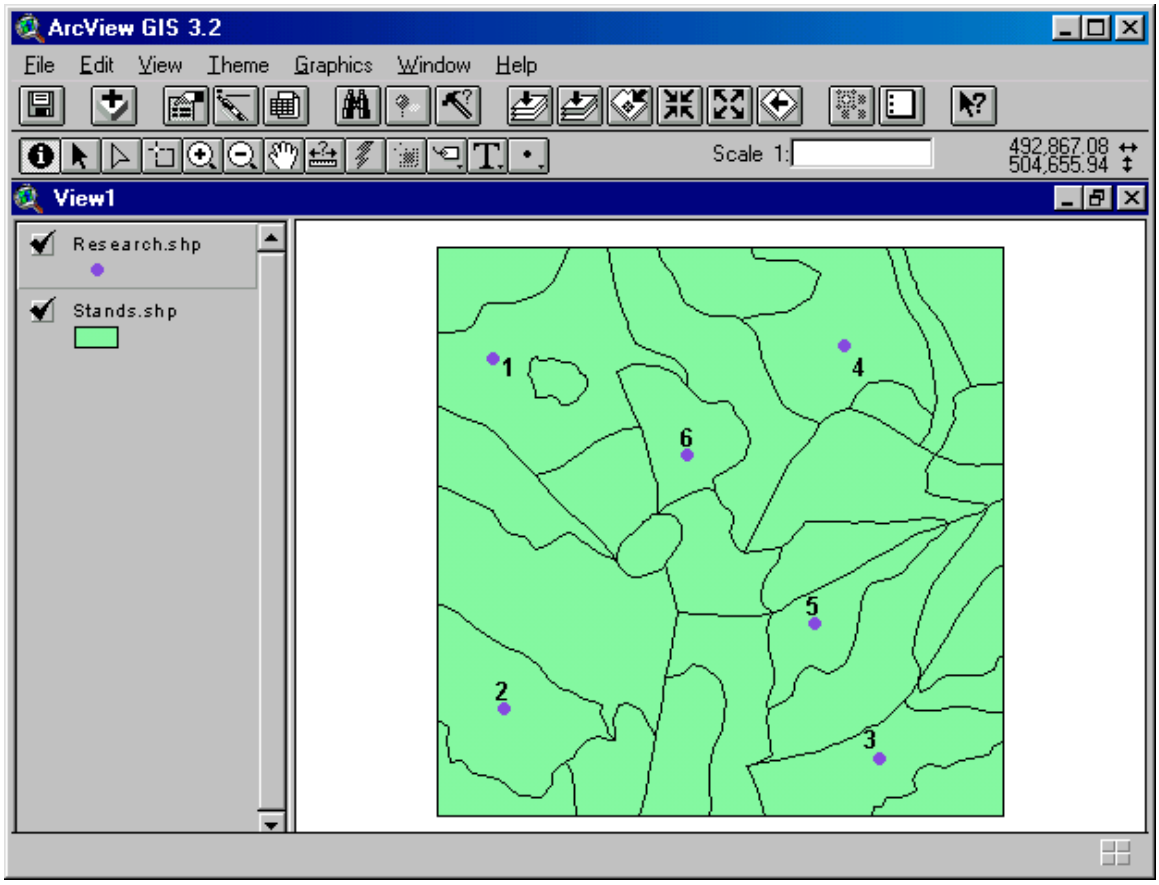
**11.5 Operations around research plots.** Assume that the managers of the Daniel Pickett forest have decided to clearcut harvest stand 28. They noticed, just prior to allowing loggers to begin operations, that a research plot (number 3) was located in the stand. If a 300 foot buffer was left around the research plot,

**a. How much forest area in stand 28 will actually be clearcut?**

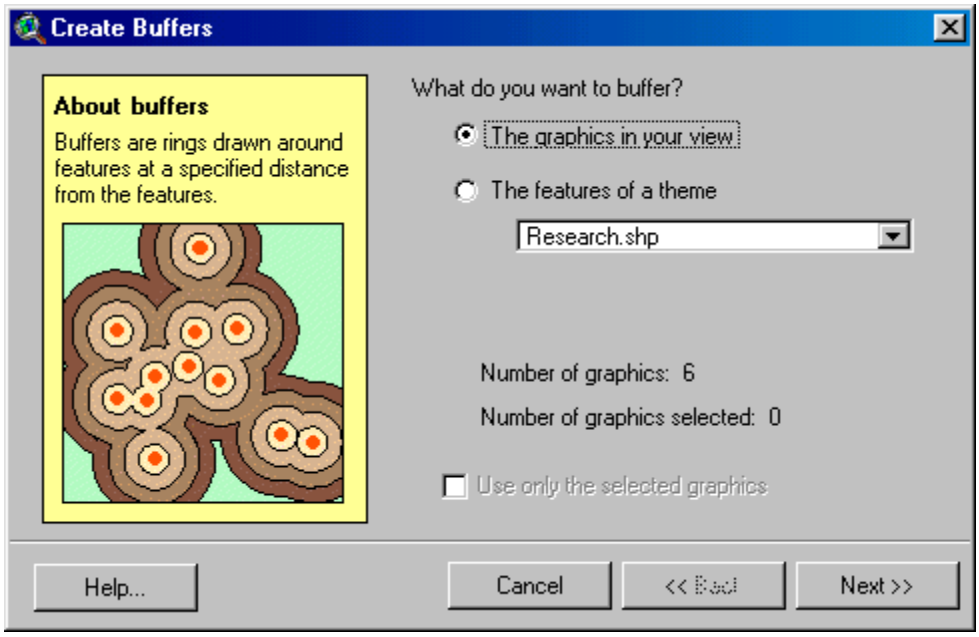
1. Open the Daniel Pickett stands and research plots GIS databases in an ArcView View Window.



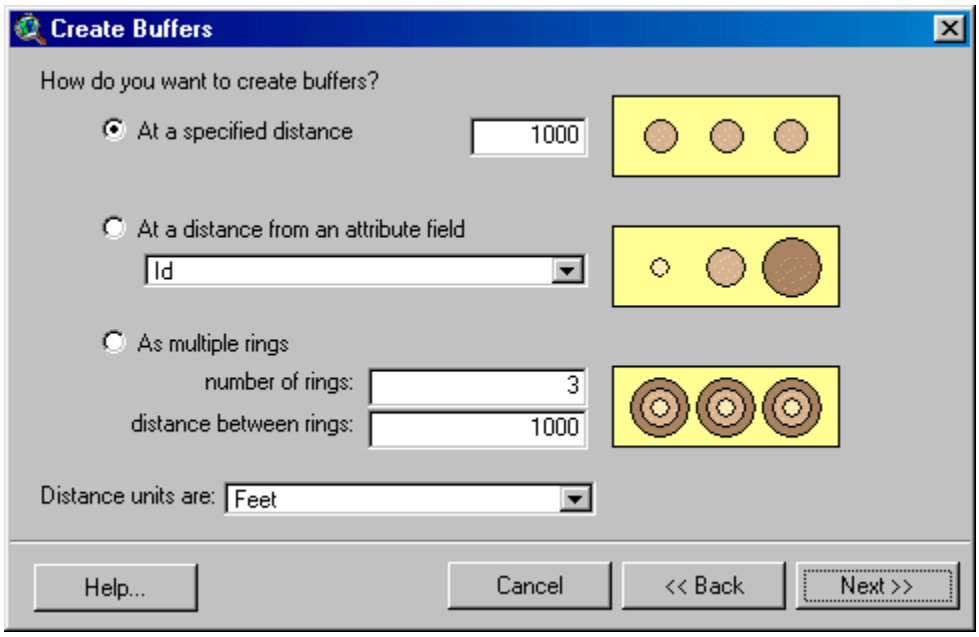

2. Buffer the research plots 300 feet. Assume that the concern of question 11.5 includes the size of the plot in the 300 foot buffer, since the size of the plot is not given.

Make the Map and Distance Units of this project "feet." Do this by selecting View, the Properties from the ArcView Main Menu system.

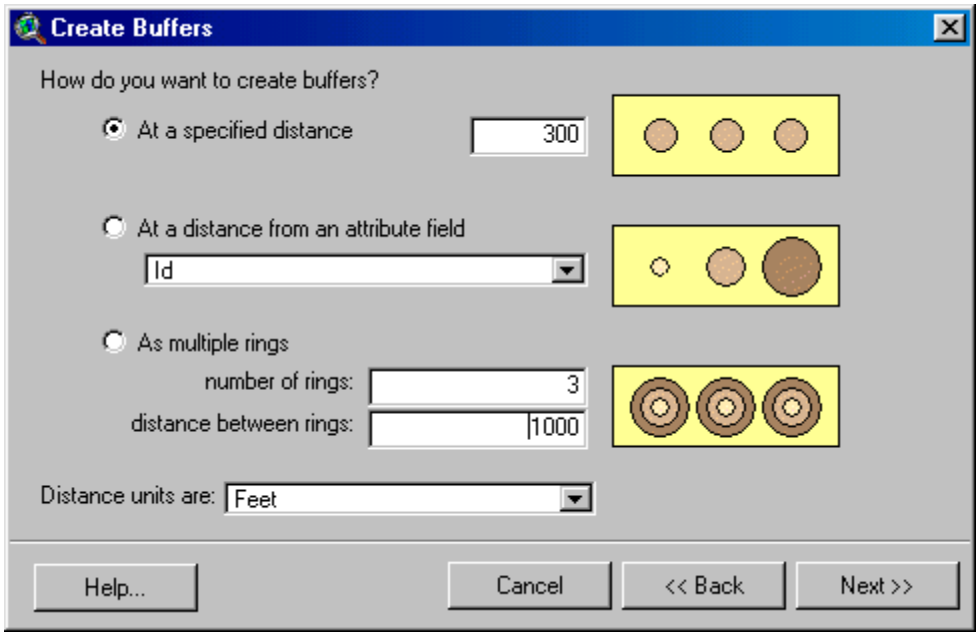
From the ArcView Main Menu system, select Theme, then Create Buffers. A dialog box should appear.



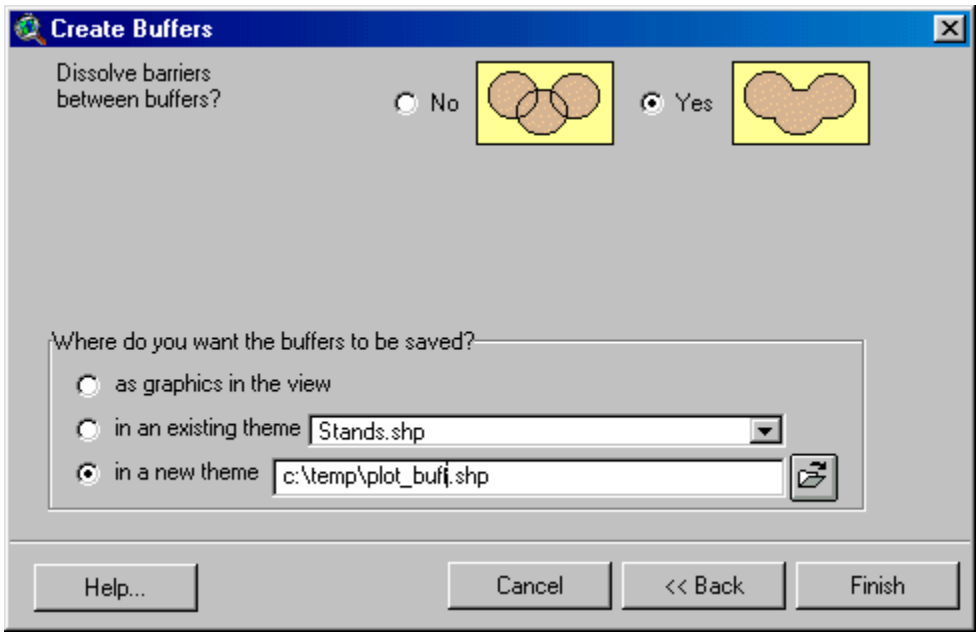

Select the "features of a theme" option, and make sure that the theme selected is the research plots GIS database. Press the Next button.



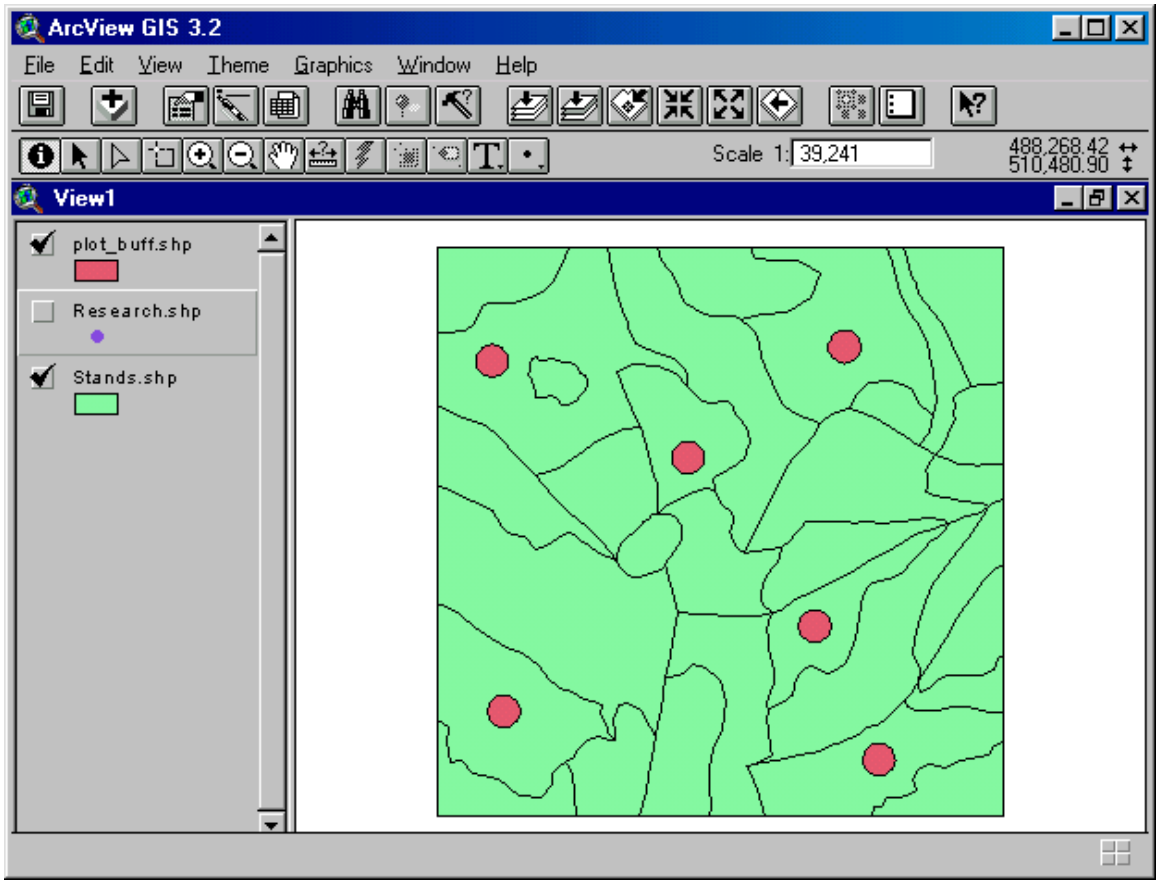

Use the "at a specific distance" option, and change the distance to 300 feet.




Press the Next button. Indicate that you want to save the buffers in a new theme, and specify the file name and location.

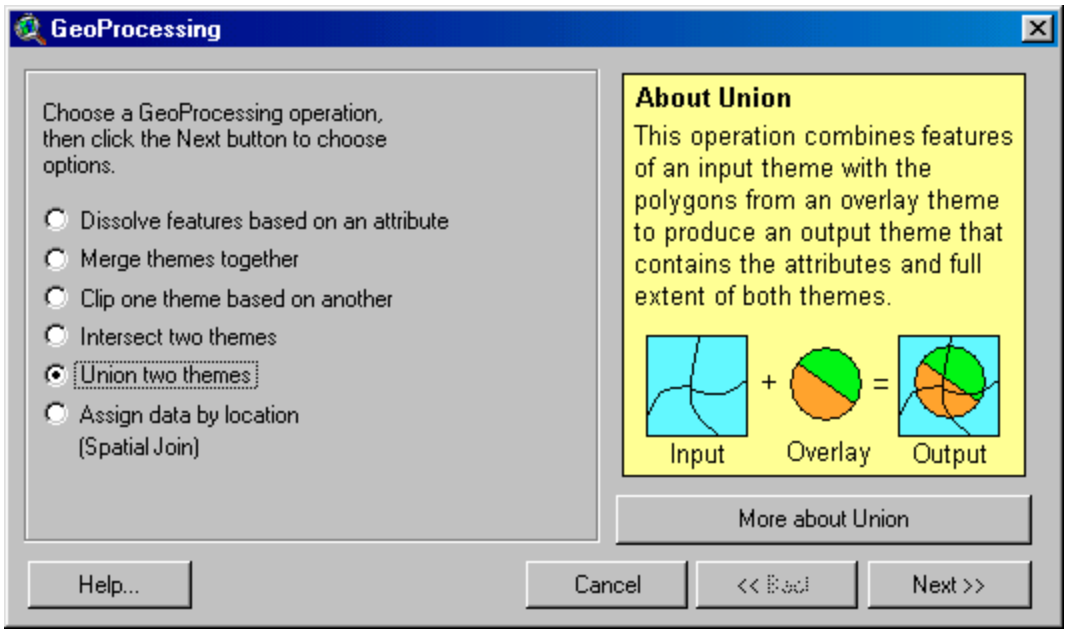



Press the Finish button. The research plot buffers GIS database should now be available in the ArcView Table of Contents.



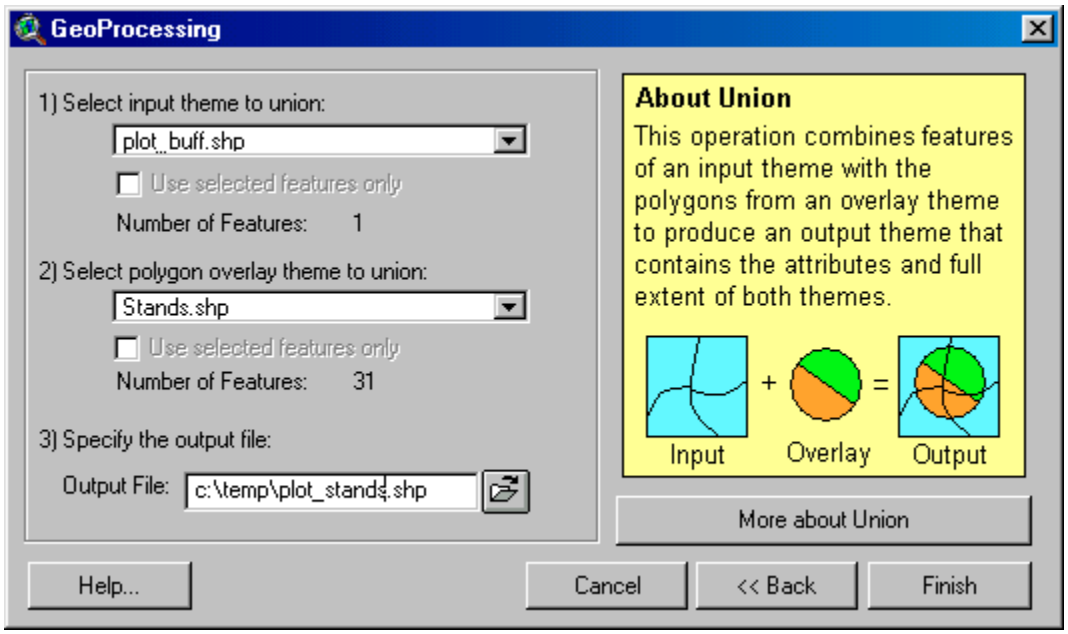

3. Acquire the Geoprocessing Wizard file extension by selection File, then Extensions from the ArcView Main Menu system. Select Geoprocessing and press Okay.

4. Perform a union process using the research plot buffers and the stands GIS database. Select View, the Geoprocessing Wizard from the ArcView Main Menu system. Choose the "union two themes" option.

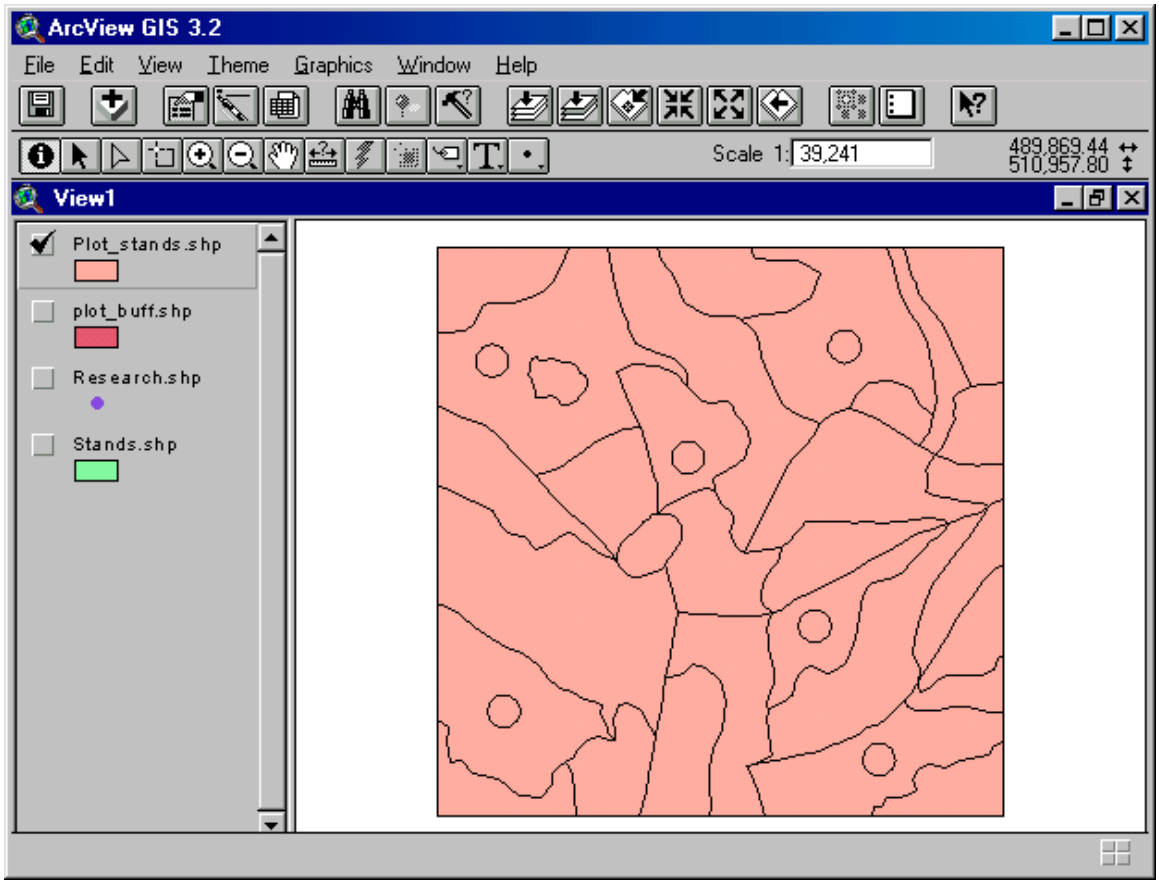



Press the Next button.

Select the stands GIS database as the input theme to union. Select the research plots GIS database as the overlay theme. Specify the file name and location of the new GIS database you are about to create.




The unioned plots and stands GIS database should now be available in the ArcView Table of Contents.




5. Update the acres associated with the unioned plots and stands GIs database. Acquire the XTOOLS file extension. Select Xtools, then Update Area, Perimeter .... from the ArcView Main Menu system.

6. Open the unioned plots and stands GIS database attribute table. Develop a query for stand 28 (stand = 28). As you can tell, two polygons were selected with the query. One of the polygons is 6.46 acres (the buffer around the plot), and the other is 116.50 acres. This is the amount that will actually be clearcut.

**b. If timber values are $400 per thousand board feet (MBF), what is the value of timber that will remain around the research plot?**

According to the attribute table, there is 21.2 MBF per acre within the stand 28 (and hence the buffer around the research plot in stand 28). If the research plot and buffer represent 6.46 acres, this amounts to 136.3 MBF (total). At $400 per MBF, the value of the timber that remains around the research plot is $54,520.

**c. What is the difference in timber volume and value between leaving the buffer around the research plot and not leaving the buffer?**

The original size of stand 28 was 122.96 acres. The value of the timber within the stand was thus $1,037,782. After removing the value of the timber in the plot buffer, the total value of the timber for the sale is $983,262. The volume in the original stand was 2,594.5 MBF, and 2,458.2 MBF after the plot buffer is removed. The volume and value are reduced to about 95% of their original condition if the buffer around the plot is retained.

**d. Develop a map that describes the vegetation conditions on the forest after the harvesting operation is completed. Assume that the 300-foot buffer was maintained around the research plot. Illustrate on the map (either with annotation or with a shading scheme) the basal area of all the stands.**

In your unioned plots and stands GIS database, edit the attribute table. Change the basal area value of stand 28 (not the polygon representing the research plot buffer) to 0 square feet per acre. If you would like, also change the age to 0, the MBF per acre to 0, and the vegetation type to B.

Develop a map using the ArcView Layout Window. We'll let you decide how to do this. If you feel you have a rather good map, send a .JPG file to Pete Bettinger (pbettinger@smokey.forestry.uga.edu), and he may post it on the book's web site. Of course all of the maps sent to him cannot be posted, so Dr. Bettinger will be the final arbiter of the choice of example maps posted there.