



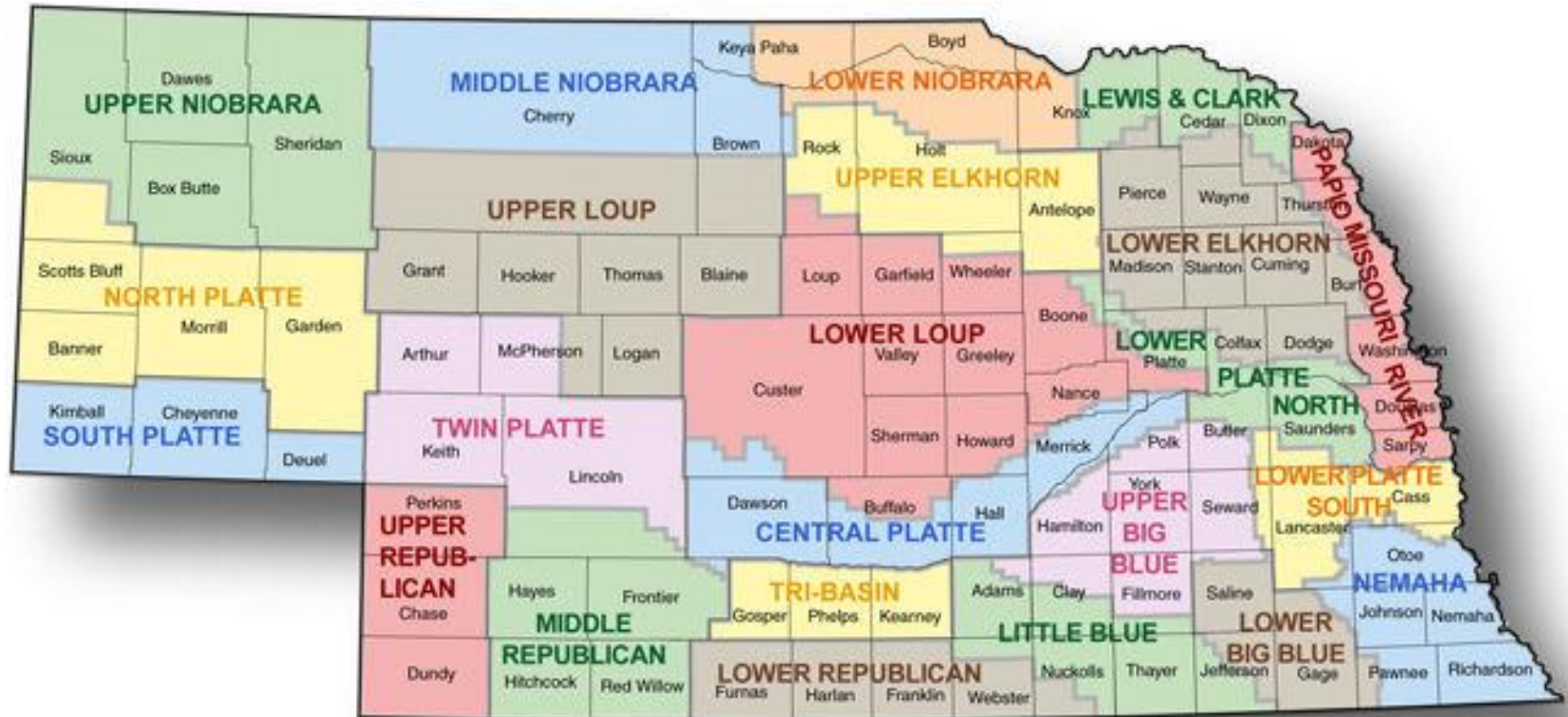
Bazile Groundwater Management Area Plan

Terry Julesgard

General Manager
Lower Niobrara NRD

NACD Annual Meeting
February 5, 2019

Nebraska's NRDs



Responsibilities of the NRDs

- Groundwater for Beneficial Use
 - Quality and Quantity
 - Rural/Regional Public Water Supplies
- Soil – mediate solutions under the Erosion and Sediment Control Act
- Trees & Wildlife Habitat
- Flood Control
- Urban Conservation
- Recreation
- Grazing Land
- Education

NRD Structure

- Locally Elected Board of Directors
- Funded by Local Property Taxes and
- Partnerships with many Agencies
- 23 local offices across the State

Why is the Bazile Groundwater Management Plan Important?

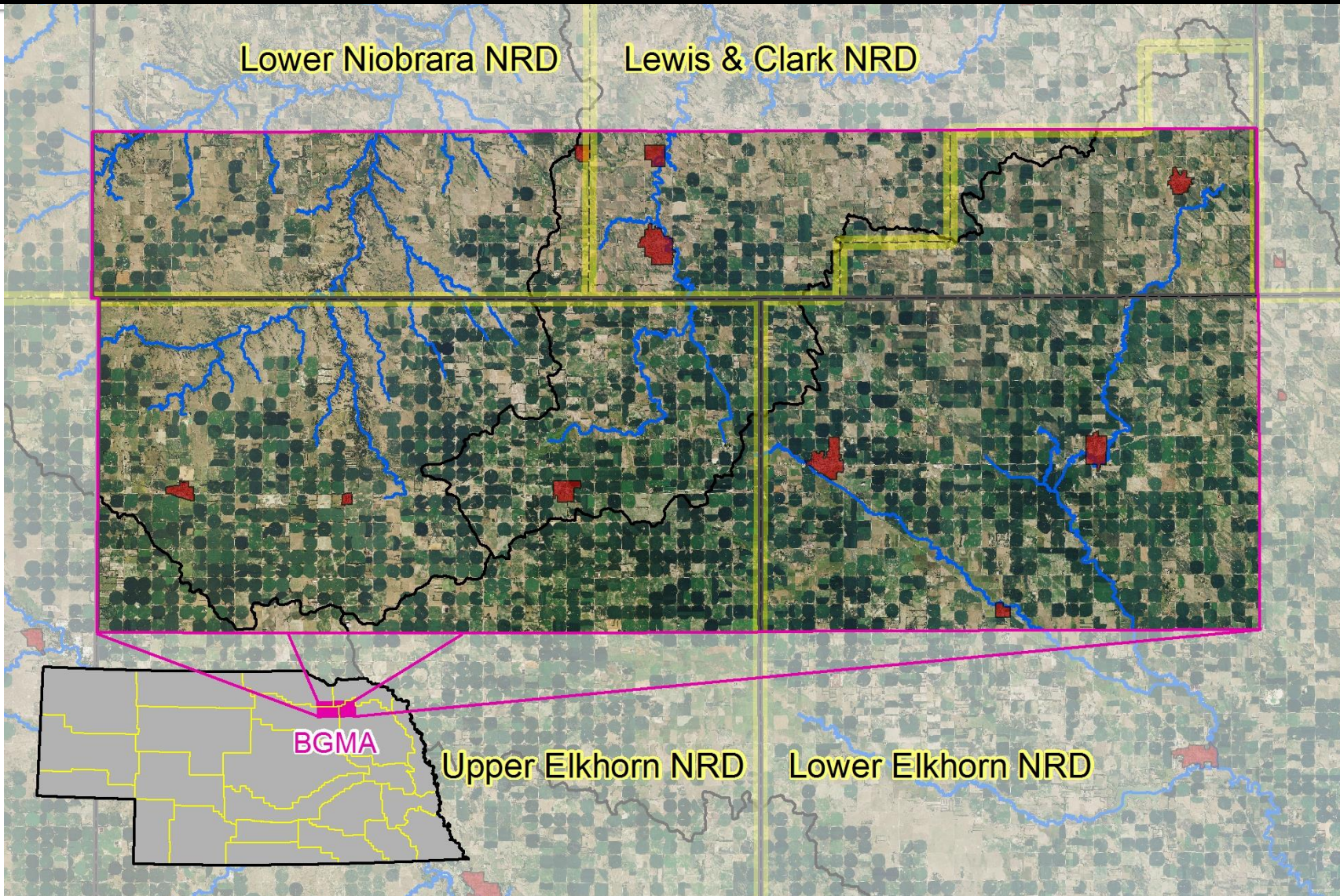
Clean Water Act 1972

- **Surface water focused**
 - Regulate Point Sources
 - In NE this was mainly large CAFOs
 - Nebraska Department of Environmental Quality (NDEQ) main issue addressed are stream quality recreation areas (bacteria)
 - Incentivize Non-Point Source (CWA Section 319 funds)
 - Because Public Water Supplies in NE are mostly groundwater sources, NDEQ did could do little to help assist with Groundwater quality issue—this was left to the State

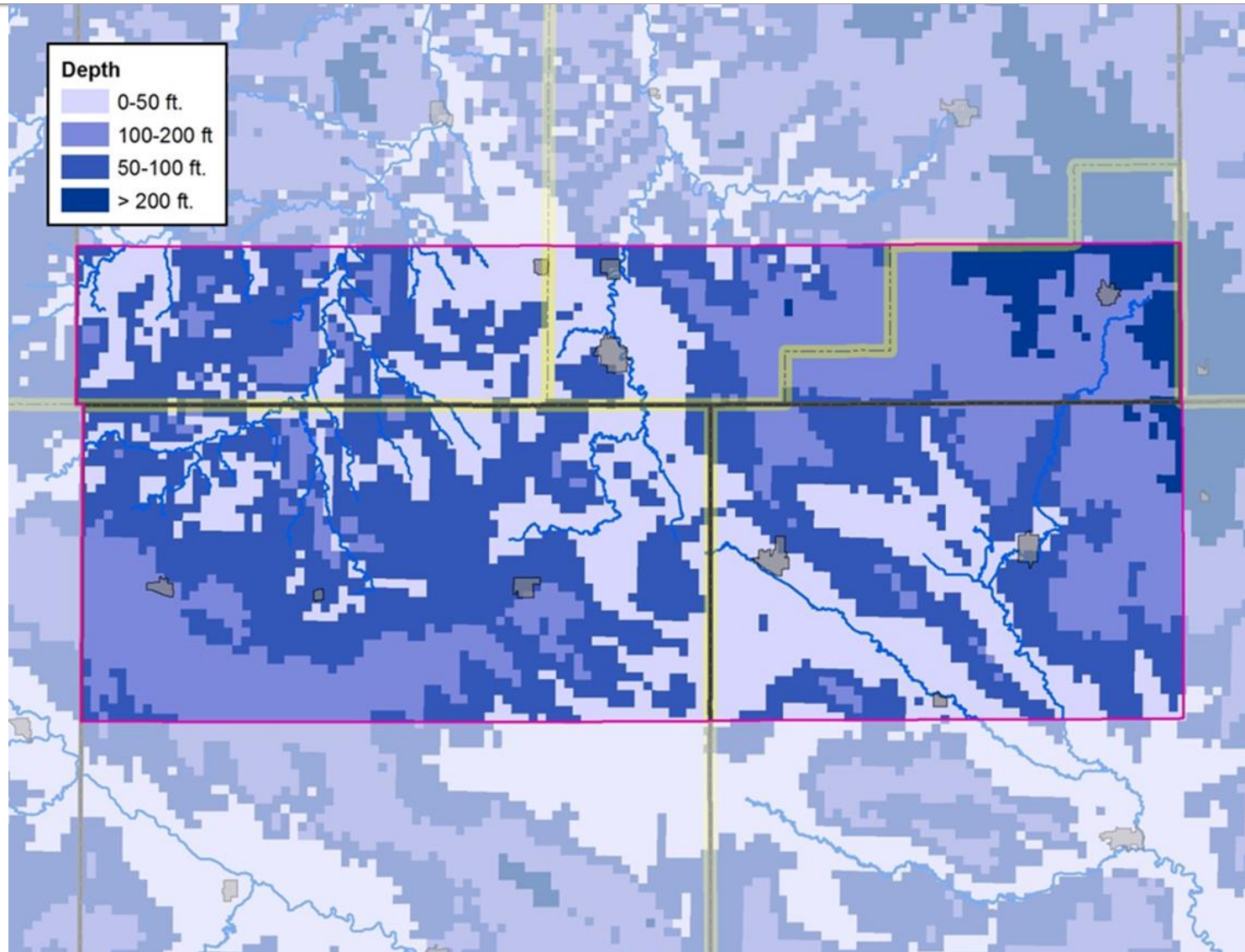
Why is the Bazile Groundwater Management Plan Important?

- The NRDs in Northeast NE were looking for assistance with the nitrate issues in the Bazile Area to assist the public water supplier
- 4 NRDs (Lewis & Clark, Upper Elkhorn, Lower Elkhorn, Lower Niobrara) partnered with NDEQ to develop a Plan to find a way to focus funds to this issue
- After many meetings and draft plans
- The result was the Bazile Groundwater Management Area Plan
- Through this plan as of 2013 Groundwater is eligible for 50% of NDEQ's 319 grant funds/year (\$1.25 million)
- **To address Non Point Source public health risk!**

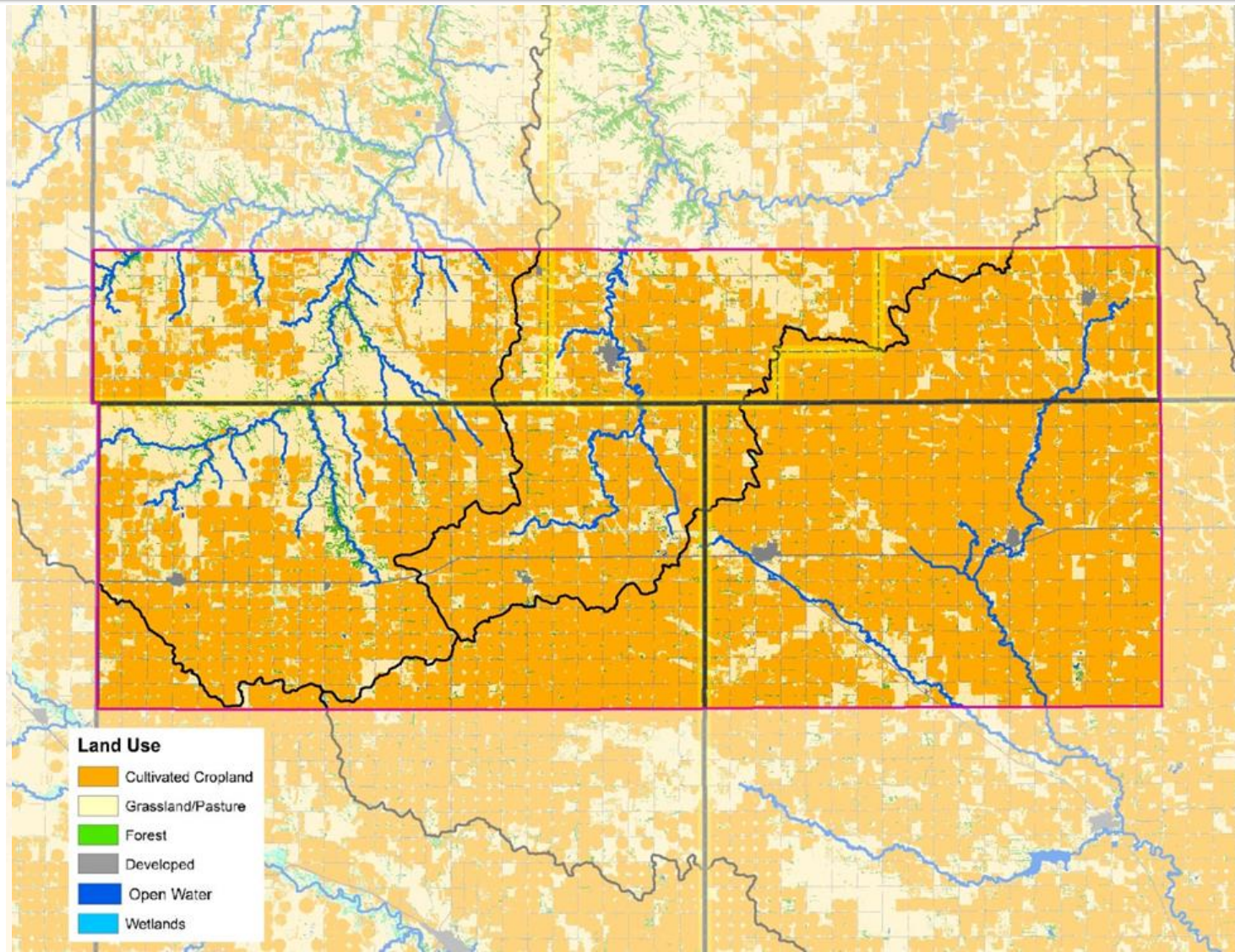
BGMA Location



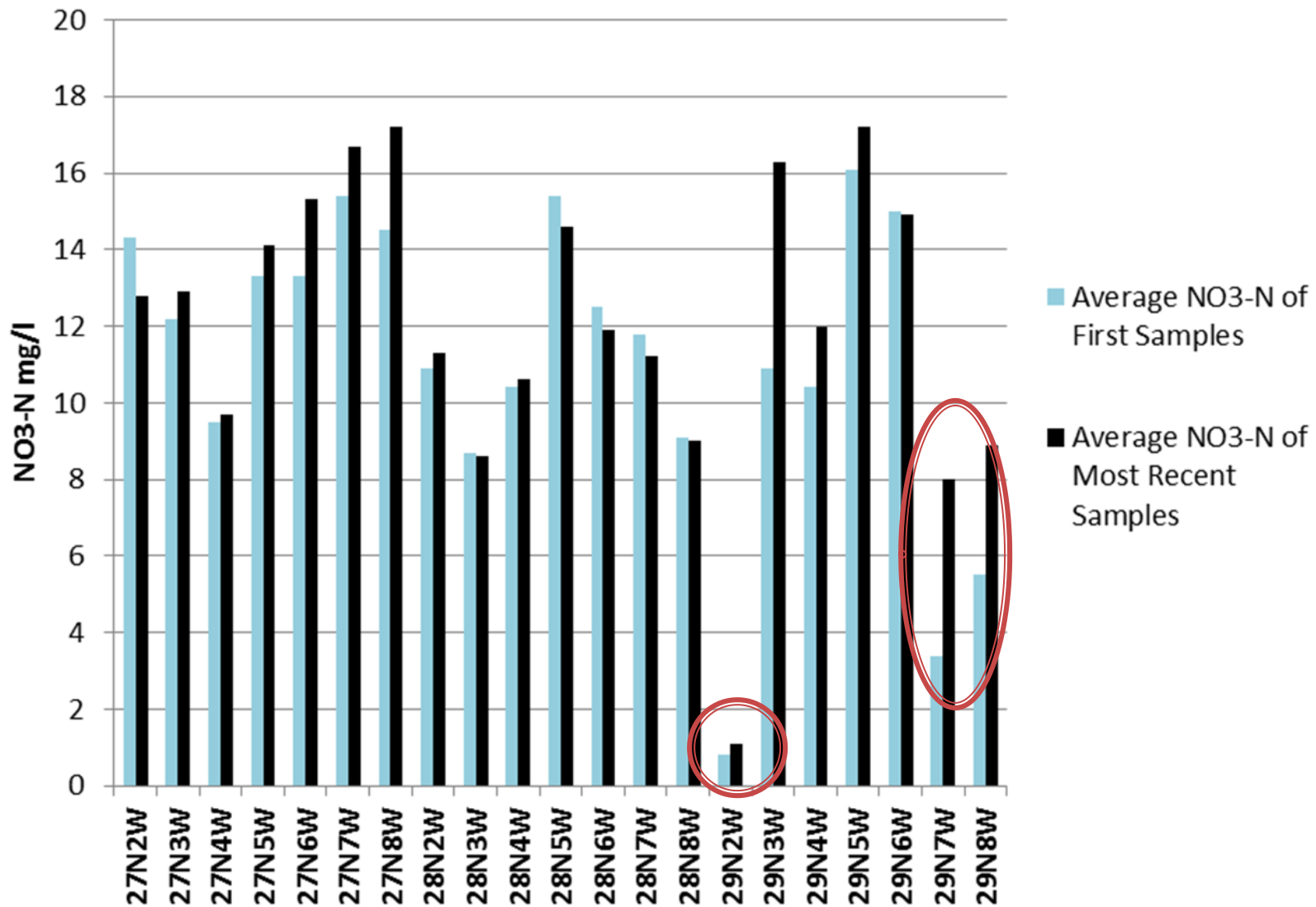
BGMA Geology & Hydrology



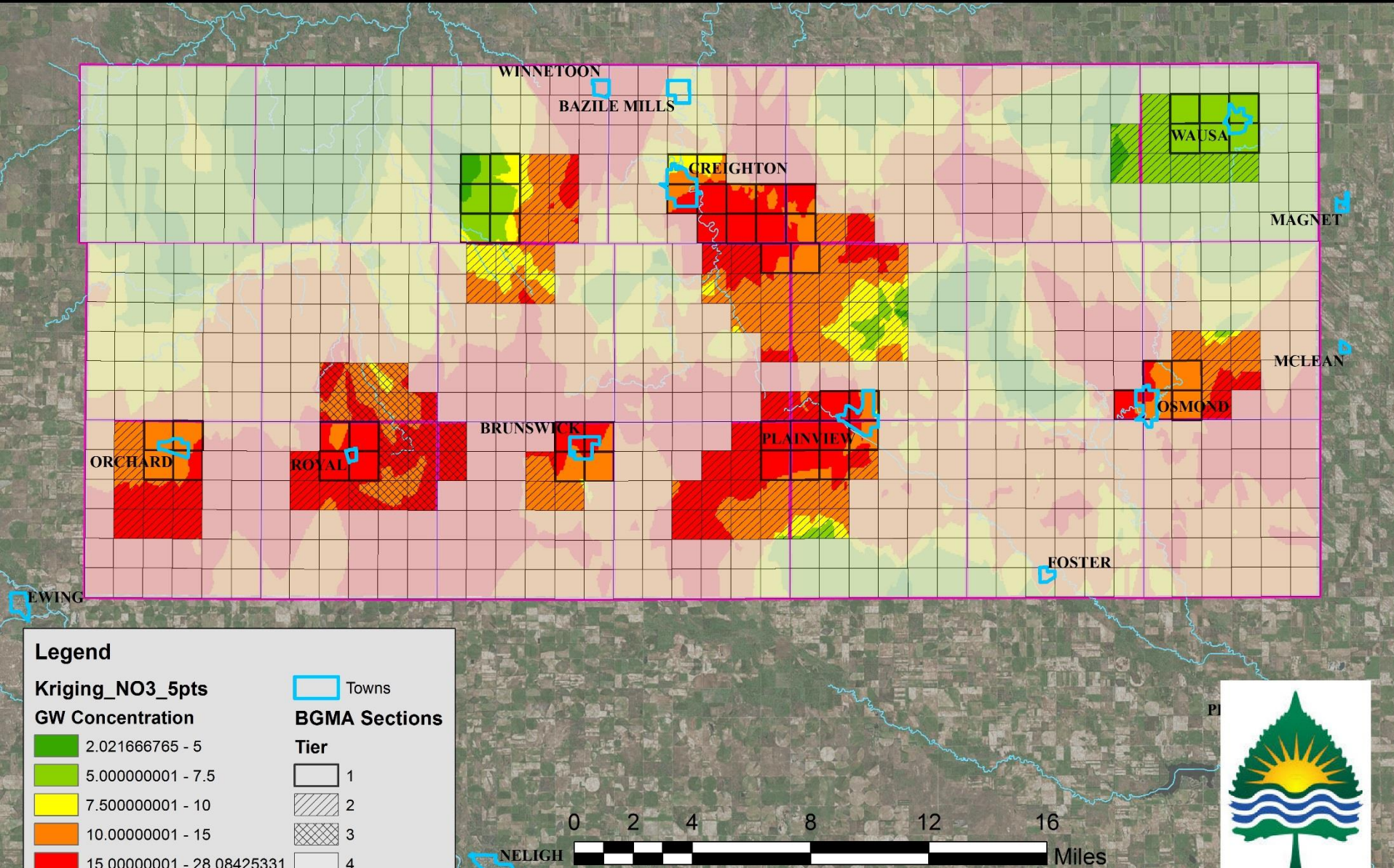
BGMA Land and Water Use



Nitrate Contamination Over Time

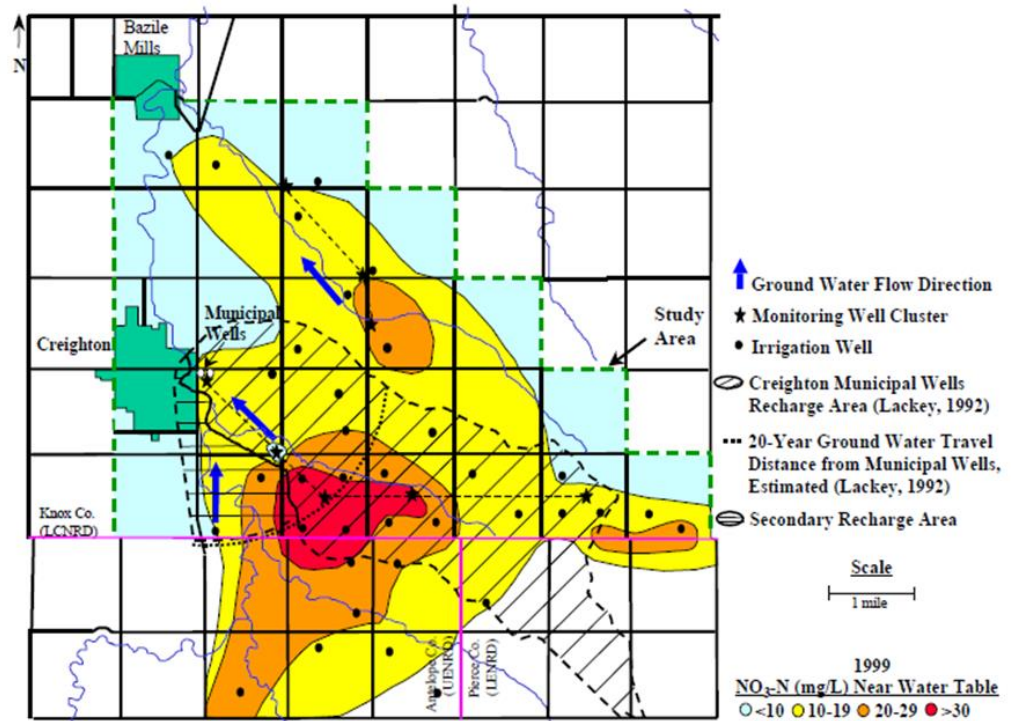
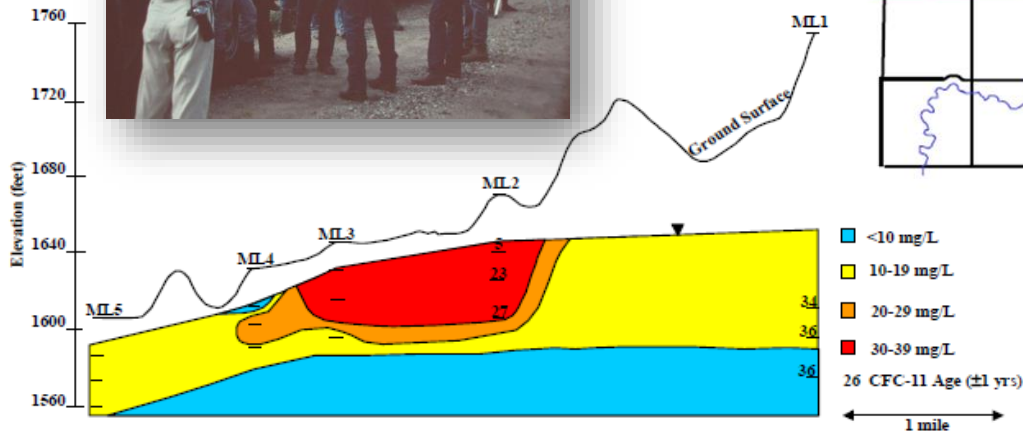


Groundwater Nitrate Contamination



History – Area Studies

■ 1990 – Bazile Triangle Groundwater Study



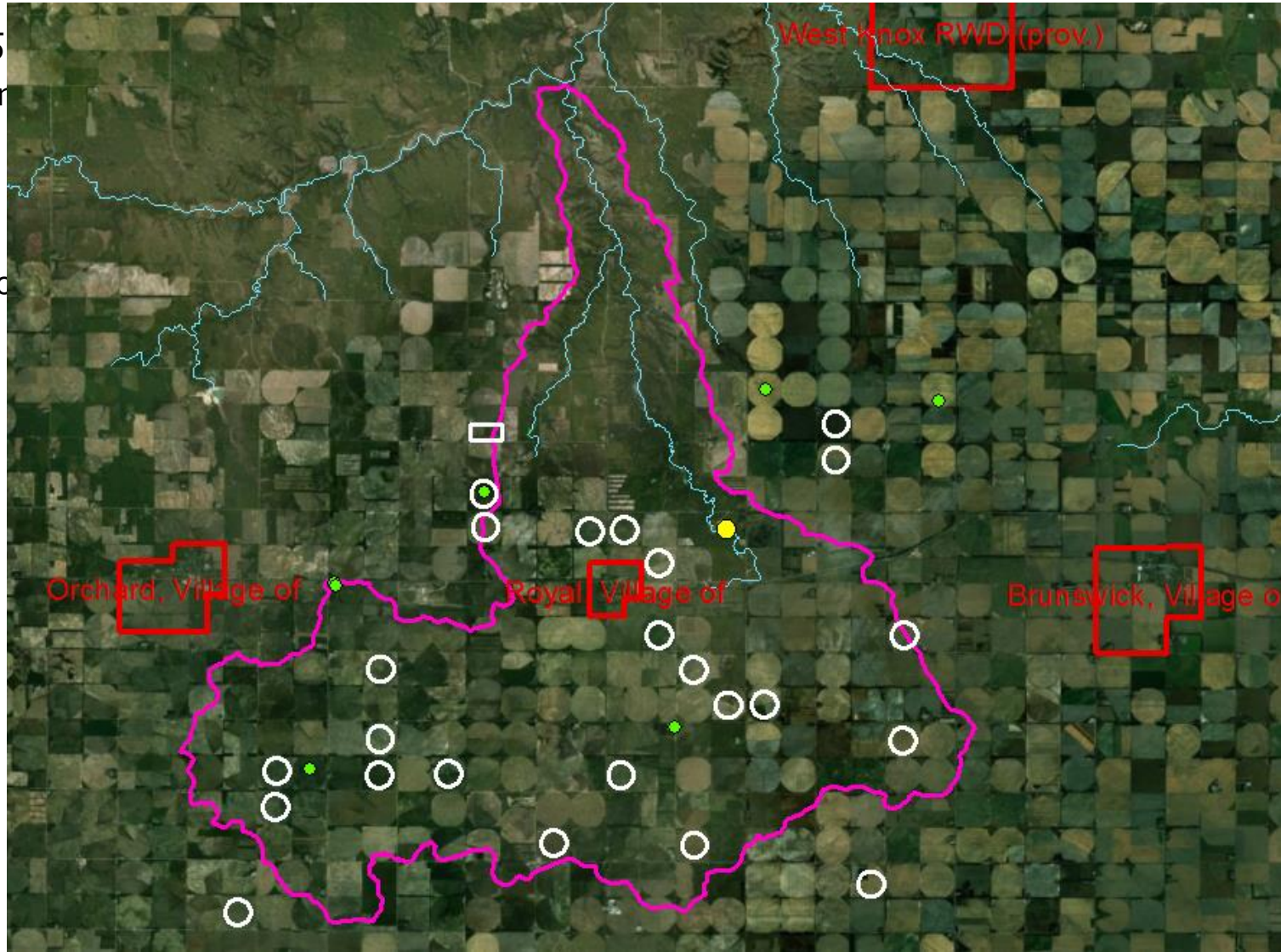
■ 2000 – Evaluation and Assessment of Ag Contaminants in Creighton, NE

History – EBVC Project

■ 2005

■ Pr

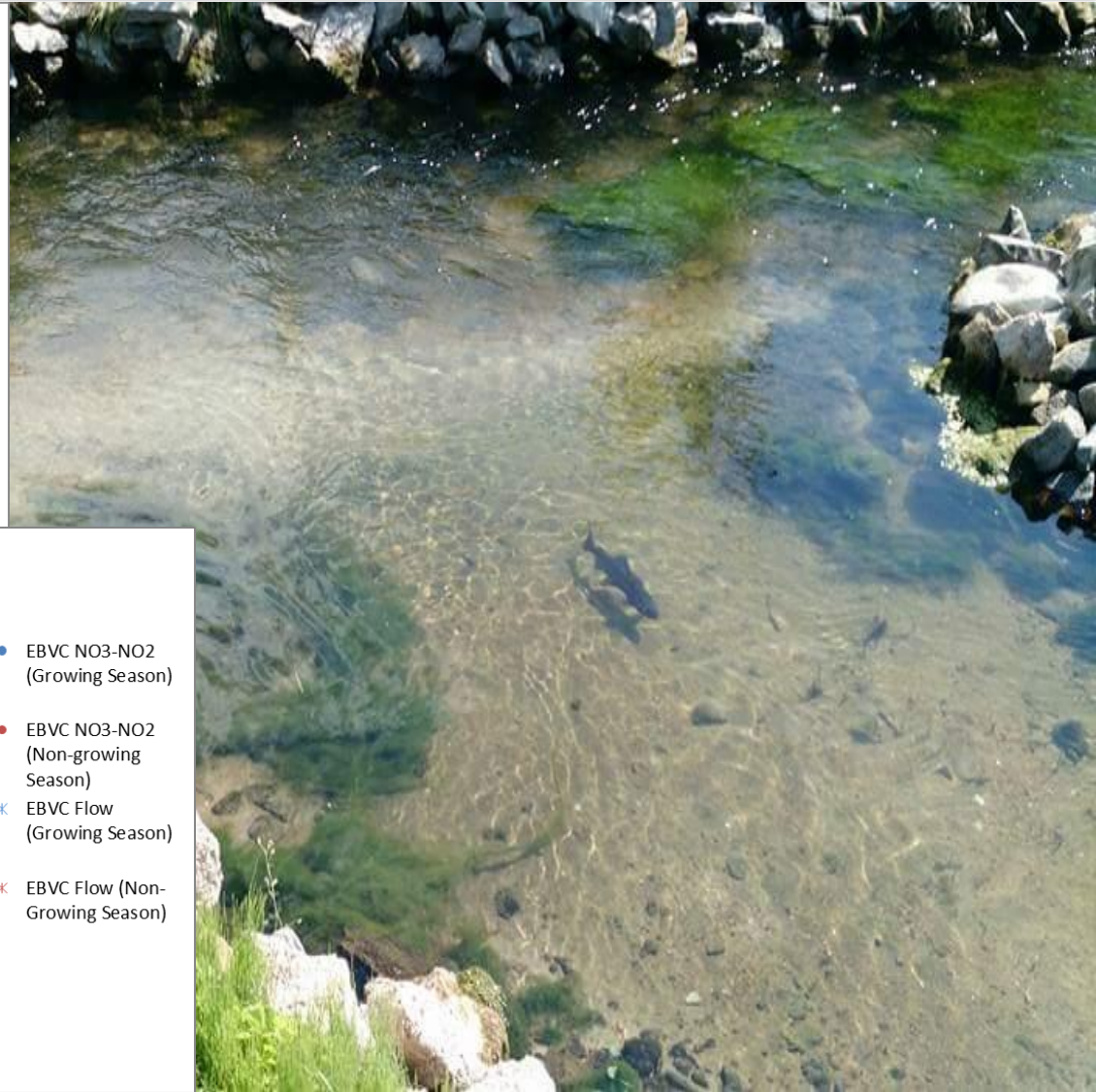
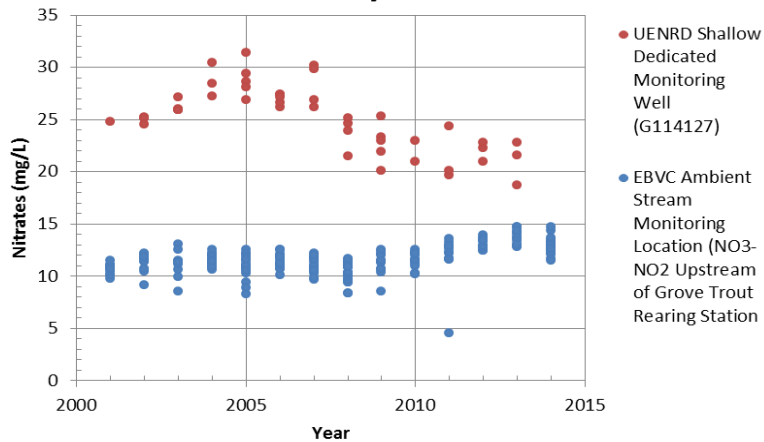
■ Po



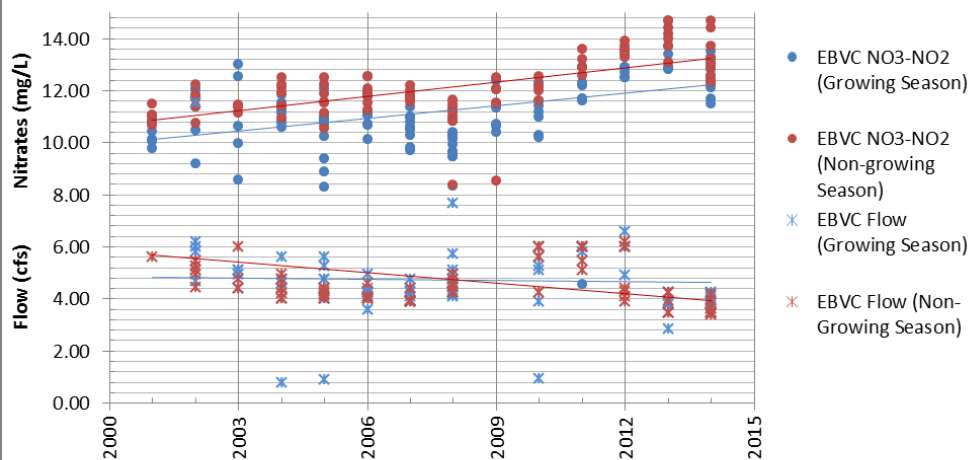
- Monitoring)
- Irrigation)
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History - EBVC Project cont...

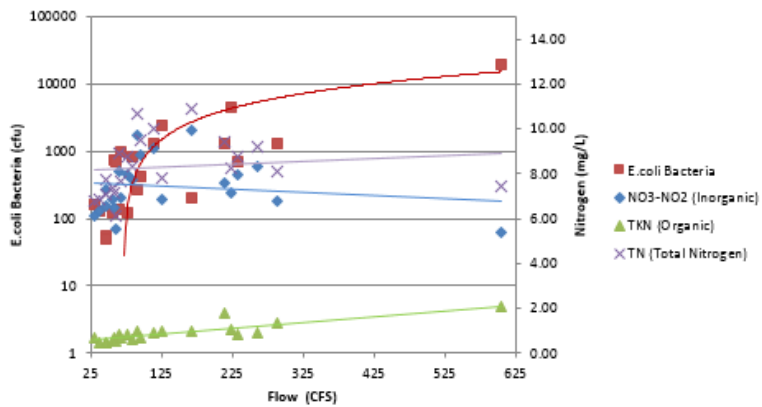
EBVC Groundwater and Surface Water Quality Data



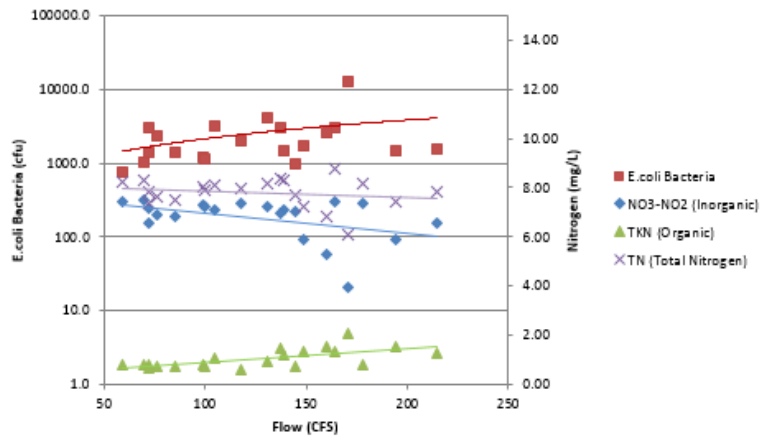
EBVC upstream of Grove Lake



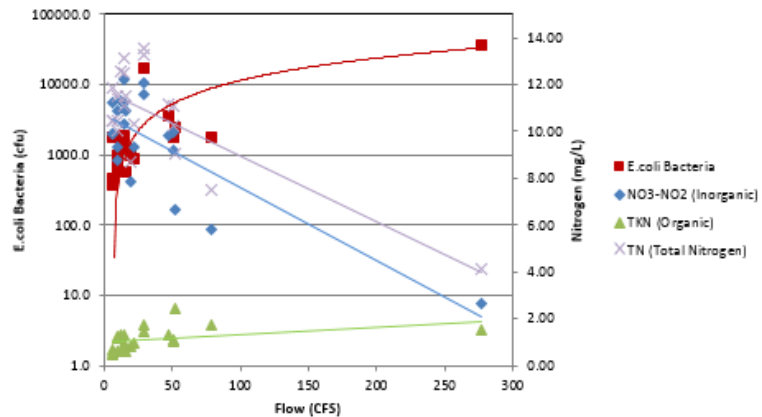
2016 Bazile Creek Water Quality Trends (MT2-12400)



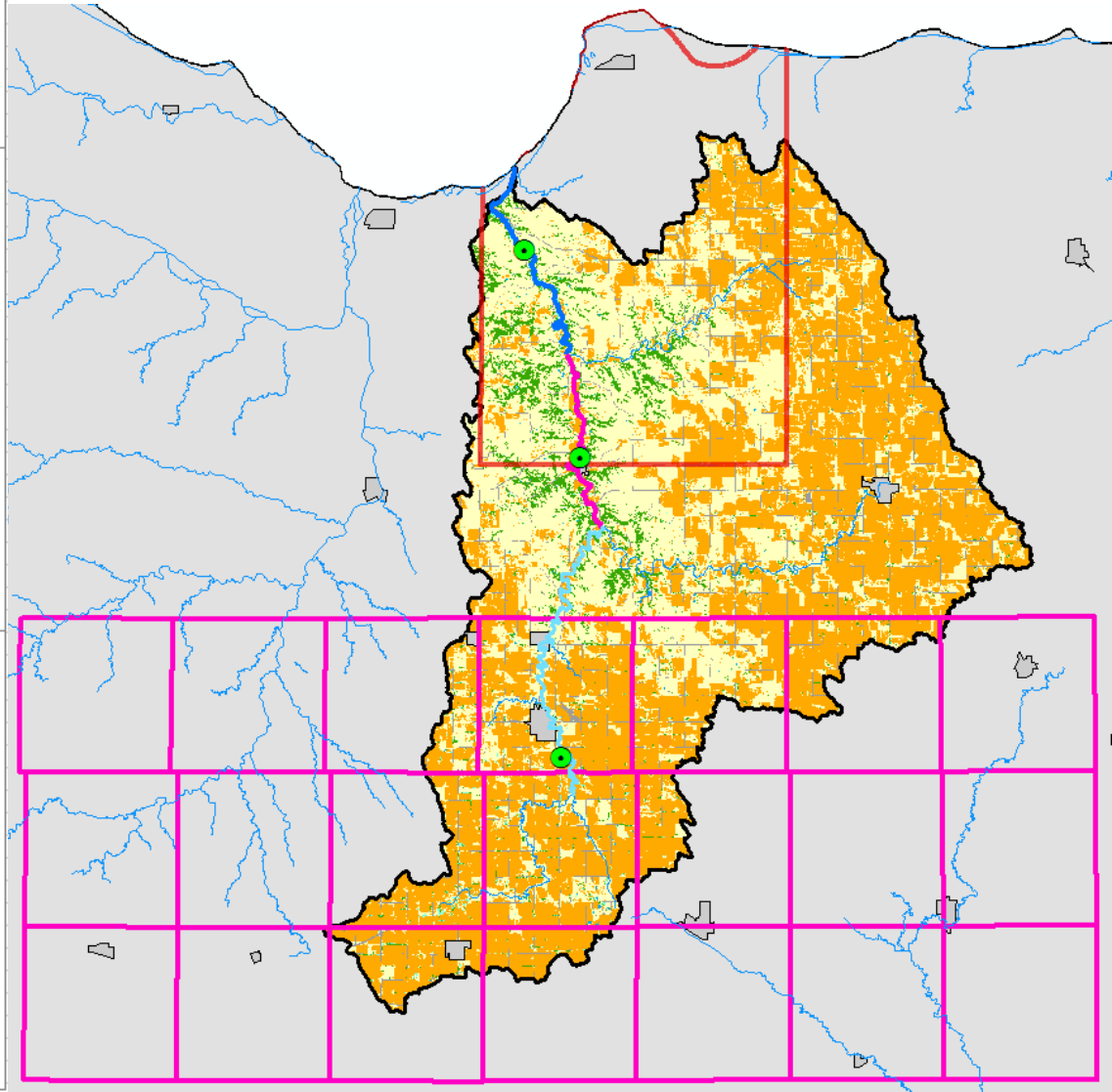
2010 Bazile Creek Water Quality Trends (MT2-12500)



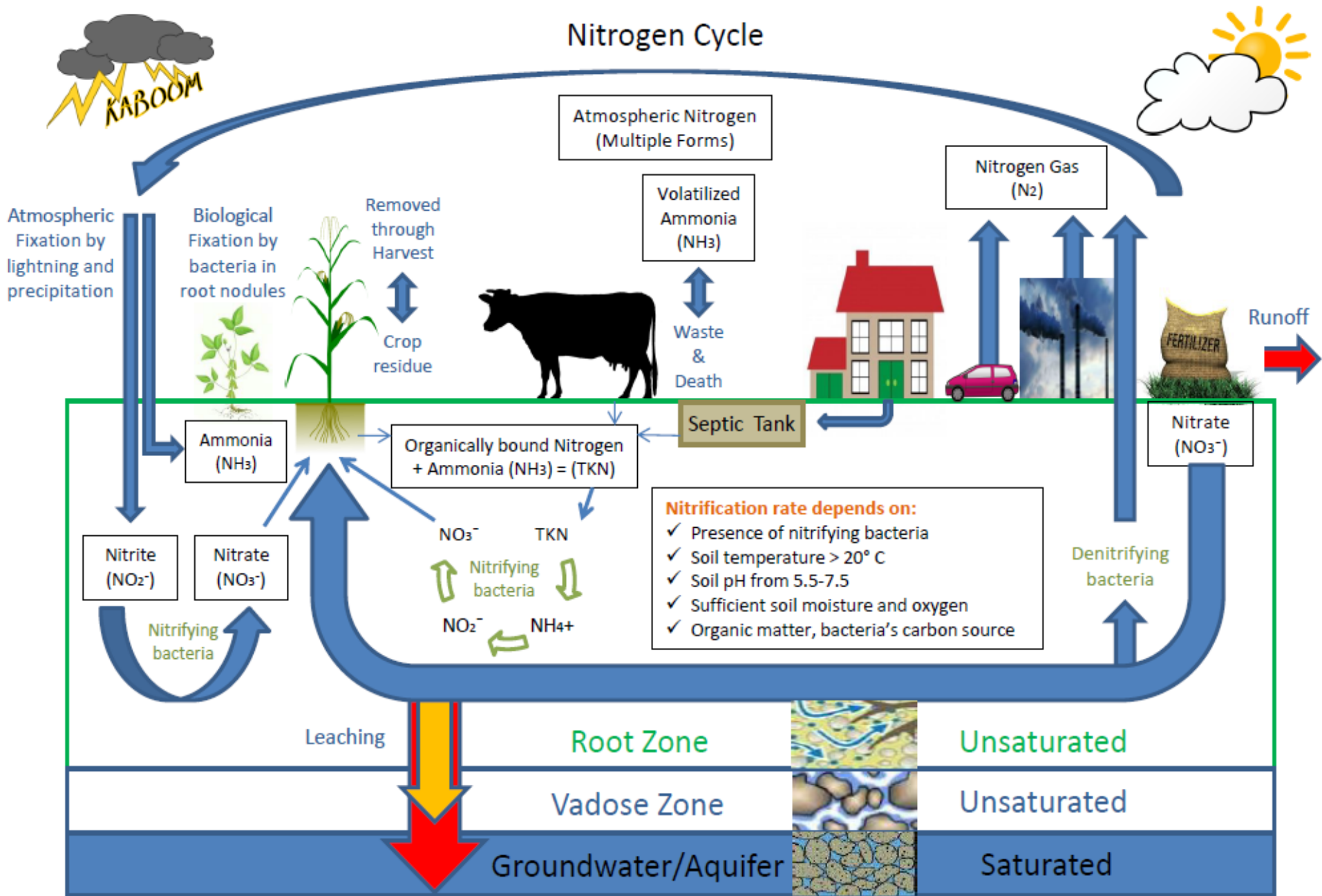
2016 Bazile Creek Water Quality Trends (MT2-12600)



Bazile Creek Surface Water Quality



Nitrogen Cycle

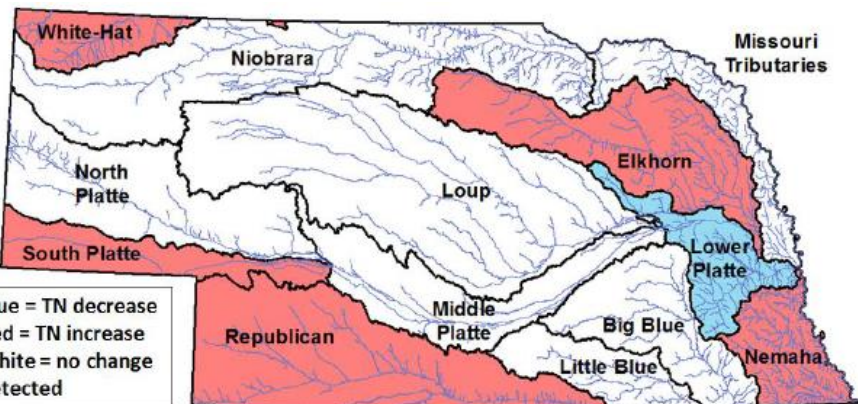
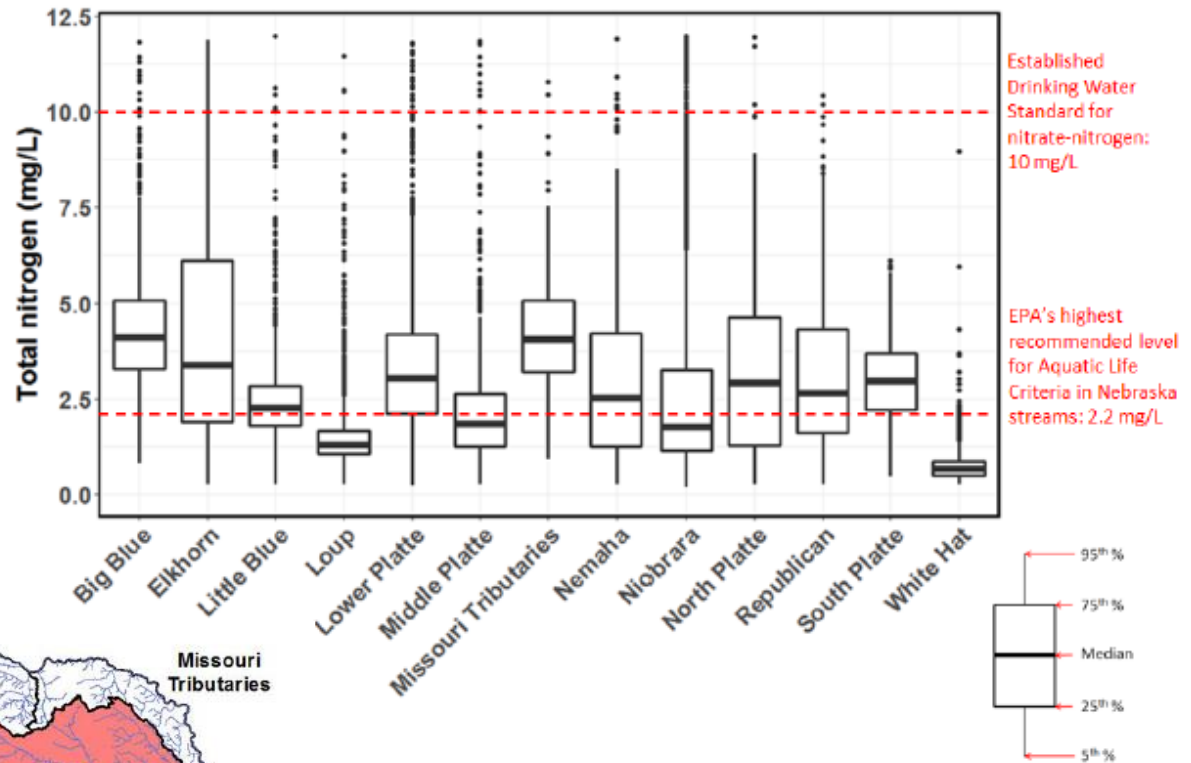


Nitrate in Drinking Water Treatment Cost

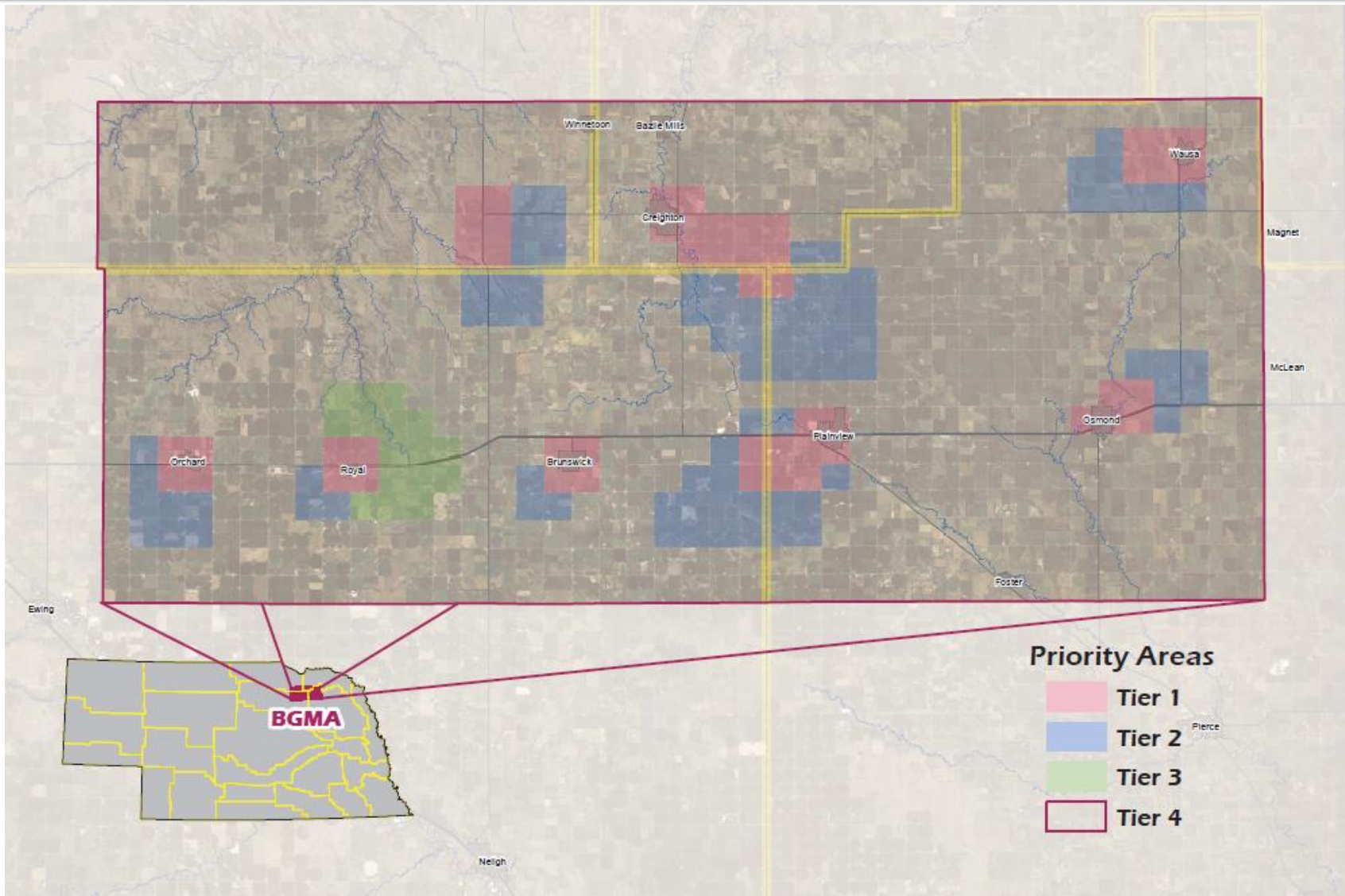
Municipalities	Population	AO	Treatment	Cost to Society
Creighton	1250	AO - 2017	Original RO Plant (excludes engineering and equipment)	1993 USDA Loan \$606,507
" "			RO Plant rehab	Current SRF Loan \$1,173,790
" "			O&M including annual depreciation over 20 years	Estimated Cost \$3,492,820
Brunswick	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 \$1,269,667
Domestic Wells	248		POU Treatment Systems (\$1,187.25 each)	Estimated Costs \$294,438
	Total = 4021			Total Cost \$9,114,370
BGMA Plan	7,159		2 –year Bazile GWMA Coordinator to carry out plan objectives and implement BMPs	319, NET, & NRD Funding = \$286,550

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

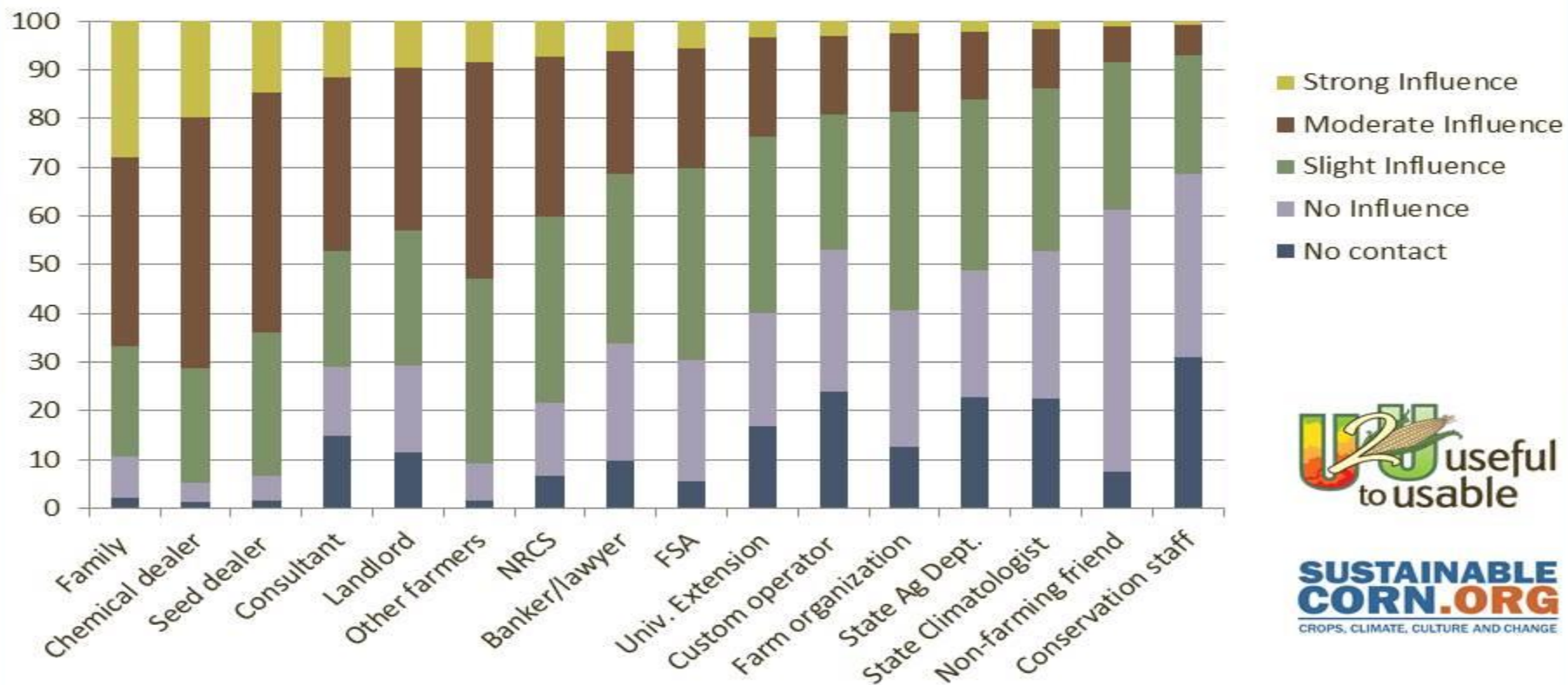
Priority Areas	Acres	Average NO ₃ -N of most recent samples	Reduction % needed	Acres Needing BMPs
Tier 1	31,224	17.6	45%	14,051
Tier 2	53,112	14.2	30%	15,934
Tier 3	10,167	14.9	46%	4,677
Tier 4	389,337	12.6	21%	81,761
Total	483,840			116,422

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**
 - 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

- Have a messenger
- Educate the messengers
- Risk Communication training
- NRDs secured a \$300,000 319 grant for plan implementation, flow meters, soil moisture probes and irrigation improvement
- Will spend nearly \$500,000 in 2018 NWQI funds on 23 contracts! This makes 35 active contracts.
- Currently have 8 new application!



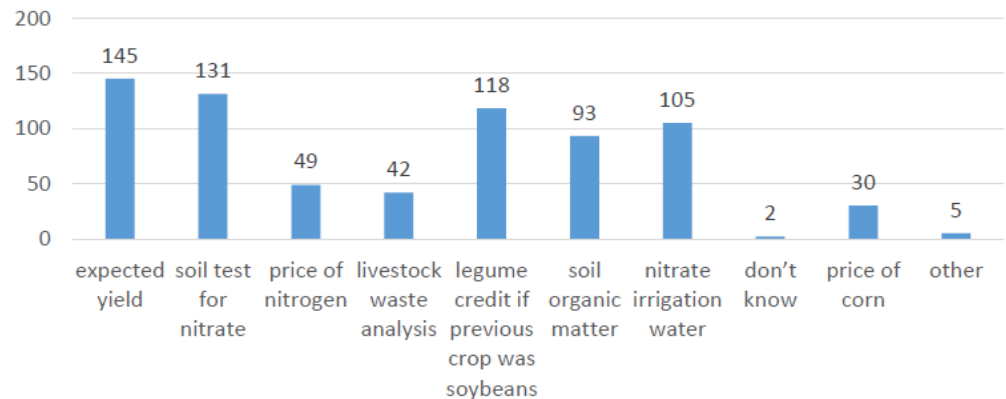
Barriers to Implementation

SURVEY GOALS

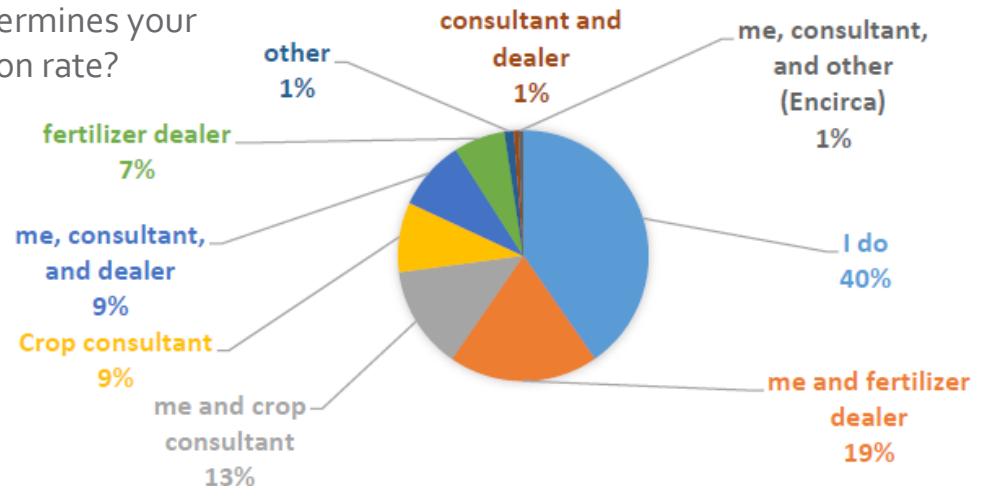
- Understand the current knowledge level of the nitrate pollution issue
- Identify BMPs currently on the landscape
- Figure out what BMPs people are interested in and why
- Understand what limits people from trying new BMPs
- 271 people, 33% responded

SURVEY RESULTS

What factors determine nitrogen application?



Who determines your application rate?



UNL Partnership



Nitrate Issue Team

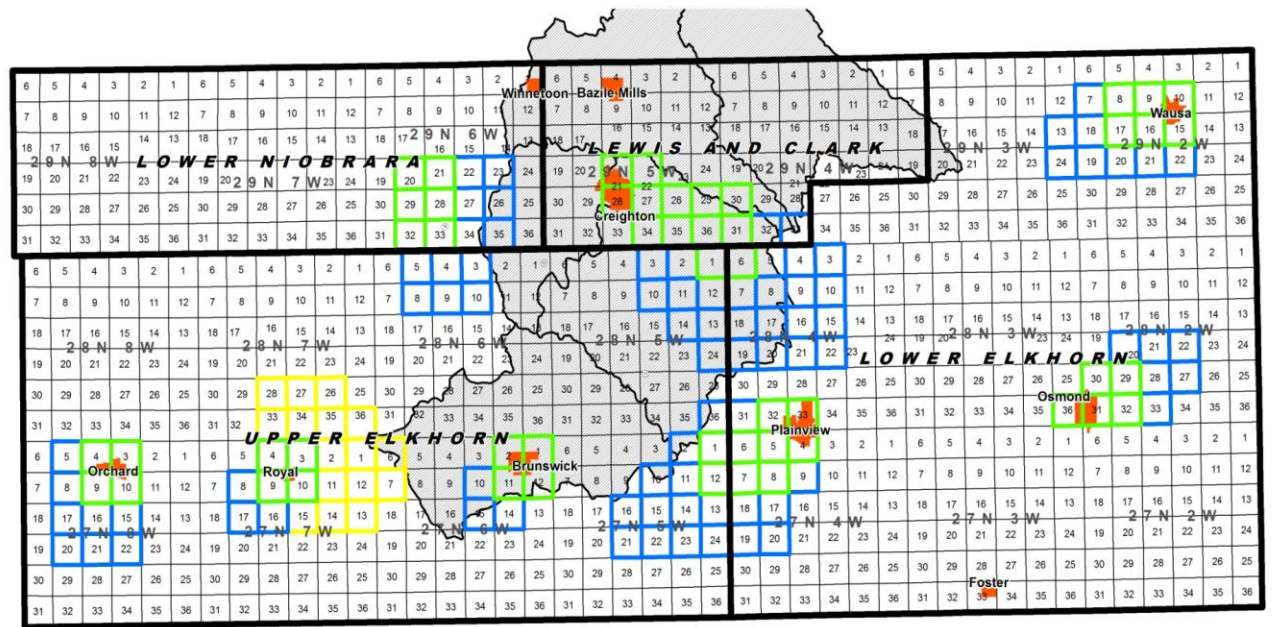
USDA's NRCS Partnership



National Water Quality Initiative

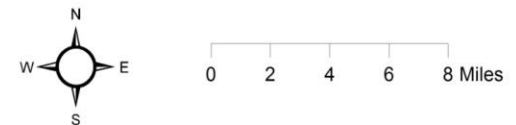
- Adding an area Extension Educator position
- Develop On-line Nitrate Training module
- Facilitating Crop Consultant discussions
- Summarize:
 - Nitrogen application studies on UNL's recommended rates
 - UNL Extension resources on BMPs that reduce nitrate contamination
 - Data pertinent to the Central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

Bazile Groundwater Management Area

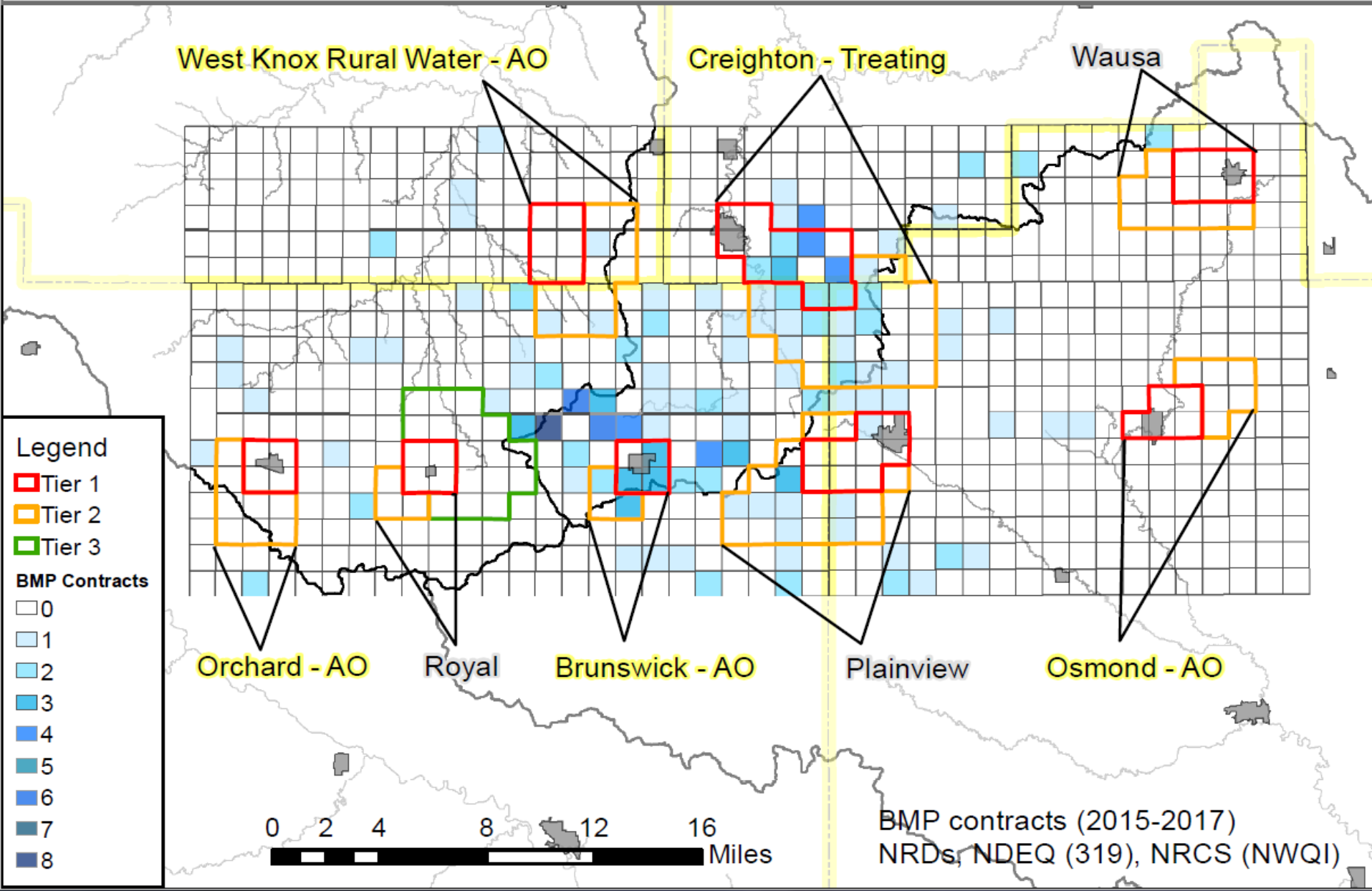


Legend

- 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

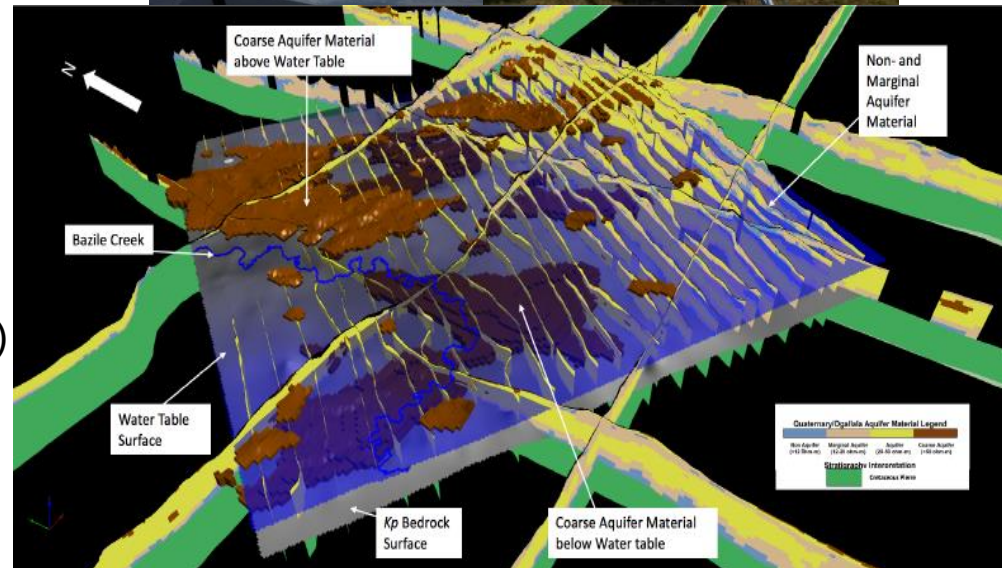


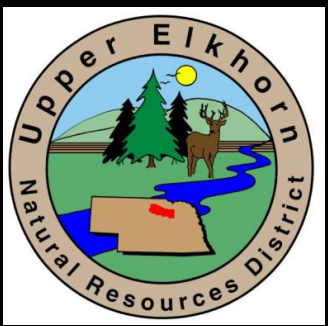
BGMA Priority Areas and Current BMPs



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?

