

Nebraska Department of Natural Resources 2016 Annual Review Report

for the jointly developed

Papio-Missouri River Natural Resources District Voluntary Integrated Management Plan



Prepared by the
Nebraska Department of Natural Resources
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NEBRASKA

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2016 Annual Review Report

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Papio-MR NRD and Nebraska Department of Natural Resources Voluntary Integrated Management Plan

1. INTRODUCTION

The Papio-Missouri River Natural Resources District (P-MRNRD) and the Nebraska Department of Natural Resources (NeDNR) jointly adopted a voluntary Integrated Management Plan (IMP) which became effective on August 31, 2014. The overarching purpose of the voluntary IMP is to jointly manage ground and surface waters to sustain a balance between water uses and supplies for the long-term, and to protect existing uses. The voluntary IMP geographic area contains the portions of the Lower Platte and Lower Elkhorn River Basins, and a small portion of the Papillion Creek watershed, that fall within the NRD boundary.

The 2016 voluntary IMP Annual Reports are intended to provide transparency between the P-MRNRD and NeDNR, as well as to the public, regarding integrated water management activities in 2016. This Annual Report covers the actions and progress made by NeDNR in 2016 to implement the voluntary IMP, with a focus on surface water. The P-MRNRD completed a separate report that describes the actions and progress made in voluntary IMP implementation, with a focus on groundwater.

Chapters 3, 4, 6 and 7 in the voluntary IMP provide the basis for the 2017 voluntary IMP Annual Reports. Chapters 3 and 4 describe goals, objectives, and action items that were developed in consultation with a diverse stakeholder group as a part of the voluntary IMP development. Chapter 6 outlines the monitoring activities that both the P-MRNRD and NeDNR will conduct and annually report on. Chapter 7 outlines the review process by which both the P-MRNRD and NeDNR will annually evaluate progress towards meeting the goals and objectives of the IMP, determine if actions are fulfilling the goals and objectives of the IMP, and jointly decide if amendments are needed.

The P-MRNRD and NeDNR met in May, 2017 to review progress made towards IMP goals and objectives, discuss future activities, and determine if any amendments were needed for the voluntary IMP. The entities agreed that the actions taken in 2016 were working to fulfill the goals and objectives of the voluntary IMP, and that no amendments to the voluntary IMP were needed at the time of this review. The 2016 Annual Report public meeting was held on July 13, 2017, as a part of the P-MRNRD's Board of Directors meeting. This meeting was publicly noticed on the P-MRNRD and NeDNR websites, and in the Omaha World Herald newspaper. Both the P-MRNRD and NeDNR Annual Reports were made accessible on the NeDNR and P-MRNRD websites at <https://dnr.nebraska.gov> and <https://www.papionrd.org>.

2. NeDNR SURFACE WATER MONITORING

The following sections comprise NeDNR’s surface water monitoring report as discussed in Chapter 6 (Monitoring Plan) of the voluntary IMP. NeDNR is responsible for collecting, tracking, evaluating, and reporting on the following activities within the voluntary IMP area:

- NeDNR stream gage measurements
- Surface water permits issued, cancelled or denied
- Data collected on surface water use for irrigation
- Annual water use by the Metropolitan Utilities District and Lincoln Water System.

Stream Gaging

Overview (IMP action item 2.1.3)

NeDNR does not operate any stream gages within the voluntary IMP area of the P-MRNRD. The U.S. Geological Survey (USGS), however, owns and operates 6 streamgages. Table 1 shows the site number, location of gage, and beginning date of measurement, and Figure 1 shows the locations of the gages. Additional streamflow data may be acquired from the USGS’s National Water Information System (NWIS) at <http://waterdata.usgs.gov/>. NeDNR will continue to assess the need for additional monitoring in the voluntary IMP area.

Table 1. USGS streamgages in the P-MRNRD voluntary IMP area

Station Name	Site Number	Funding Agencies	Begin Date
Platte River near Leshara, Neb.	06796500	USGS, Metropolitan Utilities District, Lincoln Water System	6/30/1994
Platte River near Venice, Neb.	06796550	USGS, Metropolitan Utilities District	3/23/2010
Elkhorn River at Waterloo	06800500	USGS, US Army Corps of Engineers	9/01/1928
Platte River near Ashland, Neb.	06801000	USGS, Metropolitan Utilities District, Lincoln Water System	9/01/1939
Platte River at Louisville, Neb.	06805500	USGS, US Army Corps of Engineers	5/15/1953
Papillion Creek at Fort Crook	06610795	USGS, Papio-Missouri River NRD	9/01/1948

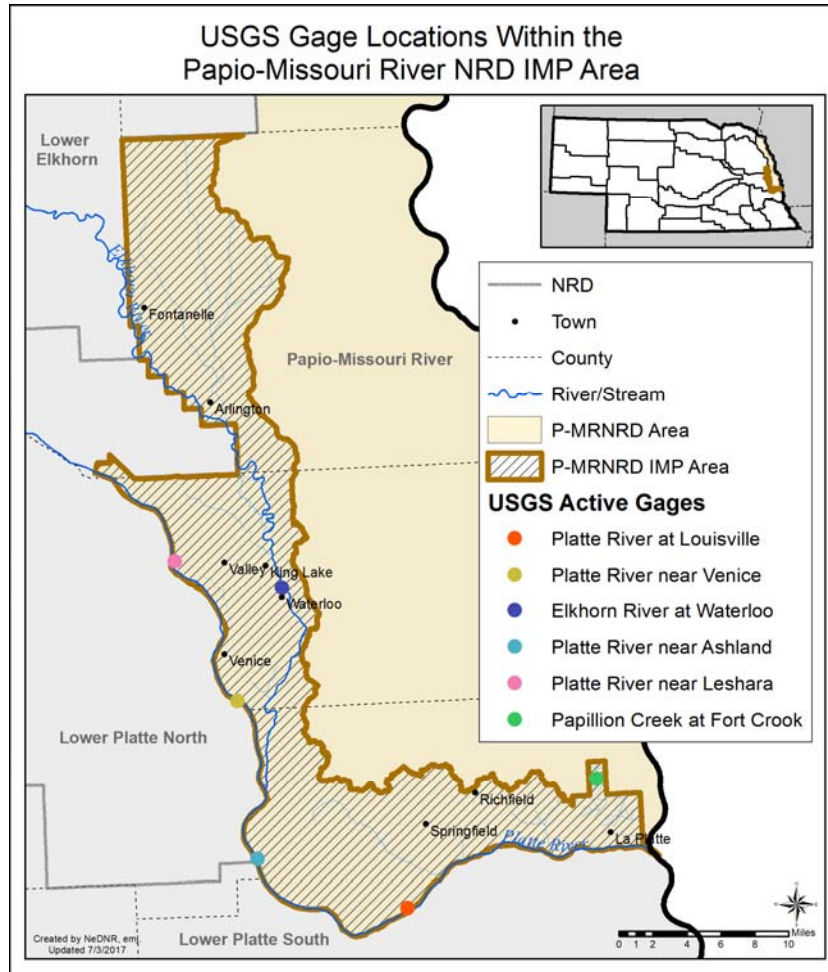


Figure 1. Location of streamgages within the voluntary IMP area.

Stream Gage Measurements (IMP action item 2.2.4)

The voluntary IMP action item 2.2.4 specifies that NeDNR and P-MRNRD will track water use and supply variability by regularly evaluating data from various monitoring networks. As such, data were downloaded from the NWIS website and compiled into general charts, to show average daily discharge for the years that the voluntary IMP has been in place. Figure 2 shows average daily discharge by year and Figure 3 shows total annual discharge for the gaged streams and rivers in the voluntary IMP area. The data were compiled for the years the voluntary IMP has been in place. For comparison, Figure 2 includes reference to the period of record averaged data as this parameter is readily available via USGS statistics; however, one should note that the period of record varies for each gage, so some of the older gages (e.g. Elkhorn R., Platte R. at Louisville) incorporate more climate variability.

Both figures show much higher than average flows occurred in 2016, compared to all other years shown. For the Platte River gages, there was roughly 40-50 percent higher average discharge compared to 2014 and to the period of record, and 20 percent higher average daily discharge compared to 2015. The Elkhorn River at Waterloo’s 2016 average daily discharge was roughly twice that of 2014, 2015, and the period of record values. The very high flows at the Lower Platte River gages reflect above average (up to 400 percent from normal) precipitation in the Upper Platte Basin, and higher than average snowpack in Wyoming and Colorado.

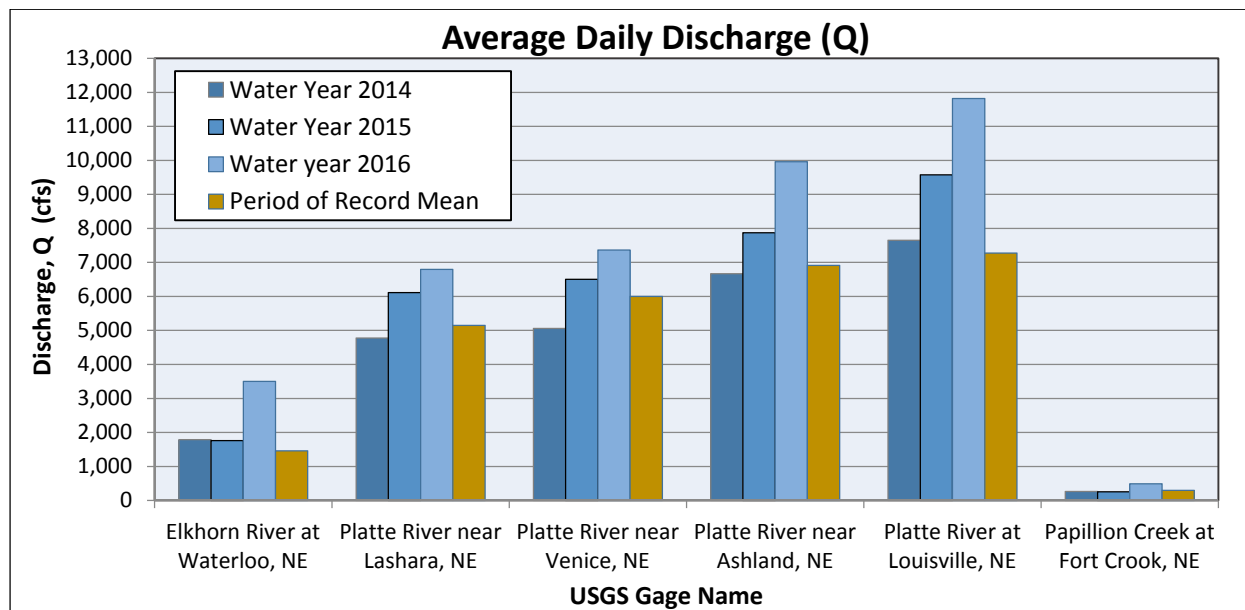


Figure 2. Average daily discharge measured by USGS stream gages for the 2014, 2015 and 2016 water years, and for the period of record mean (some provisional USGS data used).

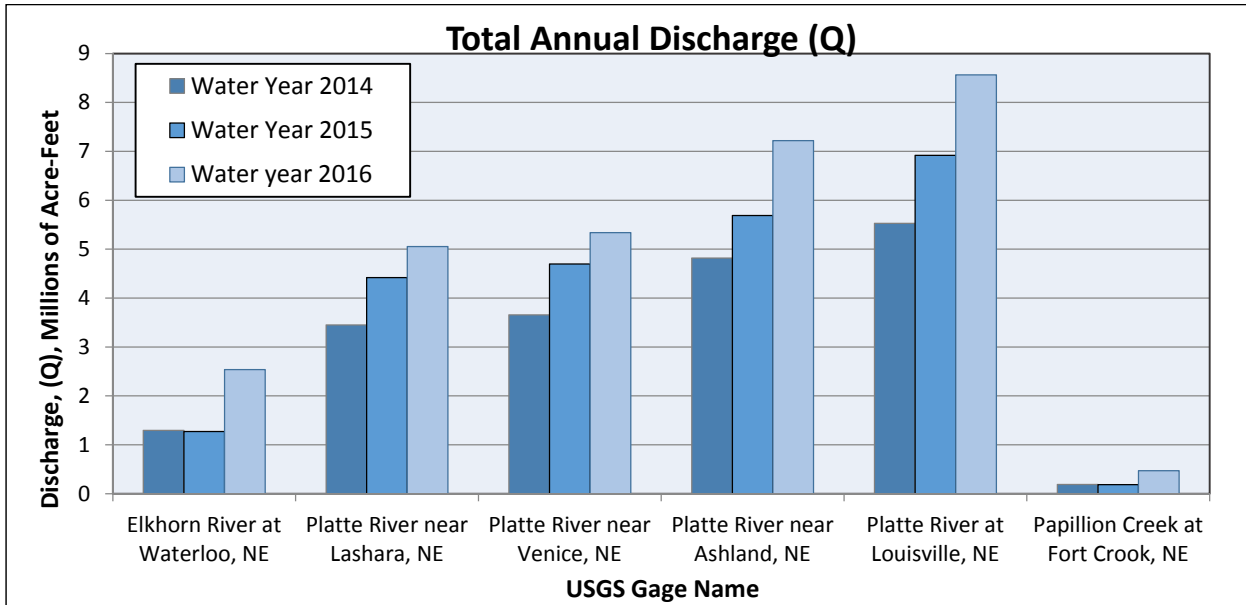


Figure 3: Total annual discharge measured by USGS stream gages for the 2014, 2015 and 2016 water years (some provisional USGS data used).

Surface Water Permitting Activity (IMP monitoring chapter; action items 2.1.5 and 2.2.1)

NeDNR continued to monitor and administer surface water appropriations and maintain records of cancelled, new, or transferred rights within the surface water control area of P-MRNRD. In 2016, NeDNR approved four new surface water applications. Two of the approvals were not associated with any new irrigated acres, as these were for flood control storage uses. Two of the approvals did include irrigated acres: one was for a domestic use and allowed 1.8 new irrigated acres, and one was for agricultural irrigation use which allowed for 111.7 acres (Figure 8). In addition, NeDNR dismissed two pending surface water applications, due to the irrigation project no longer going forward. No applications were denied and no transfers were approved in 2016. The approved and dismissed applications are summarized below in Tables 2 and 3.

Table 2. Approved surface water applications in 2016.

Applications for surface water appropriations within the surface water control area approved in 2016					
Permit Number	Use	Location of diversion	Source	Date approved	Acres permitted
A-18588	Domestic	S30-T13-R13E	Zwiebel Creek	9/16/2016	1.8
A-18613	Irrigation	S24-T8-R9E	Bell Creek	5/12/2016	111.7
A-19412	Flood Control	S2-T12-R10E	Tributary to Platte River	6/23/2016	NA
A-19418	Flood Control	S2-T12-R10E	Tributary to Platte River	6/23/2016	NA

Table 3. Dismissed surface water applications in 2016.

Applications for surface water appropriations within the surface water control area dismissed in 2016				
Permit Number	Use	Location of diversion	Source	Date dismissed
A-18864	Irrigation	S29-T18-R9E	Elkhorn River	9/16/2016
A-19204	Domestic	S12-T18-R9E	Bell Creek	9/27/2016

Surface Water Irrigation Use Data (voluntary IMP monitoring chapter, and action items 2.2.3, 2.3.2)

In 2014, NeDNR implemented a voluntary water use reporting program which was a significant step forward in tracking of surface water use. This is an important part of voluntary IMP implementation and begins to address portions of action item 2.2.3, which is to establish a system to improve monitoring and evaluation of supplies and uses and changes therein, as well as action item 2.3.2, which is to develop an online water reporting tool.

To implement the voluntary water use reporting system, NeDNR sends invitations via post cards to surface water irrigation permit holders in the District. In 2016, invitations were sent to 52 surface water irrigation (from a flowing source) permit holders. Permit holders were asked to provide information on the location and number of surface water irrigated acres, whether irrigation was used for the given year, type of irrigation used, crop type, and type of tillage. They could then voluntarily submit information by filling out an online form at <http://data.dnr.nebraska.gov/wateruse> or by calling in their information.

In 2016, twenty-two voluntary water use reports were received, which constituted a survey return rate of 41 percent. Respondents provided information on irrigated vs. non-irrigated acres, dryland (rain-fed) acres, crop type, and type of tillage. The 2016 reports accounted for 2,969 acres; and those surveys are provided in the bullets below.

In 2016:

- 91 percent of permit holders (20) employed some level of tillage conservation practices (minimum or no till).
- 17 percent of acres were reported as irrigated (490 acres).
- 84 percent of acres were reported as non-irrigated (2,479 acres).
- The crop types of total reported acres were 58% corn, 23% soybeans, 16% dry edible beans and the remaining acres comprised forage, alfalfa and other land covers.

Municipal Water Use

Lincoln Water Supply (LWS) and Metropolitan Utilities District (MUD) hold surface water appropriations for induced groundwater recharge within the voluntary IMP area. These permits are located on or in close proximity to the Platte River, and allow the appropriator to pump surface water through a groundwater well. At this time, there are no reporting requirements for these induced groundwater recharge permits.

In addition to the induced groundwater recharge permits, LWS and MUD hold municipal groundwater transfer permits, which have reporting requirements. In all, there are four combined groundwater well municipal transfer permits held by LWS and MUD. Lincoln Water Supply holds groundwater municipal transfer permits A-10367 and A-16917 and MUD holds municipal transfer permits A-10538 and A-17356. Figures 3-5 show a comparison of uses in 2014, 2015 and 2016, for each of the permits. Figure 3 shows the average daily withdrawal, Figure 4 shows annual withdrawal volume, and Figure 5 shows maximum daily use. Although these permits are quantified in gallons, the figures below have the volumes converted to acre-feet.

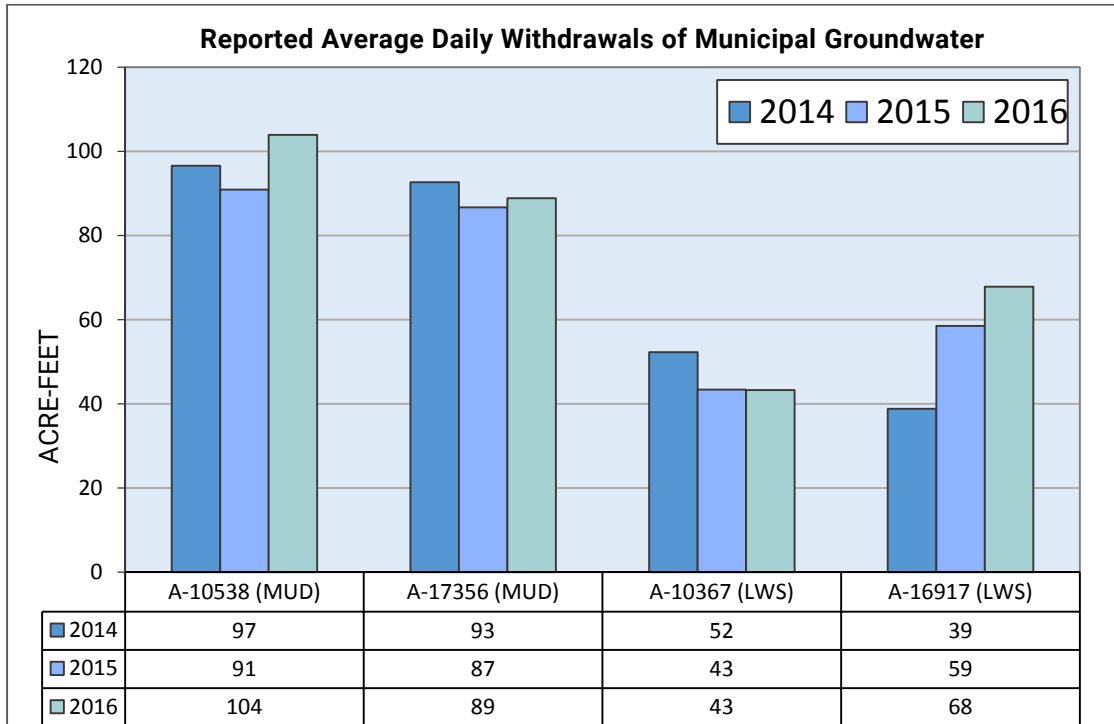


Figure 4. Reported average daily withdrawals for LWS and MUD municipal groundwater transfer permits.

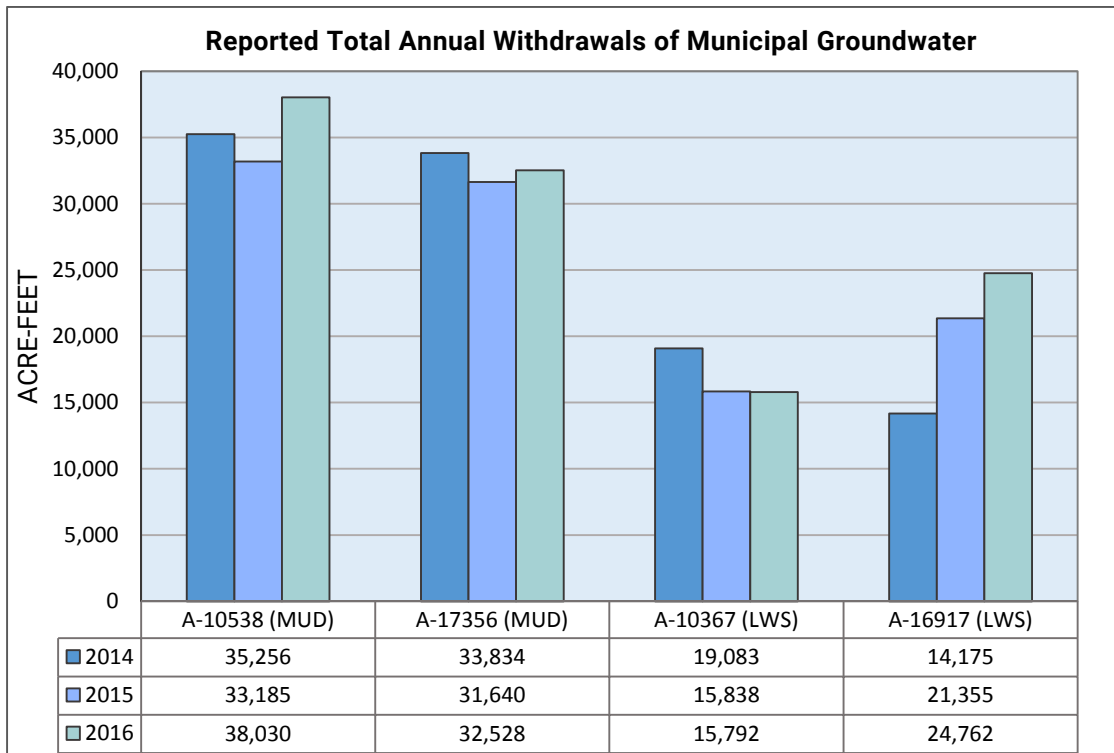


Figure 5. Reported total annual withdrawals for LWS and MUD municipal groundwater transfer permits.

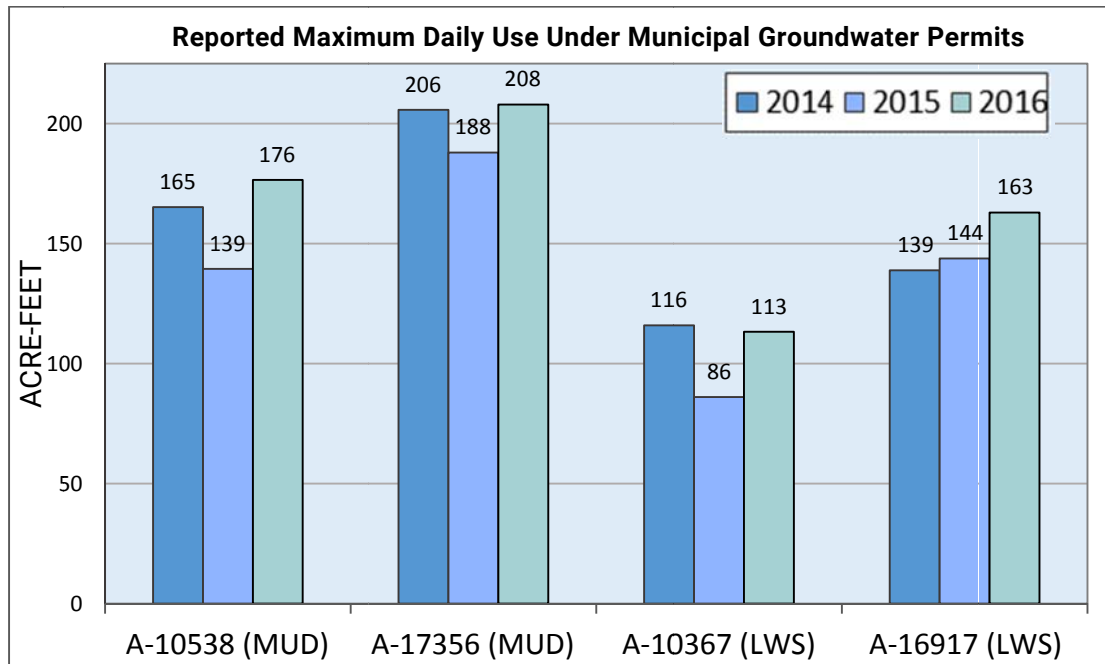


Figure 6. Reported maximum daily use for LWS and MUD municipal groundwater transfer permits.

3. ADDITIONAL PROGRESS TOWARDS GOALS, OBJECTIVES, AND ACTION ITEMS

The following gives an overview of NeDNR’s activities in 2016 that support the goals, objectives, and action items of the voluntary IMP. The specific goal, objective, and/or action item(s) that the activity pertains to is denoted after each sub-heading below.

ENWRA (Goals 1, 2 and 4; action items 1.1.4, 2.1.5, 4.1.2)

NeDNR has continued to participate in the Eastern Nebraska Water Resources Assessment (ENWRA) program as a cooperating agency. ENWRA was formed in 2006, with the long-term goal of developing a geologic framework and water budget for the previously glaciated, geologically complex portion of eastern Nebraska. ENWRA’s sponsors consist of six eastern Nebraska NRDs, and six cooperating agencies (NeDNR; Nebraska Department of Environmental Quality; Conservation and Survey Division, School of Natural Resources, University of Nebraska-Lincoln; and U.S. Geological Survey).

ENWRA’s primary project is collection of Airborne Electromagnetic Survey (AEM) data. The AEM Survey is conducted via geophysical remote sensing tool that is mounted on a helicopter. Its sensors acquire subsurface data via continuous electromagnetic transmittals that penetrate the land surface. The acquired data are synthesized, which enables estimation of aquifer locations and thicknesses.

In 2016, NeDNR representatives attended ENWRA meetings and reviewed incoming ENWRA information to keep current with ongoing activities. The predominant activity in 2016 was collection of AEM data over widespread areas in eastern Nebraska, in addition to more refined data collection over specific interest areas. In all, data were collected for over 4,000 miles of flight lines in 2016. Nearly 600 of those miles intersected the voluntary IMP geographic area, specifically Sarpy County. For more information on ENWRA and the 2016 AEM data collection effort, please see <http://www.enwra.org/>.

NeDNR Pump Site Inspections (Goal 2, Action items 2.1.5, 2.2.1, 2.2.2)

The NeDNR Field Office staff has been conducting surface water pump site inspections statewide as time and staff allow for the last 4-5 years. In 2016, due to staffing and priority water administration in other basins, the pump site visits in this area were reduced in number. It is always the goal of the field office staff to inspect each pump site at least on a biennial basis. The purpose of the pump site inspections is to gather information pertaining to use or non-use of the surface water right, crop type, irrigation method (gravity vs. center pivot), and as conditions allow, a spot flow measurement.

In 2016, seven diversion facility locations were inspected by NeDNR Field Office staff within the P-MRNRD. They visited pump sites and compiled data pertaining to each site. Permitted activities for the sites was irrigation from natural flow. At the time of the inspection of the seven diversion locations for five permits, two were set up to irrigate but none were running. This could be due to a variety of factors (precipitation, timing of visit, etc.). The locations of the pumps checked are shown in Figure 6.

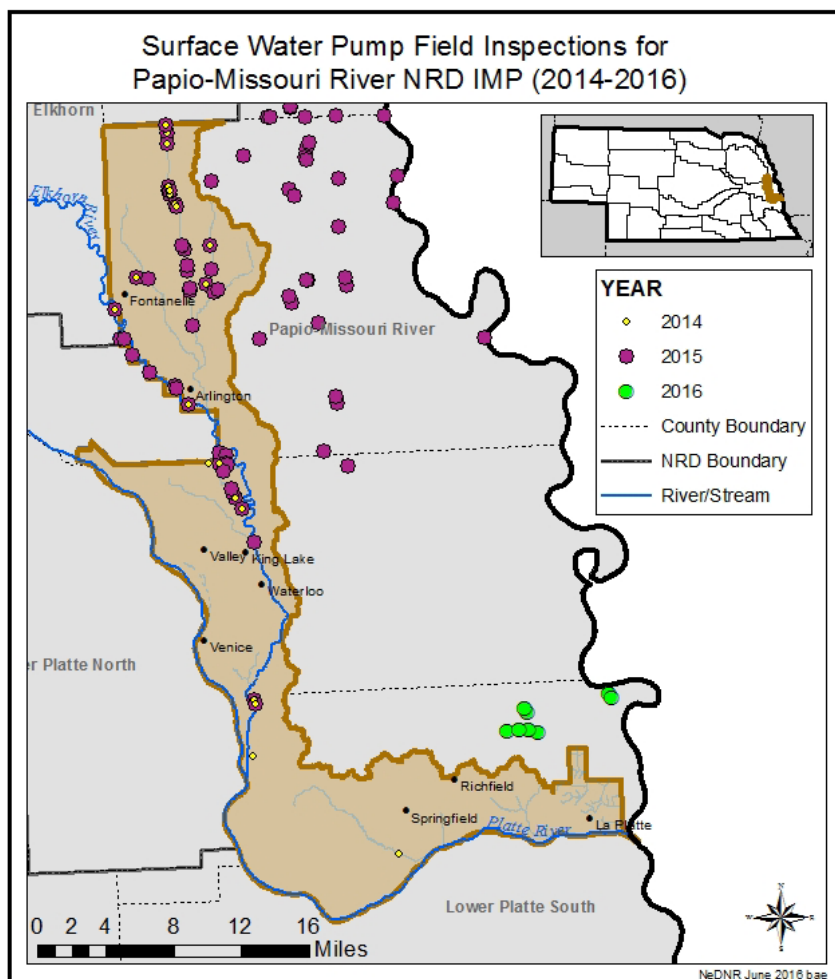


Figure 7. Surface water pump-site inspections.

Lower Platte Missouri Tributaries Model (Goal 1, Objectives 1.1 and 1.3)

The Department has continued to work with consultants on a regional numerical model for the Lower Platte River and Missouri River Tributaries Basins. The model is divided into two parts: the northern model which covers the northern two-thirds of eastern Nebraska and the southern model which covers the Nemaha Basin. Initial development of the northern model was completed in summer 2016 with documentation completed in fall 2016. Final calibration is currently underway with conclusion of the northern model project expected in 2017. The southern model development was initiated in spring 2016 and will follow on the completion of the northern model with expected completion in 2018.

When complete, these models will be used as a tool for the fully appropriated basins annual report, and for refinement of delineations of the hydrologically connected areas. Data from the model will be incorporated into the INSIGHT analysis and available through the INSIGHT web portal. The models will be available for use by NRDs. For

examples, the models could be used for assessing impacts of new surface water and groundwater developments in the region.

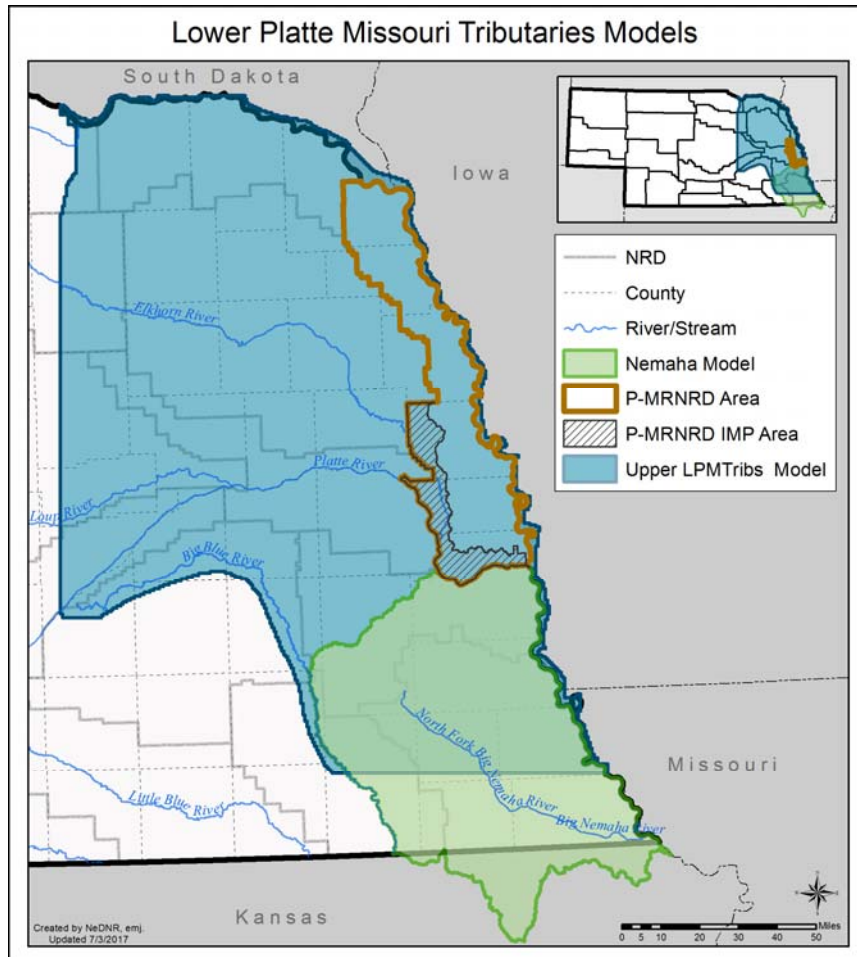


Figure 8. The Upper Lower Platte Missouri Tributaries and Nemaha model boundaries.

Education and Outreach (Goals 3, action item 3.1.1)

Each year, NeDNR staff dedicates a portion of staff time and department resources to education and outreach efforts that promote a better understanding of integrated water management and why it is important to the State’s citizens. NeDNR’s outreach efforts range from informal conversations with local citizens about how we envision and strive for collaborative water management, to more complex discussions and demonstrations about the hydrologic connection between surface and groundwater.

Statewide

NeDNR's statewide public outreach activities are broadly focused and intended to provide all interested citizens with a better understanding of how integrated water management affects them. In 2016, NeDNR staff set up educational booths at the Nebraska State Fair, Husker Harvest Days, the Governor's Ag Conference, and UNL's Women in Agriculture Conference. Improvements were also made to NeDNR's website and the INSIGHT web portal which will provide citizens with a more convenient and user friendly experience when they need to access water resources related information or data.

Local

In 2016, NeDNR participated in World O! Water held at the P-MRNRD, to promote the water conservation concepts. In addition to a booth with educational pamphlets and materials, a groundwater model demonstration was performed to convey the hydrological connection between groundwater and surface water, emphasizing how over-pumping groundwater can change the direction of flow and reduce streamflow.

Basin-Wide Planning (Goals 4, action items 4.1.1, 4.2.2, 4.2.3)

NeDNR is an active participant in the Lower Platte River Basin Coalition, which is a group comprised of the seven Lower Platte River Basin NRDs, and NeDNR. The purpose of this group is to develop a voluntary water management plan for the Lower Platte River Basin. Plan components could subsequently be incorporated into individual NRD IMPs to provide consistency in water management actions across NRD boundaries. Here, NeDNR has representatives that serve on both the managers and technical committees. For more information about the Coalition, please see <https://lprbc.nebraska.gov/>.

NeDNR is also an active participant in the Lower Platte River Basin Consortium, which is comprised of three NRDs (P-MRNRD, Lower Platte South NRD, and Lower Platte North NRD), the City of Lincoln, Metropolitan Utilities District, and NeDNR. The purpose of this group is to study long-term water supplies that may be available to the lower sub-basins of the Platte River to enhance streamflows or aquifer storage, to support sustainable public water systems and improve resiliency to future droughts.

4. REGULATORY ACTIONS

Voluntary IMPs must include one groundwater control and one surface water control. NeDNR's surface water control mimics the P-MRNRD groundwater control, which is to restrict the number of acres available for irrigation. More specifically, NeDNR will restrict the number of additional acres for surface water irrigation in the surface water areas that drain into the hydrologically connected areas (surface water control area) in an amount equal to 1/3 of the amount of acres that P-MRNRD will allow for new groundwater irrigated acres. At the close of each year, NeDNR inquires with the P-MRNRD about their acres limitations at that time. NeDNR then sets their limit at 1/3 that amount for the following year.

Because the P-MRNRD's limit on additional groundwater acres in the voluntary IMP area was set at 2,500 acres at the beginning of 2016, the NeDNR's limit on additional surface water acres for 2016 was set at 834 acres (1/3 of groundwater acres) in the surface water control area. Figure 8 shows the locations of the new permits as well as the permit types. In 2016, the actual new surface water acres that NeDNR approved was 111.7.

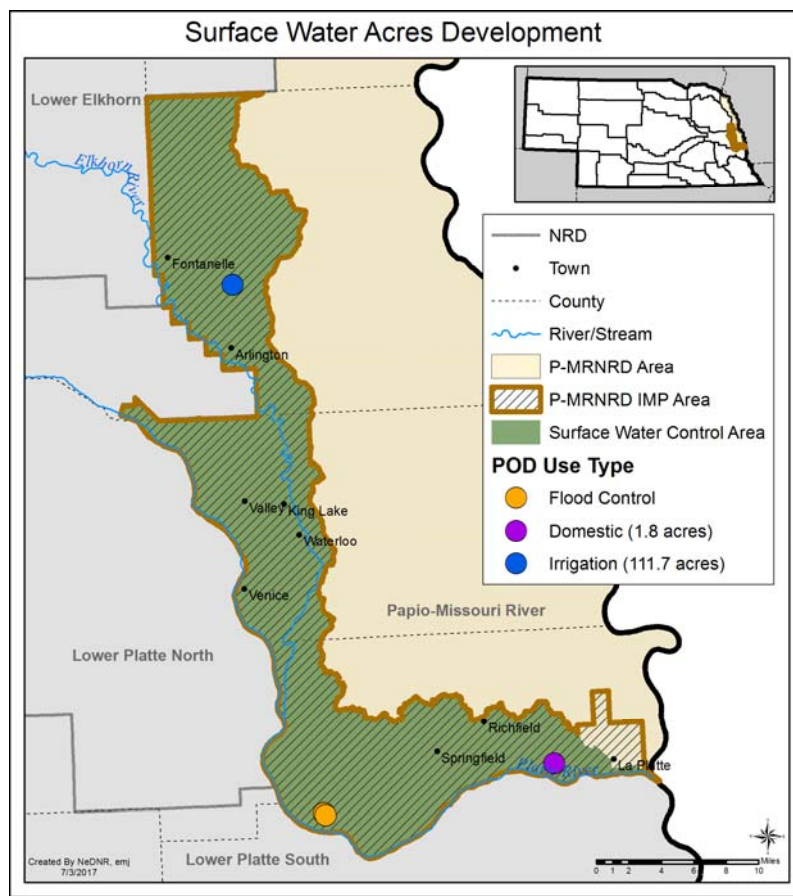


Figure 9. 2016 surface water development for the voluntary IMP area.

5. JOINTLY IDENTIFIED ACTIONS FOR SUCCEEDING TWO YEARS

These actions were discussed at the annual P-MRNRD and NeDNR review meeting held on May 25, 2017. These are in addition to the continued monitoring and reporting outlined in the regulatory and non-regulatory sections of this annual report, and serve as action steps in meeting goals and objectives presented in the voluntary IMP. The following items were listed as priority actions for the next two years.

- The P-MRNRD will continue to work to adopt a revised GWMP and associated rules and regulations; NeDNR will continue to provide feedback on the content, consulting with additional agencies as necessary.
- Both parties will review data from the Platte and Elkhorn River Valley Integrated Water Monitoring study with U.S. Geological Survey, as the data become available.
- Both parties will participate at the World O' Water public outreach event to be held on September 10, 2017.
- Both parties will coordinate on a potential municipal and industrial water use clearinghouse project.
- NeDNR will further develop INSIGHT, and will incorporate NRD data whenever possible.
- Both parties will continue to participate in basin-wide or regional groups such as ENWRA, the Lower Platte River Consortium, and Lower Platte River Basin Coalition.
- NeDNR will work to coordinate with the Lower Platte River Basin Coalition to further develop the stream depletion/accretion calculator and interface.