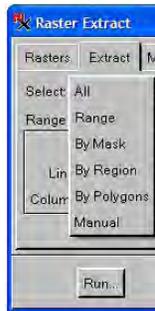


Image Processing

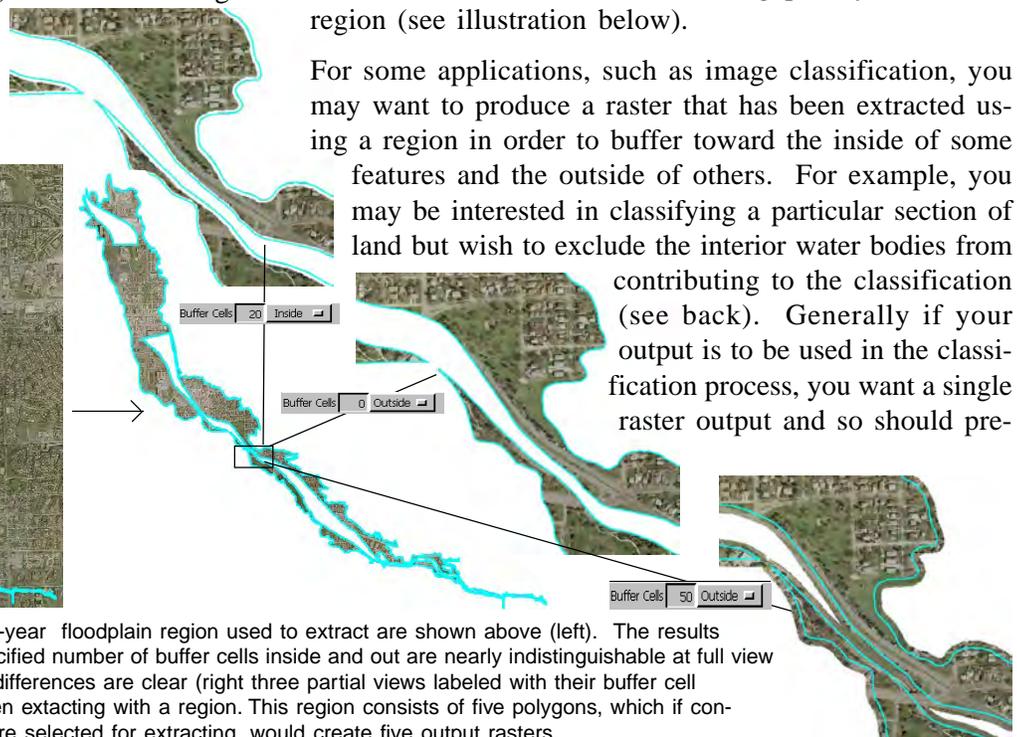
Extracting Raster Areas with Buffer

TNTmips provides six interactive selection methods to define the complex area in an internal or linked raster that you want to extract to a new raster. All of these methods are noted here and the By Region and By Polygons methods are described in detail. These two methods can automatically add the additional cells you specify by creating a buffer zone inside or outside the complex area you define with a selected region or polygons.



- **All.** Copy the entire input raster to a different output format and/or compression type and ratio than the input raster. You can also set a different output format using any of the other methods.
- **Range.** Use a rectangle tool to select the area or enter its line and column numbers manually.
- **By Mask.** Select a binary mask to define which cells will be valid or invalid in the output raster. Edge cells can also be trimmed.
- **By Region.** Choose a region object to define the area, which may be complex and contain nested islands.
- **By Polygons.** Use all polygons or polygons selected by query or interactively from a geometric object.
- **Manual.** Outline the area(s) to extract using the polyline drawing tool.

The By Region and By Polygon selection methods let you specify



The raster being extracted from and the 100-year floodplain region used to extract are shown above (left). The results without choosing buffer cells and with a specified number of buffer cells inside and out are nearly indistinguishable at full view (center). However, when you zoom in, the differences are clear (right three partial views labeled with their buffer cell options). You get a single output raster when extracting with a region. This region consists of five polygons, which if converted to vector format and all polygons were selected for extracting, would create five output rasters.

the number of extra buffer cells to add around the region or polygon(s) used to define the extraction area. Adding cells as a buffer by entering a non-zero number in the Buffer Cells field allows you to see some of the area around the region or polygon used for extracting or restrict the area to be inside these boundaries. For example, you may want to see the imagery for the area immediately surrounding your stream or other sensitive area buffer zone polygons or regions to assess potential hazards. You may want to extract map quad-sized areas from a wider area mosaic with somewhat larger than quad-sized output to insure you have the entire quad and to provide overlap areas for virtual or other mosaics.

The primary difference between the Select By Region and Select By Polygons options is that the former gives you a single raster output and the latter gives you a separate raster for each selected polygon.

The appropriate buffer distance will be determined by the resolution of the raster you are extracting from and your intended use of or requirements for the result. The higher the resolution of the raster, the greater the number of buffer cells before you will see a difference (it takes 10 cells in a 10-meter resolution raster to cover the same ground distance as 1 cell in a 100-meter resolution raster). Using a buffer can also fill in small holes or gaps in your selected region (see illustration below).

For some applications, such as image classification, you may want to produce a raster that has been extracted using a region in order to buffer toward the inside of some features and the outside of others. For example, you may be interested in classifying a particular section of land but wish to exclude the interior water bodies from contributing to the classification (see back). Generally if your output is to be used in the classification process, you want a single raster output and so should pre-

pare a region from the multiple polygons that would be involved.

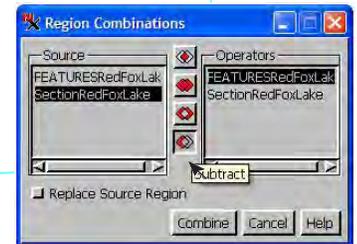
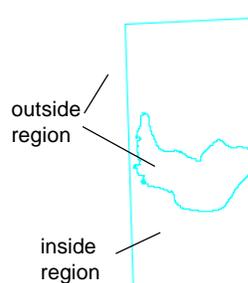
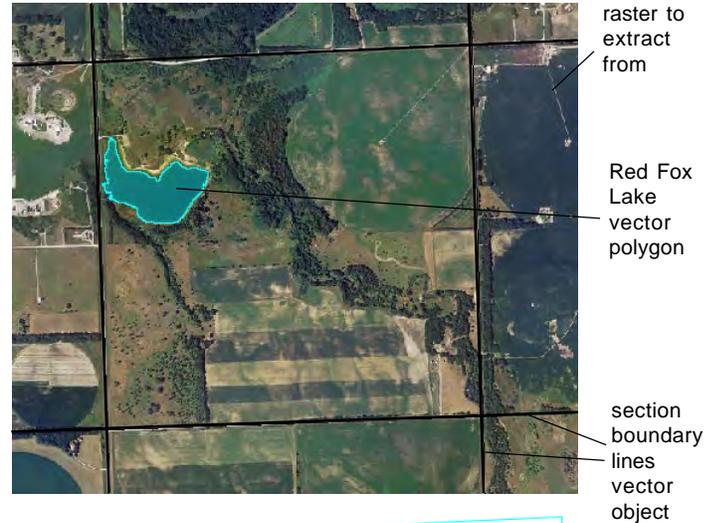
You may also want to eliminate the roads along the edges of the section of land from the area to be classified along with any water bodies contained within the section. To simply eliminate section roads, you would buffer inside the section boundaries. Such buffering could be done with the selected section polygon or with a region created from that polygon.

It is trivial to create regions from marked (selected) polygons in any TNT process with a View window. Simply select the desired polygon(s), right click on its vector layer element row in the Display or Layer Manager window, and choose Marked Polygon Region. The region generated will be listed on the Region tabbed panel of the Geo-Toolbox. If a region that has been saved is required for the process of interest, as it is when extracting by region in Raster Extract, you can also save the region from this tabbed panel.

To eliminate section roads and water bodies within the section with a buffer around the water bodies to ensure you are not including any water, you need to combine regions using the operations available on the Region tabbed panel of the GeoToolbox. For this example, you want to subtract the region created for the lake polygon from the region created by the polygon formed by the section boundary (see right). Region Combinations can be performed directly in and saved from the Raster Extract process.

In some instances, where the polygons of interest come from a number of different vector objects and you want to create a region to use for extracting, you can merge the selected polygons into a single vector object (Geometric/region boundary

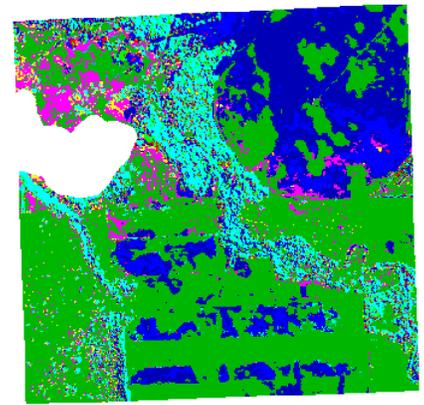
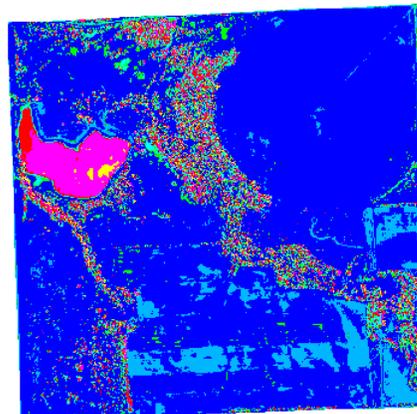
Merge to/Vector) then convert this vector object to a region (Convert/Geometric to Region) to save steps. Although region combinations can be done directly in the Raster Extract process, each combination can have only a single source and operator. Remember that nested areas (from vector polygons) in a region are alternately inside and outside the region.



Using region combinations to subtract the lake region (operator) from the section boundaries region (source) produces a region with a hole where the lake was.



Result of Raster Extract with the area selected by region and buffered inside satisfies both inside section roads and outside lake area in a single pass. Region is shown along with extracted raster result above.



Cluster analysis of agricultural land with (center) and without (right) pixels from the section roads and water that bias the classification. In each case, only 10 sample classes were generated!