Tri-Basin NRD
Planning, Water Issues and Property Rights Committee
Friday, March 21, 2025 at 9:30 AM
Tri-Basin NRD Office

Agenda:

1. Discuss options for gathering water use data

Planning committee members: Joe Larson-chairman, Brian Bergstrom, David Grimes, Brad Lundeen. Rob Hinrichs Executive Com'te. Reps. Other board members (no quorum-meeting not advertised) and the public are welcome to attend.

NOTES:

MEMO

TO: TBNRD Directors
FROM: John Thorburn
SUBJECT: Justification for Requiring Flowmeters on Irrigation Wells
DATE: 3/20/25

Introduction: Flowmeters measure water pumped by wells. Typical flowmeters measure well output and totalize the cumulative amount of water pumped. Cumulative water pumping can also be estimated using electric meters, but they don't provide data on pump flow rate, which is estimated. Remote reading flowmeters, which can provide producers with flow data on their cellphones, are becoming more common. Twelve NRDs currently require flowmeters and water use reporting on all wells. Eight more NRDs are like Tri-Basin, requiring flowmeters in management areas, but not district-wide.

Currently in Tri-Basin, we have 5112 registered active wells. Essentially 100% of all irrigation wells in the Republican River Basin are already metered and reporting water use to the NRD. All municipal, commercial and industrial wells are metered. Nearly half of wells in the Little Blue Basin are metered, and about 23% of wells in the Platte Basin are metered. All new or conditional replacement wells must be metered. All wells involved in groundwater transfers must be metered. All participants in WCIP, as well as other local and federal cost-share programs, must have meters on their wells. Some farmers have decided to meter their wells for their own benefit, but they aren't reporting their water data to us. According to our database, 2626 wells are metered and reporting to Tri-Basin NRD already. That's 51% of all registered wells in the district (see attachment).

Following are some reasons that support mandating flowmeters on all wells.

1. **Flowmeters help improve irrigation efficiency.** Producers can learn a lot from their flowmeter. Does the well pump as much water as its supposed to? Does well output decline during the course of an irrigation season? Is a variable frequency drive for a corner system functioning as it should? Has enough water been applied to the crop to keep up with forecast evapotranspiration (eT)? A flowmeter can answer all of these questions. The first noticeable symptom of many irrigation system problems is reduced well output. Farmers need to know how much their wells pump to know whether they're supplying as much water as their crop requires, so that they can achieve top yields at the lowest cost. Governor Pillen is convinced: he has repeatedly stated that he thinks farmers need to measure how much water they pump, so that they can irrigate more knowledgeably.
2. **Flowmeters help the NRD determine whether groundwater use is sustainable.** Determining the sustainability of an aquifer requires two basic

data points: how much water was added to the aquifer and how much water was withdrawn. We estimate how much water was added to the aquifer using rainfall data, CNPPID water delivery data and soil water intake rates. We can either estimate the amount of water pumped (water removed from the aquifer) based on known crop water consumption rates, or we can use actual measured data. Estimates can get reasonably close to actual water use, especially in an average year. If we choose to forego the expense of metering and use estimates instead, then we will need to regulate based on these estimates. Tri-Basin staff have already developed estimates of water use that indicate that there is a potential deficit in aquifer recharge versus withdrawals under average rainfall and pumping conditions. The Net Recharge Tool will provide an even more precise estimate of water use at a township level. Does the NRD board want to decide whether to regulate additional townships based on these estimates? Do you want early warning of potential problem areas? If we have actual water use data, we can align pumping totals with rainfall and temperature data and develop reasonably accurate predictions of how much water would be pumped under future conditions, such as an extended drought, which will help us determine how vulnerable the aquifer is to overpumping under extreme conditions.

3. **Building a record of water use data helps justify water use to outside authorities.** Some producers are concerned that revealing how much water they pump will lead to water use restrictions. It can be argued that the opposite is true. For instance, if the Unicameral decides that farmers need to limit their water use, they could set a statewide maximum allocation. If we want to argue to state senators that their planned allocation is too low, we need data to justify that argument. Such a dataset can also help us argue to the state that the "Overappropriated" designation of the upper Platte isn't justified if Platte streamflows are stable at current levels of groundwater pumping. Furthermore, if we have an area where pumping rates are high, but there isn't any decline in groundwater levels, we know that such a high rate of pumping is sustainable. That sets a baseline that we can use to compare against future conditions. If additional wells are drilled and then groundwater declines occur, we will be able to identify the "tipping point" that separates sustainable pumping from unsustainable groundwater "mining". Some have suggested alternate methods of gathering water use data, such as using electric meters as a proxy for measuring flow. Such methods of estimation are better than no data at all, but it would be inappropriate to mix estimated data with actual measured data in the same database. The estimates degrade the accuracy of the measured data.
4. **Chemigation requires use of a flowmeter to comply with legal requirements for applying restricted use chemicals.** Federal law mandates that chemical manufacturers provide customers with clear instructions about safe use of herbicides and other restricted use chemicals, i.e., that "the label is the law".

These labels include information about dilution of chemicals and maximum allowable strength for safe use. If a farmer doesn't know how much water an irrigation well pumps, they can't accurately determine whether they are using safe, LEGAL strength concentrations of their farm chemicals. Legal issues aside, it's a potential safety issue for anyone that would enter a treated field shortly after chemigation.

One typical counterargument against meters is all the time and expense needed to purchase, install, inspect and read meters. Tri-Basin uses state funds to cost-share with producers on meter installations, so, if a meter costs $2000 to purchase and install, the NRD picks up half of that cost. The actual "up front" cost to the producer ($1000) is less than $8 per acre on a 130 acre center pivot-irrigated field. In unallocated areas, Tri-Basin requires producers to maintain meters, so that would be additional expense, but not for the NRD. We also require farmers to report water use in unallocated areas, although we spot check 20% of meters every year. If meters become mandatory, presuming that they're phased in over several years, we will have extra staff time and expense, maybe as much as $100,000 per year if we need to hire an additional employee, but we can also allow several years to prepare for that expense. Furthermore, federal grants are available to pay for the cost of upgrading flowmeters to enable remote meter reading, which would reduce additional staff time and expense.

The question in the end, for directors, becomes: do you want to track, and possibly regulate, water use based on estimates, or do you and your constituents want real data as a basis for making those decisions? If the response is that we're using groundwater levels to provide the real data to determine whether we should regulate, then directors need to recognize that the reaction of the aquifer to pumping is a lagging indicator. Without good water use data, we might not even know there is a problem until we see groundwater levels decline. Every foot of drop in the aquifer increases pumping cost for producers. Proactive management is always better than reactive management.

TBNRD - Active Registered Wells

3/17/2025

Irrigation

	Gosper	Phelps	Kearney		TOTALS	
Platte	269	1419	921		2609	
Republican	491	759	366		1616	
Little Blue			840		840	5065

Commercial/Industrial

Platte	6	8	11		25	
Republican	1	14	1		16	
Little Blue			6		6	47

Total

Platte	275	1427	932		2634
Republican	492	773	367		1632
Little Blue			846		846
	767	2200	2145		5112

TBNRD - Metered Wells

3/17/2025

Irrigation

	Gosper	Phelps	Kearney		TOTALS	Harlan
Platte	62	287	189		538	
Republican	485	759	364		1608	1
Little Blue			406		406	

Commercial/Industrial

Platte	6	3	8		17
Republican	1	8			9
Little Blue			5		5

Public

Platte	3	7	4		14
Republican	4	15	2		21
Little Blue			4		4

Stock

Platte		1	3	4
Republican				
Little Blue				

Total

Platte	71	298	204	573
Republican	490	782	366	1638
Little Blue	0	0	415	415
	561	1080	985	2626

Nebraska's Groundwater Irrigated Acres – 2024

State Statute 46-702 states:

The Legislature finds that ownership of water is held by the state for the benefit of its citizens, that ground water is one of the most valuable natural resources in the state, and that an adequate supply of ground water is essential to the general welfare of the citizens of this state and to the present and future development of agriculture in the state. The Legislature recognizes its duty to define broad policy goals concerning the utilization and management of ground water and to ensure local implementation of those goals. The Legislature also finds that natural resources districts have the legal authority to regulate certain activities and, except as otherwise specifically provided by statute, as local entities are the preferred regulators of activities which may contribute to ground water depletion.

As part of the management scheme; Natural Resources Districts (NRDs) are required to prepare, for approval, a plan that spells out groundwater management objectives to address both quantity and quality. Plans will identify thresholds, that if met will result in regulatory or other action. Said thresholds are codified in NRD rules and regulations. Per state statute 46-739 actions may include;

- Allocation of amount of groundwater that may be withdrawn
- Adoption of a rotation system of groundwater use
- Well spacing requirements
- Required measurement devices (i.e. flow meters)
- A reduction in irrigated acres
- Limit or prevent the expansion of irrigated acres
- A moratorium on new wells or uses

It should be noted, the above list represents some of the regulatory actions that may be taken. Each NRD retains the option to adopt any other reasonable rules and regulations, as needed to address local conditions.

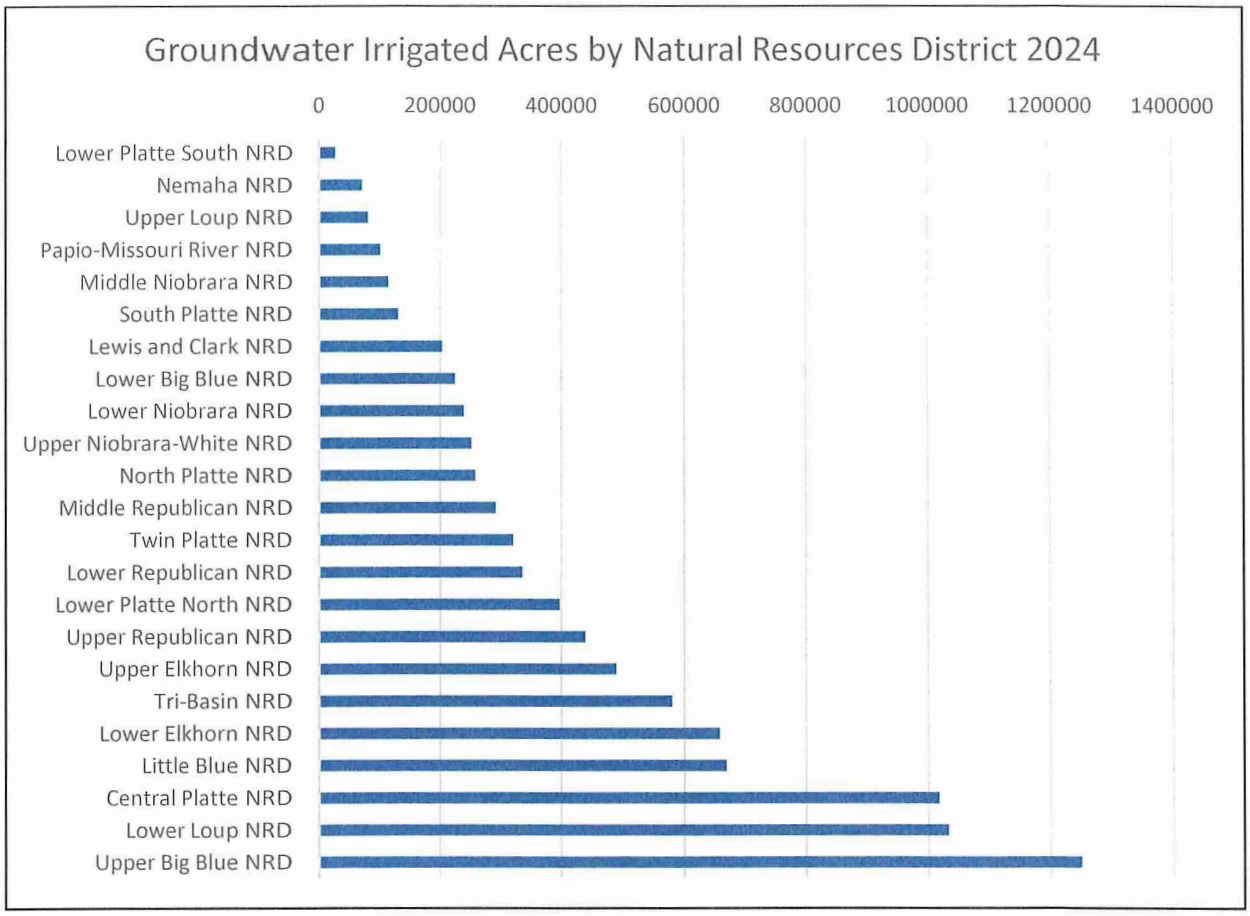
Groundwater supplies and use vary across the state as does the climate and these factors impact how groundwater is utilized. Each NRD has developed the Groundwater Management Plan, monitoring plan and accompanying rules and regulation to specifically address the local conditions.

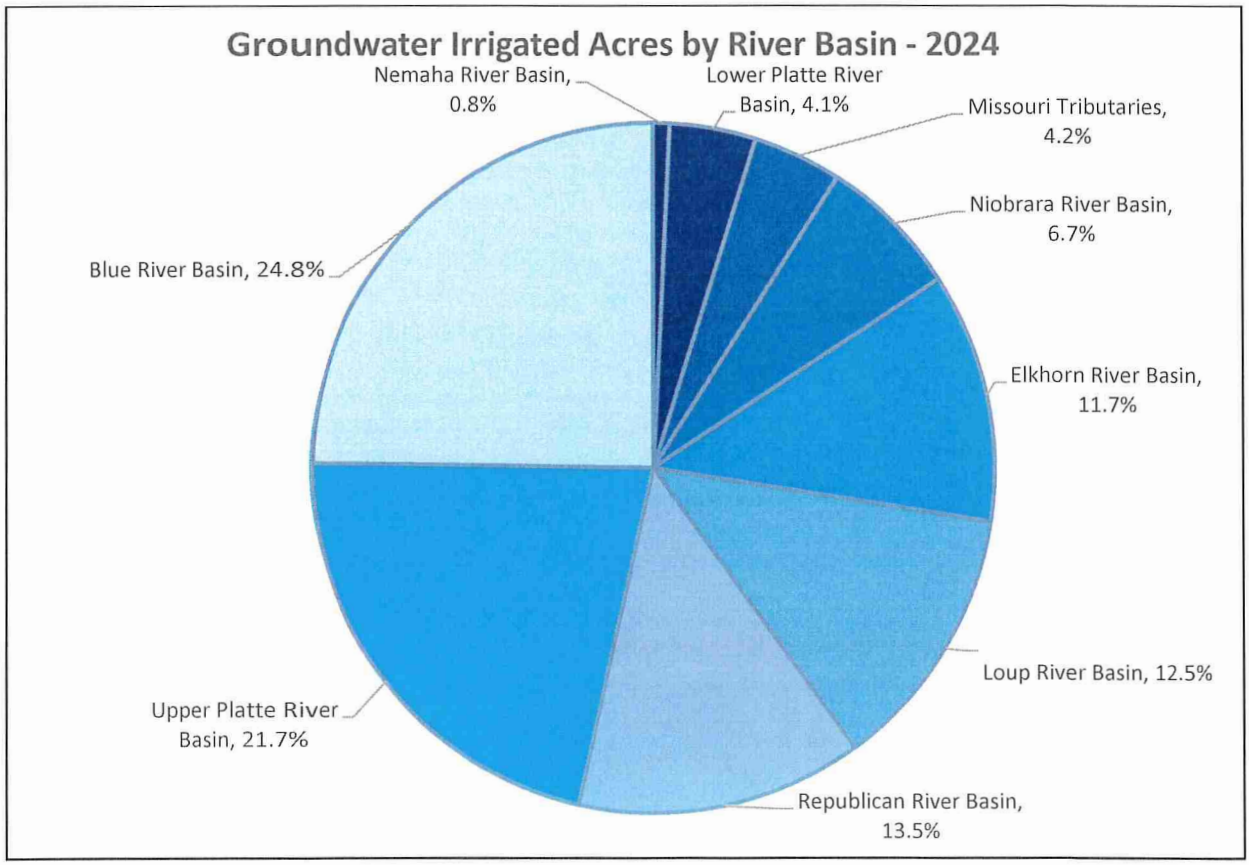
The following is a summary of groundwater irrigated acres in Nebraska along with some of the management actions that have been implemented. The purpose of this document is to provide a general overview of the groundwater irrigated acres in Nebraska. Information on local rules, regulations and information can be obtained from individual NRDs. To find an NRD go to https://www.nrdnet.org/nrds/find-your-nrd.

Groundwater Irrigated Acres in the State of Nebraska-2024

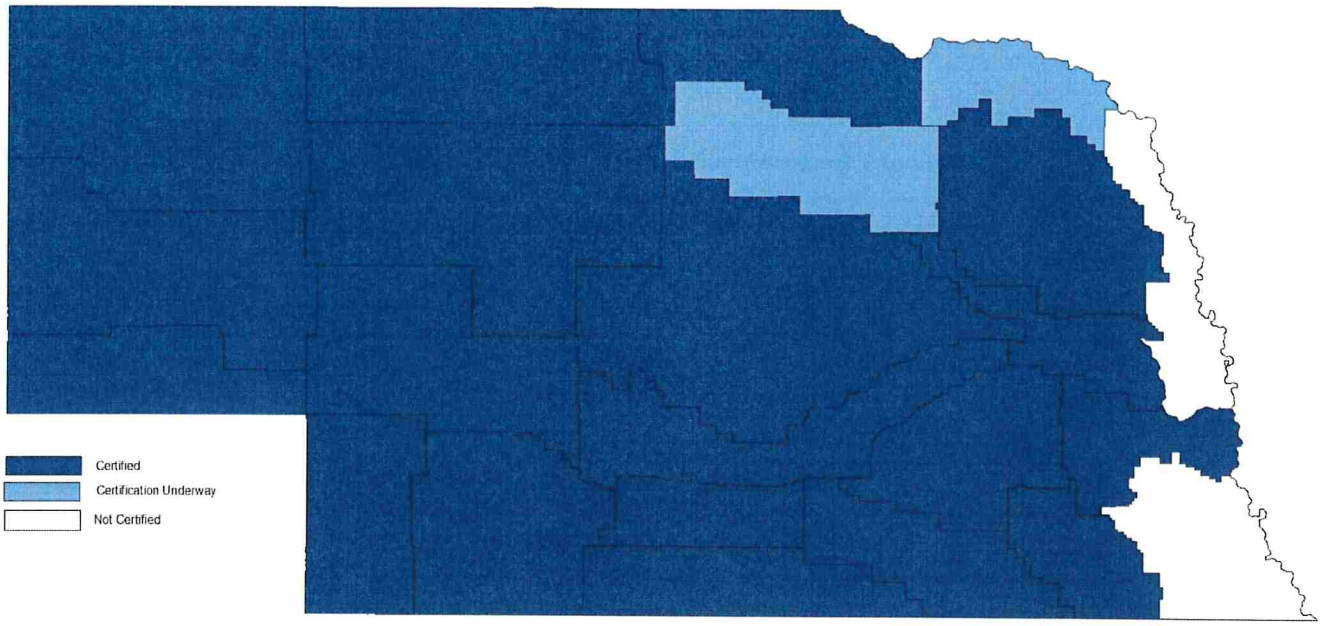
Data submitted from Nebraska's 23 Natural Resources Districts

By NRD	Acres	Percent of total GW Irrigated Acres
Lower Platte South NRD	28532	0.3%
Nemaha NRD	72104	0.8%
Upper Loup NRD	81432	0.9%
Papio-Missouri River NRD	101612	1.1%
Middle Niobrara NRD	115271	1.3%
South Platte NRD	131818	1.4%
Lewis and Clark NRD	203337	2.5%
Lower Big Blue NRD	225280	2.4%
Lower Niobrara NRD	240231	2.6%
Upper Niobrara-White NRD	252477	2.7%
North Platte NRD	258288	2.8%
Middle Republican NRD	291599	3.2%
Twin Platte NRD	320826	3.5%
Lower Republican NRD	335552	3.6%
Lower Platte North NRD	397602	4.3%
Upper Republican NRD	439055	4.8%
Upper Elkhorn NRD	489970	5.3%
Tri-Basin NRD	580520	6.3%
Lower Elkhorn NRD	657670	7.1%
Little Blue NRD	669215	7.3%
Central Platte NRD	1018263	11.0%
Lower Loup NRD	1034032	11.2%
Upper Big Blue NRD	1249195	13.5%
Total	9,193,880	
Groundwater Irrigated Acres by River Basin		
Nemaha River Basin	73956	0.8%
Lower Platte River Basin	377344	4.1%
Missouri Tributaries	383167	4.2%
Niobrara River Basin	617325	6.7%
Elkhorn River Basin	1077531	11.7%
Loup River Basin	1145969	12.5%
Republican River Basin	1243989	13.5%
Upper Platte River Basin	1990591	21.7%
Blue River Basin	2284008	24.8%
Total	9,193,880	
By Management Action		
Over Appropriated Area of Nebraska	807,323	8.8%
Fully Appropriated Area of Nebraska	2,785,240	30.2%
Groundwater Allocations in Place	1,690,472	18.3%
Acres Retired or Banked	54,498	0.6%
Total Managed/Restricted Acres	5,337,533	

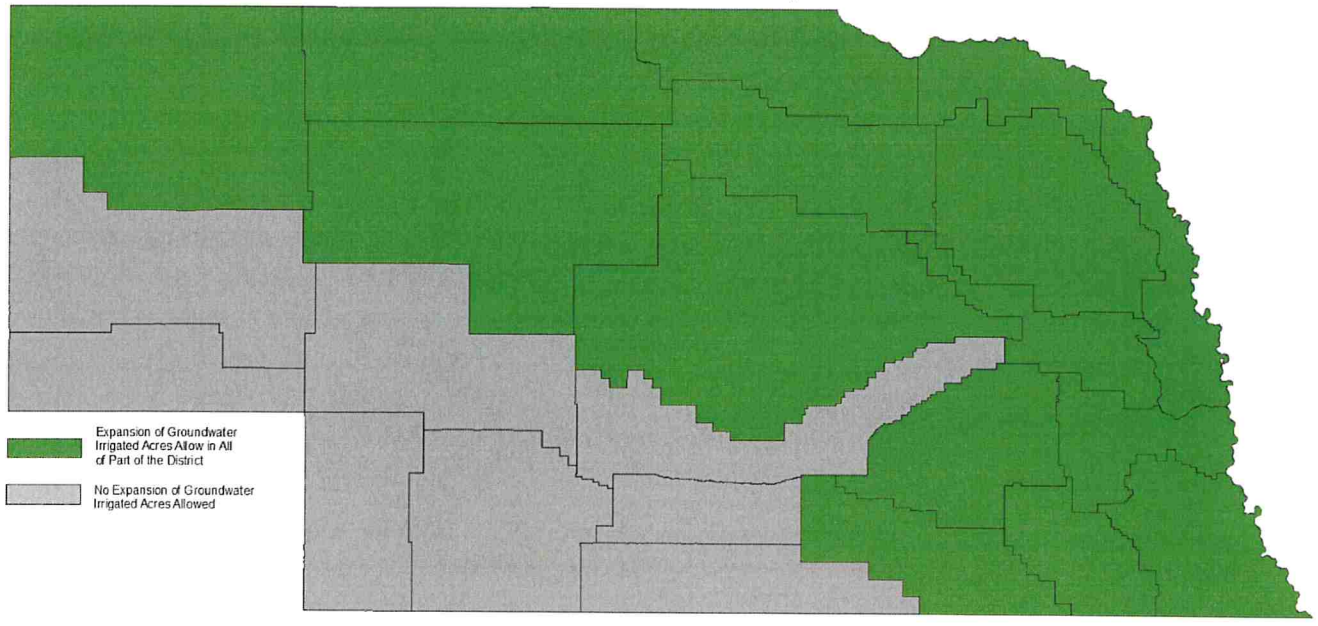

Groundwater Irrigated Acres by Natural Resources District 2024
0
200000
400000
600000
800000
1000000
1200000
1400000
Lower Platte South NRD
Nemaha NRD
Upper Loup NRD
Papio-Missouri River NRD
Middle Niobrara NRD
South Platte NRD
Lewis and Clark NRD
Lower Big Blue NRD
Lower Niobrara NRD
Upper Niobrara-White NRD
North Platte NRD
Middle Republican NRD
Twin Platte NRD
Lower Republican NRD
Lower Platte North NRD
Upper Republican NRD
Upper Elkhorn NRD
Tri-Basin NRD
Lower Elkhorn NRD
Little Blue NRD
Central Platte NRD
Lower Loup NRD
Upper Big Blue NRD


Groundwater Irrigated Acres by River Basin - 2024
Nemaha River Basin, 0.8%
Lower Platte River Basin, 4.1%
Missouri Tributaries, 4.2%
Niobrara River Basin, 6.7%
Elkhorn River Basin, 11.7%
Loup River Basin, 12.5%
Republican River Basin, 13.5%
Upper Platte River Basin, 21.7%
Blue River Basin, 24.8%

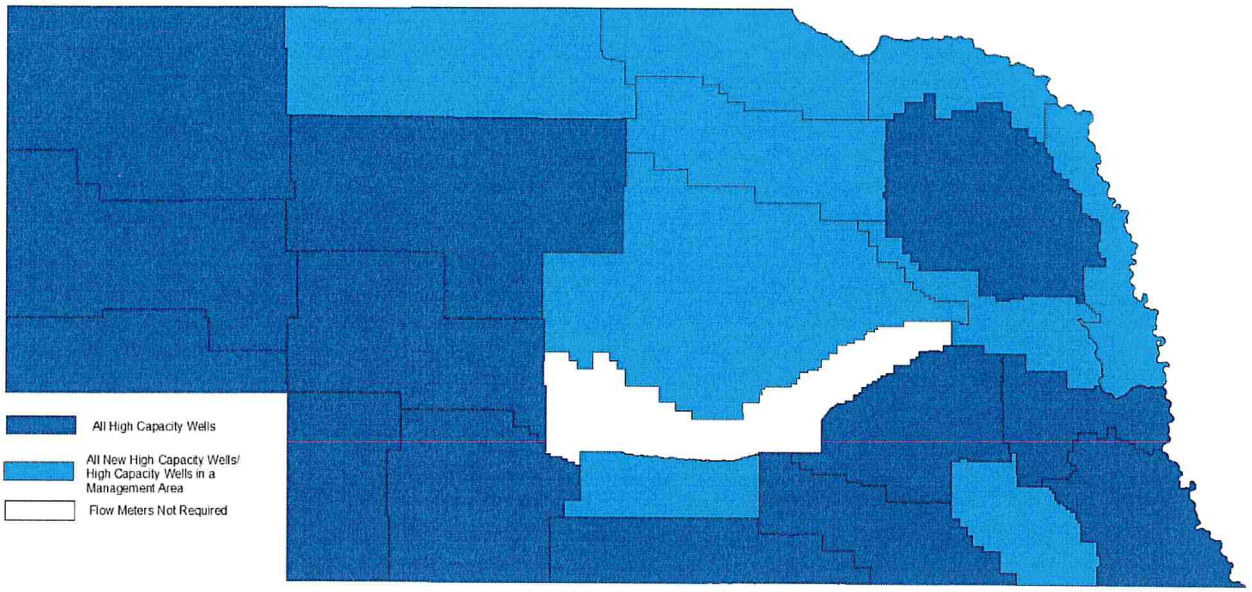
Groundwater Irrigated Acre Certification Status by NRD - 2024



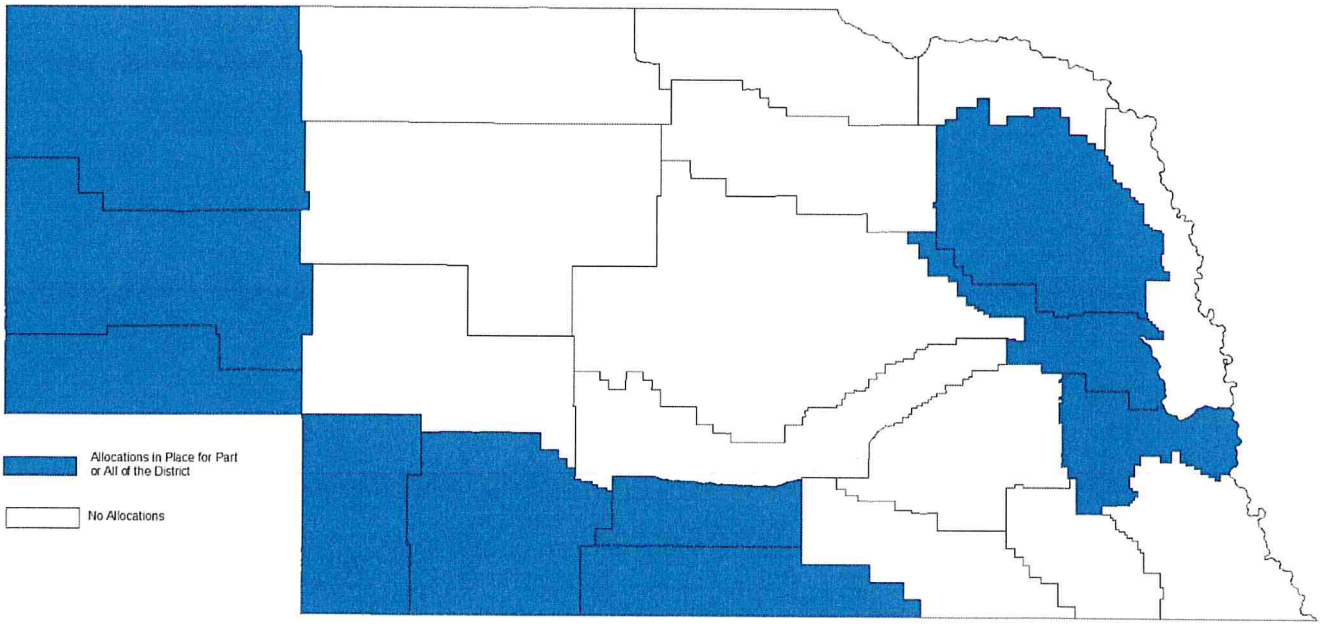
Groundwater Irrigated Acre Expansion Status by NRD - 2024



Groundwater Irrigated Acre Flow Meter Status by NRD - 2024



Groundwater Irrigated Acre Allocation Status by NRD - 2024



Flowmeter Survey

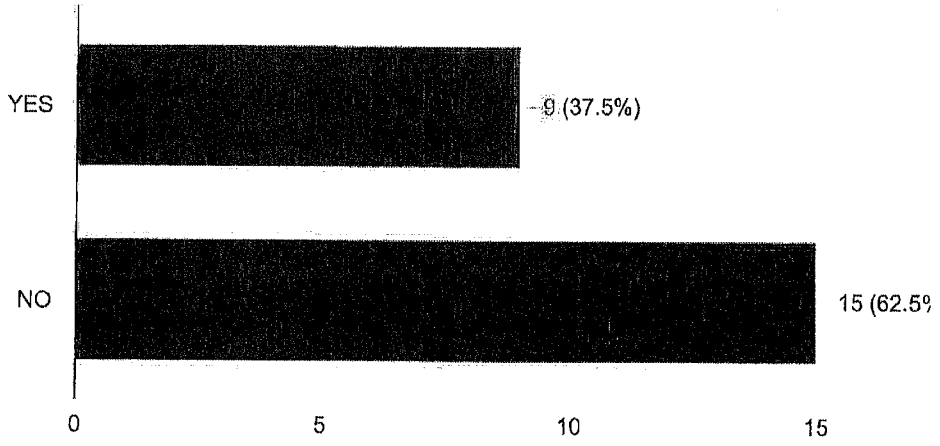
24 responses

Publish analytics

Does your NRD provide maintenance on flowmeters?

Copy

24 responses



If yes, how often do you perform maintenance? Do you charge for this service? Do you perform maintenance on site or at office?

15 responses

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N/A

Every 4 years

We hire out (2 people) for maintenance. They will take certain counties each year and rotate on a 5 year basis. We pay them $56.00 per meter.

We pay for maintenance in a township where pumping is allocated. In unallocated areas, landowners are responsible for maintenance.

on site

McCrometer Meters - Every 5 Years; Seametrics Batteries - every 2 years; Maintenance prepared on site; Maintenance is based on the estimated amount of time to perform repairs (15 min = $10, 30 min = $20, 45 min = $30, 60 min = $40)

No to previous question

Yes, we perform maintenance both on site and in the office, depending on what is needed. Maintenance interval is every 4-years or as needed - no charge for regular maintenance.

As needed but if everything is fine, we check them out every 4 years. We do not charge for maintenance as we own the telemetry flow meters.

We repair meters on a 5 year rotation in the field at no cost to the producer.

n/a

The UBBNRD hires a contractor to do the maintenance. Each mechanical meter is serviced every 5 years. The District covers the cost including gaskets and boots as needed. The service is done in the field.

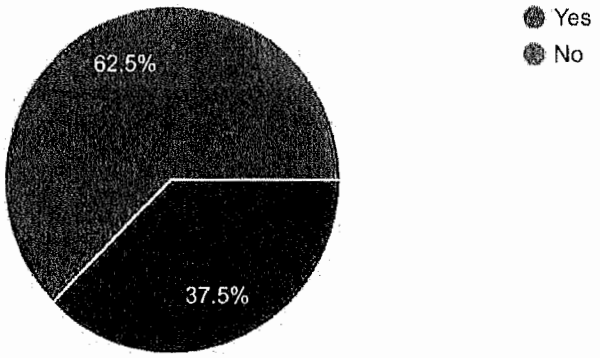
NA

no charge, aim for every 6 years, we grease the meter in the field

Does your NRD provide repairs on flowmeters?

Copy

24 responses



If yes, do you repair them in house or send them out for repair? If in house, what do you charge for labor? If sent out for repair, what company do you use?

24 responses

NA

N/A

Producer is responsible for repair

We repair most of the battery meters in house. We also repair the mechanical meters. No charge for labor.

We send meters to GPM Enterprises in Aurora NE.

one million dollars

In House, but will send out for recalibration; Repairs are based on the estimated amount of time to perform repairs (15 min = $10, 30 min = $20, 45 min = $30, 60 min = $40); Send out repairs are done primarily through GPM or McCrometer

No to previous question

Both. We perform most repairs in house. We do not charge for labor but mark up the parts needed by 20%. Occasionally, we will need to send them out to either McCrometer in California or to GPM Enterprises in Aurora, NE.

We have an independent contractor repair and maintain them. Seim Ag. is our contractor

I said no?

Technically we do but our water department is so busy that we don't advertise it.

Do not provide

We repair them in house. We don't charge for labor, only the parts.

N/a

in house

The District does not actually provide repairs. Once the meters are service if there are issues with the meter the producer will be notified. The District does provide cost-share up to $500

per meter.

Required answer but we don't repair or send out. See answer below.

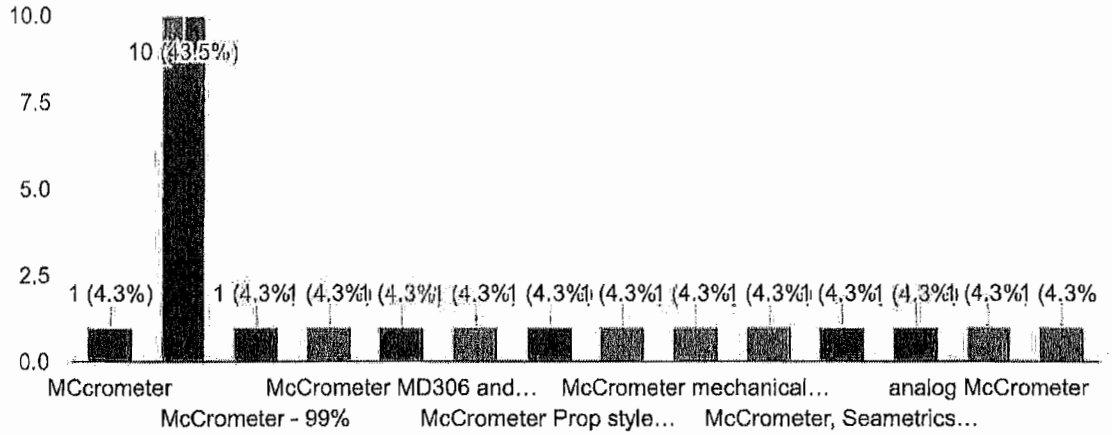
?

in house, cost of parts, no labor, also give 50% cost share

What are the most common flowmeters used in your district?

Copy

23 responses



To your knowledge, is there a brand that requires more maintenance and repair than others?

24 responses

Most of the non propeller meters that are still in the district have battery failures.

we have more failed McCrometers than anything else but that is the majority of our meters in this district. Personally I prefer them over sea metrics or fluidyne meters because batteries seem to die on sea metrics and you need electricity to read the fluidyne meters. That is a headache because the location of the electric meter is usually unknown and you are needing to call the landowner for a reading if the pivot is not running.

Not that i have experience with.

Electronic meters with batteries

Senginer, Semetric, and GrowSmart

Electronic venturi or ultrasonic meters (e.g., Seametrics) are unreliable.

growsmart

Seametrics batteries in AG2000 must be maintained every two years.

Digital

Not sure

Not to my knowledge

Unknown

I don't know.

any digital display

n/a

Mag meters that are powered by batteries

We only use McCrometer so i can't speak to the other brands.

Anything the is not mechanical

No

All electronic meters

NA

Sparling. We are trying to phase them out when one breaks.

?

no

Is there any other information about flowmeters that you would like to share?

20 responses

No

The UNWNRD board of directors has made the decision not to provide maintenance or repairs as this would be in direct competition with the irrigation equipment dealers.

we don't do maintenance or repairs in our NRD. we put it on the landowner to get the meter repaired by their irrigation dealer and I work pretty closely with them in communication to what meters have failed. we check on the meters during our chemigation inspections as well as when we read them in the fall. I also use an ultrasonic flowmeter to spot check that the meters are working properly. meters are sealed in areas that are allocated to insure they haven't been tampered with.

Please let me know if you have any other questions, I would be happy to help in any way.

Make sure professionals or staff install them in and maintain them. Landowners regularly put them in incorrectly and fail to maintain them. Go simple and easy - fail proof as possible. It cuts down on costs and headache for staff. Get meters that have similar or the same Multipliers. Gals x 100 or Acre inches .01 or Acre feet .001. Whatever it is try to get all the same if possible. Keeps data simple.

No.

We are just starting to retrofit self-reporting meters in difficult to access locations. The additional cost of the transmitter will be offset, over time, by reduced labor costs.

best invention ever mate

Most common McCrometer meters are McMag 3000 and Dura-Mag

We have a cost-share still for new meters. We pay 50% up to $750.

Over the next 3-4 years, we will install ca. 3,000 new groundwater flow meters in our district with McCrometer telemetry meters (through grant funding - 80%). We will own all the meters and provide maintenance & repairs at our cost - estimated to be $75,000 - $100,000 per year.

These meters we install transmit readings to our database via cell service twice a day so that we don't have to go out and read them manually.

avoid any digital ones, makes it a lot easier to require same units for all (ac*in are best)

n/a

Valuable tool for water management

Mechanical Flowmeters work the best with little trouble besides maintaince

If you are do decide to have a meter program it is a good idea to have some sort of a maintenance program or at least visually inspect on some standard rotation.

We do not provide maintenance and repair ourselves, but we have certified flow meter contractors that work in our district to provide services. We also pay cost share for maintenance/repair/replacement as well.

We do not require meters at this time. Triggers are in place if we see gw declines

We also change batteries in electonic meters every 4 years

Name and District

23 responses

Pat O'Brien, UNWNRD

Upper Niobrara white NRD

Kyle Temple - Middle Niobrara NRD

Lower Platte North NRD

Patty Marten - Lower Elkhorn NRD

Tri-Basin

the upper loup clown

Danielle Madden, North Platte NRD

MNNRD

Chuck Wingert, Nemaha NRD

Steve Herdzina - Lower Platte South

Todd Siel - Lower Republican NRD

Chris Martin - MRNRD

Ashley Rippe-NNRD

UNWNRD

Cooper Bollman URNRD

Lewis and clark NRD

Charlie Pierce Nemaha NRD

Terry Julesgard, Upper Big Blue NRD

Tyler Weishahn, Lower Big Blue NRD

Tyler Sanders South Platte NRD

Central Platte

Kevin Orvis, Little Blue NRD

Little Blue Natural Resources District

Irrigated Acreage Data

County	System	2020 Avg Inches/Acre	2021 Avg Inches/Acre	2022 Avg Inches/Acre	2023 Avg Inches/Acre	2024 Avg Inches/Acre	2024 Irrigated Acres
Adams	Pivot	9.5	7.6	9.5	9.8	6.8	178,150
	Gravity	16.1	13.7	17.2	16.4	12.8	13,125
	Combinations	9.5	7.9	10.3	10.8	7.5	19,178
	SDI	9.1	8.0	10.8	11.0	8.4	5,981
	Totals	10.3	8.5	10.1	10.8	7.8	**216,944**
Webster	Pivot	7.8	5.2	7.8	7.6	5.8	17,706
	Gravity	9.9	8.3	9.4	10.2	6.6	650
	Combinations	8.3	5.3	7.7	7.3	4.1	1,528
	SDI	8.5	5.8	10.0	9.7	8.9	103
	Totals	8.0	5.5	7.9	7.7	5.7	**19,987**
Clay	Pivot	6.8	7.5	8.9	11.2	7.7	105,229
	Gravity	10.2	10.5	13.0	17.5	11.7	6,939
	Combinations	9.9	8.2	9.3	11.3	8.1	10,448
	SDI	7.0	8.6	10.5	11.9	9.9	2,346
	Totals	7.3	8.0	9.2	11.9	8.3	**124,962**
Nuckolls	Pivot	4.4	7.1	8.6	10.9	7.7	52,758
	Gravity	3.7	7.0	10.6	11.0	10.6	1,272
	Combinations	4.1	7.6	9.1	11.1	7.4	4,971
	SDI	4.4	12.5	9.4	11.2	8.7	686
	Totals	4.3	7.2	8.7	10.9	7.9	**59,687**
Fillmore	Pivot	3.8	7.7	8.4	9.9	6.7	51,028
	Gravity	3.6	9.5	10.2	10.3	8.1	1,418
	Combinations	3.6	8.1	8.5	9.0	7.0	5,596
	SDI	5.5	10.1	10.1	17.7	9.1	36
	Totals	3.7	7.8	8.5	9.8	6.9	**58,078**
Thayer	Pivot	3.8	7.8	8.4	10.1	7.9	161,681
	Gravity	3.2	10.9	12.1	15.6	13.9	3,500
	Combinations	3.8	7.5	9.5	11.3	8.3	8,371
	SDI	3.4	10.1	10.1	9.7	9.5	523
	Totals	3.8	8.0	8.5	10.5	8.2	**174,075**
Jefferson	Pivot	3.2	8.5	7.8	9.5	8.0	26,765
	Gravity	3.2	12.2	9.6	9.1	7.9	224
	Combinations	2.4	6.2	5.6	6.9	5.2	1,698
	SDI	2.9	8.8	5.3	10.4	7.7	177
	Totals	3.2	8.5	7.7	9.4	7.9	**28,864**
District	**Totals**	6.7	8.0	9.4	10.7	7.8	**672,940**
Hall							**53.72**
Kansas							**329.78**
Saline							**15.00**
Into LBNRD							**392.50**
Wildlife		**3.9**	**4.8**	**9.7**	**9.7**	**10.8**	4,309
Golf Course		**31.0**	**24.0**	**22.6**	**23.1**	**18.9**	**452**
Ponds/Sprayers (gallons)		**77,837,355**	**123,388,403**	**261,540,290**	**441,270,310**	435,519	
NAD Groundwater Extraction and Treatment		**1,944 Million**	**1,925 Million**	**1,920 Million**	**1,766 Million**	**1,961 Million**	

over

Average Inches Applied by Year

	All Acres	Pivot	SA Pivot	Gravity
2017	7.5	7.2	7.0	11.5
2018	5.5	5.4	5.3	8.5
2019	2.4	2.2	2.2	3.7
2020	6.7	6.2	6.2	10.6
2021	8.0	7.6	7.6	11.5
2022	9.4	8.8	8.7	14.3
2023	10.7	10.2	10.0	17.3
2024	7.8	7.4	7.2	12.1

Reported Uses in 2024

	Low	Average	High
PIVOT	0.0	7.3	32.6
TOW LINE		15.1	
PIVOT & GRAVITY	0.0	7.5	17.9
LINEAR SPRINKLER	0.0	9.2	34.5
GRAVITY	0.0	12.1	57.0
SDI	2.1	8.8	18.1

2018 - 12,120 acres over 13", 2.00% of the reported acres

2019 - 820 acres over 13", 0.11% of the reported acres

2020 -33,811 acres over 13", 4.95% of the reported acres

2021 - 24,591 acres over 13", 3.50% of the reported acres

2022 - 49,727 acres over 13", 7.27% of the reported acres

2023 - 117,823 acres over 13", 17.5% of the reported acres

2024 - 24,887 acres over 13", 3.6% of the reported acres

If allocations are triggered, the annual use over a 5-year period is 13 inches per year