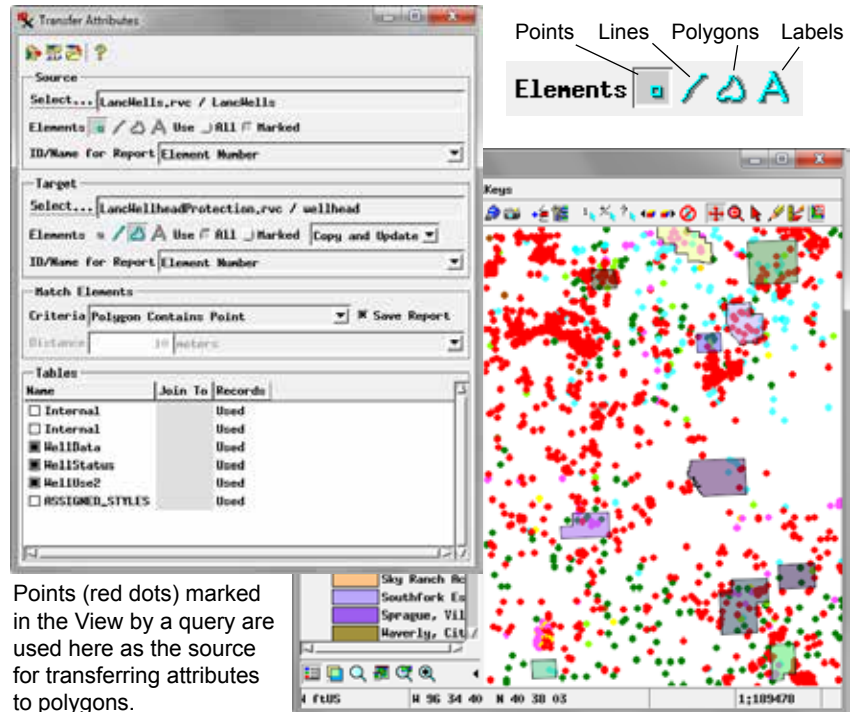# Transfer Attributes

The Transfer Attributes process in TNTmips (Geometric / Attributes / Transfer) automatically transfers attribute tables and records from elements in a source geometric object to spatially matching elements in a target object. Vector, CAD, or shape objects can be used as either source or target, and attributes can be transferred to the same or different element type (points, lines, polygons, or labels) using your choice of matching criteria. The process can also transfer attributes from a source raster object with a database (such as a classification raster) to geometric points.

You can process all geometric elements in the source and target objects or only those marked (manually or by query) in the View window that automatically displays the inputs. The attributes can be added directly to the target object or to a copy of the object. You can choose which attribute tables to transfer and whether or not to join the transferred tables to target tables with the same structure. You can also choose to create a text report file with a summary and details of the transfer operation.

The Transfer Attributes process transfers database records from the source elements to the target elements. Records may be transferred from a particular source element to zero, one, or multiple target elements and/or to a particular target element from one or more source elements. The exact result for each target element depends on the spatial matching criteria you set and the spatial relationships between the elements. The attachment type of a target table is modified from that of the source if necessary to permit multiple attached records or no record for particular elements.

Source and Target Controls

The Source and Target boxes in the Transfer Attributes window contain similar sets of controls. In each box press the Select

Points (red dots) marked in the View by a query are used here as the source for transferring attributes to polygons.

pushbutton to choose a vector, CAD, or shape object to use as the source/target for the transfer. The file and object name of the selected object is then shown in the text field to the right of the pushbutton. The relevant Elements icon buttons are activated automatically according to the element types available in the object. If more than one element type is present, turn on the icon button for desired element type.

The *Use* radiobuttons for the source and target elements allow you to choose whether to use *All* elements of the designated type or only the elements that have been *Marked* in the View window. You can mark individual elements manually in the view or use the Query Builder to mark elements based on their attributes (see the Technical Guide entitled *Interactive Query Builder* for more

(continued)

Match Elements Criteria Options for Different Source/Target Element Types

Source \ Target	Point	Line	Polygon	Label
Point	Nearest Source for each Target Nearest Target for each Source Nearest for Both Source and Target All within Minimum Distance	Nearest Line for Each Point Nearest Point for each Line Nearest for both Line and Point All within Minimum Distance	Polygon Contains Point Nearest Polygon for each Point	Nearest Point for each Label Nearest Label for each Point Nearest for both Point and Label All within Minimum Distance
Line	Nearest Line for each Point Nearest Point for each Line Nearest for both Line and Point All within Minimum Distance	Intersecting Target is Subset of Source Source is Subset of Target Equivalent within Distance All within Minimum Distance	Polygon Contains Line Overlapping	Nearest Line for each Label Nearest Label for each Line Nearest for both Line and Label All within Minimum Distance
Polygon	Polygon Contains Point Nearest Polygon for each Point	Polygon Contains Line Overlapping Split Lines by Polygon	Source Contains Target Target Contains Source Overlapping Equivalent within Distance	Polygon Contains Label Nearest Polygon for each Label
Label	Nearest Label for each Point Nearest Point for each Label Nearest for both Label and Point All within Minimum Distance	Nearest Label for each Line Nearest Line for each Label Nearest for both Label and Line All within Minimum Distance	Polygon Contains Label Nearest Polygon for each Label	Nearest Source for each Target Nearest Target for each Source Nearest for Both Source and Target All within Minimum Distance

information. Make the desired layer active in the View before using the Query Builder.)

In the Target box a menu to the right of the Element controls lets you choose whether to write the attributes directly to the selected target object (Update in Place) or to make a new copy of the target object to receive the attributes (Copy and Update).

The selected entry on the *ID/Name for Report* menu specifies the element identifier to be used in the report (if the Save Report option is selected). The default option is Element ID (if available) or Element Number; selecting the Choose... option prompts you to select a database field containing the desired unique element identifiers.

Match Elements Controls

Matching source and target elements are identified by the process using the spatial matching method you choose from the Criteria menu in the Match Elements box. Different matching criteria are available depending on the combination of source and target element types you are using. The available criteria for all source-target element type combinations are listed in the table on the previous page. Some of the matching criteria include a Distance factor, in which case the Distance field and menu are active. Enter a numeric value in the Distance field and choose the length units for that distance from the menu (default is meters).

If you turn on the Save Report toggle, the process generates a text report that gives you an overview of the transfer results (see sample below). It provides summary information (numbers of source and target elements that had no, single, or multiple matches) and detailed tabulations of the matching elements and the source and target elements with no matches.

Criteria for Spatial Matching

The spatial matching criteria are described and illustrated below. For criteria in which the word Source or Target is shown in square brackets, the Criteria menu entry uses the actual element types if source and target element types are different, or "Source" and "Target" when they are the same element type. The lists of element types for which each criterion is available show source element types on the left and target element types on the right.

Nearest [Source] for each [Target]

point or label --> point, line, or label
line or polygon --> point or label

This method transfers attributes to each target element from the nearest source element if the minimum distance between them does not exceed the specified distance. A target element receives attributes from at most one source element (see illustration below).

Nearest [Target] for each [Source]

point or label --> point, line, polygon, or label
line --> point or label

For each source element, attributes are transferred to the closest target element if the minimum distance between them does not exceed the specified distance. A particular target element may receive attributes from more than one source element (see illustration below).

Nearest for Both [Source] and [Target]

point or label --> point, line, or label
line or polygon --> point or label

Attributes are transferred to a target element from the nearest source element if that target element is also the closest one to

Sample Report File
Transfer Attributes
Criteria: Nearest Polygon for each Point
Distance: 150

From: SoilPolys.rvc / SoilPolys
   Processed 4 of 4 Polygons
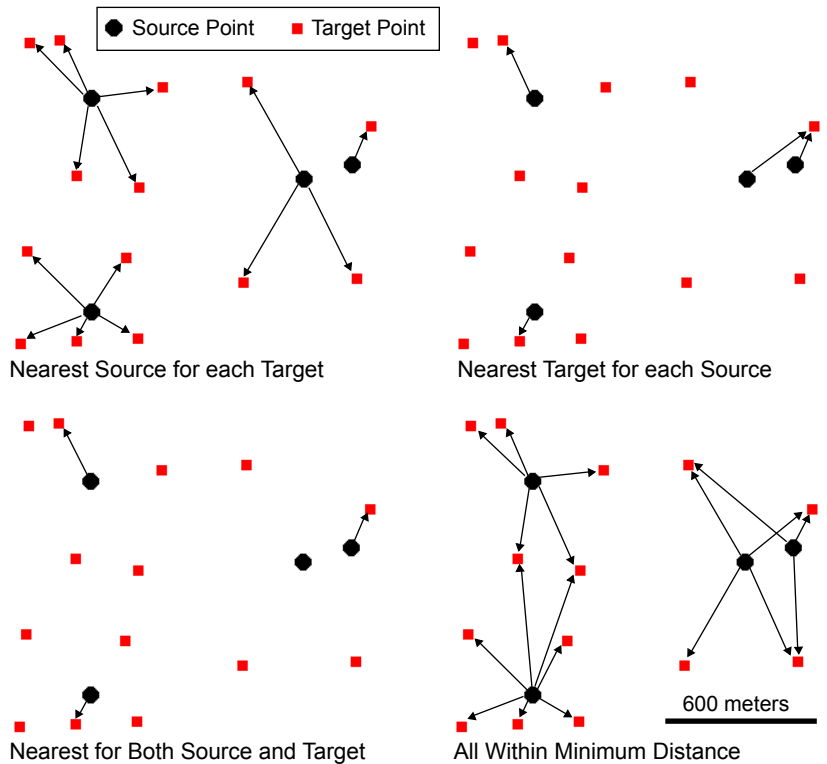   4 elements had multiple matches

To: SoilPolys.rvc / Points10_Nearest150m
   Processed 10 of 10 Points
   10 elements had a single match

Source Polygons with multiple matching Points
   1 -> 8 + 9 (2)
   2 -> 3 + 7 (2)
   3 -> 1 + 10 (2)
   4 -> 2 + 4 + 5 + 6 (4)

Target Points with one matching Polygon
   1 <- 3
   2 <- 4
   3 <- 2
   4 <- 4
   5 <- 4
   6 <- 4
   7 <- 2
   8 <- 1
   9 <- 1
   10 <- 3

Attribute Transfer Results Point to Point using Different Match Criteria
(arrows indicate attribute transfer; distance setting is 600 meters for all)

● Source Point   ■ Target Point

Nearest Source for each Target

Nearest Target for each Source

Nearest for Both Source and Target

All Within Minimum Distance

600 meters

the source element. A target element receives attributes from at most one source element (see illustration on previous page).

All within Minimum Distance
point, line, or label --> point, line, or label

In this method, attributes are transferred from a source element to all target elements for which the minimum distance between source and target is within the specified distance. Different target elements may have attributes transferred from more than one source element (see illustration on the previous page).

Intersecting
line --> line

Attributes are transferred from a source line to any target line that intersects it at least once (see illustration to the right). A target line may have attributes transferred from more than one intersecting source line.

Target is Subset of Source
line --> line

Attributes are transferred from a source line to a target line if no part of the target line is farther from the source line than the specified distance. The target line end nodes do not have to be within the specified distance from the corresponding source line nodes (see illustration to the right).

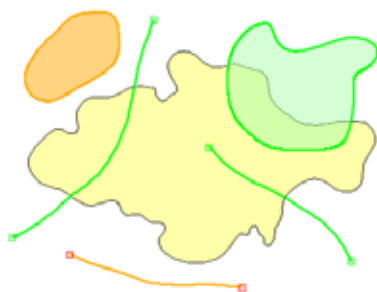### Source is Subset of Target
line --> line

Attributes are transferred to a target line from a source line if no part of the source line is farther from the target line than the specified distance. The source line end nodes do not have to be within the specified distance from the corresponding target line nodes.

Equivalent within Distance
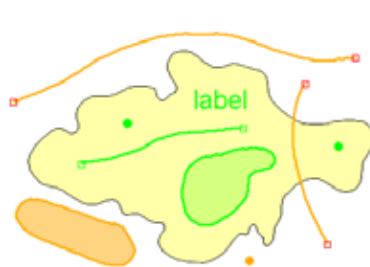line --> line
polygon --> polygon

Attributes are transferred from a source line to target line (or source polygon to target polygon) if the lines (polygon boundaries) are everywhere within the specified distance of each other. Corresponding source and target line end nodes must also be within the specified distance of each other (see illustration to the right).

Intersect

Attributes are transferred from the source line (black) to the green target lines that intersect it, but not to the non-intersecting line (orange).

Subset

Attributes are transferred from the source line (black) to the green target line, which has no point farther from the source line than the specified distance (indicated by the yellow buffer zone polygon). Target lines which have portions farther away from the source line (orange) do not have attributes transferred.
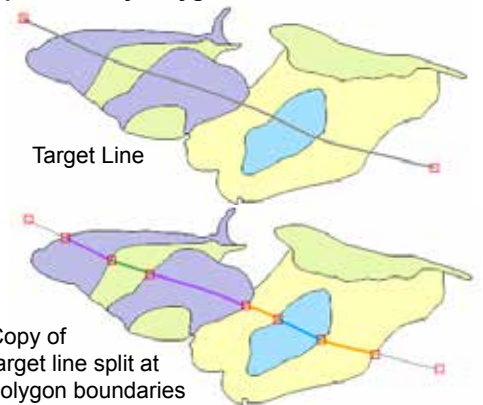
Equivalent within Distance

Attributes are transferred from the source line (black) to the green target line that lies everywhere within the specified distance from the source (indicated by the yellow buffer zone polygon) and which has end nodes no farther from the source end nodes than the specified distance.

Target lines do not have attributes transferred (orange) if any part is farther from the source line than the specified distance or if an end node is farther from the corresponding source line end node than that distance.

Split Lines by Polygon

Target Line

Copy of target line split at polygon boundaries with attributes from traversed polygon attached to each line.

Overlapping

Attributes from the source polygon (yellow) would be transferred to the overlapping polygon or lines (green) but not to the orange line or polygon.

Polygon Contains

Attributes from the source polygon (yellow) would be transferred to any of the contained elements (green) but not to the orange elements that are partially or completely outside the polygon boundary.

Overlapping
line --> polygon
polygon --> line or polygon

With the Overlapping criterion, attributes are transferred from a source line to any target polygon that overlaps it (or from a source polygon to any target line or polygon that overlaps it; see illustration above). A target element that overlaps more than one source element receives attributes from each one.

Polygon Contains [Target]
Polygon Contains [Source]
polygon --> point, line, polygon, or label
point, line, polygon, or label --> polygon

Only elements entirely contained within the boundary of a polygon serve as valid target or source for the transfer of attributes (see illustration above).

(continued)

Split Lines by Polygon
polygon --> line

The Split Lines by Polygon method changes the topology of the target lines, so choosing this matching criterion automatically sets the element output method to Copy and Update. A target line crossing one or more source polygons is split in the output by insertion of a node at each location where the line intersects a polygon boudary. Each resulting line element receives attributes from the polygon it traverses (if any; see illustration on the previous page).

Cell Containing Point
raster with database --> point

The Cell Containing Point method is set automatically when the source object is a raster object with a database and the target is point elements in a geometric object. The cell value attributes are transferred to each point element from the raster cell that contains the point.

Tables Panel

The Tables panel at the bottom of the Transfer Attributes window provides controls that let you choose which tables and records should be transferred and whether a source table should be joined to an existing target table (records written to the existing target table rather than into a new target table).

The Name column lists the available tables for the selected element type in the source object. Turn on the checkbox to the left of the table name for each table you want to transfer to the

Turn on a toggle button for each source table in the Name column you want to transfer to the target. If the field for a table in the Join column has a white background rather than gray, it means that one or more tables with the same structure as the source table (number of fields and same field types) exists in the target object. Left-click in the Join To field to show a menu from which you can choose a table to write the records to, or choose None to copy the source table to a new target table.

target object. For source label elements a Label Text entry is also provided to use the text string of the label as the attribute value to transfer. Right-click on the column heading for options to Select All or Deselect All tables.

Use the Join To field to designate whether to join the source table to an existing target table. The Join To field has a white background if one or more target tables has the same structure (number of fields and same field types) as the source table; otherwise the field is gray. Left-click on a white Join To field to show a menu from which you can choose a target table or None to copy the source table to a new target table. Right-click on the column heading for options to Set All to None or Set All to Default.

The setting in the Records column indicates which records to transfer from source table to target table. The default setting *Used* transfers only records from the source table for which there is a matching element in the target. The setting *All* transfers all records from the source table to the target; records without a matching target element do not have an element attachment. Left-click on the Records field to toggle its setting between these two options. Right-click on the column heading to choose to Set All to 'Used' or Set All to 'All'.

Running the Process

When you have selected the desired settings, press the Run icon button to run the process immediately. Standard Queue Job and Save Job icon buttons are also provided to allow you to execute the process using the TNTmips Job Processing system (see the Technical Guide entitled *System: TNTmips Job Processing System*).

If you have chosen to *Copy and Update*, a *Select output object* window then appears to allow you to designate a Project File and a name for the result object. A *Select tables for output* window then appears so you can save the output table or tables. You can press the Auto-Name button on the window to accept the default table names, or you can manually name the output tables. Press OK to accept the names. If you have turned on the Save Report toggle button, you are then prompted to provide a name for the output report file. Name the file and press the OK button to begin processing.