



Sorensen Groundwater Recharge Weir in Southeast Kearney County

2022 Annual Report of Integrated Water Management Activities in the Little Blue Basin Within Tri-Basin NRD



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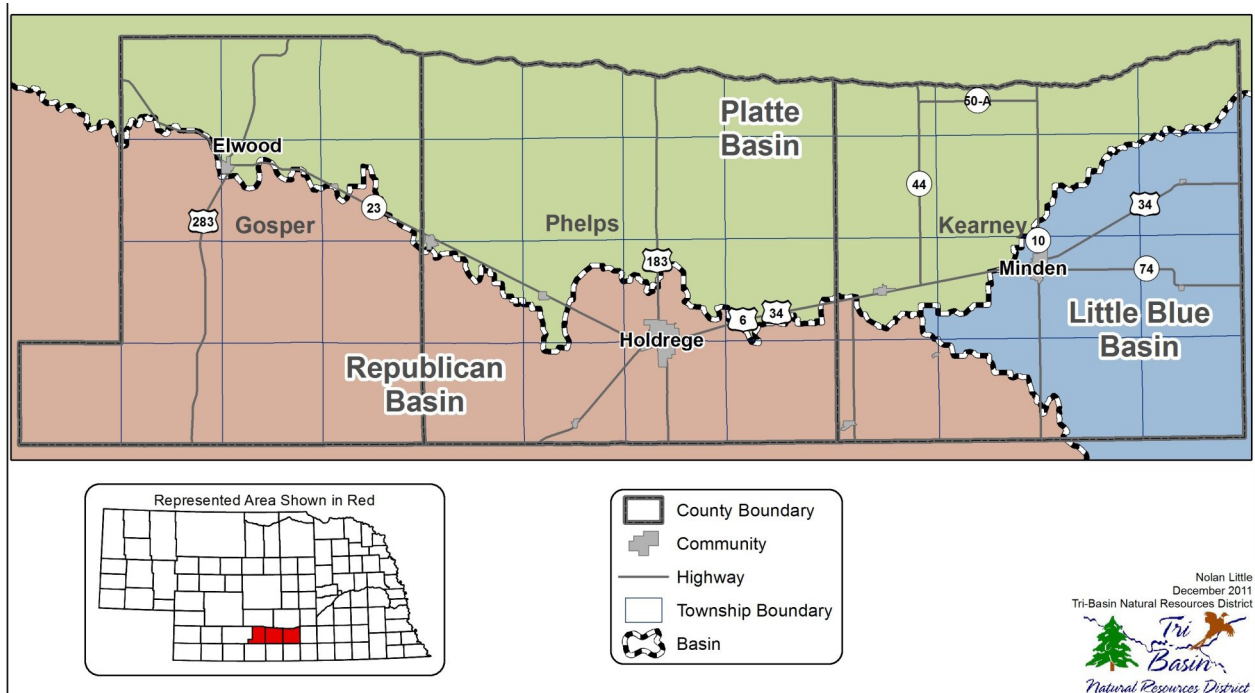
September 2023

**ANNUAL REPORT OF WATER USE ACTIVITIES
IN THE LITTLE BLUE BASIN WITHIN TRI-BASIN NRD**
TO MEET THE REQUIREMENTS OF THE JOINT INTEGRATED MANAGEMENT PLAN
FOR THE 2022 JOINT INTEGRATED MANAGEMENT PLAN PROGRESS REVIEW MEETING

I. SUMMARY

The purpose of this report is to convey information that Tri-Basin Natural Resources District (TBNRD) agreed to supply to the State of Nebraska as part of a joint voluntary Integrated Water Resources Management Plan for the Little Blue River Basin portion of the district.

Map 1: Basin Reference Map



II. INTRODUCTION

TBNRD encompasses portions of the Republican, Platte, and Little Blue River Basins (see **Map 1**, above). The district also contains an area commonly referred to as the “Groundwater Mound,” a large area spanning portions of all three basins that is characterized by groundwater levels that are generally higher than historic “pre-development” groundwater elevations.

III. CERTIFIED IRRIGATED ACRES

The District began certifying irrigated acres in the Little Blue Basin in 2006. The initial certification process in the Little Blue Basin ended on November 1, 2006, at which time, a moratorium on development of new groundwater irrigated land took effect. Since that time, corrections and revisions to the certified acre database have occurred with a net result of 91,849.78 certified irrigated acres in the Little Blue Basin portion of Tri-Basin NRD as of December 31, 2022. Data regarding certified irrigated acres can be found in **TABLE 1: Certified Irrigated Acres**, at top of page 3. The commingled acres referred to in the table are acres that may be watered with either groundwater or surface water, or a combination of both. Detailed information about locations and distribution of certified irrigated acres is available in the Tri-Basin NRD office.

TABLE 1: Certified Irrigated Acres					
Year	Groundwater	Co-Mingled	Surface	Environmental	Totals
2014					91,466.65
2015					91,487.69
2016					91,487.69
2017					91,573.87
2018					91,636.40
2019					91,636.40
2020	89,683.70	1,500.73	160.50	291.47	91,636.40
2021	89,668.08	1,500.73	160.50	291.47	91,620.78
2022	89,667.18	1,500.73	160.50	521.37	91,849.78

IV. APPROVED CERTIFIED ACRE AND GROUNDWATER TRANSFERS

TBNRD allows certified irrigated acres to be transferred from one parcel to another within the Little Blue Basin portion of the district, with some limitations. Certified irrigated acres cannot be transferred from parcels with surface water or commingled water resources to parcels that have groundwater wells as their only water source. Transfers of certified irrigated acres into townships that are classified as Phase 2 for groundwater quantity management (see **Map 3**) are also prohibited.

Between January 1, 2022, and December 31, 2022, the District approved five certified irrigated acre transfer in the Little Blue Basin. A total of 40.88 certified irrigated acres were involved in this transfer. Data regarding the location, amount, and conditions associated with each transfer can be found in **TABLE 2A: Little Blue Basin Transfers- Acres Original Locations** (below) and **TABLE 2B: Little Blue Basin Transfers- Destinations for Transferred Acres** (below).

TABLE 2A: Little Blue Basin Transfers - Acres <u>Original Locations</u>		
NRD Permit Number	Legal Description	Decertified Acres
TBAT-0386	Section 32-7- 4W	5.00
TBAT-0387	Section 33-5- 14W	9.21
TBAT-0388	Section 34-5- 14W	10.17
TBAT-0389	Section 20-7- 13W	10.00
TBAT-0397	Section 9-6- 13W	6.50
	Total	40.88

TABLE 2B: Little Blue Basin Transfers - <u>Destinations</u> for Transferred Acres		
NRD Permit Number	Legal Description	New Irrigated Acres
TBAT-0386	Section 21-6- 14W	5.00
TBAT-0387	Section 1-5- 15W	9.21
TBAT-0388	Section 1-5- 15W	10.17
TBAT-0389	Section 25-7- 14	10.00
TBAT-0397	Section 4-6- 13	6.50
	Total	40.88

- A. TBNRD regulates groundwater pumping off of overlying land by requiring landowners to secure groundwater transfer permits before they can pump groundwater to parcels that are not under the same ownership. Groundwater transfer permits can only be used to supply groundwater for irrigation of certified irrigated acres. Landowners are required to install flowmeters on wells that are permitted for transfers and to report

pumping from these wells annually to TBNRD. TBNRD issued one groundwater transfer permit in the Little Blue Basin between January 1, 2022, and December 31, 2022.

WELL CONSTRUCTION PERMITS

B. Since 1989, TBNRD has required landowners to secure well construction permits before they drill wells capable of pumping more than 50 gallons per minute. The district issues three categories of well permits: New well permits, Conditional Replacement well permits, and Replacement well permits.

C.

TBNRD requires landowners to agree to several conditions on the operation of new wells and conditional replacement wells before permits are issued. These conditions are listed in an agreement that is signed by landowners when they apply for these types of well permits. A copy of that agreement is attached to this report as **Appendix A**.

TABLE 3: TBNRD Well Permits	
Well Permit Type	Permits
New (variance) irrigation [Acre transfer involved]	0
Replacement irrigation	4
Conditional replacement irrigation - supplemental to groundwater	0
Conditional replacement irrigation—supplemental to surface water	0
Dewatering	0
New commercial/industrial	0
Domestic (over 50 gallons per minute)	0

D. **TABLE 3: TBNRD Well Permits** (above) is a breakdown of well permits TBNRD issued in the Little Blue Basin between January 1, 2022, and December 31, 2022. A detailed listing of well permits issued by TBNRD in 2022 is found in **TABLE 4: Well Permit Summary** (below).

TABLE 4: Well Permit Summary				
Permit Number	Well Permit Type	Legal Description	NDNR Reg. Number	NDNR Well ID Number
TBRP-G057231-R2	Replacement	Section 32-6- 14W	G-057231	268935
TBRP-G034136-R1	Replacement	Section 1-5- 14W	G-034136	269990
TBRP-G073494-R1	Replacement	Section 12-5- 15W	G-073494	271310
TBRP-G028296-R1	Replacement	Section 1-6- 13	G-028296	271747

V. VARIANCES

TBNRD issues new well permits to landowners of parcels that do not have a prior irrigation history only after they have transferred sufficient certified irrigated acres to the previously dryland parcel for the intended new use. The TBNRD Board must approve a variance to the rule prohibiting new well construction before new well permits can be issued.

TBNRD allows for corrections to the district’s certified irrigated acre database if landowners can provide historical proof of irrigation between 1997 and 2006. These acres were not previously included in the district’s database, because they weren’t classified as irrigated cropland by the County Assessor. Since October 2013, producers also have to show proof that the corrected acres had been watered three out of the past five years.

TBNRD also adjusts the irrigated acre database as a result of revisions made by the county assessor to taxable irrigated acres. Additions or reductions of taxable irrigated acres of four acres or less are automatically accepted by the District. Larger additions or reductions must be reviewed by the NRD Board before they are approved.

One acre correction variance was issued in the Little Blue Basin between January 1, 2022, and December 31, 2022.

TABLE 5: Certified Acre Variances				
Permit Number	Variance Type	Legal Description	NDNR Reg. Number	NDNR Well ID Number
TBAC_2022-02	Acre Correction	Section 32-6- 15	G-115808	139691

VI. MUNICIPAL AND INDUSTRIAL ACCOUNTING

TBNRD collects water use data annually from all municipalities and industries within the district. Municipal and industrial water use data for communities and industries located in the Little Blue Basin reported to TBNRD in 2022 is shown in the next two tables. A summary of municipal water use may be found in **TABLE 6:** Little Blue Basin Municipal Water Use Data and **TABLE 7:** Industrial and Commercial Water Use Data (below).

TABLE 6: Little Blue Basin Municipal Water Use Data (in gallons)						
	2017	2018	2019	2020	2021	2022
Minden	208,998,000	194,870,000	188,530,000	249,810,000	161,686,000	241,039,000

TABLE 7: Little Blue Basin Industrial and Commercial Water Use Data				
NDNR Reg. Number	Well ID	Owner	Legal Description	Gallons Used
G-093179-R1	230789	Nutrien Ag Solutions	Section 16-7- 13	2,567,429
G-142905	181415	Aurora Co-Op	Section 7-6- 14	1,130,000
G-152287	182917	Village Cleaners	Section 7-6- 14	3,315
G-152288	182918	Village Cleaners	Section 7-6- 14	2,567,429

VII. FLOWMETER DATA

TBNRD requires flowmeters to be installed and annual water use to be reported to TBNRD when landowners drill new wells, receive irrigation-related cost-share funds, or when groundwater is transferred from one parcel to another. Flowmeters are also required on all wells in Townships that are designated Phase Two for Groundwater Quantity Management (see map, **Map 3**).

There are 826 irrigation wells in the Little Blue basin portion of the Tri-Basin NRD. Of that total, 395 wells (48%) are metered, and report water use to the district. Twelve of those 395 wells were reported as not used in 2022. Of the wells that were used, farmers reported that they pumped 40,837 acre-feet of groundwater on 46,531.9 certified irrigated acres, an average of 10.5 acre-inches per acer.

Due to the installation of additional reporting flowmeters each year in the Little Blue Basin, flowmeter data and reported irrigated acres change from year to year. All district flowmeter

data is reported annually to the Nebraska Department of Natural Resources (NDNR) for Republican River Basin Compact Administration accounting. A summary of Little Blue Basin water use data is included in this report as **Appendix B**. Detailed Little Blue Basin flowmeter data is available from the Tri-Basin NRD office.

VIII. WATER BANKING ACTIVITIES

TBNRD has a program called the Water Conservation Incentive Program (see program summary in **Appendix C**). Participants in this program sign contracts agreeing to limit irrigation to the UNL Average Corn Crop Irrigation requirement. In exchange, Tri-Basin NRD agrees to pay them if they use less water than their allocated amount. Participants will be provided with credit accounts that track available water use credits for participating fields. There were no acres in the Little Blue Basin enrolled in this program 2022. The TBNRD Board of Directors has committed funds sufficient to pay incentives for as many as 8000 acres to be enrolled in the program.

IX. CONSERVATION TILLAGE

On district water use reports, landowners reported to TBNRD that conservation tillage practices have been adopted or continue to be utilized on 25,542.37 certified irrigated acres in the Little Blue Basin portion of the district during 2022 (no-till data is available from the Tri-Basin NRD office). University research (Klocke, et al, 2009) indicates that evapotranspiration (ET) is reduced by as much as 3 inches per acre on minimally tilled irrigated cropland, as compared to conventional tillage systems. If the estimates of no-till acres are accurate, as much as 2,127.41 acre-feet of water was conserved in the Little Blue Basin in TBNRD in 2022 through this conservation practice.

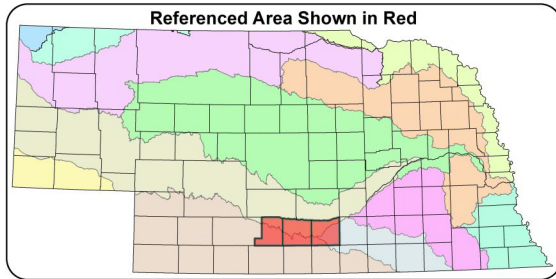
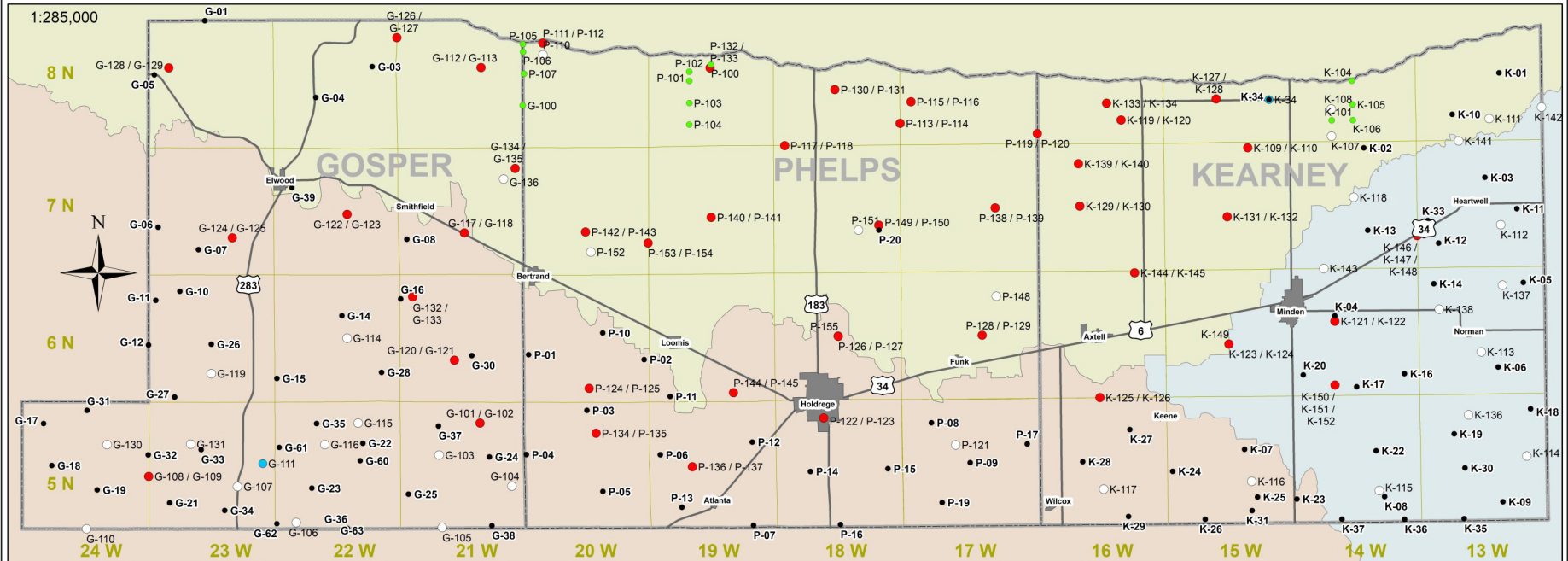
X. GROUNDWATER LEVELS

TBNRD has an extensive network of 137 dedicated groundwater observation wells (19 in the Little Blue Basin) and 90 irrigation wells (21 in the Little Blue Basin) that are used to measure groundwater levels (see **Map 2**). TBNRD also works cooperatively with CNPPID to gather groundwater level data. Data from one well in the Little Blue Basin that is measured by CNPPID is included in TBNRD's groundwater observation well database. District water level data is reported semi-annually to U.S. Geological Survey and UNL Conservation and Survey Division. Groundwater level data for the district is available from the Tri-Basin NRD office.

Map 2: Dedicated Groundwater Observation Wells

Tri-Basin Natural Resources District

Static Water Measurement Wells



• Irrigation Well	— Highway
• Transect Well	▭ County Boundary
• Nested Well	▭ Township
○ Single Well	● Little Blue Basin
• Other Well	● Republican Basin
■ Community	● Platte Basin

Observation Well Stats:

- 93 Sites
- 43 Nested Wells
- 137 Data Loggers
- 12 Hour Interval

Irrigation Well Stats:

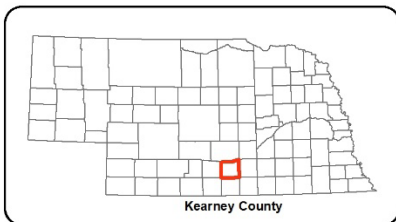
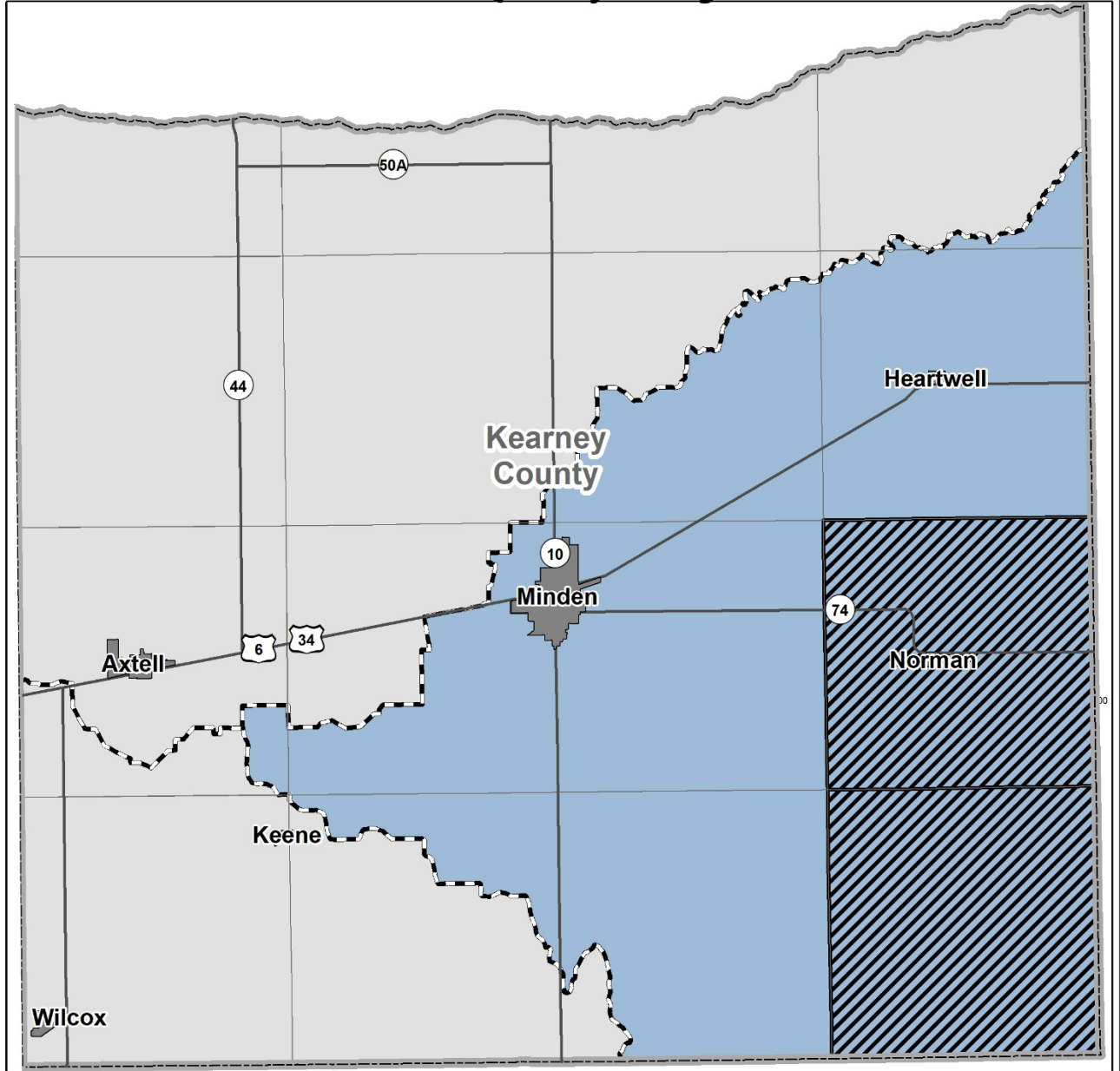
- 10 Platte Basin
- 21 Little Blue Basin
- 59 Republican Basin
- 90 Measured Wells
- Spring & Fall

Map 3: Little Blue Basin Groudnwater Quantity Management

Tri-Basin Natural Resources District

Little Blue Basin

Groundwater Quantity Management



Groundwater Quantity Management

- Phase II
- Phase III



- Community
- Highway
- Township
- County



Nolan Little
August 2023
Tri-Basin Natural Resources District

Appendix A: Tri-Basin NRD – Little Blue Basin

Tri-Basin Natural Resources District New Well and Conditional Replacement Well Permit Applicant Certification and Agreement

Applicant Certification and Agreement to be bound by Conditions and Limitations on operation of a Well permitted as a New Well or as a Conditional Replacement Well pursuant to Rule 1.13, Tri-Basin Natural Resources District Rules and Regulations for Management of Land and Water Resources

NRD Permit # _____ Applicant _____

Applicant is the owner of the following- described real estate:

_____ ¼ Section T N - R W _____

Applicant accepts and agrees to be bound by the following conditions and limitations on the operation of a well that is constructed under the authority of a permit issued by the Tri-Basin Natural Resources District (“NRD”). The conditions and limitations are (check the box and initial those that apply):

1. _____ Applicant agrees to offset any “new depletions” to streamflows of the Platte River, Little Blue River, Republican River, or their tributaries that may be determined to be associated with use of this well. Applicant agrees to use methods to offset those depletions that are deemed acceptable by the NRD and the State of Nebraska. Applicant understands and agrees that Applicant’s failure to offset said new depletions may result in closure of this well or restrictions being imposed by the NRD on the number of acres of land that can be irrigated by this well.
2. _____ Applicant agrees to abide by well spacing and pumping capacity limitations that apply to the well that is the subject of this permit, whether such limitations arise pursuant to federal or state law or by rule or regulation of the NRD. Applicant understands and agrees that Applicant’s failure to comply with all rules and regulations of the NRD that pertain to this well may result in closure of this well and civil or criminal prosecution and other penalties.
3. _____ Applicant agrees to comply with all current and future rules and regulations of the NRD that pertain to this well. Applicant understands and agrees that Applicant’s failure to comply with all rules of regulations of the NRD that pertain to this well may result in closure of this well and civil or criminal prosecution and other penalties.
4. _____ Applicant agrees to maintain any and all surface water rights associated with the land to be irrigated by this well for the lifespan of the permitted well. Applicant understands and agrees that Applicant’s failure to comply with all rules and regulations of the NRD that pertain to this well may result in closure of this well and civil or criminal prosecution and other penalties.
5. _____ Applicant agrees to irrigate only land that has been certified for irrigation by the NRD (no new irrigated acres will be allowed). Applicant understands and agrees that Applicant’s failure to prevent irrigation of land not certified for irrigation by the NRD may result in closure of this well and prosecution by the State of Nebraska.

Applicant certifies that Applicant is familiar with the information contained in this instrument and that to the best of Applicant’s knowledge and belief, such information is true, complete and accurate. Applicant further acknowledges and agrees that the NRD and/or the State of Nebraska may impose additional conditions, limitations and restrictions on operation of the well that is the subject of this permit. Applicant further acknowledges and agrees that the conditions and limitations agreed to herein shall also be binding upon Applicant’s successors-in-interest to the well and/or the subject real estate.

Appendix A: Tri-Basin NRD – Little Blue Basin

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true, complete and accurate. I further acknowledge that Tri-Basin Natural Resources District or the State of Nebraska may impose additional conditions, limitations and restrictions on operation of the well that is the subject of this permit.

Date

Signature of Applicant

Date

Signature of Applicant

Date

Signature of Witness

Approval by Tri-Basin Natural Resources District

Date

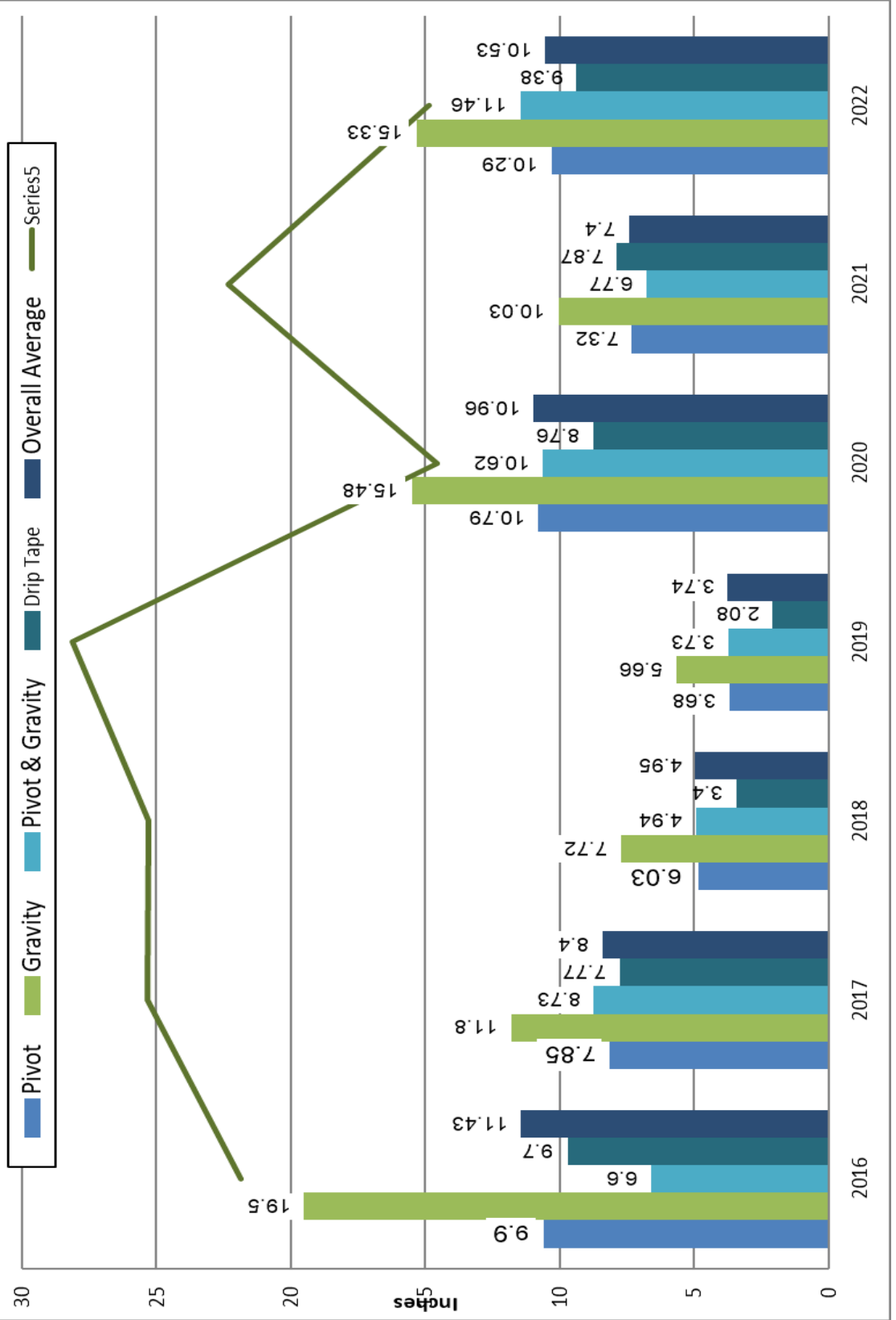
Signature of Tri-Basin NRD Representative

Appendix B: Tri-Basin NRD – Little Blue Basin

	2015	2016	2017	2018	2019	2020	2021	2022
Certified Irrigated Acres	91,487.69	91,487.69	91,573.87	91,636.40	91,636.40	91,636.40	91,620.78	91,435.75
Pivots								
Actual Reported Acres	15,587.49	19,754.85	23,632.77	26,603.59	30,815.60	30,705.70	32,930.2	41,413.13
Gallons Used	3,281,070,993	5,669,387,534	5,236,467,469	3,507,094,848	3,078,611,103	8,998,147,460	6,547,663,703	11,573,399,353
Average acre Inches	7.8	10.6	8.16	4.85	3.68	10.79	7.32	10.29
Gravity								
Actual Reported Acres	1,461.57	1,870.77	1,354.90	1,082.80	1,225.80	1,554.50	1,571.6	1,436.85
Gallons Used	562,190,113	989,690,501	434,200,258	227,035,465	188,400,072	653,593,594	428,227,872	597,939,791
Average acre Inches	14.2	19.5	11.8	7.72	5.66	15.48	10.03	15.33
Combination								
Actual Reported Acres	3,726.18	4,003.68	3,745.48	3,960.98	4,279.50	4,297.00	4,474.1	3,499.88
Gallons Used	982,280,871	1,300,887,857	887,896,796	531,214,903	433,628,400	1,238,682,129	822,782,883	1,089,026,619
Average acre Inches	6.6	6.6	8.73	4.94	3.73	10.62	6.77	11.46
Drip Tape								
Actual Reported Acres	119	119	181	181	181	182	182.0	182.00
Gallons Used	23,922,674	31,308,562	38,202,962	14,961,854	10,237,058	43,316,061	38,911,682	46,351,878
Average acre Inches	7.4	9.7	7.77	3.04	2.08	8.76	7.87	9.38
Total Volume Pumped								
Actual Reported Acres	20,894.24	25,748.30	28,914.15	31,828.37	36,501.90	36,739.20	39,157.8	46,531.86
Gallons Used	4,849,464,651	7,991,274,454	6,596,767,485	4,280,307,071	3,710,876,633	10,933,739,244	7,837,586,140	13,306,717,641
Basin IPA	8.55	11.43	8.4	4.95	3.74	10.96	7.4	10.53
Wildlife Acres							8,166,800	1,700
Other Use [Non-Irrigation]								
Total Gallons Used	4,849,464,651	7,991,274,454	6,596,767,485	4,280,307,071	3,710,876,633	10,933,739,244	7,845,752,940	13,306,719,341
ACRE FEET	14,882.46	24,524.32	20,244.74	13,135.78	11,388.26	33,554.41	24,077.73	40,836.822

Appendix B: Tri-Basin NRD – Little Blue Basin

Tri-Basin NRD Little Blue Basin Average Irrigation Pumping



Appendix C: Tri-Basin NRD Water Conservation Incentive Program

3/12/19

Introduction: The Tri-Basin NRD Water Conservation Incentive Program (WCIP) is intended to address two natural resources management issues: ensuring sustainability of groundwater supplies and protecting streamflows from diminishment due to groundwater pumping. The goal of this voluntary program is to reduce groundwater pumping and increase irrigation water use efficiency in Tri-Basin NRD.

The Program: Tri-Basin will allow landowners to enroll up to 8000 NRD-certified irrigated acres in the program. The enrollment period will be from March 26 through April 19, or until the program acre enrollment limit is reached. Once the enrollment limit is reached, water savings to the district could reach 650 acre-feet per year. Incentives in this program will likely be most attractive to landowners in phase two and phase three groundwater quantity management areas, so the water-use reductions should be greatest where the need is greatest (there are approximately 30,000 certified irrigated acres in Tri-Basin's phase two and phase three townships).

In exchange for their participation, landowners will be paid for the equivalent of one acre-inch of water credit per acre per year, with the opportunity to sell additional credits to the NRD at a set price. In addition to NRD purchases, landowners will have the opportunity to sell water credits on the open market at any agreed-upon price (private transactions require NRD board approval). Tri-Basin will maintain an "electronic bulletin board" to facilitate connections between buyers and sellers. Landowners will also be granted flexibility to irrigate any acres within enrolled parcels and to share (pool) allocations between parcels. Pooling agreements will be required to enable sharing allocations between parcels under different ownership.

The Contract: The NRD and the landowner will sign a five-year agreement. The agreement commits the landowner to limiting water use (allocation) on parcels that they select. The allocation will be equal to the UNL average corn crop consumptive irrigation requirement, which is nine inches per acre per year in Kearney County, ten inches per acre per year in Phelps County and eleven inches per acre per year in Gosper County (allocation will be limited to current allocation of nine inches per acre per year in Union Township in Gosper County). Landowners will be required to have flowmeters installed on all wells serving participating parcels and to report water use annually to the NRD. Tri-Basin NRD will offer cost share on flowmeters for participants. Tri-Basin NRD will spot check flowmeter readings on 20% of participating parcels annually. As a condition of their participation, landowners will agree to subject enrolled parcels to (most of) the same rules that apply to all landowners in Phase three groundwater quantity management areas. An instrument will be filed with the county clerk recording these contracts, to provide notice to potential buyers of water use limitations associated with program participation.

In exchange for their participation, the NRD agrees to buy one acre-inch per acre per year from every acre enrolled in the contract. Landowners will have two payment options: an annual payment of \$5 per acre-inch credit for one acre-inch per year, or payment at the end of the contract period for up to five acre-inches of credits per acre (assuming the landowner has that much unused allocation) at a rate of \$4 per acre-inch. The NRD may also choose to purchase additional credits from participants. NRD purchases of additional acre-inches will be prioritized in Groundwater Quantity Management Phase 2 and Phase 3 areas and 50%+ stream depletion zones. The NRD will have the right of first refusal to purchase unused allocations from landowners, so landowners would need NRD board approval before they make private sales.

Landowners will also have the option to irrigate any and all acres within participating parcels. They can also pool acre-inches between parcels under the same ownership (pooling water credits associated with parcels under different ownership, but the same management will

Appendix C: Tri-Basin NRD Water Conservation Incentive Program

require a separate NRD-approved pooling agreement). Pools are only allowed for multiple parcels in the same basin and with the same groundwater quantity management phase status. Water use will be deducted from landowner water credit “accounts.”

If a producer overuses their allocation, they will need to purchase credits from other landowners to eliminate their deficit. Otherwise, they will be prohibited from irrigating enrolled parcels until the deficit is eliminated. The only way a landowner can cancel a contract would be to pay the NRD for the full contracted amount (refund any payments that we’ve already made to them and pay the NRD the amount we would have paid them at the end of the contract period).

Terminology

Accounts- An account will track the number of acre-inches of water available for pumping on a parcel. Each parcel will have a separate account, unless landowners form pool accounts.

Allocations- Allocation amounts would be based on estimated safe yields from aquifers that would not result in long-term declines in groundwater levels. An initial allocation will be equal to the University of Nebraska’s average annual irrigation water consumption requirement for corn (that amount is nine inches per acre in Kearney County, ten inches per acre in Phelps County and eleven inches per acre in Gosper County).

Credits (Water Use Credits)- Credits are accumulated on a per-NRD-certified irrigated acre per-parcel basis. Allocation credits are granted at the beginning of each allocation period.

Debits- Debits would be made against accounts based on actual pumping or water credits marketed and sold to the NRD or other water users.