

## 2023 Water Quality Report



Protecting Lives

Protecting Property

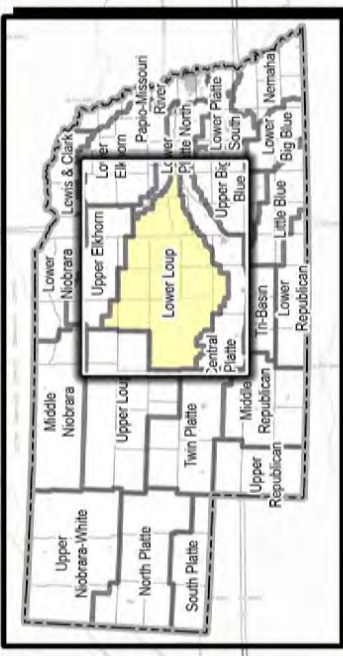
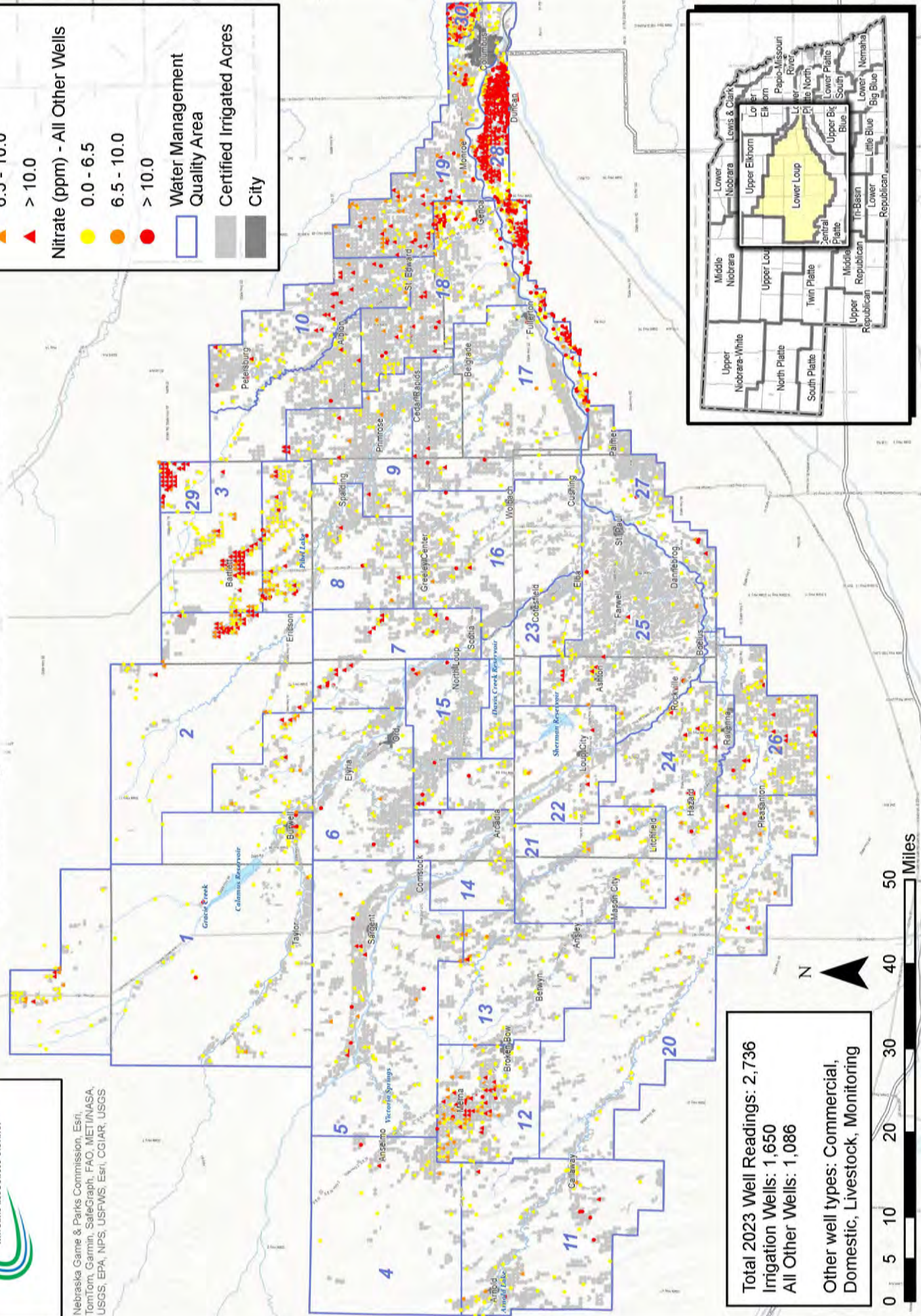
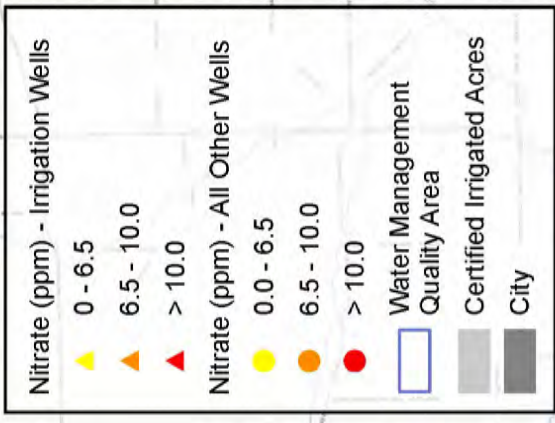
Protecting the Future

# 2023 Nitrate Sampling Results

## Lower Loup Natural Resources District

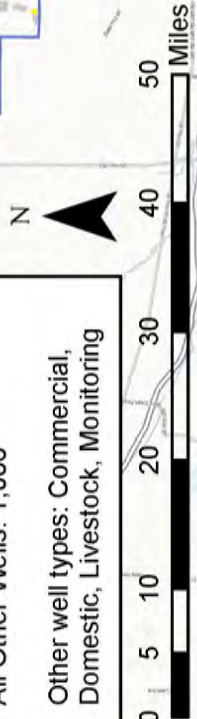


Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, MET/INASA, USGS, EPA, NPS, USFWS, Esri, CQJAR, USGS



**Total 2023 Well Readings: 2,736**  
**Irrigation Wells: 1,650**  
**All Other Wells: 1,086**

**Other well types: Commercial, Domestic, Livestock, Monitoring**



## 2023 Water Quality Report

LLNRD staff collected a total of 2,513 water samples across the District in 2023, all values are in Parts Per Million (ppm). This total comes from Irrigation wells (1,459), Domestic wells (890), Livestock wells (35), Monitoring wells (127), and Commercial wells (2). The overall trend of the District is a slight increase in the median nitrates to 5.4 ppm (+0.2 compared to 2022) with the average slightly down to 9.5 ppm (-0.7 compared to 2022). Districtwide, without the three Water Quality Management areas (Areas 28, 29, & 30), the median samples were at 2.7 ppm (+0.1 from 2022) and the average was 5.4 ppm (-0.1 from 2022).

There are currently three Water Quality Management areas in the LLNRD. To become a Phase II WQMA, the median nitrate level in that area has tested greater than 6.5 ppm for four (4) consecutive years. In Phase II, a yearly 0-36" soil sample, an irrigation water nitrate, and manure analysis are required on all row-cropped fields. Nitrogen fertilizer application is not allowed until after March 1<sup>st</sup> and split application before and after crop emergence is required unless a labeled N inhibitor is used. Flow meters are required for monitoring water application as well as passing a certification class every four (4) years. LLNRD water technicians collected 838 water samples in these three areas in 2023. Area 28 (South of the Loup River from Palmer to Columbus) has shown a slight decrease this year. Median NO<sub>3</sub> is at 18.9 ppm (-1.3 from 2022) and the average is also 18.9 ppm (-1.4 from 2022). Area 29 (Northeast Wheeler County 23N-09W) has a slight increase in 2023 NO<sub>3</sub> tests. Median is 14.0 ppm (+0.6 from 2022) and average is 13.2 ppm (+0.3 from 2022). Area 30 also shows an increase in NO<sub>3</sub> samples in 2023. Median is 9.5 ppm (+1.6 from 2022) and average is at 12.2 ppm (+0.8 from 2022).

The LLNRD has been sampling nitrate levels in water wells since 1977. The number of samples and the amount of data collected has been increasing every year, so a series of trend analyses has been assembled. Of the 30 Water Quality areas, we are seeing an increasing trend of nitrates in 14 of the 30 areas, just under half. A few areas that are nearing the 6.5 ppm WQMA designation threshold include Areas 12 (Custer County) and 19 (Platte County). This being stated, 16 areas are staying consistently below the 6.5 ppm threshold or are trending slightly down in the amounts of nitrates being found in the water.

The U.S. Environmental Protection Agency has the primary drinking water standard set at 10 ppm max for human consumption. From the domestic wells that have been tested, excluding the three WQMA's, 15% of domestic wells are testing above 10 ppm. In WQMA 28 itself, 75% of domestic wells are over the threshold for safe drinking water. These are concerning numbers

that show how important testing and nitrogen management is for quality drinking water. The graphs below illustrate the Domestic water quality in the LLNRD.

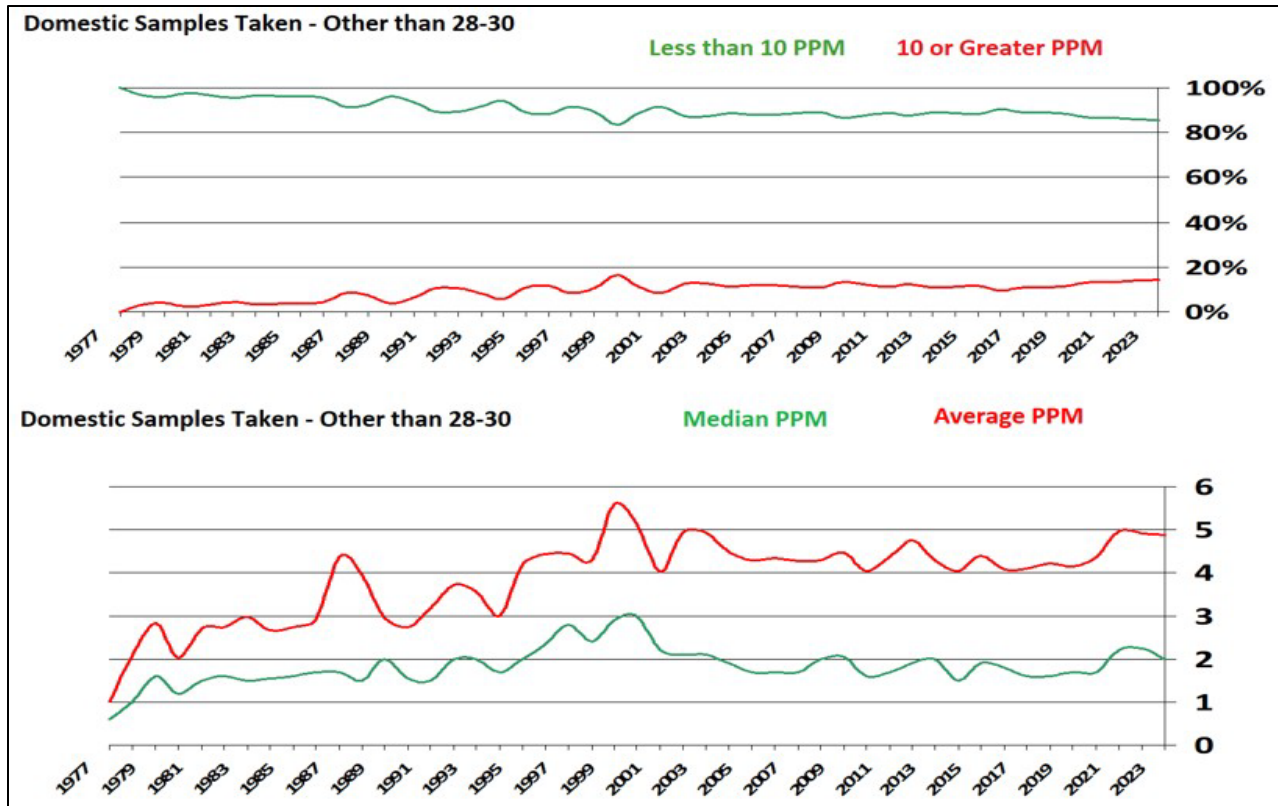


Table 1: Domestic water quality across all LLNRD without WQMA's

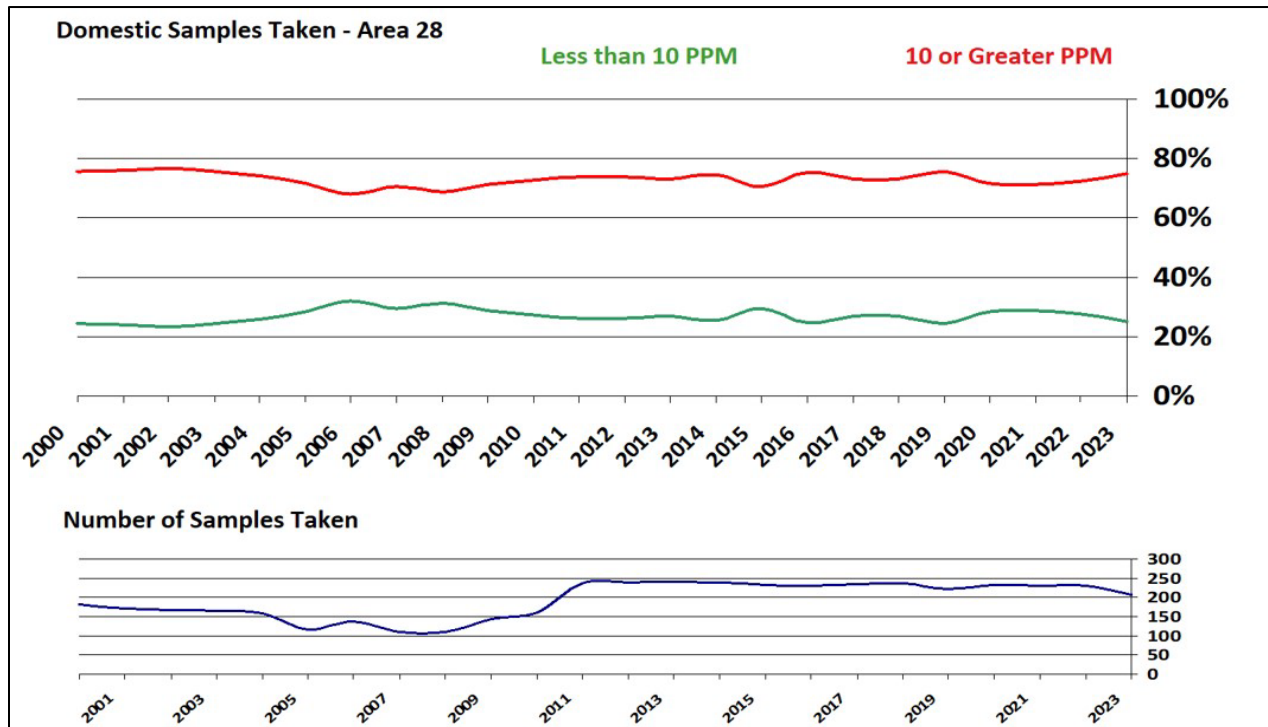
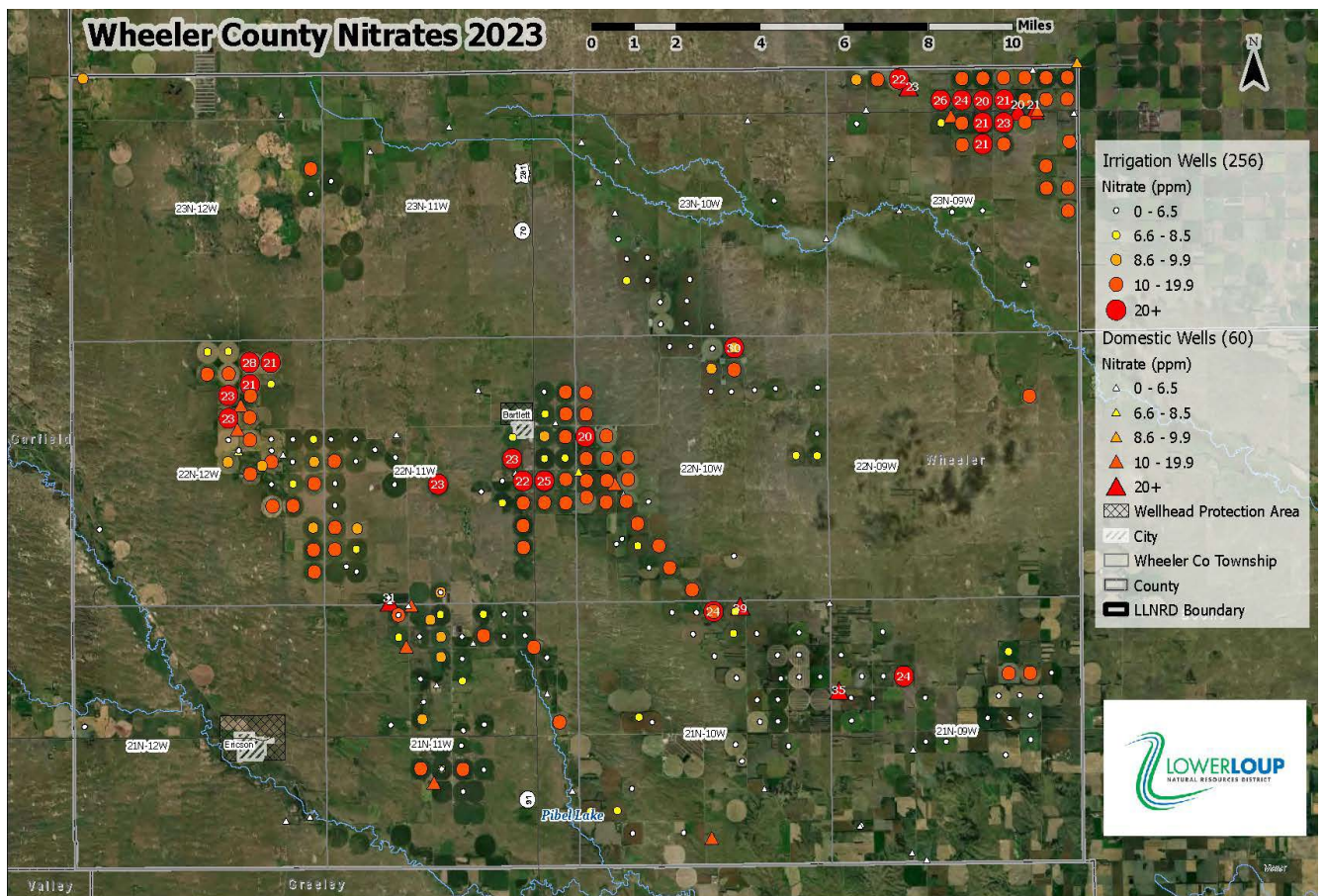


Table 2: Area 28 Domestic water quality.

Wheeler County has been an area of ongoing concern as it relates to groundwater quality. Of the 12-Wheeler County Townships that are in the LLNRD, 5 Townships are trending toward a Phase II trigger as they have consistently been above the 6.5 ppm NO<sub>3</sub> threshold for the last several years. In 2019, Rules and Regulations were modified to allow the Lower Loup NRD Board of Directors to designate smaller sub-areas into Water Quality Management Areas. Township 23N-09W in northeast Wheeler has been WQMA 29 since January 1, 2020. Several of the higher Townships are located near the town of Bartlett. The number of samples taken from this area continues to increase and with the increased amount of testing, the results are showing this is a widespread issue in the area. The county median is 6.10 ppm, but there are 3 Townships that range from 7.80 ppm up to 13.95 ppm.

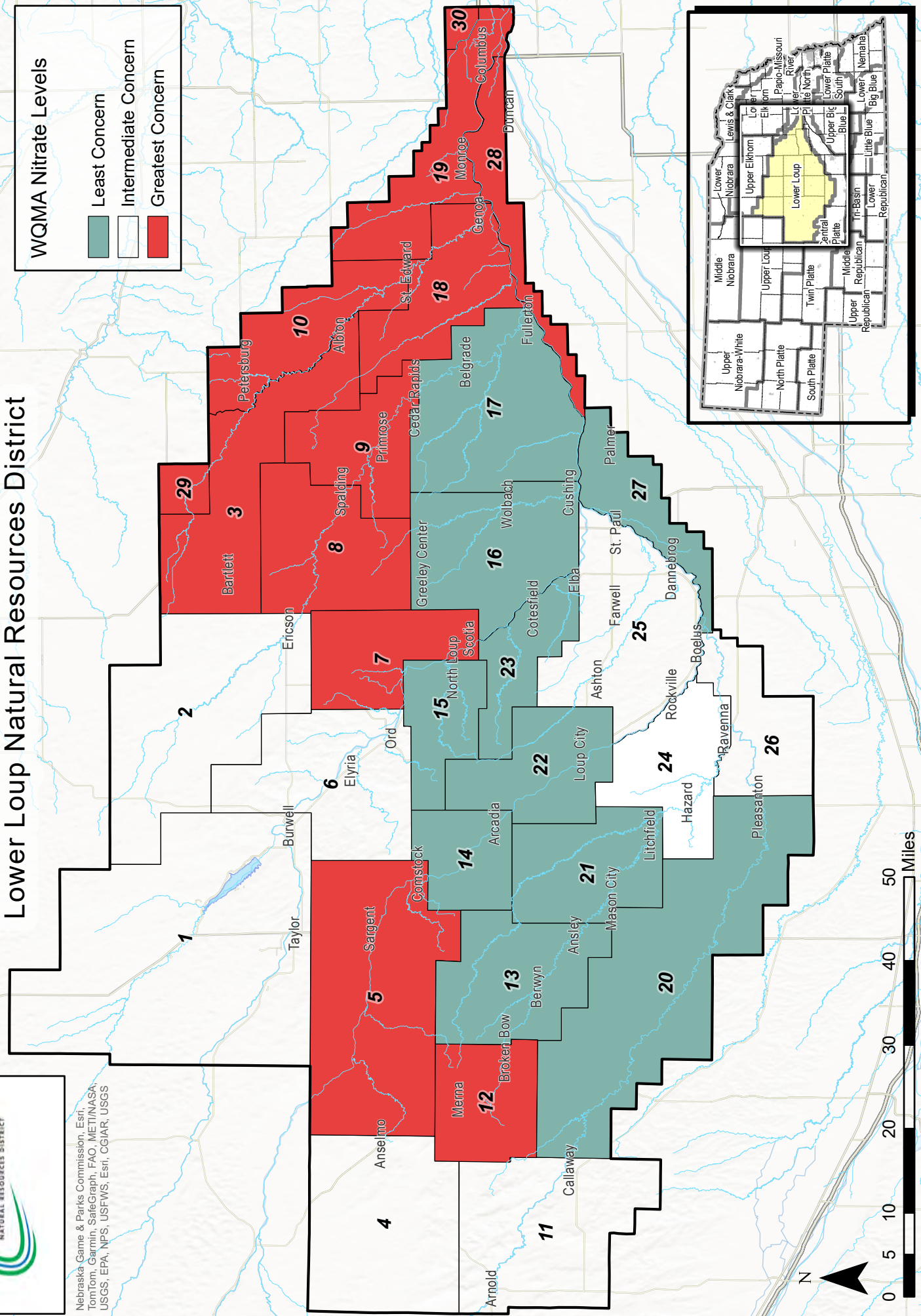


LLNRD water technicians collect water samples throughout the year and the samples are processed at Ward Laboratories in Kearney, NE. The results are collected, analyzed, and an entire record of sampling history since 1977 is available Districtwide for each specific individual well. The historical trend graphs in this report are from the 54,351 water samples that have been collected since 1977 in the Lower Loup Natural Resources District.

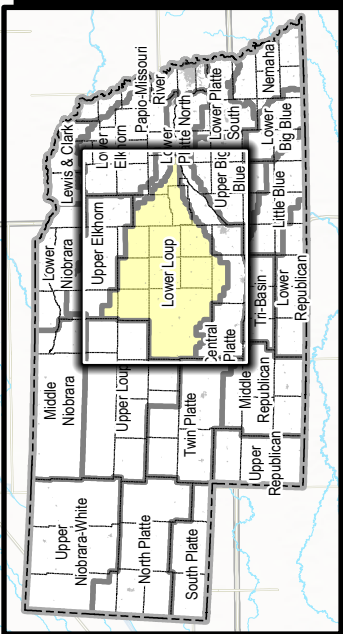
# 2023 Areas of Greatest Nitrate Concern Water Quality Management Areas

## Lower Loup Natural Resources District

### WQMA Nitrate Levels

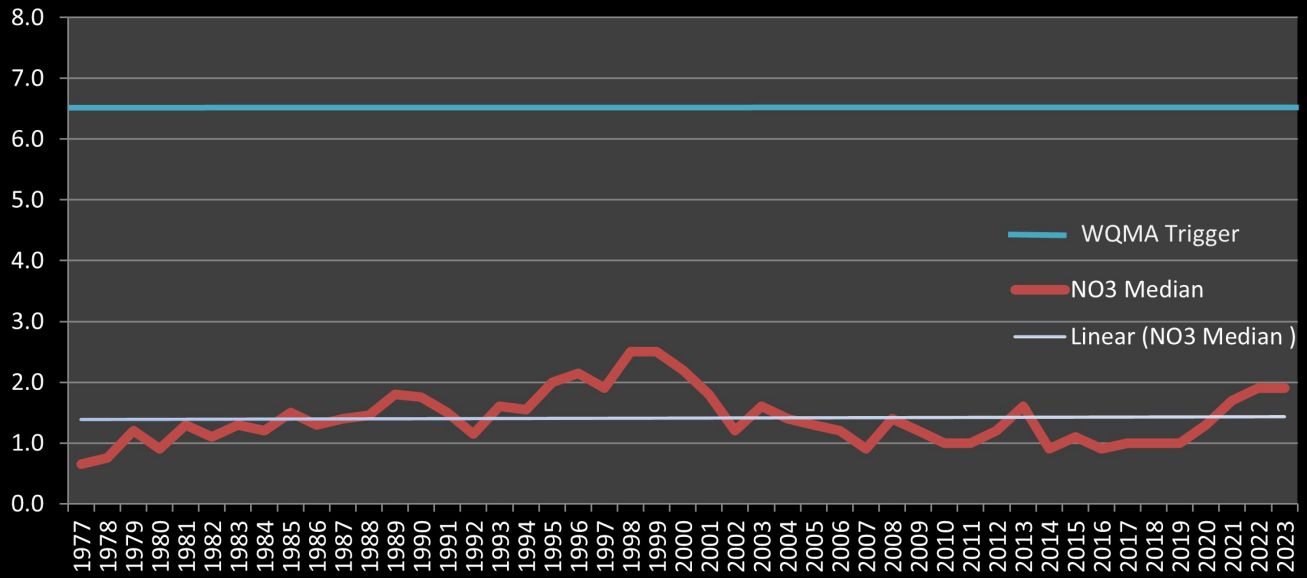


Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, MET/INASA, USGS, EPA, NPS, USFWS, Esri, CGIAR, USGS



# Area 1 NO3 Median

$$y = 0.001x + 1.384$$

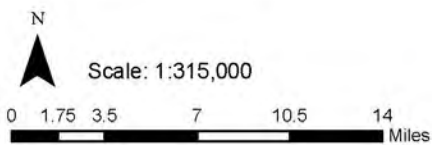
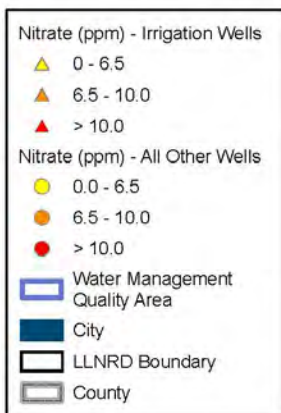


## 2023 Nitrate Sampling Results

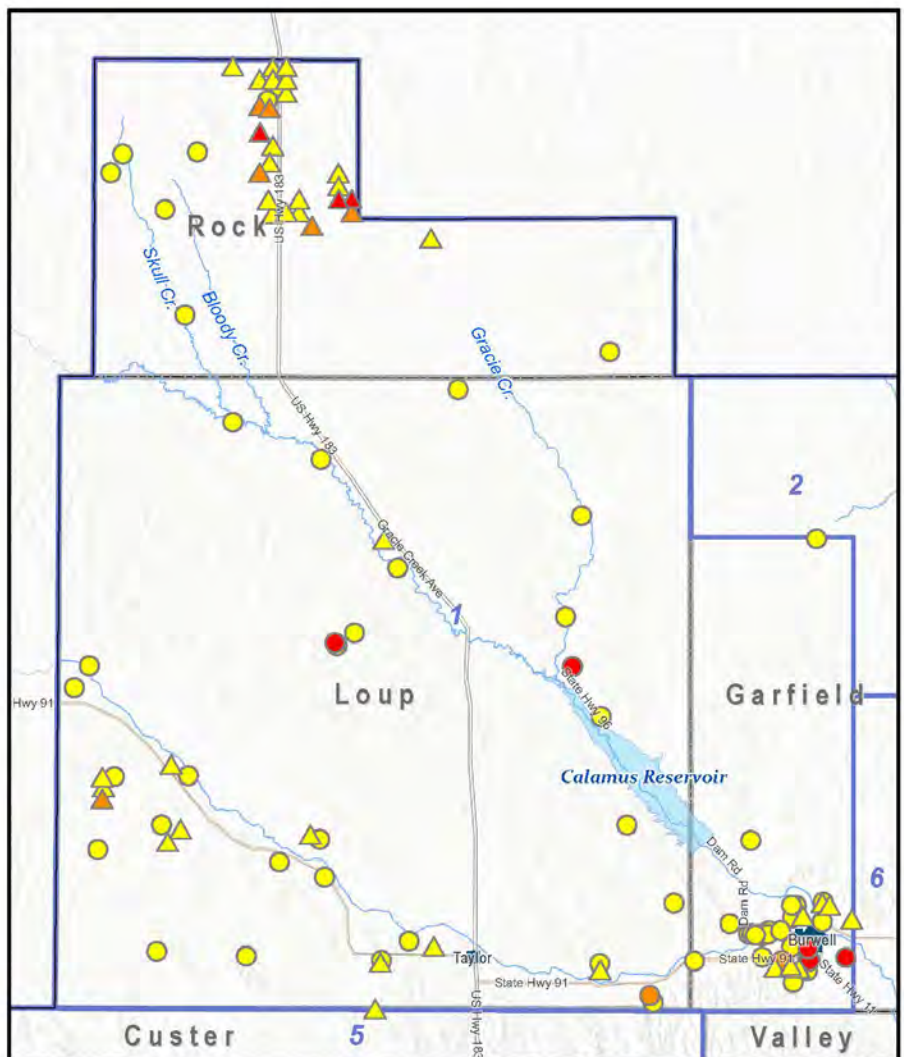
Lower Loup Natural Resources District  
Water Quality Management Area 1

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



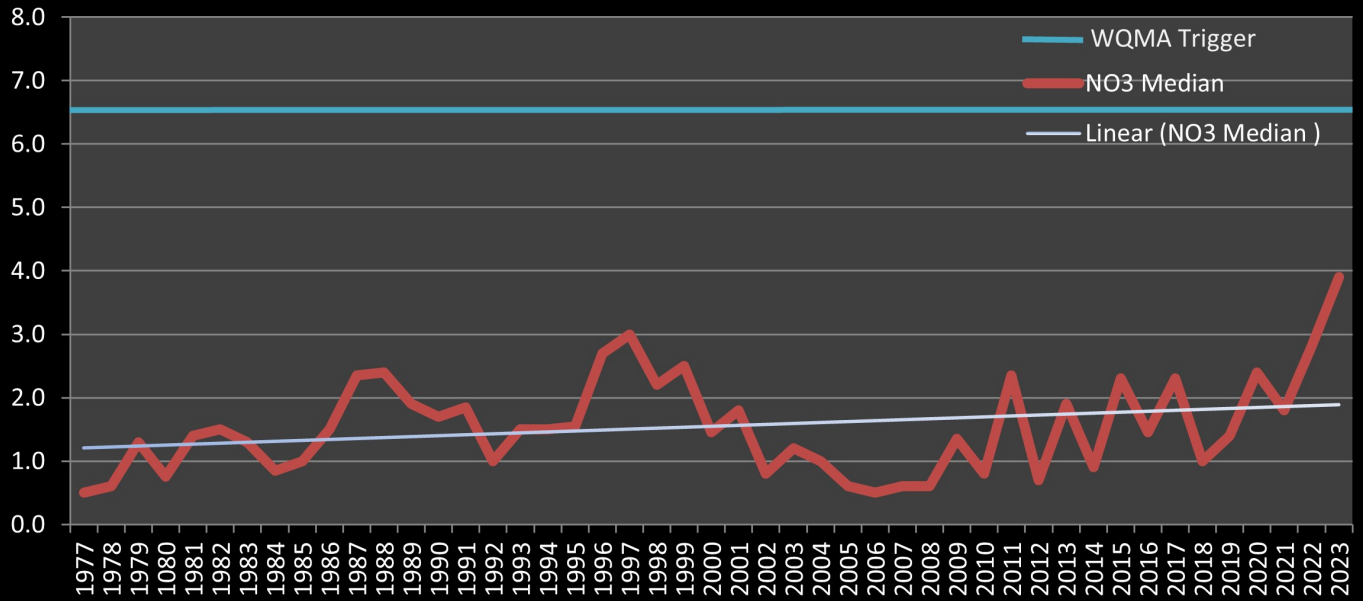
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METI/MASA, USGS, EPA, NPS, USFWS, Esri, NASA, NGA, USGS



Median: 1.9 Average: 4.1 Count: 106

# Area 2 NO3 Median

$$y = 0.0148x + 1.1925$$

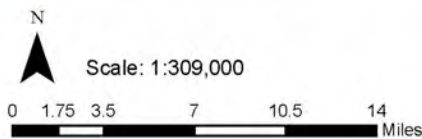
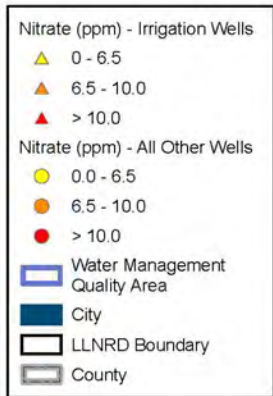


## 2023 Nitrate Sampling Results

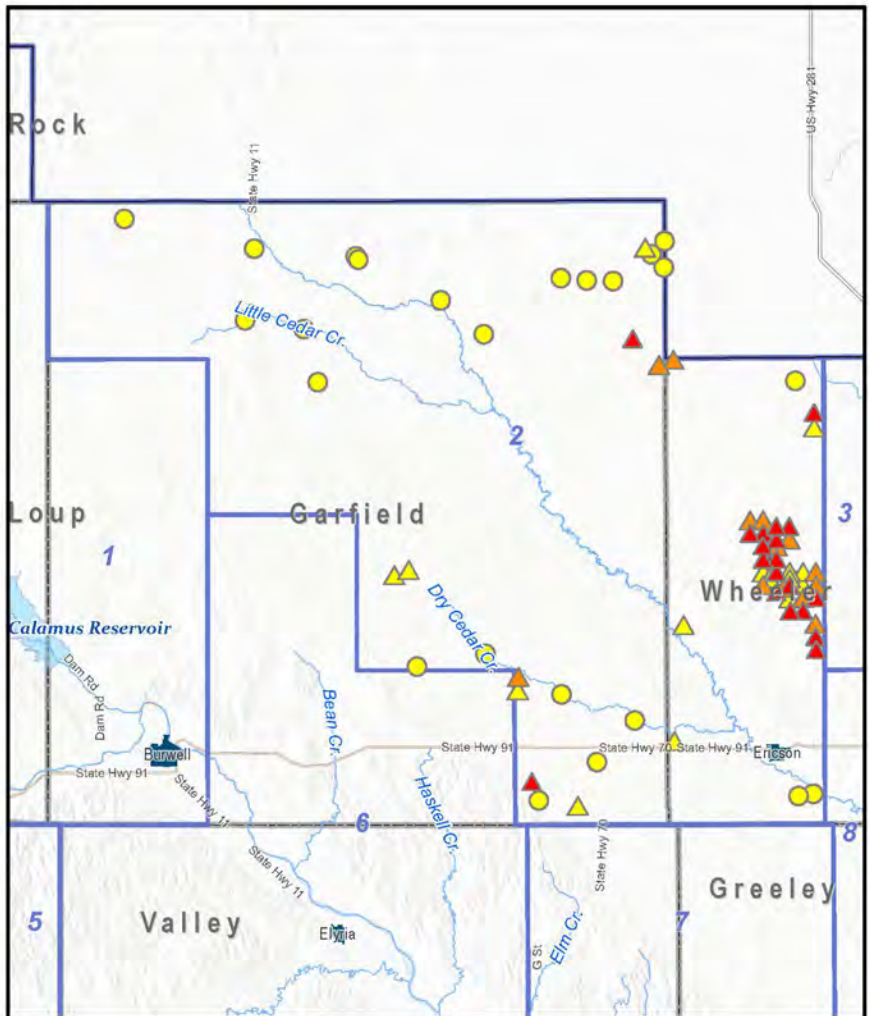
Lower Loup Natural Resources District  
Water Quality Management Area 2

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, Esri, NASA, NGA, USGS

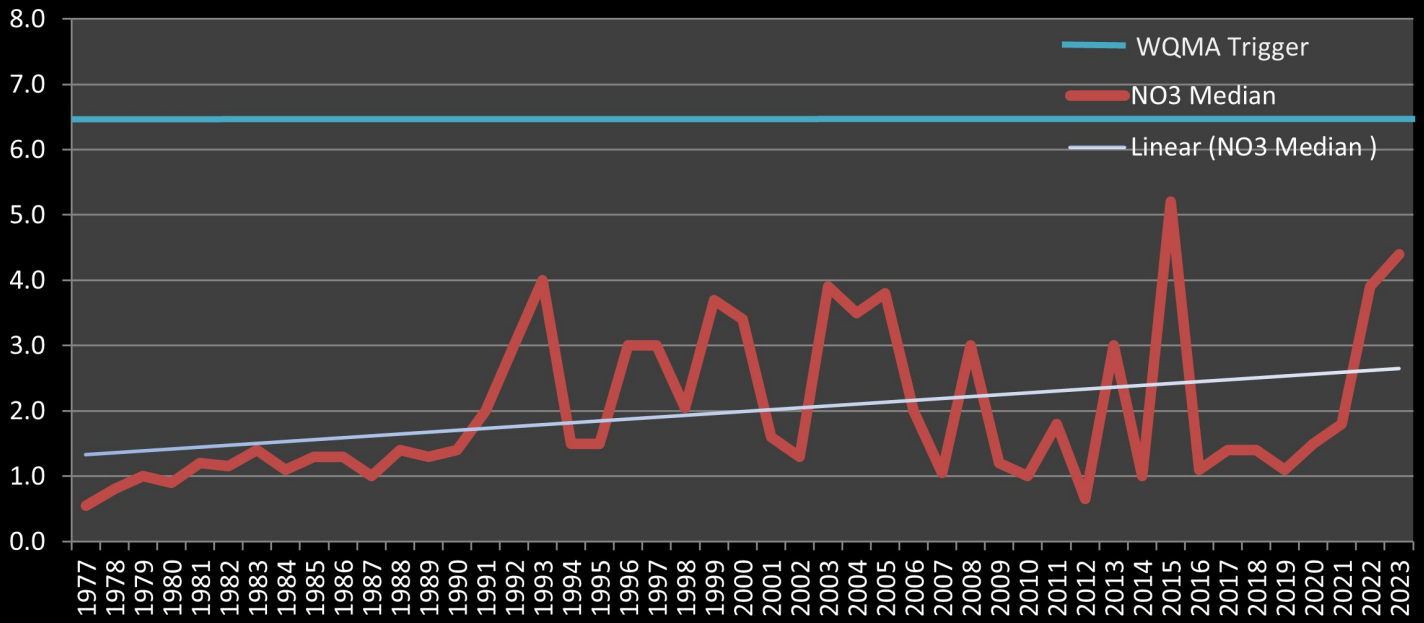


**Median: 3.9 Average: 6.0 Count: 85**



# Area 3 NO3 Median

$$y = 0.0288x + 1.3002$$

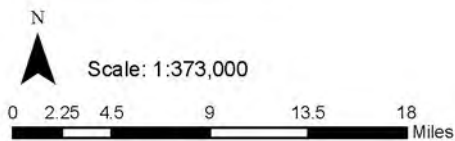
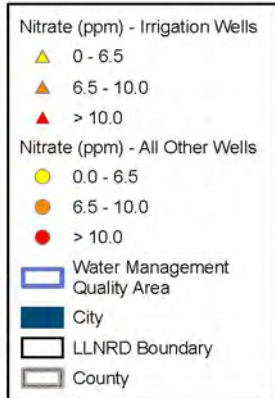


## 2023 Nitrate Sampling Results

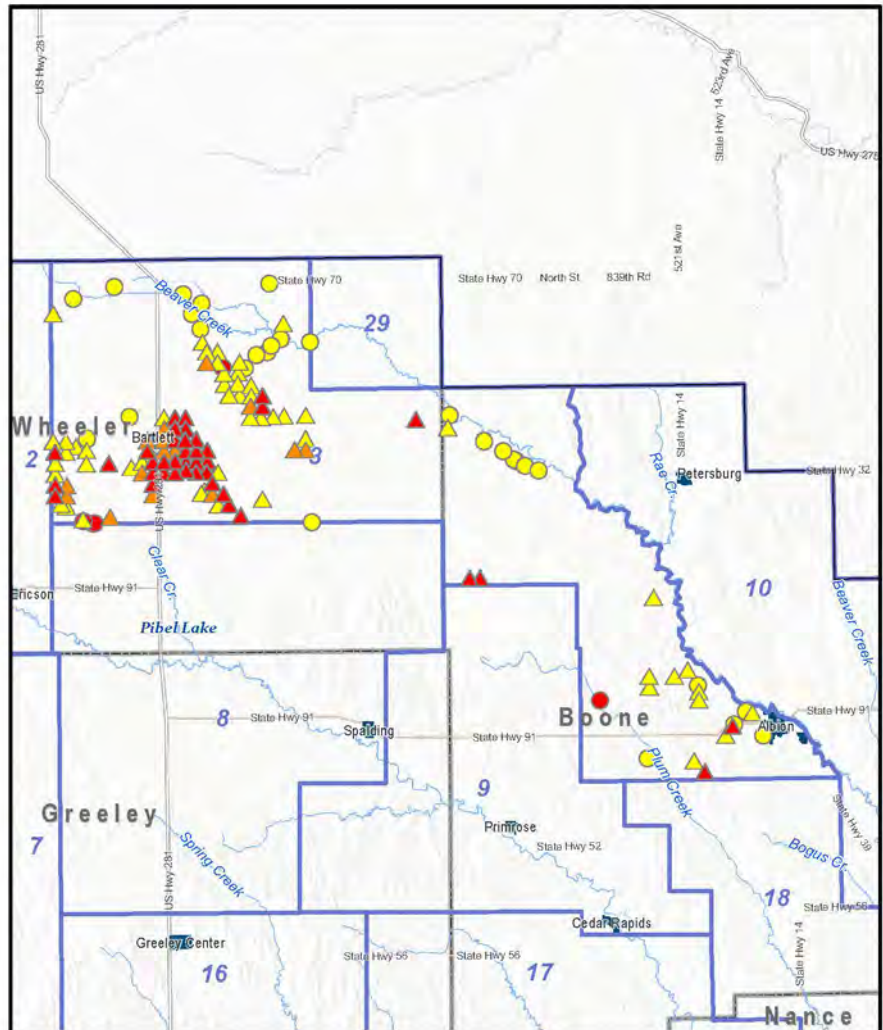
Lower Loup Natural Resources District  
Water Quality Management Area 3

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



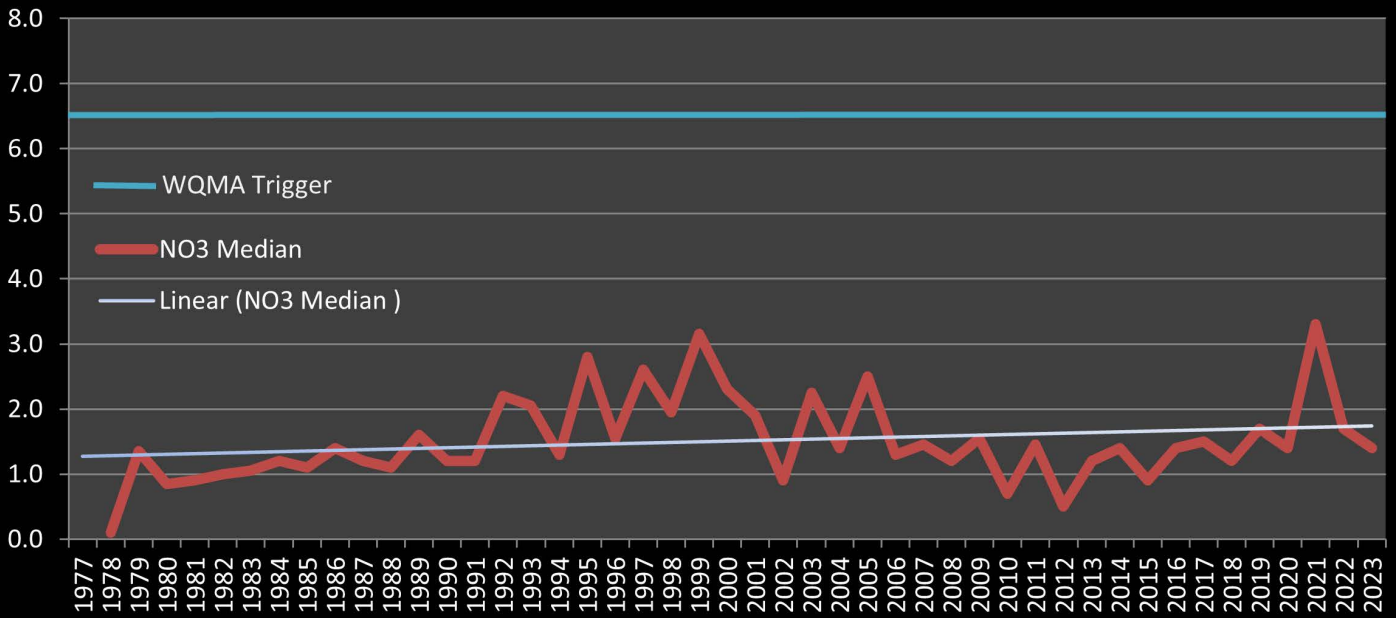
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, Esri, NASA, INGA, USGS



**Median: 4.4 Average: 6.9 Count: 174**

# Area 4 NO3 Median

$$y = 0.0101x + 1.26$$

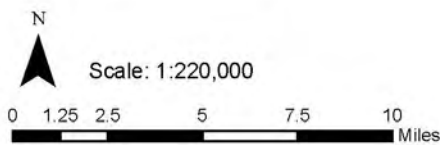


## 2023 Nitrate Sampling Results

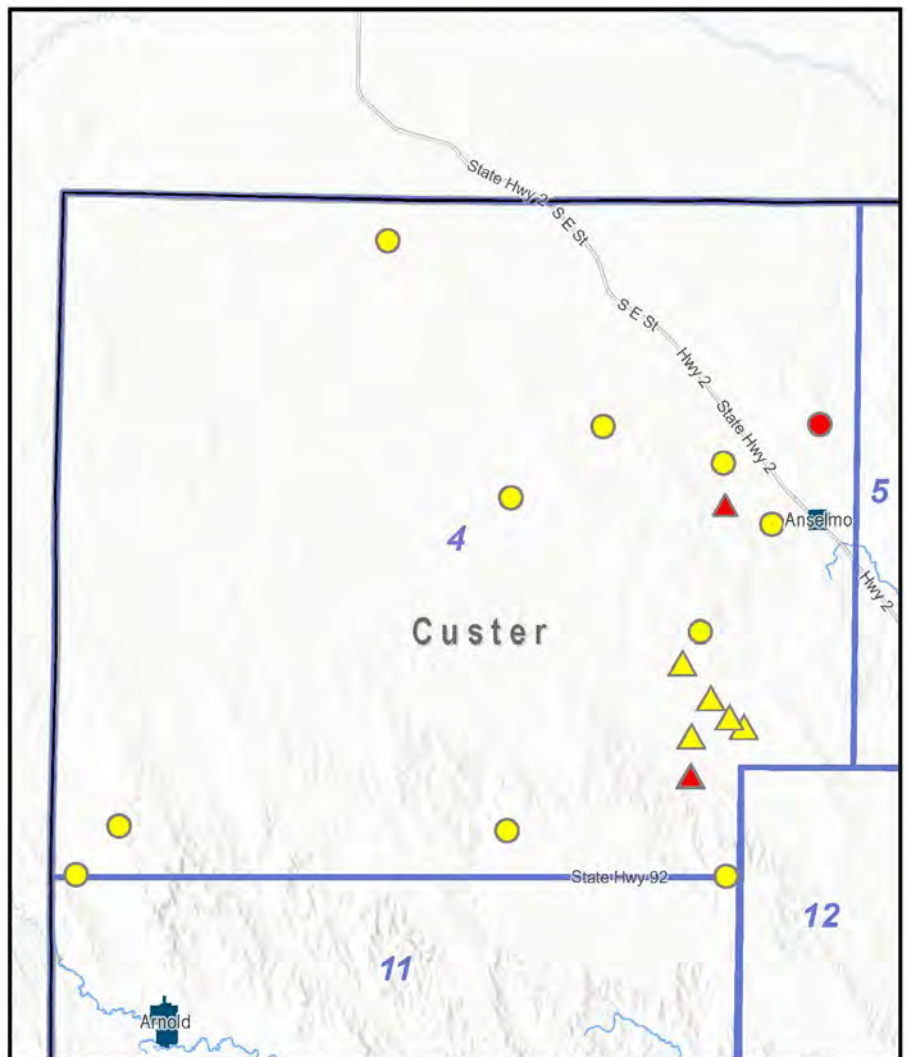
Lower Loup Natural Resources District  
Water Quality Management Area 4

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic,  
Livestock, Monitoring



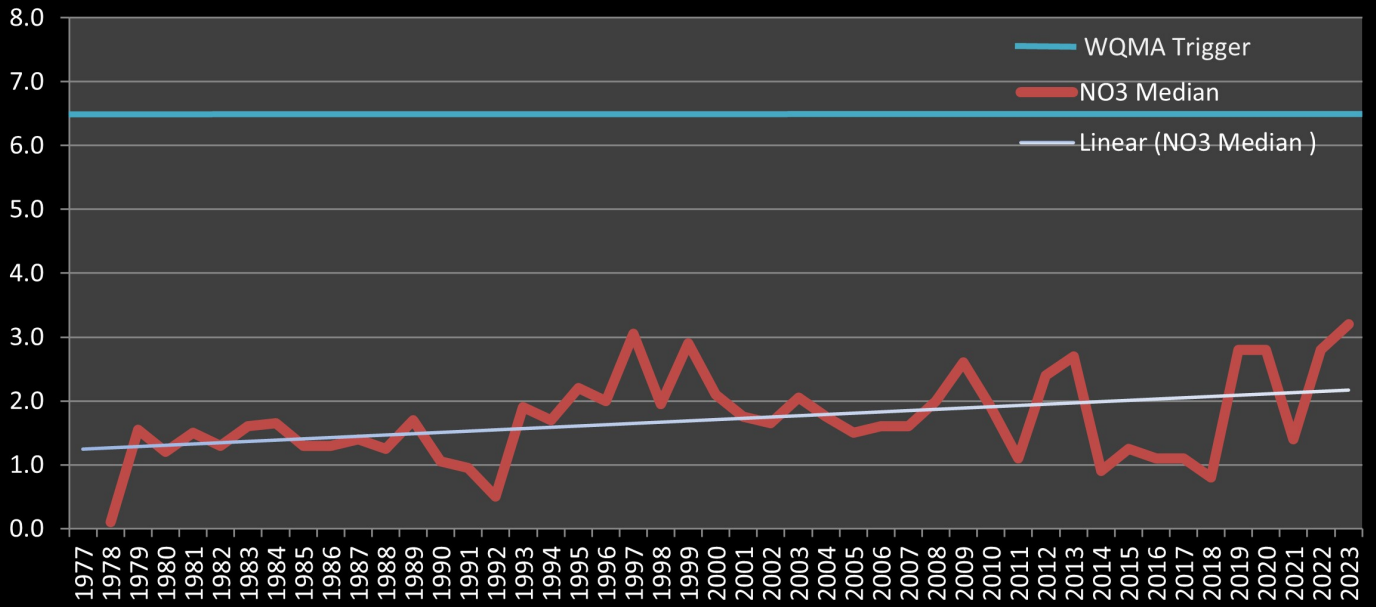
Esri, NASA, NGA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 1.4 Average: 5.1 Count: 17**

# Area 5 NO3 Median

$$y = 0.02x + 1.2258$$

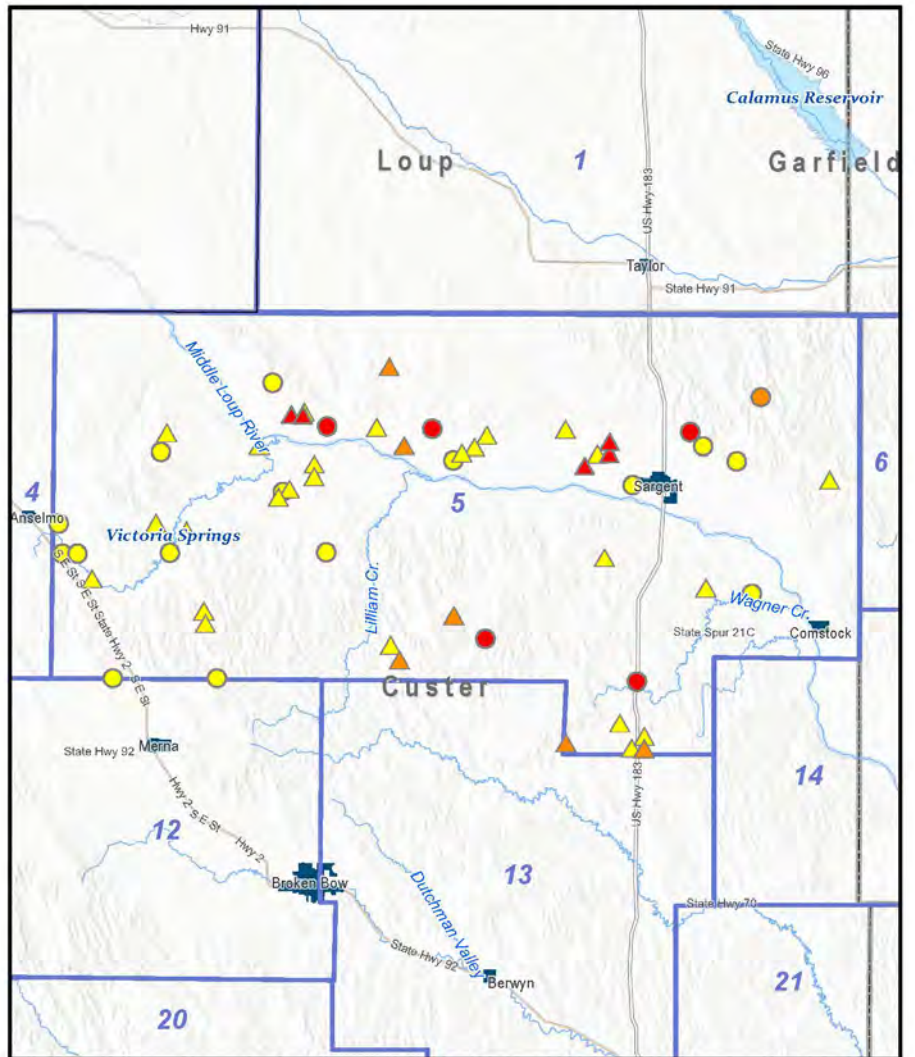
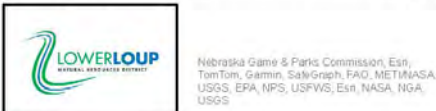
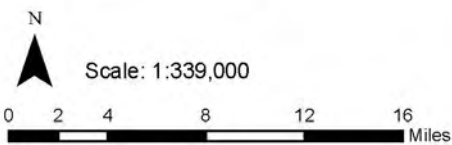


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 5

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

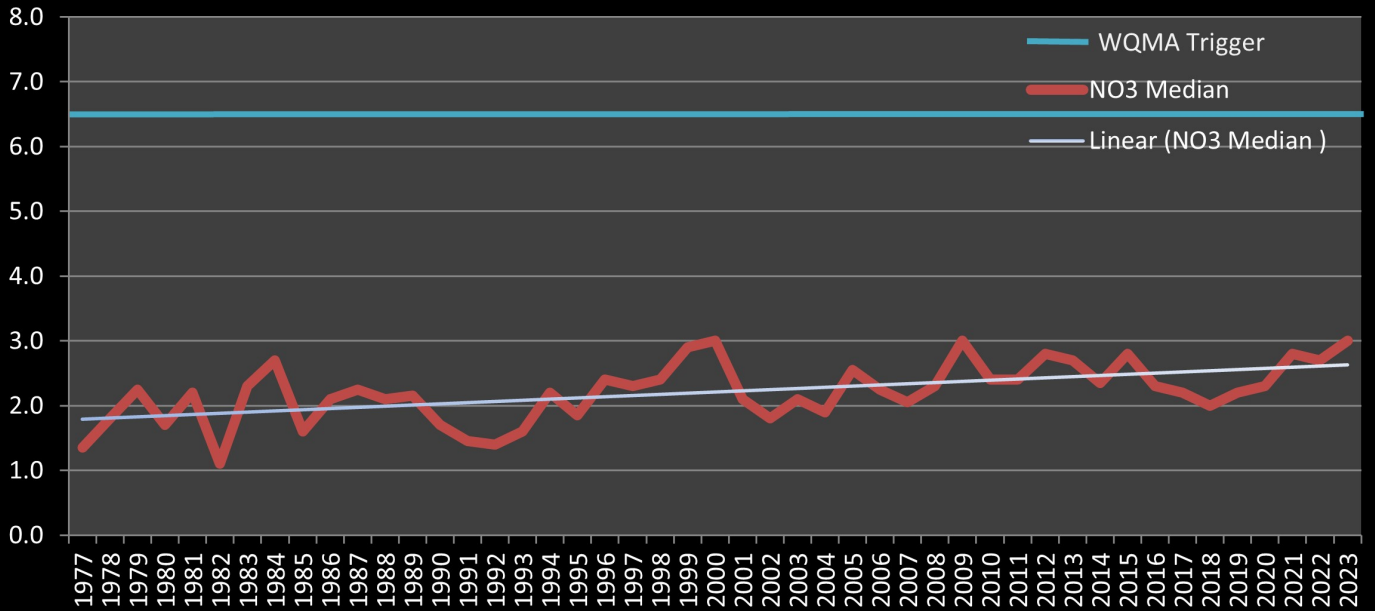
Other well types: Commercial, Domestic, Livestock, Monitoring



**Median: 3.2 Average: 5.9 Count: 53**

# Area 6 NO3 Median

$$y = 0.0183x + 1.7689$$

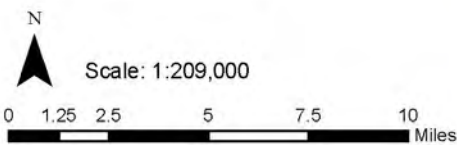


## 2023 Nitrate Sampling Results

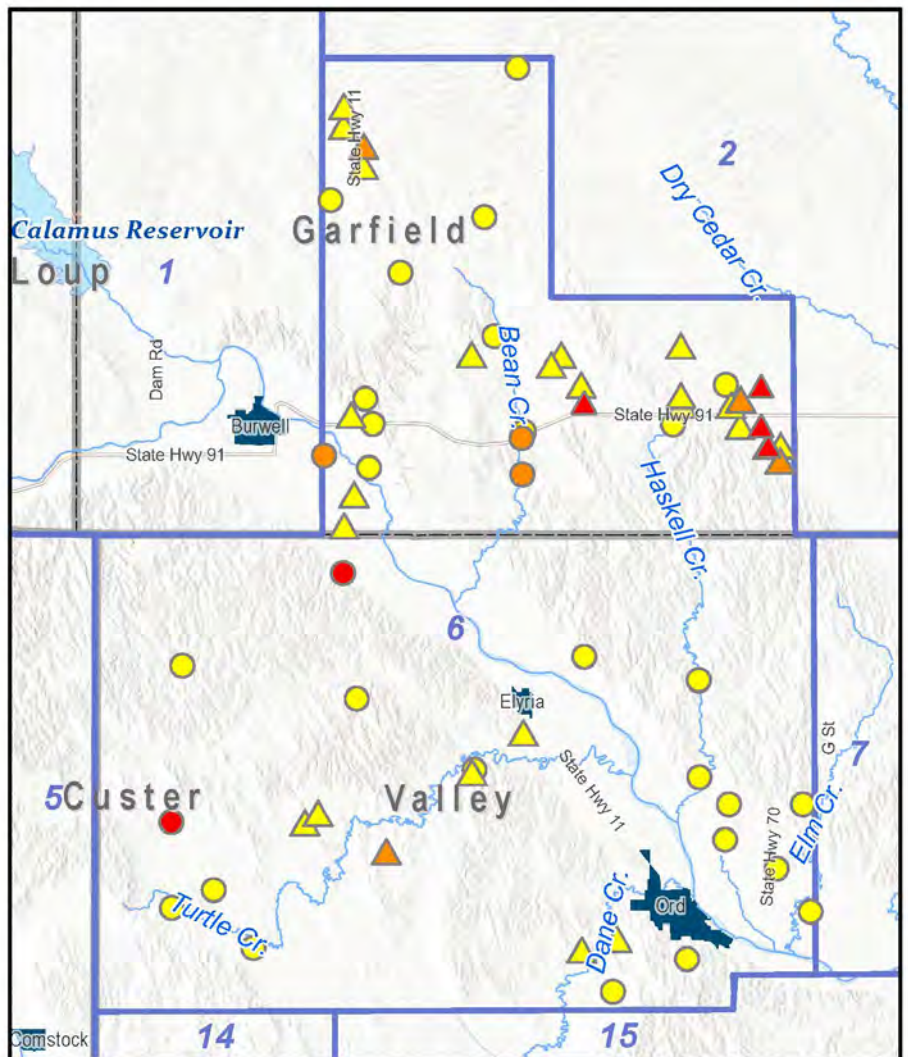
Lower Loup Natural Resources District  
Water Quality Management Area 6

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



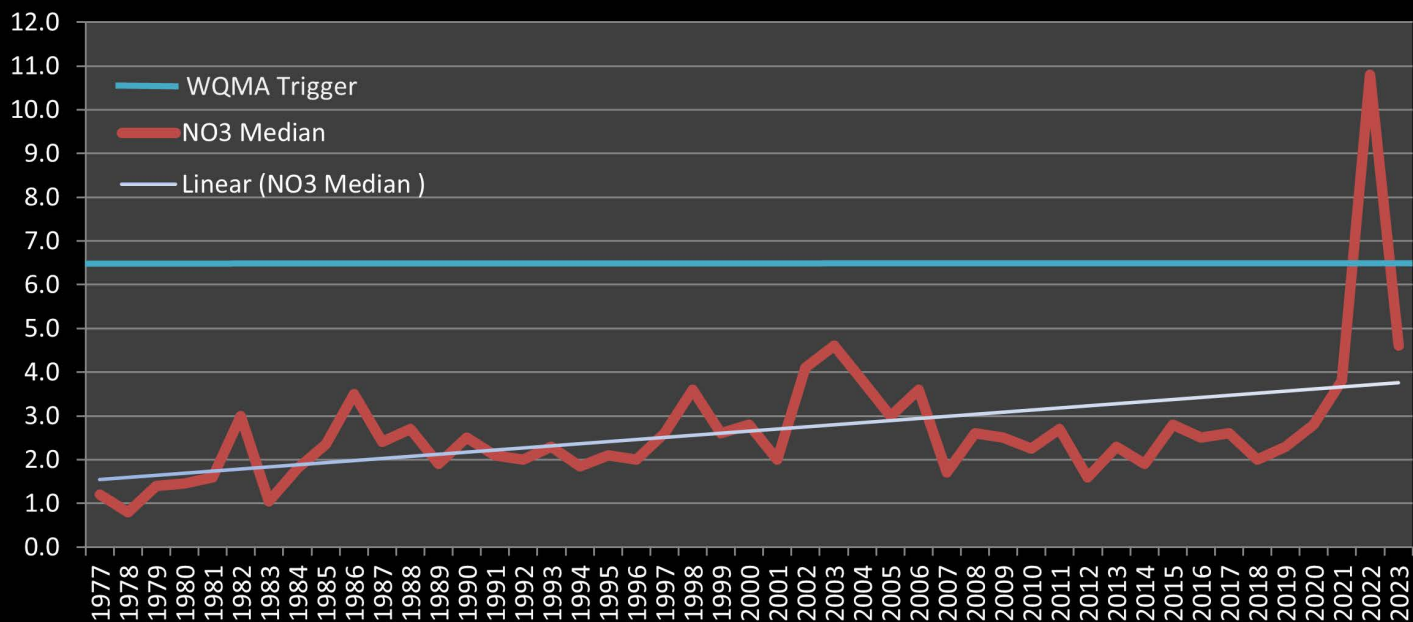
Esri, NASA, NGA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 3.0 Average: 4.8 Count: 59

# Area 7 NO3 Median

$$y = 0.0483x + 1.4895$$

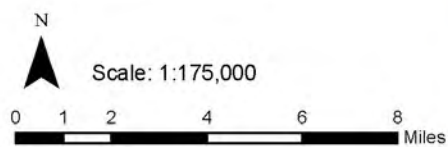
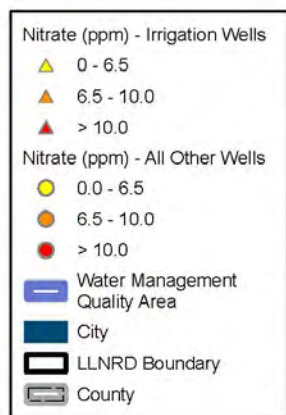


## 2023 Nitrate Sampling Results

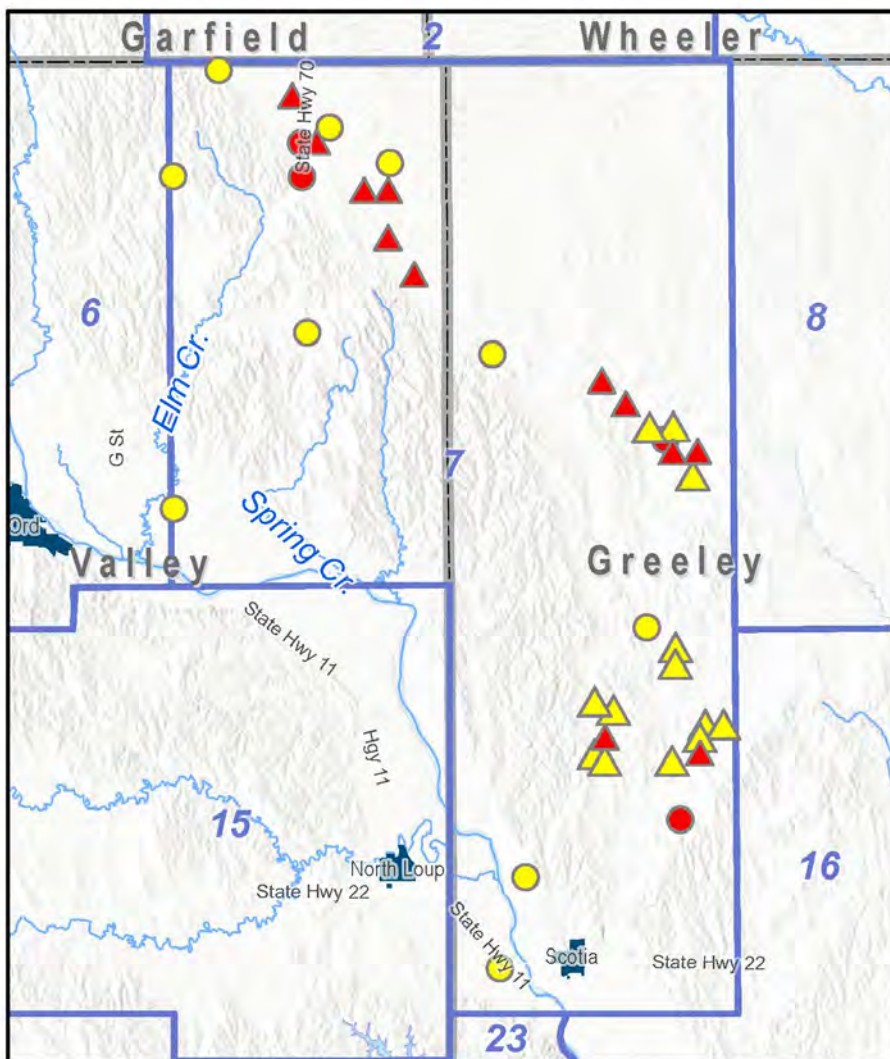
Lower Loup Natural Resources District  
Water Quality Management Area 7

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



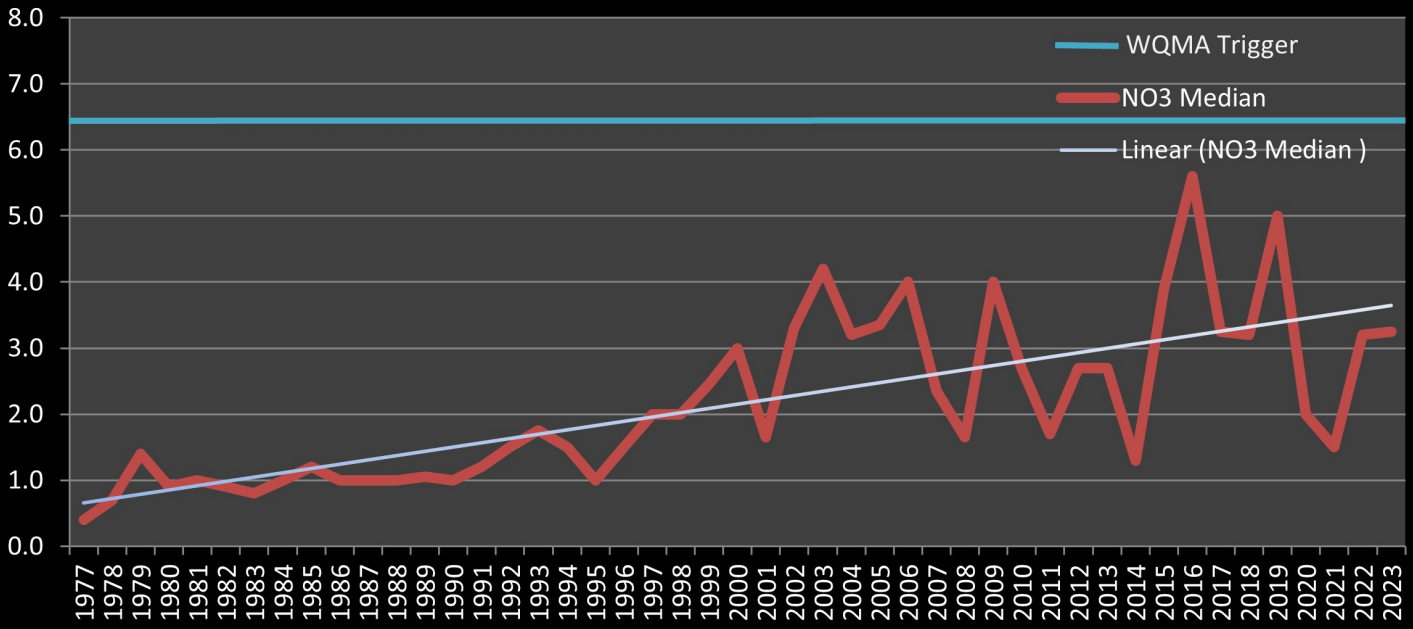
Esri, NASA, NGA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SateGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 4.6 Average: 8.1 Count: 32

# Area 8 NO3 Median

$$y = 0.0649x + 0.5904$$

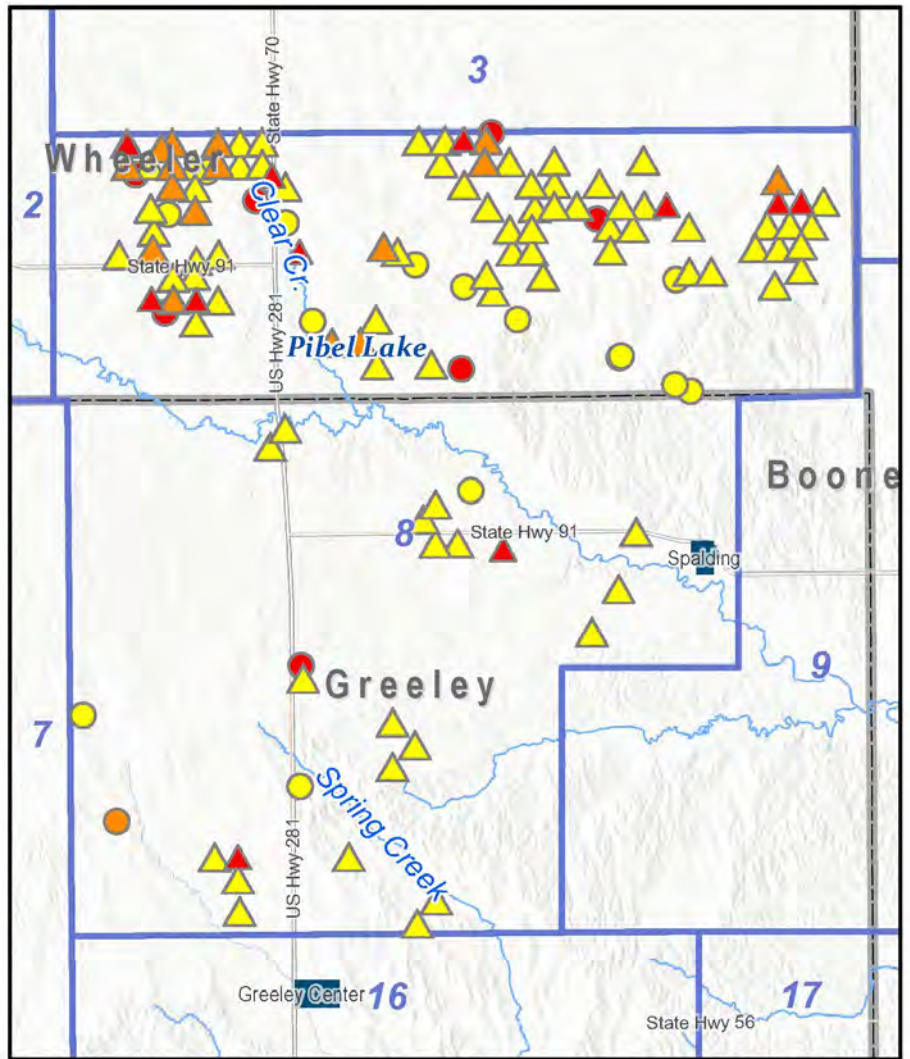
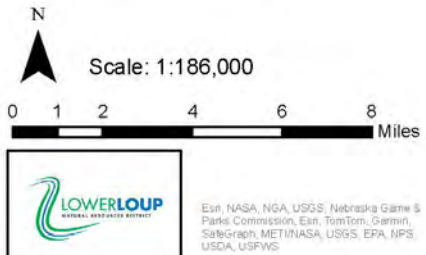


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 8

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

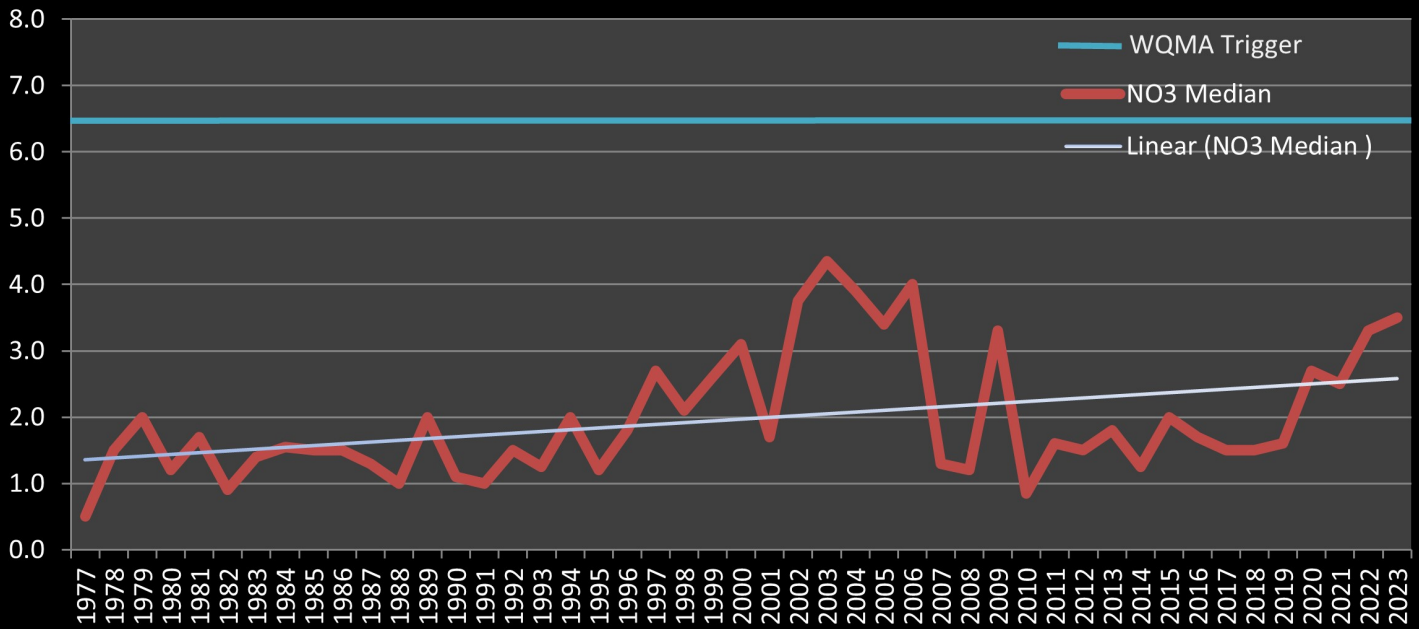
Other well types: Commercial, Domestic,  
Livestock, Monitoring



**Median: 3.3 Average: 5.7 Count: 108**

# Area 9 NO3 Median

$$y = 0.0265x + 1.3344$$

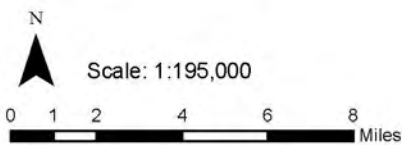
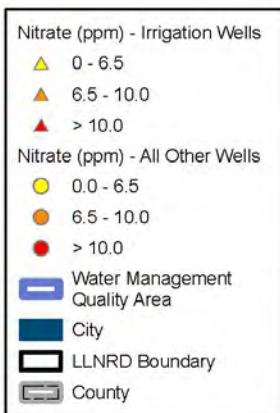


## 2023 Nitrate Sampling Results

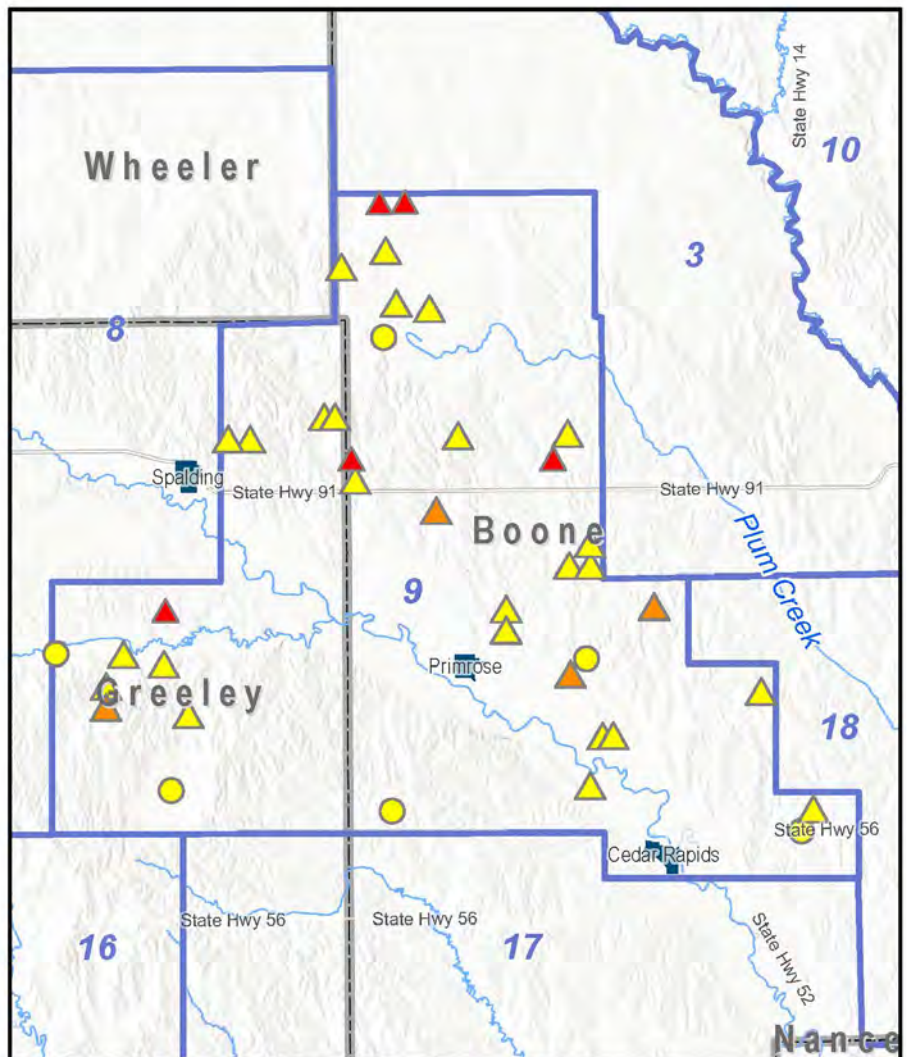
Lower Loup Natural Resources District  
Water Quality Management Area 9

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



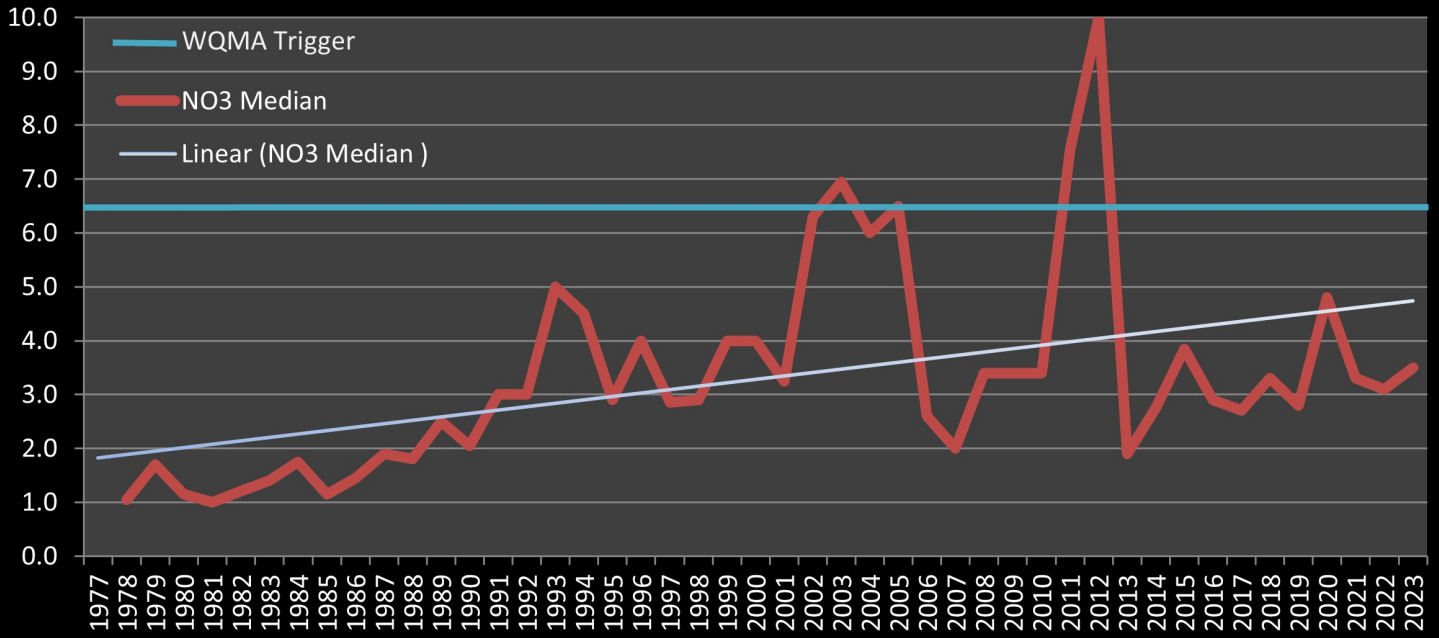
Esri, NASA, NGA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SateGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 3.5 Average: 6.1 Count: 38

# Area 10 NO3 Median

$$y = 0.0633x + 1.7639$$

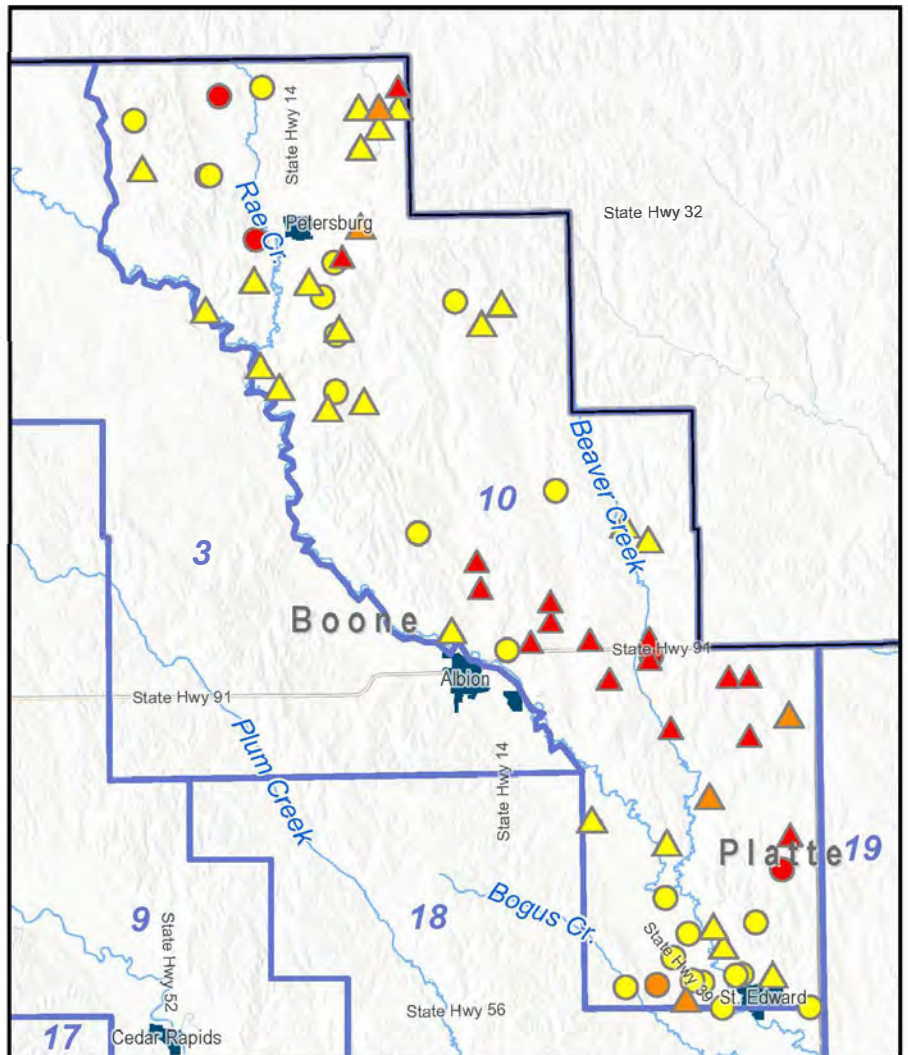
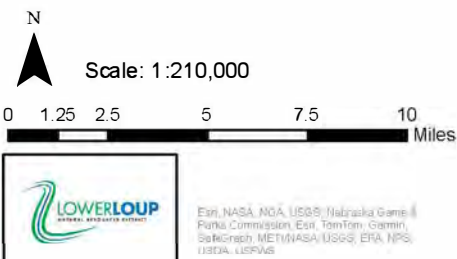
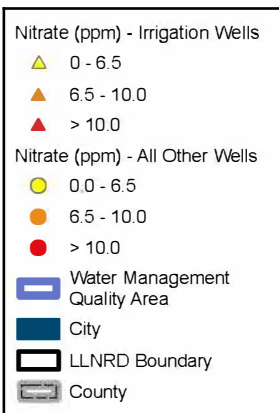


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 10

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic,  
Livestock, Monitoring

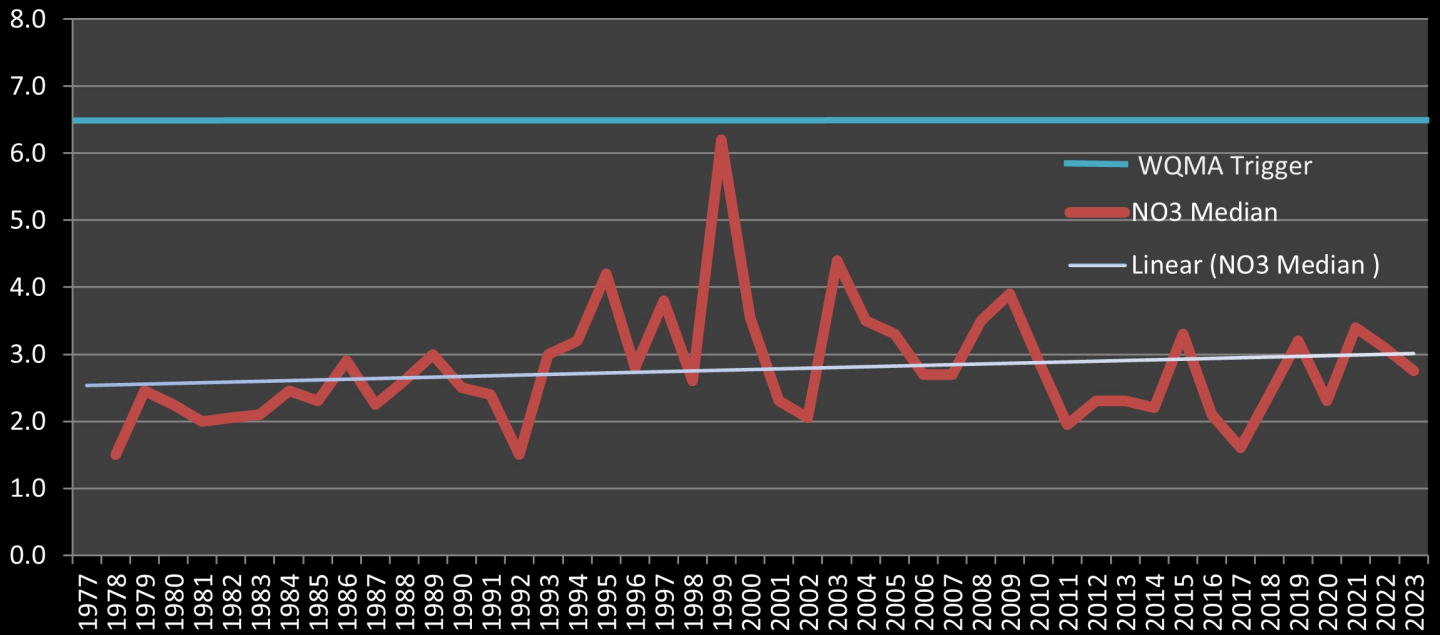


**Median: 3.5 Average: 6.1 Count: 55**



# Area 11 NO3 Median

$$y = 0.0105x + 2.5211$$

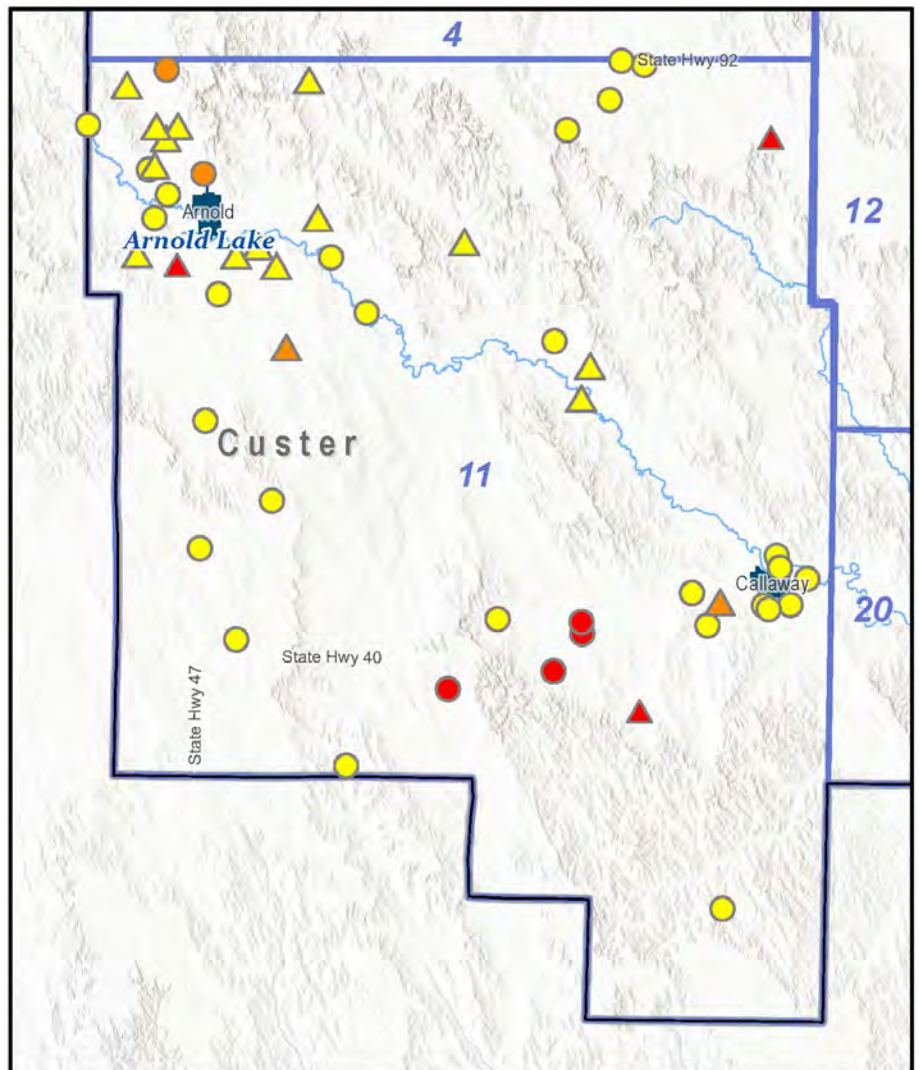
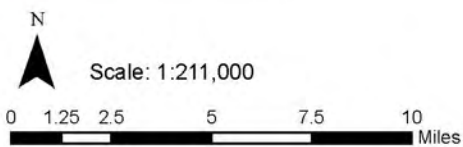
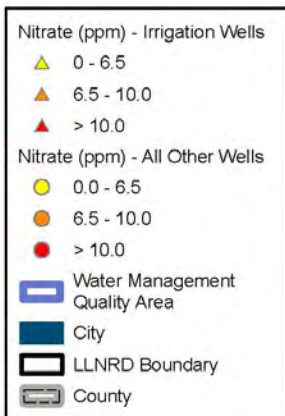


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 11

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

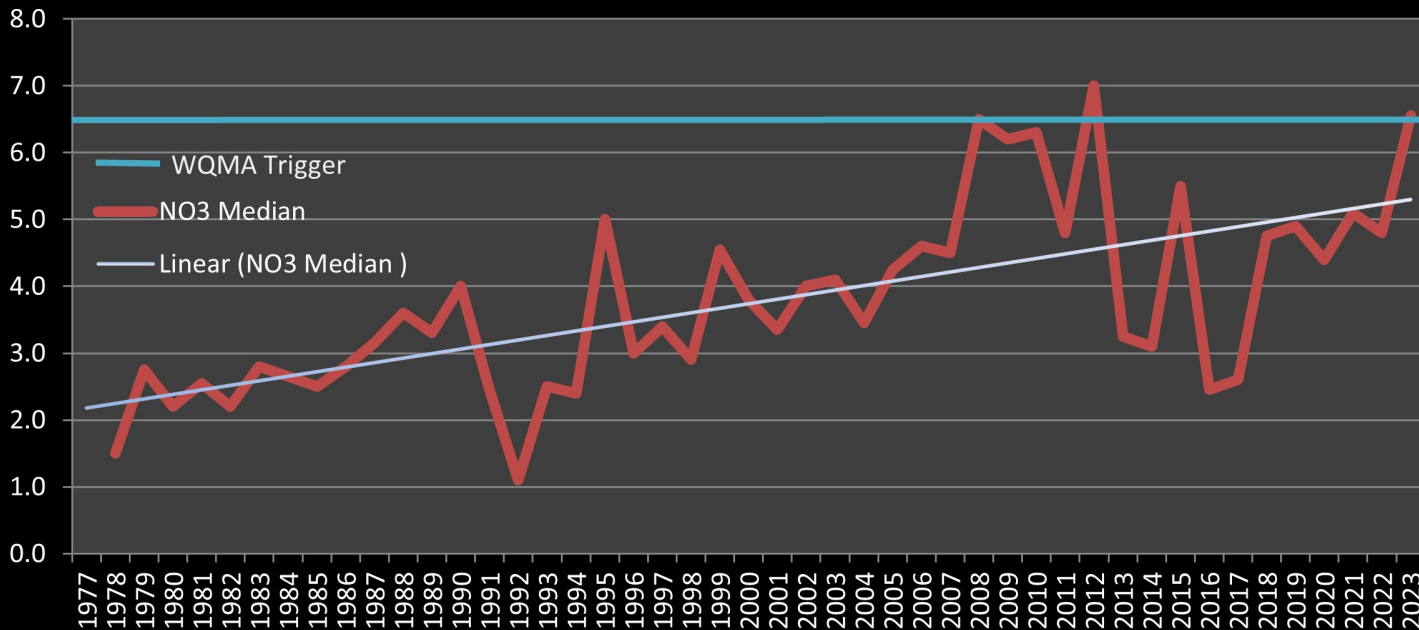
Other well types: Commercial, Domestic, Livestock, Monitoring



Median: 2.8 Average: 4.9 Count: 52

# Area 12 NO3 Median

$$y = 0.0678x + 2.1112$$

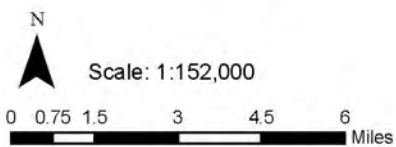
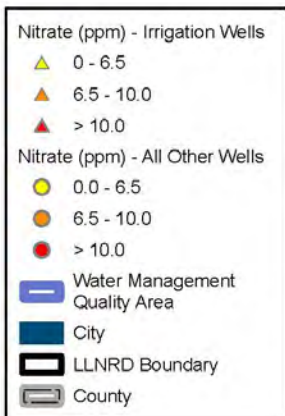


## 2023 Nitrate Sampling Results

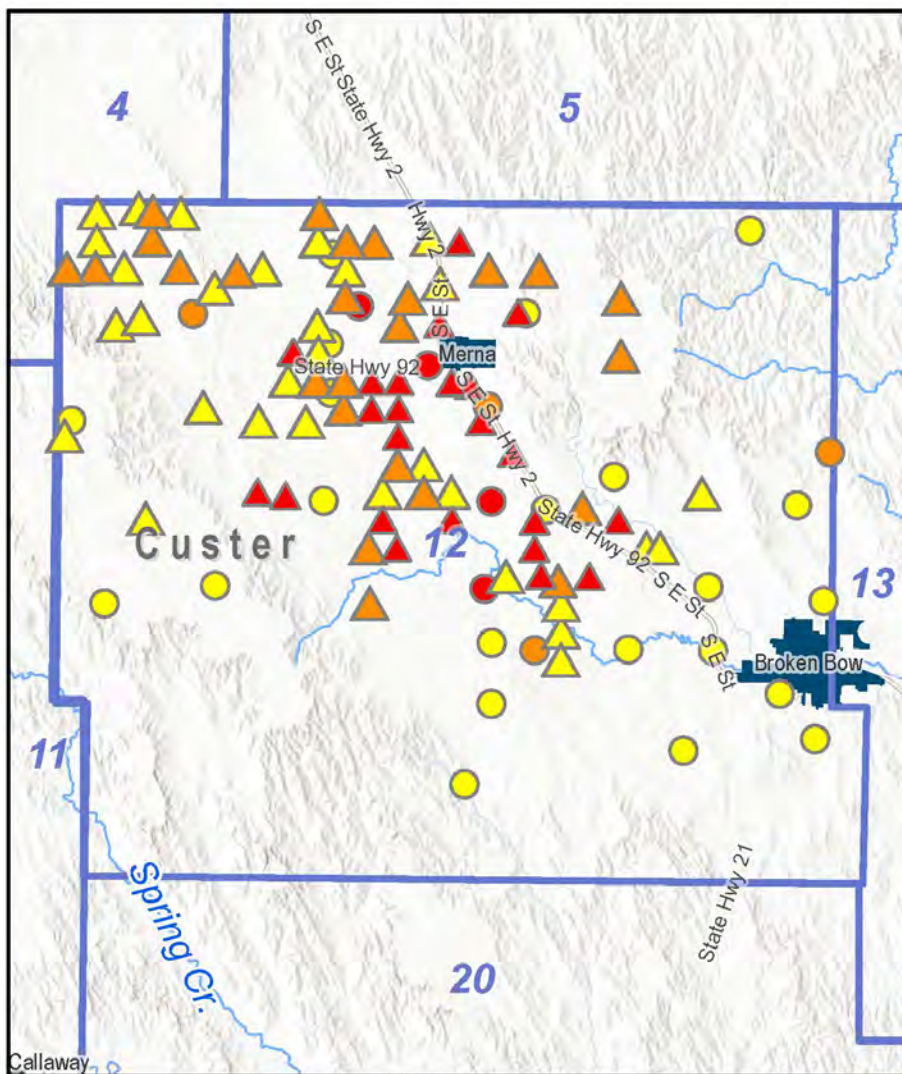
Lower Loup Natural Resources District  
Water Quality Management Area 12

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



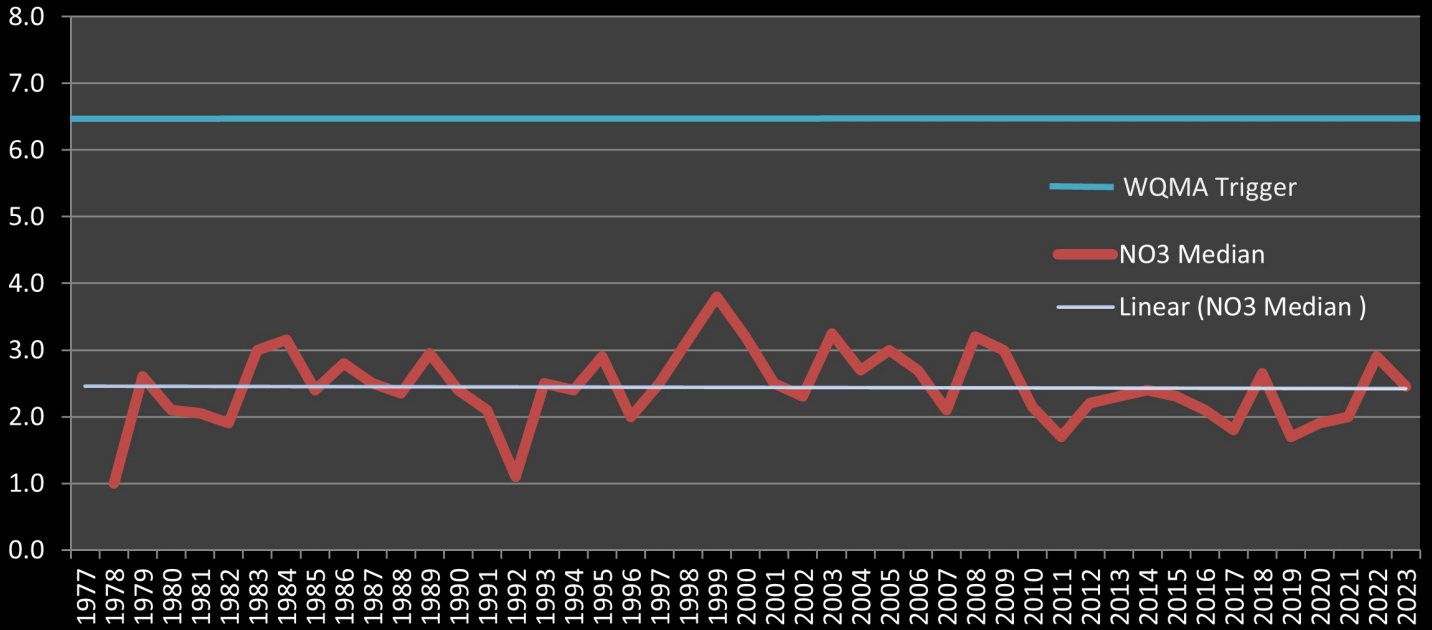
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 6.6 Average: 8.0 Count: 106

# Area 13 NO3 Median

$$y = -0.0008x + 2.4567$$

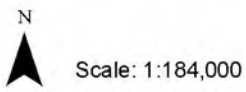
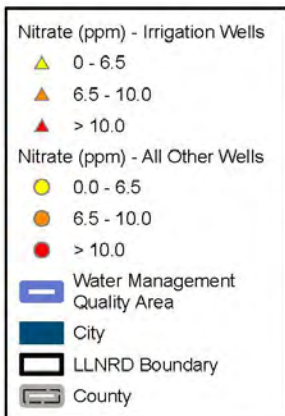


## 2023 Nitrate Sampling Results

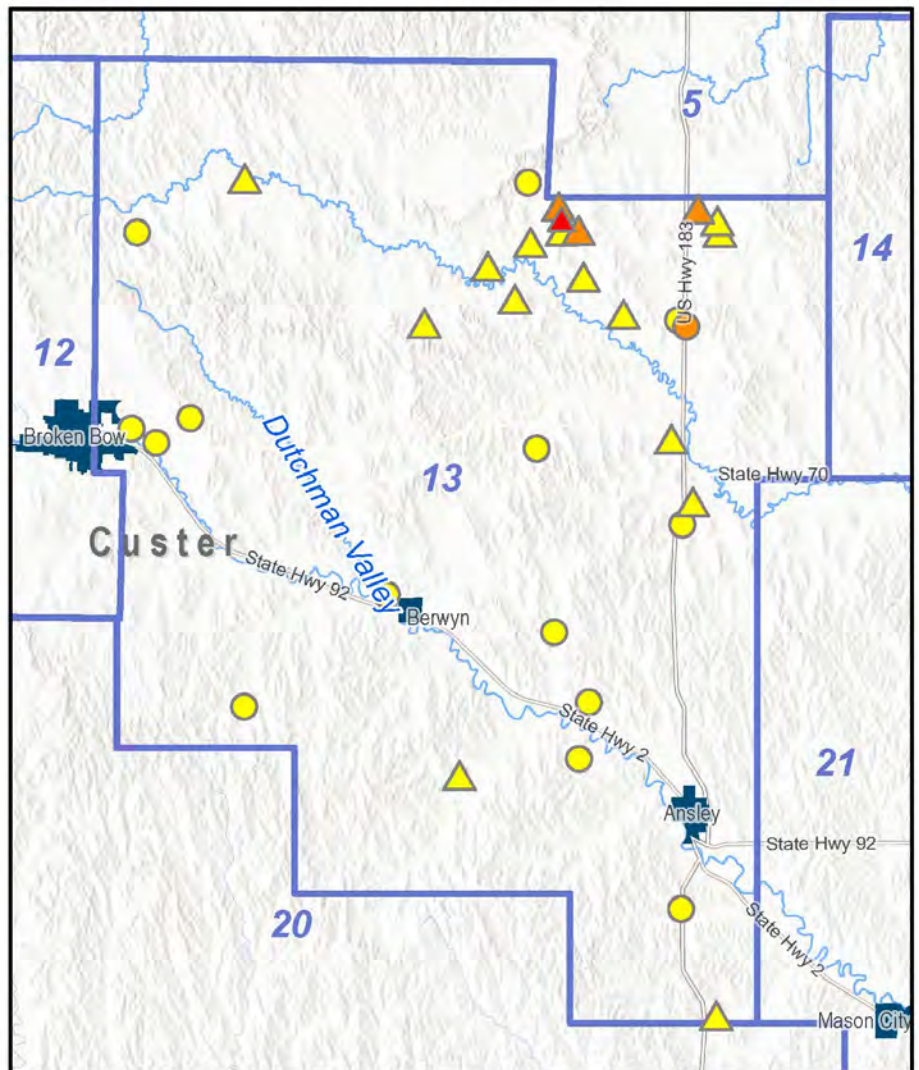
Lower Loup Natural Resources District  
Water Quality Management Area 13

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



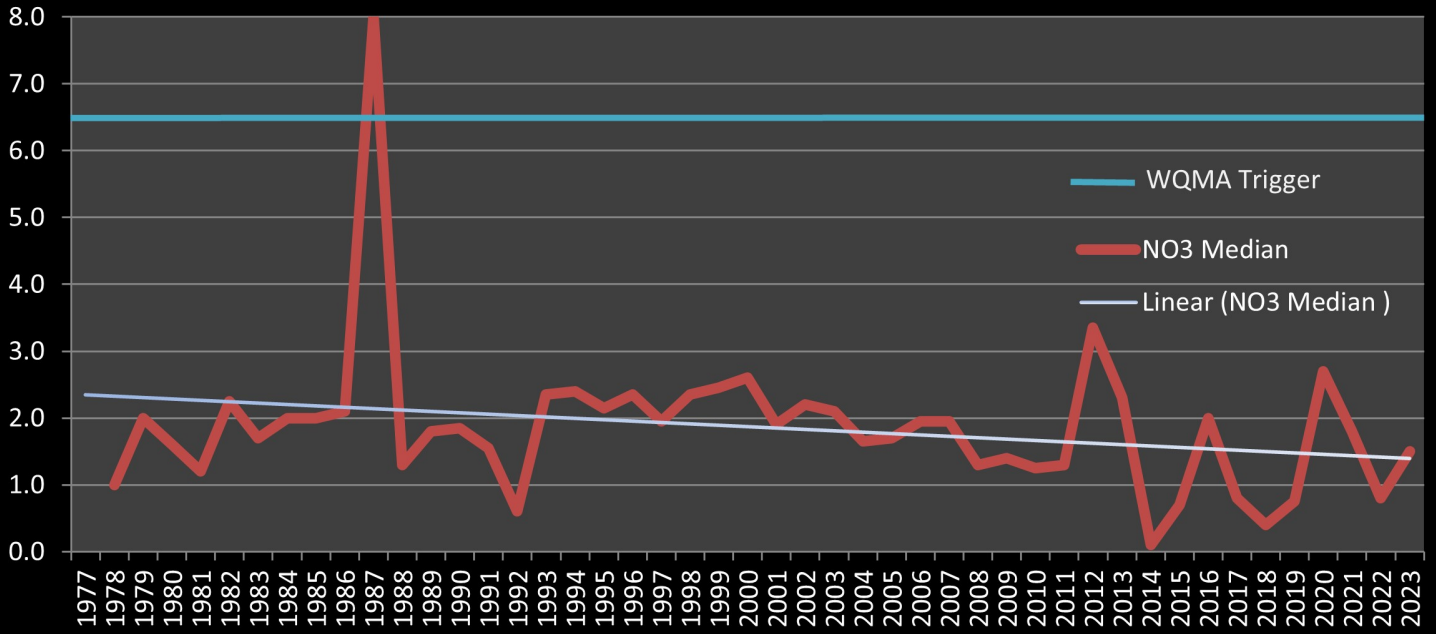
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 2.5 Average: 3.4 Count: 34**

# Area 14 NO3 Median

$$y = -0.0206x + 2.3628$$



## 2023 Nitrate Sampling Results

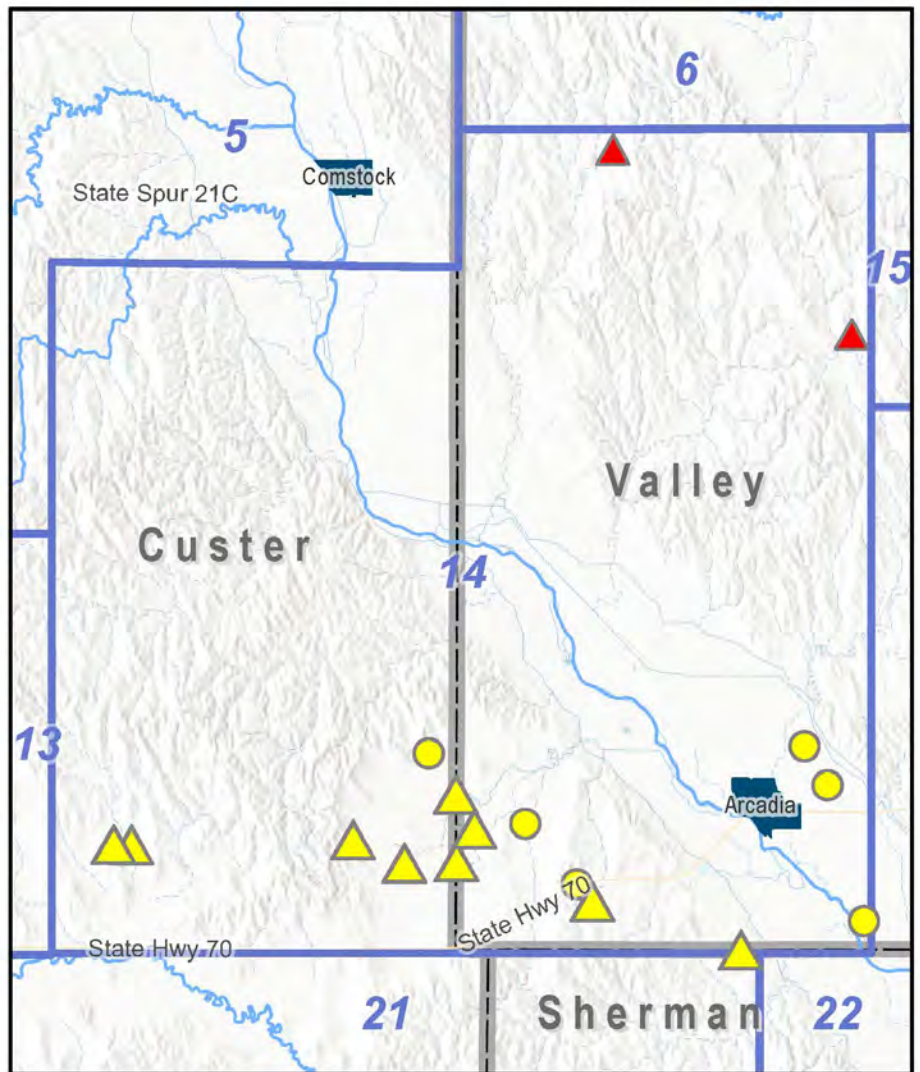
Lower Loup Natural Resources District  
Water Quality Management Area 14

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



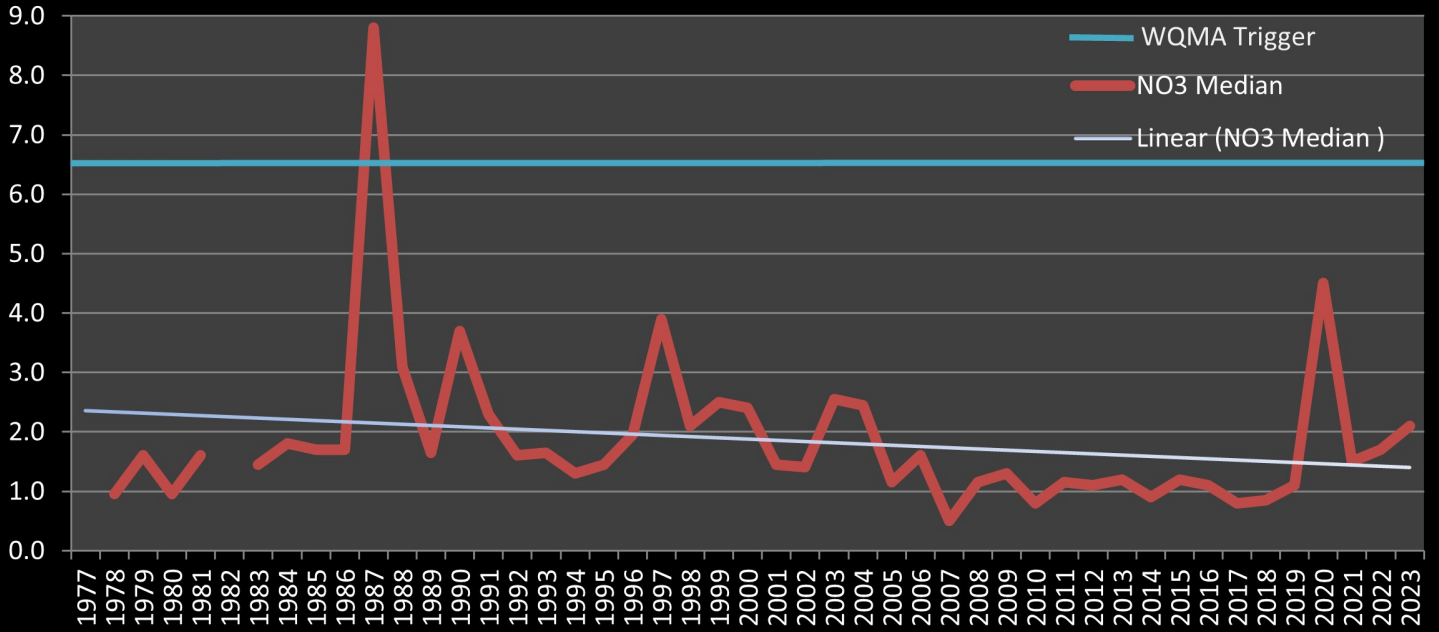
Hebrasia Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc., METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS



**Median: 1.5 Average: 3.6 Count: 14**

# Area 15 NO3 Median

$$y = -0.0206x + 2.3733$$

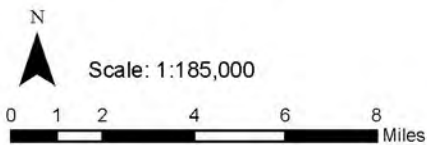


## 2023 Nitrate Sampling Results

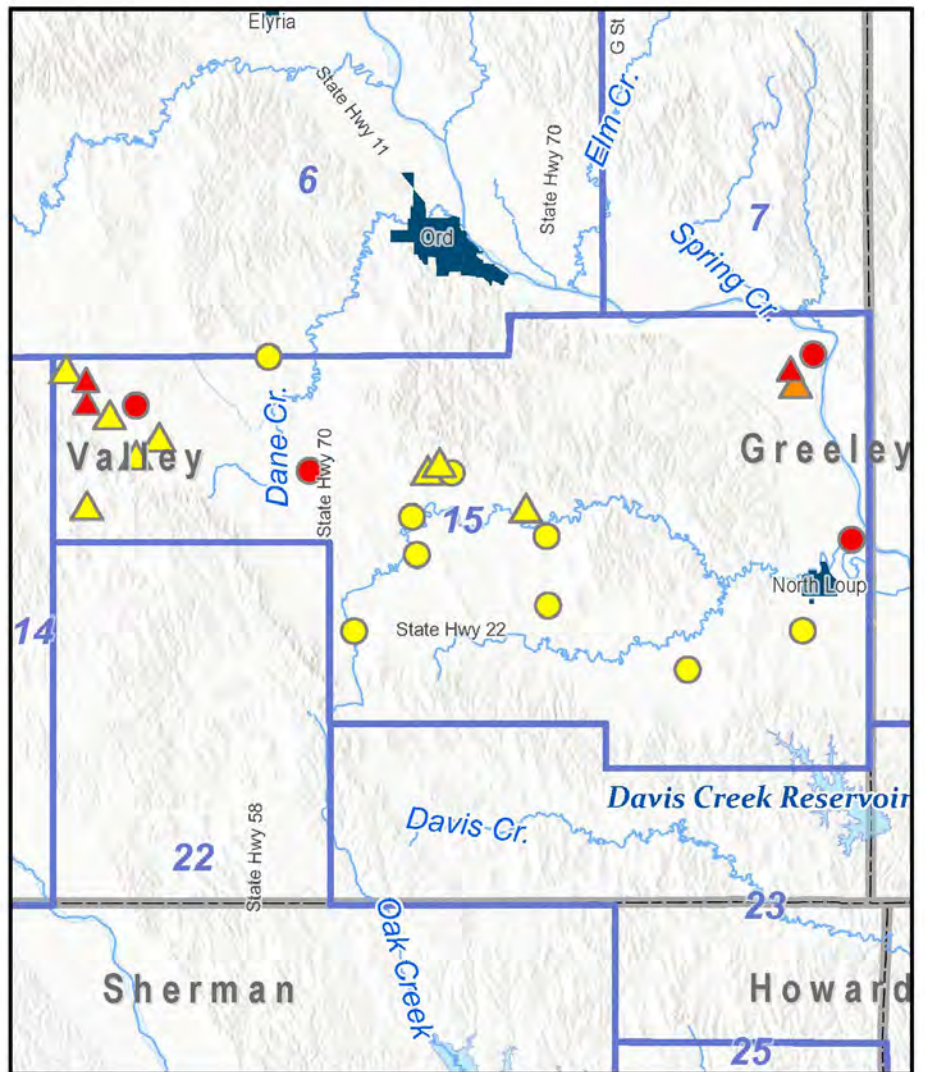
Lower Loup Natural Resources District  
Water Quality Management Area 15

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



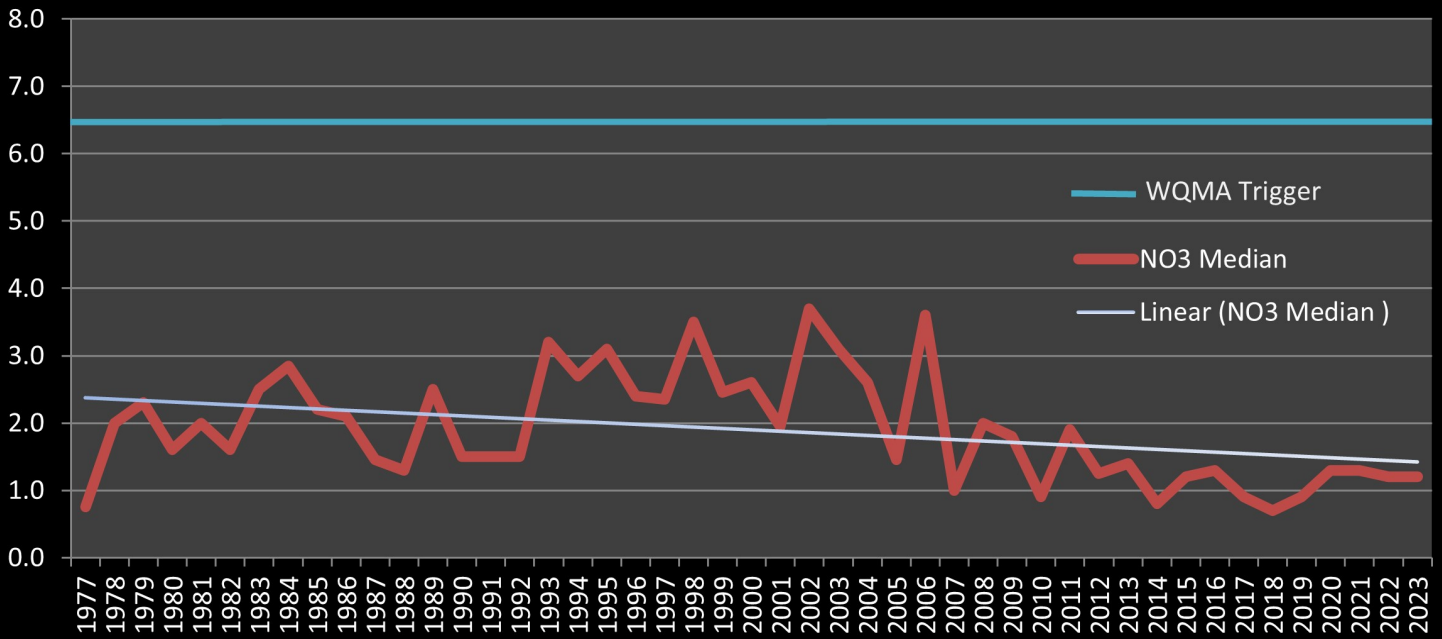
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 2.1 Average: 7.0 Count: 19

# Area 16 NO3 Median

$$y = -0.0207x + 2.3989$$

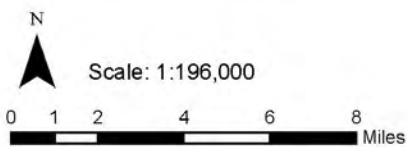
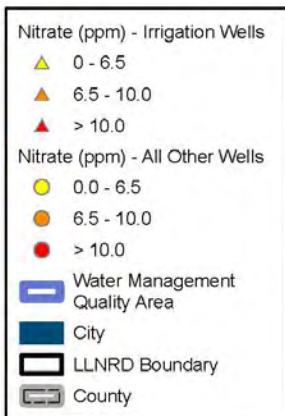


## 2023 Nitrate Sampling Results

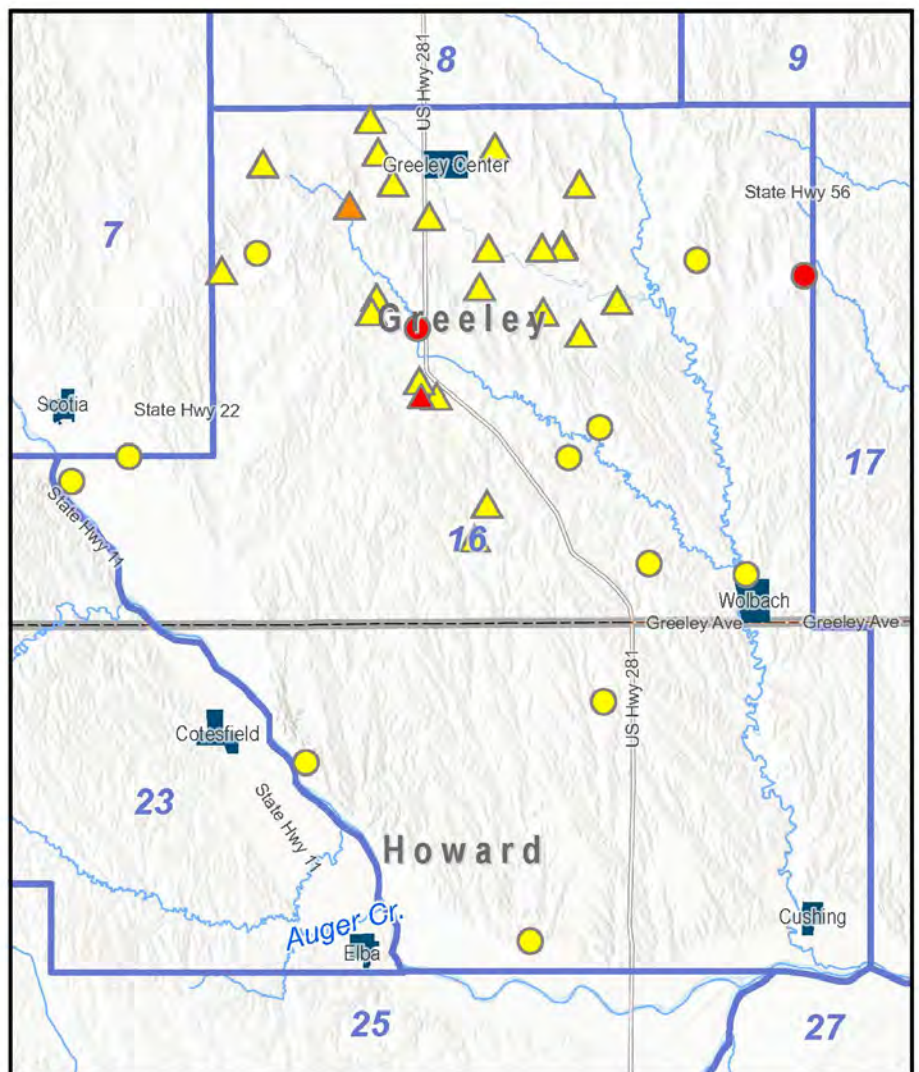
Lower Loup Natural Resources District  
Water Quality Management Area 16

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



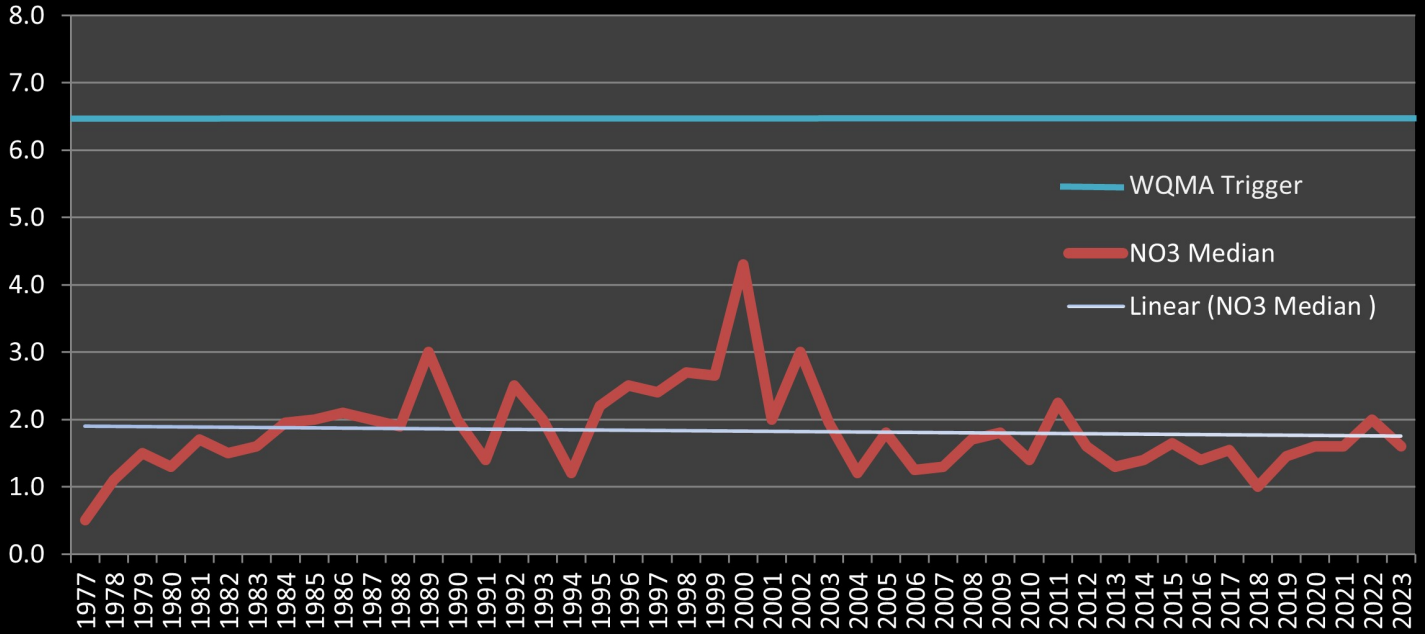
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 1.2 Average: 2.7 Count: 32**

# Area 17 NO3 Median

$$y = -0.0033x + 1.9038$$

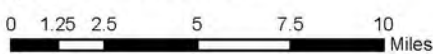
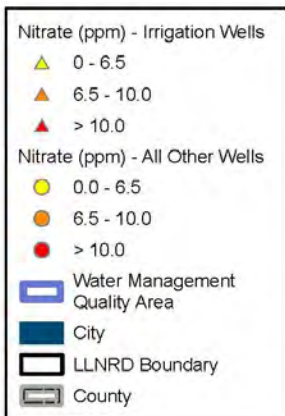


## 2023 Nitrate Sampling Results

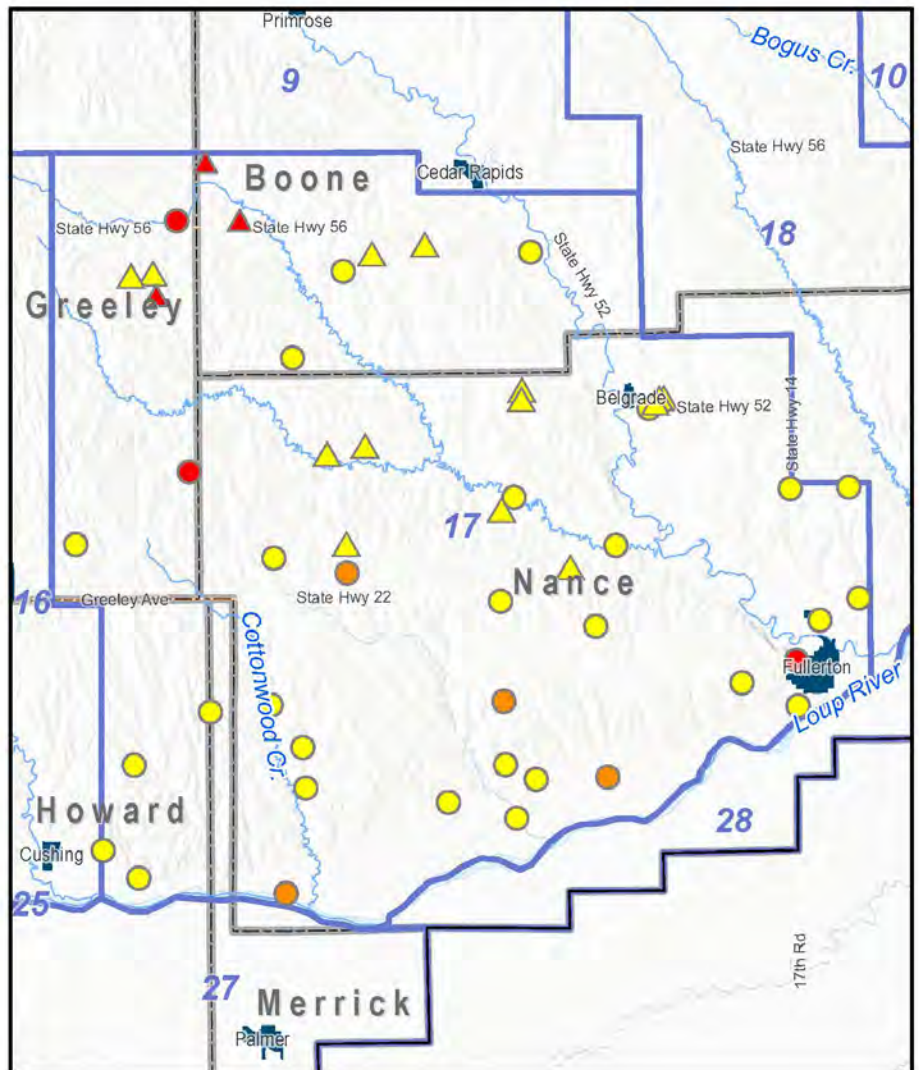
Lower Loup Natural Resources District  
Water Quality Management Area 17

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



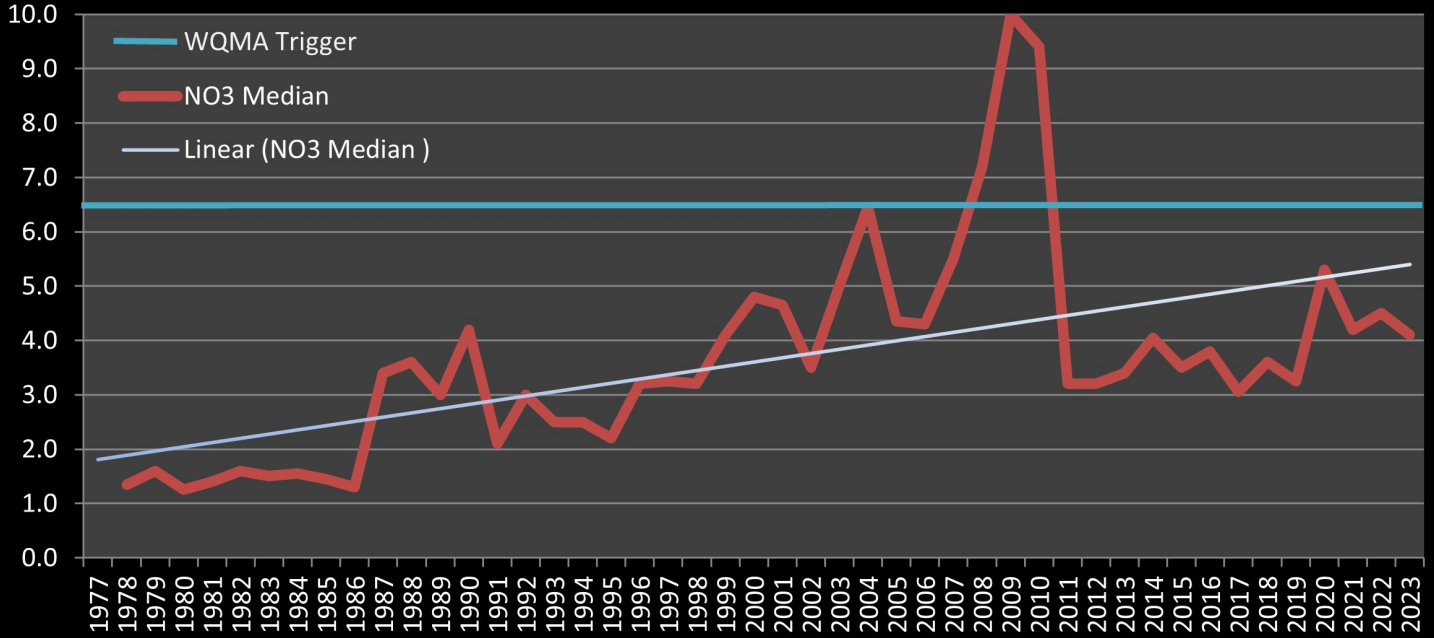
Enr. NASA, NCA, USGS, Nebraska Game & Parks Commission, Enr, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 1.6 Average: 3.9 Count: 44

# Area 18 NO3 Median

$$y = 0.0782x + 1.7258$$

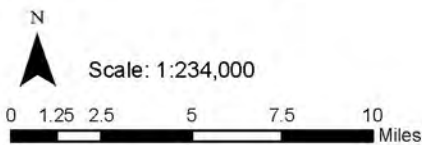
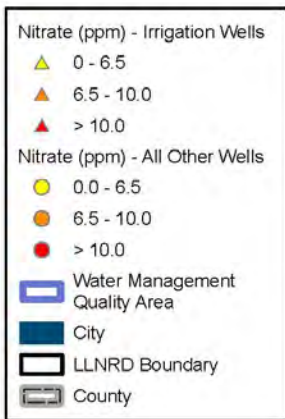


## 2023 Nitrate Sampling Results

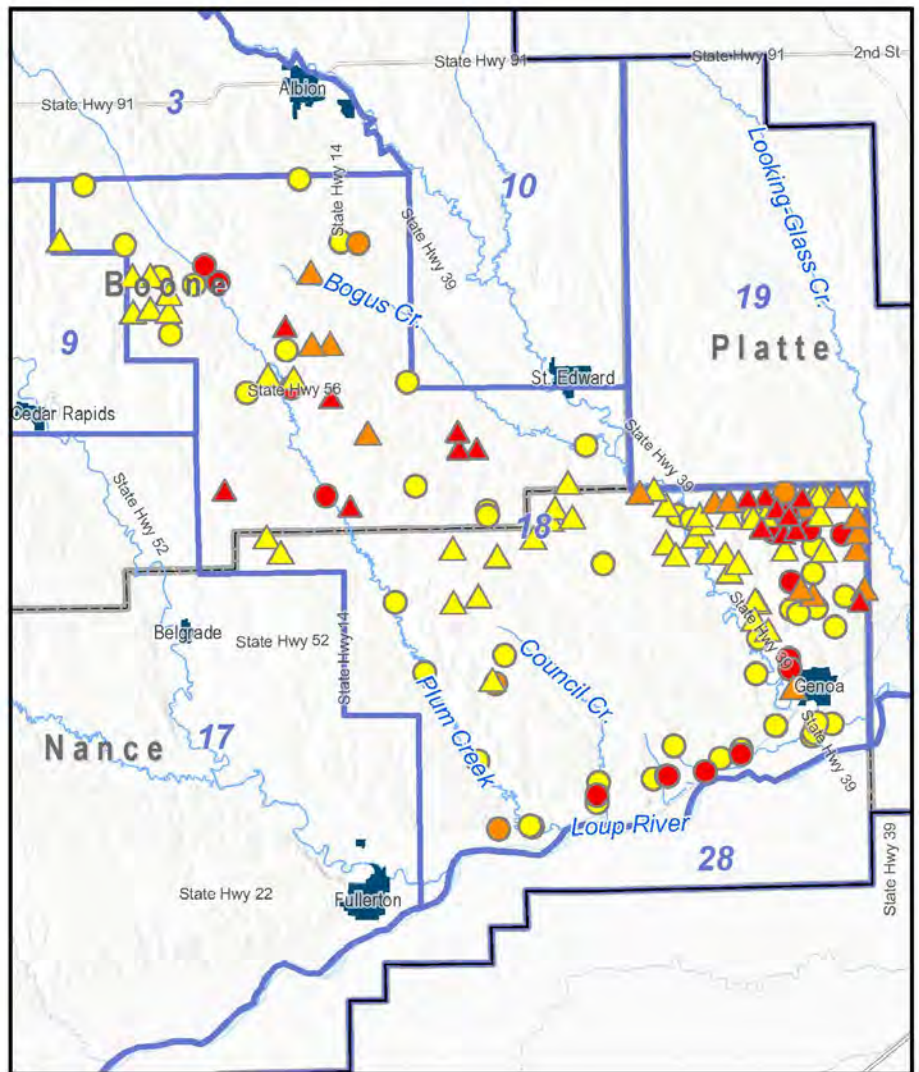
Lower Loup Natural Resources District  
Water Quality Management Area 18

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



Esri, NASA, NGA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

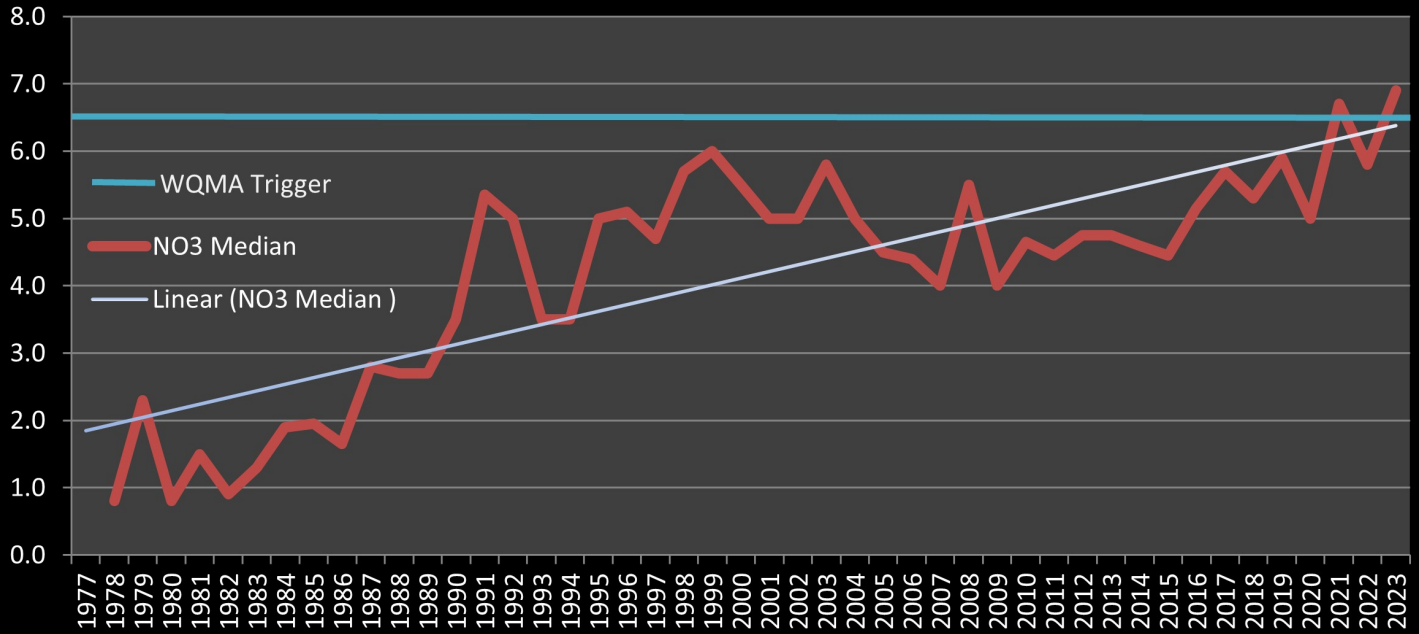


Median: 4.1 Average: 6.7 Count: 142



# Area 19 NO3 Median

$$y = 0.0983x + 1.7528$$

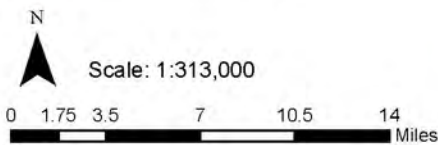
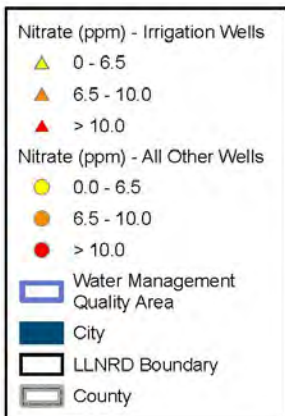


## 2023 Nitrate Sampling Results

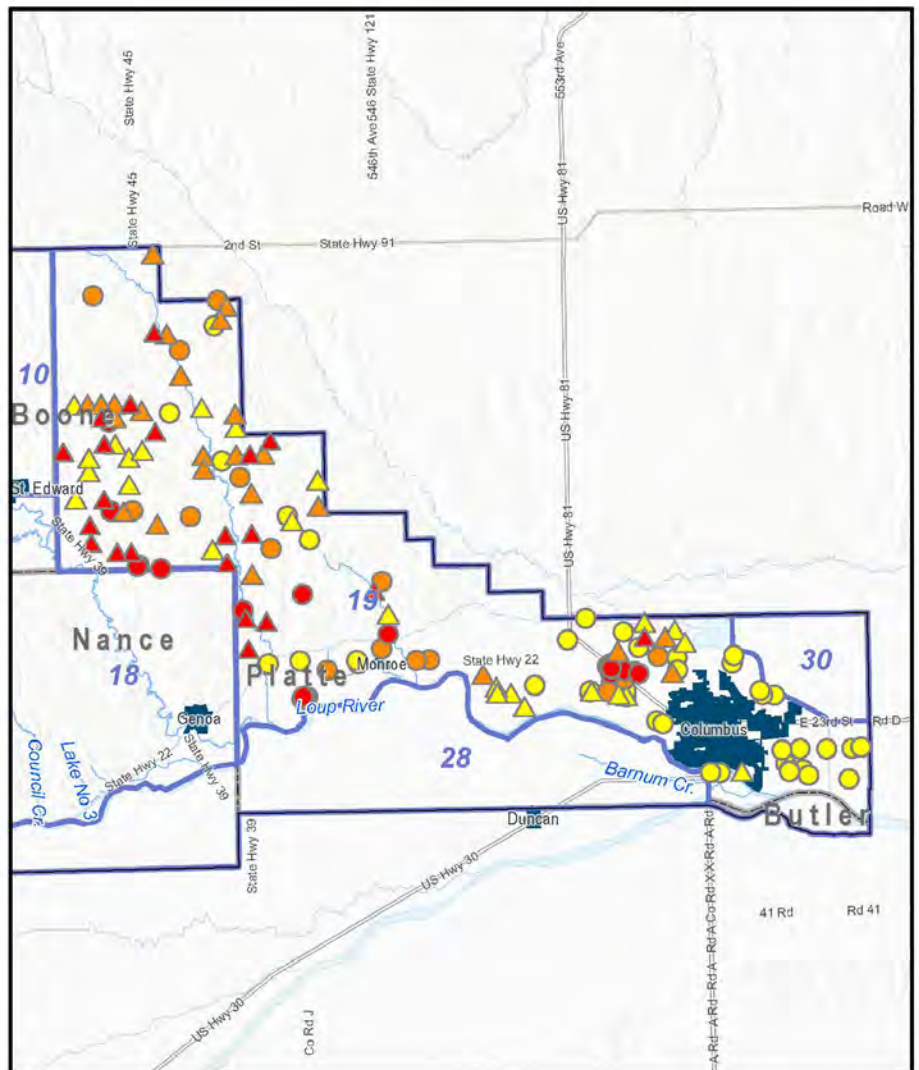
Lower Loup Natural Resources District  
Water Quality Management Area 19

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



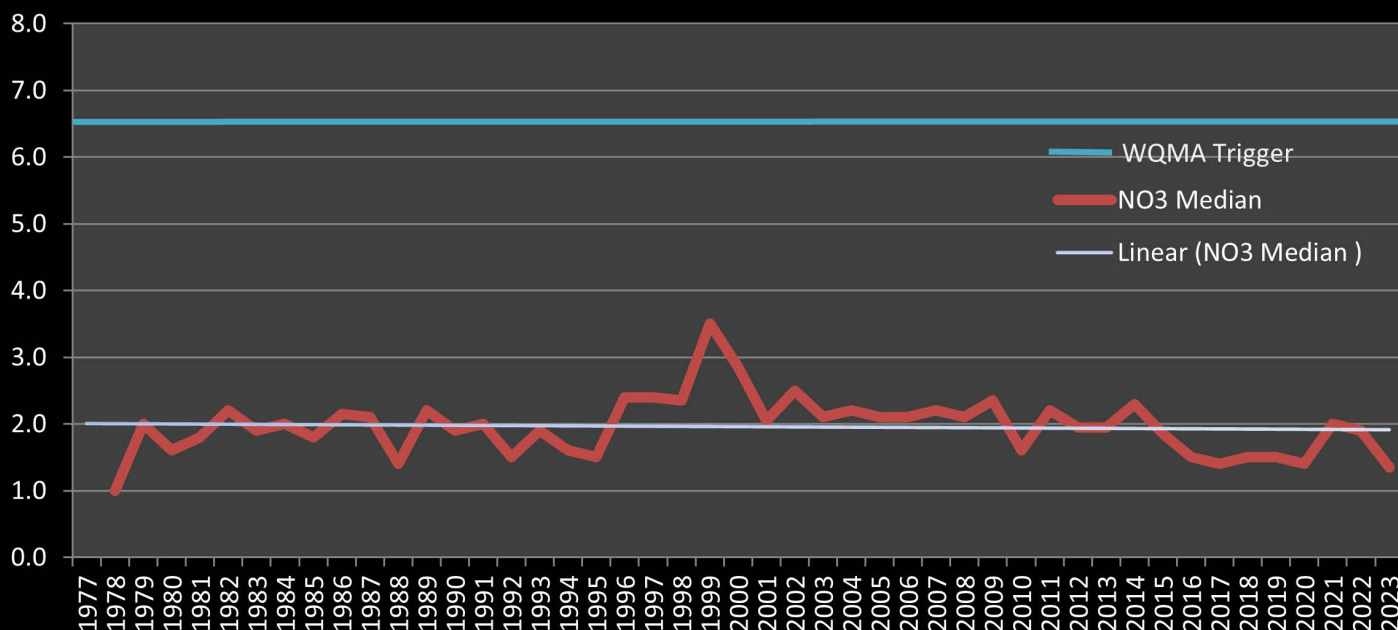
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METINASA, USGS, EPA, NPS, USFWS, Esri, NASA, NGIS, USGS



Median: **6.9** Average: 6.9 Count: 143

# Area 20 NO3 Median

$$y = -0.0019x + 2.0061$$

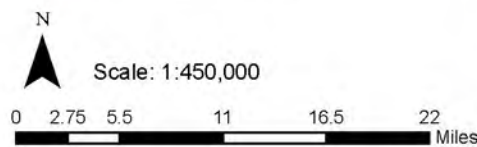
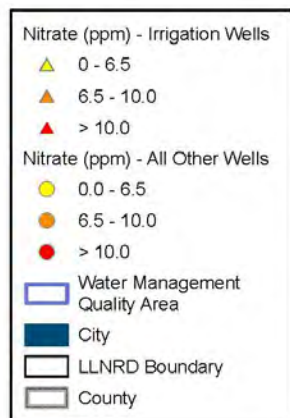


## 2023 Nitrate Sampling Results

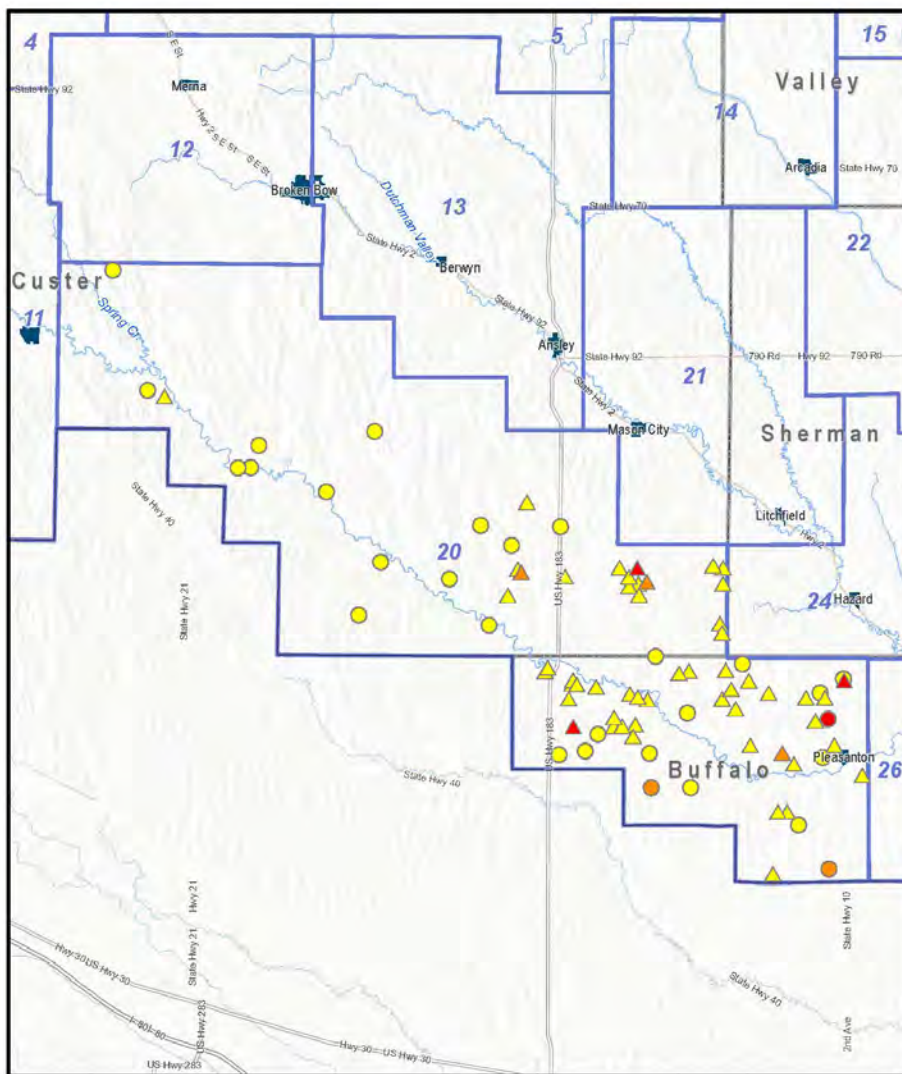
Lower Loup Natural Resources District  
Water Quality Management Area 20

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



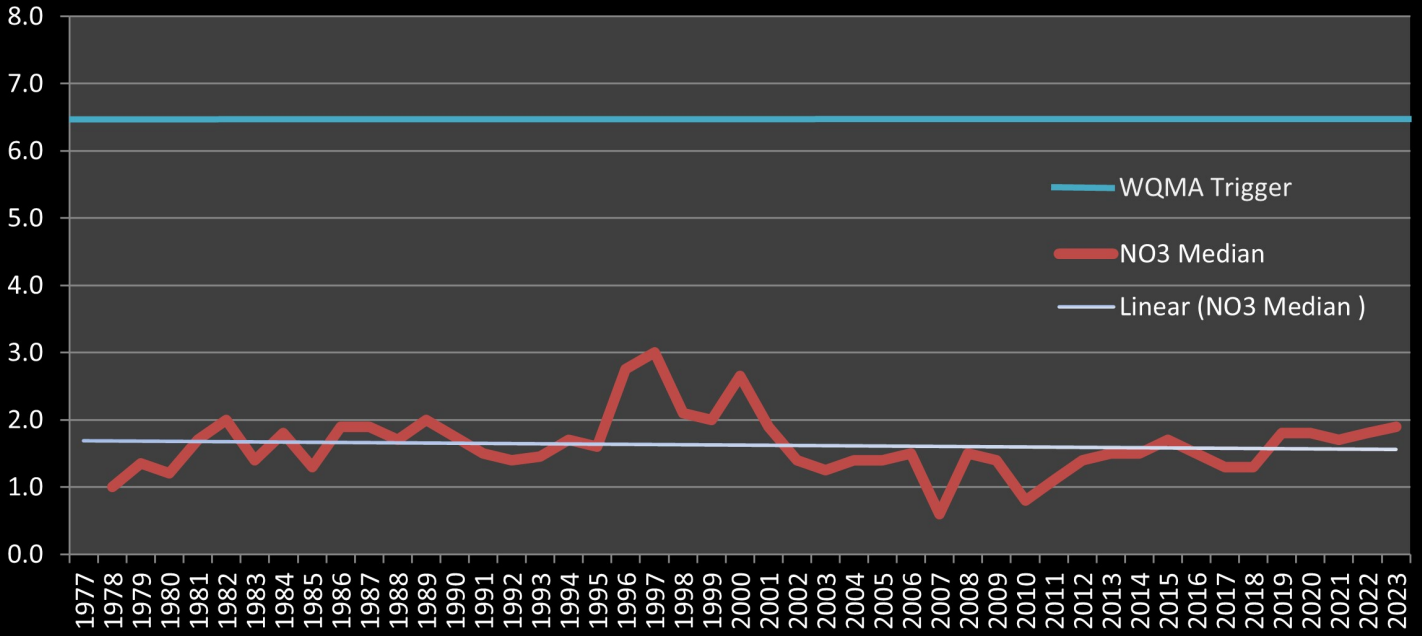
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METINASA, USGS, EPA, NPS, USFWS, Esri, CIGAR, USGS



**Median: 1.4 Average: 2.8 Count: 76**

# Area 21 NO3 Median

$$y = -0.0027x + 1.6884$$

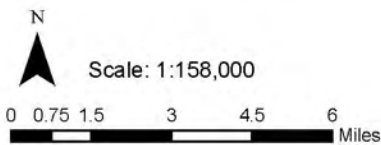
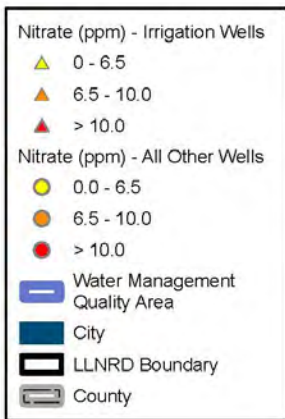


## 2023 Nitrate Sampling Results

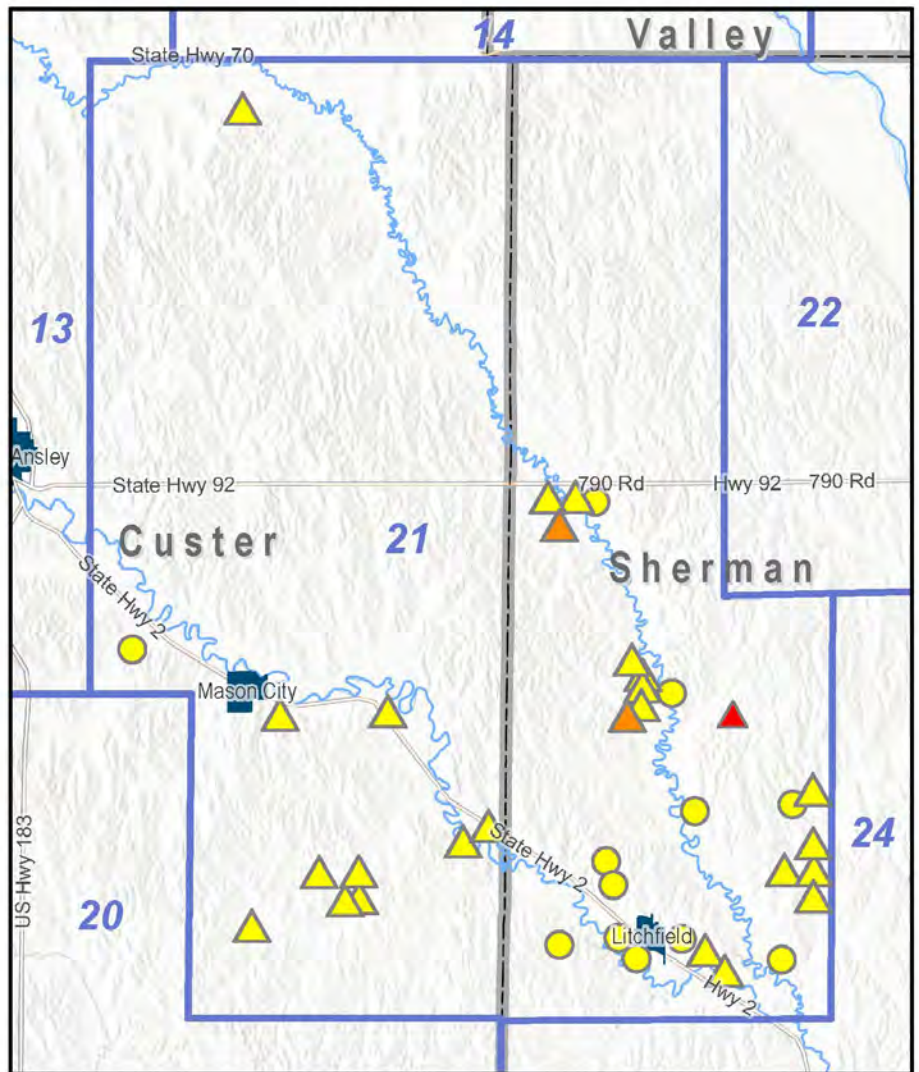
Lower Loup Natural Resources District  
Water Quality Management Area 21

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



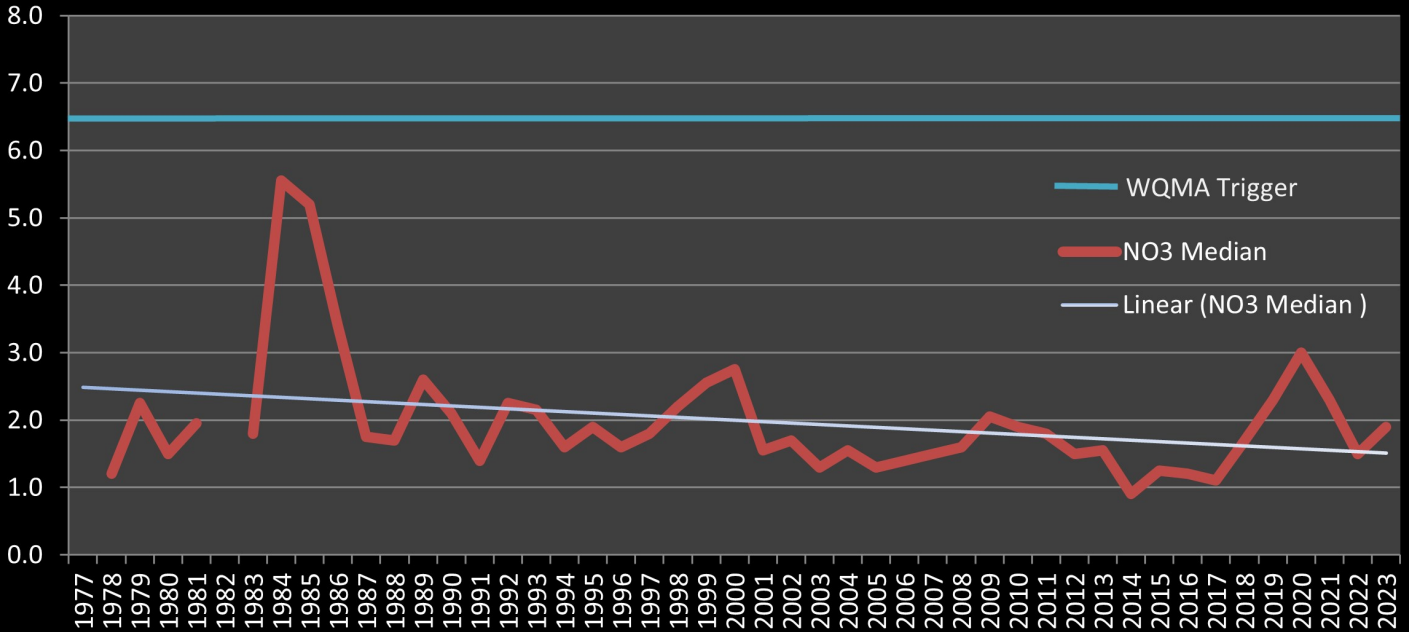
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 1.9 Average: 2.9 Count: 35**

# Area 22 NO3 Median

$$y = -0.0214x + 2.5116$$

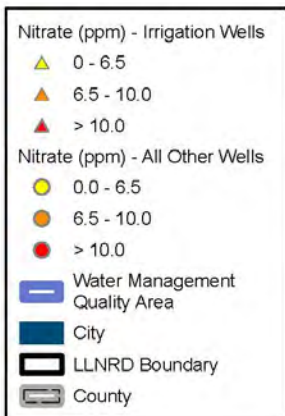


## 2023 Nitrate Sampling Results

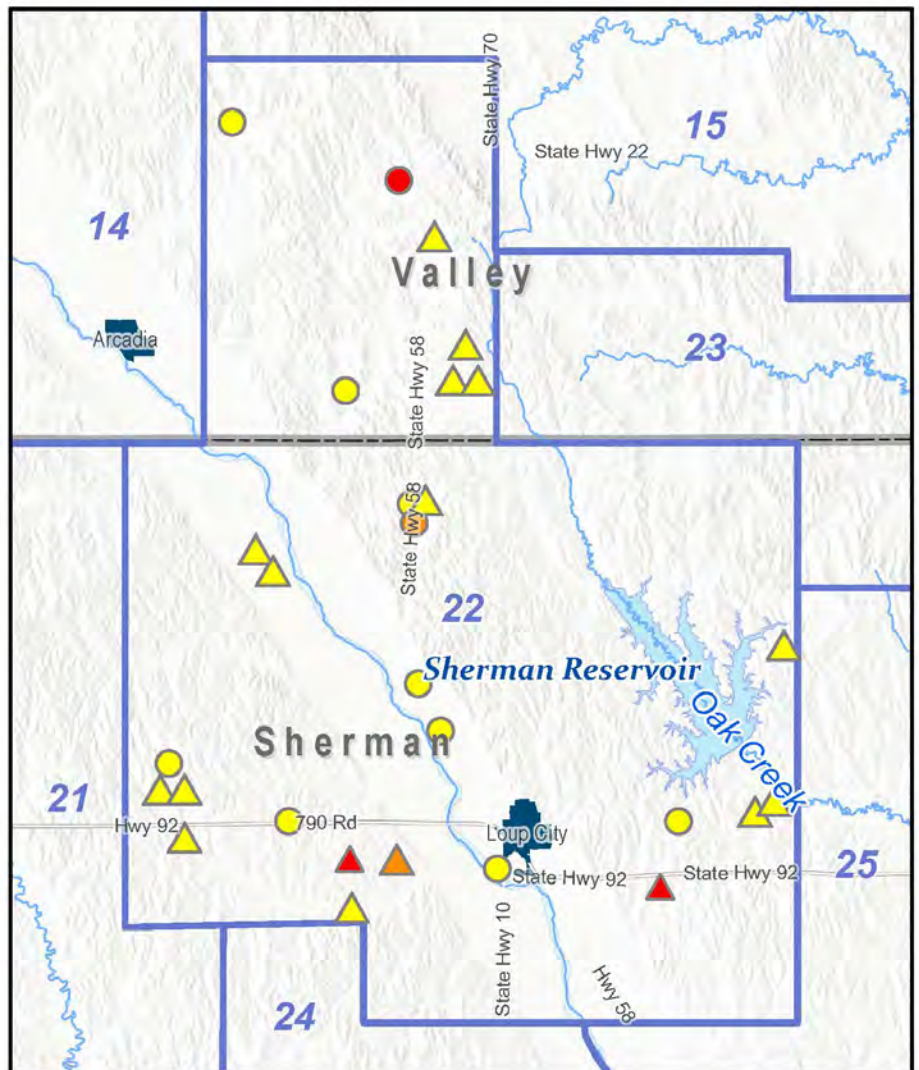
Lower Loup Natural Resources District  
Water Quality Management Area 22

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



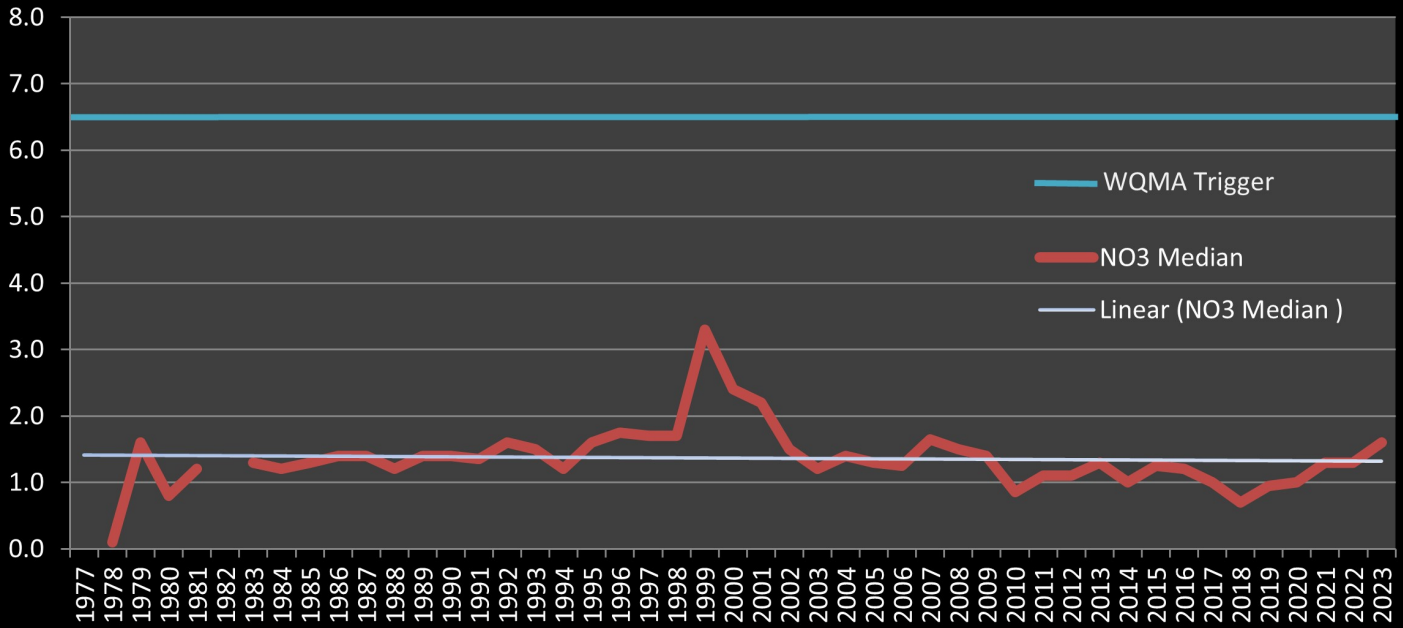
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS



Median: 1.9 Average: 3.6 Count: 24

# Area 23 NO3 Median

$$y = -0.0019x + 1.4134$$

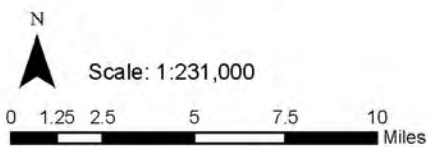
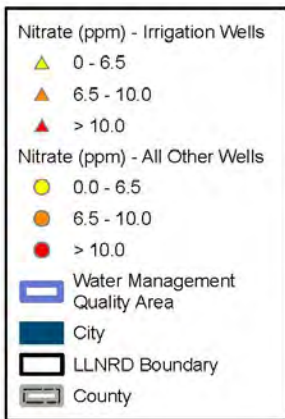


## 2023 Nitrate Sampling Results

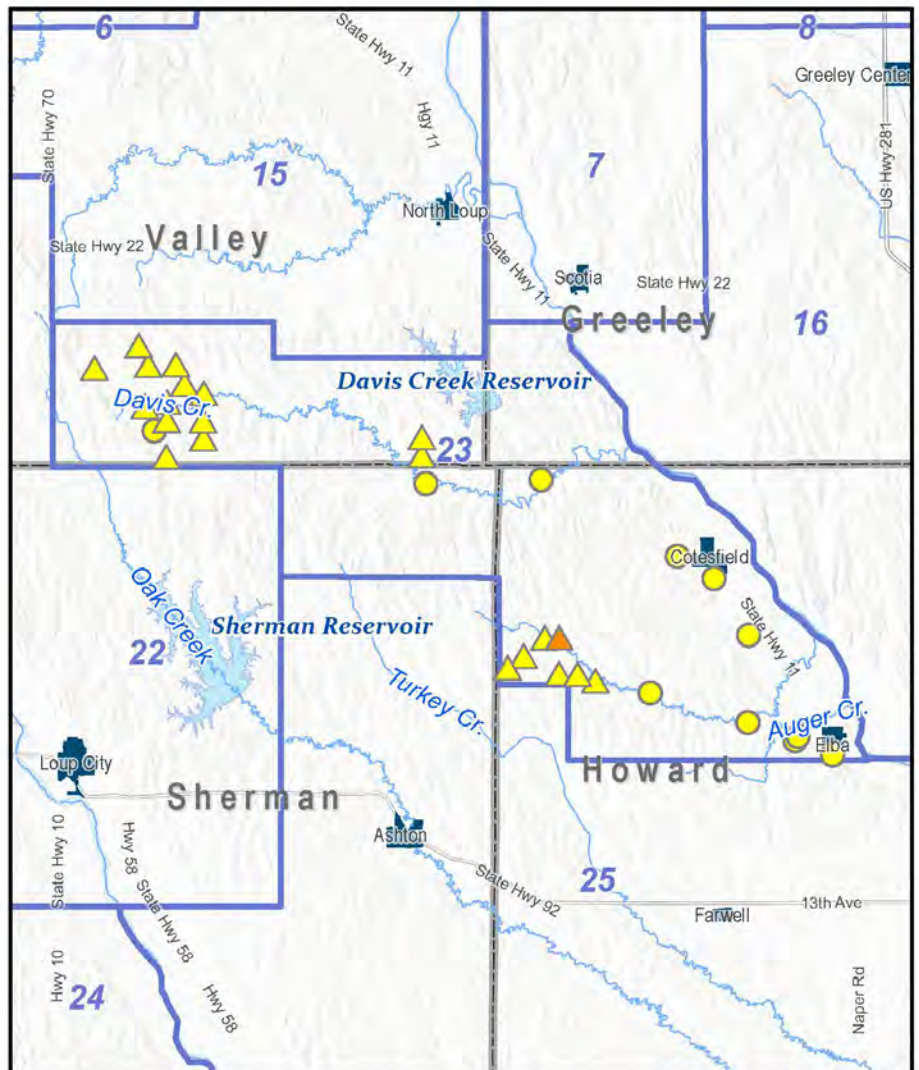
Lower Loup Natural Resources District  
Water Quality Management Area 23

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



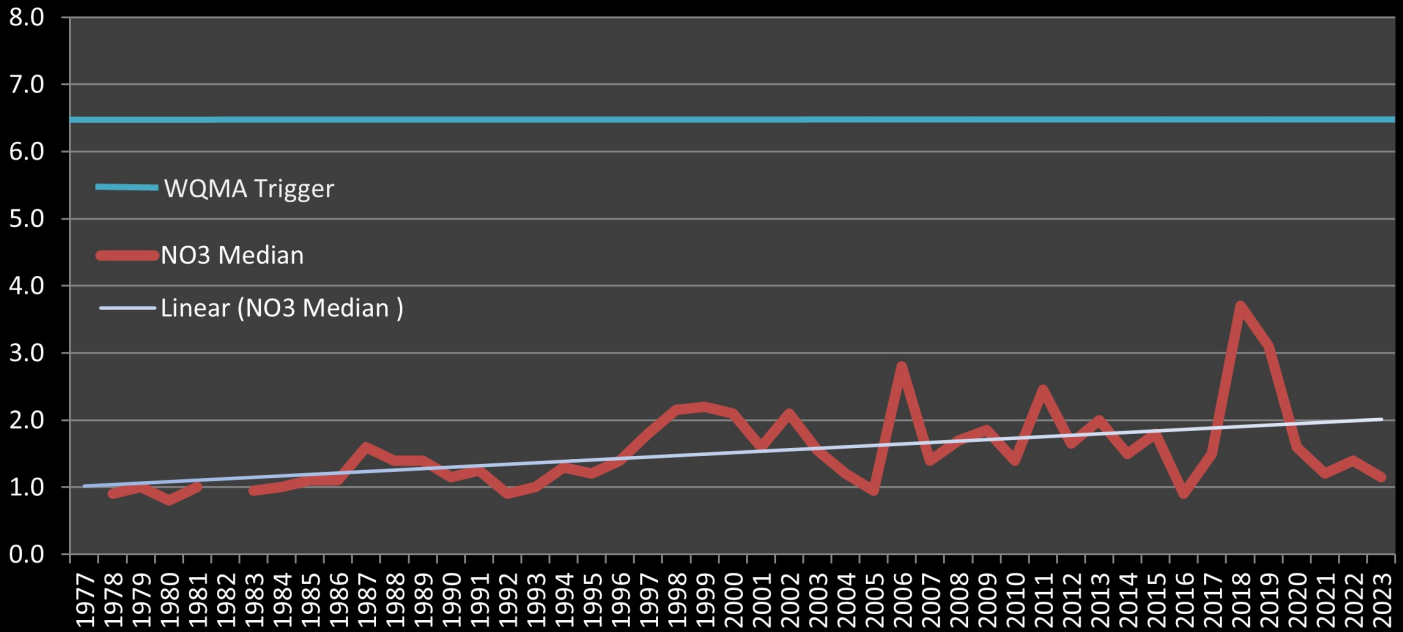
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 1.6 Average: 2.4 Count: 25**

# Area 24 NO3 Median

$$y = 0.0216x + 1.0005$$

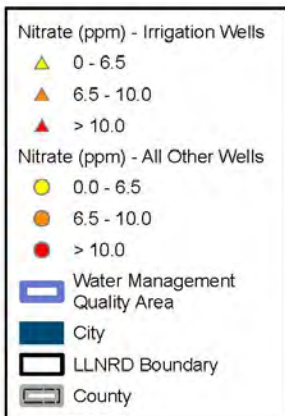


## 2023 Nitrate Sampling Results

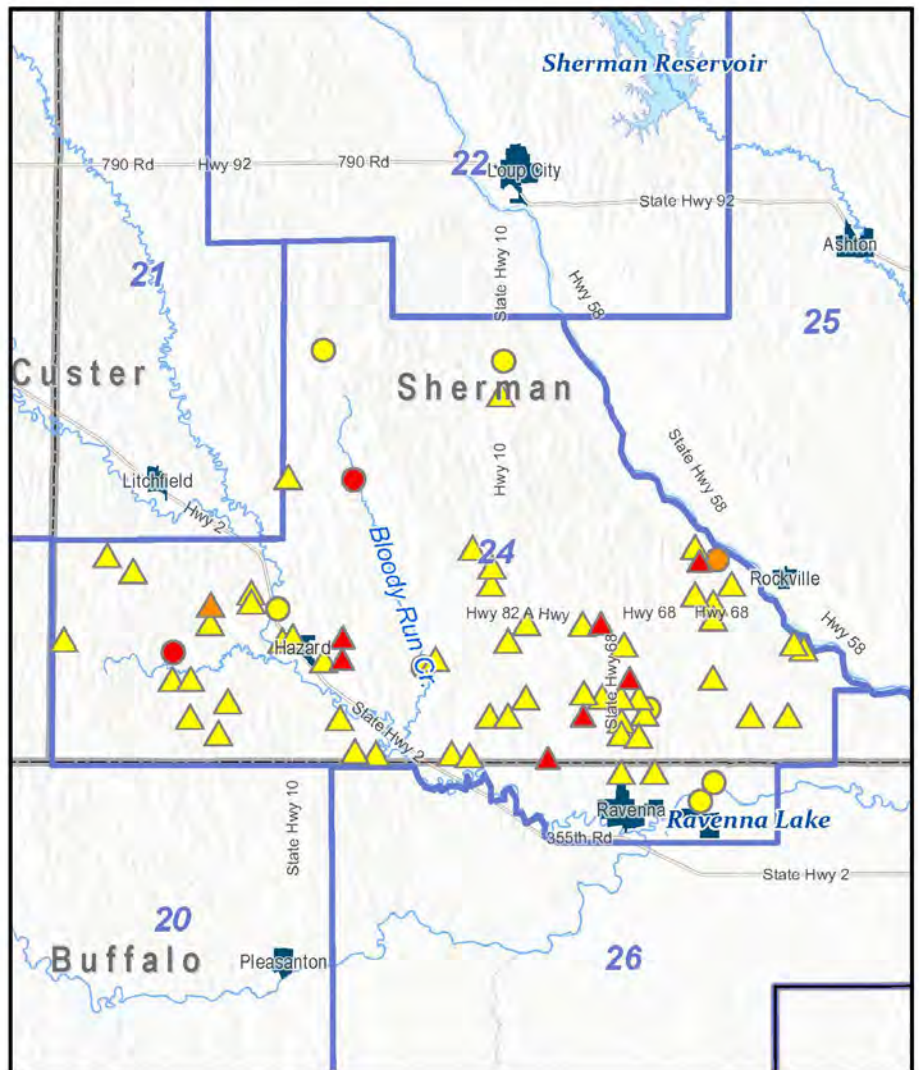
Lower Loup Natural Resources District  
Water Quality Management Area 24

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



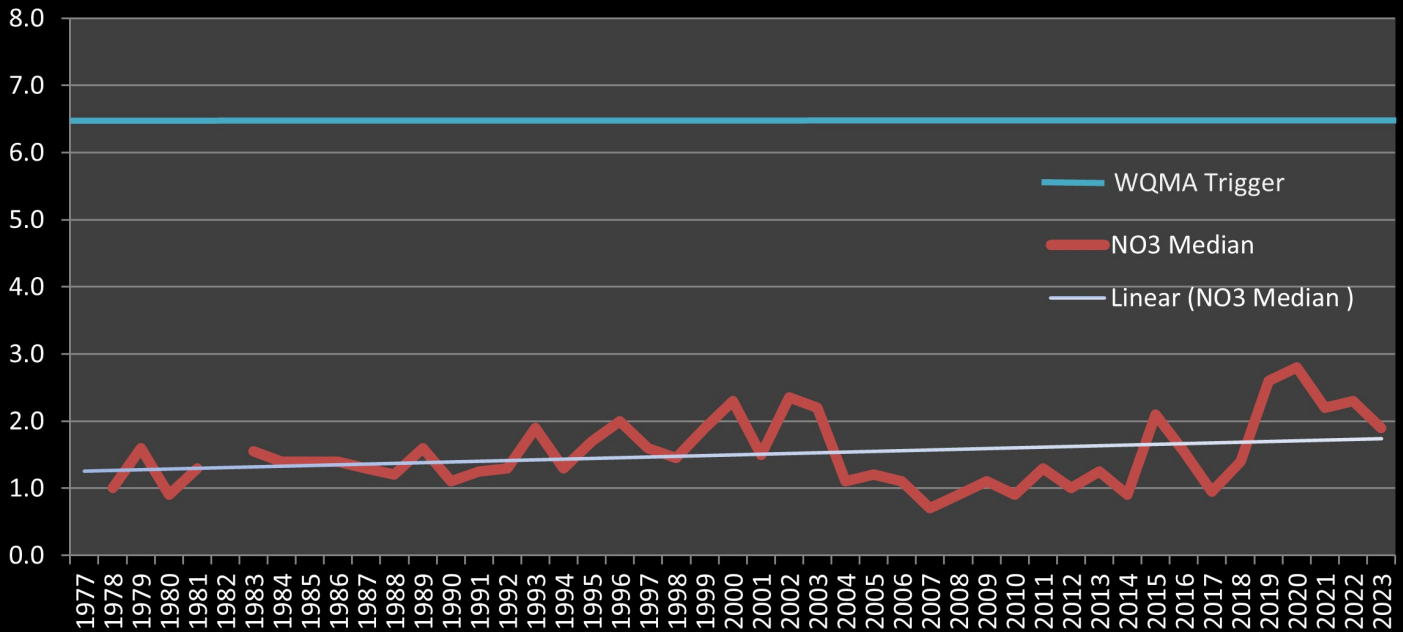
Enr, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 1.2 Average: 3.5 Count: 60**

# Area 25 NO3 Median

$$y = 0.0105x + 1.2443$$

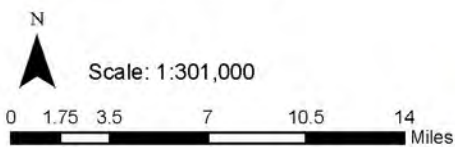
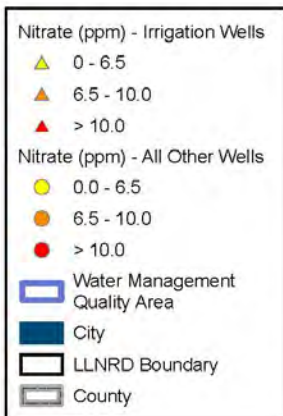


## 2023 Nitrate Sampling Results

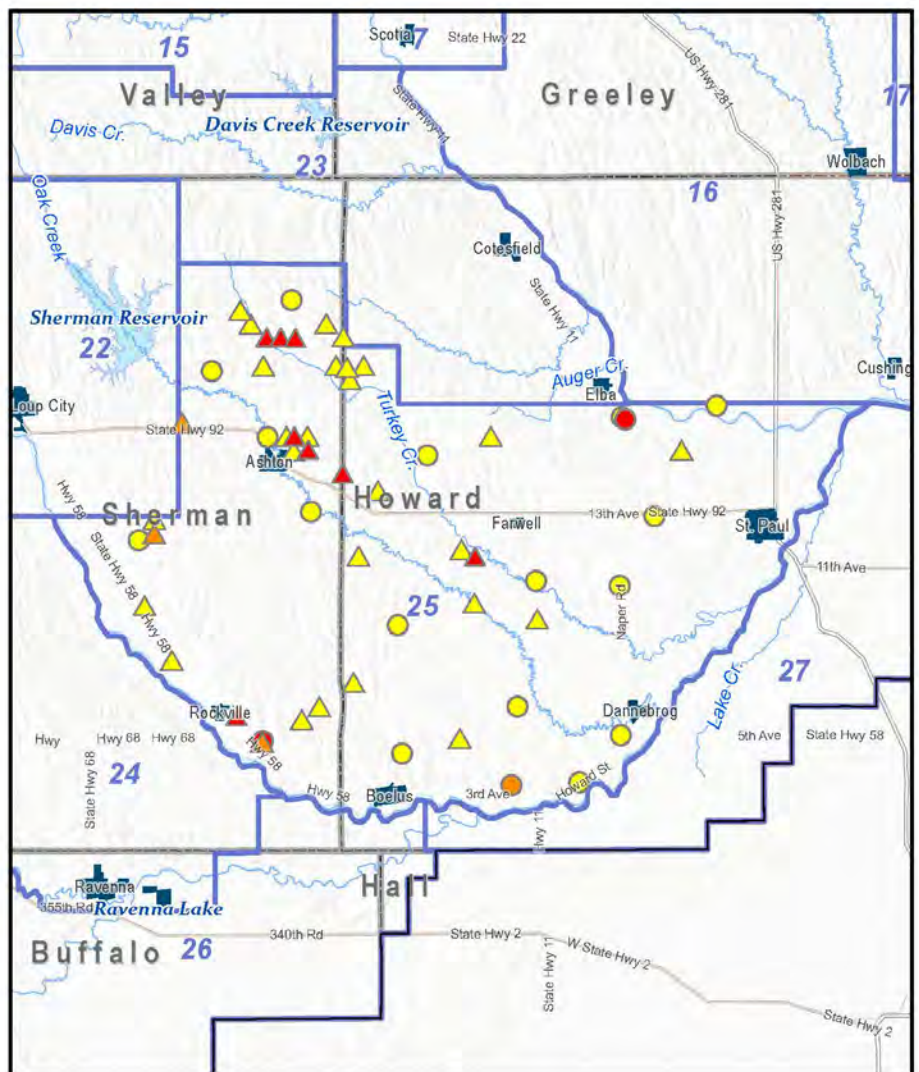
Lower Loup Natural Resources District  
Water Quality Management Area 25

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



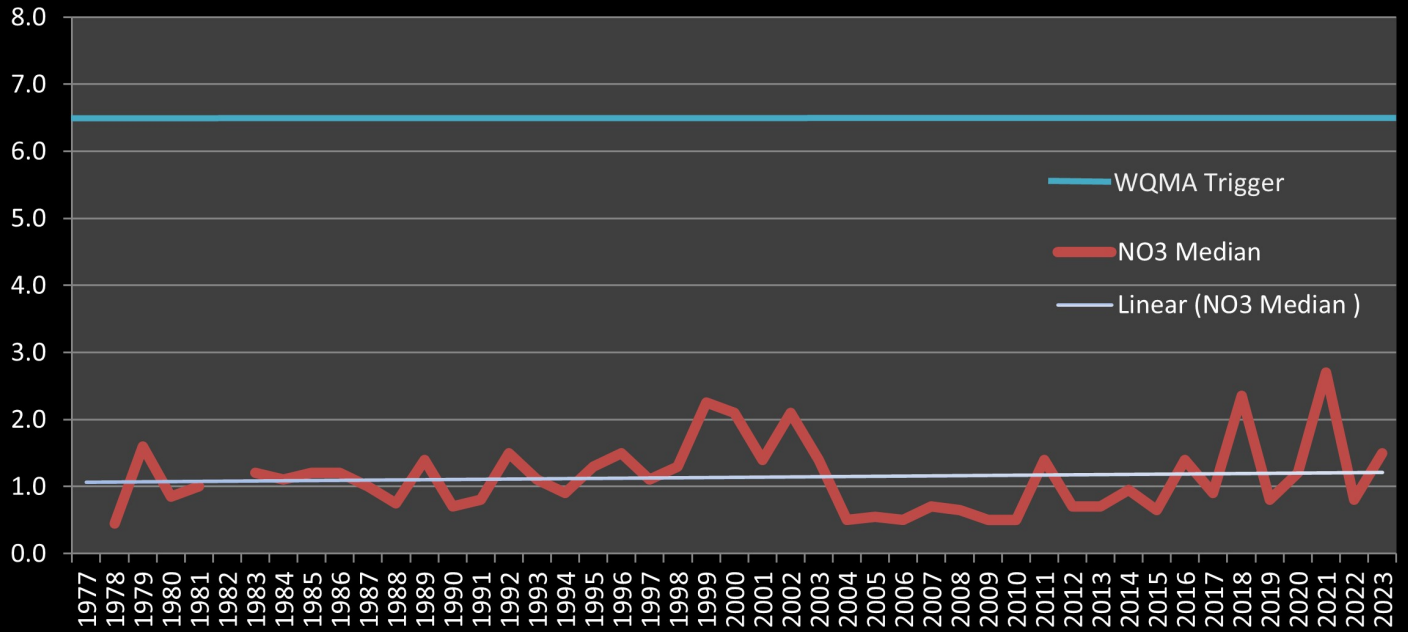
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METINASA, USGS, EPA, NPS, USFWS, Esri, NASA, INR, USGS



Median: 1.9 Average: 5.0 Count: 47

# Area 26 NO3 Median

$$y = 0.0032x + 1.0569$$

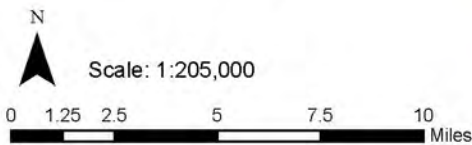
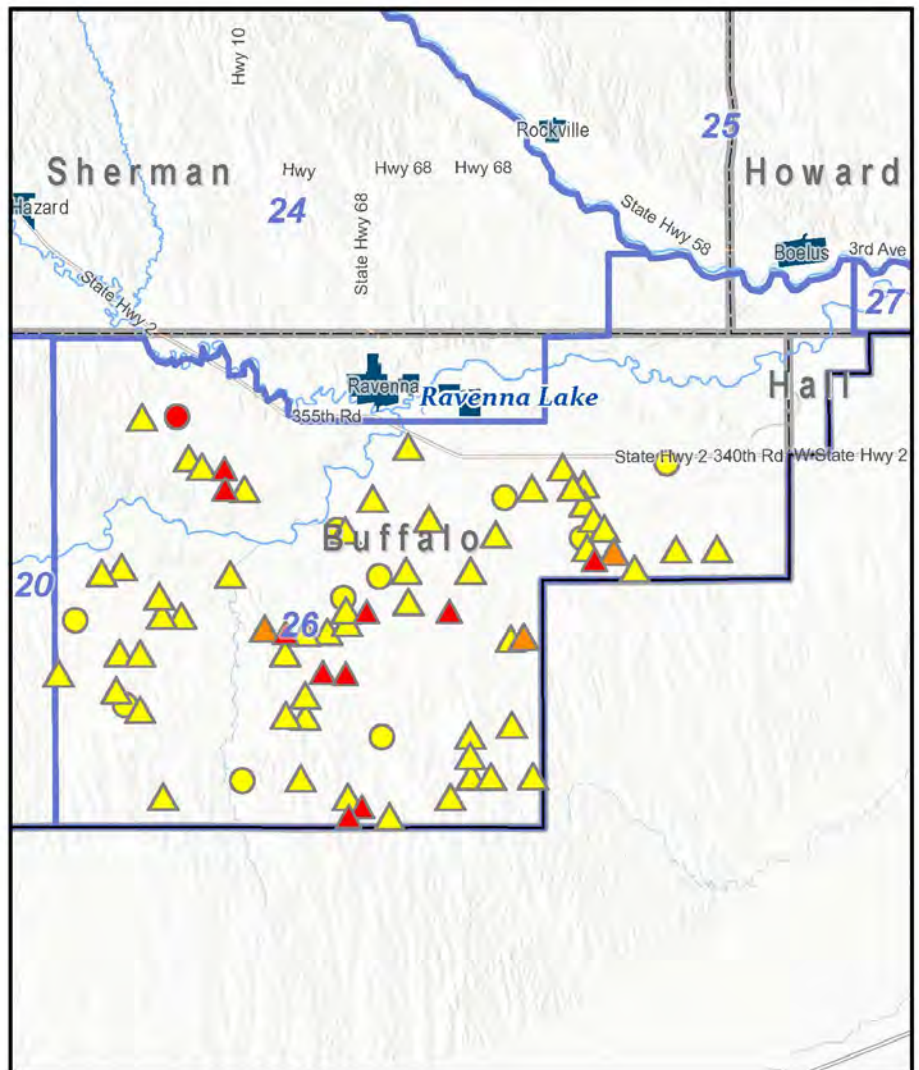
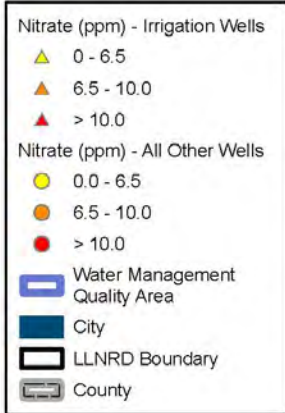


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 26

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



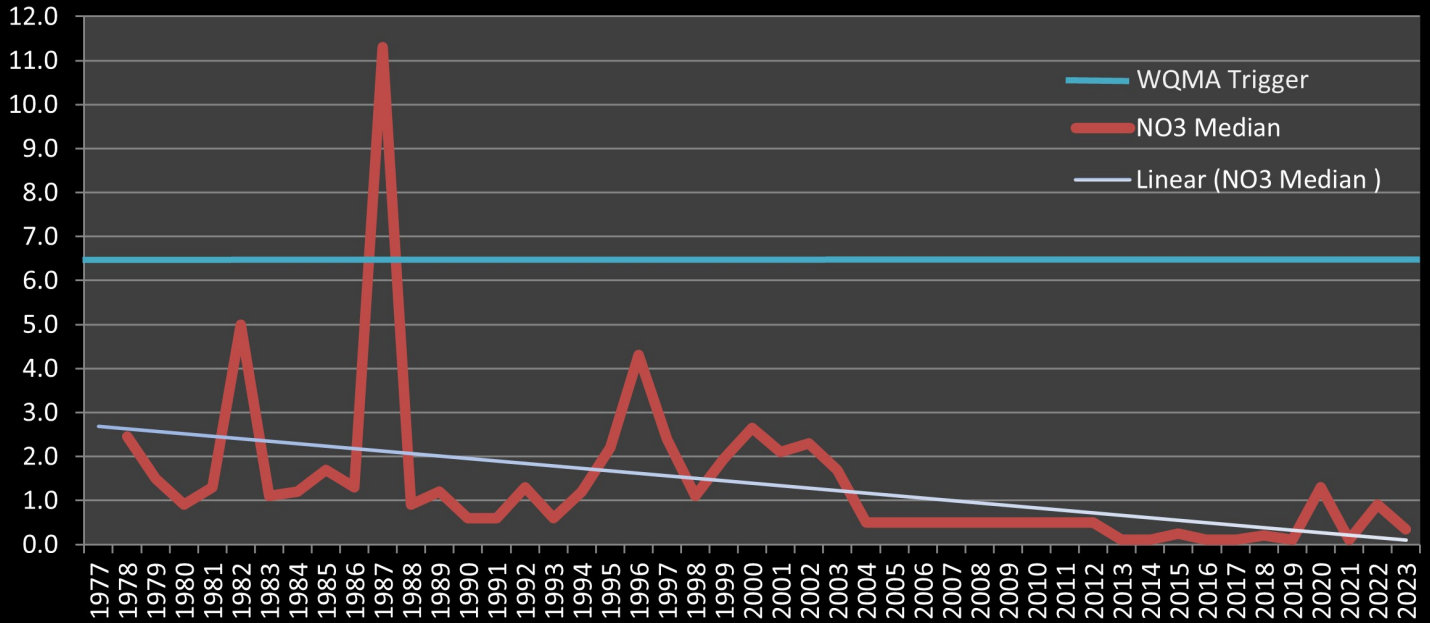
Esri, NASA, NCA, USGS, Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, MET/NASA, USGS, EPA, NPS, USDA, USFWS

Median: 1.5 Average: 3.4 Count: 63



# Area 27 NO3 Median

$$y = -0.0562x + 2.7459$$

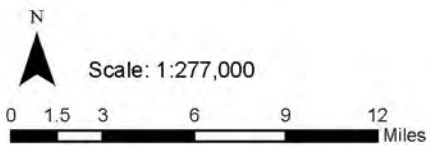
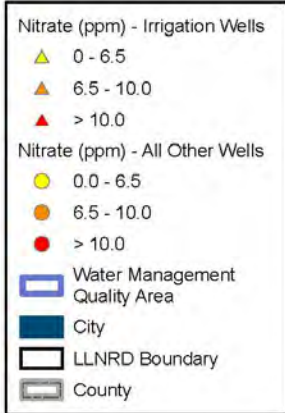


## 2023 Nitrate Sampling Results

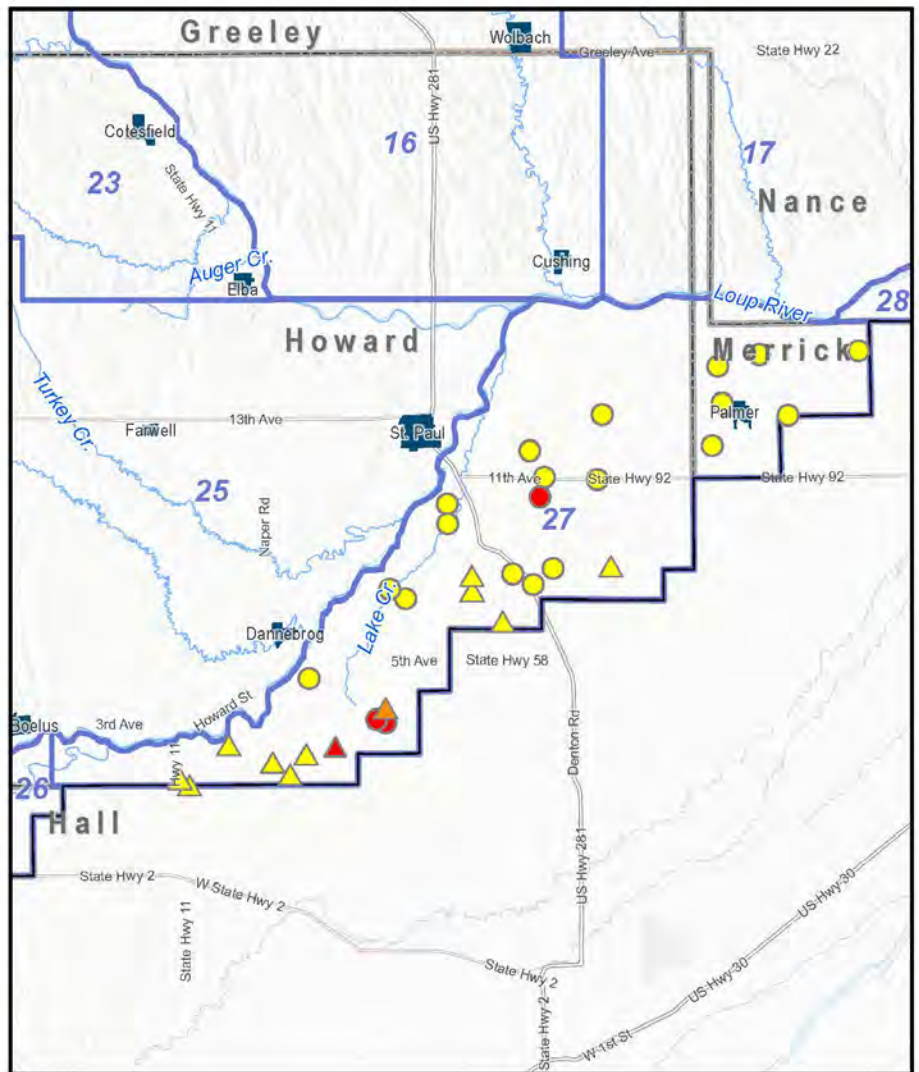
Lower Loup Natural Resources District  
Water Quality Management Area 27

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



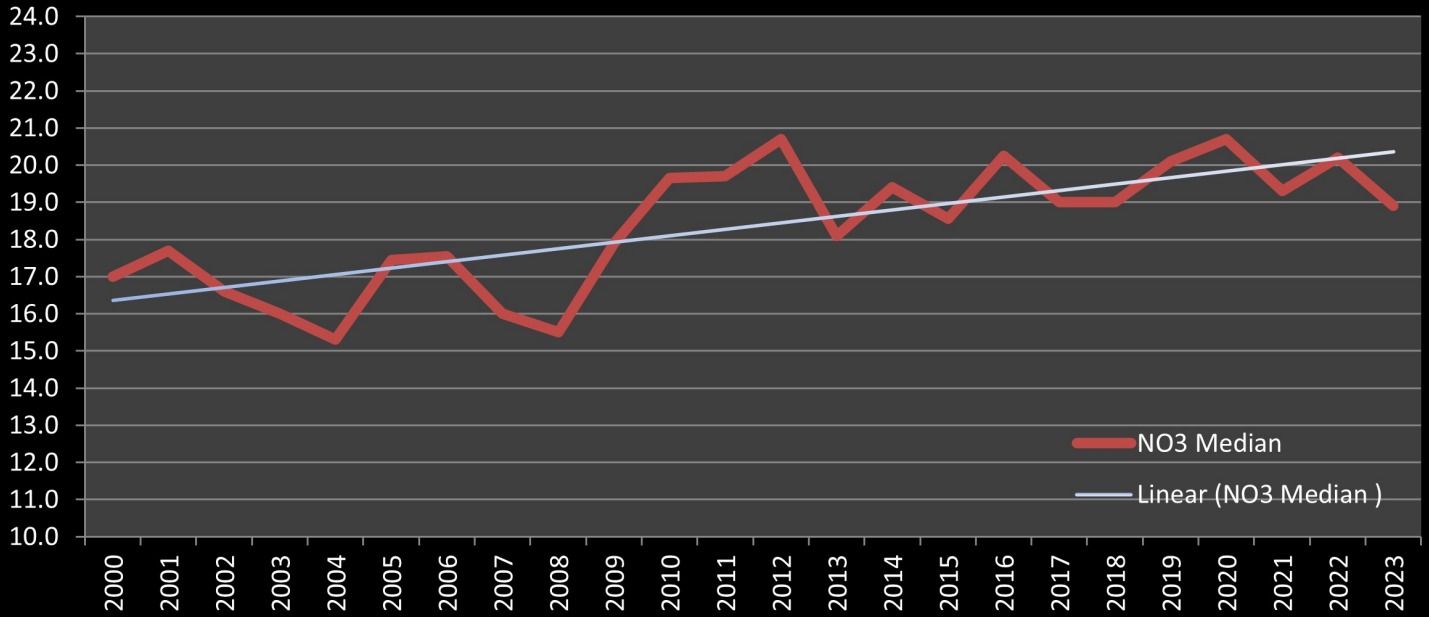
Est. NASA, NCA, USGS, Nebraska Game & Parks Commission, Exir, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS



**Median: 0.4 Average: 4.2 Count: 32**

# WQMA Area 28 NO3 Median

$$y = 0.1735x + 16.188$$

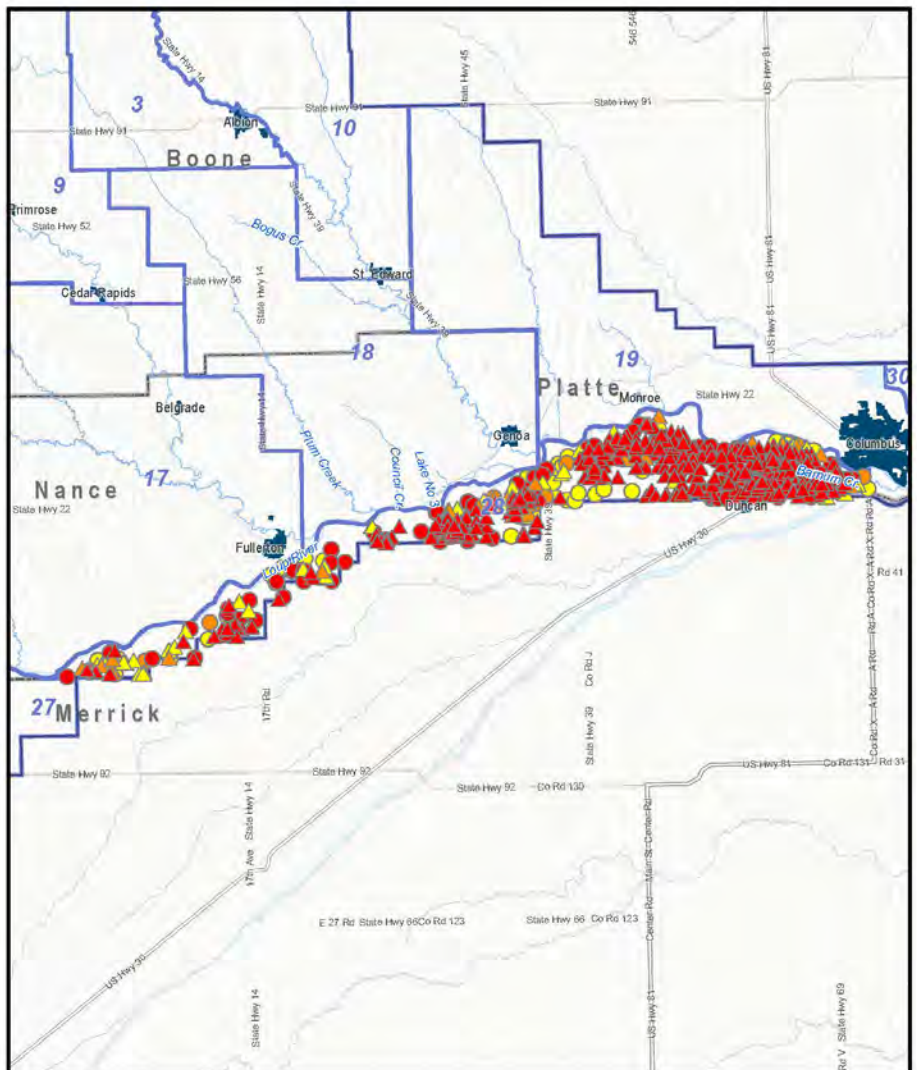
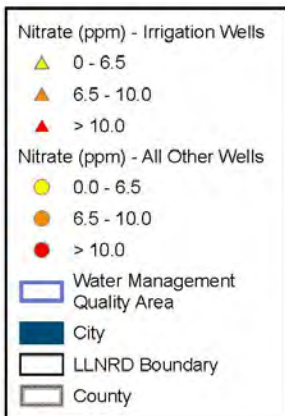


## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 28

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring



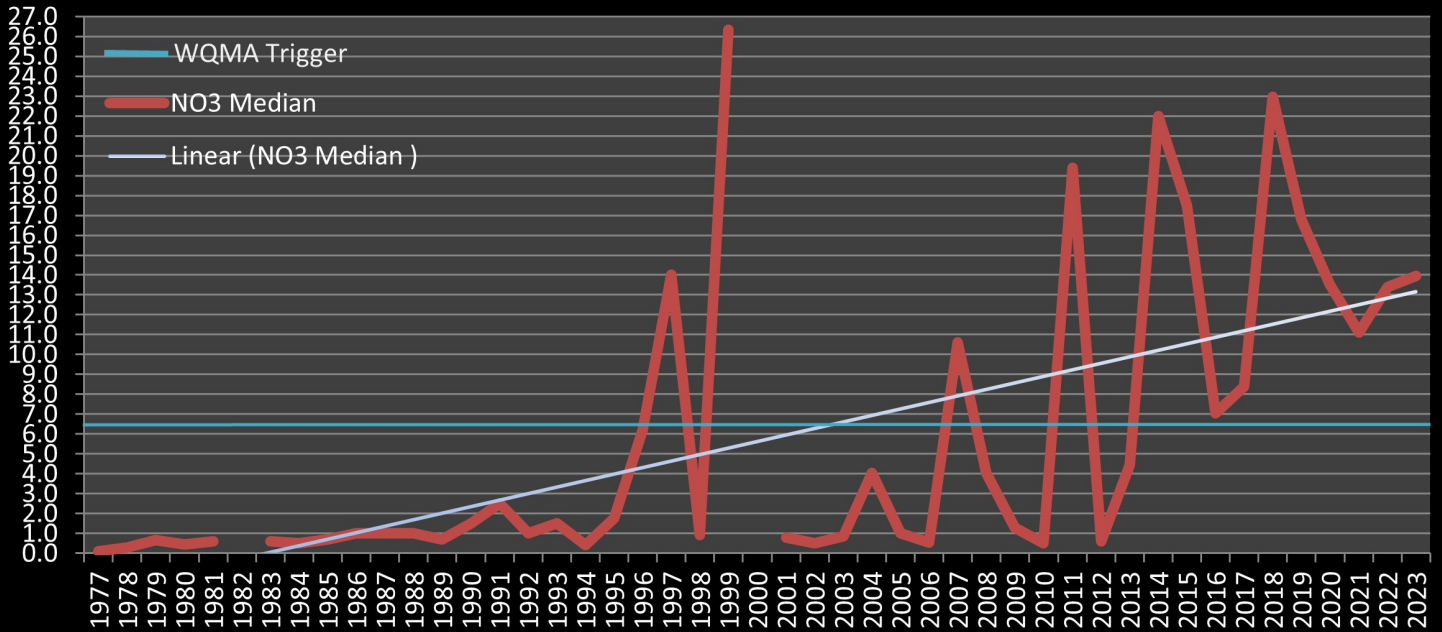
Median: **18.9** Average: 18.9 Count: 665



Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, FAO, METINASA, USGS, EPA, NPS, USFWS, Esri, OGIAR, USGS

# WQMA Area 29 NO3 Median

$$y = 0.3275x - 2.2353$$



## 2023 Nitrate Sampling Results

Lower Loup Natural Resources District  
Water Quality Management Area 29

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

Other well types: Commercial, Domestic, Livestock, Monitoring

### Nitrate (ppm) - Irrigation Wells

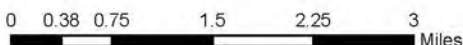
- ▲ 0 - 6.5
- ▲ 6.5 - 10.0
- ▲ > 10.0

### Nitrate (ppm) - All Other Wells

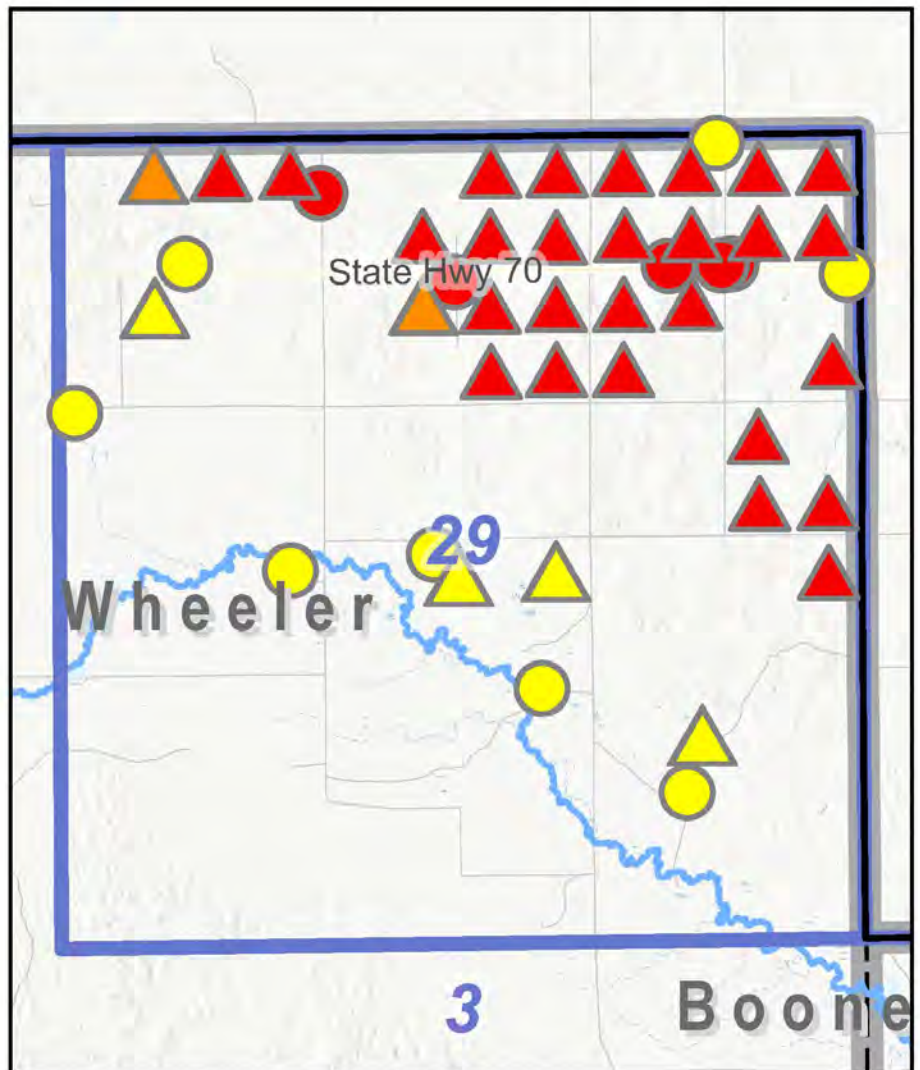
- 0.0 - 6.5
- 6.5 - 10.0
- > 10.0

- Water Management Quality Area
- City
- LLNRD Boundary
- County

Scale: 1:63,000



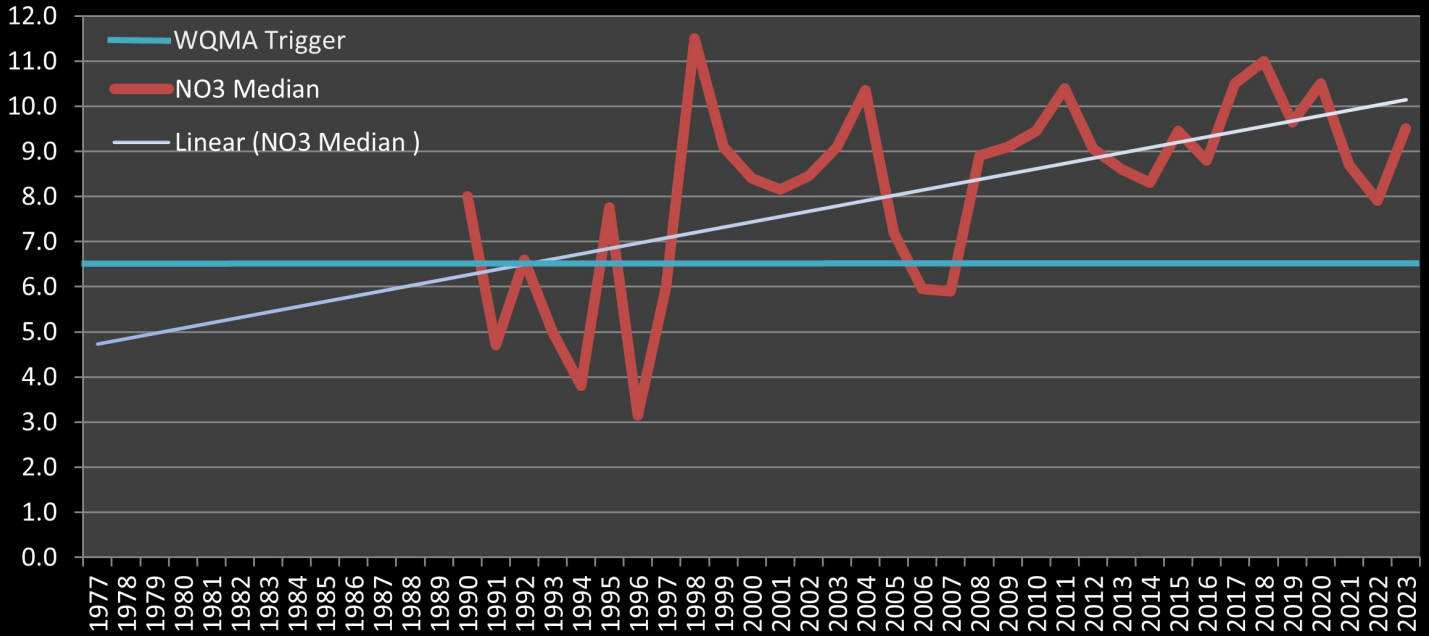
Nebraska Game & Parks Commission, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc., METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA



**Median: 14.0 Average: 13.2 Count: 50**

# WQMA Area 30 NO3 Median

$$y = 0.1178x + 4.6096$$



## 2023 Nitrate Sampling Results

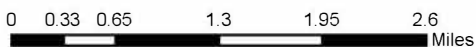
Lower Loup Natural Resources District  
Water Quality Management Area 30

Total 2023 LLNRD Well Readings: 2,736  
Irrigation Wells: 1,650  
All Other Wells: 1,086

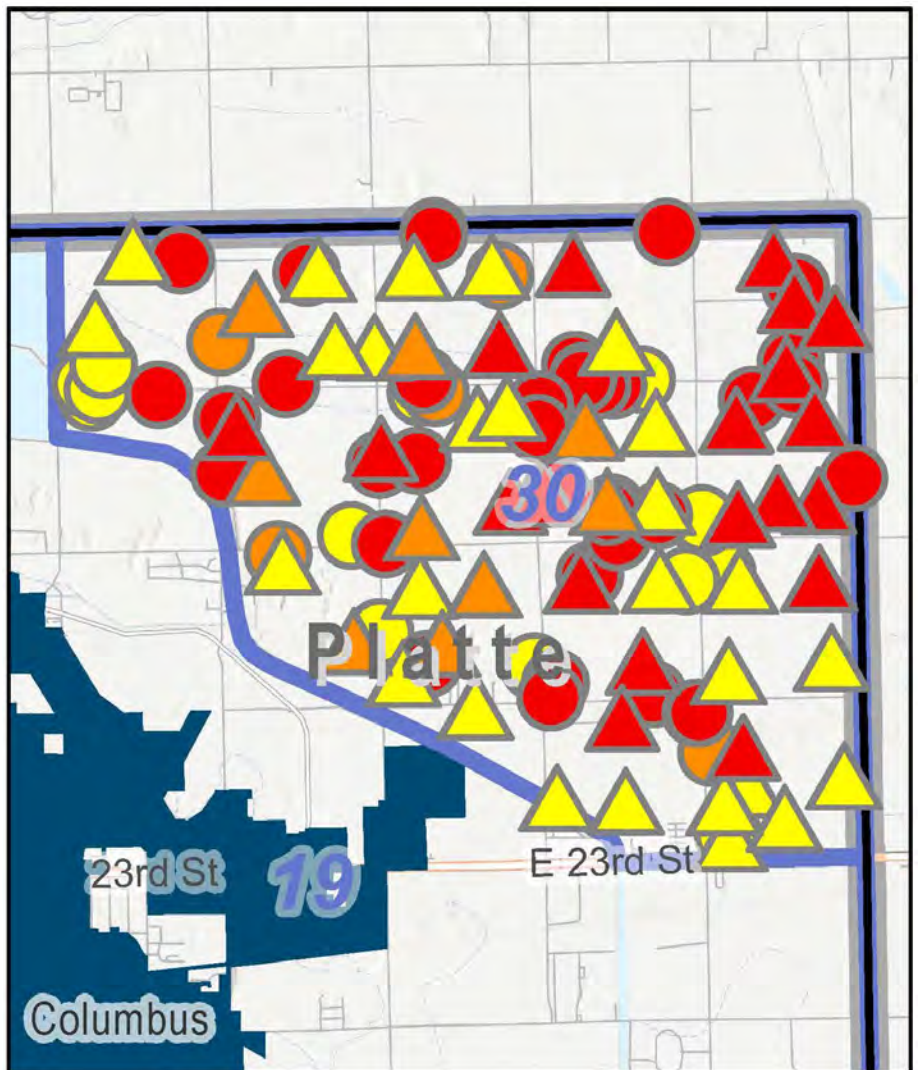
Other well types: Commercial, Domestic, Livestock, Monitoring



Scale: 1:53,000



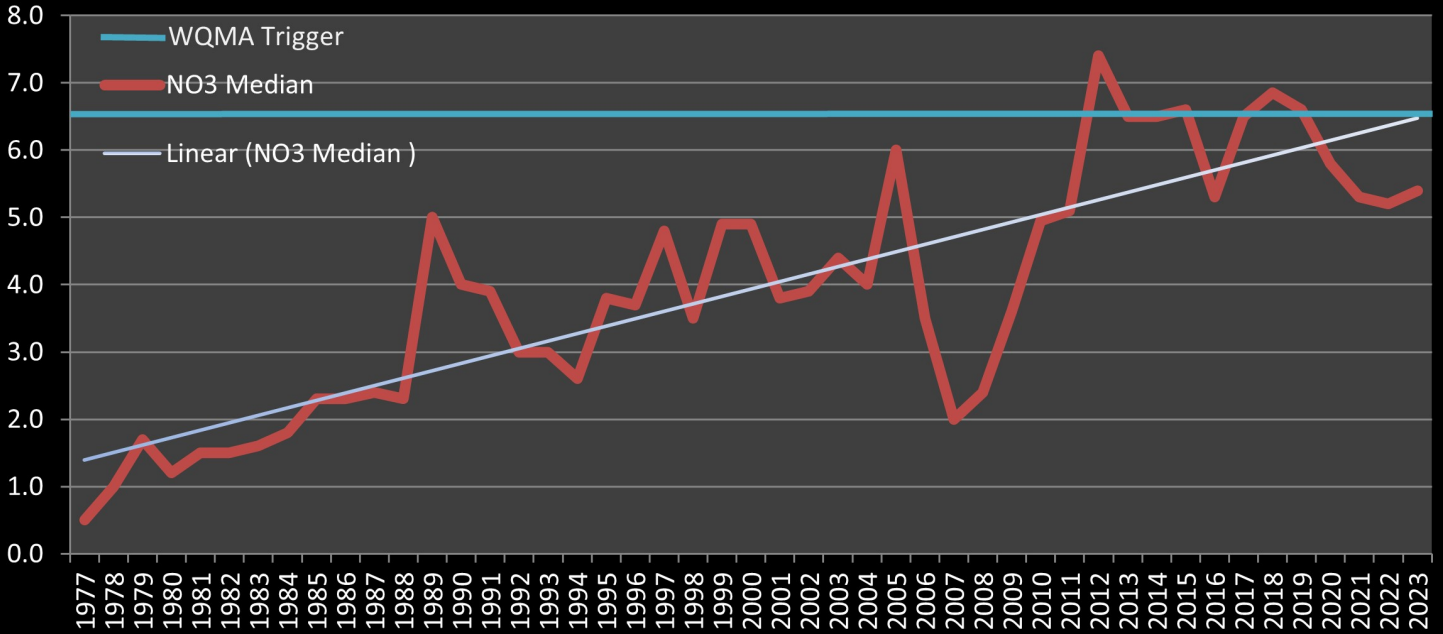
Nebraska Game & Parks Commission, Esri, Trimble, Garmin, SafeGraph, GeoTechnologies, Inc., METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA



Median: 9.5 Average: 12.2 Count: 121

### Area LLNRD NO3 Median

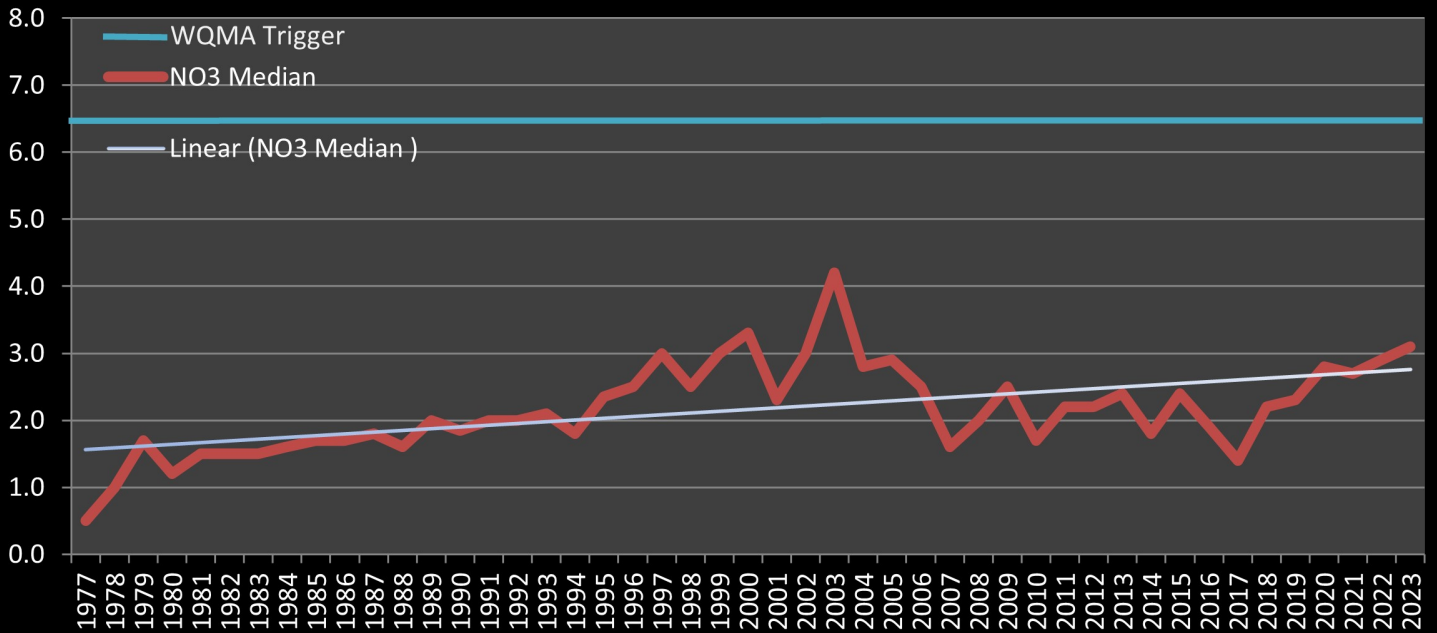
$$y = 0.1105x + 1.281$$



**Median: 5.4 Average: 9.5 Count: 2513**

### LLNRD without Area 28 NO3 Median

$$y = 0.0262x + 1.532$$



**Median: 3.1 Average: 6.1 Count: 1848**

County	Well Type	Sample Count	Average Nitrate ppm
Total 2511 All Samples <b>9.48</b>	Commercial	2	<b>15.15</b>
	Domestic	890	8.95
	Irrigation	1459	<b>10.20</b>
	Livestock	34	<b>12.53</b>
	Monitoring	127	3.87
Boone Total 162 @ 6.35	Commercial	-	-
	Domestic	61	6.42
	Irrigation	76	7.94
	Livestock	-	-
	Monitoring	25	1.33
Buffalo Total 115 @ 2.99	Commercial	-	-
	Domestic	24	3.78
	Irrigation	84	2.94
	Livestock	-	-
	Monitoring	7	0.84
Custer Total 304 @ 5.6	Commercial	-	-
	Domestic	113	4.97
	Irrigation	171	6.45
	Livestock	-	-
	Monitoring	20	1.89
Garfield Total 116 @ 3.47	Commercial	-	-
	Domestic	56	3.00
	Irrigation	36	5.46
	Livestock	-	-
	Monitoring	24	1.60
Greeley Total 89 @ 4.82	Commercial	-	-
	Domestic	23	6.10
	Irrigation	65	4.42
	Livestock	-	-
	Monitoring	1	2.00
Howard Total 71 @ 3.98	Commercial	-	-
	Domestic	43	3.92
	Irrigation	28	4.07
	Livestock	-	-
	Monitoring	-	-

County	Well Type	Sample Count	Average Nitrate ppm
Loup Total 39 @ 3.96	Commercial	-	-
	Domestic	28	2.41
	Irrigation	9	2.37
	Livestock	-	-
	Monitoring	2	<b>32.75</b>
Merrick Total 20 @ 11.79	Commercial	-	-
	Domestic	10	4.36
	Irrigation	8	<b>23.56</b>
	Livestock	2	1.80
	Monitoring	-	-
Nance Total 372 @ 11.99	Commercial	-	-
	Domestic	140	<b>11.17</b>
	Irrigation	218	<b>12.78</b>
	Livestock	11	6.61
	Monitoring	3	<b>13.07</b>
Platte Total 679 @ 16.27	Commercial	2	<b>15.15</b>
	Domestic	262	<b>15.48</b>
	Irrigation	378	<b>17.05</b>
	Livestock	20	<b>17.43</b>
	Monitoring	16	8.72
Rock Total 34 @ 4.85	Commercial	-	-
	Domestic	9	1.53
	Irrigation	25	6.04
	Livestock	-	-
	Monitoring	-	-
Sherman Total 122 @ 4.05	Commercial	-	-
	Domestic	31	3.29
	Irrigation	90	4.35
	Livestock	1	1.20
	Monitoring	-	-
Valley Total 79 @ 5.77	Commercial	-	-
	Domestic	45	4.86
	Irrigation	31	6.72
	Livestock	-	-
	Monitoring	3	9.77
Wheeler Total 310 @ 8.43	Commercial	-	-
	Domestic	45	8.54
	Irrigation	240	8.89
	Monitoring	25	3.90