

Groundwater Quality Issues in Nebraska

WSWC Groundwater Workshop
April 22, 2025

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Nebraska Department of Environment and Energy

Nebraska: The Great American Water Machine



- 1.6 million acre-feet of water flows into NE and 9 million acre-feet flows out

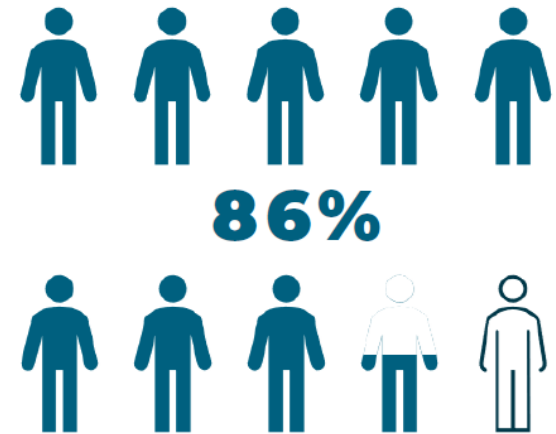
Source: Nebraska Public Media

<https://nebraskapublicmedia.org/en/series-media/non-series-video/nebraska-the-great-american-water-machine-50013668/>

Most Nebraskans Drink Groundwater

- Groundwater is a critical resource for agriculture, industry, and drinking water in Nebraska
- Approximately 360,000 Nebraskans, or about 18%, rely on private domestic wells for their drinking water
- These wells are not regulated by the Safe Drinking Water Act

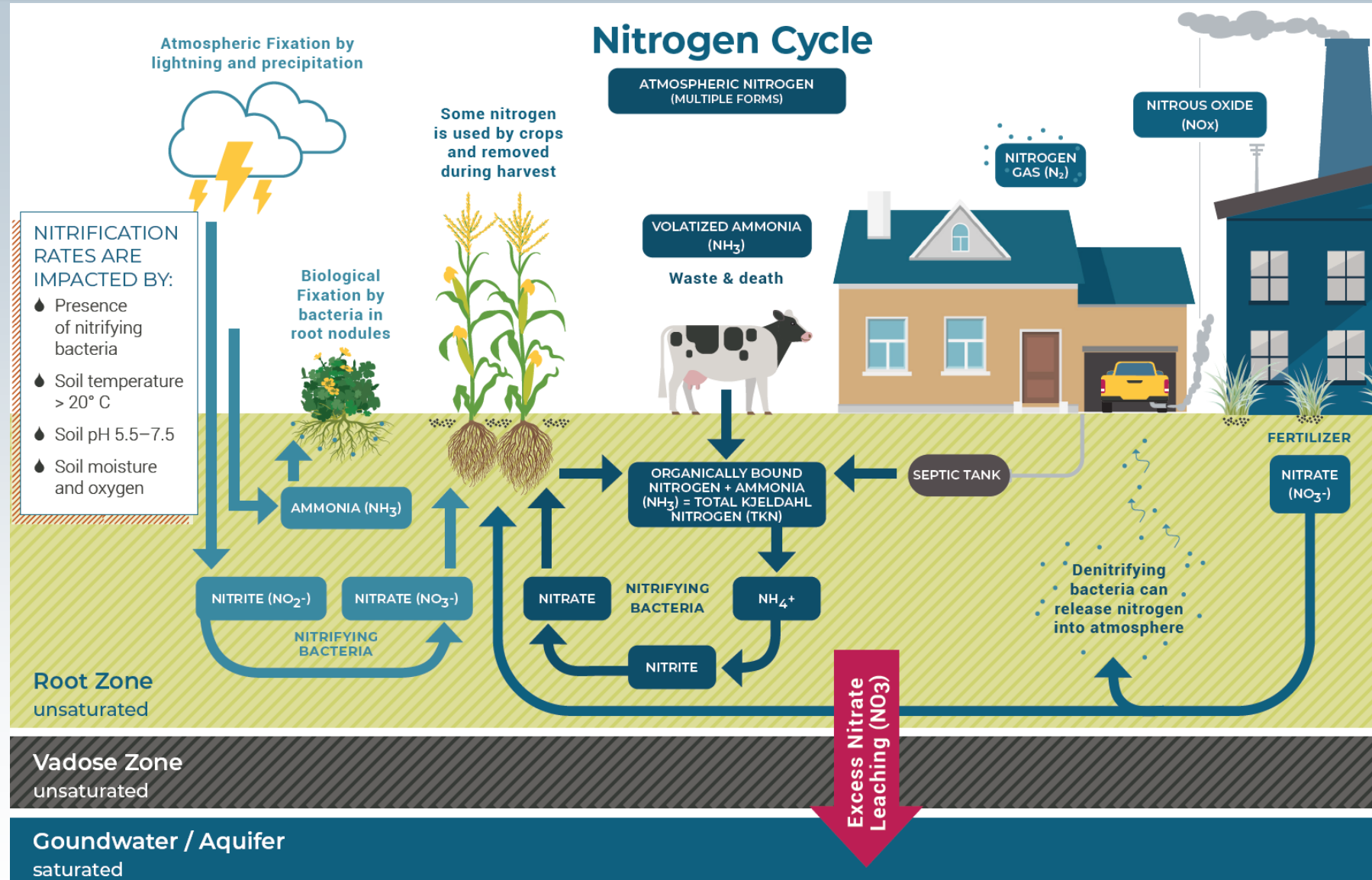
**GROUNDWATER IS THE
PRIMARY DRINKING
WATER SOURCE FOR
NEARLY NINE OF EVERY
TEN NEBRASKANS.**



Most Common Groundwater/Drinking Water Quality Concerns in Nebraska

- Nitrate
- Iron & Manganese
- Arsenic
- Uranium





Overall Objective:

Provide an analysis and recommend viable solutions for nitrate-impacted drinking water including drinking water supply not regulated by the Safe Drinking Water Act (SDWA).



NITRATE DATA &
TREND ANALYSIS



REVIEW BY
AGENCY EXPERTS
& PARTNERS



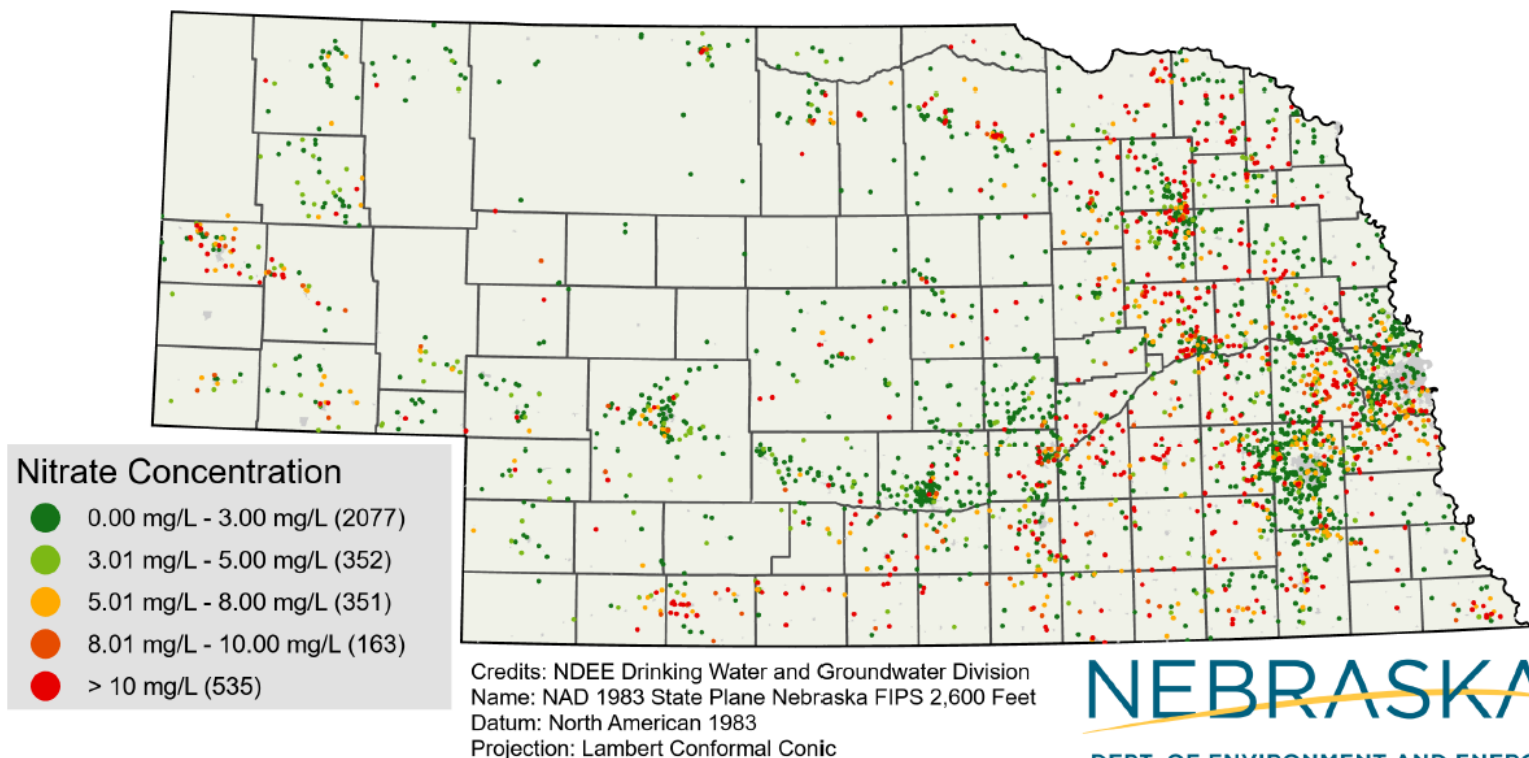
DATA-INFORMED
RECOMMENDATIONS
TO ADDRESS
NITRATE-AFFECTED
DRINKING WATER

Free Private Domestic Well Sampling Effort

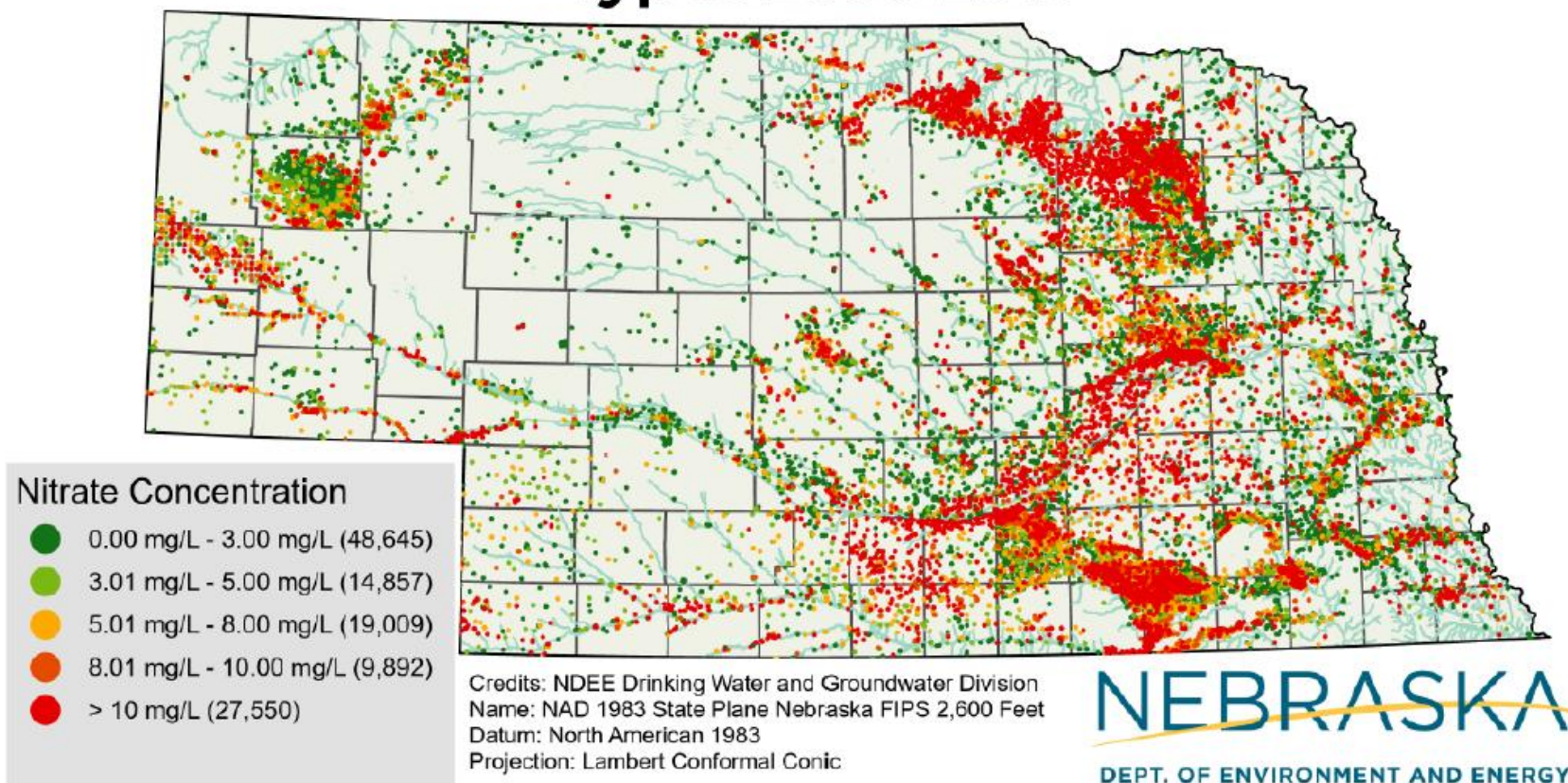
**NDEE Oversaw the
Largest Private Domestic
Well Sampling Effort in
State History**

**Over 3,400 Samples
Analyzed**

**Mean Nitrate
Concentration 4.83 mg/L**



119,683 Nitrate Well Samples from the Nebraska Groundwater Quality Clearinghouse: All Well Types 2003-2019



Manganese

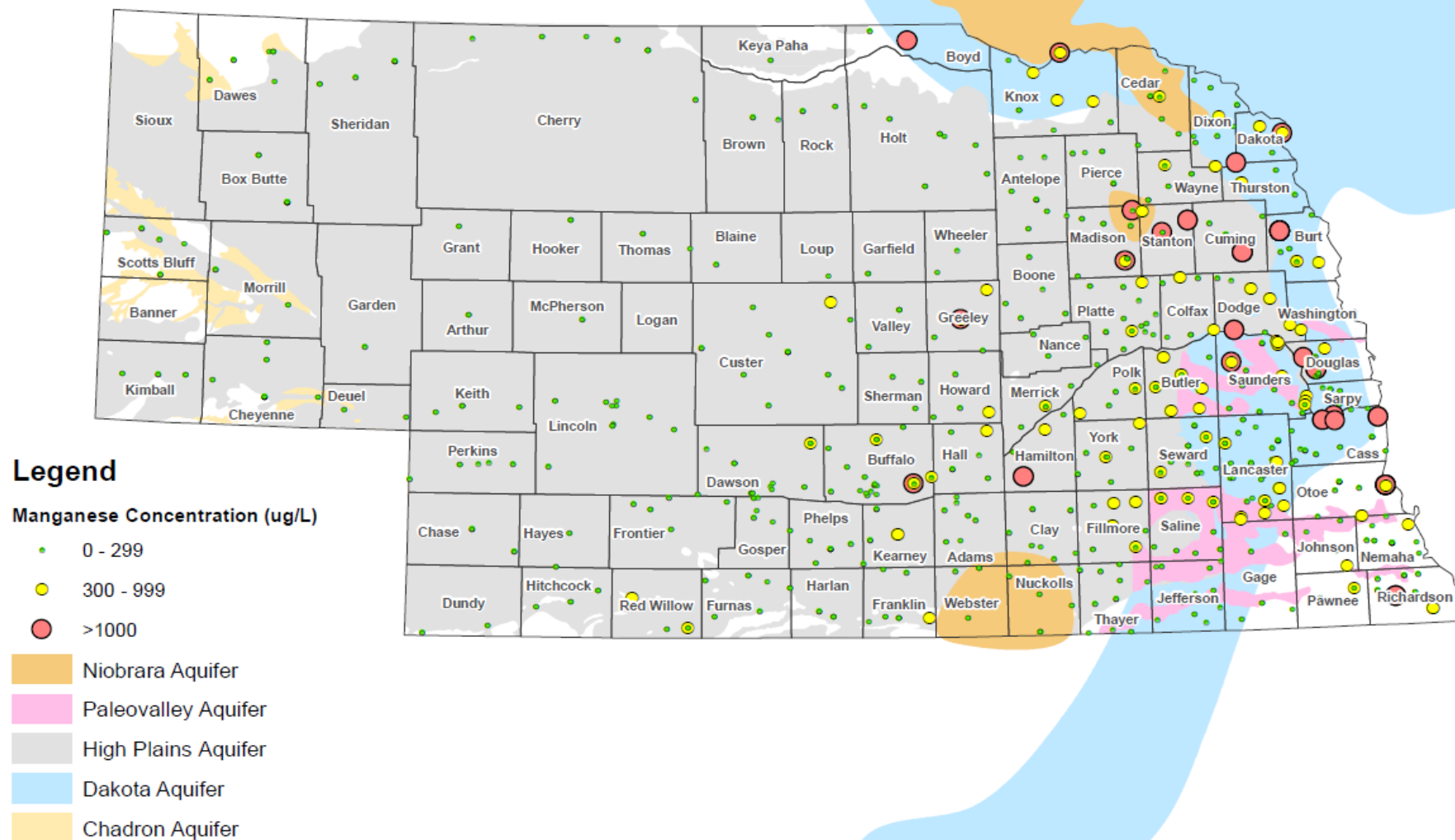


Source: WOWT (<https://www.wowt.com/content/news/West-Points-unsafe-water-raising-concerns-for-other-rural-water-systems-559294601.html>)

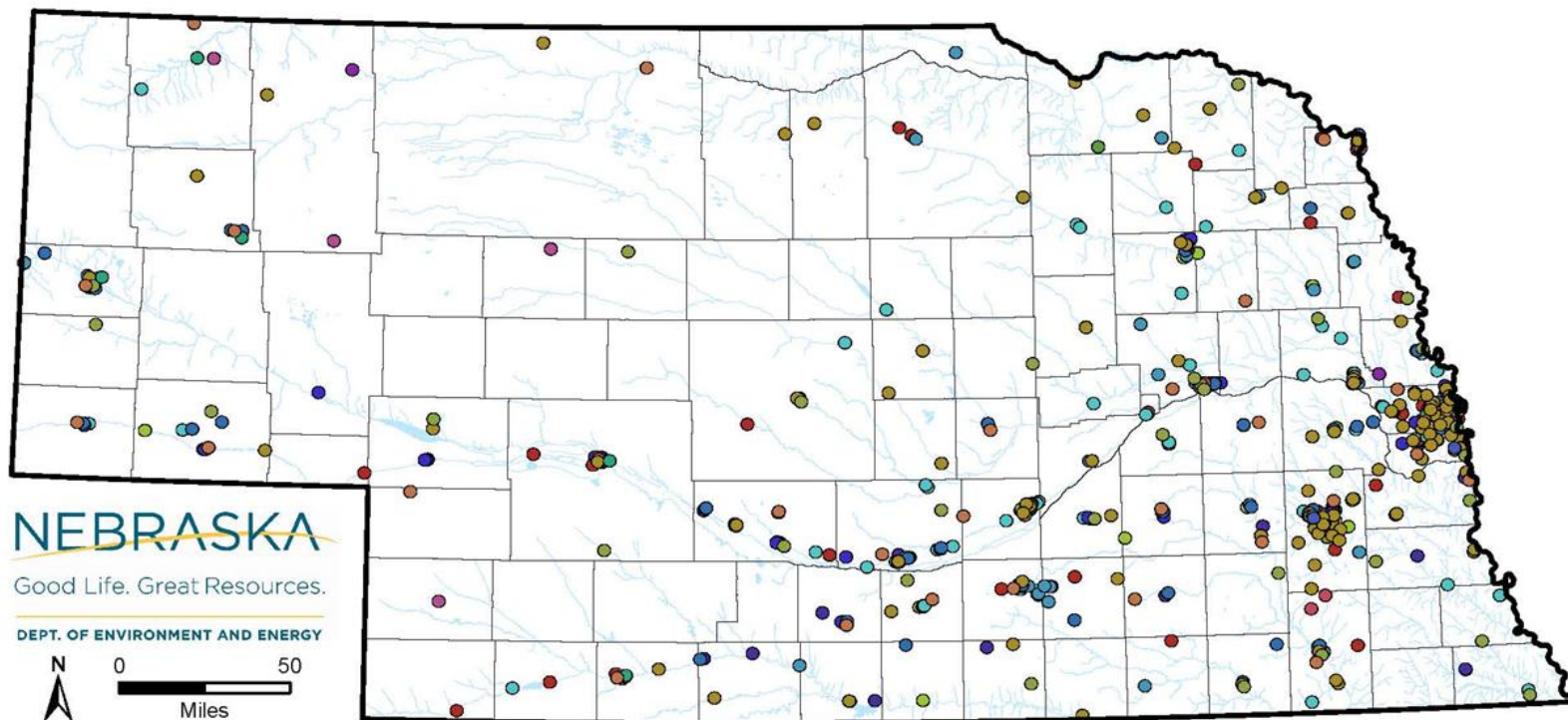
Manganese

- NDEE applied for and received a grant package in 2020 to conduct manganese sampling of community water systems in Nebraska
- Recommended public notices provided for two scenarios:
 - Above 300 ug/L: Water should not be used to prepare formula for infants
 - Above 1000 ug/L: All citizens should use filtered or bottled water for drinking

Manganese Sampling Results (August 2020)



Nebraska Statewide Inventory Per- and Polyfluoroalkyl Substances



Industries:

- | | | |
|--|-----------------------------------|---|
| ● Chemicals & Allied Products | ● Leather & Leather Products | ● Photographic Equipment & Supplies |
| ● Cutlery & Handtool Manufacturing | ● Military Bases | ● Professional & Scientific Instruments |
| ● Electrical Machinery, Equipment, & Supplies | ● Municipal Airports | ● Rubber & Plastics Products |
| ● Electroplating, Polishing, & Anodizing of Metals | ● Municipal Solid Waste Landfills | ● Textile Mill Products |
| | ● Paper & Allied Products | ● Transportation Equipment |

Unregulated Contaminant Monitoring Rule (UCMR)



PHOTO COURTESY OF NEBRASKA WATER SCIENCE CENTER

- Required of the EPA by the Safe Drinking Water Act
- List of 30 unregulated contaminants selected for one-time testing
- Done every five years

EPA UCMR 5 Results as of March 2025

94% of PWS in
Nebraska above
screening level
for lithium

35 of 52 PWS
have sampled to
date

No PFOA detects
in 35 PWS

3 PWS above
the MCL for
PFOS

1 PWS with PFBA
detects (not
regulated)

3 PWS with
PFHxS detects

NDEE Small Systems Sampling as of March 2025

416 of 449 eligible PWS have sampled (93%)

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graph TD; A[416 of 449 eligible PWS have sampled (93%)] --> B[PFOA: 7 PWS above the MCL]; B --> C[PFOS: 18 PWS above the MCL]; C --> D[PFHxS: 5 PWS above the MCL];
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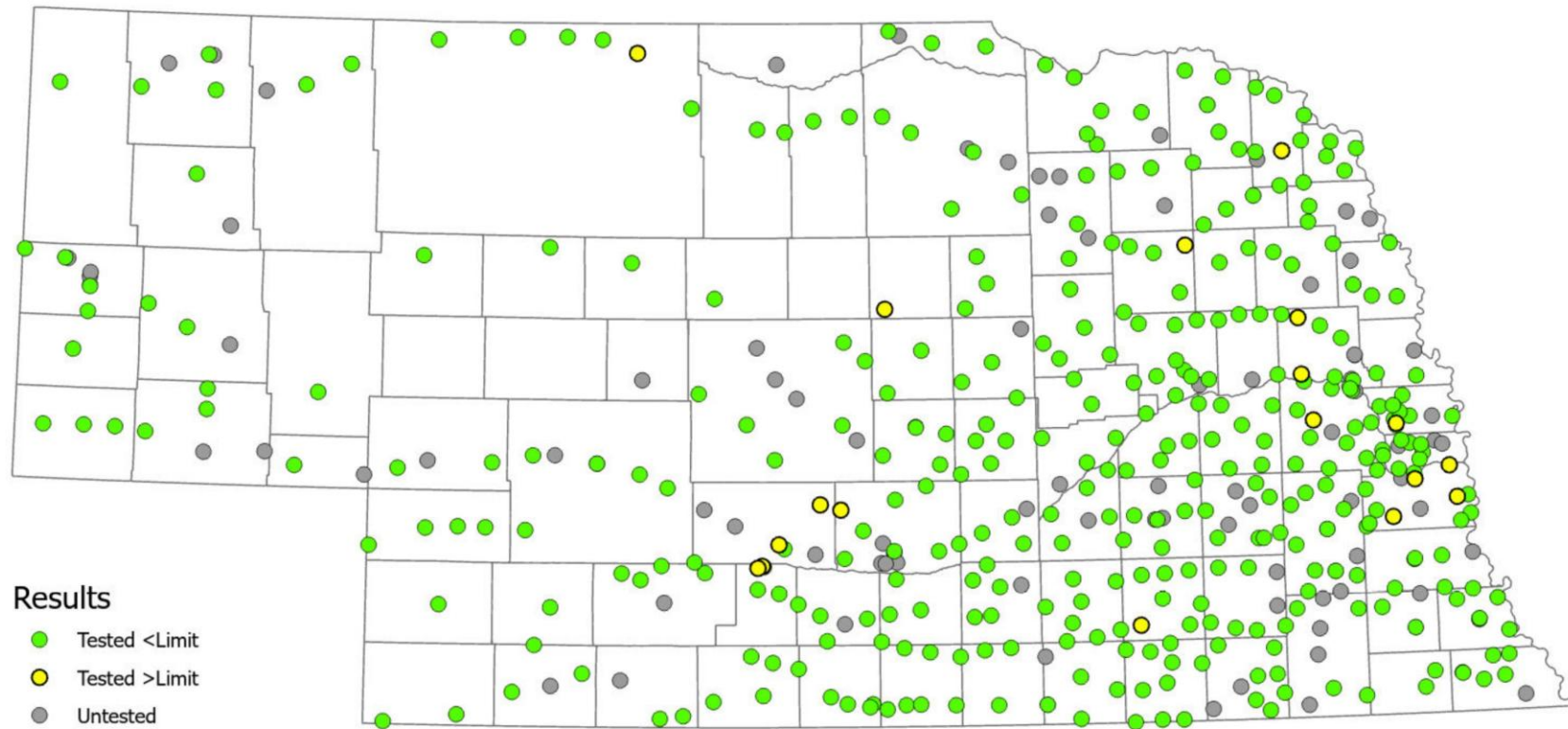
PFOA: 7 PWS above the MCL

PFOS: 18 PWS above the MCL

PFHxS: 5 PWS above the MCL

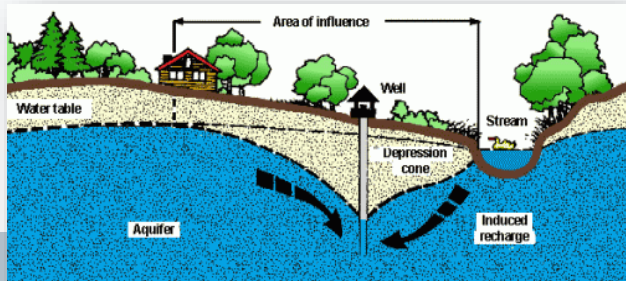
Public Water Systems PFAS Results

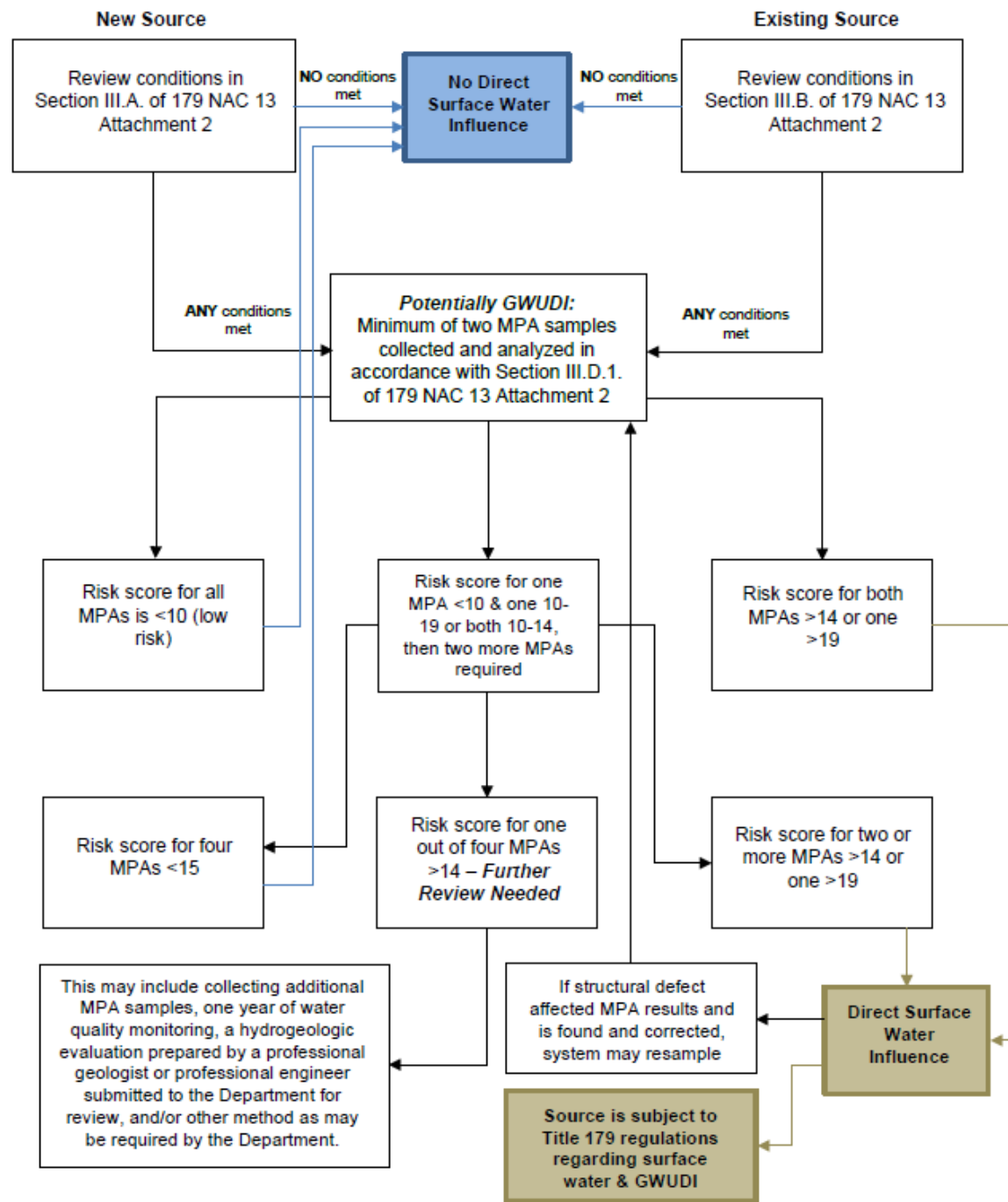
NDEE Sampling updated Jan 2, 2025

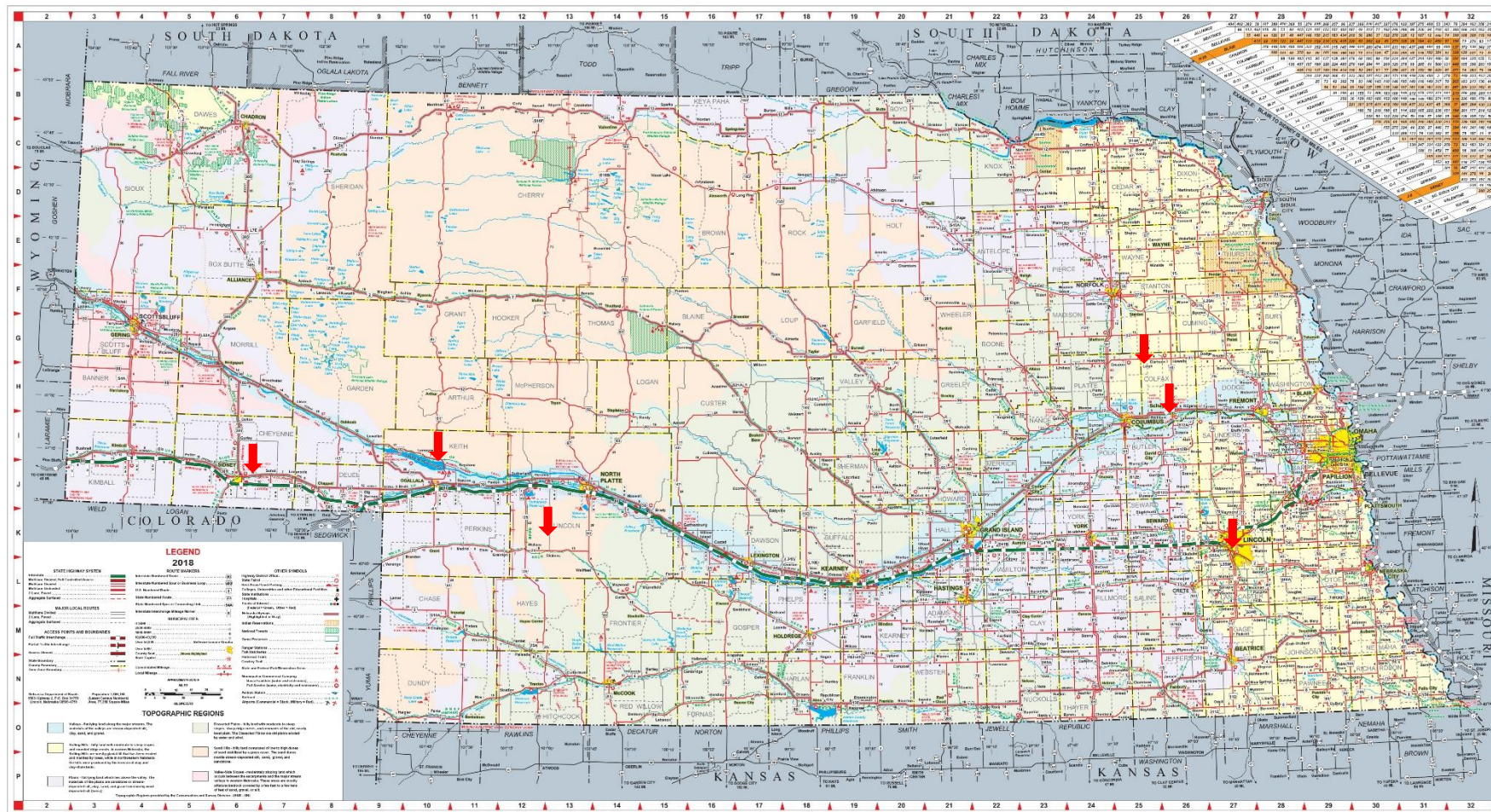


Groundwater Under the Direct Influence (GWUDI)

- Previous regulation:
 - Source waters determined to be *potentially at risk* to the direct influence of surface water required to take a minimum of a set of two Microscopic Particulate Analysis (MPA) samples
 - Presence of any single indicator in both samples considered **conclusive evidence** of surface water influence
 - Very conservative and more stringent than other states
- New regulation (as of March 18, 2025):
 - Source waters determined to be *potentially at risk* to the direct influence of surface water required to take a minimum of a set of two Microscopic Particulate Analysis (MPA) samples
 - Presence of giardia or cryptosporidium cyst will be considered **conclusive evidence** of direct surface water influence
 - Presence of any other single indicator in both samples considered **evidence of potential surface water influence and triggers an engineering review**





[illegible]

Know Before You Go, Check Online -
 For 24-Hour Weather & Travel Information visit
511.nebraska.gov

NDOT State Headquarters is located at 1500 Highway 2, Lincoln, Nebraska 68502-5480.
 If public information, call 402-478-4512 between 8:00 a.m. and 5:00 p.m., Monday thru Friday.
 Please, buckle up and drive smart. Fines are doubled in highway work zones when workers are present.

This State Highway Map is produced by the Nebraska Department of Transportation (NDOT).

Nebraska Byways

285 - Gold Rush Byway	US-385, Colorado Line to South Dakota
Bridges to Buttes Byway	US-29, Wyoming Line to Nebraska
Heritage Highway	US-138, Missouri Line to US-36/US-6 Intersection North of Elkhorn
Lewis & Clark Scenic Byway	US-75, North of 148th to South Sioux City
Lincoln Highway Scenic & Historic Byway	US-30, Wyoming Line to Iowa
Loop Rivers Scenic Byway	N-119W, Dunning to Wood River
Outlaw Trail Scenic Byway	N-112, Valentine to US-26 West of Sioux Falls
Sandhills Journey Scenic Byway	N-2, Alliance to Grand Island
Western Trails Scenic & Historic Byway	N-265/US-26, Ogallala to Wyoming

County Location/Vehicle License Index

County location and county vehicle license index are displayed in the following table.

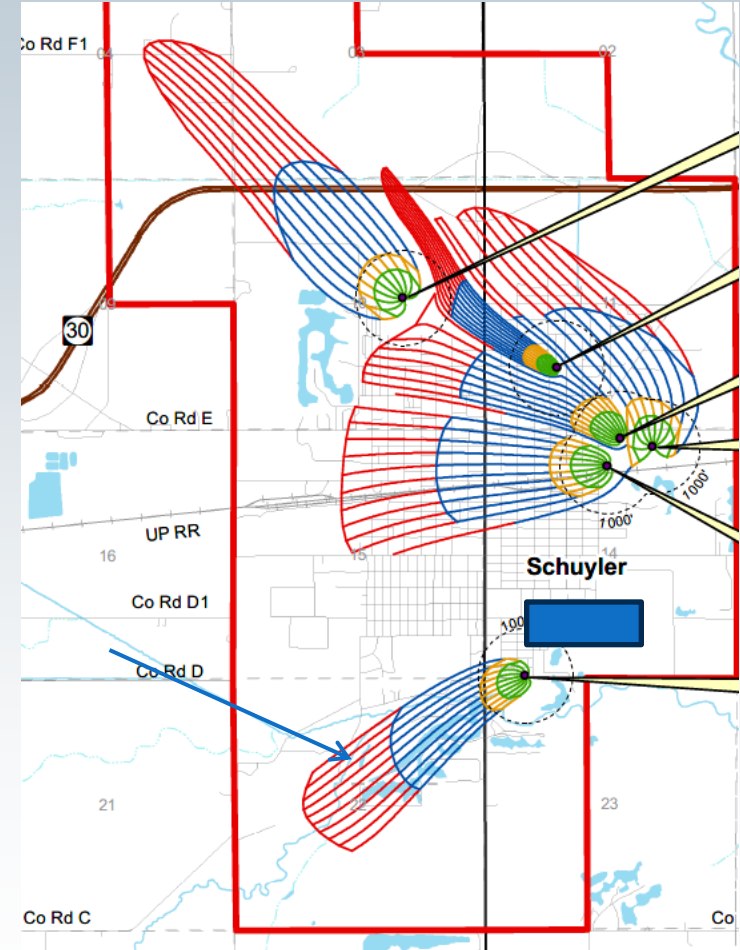
County	County Location	County Vehicle License Index
Adams	14-21	04-08
Alameda	14-22	04-09
Albany	14-23	04-10
Alameda	14-24	04-11
Alameda	14-25	04-12
Alameda	14-26	04-13
Alameda	14-27	04-14
Alameda	14-28	04-15
Alameda	14-29	04-16
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Alameda	17-93	07-80
Alameda		

Protecting Drinking Water from Surface Water Discharge (Pre-Maui) Reversed

- Nebraska has on several different occasions instituted drinking water limits on a surface discharge to a stream.
 - Discharge to a Brule formation with a private well immediately downstream.
 - Discharge from a meat processor to a small losing stream that crossed the 20-year time of travel for a community well. N of 100 mg/l. Restricted to 10 mg/l.



Reverse Maui



Interbasin Transfer

- Pumping GW over the ridge to another basin.
 - Do you need an NPDES permit?
- If the quality of the water is different - Yes



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Large Scale Septic

- Added a sawdust layer to the design of a rest area septic system to provide a carbon source for denitrification.
- Fish Cleaning Station.



Elimination of a Wastewater Discharge



Trivia

What breed of dog did sewer workers train to pull a rope through the sewer for cleaning?

Questions?

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