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# Nebraska GIS Steering Committee

## **Building a Spatial Data Infrastructure for Nebraska – December 2007**



*Coordinating the Development and Sharing of GIS  
Technology and Geospatial Data Among State, Local  
and Federal Agencies and the Private Sector*

— An Annual Report —



NEBRASKA GEOGRAPHIC INFORMATION SYSTEMS  
STEERING COMMITTEE

**BUILDING A SPATIAL DATA  
INFRASTRUCTURE FOR NEBRASKA**

An Annual Report

December 2007

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# Building a Spatial Data Infrastructure for Nebraska – December 2007

## — An Executive Summary —

**An Annual Report.** The Nebraska GIS Steering Committee is required by state statutes to submit an Annual Report on its activities to the Governor, the Legislature, and the Nebraska Information Technology Commission. For the last six years, the Steering Committee has woven into this Annual Report process the development and/or updating of a GIS strategic plan for Nebraska based upon the goals originally established in 2001.

In a recognition of the both accomplishments of many of those original goals and also a recognition of the changing environment and evolving role of state GIS coordinating councils, the GIS Steering Committee has determine that it is timely to undertake a major review and revision of its Strategic Plan during 2008.

**Strategic Direction.** The strategic focus of the GIS Steering Committee's efforts over the last year, and its future direction, reflects its mission statement and the seven long-range goals first outlined in its 2001 Strategic Plan.

*The mission of the Nebraska Geographic Information System Steering Committee is to encourage the appropriate utilization of GIS technology and to assist organizations to make public investments in GIS technology and geospatial data in an effective, efficient, and coordinated manner.*

This Annual Report and Strategic Plan provides an update on the status of each of the seven long-range goals and the related activities and provide a blueprint for future collaborative efforts directed towards realizing those goals.

**Overview of Six Year Strategic Plan Accomplishments.** Over the six-year period since the adoption of the original 2001 Strategic Plan, significant accomplishments have been realized, particularly in developing priority statewide geospatial databases that are needed by a wide variety of users. Over this six-year period, statewide geospatial databases have been developed, or greatly enhanced, for the following data themes: streams and surface water, aerial orthoimagery, surface elevation, ground transportation, groundwater/wells, geodetic control, watershed boundaries, and soil surveys.

In addition to database development accomplishments, the Steering Committee has actively supported the adoption and integration of GIS technology into homeland security and bioterrorism applications. The GIS Steering Committee has evolved to be the major coordination and collaboration mechanism for geospatial initiatives as they related to the geographic area of Nebraska. The need for land record modernization at the local government level has been studied, documented, and legislation proposed. Supporting the organization and development of a non-profit, professional Nebraska GIS/LIS Association and its biennial Nebraska GIS Symposium has advanced GIS educational efforts.

### **Accomplishments and Challenges in 2007.**

**Aerial Imagery.** Two new orthoimagery projects were completed in 2007, which demonstrate the evolving nature of interagency, intergovernmental collaboration in geospatial data development. The GIS Steering Committee actively supported a multi-jurisdictional collaborative effort to acquire high-resolution aerial imagery for much of Nebraska's urban area.

This interagency effort was organized under the auspices of the Omaha-area Metropolitan Area Planning Agency (MAPA) and resulted in imagery for an eight-county contiguous urban area around the Omaha-Council Bluffs-Lincoln area and three additional counties and four cities in non-contiguous areas in eastern and central Nebraska. Another collaborative imagery project involves the pooling of resources from several state and local agencies to acquire statewide, 1-meter, color imagery. Both of these collaborative efforts demonstrate the cost savings that can result from collaborative projects and the importance of coordination bodies such as the GIS Steering Committee to facilitate these organizational efforts.

Street Centerlines/Addresses. Three other efforts should be noted, both because of what they accomplished and because of the continuing needs they serve to highlight. Last year the GIS Steering Committee and the Office of the CIO worked with the State Patrol to pull together a “best available” statewide street centerline/address database for the State Patrol’s new statewide computer-aided dispatch system. This effort achieved its short-term goal of developing an interim dataset for this immediate application. However, all parties involved noted that because this data is very dynamic, there is a need to develop an on-going, enterprise-level approach to maintain this critical, dynamic statewide dataset, such that a multitude of users can depend upon having access to the most up-to-date and accurate data available. In 2007 an Advisory Committee on Street Centerline-Address Databases was authorized to make recommendations for an enterprise-level approach for the on-going development and maintenance of this critical dataset. Key players such as the Dept. of Roads, Public Service Commission, State Patrol, Office of the CIO and local governments are actively involved in this effort.

Shared Internet Map Services. Another 2007 initiative outlined the consensus that exists among several state and local agencies around the need to develop an enterprise-level Internet-based geospatial data exchange and map services network. GIS technology is evolving to use the Internet as a primary means to interactively share geospatial data and map services. To support the growing need to share geospatial data and map services among multiple users, an intergovernmental working group has recommended the development of an enterprise-level service, as an alternative to each individual agency developing and maintaining data sharing arrangements with other individual agencies. During 2007, this working group has worked through the OCIO to solicit \$218,000 in startup funding for this enterprise project. At the time of this report, efforts are focused on recruiting a technical lead for this intergovernmental project.

Strengthening Coordination Structures and Processes. There is a growing appreciation at the national, state, and local levels of the critical importance of strong state GIS coordinating councils. The projects highlighted in this report illustrate the importance of collaboration in today’s public agency GIS environment. The GIS Steering Committee’s structure, processes, and resources remain largely unchanged since it was originally created in 1991. However, the expectations of state coordinating councils have greatly expanded and evolved in the intervening years. If Nebraskans are to efficiently take advantage of this evolving technology, the capabilities of the state’s GIS coordinating body must be strengthened to meet the growing needs for collaboration. To critically examine and outline future GIS coordination and collaboration opportunities and needs, the GIS Steering Committee has solicited a \$50,000 grant to help underwrite a major statewide geospatial strategic planning effort in 2008.

# Building a Spatial Data Infrastructure for Nebraska — December 2007

An Annual Report

## Nebraska GIS Steering Committee

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# Building a Spatial Data Infrastructure for Nebraska — December 2007

## *Nebraska Geographic Information System Steering Committee*

### **INTRODUCTION**

The Nebraska Geographic Information System Steering Committee was established by the Legislature in 1991 (*Reissued Revised Statutes of Nebraska, 1943, §86-569 through §86-573*), in an effort to coordinate the implementation of GIS technology by public entities in Nebraska. Geographic Information Systems (GIS) is a powerful information technology that has numerous applications in both the public and private sectors. The Steering Committee's role is to see that public investment in GIS technology is achieved in a coordinated, cost-effective and efficient manner.

The GIS Steering Committee is an intergovernmental coordinating body with representatives from state, local, regional and federal public entities. A Coordinator provided through the Office of the Chief Information Officer supports the Steering Committee's work.

As required by statute, the GIS Steering Committee produces an Annual Report that is submitted to the Governor, the Clerk of the Legislature, the Nebraska Intergovernmental Data Communications Advisory Council, and Nebraska's Chief Information Officer.

### **REPORT BACKGROUND**

Geographic information is a significant subset of the information explosion that has occurred over the last two decades. In the broadest sense, geographic information is information that includes a spatial or locational reference (street address, latitude/longitude, section/township) as part of the data and is generically referred to as *geospatial or spatial data*.

The geographic component of information has become increasingly important, as information technologies, such as Geographic Information Systems (GIS), have been developed to analyze and display information based on its location. Location or place is an important aspect of most data collected and used by public agencies. GIS was initially developed primarily for use in the area of natural resources management. However, as the software's capabilities and the understanding of the technology have grown, the use of GIS has now expanded to include a wide and rapidly growing range of applications (assessment, economic development, transportation planning, public safety, emergency response, etc.). Because of the powerful capabilities of GIS and other geospatial technologies, many public agencies (state, local and federal) are making investments in the technology and more will do so in the future.

**What is Spatial Data Infrastructure?** Many GIS experts suggest that 80 to 90% of GIS implementation costs are commonly related to geospatial data development or acquisition. Fortunately, one of the more powerful features of GIS is its capability to facilitate the sharing and integration of data from a wide variety of data themes and sources. Past experience has taught public agencies the importance of coordination in making investments in information technology infrastructure. Public agencies have learned that through coordination they can aggregate demand and avoid the costly development of duplicate, non-compatible, computer and communication networks. As our understanding of GIS technology costs and requirements has matured, there is also a growing appreciation of the importance of coordination in the development of a common *spatial data infrastructure*, as a way to avoid the costly development of duplicate, non-compatible spatial data.

To take maximum advantage of the GIS capability to share and integrate data, and to secure the maximum return from public investments in geospatial data, it is important that public investments in geospatial data are coordinated across all levels and types of public agencies. State coordinating bodies, like the Nebraska GIS Steering Committee, are evolving to play a pivotal role in a loosely coordinated state, federal and local effort to build a common *National Spatial Data Infrastructure (NSDI)*. This report highlights needs and actions related to the key components and initiatives that are critical to the pursuit of a coordinated GIS development strategy and the development a common *Spatial Data Infrastructure for Nebraska*.

**An Annual Report and a Strategic Planning Process.** As noted above, the Nebraska GIS Steering Committee is required by state statutes to submit an Annual Report on its activities. For the last five years, the Steering Committee has also woven into its Annual Report process the development and/or updating of a GIS Strategic Plan for Nebraska. On an annual basis, the GIS Steering Committee has reported on its accomplishments and challenges and has updated its Strategic Plan based upon the goals originally established in 2001.

In 2007, the Nebraska GIS Steering Committee determined that many aspects of the goals and objectives originally established in 2001 have been achieved. The Steering Committee also noted that the world of GIS and geospatial technology had changed dramatically since 2001, when the goals of the current Strategic Plan were originally developed. Therefore, the Steering Committee determined that it was time to step back and undertake a major revision of the Strategic Plan for spatial data infrastructure development for the geographic area of Nebraska.

As a result of this decision, this Annual Report reports on key 2007 initiatives but provides less of an outline for future strategic direction. For those desiring access to a more comprehensive review of the existing Strategic Plan and accomplishments, the 2006 Annual Report and Strategic Plan is available online at:

[http://www.nitc.state.ne.us/gisc/docs/AnnRpt/AnnRpt&Strategic\\_Plan\\_06.pdf](http://www.nitc.state.ne.us/gisc/docs/AnnRpt/AnnRpt&Strategic_Plan_06.pdf) .

Over the course of 2007, the Steering Committee has developed a framework for an inclusive outreach process which it hopes will solicit the needs and plans of Nebraska agencies, and the development of a Strategic Plan that will guide future GIS/spatial data infrastructure development for Nebraska. This strategic planning process will be a major focus of the GIS Steering Committee's efforts in 2008

<http://www.nitc.state.ne.us/gisc/wrkgrps/StrPlan/Proposal%20Narrative%20Nebr%202008%20CAP.pdf> ).

## STRATEGIC DIRECTION

In the year 2000 the Nebraska GIS Steering Committee published a Strategic Plan and Annual Report that outlined its mission and six long-range goals or strategic initiatives that would serve as guides in *Building a Spatial Data Infrastructure for Nebraska*. In aftermath of the September 11<sup>th</sup> terrorist attacks, the Steering Committee added a new strategic initiative related to assisting in the application of GIS technology to Homeland Security initiatives when it updated its Strategic Plan in 2001. On an annual basis since then, the GIS Steering Committee has reviewed and affirmed those seven strategic initiatives, and this report provides an update on the status and plans related to those initiatives.

### NEBRASKA GIS STEERING COMMITTEE MISSION

The Nebraska GIS Steering Committee has defined a mission statement to serve as a guide for its work.

*The mission of the Nebraska Geographic Information System Steering Committee is to encourage the appropriate utilization of GIS technology and to assist organizations to make public investments in GIS technology and geospatial data in an effective, efficient, and coordinated manner.*

### LONG-RANGE GOALS AND/OR STRATEGIC INITIATIVES

Within the context of the Steering Committee's mission statement and its strategic planning process, the GIS Steering Committee has reaffirmed the following long-term goals for coordinated GIS development.

**Priority Database Development.** *Coordinate the development of widely needed digital geospatial databases in a standard reference format and establish systems for the on-going cooperative maintenance and enhancement of these priority geospatial databases.*

Core subsets of geospatial databases (roads, streams, governmental boundaries, aerial photography, etc.) are needed by a wide range of state, local and federal government agencies and private entities. The cooperative development and maintenance of these core databases is the most cost-effective means of providing these databases. These core databases also provide the framework for the development of numerous other geospatial databases. The cooperative development of standardized framework databases will minimize costly duplication of effort, facilitate data sharing and minimize costly data integration problems due to incompatible data.

**Homeland Security and Emergency Management.** *Continue to assist, as requested, the Nebraska Emergency Management Agency and other emergency and public safety agencies in planning for short and long-term GIS and geospatial data requirements to support Homeland Security and other public safety initiatives.*

Timely, accurate information, easily accessed and capable of being shared across federal, state, and local political jurisdictions is fundamental to strengthening the decision-making capability of those tasked with the homeland security and emergency management mission. The GIS Steering Committee has long seen the tremendous potential of GIS technology for emergency preparedness and response applications. In the aftermath of the September 11<sup>th</sup> attacks, it has become clearer that in emergency situations of whatever origin, our nation and/or state is

dependent on rapid access to and application of many types of current, accurate geospatial information. Given the nature of the geospatial data needed for these applications, it is also clear that interagency collaboration and coordination are keys to realizing that potential.

**Land Records Modernization.** *Promote and facilitate local government land record modernization and GIS development.*

One of the most promising and cost-effective application areas of GIS technology is the modernization of how local government land records are maintained and accessed. The land record information maintained by local governments is also one of the framework geospatial databases that are needed by a wide variety of state, local and federal agencies and private entities. It is in the interest of the broader GIS community that this land record information be developed in a standardized geospatial format that is accessible to multiple users at the local, state and federal level.

**Data Sharing and Distribution.** *Develop structures, standards, and processes that facilitate easy access to, integration, and usability of publicly available geospatial data.*

A key component of any coordinated GIS development strategy must be the development and maintenance of mechanisms to facilitate the sharing of commonly needed geospatial data. There are several essential elements to such a data sharing strategy. These include the easy ability to discover the existence of data and how it can be accessed. The documentation of the data to facilitate its proper use is another essential element, as is the establishment and wide implementation of data standards to facilitate data integration.

**Technical Assistance.** *Provide technical assistance to local governments and state agencies.*

With the growing interest in GIS technology, it is no longer just being used by a limited number of fairly large public agencies. It is becoming a powerful mainstream information technology, with a wide variety of state and local level agencies either developing or having an interest in developing GIS applications. With this growing interest in the technology, there is a parallel growing need for technical assistance to help these agencies develop their GIS/geospatial data or applications. With more and more agencies expressing interest in the technology, it is time to consider the merits and efficiencies that might be gained by arrangements to aggregate the demand and resources available to support these technical services.

**Education/Outreach.** *Promote an educational outreach program designed to maximize the overall return on public investments in the development of geographically referenced databases and GIS systems by providing educational materials, presentations and coordination services to the public officials and technical staff who will be making these investment decisions.*

While GIS can no longer be considered a new technology, it is still new and relatively complex for many of the agencies and policy makers who are now considering their initial public investments in the technology. Without education and/or technical assistance these public sector decision-makers can easily make costly mistakes in their initial GIS investment decisions.

**Strengthen Coordination Capacity.** *Strengthen the GIS Steering Committee's capacity to facilitate the implementation of priority geospatial database development decisions, data*

*sharing, interagency/intergovernmental partnerships, and agencies' utilization of GIS technology.*

While Nebraska statutes define broad areas of responsibilities for the Nebraska GIS Steering Committee, the Committee has very little in the way of independent authority and/or resources to seriously address those responsibilities. Many of today's major geospatial data development efforts are only feasible through intergovernmental partnerships. The Steering Committee's structure is poorly suited to facilitating the actual implementation of those partnership projects..

## **DATA DEVELOPMENT GOALS AND INITIATIVES**

One of the primary foci of National Spatial Data Infrastructure (NSDI) development is the development and maintenance of a core set of geospatial databases that are used in a wide variety of GIS/geospatial data applications.

***PRIORITY DATABASE DEVELOPMENT AND MAINTENANCE.*** *Coordinate the development of widely needed digital geospatial databases in a standard reference format and establish systems for the on-going cooperative maintenance and enhancement of these priority geospatial databases.*

A wide range of state, local and federal government agencies and private entities need a core subset of geospatial databases. The cooperative development and maintenance of these core databases is the most cost-effective means of providing these databases. These core databases also provide the framework for the development of numerous other geospatial databases. The cooperative development of standardized framework databases will minimize costly duplication of effort, facilitate data sharing and minimize costly data integration problems due to incompatible data.

A set of seven data layers or themes have been identified nationally as priorities for coordinated nationwide development:

Hydrography	Ortho-aerial imagery	Surface Elevation
Cadastral	Transportation	Administrative Boundaries
Geodetic Control		

Collectively, the above data themes are referred to as the "Framework" data layers because of the role they play in providing an underlying data framework for a very broad array of GIS applications. Because of the importance of these data layers, the Nebraska GIS Steering Committee has prioritized their statewide development and maintenance. In addition to these framework data themes, the Nebraska GIS Steering Committee has also prioritized for statewide development four other data themes due to their specific importance to Nebraska:

Street Addresses	Groundwater features – Wells	Soil Surveys
Watershed Boundaries		

## FRAMEWORK LAYERS

### Theme: Hydrography

**Why it is a Priority.** Geospatial databases that accurately map and provide core descriptive attribute information on surface water features have been prioritized for development by both the Nebraska GIS Steering Committee and the Federal Geographic Data Committee because they are among a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users. This dataset is also a core geospatial dataset for the USGS National Map effort and the guidelines for critical Homeland Security geospatial data needs.

Because of the importance of surface water to Nebraska, numerous state, local and federal agencies collect, analyze, and use data related to surface water features (rivers, streams, canals, lakes, wetlands, etc.). Until the recently completed high-resolution National Hydrography Dataset (NHD) project was initiated there was no statewide, digital, surface water features geospatial database available that was sufficiently comprehensive, and at a scale of spatial accuracy and detail to serve as a standard reference database for these wide-ranging applications.

**Current Status and 2007 Efforts.** In 2007, a multi-year, multi-agency collaborative effort to remap and develop an intelligent database model for Nebraska's surface water features was essentially completed. This multi-year data development endeavor was completed ahead of schedule and significantly under the original cost estimates, thanks primarily to the leadership of the Nebraska Department of Natural Resources (NDNR).

This project was an interagency effort from the beginning. The NDNR was the lead state agency, with a work-share agreement with the US Geological Survey. Under this work-share agreement, NDNR was responsible for in-house creation of the updated stream vectors and USGS is responsible for conflating the attributes, quality control, and providing training and technical assistance. Also assisting in this project was the Conservation and Survey Division – UNL. Start up funding was contributed by the Nebraska Information Technology Commission, the Nebraska Dept. of Roads, local Natural Resources Districts and the Nebraska Dept. of Environmental Quality. After the initial startup funding, the project was primarily funded by NDNR in-kind staff contributions and by grants from NDEQ's Section 106 Fund and NDEQ's 319 Non-point source funds. In 2006, the Nebraska GIS Steering Committee worked with the Department of Property Assessment and Taxation and the Department of Roads to secure the funding commitments necessary to enable the completion of this large-scale, collaborative project.

**Source:** Hydrographic line work is digitized from 1993 and/or 1999 1:12,000-scale DOQs. Attributes were conflated from 1:100,000 NHD and corrected based on local knowledge of stream networks.

**Standards:** Standards for high-resolution National Hydrographic Dataset, <http://mapping.usgs.gov/standards/>

**What is needed?** The on-going maintenance and enhancement of this dataset will be a continuing need. Fortunately, the NDNR has agreed to take the lead responsibility for the on-going stewardship of this critical dataset. A draft NHD Stewardship Agreement has been developed and is currently under review by NDNR, USGS, and the GIS Steering Committee.

Initial training for NDNR personnel in the use of NHD stewardship tools has occurred. The nature and priority for these stewardship responsibilities is currently under review. Among the likely foci of this effort is the refinement of stream-flow patterns as they related to irrigation canals, and a remapping of the Niobrara River watershed (as the NHD for that watershed was completed under a separate contract between the USGS and the Forest Service and the stream centerline was not remapped as it was for the rest of Nebraska).

**What is the likely source?** The NDNR will provide the primary leadership for the on-going stewardship and maintenance of this dataset, working in cooperation with heavy dataset users such as the Natural Resources Districts, Department of Roads, Department of Environmental Quality, UNL School of Natural Resources, Game and Parks Commission and local governments. The nature, extent and process of this stewardship work have yet to be fully defined. The Nebraska GIS Steering Committee should work with NDNR to organize NHD user training and support groups.

**Most appropriate data steward:** Nebraska Department of Natural Resources

**Maintenance:** Nebraska Department of Natural Resources

### **Theme: Digital Ortho Photography**

**Why it is a Priority.** The Nebraska GIS Steering Committee and the Federal Geographic Data Committee have identified geo-referenced, ortho-rectified aerial photography as a high priority for development. This data is also a core geospatial dataset for the USGS National Map effort and the current guidelines for critical Homeland Security geospatial data needs. This database is among a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users.

Orthoimagery refers to aerial photography that has been geo-referenced and corrected for errors due to camera angle and terrain displacement. Orthoimagery is used as a base map for a wide variety of GIS and geospatial analyses. Because all of the points on orthophotos are geo-referenced, it can be used to collect the shape and locational coordinates of any surface feature that can be seen in the photo. This characteristic of orthophotos makes them a very cost-effective means for deriving other needed geospatial databases. Orthoimagery also provides a valuable visual backdrop for many abstract GIS maps and analyses and as such provide an important real world context for an abstract map.

The level of spatial accuracy and imagery resolution can vary greatly in orthoimagery products. Higher levels of spatial accuracy and imagery resolution are required as the orthoimagery is used for more local applications, particularly in densely populated areas. In current practice, 1-meter resolution imagery is commonly used for rural area applications and in densely populated urban areas, 6-inch up to 3-inch resolution imagery is increasingly common.

**Current Status and 2007 Efforts.** During 2007, two collaborative efforts resulted in new imagery acquisition. One of these efforts was focused on acquiring updated statewide imagery and the other on acquiring high-resolution imagery for much of Nebraska's more urbanized area. Both efforts illustrate the power of collaboration and the substantial cost savings that can result.

Updated Statewide DOQs. In 2007, the GIS Steering Committee coordinated efforts with several state and local agencies to acquire updated 2006-based, statewide, 1-meter, full color, leaf-on orthoimagery. This statewide imagery was acquired for the bargain price of \$8,500. The original full acquisition costs for this statewide imagery were over \$1,000,000 – a very significant costs savings realized through on-going efforts at intergovernmental communications and coordination.

In the middle of 2006, the Steering Committee was beginning initial discussions about how \$400,000 might be raised to enable a one-third partnership with the Farm Services Agency (FSA) - USDA to acquire updated statewide 1-meter orthoimagery two years down the road in 2008. Since the last statewide 1-meter imagery acquisition was from 2003, the Steering Committee determined that a five-year interval was appropriate for new imagery acquisition and the \$400,000 costs appeared to be a bargain because the overall acquisition costs for the imagery was expected to be over \$1,000,000. Over the course of 2006 and 2007, the Steering Committee became aware of a series of opportunities which initially provided the opportunity to acquire 2006 statewide, 1-meter, full-color, leaf-on imagery for \$50,000 and then finally for the low bargain price of only \$8,500. On-going communication and coordination between state, federal, and local agencies enabled the Steering Committee to be aware of these unique opportunities and to take advantage of them. In the end, the following agencies participated in acquiring, processing and distributing this updated statewide imagery to the Nebraska GIS user community:

Dept. of Roads	Nebraska Public Power District
Dept. of Environmental Quality	State Surveyors Office
Metropolitan Area Planning Agency	Dept. of Property Assessment & Taxation
Nebr. Association of Resources Districts	Nebr. Emergency Management Agency
Dept. of Natural Resources	Office of the CIO

Updated High-Resolution Local Area DOQs. For a wide-range of state, regional, and rural applications, one-meter, resolution “leaf-on” imagery is quite adequate. However, for many more urbanized area applications, higher resolution (1-foot or 6-inch) imagery is needed. These same urbanized areas also have problems using the “leaf-on” imagery that is currently being collected as a part of most statewide imagery acquisition initiatives. The acquisition of higher resolution imagery, by a single city or county, is very costly both in terms of direct contract costs and the personnel time requirements to manage the bidding and contracting process.

A two-year collaborative planning effort to acquire updated high-resolution imagery for much of Nebraska’s more densely populated area neared completion at the close of 2007. This project demonstrates the substantial cost savings that can be achieved by public entities collaborating to pool their imagery needs and resources. This project (known as NI-ROC, Nebraska-Iowa Regional Orthophotography Consortium) is based on earlier Omaha-area collaborative efforts to periodically acquire high-resolution imagery. The NI-ROC project was formally managed by the Omaha-area Metropolitan Area Planning Agency (MAPA) and relied heavily on the technical and coordination leadership of the Omaha/Douglas County GIS Coordinator and the Sarpy County GIS Coordinator. The Nebraska GIS Steering Committee has acted to encourage and facilitate the expansion of this collaborative effort to include additional public entities and areas beyond the Omaha-area core and to facilitate state agencies’ partnership with this initiative.

The NI-ROC effort contracted with a vendor for the acquisition of high-resolution (6-inch or 1-foot) imagery for an eight-county contiguous area around the Omaha-Council Bluffs-

Lincoln metro area, and for three counties and four cities in non-contiguous areas in the eastern half of Nebraska (see project area map on next page). The total project area is very large (approximately 8,000 sq. mi.) and the total project costs are in the \$1,300,000 neighborhood. Partners included numerous cities, counties, NRDs, utilities, state agencies and the USGS. The project price was a substantial cost savings for the partners, compared to what their costs would be if they were to individually pursue imagery acquisition.

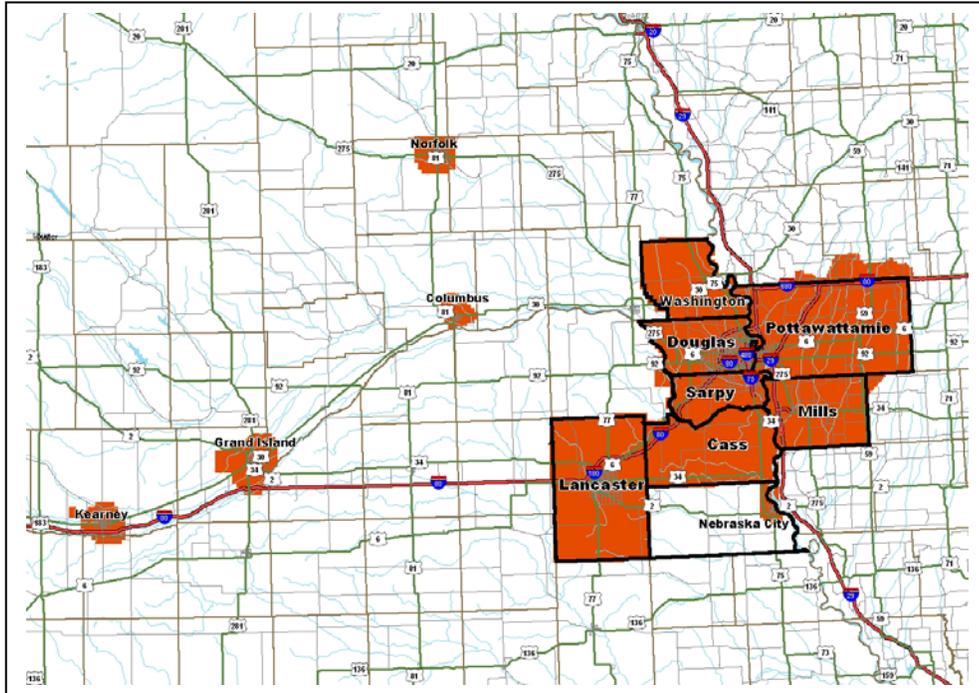
**What is needed?** To support growing collaborative geospatial data acquisition efforts, further development of both the institutional and technical capabilities is needed. Particularly in the area of imagery acquisition, it is very clear that substantial cost savings can be achieved by pooling needs and resources. Potential project partners come from all levels of government and therefore have differing budget cycles and timelines. Many potential project partners want to have the ability to spread their costs over multiple budget periods. These collaborative projects would be greatly facilitated by developing accounting/finance procedures and/or the authority that would allow for the pooling of funds from multiple agencies and over multiple fiscal years.

As these collaborative projects grow and more partners become involved, the need for additional coordination, outreach and project management resources also significantly increases. The availability of technical resources to help guide the development of the project technical specifications and to provide oversight is also critical to facilitating the collaborative process. Significant public resources can be saved by these collaborative data acquisition projects, but as they continue to grow they need to be transitioned from ad hoc efforts to have a more stable institutional base that can provide the resources required.

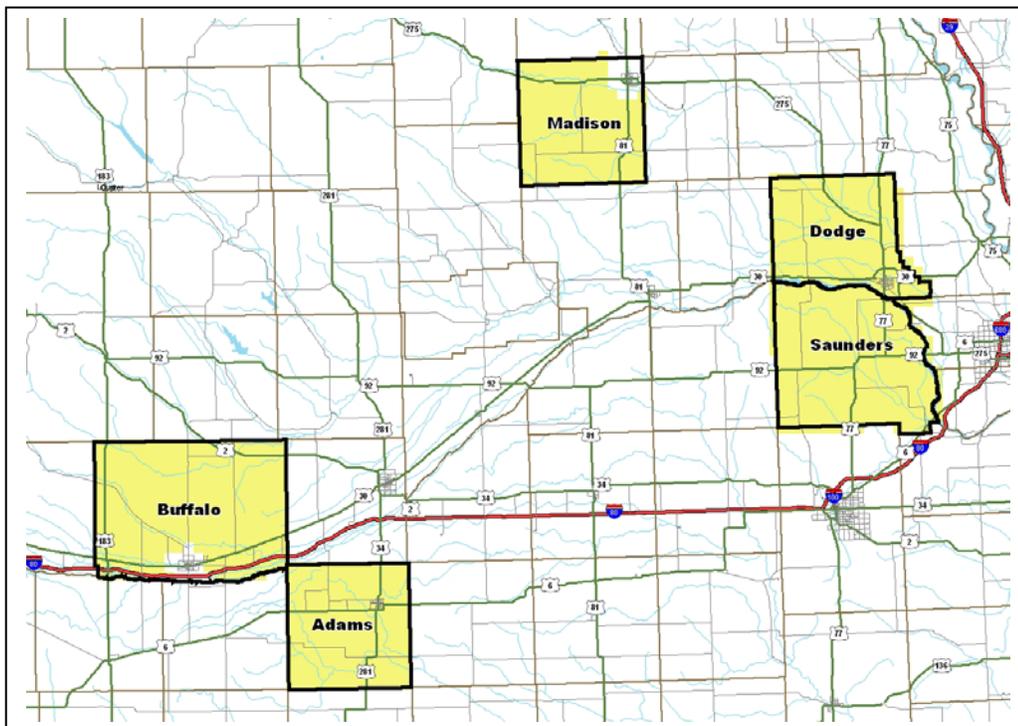
**What is the likely source?** The two imagery acquisition projects executed in 2007 demonstrate that if given sufficient lead-time and sufficient coordination and management resources there is considerable support among public entities for the acquisition of updated aerial imagery and a willingness to partner in these endeavors. The more scarce resource, which is critical to the success of these collaborative endeavors, is the coordination, management, and technical resources and support institutions necessary to efficiently organize and manage these multiple partners, their varying needs, and their resources.

For statewide imagery acquisition, the GIS Steering Committee and its Coordinator are obvious places to look for those coordination, management, and technical resources. However, as has been noted in previous Annual Reports and Strategic Plans, there is a growing need to strengthen the enterprise-level coordination, management and technical resources available to support such GIS Steering Committee initiatives.

The NI-ROC imagery initiative relied heavily on the coordination and technical resources provided by the Omaha/Douglas County GIS Coordinator and the Sarpy County GIS Coordinator. The MAPA organization provided the critically needed institutional framework and support for efficiently pooling the resources and managing this collaborative project. Local coordination, management and technical resources are likely to always be a key component of these local-area collaborative initiatives. However, to avoid the danger of placing too much strain on these limited local resources, state-level efforts should be undertaken to provide institutional support and additional coordination, management, and technical resources to support for these local efforts.



NI-ROC Area for 6" Orthoimagery



NI-ROC Area for 12" Orthoimagery

**Most appropriate data steward:** Nebraska Department of Natural Resources, US Geological Survey, and the Farm Service Agency - USDA for statewide DOQs and local government agencies in some cases. As the local government high-resolution imagery efforts expand, the GIS Steering Committee should work with these local entities to explore what role the state should play in helping to store and serve this data to the broader user community.

**Maintenance:** Because of its wide range of applications, periodic updating of this dataset will be desired by a cross-section of state, local, and federal agencies. This is particularly true for areas in the eastern part of the state with higher population and higher levels of development activity. The Omaha-Lincoln area NI-ROC initiative provides the most promising model for addressing this need for periodic updates. The continued acquisition of orthoimagery by FSA-USDA is currently the most promising initiative to address this need for periodic updating of statewide imagery.

### **Theme: Elevation**

**Why it is a priority.** Surface elevation models are another geospatial dataset that has been prioritized for development by both the Nebraska GIS Steering Committee and the Federal Geographic Data Committee because it is one of a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users. This dataset is also a core geospatial dataset for the USGS National Map effort and the current guidelines for critical Homeland Security geospatial data needs. Most surface elevation models, commonly known as Digital Elevation Models (DEMs), are based on a regularly spaced grid of points for which the elevation of the earth's surface is known at each point.

The availability of DEMs for a given area enables a wide variety of GIS applications to be undertaken for which the relative altitude or slope of the earth's surface is an important characteristic. The availability of DEMs also provide the data infrastructure to enable a GIS to generate a 3-D model of the earth's surface and drape aerial photography and/or conceptual project plans over that 3-D model for a "real world" perspective.

**Current Status.** As a result of the three-year work-share agreement between the Nebraska Department of Natural Resources (NDNR) and the USGS that produced the Digital Orthophoto Quads (DOQs), a statewide dataset of 1:24,000-scale DEMs was completed for Nebraska in 1998. These DEMs are based on a grid of regularly spaced points, 30-meters apart. In the follow-up NDNR-USGS work-share agreement to develop 1999 DOQs, it was decided to include a joint effort to reprocess the elevation data to create statewide 10-meter DEMs. This 10-meter DEM development effort is now completed.

The City of Lincoln and Lancaster County, as a part of a 1997 orthophotography project, also generated a digital terrain model (DTM) from which 2-foot contours were derived. These DTMs cover 296 sections in and around the City of Lincoln. In 2004, USGS funded data acquisition and development for an enhanced DEM for most of the Lincoln - Lancaster area, utilizing LIDAR (LIght Detection And Ranging) technology to derive new 2-foot contours. This project extended the area for which 2-foot contours were available. Additionally, the downtown area was done at a density of 1-meter spacing providing greater density from which to derive 3-D information.

An Omaha-area regional consortium contracted with a vendor in 2004 to develop enhanced DEMs and multi-resolution DOQs for Pottawattamie County in Iowa, the Nebraska counties of Douglas, Sarpy, and Washington, and the City of Fremont, Nebraska. This regional consortium included numerous local and state public entities and the USGS. The enhanced DEM consist of either 2- or 4-foot contours, with the 2-foot contours developed for the highly urbanized areas. Access to these higher-level DEMs is available only through specific arrangements with the local partners or USGS. A local point of contact for access to existing DEMs and for future regional acquisitions is Michael Schonlau, Omaha/Douglas County GIS Coordinator, 404-444-3982, MSchonlau@ci.omaha.ne.us.

**Source:** Complete statewide coverage based on 10-foot interval contours (hypsography digital line graph) derived from the existing USGS 7.5-minute topographic maps. See local contacts for specific information regarding enhanced local DEMs.

**Standards:** The 7.5-minute DEM data are digital representations of cartographic elevation data from USGS 7.5-minute topographic maps stored in a raster form. The DEMs consist of an array of elevations for ground positions at regularly spaced intervals. The DEM data are stored as profiles with a 10-meter square grid spacing along and between each profile, <http://mapping.usgs.gov/standards/>. See local contacts for specific information regarding enhanced local DEMs.

**What is needed?** The Nebraska GIS Steering Committee and state and local agencies should be proactive in responding to, and partnering with initiatives that offer the potential for enhancing elevation data in the state. There is growing interest in the development of enhanced elevation data through the use of LIDAR (Light Detection And Ranging) technology. Collaborative efforts should be explored to determine the level of interest, the required specifications, the likely costs, and the range of potential funding available.

**What is the likely source?** The Rainwater Basin Joint Venture (a collaborative, state, local and federal interagency effort to protect and restore wetlands in south-central Nebraska) has received a grant from the NRCS-USDA to pursue a LIDAR project in that project area. At the time of this report, additional matching funding were still needed. There is also interest in the collection of enhanced elevation data via LIDAR for the Republican River basin and the Platte River basin. In 2007, the GIS Steering Committee authorized the formation of an Advisory Committee on LIDAR to explore collaborative LIDAR initiatives.

**Most appropriate data steward:** Nebraska Department of Natural Resources, US Geological Survey, and local government agencies

**Maintenance:** Outside of the potential of major upgrade projects such as a large-area LIDAR effort, it is unlikely that there will be significant maintenance undertaken on this dataset on a statewide basis. Local DEM enhancements will be driven by local needs and realized through multi-agency partnerships.

### **Theme: Cadastral**

**Why it is a priority.** The Nebraska GIS Steering Committee and the Federal Geographic Data Committee have both identified the cadastral/PLSS database as a high priority for development. This database is among a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data

users. A geospatial cadastral database provides both standard identifiers and locational (latitude/longitude) coordinates for the PLSS corners.

The Public Land Survey System (PLSS) section corners in Nebraska are the basis for defining all land ownership in our state. Establishing reasonably accurate locational coordinates for these corners provides a necessary foundation for modernizing local government land records. There are approximately 100,000 such PLSS section corners in Nebraska, and they were originally surveyed roughly 125 years ago. In theory these PLSS section corners define one-mile squares, but the practical reality is that there are wide variations in the actual distance between the original placements of these corners.

However, it is the original placement of these corners that legally defines all land ownership parcels. Determining the "real world" coordinates of these original corner placements is one of the biggest hurdles that slows the adoption of modern geospatial technologies to manage and access land ownership records. A wide range of state, local and federal government agencies and private sector entities utilize land ownership data. Since the PLSS is the legal foundation for defining all land ownership parcels in Nebraska, and geospatial land ownership data is needed by a wide variety of entities, the development of a geospatial PLSS database must be a key component of the state's data infrastructure development plans.

**Current Status.** Currently there are two relatively low-resolution, statewide Nebraska PLSS databases available for public use. The Nebraska Department of Natural Resources (NDNR) developed a statewide PLSS database in the early 1990s and another was developed by the U.S. Bureau of Land Management (BLM) in 1997 to provide a basis for Nebraska PLSS pilot projects. Using different methodologies, both databases were derived from digitizing section corners, as shown on the USGS 1:24,000 topographic quad maps, and therefore have a spatial accuracy, which cannot be verified without extensive investigation. The two databases have been crosschecked and adjusted for obvious errors beyond  $\pm 50$  ft.

While these two databases were derived from the same source data, they each incorporate some distinct built-in features (identification schemes, attributes, etc.), which facilitate their use in specific applications. The 2004 Nebraska GIS Strategic Plans urged the State Surveyors Office and the NDNR to work together to integrate the best features of these databases to create one standard cadastral database, with standard identifiers for all PLSS corners.

In some of Nebraska's more populous areas, local governments have independently developed enhanced cadastral databases. These locally derived cadastral databases reflect a significant investment by local governments to enhance the PLSS database. Unfortunately they cover only a relatively small geographic area of Nebraska's large land area.

In response to the need to develop practical mechanisms for intergovernmental partnerships in the area of land record modernization, the Nebraska GIS Steering Committee worked with several key organizational players to outline and complete a Nebraska Land Record Modernization Study in 2003. The study researched the current status of land records in Nebraska local governments, looked at models for state/local cooperative land record programs in other states, and developed a conceptual design for a potential state/local land information program. The study found that in most Nebraska counties land records are quite dated, are not maintained using current technology, and as a result are not readily accessible or sharable. The study report recognized the important role of the cadastral database for land record modernization and recommended the development of a cooperative state/local

Nebraska Land Information System Program. Additional discussion of this study and its recommendations is available as part of the Land Record Modernization goal discussion later in this report.

**Source:** Using different methodologies, the NDNR and the BLM databases were both derived from digitizing section corners, as shown on the USGS 1:24,000 topographic quad maps. The two databases were crosschecked and adjusted for obvious errors beyond  $\pm 50$  ft.

**Standards:** <http://www.blm.gov/nils/>

**What is needed?** While new technical issues and concerns will undoubtedly surface, many of the technical issues (methodology, standards, etc.) have been addressed. To develop an enhanced statewide cadastral database a cooperative partnership between state, local and federal partners will probably be required, particularly for the rural areas of Nebraska. To move forward with the objective of creating a standardized, statewide cadastral database, there are at least three areas of needed focus, in the near term.

Implementation of a Nebraska Land Record Modernization Program. One of the biggest obstacles to moving forward with this objective was the need to engage the various stakeholders in a collaborative process to develop a rough consensus around an intergovernmental model that can facilitate the cooperative development and on-going maintenance of this core infrastructure database. Efforts in the 2005-2006 Nebraska Legislature to pass legislation that incorporated many of these recommendations of the Nebraska Land Record Modernization Study into a Nebraska Land Information System Program legislation were not successful. The Nebraska GIS Steering Committee should work with the Governor's Office, the Legislature, the Nebraska Association of County Officials and other interested parties to encourage further consideration and implementation of these recommendations.

Merging Existing Low-Resolution PLSS Databases. There currently exist two relatively low-resolution, statewide PLSS databases available for public use. Both were derived from digitizing section corners as shown on the USGS 1:24,000 topographic quad maps and therefore have a spatial accuracy which cannot be verified without extensive investigation. A considerable amount of error checking has already been done between the two databases. The Steering Committee should convene a working group to explore the merits of these databases and, if warranted, develop a plan for integrating the best features of these two databases would create one standard, low-resolution PLSS database, with standard identifiers for all PLSS corners. This low-resolution PLSS database could then serve as an interim common reference cadastral database and also serve as the framework for on-going cooperative efforts to develop an enhanced cadastral database.

Cadastral Data Enhancement. There are many GIS/geospatial applications that can benefit from the availability of more accurate PLSS databases, but which do not necessarily require the process rigor and legal certification of a licensed professional land surveyor. As part of a wide range of public and private endeavors, PLSS section corners are found and their GPS locational coordinates collected. Some of this GPS coordinate collection work is done by licensed land surveyors and some is done by non-surveyors. At the present time, there is no system to facilitate collection, from willing providers, of this enhanced data and to integrate it into an enhanced PLSS database, which could then be made available to the GIS user community.

The GIS Steering Committee and the State Surveyors Office should actively encourage and facilitate public and private entities to work together to collect, share, and integrate enhanced cadastral data as a means to provide GIS users with a more accurate PLSS cadastral reference data. For example, the Department of Roads has a large volume of PLSS cadastral data that has been collected, with a high degree of spatial accuracy, as part of its on-going road right-of-way and construction efforts. To establish the foundation for the integration and distribution of enhanced PLSS data, the GIS Steering Committee should work with the State Surveyors Office, the Department of Natural Resources, the Department of Roads, and professional surveyors to explore the feasibility of and, if appropriate, develop a proposal for how enhanced cadastral data might be quantified, shared, and integrated into an evolving PLSS reference database. For such an evolving PLSS database to be made available to the GIS user community, it would be important to clearly note that it was a reference-only database and not intended to provide a legally-defined location of a given PLSS corner, as could be provided by a licensed land surveyor.

**What is the likely source?** The State Surveyors Office and the Department of Natural Resources are the key players in making the integration of the two separate, but similar, low-resolution Nebraska PLSS databases happen. Leadership from the agencies and entities represented on the Land Record Modernization Study Advisory Committee (Governor's Policy Research Office, Nebraska Department of Property Assessment and Taxation, State Surveyor Office, State Chief Information Officer, Nebraska Association of County Officials, League of Nebraska Municipalities, and the Nebraska GIS Steering Committee) will be critical to moving the recommendations of the Nebraska Land Record Modernization Study forward.

**Most appropriate data steward:** Local governments and the State Surveyors Office

**Maintenance:** Database will likely require on-going maintenance to incorporate new and more accurate information on the position of PLSS corners as it becomes available.

### **Theme: Administrative Boundaries**

**Why it is a Priority.** A set of geospatial databases that provide both the location and shape of the key governmental unit boundaries (municipal, congressional or legislative district, counties, etc.) is another dataset that has been prioritized for development by both the Nebraska GIS Steering Committee and the Federal Geographic Data Committee. It is a priority for development because it is one of a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users.

A wide variety of data collection activities and public policy decisions involve referring to a given activity or resource relative to its location within a particular governmental unit. The availability of geospatial databases that outlines these governmental unit boundaries allows the use of geospatial technology to analyze data relative to its particular governmental unit and facilitates achieving public policy objectives relative to those governmental units.

**Current Status.** A core set of governmental unit boundary databases that are widely needed have been identified by the GIS Steering Committee. The Committee found that the following core geospatial governmental unit databases have been developed by a variety of agencies and are currently available to the general public and public agencies:

Legislative Districts	Congressional Districts	State Board of Education
Board of Regents	Supreme Court Districts	Game and Parks Districts
NRD Districts	Counties	Township/Range
Fire Districts	School Districts	Municipal Boundaries
Federally-owned land	State-owned lands	Tribal Lands

The Advisory Committee noted that most of these boundary databases were maintained by and available from a variety of agencies. However, for the average GIS user it was not always readily apparent how one would go about finding and getting a copy of these databases. The Advisory Committee also noted that while these governmental boundary databases are available, many of them are not currently documented with the standardized metadata, which facilitates both their cataloging in geospatial data clearinghouses and allows users to evaluate and properly utilize the databases.

**Source:** This information is derived from a variety of sources and maintained by several agencies. An agency's commitment to maintaining and distributing a particular geospatial boundary database is subject to changing budgets and staff allocations. For example, most of the electoral districts are based on state legislation, and in the past these geospatial databases have been maintained by the GIS staff based in the Clerk of the Legislature. However, at the present time the Clerk of the Legislature does not have a GIS specialist on staff. The school district boundary database was formerly maintained by the Nebraska Department of Education, based on information from local school districts. However, the Department of Education has reassigned their GIS staff and therefore they are not currently available for regular maintenance of this dataset.

In the case of municipal boundaries, the previous source was the US Census Bureau, however the Department of Roads updates its municipal boundary file on an annual basis and therefore provides a more current source. Efforts currently underway within the Public Service Commission to develop geospatial data related to E911, include current municipal boundaries. This may ultimately provide an even more current source, but arrangements are not currently in place to integrate those county datasets into a statewide dataset and make it readily available.

**Standards:** The standards for these databases vary related to the specific agency maintaining the databases. Most of the boundary databases are at a 1:24,000 scale of spatial accuracy.

**What is needed?** There are three primary areas of need related to this data theme in Nebraska. The first is a need for an interagency effort to get these varied databases documented with FGDC-compliant metadata. The documenting of state agency geospatial data with FGDC-compliant metadata is now required by a standard adopted by the Nebraska Information Technology Commission in 2006. Second, it is important to get these framework datasets listed on the Nebraska Geospatial Data Clearinghouse with links to online access points. Finally, the development of formal data stewardship agreements would help to clarify responsibilities and expectations and potentially minimize the maintenance of key datasets inadvertently being overlooked as a result of personnel changes.

**What is the likely source?** The Nebraska GIS Steering Committee can offer encouragement and support for agency efforts to develop metadata to document these datasets, but the metadata ultimately must be developed and maintained by the agency maintaining the specific databases. The GIS Steering Committee has a key role to play in

developing an enhanced comprehensive Nebraska geospatial data clearinghouse so that these databases can be easily located and accessed.

**Most appropriate data steward:**

Clerk of the Legislature (*needs to be revisited given staff changes*)

Legislative Districts      Congressional Districts      State Board of Education  
Board of Regents      Supreme Court Districts

Nebraska Department of Natural Resources

NRD Districts      Counties      Fire Districts

Nebraska Game and Parks Commission

Game and Parks Districts      Game and Parks Lands

Nebraska Department of Education (*needs to be revisited given staff changes*)

School Districts

Nebraska Department of Roads

Municipal Boundaries

Nebraska State Surveyor

Township/Range

Bureau of Indian Affairs

Tribal Lands

Data stewardship responsibility for these datasets have yet to be defined

Federally-owned land      State-owned lands

**Maintenance:** Maintenance needs and plans vary considerably by database and agency

**Theme: Geodetic Control**

**Why it is a Priority.** The Federal Geographic Data Committee has identified Geodetic Control as a high priority for development. This database is among a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users. This database provides the foundation for tying all other geospatial databases to a common spatial reference framework and therefore enables other databases to be combined and analyzed based on this common spatial reference.

**Current Status.** A 1998 report, developed by the State Surveyor, on the Geodetic Control data available for Nebraska noted the following. "The current data set is somewhat fragmented. National Geodetic Survey (NGS) provides information on all control, which has been submitted, for inclusion in their data. This information is disseminated in many forms including optical discs and the Internet. Individual agencies such as Nebraska Department of Roads, Nebraska Department of Natural Resources, and County Surveyors maintain records of monuments not submitted for inclusion in the NGS set. In some cases this information is difficult to locate and not available in digital form.

*"The creation of a database for geodetic control monuments, beyond that maintained by NGS may not be a good idea at this time. The use of GPS for survey quality geodetic control is increasing as accuracy improves and cost declines. Users of GPS do not have the same requirements as those who employ conventional surveying methods. Conventional surveying methods require control monuments to be reasonably close to the work area (usually 5 kilometers or less). Survey quality GPS methods extend this range considerably to a point where the monuments contained within the NGS data are usually adequate. Local counties that have enacted zoning*

*ordinances requiring geo-referencing for new subdivisions have a need for control beyond that provided by NGS. Many Land Surveyors do not have GPS capability and make the connections by conventional survey methods. In the case of Lancaster County, the County Surveyor has improved the density of the control and makes it available to the public."*

In 1996, NGS and several Nebraska partners cooperated in the development of High Accuracy Reference Network (HARN) for Nebraska. This HARN network consists of 214 monumented control stations scattered across Nebraska for which the locational coordinates have been determined, to a very high degree of accuracy, with the use of Global Positioning Satellite (GPS) technology. This HARN data is available through the NGS database.

The current assessment is that for a wide range of GIS applications the current statewide geodetic Nebraska control network and its associated NGS database probably provide adequate horizontal control. However, for some local GIS implementation projects, there may be merit in establishing additional local geodetic control. At that time, it was the assessment of this working group that efforts to enhance vertical control (elevation) should be of a higher priority than efforts to enhance horizontal control.

**Source:** The geodetic control data for Nebraska comes from multiple sources. While available from multiple sources, the geodetic control data that has been incorporated into and is available through the National Spatial Reference System (NSRS), maintained by NGS, must meet clearly defined standards outlined in the NGS Blue Book for the various orders of horizontal and vertical accuracy. Specific state and local agencies are the only source for information on the geodetic control data maintained by those agencies outside of the NSRS.

**Standards:** <http://www.ngs.noaa.gov/FGCS/BlueBook/>

**What is needed?** The current assessment is that, with the increasing availability of GPS technology, the currently available geodetic control network is adequate for a wide range of applications. The exception would be local applications such as engineering developments or local government development of geospatial land records. In these situations, a project-specific densification of the local geodetic control network is probably warranted.

Discussions between the State Surveyors Office and the Department of Roads regarding the possibility of making their extensive databases of geodetic control points available through the web offers the possibility of making Nebraska geodetic control points be more readily accessible. If NDOR and the State Surveyors Office ultimately pursue this potential initiative, the GIS Steering Committee should work closely with them to achieve the maximum benefit that can be achieved for the broader GIS/geospatial data user community

**What is the likely source?** A partnership between the Nebraska Department of Roads and the State Surveyors Office is the most likely source for new initiatives in this area.

**Most appropriate data steward:** National Geodetic Survey and State Surveyors Office

**Maintenance:** National Geodetic Survey and local governments

## **Theme: Ground Transportation**

**Why it is a Priority.** A comprehensive statewide transportation network database is another geospatial dataset that has been prioritized for development by both the Nebraska GIS Steering Committee and the Federal Geographic Data Committee. This dataset is also a core geospatial dataset for the USGS National Map effort and the current guidelines for critical Homeland Security geospatial data needs. It is a priority for development because it is one of a select subset of framework databases that provide basic data infrastructure for a wide cross-section of GIS applications and geospatial data users.

A comprehensive statewide transportation network database would include an accurate geospatial representation of the location/route of the state's highways, roads and streets along with standard identifiers for each road feature and at least a minimum subset of attribute data related to those roads. For a state like Nebraska that covers a large geographic area, highways and other roads are critical components of the public infrastructure. As we move increasingly into the digital world, so too has digital geospatial information about those road networks become a critical component of the data infrastructure that is important for a wide range of applications.

**Current Status.** Nebraska has approximately 95,900 miles of state and local roads. Of these roads, approximately 10,000 miles are state-maintained highways. Another 20,000 miles of local roads are considered either local arterial routes or local collector routes, and as such are of particular interest to state-level transportation planning. The remaining 66,000 miles of local roads serve primarily local transportation needs. At the time of this report, there continues to be several separate efforts to capture and maintain portions of this state and local road network in GIS transportation databases. None of these separate efforts produce a comprehensive, integrated statewide transportation database. Each produces transportation data that is tailored to meet their unique agency mission, but at the same time does not include some transportation database elements that are needed by others.

**Nebraska Department of Roads.** Over the past decade, Nebraska Department of Roads (NDOR) has created, and continues to maintain a GIS database, with associated attribute records, for the 10,000 miles of state-maintained highways and the approximately 20,000 miles of local arterial routes and collector routes, at a scale of 1:24,000. Therefore approximately 30,000 miles of state and local roads are currently in the NDOR GIS transportation database, out of an overall statewide total of 95,900 miles.

Separate from its GIS system, NDOR has also maintains county-specific, graphical CAD (computer-aided design) files that include graphical representations of all local roads in a given county. In this system, the 66,000 miles local roads are represented by linear graphical symbology, which is related to the particular road type (gravel, paved, etc.).

During 2004, the Nebraska GIS Steering Committee convened an intergovernmental Advisory Committee on Transportation/Street Address Databases to explore the feasibility, merits and issues involved in developing and maintaining a combined statewide transportation/street address database. The Committee determined that such a combined approach to the development and maintenance of these two interrelated databases should be pursued and structured around efforts to integrate, on an on-going basis, the "best available" data from multiple sources. The Committee worked with NDOR to define a draft minimum subset of standard attributes that should be included in a comprehensive statewide combined transportation/street address database. Further action to formerly adopt these draft standards

was deferred until after they could be “tested” as part of an NDOR pilot project. The NDOR conducted a pilot project in 2005 to evaluate this combined database approach and to develop and test software tools to facilitate data integration. The pilot project found that this combination/conflation approach to produce a “best available” dataset was workable, but with the currently available software tools, it was much more time consuming than originally anticipated. Additional information on this combined approach is available in the Street Address section of this report.

Local Governments. Several local governments maintain local road transportation network GIS databases. This is particularly true in the more urbanized areas of the state (e.g., Omaha/Douglas County, Sarpy County, Lincoln/Lancaster County) as well as some of the less urbanized areas. In some cases, multiple databases are maintained within the same, or overlapping jurisdictions (i.e. city and county, or different departments). At the present time, there is no statewide database standard for how these local transportation databases are developed or maintained. There is also no state-level system for consistently “harvesting” this data and integrating it into a comprehensive statewide database.

Public Service Commission and Enhanced E911. The Public Service Commission (PSC), as part of its efforts to facilitate the development of Enhanced E911 automated emergency response call centers across the state, is working with many Nebraska counties to contract with private vendors to develop and maintain updated street centerline/address databases. Consistent with this mission, the PSC has developed database standards that are tailored to meet the requirements of a range of commercially available, automated dispatching systems. The PSC approach is county-specific and the vendor contracts are with specific local governments and the PSC. There is no intent or resources dedicated to the statewide integration of this data.

US Bureau of the Census. In preparation for the 2010 US Census, the Census Bureau is in the midst of a major nationwide upgrade of its street centerline/address database, known as TIGER. Historically, the quality of the TIGER database has varied greatly (being particularly poor in rural areas). While the Census Bureau is willing to accept data from political subdivisions and to some extent share its data with others, it is statutorily prohibited from partnering with political subdivisions in database development efforts. At the time of this report, the Census Bureau has apparently completed its multiyear effort to upgrade the street and road centerlines. Current Census efforts as it relates to the street addresses associated with the road centerlines is focused on gathering GPS point coordinates for each address instead of address ranges. Due to federal restrictions this point address information will not be made available to other public entities.

State Patrol and Statewide Computer-Aided Dispatch. The Nebraska State Patrol has developed a statewide computer-aided dispatch system for its Patrol officers and for the officers of the State Fire Marshall and Game and Parks Commission. Integral to this system, is the need for an up-to-date, statewide street centerline/address database. The dispatch software adopted by the State Patrol is distinct from that utilized in the PSC-related E911 systems and has its own unique database requirements. In 2006, the State Patrol worked with the Office of the CIO to contract with a private vendor to complete the database conversion and integration efforts required to integrate available street centerline data (from multiple sources) into the format required for the State Patrol CAD system. As part of this initial effort, street centerline/address data for 45 counties and the statewide highway data were integrated into a “statewide” database. This was understood by all parties to be an interim

step while a more comprehensive, integrated approach to meeting this on-going need for updated statewide street centerline/address data is developed.

**Source:** The NDOR highway/street centerline files were originally created for each county using Intergraph's World Mapping software. An additional file was created for each county for digitizing the city plats. The USGS DLG's were then brought into the files. From that point several data sources have been used to enhance and tighten this transportation layer, such as NDOR General County Maps and City Plat series, the State Tourist Map, Highway Inventory Notes, GPS, etc. Much of the PSC-based street centerline work is being collected from a 1:12,000 DOQ imagery base, via "heads-up" digitizing. Some of the PSC-based work will rely on existing local government data that has been previously collected by a variety of means.

**Standards:** Existing NDOR Transportation Network Database meets 1:24,000 National Map Accuracy Standards and incorporates NDOR feature identifiers and attributes. The centerline data being developed for E911 purposes are being collected and/or adjusted to fit the 2003 statewide 1-meter DOQs. Local centerline data is being collected from a variety of sources.

**What is needed?** The widespread and growing need for a statewide street centerline-address database and the increasing number of state and local agencies which are investing public resources in the development and maintenance of pieces or components of such a statewide dataset highlight the need for an enterprise-level solution to address this need. In 2005 an initial Advisory Committee on Transportation/Street Address Databases recommended an enterprise solution conceptually based on the concept of on-going integration of the "best available" street centerline data and street address data from multiple sources. Nationally, there is a growing support for this conceptual approach. While there are some technical challenges to implementing the concept, the more serious challenges are organizational and policy in nature. In November 2007, the GIS Steering Committee authorized the formation of an Advisory Committee on Street Centerline-Address Databases to research and make recommendations on how best to implement an enterprise-level solution to this "best available" street centerline-address concept. Further information is available in the next section of this report, "Non-Framework Layers — Theme: Street Addresses".

**What is the likely source?** At the time of this report, at least three state entities have initiatives underway that involve the development and maintenance of street centerline/address data for Nebraska: the Nebraska Department of Roads, the Nebraska Public Service Commission and the Nebraska State Patrol. Each entity has separate funding sources, specific program funding obligations, and to some extent varying database requirements. Numerous local governments are also investing public resources in the development of components of this data. The GIS Steering Committee is helping to facilitate discussions between these entities to explore optimum ways in which their agency needs and resources might be combined or coordinated to achieve the maximum impact for their specific agency needs and the broader GIS user community.

**Most appropriate data steward:** Local governments and a yet to be determined state agency.

**Maintenance:** Nebraska Department of Roads, Nebraska Public Service Commission, State Patrol, and local governments

## NON-FRAMEWORK LAYERS

In addition to the Framework data layers outlined above, the Nebraska GIS Steering Committee has also identified four additional datasets that it feels should be priorities for statewide development due to their unique importance to Nebraska. These four additional priority data layers are:

Street Addresses

Groundwater features – Wells

Soil Surveys

Watershed Boundaries

### **Theme: Street Addresses**

**Why it is a Priority.** As the human services and Homeland Security-related applications (education, welfare, public safety, emergency response, etc.) of GIS technology have grown, a parallel need for a geospatial street address databases has also grown. An assessment of Homeland Security and emergency planning and response needs related to GIS identified a statewide street address database as one of the priority needs. An effort to implement enhanced E911 emergency response for emergency calls generated from cellular phones has also heightened the demand for this data. In a similar vein, an effort by the State Patrol to develop an integrated statewide computer-aided dispatch system for the State Patrol, Fire Marshall and Game and Parks Commission requires statewide street centerline/address data.

In response to this growing widespread need for this data, in 2006 the Nebraska Information Technology Commission adopted the following action item as a “Shared Services” initiative.

***Street Centerline-Address Database.*** *Develop a plan (including responsibilities and resource requirements) for the coordinated development, data integration, on-going maintenance and online distribution/Internet mapping service of a composite, “best available”, statewide street centerline/address database.*

A geospatial street address database includes a map of street centerlines and attribute data that provides the street address ranges for each side of a street or road segment (i.e. for each city block). Such a geospatial street address database provides the foundation data for a process known as geo-coding — the efficient, large-scale determination of the locational coordinates for common street addresses. This then allows common street addresses to be plotted on a map and integrated with a wide variety of other spatial data. While human services-related applications are one of most common areas of need for geospatial street address databases, they are also used for other applications such as determining the spatial coordinates for regulated facilities, emergency response or transportation routing.

**Transportation - Street Address Database Advisory Committee.** Street address data was not considered to be a part of the Transportation Database, when it was formally designed as a Framework Dataset. However, because a major component of both datasets is the street centerlines, there is a high degree of overlap in terms of the datasets themselves and the agencies interested and involved in their development. In 2004, an Advisory Committee of the GIS Steering Committee was charged with exploring the possibilities of developing an integrated system for maintaining both a statewide geospatial transportation database and a street centerline-address database. Such an integrated approach was determined to be both feasible and practical and the committee recommended that such an integrated data development approach be pursued. Consequently, there is a considerable amount of overlap in this report on the Transportation Database and the Street Address Database development

efforts. The Advisory Committee also developed draft database standards based on these working assumptions.

**Current Status.** There are several initiatives that, if coordinated, could hold the potential for the development of a system that could provide on-going updates to a statewide, “best available”, street centerline-address dataset.

**Nebraska Public Service Commission and Enhanced E911.** The NPSC has the responsibility to assist interested counties to implement enhanced E911 capabilities. A current street centerline-address database is one of the critical components of a broader system needed to accomplish this in an automated and expeditious manner. Funding is available to the NPSC through a surcharge on cellular calls, and the NPSC is working with local governments to contract with private vendors to develop and maintain this data. The draft street centerline/address database standards developed by the Advisory Committee on Transportation/Street Address Databases were shared with NPSC. NPSC has developed database standards that are tailored to meet the requirements of a range of commercially available, automated dispatching systems. The NPSC approach is county-specific and the vendor contracts are with specific local governments and the NPSC.

**State Patrol and Statewide Computer-Aided Dispatch.** The Nebraska State Patrol has developed a statewide computer-aided dispatch system for its Patrol officers and for the officers of the State Fire Marshall and Game and Parks Commission. While the State Patrol is not producing street centerline/address data itself, up-to-date, statewide street centerline/address data is integral to the on-going operation of its CAD system. In 2006-07, a private vendor was contracted to undertake a data conversion and integration effort to integrate available street centerline data (from multiple sources) into the format required for the State Patrol CAD system. This was understood by all parties to be an interim step while a more comprehensive, integrated approach to meeting this on-going need for updated statewide street centerline/address data is developed.

**NDOR Pilot Project.** In 2005, NDOR undertook a pilot project to evaluate the draft street centerline/address standards and proposed “best available” data model developed by the Advisory Committee on Transportation – Street Address Databases. The working assumption of this model would be that multiple entities (i.e., local governments, NPSC, NDOR, US Census) would be developing enhanced, updated street centerline-address data for specific areas of the state on an on-going basis. A lead agency would take the responsibility to collect this new data, assess its merits relative to existing data for a particular area, and, if appropriate, integrate the new data into the statewide database, which would be made available enterprise-wide. The pilot project found that this combination/conflation approach to produce a “best available” dataset was workable, but with the currently available software tools, it was more time consuming than originally anticipated. At the time of this report, NDOR has not pursued further development of a comprehensive “best available” street centerline/address database due to resource limitations and internal questions that were raised as to whether street address work was within the NDOR legislative mandate.

**Local Governments.** Several local governments maintain local road transportation network GIS databases. This is particularly true in the more urbanized areas of the state (e.g., Omaha/Douglas County, Sarpy County, Lincoln/Lancaster County) as well as some of the less urbanized areas. At the present time, there is no state-level system for consistently “harvesting” this data and integrating it into a comprehensive statewide database.

**US Bureau of the Census.** In preparation for the 2010 US Census, the Census Bureau is in the midst of a major nationwide upgrade of its street centerline/address database, known as TIGER. Historically, the quality of the TIGER database has varied greatly (being particularly poor in rural areas). While the Census Bureau is willing to accept data from political subdivisions and to some extent share its data with others, it is statutorily prohibited from partnering with political subdivisions in database development efforts. At the time of this report, the Census Bureau has apparently completed its multiyear effort to upgrade the street and road centerlines. Current Census efforts as it relates to the street addresses associated with the road centerlines is focused on gathering GPS point coordinates for each address instead of address ranges. Due to federal restrictions this point address information will not be made available to other public entities

**Source:** Road and street centerline data and address ranges will come from a range of data developers (NPSC, local governments, NDOR, US Census, private vendors) and will be integrated into a “best available” street centerline-address database as they become available and NDOR has the resources available for assessment and integration work.

**Standards:** Not available at this time

**What is needed?** As noted above, there are several state and local program initiatives that together offer the potential to provide the necessary resources to develop up-to-date, digital street centerline/address data for most of the state. The challenge is to work with these separate agency initiatives to develop a coordinated, sustainable enterprise program which will meet each individual agency’s needs, while also providing the broader enterprise with readily-accessible, statewide street centerline/address data for a wider range of GIS/geospatial applications. To realize this broader enterprise goal, it is important that we minimize any duplication of effort and seek to coordinate overall public investments to develop a decentralized enterprise system. In pursuit of these objectives, the GIS Steering Committee authorized the creation of an Advisory Committee on Street Centerline-Address Database in November 2007.

**What is the likely source?** The Nebraska GIS Steering Committee must provide the leadership and coordination to pull this potential interagency effort together. To achieve the maximum synergy from these separate but related public efforts, the GIS Steering Committee must work through its Advisory Committee on Street Centerline-Address Databases to develop recommendations for a consensus enterprise-level approach to integrating the efforts of the multiple players in this area.

**Most appropriate data steward:** Local governments, Public Service Commission and Nebraska Dept. of Roads, or the Office of the CIO.

**Maintenance:** On-going maintenance, with updated information provided by local governments, must be a significant component of any implementation plan.

### **Theme: Ground Water Features - Wells**

**Why it is a priority.** In late 1998 the Nebraska GIS Steering Committee authorized the formation of an interagency Water Resources Database Advisory Committee to study the need for water-related geospatial databases and make recommendations. The Advisory Committee identified 26 water-related databases needed by the interagency Committee members. Of those 26, the Advisory Committee ranked the surface water features as its

highest priority and the groundwater/water wells database as its number two priority for development.

Because of the importance of water to Nebraska, numerous state, local and federal agencies collect, analyze and use data related to water wells and the associated groundwater. As a result of a variety of programs in different agencies, a large volume of data related to wells and groundwater has been collected, and continues to be collected. Unfortunately, the lack of a universally applied water well identification scheme makes it difficult and costly to integrate this data across the different programs and agencies. For many programs, enhancing the ability to share, integrate and analyze groundwater data across programs and agencies would provide a more cost-effective way to achieve program goals and to monitor program results.

In a similar manner, accurate information on the location of water wells is increasingly important to many programs. The water well locational data most readily available to most users is from the Registered Wells Database, which contains information on over 100,000 registered wells and is maintained by Dept. of Natural Resources (NDNR). In most cases, the locational data in this database was derived from mathematical estimates based on the center of PLSS sections or distances from the PLSS corners, as recorded on the well registration form. For many of today's applications, this locational information is not sufficiently accurate, particularly when there are multiple wells in relatively close proximity.

**Current Status.** Over a period of years, different agencies have developed and maintained separate identification schemes that are used to index the water well and groundwater data they collect and maintain. The closest approximation we have to a universal well identifier system is the Registered Well ID maintained by NDNR. Unfortunately, even though they are legally required to be registered, many wells are not registered. Even when they are registered, it is sometimes difficult to determine the registered well ID when one is in the field taking samples, as there is no identifier placed on the well itself.

Because of the growing importance of having relatively accurate information on well locations, many agencies are investing public resources to use Global Positioning Satellite (GPS) technology to collect more accurate locational coordinates on water wells. A major challenge now is to develop a sustainable process whereby these GPS readings, collected by multiple agencies, are associated with the correct registered well number and incorporated into the Registered Wells database so that this information is available to all users.

In 2001, the Nebraska Legislature passed new statutory language requiring that the licensed well drillers, instead of the well owners, register new wells. To further facilitate well registration, NDNR has also developed an online well registration process. In addition, there has been an increased focus on interagency efforts (NDNR, NHHS, and NRDs) to identify existing, non-registered wells and encourage the owners (public and private) to register these wells, as required by statutes. State statutes have also been changed so that there is no longer a fee associated with changing/updating information on a well registration. This has increased the number of well owners and NRDs filing updated information on well location and other characteristics.

Recent legislative initiatives to facilitate integrated (ground and surface) water management planning has also increased the interest in getting GPS information on water wells integrated into the Registered Wells database. Under current law, if a well is not registered, it is illegal

in terms of water use. In many areas of Nebraska, water is currently over-allocated and so there is a renewed interest in getting wells registered to protect water rights.

**Source:** The water well information currently contained in the Registered Wells Database maintained by the Department of Natural Resources (NDNR) is derived primarily from well registration forms submitted by well owners. It is assumed by those knowledgeable in this field that there are a large numbers of wells that are still not registered. For a large number of the registered wells, the locational coordinates were originally derived from section or quarter-section centroids, or estimated from approximate distance measurements listed on the well registration form. Some of the more recent data comes from a change in state statutes that make well drillers responsible for registering the wells. The current effort to insure the legality of a well registration is resulting in GPS readings now being incorporated in the Registered Wells Database for some of these older wells.

**Standards:** The quality and accuracy of the estimated locational coordinates varies tremendously. Draft metadata standards to assist in documenting the source and quality of the locational coordinates have yet to be implemented.

**What is needed?** Efforts to incorporate the enhanced GPS well locational data, which has been collected by other agencies, into the NDNR Registered Wells Database have been slowed due to the lack of available resources at NDNR. At the current time, several of the NRDs (those where water resources have been declared fully or over-appropriated) are actively working with NDNR to input updated GPS well coordinates based on information gathered by the NRDs. This is a slow process, because in many cases it involves a “hands-on” well-by-well evaluation to ensure that the updated locational coordinates are associated with the correct well. Additional resources are needed to facilitate the integration of this more accurate GPS coordinate information into the Registered Wells Database.

**What is the likely source?** Reallocation of scarce technical resources within NDNR, increased appropriation from Legislature, grants or assistance from other agencies.

**Most appropriate data steward:** Nebraska Department of Natural Resources

**Maintenance:** Nebraska Department of Natural Resources and Natural Resources Districts

### **Theme: Soil Surveys**

**Why it is a Priority.** Because of the overall importance of agriculture to Nebraska’s long-term social and economic well being, the development of digital soils data is another statewide geospatial database that has been prioritized for development by the GIS Steering Committee. The development of high resolution, digital county soil survey data, in a geospatial format, provides key data that is needed for farm and ranch management applications to take advantage of GIS technology. Geospatial soil data also provides key information that can be used, in combination with other data, for siting facilities such as landfills, housing developments, and sanitary lagoons. This digital geospatial soils data is also an important factor in determining the value of property for assessment purposes.

The USDA-Natural Resources Conservation Service (NRCS) originally developed the paper County Soil Survey Manuals. These county soil manuals contain maps that outline the approximate shape and location of areas with similar soil characteristics, and provide detailed associated information on the characteristics of each particular soil type. The NRCS

developed national standards (known as SSURGO) for the conversion of these paper maps to digital geospatial format. As part of the process of conversion to digital SSURGO format, the spatial accuracy of the county soil maps were enhanced by recompiling the maps on a DOQ base map. When one considers that Nebraska includes approximately 49,500,000 acres, or 77,355 square miles of area, the overwhelming magnitude of the task of converting these paper soil maps to digital geospatial format becomes apparent.

**Current Status.** 2004 saw the completion of a five-year effort by three agencies (USDA-NRCS, Conservation and Survey Division-UNL, and the Nebraska Department of Natural Resources) to develop statewide digital SSURGO county soil surveys at a 1:24,000 map scale.

**Source:** The data is being derived from existing county soil surveys recompiled on 1993 DOQ/DEM base maps.

**Standards:** [http://www.ftw.nrcs.usda.gov/ssur\\_data.html](http://www.ftw.nrcs.usda.gov/ssur_data.html)

**What is needed?** Project completed, limited on-going maintenance and revision anticipated. There has been some suggestions that the data could be made more user-friendly and the GIS Steering Committee should convene a working group of the key agencies to explore this issue.

**What is the likely source?** Congress and State Legislature

**Most appropriate data steward:** Natural Resources Conservation Service - USDA

**Maintenance:** Natural Resources Conservation Service – USDA

### **Watershed Boundary Database**

**Why it is a Priority.** A variety of public agencies (local, state, and federal) and private entities utilize standardized watershed delineations (hydrologic units) for a wide variety of natural resource planning and regulatory applications. Hydrologic unit boundaries define the areal extent of surface water drainage to a downstream "pour" point. A standardized national watershed boundary dataset (WBD), which subdivides watershed areas into sub-basin areas of 250,000 acres or more (average size 450,000 acres) has been in existence and widely used for several years. This dataset is commonly known as the 4th level or 8-digit HUCs (Hydrologic Unit Catalog), in reference to the standardized, 8-digit numerical identifiers associated with each delineated sub-basin.

For many applications, these 8-digit watershed subdivisions are still too coarse or cover too large of an area (450,000 acre average). Consequently, new national standards were developed to guide the development of standardized watershed delineation databases that further subdivide basins into smaller watershed areas (levels 5th and 6th). As these new 5th and 6th level watershed delineations are developed and certified, they are very likely to be integrated and standardized into a wide range of federal, state, and local planning and regulatory applications.

**Current Status.** The Nebraska WBD delineation project commenced early in 2004 on what was anticipated to be a two-year project. The digitized lines of this state boundary watershed

work is completed in late 2005. The Nebraska Office of the Natural Resources Conservation Services (NRCS) – USDA coordinated this overall effort

**Source:** The following datasets were used as inputs for developing the WBD:

- Earth Resources Observations Systems (EROS) Data Center, National Elevation Dataset Hydrologic Derivatives, <http://edna.usgs.gov/>
- Current WBD datasets from adjacent states
- Existing watershed subdivisions developed by the Nebraska Department of Natural Resources (NDNR) will be used as a guide, and line work and attribution will be used where it complies to national guidelines meeting the requirements of size, number and uniformity per nested level
- DRGs, DOQs and other useful maps that are obtained

**Standards:** [http://www.ftw.nrcs.usda.gov/huc\\_data.html](http://www.ftw.nrcs.usda.gov/huc_data.html)

**What is needed?** This dataset development effort was completed in late 2005.

**What is the likely source?** The Nebraska Office of the NRCS, USDA, was the lead agency and primary funder of this project. Shandy Bittle, NRCS-USDA, 402-437-4020, [Shandy.Bittle@ne.usda.gov](mailto:Shandy.Bittle@ne.usda.gov), was the overall project coordinator

**Most appropriate data steward:** Natural Resources Conservation Service-USDA and the Nebraska Department of Natural Resources

**Maintenance:** Not available at this time.

## NON - DATA DEVELOPMENT GOALS AND INITIATIVES

In addition to the long-range goal related to the development of priority databases, the GIS Steering Committee has identified six other long-range goals or initiatives that it sees as directly related to “*Building a Spatial Data Infrastructure for Nebraska*”. This section provides an update on activities and plans related to these non-data development initiatives.

***HOMELAND SECURITY AND EMERGENCY MANAGEMENT.*** *Continue to assist, as requested, the Nebraska Emergency Management Agency and other emergency and public safety agencies in planning for short and long-term GIS and geospatial data requirements to support Homeland Security and other public safety initiatives.*

**Why it is a Priority.** Timely, accurate information, easily accessible and capable of being shared across federal, state, and local political jurisdictions is fundamental to strengthening the decision-making capability of those tasked with the homeland security and emergency management missions. GIS technology is capable of quickly rendering one or several layers of digital geospatial data into map-like products. These systems can facilitate near real-time performance of a wide range of relevant geospatial analyses. These characteristics make geographic information technologies, combined with appropriate sets of geospatial information, an invaluable tool for the handling, display, and analysis of information involved in every aspect of emergency management.

**Current Status.** At the time of the September 11<sup>th</sup> attacks, the Nebraska Emergency Management Agency (NEMA) and the Nebraska Health and Human Services System (NHHSS) had very limited GIS capabilities. In the aftermath of September 11<sup>th</sup>, NEMA and NHHSS indicated their interest in rapidly developing GIS capability. Since that time, the GIS Steering Committee has worked with and supported the efforts of both agencies to develop GIS capabilities. Early in this process, the GIS Steering Committee worked with both agencies to conduct a preliminary GIS needs assessment and produce a report entitled, “*Recommendations for Emergency Management and Bio-terrorism Response in Nebraska*” which is available at: “[http://www.cio.nebraska.gov/gis/docs/pdf/Homeland\\_Sec\\_Recmd\\_Final-11-9-02.pdf](http://www.cio.nebraska.gov/gis/docs/pdf/Homeland_Sec_Recmd_Final-11-9-02.pdf)”.

Since that interim report, both NEMA and NHHSS have moved forward to rapidly address many of the issues and recommendations outlined in the preliminary needs assessment. Much of this work has been accomplished through separate interagency agreements between each agency and the Center for Advanced Land Management Information Technology (CALMIT) at UNL.

Many of the needed geospatial databases have been assembled from other agencies on separate GIS servers. A large-scale effort has been completed to develop a comprehensive critical infrastructure database for Nebraska. GIS is being integrated into the emergency planning and drills of both agencies. Further GIS needs assessment has been undertaken in both agencies and staff training has occurred. GIS tools and analysis have also been integrated into several on-going agency applications.

**Where We Are Going.** With the GIS implementation strides taken by both NEMA and NHHSS since 2001, it is clear that both agencies have made a commitment to develop GIS as an integral part of the tools they have available for planning, analysis and emergency response. The GIS Steering Committee should continue to support GIS implementation in these critical areas by working with NEMA and NHHSS and focusing on the interagency needs and coordination such as the following.

Integration into broader GIS community initiatives for maximum synergy. There are some areas in which additional efforts should be made to integrate Homeland Security and Bioterrorism

initiatives into closely paralleling initiatives by the broader GIS community. Examples include the effort to develop a state enterprise geospatial data sharing and web services network and efforts by NDOR, NPSC, and State Patrol to create and maintain a comprehensive statewide transportation-street address data layer. It is expected that all initiatives could gain from such synergy, but with the awareness that in some cases data security concerns may limit the level of interoperability.

Data development and maintenance needs. Homeland Security and Bioterrorism GIS applications rely on many databases that are developed and maintained external to the lead agencies involved in those programs. Many of these databases are dynamic in nature and long-term arrangements need to be made to ensure that the most recent data is readily available in times of emergency. Some of the databases needed for these applications are either not yet available or still require considerable enhancement work. Two key examples are street addresses and property parcels. Both of these databases originate primarily at the local government level and their statewide availability is spotty. Continued efforts by the GIS Steering Committee are needed to facilitate the statewide development and integration of these key databases.

***LAND RECORDS MODERNIZATION INITIATIVE.*** *Promote and facilitate local government land record modernization and GIS development.*

**Why it is a Priority.** One of the most promising and cost-effective application areas of GIS technology is the modernization of how local government land records are maintained and accessed. The property parcel/land record information maintained by local governments is also one of the geospatial databases that are needed by a wide variety of state, local and federal agencies and private entities.

**Current Status.** The status of related efforts to develop statewide digital geo-referenced aerial photography and a Public Land Survey System database are outlined elsewhere in this report, under the Priority Database Development and Maintenance Initiative. Together, these two databases would provide the foundation base maps necessary for the development of geospatial property parcel databases.

In Nebraska, land records are maintained at the local government level and the dynamic public information related to changing land ownership flows through local government offices. Therefore, as a necessity, local governments must be integrally involved in any land record modernization effort. However, many local governments do not have the resources to undertake land record modernization by themselves. Many regional, state and federal agencies also have an interest in the development and maintenance of modern geospatial land records in a consistent and statewide-compatible format. In Nebraska, one of the biggest hurdles to land record modernization has been the lack of a consensus around a policy and structural framework that will facilitate local, regional, state, and federal agencies collaboration, on an on-going basis, in support of land record modernization.

In pursuit of such a policy/structural consensus, the GIS Steering Committee worked with many of the institutional players to outline a Nebraska Land Record Modernization Study in 2002-03. The goal of the study was to both outline the issues and possible alternatives for a collaborative land record modernization initiative and to bring together the key players and constituencies in a process to explore the possibilities for a consensus approach. The reports and recommendations of that study are available online at: <http://www.cio.nebraska.gov/gis/lrm/index.html> .

The overall recommendation of the study was a proposal to develop a Land Information System Program for Nebraska, which would seek to bring about statewide land records modernization on two interdependent fronts.

First, the Nebraska GIS Steering Committee would work with local governments to develop an automated, parcel-based land information system to be analytical and geographically referenced to support mapping, information, and business systems needs.

Second, the Nebraska Department of Property Assessment and Taxation would work with local governments to build a statewide interoperable assessment database and system to automate a variety of non-spatial land records, including ownership and assessment databases and related conveyance and land management documents.

**Where We Are Going.** The completion of the Nebraska Land Record Modernization Study provided a wealth of background information on the status of land record management in Nebraska and institutional models that have worked in other states to address modern land information needs. The study documented that while some of the more populous areas of Nebraska have developed modern land information systems, most of the local governments in the state still rely on outdated technology. The study found that while large amounts of public funds are expended annually to maintain these records, in most cases the land ownership maps are out-dated and the maps and related information are not readily accessible without physically traveling to seats of county government. The study concluded by proposing the development of a Land Information System Program for Nebraska.

In 2004 and 2005, the GIS Steering Committee worked with the Nebraska Association of County Officials to develop the concepts that were ultimately incorporated in a legislative bill known as the Nebraska Land Information System Program Act (LB 565). That bill incorporated many of the recommendations of the Land Record Modernization Study report and sought to create a state/local partnership to modernize land records in Nebraska. The bills supporters were unable to pass this legislation during the 2005-2006 legislative sessions.

In 2006, the Nebraska Information Technology Commission (NITC) adopted Land Record Information and Mapping Standards that had been developed by an Advisory Committee of the GIS Steering Committee ([http://www.nitc.state.ne.us/standards/data/LRMS\\_20060127.pdf](http://www.nitc.state.ne.us/standards/data/LRMS_20060127.pdf)). The focus of this standards effort was not the development of a comprehensive set of standards for local governments to follow in the development of modern GIS land records. Rather, it was to develop a minimum subset of standards and guidelines that would help to ensure that any state-level funding would result in the development of geospatial land records of reasonable quality and to facilitate the integration of these land records and maps, from multiple sources, into a workable statewide dataset. In many instances, the specific recommendations are guidelines-only for local governments, and would only become enforceable standards if associated state funding, such as that outlined in LB565, became available.

Absent any new state funding to support land record modernization, the GIS Steering Committee should explore new avenues to encourage and facilitate local governments adoption of these standards and guidelines. The GIS Steering Committee should also continue to work with the Governors Office, the Nebraska Legislature, and local government officials to ensure that policy makers are aware of the Land Record Modernization study and its recommendations. The GIS Steering Committee should also support efforts by policy makers to develop the means to implement the study's recommendations.

**DATA SHARING AND DISTRIBUTION.** *Develop structures, standards, and processes that facilitate easy access to, integration, and usability of publicly available geospatial data.*

**Why it is a Priority.** A key component of any coordinated GIS development strategy must be the development and maintenance of mechanisms to facilitate the sharing of widely needed geospatial data. In times of an emergency, responders need quick access to the most accurate and current data available, and in data formats that can be quickly and easily integrated.

There are several essential elements to such a data-sharing strategy. These include the easy ability to discover the existence of data and how it may be accessed. Geospatial data clearinghouses and geospatial online data portals are a key component of the evolving spatial data infrastructure. Data clearinghouses are intended to provide a systematic approach for cataloging and locating available geospatial data for a particular area or region.

The documentation of the data to facilitate its proper use is another essential element of facilitating data sharing. If someone gets a geospatial dataset from someone else it is difficult to determine the appropriate use of that data if it is not documented with metadata (data about the data). Without adequate documentation to explain how database figures or coding were derived it is difficult to defend policy or regulatory decisions based on that data. Standardized metadata also provides the basis for potential users to find available geospatial data through geospatial database search tools that have been developed around metadata standards.

The recent evolution of GIS technology in the area of Internet Map Services (IMS) is providing a relatively new and powerful approach for sharing geospatial data. IMS technology allows one entity to “serve up” one or more geospatial databases via the Internet. Other interested entities can then selectively link to one or more of these “served” geospatial databases and engage in a “live” interaction and analysis with various IMS “served” databases that may be on their computer or served from multiple servers in multiple locations around the world. This means that each database users does not need to find and get their own copy each database on their computer, but instead can link to databases in multiple locations and display and analyze interrelationships via the Internet. An excellent example of how IMS technology can be applied to share data on a national level is *The National Map* (<http://nationalmap.gov/>) which accesses a selected subset of geospatial datasets from state, federal, and local government agencies.

**Current Status.** The Nebraska GIS Steering Committee has long recognized facilitating data sharing and distribution as one of its priority goals. Two factors have proven to be significant impediments to achieving this goal. The most significant is the lack of available dedicated resources for this enterprise-level effort. The other major impediment is the reality that most state and local agencies have not documented their geospatial datasets with formal metadata. This metadata documentation is necessary ingredient for listing and searching for geospatial datasets on the geospatial data clearinghouse.

**Geospatial Data Center and Clearinghouse at NDNR.** The Nebraska Department of Natural Resources (NDNR) has had a long history of being a leader in support of geospatial data sharing and distribution. Working in cooperation with the GIS Steering Committee, the NDNR has established a Geospatial Data Center with the intent to provide an enterprise-level Clearinghouse to find and access available Nebraska geospatial data. Both parties have agreed to provide leadership and program oversight for the cooperative activities of the Data Center and Clearinghouse. Both parties also agree that NDNR will be the trustee of the Data Center and will have operational responsibilities.

The Geospatial Data Center and Clearinghouse infrastructure has been completed. Now what is needed is more participation from other state and local agencies to population this geospatial clearinghouse. A major obstacle to broader participation is the fact that much of the geospatial data developed and held by state and local agencies is not currently documented by FGDC-compliant metadata. The clearinghouse software relies upon standardized metadata documentation to enable its search function.

**Metadata Documentation.** To gain the maximum return on the public's investment in geospatial data, it is critically important that this data is documented with formal metadata. Metadata documentation greatly increases the likelihood that the developing agency will be able to reliably use the data after the original data developer is no longer available to that agency. Metadata also is the foundation upon which data clearinghouses conduct their searches for available geospatial data. Metadata it is also critical information to enable users, other than the original data developer, to make proper and appropriate use of the data. An informal survey of state and local agencies has found that a high percentage of existing geospatial data is not documented with metadata.

To address this situation, the GIS Steering Committee developed and adopted a metadata standard calling on state and local agencies to document their geospatial data with FGDC-compliant metadata. This standard has since also been adopted by the Nebraska Information Technology Commission ([http://www.nitc.state.ne.us/standards/data/metadata\\_standard\\_20050923.pdf](http://www.nitc.state.ne.us/standards/data/metadata_standard_20050923.pdf)), including an implementation timeline requiring completion by the end of 2006.

***NITC Geospatial Metadata Standard.*** *All state agencies and entities that receive state funding used, directly or indirectly, for geospatial data development or maintenance shall ensure that geospatial data it collects, produces, maintains, or purchases and which is used for policy development, implementation, or compliance review is documented with metadata compliant with the latest version of the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata.*

In an attempt to further heighten an awareness of the importance of accomplishing this metadata documentation, the GIS Steering Committee also worked with the NITC to adopt this as one of its Shared Services action items for 2006.

***Metadata and State Geospatial Data Catalogue.*** *Document existing state agency GIS/geospatial data with formal metadata and encourage the listing of available geospatial data in Nebraska Geospatial Data Center Clearinghouse Catalog.*

To further encourage metadata documentation, the GIS Steering Committee has also tried to help make metadata training available. The Steering Committee encouraged and supported UNL Libraries to provide a two-day training session in Lincoln in 2006. The Steering Committee also worked with UNL Libraries and the Omaha GIS Coordinator to organize a metadata training workshop scheduled to be held in Omaha early in 2008.

**Nebraska Geospatial Data Sharing Web Services Network.** With the evolution of GIS technology, it is increasingly moving to be web-enabled technology where a typical user can, via the Internet, directly access geospatial data from multiple data providers across the globe. This will be tomorrow's primary means of geospatial data sharing and distribution. Some state and

local agencies are already beginning to provide some of these online data and mapping services. In an effort to facilitate the coordinated, enterprise-level development of these online data sharing services for Nebraska, the NITC and the GIS Steering Committee have cooperatively adopted the following 2006 Shared Services action item.

***Internet Mapping Services.*** *Develop a plan for the coordinated delivery of Internet mapping services by state agencies, with the objectives of making GIS services and existing GIS/geospatial data readily available to a broader array of agencies, improving data access and services to the public, minimizing unnecessary duplication of effort, providing data and system backup, and where appropriate, provide for a coordinated security system, including the possibility for limited data access and password protection.*

A Geospatial Enterprise Data Exchange Working Group, consisting of state and local agency representatives, has developed a project charter that outlines the concepts and implementation phases. The project participants envision the development of a Nebraska enterprise-level, geospatial data exchange network and related services. This data exchange network will enable agencies to access, in an automated on-demand mode, up-to-date data from multiple participating (state, local, regional, and federal) public agencies. Because some of the data of interest will be sensitive, security and permission protocols will be integrated into the overall network design. To encourage maximum participation and utility, this data exchange network will have both an open public access/view and a private-secure access/view component. When fully developed, this data exchange network will support a wide-range of GIS/geospatial applications that require regular, dependable access to up-to-date data from multiple sources and provide the technical support to maintain these services and assist public entities to access and build applications based on these enterprise services.

In 2007, a total of \$218,000 was raised for this project from grant funding through the US Geological Survey (\$43,000), the NITC Government Collaborative Technology Fund (\$150,000), and the State Records Board (\$25,000). It is estimated that an additional \$85,000 will be needed to fund an initial two-year startup period and that a significant portion of this additional funding will come from state agency contributions. At the time of this report, effort were underway to recruit a technical project lead with the specialized skills required for this project.

### **Where We Are Going.**

**Metadata.** To protect the public's investment in geospatial data and to secure the maximum return, the GIS Steering Committee should continue to lead the effort to encourage and facilitate the documentation of geospatial data with formal metadata. The NITC standards implementation deadline is now past. The Steering Committee should follow up with individual agencies to assess their progress and encourage further metadata documentation and the listing of data in the Nebraska Geospatial Clearinghouse. The Steering Committee should also assist in organizing, publicizing, and recruiting folks to participate in metadata training sessions.

**Nebraska Geospatial Data Sharing Web Services Network.** The Steering Committee should continue to work with the Office of the CIO to promote and facilitate the development of an Enterprise Geospatial Data Exchange Network for Nebraska. This effort holds great promise for facilitating data exchange between state and local public entities and to spatially enable a wide range of public agency Internet applications. Additional funding commitments need to be arranged to complete the initial two-year startup period for this project. Recruitment efforts need

to be continued to insure that adequate technical and project leadership skills are available to assist the many state and local agencies who have indicated a willingness to participate in this intergovernmental effort.

**TECHNICAL ASSISTANCE.** *Provide technical assistance to local governments and state agencies.*

**Why it is a Priority.** With the growing interest in GIS, the technology is no longer just being used by a limited number of fairly large public agencies. It is becoming a powerful mainstream information technology, with a wide variety of state and local level agencies either developing or having an interest in developing GIS applications. With this growing interest in the technology, there is a parallel growing need for technical assistance to help these agencies develop their GIS applications. These technical assistance needs include:

- ◆ Guidance in designing and planning the development of an in-house capability;
- ◆ Specialized GIS application development;
- ◆ Large-scale geospatial data development projects; and
- ◆ On-going development and maintenance of specific GIS applications

Up to this point, the primary operational model in Nebraska has been for each agency or local government to develop and maintain its own in-house GIS capability. This has worked fairly well in that most of the early-adopter agencies already had technical personnel on board and had a fairly wide range of GIS/geospatial applications they wanted to develop. With more and more agencies expressing interest in the technology, it is time to consider the merits and efficiencies that might be gained by arrangements to aggregate the demand and resources available to support these technical services. The need for this pooling of demand and resources is particularly apparent in the rural and non-urban areas of Nebraska, where individual local governments or agencies frequently lack the resources to support the technical services they need to adequately fulfill their responsibilities. At the state government level, it is a question of the optimum use of public resources. Should each new agency interested in utilizing GIS technology develop its own in-house capabilities or should other models be explored for how best to meet this growing interest in the technology.

Over the last several years, the need for technical assistance has been highlighted in numerous studies and reports undertaken by the GIS Steering Committee. The November 2002 Annual Report and Strategic Plan outlined many of these previous calls for technical assistance. The Advisory Committee on Data Sharing and Distribution report also noted the need for technical assistance. That Advisory Committee recommended that limited technical assistance should be part of the mission of an enterprise-wide geospatial clearinghouse/data center. The need for technical assistance was also noted in the GIS Steering Committee's preliminary GIS needs assessment for the Nebraska Emergency Management Agency (NEMA), "*Recommendations for Emergency Management and Bioterrorism Response in Nebraska*".

The most recent reaffirmation of the need for technical assistance was included in the reports resulting from the Nebraska Land Record Modernization Study.

*"A major need identified is technical assistance. For the program to be successful, local agencies and staff will have to be educated and trained on the new technologies and procedures. Because of the distributed and decentralized nature of the spatial data part of the program, the need for technical assistance will be more profound."*

**Current Status.** The need for differing types of GIS-related technical assistance continues to manifest itself. In some cases it is from agencies or entities that are new users of the technology

(Dept. of Agriculture, Dept. of Revenue, State Patrol). In others, it is from agencies that are current users of GIS technology, but want to utilize some new aspects of the technology for which they currently have no expertise (i.e. Internet Map Servers).

Without the existence of a GIS-related service bureau for state agencies, each of these needs or requests for GIS technical assistance is met or unmet on a rather ad hoc basis. The Center for Advanced Land Management Information Technology (CALMIT) at UNL has evolved to take on some of the larger needs, through contractual arrangements with the Nebraska Department of Health and Human Services (NDHHS) and the Nebraska Emergency Management Agency (NEMA). In other cases, private sector firms are providing this service through contractual arrangements (Public Service Commission and E911). In some instances, multiple agencies invest in developing somewhat duplicative skill sets due to the absence of service bureau capabilities. And in other cases, new interests in potential GIS applications are dropped or deferred due to the high technical and resource hurdles related to getting started.

**Where We Are Going.** The wide-ranging need for GIS technical assistance for new users of GIS technology continues to be documented by an on-going array of studies and reports. The contractual relationship that was developed between CALMIT and NEMA and NDHHS provides one model for how these technical assistance needs might be met. At the time of this report, it is not clear whether this is a unique, short-term, application-specific model or a potentially longer-term solution that might be built upon to meet a broader array of technical assistance needs. Most of the key issues and concerns involved in enhancing the technical assistance available to local governments and state agencies are related more to intergovernmental public policy and structural issues than they are to technical issues.

***EDUCATION/OUTREACH.*** *Promote an educational outreach program designed to maximize the overall return on public investments in the development of geographically referenced databases and GIS systems by providing educational materials, presentations and coordination services to the public officials and technical staff who will be making these investment decisions.*

**Why it is a Priority.** While GIS can no longer be considered a new technology, it is still new and relatively complex for many of the agencies and policy makers who are considering their initial public investments in the technology. Without education and/or technical assistance these public sector decision-makers can easily make costly mistakes in their initial GIS investment decisions. In most instances, risks of costly mistakes have less to do with the hardware and software, and more with data purchase or development decisions. This need is particularly acute in relation to local governments. Local governments make substantial investments in mapping and aerial photography in the course of fulfilling their areas of responsibility. For many county commissioners, county assessors, and agency directors these are new areas of expertise. Public investments in a GIS educational/outreach program, directed toward government decision-makers, would increase the probability of wise public investment decisions in GIS technology and data. Such an education program would increase the likelihood that costly geospatial databases developed for one area and application, would not only work as intended for that application, but also for other areas and applications. Such an education/outreach program is a vital component of a coordinated GIS development effort.

**Current Status.** The GIS Steering Committee has attempted to address these GIS-related outreach, education and coordination needs. However, its efforts have, of necessity, been limited because of the lack of program resources. The GIS Steering Committee works cooperative with the non-profit Nebraska GIS/LIS Association to facilitate communication/ coordination within the growing GIS community. Over the last several years, the Steering Committee has regularly

staffed an educational booth at the Nebraska Association of County Officials (NACO) Annual Conference and has provided other presentations as the opportunity and resources allow.

In 2007, the GIS Steering Committee, through its Coordinator, actively supported the planning, and implementation of the 2007 Nebraska GIS Symposium, in conjunction the Nebraska GIS/LIS Association, the event's primary sponsor. . This three-day educational event was held in Omaha and included an array of workshops, plenary sessions, and breakout session on a broad variety of GIS-related topics.

**Where We Are Going.** The GIS Steering Committee will continue to work with groups like the Nebraska GIS/LIS Association, NACO and the League of Nebraska Municipalities to encourage and provide GIS-related education and outreach programs. Unless additional resources are made available, all of these efforts will be handicapped by the lack of program resources.

***STRENGTHEN COORDINATION CAPACITY.*** *Strengthen the GIS Steering Committee's operational capability to facilitate the implementation of priority geospatial database development decisions, data sharing, interagency/intergovernmental partnerships, and agencies' utilization of GIS technology.*

**Why it is a Priority.** The Nebraska GIS Steering Committee was originally authorized by the Nebraska Legislature in 1991. Nebraska statutes defined broad areas of responsibilities for the GIS Steering Committee, but gave the Committee very little in the way of independent authority and/or resources to seriously address those responsibilities. With the rapid changes in the technology and the evolving pattern of complex and on-going state, local and federal partnerships, there has been a tremendous growth in needs for, and expectations of, state GIS coordinating bodies. Yet during this period there has been almost no changes in the authority or resources available to the Nebraska GIS Steering Committee. With limited authority and no operational capability or budget, Steering Committee decisions and priorities can only be implemented through the sponsorship and active support of independent state, local or federal agencies.

The coordination of GIS development for the overall good of the broad and growing Nebraska GIS user community is a unique and challenging mission not specifically shared by any other public entity. In some specific instances other agencies' missions and priorities are congruent with those of the Steering Committee and in those cases those agencies may take the lead on a project on behalf of the Steering Committee. However, where this parallel sense of priorities does not exist, the Steering Committee is seriously limited in its ability to implement its priorities.

Over the last few years, an appreciation has grown at the national, state, and local level of the unique characteristics and challenges of GIS/geospatial information. One of the greatest strengths and challenges of GIS/geospatial information is the ability to share and integrate data from a wide variety of sources — across disciplines and levels of government. To realize the tremendous cost savings and potential of this data sharing and integration, new organizational structures, processes, and services are evolving to facilitate collaborative data development, data sharing, and overall coordination across agency silos. Collectively, these new structures, processes and services have become known as the National Spatial Data Infrastructure (NSDI). The NSDI includes not only the geospatial data itself, but also data standards, mechanism to catalog and/or search for existing data, mechanisms to facilitate coordination and collaborative

strategic planning, mechanism to pool resources and facilitate collaborative data development, and mechanism to collectively make geospatial data readily available over the Internet.

GIS and geospatial data are key information technology tools that are becoming integrated into the way a wide array of public agencies fulfill their missions. Core framework geospatial datasets are vital components of our shared information technology infrastructure. Higher long-term public costs will be the result, if we do not put in place effective mechanisms to develop and maintain common, shared versions of these key pieces of our shared spatial data infrastructure.

Many of today's major geospatial data development efforts are only feasible through intergovernmental partnerships. Lacking spending authority and/or seed funding, the Steering Committee's current structure is poorly suited to facilitating the actual implementation of those partnership projects. The financial management capability to efficiently combine and leverage other intergovernmental resources would also greatly enhance the Steering Committee's ability to implement collaborative GIS development projects. Past experience has also illustrated the growing need for technical resources to support the technical aspects of short and longer-term enterprise-level GIS endeavors.

The growing needs and expectations of state GIS coordinating councils is also appreciated at the national level. Over the last decade, the public-sector GIS user community has evolved a model of partnerships and data sharing (NSDI) between state, federal, and local agencies, as by far the best way to get the most efficient return on public investments in this technology. As this partnership model has evolved, so too has the appreciation of the important, unique role that strong state GIS coordinating structures have in making these partnerships possible. Two separate national reports have highlighted the importance of strong state geographic information coordinating councils and outlined some of the characteristics of strong state councils.

The National States Geographic Information Coordinating Council (NSGIC) is a national organization of professionals involved in state-level GIS coordination. NSGIC is the state's primary voice in working with federal agencies to set federal policy as it relates to state and federal collaboration in the area of GIS and geospatial data development and sharing. NSGIC is very aware of the importance of having strong state GIS coordinating institutions as it seeks to encourage more state/federal coordination and implementation. As an organization of professionals, NSGIC also has the experience to outline some of the characteristics that makes for successful state coordination. In 2003, NSGIC worked with its member professionals to outline some of the general characteristics of model state coordination programs. In 2004, NSGIC conducted a survey of state GIS coordinating structures and capabilities, relative to this model for successful GIS coordination. In the report issued based on a self-report of states, Nebraska was found to meet 5 of 9 suggested model coordinating criteria ([http://www.nsgic.org/states/statemodel\\_git.pdf](http://www.nsgic.org/states/statemodel_git.pdf)).

The Federal Geographic Data Committee (FGDC) is the interdepartmental federal entity that by Executive Order is responsible for GIS coordination among federal agencies. The FGDC is also very aware of the growing importance of state GIS coordination entities. The FGDC has outlined a long-term program goal calling for a national effort to develop strong GIS coordinating councils in all fifty states as a key to NSDI development. As a way of quantifying this goal, the FGDC also took the further step to outline what it saw as characteristics or capabilities of strong state GIS coordinating councils.

**Current Status.** In 2005, the Nebraska Governor Dave Heineman appointed a new Chief Information Officer and initiated a review of state information technology coordination, planning and implementation. In response to that review, the GIS Steering Committee authorized the formation of an Advisory Committee on GIS Enterprise Coordination to develop proposals for enhancing GIS enterprise coordination. In developing its proposals, the Advisory Committee considered past study findings, strategic plan recommendations, and the two national models on state-level GIS coordination. In consultation with the Governor's Policy Research Office, the CIO, and state agencies, that Advisory Committee developed a set of recommendations entitled, "Nebraska GIS / Geospatial Data Enterprise Coordination Proposals" ([http://www.cio.nebraska.gov/gis/docs/pdf/Enterprise\\_Coord\\_Proposals%209-1-05.pdf](http://www.cio.nebraska.gov/gis/docs/pdf/Enterprise_Coord_Proposals%209-1-05.pdf)). This report includes recommendations in three areas: a) Coordination, Authority, and Support; b) Data Development and Distribution; and c) Budget and Finance. These recommendations have been adopted by the GIS Steering Committee and forwarded to the Governor's Policy Research Office and the CIO for their consideration.

Since that time, some of these recommendations have been implemented, others are being worked on, and many others require administrative or legislative action for implementation. Specifically, the GIS Steering Committee through its Coordinator now has a closer link to the Office of the CIO and the Coordinator position has been administratively aligned with the CIO's Planning and Project Management section. NITC standards have been passed requiring the metadata documentation and encourage listing in the Geospatial Data Clearinghouse. Work is underway on a statewide street centerline/address database and on an online mapping service and data exchange network. In preparation for this Annual Report, the GIS Steering Committee revisited and updated these recommendations to more accurately reflect the current situation. These updated recommendations are available online at: [http://www.cio.nebraska.gov/gis/steering\\_committee/StrCmte\\_Structural%20Proposals%201-09-08.pdf](http://www.cio.nebraska.gov/gis/steering_committee/StrCmte_Structural%20Proposals%201-09-08.pdf)

**Where We Are Going.** The Steering Committee does a good job of bringing agencies and different levels of government together to define common needs and develop collaborative plans for addressing those needs. As presently structured, the Steering Committee is poorly equipped to take the next steps to help implement those collaborative plans. Unfortunately, there is also not another agency or entity currently in place that can readily take on the responsibility for implementing the increasing number of interagency, enterprise GIS-related efforts.

This Annual Report highlights several intergovernmental projects and/or initiatives that demonstrate the growing need for enhanced intergovernmental implementation tools and resources to make the most of opportunities for cost savings through GIS coordination and collaboration. The collaborative NI-ROC aerial imagery project resulted in very substantial savings through collaboration for state, local and federal agencies. However this expanding project relied heavily on coordination resources provided by Omaha/Douglas County. Omaha/Douglas County has informed the Steering Committee that they do not feel that they can continue to shoulder this growing coordination burden as interest in this high-resolution imagery project continues to grow beyond the Omaha metro area.

A primary need for the successful implementation of an enterprise-level statewide street centerline-address database is for a state entity to have the resources and mandate to take on the development and on-going maintenance of the database compiled from the "best available" data from multiple state and local governments. At this point, no state agency is charged with, or has the resources to make this commitment. In a similar vein, the effort to develop and maintain a

geospatial data sharing and web services network (GIS portal) requires that some state entity be authorized and supported to take the lead in implementing this enterprise-level service.

If the Nebraska GIS Steering Committee is to take a leading role in helping to address enterprise needs, its structure and tools need to be revised to better equip it for addressing these needs. To assist policy makers in making these needed changes, the Steering Committee has undertaken a review of its structures and capabilities and made recommendations for revisions. Consistent with those recommendations, the current efforts to more closely align the GIS Steering Committee and its Coordinator with the Office of the CIO and the Nebraska Information Technology Commission are positive steps in this direction. If new collaborative mechanisms are to be put in place to serve the Nebraska geospatial user community, it will require the support of policy makers and a sustained commitment by a range of state, local, federal, and higher education institutions to pursue creative combinations of new and existing funding avenues and initiatives.

**GIS Strategic Plan Update.** The current strategic plan, which provides the overall strategic guidance and priority for the GIS Steering Committee's work, was originally developed in 2001. Since that time the Steering Committee has made minor adjustments to the overall thrust of the Strategic Plan, while providing annual updates on the progress and revising the current objectives to reflect that progress. The world of GIS technology and in particular the world of GIS coordination is a rapidly evolving world and has change substantially since 2001.

To address this need for a major revisiting and rewriting of the Nebraska GIS Strategic Plan, the GIS Steering Committee has committed itself to a statewide strategic planning effort in 2008. As part of this strategic planning effort, the GIS Steering Committee will encourage state agencies to engage in internal GIS planning, will seek input from local governments across the state using defined geographic regions to assure statewide input, and will seek federal agency and tribal input into the planning process. The goal will be to develop a geospatial strategic plan for the geographic area of Nebraska that will prioritize public investments, will highlight opportunities for collaboration, and will make recommendations for public policies and coordination infrastructure to enhance and enable future collaboration. To help facilitate this planning process, the Office of the CIO has applied for a \$50,000 Strategic Planning grant from the Federal Geographic Data Committee.

**Section 86  
GEOGRAPHIC INFORMATION SYSTEM**

Section.

- 86-569. Legislature; Intergovernmental Data Communications Advisory Council; findings
- 86-570. Geographic Information System Steering Committee; created; members; appointment; terms; expenses.
- 86-571. Committee; officers; advisory committees; meetings.
- 86-572. Committee; duties.
- 86-573. Committee; report.

**86-569. Legislature; Intergovernmental Data Communications Advisory Council; findings.**

The Legislature finds that the Geographic Information System is a computer-based technology that captures, stores, analyzes, and displays information about the earth's surface from a geographically referenced system, that an interest in the system is rapidly increasing at all levels of government, and that an institutional mechanism is needed to encourage initiatives, coordinate efforts, avoid duplication, seek efficiencies, develop guidelines, policies, and standards for operations and management, promote education and training, and make recommendations so that such technology will benefit the entire state and endure as an analysis tool for decision makers.

The Intergovernmental Data Communications Advisory Council has found that there are many levels of experience, expertise, and hardware and software sophistication among the various levels of government and that guidelines, policies, coordination, and standards are required to realize the maximum benefits of this technology, avoid data quality problems, and resolve conflicts at a reasonable cost for the state.

It is the intent of the Legislature that a Geographic Information System Steering Committee be created with statewide responsibilities to take an active role in implementing the Geographic Information System. Such committee would help facilitate acquisition of such technology at all levels of government and make recommendations to the Legislature for program initiatives and funding and the fostering of communications, training, and education.

**86-570. Geographic Information System Steering Committee; created; members; appointment; terms; expenses.** The Geographic Information System Steering Committee is hereby created and shall consist of nineteen members as follows:

- (1) The Chief Information Officer or his or her designee and the director or designee of the Department of Environmental Control, the Department of Health and Human Services Regulation and Licensure, the Conservation and Survey Division of the University of Nebraska, the Nebraska Natural Resources Commission, and the Governor's Policy Research Office;
- (2) The Director-State Engineer or designee;
- (3) The State Surveyor or designee;
- (4) The Clerk of the Legislature or designee;
- (5) The secretary of the Game and Parks Commission or designee;
- (6) The Property Tax Administrator or designee;
- (7) One representative of federal agencies appointed by the Governor;
- (8) One representative of the natural resources districts nominated by the Nebraska Association of Resources Districts and appointed by the Governor;
- (9) One representative of the public power districts appointed by the Governor;
- (10) Two representatives of the counties nominated by the Nebraska Association of County Officials and appointed by the Governor;
- (11) One representative of the municipalities nominated by the League of Nebraska Municipalities and appointed by the Governor; and
- (12) Two members at large appointed by the Governor.

**GEOGRAPHIC INFORMATION SYSTEM § 86-570**

The appointed members shall serve for terms of four years, except that of the initial members appointed by the Governor, one of the representatives of the counties shall be appointed for one year and the other shall be appointed for three years, one of the members at large shall be appointed for one year and the other for three years, and the representative of the public power districts shall be appointed for two years. Their successors shall be appointed for four-year terms. Any vacancy on the committee shall be filled in the same manner as the original appointment, and the person selected to fill such vacancy shall have the same qualifications as the member whose vacancy is being filled.

The members shall be reimbursed for their actual and necessary expenses as provided in sections 81-1174 to 81-1177.

**86-571. Committee; officers; advisory committees; meetings.** The Geographic Information System Steering Committee shall elect a chairperson from its membership and such other officers as the committee deems necessary. As the need arises, advisory committees may be established by the committee from various levels of government, industry, or the general public to assist the committee.

The committee shall meet quarterly or upon the call of the chairperson.

**861-572. Committee; duties.** The Geographic Information System Steering Committee shall:

- (1) Make recommendations to the Legislature for program initiatives and funding;
- (2) Establish guidelines and policies for statewide Geographic Information System operations and management to include:
  - (a) The acquisition, development, maintenance, quality assurance such as quality control standards, access, ownership, cost recovery, and priorities of data bases;
  - (b) The compatibility, acquisition, and communications of hardware and software;
  - (c) The assessment of needs, identification of scope, setting of standards, and determination of an appropriate enforcement mechanism;
  - (d) The fostering of training programs and promoting education and information about the Geographic Information System; and
  - (e) The promoting of the Geographic Information System development in the State of Nebraska and providing or coordinating additional support to address Geographic Information System issues as such issues arise;
- (3) Report to, assist, and advise the Chief Information Officer in setting information technology policy; and
- (4) Provide assistance as requested by the Nebraska Information Technology Commission to support the technical panel created in section 11 of this act.

**86-573. Committee; report.** Annually, the chairperson of the Geographic Information System Steering Committee shall submit a written report, approved by the committee, to the Governor and the Clerk of the Legislature and shall send a copy of such report to the Intergovernmental Data Communications Advisory Council.

## Appendix II

### NEBRASKA GIS STEERING COMMITTEE

*as of December 2007*

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