GIS NEWS

Fall 2002

HIGHLIGHTS

MEETINGS & EVENTS

October 29, 2002
Dakota County GIS Users Group Meeting. Dakota County Western Service Center, Conference Room L139 from 1:00 p.m. to 3:00 p.m. View the complete agenda at **http://dakotanet/gis/events/gisusers.htm**. RSVP to **Julie.Daugherty@co.dakota.mn.us**

Contacts

If you would like to write an article for the Spotlight section of the GIS News newsletter and share how you use GIS in your department, call or email Randy or Julie.

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GIS 101

Why Migrate To ArcGIS 8?
by Randy Knippel

The term 'Migrate' refers to a situation where the changes are much more significant, as with changing to an entirely different product. This may require re-training of users and redevelopment of data, applications, and procedures. This is opposed to the typical term 'Upgrade' which refers to situations where software is simply enhanced while maintaining a familiar look and feel.

ArcView, the world's most popular desktop GIS and mapping software from Environmental Systems Research Institute (ESRI), provides data visualization, query, analysis, and integration capabilities along with the ability to create and edit geographic data. It was first made available in 1996 as version 2.0 for the Windows 3.1 operating system. Since then, several upgrades have been provided for enhancements, improvements, and operating system compatibility while maintaining the same basic look and feel. These upgrades typically have had a minimal impact on the users.

The latest version of ArcView is now part of a larger family of products called ArcGIS, built using the latest application development technology from Microsoft. This gives it a look and feel consistent with other products such as the Microsoft Office suite. This allows users to purchase only the functionality needed, or upgrade to additional functionality, while retaining the same look and feel. In addition, multiple users in an organization can have different levels of functionality while sharing the same base functionality. Core capabilities of ArcGIS can also be supplemented with extensions as with ArcView 3.2.

We are currently in the process of migrating to ArcView version 8.2, which represents the second revision of version 8. ArcView 8.2 maintains the base functionality of ArcView 3.2 and adds a host of improvements driven by user requests. New features include a catalog for browsing and managing data, on-the-fly coordinate projection, metadata creation, customization using VBA, new editor tools, support for static annotation, enhanced cartographic tools, direct access to Internet data, and much more.

"ArcGIS" refers to suite of products: ArcMap, ArcCatalog, and ArcToolbox. The software is licensed at three increasing levels of functionality: ArcReader, ArcView, ArcEditor and ArcInfo (figure 2). Although licensed separately, ArcGIS is a scalable set of software with the same underlying executables and user interface. Additional functionality is enabled as you move from ArcView to ArcEditor to ArcInfo. This single integrated platform for geographic data creation, management, and analysis will dramatically increase usability and interoperability.

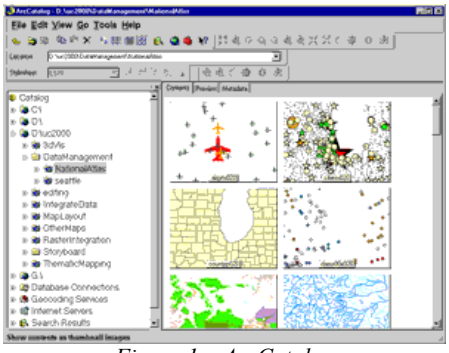

Figure 1 – ArcCatalog

ArcCatalog is a new feature of ArcGIS that provides for intuitive browsing of GIS data through a Windows Explorer-like interface. This is accomplished by combining a traditional tree view of the directory structure with options to preview geographic and associated data (figure 1). ArcCatalog expands on it's simple browsing capabilities by providing an integrated metadata feature with opportunities to create, maintain, and view documentation describing geographic data.

ArcGIS also includes a new data storage

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option called a geodatabase. The geodatabase incorporates advanced technology for storing geographic data by storing it in a Relational Database Management Systems (RDBMS). While shapefiles are still supported, the geodatabase provides users with opportunities for future expansion using these advanced capabilities (figure 2).

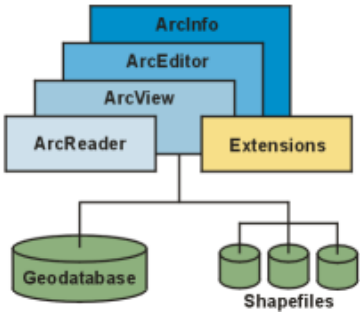


Figure 2 – ArcGIS

ESRI has publicly stated that ArcGIS will be their flagship product for the future. All new development will be designed for that platform exclusively. While they recognize they have a large customer base using ArcView 3.2 and intend to support that product indefinitely, it will not receive any significant enhancements.

ESRI allows both v. 3 and v. 8 to be run concurrently on the same machine for one year. We intend to provide services and support to make this migration as non-disruptive as possible. We will provide training to all ArcView users to help make the transition to the new product. All data currently used in ArcView 3.2 will be available in 8.2. All customization will be migrated as well. That which affects the most people will be addressed first while remaining issues will be resolved on a case by case basis.

If you have any questions or concerns, please contact me directly. All GIS Specialists are actively involved in this migration and will be able to help you as well.

Dakota COUNTY

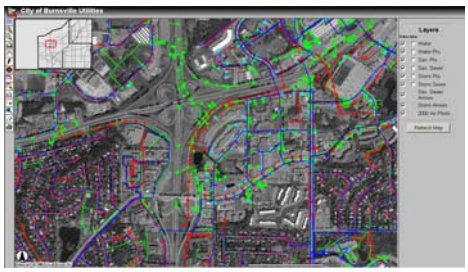
Department Spotlight

GIS in the City of Burnsville
by Tom Venables

The City of Burnsville, in partnership with Dakota County, has utilized GIS-based solutions for over a decade in many areas of city operations. In 1997, the expansion of GIS was highlighted as a high priority by the city council which directed staff to develop a plan to expand its' use throughout the city. As part of a 1998 Capital Improvements plan, additional GIS tools and training were implemented into several additional areas of operation. The city also became a member of the Local Government Information Systems (LOGIS) consortium, which provided GIS support services. A GIS users committee was formed internally and approximately 15 city staff participated initially. In early 1999, Burnsville signed an annual GIS service agreement with the Dakota County GIS office to replace LOGIS services. This direct support of GIS solutions includes training, onsite support, application development and analysis and maintenance of spatial data layers and attributes. The service provided by Dakota County has been very good and has benefited the city's GIS efforts during the implementation of several Information Technology projects.

GIS growth has increased continually and is considered a necessary tool to provide timely and accurate data for most departments. Currently, Burnsville has deployed 16 licenses of ESRI's ArcView 3.x application. The software is utilized by several departments, including Engineering, Planning, Police, Fire, Natural Resources and Forestry. Each department uses GIS for multiple purposes. Engineering generates maps of utilities, project locations, traffic markings, and five-year Capital Improvement Planning projects. The data are analyzed, and studies of utility infrastructure, pavement management, traffic management and inventories of signs, hydrants, manholes, etc. are performed.

Recently, Dakota County took data provided by the Engineering department and created an ArcIMS application for accessing utility layers. Sanitary sewer, storm sewer, and water utility layers are linked to several thousand digitally scanned as-built drawings, enabling engineering and water department staff to retrieve timely data via a web browser from any city facility location.



Burnsville Utilities ArcIMS Application

The Planning department provides timely maps for planning commission and city council meetings and special events, as well as maps identifying city zoning and Tax Increment Financing (TIF) districts within the city. GIS data sets from Dakota County provided the base address data for our Police and Fire Computer Aided Dispatch (CAD) system when it was implemented in 1999. The Police Departments utilizes an ArcIMS application built by Dakota County to map incidents. This, in turn, allows staff to analyze calls for service locations, types and density in any given area of the city. The data is extracted monthly from the CAD system and provided for the ArcIMS application. It is accessible only to police personnel via a secure web browser. Fire Department staff currently utilize an application called FIREVIEW with similar capabilities that extracts data about call history from the department's Records Management System (RMS).

Burnsville Police Department. Incident Mapper

The Natural Resources department regards GIS a basic necessity to help complete their daily responsibilities. Maps are created on a regular basis for staff and the public that identify wetland

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locations, parks, deer management areas, and more. Digital orthophoto quadrangles (DOQ's) are used extensively for visually locating features such as historic wetland boundaries and woodland areas and for measuring distances or areas within the city. The Forestry department recently completed an inventory of all Burnsville parks, collecting data on trails, trees, playground equipment, and other items by geocoding these items with a portable GPS receiver and data collector unit. The data will be used to start and maintain a GIS inventory of parks and to provide maps for the city web site and for the public. The same technology is used by the Engineering department for geo-data collection of manhole covers, hydrants, sign inventories, site surveys and more.

Future uses of GIS will include integration with a new permits and inspections system to map, analyze and display development/redevelopment trends and to provide additional data for the permitting process for planning, engineering, fire, police and inspections. Mobile mapping on laptops in police and fire vehicles is also in the implementation process. Utilizing Automatic Vehicle Locators (AVL) and Burnsville GIS spatial layers, this technology will provide public safety personnel with real-time maps displaying data about patrol areas, incident locations, utilities, buildings, and owner information. This will also be available within the Burnsville E911 dispatch center to allow dispatchers real-time visual information about police/fire unit and incident locations. It will allow operators to query criteria including specific addresses, streets, or object names such as schools or other landmarks.

The same AVL technology may possibly aid the allocation of resources for snow plowing in the winter-time. Many new public works snowplow vehicles are outfitted with GPS receivers and material sensors that will allow all data that is collected to be mapped. Additional GIS implementations in the future include: ArcPad 6.x for personal digital assistants in the field for engineering data collection and inventories; broadband mobile wireless access to ArcIMS web applications; and more development partnerships and project implementations between city staff and the Dakota County GIS office.

GIS solutions continue to be implemented throughout the city of Burnsville and their value increases steadily. It remains a city council and management priority and the majority of future large projects will be tied to GIS in some fashion.

Desktop GIS

MetroGIS DataFinder Café: A New Tool for Custom Data Sharing

by Alison Slaats – Met Council

During 2002, MetroGIS developed a new Java-based desktop data distribution application called the DataFinder Café (the name pays homage to the DNR's Data Deli which has been in service for several years). The DataFinder Café has several important features that further the data sharing functionality of the Metropolitan Council's DataFinder website. The Café allows users to subset or clip datasets using an existing feature, such as a city or school district boundary or an ad-hoc user-defined area. Additionally, users are able to custom pick attributes to download. Users are even able to select among a number of different geospatial data output formats.

Home Page of the MetroGIS DataFinder

DataFinder (www.datafinder.org), the data sharing web site, provides access to more than 100 metadata records using either the DataFinder Catalog or the DataFinder Search engine (which queries the MetroGIS DataFinder node of the National Geospatial Data Clearinghouse).

The DataFinder Catalog provides a list of all metadata records on DataFinder. The list is organized into thematic categories and a date field indicates new or updated files. Many of the data sets on DataFinder can be downloaded for free.

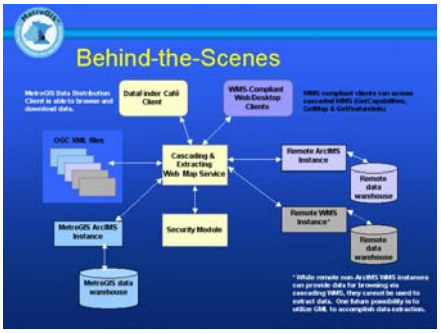
DataFinder Search is very similar to the Minnesota GeoGateway but has a metro focus. Location searches include a metro counties and cities list for quick spatial filtering.

The DataFinder Café provides the user with a lot of functionality. The interface allows users to browse the data before downloading it, extract data by area of interest, download data in different GIS formats, or download only those attributes of interest. It also provides secure access to data with distribution limitations.

The application allows for 3 different methods of data extraction and download: by ad hoc polygon, by feature, or by current extent

Users who choose to extract by feature also have the option of buffering that feature. During the download process various data format choices are made available; data may be downloaded in ESRI Shape Format (.shp), MapInfo Format (.tab), Intergraph IGDS Format (.dgn) and FME Transfer Format (.ffs).

The DataFinder Café allows MetroGIS to distribute metadata and datasets. It also can include datasets from MetroGIS producers in two ways; data can be sent to MetroGIS for hosting or else data can be hosted remotely and accessed on the fly by the Café. Datasets can also be secured if desired by the producer. Maps output by the Café use the Web Mapping Standard (WMS) and can be used by other WMS-compliant clients.



DataFinder Café "Behind the Scenes"

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Future plans for the Café include: adding the ability to extract data from non-ArcIMS nodes; showing and distributing data in different geographic projections; better integration of metadata search; take advantage of remote server functionality; and extend Café functionality to a statewide version – the "GeoIntegrator".

Tech Talk

What's New on Version 4 of the Census CD

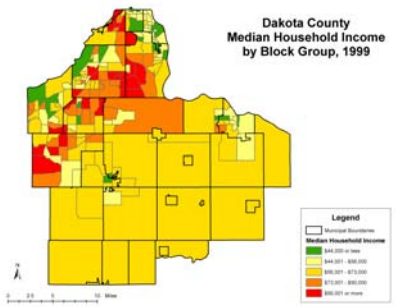
By Scott Laursen

The Dakota County Office of GIS will be releasing Version 4 of our Census CD at the Fall User's Group meeting on October 29. This new version will feature maps and data from Summary File 3 (SF3), the Census Bureau's newest Census 2000 release.

SF3 contains the "sample", also known as the "long form", Census 2000 data. This information comes from a different source than the Redistricting, Summary File 1, and Summary File 2 releases. Data from those releases were summarized from the "short form" questionnaires. Click on the following link to see a sample "short form" questionnaire: http://www.census.gov/dmd/www/pdf/d61a.pdf. The data that were obtained from the "short form" questions focused primarily on basic population and housing statistics. Population totals, age, sex, marital and family status, race, ethnicity and type of housing information were all derived from the seven basic questions that were asked on the "short form".

While "short form" questions provided a great deal of information, they don't provide insight into topics such as income, housing value or employment status. In order to obtain information about these topics, the Census Bureau created a second, "long form" questionnaire. Click on the following link to see a sample of the "long form" questionnaire: http://www.census.gov/dmd/www/pdf/d02p.pdf. The "long form" contained 53 questions: the seven that were on the "short form" plus 46 others. These new questions were divided between population and housing statistics for the major racial and ethnic groups. Specific items covered on the population side included questions about ancestry, place of birth, immigration and language spoken at home; migration; work-related topics such as place of work, type of work, and time to commute; level of education; income level; and poverty status. Housing topics included details about living quarters such as number of rooms; number of bedrooms; existence of telephone, plumbing and kitchen facilities; type of fuel used for heating; when the structure was built; how long the current residents have lived in the house; the value of the home; and how much it costs to live there. An example of this data can be seen in Figure 1.

Figure 1: Median Household Income (available from the SF3 data release)



While much of the SF1 data were tabulated at the census block level, most of the SF3 data were only tabulated at the block group level. (Some of the SF1 and SF3 data were only tabulated at the census tract level to maintain anonymity of the data). In other words, the answers from each individual "short form" questionnaire were tabulated and then aggregated together with the results from the other questionnaires that were received from other people that lived on the same block. Releasing the SF1 data for each block allowed researchers to examine trends at a very high level of detail. When it came to the SF3 data, however, the Census Bureau had to aggregate the results at the block group level rather than the census block level. A block group is created by lumping a number of blocks together to form a larger unit based on population. Ideally, the Census Bureau wanted to keep the population of block groups to between 600 and 3,000 people, with 1,500 being the ideal size. While it may sound like an arbitrary decision to only tabulate the SF3 data down to the block group level, there were sound statistical reasons for doing it. The SF3 data is often referred to as the "sample" data because the "long form" questionnaires were only sent to about one in six households. This was done for a variety of reasons including the relatively higher cost of printing the questionnaires (40 pages for the "long form" as opposed to only six for the "short form") and of tabulating the results. Because the "long forms" were not sent to the entire population, the data obtained from them had to be statistically extrapolated to reflect what they would look like if they had actually been sent to every household. The statistical method of extrapolation that was used could only be applied to a minimum population size in order to produce accurate results. Census blocks, whose boundaries are based on physical features rather than population, often had too few people in them for the statistical sampling method to work correctly. Therefore, the Census Bureau could not use census blocks, and instead used the smallest unit available to them that met the criteria for the extrapolation project, which was the block group.

Version 4 of the Census CD will contain maps and tables that have been derived from the SF3 data. In addition, the CD will contain all of the SF3 data already attached to shapefiles, just like the SF1 data currently is. This way, you can use ArcView to perform queries for specific pieces of data and to quickly make maps. The SF3 data is a rich treasure trove of information about our county – you'll be surprised what you can learn from it!

Dakota COUNTY