Tutorial

LAYOUTS

Making Map Layouts

with

TNTmips®

TNTedit™

TNTview®

Before Getting Started

All the tools you need to create simple or complex maps and posters are found in both the Display and Page Layout modes of the Display process. The ability to precisely position objects on the page is part of any layout package, but the TNT products also provide the ability to add scale bars, map grids, legends, and annotation text as part of the powerful map and poster layout features found in the visualization process.

Prerequisite Skills This booklet assumes you have completed the exercises in *Displaying Geospatial Data* and *Basic TNT Concepts* tutorials. The exercises in those booklets show you how to select and view raster, vector, CAD, shape, TIN, and database objects stored in Project Files. You should know how zoom, pan, and enhance display objects. Please be sure you remember how to add and remove layers from a multilayer view. You should also know how to set up and select your printer. This booklet does not present these basic skills again. Please consult *Displaying Geospatial Data* and *Basic TNT Concepts* for any review you need.

Sample Data The exercises presented in this booklet use sample data distributed with the TNT products. If you do not have access to a TNT products DVD, you can download the data from MicroImages' web site. The exercises in this booklet use objects from all Project Files in the MAPLO folder of DATA. The objects in the TOWNS Project File in the CARTOSCR folder are also used. Be sure to make a read/write copy of these files on your local drive.

More Documentation This booklet is intended only as an introduction to the functions in Page Layout. Consult the reference materials at microimages.com and the *Printing* tutorial for more information.

TNTmips® and TNTmips Free TNTmips comes in three versions: TNTmips Pro, TNTmips Basic, and TNTmips Free. This booklet refers to all versions as "TNTmips." If you did not purchase the professional version (which requires a software license key) or TNTmips Basic (which is locked to an individual machine), TNTmips operates in the TNTmips Free mode, which limits the size of your project materials. Most exercises in this booklet can be completed in TNTmips Free using the sample geodata provided.

Merri P. Skrdla, Ph.D., 20 January 2011

It may be difficult to identify the important points in some illustrations without a color copy of this booklet. You can print or read this booklet in color from MicroImages' web site. The web site is also your source of the newest tutorial booklets on other topics. You can download an installation guide, sample data, and the latest version of TNTmips Free.

http://www.microimages.com

Welcome to Making Map Layouts

Laying out maps and posters generally requires you to assemble and arrange several objects for the display screen or on a page. These objects may all be in a single georeferenced group with map grids, but you may additionally require scale bars, annotation text, map grids, legends, and other objects such as a north arrow or your company logo. The ability to create map grids, scale bars, legends, and annotation text is an integral part of TNTmips' Display and Page Layout features.

All of the tools and features in the Display process are available for display and page layouts, including insertion of sketch layers and 3D groups. Display layouts let you arrange objects relative to each other in the view window while page layouts add the concept of positioning relative to a page, which is necessary for printing. Any layout you create can be saved for further refinement or as a template to be reused in a series of maps.

Georeference is the basis for positioning layers in the same group and for the relative sizing of separate groups. When objects are georeferenced, you can print to or display at a specified map scale, which can be reflected in a scale bar and explicitly designated in text if desired. Objects that are not georeferenced, such as logos and text, are placed in separate groups so they can be sized and positioned independently. Some layouts may contain no georeferenced components, such as layouts made of screen captures and text for inclusion in a report.

The full layout capabilities of TNTmips are available in TNTmips Free, however in the latter you are restricted to a maximum layout size of 11" x 17" (tabloid size page). The professional version of TNTmips supports printing on a variety of large scale printers (paper sizes up to as large as current technology allows) and printing over multiple pages. Support for dithered color printing up to 11" x 17" is included in the base price of TNTmips Pro.

Vocabulary: Most printers cannot print up to the edge of the paper. The area that cannot be printed is called the **unprintable margin**. The size of the unprintable margin varies from one printer model to the next.

STEPS

- ☑ launch TNT
- ☑ select Main / Display from the TNT menu, click on the New icon and choose Page Layout 
- ☑ open the Options menu in the View window and turn off the *Redraw after any change* toggle

Pages 4–10 describe positioning multiple groups on a page, adding map grids, and printing. On pages 11–18 you develop a more complex layout that includes annotation text, a legend, logo, north arrow, and scale bars in addition to multiple layers in a georeferenced group with a map grid. The rest of the booklet provides information about development of maps in a series, templates, legend types, databases in layouts, sizing and scale issues, rendering to various formats, and map scale-controlled visibility.

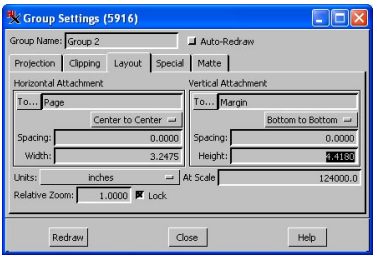
Positioning Two Groups on a Page

STEPS

- ☑ choose Add/Multiple Groups in the Display Manager and select the COMPOSITE object in the CIR_COMP Project File twice
- ☑ click on the Group Settings icon for Group 2

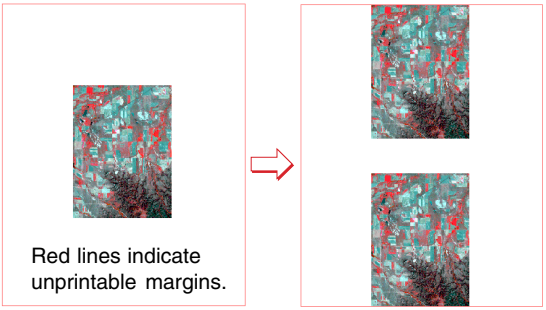
- ☑ turn off the Auto-Redraw toggle button at the top right of the Group Settings window
- ☑ click on the Layout tab and change the entry in the At Scale field at the lower right of the Group Settings window to 124000
- ☑ click on [To] in the Vertical Attachment panel
- ☑ select Margin in the list in the window that opens and click OK
- ☑ select Bottom to Bottom from the option menu in the Vertical panel
- ☑ click on the group name for Group 1 to make it the active group
- ☑ click on [To] in the Vertical Attachment panel
- ☑ click on Margin and OK in the window that opens
- ☑ select Top to Top from the option menu in the Vertical panel, and click on [Redraw]

Automatic group placement in page layouts differs from that in display layouts. Groups are automatically tiled in a display layout and have no specific attachments. All groups added to a page layout have an initial group attachment that centers them on the page. Customized group placement is established with the Placement tool or in the Group Settings window, which you open by clicking on the Settings icon found in the group icon row of the Display Manager or with the Placement tool. The parameters set apply to the currently active group. You change the group you are making settings for by changing the active group.



You can change group names by typing a new name in the Group Settings window, but in this example there are just two groups with Group 1 at the top of the page and Group 2 at the bottom, so we'll leave the default names.

The map scale at which your layout is printed is set in the At Scale field at the lower right of the Group Settings window. The value in this field is the same as that in the Map Scale field of the Page Setup window; a change made to one of these fields is updated to the other.

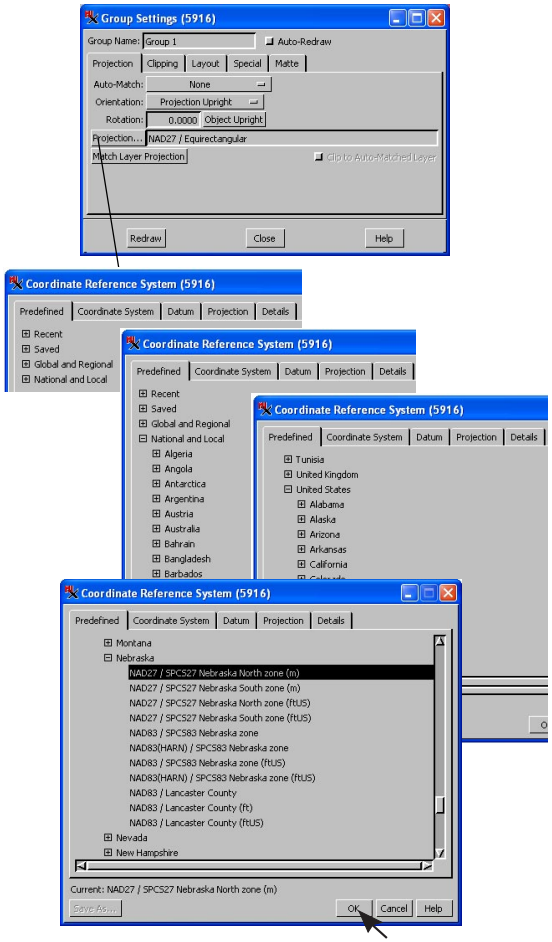


Red lines indicate unprintable margins.

Keep this layout open through the exercise on p. 8.

Setting Group Projections

The default group orientation uses the object coordinates of the first (bottom) layer in the group. If you want the group orientation to be derived from map coordinates, you need to set the Auto-Match feature to None and choose a projection for use in orientation. Once you choose a group projection, the layers in the group may be reoriented according to the projection. The selected projection and the geometry of the objects selected for display determine whether a Projection Upright orientation is noticeably different from an Object Upright orientation.



STEPS

- ☑ with Group 1 active, click on the Projection tab in the Group Settings window and choose None on the Auto-Match option button, then click on [Projection]
- ☑ expand National and Local in the Predefined panel of the Coordinate Reference System window that opens
- ☑ expand the United States group and the group for the state of Nebraska
- ☑ choose NAD27/SPCS27 Nebraska North Zone (m)
- ☑ click [OK] in the Coordinate Reference System window
- ☑ click on the Select icon for Group 2 and check that the Auto-Match option is set to First Raster or First Layer

Note: when rasters are rotated in a layout, they tend to slow the printing process. Within the size constraints of TNTmips Free or when rotated to 90°, 180°, or 270°, the effect is not significant. However, when printing large rasters, you may shorten the printing time by rotating and saving the raster (Raster / Resample and Reproject/ Automatic) prior to printing. Then substitute the rotated raster for the original in the layout.

Adding Map Grids

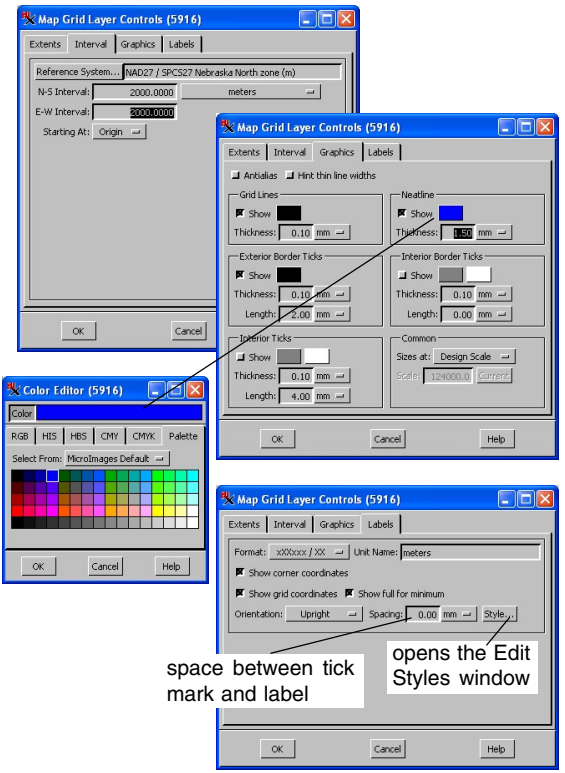
STEPS

- ☑ with Group 1 active, click on the Add Map Grid icon
- ☑ check that the Reference System is United States State Plane 1927 [NAD27/SPCS27 Nebraska North Zone (m)] and the units are meters
- ☑ on the Interval panel, set N-S and E-W Intervals to 2000 and the Starting At option to Origin
- ☑ on the Graphics panel, check that the Show buttons for Grid Lines, Neatline, and Exterior Border Ticks are on
- ☑ click on the color tile next to each of the selected graphic elements, and change Grid Lines and Exterior Border Ticks to black and the Neatline to blue
- ☑ change the Neatline Width to 1.5 mm (leave defaults for others, as shown at right)
- ☑ choose Design Scale on the Sizes at option menu
- ☑ on the Labels panel, click on [Style], set font to Arial or a similar font, set the Ascender height to 5 Points, check that the At Scale option is set to Design, and click [OK] in the Edit Styles window
- ☑ set the Coordinates Format to xXXxxx / XX, and turn on the Show grid coordinates toggle
- ☑ click on [OK] in the Map Grid Layer Controls window

A map grid may contain one or more of the following components: grid lines, neatline, border, interior/exterior tick marks, and coordinate labels. We will use all except interior tick marks. You can set the color and size independently for each of these. You can also set the font and style for coordinates.

Any map grid added comes up by default in the selected group projection. You can always change this projection, either for the group as a whole or for the map grid. You can also overlay multiple map grids in different projections on a single group.

The default map grid colors are a medium gray so they have a fair chance of showing up over most images and backgrounds. Let's set the neatline color to blue and all others to black.



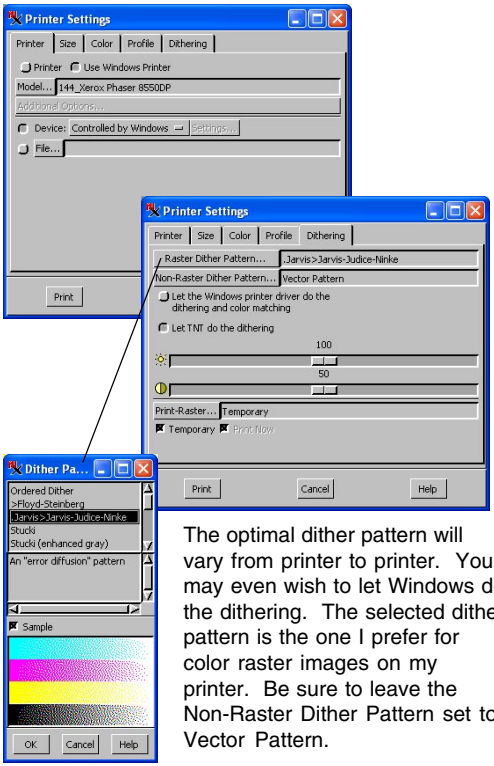
Printing a Layout

For most applications you would print a single large image with two different map grids overlaid rather than two separate groups with their own map grids as we have here. The point of the exercise, however, is not only adding map grids, but also group positioning, projection, and orientation.

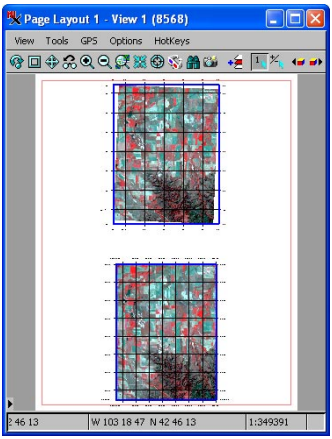
We are now ready to print this layout. The default printer is always the last selected printer so you should be set to go from your printing exercise in the *Displaying Geospatial Data* tutorial. It is always a good idea to check your page setup when you haven't printed for a while unless you know no one else uses your computer.

STEPS

- ☑ with Group 2 active, click on the Add Map Grid icon 
- ☑ check that the Reference System is Latitude / Longitude (NAD27/ Geographic) on both the Extents and Interval panels with a N-S and E-W interval of 0 01 00.00
- ☑ check that the settings made in steps 4–8 on the previous page have been maintained
- ☑ click on [OK], then Redraw 



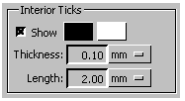
The optimal dither pattern will vary from printer to printer. You may even wish to let Windows do the dithering. The selected dither pattern is the one I prefer for color raster images on my printer. Be sure to leave the Non-Raster Dither Pattern set to Vector Pattern.



- ☑ choose Print from the Display menu in the Display Manager window
- ☑ verify that the printer Model and Destination are as intended
- ☑ click on the Dithering tab and set the Raster Dither Pattern to Jarvis-Judice-Ninke (or let Windows do the dithering)
- ☑ click on [Print]

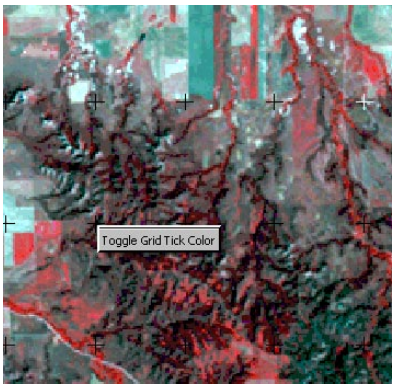
Toggling Tick Mark Colors

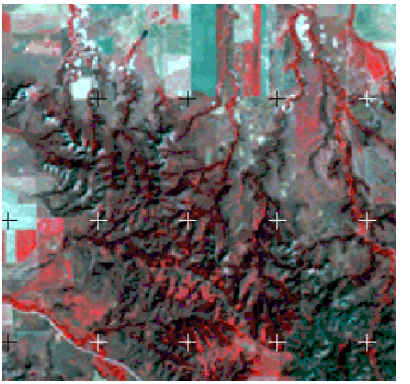
- ☑ click on the Map Grid icon for the grid in Group 2
- ☑ turn off the Show toggle for Grid Lines, and turn on the Show toggle for Interior Ticks
- ☑ set the left color button to black and the right to white, the thickness to 0.1 mm and the length to 2 mm in the Interior Ticks panel, then click [OK]
- ☑ position the cursor toward the bottom of Group 2 (bottom group) over the butte, and press the + key to zoom
- ☑ open the GeoToolbox and choose its Select tool
- ☑ right click over the butte and select the menu choice that pops up
- ☑ repeat for the other tick marks over the butte
- ☑ save your layout for use in the exercise on p.44



TNTmips provides the ability to toggle between any two colors for interior map grid tick marks. Use of this feature creates greater visibility of map grid tick marks over the entire map area when there is considerable variation in brightness over the underlying image or vector. You choose a primary color, which is initially assigned to all interior tick marks, and a secondary color, which can be assigned to individual tick marks as shown in this exercise. Interior border tick color can also be toggled.

You toggle tick mark color using the Select tool in the GeoToolbox, not the Select tool in the View window. This right mouse button menu choice is also available when other GeoToolbox tools are active. When you right-click with the Select tool, a menu with a single choice pops up. If you actively choose Toggle Grid Tick Color from the right mouse button menu, the single, closest interior tick mark or internal border tick from all the map grid layers is changed to the secondary color. If you subsequently change the secondary tick mark color, the color of the tick marks assigned to the secondary color will also change when the layout is redrawn just as for tick marks drawn in the primary color. You can, of course, also toggle a tick mark back to the primary color.





Relative and Absolute Size

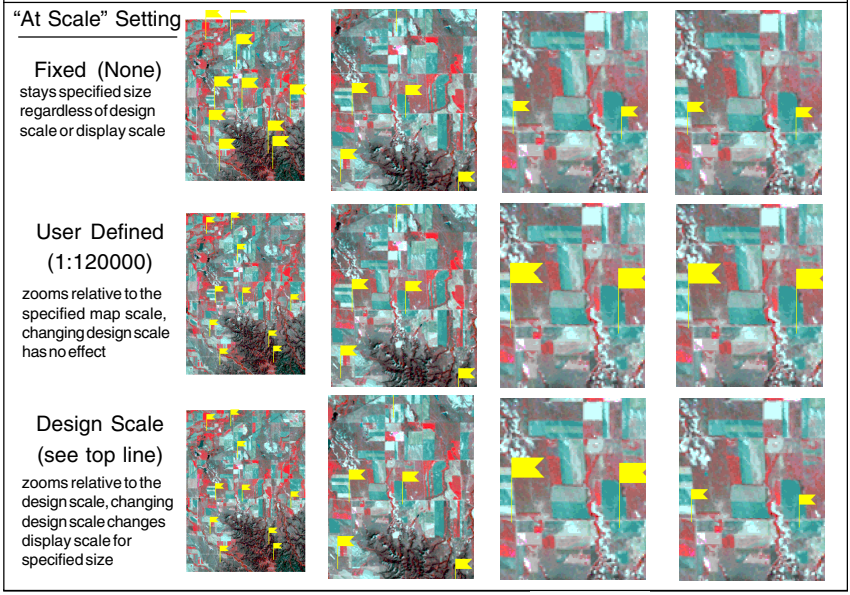
The point of using a map layout product, such as TNTmips, instead of a page layout product like Adobe® PageMaker® or Microsoft® Publisher, is that a map layout product uses georeference information to determine accurate map scales for printing and precise geographic overlay of a variety of object types. However, often not all components of a map or other layout are georeferenced (for example, annotation text, legends, and company logos). The size for such components must be set when designing a layout, and that size needs to be either absolute (unchanging) or relative to some map scale.

You set how to determine size for text, legends, line patterns, symbols, and some scale bar parameters. Map scale enters into displayed sizes, so your choice also determines if the size changes as you zoom in and out. How to set the size for ungeoreferenced objects like logos and text is discussed in the Relative Group Zoom exercise.

STEPS

- ☑ click on the New icon and select Page Layout
- ☑ click on the Add Objects icon and select the two objects in the CIR_COMP Project File (select vector second)
- ☑ open the Layer Controls for the SITES object, click on [Edit] for All Same point style, and set the At Scale option to None
- ☑ click [OK] in the Style Editor and Layer Controls windows
- ☑ zoom in and out and note the effects
- ☑ change the At Scale option to User Defined (120000) and then Design (repeat steps 3–5 for each)

Design Scale	1:120000	1:120000	1:120000	1:60000
Display Scale	1:240000	1:120000	1:60000	1:60000

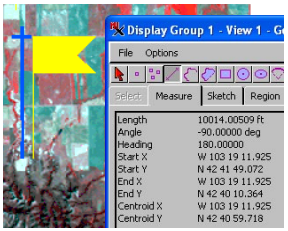


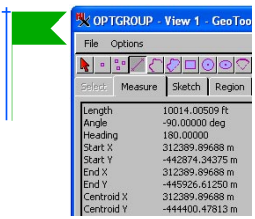
Symbols with Fixed Ground Dimensions

- ☑ with the two objects from the previous exercise still displayed, click on the Vector icon for the SITES layer
- ☑ on the Points panel of the Vector Layer Controls, click on [Edit] for Style
- ☑ set the units to Inches and the Height to 1.00
- ☑ set At Scale to User-Defined, enter 120000 in the field to the right, and click [OK] in the Style Editor and Vector Layer Controls windows
- ☑ click on Redraw
- ☑ click on the Geo-Toolbox icon, then on the Ruler tool
- ☑ zoom up on one of the flag symbols and measure the pole length
- ☑ click on the Open Display icon, and select the OPTGROUP* object in the TOWNS Project File from the CARTOSCR folder
- ☑ click on the icon for TOWNS vector, click [Styles] on the Object tab, navigate to the SITES object in the CIR_COMP Project File, and select its VECTSTYLE subobject
- ☑ click on the Points tab, change the Style to All Same, click on [Edit], then set the Point Style to Symbol, click on f2 to select the symbol, and set the height and scale as in steps 3 and 4
- ☑ repeat steps 5–7

You may want to design a symbol or line pattern so that it is always the same size or width on the ground regardless of the scale of your layout or the resolution of your data. For example, a four lane divided highway should have the same width on the ground whether displayed over a raster with 1-meter or 10-meter cell size, and a symbol for a radar reflector that measures ten feet across should represent ten feet whether displayed at 1:60000 or 1:120000.

Fixed ground dimensions are not a property of the symbol or line pattern—they are a property of the style. Achieving such real-world sizes across map scales requires that the At Scale option be set to User-Defined. You could theoretically set the symbol size or line width at a map scale of 1:1, which would eliminate scaling calculations, but the Style Editor attempts to display the sample at the requested absolute dimensions, and a 10-meter symbol far exceeds the available sample area. A number of reasonable size examples are provided below to assist you in setting your own map scales.





The symbology used in this exercise is not significant, but the results are. The measurements shown are the same for objects whose extents vary by approximately ten-fold.

at 1:12000, 1" = 1000 feet
at 1:120000, 1" = 10000 feet
at 1:1200, 1" = 100 feet

at 1:1000, 10mm = 10 meters
at 1:10000, 10mm = 100 meters

* Do not save the changes when you close this group.

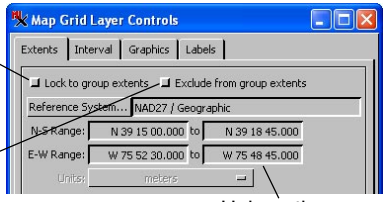
Starting a Complex Layout

Now we're going to create a fairly typical image map using a central large raster with a map grid and CAD overlays, a legend, scale bars, north arrow, company logo, and annotation text. Let's start the map with the largest group, which contains a raster and three CAD layers.

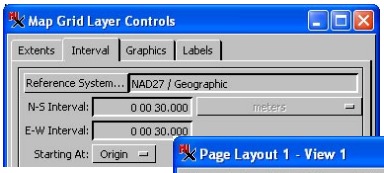
We'll add the map grid next since it will change the size of the group. The default projection for a map grid is obtained from the georeference selected in the Layer Controls for the first layer, which happens to be Universal Transverse Mercator (UTM) for the raster layer in this layout. We'll change this to Latitude / Longitude.

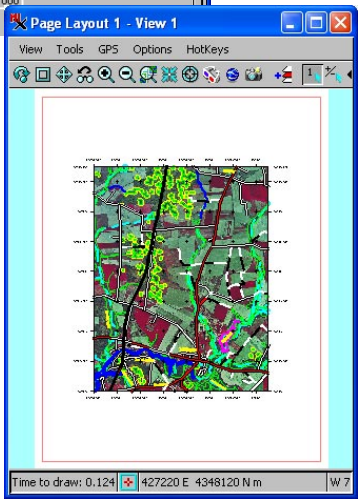
Turn this option off if it is on to be able to set extents.

Turn this option off if it is on.



Unless the extents are as specified here, the neatline will not be at the raster's edge.





Keep this layout open until done with the exercise on p. 18, or save it, and use Open Display to start again where you left off.

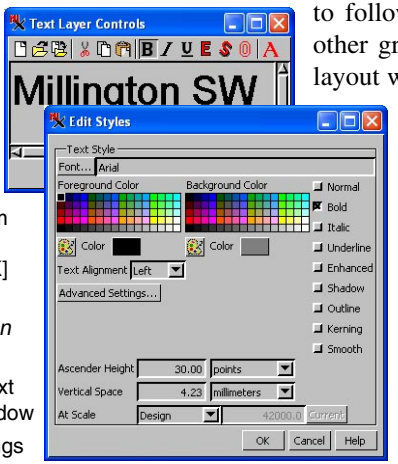
STEPS

- ☑ close the group from the last exercise (do not save changes) and the two layouts already made
- ☑ click on the New icon and choose Page Layout
- ☑ click on the Add Layer(s) icon and select COMPOSITE, BUFFERZONES, SHORELINE, and ROADSANDSTREAMS in the MILLNGTN Project File (in that order)
- ☑ click on the Settings icon for Group 1, then the Layout tab, and set the Layout Scale to 42000
- ☑ click on the Add Map Grid icon
- ☑ click on [Reference System] on the Extents tabbed panel and select Latitude / Longitude (Geographic 2D)
- ☑ set the North-South Range to N 39 15 00 to N 39 18 45, and the East - West Range to W 75 52 30 to W 75 48 45
- ☑ click on [Reference System] on the Interval tabbed panel and select Latitude / Longitude (Geographic 2D), then set the Interval to 0 00 30 in both directions
- ☑ make the neatline thickness 1 mm and the color black (refer to p. 6)
- ☑ set the Label format to DD°MM'SS" and the Ascender Height to 7 Points
- ☑ click on [OK]

Add Heading Text and Reposition Groups

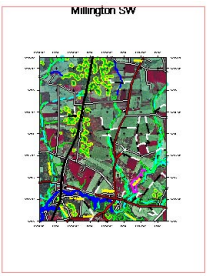
STEPS

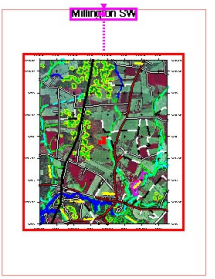
- ☑ click on the Add Text icon 
- ☑ click on the Text Style icon in the Text Layer Controls 
- ☑ check that the font is the same as selected on page 6, and click on the Bold toggle
- ☑ set the Ascender Height to 30 Points
- ☑ choose Design from the At Scale option menu and click [OK]
- ☑ click in the text box and type in *Millington SW*
- ☑ click [OK] in the Text Layer Controls window
- ☑ on the Group Settings Layout panel, click on [To…] for Vertical Attachment, choose Margin, then choose Top to Top from the Vertical Attachment option menu; set the Horizontal Attachment to Group 1*
- ☑ click on Redraw 
- ☑ click on the Placement icon in the View window 
- ☑ position the mouse within the outline for Group 1 so that you have the hand cursor, then click, after the cursor changes to the cross arrow, click and hold while dragging the box upward closer to the heading text (keep the horizontal spacing at zero), then press <enter>



The icon for adding a text layer is on the main Display Manager toolbar because text must be in a separate group for sizing and positioning. The best choice of group attachment options depends on a variety of factors such as whether you want the group to follow movements of another group and whether the layout will be used again at a different map scale. Not all printers have symmetrical margins, so horizontal centering is best achieved by attaching to the page. You can position objects at the edge of the printable area by attaching them to the margin.

An outline of the group extents appears when you switch to the Placement tool so you can drag a group to a new position on the page. The cursor is the cross arrows shape for repositioning. The cursor shapes (and functions) used for resizing elastic boxes are inactive while the Lock toggle next to the Relative Zoom field is on. This lock prevents inadvertent change of the group's map scale relative to the layout scale and other groups, so that the group prints at the map scale you expect.





* You could use the default horizontal attachments for this exercise, but this attachment is needed when you get to p. 39.

Using the Layout Placement Tool

The Layout Placement tool provides a graphic means of visualizing and changing the position and attachment of all groups in a layout. You can make a group the active group by clicking on it. The information in the Group Settings window is updated when the active group is changed and the group becomes eligible for changes in position and attachment. Use the Placement tool and the Group Settings window together to get the results you want.

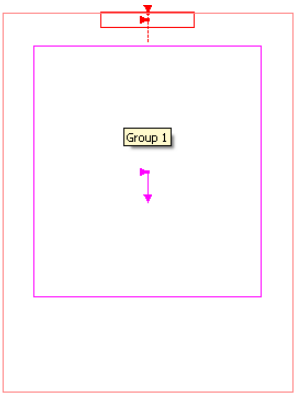
Changing group attachments works differently with the Placement tool than in the Group Settings window. If you change what a group is attached to in the Group Settings window, the values in the Spacing fields remain the same. If you change the attachment with the Placement tool, the group remains in the same position on the page and the spacing values are recalculated to reflect its distance from the new attachment group.

There are three viewing modes: normal, wireframe, and solid. In the normal mode, all layers are drawn and the Placement tool elements are added. Repositioning is easy in this mode, but it is sometimes difficult to see the attachment arrows. Drawing is faster in the wireframe and solid modes. You choose the viewing mode from the right mouse button menu, which also has a Lock Scale toggle if over a group.

STEPS

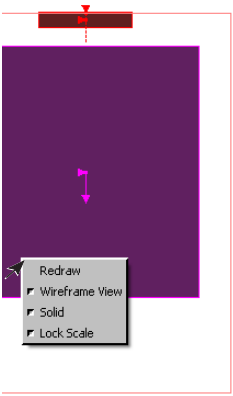
- ☑ right click over the layout and choose Wireframe View
- ☑ right click over the layout again and choose Solid
- ☑ right click over the layout again and turn Solid off

- hand cursor—you are over a group that is not the active group but will become the active group if you click
- cross arrows cursor—you are over the active group and will reposition the active group and everything attached to it if you click and drag
- ↔ double arrow cursor—you will grab an attachment arrow when you click
- left arrow cursor—no action associated with this cursor shape



The group name is provided as a DataTip when the Layout Placement tool is active.

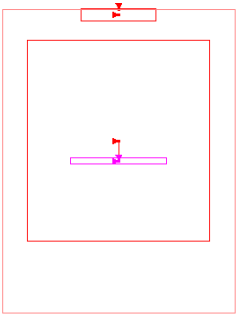
Note: You can also change to the Placement tool by typing the letter p when the View window has focus.



Adding a Scale Bar

STEPS

- ☑ click on the Add Scale Bar icon 
- ☑ change the units in the Map Units panel to miles then enter 2 for length
- ☑ set the Major and Minor Divisions to 4 and 5, respectively
- ☑ in the Size panel, set the Bar Width to 0.08 inches, the Text Size to 7 Points, and check that the At Scale entry is 42000
- ☑ confirm that the following three of six Style panel check buttons are on: Center Line, Show Units, and Show Ticks
- ☑ click on [Colors] to confirm that the colors for the border, text, and even and odd segments are black, black, red, and white, respectively
- ☑ click on [Text Style] to select the font you used for the map grid text
- ☑ click on [OK] in the Scale Bar Layer Controls

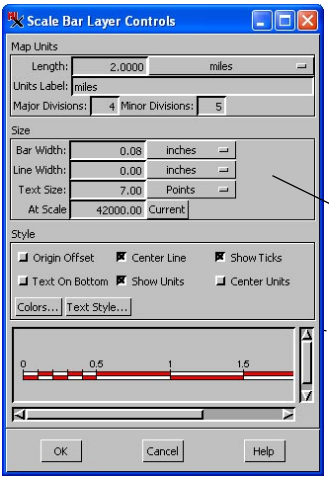


You now have a scale bar, which is the active group, centered on the page.

The vertical spacing for the final position of Group 1 will be a negative number (indicating it is above the point of attachment) that varies with your printer's printable area. The group's position can also be adjusted by entering a number directly in the Spacing field for horizontal or vertical attachment. Pressing <enter> over the layout when the Placement tool is active initiates a redraw.

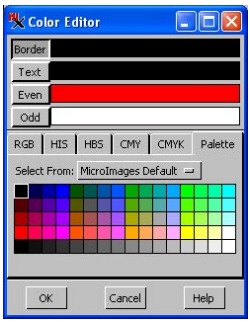
Maps often contain more than one scale bar to provide scale using different units. When multiple scale bars are included, they are generally stacked vertically with the longest scale bar at the top. The length of a scale bar is determined by the map scale of the layout and the relative zoom of the group. If you are providing scale for an enlarged inset, you need to be sure the relative zoom of the scale bar group is the same as that of the inset (see the later exercise on Relative Zoom). Because width is the dimension opposite to length, the width set is the thickness of the scale bar.

The number of minor divisions must divide evenly into the length of the major divisions (you can have 5 but not 6 minor divisions if the length of a major division is 0.5 miles).



The first minor division (upper left) is the odd color; colors then alternate.

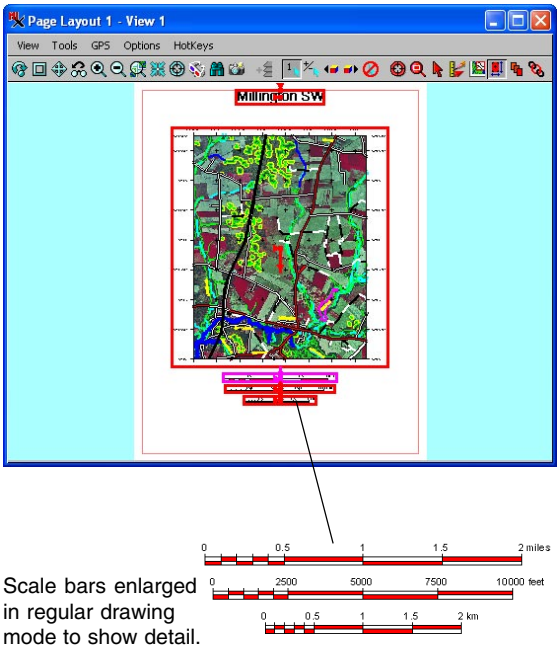
Width and Text Size are relative to the designated map scale.



Multiple Scale Bars and Positioning

Once you have added one scale bar, you just need to change the parameters in the Map Units panel, namely the units and length, to add other matching scale bars to the layout. Settings in other panels should remain the same.

Note that you can change group names before or after establishing attachments; the attachment information is updated whenever a name is changed. Attaching the scale bars to each other and then to the image map (Group 1) lets you establish uniform spacing between the scale bars, and sets it so subsequent adjustments to the image map position bring along the scale bars with the current spacing maintained. Thus, if you later decide you want to move the image closer to or further from the heading text, the scale bars will also move provided you make the position adjustments to Group 1. When you change to a different tool, such as the zoom box, the View is redrawn.



Scale bars enlarged in regular drawing mode to show detail.

STEPS

- ☑ click on the Add Scale Bar icon
- ☑ change the units in the Map Units panel to feet then set the length to 10000
- ☑ check that the font is still the font selected previously
- ☑ click on [OK] in the Scale Bar Layer Controls
- ☑ repeat steps 1–4 except change the units to kilometers, enter 2 for the Length and change the Units Label to km
- ☑ for Vertical Attachment (Layout panel of the Group Settings window) with the km group active, click on [To] and choose *feet*, then Top to Bottom, with a Spacing of 0.1"; make the horizontal attachment also to *feet*, Center to Center
- ☑ select the *feet* group and attach it vertically Top to Bottom, with a Spacing of 0.1" to the *miles* group, and horizontally, Center to Center, also to the miles group
- ☑ select the *miles* group and attach it vertically to Group 1, Top to Bottom, with a 0.2" spacing and horizontally to Group 1, Center to Center
- ☑ right click and turn off Wireframe View
- ☑ click on Save Display (name the layout if not yet saved)

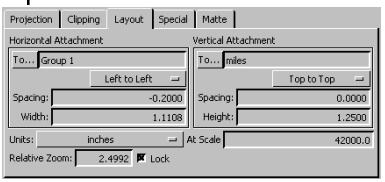
Adding a Logo and North Arrow

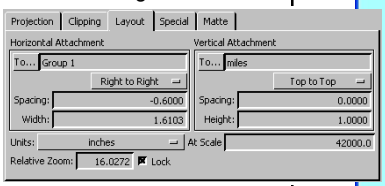
STEPS

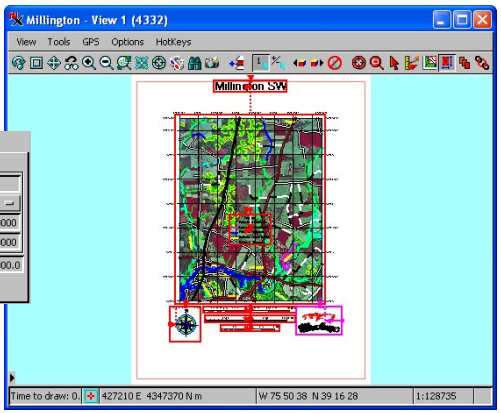
- ☑ click on the Add 2D Group to Layout icon
- ☑ click on the Add Objects icon, and select the NORTH object from the LAYOUT Project File
- ☑ change the Group Name to North Arrow in the Group Settings window
- ☑ set the Horizontal Attachment To Group 1 (Left to Left) with a spacing of -0.2" and the Vertical Attachment To *miles* (Top to Top)
- ☑ set the Height to 1.25" (type directly in the Height field)
- ☑ click on the Add 2D Group to Layout icon, then on the Add Objects icon, and select the MIGLOBE object from the LAYOUT Project File
- ☑ change the Group Name to Logo
- ☑ set the Horizontal Attachment To Group 1 (Right to Right) with Spacing of -0.6 and the Vertical Attachment To *miles* (Top to Top)
- ☑ set the Height to 1.0"
- ☑ click on the Redraw icon

Map layouts generally contain one or more components that are not georeferenced. In addition to annotation text and legends, which are sized relative to some map scale when added, there may be a north arrow and logo or other strictly graphic components. All such components must be placed in separate groups so they can be sized independently.

You usually have to change the relative zoom in order to get ungeoreferenced objects to display correctly with georeferenced objects. You do not want to make direct entries into the Width, Height, or Relative Zoom fields for georeferenced layers unless adding an enlarged or reduced inset to your layout (see later exercise on Relative Zoom). However, to make the size of an ungeoreferenced group reasonable in a layout, you can enter the desired number in any of these fields, and the other two will be automatically adjusted. Direct entry into one of these fields overrides the Lock toggle, which prevents accidental resizing while repositioning a group with the mouse.



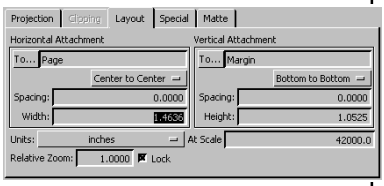




Adding a Legend and Descriptive Text

A line legend object has been prepared for your use in this layout. This legend includes only the water related line features; road lines are not included. You create your own vector and raster legends in later exercises.

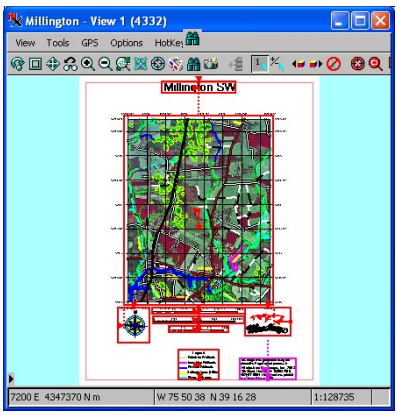
Text entered as part of a layout is saved in the layout properties, which eliminates the need to keep track of the text separately. You can also open a text file to supply the text. You can edit text after it is entered by opening the layer controls and typing in the changes. You do not need to press <enter> at the end of a line when Word Wrap is turned on in the Advanced Settings unless you want to force a line break at a particular location. You can elect to justify (align on left and right) a text block if Word Wrap is turned on. If the width of the font you are using is significantly greater than Arial, the lines may be broken differently than shown.

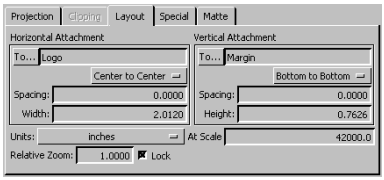


This image map was generated using the interactive Page Layout process in TNTmips from MicroImages, Inc., 206 S. 13th Street, Lincoln, NE 68508-2010, (402)477-9554. The layout was printed on a (name of your printer).

STEPS

- ☑ choose Add/Legend/Quick-Add Legend from the Display Manager menu, and select LINELEGEND from the LAYOUT Project File
- ☑ leave the Horizontal Attachment as is and set the Vertical Attachment To Margin (Bottom to Bottom)
- ☑ click on the Add Text icon, click on the Text Style icon and then on [Advanced Settings], turn on the Word Wrap toggle, set the block width to 2.00 inches, click [OK], then set the Ascender Height to 8 Points with a Vertical Space of 9.5 Points with Normal style
- ☑ type in the text at the left, and click on [OK]
- ☑ set the text group's Horizontal Attachment to Logo (Center to Center) and the Vertical Attachment To Margin (Bottom to Bottom)





- ☑ click on the Redraw icon

Note: the icons to add objects automatically placed in separate groups, such as text, scale bars, and legends, are found on the toolbar in the Display Manager window. Object types that may exist with others in a group, such as rasters and vectors, are added from the Add Objects icon or the Add menu. If you want one of the latter objects to be in a separate group, you must first add a new group.

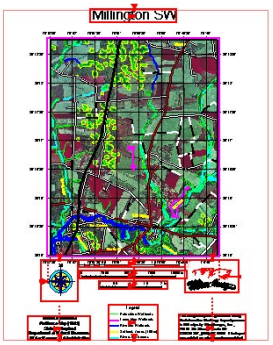
One More Text Block and Clipping

STEPS

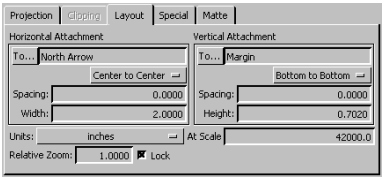
- ☑ click on the Add Text icon and set the Text Alignment to Center and the Ascender Height to 9 Points with a Vertical Space of 11 Points
- ☑ type in the text in the box at the right (press <enter> after each line), then click on [OK]

Nontidal Wetlands
Guidance Map (1989)
State of Maryland
Department of Natural Resources
Water Resources Administration

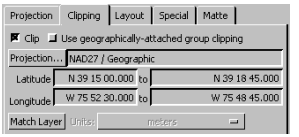
- ☑ set the Horizontal Attachment To North Arrow (Center to Center) and the Vertical Attachment To Margin (Bottom To Bottom)
- ☑ select Group 1 with the map grid as the active layer and click on the Clipping tab in the Group Settings window
- ☑ click on [Match Layer] and check that the Projection is Latitude / Longitude with Latitude from N 39 15 00 to N 39 18 45 and Longitude W 75 52 30 to W 75 48 45
- ☑ turn on the Clip toggle
- ☑ click on Redraw
- ☑ click on Save
- ☑ choose Display/Print

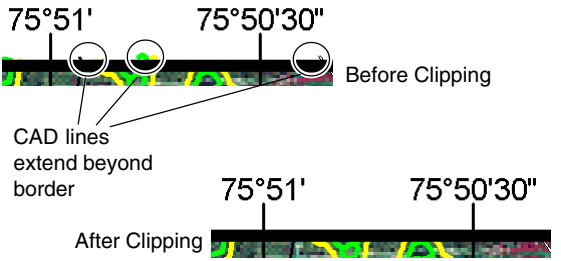


Your advanced settings are retained from one text block to the next. In the case of centered text with a return at the end of each line, the block width makes no difference except in the wireframe shown with the Placement tool. You can change text characteristics by setting them before you begin typing or by highlighting the text after typing and making the changes. TNTmips supports multiple text styles within a text block and shows the text as it will appear except that justified text appears as flush left in the Text Layer Controls window. If you right-click and turn on Show Formatting Codes, the text will be uniform and the codes used for mixed formatting will be shown.



You may have noticed while working with this layout that the CAD objects extend a little beyond the edges of the raster. We will clip this group to the raster extents to give a neater appearance to the printed product. Be sure to turn on the Clip toggle button at the upper left of the Clipping tabbed panel or the clipping parameters you enter will not be applied.





A completed version of this layout is also available with the sample data for this booklet (layout.rvc/Millington).

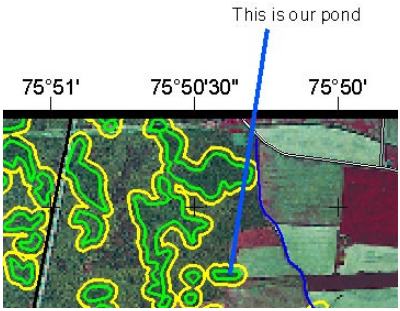
Additional Clipping Options

Groups can be clipped a number of different ways in the TNT products. Clipping is done on a group by group basis. Not all clipping options are manually set as in the previous exercise. There is a toggle on the Projection tabbed panel of the Group Settings window that is active as long as the Auto-Match option on the same panel is set to a choice other than None. When this Clip to Auto-Matched Layer toggle is on, the Clipping tab is inactive and the extents of the layer used for auto-matching are used for clipping. You could use this method to achieve the same results as in the previous exercise without having to enter geographic coordinates.

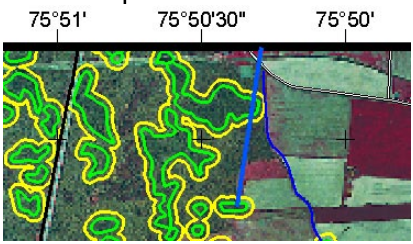
You have the option of clipping or not clipping a sketch layer when the group that contains it is clipped. This setting is found in the GeoToolboxon the Options/Sketch menu (Clip Sketch If Group Is Clipped toggle). When sketch layers are used as annotation, you probably do not want them clipped with the group. This toggle is off by default.

There is also a *Use geographically-attached group clipping* option on the Clipping tabbed panel of the Group Settings window. This option lets you use the same clipping settings as the group to which the active group is geographically attached. For more information on geographic attachment, see the later exerise entitled *Attach Groups by Georeference*.

- ☑ click on the GeoToolbox icon in the View window
- ☑ click on the Sketch tab and save the empty sketch layer
- ☑ make an annotation outside group extents in the open layout when Group 1 is the active group
- ☑ turn on the Options/Sketch/Clip Sketch if Group Is Clipped toggle and redraw
- ☑ turn off the toggle and redraw again
- ☑ delete the sketch layer then save the layout



sketch layer not clipped with group



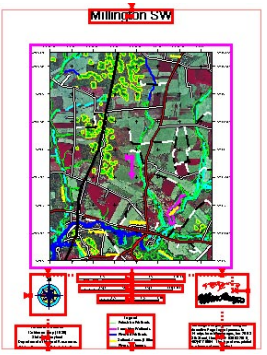
sketch layer clipped with group

Placement Tool Hot and Modifier Keys

STEPS

- ☑ change to the Layout Placement tool 
- ☑ change to wireframe viewing mode (note that redrawing is much faster for complex layouts in wireframe mode)
- ☑ click and drag Group 1 to just below the page heading
- ☑ click on the Redraw icon or press the spacebar or <enter> key
- ☑ return Group 1 to its original position
- ☑ hold down the <shift> key, then click and drag Group 1 to just below the page heading again
- ☑ note the change in relative spacing between Group 1 and the groups attached to it (North Arrow, scalebar, and logo)
- ☑ close the layout without saving the changes

Note: you can also change between tools when the View window has focus. These hotkeys are shown on the Tools menu and in ToolTips.



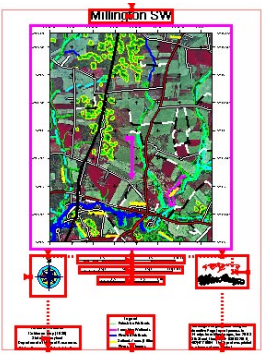
original layout

The Layout Placement tool has a number of keyboard shorcuts to make your layout manipulations quicker. These keys are only active when the View window has focus. Both the spacebar and the <enter> (or <return>) key redraw the view when the Placement tool is active. The arrow keys work to nudge the active group and all groups attached to it.

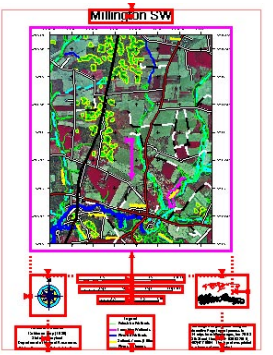
Holding down the <shift> key while dragging or using the arrow keys to move a group that has attachments from another group will move the group you are dragging without repositioning the groups attached to it. The unmodified dragging action (<shift> key not pressed) repositions the group you are dragging and all the groups attached to it.

The zoom control hot keys are availablle when using the Placement tool just as they are for other Display activities. Choose the desired option from the HotKeys menu in the View window. Note that the spacebar and arrow key functions are different than listed on the menu when the Layout Placement tool is active.

The View window automatically gets focus when doing any dragging action because you must click on the window. Check that the View window has focus if you are using hot keys and do not get the intended action.



Group 1 dragged without <shift> key held down



Group 1 dragged with <shift> key held down

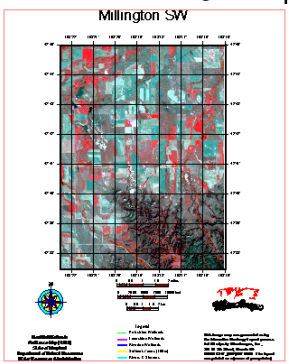
Maps in a Series: Same Paper Size

You may be doing production work in which you want to make a series of maps that use roughly the same layout. The selections you make when setting text sizes and line widths determine how easy it is to reuse a layout. In general, the At Design Scale settings are best suited for a series of maps designed for the same paper size. Such maps may contain different depictions of the same ground area or may be of a different location at the same map scale. Templates can easily prompt you for replacement objects for such a map series (see the next two exercises). This exercise describes how to alter a layout for a different location at a different map scale because it is a somewhat more complex problem.

You can "reuse" a map grid from one layout to another that covers a different geographic area by opening the Map Grid Layer Controls and updating the extents of the map grid without altering other parameters. If the map scale is significantly different, you may also want to change the grid interval.

The width and text size for scale bars is always relative to a map scale, so you need to change this scale to the new layout scale to keep the same text size and width. The length automatically changes to be correct at the new layout scale, however, you may want to change the assigned length of the scale bars. You also need to select the groups containing the logo and north arrow and enter the desired height (or width).

The text groups may need to have the text changed to correctly identify the new map; Millington SW should be changed to Crow Butte in this example. Some text layers, such as the one at the lower right, may apply to all layouts without editing.



STEPS

- ☑ click on the Open icon, and select the Millington layout saved on p. 19 (if not open)
- ☑ choose Save As from the Display menu and create a new object in the CIR_COMP Project File
- ☑ with Group 1 selected, turn off the Clip toggle* on the Clipping panel and set the map scale to 86000 (Layout panel)
- ☑ remove the raster and three CAD layers (DO NOT remove the map grid layer)
- ☑ click on the Add Objects icon, select COMPOSITE from the CIR_COMP Project File, and lower the raster
- ☑ open the Map Grid Layer Controls; change to N-S Range of N 42 37 30 to N 42 45 00 and E-W Range of W 103 22 30 to W 103 15 00
- ☑ on the Interval panel, change the Interval to 0 01 00 in both directions, and click [OK]
- ☑ open the layer controls for each of the scale bars and change the At Scale value to 86000
- ☑ set the Height for the North Arrow group to 1.25" and the Logo group to 1.0"
- ☑ click on Redraw
- ☑ choose Display / Close (saving is up to you)

* If this toggle is not off, only the legend and text groups draw.

Maps in a Series: Different Paper Sizes

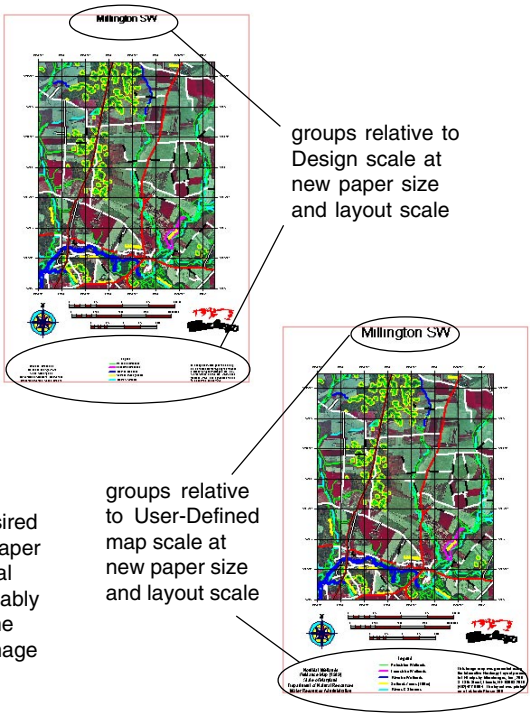
STEPS

- ☑ click on the Open icon, and select the Millington layout saved on p. 19 (not p. 21)
- ☑ choose Save As from the Display menu and create a new object in the same Project File
- ☑ choose Display / Page Setup, click on [Model], and select a printer able to print to B size paper (11" x 17", such as the HP PaintJet XL)
- ☑ on the Size panel, set the Map Scale to 28000, change the Media Size to B, and click [OK]
- ☑ select each of the three text groups (*Millington SW*, *This image was generated using the*, and *Nontidal Wetlands*), open the layer controls for each, and change the Scale setting to User-Defined [42000] in the Text Style Editor window (recall that 42000 was the scale of the Millington map on A size paper)
- ☑ open the Layer Controls for the legend and set the scale to User-Defined Map Scale [42000] in the Legend Layer Controls Sizes panel
- ☑ click on Redraw

Note how much closer to the desired result you come when changing paper sizes if User-Defined at the original map scale is set. You would probably still want to increase the size of the heading and perhaps move the image map up a little on the page before printing this layout.

The maximum printable area in TNTmips Free and Basic is tabloid size (11" x 17"), which is sufficiently larger than letter size to illustrate the effect of changing paper size on a layout. You do not actually have to have the printer to select it (if choosing models with the Printer option toggled on).

Setting text and legend layers relative to some defined map scale means that they change size as the map scale changes, which is what you want to happen if you're also changing paper size when you change map scale. As mentioned on the previous page, scale bar size specifications (width and line thickness) can only be relative to a specified map scale. The text size can be relative to either a user-defined or the design map scale. The length of scale bars always adjusts automatically when the map scale of the layout changes.



Maps in a Series: Setting Up Templates

Layout templates are designed for use with maps in a series at the same layout scale and the same paper size. You could, however, have used a template for the last exercise, but the idea is to teach you a variety of methods for modifying layouts.

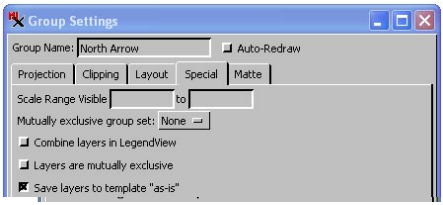
You need to do some preparation work with your layout before saving it as a template or you will be prompted for the contents of all replaceable groups in the layout. There is a single control that determines whether or not you are prompted for new group contents when a template is opened. This control is located on the Special panel of the Group Settings window. You need to turn on this toggle for each group that will be a constant feature in your map series, such as the North arrow and logo.

Scale bars are one layer type for which this toggle does not need to be set—they will be the same, unless you change the map scale, and then they are automatically adjusted. Legends also remain the same without any special settings. If the same legend does not apply to the new map, you will need to change the legend (see exercise on page 25). With multi-object legends, as long as the layer names remain the same, the legend will be updated to reflect the new objects. The layer name can be the file and object name, the object name, or the object's description. The one you select needs to be consistent across objects if you want the legend to apply to the replacement objects.

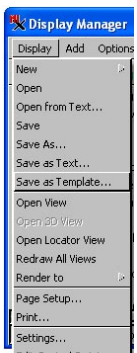
Groups with map grids are handled specially. Although you are prompted for replacement layers, the map grid remains and is automatically adjusted to the extents of the new group contents.

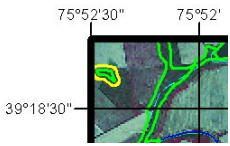
STEPS

- ☑ click on the Open Display icon, and select the Millington layout saved on p. 19
- ☑ click on the Group Settings icon for the North Arrow group
- ☑ click on the Special tab, then turn on the *Save layers to template "as-is"* toggle



- ☑ click on the Logo group
- ☑ turn on the *Save layers to template "as-is"* toggle
- ☑ click on the name of the *This image was generated using the* text group (lower right)
- ☑ turn on the *Save layers to template "as-is"* toggle
- ☑ click on the *Nontidal wetlands* text group (lower left) and turn on the same option
- ☑ choose Display / Save As Template
- ☑ save the template with your Millington layout, and name it MARYLANDMAPS
- ☑ note the coordinates at the upper left of the map





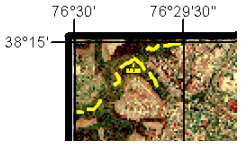
Maps in a Series: Using Templates

STEPS

- ☑ choose Display / Close, and click [No] in the Question prompt window
- ☑ click on the Open icon and select the MARYLANDMAPS template MarylandMaps
- ☑ when prompted to select the spatial layers for Group 1 choose COMPOSITE (raster) and STMARY_NW (vector) both in the STMARYS Project File
- ☑ when prompted for group clip settings, turn off the Clip toggle
- ☑ when prompted to enter replacement text for Millington SW, change the text to St. Marys City NW, and click [OK]

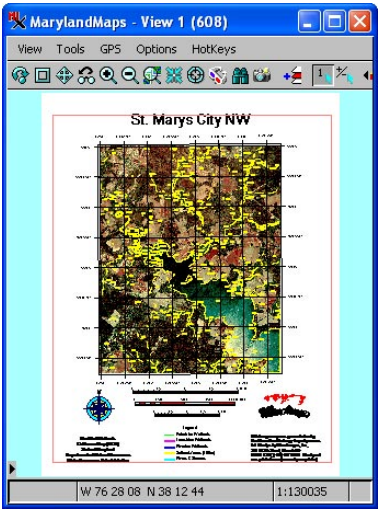
One of the features of templates is to prompt you for new group clipping extents if clipping was on in the layout from which the template was saved. If you recall, you had entered the extents for the Millington SW raster and applied clipping to Group 1. In the exercise on page 21 in which you manually update the layout, turning off clipping was included as one of the steps before the new layout was drawn. If clipping to the previous coordinates was still applied to the new Group 1, the image map would not be drawn since it is completely outside the clipping rectangle. Thus, if you are using a template to make a series of maps of the same ground area with different overlays clipped to specific extents, you will have to reset the extents for clipping the group when the template is loaded. The clipping extents at the time the template was saved are still listed on the clipping panel.

- ☑ zoom up on the upper left corner and note the map coordinates have been changed



Note: You can also create maps in a series using an SML script. This approach is described in the *Printing* booklet.

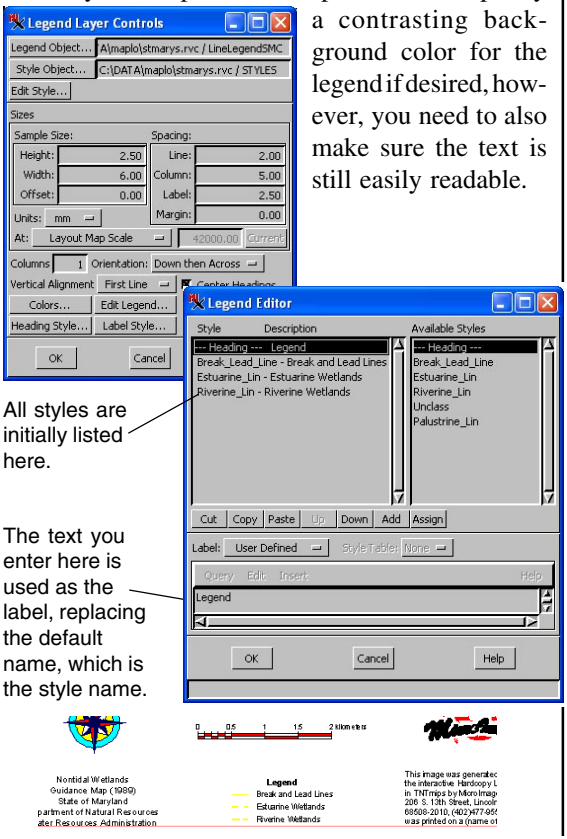
It is possible in a map series that the same legend would apply to all the maps, but that is not the case between the Millington and St. Marys City quarter quads. In the next exercise, you will learn how to make a new legend that does apply to this map.



Make a New Legend

You use the legend already in the layout as the basis for the new legend in this exercise. Creating a new legend object in this fashion has advantages over clicking on the Add Legend icon on the toolbar: you retain the group's position and you retain any styles defined for the existing legend, such as heading styles. You also don't need to delete the legend that no longer applies.

Yellow does not generally show up well in a legend printed on paper, yet it is an excellent color for visibility on this particular map. You could specify a contrasting background color for the legend if desired, however, you need to also make sure the text is still easily readable.



You might consider adding some space between the new legend and the margin because the new legend is not as tall as the original legend in the layout.

STEPS

- ☑ with the St. Marys layout open, click on the Legend icon in the LineLegend (or Millington w...)* group
- ☑ click on [Legend Object], navigate to your STMARYS Project File, click on the New Object icon, change *Millington* in the description to *St. Marys City NW*, and click [OK]
- ☑ click on [Style Object], navigate to the STMARYS Project File, and choose the STYLES object
- ☑ click on [Edit Legend], select Break_Lead_Line in the Style column, then edit the text in the field toward the bottom of the window to read *Break and Lead Lines*
- ☑ select Estuarine_Lin and change the text to *Estuarine Wetlands*; select Riverine_Lin and change the text to *Riverine Wetlands*
- ☑ select Unclass, click on [Cut], select Palustrine_Lin and click on [Cut]
- ☑ click on --Heading-- in the Available Styles column, then click on [Add]
- ☑ click in the text field toward the bottom of the window, type in Legend, and click [OK]
- ☑ click on Redraw
- ☑ click on the Save icon

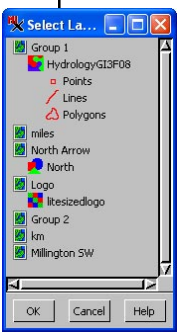
* The name of the group depends on whether you are viewing object names or descriptions for layers.

Interactive Legend Design

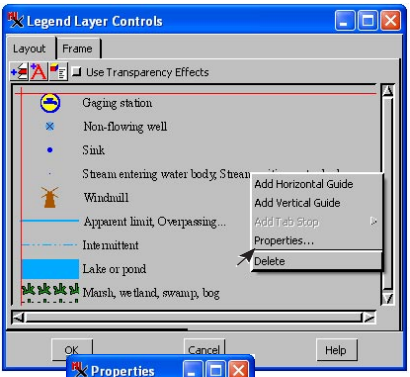
STEPS

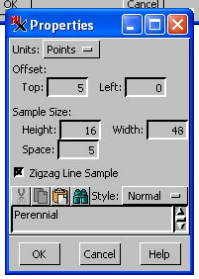
- ☑ click on the Open icon, and select the HARLANFRANKLIN layout in the DLG_HYDR Project File
- ☑ click on the Add Legend icon
- ☑ click on the Add from Layer icon on the Layout panel of the Legend Layer Controls
- ☑ click on Points for the hydrology layer, then click [OK]
- ☑ repeat steps 3 and 4, but choose Lines
- ☑ repeat steps 3 and 4, but choose Polygons
- ☑ right-click on the *Stream entering water body, Stream exiting water body...* entry and pick Delete from the menu
- ☑ right-click on *Apparent limit, Overpassing...*, and choose Properties
- ☑ double-click in the text field to highlight the text, type Perennial, then click [OK]
- ☑ click on Perennial, shift-click on Intermittent, then right-click, choose Properties, turn on the Zigzag Line Sample, and click [OK]
- ☑ keep this layout open for the next two exercises

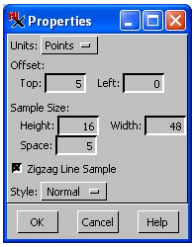
Multi-object legends let you combine legend information for multiple objects and/or multiple element types in a single legend. They also offer features not available in other legend types, such as interactive placement of legend components and the availability of frames and shadows. You will create a legend for the points, lines, and polygons from a single vector object. The method for adding additional element types or objects to the legend is exactly the same as that for adding the first. All new items in the legend are initially placed in a single column. Items are selected for moving or editing by clicking on them. Clicking on an item then shift-clicking on a second item will select the items you clicked on and all items in between. Holding the control key while clicking lets you make multiple, noncontinuous selections.



Another feature that distinguishes multi-object legends from the other legend types is they are stored as part of the layout, like scroll bars and text, rather than as separate objects. The legend is saved to the layout when you click on the OK button in the Legend Layer Controls. You can edit the legend by clicking on the group's legend icon.





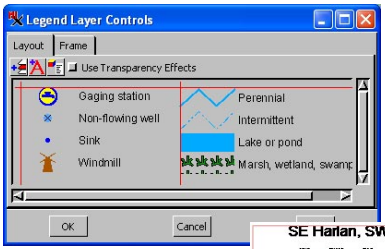


The label editing feature of the Properties window does not appear when more than one item is selected.

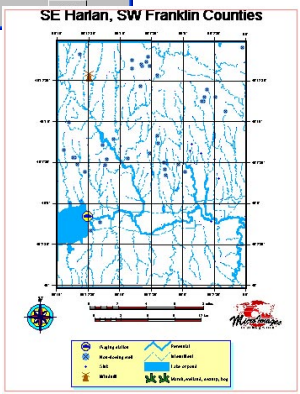
Finishing a Multi-Object Legend

Multi-object legends have two default text styles: Normal and Heading. Normal is used for labels and Heading is the default for added text. You can, however, change these assignments in the Properties window for the selected item. You can also change the font, size, and style of both text types using the Edit Text Style button at the top of the Legend Layer Controls. Additional text styles can be added for complex legends. A heading can be repositioned and edited like any other item in a legend.

You can control the amount of space between legend items using the Offset values in the Properties window. All items start out equally spaced, but this may be inadvertently changed while dragging. Simply select all items that you want to have the same spacing, right-click to open the Properties window and enter the desired value for the top and left offset. The top offset applies to the distance from the item or guide immediately above, so you may want a top offset of zero for the top item in each column. You can also change the order of items by dragging, and spacing will automatically be adjusted to accomodate the change.



If your printable area is smaller than that of the printer selected for the illustration, you may find that the legend is too large to fit in the remaining space. Just click on the Legend icon for the group and reduce the size of samples and text as needed. See the CartoScripts booklet for how to get CartoScript samples into legends.



STEPS

- ☑ right-click in the blank area of the Legend Layer Controls and choose Add Vertical Guide
- ☑ drag the new guide until it is about 1/4" right of the first legend item
- ☑ click on *Perennial*, shift-click on *Marsh, wetland, swamp, bog*, drag the group up and to the right until it is aligned with the top and new guides
- ☑ click on the Edit Text Style icon and change the parameters for Normal text if desired
- ☑ click on the Frame tab, turn on all three check boxes, and set the Angle to 330 or similar
- ☑ click on each of the color tiles and choose some color scheme you find pleasing (you should keep the backgound and drop shadow colors pale)
- ☑ click [OK], then click on the Layout Placement icon* (in View)
- ☑ set the Vertical Attachment to the Margin, Bottom to Bottom at a Spacing of 0.1"
- ☑ click on Redraw
- ☑ print the layout if desired

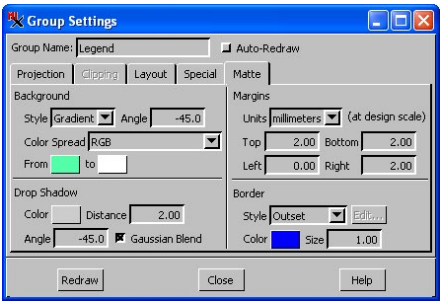
* Groups that can have only one layer, such as legends, scale bars, and text, have limited functions available in the Group Settings window, and the icon that opens the Group Settings window is the Layout Placement icon.

Mattes with Legends and Other Groups

STEPS

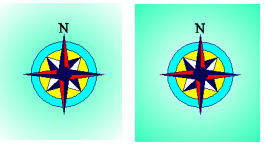
- ☑ click on the Legend icon to open the Legend Layer Controls, turn off the 3 toggles on the Frame panel, and click [OK]
- ☑ with Legend as the active group, click on the Matte panel in the Group Settings window
- ☑ set the background style to Gradient, then click on the first color tile and select medium bluegreen with 70% transparency

- ☑ leave the left margin at 0 mm, and set all others to 2.0
- ☑ set the Drop Shadow Color to a medium gray, the Distance to 2.0, and turn on Gaussian Blend
- ☑ set the Border Style to Outset, Color to blue, and Size to 1.0
- ☑ click on Redraw
- ☑ print the layout if desired



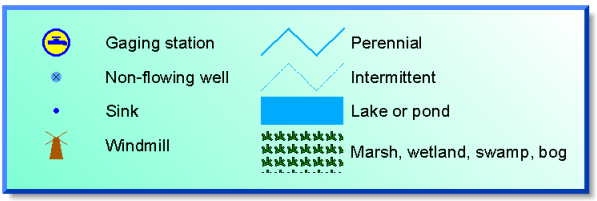
A legend frame, such as that set up in the previous exercise, is a simple example of a matte, or background layer. Mattes can be used for decorative effect with legends or any other group type and for entire layouts as well. A legend frame is limited to a solid border with a solid fill and a solid color drop shadow. Instead of setting frame parameters for a legend in the Legend Layer Controls, you can choose a matte for the legend group if you want more elaborate effects. Mattes provide gradient and radial fills using any two colors and the color spread type you specify. You can also specify solid fills. There are nine predefined border styles for mattes (solid, double, inset, outset, etched in, etched out, groove, ridge, and rounded), and CartoScripts can be used to create more ornate borders. You can choose a blended drop shadow for mattes in addition to the solid drop shadow available for frames.

Many solid colors are too dark for use as a matte background. You can lighten any color if you include transparency and the matte is part of a page layout to be printed on white paper, it will lighten the color considerably. Remember that mattes can be used for any group and that not all components of a matte need to be used.



radial background only
(colors reversed)

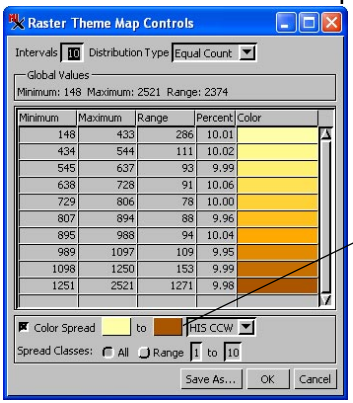
drop shadow only

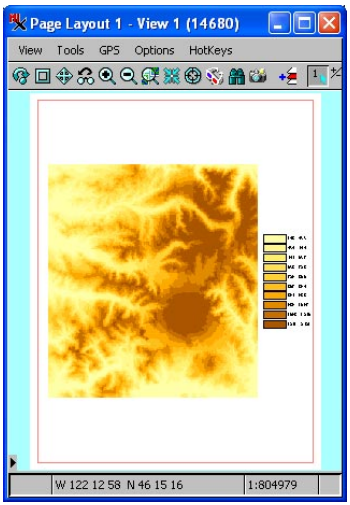


Raster Theme Mapping and Legends

The raster theme mapping feature automatically generates interval categories from the cell values of raster objects. The Raster Theme Map Controls let you set the number of intervals you want, the distribution type to use in determining the intervals, and the colors you want.

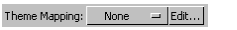
The raster theme map legend is automatically selected for you when you create a raster theme map. This legend will be used in the View window if you have the Show Legend option turned on. In the interest of space, you may want to choose an image sample or thumbnail for the legend even if it is theme mapped. However, the legend type you get for a raster when adding a multi-object legend is determined by the type of legend selected on the Legend tabbed panel of the Raster Layer Controls. You will not get the results shown in this exercise unless you leave the Legend Type in the Raster Layer Controls set to Raster Theme Map Ranges. If you want to add a legend for the raster to the page layout, saving space in the sidebar legend is not recommended.





STEPS

- ☑ click on the New icon and choose Page Layout
- ☑ click on the Add Objects icon and choose the raster in the MTSTHELENS Project File
- ☑ click on the Group Settings icon and set the layout map scale to 260,000
- ☑ click on the Layer Controls icon and click on the Edit button next to the Theme Mapping option menu



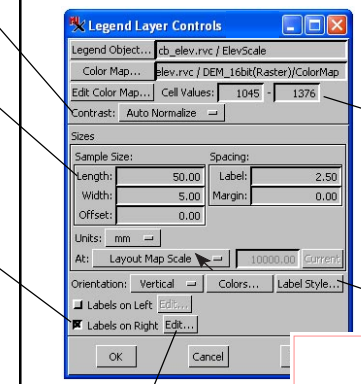
- ☑ change the color distribution to something more neutral by clicking on each of the Color Spread tiles
- ☑ click on OK and accept the default name for the theme
- ☑ click on OK in the Raster Layer Controls and redraw
- ☑ click on the Add Legend icon then on the Add from Layer icon in the Legend Layer Controls
- ☑ choose Group 1 and click OK
- ☑ in the Group Settings window, set the horizontal attachment for the legend group to the margin (Right to Right)
- ☑ set the horizontal attachment for Group 1 to the Legend (Right to Left) with a spacing of 0.1
- ☑ click on Redraw

Creating a Color Scale Legend

STEPS

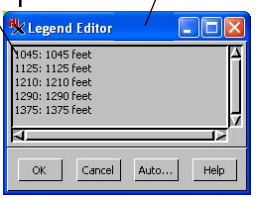
- ☑ click on New icon and choose Page Layout
- ☑ click on the Settings icon for the layout and change the Design Scale to 2X
- ☑ click on the Add Objects icon, and select DEM_16BIT in the CB_ELEV Project File
- ☑ set the contrast to Normalize and check that ColorMap is the selected Color Palette
- ☑ choose Add/Legend/Add Color Scale Legend
- ☑ create a new legend object (ELEVSCALE) in your CB_ELEV Project File
- ☑ when prompted for a color palette, select the DEM_16BIT raster then its COLORMAP subobject
- ☑ set the Contrast option menu to Normalize
- ☑ set the Sample Size Length to 50 and Width to 5 mm at the Layout Map Scale with a Label Spacing of 2.5 and Margin of 0 mm
- ☑ turn on the Labels on Right toggle button then click on [Edit] to its right
- ☑ enter the text shown in the Legend Editor window and click [OK]
- ☑ in the Group Settings window with the ElevScale group active, set the Horizontal attachment to Group 1 [Left to Right] with an Offset of 0.1" and Vertical attachment to Group 1 [Top to Top]

Color scale legends are most appropriate for quantitative data with a continuous spread color map. Because the color map value often does not reflect the real world value it represents, you need to enter the color map values you want labeled and the label text you want. We are going to have five labels such that the elevations end in either a five or zero. You can click on the Auto button and have the process generate the cell values and associated real world values over the range you enter. However these values are not likely to be multiples of five or ten. You need to enter units if you want them with the auto-generated values. You can use the procedure on the preceding page for a color scale legend but you get only two labels. These labels are the unadjusted highest and lowest cell values. Some controls for additional labels are provided on the Legend panel of the Raster Layer Controls.

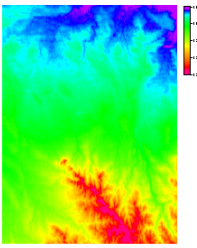


If you change the order of these values to 1376–1045, you will get the highest values at the top of the legend.

If you want a different label size, font, or color than your default for the legend, click here.



- ☑ click on [Apply] in the Group Settings window

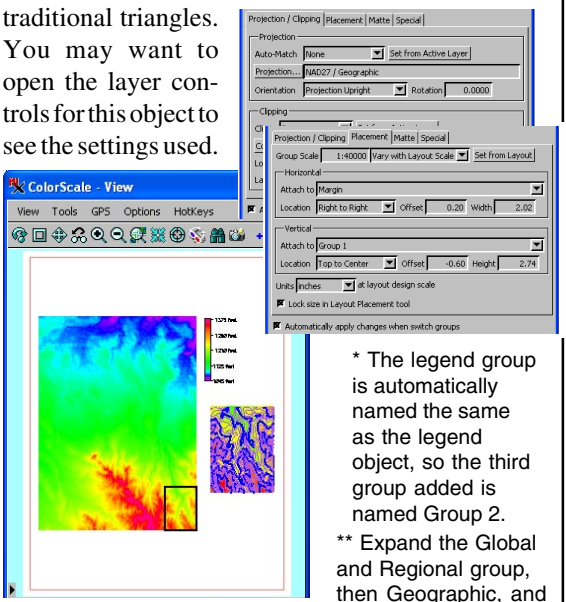


Relative Group Zoom

We are going to modify the layout just created to add a group that enlarges a portion of the raster already included. The Relative Zoom field in the Group Settings window should be used only to achieve this kind of effect or when mixing groups with and without georeferencing. The At Scale field in the lower right of the Group Settings window sets the map scale for relative sizing and printing. The map scale for printing can also be set in Page Setup.

You alter the group zoom when the Placement tool is active if you use any resizing functions with the Relative Zoom Lock button off. Any scale bars in the layout then do not accurately portray the ground distance of objects in groups with a Relative Zoom other than 1.0 unless the Relative Zoom of the scale bar group has been changed to match.

Note that the TIN object in Group 2 is being displayed directly as contours rather than as the more traditional triangles. You may want to open the layer controls for this object to see the settings used.



You may have to make some offset and scale changes depending on your paper size.

* The legend group is automatically named the same as the legend object, so the third group added is named Group 2.

** Expand the Global and Regional group, then Geographic, and select Geographic 2D: longitude, latitude (degrees)

STEPS

- ☑ select Group 1 and change its horizontal attachment to the Margin [Left to Left] with an Offset of 0.5"
- ☑ click on the Add Objects icon, and select the BLOWUPOUTLINE object from the CB_ELEV Project File
- ☑ click on the Add 2D Group to Layout icon (Display Manager)
- ☑ click on the Add Objects icon and select the DEM_16BIT and TIN_16LITE objects in the CB_ELEV Project File
- ☑ open the layer controls for DEM_16BIT, set the contrast to Normalize and check that the ColorMap is selected
- ☑ make Group 2* the active group, on the Group Settings Projection/Clipping panel set Auto-Match to None, the Projection and Coordinates to Latitude / Longitude**, the clipping range to N 42 37 30 to N 42 39 00 and the Longitude range to W 103 16 30 to W 103 15 00
- ☑ set the Horizontal Attachment to Margin [Right to Right] with an Offset of 0.2" and the Vertical attachment to Group 1 [Top to Center] with an Offset of -0.6 "
- ☑ enter 40000 in the Group Scale field
- ☑ click on [Refresh] then on the Save Display icon and create a new layout object

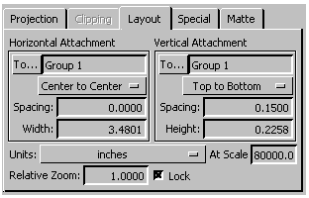
Scale Bars for Different Map Scales

STEPS

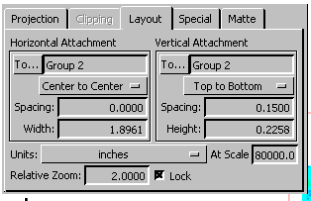
- ☑ click on the Add Scale Bar icon 
- ☑ change the Length to 4 miles
- ☑ check that the At Scale setting is 80000 (Bar Width should still be 0.08" and Text Size 7 Points)
- ☑ click on [Text Style] to check that the font is set as before
- ☑ in the Group Settings window, set the Horizontal Attachment To Group 1 [Center to Center] and Vertical Attachment to Group 1 [Top to Bottom] with a Spacing of 0.15"
- ☑ click on the Add Scale Bar icon 
- ☑ change the Length to 1.0
- ☑ change the At Scale field to 40000
- ☑ click on [Text Style] and change the At Scale selection to User-Defined (40000)
- ☑ in the Group Settings window, set the Horizontal Attachment To Group 2 [Center to Center] and Vertical Attachment to Group 2 [Top to Bottom] with a Spacing of 0.15"
- ☑ set the Relative Zoom to 2.0 (DO NOT change the At Scale setting here)
- ☑ click on the Redraw icon
- ☑ click on the Save Display icon 
- ☑ print the layout if desired

When you have groups at different map scales on the same page, it is nice to provide a scale bar for each and perhaps text that identifies the map scale.

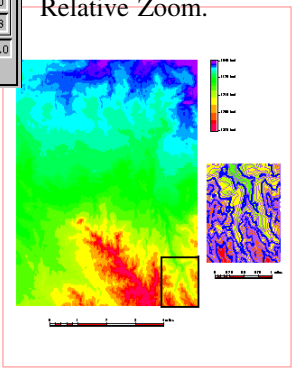
The area that is enlarged in this layout is identified with a box outline positioned in the larger image. Here it was added as a CAD object, but it can also be created in the Display process using the Sketch tool. Lines connecting the upper left and lower right corners of the box and its enlargement can also be added with the Sketch tool. Such cross-group connections in layouts work best when the groups are attached to the page or margin so their position does not shift when group extents are redefined by the addition of the sketch layer. (A sketch layer is added to the active group and obtains its georeference from that group.)



Just as you don't want to change a group's Relative Zoom unless you specifically intend to have groups at different scales on a page, you don't want to change the values in the Height and Width fields in the Group Settings window. Changing these fields also changes the Relative Zoom.

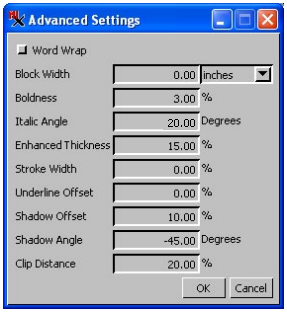


You could easily include text groups to provide the map scale of the two images ("Scale = 1:80000" for Group 1 and "Scale = 1:40000" for Group 2).



Advanced Text Features

The TNT products give you complete control over the text styles that appear in your legends and layout. You can adjust the boldness, italic angle, enhanced thickness, stroke width (outline text and underline), underline offset, shadow offset, and shadow angle. The two angle settings are expressed in degrees and all other settings as a percentage of the ascender height. Using a percentage of the height keeps the weight of the text constant as you zoom in and out or change point size (provides scalability).



With Word Wrap turned on, the text flows to the next line in the Text Layer Controls window. The text flow will be different than the way the text flows on the page unless the window width is the same as the block width. When text is drawn at the block width specified in the layout, word wrap has to pick the best place to break a line regardless of the text alignment chosen. Using word wrap means you need to use the <return> or <enter> key only at the end of a paragraph. Word wrap will break a line at a space, tab, or hyphen. You can manually insert a hyphen if you think it would improve the appearance of a line. Generally, you do not want to turn on Word Wrap for single lines of text, such as headings, because they may inadvertently wrap onto a second line.

All of the text settings and advanced options apply equally to selected text in text layers and legend text except that word wrap is always on in multi-object legends and the block width is not defined by a field, but by the position of a vertical guide.

STEPS

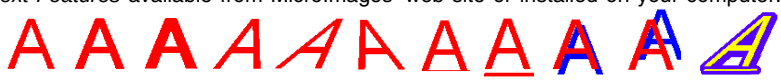
- ☑ open the layout you worked with on p.26–28
- ☑ click on the Text icon for the SE Harlan, SW group
- ☑ highlight the text and change the style to Enhanced, change the Foreground Color to yellow and the Background Color to blue, click [OK], and redraw

- ☑ note the appearance and width of the text, repeat step 2, highlight the text, click on the Text Style icon then on [Advanced Settings], change the Enhanced Thickness to 10%, click [OK], redraw, and note the text's appearance and width

- ☑ repeat steps 2–4 and try other text style modifications so you understand what the advanced options do

Note: Changes you make in the Advanced Options window are retained for the next time you add a text layer. The Clip Distance option applies to vectors with labeled elements that have the "clip under" option turned on. If you want to return to the initial default values, they are shown in the window above.

For information on all the text styles shown below, see the color plate entitled *Advanced Text Features* available from MicroImages' web site or installed on your computer.

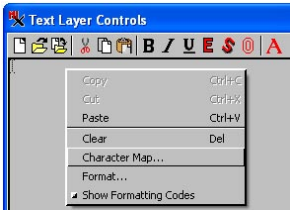


Using the Character Map Feature

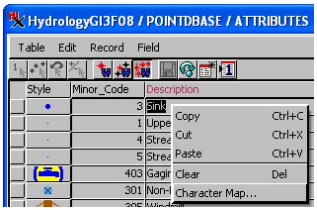
Vocabulary: Glyph is a generic word that encompasses both alphanumeric and symbolic characters.

STEPS

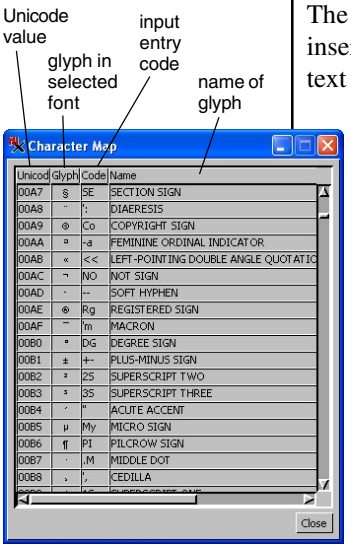
- ☑ click on New and choose Display Layout
- ☑ click on the Add Text icon
- ☑ right-click over the text entry area and choose Character Map
- ☑ scroll through the available glyphs and double-click on any you would like to insert



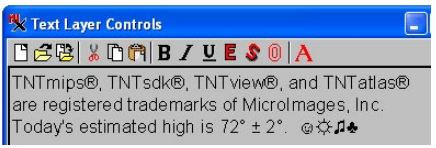
You can insert special characters from any font you have installed on your machine. You may know the input entry codes to type directly from the keyboard for some of these characters, but the TNT products provide a graphical interface for you to select and insert all special characters in the currently selected font. The Character Map window also provides the input entry code for these characters so that you can learn them and type them directly from the keyboard if used often.



You can also use the Character Map to assist with text entry when editing database fields. Your selected interface font is used for text in database fields. Change your interface font if you need characters that are not in the current interface font (Tools/System/Fonts).



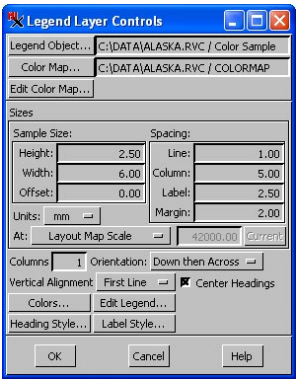
The Character Map window can remain open for insertion of additional special characters in the same text layer or database table. Simply continue entering text and use the Character Map window to insert glyphs as needed. For direct keyboard entry of unusual glyphs, press F2 followed by the input entry code shown in the third column of the Character Map window and press F2 again.



All of the text above was directly entered or selected and inserted from the Character Map window with Arial as the selected font.

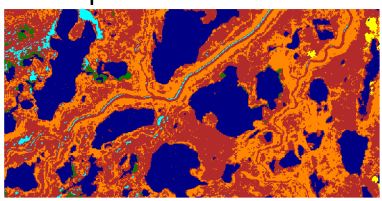
Other Legend Types

Map grids and text are saved as a part of the layout object so when you do a Save As and create a new layout object, the original is not affected by changes to text and map grids in the new layout. Legends, except for multi-object legends, cannot be altered in one layout and maintained in their original form in another because changes are saved to the legend object rather than as part of the layout object.



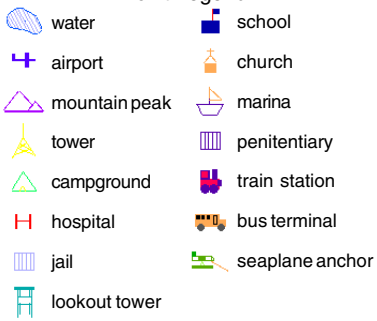
Color Sample
Legend Display Controls

The legends not yet discussed in this booklet are color sample, color scale ranges (available only in View window legends and as part of a multi-object legend), and separate point and polygon legends. The controls for all of these legend types are nearly the same as those already described. Color sample legends are intended for raster objects that contain categorical data, such as Feature Mapping results. You get a legend entry for each active entry in the color map, which is identified by default by its cell value. The number of cells that have this value is also provided in parentheses on the same line as the color sample and cell value. You can of course edit these entries to replace the cell value with the class name or to convert the number of cells to ground area. Color scale range legends are a cross between continuous color scale and color sample legends. You specify the number of samples you want and discrete samples are provided to represent a range of values. Design elements for raster legends as part of a multi-object legend are found on the Legend panel of the Raster Layer Controls.



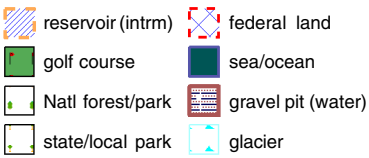
Feature Map with default
Color Sample legend

Point Legend



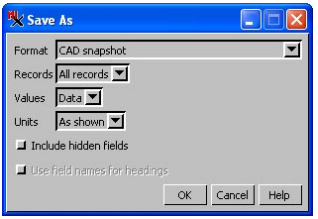
Like line legends, point and polygon legends use a style object to derive the samples and their labels. You can edit the default labels so you can include spaces and punctuation if desired.

Polygon Legend



CAD Snapshots of Database Tables

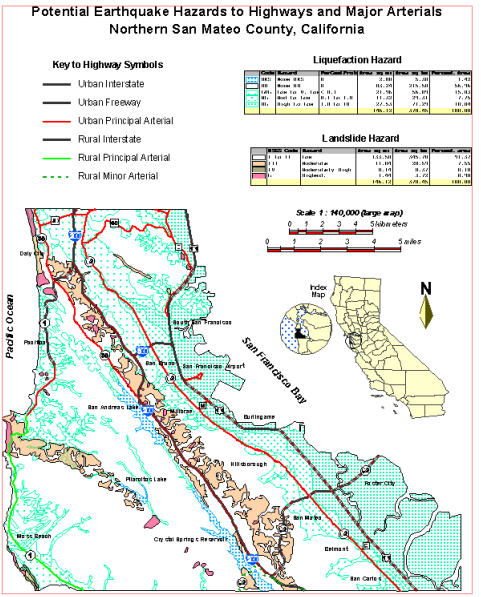
- ☑ click on Open Display*, and select QUAKEHAZ in CADSNAP.RVC
- ☑ open the LIQSUSCEPTCLASS table in the polygon database of of the QUAKEHAZ / LIQMAP layer in Group 1
- ☑ right click on Description field heading and choose Hide Column
- ☑ choose Table / Save As, set the options as shown at the right, and click [OK]
- ☑ create a new object named LIQUEF, change the font for all three styles to Courier or another monospaced font, and check bold for the heading style only
- ☑ click on the Polygon icon and set the solid fill color for BkgndEven and BkgndOdd to white
- ☑ click on the Line icon, set the HORZ_RULE color to white, then click [OK]
- ☑ open the LANDSLIDESUSCEP table in the polygon database of the QUAKEHAZ / LANSLMAP layer in Group 1
- ☑ right click on the Slope and Landslides field headings and choose Hide Column
- ☑ choose Table / Save As and repeat steps 4–7 except name the CAD object LANDSLIDE
- ☑ click on the Add Objects icon for Group 2 and choose LIQUEF
- ☑ click on the Add Objects icon for Group 3 and choose LANDSLIDE created in step 10, then redraw



Tabular database information can be included in layouts in the form of CAD snapshots. You can make these snapshots in the Database Editor, while displaying the associated object alone, or while building the layout. This snapshot can include all of a table's fields or selected fields can be hidden and not included. A CAD snapshot is not georeferenced, so it needs to be placed in a separate group with an adjusted relative scale. Groups with appropriate relative scale have already been created for you in this exercise.

The headings that appear over the CAD snapshots once added to your layout are not visible in the initial layout because they are attached to empty groups, namely the groups that you add the snapshots to.

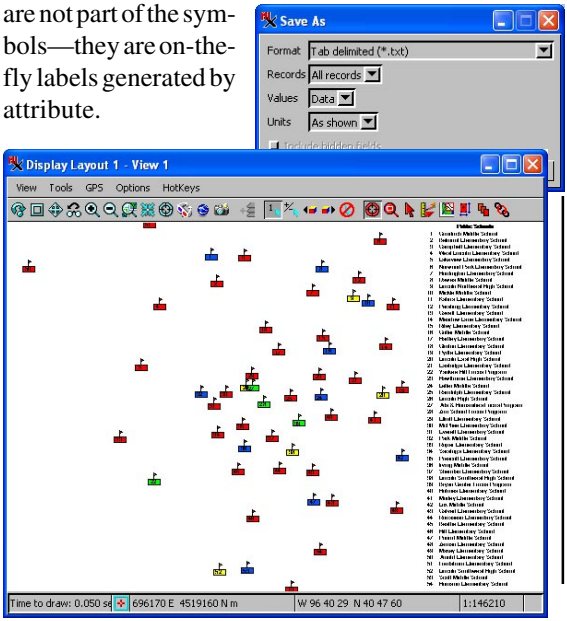
*This exercise cannot be completed in TNTmips Free or Basic.



Other Legends from Database Tables

Virtual (computed and string expression) fields are a powerful tool for many different applications. In this exercise, you are given a vector object that has a database table with an implied one-to-one attachment type and a single, computed field. Without any data entry, except the expression for the virtual field, you get a unique record associated with each element that supplies the information specified in the expression. You should look at the expression for this virtual field.

The expression combines the values from three fields in other tables with the formatting codes needed to get right aligned numbers that correspond to the numbers on the symbols and left aligned school names. You do not normally include formatting codes in a virtual field because they do not affect the database display. However, the intent was for this table to provide a legend so the formatting may as well be generated by the expression rather than inserted one line at a time later. Note that the numbers are not part of the symbols—they are on-the-fly labels generated by attribute.



STEPS

- ☑ click on the New icon and chooose Display Layout
- ☑ click on Add Objects, and select the vector object in the Schools Project File
- ☑ expand the School Points layer in the Display Manager ⊞ → ⊟
- ☑ expand the points and open the FOR_LEGEND table
- ☑ choose Table / Save As, change the Format to Tab Delimited, click OK and name the file SchoolPoints
- ☑ click on the Add Text icon, set the Text Alignment to Left, Ascender Height to 8 points, Vertical Space to 9.6 points, Foreground Color to black, and turn on the Normal toggle
- ☑ click on the Open icon, choose Open Text File, and select SchoolPoints.txt
- ☑ type Public Schools and <enter>, then highlight the typed text and turn on Bold
- ☑ click [OK] then [Yes]
- ☑ attach the SchoolPoints text group to Group 1 Left to Right with a Spacing of 0.5" and Top to Top, set At Scale to 80000 and Redraw

This exercise cannot be completed in TNTmips Free or Basic.

Hinting and Antialiasing Geometric Lines

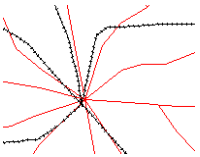
STEPS

- ☑ click on the New icon and select 2D Display
- ☑ select TIN_16LITE from the CB_ELEV Project File
- ☑ click on the Layer Controls icon, then on the Contours tab
- ☑ click on the Style button for Interval 1
- ☑ set the Width to 1.3 Screen Pixels
- ☑ zoom up on the lower right to a map scale of 1:10000
- ☑ open the TIN Layer Controls and, on the Object tabbed panel, experiment with the Antialias and Hint thin line widths options turned on and off, redrawing each time you close the TIN Layer Controls
- ☑ note the differences
- ☑ choose Display/Close

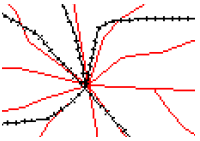
Aliasing is the stairstep effect in lines drawn digitally using a fixed, uniform color and intensity. Antialiasing removes or reduces the jagged effect. TNTmips accomplishes antialiasing using transparency to provide a smoother appearance for lines. Antialiasing is applied to any line that has a width of less than 1.5 pixels at the scale being drawn. The illustrations below were captured either from the View window or from a magnifier utility.

Hinting uses transparency to represent lines that would be less than one pixel at the current scale. Unlike antialiasing, which uses transparency to smooth the line where it would appear jagged, hinting applies to the line as a whole. The degree of transparency is proportional to how much less than one pixel the line width would be at the scale drawn. Hinting and antialiasing can be turned on and off independently for each View or for all newly opened Views.

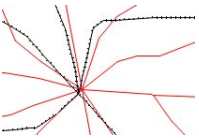
Hinting and antialiasing can be applied to all geometric object types. In this exercise they are applied to a TIN object being drawn as elevation contours.



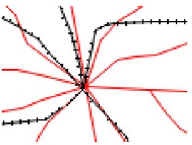
aliased
View capture



aliased
magnified

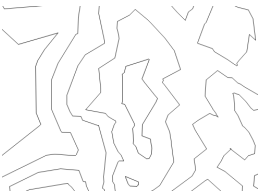


antialiased
View capture

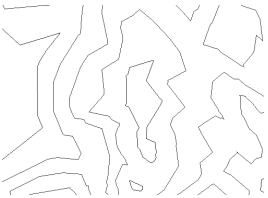


antialiased
magnified

hinting/antialiasing on



hinting off, antialiasing on

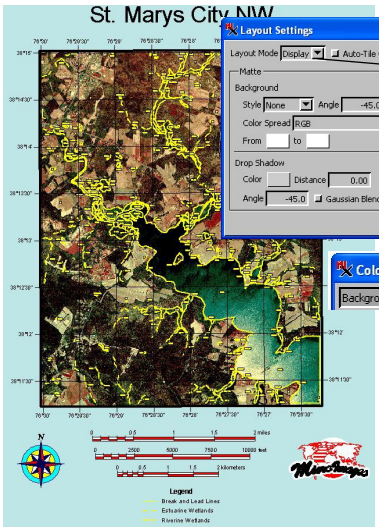


hinting/antialiasing off

Using Map Layouts in Presentations

When preparing a layout for printing *and* for use in a presentation by projector (either directly in TNTmips or from a presentation software package, such as PowerPoint), new considerations come into play. White is generally not used as a presentation background color, but it is the background color for Page Layout. You do not want a black background either, or the text will "disappear." The methods used in this exercise presume that screen capture provides high enough resolution for your presentation purposes. If not, there are a number of other strategies* to make presentation materials but the TNTmips Free size limits are applied to your exports.

The small text groups are deleted from the layout to illustrate you need not keep all groups of the original map for the screen capture. There is relatively little work to change this layout from hardcopy to display with appropriate attachments because, starting on page 12, specific attachments are made to Group 1 rather than the default Page attachment. You choose the Select tool in the next to last step so the placement rectangles are not visible for screen capture.



* If you need details on screen capture and other strategies see the *Sharing Geodata with Other Popular Products* booklet.

STEPS

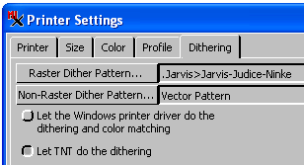
- ☑ click on the Open icon, and select the St. Marys layout (p. 25)
- ☑ click on the Layout Placement icon on the View window toolbar then on the name of the legend group to select it
- ☑ change the Horizontal Attachment to the km group Center to Center and the Vertical Attachment to the km group Top to Bottom with a spacing of about 0.2"
- ☑ delete the text groups in the lower left (Nontidal Wet...) and lower right (This image w...) of the layout
- ☑ change the heading text group to attach vertically to Group 1, Bottom to Top with 0.2" spacing
- ☑ choose Settings from the Display menu in the Display Manager window, set the Layout Mode to Display and click [OK]
- ☑ click on the Legend icon for the legend group, click on [Colors] near the bottom, and turn on the Transparent toggle to the right of the background color, then click [OK] in the Color Editor and Legend Layer Controls
- ☑ click on Full and on the Select tool
- ☑ capture the screen*

Printing to Files and Network Printers

STEPS

- ☑ if you have access to Windows printers, click on the Open icon, and select any hardcopy layout designed for A (8.5" x 11") or A4 sized paper
- ☑ choose Display/Print in the Display Manager
- ☑ click on the Use Windows Printer button

- ☑ click on the Dithering tab, and check that "Let TNT do the dithering" is selected



- ☑ click [Print], and collect your print once the Print process is finished
- ☑ choose Layout / Print, click on the Dithering tab and choose "Let the Windows printer driver do the dithering and color matching"
- ☑ click on [Run], collect your print when done, and compare

Note: the temporary raster for printing with the Windows driver requires six times the drive space needed by TNT (24-bit versus 4-bit).

TNTmips provides many different methods to print layouts. You can print immediately creating only a temporary raster, you can print to a raster object (4-bit dithered or 24-bit without dithering), or you can print to a print-file (no printfiles or 24-bit undithered in TNTmips Free). You need not have the layout open in a display process to print; printing from layouts, print rasters, and printfiles is available using the Main / Print From menu options, which use the saved objects or files without opening a View window. Print-rasters and print-files are more convenient than layouts when printing from a machine other than the one on which the layout was created because once you have a print-raster or print-file, the input objects are no longer necessary. (Almost invariably, some component of the layout is overlooked or placed in a file with a different name when the layout is copied.)

Print-raster objects can be viewed like any other raster object in TNTmips (but not in TNTmips Free, the print raster for an 8.5 x 11" page at 300 dots per inch is 2550 x 3300 cells). A print-file is not viewable; it contains the information required by the printer to print the page. A print-file is actually a pair of files, both with the name you assigned but one has a .p1 extension (large file) and the other has a .prf extension (small file). When printing from TNTmips Pro, but not from TNTmips Free, you can print over multiple pages, which gives you .p1, .p2, and so on, where the number corresponds to the page number. There is still just one .prf file. Printfiles can be printed on machines without TNTmips installed by copying them to the printer port (see p. 8 of the *Printing* booklet for explicit instructions).

You can also print to any network printer available when you print from TNTmips. If running Windows or on a Mac, you have the option of letting Windows/Mac OS X or TNTmips do the dithering. You should try both to see if you have a preference.

3D and Transparency in Layouts

You can make use of both 2D and 3D groups when designing layouts for display or hardcopy. An elastic box is provided with the 3D Viewpoint Selection window that opens when the Viewpoint Controls are opened so you can select the area of the 3D view to include in the layout. You also have all the 3D Viewpoint controls that you use when working with a separate 3D group.

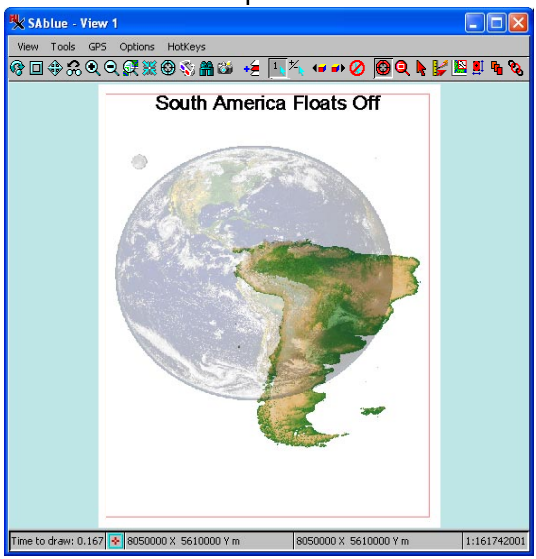
Transparency can be used with any layer type. Once transparency is set for viewing, there are no additional settings to get the transparency effects to print. Transparency is set for vector, CAD, and TIN layers as part of the polygon drawing style. Transparency can be set for rasters in a variety of ways. You can assign a percentage transparency to individual color map values; you can assign a percentage transparency to the raster as a whole (Options panel of the Raster Layer Controls); or you can select an 8-bit mask that provides transparency values for the raster displayed (0 is fully transparent, 255 is opaque).

STEPS

- ☑ click on Open, and select TRANSPARENT 3D from the CB_ELEV Project File
- ☑ click on the Layer Controls icon for the COMPOSITE layer in Group 1
- ☑ click on [Mask], select DEM_16BIT from the CB_ELEV Project File, turn on the Mask toggle, click OK, then redraw
- ☑ repeat step 3, turn off the Mask toggle, click on the Options tab, enter 70 in the Transparency field, click [OK], and redraw
- ☑ note the difference in transparency between steps 3 and 4
- ☑ print after step 3 or 4 to confirm that transparency is used in printing

without transparency

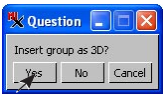
without 3D



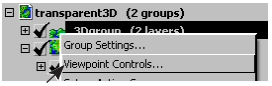
More on 3D Groups in Layouts

STEPS

- ☑ with the layout still open from the previous exercise, set the transparency for the layer in Group 1 back to 0%
- ☑ right-click on Group 2 and choose Remove Group from the menu
- ☑ choose Add/Saved Group in the Display Manager, and select _3DGROUP from the CB_ELEV Project File, and click [OK]
- ☑ click on Yes when prompted to insert group as 3D



- ☑ right-click on the 3D Group icon and choose Viewpoint Controls

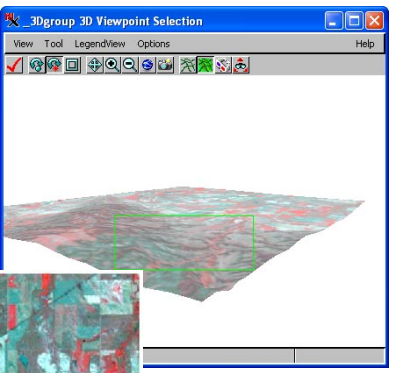


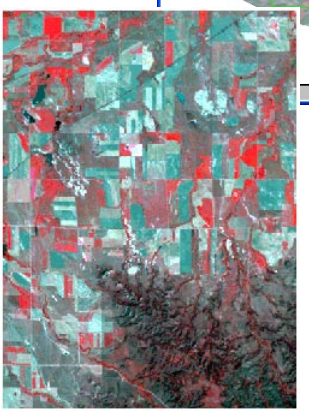
- ☑ note the features of the 3D Viewpoint Controls window
- ☑ left-click on the 3D Group icon to open the Group Settings window
- ☑ click on the Layout tab and attach the 3D group to the bottom right of Group 1 (Horizontal Attachment: Right to Right, Vertical Attachment: Bottom to Bottom)
- ☑ click on Redraw 

3D groups in layouts have an associated 3D Viewpoint Selection window in addition to the Viewpoint Controls. This window lets you choose which part of the 3D rendering you want to include in the layout and also has an Apply Changes button to indicate you are ready to update the changes made in viewpoint and/or area selected to the 3D group in the layout.

You can add a new 3D group to a layout and set up the viewpoint and selected area, or you can add a previously saved 3D group to a layout. You can also save a 3D group that you have set up in a layout and the selected area, as well as the viewpoint, will be retained, as it is for the 3D group you add in this exercise.

You can resize and reposition the existing box or draw a new box in the 3D Viewpoint Selection window. The box functions like any other elastic box in the TNT products.





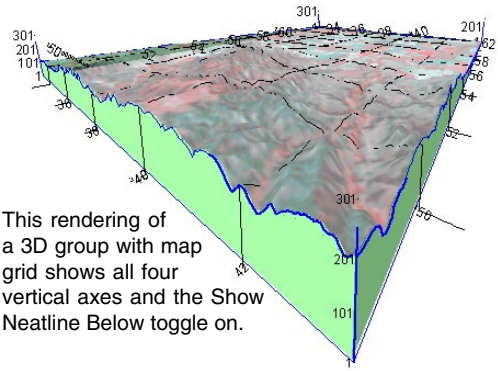
The combination of 3D and transparency in the group added, give the butte a more rugged appearance while blending well with the 2D image.

Map Grids in 3D Groups

You can have map grids in 3D as well as 2D groups. There are additional controls for 3D map grids. These include which vertical axes to show, where to position the neatline, and whether to include vertical tick marks. Map grids, like scale bars and text, are stored as part of the layout not as a separate object.

All of the settings that are unique for 3D groups appear an the 3D tabbed panel of the Map Grid Layer Controls, which is present only if you are adding a map grid to a 3D group. Your options for vertical axes are None, Farthest, Farthest Two, Farthest Three, and All. The values displayed on the vertical axes reflect the cell values and are not scaled. Here the cell values are 1 to 255. The labels at 100 meter intervals would be 1 to 301. You can change either end of the Z Range on the Extents panel of the Map Grid Layer Controls if the *Lock to group extents* toggle is not on. There are settings that pertain to Z values on all panels of this window except the Graphics panel.

The default 3D neatline outlines the edge of the surface. To get a good fit between the drape layer and the neatline you need to decrease the error tolerance of the surface layer, which means the group will take longer to render. You can vary this setting to see its effects.



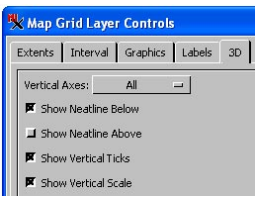
This rendering of a 3D group with map grid shows all four vertical axes and the Show Neatline Below toggle on.

For more information on 3D View Controls see the *3D Perspective Visualization* booklet.

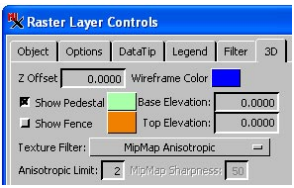
STEPS

- ☑ with the layout still open from the previous exercise, right-click on Group 1 and choose Remove Group from the menu, then click [Yes]
- ☑ left-click on the Layer Controls  icon for the surface layer and change the Error Tolerance to 0.5

- ☑ right-click on the remaining group name and choose Viewpoint Controls
- ☑ expand the selection box to include the entire 3D group
- ☑ click on the Add Map Grid  icon
- ☑ set the same map grid settings as on p. 6
- ☑ experiment with the different options on the 3D tabbed panel



- ☑ on the Labels panel, check that the Show in 3D options are checked



Additional 3D options are set on the 3D tab of the Raster Layer Controls for the drape layer.

Attach Groups by Georeference

STEPS

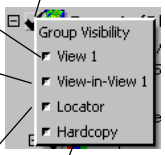
- ☑ open the layout saved on p.8
- ☑ click on the Settings icon for Group 2
- ☑ click on the Layout tab, then on [To] for Horizontal Attachment, and select Group 1
- ☑ set the option menu to Geographic, redraw, and note the difference

Note: once a group is attached geographically to another group either horizontally or vertically, it is automatically geographically attached to the same group in the other dimension.

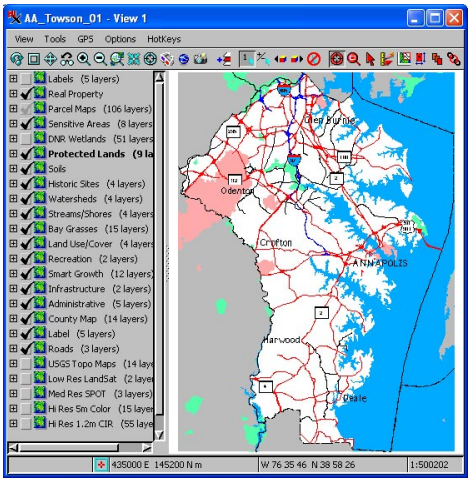
Geographic attachment of groups uses georeference information to provide exact geographic overlay of the layers in separate groups. Using georeference information as a means of establishing group position lets you organize the components of your layout. You can organize layouts with many layers into logical groups, such as parcel maps, wetlands, historic sites, and watersheds.

This type of organization makes it easy to locate particular layers if you have tens or hundreds in a layout. It also makes it easier for users that are not very familiar with your geodata, such as clients viewing your data in TNTatlas, to selectively turn layers on/off for viewing a whole group at a time or to locate individual layers within these groups.

Separate groups and layers can be turned on/off individually for viewing and/or printing. A right-click on the Show/Hide box reveals a menu with as many show/hide options as appropriate for your current display. Thus, you can use the same layout to print maps that present different themes determined by your current needs.



The visibility choices are the same for layers as for groups. The check mark will be dimmed if any View or the Hardcopy option is turned off.



This layout was developed by the Maryland Department of Natural Resources (MDNR) as part of the MERLIN (Maryland's Environmental Resources & Land Information Network) program.

The layout used for this exercise is not a likely candidate for geographic attachment, but demonstrates the mechanics. The example illustrated has 24 groups, one of which has more than 100 layers. All of the groups in this layout are geographically attached to the bottom group.

Map Scale-Controlled Visibility

Map scale-controlled visibility lets you set which groups, layers, and/or geometric elements are visible at any map scale. When geometric features are dense at full view, there is no point in displaying them until you reach a map scale at which they are well resolved. Your raster imagery may not be of sufficient resolution for display at the larger map scales where geometric display is appropriate (i.e., one raster cell may occupy many screen pixels). Remember that map scale is expressed as a ratio such that a map scale of 1:200 is a larger map scale than 1:100,000. The first time a geometric object is displayed, TNT's display process will warn you and suggest an initial map scale if the elements are too dense for reasonable display at full view.

The map scale ranges set for viewing are also used for printing. The group/layer/element must be visible at the layout scale set for printing for it to be printed. Thus, you could print maps with different layers shown from the same layout by changing only the layout scale and perhaps repositioning the layout on the page.

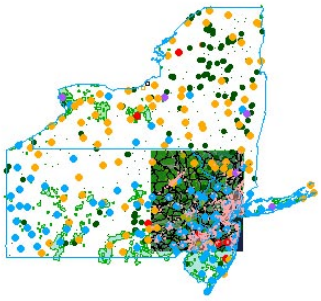
For more information on map scale-controlled visibility, see the *Working with Massive Geodata Objects* tutorial booklet and the *Layers in View Controlled by Scale* and *Elements in View Controlled by Scale* Quick Guides.

The need for map scale-controlled visibility is difficult to demonstrate in TNTmips Free-sized data sets. The layers in the layout used here were extracted from data sets with global extents. The vector-containing groups are geographically attached to the image group.

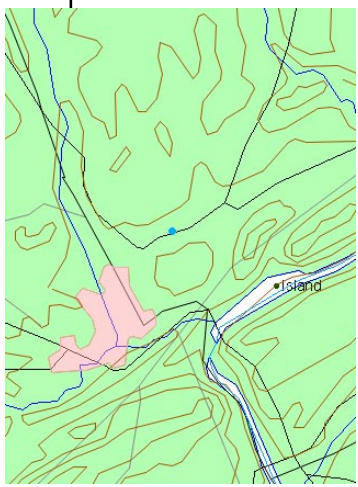
STEPS

- ☑ open the layout in the MapScale Project File
- ☑ zoom in and out and watch layers come and go
- ☑ right-click on the layout name and choose Set Scale Ranges
- ☑ notice which layers have map scale-controlled visibility

Keep this layout open for the next exercise.



map scale 1:10,000,000



map scale 1:200,000

Rendering Displays to Various Formats

This exercise assumes you have Google Earth installed. If not, download and install it. You also must be connected to the Internet to see the results.

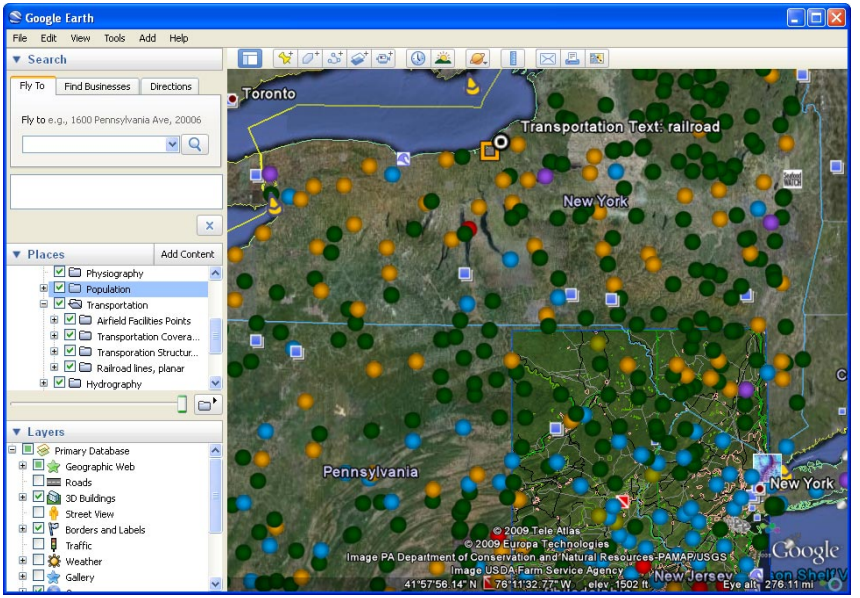
STEPS

- ☑ with the layout open from the previous exercise open, choose Display/ Render to/KML
- ☑ on the Options tabbed panel, set the Extents to Entire Display and turn on the Show result in Google Earth and Compress to KMZ toggles
- ☑ on the Raster Controls tab, set the cell size to 500 meters
- ☑ click on the Geometric Controls tab and set the Coordinate Accuracy to 100 meters

In addition to hardcopy output, you can render a group or layout to a raster object in a variety of formats, a KML (or KMZ) file, an SVG file, or a PDF file. The raster formats supported are RVC, JP2, GeoJP2, GeoTIFF, TIFF, JPEG, and PNG. All of these output types are georeferenced either internally or with an accompanying world file.

Render to Raster creates a single 16- or 24-bit composite color raster from all of the layers in your group or layout. You can set the raster size by number of rows and columns or by entering the cell size.

You get layer controls with KML, SVG, and PDF files either automatically or optionally. The additional controls provided depend on the output format selected. When rendering to KML, you have the option to open the result in Google Earth. With PDF files you can choose to open the result in your default Acrobat product.

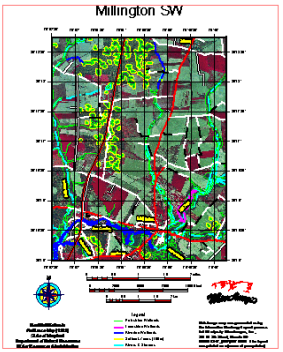


In Summary and Detail

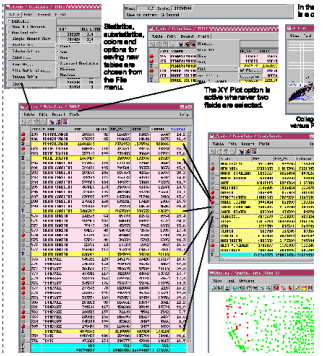
Think carefully before deleting groups in a layout. Have you established any attachments? Are you going to want some other layer in that position? If so, delete the unwanted layer(s), not the group.

If a layout is destined for reuse, pay attention to the relative scale settings. If you plan to print the same layout on a variety of paper sizes, set the scale for text and legends relative to a specified map scale for best results. If you want to use the same layout but replace the main image with another at a different map scale, set the scale relative to the design scale.

Attach groups to the page if you want them to be centered. Attach groups to the margins if you want them to remain in a fixed position on or near one of the margins. Attach groups to other groups if you want them to move together.



Sketch layers are added to the active group and derive their georeference from that group. A sketch that extends beyond the other layers in a group changes the group extents. All of the sketched lines in the partial layout shown at right are in the same group as the large database table. The table didn't move when the sketch was drawn because it is attached to the left and bottom margins.



The partial layout above consists of a variety of screen captures tied together with a sketch layer and annotation text.

Non-printer Destinations

In addition to directly printing your hardcopy layouts, there are a number of other choices for printers. One is to print to a TNTmips or Windows printfile, which can be printed from a computer not running TNTmips (see the *Printing* tutorial booklet for more information). You can also convert your layouts to a number of familiar file formats, such as TIFF, EPS (for Adobe Illustrator), PDF, and SVG. You get more controls using the render-to options discussed in the previous exercise for the supported formats (all but EPS), which is the recommended approach. You cannot print to these file types from TNTmips Free.

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