HIGHLIGHTS

MEETINGS & EVENTS

January 29, 2003
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

**ArcIMS Applications in Use by the City of Apple Valley**
by Scott Laursen

ArcIMS is rapidly becoming the tool of choice in many areas of city government. It offers rapid access to data for viewing and querying, all through a standard web browser. No specialized software needs to be purchased or installed, and no training is necessary. Anyone can use it! The Office of GIS has been working closely with the City of Apple Valley to create a number of different ArcIMS applications for use both by city employees and by the general public. This article will discuss just a few of these applications.

One of the ArcIMS applications the Office of GIS has developed is being used by the Apple Valley Natural Resources Department to track reported cases of oak wilt and Dutch elm disease. Whenever Natural Resources Department staff or members of the public discover an oak infected with oak wilt or an elm suffering from Dutch elm disease, a new record is created in a database and pertinent information is entered including the date reported, the type and number of infected trees and the address of the property that the tree is located on. This database is continually updated with information such as the date that the infected tree was removed or what kind of remediation efforts were made. Office of GIS staff took this database, geocoded the addresses, and created a simple ArcIMS application called the Apple Valley Shade Tree Disease Tracker to show the location of the properties containing the various reported cases.

Different symbols are used in the application to indicate which type of tree was reported. Parcel boundaries are displayed, as well as an aerial photo as the background. Users can click on an icon with the "identify" tool to bring up

the attribute information for that particular record. Currently only one year's worth of information has been entered into the database; when historical data has been prepared and added to the application, the year in which the diseased tree was first reported will be indicated by color.

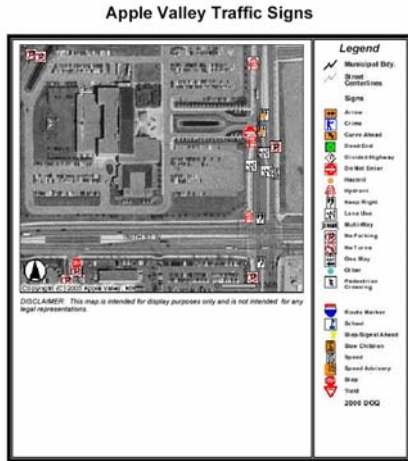Apple Valley Shade Tree Disease Tracker
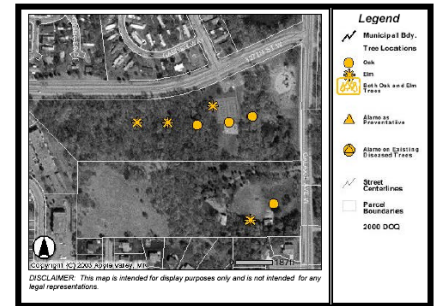
Apple Valley Natural Resources staff has many uses for the Shade Tree Disease Tracker. Staff uses the application as a quick property locator before they head out into the field to conduct inspections of infected trees. In the office, the application is used to track concentrations of infected trees and to analyze past trends in the spread of diseases, in hopes of predicting where they may appear next.

A similar ArcIMS application is being used by the Apple Valley Public Works Department to keep track of street and traffic signs. The Public Works Department has had an on-going project over the past few summers to obtain precise locations of all of the street and traffic signs in the city. X and Y coordinates are obtained for each sign using a GPS receiver, along with such information as which side of the street the sign is on, which direction it is facing, what type of sign it is, and what condition the sign is in. This database was used to create the Apple Valley Traffic Signs and Apple Valley Street Signs ArcIMS applications.

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Apple Valley Traffic Signs

Icons representing the different types of traffic signs (as well as fire hydrants) are overlaid on top of an aerial photo and street centerlines. As with the Shade Tree Disease Tracker application, users can click on an icon with the "identify" tool to bring up the attribute information for that particular record.

Apple Valley Public Works staff uses these two sign applications to keep track of the condition of the signs and to help locate particular signs that need to be inspected or replaced. Records are kept whenever a sign is replaced due to damage or old age and the database is updated regularly to reflect any changes that have taken place. Plans are in place to improve these two applications by making it possible to perform searches and queries on the database. This will allow Public Works staff to locate particular signs faster and to analyze sign replacement patterns.

There are other ArcIMS applications in development for the City of Apple Valley. The City's Parks Department and the County's Office of GIS are working together to develop a city park locator application that would link to the City's web page and be available for use by the public. Location maps of every city park would be provided, as well as aerial photos of each park and a list of facilities available at that location, such as picnic shelters, volleyball or

basketball courts, and hockey rinks. Another application that is in the works for the Natural Resources Department will be used internally to track coyote sightings in the city. Every time a citizen calls in to report a coyote sighting, the information is entered into a database. The Coyote Tracker application will place icons at the locations given in this database to let Natural Resources Department staff know where to concentrate their trapping efforts and to determine seasonal trends in sightings.

As should be obvious by now, ArcIMS applications can be tremendously useful when it comes to visually displaying database information. They are fast and easy to use, and can be made available to anyone with access to the Internet. Keep them in mind when you are planning a project! ⊕

Department Spotlight

Extending High Resolution Satellite Data to City-scale GIS Applications at the City of Eagan
by Tami Maddio

The City of Eagan was given a rare opportunity recently to collaborate with the University of Minnesota's Remote Sensing and Geospatial Analysis Laboratory to explore the use high resolution satellite imagery for GIS applications. NASA funded researchers at the University of Minnesota are using imagery that includes Eagan for several ongoing research projects. Employees at the City of Eagan who were familiar with the work at the Remote Sensing Laboratory, came in contact with these researchers and began exploring the possibility of using this technology to identify oak wilt sites within the City. The U of M researchers were interested in applying high resolution satellite imagery such as IKONOS and Quick Bird to a City-scale. The City was eager to use this technology with the assistance and expertise of the U of M researchers.

A U of M researcher and Eagan resident, Leif Olmanson, has been using satellite imagery as a tool to monitor urban lake water clarity. His work includes small lakes in Eagan. City of Eagan staff were interested in his research and saw a potential for using the same imagery for monitoring oak wilt sites.
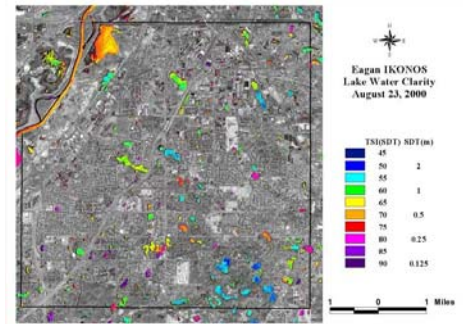
Lake Water Clarity

The NASA eForest project at the University of Minnesota was willing to fund a pilot project dealing with oak wilt in Eagan. Imagery from September 2001 was used for the initial analysis of oak wilt sites in Eagan. After the U of M did the imagery analysis, the identified sites were field verified using GPS. Nine out of 10 sites identified with the satellite imagery were positively confirmed as actually oak wilt sites. The process for identifying oak wilt by analyzing satellite imagery becomes more refined by first classifying potential oak wilt sites with the imagery and then field verifying those sites. These encouraging results have inspired the researchers and the City to think about other applications for the data and to pursue the oak wilt project further.

Comparison of the Three Conditions

Healthy　*Active*　*Dead*
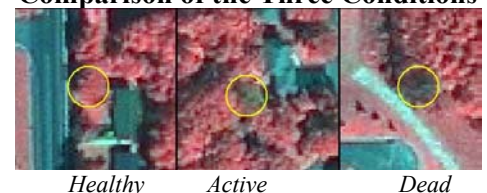
Other research that the U of M is currently working on related to Eagan includes an impervious surface

analysis, an aquatic vegetation survey, and buckthorn identification. The University has acquired 6 images of Eagan to date. The latest image is from November, 2002. This image will be used for existing research at the University and will potentially be used to identify buckthorn sites in Eagan. The use of satellite imagery to identify buckthorn could be an extremely valuable tool for the City forestry staff. This species has proven to be difficult to find and then harvest.
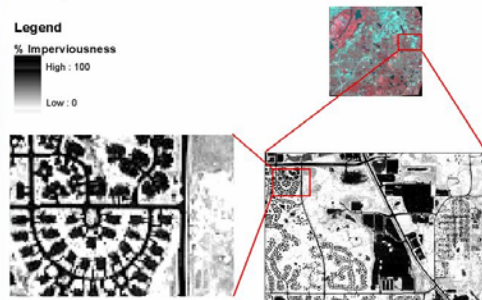
Future applications for satellite imagery at the City may include the analysis of heat island effects, other invasive species identification, turf condition analysis, water body identification and digitizing, and forest cover classification.

The partnership between the City of Eagan and the Remote Sensing Laboratory is not formalized. However, this opportunity has given both organizations perspectives on the use of high resolution satellite imagery in a new way. The oak wilt project introduced the City to the usefulness of the technology and allowed the U of M researchers to discover new possibilities for their work.

The future use of satellite imagery at the City of Eagan depends on the success of future projects, the existence of trained staff, and funds available to purchase imagery. For the time being, the City and the University of Minnesota will continue to work together and explore the applications already in progress and discover new possibilities for using this unique technology. 🌐

Desktop GIS

Map Book Generation
by Joe Sapletal

The migration to ArcMap has provided the user with many new cartographic and analysis tools, but it has created certain limitations as well. As has been discussed in the ArcGIS training classes, in ArcView 8.x there is no longer an option to have multiple layouts in a single map document as was available in ArcView 3.2. For example, in ArcView 3.2 an individual map with a unique layout for each city in Dakota County could be saved in one big project. This feature allowed for a many-to-many relationship between maps and layouts. In ArcView 8.x, a user could create many different maps in layers or in data frames, but only one layout is allowed per map document. In the example above, a separate map document would have to be created for each city's layout. We may have found a solution for you.

ESRI has made a free extension available for ArcView 8.x that can help. The Extension, called DS Map Book, allows ArcView 8.x users to create map books or map series with a few simple clicks. What is a map book? A map book is a grid-based collection of maps that are a subset of a large geographic area and which use the same layout for each map. For example, GIS staff have been working on creating city-based map books of street centerlines for Dakota County, all from within one ArcView 8.x map document using the extension from ESRI. First, we create an index grid for Dakota County based on the cities and townships. Next, we create a single layout to be used by each map book page.

With the DS Map Book extension installed and opened in ArcView 8.x, a new toolbar and a third tab appear at the bottom of the table of contents.
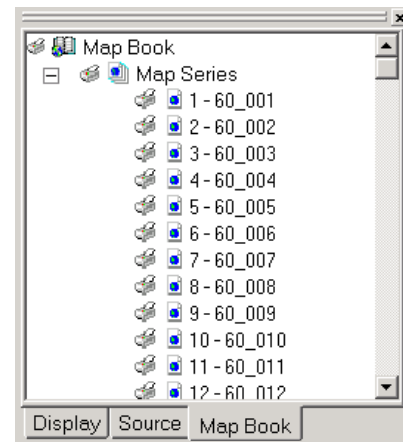

Map Book Toolbar (enlarged)

Table of Contents with Map Book Tab

The index grid is a feature class of polygons that represent the areas that will be mapped. The title for each page, or "map", of the map book is also derived from the grid. In the project we use to create C-Size (22" by 17") sheet street centerline maps, each polygon represents a city, a group of smaller cities or a township and any cities within its boundaries. Each polygon feature in our dataset is given the name of the city, cities or township it represents. Next, a layout is created that will be used to create all of the map book pages. Once the layout is created and the attribute tables updated, the extension maps each area and derives their titles from the dataset.

The index grid can also be used on the map layout to create a locator map. In our project, the city being represented in the street centerline map is highlighted on a small Dakota County locator map.

This extension can be used to create your own map grids based on a specific scale to cover a particular area. It can also be used to create a Strip Map book along a line feature such as a river or roadway.

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After the layout has been set up and the map series created, you can either send your maps to a printer or plotter or prepare them for export. By using the right-click menus available in the Map Book tab on the ArcMap Table of Contents, you can view each map in the series or choose maps to be printed or exported . The Map Book Extension allows you to export maps to PDF or one of three other image types.

To see more about the extension, visit the ESRI Arc User site and read http://www.esri.com/news/arcuser/0702/dsmapbook1of2.html. 🌎

Did You Know?

The Dakota County Office of GIS recently acquired color aerial photography covering all of Dakota County. The color images were taken in September of 2002 and have the same resolution as the 2000 black-and-white imagery currently available from the Metropolitan Council. It was purchased from Aerial Express, a Tempe, Arizona company, with funds from the GIS Enterprise Fund, and is available to Dakota County GIS users, its partner cities, the Dakota Electric Association and any Dakota County department who wishes to use it. The imagery will also be made available to the public through the Dakota County Real Estate Inquiry. County GIS users will find the imagery on the County network via an ArcView Extension. 🌎

Tech Talk

Dakota County Extensions in ArcMap
by Mary Hagerman

Migration to ArcView 8.x is well under way and many of you are a good deal of the way through

training. You are ready to start using ArcMap, but are wondering, how do I get at Dakota County data? As with ArcView 3.2, you can access County data through extensions. The GIS staff has been hard at work rewriting the Dakota County extensions for ArcMap. Module 7 of our ArcGIS training series focuses on how to use these new versions of the extensions.

In ArcView 3.2, Dakota County extensions were loaded through a dialog. This remains the same. 'Dakota County Extensions', under the 'File' menu brings up a dialog box listing all the county extensions. Clicking on an extension displays a brief description of the data and/or tools contained in the extension.
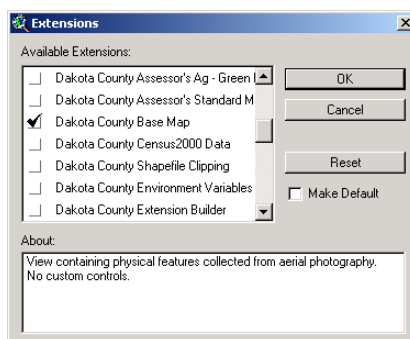
ArcView 3.2 extension dialog

There is also a button to view metadata. This is a new feature that was not available in the 3.2 versions of the extensions. The 'View Metadata' button brings up an HTML page containing detailed information about the data and tools associated with an extension. To load an extension, click the 'Load Extension' button.
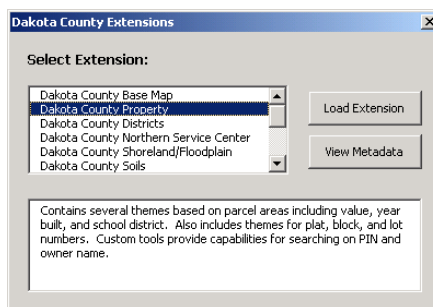
ArcMap 8.2 extension dialog

For extensions that contain data, the

data are loaded as a group layer. A group layer is a single layer file that contains information for multiple layers. Symbolization, visibility, drawing order, and scale dependence are all saved along with references to each data layer. The group layers have been created to reflect the data and symbolization of the ArcView 3.2 extensions.

A floating toolbar is loaded for each extension that contains custom tools. Toolbars are created on the fly as the extensions are loaded. Toolbars can be left floating, or docked on the user interface as desired.

So how does it work? Each time you start ArcMap, a bunch of modules containing the VBA (Visual Basic for Applications) code for the extensions are loaded into your default template (AKA the normal.mxt). When you load an extension or use one of the custom tools, the code in these modules is executed. Because modules are added to the normal.mxt, instead of copying in or overwriting the normal.mxt itself, any personal customizations you might have are unaffected.

Information about each extension, it's group layers, tools, and tables, is stored in a database. When an extension is modified, or a new extension is created, the database is updated. The extension dialog reads from this database, so it is always up-to-date, without having to visit each user's computer to install new components.

To learn more about using Dakota County extensions in ArcMap, be sure to sign up for ArcGIS training module 7 on DakotaNet at http://dakotanet/gis/training/index.htm. 🌎