Understanding farmer perceptions and management choices for reducing runoff in two Rock River Basin watersheds

Rock River Recovery Educational Forum
Jefferson, WI, April 14, 2011

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University of Wisconsin-Madison/Extension
Overview

- Background – social indicators and Ag NPS
- Application to Upper Rock and East River Watersheds
- Observations and Next Steps
- Discussion
Watershed as...

- A Problem domain
- Multiple issues
- Multiple stressors
- An institutional nexus
- Many actors
- Top-down/bottom-up
- Framework for integration
NPS Challenges

- The major cause of water quality impairment
- Limited regulatory options
- Addressed mainly through persuasion and voluntary practices
  - Financial incentives
  - Technical support
  - Outreach & education
- Measurement problems
  - Response lag for environmental change
  - Upstream impacts can mask local improvements
For Many NPS projects

- Watershed based – restoration and protection
- Goals are reduction oriented
  - Total load (modeled)
- Voluntary involvement
- Technical and $$ assistance not targeted
  - Multiple sources (programs)
  - First-come basis
- Reporting
  - Administrative indicators
  - Environmental indicators
More Challenges

- Where and how to focus resources?
- How to know if making a difference?
- Administrative Environment:
  - Increasing competition/decreasing resources
  - Accountability demands
  - Resources for staff?
USEPA Region 5 States: Add “social indicators” to NPS

Traditional Uses
- Human health
- Housing
- Education
- Social equity

Other desirable data
- Economic impact
- Resource use and value

Our needs:
- Complement Admin and Environ
- Interim, relevant for management
- Progress toward use and adoption
Process

2005

Review & Scoping

2005 - 2006

Stakeholder Input

Indicator compilation

2007-2011

Feedback, Refinement, Operationalize

Endorsement

Testing

End result:
Core indicators and implementation system

Genskow and Prokopy, 2010, Society and Natural Resources
Individual Decisions

From Nowak, Shepard, Okeefe
Theories of Behavior Change

- Theory of Planned Behavior (Ajzen)
  - Attitudes Toward Behavior
  - Social Norms
  - Perceived Behavioral Control
  - Behavioral Intent
  - Behavior / Action

- Diffusion of Innovations (Rogers)
  - knowledge
  - persuasion
  - decision
  - implementation
  - confirmation
Targeting

- Dis-proportionate effects
- Focus for greatest impact

Salt Creek Watershed, IN

Reduction in Stressors

Use of water quality management Practices

Improvement & protection of water quality

Program Activities

- Social norms
- Skills
- Attitudes
- Capacity
- Knowledge
- Awareness
- Constraints
- Values

Conceptual Model
Conceputal Model

- Administrative
- Social
- Environmental

Program Activities

- Use of water quality management practices
  - Social norms
  - Constraints
  - Values
  - Knowledge
  - Attitudes
  - Skills

Reduction in Stressors

Improvement & protection of water quality

- 5 categories with goals & indicators
- Additional contextual data
- Supplemental indicators

SI Planning and Evaluation Process

SI Step 1: Review project plan

SI Step 2: Collect and enter pre-project survey data

SI Step 3: Review data and refine social outcomes

SI Step 4: Monitor social data throughout project

SI Step 5: Collect and enter post-project survey data

SI Step 6: Collect and enter additional post-project data

SI Step 7: Review data and use results
Social Indicators for Planning & Evaluation System (SIPES)

- Critical areas & target audiences
- Scale is project level
- Consistent survey questions and data collection protocols
  - Used across projects
  - Compared over time
Before collecting social indicators:

1. What are the specific NPS problems this project is trying to address?

2. What are the critical areas that contribute to the problem?

3. Who are the target audience(s) for the NPS problem(s) your project will address?

4. What actions do you want the target audience(s) to take regarding the NPS problems?
Upper Rock River Watershed Survey
Survey Administration

- Spring 2010
- Target Audience: Farmers in sub-watersheds
- Mailed survey: multiple contacts
- 66% response (463 complete); individual Q response varies
Survey Content

- Awareness:
  - Water quality pollutants and sources
  - Management practices
- Attitudes toward water quality issues
- Use of practices
- Constraints to Practices
- Sources of information
Farmer Characteristics

- Male (91%)
- Operating alone or with spouse (49%)
- Operating with other family partners (33%)
- Family member likely to continue farm (44%)
- Operation < 500 acres (87%)
Farm Acreage

Total Tillable Acreage
(N=433)

- 1 - 99 acres: 34%
- 100 - 499 acres: 53%
- 500 - 999 acres: 9%
- 1,000 - 1,999 acres: 2%
- 2,000 + acres: 1%
Attitudes toward Water Quality Issues

- It is my personal responsibility to help protect WQ: 92%
- Using recommended management practices on farms improves WQ: 88%
- My actions have an impact on WQ: 80%
- It is important to protect WQ even if it slows economic development: 71%
- The quality of life in my community depends on good WQ in local streams, rivers and lakes: 68%
- I would be willing to change management practices to improve WQ: 58%
- I would be willing to pay more to improve WQ: 16%

Percent that Agree or Strongly Agree
Water Impairments

- Sedimentation in the water: 27%
- Algae in the water: 29%
- Nitrogen: 17%
- Phosphorus: 19%

Moderate/Severe Problem

Sedimentation in the water
Algae in the water
Nitrogen
Phosphorus
Water Impairments

- Sedimentation in the water: 54%
- Algae in the water: 47%
- Nitrogen: 43%
- Phosphorus: 41%

Not/Slight Problem: 40%
Moderate/Severe Problem: 24%
Don't Know: 19%
Sources of Pollutants

Farmers' Perceived Moderate or Severe Pollution Sources

- Soil erosion from construction sites: 14%
- Excessive use of fertilizers for crop production: 16%
- Manure from farm animals: 21%
- Soil erosion from farm fields: 24%
- Discharges from sewage treatment plants: 24%
- Excessive use of lawn fertilizers and/or pesticides: 33%
- Droppings from geese, ducks and other waterfowl: 40%
Sources of Pollutants

Farmers' Perceived Pollution Sources

- Soil erosion from construction sites: 68% Not/Slight Problem, 19% Moderate/Severe Problem, 14% Don't Know
- Excessive use of fertilizers for crop production: 68% Not/Slight Problem, 6% Moderate/Severe Problem, 16% Don't Know
- Manure from farm animals: 66% Not/Slight Problem, 12% Moderate/Severe Problem, 21% Don't Know
- Soil erosion from farm fields: 67% Not/Slight Problem, 24% Moderate/Severe Problem, 9% Don't Know
- Discharges from sewage treatment plants: 48% Not/Slight Problem, 28% Moderate/Severe Problem, 24% Don't Know
- Excessive use of lawn fertilizers and/or pesticides: 47% Not/Slight Problem, 20% Moderate/Severe Problem, 33% Don't Know
- Droppings from geese, ducks and other waterfowl: 48% Not/Slight Problem, 12% Moderate/Severe Problem, 40% Don't Know
# Use of Practices

<table>
<thead>
<tr>
<th>Practice</th>
<th>Currently use it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotate crops to control soil erosion</td>
<td>84%</td>
</tr>
<tr>
<td>Use a grassed waterway to reduce erosion and soil loss</td>
<td>67%</td>
</tr>
<tr>
<td>Conduct regular soil tests for pH and nutrients</td>
<td>56%</td>
</tr>
<tr>
<td>Restore wetlands</td>
<td>30%</td>
</tr>
<tr>
<td>Install runoff control practices for feed lots</td>
<td>27%</td>
</tr>
<tr>
<td>Construct a manure storage facility</td>
<td>22%</td>
</tr>
<tr>
<td>Use a managed grazing system</td>
<td>20%</td>
</tr>
<tr>
<td>Construct sediment basins to collect and store sediment</td>
<td>13%</td>
</tr>
<tr>
<td>Regulate the water level in tile lines</td>
<td>10%</td>
</tr>
<tr>
<td>Install a two-stage ditch design to reduce bank erosion</td>
<td>5%</td>
</tr>
<tr>
<td>Practice</td>
<td>&quot;Yes&quot; or &quot;Maybe&quot; willing to use</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Conservation Tillage</td>
<td>90%</td>
</tr>
<tr>
<td>Cover Crops</td>
<td>91%</td>
</tr>
<tr>
<td>Filter Strips</td>
<td>79%</td>
</tr>
<tr>
<td>CNMP or MMP</td>
<td>72%</td>
</tr>
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</table>
Constraints to Using **Cover Crops**

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Not at all</th>
<th>A little</th>
<th>Some</th>
<th>A lot</th>
</tr>
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<tbody>
<tr>
<td>a. Don't know how to do it</td>
<td>66%</td>
<td>20%</td>
<td>12%</td>
<td>2%</td>
</tr>
<tr>
<td>b. Time required</td>
<td>42%</td>
<td>26%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>c. Cost</td>
<td>29%</td>
<td>19%</td>
<td>31%</td>
<td>22%</td>
</tr>
<tr>
<td>d. The features of my property make it difficult</td>
<td>49%</td>
<td>22%</td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>e. Insufficient proof of water quality benefit</td>
<td>51%</td>
<td>23%</td>
<td>20%</td>
<td>6%</td>
</tr>
<tr>
<td>f. Desire to keep things the way they are</td>
<td>48%</td>
<td>21%</td>
<td>20%</td>
<td>11%</td>
</tr>
<tr>
<td>g. Hard to use with my farming system</td>
<td>43%</td>
<td>23%</td>
<td>21%</td>
<td>14%</td>
</tr>
<tr>
<td>h. Lack of equipment</td>
<td>45%</td>
<td>20%</td>
<td>24%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Cover Crops
(Users of Practice vs. Nonusers)

Mean

- a. Lack of skills or information
- b. Time required
- c. Cost
- d. The features of my property make this difficult
- e. Insufficient proof of water quality benefit
- f. Desire to keep things the way they are
- g. Hard to use with my farming system
- h. Lack of equipment benefit

Use
Don't Use
## Constraints to Using Filter Strips

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<tr>
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<td>24%</td>
<td>15%</td>
<td>4%</td>
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<tr>
<td>b. Time required</td>
<td>39%</td>
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<tr>
<td>d. The features of my property make it difficult</td>
<td>37%</td>
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<td>25%</td>
<td>15%</td>
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Filter Strips
(Users of Practice vs. Nonusers)

<table>
<thead>
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<th></th>
<th>Use</th>
<th>Don't Use</th>
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<td>c. Cost</td>
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<td>e. Insufficient proof of water quality benefit</td>
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## Constraints to Using Conservation Tillage/Residue Management

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<td>c. Cost</td>
<td>44%</td>
<td>20%</td>
<td>17%</td>
<td>19%</td>
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<tr>
<td>d. The features of my property make it difficult</td>
<td>59%</td>
<td>21%</td>
<td>14%</td>
<td>7%</td>
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<td>e. Insufficient proof of water quality benefit</td>
<td>61%</td>
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Conservation Tillage
(Users of Practice vs. Nonusers)

- a. Lack of skills or information
- b. Time required
- c. Cost
- d. The features of my property make this difficult
- e. Insufficient proof of water quality benefit
- f. Desire to keep things the way they are
- g. Hard to use with my farming system
- h. Lack of equipment

Mean

- Use
- Don't Use
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CNMP or MMP
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- h. Lack of equipment

Mean

- Use
- Don't Use
Constraints to Change Agricultural Management

Percent of Farmers Constrained 'Some' or 'A lot'

- Lack of available information about a practice: 40%
- Don't want to participate in government programs: 41%
- Not having access to the equipment that I need: 59%
- Requirements or restrictions of government programs: 62%
- Possible interference with my flexibility to change land use practices as conditions warrant: 62%
- Lack of government funds for cost share: 74%
Information Sources

Percent that Trust Information Sources Moderately or Very Much

- Crop consultants: 63%
- UW Extension county agent: 60%
- Other landowners/friends: 59%
- County land and water conservation department: 58%
- Fertilizer representatives: 52%
- Wisconsin Department of Ag, Trade, and Consumer Protection: 48%
- UW research specialist: 47%
- Natural Resources Conservation Service: 46%
- Wisconsin DNR: 41%
- US Fish and Wildlife Service: 34%
- Local farm organization: 34%
- Rock River Coalition: 30%
- Town & County RC & D: 26%
- Local environmental group: 8%
Information Sources

Percent that are Not Familiar with Information Sources

- Local environmental group: 55%
- Town & County RC & D: 37%
- Rock River Coalition: 32%
- Local farm organization: 30%
- UW research specialist: 16%
- US Fish and Wildlife Service: 11%
- Crop consultants: 10%
- County land and water conservation service: 8%
- Natural Resources Conservation Service: 8%
- UW Extension county agent: 8%
- Fertilizer representatives: 8%
- Wisconsin Department of Ag, Trade, and...: 8%
- Other landowners/friends: 7%
- Wisconsin DNR: 6%
Observations/Next Steps

- Importance of local review and discussion
- Initial Observations:
  - Perception of limited severity of most sources
  - Potential for focus practices
  - Differences among users/non-users constraints
  - High/low trust for soil/water conservation
- Benchmark for future comparison
Discussion

Acknowledgements:

Regional Social Indicators Project: http://greatlakeswater.uwex.edu/social-indicators

Kim Ness and Andy Meyers, UWEX/ERC for assistance with survey and results