ORTHOGRAPHIC PROJECTION WAS KNOWN TO EGYPTIANS AND GREEKS 2,000 YEARS AGO.

Used...	for perspective views of the Earth, Moon, and other planets. The Earth appears as it would on a photograph from deep space. Used by USGS in the *National Atlas of the United States of America*.
Directions...	are true *only* from the center point of projection.
Scale...	decreases along all lines radiating from the center point of projection. Any straight line through the center point is a great circle.
Areas and shapes...	are distorted by perspective; distortion increases away from the center point.
Map is...	perspective but not conformal or equal area.
Distances...	in the polar aspect are true along the Equator and all other parallels.
Azimuthal	Geometrically projected onto a plane. Point of projection is at infinity.

Polyconic

ORIGINATED ABOUT 1820 BY HASSLER.

Used...	almost exclusively for large-scale mapping in the United States until the 1950s. Now nearly obsolete, and no longer used by USGS for new plotting in its Topographic Map series. Best suited for areas with a north-south orientation.
Directions, distances, shapes and areas...	are true *only* along the central meridian.
Distortion...	increases away from the central meridian.
Map is...	a compromise of many properties. It is not conformal, perspective, or equal area.
Conic...	Mathematically based on an infinite number of cones tangent to an infinite number of parallels.

Robinson

PRESENTED BY ARTHUR H. ROBINSON IN 1963.

Uses...	tabular coordinates rather than mathematical formulas to make the world "look right." Better balance of size and shape of high-latitude lands than in Mercator, Van der Grinten, or Mollweide. Soviet Union, Canada, and Greenland are truer to size, but Greenland is compressed.
Directions...	are true along all parallels and along the central meridian.
Distances...	are constant along the Equator and other parallels, but scales vary.
Scale...	is true along 38° N and S, constant along any given parallel. This is the same along N and S parallels that are the same distance from the Equator.
Distortion...	All points have some. Distortion is very low along the Equator and within 45° of center. Distortion is greatest near the poles.
The map is...	not conformal, equal area, equidistant, or perspective.
Pseudo-cylindrical	or orthophanic ("right appearing") projection.

Sinusoidal Equal Area

USED BY COSSIN AND HONDIUS, BEGINNING IN 1570. ALSO CALLED THE SANSON-FLAMSTEED.

Used...	frequently in atlases to show distribution patterns. Used by the USGS to show prospective hydro carbon provinces and sedimentary basins of the world. Has been used for maps of Africa, South America, and other large areas that are mainly north-south in extent. An easily plotted equal-area projection for world maps. May have a single central meridian or, in interrupted form, several central meridians.
Graticule spacing...	retains property of equivalence of area.
Areas...	on a map are proportional to the same areas on the Earth.
Distances...	are correct along all parallels and the central meridian(s).
Shapes...	are increasingly distorted away from the central meridian(s) and near the poles.
The map is...	not conformal, perspective, or equidistant.
Pseudo-cylindrical	Mathematically based on a cylinder tangent to the Equator.

Space Oblique Mercator

DEVELOPED IN 1973-79 BY A.P. COLVOCORESSES, J.P SNYDER, AND J.L. JUNKINS.

Used…	in Landsat images because there is no distortion along the curved groundtrack under the satellite. Such a projection is needed for the continuous mapping of satellite images, but it is useful only for a relatively narrow band along the groundtrack. Space Oblique Mercator maps show a satellite's groundtrack as a curved line that is continuously true to scale as orbiting continues. The extent of the map is defined by the orbit of the satellite.
This map is conformal…	especially in the region of satellite scanning.

Stereographic

DATES FROM 2ND CENTURY B.C. ASCRIBED TO HIPPARCHUS.

Used...	by USGS for maps of Antarctica and American Geographical Society for Arctic and Antarctic maps. May be used to map large continent-sized areas of similar extent in all directions. Used in geophysics to solve spherical geometry problems. Polar aspects used for topographic maps and charts for navigating in latitudes above 80°.
Directions...	are true *only* from center point of projection.
Scale...	increases away from the center point. Any straight line through the center point is a great circle.
Distortion...	of areas and large shapes increases away from the center point.
Map is...	conformal and perspective but not equal area or equidistant.
Azimuthal	Geometrically projected on a plane. Point of projection is at the surface of the globe opposite the point of tangency.

Transverse Mercator

PRESENTED BY LAMBERT IN 1772.

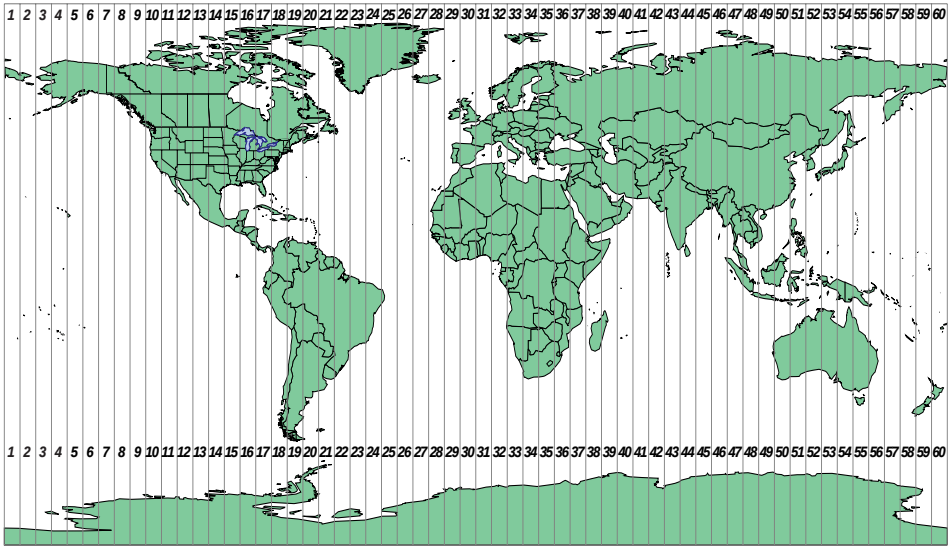
Used...	by USGS for many quadrangle maps at scales from 1:24,000 to 1:250,000; such maps can be joined at their edges only if they are in the same zone with one central meridian. Also used for mapping large areas that are mainly north-south in extent.
Distances...	are true only along the central meridian selected by the mapmaker or else along two lines parallel to it, but all distances, directions, shapes, and areas are reasonably accurate within 15° of the central meridian.
Distortion...	of distances, directions, and size of areas increases rapidly outside the 15° band.
This map is conformal,...	shapes and angles within any small area (such as that shown by a USGS topographic map) are essentially true.
Graticule spacing...	increases away from the central meridian. The Equator is straight. Other parallels are complex curves concave toward the nearest pole. The central meridian and each meridian 90° from it are straight. Other meridians are complex curves concave toward central meridian.
Cylindrical	Mathematically projected on cylinder tangent to a meridian. (Cylinder may also be secant.)

Appendix G - World UTM Zones

All values are in full degrees east (E) and west (W) of Greenwich (o degrees).

Zone	Central Meridian	Range in Longitude	Zone	Central Meridian	Range in Longitude
1	177W	180W-174W	31	3E	0 - 6E
2	171W	174W-168W	32	9E	6E- 12E
3	165W	168W-162W	33	15E	12E- 18E
4	159W	162W-156W	34	21E	18E- 24E
5	153W	156W-150W	35	27E	24E- 30E
6	147W	150W-144W	36	33E	30E- 36E
7	141W	144W-138W	37	39E	36E- 42E
8	135W	138W-132W	38	45E	42E- 48E
9	129W	132W-126W	39	51E	48E- 54E
10	123W	126W-120W	40	57E	54E- 60E
11	117W	120W-114W	41	63E	60E- 66E
12	111W	114W-108W	42	69E	66E- 72E
13	105W	108W-102W	43	75E	72E- 78E
14	99W	102W- 96W	44	81E	78E- 84E
15	93W	96W- 90W	45	87E	84E- 90E
16	87W	90W- 84W	46	93E	90E- 96E
17	81W	84W- 78W	47	99E	96E-102E
18	75W	78W- 72W	48	105E	102E-108E
19	69W	72W- 66W	49	111E	108E-114E
20	63W	66W- 60W	50	117E	114E-120E
21	57W	60W- 54W	51	123E	120E-126E
22	51W	54W- 48W	52	129E	126E-132E
23	45W	48W- 42W	53	135E	132E-138E
24	39W	42W- 36W	54	141E	138E-144E
25	33W	36W- 30W	55	147E	144E-150E
26	27W	30W- 24W	56	153E	150E-156E
27	21W	24W- 18W	57	159E	156E-162E
28	15W	18W- 12W	58	165E	162E-168E
29	9W	12W- 6W	59	171E	168E-174E
30	3W	6W - 0	60	177E	174E-180E

World UTM Zones



Appendix H - USGS Maps

The U.S. Geological Survey offers many different maps:

- Antarctic
- Geologic
- Hydrologic
- Land use
- National Atlas
- Photoimage
- Planets and Moons
- Satellite image
- Special maps
- Topographic
- Topographic-Bathymetric

Antarctic Maps

Antarctic maps are available in four different scales.

1:250,000

A topographic reconnaissance and a geologic reconnaissance series at this scale has contour intervals of 200 meters and show bathymetric information for coastal areas. The topographic series is the primary map source for the planning, logistic support, and multidisciplinary investigations of the U.S. Antarctic Research Program.

1:500,000

Three series of maps — topographic reconnaissance shaded-relief, satellite image, and sketch — are published at this scale. The satellite imagery was recorded by NASA's Landsat.

1:1,000,000

Topographic maps and Landsat maps are published at this scale. Topographic maps in the International Map of the World (IMW) format have contours at 100, 300, or 500 meters.

1:2,188,800

A reconnaissance sketch and topographic map of the Ross Ice Shelf at this scale was made in support of the Ross Ice Shelf Geophysical and Glaciological Program.

Geologic Maps

The USGS makes many kinds of geologic maps as a part of a continuing program to fulfill one of its missions: to examine the geological structure, mineral resources, and products of the national domain.

USGS maps that portray the geology of regions or local areas are available for nearly 50% of the United States.

Hydrologic Maps

Hydrologic Investigations Atlases (HA Series) are either black-and-white or multicolor maps showing a wide range of water-resources information, such as depth to ground water, floods, irrigated acreage, producing aquifers, availability of water on Indian lands, surface-water discharge to the oceans, chemical or mineral content of water, surface impoundments, and water temperature.

Flood-prone area maps (scale of 1:24,000) are available by quadrangle name, from the Water Resources Division District Office in the State of interest.

Land Use Maps

Land use refers to human uses of the land (for example, for housing and industry). Land cover describes the vegetation, water, natural surfaces, and construction on the land surface. Standard base map features include boundaries, cities and towns, railroads, roads and highways, rivers and lakes — but no contours.

Land use and land cover maps are available for most of the United States.

Land use and land cover data are shown on USGS base maps at a scale of 1:100,000 for a few maps in Western States or at 1:250,000 (most maps).

National Atlas Maps

The *National Atlas of the United States of America* (1970) contains 765 maps and charts on 335 pages. This Atlas is now out of print, but can be found in many libraries.

Separate sheets of selected reference maps and thematic maps from the Atlas are available from the USGS. Some of the sheets have been updated.

Photoimage Maps

ORTHOPHOTOMAPS

Orthophotomaps are multicolored, distortion-free, photographic image maps. They show subtle topographic detail in areas of very low relief, such as marshlands and coastal zones.

They are produced in standard 7.5 minute quadrangle format from aerial photographs. Scale of 1:24,000 or 1:25,000.

ORTHOPHOTOQUADS

Orthophotoquads are multicolored, distortion-free, photographic images maps. They have no contours, minimal cartographic treatment, and only a few names and symbols.

Orthophotoquads are available for selected areas along the east coast of the United States.

BORDER MAPS

The border maps are natural color photoimage maps. They are available for the U.S.-Mexico border and the U.S.-Canada border.

Planets and Moons

In 1960, the USGS established an astrogeology program on behalf of NASA to support lunar and planetary exploration. A prime activity of the program is the systematic mapping of the stratigraphy and structure of the Moon, Mars, Venus, Mercury, and the moons of the outer planets.

Many USGS maps of the Moon, Mars, Mercury, Venus, and the moons of Jupiter and Saturn are now available for purchase by the public.

The maps include geologic, topographic, photomosaic, and shaded-relief maps. The scales, projections and sheet sizes vary widely.

Satellite Image Maps

Satellite image maps are multicolor or black-and-white photograph-like maps made from data collected by Earth resources satellites. They are a diverse group of experimental maps printed in a standard edition and in a variety of scales and sizes. Many standard editions have topographic maps printed on the reverse side.

Most image maps are printed to simulate color-infrared photography by combining imagery that was scanned in red, green, and infrared wave lengths of light.

On color-infrared imagery, healthy vegetation appears in shades of red. Unhealthy vegetation appears in shades of pink, blue, or white. Clear water appears dark blue or black. Sediment laden water takes on a light-blue tone. Most cultural features appear as a steely blue-gray.

Satellite images are available for selected areas in about half of the States and such areas as Antarctica, the Bahamas, and Iceland.

Special Maps

A wide variety of special maps are available for purchase from the USGS:

- Geologic Map of the United States
- Basement Rock Map of the United States — Exclusive of Alaska and Hawaii
- Coal Fields of the United States
- World Seismicity Map
- Generalized Tectonic Map of North America
- Surface Water and Related Land Resources Development in the United States and Puerto Rico

Many other special USGS maps are published from time to time.

The USGS has also published several planimetric maps of the United States, North America, and the World. Most of these maps show political boundaries, major cities and capitals, and many rivers and lakes.

Topographic Maps

Most USGS topographic maps use brown contours to show the shape and elevation of the terrain. Elevations are usually shown in feet, but on some maps they are in meters. Contour intervals vary, depending mainly on the scale of the map and type of terrain. The maps show and name prominent natural and cultural (man-made) features.

7.5-MINUTE MAPS

The best known USGS maps are those of the 7.5-minute, 1:24,000-scale quadrangle series. On such maps, 1 inch = 2,000 feet. The scale of these maps is used for areas where much detail must be shown.

15-MINUTE MAPS

From 1910 to about 1950, maps showing an area within 15 minutes of latitude and longitude were the USGS standard for topographic coverage of the United States. These maps were at a scale of 1:62,500 (1 inch = about 1mile) and are still available. Features shown on these maps are similar to those on 7.5-minute maps, but some detail is omitted or generalized at the smaller scale.

U.S. 1:100,000-SCALE SERIES

Much of the United States is covered by 30- by 60-minute quadrangle maps at a scale of 1:100,000. Most of these maps are derived from 1:24,000-scale maps, but they show distances and contour intervals in meters. Contours are at intervals of 5, 10, 20, or 50 meters depending on terrain relief.

County map series

A county map may consist of one or more sheets, depending on the size of the county. County maps are available in scales of 1:50,000 and 1:100,000.

U.S. 1:250,000-scale series

Maps in the 1:250,000-scale (1 inch = about 4 miles) series are available for the entire United States. They were originated by the U.S. Army Map Service during the 1950s, but are now maintained by the USGS.

This series serves as base maps for aeronautical charts and geologic maps, for geographic reference, and in planning regional land use, transportation, and utility systems.

State map series

The State maps in this series are usually published in three separate editions: base map, highway and contour map, and shaded-relief map. Most are at a scale of 1:500,000. The features shown are limited to areas within the State. No areas adjoining States are shown except for shorelines and other water areas that form State boundaries.

U.S. 1:1,000,000-scale series

This series of topographic maps has been discontinued by the USGS and will not be reprinted when the existing stock is depleted.

The ground area shown ranges from 73,734 to 122,066 square miles (123,000 to 204,000 square kilometers). The maps show principal cities and towns, railroads, and political boundaries in black; roads in red; water features in blue; and topography in brown contour lines and gradient tints.

National park map series

Each of these topographic maps, some of them with shaded relief, feature a national park, national monument, or national historic site at a range of scales. The maps are much like the standard quadrangle maps at the same scale, but they highlight recreational features.

Shaded-relief maps

USGS publishes shaded-relief editions of certain topographic maps to accentuate physiographic features of special interest, and for some State, Antarctic, and national park maps. These maps use shaded relief, as well as contour lines, to represent the shape of the terrain.

Topographic-Bathymetric Maps

These USGS maps show in one format and one edition the data for a land-water area previously shown separately as a topographic map and a bathymetric map.

On topographic-bathymetric maps, contour lines show elevations of the land areas above sea level, and isobaths (depth contours) show the form of the land below the water surface.

Some bathymetric maps show magnetic and gravity data in addition to water depths.

Because coastal zones include both land and water, maps of such areas must include both topographic and bathymetric data. To produce these coastal maps, the National Ocean Service provides bathymetric data to be added to USGS topographic maps.

The combined map serves the needs of oceanographers, marine geologists, land use planners, physical scientists, conservationists, and others having an interest in management of the coastal zone, the wetlands, and the offshore environment.

Appendix I - Selection Operators

Math Operators

Window Interface	Description
== Equal to	for exact matches
!= Not equal to	for dissimilar matches
> Greater than	for values larger than the selected value
>= Greater than or equal to	for values that are larger than or equal to the selected value
< Less than	for values less than the selected value
<= Less than or equal to	for values that are less than or equal to the selected value
between: >a and < b	for values that are greater than “a” **and** also less than “b”
between: >=a and < b	for values that are greater than or equal to “a” **and** are also less than “b”
between: >a and <=b	for the values that are greater than “a” **and** less than or equal to “b”

Window Interface	Description
between: >=a and <=b	for the values that are greater than or equal to “a” **and** less than or equal to “b”
CN (Contains)	use to search for specific strings or sub-strings within a column (e.g., find all drainage features that contain the word **Creek**)

Logic Operators

Operator	Example	Result
AND	Street == Main St AND Street == York St	not as expected; there are **no** streets that are named both Main and York
AND	Street == Main St AND Road Class == two lane	as expected; there **are** portions of Main Street that are two lanes
OR	Street = =Main St OR Road Class == two lane	more than expected; results give streets that are **either** named Main St **or** are two lane **and** both
OR	Street == Main St OR Street == York St	as expected; results give streets that are named Main **and** York
NOT	Street == Main St W AND NOT Street == Main St	not as expected; the second arguments invalidates the first argument
NOT	Street == Main St AND NOT Street == Main St W	as expected; results give segments of Main Street that are **not** Main St W

Glossary

If you have difficulty with some of the GIS terminology used, you can access the following for more information:

- http://www.env.gov.bc.ca/gis/glosstext.html
- http://www.geo.ed.ac.uk/root/agidict/html/welcome.html
- http://www.avenza.com/glossary.html

Accuracy	The closeness of results of observations, computations or estimates to the true values or the values accepted as being true. Accuracy relates to the exactness of the result, and is distinguished from precision which relates to the exactness of the operation by which the result is obtained.
AGI	Association for Geographic Information.
Algorithm	A set of rules for solving a problem.
ASCII	American Standard Code for Information Interchange, a widely used industry standard code for exchanging alphanumeric codes in terms of bit–signatures.

ANSI	American National Standards Institute, an association formed by the American Government and industry to produce and disseminate widely used industrial standards.
Analog (or analogue)	A continuously varying electronic signal; also refers to traditional paper mapping products and aerial photographs.
Annotation	The explanatory or descriptive alphanumeric text or labels on a map (or artwork), such as street or place name.
Application	A set of computer programs designed for a specific task.
Arc	A line/vector defined by a series of points (a string of x,y coordinates).
Area	A bounded continuous two dimensional object which may or may not include its boundary. Usually defined in terms of an external polygon or in terms of a set of grid cells. A fundamental unit of geographical information. See polygon.
Aspect	Individual azimuthal map projections are divided into three aspects: the polar aspect which is tangent at the pole, the equatorial aspect which is tangent at the Equator, and the oblique aspect which is tangent anywhere else. (The word “aspect” has replaced the word “case” in modern cartographic literature.)

Attribute	Non–graphic alphanumeric textual information associated with a point, line, or area element in a GIS data set; tabular data associated with geographic features.
Azimuth	The angle measured in degrees between a base line radiating from a center point and another line radiating from the same point. Normally, the base line points North, and degrees are measured clockwise from the base line.
Bit map	A grid of small squares, cells or pixels stored in memory and used to generate an image.
Boolean	There are two types of values: true and false. These are usually represented by true/false or yes/no.
CAD(D)	Computer–Aided Drafting (Design).
Cadastral	Related to records of land tenure, often parcel based.
Cartography	The organization and communication of geographically related information in either graphic or digital form. It can include all stages from data acquisition to presentation and use.
CAST	Centre for Advanced Spatial Technologies, University of Arkansas.
Cell	The basic element of spatial information in a raster image.
Clipping	A graphic process of cutting lines and symbols off the edge of a display area.

Color Ramp	A graduated range of colors between two extreme color selections.
Conformality	A map projection is conformal when at any point the scale is the same in every direction. Therefore, meridians and parallels intersect at right angles and the shapes of very small areas and angles with very short sides are preserved. The size of most areas, however, is distorted.
Contour	A line connecting points of equal elevation.
Curvature	The amount of curve in line as defined by a series of points.
Data model	An abstraction of the real world which incorporates only those properties thought to be relevant to the application at hand. The data model would normally define specific groups of entities, and their attributes and the relationships between these entities. A data model is independent of a computer system and its associated data structures.
Database	A collection of data organized according to a conceptual structure describing the characteristics of the data and the relationships among their corresponding entities.
Database management system (DBMS)	A set of computer programs for organizing the information in a database usually containing routines for data input, verification, storage, and retrieval.

Defaults	The values or actions that would normally be expected to occur.
Demographics	Statistics of birth, death, population, etc.
Developable surface	A developable surface is a simple geometric form capable of being flattened without stretching. Many map projections can then be grouped by a particular developable surface: cylinder, cone, or plane.
Digital	The ability to represent data in discrete units or digits.
DLG	Digital Line Graph, a USGS standard output file format.
Drag	To hold down the mouse button while you move the mouse cursor on the screen.
Drag and drop	The act of dragging a file with the mouse over another executable file to cause some action on the first file.
DTP	Desktop Publishing.
Element	A fundamental geographical unit of information, such as a point, line, area, or pixel.
Equal areas	A map projection is equal area if every part, as well as the whole, has the same area as the corresponding part on the Earth, at the same reduced scale. No flat map can be both equal area and conformal.

Equidistant	Equidistant maps show true distances only from the center of the projection or along a special set of lines. For example, an Azimuthal Equidistant map centered at Washington shows the correct distance between Washington and any other point on the projection. It shows the correct distance between Washington and San Diego and between Washington and Seattle. But, it does not show the correct distance between San Diego and Seattle. No flat map can be both equidistant and equal area.
FAQ	Frequently Asked Questions.
Feature code	A set of characters (alpha, alpha/numeric or numeric) within the GIS, which uniquely identifies a feature class or group of features.
File	A collection of related information that can be accessed by an assigned name.
Filter	See Plug–in filters.
Folder	A storage area for files within the Macintosh OS, the equivalent of a DOS or UNIX directory.
Format	The way in which data is arranged for storage and for transmission between software and/or computers.
FTP	File Transfer Protocol.
Generate	The file format created by the Arc/Info Ungenerate function.

Geographic features	Points, lines, and areas that comprise a map.
Geographic Information System (GIS)	Any system designed for the capturing, storing, checking, integrating, analyzing and displaying of spatially referenced data about the earth.
Geo–referencing	The delimiting of a given object, in terms of its spatial location on the earth's surface or within some coordinate system.
GIR	Geographic Information Retrieval.
GIS	Geographic Information Systems.
GPS	Global Positioning Systems.
Grain	The frequency of vertices or points forming a line.
Graticule	The spherical coordinate system based on lines of latitude and longitude.
Great circle	A circle formed on the surface of a sphere by a plane that passes through the center of the sphere. The Equator, each meridian, and each other full circumference of the Earth forms a great circle. The arc of a great circle shows the shortest distance between points on the surface of the Earth.
Grid	A set of regularly spaced sample points or an exact set of reference lines over the earth's surface.

Hydrography	In its most general definition, hydrography is the description and study of seas, lakes, rivers, and other bodies of water with regard to: the measurement of flow and investigation of the behavior of streams; the measurement of tides and currents, and the surveying, sounding, and charting of those bodies of water (Webster's Third New International Dictionary, 1993).
Hypsography	Lines which depict the relief of the land or contours.
Icon	An image representing a software function or tool.
Import sequence	The order of steps required to import data.
JPEG	Joint Photographic Experts Group, is a lossy compression technique for raster file formats.
Label	Text used to identify a map feature.
LANDSAT	The generic name for a series of earth resource scanning satellites launched by the United States of America.
Latitude	Angular distance, expressed in degrees and minutes, along a meridian north or south of the equator.
Layer	A designated level in artwork used for storing, organizing and editing graphic or mapping data.
Legend	The section of the map that explains the meaning of the symbols used to depict graphic or geographical elements.

Legend element	A legend key combined with its associated text.
Legend key	The graphic symbol used to illustrate attributes in a legend.
Longitude	The angular distance east or west from a standard meridian to another meridian on the earth's surface; expressed in degrees and minutes.
Line	One of the basic geographical elements, defined by at least two pairs of x,y coordinates; usually too narrow to be an area. See also arc and vector.
Linear scale	Linear scale is the relation between a distance on a map and the corresponding distance on the Earth. Scale varies from place to place on every map. The degree of variation depends on the projection used in making the map.
Lossless/Lossy	Lossless techniques compress image data without removing detail; lossy techniques compress images by removing detail.
Map anchor	The minimum x and y coordinates of the data files.
Map co–ordinates	The x,y representations of ellipsoidal earth locations on a mapping plane.
Map projection	A map projection is a systematic representation of a round body such as the Earth on a flat (plane) surface. Each map projection has specific properties that make it useful for specific purposes.
Marquee	A dashed rectangle drawn with a selection tool to select multiple objects.

Meta–Data	Data about data typically including information such as currency, accuracy, and extent. Meta–data is typically stored in data models or data dictionaries.
Mid/Mif	A file format exported from MapInfo GIS software.
NAD	North American Datum.
Network	Two or more interconnected computer systems for implementation of specific functions or a set of interconnected graphic lines defining some spatial features.
Node	The point or intersection at which areas or lines are joined; endpoints of an arc.
NSDI	National Spatial Data Infrastructure.
Overlay	A set of graphical data that can be superimposed on another set of graphical data through registration to a common coordinate system. The process of laying one set of digital spatial data over another for analysis purposes.
Page anchor	The location on the page where the map anchor is placed.
Page size	The size of the drawing page.
Parameters	Variable options or choices; boundaries of operations or of an object.

PDF	Portable Document Format. Developed by Adobe, a PDF is a file type which can be used to cross Macintosh, Windows, DOS, and UNIX platforms.
Pixel	The smallest unit of information in a grid cell map or raster image.
Plug–in filter	A module or modules supplied separately from the Adobe Illustrator program, usually for creating special effects in artwork. The MAPublisher application plug–in filters are modules that enable the incorporation of GIS and mapping capabilities within the Adobe Illustrator graphics environment.
PMS	Pantone Matching System.
Point	A discrete location represented by a symbol or label; usually too small to be displayed as an area or line.
Polygon	Any area bounded by a straight or irregular closed line representing a map component or any other graphic feature.
Positional Accuracy	The degree to which a position is measured or depicted, relative to its correct position as established by either other features or by other accurate processes.
PPC	Power PC (as in the Power Macintosh).

Precision	That which relates to the exactness of the operation by which the result is obtained. The exactness with which a value is expressed, whether the value be right or wrong.
Projection	The representation on a plane surface of any part of the surface of the earth.
Raster	A regular grid of cells covering an area.
Record	A set of attributes relating to any entity; a set of related, contiguous data.
Redundancy	The duplication of data in a database.
Render	To cause to be or to become, to draw.
Resolution	The number of dots per inch displayed on screen or printed to an output device.
Rhumb line	A line on the surface of the Earth cutting all meridians at the same angle. A rhumb line shows true direction. Parallels and meridians, which also maintain constant true directions, may be considered special cases of the rhumb line. A rhumb line is a straight line on a Mercator projection. A straight rhumb line does not show the shortest distance between points unless the points are on the Equator or on the same meridian.
RS	Remote Sensing.
Rubber sheeting	The transformation of spatial data to stretch or compress them to fit with other data.

SAIF	Spatial Archive and Interchange Format. SAIF is a Canadian Draft National Standard for Geomatics data interchange. It is a specification for data which includes an object–oriented data model and a language for describing both spatial and non–spatial data.
Scale	The relation between the size of an object on a map and its size in the real world.
Scanner	A device for converting images from maps or photographs of part of the real world into digital form automatically.
SDTS	Spatial Data Transfer Standard.
SEA	Self Extracting Archive, a file compression format for reducing the size of large files for archival or transfer.
Sliver	A gap formed when two lines which should be contiguous are slightly separated in a graphical representation or map.
Spatial	Of space, a two or three dimensional position in space.
Sphere co–ordinates	x, y locations on the ellipsoidal earth, usually expressed in degrees and minutes.
SPOT	An earth resource satellite with high resolution sensors launched by France in January 1986.
Static graphic files	Unchanging and non–editable graphic files.

Thematic map	A map displaying selected kinds of information relating to specific themes, such as soil, land–use etc.
TIFF	Tagged Image File Format, a common {raster} graphic file format.
Tile	A discrete part of the earth's surface. By splitting a study area into tiles, considerable savings in access times and improvements in system performance can be achieved.
Topographic map	A map showing natural and man–made features as well as relief, often in the form of contours.
Topology	The way in which geographic features relate to each other.
Toponym	The place names of a region or map feature.
Transform	The process of changing the scale, projection, or orientation of a mapped image.
TRIM	Terrain Resource Information Management.
Unix	A general–purpose, multi–user computer operating system.
URL	Universal Resource Locators.
USGS	United States Geological Survey.
UTM	Universal Transverse Mercator.

Vertices	Points representing spatial x,y co–ordinates that occur along an arc between the nodes and help define the shape of the arc.
Vectors	Linework or artwork. See lines and arcs.
WWW	World Wide Web.
Zone	Any well defined region of more or less beltlike form.
Zoom	To magnify or reduce the current view of a document.