FGDC CAP Grant – Category 5: Data Stewardship for the National Map

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                                            NSDI

Report Type: Final Report

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Data Themes: Transportation

Executive Summary

The Transportation Data Stewardship Enhancement Plan was accomplished under a
project funded as part of the National Spatial Data Infrastructure (NSDI) Cooperative
Agreement Program (CAP) Category 5—a grant program administered by the U.S.
Geological Survey. It defines a framework and specific initiatives to enhance and expand
the Michigan Geographic Framework transportation data themes through building an
environment that encourages broad participation through shared responsibility, shared
costs, shared benefits, and shared control.

Work on the plan preparation began in March of 2010 and was completed in September
of 2010. The Center for Shared Solutions and Technology Partnerships assembled a
project Steering Committee to oversee plan preparation and have engaged a consultant
team from the firm GeoPlanning Services, LLC to gather information and prepare the
plan. Input was gathered from the project Steering Committee, and project participants
from the statewide GIS community.

The planning process determined that effective long term Stewardship requires active
involvement by a wide variety of partners with a stake in the success of the program. The
plan recommends a number of specific tasks, in tight alignment with the Michigan
Statewide GIS Business Plan, to build a framework for the program. These tasks include
a number related to governance such as creation of technical working groups to develop a

stewardship charter and address specific programmatic issues such as the structure of the transportation stewardship program, data distribution policies, and data standards.

Project Narrative

a. **Describe the project; its tasks, highlights, challenges, and accomplishments. What are your approaches to overcoming impediments to participation in *The National Map*? Based on your experience what would you recommend for implementation and development for project success (technical, institutional and organizational)?**

The Michigan Center for Shared Solutions and Technology Partnerships (CSSTP) manages the Michigan Geographic Framework (MGF) program. The MGF is the mechanism for maintaining the State of Michigan's core enterprise spatial assets. Managed as a statewide, seamless, topologically-integrated base map, it includes a complete transportation network. The MGF is designed to promote cross-boundary collaborative partnerships among all levels of government to allow highly efficient and effective data maintenance. The MGF provides a centralized place to store and maintain the transportation network. This reduces duplicated efforts and thus creates significant cost savings. In addition, it creates common, standardized, product-enabling data-sharing and communications within the Geographic Information Standards (GIS) community. CSSTP has made great progress in developing a standardized base map, sharing data and collaborating in data maintenance. Over and above current successes, there are many opportunities this grant will allow CSSTP to explore, expand, and document.

At present, the MGF is managed and maintained in two platforms: ESRI coverage and Microsoft Visual FoxPro. FoxPro was developed in the late 1990's and has helped MGF grow into a stable program. Releasing products on an annual schedule, the program has been identified as a State of Michigan enterprise application. The current system is built on outdated technology, which the MGF has outgrown. CSSTP is in the process of moving the MGF into an Oracle Spatial 11g topology data model with an ERDAS ADE internet-editing environment. As a by-product of the migration, CSSTP wishes to capitalize on the potential role that local agencies could play in helping edit and update the MGF.

There were two main goals for this grant. The first was to identify the processes, procedures and tools necessary for increased local participation in the MGF program. The second was to promote the benefits of the collaboration for all levels of government. Specifically, this grant was used to perform the following activities:

Survey the MGF user community:

To support the development of a stewardship enhancement plan for the Michigan Geographic Framework (MGF) the outreach effort also sought to gather stakeholder impressions of cooperative programs and get their specific input into the future evolution of the MGF data and services.

The community outreach portion of the project summarized here included facilitated listening sessions in 5 locations, an on-line survey, and targeted interviews with key members of the stakeholder community. A total of 191 individuals from the Michigan

GIS community participated in one of five listening summits that were held in different locations throughout the state of Michigan. Additionally, 282 individuals responded to the on-line survey to provide their input into the direction of Statewide GIS Business Plan and stewardship enhancement plan. During the outreach phase of this project a total of 291 individuals provided e-mail information though either an RSVP to the listening summits or providing it during the on-line survey with the request they be added to a project mailing list.

A copy of all findings from the information gathering can be found at the project website (www.michigan.gov/nsdi).

Categorize the user community into capability groups:

Planning for MGF enhancement and increased participation is based on an understanding of the characteristics of Michigan's statewide GIS user community which includes all levels of government, regional agencies, nonprofit organizations, public and private utilities, private firms, and the general public. These GIS stakeholder organizations exhibit a wide spectrum in terms of: a) production/update of geographic data and b) access to GIS technology (systems, software, applications). This wide spectrum is best viewed as a continuum from low to high for both characteristics as demonstrated in Figure 2 below. This characterization of the MGF user community is used as a basis for planning and delivery of services and support to user organizations and the development of an effective stewardship. It recognizes that the GIS community in Michigan is made up of a diverse set of public, private, and non-profit organizations that exhibit a large range in availability and use of GIS technology and existing geographic data compilation and maintenance programs. Recommended actions in this plan take into account these differences.

It is within this broad classification of potential stewardship participants that recommendations must consider moving forward:
   ➢ Stewardship Group I—Organizations with active enterprise GIS and transactional updates of MGF data that support a variety of business drivers. These organizations may maintain a digital address assignment process and continuously update road centerline data to support 911 and other critical business drivers.
   ➢ Stewardship Group II—Sophisticated data users that create little or no MGF data. Organizations in this group may make extensive use of transportation data but may not be creators of these data. Some of these organizations likely are those that reported receiving data from an outside source and editing it to meet their specific needs.
   ➢ Stewardship Group III—Organizations that have a business driver to create MGF data that do not routinely update digital spatial databases. An example of these organizations may be jurisdictions that perform manual address assignment and maintain MSAG data outside of a spatial environment.
   ➢ Stewardship Group IV—Organizations or individuals that have occasional or no need to create MGF data and are infrequent users of GIS technology. This group includes the general public or other occasional users of web mapping services to locate an address, get driving directions, or explore spatial data such as property tax information without any driver to have sophisticated technology.

Identify requirements for interfacing between the MGF and each group:

During the outreach phase of this project most members of the GIS community in Michigan reacted positively when asked about the data content, quality and availability of the MGF and there was praise for the MGF staff. There were observations about weaknesses and suggestions for improvement including:

➢ MGF program will be used in different ways by different types of participants. Counties and municipalities with robust GIS programs, the MGF will not be the primary source of transportation data they use but it is a primary source for lower population/lower resourced counties, cities, villages, and townships. Most of the interviewees representing organizations with robust GIS programs indicated that they would have some use for the MGF—when GIS applications requires transportation and other data outside of their jurisdiction boundary. Most indicated that they would participate in the MGF program as a data provider if he CSSTP provided an efficient way to submit data.

➢ There was close to full consensus that the CSSTP needs to be doing a better job of outreach and establishing partnerships with local government entities to maintain the statewide MGF databases.

➢ Some individuals noted that the CSSTP has not provided a clear approach and mechanism for local governments to provide data updates to the MGF—indicating that this has been a factor inhibiting participation by local governments.

➢ Some local government jurisdictions place limitations and/or charge fees for distribution of certain high value GIS data (e.g., high-resolution ortho imagery, parcels). This circumstance must be addressed, to the satisfaction of these jurisdictions, before statewide access to these data.

Specific comments for improvements to the MGF related to communications to partners and users included:

➢ Improve communications and understanding of the complexity of the MGF framework data so it can be fully utilized would be enhanced by the production of a training program and associated detailed user guide

➢ Provide clearer descriptions of MGF datasets and make metadata easy to access to give users information to allow them to make the most effective use of the data

➢ Improve Web-site navigation and tools to find and access MGF data

➢ Establish more clarity in how disputes in the data are resolved (for boundary changes for example) and provide better feedback on the status of data corrections and additions while they are in process

➢ Provide a list of all MGF contacts to facilitate communication between users and data custodians

➢ Build enhanced applications and Web services to allow users to perform queries and map visualization online without a requirement to download data

Create design plans, processes and procedures to standardize distribution of MGF changes:

Implementing a stable framework stewardship plan will require overcoming several challenges:

➢ Commitments from Source Stewards will be an important hurdle in the early stages of this process. Within the context of Michigan's enhanced access policies where data ownership and sale rights are held by the organization that creates the data it may be difficult to establish source steward relationships with

organizations found in Stewardship Group I, organizations with active enterprise GIS. Participants from each of the four Stewardship Groupings should be identified and systems established to demonstrate and successes to the broader GIS community.

For the most part, duties and responsibilities required for Framework stewardship will be performed by personnel employed by individual organizations. In many cases, these activities will extend beyond the needs of the agency. Therefore, incorporating stewardship into agency planning and budgeting, and incorporating stewardship responsibilities into position descriptions for Framework Stewards are necessary steps to achieving long-term stability for MGF and realizing its statewide benefits.

➢ Funding: In order to assure stability over time of a stewardship program it will be important to identify a mechanism that will make available sustainable funding to support data development and maintenance in a collaborative environment.

➢ Data Integration: There will be technical challenges associated with receiving data sets from multiple source stewards. For organizations in Stewardship Group I challenges may be technical in nature related to the ability to match well established enterprise databases into a statewide theme. Organizations in each capability cell will have unique challenges that will need to be overcome through provision of customized ETL tools, no-line data creation and editing tools, or basic GIS education of decision makers and professionals in the possible stewardship partner.

➢ Liability: Some potential stewardship partners may have concerns related to their potential liability from providing a component of a larger dataset made available for unrestricted public use. Ultimately this issue may require the Michigan Legislature to address this issue. In the immediate term an opinion from the Attorney General and standard disclaimers and acceptable use statements may be sufficient to eliminate these concerns.

➢ Adoption and Enforcement of Standards: Essential to the stewardship process is agreement among the user community of the standards to be implemented for that theme. These standards must take into account the broad range of user requirements while being respectful of the potential demands on Source Steward organizations. Standards should be adopted by each theme working group and validated through a formal process by the CBTSC.

➢ Distribution and Access: A formal mechanism for controlling distribution and access to framework data must be developed. There are clear and valid concerns on the part of many members of the GIS community that data provided to the state will be freely distributed thus jeopardizing their ability to re-sell these data to private users. Additional concerns have been expressed regarding the sensitive nature of some data that may be part of the MGF including features critical to homeland security and utility networks.

The findings from the research done during this grant period will directly feed the development of the tools and procedures in new MGF editing environment. This grant will hold CSSTP accountable to the local data steward to meet their requirements. In addition, it will allow CSSTP to focus on this critical component for the growth and long-term sustainability of the MGF.

b. **Describe the data connect provided to *The National Map*. Are there any use restrictions? Are your map services and data documentation (metadata)**

registered in Geospatial One-Stop? What is the status of maintaining, updating and serving themes of data that are included in The National Map? Based on your perspective and project experience describe user requirements for a national level spatial data infrastructure.

The data will not experience any degrading and has no restrictions. The MGF is available for free public consumption through the CSSTP Geographic Data Library website: http://www.mcgi.state.mi.us/mgdl/. However, it is not registered to the Geospatial One-Stop. The MGF transportation network is updated continuously and released on an annual schedule. Currently, there is not a formal arrangement for providing updates to the National map, but this is an area that we would like to improve through this grant.

Based on CSSTP's experience in data sharing between the State of Michigan and local Governments, we have found that the two years is the most time intensive. During this time period a data sharing agreement has to be created and the two centerline models must be reconciled. Both agencies must commit to the partnership or it will not succeed. In addition, it must be a win-win situation. Win-lose and win- break even situations are not acceptable.

Once the centerlines have been reconciled, we have found the there must be a mechanism to communicate change. Both agencies often have business requirements and updates that change their centerline files. We have found that a primary key is the most efficient communication tool. However, there needs to be a protocol established to identify changes to the primary key value. The Michigan Geographic Framework maintains a primary key linear referencing system (LRS) for the transportation network. When the LRS values are changed, a "transaction" record is recorded. This allows us to migrate the primary keys of the connected dataset and link to the new MGF. However, this adds some complexity when editing to ensure that primary keys are not copied or removed during an editing session.

c. **Describe the operational capability to maintain and update data through periodic updates of data made available to *The National Map***

The Michigan Geographic Framework (MGF) has dedicated editing staff to maintain the transportation network. If updates and changes were made to the National Map, and communicated to CSSTP, the changes would be integrated into the MGF and released to the public with the following annual delivery.

d. **Discuss the issues, difficulties, and challenges (technical, institutional, and organizational) that were encountered. Do you need assistance? If so, what type of assistance do you need?**

Procurement of Contractual Services to conduct listening sessions and write a marketing plan proved to be difficult within our state's current economic strife. However, we are USGS worked with us to set a new project timeline and we were able to deliver the project on time.

e. **Describe your relationship and issues with the USGS. Has a formal ongoing agreement been established to provide data to *The National Map*? Describe your plans for follow-on activities. What are the terms and mutual commitment of resources? Please attach copy of written agreement if available.**

Currently, there is not a formal data sharing agreement or local stewardship between CSSTP and USGS for the transportation network. We would like to provide transportation changes to the National Map. CSSTP is the local data steward for the National Hydrological Dataset (NHD).

Feedback on Cooperative Agreements Program

What are the program strengths and weaknesses?
The flexibility and collaborative spirit behind these projects are its strengths. The only weakness we found was in the actual grants.gov system and the difficulties in final financial reporting.

Where does the program make a difference?
The program gave us the jump start and exposure that was needed on a statewide basis to help us better understand the MGF user groups throughout our state and what changes we need to incorporate to allow for increased stewardship.

Was the assistance you received sufficient or effective?
The assistance of the USGS and FGDC was extremely helpful and timely. Thank you to all who help coordinate these grants.

What would you recommend doing differently?
I think this grant process was very effective and wouldn't change it if offered again as a cooperative agreement opportunity.

Are there factors that are missing or additional needs that should be considered?
N/A

Are there program management concerns that need to be addressed? Time frame?
I felt the time frame was very flexible allowing for that not to be a project constraint, the one management improvement would be a dedicated reporting resource to help wade through the federal financial reporting system.

If you were to do this again, what would you do differently?
I would spend a little more time up front getting some of the dates and project timeline in place before the award.