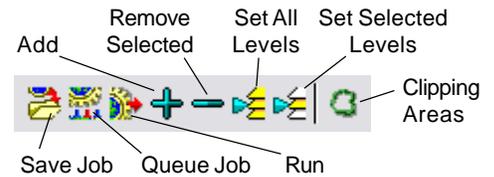


# Merge Structures

The Merge Tilesets process (Tilesets/Image/Merge) in TNTmips Pro allows you to merge a few or many standard web tilesets into a single tileset. You can assemble many spatially-adjacent smaller tilesets created in the Export Raster Tilesets process, such as state or provincial orthoimage tilesets (“mosaicking” tilesets). The process allows you to set the range of output zoom levels individually for each input tileset, so you can also construct a single tileset from a number of spatially-coincident or overlapping tilesets that contain different zoom level ranges. This capability allows you to combine imagery tilesets produced from input images with different spatial resolutions (e.g., aerial orthophoto and satellite images) or a number of single-zoom-level tilesets created from geometric layers in the Render to Tileset procedure in the Display process (see the Technical Guide entitled *Tilesets: Render from Displayed Layers*).

The Export Raster Tilesets and Merge Tilesets processes are designed to work together to efficiently assemble very large tilesets. You can first prepare multiple, spatially-adjoint smaller tilesets in the Export Raster Tilesets process, where TNT Job Processing allows you to run concurrent tileset operations to exploit your system’s multiple processor cores. You then use the Merge Tileset process to assemble these individual tilesets into a single larger tileset. See the Technical Guide entitled *Tilesets: Assembling Very Large Tilesets*.

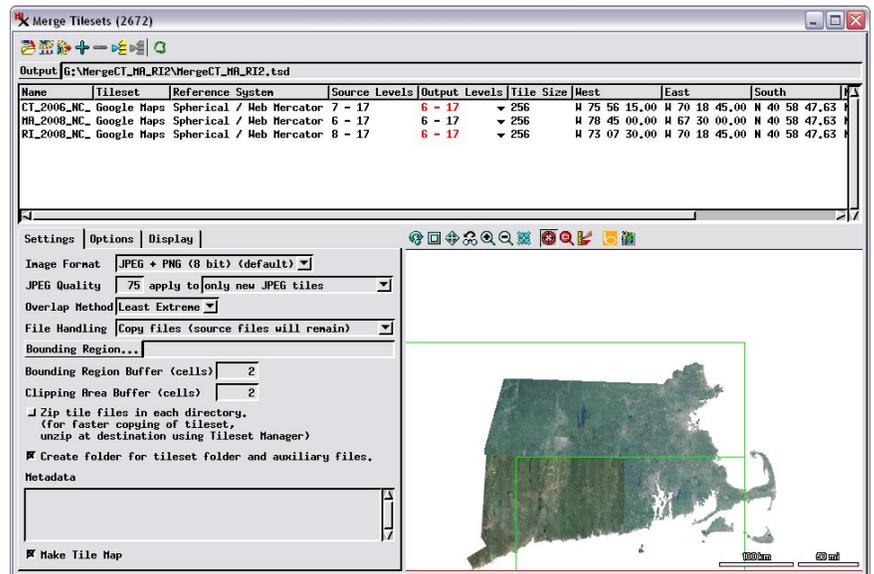
All of the tilesets you select for a single merge operation must be standard web tilesets of the same type (Google Maps, Bing Maps, Google Earth, or NASA Worldwind). The output of any merge process can be written to a new tileset with its own structure and TileSet Definition (TSD) link file, or you can merge one or more tilesets into an existing tileset in place. Tiles from the input tilesets that can be reused without modification are either copied or moved to the destination tileset. Use the File Handling menu to choose between copying (which leaves the input tilesets in place) or moving (which deletes the input tilesets). In any areas of spatial overlap at individual zoom levels, new tiles are computed from the input tiles using the overlap handling rule you select from the Overlap Method menu, in the same way that overlapping images are handled in the Automatic Mosaic process. New tiles are also computed as needed for any output lower-resolution zoom levels that are outside the zoom level range of the inputs. However, a tileset merge cannot produce higher-resolution (higher zoom level) tiles from a lower zoom level.



## Choosing Input and Output Tilesets

To select tilesets to merge, use the Add icon button on the Merge Tilesets window’s toolbar and select the TSD file representing each tileset. The list in the Merge Tilesets window shows the name of each input tileset, its range of source zoom levels, and other details. Then press the Output button to select the destination. If you are merging to a new tileset, navigate to the desired drive location and name a new TSD file to identify and describe the new tileset. If the *Create folder for tileset folder and auxiliary files* toggle is turned on (the default), an enclosing directory is automatically created with the designated name to contain all of the tileset constituents, including the TSD file.

Alternatively, you can merge one or more tilesets into an existing tileset in place by selecting the TSD file of the target tileset as the output of the process (rather than as one of the input tilesets). The input tilesets are then merged into this existing tileset, modifying its structure and its TSD file. This procedure can be useful if you need to add a small area to an existing large tileset (e.g. adding a missing county to a statewide orthoimage tileset). In that case merging in place can be much faster than creating a completely new tileset, as the existing tiles in the large target tileset do not need to be moved or copied to a new location. Because this procedure permanently modifies the target tileset, however, several warnings



Merge Tilesets process window set to merge individual Google Maps natural-color orthoimage tilesets for three states: Massachusetts, Connecticut, and Rhode Island.

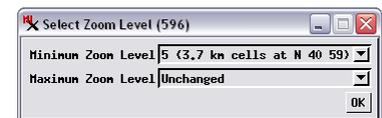
are presented when you select an existing tileset as the process output.

## Zoom Level Range

A default range of output zoom levels is automatically computed for each source tileset and is shown in the Output Levels column in the tileset list. You can modify the output level range individually for each input tileset. The Output Levels column includes a small icon button in the shape of a black triangle; pressing this button opens the Select Zoom Level window, in which you can set the output minimum and maximum zoom levels for that tileset. You can also use the Set All Levels and Set Selected Levels icon but-

Source Levels	Output Levels
7 - 17	5 - 17
6 - 17	5 - 17
8 - 17	5 - 17

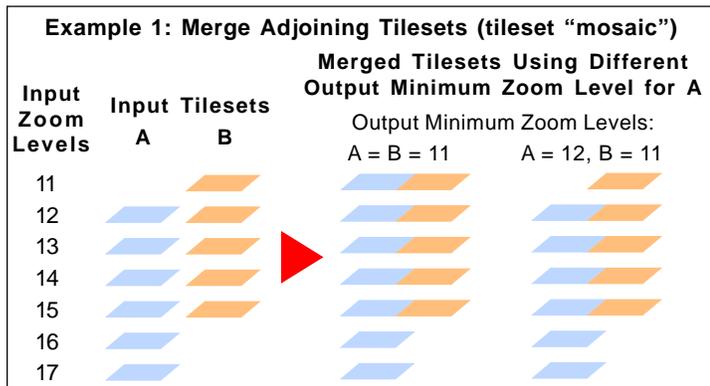
Click to change output zoom levels



(over)

tons in the Merge Tilesets toolbar to open the Select Zoom Level window and set the range for one, several, or all inputs at once. The maximum output level must be equal to or less than the maximum zoom level in the source tileset. If you set a lower output maximum, any higher zoom levels in the input tileset are ignored and not used to create the output.

The output minimum zoom level you set can be equal to, less than, or greater than the minimum level in the source tileset. If you set the output minimum to a higher value than the minimum source zoom, the lower-numbered zoom levels in that tileset are ignored when constructing the merged tileset. If your output minimum is less than that of the source, tiles for these reduced-resolution zoom levels are automatically computed when needed from the higher-resolution zoom levels. If your zoom level range settings are such that an area of a particular zoom level could be populated either by existing tiles at that level from one of the inputs or tiles recomputed from a higher-resolution source, preference is given to the higher-resolution source. Thus when you are merging tilesets that overlap spatially but include different zoom level ranges, the minimum output zoom level you set for each input is critical in determining which imagery appears at the lower zoom levels in the merged result (see illustrations below for examples).



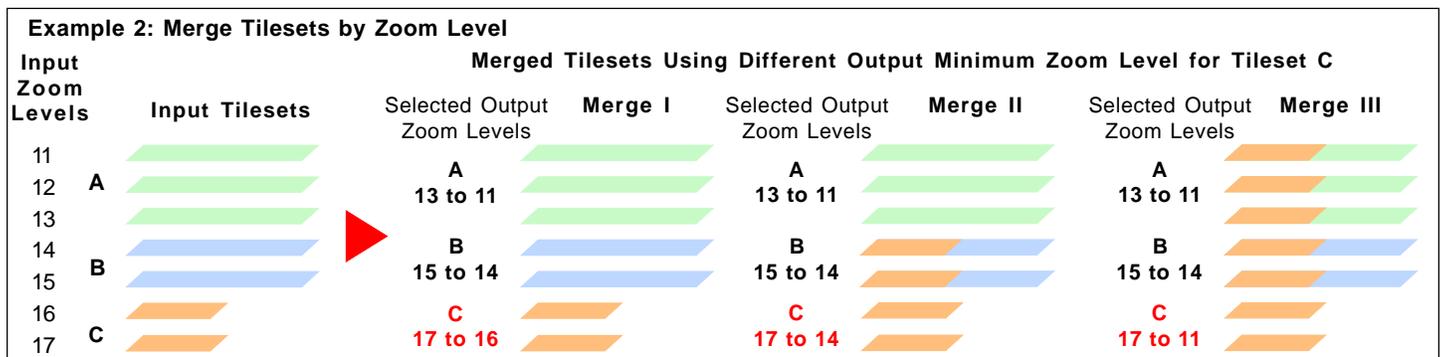
## Image Format

The Image Format menu allows you to set the tile file format(s) to use in the merged tileset. The output format need not be the same as that of the input tilesets, but using a different output format requires that tile files that could be merely copied if using the same format will instead have their contents read and converted to the new file format(s), increasing processing time. If the format selection includes JPEG, you can set a quality percentage value for the JPEG compression and choose whether to apply this quality setting only to new JPEG tiles (created by merging overlapping input tiles) or to also recompress existing JPEG tiles. See the TechGuide entitled *Tilesets: Tile Image Formats* for more information about image formats in tilesets.

## Clipping Areas and Bounding Region

You can define a specific spatial portion of any input tileset(s) to use within the merge operation by designating a clipping area for each of the desired tilesets. You can also define a project boundary (bounding region) to limit the overall extents of the output tileset, and set buffer distances for the bounding region and clipping areas. Procedures for setting clipping areas and a bounding region are described in the TechGuides *Tilesets: Extract Structures* and *Tilesets: Clipping to a Project Boundary*.

You can use the Merge Tilesets process to "mosaic" adjoining and/or partially overlapping tilesets (for example, orthoimage tilesets of adjacent states or counties). In the example to the left, Google Maps tilesets A (zoom levels 17 through 12) and B (zoom levels 15 through 11) are merged. Two sample outputs are illustrated. With the output minimum zoom level set to 11 for both tilesets (the default setting), this minimum zoom level is populated with imagery from both input tilesets; the tiles at level 12 of tileset A are automatically resampled to produce the new reduced-resolution tiles for its portion of the merged tileset. With the minimum zoom level for tileset A set to 12 (same as its input), zoom level 11 in the merged tileset only contains tile data from tileset B. Because only tileset A contains data at zoom levels 16 and 17, the merged tileset in both cases only contains tiles in those zoom levels for the area contributed by tileset A.



The Merge Tilesets process lets you specify the output range of zoom levels to create from each input tileset. This feature allows you to merge tilesets produced from imagery with different spatial resolution covering the same (or overlapping) areas and affords you control over which imagery is used to populate each zoom level in the merged tileset. In the example illustrated above, three tilesets with different ranges of zoom levels are merged. Three sample merged outputs are illustrated. In all of the sample cases, the output zoom level ranges set for tilesets A and B are the same as their input ranges, which do not overlap. The output zoom level range is varied in each case for tileset C, which has input zoom levels 17 and 16 and covers only part of the area covered by tilesets A and B. In sample merge I, the output zoom level range for tileset C is the same as its input range. In this case each zoom

level range in the merged output contains tiles from only one input tileset, so producing the output tiles merely involves copying (or moving) them from the input to the output destination. In sample merge II, a lower output minimum zoom level (14) is set for tileset C. Because in overlap areas tiles recomputed from higher zoom levels are created in preference to existing low-resolution tiles, zoom levels 15 and 14 of the output tileset contain imagery from both tileset C (in its area of coverage) and tileset B (outside the area covered by C). In sample merge III, the output minimum zoom level for tileset C is set to zoom level 11, the same as the minimum input level for tileset A. As a result, the tileset C imagery is propagated all the way through the zoom levels to the minimum zoom level 11, and the three lowest-resolution zoom levels all include imagery from tilesets A and C.