Bazile Groundwater Management Area Plan

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NEBRASKA
DEPT. OF ENVIRONMENTAL QUALITY
Why is this Plan Important?

- Nebraska’s first *Alternative to a 9-Element* water quality management plan for **GROUNDWATER**.

- Groundwater projects now eligible for up to 50% of NDEQ’s 319 project funds annually.

- New collaboration with NDEQ Sourcewater Protection Program for planning/implementation.
Groundwater is the primary source of drinking water for ~90% of Nebraskans. High levels of nitrate in groundwater is one of the biggest Nonpoint Source Pollution threats to public health in Nebraska.
Areas in the United States with the highest risk of nitrate contamination of shallow ground water generally have high nitrogen input, well-drained soils, and less extensive woodland relative to cropland.

https://water.usgs.gov/nawqa/nutrients/pubs/wcp_v39_n012
BGMA Location
BGMA Geology & Hydrology
Nitrate Contamination Over Time

- **Average NO3-N of First Samples**
- **Average NO3-N of Most Recent Samples**
Groundwater Nitrate Contamination

Legend

Kriging_NO3_5pts
GW Concentration

<table>
<thead>
<tr>
<th>Tier</th>
<th>Concentration Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.021666765 - 5</td>
</tr>
<tr>
<td>2</td>
<td>5.0000000001 - 7.5</td>
</tr>
<tr>
<td>3</td>
<td>7.5000000001 - 10</td>
</tr>
<tr>
<td>4</td>
<td>10.000000001 - 15</td>
</tr>
<tr>
<td>5</td>
<td>15.000000001 - 28.08425331</td>
</tr>
</tbody>
</table>

BGMA Sections

Tier

- | 1
- | 2
- | 3
- | 4

Towns

- Winnetoon
- Bazile Mills

Map showing nitrate contamination levels across different areas, with城镇和BGMA层级标识。
History – Area Studies

- **1990 – Bazile Triangle Groundwater Study**

![Map of Bazile Triangle Groundwater Study](image1)

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

![Map of Creighton Ag Contaminants](image2)
# Nitrate in Drinking Water Treatment Cost

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Population</th>
<th>AO</th>
<th>Treatment</th>
<th>Cost to Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creighton</td>
<td>1250</td>
<td>AO - 2017</td>
<td>Original RO Plant (excludes engineering and equipment)</td>
<td>1993 USDA Loan $606,507</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RO Plant rehab</td>
<td>Current SRF Loan $1,173,790</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>O&amp;M including annual depreciation over 20 years</td>
<td>Estimated Cost $3,492,820</td>
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<tr>
<td>Brunswick</td>
<td>179</td>
<td>AO - 2015</td>
<td>Replace wells, mains, and meters</td>
<td>SRF 2014 Request $594,839</td>
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<tr>
<td>Orchard</td>
<td>391</td>
<td>AO</td>
<td>Place &quot;Bad well&quot; (9.83 ppm) on emergency use</td>
<td></td>
</tr>
<tr>
<td>Osmond</td>
<td>796</td>
<td>AO – 2013 &amp; 2017</td>
<td>Replace wells, mains, tower, and meters</td>
<td>SRF 2014 Request $1,682,309</td>
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<tr>
<td>Plainview</td>
<td>1157</td>
<td></td>
<td>Replace wells and mains</td>
<td>SRF 2014 Request $1,269,667</td>
</tr>
<tr>
<td>Domestic Wells</td>
<td>248</td>
<td></td>
<td>POU Treatment Systems ($1,187.25 each )</td>
<td>Estimated Costs $294,438</td>
</tr>
<tr>
<td><strong>Total = 4021</strong></td>
<td>**</td>
<td></td>
<td></td>
<td><strong>Total Cost $9,114,370</strong></td>
</tr>
<tr>
<td>BGMA Plan</td>
<td>7,159</td>
<td></td>
<td>2 –year Bazile GWMA Coordinator to carry out plan objectives and implement BMPs</td>
<td>319, NET, &amp; NRD Funding = $500,000</td>
</tr>
</tbody>
</table>
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
Objectives

**Objective 1: Educate Public**
- Current efforts and trends
- WHPA plans
- SW/GW interactions

**Objective 2: Implement BMPs**
- Cover crops
- Nutrient management
- Well abandonment, etc.

**Objectives 3&4: Identify Needs**
- Data gaps
- Barriers to BMP adoption
The Best Messenger

![Bar graph showing influence levels for different messenger types.](Image)

- **Strong Influence**: Proportion of influence represented by the tallest section of each bar.
- **Moderate Influence**: Middle section of each bar.
- **Slight Influence**: Smaller section of each bar.
- **No Influence**: Smallest section of each bar.
- **No contact**: Bars with no color.

**Messenger Types**:
- Family
- Chemical dealer
- Seed dealer
- Consultant
- Landlord
- Other farmers
- NRCS
- Banker/lawyer
- FSA
- Univ. Extension
- Custom operator
- Farm organization
- State Ag. Dept.
- State Climatologist
- Non-farming friend
- Conservation staff
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 spent $500,000 in NWQI funds available for 2018.
GOAL: Understand current knowledge of nitrate issue and barriers for BMP adoption.

Who determines your nitrogen application rate?

- Me and fertilizer dealer (19%)
- Me and crop consultant (13%)
- Crop consultant (9%)
- Me, consultant, and dealer (9%)
- Me, consultant, and other (Encirca) (1%)
- Consultant and dealer (1%)
- Other (1%)
- Fertilizer dealer (7%)
- I do (40%)
GOAL: Understand current knowledge of nitrate issue and barriers for BMP adoption.
Filling in data gaps

- Weather station for real time ET data (2016)
- NRDs conducted an airborne electromagnetic (AEM) geophysical survey (completed in 2017)
- University of Nebraska-Lincoln (UNL) Isotope and Recharge study (completed in 2018), will be gathering Tiers 1&2 vadose zone baselines (2018-19)
- NDEQ-UNL ID screened intervals of baseline wells (2018-2019)
- UNL Transit time and Nitrate delivery to Bazile Creek survey. (2018-19)
- NDEQ and NeDHHS working on well rehab demos.
Groundwater issues are SOCIAL issues.
What is the economic value of BMPs to farmers?

PRIZES FOR:
1. Most profitable farm ($2,000)
2. Input use efficiency ($1,000)
3. Greatest yield ($320)

https://taps.unl.edu/
Questions?

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