Introduction to ArcGIS for Spatial Analysis

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Components

- Desktop GIS
- Server GIS
- Embedded GIS
- Mobile GIS
- GIS Web Services
- Geodatabase

- **ArcReader** is a free viewer for maps
- **ArcView** provides extensive mapping,
- **ArcEditor** includes advanced editing
- **ArcInfo** is the full function, flagship GIS

ArcGIS Desktop Applications
applications including ArcMap, ArcCatalog, ArcToolbox, ModelBuilder, and ArcGlobe.

ArcGIS Desktop Extensions
Spatial Analysis with ArcGIS - examples:

- Queries
- Spatial joins
- Map overlay (Analysis Toolbox)
- Raster analysis (Spatial Analyst Extension)
Selecting by attributes

1. Choose Selection > Select By Attributes from the main menu bar.

2. For a detailed walk-through of the process, click the Query Wizard. Otherwise, fill out the boxes in the window (Fig. 7.21).

3. Choose the layer whose features are to be selected.

4. Choose the selection method.

5. Enter the expression. Double-click a field from the list to enter it into the expression box. Click a condition (such as = or >=) to enter it in the box. Double-click a value from the values list to enter it, or type in a value from the keyboard. Strings must be enclosed in single quotes.

6. If the desired value does not appear in the value box, try clicking Complete List to ensure that all possible values are shown.

7. Click Apply to execute the expression and create the selection.

Selecting by location

1. Choose Selection > Select By Location from the main menu bar.

2. Choose the selection method (Fig. 7.22).

3. Choose the layer(s) from which to select features.

4. Choose the spatial condition.

5. Choose the layer to use as part of the spatial condition (such as within a certain distance of Rivers).

6. To use only the selected features of the condition layer, check the Use selected features box.

7. If using the condition Within Distance Of, or to increase the distance over which the other criteria are applied, enter a buffer amount and distance units, and check the Apply a buffer box if needed.

8. Check the pictures to verify that the selection criteria are valid.

9. Click Apply to make the selection.
Performing a spatial join

In a spatial join, the attributes of features in the source layer are appended to the features in the destination table. The output layer always contains the same features as the destination table.

When choosing the join options in step 4, keep in mind the cardinality of the join to pick the most appropriate one.

1. Right-click the destination layer in the Table of Contents and choose Joins and Relates > Join.
2. Choose to join to another layer based on spatial location (Fig. 8.19).
3. Choose the source layer from the drop-down box, or click the Browse button to choose one on disk.
4. Choose one of the two join options and specify any summary statistics desired, if applicable.
5. Specify the shapefile or feature class file to contain the new output layer.
6. For more information on joins, click the About joining data button.
7. Click OK to execute the join.

Geoprocessing

In ArcView GIS 3, the geoprocessing environment consisted primarily of the Buffer Wizard and the Geoprocessing Wizard, with capabilities to dissolve, merge, clip, intersect, and union. These functions are now available in ArcView 9 as tools within ArcToolbox. The table below shows the location of the Geoprocessing and Buffer Wizard functions in the ArcView 9 geoprocessing environment.

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<th>ArcView GIS 3 Geoprocessing and Buffer Wizard functionality</th>
<th>ArcView 9 ArcToolbox</th>
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<td>Analysis toolbox &gt; Proximity toolset &gt; Multiple Ring Buffer tool</td>
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map overlay: intersect

map overlay: buffers
How to calculate areas of Intersects

Shapefiles must be imported to Geodatabases (GDB) to determine areas and lengths. Here is a simple way how to create a new GDB with a single shapefile as feature.

1. Start ArcCatalog and navigate to the folder that will contain the new GDB.
2. Rightclick the folder and choose New > Geodatabase and name it. Keep the defaults.
3. Rightclick on the new GDB icon and choose New > Feature Class and name it.
4. Rightclick on the new GDB icon and choose Import > Feature Class (single).
   As Input Feature navigate to the shapefile you want to intersect with, Output location is your new GDB, and Output Feature Class name is the name of the Feature Class you just created.
   Note: This will add data to the new Feature Class.
5. Close ArcCatalog and open ArcMap.
6. Choose Add Data from the Menu Bar and add the newly created Feature Class from your GDB as a new layer.
7. Perform the intersect with ArcToolbox (Analysis Tools > Overlay > Intersect).

• M. Price (2005): Mastering ArcGIS.
  McGraw Hill
• http://www-sul.stanford.edu/depts/gis/
• http://www.esri.com/