

# Drainage Districts as Nitrate-Nitrogen Sources to Headwater Streams

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Iowa Soybean Association



Environmental  
Programs & Services  
IOWA SOYBEAN ASSOCIATION

# Iowa Soybean Association

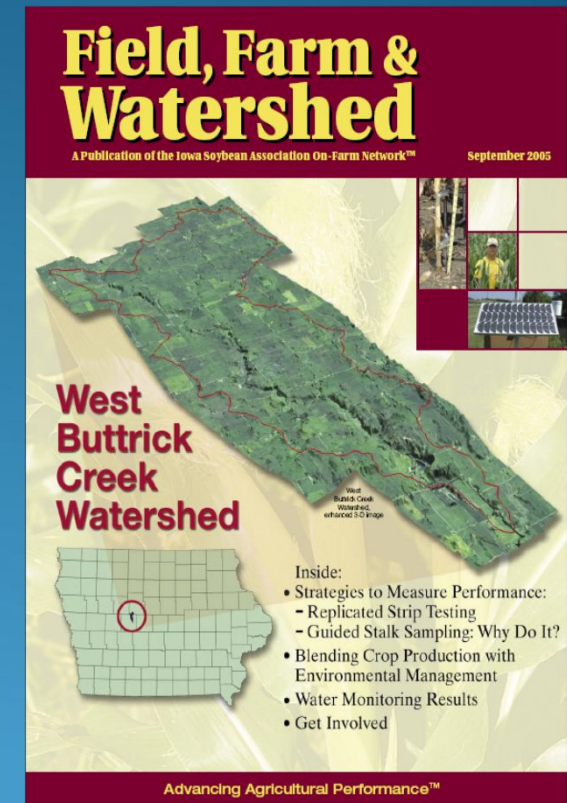
## Environmental Programs and Services

*Advance agricultural leadership for environmental quality by developing, applying, and promoting programs that assist producers to perform agronomically and economically*

- Develops policies and programs that help farmers expand profit opportunities while promoting environmentally sensitive production using the soybean checkoff and other resources.
- The Association is governed by an elected volunteer board of 21 farmers.
- Approximately 45,000 Iowa Farmers plant about 10 million acres of soybeans annually producing over 500 million bushels.
- Iowa's soybean crop accounted for about \$3.36 billion in US trade exports in 2010 – setting a record.
- Soy industry in Iowa - 16,656 jobs amounting to \$632 million in labor income (2008 study)

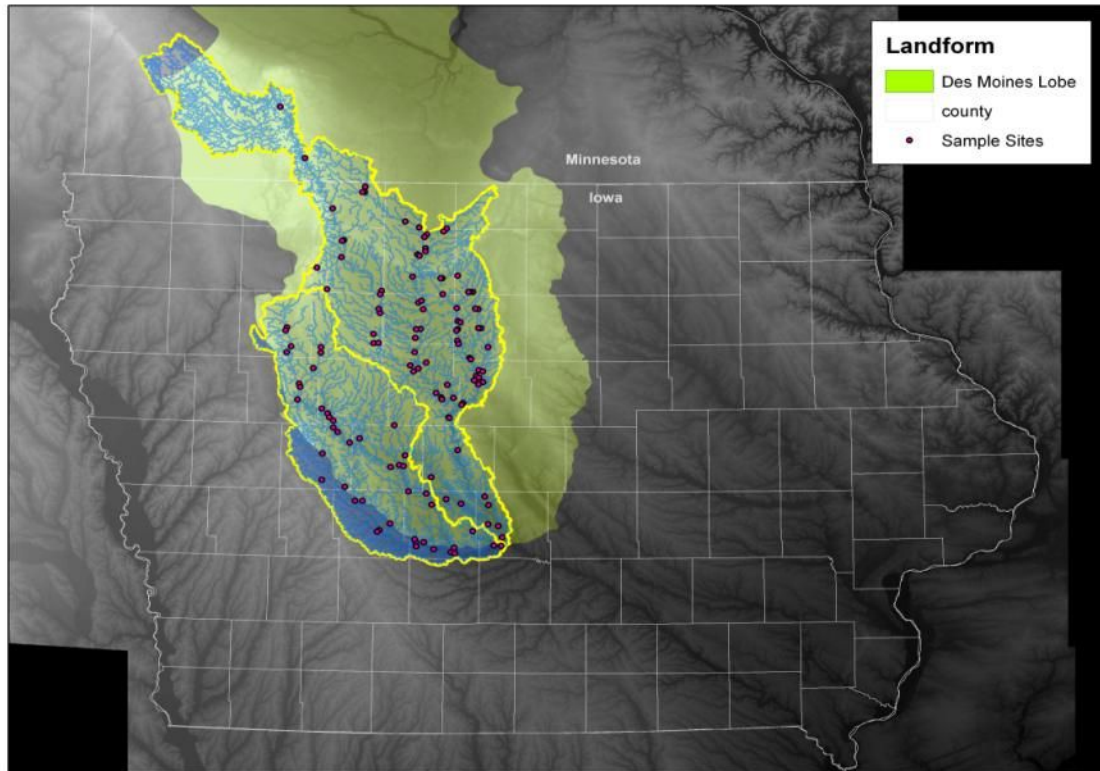
# Environmental Programs and Services

- Provide leadership from agriculture; have impact.
  - Environment
  - Policy
  - Profitability
- Seeking and capturing performance; tools/ techniques help farmers address issues.
- Apply science to gain understanding, impact and profit
- Crosses multiple geographic scales
- Valuing cooperative partnerships and collaborations
- Provide value to membership and Iowa farmers.



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# Agriculture's Clean Water Alliance



- 13 fertilizer dealers in the Raccoon/Des Moines River watersheds.
- Sell and apply most of the nitrogen used on 5 million acres of cropland in the watershed.
- Leading private sector sponsor of water quality monitoring
- Code of Practice
- Bioreactor demonstration study

*Mission:* To reduce the nutrient loss – specifically nitrate – from farm fields and to keep the nutrients from entering the Raccoon River and Des Moines River and its tributaries.

## 47 Priority Areas for Biodiversity Conservation

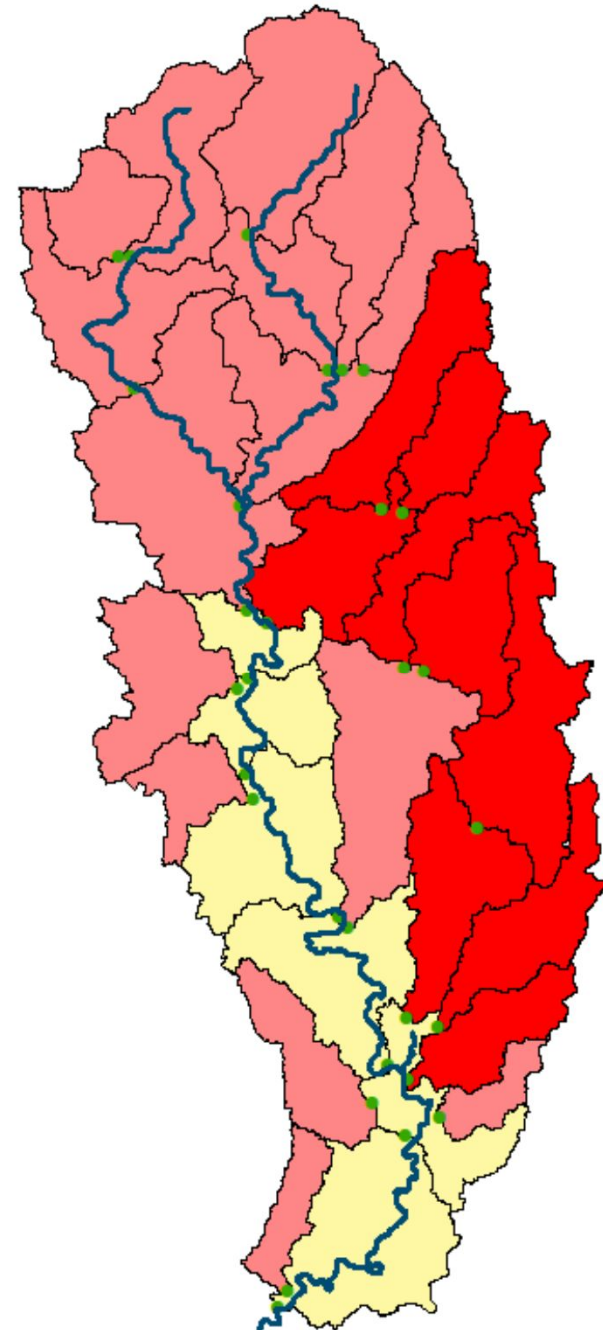
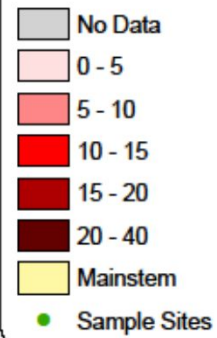


# Monitoring



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## Ave Nitrate-N Ave3Yr



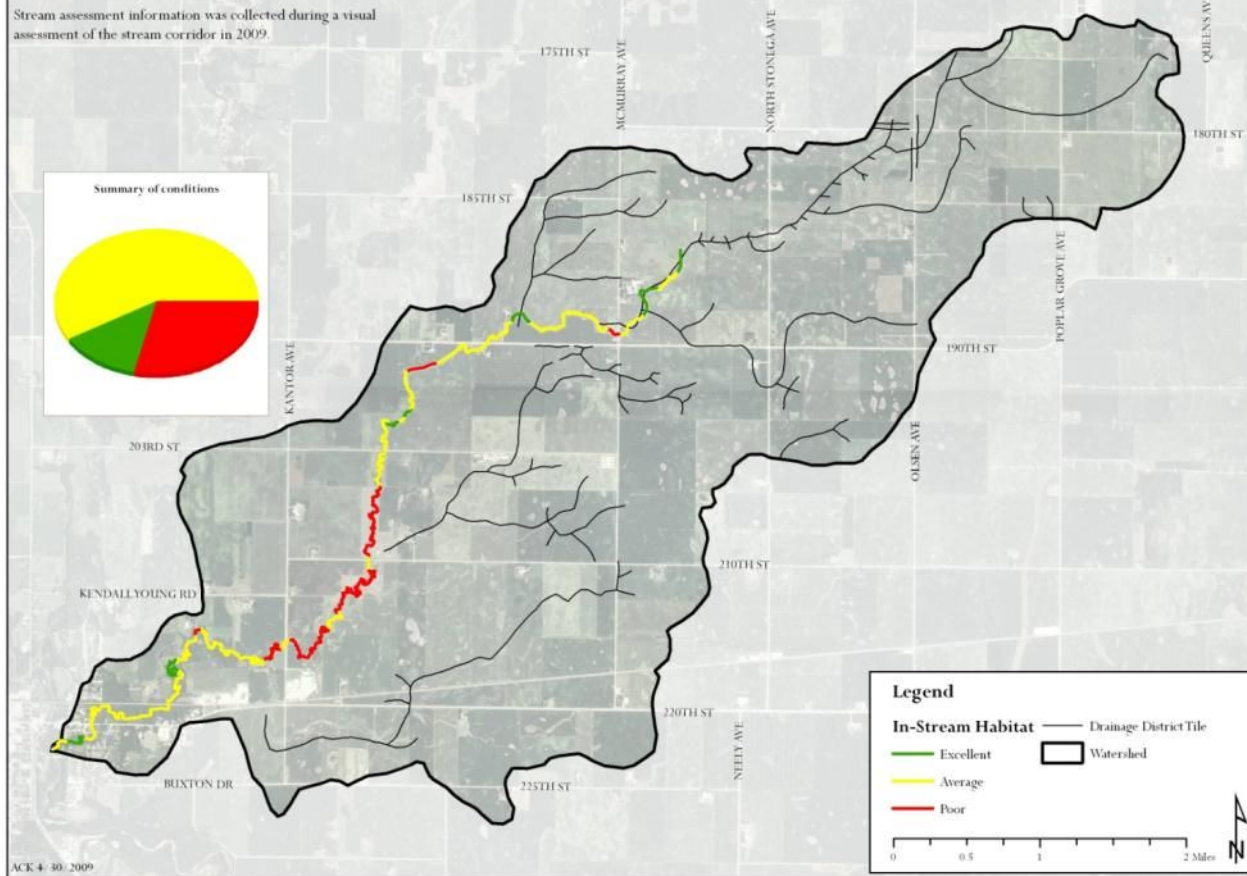
# Watershed Program

## Elements:

- Multi-scale watershed assessment and planning facilitation
- CEMSA planning with groups of farmers
- Management Evaluation – Groups / Replicated Strips Trials/Stalk sampling
- Environmental evaluation via water monitoring
- Targeted Conservation Systems – Bioreactor, Shallow Wetland, others
- Technical Service Contracts – ACWA / DMWW / TNC / ISU / Prairie River and Prairie Winds RC&D's

# Lyons Creek - Hamilton County In-Stream Habitat

Stream assessment information was collected during a visual assessment of the stream corridor in 2009.



# RASCAL Assessments – Lyons Creek



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Survey Parameter	Categories				
Adjacent Land Cover	Row Crop	Trees	Grass	Pasture	Residential
	38.3%	14.5%	5.1%	35.0%	9.1%
Riparian Zone Width	< 10 ft	10 - 30 ft	30 - 60 ft	> 60 ft	
	36.4%	11.7%	24.4%	28.6%	
Bank Stability	Stable	Mod. Stable	Mod. Unstable	Unstable	
	6.3%	34.2%	26.8%	32.7%	
Substrate	Boulder	Cobble	Gravel	Sand	Silt/Mud
	0.6%	15.0%	20.5%	55.4%	8.5%
Stream Habitat	Poor	Average	Excellent		
	28.6%	58.7%	12.7%		



# Watershed Planning

- **A comprehensive plan for the watershed**
  - Farmer involvement; locally-led
  - Inventories available data
  - Identifies water quality concerns
  - Outlines resources and partners available
  - Provides guidance on steps needed to address the concerns
- **Set of integrated solutions; no silver bullet**
- **Infield/Edge of Field**
- **MRBI practice list**
- **Implementation**

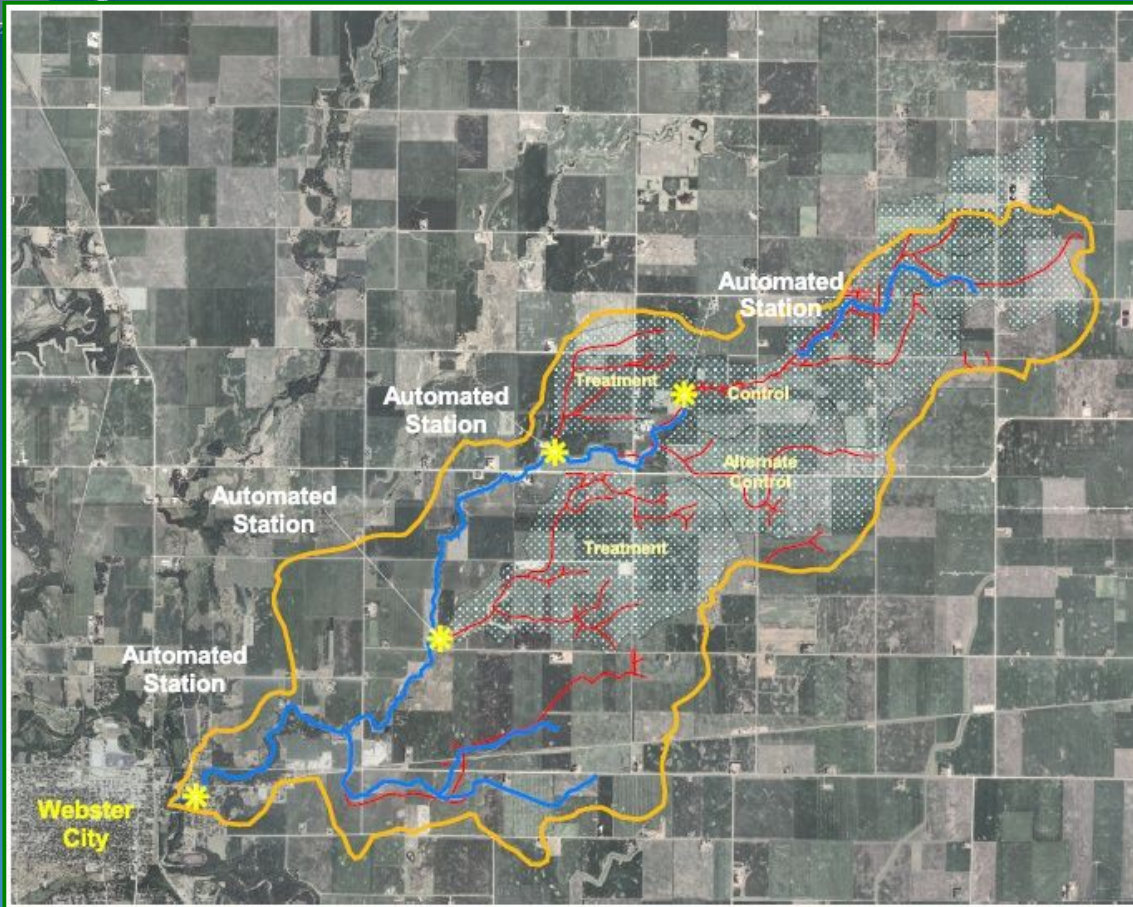
**Lyons Creek Watershed**



**Watershed Management Plan**

**March 31, 2010**

# Lyons Creek Paired Watershed Study

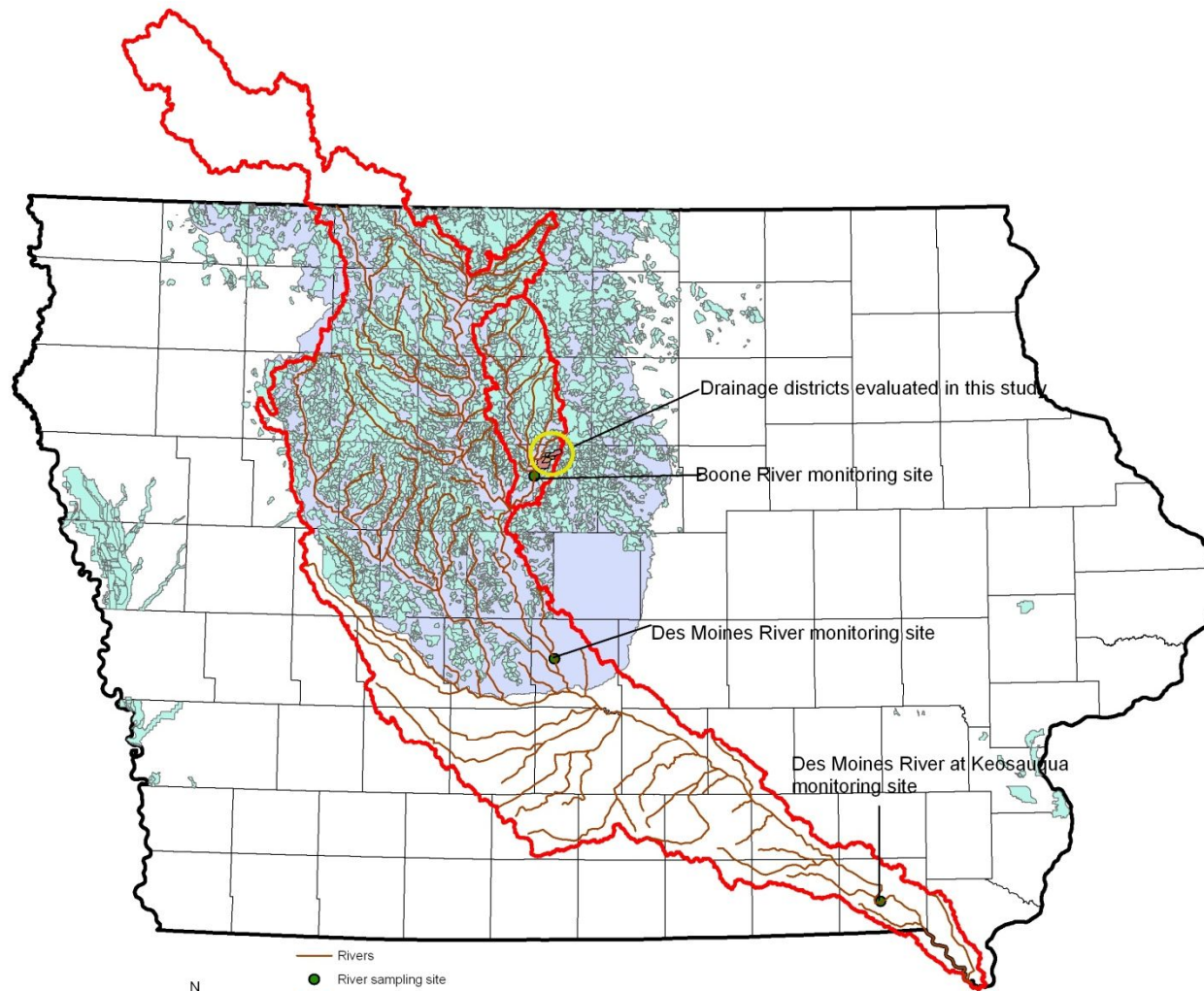


- 600 – 2,000 acres
- Two treatment; one control
- Partnering with TNC, IDNR, IGSB, others

# Lyons Creek Paired Watershed Study

## Potential Practices for Treatment Watershed

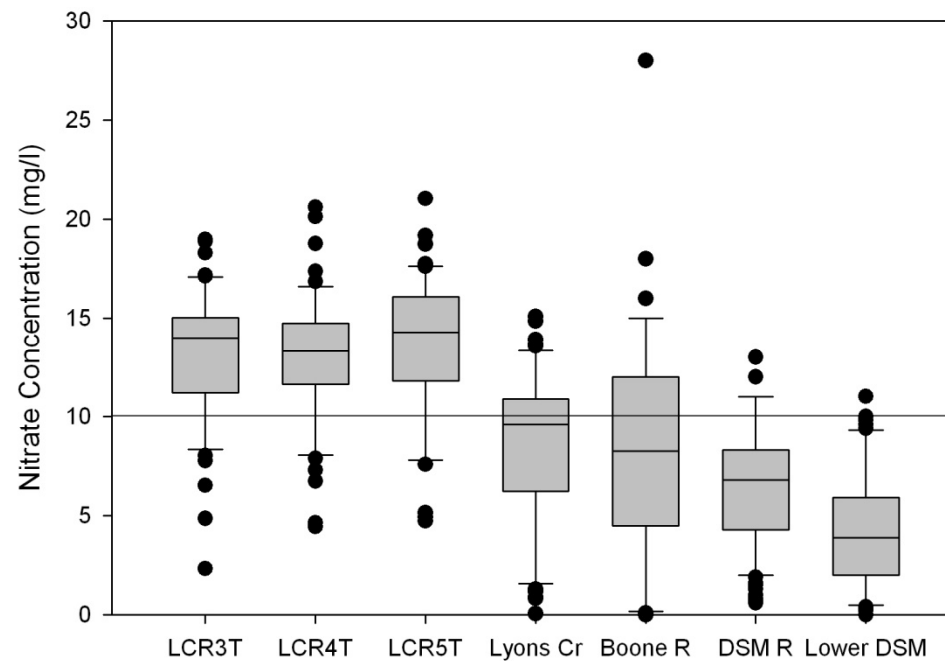
- Cover Crops
- Intensive Nutrient Management (timing, rate, form)
- Edge of Field Buffers - Tile line Bioreactors, Riparian Buffers, Constructed Wetlands
- Drainage Water Management
- Tillage changes – Strip till, No-Till
- Alternative Surface water intakes



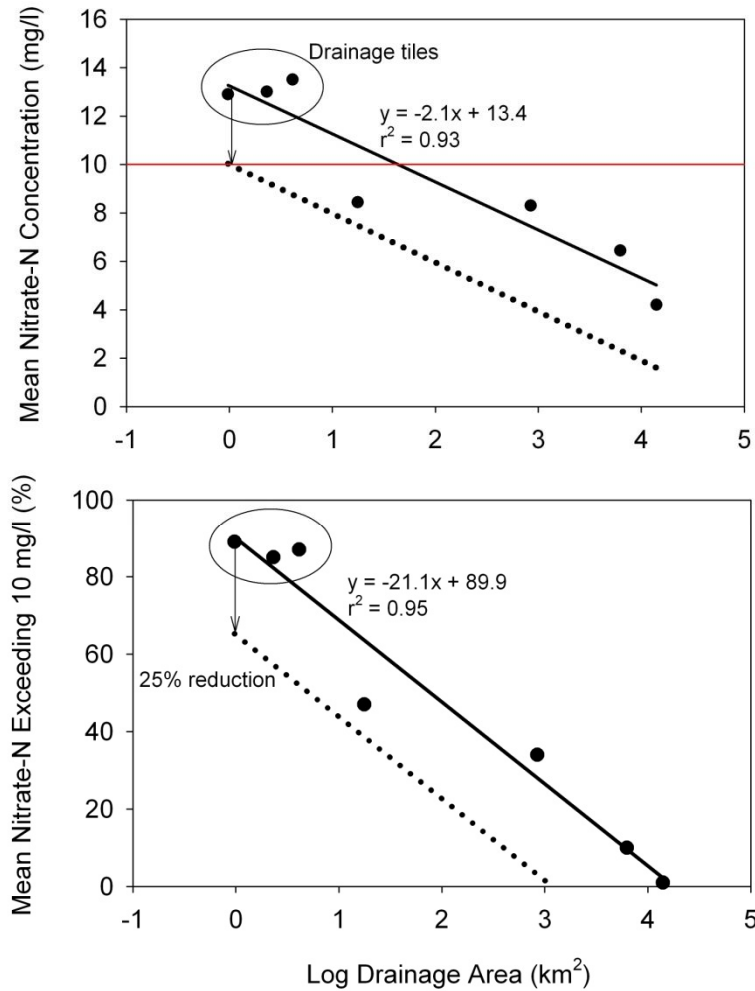
- Rivers
- River sampling site
- Drainage districts in this study
- Lyons Creek basin
- Boone River and Des Moines River basins
- Drainage districts
- Des Moines Lobe

0 25 50 100 150 200  
Kilometers

# Relation of Nitrate Concentrations to Downstream Water Bodies

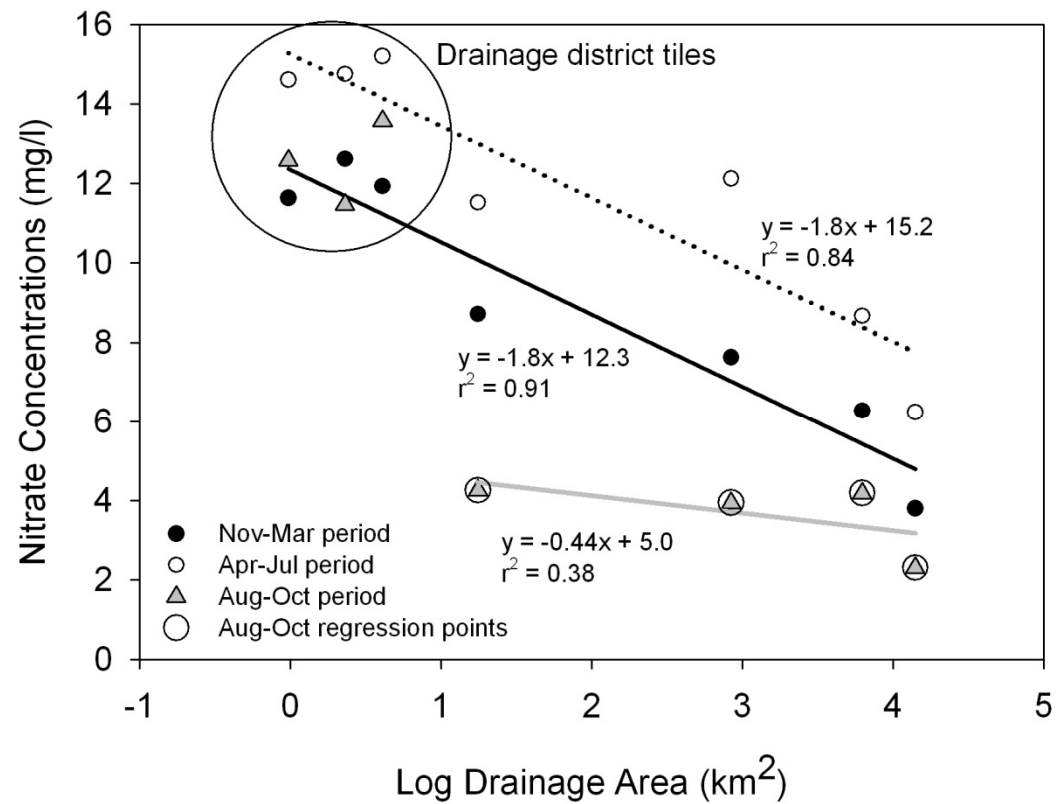


# Where should nitrate reductions be focused?



Linear relations are anchored to y-axis by drainage district tile concentrations

# Variation in Relation by Season



# Thank You

- TNC
- Iowa DNR
- Iowa Geologic and Water Survey
- Boone River Watershed Association
- Jennifer Filipiak
- Eileen Bader
- Keith Schilling
- Christopher Jones

Schilling, K.E., et al., Nitrate-nitrogen patterns in engineered catchments in the upper Mississippi River basin.  
Ecol. Eng. (2012), doi:10.1016/j.ecoleng.2012.01.026



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