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## Summer 2005 Department Spotlight: Excavation Permit Tracking Made Easier

by Gordon McConnell  
Transportation Department

The Dakota County Transportation Department owns right of ways along nearly all of the County-owned roadways. Frequently, public and private entities need to do excavating work within these right of ways. The Transportation Department, in conjunction with the Office of GIS, has come up with a way to keep track of the work that is done within these right of ways.

Dakota County is one of the fastest growing counties in the state. The County's Transportation Department receives approximately 250 permits for excavation work each year in its right of ways. After these permits are reviewed and processed through to completion, they are cataloged and placed in binders. All these binders develop into volumes of books that are filed by year for life and kept available for future review.

Over time, problems sometimes develop with excavations. Cracks that appear in the roadway, ditches that settle and grass that doesn't grow back are typical problems. When problems occur, it is important to contact the utility owner so they can remedy the situation. Given the number of permits for construction work along the county road system it's often difficult to find out who dug where, and hours are often spent searching for historic permits.

A better system for permit tracking was needed, so a new GIS database and application were developed jointly by the Transportation Department and the Office of GIS to track permits by location. The process works as follows.



Permits in the right of way

Excavation locations are entered into the database by Transportation Department staff by drawing lines along the proposed route. The next step is to annotate the line with the permit number, contact name, type of facility and the year installed. Once saved, the application automatically changes the color of the line to represent the national color code for that type of facility. The permit documents and plan sheets can also then be scanned and a link placed with the line annotation.

Now, when an excavation issue develops, staff can simply look up the location in the database and click on any color coded lines in that area. This little extra step has saved hours of time digging through years of permits in order to correct problems. The permit forms and plan sheets can be boxed and put in storage, saving space. Sometimes it is the simple applications that provide the most savings. In the future, other similar records could be track by GIS location, using a variation on the same application

## Summer 2005 Desktop GIS: DakotaNet GIS: Making Geography Our Common Denominator

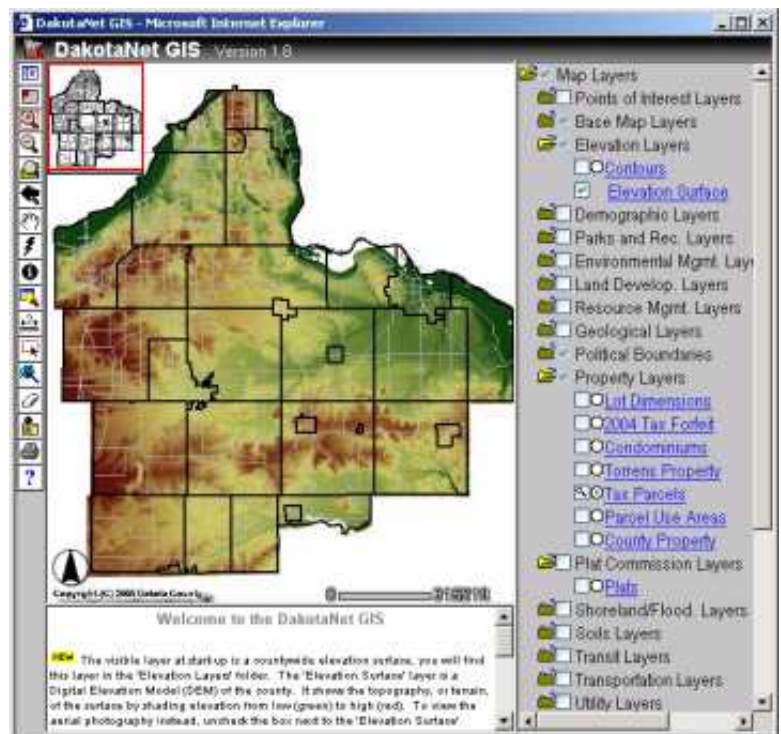
by Mary Hagerman

The Parks Department sites a new park in the southwestern part of the county. The Transportation Department realigns a stretch of highway. The Plat Commission reviews a proposal for a new housing development. All of these projects involve location, or geography. The Parks Department may ask the questions "What part of the county is not served by existing parks?" or "Where are available open spaces near natural or historical features?" The Transportation Department may need to know how much right-of-way will have to be acquired along the highway realignment. They may also want to know what the current land uses are within that right-of-way. The Plat Commission has to ensure that the proposed development plan incorporates adequate access to and from adjacent roads. They may also want to know if there other new developments in the vicinity that would add to the increased impact on traffic. These are all questions of geography.

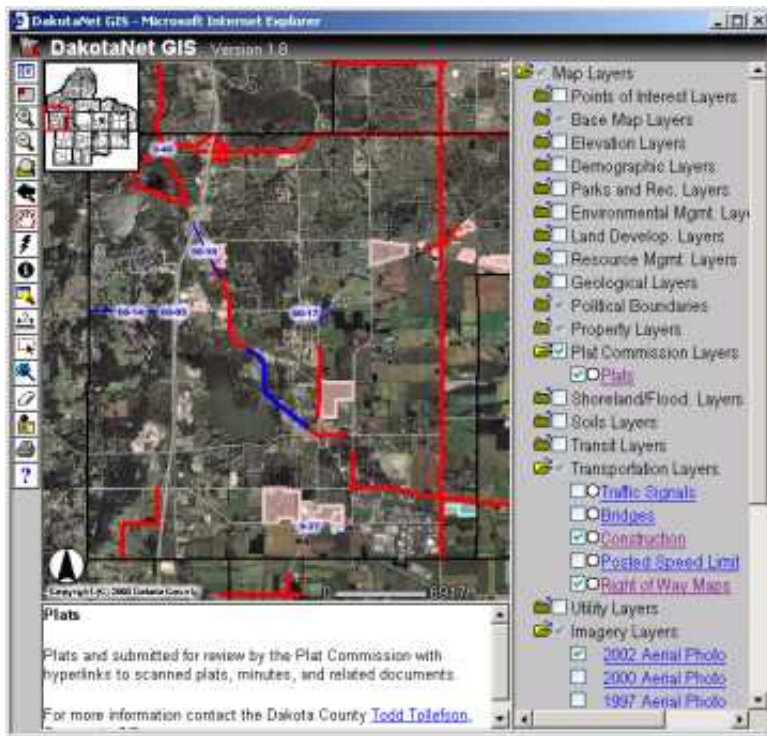
Location underlies nearly everything we do - literally. Suppose the highway realignment is adjacent to the new park, or runs through the proposed development. It wouldn't be very efficient for the Parks Department and Transportation Department to simultaneously work to acquire the same tract of land. Would it make sense for one County entity to approve the development of a parcel of land, and then have another try to acquire it for right-of-way?

The common denominator in all of these efforts is geography. There is a new geographic information system (GIS) available on DakotaNet that attempts to address this geographic commonality. *DakotaNet GIS* is a web-based tool that allows county staff to explore data from other county departments. This enables each department to be informed of other departments' activities and to incorporate that knowledge into their own plans. *DakotaNet GIS* provides the opportunity for people to see the big picture in the geographic relationships between the wide variety of concerns and interests that exist throughout the county.

*DakotaNet GIS* serves two primary functions. First, it is a data discovery tool, or digital data catalog. There are more than 100 datasets represented, with more being added all the time. County staff can browse the available data, read a basic description of the data, and find out who to contact for more information. Among the datasets included are parcel data, environmental hazards, highway construction projects, and aerial photography from several different years.







Second, *DakotaNet GIS* is a tool for geographic analysis. County staff can view on a map the area of the county in which they are interested. Having access to a wealth of data from throughout the county, they can overlay a variety of datasets onto their own project areas to reveal any geographical relationships. Plats of proposed new developments can be displayed along with streets, construction projects, and county right-of-ways. The user is able to view the dataset attributes by clicking on the individual features on the map. Some datasets even incorporate hyperlinks to photos or scanned documents. There are also tools for searching parcels, locating addresses, and measuring distances.

Additionally, *DakotaNet GIS* can be used to make ad hoc maps. Although the GIS is intended as an information gathering and analysis tool, the capability exists to create and print basic working maps. There is a variety of reference data,

including parcels, streets, municipal boundaries, and aerial photography that can be used as a backdrop for overlaying and mapping any dataset of interest. Output map options include 8.5x11 or 11x17 in both portrait and landscape orientations.

*DakotaNet GIS's* user interface features an interactive map for viewing data, along with a layer list for managing the data. The layer list groups datasets into folders, similar to Windows Explorer folders. By clicking on check boxes next to the layers, or datasets, the user is able to control which layers are visible on the map. A collection of tools for navigating around the map allows the user to zoom and pan to an area of interest. The help pages give brief instructions on how to use the GIS, with specific explanations of how to use each tool or button. GIS staff are available to help as well.

Originally, *DakotaNet GIS* was developed for the Physical Development division and called Physical Development GIS. Read the [Physical Development GIS article](#) in the Fall 2004 issue of GIS News for more information. To access *DakotaNet GIS*, go to DakotaNet, click on the 'Applications' tab, and click "Geographic Information System". There is also the option to save a shortcut to your desktop.



## Summer 2005 GIS 101: [Pixel] Size Does Matter

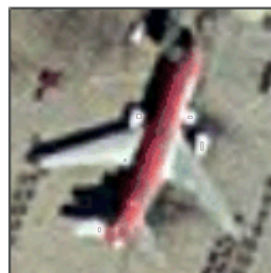
by Todd Lusk

Aerial imagery is one of the most useful items to have around. Whether you are doing some heads-up digitizing of the locations of sidewalks, presenting an idea to the public or to a City Council, or just looking for some feature of interest, it's always nice to have a clear picture at your disposal. The United States Geological Survey (USGS) has helped to make that more of a reality by releasing 1-foot resolution aerial photography in the Twin Cities metropolitan area.



So what exactly is it that makes pixel size in imagery matter? The simple answer is the amount of data. The smaller the pixel size (or greater the resolution) the more information that is available in the imagery. The more information in the imagery, the clearer the picture and the smaller the features that are able to be seen.

**0.75-Meter**  
(approx. 2.5' Pixels)

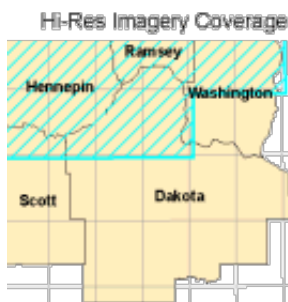


**0.3-Meter**  
(approx. 1' Pixels)



*Comparing pixel sizes at a scale of 1:1000. Notice how much clearer the image is on the right.*

In the spring of 2005 the USGS announced the release of high-resolution imagery covering much of the Twin Cities metropolitan area. The images cover roughly the northern half of Dakota County following standard USGS 7.5' (1:24,000) quadrangles. It was collected in April of 2004.



The availability of this new imagery is not limited just to those who have GIS software at their disposal. The general public can also access it through various web mapping applications on the USGS website (<http://www.usgs.gov>). To access the 2004 imagery, along with several other base map layers, go directly to [The National Map](#) site. Once there, click on the "Go to Viewer" button to open the mapping application.

Another way to access the information is through the Seamless Data Distribution System (SDDS). This system allows users to download imagery data along with other datasets available in the application. Simply visit the SDDS at <http://seamless.usgs.gov> and click on "View and Download United States Data".

Downloads are currently limited to a size of 1500 megabytes, so it not possible to download all of the 2004 imagery in a single pass.

Lastly, for those using ArcGIS, the imagery can be accessed and displayed in ArcMap directly from the USGS internet servers. Simply add the mapping server in ArcCatalog using the web address "<http://gisdata.usgs.gov>". Then look for the layer named "USGS\_EDC\_Ortho\_Urban" and add it to an open ArcMap session. The imagery, which is in lat-long coordinates, will project on-the-fly in ArcMap if a coordinate system is defined for the data frame first.



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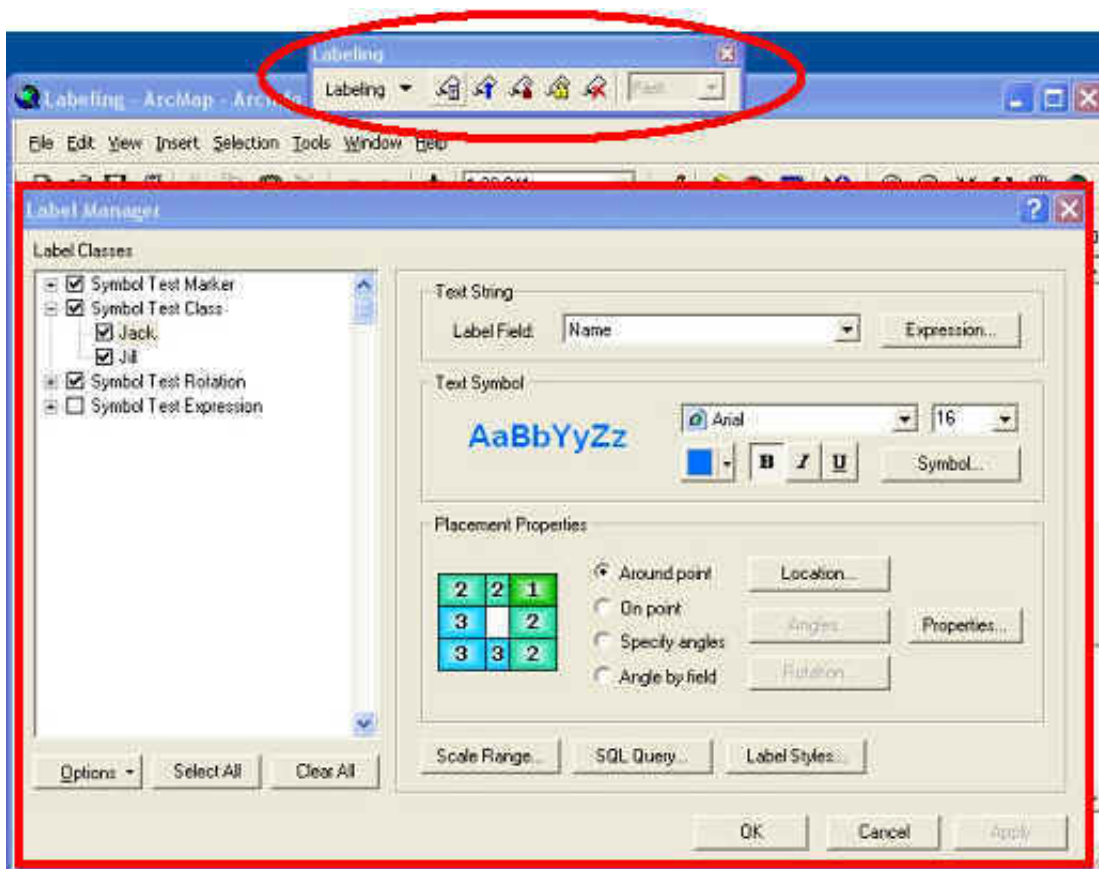
## Summer 2005 Tech Talk: Labeling Like a Pro

by Matt McGuire

In cartography, using the interplay between data and style to create information brings unique challenges for every individual map. Labeling features often helps with these challenges, and doing it well can make a complicated map more meaningful. ESRI's ArcMap 9.x comes with a powerful but complicated set of labeling tools. While not a detailed how-to, this article will use examples to detail three techniques - creating label classes, creating label expressions and using text formatting tags- to help you get more out of ArcMap's labeling tools.

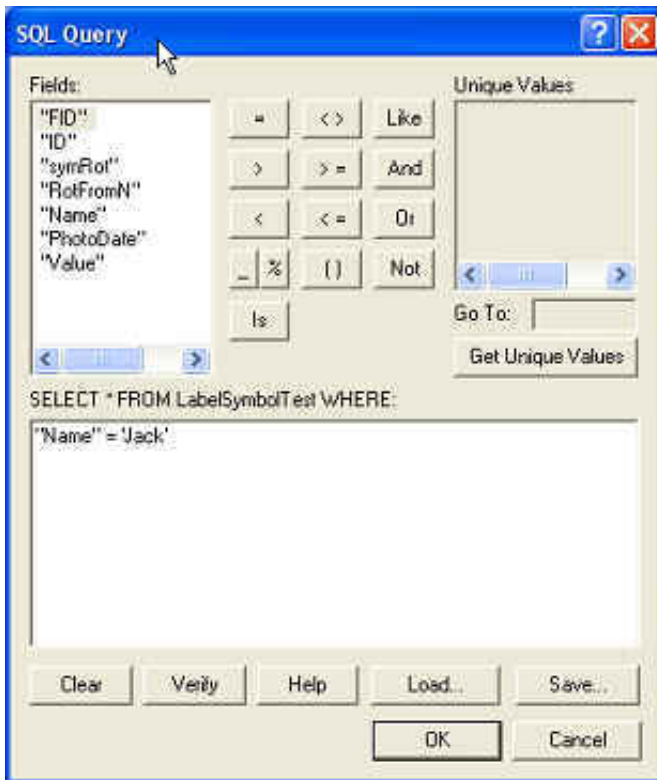
### The Label Manager

The Label Manger is a new tool in ArcMap. It can be accessed through the Label Toolbar that comes standard with ArcMap 9.x. Accessing all your map layers' label properties is much faster and easier through the Label Manager than through each individual layer's properties. To make the Label Toolbar visible in ArcMap, choose the View menu -> Toolbars -> Labeling.



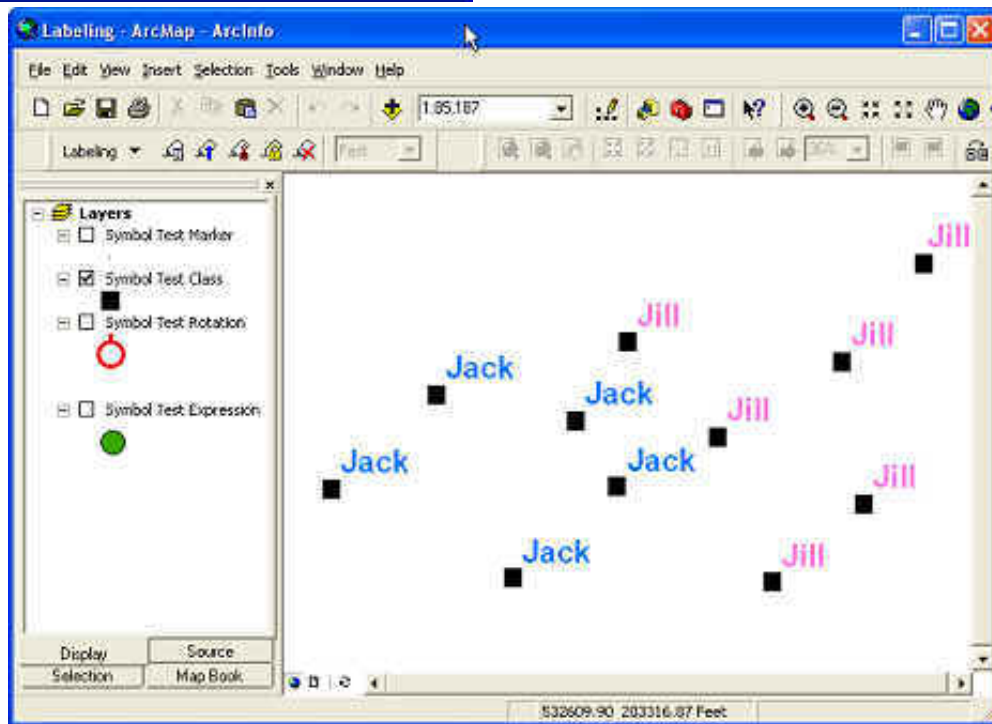
Notice that each layer can be expanded to show at least one label class. The way a layer is drawn - the font, color and size, for example - is controlled through the label class. We will be using the Label Manager to access the label properties of our sample dataset for the rest of the article.

### Defining label classes



Our example dataset is a point layer showing the location of photos taken with some attributes to use for labeling. One of the attributes is the name of the person who took the photograph, "Jack" or "Jill". We want to label pictures taken by Jack differently than those taken by Jill. To do this, we open the label manager in ArcMap, and expand our layer.

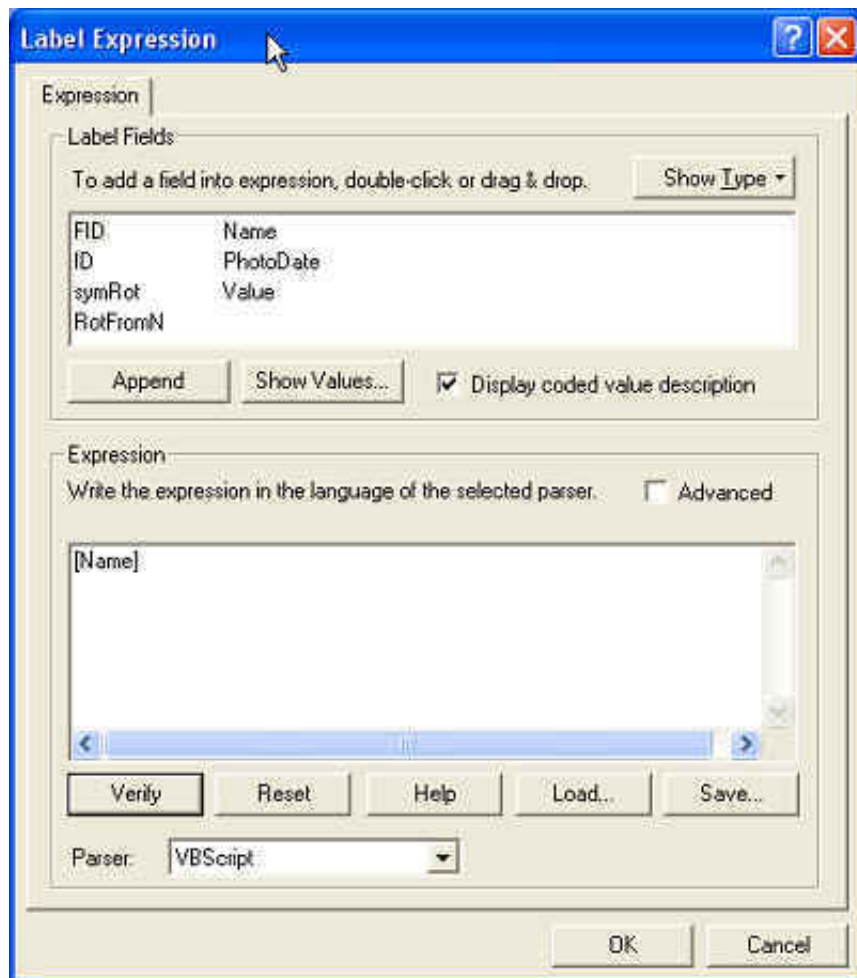
To distinguish photos taken by Jack from those taken by Jill, we have to create a class for Jack and a class for Jill. We have only one label class to start, called "Default". We want to rename this to "Jack". You can do so by right clicking on it and selecting the option "Rename Class...". Then we enter the name "Jack", and click on the "SQL Query..." button to specify **"Name" = 'Jack'**. We then create a new label class and give it a name, "Jill". Repeat the SQL Query instructions, substituting "Jack" with "Jill". Now we have two label classes.



When we change the label attributes, such as the font size or font color, they only apply to the label class that is currently selected, either "Jack" or "Jill". After changing the text properties of each label class, Jack's photos are symbolized with blue text, and Jill's are symbolized with pink text.

### Writing a label expression

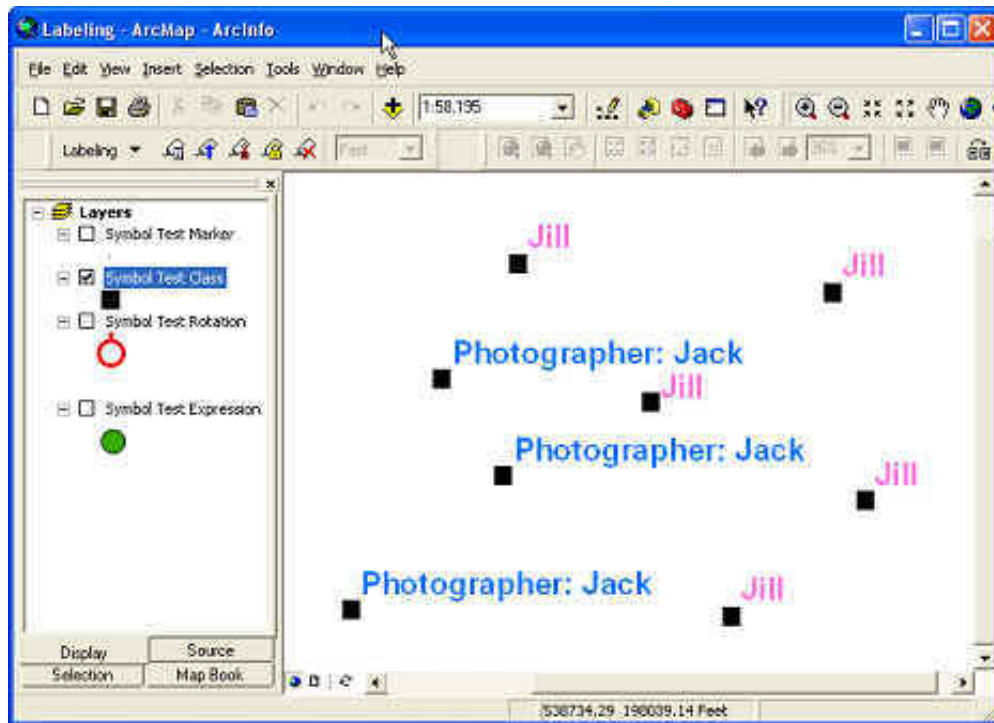
There is another button in the label class properties, called "Expression..." Clicking it will give you access to a dialog where you can manipulate the label text using scripts.



Scripts can be written in VBScript or JavaScript. Here we will use VBScript to create a label that shows more than just the photographer's name. We'll show the date on which the picture was taken, a number field, and we'll format the information to look like a table.

The label expressions dialog shows the field names at the top and a text entry area at the bottom. You can drag the fields you want to include in your label from the top to the text entry area, or click "Append" to add a space and then the field. The fields look like this - **[Name]** - in the text entry area, while regular text looks like this - **"Photographer"** - including the quotes. Using the Jack and Jill example, we can modify the label "Jack" to read "Photographer: Jack" by writing a script that looks like this: **"Photographer: " & [Name]** . Notice how Jill's labels stay the same because the expression only applies to the current label class.

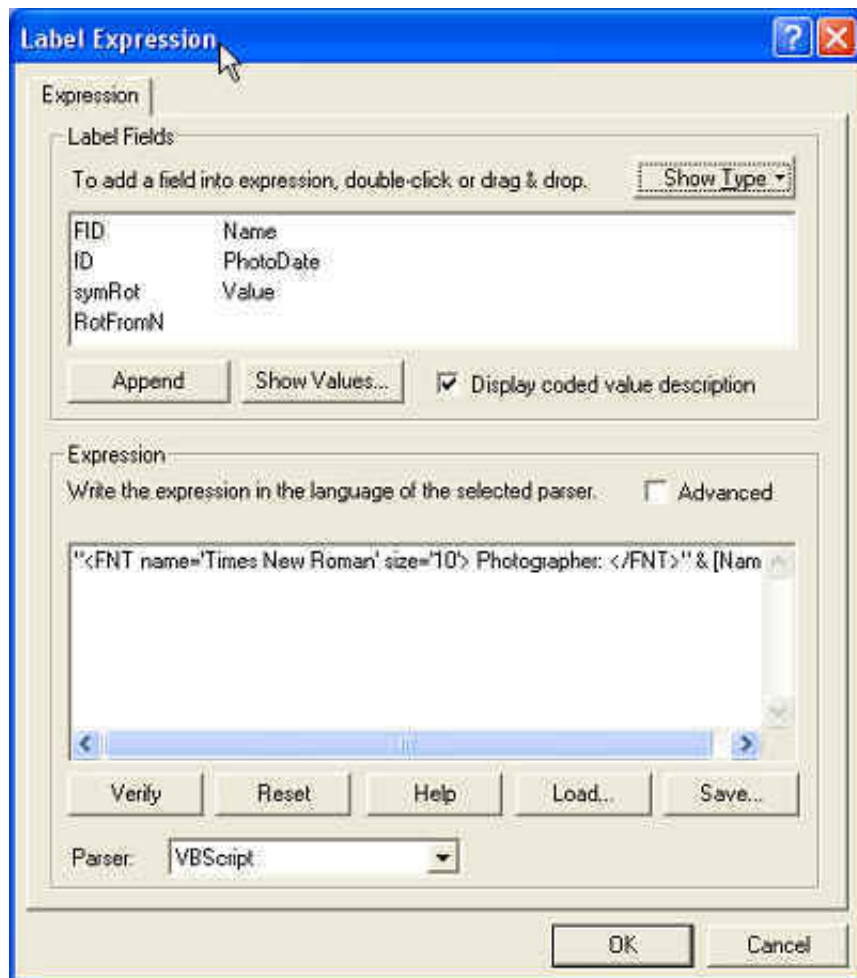




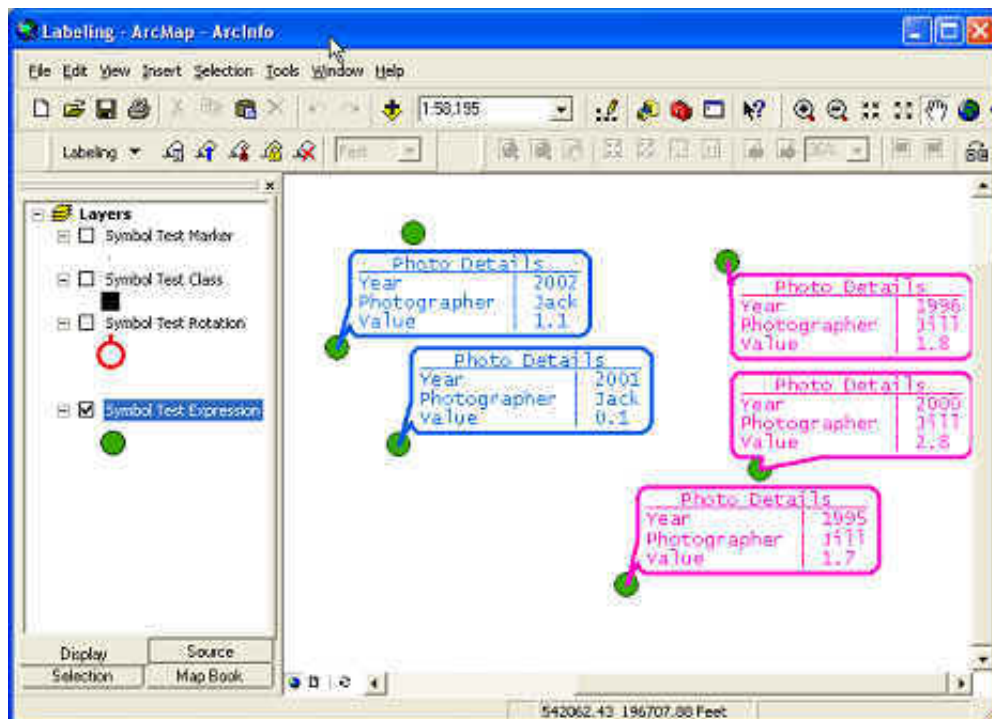
## Text Formatting Tags

Label Expressions can be extended with text formatting tags. These are HTML-like tags used in ArcMap that can modify the look of your text. (These tags look like HTML tags, but they aren't the same. Do not try to use HTML tags in Label Expressions - they won't work.) With text formatting tags, you can do things like underline certain words, or make all the words use only capital letters.

In our example we are going to use text formatting tags to change the font of the word "Photographer" to separate it visually from the word "Jack". We want to change the font of "Photographer" from the default of Arial size 16 to Times New Roman size 10. Our expression from above, "Photographer: " & [Name] , becomes "**<FNT name='Times New Roman' size='10'> Photographer:</FNT> " & [Name] .**



Using all three of the above techniques allows us to make labels that look like this:



You can use these techniques to put a lot more information on your maps, with less effort than you did before.

For more information about the Label Manager, label classes, writing label expressions, and text formatting tags,

see the ArcGIS Desktop Help or talk to a GIS Specialist.

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