

## Spatial Display

# Viewing WMS Layers

Web Map Service (WMS) layers are simply composite images returned by a WMS with largely predetermined display characteristics. WMS layers can provide significant enhancement to your displays (see the Technical Guide entitled *Spatial Display: Select WMS Layers for Viewing*). Just as for any local layer, the TNT products transparently handle Coordinate Reference System (CRS) conversion whether or not the WMS providing the image can supply it in the CRS selected for the view.

Many of the other features of the Display process, including sketching, measuring, and GPS tracking, are available for use with WMS layers whether displayed alone or in combination with other WMS layers or local layers (which means layers on your machine and/or layers accessed from a private network). These features are provided with the GeoToolbox, which integrates these functions such that any shape you draw either manually or using GPS input automatically generates measurements and can be added to a sketch layer and/or used to create a region. The units used for measurements and the color and weight of the lines drawn can be changed while using the GeoToolbox to suit the scale and color of the layers you are displaying.

Layers from more than one WMS can be selected for display together. Each time you click on the Add WMS

Lat/Lon as received from any WMS (note elliptical distortion)

- without Lat/Lon aspect correction
- with Lat/Lon aspect correction

Lat/Lon with aspect correction supplied by TNT

same area changed to UTM Zone 16

You can change the CRS used to display WMS and local layers. Here a single WMS layer is shown in Lat/Lon with and without aspect correction and transformed into UTM (left).

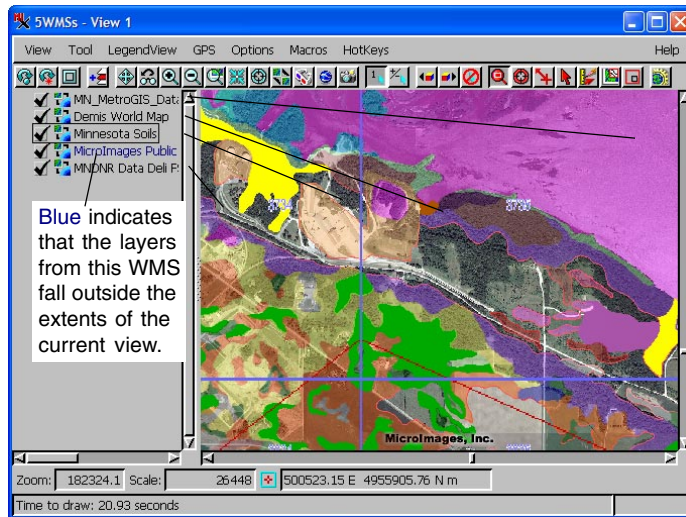
local layer

WMS

Use the TNT GeoToolbox to draw areas for measuring, to add to a sketch, and/or to create a region.

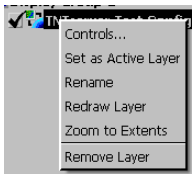
Use live GPS or a GPS log to generate a region or a sketch element.

icon, you can select one or more layers from a single WMS. If more than one layer is selected at one time from a single WMS, a composite image is delivered by the WMS. You cannot control display of individual layers that make up a composite image—all are either on or off. However, if map scale control was built into the layers accessed as a composite layer from a WMS, layers may turn on and off as you zoom in and out. In order to turn individual layers on/off on demand in the display, add them as separate WMS layers.



Layers selected from five different WMSs, four of which are displayed in the current view (quadrangle boundaries, rivers and waterbodies, and FSA orthophotos). The fifth falls outside the extents of the current view.

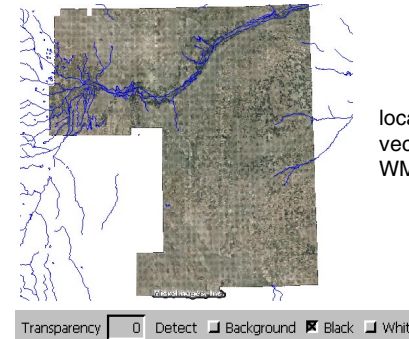
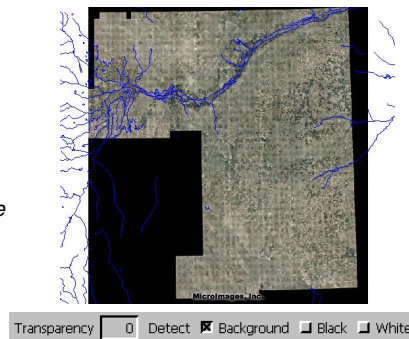
Layers from four different WMSs are selected for display together in the illustration at the right (above). Regardless of the number of layers selected as a single WMS layer, only one layer entry appears in the layer list (Display Manager and LegendView). LegendView uses the same color-coding for WMS layers it uses for all layer types to give you some information about the visibility of these layers (red—error loading layer, green—off by map scale at current view scale, blue—outside extents of current view, gray—layer turned off, black—layer displayed).



There are a number of right mouse button menu choices for WMS layers in the Display Manager (shown left). The default name for a WMS layer is the name of the WMS that supplied it. If using multiple, separate layers from one WMS, you may want to use the Rename function to better keep track of what you have displayed. You can also zoom to the extents of an individual WMS layer, open the layer controls, make the layer the active layer, or redraw or remove the layer.

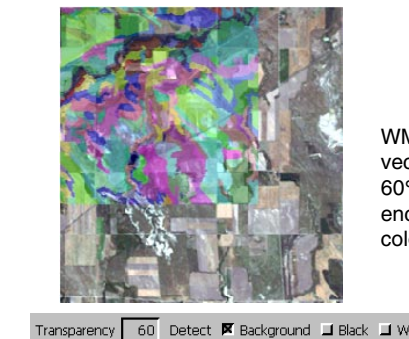
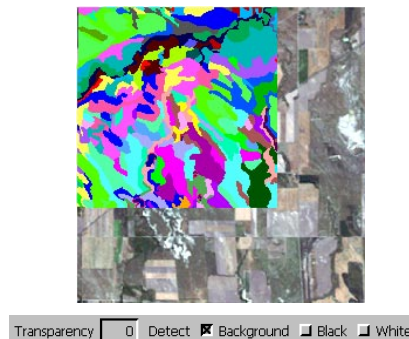
The contrast and color maps for WMS layers are predetermined by the WMS providing the image. The transparency features in the Web Map Service Layer Controls allow some aspects of the appearance of WMS layers to be manipulated in the Display process. In addition to varying the transparency for the layer as a whole, you can elect transparency for white, black, and/or cell values matching the background color of the view. You will only see the effect of making the background color transparent if the WMS layer overlaps other layers.

Some image formats have no concept of a null value, such as TIFF, JPEG, and JPEG2000. Nulls are likely to be represented as black (shown here) or white, both of which can be made transparent in the Web Map Service Layer Controls (see the TechGuide entitled *Spatial Display: Web Map Service Layer Selection & Controls*). Transparency for WMS image pixels that match the view background color is on by default.



local drainage vector layer over WMS layer

Some WMS-acquired vector layers may have polygon-fill-color transparency built in while others, such as the soil type polygons shown at the right, do not. The Transparency field in the Web Map Service Layer Controls lets you designate a transparency level for the WMS layer as a whole. Here 60% transparency is applied to soil polygons in the selected WMS layer. Partial transparency can be applied to raster layers as well.



WMS soil type vector layer with 60% transparency over local, color image layer