Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)

LCCMR ID: 191-F

Project Title:

Lake Superior Watershed & Stormwater Protection and Education

LCCMR 2010 Funding Priority:

F. Environmental Education

Total Project Budget: $ $121,196

Proposed Project Time Period for the Funding Requested: 2 years, 2010 - 2012

Other Non-State Funds: $ $0

Summary:

We will create watershed exhibits and curricula using real-time data to enhance public understanding of connections between weather, hydrology, land use, individual actions and the health of lakes and streams

Name: Sarah Erickson

Sponsoring Organization: Great Lakes Aquarium

Address: 353 Harbor Dr
Duluth MN 55802

Telephone Number: (218) 740-2007

Email: serickson@glaquarium.org

Fax: (218) 740-2020

Web Address: www.glaquarium.org

Location:

Region: NE

County Name: St. Louis

City / Township: Duluth

_____ Knowledge Base _____ Broad App. _____ Innovation

_____ Leverage _____ Outcomes

_____ Partnerships _____ Urgency _____ TOTAL

MAIN PROPOSAL

PROJECT TITLE: Lake Superior Watershed & Stormwater Protection and Education

I. PROJECT STATEMENT

In order for people to make environmentally conscientious decisions in their everyday life, they must first understand the connections between human actions, landscape and environmental quality. Of particular importance to the Lake Superior watershed are the actions and impacts as they relate to stream and lake water quality, and by association fish and wildlife habitat. Most of Minnesota's lake and stream impairments are directly related to poor land use decisions by homeowners and communities. **The ultimate goal of this project is to enhance public understanding of the connections between weather, hydrology, and land use within urban and rural watersheds.** Quality environmental education is based on accurate information and addresses participant awareness, knowledge, skills, and empowerment while providing opportunities or steps for action. With these elements in mind, this project will improve public understanding of how lakes, streams and watersheds "work", how these systems are affected by weather and climate, and how individual everyday actions can cost-effectively protect water bodies, and if necessary, help to restore them.

This project will focus on the stormwater issue in the Lake Superior Basin. Stormwater degradation is a major source of pollution to surface and groundwater resources throughout the Great Lakes region. It is a particularly significant issue in northern Minnesota and the Superior Basin, home to hundreds of sensitive trout streams and coastal zones. Environmental quality and human health are part of the public consciousness. Common questions, such as- *Can I drink the water? Is there going to be wastewater overflow from that storm yesterday? Can I eat the fish? Is it safe to swim here?* - illustrate the need for greater public exposure to and understanding of local aquatic and terrestrial systems. We will address that need by integrating scientific data with an interactive interpretive display at Great Lakes Aquarium (GLA) in Duluth, MN.

The interactive kiosks will integrate existing streaming data, interactive data animation tools and interpretive materials adapted from the award winning *www.LakeSuperiorStreams.org* (*LSS*) and *www.WaterontheWeb.org* (*WOW*) websites. In addition, real time, seasonal and year-to-year meteorological information will be linked to land use and changes in steam and lake dynamics. The primary focus of *LSS* has been to improve diverse audiences' understanding of the stormwater pollution issue in order to improve environmental decision-making. The delivery of easy to interpret, time-relevant data has been at its core and this will be a key feature of the proposed project. Key themes addressed by this exhibit include: (1) How lakes and streams "work"; (2) urban and rural stormwater pollution: How does it happen; (3) Beach advisories: cause, effect and risks; (4) How is climate change likely to affect lakes and streams; (5) What can we do to improve and protect our water resources. Educational materials will be based on real-time data collected remotely from local and regionally important water bodies. Audiences will be guided along a path of *Understanding* • *Engaging & Interactive Observation* • *Interpretation*• *Individual Actions*. The new exhibits will also complement a new weather station in development and a broadcast meteorology collaboration led by LSS/UMD researchers beginning in 2009.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: **Budget: $ 51,199**

Establish touch screen kiosks at Great Lakes Aquarium that display real time data from Superior Basin streams and on-lake buoys with interactive, user-friendly data animation and visualization tools within a Google-Map framework. The exhibit will prominently feature a large screen (~60 inch) display of multiple streams of mapped and colorized water quality data in addition to local weather data (see www.duluthstreams.org/streams/data_Java/DVTexamples.html and www.waterontheweb.org/data/visualize.html. Featured water quality parameters can be seasonally

changed to illustrate sedimentation or road salt effects, beach health, trout stream temperatures and flows, and thermal mixing in Lake Superior.

Deliverable	Completion Date
1. Data display kiosk	**June 2011**

Result 2: **Budget: 58,394**

Establish 5 complementary touch screen kiosks providing interpretive materials adapted from pre-existing and in-development data vignettes created for *www.lakesuperiorstreams.org*, *www.watertheweb.org*, and *www.mnbeaches.org* . Themes will be related to the actual data streams and linked to personal actions that can help ameliorate adverse impacts.

Deliverable	Completion Date
1. Interpretive and supportive materials for 5 kiosks	**June 2011**

Result 3: **Budget: $11,604**

Develop formal and nonformal educational curricula, materials and other programmatic activities to complement the data kiosk and its associated kiosk "themes". Train docents in the use of the kiosks for educating GLA visitors and also for teachers and school groups.

Deliverables	Completion Date
1. Curricular materials; docent training and use of curricula	**June 2012**
2. Install materials for download from *LSS* and *WOW* websites.	**June 2012**

PROJECT STRATEGY AND TIMELINE

A. Project Partners: Natural Resources Research Institute (UMD) scientists, who developed and operate the *LSS*, *WOW*, and *MNBeaches* network of data-based educational websites, will do the computer programming and data telecommunications, adapt existing and evolving website data vignettes, and compose interpretational materials; they have been technical advisors to the GLA since its creation. Sea Grant (SG-UMD) outreach and extension educators are co-authors of *LSS* and *WOW* and collaborate with the GLA, the Science Museum of MN, and local, regional and national networks of teachers and extension educators to deliver curricula, and teacher/citizen training on inland and Great Lakes basin water issues. SG will play a lead role in achieving the best mixture of science and entertainment for the data story-telling. NRRI, SG and GLA also work with UMD's Large Lakes Observatory to make use of their buoy data and scientific expertise on Lake Superior. The Visual Digital Imaging Lab (VDIL-UMD) will support students to assist GLA with graphic design and flash animations for kiosks. The project will draw on the stormwater expertise of the Superior Regional Stormwater Protection Team (RSPT: 26 agencies and organizations partnering to develop consistent stormwater education and pollution prevention messages in the region). MPCA-Duluth, the City of Duluth, and the Western Lake Superior Sanitary District are major LSS and RSPT partners.

B. Project Impact: GLA is an ideal new outlet for disseminating stormwater and other water pollution prevention materials to local and regional communities. Over 100,000 visitors of all ages participate each year in on-site and outreach educational programming. Hands-on exhibits encourage exploration of aquatic ecosystems, while 10,000 preK-12 grade students take a closer look with classes and formal programming. Teacher workshops and visiting speakers provide additional experiences for adults. The exhibits will also lead visitors to home and school use of the similar but more comprehensive water science educational websites based at NRRI that collectively receive over 2 million requests/month and over 300,000 web page requests/month with usage spikes indicating heavy use by schools in spring and fall. Since 2001, *WOW* has received over 100 million server requests and 9 million requests for webpages; since 2002, *LSS* has received 18 million server requests and 4 million requests for pages. End products will also be featured on LSS and WOW.

C. Time: **This is a multi-year project ending on June 30, 2012.**

Project Budget: Lake Superior Watershed & Stormwater Protection and

IV. TOTAL PROJECT REQUEST BUDGET (3 years)

BUDGET ITEM	AMOUNT
Personnel:	
Sarah Erickson Project Leader (Salary: $3500; FB $1050) Yr 1-5%, Yr 2- 5%	$ 4,550
Exhibit staff technicians (Salary: $1370; FB $411) 2%+2% Yr 1	$ 1,781
Staff Educator (Salary: $960; FB $288) 2%, 2%	$ 1,248
Equipment/Tools/Supplies:	$ -
kiosk construction materials+ signage	$ 1,700
Computer hardware for kiosk exhibits (6)	$ 6,000
Water quality instruments for school curricular activities (25x $100 ea)	$ 2,500
Travel:	$ -
Project meetings (local travel to NRRI and Sea Grant: 50mi/mo*$0.55* 2 yrs)	$ 660
Other	
Touch screen displays (1 large@ $2500 + 5 small @ $800ea)	$ 6,500
Graphic design	$ 1,000
Subcontract (U. of Minnesota -Duluth)	
NRRI+ SeaGrant Staff Effort: Salary: $61,792; FB: $21,450 (programming, outreach, limnology, curriculum assistance)	$ 83,242
General computer supplies $800	$800
Photographic, publication, and graphics	$200
GIS fees (maps for exhibits)	$520
Visual Digital Imaging Lab - graphic design; flash anmation services for kiosks	$10,000
	$ -
Travel:	$ -
Project meetings (local travel to GLAquarium: 38mi/mo*$0.55* 2 yrs)	$ 495

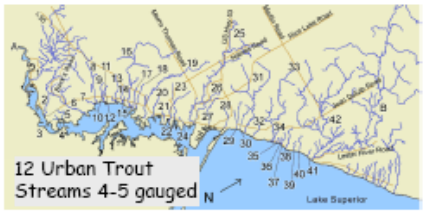
Additional Budget Items:	$ -
TOTAL PROJECT BUDGET REQUEST TO LCCMR	$ 121,196

V. OTHER FUNDS

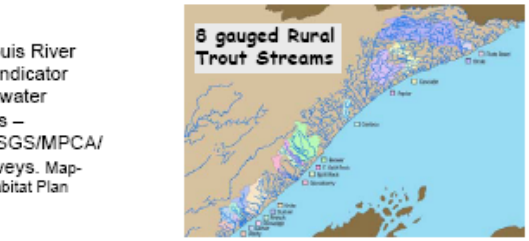
SOURCE OF FUNDS	AMOUNT	Status
Other State $ Being Applied to Project During Project Period: 1) UMD Match anticipated at $33,793	$33,312	*pending*
In-kind Services During Project Period: 1) Aquarium Education Director effort and one staff educator salary matched at 1:1 for the entirety of the project (Salary+FB: $5798); 1 touch screen display + computer tower ($1500)	$ 7,298	approved (Letter pending)
Funding History: *no prior funding requests*		

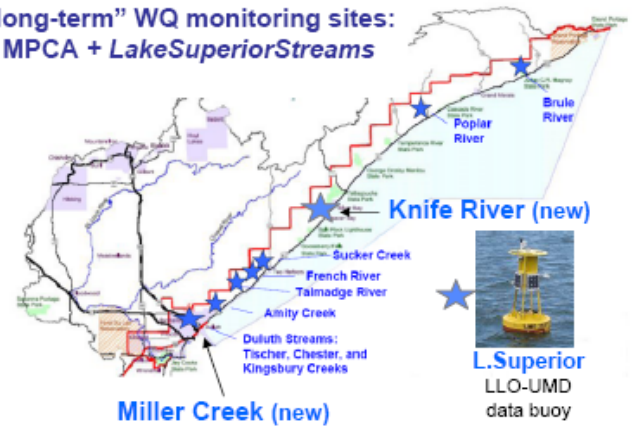
MAP

LCCMR 2010 Lake Superior Watershed & Stormwater Protection and Education
Project Manager: Sarah Erickson, Great Lakes Aquarium, Duluth, MN in partnership with U. of MN-Duluth



Left: St. Louis River long-term Indicator bacteria & water quality sites – WLSSD/USGS/MPCA/ Duluth surveys. Map-SLR CAC Habitat Plan





LCCMR 2009 PROJECT MANAGER QUALIFICATIONS

Project Title: Lake Superior Watershed & Stormwater Protection and Education
Sarah Kate Erickson, Great Lakes Aquarium, Duluth, MN

Key Qualifications
Ms. Erickson is the Education Director at Great Lakes Aquarium managing staff, programs and exhibit design related to stewardship, understanding and exploration of the Great Lakes and aquatic ecosystems. She brings to this project experience in: K-12 environmental education curriculum and instruction in formal and non-formal settings; interpretation and data collection in both field and museum environments; relaying current science information to learners of all ages through partnerships with schools, scientists and aquaria/museums. She is currently working with all of the proposed UM-Duluth partners on a variety of projects designed to enhance existing GLA exhibits and add new features.

Education

Smith College	Biology	B.A. 2002
University of Minnesota Duluth	Environmental Education	Certificate 2005
University of Minnesota Duluth	Environmental Education	M.Ed. 2007

Previous Positions Hartley Nature Center (2006-7); Partners in Education Coordinator–MN Sea Grant (2005-6); Wolf Ridge ELC (2004-5); Oregon Museum of Science and Industry (2002-3)

Grants
COSEE *O'Lakers* – Marine science field trips. In collaboration with Silver Bay Public Schools and Fond du Lac Ojibwe School. Centers for Ocean Sciences Education Excellence (NOAA). 2008.
MNDNR/NOAA Coastal Program –Local shoreline clean-up efforts- International Coast Clean-up. 2008.

Research
The role of place attachment in K-12 outreach environmental education. M.Ed. Thesis. 2007.

Selected curricula and Exhibits
Lake Superior and Beyond. Grade 3-5. Movement of water and wildlife throughout the Great Lakes. 2005.
What is it like to live underwater. Grades 3-5. Topic: Fish adaptations related to habitat. 2006.
Amazing Amazon. Exhibit design, signage and interpretive programming for permanent exhibit at Great Lakes Aquarium. In conjunction with J.Walker, S. Kubarek and S. Grant. 2008.
Freshwater Forest. Exhibit design, signage and interactive displays for permanent exhibit at Great Lakes Aquarium. In conjunction with US Forest Service, J. Walker, and J. LaVoy. 2009.

Great Lakes Aquarium (GLA) is an educational non-profit that "inspires stewardship, understanding and exploration of the Great Lakes and aquatic ecosystems in a global context". With over 100,000 visitors annually, of which 10,000 are preK-12 students, GLA is the most visited paid attraction in Duluth. Visitors possess a range of background knowledge and motivation in touring the facility. First hand experiences in spaces such as zoos, aquaria and museums have been shown to enhance science learning in all ages. The interactive and live animal exhibits at GLA encourage visitors to connect with ecosystems and wildlife in unique and valuable ways. Self-guided tours, interpretive programs, classes, lectures, and internships provide opportunities for visitors to engage and explore at their own pace and desired depth. **NRRI and Sea Grant Partners**: Partner NRRI scientists and SG educators have extensive experience in developing tools for assessing and managing water resources, and educating general and technical audiences about how human activities affect water quality and ecosystem health. They are also involved in climate change research and outreach, and have participated in the development of the MN Statewide Conservation and Protection Plan, which will help guide issue emphasis.