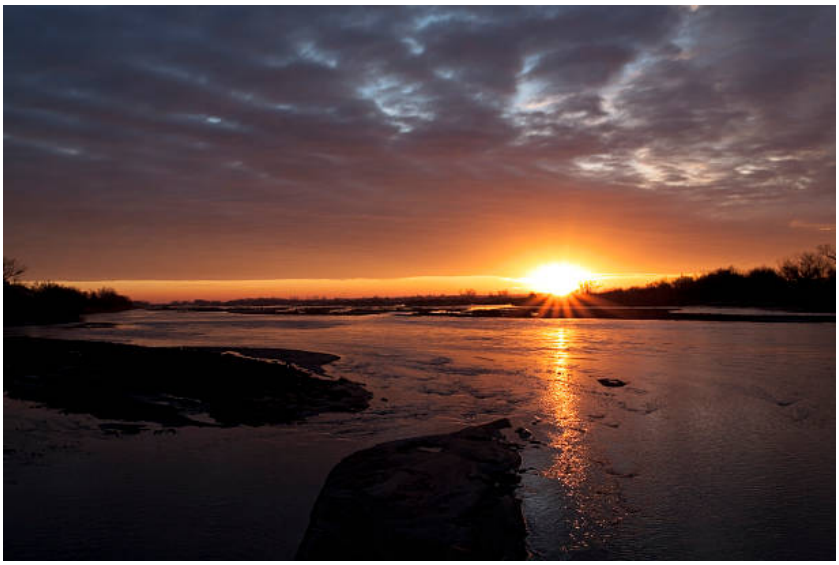
ANNUAL INTEGRATED MANAGEMENT PLAN REPORT

2016



JOINTLY PREPARED BY THE LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT AND THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES

Submitted at the Lower Platte South Board Meeting/IMP Annual Review

August 16, 2017

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

2016 ANNUAL REPORT FOR LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT and NEBRASKA DEPARTMENT OF NATURAL RESOURCES INTEGRATED MANAGEMENT PLAN

Jointly prepared by the Lower Platte South NRD and the Nebraska Department of Natural Resources
Submitted on August 16, 2017

Introduction

The Lower Platte South Natural Resources District (LPSNRD) and the Nebraska Department of Natural Resources (NeDNR) jointly adopted a voluntary Integrated Management Plan (IMP) which became effective on May 15, 2014 with the goal of jointly managing ground and surface waters within the LPSNRD to sustain a balance between water uses and supplies for the long term. An in-depth public involvement plan that included focus groups, a 13-month stakeholder process, a virtual town hall, and outside agency outreach was an integral part in developing goals and objectives within the IMP.

This Annual Report covers progress made towards Voluntary IMP action items for both the LPSNRD and NeDNR in 2016. It is consistent with Chapter 9 of the IMP, which outlines the procedures for review and potential modification of the Voluntary IMP. Here, LPSNRD and NeDNR will annually report on data collected, on new groundwater or surface permits and uses, and will review progress made toward achieving the goals and objectives.

To begin the process, The LPSNRD and NeDNR staff met on July, 6 2017 to discuss progress made in 2016 towards the goals and objectives of the plan, action steps for the next two years, and whether modifications to the IMP were needed. The action steps for the next two years are included in the "Jointly Identified Actions" section at the end of this report. The LPSNRD and NeDNR jointly decided that no modifications to the IMP were needed at the time of the 2016 annual review. The LPSNRD and NeDNR subsequently worked collaboratively to write this report. Highlights from the report were presented to the LPSNRD Board and public on August 16, 2017, at LPSNRD's regularly scheduled board meeting. Notice of the meeting was publicly distributed in area newspapers on August 5, 2017; NeDNR also posted the meeting announcement on its website the week of August 7, 2017.

As the LPSNRD regulates groundwater and the NeDNR regulates surface water, some sections are written individually, but wherever possible, sections are written jointly to reflect the partnership between LPSNRD and NeDNR in integrated ground and surface water management. This annual report provides transparency, to each other, and to the public of the progress made by LPSNRD and NeDNR in implementing the Voluntary IMP as a means to protect interconnected ground and surface water resources and existing water users for the near and long-term.

Monitoring and Data Collection

Surface Water Monitoring

Stream Gaging

NeDNR does not operate any stream gages within the LPSNRD voluntary IMP area. The U.S. Geological Survey (USGS), however, currently owns and operates 21 stream gages in this area. Table 1 shows the gage name, gage number, beginning date of measurement and whether the LPSNRD assists with gage funding. 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 IMP area, but does not plan to add any stream gages at this time.

Table 1: Existing USGS stream gages in the LPSNRD.

Gage Name	Gage Number	Begin Date	LPSNRD assist in funding?
Salt Creek at Roca, Nebr.	06803000	5/14/1951	yes
Salt Creek at Pioneers Boulevard at Lincoln, Nebr.	06803080	6/20/1994	yes
Haines Branch at SW 56th St at Lincoln, Nebr.	06803093	6/20/1994	yes
Middle Creek at SW 63rd St at Lincoln, Nebr.	06803170	6/20/1994	yes
Oak Creek at Air Park Road at Lincoln, Nebr.	06803486	5/21/1987	yes
Salt Creek at Fairgrounds at Lincoln, Nebr.	06803495	6/20/1994	no
Salt Creek at Lincoln, Nebr.	06803500	5/11/1942	yes
Little Salt Creek near Lincoln, Nebr.	06803510	5/11/1942	yes
Salt Creek at 70th Street at Lincoln, Nebr.	06803513	5/31/1994	yes
Stevens Creek near Lincoln, Nebr.	06803520	10/14/1968	yes
Rock Creek near Ceresco, Nebr.	06803530	4/1/1970	yes
Salt Creek at Greenwood, Nebr.	06803555	1/16/1952	no
Wahoo Creek at Ashland, Nebr.	06804700	2/22/1990	no
Weeping Water Creek at Union, Nebr.	06806500	1/11/1950	yes
Antelope Creek at 27th St at Lincoln, Nebr.	06803300	3/14/2012	yes
Deadman's Run at 38th Street at Lincoln, Nebr.	06803502	08/27/2014	no
Salt Creek near Ashland, Nebr.	06805000	10/01/2007	yes
North Oak Creek at Valparaiso, Nebr.	06803430	8/12/2016	yes
North Oak Creek near Touhy, Nebr.	06803420	8/12/2016	yes
Platte River near Ashland, Nebr.	06801000	8/20/1928	no
Platte River at Louisville, Nebr.	06805500	5/15/1953	no

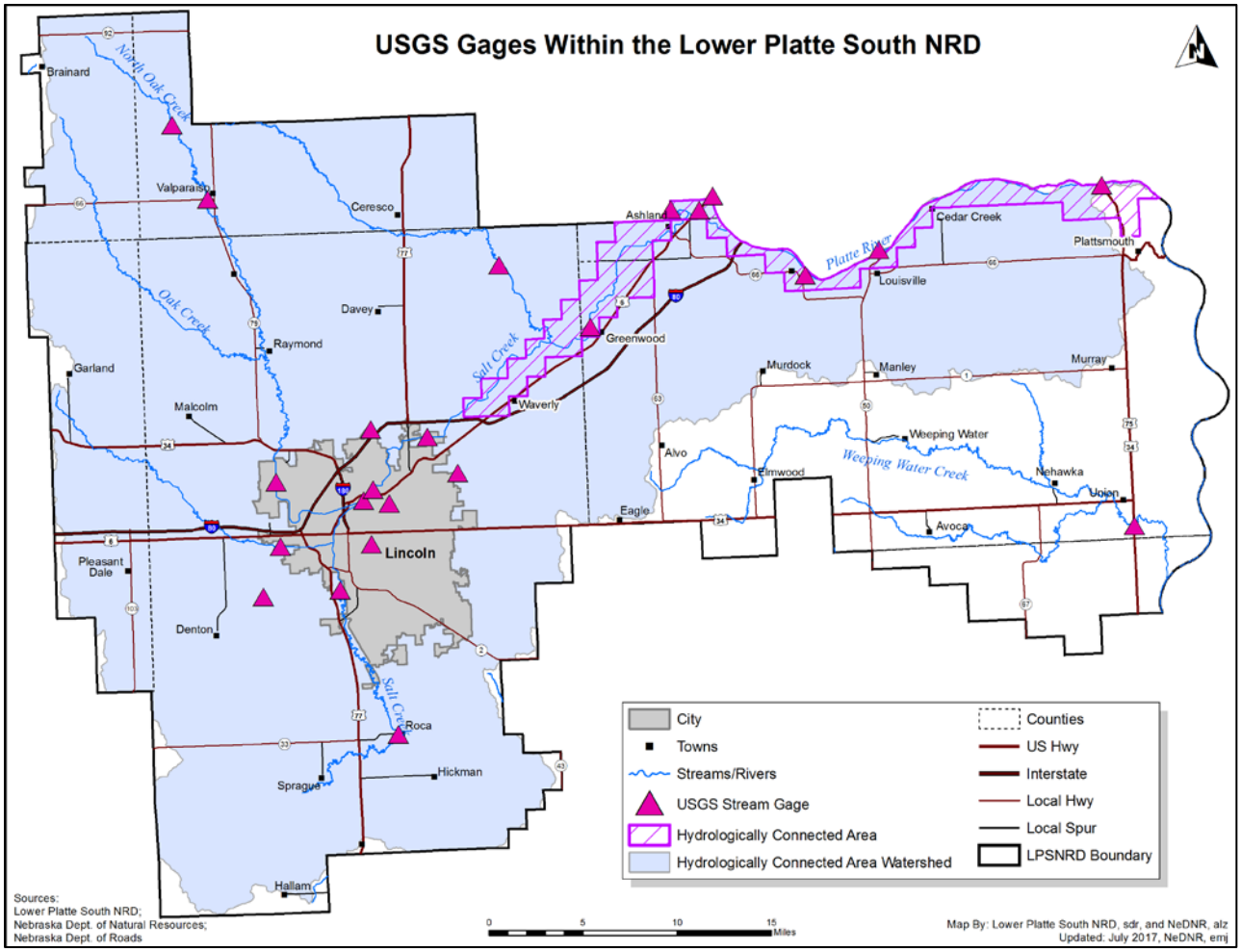


Figure 1: Location of USGS gages in the LPSNRD.

The voluntary IMP monitoring plan (Chapter 8 of the LPSNRD IMP) specifies that NeDNR and LPSNRD should track variability on water use and supply by regularly evaluating data from existing surface water, groundwater and weather monitoring networks. Thus, as part of this report, NeDNR compiled annual discharge data for select stream gages. The data were acquired from the USGS National Water Information System (NWIS) website. The stream gages included two locations on the Salt Creek main stem (Figures 2 and 3), two locations on tributaries to the Salt Creek (Little Salt Creek, Figure 4 and Steven's Creek, Figure 5), and one location on the Platte River (Platte River at Louisville, Figure 6).

As shown in Figures 2 through 6, the annual discharge was higher than the period of record average discharge for all measured locations. The 2016 annual discharge of the Salt Creek and Little Salt Creek was lower than 2015 discharge; while the 2016 annual discharge for Steven's Creek and the Platte River at Louisville was higher than 2015 discharge. The high flows shown for Steven's Creek gage reflects runoff from a small watershed in the south-central portion of LPSNRD, which experienced heavy localized rain events in 2016. For the Platte River at Louisville, however,

the significantly high flows reflect above average (up to 400 percent of normal) precipitation in the Upper Platte Basin, and higher than average snowpack in Wyoming and Colorado. NeNDR will continue to track the variability of streamflow as a part of IMP monitoring.

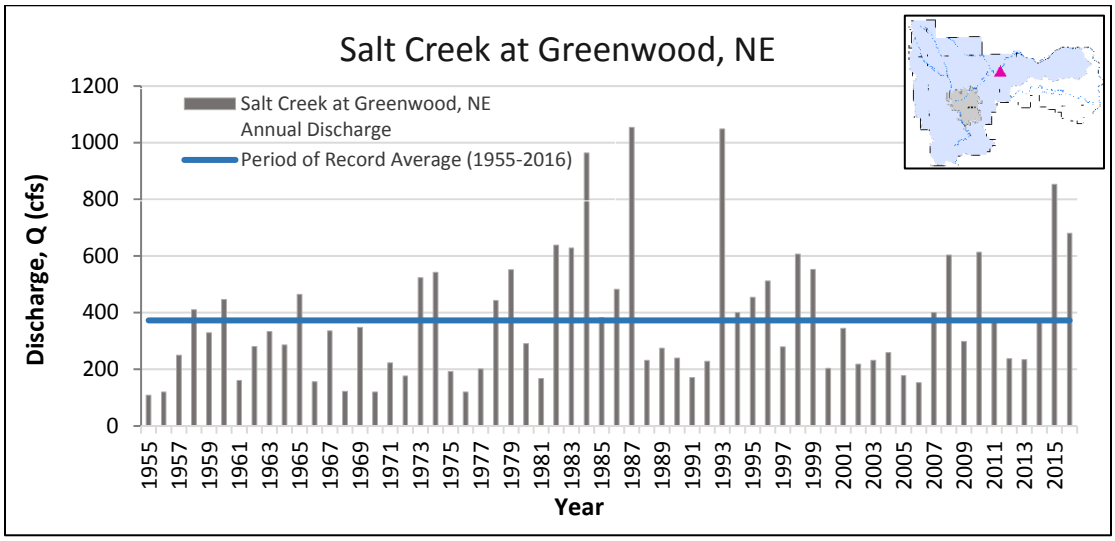


Figure 2: Historical annual discharge for Salt Creek at Greenwood, NE (source: USGS-NWIS. Some provisional data used).

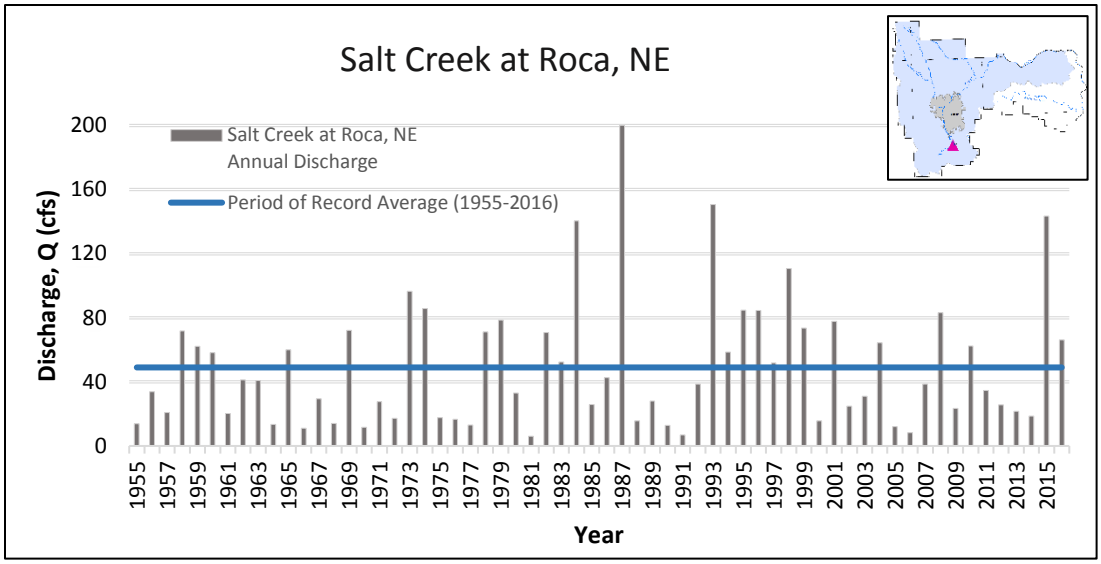


Figure 3: Historical annual discharge for Salt Creek at Roca, NE (Source: USGS-NWIS. Some provisional data used).

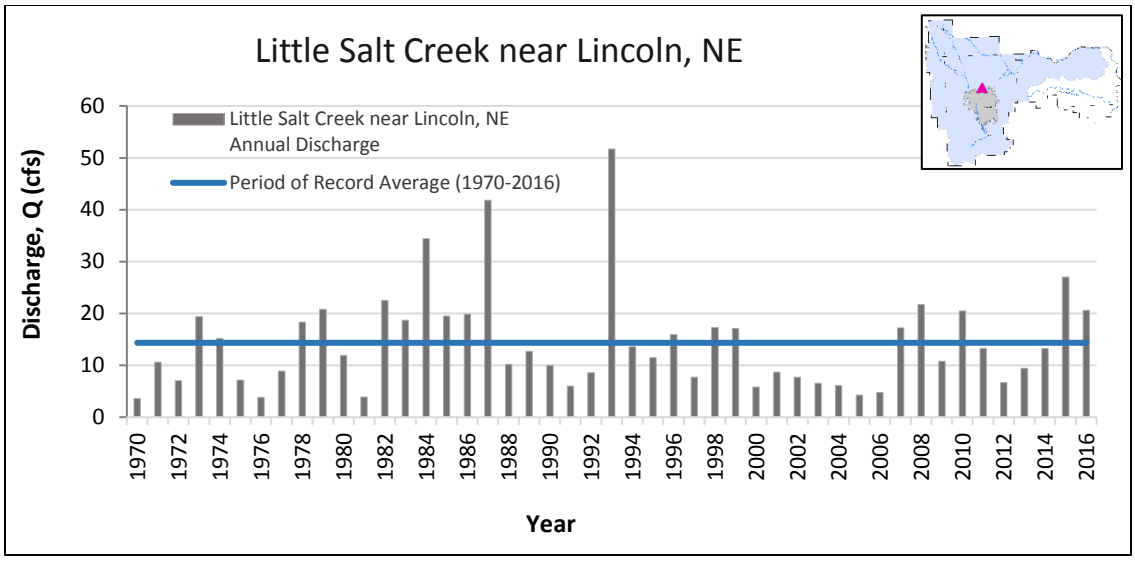


Figure 4: Historical annual discharge for Little Salt Creek near Lincoln, NE (Source: USGS-NWIS. Some provisional data used).

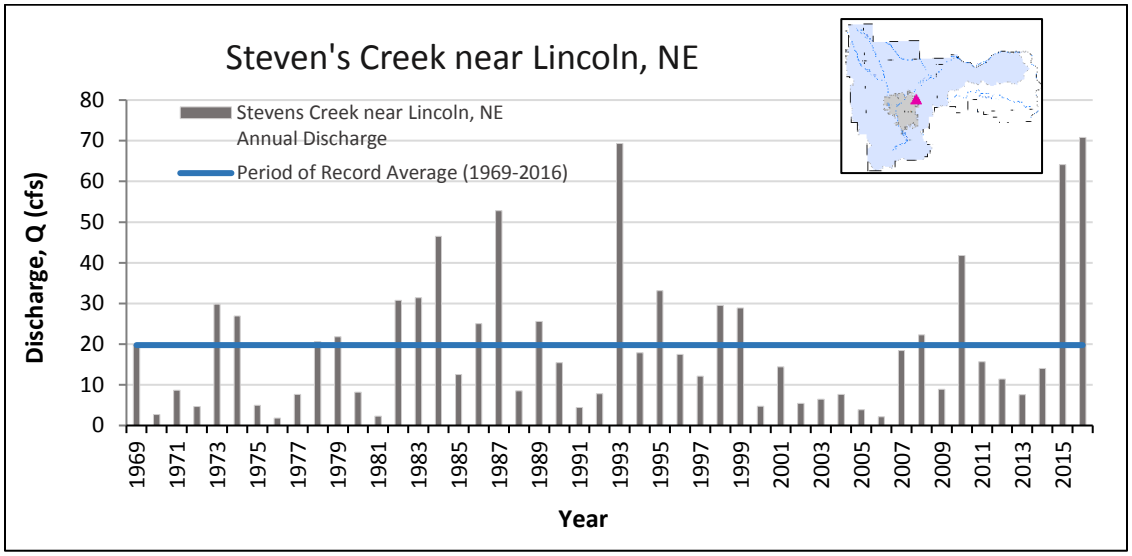


Figure 5: Historical annual discharge for Steven's Creek near Lincoln, NE (Source: USGS-NWIS. Some provisional data used).

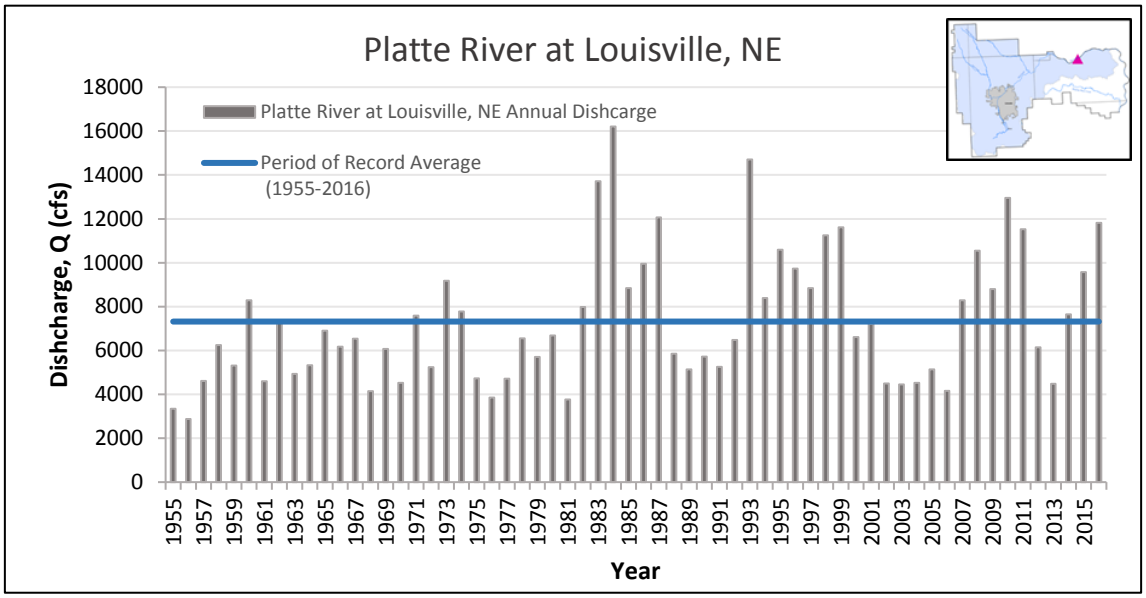


Figure 6: Historical annual discharge for the Platte River at Louisville, NE (Source: USGS-NWIS. Some provisional data used).

Appropriations

NeDNR continued to monitor and administer surface water appropriations and maintain records for cancelled, new, or transferred rights. In 2016, NeDNR approved one surface water permit for irrigation, dismissed five surface water permit applications, cancelled eight surface water permits in full, and partially cancelled one surface water permit (Figure 7, Tables 2 - 5). The new surface water permit allowed for 16 new surface water acres. The cancellations included one permit for fish and wildlife habitat, two permits for storage, and six permits for surface water irrigation that totaled 461 acres (both full and partial cancellations). The irrigated acres cancellations were due non-use or user relinquishment. No surface rights were transferred in 2016. The dismissals were due to failure to meet the conditions of the application approval order, or to the project not moving forward.

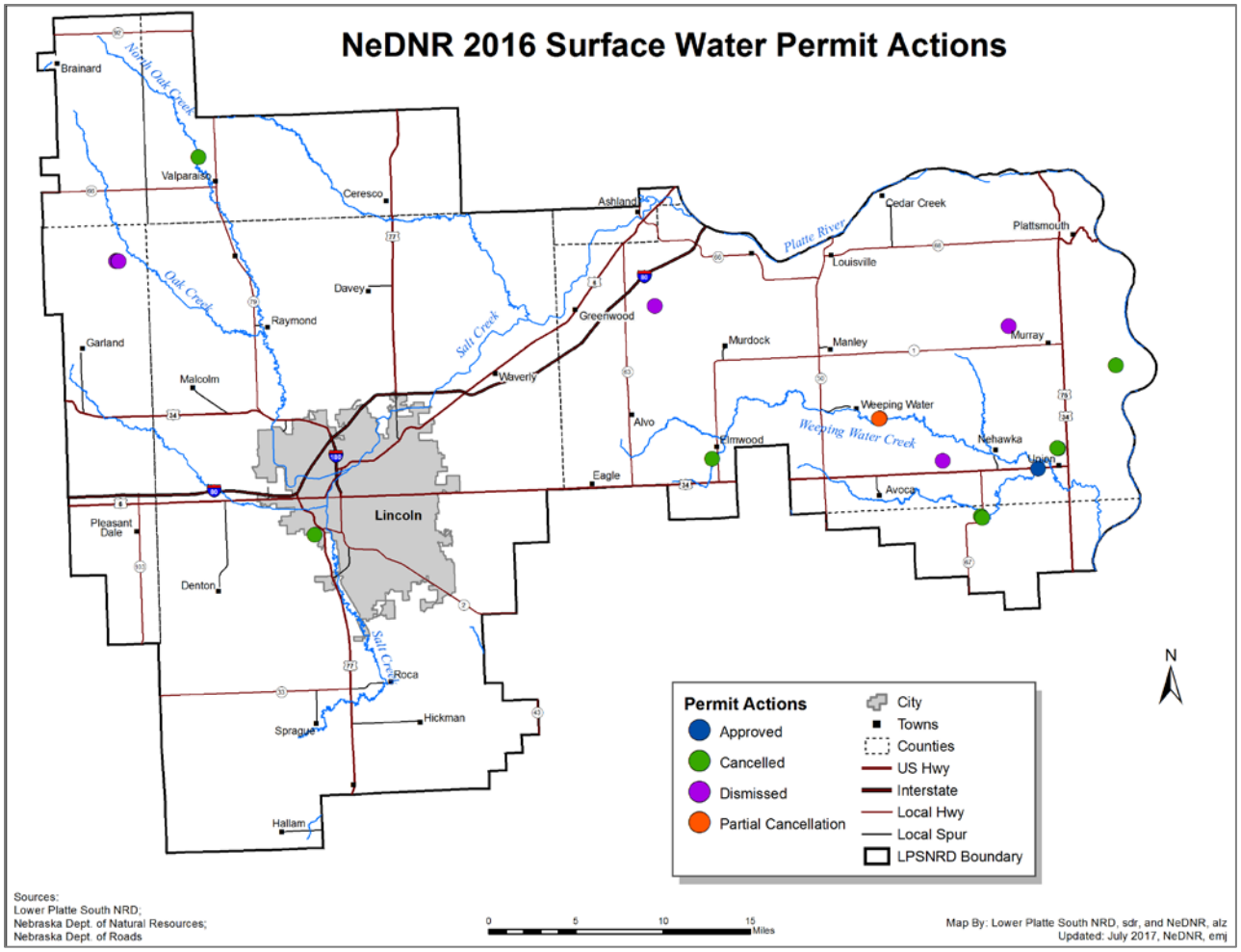


Figure 7: NeDNR surface water permitting actions in 2016.

Table 2: New surface water appropriations approved in 2016.

New Surface Water Appropriations Approved in 2016 within LPSNRD							
Appropriation Number	**Approval Date**	**Use**	**Acres**	**Grant in cfs**	**Section**	**Township**	**Range**
A-19422	4/26/2016	Irrigation from Natural Stream	16.0	0.23	27	10	13E

Table 3: Surface water appropriations partially cancelled in 2016.

Surface Water Appropriations Partially Cancelled in 2016 within LPSNRD								
Appropriation Number	**Grant Cancelled**	**Acres Cancelled**	**Remaining Acres**	**Cancellation Date**	**Use**	**Section**	**Township**	**Range**
A-19001	0.07 cfs	48.9	26.2	4/6/2016	Irrigation from Natural Stream	6	10	12E

Table 4: Surface water appropriations fully cancelled in 2016 within LPSNRD.

Surface Water Appropriations Fully Cancelled in 2016 within LPSNRD							
Appropriation Number	**Grant Cancelled**	**Acres Cancelled**	**Cancellation Date**	**Use**	**Section**	**Township**	**Range**
A-13589	1.91 cfs	133.7	8/8/2016	Irrigation from Natural Stream	1	9	12E
A-16540	0.04 cfs	--	11/18/2016	Fish and Wildlife Habitat	3	9	6E
A-12815	1.05 cfs	73.5	4/28/2016	Irrigation from Natural Stream	15	13	5E
A-19007	0.53 cfs	37.4	4/6/2016	Irrigation from Natural Stream	28	11	14E
A-19021	1.04 cfs	72.9	3/17/2016	Irrigation from Natural Stream	14	10	13E
A-19143	1.35 cfs	94.7	9/27/2016	Irrigation from Natural Stream	16	10	10E
A-19181	13.7 af	--	1/29/2016	Storage	14	12	4E
A-19182	16.5 af	--	1/29/2016	Storage	14	12	4E

Table 5: Surface water appropriations dismissed in 2016 within LPSNRD.

Dismissed Surface Water Appropriations in 2016 within LPSNRD						
Appropriation Number	**Order Date**	**Use**	**Acres**	**Section**	**Township**	**Range**
A-18568	4/26/2016	Irrigation from Natural Stream	20.0	36	12	9E
A-18580	12/20/2016	Irrigation from Natural Stream	16.0	8	11	13E
A-19084	5/20/2016	Irrigation from a Reservoir	150.0	22	10	12E
A-19183	3/17/2016	Irrigation from a Reservoir	80.0	14	12	4E
A-19184	3/17/2016	Irrigation from a Reservoir	50.0	14	12	4E

Voluntary Surface Water Use Reporting

2016 was NeDNR's third year of implementing a voluntary water use reporting program in LPSNRD to estimate water use in areas where reporting is not currently required by law. To do this, NeDNR sent out postcards and letters to surface water irrigation permit holders within the District, inviting them to participate in the voluntary reporting program. Participants could submit information via a hardcopy form, an online form, or by calling in to the Department.

In the LPSNRD, 47 voluntary water use reports were received out of 208 letters, resulting in 23% participation. In 2015, 58 voluntary use reports were received, so there was a slight decline in response rates between the years. The responses provided information on the location and number of surface water irrigated acres, whether or not irrigation was used in 2016, the type of irrigation used, crop type, and type of tillage. These reporting activities accounted for slightly over 3,000 acres across Cass, Lancaster, Saunders, and Seward counties. Of the 47 total responses:

- 36 (77%) of the respondents used some sort of tillage conservation practices (minimum or no till)
- 26 (55%) irrigated in 2016, accounting for 1,389 irrigated acres, or 46% of all acres reported.
- The most common crop types were corn (52%), soybeans (33%), other (14%), and alfalfa (1%).

Surface Water Pump-Site Visits

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. The purpose of the pump-site inspections is to gather information pertaining to use or nonuse of the surface water right, crop type, irrigation status, irrigation method (gravity vs pivot), and if possible, a spot flow measurement. It is the goal of the field office staff to inspect each pump site at least once on a biennial basis.

In 2016, 172 permit sites out of 390 total sites for LPSNRD (44%) were inspected by NeDNR Field Office staff and data pertaining to each site was collected and compiled. Of the inspected sites, 168 sites were for irrigation from a natural flow, three sites were for irrigation from storage facilities, and one site was for supplemental irrigation. At the time of the inspections, there were 16 sites set-up to irrigate, however, only three sites were actually running, which could be due to a variety of factors including abundant rainfall, timing of visit, etc. The locations of the pump checks are shown in Figure 8.

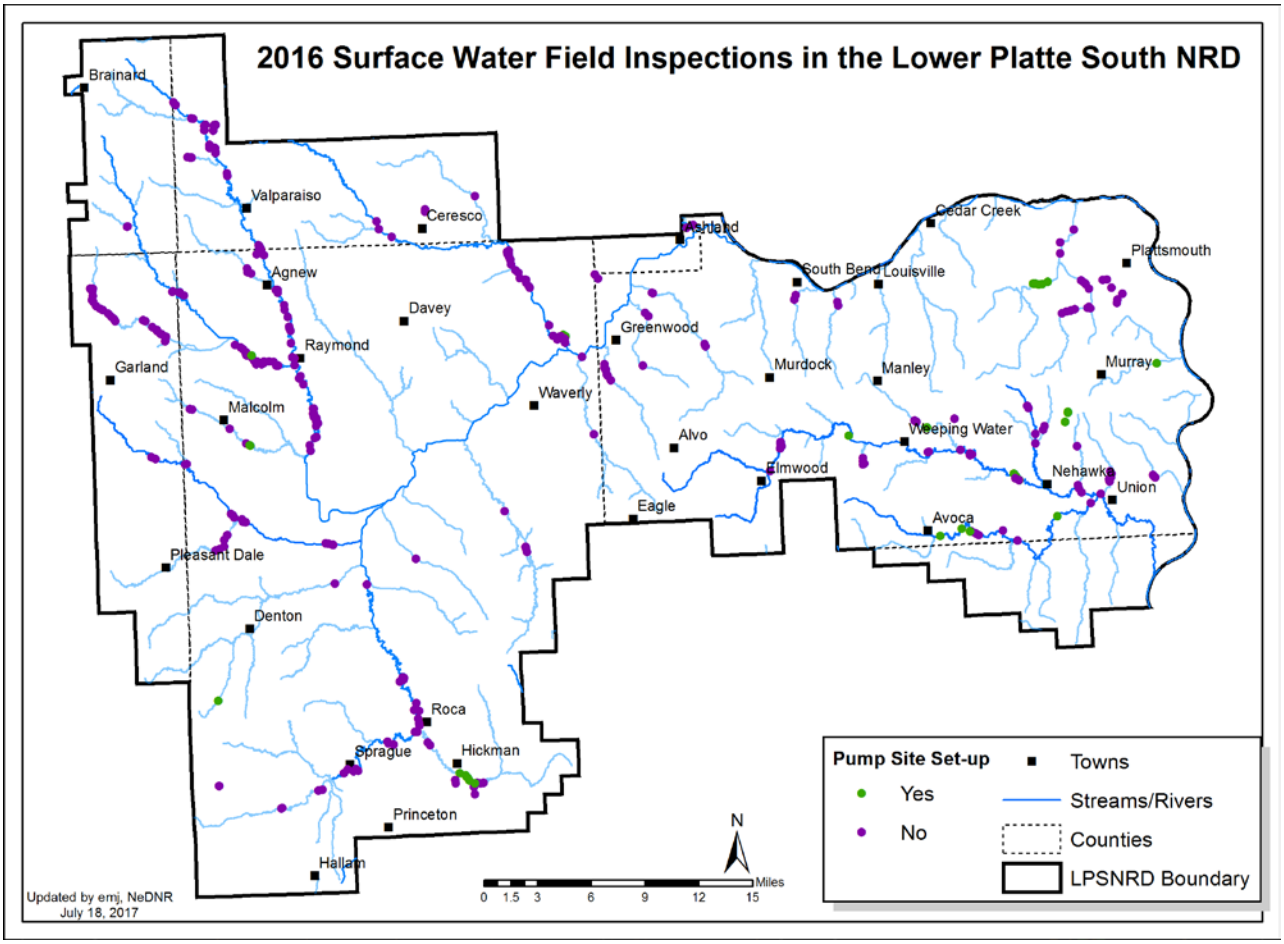


Figure 8: 2016 surface water field inspections in LPSNRD.

Groundwater Monitoring

Metering and Groundwater Level Monitoring

All wells with capacity to pump over 50 gallons per minute (gpm) are metered, which numbered 392 at the close of 2016. LPSNRD collected records of usage from these wells, and in addition, from all public supply wells. The calculated total pumping for 2016 from 385 of these wells was 3.7 billion gallons, with 305 irrigation wells accounting for 59.31% of the total measured pumping. This total pumping volume did not include the public supply wells. In addition, LPSNRD inspected and read 111 groundwater well meters during 2016.

LPSNRD also collected groundwater level data from 141 wells in the spring and fall of 2016, and 122 of these wells are part of the District's official water level network. Of these, 7 wells showed declines and 114 wells showed an increase from spring 2015 to spring 2016, while 1 well showed no change; the maximum decline was 9.96 feet while the maximum increase was 12.65 feet, with an average static water level increase of 2.01 feet. Figure 9 shows a spatial representation of groundwater level changes. The average change by groundwater reservoir is shown in Table 6.

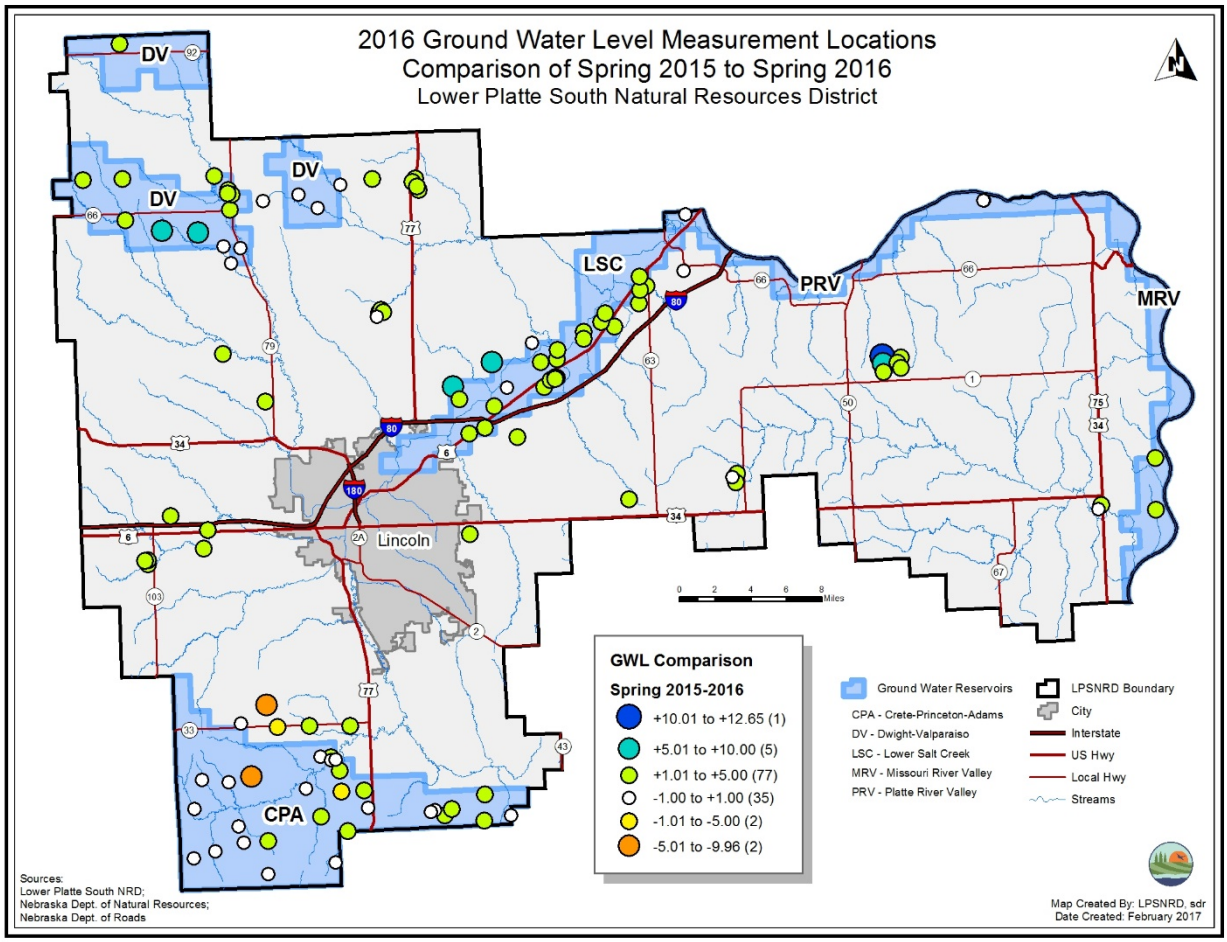


Figure 9: 2016 groundwater level measurement location. Comparison of Spring 2015 to Spring 2016.

Table 6: Average well level change by groundwater reservoir. Comparison of Spring 2015 to spring 2016.

Average Well Level Change by Groundwater Reservoir	
GW Reservoir	**Spring '15 to Spring '16 (ft)**
Crete-Princeton-Adams	0.42
Dwight-Valparaiso	2.65
Lower Salt Creek	3.28
Missouri River Valley	1.73
Platte River Valley	0.54
Remaining Area	2.26

Permitting Activities

LPSNRD issued seven well permits in 2016 for varied uses as reported in Table 7 and locations shown in Figure 10. Of these, two wells were completed in 2016, with an additional seven wells being completed from 2015 permitting activities. All statutory well-spacing minimum requirements were followed for all new and replacement wells.

Table 7: LPSNRD approved or completed groundwater wells in 2016.

Approved GW Well Permits in 2016	Number of Permits	Completed wells in 2016	
Irrigation	3	From 2015 Permits	7
Commercial	1	From 2016 Permits	2
Public Water Supply	1		
Aquaculture	1		
Lake Supply	0		
Wetland	1		
Total	7	**Total**	9

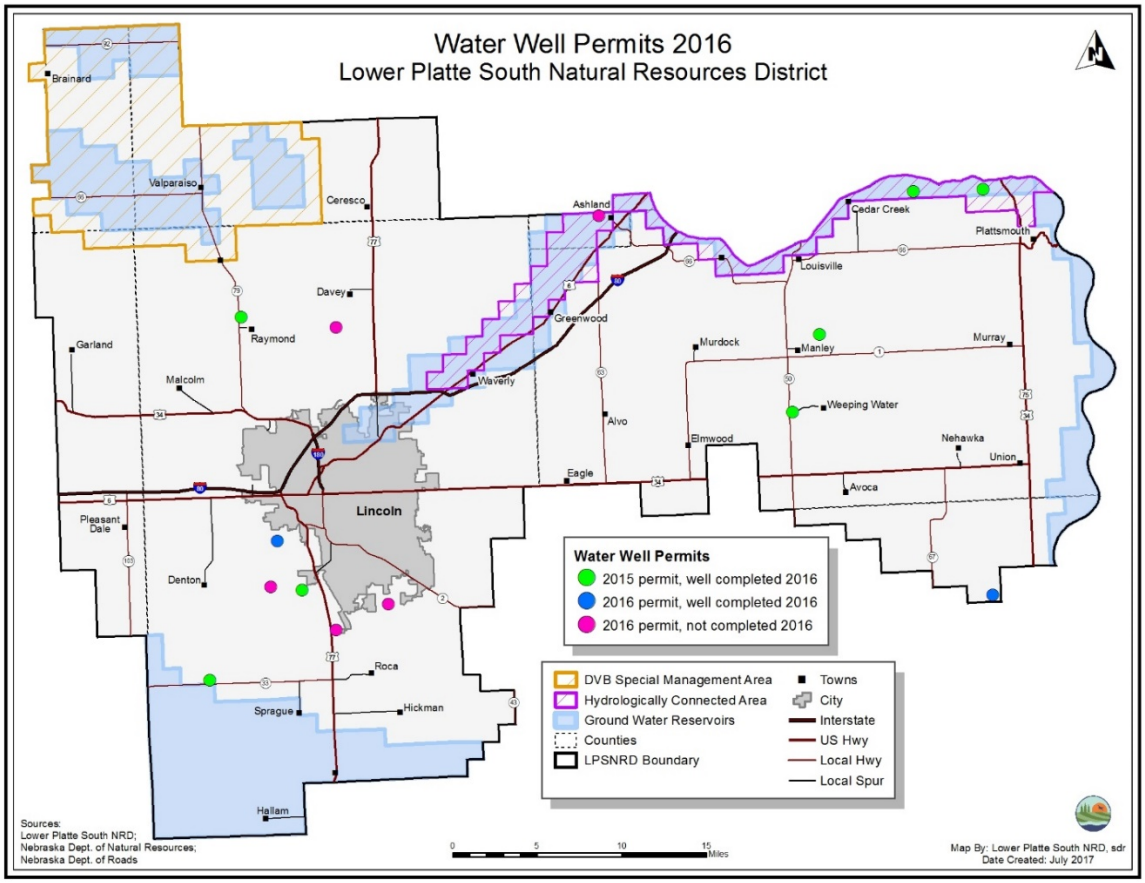


Figure 10: LPSNRD groundwater well permits approved or completed in 2016.

Land Use and Land Cover (LULC) Monitoring and Actions

In 2016, LPSNRD certified 22.1 additional groundwater irrigated acres within the Hydrologically Connected Area (HCA), for a total of 3,206.42 acres (Figure 11). As specified in the IMP, newly certified groundwater irrigated acres within the hydrologically connected area did not exceed 20% (593 acres) of the total certified groundwater irrigated acres in the same area. In the remainder of the District an additional 205.83 groundwater irrigated acres were certified, for a total of 26,794.57 acres.

One variance was approved to expand certified groundwater irrigated acres in the hydrologically connected area. An additional variance was approved to construct a salt water well without conducting the required variable rate pumping before taking water quality samples. No groundwater transfers or water banking actions occurred in the District in 2016. LPSNRD continued to provide cost-share assistance on best management practices and equipment to encourage groundwater efficiency.

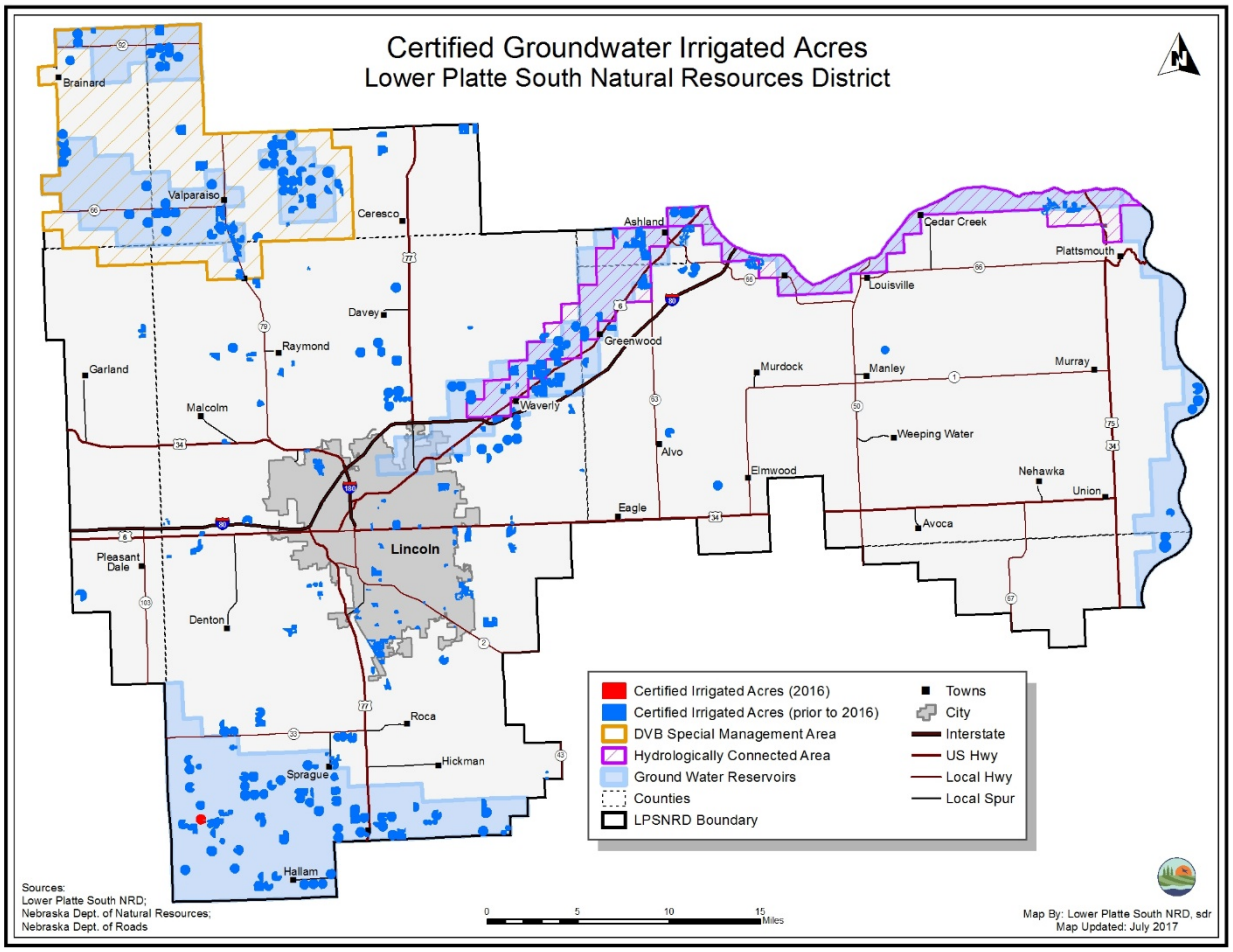


Figure 11: LPSNRD existing and new certified groundwater irrigated acres in 2016.

Regulatory Actions put in Place During 2016

LPSNRD Groundwater Acres Limitations

An annual limitation of 593 additional certified irrigated acres continues to be in place on hydrologically connected areas within the LPSNRD. A temporary moratorium on the Dwight-Valparaiso area was lifted in 2014 following designation of Dwight-Valparaiso-Brainard Special Management Area, but a rule continued in place to not allow an increase in irrigated acres (Figure 11), and pumping allocations for irrigated land also continued to be in effect.

NeDNR Surface Water Acres Limitations

NeDNR's sets its surface water limitations to 1/3 the amount of acres that the LPSNRD allows for new groundwater irrigated acres, as of January 1 for each year. For 2016, NeDNR's surface water acres limitation was 198 acres in the surface water control area as shown in Figure 12. Although this limit was in place, there were no new surface water acres added within the control area. There were, however, 73.5 cancelled acres within the control area, and 16 new surface water acres approved outside of control area (Figure 12).

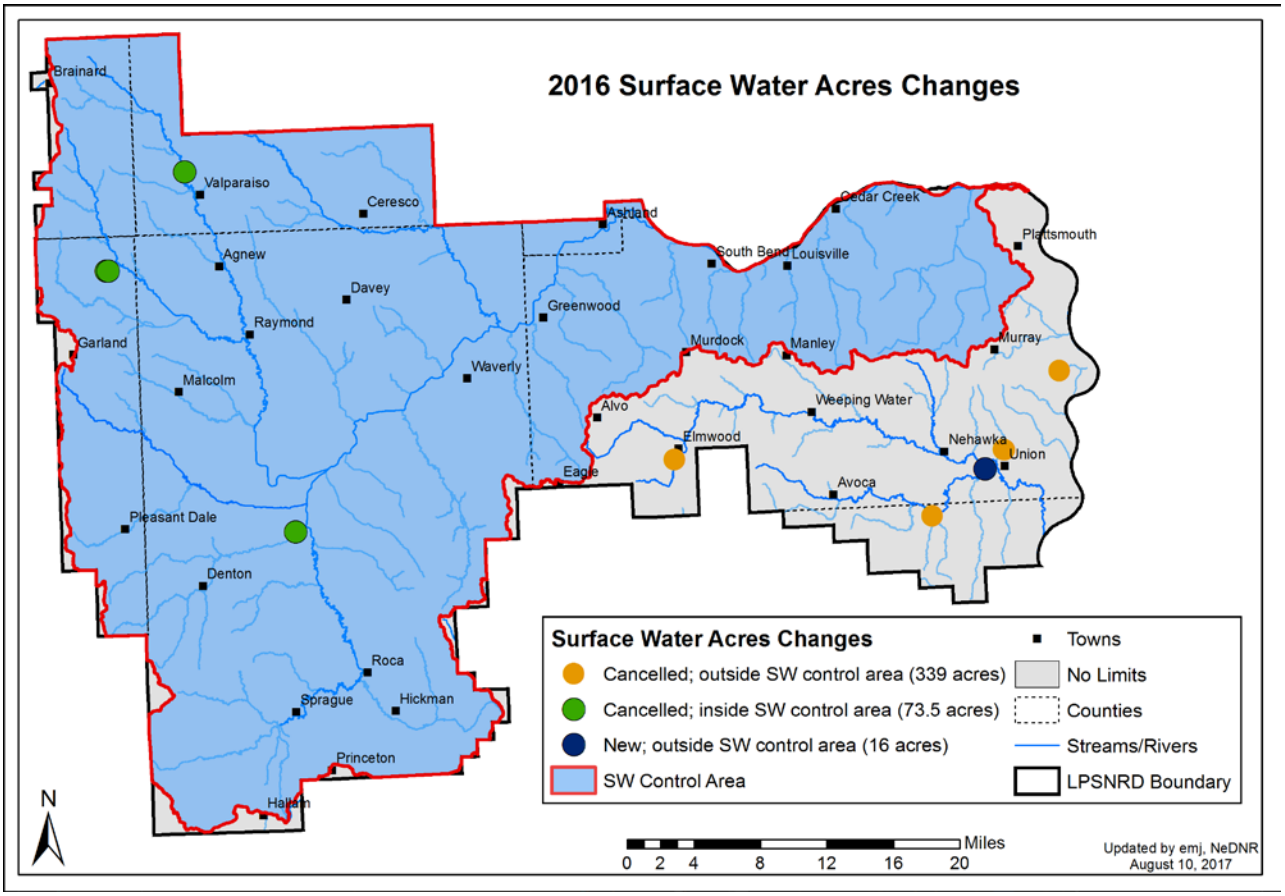


Figure 12: NeDNR 2016 surface water acre limits for LPSNRD.

Studies and Planning

The following studies were continued or completed in 2016 by the LPSNRD and NeDNR, to gather and evaluate data, information, and methodologies that could be used to increase understanding of the surface and groundwater supplies and uses within, and as appropriate, outside the District. These studies help to meet the goals and objectives that were developed through the IMP stakeholder process.

Additional IMP Components (HDR, Inc. services)

In 2014, LPSNRD retained HDR, Inc. to provide professional services to address the following additional components for the IMP. These specific IMP components were completed in 2015 and will be appended to the IMP. In general, the tasks were:

- Develop a process to collect and record water use data from all municipalities and rural water districts and from all major non-municipal industrial water users. (LPSNRD IMP, Chapter 7: I(e)(i) and I(f)(i), page 8)
- Procedures to track depletions and gains to streamflows resulting from new, retired, or other changes to water uses within the District. (LPSNRD IMP, Chapter 8: II(d) page 11)
- An Emergency Response/Drought Mitigation Plan, which included holding a Drought Tournament, participated in by 30 stakeholders. (LPSNRD IMP, Chapter 7: V(a) page 11)

LPSNRD contracted with HDR, Inc. again in 2016 to perform additional services associated with the District's IMP Planning Components. The purpose of the project is to build on the planning components provided in the LPSNRD IMP Planning Components Methodology Report, finalized in November of 2015. This amendment is used for developing and completing tools and recommendations from the original contract for use by the LPSNRD to help implement the IMP. These will continue to help LPSNRD to observe, quantify, and manage the water resources within the District's boundary. Specifically, the methodologies being developed as part of this Project include the following:

- Implement the GIS database recommendations made during the first phase of the Project.
- Review and analyze drought response plans of the public water suppliers within the District.
- Research conservation programs for water use management.
- Develop science-based protocols for estimating unmeasured water uses.

In addition, LPSNRD and NeDNR partnered with Lower Platte North NRD, Papio-Missouri River NRD, Metropolitan Utilities Department, and the Lincoln Water System to form the Lower Platte River Consortium (LPRC) in 2016. The Consortium contracted with HDR, Inc. to develop a Drought Contingency Plan. The primary focus of the plan will be to further refine the Consortium's collective understanding of drought vulnerabilities, while developing more robust monitoring and forecasting tools coupled with timely triggers, new mitigation strategies and responsive

actions to create a sound operational framework and improve critical water supply needs of the area through drought periods. The planning area includes the Lower Platte River upstream of the Platte River at Louisville and downstream of the Platte River at Duncan.

Stream Accretion and Depletion Calculator Expansion

NeDNR is planning to expand the stream accretions/depletions calculator that is currently used in the Upper Platte Basin, to the Lower Platte River Basin. The calculator will use data from a soil water balance model (CROPSIM) and groundwater models to allow users to calculate changes in consumptive use resulting from land use changes, and estimate the impacts to streamflow as a result of the land use change. This will provide a uniform platform for tracking water use changes, and estimating streamflow and consumptive use impacts within the Lower Platte River Basin.

Lower Platte Missouri Tributaries Model Development

NeDNR 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 that covers the northern two-thirds of eastern Nebraska, and the southern model that covers the Nemaha Basin. This has been a multi-year process; however, final calibration of the model currently underway and is expected to be completed by the end of 2017. Nemaha model development was initiated in spring 2016; this model is expected to be completed 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 models will be incorporated into the Integrated Network of Scientific Information and Geohydrologic Tools (INSIGHT) analysis (further explained in the next section) and be made available through the INSIGHT web portal (https://nednr.nebraska.gov/INSIGHT/). The models will also be available as a decision support tool for NRDs, to evaluate impacts to aquifer and streamflow under various management scenarios such as irrigation development, crop type changes, etc.

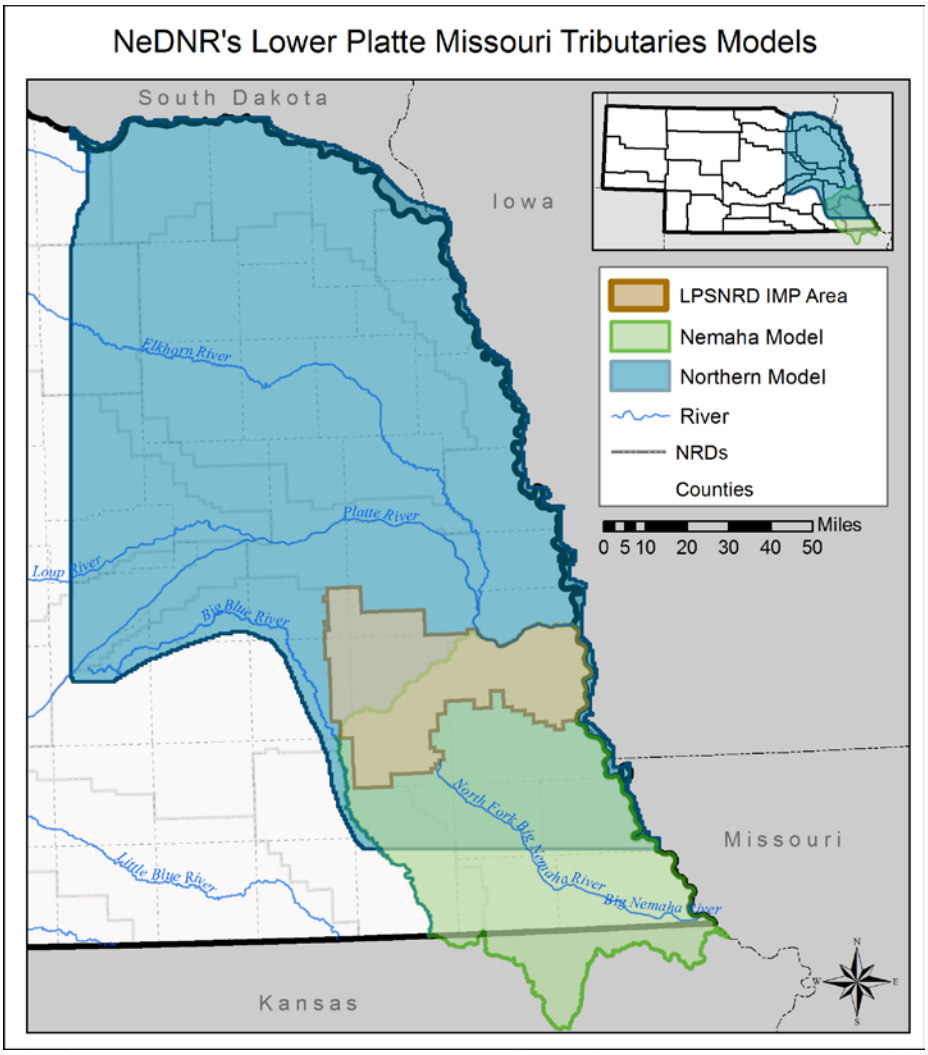


Figure 13: NeDNR's Lower Platte-Missouri Tributaries models.

Water Inventory and Water Use/Supply Management

LPSNRD Accomplishments

LPSNRD has continued data collection and sharing of data, and has worked to improve the database that houses this information. LPSNRD further reviewed groundwater well permits relative to aquifer capacity and sustainability. LPSNRD also continued the open dialogue with public water suppliers on current and future water supplies, and supported storm water capture and reuse projects in the District. LPSNRD contracted with JEO to conduct a preliminary study on alternatives and estimated costs to provide a potable water supply to the Exit 426 Interchange area in Cass County, supplied by the City of Ashland wellfield. LPSNRD continued to participate with the Lower Platte River Weed Authority and the Lancaster County Weed Authority on invasive species control relative to water supply.

NeDNR's INSIGHT Web Portal

The Integrated Network of Scientific Information and Geohydrologic Tools (INSIGHT) web portal at https://nednr.nebraska.gov/INSIGHT/ is a water use, supply and balance tool that was developed by the Department and was released in 2014. INSIGHT aids water managers and other interested parties in better understanding current and future water demands, effectiveness of water management strategies, and critical areas of water shortage. The user can access information pertaining to water supplies and demands (precipitation, irrigation, hydropower, etc.), as well as view maps with associated charts that show overall water balance (current, near-term, or long-term) at a subbasin scale. A valuable feature of INSIGHT is that all the datasets that are used to compile the water balance analyses are also stored within the web portal and are available for download.

NeDNR will continue to update the current INSIGHT analysis and add other basins as new data become available. At this time, NeDNR has compiled data for the Lower Platte River, from North Bend, NE to Louisville, NE which covers a large portion of the LPSNRD IMP area. It does not include the portion of the NRD that is a part of the Nemaha River Basin, but this area will be added to INSIGHT subsequent to the completion of the Lower Platte Missouri Tributaries models.

Education/Outreach

NeDNR Activities

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. In 2016, NeDNR also made updates to the INSIGHT website, as a part of an incremental improvement plan, to improve accessibility and understandability of INSIGHT data and analysis.

Local

NeDNR participated in Earth Day and Keep Cass County Beautiful, both events are located within the LPSNRD. In addition to a booth with educational pamphlets and materials, a hands-on groundwater model demonstration was presented to convey the hydrological connection between groundwater and surface water, emphasizing how over-pumping groundwater can change the direction of subsurface flow and eventually reduce streamflow.

LPSNRD Activities

Each February LPSNRD compiles a *Ground Water Management Plan Review*; a report of all groundwater activities completed in the previous calendar year. The report includes results of well sampling and measuring, progress made in on-going groundwater programs, the status of each groundwater management area, and more. The review is presented in summary to the LPSNRD Board of Directors and the complete review is posted on LPSNRD's website, http://www.lpsnrd.org. The posted review is promoted on the website Home page and in the

District newsletter.

In March, 2015, LPSNRD made aquifer data gathered in aerial scans by Exploration Resources International (XRI) in 2013 available on its website. An interactive map is linked to the website and users may click on a specific location within the DVB Special Management Area to see data for that location. All of the related raw data (the scope of which goes far beyond just the basic aquifer information) and a staff summary of the data are also available on the website. The printed final report by XRI consists of more than 600 pages and LPSRD arranged for the printed report to be available for public access at public libraries in Dwight and Valparaiso and at the East Butler Public Schools Library in Brainard.

LPSNRD plans on obtaining more AEM data through additional aerial scans in 2017.

The NRD continues to host Test Your Well Nights for specific areas each year. Private well owners are able to bring water samples in to be tested for nitrates and LPSNRD worked with local FFA chapters and Science students to test the water.

The LPSNRD worked with UNL Extension to implement a Certification Program for irrigators, and continued to provide cost-share and educational support for irrigation best management practices.

LPSNRD also promoted its groundwater activities through social media platforms Instagram and Facebook. Information was shared about groundwater levels, samples, data loggers and monitoring wells.

The stakeholder advisory group for the Dwight-Valparaiso-Brainard Special Management Area (DVB) was kept updated on DVB activities. The group held annual meetings in December of 2014, January of 2016, and in March of 2017, where they were updated by LPSNRD staff and contributed their own input. The group also met in February of 2015 to be updated on aerial electromagnetic imaging activity in DVB.

LPSNRD continually seeks to maintain public awareness to information about groundwater levels, available cost-sharing and conservation best management practices through its publications, website, and through District media.

Collaboration with Other Entities

Eastern Nebraska Water Resources Assessment

Both LPSNRD and NeDNR participated in the Eastern Nebraska Water Resources Assessment (ENWRA) program in 2016 to cooperate on hydrogeologic data research and modeling. ENWRA's participants include six NRDs in eastern Nebraska and NeDNR. As a part of this mapping effort, NeDNR and LPSNRD continued the interlocal cooperative agreement with ENWRA to support a hydrologic framework study which involves using a helicopter based-geophysical remote sensing tool, termed Airborne Electromagnetic Survey (AEM), to determine aquifer locations and thicknesses.

LPSNRD additionally participated in data sharing of LPSNRD's earlier data from the 2013 AEM flight over the northwestern portion of the District. Also in 2016, LPSNRD received a Water Sustainability Fund (WSF) grant for additional AEM flights, with the application coordinated through ENWRA. LPSNRD's application involves detailed flights in the eastern portion of the District, as well as additional flight lines in the Lower Salt Creek drainage to continue refining our understanding of groundwater-surface water connection in that area. The flights were completed in July 2016, and the final report is due by December 31, 2017. Finally, representatives from both the LPSNRD and NeDNR attended ENWRA's technical and managerial meetings, and kept up-to-date on studies and data collection activities.

Lower Platte River Basin Coalition

Both the LPSNRD and NeDNR are active participants in the Lower Platte River Basin Coalition (LPRBC), 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/.

Lower Platte River Consortium

LPSNRD and NeDNR are participating members of the Lower Platte River Consortium (LPRC). The LPRC was formed through and interlocal agreement in 2016 and also includes Lower Platte North NRD, Papio-Missouri River, MUD, and LWS as members. The Consortium will work together to develop regional solutions to improve the water supply reliability and drought resiliency of the Lower Platte River. The Lower Platte River Drought Contingency Plan (LPRDCP) is a collaborative project among these six water management agencies along with the Bureau of Reclamation. The LPRDCP is expected to be finalized in September of 2018 and will analyze the available water in the area and develop a plan to retain or acquire water for this part of the state and its population in years of drought.

Lower Platte River Corridor Alliance

Both the LPSNRD and NeDNR are active participants in the Lower Platte River Corridor Alliance (LPRCA), which is a group comprised of the nine agencies, including the LPSNRD, Lower Platte North NRD, Papio-Missouri River NRD, NeDNR, Nebraska Department of Environmental Quality, Nebraska Department of Health and Human Services, Nebraska Game and Parks Commission, Nebraska State Military Department, and the University of Nebraska Institute of Agriculture and Natural Resources. The LPRCA is dedicated to working with people to protect the long-term vitality of the Lower Platte River Corridor. The mission of the LPRCA is to foster the development and implementation of locally drawn strategies, actions, and practices to protect, enhance, and restore the vitality of the Lower Platte River's resources. Created in 1996 through an interlocal agreement, the Alliance uses a variety of "tools" to assist counties, communities, governments, resource management organizations, and the general public to meet Lower Platte River Corridor management challenges. These "tools" include public awareness

events, educational workshops, recreation studies, water quality studies, floodplain studies, land-use planning assistance, and a variety of other projects. For more information about the LPRCA, please see www.lowerplatte.org

Other Collaborations

The LPSNRD cooperated with the USGS on collection of surface water/streamflow data. In 2015, LPSNRD staff initiated contact with USGS personnel to begin identification of new stream gage locations in the Oak Creek drainage of the Dwight-Valparaiso-Brainard Special Management Area, and two new gages were installed in 2016 near the village of Valparaiso and the unincorporated community of Touhy. This effort utilized the AEM data from 2013, and will ultimately be aimed at further defining the relationship between ground and surface water in this area. The LPSNRD additionally cooperated with UNL, USGS, adjoining NRDs, and NeDNR on groundwater data sharing.

Jointly Identified Actions for Succeeding Two Years

As stated in the IMP, LPSNRD and NeDNR will jointly identify action steps for the succeeding two years for implementation and these are listed below. The following actions 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 IMP:

1. NeDNR will continue to develop INSIGHT as a tool for water management, and will expand the analysis to the east (Missouri Tributaries) as data become available.
2. Both the LPSNRD and NeDNR will continue to participate in basin-wide or regional groups such as ENWRA, the Lower Platte River Consortium, and Lower Platte River Basin Coalition.
3. As a part of the Lower Platte River Basin Coalition, the NeDNR and LPSNRD will continue work to acquire and develop data to be used as a foundation for the Basin-Wide Planning initiative.
4. Both the LPSNRD and NeDNR will continue public outreach activities related to integrated water management, and plan to participate in the Earth Wellness Festival, a science orientated event aimed to engage fifth grade students. This will take place during the spring of 2018.
5. NeDNR will continue to monitor surface water permit sites on a rotating basis to gain a better understanding of surface water use within the LPSNRD.
6. Both the LPSNRD and NeDNR will evaluate the need for additional stream gages in or near the LPSNRD, including a potential additional stream gage in the Oak Creek drainage in the northwestern portion of the District.
7. The LPSNRD will continue to monitor groundwater level changes through its network of groundwater monitoring wells.

8. The LPSNRD will continue to meter and require annual pumping reports for groundwater wells that have capacity to pump over 50 gpm, as well as public supply wells. The LPSNRD will continue to assimilate the data into a comprehensive dataset.
9. The LPSNRD will continue to collect information on municipal, rural water, and non-municipal industrial water use, land use and population changes, and climate changes.
10. The LPSNRD will continue the work through the contract with HDR, Inc. to complete the IMP component tasks identified through that contract, including further development on a Drought Emergency Response Plan, research on conservation programs for various water uses, analyzing unmeasured water uses, and implementation of revisions to the GIS database.
11. NeDNR will continue development of the Lower Platte Missouri Tributary models, and upon completion, will provide a presentation to the LPSNRD Board regarding the model development, results and capabilities.
12. NeDNR will continue its voluntary water use reporting program.
13. The LPSNRD will develop recommendations for the development and management of geographic areas with limited aquifers.
14. The LPSNRD will conduct discussions with municipalities and rural water districts on coordinating services with regional systems and on water shortage action plans.
15. The LPSNRD and NeDNR will review the need to update the IMP Goals and Objectives, with participation by the Advisory Committee.
16. The LPSNRD and NeDNR will continue working to move LPSNRD data into a central repository.