Chapter 2

ArcCatalog

MANAGING DATA

Version 8.0 of ArcInfo is a powerhouse capable of combining many types of data. ArcCatalog helps you organize, track, and find the data layers and components you need for your analyses. With Arc-Catalog, you know what you have, and where to find it.

Using GIStechnology, you can very quickly accumulate more data than you can efficiently track. Your data might be of many types, including ArcInfo coverages, ArcView shapefiles, CAD files, database files, map compositions you have already created using ArcInfo, and even digital and nondigital photographs.

Although ArcCatalog employs the simplest menu system of the three new components constituting Arc Desktop, it may be the most difficult for both new and seasoned users of ArcInfo to get used to. This chapter helps you start quickly with ArcCatalog, which you will soon find an invaluable tool for data organization.

Once you are familiar with ArcCatalog, you will be able to create shortcuts that will obviate the need to remember those long path names that have plagued users. You will learn how to quickly organize and browse your data, and to drag and drop what you need for use in ArcMap or ArcToolbox. You will even be able to add comments about your data layers using the metadata feature. This chapter serves as an introduction to these ArcCatalog capabilities, covering the following.

• Types of data ArcCatalog can access

- The menu interface
- Exploring your data
- Managing your data
- Customizing the interface

Types of Data ArcCatalog Can Access

With Version 8.0, ESRI has increased the number and types of spatial data with which ArcInfo can work. In ArcCatalog, data types and their locations are referred to as items. In other words, the data unit name and its path name constitute one item. The major data types with which ArcCatalog works are discussed in the sections that follow.

✎ **NOTE:** *The term item as used by ArcCatalog refers to a data layer and its path name. Do not confuse this with the way item is used in a database sense.*

ArcMap Maps and Layers

Maps and layers are documents created using ArcMap. These documents may contain several elements in addition to the data item. A map of, for example, Alaskan forests might contain a title, a legend, a North arrow, a source statement, and the data item (perhaps a coverage) of forest locations. Together, these elements constitute the map. ArcCatalog can create direct links to maps, which allows you to quickly access frequently used maps.

Layers are essentially shortcuts to the location of geographic data on your computer. Layers may exist independently or may be part of an ArcMap map. They can be created from tables of geographic data, coverages, or information accessed from an SQL database.

Layers are an important addition to ArcInfo, as many data sources can be combined into a group layer. For instance, separate coverages of secondary roads and highways can be grouped into a transportation group layer. By adding the group layer to the catalog, users do not have to know the names or locations of the separate coverages.

Symbology (for example, highways displayed in red and secondary roads in black) may be easily added to layers using interactive query and palette functions in ArcMap (see Chapter __, ArcMap). Veteran ArcInfo users will much appreciate this alternative to traditional "reselect" or look-up table symbology assignment.
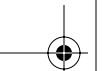
✓ **TIP:** *Add symbology to layers to create a trademark "look and feel" for your organization's map products. Clients will appreciate symbology standardization, and effective maps are less dependent on the person creating them.*

Folders

When starting ArcCatalog for the first time, you will see something called folder connections. These are icons that represent each drive on your computer. Another icon, called database connections, allows you to create and store connections to external databases. You can add folder connections to access specific directories on your hard drive, other shared resources on the network, or even data held on a CD. Folder connections are flexible: you may add or delete them at any time. Setting up folders for regularly used data sources will be one of your top time savers in ArcInfo.

✒ **NOTE:** *Clicking on a folder opens the folder to reveal its content. However, ArcCatalog shows only data sources (such as coverages and shapefiles) and folders that contain data sources. Other files, such as word processing documents, will not be shown.*

Shapefiles and Associated dBase Files

Shapefiles are the standard data set used by ESRI's ArcView software. Shapefiles have associated dBase files that are viewable by ArcCatalog. By default, other types of ArcView files, such as projects (with the .apr suffix), are not viewable by default in ArcCatalog.

You can make ArcView projects viewable in ArcCatalog by adding them to the list of viewable file types. You do this by selecting Tools ➥ **Options** ➥ **File Types** and adding the .apr file extension to the list of recognized file types. ArcView projects will then appear in ArcCatalog. Clicking on a project in ArcCatalog will display the project in ArcView, however, because ArcInfo does not read ArcView project files.

Coverages

ArcInfo coverages consist of point, line, or polygon features. ArcCatalog identifies each feature type and makes it viewable. Select-

ing the polygon feature, for example, would let you see the content of the polygon attribute table.

Recall from Chapter 1 that a polygon coverage consists of more than one feature type, specifically line and polygon features. This means that both will be viewable in ArcCatalog.

TIN and Raster Files

ArcInfo also makes use of spatial data stored as raster or TIN (Triangulated Irregular Network) data sets. Examples of raster data include satellite imagery and USGS digital elevation models (DEMs). TIN data consist of X, Y, and Z points (usually elevation) and a set of lines that connect these points into irregularly shaped triangles, which, for example, are used to model terrain.

TINs are also useful for 3D analysis and viewing. Separate modules for creating and manipulating raster and TIN data are available for purchase with ArcInfo, but a detailed discussion of them is beyond the scope of this book. Suffice it to say that these data types are viewable just like other data types within ArcCatalog.

CAD Files

CAD files (computer-assisted drawing/design) can also be viewed within ArcCatalog. Such popular programs as AutoCAD and MicroStation generate CAD files. Often CAD files will contain more than one layer. In these cases, ArcCatalog will present a drawing as two files, one representing the entire drawing and the other representing point, polygon, line, and annotation classes. When viewing a CAD drawing, ArcCatalog allows you to select which layers it will display.

Geodatabases

Geodatabases are new in ArcInfo 8.0. Simply put, a geodatabase is a relational database that contains spatial information. Traditional ArcInfo information such as coverages and related data files (such as Info files) can be represented as a geodatabase. What makes geodatabases so useful is their ability to store relationships between features. By creating something called a relationship class, you can specify the relationship between features. For instance, you can cre-

ate a relationship between a coverage of states and counties. Then, when selecting a county you would also automatically see all information about its state.

Coordinate Systems

A Coordinate Systems folder is normally hidden from view. You make it visible by selecting Options ◊ Customize menu. This folder contains information about the coordinate systems (map projections) used by your data sources. It can be useful when creating new spatial data sets, as you need only point to an existing projection in this folder to correctly register your new data.

NOTE: See Chapter __ [ArcPlot] for more information on map projections..

XML Files

XML (Extensible Markup Language) is a programming language similar to HTML. It is used by ArcCatalog to display and edit the metadata for all ArcInfo data sources. Programming in XML is outside the scope of this book, but XML programmers may find uses for their own files in ArcCatalog.

The Menu Interface

The ArcCatalog screen, shown in the following illustration, consists of two main components: the Tree panel and the Views panel. The Tree panel lists the Catalog content (the data), and it is here that you select an item. The Views panel displays the content of the selected item. There are also customizable toolbars that act as shortcuts to various operations in ArcCatalog.

ai02001.tif
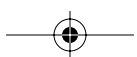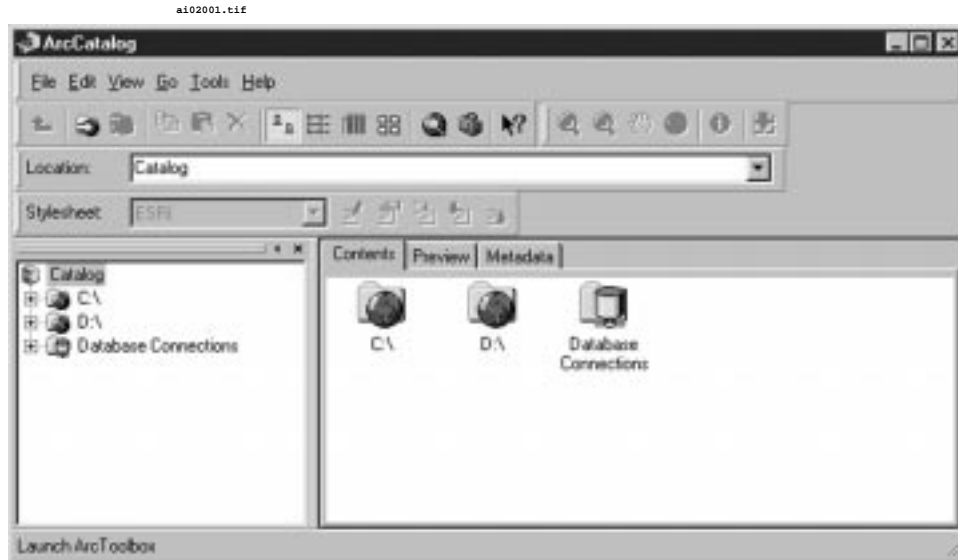
ArcCatalog screen.

The Tree panel is normally the left-hand window. This window can be resized, switched with the Views window, or dragged out of the ArcCatalog window entirely. Notice the small left-pointing arrow and the X in the upper right corner of the Tree panel. Clicking on the arrow minimizes the Tree panel, leaving the View panel to fill the screen. Restore the Tree panel by clicking on the small arrow on top of the dotted, left-hand side. Clicking on the X closes the Tree panel. Restore a closed Tree panel by selecting View ◊ Catalog Tree.

The Views panel contains three tabs along its top: Content, Preview, and Metadata. Each tab displays something different about the high-lighted selection in the Tree panel. The Content window contains information about what is within the highlighted selection. For instance, if you have a polygon coverage highlighted in the Tree panel, the Content tab will show the feature types that comprise such a coverage (in this case, arc, label, polygon, and tic folders).

Clicking on the Preview tabpresents a selection of graphic file types. The Metadata tab is used to view descriptions of the highlighted data type. Exercise 2-1, which follows, shows you how to use these features to explore your data.

Exercise 2-1: Exploring Data Using ArcCatalog

This exercise takes you step by step through the basics of using Arc-Catalog to explore your data. Be sure that the data for Exercise 2-1 on the companion CD-ROM has been loaded to your hard drive.

✎ **NOTE:** *For this exercise, assume that the data has been loaded to a folder named D:\exercises\exercise_2. If you have loaded it to your C drive (or a different drive letter), be sure to substitute your drive letter for D.*

Step 1: Exploring the Content of Exercise 2-1

You can explore the content of a folder by highlighting it in the Tree (the left-hand window) of the main ArcCatalog window. Use the Tree panel to navigate to D:\exercises\exercise_2. Highlight the Exercise_2 folder. Your screen should resemble that shown in the following illustration.
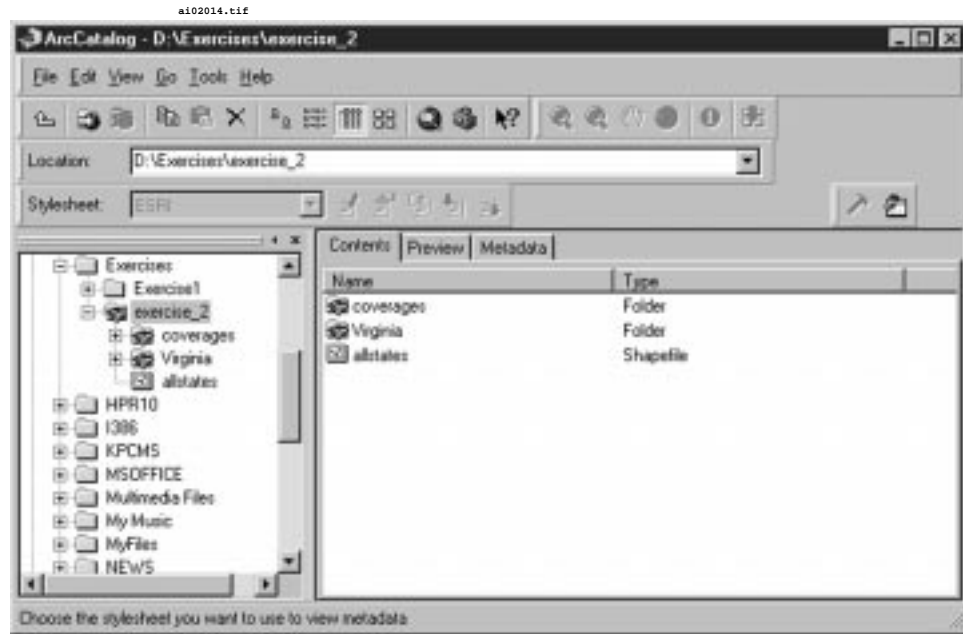
Starting screen.

Notice the two folders named coverages and Virginia. ArcCatalog portrays these folders with a small blue symbol over the traditional yellow folder, which simply means that ArcCatalog believes there are spatial data sets within these folders. A shapefile, called ALL-STATES, should also be present in the folder for Exercise 2-1.

Select the ALLSTATES shapefile. Notice that the Content tab is selected in the View panel and that nothing is displayed. Why? Remember that the content ArcCatalog looks for are other folders, or feature types such as polygons and lines. Because shapefiles store data differently, no content is listed. Although shapefiles originate in ArcView, another ESRI GIS software package, they are viewable, and useable, in ArcInfo.

Step 2: Examining Information About a Shapefile

With the shapefile ALLSTATES highlighted, click on the Preview tab in the View panel. You should see a screen similar to that shown in the following illustration.

ai02015.tif
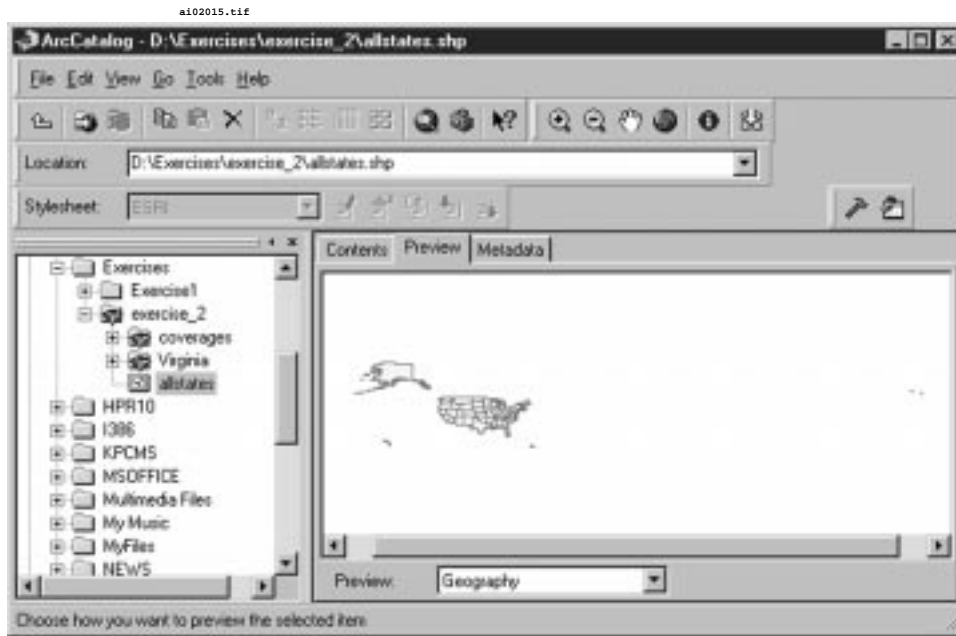
Screen resulting from use of the View panel's Preview tab.

ArcCatalog draws the graphic content (the "geography") of the shapefile in the Preview panel. Notice the scrollable window in the bottom section of the Preview panel. Click on this window, shown in the following illustration, and change its view from "geography" to "table."

ai02016.tif
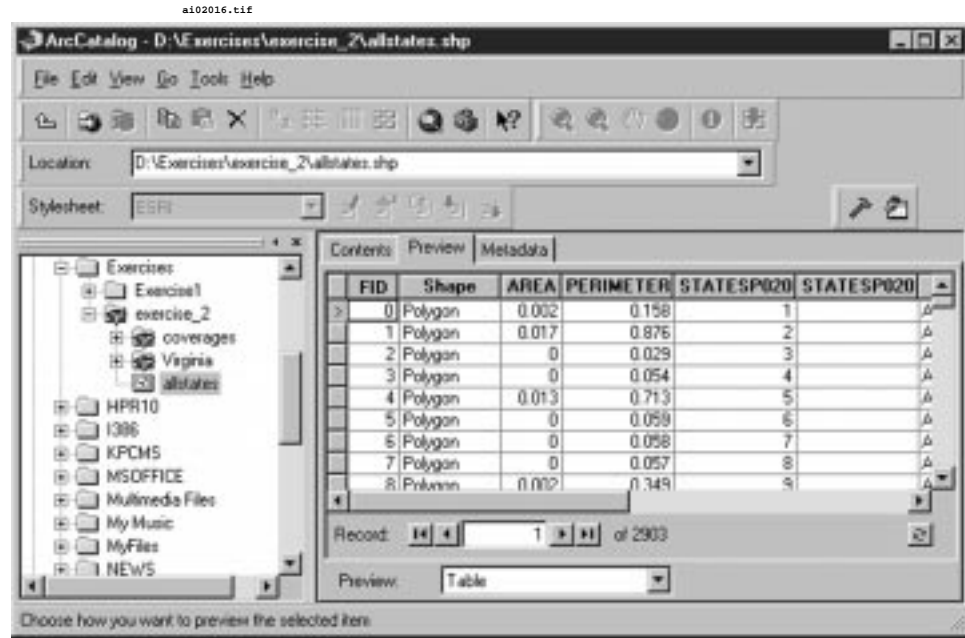
Preview panel scrollable window.

Now the shapefile's associated tabular data is displayed. You can quickly examine data to determine if they suit your needs for a particular project. You can also toggle between "geography" and "table." Using the Preview panel is a convenient means of quickly previewing data items. It is a lot like browsing books in the library: you can look at the pictures or read the content.

Step 3: Examining Metadata

Click the Metadata tab in the View panel. A new screen with three tabs –(Description, Spatial, and Attributes) appears, shown in the following illustration. These tabs display information about the shapefile. This is essentially what metadata is: data about data.
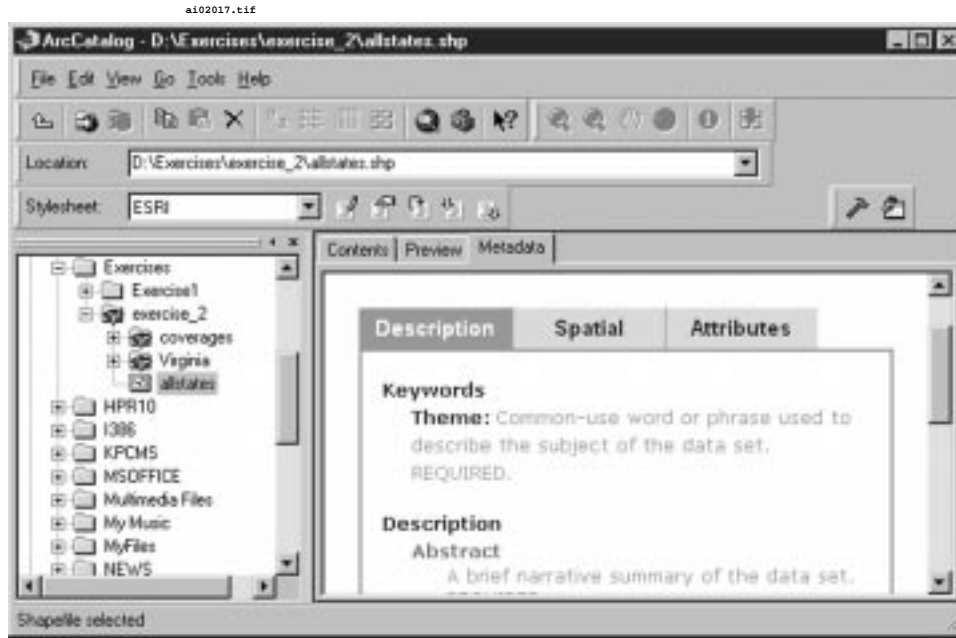
Options under the Metadata tab.

Select the Description tab, shown in the following illustration, to access an area provided for user-added text that describes the shapefile. This can be edited using the metadata editor: click on the "paper and pencil" icon located on the metadata toolbar just above the View window. Information useful to your organization and clients can be added here.

ai02018.tif
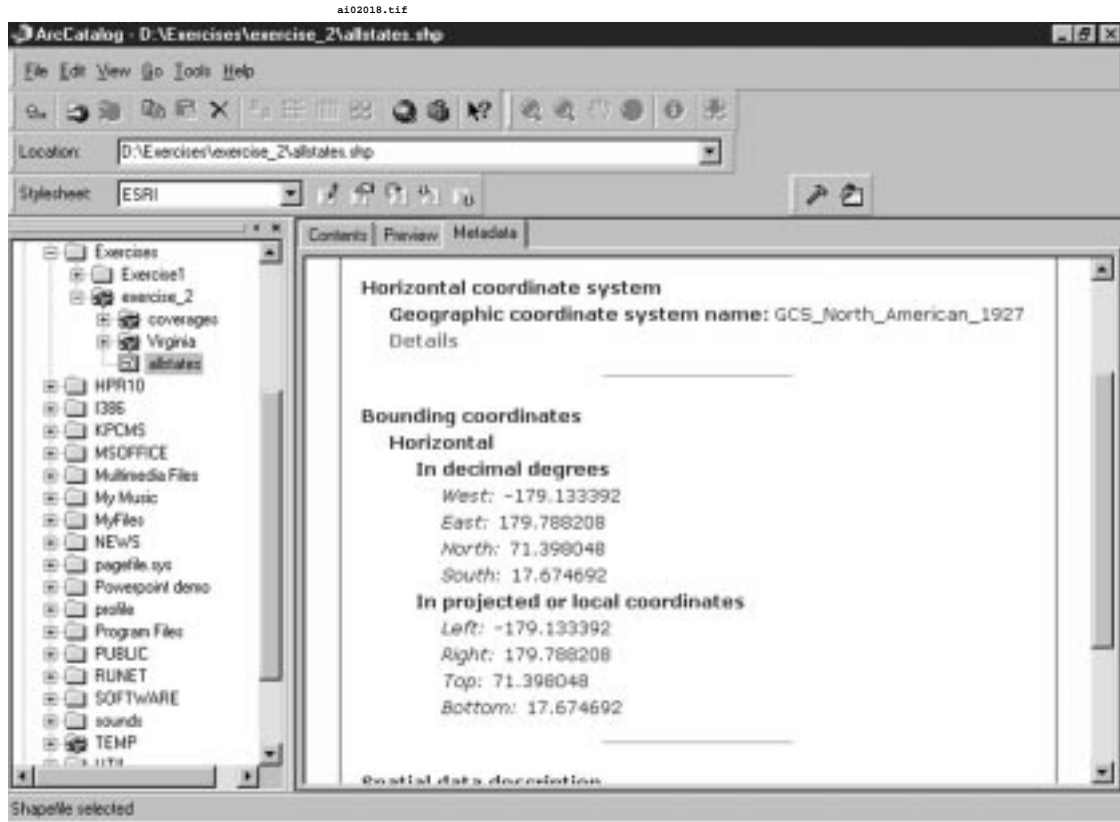
Description tab.

✓ **TIP:** *Take advantage of the metadata feature to add information such as date of creation, purpose, person responsible, data sources, and so on to your data items. As data age and staff changes, this can help prevent mistakes resulting from using old or inappropriate data items in current analyses. It can also be a nice "value-added" feature for work done for your clients.*

Select the Spatial tab, shown in the following illustration, to see information about the shapefile's projection and its geographic coordinates. This data cannot be edited: it can be viewed only. If you want to change its projection, for example, you must use a different ArcInfo tool.
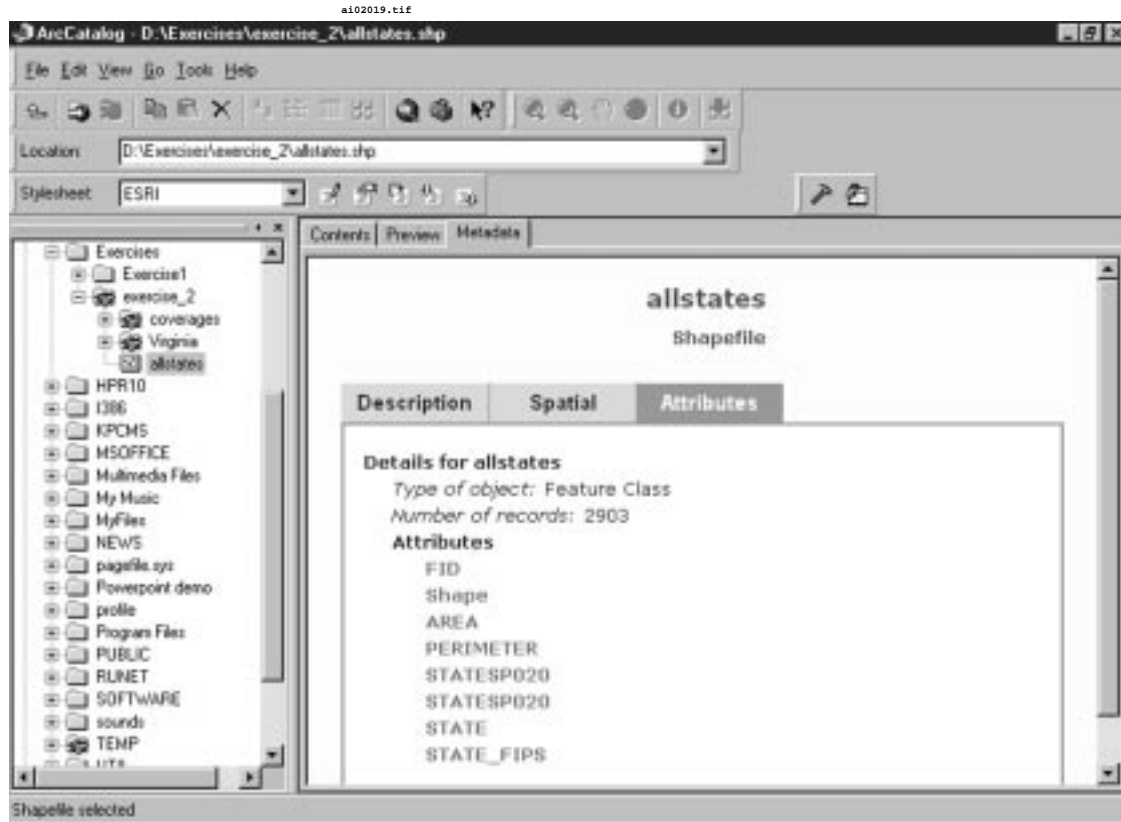
Spatial tab.

Select the Attributes tab. This lists the shapefile's attributes. Again, the attributes may be viewed only, not edited. Changing attributes requires different ArcInfo tools.

Step 4: Examining a Coverage

In the Tree panel, access the coverages folder and select the coverage named FED_LANDS. Click on the Content tab in the View panel. You should see a screen like that shown in the following illustration.

ai02020.tif
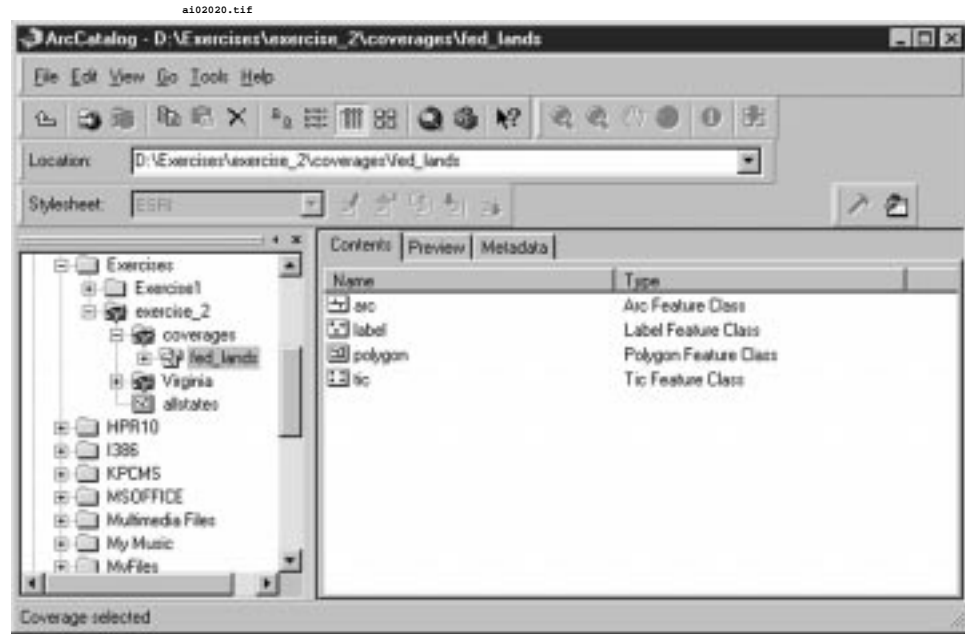
Content tab screen.

Now the View panel shows four entities: arc, label, polygon, and tic. Each of these is a feature within this ArcInfo coverage. You can explore an individual feature type or look at the coverage in its entirety. Look first at the entire coverage by clicking on the Preview tab in the View panel. The screen should look as it does in the following illustration.
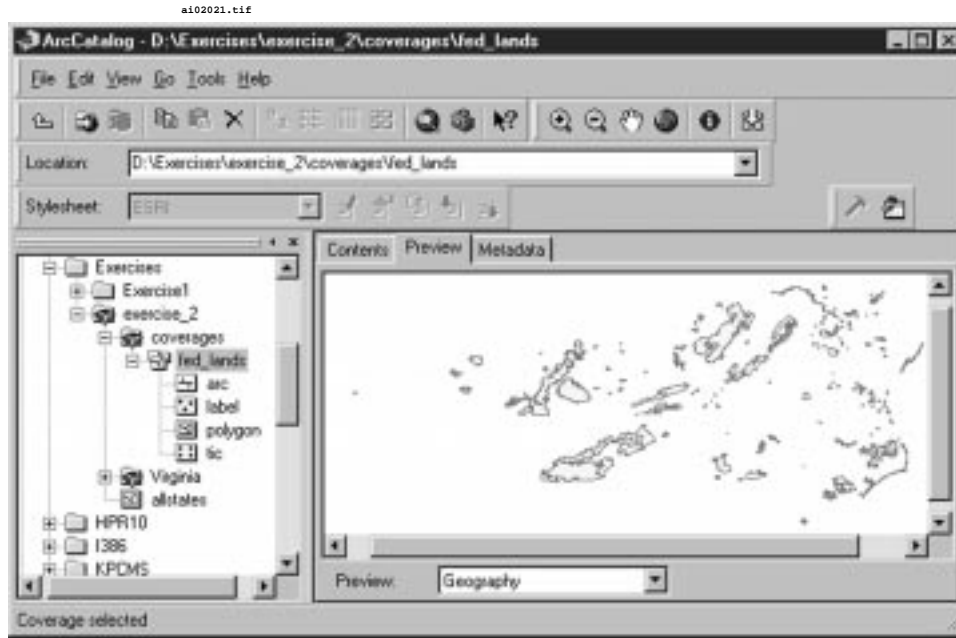
Review tab screen.

A graphic of federally owned land in the state of Virginia is displayed. As with a shapefile, you may select the Table option in the preview's scrollable window. This shows you the polygon attribute table (.PAT) associated with this coverage. Now select the Metadata tab to explore the attributes, projection, and geographic bounds.

Next, look at just one of the features within the coverage. Select the label feature in the Tree panel. Select the Preview tab in the View panel. The screen now shows only the center points of the polygons, as shown in the following illustration. Because coverage features can be extracted and used to create new coverages (for example, extracting the points from one coverage for use in another), viewing just one feature type can be useful. Similarly, you may select the tic, label, or polygon features. ArcCatalog will display just those features you select.

ai02022.tif
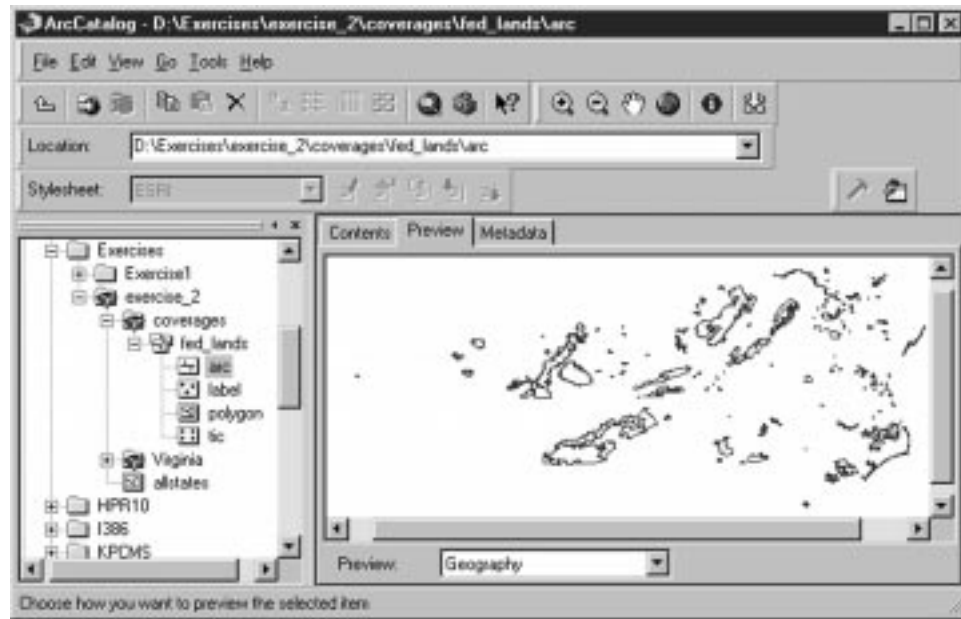
Screen showing center points of polygons.

By now you should be comfortable navigating and exploring your data using ArcCatalog. This exercise covered viewing the geographic and tabular data associated with data items. It also introduced you to the function and usefulness of metadata, and demonstrated how to view components of a data item. You can now use ArcCatalog to effectively navigate, explore, and manage your data.

Managing Data

As you have seen, ArcCatalog provides an effective means of browsing spatial data: no more long path names or switching to the operating system's search functions. ArcCatalog also provides excellent, easy-to-use tools for organizing data. The sections that follow discuss using ArcCatalog's tools to create new folders, workspaces, and coverages, and to move, rename, copy, and delete items. Examples provided draw upon data items used in exercise 2-1.

Copy   Ctrl+C
Paste   Ctrl+V
X   Delete
Rename
Refresh
New   ▶
Properties...
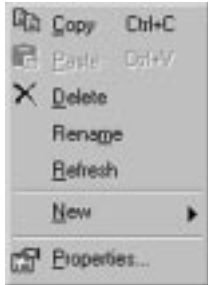
Exercise 2-1 folder menu.

Creating a Folder

A folder is really like a directory: it can hold data items or other folders. To create a folder, go back to the Tree panel and highlight the exercise_2-1 folder. Then, with the exercise_2-1 folder highlighted, right-click the mouse. The menu shown in the following illustration will appear.

ai02023.tif

Select the New option, and then Folder from the list of choices, shown in the following illustration. Type in the new folder name, my_data.

ai02024.tif
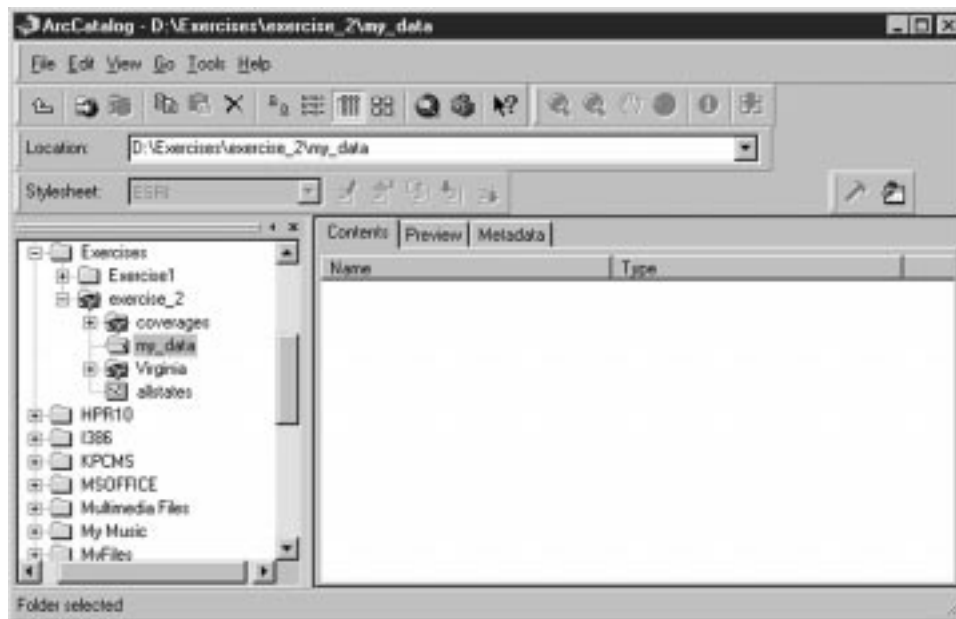
Selections under the New option.

Your exercise_2 folder should now have a subfolder named my_data.

Moving Data Sets to New Folders

Now move the ALLSTATES shapefile into your new folder. Highlight the ALLSTATES shapefile in the Tree panel and, while holding down the left mouse button, drag the shapefile to the my_data folder. Once there, release the mouse button.

The ALLSTATES shapefile is now in its new folder. Notice that all files associated with the ALLSTATES shapefile moved with it. Practice moving other data sets into the folder.

Copying Data Sets to a New Folder

In the last section, you physically moved the ALLSTATES data set from one folder to another. This time, copy it. Copying creates an exact duplicate of the data set and puts it in a new location.

To make a copy of ALLSTATES, access the my_data folder and highlight it. Now right click and select Copy from the pop-up menu. ArcCatalog now knows that ALLSTATES is selected for copying. Release the mouse button and select the exercise_2 folder. Right click on this folder name and select Paste. The result is shown in the following illustration.

ai02027.tif


Result of the Paste operation.

Now there are two copies of ALLSTATES: one in the exercise_2 folder and one in the my_data folder. To copy several items at once, hold down the Shift key and select them all. Then use the Copy and Paste commands. You can also copy entire folders or groups of folders.

✓ **TIP:** *Organize your work as you go. For example, if your current project has several data items, grouping them in one folder makes backups and information exchanges easy.*

Renaming Data Sets

Renaming a data set is similar to copying one. Practice by renaming the FED_LANDS coverage (in the coverages folder) with the more descriptive name VA_FED_LAND. Again, use the Tree panel to open the coverages folder, and highlight the FED_LANDS coverage. Click the right mouse button and select Rename. The result is shown in the following illustration.

ai02026.tif
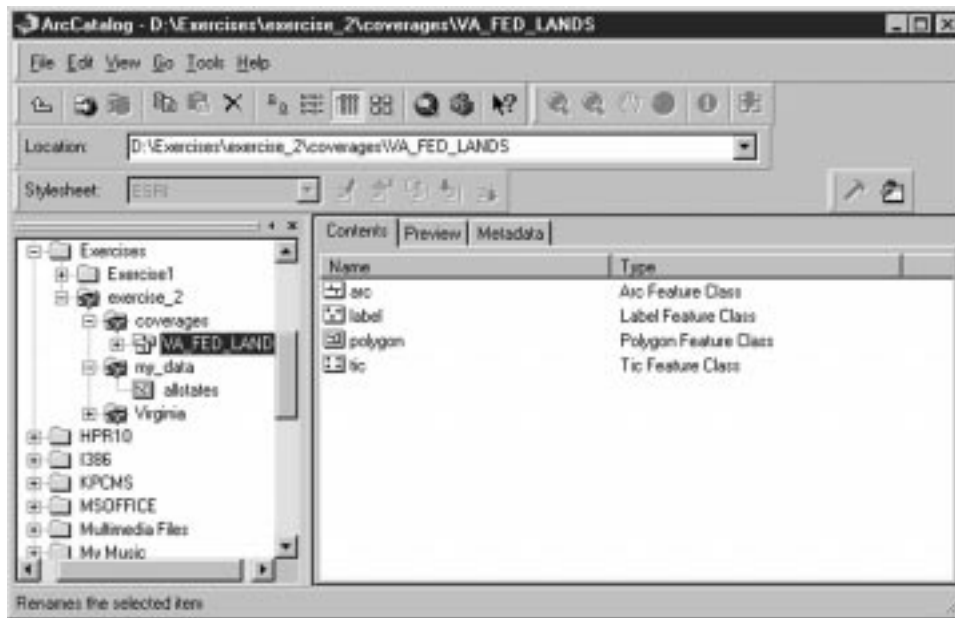
Result of selecting Rename.

Type in VA_FED_LAND as the new name. The new name takes effect immediately.

☛ **WARNING:** *Never change the name of a coverage or shapefile from Windows Explorer! For shapefiles and especially for coverages, many associated files are hidden from the user. Data sets can be destroyed if the hidden file names are not changed.*

Use the ArcCatalog commands (or the appropriate Arc com-
mands, discussed later in this book) to ensure that those hidden
files also have their names changed.

Deleting Folders and Data Sets

Again, deleting a folder or data item is similar to copying and
renaming one. Practice by deleting the shapefile you just moved
into the my_data folder. First, open the my_data folder. Highlight
the ALLSTATES shapefile. Right click with the mouse and select
Delete. All files associated with ALLSTATES will be erased.

☞ **WARNING:** *Be careful when deleting! No "Undo" command*
exists in ArcCatalog, so anything deleted is gone for good.

To delete a folder, perform the operation previously described. This
time, however, select the my_data folder and delete it by right click-
ing with the mouse.

☞ **WARNING:** *Anytime you delete a folder, you also delete all data*
residing within it. Therefore, be careful and keep your backups
*current!*

Creating ArcInfo Workspaces

Workspaces differ from working directories. A workspace is unique
to ArcInfo, and when created includes an Info (the database com-
ponent) subdirectory. Workspaces can be first created and then
have data moved into them, or you can make a workspace from a
directory by copying a coverage into it. Using ArcCatalog to create a
workspace automatically sets up an INFO directory for you.

To create a workspace, select the folder in which you want a work-
space. Then select **File ➤ New ➤ ArcInfo Workspace**. You will
be prompted to enter a name for the workspace, which now resides
in the selected folder.
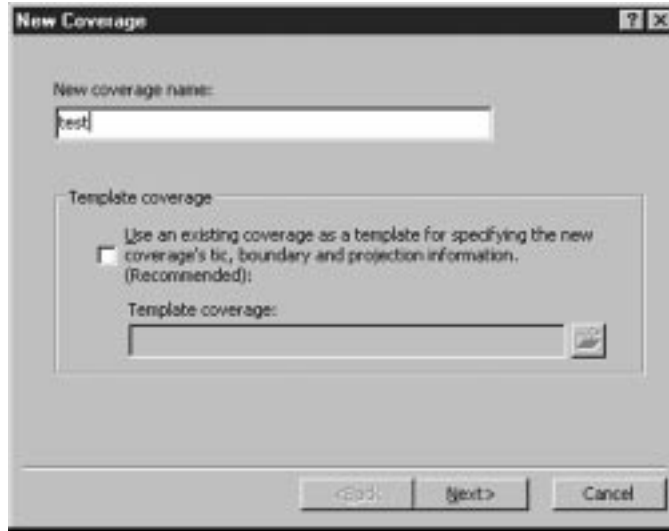
Creating ArcInfo Coverages

Creating a new ArcInfo coverage is similar to creating a new work-
space. Again, select the folder in which you want to create a new
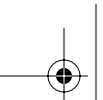
coverage. As practice, create a new coverage named TEST in the coverages folder, shown in the following illustration.

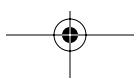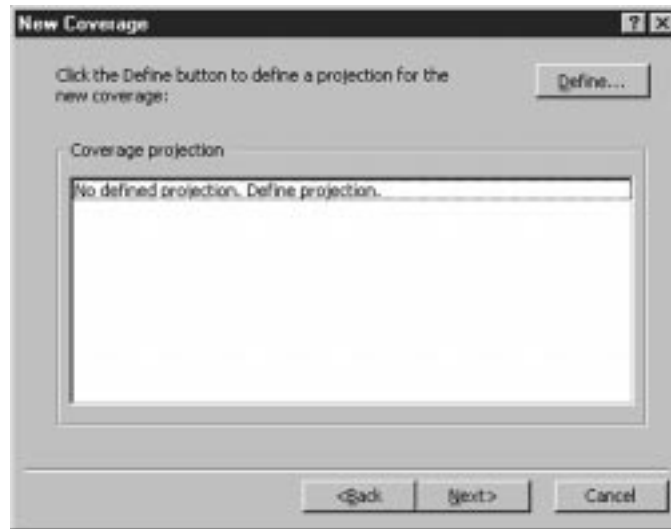*Coverages folder*

ai02028.tif

Next, select **File ➡ New ➡ Coverage**. The menu that appears takes you step by step through the process. A menu box appears, shown in the following illustration, prompting you for the name of the coverage. Type TEST. Click on the Next button.

*Menu box for name of coverage.*

ai02029.tif

Define a projection for the coverage. Projections are mathematical formulas used to translate the coordinates from a 3D Earth to a 2D piece of paper. Projections are covered in more detail later in this book. For now, know that the data items must have the same projection in order to be viewed or used together.

You can choose a projection interactively or specify the name of an existing coverage whose projection you want to copy, as shown in the following illustration. Selecting the Interactive option starts the Define Projection wizard, discussed in Chapter 4. Selecting an existing coverage prompts you for the name of a coverage from which a projection file is copied to this new coverage. Of course, you do not have to define a projection when creating a new coverage. For this example, simply click on the Next button.

Projection selection options.

`ai02031.tif`

You are now prompted for the ArcInfo feature type (point, line, poly, or tic) that will be the main feature type for this coverage. Select Polygon. You can also specify whether the coverage should be stored as single or double precision (discussed in detail elsewhere), as indicated in the following illustration.

ai02032.tif
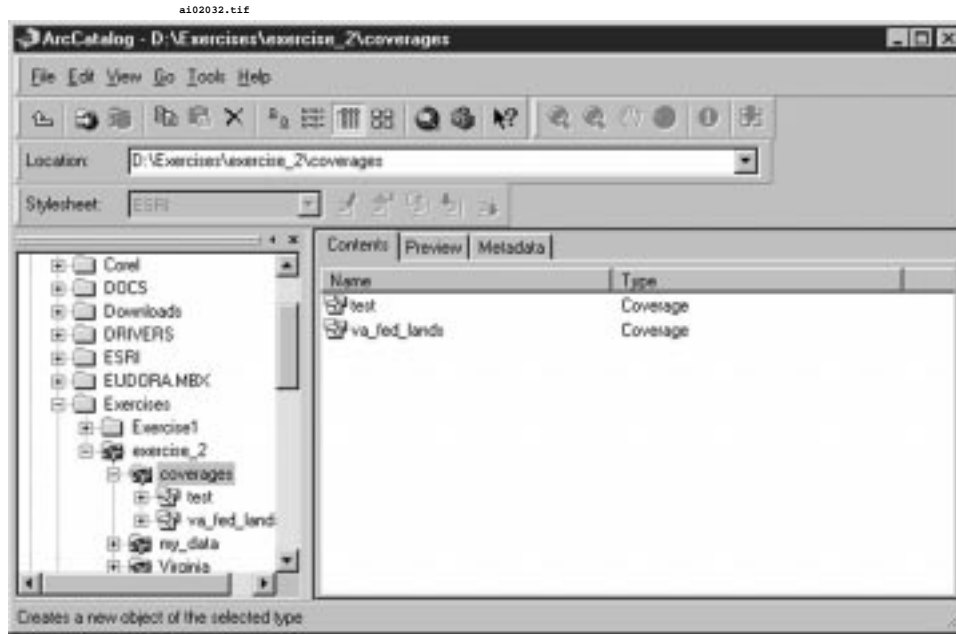
ArcInfo feature type selection.

You should now see that the TEST coverage has been added to the coverages folder. It is an empty coverage, ready for data addition via such processes as digitization.

Customizing the Catalog

Once you are familiar with the look of ArcCatalog, consider adding some tools to make it even more useful. You will increase your efficiency, and limit the information you deal with to that which is truly useful. The exercise that follows shows you how to customize toolbars to suit your needs.

ArcCatalog's toolbars are well equipped with frequently used tools (commands). However, suppose you perform a lot of work with ArcView shapefiles, and you are an experienced Visual Basic programmer. ArcCatalog's flexibility lets you create and modify your own toolbars. Exercise 2-2, which follows, takes you step by step through customizing a toolbar for working with shapefiles, including accessing the Visual Basic editor.

Exercise 2-2: Customizing a Toolbar

To learn how to customize a toolbar, work through the steps that follow.

Step 1: Assigning a Name to a New Toolbar

Click on the **Tools ➡Customize** menu, shown in the first of the following illustrations. Here you will see the default menu bars ArcCatalog uses. On the right side are several buttons, starting with New. Click on New to assign the name My Tools to your custom toolbar. Your new screen should look like that shown in the second of the following illustrations.

ai02008.tif
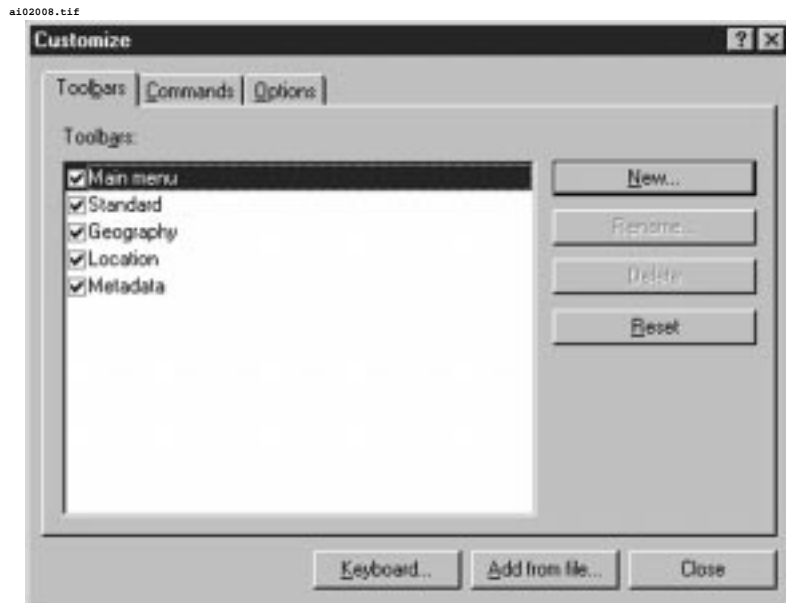
Tools ➡ Customize menu.

Revised toolbar screen.

ai02009.tif
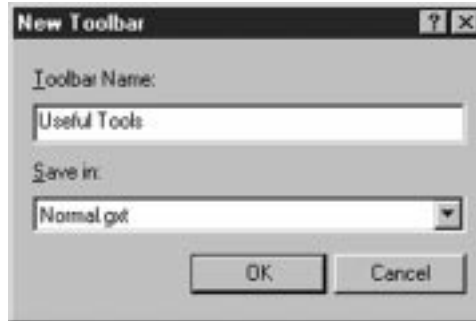
The top row (where the menu options were) is now blank and ready for you to add commands and icons.

Step 2: *Assigning Tools to a Menu Bar*

Now select the Commands tab in the Customize window. Two scrollable windows named Categories and Commands appear, as shown in the following illustration.

ai02010.tif

Categories and Commands windows.
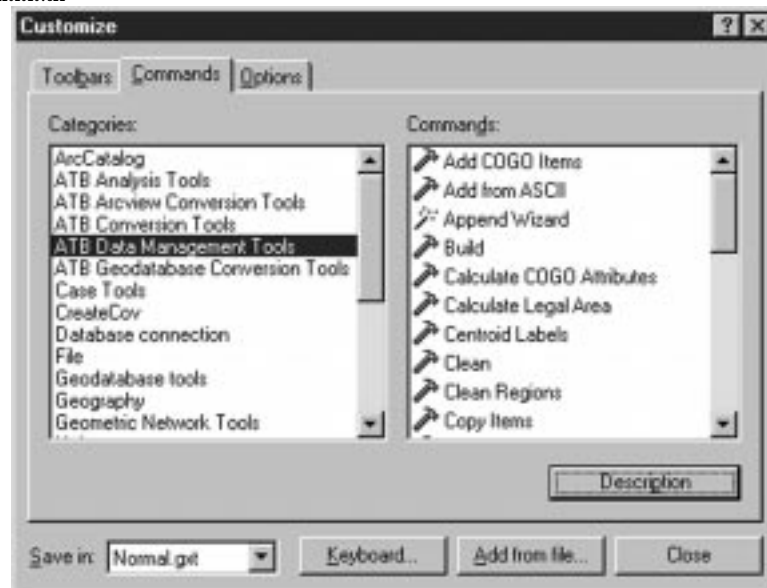
Take a moment to explore the category listings. As you select a category, lists of commands relating to it automatically appear in the Commands window. Each of these commands is available for inclusion in your own custom toolbars.

Add some commands specific to working with ArcView shapefiles
to your My Tools toolbar. Select the ATB (ArcToolbox) Conversion
category; then select the "Shapefile to coverage" command. Now
hold down the left mouse button and drag the "Shapefile to cover-
age" command until the mouse is on top of the blank toolbar you
just created (My Tools). Release the mouse button and the tool will
be added to the toolbar.

Now add another tool. Go to the Tools category and select the Visu-
alBasiceditor. Drag this command to the new toolbar. Your main
ArcCatalog window should now look like that shown in the follow-
ing illustration.

ai02013.tif

Revised main ArcCatalog window.

Practice adding other tools, such as the ArcMap startup icon. You
can add and delete tools as needed. You can also move the location
of the "My Tools" menu bar by grabbing its toolbar handle (the line
on its left side): hold down the left mouse button and drag the bar to
its new location. All of the menu bars can be rearranged in this way.

Customizing and arranging the toolbars helps you get to what you
need quickly. Individuals in your organization can customize the
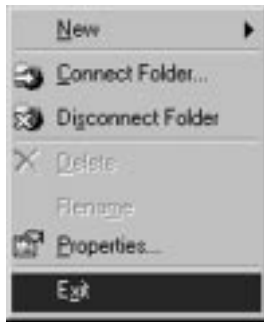ArcCatalog menu bars to best fit the particular work they perform.
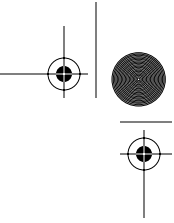
This increases everyone's efficiency by saving command and data search and access time.

Menu Commands

The following sections discuss the various menus and the options within them. The File, Edit, View, Go, and Tools menus are explored.

File Menu

File menu.

New: Select this option to create new folders, ArcInfo workspaces, ArcInfo coverages, and personal geodatabases.

Connect Folder: Establishes a connection to another hard drive on your PC, or to a shared drive somewhere on your network.

Disconnect Folder: Similar to the previous option, this selection disconnects you from a hard drive or shared drive.

Delete: Use this to delete coverages, workspaces, and data files.

Rename: Allows you to rename folders, coverages, and files.

Properties: If you have a hard drive selected in the Tree pane, selecting Properties will reveal details about the hard drive, such as available disk space. Highlight a coverage and this choice will provide information about the coverage's features, projection, and so on.

Exit: Ends your ArcCatalog session.
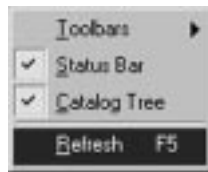
Edit Menu

Edit menu.

Copy: Copies the highlighted selection to the Clipboard.

*Paste:* Takes the content of the Clipboard and pastes it in a location you specify.

View Menu

View menu.

Toolbars: Use this option to change the toolbars appearing in the ArcCatalog window. You may turn on or off the following menu bars: Main, Standard, Geography, Location, and Metadata. All commands accessed through these menus are also available from the pull-down menus.

Status Bar: Turns on or off the message that displays in the bottom of the ArcCatalog window each time you move the cursor over a
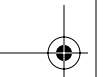
toolbar button. This is strictly a matter of personal preference. Some like to see a message that describes the use of each button, whereas others find it annoying.

Tree Bar: Toggles on or off the Tree panel. Turn it off if you want to work closely with an item present in the View panel.

Refresh: Select this option to refresh the screen.

Go Menu

`ai02005.tif`

Go menu.

Up one level: Use this option to view the content of the next folder up.

Tools Menu
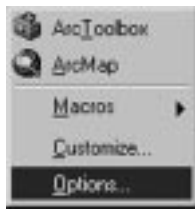
ai02006.tif

Arc Toolbox: Starts Arc Toolbox.

Arc Map: Starts Arc Map.

Macros: Select this option to run or record a macro. A macro is a "shortcut" command that executes a collection of commands you may use frequently. You can also gain access to the Visual Basic editor included with Version 8.0 of ArcInfo. Programs in Visual Basic can call and execute ArcInfo commands. Visual Basic can be a useful tool for tying the functionality of ArcInfo into other pro-grams/processes your organization uses. Programming in Visual Basic, however, is outside the scope of this book.

Tools menu.

✓ **TIP:** *Create macros to efficiently execute series commands you use frequently.*

Customize: Allows you to create new menu toolbars and to assign commonly used commands to keystrokes. You can increase your efficiency by taking advantage of these customizations.

Options: Lets you control the data types that appear in ArcCatalog. This selection also has some control options for how to handle imagery data. Use this to control what data types appear in the Tree Panel window. This can quicken your search for a particular data layer (a coverage, for example) by only showing items of that data type. If you regularly work with only one or two types, using this selection can save you time in having to search through all of the data types your organization uses.