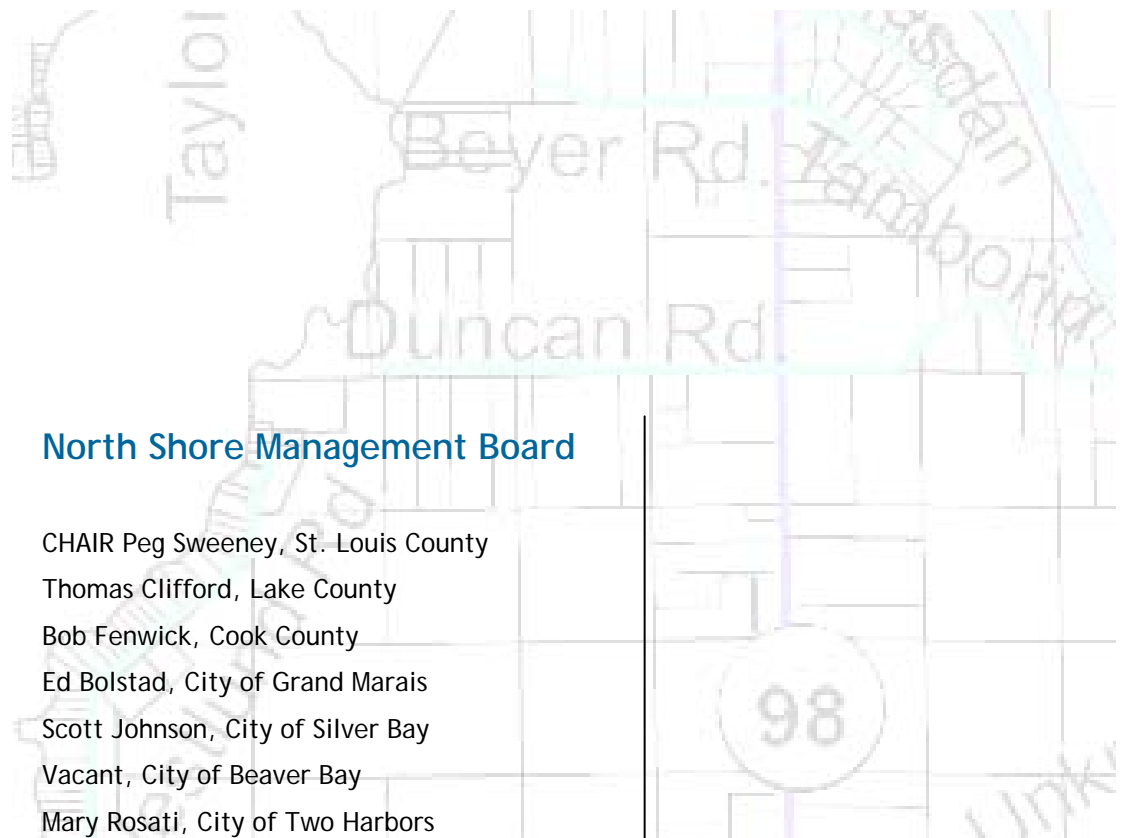# North Shore Management Board

North Shore GIS Assessment

March 2008

North Shore Management Board

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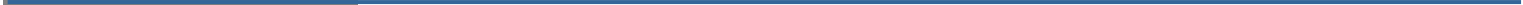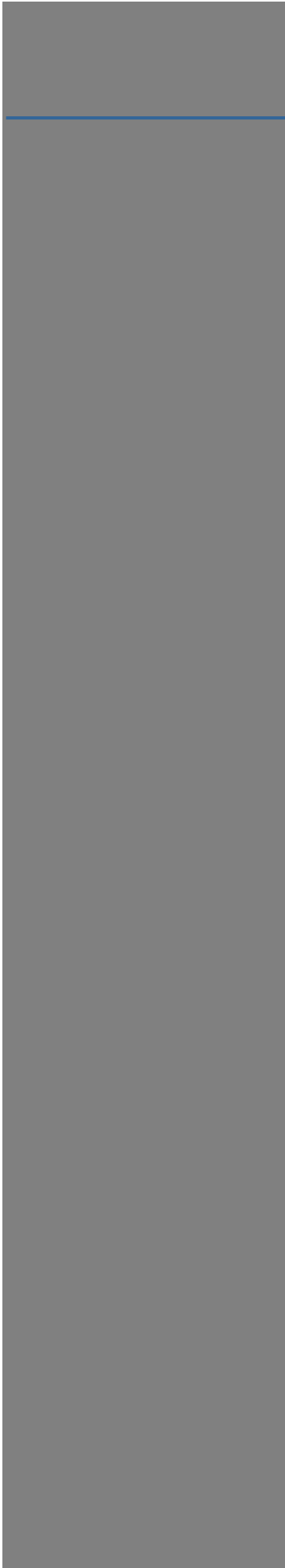
Scott Johnson, City of Silver Bay

Vacant, City of Beaver Bay

Mary Rosati, City of Two Harbors

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Jeff Cook, Duluth Township

Rich Sve, Town of Silver Creek

SECTION 1: INTRODUCTION

Project Funding

This project was funded in part by the Coastal Zone Management Act, by NOAA's Office of Ocean and Coastal Resource Management, in conjunction with Minnesota's Lake Superior Coastal Program.


Board Background

The North Shore Management Plan area boundary is defined along the 40-acre subdivision lines of the rectangular coordinate system established in the U.S. Public Land Survey, nearest to the landward side of a line 1000 feet from the shoreline of Lake Superior or 300 feet landward from the center line of U.S Highway 61, whichever is greater. However, the boundary between Lakewood Township and the western corporate limits of Two Harbors is the centerline of the U.S. Highway 61 Expressway. (See Figure 2 below).

The North Shore of Lake Superior

Definition of the North Shore Management Plan Area Boundary
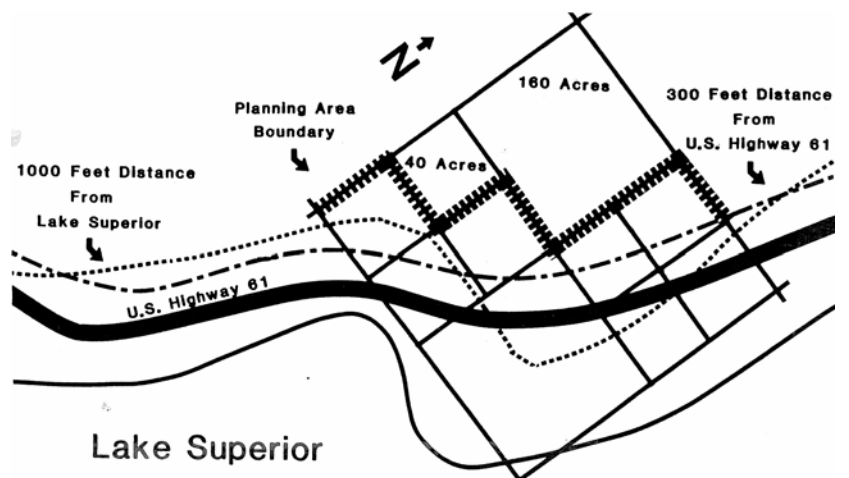
Source: 1988 North Shore Management Plan

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The North Shore Management Board (NSMB) is a joint powers agreement among 10 local governments (counties, cities, and townships) along Minnesota's Lake Superior coast. The NSMB was created in 1987 to develop a plan for uniform land use regulations for properties on and near Lake Superior (see inset below), which is valued by Minnesotans as a natural, recreational, economic, and cultural resource. The NSMB completed and implemented its original plan in 1988. That plan was revised and updated in 2004[*]. Implementation of the 2004 plan's minimum standards with local units of government is now nearly complete.

In addition to being responsible for the North Shore Management Plan, the NSMB serves as a forum for land use and environmental discussion between the member entities. The Board discusses development trends, newly identified issues, and other concerns that are common among the entities. The Board has organized a Technical Advisory Committee (TAC) of zoning professionals and agency officials to add expertise to the discussions.

Project Introduction

Developing and advancing GIS is a priority of the North Shore Management Board. The NSMB initiated the GIS Assessment process to assess the needs of the local entities along the North Shore and identify what data development efforts along the North Shore. At the start of the project it was unknown as to which entities utilize GIS and at what level. There are many needs that the local entities have for data and information. This project identifies many of the needs and makes recommendations for data development, future coordination, and collaborative efforts.

This project was a three part process. First, agencies and organizations were contacted and asked to discuss what GIS data they maintain and develop. Those contacted include; Minnesota's Lake Superior Coastal Program, Natural Resource Research Institute, Minnesota Pollution Control Agency, University of Minnesota-Duluth GIS Lab, Superior National Forest, and Minnesota Sea Grant. Several of these organizations develop detailed data sets and have varying GIS projects that are ongoing. Some of the items identified include what data they are maintaining, what projects are planned for data collection, and how they distribute the GIS data.

The next step of the process was to identify which entities along the North Shore were utilizing GIS. In initial phone interviews with entity staff, it was established that very few of the townships and cities use GIS. The NSMB then decided to engage the elected officials of the townships and cities in a dialogue about GIS and provide some education as to how GIS can be utilized. Each entity was then sent a follow-up survey to identify their current GIS capabilities and interest in further utilizing GIS. The counties (St. Louis, Lake, and Cook) already have GIS. The County staff was contacted and asked questions about their usage and their future plans for the GIS departments.

A positive product of this assessment was the education of the elected officials of the capabilities of GIS at their council/board meetings. During our presentations at the cities and townships, an overview of GIS was given and the elected officials were given a GIS demonstration and provided with examples of how the tool can be used in decision making processes. After the demonstration, elected officials and staff were given a chance to ask questions and enter into a dialogue about GIS. This was a chance for the NSMB to learn how the entities viewed GIS, and highlight possible opportunities for GIS development.

The final step in the process was to work with the NSMB staff and Technical Advisory Committee to develop recommendations. These recommendations include identifying GIS needs that can be addressed by the NSMB and identifying what GIS data the entities could use in decision making.

What is GIS?

Geographic Information Systems (GIS) uses computers, software, data and people to explore the fundamental principles of geography. It is used to inventory, analyze and manage many aspects of the world. GIS takes numbers and words from databases and puts them on a map by linking spatial and attribute data. Spatial data refers to locations on the earth and attribute data is the additional information which can be tied to the spatial data. It is the partnership of these two data types that enables GIS to be such an effective problem solving tool.
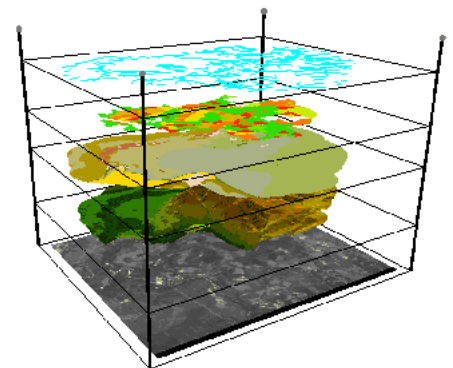
Layers are used to manipulate and analyze data.

SECTION 2: CURRENT GIS EFFORTS AND PROGRAMS

GIS is growing in popularity and is used in research and government regulation. More and more, independent organizations and government agencies are incorporating GIS data projects into most of their efforts. The NSMB contacted several local organizations to see what their recent and current projects are that they have been working on.

<u>Minnesota's Lake Superior Coastal Program</u>
The Coastal Program is housed under the Minnesota Department of Natural Resources Waters Division and provides technical and financial resources to the local communities. The Coastal Program coordinates and participates in many of the GIS efforts along the North Shore. The Coastal Program funded the creation of the Coastal GIS website which provides information and maps for the entire Coastal Zone which encompasses the entire NSMP Area. The Coastal Program funds many projects like this as well as assists local units of government with their GIS efforts. Also, the Coastal Program can provide equipment and the *Landview* computer program that can assist with mapping needs.

<u>Minnesota Department of Natural Resources</u>
The Department of Natural Resources hosts a website called the DNR Data Deli. This website provides a plethora of data for the local areas. This encompasses all DNR department data including animal numbers, fisheries, ecological data, watersheds, water access sites, and local boundaries.

<u>Natural Resources Research Institute</u>
The Natural Resources Research Institute (NRRI) is the entity that administers the Coastal GIS website (http://www.nrri.umn.edu/ coastalGIS/) which has proven to be an essential resource for accessing information for the North Shore. GIS projects and various information sources are available on the NRRI Website as well. NRRI is also involved in many projects that involve GIS research and analysis. This group also works with communities in developing build-out scenarios and other technical projects. NRRI does a lot to establish economic growth while continuing to look at the environment and how it is impacted.

<u>Minnesota Pollution Control Agency</u>
The Minnesota Pollution Control Agency develops and maintains data sets throughout the state. More notably, the MPCA has information that was

developed in collaboration with the Lake Superior Basin Plan, on a watershed-by-watershed basis. This information includes percent public ownership, percent erodible soils, land use by watershed, number of road crossings, dams, and several other data sets. The MPCA also did some prioritized watersheds that could experience significant change. In the future, the MPCA continues to maintain a variety of other data that includes impervious surface coverages, sediment quality, sewer infrastructure lines, lake and stream classifications, beach sites, groundwater sampling, and further data sets.

<u>University of Minnesota-Duluth GIS Lab</u>
The UMD GIS Lab is a teaching facility for the academic programs at the university. It is also a contributor in education and a research facility for cartographic and geographic information system (GIS) needs. The GIS Lab continues to support projects of the university and other community projects as well as student research projects.

<u>Superior National Forest (USFS)</u>
The Superior National Forest uses GIS for a variety of tasks that include resource management and data collection. Some of the information the forestry maintains includes campsite information, surface and subsurface mineral rights mapping, watershed boundaries, landscape ecosystem-based coverages, and road and trail data. The Superior National Forest uses a variety of data through analysis that includes ten meter DEM's, CFS code ownership, GCS township and survey sections, Land Sat, and Stans database.

<u>Minnesota Sea Grant</u>
Minnesota Sea Grant promotes responsible management and sound policy decisions that enhance Lake Superior and Minnesota's inland aquatic resources, through technology. Minnesota Sea Grant works on a variety of projects some of which include GIS analysis. Currently they are working with the City of Two Harbors, Lakewood Township, and the Lester and Amity Creek watershed. For these areas Minnesota Sea Grant is projecting several community build-outs scenarios possible using existing zoning, conservation design concepts, and smart growth ideas. The projects include creating visualizations of how each community could look given the current zoning standards and comparing their relative effects on stormwater runoff and water quality.

Minnesota Sea Grant is also working to create an online Community Resource Inventory for coastal communities. This would include all

townships within the coastal boundary and a few adjacent as well. This project would be modeled after similar projects completed by Nonpoint Education for Municipal Officials (NEMO). This project will provide needed mapping and analysis abilities to the townships along the North Shore and would be modeled to fit the local needs.

St. Louis County Portal Project
St. Louis County is currently developing a Proof of Concept for a county-wide Land Records Portal. The purpose of the portal is to provide a link between county employees, partners, and the public to myriad data pertaining to land records throughout many departments at St. Louis County. The portal will provide users with extensive capabilities to search data through interactive queries, extract data through reports, map data via linkages to the county's GIS infrastructure, and even provide editing and update capabilities for county users and partnering organizations. Access and user privileges will be regulated via user authentication, providing higher levels of detail and capability to county staff and "need to know" partners; while providing more limited, yet extremely useful information for other partners and subscribers, and the general public. The concept behind the portal is that of a GIS-based mapping interface with expanded capabilities to provide non-spatial information when maps are not required.

The portal will be a web-based interface, designed to leverage the capabilities of ArcGIS Server and ArcIMS, while requiring only an internet connection for users. Applications and tools are being designed with the intention of providing simple, but powerful solutions to those wishing to access and analyze land records data; all in an appealing, professionally-styled interface that is intuitive to the end user. St. Louis County is anticipating the proof of concept to be operational in May, 2008; with launch of the production environment portal to follow later in 2008 or early 2009.

Western Lake Superior Sanitary District
The Western Lake Superior Sanitary District (WLSSD) currently maintains data for Duluth North Shore Sanitary District and the Knife River Larsmont Sanitary District. The detail of this data includes locations for sanitary sewers, manholes, lift stations, entry points, and sewer-shed boundaries.

Grand Portage Reservation
The Grand Portage Reservation currently has one full-time GIS staff that coordinates data for several efforts including; forestry, biology and wildlife (fisheries), environmental mapping, planning, history, land use planning,

land ownership, and transportation. They have been utilizing GIS since 1993. Grand Portage does update and develop new data files for the Reservation when necessary.

Arrowhead Regional Development Commission
The Arrowhead Regional Development Commission (ARDC) is a multi-disciplined planning and development organization whose jurisdiction encompasses the Northeast Minnesota counties of Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis.

ARDC has several planners and two GIS Specialists that provide GIS support to a variety of projects and communities. ARDC has installed a new server with an upgraded license of ArcGIS Server. This will increase the ability for staff to create maps with Web-oriented spatial data services, to give browser-based access to GIS users both inside and outside of ARDC. The server will also store accurate and up-to-date regional GIS data sets. ARDC is working hard to foster data sharing relationships amongst various public and private entities in hopes that duplicated efforts will be reduced and areas of "data black-outs" can be supplemented.

ARDC is launching its first collaborative GIS effort through the Laurentian GIS Collaborative. The goal of this project is to give the local decision makers of seven pilot communities on the Iron Range, the ability to use only their web browser to access a web interface to create maps, perform some analysis and have a visual tool that can be used to help them make decisions. Data for each community is captured and/or created, hosted on the ARDC ArcGIS Server and then available through a web-based interface.

Minnesota Department of Transportation
MNDOT is using GIS to improve data, make maps and make information available for all users of MNDOT data. GIS is used for things like performance monitoring, long-range planning, project development and engineering design decisions. MNDOT is focusing on building new applications and systems to enhance quality and access, providing expanded technical support, strengthening data partnerships and becoming more involved in national data initiatives.

Most of the data that MNDOT maintains is done at their Central Office in St. Paul, however GIS is utilized at the local level. Mapping products and services created by MNDOT include the official state highway map, state maps, county and city maps, the GIS basemap and maps used to adjust boundaries. The main data layers that MNDOT creates, maintains and

uses are roadways, railroads, airports, pipelines, boundaries, city names and population, lakes and rivers, forests, parks, waterfowl refuge and wildlife areas, historic sites, public access sites and gravel pits.

Land Management Information Center (LMIC)
LMIC works with state, local and federal governments, professional associations, universities, nonprofit organizations and businesses to coordinate activities related to geographic information technology and data development. LMIC identifies data needs, promotes standards, develops and integrates data, serves as a state data archive, and provides geographic data to the public, emphasizing cost-effective visualization and data download services over the Internet.

SECTION 3: CURRENT UTILIZATION BY LOCAL UNITS OF GOVERNMENT

At the start of this assessment the NSMB Staff used phone interviews with local governments' staff to get a feel for how GIS is currently being used. At this point it was determined that a more definitive process was necessary to identify the future of GIS in these communities.

Cook, Lake, and St. Louis Counties all have GIS and utilize it at more advanced levels. However their use and organization was reviewed as well to identify the concentrations in which GIS is being utilized in each County. All three counties have a GIS trained staff that use GIS on a regular basis.

Cook County has a GIS department which uses GIS for everyday functions, future planning, re-zoning requests, workflow mapping, and variance requests and tracking public utilities. The GIS department provides support to several county departments but also various projects at the township and municipality level. The county uses a GIS evacuation tool for forest fires that occur in their region. The Cook County GIS department is continuing to develop and grow to aid in serving the County needs more thoroughly. Cook County does have a data sharing agreement in place with the DNR.

In **Lake County** several departments utilize GIS including; Forestry, Sherriff's Department, Planning and Zoning, Solid Waste, and the Highway Department. These departments use a web fusion tool that provides mostly a visual tool to the departments. The County does use ArcGIS mainly for forestry and land management needs. Lake County does not currently do a lot of data maintenance, but does develop data through GPS. Lake County does contract with some venders for GIS data development and has a need for more cartography and data analyses. Lake County does not currently have any data sharing agreements in place.

In **St. Louis County**, many departments use GIS for everyday functions, including; Assessor, Auditor, Land Department, Public Health and Human Services, Planning, and Public Works. The County uses GIS for a variety of functions including future planning, re-zoning requests, permit tracking, variance requests, public utility tracking, and transportation planning.
At the township level, the NSMB identified that GIS was used very minimally. Some of the townships were in possession of an application

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that provides hydrology, land ownership, and civil division boundaries. While this information is very helpful to townships it is limited as to being able to develop or change data layers. Lake County is also working on a larger project that will open many opportunities within the County. (See page 5)

Silver Creek currently uses a limited mapping application that does not have many GIS capabilities. The town sees GIS as a useful tool for land use planning and administering zoning. As GIS is a great expense; some barriers that are currently stopping the town from acquiring GIS include funding for equipment, personnel training, and maintenance costs. The town does recognize the value of having GIS locally.

Duluth Township currently uses a mapping application and has planning staff that is experienced in GIS. The township can foresee using GIS in many facets, including; aiding land use decisions, approving building permits, long term planning, and parcel/land organization. Further training and equipment costs are a barrier for the township. A need for increased detail and accuracy of all data is needed for geo-referencing and accurate map making was expressed.

Lakewood Township does not currently use GIS, but sees a need for it in land use planning and zoning. Lakewood Township currently has zoning, topography, and waterway maps that would be helpful in a digital, GIS format. GIS would also be helpful in completing and implementing the Lakewood Comprehensive Land Use Plan.

The four cities along the North Shore (Two Harbors, Beaver Bay, Silver Bay, and Grand Marais) utilize GIS at varying levels. Some of the cities contract out their GIS services which can be expensive. There were other instances where the cities did own GIS licenses, but were not using it to its full potential. None of the cities have trained GIS users.

The **City of Grand Marais** currently has one GIS software license. Grand Marais has completed limited data development and utilizes GIS on a rare, project specific basis. The City currently relies on Cook County for map creation and other related GIS needs. As training and software are expensive, Grand Marais could use a more user-friendly mapping tool that could aid in making land use decisions.

The **City of Silver Bay** does not currently use GIS. In the past years the City has contracted with outside consultants to do various GIS work when necessary. This includes planning and zoning boundaries, street layers,

parcels, and various other data layers. At this time Silver Bay is not looking to utilize full versions of Arc View because of the cost, training, and personnel needs.

Beaver Bay does not currently use GIS. The city sees a need for a variety of uses that would aid their government in land use decisions. Beaver Bay would need money and training to build the information and databases necessary for GIS. The city expressed a desire to use GIS technology to track infrastructure, road alignments, parcels, subdivisions, and zoning areas. Beaver Bay now obtains digital files when contracting out map publishing, which will be very helpful when the city begins utilizing data.

The **City of Two Harbors** does not currently utilize GIS. The Two Harbors planner on retainer does have access to GIS through ARDC. Two Harbors sees a need for parcel data development. Other information that would be helpful would be utility-based information including where utilities connect to each parcel.

All three counties along the North Shore are using GIS. Although they utilize GIS in a different way, all are continuing to expand their programs. Of the seven cities and townships, only one city has access to a full GIS license. Major barriers for the cities and townships are funding, training, and available staff.

This assessment shows that there is a huge demand for growth in GIS and further efforts are needed in securing funding and implementing GIS usage along the North Shore. We found that there was little knowledge of the capabilities in GIS, but their was great interest in having GIS as a tool.

SECTION 4: IDENTIFYING DATA NEEDS

GIS data can range from detailed photographs to parcel property layers to septic system locations. The amount and type of data that can be developed is limitless. The local governments were distributed a survey that asked what the local governments needed for data. The local entities and other GIS users, identified that the following data sets would be very supplemental to the local governments:

- *Updated local road layers*- Local road layers are very valuable to local governments, as many entities do not have accurate maps. While roads are being changed, resurfaced, rerouted, and vacated often times the local road maps are not updated. There was an expressed need to have updated maps with accurate road locations including attributes of the roads. Noting attributes in GIS (road width, right of way, road surface, presence of curb and gutter, and sidewalks) can help when making planning maps.

- *Sewers or sewer lines*- Several entities along the North Shore have a mix of Independent Septic Treatment Systems and sewer lines. Keeping updated layers as to which properties have ISTS and which are connected to public sewers is helpful. Also the locations of ISTS systems should be mapped to know how close these systems are to Lake Superior or other setbacks for construction projects occurring nearby. This information is very important when new development or lot changes are being considered.

- *Utilities*- Besides mapping sewer lines, mapping all infrastructure including gas, electric, and water lines would be beneficial. Having the precise locations of these utilities helps for planning efforts as well as public works departments for emergencies or routine maintenance. Attributes that could be included in these layers includes man hole location, fire hydrant location, where the utiltites connect to each property, power pole location, etc.

- *Survey lines and markers*- Having accurate survey lines and ground markers identified in GIS would be very beneficial to local entities. These maps can be used for identifying official setbacks, easements, or property boundaries. This information could prove especially important in permit hearings and discussions.


Data points collected with GPS units can be easily uploaded into GIS and used to show physical locations on an aerial photo or map.

- *Erosion hazard areas*- The NSMB identifies erosion hazard areas in the North Shore Management Plan. This information would be helpful to entities when paired with zoning coverages to identify what areas along the shore are more prone to erosion and make land use decisions based on this information. The NSMB is currently identifying a process of updating this information.

- *Waterways and wet lands*- While the NSMB works to set standards that preserve Lake Superior there are other hydrology files that are important along the shore that include; rivers, streams, and wetlands. Having these items digitized can be very helpful- especially when approving new development and wastewater systems. Many of the local rivers and streams are sensitive and accurate maps would help to incorporate planning around the rivers.

- *Parcel layers*- Updating parcels and property information and having it digitized for each entity would be extremely valuable. Using paper maps to manage parcels gets chaotic, crowded, and disorganized. Digital parcel layers can have owner information, permanent easements, and other property conditions that are important. Having an accurate parcel layer, helps with the accuracy of most other files including; road layers, zoning districts, etc. Adding additional information like road setbacks to the layer could be helpful for planning purposes as well. The greatest benefit of managing parcels is having the information all in one place, streamlining the parcel management processes.

- *Sign locations*- When entities are working with sign ordinances and permitting new signs it is helpful to know what signs are located in close vicinities. Many projects could be useful for local entities in analyzing how to improve their ordinances.

- *Easements*- As lands continue to be developed, the number of easements continue to grow. Tracking easements and easement vacations through GIS is an efficient way to keep them organized and stopping them from falling through the cracks.

- *Various historical data*- GIS can be a location for storing historical data. This includes past development plats, vacated roads, previous land use zones and anything that could make for helpful reference material in future decision making processes.

The North Shore Scenic Drive Council completed a project that used GPS and GIS to map the signs and billboards along Highway 61.

- *Culvert locations*- Culvert locations on local roads can be very beneficial to local public works departments. Culverts, over time can become overgrown and plugged, creating drainage problems. Having culvert locations readily available can be of great use to public works departments when responding to problems, being able to identify exact pipe locations.

- *Soil maps*- Soils are an important topic on the North Shore and can cause issues with septic systems, development, and shoreline erosion. An understanding of the ground make-up is very important for entities when permitting new construction, when the soils can range from clay, till, or bedrock. Soils can have a large say in densities and are important to know before zoning decisions.

- *Lidar aerial imagery*- Lidar is remote sensing technology that can be used for identifying elevation and other three dimensional features that can be useful on maps. Lidar imagery is a newer technology that can be used for a variety of analyses. This information tends to be fairly expensive, but is begin utilized more and more.
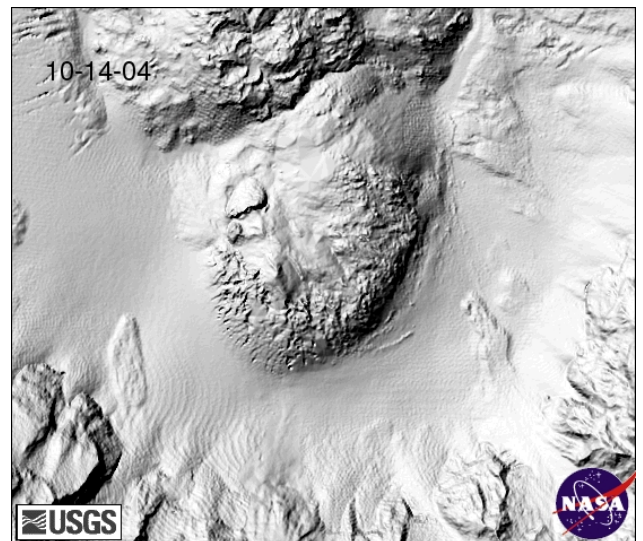
Example of lidar imagery.

- *Topography layers*- Detailed topography layers can be useful for identifying structure location in relation to the slope of hills or bluffs.

This data represents many of the data sets that are currently needed. However, over time, the needs for data will change and should be reevaluated again in the future. The most notable and heavily requested data was for parcel layers, accurate road files, and utilities. The trend throughout the discussions was to have data that is localized. The more data that is developed and readily available, the more incentive there will be for local governments to utilize GIS.

Data Sharing

Sharing data can be a polarizing topic in GIS projects and efforts. Each entity and organization has different views on sharing data. Data can be very expensive to develop and maintain and it is understandable why entities take pride and place high value on this data.

However, by fostering a data sharing culture entities along the North Shore will be able to utilize GIS more efficiently in the future. Data sharing can help entities in identifying potential resources more easily by learning how others have obtained such resources. The reuse of resources (data and services) across multiple domains is more efficient; for example rather than several entities going through lengthy tasks of data manipulation, after a layer has been created, making the product available to interested entities, to reduce duplication and save time and effort.

An important part of data sharing and collaboration is the need to adopt the same data standards so when data is made available- the data will fit into existing infrastructure. Data created by public funding should be shared as much as possible, to illuminate research, policy, practice, theory building and testing. This is particularly important for unique data that cannot be readily replicated.

SECTION 5: RECOMMENDATIONS AND NEXT STEPS

Recommendation 1: All local entities should seek to acquire digital GIS data and metadata from vendors when contracting with them to develop data. When entities work on future projects (comprehensive plans, trails plans, etc.) the digital GIS files can supplement those efforts and integrate into datasets for when entities do begin usage of GIS.

Recommendation 2: Local funding and grant sources (i.e. Minnesota's Lake Superior Coastal Program) should prioritize funding projects that focus on data development; especially for parcel and utility mapping efforts. Digitizing parcels and utilities (sewer, water, and gas lines) were the most requested data from interviews with the local entities. Projects that include this type of data should be prioritized, which will result in a great asset for the local governments.

Recommendation 3: The NSMB should continue to support local and regional GIS development efforts. This includes supporting local governments in utilizing GIS and acquiring data. The NSMB will also continue to work with organizations and recommending data development and maintenance. This includes encouraging communities to utilize the Coastal Program's *Landview* program for basic mapping needs. This program may benefit some communities and others may need more sophisticated software.

Recommendation 4: When entities acquire GIS software, data sharing policies should be developed and forwarded to the NSMB and other interested parties. Data sharing policies are important because they establish how data is to be shared and managed and help to keep data accurately maintained. Having the same data available in multiple locations can degrade data and contribute to inaccuracies being developed and shared. If the primary data developer, also acts as the data distributor, many problems can be avoided.

Recommendation 5: Local governments, state agencies, other organizations, and the North Shore Management Board should openly communicate and coordinate for collaborative GIS efforts. As GIS continues to be more versatile, there will likely be many efforts

to make GIS and data more available.   Not only will further communication, avoid unneeded duplication, but it will also help to make sure that local needs are being met.

Recommendation 6: The NSMB should seek funding opportunities that will help with GIS development. The NSMB should continue to pursue projects that will bring more GIS tools to the local units of government. The NSMB should also forward funding opportunities to the local governments.

What's Next?

The NSMB has established that there is a great need and much interest in local governments utilizing GIS. It was established that out of the seven townships and cities that are members of the NSMB, none of them are fully utilizing GIS. The NSMB will continue to work with organizations and agencies in helping to meet GIS needs. This will include recommending data development, seeking funding, and facilitating processes for increasing the use of GIS. This document will continue to serve as a reference piece for the NSMB, local governments, and other interested agencies.   The NSMB will use this process to build local GIS efforts and to continue to follow up with the recommendations and identify new ways to utilize GIS and other decision making tools.

The NSMB will revisit the recommendations from this document periodically to make sure that NSMB recommendations are being followed and identify new opportunities that can be explored.

APPENDIX: LOCAL GIS CONTACTS

GIS User	contact	phone	email
Arrowhead Electric Cooperative	Joe Buttweiler	(800) 864-3744	jbuttweiler@aecimn.com
Arrowhead Regional Development Commission	Kara Kent	(218) 529-7539	kkent@ardc.org
Community GIS	Tony Kroska	(218) 279-5925	kroska@commgis.org
Cook County GIS Department	Kyle Oberg	(218) 387-3663	kyle.oberg@co.cook.mn.us
CO-OP Light and Power	Larry Sandresky	(800) 580-5881	staking@clp.com
DNR/ Coastal Program	Clinton Little	(218) 834-6636	clinton.little@dnr.state.mn.us
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Lake County Information Technology	John Swardstrom	(218) 834-8487	john.swardstrom@co.lake.mn.us
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Minnesota Sea Grant	Jesse Schomberg	(218) 726-6182	jschombe@d.umn.edu
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Superior National Forest (USFS)	Kendall Cikanek	(218) 626-4391	kcikanek@fs.fed.us
UMD GIS Laboratory	Stacy Stark	(218) 726-7438	slstark@d.umn.edu
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