

Appendix C

ArcView GIS 3.2 Screening Analysis Tool



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Appendix C. ArcView GIS 3.2 Screening Analysis Tool

The ArcView Geographic Information System (GIS) 3.2 Screening Analysis Tool was developed to help with the statewide screening of data to identify potential geographic locations for groundwater banking. This tool allows a GIS user to reclassify grid data in a format that allows identification of potential recharge sites based on specific criteria. For example, a water resources manager may decide that potential recharge sites should be (1) within 5 miles of surface water, (2) above an unconfined aquifer that is more than 50 feet below ground surface (ft bgs) but less than 500 ft bgs, and (3) located in an area with little slope. The ArcView GIS 3.2 Screening Analysis Tool can help the GIS user to query the data and find any locations that fit the specified criteria.

C.1 Types of Screening Analysis

The analysis can be performed in one of two ways:

- A *Boolean-type analysis* that determines only whether the defined criteria is met or not. For example, if a site is within 5 miles of surface water (entered as 8,046.72 meters using the Screening Analysis Tool interface), the location will be included as a potential site. However, if the site is located more than 5 miles from surface water, this analysis will eliminate it as a potential site.
- A *weighted screen* allows a user to give preference to some criteria over others by assigning weighted values to criteria. For example, locations within 2 miles (entered as 3,218.688 meters using the interface) of surface water may be given a value of 10, while locations that are between 2 miles and 5 miles from surface water may be given a less favorable value of 1. Locations greater than 5 miles from surface water may be eliminated altogether. This type of weighting allows for greater flexibility than a Boolean-type analysis.



C.2 How to Use the Screening Analysis Tool

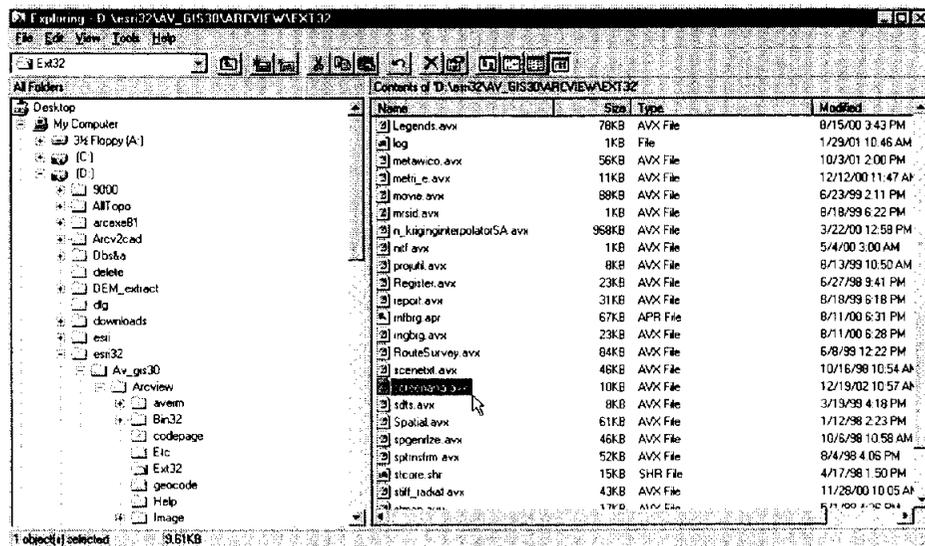
Sections C.2.1 and C.2.2 describe how to use the ArcView GIS 3.2 Screening Analysis Tool; Section C.2.3 provides definitions of the fields on the “Reclassify Values” dialog box. Users should be familiar with the ArcView Spatial Analyst interface before attempting to use the Screening Analysis Tool.

C.2.1 Add the Screening Analysis Extension to ArcView

The interface for the screening tool is an ArcView extension. Before you can successfully use the ArcView database interface the first time, you must make this interface available by adding the extension (*screenana.avx*) to the ArcView extension folder on your hard drive. This folder is typically located on your C or D drive (e.g., *D:\esri32\Av_gis30\Arcview\Ext32*). The Arcview Spatial Analyst extension is required to run the Screening Analysis Tool. This extension allows you to create, query, map, and analyze cell-based raster data (grids) and to perform integrated vector-raster analysis (ESRI).

Note: This procedure is only performed once — before the first time you use the ArcView Screening Analysis Tool.

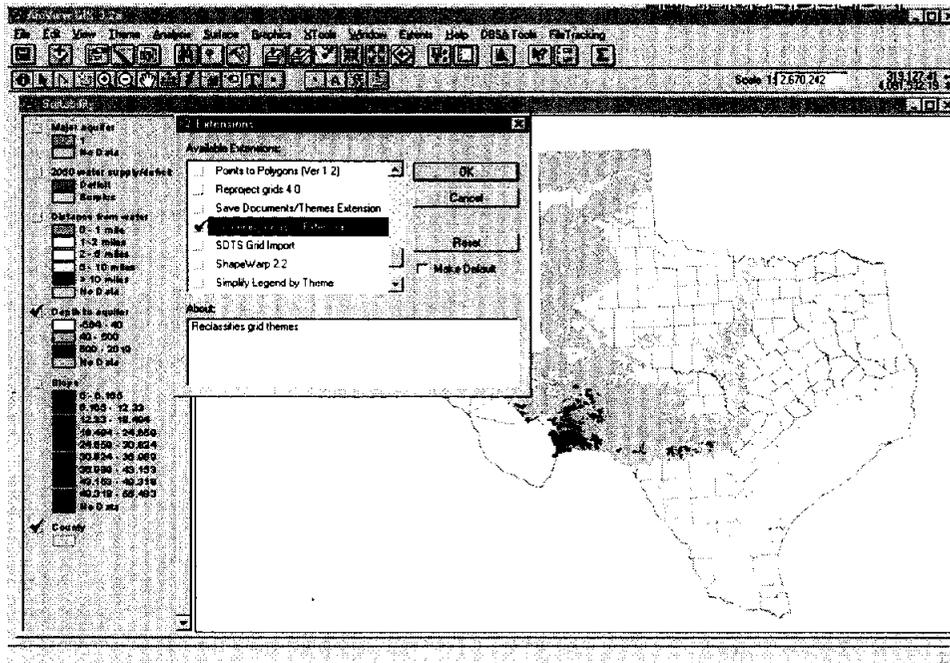
Step 1 Copy the database extension (*screenana.avx*) from the compact disk (CD) to the ArcView extension folder (*D:\esri32\Av_gis30\Arcview\Ext32*), as shown below.





Step 2 Open ArcView and select Extensions from the pull-down File menu.

A list of all available ArcView extensions will be displayed in a pop-up window, as shown below.



Step 3 Click on check box next to Screening Analysis Extension and click OK.

A tool button  will be added to the ArcView toolbar.

If you place the cursor over this button, you will see the following message:

Weight grid themes for screening analysis

C.2.2 Use the Tool to Screen Locations

Step 1: From the ArcView view window, activate the grid themes you wish to use as screening criteria.

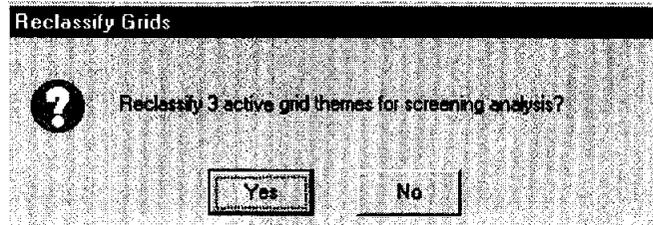
Note: Make sure there are at least two active grid themes in the view window.

You can apply the weighting utility only to grid themes. There must be at least two grid themes active in the view window for the utility to function.



Step 2: Click on the tool button  on the ArcView toolbar.

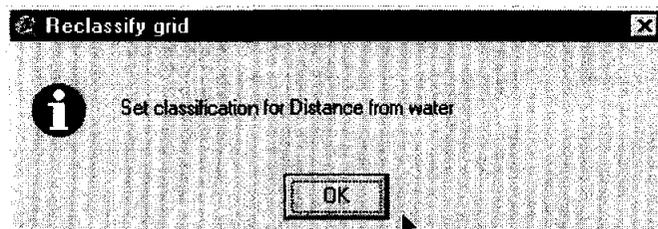
The following message will appear, indicating how many grid themes will be reclassified:



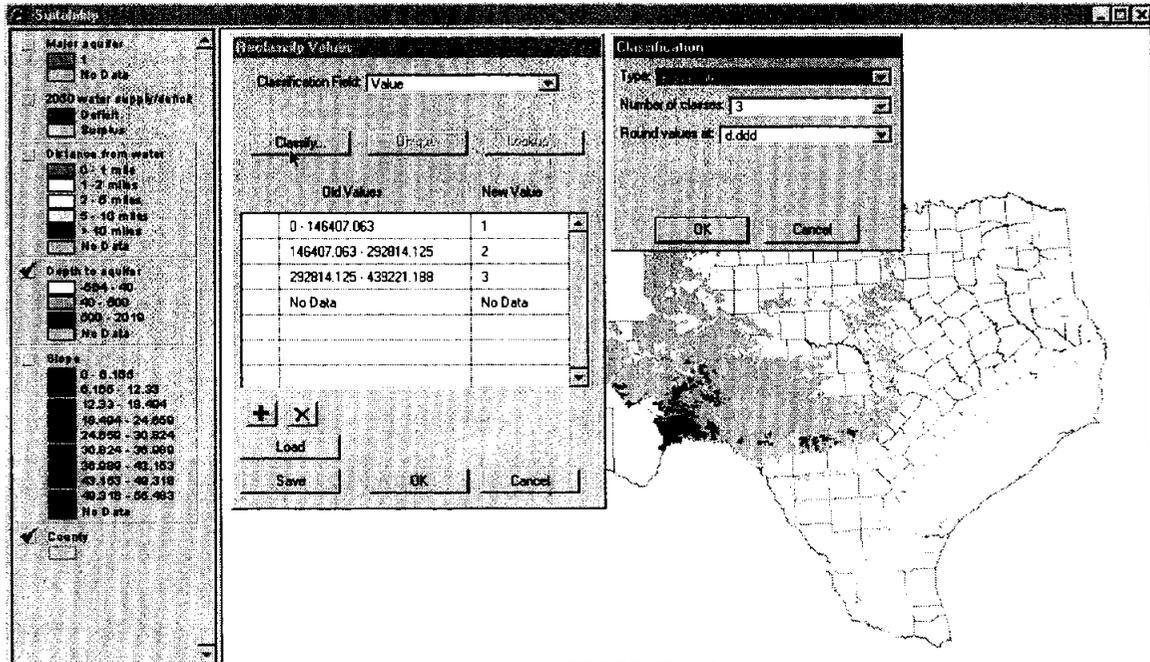
Step 3: Click on Yes if the message shows the correct number of themes to be reclassified. Otherwise, click on No and return to Step 1.

Note: If there are not at least two active grid themes, an error message will appear and the analysis will end. If any other type of theme is active (i.e., a shapefile, image, tin, or ArcInfo coverage), a message will be displayed telling you that these themes will not be included in the process.

Before each grid theme is reclassified, the following message box will appear to let you know which theme is about to be reclassified. Click on OK to continue the reclassification.



For each theme to be reclassified, a “Reclassify Values” dialog box will appear. This window allows you establish the new classification values for the theme. For example, if a distance-to-surface-water grid theme is being reclassified, you will be able to specify the new values for screening.



Step 4: Enter the appropriate screening values in the "Reclassify Values" dialog box.

Refer to the field definitions in Section C.2.3 for additional help.

Note: You must specify "No Data" in the New Value field for any values that should be eliminated from the classification.

The sample screen shots on the following page demonstrate how the same grid theme — in this case, distance from surface water — might be reclassified, based on (1) Boolean logic or (2) weighted values. In the screen on the left, which illustrates Boolean logic, any site located 5 miles or less (i.e., 0-8,046.72 meters) from surface water will be included in the classification (i.e., assigned a value of "1"). However, sites located more than 5 miles (i.e., 8,046.72 – 439,221.188 meters) from surface water will be dropped from the classification (i.e., assigned a value of "No Data"). The screen on the right shows how the same screening criteria might be used to provide a weighted value analysis. In this example, any sites located 2 miles or less (i.e., 0 – 3,218.688 meters) from surface water are assigned a higher weighted value than sites located between 2 and 5 miles (3,218.688 -8,046.72 meters) from surface water. As with the Boolean analysis, sites that are more than 5 miles from surface water will be dropped from the analysis.



Classification Field: The field in the input grid theme's table that will be used to supply the Old Values. If the grid theme does not have a table, like floating point grid themes, the only field shown is Value.

Classify: Opens the Classification dialog for filling out the parameters to classify the Old Values.

Unique: Sets the Old Values to the unique values found in the Classification Field. Only available for integer grid themes.

Lookup: Sets the New Value to a value found in a field in the input grid theme's table. In the Lookup Values dialog, you can pick the field to use as the New Value. Only available for integer grid themes.

Old Values: The range, list, or single value to be changed to the New Value. Any combination of ranges, lists, or single values can be used. Separate ranges with a dash (-) and lists with a comma (.). To edit an entry, click on it and type in the new specification.

New Value: The new value can be either a single value or as "No Data."



Adds a new record to the reclassification, below the selected record. Select a record by clicking on the column to the left of the Old Values column.



Deletes the selected record in the reclassification. Select a record by clicking on the column to the left of the Old Values column.

Load: Enables you to load a previously saved reclassification from a file (.avc). In the Load Classification dialog, you may navigate to the reclassification file you wish to load.

Save: Saves your reclassification to a file (.avc). In the Save Classification dialog, you may navigate to where you would like to save your reclassification file.