



Applying knowledge to improve water quality

# Heartland

Regional Water  
Coordination Initiative

A Partnership of USDA CSREES  
& Land Grant Colleges and Universities



# ***Improving Nutrient & Pesticide Management Capacity in the Heartland: Process and Products***

Daniel Devlin, Charles Barden, Charles Wortmann,  
Amanda Schielke, and Teshome Regassa

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# Land Use in the Heartland



	<i>Land in Crops (%)</i>	<i>Land in Farms (%)</i>
<i>Iowa</i>	<i>75</i>	<i>87</i>
<i>Kansas</i>	<i>57</i>	<i>88</i>
<i>Missouri</i>	<i>44</i>	<i>65</i>
<i>Nebraska</i>	<i>45</i>	<i>93</i>
<i>U.S. Total – Lower 48 States</i>	<i>19</i>	<i>41</i>

# Agricultural Production in the Heartland

- 22.5% of U.S. cropland is the Heartland Region
- 36% of corn produced in the U.S.
- 38% of all hogs and pigs in the U.S.
- 21% of all cattle in the U.S.
- In 1999, 23.4 million pounds of atrazine herbicide and 3,551 million pounds of nitrogen fertilizer were applied to corn in the Heartland



# Heartland Regional Water Coordination Initiative

## *Three Teams*

- Animal Manure Management
- Nutrient and Pesticide Management
- Citizen Involvement in Watershed Management

# Heartland Regional Water Coordination Initiative

- Animal Manure Management Team
- **Nutrient and Pesticide Management Team**
- Citizen Involvement in Watershed Management Team





# NPM Process

## ➤ Nutrient & Pesticide Management (NPM) Team Principal Investigators

- ❑ Dan Devlin, Kansas State University
  - Professor - Extension Environmental Quality, Specializing in Nutrient Management, Pesticide Management and Water Quality
- ❑ Charles Barden, Kansas State University
  - Associate Professor - Extension Forester, Specializing in Forestry and Water Quality
- ❑ Charles Wortmann, The University of Nebraska - Lincoln
  - Associate Professor – Soil Science, Specializing in Soil fertility management; nutrient management planning, manure use, and water quality protection.





# NPM Process

## ➤ NPM Project Associates

- ❑ Amanda Schielke, Kansas State University
  - Water Quality Education and Event Coordinator
- ❑ Teshome Regassa, The University of Nebraska – Lincoln
  - Extension Water Quality Specialist
  - Teshome represents both the Heartland NPM Team and the Animal Manure Management (AMM) Team.



# NPM Process



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- Developed and Utilized a Steering Committee
  - ❑ Members:
    - Land Grant University Faculty from Iowa State University, Kansas State University, University of Missouri and the University of Nebraska
    - State Environmental and Agricultural Agency Personnel from IA, KS, MO and NE
    - Federal Environmental Agency Personnel - NRCS from IA, KS, MO and NE and Region 7 – EPA
    - Private sector organizations
  - ❑ Objective:
    - To determine priority issues in the Heartland Region and oversee the NPM Team's efforts in addressing these issues.



# NPM Process



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## ➤ Method in addressing priority issues

### ❑ Research Roundtables

- Participants included researchers from LGU's in the Heartland Region, researchers from USDA-ARS, EPA and NRCS.
- Goal: Share research findings, prioritize regional research needs and identify opportunities for collaboration.

### ❑ Summer Workshops to follow

- Participants included LGU extension and research faculty, federal and state agencies, such as EPA, USDA-ARS, NRCS, Department of Natural Resources and Environment, Departments of Agriculture, and Soil Conservation Districts, etc.
- Goal: Share research findings, provide training on BMPs, discuss BMP implementation strategies and provide the capacity for collaboration





# NPM Process

- NPM Roundtables and Workshops: Issues Addressed
  - ❑ 2004 – Phosphorus Best Management Practices
  - ❑ 2005 – Nitrogen Best Management Practices
  - ❑ 2006 – Pesticide Best Management Practices
  - ❑ 2007 – Targeting Critical Source Areas for Implementation of BMPs
  - ❑ 2008 – Impact Assessment and Achievements in Water Quality
    - Roundtable was held on January 23-24, 2008
    - Workshop will be held June 17-19, 2008.





# NPM Products

## ➤ Team Outputs and Regional Outcomes:

### ☐ Regional Publications

- *“Phosphorus Indexes in Four Midwestern States: An Evaluation of the Differences and Similarities”* – Paper Published in the Journal of Soil and Water Conservation in October 2005
- *“Agricultural Phosphorus Management and Water Quality Protection in the Midwest”* – collaboration of authors from NPM 2004 Workshop
- *“Agricultural Nitrogen Management and Water Quality Protection in the Midwest”* – collaboration of authors from NPM 2005 Workshop
- Pesticides Publication – final review – collaboration of authors from NPM 2006 Workshop
- Targeting Publication – final review – collaboration of authors from NPM 2007 Workshop



RP187

# Agricultural Phosphorus Management and Water Quality Protection in the Midwest



EPA Region VII



Charles S. Wortman  
 University of Nebraska-Lincoln  
 Matt Helman and Antonio Molinaro  
 Iowa State University  
 Charles Borden, Dan Devlin, and Gary Poczynski  
 Kansas State University  
 John Loy and Ray Massey  
 University of Missouri-Columbia  
 John Holz and Charles Shapiro  
 University of Nebraska-Lincoln  
 John Kovar, USDA-ARS National Soil Tillage Laboratory



RP189

# Agricultural Nitrogen Management for Water Quality Protection in the Midwest



EPA Region VII



University of Nebraska-Lincoln  
 Iowa State University  
 Kansas State University  
 University of Missouri-Columbia  
 USDA-ARS



# NPM Products



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## ➤ Team Outputs and Regional Outcomes:

### ❑ Website

- The NPM Team's Website was the recipient of the *American Society of Agronomy's* Education Materials Award of Excellence in 2004.
- A poster titled "*Distribution of Research-based Nutrient and Pesticide Management Information*", demonstrating the website's unique features, was presented at the CSREES conference in 2005 and the 2005 Water and the Future of Kansas Conference.

### ❑ Grants Funded because of NPM Team Facilitation

- Research Group developed from 2006 roundtable submitted and received funding for a CSREES 406 competitive grant proposal for \$570,000 over three years titled "*Targeting Watershed Vulnerability and Behaviors Leading to Adoption of Conservation Management Practices*" – The group consisted of UN-L, KSU and USDA-ARS in Missouri, and Iowa Geological Survey researchers.



# NPM Products



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## ➤ Team Outputs and Regional Outcomes:

- ❑ Increased Communication and Interaction in the Region
  - Over 175 individuals have attended NPM roundtables and workshops, improving inter-state and inter-agency communication.
  - Communicative benefit of NPM activities is exemplified by participant statements on event feedback questionnaires, such as:
    - *“Good Forum for interactions between academia and practitioners.”*
    - *“Thanks for the opportunity to include field personnel in this workshop. This was a great opportunity to inform county level offices of the broader regional concern.”*
    - *“Heartland is the reason that state and federal agencies like NRCS and USDA-ARS are meeting with university personnel to discuss research.”*
    - *“This [Heartland group] provides a mechanism for contacting people in other states.”*
    - *There are all sorts of ties and connections here that are well beyond anything that we could have done without the project.”*



# NPM Products



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- Team Outputs and Regional Outcomes:
  - NPM has produced Capacity-building results.
    - NPM's communication and collaboration with Haskell Indian Nations University (1994 Land Grant) has resulted in several collaborative research proposals, two of which were selected for funding.
      - Haskell was awarded an EPA – Region 7 grant titled *“Water: Mother Earth’s Gift”* – Haskell will lead with KSU faculty cooperating.
      - Haskell was awarded a USDA-CSREES Tribal College Research Program Grant titled *“Streambank Stabilization and Restoration Practices in the Big Soldier Creek Watershed of the Prairie Band Potawatomie Nation Reservation”* - Haskell and KSU faculty serve as co-principal investigators.
    - The NPM Team contributed to training sessions throughout the region
      - Livestock Waste Training in Kansas, 2004 (over 300 attendees)
      - Cropland BMPs for Meeting TMDLs and Flint Hills Burning Training , 2004
      - Managing Soil and Applied Nutrients Training , 2004 – 2007
      - Fluid Fertilizer Training, 2005 – 2007
      - KSU Weed and Nutrient Management Training Workshop, 2006
      - Watershed Management and Community Involvement Workshop in NE, 2006





# Major Impacts

- Impacts from NPM Products
  - ❑ Nebraska P Index was changed as a direct result of the P Index comparison paper.
  - ❑ NRCS Nutrient Management 590 standard requires livestock producers to apply manure nutrients at a crop removal rate as recommended by the P-Index.
  - ❑ EQIP contracts now require a Comprehensive Nutrient Management Plan (CNMP) that includes the P-Index calculation to assess the risk of P loss from fields receiving nutrients, this affected 6000 producers within the Heartland Region.
  - ❑ EPA – Region 7 and extension has purchased field and stream assessment tools that were presented to them at the NPM 2007 Workshop.



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# QUESTIONS??

