

Michigan Technological University
School of Forest Resources and Environmental Science
Geographic Information Systems for Natural Resource Management
Spring Semester 2009

Laboratory Exercise 2
Digital Line Graph Data- Downloading and Importing into ArcMap

Prepare Your Directory

Before downloading and importing any data make a “lab2dlg” folder directory in your class directory. Within that folder, create five folders named bdry, hydro, hypso, trans and masterdd.

Digital Line Graph (DLG) Data

DLG data is a vector based data set containing information such as hydrology, transportation, hypsography (contour lines), and boundaries including GLO Township and Range lines. The information is available at several scales: 1:24,000, 1:1,000,000 and 1:2,000,000, and is a digital representation of some of the thematic features on analog USGS quadrangle maps. The data is distributed through several clearing houses. For this lab you can find the needed information at the GIS Data Depot. The gateway to the website is: www.gisdatadepot.com.

Downloading DLG Data

This semester we will download and work with the digital data for Indiantown. This 7.5” quadrangle is located just east of Munising, Michigan in Alger County and includes portions of the Pictured Rocks National Lakeshore and the Hiawatha National Forest.

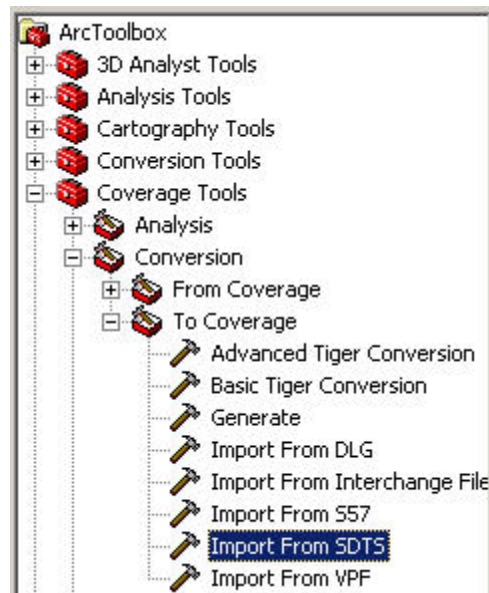
The data distributed by the GIS Data Depot is cataloged by location, usually by State and then by county. After logging into your account, click on GIS Data and click on Michigan in the graphic of the US, then chose Alger County’s 1:24K DLG data. Scroll down to the listing for the Indiantown Quadrangle.

There are 4 layers to download- boundaries, hydrography, hypsography, and transportation (roads, railroads, natural gas pipelines are included in transportation). Download each layer into its own folder, and download the master data dictionary (masterdd) into the “masterdd” folder. A link for the masterdd is at the top of the same page you are downloading the other layers from.



Decompress the data within each folder using Power Archiver.

ArcMap is not capable of viewing and utilizing DLG data directly in this format called SDTS (Spatial Data Transfer Standard). The data must be converted from SDTS format to an Arc coverage using the **Coverage Tools** toolbox in **ArcToolbox**.

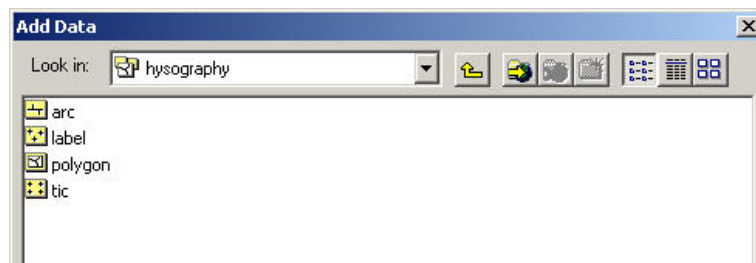


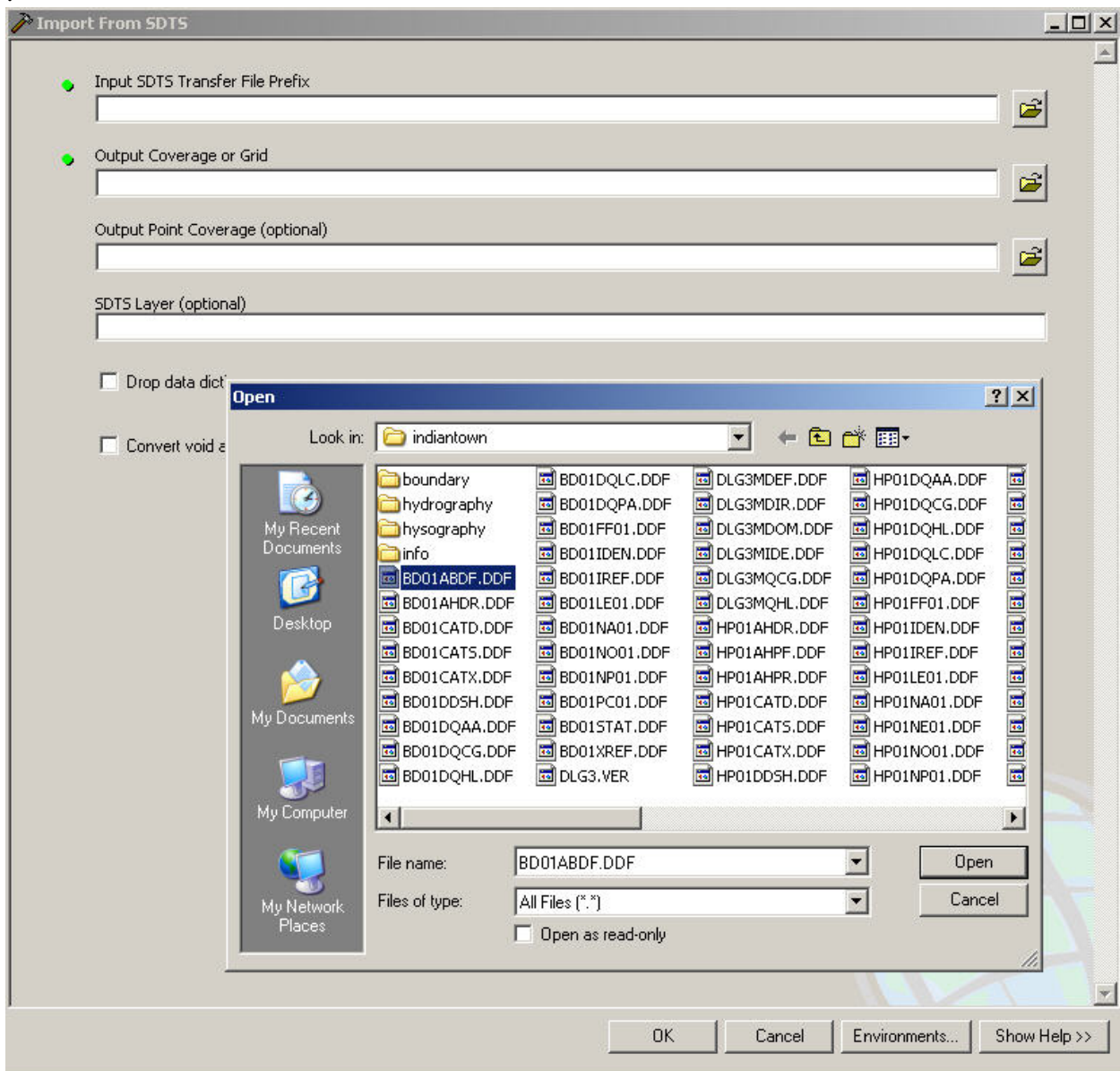
Converting Downloaded Data to a Useable Format

Launch ArcMap and open the viewing area by starting with a new, empty map. If ArcToolbox is not open, open it. Refer to last week's lab handout if you don't remember how to do this.

Convert each layer to a coverage by opening the **Coverage** file in **ArcToolbox** and navigating to **Conversion > To Coverage > Import From SDTS** tool (shown in the illustration above). In the dialog box, input the data line select one file from the thematic layer folder as input (see illustration on next page). There are many files in each folder after extraction, you only need to select one of them, the SDTS Wizard will use the rest to create one coverage file for you to use. Repeat these steps for each of the other folders, except the masterdd. As each layer is processed you should view the output box generated by the SDTS Wizard to make sure the conversion has completed successfully with "completed" or "executed successfully" displayed.

Once you have processed all of the DLG layers, display them in ArcMap with the **Add Data** button (again- refer to last week's handout if needed). You will want to display arc and/or polygon for the layers. Experiment and see how best to display each of the thematic layers. To see the different layers double click on the coverage file with in the folder (ex. hysography) and a list of layers will appear, select the appropriate format. For example, with the hydrography you will want to display the hydrography arcs and polygons if you want to show the lakes as solid blue polygons. You do not have to add all of the layers (ex. tic, nodes, etc.).



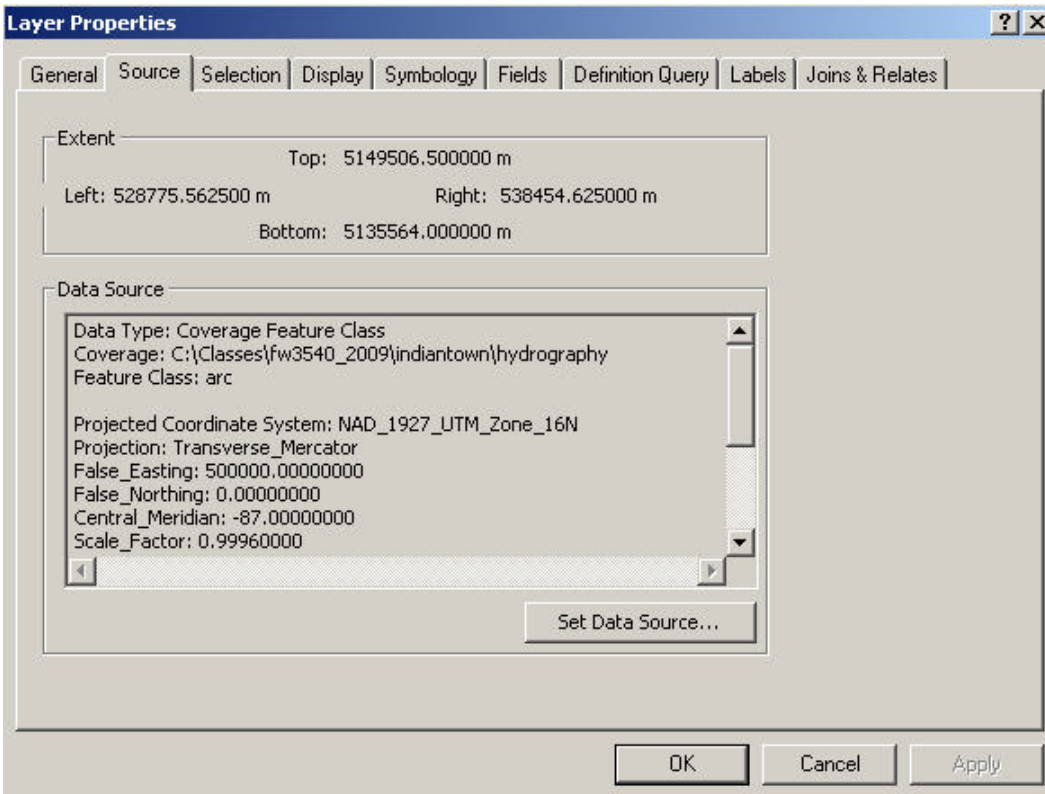
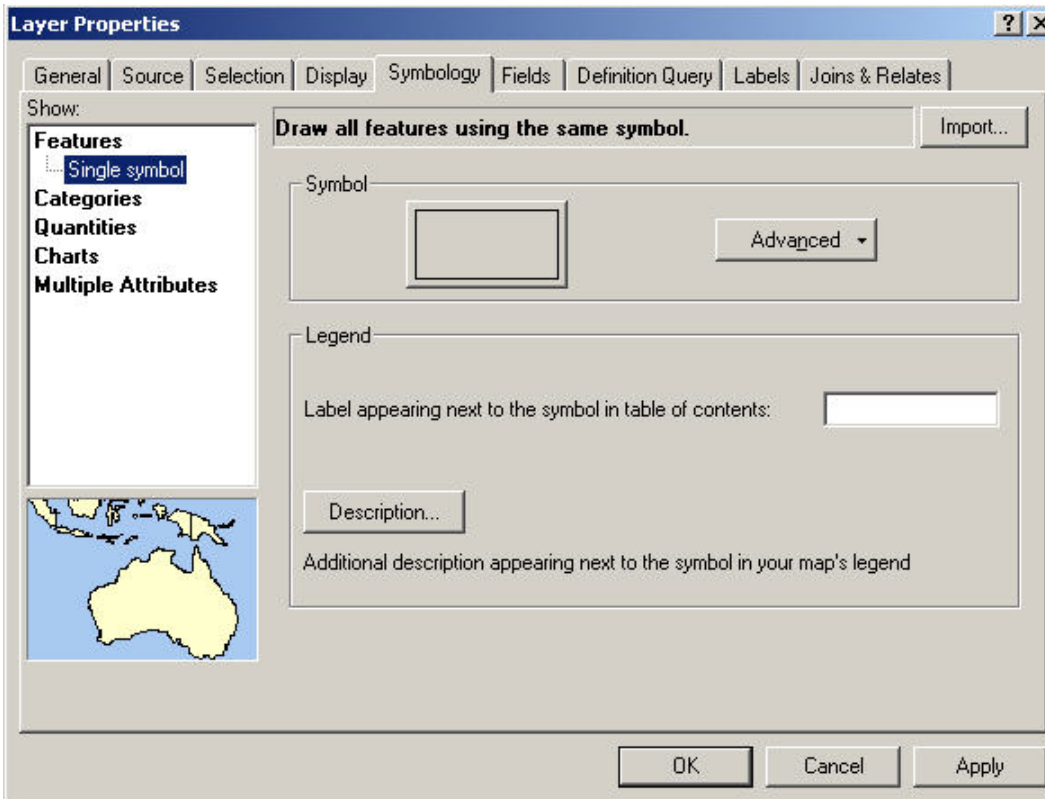


Making DLG Information Useful

Create a legend for each thematic layer to make them discernable when all are displayed in the viewer simultaneously. To do this, right click on the layer name displayed in the table of contents and choose **Properties> Symbology Tab** (see illustration on next page). Under Features, select Single Symbol. Click on the raised box shown in the symbol window and select an appropriate symbol and/or color. Note you will not be able to “color of fill in ” the lake polygons yet, as the thematic layers has no appropriate attribute data.

Information about the thematic layers, can be found by opening the layer’s **Properties** file. Clicking on the **Layer Properties, General** tab will tell you the location of the coverage, what

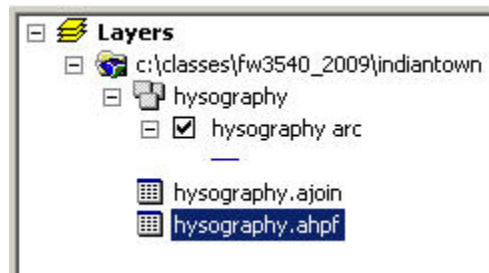
coordinate system the thematic layer is projected to and what are distance units (see below).



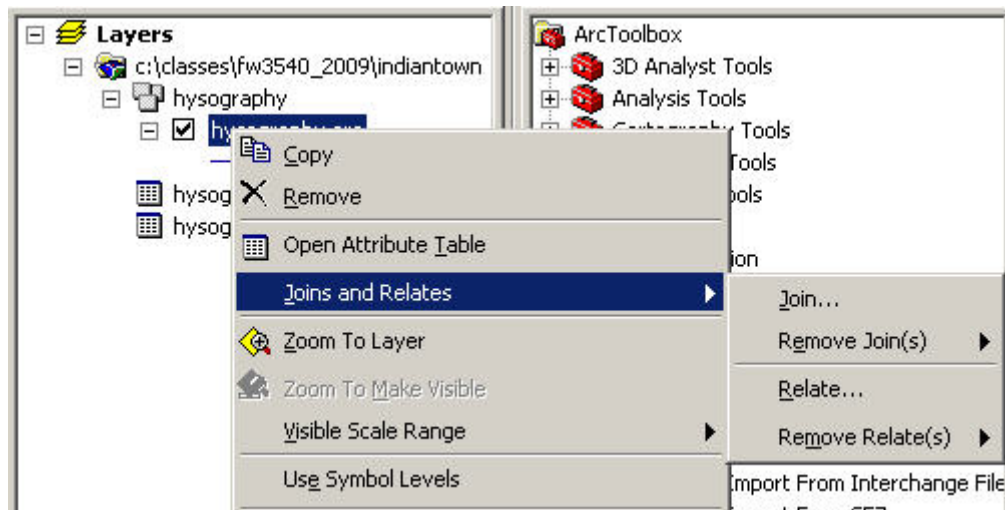
The attributes for DLG thematic layers are stored in external databases. For example, when you display the elevation (hypsography) lines to your map, they are just lines without any elevation attributes associated with them. Therefore, you must join the attributes (elevation values) to the features (contour lines) to create a valid, complete and useable thematic layer.

To join a table of attributes to a coverage (start with the hypsography arc layer), follow these steps:

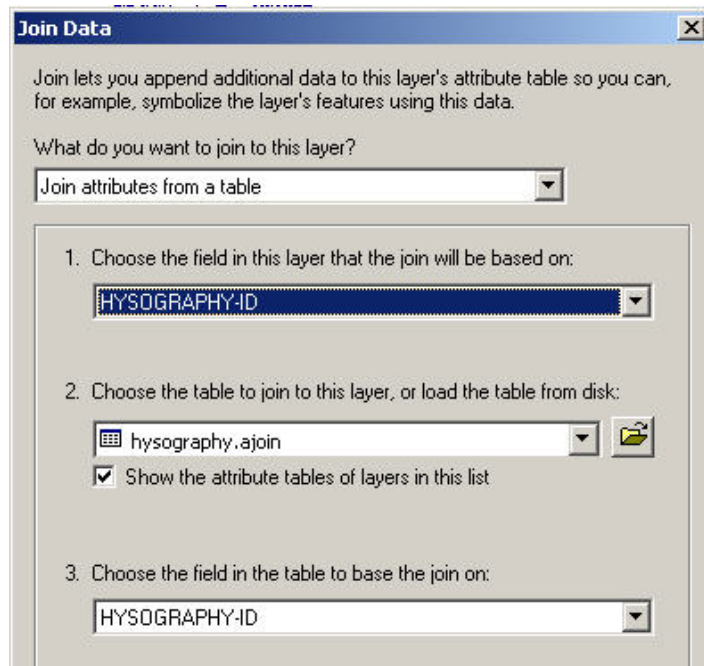
Add the files HP01.ajoin and HP01.ahpr to your map document (these are tables, but you add them to ArcMap just like spatial data).



Right-click on hypsography thematic layer and select **Joins and Relates > Join...**



Select Join attributes from table
Choose HP01-ID as the join field.
Select HP01.ajoin as the table to join to.
Select HP01-ID as the field to base the join on. Click OK (see illustration on next page).



Then complete a second join---

Right-click on HP01 arc and select **Joins and Relates > Joins...**

Select Join attributes from a table

Choose HP01.MODN-ID as the join field.

Select HP01.ahpr as the table to join to.

Select MODN-ID as the field to base the join on. Click OK and answer YES

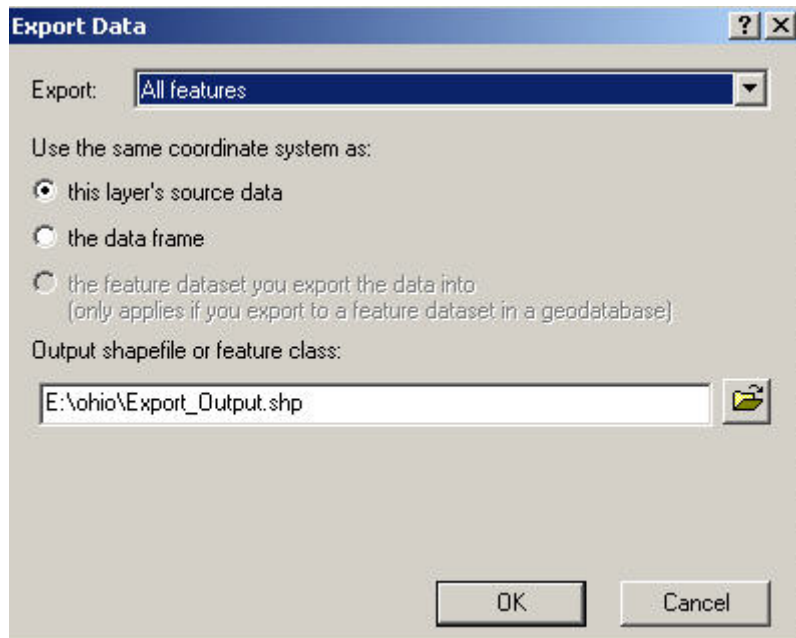
To see the outcome of the two joins, right click on the hysography thematic layer and chose **Open Attribute Table**. As you scroll the table to the left you will see the original attributes from the hysography arc layer, followed by the data from the .ajoin table, followed by the data from the .ahpf table. Note that this join is NOT permanent. If you shut down the session right now the join will be lost. It is only a temporary connection.

For a join to become permanent, a new thematic layer must be created. To do so- right-click on the layer name and choose **Data > Export Data**. Place the new output file in the lab 2 folder and name it appropriately. For example- hysography (elevation), hydrography (hydrology), transportation (roads, railroads, and gasoline) Note the new file is not a coverage, but rather a shapefile (.shp extension) (see the window on the next page).

Repeat the steps above to join the appropriate attribute files to the hydrography coverage. You will need the external table hy01.ahyf in addition to the coverage. No .ajoin table is needed with this thematic layer. Then repeat the procedure for the remainder of the DLG thematic layers.

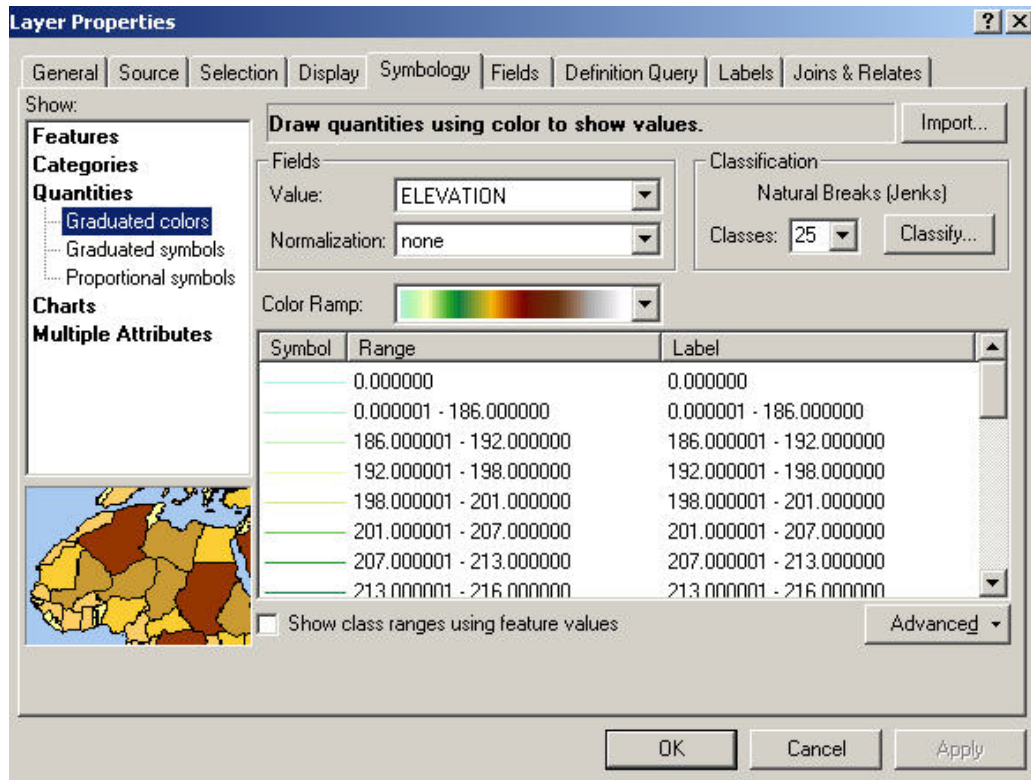
If you are not sure what information is in a particular DLG table, right click on the table name after adding it to the table of contents and choose open. You will be able to see what information is contained within. Note that more than one table can be open at the same time. Don't hesitate to

explore the tables and see what information is stored there.



Creating a Legend

Color is an important component of spatial data and interpreting the information being presented is easier when color is used as the human eye can detect about 21 shades of gray, but thousands of shades of color. Thus we are naturally attracted to color images.



Open the Properties window for the elevation data (hysography) and choose symbology. Refer to the illustration on the previous page, and set your symbology window to match. The color ramp shown is the standard elevation color range adopted by USGS for portraying elevation.

You should also begin to learn how to access the **ArcMap Help**. Click on **Help** on the top toolbar, choose **ArcMap Desktop Help**. Click on the **Contents** tab, go to **Mapping And visualization, symbolizing data, Drawing features to show categories**. Double click to open this window. Notice the detailed step-by-step instructions for setting up various types of legends.

Due Next Week in Lab (these must be completed using a word processor):

Flowchart of Importing and Converting DLGs

Flowchart of Joining Attributes to a DLG coverage

Flowchart for Setting up a Legend

A Note About Flowchart Construction

Each of you is expected to construct your own flowchart. You must do your own work in designing and filling in the flowchart. It is very easy to detect duplicated flowcharts. Duplicated flowcharts are considered “cheating” and in violation of the University’s Academic Integrity Policy. Such violations will be reported to the Dean of Student’s Office and you will receive no credit for that lab exercise.

