INTEGRATED MANAGEMENT PLAN

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INTEGRATED MANAGEMENT PLAN

jointly developed by the

LEWIS AND CLARK NATURAL RESOURCES DISTRICT

and the

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

1. AUTHORITY and EFFECTIVE DATE

This Integrated Management Plan (IMP) was prepared voluntarily and adopted on July 28, 2016 by the Board of Directors of the Lewis and Clark Natural Resources District (District) and on August 1, 2016, by the Nebraska Department of Natural Resources (Department) in consultation with the Lewis and Clark Natural Resources District Stakeholder Advisory Committee and in accordance with the Nebraska Ground Water Management and Protection Act. The act assigns the responsibilities and the authority to the Department and the District for management of groundwater and hydrologically connected waters in accordance with *Neb. Rev. Stat.* §§46-702, 46-703, 46-707, 46-712, 46-715, 46-716, 46-717, 46-718, 46-720, and 46-739.

The District has significant legal authority to regulate activities within its boundaries in a way that ensures agriculture remains an important industry to the State of Nebraska in accordance with *Neb. Rev. Stat.* §§46-703 and 46-704(3).

2. PURPOSE

The Lewis and Clark Natural Resources District, in collaboration with the Nebraska Department of Natural Resources, developed this voluntary IMP with the primary purpose of attaining and/or maintaining a desired balance between water uses and water supplies of both surface water and groundwater sources. In this way, economic viability, social health, environmental health, public safety, and public welfare in the District can be better achieved and maintained. Through the integrated water management process, existing groundwater users and surface water appropriators will be better protected over the near and long term.

This voluntary IMP focuses on water supplies of the entire District and incorporates many aspects that mutually benefit other actions of the District, as set forth in the District's Ground Water Management Plan, the Bazile Groundwater Management Area Plan, and findings from other District projects and studies. The integrated management planning process will allow for:

(a) a more complete inventory of all water supplies and water uses,
(b) increased collaboration between the entities that manage water resources,
(c) increased public awareness of water resources issues, and
(d) opportunities for stakeholders, the District and the Department to work together to develop short and long-term management solutions for the District's water resources.

3. INTEGRATED WATER MANAGEMENT FRAMEWORK

With increasing demands on water resources, it became necessary for the State of Nebraska to recognize the importance of managing hydrologically connected groundwater as "one water" due to the interconnection between surface water and underlying groundwater aquifers. LB 962, passed in 2004, established the framework for managing hydrologically connected waters through **integrated water management**. This framework enables the Department and the NRDs to work together to manage groundwater and surface water as a single resource, thus replacing the previous system that treated them as two separate and un-related resources.

Mandated integrated water management

From 2004 to early 2010, integrated water management applied only to basins (sub-basins or reaches) that had been determined by the Department to be "fully appropriated" as indicated in *Neb. Rev. Stat.* § 46-713. This statute specifies that the Department will conduct an annual review of water supplies and uses of river basins, subbasins, or reaches (hereinafter referred to as "basins/subbasins"). A basin/subbasin is deemed fully appropriated if the Department determines that current uses of hydrologically connected surface water and groundwater in the basin/subbasin cause or will, in the reasonably foreseeable future, cause (*Neb. Rev. Stat.* §46-713(3)):

(a) 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,
(b) 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
(c) reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws.

If the Department has designated or has made a final determination that a basin/subbasin is fully appropriated, an IMP must be developed. *Nebraska Revised Statutes* §§46-715 to 46-717 and portions of 46-718 outline the process of IMP development and implementation. The ultimate purpose or goal of the IMP process is to maintain and/or attain balance between water uses and water supplies of both surface water and groundwater, therefore protecting current investments and interests while facilitating economic growth and well-being across the District. An IMP must contain the following components:

(a) clear goals and objectives to help the basin achieve and sustain water balance so that economic viability, social and environmental health, safety and welfare of the basin/subbasin is achieved and maintained,
(b) a map clearly showing the geographic extent of the IMP,
(c) one or more groundwater and one or more surface water control(s) that are consistent to reach the goals and objectives of the IMP; these controls must be authorized by statute (*Neb. Rev. Stat.* §§46-739 and 46-716),
(d) a plan to gather and evaluate data, information and methodologies to test the validity of information and conclusions upon which the IMP is based, and further understanding of hydrologically connected waters, and

(e) clear and transparent procedures to track depletions or accretions to streamflows resulting from a change in water use(s).

In order to provide a process for economic development opportunities and economic sustainability within a basin/subbasin, the IMP shall also include clear and transparent procedures to track depletions and gains to streamflows resulting from new, retired, or other changes to uses within the basin/subbasin.

During development of an IMP, the Department and affected NRD(s) shall consult with a stakeholder group of statutorily identified constituents (*Neb. Rev. Stat.* § 46-717(2)), and shall solicit public comments and opinions. The best available scientific data and information is to be used in development of an IMP. In addition, an IMP may include any applicable incentive programs that are authorized by law.

Voluntary integrated management planning

In 2010, LB 764 was approved and created a framework for voluntary integrated management planning, which allowed Districts that had not been designated as fully appropriated to voluntarily develop a joint IMP with the Department utilizing the statutes set forth for mandated IMPs. The voluntary IMP framework is a **proactive** approach to water management. It is an opportunity for NRDs and the Department to work together to manage the basins/subbasins in a way that allows for managed growth of water uses while protecting all existing uses. In early 2013, the District made the decision to jointly develop a voluntary IMP with the Department, in accordance with *Neb. Rev. Stat.* § 46-715(1)(b).

If the Department should determine that a basin/sub-basin within the District is fully appropriated, the Department and the District may amend the IMP to fulfill mandated IMP requirements. At the time of this writing, the District has not been determined by the Department to be fully appropriated. Thus, this IMP is completely voluntary. Because current water supplies are greater than the current level of use, this IMP does not include procedures to track depletions and gains to streamflows resulting from new, retired, or other changes to uses within the basin/subbasin. The Department will continue to assess the available water supplies and uses and report the findings in the Department's Annual Fully Appropriated Basins Report. Additionally, the IMP area is not subject to any interstate compact or decree, or any other formal contract or agreement pertaining to surface water or groundwater use or supplies.

4. BACKGROUND

Natural Resources Districts

In 1972, a law passed by the Nebraska Legislature became effective that combined 154 special purpose entities into what are now 23 Natural Resources Districts (NRDs). The NRDs are local political subdivisions that are unique to Nebraska. The boundaries of the NRDs generally follow major river basins, enabling a local government framework to respond to local water interests. The District contains all, or portions of the Aowa Creek Basin, Bazile Creek Basin, Beaver Creek-Missouri River Basin, Bow Creek Basin, West Bow Creek Basin, Elk Creek Basin, Howe Creek Basin, Lewis and Clark Lake-Missouri River Basin, Lime Creek-Missouri River Basin, and Little Bazile Creek Basin (Figure 1).

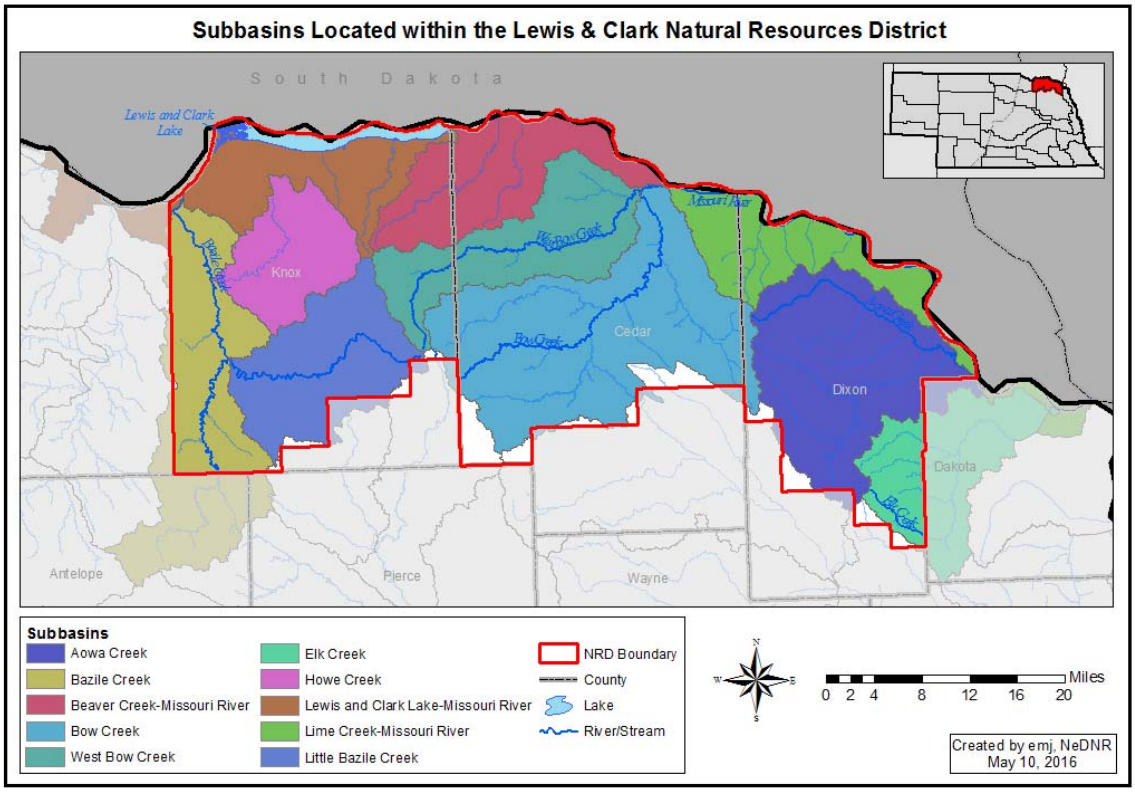

Figure 1: The ten primary subbasins of the District.

NRDs are governed by an elected board of directors who have broad responsibilities to protect Nebraska's natural resources. NRDs are charged with 12 areas of responsibility:

(1) development, management, use, and conservation of groundwater and surface water,
(2) soil conservation,
(3) erosion prevention and control,
(4) flood prevention and control,
(5) pollution control,
(6) water supply for any beneficial uses,
(7) prevention of damages from flood water and sediment,
(8) development and management of recreational and park facilities,
(9) forestry and range management,
(10) development and management of fish and wildlife habitat,
(11) drainage improvement, and
(12) solid waste management.

Nebraska Department of Natural Resources

The Nebraska Department of Natural Resources (Department) has been in existence since July 1, 2000, when two existing state agencies were merged. These agencies were the Department of Water Resources and the Nebraska Natural Resources Commission. Since this time, the Department has had broad responsibilities in the areas of Nebraska's surface water regulation, groundwater well registrations, floodplain management, dam safety, natural resources planning and development, and

dissemination of data and information pertaining to these topics. In addition, the Department participates in numerous federal, interstate, state and local studies and represents Nebraska in connection with interstate compacts and decrees. The agency also administers several state funds used to help conserve, protect and develop Nebraska's natural resources (Department Newsletter, Issue 1, winter 2000). As a result of the passing of LB 962 in 2004, the Integrated Water Management (IWM) division of the Department was formed. The IWM division has been steadily growing through the years and currently has 18 full-time positions. The employees in these positions have expertise in water planning, groundwater modeling, and/or hydrology.

Regulatory framework for groundwater and surface water management

While NRDs are responsible for the planning, monitoring, and regulation of groundwater in their respective districts; the Department, a state entity, manages and regulates surface water throughout the State. There are two distinct and very different laws which govern the beneficial use of groundwater and surface water in the State of Nebraska:

(1) the common law concept of correlative rights for groundwater, and
(2) the prior appropriation doctrine for surface water.

Groundwater

In the State of Nebraska, groundwater is owned by the public. The only right to groundwater that can be held by an overlying landowner is the reasonable and beneficial use of the groundwater underlying his or her land. That right is subject to the provisions of the Nebraska Ground Water Management and Protection Act, as well as the correlative rights of other landowners when the groundwater supply is insufficient to meet the reasonable needs of all users. As such, groundwater is essentially a "share and share alike" system in Nebraska.

Landowners establishing a groundwater well for domestic or stock use are not required to obtain a well permit from the District; however, they are required to have all new wells registered with the Department. In order to execute groundwater rights for uses other than domestic or stock, land owners must first obtain a permit to drill a well from the NRD. If approved, the well permit allows the land owner to drill and extract as much groundwater as needed, as long as the use is deemed beneficial. When construction is completed, the well is registered with the Department and entered into a statewide database.

Groundwater Management Plan

The Legislature passed the Ground Water Management and Protection Act (*Neb. Rev. Stat.* §§46-701 to 46-756) requiring each NRD to establish a plan designed to protect the quantity and quality of groundwater resources in their district. In 1986, the District approved its Groundwater Management Plan to meet those requirements. The major concern for the District at that time was groundwater levels. The Plan was updated in 1995 with additional information regarding water quality investigations initiated to provide information on the concentration, scope, and trends of potential contaminants within the District. With the 1995 update, the District reported no significant change in water levels. In response to the drought of 2012 and a significant increase in irrigation well development, the District adopted Rules and Regulations in 2014 in order to inventory and protect water quantity. The Groundwater Management Plan remains in effect to improve and protect the quantity and quality of the District's groundwater supplies.

Surface water

Surface water appropriations (rights) entitle landowners or organizations to remove a set amount of water from a specific location, such as a water body or a point of diversion from a stream, river, or its tributaries. Surface water rights follow the prior appropriation doctrine, where water rights having an earlier approval date ("senior uses") are entitled to their full appropriation before a priority water right that has a later approval date ("junior uses") is allowed to divert water. Therefore, during periods when the overall water supply is insufficient to meet all appropriated water rights, the Department's system of prior appropriation remains in effect to protect senior surface water users.

Preference system

There is also a preference system defined in statute, which pertains to both groundwater and surface water, where certain types of uses have legal preference over others (see *Neb. Rev. Stat.* §46-613). The order of preference from highest to lowest is as follows:

(1) domestic uses
(2) agricultural uses
(3) industrial uses

The Department's preference system of prior appropriation also remains in effect to protect existing surface water uses.

5. VOLUNTARY IMP DEVELOPMENT PROCESS

Letters of Intent

On March 4, 2013, the District submitted a letter of intent to develop a voluntary IMP to the Department. The Department provided a reciprocal letter of intent on March 18, 2013. These letters are attached in Appendix A.

Stakeholder process

The development of this voluntary IMP was a collaborative process between the District, the Department, and the Stakeholder Advisory Committee. In the late winter of 2014, the District solicited stakeholder participation via phone calls and a newspaper advertisement, and all individuals who responded were appointed to the Stakeholder Advisory Committee. This committee is comprised of individuals who live and work within the District and represent a variety of interests, such as agricultural, municipal, commercial, environmental, and recreational. More information about the Stakeholder Advisory Committee process is provided in Appendix B.

Internal coordination

In the time between stakeholder meetings, the District and the Department met several times to discuss IMP progress and the input received from stakeholders. The District and Department discussed the goals, objectives, and action items in terms of feasibility and their potential to fulfill the purpose of the IMP. Some goals and objectives were moved to a "long-term studies/goals" section; in this way, the District and Department will maintain sight of these important stakeholder ideas, while balancing funding and staff resources.

Public meetings

Next, the District and the Department actively solicited public comments and opinions by holding a public informational meeting in an effort to increase awareness and knowledge of the IMP across the District. Comments and feedback resulted in no changes to the draft IMP.

The District and the Department subsequently held a joint public hearing where any member of the public could provide testimony, either in writing or in person. Following the hearing, the Department and the District considered the testimony, and determined no changes were necessary. As such, the District and Department subsequently agreed to adopt the IMP and implement the controls in the groundwater and surface water action items listed herein to the entire geographic area within the District, as shown in Figure 2.

6. GEOGRAPHIC AREA OF IMP

When the IMP process was initiated, the District and the Department made the decision to include all District water uses, as opposed to only the uses in the hydrologically connected area, as allowed by statute (*Neb. Rev. Stat.* §46-715(3)). This was partly due to a complex hydrogeology and limited data regarding hydrologically connected areas at the time of IMP development. Therefore, the geographic boundaries for the IMP area are the legal boundaries of the District (Figure 2).

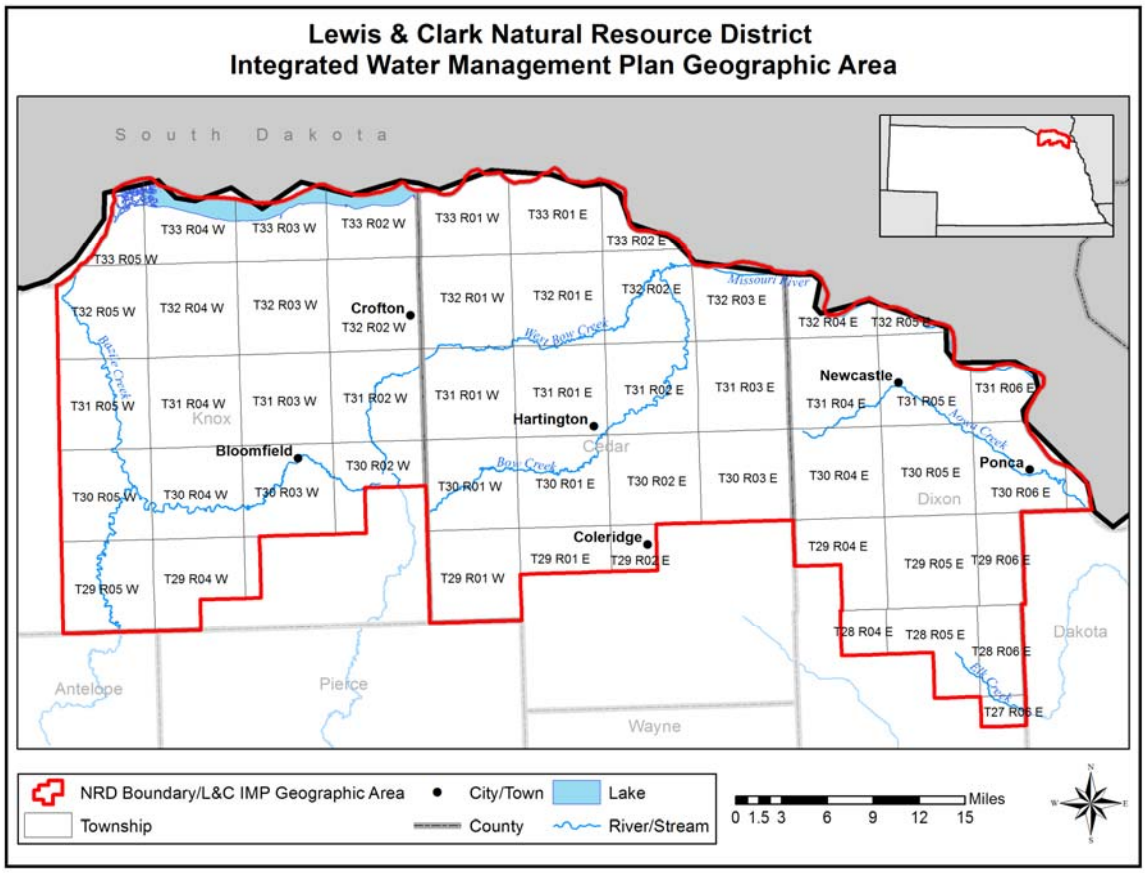

Figure 2: The geographic area of IMP is the area within the District boundary.

District geology

A generalized block diagram of the subsurface geology of the District is represented in Figure 3. As illustrated in the diagram, the District is underlain by Quaternary Alluvium composed of clay, silt, sand, and gravel deposited by glacial processes during the Pleistocene and Holocene epochs. Beneath the alluvium, the first seven formations that occur in the District are illustrated. Not all of these formations are water bearing formations. Thick glacial deposits of loess and till overlie silt and sand units. The saturated silt, sands, and gravels of the District can be productive aquifers.

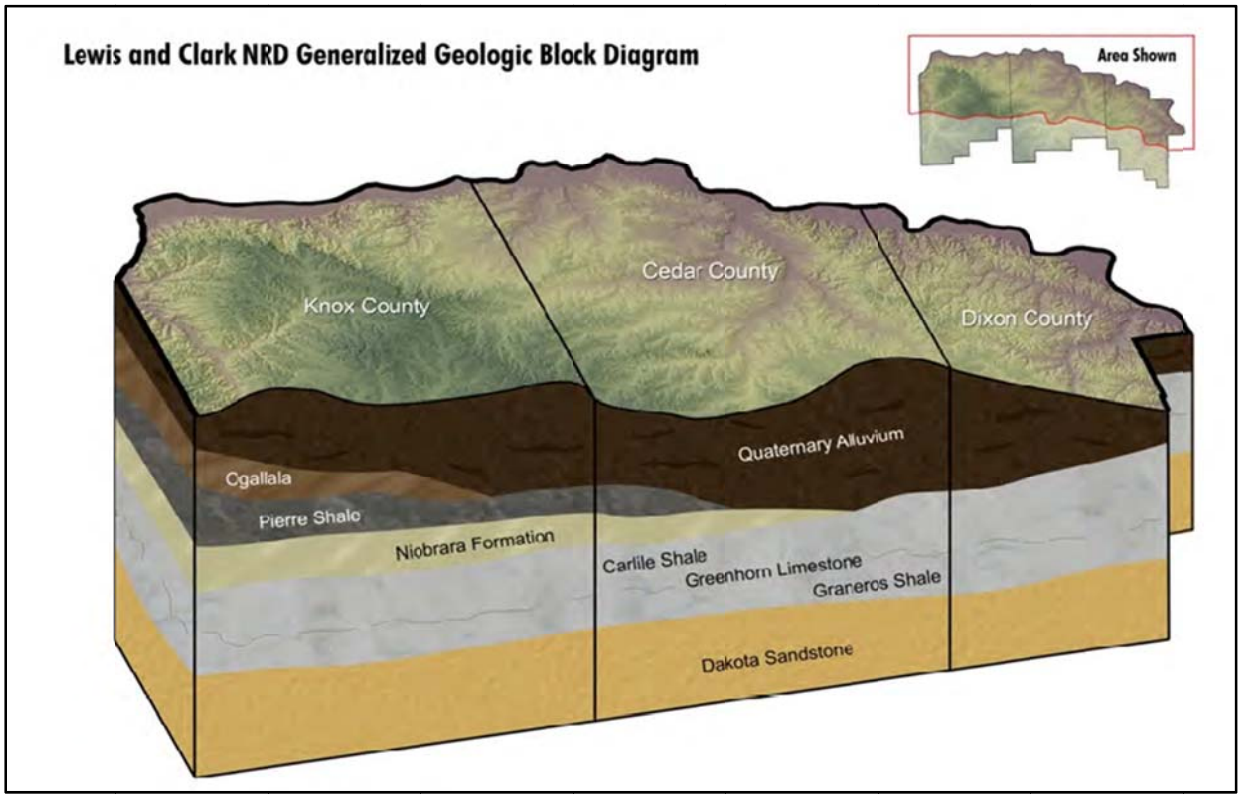

Figure 3: Generalized geologic block diagram of the District.

Groundwater of the District

There are two main aquifer types that produce significant quantities of water in the District. The unconsolidated units that overlie the bedrock (alluvial aquifers) and bedrock aquifers comprised of consolidated to semi-consolidated rock. Most of the alluvial aquifers are combined in Figure 4 as "undifferentiated sand and gravel," however; the "Missouri River Alluvium" is identified separately along the northern border of the District. There are three main types of alluvial aquifers and bedrock aquifers. The types and subtypes of the aquifers in the District are listed below:

Alluvial Aquifers

1) paleovalley aquifers that represent buried ancient stream valleys,
2) alluvial aquifers that were deposited in modern and abandoned stream valleys, and
3) isolated smaller scale aquifers of multiple origins.

Bedrock Aquifers

1) Ogallala bedrock,

2) Niobrara bedrock, and
3) Dakota sandstone.

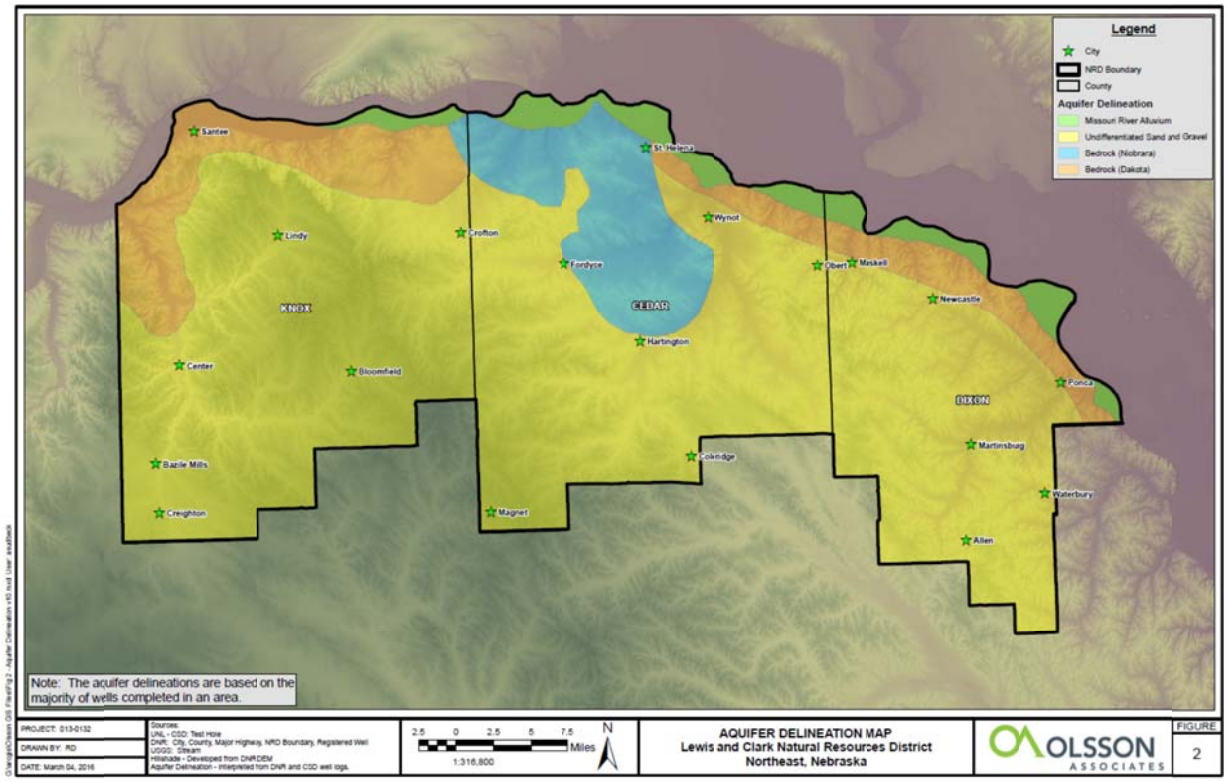

Figure 4: Aquifer delineation map of the District based on the majority of wells completed in the area.

The Ogallala group is present in the south central portion of Knox and Cedar County. Sufficient water for irrigation exists in areas where the Ogallala group consists of saturated sand and sandstone. However, in most cases in northeastern Nebraska, the Ogallala consists primarily of silts and clays with low transmissivity (Dreezen, VH, unpublished report). The Ogallala group is not identified in Figure 4 due to the limited understanding of aquifer extent.

Well development occurs in each of the unconsolidated and bedrock aquifer types. Irrigation well development has historically occurred in sand and gravel aquifers in the areas where there is sufficient formation to allow development and where the lay of the land is such to benefit from irrigation application. In areas where the sand and gravel formations are not significant and the bedrock is at or near the surface, irrigation development has occurred in the Niobrara Bedrock Formation and more recently there has been development in the much deeper buried, Dakota Bedrock Formation. Figure 5 represents the locations and types of registered wells developed across the District. Figure 5 also indicates areas of landowner-reported well interference between groundwater users that occurred in 2012 when the region experienced high water use and reduced aquifer recharge.

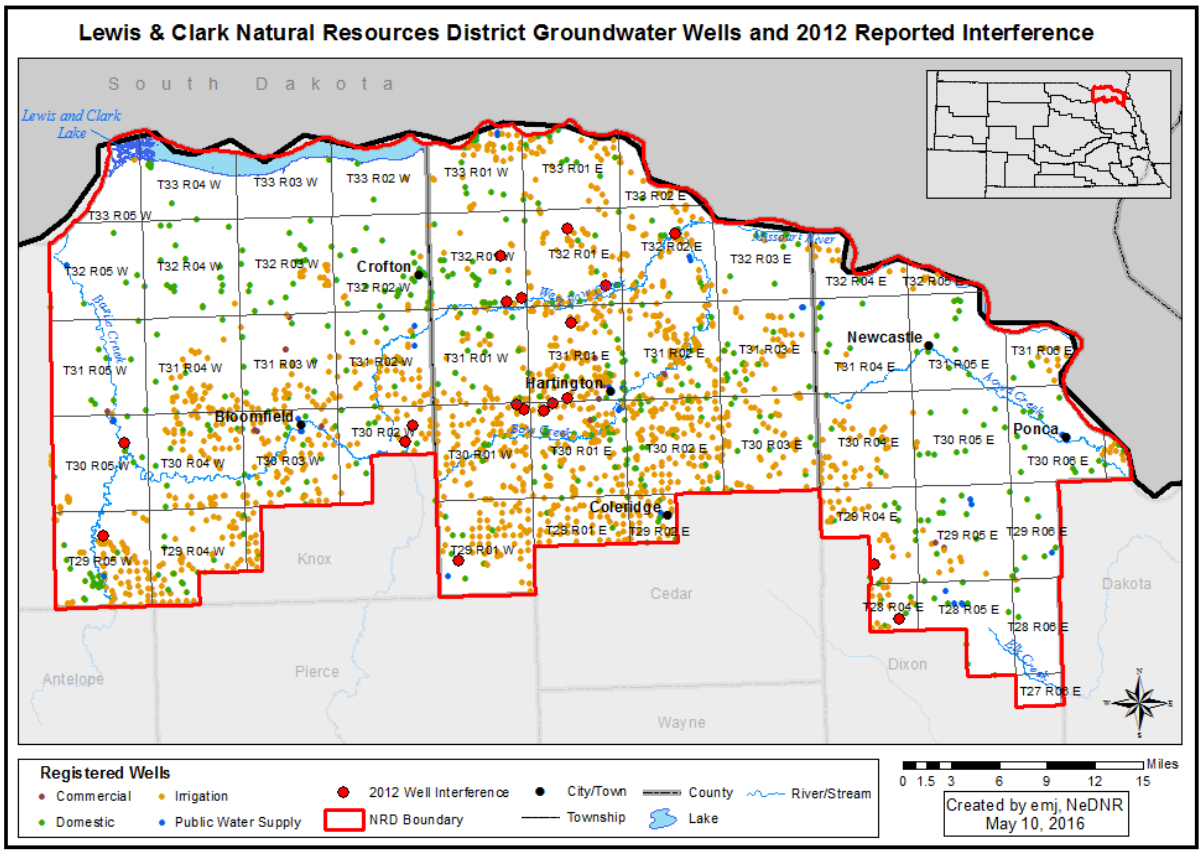

Figure 5: Distribution and types of registered groundwater wells in the District and reports of 2012 groundwater well interference.

Surface water of the District

The majority of the District's surface water sources are made up by the Aowa, Bow, West Bow, and Bazile Creeks. The Missouri River and Lewis and Clark Lake border the District on the north and east sides. Both the river and lake are under the authority of the U.S. Army Corps of Engineers. As such, management of the Missouri River and Lewis and Clark Lake are beyond the scope of this plan.

Surface water permits

The purpose of a surface water permit granted by the Department may be for diversion of water from a naturally flowing source or a reservoir for irrigation of crops, or a permit to store water in an impoundment, also known as a reservoir. There are no organized irrigation districts, canal companies, etc., within the District.

Table 1 provides a breakdown of surface water permits by type, and Figure 6 provides an overview of the location of those permits. There are 108 active irrigation permits that cover 9,527 acres in the District. Of these, 98 allow diversion from a naturally flowing stream (9,283 acres). The remainder allow for irrigation using water from storage, or from both storage and a naturally flowing stream.

Active Surface Water Permits Within the Lewis and Clark NRD as of May, 2016				
Purpose of Permit	**Number of Permits**	**Acres approved for irrigation**	**Permit Holder**	**Acre-feet of water**
(IR) Diversion from naturally flowing source for irrigation	98	9,283	Multiple	
(SI) Diversion from a reservoir for irrigation of land that also is approved to receive water from naturally flowing source	6	(687)	Multiple	
(SO) Diversion only from a reservoir for irrigation	4	244	Multiple	
Total permits for irrigation	**108**			
(ST) Storage of water in reservoir	17		Multiple	1,589
(ST) Storage of water in reservoir	35		LCNRD	2,235
(PW) Public Water Supply	2		LCNRD	
(WS) Livestock Waste Storage	3		Multiple	
Total permits for all surface water	**165**	**9,527**		**3,824**

Table 1: Active surface water permits within the District boundary.

Initially, three public water supply permits existed in the District. One of those three, which was held by the City of Crofton, was no longer in use and was cancelled in full on March 16, 2016. The remaining two active permits are held by the District to divert water from the Missouri River by the Cedar-Knox Rural Water Project (Project). The water is treated at the Devil's Nest Water Treatment Facility for distribution to Project customers. There are three livestock waste control facilities that were permitted prior to a change in the law exempting them from any surface water permitting requirements. Currently, livestock waste facilities are exempt from storage permits by statute *Neb. Rev. Stat.* §46-241.

Currently, there are 52 active storage permits to store a total of 3,825 acre-feet of surface water (one acre-foot of water covers one acre of land at a depth of one foot). The permits range in volume from 0.65 acre-feet to 942 acre-feet. Of the active storage permits, 35 are held by the District, the majority of which are flood control structures located in the Aowa Creek watershed of Dixon County. These 35 permits have a combined storage capacity of 3,228 acre-feet of water, which makes up about 84% of the water stored in reservoirs within the District. The other 17 storage permits are held by various individual holders and constitute about 16% of the water stored in the District, with a combined storage capacity of 598 acre-feet of water.

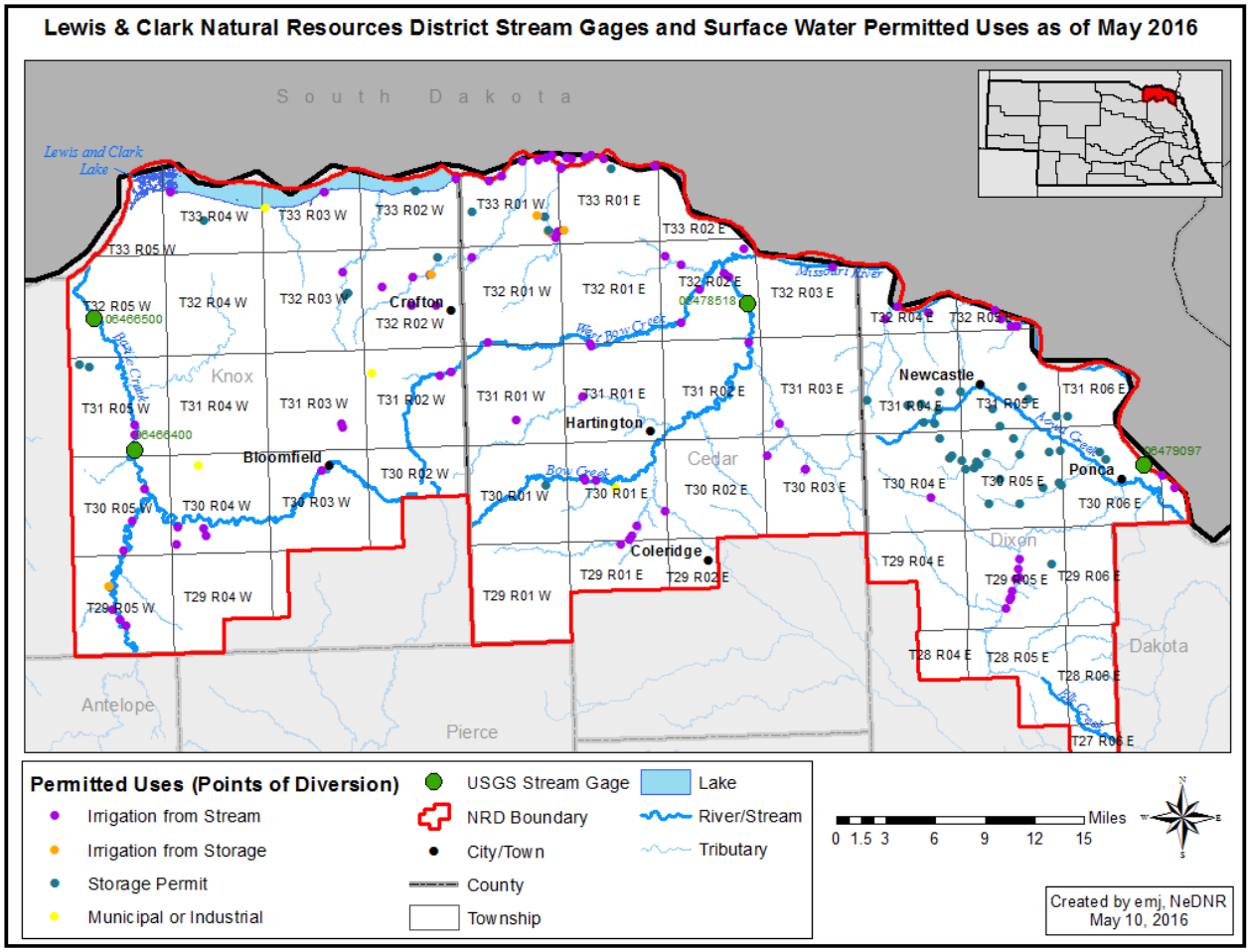

Figure 6: The location of surface water permits and stream gages in the District.

Streamgages

There are currently six stream gages in the District which are all operated by U.S. Geological Survey (USGS)(Table 2 and Figure 6). Five of these gages were actively recording streamflow at the time of the writing of this IMP.

Gage number	Gage Name	Start Year	End Year
06466500	Bazile Creek near Niobrara, NE	1952	Still recording
06466400	Bazile Creek at Center, NE	2003	Still recording
06478522	Bow Creek near Wynot, NE	2015	Still Recording
06478518	Bow Creek near St. James, NE	1979	1993
06479097	Missouri River near Ponca, NE	2006	2007
06478526	Missouri River near Maskell, NE	2008	Still recording
06478523	Missouri River near St. James, NE	2012	Still recording

Table 2: USGS streamgages located within the District boundary.

7. GOALS, OBJECTIVES, ACTION ITEMS, and LONG-TERM STUDIES

The purpose of the integrated management planning process is to maintain and/or attain balance between water uses and water supplies of both surface water and groundwater. Goals, objectives, and action items help achieve the primary purpose of the IMP.

Goals, objectives, and action items

The IMP goals and their supporting objectives and action items will be ongoing and will adhere to an adaptive management framework. The goals and their respective objectives and action items support each other, and considered together over time, are intended to improve data collection, analyses, and decision-making. The goals, objectives, and action items were based on the following concepts:

(1) The **goals** define what the stakeholders, District, and Department wish to accomplish.
(2) The **objectives** break the goals into sub-categories, and where possible, define desired measurable results that can be monitored.
(3) **Action items** describe the specific tasks to be undertaken to reach each objective.

Non-regulatory action items are actions that <u>are not</u> defined by a legal mandate; whereas regulatory action items (controls) <u>are</u> defined by a legal mandate. IMPs and associated regulatory actions, once adopted, cannot be changed without holding a public hearing.

The Stakeholder Advisory Committee, the District, and the Department worked collaboratively to write the goals, objectives, and action items. Tables 3a-3c list the goals, objectives and action items, who will be working on each action item (Department, District, or both), and the schedule for action item reporting. The plan for the reporting and exchange of data associated with specific action items is further discussed in Chapter 8.

Goal 1: Develop and maintain a district-wide water inventory.			
Objective	**Action Item**	**Assigned to**	**Reporting/Exchange**
Objective 1.1: Create and maintain a comprehensive database of ground and surface water information.	**1.1.1** Compile and update information concerning streamflow, surface water uses, and hydrologically connected areas.	**Department**	**Biennially** exchange stream gage data and pump check reports.
	1.1.2 Compile and update information on groundwater levels, groundwater irrigation use, and reported well interference.	**District**	**Biennially** exchange observation/irrigation level, and flow meter reports.
	1.1.3 Inventory impact analyses and/or aquifer testing on new, large groundwater uses and surface water appropriations.	**District & Department**	Report in **biennial** review.
	1.1.4 Continue certification of acres District-wide.	**District**	Exchange certified irrigated acres data **each January.**
	1.1.5 Update hydrographs for groundwater wells monitored.	**District**	**Biennially** exchange results (Department may provide graphics assistance).
Objective 1.2: Address data gaps in the surface and groundwater monitoring network.	**1.2.1** Implement and maintain a voluntary water use reporting system for surface water users.	**Department**	**Annually** report on information received.
	1.2.2 Evaluate the need for new stream or well level gages, and the best locations for these.	**District & Department**	New gages will be added to reports in Objective 1.1.
	1.2.3 Expand knowledge of groundwater inventory by filling in the hydrogeologic framework with additional test holes and observation wells for monitoring in areas where deemed appropriate by CSD.	**District & Department**	Incorporate new information into test hole and observation wells reporting.
	1.2.4 Increase the number of monitoring wells in the Dakota and Niobrara Aquifer systems.	**District**	
	1.2.5 Develop additional observation wells in areas that lack adequate data to follow the trends of groundwater levels.	**District**	
Objective 1.3: Improve delineations of hydrologically connected areal extents.	**1.3.1** Develop groundwater models for Eastern Nebraska to further understanding of hydrologically connected areas.	**Department**	**Biennially** report progress or provide model.
	1.3.2 Assess benefits/limitations of using remotely accessed electromagnetic data to aid interpretation of hydrologically connected areas.	**Department**	**Biennially** report progress.

Table 3a: Goal 1.

Goal 2: Protect existing water uses while allowing for future water development.			
Objective	**Action Item**	**Assigned To**	**Reporting/Exchange**
Objective 2.1: Collaborate with local, state, and federal entities to better manage hydrologically connected ground and surface water.	**2.1.1** Stay up-to-date on USFWS, USACE and NPS water management efforts that may affect the District and to facilitate compliance with state and federal laws.	**Department**	Report pertinent changes as needed and summarize in **biennial** review.
	2.1.2 As hydrologically connected areas are refined, coordinate management efforts with affected local entities as needed.	**District**	Report progress in **biennial** review.
	2.1.3 Collaborate with UNL, NRCS, others to identify areas in the District where the potential for groundwater recharge has changed and why.	**District**	Report progress in **biennial** review.
Objective 2.2: Maintain and increase knowledge about activities along the Missouri River.	**2.2.1** Continued Department participation in MRRIC as long as Nebraska remains a participating member.	**Department**	Report on coordination efforts in **biennial** review.
	2.2.2 Coordination to disseminate pertinent information to the District regarding activities along the Missouri River.	**Department**	
	2.2.3 Continued monitoring of USACE potential to charge for surface water use from storage in Lewis and Clark Lake.	**Department**	
Objective 2.3: Improve water resource sustainability through innovative management strategies.	**2.3.1** Consider establishing different requirements for groundwater wells drilled before the designation of a management area and those drilled afterward.	**District**	Report progress in **biennial** review.
	2.3.2 Develop alternative scenarios in the Department's groundwater model to evaluate potential changes in land use or management (e.g. model how cancelled surface water permits impact the water balance).	**Department**	Report progress in **biennial** review.
	2.3.3 Explore methods to minimize water use conflicts (surface or groundwater).	**District & Department**	Report progress in **biennial** review.

Table 3b: Goal 2.

Goal 3: Increase public awareness and understanding of integrated water management.			
Objective	**Action Item**	**Assigned To**	**Reporting/ Exchange**
Objective 3.1: Expand public outreach programs for ground and surface water.	**3.1.1** Increase news releases regarding groundwater conditions and activities.	**District**	Provide list of articles in **biennial** review.
	3.1.2 Create new educational/informational handouts about groundwater and surface water (well/surface water permitting, trends in surface water and groundwater levels, etc.)	**District & Department**	Provide list of handouts at **biennial** review.
Objective 3.2: Expand public outreach programs related to integrated water management.	**3.2.1** Disseminate information through the District website about federal activities on the Missouri River with respect to groundwater and surface water supply in the District.	**District & Department**	Exchange list of documents created in **biennial** review.
	3.2.2 Develop informational materials about Integrated Water Management, and as needed, other ground and/or surface water related topics affecting the District.	**District & Department**	Exchange list of documents created in **biennial** review.
	3.2.3 Jointly participate in public outreach events related to integrated water management.	**District & Department**	Report on **biennially**.

Table 3c: Goal 3.

Long-term studies and goals

The District and the Department held several coordination meetings following the stakeholder process to determine the feasibility (funding, staff time, etc.) of the proposed goals, objectives, and action items. The meetings also helped determine whether the proposed actions of the IMP could be realistically accomplished as a part of IMP implementation. Some goals and action items were determined not to be feasible at this time, and thus, were set apart for long term implementation, to be worked on as time and funding allows.

These long term studies and goals are listed in Table 4. It is important to note that the implementation of these goals/studies would be supportive of the IMP purpose. Thus, the feasibility of incorporating these into the goals and objectives in future revisions of the IMP will be considered at each biennial review, and as new data and methodologies that support their addition become available.

Long-term studies and goals.			
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** Evaluate potential for a tile drainage study based upon review of existing data and funding.	**District**	Discuss feasibility of adding these action items to the IMP at **biennial** meeting.
	1.1.2 Seek voluntary data from landowners pertaining to tile drain locations.	**District**	
	1.1.3 Evaluate potential to develop modeling scenarios that predict the impact of tile drainage on streamflow and recharge.	**District & Department**	
Long-term Goal 1.2: Develop programs and or guidelines to encourage water conservation for municipal agricultural, and industrial applications.	**1.2.1** Develop homeowner/resident incentive programs to encourage water conservation.	**District**	
	1.2.2 Encourage municipalities and industrial users to develop water conservation plans.	**District**	
	1.2.3 Consider incentive or cost-share programs to promote water conservation in agricultural practices.	**District**	

Table 4: Long-term goals and studies.

8. REGULATORY ACTION ITEMS

The regulatory actions (controls) included in this IMP are considered to be consistent with the goals and objectives presented above. The groundwater controls authorized for adoption by the District are set forth in *Neb. Rev. Stat.* § 46-739; the surface water controls authorized for adoption by the Department are in *Neb. Rev. Stat.* § 46-716 of the Ground Water Management and Protection Act.

Groundwater regulatory action for integrated water management

The District will mandate education requirements for new industrial and agricultural groundwater permits.

Surface water regulatory action for integrated water management

The Department will mandate education requirements for new industrial and agricultural surface water permits.

District Rules and Regulations - Actions for groundwater management

Several regulatory actions are already in place as a result of the District's Rules and Regulations for Groundwater Quantity Management Areas. These regulatory actions may be found in Chapters 5 and 11-18 of the District's Rules and Regulations (a copy of this may be obtained by visiting the District's website or by contacting the District office). At the time of this writing, the Rules and Regulations had last been updated in 2015.

Additional groundwater regulation is not planned at this time under the District's Rules and Regulations. However, if there is ever a need to further regulate groundwater, the District would utilize authorities identified in *Neb. Rev. Stat.* §46-739 as a means to protect existing uses. Any new

regulatory measures would have to be implemented by order, and would require a public hearing for the public to provide testimony.

9. MONITORING PLAN

The overall objective of the monitoring plan is to gather and evaluate data, information, and methodologies that could be used to accomplish the purpose of this IMP. The District and the Department have agreed to complete the following actions set forth in this monitoring plan as required by *Neb. Rev. Stat.* § 46-715(2)(e):

(1) annually track and report water use activities within the District (also pursuant to *Neb. Rev. Stat.* § 46-715(3)(d)),
(2) increase understanding of the hydrologically connected surface and groundwater within the District, and
(3) test the validity of the information and conclusions upon which this IMP is based.

Track and report water uses

To the extent feasible, the District will be responsible for collecting, tracking, evaluating, and reporting on the number, location, amount, and timing of the following water use activities:

(a) groundwater level measurements,
(b) certification of groundwater uses and any changes to these certifications,
(c) municipal, commercial, and industrial annual water uses,
(d) irrigation water use data required mandatorily or voluntarily by the District, such as metered high capacity well flow data,
(e) water well construction permits issued,
(f) the number of well permits denied,
(g) variances granted by the District and/or the Department that allow an action contrary to an existing rule or regulation, including the purpose, the location, the length of time for which the variance is applicable, and the reasoning behind approval of the variance,
(h) transfer permits granted by the District and/or the Department allowing the point of withdrawal, location of use, type of use, addition of a type of use, or location of certified irrigated acres to be altered, including all information provided with the application and used in the approval of the transfer.

The Department will be responsible for collecting, tracking, evaluating, and reporting the following activities:

(a) The Department will continue any existing stream gaging in the District and look for new opportunities to enhance the stream gage network.
(b) The Department will continue to administer surface water rights according to State law and monitor use of surface water to make sure that unauthorized irrigation is not occurring.
(c) The Department will continue to map and track surface water irrigated acres. The Department will also continue to require that project maps are submitted and approved prior to obtaining a surface water permit.

(d) The Department will implement a voluntary reporting program for surface water irrigation permit holders in the District aimed at identifying the quantity of water pumped, the acres irrigated, and the type of irrigation system used.
(e) The Department will continue to evaluate the necessity for mandatory installation of water flow meters on all surface water pumps for irrigation, industrial, and municipal uses.
(f) The Department will continue to implement rules pertaining to transfers of surface water rights–according to *Neb. Rev. Stat.* §§ 46-290 to 46-294.04. Should a moratorium be placed on new surface water appropriations in the District, the Department may grant a variance from the moratorium on a case-by-case basis, following the Department rules and regulations.
(g) The Department has developed a methodology, in conjunction with several NRDs across the state, to quantitatively assess the hydrologically connected groundwater and surface water of the State for use in the Annual Evaluation of Hydrologically Connected Water Supplies. This methodology will be used to monitor the balance of water supplies within the IMP Area. This methodology will be updated with the best available data and analysis as provided by the District and the Department.

The District and the Department will jointly evaluate the data and information gathered for accuracy, identify data anomalies and probable causes for them, and flag data and information that may require closer inspection and review. In addition, the District and the Department will compare annual water use data to historically reported water use data and information, and perform analyses to determine the impacts of new water uses on existing water users within the District.

Increase understanding of hydrologically connected surface and groundwater

Objective 1.3 provides a framework for District and Department work regarding determination of hydrologically connected area(s) of the District. At the time of this writing, the Department is developing a groundwater model for Eastern Nebraska which includes the District's IMP area. The model will be calibrated with sufficient spatial and temporal variability to assess the depletions and gains to baseflow annually, and define areas of hydrologic connectivity.

Once developed, the Department will periodically update the model as new data and information become available. If there are updates to the hydrologically connected area, the Department will convey these results to the District as soon as the data become available. Model progress on these ongoing studies will also be reported at the biennial review.

10. FUNDING OPTIONS

Many of the identified goals, objectives, and action items will be implemented utilizing existing staff time and funding sources. There will be occasions when alternative funding sources will be necessary to move forward with identified action items in either the primary or long-term goals. Some of the potential funding sources available to the District and Department follow:

Occupation tax

The District has the ability to implement an occupation tax, following proper protocol and hearings for implementation. An occupation tax would only be implemented if other options available to the District are not sufficient to remedy the problem(s).

Water Sustainability Fund

The Water Sustainability Fund is a source of financial support to help the State achieve the goals set forth in *Neb. Rev. Stat.* § 2-1506, Rules (Title 261) adopted by the Nebraska Natural Resources Commission. One goal of the Water Sustainability Fund is to promote the goals and objectives of approved integrated management plans or ground water management plans. As such, the District may apply for funds when a suitable project or study is identified.

Nebraska Environmental Trust

Annual grants are awarded by the Nebraska Environmental Trust (NET) which is funded by profits from the Nebraska Lottery and are used to fund projects related to environmental concerns, including surface water and groundwater. The District and/or Department will apply for NET funds when a suitable project or study is identified.

Other funding sources

Other funding sources may become available to the District or Department at any given time. When appropriate and feasible, those sources will be utilized to make progress on action items identified in the IMP.

11. INFORMATION CONSIDERED IN PREPARING THIS IMP

Information used in the preparation of this IMP and to be used in the subsequent implementation of this IMP, can be found in the following: Nebraska Ground Water Management and Protection Act; the District's Ground Water Management Plan; the District's Rules and Regulations, the Department's Rules for Surface Water, U.S. Geologic Survey stream gage records, the District's well interference records, the Department's registered wells database, the Department's surface water administrative records, the Department's Lower Platte Missouri Tributaries groundwater model (currently in development), the District's observation well network records, as well as additional data acquired by either the Department or the District and additional data on file with the District and Department.

12. REVIEW PROCESS AND MODIFICATIONS TO THE INTEGRATED MANAGEMENT PLAN

The IMP implementation utilizes an adaptive management approach. Thus, it is a work in progress for attaining or maintaining the desired balance of the hydrologic system. As an affected area or subarea of the District changes or more data become available, the IMP implementation may be reassessed and modified to accommodate changing circumstances such as hydrology, economics, water demands, and supplies.

The District and Department will hold a biennial review to evaluate the IMP. Stakeholders will be invited to the biennial review. Action items undertaken by the District and Department will be reviewed to determine if these items are fulfilling the goals and objectives of the IMP. The District and Department will jointly determine if amendments to the IMP are necessary. Amendments to the IMP will require an agreement by both parties and may require reconvening the Stakeholder Advisory Committee. If amendments to the IMP are necessary the District and Department will hold a joint hearing and issue the pertinent orders to formally adopt the revised IMP.

APPENDIX A: IMP LETTERS OF INTENT

LEWIS & CLARK NRD NATURAL RESOURCES DISTRICT

Protecting Lives, Protecting Property, Protecting our Future

608 N ROBINSON AVE
PO BOX 518
HARTINGTON NE 68739-0518
PHONE (402) 254-6758
FAX (402) 254-6759

March 4, 2013

Jesse Bradley
Nebraska Dept of Natural Resources
301 Centennial Mall South, 4th Floor
Lincoln NE 68509-4676

Dear Jesse:

This letter is to advise the Nebraska Dept. of Natural Resources that the Lewis and Clark Natural Resources District would like to go on record as requesting to work with DNR to develop a voluntary Integrated Management Plan.

Board action taken February 28, 2013 authorized this request and I have already talked to Brandi Flyr on it. We will also be drafting an amendment to our Groundwater Management Plan to more fully respond to groundwater quantity issues that will require well permits across the entire District.

Please advise us on the proper follow up regarding these issues so we can begin the steps necessary over the next few months.

Sincerely,

Tom Moser

Tom Moser
General Manager

cc: Gary Howey, Chairman
Jeff Steffen, NRC

Dave Heineman
Governor

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
Brian P. Dunnigan, P.E.
Director

March 18, 2013

IN REPLY TO:

RECEIVED
MAR 20 2013
LEWIS & CLARK NRD

Ron Wortmann, Chair
Lewis & Clark Natural Resources District
608 North Robinson Avenue
P.O. Box 518
Hartington, NE 68739-0518

Dear Mr. Wortmann:

The Nebraska Department of Natural Resources (Department) is pleased to receive the Lewis and Clark Natural Resources District's (District) March 4, 2013, letter stating the District's intent to develop a voluntary integrated management plan (IMP), pursuant to *Neb. Rev. Stat.* § 46-715 (1)(b). Department staff will be contacting your District to discuss details and the next steps in the integrated management planning process.

The Department looks forward to developing the IMP with the District, in addition to furthering the effective working relationship between the District and the Department.

Sincerely,

Brian P. Dunnigan

Brian P. Dunnigan, P.E.
Director

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APPENDIX B: PUBLIC INVOLVEMENT SUMMARY REPORT

The public involvement process for the Lewis and Clark Natural Resources District (District) Integrated Management Plan (IMP) development process was designed to encompass broad stakeholder values, interests, future needs and priorities, and raise awareness to encourage broad community support for water management within the basin. The public involvement process was guided by the principles outlined in the International Association for Public Participation's Spectrum of Public Participation. This document summarizes public involvement efforts during the development process.

Stakeholder Advisory Committee:

In developing the IMP for the Lewis and Clark basin, the District worked collaboratively with the Nebraska Department of Natural Resources (Department) and a Stakeholder Advisory Committee to meet the requirements of the IMP set forth by the Department. The Stakeholder Advisory Committee was formed through local solicitations and nominations. The District submitted a news release in September 2014 to several area newspapers and the Nebraska Farmer magazine seeking interested persons to serve on the Advisory Committee. In addition, the District sent out letters to seven individuals who were nominated as potential members of the Advisory Committee through District contacts. Nine interested individuals contacted the District and were appointed to the Stakeholder Advisory Committee. The nine-member Stakeholder Advisory Committee included diverse representation from agriculture, well drillers, public power producers, industry/business, recreation, environmental groups, and educators.

The Stakeholder Advisory Committee served at the request and direction of the IMP Subcommittee and was charged with the task of gathering information related to surface and groundwater management, providing thoughtful and informed input, and helping educate and engage other stakeholders in the IMP planning process.

The District and the Department planned three Stakeholder Advisory Committee meetings for 2015, so that the committee would have several opportunities to provide input on goals, objectives, and the overall plan development. These meetings were held on February 23, 2015; March 18, 2015; and June 8, 2015. At each meeting, issues, goals, objectives, and/or action items were discussed, modified, and written according to stakeholder interests. At the June 8 meeting, the stakeholders enthusiastically indicated they would like to hold an additional meeting to further discuss IMP components, and as such, a fourth stakeholder meeting was held on November 9, 2015. A summary of the meetings follow:

Meeting 1: February 23, 2015

The first stakeholder meeting occurred on February 23, 2015. Eight of the nine stakeholders and two members of the public were in attendance. The focus of this first meeting was on exchanging background information and beginning to identify and discuss local water issues. The District began by welcoming stakeholders and giving a brief overview of the role of stakeholders in the integrated management planning process, focusing on the need for local input to help guide plan details. During this introduction, a cross section of geological formations and maps of appropriations and depth to bedrock were distributed and explained. Then the Department gave a presentation describing IMPs. This presentation included details about the purpose of integrated management planning, described the roles of the Department, the District, and stakeholders in the process, and outlined the components of an IMP.

Following this introduction, stakeholders identified and discussed water issues within the District. The issues identified addressed the following topics: collaboration with outside entities such as the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, municipalities, and other states; collection of streamflow data and identification of potential areas of surface water–groundwater connection; identification of the potential impacts and existing extent of tiling; improvement the spatial distribution of existing water data for the District and the overall lack of data; understanding of domestic and irrigation well interference; exploration of education and outreach needs and potential methods for distributing information; and consideration of recreation. At the meeting's conclusion, the District and the Department distributed a list of preliminary ideas for goals and objectives for the plan. Stakeholders were asked come to the second stakeholder meeting prepared to discuss this list of ideas.

Meeting 2: March 18, 2015

The second Stakeholder Advisory Committee meeting occurred on March 18, 2015. All nine stakeholders and two members of the public were in attendance. This second meeting focused on goals and objectives for the plan. To begin the discussion of goals and objectives, the Department reviewed some of the background information on IMPs that they had presented at the previous meeting and gave an overview of IMP requirements, including goals, objectives, and controls. The key terms "goals," "objectives," and "action items" were defined and distinguished from one another.

Between the first and second stakeholder meetings, the Department and the District developed draft goals and objectives in response to the input provided by stakeholders at the first meeting. At this second stakeholder meeting, stakeholders first reviewed the draft's overarching goals and agreed that they captured what had been discussed at the first stakeholder meetings. They then proceeded to discuss individual goals. Stakeholders provided ideas and information related to stream gages, tile drainage systems, a groundwater use inventory, the Missouri River Recovery Implementation Committee, access to surface water stored by the U.S. Army Corps of Engineers, education and outreach, and recreation. Because recreation on the Missouri River is beyond the authority of the Department and the District, it was decided to remove recreation from the list of draft goals.

Meeting 3: June 8, 2015

The third Stakeholder Advisory Committee meeting was held on June 8th, 2015 at the District office. At the meeting, six of the nine stakeholders and two members of the public reviewed and provided input on the goals and objectives of the IMP. The educational component of the third meeting focused on the Missouri River Recovery Implementation Committee (MRRIC). Shuhai Zheng from the Department provided a general overview of MRRIC and current projects that MRRIC members were working on. Because the activities of MRRIC may impact water users within the District, one of the objectives in the IMP is for the

Department to share information with the District about MRRIC meetings and potential actions, as long as the Department participates as a MRRIC member.

Following Zheng's MRRIC presentation, the meeting participants reviewed the IMP goals and objectives, which had been revised by the District and the Department at an April 2015 coordination meeting. While considering how the components of the IMP would contribute to current and future management priorities, the stakeholders provided valuable information about why the goals and objectives were important to water users within the District. The stakeholders described how data derived from collaborative efforts directed by the goals and objectives to monitor, collect, and analyze water use could benefit water users in their everyday water management efforts. In addition, all meeting participants contributed to a useful discussion about the feasibility of implementing many of the action items intended to support the goals and objectives. At the conclusion of the meeting, the group decided to discuss potential controls and the goals and objectives of the education and outreach component of the IMP at the fourth stakeholder meeting.

Meeting 4: November 9, 2015

The fourth Stakeholder Advisory Committee meeting was held on November 9th, 2015 at the District office. Five of the nine stakeholders and two members of the public met to review revisions of the IMP goals and objectives and to consider potential controls to be included in the IMP. The educational component of the fourth meeting consisted of a presentation from Sue Lackey, a hydrogeologist with the University of Nebraska's (UNL's) Conservation and Survey Division. Lackey discussed recent geological studies investigating the hydrogeology of northeast Nebraska and how data from a regional observation well network will be correlated with other analyses in order to provide a better understanding of the area's subsurface geology.

After Lackey's presentation, the stakeholders, the District, and the Department reviewed how input from the third stakeholder meeting was incorporated into the IMP's goals and objectives, including the addition of a Long Term Studies and Goals section. This section outlined projects for which there may currently be a lack of time and funding resources, but that the District and the Department would like to review for feasibility on regular basis. The meeting participants also discussed possible management controls to be included in the IMP and potential funding options. In order to ensure that water users within the District will be fully aware of the IMP's various components, the stakeholders decided that a public informational meeting should be held prior to the required public hearing. The group agreed that the public informational meeting and public hearing would be scheduled after the Department and the District distribute a final draft of the IMP for the stakeholders to review, ask questions about, and comment on.

Public meeting: July 6, 2016

A public informational hearing was held on July 6, 2016. There were representatives of the public, the stakeholder advisory committee and the District's board at the meeting. Annette Sudbeck (District) and Amy Zoller (Department) delivered a power point presentation outlining the IMP. Copies of the IMP were made available to the attendees.

Public hearing: July 28, 2016

A joint public hearing was held in Hartington on July 28, 2016 to accept testimony regarding the IMP. Public notices for the hearing had been distributed in local papers and the Omaha World Herald on July 6, July13 and July 20. There was no testimony regarding the IMP; however, there were some questions about the IMP that were addressed immediately following the hearing.