Adding Thematic Data to ArcExplorer

ArcExplorer provides a simple, inexpensive way to view geographic information. You use geographic files (called "themes" or "shapefiles") produced by government agencies, private companies, and others to create maps of the data in the files. Sometimes, you may wish to add your own thematic (attribute) data to map—things like population, median family income, etc.— using existing geographic shapes. This guide describes how you can do this.

First, adding data to a theme requires editing the theme's data table. You should do this only if you are comfortable with using tools such as Microsoft Excel. Second, you should work on a duplicate copy of the data table, just in case you make a mistake (no matter how experienced we become, we can always make a mistake). Make a copy by copying the files for the project and pasting them into another folder so that you will have a backup.

Some background...

A *theme* actually consists of several files. The all have the same name, like "states", but they have different extensions. The file "states.shp" would be the file containing the geometric definitions of the geographic features, like state outlines. The file "states.dbf" contains the thematic, or attribute, data for the states. The third file, "states.shx" is an index file. It tells ArcExplorer which rows in the states.dbf files correspond to the state outlines in the states.shp file. For example, we have an outline for California in our states.shp file. We also have a row (called a "record") in the states.dbf file. *states.shx* indicates that the row (number 6 in this case, corresponds to the set of coordinates making up the boundary of California.

You generally don't have to worry too much about these three files, except that if you want to make a copy of the theme's files so that you can make maps, then you will need to copy all three files. If you rename one of them (e.g., "states" to "usstates"), then you have to rename all of them. Finally, you will be adding data to the .dbf file; you need to avoid making changes that may affect how the files work together.

Editing the database (.dbf) table

If you are up to this, then you can edit your database table using a database program such as Microsoft Access, or you can use a spreadsheet program like Microsoft Excel that can read and write database tables dBase format (this is the format of a .dbf file). We will describe the procedure for Excel because it is more complex, and because many of you have Excel and are probably familiar with it already.

Open your .dbf file in Excel (use the *File>Open* menu choice). You should see the file open as if is an Excel workbook. The table has a special organization that you need to maintain if you plan to use it with ArcExplorer.

First, the names of the data fields are in the first row. Each field in the database must have a field name, and the names must begin with a letter (A-Z), must be no more than 11 characters long, and may not contain any special characters other than an underscore "_".

Second, each row represents a geographic feature, so each feature has one row, and only one row. You should not change the number of rows, otherwise you will end up with missing data. Worse yet, the index file keeps track of the associations by row number, so if you delete rows or insert rows into the middle of the table, then you will change the order of the data, and, some of your geographic features will have the wrong data (e.g., the shape for California ends up with data for Delaware). So, the basic rule is **don't add or delete rows**.

OK. If you are still game after all of these warnings, then you can begin to add your data. Insert the data in columns following the original columns. Don't leave any blank columns. Also, make sure that the data values are in the proper rows. Don't assume that the data are in any particular order, such as an alphabetical listing of the states. They may or may not be, depending on how the geographic features were created.

Once you've entered all of your data, save your file (this is to make sure that you don't lose your data entry as you perform the next steps. Make sure to save it as an Excel workbook (select the

file type from the *Save as type* textbox at the bottom of the *Save As* dialog).

Now you are ready to redefine the set of cells that make up the database. When Excel reads a .dbf file, it creates a named set of cells ("Database") that refer to the cells in the database. Only these cells will be written to the .dbf file when you save it. So you need to tell Excel that the Database includes your new columns. If you know about names in Excel, then the following will be familiar.
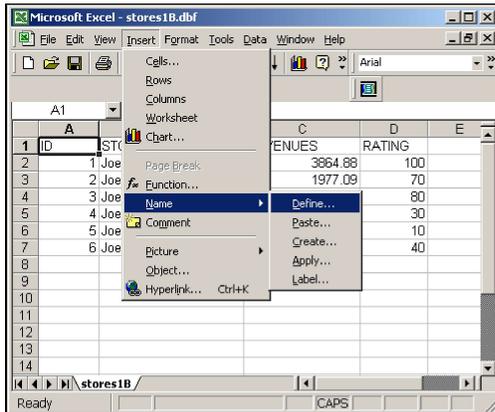

Open the Define Name dialog (*Insert>Name>Define*). The dialog should appear with the name "Database" in the larger window. Click the name "Database" and you will see the information in the Refers to: textbox (the one at the bottom of the dialog window) that tells you which cells make up the database.

You may edit the cell range to include your new columns, or you may define the new cell reference by graphic selection.
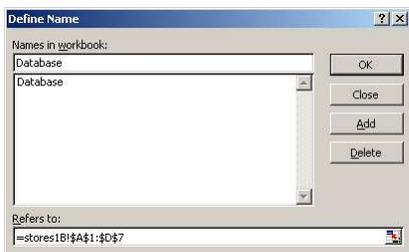
For a graphic selection, click the *Define Name* editing button at the right end of the Refers to textbox to redefine the cell reference.
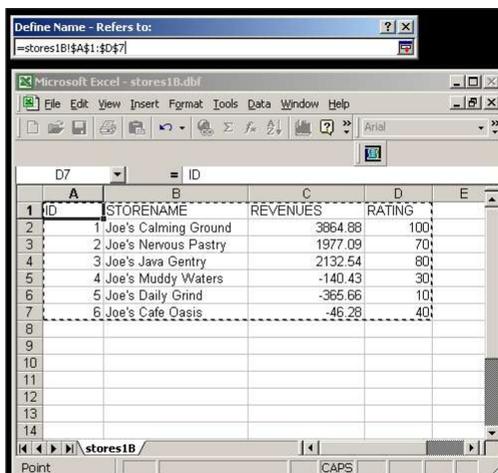
You should see the *Define Name-Refers to:* dialog appear with the cell range formula highlighted and the cell range in the table outlined. Click on your spreadsheet and highlight the cell ranges of your database (select all cells in the database, not just the cells you added).

Close the *Define Name-Refers to:* dialog by clicking the close button (x). The apply the change to the Database item by clicking the *Add* button. Click *OK* to close the *Define Name* dialog.

Save the file, this time as <shapefilename>.dbf, where "<shapefilename>" is the name of the shapefile you are editing, overwriting the existing .dbf (this is why you want to have backup copies...once you overwrite, the original data is no longer available).

Now you can go back to ArcExplorer. You should see your new data when you add this theme to an Explorer map, or if you open an existing project containing this theme. Open the theme's properties and check the data fields available (use the *Unique Value* symbolization if you want to see all of the fields in the theme's data table).