



Lower Platte River Basin Water Management Plan P-MRNRD Annual Report 2019

DRAFT – March 4, 2020

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**Confluence of the Platte and Elkhorn Rivers –
March 16, 2019**

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1.0 INTRODUCTION

The Pappio-Missouri River Board of Directors adopted the Lower Platte River Basin Water Management Plan (LPBWMP), dated October of 2017, on December 14, 2017. As part of the Lower Platte River Basin Coalition, the six other NRDs and the Nebraska Department of Natural Resources also approved the LPBWMP and agreed to cooperatively implement the plan per Interlocal Agreement #2.

The Lower Platte River Basin Water Management Plan recommends numerical limits for allowable new water depletions during the first 5-year increment of the plan (January 1, 2017 through December 31, 2021). The allowable new depletions for the first 5-year increment were divided by subbasin and further by individual NRD as documented in Table 4.2 of the LPBWMP.

The LPBWMP calls for the annual tracking of allowable new depletions beginning July 1, 2016. The first reporting period of the Basinwide Plan first increment, according to Table 5.1, is July 1, 2016 through December 31, 2017. All subsequent reporting years are required on a calendar year basis starting in 2018. This report provides the data collected during the 2019 reporting period for the plan area within the Pappio-Missouri River NRD in accordance with Table 5.2 of the LPBWMP.

2.0 2019 DATA COLLECTION

Data collected and reported on water supplies and uses within the P-MRNRD include:

- Certified Irrigated Acres
- Co-mingled Groundwater and Surface Water Uses
- Municipal and Industrial Groundwater Uses
- New Groundwater consumptive uses
- Groundwater Use Transfers
- Water supply well permits granted
- Retirement of groundwater consumptive uses
- Water use flow meter date
- Water banking activities
- Stream flow accretion activities
- Groundwater elevation data
- Stream gage measurements on NRD maintained gages
- NRD regulations/management area activities
- New water depletions
- New data collected or model/study results

2.1 CERTIFIED IRRIGATED ACRES

The P-MRNRD has not completed certification of irrigated acres within its Integrated Management Plan (IMP) or LPBWMP area, which includes all areas tributary to the Platte and Elkhorn Rivers (herein after referred to as the “plan area”). This plan area covers approximately 228,000 acres in Sarpy, Douglas and Washington counties. It is estimated that irrigated cropland comprises approximately 11% of this land area or 25,000 acres.

The P-MRNRD is proposing to complete the initial certification of irrigated acres within the next year. Since 2009, approximately 3,600 new irrigated acres which received a variance from the District under the requirements of LB 483 have been certified.

2.2 CO-MINGLED GROUNDWATER AND SURFACE WATER USE

No data is collected on co-mingled groundwater and surface water use within the P-MRNRD.

2.3 MUNICIPAL AND INDUSTRIAL GROUNDWATER USES

The P-MRNRD has collected annual data on municipal uses within the plan area since 2015. This data is reported only for the municipal wells within our District and would not include Metropolitan Utilities District (MUD), Lincoln, or Fremont wells in adjacent counties. Data from commercial or industrial users who have their own individual water supply well is not collected at this time.

Municipal Annual Water Use

| Municipal Well Field | 2016 Total Pumped (Ac-ft) | 2017 Total Pumped (Ac-ft) | 2018 Total Pumped (Ac-ft) | 2019 Total Pumped (Ac-ft) | Notes |
|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------------|
| Papillion | 4,326.2 | 4,661.1 | 4,482.2 | 4,655.4 | |
| Lincoln | 20,451.2 | 22,115.1 | 11,866.5 | 8,246.5 | Includes only wells in P-MRNRD |
| MUD South | 38,030.4 | 27,217.2 | 31,104.3 | 36,201.0 | |
| MUD West | 8,976.2 | 12,225.1 | 10,741.7 | 9,861.9 | Includes only wells in P-MRNRD |
| Fremont | 4,971.5 | 4,987.4 | 5,395.3 | 5,719.6 | Includes only wells in P-MRNRD |
| Valley | 334.4 | 469.3 | 506.3 | 537.3 | |
| Springfield | 170.8 | 183.8 | 202.3 | 188.7 | |
| Gretna | 1,052.0 | 1,267.4 | 1,263.5 | 1,279.7 | |
| Arlington | 217.4 | 231.3 | 165.8 | XXX | |
| TOTAL | 83,501.6 | 73,357.7 | 65,727.9 | 66,690.1 | |

Lincoln's municipal uses have varied over the last few years not only due to demand, but to ongoing treatment plant maintenance and flooding issues. The net consumptive use of municipal water is not tracked or estimated at this time as return flows to the Platte River tributaries are not reported or estimated. Municipal water pumped by MUD and Papillion would be considered a total consumptive use as it ends up as return flow to the Missouri River.

2.4 NEW GROUNDWATER CONSUMPTIVE USES

The P-MRNRD only tracks groundwater consumptive uses as a result of new irrigated acres which receive a variance from the District under the prior requirements of LB 483 and our current IMP. No new irrigated acres in the plan area were granted a variance in 2019. Any depletions from new irrigated acres are reported in Section 2.14.

New groundwater consumptive uses from high capacity wells used for livestock were permitted in the uplands north of Arlington by the PMRNRD in 2018, but not accounted for as a consumptive use. Applying groundwater use estimates and methods similar to LPNRRD, consumptive use estimates for these two livestock facilities are now included in Section 2.14.

2.5 GROUNDWATER USE TRANSFERS

The P-MRNRD does not review or approve groundwater use transfers at this time. Therefore, no data is available.

2.6 WATER SUPPLY WELL PERMITS GRANTED

The P-MRNRD adopted requirements for well permits for new high capacity wells effective March 1, 2018. Only one new high capacity well permit was approved in the Platte River Basin (Plan Area) in 2019, and this was a replacement irrigation well with no new irrigated acres. Two well permits (with two 80 gpm wells at each site) for chicken production barns (livestock) in Washington County were approved in 2018. A copy of the data provided in the Excel spreadsheet is attached to this report for reference.

2.7 RETIREMENT OF GROUNDWATER CONSUMPTIVE USES

The P-MRNRD does not review or collect information on groundwater use retirements at this time. According to the NDNR Registered Well Database, two irrigation wells, along the east bank of the Elkhorn River in Douglas County, were decommissioned in 2019 in the P-MRNRD IMP Area (and one of these was replaced with the well granted a new well permit). This indicates the retirement of groundwater consumptive uses would be negligible over this reporting period.

2.8 WATER USE FLOW METER DATA

The P-MRNRD does not require or collect data from flow meters at this time. Therefore, no data is currently available. Flow meters will be required on all active high capacity wells following March 1, 2023. Prior to that time, the NRD will collect flow meter data from wells that it provides cost-share funding to install the flow meter.

2.9 WATER BANKING ACTIVITIES

The P-MRNRD does not operate or maintain any available water banks at this time. Therefore, no data is available.

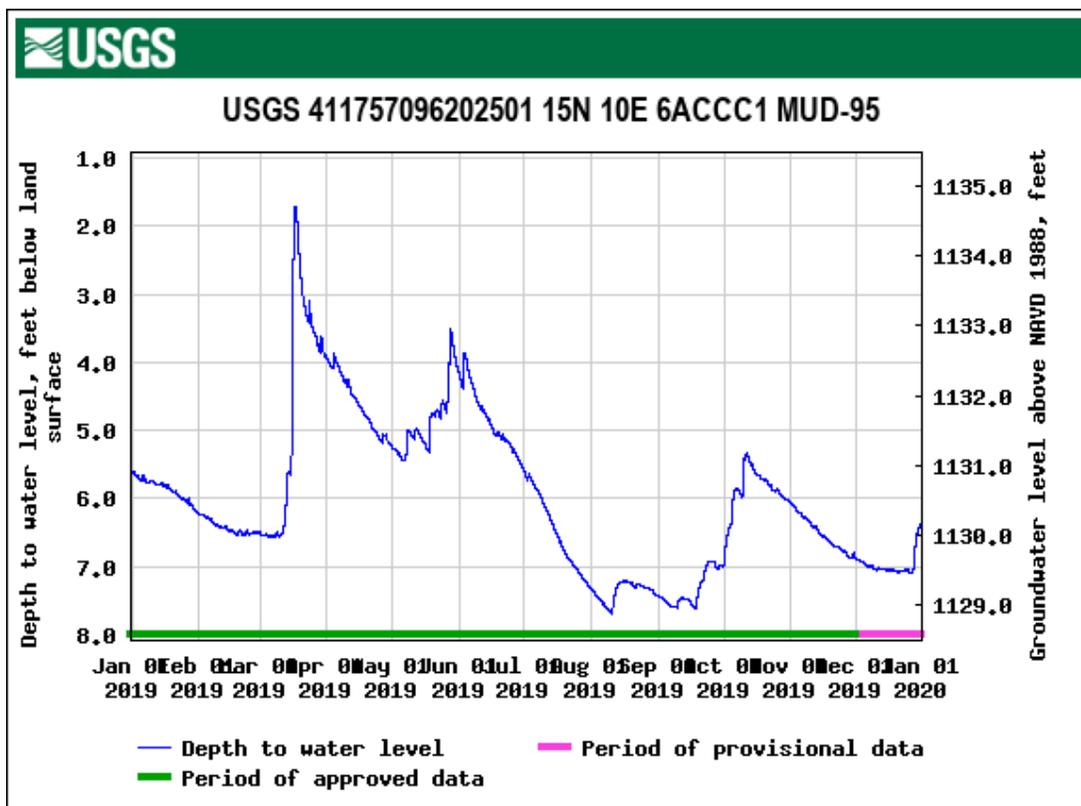
2.10 STREAMFLOW ACCRETION ACTIVITIES

There are no ongoing projects in the P-MRNRD to augment surface water flow or conjunctively manage groundwater and surface water. Ongoing studies relevant to conjunctive management of surface and groundwater between the Platte and Elkhorn Rivers is discussed in Section 2.15.

2.11 GROUNDWATER ELEVATION DATA

Groundwater level measurements were collected at 30 locations within the plan area during the spring of 2019. Some sites have been measured since 1978. In general, groundwater levels in late April through May 2019 were above their period of record average following the 2019 March flooding. Figure 1 displays the depth to groundwater measured and the percent rise or decline from the running average for each groundwater level measurement location. This groundwater level data in the IMP area has a standard deviation between 0 and 2 feet.

The USGS and PMRNRD have been able to collect continuous recording groundwater level data at 5 sites within the plan area, spread across the Platte and Elkhorn River valley between Leshara and Waterloo. Below is the annual data from one of these sites. This shows the large increase in groundwater levels across the valley as a result of the March 2019 flood event.



2.12 STREAM GAGE MEASUREMENT ON NRD MAINTAINED GAGES

The P-MRNRD does not own or operate any stream gages within our IMP area that are independent of data collected by USGS or NDNR.

2.13 NRD REGULATIONS/MANAGEMENT AREA ACTIVITIES

Major updates to the P-MRNRD's Groundwater Management Plan (GMP) and Rules and Regulations were adopted in March 2018. A Phase I Groundwater Quantity Management Area (GMAs) was designated for the entire P-MRNRD on March 1, 2018. New rules which became effective March 1, 2018 under the new Phase I GMA designation include:

- Water Supply Well Permits are required for all new high capacity wells (>50 gpm) within the NRD.
- In addition to minimum state requirements, a 600 foot well spacing will be required between all new high capacity well and any other registered water supply well.
- Flow meters will be required within the hydrologically connected area of the IMP by March 1, 2023.

2.14 NEW WATER DEPLETIONS

The P-MRNRD requires the issuance of a variance to expand irrigated acres in the plan area. This data is input into the accounting for estimating depletions as described on page 28 of the LPBWMP.

The P-MRNRD did not receive any variance applications to expand irrigated acres in the plan area during the reporting period. The registration of any new wells during this time period was used as check to verify that any new uses actually received a variance. It was confirmed that no new wells were completed during 2019 that cause a new water depletion.

It is the P-MRNRD's understanding that increases of municipal use for municipalities with transfer permits, including MUD and Lincoln, were already accounted for before allowed depletions were calculated. Increases in use by other municipalities or industry will be researched by the Basin Coalition and accounted for after the first increment.

New groundwater depletions from high capacity wells used for livestock were permitted in the uplands north of Arlington by the PMRNRD in 2018, but are not accounted for as a new depletions yet as livestock uses are still being evaluated by the Coalition. Applying groundwater use estimates (90 gal per day per 1,000 chickens) and peak season depletions (= annual depletion * 0.3) estimates for these two livestock facilities are included in Table 1 below.

Table 1. Peak Season Depletions for High Capacity Wells to Supply Livestock Operations in the Plan Area (2018 – 2019)

| Well Permit No. | Year | SDF | Peak Season Depletion | Well Status | Location |
|-----------------|------|-------|---------------------------------------|----------------|-------------------------|
| 1018005 | 2018 | 0.621 | 4 – 47,000 chicken barns = 2.90 ac-ft | Not Registered | 41.606530°, -96.386265° |
| 1018008 | 2018 | 0.836 | 4 – 47,000 chicken barns = 3.90 ac-ft | Not Registered | 41.504844, -96.410792 |

Not including the livestock uses, the balance of allowable new depletion for the P-MRNRD between January 1, 2020 and December 31, 2021 is shown in the table below:

| Depletion Desc. | Peak Season Depletion (AF) | Balance (AF) |
|--|----------------------------|--------------|
| 2016 – 2021 PMRNRD Allowable Depletion | | 869 |
| 2016-17 New NRD GW Depletion | 1.5 | 867.5 |
| 2016-17 New NDNR SW Depletion | 67.3 | 800.2 |
| 2018 New NRD GW Depletion | 0 | 800.2 |
| 2018 New NDNR SW Depletion | 0 | 800.2 |
| 2019 New NRD GW Depletion | 0 | 800.2 |
| 2019 New NDNR SW Depletion | 10.0 | 790.2 |
| TOTAL Depletion | 78.8 | 790.2 |

2.15 NEW DATA COLLECTED OR MODEL/STUDY RESULTS

The P-MRNRD is engaged in several ongoing studies with other NRDs and agencies within the Lower Platte Basin.

One such study effort is the Lower Platte River Consortium spearheaded by the Lower Platte South NRD in partnership with Lower Platte North NRD, P-MRNRD, City of Lincoln, MUD, and NDNR. The objective of the consortium is to develop a Drought Mitigation Plan for the Lower Platte River. See documentation available at: <https://www.lpsnrd.org/draft-drought-plan>

Another effort is an ongoing USGS study sponsored by the P-MRNRD and Lower Platte North NRD to monitor groundwater and surface water conditions in the combined Platte and Elkhorn River Valley. A final report was issued in 2019 and is available through the USGS publication warehouse at: <https://pubs.er.usgs.gov/publication/sir20195048>.

3.0 REVISIONS TO THE PLAN

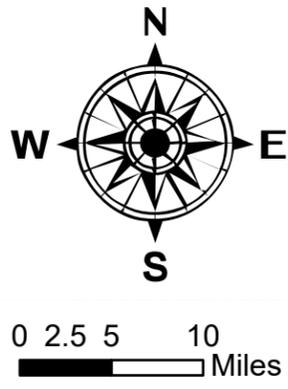
There are no anticipated revisions to the plan at this time. The P-MRNRD will need to document and prepare revisions to its Integrated Management Plan with NDNR in order to incorporate the allowable depletion values per the LPBWMP.

4.0 COALITION BUDGET AND MEMBER CONTRIBUTIONS

The P-MRNRD has \$20,000 budgeted for support of the coalition this fiscal year (before July 1, 2020)

FIGURES and APPENDICES

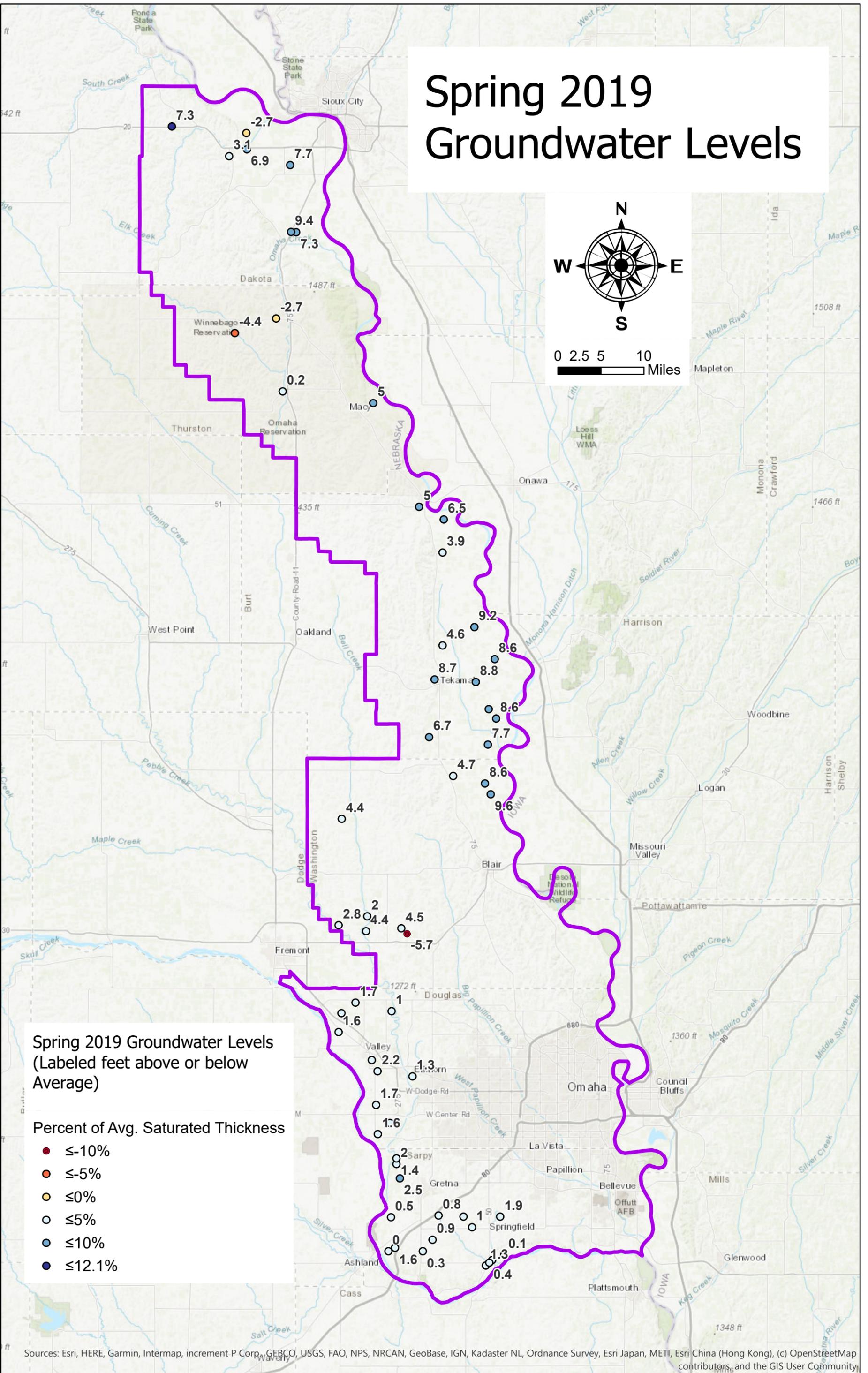
Spring 2019 Groundwater Levels



Spring 2019 Groundwater Levels (Labeled feet above or below Average)

Percent of Avg. Saturated Thickness

- $\leq -10\%$
- $\leq -5\%$
- $\leq 0\%$
- $\leq 5\%$
- $\leq 10\%$
- $\leq 12.1\%$



| NRD Permit ID | DNR Well Registration | DNR Well ID | County | X UTM Zone 14 | Y UTM Zone 14 | Latitude | Longitude | Township | Range | Range Direction | Section | SubSection |
|---------------|-----------------------|-------------|------------|---------------|---------------|-------------|-------------|----------|-------|-----------------|---------|------------|
| | G-180920 | 245475 | Sarpy | | | 41.10488889 | -96.3022778 | 13 | 10 | E | 9 | SESW |
| | G-189021 | 245476 | Sarpy | | | 41.10579444 | -96.3046806 | 13 | 10 | E | 9 | SESW |
| | G-182491 | 248288 | Sarpy | | | 41.10592222 | -96.1597444 | 13 | 11 | E | 10 | SESE |
| | G-181167 | 245902 | Sarpy | | | 41.02886111 | -96.2732778 | 12 | 10 | E | 11 | NWNW |
| | G-182516 | 248316 | Dodge | | | 41.40638889 | -96.4872222 | 17 | 8 | E | 35 | NENE |
| | G-184854 | 252279 | Douglas | | | 41.24883889 | -96.2969917 | 15 | 10 | E | 21 | SWSE |
| | G-184028 | 250836 | Douglas | | | 41.220675 | -96.332275 | 15 | 10 | E | 31 | SESE |
| 1018005 | | | Washington | ##### | ##### | | | 19 | 9 | E | 23 | |
| | G-184660 | 251914 | Sarpy | | | 41.17166667 | -96.3013889 | 14 | 10 | E | 21 | SWNE |
| 1018011 | G-186281 | 254511 | Sarpy | ##### | ##### | 41.05611111 | -96.3130556 | 13 | 10 | E | 32 | SENE |
| 1018009 | G-075361 | 252697 | Douglas | ##### | ##### | 41.2165 | -96.33506 | 14 | 10 | E | 6 | NWNE |
| 1018010 | | | Washington | ##### | ##### | | | 20 | 11 | E | 26 | |
| 1019003 | | | Douglas | | | 41.38 | -96.389504 | 16 | 9 | E | 2 | SW |
| 1019009 | G-073758 | 258669 | Douglas | | | 41.31942222 | -96.2919056 | 16 | 10 | E | 34 | NWNW |

New_Well

| HUC8 | HUC12 | Use | Approval Date | Install Date | Status | Flow Meter ID | Flow Meter Install Date | Pump Capacity (gpm) | Replacement Well | Notes |
|------|-------|-----|---------------|--------------|-----------------|---------------|-------------------------|---------------------|------------------|--|
| | | | | 9/14/2016 | Registered | | | 1800 | No | Lyman-Richey Commercial/Industrial |
| | | | | 9/16/2016 | Registered | | | 1800 | No | Lyman-Richey Commercial/Industrial |
| | | | | 10/28/2016 | Registered | | | 100 | No | Hughes Tree Service Commercial/Ind |
| | | | | 10/19/2016 | Registered | | | 322 | No | Cloisters on the Platte Commercial/In |
| | | | | 4/17/2017 | Registered | | | 700 | No | NEBCO Commercial/Industrial |
| | | | | 10/2/2017 | Registered | | | 120 | No | West Shores Commercial/Industrial |
| | | | | 3/7/2017 | Registered | | | 260 | No | Variance V-0052 |
| | | | 4/26/2018 | | Permit Approved | | | 80 | No | Ruwe Livestock Barns |
| | | | | 3/1/2018 | Registered | | | 125 | No | Registered Use is Other |
| | | | 8/30/2018 | 10/19/2018 | Registered | | | | No | Use is Recreation to fill duck hunting |
| | | | 6/12/2018 | 3/15/2018 | Registered | | | 3100 | Yes | MUD West Well Field Replacement V |
| | | | | | Permit Approved | | | 80 | No | Soll Livestock Barns |
| | | | 2/4/2019 | | Permit Approved | | | 75 | No | Quasar Drive-In Commercial/Industria |
| | | | 9/24/2019 | 10/5/2019 | Registered | | | 500 | Yes | Replaced G-073758 |

Change_Certified_Acres

| NRD (abbreviation) | NRD Transaction ID | Part | Change Type | County | X UTM Zone 14 | Y UTM Zone 14 | Latitude | Longitude | Township | Range | Range Direction | Section |
|-------------------------------|-------------------------------|-------------|--------------------|---------------|--------------------------|--------------------------|-----------------|------------------|-----------------|--------------|------------------------|----------------|
| PMR | V-0052 | 1 | New | Douglas | | | 41.2207 | -96.332275 | 15 | 10 | E | 31 |

Change_Certified_Acres

| SubSection | HUC8 | HUC12 | Change Date | Area (acres) | DNR Well Registrations | DNR Surface Water Appropriation ID | Ratio Surface Water | Irrigation Method | Use of Irrigated Acres | SDF | NIR feet | Notes |
|------------|------|-------|-------------|--------------|------------------------|------------------------------------|---------------------|-------------------|------------------------|------|----------|-------|
| SESE | | | 2/16/2017 | 11.00 | G-184028 | | | Center Pivot | | 0.85 | 0.54 | |

| Lower Platte Basin Coalition Reporting | Certified Acres | Variance Process | Transfer Process | Collecting Municipal Use | Sand/Gravel Pit Information | Collecting Commercial/Industrial Use | Collecting Livestock Well Usage (>50gpm) | Flowmeters | Water Banking | New Acres | Well Moratorium | Well Agreements (replacement, supplemental) |
|--|--|---|--|--|--|--|---|---|--|---|--|--|
| Lower Loup NRD | All Acres since 2006 | Since 2007 | Since 2006 | Since 2016, data collected via NRD form | None collected beyond commercial use | Started in 2019, data collected via NRD form, rule requirement | Started in 2019, data collected via NRD form | Mandatory in three sub-areas, voluntary for rest of District, approximately 1,000 meters read by NRD staff on a bi-annual basis | Since 2006, based on transfers, sw relinquishment | Board Decides Annually/Basin Dependant, applications in September, ranking criteria based | Since 2007 | Since 2007: Supplemental are conditional, replacements allowed, new are variance based |
| Upper Loup NRD | All Acres since 2008 | Since 2010 | Only allow transfers within district boundaries | Since 2008 on ULNRD form | None collected | Since 2010 on ULNRD form | Since 2010 - none to date | Mandatory across the district by May 1, 2020 | No water banking program to date | Board decides annually in June. Applications due previous September, ranking criteria based | No | Both allowed, to date no supplemental wells drilled. |
| Lower Elkhorn NRD | | | | | | | | Mandatory District-wide on all high capacity wells. Annual water-use reports due by December 1 each year. Approximately 5,000 total meters in District. | None | Determined annually by Board action. Approvals determined by highest ranking requests, as determined by the scoring/evaluation matrix. No new acres in Quantity Management Subareas, or in any Phase 3 Area (for groundwater quality protection). | No new wells without an approved variance. Established in January 2009. | Replacements allowed, new wells with an approved variance. Annual groundwater allocation of 9 acre inches for any new irrigation well constructed to expand irrigated acres. |
| Upper Elkhorn NRD | Working on completing acre certification, acres can still be certified until Feb. 1, 2021 | none | Since 2011 | Since 2016 - for the municipalities in the LPRB to include in this report | None collected unless part of this report's commercial/industrial use | None collected; show on report who has wells registered for this use | None collected; show on report who has wells registered for this use | Since October 2010, flowmeters have been required on all new wells (new, helper, transfer, or replacement) permitted in UENRD which pump ≥ 50 GPM. | No formal water banking, but in conjunction with our Acre Certification, UENRD is certifying historically groundwater irrigated acres at 95% should the landowner decide to reactivate a field for irrigation purposes, and "banking" the 5% | Board decides annually if there will be any new acres allowed that year. If allowed there is ranking criteria | None currently in effect | Replacements and supplementals are allowed with well permit |
| Lower Platte North NRD | Since 2014 | Since 2009 | Since 1997 | Required by all communities since 2018, certain communities since 2009 | Collected Voluntary since 2018 | Collected Voluntary since 2018 | Required in 2 sub-areas where wells >50 gpm | Required in 2 sub-areas on wells >50 gpm. Read by producers and spot checked within a 4 year period | None | Board allocates 200 Acre Feet per year by variance process and ranking criteria. | No new well in 2 sub-areas only | New wells approved by variance process. Replacement allowed and supplemental by Board approval since 2009 |
| Lower Platte South NRD | All acres since 2011 | Since early 2000s | Since early 2000s | Variable; still developing procedure | None collected beyond reported use; annual reporting since 2011 | None collected beyond reported use; annual reporting since 2011 | None collected beyond reported use; annual reporting since 2011 | Mandatory on all wells >50 gpm and on all new permitted wells since 2011 | None | No new acres allowed in Dwight-Valparaiso-Brainard Special Management Area; no other restrictions | None currently in effect | Replacements allowed with Board approval for DVB SMA; no other restrictions |
| Papio-Missouri NRD | Only new acres approved with a Variance since 2009 | Since 2009 | None | Since 2016 | None collected | None collected outside of municipal use | Only for wells permitted > 50gpm, since March 2018 | Began cost-share in 2018, not mandatory until 2023 | None | Variance is granted on first-come basis in IMP area, no other restrictions | None in effect | Replacements allowed with well permit; no other restrictions |
| Nebraska DNR | No "certified" acres, although maps are required by statutes as of 1919 (some exceptions), and by current Rules* as of April 30, 2005. | Current Rules* as of April 30, 2005. NeDNR's process begins with a "petition for leave to file" a new application in a moratorium area. | Current Transfer Statutes as of 2004, Current Rules* as of April 30, 2005. | Surface Water: None; Groundwater: Reporting required through permit conditions | In Upper Platte Basin performed remote sensing analysis to determine # and location of water bodies and estimated CU | Surface Water: None; Groundwater: Reporting required through permit conditions | In Upper Platte estimate head of cattle and associated consumptive use from NASS data | Required for permits to conduct water in a stream; Possible for surface water permits on a case by case basis. | In Upper Platte, work with NRDs to include SW in water banking calculations | Only possible through new permits, and subject to IMP controls | Since 2006 temporary stays in some NRDs with exceptions, replaced by current IMP limits to development | NA |

*Nebraska Administrative Code, Department of Natural Resources Rules for