

# Bazile Groundwater Management Area Plan



**Laura Johnson**

**NARD Fall Conference**

**September 25th, 2018**

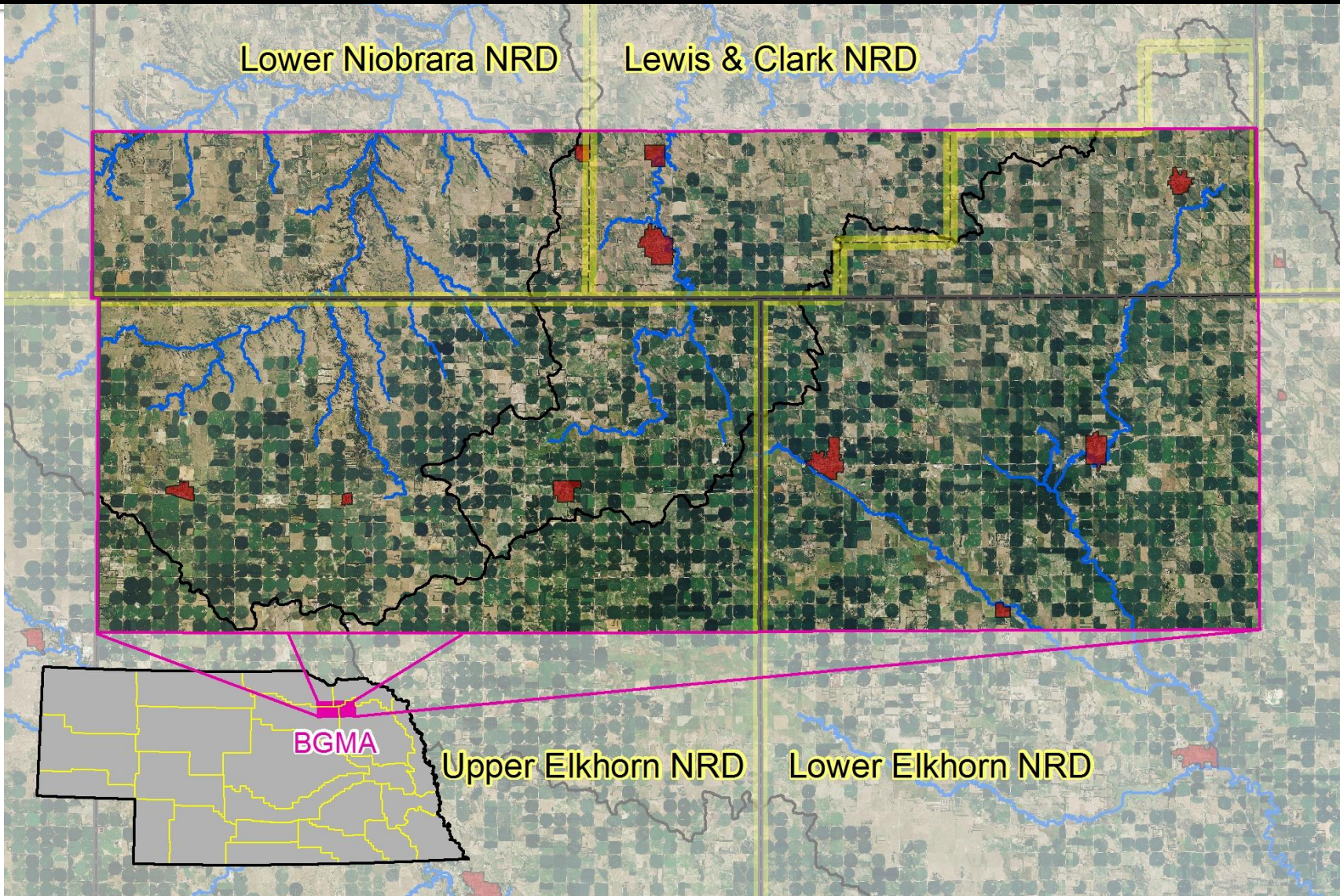
# Why is this Plan Important?

## Clean Water Act 1972

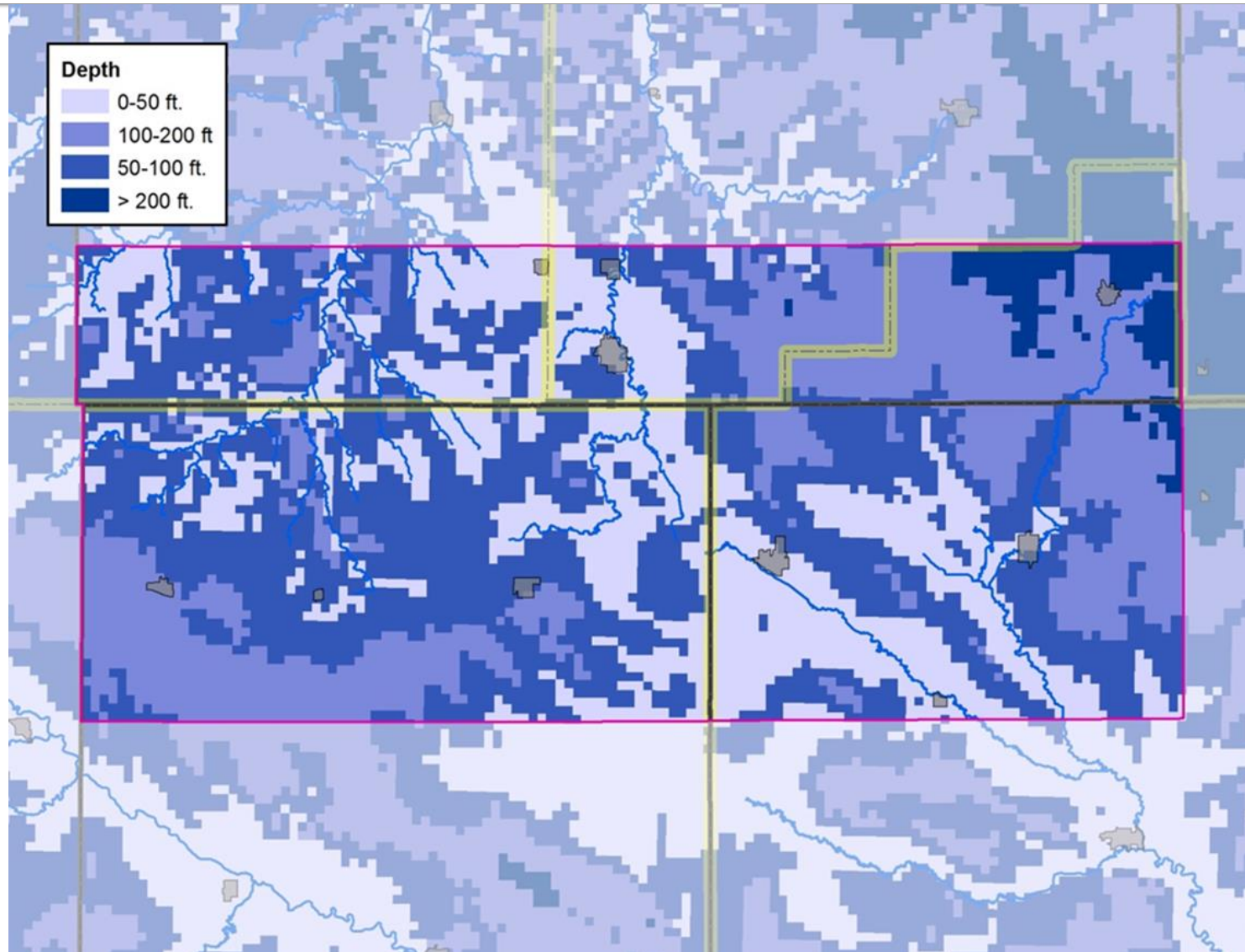
- **Surface water focused**
  - Regulate Point Sources
  - **Incentivize Non-Point (CWA Section 319 funds)**
- **Groundwater is now**
  - Eligible for 50% of NDEQ's 319 grant funds/year (\$1.25 million)
  - **NPS public health risk!**



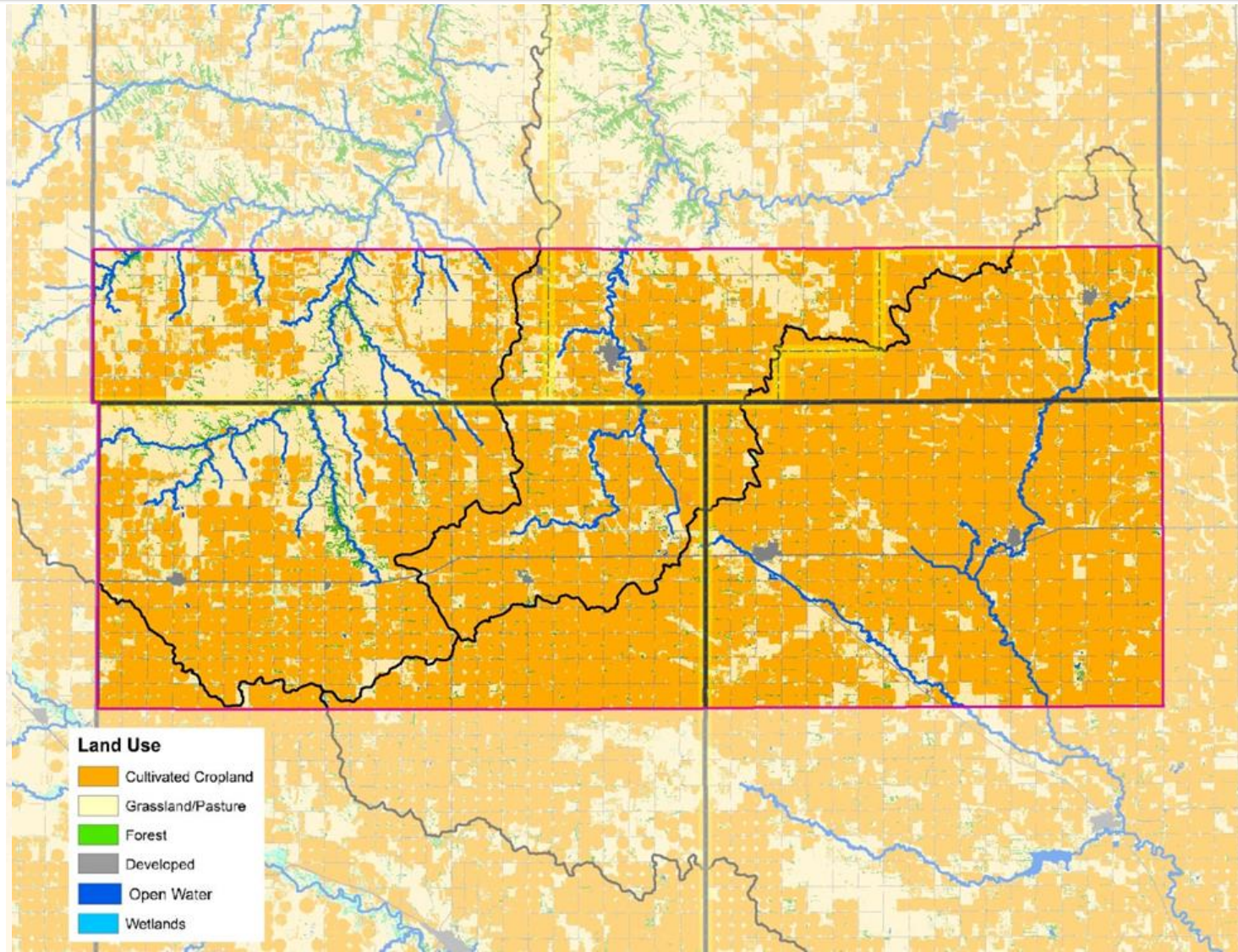
# BGMA Location



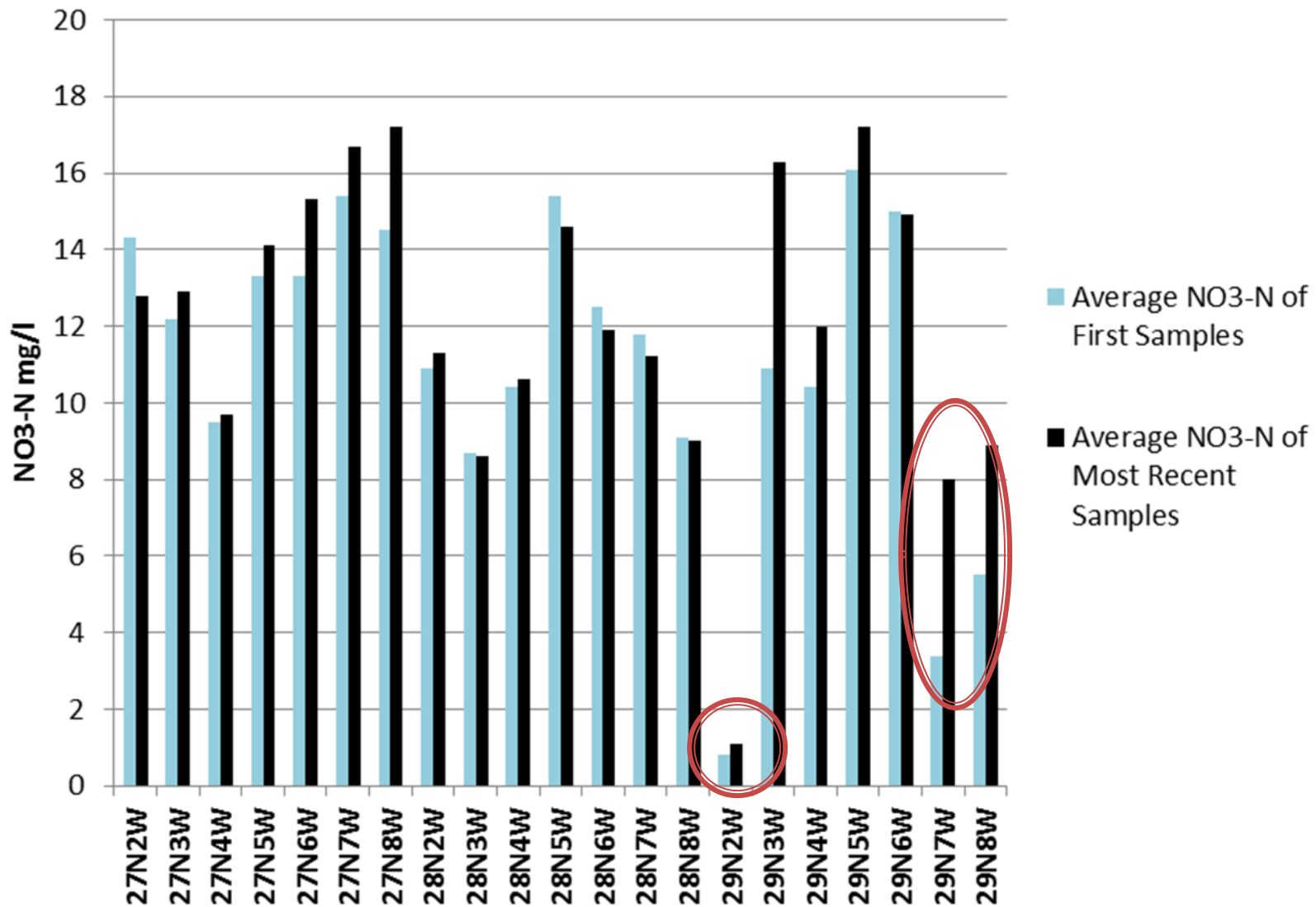
# BGMA Geology & Hydrology



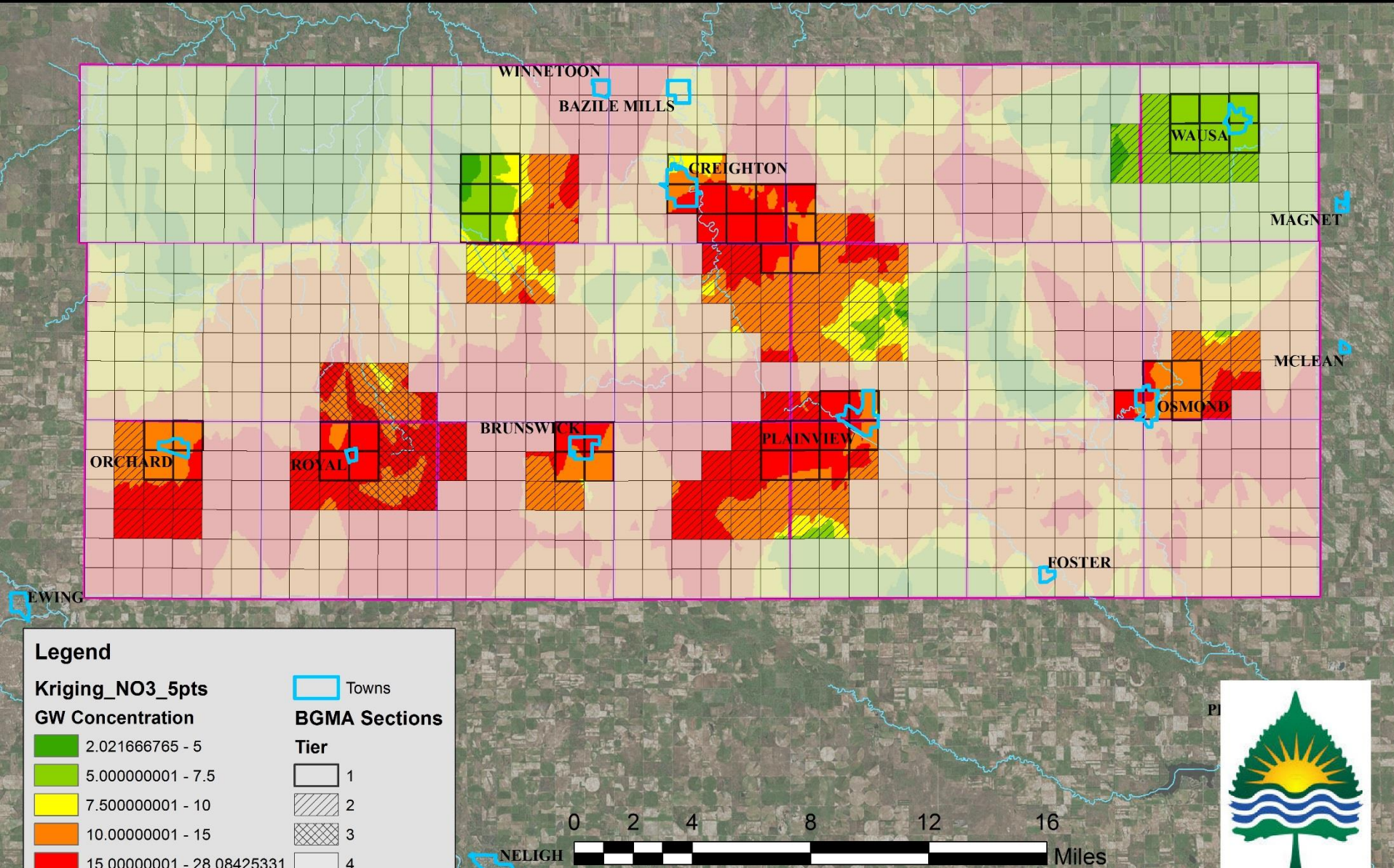
# BGMA Land and Water Use



# Nitrate Contamination Over Time

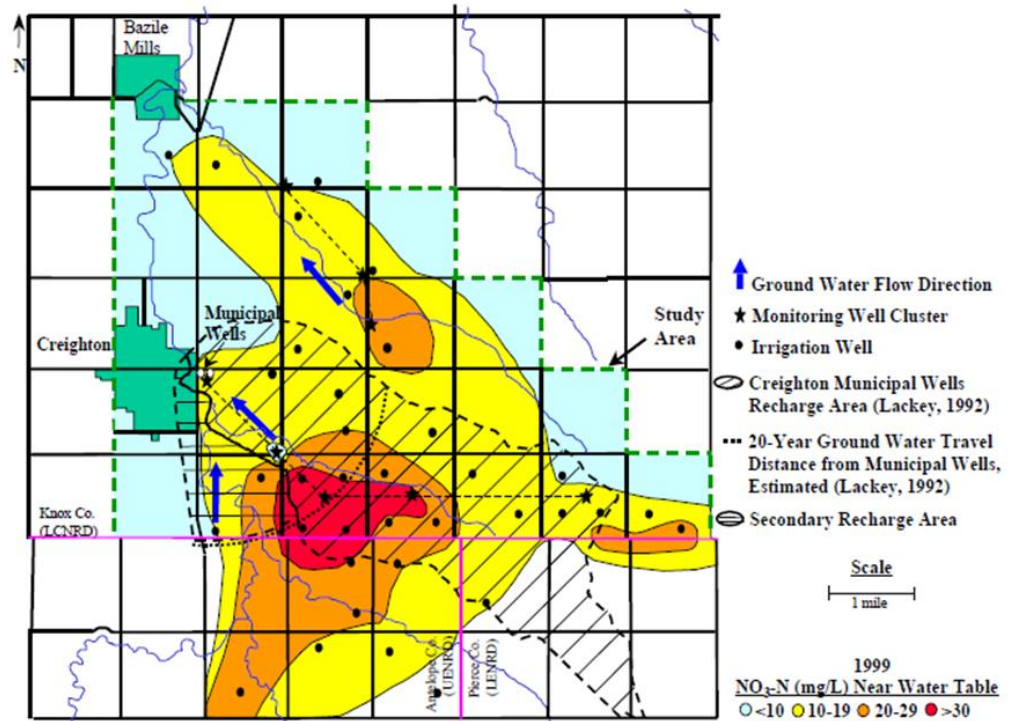
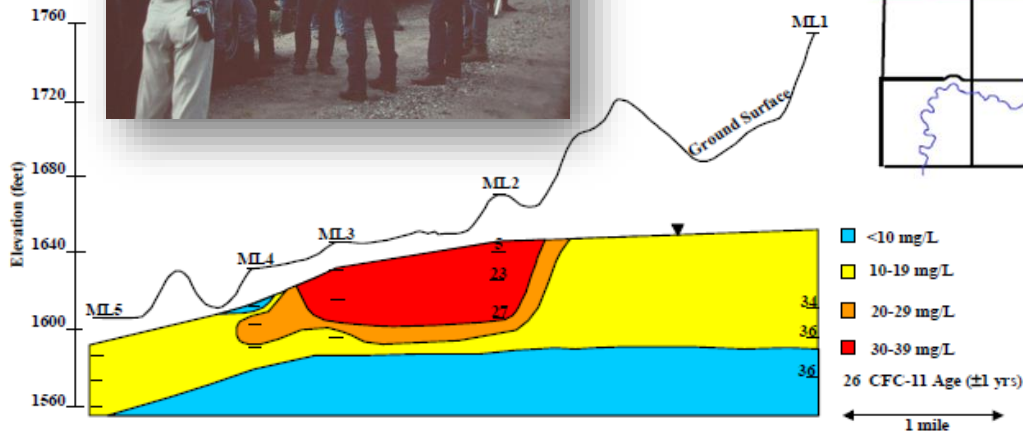


# Groundwater Nitrate Contamination



# History – Area Studies

## 1990 – Bazile Triangle Groundwater Study



## 2000 – Evaluation and Assessment of Ag Contaminants in Creighton, NE

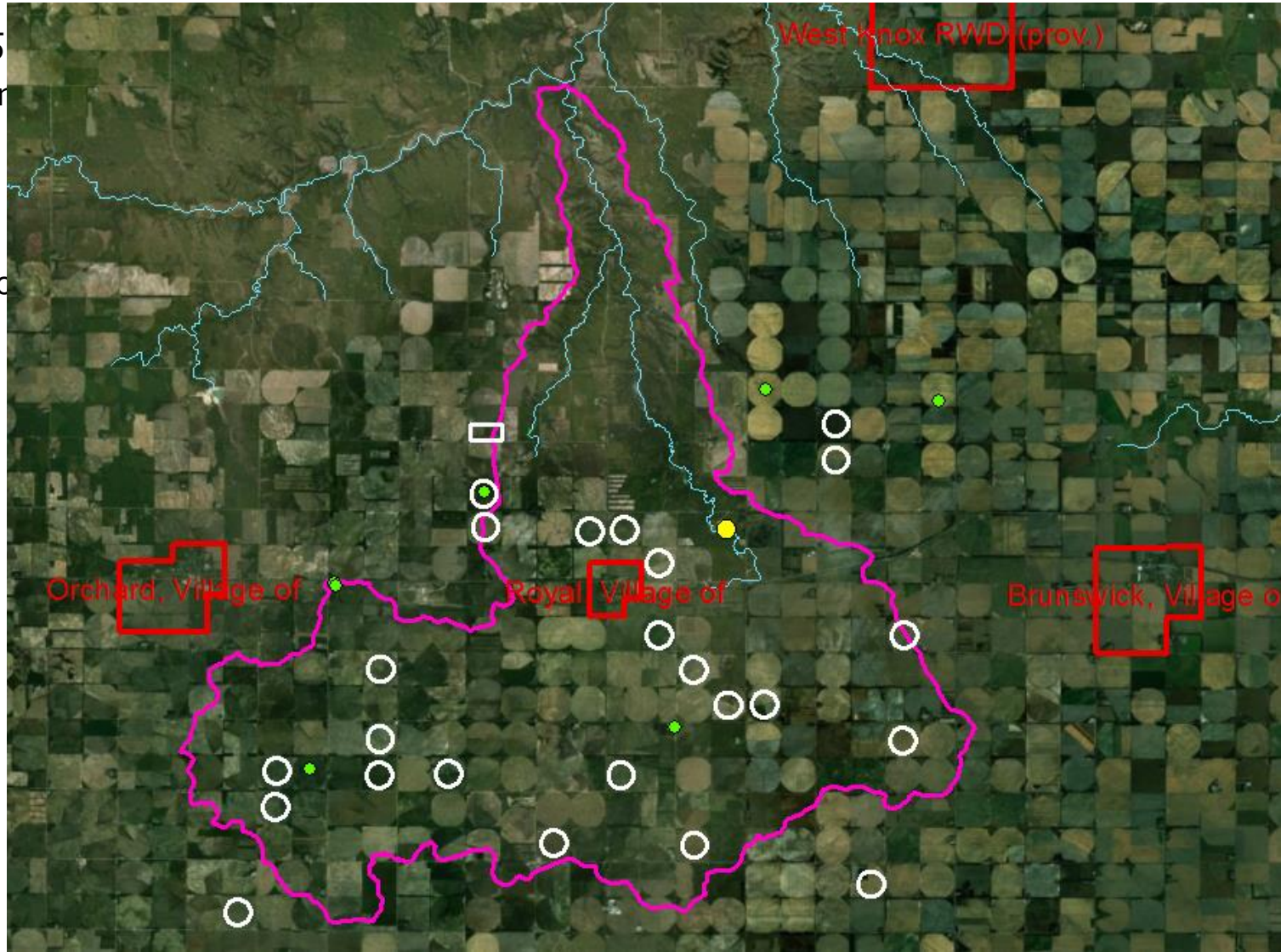


# History – EBVC Project

■ 2005

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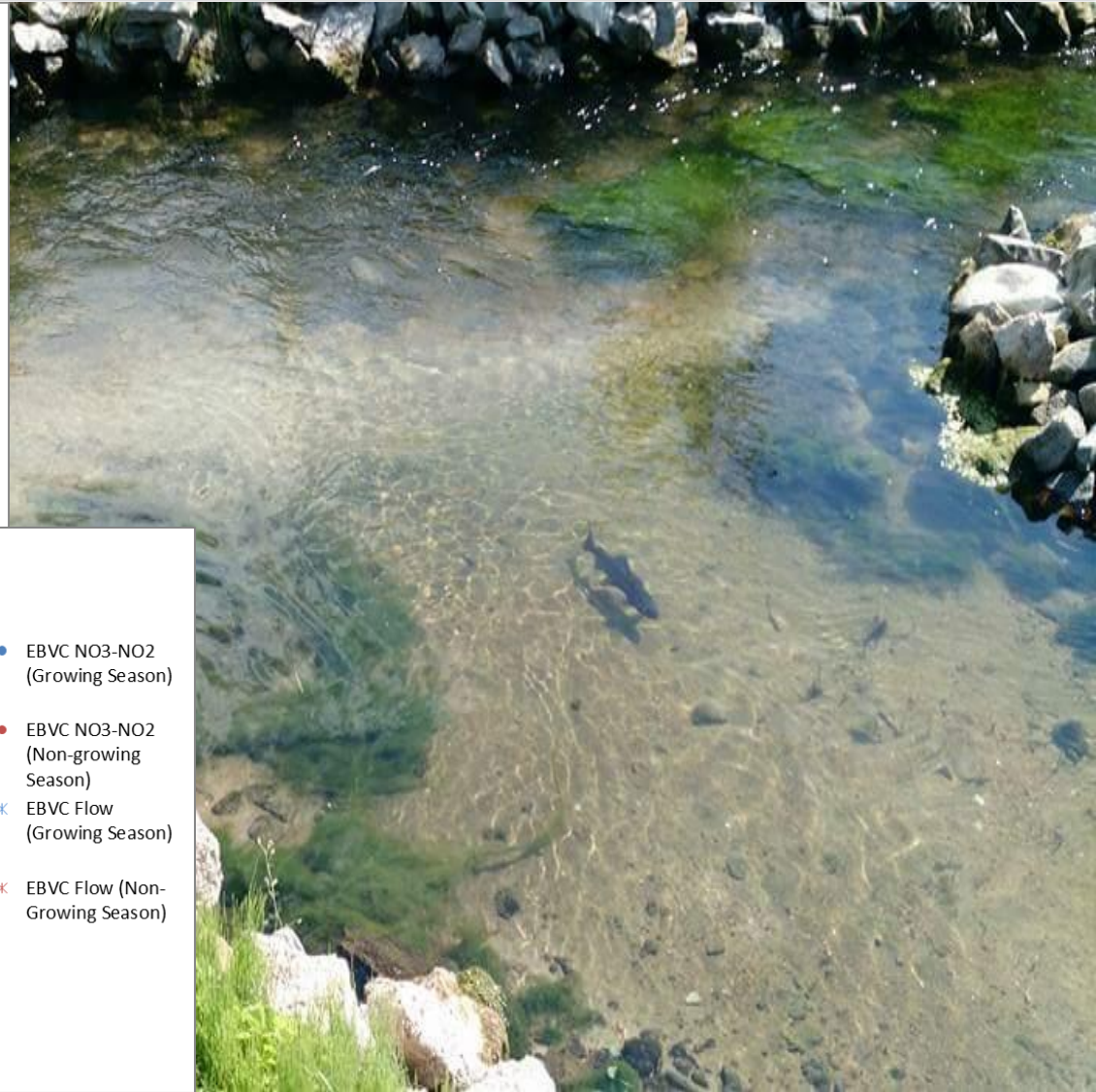
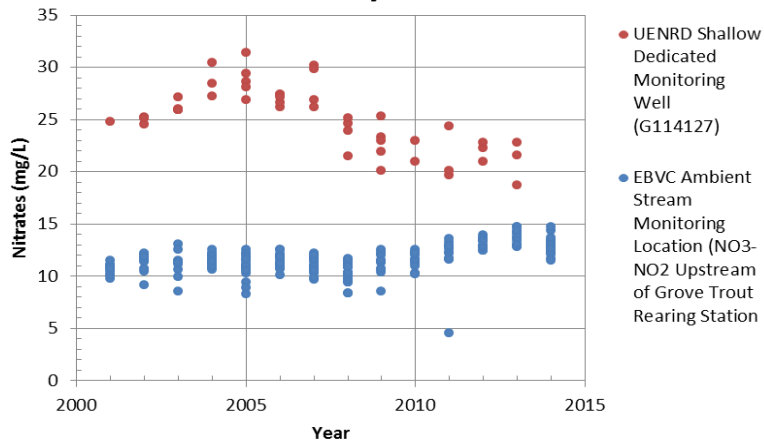
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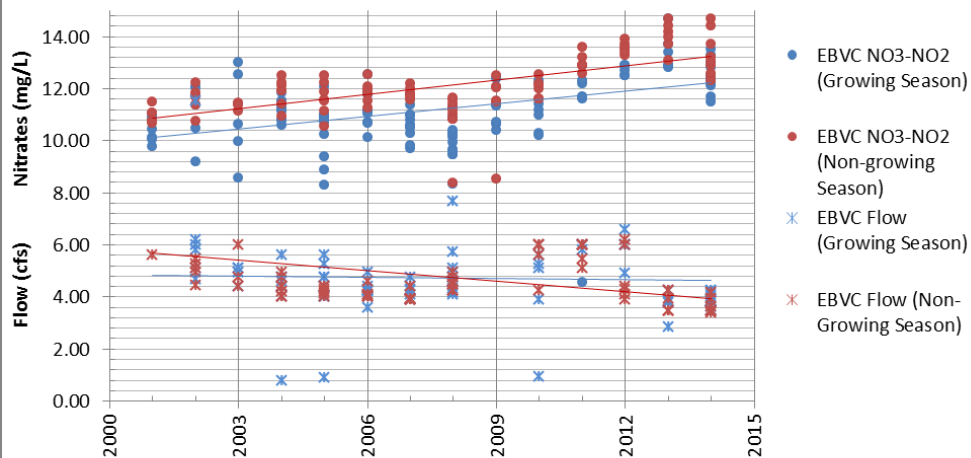
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# History - EBVC Project cont...

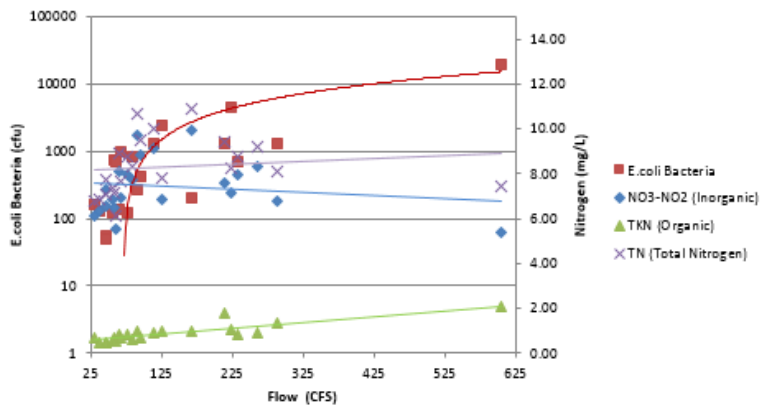
## EBVC Groundwater and Surface Water Quality Data



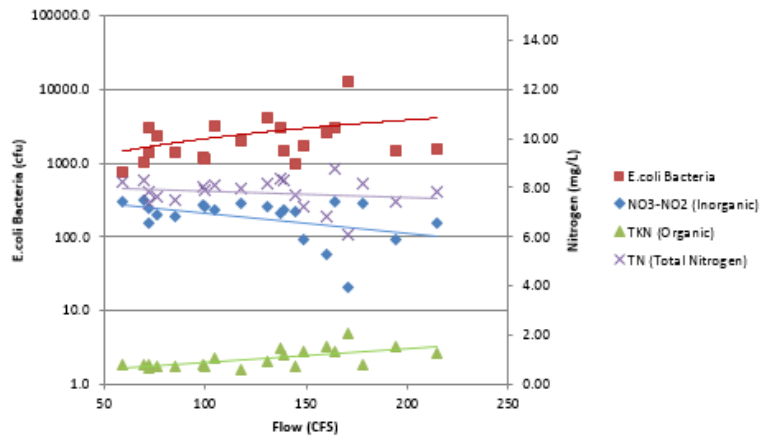
## EBVC upstream of Grove Lake



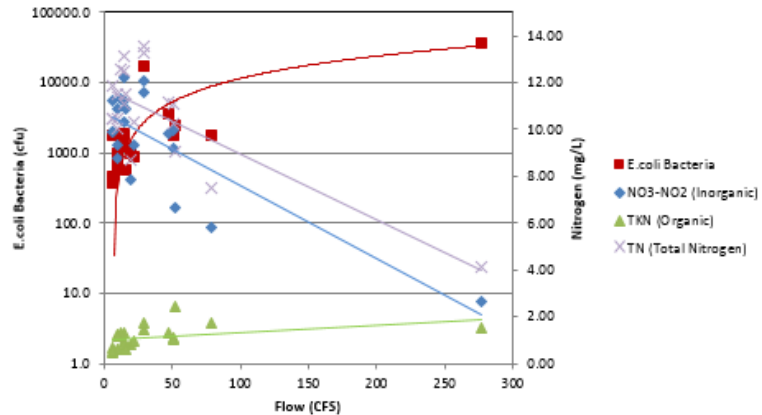
2016 Bazile Creek Water Quality Trends (MT2-12400)



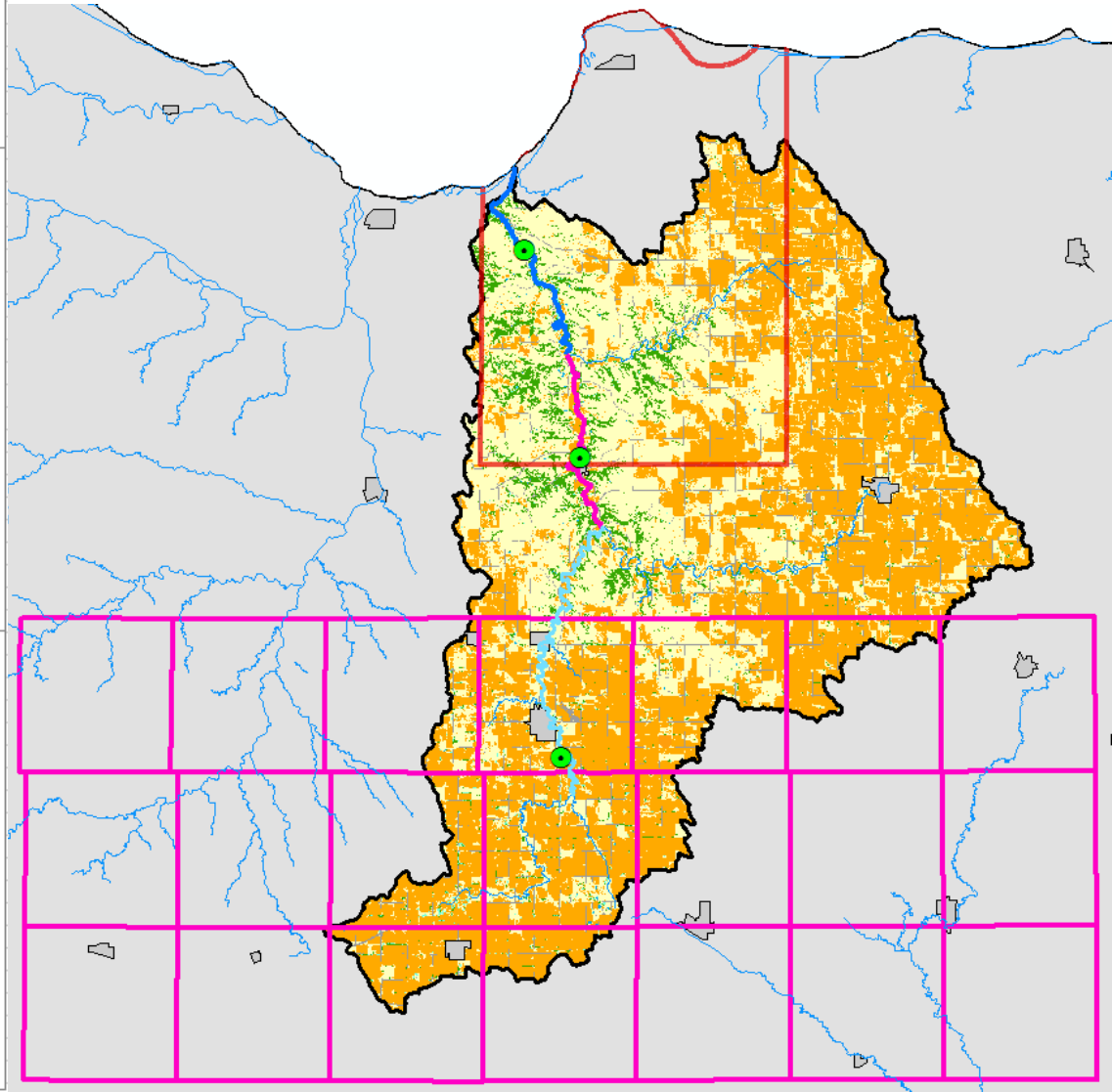
2010 Bazile Creek Water Quality Trends (MT2-12500)



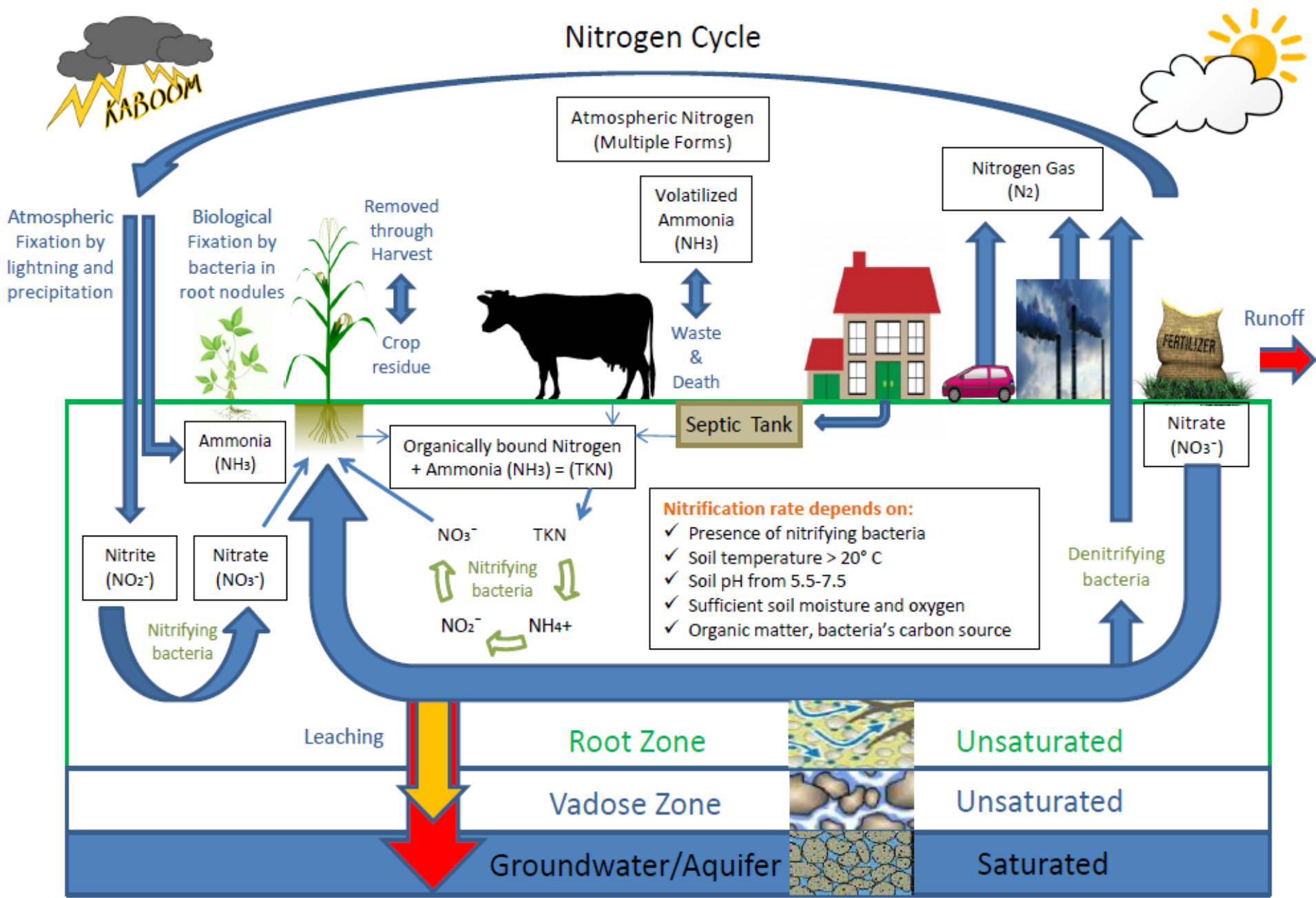
2016 Bazile Creek Water Quality Trends (MT2-12600)



# Bazile Creek Surface Water Quality



# Nitrogen Cycle

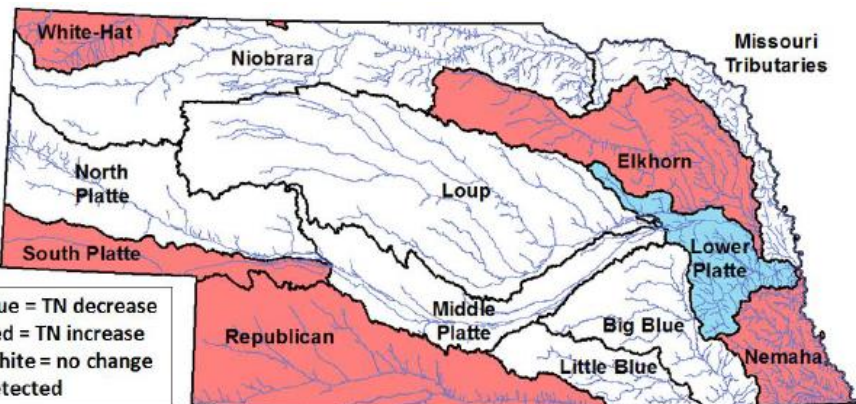
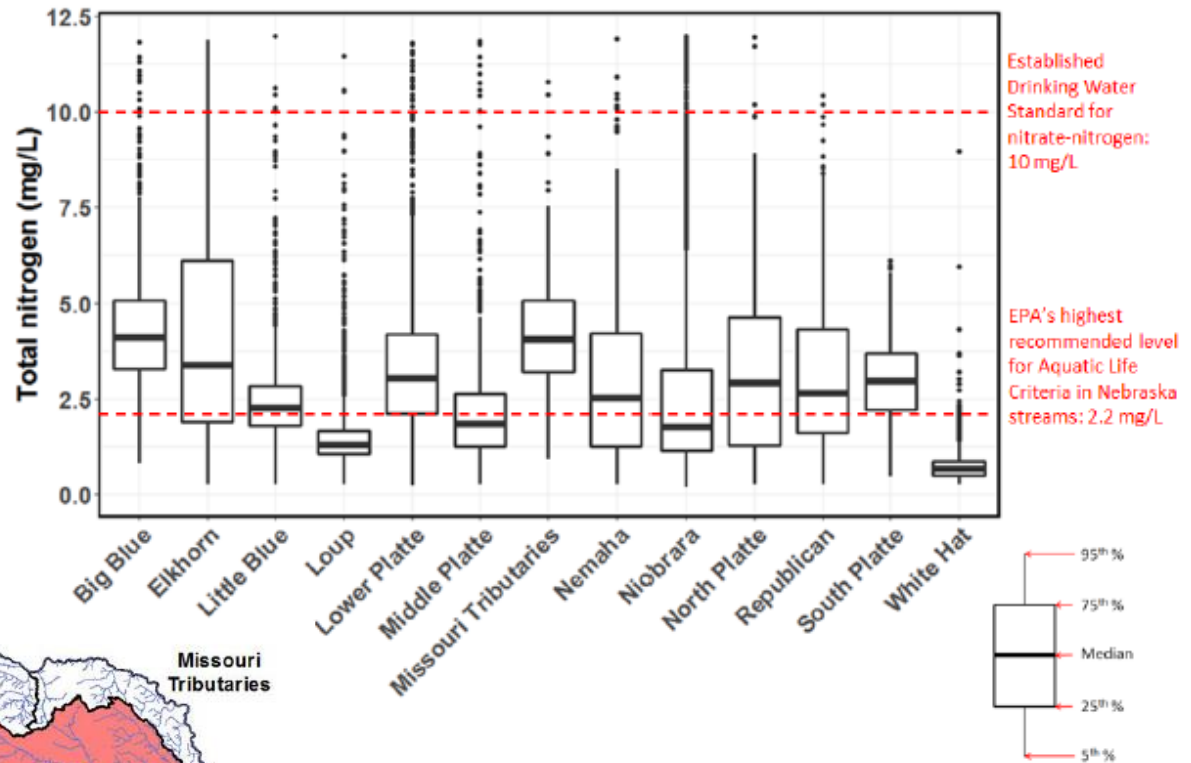


# Nitrate in Drinking Water Treatment Cost

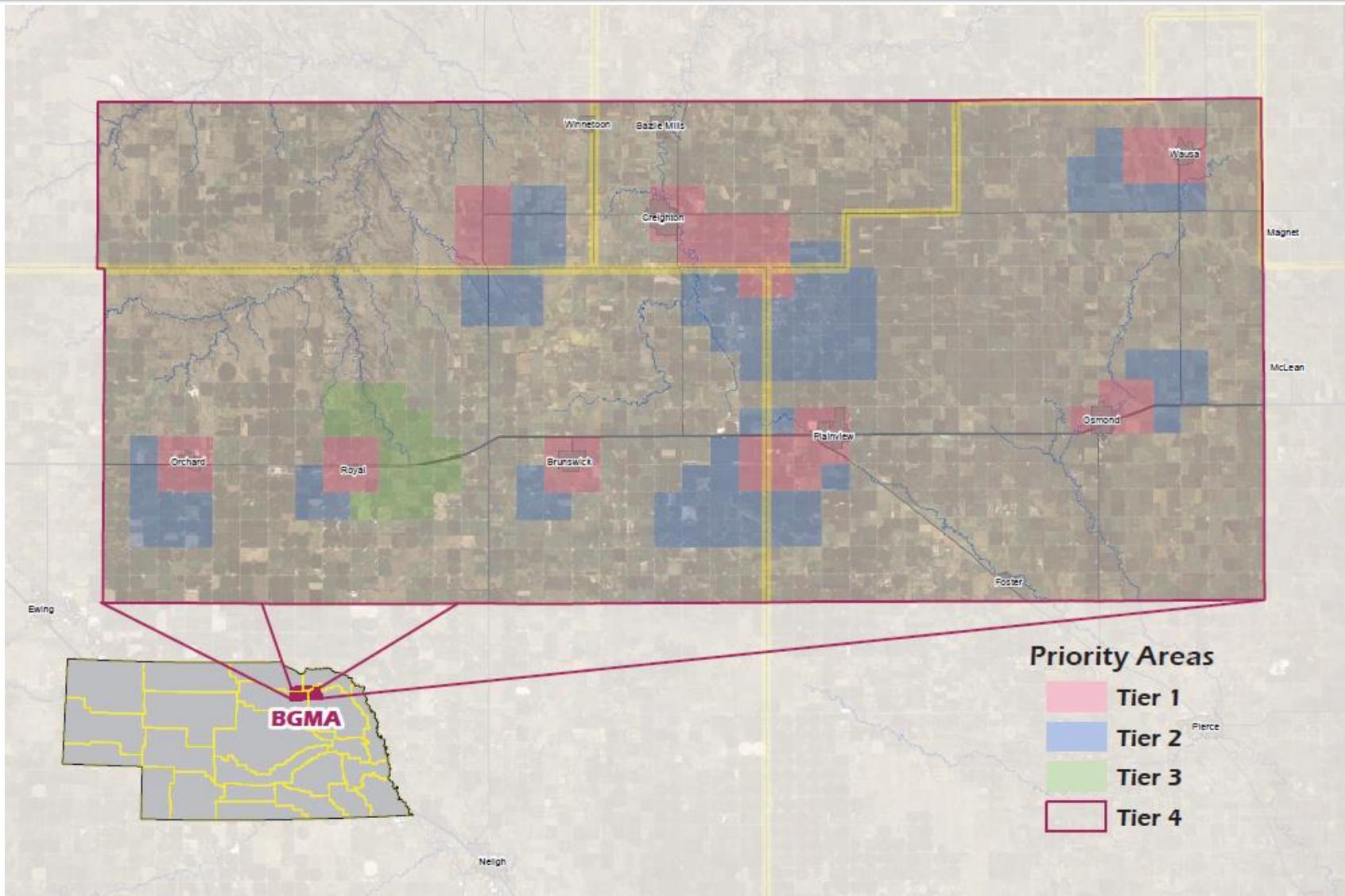
Municipalities	Population	AO	Treatment	Cost to Society
Creighton	1250	AO - 2017	Original RO Plant (excludes engineering and equipment)	1993 USDA Loan \$606,507
" "			RO Plant rehab	Current SRF Loan \$1,173,790
" "			O&M including annual depreciation over 20 years	Estimated Cost \$3,492,820
Brunswick	179	AO - 2015	Replace wells, mains, and meters	SRF 2014 Request \$ 594,839
Orchard	391	AO	Place "Bad well" (9.83 ppm) on emergency use	
Osmond	796	AO - 2013 & 2017	Replace wells, mains, tower, and meters	SRF 2014 Request \$1,682,309
Plainview	1157		Replace wells and mains	SRF 2014 Request \$,1269,667
Domestic Wells	248		POU Treatment Systems (\$1,187.25 each )	Estimated Costs \$294,438
	Total = 4021			<b>Total Cost \$9,114,370</b>
BGMA Plan	7,159		2 –year Bazile GWMA Coordinator to carry out plan objectives and implement BMPs	<b>319, NET, &amp; NRD Funding = \$286,550</b>

# Total Nitrogen in Nebraska

2002-2014 Ambient Network Total Nitrogen Results



# BGMA Priority Areas



# BGMA Plan Goals

## SHORT TERM – 5 YEARS

- Halt the trend of increasing nitrate concentrations in Tiers 1-3

## LONG TERM – 20 YEARS

- Reduce nitrate concentrations below 10 mg/l in Tiers 1 and 2 and remove all PWS from Administrative Orders for nitrate
- GW contamination and other NPS pollution will not impair SW beneficial uses in the Tier 3 area

Priority Areas	Acres	Average NO <sub>3</sub> -N of most recent samples	Reduction % needed	Acres Needing BMPs
Tier 1	31,224	17.6	45%	14,051
Tier 2	53,112	14.2	30%	15,934
Tier 3	10,167	14.9	46%	4,677
Tier 4	389,337	12.6	21%	81,761
Total	483,840			116,422

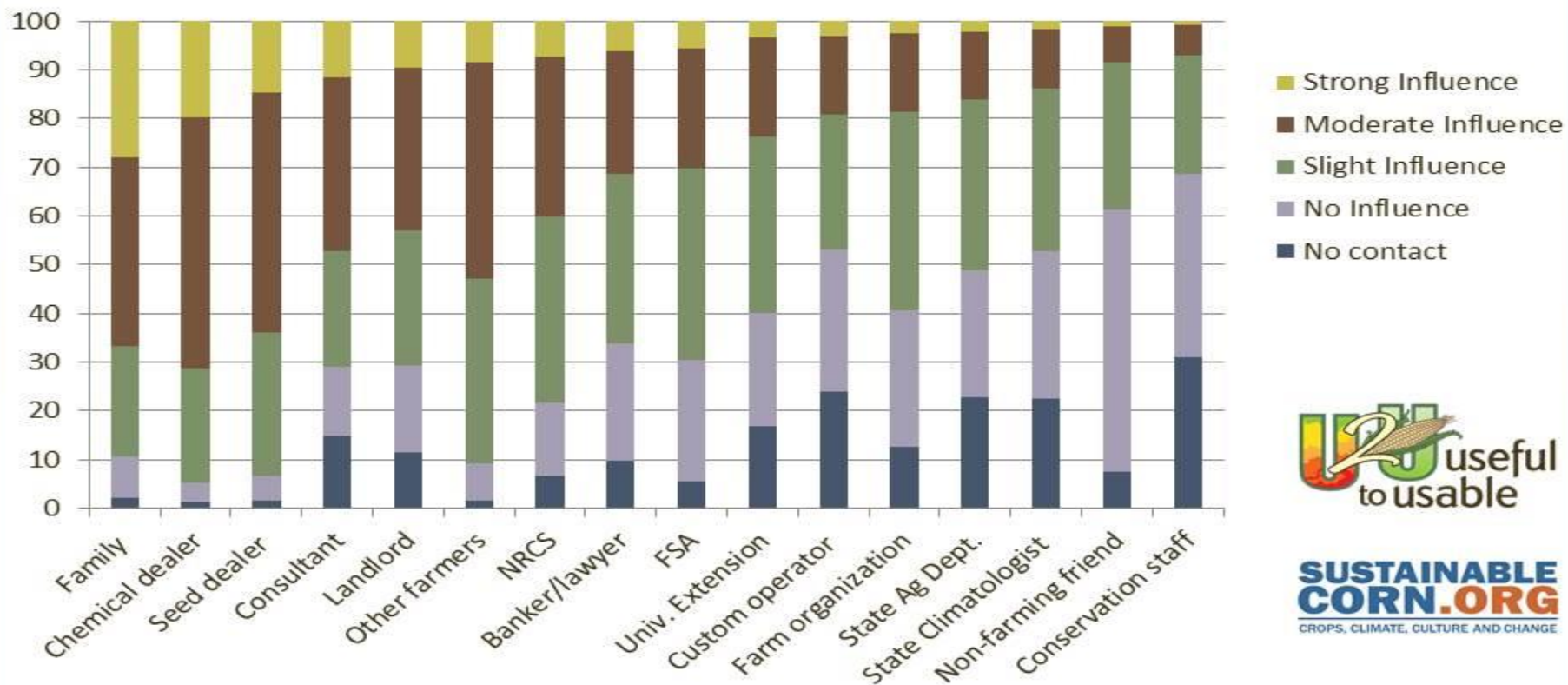


# Short Term Goal: Objectives and Tasks

- **Objective 1: Educate Public**
  - Status quo, current efforts and trends of both Quality & Quantity, WHPA plans, SW/GW interactions, available and efficient BMPs, demonstration plots, etc.
- **Objective 2: Implement BMPs**
  - BMPs from Appendix E (above and beyond GWMP requirements)
- **Objectives 3&4: Identify Needs**
  - Inadequate septic systems and create a program to assist with upgrades
  - Abandoned wells and create a program to assist with well decommissions.



# The Best Messenger



# Plan Implementation

- BGMA has the right messenger (Phil Steinkamp)
- As part of the State-Wide Nitrogen Campaign the Bazile group completed Risk Communication training
- NRDs secured a \$300,000 319 grant for plan implementation and will spend all \$500,000 in NWQI funds available for 2018!



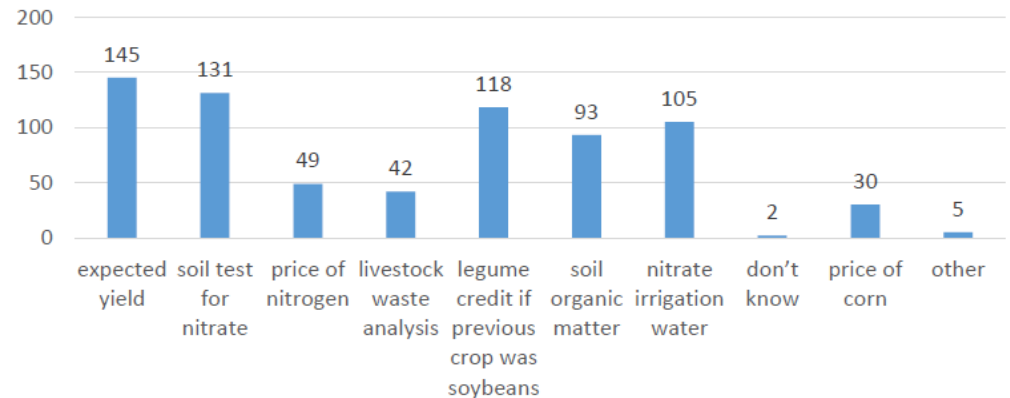
# Barriers to Implementation

## SURVEY GOALS

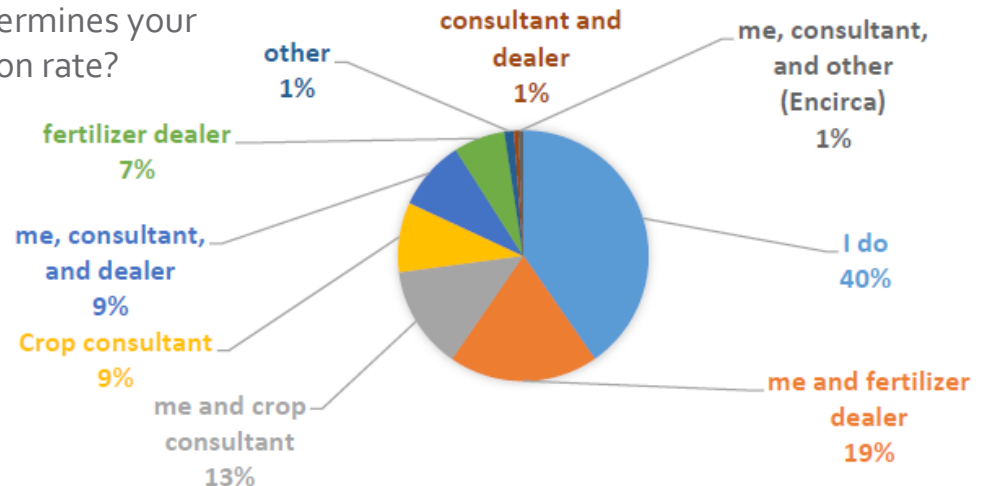
- Understand the current knowledge level of the nitrate pollution issue
- Identify BMPs currently on the landscape
- Figure out what BMPs people are interested in and why
- Understand what limits people from trying new BMPs
- 271 people, 33% responded

## SURVEY RESULTS

What factors determine nitrogen application?



Who determines your application rate?



# UNL Partnership



## Nitrate Issue Team

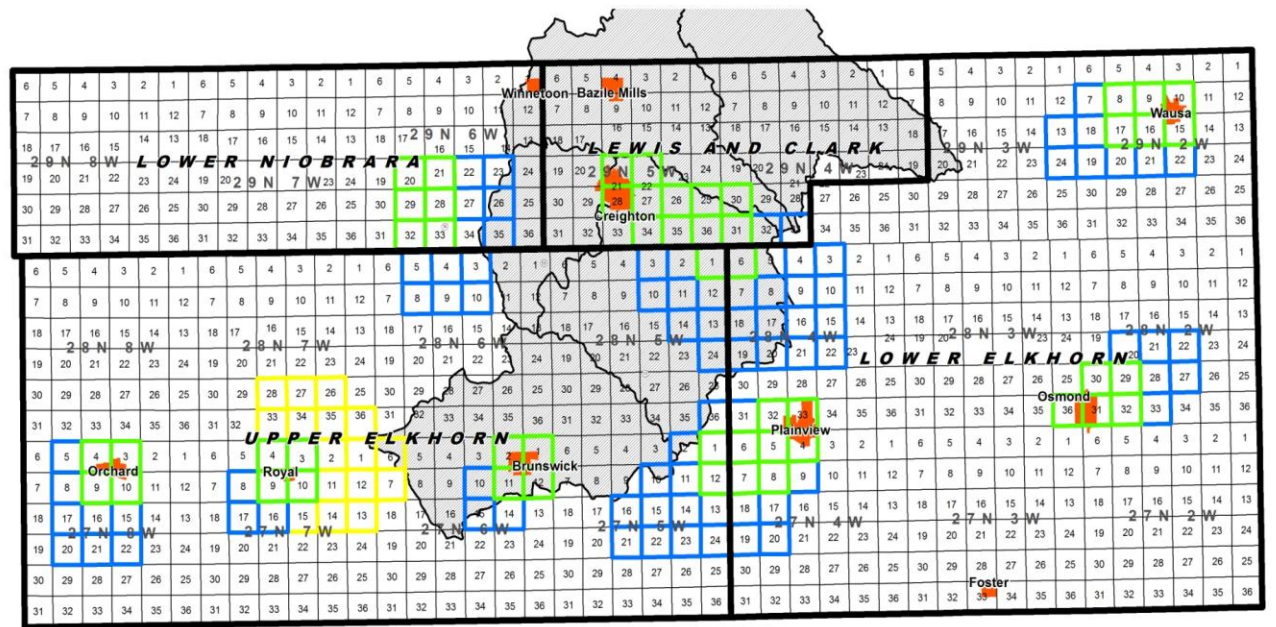
# USDA's NRCS Partnership



## National Water Quality Initiative

- Adding an area Extension Educator position
- Develop On-line Nitrate Training module
- Facilitating Crop Consultant discussions
- Summarize:
  - Nitrogen application studies on UNL's recommended rates
  - UNL Extension resources on BMPs that reduce nitrate contamination
  - Data pertinent to the Central Platte NRD's reduction in nitrate levels

### Bazile Groundwater Management Area

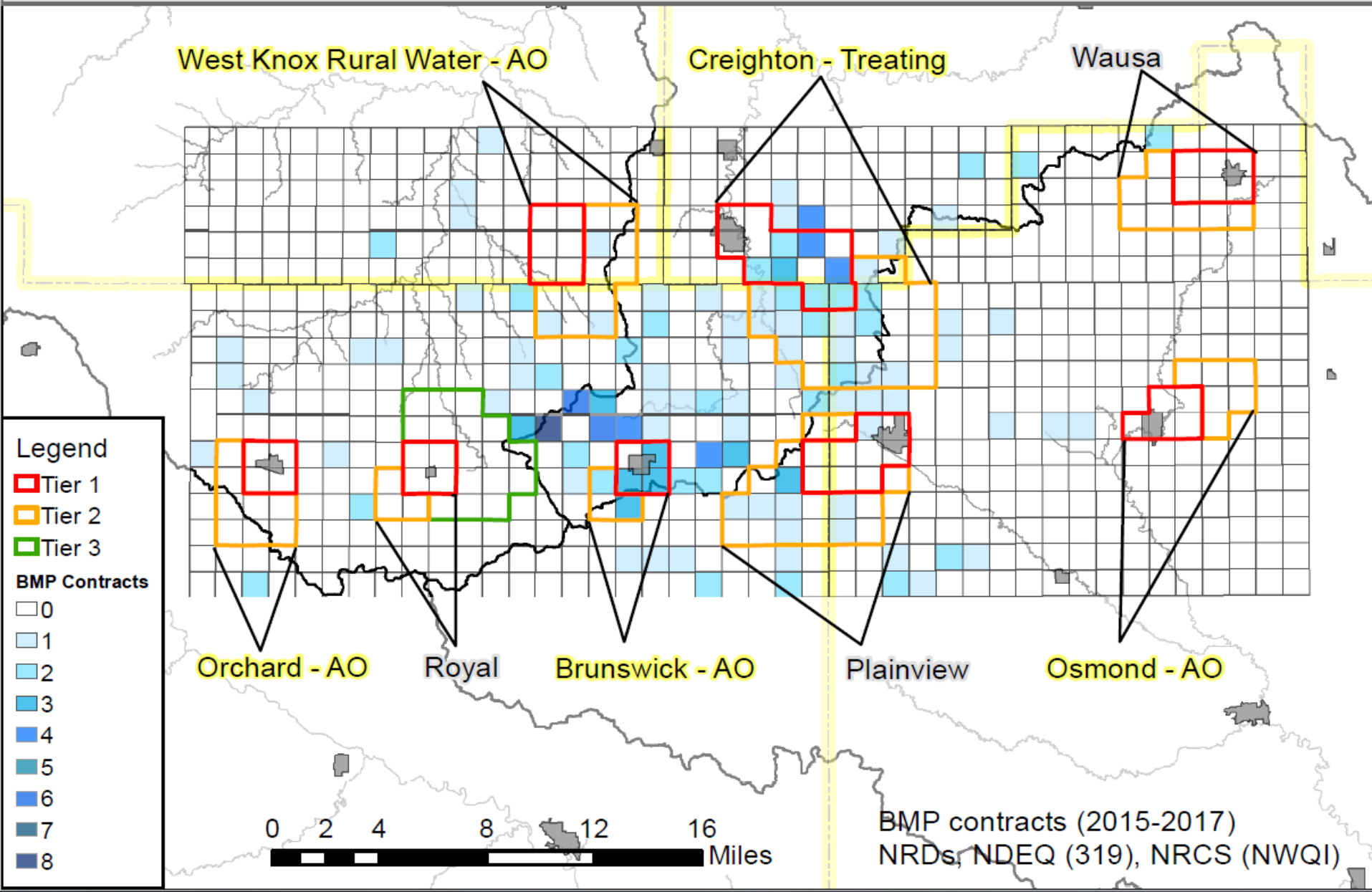


#### Legend

- Tier1 Costshare Available (20 year time of travel)
- Tier2 Costshare Available (50 year time of travel)
- Tier3 (East Branch Verdigre Creek)
- NRCS National Water Quality Initiative

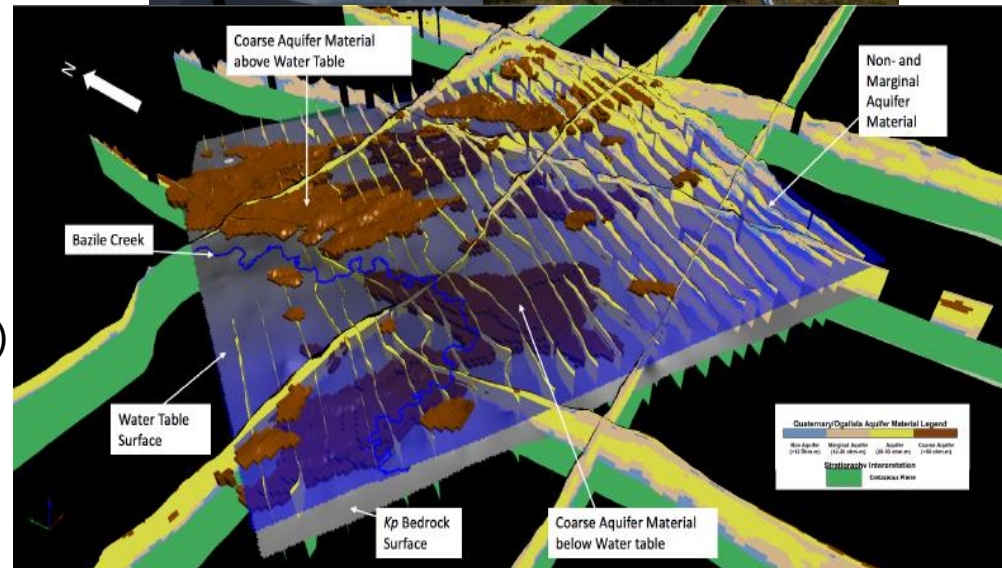


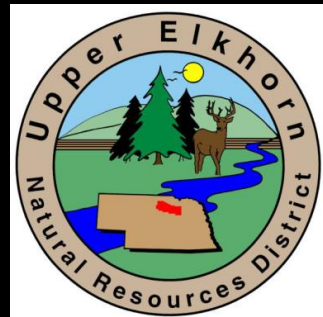
# BGMA Priority Areas and Current BMPs



# Filling in data gaps

- Installed a weather station to provide real time ET data (2016)
- NRDs conducted an airborne electromagnetic geophysical survey (completed in 2017)
- Dan Snow's Isotope and Recharge study (completed in 2018), will be gathering Tiers 1&2 vadose zone baselines (2018-19)
- Dave Miesbach and Sue Lackey ID screened intervals of baseline wells (2018-2019)
- Troy Gilmore's Transit time and Nitrate delivery to Bazile Creek survey. (2018-19)
- Dave Miesbach and DHHS working on well rehab demos (In discussions about funding)





# Questions?

