Red River Basin Decision Information Network

DECISION SUPPORT TOOLS FOR WATER AND NATURAL RESOURCE MANAGEMENT

International Water Institute
Supporting Flood Research and Watershed Education

PRESENTATION OUTLINE

- IWI/RRBDIN BACKGROUND
- DECISION SUPPORT
- DECISION SUPPORT TOOLS
  - Watershed/Project Planning Tool
  - Water Quality Decision Support System

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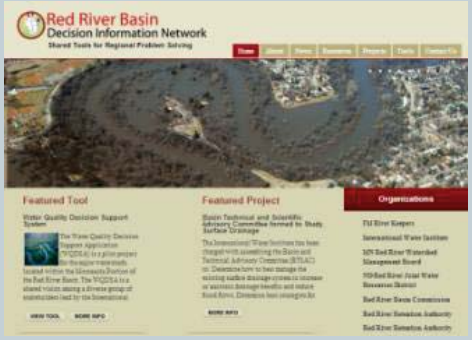
Red River Basin Decision Information Network

www.rrbdin.org

- 1997 Flood - Recommendation of the International Joint Commission's Red River Basin Task Force: Promote a more open and contiguous source for basin-wide information sharing
- Development Team
  - International Water Institute
  - Houston Engineering Inc.
  - Others
- Funding – "Next Generation" RRBDIN
  - US Corps of Engineers (St. Paul)



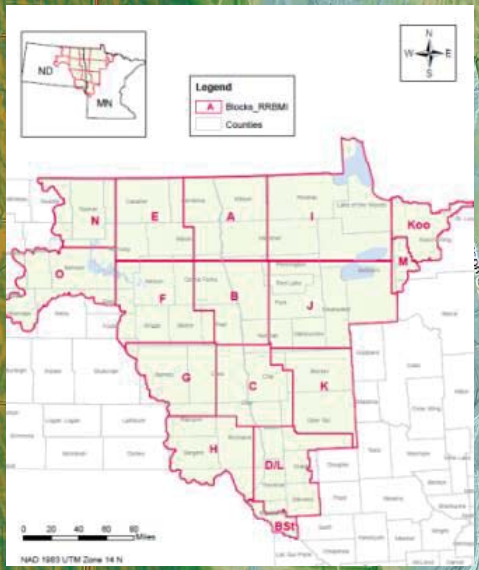
DECISION SUPPORT

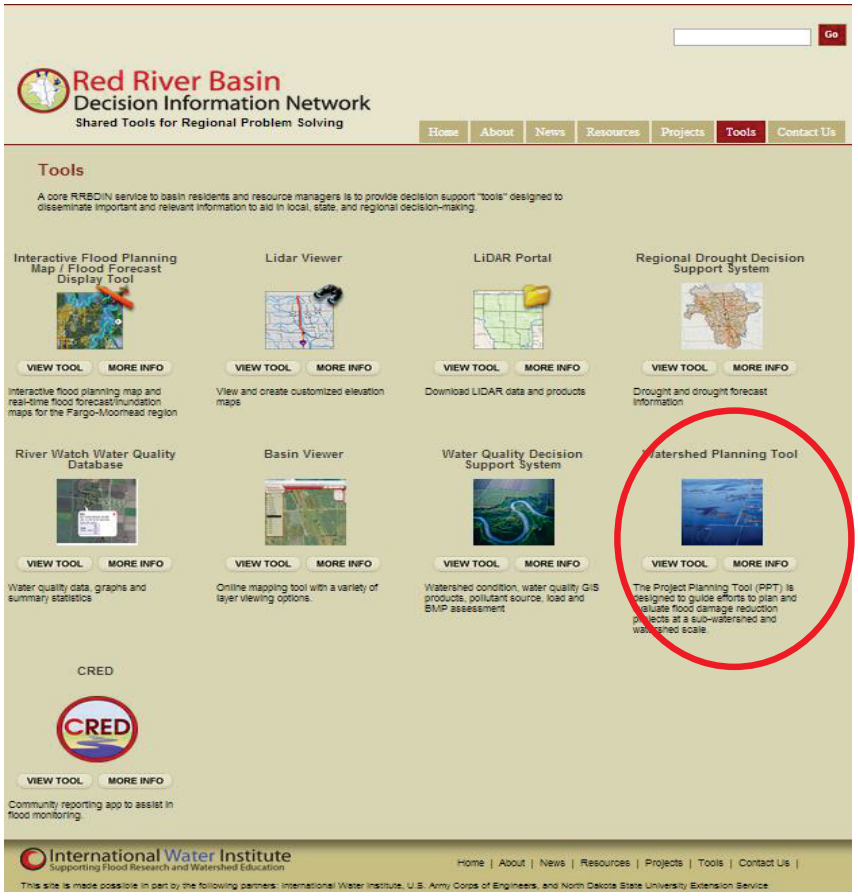
- Packaging and Disseminating New and Existing Information to Support Informed Decision-Making
- Internet-Based
- User Defined (non-technical)
  - Planning
  - Management
  - Operation

Red River Basin Mapping Initiative
(LiDAR)

"Redefining the Landscape"

- Completed in 2009
- 55,000 square miles (US portion of the Red River Basin)
- Data
  - Vertical - 15cm RMSE
  - Horizontal - 1.4 Meter
  - Digital Elevation Model





Watershed Planning Tool

- GOAL:
  - Guide efforts to plan and evaluate flood damage reduction strategies
- Audience (non-technical)
  - Local, state and federal Land and Water Managers
  - Funding Sources
  - Landowners/public

Red River Watershed Management Board

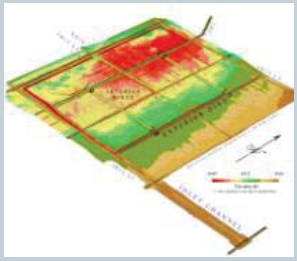
Watershed Planning Tool

- Uses enhanced geospatial products (derived from LiDAR)
- Facilitate and document the watershed planning and decision making process (flood damage reduction)
- Permit Approvals - compile/catalogue required permit Information (related to Points of Concurrence)

*MN**

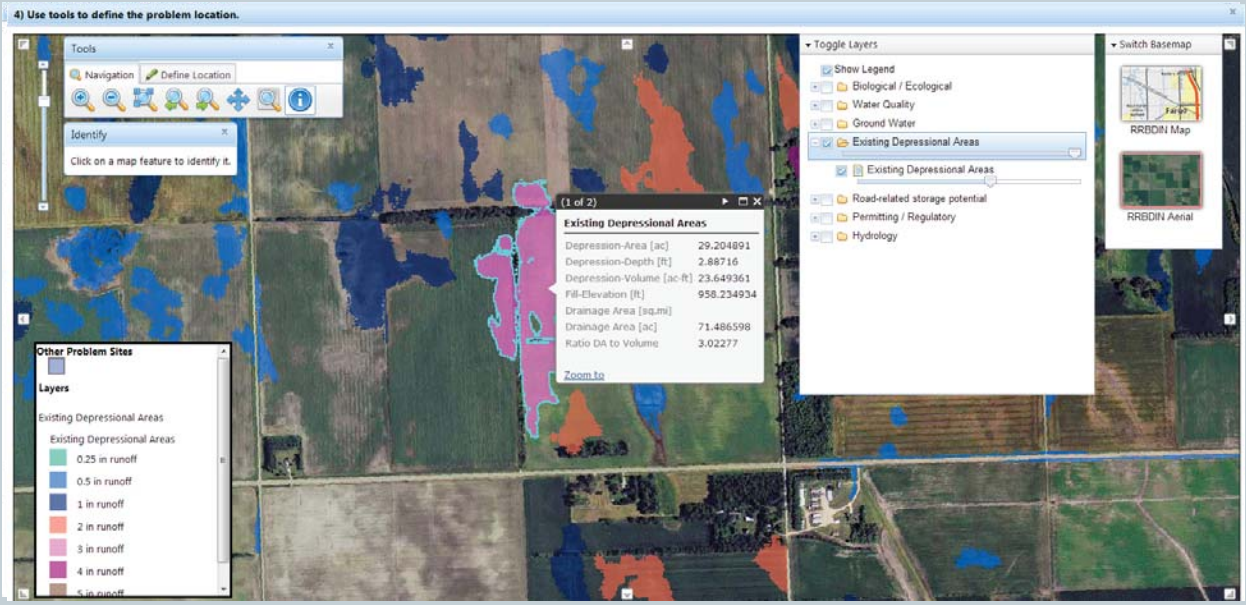
Water Retention Opportunities

- Existing depressions that retain water.
- Other areas on the landscape where water can be retained.
  - On channel
  - Off channel

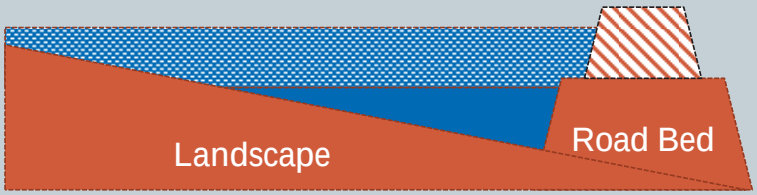


Location?
Capacity?
Footprint?
Drainage area?
Downstream effectiveness?
Flood Damage Reduction priority?
Permit complexity?

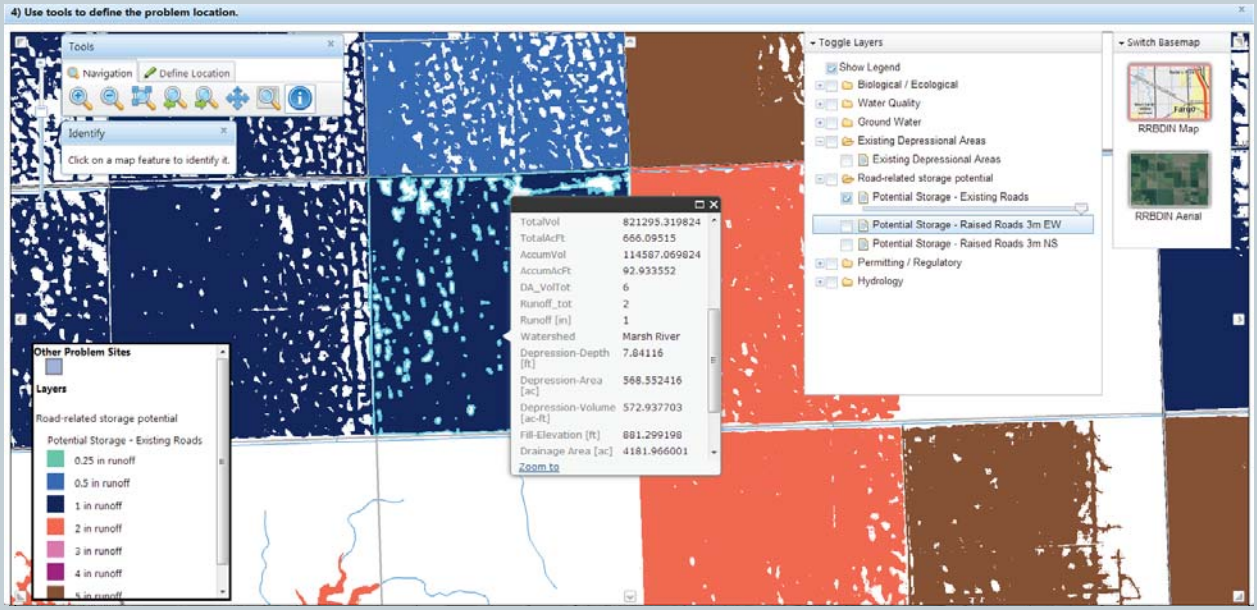
Existing Depressions



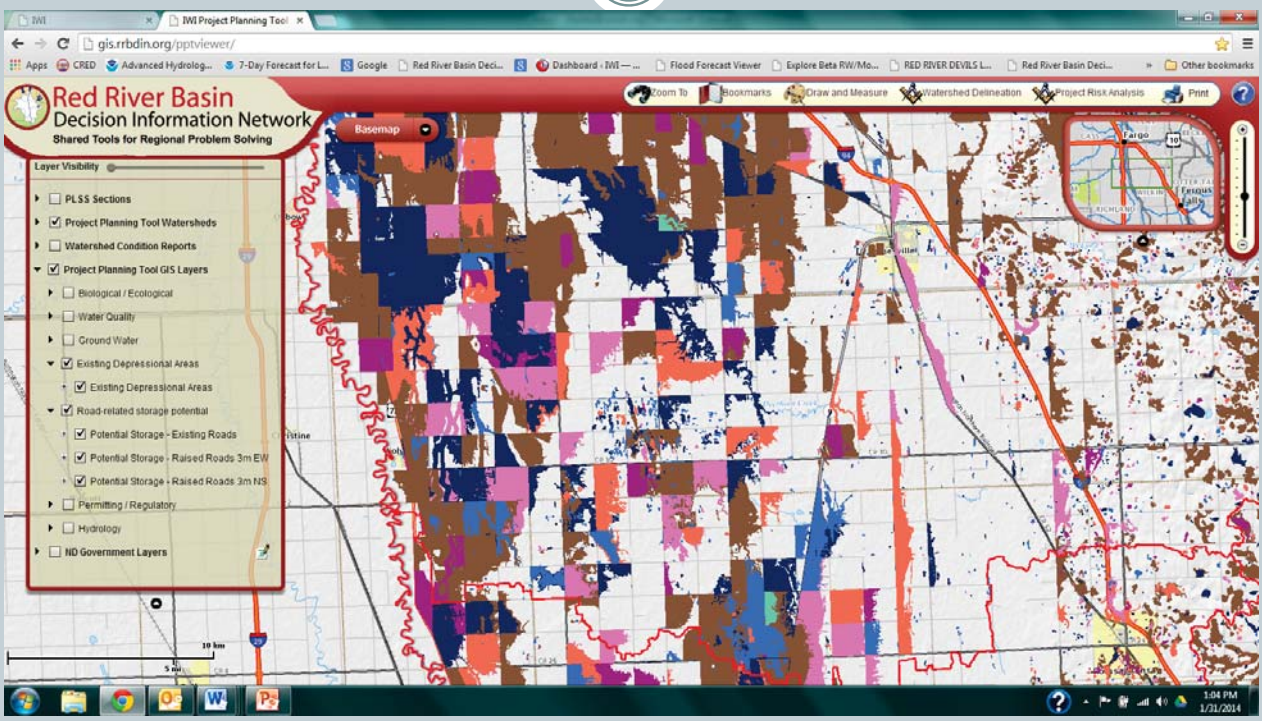
Road Raised Analysis



Raised Roads



Floodwater Storage Options



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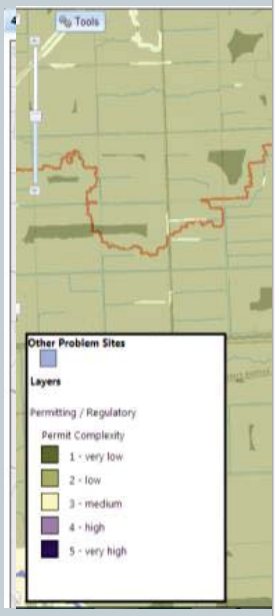

Decision Information Network

Project Planning Tool

Project Risk Analyis (Fatal Flaw) Report

Report Statistics:

Report Date: 11/20/2013
Report Run Time: 13:29

Report Purpose: This report identifies potential environmental concerns within **1 Mile** of your proposal site.

1) There are **0** of point source discharges identified by the EPA Permit Compliance System within **1 Mile** of the proposed location. For more information see **http://water.epa.gov/scitech/datait/models/basins/pcs3.cfm.**

2) There are **0** of lakes listed as impaired within **1 Mile** of the proposed location. These lakes are impaired for **[No Imparied Lakes]**. For more information see **http://gis.rrbdin.org/ppt/metadata/tmdllakes.xml.**

3) The nearest stream named **[No Imparied Streams]** is listed as impaired within **1 Mile** of the proposed location. This stream is impaired for **[No Imparied Streams]**. For more information see **http://gis.rrbdin.org/ppt/metadata/tmdlstreams.xml.**

4) There are **6** of Minnesota State endangered species of special within **1 Mile** of the proposed location. State law requires the specific location not be disclosed. Please contact the Minnesota DNR Natural Heritage Program for specific information. For more information see **http://gis.rrbdin.org/ppt/metadata/mn.htm.**

5) There are **0** of Federally endangered species of special within **1 Mile** of the proposed location. Federal law requires the specific location not be disclosed. For more information see **http://gis.rrbdin.org/ppt/metadata/mn.htm.**

6) There are **5** of sites with a biodiversity rank of **Moderate** within **1 Mile** of the location. For more information see **http://deli.dnr.state.mn.us/metadata/mcbs_sbspy3.html.**

7) There are **0** of known feedlots within **1 Mile** of the proposed location. Other feedlots may be in the area and should be verified in the field. For more information see **http://gis.rrbdin.org/ppt/metadata/feedlots.html.**

8) There are **3** of known wells within the Minnesota Department of Health database, within **1 Mile** of the location. For more information see **http://www.mngeo.state.mn.us/chouse/metadata/cwi.html.**

9) The site **ISN'T** located withing a ground water source water assessment area. For more information see **http://www.health.state.mn.us/divs/eh/water/swp/maps/gis/dwsma.html.**

10) The **ISN'T** located within an area having a Drinking Water Supply Management Area Vulnerability of **[No Rank Available]**. For more information see **http://www.health.state.mn.us/divs/eh/water/swp/maps/gis/dwsvul.html.**

11) The **IS** located within an area having a Ground Water Contamination Susceptibility of **Low Susceptibility**. For more information see **http://www.mngeo.state.mn.us/chouse/metadata/gwc.html.**

12) The area is estimated to have a permit complexity score of **3 - Medium.**

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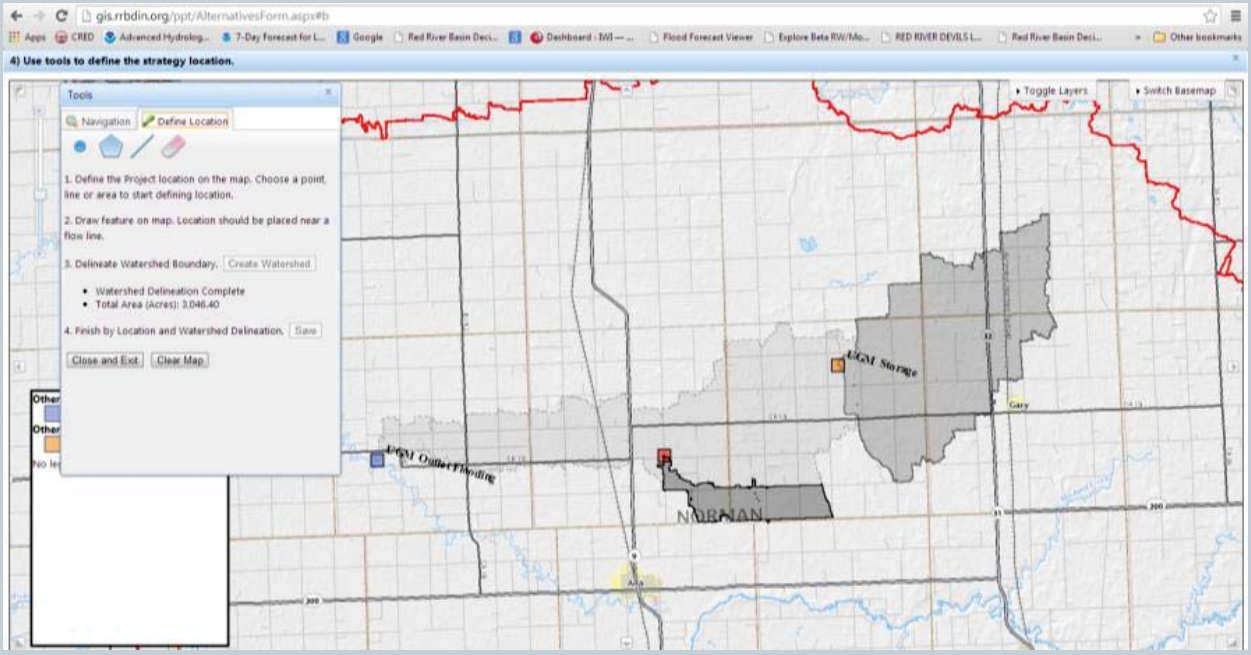
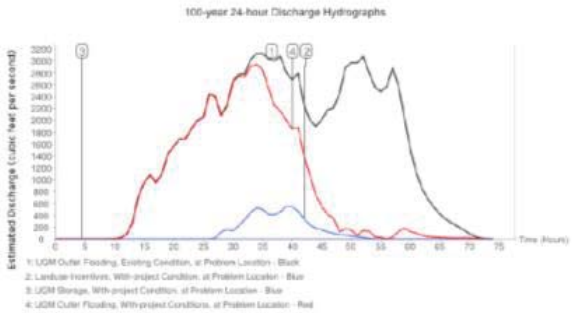
Watershed Delineation - Hydrology



Alternatives Analysis/Report

A travel time grid is used to account for the movement of runoff to downstream locations.

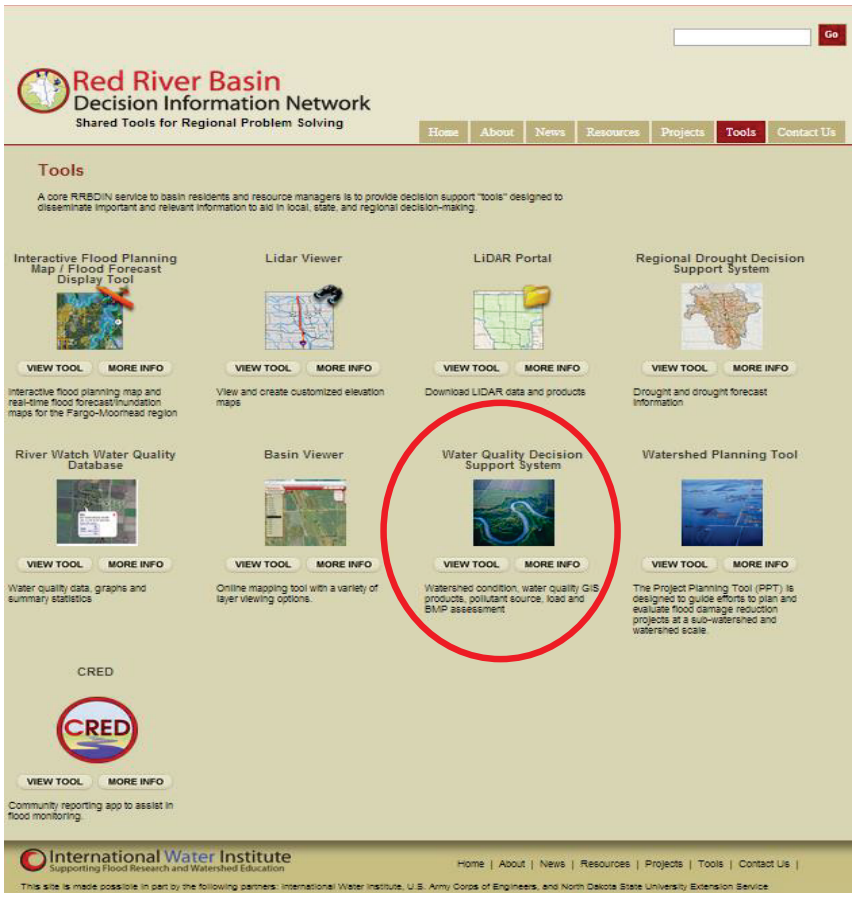
Estimated Results for Cumulative Projects at **UGM Outlet Flooding** Problem



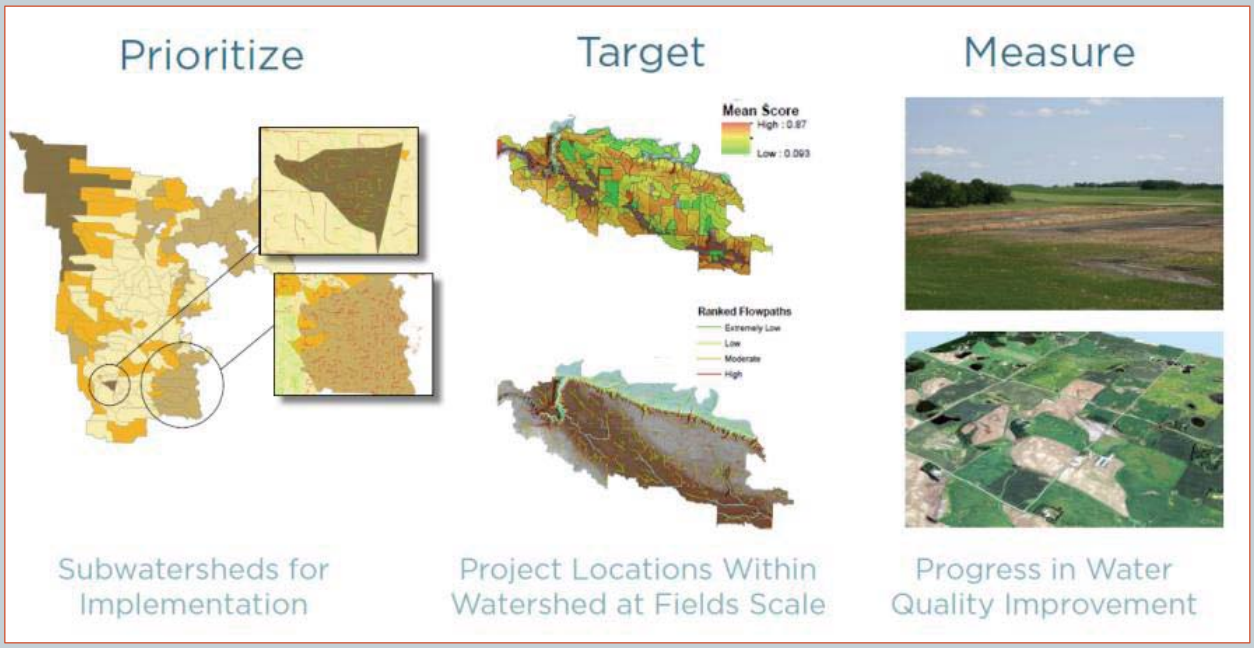
	Existing Condition @ Problem Location	Identified Goal	With-project @ Problem Location	Estimated Reduction	
	UGM Outlet Flooding	Reduce Peak Flows	Landuse Incentives & UGM Storage	Amount	Percentage
Estimated Peak Discharge (cfs)					
24-Hour Duration					
2-year	*Future*				
10-year	*Future*				
100-year	3125.17	300.0	2942.81	182.36	5.84%

NEXT STEPS/OPPORTUNITIES

- Develop Local Capacity to Plan and Analyze Potential FDR Strategies
- Streamline Permitting
- Establish a Problem Location Dataset
- Establish a Local/Basinwide FDR Strategy History
- Basin-Wide Application



VISION



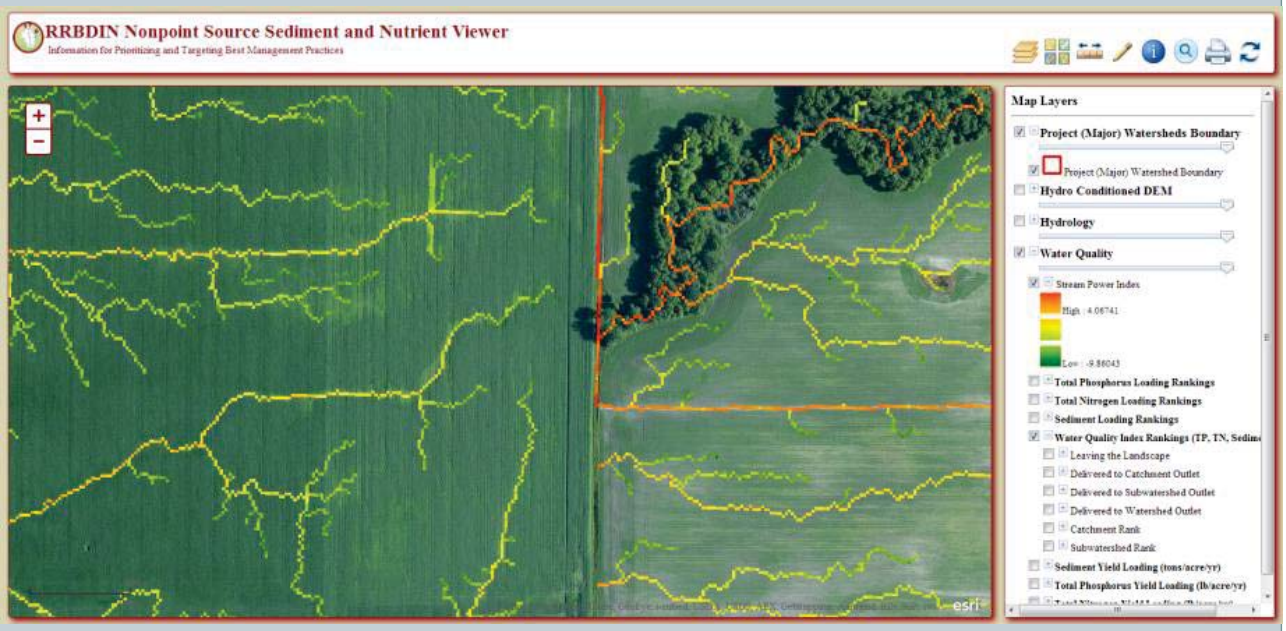
Water Quality Decision Support Application

- GOAL:
  - Prioritize, Market, and Implement Actions to Achieve Water Quality Objectives
- Audience (non-technical)
  - Local, state and federal Land and Water Managers
  - Funding Sources
  - Landowners/public

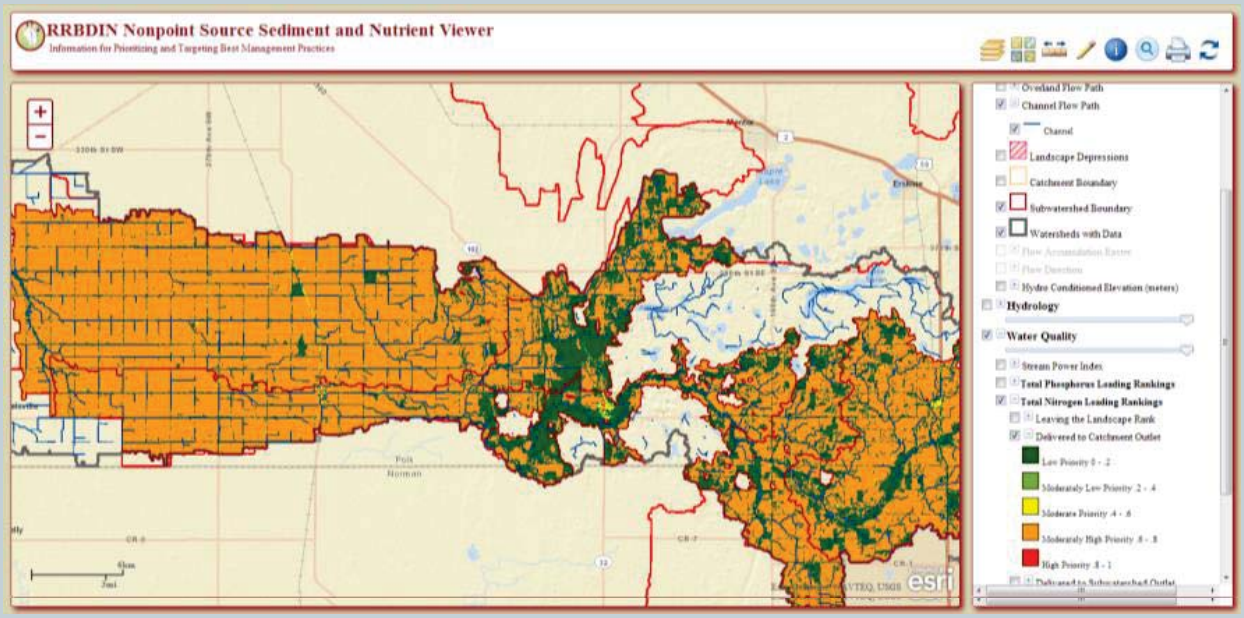
WQDSA TOOLS and APPLICATIONS

- Interactive map to display water quality GIS data
- Download water quality GIS data
- Access web services
- Identify pollutant sources
- Prioritize watersheds and target *fields* for implementation of Best Management Practices (BMP) and Conservation Practices (CP)
- Evaluate effectiveness of agricultural BMPs and CPs (future)*

Ranked Stream Power Index



Total N Loading Ranking



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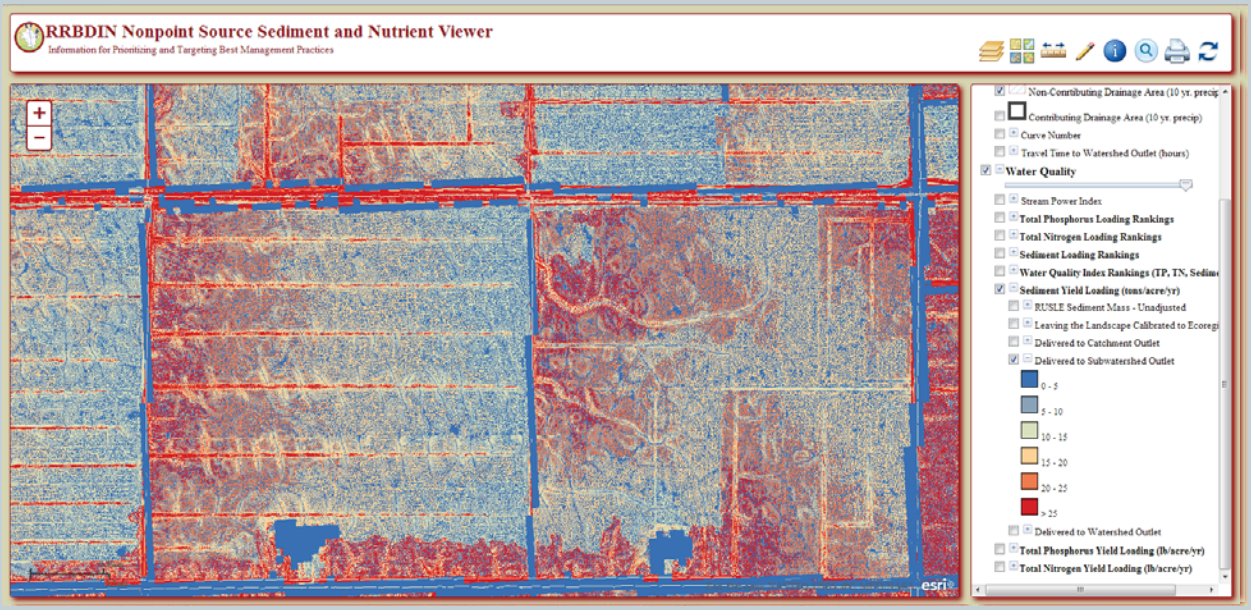
Sediment Yield Loading (tons/acre/year)



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WQDSA CURRENT STATUS

- WQDSA Viewer Available
  - Sand Hill WD Pilot
- WQDSA Download Portal Available
  - Sand Hill WQ Pilot
- MN RRB Watershed Data Generation in Progress
  - Estimate Completion: January, 2014
- ND Wild Rice Watershed
  - 2014
- Outreach
  - Ongoing in MN (WD, SWCDs, NRCS)

NEXT STEPS/OPPORTUNITIES

- Ingest Other WQ Model (E.g. HSPF) Results (water quality loadings)
- Dynamic Reports
  - Pollutant Source Assessment
  - Water Quality Risk Analysis
- Integrate with Watershed Planning Tool
- Expand Application
- BMP/CP Scenario Evaluations*

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FOR MORE INFORMATION

www.rrbdin.org

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"Availability of good information lies at the heart of effective and equitable decision making"

(Allen and Kilvington 1999)

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