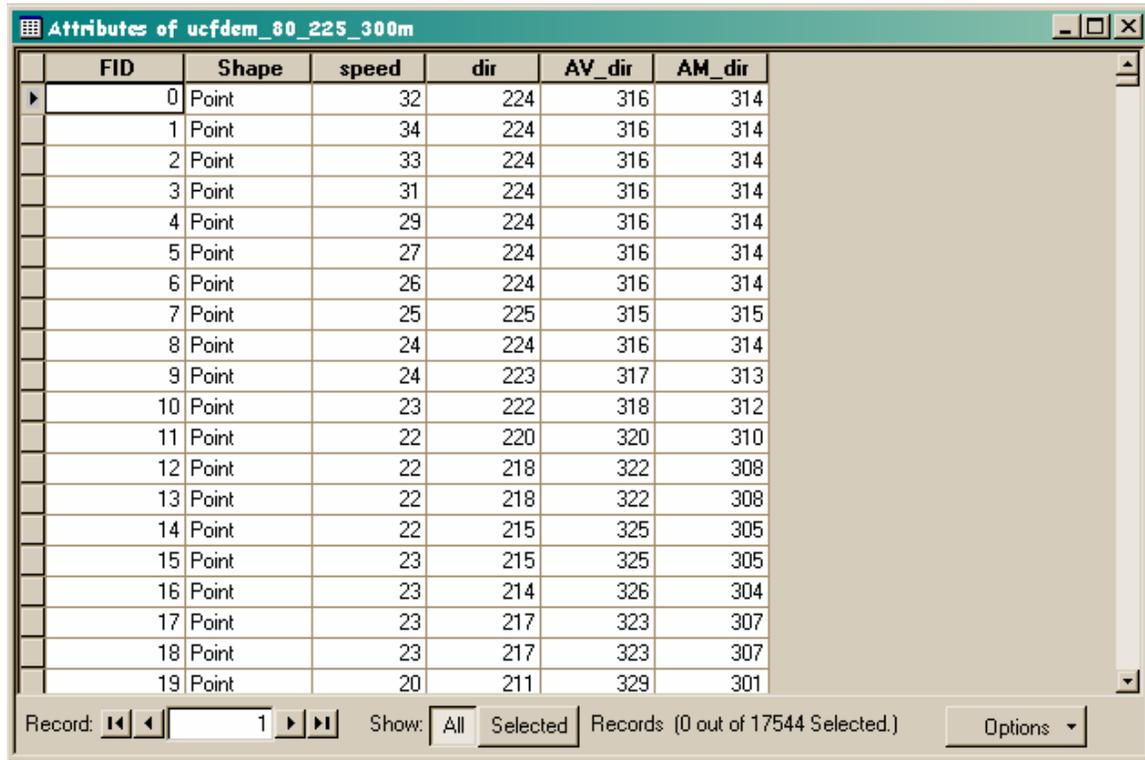


Displaying and Rotating Wind Wizard Derived Wind Direction and Windspeed Vectors in ArcMap 8.3

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A. Displaying Wind Wizard generated Gridded Wind Direction – Speed vectors.

Data requirements are an ArcMap shapefile format. The shapefile generated during the Wind Wizard process will contain five data fields in the associated .DBF file (Figure 1).



FID	Shape	speed	dir	AV_dir	AM_dir
0	Point	32	224	316	314
1	Point	34	224	316	314
2	Point	33	224	316	314
3	Point	31	224	316	314
4	Point	29	224	316	314
5	Point	27	224	316	314
6	Point	26	224	316	314
7	Point	25	225	315	315
8	Point	24	224	316	314
9	Point	24	223	317	313
10	Point	23	222	318	312
11	Point	22	220	320	310
12	Point	22	218	322	308
13	Point	22	218	322	308
14	Point	22	215	325	305
15	Point	23	215	325	305
16	Point	23	214	326	304
17	Point	23	217	323	307
18	Point	23	217	323	307
19	Point	20	211	329	301

Figure 3. Attribute table for Wind Wizard generated shapefile as displayed in ArcMap.

- FID: Feature ID, a unique number assigned to that point by ArcMap.
- Shape: Point indicates that the feature type for the shapefile is a point.
- speed: Is the Wind Wizard generated windspeed at the 20-foot level in miles per hour (mph).
- dir: Is the Wind Wizard generated azimuth direction the wind is coming from in degrees.
- AV_dir: Is the Wind Wizard manipulated value required for use in ArcView for display purposes.
- AM_dir: Is the Wind Wizard manipulated value required for use in ArcMap for display purposes.

1. Open ArcMap and load other data coverages and fire perimeter files of interest.
6. Load the ArcMap Wind Wizard shapefile for the fire of interest. The wind vector grid will appear on the coverage as individual points (Figure 2).

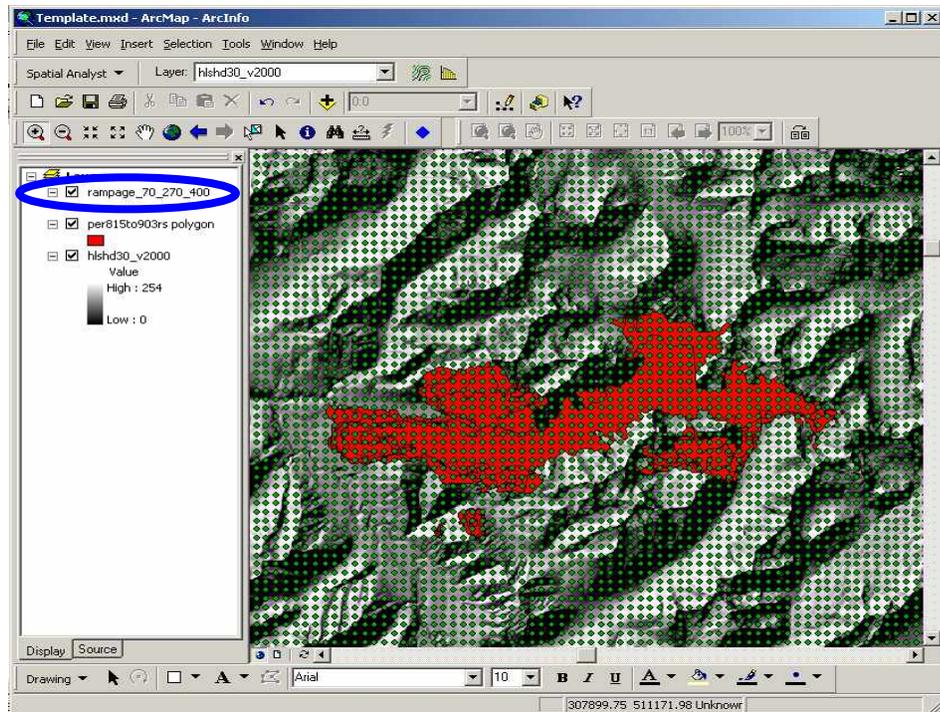


Figure 2. Example ArcMap project with Wind Wizard generated shapefile as displayed in ArcMap prior to scaling and rotation of the Wind Wizard generated vectors.

7. After loading the file into the ArcMap project, double click on the layer name in the **Table of Contents** to open the **Layer Properties**. This will open the dialog box in Figure 3.
8. Click on the **Symbology** tab. (Figure 3).

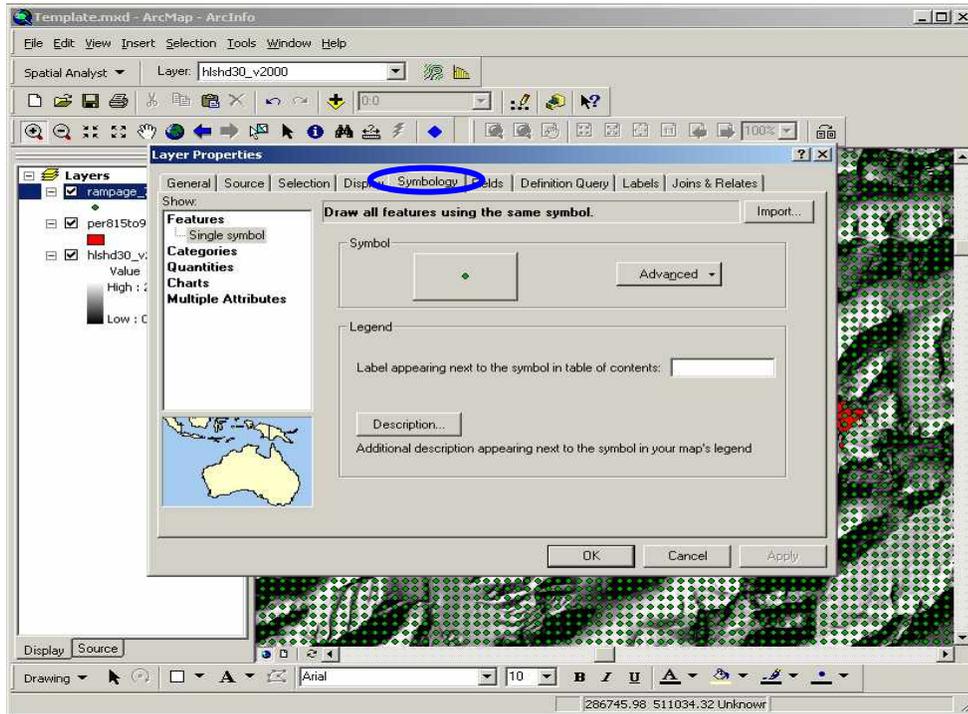


Figure 3. Layer Properties dialog box as displayed in ArcMap.

9. In the **Show** pane on the left side, select **Quantities** then **Graduated symbols** (Figure 4).

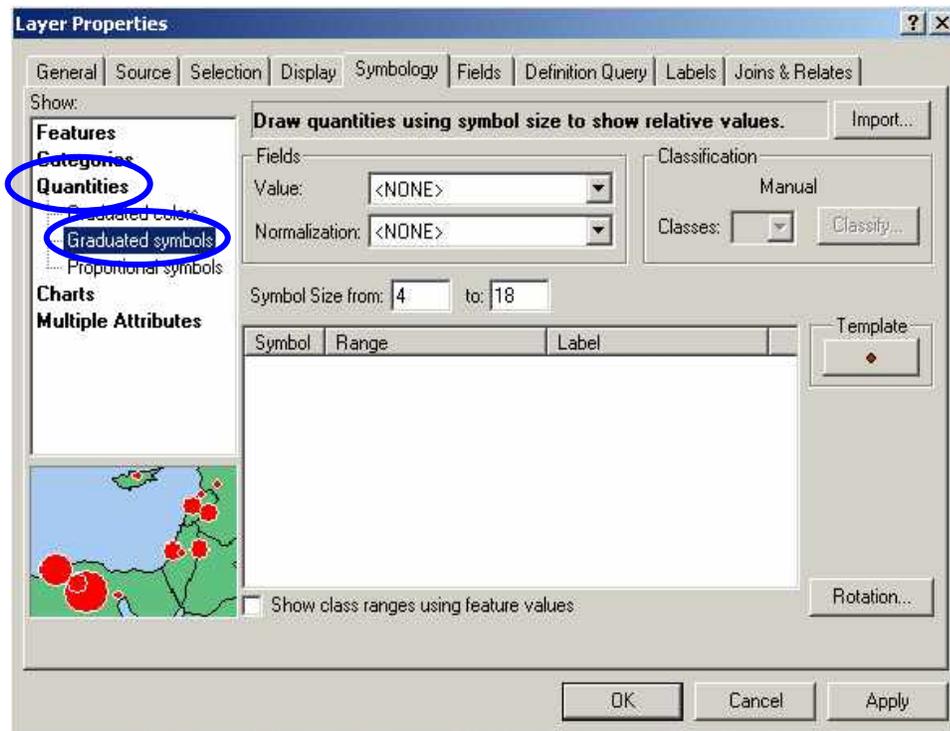
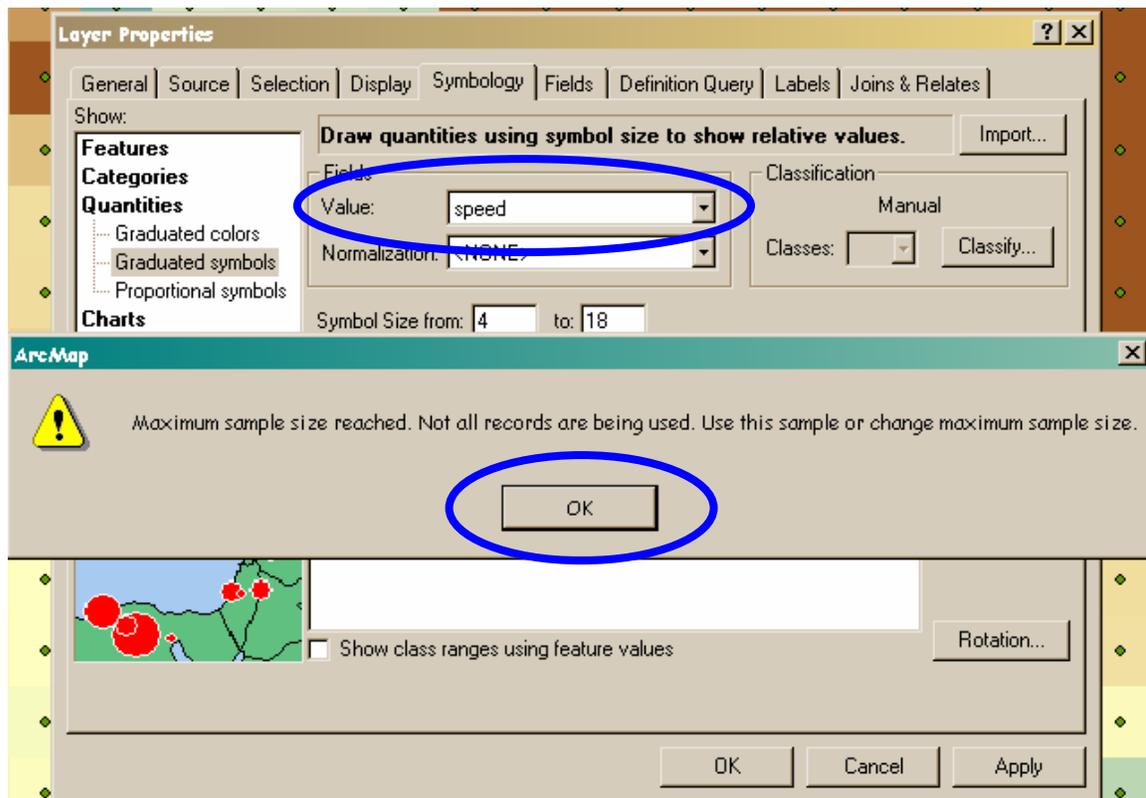


Figure 4. Selecting the Quantities and Graduated symbol.

10. In the **Value** window click on the dropdown arrow and select **speed** from the available options. The following **Warning Message** (Figure 5) will appear depending on the number of records in the associated shapefile. Click

on the **OK** button and the **Warning Message** will disappear. To change the number of records in ArcMap refer to Appendix D.



Figure

5. Selecting speed as the value to graduate the symbol and removing the Warning Message box.

11. Selecting the display symbol and changing the **Symbol Size** (Figure 6). Enter a **Symbol Size** range (20 -30). Arrows are not in the default symbol sets, so to select an arrow to display you need to choose one of the symbol sets that have arrows in it. This is done by clicking on the **Template** button (Figure 6).

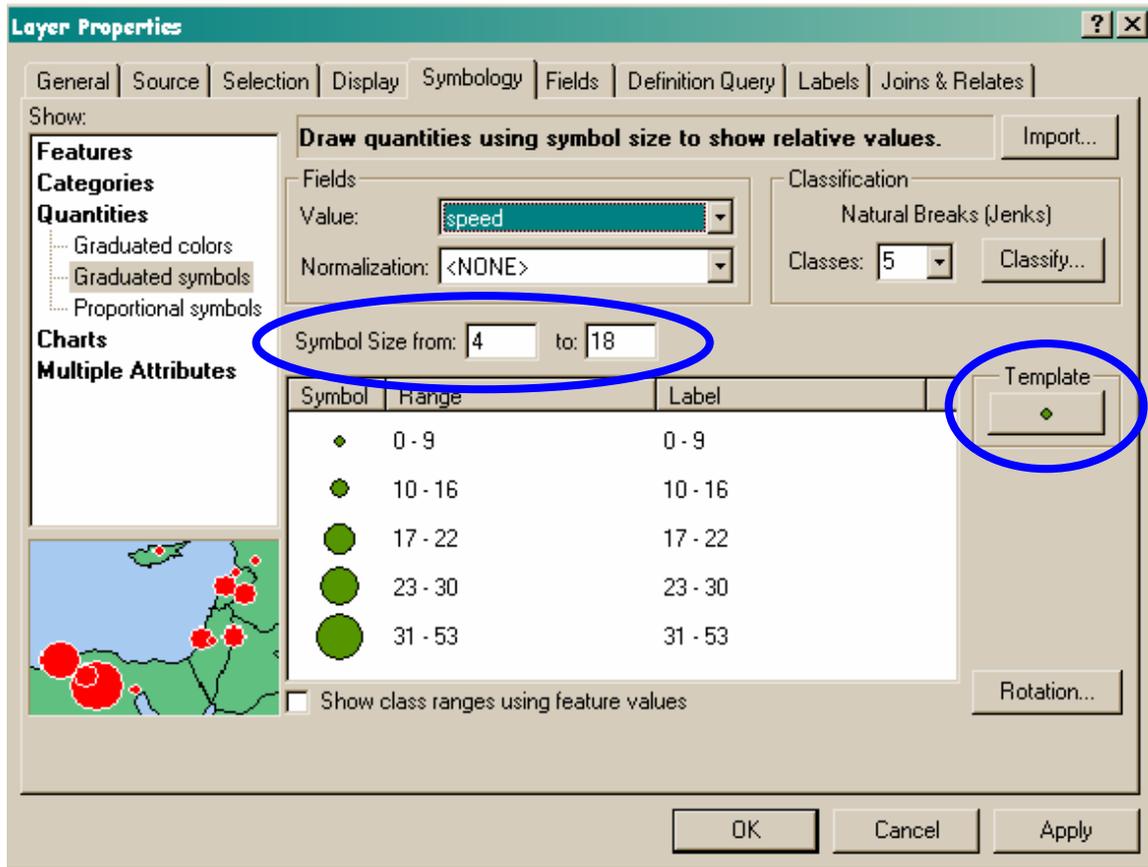


Figure 6. Changing the Symbol Size Range and choosing a new symbol set with arrows.

12. Select a symbol to represent the wind vectors. Under **More Symbols** choose either the **IGL** or **Forestry** symbol sets. The arrows toward the bottom work well in the **IGL** symbol set (Figure 7).

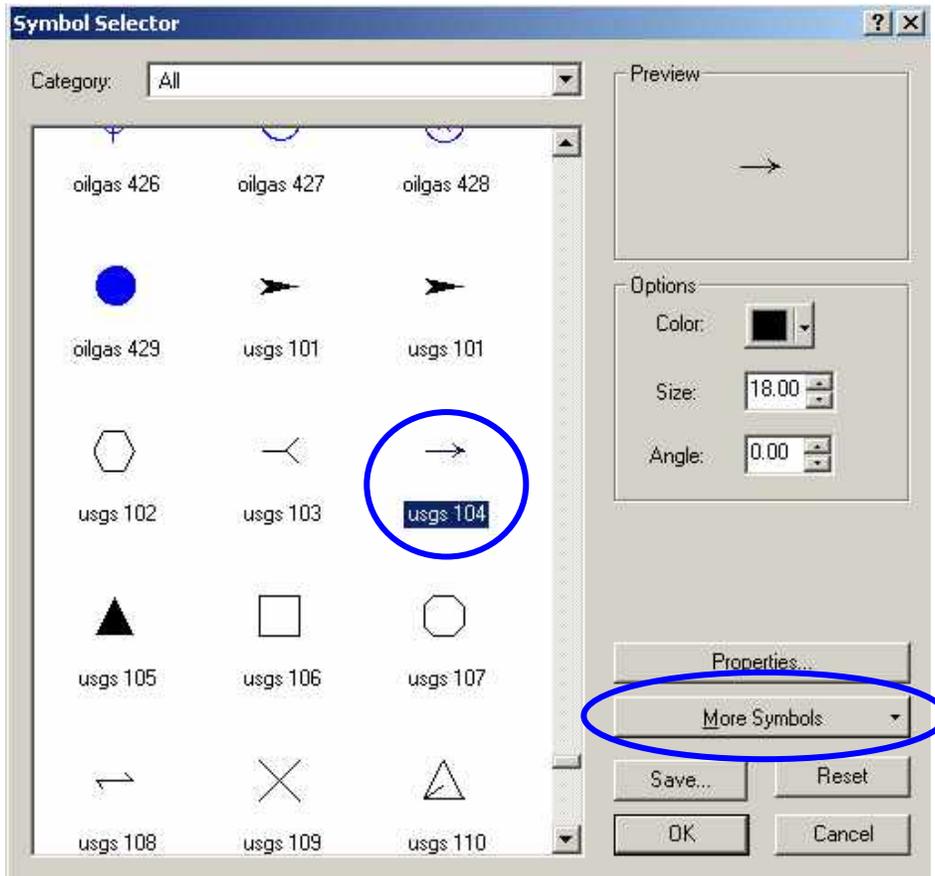


Figure 7. Selecting an appropriate arrow for display from the IGL symbol set.

13. Click **OK** to return the **Layer Properties**.

14. Click on the **Rotation** button which will open the **Rotation** dialog box (Figure 8). Click on the dropdown arrow and select **AM_dir** to rotate the points from the available options and select **Geographic** in the radio button for **Rotation Style**.

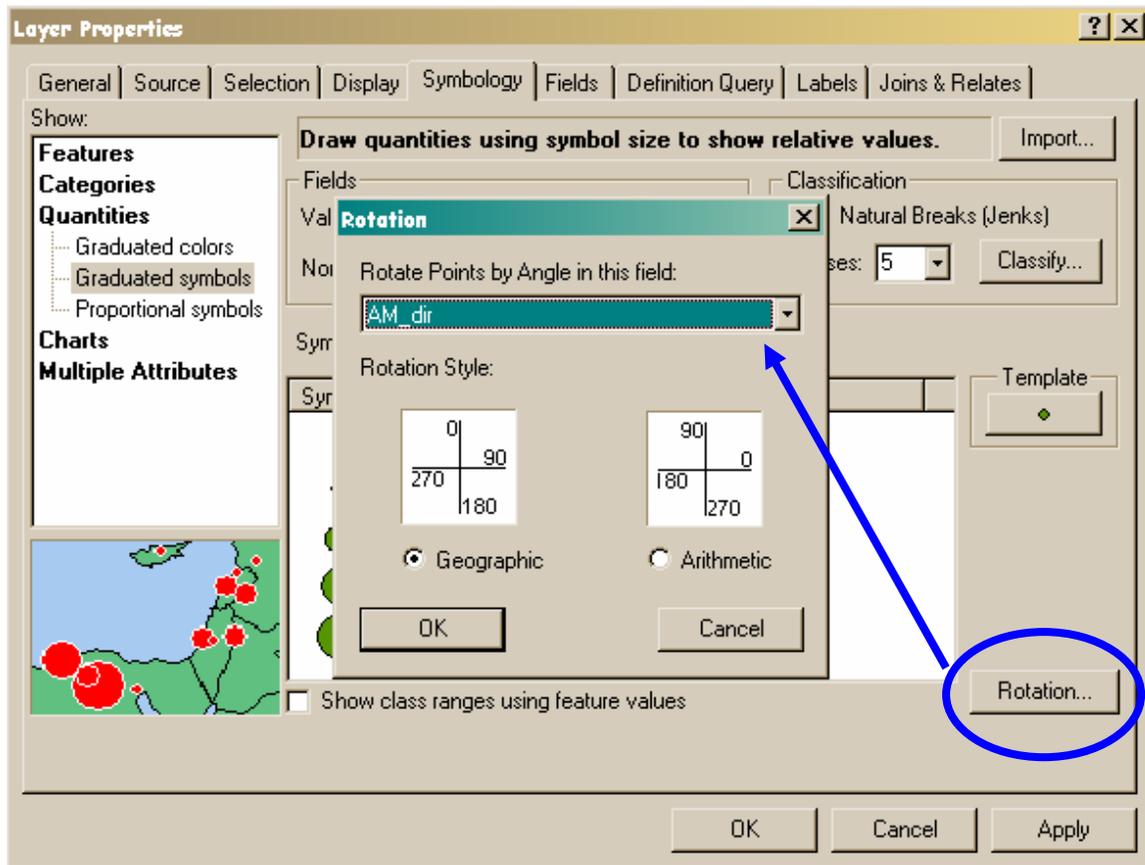


Figure 8. Selecting the data field and Rotation Style for arrow rotation.

15. Click **OK** to close the **Rotation** window and **OK** again to close the **Layer Properties** window.
16. The wind vectors will appear over the existing layers (Figure 9).
17. Symbol colors can be changed by clicking on the individual symbols in the **Table of Contents** for the respective shapefile (Figure 9).

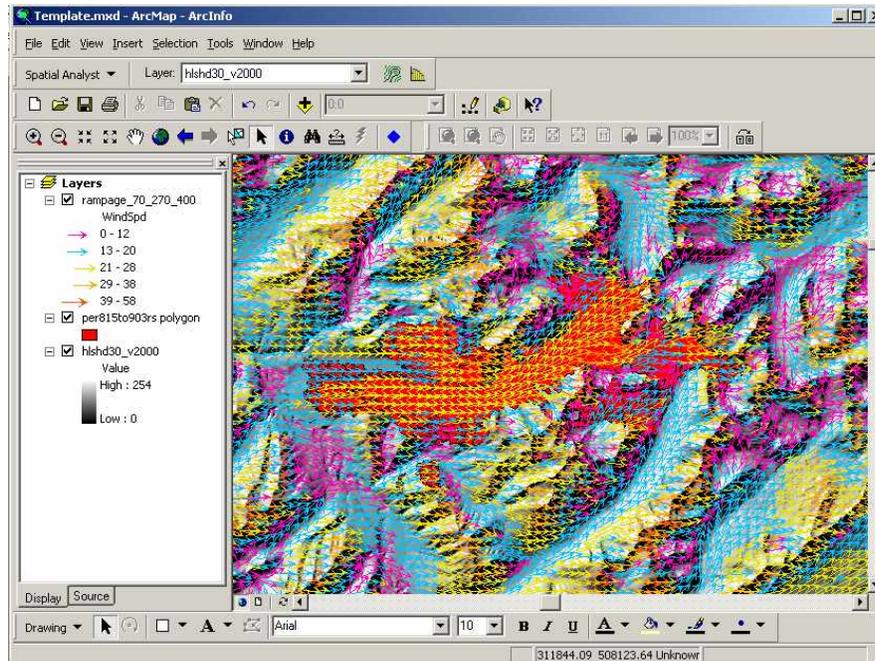


Figure 9. ArcMap display of rotated and graduated wind direction and speed.

B. Query the Gridded Wind Output in ArcMap

To correctly rotate the arrows in ArcMap as described above requires manipulation of the data generated by the Wind Wizard software for display purposes. In Figure 10 the query information for the circled arrow shows the wind speed as 32 mph with an AM_dir of 312. The AM_dir value for wind direction in the shapefile **IS NOT** the same value as generated by the Wind Wizard software; it is for rotation and display purposes only. For this point the windspeed is 32 mph (speed) and wind is coming from 222 degree (Dir). The values for speed and dir are the Wind Wizard derived values that should be used in any analysis using this shapefile.

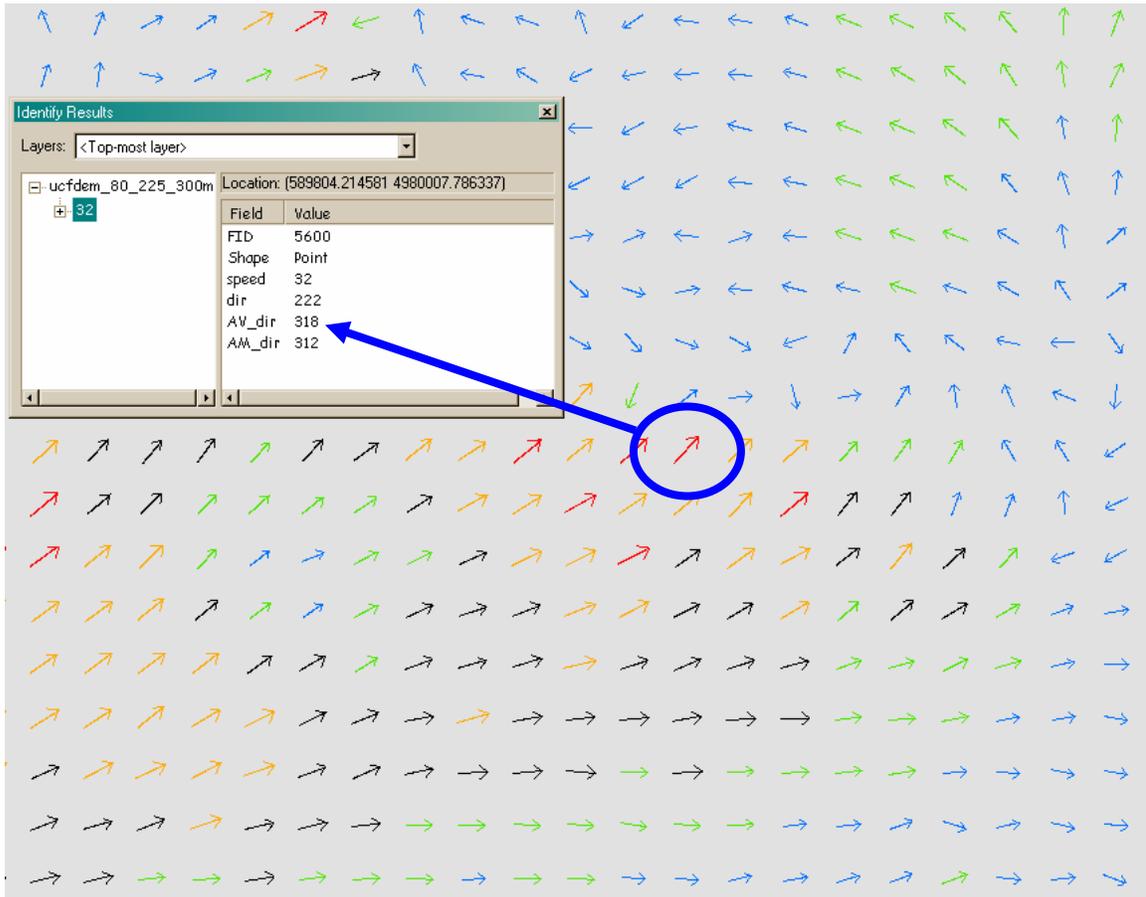


Figure 10. Query results of gridded wind shapefile in ArcMap showing the difference in the wind direction in the shapefile and the rotation angle of the arrow.

Figure 11 focuses on the same point on the landscape. However, in this case the ArcMap shapefile is overlaid on the GRID of wind direction generated by the Wind Wizard software. A query of the individual raster cell shows a Pixel value of 222 which corresponds to the direction the wind is coming from.

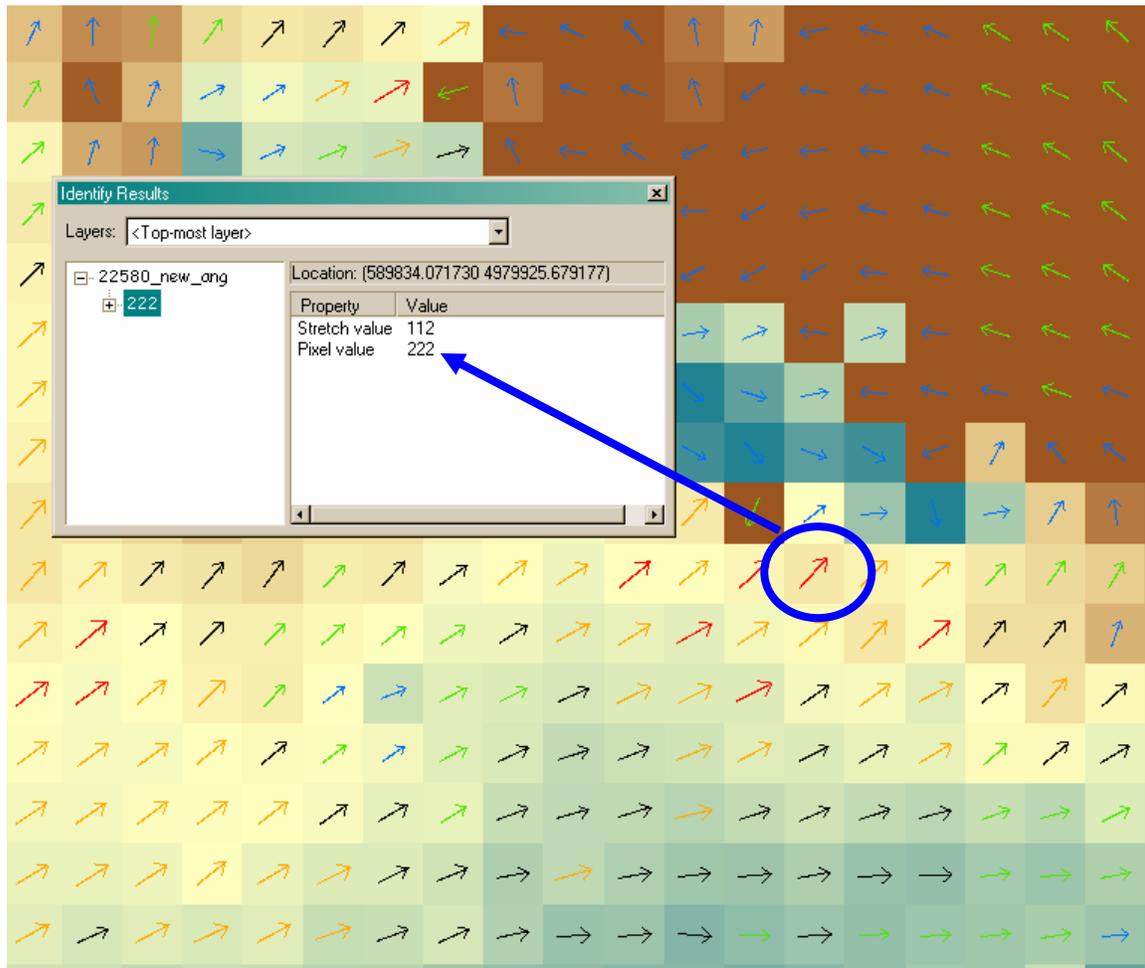


Figure 10. Query of the gridded wind generated ArcMap shapefile overlaid on the GRID ASCII Raster output from the wind wizard process.

Appendix D: How to Change the Number of Records Used In ArcMap when Displaying Wizard Shapefile Output

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When displaying the Wind Wizard derived wind direction-speed shapefile information in ArcMap, the warning displayed in Figure 1 will often occur. This is because the default number of records to be displayed in ArcMap is the **First 10,000 Records** regardless of the distribution and spatial location of the data. Depending on the output file resolution selected in the Wind Wizard software and the landscape extent this number can easily be exceeded. As a consequence, not all records in the shapefile will be used during display of the windspeed values. Additionally, within ArcMap your choice of Classification Method and the number of Classes will also affect the displayed ranges of information.

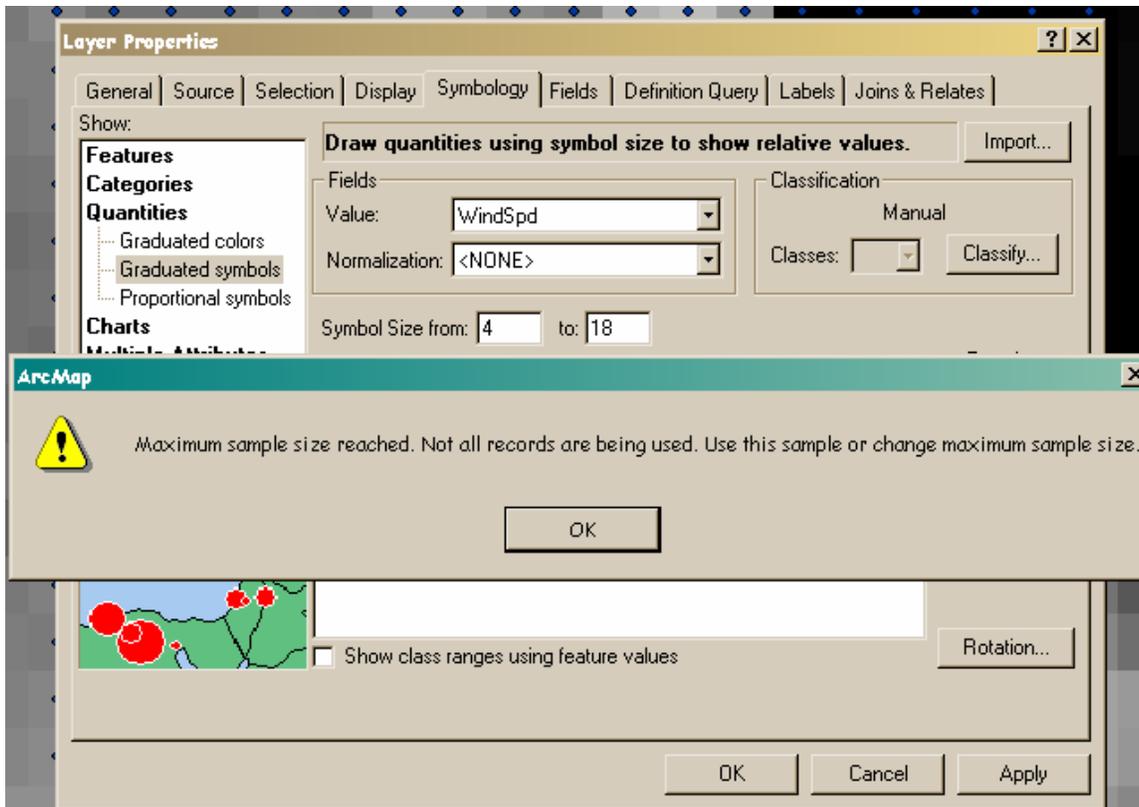


Figure 4. Error message when the number of records in the Wind Wizard ArcMap shapefile exceeds the default settings.

Because only the first 10,000 records are used not all the information will be used in defining the ranges of windspeed during the rotation process. This can lead to a misunderstanding of what the maximum and minimum windspeed values really are. For example, in Figure 2a the maximum windspeed value displayed is 13 mph while in Figure 2b the maximum windspeed value displayed is 20 mph.

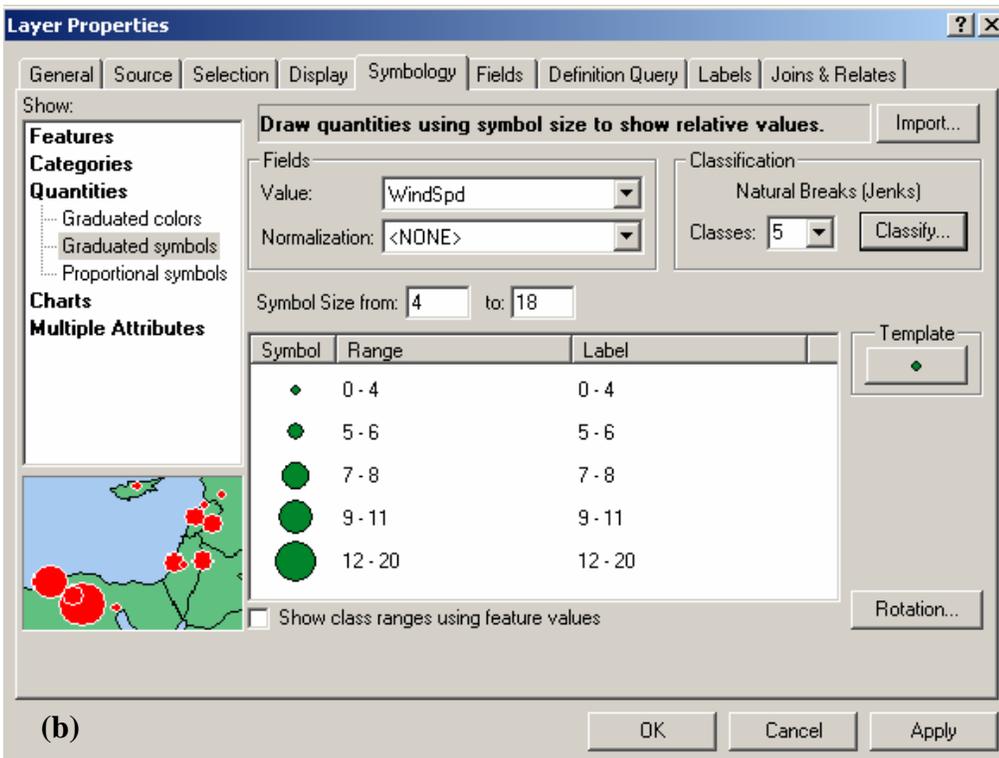
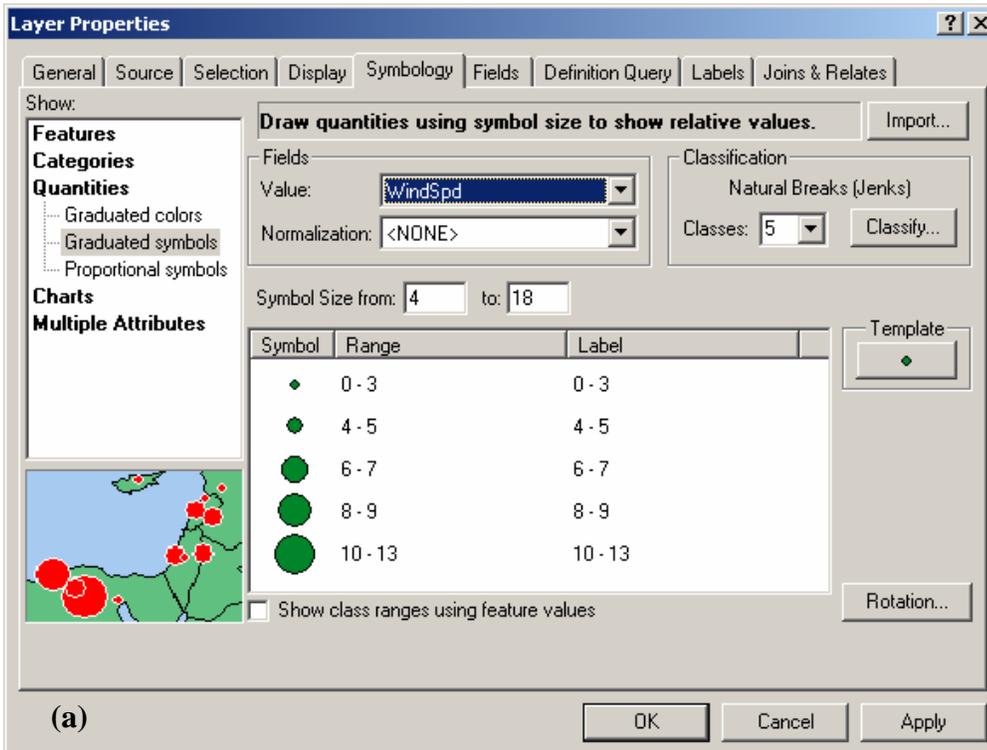


Figure 5. Displayed ranges of wind speed values based on Maximum Sample Size. (a) using default setting of 10,000 records and (b) setting Maximum Sample size so all records are used.

To change the number of records used for the shapefile is an easy change. This is not a universal change to the settings but only applies to the shapefile while active in the view. To change the settings first click on the **OK** button in the warning message; this will remove the warning message box. Next, select **Classify** (Figure 3).

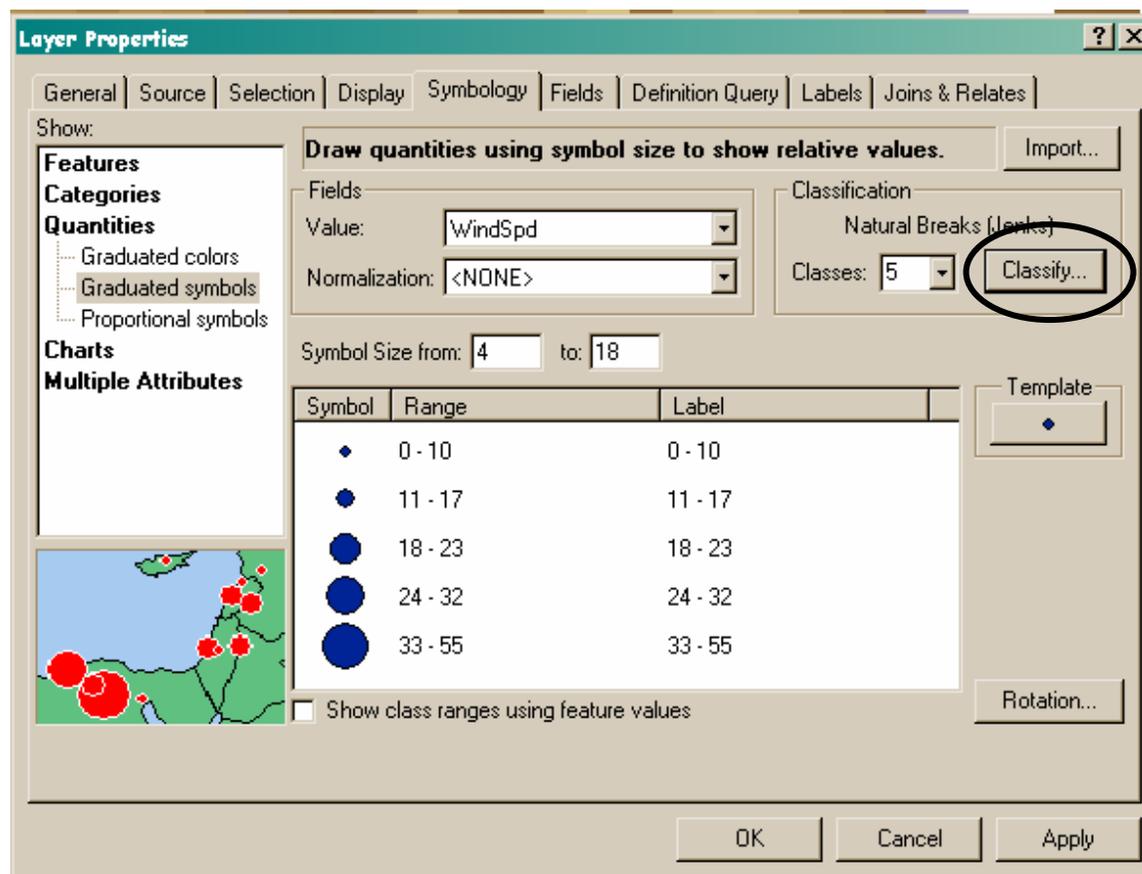


Figure 3. Classify button to start the process of changing the default settings for number of records displayed in ArcMap.

Selecting the **Classify** button will open the window displayed in Figure 4.

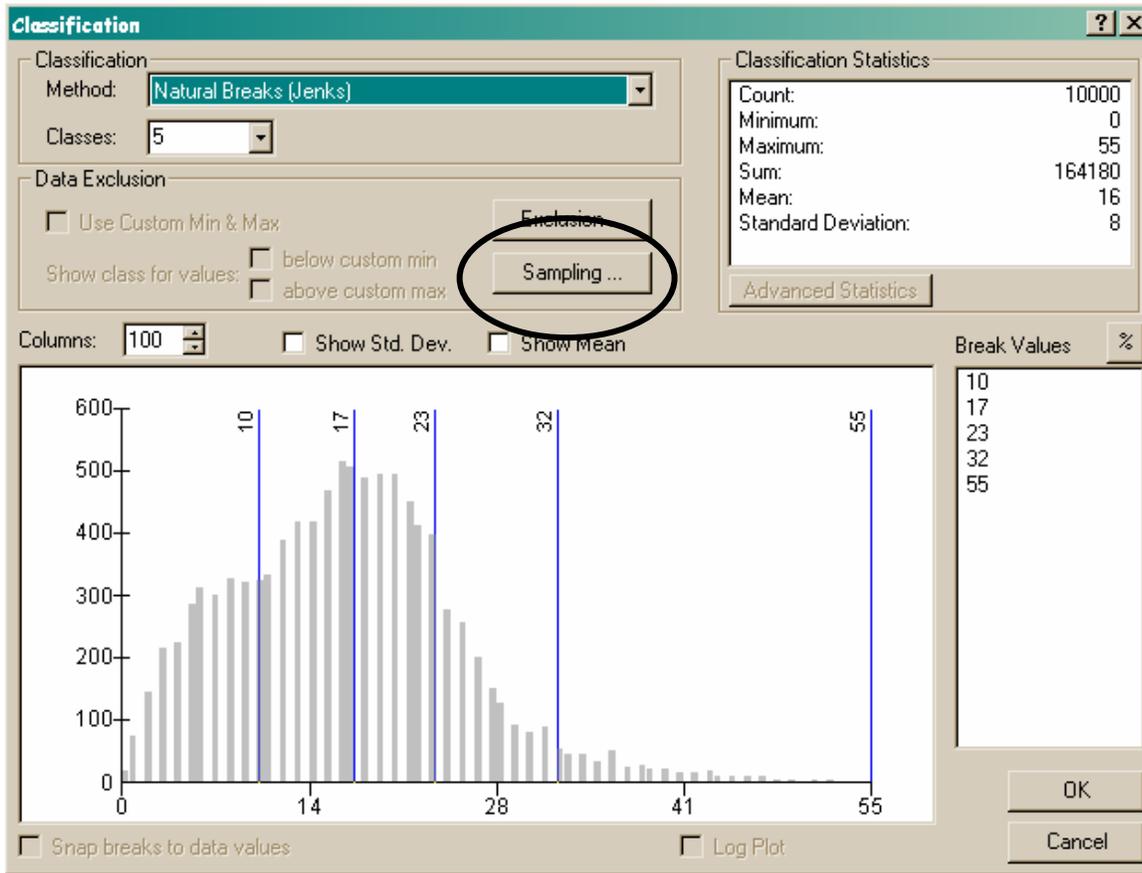


Figure 4. Classification window showing the number of records used in the Classification Statistics displayed in ArcMap.

In the **Classification Statistics** pane in the upper right you can see the number of records used (Count), minimum and maximum, mean, and standard deviation. All these values will change based on the **Data Sampling** method selected; in this case the number of values is the default value of **First 10,000 Records**.

The number of records or sampling method chosen here does not affect summary or statistical operations performed on the data fields within the shapefile attribute table. Operations performed on the shapefile attribute table will use all the records available for the selected data field unless a subset of the records has been selected.

To change the **Maximum Sampling Size**, select the **Sampling** button (Figure 4). This will open the **Data Sampling** dialog box displayed in Figure 5.

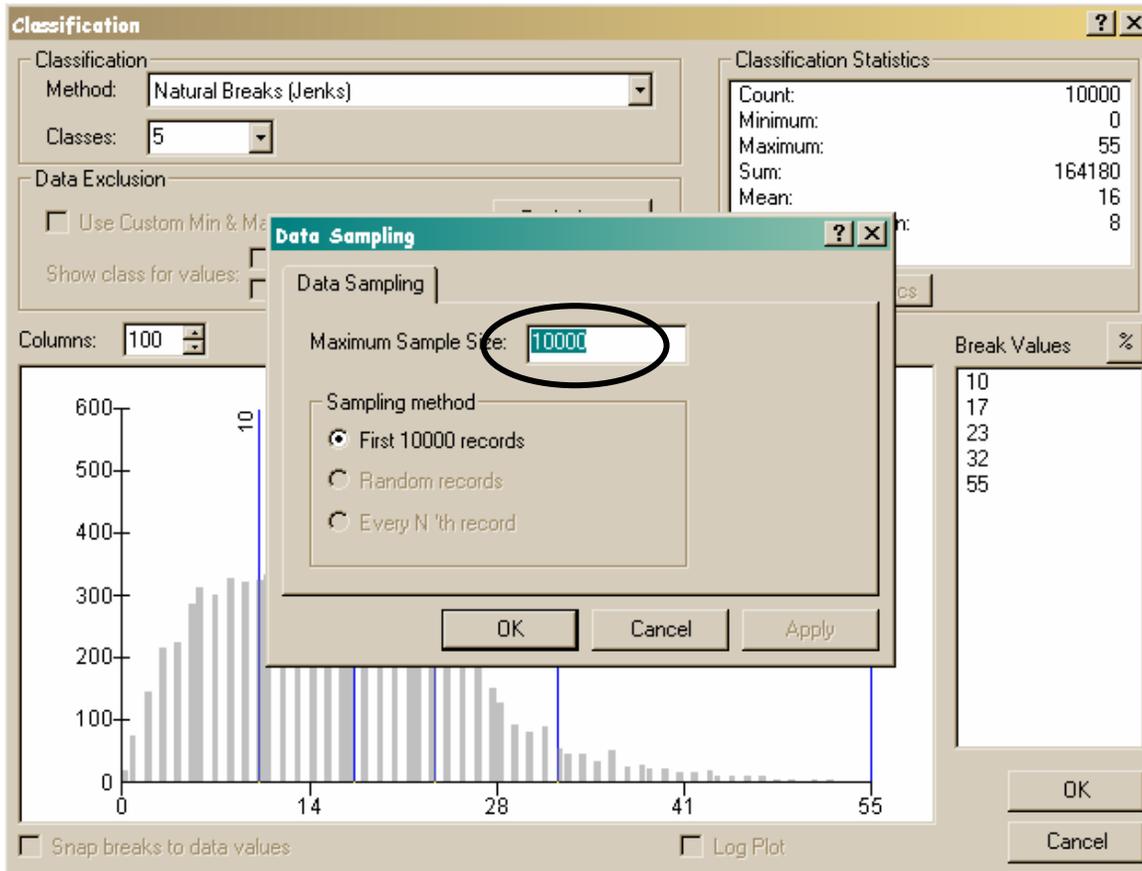


Figure 5. Dialog box to change the data sampling and sampling methods for the shapefile in ArcMap.

In the **Data Sampling** dialog box you will need to change the **Maximum Sample Size** used from 10,000 to a larger value (Figure 5). After changing the **Maximum Sample Size** value click on **OK** until all dialog boxes have closed. For most shapefiles changing this value to 100,000 should ensure that all records are being used. However, the number of records included in any one shapefile is determined by the size of the landscape as well as the output resolution selected in the Wind Wizard software. Because of this you may need to set this value higher in some cases. To see how many records are in the shapefile, you can do the following.

1. In the **Table of Contents** pane right-click on the shapefile of interest.
2. Select **Open Attribute Table**.
3. On the bottom right-hand side will be the statement "Records (0 out of ## Selected). The ## will be the total number of records in the shapefile (Figure 6). If a subset of the total number of records has been selected this too can be determined. The number of selected records would show up where the 0 is for this example.

Attributes of ucfdem_80_225_300m						
FID	Shape	speed	dir	AV_dir	AM_dir	
0	Point	32	224	316	314	
1	Point	34	224	316	314	
2	Point	33	224	316	314	
3	Point	31	224	316	314	
4	Point	29	224	316	314	
5	Point	27	224	316	314	
6	Point	26	224	316	314	
7	Point	25	225	315	315	
8	Point	24	224	316	314	
9	Point	24	223	317	313	
10	Point	23	222	318	312	
11	Point	22	220	320	310	
12	Point	22	218	322	308	
13	Point	22	218	322	308	
14	Point	22	215	325	305	
15	Point	23	215	325	305	
16	Point	23	214	326	304	
17	Point	23	217	323	307	
18	Point	23	217	323	307	
19	Point	20	211	329	301	

Record: Show: Records (0 out of 17544 Selected.)

Figure 6. Attribute table for Wind Wizard generated shapefile in ArcMap.