

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

LCCMR ID: 019-A2

Project Title: Improving Natural Resource Conservation with Value-Added LiDAR

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

Total Project Budget: \$ \$398,300

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

Other Non-State Funds: \$ 0

Summary:

Value added LiDAR products and tools will be created and integrated into a web portal to accelerate LiDAR use for targeting and planning land and water conservation practices and projects.

Name: Charles Fritz

Sponsoring Organization: International Water Institute

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Fargo ND 58008

Telephone Number: 701-231-9747

Email: charles.fritz@arvig.net

Web Address: http://www.internationalwaterinstitute.org/

Location

Region: NW

Ecological Section: Red River Valley (251A)

County Name: Becker, Beltrami, Big Stone, Clay, Clearwater, Grant, Itasca, Kittson, Koochiching, Lake of the Woods, Mahnomon, Norman, Otter Tail, Pennington, Polk, Red Lake, Roseau, Traverse, Wilkin

City / Township:

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ Employment	_____ TOTAL _____%

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Improving Natural Resource Conservation with Value-Added LiDAR.

I. PROJECT STATEMENT

Flood damage reduction, natural resource enhancement, and water quality improvement are primary goals of land and water managers in the Red River Basin. To support this work, the Red River Basin Mapping Initiative began providing Light Detecting and Ranging (LiDAR) data in 2009. LiDAR data are critical for efficiently targeting and planning conservation projects but use of raw LiDAR data requires specialized knowledge, skills, and expensive software not readily available to most conservation professionals in Minnesota.

This project will: 1) prioritize needs of local, regional, and statewide land and water conservation professionals, 2) develop value added priority focused LiDAR-derived products, 3) develop applied planning and decision making tools to better target and plan conservation projects, 4) integrate and share LiDAR-derived products through a web-based Decision Support System (currently www.rrbdin.org), and 5) train resource professionals to use the products to target, plan, and implement conservation practices and projects.

Feedback from recent LiDAR workshops determined that conservation professionals will use LiDAR in their work only if "value-added" products derived from LiDAR data are readily available and easy to use for large geographic areas. Integrating these LiDAR products with existing geospatial data will require the development of next generation analytical applications/tools to target, plan, and implement projects that achieve the greatest benefits.

The Red River Basin is well suited for this project because a web-based information portal already exists, comprehensive watershed plans and hydrologic models are complete for all tributary watersheds, and water quality plans and models are available in most watersheds. This project will leverage several ongoing initiatives, accelerate efforts to reduce flood damage and enhance natural resources, and make progress toward several Minnesota State Conservation and Preservation Plan goals (Community Land Use #2, Agricultural Land Use #4, Habitat #1, 2, 5, 6, 7, 12, and 13).

This project will deliver ready-to-use LiDAR-based products to better target, plan, and implement conservation in the Red River Basin. The products and methods to derive them will have statewide relevance and contribute substantially to the knowledge infrastructure related goals in the SCPP.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Prioritize conservation professional's needs for LiDAR-derived products

Budget: \$ 11,700

Host four workshops in the Red River basin (22 counties) to demonstrate examples of LiDAR-derived products and applied tools (e.g. watershed delineation, fine-scale contours, breaklines, terrain attributes, tools to target and plan wetland restorations, sediment basins, etc).

Participants will be surveyed to prioritize LiDAR product needs and focus efforts in activities 2 and 3. Regional and field staff from soil and water conservation districts, watershed districts, consulting engineers, USFWS, DNR, NRCS, BWSR, PCA, MNDOT, county engineering and planning and zoning staff will be invited.

Outcome	Completion Date
1. 4 workshops with conservation professionals in the Red River basin.	August, 2011
2. Report priority needs for LiDAR-derived data and tools.	September, 2011

Activity 2: Develop and evaluate LiDAR-derived products **Budget:** \$ 225,760

A suite of high priority LiDAR-derived products will be created for pilot areas and their utility will be evaluated. Products for basin-wide application will be recommended, created, and integrated into a Decision Support System (DSS).

Outcome	Completion Date
1. Suite of LiDAR-derived data products for pilot areas.	February, 2012
2. Report on pilot area efforts and make recommendations.	April, 2012
3. Recommended LiDAR-derived products created for the Red River Basin.	July, 2013
4. Data products integrated into a DSS.	August, 2013

Activity 3: Develop and evaluate LiDAR-derived geospatial tools Budget: \$ 158,300

Geospatial tools for planning and decision making will be created. Tools will be evaluated for usability and efficacy by potential users and revised as needed. Completed tools will be integrated into a DSS.

Outcome	Completion Date
1. A suite of LiDAR-integrated geospatial applications/tools.	December, 2012
2. Report that evaluates geospatial tool usability and efficacy.	March, 2013
3. Priority geospatial tools revised for use across the Red River Basin.	July, 2013
4. Complete geospatial tools integrated into a DSS.	December, 2013

Activity 4: Training, outreach, and communication Budget: \$ 24,840

Develop training modules, public outreach efforts and materials, conduct training workshops, and integrate information into a DSS.

Outcome	Completion Date
1. Develop on-line tutorials and “how to” presentation materials.	February, 2014
2. Conduct 4 to 6 training workshops.	June, 2014
3. Integrate training materials into a DSS.	June, 2014

III. PROJECT STRATEGY

A. Project Team/Partners

The project team funded to lead this project includes: Charles Fritz, Grit May, and interns, Int. Water Institute (IWI); Henry VanOffelen, MN Center for Env. Advocacy; Consulting engineering firms with LiDAR and web-GIS expertise.

Interested partners include: Red River Watershed Management Board, Red River Flood Damage Reduction Workgroup, DNR, PCA, BWSR, USFWS, NRCS, USACE, SWCDs, county engineers, planning and zoning administrators, conservation organizations, and the U of MN NW Reg. Sustainable Development Partnership. In-kind and direct funding from these partners is expected based on their history with other related projects.

B. Timeline Requirements

This project will require three years to complete. Deriving the suite of value-added LiDAR products and tools needed by conservation professionals that meet national data standards at the scale of the Red River Basin is a large and challenging task.

C. Long-Term Strategy and Future Funding Needs

Project results will be integrated into a next generation DSS. Continued collaborations among land and water managers from Minnesota, North Dakota, and U.S. Army Corps of Engineers are expected to sustain upgrades and maintain the DSS. There will be additional funding needs for other independent projects to derive LiDAR products and applications/tools as understanding of conservation practices, geospatial data, and technologies continues to advance.

2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 3 years

BUDGET ITEM	AMOUNT
Personnel: Charles Fritz, Project Oversight (<10% FTE per year) and Grit May, Lead LiDAR Product Development, International Water Institute (65% FTE per year). 70% salary. 30% benefits.	\$ 143,940
Contracts: Henry VanOffelen, Nat. Resource Scientist, Minnesota Center for Environmental Advocacy, Lead Interagency coordination and LiDAR tool development coordination. (33% FTE per year average) 85% salary. 15% benefits.	\$ 77,760
Engineering consultants with experience working with LiDAR data and in building geospatial tool will develop some datat products and geospatial tools and will integrate all project products into a DSS.	\$ 151,600
Equipment/Tools/Supplies: Software tools essential to this project include ArcInfo, 3-D analyst, spatial analyst, and ANUDEM (reccomended by DNR)	\$ 21,500
Acquisition (Fee Title or Permanent Easements): <i>In this column, indicate proposed # of acres and and name of organization or entity who will hold title.</i>	NA
Travel: <i>Be specific. Only in-state travel essential to completing project activities can be included.</i>	\$ 3,500
Additional Budget Items: <i>In this column, list any additional budget items that do not fit above categories. List by item(s) or item type(s) and explain how number was reached. One row per type/category.</i>	NA
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 398,300

V. OTHER FUNDS

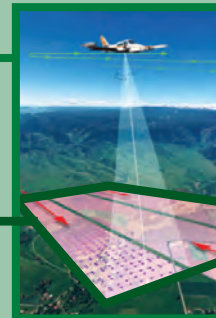
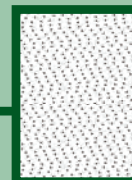
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: At a minimum funding from watershed districts and the Red River Water Management board is expected; however, the amount is unknown at the time of application.	\$ -	Pending
Other State \$ Being Applied to Project During Project Period: The U of M NW Regional Sustainable Development Partnership is interested in this project and may fund portions of Activity 1 and 4.	\$ 10,000	Pending
In-kind Services During Project Period: <i>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.</i>	\$ 29,250	Pending
Funding History: Development of the Red River Decision Information Network (% local, %fed, % state)	\$ 1,100,000	100% Federal
Funding History: Red River Basin Mapping Initiative, Minnesota portion. (% local, %fed, % state)	\$ 600,000	15 partners - \$5.0 million
Funding History: The Next Generation RRBDIN (% local, % fed, % state)	\$ 700,000	100% Federal
Funding History: Phase 6 of the Next Generation RRBDIN: Project development and permitting guide (, % state)	\$ 270,000	50% MN

Improving Natural Resource Conservation with value-added LiDAR

Collection of LiDAR data

Process point data

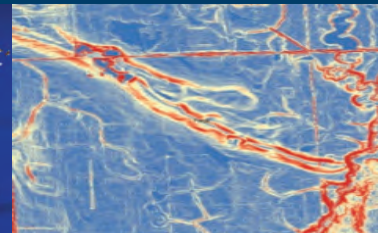
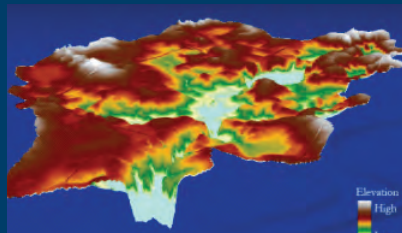
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Prioritize User Needs

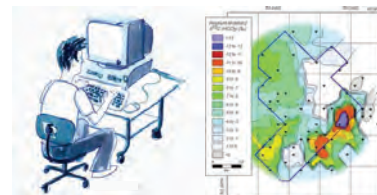


Derive Value Added Products



Existing Geospatial Products

Integration



Develop new geospatial tools

Use Decision Support System to Target and Implement Conservation



ORGANIZATIONAL DESCRIPTION

The International Flood Mitigation Initiative documented the need for a basin-wide organization that would coordinate watershed research and education after the 1997 Red River flood. The International Water Institute (IWI) was formed in 2000 to coordinate watershed research and deliver watershed education programming in the Red River of the North Basin. The Institute serves basin residents and local, regional, state and federal resource managers and professionals.

Formerly known as the Red River Basin Institute, the IWI is a 501(c)(3) tax-exempt nonprofit corporation managed by a 9-member international Board of Directors. The Institute has been lead organization for a number of basin-wide initiatives including the River Watch Citizen Monitoring Program, Water Quality studies for the International Joint Commission, the National Science Foundation Understanding the Science Connected to Technology, the Red River Basin Decision Information Network, and most recently the Red River Basin Mapping Initiative – a \$5.0 million effort to acquire LiDAR elevation data across the entire US portion of the Red River Basin (<http://www.internationalwaterinstitute.org/>). The Institute has two full-time-equivalent employees who work with an established network of partners in Minnesota, North Dakota and Manitoba.

PROJECT MANAGER QUALIFICATIONS

Charles Fritz joined the Institute as its Executive Director in 2000 – first as a member of the Board of Directors, and then as the Executive Director. As the Institute Executive Director, his work is focused on Red River Basin watershed education, research, and aiding local and regional decision-makers regarding flood reduction and natural resource enhancement projects. Most recently, he was responsible for coordinating a funding partnership consisting of 15 local, regional, state, and federal partners for the Red River Basin Mapping Initiative. Prior to his role as Institute Director, he served as Program Manager for the Red River Basin Commission and the Administrator for the Red Lake Watershed District.

Mr. Fritz is a member of the International Joint Commission’s Aquatic Ecosystem Committee, the Minnesota Flood Damage Reduction Work Group, and the Red River Basin Watershed Feasibility Study Joint Technical Advisory Team. Mr. Fritz has an undergraduate degree in Wildlife and Fisheries and a Master’s of Science in Natural Resources Management from North Dakota State University.

Career highlights include: North Dakota Carbon Credit Program, Environmental Protection Agency “Friends of the EPA” Award, National Science Foundation Outstanding ITEST Principle Investigator Award, Flood Forecast Display Tool Project Manager, Red River Basin Mapping Initiative (Digital Elevation Model) Project Manager, Presenter at Transboundary Dniester River Basin Management and the EU Water Management Directive Conference (Chisinau, Moldova), Lake Winnipeg Leadership Forum Member, Basin River Watch Project Administrator, Watershed Information Network Project Manager, River of Dreams Project Manager, Red River Basin Teachers Institute Project Manager, and National Science Foundation Proposal Review Team Member.