

**Environment and Natural Resources Trust Fund
2011-2012 Request for Proposals (RFP)**

LCCMR ID: 016-A2

Project Title: Common Ground: The Minnesota Environmental Mapping Commons

Category: A2. Natural Resource Data and Information: Distribution, Application, and Training

Total Project Budget: \$ \$675,000

Proposed Project Time Period for the Funding Requested: 2 yrs, July 2011 - June 2013

Other Non-State Funds: \$ 75,000

Summary:

Implements a "public commons" for finding and downloading environmental data, along with an interactive mapping and modeling system (ECOView) that uses "real-time" data feeds from state, local and federal agencies.

Name: David Arbeit

Sponsoring Organization: Dept. of Administration - Minnesota Geospatial Information Office

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Web Address: www.mngeo.state.mn.us

Location

Region: Statewide

Ecological Section: Statewide

County Name: Statewide

City / Township:

<input type="checkbox"/> Funding Priorities	<input type="checkbox"/> Multiple Benefits	<input type="checkbox"/> Outcomes	<input type="checkbox"/> Knowledge Base
<input type="checkbox"/> Extent of Impact	<input type="checkbox"/> Innovation	<input type="checkbox"/> Scientific/Tech Basis	<input type="checkbox"/> Urgency
<input type="checkbox"/> Capacity Readiness	<input type="checkbox"/> Leverage	<input type="checkbox"/> Employment	<input type="checkbox"/> TOTAL _____%

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Common Ground – The Minnesota Environmental Mapping Commons

I. PROJECT STATEMENT

Minnesota is among the nation’s leaders in using GIS to protect its environment. Forty years ago the LCMR funded a system to help protect the state’s lakes. Before GIS existed, this “watershed” project mapped land use and modeled environmental impacts of development. Since then, Minnesota’s investments in data to guide environmental policies and practices have been impressive: imagery, LiDAR, atlases, wetlands, contaminated sites, impaired waters, wells, storage tanks, feedlots. The investments continue, but a persistent complaint remains – data cannot be quickly assembled to inform policies or decisions. We need seamless access to data, models and maps to protect our resources – especially surface and groundwater.

Recent flood emergencies usefully illustrate the need and project goals. Imagine flooded rivers inundating areas containing hazardous wastes, storage tanks, wellheads or feedlots with high concentrations of contaminants. Rising waters cover these sites, carrying contaminants into a network of streams, rivers and lakes or to aquifers through pervious soils. Result: degraded surface water and groundwater. As stewards of our environment, we must be able to quickly identify flooded areas, pollution sources exposed to floods, and environmental risks from contaminants transported “downstream.” This project would accomplish that.

Working with state agencies, local governments, academia, nonprofits, and the State’s Geospatial Advisory Councils, MnGeo will implement a “public commons” for finding and downloading environmental data -- the Environmental Mapping Commons, along with an interactive mapping and modeling system (ECOView) that uses “real-time” data feeds from state, local and federal agencies. ECOView will use new methods for publishing map services and model inundated areas, contaminant migration through water networks, and underground impacts on groundwater through diffusion. The project builds on work of a Geospatial Commons work group chartered by MnGeo and tools developed for emergency response.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Establishing Common Ground

Budget: \$ 35,000

Project advisors will meet shortly after the start date, followed by retreats and workshops to strengthen stakeholder commitment and refine project scope and priorities. Workshops will be held at various locations around the state to ensure active stakeholder participation.

Outcome	Completion Date
1. Initial meeting of project advisory committee	July 22, 2011
2. Environmental Commons “Kick-Off” retreat	August 19, 2011
3. Design priorities and detailed technical specifications finalized	September 16, 2011

Activity 2: Create Environmental Commons “One Stop Shop”

Budget: \$ 130,000

Create a searchable catalog of all environmental data, mapping sites, and web services. Web services use open standards used to integrate data from multiple sources in real-time. The Commons will tie together the Data Deli, DataFinder, and MN Geospatial Clearinghouse.

Outcome	Completion Date
1. Interface for “Environmental Commons” designed	December 31, 2011
2. Existing data, mapping, and services identified and cataloged	March 31, 2011
3. Interface for “Environmental Commons” tested and implemented	June 30, 2012

Activity 3: Develop Real-Time Geospatial Web Services**Budget: \$ 135,000**

Using best practices, MnGeo and technical contractors will develop geospatial web services needed for real-time integration of data. The team will work with organizations that hold data to develop web services where they do not already exist and enhance other services, if needed.

Outcome	Completion Date
1. Needed data sources not supported by web services documented	March 31, 2012
2. Services needed to feed integrated map services developed	June 30, 2012

Activity 4: Environmental Commons Map Viewer - ECOView**Budget: \$ 125,000**

Design and implement an integrated map viewer that presents available data through an easily used map interface. ECOView will assemble data in real-time so that it will be up-to-date, be accessible to the public through standard web browsers, and require no special GIS skills.

Outcome	Completion Date
1. ECOView (Beta): Environmental Commons Map Viewer completed	September 30, 2012
2. ECOView (V1): Environmental Commons Map Viewer available	December 31, 2012

Activity 5: Environmental Modeling and Analysis Prototypes**Budget: \$ 250,000**

Develop prototype “flood inundation” and “water network trace” models. The inundation model will use elevation data to identify areas affected by a range of crest levels of the Minnesota, Red, and Mississippi rivers. The trace model will use high-resolution hydrography network data to identify downstream impacts of surface water contamination.

Outcome	Completion Date
1. Complete flood inundation and impact model prototype	February 28, 2013
2. Complete surface water trace model prototype	March 31, 2013
3. Models integrated into Environmental Commons Map Viewer	June 15, 2013

III. PROJECT STRATEGY**A. Project Team/Partners**

- Sponsor: David Arbeit – Geospatial Information Officer, MnGeo (In-kind)
- Project Staff: Fred Logman (Funded), MnGeo staff (In-Kind and funded)
- Technical Consultants: TBD (Funded as contractors)
- Web Support and Hosting: MnGeo (Partially funded)
- Advisors: EQB, DNR, Agriculture, Health, BWSR, organizations on state Geospatial Advisory Councils (including DNR, Agriculture, MPCA, Health, BWSR, Metropolitan Council, USGS, US Fish & Wildlife, 1000 Friends, University of Minnesota)

B. Timeline Requirements

This project will be completed and a final report prepared within two calendar years.

C. Long-Term Strategy and Future Funding Needs

This is an important component of ongoing work to develop a statewide “enterprise” GIS solution, coordinated and supported by MnGeo. Systems implemented will be hosted by MnGeo in compliance with its legislative mandate specified in 2009 legislation as MS 16.99. The project complements a plan being developed by a team sponsored by MnGeo, DNR, MnDOT and the Metropolitan Council for a “One Stop” solution for geospatial data and services. Environmental Commons will be maintained by MnGeo or its designees and located in a secure data center maintained by the Office of Enterprise Technology. Future funding may be needed to fully implement and support the modeling prototypes.

2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET [2] years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: Manager, MnGeo: 0.25 FTE (Sal & Ben, 24 mo. @ \$90,000/yr) Analyst, MnGeo: 0.75 FTE (Sal & Ben, 24 mo. @ \$80,000/yr)	\$ 165,000
Contracts: Web Portal -- Consultant on State Master Contract (TBD) - \$50,000 Data Integration & Services -- Consultant contracts (TBD) -- \$100,000 Env Commons Map Viewer -- Consultant contract (TBD) - \$75,000 Environmental Modeling -- Consultant contract (TBD) - \$240,000	\$ 475,000
Equipment/Tools/Supplies: Dedicated Environmental Commons Server and Storage Server estimate (4 Quad Core Processors, 128 GB Memory, 3 TB Storage)	\$ 30,000
Acquisition (Fee Title or Permanent Easements): NA	\$ -
Travel: Travel to Workshops and Retreats for Team and Stakeholders	\$ 5,000
Additional Budget Items:	\$ -
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 675,000

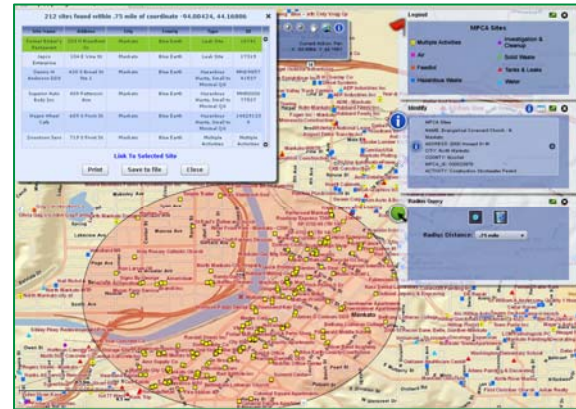
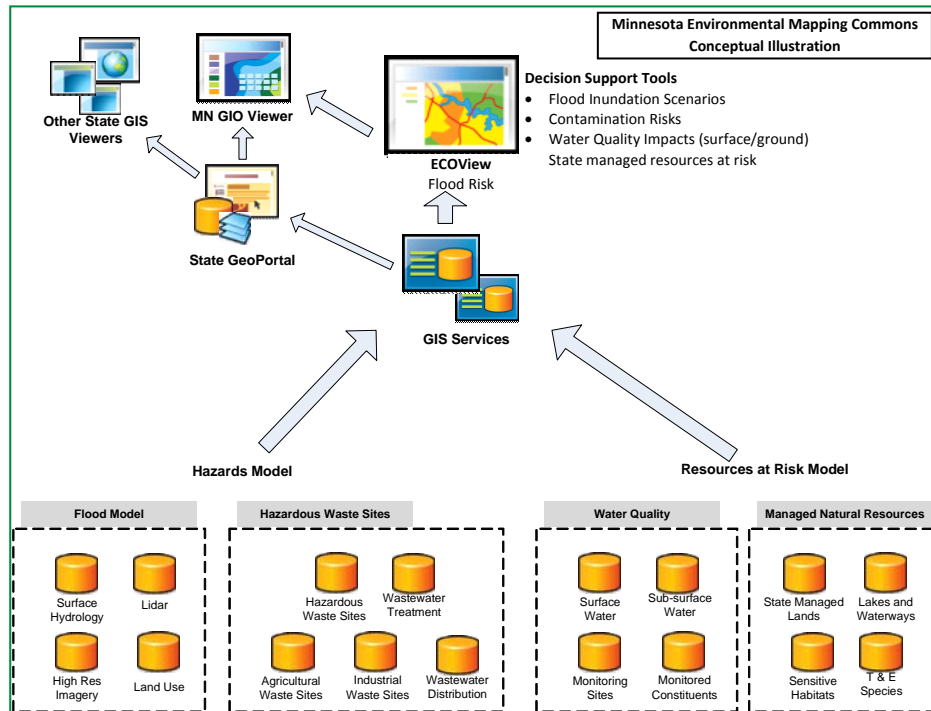
V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: MnGeo currently has funding from the USGS to develop procedures to improve and maintain a statewide hydrologic dataset. The data ties all surface water features (streams, lakes, wetlands, ditches, etc.) into a unified network that can be used to trace downstream impacts. The data and tools resulting from this EPA-funded project will support hydrologic network trace modeling for Environmental Data and Mapping Commons. A recently awarded grant of \$200,000 will support work that will begin in the summer of 2010 and continue into 2012. The USGS has invited MnGeo to submit a proposal for an additional \$75,000 for this project. About 75,000 of this amount is estimated to relate directly to this project.	\$ 75,000	<i>Secured Pending</i>
Other State \$ Being Applied to Project During Project Period: Software Licenses: ArcGIS Server (20,000); Hosting Charges for Server (2,500)	\$ 22,500	
In-kind Services During Project Period: MnGeo: Arbeit, Cialek, Maeder, Rader, IT Staff -- (1500 hrs, est.) ~ \$75,000 Partners and Advisory Groups: -- (1000 hrs, est.) ~ \$50,000	\$ 125,000	
Remaining \$ from Current ENRTF Appropriation (if applicable):	\$ -	
Funding History:	\$ -	

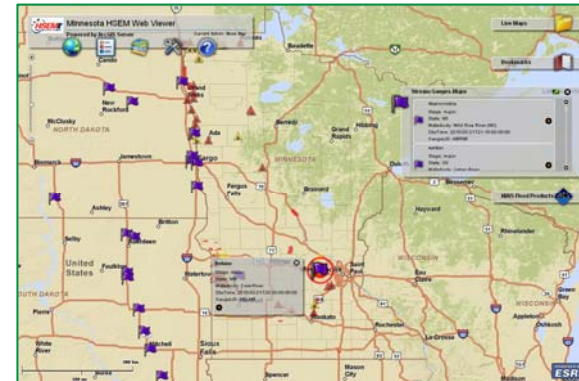
The Minnesota Environmental Mapping Commons

The Environmental Mapping Commons will provide a “One Stop” source for locating data and mapping services needed to manage and protect Minnesota’s resources, infrastructure, and people. Illustrated here are three examples of specialized web mapping services created by state and local agencies and that were available to support responses to the 2010 spring floods.

The conceptual diagram illustrates how data available through the Environmental Mapping Commons would be used to support ECOView and web mapping applications like those shown here.

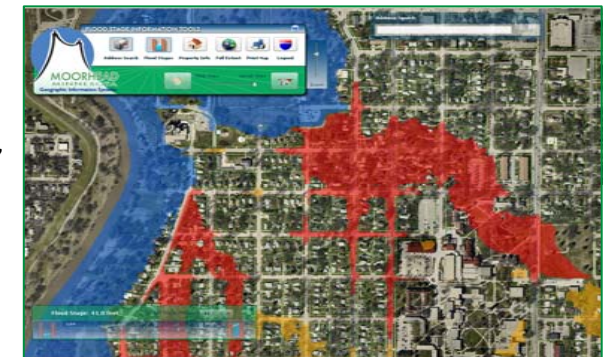


MPCA “What’s in My Neighborhood” viewer showing monitored sites, identifying hazardous sites within ¼ mile of Mankato bridge.



State Emergency Operations Center Viewer showing “real-time” data from stream gauges, highway closures and weather service.

Moorhead’s viewer showing inundated areas at projected cresting for spring 2010, derived from LiDAR overlaid on imagery data.



Common Ground: The Minnesota Environmental Mapping Commons

Project Manager

David Arbeit is Minnesota's Chief Geospatial Information Officer, chairs the State Government Geospatial Advisory Council, is an ex-officio member of the Statewide Geospatial Advisory Council, and serves on the state's Information Technology Architectural Review Board, created to advise the state CIO. He also directs the Office of Geographic and Demographic Analysis, a division of the Minnesota Department of Administration. As GDA Director, he oversees programs of the Minnesota Geospatial Information Office, the State Demographer, the State Archaeologist, and the Environmental Quality Board. David holds an undergraduate degree in Engineering and master's and doctoral degrees in Regional Planning from Cornell University. Dr. Arbeit served as Director of the Land Management Information Center 1994 until 2009, when he was appointed as the state's first Chief Geospatial Information Officer. David has worked with geospatial technologies for more than 40 years as an educator, researcher and practitioner in municipal, county and state government.

MnGeo: The Minnesota Geospatial Information Office

The Minnesota Geospatial Information Office, known as MnGeo, was established in May 2009 as the first state agency with legislatively defined responsibility for coordinating GIS within Minnesota.

It was created following an extensive analysis of GIS use in state government and as a strategic Drive to Excellence initiative to pursue an enterprise strategy to implementing GIS within the state. It is headed by the State's Chief Geospatial Information Officer and advised by state agencies through the State Government Geospatial Advisory Council and other stakeholders through the Statewide Geospatial Advisory Council – both created by legislative action.

MnGeo succeeds the Land Management Information Center. Created in 1977 as the first state agency anywhere exclusively devoted to providing GIS services within state government, LMIC's role had evolved since that time from a project-oriented program to Minnesota's "ad hoc" GIS coordinating organization. With the passage of legislation to create MnGeo, LMIC ceased to exist. However, all of LMIC's functions essential to MnGeo's coordination responsibilities, along with LMIC's resources, were transferred to the new office. MnGeo works closely with the Office of Enterprise Technology in fulfilling its mission: *Improving services statewide through the coordinated, affordable, reliable and effective use of GIS.*

MnGeo staff is recognized both within the state and nationally for its dedication, capabilities and successes. Equally important, MnGeo has a successful record of leading collaborative projects that have resulted in Minnesota's reputation as a leader in the GIS field. With active involvement of partners participating on the Common Ground project team, this project will add to Minnesota's reputation for innovation and success.

