

# **Geographic Information Systems and Remote Sensing for Natural Resource Management**

**FW3540**

**Lecture 21**

**GIS Analysis Functions**

Overlay Functions

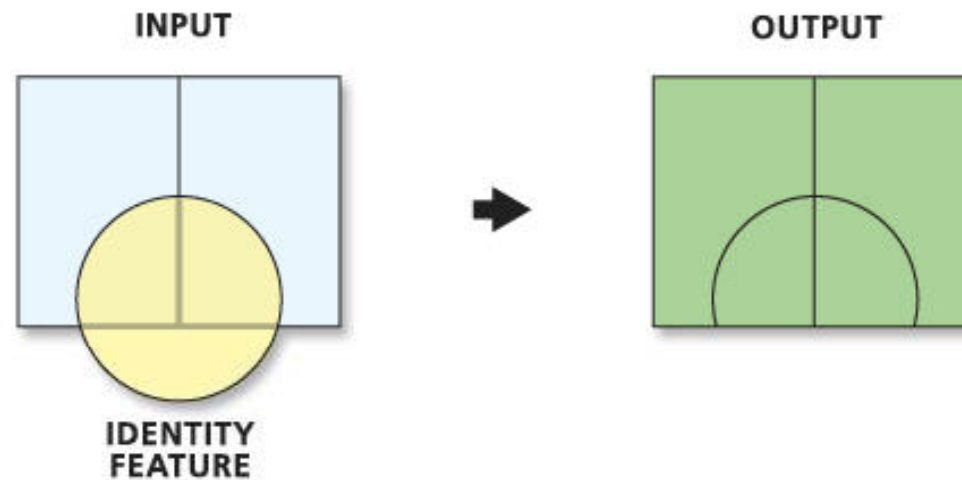
Union

Intersection

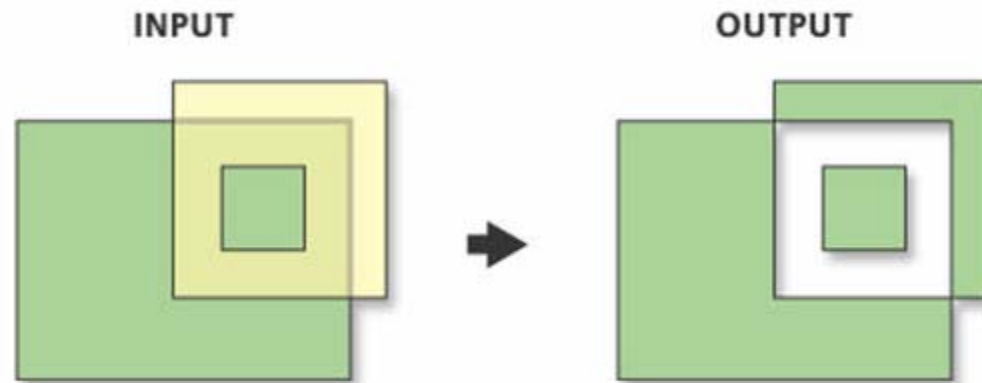
Erase

Identity

**Identity** computes geometric intersection of two thematic layers. All features of the input thematic layers, as well as those features of the identity thematic layer that overlap the input thematic layer, are preserved in the output thematic layer. Order of input is important- first layer defines spatial extent.

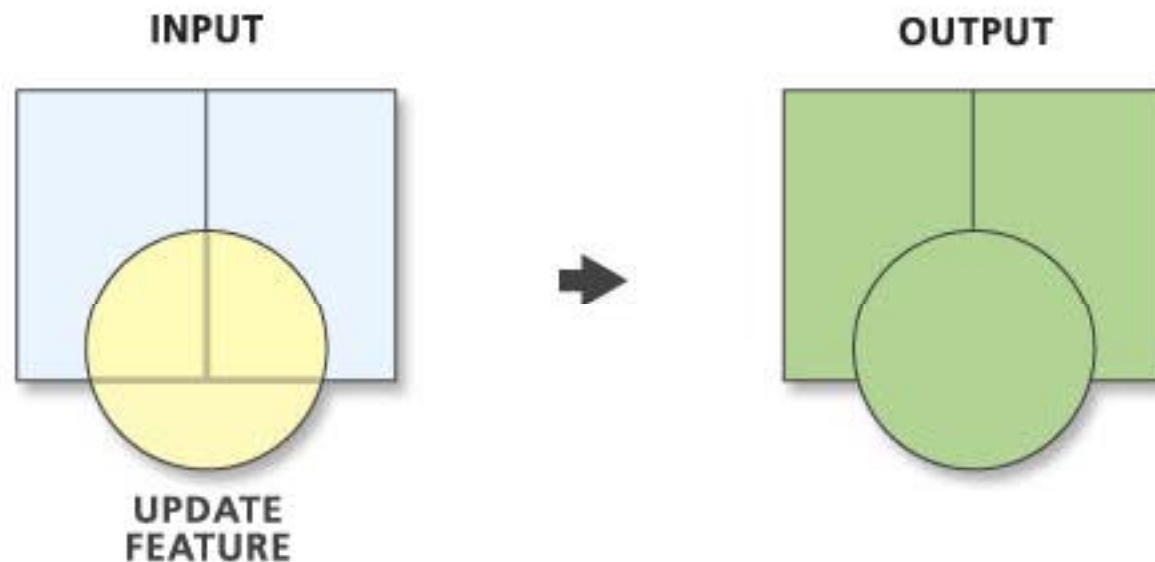


**Symmetrical Difference** computes a geometric intersection of the input and difference features. Features or portion of features common to only one of the input will be written to the output. Inputs must be polygons.

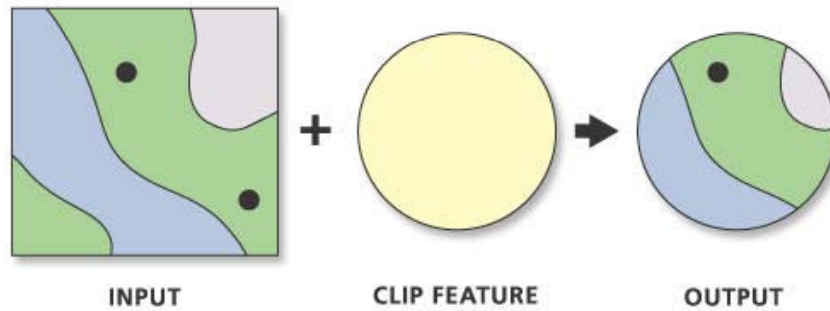


**Update** creates a new thematic layer by intersecting two sets of features. The features of the update layer define the updating extent. Polygons only

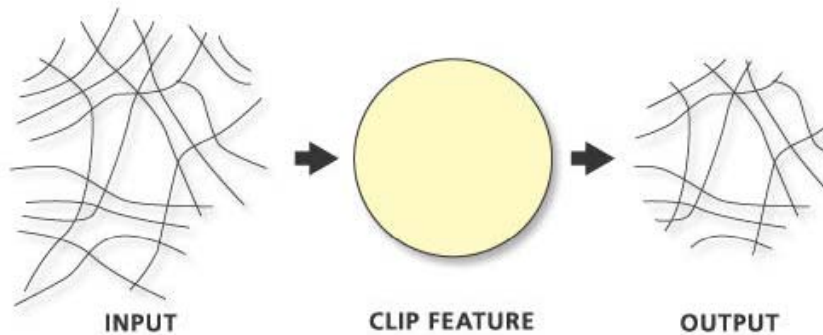
Update uses the updating extent in a ‘cut-and-paste’ operation. Update thematic layer features replace the area they overlap in the input thematic layer.



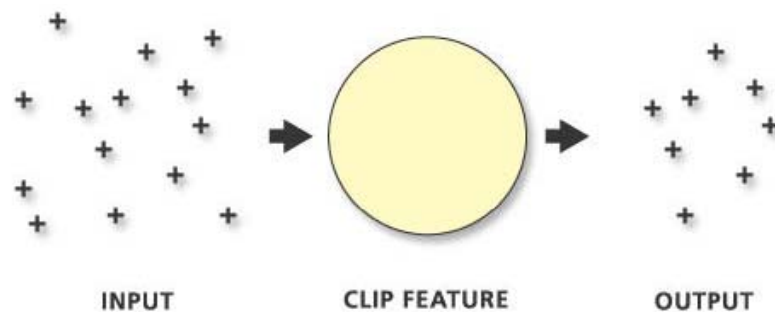
- Polygon features clipped by polygon features



- Line features clipped by polygon features



- Point features clipped by polygon features

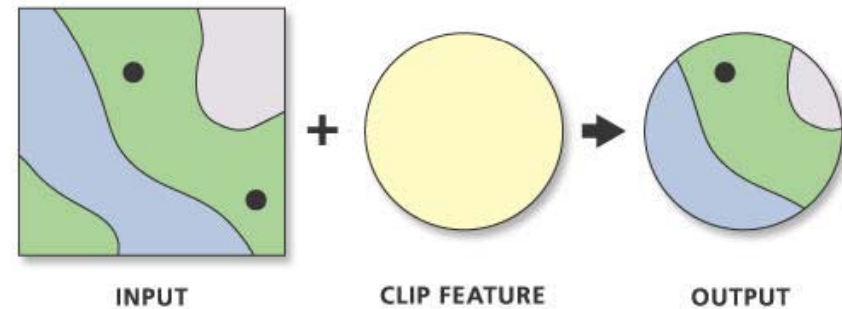


## CLIP

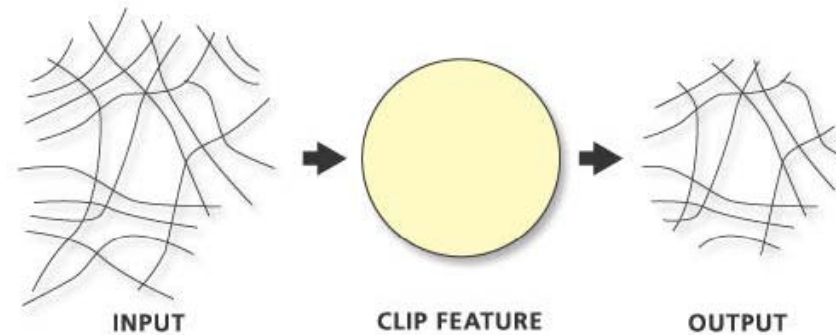
Use Clip when you want to cut out a piece of one feature class using one or more of the features in another feature class as a "cookie cutter". This is particularly useful for creating a new feature class that contains a geographic subset of the features in another, larger feature class.

The feature class that is having its features clipped can contain points, lines, or polygons. The clip feature class, however, must be a polygon feature class.

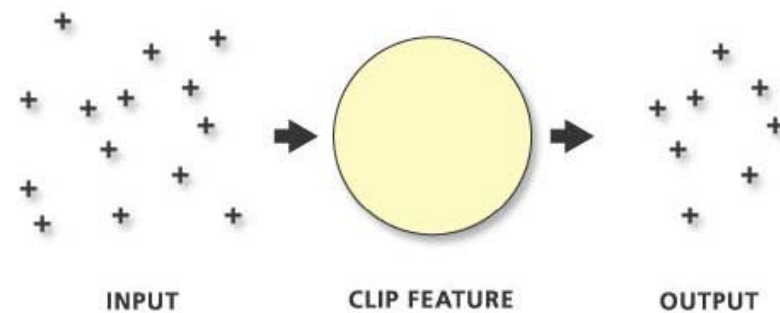
- Polygon features clipped by polygon features



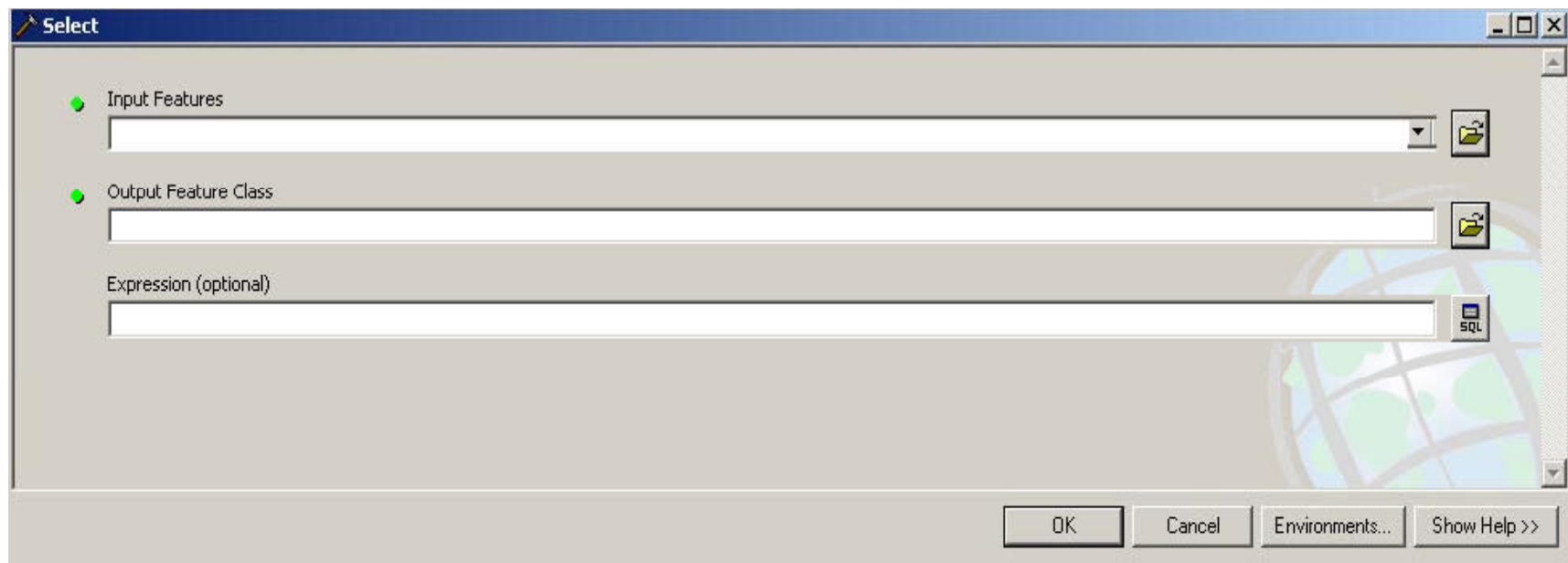
- Line features clipped by polygon features



- Point features clipped by polygon features



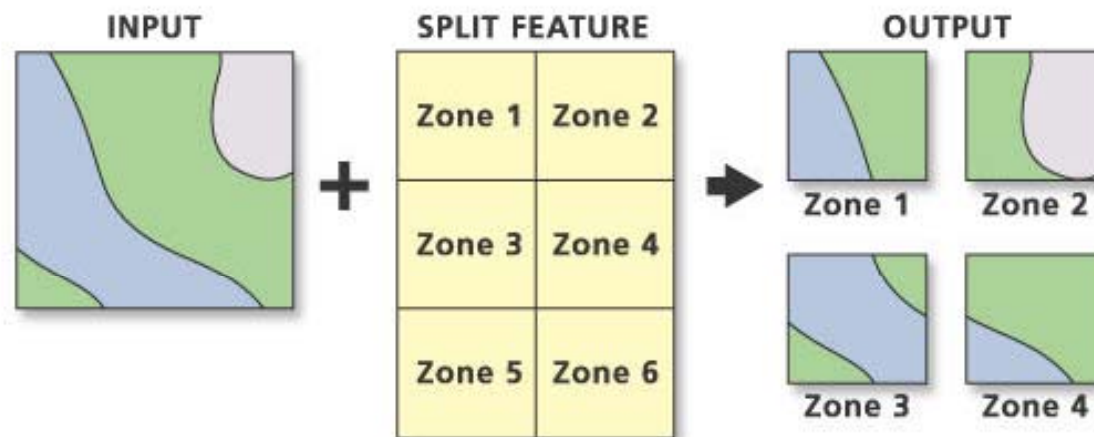
Extracts features from an input feature class or input feature layer and stores them in a new output feature class. The output feature class may be created with a subset of features based on a Structured Query Language (SQL) expression.



## SPLIT

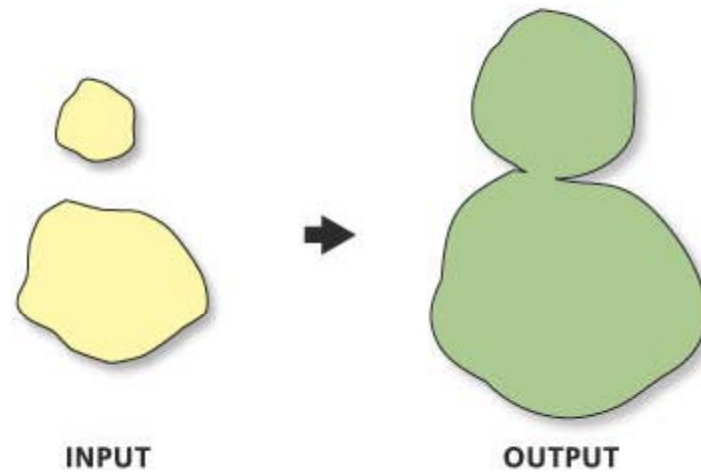
Breaks the Input Features into multiple output feature classes.

The boundary of each unique value in the Split Field is used to split the Input Features. The name of the output feature classes will be the same as the Split Field's unique values.



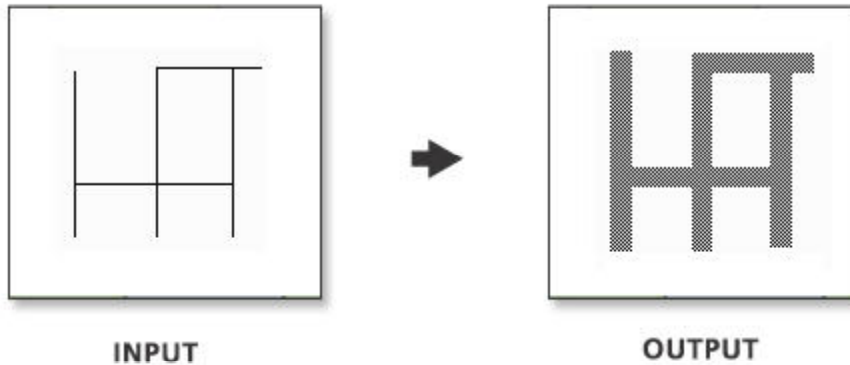
## BUFFER

Creates buffer polygons to a specified distance around the Input Features. An optional dissolve can be performed to remove overlapping buffers.



The width of the buffer can be specified in one of two ways:

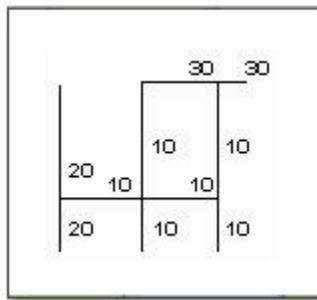
**Fixed distance:** Specify a constant distance to apply to the Input Features.



Because the buffer distance is a constant, all features are buffered to the same width.

From field: Choose the name of a numeric distance field from the specified feature class. Each feature will be buffered according to its associated value in the chosen field.

Buffer of a line feature class using a numeric field with values of 10, 20, and 30 for Distance, an End Type of FLAT, a Side Type of FULL, and a Dissolve Type of ALL.



**INPUT**



**OUTPUT**

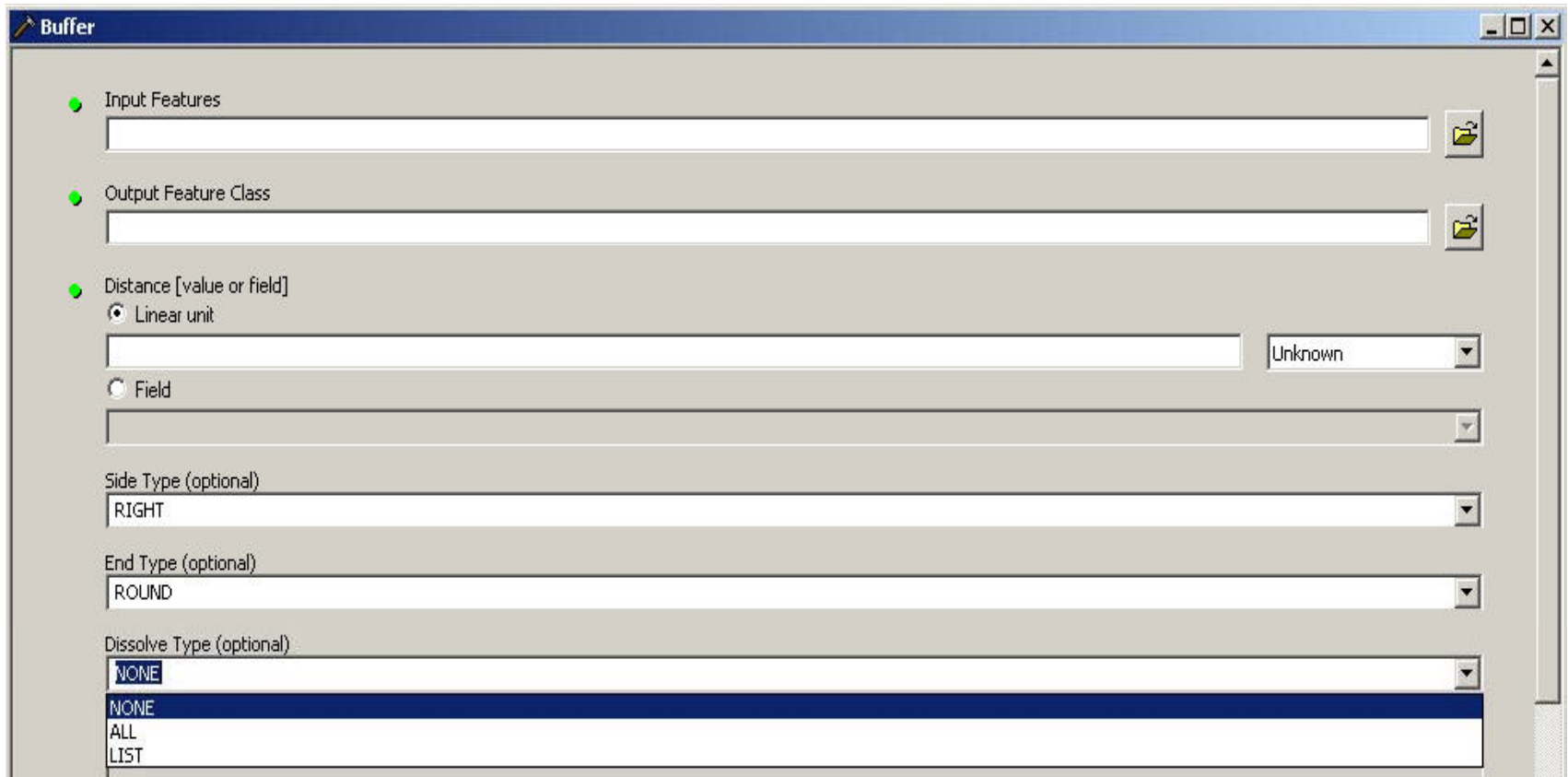
Because the buffer distances are dependent on the field values, various buffer widths can be applied in the same operation.

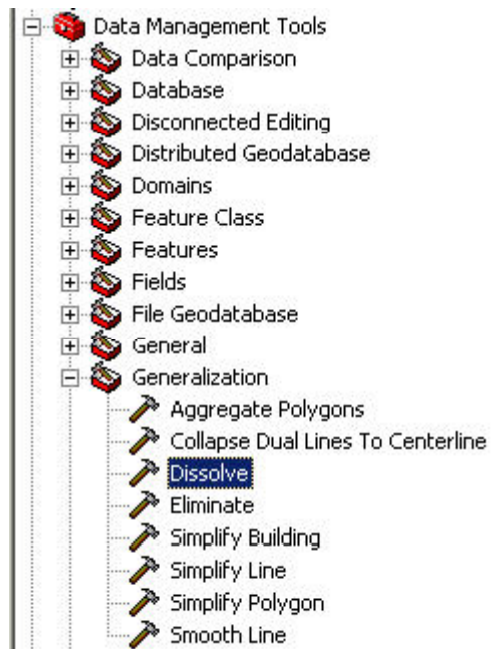
The LEFT and RIGHT options generate buffers at the topological left or right of a line. Caution must be exercised in interpreting the left or right side of a polyline. With connecting polylines, the left side of one polyline may be on the right side of another connecting polyline.

The image shows a screenshot of a software dialog box titled "Buffer". The dialog box has a blue title bar with standard window controls (minimize, maximize, close). The main area is light gray and contains several sections:

- Input Features:** A text input field with a folder icon to its right.
- Output Feature Class:** A text input field with a folder icon to its right.
- Distance [value or field]:** This section contains two radio buttons: "Linear unit" (which is selected) and "Field". Below the radio buttons are two input fields. The first field is empty, and the second field contains the text "Unknown".
- Side Type (optional):** A dropdown menu currently showing "FULL". Below the dropdown is a list box containing the options "FULL", "LEFT", and "RIGHT". The "RIGHT" option is highlighted with a blue background.

Using the Dissolve Type parameter ALL option will dissolve all buffer polygons into a single multipart polygon feature. Buffers of related features can be dissolved together using the Dissolve Type parameter LIST option and a set of fields for Dissolve Fields. Buffer features with the same values in their Dissolve Fields will be dissolved together.





## DISSOLVE

Aggregates features based on specified attributes.

Features with the same value combinations for the specified fields will be aggregated (dissolved) into a single feature. The Dissolve fields are written to the Output Feature Class table.

### Illustration

