



2022 Annual Integrated Management Plan (IMP) Report

Reporting on 2021 Data and Activities

Middle Niobrara Natural Resources District

May 9th, 2022



Purpose

The Middle Niobrara Natural Resources District (MNNRD or District) and the Nebraska Department of Natural Resources (NeDNR or Department) jointly adopted a voluntary Integrated Management Plan (IMP) which became effective on December 30, 2020.

Annual reports for the voluntary IMP are intended to provide transparency between the MNNRD and NeDNR, and to keep the public informed about integrated water management activities within the District. This annual report covers the actions and progress made by the MNNRD in 2021 to implement voluntary IMP items with a focus on groundwater quantity.

MNNRD Reporting Responsibilities

The IMP requires that the MNNRD annually reports on the following ground water data collected by the District:

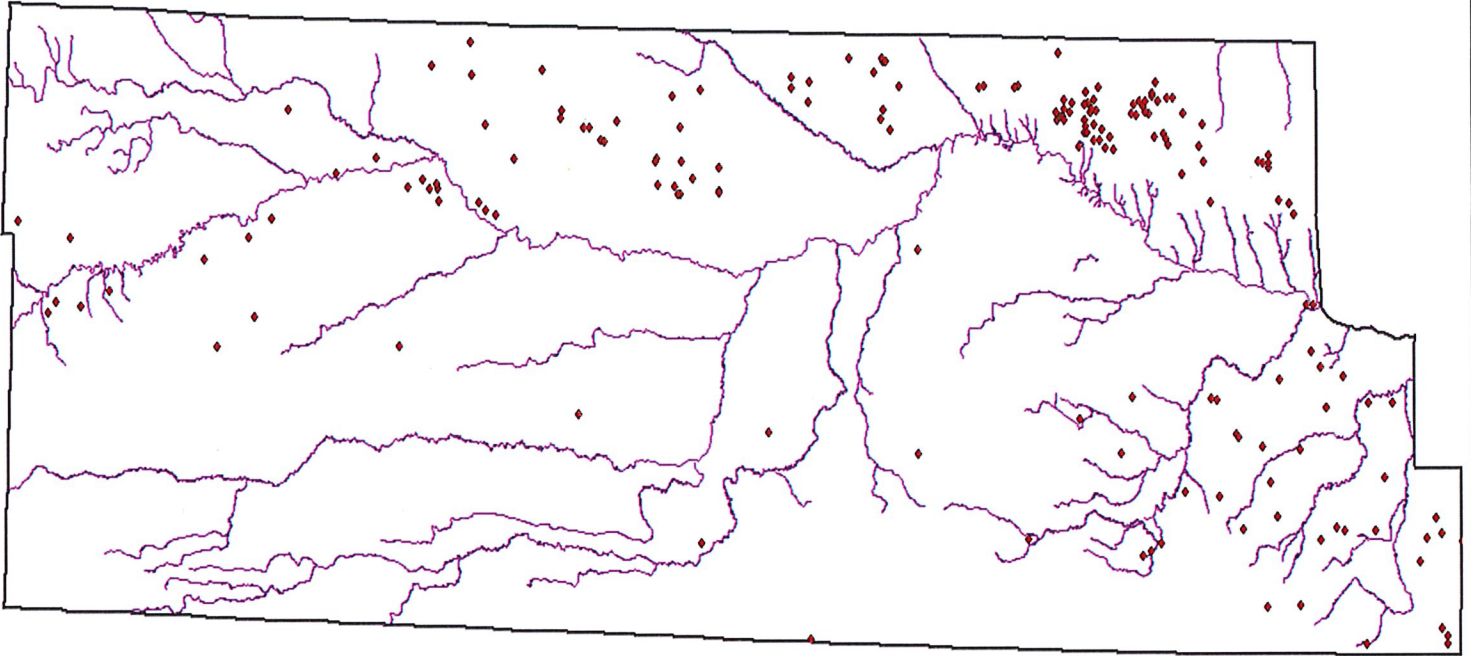
1. Static groundwater level measurements.
2. Certification of groundwater uses and any changes to these certifications.
3. Information gathered through the municipal and non-municipal industrial accounting process.
4. Irrigation water use data collected by the District, such as from metered high capacity well flow data.
5. Stream gage measurements on District-sponsored gages.
6. Water well construction permits issued and denied and any conditions associated with the permits issued .
7. Any variances issued, including the purpose, location, any required offset, the length of time for which the variance is applicable, and the reasoning behind approval of the variance.
8. Approved transfers, including all of the information provided with the application and used in the approval of the transfer, the location of the land area or well that is being transferred, and the location of the land area or well that will replace the original relevant flow meter data collected.
9. Any retirements of irrigated aces or other activities by the District for the purpose of mitigating depletions.
10. Information related to any water banking transactions.
11. In keeping with Neb. Rev. Stat. §46-715(3) which requires the IMP to include procedures to track depletions and gains to streamflow's resulting from new, retired, or other changes to uses:
 - a. Geographic location of new water wells permitted
 - b. Depletion calculated (and method of calculation) for each new water well permitted

- c. Estimated total consumptive use of each new water well permitted
- d. Retirements of agricultural, municipal, or industrial groundwater consumptive uses
- e. Information on any mitigation or new projects that have occurred, including geographic location, description of type and operations of the project, source water of the project, and calculated benefits associated with the project (if the project is groundwater augmentation, the report should include calculated accretions as well as the method/models used to estimated accretion values)
- f. Streamflow accretion activities
- g. Water banking activities
- h. District regulations/management activities (designated groundwater management areas, use restrictions, etc.)
- i. New depletions accounting report
- j. New data collected or model/study results (conservation measures, riparian ET, etc.).
- k. Offsets provided for depletions resulting from increased consumptive use related to the above-listed items. This includes reporting on offsets and mitigation activities for the purpose of addressing new depletive water uses. Such activities to be reported include canal diversions for the purpose of groundwater recharge, operation of stream augmentation projects, conjunctive management, and irrigated acre retirements.

1. Static Groundwater Level Measurements

The Middle Niobrara NRD collects static groundwater level measurements at 184 sites across the district semi-annually. Measurements are collected prior to irrigation in late March, and again after the irrigation season in late October. These timeframes allow the District to see the full effects of the drawdown from the irrigation season and the subsequent recharge. These 184 sites consist of 60 dedicated monitoring wells and 124 irrigation wells. Total sampling sites have increased dramatically since 2011 when the Board of Directors required all new irrigated acres to be sampled for groundwater quality and quantity. The District is also in the process of adding 14 more dedicated monitoring wells in 7 different locations. Locations have dedicated data loggers/pressure transducers in one or more of the wells on site. These data loggers take a water level measurement, up to every 15 minutes, every day of the year. This data is a valuable addition to regular static water level data.

MNNRD Water Quantity Sampling Sites



While annual precipitation was below average during the 2021 growing season across much of the district, producers are still dealing with the effects of extremely high precipitation from 2017-2020. Static water level data shows that is still very true. There are numerous sites in every county of the district that have rising water levels, even with substantial amounts of irrigation and groundwater use during the summer of 2021. 68% of the sampled wells in Cherry County showed an increase in water levels in the last year, with wells showing as much as 5.06 feet of increase from this time last year. There are areas of the district that are slowing down in their groundwater increase, or decreasing from measured levels in past years, although most of these areas are coming down from record highs. The District currently maintains an average of 2.08' above 1998 levels.

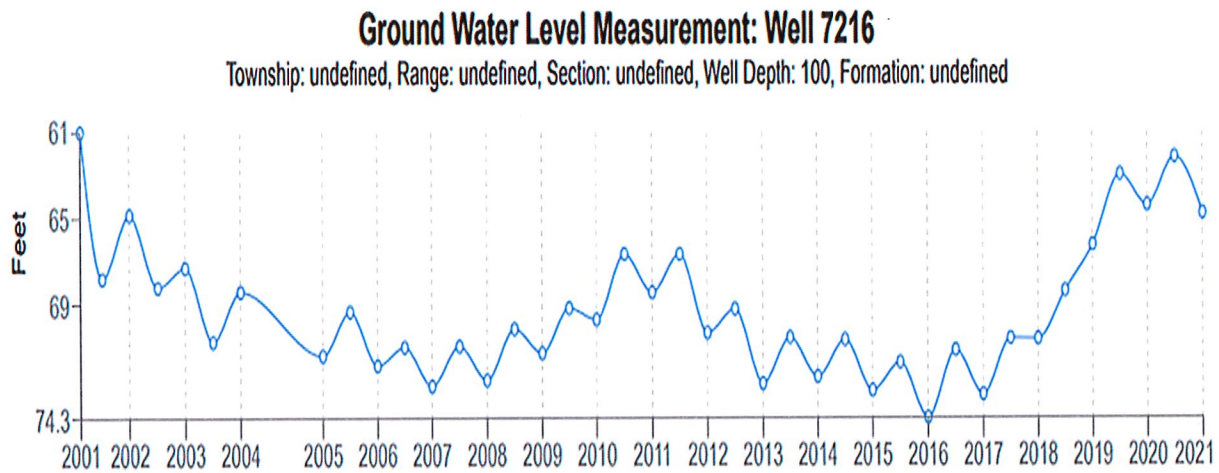
The graph located below shows the changes in measurements from the fall of 2021, relative to the measurements from the fall of 2020. Included in the graph is the highest and lowest changes measured since the fall of 2020 as well as the average change and the percentage of sampled wells showing an increase. Tables are sorted by county as well as the District average as a whole.

Fall 2021 Static Water level Changes Relative to the Fall of 2020

	Cherry	Brown	Rock	Keya Paha	MNNRD District
Lowest Change Since Fall 2020	-3.85'	-3.47'	-2.59'	-2.02'	
Highest Change Since Fall 2020	5.06'	3.71'	0.81	1.52'	
Average Change Since Fall 2020	0.73'	-0.75'	-1.01'	-0.75'	-0.41'
% Of Sampled Wells Showing an Increase Since Fall of 2020	68%	31%	20%	15%	34%

One Representative Static Groundwater Level Graph from each county in the MNNRD

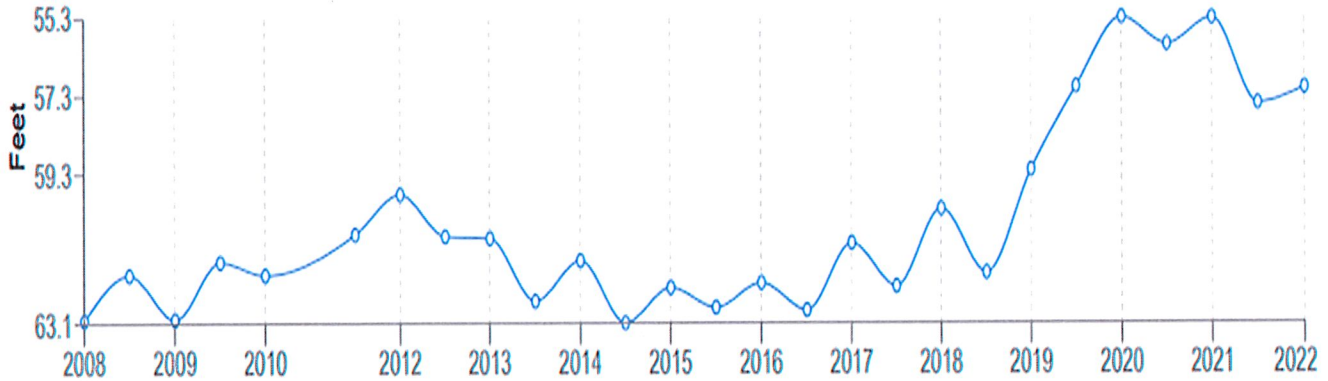
Data From One Location that is a Representative Graph of Western Rock County Static Water Levels



Data From One Location that is a Representative Graph of Brown County Static Water Levels

Ground Water Level Measurement: Well 7036

Township: undefined, Range: undefined, Section: undefined, Well Depth: 75, Formation: undefined



Data From One Location that is a Representative Graph of Keya Paha County Static Water Levels

Ground Water Level Measurement: Well 7177

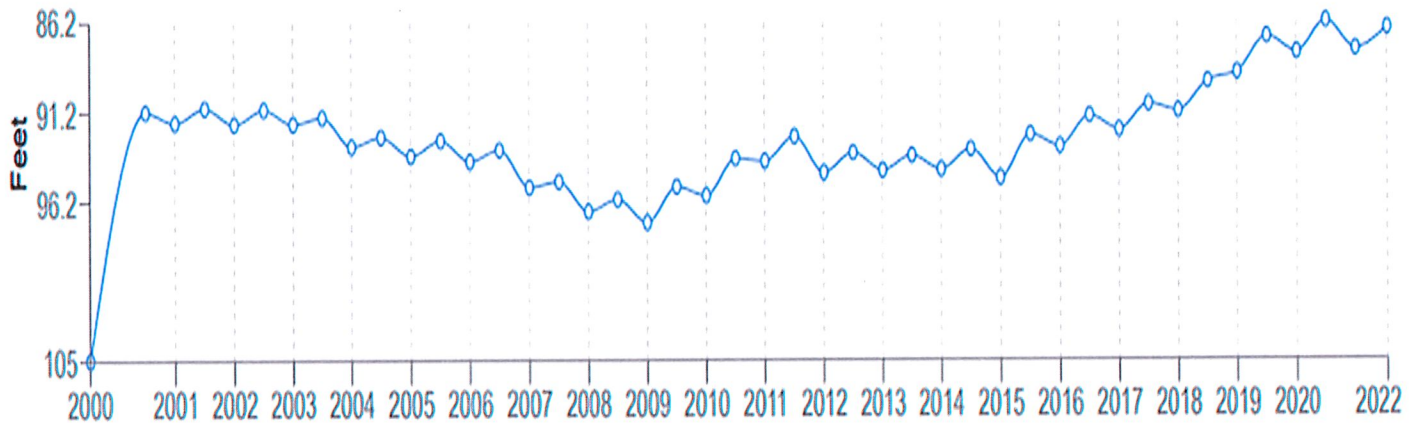
Township: undefined, Range: undefined, Section: undefined, Well Depth: 55, Formation: undefined



Data From One location that is a Representative Graph of Cherry County Static Water Levels

Ground Water Level Measurement: Well 7159

Township: undefined, Range: undefined, Section: undefined, Well Depth: 135, Formation: undefined



2. Certification of new groundwater uses and any changes to these certifications.

In 2021 the MNNRD board approved 4 certifications for new groundwater uses, all located in northern Brown County. The 4 new certifications were all for irrigation purposes and totaled 517.29 acres. The location and acres of the approved certifications are as follows:

<u>Location</u>	<u>Acres Approved for Certification</u>
NW ¼ 27-32-21	129.6
SE ¼ 21-32-21	128.9
SE ¼ 28-32-21	127.64
NE ¼ 28-32-21	131.15

No high capacity well permits were applied for or approved for these new uses during 2021 and there is no active irrigation on any of these acres.

Following certification, a transfer application for the 128.9 acres located in SE ¼ 21-32-21 to transfer those acres to SE ¼ 2-34-26 in Cherry County was approved by the board of directors.

The MNNRD continues to update landowner and groundwater certification changes.

3. Information gathered through the municipal and non-municipal industrial accounting process.

The Middle Niobrara NRD collects consumptive use data from the local municipalities on a yearly basis. The municipalities below currently or have reported data to the MNNRD. 5-year average yearly use in millions of gallons for each city or village is found below.

<u>City / Village</u>	<u>Average Consumptive Use (Millions of Gallons)</u>
City of Valentine	300.90
City of Ainsworth	141.40
Village of Woodlake	12.87
Village of Crookston	4.97
Village of Kilgore	4.75
Village of Merriman	18.40
Village of Cody	5.9
City of Long Pine	27.07

4. Irrigation water use data collected by the District.

Middle Niobrara NRD staff, on semiannual basis, reads and collects data on 95 flow meters in the district. There is currently only one circumstance that would require flow meters in the district. The board of directors voted to require flow meters on all new irrigation wells drilled after 2011. Staff collects data on these mandatory meters, as well as a handful flow meters landowners have voluntarily installed and given permission for the MNNRD to collect data on. Landowners in Management Zone 3 are required to report estimated water use in their yearly fertilizer report forms, which usually comes in the form of engine hours, electric bills, or soil moisture sensing equipment. Per county averages in Acre Inches for 2021 are as follows:

<u>County</u>	<u>Average Acre Inches</u>
Cherry County	15.59"
Keya Paha County	16.27"
Brown County	15.61"
Rock County	13.50"

5. Stream gage measurements on District-sponsored gages.

The Middle Niobrara NRD does not currently sponsor any stream gage measuring equipment.

6. Water well construction permits issued or denied and any conditions associated with the permits issued.

In 2021, the Middle Niobrara approved 11 high capacity well construction permits. Out of the 11 permits issued, 10 of the permits were replacement well permits for existing irrigation wells and 1 was a permit for a new irrigation well. The 1 permit approved for a new well was for the educational project (SINREC) located at the Middle Niobrara NRD. This well was limited to 330 GPM and will only water 1.06 acres.

There are 14 conditions and restrictions in place during the process of an *Application For A Permit To Construct A Water Well In The MNNRD*. Additional conditions or restrictions were only applied to 1 permit out of the 11 because it required two new wells to replace the existing irrigation well. The conditions of approval for that permit were that they were to be physically tied together and the wells only be used for irrigation purposes.

7. Variances

There were no variances or expedited variances applied for or granted by the MNNRD Board of Directors in 2021.

8. Certified Irrigated Acre Transfers

Information on Transfer Applications include Landowner Requesting and Providing the transfers, legal description, total acres being transferred, and well registration numbers if applicable. After receiving the application, MNNRD staff add the following information from both locations to the application:

Stream Depletion (SDF)

Slope and Erosion Issues

Title Report (Free and Clear Titles)

Static Water levels

Nature of the Transfer

After review of the application the Board of Directors consider all factors and decide to approve, approve with conditions, or deny the application.

There were two certified irrigated acre transfer applications reviewed and approved by the Board of Directors in 2021. There were no transfers denied by the Board in 2021.

<u>Location Providing Transfer</u>	<u>Acres</u>	<u>SDF</u>	<u>Location Receiving Transfer</u>	<u>Acres</u>	<u>SDF</u>
SE ¼ 21-32-21	128.2	92% SDF	SE ¼ 2-34-26	128.2	22% SDF
SE ¼ 24-29-21	135.6	90% SDF	NW ¼ 3-34-25	135.6	22% SDF

9. Retirements of irrigated aces or other activities by the District for the purpose of mitigating depletions.

There were no retirements of irrigated acres in 2021 by the MNNRD. The District continues to be in a self-imposed, no new irrigated acre moratorium following the end of the LB 483 process in 2015. 10,000 acres were opened for development from 2011-2015 and the moratorium since then has allowed the District to collect data on the impacts of the newly developed acres.

The Ainsworth Irrigation District (AID) and the District continue to work together on potential projects that can reduce the amount of water going through the AID canal system that isn't being used for its intended purposes. These projects can help keep water in the Snake River and bound for the Niobrara. Canal water turnouts directly damage streams, streambanks, and streambeds in Brown County and have created an artificial water mound in portions of Brown and Eastern Cherry Counties.

District staff and Board of Directors continue to encourage landowners to apply for a variance to relinquish surface rights and uses in exchange for groundwater uses. These exchanges have immediate impacts to stream depletions and can be beneficial to all parties involved.

10. Water Banking

MNNRD Board and Staff are currently working on redeveloping a water bank for District uses. The MNNRD started accepting Certified Acre transfer applications in 2008 when the District finished its irrigated acre certification process. Any transferring of irrigated acre rights from a low to a higher stream depletion (SDF) requires an acre offset. Acres transferred from a higher SDF to a lower SDF are only allowed at a 1:1 ratio, with the MNNRD banking the remaining difference. Landowners are also encouraged by the MNNRD to transition their surface water irrigation to groundwater irrigation. These scenarios always result in a reduction in SDF. As a result of the 51 transfers since 2008, the MNNRD has banked a total of **1,389.07** groundwater-irrigated acres.



Middle Niobrara NRD