



MetroGIS Performance Measures

Case Study Document: 1999-2007

MetroGIS

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This document contains testimonials of the effectiveness and utility of the work of the MetroGIS collaborative collected between 1999 and 2007

MetroGIS Testimony before the U. S. House of Representatives, 1999
Metropolitan Mosquito Control Board, 2002
Technology Innovation Educational Services (TIES), 2002
Metropolitan Council, 2002
Riley-Purgatory-Bluff Creek Watershed District, 2002
Metropolitan Airports Commission, 2002
SRF Consulting Group, 2003
Metropolitan Emergency Services Board, 2004
City of Roseville, 2005
Metro Evacuation Traffic Management Plan – University of Minnesota, 2006
1000 Friends of Minnesota, 2007

Special thanks to Jeanne Landkamer of Landkamer Consulting for her excellent work in conducting the interviews and documenting the results.

MetroGIS



Benefits to Local, County, Regional, State and Federal Organizations

Submitted as part of MetroGIS's testimony presented to the Subcommittee on
Government Management, Information and Technology,
U.S. House of Representatives, June 1999.

MetroGIS: Benefits

Federal: U. S. Census Bureau

The Organization: The U. S. Census Bureau collects, organizes and distributes social, demographic and economic information for the United States of America.

The Issue: The Census Bureau relies on local input to assure complete and accurate information is available for the decennial census. Local agencies can best respond using GIS tools to speed the process, improve accuracy and assure quick response to census requests.

The Census Bureau uses the TIGER/Line file to support the mapping and related geographic activities required by the decennial census and sample survey programs. The lines in TIGER are used to form census block and other boundaries. While the TIGER data is sufficiently accurate for the Census Bureau and many other uses, its positional accuracy does not allow locally maintained GIS data to be accurately matched to census data. Local agencies can not use TIGER data to effectively fulfill Census Bureau request.

In the Past. Communities have reviewed census address lists and housing counts to verify their accuracy and manually reviewed and edited census boundary information using paper maps.

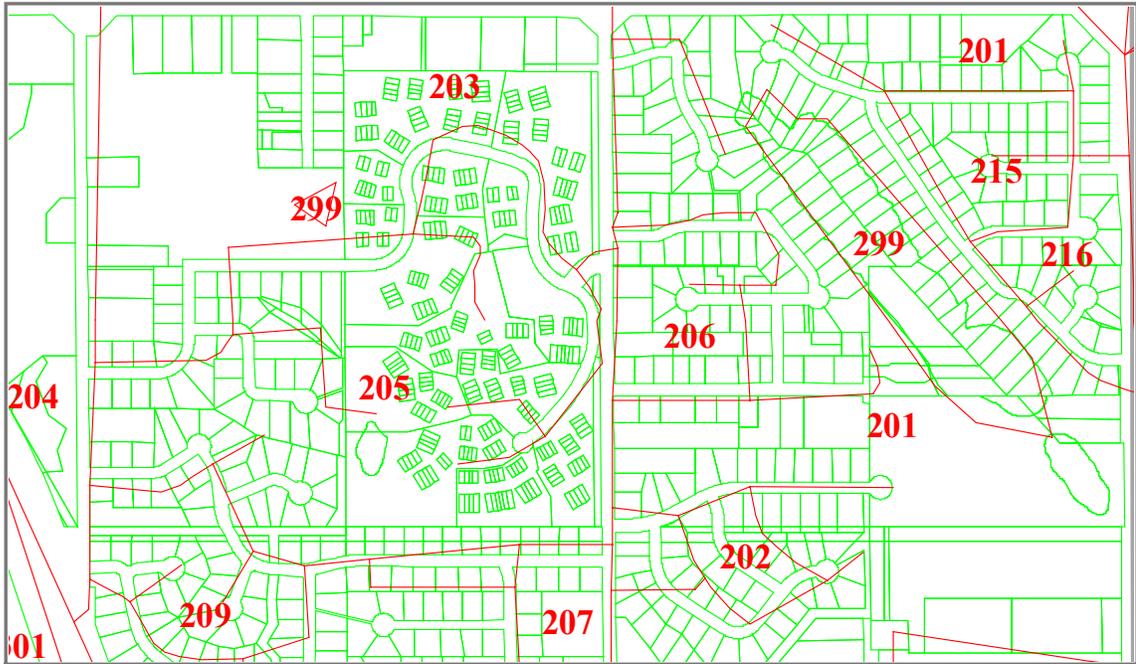
Today. While many of the same review processes continue to be used, a MetroGIS project is underway to assign census block designations to locally developed GIS road data. The road data, which forms many census block boundaries, is aligned to parcel data. By adding non-road boundaries to the road information complete census blocks can be formed. The result creates an accurate census geographical database that serves local needs.

In the Future. When the work is completed and census boundaries match parcel data, local officials will be able to directly compare the census blocks with parcel data. The number of housing units in a block can be derived from parcel data. Since the local parcel files are continuously updated, they contain the most current information available. Many Census Bureau requests can then be fulfilled quickly using GIS.

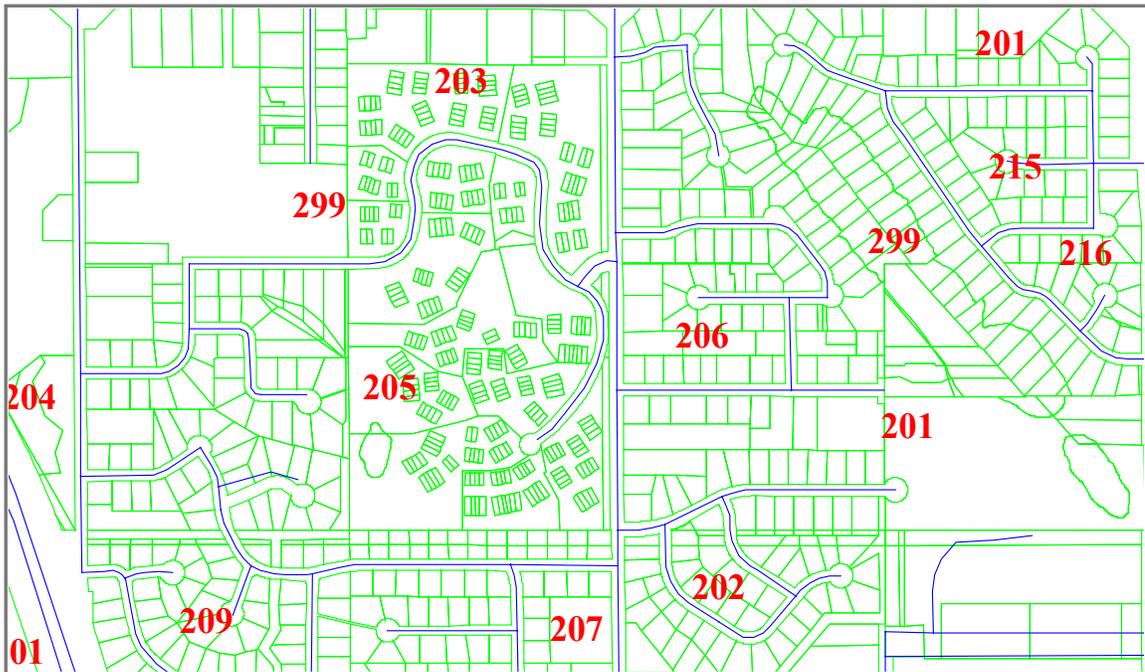
Value.

- **Automated procedures save time.** Automated procedures can be developed which will reduce the time local staff spend responding to Census Bureau requests for local input. Census Bureau requests often have short timelines making quick response critical. Requested information will be delivered quicker and with less effort than in the past.
- **Mid-decade estimates will improve.** Aligning census geography to local geographic data will make it possible to effectively use new parcel and land use information to estimate population and demographic change.
- **Accurate local geography lays groundwork for TIGER improvements.** An essential principal of the NSDI is to make local data available at the national level. By building census geography that matches locally developed and maintained geography, the foundation is built which will allow GIS information to flow from local government to the federal government.

Matching Census Boundaries to Local Parcel Information City of Arden Hills



Comparison of TIGER to parcel data



Comparison of The Lawrence Group roads to parcel data

- | | |
|--|--|
| <ul style="list-style-type: none"> — 1998 Ramsey County Parcels — 1999 Lawrence Group Roads | <ul style="list-style-type: none"> — 1990 U.S. Census TIGER 101 1990 Census Block Number |
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MetroGIS: Benefits

State: Minnesota's Department of Children, Families & Learning

The Organization: Food and Nutrition Service is a division within the State of Minnesota's Department of Children, Families & Learning.

The Issue: The Department of Children, Families and Learning (MnCFL) is responsible for determining eligibility for family child care providers participating in the Child and Adult Care Food Program (CACFP) in Minnesota. More than 40 million federal dollars are dispersed annually to over 15,000 providers located throughout the state who are administered by 11 sponsoring organizations.

Approximately 7,500 providers are located in Twin Cities metropolitan area. Geography is the basis for Tier I assistance. To be eligible, child care providers must be located in an area where at least half of the children are eligible for free and reduced price school meals, based on school data or 1990 U.S. Census Bureau data. Accurate locations of the child care providers had to be determined and referenced by geographic coordinates before eligibility could be resolved. This process was undertaken by the State of Minnesota's Land Management Information Center (LMIC).

In the Past: Prior to the availability of The Lawrence Group (TLG) data, geo-locating child care providers in the Twin Cities area was accomplished using address matching functions with the U.S. Census Bureau's TIGER street data. The process was typically only 65% successful, even less so in the high-growth suburban areas. Unmatched addresses required either a site visit by the provider's sponsoring agency, at which time a GPS based coordinate was determined, or a telephone call to the provider by LMIC staff. In the latter case, staff would work with the provider while viewing a digital map to best determine their location. This was a time consuming process.

Today: Geo-locating child care providers using address matching processes and the TLG data is typically 95% successful, minimizing additional staff time. Furthermore, the location is usually more precise than a GPS (non-differential) reading. The quality of the location can be very important since eligibility for federal funds may vary from one side of the street to the other.

In the Future: In late 1999, sponsoring agencies will be able to determine Tier I eligibility for potential and existing providers within the Twin Cities area via a MnCFL web site currently under construction. The TLG data will be the backbone for this "on-line" address matching system.

Value:

- **Reduced Costs.** Because the TLG address base is more accurate and up-to-date than TIGER, improved address matching results reduce the staff time required to locate eligible child care providers.
- **Improved Locational Quality:** Providers can be geo-located more precisely with the TLG data thereby reducing errors in eligibility determination.
- **Faster Public Service:** Using the TLG data via MnCLF's web site will make the eligibility determination virtually instantaneous thereby improving the service child care providers receive from sponsoring organizations.

MetroGIS: Benefits

Regional: Metropolitan Council

The Organization: The Metropolitan Council conducts long-range planning in coordination with local units of government and other organizations to guide growth and development in the Minneapolis and St. Paul metropolitan region. The Council also operates the regional transit service (Metro Transit), wastewater collection and treatment services, and the metropolitan housing and redevelopment authority.

The Issue: A proposed site for a new State Motor Pool and Metro Transit garage facility has been identified on the east side of downtown St. Paul. An environmental assessment work sheet (EAW) must be completed to determine the impact of this proposal. Using the most current and accurate information for this process is critical to a full and complete discussion of the issues the garage presents.

In the Past. Little digital information was available in the past. Producing maps which showed the location of utility services, roadways, neighborhood boundaries and environmental features required manual drafting of individual maps. This became especially complex when those features needed to be combined on one map.

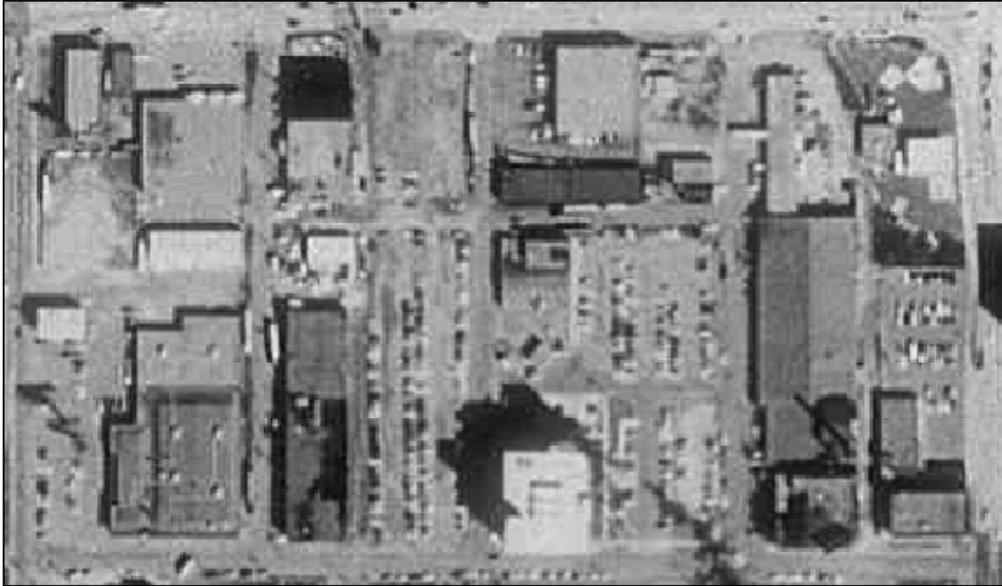
Today. The Council requested relevant GIS information from the City of St. Paul. The information included digital ortho imagery produced cooperatively by the Capital Architecture and Planning Board and the City of St. Paul. This imagery was created using aerial photographs from the first cooperative project undertaken by the MetroGIS initiative.

In the Future. Additional information such as local utility network and detailed street rights-of-way data will be available from the City of St. Paul as they complete additional GIS data and make it available to participants in MetroGIS.

Value.

- **Data Development Cost Savings.** The same data can be used by more than one organization. The original aerial photographs were shared with Ramsey County, which in turn shared the data with the City of St. Paul. The city cooperatively developed ortho imagery with the Capital Architecture and Planning Board and finally the imagery was shared with the Council for its EAW process. Four organizations have used the data each time adding value and increasing its usefulness to other organizations. A few thousand dollars extra would have been spent by each organization or they would have made due with less data. (Estimated Savings: \$8,000)
- **Increased Data Quality.** The amount of detail visible in available data has been increased. Without MetroGIS, the Council would not have the high-resolution information available for the EAW. Descriptive information would be less precise both for use in the EAW process and for public presentation of the information. It would take longer to explain the location and characteristics of the proposed site in public hearings or require additional expense in preparing materials for the hearings. (Savings: 1/4 hour of public hearing time and/or \$1,000 in extra graphic presentation costs).
- **Better Decision-Making.** As MetroGIS matures sharing data will become easier and each participant can focus on maintaining data critical to their mission. All MetroGIS participants benefit by easy access to high quality data produced by the organizations that know the data the best. Although detailed utility information was not available, the Council would have benefited from such data. The additional staff time needed to determine local utility alignments and impacts would have been avoided. The accuracy of that determination would also have been improved. (Estimated Savings: 8 hours of staff time. What is better decision-making worth?)

Which Image Would You Use for Decision Making?



Both of these images show the proposed site for a new combined State Motor Pool and Metro Transit bus garage. The above image is from 1991 USGS 20,000 foot aerial photography (DOQs). The image shown below is from a 1996 MetroGIS cooperative demonstration to collect aerial imagery at 5000 feet. Four organizations cooperated to produce the latter GIS product. None of the organizations paid for the entire effort, but all have access to the final product for decision making.



MetroGIS: Benefits

County: Hennepin International Trade Services

The Organization: Hennepin International Trade Services is an organization within Hennepin County government which provides services to businesses involved in international trade.

The Issue: A study of import and export businesses was conducted to determine ways in which Hennepin County can support the development of these businesses. While many of these businesses have headquarters in Hennepin County they frequently have facilities outside the county.

In the Past. Six months ago 88% of these businesses were located to within approximately one block of their true location. Accomplishing this task required more than 40 hours of staff time and the cooperation of Hennepin International Trade Services and the Metropolitan Council. Because of the lack of addressing data standards, incomplete data and competing priorities at the two organizations, the work was spread over more than one year.

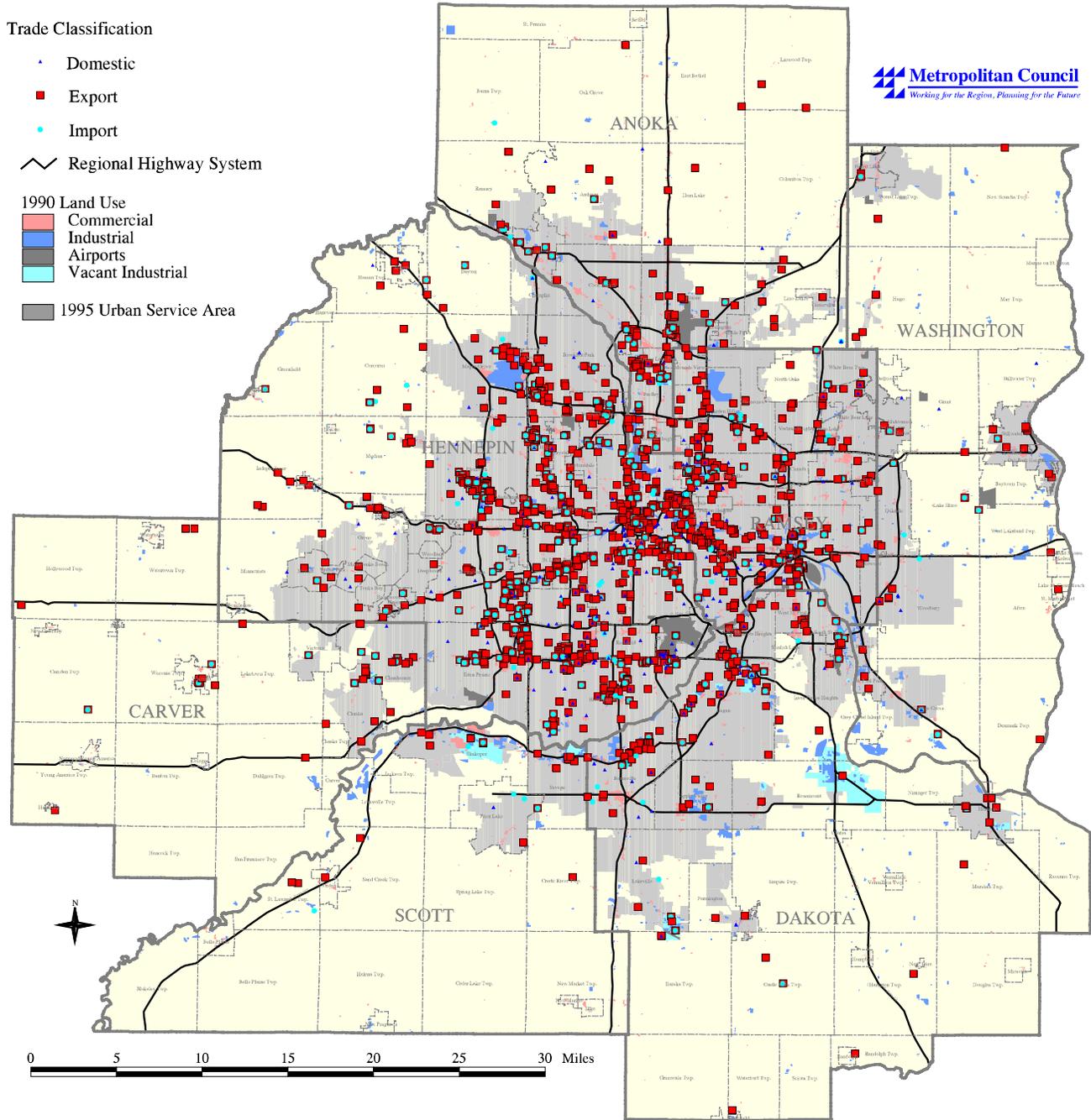
Today. With the use of TLG street centerline data made available through the MetroGIS initiative, the businesses can be located faster and with greater precision. The number of businesses which can be located with this process is the same or greater.

In the Future. Hennepin International Trade Services could produce a similar map in a few hours using addressing guidelines developed by the MetroGIS initiative and a future address matching application based on those guidelines. It would be possible for Hennepin International to regularly track import and export business development trends and assess the impact of their efforts.

Value.

- **Improved Data Completeness.** More import and export businesses can be mapped through an improved address matching process which uses TLG data and adheres to addressing guidelines. For example questions that could be answered more completely are: Where are all the medical equipment exporters located and what percentage of them are in Hennepin County?
- **Improved Data Quality.** The quality of information can be improved through the address matching process. As is often the case when data are first mapped in a GIS, some of the Hennepin International Trade Services data were incomplete. This became obvious when the first printed map did not show any importers or exporters in the eastern metro area. Corrections were made to the original data that improved the quality of the map and the data itself.
- **Reduced Staff Time.** Staff time required for locating import and export businesses will be reduced through access to region-wide street centerline data, standardized addressing specifications and shared address matching applications.
- **Increased Data Accuracy.** Improved precision means that the locational characteristics of import and export businesses can be more accurately described. A question that could be answered more accurately might be: Near what urban services and commercial and industrial establishments are electronic component assemblers located?
- **Increased Timeliness.** Shared data access, standards and applications also decrease project development time. By using data standards and applications that are meant to work together, Hennepin International would experience fewer delays due to process development time. By using shared data, standards and applications, Hennepin International would no longer be dependent on another organization to complete priority work.
- **Reduced Consultant Costs.** Hiring consultants becomes less costly when the consultants are familiar with MetroGIS data, standards and applications. The consultants can spend less time writing applications, developing data and organizing projects and more time producing desired results.

Twin Cities Metropolitan Area Locations of International Trading Companies Headquartered in Hennepin County



The original data table, containing business names, addresses and five-digit zip codes, was processed using postal coding software which assigned nine-digit zip codes to records for which adequate addresses were available. The resulting data file was then geocoded to the Metropolitan Council's "Zip+4" coverage using the ArcView 3.0 geocoding process. This resulted in an 88% match rate, or, geographically correct placement of 2,932 of 3,334 records.

MetroGIS: Benefits

Cities: Minneapolis Public Works Department

The Organization: The Minneapolis Public Works Department (MPWD) creates comprehensive engineering plans for all capital improvement projects, including: street, sewer, water and traffic improvements and coordinates GIS mapping for all City of Minneapolis departments. To perform these functions the MPWD builds, maintains and distributes comprehensive property, planimetric, topographic, utility, and digital ortho photography mapping databases within the corporate limits of Minneapolis.

The Issue: The MPWD only maintains engineering and GIS mapping data within the corporate limits of Minneapolis. However, many capital improvement projects and GIS requests extend beyond the City's corporate limits. A recent request for engineering and GIS mapping on University Avenue at the Minneapolis/St. Paul border illustrates the potential of MetroGIS.

In the Past: Prior to MetroGIS, similar requests were either overlooked or painstakingly completed.

Not only does the border between Minneapolis and St Paul separate two cities but it is also the border between Hennepin and Ramsey counties. Each of these four agencies has a unique GIS system, with distinct maps stored in different coordinate projections. In addition, capital improvement projects involve non-public utility companies, such as Northern States Power Company, the local electric utility, which also have data stored in a unique system.

Creating capital improvement maps beyond the corporate limits of Minneapolis was an arduous task for MPWD. It included finding the proper contact at each agency, who would extract the electronic map, and transmit it to MPWD. Then GIS technicians would convert the map to the local coordinate system and symbol nomenclature, and combine it with MPWD maps.

In General, only the highest priority projects warranted this kind of effort.

Today: The task is made simpler with the beginnings of MetroGIS in place. Certain map data sets, like the road centerline and municipal boundary files, are available via MetroGIS and are already loaded on the MPWD system. Agreements are also in place to make additional datasets available to all MetroGIS users. These map databases include property parcels, planimetric and digital ortho photography.

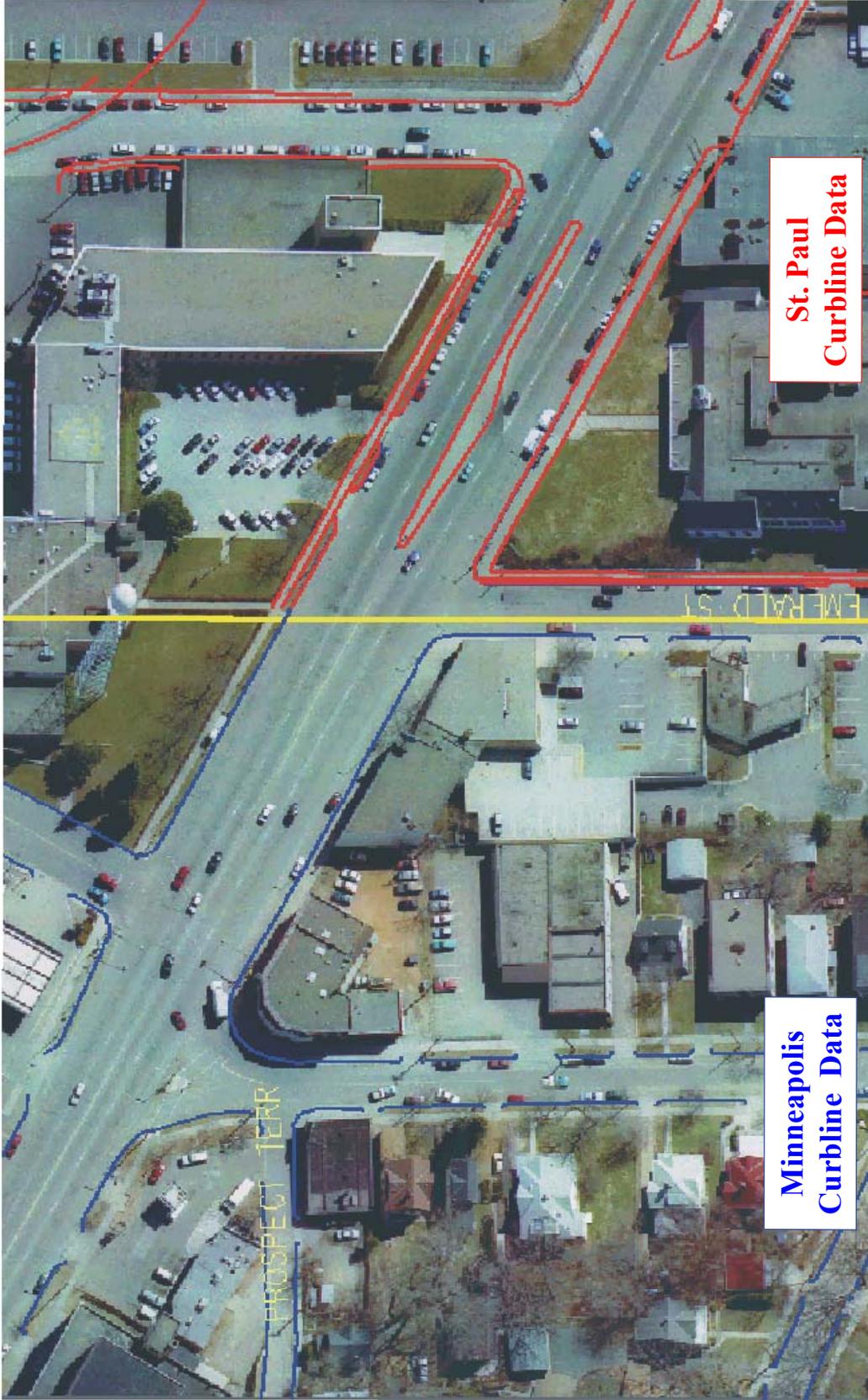
Working relationships built within MetroGIS have also helped MPWD identify the key data stewards in communities adjacent to Minneapolis.

In the Future: The value to all MetroGIS participants will increase exponentially with access to GIS data sets from multiple agencies. For example, data sets from multiple agencies were used to create this powerful yet sublime map. It not only shows what can be done with a mature MetroGIS central clearinghouse in place, it also shows what users will easily and quickly be able to do from their desktop.

Value:

- **Quick Turnaround:** With the central MetroGIS map clearinghouse available, it will be possible to create complex engineering and GIS maps that extend beyond Minneapolis limits in hours instead of days or weeks, which was the case without MetroGIS.
- **Reduced Costs:** Less handwork with quicker turnaround will translate into less cost.
- **Accurate and Current Data:** By sharing GIS data through MetroGIS, agencies that originate the data can easily share the best available information with others. A good example is the TLG road centerline data set that is available to MetroGIS participants. After the TLG data was initially loaded into the MPWD GIS system, the Minneapolis portion was compared against more accurate Minneapolis data. The corrections were sent to the data vendor and quickly implemented on the original TLG data. An updated TLG road centerline data set was returned to Minneapolis and loaded into their system. At the same time, the updated TLG data was available to all MetroGIS users.

Multiple County Planimetric Fit



**Minneapolis
Curbline Data**

**St. Paul
Curbline Data**

The separate Minneapolis and St. Paul planimetric data files match at the common city boundary.

MetroGIS: Benefits

School Districts: Lakeville

The Organization: Lakeville School District serves 11 individual schools in the counties of Dakota and Scott. Lakeville is a rapidly growing outer-ring suburb in the metropolitan area. The number of students being served by the school district is also growing as a result of the population increase.

The Issue: Decisions about where to locate new school facilities, programs, and school boundaries need to be made to meet changing student population distributions.

In the Past. Before MetroGIS, school siting decisions in Lakeville were made without the benefit of GIS data. Sites were analyzed for suitability. However, without access to GIS information about parcels, it was impossible for the school district to map the residence of pre-school age children relative to the potential new school sites.

Today. Through the MetroGIS agreements, parcel data from Dakota County has been provided to the Lakeville school district. Scott County is expected to provide parcel data to the school district soon. The district will be able to analyze the distributions and concentrations of different age populations. Better decisions will be made about where to locate new facilities, where to target special programs and service delivery; and how to more efficiently route buses.

In the Future. As more and more data (such as the Street Centerline data set and socioeconomic data) become available through MetroGIS, Lakeville school district will continue to increase its ability to match the needs of families with resources.

Value.

- **Reduced Costs.** The Lakeville school district will benefit from MetroGIS in a number of ways. The GIS data sharing agreements have created conditions which allow districts to obtain GIS files from counties and cities at a fraction of the cost that would have been incurred if the district had developed that information itself. Lakeville wants to build a GIS but is in a municipality that does not have existing GIS centerline data. Use of the Lawrence street centerline data through the MetroGIS initiative has added a valuable data set to Lakeville School Districts GIS.
- **Common Language.** Another less obvious benefit to Lakeville School District is that GIS is a common language that all units of government can use. By promoting this common language the MetroGIS effort has also facilitated greater communication between school districts, cities and counties.
- **More Accurate, Current Information.** Through the use of county parcel databases, The Lawrence Group street centerline data set, and other data available through MetroGIS, the Lakeville School District will be able to base decisions on the most current, accurate information available.
- **Identifying local unique characteristics and needs.** Development of a GIS using MetroGIS resources will allow Lakeville School District access to information specific to their geographic area. Local unique characteristics and needs can be more readily available than is possible with less specific data.

MetroGIS: Benefits

Watershed Districts: Ramsey Washington Metro

The Organization: The Ramsey Washington Metro Watershed District which straddles the boundary between Ramsey and Washington Counties is charged with managing water resources through regulations and construction projects.

The Issue: The Ramsey Washington Metro Watershed District advocates the sealing of abandoned wells to help preserve the quality of the region's ground water. Critical areas for sealing abandoned wells have been identified. However, determining which wells are within the critical areas is a complex task best completed with the use of a GIS and data available from other government agencies.

In the Past. Previously, the process of determining whether a well is in a critical area involved using paper maps and information about the nearest street intersection. County parcel maps have improved the watershed district's ability to accurately locate wells, but often well owners do not have enough information to locate the well. (E.g. property identification number).

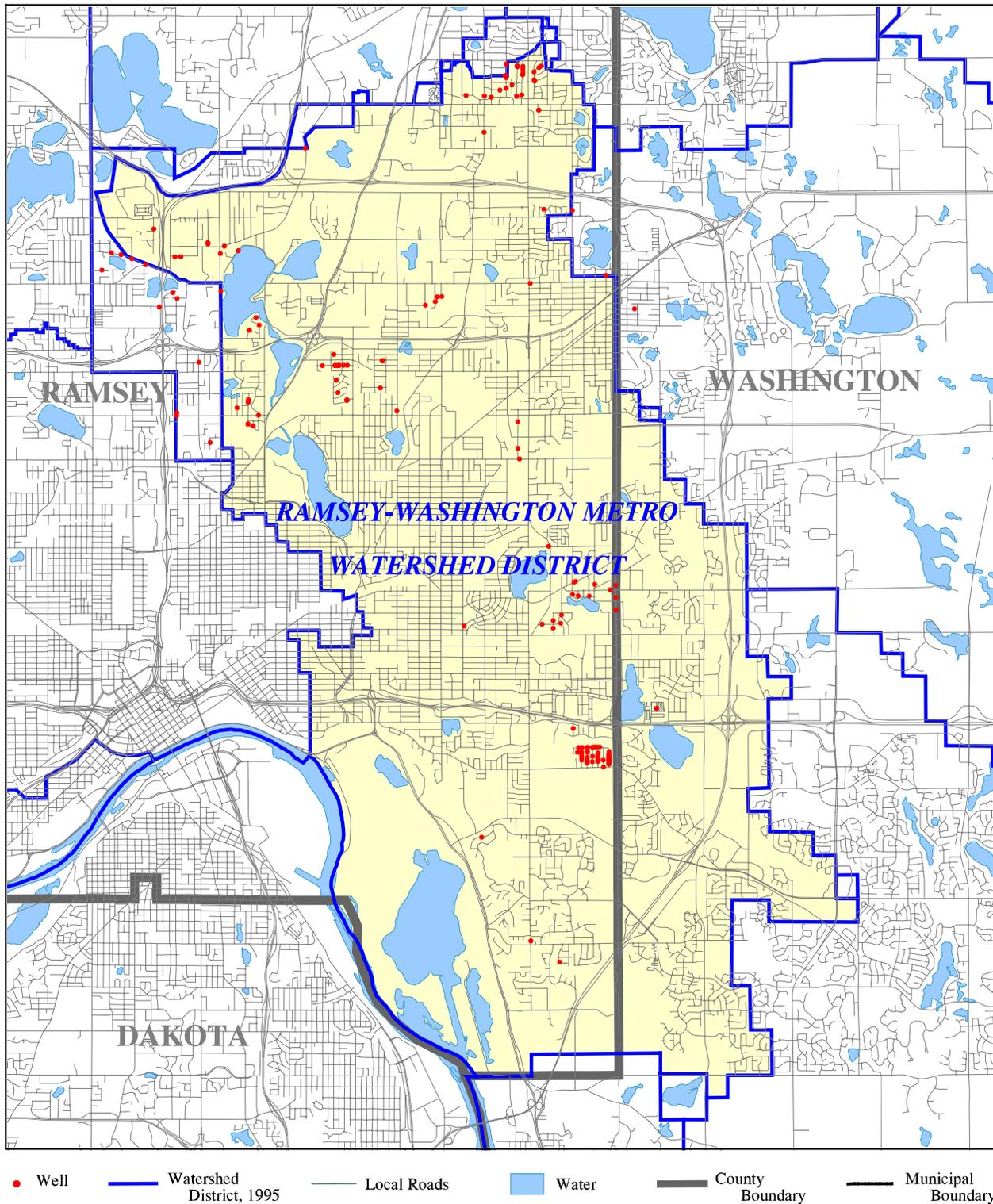
Today. The use of county parcel GIS data through MetroGIS data sharing has improved the watershed district's ability to accurately locate wells. The availability of street centerline data has provided another method for locating wells by using street addresses.

In the Future. Improving integration of street centerline and parcel data, establishing standards for sharing parcel data between counties and improving address information will all help improve the accuracy with which abandoned wells can be located.

Value.

- **Faster Public Service.** The use of both county parcel data and street centerline data increases the effectiveness of watershed district staff in determining a well location when a well owner calls in to inquire about eligibility for the well abandonment program. Staff time is reduced and citizens are satisfied with the service they receive.
- **Reduced Programming Costs.** It will eventually become possible through the MetroGIS initiative, to translate county parcel attribute data into a region-wide standard. This will increase the value of parcel data in well abandonment programs throughout the region, because the same computer programs can be shared between watershed districts. One well abandonment application can be written and shared among all interested watershed management organizations. (One program serves 10 organizations.)

Ramsey-Washington Metro Watershed District



The Ramsey-Washington Metro Watershed District straddles the boundary of Ramsey and Washington Counties. The well symbols represent wells which have been properly abandoned through the Watershed Districts well abandonment program.

DATA SOURCES: Ramsey-Washington Metro Watershed District; Ramsey County; Washington County; The Lawrence Group; Metropolitan Council

MetroGIS: Performance Measures Case Study

METROPOLITAN MOSQUITO CONTROL DISTRICT

Organization: Metropolitan Mosquito Control District (MMCD)
MMCD Staff Contact: Nancy Read, Technical Services Leader
nancread@visi.com
651-645-9149

Date of Interview: April 9, 2002

Interviewers: Jeanne Landkamer, Landkamer Consulting
612-722-3999
Kathie Doty, Richardson Richter and Associates
651-222-7227

Organizational Profile: The mission of the Metropolitan Mosquito Control District is to promote health and well being by protecting the public from disease and annoyance caused by mosquitoes, black flies and ticks in an environmentally safe manner. The district surveys for and controls mosquitoes that transmit human diseases; monitors deer tick populations and provides public education; and provides related services to the seven-county Twin Cities metropolitan area.

Uses of GIS: The District's primary use of GIS is in providing maps to its 150 field inspectors. These maps, which currently contain orthophoto, street centerline, parcel, wetlands and woodlands data, are used to help the inspectors locate and treat mosquito-producing areas.

Success Story: The treehole mosquito, one of several common mosquito species tracked by the District, carries the potentially fatal LaCrosse Encephalitis virus. The District's goal is to prevent incidents of the disease. The mosquitos breed in treeholes, discarded tires, pockets of wet tarp and other containers where small amounts of water can accumulate.

The field maps created with the District's GIS, combined with detailed data sheets used to record information during site visits, help inspectors to: find and document breeding sites; destroy or remove the sites; and keep track of when and which properties have been inspected. In addition, GIS can accelerate the notification process of neighboring property owners when a case of the disease is reported. GIS also helps determine the probable area of origin of the disease-carrying mosquito, thus guiding further prevention efforts.

The Twin Cities metropolitan area, with a 2000 population of more than 2.6 million people, has had an annual average of just 2.2 cases of LaCrosse Encephalitis in the last six years. The number of cases per 100,000 population aged 18 and under (the at-risk population) in the metro area is 1/10th that of other areas where the disease is endemic in southeastern Minnesota. In addition, the metro area cases are now more likely to occur near the outer edge of the District.

Impact of MetroGIS: Producing local maps for the District's field inspectors has changed dramatically since the advent of MetroGIS. Before 1995, the District hired a firm to take aerial

photos of a small portion of the metro area every three to five years at a cost of \$5,000 to \$10,000, according to MMCD Technical Service Leader Nancy Read. The photos served as a base layer for some of the maps, which district employees spent the winter months hand-drawing and coloring. The maps were updated only once every five years, and were closely guarded because losing one represented many additional hours of work. Read estimates that it takes 1/10th the time to produce field maps with GIS than it did before, allowing a much-needed shift of resources from map production to field inspection and prevention work.

The accuracy of the maps was greatly improved with the addition of the street centerline data layer, made available to the District free of charge through MetroGIS. Orthophotos of the entire seven-county region taken under contract for the Metropolitan Council every three to four years--and made available through MetroGIS for a nominal cost--have reduced the cost and greatly increased the currency of the field maps. "The orthophotos have been our lifeblood," says Read.

Parcel data is critical for the District's work in several respects. One is when the District needs to notify people quickly about increased risk of disease. Another is when inspectors need to respect the wishes of individual property owners for differing treatment methods. According to Read, owners previously would sometimes describe the boundaries of their property very liberally. With parcel data on the field maps, inspectors can see where property lines are located.

Before MetroGIS, the District acquired parcel data for a fee from each county, having to sign separate license agreements. Now parcel data is free through the MetroGIS data-sharing agreements, with one license agreement covering almost the entire metro area. Furthermore, with the advent of the regional parcel dataset developed collaboratively through MetroGIS, Read will no longer have to spend time reconciling the differing county parcel data to the UTM coordinate system used by the District. She will be able to download easily what she needs from the MetroGIS Web site, DataFinder, using the District's software platform.

DataFinder is a useful source of other data used by the District, including population density and other Census data used for planning services. Data acquired through MetroGIS is useful in making presentations to county boards and other groups about the work of the District. The District hopes in the future to distribute its digitized wetlands data through DataFinder.

Another big benefit of MetroGIS to the District has been the networking and learning opportunities it has provided. Read has found other GIS users with similar interests through MetroGIS and has done some data trading.

In summary, MetroGIS has greatly reduced the cost and time required to produce the District's field maps while increasing their accuracy. More of the agency's resources can be directed towards its core mission.

MetroGIS: Performance Measures Case Study

TIES

Organization: TIES—Technology Information and Education Services
TIES Staff Contact: Dick Carlstrom, GIS Consultant
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651-999-6324

Date of Interview: April 9, 2002

Interviewers: Jeanne Landkamer, Landkamer Consulting
612-722-3999
Kathie Doty, Richardson Richter and Associates
651-222-7227

Summary Author: Jeanne Landkamer

Organizational Profile: TIES—Technology Information and Education Services—is a cooperative of 36 Minnesota school districts, the vast majority of which are in the seven-county Twin Cities area. TIES offer products, services and training in five major areas: technical services, student information and administration, systems software support, transportation, and learning and technology.

Uses of GIS: TIES provides GIS consulting and services to its member districts for a variety of purposes, among them: planning future facility needs, including siting new schools; establishing or altering school attendance boundaries; demographic analysis; and transportation mapping. For TIES member school districts, GIS is an integral tool for both making good decisions and communicating with the public during and after the decision-making process.

Recent Successes: A) During the 2001-02 school year, the Anoka-Hennepin School District decided to change its school busing policy to help address a \$10 million district budget deficit. The previous policy was that all students outside an area within one mile of each school would be provided free bus service. The new policy changed the distance to two miles, but left open the option for students from one to two miles from school to pay for bus service.

District staff met with law enforcement and transportation officials to identify safe walking routes and locations for crossing guards. The district then asked TIES staff to use GIS to develop, for each school in the district, a map of the school attendance area showing safe walking routes and crossing guard locations. Streets, parks and lakes, and parcel lines were included so families could pinpoint their house. These maps (see attached sample) were posted on the school district Web site. District officials report overwhelmingly positive comments from parents.

Helping parents choose appropriate routes for their children would have been a Herculean task without data mapping and the Internet, according to Chuck Holden, the district's director of operations. "A majority of parents in the district have access to the Internet," he said. "With this technology, we can easily provide a large amount of detailed route and crossing guard information very effectively."

B) The St. Louis Park School District was changing demographically and wanted to investigate the perception that many more low-income students were attending one elementary school in the district than the other. Using a combination of district-gathered demographic information and GIS parcel data, TIES was able to create for the district a map showing the distribution of students by income. The district is now revising its school boundaries to achieve a better socioeconomic balance in its schools. Putting the data into picture form helped school officials and school board members come to agreement and change the boundaries more easily.

Impact of MetroGIS: According to Dick Carlstrom, GIS consultant with TIES, neither of these—nor any of the GIS projects that TIES does for its member districts—would be possible without MetroGIS. What MetroGIS has done, Carlstrom says, is provide free access to critical data (e.g., street centerlines, parcels) which the districts could not, on their own, afford to acquire and/or manipulate for their purposes.

The unique public/private sector collaboration between MetroGIS, the Minnesota Department of Transportation and The Lawrence Group (TLG) provides TIES (and other metro area government entities) with free access to street centerline data. In contrast, if TIES were to acquire the street centerline data for all its constituent school districts, the current cost would be at least \$35,000, as estimated by TLG principal Larry Charboneau. TIES would also pay an annual cost of \$1,500 to keep the data updated. Most districts cannot afford to pay for the data, especially those facing tight budgets or even deficits, as many are today.

The data-sharing agreements negotiated by MetroGIS with counties also give school districts free access to county parcel data. Previously, in the St. Louis Park example above, TIES or the district would have paid the county to extract the school district portion of the county parcel data and send it to TIES. Now, with the new regional parcel dataset created through MetroGIS and available via the MetroGIS DataFinder Web site, TIES will no longer have to acquire parcel data from each county separately and manipulate it. Acquiring up-to-date, accurate data will be a quick, one-stop process. Without the data-sharing agreements, TIES and its constituent members would have gone without the data—it is simply not within the budgets of most school districts.

The ability to do detailed demographic analysis is a result of having the parcel data, according to Carlstrom. No one would spend the time necessary to put the analysis in picture form by hand—it would be extremely painstaking and time-consuming.

Beyond the unparalleled access to data provided by MetroGIS, Carlstrom said that one of the biggest benefits for him has been the collegiality and support of the MetroGIS community. Getting together at meetings provides people with an opportunity to find out what other GIS professionals in a variety of organizations are doing, what challenges they are facing and how they are overcoming them. He said the assistance he received from these colleagues as TIES set up its GIS shop was very important.

MetroGIS: Performance Measures Case Study

METROPOLITAN COUNCIL

Organization: Metropolitan Council
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Date of Interview: April 30, 2002
Interviewer: Jeanne Landkamer, Landkamer Consulting
612-722-3999

Organizational Profile: The Metropolitan Council coordinates planning and advocates Smart Growth development in the seven-county Twin Cities region through joint action with the public and private sectors. The Council operates regional services including wastewater collection and treatment, transit, and housing assistance to low-income individuals and families. The Council also establishes policies and provides planning and technical assistance to communities in the region for airports, regional parks, highways and transit, sewers, air and water quality, land use and affordable housing.

Uses of GIS: GIS is an integral tool for the Council's work with local communities in planning for regional growth. For example, GIS data and maps allow the Council to: get a region-wide view of current and future land use; make more reliable growth forecasts; predict more accurately the development capacity of the region; and very importantly, communicate more easily with local communities. GIS is used in myriad ways to improve Council operations. A small sample includes: mapping transit routes; siting potential affordable housing units; notifying people about sewer construction; and illustrating lake quality information.

Success Stories: 1) Planning for regional growth is central to the Council's mission. In 2002, the Council is developing a new regional growth strategy to guide local communities and regional investments in the coming decades. Part of the process of developing the new strategy is an unprecedented public involvement initiative called Smart Growth Twin Cities. Stakeholders and citizens were invited to participate in a series of workshops where, in small groups, they used an innovative planning game to create scenarios showing how and where to accommodate the growth that is forecasted for the region over the next 20 years. Participants discussed options and then placed chips representing various types of development on a GIS-developed map that included municipal boundaries, land use, transportation networks, lakes and rivers, natural resources and parks, and other data.

The Council's consultants, Calthorpe Associates—recognized leaders in the nation in urban planning—used the workshop-created scenarios to develop two overall growth scenarios for the region that can be compared to a baseline model. The baseline is a compilation of the updated comprehensive land use plans of the nearly 200 municipalities in the seven-county area. These plans contain the future land uses planned by each

community. The two new scenarios represent alternatives that contain more walkable, transit-oriented development and more intense redevelopment to limit both the amount of open space consumed by growth and the new infrastructure costs associated with greenfield development. The scenarios are detailed to the parcel level.

The scenario maps rely on a variety of GIS data including a generalized regional future land use scheme, parcels, street centerlines, natural resources and more. Peter Calthorpe, in a May 2002 presentation to the Metropolitan Council, called this region's GIS database "one of the best in the country." The level of detail, particularly in terms of parcels and future land use, was critical to his firm's analysis. The maps will be a significant communications tool at several community dialogues in 2002 as the Council seeks public input on a regional growth strategy.

"These maps show what would be practically impossible to explain in words," says Metropolitan Council Member Roger Williams. "They allow us to visualize the impact of various actions we might take."

2) GIS is an integral component of the Council's day-to-day operations. For example, the Council is planning to build a new sewer interceptor through Dakota County, which is largely rural. A combination of orthophotos, street centerline and parcel data was used to create a map of the proposed interceptor route that greatly enhanced communication with residents along and near the route (see attachment). The parcel data facilitated quick notification of all affected residents.

Each parcel owner was mailed the route map. With that level of detail in hand, residents were able to give the Council better feedback about the route and provide information that didn't show up on the map, for example, the location of a tiny rural cemetery. The chair of a local town board in the county praised the Council for its "superb job" in communicating with the public on the matter. The process left rural residents with a positive image of the Council.

Impact of MetroGIS: MetroGIS played a crucial role in the success of both the projects discussed above. The regional data solutions chosen and developed through MetroGIS—especially the regional parcel data and the generalized future land use data—made the regional growth scenarios possible and greatly enhance the Council's general planning capabilities. Both datasets were priorities of the MetroGIS community, and both were developed over a period of years on the basis of local pilot projects. The future land use dataset¹ allows the Council (and other units of government) to make "apples-to-apples" comparisons of planned land use between communities. The innovative dataset is, as far as staff is aware, unprecedented in the GIS community nationwide.

¹ Attached, for illustration and comparison, are two planned land use maps for three adjacent communities in the Twin Cities Area. The first map shows a compilation of individual community future land use designations as they appear in the local comprehensive plan of each community; the second, the simplified regional future land use coding scheme developed by MetroGIS.

Over the seven years since the birth of MetroGIS, the credibility of the Council with local governments has increased greatly, for several reasons:

- ◆ The level of detail in the Council's data has increased dramatically because source data are accessible from other organizations through the MetroGIS data-sharing agreements.
- ◆ MetroGIS was set up to be extremely participatory; local governments are an integral part of the process of setting priorities, and developing standards and policies. Local governments share ownership in the results.
- ◆ The investment the Council has made in MetroGIS has generated a great deal of goodwill from local governments across the region, especially those that use street centerline, parcel and other regional datasets in their day-to-day operations.

The Council's mission is to "improve regional competitiveness in the global economy so that this is one of the best places to live, work, raise a family and do business." Embedded in the concept of high quality of life is a well-functioning GIS infrastructure that facilitates the flow of accurate, reliable information for decision-makers. The MetroGIS data-sharing agreements greatly reduce data development costs, the single-biggest expense of developing a viable GIS, making GIS a tool that local governments can afford.

MetroGIS also facilitates the way the Council conducts its business. The quality and quantity of mission-critical data available through MetroGIS makes it much easier to communicate with citizens, local communities and regional policy-makers. Rick Gelbmann, the Council's GIS Manager, estimates that if the Council were to achieve the same level of data availability and quality without MetroGIS, it would be spending a minimum of 10 times its current GIS budget. The reality is the Council couldn't afford it, and simply wouldn't have the level of data resources it does now, limiting the types of analysis and communication it could do.

Part of what makes the MetroGIS regional datasets so valuable is their inter-operability—the way they can be easily layered. This is the result of standards developed and agreed upon by participants in MetroGIS. The development and widespread use of standards also reduces data costs and increases the data's utility.

The MetroGIS DataFinder, the Internet-based data information and distribution tool, has also aided Council productivity by increasing the amount of data that can be distributed and decreasing the amount of staff time spent on it. DataFinder had an average of 1,622 unique visitors in 2002; an average of 859 datasets, much of it Council data, were downloaded monthly in the same period. Because of the metadata on the site, the Council doesn't have to answer as many questions about available data. DataFinder also creates consistency in terms of data access and distribution policies. The 80+ Council GIS users know that any data request can be filled simply through referrals to DataFinder.org. Questions about access, licensing and documentation can all be answered on that one site.

Not only has MetroGIS reduced costs by facilitating data-sharing, but it has created a community of GIS users who can learn from each other's experiences. Relationships are established at committee meetings that develop and grow outside the MetroGIS forum. The cooperative atmosphere and good working relationships established through MetroGIS made possible the development of a region-wide future land use coding scheme, according to Gelbmann. "I don't believe it would have been possible for the Council to develop regional future land use data without the participation of the communities facilitated by MetroGIS," he said.

The Council has been a strong supporter of MetroGIS because of the clear benefits to regional planning and operations, and to government throughout the region, according to Council Member Williams. "I have to be able to see things spatially," he said. "The ability to overlay data from a variety of sources because of the MetroGIS collaboration pays off in better decisions and better communication with the public.

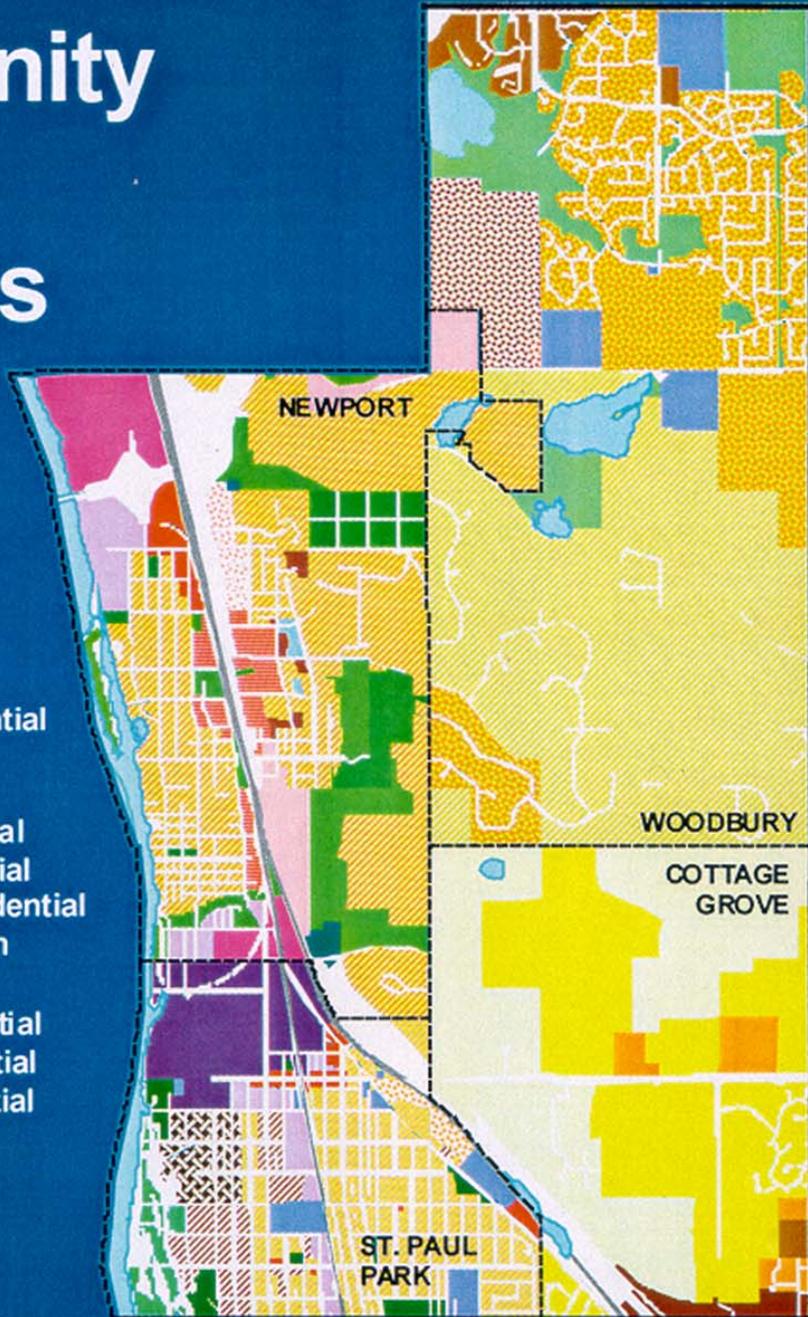
"Data-sharing has practical benefits—like saving time and money—for everyone involved," added Williams. "It's a win-win situation."

Community Coding Schemes

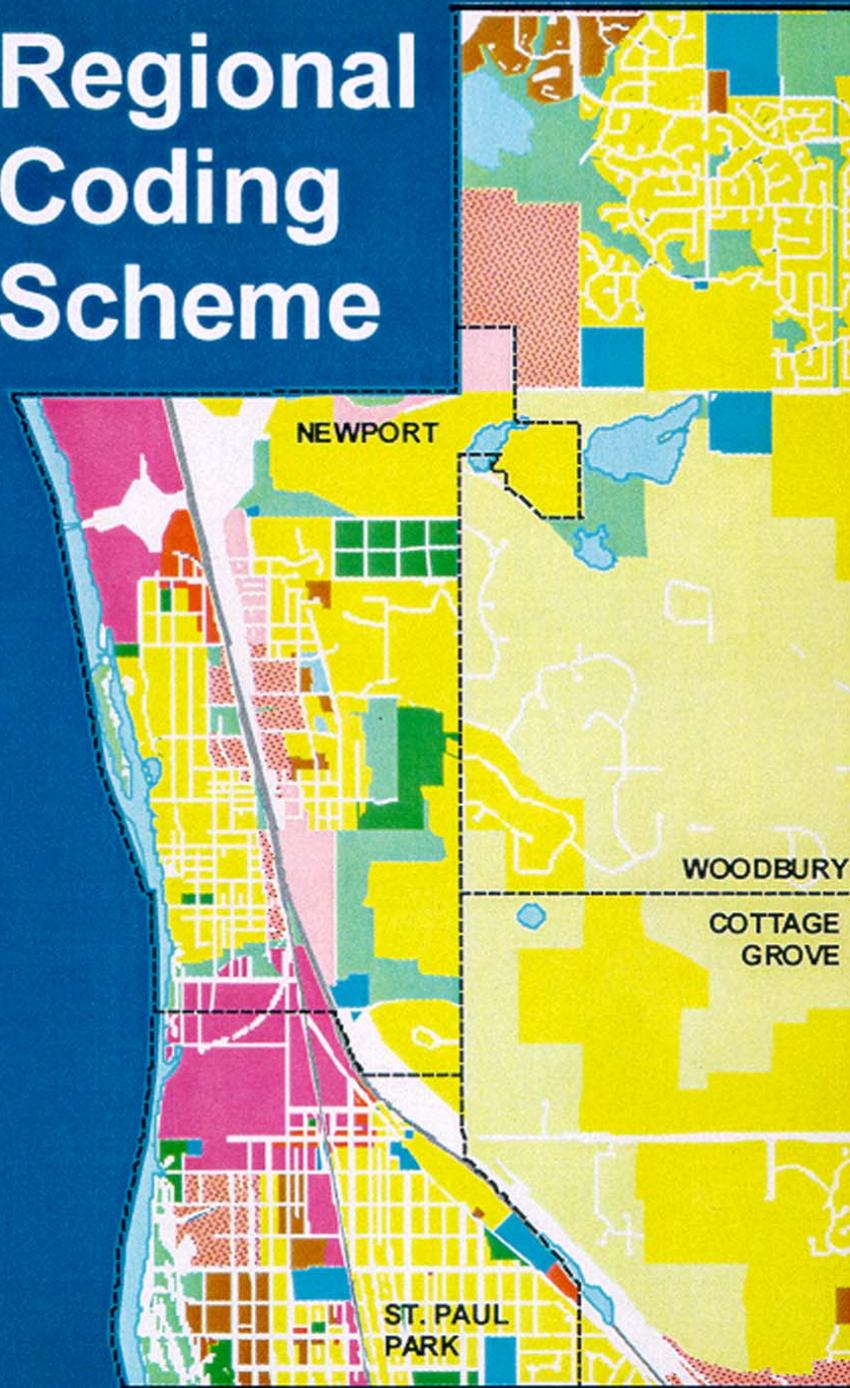
Community Designations:

-  Rural Residential
-  Rural Estate
-  Single Family Residential
-  Single Family Urban
-  Multi-Family
-  Multi Family Residential
-  Low Density Residential
-  Medium Density Residential
-  Medium Density Urban Residential
-  Mobile Home Residential
-  High Density Residential
-  Urban Mixed Residential
-  Commercial
-  Commercial/Service/Office
-  Business Park
-  Office/Warehouse
-  Places to Shop
-  Downtown/Mixed Use
-  Light Industrial
-  General Industrial
-  Industrial
-  Heavy Industrial
-  Mixed Use
-  Places to Work
-  Public/Semi Public
-  Cemetery

-  Green Space
-  National Wetlands Inventory
-  Open Space
-  Park
-  Parks and Recreation
-  Railway
-  Right of Way
-  Water



Regional Coding Scheme



Regional Land Use Codes:

 Rural Residential	 Mixed Use
 Low to Medium Density Residential	 Institutional
 High Density Residential	 Open Space
 Commercial	 Park and Recreation
 Office	 Railway Corridor
 Industrial	 Roadway
	 Water

MetroGIS: Performance Measures Case Study

RILEY-PURGATORY-BLUFF CREEK WATERSHED DISTRICT

Organization: Riley-Purgatory-Bluff Creek Watershed District
Staff Contact: Tim Anderson, Barr Engineering
tanderson@barr.com
952-832-2600
Date of Interview: Oct. 10, 2002
Interviewer: Jeanne Landkamer, Landkamer Consulting
612-722-3999

Organizational Profile: The Riley-Purgatory-Bluff Creek Watershed District was formed in 1969 to enhance water quality and to protect residents from flooding in the 46-square-mile District. Under state law, it is responsible for water resources planning. The District works with other government bodies to regulate stormwater runoff, improve water quality, and provide recreation. The District also works with developers on any project that proposes to alter floodplains, wetlands or streams. The District requires permits for such projects to ensure that land use changes do not negatively impact water quality and flood protection. District review of permits provides an opportunity for citizen input on water-related issues.

Uses of GIS: Geospatial data are critical for a great deal of the District's work, including erosion control permitting, flood prevention, and water quality monitoring and prediction. Among the data used by the District are parcels, future land use, orthophotos, soils and land cover.

Recent Successes: The MetroGIS future land use dataset is used in computer models that can help predict the quality and quantity of surface-water flows in 2020. Barr looks at the development plans of the cities in the District, and is then able to evaluate the impacts on area lakes. With that information, it can create different scenarios for how to maintain and improve the conditions of the water bodies.

The District recently published a colorful map that highlights parks and trails located in the District. Data for the map came from a number of sources, including the parks/features element of The Lawrence Group dataset, available free of charge to government users through MetroGIS.

Impact of MetroGIS: The District, like many government entities that participate in MetroGIS, finds that one of the biggest benefits of MetroGIS is www.datafinder.org, the one-stop shop for data that the District uses in its everyday operations.

GIS Specialist Tim Anderson, of the District's consulting firm, Barr Engineering, explains that before MetroGIS, his firm had to spend time and money getting data from two separate counties and several cities and then reconciling the data. Through the MetroGIS data-sharing agreements, that data can be downloaded for free and is often contained in a regional dataset that doesn't require any further work to piece it together. "This represents a savings for our clients because we don't have to generate or look for the data," Anderson said.

“It’s like manufacturers who get together to standardize the size of bolts,” said Conrad Fiskness, one of five managers on the Riley-Purgatory-Bluff Creek Watershed District Board, and a member of the MetroGIS Policy Board. “MetroGIS is an idea that makes sense—communities and agencies cooperating to develop standards that make sharing data easier and, in the process, save taxpayers’ money.”

MetroGIS: Performance Measures Case Study

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MetroGIS: Performance Measures Case Study

SRF CONSULTING GROUP, INC.

Organization: SRF Consulting Group, Inc.
Staff Contact: Robert Diedrich
Senior GIS Specialist
Rdiedrich@srfconsulting.com
(763) 475-0010
Date of Interview: October 2003
Interviewer: Jeanne Landkamer, Landkamer Consulting
612-722-3999

Organizational Profile: SRF Consulting Group, Inc., located in Plymouth, MN, is a full-service consulting firm that provides a wide range of planning, design and in-construction services for local governments, states, and other public entities. Services include local and regional government transportation plans, major river crossing studies, environmental impact statements, alternative urban area-wide reviews, archaeological assessments, market analysis, GPS collection and analysis, travel demand management plans, transportation-related design, and others.

Uses of GIS: All projects within the seven-county Twin Cities metropolitan area undertaken by SRF employ a variety of geospatial data made available through MetroGIS. These data are incorporated into a variety of maps and figures to convey pertinent information and concepts in reports, presentations and open house materials. Datasets frequently used in SRF projects include street centerlines, transit routes, parcels, future land use, orthophotos, soils, land cover and others.

Recent Success: SRF Consulting Group was hired as the lead consultant for a Trunk Highway (TH) 41 River Crossing Study in Scott and Carver Counties. The goal of the study is to identify a new Minnesota River crossing to connect TH 169 and future TH 312 in the vicinity of the existing TH 41 corridor in order to meet future travel demand caused by rapid population growth in the two counties.

In October 2003, SRF completed a draft scoping decision document for the project, which includes:

- An analysis of current and future transportation issues and needs in the corridor.
- A summary of the alternative solutions that were considered, the reasons for not carrying some alternatives forward, and a list of alternatives to be examined further in an environmental impact statement (EIS).
- A list of environmental issues to be studied in more detail in the EIS.

Impact of MetroGIS: The river crossing study is very complex in part because it involves multiple jurisdictions—three counties and several municipalities. MetroGIS DataFinder and the DataFinder Café data distribution tool quickly and nearly effortlessly provided SRF with accurate, up-to-date and seamless data covering the multiple jurisdictions. “GIS and MetroGIS

data is the quickest, most effective and least expensive technique to produce the highest quality analysis,” according to Bob Diedrich, Senior GIS Specialist with SRF.

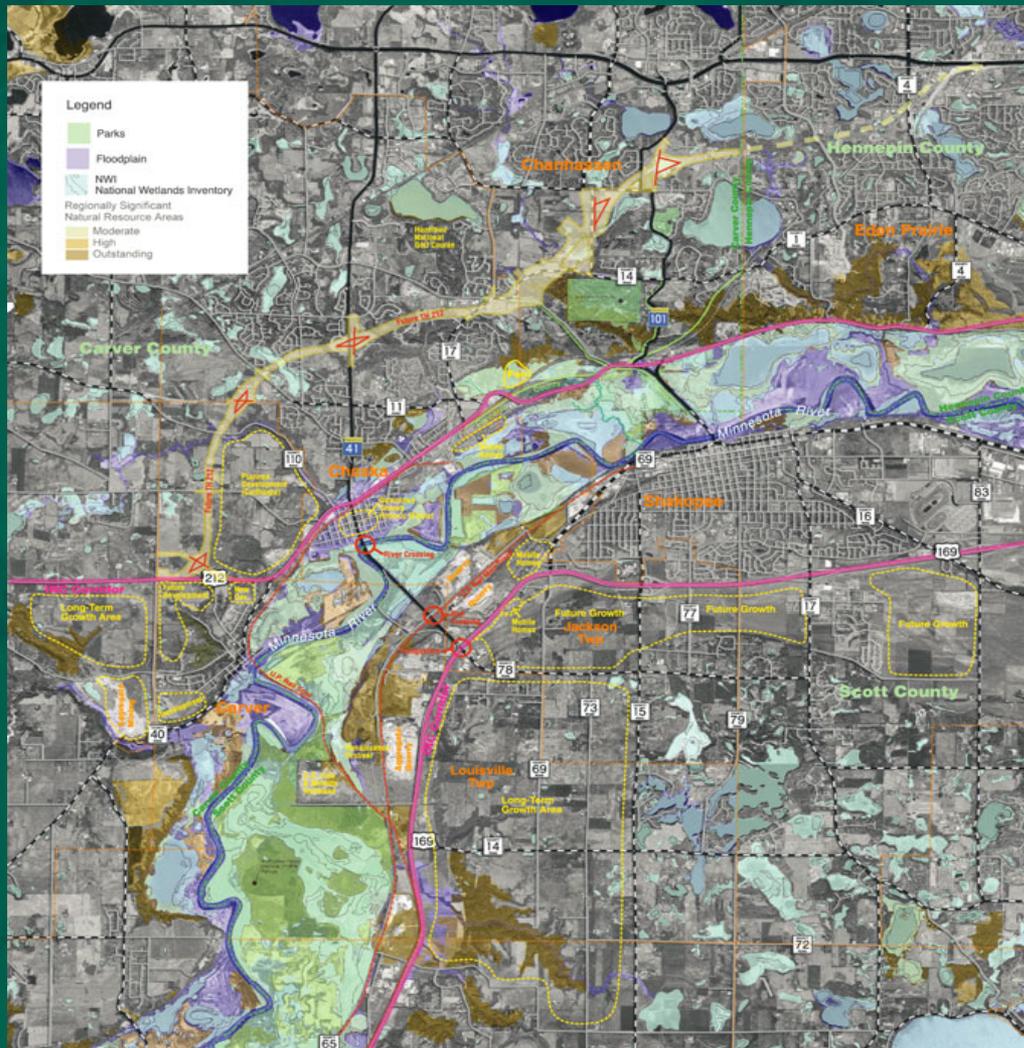
In particular, the 2020 Planned Land Use dataset has “revolutionized our planning practices,” said Diedrich. “This data has saved considerable time and effort in identifying and analyzing future development patterns. Before this data became available, we used paper maps for future land use patterns. We are saving our clients many dollars throughout the project, not to mention that the foundation of the analysis is more reliable and accurate.”

MetroGIS regional datasets have had some unexpected uses for SRF. For example, the existing and future land use datasets show park land and water. SRF can extract those features and create stand-alone layers, thus avoiding having to acquire them elsewhere.

In summary, the regional datasets made available through MetroGIS, and the ease with which they can be acquired through DataFinder Café, create productivity gains and cost savings for SRF, which in turn means reduced costs for their clients.

TH 41 - Minnesota River Crossing

Transportation Issues and Constraints



MetroGIS: Performance Measures Case Study

METROPOLITAN 911 BOARD

Organization: Metropolitan 911 Board
Staff Contact: Gordon Chinander, GIS Coordinator
gchinander@mn-metro911.org
651-603-0054
Date of Interview: Dec. 21, 2004
Interviewer: Jeanne Landkamer, Landkamer Consulting
612-722-3999

Summary: New telecommunications technologies, such as wireless phones, are the catalyst for expanded use of geographic information systems (GIS) by the Metropolitan 911 Board and the 27 emergency dispatch centers in the seven-county metropolitan area. The culture of data-sharing nurtured by MetroGIS, and the regional data made available through MetroGIS and its web-based DataFinder, are saving time and money for the 911 Board.

Organizational Profile: The Metropolitan 911 Board supports public safety for the residents of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington Counties by maintaining and enhancing 911 emergency telephone service and facilitating coordination of Emergency Medical Services (EMS). This coordinated, regional approach to 911 and EMS ensures the integrity and accuracy of the Metro 911 system while reducing costs.

Uses of GIS: The Board's primary use of GIS is to create and maintain spatial databases for the 27 Public Safety Answering Points (PSAPs), or emergency dispatch centers, in the seven-county metropolitan area. For example, the 911 Board created and maintains datasets such as emergency service zones and PSAP boundaries. Work is under way on a dataset that will map the location of police stations, fire stations, cell phone towers and other facilities critical to the operation of 911 and EMS.

Current project: The 911 Board's biggest current GIS project is to reconcile the differences between spatial datasets, like street centerline data used to map locations, with the Master Street Address Guide data file, which is used by wired telephone companies to create the location database records for 911. Combined with mapping applications used by the PSAPs, the result will allow dispatchers to see the location of an emergency call appear automatically on a live map screen, as well as identify the correct response agency. This would shorten the time in which dispatchers and emergency personnel could respond to calls.

Looking to the future: The 911 Board has two goals with regard to GIS. The first is to provide accurate spatial data to the PSAPs. The second is to create mapping standards for applications that would allow the PSAPs to identify the location of an emergency call on a live map screen, regardless of what telecommunications technology the caller uses. If the PSAP had Automated Vehicle Location (AVL) technology, the screen would also show the location of public safety responders best able to respond to that emergency. A robust database could include a point file

linked to locally maintained databases that contain additional information about buildings, such as whether they contain hazardous materials.

But such a database is an ambitious goal in an environment of fast-changing telecommunications technology. The explosion of wireless telephone use has created a major challenge for 911 service. The Twin Cities area's 911 system was established in the early 1980s, based on wired phone service. The system was designed to immediately provide the phone number and location of incoming calls (as tabular data) based on phone company customer records, updated daily. The system has worked well, with a few exceptions – such as calls coming from large, multi-building facilities like college campuses – which require implementation of additional technology.

Wireless technology is one of several new technologies that are creating the need for new solutions. Wireless calls are not made from a fixed location. Only recently have the wireless carriers in the Twin Cities area begun delivering caller location information along with voice on 911 calls. One solution employed by carriers uses global positioning satellite technology built into handsets, which requires PSAPs to translate a longitude and latitude coordinate on to a map view that often can be translated into a street address. “Wireless technology has pushed us into the GIS world,” said Pete Eggimann, 911 Services Director for the Metro 911 Board, “and it’s the way of the future.”

In this new environment, the Metro 911 Board is working on a number of fronts to continue assisting the PSAPs to respond more quickly to 911 calls. Among these efforts are adapting current datasets or developing new ones for the PSAPS, and developing uniform regional 911 dataset standards. The Board also works closely with local governments – which provide the bulk of emergency response services – to advocate for regulatory changes that will serve consumers by making the 911 system work as well as possible.

Impact of MetroGIS: For almost 10 years, MetroGIS has been bringing together GIS technical experts, managers and policymakers to share information, work cooperatively on projects of mutual benefit, develop data standards and create regional datasets. The working relationships and atmosphere of cooperation created by MetroGIS is making 911 GIS Coordinator Gordon Chinander's job easier.

A multi-agency working group, with staff support from MetroGIS, is exploring ways to make street centerline data more usable for public emergency response purposes. The group is also attempting to devise a set of standards, or requirements, for software vendors that will maximize the value of street address data.

“Without MetroGIS, we'd have to start over and duplicate everything they have done,” said Chinander, “like the single license agreement for data sharing, and the contacts among data producers and users. MetroGIS is way ahead of the curve, and has saved us a tremendous amount of time and money to get the information we need. It's helping us work a whole lot more efficiently.”

MetroGIS: Performance Measures Case Study

City of Roseville

Organization: City of Roseville
Staff Contact: Dennis Welsch, Community Development Director
dennis.welsch@ci.roseville.mn.us
651-792-7071
Date of Interview: May 18, 2005
Interviewer: Jeanne Landkamer, Landkamer Consulting
612-722-3999

Organizational Profile: The City of Roseville is a first-ring suburban community of 33,690, situated just north of St. Paul and east of northern Minneapolis. Located on two major highway arterials (I-35W & State Hwy. 36), it is a short commute to either downtown area. Roseville is considered the retail and commercial hub of the northeast suburban area.

Uses of GIS: The City of Roseville has been using geographic information systems (GIS) since 1993 as the primary means for producing its maps as well as for the preparation of many reports and other data that assist the city in its day-to-day business and decision-making. A few examples of Roseville's use of GIS include:

- Generating monthly reports on crime data mapped by address.
- Analyzing the fiscal impact of various redevelopment scenarios.
- Creating up-to-date mailing lists.
- Mapping and analyzing land use on a subregional level.
- Providing an online mapping service that allows viewers to access mapped data on city zoning, land use, demographics, development opportunities, parks and trails, and property tax and value.

Success story: Roseville is home to more than 2,200 businesses that employ more than 39,000 people, many of whom live outside the city. City staff rely on GIS data that cross city and county boundaries to undertake economic development planning that helps the city attract new businesses and assist existing businesses to grow and flourish. GIS gives the city the ability to map, analyze and cross-reference employment, demographic, housing and travel behavior data. For example, the city can analyze its housing stock to ensure the mix is affordable to current and potential workers in the city, thus reducing commute time and demand on area roadways. It can also look at demographic data to plan for the right mix of housing over a period of time.

Impact of MetroGIS: City planning is incomplete if it takes into account only what is happening inside the borders of the city. Roseville's employment base and travelsheds go well beyond its borders, so access to data about property characteristics, land use, employment, travel behavior and demographics from other cities and counties is critical. The culture of data-sharing facilitated by MetroGIS, and its easy data access tool, DataFinder, make cross-jurisdictional analysis not only possible but quick and easy.

“It would have been an onerous task for us to try to gather data from several cities and two counties on our own,” explained David Windle, Roseville’s GIS Coordinator. “The analysis would not be politically or technically feasible -- especially without the MetroGIS future land use data, which provides a common language that allows apples-to-apples comparisons.

“Having an organization that coordinates the sharing of data is a much more efficient mechanism than having all the region’s cities, and other organizations, spending time to acquire the data individually,” said Dennis Welsch, Roseville’s community development director. “The bottom line is better service to the public – by enabling management and elected officials to make more informed decisions because of access to the wealth of information that can be processed and displayed using GIS.”

Roseville is a member of the Ramsey County GIS Users Group, an alliance of cities, neighborhood groups, the county, schools and other organizations that use GIS in carrying out their missions. MetroGIS has been a “tremendous resource” for the user group, Windle said. When the group or some of its members are trying something new, they look to MetroGIS for guidance. “Inevitably, someone in the region has tried something like it. Through MetroGIS, we are able to talk on a regular basis with our colleagues across the region.”

Another important role that MetroGIS plays, Windle said, is in developing data standards and best practices that serve as guidelines for local communities. “Using the standards and best practices gives us a lot more confidence in our locally produced data. It also ensures that data from different jurisdictions is more likely to be compatible.”

With communities using MetroGIS-endorsed datasets as a base for their planning, the accuracy of data is not questioned nearly as much, said Welsch. “Communities can focus their discussions with the Metropolitan Council, for example, during the comprehensive planning process, on substantive policy issues rather than on whether the data are good or not.”

The Memphis Chamber of Commerce made a visit to the Twin Cities and Roseville several years ago, Welsch said. “They were astounded that the region had figured out how to get cities, counties, school districts and other local governments to share data. Now they’re working in their metropolitan area to get something similar started. MetroGIS is an asset we just can’t take for granted.”

MetroGIS: Performance Measures Case Study

Metro Evacuation Traffic Management Plan

Primary Organization: Computer Science Department, University of Minnesota
Staff Contact: Dr. Shashi Shekhar
shekhar@cs.umn.edu
Date of Interview: Sept. 27, 2006
Interviewer: Jeanne Landkamer, Metropolitan Council
Jeanne.landkamer@metc.state.mn.us

Summary: The availability of regional data through MetroGIS makes emergency evacuation planning less costly and time-consuming, and more effective.

Problem: Evacuating large numbers of people during a natural disaster or terrorist attack is an immense challenge for emergency management professionals. Hurricanes Katrina and Rita vividly illustrated the problem. Miles-long traffic jams on Texas freeways as Rita bore down on Texas exposed the limitations of the regional transportation network and the inadequacy of evacuation route planning.

Efficient tools are needed to produce plans that identify routes and schedules to evacuate affected populations as quickly and effectively as possible. Dr. Shashi Shekhar, professor of computer science at the University of Minnesota, described how traditional computing methods can take from several hours to several days to determine evacuation routes from any particular location, especially in heavily populated urban areas.

Motivated by the terrorist attacks of 9/11/01, Dr. Shekhar decided to create a tool that would allow emergency workers to quickly develop evacuation plans even for large-scale disasters involving multiple cities and townships.

Solution: Dr. Shekhar and his student research team developed a practical algorithm for evacuation planning that takes into account the capacity constraints built into transportation networks, but would determine a good solution to any large-scale evacuation problem much more quickly than the traditional mathematical programming approach. They dubbed the algorithm the Capacity Constrained Route Planner (CCRP).

The CCRP got its first major test in 2003 when it was used to create an alternative evacuation plan for a disaster scenario at the Monticello nuclear power plant. Using GIS, the researchers were able to model the transportation network surrounding the plant by incorporating population data for each part of the network. The resulting plan reduced evacuation time from four to two-and-one-half hours.

Based on their test experience, Dr. Shekhar and his team further refined the CCRP. In 2005, they collaborated with many partners, including the Minnesota Department of Transportation and URS Corporation, to develop evacuation plans for five locations in the Twin Cities area with up to 150,000 people in a one-mile radius. The CCRP was able

to produce viable evacuation plans for each scenario “in just a couple of minutes,” Shekhar said.

The tests resulted in an interesting finding, Shekhar said. It turns out that within a one-mile radius of a disaster occurrence it is more efficient for people to evacuate by walking rather than driving. If people walk to a pre-assigned point where they can be picked up by public transportation, congestion is reduced and the evacuation proceeds in less time.

Dr. Shekhar’s team ultimately developed a web-based interface that with a few clicks of a mouse allows emergency management workers to create an evacuation plan for any point in the seven-county region. The team is now exploring phased evacuations, contra-flow traffic management and other ideas to further reduce evacuation times.

Impact of MetroGIS: In order to run the algorithms, the research team needed a variety of geospatial data, including road maps with capacity information and basic daytime population estimates. Much of the required data were available free of charge on the MetroGIS DataFinder website.

“If we didn’t have easy access to these datasets then the use of our algorithms would be extremely difficult if not impossible,” said Dr. Shekhar. Collecting and verifying the data from multiple jurisdictions would take a tremendous amount of time. The cost could make such an effort less attractive.

“Without regional data, we wouldn’t be able to do evacuation planning for multiple areas,” explained Sonia Morphew, director of the Minnesota Department of Transportation’s Office of Homeland Security and Emergency Management, and a partner on the emergency evacuation planning project. “Regional data allow us to keep a constant flow of traffic instead of having a number of separate plans that could contradict each other.”

“The availability of critical GIS data layers is very important for emergency preparations and management,” Dr. Shekhar summarized. “Such datasets can greatly reduce evacuation times and the risk of exposure for vulnerable populations, ultimately saving many lives.”

[Read more about the technical details of the CCRP.](#)

MetroGIS: Performance Measures Case Study

Planning Assistance for Growing Communities

Primary Organization: 1000 Friends of Minnesota
Staff Contact: Sally Wakefield
Geospatial Services Manager
651-312-1000, ext. 13
swakefield@1000fom.org

Date of Interview: Dec. 13, 2007

Summary: MetroGIS data makes it possible for the nonprofit 1000 Friends of Minnesota to assist small but growing communities on the edge of the region to plan their future and involve citizens more effectively in the planning process.

Problem: Minnesota's population is growing steadily. Nowhere is that growth more evident than in a corridor running roughly from St. Cloud on the northwest through the Twin Cities metropolitan area and southeast to Rochester.

Many small communities in the path of this growth have a vision of maintaining their community character, open spaces and rural lifestyle, while also enjoying the economic development that growth can bring. However, they lack the financial and technical resources for adequate planning to make their vision reality.

In addition, it can be difficult for communities to engage their citizens in the planning process when the primary tools are abstract concepts like cluster housing or sustainable development. But when citizens can visualize their future using computer mapping tools, the concepts come to life.

Solution: Growing By Design Technical Resource Center, an initiative of the St. Paul-based nonprofit organization 1000 Friends of Minnesota, helps communities to think about their growth options, engage citizens in the planning process and forge a common base of understanding of planning concepts. It also brings geospatial data tools to small, growing communities that can't afford to set up their own geographic information system (GIS).

For example, 1000 Friends worked with the City of Dayton, in northwest Hennepin County, as part of a University of Minnesota Center for Urban and Regional Affairs (CURA) program called "The Edge Project." Funded by The McKnight Foundation, the project aimed to study issues faced by growing communities at the edge of the metro area and provide tools to help those communities with few technical and financial resources to do their planning.

1000 Friends assisted Dayton to develop a plan for parks, trails and open space. In 2000, the city had a population of 4,693 – a figure that is expected to grow to 28,700 in 2030. To create its 2030 comprehensive plan update, the city needed to determine where that

growth will occur, what areas the city wants to preserve as parks and open space, and how to connect development and parks with a system of trails.

“Interactive mapping is a canvas to facilitate that planning,” said Sally Wakefield, Geospatial Services Manager for 1000 Friends.

One of the goals in Dayton’s open space planning process was to take advantage of the detailed and localized knowledge of city residents. To accomplish that, Wakefield and CURA’s Dan Marckel used Google Earth aerial photos as a base map. They then layered on other data obtained through MetroGIS. Adding data like land use, surface water, significant natural areas, streets and sewer interceptors gave residents a more complete picture of what’s already on the ground in their community.

During an all-day “note-taking exercise,” residents were invited to come in at their convenience, look at the computerized maps and add information about different points or areas on the map. People could even add links to videos posted online, Wakefield said, such as someone describing the history of a farmstead or showing local nesting sites of declining bird species.

The resulting map was “remarkably detailed” and was very helpful in developing the city’s parks, trails and open space plan, said Tim McNeil, who participated in the planning exercise and is now a member of the Dayton City Council. “But it will go way beyond that for our comprehensive planning process. I’m hoping to use the map to create overlays for our ordinances so that, for example, we can decide to establish a more stringent standard for low-impact development in more sensitive areas.”

Part of the process was putting the maps on CD for residents to take home so they could get more familiar with the data. “Before the advent of public mapping systems like Google Earth only trained professionals had access to land-based data,” Wakefield said. “These public tools help build trust and a better understanding of the data. They also help people better understand their entire community, not just the area they live in.”

Impact of MetroGIS: “We used a ton of MetroGIS data for this project,” said Wakefield, listing transportation, sewer interceptors, parcels, street centerlines, current and future land use, parks and metro greenways. “There are many datasets created and/or maintained by MetroGIS that are crucial to planning in the metro area. You can’t get it anywhere else. It’s great that people can search for regional data and get most of it in one place.”

“We were working with a planner who had some GIS background but who didn’t know where to get data or which data were most appropriate,” Wakefield added. “We were not only able to access the data through MetroGIS DataFinder but we were able to educate the community about what data is available for their use.”

“The mapping tools that 1000 Friends brought us were critical,” said Erin Swtora, assistant to the Dayton City Administrator. “We’re a very small city, and we don’t have

the cash flow to implement a major GIS and to maintain it. Sally was able to step in, set it up, and get all of the data we needed. She was essential to our planning process. I'm sure she saved the city money in the long run."

1000 Friends will continue to rely on MetroGIS datasets during its six-year Community Growth Options project being launched in 2008. Backed by a new \$1.5 million grant from the McKnight Foundation, 1000 Friends – in partnership with the CURA and the U of M's Humphrey Institute of Public Affairs – will deliver direct planning and implementation assistance to 10 rapidly growing communities both inside and outside the seven-county metro area.