GIS NEWS

HIGHLIGHTS

MEETINGS & EVENTS

April 30, 2002
Dakota County GIS Users Group Meeting. Dakota County Western Service Center, Conference Room L139 from 1:00 pm to 3:00 p.m.

Meeting Highlight: Data Privacy with Jay Stassen The Survey and Land Information Department is pleased to announce a special presentation by Jay Stassen from the Dakota County Attorney's Department. He will be talking about Data Privacy Issues and will address data privacy in regards to use of data with GIS and the public. Mark your calendar to attend this meeting! View the complete agenda at **http://dakotanet/survey/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.

Randy Knippel
952.891.7080
Randy.Knippel@co.dakota.mn.us

Julie Daugherty
952.891.7086
Julie.Daugherty@co.dakota.mn.us

GIS 101

Mapping Population Data
by Mary Hagerman

By now, most people are aware that data from the 2000 Census is available. Often, the best way to understand these population and housing figures is to map them. But to make a good map that will accurately depict your data, you need to understand your data and how to use it correctly.

When you are mapping data collected by some unit of area, such as cities or census tracts, you first need to standardize your data. If the areas you are working with are all the same size (e.g. city blocks can be very uniform in size), this may not be necessary. But most often, these areas will vary greatly in size and shape. The data needs to be standardized to account for those differences. When mapping non-standardized data, such as total population counts, larger areas tend to have higher values, and smaller areas tend to have lower values. This can be very misleading.
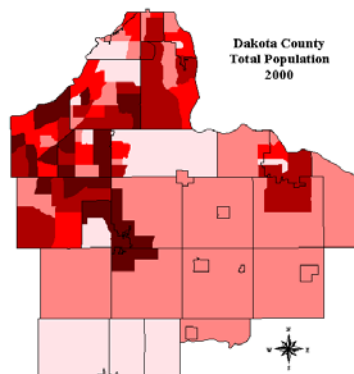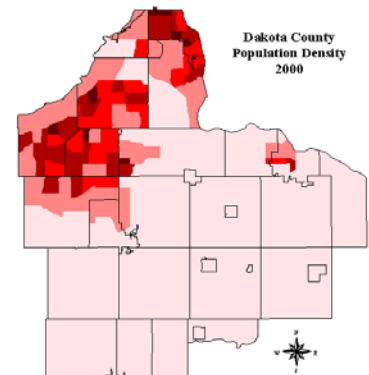

Population counts by census tract

For example, if we map (non-standardized) population counts for Dakota County by census tract, we get rural areas with higher values than some parts of the more populated urban areas *(see map above)*. Notice

the light colored tracts in Hastings, Apple Valley, Eagan, and South St. Paul. This is because the tracts in the urban areas are much smaller than in the rural areas.

A better representation of population in Dakota County would be a map of population density, or population per unit area, such as persons per square mile. We need to standardize our population data by area to account for differences in tract sizes. The map of population density looks more like what we would expect to see. The rural areas have relatively low values, and the urban areas (Burnsville, Eagan, South St. Paul, etc.) have higher values.

*Population density by census tract*

Another way to map population is with dot densities. Dot densities simulate plotting a dot on the map for each person. When data are collected by area, as with the census, we do not know the actual location of all the dots, but we do know how many dots fall within each area. A dot density map standardizes the data by drawing the correct number of dots in each tract. The result, especially if your units are fairly small, is a distribution very close to the actual population.

Comparing the maps of population counts and population density to the

(continued from page 1)

dot density map shows that the population density map is the more accurate map.
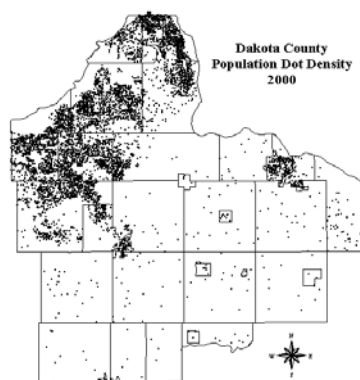
Population dot density

When mapping population, density, or population by unit area, is the most logical way to standardize the data. There are other ways that data can be standardized. If you are mapping senior citizens or persons in poverty it might make more sense to portray your data as a percentage. Crime and unemployment are often mapped as rates (e.g. crimes per 100,000 persons). Through standardization, we can take advantage of a wealth of data collected by some kind of area, and present them in a logical manner that accurately reflects the data. ☺

Department Spotlight

Dakota County Soil and Water Conservation District - What is the MLCCS?
by Dave Holmen

What Is the MLCCS?
The Minnesota Land Cover Classification System (MLCCS) provides a method of describing any parcel of land in terms of its vegetation (or lack of it) and the amount of impervious surface (such as pavement and buildings) present. It was developed cooperatively by:

- Dakota County Soil and Water Conservation District (Dakota SWCD)

- Friends of the Mississippi River

- Minnesota Department of Natural Resources (DNR)

- Great River Greening

- U.S. Fish and Wildlife Service (USFWS)

Before the MLCCS was developed, many important questions could not be answered, including:

- *What natural vegetation remains, besides the high-quality remnants mapped by the Minnesota County Biological Survey?*

- *Where are degraded natural sites that would benefit from restoration efforts?*

- *What native plant communities should be restored to these sites?*

- *How much impervious surface covers each watershed?*

To answer questions like these, every square inch of the landscape must be mapped using a consistent classification system. The Metropolitan Council has a system to classify land use (such as parks and recreation, multi-family residential and vacant), but it does not indicate the type of vegetation present or specific percent impervious cover. The DNR Natural Heritage Program has a system to classify native plant communities, but it is not applicable to highly disturbed areas.

The MLCCS generally classifies native plant communities according to the DNR system. But for developed areas and disturbed vegetation, the MLCCS uses a completely new system, combining elements from several other classifications. The MLCCS uses names familiar to many Minnesotans, such as oak forest, but also new classifications, such as short grasses and mixed trees with 26%-50% impervious cover.

2000 aerial photograph

Land use inventory

MLCCS inventory

National Park Service Mississippi National River & Recreation Area, DNR Metro Region and Great River Greening, 1999 - 2000

How do we use the MLCCS?
SWCD staff use the MLCCS land cover inventory to review sites prior to field investigations, in WCA investigations, and for watershed planning and management. The Office of Planning and our office used the inventory to identify natural areas for the Dakota County Farmland and Natural Areas Project (FNAP) and is currently being used

(continued from page 2)

to identify greenway corridors and natural community restoration potential under the Suburban Dakota County Greenway Project. Waste Management used the MLCCS as part of the Hastings Nitrate Study. Land Cover is a critical source of information for all of our efforts and is now available for us to use.

If you'd like more information, please contact our office at 651.480.777 and ask for Dave or Jay.

(Parts of this article were taken from the online press release by Great River Greening) 🌐

Desktop GIS

GIS and Emergency Preparedness
by Todd Lusk

In the days following the terrorist attacks on the World Trade Center, Geographic Information Systems (GIS) technologies played a very large role in helping emergency crews respond quickly and effectively. Within three days of the attacks an entire GIS Operations Center was assembled and staffed twenty-four hours a day. Resources ranging from the Minnesota Department of Natural Resource's MAPMOBILE to satellite imaging from Space Imaging's IKONOS satellite poured into the Emergency Operations Center to help with recovery and cleanup efforts.
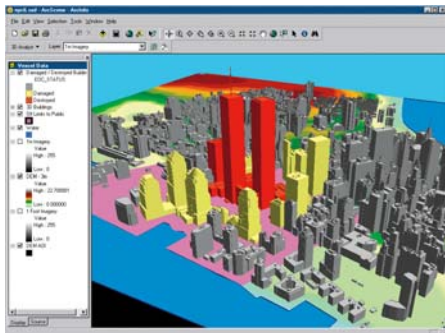
Figure 1. *An example of how GIS was used at the World Trade Center site.*

In light of the attacks local government's ability to respond in an emergency has become a concern for many people. The GIS Unit of the Survey and Land Information Department has begun to closely work with David Gisch, the County's Emergency Preparedness Coordinator, to find ways GIS can be used in emergency situations within Dakota County. A workgroup with representatives from cities, school districts, and other agencies within the County has been formed to ensure that Dakota County is prepared to use GIS if an emergency were to arise.

One of the first tasks the workgroup accomplished was to assemble a database of existing County facilities and resources. This database included information from school districts, the County's geographic data, and the American Red Cross. All of the information was compiled and put into an internet-based application so that it would be available twenty-four hours a day.

The application is password-protected so that only those who are authorized to view the data may do so. The workgroup decided that having the application open to anyone for viewing could be risky because of the chance of someone using the information for an attack.

The emergency preparedness workgroup is planning to hold meetings on a regular basis to be sure that the County maintains a high level of preparedness. They are also working on a way to ensure that GIS data will be available in the event that a major disaster or terrorist attack were to occur somewhere within the County's borders.

If you would like more information on how GIS was used in the attacks on the World Trade Center, are interested in becoming involved in the emergency preparedness workgroup or would like more

information on what Dakota County is doing to insure that we are prepared for an emergency please contact Randy Knippel at 952-891-7080 or Todd Lusk at 952-891-7084.

GIS at the World Trade Center in NYC (from FEMA)

GIS Solution Aids WTC Rescue Efforts (from *ESRI*)

Attack on America: Imagery of the Attacks on the World Trade Center (from SpaceImaging.com)

Targets of Terror: Mapping the Surface of a Disaster (from *The New York Times*) 🌐

Tech Talk

How to Navigate Through the Summary File 1 Data Sets
By Scott Laursen and Julie Daugherty

Summary File 1, the Census Bureau's first release of detailed information from Census 2000, contains over 2,000 fields of data in 39 separate data files. The files are organized into nearly 300 different tables that use a perplexing alphanumeric coding system to identify the individual fields of data. Finding and extracting specific data in this complex structure can be a daunting task. Fortunately, the Census Bureau has provided detailed documentation to help users navigate through the complicated file structure. By mastering the art of using the Census Bureau's documentation, finding data becomes much easier.

Here is an example of finding Average Family Size by Census Block.

(continued from page 3)

1. Study the documentation: First, open the Summary File 1 (SF1) Technical Documentation. It can be located on the Census CD or on the Survey and Land Information Department's Census website (on the intranet) in the Documentation folder. (It can also be found on the Internet at http://www.census.gov/prod/cen2000/doc/sf1.pdf.)

2. Identifying the Subject's Table Number: Use the Table of Contents on the left-hand side to navigate to "Chapter 3 – Subject Locator". This chapter contains all fields of the dataset listed alphabetically by subject. The column on the right - hand side of the page provides the table number where the subject can be located. Keep the table number handy because you will need it again in the future.

The Average Family Size subject is located in table P33 (see Figure "1" below). The asterisk behind the table number indicates that this table is repeated in the database by specific race and/or Hispanic or Latino groups.
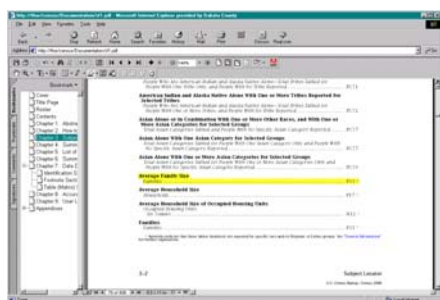

FIGURE 1 – SUBJECT LOCATOR

Next, go to "Chapter 7 – Data Dictionary " to identify the fields needed in the database.

3. Chapter 7 – Data Dictionary:

- **Table (Matrix) Section –** When you go to this chapter you will see a Contents section at the top of the first page. Click on the link to the section titled "Table

(Matrix) Section". That will take you down to page 25, where the table listings begin. The table number is provided on the left-hand side. Scroll down in this chapter until you find your table number.
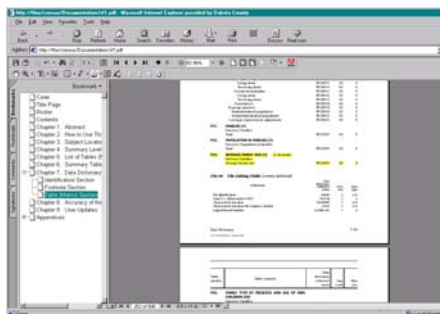

FIGURE 2 – TABLE NUMBER

- **Look for File Number**
- **Look for Reference Name**

The second column on the page (Table contents) gives a verbal description of the general data category (in bold) and of the individual fields that are contained within that general category. The third column (Data dictionary reference name) gives the field identifier number and an alphanumeric code that is used as the column header in the data tables. The fourth column, Segment, lists which data file the data can be found in, while the fifth column, Max size, gives the maximum number of characters the field width can be.

Average Family Size has a field identifier of P033001, segment/file number 03, and a maximum field size of 9. This means that the subject is located in File 3 of Summary File 1, with a data field name of "P033001". The number in that field represents the Average Family Size per census block and has a maximum length of 9 characters.

4. Finding the Data!

In the directory where your Summary File 1 files are located, navigate to sf1_file03.dbf (Summary File 1, File 03) to find the data. The worksheet should look something
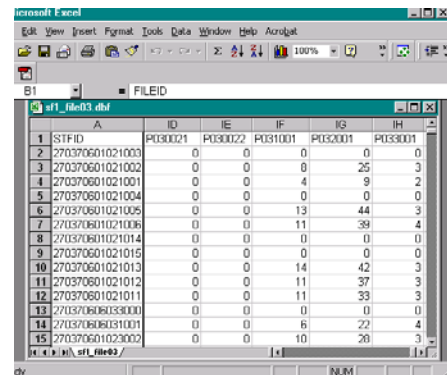
similar to Figure 3, below.

FIGURE 3 – SAMPLE SPREADSHEET

Along the left hand side of the table is a field titled "STFID". This field contains a numeric code that uniquely identifies individual census blocks. The code consists of a two-digit state code ("27" for Minnesota), a three-digit County Code ("037" for Dakota County), a six-digit code for Census Tract (ex. "060501") and a four-digit block number (ex. "1001"). The top of the table contains the field identifier numbers. The Average Family Size field identifier is "P033001". Each row of data in that column corresponds to the average family size in the census block listed on the left hand side.

From this example, you can see that using theSF1 Technical Documentation is crucial to any attempts at extracting data from the SF1 data tables. All of the information needed to locate data can be found in the documentation. All it takes is a little bit of time to learn how to use it. 🌐

GIS NEWS is Produced Quarterly by GIS Staff

Randy Knippel
Julie Daugherty
Mary Hagerman
Scott Laursen
Todd Lusk
Joe Sapletal
Kent Tupper