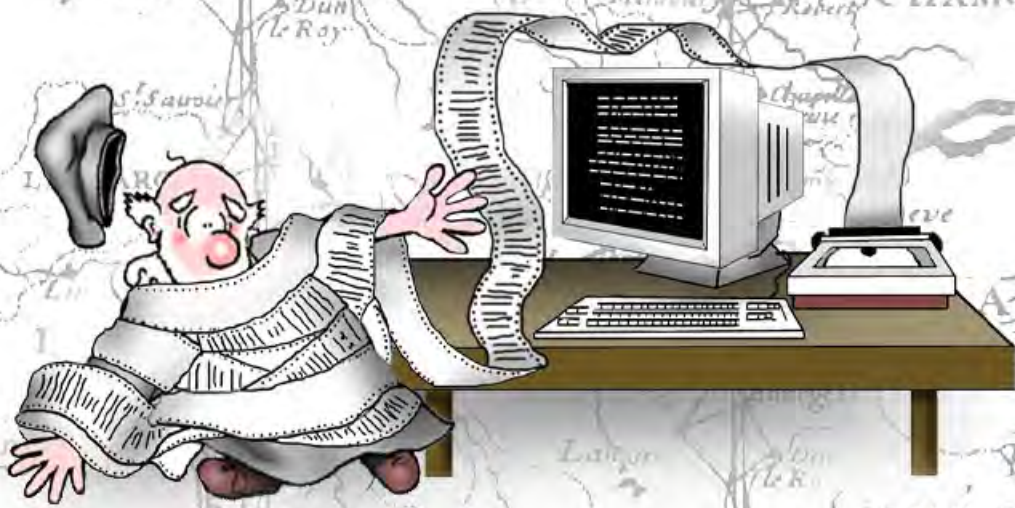


Tutorial



PRINTING

Printing



with

TNTmips®

TNTedit™

TNTview®

Before Getting Started

All the tools you need to create simple or complex maps and posters are found in the Hardcopy Layout, or Map & Poster Layout, process. Printing has its own issues once a layout is created. There are dithering and print drivers to consider. Printing a layout on different printers requires special consideration. There is also the question of how best to print maps in a series (TNTmips® offers both template and script approaches). In short, there is much more to be considered for printing than clicking on the Print icon.

Prerequisite Skills This booklet assumes you have completed the exercises in the *Displaying Geospatial Data* and *Navigating* tutorial booklets. The exercises in those booklets introduce essential skills and basic techniques, which are not covered again here. The *Making Map Layouts* booklet is a companion booklet to this one. You should understand how layouts are created before you begin printing them. Without this knowledge, you will not understand why layouts may appear to change when selecting different printers.

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 CD, you can download the data from MicroImages' web site. The exercises in this booklet use the files and objects in the PRINTING directory of DATA. Make a read-write copy of these files on your local drive.

More Documentation This booklet is intended only as an introduction to the printing functions in TNTmips. Consult the TNTmips reference manual for more information.

TNTmips and TNTlite® TNTmips comes in two versions: the professional version and the free TNTlite version. This booklet refers to both versions as "TNTmips." If you did not purchase the professional version (which requires a software license key), TNTmips operates in TNTlite mode, which limits the size of your project materials. Most exercises in this booklet can be completed in TNTlite using the sample geodata provided. However, you cannot make print-files or print over multiple pages in TNTlite. If an exercise cannot be completed in TNTlite, it is noted on the page.

Merri P. Skrdla, Ph.D., 19 May 2005
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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 TNTlite.

<http://www.microimages.com>

Welcome to Printing

Many people think of printing as something that happens effortlessly at the end of the more complicated process of creating a document or layout. If this viewpoint matches your experience, you have indeed been lucky. I recently was unable to print a 70-page document that had no illustrations in Microsoft Word without getting artifacts, such as repeated words that were not repeated in the text. Think how much more complicated getting imagery with vector overlays, map grids, and scale bars to print may be. TNTmips tries to make printing effortless, but printing is no longer under complete control of TNTmips for many printers.

TNTmips offers two kinds of printing: snapshot printing and printing to a specified map scale. Snapshot printing is available in all five Spatial Data Display modes (2D Group, 3D Group, 3D Simulation, Display Layout, and Hardcopy Layout), as well as in any other process with a View window. Snapshot printing takes the current contents of the View window (including background) and sizes it to fit a single page on your printer. Map scale specified printing is only available from the Hardcopy Layout mode of Spatial Data Display or from one of the Print From options on the Support menu after having first used Hardcopy Layout to create the appropriate object or file type. When printing to a specified map scale, the entire layout is printed whether or not it is currently shown in the View window. If the designated map scale means the map requires more than one page on your printer, the layout can be printed over multiple pages and pieced together. (Printing over multiple pages is not available in TNTlite.)

The professional version of TNTmips supports printing on a variety of large scale printers (sizes as large as current technology allows). Support for dithered color printing up to 11" x 17" (tabloid size page) is included in the base price of TNTmips and is the maximum layout or printed size allowed in TNTlite.



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 and is a physical limitation of the printer. The printable area is the area inside the unprintable margins.

Note: MicrolImages no longer needs to write its own drivers since printer drivers are now commonly included with the hardware. The result is many levels of printer support that previously required an additional charge are now free.

Page 4 describes printer setup, pages 5–6 discuss using saved layouts on different printers. Pages 7–11 discuss print-rasters and files and methods of dithering. Color management, external files, printing transparency, snapshot printing, large layouts with rotated rasters, printing large maps on small paper, using templates and scripts to print maps in a series, and hints and common printing problems are also discussed.

Page Setup and Printer Selection

STEPS

- ☑ choose Support / Setup / Printers from the main TNTmips menu
- ☑ turn on the Printer toggle if not on, click on [Model], select your printer from the list, and click [OK]
- ☑ if your printer is not on the list, click Cancel, and toggle on Use Windows Printer or Use Macintosh Printer instead of the first Printer toggle
- ☑ if using Windows for printer selection (step 3), click on [Model] and, if the correct printer name does not appear, select your printer (on the Mac, go to the Print Center and change the selected printer if the desired printer is not shown)
- ☑ be sure the Device toggle is on, then if Printer is toggled on, choose the appropriate port (if directly connected) or networked printer on the Device option menu
- ☑ click [OK] in the Printer Settings window

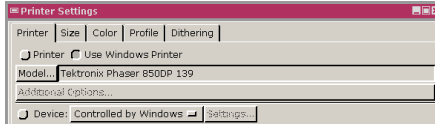
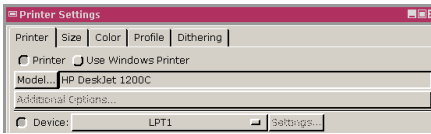
Note: In X Desktop mode, the Print Setup window may show up behind the desktop. Look for it by minimizing TNTmips.

The Page Setup window that opens when you choose Support / Setup / Printers is the same window that opens when you choose Page Setup from the Layout menu in the Layout Controls window. The only advantage in accessing it from the Support menu is that your printer, and thus your page dimensions and margins, will already be set when you start a new hardcopy layout. The selected printer and margins are saved with a layout so, if you open a saved layout, the selected printer may be different than specified with Support / Setup / Printers.

Before you can choose a printer in TNTmips, it must be set up for use on your computer. Printer setup and printing is different for nearly every platform and for every version of UNIX; contact your system admin-

istrator if you need help.

You get a list of printers with drivers written by Micro-Images' software engineers when you click on



[Model] with the Printer toggle on. If your printer is not on that list, you need to turn on the Use Windows Printer or Use Macintosh Printer toggle. If running under Windows, the Model button then opens your Windows Page Setup so you can change printers and specify additional parameters. If running on the Macintosh, the only available printer with the Use Macintosh Printer toggle on is the printer selected in your System Preferences.


Once you have chosen a printer, you can choose between a device (port or networked printer) or a file for the print destination. We will use the Device option for now and the File option in a later exercise.

Saved Layouts with Different Printers

In this booklet, you begin with a saved layout, such as you created in the exercises in the *Making Map Layouts* tutorial. Printing works best when the printer to which you have access was selected before a layout is created because your choice of printers determines the size of the unprintable margins. When this margin size is different, the position of any groups attached to the margin will be shifted correspondingly on the page.

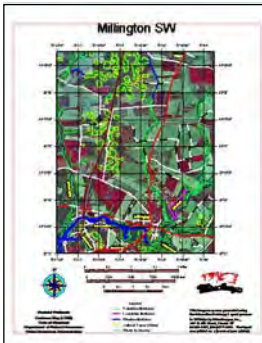
Since this layout was not created on your system, it is simple coincidence if the correct printer or a printer with the same unprintable margins is selected. The layout was created with an HP 1200C as the selected printer. The unprintable margins on this printer are: top, 0.63"; bottom, 0.39"; left, 0.30"; and right, 0.20". You can see from the illustrations below in which the paper size is the same that switching from one printer to another affects the position of some of the groups. The differences shown place one group over another (legend over scale bar, middle, and heading over map, right). The middle case is easily resolved by moving the map up. One of the scale bars would probably need to be deleted to get the heading, map, and legend to fit in the printable area of the printer on the right at the current map scale.

STEPS

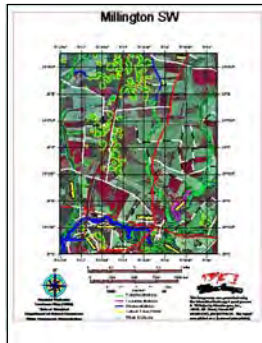
- choose Display / Spatial Data from the main menu
- click on the Open icon, choose Open  Layout and select Millington from the LAYOUT Project File
- set your View window background color to a color other than white (Options / Colors in the View window) so you can see the edge of the page
- choose Page Setup from the Layout menu in the Layout Controls window
- select your printer and set the Device option just as you did in the previous exercise
- click [OK] in the Printer Settings window
- check to see how your layout was affected

HP 1200C

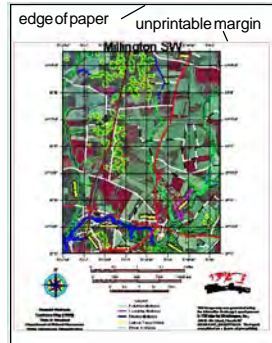
Printable Height 9.98"
Printable Width 8.00"



top margin smaller
bottom margin larger







top and bottom margins larger



Adjusting Layouts

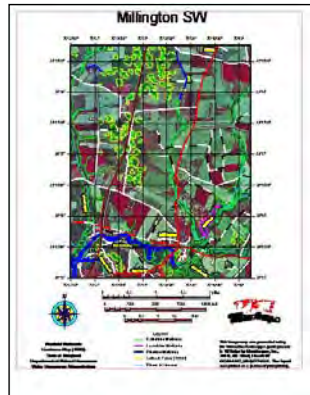
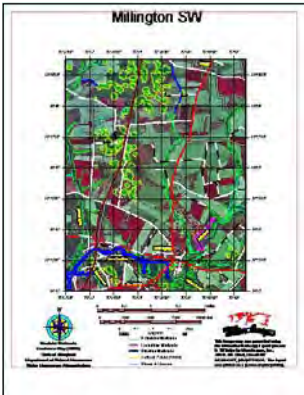
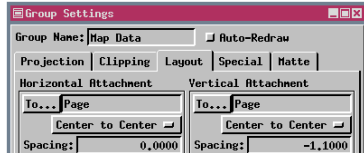
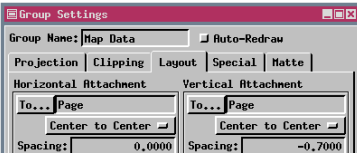
STEPS

- with the same layout open and your own printer selected, make MAP DATA the active group,  then click on the Placement tool 
- either drag the Map Data Placement tool rectangle or type a new value for vertical spacing in the Group Settings window as necessary to make the layout pleasing for your printer
- make any other adjustments necessary for your printer
- edit the parenthetical text at the end in the This image m... group to be the name of your printer
- click on the Save Layout icon 
- click on the Print icon 

The amount of effort required to adjust a layout for a printer with different unprintable margins is dependent on how the attachments in the layout are set up. In the case of this layout, the title is attached to the top margin; the two text blocks and legend are attached to the bottom margin; the scale bars, North arrow, and logo are attached to the orthophoto group; and the orthophoto group is attached to the page. Switching to a printer with a smaller top margin and larger bottom margin, as illustrated below, requires only a change in the vertical spacing of the orthophoto group.

If this layout had been made with all attachments relative to the page or margins, you would have to move six groups to achieve the same effect as moving the orthophoto group with the attachments as they are. Taking the time to create logical attachments when you make a layout is generally worth it.

You need to be sure that all groups are completely inside the printable area. Any group that extends over a margin will be clipped at the margin.



Print-Rasters

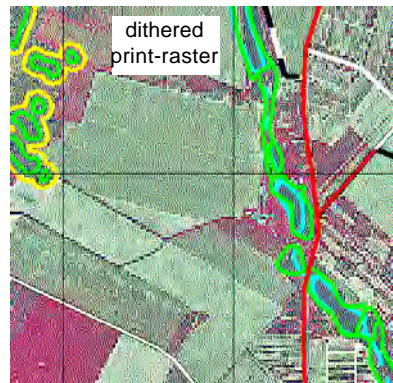
A print-raster is a raster prepared by the hardcopy layout process in which each cell represents the actual value to be sent to the selected printer for an individual printed dot, or printel. The dimensions of a print-raster correspond to the margin to margin dimensions of your selected paper size times the resolution at which you are printing. So, if your unprintable margins are 0.5" on all sides of an 8.5" x 11" page and your printer resolution is 600 dpi, your print-raster will be 4500 x 6000. Print-rasters are either 4-bit (dithered) or 24-bit (undithered). Thus, a print-raster of the dimensions listed would be either 13.5 Mb or 81 Mb. Dithering is not applied by TNT when you are using Windows to do the dithering; when you are printing to a TIFF, PDF, or other file type; and for certain printer types that do not use dithering, such as dye sublimation printers.

Generally, a print-raster is a temporary object created for printing and deleted automatically when the print is done. You can, however, choose to save it. The time required to make the print-raster depends on the speed of your machine and the complexity of the layout. If your layout takes a significant amount of time to render and you know you will be printing it on a number of occasions, choose to save the print-raster. Subsequent printing times will be reduced to the amount of time it takes to send the raster to the printer. When you print a print-raster, you do not print it through display; use Support / Print From / Print-Raster. Printing to TIFF creates an undithered print-raster in a different file format, which allows you to add special effects in a compatible graphics package that is used to print the finished product. Printing to other external formats is discussed later. You cannot print to these external file formats using TNTlite.

* A TNTlite sized piece of a print-raster can be found for viewing in the DITHERED Project File if you are running TNTlite.

STEPS


- with the same layout open as for the previous exercise, choose Layout / Print in the Layout Controls window
- click on the Dithering tab, and make sure that *Let TNT do the dithering* is toggled on
- click on the Print-Raster button and name a new raster object
- turn off both the Temporary and Print Now toggles (this exercise cannot be done in TNTlite*)
- click on [OK]
- open a new 2D group, click on the Add Raster icon, choose Quick-Add Single, and select the print-raster just created
- look at the raster at both full view and 1X*
- choose Support / Print From / Print-Raster, select your print-raster, and click on Run
- compare this print to the one made in the previous exercise



Print-Files

Note: This exercise cannot be completed in TNTlite.

STEPS

- click on the Open icon, choose Open  Layout, and select the layout you saved on p. 6
- choose Layout / Print
- click on [File] on the Printer panel, navigate to the directory where you want to save your print-file, click on the New File icon and name the file (check that the File radio button is also on)
- click on the Dithering tab and set the Print-Raster to Temporary if not already (click on the Temporary toggle beneath the Print-Raster button)
- click on [Print]
- choose Support / Print From / Print-File
- before selecting your file, set the appropriate toggle for the printer driver (Printer or Use Windows Printer) because that determines whether the file to select is a .prn or .prf file
- click on [File], and select your print-file
- make sure the Model and Device are set as they were when you created the print-file
- click on [OK]
- retrieve your print and verify that it looks just the same as when you printed it on page 6

Like a print-raster, a print-file contains all the information necessary to send your layout to a printer. However, it is no longer a viewable raster object, and it is not in RVC format. A print-file made using one of TNTmips' print drivers is actually a pair of files, both with the name you assigned but one with a .prf extension (small file), and one with a .p1 extension (large file). If a layout covers multiple pages and was printed with TNTmips' drivers, there will be a .p1, .p2, and so on, where the number corresponds to the page number. There is still only one .prf file. A print-file made using the Windows' print drivers is a single file with a .prn extension regardless of the number of pages. In TNTlite you cannot print over multiple pages, nor can you print to a print-file. There are a variety of reasons to create a print-file rather than printing directly, such as your printer is down for maintenance or you are supposed to restrict your printing to certain times.

If the printer you want to print to is not available over the network and is attached to a machine that does not have TNTmips installed, you can print by transferring your print-files to that machine and copying them directly to the printer port if they were created with one of TNTmips' drivers. To print a print-file from a Windows machine that does not have TNTmips installed, enter

copy / b filename.p1 port:

at a command prompt and insert the correct file name, page number (.p1, .p2, and so on), and port name (lpt1, lpt2, com1, and so on). In a command shell on a Unix machine, enter

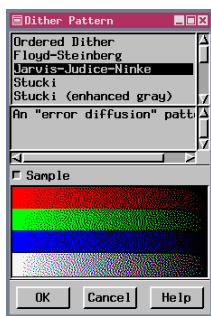
lp -dprintername filename.p1 (for System 5)
lpr -Pprintername filename.p1 (for BSD)

and insert the correct printer name (for example, -dhpraw), file name, and page number. The Macintosh also uses the lpr -P command listed for BSD.

Dither Patterns

Dithering is used to create the visual illusion of a continuous tone image on the printed page by the calculated placement of tiny picture elements, or printels, which usually are not resolved by the human eye. This calculated placement creates the appearance of more colors and shades of color than would be present otherwise. Dithering is necessary to produce the impression of continuous tone when hardcopy is produced on a printer that uses fixed intensity, fixed size printels. Film recorders and sublimation printers use variable intensity printels, which makes color management in the print process similar to generating colors for on-screen display. A type of ink jet technology uses variable size printels. Dithering degrades, rather than enhances, prints for these printer types.

Viewing a print raster lets you get a better understanding of dithering because you can zoom in until you can discern the separate cyan, magenta, yellow, and sometimes black dots. You should also notice that while the image area of the sample map is dithered, vector, CAD, text, and map grid layers appear solid. These layer types are plotted into the raster after the image is dithered and are not dithered or are dithered differently (see p. 11). Be sure to view the TNTlite-sized piece extracted from a print-raster mentioned on page 7 if you cannot save and view your own.



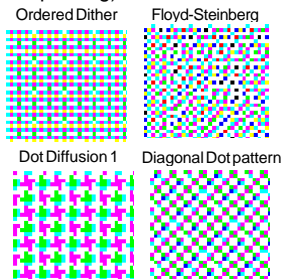
When viewed at their normal size (below), there is little difference between these dither patterns for this solid color.

50% Red, 60% Green, 70% Blue (Undithered)



Vocabulary: A **printel** is the smallest element of a picture that can be individually processed and printed. Printel size is inversely related to printer resolution. Printing at 300 dots per inch (dpi) uses printels that are twice the size in each dimension (4 times the area) as when printing at 600 dpi.

- STEPS**
- with the MILLINGTON layout open in Spatial Data Display, choose Layout / Page Setup
 - click on the Dithering tab, then on [Raster Dither Pattern]
 - click on each of the dither patterns in the list and note how the sample changes; also note the comments for the selected pattern below the list of dither patterns (such as for the Dot Diffusion patterns, which work well on electrostatic printers)
 - choose a dither pattern different than that you used the first time you printed the layout, and print the layout again (set the print raster back to temporary before printing)



Jarvis-Judice-Ninke

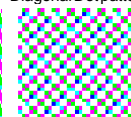
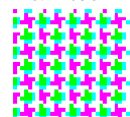
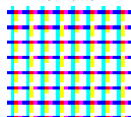
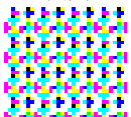
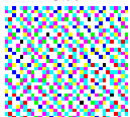
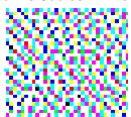
Stucki

Halftone 1

Dot Pattern 1

Dot Diffusion 1

Diagonal Dot pattern



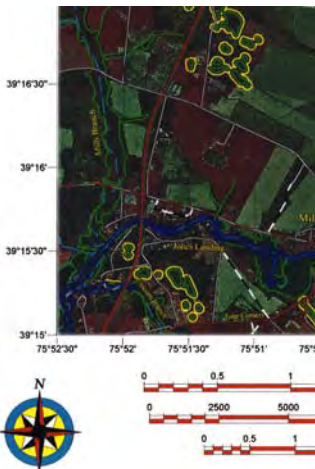
Who Does Your Dithering?

STEPS

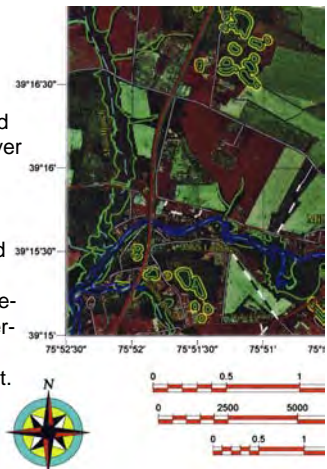
- choose another dither pattern and print again being sure that between the last exercise and this exercise you have chosen dither patterns appropriate for your printer type (for example, dot diffusion patterns for electrostatic printers, error diffusion patterns for other printer types) as well as others if you want to experiment further
- choose Layout / Print, and with Use Windows Printer or Use Macintosh Printer chosen on the Printer panel, click on the Dithering panel and choose Let the Windows (Macintosh) printer driver do the dithering and color matching
- click on [Print], and compare the results to your other prints

Printing is an empirical process, which means if you have any interest in generating the best looking prints, you will try a few different options and decide which is most pleasing. As described in the previous exercise, TNTmips offers a variety of dither patterns. You can also choose to let the Windows or Macintosh driver do the dithering and color matching, in which case you do not get a choice of dither patterns; you get the one provided by the print driver. You really cannot be sure which dither pattern will provide the best results without trying them. If you prefer the overall quality of the TNTmips dithering, but think the Windows / Macintosh driver provides truer color, you can try color balancing in TNTmips. Color balancing is described briefly in a later exercise and extensively in another booklet (*Getting Good Color*).

Beside having a choice of dither patterns, TNTmips dithering lets you choose a separate dither pattern for non-raster layers to provide crisp vector lines, map grids, and text. Choose Vector Pattern as the non-raster dither pattern to get the benefit of this feature. When Windows or the Macintosh do the dithering, the entire layout is treated as one large raster object.



Portions of pages printed using TNTmips' Jarvis-Judice-Ninke dither pattern and the pattern used by the Windows driver were scanned for comparison. After being printed and scanned and printed again, the original print is not well represented, but the differences between the two remain apparent.




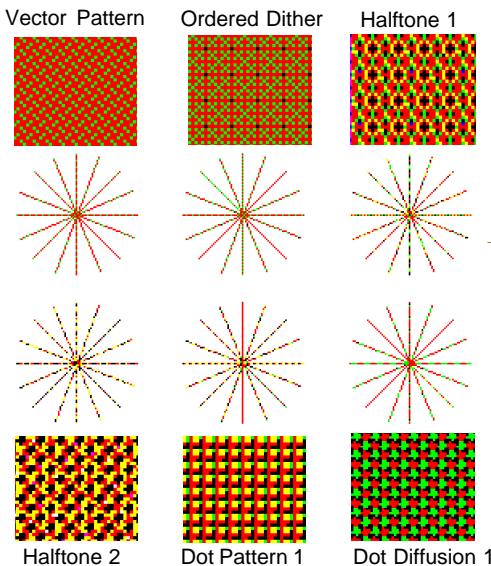
Vector Dithering

The non-raster dither pattern you choose does not affect the output as long as all of the non-raster layers in the layout use only cyan, magenta, yellow, red, green, blue, black and white; colors in the printer palette are solid regardless of the selected dither pattern. Dithering is necessary to produce colors beyond the eight colors of the printer palette.

All of the vector dither patterns can produce the 64-colors of the standard color palette. When you choose element colors that are not part of the standard palette, the Vector Pattern dither ends up producing its closest match in the standard 64. However, the Vector Pattern dither is the smallest dither pattern, which means it is the best suited for thin lines. Dither patterns that require a larger area to represent colors may create broken lines or lines without a uniform color appearance when the lines are thin, but they can provide more colors than provided by the Vector Pattern. Broken lines do not occur for these other dither patterns when using thicker line widths.

STEPS

- click on Open, choose Open  Group, and select the `_6STARBURSTS` group from the `STARBURS` Project File
- the group should open with a 1X view of the six dithered starbursts shown in the center of the illustration at the bottom of this page
- zoom in and examine the details of each of the dither patterns
- click on Open, choose Open Layout, and select `STARBURST` from the `STARBURS` Project File (this layout is at a much larger scale than the dithered screen captures, which were printed at 1:2400)
- if not running TNTlite, try printing to a print-raster with some of the other vector dither patterns

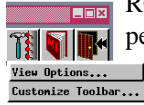


The illustration at the left shows a starburst made of thin lines and a rectangle filled with the same color (color 54 of the standard 64). As you look at the enlarged dither patterns, visualize how lines at the angles of the starburst would acquire colors with the corresponding dither pattern. For example, it is easy to see how the vertical line in the starburst could be solid red rather than brown using Dot Pattern 1.

Color Management

STEPS

- ☑ open the layout you saved on page 6
- ☑ choose View Options from the Setup icon on the Spatial Data Display toolbar
- ☑ click on the Color tab, set the Rendering Intent to Absolute Colorimetric
- ☑ click on either the Profile or the Custom radio button and select a monitor profile or enter the characteristics of your monitor, then click [OK]
- ☑ choose Layout / Page Setup, click on the Profile tab, and turn on the Use ICM Profile toggle
- ☑ select the profile for your printer on the Profile option menu (all installed profiles show on this menu), turn on the Proof to screen toggle, and click [OK]
- ☑ note the change in appearance, then set a different rendering intent
- ☑ repeat the previous step but turn on the Use out-of-gamut alarm toggle

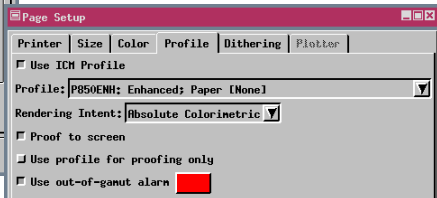
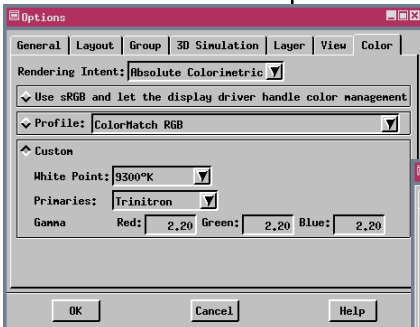


You may have been surprised at the difference between how a layout appears on your screen and the printed version. If your monitor uses the standard RGB color space (sRGB) and your printer expects data sent in sRGB, you should not have this problem provided the sRGB color profile is selected for your monitor and the “Let display driver do color management” option is on for the X server. This X server option is not available on the Mac, but color management is under control of the display driver if sRGB is selected for the monitor.

The problem is that there are many more colors available for display than most printers can produce. The printer profile (ICM or ICC) tells a printer how to produce sRGB colors from the input it is given. The rendering intent lets you determine how to handle colors used in the source image (source gamut) that are not available for printing (destination gamut). Such colors are said to be out of gamut. There are four rendering intents: absolute colorimetric, relative colorimetric, perceptual, and saturation. For the definitions of these intents and additional information on and illustrations of color matching in the TNT products, see the three color plates on the topic posted on MicroImages’ web site.

The ability to proof to the screen, or see how the printed product would look without printing, is provided by the color management tools. In order to

proof to the screen, the rendering intent for the View must be absolute colorimetric. You can also highlight all the colors in the display that are out of gamut for your printer.



Printing to External Formats

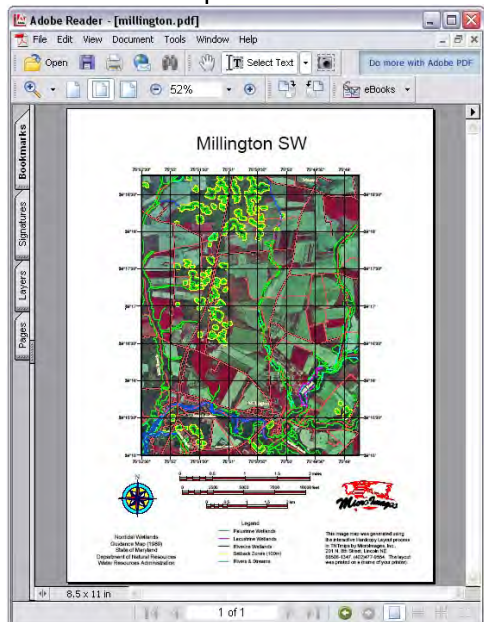
TNTmips lets you use the print process to create files in a number of external formats, which include Adobe Illustrator (*.ai), Adobe Portable Document Format (*.pdf), Encapsulated PostScript (*.eps), Tag Image File Format (*.tif), and Scalable Vector Graphics (*.svg). This print process is different than export because you are converting an entire layout, not just an individual object, to the format with different layer types treated differently depending on how the external format handles each object type.

TIFF may be the format of choice when you are making a file to take to a printing service, but all layers are rendered into a raster, just as when creating a print-raster. Text and vectors can no longer be manipulated. When you convert to PDF, the text remains as text and may undergo font substitution when viewed if the layout contains proprietary fonts. When you convert to Adobe Illustrator or eps, vector and CAD elements retain their individual nature and can be manipulated in Illustrator or other programs that read these formats. SVG files are well suited for web use and are able to utilize a great deal of functionality provided by an SVG viewer. If you want to distribute your layout for viewing by others, PDF and SVG are good choices because there are viewers for both that can be downloaded for free from Adobe's web site. If you want to insert it in another document, such as Word or PageMaker, you should print to TIFF or EPS. If you want to manipulate the layout further, print to an Adobe Illustrator file.

This exercise cannot be completed in TNTlite.

STEPS

- choose Display / Spatial Data, select Open Layout from the Open icon, then choose the layout in the LAYOUT Project File
- choose Layout / Print, click on the Printer toggle if it is not on, then click on [Model], choose Adobe Acrobat File (pdf), and click [OK]
- click on [Additional Options], note the available options, and click [OK]
- click [Print] in the Printer Settings window
- if you have Adobe Illustrator so you can view the result, repeat steps 2 and 3 but select Adobe Illustrator File



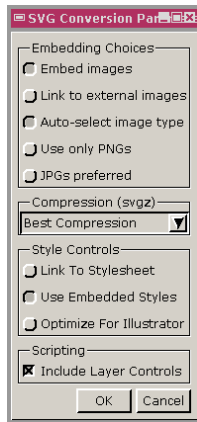
Options When Printing to SVG

This exercise cannot be completed in TNTlite.

STEPS

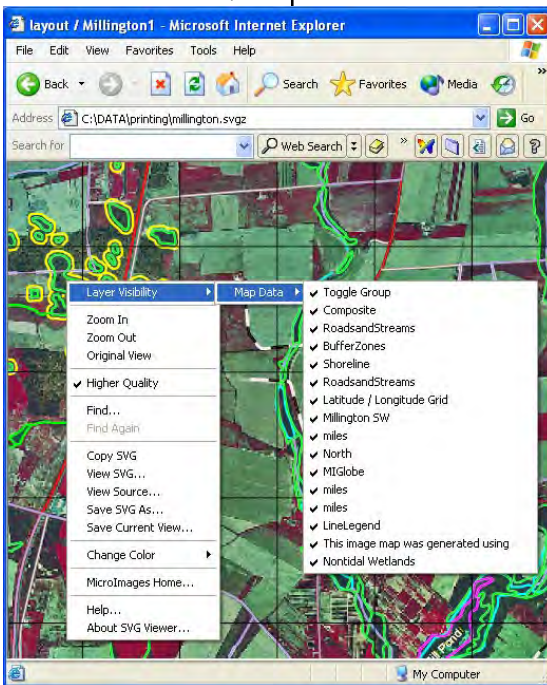
- ☑ using the same layout as in the previous exercise, choose Layout / Print, click on [Model], choose Scalable Vector Graphics File (SVG), and click [OK]
- ☑ click on [Additional Options], set the options as shown, click [OK], then [Print]
- ☑ double click on the SVGZ file produced and pursue your options (the file should open in your browser; if not, go to <http://www.adobe.com/svg/viewer/install> to download the viewer)

Scalable Vector Graphics (SVG) is a graphics file format and web development language based on XML. SVG is the official WorldWide Web Consortium open format for the storage, modification, and transmission of “smart” documents ranging from animated graphics to complex map layouts. Discrete map elements are represented by SVG so that point symbols, labels, line patterns, bitmap fills, hatch patterns, polygon transparency, base raster images, complex legends, and portable fonts are incorporated.



The SVG conversion parameters let you choose whether to embed or link to images, what format to store them in, whether and

how to compress the images, whether to link to or embed style sheets, and whether to include layer controls. If you elect to include layer controls, a JavaScript is added to the SVG file that provides layer controls along with the other SVG right-mouse menu functions (shown at left). If you choose to use compression and imbed images, your output file has a .svgz rather than .svg extension. If you embed images, the total file size is slightly larger, but you don't have to keep track of multiple files when transmitting your SVG to others.






Printing Transparency

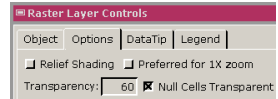
Transparency effects allow you to see through an upper layer to a layer below. There is a distinction to be made between polygon bit map and hatch fill patterns that include transparent areas and solid color fills that have an assigned transparency value. The former requires no special processing to see through to layers below, while the latter requires that display values be recalculated in true color (24-bit color) to determine the resulting value for overlaid transparent color and any colors beneath. Printing a layout that includes transparency effects requires a 24-bit temporary print raster, which will be reduced to a 4-bit raster if TNTmips is doing the dithering.



In addition to assigning transparency for vector, CAD, and TIN polygon fills when drawing styles are assigned, you can assign transparency for raster layers. Transparency effects for raster layers can be assigned either uniformly for all raster values on the Options panel of the Raster Layer Display Controls or for individual cell values by assigning transparency values for color map entries. You can also introduce transparency using an 8-bit mask.

Once transparency is assigned for viewing, it is automatically incorporated in any printed output—there are no additional settings to make. Because transparency effects require additional calculations, a layout that uses them will take longer to print. Remember also that your temporary disk space requirements increase (unless you are having Windows or the Macintosh do the dithering, see page 7).


STEPS

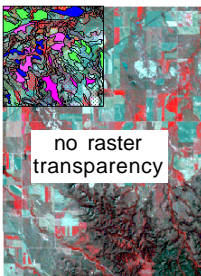
- ☑ click on the Open icon, choose Open Layout, and select the TRANSPARENCY layout in the CB_LAYOUT Project File 
- ☑ click on Print, and print the layout 
- ☑ click on the Raster icon in the COMPOSITE layer icon row, click on the Options tab, type in 60 in the Transparency field, and click [OK] 



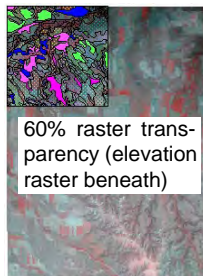
- ☑ use the zoom box to zoom up around the vector layer at the upper left 
- ☑ click on the Vector icon for the CBSOILS_LITE layer, click on the Polygons tab, click on [Specify] for Style By Attribute, click on [Edit Styles] 
- ☑ scroll through the styles list (top panel) until you see BnB, select it, and enter 70 in the Transparency field (Fill Style panel); do the same for KeB, Sa, and SrD styles
- ☑ click [OK] in reverse order of the windows

opened until the Vector Layer Controls window closes

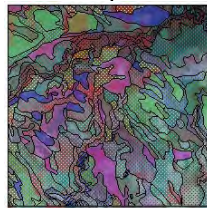
- ☑ click on Print 
- ☑ compare your initial and final prints



no raster transparency



60% raster transparency (elevation raster beneath)



70% transparency for solid vector polygons

Snapshot Printing

Note: Printing a complete layout, whether it is one group or many, at a specified map scale is only available in the Hardcopy Layout mode of Spatial Data Display.

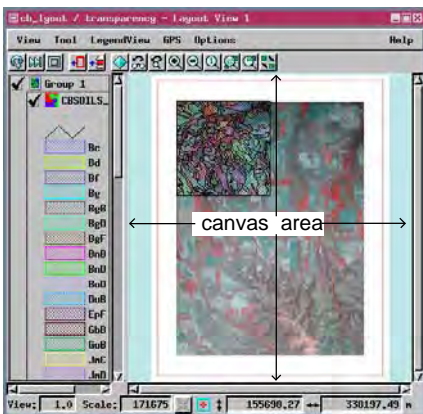
STEPS

- ☑ with the same layout open at Full View as for the previous exercise, choose View / Print Snapshot (View window)
- ☑ make sure your printer is selected, then click [Print] in the Printer Settings window
- ☑ zoom in around the upper left of the group (use the zoom box or the + key), and choose Print Snapshot again
- ☑ collect your prints and compare the quality, particularly of the vector lines, to your previous prints

An additional printing method, snapshot printing, is available from any View window in TNTmips (choose View / Print Snapshot). Snapshot printing saves the currently visible contents of the View window to a temporary raster, opens the Page Setup window so you can choose your printer, then scales the temporary raster to the printable area of the selected printer after you click [Run]. The entire canvas area of the View window is captured and printed, which includes any visible background. If you are zoomed in so that not all of all layers show, only what is currently visible will print.

Unless your View window canvas is at least as big as a printed page, the resolution of the snapshot will be lower (appear coarser) than on your display screen. You do not have control over the map scale at which a snapshot is printed; it is simply scaled to be as large as possible while fitting on a single page.

The ability to print a snapshot from any View window means you can capture your progress in the Spatial Data Editor or a mosaic layout. You can also save a snapshot as a raster object (View / Snapshot.)



The canvas area of the View window is scaled to be as large as possible on a single page, then is centered on the paper in the other dimension.



Rotated Rasters

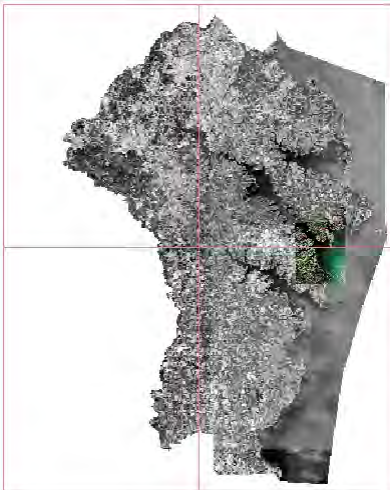
When making largeprints of large rasters that are rotated to angles other than 90° , 180° , or 270° , you are better off to resample the raster to the projection or desired angle before you print. The issue is not one of quality, but time. It takes nearly three times as long to print the layout below with the group oriented to projection north (right) than with the raster upright (left). The raster dimensions in this example are 5962 lines by 4133 columns and the layout is being printed over four A sized ($8\frac{1}{2}'' \times 11''$) pages. The difference in printing time between rotated and unrotated rasters is minimal if a lite-sized object is printed over four pages (a very low resolution print) or the object illustrated below is printed on a single page.

Your time savings increases with the size of the print. The number of times you print the same layout is also a factor. For the layout illustrated, it takes as long to resample the raster to projection as it does to print it rotated. However, if you make several prints separately, your time savings begin to add up.

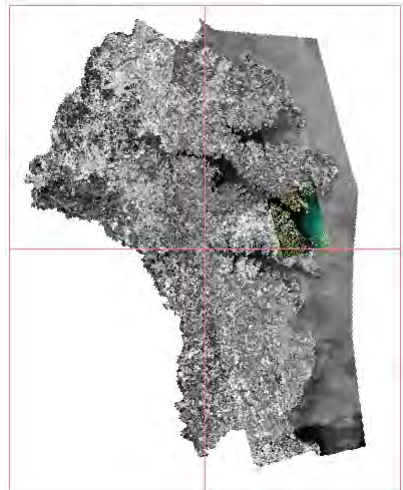
There is no data provided for this exercise since lite-sized objects will not exhibit the effect. The following steps can be used with your own data to resample a raster to a particular projection.

- choose Process / Raster / Resample and Reproject / Automatic
- select the raster(s) to resample
- click on Settings tab and make sure the selection on the Model menu is From Georeference
- the Orient menu selection should be To Projection
- click on [Reference System] and choose the projection you want the raster resampled to
- make any other desired selections, then click on [Run]

Layout with raster upright took 1 min 48 sec to print.




Layout with raster rotated to projection North took 5 min to print.

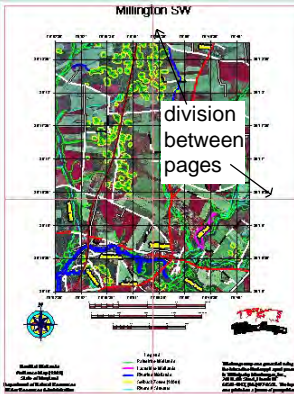


Printing Large Maps on Small Paper

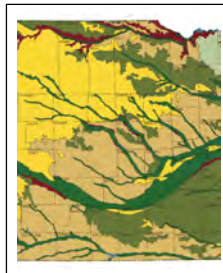
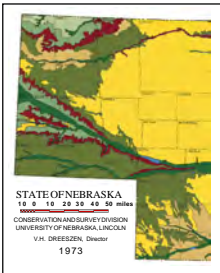
Note: This exercise cannot be completed in TNTlite.

STEPS

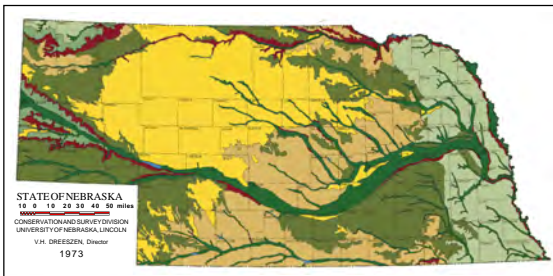
- ☑ using the layout you saved on page 6, choose Layout / Page Setup*
- ☑ on the Size tab, change the Units to pages, then enter 2 in both the width and height fields
- ☑ change the map scale to 20000, then click [OK]
- ☑ make adjustments in the layout as necessary (Group 1 will likely need to be moved up)
- ☑ click on the Print icon 
- ☑ carefully trim and assemble your map
- ☑ choose Layout / Close; choose No when asked to save changes



When your layout size is larger than the printable area on a single piece of paper, TNTmips divides the layout over the necessary number of pages such that nothing is lost in the unprintable margins. The last row or column printed on a page is within the printable area, and the next page has its unprintable margin then the next row or column of the preceding page. You just need to carefully trim at the edge of the printed area and piece your map together. You may want to trim only one piece of paper at each of the seams so you have a little paper overlap at a seam and you don't have to get two cut edges to meet exactly.



* turn off color management if desired



Scissors or a paper cutter and tape or other mounting materials are all that is required to make a large format product on letter size paper.

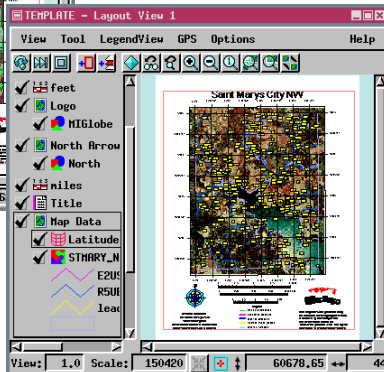
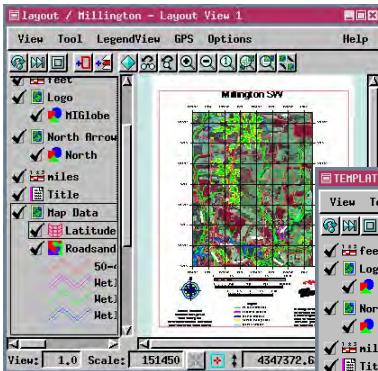
Using Templates for Maps in a Series

The steps required to prepare this layout for use as a template have already been done for you and are saved as part of the layout. This preparation involves indicating which groups need layers replaced and which should remain unchanged. This preparation took under a minute to complete for this layout. (For details on how to make these group specific settings consult *Making Map Layouts*.)

Notice when replacing layers for the image map group, you are not restricted to one-to-one replacement—you can select any number of layers. Also, the map grid in this group is automatically updated to reflect the extents of the newly selected objects.

When you choose Open Layout from the Open icon on the Spatial Data Display toolbar, you can select either a layout or a template. Once you have opened a template, selected replacement layers, and edited the title text, you can save the new layout if desired. Choosing Layout / Save creates a new layout; it does

not overwrite the template.



Templates let you make a nearly effortless transition from one layout to another in a series of maps.

STEPS

- open the layout you saved on page 6
- choose Layout / Save As Template (Layout Controls window; name the template and click [OK])
- click on the Open icon, choose Open Layout, and select the template you just saved
- when prompted to select the spatial layers for the Map Data group, first add the raster in the stmar1nw Project File then the vector in the stmar6nw Project File to the Selections list, and click [OK]
- turn off the Clip toggle and click [OK] in the Group Clip Settings
- when prompted to enter / edit replacement text for the Title group, change Millington SW to Saint Marys City NW
- zoom up on the upper left corner of the map in both layouts (original Millington and template with substitutions) to verify that the map grid coordinates have changed
- click on the Save Layout icon and name the layout SaintMarys

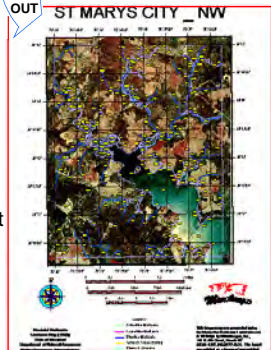
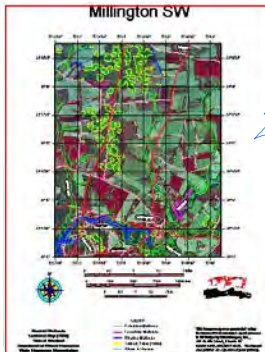
Using Scripts to Make Maps in a Series

STEPS

- ☑ choose Process / SML / Run from the main menu
- ☑ select MAPS.SML from your printing data collection, and click [OK]
- ☑ choose the layout you saved on p.6 when prompted to *Select the template layout*
- ☑ choose COMPOSITE in the STMAR1NW Project File when prompted to *Select raster object for "DOQQ"*
- ☑ choose STMARY_NW in the STMAR6NW Project File when prompted to *Select vector object for "WetlandsVector"*
- ☑ click on the New Folder icon when prompted to *Select output print file*, name the folder, then click on the New File icon, and name the print-file
- ☑ in the Settings window, which opens next, truncate the default title to read ST MARYS CITY - NW, then click [OK]
- ☑ when asked if you want to copy the raster and vector, answer No
- ☑ when the Page Setup window opens, select your printer, make sure the File (not the Device) toggle is on, and click OK
- ☑ answer Yes when asked if you want to print the layout now
- ☑ choose Support / Print From / Print-File, and print the print-file you just made

A second means of creating maps in a series uses SML scripts. The script approach provided in this exercise was developed before templates were available. The script approach still has the added advantage that it directly creates a new layout and print-file with the indicated replacement objects. The script will also copy the replacement objects to the working directory (where the layout and print-file are saved) if desired. Making a local copy may save considerable time in generating the print-file if the replacement objects are initially accessed over a network or from a CD-ROM. You do not need to take advantage of this feature because you should already have a local copy of these files.

The script provided is designed particularly for the layout you are working with. The script will likely need to be modified in order to be used with other data. One of the specific requirements of the script, for example, is a group named Map Data that contains the spatial data to be replaced from one layout to the next. Other layout specific parameters specified directly in the script are layout map scale, dither patterns, and the vector overlay's style object.



You can use the same script and initial layout to make as many maps in a series as desired.

Hints for Reliable Printing

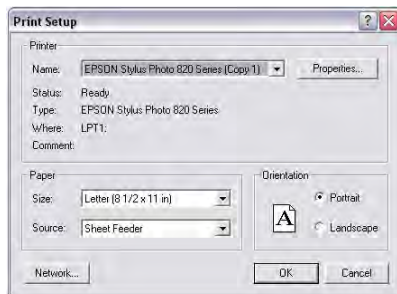
Set Printer Defaults at the System Level.

Each time you print with Use Windows or Mac Printer selected, the default setup for that printer is used unless you click on the Model button and change these options. It is much easier to change your system default than to remember to check and change these settings every time you print because you have to open two additional windows to check them. In Windows you need to make the changes in the printer control panel. On the Mac, the printer settings are found with the System Preferences.



Setting Portrait and Landscape Printing.

Make sure that your portrait or landscape page orientation selection is also set in the Windows or Mac Page Setup window that opens when you click on the Model button. Setting the page orientation in TNTmips Page Setup sets the orientation of the layout. Setting it in the Windows or Mac Page Setup window sets the orientation of the printed output.

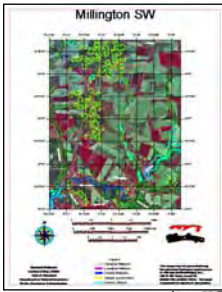


Do not dither twice. If TNT is doing the dithering, make sure that any Color Correction or other such options for your printer are turned off. Having these options turned on will redither the dithered output from TNTmips, which will produce a muddy and apparently lower resolution print.

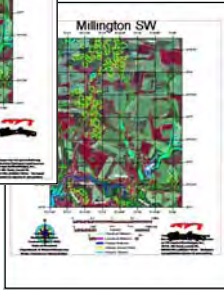
Printing transparency efficiently. TNTmips dithers a layout to a 4-bit raster. Transparency requires an intermediate 24-bit raster to composite the colors. Having transparency in lower groups in the layout minimizes the extent of this 24-bit calculation because groups above and groups that do not overlap the group with transparency can be dithered directly to the 4-bit print-raster. This only applies if you are using TNT to do the dithering because Windows and Mac drivers always create a 24-bit print-raster.



Avoiding Common Printing Errors



The layout (above left) requires significant adjustment to print on a single page for the printer selected above right.



Be sure your printer and the proper page size are selected *before* you design your layout. If you design a layout assuming the correct printer is selected, you are likely to find you need to make adjustments and print again. Changing the printer when you go to print does not magically fix your layout—group attachments are still as they were, which means the spacing between groups may not be appropriate when the printable area changes or you may get what you thought was a single page layout printed over multiple pages.

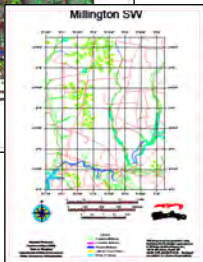
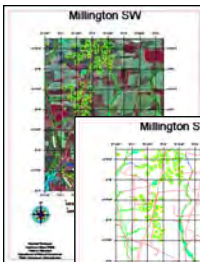


Is your print dark and murky or perhaps grainy? Remember you have many dither patterns and a full suite of color balancing tools at your disposal in TNTmips. You may also have the option of using either TNTmips or your Windows or Macintosh drivers for dithering and color balancing. TNTmips lets you print multiple test strips on a single page to help you determine the ideal color balance for your layout.

Hide/Show (View 1)



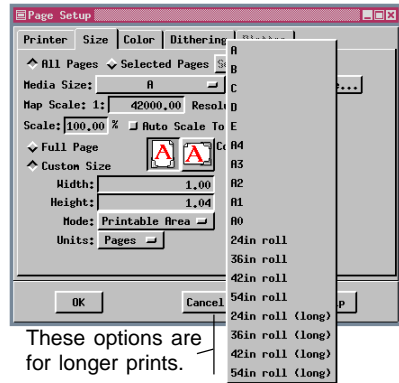
Hide/Show on Hardcopy



Are layers not printing that show on the screen or vice versa? In hardcopy layout mode, there are at least two hide / show icons—one for the View window and one for the hardcopy. You can include layers in a layout that you want to define group extents or projection and elect not to show them in the View window and/or on the print. You could, for example, decide you want a print of the layout with just the vector overlays and not the image map. If you just turn off the layer for viewing, it will still appear on the print. Or you may want the image layer, which is shown in the View but missing on the print because the Hide / Show on Hardcopy option was accidentally set to hide.

Avoiding Common Printing Errors

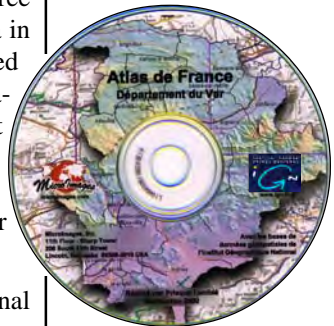
Be sure to select the long roll option for your paper width when your layout is longer than 42". The other roll options will print approximately 42" to 44" long then cut the paper whether your layout has completed printing or not. Not selecting the correct page size option for such layouts is costly in both ink and paper.



Use the HP650C specific drivers when using the TNT print drivers for an HP DesignJet 650C (you can also use Windows or Macintosh drivers for this printer). TNTmips' DesignJet series drivers do not work for this older printer. Also be sure the printer is set in Autodetect mode rather than HPGL/2 mode. Printing from some software may reset your printer to HPGL/2 mode. You need to set it back to Autodetect in the printer control panel for it to work when printing from TNTmips.



Do you really need hardcopy? Paper is not the only means of distributing your layouts and other project results. TNTmips lets you create atlases that can be burned to CD-ROM and distributed with the free TNTatlas software. The recipients of your data in this form have much more than a simple printed map. They can zoom in, view database information, make measurements, and include GPS input that puts them on the map. They can navigate through a logical hierarchy of many layouts. Blank CDs are generally significantly cheaper than even small color prints.



Atlases can be linked to documents in external formats, such as Adobe Acrobat's PDF format. Creating an Adobe Acrobat file is a printing option in TNTmips, so your layouts can be transformed into .pdf files. The recipient of an atlas that contains such a link can make their own prints of such documents if desired.

Advanced Software for Geospatial Analysis

MicroImages, Inc. publishes a complete line of professional software for advanced geospatial data visualization, analysis, and publishing. Contact us or visit our web site for detailed product information.

TNTmips TNTmips is a professional system for fully integrated GIS, image analysis, CAD, TIN, desktop cartography, and geospatial database management.

TNTedit TNTedit provides interactive tools to create, georeference, and edit vector, image, CAD, TIN, and relational database project materials in a wide variety of formats.

TNTview TNTview has the same powerful display features as TNTmips and is perfect for those who do not need the technical processing and preparation features of TNTmips.

TNTatlas TNTatlas lets you publish and distribute your spatial project materials on CD-ROM at low cost. TNTatlas CDs can be used on any popular computing platform.

TNTserver TNTserver lets you publish TNTatlases on the Internet or on your intranet. Navigate through geodata atlases with your web browser and the TNTclient Java applet.

TNTlite TNTlite is a free version of TNTmips for students and professionals with small projects. You can download TNTlite from MicroImages' web site, or you can order TNTlite on CD-ROM.

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