



# ArcGIS 8.1: ESRI's Big Step Forward

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Figure 1: ArcCatalog is the "super table of contents" for all of ArcGIS.

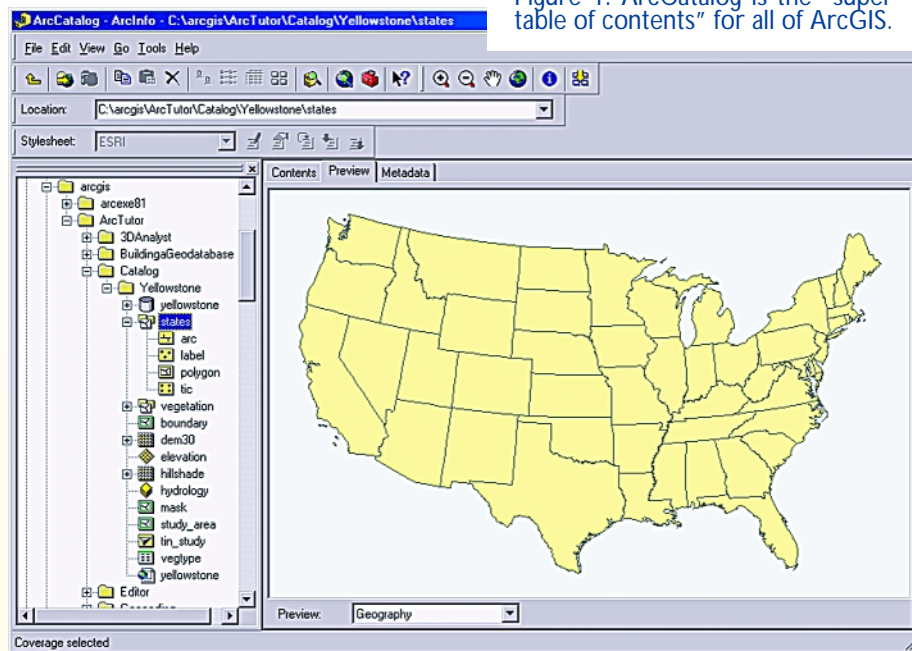


table of contents" for all data: data from the Web, local data in shape files and coverages, imagery, CAD drawings, SDE layers, and more. ArcCatalog provides a preview of both geographic and tabular data, tools to create or review metadata (data about the data), and tools to perform searches for data meeting criteria of interest. The tree-like management structure is familiar and the interface very intuitive.

ArcToolbox is the other supporting player. ArcToolbox is where all of the traditional ArcInfo commands—those for converting formats, performing analysis and cleanup data management—are presented. The term "presented" is accurate: new dialogs allow input in what used to be command line functions, complete with explanatory graphics. ArcToolbox is slicker than the old ArcTools, but using these tools still demands an understanding of the data model and traditional ArcInfo geoprocessing (clean and build). ArcView 8.1 has a

As much as I'd like to review ArcInfo 8.1 in a vacuum, assuming nothing came before, I can't do that in good conscience. Many people have just dabbled, while others have gone much further, with previous versions of ArcView and ArcInfo. It would be a disservice to discuss the new release without reference to its predecessors.

The bad news, for users of ArcView 3.x, is that Avenue, the longtime customization language is not supported in the 8.x version. The good news, and I say this with care, is that this release is a better ArcView and ArcInfo. I will not go so far as to say that it will be a painless transition for those moving from a previous ESRI package, but I will say that as users explore a totally new interface and new features, they will discover many functions that will make them smile.

## Family of Products

ArcGIS 8.1 is really the family of products. ArcView is the bottom tier in the family filling the space ArcView 3.x did, focusing on visualization, basic editing,

and analysis. ArcEditor adds more functionality, especially support for advanced data models, coverage editing, and version management with SDE. ArcInfo has it all, including the complete functionality of "classic ArcInfo." All of these products look just about the same on the screen, except that each one has different commands available.

All three family members are built on three separate, but related applications: ArcMap, ArcCatalog, and ArcToolbox. Each one includes more and more "tools" as you progress up from ArcView to ArcInfo. ArcMap, discussed later, is the "mapping" arena where users will spend most of their time, while ArcCatalog and ArcToolbox play key supporting roles.

ArcCatalog is the "explorer" view of data. This is the "super

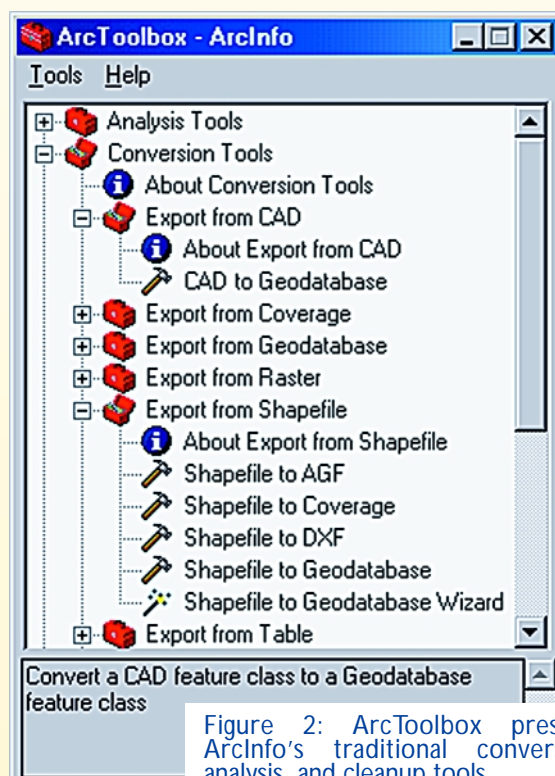


Figure 2: ArcToolbox presents ArcInfo's traditional conversion, analysis, and cleanup tools.



trimmed down version of ArcToolbox; ArcInfo contains the full version.

### ArcMap

As I worked with ArcMap, the mapping heart of all of the ArcGIS family, I found a few things that "I'd always wanted." First off, I found a floating tool palette with tools that I use all the time: zoom, pan, identify, etc. When I wanted to label a feature with my own text, not text in the database, I used the same tool I know well from PowerPoint. It had the same location on the screen, the same look and feel. When I wanted to pick up the text and move it around, it was no problem. I soon learned that any task could be done either when looking at the data view or the layout view. In other words, a user can work either with the "data" (data view) or with the "map product" (layout view) whichever makes sense.

The layout view seemed faster and more responsive than the one in ArcView 3.x. There was no delay in moving around data frames, creating a title or zooming in. Tools to align map objects (map frames, north arrows, legends) as well as "make them the same size," are just like those in PowerPoint, and enhance map production. These made mapmaking fun!

Thematic mapping is a bit more complex than in past releases, but only because there are more options. One nice feature: a tool to use a map style (symbolology) from an existing file. This was far less painful than importing a legend, the process used in ArcView 3.x. Another task that was challenging in ArcView 3.x was a spatial selection, referred to in that version as a "theme on theme" selection. Deciphering the dialog box to pose the correct question could be daunting. In ArcGIS the statement of the spatial selection query is defined in plain English: I want to select a feature from "which layer" that "has this spatial relationship" with the feature in "which layer." The quoted terms are picked from dropdown lists. Simple!

When it's time to save the map as a new .mxd file, there is an option to store the full path names to the data or the relative path names. Choosing the latter

makes it easy to move the data from directory to directory or machine to machine and still enable the map to find it. Big smile!

### New Terms, New Data Formats

I found myself learning new words as I explored ArcGIS. Those old projects, .apr in ArcView are now maps, .mxd. Just like projects, these little files store pointers to data and information on its sym-

(Mygeodatabase.mdb is an Access table; selected\_features is a feature in that table). In the end of course, how the data is stored, for most of us, doesn't matter, so long as we can use it. The big limitation of data stored in geodatabases is that clean up tools (build, clean) are not available; for now these work only on coverages (the "classic ArcInfo" format).

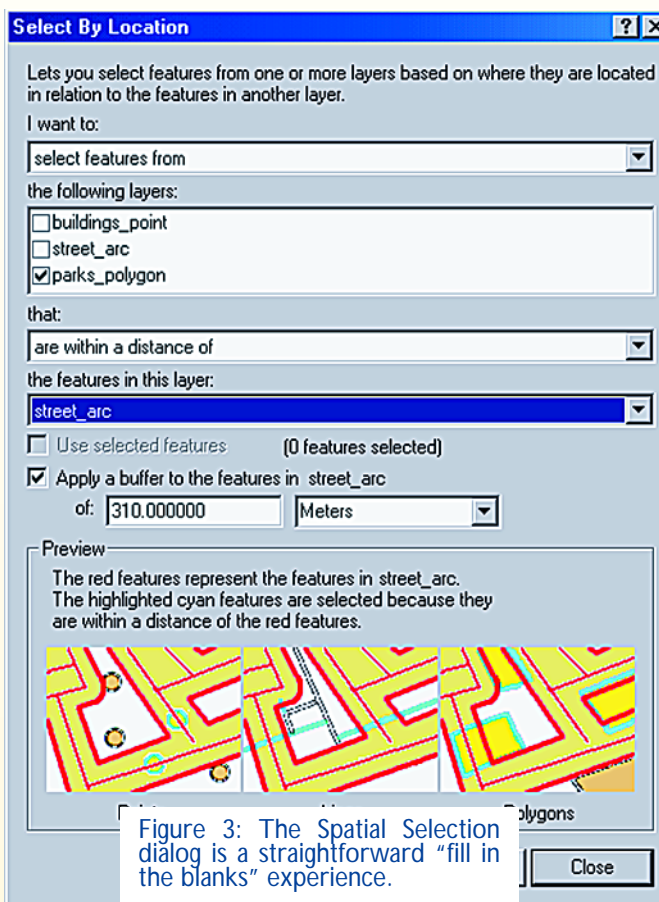
### ArcGIS for Surveyors

A few parts of 8.1 will especially interest surveyors. First off, the direct connection to ArcIMS services on the Internet, like the Geography Network, means that data provided by others may be available for immediate use, live, in an ArcMap session. Image servers provide snapshots of the data for use as background reference while feature servers provide streamed vector features that can be resymbolized and used in analysis. I was able to very easily use some data from the Pennsylvania Spatial Data Access (PASDA) as background information.

To edit data stored locally, the user must first "turn on" editing. Mostly, this protects files from two people hitting the data at once, but it's an extra task to remember, especially for those comfortable in the CAD arena. From there on, however, editing is slick. A variety of snapping options (vertex, edge, end) are available for each layer in the data frame. New features are created by keying in relative or absolute

coordinates, drawing parallel or perpendicular to existing geometry, even inserting curves. This is not CAD, but it is the closest ESRI has ventured in that direction. Be sure to turn editing off, so that changes are saved!

The editing tools contain a variety of features that surveyors and other engineering users have hoped for in a GIS package. Tools including "trim" and "extend" as well as "modify feature" and "mirror" are available. But remember: this is more than CAD. ArcEditor and ArcInfo have the power to associate two feature types so they are edited "together." That means that if a state boundary is defined



biology, layout, etc. A data frame holds a set of layers that make up a map. A map document can have many data frames.

One of the new things to get used to is how data is stored. After selecting some features, I chose to write them out to a new file. That might be a single feature shape file (the "old way" which stores only points or only lines or only polygons) or a new feature in an existing geodatabase (the "new" way which can store a variety of feature types in a single file). The odd part was the path to the new file: *c:\arcgis\mydata\mygeodatabase.mdb\selected\_features*.





## FEATURE

by a river, so long as the river and the boundary are associated, any edits one makes will "bring the other along."

ESRI has also made great strides in tackling data from different projections and coordinate systems. Unlike ArcView 3.x, with its available, but frankly work-intensive projector extension, for converting data to matching an existing coordinate system, ESRI has implemented true, layer based, on-the-fly, coordinate transformations in ArcGIS 8.1. To work, projection information for each layer is required, a good habit to get into anyway.

CAD files can be used in two ways in ArcGIS: as background, which requires nothing more than adding the file as a layer, or as a new feature in a geodatabase, which is a bit more complex. CAD data added as a layer is fine for query or snapping use, while CAD data imported to a geodatabase is fully available for editing. The import dialog has many steps, but they are needed to answer key questions about the import: Do you want to import all of the CAD features or just a subset? Is the file georeferenced? Do you want to snap the data to existing features? Do you want to map the attribute data to existing fields? An ArcGIS user will really need to know the CAD data before importing it. ArcCatalog doesn't help in determining which layers are available and which features are in which layer. This task requires adding the file as background to ArcMap and interrogating it, or alternatively, looking at it in another package. Only with a clear understanding of the CAD file layout, would I recommend loading the valuable data into a geodatabase.

### Conclusion

The new ArcGIS products run on only Windows NT and Windows 2000. ESRI is preparing versions for earlier Windows releases and ME. Users are warned to get a beefy machine (400 MHz) with plenty of hard disk space (10 Gb) and RAM (128 Mb seems like a bare minimum). On the 500 MHz 256 Mb generic PC with Windows 2000 that I used, the program was fast and impressively stable.

Documentation is complete. ESRI delivers ArcInfo 8.1 with ten books including tutorials for each application, a huge tome on ArcMap (more than 500 pages), and whole books on building geodatabases, projections, and more. All

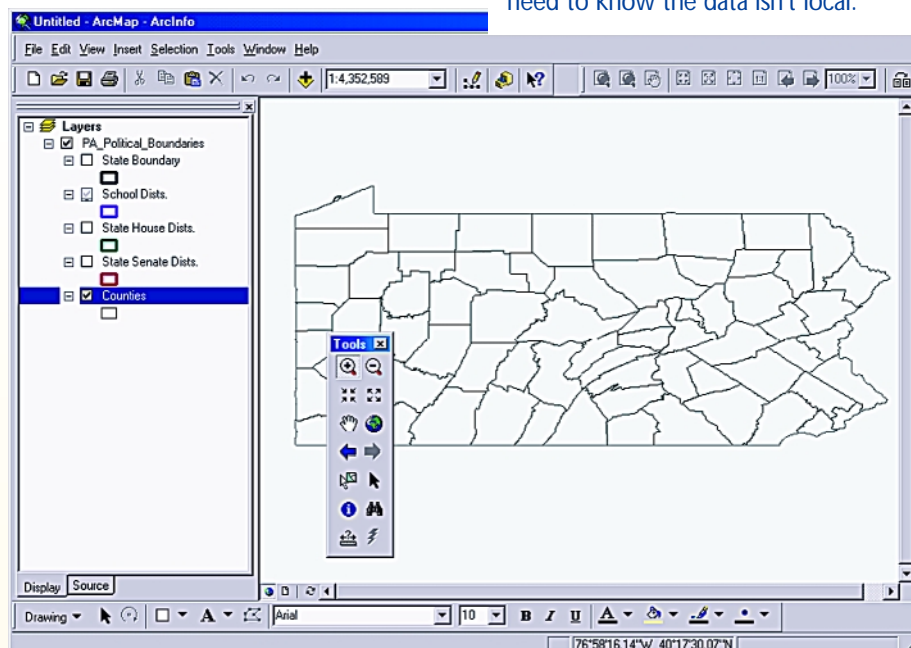


Figure 4: Data in ArcMap coming "live" from PASDA, via the Geography Network. Working in ArcMap, there's no need to know the data isn't local.

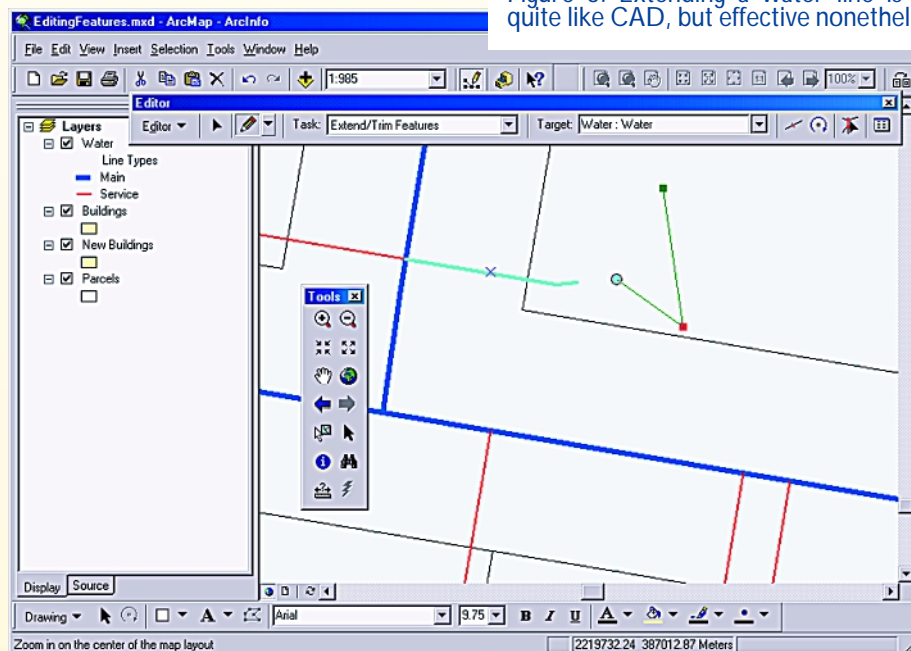


Figure 5: Extending a water line is not quite like CAD, but effective nonetheless.

of the books are full color, and as I've always felt about ESRI manuals, are very readable. The online help is also quite good.

This is a fine first step forward for ESRI as it reengineers its product family to a single code base. The new platform (COM under Windows), new database-style data storage (the geodatabase), and new customization environment (Visual Basic) mean that applications should start appearing very soon from third parties for a wide variety of

users, including those in surveying and engineering. Feel confident that the underlying context is well thought-out and highly expandable. ▽

*ADENA SCHUTZBERG is Principal at ABS Consulting Group, and Mapping/GIS Editor at TenLinks.com. She wishes to acknowledge the generosity of Fay, Spofford and Thorndike, Burlington, Massachusetts, which made this review possible.*



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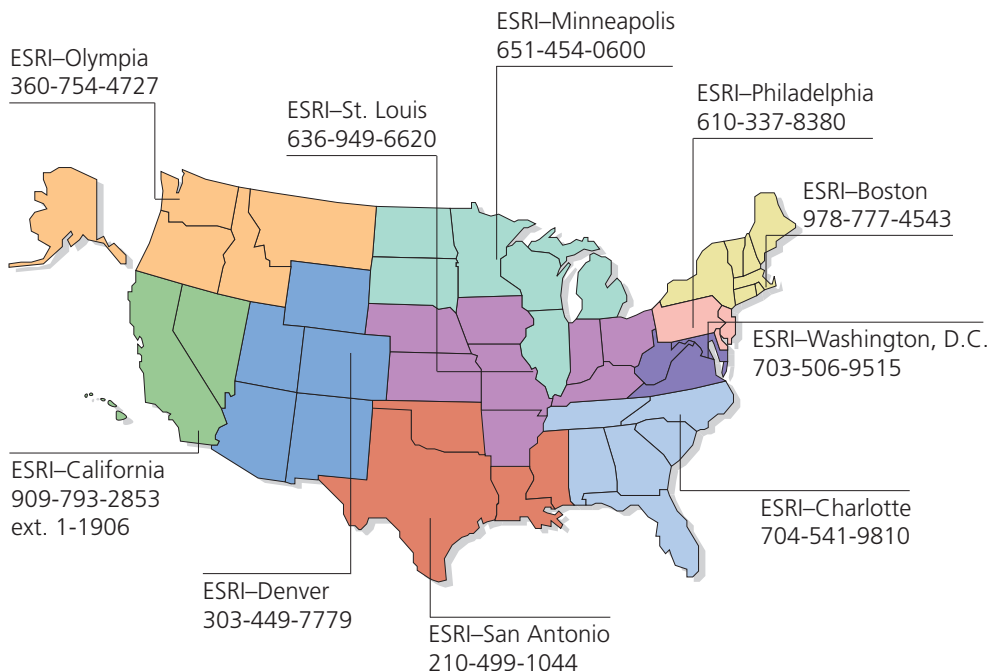
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