

# Environmental Update

May 23, May 24, May 25 2017

North Platte, Ithaca, Norfolk

**Marty Link**

Water Quality Division Administrator

# What Programs are in the Water Quality Division at NDEQ?

## ❖ Petroleum Remediation

- ❖ Leaking Underground Storage Tanks
- ❖ Title 200 – Petroleum Release Remedial Action Reimbursement Fund

## ❖ Water Quality Assessment

- ❖ Surface Water Monitoring, Fish Kill & Complaint Response, Fish Tissue, Biological Monitoring
- ❖ Groundwater, Spill/Release Remediation, UIC, WHP/Source Water, Livestock GW Monitoring
- ❖ **Planning**: Integrated Report, TMDLs, 401 Cert, Surface Water Standards, Nonpoint Source





# Petroleum Remediation

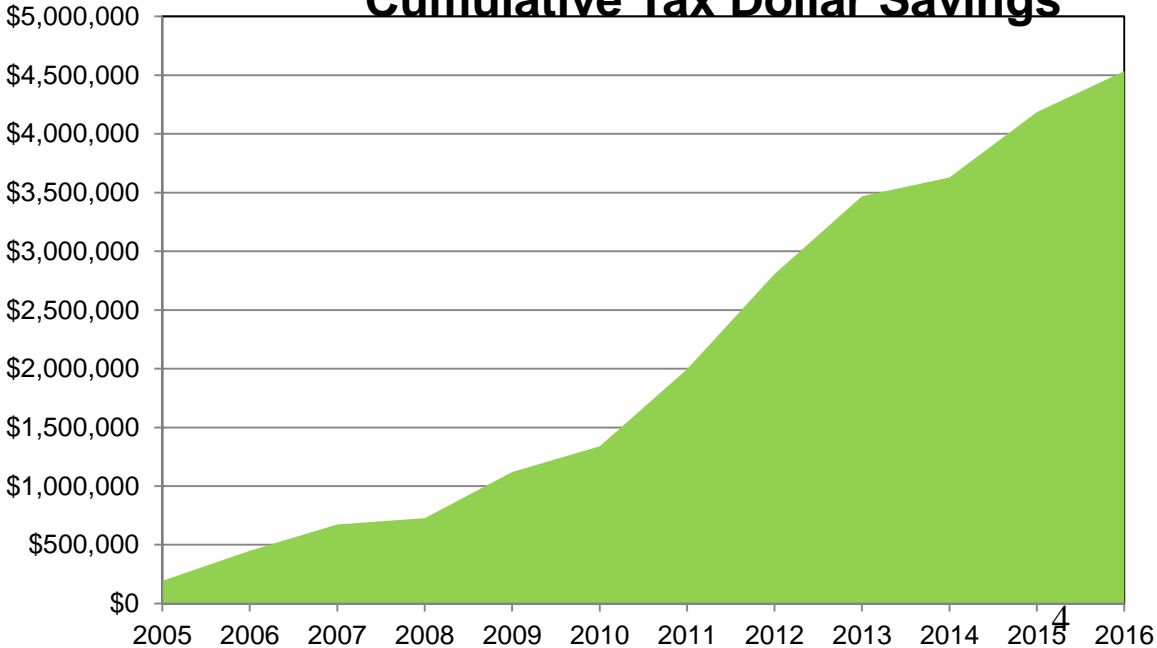
- Require and Direct Groundwater Remediation
- Reimburse Responsible Parties for Approved Remediation Activities

# Petroleum Remediation – Equipment Reuse Program

| Year           | Items Reused | Replacement Cost | Running Total/<br>Tax Savings |
|----------------|--------------|------------------|-------------------------------|
| 2005           | 92           | \$193,085        | \$193,085                     |
| 2006           | 141          | \$256,359        | \$449,444                     |
| 2007           | 41           | \$224,010        | \$673,454                     |
| 2008           | 50           | \$53,610         | \$727,064                     |
| 2009           | 33           | \$393,052        | \$1,120,111                   |
| 2010           | 62           | \$218,787        | \$1,338,903                   |
| 2011           | 31           | \$657,108        | \$1,996,011                   |
| 2012           | 47           | \$810,385        | \$2,806,396                   |
| 2013           | 29           | \$662,355        | \$3,468,751                   |
| 2014           | 50           | \$159,691        | \$3,628,442                   |
| 2015           | 47           | \$556,898        | \$4,185,340                   |
| 2016           | 25           | \$349,093        | \$4,534,433                   |
| Started 6/2005 |              |                  |                               |

~650 pieces of  
equipment reused.  
**~\$4.5 million  
saved!**

**Cumulative Tax Dollar Savings**





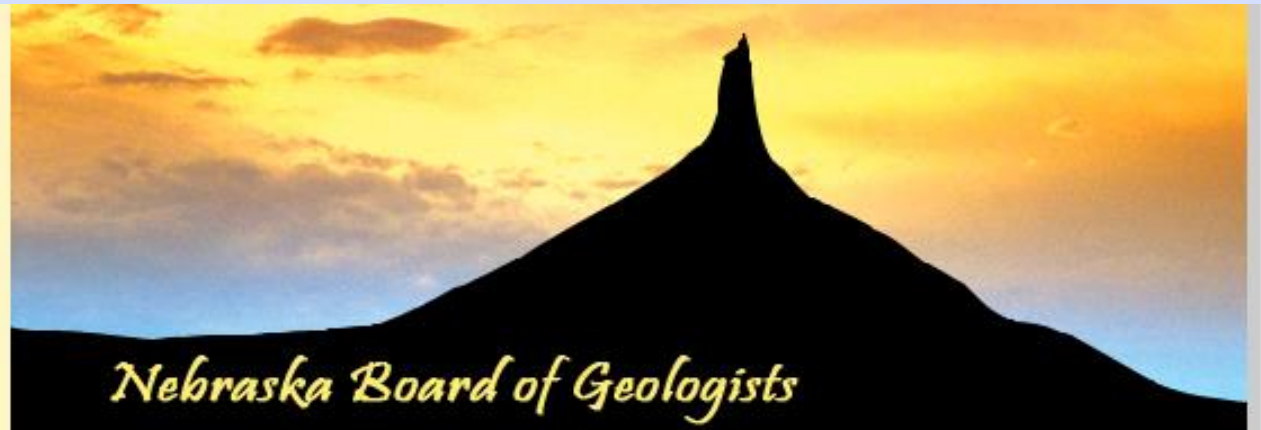


## Storing & Moving Petroleum Remediation Equipment



# Professional Geologists ...

- Are qualified individuals who safeguard life, health, property, and promote the public welfare.
- Sign and seal geologic work, reports, diagrams.
- NDEQ requires PG for Petroleum Remediation Contracts & Environmental Services contracts for Superfund and Brownfields work.



Two annual reports Water Quality Div.  
publishes:

- **Nebraska Water Monitoring Programs Report**
- **Nebraska Groundwater Quality Monitoring Report**

<http://deq.ne.gov>



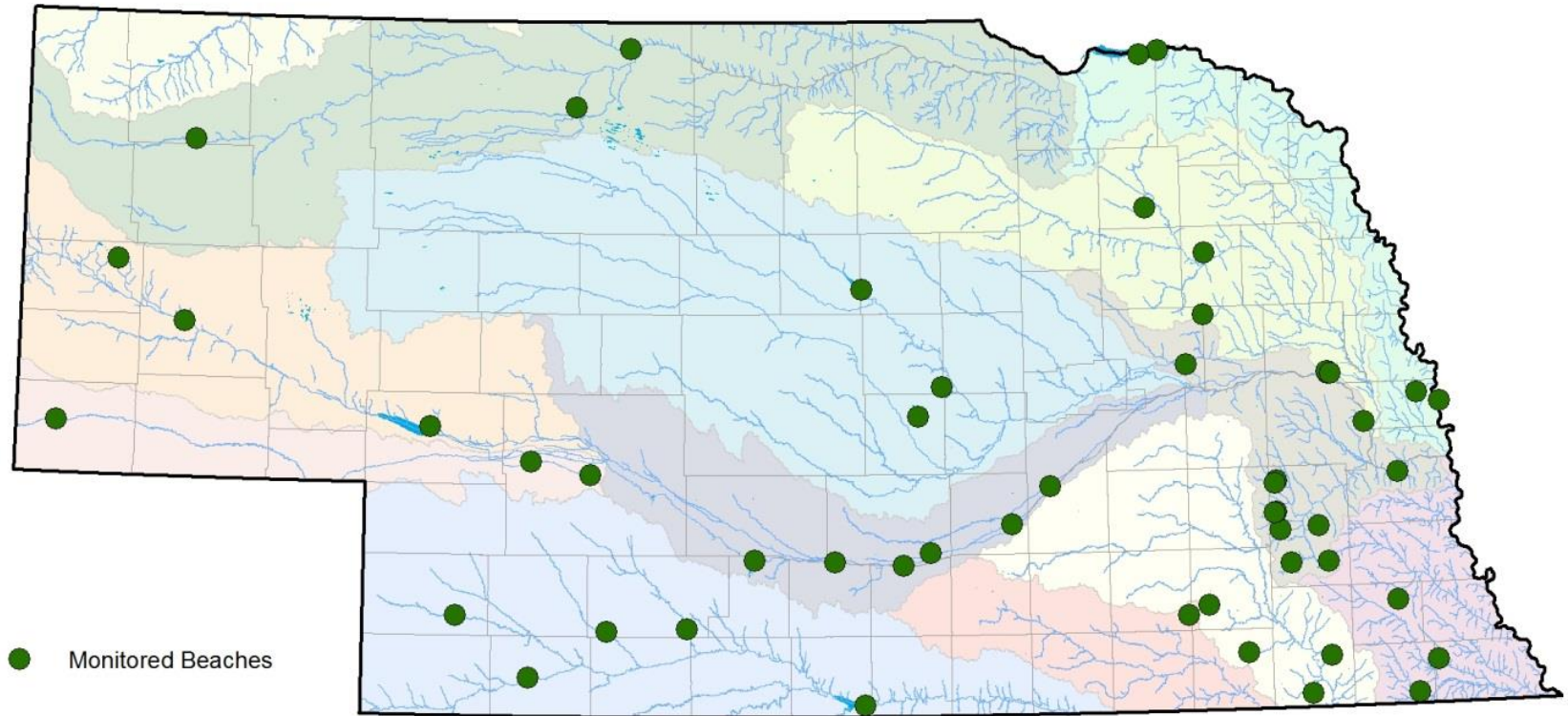


**Harmful Algal Blooms (HAB)**  
**Blue-Green Algae**  
toxin = microcystin



# 2017 - Monitoring at 53 Beaches at 50 Lakes

May 1 – September 30

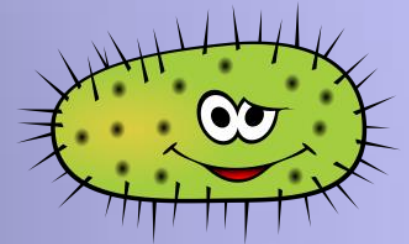


Sample early in week, results posted by  
Thursday afternoon. <http://deq.ne.gov>  
**>20 ppb microcystin = Health Alert**

Sign up for the NEW  
**BeachWatch Listserv**  
**Weekly Emails** with beach water  
quality!

Directions on our web site

<http://deq.ne.gov>



- - Or - -

**Send an email to**

`listserv@listserv.nebraska.gov`

**Subject: blank**

**Body: Subscribe DEQ-BeachWatch John Smith**

--- you will get an email requesting confirmation.



**THIS LAKE IS MONITORED FOR  
HARMFUL ALGAL BLOOMS  
AND *E. COLI* BACTERIA**

**MAY 1<sup>ST</sup> – SEPT 30<sup>TH</sup>**

**NO WATER QUALITY  
HEALTH ALERT AT THIS TIME**

*No hay alerta de calidad del agua vigente*

**Statewide Sampling Results  
and More Information:**

**<http://deq.ne.gov>  
(877) 253-2603**

**[ndeq.beachwatch@nebraska.gov](mailto:ndeq.beachwatch@nebraska.gov)**

**NEBRASKA** **NEBRASKA** **NEBRASKA**  
DEPT. OF ENVIRONMENTAL QUALITY - GAME & PARKS - DEPT. OF HEALTH AND HUMAN SERVICES

**Sign at beaches,  
boat ramps, etc.**

**Sign posted year  
round & when no  
HAB present**



**Sign flipped  
down, posted  
when HAB  
present  
&  
Health Alert  
issued**

**Note:** EPA proposal for  
**4ug/l microcystin**  
(now NDEQ uses 20 ug/l)



# Surface Water Monitoring & Everything that Follows

Monitor – Ambient + Basin  
Rotation

```
graph TD; A[Monitor – Ambient + Basin Rotation] --> B[Assess – Data]; B --> C[Integrated Report (CWA 303(d) + 305(b))]; C --> D[TMDLs (not regulatory)]; D --> E[Voluntary Watershed/Basin Plan, Implement Projects];
```

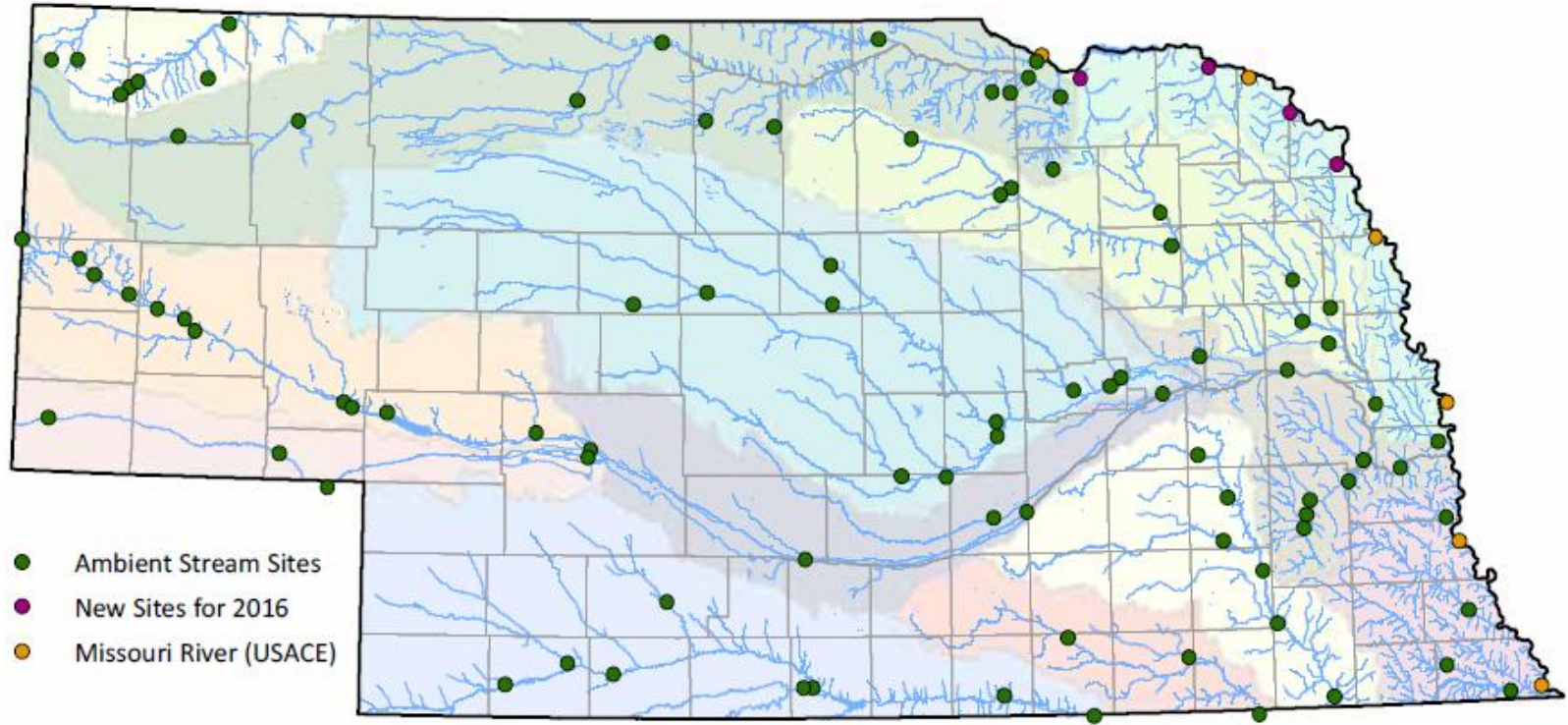
Assess – Data

Integrated Report (CWA  
303(d) + 305(b))

TMDLs (not regulatory)

Voluntary Watershed/Basin  
Plan, Implement Projects

## Monitor – Ambient + Basin Rotation, etc.



Locations of Ambient Stream Monitoring Program sites.

**LOCATIONS:** ~97 Ambient Stream, ~44 Basin Rotation, ~45 Ambient Lake, 100+/- Fish Tissue, ~34 Stream Biological --  
**~40,000 Analyses/Year**



# Surface Water Monitoring & Everything that Follows

Monitor – Ambient + Basin  
Rotation

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graph TD; A[Monitor – Ambient + Basin Rotation] --> B[Assess – Data]; B --> C[Integrated Report (CWA 303(d) + 305(b))]; C --> D[TMDLs (not regulatory)]; D --> E[Voluntary Watershed/Basin Plan, Implement Projects];
```

The diagram is a vertical flowchart with five colored rectangular boxes connected by downward-pointing blue arrows. The boxes are: 1. Green: 'Monitor – Ambient + Basin Rotation'. 2. Orange: 'Assess – Data'. 3. Light blue: 'Integrated Report (CWA 303(d) + 305(b))'. 4. Purple: 'TMDLs (not regulatory)'. 5. Pink: 'Voluntary Watershed/Basin Plan, Implement Projects'. A large blue arrow points from the right towards the orange box.

Assess – Data

Integrated Report  
(CWA 303(d) + 305(b))

TMDLs (not regulatory)

Voluntary Watershed/Basin  
Plan, Implement Projects

|    | A                    | B                | C      | D     |
|----|----------------------|------------------|--------|-------|
| 1  | Valores bursátiles   |                  |        |       |
| 2  |                      |                  |        |       |
| 3  | Valor total neto     | 42.213           |        |       |
| 4  | Valor total actual   | 37.475           |        |       |
| 5  | Costo total          | 33.263           |        |       |
| 6  | Nº total de acciones | 1.000            |        |       |
| 7  |                      |                  |        |       |
| 8  | Nombre               | Precio de compra | Numero | Costo |
| 9  | Líneas Aéreas Cielo  | 34 1/2           |        |       |
| 10 | Soto y Peña          | 22 1/8           |        |       |
| 11 | Importadores Neptuno | 51               |        |       |

# Assess – Data

## Point Source - Permits

## Nonpoint Source – TMDLs, Watershed Plans

$$\vec{F} = m \frac{dv}{dt}$$

$$E = k \frac{q}{r^2} = \frac{1}{4\pi\epsilon_0} \frac{q}{r^2}$$

$$\sum_{surf} E_{\perp} \Delta A = \frac{q}{\epsilon_0}$$

$$\sum_{junc} I_j = 0$$

$$F = qvB_{\perp} = qv_{\perp}B = qvB \sin(\theta)$$

$$F = ILB_{\perp} = I_{\perp}LB = ILB \sin(\theta)$$

$$\sum_{curv} B_{\parallel} \Delta l = \mu_0 I_{\perp}$$

$$\Delta(K.E) = KE_f - KE_i$$

$$k = 8.99 (10)^9 \left[ \frac{Nm^2}{C^2} \right]$$

$$\epsilon_0 = 8.85 (10)^{-12} \left[ \frac{C^2}{Nm^2} \right]$$

$$V = k \frac{q}{r} = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$$

$$C = \frac{A\epsilon_0}{d}$$

$$\sigma = \frac{Q}{A}$$

$$V = Ed$$

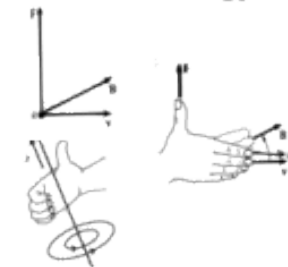
$$U = \frac{QV}{2} = \frac{CV^2}{2} = \frac{Q^2}{2C}$$

$$\frac{1}{R_{ser}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$C_{ser} = C_1 + C_2$$

$$B = \frac{\mu_0 I}{2\pi r}$$

$$\mu_0 = 4\pi (10)^{-7} Tm/A$$



# Surface Water Monitoring & Everything that Follows

Monitor – Ambient + Basin  
Rotation

```
graph TD; A[Monitor – Ambient + Basin Rotation] --> B[Assess – Data]; B --> C[Integrated Report (CWA 303(d) + 305(b))]; D[External Input] --> C; C --> E[TMDLs (not regulatory)]; E --> F[Voluntary Watershed/Basin Plan, Implement Projects];
```

Assess – Data

Integrated Report  
(CWA 303(d) + 305(b))

TMDLs (not regulatory)

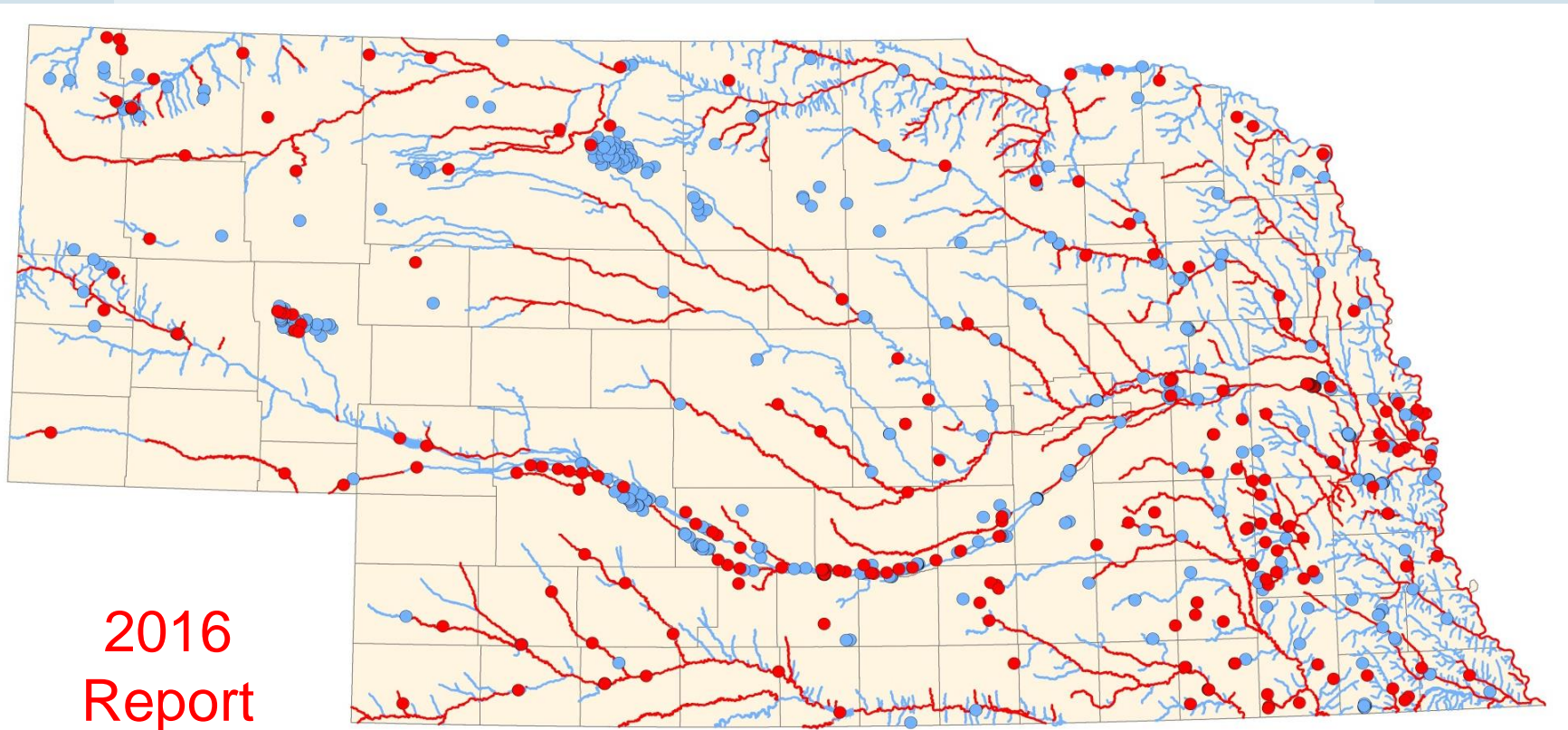
Voluntary Watershed/Basin  
Plan, Implement Projects



# Integrated Report (CWA 303(d) + 305(b))

Even Numbered  
Years  
**April 1, 2018**

<http://deq.ne.gov/NDEQProg.nsf/OnWeb/TMDL>



**2016  
Report**

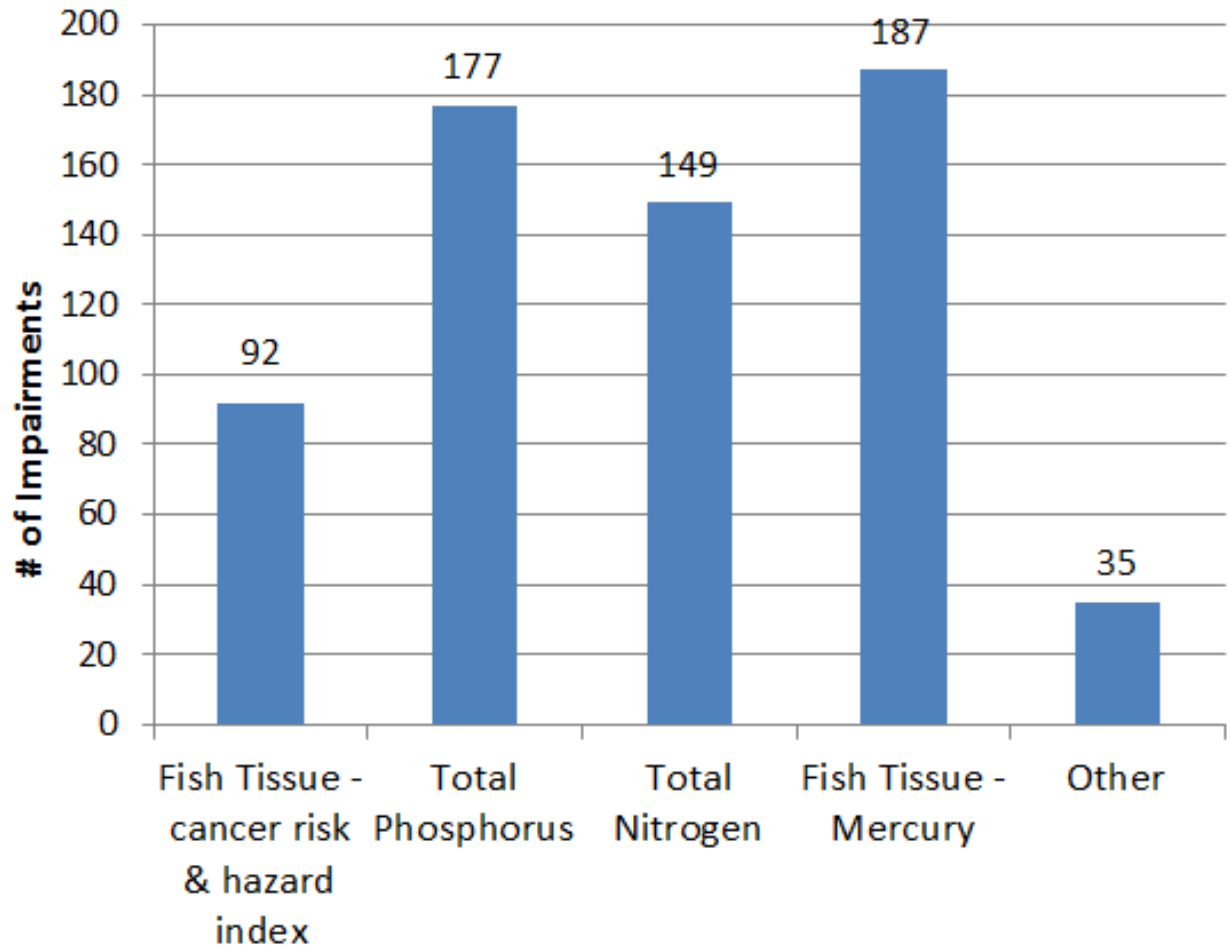
## Streams

- Impaired
- Meets Standards or Unknown

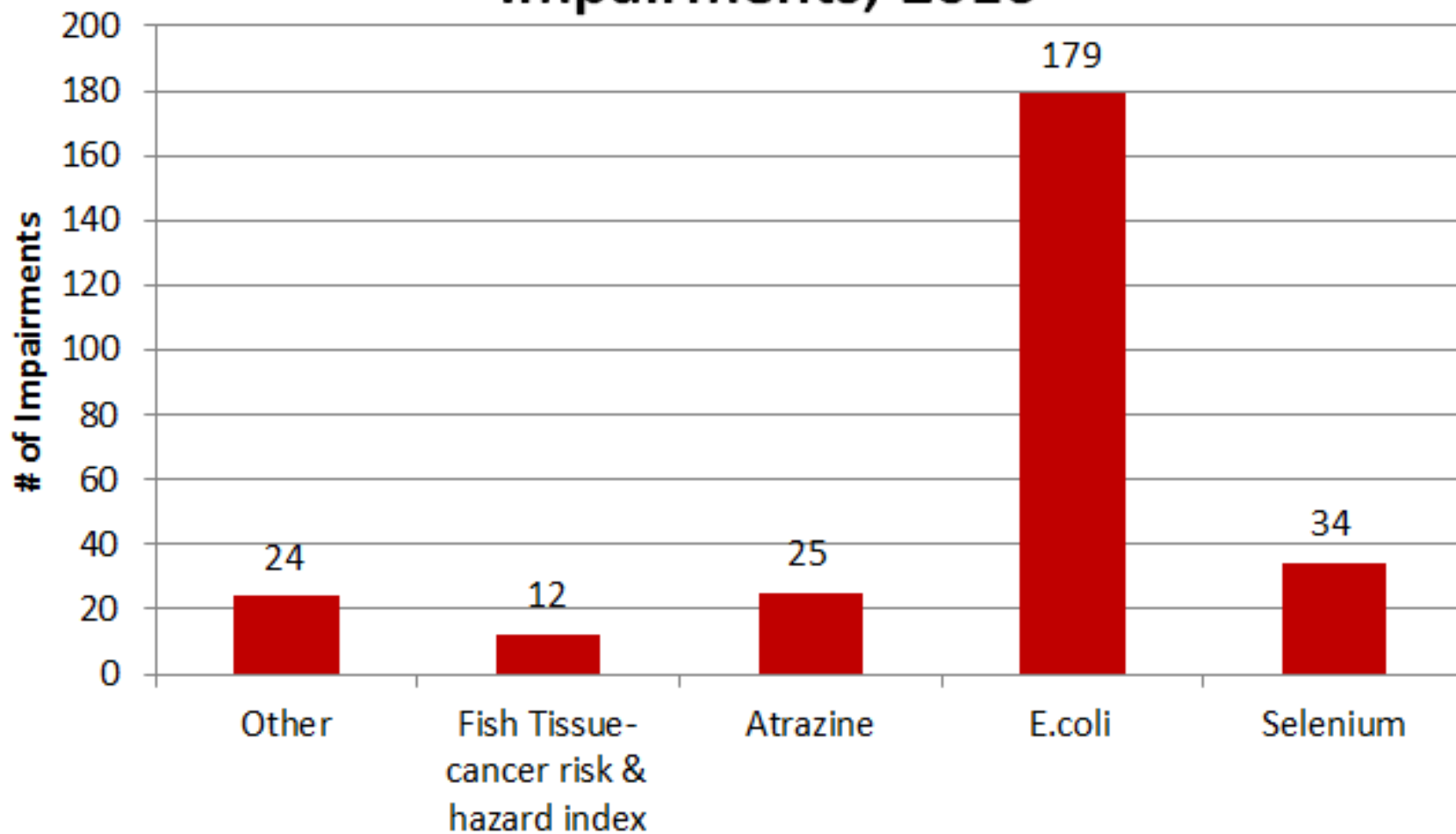
## Lakes and Reservoirs

- Impaired
- Meets Standards or Unknown

# CWA Sec. 303(d) Causes for Lake Impairments, 2016



## CWA Sec. 303(d) Causes for Stream Impairments, 2016





# Surface Water Monitoring & Everything that Follows

Monitor – Ambient + Basin  
Rotation

Assess – Data

Integrated Report (CWA  
303(d) + 305(b))

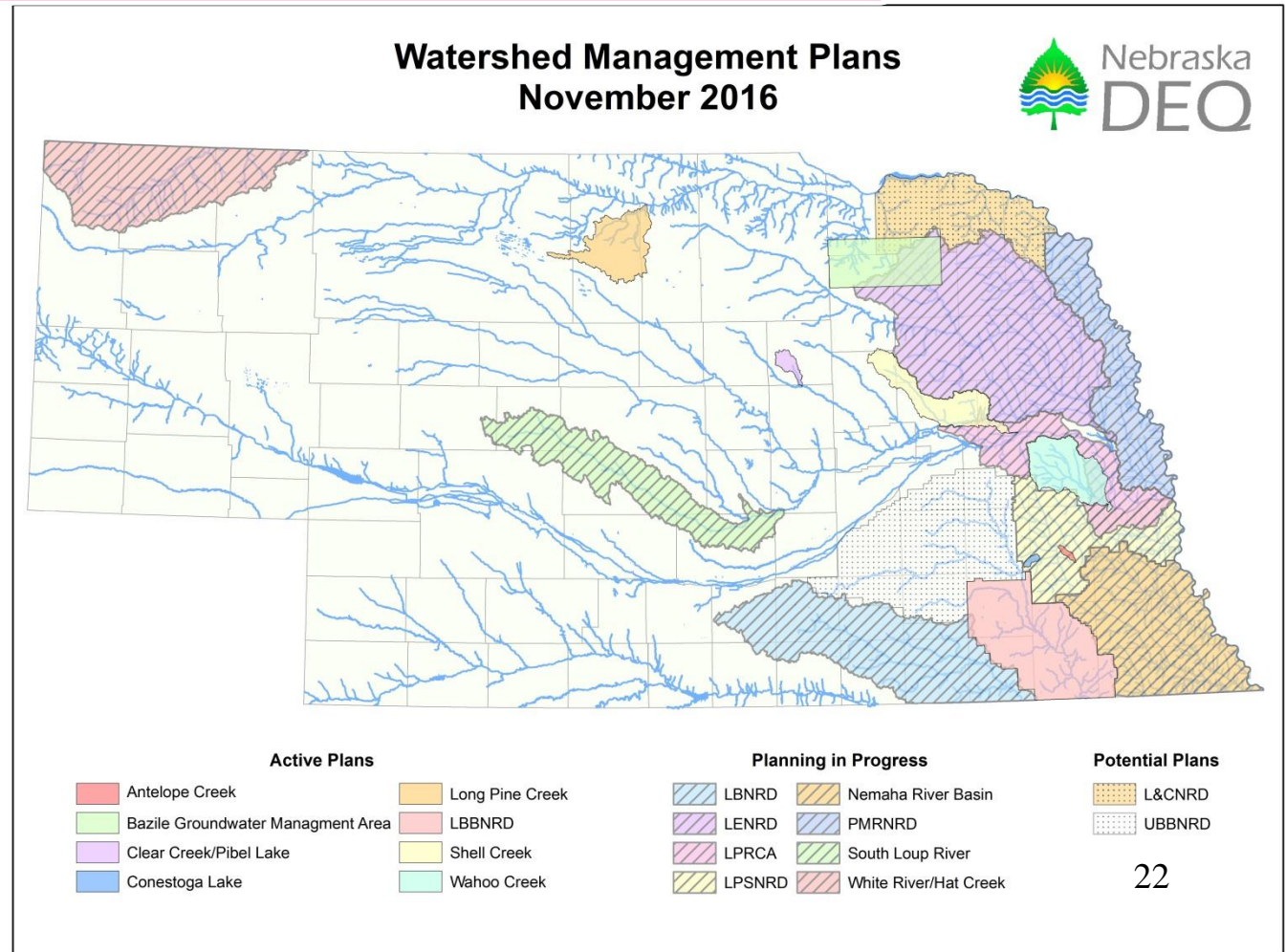
TMDLs (not regulatory)

Voluntary Watershed/Basin  
Plans, Implement Projects

TMDLs (not regulatory)



Voluntary Watershed/Basin Management Plans, Implement Projects





# Conestoga Lake near Lincoln

– upland work, drain, excavate, reshape, reseed banks, create off-channel wetlands



# Encourage & Cost Share on BMPs

← No till



Terraces →



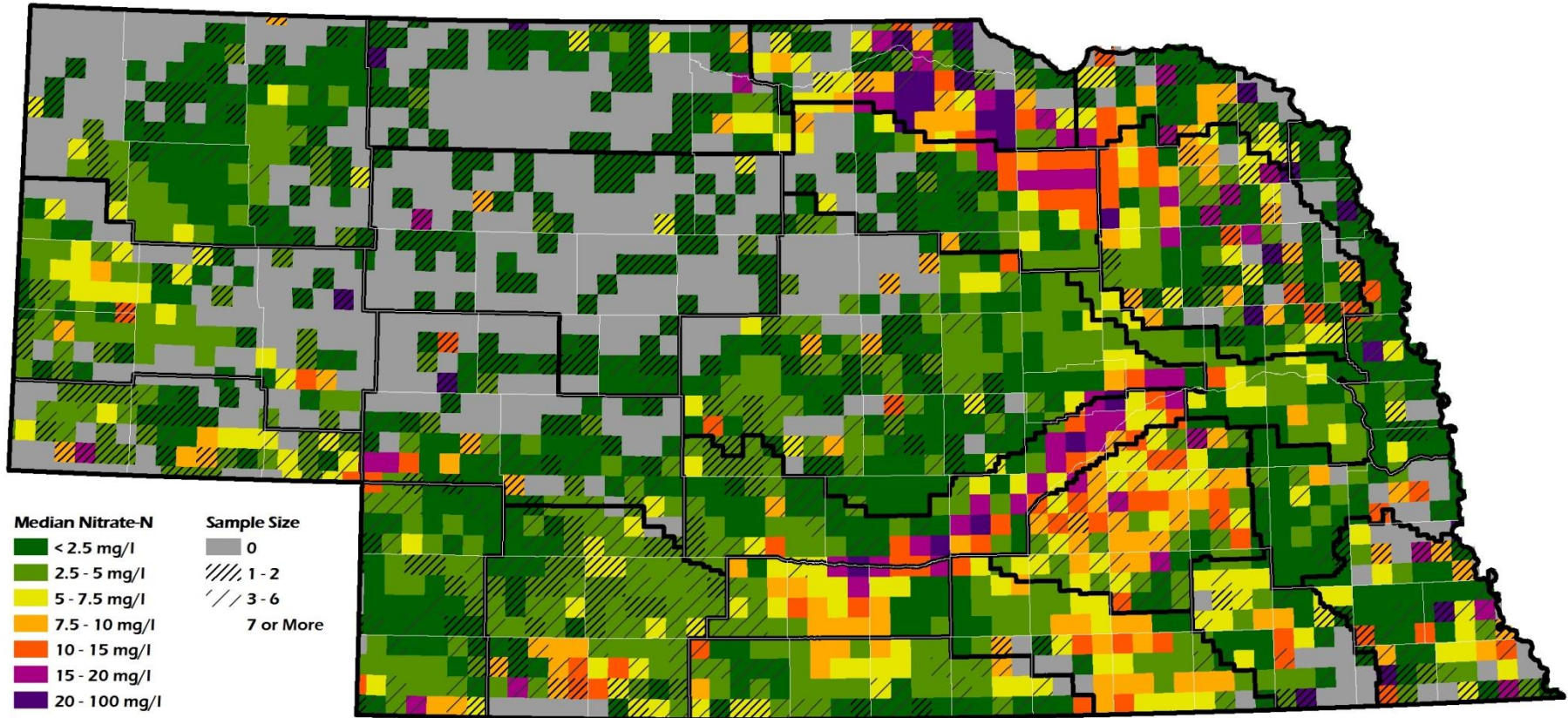


# Groundwater





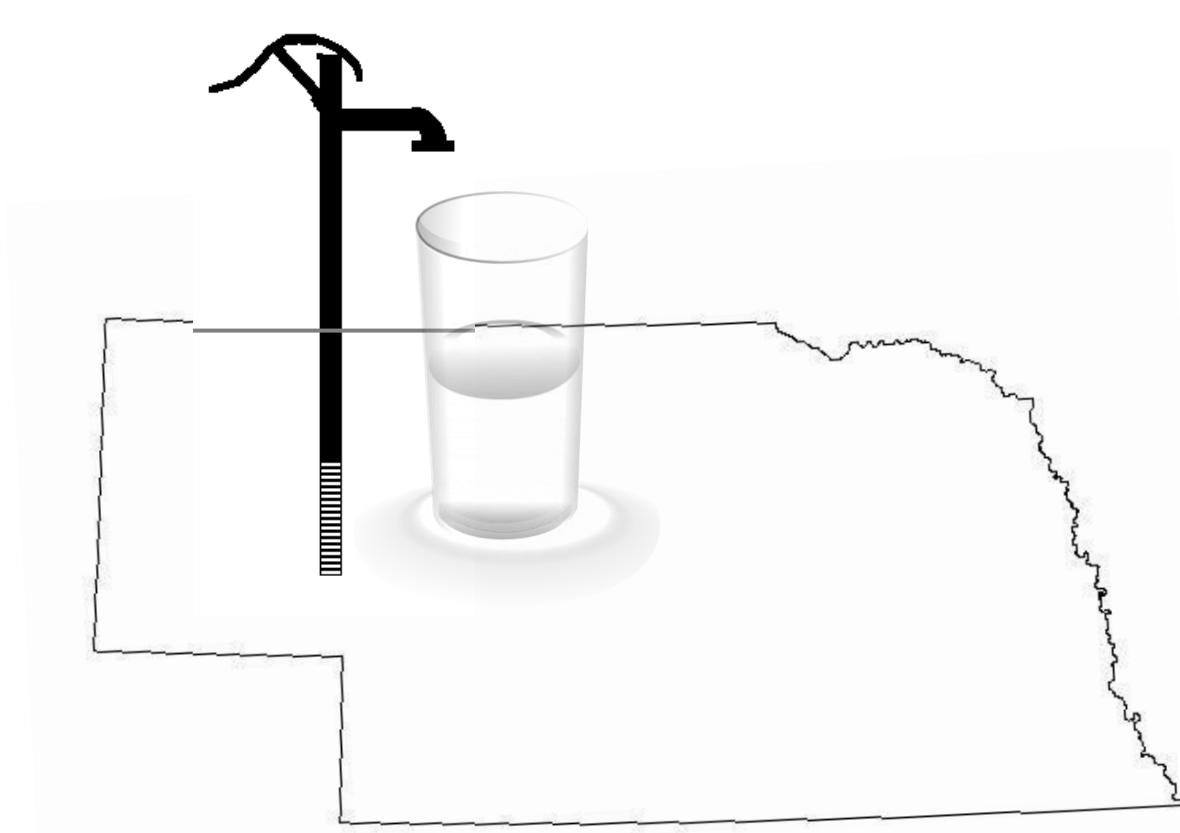
# From the Dec. 2016 Groundwater Monitoring Report



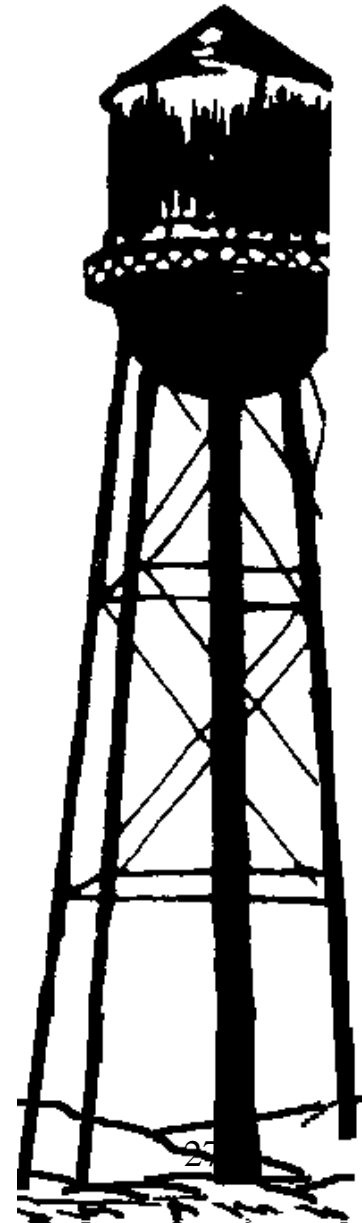
Nitrate as N, by Township (36 sq.mi.)



# Groundwater & Wellhead Protection



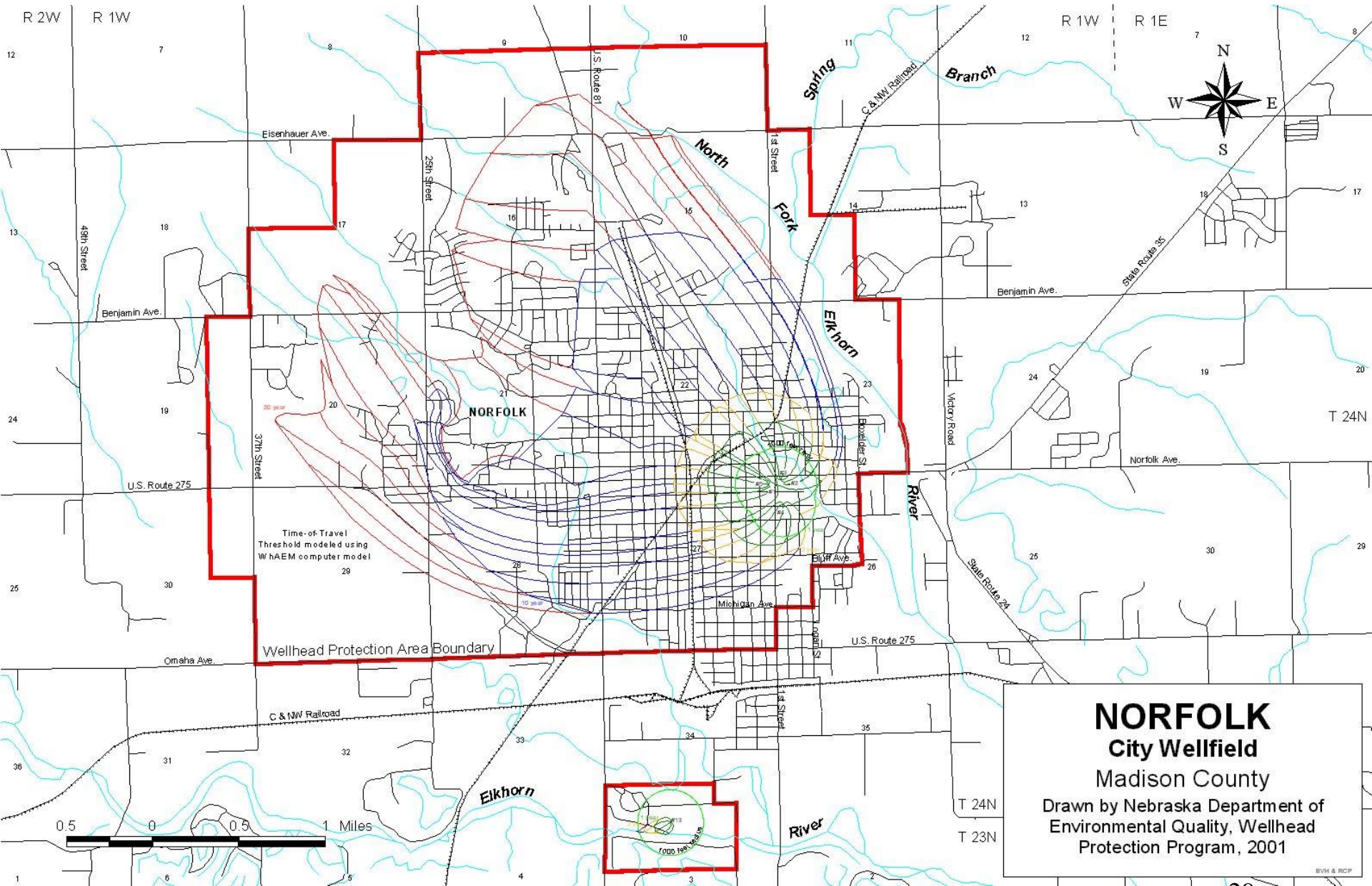
**~ 88% of Nebraskans rely wholly or partially on Groundwater for drinking water**



# Groundwater & Wellhead Protection

- Wellhead Protection Area map
- Contaminant Source Inventory
  - Most threatening, most prevalent
  - Gas stations, fertilizer sales/storage, ag chemical application, abandoned wells
- Contaminant Source Management
  - Ordinances, BMPs
- Emergency, Contingency, & Long-Term Planning
  - Ice Storm, Tornado, future growth
- Public Education & Participation
- Funding Options

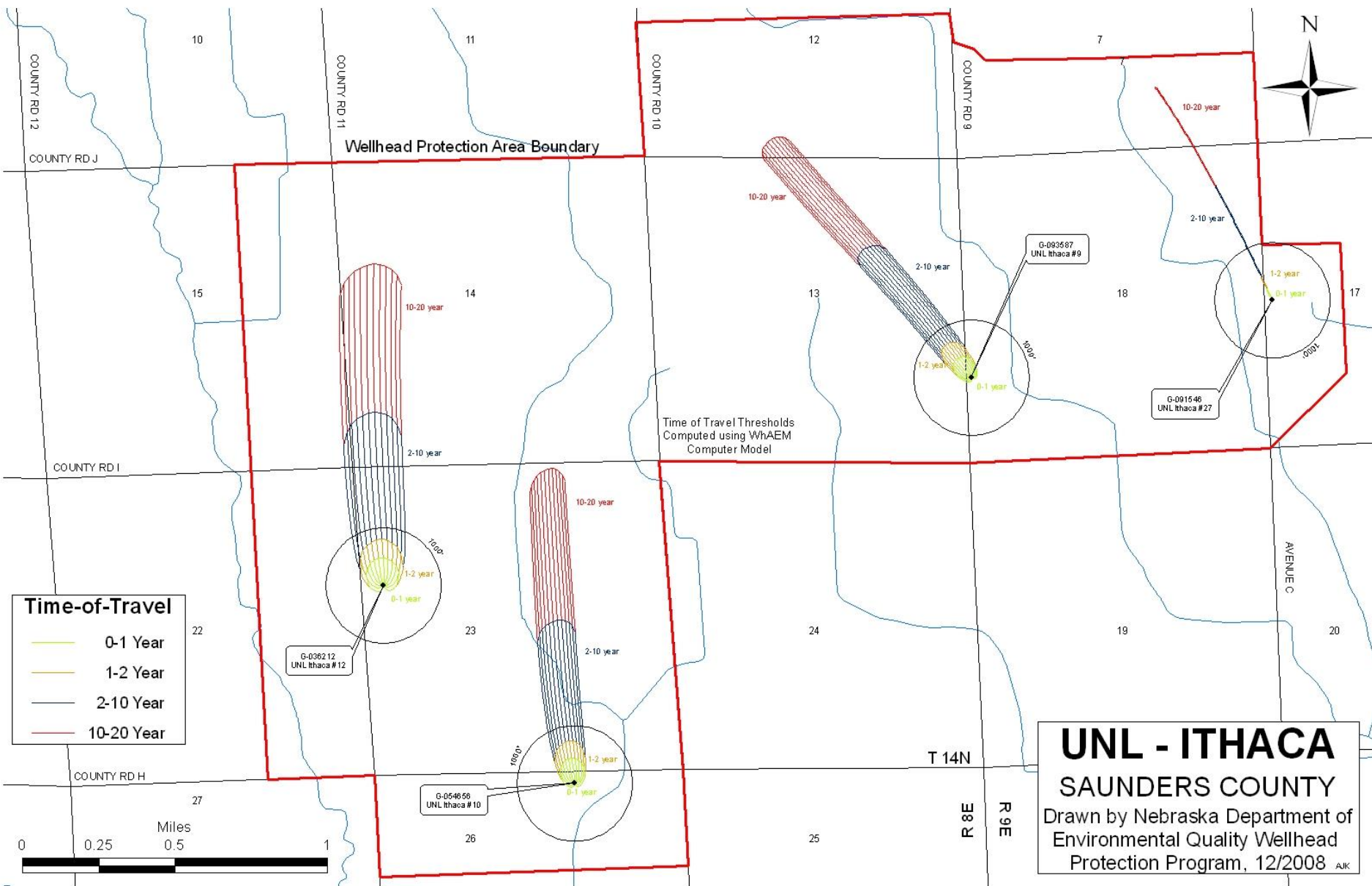




**NORFOLK**  
**City Wellfield**  
 Madison County  
 Drawn by Nebraska Department of  
 Environmental Quality, Wellhead  
 Protection Program, 2001

BVM & RCP

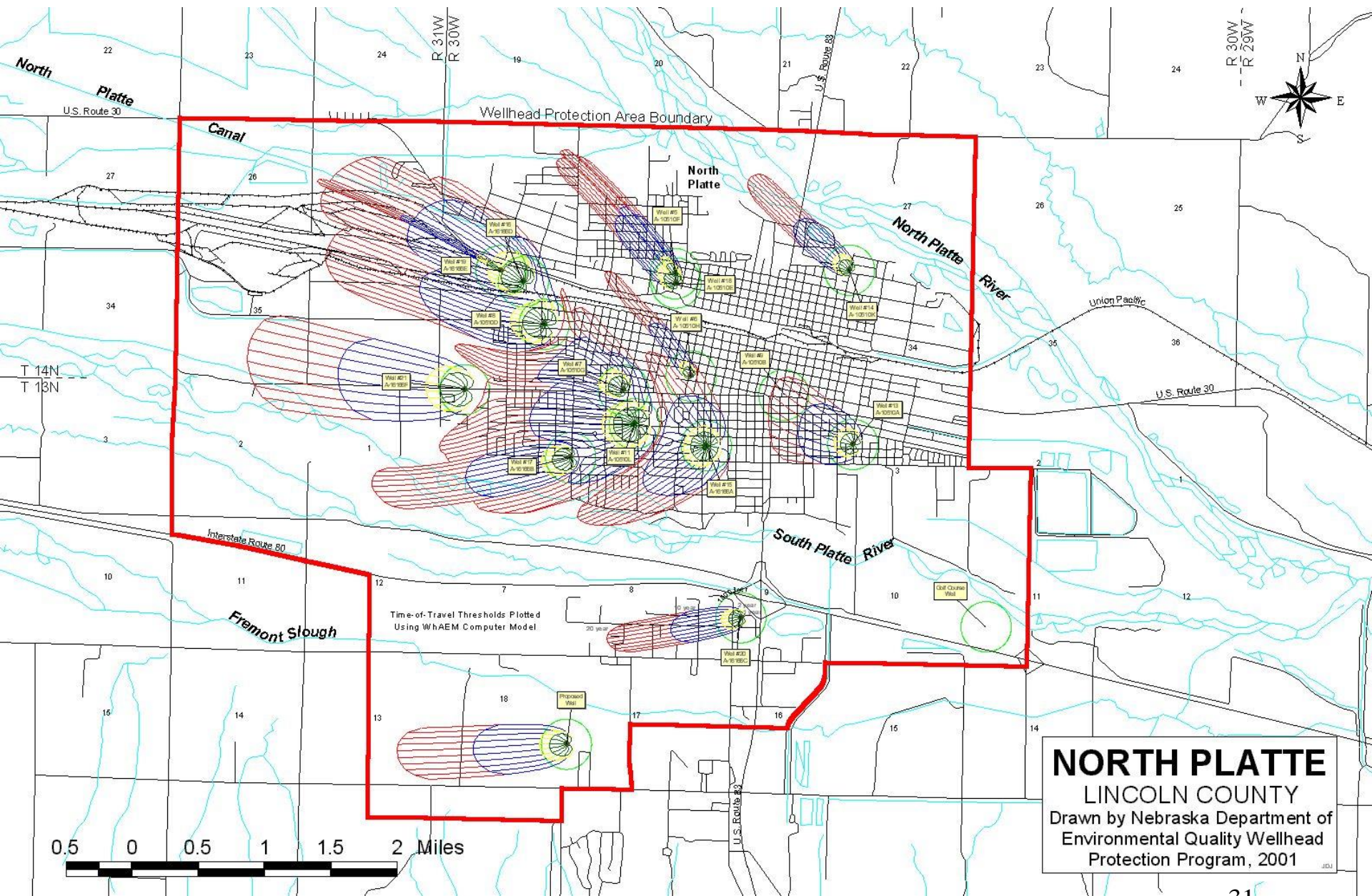




**Time-of-Travel**

- 0-1 Year
- 1-2 Year
- 2-10 Year
- 10-20 Year

**UNL - ITHACA**  
**SAUNDERS COUNTY**  
 Drawn by Nebraska Department of  
 Environmental Quality Wellhead  
 Protection Program, 12/2008 AK







**Questions?**

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