

## How the Spatial Data Summaries Were Generated for the Arc Hydro Watershed Fact Pages

Sandra Fox  
St. Johns River Water Management District

### The Spatial Data Summary Tool

In addition to the development of the GIS data for the Arc Hydro implementation, a new tool was developed at the St. Johns River Water Management District that made the creation of the Arc Hydro watershed fact pages possible. The tool calculates a summary of almost any GIS layer based on the area selected in the map interface (ArcMap).

To develop the **Spatial Data Summaries** and accompanying maps for the **Fact Pages**, the watershed or drainage areas for each of the 73 water quality-monitoring sites were delineated by Arc Hydro using the Trace By Next-Down-ID Attribute tool (Figure 1). Figure 2 shows an example of a watershed delineated using this tool in Arc Hydro for one of the Surface Water Quality Monitoring (SWQM) program's 73 water quality sites.

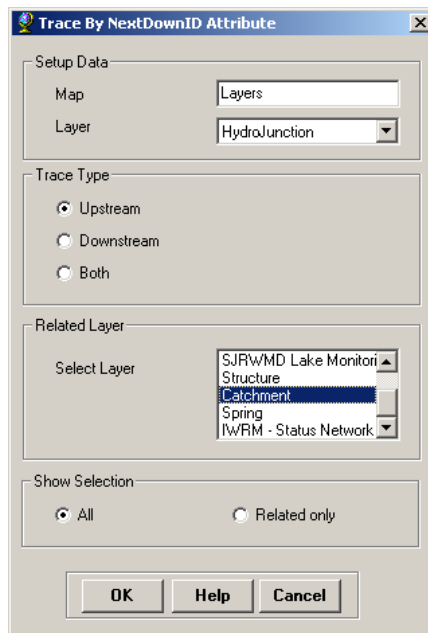


Figure 1. The Trace By Next-Down-ID Attribute tool user interface.

Once an area has been selected, as shown in Figure 2, the Spatial Data Summary Tool (SDST) can be used<sup>1</sup>. Figure 3 is the opening dialog box for the SDST. The user is required to select a folder to which the reports and a log file will be saved. The save

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<sup>1</sup> **Note:** The SDST tool will work for any type of polygon feature class such as county or permitting boundaries. The only requirement is that the polygon(s) representing the area to be summarized be selected in the map interface.

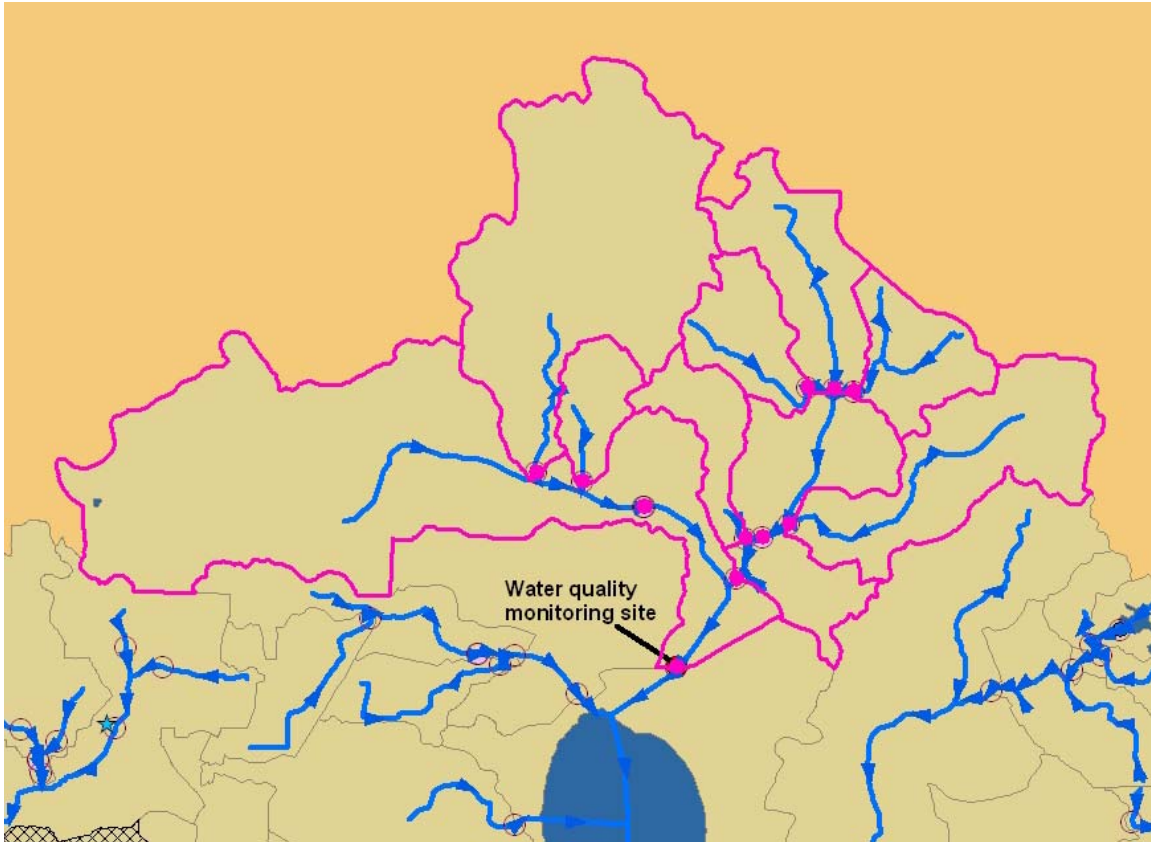


Figure 2. The areas highlighted in pink are the SJRWMD catchments that were selected by the Trace By Next-Down-ID Attribute tool.

results check box allows the user to keep a mapable version of the summary. If this box is not checked, the user still has the ability to save the tabular and HTML-version of the results after the summary is generated (discussed below in **Saving Summary Results**). Note that the user has the choice to include areas in the spatial summary for which no data are available.<sup>2</sup>

### Spatial Data Summary generation

Figure 4 shows the user interface for the summarization of a single layer of vector data. All of the layers for which a summary can be generated will be listed in the first window, accessed by the drop down arrow on the right of the window. Once an input layer has been selected, the analysis field is automatically generated based on how the data has been previously grouped in the project table of contents (Figures 5 and 7). This feature makes the SDST flexible and suitable for advanced analysis<sup>3</sup>. Figures 5 and 7 show two different grouping methods for land use data. The results from using the SDST for each are shown in Figures 6 and 8, respectively.

<sup>2</sup> "No data" can occur for a number of reasons such as the data may still be in development, or the data type may not apply to the area to be summarized, such as shown in Figure 13 in the Appendix.

<sup>3</sup> A variety of layer files can be created for a single-data source, allowing the analyst to modify the method of summarization of the data.

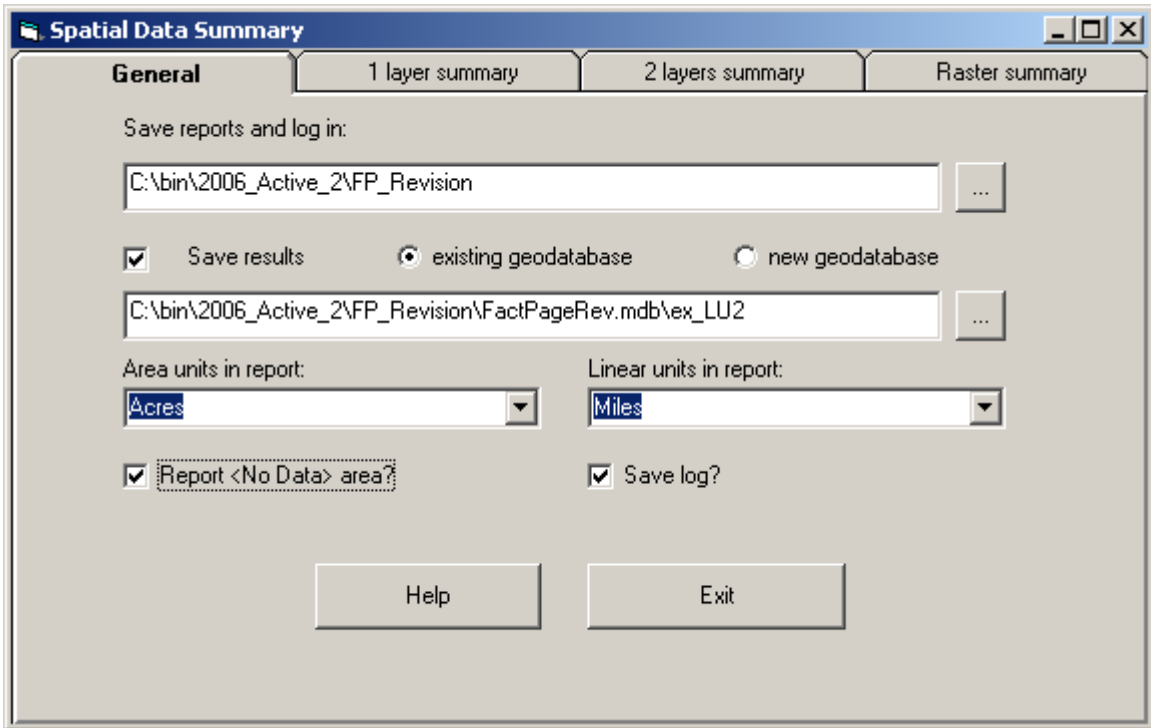


Figure 3. The opening dialog box for the Spatial Data Summary Tool (SDST).

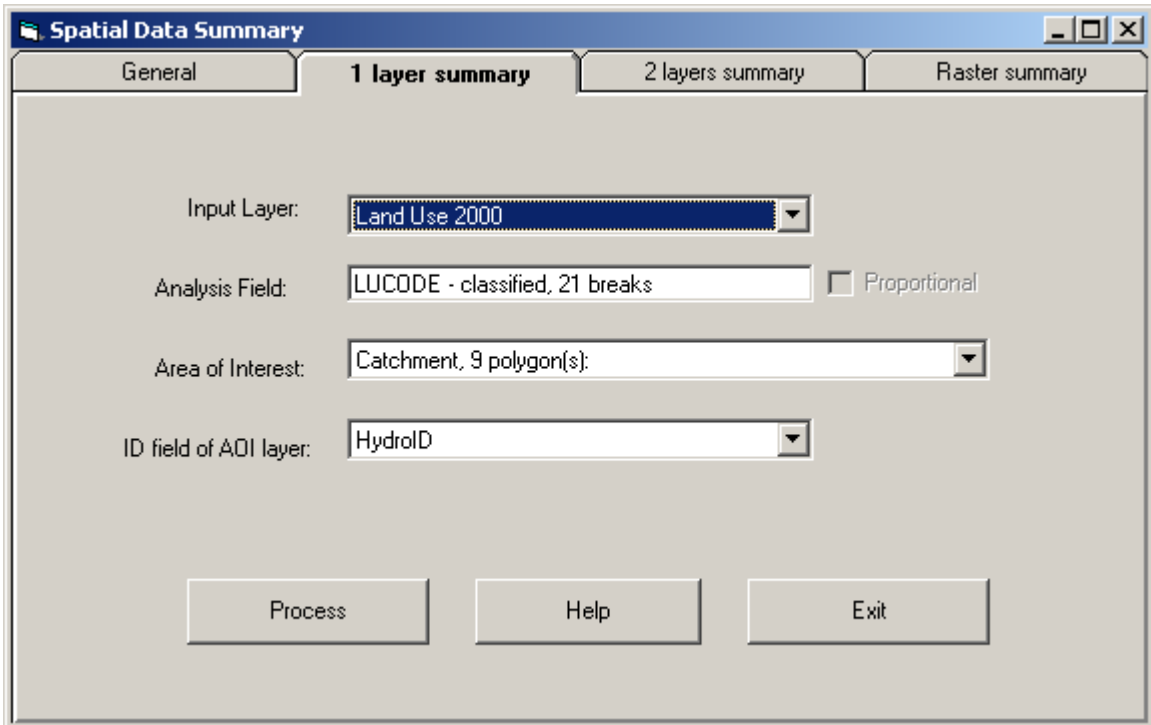


Figure 4. The SDST single-vector layer summarization dialog box.

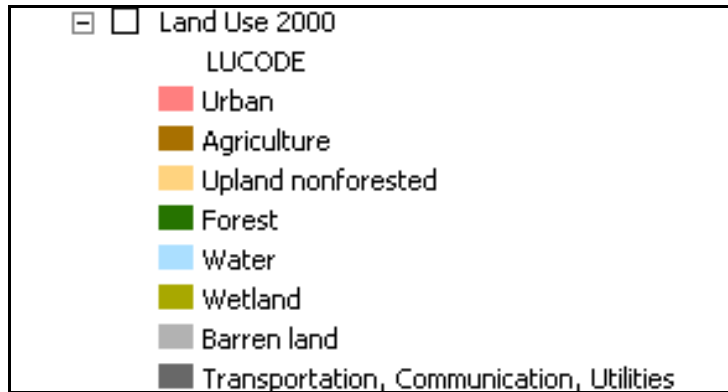


Figure 5. Land use classification for the SDST, results shown in Figure 6.

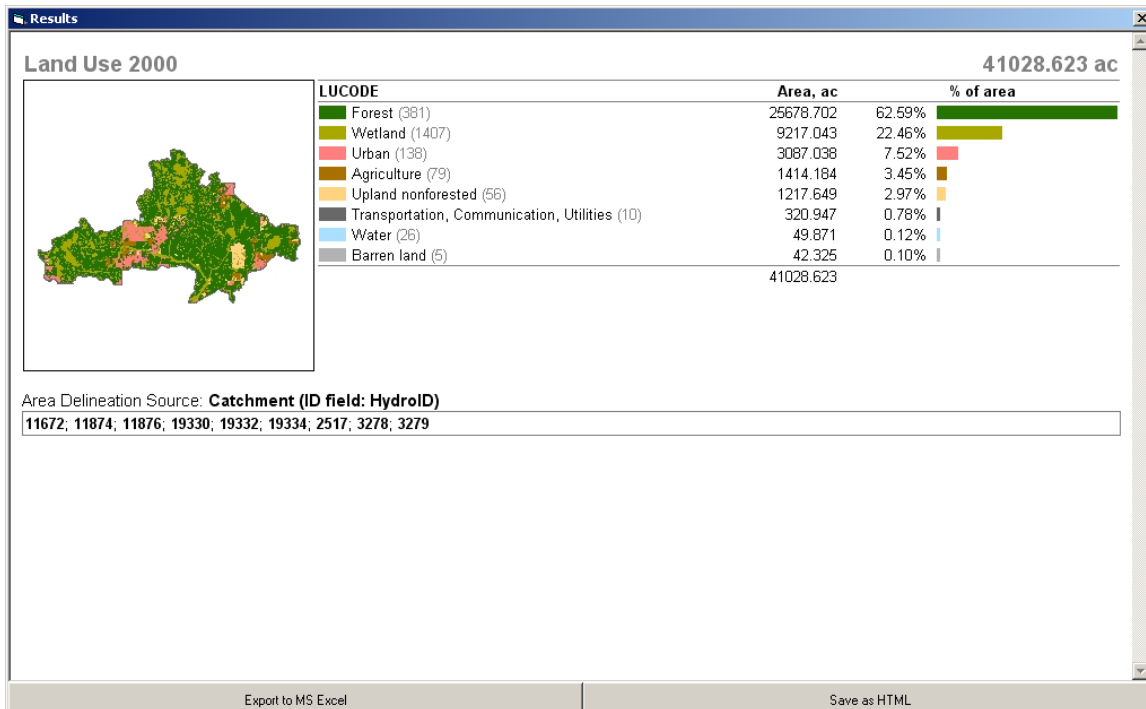


Figure 6. Results from the SDST for the area shown in Figure 2, based on the land use classes shown in Figure 5.

In the upper left hand corner of the results (Figures 6 and 8) a JPG-format of the summarized data is displayed. In the center, a numerical summary of the data is displayed. And at the right is a chart of the data, graphically showing the summarized data from largest to smallest areas represented. The numbers in parentheses following each land use class represent a count of the individual patches of that land use-type found in the source data. This data provides a suggestion about the distribution of the land use category on the ground. For example, a small area (total acres) that has a relatively large number (in parentheses) suggests that the land use category may be characterized by many smaller patches, possibly spread out over a large area (the entire area being summarized). The numbers shown along the bottom, under Area Delineation Source are useful to the analyst in keeping track of the area being summarized.

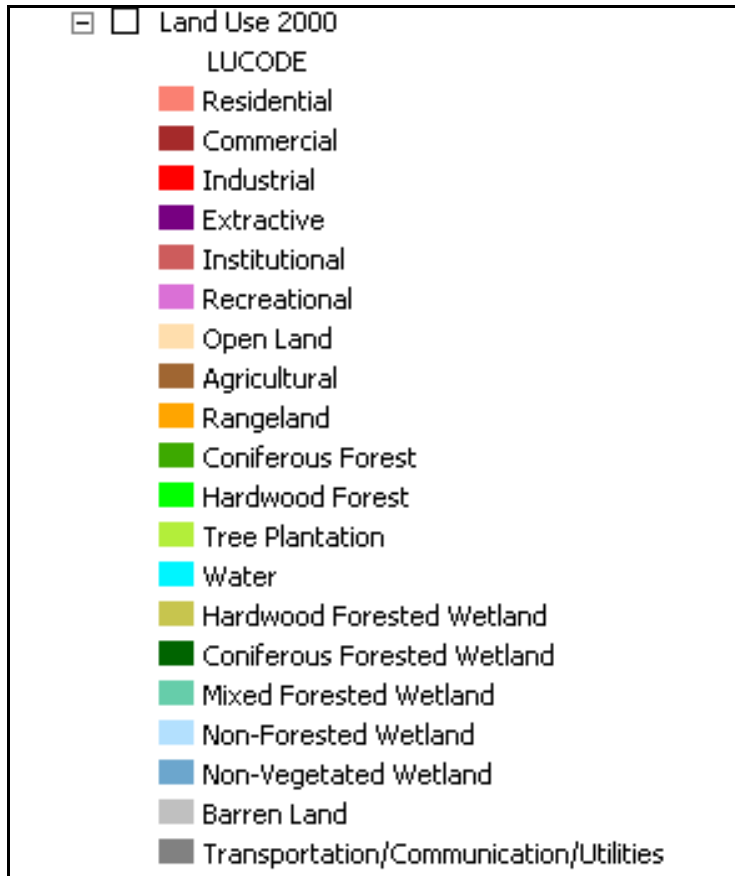


Figure 7. An alternated land use classification scheme.

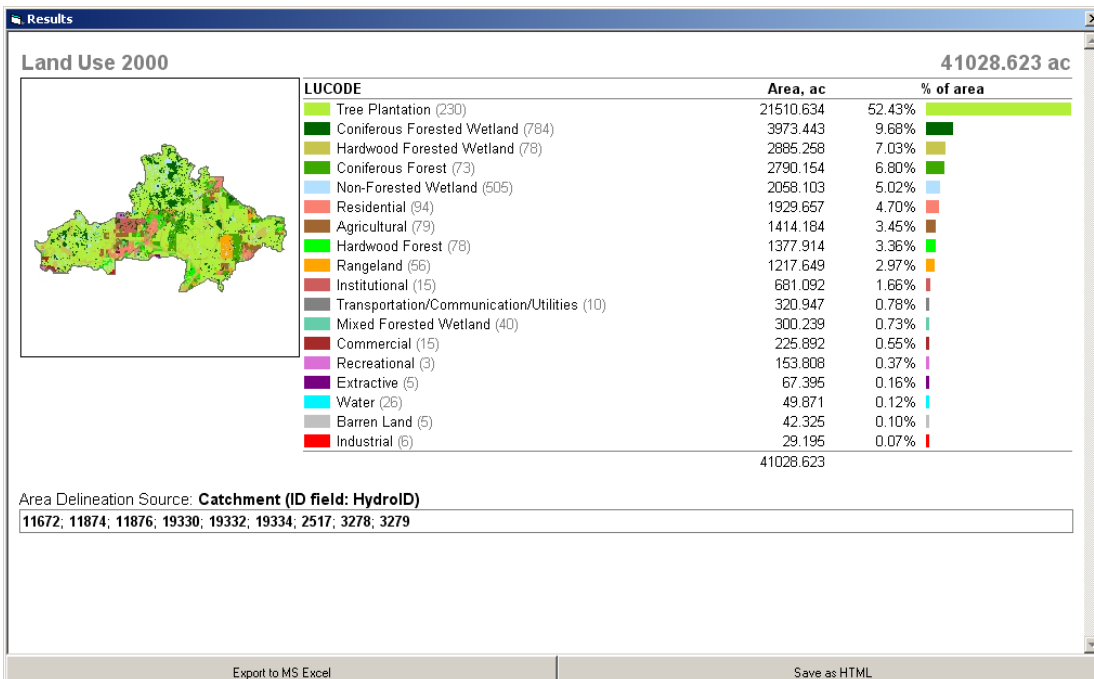


Figure 8. The results using the SDST on the area shown in Figure 2 with the classification scheme shown in Figure 7.  
**Summarizing two layers simultaneously**

Although not used in the development of the spatial summaries for the fact page project, the SDST was designed to perform a more complex analysis—summarizing two data sources simultaneously for the selected area. Figure 9 shows the user interface of the SDST to generate a two-layer summary. Figure 10 shows the results for the area selected in Figure 2, summarizing land use and soils.

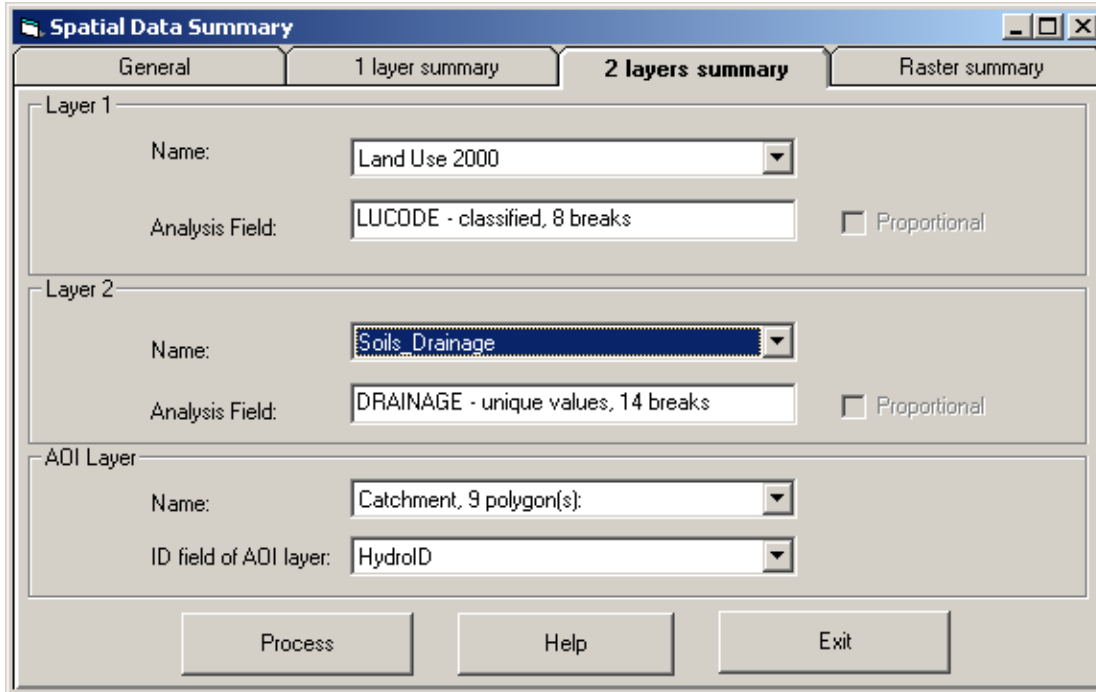


Figure 9. The user-interface of the SDST for a two-layer summary.

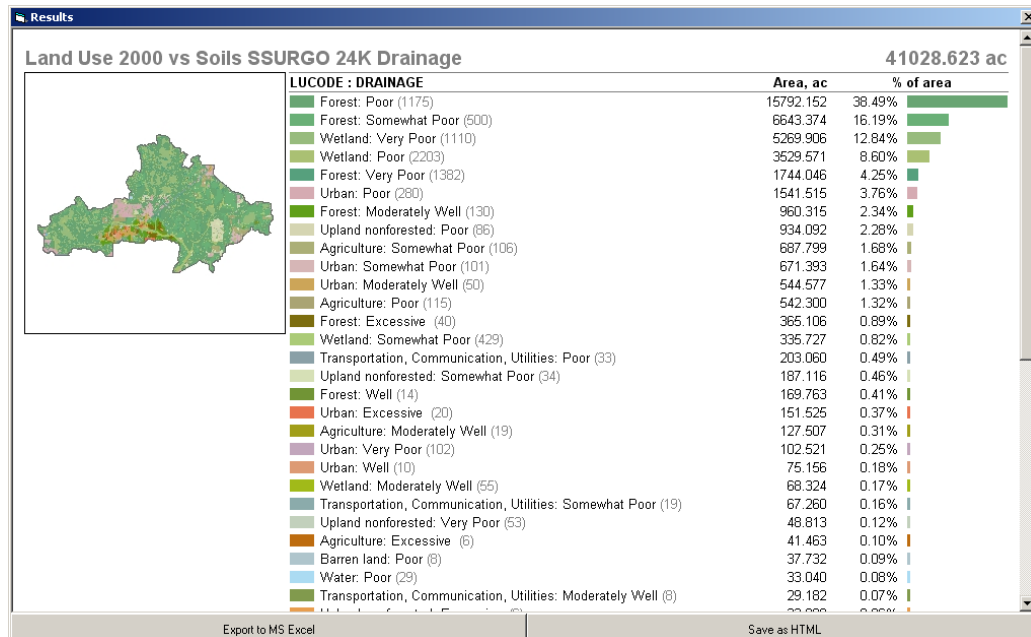


Figure 10. Partial display of the results from a two-layer summary.

**Summary based on raster data**

The examples from the SDST shown thus far are based on vector data. The SDST was designed to work on raster data, as well. The SDST user interface for a raster summary is shown in Figure 11, while the results using elevation data are shown in Figure 12.

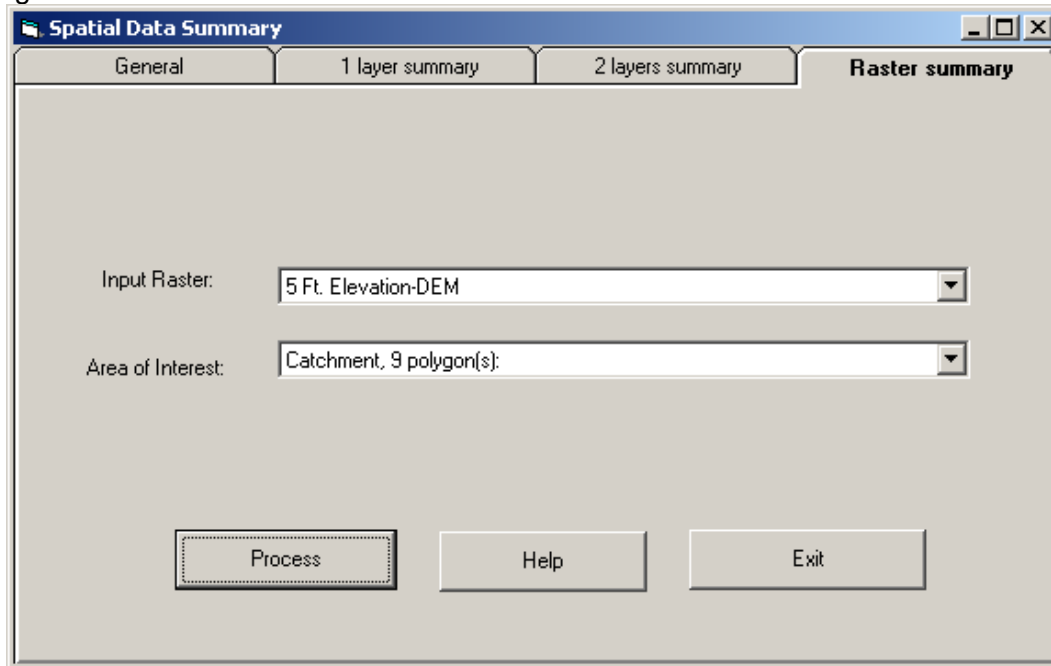


Figure 11. The user-interface for a raster summary.

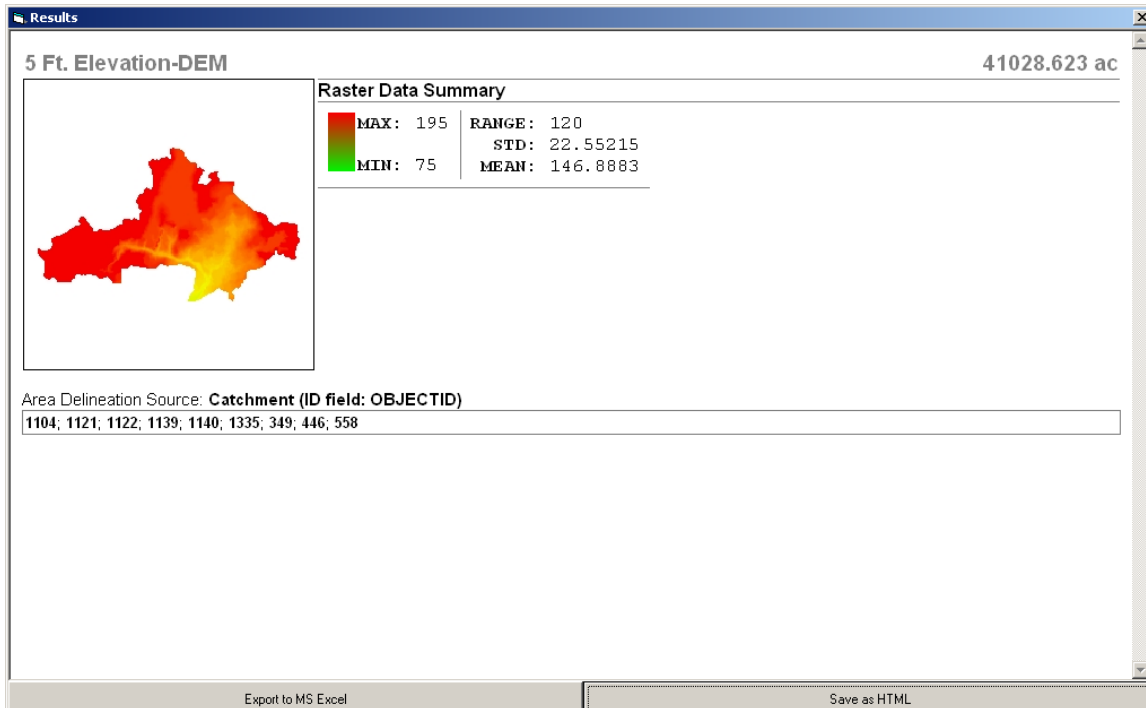


Figure 12. The results, using the SDST for the area shown in Figure 2, and using elevation data.

### Saving summary results

Once the spatial summary has been generated, the results appear as a new window on top of the map interface (Figures 6, 8, 10 and 12). Along the bottom are buttons allowing the results to be saved. The results can be exported as a worksheet in Excel and/or in HTML-format. The spatial summaries shown in the fact pages were generated using the Save as HTML function.

### Conclusions

The Spatial Data Summary Tool allows for rapid and versatile summarization of GIS data and produces results in GIS (mapable), tabular and HTML-format. What was once a time-consuming and laborious task can now be accomplished quickly (depending on the total area and complexity of the data being summarized). QA/QC was performed on a variety of data types, demonstrating that the results from the tool are identical to those produced by standard GIS data clipping results.

### Appendix

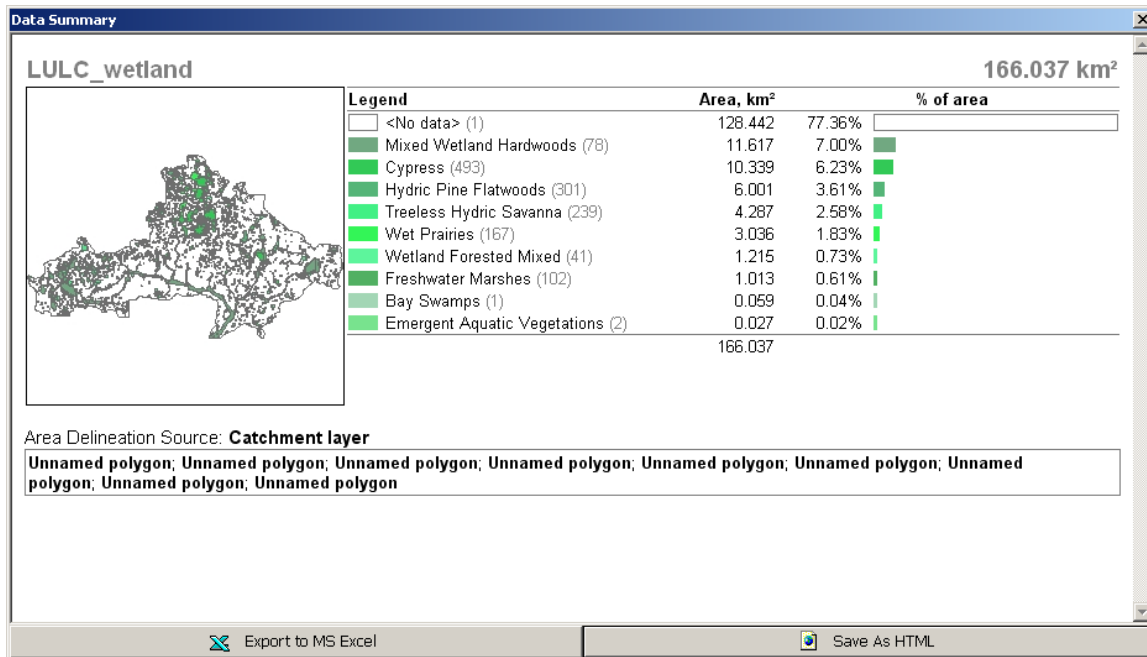


Figure 13. This example shows where the No Data function applies. The layer being summarized includes only wetland areas. Therefore, upland areas are not mapped and show up as No Data in the summary.