

Environment and Natural Resources Trust Fund

2011-2012 Request for Proposals (RFP)

LCCMR ID: 094-C3+4

Project Title: Adaptive Watershed Planning Tools for the North Shore

Category: C3+4. Technical Assistance and Community-Based Planning

Total Project Budget: \$ \$595,531

Proposed Project Time Period for the Funding Requested: 3 yrs, July 2011 - June 2014

Other Non-State Funds: \$ 0

Summary:

This research and outreach project will enhance North Shore adaptive, inter-jurisdictional watershed planning through identification and communication of hydrological impacts based on various development and climate trends scenarios.

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Sponsoring Organization: U of MN - Water Resources Center

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Location

Region: NE

Ecological Section: Northern Superior Uplands (212L)

County Name: Lake, St. Louis

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 <u>%</u>

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Adaptive Watershed Planning Tools for the North Shore

I. PROJECT STATEMENT

For the citizens of Minnesota, the North Shore of Lake Superior is an iconic, diverse and dynamic natural landscape where cultural “lifescapes” echo the intimate wilderness connection long cultivated by those who live, work and play in the region. State parks, working forests, mining and logging towns, resorts and historic buildings anchor the North Shore economy and attract visitors from across the globe. Local decision makers increasingly recognize the diversity and significance of the ecosystem services upon which North Shore communities depend including habitat protection, water purification, flood control, soil conservation, scenic quality, recreation opportunities, and nature-based tourism industries. Multiple planning efforts aimed at protecting these resources are underway at local, regional and state levels however, despite these initiatives, the region, and particularly its **water resources continue to be threatened by multiple stressors including shoreland development, forest parcelization and development, erosion and stream sedimentation** (Minnesota Pollution Control Agency, 2004; Minnesota Statewide Conservation and Preservation Plan, 2008). Over the next several decades, experts anticipate **climate change will exacerbate these pressures**, straining hydrologic, vegetation, and social systems and amplifying the need for regionally coordinated, adaptive planning (Galatowitsch et al. 2009). The quality of Minnesota’s water resources are inextricably linked to land cover, land use, and ultimately, local decision-making. Past studies have shown that to engage in regionally coordinated, adaptive planning, decision makers need an enhanced toolkit. This toolkit should be comprised of a systems-level understanding of biophysical and social conditions and stressors, a comprehensive understanding of drivers and consequences of change, an ability to build relationships and share knowledge across sectors and jurisdictions, and the capacity to organize collective action and manage conflict. Our work is motivated by two research questions: (1) What are the consequences of changing land use, land cover, and climate on the Lake Superior Watershed and its stream water quality? (2) How can we build local level capacity for regionally coordinated, adaptive planning to address these consequences? We propose a community-based research and outreach project that will enhance adaptive watershed planning efforts on the North Shore. Specific objectives are to 1) quantify and model the effects of historic and current land cover, land use, and climate trends on water quality; 2) assess the planning capabilities of local and regional governance; and 3) identify strategies for increasing capacity for regionally coordinated, adaptive planning at the watershed-scale. We propose to **promote regionally coordinated, adaptive planning on the North Shore by developing new and strengthening and expanding existing tools for local decision-makers**. This project will provide planners and decision makers with innovative and scientifically grounded tools to anticipate, mitigate, and respond to change and to protect the valuable natural and cultural resources that make the North Shore a treasured landscape.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Compile and assess current watershed data. Budget: \$ 155,729.00

Using two watersheds with existing flow and water quality records that have similar physical characteristics but different land use conditions (e.g., Baptism and Poplar Rivers), we will compile existing hydrologic, water quality, topographic, soil, vegetation, climate and current and historic land use data. A coupled hydrology and water quality model (H-WQ) will be calibrated to simulate measured hydrology and water quality for the existing conditions and under historic land cover.

Outcome	Completion Date
1. Complete analysis of strengths and limitations of plans	December 31, 2011
2. Complete compilation of existing hydrologic, biophysical and land use data	December 31, 2011
3. Complete calibration of HWQ model based on current watershed conditions	June 30, 2012

Activity 2: Synthesized systems map and stakeholder outreach. Budget: \$ 119,944.00

Because sediment loads, flow regimes and biological integrity of water basins connected to Lake Superior are intimately connected to human activities and will likely be affected by climate change, we will synthesize data compiled in Activity 1 to create a conceptual ‘systems map’ that articulates interactions among natural and human systems within the watershed. We will conduct focus group meetings with Multi-stakeholder Working Groups (MWG) to examine hydrologic, vegetation, social system problems, threats, and needs; refine our integrated

'systems map'; and assess planning capabilities and effectiveness of BMPs for sustainable watershed management. With MWGs, we will assess strengths, weaknesses and needs for cross-jurisdiction, sustainable watershed management and identify future pressures on hydrologic, vegetation and social systems (e.g. development, parcelization and climate trends). For each watershed we will also compile and analyze land use and environment plans, inventory and monitoring reports, and ordinances.

Outcome	Completion Date
1. Finish initial integrated conceptual 'systems map'	July 31, 2012
2. Organize Multi-stakeholder working group (MWG)	September 30, 2012
3. Complete MWG focus group meetings	December 31, 2012
4. Focus group summary report	February 28, 2013

Activity 3: Future Scenario Building Budget: \$ 222,763.00

We will develop future climate scenarios using existing estimates for the North Shore from 'downscaled' global circulation models (GCMs). Since considerable uncertainty exists at local scales, we will model climate conditions that bracket a range of expected futures. We will create future development scenarios based on planning documents. Scenarios will be applied to the H-WQ model to evaluate the sensitivity of the watersheds to development and climate change. We will identify existing strategies for enhancing hydrologic, vegetation and social systems resilience, adaptive capacity, and transformation.

Outcome	Completion Date
1. Complete development of future climate scenarios based on local GCMs	June 30, 2013
2. Complete analysis of likely future development scenarios	June 30, 2013
3. Sensitivity analysis of the flow quality and quantity and sedimentation	September 30, 2013
4. Report "Strategies for watershed resilience, adaptation, and transformation"	December 31, 2013

Activity 4: Building capacity to address changing land/water/climate Budget: \$ 87,095.00

We will use the scenarios built in Activity 3 to conduct workshops with the cross-jurisdiction multi-stakeholder working group to develop watershed wide strategies and tools to address changing development and climate regimes that may impact water quality along the North Shore. Tools may include incentive programs for sustainable development and landowner decision-making, regional agreements, and vegetation/water management plans.

Outcome	Completion Date
1. Report "Adaptive watershed planning in a changing environment"	June 30, 2014

III. PROJECT STRATEGY

A. Project Team/Partners Team – F. Sleeper (project manager, stakeholder expertise), Water Resources Center, University of Minnesota (UMN); M. Davenport (human dimensions), R. Montgomery (forest ecology, climate change), Dept of Forest Resources, UMN; S. Enzler (policy, planning, law) Inst. on the Environment, UMN; J. Nieber (hydrology), Dept. of Bioproducts & Biosystems Engineering, UMN; L. Johnson (GIS, modeling), Natural Resources Research Institute, UMN-Duluth. Other partners (unfunded): P. Snyder (climate modeling), Dept. Soil, Water & Climate, UMN; K. Brooks, Dept. of Forest Resources, UMN; J. Magner, MPCA. We will also collaborate with researchers and stakeholders at NOAA, Lake & St. Louis County Soil Water Conservation Districts, NRRI, the Superior National Forest, and Minnesota Forest Resources Council.

B. Timeline Requirements

This project will be completed within 36 months of the commencement of funding.

C. Long-Term Strategy and Future Funding Needs

Our project will establish paired watersheds for long-term monitoring and modeling and evaluate the effectiveness of the system approach we develop here. This is in line with the MPCA's sentinel watershed and One-Water strategy. To sustain this project in the long term, we will explore other funding sources such as the Joyce Foundation, Environmental Protection Agency Great Lakes Initiative, and National Science Foundation.

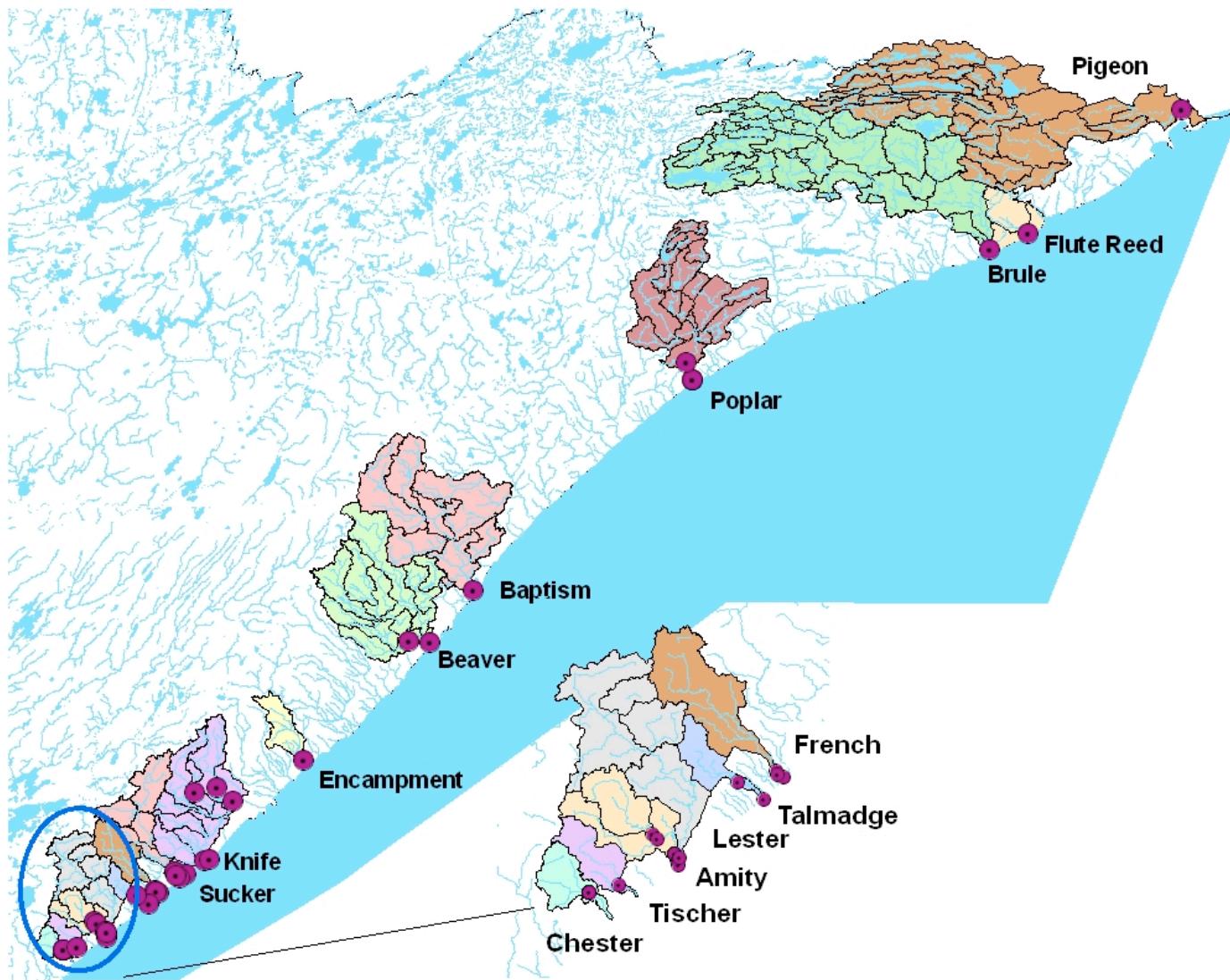
2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 3 years (July 1, 2011-June 30,2014)

BUDGET ITEM	AMOUNT
Personnel: Faculty/staff: Davenport 1 summer month per year for three years; Montgomery 1 summer month per year for three years; Enzler 30% salary for year 1, 25% salary for years 2 and 3. Fringe benefit rate for all three is 33.3% 3 graduate students year 1and 2 2 graduate students year 3. Fringe benefit rate of 70% for all. 1/4 time lab manager for 3 years and 10% editor for year 3.	\$ 578,281
Contracts: N/A	\$ -
Equipment/Tools/Supplies: N/A	\$ -
Acquisition (Fee Title or Permanent Easements): N/A	\$ -
Travel: Travel to Project sights on North Shore for stakeholder meetings, collection of hydrologic data, and other data collection. \$5,000 per year.	\$ 15,000
Additional Budget Items: Printing and misc. supplies @ \$250/year, printing at \$250/year and Meeting costs @ \$250/year	\$ 2,250
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 595,531

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: Indicate any additional non-state cash \$ to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.	\$ -	Indicate: Secured or Pending
Other State \$ Being Applied to Project During Project Period: Indicate any additional state cash \$ (e.g. bonding, other grants) to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.	\$ -	Indicate: Secured or Pending
In-kind Services During Project Period: Indicate any in-kind services to be provided during the funding period. List type of service(s) and estimated value. In-kind services listed must be specific to the project.	\$ -	
Remaining \$ from Current ENRTF Appropriation (if applicable): Specify \$ and year of appropriation from any current ENRTF appropriation for any directly related project of the project manager or organization that remains unspent or not yet legally obligated at the time of proposal submission. Be as specific as possible. Describe the status of \$ in the right-most column.	\$ -	Indicate: Unspent? Not Legally Obligated? Other?
Funding History: Indicate funding secured prior to July 1, 2011 for activities directly relevant to this specific funding request. State specific source(s) of funds.	\$ -	



Regional location of the proposed study. Watersheds that have hydrologic and water quality gauging stations are outlined on the map. The Baptism River and the Poplar River watersheds are two that have characteristics suitable for selection as watersheds to be utilized in the proposed study.

Faye Sleeper is co-director of the University of Minnesota's Water Resources Center and will be overall project manager for this proposal. She works on issues related to impaired waters/total maximum daily load, water policy, citizen engagement and bringing together practitioners with researchers to solve water quality and quantity issues. Faye has facilitated numerous projects and meetings throughout her career and more recently projects on environmental education, ground water sustainability, climate change adaptation, clean water funds measurement and TMDL training for agricultural producers. Prior to this current position Faye worked at the Minnesota Pollution Control Agency (MPCA) for 17 years where initially, she worked in the construction grants program, in the wastewater enforcement program and as the project leader for an EPA funded wastewater project with the Russian Federation. Her last eight years at the PCA, Faye Managed the Watershed Section at the Minnesota Pollution Control Agency. This section is responsible for coordinating policy, legislative and financial programs for the MPCA's impaired waters and nonpoint source water programs. Faye is Water Quality Coordinator for the Great Lakes Region Water NIFA team and represents University of Minnesota Extension on the Board of Water and Soil Resources. Faye has managed numerous grant projects that included technical expertise, including US/Russia Wastewater Project, USDA CSREES water quality grant, DNR Facilitation Master Agreement,

Organization Description

The University of Minnesota is one of the largest, most comprehensive, and most prestigious public universities in the United States (http://www1.umn.edu/twincities/01_about.php). The facilities at the University contain all the facilities needed for the proposed research.