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Nebraska's Natural Resources Districts
www.nrdnet.org
Protecting Lives • Protecting Property • Protecting the Future

January 9, 2023

TO: Interested Parties
FROM: Dean E. Edson, Executive Director
RE: 2022 NRD Water Management Activities Summary

This packet includes a summary of irrigated acres in Nebraska and a general overview of actions in place to manage water development and protect existing uses. Maps included in the packet also provide a snapshot of groundwater irrigated acres across Nebraska, as well as water quality and quantity management actions and controls enacted by Nebraska's Natural Resources Districts (NRDs) to protect local water quality and quantity. Also included is a summary of individual NRD water management activities as of December 2022, as well as a timeline summary of significant law changes from the last 50 years authorizing various management programs for the NRDs.

The districts are listed alphabetically with a summary of activities and water management programs.

Since their inception in 1972, Nebraska's Natural Resources Districts (NRDs) have been monitoring groundwater quantity and quality to protect lives, property, and the future. Approximately 85 percent of Nebraskans rely on groundwater as their drinking water source and it is the primary irrigation source for agriculture, Nebraska's No. 1 industry. NRDs work with irrigators to monitor water use, establish groundwater recharge projects, and implement water-wise programs, along with developing groundwater quality plans, which are an essential part of protecting Nebraska's most precious resource.

Nebraska is fortunate to have aquifers below it. If poured over the surface of the state, the water in those aquifers would have a depth of 37.9 feet. A report by the U.S. Geological Survey (USGS) indicates that, on average, the condition of the Ogallala Aquifer in Nebraska is significantly healthier than in all other states that lay over large portions of the high plains freshwater aquifer, with Nebraska water levels being sustained near predevelopment levels.

While other states overlying the high plains aquifer watch their water supplies dwindle and scramble to develop management systems to protect it, Nebraska's NRDs along with federal and state partners and local citizens are working to sustainably manage and protect our water for future generations.

If you have any questions, please contact the individual NRD manager listed or myself at:

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Ground Water Management Summary
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Natural resources districts have local responsibility for protecting ground water from overuse and pollution. Each district has a plan to protect ground water. State law has given districts a variety of regulatory tools, to deal with contamination, shortages or user conflicts. Below is a timeline since the creation of the NRD's until present day.

1972 – Natural Resources Districts begin operations after passage of LB 1357, groundwater management by NRD's is a vital mainstay of the act.

1975 – LB 577 adopted by the Legislature recognizes that ownership of water is held by the state for the benefit of its citizens and that NRD's have the legal authority to regulate certain activities in the use of groundwater.

1975 – NRD's began recording static water levels by using a network of observation and recorder wells. Partnerships in this endeavor were made with UNL Conservation and Survey Division, USGS, and other state agencies. Groundwater well moratoriums were allowed only if groundwater levels declined and only when all other authorized controls were not protecting water supplies (this provision stayed in law until passage of LB962 in 2004).

1985 – Legislature adopted LB 1106, the Ground Water Management and Protection Act which allows NRD's to create Ground Water Management Plans for quality and quantity. Plans must be approved by the State of Nebraska.

1986 – Each NRD has in place an approved Ground Water Management Plan reviewed by the state that is continually maintained and updated. Groundwater decline trigger-levels are set by the districts to initiate regulation, if approved by the State of Nebraska.

1996 – Legislature adopted LB 108 which restructured the Ground Water Management and Protection Act for integrated management of ground and surface water applying first to the Lower Republican NRD, Middle Republican NRD, Upper Republican NRD, and Tri-Basin NRD. The statutes applied to the remaining districts in 1999. This was the first time Nebraska law recognized a connection between ground and surface water. The legislation allowed for any individual or NRD to request the state to review any determination of conjunctive use conflicts between ground and surface water.

1996 – All four NRDs involved in LB 108 requested the Nebraska Department of Water Resources for a determination as to whether there were disputes between ground and surface water users. The state made a preliminary determination in September that the conjunctive use of ground and surface water was leading to disputes over water use in the Republican River Basin. Studies were initiated by the NRDs in the Republican basin.

1998 – Before the State of Nebraska was ready to make a final determination, Kansas filed a lawsuit against Nebraska over consumptive use of water in the Basin. The State of Nebraska requested the four NRD's to suspend their initial 1996 request and not impose well drilling moratoriums.

2004 – Following the Republican River settlement agreement between Kansas, Nebraska and Colorado, the Republican Basin NRDs implement allocations at levels recommended by the State of Nebraska to maintain compliance with the agreement. The allocations targeted a 5-10 percent reduction in use according to state officials.

2004 – The legislature adopted LB 962 addressing ground and surface water interaction. The primary intent was to declare certain river basins "over or fully appropriated" which will bring imposed regulations such as well moratoriums, certifying irrigated acres, developing an "Integrated Water Management Plan" and other management actions as determined by the NRD. All districts included in the "over or fully appropriated" basins have imposed more stringent regulation than requested by the State of Nebraska. In addition, 7 NRD's have extended moratorium boundaries beyond state recommendations. (Tri-Basin NRD, Central Platte NRD, South Platte NRD, Lower Platte North NRD, Upper Niobrara – White NRD, Nemaha NRD, & Little Blue NRD). Basins not declared fully or over appropriated will be reviewed prior to January 1 of each year.

2006 – The legislature passed LB 1226 into law which provided several modifications and clarifications to implement LB 962. The key changes include:

1) Provided an exemption for municipalities from allocation restrictions imposed after November 1, 2005. The municipal exemption also allows for new industrial uses up to 25 million gallons annually for growth. Although the exemptions are provided to the municipalities, in fully or over-appropriated areas the NRDs are required to reduce other water uses by an equal amount of the increase either through regulation or retirement of existing uses.
2) For natural resources districts located in a river basin, sub-basin, or reach that has been determined to be fully appropriated over-appropriated, the measure increases the levy authority by 3 cents to administer and implement ground water management activities and integrated management activities. The levy is in addition to the 4.5 cent levy and the extra 1.0 cent levy authority granted by LB 962 in 2004. The additional authority to exceed restricted funds budgeted was scheduled to phase out over 3 years.
3) Provide authority to the NRDs to request DNR stop issuing surface water rights in areas where a NRD has imposed a well drilling moratorium and/or a stay on expansion of irrigated acres. This provision has been used by several NRDs.

2005-06 – Although groundwater pumping in the Republican Basin was 20 percent below the allocation recommended by the State of Nebraska in both years, state officials tell the NRDs this was not enough. The lingering drought is impacting water supplies.

2007 – LB701 was passed by the legislature, providing additional authorities to address water management activities. The key changes include:
1) Allowing NRDs in areas that are covered by an interstate compact to lease or purchase water to enhance stream flows and pay for such by issuing bonds. The NRDs were granted new taxing authority of up to 10 cents from property tax and/or up to $10/irrigated acre occupation tax to pay for the bonds. The NRDs in the Republican Basin leased over 30,000 acre-feet of water in 2007 under this provision. A lawsuit has been filed regarding the constitutionality of this provision which stopped the issuance of the bond to pay the water right holders for the lease of the water.
2) Establishment of a Water Resources Cash Fund to be administered by DNR to comply with interstate water compacts and to conserve water in fully and over-appropriated basins. This provision of the bill appropriates $2.7 million per year to the Water Resources Cash Fund. The NRDs are providing more local funds than required to access these funds.
3) An extension of the 3 cent levy authority for NRDs in fully and over-appropriated areas from 2008 to 2012.
4) Requires DNR, in consultation with the effected natural resources district, to do an annual determination in fully and over-appropriated basins, starting January 1, 2008, and every January 1 thereafter, to estimate the maximum amount of water that may be available from stream flow for a beneficial purpose in the short and long-term. The language would not be an "order" by the department, rather only a forecast developed by DNR and the affected NRDs.
5) Allows NRDs to impose a temporary well drilling moratorium without a notice or hearing, but requires a hearing within 180 days. Similar language is included allowing DNR to impose a temporary 180-day stay on new surface water natural-flow appropriations in areas where a natural resources district has imposed a temporary 180-day stay on new well construction and the addition of new irrigated acres. Water wells of public water suppliers are exempt from temporary moratoriums. The Lower Platte North NRD used this provision of law in 2007.
6) Creation of a 13-member Riparian Vegetation Task Force, as proposed in LB 458, consisting of a representative of the Governor, state agencies, NRDs, the Nebraska Environmental Trust, and a riparian landowner from each of the state's congressional districts. State funding of $2.5 million year was included to provide grants to remove vegetation and invasive species of river channels in fully or over-appropriated areas. In 2007, NRDs in the Platte and Republican basins provided matching funds and in-kind funding for this program.

2007 - Preliminary estimates on groundwater use are well below allocations for the 3rd year in a row in the Republican Basin. Water leased by the Republican Basin NRDs from surface water right holders and normal rainfall keeps the State of Nebraska in compliance for water use.

2008 - Due to constitutional challenges on LB 701, the Republican Basin NRDs cannot issue bonds under the law to raise funds to pay surface water right holders for the water leased. While the case works its way through the legal process, the Nebraska Legislature passes LB1094 which loans the Republican Basin NRDs $9 million to pay the surface water right holders for the leased water. Oral arguments will be held December 14, 2009 in the Lancaster County District Court.

2009- The legislature adopted a bill, LB 54, to allow NRDs to track depletions and gains resulting from new, expired or modified water use in fully or over-appropriated areas. Procedures to include:

1) Use of generally accepted methodologies based on the best available information.
2) Provide a methodology to estimate stream flow depletions and gains and provide information on gains as offsets to new uses.
3) Require the identification of means to be utilized so new uses will not have more than a de minims effect on existing surface water or groundwater users.
4) Provide a procedure for sharing information between the Department of Natural Resources and the NRDs.
5) Identify water that could mitigate new uses.
6) Provide a plan, after consulting with and providing an opportunity for public input from interested parties, for making water available for offset for economic development purposes.

2009- LB483 was passed by the legislature, that changes the planning process for NRDs when a determination is made that the district is not fully appropriated and a stay on well drilling has expired or that a preliminary determination was made that a basin, sub-basin, or reach is fully appropriated but a final determination finds that it is not fully appropriated. The key changes include:

1) Change the date for a request of re-evaluation of a basin from March 1 to July 1.
2) Require natural resources districts that are in a situation where a status change has occurred from fully appropriated or preliminarily fully appropriated to not fully appropriated, to create and implement a policy for the prioritization and granting of water well permits for the four-year period following the change.
3) Require moratoriums to stay in place until the districts developed rules and regulations to allow limited growth that would not reach a point to cause a fully appropriated determination.
4) Require DNR to approve the NRD rules and regulations within 60 days of NRD adoption. If DNR fails to approve the regulations, NRDs would have to adopt rules and regulations to allow up to 2,500 irrigated acres growth or not more than 20 percent increase in historic irrigated acres within a hydrologically-connected area.
5) The bill would prohibit DNR from issuing any new appropriation for the four-year period following a status change that would result in a fully appropriated status based on the most recent evaluation.
6) Prohibit DNR from granting more than 834 acres of new surface water appropriations for irrigation

2010- LB 764 was passed by legislature that allows NRDs to develop IMPs in areas that are not fully or over-appropriated**.** This bill allows a natural resources district encompassing a river basin, sub-basin, or reach that has not been designated as fully or over-appropriated to, jointly with the department, develop an integrated management plan for such river basin, sub-basin, or reach located within the district.

2010- The legislature adopted a bill, LB 862, that changed provisions relating to the regulation of water. The bill makes two important changes to the occupation tax and managing water resources. First the bill provides the NRDs a local water user-based fee system to self-fund many of the activities necessary to adequately deal with the water challenges facing Nebraska while protecting local economies and all existing and future uses.

In order for NRDs to use the occupation tax they must have it in their Integrated Management Plan (IMP) with plans on how the funds will be being used. The IMP then has to be approved by DNR. The occupation tax can only be used to purchase or lease groundwater or surface water rights, purchase or lease of water from canals or reservoirs, removal of vegetation or invasive species that affect the river flow, or change augmentation of the river flows. This will allow NRDs to implement programs that will help protect the economy in the fully and over-appropriated basins in water-short years.

The second major change is that the occupation tax can be used to fund programs without issuing bonds. Although bonding is still allowed, this option allows NRDs to pay for smaller projects in one year rather than financing them.

2011- The bill LB 229e was passed by the legislature and provides for a process for the Nebraska Department of Natural Resources to apply for a grant from the Nebraska Environmental Trust Fund (NETF) to fund water programs. This is what the compromise does:

- Allows the Department of Natural Resources (DNR) to apply to NETF for a three-year $9.9 million grant for fully/over-appropriated river basins and gives that grant 50 bonus points in the ranking.

- Provides an annual match of $3.3 million in General Fund dollars that will be appropriated to the Water Resources Cash Fund (WRCF).
- Adds intent language to apply for an additional three-year grant provided that benchmark criteria are met.
- Requires natural resources districts to provide a 40 percent matching fund requirement.

2011- LB 400 was passed by the legislature that incorporates language from LB 528 to change the sunset date for the NRD three-cent levy for ground water management activities and integrated management activities in fully and over-appropriated areas from 2011-12 to 2017-18.

2012- LB 526e was passed by the legislature to allow for an entire surface water irrigation right to be transferred for a non-consumptive use. The new language would place conditions on such a transfer, including that the transfer or change in purpose will not diminish the supply of water available or otherwise adversely affect any other water appropriator, adversely affect Nebraska's ability to meet its obligations under a multistate agreement, or result in administration of the prior appropriation system by the Department of Natural Resources, which would not have otherwise occurred.

2012- Bills LB 950 and LB 950Ae were passed by the legislature to provide an additional $1.4 million to the Water Resources Cash Fund, bringing the total to $4.7 million. The emergency clause was included in the companion "A" bill.

2012- The legislature approved LB 1125e which provides a process for natural resources districts to follow when implementing an occupation tax. The process for implementing an occupation tax in the bill is as follows:
- Acres classified by the county assessor as irrigated shall be subject to such district's occupation tax unless on or before March 1 in each subsequent year, the record owner certifies to the district the non-irrigation status of such acres.
- A district may exempt from the occupation tax acres that are enrolled in local, state, or federal temporary irrigation retirement programs that prohibit the application of irrigation water in the year for which the tax is levied.
- Except as provided above, a district is prohibited from providing an exemption from, or allowing a request for a local refund of, an occupation tax on irrigated acres regardless of the irrigation source while the record owner maintains irrigated status on such acres in the year for which the tax is levied.

2014- The legislature passed LB 1098 which expanded the Natural Resources Commission from 16 members to 27 members and created the Water Sustainability Fund. Legislative intent was added that the fund be equitably distributed statewide to the greatest extent possible for the long term. Also, intent language was added that distributions from the fund for sewer infrastructure facilities to reduce combined sewer overflow not exceed 10% of the total annual appropriation to the Water Sustainability Fund.

The accompanying "A" bill appropriated $21 million from the Water Sustainability Fund for FY 2014-15 and $11 million from the Water Sustainability Fund for FY 2015-16 to the Department of Natural Resources to aid in carrying out the provisions of LB 1098. Legislative findings are added that the goals of the fund can be met by giving equal consideration to four categories of projects:

- Research, data and modeling;
- Rehabilitation or restoration of water supply infrastructure, new water supply infrastructure, or water supply infrastructure maintenance or flood prevention for protection of critical infrastructure;
- Conjunctive management, storage, and integrated management of groundwater and surface water; and
- Compliance with interstate compacts or agreements or other formal state contracts or agreements or federal law.

The additional appointed membership on the commission is to include: Agribusiness interests; agricultural interests; groundwater irrigators (current appointment); irrigation districts; manufacturing interests; metropolitan utilities districts; municipal users of water from a city of the primary class; municipal users of water from a city of the first or second class or a village (current appointment); outdoor recreation users; public power districts; public power and irrigation districts; range livestock owners; surface water irrigators (current appointment); and wildlife conservation interests.

2016- The legislature passed LB 1038 which changed Nebraska water transfer statutes to allow an appropriation for manufacturing of hydropower to be changed in the full amount to an instream basin-management appropriation to be held

jointly by the Game and Parks Commission and any natural resources district or combination of natural resources districts. This change effectively provided the legal framework necessary to carry out an existing MOU between NPPD, NGPC and the Niobrara Basin River NRDs for the purchase of Spencer Hydro water rights. Under the MOU, the NRDs and the NGPC would jointly purchase and hold the water rights from the Spencer Hydroelectric generation facility and convert the rights to provide a protected instream flow for the Niobrara River.

The provided beneficial use of such change is to maintain the functional stream flow for conservation of fish and wildlife and for recreation that existed by the manufacturing of hydropower and to assist in the implementation of an approved integrated management plan (IMP) of ground water and surface water resources for each natural resources district within the river basin. The bill also outlined that the Priority Date of the Water right is to be maintained so that the right can be protected by a senior date. The bill requires that the new appropriation be subject to condemnation and subordination agreements that exist under the current appropriation and that any person who held a subordination agreement or condemnation award prior to the transfer shall be allowed to enter into a new subordination agreement for terms consistent with the original subordination agreement at no additional cost.

This was a critical step in providing the legal framework for such a transfer and allowing an existing hydropower right to be put to a new beneficial use, working to protect all existing uses of domestic, livestock, municipal, surface water irrigation and groundwater irrigation, while allowing for managed new beneficial uses through the implementation of an integrated management plan.

2018 – The legislature passed LB 758e which allows a natural resources district or districts that acquire private land to develop and operate a water augmentation project for streamflow enhancement to make voluntary payments in lieu of taxes to the county treasurer of the county in which the land is located. A payment in lieu of tax may be made for any year in which the joint entity or natural resources district owns the land, including any year prior to the effective date of the act. The amount of the payment in lieu of tax for any year can not be more than the real property taxes that would have been paid on the land for such year if the land were subject to taxation.

2018 - The legislature failed to extend the maximum 3-cent levy authority for fully or over-appropriated districts from FY 2017-18 to FY 2025-26. Senators failed to invoke cloture on LB 98 on March 7th, 2018, by a 27-14-8 vote. Thirty-three votes are necessary to invoke cloture and vote to advance the bill. Senators Stinner, Friesen and Hughes did a tremendous job arguing the merits of the legislation but could not overcome opposition to the bill from Senators Groene, Erdman and Governor Ricketts. Thus, the local revenue source for NRDs in the fully and over-appropriated areas to address state mandates and water sustainability programs ended that year. Senator Stinner had declared LB 98 his Priority Bill for the 2018 session.

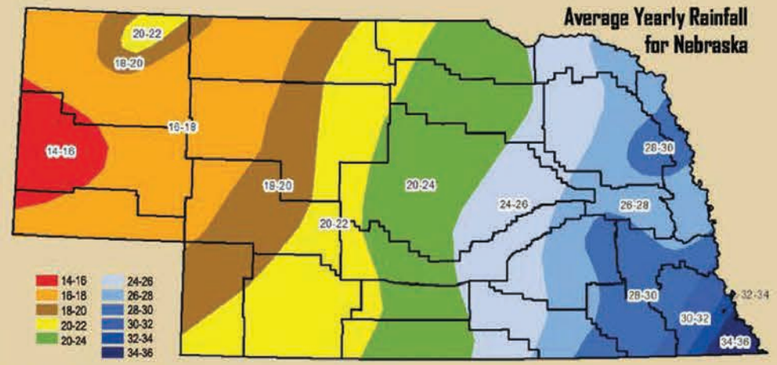
2022 – The legislature passed LB 1015. The bill authorized construction of a canal that would divert South Platte River water from Colorado to Nebraska under a 1923 interstate compact. The compact entitles Nebraska to 120 cubic feet of water per second during the summer. Nebraska also has a right to 500 cubic feet of water per second during the non-irrigation season ***but only if*** it builds a canal to divert it from the river in Colorado to a reservoir system in Nebraska. Separate legislation provided funding to begin engineering and design of the canal.

As of 2022, to comply with the Platte River Recovery Implementation Program and to meet the requirements established by the Nebraska Legislature, the Central Platte NRD has spent $20M to return a required 18,500 acre-feet to the Platte River, Nebraska could receive this same amount of water (18,500 ac/ft) every 18 days with the South Platte Canal.

NRDs Are Managing Water Statewide:

Nebraska's 23 Natural Resources Districts (NRDs) are uniquely positioned to manage the conservation of the state's natural resources through local governance. Because of Nebraska's diverse geology, climatology, and hydrology, each NRD—and it's locally elected board of directors—are able to enact rules, regulations, and programs that can assist its District's citizens and protect local natural resources for future generations to share. Water management regulations in particular include allocating groundwater, augmenting surface water, requiring flow meters, instituting well drilling moratoriums, requiring water use reports, and restricting the expansion of irrigated acres. Individual NRDs use these regulations in different combinations and to different degrees depending on their respective geographic areas of concern. Below is a map showing all 23 NRDs and their most recent status of water management techniques.

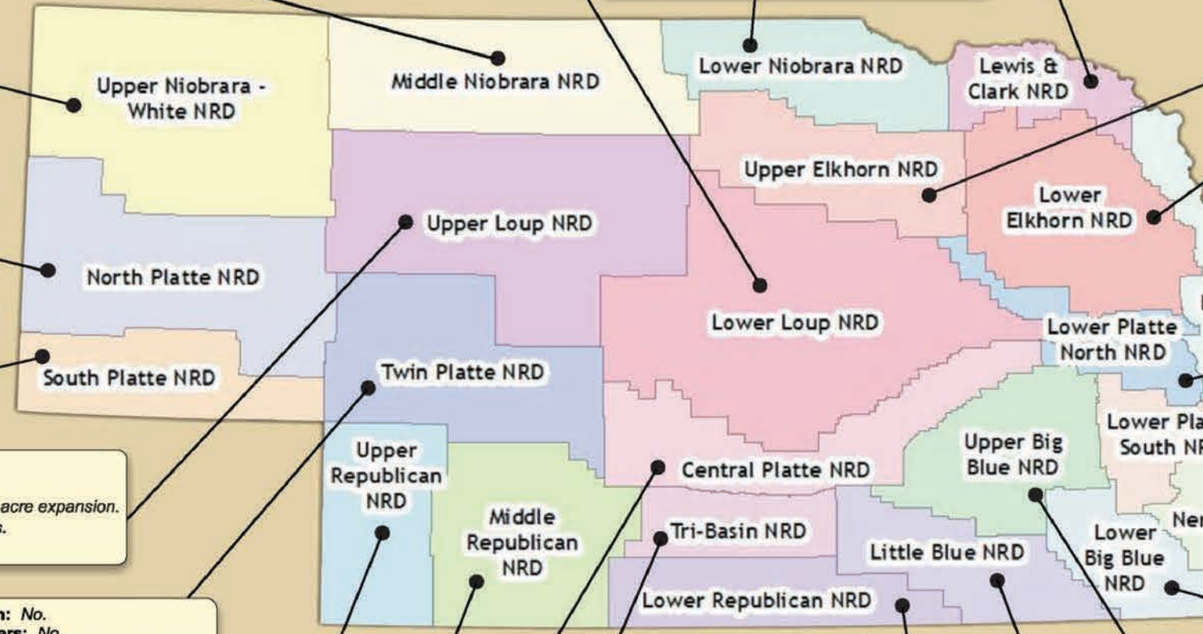
So why does this matter to you? Quite simply, Nebraska's NRDs are working to ensure that you and future generations can continue to share in the use and enjoyment of our natural resources. Nebraska's NRDs: Protecting Lives, Protecting Property, and Protecting the Future...



Precipitation varies dramatically across the state ranging from 14" to 16" a year in the Panhandle to 34"-36" a year in the most southeastern portion of Nebraska. Therefore, allocation amounts, along with historic water use, take precipitation into consideration.

NRD GROUNDWATER QUANTITY REGULATIONS ACROSS NEBRASKA

January 2023



Allocation: *No.*
Flow meters: *Yes, new development.*
Well Drilling Moratorium: *Yes, temporary stay.*
Required Water Use Reports: *Yes, in sub-area.*
Rainfall Yearly Average: *16"-20"*

Allocation: *No.*
Flow meters: *Yes, sub-areas; commercial and industrial wells; all new development*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes, in sub-areas; commercial & industrial wells*
Rainfall Yearly Average: *22"-27"*

Allocation: *No.*
Flow meters: *Yes, on new wells.*
Well Drilling Moratorium: *No.*
Required Water Use Reports: *Yes, where flow meters are required.*
Rainfall Yearly Average: *24"-26"*

Allocation: *No.*
Flow meters: *Yes, on new wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes, in sub-areas.*
Rainfall Yearly Average: *22"-24"*

Allocation: *No.*
Flow meters: *Yes.*
Well Drilling Moratorium: *No, but limited irrigated acre development determined annually.*
Required Water Use Reports: *Yes, Phase II & III areas*
Rainfall Yearly Average: *24"-28"*

Allocation: *65"/5yrs.*
Flow meters: *Yes, all wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *15"-19"*

Allocation: *13"-14"/1yr., in sub-areas.*
Flow meters: *Yes, for all irrigation wells by Jan. 1, 2018 and for all new high capacity wells.*
Well Drilling Moratorium: *No, but new irrigated acres only with an approved variance.*
Required Water Use Reports: *Yes, for all District required flow meters.*
Rainfall Yearly Average: *26"-30"*

Allocation: *No.*
Flow meters: *Yes, in sub-areas by 03/01/2023.*
Well Drilling Moratorium: *No, but limited irrigated acre development.*
Required Water Use Reports: *No.*
Rainfall Yearly Average: *30"-32"*

Allocation: *70"/5yrs. & Pumpkin Creek = 60"/5yrs.*
Flow meters: *Yes, on all wells by 12/31/16.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *14"-18"*

Allocation: *27"/3yrs., in sub-areas.*
Flow meters: *Yes, in sub-areas.*
Well Drilling Moratorium: *Yes, in sub-areas.*
Required Water Use Reports: *Yes, in sub-areas.*
Rainfall Yearly Average: *26"-30"*

Allocation: *39"- 48"/3yrs. by sub-area.*
Flow meters: *Yes, all wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *14"-18"*

Allocation: *21"/3yrs. 9"/yr. maximum, in NW sub-area.*
Flow meters: *Yes, on all NRD-permitted wells.*
Well Drilling Moratorium: *No, but restrictions on irrigated acres in NW sub-area.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *28"-30"*

Allocation: *No.*
Flow meters: *Yes.*
Well Drilling Moratorium: *Limited acre expansion.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *18"-22"*

Allocation: *No.*
Flow meters: *Yes, on new wells.*
Well Drilling Moratorium: *No, well permit ranking.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *34"-36"*

Allocation: *No.*
Flow meters: *No.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *No.*
Rainfall Yearly Average: *18"-22"*

Allocation: *Set* when triggered.
Flow meters: *Yes, on new wells.*
Well Drilling Moratorium: *No; well permit ranking.*
Required Water Use Reports: *No.*
Rainfall Yearly Average: *28"-30"*

Allocation: *27"/3yrs., in sub-areas.*
Flow meters: *Yes-Republican Basin.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *22"-24"*

Allocation: *65"/5yrs.*
Flow meters: *Yes, all wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *17"-20"*

Allocation: *No.*
Flow meters: *No.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *22"-29"*

Allocation: When triggered = *30"/3yrs., then 45"/5yrs.*
Flow meters: *Yes, on all wells by 1/1/16.*
Well Drilling Moratorium: *No.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *26"-28"*

Allocation: *60"/5yrs.*
Flow meters: *Yes, all wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *20"-22"*

Allocation: *45"/5yrs.*
Flow meters: *Yes, all wells.*
Well Drilling Moratorium: *Yes.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *22"-24"*

Allocation: When triggered = *60" + 5" bank/5 years.*
Flow meters: *Yes, on all wells.*
Well Drilling Moratorium: *Yes, in sub-areas.*
Required Water Use Reports: *Yes.*
Rainfall Yearly Average: *26"-31"*

EDITOR'S NOTE: *The information presented statewide reflects water management and conservation data as of January 2023*

This map is intended for general reference only. District, and sub-area specific rules and regulations are put in place by a locally elected board of directors for each Natural Resources District. As a result, rules and regulations are subject to change per local board action. Not all restrictions pertaining to water management are represented on this map. Please contact your local NRD to obtain the most current rules and regulations for that District.

Information gathered and published by:
Nebraska Assoc. of Resources Districts
Updated, January 2023

NRDs Are Managing Water Statewide:

Nebraska's 23 Natural Resources Districts (NRDs) are uniquely positioned to manage the conservation of the state's natural resources through local governance. Because of Nebraska's diverse geology, climatology, and hydrology, each NRD—and it's locally elected board of directors—are able to enact rules, regulations, and programs that can assist its District's citizens and protect local natural resources for future generations to share. Water management regulations in particular include allocating groundwater, augmenting surface water, requiring flow meters, instituting well drilling moratoriums, requiring water use reports, and restricting the expansion of irrigated acres. Individual NRDs use these regulations in different combinations and to different degrees depending on their respective geographic areas of concern. Below is a map showing all 23 NRDs and their most recent status of water management techniques.

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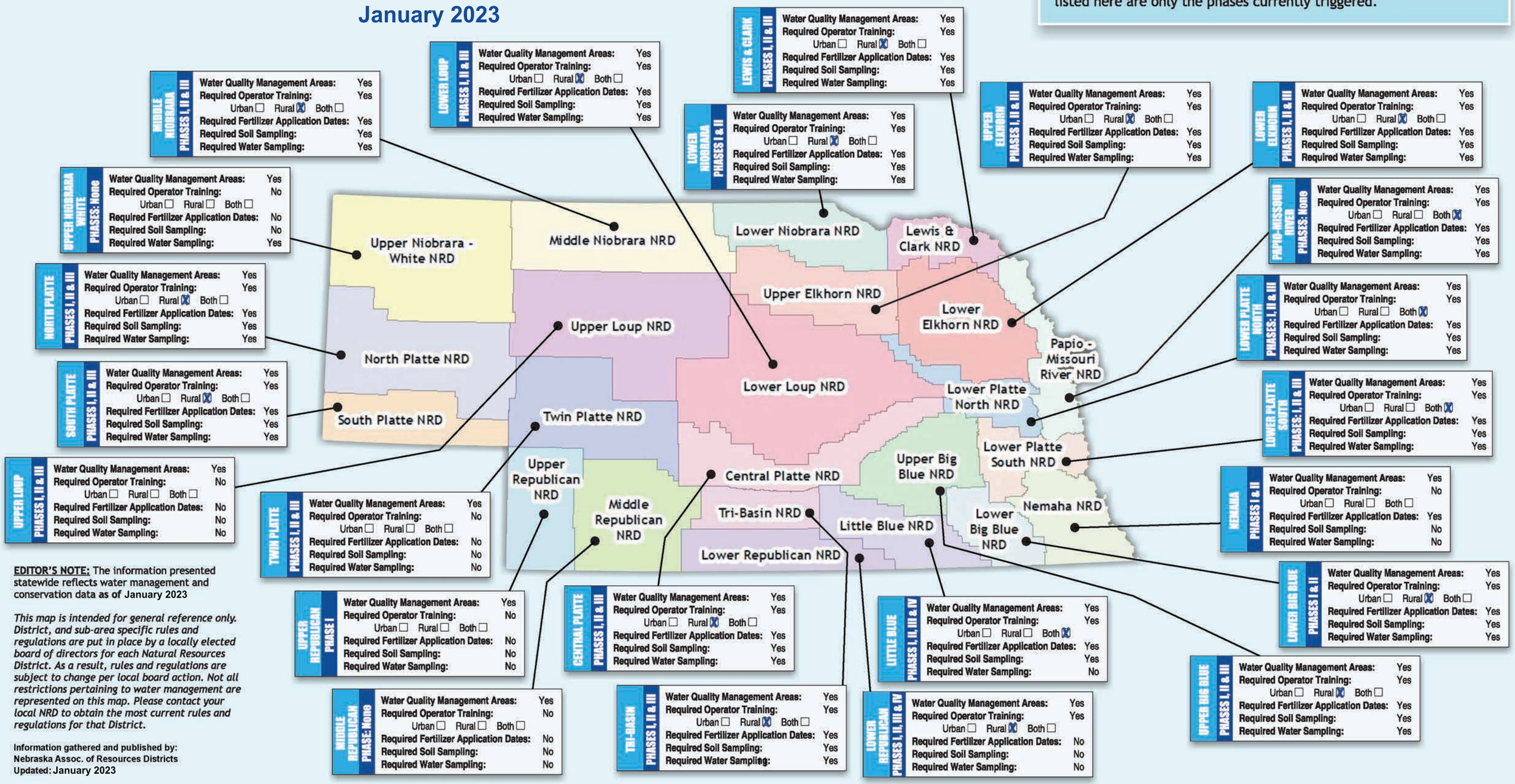
In reference to Phase I, II, III and IV areas, NRDs utilize trigger points signifying specific levels of nitrate in groundwater through monitoring well testing. These triggers are put in place to protect the drinking water supply. Trigger points may vary within the individual NRD boundary, but are relative to the safe drinking water standards mandated federally. A district may have all, none, or part of its districts designated as Phase I, II, III and IV areas, or any combination. The higher the Phase, the more implementation of management efforts for protection is required. It is best to consult with your local NRD to identify with their programs. The phases listed here are only the phases currently triggered.

NRD GROUNDWATER QUALITY REGULATIONS ACROSS NEBRASKA

January 2023



MIDDLE NIOBRARA — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER LOUP — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LEWIS & CLARK — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER NIOBRARA — PHASES I & II

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

UPPER ELKHORN — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER ELKHORN — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

UPPER NIOBRARA WHITE — PHASES: None

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	Yes

PAPIO-MISSOURI RIVER — PHASES: None

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☐ Both ☒	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

NORTH PLATTE — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER PLATTE NORTH — PHASES: I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☐ Both ☒	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

SOUTH PLATTE — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER PLATTE SOUTH — PHASES: I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☐ Both ☒	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

UPPER LOUP — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	No

NEMAHA — PHASES I & II

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	No
Required Water Sampling:	No

TWIN PLATTE — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	No

LOWER BIG BLUE — PHASES I & II

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

UPPER REPUBLICAN — PHASE I

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	No

CENTRAL PLATTE — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LITTLE BLUE — PHASES I, II, III & IV

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☐ Both ☒	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	No

UPPER BIG BLUE — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

MIDDLE REPUBLICAN — PHASE: None

Water Quality Management Areas:	Yes
Required Operator Training:	No
Urban ☐ Rural ☐ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	No

TRI-BASIN — PHASES I, II & III

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	Yes
Required Soil Sampling:	Yes
Required Water Sampling:	Yes

LOWER REPUBLICAN — PHASES I, II, III & IV

Water Quality Management Areas:	Yes
Required Operator Training:	Yes
Urban ☐ Rural ☒ Both ☐	
Required Fertilizer Application Dates:	No
Required Soil Sampling:	No
Required Water Sampling:	No

EDITOR'S NOTE: The information presented statewide reflects water management and conservation data as of January 2023

This map is intended for general reference only. District, and sub-area specific rules and regulations are put in place by a locally elected board of directors for each Natural Resources District. As a result, rules and regulations are subject to change per local board action. Not all restrictions pertaining to water management are represented on this map. Please contact your local NRD to obtain the most current rules and regulations for that District.

Information gathered and published by:
Nebraska Assoc. of Resources Districts
Updated: January 2023

Nebraska's Groundwater Irrigated Acres – 2022

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.

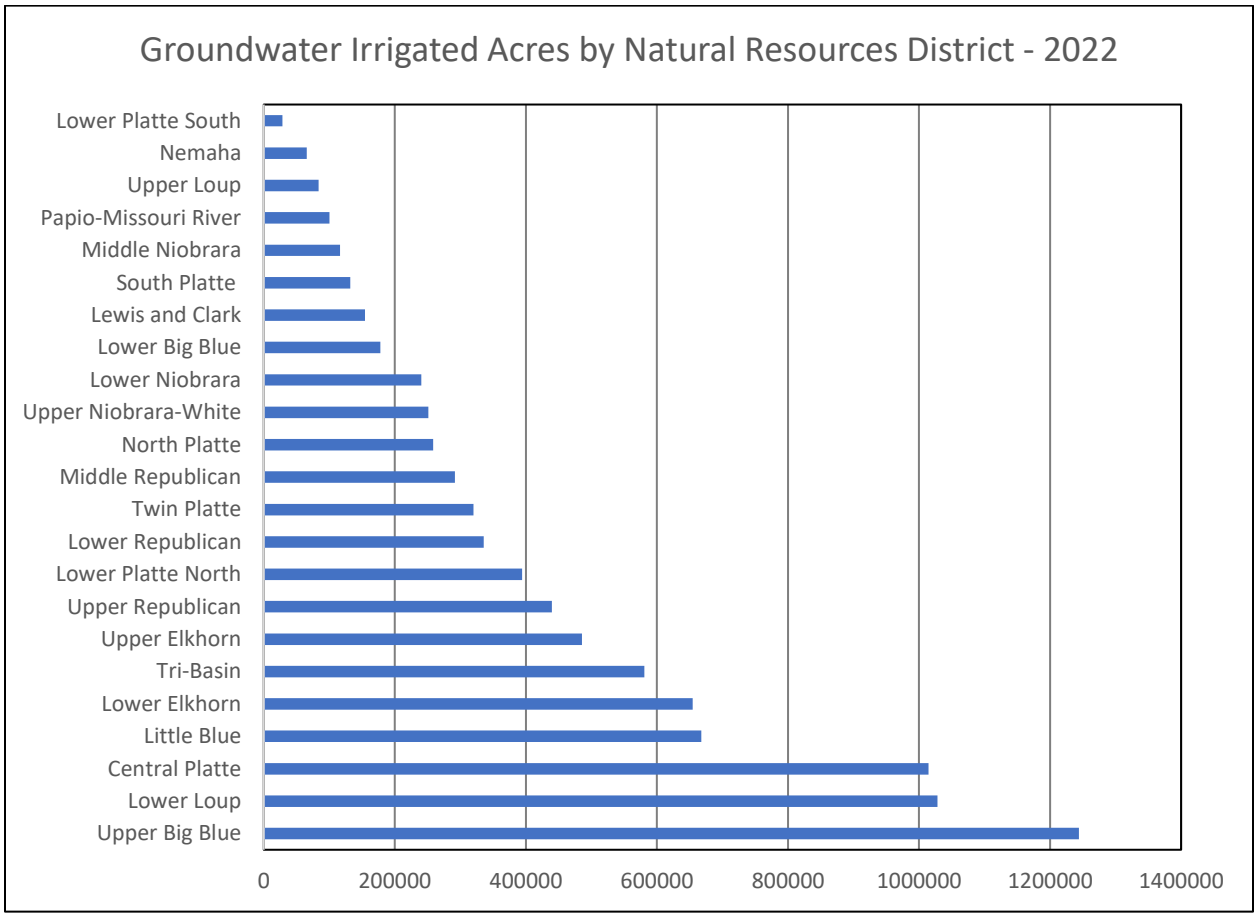
Groundwater Irrigated Acres in the State of Nebraska-2022

Data submitted from Nebraska's 23 Natural Resources Districts

By NRD	Acres	Percent of total GW Irrigated Acres
Lower Platte South NRD	28300	0.3%
Nemaha NRD	65616	0.7%
Upper Loup NRD	83854	0.9%
Papio-Missouri River NRD	100214	1.1%
Middle Niobrara NRD	116170	1.3%
South Platte NRD	131818	1.5%
Lewis and Clark NRD	154500	1.7%
Lower Big Blue NRD	177715	2.0%
Lower Niobrara NRD	240231	2.7%
Upper Niobrara-White NRD	251017	2.8%
North Platte NRD	258316	2.8%
Middle Republican NRD	291599	3.2%
Twin Platte NRD	320079	3.5%
Lower Republican NRD	335691	3.7%
Lower Platte North NRD	394136	4.3%
Upper Republican NRD	439639	4.8%
Upper Elkhorn NRD	485733	5.4%
Tri-Basin NRD	581019	6.4%
Lower Elkhorn NRD	654573	7.2%
Little Blue NRD	667849	7.4%
Central Platte NRD	1014666	11.2%
Lower Loup NRD	1028004	11.3%
Upper Big Blue NRD	1244226	14%
Total	9,064,963	

Groundwater Irrigated Acres by River Basin		
Nemaha River Basin	67468	1%
Lower Platte River Basin	290555	3%
Missouri Tributaries	333172	4%
Niobrara River Basin	616080	7%
Elkhorn River Basin	1070820	12%
Loup River Basin	1217392	13%
Republican River Basin	1245178	14%
Upper Platte River Basin	1994362	22%
Blue River Basin	2229937	25%
Total	9,064,963	

By Management Action	Acres	
Over Appropriate Area of Nebraska	811,178	8.9%
Fully Appropriated Area of Nebraska	2,796,069	30.8%
Groundwater Allocations in Place	1,799,479	19.9%
Acres Retired or Banked	69,451	0.8%


Groundwater Irrigated Acres by Natural Resources District - 2022
Lower Platte South
Nemaha
Upper Loup
Papio-Missouri River
Middle Niobrara
South Platte
Lewis and Clark
Lower Big Blue
Lower Niobrara
Upper Niobrara-White
North Platte
Middle Republican
Twin Platte
Lower Republican
Lower Platte North
Upper Republican
Upper Elkhorn
Tri-Basin
Lower Elkhorn
Little Blue
Central Platte
Lower Loup
Upper Big Blue
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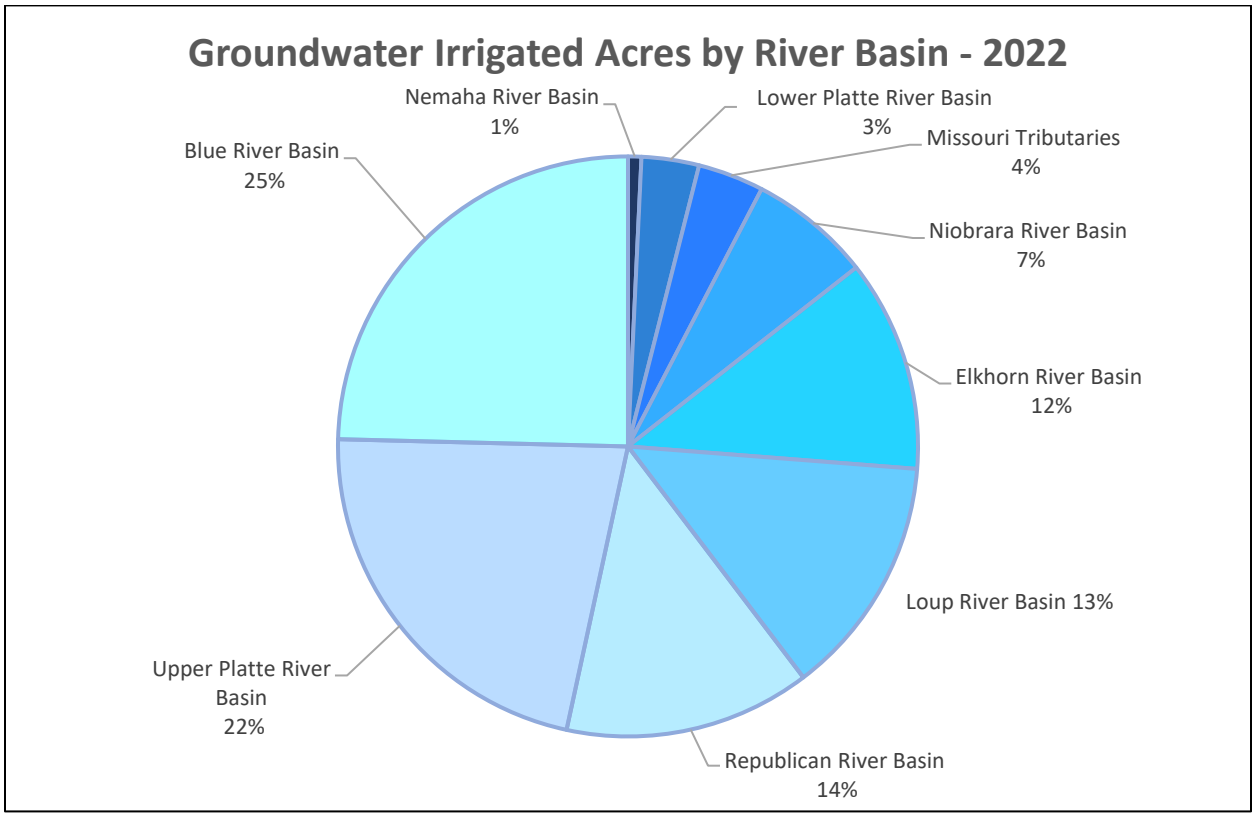
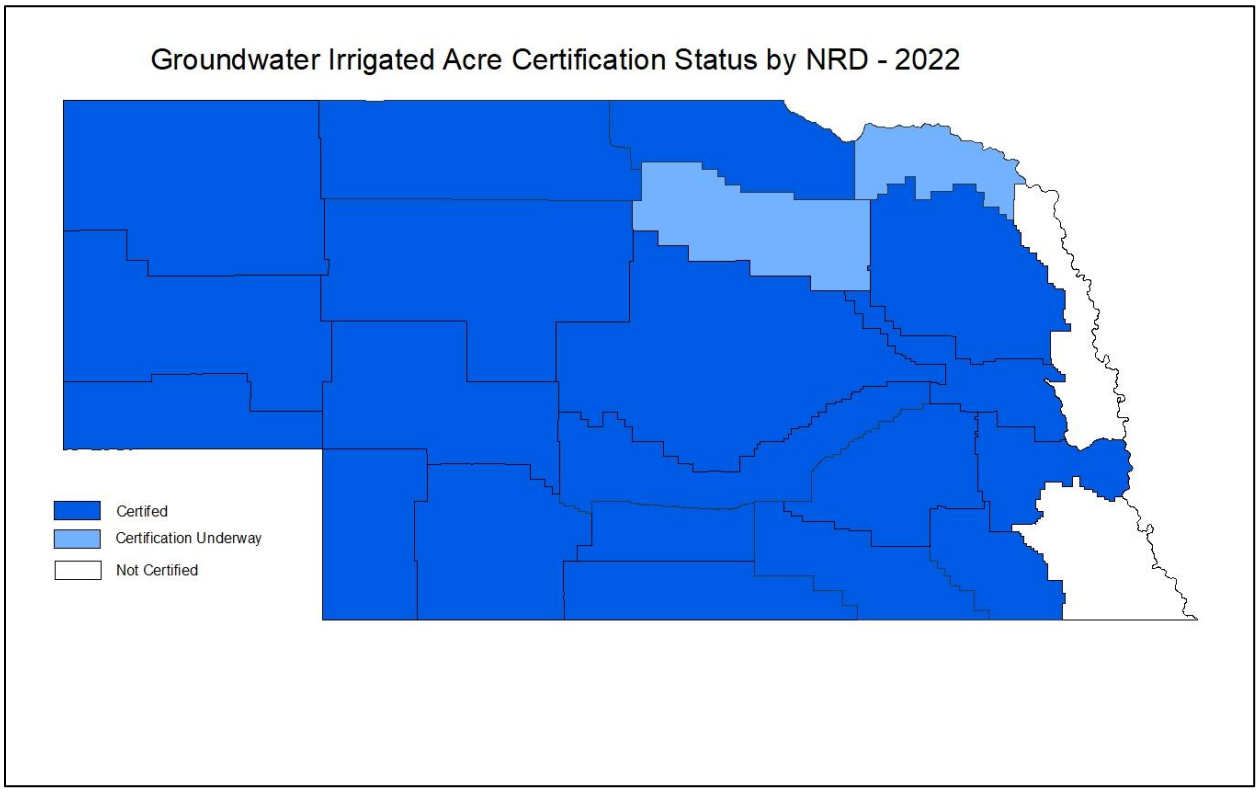
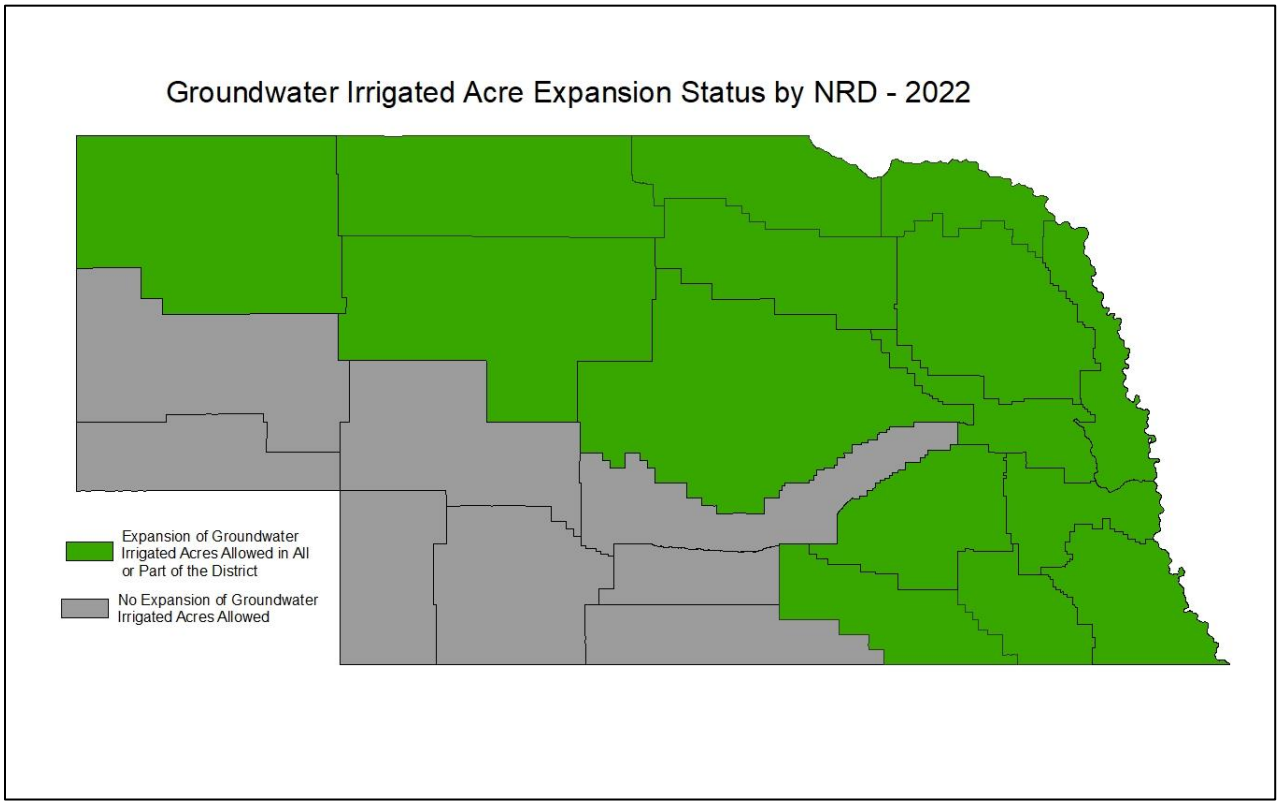
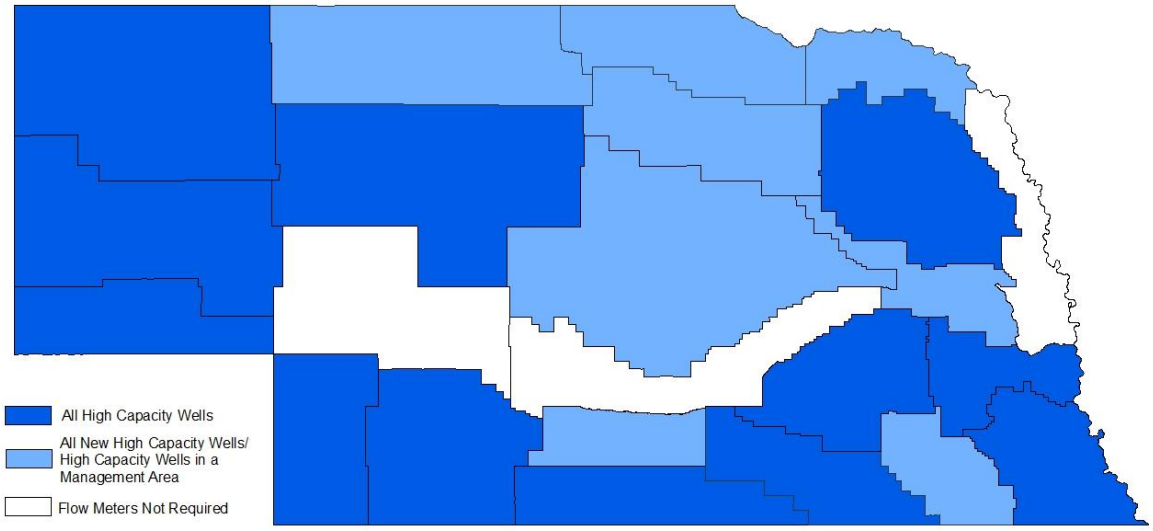
600000
800000
1000000
1200000
1400000


Groundwater Irrigated Acres by River Basin - 2022
Nemaha River Basin 1%
Lower Platte River Basin 3%
Missouri Tributaries 4%
Niobrara River Basin 7%
Elkhorn River Basin 12%
Loup River Basin 13%
Republican River Basin 14%
Upper Platte River Basin 22%
Blue River Basin 25%

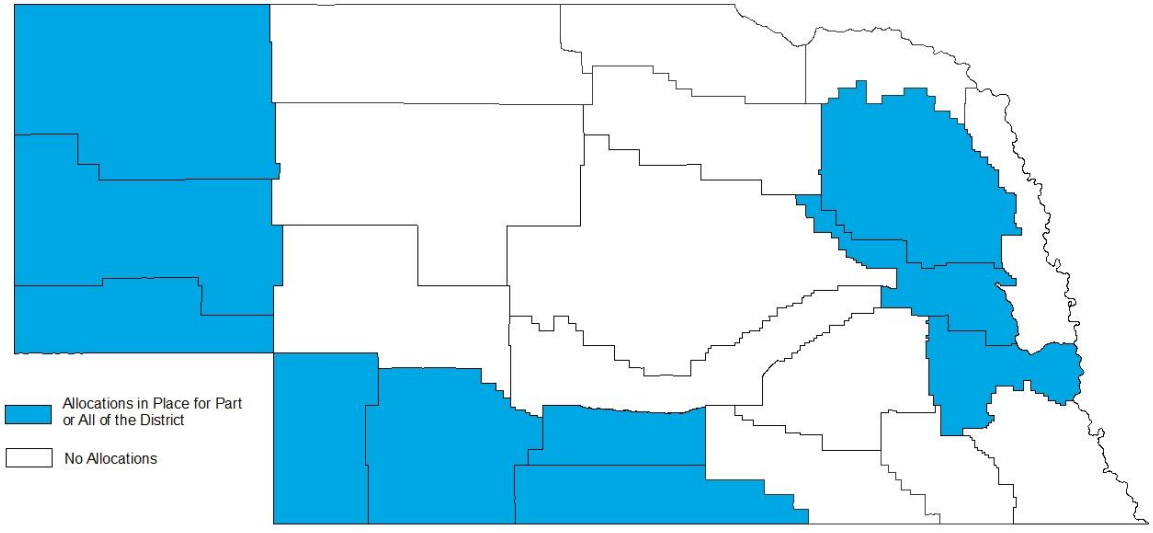

Groundwater Irrigated Acre Certification Status by NRD - 2022
Certifed
Certification Underway
Not Certified


Groundwater Irrigated Acre Expansion Status by NRD - 2022
Expansion of Groundwater Irrigated Acres Allowed in All or Part of the District
No Expansion of Groundwater Irrigated Acres Allowed

Groundwater Irrigated Acre Flow Meter Status by NRD - 2022



Groundwater Irrigated Acre Allocation Status by NRD - 2022



Central Platte NRD

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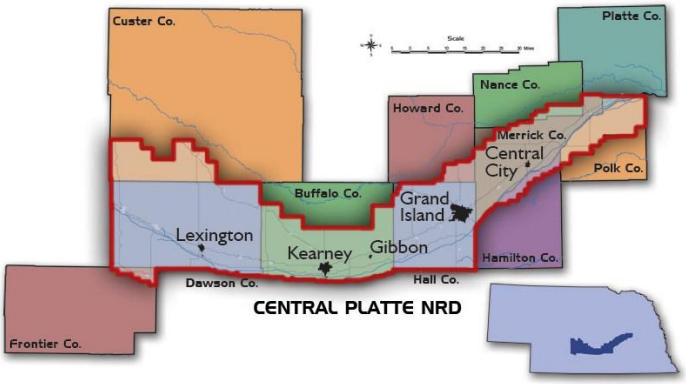

GROUNDWATER MANAGEMENT

Central Platte NRD has 1,029,230 certified irrigated acres with 937,488 acres irrigated with groundwater only; 14,562 acres with surface water only and the remaining 77,180 acres are co-mingled use. Crops irrigated in the District include corn, soybeans, sorghum, potatoes, alfalfa, small grains and sunflowers. CPNRD's Groundwater Management Plan is being updated to incorporate significant new data and changes to the quantity management goals since the original plan was implemented in 1987. The quality section of the Plan will be reviewed in the future. The Cooperative Hydrology Study and the Groundwater Evaluation Toolkit are being utilized to determine management options and proposed changes to the Plan.

GROUNDWATER QUANTITY

CPNRD's Quantity Management Plan established 24 groundwater supply management areas that are similar in aquifer conditions, soils and topographic characteristics. The Plan uses a phased approach to implement controls when needed with maximum acceptable declines ranging from 10' in the eastern part of the District to 30' in portions of the western end.

Between 450-500 wells are measured each spring and fall to monitor groundwater levels. The 1982 groundwater levels were established as the benchmark year to compare groundwater level changes. In 2003, CPNRD issued a suspension on drilling new wells and expansion of irrigated acres to determine what groundwater and surface water problems existed and how future water supplies could be affected.

In 2015, CPNRD implemented an irrigation website (cpnrd.gisworkshop.com) to allow producers to fill out their annual Groundwater Management forms online and check certified irrigated acres. Producers may log in throughout the year to record water/soil test results and their actual yields prior to submitting the form. Producers benefit by having all past information in one location.

Agreements

In 2004, NeDNR declared all or portions of 9 NRDs "fully appropriated." The Platte River Basin, above the Kearney Canal Diversion, North Platte River Basin, and South Platte River Basin were designated as over-appropriated. CPNRD has been proactive in developing projects to increase aquifer recharge, reduce aquifer depletion, increase stream flow and remediate threats to drinking water.

Integrated Management Plans (IMP) Within the CPNRD, the Platte Basin above Elm Creek was designated as over-appropriated and the area from Columbus to Elm Creek as fully appropriated. In response, CPNRD and NeDNR developed an individual Integrated Management Plan. The Platte River Basin-Wide Plan was implemented in 2012 to set objectives to incrementally reduce the difference between current and fully appropriated levels of development within the basin. The second increment was approved in 2019 by North Platte, South Platte, Central Platte, Twin Platte, Tri-Basin NRDs and NeDNR.

Platte River Recovery Implementation Program (PRRIP) CPNRD is a partner in PRRIP's goal to improve and conserve habitat for threatened and endangered species (whooping crane, piping plover, pallid sturgeon). Partners include the Fish & Wildlife Service, Nebraska, Colorado and Wyoming. The plan was implemented in 2006, requiring no new depletions to target stream flows and objectives to bring the Platte River back to 1997 levels. Federal funding was approved through 2032.

Surface Water Storage In 2018, CPNRD partnered with CNPPID, NPPD, and NeDNR to transfer unused surface water to an Environmental Account (EA) in Lake McConaughy annually, allowing the mitigation water to be released to meet various water management targets and goals.

Water Utilization

Water Bank In 2007, CPNRD initiated the first Water Bank in Nebraska to acquire water rights from willing landowners to reach post-1997 water mitigation goals to put water back to the Platte River.

Irrigation Canals In 2012, CPNRD rehabilitated surface water canals in Dawson County (Cozad Ditch, Thirty Mile Irrigation

District, Southside Irrigation District). The canals deliver water for surface water irrigation and divert water for retimed recharge during excess flow events. Excess Platte River flows diverted by the canals totaled 89,590 AF with recharge of 40,512 AF.

Research

Producer Data In 2013, CPNRD began providing cost-share for producers to install telemetry equipment to provide real-time data on water usage and soil moisture. The amount of water pumped and precipitation are measured to develop irrigation efficiencies by equipment type, soil water holding capacities and crop type.

Flood Planning CPNRD has 40 flood risk reduction projects. In 2020, CPNRD received three Watershed & Flood Prevention Operations Program (WFPO) grants from NRCS to identify what is needed to address flooding and to design specific watershed plans. The two-year grants pay 100% of costs to complete an Environmental Assessment for Spring/Buffalo Creeks Watershed in Dawson County; Lower Wood River Watershed in Buffalo, Hall and Merrick counties; and Elm/Turkey Creek Watershed in Dawson and Buffalo counties.

Drought Mitigation In 2018, CPNRD initiated a Drought Management Plan to identify District vulnerabilities, create a methodology for monitoring drought conditions and identify processes to manage future drought events; with the goal to maintain a sustainable and stable water supply for all users. CPNRD received a Water Sustainability Fund grant from the NRC to develop the plan and is currently working on the Extreme Event Reporter (GIS-based tools).

GROUNDWATER QUALITY

CPNRD's Quality Management Plan was developed to address increasing high concentrations of nitrate-nitrogen in the groundwater and vadose zones throughout the District. The plan uses a phased approach with lesser restrictions in areas with low nitrate concentrations in the groundwater and additional regulations applied to areas with higher concentrations.

Chemigation Irrigators who chemigate must comply with Nebraska's Chemigation Act and the NDEE and CPNRD regulations. All operators applying chemicals through an irrigation system must have the correct safety equipment, be properly trained/certified and obtain a permit from the NRD before legally being allowed to chemigate. In 2022, CPNRD issued 2,174 renewal permits and 185 new chemigation permits.

Research

Demonstration Projects The CPNRD/UNL demonstration project was initiated in 1980 and has had over 400 demonstration sites located on producers' cornfields. The plots have provided 290 field days on new practices and technologies such as ET gages, irrigation scheduling, soil moisture capacitance probes, slow/controlled release nitrogen products and cover crops.

Monitoring Wells CPNRD has 116 active monitoring wells used for the Quality and Quantity programs. New dedicated monitoring wells continue to be installed, with 21 installed in Buffalo, Hall and Howard counties in 2021/2022 to replace irrigation wells that are no longer accessible to measure. CPNRD staff monitors 450-500 wells throughout the District each spring and fall for the Groundwater Management Program.

On-Farm Fertigation In 2018, the fertigation project was initiated to assist producers with timing of nitrogen and insecticide applications. Developed through on-field research, N-Time Fertigation is a web management system that delivers real-time, imagery-based fertilizer recommendations to users throughout the growing season to improve nitrogen fertilization timing.

New Producer Programs

Nebraska Soil Carbon Project In May 2020, The Nature Conservancy received $4.4 million in RCPP funding with NRCS, CPNRD and Upper Big Blue NRD to connect farmers with companies looking to offset their carbon footprint implement soil health practices that capture carbon (cover crops, reduced tillage, diversified crop rotation). Participating companies include Cargill, Target, McDonald's and others.

Precision Conservation Management (PCM) 60 Frito Lay growers in Dawson County have signed up for improved farming practices on 91,000 acres including no-till, strip till, 10% nitrogen reduction applied and autonomous irrigation equipment. A program will be initiated in 2023, to provide financial incentive up to $7,200 for producers to switch from diesel to electronic-powered equipment. PCM originated from the Illinois Corn Growers Association and is funded by NRCS– Regional Conservation Partnership Program.

FUTURE WATER SUSTAINABILITY

In looking forward, the District will continue to strive towards water resources sustainability and methods to improve groundwater quality in the Central Platte Valley by collecting and evaluating data that will be used to improve current management plans.

Lewis & Clark NRD

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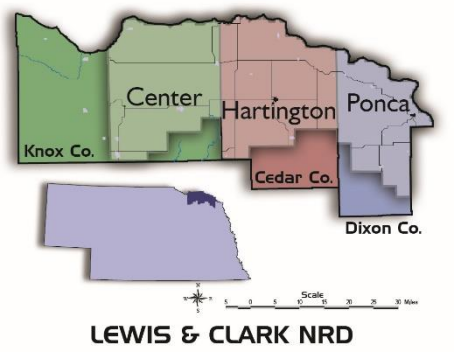

GROUNDWATER STATUS

The Lewis & Clark Natural Resources District (LCNRD), located in the northeast corner of the state. The northern portion of the district is primarily non-irrigated land due to limitations of aquifer systems and /or topography to support row cropping. The southern portion of the district is largely irrigated due to more plentiful groundwater resources and flatter topography. Combinations of confined and unconfined glaciated aquifers result in mostly low production wells with slow recharge in the northern portion of the district. Highly diverse and unpredictably dispersed sand and gravel aquifers make up the majority of the groundwater resources in the southern portion of the district. Groundwater is also withdrawn from the Niobrara and Dakota bedrock aquifers and the Missouri River alluvium for the primary purposes of irrigation, domestic, and/or stock use.

The district has observed a sizeable surge in new irrigation wells and acres irrigated from 2012 to 2016 and again in 2020-2022. As of December 31, 2022, there was a total of 1,808 registered irrigation wells in the district, a 55% increase since 2011.

Groundwater Quantity: LCNRD has monitored static water level in wells in discrete aquifers dispersed across the district to monitor the effect of irrigation development on local aquifers since 1976. The district measures static water levels in 34 irrigation wells developed in sand and gravel formation wells, Niobrara Bedrock Formation wells, and the Dakota Bedrock Formation wells. Historically the Dakota Formation has been accessed primarily for stock and domestic use in areas where sand and gravel aquifers are lacking, however, use over the past several years includes irrigation. The district has constructed four dedicated observation wells in the Dakota Formation and dedicated transducers have been installed for the purpose of routine recordings of water levels. Approximately 60 dedicated observation wells have been developed in the groundwater resources of the district to monitor quantity and quality.

Records indicate that during the first 36 years of measurements approximately half of the original wells had increasing static water level trends. That trend continued until 2012, when drought conditions and increased irrigation pumping resulted in significant declines observed on all wells. Spring water level readings from 2013 to 2020 showed moderate rebounds each year. Readings following the 2020, 2021, and 2022 irrigation seasons reflected lower water levels than the fall of 2019, 2020, and 2021, as much of the district received less than average rainfall which resulted in higher than average pumping demands for much of the district. Spring 2022 readings reflected rebounds below that of years following average rainfall seasons. Prolonged dry conditions may result in increased pressure on irrigation wells and reduced recharge, negatively impacting groundwater quantity. LCNRD will again evaluate the impact to aquifers in the spring of 2023.

Groundwater Quality: LCNRD monitors on average 112 irrigation wells across the district and 125 irrigation wells in the Bazile Groundwater Management Area (BGMA) located in south central Knox County. LCNRD also monitors water quality and water level of 20 dedicated observation wells in the BGMA. In 2015 the district began additional water quality and water quantity monitoring of aquifers across the district through construction of 13 dedicated observation wells. In recent years 37 dedicated wells have been added to the monitoring program. Test holes were drilled and observation wells constructed using a combination of Nebraska Environmental Trust (NET) funds, Nebraska Department of Environmental and Energy (NDEE) funds, University of Nebraska Lincoln Conservation and Survey Division (UNL-CSD) time and match, and match dollars provided by the LCNRD to better define the aquifer systems of the district, develop a groundwater monitoring network and manage the resource.

Water quality monitoring indicates concern for increased nitrate contamination over the last 10+ years. Levels have reached Phase II limits in some areas where samples have reached and exceeded 5 ppm, the trigger level. The District response has been increased monitoring and educational efforts towards fertilizer management. The BGMA has been in a Phase III management area since 2004. Phase III management areas are established when 50% of the irrigation water samples taken have reached the trigger level of 9 ppm or higher for a period of at least three years. To address the BGMA elevated nitrates, LCNRD has joined efforts with three other NRDs to develop a community based, action plan which focuses on education and best management practice adoption within a 21-township area. The plan was approved by EPA in 2016. The NRDs jointly fund a BGMA Coordinator through partnership with NRCS and an Extension Educator with the University of Nebraska, School of Natural Resources. The primary focus of these positions is to address the nitrate contamination in the Bazile Groundwater Management Area.

ACTION STEPS:

- 1986 – Developed a Groundwater Management Plan (updated in 1993 and amended in 2014).
- 2004 – Established Bazile Groundwater Management Area which includes the townships; Creighton, Columbia sections 6, 7,18,19, and Cleveland (except 25,26,27,34,35,36) to improve groundwater quality.
- 2016 – LCNRD with the Nebraska Department of Natural Resources developed and adopted a voluntary Integrated Management Plan (IMP) that became effective on September 5, 2016. The regulatory action item adopted as part of the IMP, as mandated by statute, is to require an education component for applicants pursuing groundwater well permits or surface water permits in the district.
- 2016-2020 – Aero Electromagnetic (AEM) surveys of the subsurface geology conducted to better evaluate the geology and aquifers of the district to protect the resource through targeted, appropriate management. The surveys have been used to assist in identification of potential groundwater sources for the community of Martinsburg and for the Cedar Knox Rural Water Project.
- 2020 – LCNRD began implementation of identified priorities in the Bow Creek Watershed based on the approved Water Quality Management Plan (WQMP) drafted with stakeholders and the NDEE. The plan covers district-wide evaluation and recommendations to address surface and groundwater quality concerns. The WQMP identifies the Bow, Bazile and Howe Creeks as priority or special priority areas for management.
- 2021 – Implemented updated Rules and Regulations to the existing GWMP to address groundwater quantity management. The modifications include identified sub areas of the District, well permit ranking, certification of irrigated acres, flow meters, and well spacing limits.
- 2021 – Updating the Rules and Regulations to the GWMP to address groundwater quality. Modifications are slated to be publicly reviewed, finalized, and adopted in 2023.
- 2022 – Enacted a 180 day stay on high capacity well construction to allow updates of rules and regulations to protect groundwater resources.

FUTURE

Rainfall over the last three years has had a negative impact on groundwater levels in LCNRD. Potential impacts of drier than normal conditions and the increases in groundwater development since 2012 could result in additional pressure on groundwater resources in 2023 and beyond. Triggers for rules and regulations pertaining to groundwater quantity could be met if drought conditions continue. The district plans to update redraft the district's Groundwater Management Plan in 2023.

LCNRD continually works towards improved identification of the aquifer systems in the district and preparing to manage groundwater use should the need occur. Groundwater quantity and quality management protection methods included by the district in its rules and regulations are groundwater level triggers and a water management plan to limit groundwater use should declines re-develop. Permits for high capacity well construction and irrigated acre expansion are required district wide. LCNRD has not been declared "Fully Appropriated".

Little Blue Natural Resources District

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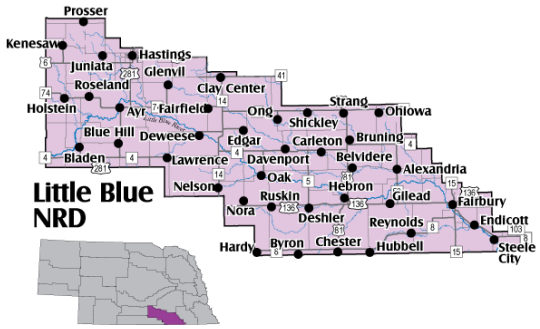

GROUNDWATER STATUS: The Little Blue NRD measures groundwater levels biannually using a monitoring network of 340 deep wells and a 50-well network of dedicated monitoring wells equipped with data loggers. Water levels are tracked using a weighted average graph using 2016 as a baseline. Water levels have been trending downward, spring of 2022 saw a slight decline of -0.49 of a foot. But the 2022 levels are still 2.44 feet above the 2016 trigger level. The District has 6,463 active irrigation wells and approximately 680,000 irrigated acres. Certification of acres was initially completed on December 31, 2018 and continues today.

Groundwater monitoring has indicated a gradual increase in nitrate contamination in most areas of the District ranging from 0.5 parts per million to nearly 30 ppm. The average nitrates in 2022 is 8.6 ppm district wide. These conditions have prompted the establishment of eight intensive water quality management areas totaling 402,650 acres which have met trigger levels. Optional operator training has been implemented to present the scope of the problems, conservation options, and engaged operators in helping resolve those problems.

ACTION, STEPS, AND GUIDELINES:

- **1974** -- Modeling predicted groundwater declines based on 3 rates of well developments.
- **1979** -- The northern one-third of the District was declared a Groundwater Control Area for quantity.
- **1986** -- Groundwater Management Plan for the District was created addressing quality and quantity.
- **1993** -- Groundwater Control Area dissolved. New management planning approach began.
- **1996** -- New Groundwater Management Plan approved as required by State law.
- **2003** -- Groundwater studies were initiated for all of Thayer, and portions of Nuckolls and Jefferson counties to provide more detailed mapping of aquifer and an understanding of the water resources.
- **2005** -- NRD worked with City of Fairbury to determine methods to reduce nitrates for the City's municipal water supply, a direct impact to the District's rural water project.
- **2006** -- Updates to Groundwater Management Plan established a comprehensive set of rules and regulations for groundwater management, including: conditions for high capacity uses, wider well spacing, water transfers, fall fertilization restrictions and sub-area management action adjustments.
- **2006** -- A water quantity sub-area was established in southern Thayer and Jefferson counties with a stay imposed on well permits and expanding irrigated acres. All irrigated acres in the area were certified and pumpage data was gathered from operators.
- **2008** -- A study to determine hydrologically connected surface and groundwater was completed for the Blue River Basin by the Upper Big Blue NRD. The NRD installed a network of dedicated monitoring wells to better understand the aquifer's response to groundwater withdrawals
- **2009** -- NRD began intensive discussions with the City of Hastings regarding wellhead protection
- **2010** -- NRD Board initiated a district-wide hydro-geologic study to fill data gaps and compile all available information for more user-friendly planning tools. Extensive water sampling by NRD in Adams County revealed widespread nitrate problems upgradient of the City of Hastings wells.
- **2011** -- Initiated an evaluation of soil irrigation suitability study to determine if more stringent regulations are necessary before issuing well permits for highly erodible lands. NRD Board adopted rules and regulations which apply an aquifer score (supported by the hydrogeologic study data) and soils score (based on the irrigation suitability) to evaluate all new irrigation well permits. The Hastings wellhead protection area and associated rules are approved.
- **2012-2013** -- NRD collected over 2,500 water samples covering over 100,000 acres to determine severity and extent of nitrate pollution. Extensive conservation promotion in area.

• **2013** – NRD conducted deep soil coring analysis to determine extent of residual nitrates in vadose zone. NET funds sought to conduct a basin-wide water quality planning effort to evaluate whether existing projects and programs are adequate to remedy groundwater problems.
• **2014** – NRD enacted new groundwater rules requiring flow meter installation, irrigated acre certification, annual water use reporting, and district-wide mandatory operator training focusing on irrigation water use efficiency, nitrogen management, hydrogeology, soil health and conservation.
• **2015** – NRD established two additional water quality areas totaling 110,720 acres. The Little Blue and Tri-Basin NRDs completed a basin-wide water quality plan.
• **2016** – The District implemented the Basin-wide water management plan and hired a Watershed Coordinator. A Voluntary Integrated Management Plan (VIMP) was initiated, and the District discussed matters of mutual interest with Tri-Basin NRD.
• **2017 --** The district revised its Ground Water Management Plan (GWMP) and began rules re-write to address declining water table and more frequent conflicts between water users.
• **2018** – New groundwater rules were adopted and implemented establishing new water level triggers and associated regulations for allocation of groundwater. District-wide required soil sampling and fertilizer restrictions on sandy soils were implemented. District promotes wide-spread soil health measures and initiates some demo sites to foster support for soil health principals.
• **2018** – An area of NW Adams County was placed in stay area to prevent further depletions to Platte River flows as part of the Platte River Recovery Implementation Program (PRRIP). PRRIP was signed by the federal government and the basin states of Nebraska, Colorado, and Wyoming in 2006. The plan requires no new depletions to target flows and efforts to bring the Platte River back to 1997 levels. Funding for the PRRIP extension was approved through 2032.
• **2019** – Voluntary Integrated Management Plan was completed and adopted.
• **2020** – The District conducted a second deep soil coring analysis to determine extent of residual nitrates in vadose zone. This is a repeat study of one done in 2014. NET and NDEE funds sought to conduct a basin-wide water quality planning effort to evaluate whether existing projects and programs are adequate to remedy groundwater problems.
• **2022 –** NRD Board votes to make Operator Training for operators/producers in high nitrate areas optional instead of mandatory. Successfully applied for Water Sustainability funds to update the District's 2011 Hydro-Geologic Study.

FUTURE ACTIONS:

The District will continue to monitor the water table levels through the annual well readings and observation well networks. Monitoring of the District's water quality conditions will continue and expand throughout remaining areas of District. Operator training activities share water resources concerns and trends and provide guidance to producers in implementing BMPs and new technologies to reduce water consumption and reduce risks to water quality. NRD will assist communities with development and implementation of wellhead protection plans, water source protection and locating new prospective water sources.

Lower Big Blue NRD

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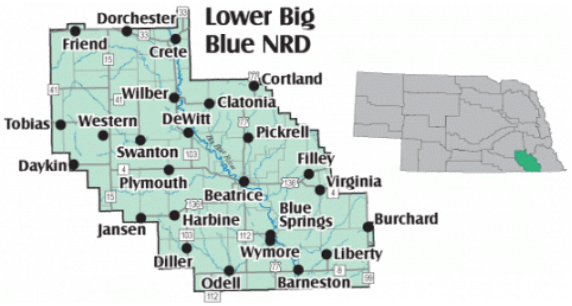

GROUNDWATER STATUS

Among conducting its annual groundwater monitoring and management programs the Lower Big Blue Natural Resources District (LBBNRD) has been and remains at various phases of additional groundwater projects of late. In the Spring of 2022, the NRD and the Nebraska Department of Natural Resources finalized and adopted a joint Voluntary Integrated Management Plan (VIMP). The NRD also requested and was granted extensions to continue carrying out water quality and a water quantity management projects in conjunction with the Nebraska Environmental Trust (NET). Cooperative blue basin modeling efforts continue among the four NRDs and the NeDNR.

After Spring groundwater levels were measured, attention turned to chemigation inspections and groundwater nitrate sampling. Spring water levels were down anywhere from 1.91 feet in Saline County to 3.93 feet in Jefferson County from the Spring of 2021. There are over 500 chemigation permits in the district, and staff collect nitrate samples from a network dedicated monitoring wells and irrigation wells. Through two NET projects, the District was also able to install ten real-time telemetry setups on dedicated monitoring wells and two weather stations in designated project areas.

In the Fall of 2022, the NRD's Groundwater Rules and Regulations updates were finalized and approved, the NRD was approved for Water Sustainability Fund support of its first Airborne Electromagnetic Hydrogeologic Mapping (AEM) project, and the District enacted an immediate 180-day moratorium, or stay, to address groundwater declines in specific areas of the district. Fall water levels were down anywhere from 4.35 feet in Saline County to 7.46 feet in Gage County from the Spring of 2022. Levels are 7.51 feet below the baseline with an average Fall-to-Spring recharge of 2.12 feet. District groundwater management decisions are based on Spring readings.

The entire district was declared a Groundwater Management Area in 1997 due to concerns about water quality. Permits are required for wells pumping at least 50 gallons per minute. Currently there are no pumping restrictions in the NRD. The District is monitoring groundwater levels and will follow its Groundwater Management Plan if groundwater declines reach designated trigger levels. Water levels have been monitored since 1981. The district has a 60-square-mile Phase II area where operators must meet educational requirements and submit reporting forms on residual nitrogen sampling and other BMPs. Fall fertilization is delayed until after November 1st. The Phase II area has nitrate-nitrogen levels in the groundwater that are over 6 ppm. The rest of the NRD is in a Phase I area where nitrate-nitrogen levels are below 6 ppm. Operators use voluntary measures designed to prevent and reduce groundwater contamination.

The NRD has several incentive programs that address water quality and quantity problems. Nitrate sampling is provided at no cost to the well owner. Groundwater users are offered cost-share on flow meters to obtain information on the flow rate of their wells and amount of gallons pumped. ET gauges and soil moisture probe cost-share provides information to help irrigators schedule their irrigation applications more efficiently. Well decommissioning and deep soil nitrate sampling cost-share programs remain in place as well.

ACTION STEPS

- 1981 – Groundwater level measurement program begun
- 1985 – District Groundwater Management Plan adopted
- 1987 – Districtwide groundwater monitoring network established to provide baseline data for groundwater quality
- 1988 – Special Protection Area (SPA) study conducted in an area northwest of the City of Beatrice by the Nebraska Department of Environmental Quality
- 1990 – Additional study in the proposed SPA begun by NRD
- 1993 – Groundwater Management Plan updated to identify, manage and establish goals concerning groundwater quality
- 1994 – Three-year SPA study completed
- 1995 – Groundwater Management Plan updated to propose a SPA in a six-township area northwest of the City of Beatrice
- 1997 – Groundwater Management Plan updated to include groundwater quality regulations and declare the entire district a Groundwater Management Area as well as establish a 60-square-mile Phase II area
- 2006 – Blue Basin Groundwater Study begun in conjunction with the Upper Big Blue and Little Blue NRDs
- 2008 – Blue Basin Groundwater Study completed with results indicating only small areas of groundwater-surface water interconnection
- 2011 – Groundwater policy amended to require flow meters on new and replacement wells and to establish a 1,000-foot setback requirement for new wells from adjacent high-capacity wells of separate ownership
- 2013 – Immediate 180-day moratorium, or stay, on the construction of new wells imposed districtwide per Neb. Rev. Stat. 46-707(2) to provide the NRD with an opportunity to revise its groundwater rules and regulations
- 2014 – Public hearing held in DeWitt, NE per Neb. Rev. Stat. 46-707 and 46-743 to receive public comment on the moratorium and the proposed changes to NRD groundwater rules and regulations; Groundwater Management Plan updated to include updated Groundwater Rules and Regulations
- 2015 – Drilling and construction of dedicated monitoring well network begun
- 2020 – Nebraska Environmental Trust (NET) funding awarded for two management and education projects in areas of concern for groundwater quality and quantity
- 2022 – Updates to Groundwater Rules and Regulations finalized and approved; immediate 180-day moratorium, or stay, on the construction of new wells imposed districtwide per Neb. Rev. Stat. 46-707(2) to provide the NRD with an opportunity to proactively evaluate groundwater management options, including the creation and management of subareas

FUTURE

The District has focused efforts on groundwater quality management in certain areas of groundwater nitrate concern and has increased focus on groundwater quantity management amid drought conditions and concerns over groundwater declines. Among specific management tools being evaluated for potential improvement are the well permitting evaluation process for new high-capacity wells and phased approaches to Groundwater Quantity Management Areas (GWQMAs). In addition, the District continues to seek and pursue opportunities to further study soil nitrate and groundwater nitrate concentrations along with aquifer extent and composition assessment. Finally, the LBBNRD intends to install additional dedicated monitoring wells for incorporating into its network and further evaluating any impacts to groundwater.

Lower Elkhorn NRD

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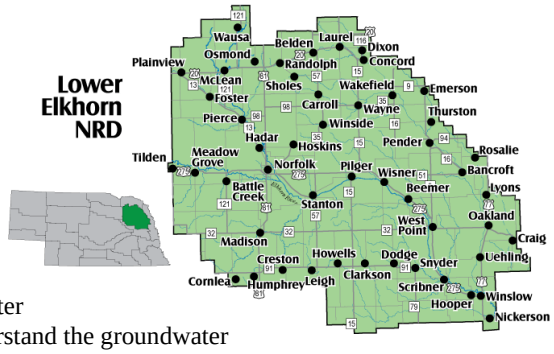

GROUNDWATER STATUS

The Lower Elkhorn Natural Resources District (District) monitors both groundwater quantity and quality to detect any changes, trends, or problems, as well as to understand the groundwater and the complex hydrogeology of the area.

Since the mid-1970s, the District has monitored groundwater quantity by measuring the depth of the groundwater in irrigation and specially designed monitoring wells. If groundwater drops to a certain level in any of these wells, the NRD will work with local groundwater users to take protective measures to sustain groundwater supplies over the long term.

These measurements reveal that groundwater levels typically rise and fall over time, closely following precipitation cycles, but historically groundwater supplies have generally recovered to sustainable levels. This was recently evident when above average precipitation between 2008 and 2010 generated substantial recharge to groundwater levels, which also coincided with a decrease in demand from groundwater users. However, a lack of precipitation during the last half of 2011 through 2012 created extreme drought conditions and declining groundwater levels, caused by an acute spike in groundwater demand from all groundwater users. These wet/dry cycles are nothing new, but their intensity seems to be intensifying, much like other weather events that occur around the globe.

In 2022 the District once again focused efforts on sampling of irrigation wells in Colfax, Cuming, and Dodge Counties to collect water samples for isotope characterization. In addition, irrigation wells in Dixon, Thurston, and Burt Counties were sampled to assess nitrate concentration. In total, approximately 400 individual locations were visited to collect samples for water quality monitoring purposes. The data from this effort reveals that groundwater nitrate is still an acute problem in numerous locations within the LENRD and supports the delineation of an additional Phase 2 Area in portions of Cuming, Colfax, and Dodge Counties. The decision to establish this proposed management area has yet to be made as it was indicated (by the Board) that additional data would be helpful in determining the origin of the nitrate contamination. In an attempt to shed some light on that topic the District has entered into a contract with the UNL Water Sciences Laboratory to analyze groundwater samples for isotopes which will provide indication of an organic or inorganic source of nitrate. The District has also cooperated with several landowners in Cuming, Colfax, and Dodge County to collect vadose cores which are being analyzed and stratified for residual nitrate. This is a multi-faceted project and additional sites will be secured and sampled during 2023.

The LENRD Hydrogeologic Groundwater Model has been completed and a Graphic User Interface (GUI) has been created by Long Spring Consulting which will allow the District to utilize the model to evaluate new uses of groundwater in the District. As of this writing, LENRD staff are spending time running scenarios to test the functionality and accuracy of the interface.

During 2022, the Lower Elkhorn once again found itself in the grips of an extreme drought and ended the year well below average for annual precipitation. The annual precipitation for the National Weather Service Karl Stefan Airport reporting station, which is located just south of Norfolk, recorded 13.27 inches of precipitation during 2022, which is 68 percent below the average amount of 27.01 inches. The amount received during 2022 was the least amount of annual precipitation for this station, with the period of record dating back to 1894. This phenomenon was common at most locations throughout the District, and in response to the acute drought conditions the Board of Directors enacted a groundwater allocation on irrigation wells located in any portion of the District that is delineated in an extreme or exceptional category by the U.S. Drought Monitor. The board exercised a drought management provision contained within its groundwater management plan and the basis for the decision is rooted in the concern that the acute drought will continue into 2023 and beyond. In addition to this action, municipalities will be required to develop drought response plans that will require them to also adhere to an annual cap on per capita use during 2023. The health, welfare, and economic vitality of the residents of the District is directly tied to a reliable supply of groundwater to serve those needs, and proactive conservation measures in the short term will ensure that the resource is protected for future needs and demands. The District also allocated financial resources to allow for assistance with water quality testing and treatment from privately owned domestic wells.

ACTION STEPS

- **1976** – Begin semiannual (spring and fall) measurements of the depth of the groundwater.
- **1986** – Groundwater Management Plan approved by the Department of Natural Resources (what was then called the Department of Water Resources). Begin annual groundwater quality sampling.
- **1996 and 1997** – Groundwater Management Plan quantity and quality sections revised and a district-wide groundwater management area is established, including a “Phase 2” subarea in Pierce County. Farmers in the Phase 2 area must attend educational programs, test their irrigation water, perform deep soil testing, and report these results and irrigation water and nitrogen use to the District.
- **1999** – Monitoring well network started.
- **2005** – The Phase 2 subarea is expanded to include most of Pierce County.
- **2007** – Flow meters required on new wells.

- **2008** – The District imposes a stay on new wells and new irrigated acres in both the hydrologically connected and the non-hydrologically connected areas of the District.
- **2009** – The District limits new irrigation growth to a per-year average of 2,500 acres in the hydrologically connected and 5,000 acres in the non-hydrologically connected areas of the District.
- **2012** – The District agreed to develop a voluntary integrated management plan with the Nebraska Department of Natural Resources (NeDNR) and joins with other districts in the Lower Platte Basin to develop a complementary basin-wide water plan. The District prohibits new irrigation development for 2013 and begins the process of certifying irrigated acres.
- **2013** – The District establishes five Quantity Subareas to minimize well interference problems and prohibited new irrigation development for 2014. The District contracted with XRI to perform an airborne geophysical study of the hydrogeologic framework in the Clarkson-Howells area.
- **2014** – The District expands the use of airborne geophysical flights to cover 30 townships (at a price of $500,000) in the area surrounding the Quantity Subareas to expedite its understanding of the area's hydrogeologic framework. The District enters a memorandum of understanding with Northeast Community College to become partners to develop water resources educational programs for agricultural students and producers.
- **2015** – The LENRD approved amendments to its Groundwater Management Plan, which will require the future installation of flow meters on all irrigation wells.
- **2016** - Modifications were approved to require the installation of flow meters on high capacity wells in the District, utilized as commercial, industrial, public water supply, or any wells in a series with other wells – designed to pump greater than 50 gallons per minute. The District also approved changes to the Groundwater Management Area Rules and Regulations, modifying the Phase Area controls for protection of groundwater quality
- **2017 -** The LENRD agreed with the partners of the Lower Platte Basin Coalition and the Upper Elkhorn NRD on the terms of the Lower Platte Basin Coalition Management Plan. The District was able to leverage grant funding to match local tax dollars for the collection of Aerial Electromagnetic (AEM) data in several counties in the District. The District is also working towards the completion of a Drought Mitigation Plan and the Lower Elkhorn River Basin Water Quality Management Plan. The district filed an application with NeDNR for an appropriation of in-stream flows in the Elkhorn river.
- **2018 –** The District finalized and adopted the voluntary Integrated Management Plan. Grant funding allowed for the continued collection of Aerial Electromagnetic (AEM) data within the District. The District partnered with the Nebraska Department of Natural Resources (NeDNR) on the development of a pilot scale hydrogeologic groundwater model, with the project focusing on Wayne County. Changes were adopted that modified the controls and boundaries of the Groundwater Management Area, established to address groundwater nitrate issues in portions of Pierce and Madison Counties. Above average precipitation allowed many well owners to eliminate the need for supplemental irrigation during the 2018 growing season.
- **2019 –** The District was not spared from the flooding that occurred in March of 2019. The impacts of this traumatic event have initiated the study and evaluation of flood protection for several communities within the District. This will be the first in a multi-year effort to repair damaged infrastructure and to plan for potential construction of new projects.
- **2020 –** The District initiated the formal process of a proposed groundwater management area in portions of Cuming, Colfax, and Dodge Counties due to the detection of elevated levels of nitrate as part of its routine and annual groundwater monitoring. A virtual public information meeting was conducted in December to inform interested stakeholders of the proposed changes, and the agenda also contained speakers from the healthcare, agronomic, and geologic disciplines.
- **2021 –** The District continues to monitor groundwater quality by focusing resources on the collection of samples from its monitoring well network, and from irrigation wells throughout the District. There is sufficient data for the delineation of a management area in portions of Cuming, Colfax, and Dodge Counties, and the District continues to engage technical experts on a path forward.
- **2022 –** Monitoring of groundwater quality continues to be a central focus for the LENRD. Additional studies are underway, including isotope characterization of water and collection of vadose cores to assess residual amounts of nitrate in the soil profile. In response to the acute drought conditions in the LENRD, the Board of Directors enacted a response measure as provided by the Drought Management Plan, which places annual groundwater allocations on most irrigation wells not currently subject to allocations, along with limits on per capita usage for municipal water systems. In addition, the processing of variances for expanded groundwater irrigation has been placed on hold until the drought conditions improve in the District. The District is also providing assistance for monitoring of water quality from privately owned domestic wells, and will also provide financial assistance to allow for the installation of treatment systems to remediate nitrate or pesticide/herbicide contamination.

FUTURE – Water quality issues and flood control projects are central focus areas that will take priority looking into the near and distant future.

Lower Loup NRD

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GROUNDWATER STATUS

District data shows the NRD's groundwater levels remain higher today than they were in 1972 and average stream flows have also improved. Groundwater levels across the NRD in the spring of 2022 decreased an average 1.35 feet from levels in 2021.

ACTION STEPS & TIMELINES

- 1975 – Started District static water level measurements
- 1979 – Attempted to implement a water quantity control area, but were denied by the Nebraska Department of Water Resources
- 1980 – Stream gauging began on Beaver Creek due to water quantity issues in Sandhills
- 1981 – Installed transect wells along Beaver Creek as part of study
- 1985 – The first District Groundwater Management Plan implemented
- 1990s – Major expansion of water quantity program, went from 230 to 300 wells for static water level measurements
- 1995 & 2002 - Water Quality Section of Groundwater Management Plan updated
  - ❖ Approve agreement with DNR to survey elevations of all monitoring wells in NRD; surveys continue on annual basis
- 2005 – Work on streambed conductance measurements in Loup River Basin begins
- 2006 – Water Resources Committee & Variance Committee created to deal with water quantity issues
  - ❖ Stay placed on the issuance of well permits, certification of irrigated acres required, variance process approved
  - ❖ Elkhorn-Loup Modeling Study begins
  - ❖ USGS completed seepage run measurements on streams in Loup and Elkhorn River Basins
- 2007 – Initiated the installation of SWL data loggers
  - ❖ Stay issued on expansion of irrigated acres
  - ❖ Adopted new Water Transfer Rules and Regulations
- 2008 – Completed Phase I of Elkhorn-Loup Modeling Study
  - ❖ Completed Irrigated Acre Certification Process with over 1.2 million acres certified
  - ❖ Preliminary determination by DNR that the lower Platte River Basin was fully- appropriated
- 2009 – Fully-appropriated determination for lower Platte River Basin reversed by DNR
  - ❖ Adopted rules and regulations to create a process for allowing irrigated acre development as a result of passage of LB-483; 10,000 acres granted from 2009 to 2012
- 2010 – Adopted new Groundwater Management Area Rules and Regulations that included the definition of a "banked" acre
  - ❖ Completed Phase II of ELM Study with refined stream depletion map
  - ❖ Completed ELM Study geophysical and test hole analysis of Lower Loup and Upper Elkhorn NRDs
  - ❖ Began Area 28 Aquifer Properties and Nitrate Management Analysis Project
  - ❖ Received Nebraska Environmental Trust Grant for Irrigation Monitoring Project, providing well data loggers and producer cost-share for flow meters
- 2011 – Completed spraying of invasive species on major tributaries of the Loup River System & reconnaissance in river sub-basins
  - ❖ Provided financial assistance for repairs of major infrastructure with irrigation districts following flood damage: additional funding provided in 2012
  - ❖ Began the South Loup River Basin Water Quantity Study to collect data on water quantity conditions
- 2012 – Adopted new groundwater management area rules and regulations, including rules governing irrigation using of lagoon water and prohibiting new irrigated acres within a wellhead protection area
  - ❖ Completed aquifer study of Groundwater Management Area 28 in Platte and Nance Counties with Olsson Associates
- 2013 – Approved 2,696 chemigation applications, the most of any NRD in the state
  - ❖ Entered membership in the Lower Platte River Basin Group, a coalition of NRDs and DNR to look at groundwater/surface water management in the lower Platte River basin and began work on a basin-wide integrated management plan
  - ❖ Approved new rules and regulations in the Groundwater Management Plan, including mandatory flow meters to manage groundwater quality in all Phase II and Phase III Groundwater Management Areas
  - ❖ Adopted new criteria for the transfer of irrigated acres, using USDA conservation plans
  - ❖ Established new regulations allowing pumping of livestock lagoon water on uncertified acres in emergency, must pump, situations
- 2014 – Initiated development of a Voluntary Integrated Management Plan for the entire District with DNR
  - ❖ Initiated a Quality/Quantity Watershed Management Plan for the South Loup River Basin

- 2015 – Held multiple stakeholders meetings to provide input in the development of a Voluntary Integrated Management Plan for the entire District with DNR
  - ❖ Initiated a hydrogeologic survey of the groundwater resource in the city of Columbus, including a city storm water inventory and potential recharge project for the Christopher Cove subdivision.
  - ❖ Participated in and helped fund Project SENSE, which focused on improving nitrogen fertilizer use efficiency and reduction of nitrogen loss to the groundwater
- 2016 – Completed Columbus Area Water Assessment Study
  - ❖ Granted 1,996 new irrigated acres in the North Loup River and Beaver Creek sub-basins
  - ❖ Completed the Clear Creek Watershed Plan in Wheeler County
  - ❖ Completed aerial-electromagnetic flights in parts of Nance and Platte Counties to map groundwater and subsurface geology
  - ❖ Completed installation of flow-meters on all irrigation wells in the Phase III Groundwater Quality Management Area
  - ❖ Approved, with DNR, the integrated management plans for the District and the Loup River Basin
- 2017 - Purchased monitoring equipment, additional e-Coli sampling, and new monitoring wells for South Loup River Basin
  - ❖ Initiated Columbus Recharge Project with City of Columbus, Christopher Cove subdivision, and Archer Daniels Midland; received grant from the Nebraska Water Sustainability Fund for project
  - ❖ Approved 1,462 new irrigated acres in Beaver Creek and North Loup sub-basins
  - ❖ Approved interlocal agreement for the Lower Platte River Basin Coalition
- 2018 – Approved a full color upgrade to annual infrared photography of the District
  - ❖ Initiated Cover Crop Groundwater Impact Study and utilized funding from Water Sustainability Fund
  - ❖ Initiated Drought Management Plan and obtained funding from Water Sustainability Fund
  - ❖ Approved Aerial Electromagnetic Survey of Buffalo County with Water Sustainability Fund grant
  - ❖ Approved 2,623 new irrigated acres in the North Loup, Middle Loup and Beaver Creek sub-basins
  - ❖ Completed recharge portion of Ravenna Lake Study and continue water quality monitoring
  - ❖ Approved adding variable speed irrigation to the list of approved practices under NSWCP
  - ❖ Assisting City of Broken Bow with levee replacement study and initiated a Drinking Water Protection Plan
  - ❖ Collaborating with NDEQ and USGS to assess e. Coli levels continuously in the South Loup River
- 2019 – Initiated the Columbus Area Recharge Project
  - ❖ Approved groundwater rules changes that allow use of more refined boundaries for groundwater management areas
  - ❖ Gave approval to a watershed study of Mud Creek with goals to limit flooding and improve water quality
  - ❖ Created Phase II Groundwater Quality Management Sub-Area 29 in a portion of Wheeler County and created a flowmeter cost-share program for the sub-area
  - ❖ Initiated a variable rate irrigation cost-share program
  - ❖ Approved 2,367 new irrigated acres for development in 2020
- 2020 – Created Phase II Groundwater Quality Management Sub-Area 30 in a portion of Platte County and a flowmeter cost-share program for the sub-area
  - ❖ Initiated a groundwater isotope study in Groundwater Quality Management Sub-Area 30
  - ❖ Sought grant funding for South Loup Watershed Best Management Practices Cost-Share Program
  - ❖ Granted 2,015 new irrigated acres in the District for development in 2021
  - ❖ Completed aerial-electromagnetic flights in parts of Nance and Platte Counties to map groundwater and subsurface geology
  - ❖ Initiated work with the community of Sargent to develop flood relief projects to combat ongoing flood impacts in the area
- 2021 – Designated a groundwater restricted use area in northern Boone County due to ongoing concerns in the area. New restriction means no new acre applications, transfers into the area and new supplemental wells for irrigation.
  - ❖ Initiated a groundwater isotope study in Groundwater Quality Management Sub-Area 30
  - ❖ Completed new subdistrict boundaries using data from the 2020 US Census
  - ❖ Approved 2,951 new irrigated acres for development in 2022
  - ❖ Partnered with the NRCS to develop a Watershed and Flood Prevention Operations Plan for Mira Creek to address flooding issues in the community of North Loup
    - 2022 – Completed construction on Columbus Area Recharge Project and held an open house showcasing the work and partnerships associated with the project
  - ❖ Completed aerial-electromagnetic flights in Nance County to map groundwater and subsurface geology in areas with limited groundwater capacities
  - ❖ Approved a Drought Management Plan to provide the NRD with progressive response management options and assessment during times of drought
  - ❖ Increased chemigation fees on new permits to encourage renewal permits
  - ❖ Approved 1,125 new irrigated acres for development in 2023 between the Middle and North Loup Rivers, an area that has seen consistent rising groundwater levels

FUTURE

The Lower Loup NRD has initiated a number of studies to address water quality and quantity concerns and will be updating Rules and Regulations to take progressive actions to address groundwater concerns across the District. Work continues with the integrated management plan for the Lower Platte Basin and to evaluate available basin water. The District is working with the University of Nebraska, USGS, and others to formulate options to combat continued nitrate contamination.

Lower Niobrara NRD

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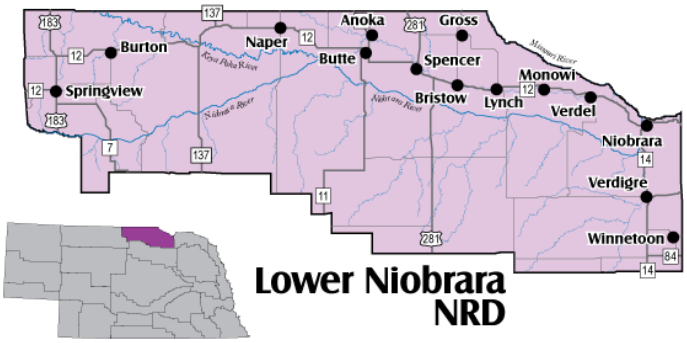

GROUNDWATER STATUS

The Lower Niobrara NRD (District) developed a Voluntary Integrated Management Plan (IMP) with the Department of Natural Resources (Department) which went into effect May 1, 2014. The IMP goes through an annual review and has been through a five-year summary as required by statutes. The IMP outlines how the Department and the District will work together to better manage the surface water and groundwater of the District. The District updates its rules and regulations to address new water issues as they arise. Provisions in the rules and regulations include: 1) the Board has the ability to not accept or limit the number of new irrigated acres District wide, 2) created a ranking process for new high capacity wells, 3) created parameters to be met before a supplemental/helper well will be considered for an existing irrigation system, 4) joined three Districts in the creation the Bazile Groundwater Management Area (water quality) in the SE corner of the District, 5) requires all groundwater and surface water irrigated acres be certified within the boundaries of the District, 6) created comprehensive Phase III rules for improvement of groundwater quality in our high nitrate areas. Currently the District and the Department are looking at revisions to the IMP regarding new irrigated acre development and the Niobrara River Basin Alliance requirements.

December of 2019, the District as a member of the Niobrara River Basin Alliance entered into a Purchase Agreement with the Nebraska Game and Parks Commission and Nebraska Public Power District (NPPD) to purchase from NPPD their surface water appropriations. The intent of the purchase is to ensure the Niobrara River continues to be managed for fish, wildlife, recreation, municipal, industry and agriculture production into the future. A transfer application was submitted by NPPD and has been approved by the Department.

In June 2022 LNNRD Board of Directors, in accordance with the Districts Rules and Regulations, approved up to 500 new irrigated acres can be added to the District through the application process. A total of 624 new irrigated acres met the ranking criteria, but only 499 were approved for development. The District will continue accepting applications for areas where old farmsteads are removed to allow the pivot to make a complete circle which can improve the efficiency of the system. In accordance with our IMP the Department may approve up to 167 new surface water irrigated acres in the District in 2023.

All irrigated acres within District are now certified. The District has the following irrigated acres; 214,824A irrigated with groundwater, 18,126A irrigated with surface water and 3589A irrigated with both surface and groundwater. This total does not include the new acres which will be added in 2022 with the approval of new acre applications.

The Lower Niobrara NRD monitors static groundwater levels in 75 wells each spring and fall. Currently no areas of persistent declines have been identified. But there have been significant declines across the District do to the recent drought which has started the discussion on a Drought Mitigation Plan development. To better monitor static water levels, the District installed seven transducers which measure the static water level daily. This information assists the Board in their decision-making process on water quantity issues. The District also received a NET Grant to add additional monitoring wells across the District. To date, all monitoring wells are installed and currently waiting for the transducers and telemetry equipment. Once the equipment is installed there will be a link on our web page where the public can view the data being produced.

As directed by the LNNRD Groundwater Quality Management Plan the staff samples irrigation wells on a yearly rotation to identify areas with water quality issues. There were eight sub-areas identified originally and placed into the Phase II designation. In 2018, the Directors added 50,000+ acres into Phase II areas which equates to approximately 90% of the irrigated acres in the District are now in Phase II designation. In these areas the producers is required to follow best management practices regarding nitrogen use and complete annual reporting forms which track their nitrogen use by field.

With the new Phase III rules, the District is looking at moving some of these Phase II areas to Phase III because the nitrates levels continue to rise.

In other water quality related work, the District entered the Bazile Groundwater Management Area Interlocal Agreement with the Upper and Lower Elkhorn NRDs and the Lewis & Clark NRD. This agreement is to address the high nitrates in the Creighton and surrounding communities by promoting best management practices in the production of row crops and sensible fertilizer and water management in the area.

ACTION STEPS & TIMELINE

- 1996 – Groundwater Quality Management Area implemented
- 2003 – Groundwater Plan was amended by Board and approved by state of Nebraska
- 2004 – A Phase II area was implemented in north central Holt County with high nitrate levels
- 2006 – The second Phase II area was implemented in areas with high nitrate levels in northwestern Holt County and western Boyd County
- 2007 – On October 17th a portion of the Lower Niobrara was determined fully appropriated
- 2008 – Preliminary determination by DNR that the Lower Platte Basin was fully appropriated
- 2009 – The Lower Platte River Basin fully appropriated determination was reversed by DNR. Rules and regulations were approved to limit irrigation growth to 2500 acres per year for 4 years
- 2011 – Supreme Court reversed the Lower Niobrara River Basin Fully Appropriated designation; Rules and Regulation were approved to allow for limited irrigation in the reversal area; District requested to begin the Voluntary Integrated Management Plan with the Department of Natural Resources
- 2013 – Worked with GIS Workshop to develop a program to manage the irrigated acre certification process; District implements a 180 day stay on new high-capacity wells and the addition of irrigated acres; District completes Voluntary Integrated Management Plan and updates Rules and Regulation to better manage the ground and surface water of the District
- 2014 – Voluntary Integrated Management Plan and updated Rules and Regulations go into effect
- 2015 – Working with the Niobrara River Basin Alliance on a Voluntary Basin Wide Management Plan
- 2016 – Adopted comprehensive Phase III groundwater quality management rules
- 2018 – Added 50,000 acres to the Phase II reporting requirements for nitrates
- 2018 – Applied for and received an NET Grant to install additional monitor wells for both water quality and quantity
- 2019 – Completed the 5-year review of the District Integrated Management Plan with DNR
- 2019 – Will allow up to 500 new irrigated acres to complete pivot circle
- 2020 and 2021 – Approved 1,772 new irrigated acres across the District
- 2022 – Completed the installation of 19 monitoring wells across the District. Transducer and Telemetry will be installed for real time monitoring by the District and public. 499 new irrigated acres were approved.

FUTURE

Through the IMP the District and the Department continue to develop better ground and surface water management for the District. By using the Stakeholder Committee process the District is equipped to address water resource issues before they become major problems. With the certification of irrigated acres and the development of a comprehensive database the District will be able to better track changes in water quality and quantity on an annual basis. The District is also looking into developing hydro geology maps to help identify sub-areas where more groundwater management may be needed. The staff continues to sample wells for nitrates, measure static water levels and gather flowmeter readings. The Lower Niobrara NRD will also continue to monitor and implement its Groundwater Management Plan and Integrated Management Plan and Rules and Regulations. The District will develop and implement new rules and regulations as deemed necessary by its Board of Directors.

Lower Platte North NRD

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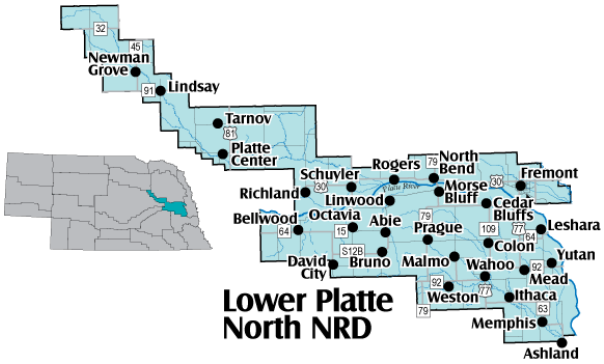

GROUNDWATER STATUS & ACTION STEPS

The Lower Platte North NRD (LPNNRD) comprises portions of seven Counties in east central Nebraska: Boone, Madison, Platte, Colfax, Butler, Dodge, and Saunders Counties. The District covers 1,587 square miles or approximately 1.03 million acres.

The following is a summary of management activities since 2010. Please contact LPNNRD if more information is needed on previous management activities.

2010 - The District currently has three ground water development areas: Normal, Limited and Restricted. Ongoing studies include: ENWRA, ELM, and Platte Valley Modeling Studies, along with new studies: mapping the geology of the Swedeburg Subarea using helicopter electromagnetic survey and test holes. Concerning ground water quality, intensive sampling of wells in the Bellwood area is being done to reevaluate the effectiveness of the District's Phase 2 management area for increasing nitrate levels.

2011 – July 2011 the LPNNRD Board voted to proceed with development of a voluntary Integrated Management Plan (IMP) for the district. Intensive ground water quality sampling was completed in our Bellwood Phase 2 GWMA to evaluate changes of the nitrate-nitrogen content in the aquifer since 2002 and to compare readings to landowner submitted nitrate results. The District continues to closely monitor cleanup efforts at two superfund sites, the Former Ordnance Plant near Mead and Lindsay Manufacturing.

2012 – The summer of 2012 brought on a quick and intensive drought that was felt though-out the State. As a consequence the LPNNRD received several well interference complaints that exceeded the number of complaints we received during the previous drought years from 2000 to 2006. All types of wells seemed to be affected, but was most noticeable in domestic and stock wells. The real effects of the drought on ground water levels may not be known until the spring readings of 2013.

2013 - In late August we started receiving several complaints from the Bruno to Brainard area within LPNNRD and LPSNRD. This area has confined aquifers existing in many different layers and when area high capacity wells all run at the same time, this can cause large pressure drops in these aquifers. During the fall and winter of 2013 the LPNNRD was looking at modifications to our ground water management Rules to address more of these in-season declines. The Platte Valley model and the Swedeburg subarea studies were completed in early 2013.

2014 - In February we updated our GWMA Rules and Regulations to primarily address the mid-summer declines in the Bruno area and the uplands of Platte and Colfax Counties. These are now designated as the Butler-Saunders and Platte-Colfax Special Quantity Subareas (SQS). LPNNRD awarded a contract with Olsson Associates for development of a Voluntary Integrated Water Management Plan (V-IMP). The contract for the Lower Platte River Basin Coordination Plan (LPRBC) was awarded to HDR in early summer 2014 to develop a basin-wide approach to managing the water. Seven NRD's and DNR are involved in this process.

2015 – Special Quantity Subarea (SQS) #1 in portions of Butler and Saunders County began with water meters required on all high capacity wells and a rolling water allocation of 27 inches over each three-year period. SQS #2 in portions of Colfax and Platte Counties begin the same restrictions on May 1, 2016. The Bellwood Phase 2 Area (water quality for nitrates) is a positive story with the 32 square mile area being reduced to 21 square miles as nitrate levels continue to slowly decline. Richland/Schuyler Phase 2 Area (water quality for nitrates) is moving the wrong direction and the 55 square mile area was moved from Phase 2 to Phase 3 with 10 new sections moved into Phase 2. A Water Sustainability Fund Grant has been applied for to continue Aerial Electro Magnetic Surveying of our Aquifers.

2016 - For 2016 GWMA activities focused on four areas: the Platte - Colfax Special Quantity Subarea (SQS #2) became effective, Airborne Electromagnetic flights in our two SQS areas, the Voluntary Integrated Water Management Plan (V-IMP), and the Lower Platte River Basin Water Management Plan Coalition (LPRBC). The Platte - Colfax Special Quantity Subarea became effective on January 1, 2016. This is a confined aquifer where large groundwater pressure drops are noted in the aquifer when a large number of irrigation wells run at the same time. Several classes were held from January through March that described the new rules, proper installation of flow meters and the irrigation water allocation system. We have approximately 300 irrigation wells in this SQS area. During July 2016 Airborne Electromagnetic flights (AEM) were done over both of our SQS areas with approximately ⅓ mile spacing to more accurately map the geology of these confined aquifers. The final report won't be completed until August 2017. The District resumed work on our Voluntary Integrated Water Management Plan and our last stakeholder meeting was held on October 5, 2016. The Department of Natural Resources is currently reviewing the plan and we hope to have approval and passage of the Plan in early 2017. The LPRBC NRD's have tentatively agreed to establishing flows in the Platte, Loup, and Elkhorn river sub-basins as a certain percentage of total flow measured at the Louisville gauge on the Platte River. Future work will focus on dividing up river flow contributions from each NRD within each river sub-basin. Following approval of the V-IMP and the LPRBC, a major rewrite of the LPNNRD Ground Water Management Rules and Regulations will be in order.

2017 – The final report was received on the 2016 AEM flights conducted within the SQS areas, which the NRD is utilizing for water management. A follow-up WSF grant was submitted by ENWRA and approved for conducting more flights within the District. The District has completed the Lower Platte Basin Integrated Management Plan and resumed working on the VIMP plan along with a rewrite of the Ground Water Management Plan. The District is involved with the process of developing a drought contingency plan for the Platte River, which should be completed in 2018. Test holes into the Dakota Aquifer will be drilled in the Spring of 2018 with AEM flight being conducted in the Fall.

2018 – The District finalize the VIMP which went in effect in June. The plan details objectives that will be achieved jointly with NDNR along with a consumptive water use allotment within the Basin. The District also updated the Groundwater Rules and Regulation to coincide with the VIMP. The District will handle additional consumptive water use by using acre feet depletions instead of irrigated acres. Other changes in the Rules and Regulations included adding a Phase IV for Water Quality, to handle the rising nitrate issues within the District. More AEM flights were conducted along with the drilling of 3 wells into the Dakota aquifer for the purpose of AEM verification and if this aquifer could be a potential source of potable water. The Consortium conducted 2 public open houses for feedback on the Lower Platte Basin Drought Plan, which is in the process of being finalized in 2019.

2019 – The NRD has taken a pro-active approach in the Nitrogen Management Areas. Staff developed a local stake-holder group to assist in setting up the management criteria. Extra water, soil and vadose sampling were conducted to help in the analysis of the overlying nitrate issues. The Bureau of Reclamation has approved the Lower Platte Basin Drought Plan, with the LPNNRD giving approval in December.

FUTURE

The LPNNRD will focus on these concerns in the next five years:

1. Continue the joint project with the NRD/UNL/DNR on using real-time monitoring stations within the SQS areas to study the effects of drawdown and refining the model incorporating the AEM data. This will allow the NRD to consider different management approaches for confined and unconfined aquifers.
2. Integrated Water Management with DNR and the Coalition will be discussed as the first 5-year increment ends in 2021. To assist in the process, additional information might need to be gathered, like a geological model in areas of concerns. Water management could include siting of potential recharge sites, storage reservoirs (both surface and ground water), and potential water reuse projects to enhance the water supply in the District. Additional monitoring wells, stream flow gauging, and precipitation sites will likely be necessary. Effects of climate change will also need to be considered as part of integrated water management.
3. Conduct intensive analysis of the groundwater quality within the District and especially in identified Water Quality Management Areas . A series of chemical analysis will be conducted along with GIS mapping utilizing AEM information, to attempt to identify what Best Management Practice will be the most effective in curbing the contamination.

Lower Platte South NRD

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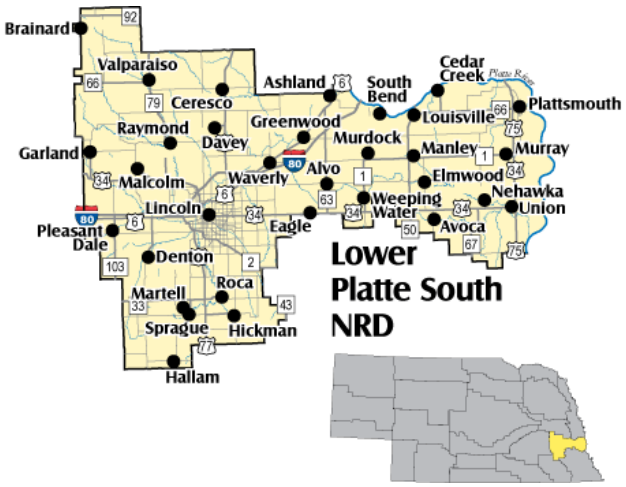

GROUNDWATER STATUS

The LPSNRD currently monitors over 200 wells for groundwater quality and about 150 wells for quantity in its monitoring network. The network continues to grow and evolve to accommodate the hydrogeologic variability of the area. The LPSNRD also samples about 100 community water supply wells and monitoring wells as part of its on-going efforts to assist communities in monitoring and protecting their groundwater supplies. Several communities, with assistance from the LPSNRD, have installed monitoring wells to supplement their monitoring networks.

ACTION STEPS

- 1970's and 1980's – Began taking groundwater level measurements to supplement information obtained by USGS and others, and collecting groundwater samples to monitor nonpoint source contaminants.
- 1985 – First LPSNRD Groundwater Management Plan in accordance with LB1106.
- 1995 – LPSNRD revised its Groundwater Management Plan to incorporate additional requirements in LB 51 (1991) and LB 480 (1994). Entire LPSNRD placed in Phase 1 Groundwater Management Area.
- 2000-2020 – Declared and implemented seven Phase II and Phase III Management Areas for nitrates in groundwater and implemented regulations. Joined with other NRDs and state agencies to initiate the Eastern Nebraska Water Resources Assessment. Adopted major changes to Groundwater Rules and Regulations, including well permitting, water well meters, and managing the Hydrologically Connected Area. Completed airborne electromagnetic (AEM) surveys across the District; this effort spanned the period 2006-2019. Initiated requirements for certification of irrigated acres and program for installing meters and reporting water use. Developed and adopted one of the state's first voluntary Integrated Management Plans (IMP). Cooperated with Lower Platte Basin NRDs on development of basin-wide management plan. Developed and implemented new rules and regulations for Dwight-Valparaiso-Brainard Special Management Area (DVB SMA). Initiated and continued vadose zone monitoring program; worked with UNL Water Sciences Lab to develop advanced means of analysis as well as statewide methodology. Maintained and continued development of network of dedicated monitoring wells, including daily remote water level monitoring devices and telemetry systems. Continued involvement/implementation of voluntary IMP and Lower Platte River Basin Water Management Coalition (LPRBC). Cooperated with City of Waverly and other partners to develop Drinking Water Protection Plan, and began development of Drinking Water Protection Specialist to assist Waverly and other public water suppliers with protection of their groundwater resources.
- 2021—Continued verification studies in Raymond and Ashland (delayed due to pandemic issues). Continued cooperation on Waverly Drinking Water Protection Plan and began process of applying for NDEE grant supporting Waverly and establishing Drinking Water Protection Specialist position for

LPSNRD as part of 2019 District-Wide Water Quality Plan. Participated in finalization of and input on Ashland WHP Plan. Issued three water well permits for large-scale industrial (320-400 million gallons/year) user in southern LPSNRD and began implementation of long-term monitoring program. Applied for and awarded nearly $250,000 in WSF grant funding for using AEM data for hydrogeologic framework and groundwater modeling.

- 2022—Received $247,500 in WSF Grant funds (matched by $165,000 of NRD funds) and retained consulting firm to develop Three-Dimensional Hydrogeologic Framework for entire LPSNRD and prepare AEM data for inclusion in future groundwater modeling efforts. Continued cooperation with PMR and LPNNRDs and NeDNR on regional modeling efforts. Initiate revisions of Groundwater Rules and Regulations mainly to provide new class of water well permits for large water uses (>500 AF/year). Completed application and draft Project Implementation Plan for Waverly Wellhead Protection Area and creation of Drinking Water Specialist Position. Continued involvement/implementation of voluntary IMP, LPRBC, and Drought Consortium.

FUTURE

The LPSNRD will continue development and implementation of its voluntary IMP, LPRBC, and Drought Consortium commitments for the foreseeable future. The NRD will continue implementation of the Phase II and Phase III GWMAs for groundwater quality (including nitrogen certification in 2023) as well as DVB SMA irrigation allocation and certification for groundwater quantity. LPSNRD will continue to perform additional groundwater monitoring in the Monolith/NPPD area near Hallam. The District will continue to implement and expand its vadose zone monitoring program emphasizing advanced techniques used by UNL, and coordinate that program with its ongoing groundwater monitoring and test hole drilling. LPSNRD will continue utilizing AEM and other data for District-wide hydrogeologic framework work with other NRDs, NeDNR, NDEE, and private consultants to develop and implement a strategy for groundwater modeling at various scales. The NRD will implement the revisions to its Groundwater Rules and Regulations for future large-scale water users and continue to evaluate the need for additional revisions. LPSNRD will also utilize NDEE funding as well as its own resources to hire a Drinking Water Protection Specialist position to work with Waverly and all of the public water suppliers in the District on a wide variety of groundwater protection issues. All of the above efforts will be supported and made more efficient with implementation of the mobile data access program.

Lower Republican NRD

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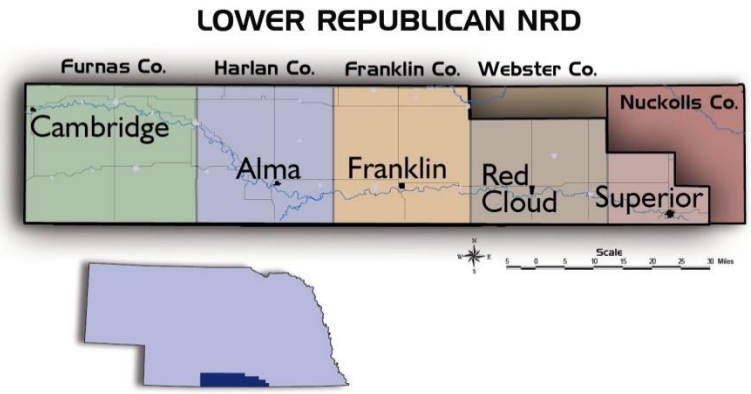

GROUNDWATER STATUS

The Lower Republican NRD has been designated as fully appropriated; however, the settlement agreement reached between the states of Nebraska, Kansas, and Colorado has prompted the LRNRD to implement a number of Groundwater Management Controls. The controls implemented have been for the preservation and conservation of groundwater and for compact compliance.

ACTION STEPS

- December 9, 2002—Moratorium on New Wells
- December 31, 2004—Moratorium on New Acres
- December 31, 2004—Acres Certified (Total Irrigated Acres 325,876)
- April 1, 2005—Metering of all groundwater wells
- June 24, 2005—Integrated Management Plan
    - Allocations:
        - West of Hwy 183 = 36 inches for 3 years / East of Hwy 183 = 33 inches for 3 years
- February 29, 2008—Integrated Management Plan
    - Allocations: 45 inches for 5 years District Wide
- October 1, 2011—Integrated Management Plan
    - Allocations: 45 inches for 5 years District Wide
- 2013—NCORPE Augmentation Project
    - Retirement of nearly 15,000 irrigated acres
    - Ability to augment streamflow to ensure Compact Compliance
- January 15, 2016—Integrated Management Plan
    - Allocations: 45 inches for 5 years District Wide
- January 1, 2018—13” Hard Cap during Compact Call years
- March 1, 2019—Republican River Basin-Wide Plan adopted
- September 27, 2021—Integrated Management Plan
    - Allocations: 45 inches for 5 years District Wide

In 2013, the Lower Republican NRD partnered with the Middle Republican, Upper Republican, and Twin Platte NRD’s to purchase a 19,500-acre farm south of North Platte on the watershed boundary of the Platte and Republican basins. An Interlocal Agreement was signed between the Districts and a new entity was formed, NCORPE, the Nebraska Cooperative Republican Platte Enhancement Project. Nearly 15,000 acres on the farm

have been retired from irrigation. Water is pumped south to the Republican and north to the Platte River for augmentation purposes. This enhances stream flow and supports Nebraska's obligations with the Republican River Compact and the Platte River over appropriated offsets.

We have promoted the use of soil moisture sensor technology heavily for the past four years and presently have moisture sensors installed on over 160,000 acres. This technology allows the irrigator to water only when the crop needs it, not when his neighbor is watering or when it looks like it needs it. Soil moisture sensors have been proven to lower water usage by 1 to 2 inches per acre per year. It is estimated that the sensors are lowering water usage in the Lower Republican NRD by as much as 26,000 acre-feet per year.

WATER USAGE	
2003 = 13.03 inches per acre	2013 = 8.45 inches per acre
2004 = 11.24 inches per acre	2014 = 5.65 inches per acre
2005 = 7.17 inches per acre	2015 = 7.30 inches per acre
2006 = 7.58 inches per acre	2016 = 7.99 inches per acre
2007 = 6.11 inches per acre	2017 = 6.48 inches per acre
2008 = 5.25 inches per acre	2018 = 4.86 inches per acre
2009 = 5.92 inches per acre	2019 = 3.71 inches per acre
2010 = 4.44 inches per acre	2020 = 8.15 inches per acre
2011 = 5.46 inches per acre	2021 = 6.32 inches per acre
2012 = 11.52 inches per acre	2022 = 9.86 inches per acre

The Lower Republican NRD has been actively involved in promoting and implementing several conservation programs aimed at improving irrigation efficiency and lowering our overall use of groundwater.

Conservation Programs and Acres Involved

EQIP— 1,168.71 acres
CREP— 5,450.00 acres
Exempt— 4,205.87 acres
Non-Irrigatable—1,107.50 acres

11,932.08 acres permanently or temporarily retired since 2005. This represents approximately 4% of the total irrigated acres in the LRNRD.

FUTURE

LRNRD is actively pursuing projects to assist with our obligations under the IMP that support Interstate Compact Compliance. Active efforts include: conjunctive management, inter-basin diversion, retirement of irrigated acres, irrigation efficiency improvements, allocation monitoring and modeling. During the last two years, the LRNRD has received federal and state grant funds to support these existing and future management actions. Watershed and Flood Prevention Operations grants for two watersheds in the LRNRD were awarded by the NRCS for developing an EA-Plan and assessing the feasibility of potential projects for increasing agriculture water supply in the LRNRD.

Middle Niobrara NRD

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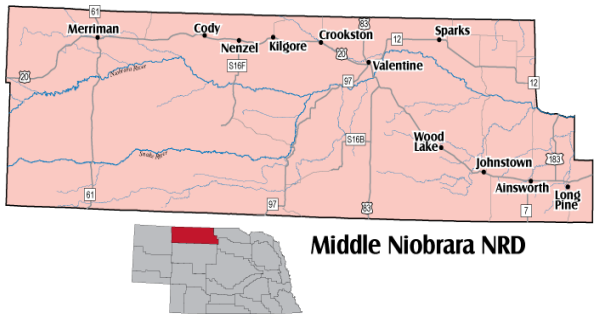

Bordering South Dakota, the Middle Niobrara Natural Resources District (MNNRD) lies in North Central Nebraska along the middle stretch of the Niobrara River. One of the largest NRD's in the state, the district has an area of 2.9 million acres which includes the northern two thirds of Cherry, western Keya Paha, northern Brown and a small part of western Rock Counties.

Groundwater Status

The District has certified 154,357 groundwater, surface water and combination surface/ground water irrigated acres since 2008. 154,357 irrigated acres make up about 5% of the total acres in the MNNRD. Irrigation well development in the MNNRD began as early as 1927 and slowly increased until the 1970's when there was a sharp increase of 618 irrigated fields. Since the 1980's there has been a more gradual increase of new acres being irrigated. There are currently 1210 irrigation wells within MNNRD boundaries.

Groundwater levels are monitored by the measurement of static water levels twice a year at 230 sites. Water levels in the MNNRD are at all-time highs. 15 years of consistent, above average moisture has led to average water levels increasing nearly 5 foot in nearly every reach of the district. Even after 2 years of average to below average precipitation, static water levels show that nearly 75% of the sampled wells in the district are higher than they were 5 years ago, with numerous wells being higher than they were since the 1980s. Fields are starting to come back into production after being inundated with water for numerous years. 2022 brought severe drought to most of the District, like the rest of Nebraska, and irrigation and water use was extensive.

Action Steps, & Timeline

In 1975, the MNNRD began to monitor groundwater, 10 years later that data was used to begin writing a Ground Water Management Plan (GMP).The district's Ground Water Management Plan was approved by the Nebraska Department of Natural Resources in 1995, with the rules and regulations portion initially approved in 2001 and updated February 11, 2013. The MNNRD GMP is primarily qualitative. Qualitative management includes Management Zones 1 thru 4 with Zones 1 thru 3 in effect currently. Updates to the rules and regulations in April of2007 now require all persons who apply any type of fertilizer on a total of more than five acres of land in all management zones to complete a fe1tilizer applicator certification course once every four years. Producers in Zone 3 (nitrates greater than 5 ppm in more than 50% of the wells) are also required to use and adopt two or more Best Management Practices from an approved list along with conducting annual soil testing. Quantitative management includes the goal to forever maintain the present level of groundwater within historic natural fluctuations that occur. Fe1tilizer and nitrogen application is continually monitored through yearly landowner reporting.

The Lower Niobrara Basin was declared fully appropriated on January 25, 2008, placing a moratorium on new high capacity wells and surface water development, and on expansion of irrigated acres. A contestment was filed with Nebraska Department of Natural Resources (NDNR) by four NRDs on February 9, 2008 to request NDNR to determine if the Lower Niobrara Basin was truly fully appropriated. This case went all the way to the Nebraska Supreme Court. On June 3, 2011, the Supreme Court reversed the fully appropriated determination. On June 29, 2011 NDNR notified the District that they had 120 days to come up with rules and regulations to comply with LB 483. These regulations could allow for limited expansion on new groundwater and surface water uses. Over the next four years, the District approved 9,938 new irrigated acres or uses. After LB 483, the district placed a moratorium on new high-capacity wells. This allowed district staff to gather data on the new irrigated acres to see how they are affecting groundwater levels. After a 7-year moratorium and extensive data collection the Board of Directors voted in 2021 to move forward with some possible irrigated acre expansion and rule amendments.

Current and Future Activities

Staff and the Board of Directors spent the winter of 2021 revising rules and regulations for groundwater activities in the district. Processes like certifications, fertilizer reporting, and moratoriums were amended to better suit the needs of the District. Also included in that rule's amendment, for the first time since 2013, the District voted to accept applications for up to 3,000 new groundwater irrigated acres. The District received 31 total applications for 3,477 total acres. After site visits, plan review, and ranking, the Board approved 28 applications for 2,999 acres. The Board will have the option every spring, after review of data and groundwater modeling, to decide on how many acres will be open for development in the coming year.

The MNNRD is continuing to add to the amount of dedicated monitoring wells located across the district. 14 monitoring wells at 7 new locations were added in 2022. Bringing the Districts total to 77 monitoring wells in 56 locations. The District promotes water conservation through a cost share program that includes assistance on pivot conversions and soil moisture sensors. Flow meters are not required in the district, but an ultrasonic flow meter is offered to irrigators free of charge.

The MNNRD second year of participation in the Voluntary Integrated Management Plan (VIMP) with the Nebraska Department of Natural Resources, which went into effect in January of 2021. Staff and directors from both parties met in May to discuss activities, joint projects, and to look ahead to short- and long-term goals and objectives. This process helps the MNNRD and the NDNR work together in effectively managing surface and groundwater in the state.
Over the years, Long Pine Creek and its tributaries have experienced significant stream bank erosion, threatening structures, and further impairing hydrological and biological functions of the stream. In addition, Long Pine Creek, Bone Creek, the Niobrara River from Bear Creek to Snake Creek, and the Boardman Creek are listed on the 303 (d) impaired waters list for E. coli and high temperatures.

A detailed assessment and conceptual restoration plan repo1t for Sand Draw Creek and a watershed Water Quality Management Plan for the Long Pine Creek Watershed were developed in 2016. The MNNRD, along with FYRA Engineering, are in the design and permitting phase of addressing environmental threats within the LPCW through an in-stream restoration project (SD-4) that will involve a multi-structure system on Sand Draw Creek (SDC). Another project that is in the design and permitting phase, addressing similar resource concerns, is located on SDC upstream of the Old HWY 7 /SDC crossing that was destroyed in 2019 flooding events. This project will consist of a multi-structure in-stream restoration system. Another project on a side tributary/drainage of Willow Creek has been completed. These projects will address head cutting, water quality, erosion, sediment control, wildlife, and fisheries.

The MNNRD along with FYRA Engineering is in the final approval stage of our LPCW Watershed & Flood Protection and Operations (WFPO) Plan-EA. The MNNRD and FYRA Engineering are waiting on final approval from NRCS Headquarters in Washington, D.C. before moving forward with final project design and permitting. Project implementation funding was sought through the Water Sustainability Fund (WSF) and sent to the Nebraska Department of Natural Resources (NDNR) in July 2021. MNNRD was approved for WSF in December 2021.

The MNNRD was approved in August 2020 for three out of five WFPO Watershed proposals in Cherry County, NE. One application, Schlagel and Evergreen Creek Watershed, was evaluated for feasibility by the USDA-NRCS and approved. MNNRD is waiting on the final project agreement before beginning the initial planning stages. Two of the WFPO planning's (CC WFPO A & B) are south of Merriman, NE and the other WFPO planning (CC WFPO E) is south of the Valentine National Wildlife Refuge.

Middle Republican NRD

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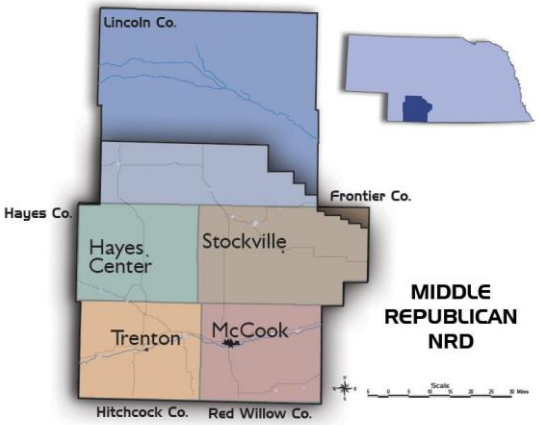

GROUNDWATER STATUS

Following a request by the districts to the Department of Water Resources, the Republican Basin received a preliminary designation of being fully appropriated under LB108 in September of 1996. The Joint Action Plan process was placed on hold during the lawsuit with Kansas from May 1998 to July 2003. In July of 2003 a final determination of conflicts under the LB 108 process was made and the development of rules and regulations began. In July of 2004 a "fully appropriated" designation was made under LB 962 and the Joint Action Plan process was replaced by the Integrated Management Plan process. The first generation Integrated Management Plan (IMP) became effective on January 1, 2005, a revised IMP became effective on September 27, 2021. The MRNRD Board revised the groundwater rules and regulations that became effective on March 1,2021. The Republican River Basin Wide Plan has been completed, approved and accepted by the Nebraska DNR and the Republican River NRD's.

The first Ground Water Management Area was adopted in July of 1998 and has been revised several times to reflect changes in emphasis, legislation and the compact settlement. A Quality Management Area along the main stem of the Republican River in Hitchcock and Red Willow Counties was created and adopted in 1993 and we continue to monitor levels of nitrate contamination in this area. Average levels of nitrates are approximately 7.5 mg/l and have not increased since 1993. Many areas show a reduction in the levels of nitrate.

Irrigated acres in MRNRD – 309,532 (approximately 1 acre in every 8 is irrigated)

Allocation in MRNRD – 12 inches/year (60 inches over a 5-year period).

Actual irrigation water use:

2005- 8.52 inches	2013- 10.13 inches
2006–10.32 inches	2014- 9.06 inches
2007– 7.98 inches	2015- 9.75 inches
2008- 8.59 inches	2016- 10.25 inches
2009– 8.17 inches	2017- 10.84 inches
2010– 7.85 inches	2018- 7.02 inches
2011—8.40 inches	2019- 5.72 inches
2012—16.8 inches	2020- 11.64 inches

ACTION STEPS & TIMELINE

- Ground Water Management Area — July 1, 1998
  - Last Revision — March 1, 2021
- Temporary Suspension of Drilling — June 12, 2002
- Certification of Irrigated Acres — November 2003
- All Water Uses Metered — December 2004

- Integrated Management Plan Implemented January 2005
    - Last Revision September 27, 2021

The current IMP includes updated augmentation information, an improved forecast provision and the possibility of pumping restrictions in a compact call year. These restrictions apply to surface water and ground water users. Ground water allocations may be subject to a reduction in order to maintain compact compliance. These reductions would apply to all ground water irrigated acres in the district. Bans on new wells and new acres remain in place.

Revised allocation for the period of 2018 through 2022 is 60 inches for five years. Actual pumping levels throughout the MRNRD have been less than the set allocation. Yearly pumping data and irrigated acres are provided to the Department of Natural Resources to be used in compact accounting.

PROGRAMS

- Retirement of Irrigated acres:

CREP – temporary – 13,000 acres	10 to 15 year contracts
EQIP, AWEP and ARP – 4275 acres	
Riverside Irrigation Company	672 acres of surface water and 305 acres of commingled ground water.

- River Flow Enhancement – The revised authorities provided by LB 862 will be used to fund retirement programs, leases and augmentation. Planned assessment of $10.00/acre.
- Riparian Projects – River riparian improvements completed. Maintenance efforts continue.
- N-CORPE Nebraska Cooperative Republican Platte Enhancement Project. An interlocal agreement with the Twin Platte, Upper Republican, Middle republican, and Lower Republican NRDs to purchase 19,500 acres and develop pipelines to augment flow in both the Platte and Republican Rivers.
- Flood Control - The district provides operation and maintenance of 34 flood control structures. These structures are on tributaries to the Republican River and are all dry structures. They capture flood flows and release them over a period of days to minimize the flood effects of significant storms.

FUTURE

Modeling – The first watershed model of the "Medicine Creek Basin", was developed in 2016 for our Board of Directors to have a calibrated transient groundwater flow model that provided a more robust tool for them to use for decision making with a more science-based answer. The modelling projects now include the Red Willow modelling, AEM data collection and the Culbertson Canal Recharge Study.

Surface Water Projects – The MRNRD has an agreement with the Frenchman Valley Irrigation District that benefits both groundwater recharge and meeting any Republican River Compact requirements. We offer support to the Frenchman Cambridge Irrigation District in their efforts to become more efficient through telemetry management.

Irrigation Efficiency - We currently have developed our own High-Tech Irrigation Efficiency Program within our District as a project of aquifer sustainability that will offer real-time data that provides growers with the information needed to make quick, effective management decisions. The MRNRD has initiated installing telemetry meters on all wells, replacing the existing mechanical meters. This project will provide real time data to producers as well as be an effective manner for the MRNRD to monitor and manage groundwater resources in the NRD.

The MRNRD has a goal of being more efficient and believe that "efficiency is a core element of a sustainable water source" and that we want to be more innovative with our management actions and listen to the area producers and those stakeholders that have skin in the game because they can have a lot to offer in a sense of advice and innovative ideas.

Nemaha NRD

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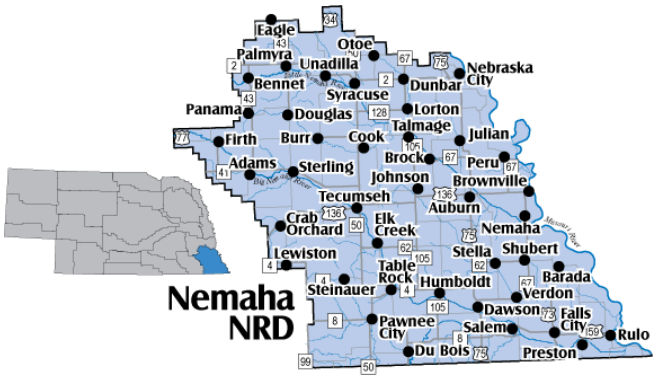

Groundwater Management Activities

The Nemaha NRD is served by just a few aquifers that yield large amounts of water for the majority of uses in the District. Although irrigation has typically been somewhat limited within the District, the 1970s and the 2000s each saw a big jump in new irrigation well construction with 206 and 220, respectively. This compares to 30 in the 1950s, 41 in the 1960s, 38 in the 1980s, and 29 in the 1990s. From 2010 to the present a total of 267 have been constructed. There are currently 786 registered active or inactive irrigation wells within the District.

August 1999 - The entire District was designated as a Phase I Groundwater Management Area (GWMA). Phase I controls require a permit, prior to construction, for wells designed to pump greater than 50 gallons per minute. To date, 711 wells have received approved permits throughout the District, however only 567 have been constructed and registered. The other approved permitted wells were either not constructed due to the permit expiring or lack of sufficient groundwater quantity to serve the purpose desired.

May 2006 - Responding to increased well development and conflicts among some users, the NRD board issued a District-wide, temporary, two-year closure to the issuance of well permits effective May 15, 2006. The closure was blanketed District-wide as defensible data to support delineated aquifer boundaries was not available. Also, during this time the District's Groundwater Management Plan (GWMP) was in the process of being updated in order to better address groundwater quantity issues. A variance process was also established during the two-year closure requiring greater spacing between high-capacity wells, drilling of a testhole and Board approval. This allowed the District to better scrutinize each request on a case-by-case basis.

The District currently has 34 active continuous read water level recorder wells and hand measures over 130 wells (irrigation, livestock, domestic, and public water supply) each spring and fall. A grant from the Nebraska Environmental Trust added 18 of 36 total observation wells this past year.

A three-year grant application from the Integrated Water Management Policy Program Funds (IWMPPF) was submitted to and approved by the Nebraska Natural Resources Commission in 2006. The funds were used to collect hydrogeologic data, install additional continuous recorder wells and develop a groundwater model in order to delineate aquifer boundaries, develop management areas and regulate groundwater use accordingly. It was the District's goal to have the GWMP updates completed and in place by the May 2008 well permit closure expiration date, however that date was extended until October 2008. Additional changes to the District's Groundwater Management Plan and associated Rules and Regulations prompted the District to initiate a temporary 180 day stay on new high capacity well development in lieu of extending the temporary closure rule a second time. The new Groundwater Management Rules and Regulations went into effect on February 1st, 2009 thus ending the temporary 180 day stay early.

The District is also a partner with five other eastern NRDs called the Eastern Nebraska Water Resources Assessment (ENWRA) group that are researching geophysical technologies to delineate the glaciated aquifer regions of eastern Nebraska. A helicopter is used to fly the geophysical electromagnetic induction sensors that map the geology. Funding has been a major hurdle with conducting the flights as they are very expensive however approximately 1,616 miles were flown in 2007, 2015, 2018 & 2020. The data collected clearly delineates the geology from the ground surface to and past the bedrock.

January 2013 - Responding to increased well development and conflicts among some users, the NRD Board issued a District-wide, temporary, 180 day stay on the construction of any new high capacity well development and to not accept any new well permit applications effective January 10, 2013. The temporary stay allowed time for the District to develop a well ranking methodology in order for the Board to have a systematic and impartial way to review each well permit and determine whether to approve or deny the application. The well ranking methodology was completed in four months and the stay was lifted on May 9th, 2013. The methodology considers the thickness of the principal aquifer and the aquifer's transmissivity, which is calculated based upon the material recorded from a testhole log (required with the well permit application). Also, the methodology considers the density of registered irrigation, public water supply, commercial, domestic, livestock and "other" type wells in relation to a proposed well site. Lastly, if the purpose of the well is irrigation then the method of watering (gravity, pivot, subsurface drip) is considered in the scoring. A total of 220 wells have been approved since May of 2013 with 208 for irrigation, 7 for public water supply, 4 for wetland flooding, and 1 for commercial/industrial supply. Of the 220 approved well permits: 181 were constructed, 29 expired, 3 have not been registered and 7 are currently active.

December 2014 – After over a year with the new well ranking methodology in place, several updates and changes were compiled for the ranking system as well as the groundwater quantity management rules and regulations. The changes to the ranking system included using a weighted average for the density calculations, requiring a minimum of 10 feet of principle aquifer formation, and reducing the points given for the three irrigation methods. Rule changes included definition updates, increasing a late well permit application fee to $1,000 and reducing allocation amounts for Phase III management. Spacing has also been updated by not allowing high capacity well development within one half mile of any registered public water supply well and 500 feet from any registered domestic or livestock well. Lastly, transfer rules were changed that limit the number of additional acres, land parcels must be contiguous, and the supply well must meet or exceed the minimum score needed from the well ranking methodology.

Through 2015 there has only been one change made concerning the District's well ranking methodology in which the minimum score required for approval was increased in eastern half of Richardson County. The point increase was in response to well interference issues between some irrigation wells impacting domestic and public water supply wells.

2017 – Legette, Brashears and Graham (LBG), a nationwide environmental engineering firm, completed hydrogeologic assessment report of the entire NRD. This is the most comprehensive review and assessment of the basin's groundwater resource ever completed. It better defines aquifer boundaries and the potential for future development within those areas. Data from the report will be used to develop aquifer risk area boundaries and update present groundwater rules and regulations.

2019 – The District finished updating its Groundwater Quantity Management Area Rules & Regulations and has submitted them to the Nebraska Department of Natural Resources for review. The District plans to hold a public hearing on the new rules in late January or early February of 2020 and have Director approval at the February 2020 Board meeting. New updates include additional definitions, requiring a detailed irrigation plan be submitted with the total number of irrigated acres, allowing wells pumping between 50 – 150 gpm exempt from the District's Well Permit Ranking Methodology, denying a well permit when the required testhole log has a calculated transmissivity value of less than 10,000 gpd/ft and requiring a 90-day waiting period to reapply for a well permit if a permit has expired, been withdrawn or canceled. Other items also revised include transfers, Phase II & III Groundwater Quantity restrictions and delineation of aquifer regions.

2020 – The District entered into an agreement with the Nebraska Department of Natural Resources and HDR Engineering to develop a Voluntary Integrated Management Plan. Stakeholders were selected and two meeting have been held.

2022 – The District completed and adopted the Voluntary Integrated Management Plan.

North Platte NRD

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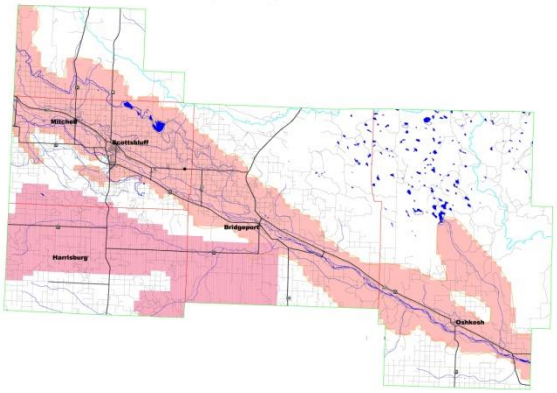

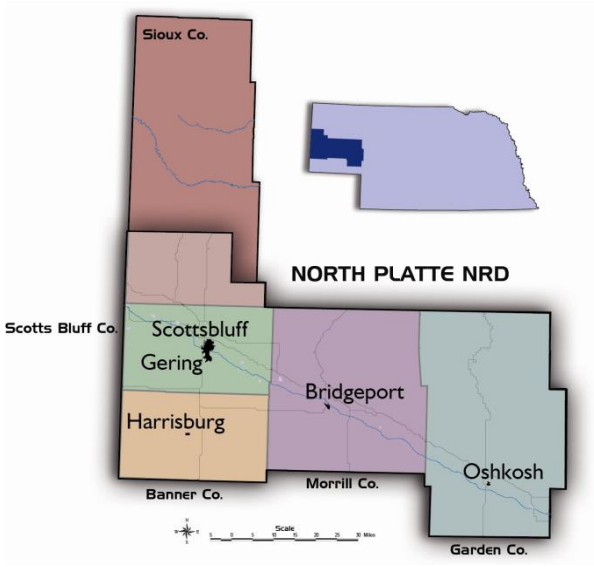

The NPNRD showing the Overappropriated area in light pink and the Pumpkin Creek Basin Subarea in dark pink.

GROUND WATER SOURCES

- Ground water recharge and return flows in the North Platte River Valley are highly dependent on the delivery of irrigation water through the surface water canal system.
- The total water in the North Platte River system relies on the snowfall and runoff from the Rocky Mountains in Colorado and Wyoming. These sources also directly impact the amount of water available downstream.

ACTION STEPS & TIMELINE – The North Platte NRD has been proactive in dealing with water issues and drought cycles:

- **2001 - 2008** -- A moratorium was placed on the drilling of new wells in the entire NRD, with Pumpkin Creek Basin Subarea being the first in Platte River Basin, as well as a stay on the expansion of new irrigated acres. All ground water uses in the District were certified. Flow meter installation was required in the over appropriated portion of the District and was completed in 2008. In 2005, a ground water irrigation allocation was implemented in the Pumpkin Creek Basin Subarea, and in 2007, an allocation for ground water irrigation use in the over appropriated area of the District was established.
- **2009** – A Basin-wide Plan was adopted for the over appropriated portion of the Platte River Basin and took effect on September 11. The North Platte NRD's Integrated Management Plan was adopted on September 14.
- **2014** – The Board of Directors set a new allocation of 70 acre-inches per acre over five water years in the over appropriated area of the District and 60 acre-inches per acre over five water years in the Pumpkin Creek Basin Subarea. The original allocations had been set at 18 acre-inches per water year in the over appropriated area (2007) and 15 acre-inches per water year in the Pumpkin Creek Sub-basin (2005).
- **2015** – Instituted programs to help generate interest in temporary and permanent retirement of irrigated acres. The Encouraging Producer Innovation through Conservation (EPIC) Program encouraged enrollees in federal conservation programs to renew their contracts by providing a bonus incentive payment. It also provided grant funds for producers who proposed innovative agricultural practices to help save water. Another program implemented was the 10/30 Program. Modeled after the federal set-aside program of the 1980s, this program will temporarily retire small parcels of marginal or hard-to-farm land. While EPIC is specifically designed for ground water users only, 10/30 could be utilized for both ground water, surface water, or commingled water users.
- **2016** – The District received two grants (Nebraska Environmental Trust and the Nebraska Department of Natural Resources) to install over 850 telemetry units on flow meters in the District. The telemetry program will provide real-time ground water use data to both the District and the landowner/operator. The program will also save both time and money for the District, as staff will no longer have to go out and physically read those flow meters.
- **2016 --** The District applied for and received a Water Sustainability Fund grant to help permanently retire ground

water acres. Of the 1,000 acres targeted, the District has permanently retired 838.29 acres.

- **2016** – The District, in concert with federal programs, has temporarily or permanently retired almost 9,100 irrigated acres within the District.
- **2017-** The NPNRD Board of Directors has approved the North Platte NRD Community Drought Plan after stakeholders all over the District came together to participate in the District's first-ever drought planning process. These conversations, and the ideas they generated, evolved into the current Drought Plan. Implantation of the plan including public outreach in commenced 2020
- **2018-** North Platte NRD amended rules for collections of water use data from wells outside of the over appropriated area of the district.
- **2019-** The North Platte NRD adopted a levels of nitrate management requirements. These regulations will be implemented in January 2021
- **2017-Today -** The District has instituted our allocation buy-down program which allows producers to sell the District up to 14 acre-inches of their allocation per year. It has been hugely successful and allows producers some added risk mitigation due to low commodity prices or experimenting with alternative crops.

FUTURE – The North Platte NRD *has completed work on updating the Western Water Use Management Model,* which is one of the most up-to-date tools the NRD has available to meet the needs of our constituents and our statutory obligations**.** It provides a better picture of how the ground water and surface water interact, and it gives our Board of Directors the best available information when making decisions. The Board has also streamlined the conservation cost-share programs to be more in line with our water-management goals.

The District continues to partner with landowners, canal companies, and irrigation districts on recharge projects surface water uses. The District has also promoted alternative water-saving methods to increase on-farm efficiencies. The use of telemetry units will provide our producers an up-to-date picture of water use, and features such as soil moisture probes, rain buckets, and other water saving devices can be added to the units to help improve water efficiency. Variable rate irrigation, updating pivot packages, and investment in data-gathering devices are other ways of helping producers improve their water management and save them money, as well as providing another way to meet District IMP obligations. These activities, along with others, will provide both immediate and long-term benefits. We are also taking a leadership role in educating our constituents, rural and urban, about the urgency of protecting our water resources.

The District is continuing to seek ways to address the water issues on the North Platte River and is working with other Platte Basin NRDs to meet the obligations established in LB 962 (2004) and the Platte River Recovery and Implementation Plan. We are evaluating, on a continuing basis, the effectiveness of our actions in implementing the Integrated Management Plan. As of 2020, the NPNRD has returned nearly 27,000-acre feet of water back to the river annually, far exceeding our original goal of 8,000 acre-feet for the first increment.

Updated 1222

Papio-Missouri River NRD

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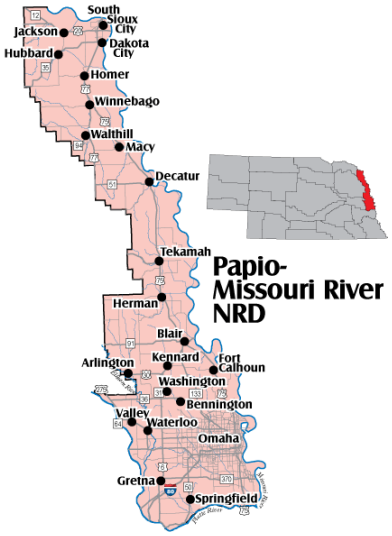

GROUNDWATER STATUS

The Papio-Missouri River NRD (P-MRNRD) monitors groundwater quality and quantity across the District. Groundwater levels are taken twice per year, in the spring and the fall. Monitoring results to date reflect the cyclical nature of river levels, irrigation well pumping and recharge, but have not shown any long-term declines.

Water quality monitoring is done through a partnership with the US Geological Survey (USGS) on a rotating schedule of four different aquifer areas; the Missouri River alluvium, the Platte and Elkhorn River alluvium, the Upland areas, and the Dakota Aquifer. The District has in place 45 dedicated monitoring wells at 16 locations (12 in Wellhead Protection Areas) that are sampled at least biannually. Monitoring results show a majority of the P-MRNRD with nitrate levels well below the 10 ppm MCL. However, areas of concern with nitrate levels between 5 and 8 ppm have been detected in Tekamah's WHPA and south of Springfield, NE.

The District elected to develop a voluntary Integrated Management Plan (IMP) for the Lower Platte River drainage area of our NRD in cooperation with the Nebraska Department of Natural Resources (NDNR). The groundwater control put in place with the adoption of the voluntary IMP in 2014 establishes a limit of no more than 2,500 acres of new groundwater irrigation development per year. The NDNR also placed a limit on the expansion of surface water irrigated acres within the IMP area of 833 additional acres per year. The completion of the Lower Platte Basin-Wide Water Management Plan recommends that the P-MRNRD limit the total amount of new surface and groundwater depletions over the first five-year increment to 869 acre-feet. New depletions are calculated each year by the NRD and NDNR and included in a basin-wide report.

In 2018, the P-MRNRD completed and adopted a new Groundwater Management Plan (GMP) for the entire NRD. The new GMP continues the goal of keeping groundwater quantity and quality sustainable forever, sets new triggers for groundwater quality phases and quantity levels, and recommends various actions for designated groundwater management areas. These recommended actions were incorporated into updated Groundwater Management Rules and Regulations, adopted by the P-MRNRD and effective on March 1, 2018. Fertilizer application date restrictions allow fertilizer applications across most of the District after Nov. 1, except those areas in the hydrologically connected Platte and Elkhorn River valley which must wait until after March 1 to apply fertilizer with over 40 lbs/acre of nitrogen. The newly adopted rules and regulations also enacted well permit requirements throughout the NRD for any well over 50 gpm with required setbacks of 600 feet from any registered well (not just other registered wells >50 gpm).

Small areas in which over 50% of the nitrate sample results have been between 5 and 8 ppm were designated as Phase II Groundwater Quality Management Areas. Agricultural producers who apply fertilizer in these areas must attend nutrient management training, provide annual fertilizer reports, and spilt their fall and spring fertilizer application at least 80/20 respectively with an appropriate inhibitor used in the fall.

ACTION STEPS AND TIMELINE

• 1978 – Initiated static water level monitoring program in the District.
• 1985 – Adopted Groundwater Management Plan (GWMP) as required.
• 1992 – USGS begins groundwater quality monitoring across P-MRNRD
• 1994 – Revised GWMP to include triggers for groundwater quantity and groundwater quality.
• 2009 – Imposed stay on new irrigation wells and limited expansion of groundwater irrigated acres to 2,500 annually.
• 2014 – Adopted voluntary Integrated Management Plan and continued limit on groundwater irrigation.
• 2015 – Completed AEM framework surveys along UNL CSD cross-sections.
• 2016 – Collected AEM survey of western Sarpy County
• 2016 – 2018 - Platte and Elkhorn River Integrated Water Monitoring Study with USGS
• 2017 – Lower Platte River Basin-Wide Water Management Plan adopted
• 2017 – 2018 - Participated in Lower Platte River Drought Mitigation Planning
• 2018 – New Groundwater Management Plan adopted in February; Collected AEM survey NW of Omaha
• 2018 – New Groundwater Management Rules and Regulations effective March 1. Rules and Regulations designate Phase I and Phase II Groundwater Quality Management Areas and a Level I Groundwater Quantity Management Area throughout the entire NRD
• 2019 – New Lower Platte River Drought Contingency Plan adopted
• 2020 – Collected AEM survey of remainder of NRD area

FUTURE

The Papio-Missouri River NRD does not anticipate long-term declines in groundwater levels within the District. The District will continue to monitor both quantity and quality to continue to build upon existing information. This information is provided to USGS and the Conservation and Survey Division at the University of Nebraska-Lincoln. The data is permanently stored in the Nebraska Department of Natural Resources Data Bank.

The District continues to implement and report on the action items outlined in our voluntary Integrated Management Plan and Lower Platte River Basin-Wide Water Management Plan. Adoption of the Basin-Wide Water Management Plan was approved by the P-MRNRD in November 2017 and may require changes to the District's IMP and allowable yearly groundwater and surface water development in the Platte River drainage area. The District has also worked with USGS and received grant funding for the continuous monitoring of groundwater levels and streamflow between the Platte and Elkhorn Rivers to improve the understanding of groundwater gains and losses. The final Lower Platte River Drought Contingency Plan was adopted in 2019 and as such, the P-MRNRD will continue to be involved in the Lower Platte River Consortium and participate in drought monitoring and mitigation actions.

The District is a partner in the joint Eastern Nebraska Water Resources Assessment (ENWRA) project to better map and manage the groundwater resources in Eastern Nebraska. In cooperation with ENWRA, Airborne Electromagnetic Geophysical Surveys of UNL CSD cross section locations within our District were completed in 2015, 2016, 2018, and 2020.

The new GMP along with revised rules and regulations designated Groundwater Management Areas for both quantity and quality across the District. The P-MRNRD will carry out these rules and regulations for specific Groundwater Management Areas.

South Platte NRD

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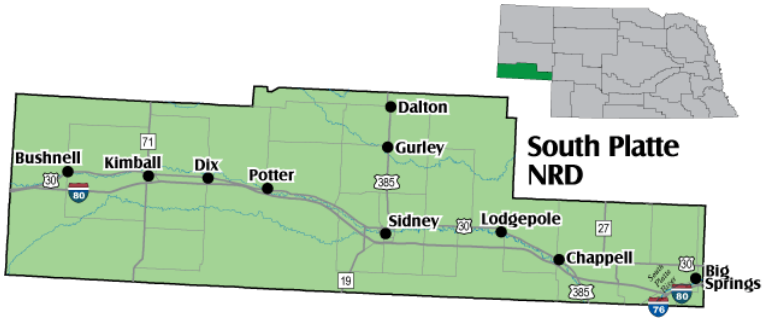

GROUND WATER STATUS – The South Platte NRD is in the southern portion of Nebraska's panhandle, and encompasses all of Cheyenne, Deuel, and Kimball Counties. The land area of the District covers 1,654,300 acres, which is about 3% of the state's land base. Agriculture dominates the economy of the District. Non-irrigated cropland is the largest land use; followed by rangeland and irrigated cropland. Ground water supplies are a vital resource to the District. Domestic, municipal, and industrial water use is strictly from ground water. The South Platte NRD has 132,042 certified irrigated acres or what equates to 1.5% of the ground water irrigated acres in Nebraska. Ground water management goals/objectives are achieved through regulatory and non-regulatory measures pursuant to the Nebraska Ground Water Management and Protection Act. The District continues to develop a more detailed understanding of ground water, as well as programs to further reduce consumptive water uses with economic consideration.

ACTION STEPS AND TIMELINES

- 1988 – SPNRD develops a District wide Ground Water Quality Monitoring Program.
- 1988-1991 – SPNRD conducts detection monitoring effort to identify elevated levels of nitrate-nitrogen and to determine baseline water quality to develop a general understanding of regional ground water quality issues.
- 1990 – The SPNRD adopted and implemented the Sidney Ground Water Management Area, now called the Sidney Ground Water Quality Management Subarea (SGWQMSA), which includes the City of Sidney in a 29-section area.
- 1992 – The SPNRD developed long term monitoring goals and objectives to expand the monitoring network to include a greater number of irrigation /domestic wells and consistently sample these "network wells" to identify trends.
- 1994 – The SPNRD's Ground Water Management Plan (GWMP) was revised and approved, meeting the requirements addressing ground water quality.
- 1994 – The SPNRD's GWMP defined the three Phases of water quality management within the SPNRD as follows:
    - Phase I Controls: Established when the average nitrate-nitrogen levels of all sampled wells exceed 65% (6.5 ppm for nitrates) of the MCL for three consecutive years
    - Phase II Controls: Established when the average nitrate-nitrogen levels of all sampled wells exceed 80% (8.0 ppm for nitrates) of the MCL for three consecutive years
    - Phase III Controls: Established when the average nitrate-nitrogen levels of all sampled wells exceed 95% (9.5 ppm for nitrates) of the MCL for three consecutive years
- 1994 – The SGWQMSA was designated as Phase II.
- 1995 – The SPNRD adopted and implemented two ground water quality subareas in Deuel County, now called the South Platte Valley Ground Water Quality Management Subarea (SPVGWQMSA) as Phase II and the Deuel County Lodgepole Valley Ground Water Quality Management Subarea (DCLPVGWQMSA) as Phase I.
- 1998 - The SPNRD adopted and implemented the Cheyenne County East Lodgepole Valley Ground Water Quality Management Subarea (CCELVGWQMSA) as Phase I.
- 1998 – The Cooperative Hydrology Study (COHYST) was started to develop scientifically supportable hydrologic databases, analyses, models, and other information in the Platte Basin in Nebraska upstream of Columbus.
- 2001 – The SPNRD Board of Directors revised its Ground Water Management Plan to incorporate a Ground Water Integrated Management Plan and to establish a Districtwide Ground Water Management Area designation.
- October 2002 – The SPNRD Board of Directors adopted an order to establish a Districtwide Ground Water Management Area to manage ground water for concerns of quantity, integrated management, and quality.
- October 2002 – The SPNRD Board of Directors adopted an order establishing the Lodgepole Creek Integrated Ground Water Management Subarea, which placed a moratorium on permits for new wells with a capacity of 50 gallons per minute or greater.
- 2002-2006 – Completed certification of 133,457 total irrigated acres with 1,312 registered irrigation wells.
- January 2004 – SPNRD Board of Directors ordered a temporary suspension of water well construction for all areas of the District not already in a moratorium.
- January 2004 – The Board of Directors approved requirement to have flow meters installed on irrigation wells Districtwide. Flow meters were installed incrementally through March 2009.

- July 2004 – Because of LB 962 (2004), stays were placed on the drilling of new large capacity wells and expansion of irrigated acres throughout the District.
- September 2004 – Under LB 962, the entire SPNRD was designated as either fully appropriated or overappropriated.
- January 2007 – First SPNRD required allocations went into effect for 2007 growing season.
- October 2007 – Under the District Rules and Regulations began adjusting Certified Irrigated Acres through variance requests, voluntary CIA retirements, and well deferments.
- July 2008 – The SPNRD and NDNR Integrated Management Plan (IMP) was adopted and went into effect.
- January 2009 – Allocations began in the last subareas phased in under the District's requirements.
- January 2009 – The SPNRD commissioned a study from UNL to determine possible impacts and implications regulations might have on the agricultural community and District economy.
- July 2009 – The SPNRD, NDNR and Platte Basin NRDs approved and implemented the Basin-Wide Plan for Joint Integrated Water Resources Management of Overappropriated Portions of the Platte River Basin.
- July 2009 – The SPNRD Board adopted amendments to the Districtwide Ground Water Management Area Rules and Regulations, lowering allocations in four subareas in the overappropriated area beginning in the 2010 irrigation season.
- February 2010 – As part of the IMP process, the SPNRD began the process to account for industrial/ commercial water uses and establish baselines.
- April/May 2011 –The SPNRD participated in excess flow projects from the South Platte River to the Western Canal. The two projects ran off-season water into canals or recharge pits and delivered more than 157 acre-feet of water.
- September 2011 – The Board approved the final baselines for municipal water accounting, completing the process to account for most ground water uses within the District.
- March 2012 – The Board approved allocation adjustments for the District's tablelands for irrigation years 2013-2015. Allocations were reduced from a 20" per year average to a 14" per year average.
- February 2012 – To help meet goals pertaining to reduction of ground water use under the District's IMP, the board approved funding to be used in conjunction with PBHEP and AWEP program funds as incentives to permanently decertify irrigated acres within the District's overappropriated area.
- July 2012 – Platte Basin NRDs and NDNR formed the Platte Basin Coalition. The Coalition applied for NET funds for projects to study, develop and implement management actions to reduce the consumptive uses of water or to enhance stream flows or ground water recharge in the Platte River Basin.
- 2015 – The South Platte Valley Ground Water Quality Management Subarea was lowered from Phase II to Phase I because of decreasing nitrate levels in the subarea.
- 2019 – During the implementation of the first increment of the Basin-Wide Plan the District achieved progress toward offsetting post-1997 use depletions through a combination of groundwater allocations, intentional recharge to retime and augment baseflows and retiring irrigated land (conservation easements).
- 2019 – Through the SPNRD Integrated Management Plan the SPNRD exceeded expectations during the first ten-year increment designated for the District to offset average annual depletions rates to the North Platte River, South Platte River and to Lodgepole Creek.
- April 2021 – Amendments to the Districtwide Ground Water Management Area were approved by the Board. The Subarea allocation amounts for the 2022-2024 period were kept the same as the allocations for the 2019-2021 period. Allocations for the 3-year allocation period is as follows: Subarea A - 42"; Subarea B - 42"; Subarea C - 42"; Subarea D - 48"; Subarea E - 48"; and Tablelands - 39".
- 2022 – Due to increasing nitrate levels The Sidney Ground Water Management Area moved to Phase III and applies to all irrigated crops except for alfalfa.

RESEARCH, EDUCATION & TECHNOLOGY – The District is constantly searching for more information on water resources in efforts to manage the resource wisely and fulfill the requirements of state law. Some projects include:

- Ongoing – Groundwater Modeling "Western Water Use Management Model" (WWUMM) and beginning of analysis of WWUMM to see how water availability and sustainability are affected by management actions. Analysis will also monitor how the District is meeting its requirements for the IMP and Districtwide Water Management Rules and Regulations. The WWUMM is used along with the Irrigator/Industrial/Municipal Water Usage Reports and Water Level Reports and continued input from the public with Water Advisory Committee Meetings to help the District manage its water resources.
- 2021 (ongoing) – The SPNRD is partnering with the Platte Basin Coalition to develop a USDOI Drought Contingency Plan for the Upper Platte River in Nebraska. The Coalition, comprised of the NeDNR and 5-NRDs, will develop regional solutions to improve the water supply reliability and drought resiliency of the Upper Platte River Basin.
- October 2022 – The District was successful in seeking funding through the fourth-generation Water Sustainability Fund grant application period to further update and refine the WWUMM to ensure the most up to date modeling and information. This follows previous funding received in 2016, 2018, and 2020 through the Water Sustainability Fund.

Tri-Basin NRD

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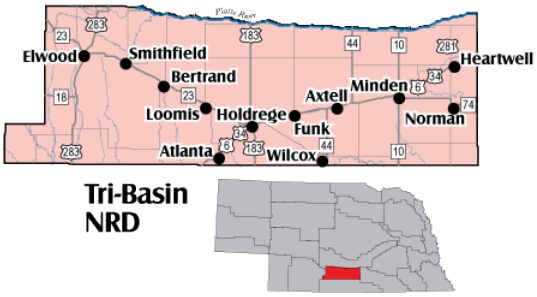

GROUNDWATER STATUS

Tri-Basin NRD includes portions of the Platte, Republican and Little Blue River basins in south-central Nebraska. All irrigated land in the district has been counted and certified. No additional irrigated acres can be developed anywhere within the district. Flowmeters are in place on all wells in the Republican Basin portion of the district and are required on all conditional replacement wells. Transfers of groundwater and certified irrigated acres are regulated under NRD rules.

ACTION STEPS & TIMELINES

- 1977- Tri-Basin initiated a district-wide groundwater level data observation network.
- 1981-87- Tri-Basin worked with US Geological Survey (USGS) and NE Natural Resources Commission to model groundwater resources in south-central Nebraska. This model was used as a basis for Tri-Basin‘s first groundwater management plan.
- 1989- Tri-Basin established a groundwater management area to protect groundwater quality.
- 1995- Revised NRD groundwater management plan was approved by Nebraska Department of Water Resources.
- 1996-Tri Basin and other Republican Basin NRDs initiated “LB 108” process for Republican Basin portion of the district to regulate groundwater users to protect Republican River streamflows. It was suspended at the request of Attorney General Don Stenberg after Kansas filed a lawsuit against Nebraska over Republican River Compact compliance in 1998.
- June 2003- Tri-Basin NRD required flowmeters on all irrigation wells in the Republican Basin portion of the district. Flowmeters are also required on all new wells district-wide.
- July 2004- Tri-Basin NRD and DNR agreed on a joint action plan for the Republican Basin portion of the district under LB 108 provisions.
- September 2004- Tri-Basin declared a district-wide groundwater quantity management area and an integrated management area to protect Platte and Republican basin streamflows.
- March 2006- Tri-Basin expanded the integrated management area to include an area in the Platte Basin designated that same month by DNR as fully appropriated.
- October 2006- Tri-Basin closed the Little Blue Basin portion of the district to development of additional irrigated acres to prevent groundwater declines. Tri-Basin is working with Little Blue NRD to develop a joint plan for management of groundwater supplies.
- May 2008- Nebraska Game & Parks Commission (NGPC), Central Nebraska Public Power and Irrigation District (CNPPID) and Tri-Basin NRD approved an agreement that enables Tri-Basin and NGPC to compensate CNPPID for delivering excess Platte streamflows to Elwood Reservoir. These water deliveries, the first high flow diversions for purposes other than irrigation in Nebraska history, protected the fishery at Elwood Reservoir and provided groundwater recharge that benefits both the Platte and Republican River basins.
- September 2008- Tri-Basin NRD designated one township in Gosper County as a phase 3 Groundwater Quantity Management Area, due to declining groundwater levels. Groundwater pumping was limited to a total of 27 inches per acre for 2009-2011. An adjacent township was

designated as phase 2 for quantity management. The Phase 3 restrictions have continued and the declines in groundwater levels have stopped.

- July 2009- Tri-Basin NRD and CNPPID approved an agreement for CNPPID to request that DNR re-classify 3000 acres of surface irrigation water rights for instream flow. The water will be delivered to the Platte River near Lexington and will offset groundwater well depletions to streamflows.
- August 2009- Tri-Basin NRD and NDNR agreed on joint IMP for the Platte Basin portion of the NRD. The IMP and associated NRD rules changes take effect September 15, 2009.
- May 2011- Tri-Basin NRD launched the first phase of a streamflow augmentation project on North Dry Creek, a tributary of the Platte River in Kearney County. The project involves leasing land for groundwater wellfields that will be used to augment streamflows in North Dry Creek. The project helps the State of Nebraska fulfill its commitment to the Platte River Recovery Implementation Program to reduce shortages to Platte River flow targets. A second augmentation well was drilled in July, 2014.
- November 2015- Tri-Basin NRD and Lower Republican NRD approved an interlocal agreement to study development of a project to divert excess flows from the Platte to the Republican River basin. A feasibility study is in progress.
- October 2016- Tri-Basin NRD board designated May Township in Kearney County as Phase 2 for groundwater quantity management, to arrest groundwater declines before they become critical.
- 2009 to present – Tri-Basin NRD and NDNR contracted with Central Nebraska Public Power & Irrigation District to divert high flows from the Platte for purposes of providing groundwater recharge. Tri-Basin and DNR paid CNPPID over $2,200,000 for diverting about 49,000 acre-feet of water during these events.
- January 2016- Tri-Basin NRD and Lower Republican NRD signed an inter-local cooperation agreement to evaluate the feasibility of a Platte-Republican Diversion project. A feasibility study was completed in March 2017 and indicates the project would have a very favorable cost-benefit ratio. The districts received a Water Sustainability Fund grant of $900,000 in December 2017 to assist with construction costs. Tri-Basin and Lower Republican applied for a water right for the project in 2018. After two hearings, in 2019 and 2021, the Department of Natural Resources determined that there were no valid objections to the water right application in a ruling on December 12, 2022.
- 2019- Tri-Basin launched the Water Conservation Incentive Program (WCIP). This program offers management flexibility and financial incentives to groundwater users who agree to accept voluntary allocations and for owners of commingled parcels (access to both groundwater and surface water) to use canal water. Over 5570 acres are enrolled in the program as of 2022.
- Sept. 2020-Tri-Basin NRD and the Platte River Recovery Program (PRRIP) entered into an agreement for TBNRD to construct and operate a streamflow augmentation wellfield (eight wells) along the Platte River in northwest Phelps County. The wellfield is intended to reduce impacts to streamflows due to groundwater pumping and to help support habitat needs of endangered Whooping Cranes and other migratory birds.

FUTURE

Tri-Basin NRD has enacted comprehensive regulations to manage groundwater quality and quantity, as well as for integrated management of interconnected groundwater and surface water resources. Protecting domestic water supplies is the top priority under the district Groundwater Management Plan.

Twin Platte Natural Resources District

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GROUND WATER STATUS – The Twin Platte Natural Resources District (TPNRD) began an extensive ground water level monitoring program in the mid 1970's and established a Ground Water Management Plan in the mid 1980's. In 2004, the Board of Directors, in consideration of the Water Policy Task Force recommendations that resulted in LB 962-2004 being enacted by the Nebraska Legislature, approved a temporary suspension on drilling new wells for an area within the 28%/40 years SDF line. In 2006, the Board of Directors took action to approve a Ground Water Management Area that established a stay on the issuance of high capacity water well construction permits for all of the TPNRD. In 2007, the Board of Directors took action to adopt a stay on the use of existing water wells to increase the number of acres historically irrigated for all of the TPNRD. All of the irrigated acres were certified in 2010. No new acres can be developed without Board of Directors approval.

ACTION STEPS & TIMELINES

- **1976-**Began an extensive ground water level monitoring program.
- **1985-**Established a Ground Water Management Plan.
- **March 12, 1998-**Approved participating in an Inter-local Cooperation Agreement for a Cooperative Hydrology Study (COHYST) for the Platte River Basin in Nebraska.
- **July 1, 2004-**Temporary Suspension on Drilling New Wells began for the area within 28%/40 Years SDF line.
- **February 24, 2006-**A Ground Water Management Area became effective which established a stay on the issuance of high capacity water well construction permits for the entire TPNRD.
- **June 18, 2007-**A stay on the use of existing water wells to increase the number of acres historically irrigated became effective for the entire TPNRD.
- **2004-Began TPNRD Integrated Management Plan (IMP) (LB 962-2004 Required)**
  - To incrementally achieve and sustain a fully appropriated condition.
  - 2004-2009 – Stakeholders prepared recommendations for the TPNRD IMP
  - Within the first 10 Year Increment (2009-2019), address impacts of streamflow depletions to surface water appropriations due to water use initiated after July 1, 1997.
    - For the TPNRD, that requirement consisted of adding 7,700 acre feet of water per year to the Platte River within the TPNRD.
  - Within the second 10 Year Increment (2019-2029), address impacts of streamflow depletions to surface water appropriations due to water use initiated after July 1, 1997.
    - For the TPNRD, that requirement consisted of an additional 17,300 acre feet of water per year to the Platte River within the TPNRD for a total of 25,000 acre feet per year.
  - Within Subsequent Increments, address returning the river to a fully appropriated condition.
  - Offset water projects and programs for IMP
    - November 2012-NCORPE (Nebraska Cooperative Republican Platte Enhancement Project)

    - The TPNRD and the three Republican NRDs permanently retired 19,500 irrigated acres in Southern Lincoln County.
    - A pipeline is used the convey water to both the Platte and Republican Rivers as needed.
    - 117 irrigation wells were decommissioned, and the irrigated acres returned to native vegetation.
    - October 2017-NCORPE-North Pipeline Complete - Water to the Platte River.
- 2015 – Ongoing – TPNRD lease agreements with the irrigation districts in the TPNRD for use of their canals and laterals to divert available excess flows in the Platte River
- 2015 – Ongoing – NE Department of Natural Resources opportunities for the Acreage Reserve Program
- 2018 – Ongoing – Paying landowners to maintain not irrigating certified ground water acres
- Spring 2019 - Ongoing -TPNRD Water Data Program – GiSC (Growers Information Services Cooperative)
    - Tool for TPNRD and growers
    - The Water Data Program components
        - Agreement with GiSC
        - Obtaining irrigation well flow rates (contracts with well drilling companies)
        - Work with electrical providers to automate smart meter reading downloads
        - Installing transmitters with wireless communications for the running time of diesel/gas powered wells
        - A second increment Integrated Management Plan (IMP) Work Plan with Olsson for working with the GiSC data
        - Validation of the data obtained by GiSC with water meters on wells in the TPNRD
        - Data Storage & Management
        - Uses certified acres to accurately report water usage by crop type.
    - Accurate real-time water usage data for the grower and the TPNRD that will be used in ground water computer models to determine IMP requirements, and offset water from projects and programs.
- January 2022 - Submitted an application to the NRCS Watershed and Flood Prevention Program, “Watershed and Flood Prevention Operations” (WFPO), that provides an opportunity for the irrigation districts in the TPNRD and the TPNRD Integrated Management Plan (IMP).
- 2022 – Ongoing - Working with the NE Department of Natural Resources for obtaining Surface Water Irrigation Infrastructure Funds that provides an opportunity for the irrigation districts in the TPNRD and the TPNRD Integrated Management Plan (IMP).
- January 2022 – Opportunities for the Platte River Basin throughout NE for the South Platte River Compact Perkins County Canal project.

Upper Big Blue NRD

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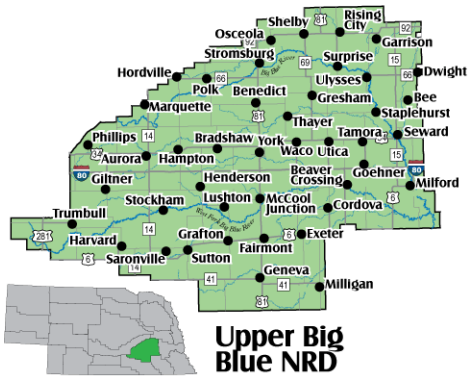

GROUNDWATER STATUS:

The Upper Big Blue NRD Groundwater Management Area was the second one established in Nebraska. That was in 1977, right after the Upper Republican Area. The Upper Big Blue NRD Groundwater Management Area encompasses all or parts of nine counties and has 1/8 of the total irrigated acres in Nebraska. The changes in water levels are closely related to the changes in annual rainfall. Coincidently, the Upper Big Blue NRD has more irrigated acres within its boundaries than 37 states. The average irrigation use for 2021 was 6.7 inches per acre. This is based on reports covering 1,244,369 acres in the District. Over 1,000,000 acres use center pivot irrigation systems.

ACTION STEPS & TIMELINE

- **1972** – Upper Big Blue NRD created (all 23 NRDs started on the same date).
- **1974-76** - Dry period, drought coupled with increase of groundwater wells being drilled.
- **1975** – Nebraska Groundwater Management Act adopted by the Legislature.
- **1977 –** Upper Big Blue Groundwater Management Area established in a cooperative effort between the Nebraska Department of Water Resources and the Upper Big Blue NRD to protect the future.
- **1978 – Upper Big Blue NRD average groundwater level hits** low of 7 feet below 1961 level.
- **1979 – Ground Water Management Area regulations go into effect** with the goal of keeping the declines to less than ½ foot per year. The rules included well permits, 1,000 foot well spacing, and future allocation if decline rate was exceeded.
- **1980-87; 1991-94; 1997-99; 2007-08** —**Wet periods:** Abundance of precipitation; groundwater levels rise; rising average groundwater levels mirror rising accumulated rainfall.
- **1990 – Rules changed to hold the average groundwater level at or above the 1978 level (sustainability).**
- **1993 –** Water Quality Management Area established in Upper Big Blue NRD through cooperative effort with the Department of Environmental Quality.
- **1999 –** Rules added to require large groundwater users (withdrawal of 500-acre feet from one parcel of land per year) to conduct a hydrologic study showing the impacts of the groundwater withdrawal. If the impact is not adverse, a permit is granted.
- **2000 – Upper Big Blue average groundwater level hits all-time high** of 7 feet above 1961 level.
- **2001-04 –** Dry periods and extreme drought conditions, groundwater levels decline.
- **2004 –** Regulations amended establishing a reporting trigger (groundwater level declines to a point three feet above the1978 level) and an allocation trigger (another 3-foot drop beyond the reporting trigger). A flowmeter must be installed on any new or replacement well.
- **2005 –** Small area in Hamilton County parallel to the Platte River declared fully appropriated with a stay on well drilling and expansion of irrigated acres. The rest of the NRD does not have a well drilling moratorium but is still subject to the groundwater management regulations.
- **2006 - Reporting trigger reached, requiring the certification of all irrigated acres using county assessor records.** Three ethanol plants permitted to drill wells based on minor impacts demonstrated through required large water user hydrologic studies. One other site was deemed not feasible for permit because of impact on other water users.
- **2007 – Above average annual rainfall.** All water users required to report water use by Dec. 31, 2007. Total average irrigation water use reported was 4.95 inches per acre. 1,109,818 irrigated acres were certified by the Board of Directors. Rules were changed to implement more restrictive groundwater transfers. A city begins required large water user study for proposed city well field.
- **2008-09 – Additional acres certified** bringing the total to nearly 1.2 million certified irrigated acres. Total average irrigation water use reported was 4.3 inches per acre. Fifth ethanol plant water study approved but for lesser amount of withdrawal than requested.

- **2010-11 – Flood Control/Drainage Projects** created in Milford and David City to protect lives and property for District citizens.
- **2012 – Severe drought.** Average district groundwater levels drop -4.38 feet.
- **2013 – Allocation Regulation:** The Board adopted the regulation to set the first allocation period of 30 acre inches over three years, with a second allocation period of 45 acre inches over five years (a 10% reduction). When the allocation trigger is reached, the allocation process is invoked. The allocation trigger on the Upper Big Blue NRD's average groundwater level chart has been in place since 1990.
- **2014 – Mandatory Flow Meters:** ALL wells with a pumping capacity greater than 50 gpm must be equipped with a District approved flow meter by January 1, 2016.
  High Risk Groundwater Area (15% of District) established, which includes the following: New high capacity wells (wells that pump more than 50 gpm) must be at least 1,250 feet from existing high capacity wells, including wells with the same ownership; new high capacity wells must be at least 1,250 feet from existing domestic wells under different ownership; new high capacity wells must be at least two miles from existing municipal wells; existing wells may be replaced; new or replacement domestic water wells shall be constructed to such a depth that they are less likely to be affected by seasonal water level declines caused by other water wells in the same area.
- **2015 – Average district groundwater levels are up +1.42 feet.**
  Small Dams Program: The Private Dams Program provides planning, design and financial assistance for the construction or reconstruction of dams located on private property. These dams generally have a cost exceeding $15,000 and have a drainage area of approximately 80 to 640 acres. Dams constructed under this program generally involve only one landowner. Public benefits include flood control, sediment and erosion control, water conservation, groundwater recharge, and fish and wildlife enhancement.
- **2017-20 – Average district groundwater levels are stable showing little fluctuation. Average water use remains at or below the NRD average of 6.6 inches per acre.**
  Joint Water Management Plan: Embarked on the first-ever combined water quality management and voluntary integrated management planning processes in partnership with both the Nebraska Department of Environment and Energy (NDEE) and the Nebraska Department of Natural Resources (NeDNR). Water quality management plans address restoration and protection of water quality and are developed with assistance from NDEE. Voluntary integrated management plans address the sustainability and quantity of hydrologically connected groundwater and surface water and are developed with assistance from NeDNR. The Upper Big Blue NRD viewed the separate planning processes to combine two inseparable priorities for water quantity and quality into a consolidated planning process that fully engages citizens within the District to help form the goals and objectives for both plans. The theme for this project is One District, Two Plans, One Water. The Water Quality Management Plan was adopted by EPA in December 2019. This effort sparked the creation of incentive programs aimed to protect surface and groundwater quality thru the use of cover crops and filter/buffer strips.
  Project GROW (Growing Rotational crops On Wellfields) is a partnership between the City of York and the NRD. The goals are to improve soil health, increase soil carbon, erosion control, non-leaching of nitrogen into the water table, and increasing water holding capacity in the soil, culminating in the protection of York's water quality at the wellfield while maintaining agricultural profitability. This partnership will continue through 2027.
  Blue Basin Regional Groundwater Model: The NRD in partnership with NeDNR, Lower Big Blue, Little Blue and Tri-Basin NRDs continue to work on a regional groundwater flow model of the Blue River Basin in Nebraska. The model will identify areas of hydrologic connection between ground and surface water, aid in the development of large water user studies, and aid in the development of policies pertaining to groundwater quantity.
  Partnerships with The Nature Conservancy: The NRD has partnered with The Nature Conservancy and other agencies to begin two long-range programs on soil health. One involves interseeding cover crops in corn and soybeans at the V-4 to V-6 stage of growth. The other program offers producers financial incentives for a variety of soil health practices, from cover crops, to reduced tillage, to enhanced crop rotation.
- **2022 – Average district groundwater levels drop -0.24 feet.**
  Chemigation Incentive Program: The district launches a new chemigation incentive program to encourage the use of split nitrogen application using center pivot irrigation.
  At-home Water Quality Test Kits: To increase awareness to drinking water quality the district, in partnership with the University of Nebraska Citizen Science Program began offering at-home water quality test kits to private well owners. In the partnerships first year, over 500 test kits have been distributed within the district.

Upper Elkhorn NRD

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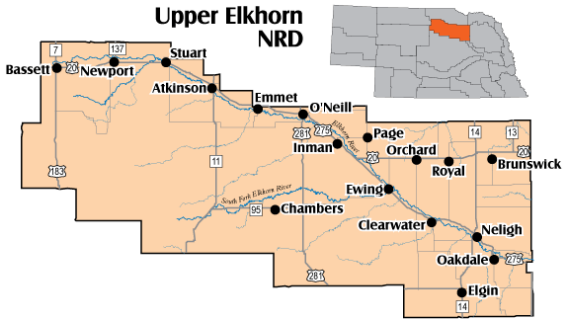

GROUNDWATER STATUS

Located in northeast central part of the state, the Upper Elkhorn NRD encompasses approximately 1.9 million acres of cropland, rangeland, and grassland in Antelope, southern Holt, eastern Rock, and northern Wheeler Counties. Irrigated agriculture, cattle, and hay production are vital to the economy of this sparsely populated region. Currently (2022), NeDNR has not labeled any portion of the district as fully-appropriated. Portions of the Niobrara and Lower Platte River Basins were preliminarily labeled fully appropriated, but this was reversed by NeDNR in 2011 and 2009, respectively. Limited groundwater development (12,500 acres) was allowed to be developed between 2009-2013 of which 11, 282 acres were developed. After the 2012 drought, no new groundwater irrigated acres were allowed for the 2014-2016 growing seasons. Since 2009, 15,584.13 new groundwater irrigated acres and 10,059.41 transferable gw irrigated acres have been allowed to be developed. No significant decline in static water levels have occurred since annual spring static water levels were first recorded in 1972.

ACTION STEPS & TIMELINES

- **2012** – UENRD partnered with NARD, NDEQ, and the CSD of the University of Nebraska-Lincoln to develop an online Nitrogen Applicator's Certification Program.

***** UENRD continued to participate in the Elkhorn-Loup Model with other NRDs and USGS. Phase III of the ELM model to be completed in FY14-15 which will assist in management decisions with the hydrologic connectivity between ground and surface water into the future.

***** Certification of groundwater irrigated acres throughout the whole NRD began.

***** The Upper Elkhorn NRD began working with three other NRDs and NDEQ in developing a watershed management plan for the Bazile Groundwater Management Area (BGMA) in northern Antelope, Knox, and Pierce counties. This plan, approved in 2016, is the first community-based, groundwater management plan approved by EPA.

*****The UENRD labeled portions or all of 25 additional townships to the existing 4 townships (557,00 acres) as Phase II areas for nitrate-nitrogen. Additional reporting and restrictions are required.

***** The UENRD made changes to the District Groundwater Management Plan Rules and Regulations, allowing up to 2,500 acres to be developed for groundwater irrigation, include and require the remaining 8% of the district that was outside of the Lower Platte 10/50 area to apply for expansion of irrigated acres, and setting a time period (November 1-March 1) to allow for irrigated acre transfers.

- **2013 –** The Upper Elkhorn NRD took large strides in certifying groundwater irrigated acres.

***** UENRD joined the Lower Platte River Basin Coalition (LPRBC) (comprised of 7 NRDs) to develop a voluntary basin-wide integrated management plan.

***** UENRD joined 4 other NRDs (UNWNRD, MNNRD, LNNRD, LLNRD) and formed the Niobrara River Basin Alliance (NRBA) to work on ground and surface water-related issues.

- **2014** – Coordinator was hired for the BGMA to inform cooperators of best management practices (BMPs). Irrigation and nitrogen demonstration sites and cost-share programs have been developed, funded in part by a Nebraska Environmental Trust (NET) grant.

***** The Board voted to develop a Basin-wide Management Plan (IMP) with NeDNR for the NRBA. The Plan to be developed is to manage existing surface and groundwater uses and evaluate potential development of those uses for the future.

- **2015** – UENRD unveiled an online reporting program to assist cooperators on Phase II nitrogen reporting requirements of the Districts Rules and Regulations.

* LPRBC NRDs collectively began working within the Lower Platte River Basin on developing a Basin-Wide IMP to protect and enhance ground and surface water within the basin.

***** NRBC NRDs and NGPC submitted an instream flow request to NeDNR.
***** NRBC and NGPC signed a MOU to acquire NPPD's Spencer Hydroelectric facility for the betterment and management of surface and groundwater resources.
***** UENRD expanded 300 additional gw data collection points to provide the district with, nitrate, static water levels, and flow meter readings to estimate trend lines and groundwater usage. District expanded flowmeter readings on approximately 400 sites bringing total to 525 sites.
***** May 26, UENRD voted to move forward with a Voluntary Integrated Management Plan.
***** Spring static water levels still had not fully recovered from the 2012 drought.

- **2016** – The Bazile Groundwater Management Project received a grant from the Nebraska Environmental Trust to fly Aerial Electromagnet (AEM) grid surveys over the entire Bazile Groundwater Management Area. Transects were flown in 2016 and the company, Aqua Geo Frameworks, presented the results to the staff and the public in Creighton, NE in 2017.
- **2017** – The Niobrara Instream Flow Application was approved by NeDNR for the NGPC and NRBA.

*****The Board passed new Rule 27 to the UENRD Rules & Regulations. This Rule better manages water quantity in the District based on static water levels triggering mechanisms and management including Information and Education programs, flowmeter requirements, and allocations to protect future users. The new Rule became effective February 1, 2018.
*****The Board approved the Lower Platte River Basin Coalition Plan to protect and enhance ground and surface water within the basin of the seven participating NRDs.

- **2018** – Groundwater Management Plan Rules & Regulations (Water Quality Controls) were approved by UENRD and NeDNR on Dec 17, 2018 and became effective February 1, 2019.

*A Voluntary IMP was approved by UENRD and NeDNR Dec 17, 2018 and became effective February 1, 2019.

- **2019** – NRBA members approved to move forward with purchase of NPPD's surface water rights associated with Spencer Hydro Facility.

*New GWMP Rules and Regulations approved regarding groundwater transfers which became effective November 1, 2019.
*Bazile Groundwater Management Area Team hired an UN-L Extension Coordinator to work with producers on demonstration sites promoting Best Management Practices.

- **2020** – The Board of Directors election format changed to by sub-district not sub-district at-large.

*UENRD approved 904 acres for groundwater irrigation development for 2021 growing season.
*Bazile Management Area Team established 3 demonstration sites promoting Nitrogen Inhibitors, Diverse Crop Rotation, and Soil Health.

- **2021 –** Bazile Management Project submitted a new PIP and was accepted by US-EPA.

*August **–** Appropriate documentation was submitted to NeDNR to transfer NPPD's Spencer Hydro water appropriations to the NGPC and the NRBA.
*October 1, the newly updated UENRD Rules and Regulations became effective.

- **2022 –** UENRD updated requirements for new groundwater irrigation development and approved 300 acres for the 2023 growing season. The focus of the updated requirements was the completion of full circle rotations on center pivot irrigation systems. Acres were only approved where the focus and application requirements were met.

* October – The application to NeDNR to transfer NPPD's Spencer Hydro water appropriations to the NGPC and the NRBA was approved and the order signed by NeDNR. The order permanently transferred the appropriations from hydropower production purposes to instream basin-management appropriations for fish, wildlife, and recreation purposes.

Ongoing – Each year UENRD helps sponsor area water festivals and environmental events to promote the awareness of our natural resources to students across Northeast Nebraska. UENRD is actively promoting conservation of soil & water resources.

Upper Loup Natural Resources District

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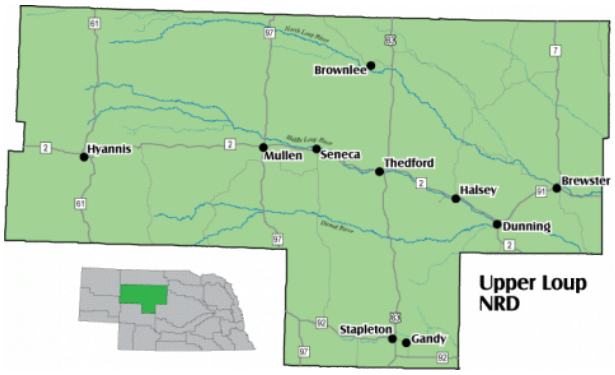

Upper Loup NRD, part of the Loup River Basin, includes all of Grant, Hooker, Thomas, Blaine, and Logan Counties and parts of McPherson, Brown, and Cherry Counties. The entire sparsely populated area of 4,275,000 acres, is agricultural in character with the main agricultural activity cattle and hay production.

1970's Ninety-nine wells measured annually in the fall for static water levels since 1972.

1978 Several water quality programs established (soil sampling, noxious weed control).

1985 Ground Water Management Plan was prepared and approved for the ULNRD.

1986 Began testing all ground water samples for nitrates upon request.

1987 Started issuing chemigation permits and performing inspections.

1990 Helped fund and maintain long term two weather stations.

1991 A revision of the 1985 Groundwater Management Plan is completed.

1994 Additions to the quality portions of the Ground Water Plan were made.

1995 Began to participate in Water Wellhead Decommissioning cost share program.

1998 District purchased an Ultrasonic Fuji Flowmeter to test the flow rates on irrigation wells.

2004 Began participating in the Nebraska Rainfall Assessment and Information Network.

2005 One of the co-sponsors in the Elkhorn-Loup Groundwater Model study (ELM).

2006 District gathers irrigated water use information from producers.

2007 Developed and adopted Groundwater Area Management Rules and Regulations. New rules include the requirement of well permits and flow meters on all new wells pumping 50gpm or more, certification of irrigated acres, water use reporting from irrigators, commercial users and municipalities.

2008 Began certifying irrigated acres, certified 67,000 across District. Drilled 3 dedicated monitoring wells each with continuous data recorders. Implemented a cyclic water quality testing program for nitrates for all registered and requested non-registered domestic and irrigation wells throughout the District. Started annual educational visits to all schools within District.

2009 Developed and adopted LB-483 Rules and Regulations which limit the expansion of irrigated acres to 2,500 acres annually or 10,000 over the next 4 years. 67,382 irrigated acres certified. Drilled 3 dedicated monitoring wells with continuous data recorders.

2010 Placed a District wide limitation on expansion of irrigated acres not to exceed 2,500 acres per year. 69,882 acres were certified. Installed 2 stream gages, one on the South Loup and one on the North Loup Rivers. Recycling trailers were placed in 5 of the villages within the District. Drilled 3 additional dedicated monitoring wells. Implemented a community driven All Hazards Mitigation Plan.

2011 Certified 70,226 irrigated acres. Recycling program added more collection trailers and collected over 46 tons of recyclable materials.

2012 Certified 73,812 irrigated acres. Provided cost share on 79 flowmeters and 15 soil moisture sensors across District. Recycling program expanded to include another village and a baling facility was built at the Thedford office. ULNRD began an annual "Junior High" field day for all the schools in our District.

2013 Developing a Basin Wide Water Management Plan with 7 other NRD's in the Lower Platte South Basin. Certified 80,205 irrigated acres. Placed 6 more soil moisture sensors throughout District. District purchased another large vertical baler to increase efficiency in our recycling efforts.

2014 The Upper Loup started a Voluntary Integrated Management Plan (VIMP) with DNR. Partnered on a 319

South Loup Watershed Management Plan. 80,933 certified irrigated acres this year. 30 soil moisture sensors placed across the District. Purchased an additional no-till drill for producers to use to improve soil health and water quality. NRD partnered with a local RC & D office to purchase equipment to aid in cedar removal.

2015 District began a 3-year study to enhance our understanding of spatial and temporal characteristics of groundwater and surface water interaction in the Loup River Basin. Groundwater Rules and Regulations were amended to state that no high-capacity wells are to be drilled within 300 feet of an existing active domestic well and flowmeters are required on all high-capacity wells in sub-district 5 by May 1 of 2017, in sub-district 4 by May 1, 2018 and sub-districts 1-3 by May 1 of 2020. We have 80,933 certified irrigated acres. We completed our Hazard Mitigation Plan 5-year update.

2016 The District approved its Voluntary Integrated Management Plan. Drilled 3 observation wells for both quality and quantity. We have 81,882 certified irrigated acres. Began a District-wide water budget study. No new irrigated acres for 2017 while in the middle of the water budget study.

2017 81,882 certified irrigated acres. Domestic and irrigation wells across the district continue to be tested annually for nitrates and currently average 3.4 ppm, well below the 10-ppm public health limit. Our first year of our recycling program, 2010, we accumulated 26 tons of recyclables in 2017 we collected over 119 tons of paper, cardboard, tin and aluminum. To date we check 135 static water levels and 13 dedicated monitoring wells within the District. Since first checking levels in the 70's our ground water levels have been steady and no long-term declines found. District continues to provide natural resources presentations to local schools, producers and community organizations.

2018 To date over half of our District's high-capacity irrigation wells have flowmeters installed with a due date of 2020 to have the entire District metered. Static water levels remain steady and nitrate levels continue to be far below the public health limit. Recyclables collected over the past year and kept out of our landfill system was 26 tons plus.

2019 **I**rrigated acres reviewed using 2018 aerial photography. We have 81,897 certified irrigated acres. Static water levels remain steady, a few sub-districts have increased 1-3 feet. Completed our 5-year Hazard Mitigation Plan renewal. Designing and planning an arboretum for local rural fire department which will aid in erosion and runoff of the project site. Entire District remains in a phase 1 designation in regards to nitrate levels which is between 0-5.9 mg/L. NRD provided 37 presentations to schools and groups this past year on natural resources such as water, soils, range and wildlife.

2020 Total number of certified acres to date is 82,341. All high-capacity wells in the District are metered and annual water use amounts are collected by NRD staff. ULNRD has started a Drought Mitigation Plan to be completed in 2022. Static groundwater levels remain steady with no notable decreases. Recycling program has increased and is now collecting glass and electronics in addition to paper, plastics, tin and aluminum. This year the District began testing for manganese along with nitrates. To date the entire ULNRD remains in Phase 1 (0-5.9 mg/L) designation for nitrates. The NRD completed arboretum project, with over a thousand trees, shrubs and pollinators being planted.

2021 District continues to monitor both water quantity and quality across the District. To date groundwater levels remain steady and entire area remains in Phase 1 for nitrates. District purchased a new 15' No-till drill for use by producers to help with soil health. Post COVID school presentations and Jr. High Field Day were held this year.

2022 ULNRD started using a new database system with new mapping, certified acres were cleaned up and show to date acres as 80,425. A District-wide Drought Mitigation Plan was completed and approved. Our Groundwater Management Plan was updated this year. No notable changes in groundwater levels across the NRD and the entire district remains in Phase 1 (0-5.9 mg/L) designation for nitrates.

Upper Niobrara White NRD

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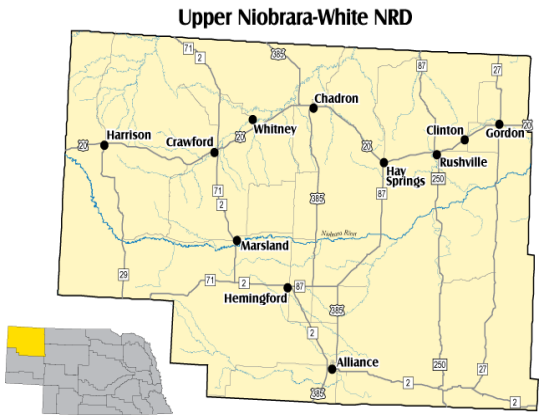

GROUNDWATER STATUS

Portions of the UNWNRD have been experiencing declining static water levels since the early 1970's. The District approved a Ground Water Management Plan in 1984. In July of 1998 the District designated a District-wide Ground Water Management Area and adopted Rules and Regulations for enforcement. In 2003, the UNWNRD imposed a moratorium on the issuance of well permits for wells pumping over 50 gpm. Replacement wells are still allowed with a permit from the District. The UNWNRD is divided into six ground water management sub-areas. By DNR determination, the UNWNRD was preliminarily designated fully appropriated in July 2004. After studies and a hearing, a final determination in November 2004 led to ground water management sub-areas 1, 4 and 5 being declared fully-appropriated. In October 2007, DNR preliminarily determined the Lower Niobrara River Basin to be fully appropriated and made a final determination in January of 2008, this fully appropriated determination included ground water management sub-areas 6 and portions of sub-areas 2 and 3. In June 2011, the Nebraska Supreme Court ruled that the Lower Niobrara River Basin was not fully appropriated and the Department's 2008 determination was reversed.

Water quality degradation is not a widespread issue in the UNWNRD. Water sampling throughout the District has shown very little contamination. The UNWNRD, with the help from the Department of Environmental Quality (DEQ), has established water quality priority areas where ground water contamination has been indicated or there is a greater potential for contamination.

ACTION STEPS AND TIMELINES

- 1984 – Ground Water Management Plan developed and adopted.
- 1995 – Ground Water Management Plan revisions adopted.
- 1998 – Ground Water Management Area established for the entire District.
- 2003 – The UNWNRD requests DNR study, in consultation with the NRD, the hydrologically connected ground and surface water in the District and a joint action plan be developed for the integrated management of ground and surface water resources. The UNWNRD imposed a temporary suspension on the issuance of new well permits in the entire district. The UNWNRD appointed a Citizen's Advisory Committee to assist with revisions to the NRD's Ground Water Management Plan and the development of a Joint Action Plan.
- 2004 – The entire UNWNRD preliminarily determined to be fully appropriated by the Department of Natural Resources after the passage of LB 962. DNR held public informational meetings and public hearings in October and released their conclusions in the form of a report entitled: "Report on Hydrologically Connected Groundwater and Surface Water in the Upper Niobrara White Natural Resources District". DNR released its final determination designating Hat Creek Basin, the White River Basin, the portion of the Niobrara River Basin above the Mirage Flats Diversion Dam, The Box Butte Creek Sub-basin and the Snake Creek Sub-basin fully appropriated. The District and DNR started preparing an Integrated Management Plan for management of water resources for the fully appropriated area.
- 2005 – The UNWNRD amended the Rules and Regulations for the Ground Water Management Area and enforcement of the Ground Water Management Plan.
- 2006 – The UNWNRD revisions to the Ground Water Management Plan and amendments to the Ground Water Management Area Rules and Regulations adopted.
- 2007 – The UNWNRD finalized the certification of all regulated uses in the entire District. Irrigation ground water wells within ground water management sub-areas 4 and 6 are metered and were restricted to a 16-acre inch per year allocation. DNR preliminarily determines the Lower Niobrara River Basin to be fully appropriated.

- 2008 – DNR released final determination that the Lower Niobrara Basin is fully appropriated and the portion of the District included in this determination is incorporated into the Integrated Management Plan and Rules and Regulations. Ground water management sub-area 2 triggered a phase II designation, all high capacity wells required to be metered by March 1, 2009. The UNWNRD and DNR completed the Final Draft of the Integrated Management Plan. Plan requires meters in ground water management sub-area 5 by March 1, 2010. The UNWNRD revised GWMA Rules and Regulations to keep consistency between IMP Rules and Regulations and the GWMA Rules and Regulations.
- 2009 – Integrated Management Plan adopted May 14, 2009. The UNWNRD finalized GWMA Rules and Regulations amendments. The UNWNRD and DNR worked with an independent consultant to develop an integrated ground water model and surface water model for the portion of the Niobrara River above the Mirage Flats Diversion.
- 2010 – GWMA Rules and Regulations adopted June 10, 2010. The 2011-2014 allocation is reduced to 54 acre inches, annualized at 13.5 inches per year. UNWNRD supports the DNR in a request for a Water SMART grant from the Bureau of Reclamation's Basin Study Program to study water management options in the Niobrara River Basin. The Niobrara River Basin study is one of six projects that the Bureau funded in 2010.
- 2011 – UNWNRD and Department reviewed and modified the Integrated Management Plan. The Lower Niobrara River Basin is determined to not be fully appropriated by Nebraska Supreme Court ruling. This decision changed the fully appropriated area of the UNWNRD and led the District to modify its rules and regulations to incorporate the LB 483 rules.
- 2012 – The UNWNRD continued to work with the DNR and consultants to finalize ground water and surface water modeling in the Niobrara Basin.
- 2014 – The 2011-2014 average water use is 11.58 inches per acre. The 2015-2019 allocation is reduced to 65 inches, annualized to 13 inches per year. In collaboration with DNR, the UNWNRD completes the integrated management model and begun utilization of the model in evaluating scenarios and management recommendations.
- 2015 – The Niobrara River Basin Alliance (NRBA) is created by the NRD's in the basin to develop a coordinated basin-wide management plan with the DNR, as well as a Memorandum of Understanding is signed by the NRBA, Nebraska Game and Parks and Nebraska Public Power District for the purchase of the Spencer Hydropower facility and associated water right. The UNWNRD partners with the DNR through Insight Data Enhancement Program (IDEP) funding to evaluate actual water use data and coordinate information into input data sets for water modeling. The UNWNRD partners with DEQ to complete a Watershed Management Plan for the White River and Hat Creek Watersheds.
- 2018 – The UNWNRD Board voted to allow an exception to the District-wide well moratorium in ground water management subarea 3. Conditional well permits may be issued for development of up to 1300 acres, with approval through a ranked application process. The 2020-2024 allocation will remain at 65 inches, annualized at 13 inches per year.
- 2019 – The UNWNRD and Department partnered to conduct a recharge potential analysis to mitigate groundwater declines. The UNWNRD undertakes a review and update of the certified acres in the district.
- 2020 – An analysis, in partnership with the Department, was undertaken to assess the feasibility of relocating water from areas where water levels have been observed to be increasing to areas of decline.
- 2021 – Initiated a Watershed and Flood Prevention Operations (WFPO) Project in partnership with NRCS to capture flood waters for reducing flood damage and to recharge groundwater in the Box Butte Creek Watershed.

FUTURE

The District will continue to evaluate scenarios with the integrated management model and monitor, in conjunction with State and Federal agencies, the ground and surface water resources within the district; if declines in these water supplies continue to occur, further restrictions may be placed on some or all of the water users in the District.

Upper Republican NRD

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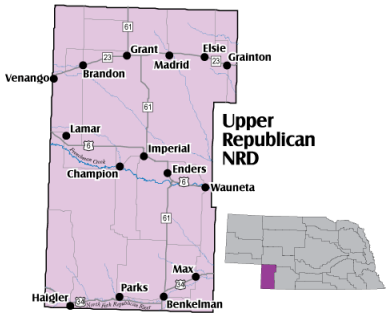

GROUNDWATER STATUS

The Upper Republican NRD was the first NRD in the state, and possibly the first entity in the U.S., to regulate agricultural groundwater use. It began doing so in the late 1970's after it and other NRDs were given regulatory authority via the Groundwater Management and Protection Act by the Nebraska Legislature, which was encouraged to pass the legislation by the Upper Republican and other NRDs. The Upper Republican NRD aggressively employed the new available authorities by requiring all irrigation wells be metered, limiting the volume of water that could be applied on cropland over 5-year allocation periods, requiring minimum spacing between irrigation wells, and eventually prohibiting new and expanded irrigation uses, among other actions. The Upper Republican's rules have slowed groundwater declines and will continue to evolve to preserve water for future generations.

History of regulations pertaining to irrigation wells in the Groundwater Management Control Area established February 7, 1978:

ACTION STEPS AND TIMELINES

- 1976 – Ground Water (GW) Management Act Passed
- 1977 – Established GW Management Area and Certified Acres
- 1978 – 1979 – Established GW Metering program
- 1978-1979 – Well Spacing: 3300 ft. from existing irrigation well and 1,320 ft. from existing stock or domestic well in townships designated as critical. Allocation set at 20 inches per acre per year including incentives for installing meters prior to 1980.
- 1980-1982 – Meters required on all wells. Allocation is set at 22 inches per year.
- 1983-1987 – Allocation reduced to 20 inches per acre per year for flood irrigation and 16 inches per acre per year for sprinkler irrigation.
- 1988-1992 – Allocation reduced to 15 inches per acre per year for all irrigation wells.
- 1992 – Well spacing in critical townships increased to 5,280 ft. from existing irrigation wells.
- 1993-2004 – Allocation reduced to 14.5 inches per acre per year.
- 1997 – Permanent moratorium on new irrigation wells issued, the first well-drilling moratorium in the state
- 1998-2005–Republican River Compact Lawsuit and Settlement Agreement – Kansas sued Nebraska in 1998 alleging noncompliance with the Republican River Compact that allocates waters of the Republican River Basin between Colorado, Nebraska and Kansas. The suit led to a 2002 settlement agreement between the three states that established a new methodology for determining compliance with the compact; primarily, depletions to stream flow from groundwater pumping were included in the accounting of each states' use of its compact allocation. In July of 2004 a "fully appropriated" designation was made under LB 962. In May 2005 the District adopted its first Integrated Management Plan (IMP) pursuant to LB 962. The IMP is a cooperative effort by the NRD and Nebraska Department of Natural Resources to ensure short and long-term Compact compliance.
- 2005-2007 – Allocation reduced to 13.5 inches per acre per year.
- 2007– Revised IMP adopted that included reduced water use, implementation of incentive programs and surface water leases funded through authorities granted in LB701 intended to ensure the State's compliance with the Compact and Settlement. In cooperation with the Middle and Lower Republican NRDs, surface water was leased from Frenchman Valley, Riverside, and Frenchman-Cambridge Irrigation Districts, allowing the State to maintain its consumptive use within its allocation for the 2007 year, as well as reduce the amount of the State's overuse in the 2003-2007 five year accounting period.

- 2008– Allocation reduced to 13 inches per acre per year for 5-year allocation period. Study of possible augmentation projects continued. Water short year compliance options for Integrated Management Plan with Department of Natural Resources were analyzed.
- 2010 – Adopted a revised IMP designed to keep the state in compliance with the Compact during water-short years using a combination of programs and projects to reduce consumptive use. Plan emphasizes acreage retirement and stream flow enhancement projects.
- 2011– District purchases 4,080 acres and 2,400 adjoining acres the following year that were retired from irrigation so a portion of the water that otherwise would have been used to irrigate could be piped into Rock Creek, a tributary of the Republican River, to aid Compact compliance. The Rock Creek Augmentation Project can provide the majority of the water that history suggests the District may need during the driest of times to meet its Compact compliance obligations. In addition to the project, the District used federal and local dollars to permanently retire from irrigation 1,360 acres. On average, nearly 11 inches of water for irrigation had annually been applied to the acres, and the average stream-flow depletion factor of the retired land is 88 percent.
- 2012 – An additional 188 acres with significant impacts on stream flow were permanently retired from irrigation using District funds and federal AWEP funds, bringing the total number of retired acres through the AWEP program to 1,546. The District, along with three other NRDs, initiated the NCORPE augmentation project in Lincoln County that included the retirement of approximately 16,000 acres from irrigated production. The project can keep the state in compliance with the Republican River Compact during exceptionally dry periods.
- 2013 – The Rock Creek Augmentation Project began operations and prevented the shutdown of at least 23,000 irrigated acres in the District to maintain compliance with the Republican River Compact. Construction began on the NCORPE augmentation project. Combined with the Rock Creek Augmentation Project, NCORPE helped prevent an irrigation shutdown on about 300,000 acres in 2014. The URNRD Board of Directors in 2013 also approved new rules designed to conserve water. The new rules limit the amount of carry-forward allocation farmers can use to 7.5 inches during an allocation period. Another rules change penalizes farmers who borrow allocation from a subsequent allocation period.
- 2014 – In February 2014, NCORPE began operations with a goal of increasing stream flow by approximately 42,500 acre feet so the State could maintain compliance with the Compact. The Rock Creek Augmentation Project in Dundy County added about 21,000 acre feet of stream flow in 2014. In the fall of 2014, the State reached agreements with Kansas and Colorado that allows the augmentation projects to get 100% credit for water pumped in 2014 and 2015.
- 2015 – Operation of NCORPE prevented an irrigation shutdown on about 300,000 acres in the Basin and kept the state in compliance with the Compact. The U.S. Supreme Court issued a final ruling in the KS v. NE case alleging Nebraska's noncompliance with the Compact in 2005 and 2006. Kansas' request to permanently shut down irrigation on 500,000 acres in Nebraska was rejected and Compact accounting change that benefits Nebraska approved. The IMP was revised to implement aspects of Supreme Court decision and agreement among Compact states that gives Nebraska and the NRDs more flexibility with augmentation operations.
- 2016 – The three states party to the Compact reached a landmark agreement expected to reduce the amount of water that has to be provided to Kansas by Nebraska via actions including augmentation. The NCORPE project is again operated, preventing an irrigation shutdown in the Republican Basin.
- 2018 – Nebraska Supreme Court rules that groundwater access is linked to land ownership.

FUTURE

2022 was the last year of the District's five-year allocation period; a new five-year allocation and other rules changes are expected for 2023 to help the District continue efforts to bring water uses into balance with water supplies.