# ANNUAL INTEGRATED MANAGEMENT PLAN REPORT

2014



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

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# 2014 ANNUAL REPORT FOR LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT/NEBRASKA DEPARTMENT OF NATURAL RESOURCES INTEGRATED MANAGEMENT PLAN

Jointly prepared by the Lower Platte South NRD and the Nebraska Department of Natural Resources

Submitted at 2014 Annual IMP Report Meeting held August 20, 2015.

#### Introduction

The Lower Platte South Natural Resources District (LPSNRD) and the Nebraska Department of Natural Resources (NDNR) jointly adopted an 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.

The 2014 annual report is consistent with Chapter 9 of the IMP, which outlines procedures for reviewing and potentially modifying the IMP. In June, 2015 the LPSNRD and NDNR met and jointly decided that no amendments to the IMP were needed at the time of the 2014 annual review. In addition, the NRD and DNR worked collaboratively to identify action steps for the years 2015 and 2016 and these are presented in the "Future Actions" section of this report. The LPSNRD and NDNR also worked together to write this joint annual report, and this report was made available to the public via the LPSNRD and NDNR websites on July 24, 2015, prior to the annual meeting held on August 20, 2015. In addition, the LPSNRD and NDNR distributed a public notice of the annual meeting in area newspapers for two weeks in July, 2015.

This annual report covers the actions and progress made towards IMP action items for both the LPSNRD and NDNR. The IMP states (Chapter 9) that the LPSNRD and NDNR 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. As the LPSNRD regulates groundwater and the NDNR regulates surface water, some sections are written individually, but wherever possible, sections are written jointly to reflect the partnership required to successfully implement the IMP. This IMP annual report provides transparency, to each other, and to the public of what the LPSNRD and NDNR do on a regular basis to protect existing water users while allowing for economic viability.

# **Monitoring and Data Collection**

# **Surface Water Monitoring**

# Streamgaging

NDNR does not operate any stream gages within the boundaries of LPSNRD. The USGS, however, owns and operates 14 stream gages within the District (Table 1, Figure 1). LPSNRD is in a cooperative agreement with USGS to assist in funding 12 of these gages. Streamflow data can be acquired from USGS's National Water Information System at <a href="http://waterdata.usgs.gov/">http://waterdata.usgs.gov/</a>.

Agency	Site Number	Station Name	Begin Date	LPSNRD assist in funding?
USGS	6803000	Salt Creek at Roca, Nebr.	05/14/1951	yes
USGS	6803080	Salt Creek at Pioneers Boulevard at Lincoln, Nebr.	06/20/1994	yes
USGS	6803093	Haines Branch at SW 56th St at Lincoln, Nebr.	06/20/1994	yes
USGS	6803170	Middle Creek at SW 63rd St at Lincoln, Nebr.	06/20/1994	yes
USGS	6803486	Oak Creek at Air Park Road at Lincoln, Nebr.	05/21/1987	yes
USGS	6803495	Salt Creek at Fairgrounds at Lincoln, Nebr.	06/20/1994	no
USGS	6803500	Salt Creek at Lincoln, Nebr.	05/11/1942	yes
USGS	6803510	Little Salt Creek near Lincoln, Nebr.	10/14/1968	yes
USGS	6803513	Salt Creek at 70th Street at Lincoln, Nebr.	05/31/1994	yes
USGS	6803520	Stevens Creek near Lincoln, Nebr.	10/14/1968	yes
USGS	6803530	Rock Creek near Ceresco, Nebr.	04/01/1970	yes
USGS	6803555	Salt Creek at Greenwood, Nebr.	07/27/1971	no
USGS	6804700	Wahoo Creek at Ashland, Nebr.	02/22/1990	no
USGS	6806500	Weeping Water Creek at Union, Nebr.	01/11/1950	yes

Table 1: 2014 Stream Gages within the LPSNRD boundary.

# **Appropriations**

The NDNR continued to monitor and administer surface water appropriations and maintain records concerning cancelled, new, or transferred rights. In 2014, the NDNR approved 4 surface water permits: 1 for irrigation, 2 for storage, and 1 for manufacturing (Table 2, Figure 1). NDNR cancelled 15 surface water appropriations: 13 for irrigation and 2 for storage (Table 3, Figure 1). No surface water rights were transferred in 2014.

Appropriation Number	Approval Date	Use	Grant in CFS	Grant in AF	Section	Town- ship	Range
A-19143	1/10/2014	Irrigation	1.35		16	10	10 E
A-19295	10/28/2014	Manufacturing	2.04		3	10	11 E
A-19083	1/29/2014	Storage		24	22	10	12 E
A-19250	7/16/2014	Supplemental		60	27	10	7 E

Table 2: NDNR new surface water permits in 2014

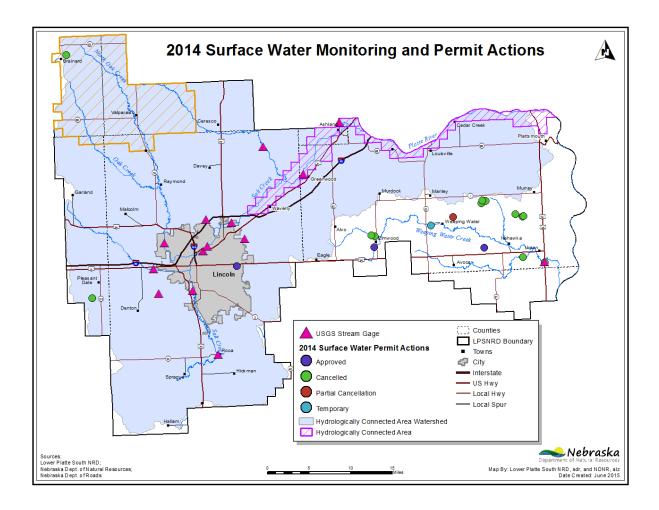


Figure 1: 2014 surface water monitoring and permit actions

# **Surface Water Monitoring (continued)**

# Meters and reporting

In 2014, NDNR implemented a voluntary water use reporting program to estimate water use in areas where reporting is not currently required by law. NDNR sent out letters to surface water irrigation permit holders within the District, inviting them to participate in the voluntary reporting program. Participants could either fill out an online form at <a href="http://data.dnr.nebraska.gov/wateruse">http://data.dnr.nebraska.gov/wateruse</a> (ongoing) or call in to report use. In the LPSNRD, 51 voluntary water use reports were received out of 218 appropriations (23%). Permit holders who reported provided information on the location and number of surface water irrigated acres, whether or not irrigation was used in 2014, the type of irrigation used, crop type, and type of tillage. These reporting activities accounted for nearly 2,700 acres across Cass, Lancaster, Saunders, and Seward counties. Of the 51 total responses:

- 45 (88%) employed tillage conservation practices
- 20 (39%) irrigated in 2014, accounting for 1,456.4 irrigated acres, or 55% of all acres reported.
- The most common crop types were corn (47%), soybeans (35%), other (16%), alfalfa (2%).

Appropriation Number	Status	Use	Section	Township	Range	Cancellatio n Date	Begin Acres	Cancelled Acres	Cancellatio n in CFS	Cancellatio n in AF	Right ID
2664	Cancelled in Full	Irrigation	36	10	13 E	6/11/2014	80	80			4386
13104	Cancelled in	Irrigation	9	10	10 E	9/4/2014	39.8	39.6			4294
13104	Full	irrigation		10	10 L	3/4/2014	33.8	0.2			4234
13108	Cancelled in Full	Irrigation	33	11	13 E	9/26/2014	81.5	81.5			4348
13109	Cancelled in Full	Irrigation	32	11	13 E	9/26/2014	38	38			4339
13496	Cancelled in Full	Irrigation	22	11	12 E	7/9/2014	60.42	60.42			4331
13497	Cancelled in Full	Irrigation	22	11	12 E	7/9/2014	74.33	74.33			4333
13498	Cancelled in Full	Irrigation	23	11	12 E	7/9/2014	127.66	127.66			4334
14320	Cancelled in Full	Irrigation	28	10	13 E	7/16/2014	76	76			4377
14911	Cancelled in	Irrigation	33	11	13 E	11/21/2014	135.5	77.0			4349
14311	Full	irrigation	33	11	13 L	11/21/2014	155.5	58.5			4343
14912	Cancelled in Full	Irrigation	32	11	13 E	11/21/2014	46.6	46.6			4340
15782	Cancelled in Full	Irrigation	5	10	10 E	11/21/2014	208.3	208.3			4293
15789	Cancelled in Part	Irrigation	31	11	12 E	9/4/2014	214.4	40.3			4319
15036C	Cancelled in Full	Stor-only	17	14	4 E	5/22/2014	95.8	95.8			10622
18786	Cancelled in Full	Storage	10	9	4 E	8/19/2014				29.3	10985
18907	Cancelled in Full	Supple- mental Storage	27	10	7 E	7/2/2014				60	11127

Table 3: NDNR cancelled water rights in 2014

#### Surface water permit site visits

The NDNR Lincoln field office visited 175 natural flow permit sites to perform pump site inspections in 2014, to gather data on whether the field was irrigated. Of these sites, only 12 pumps were set up to irrigate at the time of the visit. The locations of the pump checks are shown in Figure 2. The field office will continue to monitor surface water irrigated lands for use.

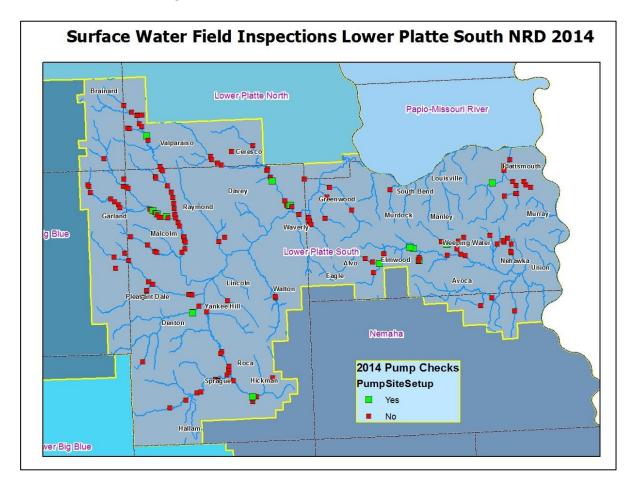


Figure 2: Locations of pumps that were checked for surface water use by the Department in 2014.

#### **Groundwater Monitoring**

# Metering and groundwater level monitoring

All wells with capacity to pump over 50 gallons per minute (gpm) are metered, which numbered 395 at the close of 2014. LPSNRD collected records of usage from 393 wells, and in addition from all public supply wells. The calculated total pumping for 2014 from 382 of these wells was 5,544,472 gallons, with 206 irrigation wells accounting for 60.18% of the total measured pumping. This total pumping volume did not include the public supply wells. In addition, the NRD inspected and read 111 groundwater well meters during 2014.

LPSNRD also collected groundwater level data from 139 wells in the spring and the fall of 2014. Of these, 109 wells showed declines from spring 2013 to spring 2014; the declines averaged 1.12 feet. There were 23 wells that showed no declines or changes of any type. Figure 3 shows a spatial representation of groundwater level changes. The average change by groundwater reservoir is shown in Table 4.

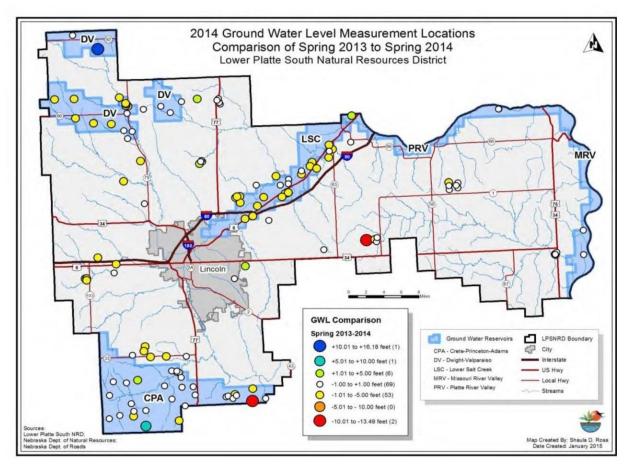


Figure 3: Spring 2013 to spring 2014 groundwater level changes shown by 139 monitoring wells.

Average Well Level Change by Ground Water Reservoir						
GW Reservoir	Spring '13 to Spring '14					
Crete-Princeton-Adams	-0.56					
Dwight-Valparaiso	-1.88					
Lower Salt Creek	-1.65					
Missouri River Valley	0.07					
Platte River Valley	0.79					
Remaining Area	-1.08					

Table 4: Spring 2013 to spring 2014 average groundwater level changes in specific reservoir locations.

# Permitting activities

LPSNRD approved 29 well permits in 2014 for varied uses as reported in Table 5 and Figure 4. Of these, 10 wells were completed in 2014, with an additional 9 wells being completed from 2013 permitting activities. All statutory well-spacing minimum requirements were followed for all new and replacement wells.

Approved GW well Permits in 2014	Number of Permits	Completed wells in 2014			
Irrigation	24	From 2013 Permits	9		
Public Water Supply	2	From 2014 Permits	10		
Lake fill	2	Total	19		
Emergency supply	10				
Total	29				

Table 5: Permitting activities that were approved or completed in 2014.

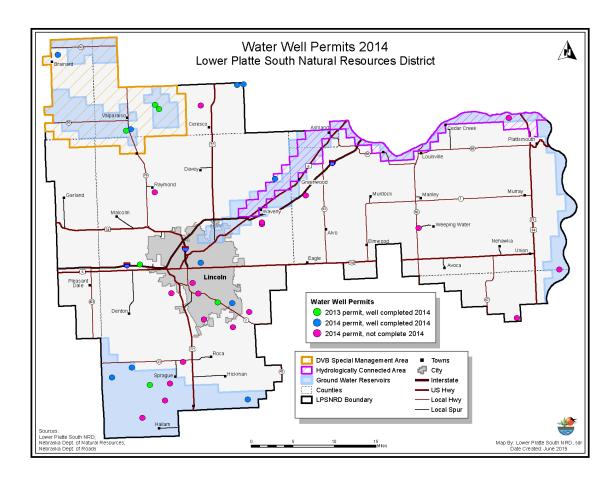


Figure 4: Groundwater well permits approved in 2014.

# Land Use and Land Cover (LULC) monitoring and actions

In 2014, LPSNRD certified 48 additional irrigated acres within the Hydrologically Connected Area (HCA), for a total of 3,172.32 acres (Figure 5). In the remainder of the District, 1,636.12 irrigated acres were certified, for a total of 23,057.75 acres. As specified in the IMP, newly certified irrigated acres within the hydrologically connected area did not exceed 20% of the total certified irrigated acres in the same area.

One variance was approved to expand certified irrigated acres in the hydrologically connected area. An additional variance was approved to irrigate acres outside of a ground water reservoir from a well located in a ground water reservoir. Four variances were approved in the Dwight-Valparaiso-Brainard Special Management Area, adding 237.55 certified irrigated acres. No ground water transfers or water banking actions occurred in the District in 2014. LPSNRD continued to provide cost-share assistance on best management practices and equipment to encourage ground water efficiency.

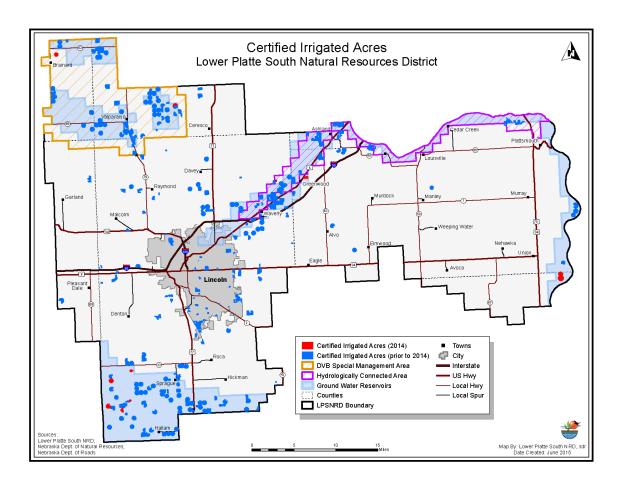


Figure 5: Existing and newly certified irrigated acres in 2014.

# Regulatory actions put in place in 2014

# Moratoriums enforced by LPSNRD

A moratorium continues to be in place on hydrologically connected areas. A temporary moratorium on the Dwight-Valparaiso area was lifted in 2014 following designation of Dwight-Valparaiso-Brainard Special Management Area, with a no increase in certified irrigated acres rule (Figure 6).

# Moratoriums enforced by NDNR

No moratorium or restrictions on new surface water acres for irrigation were in place in the District in 2014. As stated in the IMP, NDNR will restrict the number of additional acres for surface water irrigation in the surface water areas that drain into the hydrologically connected areas, in an amount equal to 1/3 of the amount of acres that LPSNRD will allow for new groundwater irrigated acres. After coordinating with LPSNRD in order to find out the number of acres that would be allowed for groundwater irrigated acres in 2015, NDNR's Surface Water Permitting Division started limiting additional surface water acres to 198 acres/year on January 1, 2015 (Figure 6).

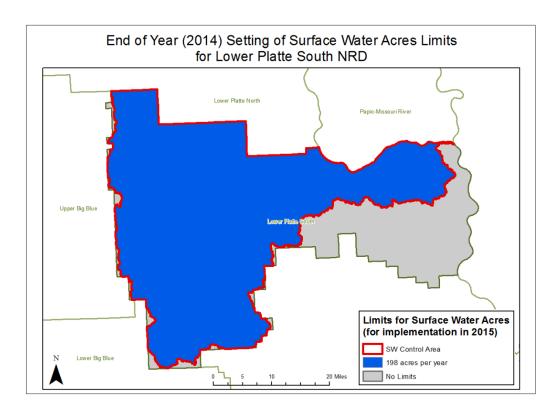


Figure 6: Surface water limits were set at the end of 2014 for 2015 implementation

#### **Studies and Planning**

The following studies were implemented in 2014 by the LPSNRD and NDNR, with the purpose 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 stakeholder process.

#### Contract with HDR, Inc.

In 2014, LPSNRD retained HDR to provide professional services to address the following additional components for the Integrated Management Plan (to be completed in 2015 and amended into the IMP):

- Process to collect and record water use data from all municipalities and rural water Districts and from all major non-municipal industrial water users. (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. (Chapter 8: II(d) page 11)
- An Emergency Response/Drought Mitigation Plan, which included holding a Drought Tournament, participated in by 30 stakeholders. (Chapter 7: V(a) page 11)

# Lower Platte Missouri Tributaries Model Development

In 2014, NDNR contracted with HDR, Inc. to develop a numerical groundwater model for Lower Platte and Missouri Tributaries (LPMT) basins. LPSNRD has aided in model development by providing digitized, certified acres which are used to develop land use and land cover datasets which greatly improve pumping and recharge estimates that are used as inputs to the groundwater model. When complete, the model for the LPMT Basin will be used as a tool for the fully appropriated basins annual report, as well as for assessing impacts of emerging and historic surface water and groundwater developments in the region.

A primary objective of the model is to refine hydrologically connected areas. To perform this task, the model will be broken into two areas, an upper area and a lower area. In 2014, development began on the upper area model, which completely covers the LPSNRD area (Figure 7). The lower boundary model will encompass potentially hydrologically connected areas of Nemaha Basin and development of this model (including delineation of the lower boundary) will follow the upper model development.

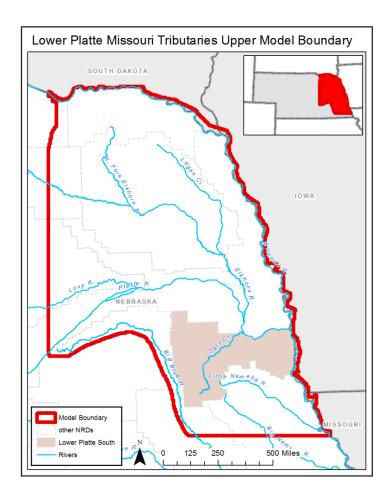


Figure 7: The boundary of the Lower Platte Missouri Tributaries model, for the upper portion of Eastern, NE, in relation to the Lower Platte South NRD.

# Water inventory and Water Use/Supply Management

# **LPSNRD** accomplishments

LPSNRD continued data collection and sharing of data, and has worked to improve the database that houses this information. In addition, LPSNRD reviewed the University of Nebraska, Lincoln climate change report to stay up to date with the current information related to cyclical climate patterns. LPSNRD further reviewed ground water 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 participated with the Lower Platte River Weed Authority and the Lancaster County Weed Authority on invasive species control relative to water supply.

# NDNR's release of INSIGHT

In January 2014, NDNR released a new web-based tool called INSIGHT (an Integrated Network of Scientific Information and Geohydrologic Tools, <a href="http://dnr.nebraska.gov/insight/">http://dnr.nebraska.gov/insight/</a>), which provides information about water supply and use for basins and subbasins within Nebraska. LPSNRD aided in INSIGHT development by providing up-to-date digitized certified acres which feed into the basin water use. Through a series of maps that are directly linked to basin-specific data, INSIGHT provides a mechanism to store and display previously unconnected datasets that together paint a picture of overall basin water health. INSIGHT was developed to aid water managers in understanding current and future water demands, evaluating the effectiveness of water management strategies, and assessing critical areas of water shortage. At this time, NDNR has compiled data for the Lower Platte River, North Bend to Louisville portion of the LPSNRD (Figure 8). NDNR will expand the area covered by INSIGHT as data become available, such as the modeling data from the LPMT model.

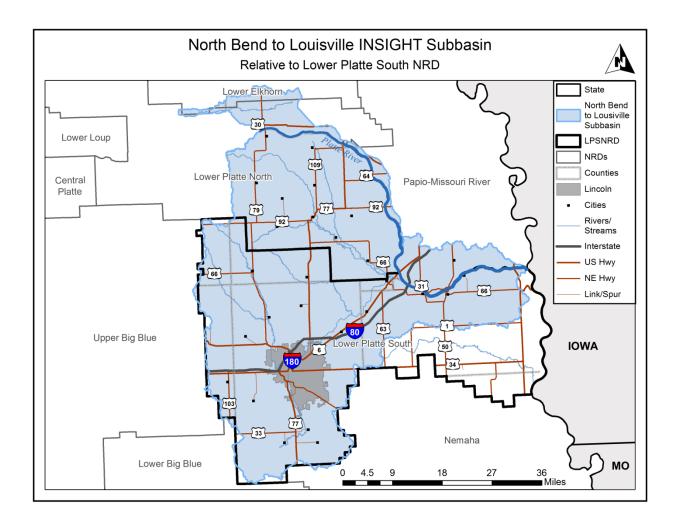


Figure 8: INSIGHT's North Bend to Louisville subbasin in comparison to the LPSNRD.

#### **Education/Outreach**

The LPSNRD worked with UNL Extension to develop a Certification Program for irrigators, and continued to provide cost-share and educational support for irrigation best management practices. NDNR and LPSNRD both participated in Lincoln Earth Day (April, 2015) in Lincoln, NE. NDNR additionally participated in Waterfest, June 2014, also in Lincoln, NE. At these events, NDNR's Integrated Water Management (IWM) division representatives focused on introducing the public to the LPSNRD's IMP, explaining INSIGHT, and leading a hands-on activity about water use and the importance of water supply planning. INSIGHT is also a part of NDNR's public outreach program as it provides a mechanism for the public to access and review water use and water supply information as it relates to unique Nebraska sub-basins

In April, 2015, LPSNRD conducted its periodic (every four years) public survey. The telephone survey of 300 constituents is used to assess environmental concerns and constituent's perceptions about NRD activities. By far, water issues were the biggest public environmental concern and the survey results were featured in a Summer 2015 NRD newsletter article. Complete results were posted on the District's website: http://www.lpsnrd.org/PublicSurvey2015.

Elmwood, NE resident Lou Allgayer was made a 2014 Omaha World Herald/UNL Master Conservationist, after his nomination by LPSNRD. Allgayer's innovations that have led to his being able to store and use up to 10,000 gallons of stormwater at his Elmwood apartment complex were publicized in the NRD's newsletter and on its website. There was also extensive local media coverage.

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

#### Collaboration with other entities

#### **ENWRA**

Both LPSNRD and NDNR participated in the Eastern Nebraska Water Resources Assessment (ENWRA) program in 2014, to cooperate on hydrogeologic data research and modeling. ENWRA's participants include six NRDs in eastern Nebraska, and NDNR. As a part of this research effort, in 2014 NDNR and LPSNRD entered into an 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. Representatives from both the LPSNRD and NDNR attended ENWRA's technical and managerial meetings, and kept up-to-date on studies and data collection activities.

#### **LPRBC**

Both the LPSNRD and NDNR participated with the Lower Platte River Basin Coalition (LPRBC) to develop a basin-wide water plan. The LPRBC was formed in April, 2013 when seven NRDs in the Lower Platte Basin (including Lower Platte South) and NDNR entered into a five-year interlocal cooperative agreement to form the coalition for the purpose of pursuing and discussing water management in the Basin.

The LPRBC took the initial steps to develop the basin-wide plan in the spring of 2014. During 2014, the LPRBC drafted surface and groundwater controls and a list of potential action items for each individual objective. As part of the planning process, the LPRBC's technical committee discussed the potential applicability of the information available through NDNR's INSIGHT database to the water banking framework. The LPRBC also began the process of identifying a common methodology and accounting system that would provide a guideline for the member NRDs for possible future water banks to support water management activities. Additional information about the LPRBC activities, including basin-wide plan development, is available on the following website: <a href="http://dnr.nebraska.gov/LPRBC">http://dnr.nebraska.gov/LPRBC</a>.

# **Other Collaboration**

The LPSNRD cooperated with the U.S. Geological Survey on collection of surface water / streamflow data. The LPSNRD additionally cooperated with UNL, USGS, adjoining NRDs and NDNR on ground water data sharing.

#### Jointly identified actions for succeeding two years

As stated in the IMP, NDNR and the LPSNRD will jointly identify action steps for the succeeding two years. The action steps that the Department and LPSNRD plan to implement in the next two years follow. 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 IMP:

- 1. NDNR 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 NDNR and LPSNRD will continue to participate in ENWRA and LPRBC groups
- 3. The NDNR and LPSNRD will continue public outreach activities related to integrated water management, and plan to participate in one joint public outreach event in either 2015 or 2016.
- 4. NDNR will continue to monitor surface water permit sites on a rotating basis to gain a better understanding of surface water use within the LPSNRD.
- 5. Both the LPSNRD and NDNR will evaluate the need for additional stream gages in or near the Lower Platte South NRD.
- 6. The LPSNRD will continue to monitor groundwater level changes through its network of groundwater monitoring wells.
- 7. 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.
- 8. The LPSNRD will continue the work through the contract with HDR, Inc. to complete the IMP component tasks identified through that contract.
- 9. NDNR will continue development of the Upper Lower Platte Missouri Tributary model, with cooperation from LPSNRD.
- 10. NDNR will continue its voluntary water use reporting program.
- 11. The LPSNRD will initiate a cooperative study of the effectiveness and feasibility of water conveyance via streams from upstream sources.
- 12. The LPSNRD will develop recommendations for the development and management of geographic areas with limited aquifers.
- 13. The LPSNRD will conduct discussions with municipalities and rural water districts on coordinating services with regional systems and on water shortage action plans.