Wisconsin Location Matters

A Statewide Geographic Information Strategy

01/16/2007

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Executive Summary

Emergency response. Wireless 911. Pandemic planning. Voter registration. Sex offender tracking. Each of these presents serious challenges for our society, and the public expects and deserves these and numerous related issues to be addressed efficiently and effectively. The coordinated use of geographic information and technologies, including geographic information systems (GIS), is the most effective way to meet these challenges. Although many organizations already use some form of GIS to help support program planning, management, monitoring, and evaluation, many others lack these resources.

Wisconsin needs overarching cross-jurisdictional and cross-functional sharing of geographic information and services. This document presents a plan for improving the coordination and delivery of geographic information services throughout Wisconsin. The plan consists of five goals and associated strategies that, when considered together, will contribute significantly to the realization of this statewide geographic information vision.

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Strategic Goals of the Strategy

1. Improve Coordination
Implement mechanisms to improve program coordination and technical collaboration among GIS stakeholders. The most critical component for improved coordination is the establishment of the Wisconsin Geographic Information Council (WIGIC) in 2007.

2. Establish a Robust Data Framework
Build an effective and efficient structure to create, maintain, integrate, access, and use geographic data in support of Wisconsin's geographic information needs.

3. Provide Geographic Information Services
Improve services for the acquisition, discovery, sharing, and use of geographic information and technology. These services will help reduce redundant activities and will facilitate the delivery of critical information to the public.

4. Obtain Funding
Establish funding mechanisms sufficient to operate ongoing programs and support new initiatives that address critical business needs. Lack of adequate and sustainable funding is one of the most significant barriers to the coordinated development, use, and maintenance of geographic information resources and services statewide.

5. Promote Education and Awareness
Increase awareness, knowledge, and expertise in the value and uses of geographic information, technology, and services.

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Strategies/Actions

Specific actions are required to begin the successful realization of Wisconsin's vision:

- WIGIC must be formally created and recognized as the guiding body for statewide geographic information activities in Wisconsin.

- The contents of this plan must be communicated to stakeholders and decision-makers throughout Wisconsin. Without their willingness to participate and collaborate, and without their political, technical, and financial support, this plan will fail.

- Under the guidance of the WIGIC, specific implementation plans must be developed for each goal. These implementation plans must include detailed objectives and proposed solutions for achieving each goal. Involvement from the legislative, administrative, and GIS communities will be necessary in the development of these plans.

Wisconsin's vision that stakeholders have "real-time" access to high-quality geographic information, technology, and services for sound and coordinated decision making is possible. In fact, it exists in many other states and organizations. Success depends upon the willing collaboration of many entities and individuals. There is no question that the coordinated use of GIS will expand economic development, improve public safety and public health, make us better prepared for emergencies, and help protect our cultural and natural resources.

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Introduction

Location, Location, Location!

Increasingly, our society relies on — and benefits from — information about the location of people, places, things, and events. Principles and practices fundamental to the way our society functions (ownership of land, for example) are based on **geographic information*. Everyday life is difficult to imagine without maps and location information to enable vital activities such as land and property administration, transportation and logistics, agriculture, natural resource and wildlife management, environmental management, emergency services, homeland security, and health and human services. In addition, residents increasingly use location information in their daily lives via in-car navigation, **GPS (global positioning system)*, and other similar services.

Geographic Information and Technology: It's the Future. The use of geographic information is supported by a powerful technology, **GIS*, which has been continuously evolving since its inception in the mid 1960s. GIS is one of the most pervasive of today's technologies and is recognized by the U.S. Department of Labor as a high-growth technology, with daily use by governments, the private sector, academia, and private residents. High-capacity computers and networks, improved software, data collection using GPS and digital sensors — it's the expansion of technologies such as these that's driven the evolution of GIS. And let's not forget about the growth of the Internet and its ability to integrate information from multiple sources. The transition of geographic information from paper to digital maps has also been fundamental. Digital information is more widely available via personal computers and the Internet, which amounts to an array of uses that were once impossible with paper-based information only. This trend will certainly continue.

More Efficient and Effective Government Saves Tax Dollars. Many government entities use geographic information to make better and faster decisions, and to save money by delivering public services more efficiently and effectively. One simple example is digital property maps. Integration and exchange of parcel data from local to state to federal agencies increases productivity at all levels, while reducing costs and duplication. For instance, a state revenue agency can link — in real-time — property records of multiple local governments to ensure fair distribution of the tax burden. Title companies, realtors, residents, and others benefit by using digital parcel maps to help identify and describe parcels, reduce the cost of title insurance, and reduce real estate transaction costs. Additionally, local governments use GIS to select solid waste disposal sites, analyze crime statistics, and determine response strategies to fires.

The President's Office of Management and Budget (OMB) has recognized the value and importance of GIS in the federal government. The OMB has identified the geospatial sector as one of three new E-Gov Lines of Business (LOB) (along with budget formulation and execution, and IT infrastructure optimization). The **geospatial LOB* is intended to result in (1) a more coordinated approach to producing, maintaining, and using geospatial data; and (2) sustainable participation from federal partners in collaborative activities.

*Please note that terms and topics preceded by an asterisk (*) can be found in the Glossary.

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Better Planning and Decision Making Encourages Economic Development. Integration of geographic information into daily business functions helps individuals, government agencies, and businesses make better decisions and save time and money. Major retail chains (e.g., McDonalds, Starbucks, and Walgreens) plan new store locations and design marketing strategies based on geographic information. Trucking companies use geographic information to optimize the logistics of freight movement. Energy companies use geographic information to find, collect, and convert raw energy into forms we can use. Utilities use geographic information to build and maintain the distribution networks that deliver the ultimate forms of energy we are so dependent on in modern society (e.g., gasoline, oil, natural gas, and electricity). Departments of Transportation and local governments use GIS to manage information about the condition of roadways and to determine the distribution of maintenance dollars.

Coordinated Emergency Response Improves Public Safety. When state agencies and adjoining counties and municipalities can access each other's geographic information in real-time, they can share a common view of an emergency that spans their boundaries. This allows local fire and police response teams, state emergency management staff, and FEMA personnel to make quicker and more informed decisions for a "borderless response." When concerned parties have access to the same information, the entity closest to the incident is able to respond more effectively. Making geographic information more accessible has many benefits. Importantly, greater accessibility necessitates additional coordination and integration.

Cost Savings: Time Is Money. Broad use of standardized information reduces the potential for unnecessary costs by preventing duplication of resources and efforts. We cannot afford the inefficiency and cost of incompatible, conflicting, and/or duplicated geographic information resources. Furthermore, these costs are not purely monetary: Inaccurate address information can lead to delayed response to emergencies, which can have a number of obvious negative consequences. And inadequate data-sharing mechanisms can lead to ineffective resource management practices by environmental management, agriculture, and planning agencies.

Wisconsin's Story: Public-Private Partnership

Wisconsin has had a long and unique approach to GIS in comparison to most states. Key components in Wisconsin include a statewide, county-based funding and coordination program known as the *Wisconsin Land Information Program (WLIP)*, a *State Cartographer's Office (SCO)*, and, more recently, the creation of a state *Geographic Information Officer (GIO)* position within the Wisconsin Department of Administration (DOA). Wisconsin has also had extensive GIS capacity for many years in several state agencies and within a number of campuses in the University of Wisconsin (UW) System, most notably UW-Madison.

Authorized by statute in 1989, the WLIP (through the Wisconsin Land Information Board until mid-1995 and now through the DOA) establishes policy, sets standards, and administers grant funding available to all counties to modernize land information and expand GIS capacity and use. Although the WLIP has been effective in providing the organizational framework and funding means for GIS growth in counties, this assistance does not meet all of the financial and technical requirements of local governments. Additionally, the grant programs have had limited impact on state agencies.

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Wisconsin is one of just a few states with an SCO. Authorized by statute in 1973, the SCO in Wisconsin is a unit of UW-Madison. The SCO's functions include serving as an information and data clearinghouse, and providing advice and education related to mapping, data, outreach assistance, and educational opportunities.

In 2005 the State of Wisconsin hired its first GIO, located in the Division of Enterprise Technology in the DOA. The GIO has broad responsibilities: to facilitate the coordination of GIS activities among stakeholder groups, encourage the adoption of appropriate standards and data-sharing policies, and identify strategic directions for statewide GIS. Currently, the GIO is focused on establishing a Wisconsin Enterprise Geographic Information System (WEGIS), which would facilitate the improvement of GIS services and their coordination between state agencies.

In addition to governmental organizations, several private organizations have done much to foster GIS growth and development in Wisconsin. Created in 1987, the Wisconsin Land Information Association (WLIA) is a private, nonprofit organization representing nearly 600 professionals dedicated to the preparation and maintenance of GIS and local land information systems. WLIA task forces and committees study and make recommendations regarding GIS issues, and this work is sometimes formalized into guidelines or standards that are adopted by other stakeholders.

The Wisconsin Land Information Officers Network (LION) is composed of all designated *county land information officers*. The purpose of the network is to address issues common to counties, communicate with the Wisconsin DOA, and cooperatively seek solutions to county land information problems.

The state's long history of GIS research, collaboration, and advocacy has resulted in many past achievements and successes. Wisconsin must also recognize, however, that new *business drivers* are continually emerging. Stakeholders increasingly use GIS for a wide variety of business needs such as the following: economic development, environmental management, agriculture, education, public health and safety, law enforcement, human services, infrastructure management, planning, zoning, real property records management, redistricting, homeland security, and emergency management.

Strategic Goals: The Path to the Future

Recognizing, understanding, and prioritizing current business drivers and emerging issues is critical for successful GIS strategic planning. Wisconsin's plan is responsive to the needs of the state's residents, businesses, and decision-makers, who expect excellent client service and easily accessible and understandable information. They also expect more work to be accomplished with fewer resources.

The following five strategic goals, if implemented, will move the understanding, use, effectiveness, and value of GIS to a higher level within Wisconsin. To be accomplished, these goals will certainly require additional discussion, understanding, support, and in some instances, increased funding.

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Goal 1: Improve Coordination

The most significant factor for achieving Wisconsin's GIS strategic goals will be through effective coordination. Successful coordination implies broad-based communication and a deep understanding of the responsibilities and needs of organizations that provide and use GIS services across the state.

GIS coordination must have executive level support and be led by a coalition of entities that facilitate coordination and collaboration among stakeholder groups. With all levels of government facing reduced funding, coordination between government agencies and between government and private entities is critical to the effective operation of counties, municipalities, and the state. Past coordination efforts have addressed specific program needs. As GIS evolves, more effective and broader coordination is an absolute necessity.

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Coordination Trends

- Thirty-eight *states have established GIS coordination councils (see map below) to ensure that public and private GIS investments, use, and sharing are identified, prioritized, and coordinated among all interested organizations (for list of states see Glossary). The *National States Geographic Information Council (NSGIC)* and the *Federal Geographic Data Committee (FGDC)* both recognize and promote the value of statewide coordination and the role of state councils.
- Geographic information is recognized as a critical and rapidly growing application technology in government agencies, private companies, academia, and utilities.
- The adoption of geographic information technology makes analysis of social and business problems possible and solutions affordable.
- Federal funding eligibility for GIS data development is becoming increasingly dependent on the demonstration of an effective statewide coordination mechanism involving a range of public and private sectors.

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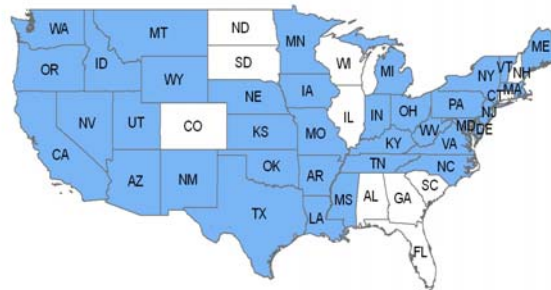
Coordination Goal
Implement mechanisms to improve program coordination and technical collaboration among GIS stakeholders.

Coordination Strategies

- In 2007 establish via Executive Order the Wisconsin Geographic Information Council (WIGIC), a broadly representative body whose purpose will be to provide geographic technology leadership in Wisconsin.
- WIGIC will represent Wisconsin's GIS *stakeholder groups*.
- WIGIC will be modeled on the desired and successful aspects of coordination councils in other states.
- WIGIC will communicate statewide goals and programs to the stakeholder groups; recommend policies for data standards, exchange, security, funding, and services; serve as an advisory body to the State's *Chief Information Officer (CIO)* and GIO; and facilitate coordination with federal agencies.
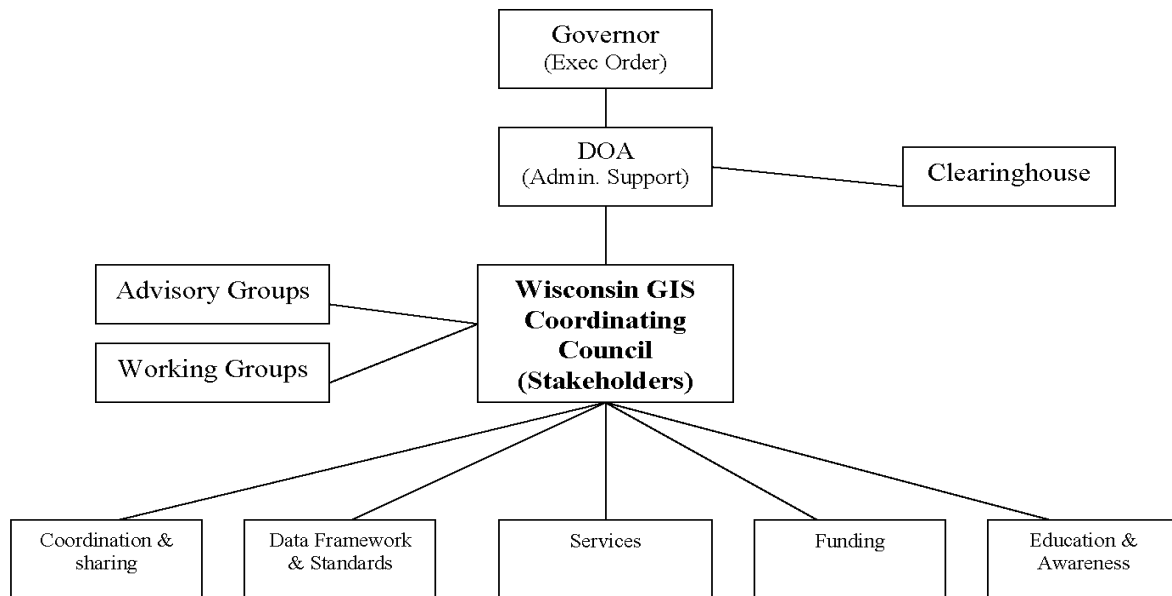
The illustration above presents a possible model for the proposed Wisconsin Geographic Information Coordinating Council (WIGIC). Council members will represent a broad range of stakeholder groups and will have responsibility to evaluate and recommend steps to implement the strategic goals identified in this plan.

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Coordination Benefits

- Improved coordination will build a useful statewide information infrastructure, e.g., a statewide transportation network and associated addresses for voter registration, *wireless E-911* response, and regional emergency response coordination.
- WIGIC will provide a mechanism to stay current with expectations, needs, innovation, and technological growth.
- WIGIC will build on the existing structure of the WLIP.
- WIGIC improves the state's eligibility for acquiring federal funding (e.g., *Imagery for the Nation Initiative*).

Coordinated DOP Acquisition
*Digital orthophotos (DOPs) provide the data foundation for most public and private GIS. Historically, DOPs have been acquired with little cooperation among agencies, resulting in inconsistent and duplicated DOP coverage and cost across Wisconsin.

In 2005, over 85 municipalities and 44 counties acquired DOPs through consortiums. This reduced costs through high volume pricing and a common contracting approach. County LIOs and regional planning commissions coordinated many consortium activities.

In 2006, a similar consortium effort involving counties and municipalities in northwest Wisconsin failed due to insufficient funding. **Statewide coordination of activities is vital to the success of similar future initiatives.**

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Goal 2: Establish a Robust Data Framework

Wisconsin needs a comprehensive and widely adopted framework of policies, standards, agreements, and best practices to streamline the sharing of geographic data among stakeholder groups. Wisconsin has identified and developed several required foundational data sets. However, to support existing business needs and emerging business needs (such as emergency management), some of this data must be enhanced and new data created.

A consistent framework for data collection, management, integration, and sharing will save time and money. Without this framework, geographic data sharing and integration is often unnecessarily complicated and inefficient. Simply discovering if data exists and how it may be accessed can be exhausting. And when geographic data does exist, it may be in a format or system that cannot be easily accessed, integrated, or used. In addition, the Internet often gives the inaccurate impression that all critical geographic data is already available and accessible. Confusion about data restrictions also hinders sharing, especially during emergencies, when quick access to accurate data is critical.

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Data Framework Trends
- Implementation of wireless and traditional **E-911* allows public safety and law enforcement officials to map caller locations and coordinate emergency response activities across jurisdictions.
- Development of international, federal, and industry standards for geographic data, data exchange, and location-based services promotes efficient data integration and sharing among stakeholder groups.
- Development of data warehouses with "views" that integrate data from different sources allows data to be collected once and then used for a variety of purposes across programs.

Framework Goal
Establish an effective and efficient framework to develop, maintain, access, integrate, and use geographic data across all areas and jurisdictions in Wisconsin.

Data Framework Strategy
- **Build and improve critical geographic data**
  - ⇨ Identify geographic data needed to support critical business functions.
  - ⇨ Use geographic data from existing sources, as appropriate.
  - ⇨ Prioritize critical geographic data gaps and recommend ways to acquire missing data.
  - ⇨ Publish and maintain an inventory of existing geographic data.

- **Adopt geographic data framework policies, standards, and best practices**
  - ⇨ Adopt established policies, standards, and best practices, as appropriate.
  - ⇨ Develop and adopt new data policies, standards, and best practices, as needed.
  - ⇨ Promote awareness and understanding of policies, standards, and best practices.

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- **Facilitate access to geographic data**
  - ⇨ Formally recognize the authority and responsibility of distributed producers to create and manage geographic data.
  - ⇨ Support the creation and maintenance of statewide and regional views of geographic data that integrate data from distributed sources.
  - ⇨ Recommend mechanisms to simplify and automate the data search, view, and exchange of geographic data.

- **Promote collaboration to create, maintain, and share geographic data**
  - ⇨ Adopt policies that encourage data sharing while addressing privacy, licensing, copyright, data-as-revenue, and legal concerns.
  - ⇨ Identify, evaluate, and recommend specific data-sharing agreements for emergency and non-emergency situations.
  - ⇨ Identify potential supporting partnerships (such as links to federal initiatives) and identify incentives for data sharing.
  - ⇨ Coordinate the acquisition and management of statewide geographic data that support critical business needs.

Data Framework Benefits
- Supports efficient access to geographic information in emergency situations.
- Eliminates redundant funding for development of and access to the same critical geographic data.
- Provides a statewide framework consistent with federal geographic data standards and completes federal National Spatial Data Infrastructure (NSDI) foundational geographic data for Wisconsin.
- Builds on existing data development investments (e.g., WLIP and state agency initiatives).

Siren Tornado: Lessons Learned

In 2001 an F3 tornado destroyed property and lives along its 41-mile swath across northwest Wisconsin. GIS played a vital role in various planning, preparedness, response, and recovery activities associated with this tornado. The Burnett County Land Information Office and Emergency Management Office, in coordination with the Wisconsin Department of Natural Resources and other agencies, shared geographic information and used GIS tools to create a common view of the affected areas in the tornado's path (see image below). The benefits of GIS were measured in terms of improved efficiency, effectiveness, and equity when addressing the needs of affected municipalities, businesses, and residents.

See: http://www.ruralgis.org/publications/viewCatalogueItem.asp?id=30&rgisSite=1

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Goal 3: Provide Geographic Information Services

GIS services are critical for a wide variety of functions for stakeholder groups. However, many organizations lack sufficient knowledge of and/or access to GIS resources. This inconsistency, especially among governmental agencies at different levels, hinders the discovery, sharing, and use of geographic data across organizational boundaries. This in turn hampers efforts to coordinate the presentation of information and the delivery of programs to the public.

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Geographic Information Services Trends
- Recent natural disasters (e.g., Siren and Stoughton tornadoes) demonstrate that coordination and integration of geographic data are critical for emergency response activities.
- Demand for GIS by government agencies at all levels is increasing. "Service" models provide customers with access to GIS resources that don't have to be created and managed internally.
- Many government agencies at all levels are consolidating IT and GIS resources, and moving toward *service oriented architecture* models.

Geographic Information Services Goal
Identify, provide, and maintain a comprehensive suite of GIS services for Wisconsin.

Geographic Information Services Strategy
- **GIS Product Services**
  - ⇨ Provide web interface for customers to order existing or customized GIS products, such as maps, reports, geographic data, publications, and other products.
  - ⇨ Provide simple "Make a Map" wizard for customers to create their own maps.

- **GIS Infrastructure Services**
  - ⇨ As appropriate, coordinate the creation and maintenance of information technology infrastructure to support the GIS services described in this document.

- **GIS Web and Application Services**
  - ⇨ As appropriate, establish web and GIS application development and hosting services to support the GIS services described in this document.
  - ⇨ Use a service oriented architecture approach to build upon existing GIS efforts of government agencies, tribes, and private sector organizations.

- **GIS Data and *Metadata* Services**
  - ⇨ Support GIS data and metadata development, maintenance, hosting, and integration services.
  - ⇨ *Data warehouse* contains statewide and regional "views" of geographic data created from officially recognized distributed sources.
  - ⇨ Develop automated processes to extract, transfer, convert, load, and integrate data into statewide and regional views.

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- **Location-based Services**
    - ⇨ Facilitate integration of GIS data and applications with location-based technologies, such as wireless and traditional E-911, GPS, and address validation.

- **GIS Business/Program Services**
    - ⇨ Establish a "Wisconsin GIS Portal" to inform and support customers in the acquisition, use, and management of geographic data and GIS services.
    - ⇨ Coordinate GIS vendor product licensing, contracts, consulting services, etc.
    - ⇨ Standardize processes and templates for GIS related RFPs, MOUs, contracts, etc.
    - ⇨ Support GIS strategic planning, funding coordination, and project collaboration.
    - ⇨ Establish stakeholder groups to resolve issues associated with GIS services.

Geographic Information Services Benefits

- Provide consumers that lack internal GIS capabilities with understanding of and access to geographic data and GIS resources and services.
- More flexible, cost-effective funding options based on different service "levels" and delivery mechanisms.
- Coordinate and standardize agency GIS activities in government.

Geographic information services support each other and a variety of stakeholder business needs, as demonstrated in this chart.

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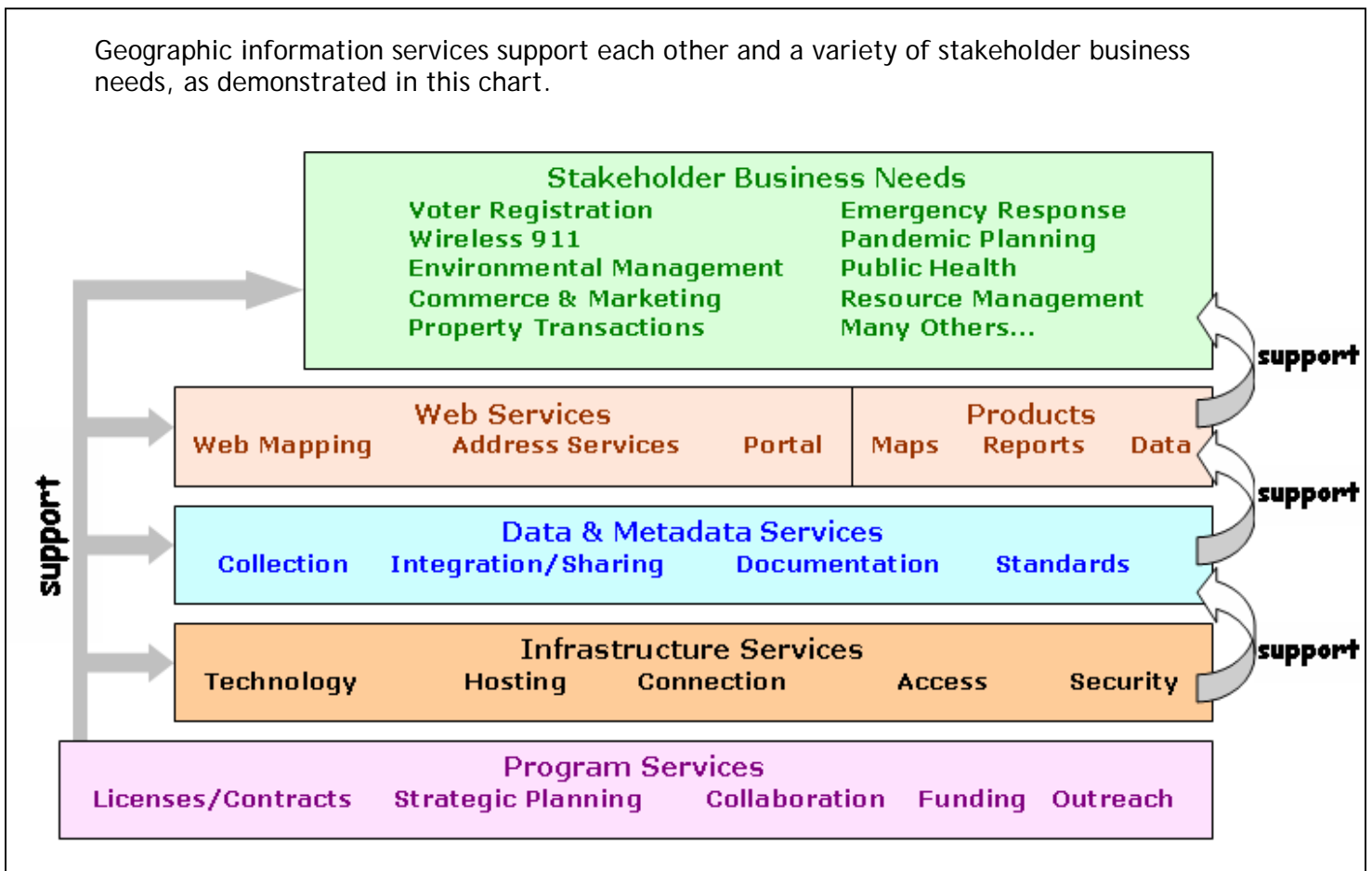
Goal 4: Obtain Funding

Establishing adequate and sustainable funding will remove a significant barrier to the coordinated development, use, and maintenance of GIS resources and services across Wisconsin. Traditionally, GIS stakeholders have individually funded the development of their respective GIS data and systems. While the WLIP has enabled GIS capabilities in many counties, it was not designed to build and support the full spectrum of GIS capabilities required. GIS is used by agencies because it is the most efficient and effective way to deliver essential services to the public. However, GIS activities are often not funded by the operations that use them and are viewed as support services that must be funded from external sources.

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Funding Trends
- Easy, cost-free access to geographic data has been a positive influence on economic development in many areas. The expansion of GIS services and technologies has not only benefited functions traditionally associated with geographic information but also has brought benefits to other institutions and the public.
- There is a continued significant disparity in GIS capabilities among state, county, and local agencies. The disparity negatively affects the ability to deliver services in some geographic locations.
- Municipal governments have a growing need to develop GIS services complementary to those of county governments. Some municipal and county governments have needed to charge for GIS services to obtain funding for their GIS services. This can lead to license restrictions, which impede the free flow of data in emergency situations.
- Current economic and political climate encourages the mix of taxes and surcharges to fund new or expanded services.

Funding Goal
Establish adequate and reliable funding mechanisms dedicated to the coordinated development and maintenance of GIS resources and activities in Wisconsin.

Funding Strategies
- Establish the level of funding required and define a funding model appropriate for use in Wisconsin.
    - ⇨ Estimate resources spent and additional requirements.
    - ⇨ Investigate alternative models.
    - ⇨ Get entire community involved.
- Maximize the use of external funding sources by aggressively pursuing grant and other funding opportunities to support Wisconsin GIS services.
- Continue the collection of the WLIP real estate transaction-recording fee. Restore the use of WLIP funds to support activities as specified in statute.
- Ensure that all expenditures of public funds supporting GIS are related to demonstrable outcomes and linked to multiple levels of government within the state.

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Funding Benefits

- Stable, adequate funding will:
  - ⇨ Enable more consistent, equitable delivery of vital services across the state.
  - ⇨ Allow better planning and integration with federal funding initiatives.
  - ⇨ Provide access to resources for agencies and organizations that currently lack GIS capabilities, and reduce costs associated with redundancy among state agencies.
  - ⇨ Enable agencies to make data more freely available, increasing its use and value.
- The WLIP funds land information modernization activities.
- Sound funding policies will promote standardization, strengthen accountability, and improve delivery of GIS services.

Wisconsin Soil Surveys: An Example of Successful Cooperative Funding
Soil surveys are produced for private lands across the nation as part of the National Cooperative Soil Survey program administered by the Natural Resources Conservation Service (NRCS). Soil surveys describe and map the extent of soils, the physical and chemical properties of soils, and the conditions for soil use. These surveys provide sufficient detail to meet the needs of farmers, community planners, engineers, zoning administrators, land developers, and others.

Seven years ago, only 20 of Wisconsin's 72 counties had digital soil surveys meeting NRCS standards. Digital soil surveys provide important geographic information for analyzing and defining proper uses of land. In 1999, NRCS estimated that completion of digital soil mapping would take until the year 2014 at then-current funding levels. In 1999 the NRCS, the Wisconsin Land Information Board (WLIB), and several state agencies came together in a cooperative funding partnership with the goal of expediting the completion of soil surveys statewide. Under this agreement, the NRCS committed two-thirds of the required $12 million, while the WLIB (using WLIP funds) and the state agencies covered the remaining one-third. The soil survey for the final county was completed and made available to the public on the Internet in the summer of 2006. Governor Doyle proclaimed 2006 the "Year of Soil," in part to celebrate this cooperative effort. ftp://ftp-fc.sc.egov.usda.gov/WI/Soil/yosproclamation.pdf

The completion of Wisconsin's digital soil survey demonstrates how properly conceived and managed cooperative funding ventures greatly assist in the development/acquisition of critical geographic information. Similar efforts are needed to obtain other vital statewide geographic information (e.g., transportation networks, elevation data, digital aerial imagery) needed to support critical business functions.

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Goal 5: Promote Education and Awareness

The use of GIS and its supporting technology is rapidly growing and at the same time continually changing. As a result, many decision-makers are unaware of the potential uses, benefits, and improved decision making that can be realized by incorporating GIS into established organizational responsibilities. Across the state, there is an immediate need to provide leaders and decision-makers with an increased awareness of the concepts, capabilities, and benefits of GIS.

In 2004 the U.S. Department of Labor identified GIS as one of the three most important evolving technology fields in the nation, along with nanotechnology and biotechnology. In both the public and private sectors in Wisconsin, there is a growing need for employees with solid education, training, and skills in GIS. Based on data from the *Geospatial Industry Workforce Information System*, Wisconsin currently has nearly 30,000 workers in fields related to geographic information technologies, with an estimated 16% growth rate over the next 10 years. Wisconsin needs to develop an enlightened and comprehensive policy on GIS education, one that benefits K-12 students, professionals, employers, and residents.

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Education and Awareness Trends
- GIS is becoming increasingly important for the delivery of services, and the general public is beginning to use GIS on a daily basis.
- More public and private organizations are recognizing the value of GIS and are investing in GIS education. GIS training is available through a variety of organizations, including educational institutions, public and private employers, and software vendors.
- GIS education is essentially not being implemented at the K-12 level; however, GIS education appears to be expanding to more universities within the state.

Education and Awareness Goal
Increase awareness, knowledge, and expertise in the value and uses of geographic information, technology, and services.

Education and Awareness Strategies
- Utilize the WIGIC to raise the level of awareness of decision-makers at all levels of government about GIS requirements and benefits.
- Identify groups and organizations that would benefit from GIS education and training and develop resources to provide a learning experience for schools, businesses, and government.
- Inform and educate existing GIS users in the state.
- Encourage better coordination of GIS educational offerings at all UW campuses and involve the Wisconsin Technical College System.
- Add GIS awareness and fundamentals to the state's K-12 curriculum.

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Education and Awareness Benefits

- Increased awareness will improve delivery of services through wider use of GIS technology.
- An educated and skilled GIS workforce can improve the economy by attracting GIS businesses to the state and will make government and business more efficient.
- Residents will be able to make better decisions about public policy and will be able to plan for and respond to emergency situations through the use of GIS services.

Google Earth

Access to GIS data has become universally available with Internet tools such as Google Earth. These tools are used daily by individuals and businesses for navigation and general viewing purposes. The popular media is shining a spotlight on geographic information technology with stories about maps on phones, GPS in cars, and near real-time aerial pictures of news events such as Hurricane Katrina, the tsunami in Indonesia, and the Iraq conflict. Unfortunately, the general public is not always aware of the limitations of the underlying data presented on a variety of Internet mapping sites. Providing education regarding what they see and how to interpret the information will improve the overall ability of government and businesses to use these mechanisms in providing services. For more information, visit http://earth.google.com.

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Conclusion and Next Steps

The residents of Wisconsin deserve the best possible delivery of geographic information services at the lowest costs. The use of GIS assists in those efforts. However, in order to maximize these benefits, the state must approach the use of GIS in a thoughtful, organized fashion. *A Statewide Geographic Information Strategy* describes an approach that emphasizes collaboration to achieve five goals that, when achieved, will make people safer, enhance economic development, protect the environment, and improve government.

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Steps to be Taken
First, the WIGIC must be established. Initial efforts to define the function and structure of this organization have begun under the auspices of the GIO. The intent is to formally define the Council via Executive Order in 2007.

Second, the contents of this plan must be communicated to members of stakeholder groups and decision-makers throughout Wisconsin to promote the understanding of the goals and garner support for them.

Third, specific implementation plans must be developed to address the individual goals stated in the strategy. These detailed plans will describe specific tactics that are suitable for Wisconsin to achieve each goal. This activity will be best conducted under the guidance of the WIGIC.

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Strategic Planning Process

WLIA initiated this planning process by inviting 33 state organizations to participate. On April 12, 2006, a group of nearly 100 enthusiastic stakeholders convened in Stevens Point, Wisconsin, for a daylong, professionally facilitated session. Participants included federal, state, county, municipal, tribal, university, emergency management, planning, engineering, mapping, GIS, and realtor representatives, in addition to students and others. Interestingly, 40% of the participants were not WLIA members but professionals from other groups who recognized the need to better leverage geographic information and technology for their business needs. The participants compiled ideas and data about GIS changes and trends, current strengths and challenges, and critical success factors.

A core planning team, representing a cross-section of the original group, was then selected to continue the process. Working with the information gathered at the initial meeting (along with the same professional facilitator from that meeting), the core planning team developed the goals and related strategies set forth in this document. A subset of the team was identified to compose the final strategy document and make it available for review. The contents of this plan reflect a consensus of core team members. Participants volunteered their time and resources to help make this effort successful.

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Core Team Members

Fred Halfen	Wisconsin Land Information Association and Ayres Associates Inc
David Mockert	Department of Administration
Ted Koch	State Cartographers Office
Dick Vraga	U. S. Geological Survey
Lisa Morrison	Department of Agriculture, Trade and Consumer Protection
Tyson Halla	Wisconsin Realtors Association
Bill Huxhold	University of Wisconsin-Milwaukee
Jay Yearwood	City of Appleton
Diann Danielsen	Land Information Officers Network and Dane County
Jason Grueneberg	Wood County
Mike Koutnik	Environmental Systems Research Institute, Inc.
John Ellingson	Wisconsin County Surveyors Association and Jackson County
Kent Pena	U.S. Department of Agriculture, Natural Resources Conservation Service
Kevin Pomeroy	1,000 Friends of Wisconsin
Terrance McMahon	Wisconsin Towns Association
Brian Braithwaite	Real Properties Listers and Washington County
Cindy Wisinski	Register of Deeds Association and Portage County
Alan Blencoe	National Emergency Number Association and LaCrosse County
Tony Bellovary	Bay-Lake Regional Planning Commission
Thomas Tym	Ruekert & Mielke, Inc.

Additional information about the strategic planning process and core team activities can be found at http://www.wlia.org/wilandinfo/strategic+planning/default.asp.

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Glossary

Business Drivers. External or internal influences that significantly impact and/or set directions for programs. Examples of business drivers may include providing direct information access, following open standards, protecting privacy while offering transparency, providing timely access to decision support information, accomplishing more with fewer resources, and using alternative funding sources. Business drivers exist for all organizations, whether public, private, or nonprofit.

Chief Information Officer (CIO). The chief information officer, or CIO, is a job title for the head of the information technology group within an organization. Wisconsin's CIO is the administrative head of the Division of Enterprise Technology within the Wisconsin DOA.

County Land Information Officer (LIO). The LIO is the coordinator of GIS projects within the county and between the county and other agencies, and the coordinator of the countywide land records modernization plan. This person also recommends grants and is the county point of contact for information on county policies, procedures, and information holdings.

Data Warehouse. A data warehouse is a copy of transaction data specifically structured for querying and reporting.

Digital Orthophotograph (DOP). An orthophotograph is an aerial photograph that has been geometrically corrected (i.e., orthorectified) so that its scale is uniform. Each ortho has been adjusted for topographic relief, lens distortion, and camera tilt, and can be thought of as a photographic map that can be used to measure true distances. A DOP is an orthophotograph in digital format.

E-911 (Enhanced 911). A service feature of the 911 emergency-calling system that automatically associates a physical address with the caller's telephone number. Computer software associates the caller's line and a street address to provide emergency responders with the location of the emergency.

Federal Geographic Data Committee (FGDC). An interagency federal committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. Numerous stakeholder organizations participate in FGDC activities representing the interests of state and local government, industry, and professional organizations. www.fgdc.gov

Geographic Information. Data in a spatial and temporal context that describes the location or distribution of phenomena, processes, and features, as well as the interaction of humans and their environment.

Geographic Information Officer (GIO). The geographic information officer, or GIO, is a job title for the head of the geographic information technology group within an organization. Wisconsin's GIO is located in the Division of Enterprise Technology within the Wisconsin DOA. This person reports directly to the State's CIO.

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GIS (Geographic Information System). GIS links geography and data. A specific GIS is a collection of special-purpose digital databases in which a common spatial coordinate system is the primary means of reference. GIS contain subsystems for (1) data input; (2) data storage, retrieval, and representation; (3) data management, transformation, and analysis; and (4) data reporting and product generation (such as maps).

It is useful to view GIS as a *process* rather than a thing. A GIS supports data collection, analysis, and decision making and is far more than a software or hardware product. Other terms for GIS and special purpose GIS include the following: land-base information system, land record system, land information system, land management system, multipurpose cadastre, and AM/FM system. (Source: The Geographer's Craft, Department of Geography, University of Colorado at Boulder.)

Geospatial Industry Workforce Information System (GIWIS). A joint project to identify occupations primarily involved in working with geographic information. The American Association of Geographers and the Geospatial Information and Technology Association direct the project.

Geospatial Line of Business (LOB). The LOB initiative seeks to leverage commonalities and target architecture approaches (i.e., systems, best practices, migration strategies, key interfaces) to support development of shared business processes and system solutions. The geospatial LOB will further refine the opportunities for optimizing and consolidating federal geospatial-related investments to reduce the cost of government and, at the same time, improve services to residents. Cross-agency coordination of geospatial activities can identify, consolidate, and reduce or eliminate redundant geospatial investments.

GPS (Global Positioning System). GPS is a U.S. space-based radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis — freely available to all. A constellation of more than two dozen satellites that broadcast precise timing signals by radio allows GPS receivers to accurately determine the location (longitude, latitude, and altitude) of a feature anywhere on the earth. Disaster relief and emergency services depend upon GPS for location and timing capabilities in their life-saving missions. The accurate timing provided by GPS facilitates everyday activities such as banking, mobile phone operations, surveying, mapping, and even the control of power grids.

Imagery for the Nation Initiative. A nationwide program to collect and disseminate standardized, multi-resolution aerial imagery products on set schedules. The National States Geographic Information Council (NSGIC), in cooperation with the National Digital Orthophoto Program Committee (NDOP) and the Federal Geographic Data Committee (FGDC), sponsors this initiative. Local, state, regional, tribal, and federal partners will be able to exercise "buy-up" options for enhancements that are required by their organizations. The imagery acquired through this program will remain in the public domain and be archived to secure its availability for posterity.

Metadata. Often understood as "data about data," it is a file of information that captures the basic characteristics of a data or information resource. It represents the who, what, when, where, why, and how of the resource.

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National States Geographic Information Council (NSGIC). The National States Geographic Information Council (NSGIC) is an organization committed to efficient and effective government through the prudent adoption of geospatial information technologies (GIT). Members of NSGIC include senior state geographic information system (GIS) managers and coordinators, and representatives from federal agencies, local government, the private sector, academia, and professional organizations. NSGIC provides a unified voice on geographic information and technology issues, advocates state interests, and supports members in their statewide initiatives.

NSGIC advocates the following nine coordination criteria as essential to fully enable statewide geographic information coordination activities:
1. A full-time paid coordinator position is designated and has the authority to implement the state's business and strategic plans.
2. A clearly defined authority exists for statewide coordination of geospatial information technologies and data production.
3. The statewide coordination office has a formal relationship with the state's chief information officer (or similar office).
4. A champion (politician or executive decision maker) is aware and involved in the process of coordination.
5. Responsibilities for developing the NSDI and a state clearinghouse are assigned.
6. The ability exists to work and coordinate with local governments, academia, and the private sector.
7. Sustainable funding sources exist to meet projected needs.
8. Coordinators have the authority to enter into contracts and become capable of receiving and expending funds.
9. The federal government works through the statewide coordinating authority.

Service Oriented Architecture (SOA). SOA is an approach for organizing and utilizing distributed capabilities that may be under the control of different owners. It provides a uniform means to offer, discover, and use capabilities for a broad audience. Benefits include increased capabilities and cost savings due to the elimination of redundant development activities.

Stakeholder Groups. This term is meant to encompass the broadest range of GIS producers and consumers. The term includes, but is not limited to, the following groups: governing bodies at the municipal, county, state, tribal, and federal levels; regional planning commissions; state and federal agencies; professional organizations; nonprofits; utilities; private businesses; academia; and the public.

State Cartographer's Office (SCO). The SCO is a unit within the Department of Geography at the University of Wisconsin-Madison. With an outreach mission specified in statute, the SCO gathers, maintains, and disseminates information about mapping and geospatial data in the state.

States with GIS Coordinating Councils. Alaska, Arizona, Arkansas, California, Delaware, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wyoming.

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Wireless E-911 (Enhanced 911). A technology implementation that provides emergency response operations a relatively accurate location (using latitude/longitude) of the caller.

Current geographic information that shows the location of the caller is a critical component of a functional E-911 system. Examples of this form of information include transportation networks, addresses, water features, names, and trails.

Wisconsin Land Information Program (WLIP). Established by statute in 1989, the WLIP is a unique Wisconsin program focused on local governments with the goal of modernizing Wisconsin's 150-year old land information system and making those records and associated geographic information more accessible to all. The WLIP is structured on a combination of data and administrative standards, dedicated funding, and prescribed duties for the state's administration organization and local governments. The WLIP, through the Land Information Board (which was dissolved on June 30, 2005), established policy, set standards, and provided funding to local governments for land information and GIS related activities. On July 1, 2005, all duties previously assigned to the WLIB were transferred to the Wisconsin DOA.

Since the early 1990s, all 72 counties have voluntarily participated in the WLIP. To do so, counties have had to meet certain requirements specified in the WLIP's enabling legislation. The WLIP's funding mechanism is a land transaction-recording fee collected at each County Register of Deeds office. The WLIP was modeled on the concept of a decentralized confederation of systems where the responsibility to collect and maintain information remained at the local level. The confederation of systems was intended to exist as independent databases on a variety of computer hardware and software. The conceptual model for the WLIP evolved from more than 20 years of study by the State, UW-Madison, local governments, and federal agencies.