

Reassign Image Cell Values

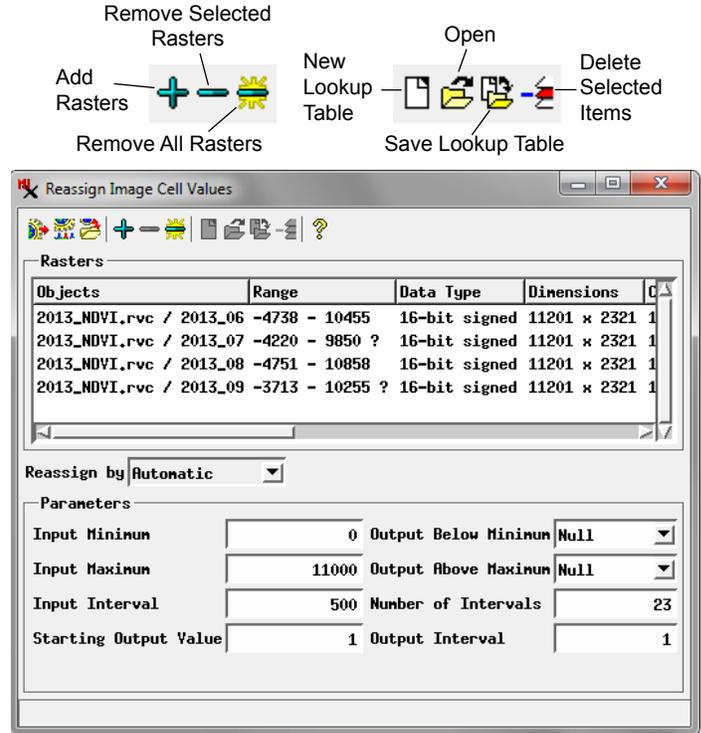
The Reassign Image Cell Values process (Image / Classify / Reassign Cell Values) transforms individual cell values or ranges of cell values in an input raster object to different values in an output raster object of the same dimensions. The input raster can be any single-value integer or floating-point data type, and the output raster can have a different data type than the input. Multiple input rasters with the same data type can be processed together using the same reassignment settings. Some possible uses of this process include:

- convert a continuous range of values (integer or floating-point) to a series of discrete integer values, each representing an equal range of input values (sometimes called *density slicing*)
- map unequal ranges of continuous values to a series of integer values
- extract specific ranges of values from the input raster, with input cells outside those ranges set as null in the output
- change one or more individual cell values in a raster object with condition scores to be used in map overlay analysis operations
- apply a contrast lookup table to one or more grayscale images.

The Reassign Image Cell Values process includes some of the same capabilities as the more specialized Apply Contrast and Set Raster Null Cells processes, but takes a more general approach to transforming raster cell values by providing multiple methods for value reassignment. The Automatic method segments a range of input values into a set of uniform contiguous intervals and automatically assigns an output integer value to the cells in each interval. In the Threshold, Range, and Value methods, you manually define a lookup table that maps input cell values to output cell values. In the Database Table method, new cell values are assigned using lookup values in a specified field in an attached raster database table.

Reassign Image Cell Values Window

Use the Add Rasters icon button (see illustration above right) to choose one or more input raster objects to process. The selected rasters are listed in the Rasters box. This columnar list shows the file and object name in the Objects column, and additional columns provide other information about each object, such as the numeric range of cell values, the numeric data type, dimensions, cell size, extents ranges, and coordinate reference system. The cell value range is read from the raster histogram. If the histogram is sampled, the displayed range may be smaller than the full range of cell values; in this case, the range listing is followed by a question mark. (You may wish to recompute a full histogram before using the raster as input in this process.) You can remove objects from the Rasters list in two ways: select one or more input rasters in the list and press the Remove Selected Rasters icon button, or press the Remove All Rasters icon button to clear the list.



Use the *Reassign by* menu to select the reassignment method. The lower portion of the window presents Parameters controls for the Automatic method, Lookup Table controls for the Threshold, Range, and Value methods, and a list of database fields in the Database Table method.

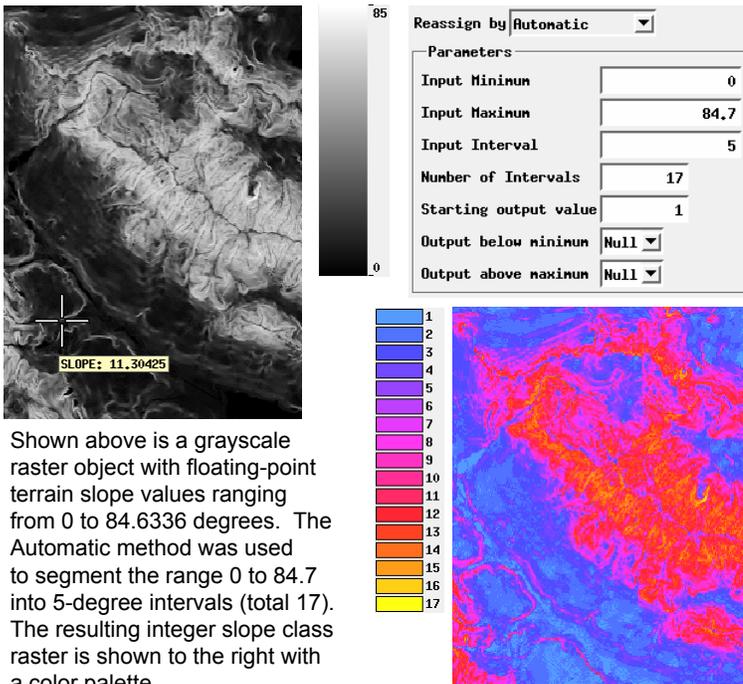
Automatic Method

The Automatic method is designed to let you quickly segment a range of input values into a set of uniform contiguous intervals and automatically assign an output integer value to the cells in each interval. For example, the input might be a terrain slope raster with floating-point values in degrees, and you wish to create a slope class raster with integer values each representing a 5-degree range in slope (the interval value; see illustration on the next page).

When you choose the Automatic method, you enter values in the Input Minimum and Input Maximum fields in the Parameters box to define the range of values (including the specified minimum and maximum) to be processed. With the range defined, entering an Input Interval value computes and shows a corresponding Number of Intervals value; likewise, entering a Number of Intervals value recalculates the Input Interval Value. You can specify minimum and maximum values outside the range of actual raster values, but the resulting output raster may have fewer intervals than the number shown.

Intervals are assigned output cell values beginning with the Starting Output Value that you enter (default value is 1) and incremented by the Output Interval value (default 1). If the input range you designate for processing does not include the entire

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Shown above is a grayscale raster object with floating-point terrain slope values ranging from 0 to 84.6336 degrees. The Automatic method was used to segment the range 0 to 84.7 into 5-degree intervals (total 17). The resulting integer slope class raster is shown to the right with a color palette.

input range, you can use the Output Below Minimum and Output Above Maximum controls to set the output values assigned to cells outside this input range. You can enter a specific value in each editable field or select Null from the menu button.

When you use integer starting and interval output values, the Automatic method produces integer output from an integer or floating-point input raster. The integer datatype (4-, 8-, 16-, or 32-bit signed or unsigned) is set automatically based on the range of output values you specify. However, if you set a non-integer starting value and/or output interval value to produce decimal output values, the process creates a 32-bit floating-point raster.

Threshold, Range, and Value Methods

When you select the Threshold, Range, or Value option from the *Reassign by* menu, you use the Lookup Table controls in the lower portion of the window to create a lookup table with a series of entries that define how output values are assigned from individual input cell values or ranges of values. You can set the output value for an entry to be a specific numeric value, null, or set values in that entry to be left unchanged. The table has two or three fields (depending on the method); left-click on the *Add>* entry in the left-hand field to add a table entry and fill in the fields. The Lookup Table panel has several columns to accommodate tables with many entries.

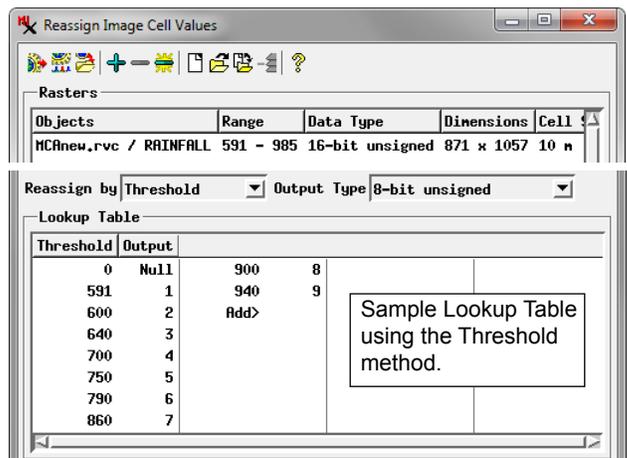
For each of these methods the Output field is used to set the output value for a specific table entry. Left-click in this field to enter a specific numeric value, or right-click for a menu from which you can choose Null or Unchanged. You can also leave the field blank or enter “n” to set the value to Null, or enter “u” for Unchanged. Use the Output Type menu to choose the data type for the output raster (8-, 16-, or 32-bit unsigned or signed integer, or 32- or 64-bit floating-point).

You can save the lookup table as an XML-formatted text file (*.lutx) by pressing the Save Lookup Table icon button in the toolbar at the top of the window. Pressing the Open icon button

presents a menu with choices to *Open saved lookup table* and *Import from contrast table*. You can remove one or more entries from the current table using the Delete Selected Items icon button. Left-click in an entry to select it exclusively, <Ctrl> left-click to toggle selections, and <Shift> left-click to select more than one entry (or a range of entries). Press the New Lookup Table icon button to clear the current table and start a new one.

Threshold: The Threshold method is designed to let you segment the range of input values into a set of contiguous but not necessarily equal intervals by specifying threshold input values and associated output cell values. If you want to segment using equal intervals and create integer output, it is easier to use the Automatic method.

The Lookup Table for the Threshold method has Threshold and Output fields. The default table entry has a Threshold value equal to the minimum possible value for the input raster data type and an Output value of Null, which you can change to a specific value or Unchanged. Left-click on the *Add>* control in the Threshold field to add a threshold value, then press <Tab> to activate the corresponding Output field (or left-click in the field) to enter or select an output value. The output value is assigned for all input values from the specified threshold up to but not including the next greater threshold value (or the maximum raster value if there is no higher threshold). If the lowest threshold value you enter is greater than the minimum value in the input raster, input values less than this threshold are assigned the output value you specified for the initial threshold. If you enter thresholds out of numerical order, the Lookup Table listing is automatically resorted to show the entries in order of increasing threshold value.

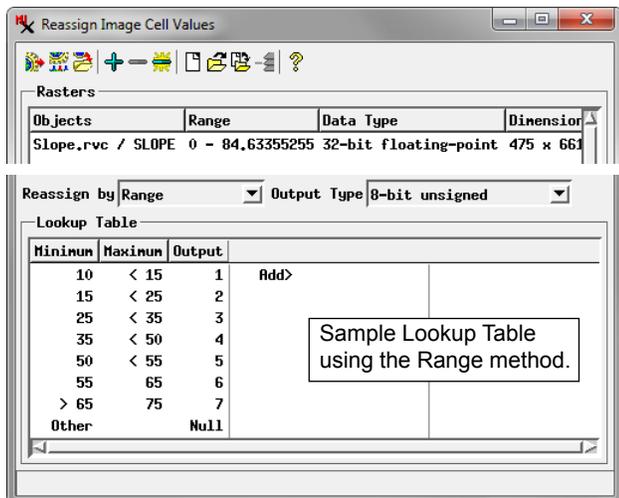


Range: The Lookup Table for the Range method has Minimum, Maximum, and Output fields that let you set any number of contiguous or noncontiguous range intervals. The table has a default entry *Other* that sets the output value (specific value, null, or unchanged) for all input values outside of the ranges you specify.

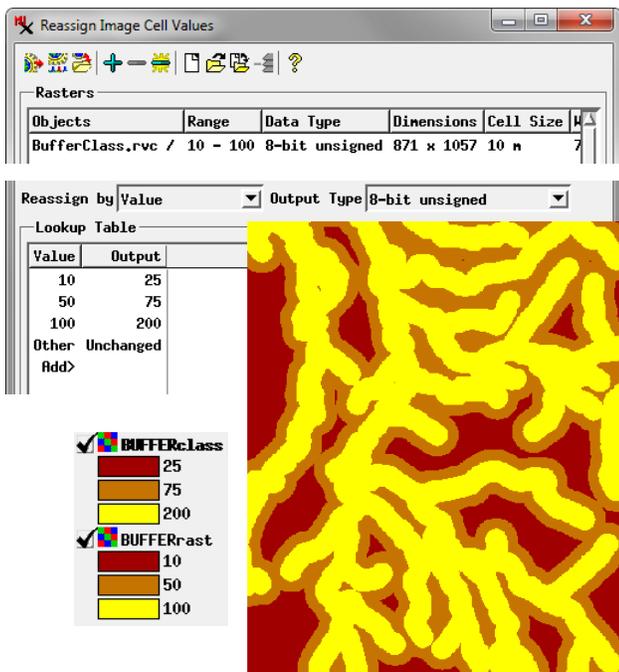
Ranges are required to be exclusive and non-overlapping. If you enter a new range that overlaps any previous ranges, the previous range limits are automatically adjusted as needed to prevent numeric overlap and preserve the last range limits entered. For

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example, if you enter a range 300 to 400 and then 400 to 500 for integer input, the resulting ranges will be 300 to 399 and 400 to 500. When you are processing rasters with integer data type, the minimum and maximum values you enter for a range are always inclusive; the range includes all values equal to or greater than the minimum and less than or equal to the maximum. For floating point inputs the range limits are inclusive by default, but you can enter ">" before a minimum value or "<" before a maximum value to exclude the limit from the range (see illustration below).



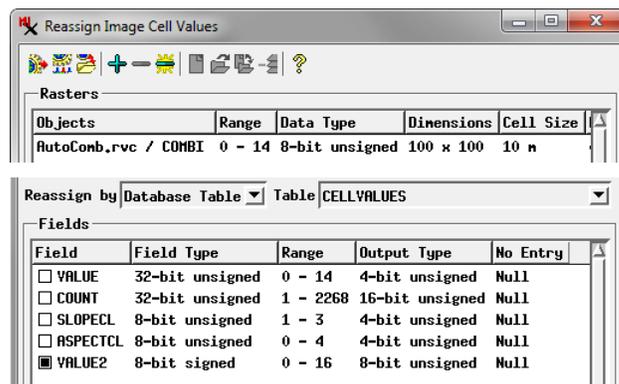
Value: In the Value method you assign an output value to each specific input cell value that you wish to process. The table has a default entry *Other* that sets the output value (specific value, null, or unchanged) for all other input values. This method is most useful for processing a raster object with a small number of cell values or a small number that you want to change.



In the example illustrated here, the input raster object is a set of three buffer zones around streams. The raster value is a numerical score to be used in map overlay analysis operations with other spatial data. The Value method is used to change the set of scores in the input (10, 50, and 100) to 25, 75, and 200.

Database Table Method

The Database Table method uses values in a designated field in a raster database table with records attached to cell values to provide the lookup table values. The input cell value is replaced by the value in the selected field in the attached record. When you choose this method from the *Reassign by* menu, a Table menu is shown to the right from which you can choose a database table (if more than one table is present). The Fields box below these menus lists the name of the fields in the selected table (Field column) along with the field data type and the range of numeric values in the field. Numeric fields and string fields with only numeric characters can be selected (entries shown in black text); other field types are shown in gray text and cannot be selected. Left-click on the box to the left of the field name for any fields you wish to use. A separate output raster object is created for each field you select.



The Output Type column shows the default raster data type to be used for the output raster object for each selected field; left-click on this field to show a menu from which you can select a different raster data type. The No Entry column sets the value to assign to output cells when the input cell value has no record in the selected table or the selected field in the attached record is blank. You can enter a specific value or select Null or Unchanged.

In the example illustrated here, the input raster was created from slope class and aspect class raster objects using the Automatic Raster Combination process in TNTmips (Image / Combine / Automatic), which creates an output raster with a unique value for each numeric combination of input raster values; a database table records the component input values for each output raster value. The VALUE field in this table shows the output cell value. A new field (VALUE2) was added manually to this table and different values were entered for some of the output cell values (all values where the ASPECT_CL value = 0 were set to 0). The VALUE2 field was then used as the source for the lookup table values in the Reassign Image Cell Values process.

