Water Committee Meeting
Wednesday, May 29, 2024 6:00 PM
Lower Platte North NRD Office
P.O. Box 126
Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. REGULATORY

2.A. GROUND WATER MANAGEMENT AREA

2.A.1. Variance Requests in the Restricted Development Areas

2.A.2. Well Permit Program

2.A.3. Voluntary Integrated Water Management Plan - LPNNRD

The V-IMP was adopted jointly by NeDNR and LPNNRD in June 2018. The plan goes through annual reviews with a more extensive evaluation planned for every 5 years. The NeDNR has reached out and is wanting to do extensive review of the goals and objectives of the plan. A letter is attached to start the process along with the 2018 V-IMP plan.

Staff recommends reviewing the plan with NeDNR.

2.A.4. Cost Share Programs

2.A.5. Lower Platte River Basin Water Management Plan Coalition (LPRBC)

Nothing new to report.

2.B. CHEMIGATION

As of May 29, 2024, we have 424 renewals and 18 new permit applications for a current total of 442. Inspections for 1 new permit have been completed. In 2023, the NRD had 701 permits with the deadline for renewal being June 1.

2.C. GROUND WATER ENERGY LEVELS

The Committee asked staff to obtain a hydro-geologist to present information about the current aquifer regions, trigger levels and compare monitoring wells in each area. LRE made a presentation to address some of these issues.

The following tasks have been updated since the Water Committee Meeting:

Task 1 - Subarea Review and Delineation - $8,000

Task 2 - Review Spring/Fall Wells and Standardize Hydrographs. - $9,000

Task 3 - Quantity Trigger Evaluation - $3,000

Task 4 - Protocols for Evaluating New Well Permit Application Establishing Safe-Yield Thresholds - $4,000

The total for all 4 tasks is $35,000.

The Committee reviewed Version 1.0 with 62 wells instead of reviewing 200 wells, which Version 2.0 includes. With the extra wells and additional tasks, the cost is now $35,000 and the Water Committee recommended $25,000 for 3 tasks added to the budget for next year. If the Board wants to do all 4 tasks, the motion would be for $35,000.

More detailed information is attached explaining what is being proposed. This would be an amendment to the GWMP update if the Board moves forward.

2.D. Groundwater Management Plan

An invoice is attached from LRE for $6,701.50 for the GWMP update.

2.E. GROUND WATER QUALITY SAMPLING

The staff and committee discussed the cost-sharing policy on Reverse Osmosis Units, which is attached. The Committee would like a chance to review the policy and get more feedback from other members. Questions were brought up about the scientific data about choosing 8 PPM as the threshold and expectations on nitrate reduction from the RO unit.

2.E.1. Groundwater Quality Assessment

Staff and LRE had kickoff meetings with Platte Center and Newman Grove on their Source Water Protection Grants. At the March Board Meeting, the LPN agreed to do a water quality assessment of the Shell Creek Area to fill in the area between these communities. A map is attached showing the area that will be assessed along with an invoice for $2,203.

2.F. Drought Plan Proposal

Attached is the Hazard Mitigation Contract Amendment to include a drought plan. The cost of the plan is $95,000, of which 75% is reimbursed by grant funding. The NRD share would be $23,750.

The Committee would like more time to evaluate the proposal and if it should be included in next year's budget.

3. GROUND WATER PROGRAMS

3.A. DECOMMISSIONED WELL PROGRAM

3.A.1. Well Estimates

No new wells has been reviewed and approved for decommissioning since the last Committee meeting.

Well Owner	Type of Well	Cost Share Estimate	County

3.A.2. Plugged Wells

No wells have been plugged, reviewed, and ready for cost share payment approval this month.

Well Owner	Type of Well	Cost Share Estimate	County

3.B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

3.B.1. Phase Area Update

There are no new applications or invoices to approve for the May Water Committee Meeting.

3.B.2. Lower Platte River Sub-Regional Groundwater Modeling

An invoice is attached from Papio-Missouri River NRD for $23,697.22 for LPN share on this 3-year project for groundwater modeling. This is year 1 of this project with an update on how the modeling is progressing attached. This model, when completed, will assist in determining the hydrological connected area (HCA) and stream depletion factors.

3.B.3. Lower Platte River Consortium

The next meeting is scheduled for June 11 as a virtual meeting.

3.C. NEW MONITORING WELLS

Attached is an invoice for $3,908.20 from In-Situ for equipment to assist in connecting multiple HydroVus together. This will allow NRD staff to move equipment to other wells. This invoice will go against LPN credit at InSitu

4. SURFACE WATER PROGRAMS

4.A. STATE LAKES, FOR THE WEEK OF

This week's beach Bacteria and Harmful Algal Bloom results are now posted on the NDEE web page (Current Health Alerts and Sampling Results For This Week).

There will be **0** beaches on Health Alert this week.

Current Lakes on "Health Alert"			
Lake	**County**	**Microcystin (ppb)**	**Sample Date**
NONE!!!			

When a lake exceeds 8 ppb of microcystin it will be placed on Health Alert. If a lake is under a Health Alert, signs will be posted recommending people

avoid full body contact activities such as swimming, wading, skiing, jet skiing, etc.
We have **3** beaches with *E.coli* testing above 235 colonies/100 ml.

Lakes with High *E.coli* Bacteria			
Lake	**County**	***E.coli* (MPN)**	**Sample Date**
Cottonmill Park Swim Lake	**Buffalo**	**>2,420**	**5/21/2024**
Carter Lake (Omaha)	**Douglas**	**>2,420**	**5/20/2024**
Johnson Lake	**Gosper**	**1,986**	**5/21/2024**

When *E. coli* bacteria levels test above 235 colonies/100 ml a Health Alert is not issued. However, conditions are at a higher risk to human health when swimming. Considering the more rapid changes in bacteria conditions, signs are not posted with these higher levels. Although, we want people to be aware of beach conditions and use their own judgment as to whether they use a listed water body.

5. OTHER
   Water Leader Academy Update
   5.A. COMMENTS FROM THE PUBLIC

June 10, 2024

Mr. Thomas Riley, P.E., Director
Nebraska Department of Natural Resources
245 Fallbrook Blvd, Suite 201
Lincoln, NE 68521-6729

RE: Initiation of updates to LPNNRD's integrated management plan

Dear Director Riley:

This letter is to confirm that the Lower Platte North Natural Resources District (District) and the Department of Natural Resources (Department) have jointly determined that updates to the integrated management plan (IMP) for the District are necessary. In accordance with *Nebraska Revised Statutes* §§ 46-715 through 46-718, updates to the IMP will be developed and adopted using a consultative and collaborative process.

Following adoption of the IMP in 2018, the District and the Department have made collaborative efforts to implement the goals and objectives set forth in the IMP and have met regularly to review progress. The purpose of updating the IMP is to meet the needs of the District and the Department and reflect the intent of the Lower Platte River Basinwide Plan.

The District would like to meet with your staff in the coming weeks to discuss potential updates and a project timeline. Daryl Andersen will be the District staff contact leading coordination of IMP updates. You may reach them at 402-443-4675 and dandersen@lpnnd.org. Please work with Daryl Andersen in scheduling a suitable date and time to discuss this matter.

Respectfully,

Eric Gottschalk
General Manager
Lower Platte North Natural Resources District

LOWER PLATTE NORTH
Natural Resources District

2018

Lower Platte North Natural Resources District Voluntary Integrated Management Plan

NEBRASKA
DEPT. OF NATURAL RESOURCES

Prepared by the:
Lower Platte North
Natural Resources District

and

Nebraska Department of
Natural Resources

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1.0 AUTHORITY AND EFFECTIVE DATE

This Integrated Management Plan was voluntarily prepared for, and adopted by, the Board of Directors of the Lower Platte North Natural Resources District (District) and the Nebraska Department of Natural Resources (Department). It was developed in consultation with its Stakeholder Advisory Committee and in accordance with the Nebraska Ground Water Management and Protection Act. The Act assigns the Department and the District the responsibilities and authority for management of groundwater, surface water, and their hydrologically connected areas in accordance with the Nebraska Groundwater Management and Protection Act, N.R.S. Chapter 46, Article 7.

This IMP was adopted by the Lower Platte North Natural Resources District on June 11, 2018 and by the Nebraska Department of Natural Resources on June 13, 2018. The IMP became effective on July 15, 2018.

2.0 INTRODUCTION

In the Lower Platte North Natural Resources District (District), sustainable water resources are critically important. Water users include domestic, agriculture, industry, recreation, and wildlife; all such users rely on readily available water resources. The protection of this invaluable resource is paramount to preserving the standard of living, environmental health, and community vitality for District residents and future generations (Figure 1).

The drought of 2012 highlighted the fragile and finite nature of the District's groundwater and surface water supplies. The drought caused shortages that were experienced by irrigators, domestic users, and public water suppliers alike. The shortages were not confined to groundwater or surface water; rather, they affected the resource as a whole due to the complex hydrologic connectivity between ground and surface water: the use of one water source affects the other.

In the state of Nebraska, the District oversees the monitoring and regulation of groundwater (Figure 2), and the Department oversees the monitoring and regulation of surface water (Figure 3).

Figure 1. A District sponsored field trip teaches students about the protection of water resources.

The District's Board of Directors recognized the need for joint management of groundwater and surface water and initiated development of a voluntary integrated management plan (IMP) with the Department.

This voluntary IMP provides the framework for joint management of groundwater and surface water, recognizing that the two water sources are hydrologically connected. This framework enables the District and the Department to coordinate management actions and the monitoring of groundwater and surface water, in order to better protect water resources for future generations.

Figure 2. Groundwater monitoring is conducted by the District.

Figure 3. Surface water monitoring is conducted by the Department.

3.0 BACKGROUND

3.1 Fully Appropriated Basins Evaluation

In 2004, the Nebraska Legislature adopted LB962, which requires the Department to annually evaluate the long-term water balance of hydrologically connected river basins and subbasins. The Department report entitled "Annual Evaluation of Availability of Hydrologically Connected Water Supplies" (Annual Report) conveys the results of this evaluation. Through this Fully Appropriated Basins (FAB) evaluation, a river basin or subbasin is considered "fully-appropriated" when current uses of hydrologically connected water supplies will, in the reasonably foreseeable future, cause:

- The surface water supply to be insufficient to sustain, over the long-term, the beneficial or useful purposes for which existing natural-flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted;
- The streamflow to be insufficient to sustain, over the long-term, the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved; or
- Reduction in the flow of a river or stream sufficient enough to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws.

The Department identifies "hydrologically connected areas" (Figure 4) as part of the annual Fully Appropriated Basins evaluation. These are defined as the geographic areas where a groundwater well would deplete river flow by at least ten percent of the water pumped over a 50 year period, known as the "10/50 area".

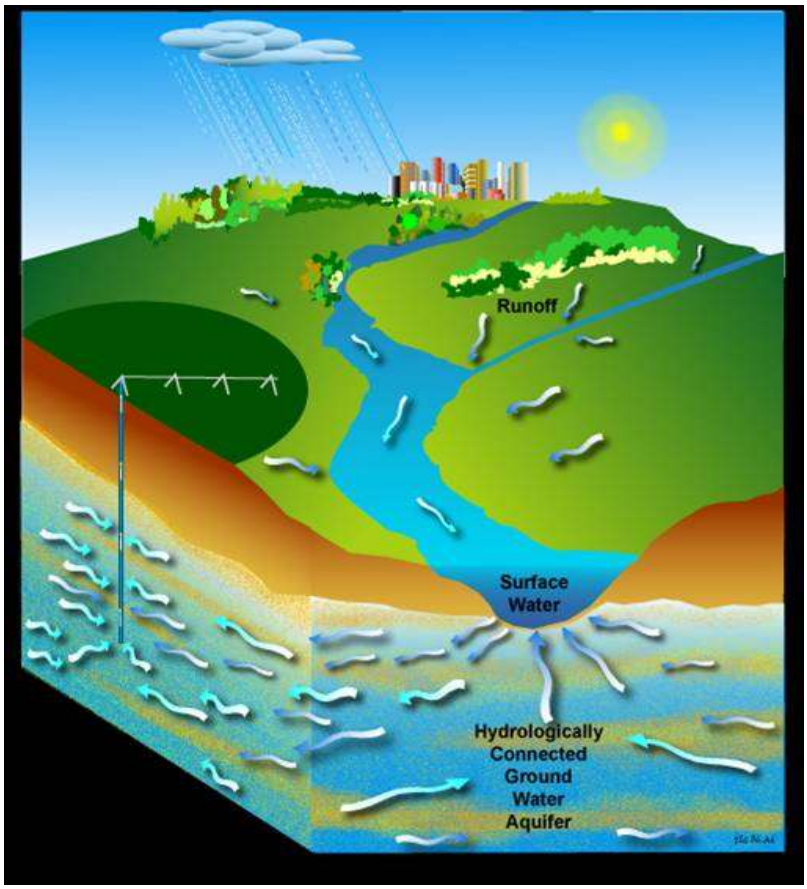


Figure 4. Diagram showing the hydrologically connected concept. The stream supplies a portion of its available flow to the underlying aquifer; the aquifer intersects the stream and contributes groundwater to stream flow.

3.2 Integrated Management Plans

Relation to FAB Evaluation

If the Department has designated or determined a river basin or subbasin to be fully appropriated based upon criteria in §§ 46-713 and 46-714, the affected NRD(s) must develop an Integrated Management Plan (IMP) with the Department. This is a joint water quantity management plan developed and implemented by the Department and the NRD(s). A District may also voluntarily develop an IMP based upon § 46-715(1)(b). The purpose of an IMP is to manage the river basin or subbasin to achieve and sustain long term balance between water uses and water supplies. Neb. Rev. Stat. §§ 46-715 to 46-717 and subsections (1) and (2) of 46-718 describe the process by which the IMP is developed and implemented.

Mandatory Components of an IMP

Neb. Rev. Stat. § 46-715(2) specifies five mandatory components that are included in each IMP. These components enable effective implementation of the IMP in order to fulfill the purpose of maintaining and achieving a balance between hydrologically connected groundwater and surface water. These components are:

- Clear goals and objectives with a purpose of sustaining a balance between uses and supplies so that economic viability, social and environmental health, safety and welfare of the basin/subbasin is achieved and maintained,
- A map clearly delineating the geographic extent of the IMP,
- One or more groundwater controls,
- One or more surface water controls, and
- A plan to gather and evaluate data, information, and methodologies to implement the IMP, increase understanding of the surface water and hydrologically connected groundwater system, and test the validity of information and conclusions upon which the IMP is based.

Neb. Rev. Stat. § 46-715(3) outlines additional IMP components that provide a process for economic development opportunities and economic sustainability. The IMP, in conjunction with District rules and regulations and Department rules, regulations, and statutes, establishes procedures to meet the requirements of § 46-715(3). In this way, economic development in the river basin or subbasin may continue, so long as existing surface and groundwater users are not adversely affected by the new uses.

Neb. Rev. Stat. § 46-715(4) describes the purpose of groundwater control(s) and surface control(s) that are to be included in each IMP. The controls should be consistent with the goals and objectives of the plan, protect existing ground and surface water users in hydrologically connected areas, and be sufficient to ensure the state will remain in compliance with any applicable interested water compact or other formal contract or agreement. The allowable surface water controls are listed in Neb. Rev. Stat. § 46-716, and the allowable groundwater controls listed in Neb. Rev. Stat. § 46-739.

Stakeholder Process

Neb. Rev. Stat. § 46-717(2) outlines the stakeholder process that is an integral part of IMP development. It states the specific stakeholder interests that the District and the Department shall consult during the preparation of the IMP. These interest groups are:

- Irrigation districts,
- Reclamation districts,
- Public power and irrigation districts,
- Mutual irrigation companies,
- Canal companies, and
- Municipalities.

Other water users and stakeholders that are deemed appropriate by the District or Department may be consulted during IMP development. The District and Department are required to solicit public comments and opinons through public meetings and other means.

3.3 Voluntary Integrated Management Plans

LB764, enacted in 2010 and codified at Neb. Rev. Stat. § 46-715(1)[b], authorized NRDs to voluntarily develop an IMP with the Department to jointly manage groundwater and surface water uses and supplies in areas that have not been designated as fully appropriated. The voluntary IMP process is an opportunity for NRDs and the Department to work together to protect exisiting water uses by proactively managing the growth of water use in an effort to avoid such a designation. A voluntary IMP is developed in the same way as a mandated IMP; it utilizes the same statutory framework as discussed in Section 3.2.

3.4 Lower Platte Basin Water Management Plan

In April 2013, the Department and the seven NRDs that make up the Lower Platte River Basin (Basin) formed the Lower Platte River Basin Coalition (Coalition). The Coalition members are:

- Upper Loup NRD,
- Lower Loup NRD,
- Upper Elkhorn NRD,
- Lower Elkhorn NRD,
- Lower Platte North NRD,
- Lower Platte South NRD,
- Papio-Missouri River NRD, and
- Nebraska Department of Natural Resources.

The Coalition's mission is to coordinate efforts to protect the long-term balance of the Basin's water uses and water supplies. The first action of the Coalition was to voluntarily develop a Lower Platte Basin Water Management Plan (Basin Plan).

For Basin Plan development, a technical committee, management committee, and Board were formed, and a team of consultants was hired to conduct analyses and coordinate meetings. Over the course of four years, eleven technical committee meetings, eleven management committee meetings, three board meetings, and three workshops were held. Several large-scale technical analyses were conducted and the results were used to inform the discussion throughout the development process. Through these activities, a framework for coordinated management of water uses and supplies was established; the policies and practices therein will be implemented through individual IMPs.

The agreed upon Basin Plan was adopted in October 2017. The Basin Plan operates on a five-year increment schedule, with the first increment beginning July 1, 2016 and ending December 31, 2021. The Basin Plan may be accessed on the District's or the Department's websites.

4.0 PUBLIC PARTICIPATION PROCESS

In accordance with Neb. Rev. Stat. § 46-717(2), this voluntary IMP was developed collaboratively by the District and the Department. It was created in consultation with a diverse stakeholder group that consisted of the following general interest groups (see Appendix B for a complete list of participants):

- Agriculture,
- Industry,
- Municipal water supply,
- Environmental,
- Recreation,
- County and city officials, and
- Technical advisors.

A private consultant was hired to assist in the planning process; specifically, to facilitate stakeholder meetings and provide technical analyses. The consultant conducted a water balance study, the results of which were used to inform stakeholders through the public participation process. The full report, entitled "Lower Platte North Natural Resources District Water Balance Study" (2014), is available upon request from the District.

The District and Department held seven stakeholder meetings between 2014 and 2017 to solicit public input regarding the direction of the voluntary IMP and gain insight about goals, objectives, and action items that would become an integral part of the Basin Plan. In the interim, the District and the Department held multiple coordination meetings to carefully evaluate and consider stakeholder recommendations, and from this, incrementally develop the IMP. Upon IMP completion, an open house was held (March 2018) to inform and engage the public; there, the completed IMP was presented and discussed. Stakeholders were encouraged to attend the open house and provide their insight as community leaders in the voluntary IMP development process. Following the open house, and pursuant to Neb. Rev. Stat. §§ 46-718 and 46-743, a public hearing was held to take testimony for District and Department consideration prior to adoption of the voluntary IMP.

5.0 MAP AND DESCRIPTION OF THE IMP AREA

5.1 Map of the Integrated Management Plan Area

The geographic area of the voluntary IMP occurs as two distinct control areas: a Surface Water Control Area (SWCA) and a Groundwater Control Area (GCA). Regulatory actions implemented by the Department shall be limited to the SWCA, defined as the drainage basin of the Platte River and its tributaries within the District. Regulatory actions implemented by the District shall be limited to the GCA; this area was defined as a part of previous Department studies and overlaps a portion of the SWCA. The GCA and SWCA are shown, in detail, in Figure 5.The District and Department recognize that as increased understanding of hydrologically connected areas becomes available through new data, models, and analyses, the defined control areas may change. Any changes to the voluntary IMP control areas require agreement between the District and Department, in addition to a statutorily defined public noticing period and public hearing (see Section 12.0 Review Process and Modifications).

5.2 Land Use and Land Cover

The District land area covers approximately one million acres. The predominant land covers are cultivated crops (irrigated and dryland) with smaller areas of grassland, developed (urban) land, and other land covers (Table 1, Figure 6). Nearly half of the cultivated crops are irrigated by groundwater, surface water, or both. The distribution of irrigated crops by water source is shown in Figure 7. Of the cultivated crops, 97 percent of the acres are farmed as corn or soybeans.

Land Cover	Acres	Percent (%)
Dryland agricultural crops	379,990	37
Irrigated agricultural crops	369,720	36
Grassland	133,510	13
Developed (urban) land	51,350	5
Other land cover (woodlands, water, etc.)	92,430	9
Total land	**1,027,000**	

Table 1. Major land covers in the District.

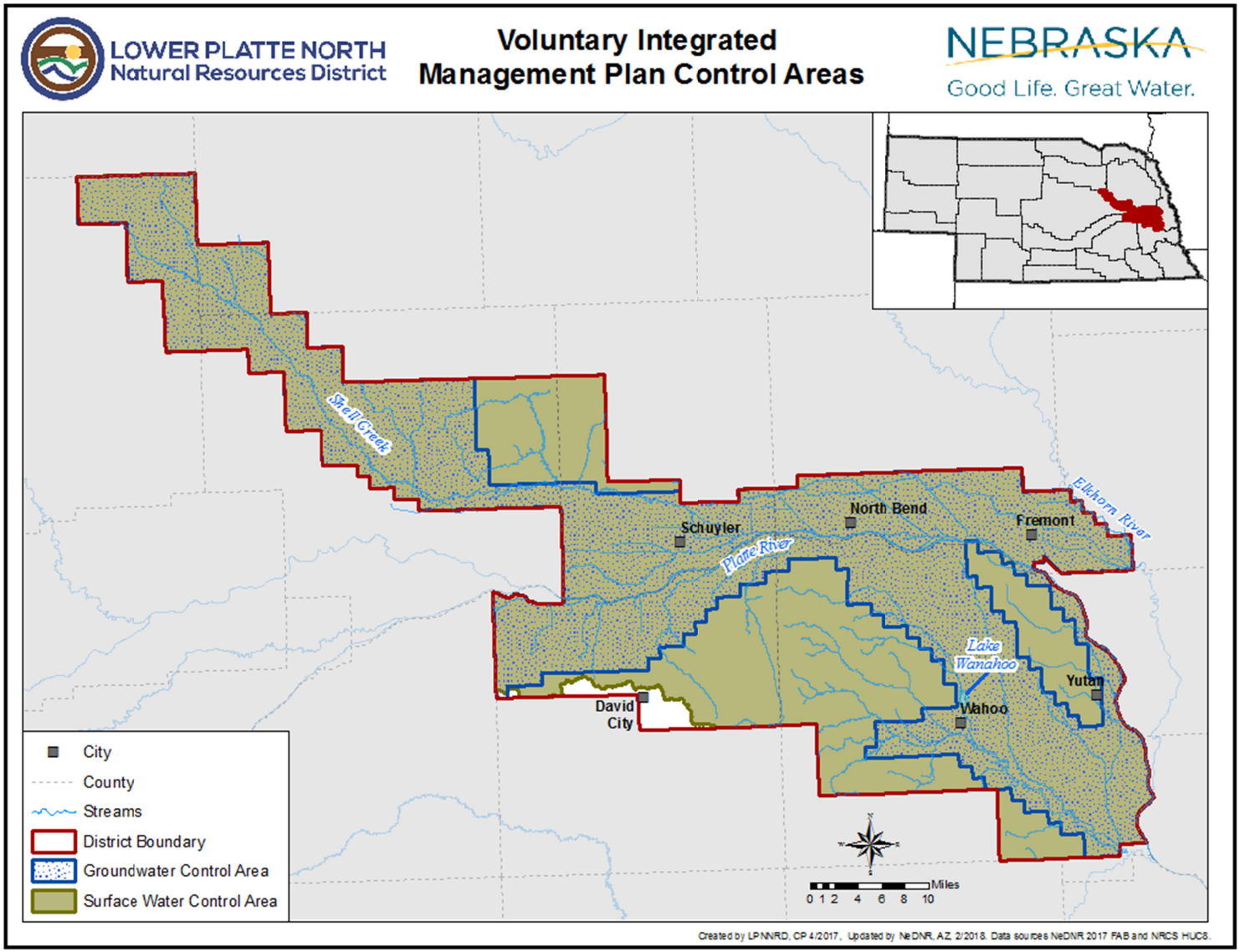


Figure 5. Geographic areas of the voluntary IMP.

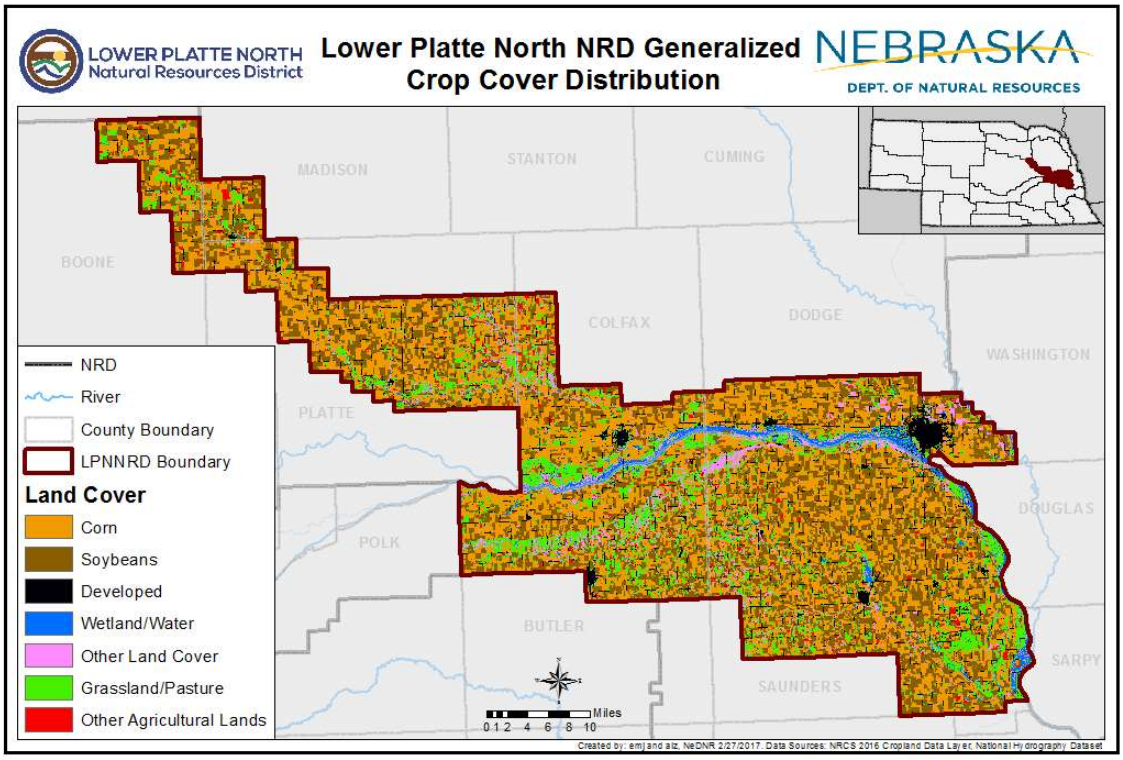


Figure 6. Major land cover types in the District.

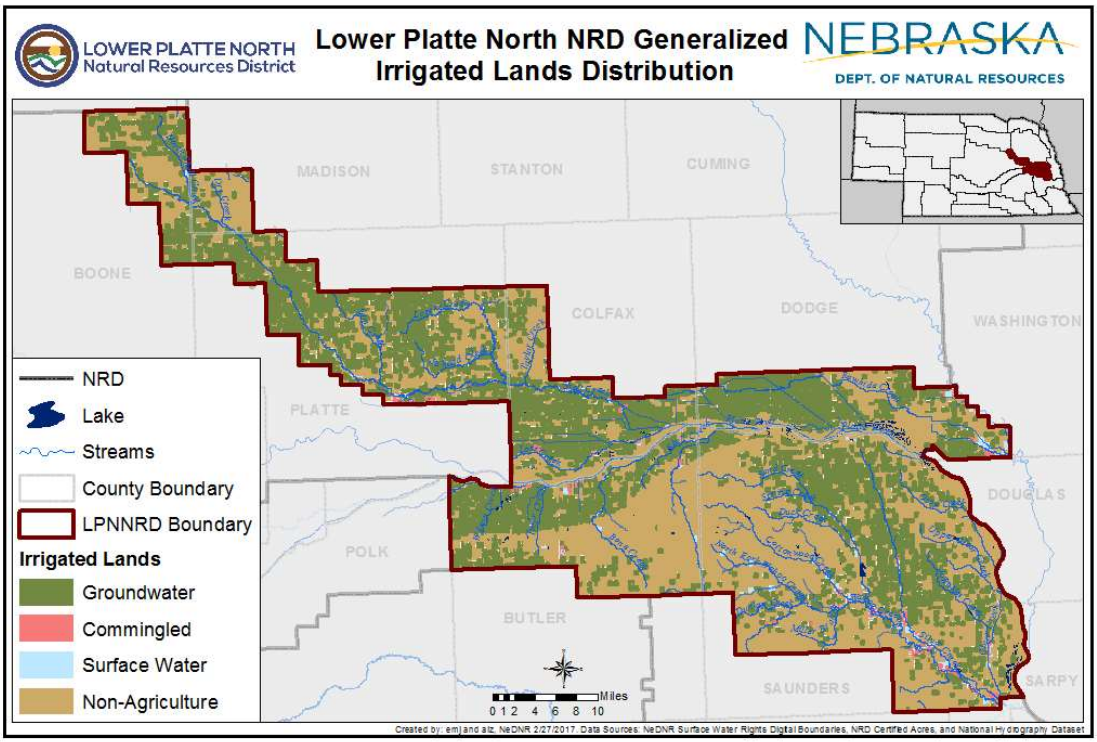


Figure 7. Irrigation distribution in the District.

5.3 Surface Water

Local Hydrology

Over 98 percent of the District's surface water drains into the Platte River. Major surface water features in the District include the Platte River and its tributaries including Loseke, Sand, Shell, Silver, and Wahoo Creeks. There are a number of reservoirs that serve various purposes within the District. The largest reservoir, Lake Wanahoo, is located north of Wahoo and provides recreational opportunities, environmental benefits, and flood protection for area residents (Figure 8). The District receives approximately 29 inches of precipitation per year over the District as a whole; this amount varies locally, generally increasing from west to east.

Surface Water Permits

The Department has authority over the permitting, inspection, and adjudication of Nebraska's surface water appropriations, with uses ranging from domestic, to agriculture, and even power generation. Within the District, there are a variety of active surface water permits that include agricultural, industrial, storage, and other uses. Table 2 summarizes the active surface water appropriations by type and water amount, as of February 2018. Each surface water permit has an approved location where the water may be stored or withdrawn; this location is termed the "point of diversion". A map of the District's surface water points of diversion is shown in Figure 9.

Figure 8. Lake Wanahoo, just north of Wahoo, is the District's largest reservoir.

Surface Water Permits In The Lower Platte North NRD (February, 2018)				
Purpose of Permit	**Number of Permits**	**Permitted Acres for Irrigation**	**Natural Flow Grant (cfs)**	**Storage Grant (AF)**
Diversion from naturally flowing source for irrigation	157	11,618	147	NA
Diversion from a reservoir for irrigation of land that is also approved to receive water from naturally flowing source	1	(209)	NA	(17)
Diversion only from a reservoir for irrigation	6	432	NA	(240)
Total Irrigation Permits	**164**	**12,050**	**147**	**(257)**
Domestic use	1	0.5	0.01	NA
Dust control	1	NA	0.89	NA
Instream flow	2	NA	Variable[1]	NA
Induced groundwater recharge	6	NA	Variable[1]	NA
Total Miscellaneous Permits	**10**	**1**	**1**	**NA**
Storage of water in reservoir (permits held by District)	39	NA	NA	14,017
Storage of water in reservoir (all non-District permits)	19	NA	NA	896
Supplemental Storage[2]	7	NA	NA	256
Total Storage Permits	**65**	**NA**	**NA**	**15,169**
Totals	**239**	**12,051**	**148**	**15,169**

[1] See permit for amounts allowed

[2] Supplemental Storage is an additional permit for storage in an existing reservoir

Table 2. Types and amounts of water associated of active surface water permits in the District. Numbers in parenthesis are supplemental uses and are not counted towards totals.

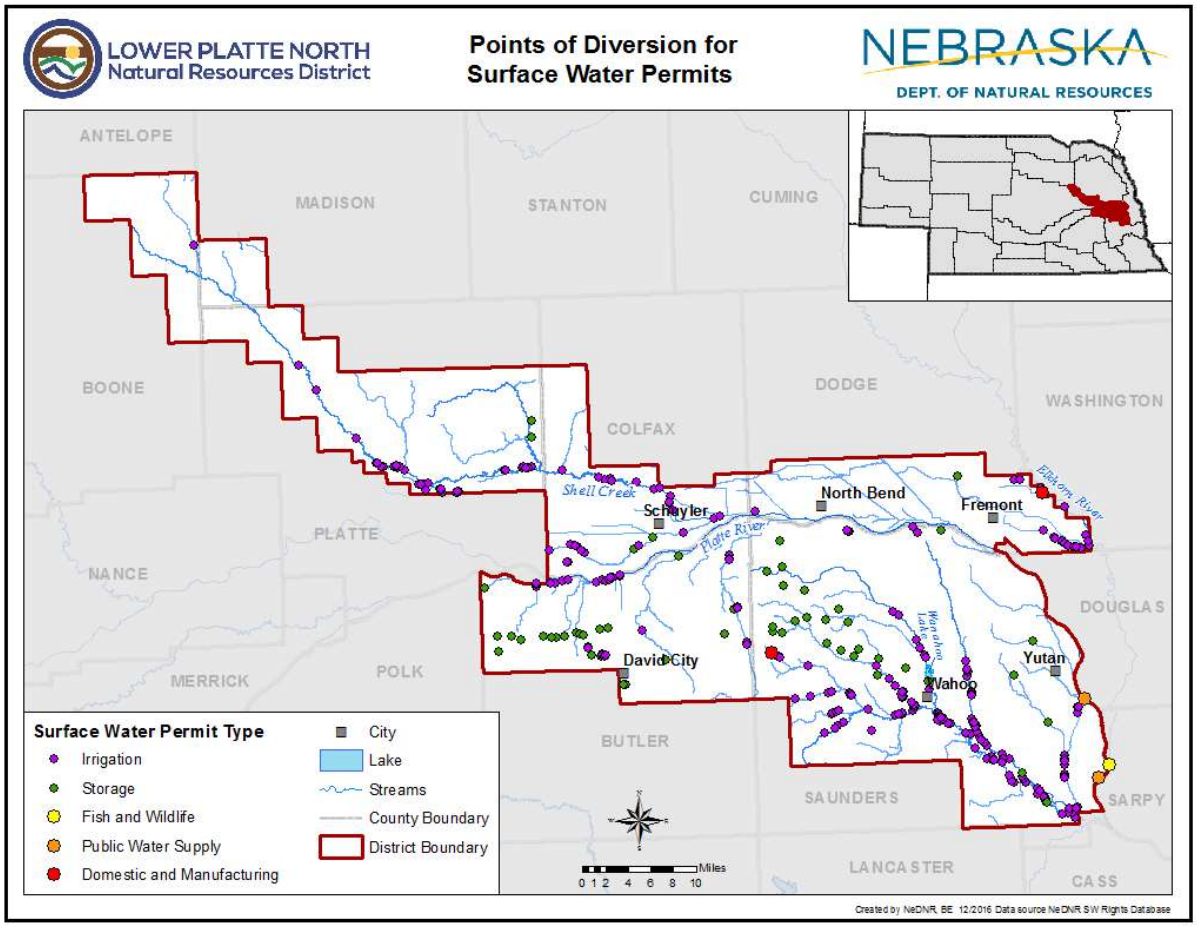


Figure 9. Points of diversion associated with surface water permits.

5.4 Groundwater

Major Aquifers

The District consists of various aquifer types, though most fall into two predominant categories: bedrock and alluvial aquifers. For the purposes of this IMP, the primary and secondary aquifers of the District are described as follows:

- **Bedrock Aquifers**: defined as water bearing, consolidated to semi-consolidated, rock formations including:
    - **Ogallala Aquifer:** The Ogallala Aquifer is located mostly in the northwestern part of the District, covering a small portion of Boone, Platte, and Madison counties. It consists of sand, sandstone, silt, and gravel. This aquifer group is part of a larger aquifer known as the High Plains Aquifer.
    - **Dakota Aquifer:** The Dakota aquifer underlies alluvial aquifers. Wells drilled in this aquifer are located mostly in the central to southeastern part of the District, including portions of Butler, Colfax, Dodge, and Saunders counties. The Dakota Aquifer is

considered a secondary aquifer, with water quality issues due to elevated levels of sodium, chloride, and total dissolved solids.

- **Alluvial Aquifers:** Broadly defined as buried paleovalley aquifers in ancient stream valleys, aquifers created by modern streams, and aquifers of other origins. Most registered wells in the district are completed in undifferentiated sand and gravel aquifers of multiple origins. These aquifers, distributed across the District, are discontinuous and have inconsistent thickness. Productivity of these wells varies significantly depending on the local thickness and continuity of the sand and gravel deposits.

Registered Wells

There are over 7,000 registered wells in the District, over half of which are high capacity wells for irrigation use. As such, irrigation is the driving force behind groundwater usage in the District. With such a large number of high capacity wells, it is incumbent that the District take steps to ensure that exisiting groundwater users are protected from shortages. While protecting existing groundwater users is paramount, the District recognizes the need for a smart growth strategy, allowing for new groundwater uses, using the latest data, techniques, and studies from a variety of sources. The spatial extent of registered wells in the District is shown in Figure 10.

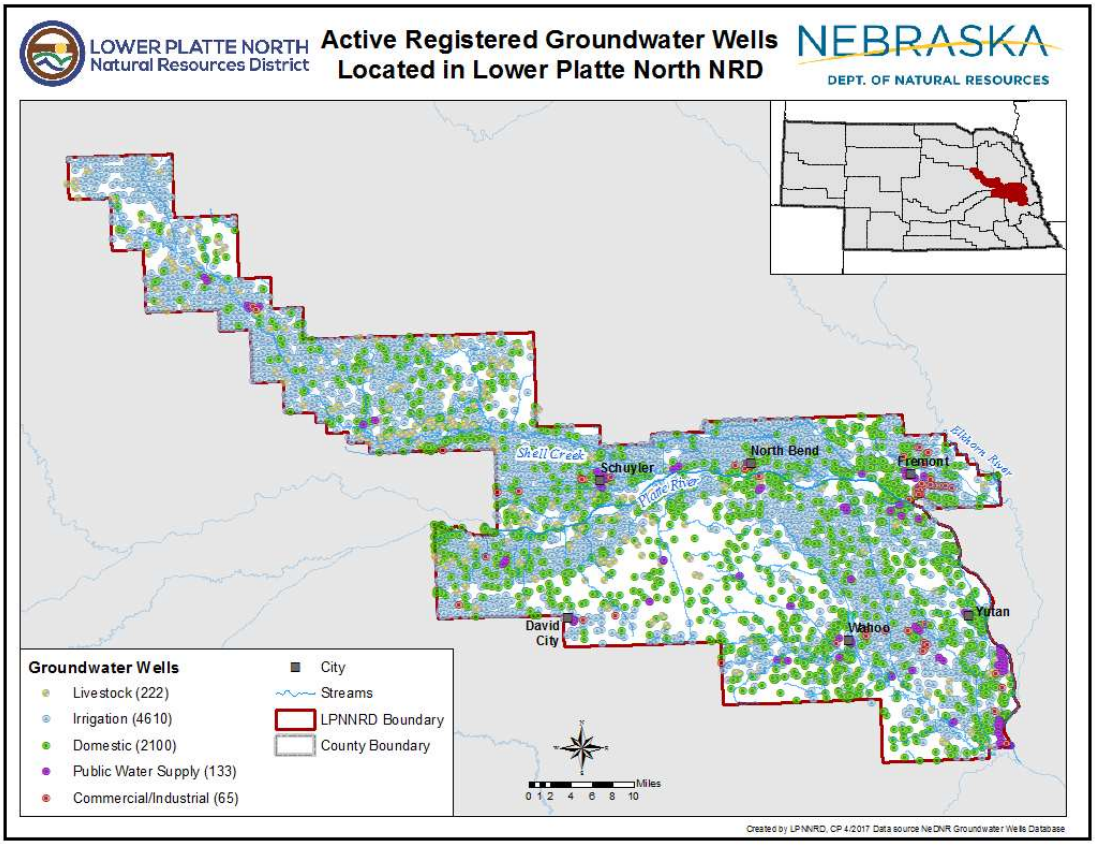


Figure 10. Registered wells distribution within the District.

District Groundwater Management

Groundwater in the District varies greatly, in terms of both quantity and quality. These variations can occur over relatively small geographic areas. To efficiently address this variation, the District has created several groundwater management areas as shown in Figure 11. Some of these management areas overlap the Groundwater Control Area of the IMP (Figure 5). The additional restrictions on these areas, as set forth by the District under the Board of Director's authority, shall be the prevailing management doctrine in those areas of overlap.

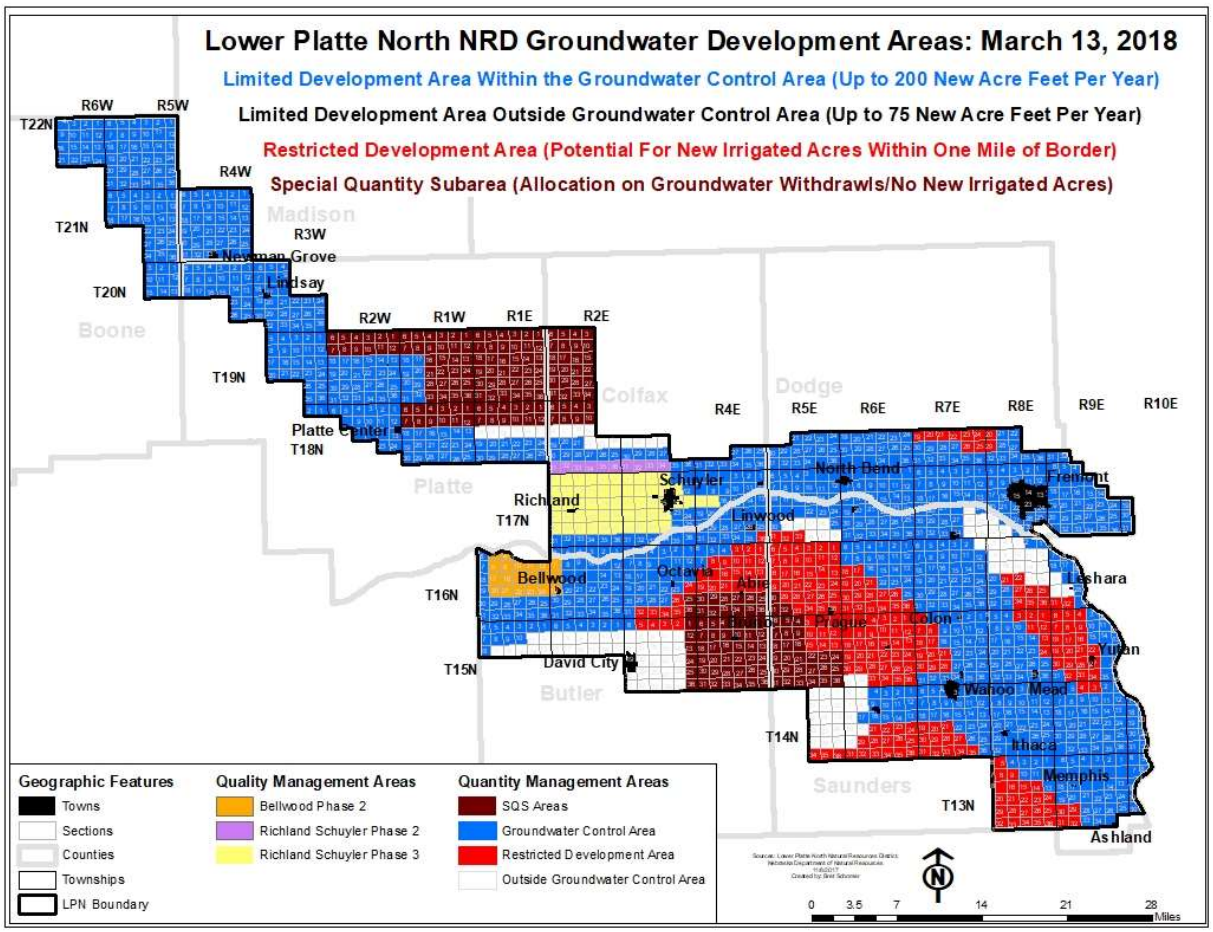


Figure 11. Groundwater Management Areas within the District, including two Water Quantity Areas and two Water Quality Areas.

6.0 GOALS AND OBJECTIVES

Goals begin as abstract thoughts that are refined through discussion and debate. Reaching a goal requires completing a series of objectives along the way, which, in turn, require their own set of actions. The final goals, objectives, and action items of an IMP are a carefully constructed mosaic of stakeholder, District, and Department inputs. Those items create a path forward for effective, long-term, management of groundwater and surface water. Under advisement from the Stakeholder Advisory Committee, the District and Department agreed, where feasible, to implement goals and objectives in ways that maximize benefits, reduce costs, and have the least impact upon end users. The goals, objectives, and action items developed for this voluntary IMP are shown in Table 3 through Table 7.

Goal One: Water Supply Inventory

In order to successfully manage any resource, it is vital to have an understanding of the availability of that resource. Recognizing that a thorough accounting of groundwater and surface water supplies needs developed, the District and the Department have partned on Goal 1, which is the backbone of a successful IMP. The following table summarizes the steps needed to attain this goal.

Goal 1: Develop and maintain a District-wide water supply inventory		
Objective	**Action Item**	**Assigned To**
Objective 1.1: Conduct data collection and analyses of current and potential water supplies using best available information, data, science, and considering future technological advances.	1.1.1 Maintain a database of current ground and surface water supplies.	District and Department
	1.1.2 Use best available science to identify District-wide aquifer distribution, including the distribution of bedrock, perched, and pocket aquifers.	District and Department
	1.1.3 Maintain a database of current water quality problem areas.	District
	1.1.4 Use best available data and methods to refine delineations of hydrologically connected surface water and groundwater.	District and Department
	1.1.5 Evaluate the potential to augment existing supplies by accessing additional waters within and outside of the District, including recharge projects, improving existing and adding new water storage/conveyance infrastructure, or through brackish water supplies.	District and Department
	1.1.6 Evaluate short and long term climate variability and potential effects on water supply.	District and Department
	1.1.7 Evaluate new technologies and methods of water accounting that support water management goals.	District and Department
	1.1.8. Coordinate District and Department databases to better utilize staff time, improve water management efficiencies, and assist with public outreach.	District and Department
Objective 1.2: Determine the District's inflows and outflows of surface water and groundwater and changes in storage	1.2.1 Continue surface water and groundwater monitoring across the District.	District and Department
	1.2.2 Use surface water and groundwater measurements and models to estimate District inflows and outflows.	District and Department
	1.2.3 Identify data gaps in monitoring networks (precipitation, stream flow, groundwater level networks, etc.).	District and Department

Table 3. Goal 1 of the voluntary IMP.

Goal Two: Water Demand Inventory

Once an inventory of current water supplies is completed, it is necessary to understand the current demand for those supplies. Without a firm grasp of supply and demand, there is a very real risk of applying poor management techniques to the resource and ending up with a water deficit. It is much more difficult to manage from behind regarding water usage. Table 4, shown below, defines how the District and the Department will build a comprehensive database of current water usage in order to build a foundation for improved water management.

Goal 2: Develop and maintain a District-wide water demand inventory		
Objective	**Action Item**	**Assigned To**
Objective 2.1: Evaluate current and future water demands that may be influenced by municipal, agricultural, industrial, hydropower, and instream flow requirements	2.1.1 Develop standard protocols to ensure municipal water supply reports and forecasts are integrated into the District-wide and Department databases.	District and Department
	2.1.2 Evaluate how population growth and potential water reuse could influence per capita water consumption to estimate future water demands.	District and Department
	2.1.3 Continue certification of irrigated acres, well metering, and reporting requirements to track current water demands.	District
	2.1.4 Evaluate how historical and future land use/cover changes, urban growth, or adoption of conservation practices affects water demand.	District and Department
	2.1.5 Coordinate with the Department to identify surface water rights for potential prioritization in Department adjudication investigations.	District and Department
	2.1.6 Evaluate current and project future water demands of all water users to assess instream flow within the district and comply with downstream requirements.	District and Department
	2.1.7 Evaluate potential water demands for hydropower.	District and Department
Objective 2.2: Evaluate current water demands and estimate future impacts concerning surface or groundwater quality	2.2.1 Estimate effects on demands due to environmental mitigation activities that utilize large quantities of water.	District
	2.2.2 Estimate effects on demands in scenarios where municipal wells are moved to hydrologically connected areas to improve quality.	District and Department
	2.2.3 Continue mapping and tracking surface water irrigated acres and voluntary water use reporting to monitor surface water demands.	Department

Table 4. Goal 2 of voluntary IMP.

Goal Three: Sustainability of the Resource

The information gathered in Goal 1 and Goal 2 will allow the District and Department to implement proactive management techniques in an attempt to ensure there is a sustainable balance between supply and demand. The path toward sustainability is shown in Table 5 below.

Goal 3: Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies		
Objective	**Action Item**	**Assigned To**
Objective 3.1: Update policies, practices, and programs to maintain and improve water supply and water quality as it affects supply	3.1.1. Where feasible, promote practices focused on reuse of rain, storm, waste, industrial, or irrigation water.	District
	3.1.2. Develop a District-wide water banking program to minimize water conflicts between different water users and sources.	District and Department
	3.1.3 Cooperate with other entities to identify, evaluate, and prioritize locations and types of conjunctive water management and water use projects	District and Department
	3.1.4. Periodically review rules and regulations, ensuring they are up-to-date with current data, technologies, and the IMP.	District and Department
Objective 3.2: Develop programs and guidelines to conserve water within municipalities, the agricultural sector, and industrial applications	3.2.1 Where feasible, implement cost-share programs for irrigation conservation by partnering with producers in technologies that improve irrigation efficiency and track water usage over time.	District and Department
	3.2.2 Use new, and existing, studies and data to establish specific guidelines for sustainable development of major, minor, and pocket aquifers.	District
	3.2.3 Collaborate with municipalities and industrial users on development or refinement of water conservation plans.	District

Table 5. Goal 3 of the voluntary IMP.

Goal Four: Public Outreach

With competing interests, legal complexity, and finite resources, it is imperative that the District and the Department remain as transparent as possible about the management techniques that are utilized to preserve water as a resource for all Nebraskans. Table 6 lists how the District and Department plan to integrate a comprehensive public outreach program within the IMP.

Goal 4: Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well		
Objective	**Action Item**	**Assigned To**
Objective 4.1: Maintain existing public outreach activities and programs	4.1.1 Maintain District certification classes to update producers on current water conditions, best management practices, potential state legislation, and changes in District and state water management issues.	District
	4.1.2 Maintain public education programs including county fairs, newsletters, newspaper articles, radio spots, public notices, fliers, social media, and District and Department websites.	District and Department
	4.1.3 Continue to cooperate with UNL Extension to utilize and explore the use of mobile applications to assist producers with different water conservation practices.	District and Department
Objective 4.2: Incorporate new data, technologies, and programs to enhance public outreach	4.2.1 Develop new materials and activities to educate the public on the benefits and limitations of riparian vegetation management.	District and Department
	4.2.2 Educate homeowners on ways to conserve water in the home, garden, and lawn, through planting of more drought-resistant plants or different landscaping practices.	District
	4.2.3 Explore information-sharing systems between District personnel and water users in the District. These systems could be used to track precipitation patterns, crop evapotranspiration (ET) requirements, soil moisture levels, rotation of pumping between water users to reduce peak aquifer demands, real-time groundwater energy level sites in important aquifers or subareas, and current stream flow conditions.	District
	4.2.4 Quantify water use efficiencies and disseminate through public education programs to enhance productivity.	District
	4.2.5 Explore public education through television and social media to inform the public about current programs and elicit feedback for projected District programs.	District

Table 6. Goal 4 of the voluntary IMP.

Goal Five: Basin-wide Coordination

The District is part of the larger Lower Platte River Basin. Attempting to manage groundwater and surface water resources within a subset of the basin is short-sighted. In order to effectively manage the Lower Platte River Basin as a whole, the District and the Department will cooperate with the Coalition, the Eastern Nebraska Water Resources Assessment (ENWRA), and others to set forth a series of cooperative steps to mitigate problems throughout the Basin. Table 7 lists the cooperative actions to be undertaken to help manage the Basin water supplies and uses as a whole.

Goal 5: Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands		
Objective	**Action Item**	**Assigned To**
Objective 5.1: Continue active participation in Lower Platte River Basin Coalition (Coalition) water management planning activities	5.1.1 Cooperate on water management studies and planning with the Coalition.	District and Department
	5.1.2 Evaluate federal, statewide, and local funding options for basin-wide water management activities.	District and Department
	5.1.3 Coordinate to develop and implement transfer and water banking systems that are compatible between the District and the Coalition	District and Department
	5.1.4 Evaluate proposed transfers utilizing methodology consistent with other Lower Platte NRDs, as specified in the basin-wide plan.	District
Objective 5.2: Coordinate to expand conjunctive management opportunities to mitigate new uses	5.2.1 Review and analyze existing studies of water storage opportunities in the Lower Platte River Basin and conduct additional multi-agency studies, as appropriate.	District and Department
	5.2.2 Evaluate benefits and limitations of potential conjunctive management projects	District and Department
Objective 5.3: Coordinate with ENWRA to increase knowledge about existing groundwater supplies and connection to surface water	5.3.1 Continue active participation in ENWRA meetings, studies, and activities.	District and Department
	5.3.2 Evaluate whether ENWRA data can improve modeling of hydrologically connected areas on a large scale.	District and Department
Objective 5.4: Strengthen coordination with other agencies about efforts to sustain or increase Lower Platte River flows	5.4.2 Coordinate to review and assess benefits and limitations of protecting Lower Platte River flows through existing instream flow water rights.	District and Department
	5.4.3 Continue to coordinate with other agencies on riparian vegetation management activities.	District and Department

Table 7. Goal 5 of the voluntary IMP.

7.0 LONG TERM STUDY

The District and the Department held several coordination meetings to determine the feasibility of proposed goals, objectives, and action items following the stakeholder process. A better understanding of tile drainage systems, an ongoing request at stakeholder meetings, was originally placed as an objective in water inventory goals. Due to costs, availability of funding, staff commitment, and questions regarding the reliability of results using current techniques, the District Board of Directors found including tile drainage systems to be infeasible during the near term implementation of the voluntary IMP.

In consultation with the stakeholder group, the District and the Department classified the tile drainage objective as a long-term study to be addressed if funding, data, or improved methodologies become available (Table 8).

LONG-TERM STUDY			
Goal / Study	**Action Item**	**Assigned To**	**Reporting/ Exchange**
Long-term Study 1.1 Increase understanding of tile drainage systems in the District and their impact on water supply.	1.1.1 Conduct a tile drainage study based upon review of existing data and funding.	District	Discuss solutions to obstacles pertaining to action items listed at annual meeting.
	1.1.2 Seek voluntary data from landowners pertaining to tile drain locations.	District	
	1.1.3 Evaluate the potential to develop modeling scenarios that predict the impact of tile drainage on streamflow and recharge.	District and Department	

Table 8. The long-term study of the voluntary IMP.

8.0 REGULATORY ACTIONS (CONTROLS)

Per Neb. Rev. Stat. § 46-715, each IMP must have at least one groundwater control and at least one surface water control. The controls must be consistent to meet the goals and objectives of the Basin Plan. The allowable groundwater and surface water controls are specified in Neb. Rev. Stat. §§ 46-739 and 46-716, for groundwater and surface water, respectively. For this IMP, the District and Department each agreed on two controls that will be jointly implemented to manage hydrologically connected groundwater and surface water. These controls are "limits on new uses" and "municipal water use tracking requirements", and are further described below.

Limits on New Uses

The Coalition agreed to specific limits on the development of new water uses within the hydrologically connected area of each NRD, and as specified in the Basin Plan, initially discussed in Section 3.0 (Background). The limits on development of new water uses are in terms of allowable "stream depletions." This corresponds to the impact that new surface water and groundwater uses are expected to have on the the Platte River and its tributaries during the peak water period of June to August over a period of 50 years.

The allowable stream depletions were based on analyses that evaluated historic excess flows in the Lower Platte Basin; these excess flows were further subdivided into subbasins. Limits for individual NRDs were agreed upon through discussions between the NRDs in each respective Lower Platte River subbasin. The Department and each respective NRD then determined the division of groundwater and surface water depletions that would be carried out through the individual IMP controls.

The allowable stream depletions correspond to a five-year increment that began July 1, 2016 and ends December 31, 2021 (i.e. First Increment). All surface water and groundwater development initiated after July 1, 2016 will be included in the accounting of new uses. An agreed upon methodology will be used by the NRDs and the Department to convert new irrigated acres into estimated stream depletion. The controls for limits on new uses are as follows:

District Groundwater Limits
The District will limit new groundwater uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment which concludes on December 31, 2021[1].

Department Surface Water Limits
The Department will limit new surface water uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment which concludes on December 31, 2021[1].

[1]Depletions that are not utilized by the District or the Department will be redistributed annually and shared equally between the District and the Department (see Appendix C for an example).

Municipal Tracking

The District and Department shall require tracking of municipal water use. At present, municipal water use is only tracked by the District or the Department if there is a transfer permit. This regulatory action increases the ability of the Department and District to accurately account for the usage of this large-scale water consumer. The controls for tracking of municipal water use are:

District Groundwater Municipal Tracking
The District will require annual use reports for municipal groundwater users.

Department Surface Water Municipal Tracking
The Department will require annual use reports for municipal surface water permit holders and municipal groundwater transfer permit holders.

9.0 MONITORING PLAN

The District and Department have agreed to the following course of action in accordance with Neb. Rev. Stat. § 46-715 (2)[e]. This includes:

- Gathering and evaluating data, information, and methodologies to complete the voluntary IMP,
- Increase understanding of the surface water and hydrologically connected groundwater system, and
- Test the validity of the conclusions and information upon which the voluntary IMP is based.

In order to evaluate progress of voluntary IMP implementation, the District and Department have agreed to collect, track, evaluate, and report on specific activities.

Monitoring and Reporting of Water Use and Water Supply

The District is tasked with the following monitoring and reporting activities:

- Groundwater elevation data
- Flow meter data (if meter data is collected)
- Certified irrigated groundwater acres
- Municipal and industrial groundwater uses
- New groundwater consumptive uses (agricultural, municipal, industrial)
- Retirement of groundwater consumptive uses (agricultural, municipal, industrial)
- Well drilling permits approved, cancelled, or denied
- Variances for new water uses granted, cancelled, or denied
- Water transfer permits granted, cancelled, or denied
- Stream gage measurements on District maintained gages

- District regulations/management activities (designated groundwater management areas, use restriction, etc.)
- New depletions accounting report
- Streamflow accretion activities (new projects, conjunctive management projects, etc.)
- Water banking activites (if bank exists)

The Department is tasked with the following monitoring and reporting activities:

- Surface water irrigation use
- Municipal and industrial surface water uses
- New surface water appropriation granted (natural flow, storage, groundwater recharge, etc.)
- New groundwater permits issued
- Stream gage measurements from Department maintained gages
- Transfers/cancellations of surface water apropriations
- Surface water administrative actions taken
- New depletions accounting
- New data acquisitions, model and/or study results (conservation measured, riparian evapotranspiration, etc.)
- Voluntary water use
- Surface water pump investigations

Monitoring of Water Balance and Increase Understanding of Hydrologically Connected Areas

In conjunction with several Platte River Basin NRDs, the Department developed a methodology, the Integrated Network of Scientific Information and GeoHydrologic Tools (INSIGHT), to quantitatively assess water supplies and balances. The results and data behind these analyses are distributed to the Lower Platte River Basin NRDs. The INSIGHT methodology is updated with the best available data and analysis, as provided by the District and the Department. Any updates to the methodology will be used to expand the understanding of the hydrologically connected area, and, if necessary, refine the boundaries of management areas.

Joint Analyses of Data and Information, and Impacts on Existing Uses

The District and the Department will jointly review monitoring and studies, data, and information and evaluate for accuracy and consistency. Any discrepancies will be documented, reviewed, and revised, using the best available data and methods. Additionally, the District and the Department will utilize INSIGHT to compare annual water use data to historically reported water use data to perform analyses determining the impacts of new water uses on existing water users within the District.

10.0 INCENTIVE PROGRAMS

The District and the Department shall evaluate cost-share incentive programs that promote water conservation practices. Incentive programs may include any program authorized by state law or federal programs. Water users or landowners, who utilize such programs, may be required to enter into and perform such agreements or covenants concerning the use of land or water as are necessary to produce the benefits for which the incentive program is established. The District shall explore grant opportunities to supplement the annual budgeting process for funding incentive programs for voluntary IMP activities.

11.0 FUNDING OPTIONS

Additional funding sources may be needed to implement some of the action items listed in this voluntary IMP. This section provides information on a variety of funding options that the District and the Department may utilize. The general criteria and applicability of each of the funding sources are presented. The funding sources presented here are not necessarily inclusive of all funding options available; information presented here is subject to change as funding sources may change their terms and criteria.

11.1 Federal Funding Options

U.S. Department of Agriculture, Farm Service Agency

- *Conservation Reserve Enhancement Program (CREP).* The CREP is part of the Conservation Reserve Program (CRP). The Nebraska CREP is intended to reduce irrigation water use, improve water quality, and enhance wildlife habitat through the establishment of vegetative cover. The program helps replenish streams, rivers, and reservoirs.

U.S. Department of Agriculture, Natural Resource Conservation Service

- *Agricultural Conservation Easement Program (ACEP).* The ACEP provides financial and technical assistance to protect critical wetlands, agricultural lands, and grasslands through easements.
- *Conservation Security Program (CSP).* The CSP is available in select watersheds across the nation. This program is designed to reward farmers and ranchers who implement conservation on working lands and to encourage them to do more.
- *Environmental Quality Incentives Program (EQIP).* The EQIP offers technical assistance, cost-share, and incentive payments available to agricultural producers to implement conservation practices that improve water quality, increase water conservation, and enhance grazing lands.
- *Wildlife Habitat Incentives Program (WHIP).* The WHIP provides technical and financial assistance to landowners and others to develop and improve wildlife habitat on private lands.

U.S. Department of the Interior, Bureau of Reclamation

- *WaterSMART Program.* Grants are provided to irrigation districts, water districts, and other organizations that deliver water or power to cost-share on projects that use water more efficiently. The projects should support water sustainability in the west.

11.2 State Funding Options

The Nebraska Environmental Trust. The Nebraska Environmental Trust was established in 1992 to conserve, enhance, and restore the natural environments of Nebraska. The Trust especially seeks projects that involve public and private sector collaboration to implement high-quality, cost-effective projects.

Nebraska Department of Environmental Quality

- *Nonpoint Source Water Quality Grants (Section 319*)**.** Under Section 319 of the federal Clean Water Act, the federal government awards funds to the Nebraska Department of Environmental Quality to provide financial assistance for prevention and abatement of nonpoint source water pollution. This funding is granted to units of government, educational institutions, and non-profit organizations for projects that facilitate implementation of the state Nonpoint Source Management Plan.

Nebraska Game and Parks Commission

- *Nebraska Wildlife Conservation Fund.* This fund exists for conservation of nongame species, with particular focus on species determined to be threatened or endangered, ensuring their continued existence for scientific purposes and human enjoyment.

Nebraska Department of Natural Resources

- *Water Well Decommissioning Fund.* The objective of the Water Well Decommissioning Fund is to provide cost share assistance to encourage proper decommissioning of water wells in the state.
- *Nebraska Soil and Water Conservation Fund.* This fund provides state financial assistance to landowners for installation of approved soil and water conservation measures meant to improve water quality, conserve water, and control erosion and sedimentation.
- *Small Watersheds Flood Control Fund.* The purpose of this fund is to assist local sponsors with the acquisition of land rights for flood control projects. Local sponsors use the fund to acquire easements or fee title to tracts that are needed to implement a project.
- *Natural Resources Water Quality Fund.* This fund was created to provide state funds to NRDs for their water quality programs.
- *Water Sustainability Fund.* During the 2014 legislative session, the Nebraska Legislature passed LB-1098, creating the Water Sustainability Fund. This fund acts to improve water quality and usage, achieve water management goals, evaluate flood control, and comply with existing interstate agreements and compacts.

11.3 Local Funding Options

It is the intent of the District to utilize qualified projects described in Neb. Rev. Stat. § 2-3226.04 to provide river-flow enhancement to achieve the goals and objectives of the District and Department under the Groundwater Management and Protection Act. The District may fund projects through the follwing mechanism:

Occupation Tax (Neb. Rev. Stat. § 2-3226.05). This authority allows the District to levy an occupation tax, not to exceed ten dollars per irrigated acre, upon the activity of irrigation of agricultural lands on an annual basis. Statute requires a public meeting for the provision of public comments to be held if the District board moves to implement an occupation tax for a qualifying project.

12.0 REVIEW PROCESS AND MODIFICATIONS

IMP implementation utilizes an adaptive management approach for attaining or maintaining the desired balance of the hydrologic system. An adaptive management approach allows an IMP to be modified as changes to a District area, sub-area, new techniques, or the availability of additional data or information occur.

The District and Department will hold an annual review to evaluate progress made towards implementation of the voluntary IMP. As part of this annual review, the District and Department will exchange annual reports summarizing the monitoring activities described in Section 9.0. The monitoring and study reports and data will be prepared, compiled, and exchanged in a standardized format, as agreed upon by the District and Department. This annual meeting may occur in conjunction with the Lower Platte River Basin Coalition annual meeting. Stakeholders and the public will be encouraged to attend the annual review.

The District and Department will regularly evaluate whether IMP goals and objectives are being met, and will jointly determine if amendments to the IMP are required. Amendments will require an agreement by both the Department and the District, and may require reconvening the Stakeholder Advisory Committee. If amendments to the IMP are proposed, the District and Department will hold a joint hearing to issue the pertinent orders to formally adopt the revised IMP.

13.0 INFORMATION CONSIDERED IN DEVELOPMENT OF THIS PLAN

The following sources of information were used in the preparation of the voluntary IMP:

- The Lower Platte River Basin Coalition's "Basin Water Management Plan" (2018)
- Data on recharge rates within the District and adjoining NRDs
- Community Involvement Plan for the District, 2012
- The District's Water Balance Study, 2014
- The District's Sub-area Delineation Study, 2009
- The Department's rules for surface water
- The Department's groundwater models
- The Department's stream gage records
- The Department's INSIGHT tool and web portal
- The Department's surface water administrative records
- The Department's surface water digitized fields geospatial layer
- The Department's Fully Appropriated Basins report and data
- The U.S. Geologic Survey's stream gage records
- Past and present surface water use within and bordering the District
- Climate data and information (accessed from High Plains Regional Climate Center)
- Data on groundwater supplies and groundwater uses within and bordering the District
- Land cover data (Cropland data layer, CALMIT 2005, the District's certified acres)
- Report entititled "Development of Groundwater Flow Model for the Lower Platte North Natural Resources District Area, Nebraska", Dr. Xun-Hong Chen and Gengxin Ou, 2013
- Additional data acquired by the District or the Department and additional data on file with the District and Department.

14.0 GLOSSARY OF TERMS

Acre-foot (AF)—Volume of water required to cover 1 acre of land (43,560 square feet) to a depth of 1 foot, equivalent to 325,851 gallons.

Alluvial aquifers—Buried paleovalley aquifers in ancient stream valleys, aquifers created by modern streams, and aquifers of other origins.

Aquifer—A geological formation or structure of permeable rock or unconsolidated materials that stores and/or transmits water, such as to wells and springs.

Appropriation—A permit granted by the Department to use surface water for a beneficial use in a specific amount, purpose, and location. It is based on first-in-time, first-in-right.

Bedrock aquifers—Water bearing , consolidated to semi-consolidated rock formations.

Conjunctive management—The coordinated and combined process that utilizes the connection between surface water and groundwater to maximize water use, while minimizing impacts to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the reliability of that supply.

Cubic foot per second (cfs)—The rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second.

Groundwater—Water which occurs in, or moves, seeps, filters, or percolates, through the groundunder the surface of the land, and shall include groundwater which becomes commingled with waters from surface sources.

Groundwater management plan—The Lower Platte North NRD's plan that identifies the water quantity and quality characteristics, supplies, uses, data collection methods, management objectives, and management areas of groundwater supplies within the NRD.

Groundwater recharge—The addition of water to the zone of saturation. Infiltration of precipitation and its movement to the water table is one form of natural recharge.

Hydrologically connected—Describes a geographic area designated by the Department where the existing amount of groundwater and surface water each has significant influence on the other, and where appropriate regulations exist.

INSIGHT—Developed and maintained by the Department, INSIGHT stands for an Integrated Network of Scientific Information and GeoHydrologic Tools. The purpose of INSIGHT is to provide an annual snapshot of water conditions across the state. Hydrologic data are consolidated from several different sources, including the Department, U.S. Geological Survey, U.S. Bureau of Reclamation, and local NRDs, and are presented in charts for the following categories: water supplies, water demands, nature and extent of use, and water balance. These data are presented in a

consistent format and become more local as the user drills down from the statewide level to the basin-wide and subbasin levels using the database interface.

Instream Flow Demand—Demand for streamflow taking place within the stream and is not withdrawn from a surface water source. These demands are based on current appropriations held by the Nebraska Game and Parks Commission or any NRD.

River basin—The land area that is drained by a river and its tributaries.

Stakeholders—Representatives from various groups and professional fields who have an interest or concern in a particular topic, and can affect or be affected by an organization's actions.

Subbasin—A portion of a river basin that is drained by a portion of tributaries in that river basin.

Stream depletion—Reduction to streamflow that results from a new use of either groundwater or surface water.

Surface water—Water which occurs or moves on the surface of the Earth such as in a stream, river, lake, wetland, or ocean.

Water use—The legally accepted use of a groundwater well or surface water appropriation.

Water bank—A mechanism used to facilitate the transfer of water between parties, often using market-driven transactions. Water banks can be institutional, physical, or mixtures of both.

Watershed—The area of land where all of the water that drains under or off of it goes to the same outlet.

APPENDIX A

STAKEHOLDER ADVISORY COMMITTEE

Lower Platte North Natural Resources District's Voluntary IMP Stakeholder Advisory Committee

Note: This list only includes those who attended one or more meeting

First Name	Last Name	Affiliation
Frank	Albrecht	Nebraska Game and Parks Commission
Larry	Andreasen	City of Fremont Department of Utilities
Ron	Brown	Hormel Foods
Joel	Christensen	Metropolitan Utilities District
Dana	Divine	University of Nebraska-Lincoln
Francis	Emanuel	Francis Emanuel Farms
Jocelyn	Golden	City of Lincoln
John	Hayes	City of Lindsay
Lumir	Jedlicka	Agricultural Producer
Matt	Jedlicka	Agricultural Producer
Tracy	McConnell	Grosch Irrigation, Drilling and Exploration
Jim	McGowen	City of Schuyler
Ron	Papa	Papa Farms
Steve	Peterson	U.S. Geological Survey
Jeff	Runge	U.S. Fish and Wildlife Service
Loran	Schmit	Association of Nebraska Ethanol Producers
Meghan	Sittler	Lower Platte River Corridor Alliance
Ron	Sladky	Sladky Farms
Kristine	Stein	U.S. Army Corps of Engineers
Todd	Thompson	Mid-Continent Irrigation
Kevin	Tobin	Metropolitan Utilities District
Carol	White	Lyman-Richey Corporation
Doug	Whitfield	Metropolitan Utilities District
Rick	Wilson	U.S. Geological Survey

APPENDIX B

DEPLETION CALCULATION EXAMPLE FOR LIMITS ON NEW DEVELOPMENT

Depletion calculation example for limits on new development
50/50 groundwater/surface water split, reset annually

Modified Handout from District Water Committee: January 31, 2018

1. Limits on New Development (from the Lower Platte Basin Water Management Plan):

TABLE 4.2. FIRST 5-YEAR INCREMENT ALLOWABLE NEW DEVELOPMENT (DEPLETIONS) BY NRD

NRD	Sub-Basin	First 5-year Increment Allowable New Development (Depletions) – Peak Season [1]	
		% Sub-Basin	AF
Upper Loup NRD	Loup River	32%	2,768
Lower Loup NRD	Loup River	68%	5,883
Upper Elkhorn NRD	Elkhorn River	25%	1,504
Lower Elkhorn NRD	Elkhorn River	75%	4,514
Papio-Missouri River NRD	Lower Platte River	21%	869
Lower Platte South NRD	Lower Platte River	24%	993
Lower Platte North NRD	Lower Platte River	55%	2,276

[1]The allowable new depletion is for all new uses. Apportionment between new surface water and groundwater uses will be made according to each NRD Integrated Management Plan.

2. Example of a groundwater depletions calculation (from the LP Basin Water Management Plan).
   - 160 acres of corn
   - Net Irrigation Requirement of 12 inches (1 ft)
   - Stream Depletion Factor (SDF) at this location is 0.50
   - 30% of depletions occur during the peak season

   New Depletions (AF) = (# of acres) × (Net Irrigation Requirement in feet) × (SDF) × (% depletions during peak season)

   (160 acres) × (1 ft) × (0.50) × (0.30) = 24 AF groundwater depletion.

3. Example of a surface water depletions calculation
   - 160 acres of corn
   - Net Irrigation Requirement of 12 inches (1 ft)
   - Stream Depletion Factor (SDF) is 1.0
   - 100% of depletions occur during the peak season

   (**160 acres) × (1 ft) × (1.0) × (1.0) = 160 AF surface water depletion.**

4. Specific parameters for District (based on Department's preliminary model results)
   - District's Net Corn Crop irrigation Requirement ranges from 8.8 inches to 6.5 inches (west to east); with a mean value of **7.28** inches.
   - SDF: 0.3 to 1.0, **mean SDF is 0.76** (higher closer to streams)

5. GW and SW Development in 2016 and 2017 in the District.

Year	GW Acres	GW Depletions	SW Acres[1]	SW Depletions[1]
2016	~2500	~350 AF	0	0
2017	~2500	~350 AF	0	0

[1]The Department did not approve any new SW permits for irrigation from natural flow. There was one "Irrigation from Storage Only" permit, approved in 2017, for 129 acres.

6. Example of how a 50/50 division of GW and SW could look if implemented in voluntary IMP. The 50/50 division is re-calculated every year based on available acres. We start with 2,276 AF, or 1,138 AF each.

Year	Total available Depletion (AF)	Available GW Depletion (AF)	Available SW Depletion (AF)	Used GW depletion (AF)	Used SW Depletion (AF)	Total Used Depletion (AF)	Remaining Depletion for next year (AF)
2016	2, 276	1,138	1,138	(350)	(0)	(350)	1,926
2017	1,926	963	963	(350)	(0)	(350)	1,576
2018	1,576	788	788	--	--	--	--

7. How many GW acres result in 788 AF in the District? A generalized example follows.
   GW--Assume 0.7 SDF, NIR= 7.28 in (0.6 ft), 0.3 (30%) in peak season:
   788 AF/ (0.7 SDF × 0.6ft × 0.3) = 6,253 acres

8. How many SW acres result in 438 AF in the District? A generalized example follows.
   SW--Assume 1.0 SDF, NIR=7.28 in (0.6 ft), 1.0 (100%) in peak season:
   788 AF/ (1.0 SDF × 0.6ft × 1.0) = 1,313 acres

CHEMIGATION - May 2024

TOTAL CHEMIGATION APPLICATIONS IN 2023 (701)

NEW CHEMIGATION APPLICATIONS - 18

(5) Boone (2) Butler (1) Colfax (0) Dodge (1) Madison (0) Platte (9) Saunders

RENEWALS: 424

BOONE COUNTY - 34
BUTLER COUNTY - 35
COLFAX COUNTY - 56
DODGE COUNTY - 77
MADISON COUNTY - 6
PLATTE COUNTY - 78
SAUNDERS COUNTY - 138

RENEWAL INSPECTIONS: 0

(0) Boone (0) Butler (0) Colfax (0) Dodge (0) Madison (0) Platte (0) Saunders

NEW INSPECTIONS: 0

(0) Boone (0) Butler (0) Colfax (0) Dodge (0) Madison (0) Platte (0) Saunders

NEW CANCELLATIONS: 1

(0) Boone (0) Butler (1) Colfax (0) Dodge (0) Madison (0) Platte (0) Saunders

EMERGENCY: 0

Lower Platte North NRD
Groundwater Management Plan Update
Project Modification – Version 2.0
June 6, 2024

PURPOSE

The Lower Platte North Natural Resources District (LPNNRD) staff are currently working with LRE Water (LRE) to update the Groundwater Management Plan (GWMP). The primary tasks of the current effort include:

1) Data review and assessment,
2) Stakeholder involvement,
3) Plan development, and;
4) GWMP review and presentation.

After LRE reviewed available data, several recommendations were provided to LPNNRD staff at a technical group meeting held April 25th, 2024. It was determined by staff that it would be most beneficial to carry several of these recommendations forward now as the document was being prepared, rather than after the GWMP update is complete. Four priority tasks were selected and include:

1) Establishment of subareas,
2) Review and standardization of spring/fall water level hydrographs,
3) Additional review of quantity triggers used in the rules and regulations, and;
4) Provide language describing potential methodologies or protocols for evaluating permit applications for future well sites.

LRE is providing the following summary of tasks and cost for consideration by LPNNRD to be incorporated into the current effort. Incorporation of these tasks would provide a more comprehensive and productive document now, rather than waiting until the GWMP update is complete. Assuming these actions proceed by July 2024, the schedule for the GWMP update would remain as planned with a final deliverable to LPNNRD by the end of 2024.

PROJECT MODIFICATION TASKS

Task 1 – Subarea Review and Delineation

The current subareas were delineated by Olsson in the March 2009 LPN Hydrogeologic Evaluation and Subarea Delineation Study (attached). The subareas were delineated based on local hydrogeologic conditions and depositional characteristics. To provide additional review, and possible modifications of delineated subareas across the LPNNRD, LRE is proposing to complete a high-level review of the current subareas based upon AEM and hydrogeologic data collected after the March 2009 study.

Subareas will be utilized to manage water quantity (LPNNRD Control Areas) but could also be used to define areas for water quality studies (LPNNRD Phase Areas); however, as discussed at the April 25th meeting, the delineated Control Areas and Phase Areas may ultimately cross or be smaller than subarea boundaries.

Activities that will be completed under this task are as follows.

- Review available hydrogeologic data to validate or modify the subareas, and potentially adjust the hydrogeologic boundaries originally proposed in 2009. Subareas would also be rounded by sections. Major data sources include:
    - Hydrogeologic Assessment (LRE, 2023)
    - 3D AEM Hydrogeologic Framework (LRE, 2022)
    - Water Resources Inventory Report (Olsson, 2015)
    - Hydrogeologic Evaluation and Sub Area Delineation report (Olsson, 2009)
- Provide a GIS shapefile and map of draft subareas to LPNNRD staff for an internal review. LRE will make one round of edits and produce a draft-final subarea delineation.
- Provide draft-final shapefile and map for LPNNRD staff to share with the Board of Directors. The purpose is to apply local knowledge of the aquifers to ensure the subareas are as representative of local conditions as possible.
- Integrate the final subareas into the GWMP update.

Cost: $8,000

Task 2 – Review Spring/Fall Wells and Standardize Hydrographs

Currently, LPNNRD staff obtain spring and fall water levels from approximately 200 wells district-wide to help determine changes in water levels. A review of each well (lithology, well screened interval and depth) and how accurately it represents the aquifer and local pumping influences has not been completed. LRE would provide a review of the well log and determine if the well is adequate for use in making water resource management decisions and add more detail on standardized hydrographs that could be updated in-house by staff annually as water level data is collected.

- Deliver consistent hydrographs for up to 200 wells used for spring/fall water levels using the district's existing water level/well hydrograph Excel spreadsheet. The spreadsheet provided by the district will include the current baseline and existing trigger or Control Levels used by the district. The consistency will be met by applying the same vertical and horizontal scales on each graph.
- Determine if geologic and well construction information that is available for each well is sufficient for use in the monitoring network.
- Add details to each hydrograph such as: subarea, registration number, a map with location, well depth, screen interval, number of high capacity wells within 1-mile, and lithologic description (example attached). Make recommendations for adding other wells for use in the spring/fall monitoring network.

Cost: $20,000

Task 3 - Quantity Trigger Evaluation

Methods currently used by LPNNRD staff to evaluate quantity triggers (i.e., Control Level in the rules) were established in the late-1980s. Since that time there has been minimal updating or detailed review of these procedures. This task would allow LRE to review current protocols and provide recommendations for updating the triggers as part of the GWMP update.

- Perform a literature review of similar water quantity trigger policies (e.g. other NRDs, national references, etc.)
- Provide recommendations and direction for modifications of triggers for unconfined and confined aquifers.
- Provide language to be considered for incorporation into LPNNRD's Rules and Regulations. The addition of this language would be a recommendation in the updated GWMP.

Cost: $3,000

Task 4 – Protocols for Evaluating New Well Permit Application Establishing Safe-Yield Thresholds

Many well permit reviews often raise questions about the potential for the new well to cause interference to existing water users. This tasks would describe a process for obtaining crucial data to support decisions on new wells within questionable areas prior to considering a variance request. This process will assist the LPNRD and the applicant with the information necessary to address uncertainties related to well yield and potential interference.

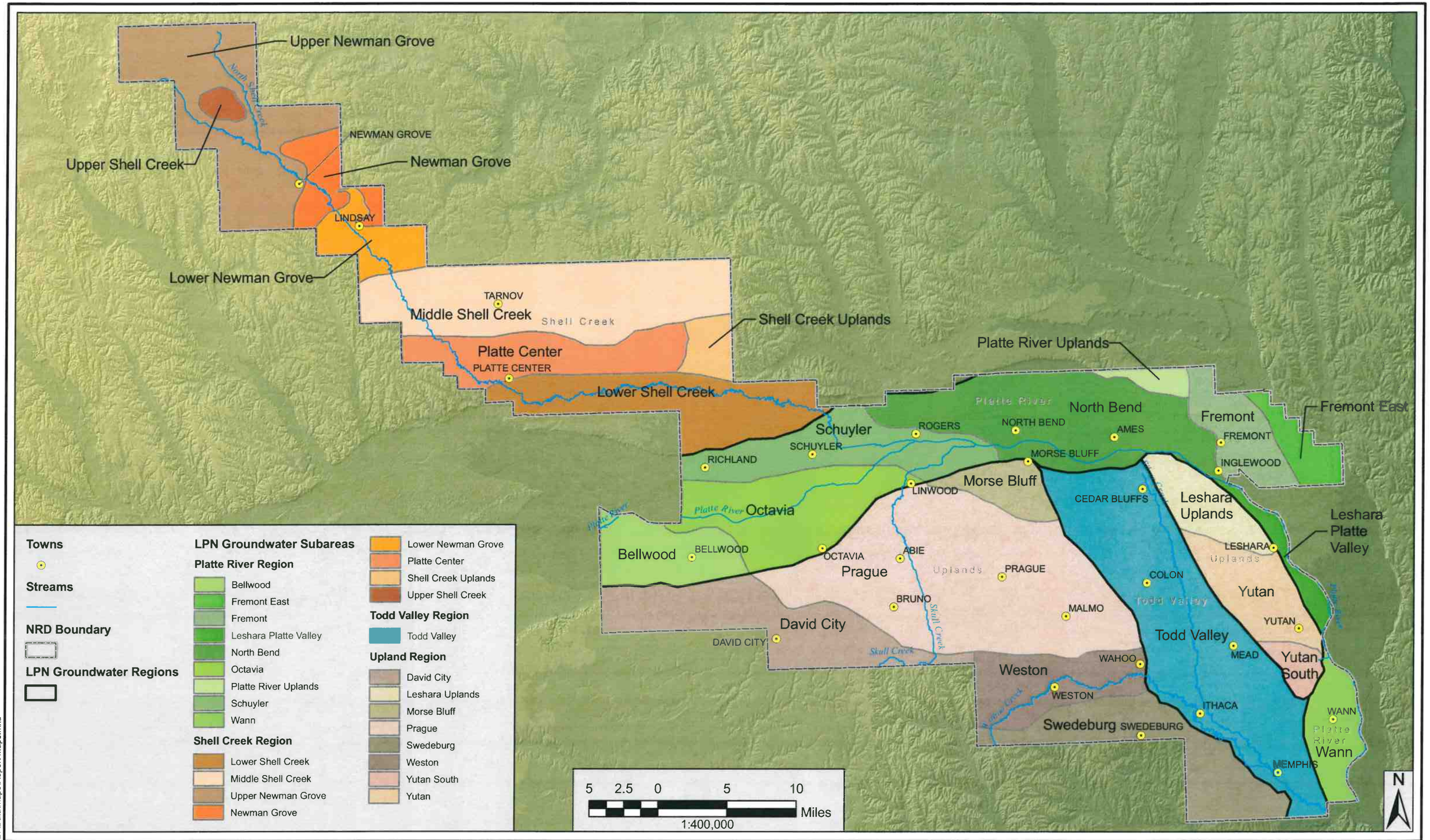
- Complete a high-level review of the district's existing well scoring protocol.
- Provide language describing possible protocol for the LPNNRD to consider during their review and evaluation of water use permit applications. Possible outcomes from these evaluations could require a site-specific desktop assessment, or potentially drilling a test hole, installing a test well, performing an aquifer pumping test, completing a hydrogeologic assessment report, and utilizing a refined numerical groundwater model.
- Describe a stepwise approach for the permit application evaluation process and recommended methods for conducting an aquifer pumping test to support permit decisions.

Cost: $4,000

COST SUMMARY

Cost for project management, progress meetings, invoicing, and general coordination for these additional tasks was not included. LRE will manage these additional tasks through the existing agreement with LPNNRD for the GWMP update.

TASK NO.	TASK NAME	COST
1	Subarea Delineation	$8,000
2	Review Spring/Fall Wells & Standardize Hydrographs	$20,000
3	Quantity Trigger Evaluation	$3,000
4	Safe-Yield Thresholds	$4,000
	TOTAL	$35,000



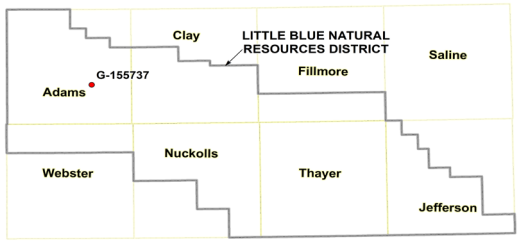
F:\Projects\007-0427\Datalmaps\Report Maps.mxd

PROJECT: 007-0427	Source: Towns, 1996, CSD; Streams, 2007, CSD; NRD Boundary, 2007, CSD; Elevation, 1998, USGS; Range-Township, 1996, CSD
DRAWN BY: RD	
Date: 3/2/2009	

GROUNDWATER MANAGEMENT REGIONS AND SUBAREAS
Lower Platte North Natural Resources District

OLSSON ASSOCIATES
1111 Lincoln Mall, Suite 111
P.O. Box 84608
Lincoln, NE 68501-4608
TEL 402.474.6311
FAX 402.474.5160
www.olssonassoc.com

FIGURE 1.1



LITTLE BLUE NATURAL RESOURCES DISTRICT
FRICKE G-155737
NW 1/4 SW 1/4 SEC 23, T6N, R10W
DEPTH TO WATER VS. TIME
JANUARY 2008 THROUGH DECEMBER 2022

Well Depth: 166 ft
Top of Screen: 160 ft
Bottom of Screen: 166 ft
High Capacity Wells Within
1-Mile Radius: 14

U:\6001LTB02_LBNRD_Hydrogeologic_Assessment_Update\Background Info\From NRD\Daily Water Level Hydrographs\New Hydroprah Spreadsheets\
Fricke_G-155737, Hydrograph Const.

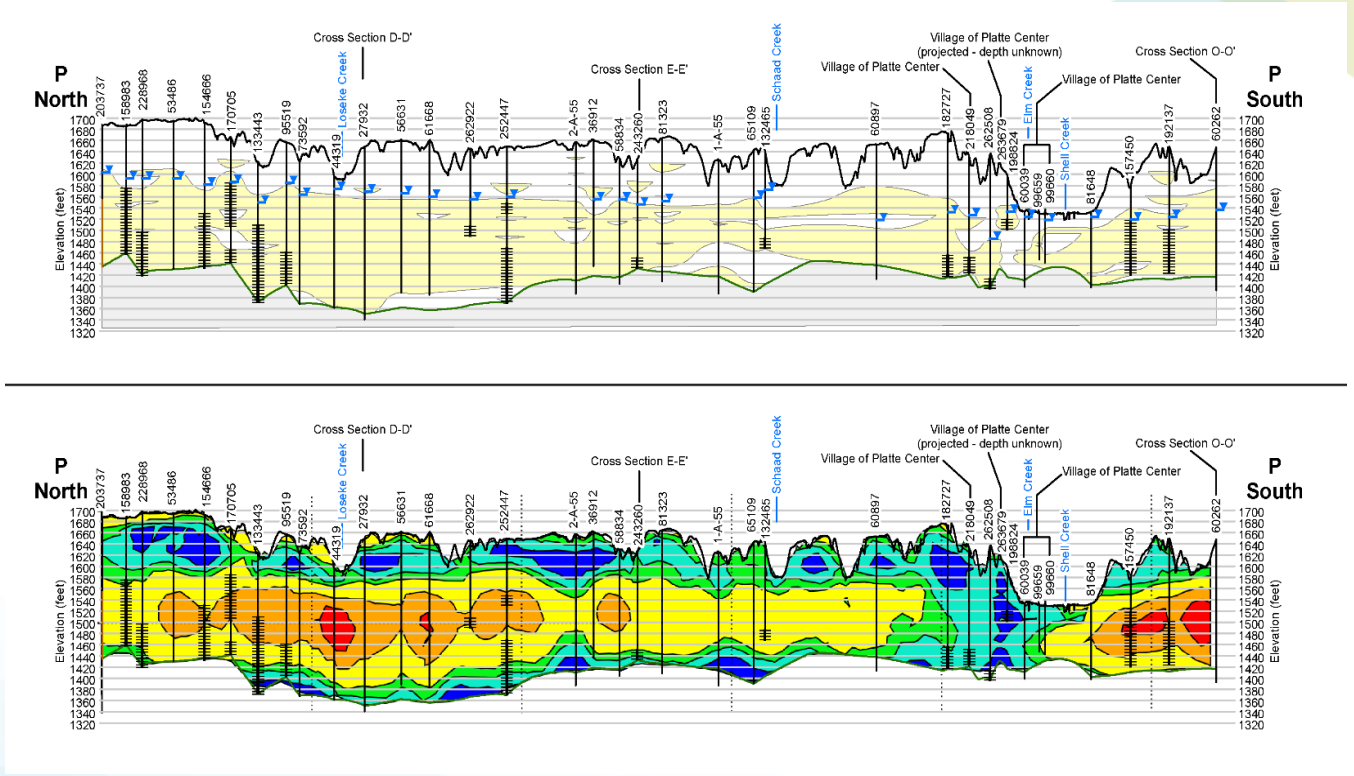

LRE WATER
LPNNRD Board Meeting
Monday, June 10th, 2024 – 6:00PM
GROUNDWATER MANAGEMENT PLAN UPDATE
ADDITIONAL TASKS - VERSION 2.0
LREWATER.COM
ROCKY MOUNTAIN | MIDWEST | SOUTHWEST | TEXAS

PURPOSE & PRIORITIES

- Technical group discussion on GWMP update on April 25, 2024
- LRE presented several recommendations
- Staff asked for a cost to carry priority recommendations forward now, rather than waiting
    1) Establishment of subareas
    2) Review & Standardization of spring/fall water level hydrographs
    3) Review quantity triggers used in rules & regs
    4) Protocols for evaluating well permits
- Since Water Committee, changes were made after staff feedback

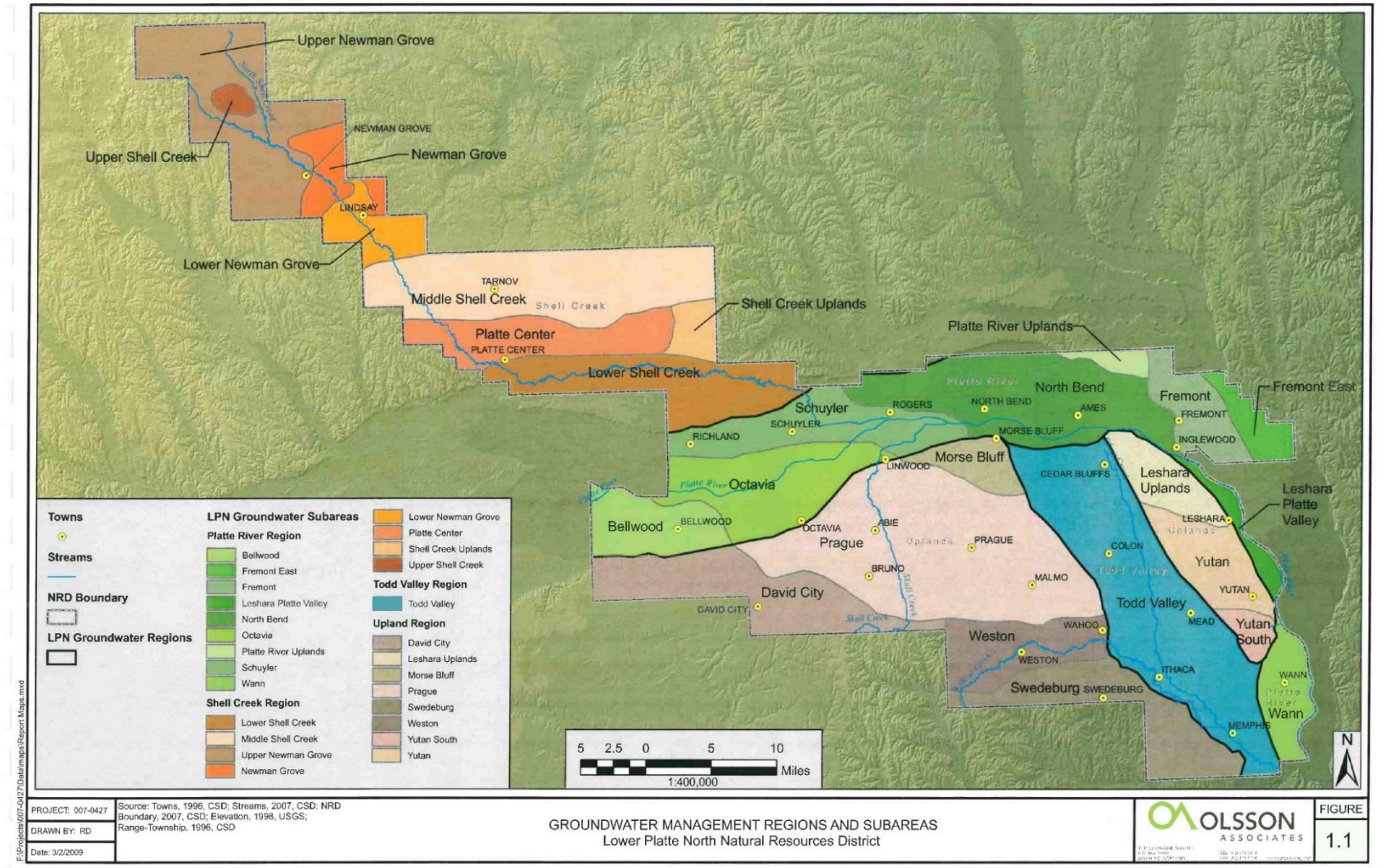
TASK 1 – SUBAREA REVIEW & DELINEATION

- Subarea Review & Delineation
  - Subareas delineated by hydrogeologic setting
  - Begin with 2009 areas delineated by Olsson
  - Hydrogeologic Assessment (LRE, 2023)
  - 3D AEM Framework (LRE, 2022)
  - Provide final areas
  - Incorporate into GWMP



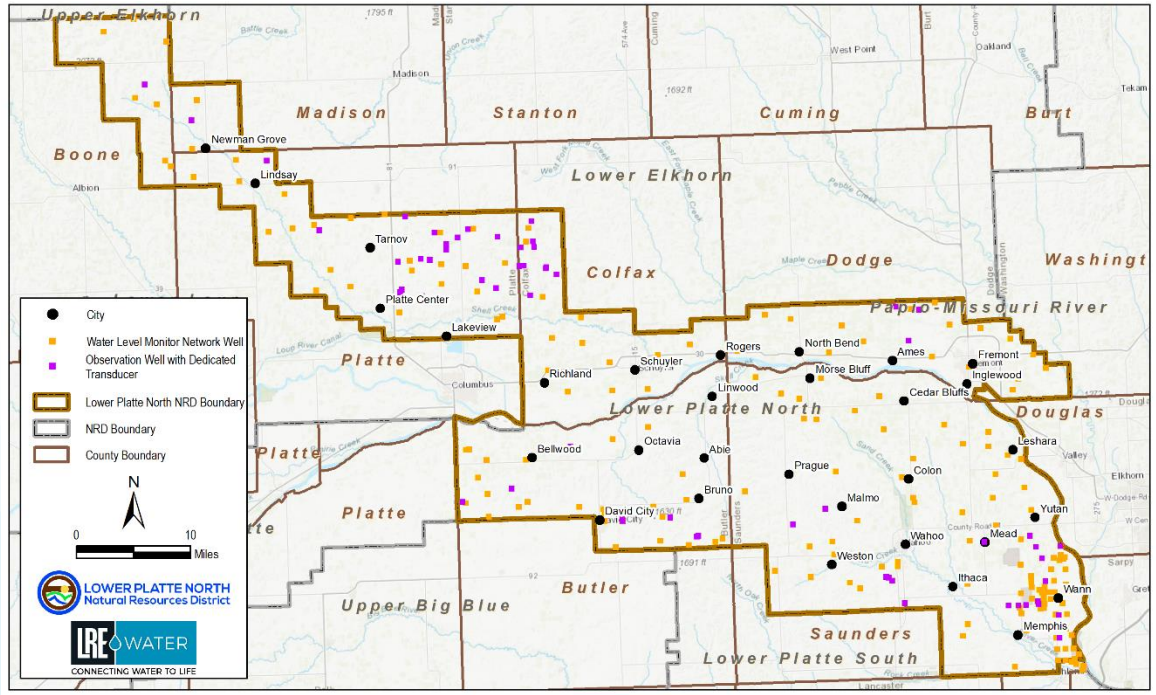
TASK 1 – SUBAREA REVIEW & DELINEATION

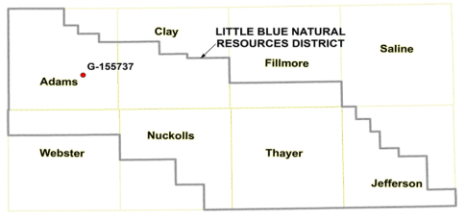
- Areas refined to sections
- Some could be split or combined
- Primarily for quantity, but could also be used for quality studies
- Quantity Control& Quality Phase areas can cross subarea boundaries
- Add a number to each area



TASK 2 – REVIEW SPRING/FALL WELLS & STANDARDIZE HYDROGRAPHS

- Review up to 200 wells used for spring/fall water levels
- Determine if geologic and well construction information is sufficient
- Add details to hydrographs:
  - Subarea
  - Well location map
  - Well depth
  - Screen interval
  - High-capacity well density
  - Lithologic description





LITTLE BLUE NATURAL RESOURCES DISTRICT
FRICKE G-155737
NW 1/4 SW 1/4 SEC 23, T6N, R10W
DEPTH TO WATER VS. TIME
JANUARY 2008 THROUGH DECEMBER 2022

Well Depth: 166 ft
Top of Screen: 160 ft
Bottom of Screen: 166 ft
High Capacity Wells Within 1-Mile Radius: 14

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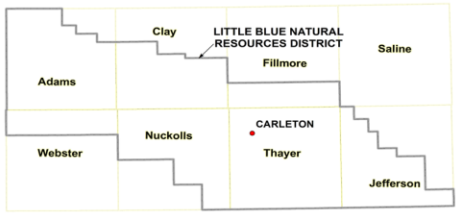

LITTLE BLUE NATURAL RESOURCES DISTRICT
CARLETON
NE 1/4 NE 1/4 SEC 2, T3N, R4W
DEPTH TO WATER VS. TIME
JANUARY 2008 THROUGH DECEMBER 2022

Well Details are Unkown

High Capacity Wells Within
1-Mile Radius: 18

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TASK 3 – QUANTITY TRIGGER EVALUATION

- Review existing triggers within rules & regs
- Review literature, other NRDs methods/thresholds
- Provide language to consider for incorporation into rules/regs (after GWMP update is complete)

TABLE 10
LOWER PLATTE NORTH NRD
GROUNDWATER QUANTITY MANAGEMENT PROGRAM

UNCONFINED AQUIFER		
Rules and Regulations	**Level I 10% drop in saturated thickness**	**Level II 15% drop in saturated thickness**
1. All operators of well systems that pump greater than 100 gpm must attend education classes and be certified every 4 years.	X	X
2. Permit required for all new wells to be drilled which will pump greater than 50 gpm.	X	X
3. Well metering program established on all wells pumping greater than 100 gpm.	Encouraged	Required
4. Adopt acre-inch allocations per crops planted dependent on aquifer.	Encouraged	Required
5. Water Use Report to NRD prior to December 31.	Encouraged	Annually
6. Require well-spacing pursuant to section 46-673.12 (will vary with % decline)		X
7. Require use of best management practices.		X

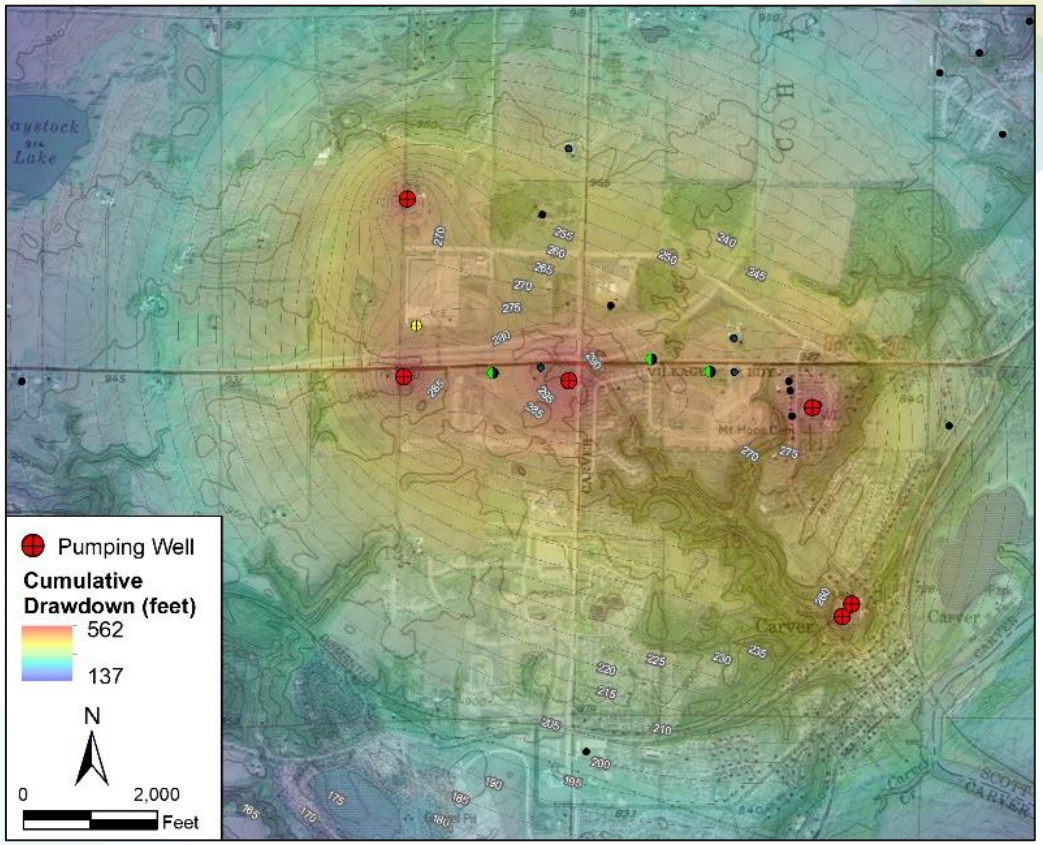
CONFINED AQUIFERS			
Rules and Regulations	**Level IA 7% drop in potentiometric-aquifer thickness**	**Level IIA 10% drop in potentiometric-aquifer thickness**	**Level IIIA 15% drop in potentiometric-aquifer thickness**
1. All operators of well systems that pump greater than 100 gpm must attend education classes and be certified every 4 years.	X	X	X
2. Permits required on all new wells to be drilled which will pump greater than 50 gpm.	X	X	X
3. Well metering program established on all wells pumping greater than 100 gpm.	Encouraged	Required	Required
4. Adopt acre-inch allocations per crops planted dependant on aquifer.	Encouraged	Required	Required
5. Water Use Report to NRD prior to December 31.	Encouraged	Annually	Annually
6. Require well spacing pursuant to Section 46-673.12. (Will v ary with % decline)			X
7. Require use of best management practices.			X

TASK 4 – SAFE-YIELD THRESHOLD

- Review current process to address potential well interference
- Process to obtain data to support decision making on questionable well applications
  - Desktop assessment
  - Aquifer pumping test
  - Hydrogeologic assessment report
  - Groundwater model

TASK 4 – SAFE-YIELD THRESHOLD

- Stepwise approach to help limit impacts to the aquifer
- Obtain data before deciding on a variance request
- Written language to consider for Rules & Regulations modification



SUMMARY

- Budget addition
- Modification to GWMP agreement
- Would not alter schedule to finish GWMP update in December if started by July 2024

TASK NO.	TASK NAME	COST
1	Subarea Delineation	$8,000
2	Review Spring/Fall Wells & Standardize Hydrographs	$20,000
3	Quantity Trigger Evaluation	$3,000
4	Safe-Yield Thresholds	$4,000
	TOTAL	**$35,000**

LRE WATER

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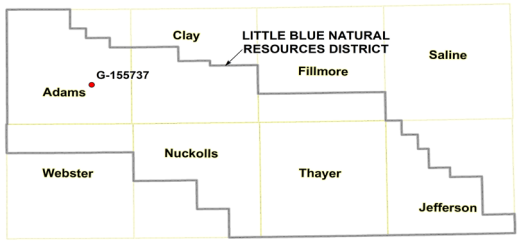

LITTLE BLUE NATURAL RESOURCES DISTRICT
FRICKE G-155737
NW 1/4 SW 1/4 SEC 23, T6N, R10W
DEPTH TO WATER VS. TIME
JANUARY 2008 THROUGH DECEMBER 2022

Well Depth: 166 ft
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Bottom of Screen: 166 ft
High Capacity Wells Within
1-Mile Radius: 14

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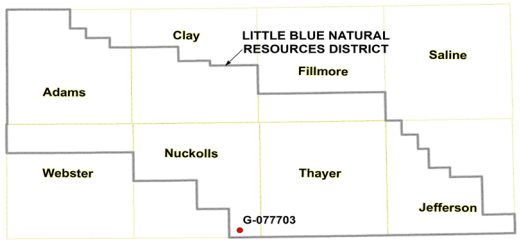
Fricke_G-155737, Hydrograph Const.



LITTLE BLUE NATURAL RESOURCES DISTRICT
HARDY G-077703
NW 1/4 SW 1/4 SEC 28, T1N, R5W
DEPTH TO WATER VS. TIME
JANUARY 2008 THROUGH DECEMBER 2022

Well Depth: 63 ft
Top of Screen: 20 ft
Bottom of Screen: 63 ft
High Capacity Wells Within 1-Mile Radius: 0

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Hardy_G-077703, Hydrograph Const.

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May 15, 2024
Invoice No: 26357

Invoice Total: $6,701.50

Please Remit To:
LRE Water
1221 Auraria Pkwy
Denver, CO 80204
(303) 455-9589
accounting@LREwater.com

Daryl Andersen
Lower Platte North NRD
511 Commercial Park Road
Wahoo, NE 68066-0126

Invoice Email: dandersen@lpnnrd.org
Project No.: 5036LPN03
Project Name: LPNNRD GW Management Plan

Professional Services through April 25, 2024

Task 02 Stakeholder Involvement

Professional Personnel

	Hours	Rate	Amount	
Mohr, Jonathan	.50	195.00	97.50	
Totals	.50		97.50	
Total Labor				**$97.50**
			Total this Task	**$97.50**

Task 03 Plan Development

Professional Personnel

	Hours	Rate	Amount	
Hume, David	7.25	245.00	1,776.25	
Mohr, Jonathan	14.50	195.00	2,827.50	
Sopiwnik, Roscoe	9.75	200.00	1,950.00	
Totals	31.50		6,553.75	
Total Labor				**$6,553.75**

Reimbursable Expenses

Mohr, Jonathan			50.25	
Total Reimbursables			**50.25**	**$50.25**
			Total this Task	**$6,604.00**
			Total this Invoice	**$6,701.50**

Outstanding Invoices

Number	Date	Balance
26025	4/11/2024	4,717.50
Total		**$4,717.50**

Total Now Due	**$11,419.00**

DOMESTIC WELL WATER TREATMENT SYSTEM COST-SHARE PROGRAM

Purpose: *This program is intended to assist with funding the installation of a water treatment system on eligible domestic wells.*

Eligible Participants: Active domestic wells within the LPNNRD. Well must be sampled through the LPNNRD's domestic well sampling program, which utilizes the Nebraska State Laboratory. Cost-share program is for a one-time purchase of a water treatment system through this program.

Eligible Components:

- Equipment and installation costs for a water treatment system
- Registration cost of the domestic well up to $70.

In-Eligible Components:

- Maintenance costs and follow up sampling
- Registration of illegal wells or equipment (i.e. sand point wells)

Requirements:

1. If the domestic well is not currently registered, the LPNNRD will assist in the paperwork along with the cost of registering the well.

2. Well owners must first apply for and utilize any other funding if available and eligible.

3. If ineligible for other funding, or funding is exhausted, well owners may apply for LPNNRD cost share program.

4. The sample results must be 8 ppm or greater for nitrate or test positive for other contaminates over the drinking water standards.

5. The application must be approved by the LPNNRD prior to the purchase and installation of the equipment.

6. Equipment must reduce nitrate to less than 3 parts per million (mg/l) and be approved by the LPNNRD. For other contaminates the equipment must reduce the level to meet drinking water standards and be approved by the LPNNRD. Cost estimate from a licensed plumber must be submitted for the installation of an RO system certified by the American National Standards Institute.

7. Following installation, well owners are required to conduct one follow-up sample to verify the equipment is functioning correctly and send results to LPNNRD.

8. After receiving water treatment system cost share, the domestic well is no longer eligible for the LPNNRD's water sampling program.

Cost-Share: 75% of the total cost, not to exceed $800. One time use program.

Reasons to register your well:

- What you get in return is over $300 in water testing for free! Testing your water, especially if you have a family drinking, bathing, and cooking with it, will give you peace of mind that the water is safe.
- Registering your well allows NRD staff to review locations when high capacity well permits are submitted. This might give you protection from potential infringements on your quality and quantity of water from new wells drilled in the future.
- Registering your well is easy and it opens the door to this program and others that may be offered by the LPNNRD in the future. The potential to save thousands of dollars and improve the quality of your drinking water makes this program WELL worth looking into,

Registration Cost for a well

Important! For single water wells which were completed before 2002 and are being registered by the well owner please review the bottom of the last page of the registration form for minimal information required. For single wells pumping 50 gallons per minute (gpm) or less the current registration fee is **$70**. For single wells pumping more than 50 gpm the current fee is **$110** and you may need a permit from your local Natural Resources District (District) before the well may be registered. Check with the District before submitting a registration form for wells pumping more than 50 gpm. For more detailed fee information and instructions on how to fill out a registration form please click the link below to download the companion instruction document. It is imperative that the geographic coordinates for the well location and the legal description required in section 3 of the form are accurate and consistent with each other.

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May 15, 2024
Invoice No: 26358

Invoice Total: $2,203.00

Daryl Andersen
Lower Platte North NRD
511 Commercial Park Road
Wahoo, NE 68066-0126

Please Remit To:
LRE Water
1221 Auraria Pkwy
Denver, CO 80204
(303) 455-9589
accounting@LREwater.com

Invoice Email: dandersen@lpnnrd.org
Project No.: 5036LPN04
Project Name: LPNNRD Nitrate Assessment Project

Professional Services through April 25, 2024

Task 01 Risk Tool Expansion

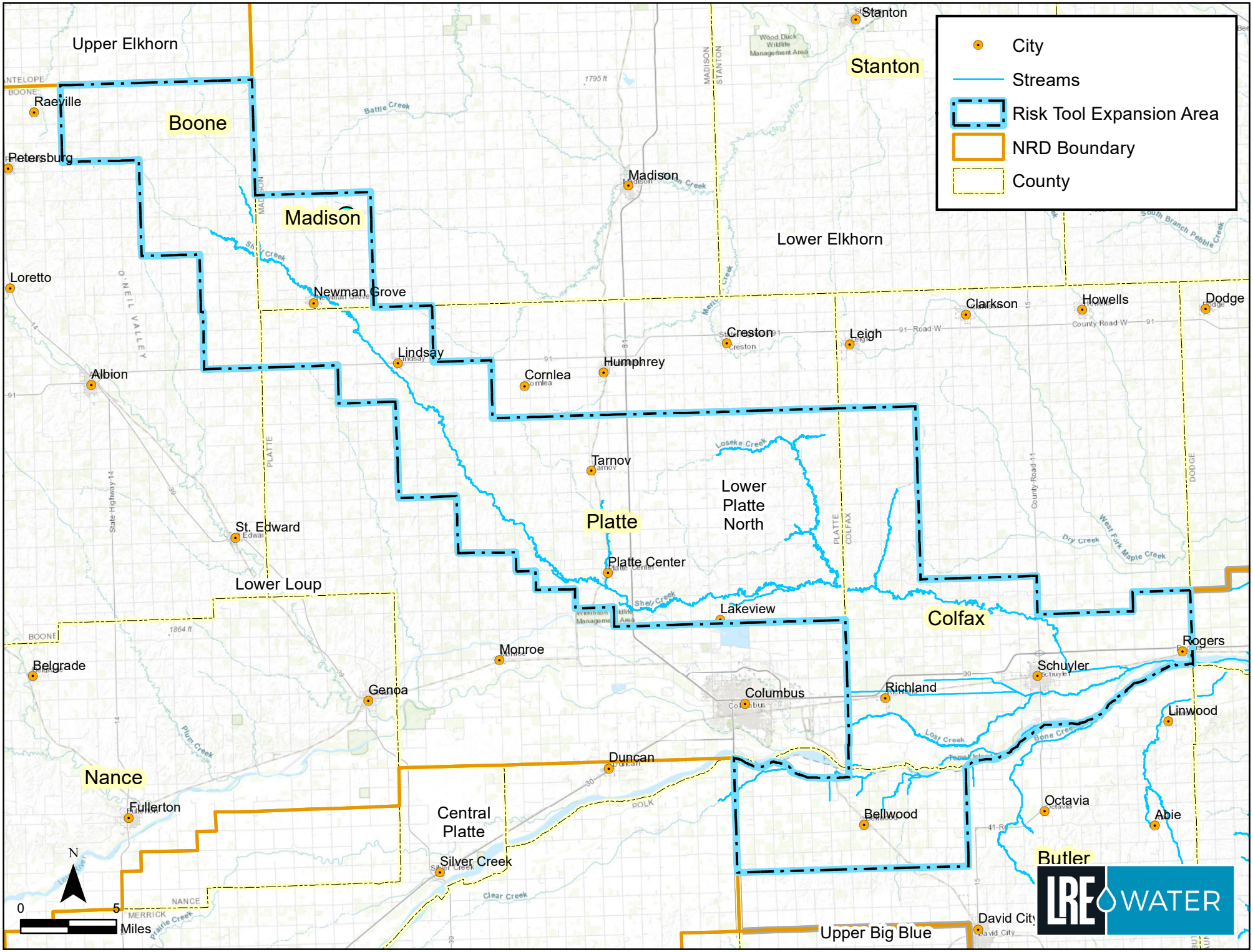
Professional Personnel

	Hours	Rate	Amount	
Hume, David	.25	245.00	61.25	
Sopiwnik, Roscoe	3.25	200.00	650.00	
Totals	3.50		711.25	
Total Labor				**$711.25**
		Total this Task		**$711.25**

Task 02 USC Groundwater Model

Professional Personnel

	Hours	Rate	Amount	
Bauer, Jacob	1.00	225.00	225.00	
Hume, David	1.50	245.00	367.50	
Mohr, Jonathan	3.75	195.00	731.25	
Plante, Michael	.75	224.00	168.00	
Totals	7.00		1,491.75	
Total Labor				**$1,491.75**
		Total this Task		**$1,491.75**
		Total this Invoice		**$2,203.00**


City
Streams
Risk Tool Expansion Area
NRD Boundary
County
Upper Elkhorn
Boone
Madison
Stanton
Lower Elkhorn
Platte
Lower Platte North
Colfax
Lower Loup
Nance
Central Platte
Upper Big Blue
Butler
Raeville
Petersburg
Loretto
Newman Grove
Albion
Lindsay
Cornlea
Humphrey
Creston
Leigh
Clarkson
Howells
Dodge
Tarnov
St. Edward
Platte Center
Lakeview
Monroe
Belgrade
Genoa
Columbus
Richland
Schuyler
Rogers
Linwood
Duncan
Fullerton
Silver Creek
Bellwood
Octavia
Abie
David City
Battle Creek
Shell Creek
Loseke Creek
Dry Creek
West Fork Maple Creek
Lost Creek
Bone Creek
Plum Creek
Prairie Creek
Clear Creek
Merrick Creek
South Branch Pebble Creek
Wood Duck Wildlife Management Area
O'Neill Valley
State Highway 14
County Road 11
County Road W
91 Road W
N
0
5
Miles
LRE WATER

AMENDMENT TO OWNER-ENGINEER AGREEMENT
Amendment No. 1

The Effective Date of this Amendment is: date signed by owner

ARTICLE 1 – BACKGROUND DATA

Effective Date of Owner-Engineer Agreement: **December 8, 2022**
Owner: Lower Platte North NRD
Engineer: JEO Consulting Group, Inc.
JEO Project Number: 220954.00
Project: Lower Platte North NRD 2025 Hazard Mitigation Plan Update

ARTICLE 2 – NATURE OF AMENDMENT

X Additional Services to be performed by Engineer

X Modifications of payment to Engineer

ARTICLE 3 – DESCRIPTION OF MODIFICATIONS

Perform engineering services related to Drought Management Plan. See Exhibit A, attached.

ARTICLE 4 – AGREEMENT SUMMARY

Original agreement amount:	$ **155,000**
Net change for prior amendments:	$ **0**
This amendment amount:	$ **95,000**
Adjusted Agreement amount:	$ **250,000**

The foregoing Agreement Summary is for reference only and does not alter the terms of the Agreement, including those set forth in Exhibit B.

Owner and Engineer hereby agree to modify the above-referenced Agreement as set forth in this Amendment. All provisions of the Agreement not modified by this or previous Amendments remain in effect.

OWNER: **Lower Platte North NRD**	ENGINEER: **JEO Consulting Group, Inc.**
By: _____	By: _____
Print name: _____	Print name: Rebecca Appleford
Title: _____	Title: Project Manager
Date Signed: _____	Date Signed: **5/15/2024**

Lower Platte North NRD
Drought Management Plan as part of the
2025 Hazard Mitigation Plan Update
Additional Services Scope

Amendment Task Description

As part of the update to the 2025 Lower Platte North NRD's Hazard Mitigation Plan, the NRD included additional funds in their FEMA BRIC Grant to lead an effort to develop a proactive drought management plan for the district. The drought management plan will reduce district-wide impacts during drought events and aid the NRD in water resource management. A significant part of the planning process will focus on the district's communities to evaluate their drought vulnerabilities, provide education and public engagement, and understand available community drought ordinances that are in place. Additionally, this project will include the establishment of a drought monitoring and forecasting protocol; identify potential best management practices and future recommendations that could be promoted and/or implemented within the district that will reduce drought impacts; and help proactively prepare for drought and provide awareness during drought events. The outcome of the project will be a more sustainable and stable water supply for all users across the district and key information will be integrated into the NRD's 2025 Hazard Mitigation Plan Update.

Additional Project Task 7

Task 7.1: Project Management and Coordination

Task 7.1.1 Kick-Off Meeting. JEO and NRD staff will have a project kick-off meeting. JEO will develop meeting materials to include a meeting agenda, proposed project schedule, roles and responsibilities, draft contact list, and other items as necessary.

Task 7.1.2 Mid-Project Meeting. JEO and NRD staff will have a mid-project meeting to review information gathered from community meetings and the pop-up events (see Task 7.3). During this meeting, JEO and NRD staff will discuss draft drought monitoring procedures and potential best management practices that could be implemented to reduce drought impacts.

Task 7.1.3 Project Management and Coordination. JEO will develop a project management plan and will provide monthly update and project invoices to NRD as part of Task 1.1 in the hazard mitigation plan contract. JEO will coordinate with LRE and the NRD while the update to the groundwater management plan is under development. Up to two (2) JEO staff members will attend groundwater management plan meetings as needed (up to 4 meetings) to support the development of the drought plan.

Task 7.2: Data Collection, GIS, and Drought Risk Assessment

Task 7.2.1 Data Collection. JEO will collect data from historic records, reports, and monitoring sites along with other necessary data to complete the plan. Data sources may include, but are not limited to:

- NRCS
- NDHHS
- NDEE
- NeDNR
- NGPC
- USGS
- NCEI

Furthermore, plans and studies will be collected from the NRD and communities, which may include, but not limited to voluntary integrated management plan, groundwater quality and quantity rules and regulations, water emergency contingency plans, etc. Any drought ordinances or regulations will also be collected.

Task 7.2.2 GIS Mapping. JEO will coordinate with NRD staff for water related GIS data to produce GIS maps to be used in the risk assessment, monitoring protocol, and other sections of the plan.

Task 7.2.3 NRD and Communities Vulnerability and Risk Assessments. After gathering the required data, historical drought data will be examined for the NRD to learn about previous drought events, how severe they were, and how they affected communities and agriculture. Moreover, a thorough evaluation will be done for each community of their susceptibility to drought. Information and assessments completed as part of the development of the NRD's groundwater management plan will be integrated into the drought plan.

Task 7.3: Public Engagement and Community Meetings

Task 7.3.1 Community Meetings. JEO will meet with up to 16 communities to discuss drought impacts, vulnerabilities, and drought ordinances. This will include assessing existing response measures and monitoring practices for drought events. Meetings can be conducted virtually or in person, depending on the preferences of each community and JEO. Where feasible, these meetings may coincide with one-on-one sessions related to the Hazard Mitigation Plan (HMP) to optimize staff time and resources. Topics of discussion will encompass potential mitigation and response strategies, considerations for drought ordinances and regulations, and ways in which the NRD can effectively assist communities during drought periods.

Task 7.3.2 Public Engagement – Pop Up Events. JEO will work with NRD to host pop-up events (max 3) throughout the NRD to inform the public of the plan and gather input. JEO will staff up to three (3) events and will provide materials and instructions if additional events are requested. These pop-up events will take place at county fairs or other local events as determined by NRD and JEO. JEO will assist NRD with publicizing the pop-up events. Engagement could include, but is not limited to: press releases, social media prompts, flyers, and website posts.

Task 7.4: Develop Drought Management Plan

Task 7.4.1 Develop Drought Management Plan. JEO will lead the development of the Drought Management Plan document, with a primary focus on identifying and addressing drought impacts on communities. This includes identifying vulnerable populations, critical management periods, past water shortages, and other community-specific vulnerabilities. Collaborating with the NRD and based on public & community feedback, JEO will establish procedures for district-wide drought monitoring and forecasting.

Furthermore, in coordination with the NRD, JEO will identify and recommend best management practices tailored for the NRD and the district's communities. These practices will aim to reduce drought impacts, enhance proactive drought preparedness, and raise awareness during drought events. JEO will also provide recommendations for ongoing plan updates to ensure continued effectiveness in addressing community drought challenges.

Task 7.4.2 Sample Community Drought Ordinance. Create an example drought ordinance that communities can use to create their own individualized drought ordinance. Two to three example ordinances will be provided ranging from a basic short ordinance to a more complex longer ordinance.

Task 7.4.3 Quality Control. JEO will conduct a thorough review of the Drought Management Plan for both grammatical and technical accuracy.

Task 7 Deliverables

Deliverables will be distributed to the NRD and communities as necessary throughout the project. Specific deliverables for this project include:

- An electronic copy of the Drought Management Plan
- Up to two print copies of the Drought Management Plan, as requested.
- Sample Community Drought Ordinances (max 3)

Assumptions

JEO will develop a project management plan that includes: a framework for project related communications, proposed project schedule, anticipated milestones, and project deadlines. JEO will provide monthly update reports and project invoices to NRD as part of Task 1.1 in the hazard mitigation plan contract. Other project assumptions are listed below:

- LRE will provide data and groundwater management plan outcomes for use within the development of the drought management plan.
- NRD staff will assist JEO in collecting community-specific information where possible.
- NRD will assist in scheduling and will identify and secure locations for all in-person plan meetings.
- NRD will assist with dissemination of public engagement materials.
- NRD will staff up to three (3) of the pop-up events. JEO will staff (up to two people) up to three (3) pop-events.
- NRD will assist JEO in the identification of potential pop-up event locations. For now, it is assumed that pop-up events will occur during county fairs.
- NRD will assist with collection of technical data (planning documents, groundwater data, etc.).
- NRD will assist in providing GIS data used in the development of the plan.
- NRD will review the draft plan and provide comments/revisions prior to finalization.
- JEO will not need to attend NRD board meetings regarding the Drought Management Plan.

Project Schedule

The following project schedule relates to the tasks outlined above with the original project schedule remaining unchanged. This schedule may be adjusted based on NRD and JEO availability.

Drought Plan Kick-off Meeting:	June 2024
Data Collection:	June – October 2024
Pop-up Events:	July – August 2024
Community Meetings:	July 2024 – January 2025
Plan Development:	September 2024 – March 2025
Draft Plan Review:	March – April 2025
Submit Plan to FEMA with HMP:	April – July 2025

Updated Project Fee

The contract project fee will be amended as outlined below:

Task 7.1: Project Management and Coordination	$12,500
Task 7.2: Data Collection, GIS, and Drought Risk Assessment	$16,500
Task 7.3: Public Engagement and Community Meetings	$35,000
Task 7.4: Develop Drought Management Plan	$31,000
Task 7 Subtotal:	**$95,000**
Tasks 1-6 Subtotal (original contract):	**$155,000**
Total Revised Project Fee:	**$250,000**

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

INVOICE

Papio-Missouri River NRD
8901 S. 154th Street
Omaha, NE 68138
(402) 444-6222

INVOICE NUMBER	**2024-1LPGW**
INVOICE DATE	**May 15, 2024**

TO:

Lower Platte North Natural Resources District
PO Box 126
Wahoo, NE 68066

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
1	Lower Platte River Sub-Regional Groundwater Modeling	23,697.22	$23,697.22
		SUBTOTAL	$23,697.22
		TAX	$0.00
		FREIGHT	
			$23,697.22 PAY THIS AMOUNT

DIRECT ALL INQUIRIES TO:

Philip Paitz
402 444-6222
email: ppaitz@papionrd.org

MAKE ALL CHECKS PAYABLE TO:

Papio-Missouri River NRD
8901 S. 154th Street
Omaha, NE 68138

THANK YOU!

*Please pay on a separate check from other payments to Papio-Missouri River NRD. Thank you.

Payment is due by 6/30/24

Lower Platte River Sub-Regional Groundwater Modeling - Action Items

Through 25 March 2024

Item No.	Action Item	Origination Date	Responsible Party	Task Notes	Status
6	Place data in shared folder.	22-Aug-23	Collective		Ongoing
7	Review NRD buget vs. project timeline.	22-Aug-23	Collective		Ongoing
11	Work with HDR in Leapfrog data development. Review outputs and maps.	21-Sep-23	AGF		Complete
17	Add data sources to final version of Task 200/300 memos.	21-Sep-23	Modeling Team		Ongoing
21	Reach out to MUD for USGS/MUD well field model.	18-Jan-24	JEO/HDR		Ongoing
23	Document minimum thickness assumption for layer division.	25-Mar-24	HDR		Complete
26	Share model development files with Collective for review.	25-Mar-24	Modeling Team		Complete
27	Provide data from past observations of perennial streams.	25-Mar-24	NeDNR		Complete
28	Provide data from this years observations of perennial streams.	25-Mar-24	NeDNR		Complete
29	Reach out to Katie Cameron for CSD observation data comparison to USGS.	25-Mar-24	HDR		Complete

Quote – Q-116737

In-Situ, Inc.
221 E. Lincoln Avenue
Fort Collins, CO 80524
U.S.A.

Tel: (800) 446-7488
Fax: (970) 498-1598
Email: sales@in-situ.com
Web: www.in-situ.com

Issued By: Tony Walker
Date: May 24, 2024
Quote Valid for 30 days

Sales Manager	Customer ID	Payment Terms	Shipping Method	INCO Terms	Final Destination
Stephane Mary	C004961	NET 30 DAYS	FedEx Ground		United States Nebraska

Quote To:	Ship To:
Lower Platte North NRD P.O. BOX 126 Wahoo, Nebraska 68066 United States	Lower Platte North NRD 511 COMMERCIAL PARK ROAD WAHOO, Nebraska 68066 United States
Attn:	**Comments:**
Russell Oaklund roaklund@lpnnrd.org 4024434675	

Equipment

Line	Product Description	Part Number	Unit of Sale	Qty.	Unit List Price	Total List Price	Disc.	Customer Total Price
1.	TROLL Net Hub 4-Port Bulkhead	0092160	Each	2	$1,395.00	$2,790.00	20.00%	$2,232.00
2.	Replacement Desiccant Bag for Controll Pro	0087630	Each	2	$15.00	$30.00	20.00%	$24.00
3.	ADCON RG1-200 Rain Gauge 0.2mm	A2007330 49	Each	1	$795.00	$795.00	20.00%	$636.00
4.	Load-Bearing Universal Adapter for quick , waterproof connection of 3rd party instruments (includes cable to connect to VuLink)	0104160	Each	2	$175.00	$350.00	20.00%	$280.00
5.	Rugged Cable Splitter Vented	0095500	Each	1	$365.00	$365.00	20.00%	$292.00
6.	Rugged Twist-Lock Cable, Vented, TPU, No Reel, Twist-Lock,	0052000-POLY-NONE-TWISTLOCK-	3ft	2	$187.00	$374.00	20.00%	$299.20
							Subtotal:	**$3,763.20**

Quote Total

Tax is not normally quoted due to State & local variability. If you need to have Tax included in this quotation, please contact us.
If your organization is a tax-exempt entity, please email or fax a copy of your tax-exempt certificate to taxcerts@in-situ.com or fax to (970) 498-1598.
Tax rates will be based on delivery address of the order.

Sales Tax: **$0.00**

For further information regarding the Warranty or Terms and Conditions, please refer to our website at http://in-situ.com/terms-conditions/

All quoted product & service prices are in U.S. Dollars unless specifically noted otherwise.

Shipping: **$145.00**

Total Amount (Excludes Optional Items): **USD** **$3,908.20**

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