



INTEGRATED MANAGEMENT PLAN

Jointly Developed by the Lower Big Blue
Natural Resources District and the Nebraska
Department of Natural Resources

April 2022



Table of Contents

1	Authority and Effective Date	3
2	Purpose	3
3	Background	3
3.1	Natural Resource Districts, Nebraska Department of Natural Resources, and Water Management in Nebraska	3
3.2	Integrated Management Plans	4
3.3	Voluntary Integrated Management Plans	5
3.4	Big Blue River Compact	6
4	Description of Lower Big Blue Natural Resources District	6
4.1	Surface Water Features	7
4.2	Ground Water Aquifers	8
5	Integrated Management Planning Process	8
6	Stakeholder and Public Involvement	10
7	Goals, Objectives, and Action Items	12
8	Geographic Extent of Control Areas	14
9	Controls	17
9.1	Groundwater Controls	17
9.2	Surface Water Controls	17
10	Incentive Programs	17
11	Funding Options	18
11.1	Federal Funding Options	18
11.2	State Funding Options	18
11.3	Local Funding Options	19
12	Monitoring Plan	19
12.1	Tracking and Reporting Water Uses	20
12.2	Increase Understanding of Hydrologically Connected Groundwater	21
13	Modifications to the Integrated Management Plan	21

List of Figures

- Figure 1 Groundwater Control Area
Figure 2 Surface Water Control Areas

List of Appendices

- Appendix A Letters Initiating the Voluntary IMP Process
- Appendix B Glossary of Terms
- Appendix C Stakeholder Advisory Committee

1 Authority and Effective Date

This Voluntary Integrated Management Plan (VIMP) was prepared voluntarily by the staff and Board of Directors of the Lower Big Blue Natural Resources District (District) and the Nebraska Department of Natural Resources (Department) in consultation with the District Stakeholder Advisory Committee (SAC) and in accordance with the Nebraska Groundwater 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 Nebraska Revised Statutes (*Neb. Rev. Stat.*) §46-715(1)(b), §46-715 to 46-717, and subsections (1) and (2) of §46-718.

The letters initiating the VIMP process are included in **Appendix A**. This VIMP was adopted by the District on February 17, 2022, and by the Department on March 14, 2022. The effective date of this VIMP is April 6, 2022.

2 Purpose

The District, in collaboration with the Department, developed this VIMP to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare can be achieved and maintained in the District for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users. Should the Department subsequently determine an affected river basin, subbasin, or reach within the District to be fully appropriated, the Department and District may amend this VIMP.

3 Background

3.1 Natural Resource Districts, Nebraska Department of Natural Resources, and Water Management in Nebraska

In 1969, the Nebraska Legislature passed LB 1357 that combined 154 special purpose entities into what are now 23 natural resources districts (NRDs) in 1972. Unique to Nebraska, NRDs are local government entities, governed by an elected board of directors, with broad responsibilities to protect Nebraska's natural resources. NRD boundaries generally follow major river basins, enabling local districts to respond best to local needs.

NRDs are charged with 12 areas of responsibility, including:

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
12. Solid waste management

In particular, NRDs are responsible for the planning, monitoring, and regulation of groundwater in their districts, while the Department, a state entity, manages and regulates surface waters within the state.

The Department has been in existence since July 1, 2000, when two existing state agencies were merged: the Department of Water Resources and the Nebraska Natural Resources Commission. Since 2000, 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 Department also administers several state funds used to help conserve, protect, and develop Nebraska's natural resources (Department Newsletter, Issue 1, winter 2000). After the passing of Legislative Bill (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 hydrology.

The beneficial use of groundwater and surface water in the state of Nebraska is governed by two discrete laws: (1) the common law concept of correlative rights for groundwater, and (2) the prior appropriation doctrine for surface water. The correlative rights rule allows owners to drill wells and extract groundwater from an underlying aquifer for reasonable and beneficial purposes, subject to management by the public. To execute this right, landowners must first obtain a permit to drill a well from their local NRD. Within the District, if approved, the well permit allows the landowner to drill and extract as much groundwater as needed, subject to NRD limitations in place, as long as the use is deemed beneficial. When construction is completed, the well permit is registered with the Department, which places the information in a statewide database. The correlative groundwater rights rule is essentially a "share and share alike" system. Under the prior appropriation doctrine, surface waters of the state are allowed to be diverted based on the date that the application was filed with the Department. Surface water rights entitle landowners or organizations to remove a set amount of water from a specific location, along with other specific terms and conditions. During periods when the overall water supply is insufficient to meet all appropriated water rights, this system protects those who received their water rights first. Thus, the water right for the same use, with the earliest date (or senior priority) is entitled to their full appropriation before a later (or junior) priority date water right receives any water.

3.2 Integrated Management Plans

LB 962 allows the Department and the NRDs to work together to manage groundwater and surface water as a hydrologically connected resource under integrated management plans. With the increasing demand on water resources, it is necessary to recognize the importance of hydrologically connected groundwater and surface water and the difficulties entailed in the management thereof, because of their

properties, distribution, and the interconnection between surface water and the underlying groundwater aquifers.

Under LB 962, an integrated management plan must be developed if the Department determines that a river basin, subbasin, or reach is fully appropriated. Statute defines a fully appropriated condition as follows:

A river basin, subbasin, or reach shall be deemed fully appropriated if the [D]epartment determines [...] that [current] uses of hydrologically connected surface water and ground water in the river basin, subbasin, or reach cause or will in the reasonably foreseeable future cause (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. (*Neb. Rev. Stat. §46-713(3)*)

3.3 Voluntary Integrated Management Plans

LB 764, enacted in 2010 and codified at *Neb. Rev. Stat. § 46-715(1)[b]*, authorized NRDs to voluntarily develop an integrated management plan with the Department to jointly manage groundwater and surface water uses and supplies in areas that have not been designated as fully appropriated. The process is initiated when the District notifies the Department of its intention to develop a VIMP. The objective of a VIMP is to manage the river basins, subbasins, or reaches within the District to attain and/or sustain a desired balance between water uses and water supplies for the long term, while protecting existing users.

The NRDs' authorities focus on groundwater management; the Department administers surface water rights and may issue Groundwater Municipal and Industrial transfer permits. With the increasing demand on water resources, it is necessary to realize the importance and use of hydrologically connected groundwater and surface water. Groundwater and surface water have an intricate relationship, which can be difficult to manage.

Although there is no official determination by the Department that any area of the District is fully appropriated, the District is continuing to be proactive in water management and is voluntarily developing this plan jointly with the Department, in part to reduce the potential that the District be designated as fully appropriated in the future. This VIMP is intended to meet many of the requirements of an integrated management plan required if the District, or part of the District, is determined to be fully appropriated by the Department. If a District develops a VIMP and the Department subsequently determines the affected river basin, subbasin, or reach to be fully appropriated, the Department and the affected NRD may amend the VIMP.

3.4 Big Blue River Compact

The District and Department participate in the Big Blue River Compact, which the States of Nebraska and Kansas entered in 1971. The major purposes of the Compact are (from *Neb. Rev. Stat. § 1-115*):

1. To promote interstate comity between the States of Nebraska and Kansas;
2. To achieve an equitable apportionment of the waters of the Big Blue River Basin and to promote orderly development thereof; and
3. To encourage continuation of the active pollution-abatement programs in each of the two States and to seek further reduction in both natural and man-made pollution of the waters of the Big Blue River Basin.

The Big Blue River Compact Administration (Administration) is made up of one Commissioner each from Nebraska (the Director of the Department of Natural Resources) and Kansas, and a Federal member designated by the President of the United States. The Administration holds an annual meeting each May to report on each State's activities pertaining to the Big Blue River Basin and its tributaries, and an annual report is assembled and published to commemorate each meeting. The District and the Blue Basin NRDs provide reports for their respective districts that are incorporated into the Nebraska report. A representative from the Department of Environment and Energy also participates in the annual meeting to report on the water quality in the Basin. It is interesting to note that the Blue River Compact was the first interstate water related Compact in the United States to address both water quality and water quantity.

As part of equitable apportionment of the Blue River Basin waters between Kansas and Nebraska, surface water users in the Basin are subject to terms of water administration that are specified in the Compact. To meet Compact compliance, the Department is required to regulate diversions of the surface water during the period of May 1 to September 30. The Compact specifies flow requirements at the Administration's stream gage near the Nebraska-Kansas state line for each specific month. If flows are insufficient to meet Compact requirements, the Department is responsible for closing natural flow surface water users that are junior to (newer than) November 1, 1968. In these times of shortage, surface water users that are senior to (older than) November 1, 1968 are also closely monitored to ensure the water diverted is within the allocated amounts of surface water appropriations. Water in storage, regardless of priority, is also monitored, as there are no increases allowed in reservoir storage during times of shortages. The Compact also specifies that groundwater irrigators within the District junior to (newer than) November 1, 1968 are regulated in the same manner as surface water users in the Big Blue River Basin from the mouth of Turkey Creek to the Kansas state line. Only those wells within one mile of the Big Blue River are regulated.

4 Description of Lower Big Blue Natural Resources District

The District is located in southeast Nebraska, adjoining Kansas in the lower portion of the Big Blue River Basin. The District encompasses parts of Saline, Jefferson, Gage, and Pawnee Counties. The

District covers 1,644 square miles and has a population of 36,964 in 27 communities. The largest cities within the District are Beatrice (population 12,300) and Crete (population 7,043).

Agriculture is the principal enterprise within the District, with row crop as the predominant land use and corn and soybeans being the primary cash grain crops. Groundwater is the primary source of water for irrigation, drinking water, and industrial uses. There are surface water appropriations for use of the Big Blue River and its tributaries, predominately for crop irrigation.

The District topography is characterized by flat plains in the headwaters, dissected tablelands with relatively narrow mainstream channels in the middle portions, and both dissected plains and gently rolling hills in the lower portion of the basin. The majority of the District lies within the Dissected Till Plains Section of the Central Lowland Province, with the far northwest portion of the District in the High Plains Section of the Great Plains Province. The High Plains Section is characterized by loess plains overlying fluvial sand and gravel deposits. The Dissected Till Plains Section is characterized by dissected deposits of loess-mantled glacial till and fluvial deposits of clay, gravel, sand, and silt that overlie bedrock.

4.1 Surface Water Features

The Big Blue River is the predominant stream in the basin, entering at the north extent of the District near Crete. It passes east of Wilber, just southwest of Beatrice, east of Blue Springs and Wymore, and eventually exits the southern extent of the District at the Nebraska-Kansas border.

Turkey Creek enters along the western boundary of the District and flows easterly through the northwest portion of the District. It makes a southward turn passing west of Wilber, then southwest of De Witt before its confluence with the Big Blue River.

At the western extent of the District are the headwaters of Swan Creek in Saline County. Formed by the North Fork and South Fork, these streams converge west of Swanton to form Swan Creek, which is a tributary to Turkey Creek just west of De Witt.

Also, along the western extent of the District are the headwaters of Cub Creek, just north of Fairbury, and Big Indian Creek near Jansen. Cub Creek flows generally east, converging with the Lower Big Blue River west of Beatrice. Big Indian Creek flows southeasterly towards Odell and then shifts northeasterly bypassing along the south side of Wymore where it converges with the Big Blue River.

The headwaters of Indian Creek are located on the northeast boundary of the District. Indian Creek flows south bypassing east of Pickrell and meanders through the north side of Beatrice. The confluence with the Lower Big Blue River is just upstream of the Court Street bridge.

The headwaters of Bear Creek, Cedar Creek, and Mud Creek are located along the east boundary of the District and flow generally southwesterly. Bear and Cedar Creeks converge with the Lower Big Blue River southeast of Beatrice and the confluence of Mud Creek with the Lower Big Blue River is north of Blue Springs.

The headwaters of Wolf-Wildcat Creek, Plum Creek, and Mission Creek are located along the southeast boundary of the District. Wolf-Wildcat and Plum Creeks flow southwesterly and converge

with the Lower Big Blue north and south of Barneston, respectively. Mission Creek flows west, with a portion meandering outside the District boundary into northern Kansas and then returns just before its confluence with the Lower Big Blue at the southern boundary. Figure 2 illustrates the surface water features within the basin.

With over 270 dams constructed primarily for flood control within 12 completed watershed planning areas, the District is considered the Watershed Capital of Nebraska.

4.2 Ground Water Aquifers

The District has two primary aquifer types that provide significant quantities of water. The first type of aquifer is the alluvial aquifers found in both recent and historic stream valleys within the District. These aquifers consist of sand and gravel deposits with high permeability and generally have excellent water production capability. The second type of aquifer present in the District is the Dakota bedrock aquifer, which is stratigraphically below the alluvial aquifers, and underlies the majority of Nebraska. The Dakota formation is a sandstone aquifer with typically lower water production capability than the alluvial aquifers and occasionally can have water quality issues with total dissolved solids being above secondary drinking water standards.

The majority of groundwater wells within the District are completed within the alluvial valley aquifers, with well development in the Dakota aquifer primarily occurring in the southwestern portion of the District where alluvial aquifers are largely absent.

5 Integrated Management Planning Process

The integrated management planning process uses an adaptive management approach. Thus, it is a work in progress for either attaining or maintaining the desired balance of the hydrologic system. As an affected area or subarea of the District changes and more data becomes available, the VIMP goals and objectives will be reassessed and changes may be made, as necessary, to accommodate changing circumstances such as hydrology, economics, and water demands and supplies. The VIMP will evolve in incremental phases as elements of the plan are achieved and additional elements to the VIMP are sought by the District, its Stakeholder Advisory Committee, or the Department. The VIMP will be reviewed annually, and the District and the Department will determine if the VIMP needs to be modified to achieve its goals and objectives. This VIMP focuses on hydrologically connected surface water and groundwater but incorporates many aspects that mutually benefit other actions of the District, as set forth in the District's Groundwater Management Plan, the Blue River Compact, and findings from other District projects and studies. The integrated management planning process allows for: (1) understanding water supplies and uses within the District; (2) preventing or mitigating water related conflicts within the District; (3) planning for sustainable growth in water uses and demands; and (4) informing the public of the District's water resources and efforts to effectively manage those resources.

Data, analyses, models, and the best available science are the tools that provide the information that is critical for implementing water management activities and meeting VIMP goals. Among other things, these tools will be used to assess water supplies, water uses, water availability, water shortages for existing water users, and to identify future water needs at the basin level and subbasin level within the District. The District and the Department will seek to ensure that agreed upon methodologies for data

collection and analyses, and processes for greater transparency in all decision-making activities, are used.

Pursuant to *Neb. Rev. Stat. § 46-715(2)*,

[a]n integrated management plan shall include the following: (a) clear goals and objectives with a purpose of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin, subbasin, or reach can be achieved and maintained for both the near term and the long term; (b) a map clearly delineating the geographic area subject to the integrated management plan; (c) one or more of the ground water controls authorized for adoption by [NRDs] pursuant to section 46-739; (d) one or more of the surface water controls authorized for adoption by the [D]epartment pursuant to section 46-716; and (e) a plan to gather and evaluate data, information, and methodologies that could be used to implement sections 46-715 to 46-717, increase understanding of the surface water and hydrologically connected ground water system, and test the validity of the conclusions and information upon which the integrated management plan is based. The plan may also provide for utilization of any applicable incentive program authorized by law. (*Neb. Rev. Stat. § 46-715(2)*)

Pursuant to *Neb. Rev. Stat. § 46-715(3)*,

an integrated management plan shall provide a process for economic development opportunities and economic sustainability within a river basin, subbasin, or reach, [and] shall include clear and transparent procedures to track depletions and gains to streamflows resulting from new, retired, or other changes to uses within the river basin, subbasin, or reach. The procedures shall:

- (a) Utilize generally accepted methodologies based on the best available information, data, and science;
- (b) Include a generally accepted methodology to be utilized to estimate depletions and gains to streamflows, which methodology includes location, amount, and time regarding gains to streamflows as offsets to new uses;
- (c) Identify a means to be utilized so that new uses not have more than a de minimis effect upon existing surface water users or ground water users;
- (d) Identify procedures the [District] and the [D]epartment will use to report, consult, and otherwise share information on new uses, changes in uses, or other activities affecting water use in the river basin, subbasin, or reach;
- (e) Identify, to the extent feasible, potential water available to mitigate new uses, including, but not limited to, water rights leases, interference agreements, augmentation projects, conjunctive use management, and use retirement;

(f) Develop, to the extent feasible, an outline of plans after consultation with and an opportunity to provide input from irrigation districts, public power and irrigation districts, reclamation districts, municipalities, other political subdivisions, and other water users to make water available for offset to enhance and encourage economic development opportunities and economic sustainability in the river basin, subbasin, or reach; and

(g) Clearly identify procedures that applicants for new uses shall take to apply for approval of a new water use and corresponding offset. *Neb. Rev. Stat. § 46-715(3)*

To accomplish the objectives set forth in *Neb. Rev. Stat. § 46-715(3)*, this VIMP provides a process that allows for utilization of the best available data and science to understand current supplies and uses, to estimate effects of new uses, and to explore the potential for new water uses. There are currently clear processes in place through the District's Rules and Regulations and the Department's Statutes and Rules and Regulations through which new applicants for uses may apply and seek approval.

Pursuant to *Neb. Rev. Stat. § 46-715(4)*,

[t]he ground water and surface water controls proposed for adoption in the integrated management plan [...] shall, [...] (a) be consistent with the goals and objectives of the plan, (b) be sufficient to ensure the state will remain in compliance with applicable state and federal laws, any applicable interstate water compact or decree, or other formal state contract or agreement pertaining to surface water or ground water use or supplies, and (c) protect the ground water users whose water wells are dependent on recharge from the river or stream involved and the surface water appropriators on such river or stream from streamflow depletion caused by surface water uses and ground water uses begun, in the case of a river basin, subbasin, or reach designated as over appropriated or preliminarily determined to be fully appropriated in accordance with section 46-713, after the date of such designation or preliminary determination. (*Neb. Rev. Stat. § 46-715(4)*)

After the final hearing under *Neb. Rev. Stat. § 46-718(1)*, the Department and the District agreed to adopt and implement the controls in the groundwater and surface water action items herein to the entire geographical area within the boundaries of the District. Figures 1 and 2 clearly delineate the VIMP Management Control Areas.

6 Stakeholder and Public Involvement

Neb. Rev. Stat. § 46-717(2) outlines the stakeholder process that is an integral part of integrated management plan development. It states the specific stakeholder interests that the District and the Department will consult during the preparation of the VIMP: irrigation districts, public power and irrigation districts, mutual irrigation and canal companies, municipalities, and other water users as deemed appropriate. The VIMP process relies on collaboration between the NRDs and the Department, in consultation with a diverse stakeholder group. As part of the VIMP development, the District and the

Department reached out to a group of stakeholders that represented a wide array of water interests, including:

- Large Irrigators (irrigation districts, reclamation districts, public power and irrigation districts, mutual irrigation districts, and canal companies)
- Municipalities
- Industrial Users
- Individual Groundwater Irrigators
- Individual Surface Water Irrigators
- Agencies
- Agricultural groups
- Large water users (for example, livestock)
- Rural water districts
- Well Drillers
- Recreation Groups
- Economic Development Organizations

From the initial list of identified stakeholders, the District and the Department convened a group that represented the following water interests:

- Municipalities
- Industrial Users
- Individual Groundwater Irrigators
- Individual Surface Water Irrigators
- Other Large Water Users (for example, livestock)
- Rural Water Districts
- Well Drillers

A complete list of representatives from the Stakeholder Advisory Committee (SAC) can be found in **Appendix C**. The stakeholders' input was invaluable in the development of the VIMP, and their time, insights, and efforts were greatly appreciated by both the District and the Department.

The SAC met three times between summer of 2020 and fall of 2021 and worked together to identify and inform the District and Department of issues in the District and to develop goals, objectives, and action items of the VIMP. The District and the Department carefully evaluated and considered all recommendations and input received by the SAC. The final goals, objectives, and action items are intended to serve as a path forward for effective, long-term management of groundwater and surface water throughout the District.

A public hearing was held January 5, 2022. At the hearing, the District and the Department received testimony on the draft VIMP. After the hearing, the District and Department considered the testimony in their decision to jointly adopt the VIMP.

Stakeholder and public engagement milestones are articulated in the following graphic.



7 Goals, Objectives, and Action Items

The **ultimate goal of the integrated management process is to protect existing investments and interests while facilitating economic growth and well-being across the District.** For the first phase/increment of the integrated management planning process for the District’s VIMP, the goals and objectives focus on understanding the water supplies and uses within the District, resolving potential conflicts between users, planning for future uses, and effectively communicating water resource information and management actions to the general public. These fundamental elements of integrated management planning allow for tailoring Department and District actions in the following phases of the VIMP process and provide the framework for water management decisions going forward.

A **goal** is a desired outcome of actions taken in support of achieving the overall purpose of the VIMP. An **objective** is an achievable and measurable action taken to attain the desired result stated in the goal it supports. Goals provide a broad picture of intentions, whereas objectives define specific ways to achieve these goals. The objectives are then supported by detailed action items that will get the necessary work accomplished.

Goals and Objectives		Responsibility
Goal 1.0 Develop a better understanding of District’s water supplies and uses. This goal is focused on data collection and analysis of supplies and uses fundamental to effectively managing the District’s water resources. The first objective is focused on collecting and maintaining a database of water uses and supplies within the District. The second objective is focused on development of tools and their use in further understanding the District’s water resources. The third objective is focused on monitoring the trends in supplies and uses within the basin to inform management actions in the future.		
Objective 1.1 Collect and maintain database of water supplies and uses, utilizing the best available information, data, and science.		
Action Items	1.1.1 Identify gaps in surface water gage data and supplement with new gages.	Both
	1.1.2 Continue certification of groundwater irrigated acres and maintain related data.	LBBNRD

Goals and Objectives		Responsibility
	1.1.3 Determine surface water and co-mingled (groundwater and surface water sources) irrigated acres and maintain related data.	Both
	1.1.4 Prioritize and develop monitoring protocols for key new and existing water uses not currently monitored.	LBBNRD
Objective 1.2 Continue development of numerical groundwater model of the Big Blue basin and interconnected water sources for use as a management tool.		
Action Items	1.2.1 Define hydrologically connected areas within the District.	Both
	1.2.2 Simulate drought and new use effects on water supplies.	Both
	1.2.3 Maintain numerical groundwater model of the Big Blue basin.	NeDNR
	1.2.4 Use numerical groundwater model for calculations of water supply and use.	NeDNR
Objective 1.3 Monitor changes in water supplies and uses within the District (farming practices, land use, industrial growth, population, etc.).		
Action Items	1.3.1 Monitor district-wide irrigation use on currently metered wells and determine the need to develop and implement monitoring processes for water uses not currently monitored.	LBBNRD
	1.3.2 Continue to pursue cost-share opportunities for installation and maintenance of irrigation efficiency instrumentation (well meters, soil moisture sensors, ET sensors, weather stations, etc.).	LBBNRD
	1.3.3 Continue monitoring well data collection and trend analysis.	LBBNRD
	1.3.4 Continue voluntary reporting of surface water uses.	NeDNR
Goal 2.0 Prevent or mitigate water related conflicts within the District. There is a hydrologic connection of surface water and groundwater resources and the potential exists for uses to affect one another. These conflicts may arise not only between surface water and groundwater users, but also between types of use: domestic, municipal, industrial, agricultural, environmental, etc. The Department and District will work cooperatively with water users to identify potential conflicts, evaluate those conflicts, and implement/enhance management approaches and solutions to address conflicts.		
Objective 2.1 Assess the potential impact of new and existing surface water and groundwater uses on existing surface water and groundwater users within the District and maintain rules and regulations to enhance equitable water use management.		
Action Items	2.1.1 Utilize tools, such as GW models and hydrologic tools for the assessment.	Both
	2.1.2 Maintain district's protocols for evaluating new groundwater uses. Periodically review and update protocols, as necessary.	LBBNRD
	2.1.3 Periodically review/update of evaluation and approval processes used for all new uses.	Both
Objective 2.2 Maintain compliance with the Big Blue River Compact.		
Action Items	2.2.1 Continue coordination, including with other NRD's, on compact compliance.	Both
	2.2.2 Continue coordination with Kansas on compact compliance.	Both
	2.2.3 Consider compact compliance in evaluating new uses.	Both
Goal 3.0 Inform the public of the District's water resources and management efforts.		
Objective 3.1 Develop and expand educational material on the water resources of the District.		

Goals and Objectives		Responsibility
Action Items	3.1.1 Develop outreach material on water use/conservation (for example, irrigation efficiencies and increase crop yields with same or lower water use; City of Beatrice growth, while using same amount of water as in 1970, etc.).	LBBNRD
	3.1.2 Determine additional educational needs goals through solicitation of input from District constituents.	Both
	3.1.3 • Engage specialists (UNL, County extension, NeDNR), as needed, for educational programs.	LBBNRD
	3.1.4 Develop supporting educational material, workshops, etc. based on determined needs.	LBBNRD
Objective 3.2 Maintain and expand public outreach activities.		
Action Items	3.2.1 Continue to engage in elementary and secondary education opportunities.	LBBNRD
	3.2.2 Develop outreach program to target specific groups (producers, municipal/industrial users, etc.) with educational workshops.	LBBNRD
	3.2.3 NeDNR to partner with District on opportunities for outreach, including NeDNR’s engagement at the Nebraska State Fair and Husker Harvest Days.	Both

8 Geographic Extent of Control Areas

In accordance with *Neb. Rev. Stat. § 46-715(2)*, the geographic area of the District’s VIMP includes all water users within the boundary of the District (see Figures 1 and 2). The District has designated a groundwater control area that covers the District; the area where groundwater controls described in Section 9 and implemented by the District as part of this VIMP apply (see Figure 1). Surface water controls described in Section 9 apply throughout the contributing surface water area of the Big Blue River (see Figure 2). The District and Department recognize that, as new information and increased understanding becomes available through new data, models, and analyses, the defined control areas may change. Any changes to the VIMP control areas require agreement between the District and Department, in addition to a statutorily defined public notice period and public hearing.

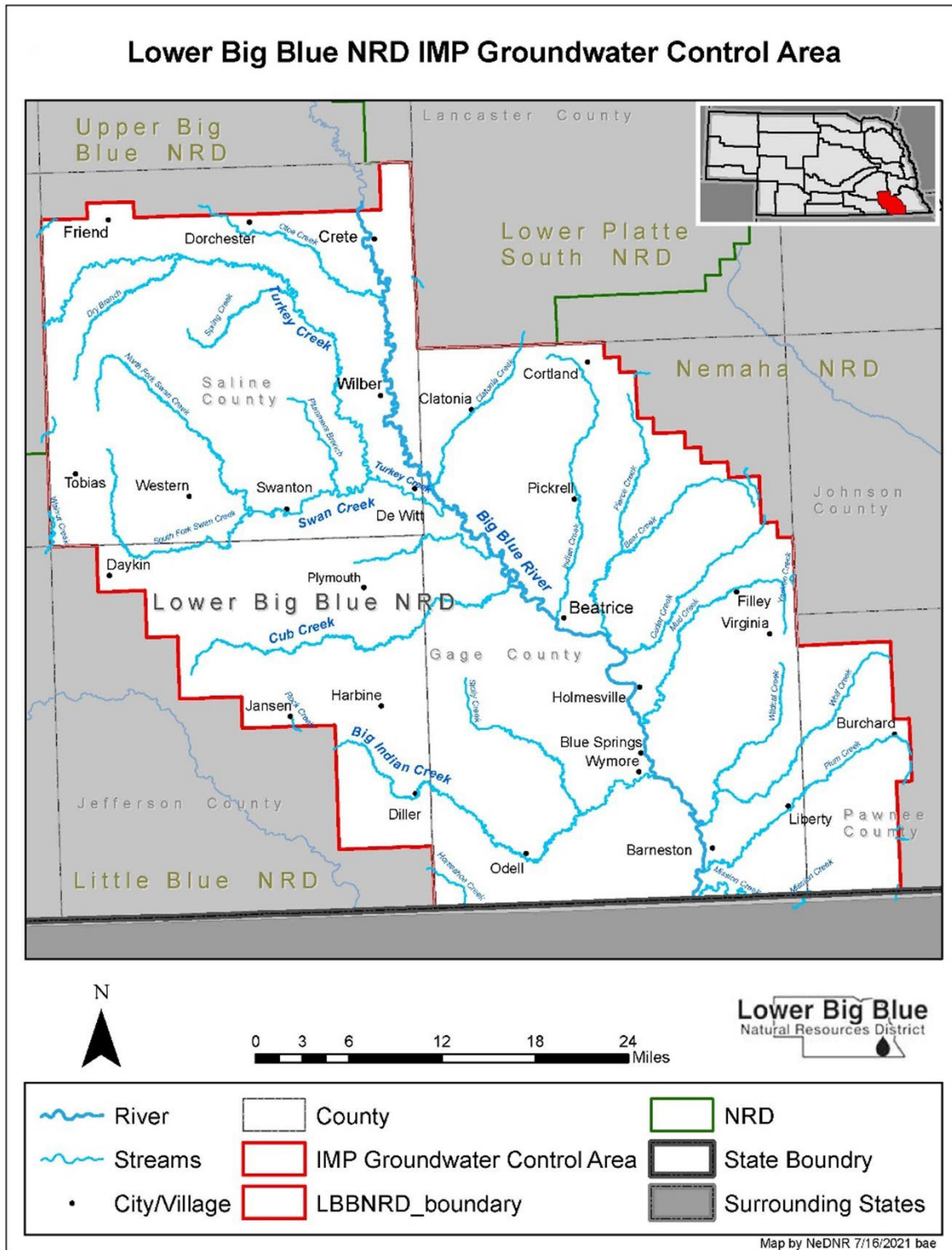


Figure 1: Groundwater control area for LBBNRD.

Lower Big Blue NRD IMP Surface Water Control Area

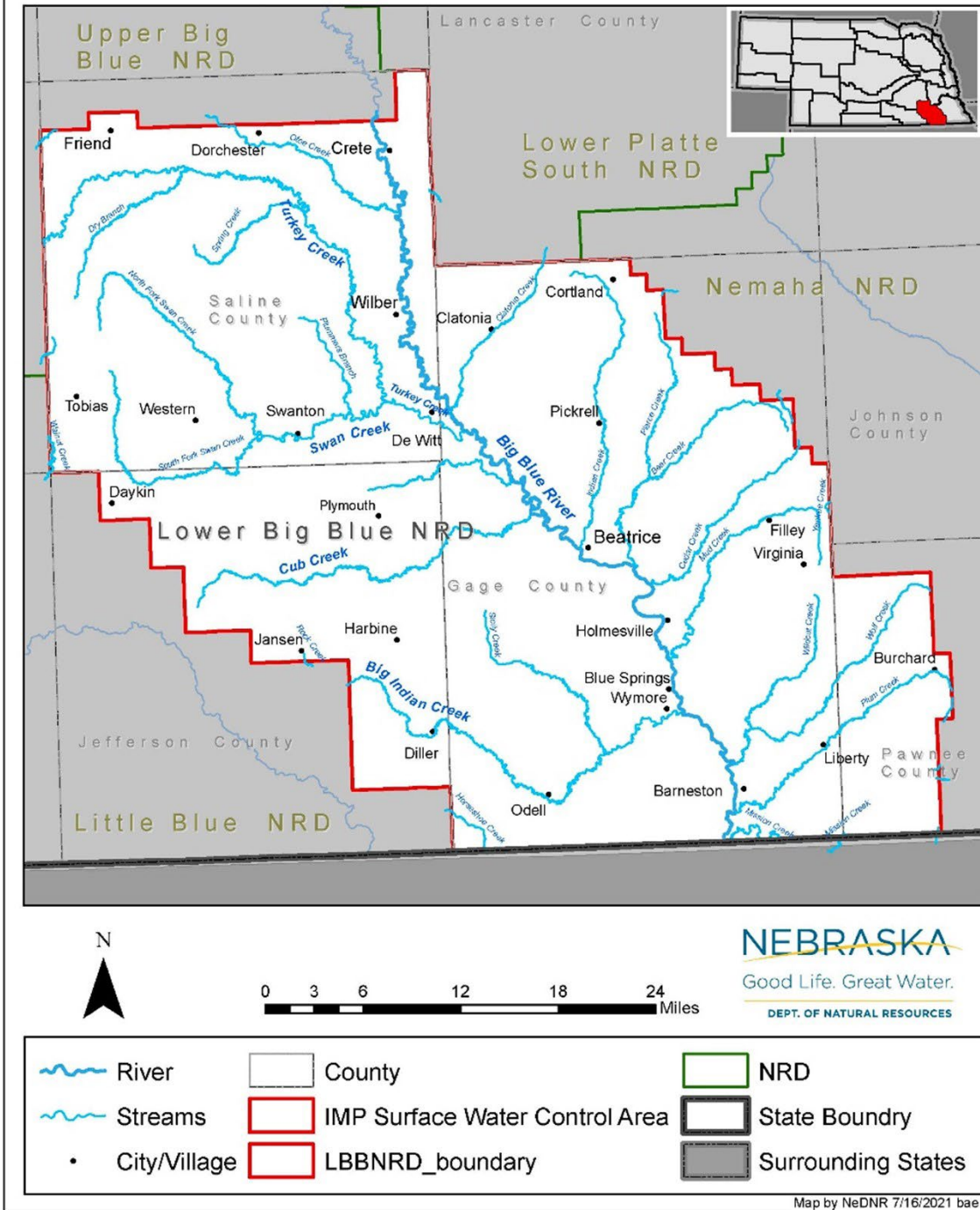


Figure 2: Surface water control area for LBBNRD.

9 Controls

This section describes the controls that the District and the Department have chosen to adopt as a part of this VIMP. These controls were selected from the allowed controls listed in *Neb. Rev. Stat.* §§ 46-739 and 46-716 for groundwater and surface water controls, respectively. In accordance with *Neb. Rev. Stat.* § 46-715(4), the controls are consistent with the goals and objectives of the VIMP and will protect groundwater and surface water users.

9.1 Groundwater Controls

1. **Certification of groundwater irrigated acres.** The District will certify all irrigated acres within the District boundaries within 3 years (time will begin when the VIMP is approved and goes into effect). The District is in the process of certifying all groundwater irrigated acres using a GIS-based data system in conjunction with County Assessors, US Farm Service Agency documents, and aerial photographs of historically irrigated acres.
2. **Permit for new wells with pumping capacity greater than 50 gallons per minute (gpm).** The District will require a permit for all new wells with capacity greater than 50 gpm.
3. **Require metering devices on all new wells.** The District will require flow metering devices to be installed on all new wells with capacity greater than 50 gpm. The flow meters must be installed according to the manufacturer's specifications. Additionally, flow meters must measure in units of gallons per minute and must have a totalizer to measure units of acre-feet.

9.2 Surface Water Controls

1. **Require measuring devices on any new high-capacity surface water irrigators.** The Department will require measuring devices on new surface water appropriations in excess of 50 gpm.
2. **Continue to enforce the administration of surface water controls.** The Department will utilize existing records to monitor the use of surface water and to make sure that unauthorized irrigation is not occurring. The Department will also be proactive in initiating subsequent adjudications whenever information available to the Department indicates the need for adjudication as outlined by state statutes.

10 Incentive Programs

The District and the Department will evaluate cost-share incentive programs that promote water conservation practices and implement where feasible. Incentive programs may include any program authorized by state law or federal programs. Water users or landowners who voluntarily participate in 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. Furthermore, the District and the Department will explore grant opportunities to supplement the annual budgeting process for funding action items for VIMP activities.

11 Funding Options

Additional funding sources may be needed to implement some of the action items listed in this VIMP. This section provides information on a variety of funding options that the District and the Department may use. 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, 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 sharing, 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 Environment and Energy

- 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 Environment and Energy to provide financial assistance for prevention and abatement of nonpoint source water pollution. This funding is granted to units of government, educational institutions, and nonprofit 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. 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 use 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 to achieve the goals and objectives of the Department under the Ground Water Management and Protection Act. The District may pay for such projects by using the occupation tax provided in *Neb. Rev. Stat. § 2-3226.05*, funds granted to the District by the state or federal government, or the levy authority authorized by *Neb. Rev. Stat. § 2-3225*:

Occupation Tax (*Neb. Rev. Stat. § 2-3226.05*). This authority allows the District to levy an occupation tax, not to exceed 10 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 Monitoring Plan

In accordance with *Neb. Rev. Stat. § 46-715(2)(e)*, the purpose of the monitoring plan is “to gather and evaluate data, information, and methodologies that could be used to implement sections 46-715 to 46-717, increase understanding of the surface water and hydrologically connected ground water system, and test the validity of the conclusions and information upon which the integrated management plan is based”. As such, the District and the Department have agreed to complete and report on the actions listed in the following subsection.

12.1 Tracking and Reporting Water Uses

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

- (a) Static groundwater level measurements
- (b) Certification of groundwater uses and any changes to these certifications
- (c) Develop reporting forms for unreported uses (municipal, commercial, and industrial annual water uses), as prioritized in Action Item 1.1.4.
- (d) Irrigation water use data collected by the District, such as from metered high capacity well flow data
- (e) Stream gage measurements on District-sponsored gages
- (f) Water well construction permits issued and denied
- (g) Variances granted by the District that allow an action contrary to an existing rule or regulation, including the purpose, location, and length of time for which the variance is applicable, and the reasoning behind approval of the variance
- (h) Transfer permits granted by the District 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 is responsible for collecting, tracking, evaluating, and reporting the following activities:

- (a) Irrigation surface water use
- (b) Municipal and industrial surface water use
- (c) New surface water appropriations granted (natural flow, storage, groundwater recharge, etc.)
- (d) New groundwater permits issued
- (e) Variances granted by the Department that allow an action contrary to an existing rule or regulation, including the purpose, location, and length of time for which the variance is applicable, and the reasoning behind approval of the variance
- (f) Transfer permits granted by the Department allowing the point of withdrawal, location of use, type of use, or addition of a type of use, including all information provided with the application and used in the approval of the transfer
- (g) Stream gage measurements from Department-maintained gages
- (h) Transfers/cancellations of surface water appropriations
- (i) Surface water administrative actions taken
- (j) New data collected or model/study results (conservation measures, riparian ET, etc.)

The District and Department will meet each year to review the VIMP, with the first annual VIMP meeting to occur prior to December 31, 2023. The District and Department will jointly review and evaluate the reports and data gathered for accuracy and consistency, identify data anomalies and probable causes, and flag data and information that may require closer inspection and review. The District and Department will evaluate progress toward completion of identified action items and discuss anticipated activities in support of VIMP implementation for the coming year.

Further, the District and Department will meet annually with other Blue Basin districts – including Upper Big Blue, Little Blue, and Tri-Basin NRDs – to discuss management issues in the basin as a whole and

share information as outlined above. These meetings will also be used to discuss management and IMP goals district-wide and prioritize work carried out using the Blue Basin numerical groundwater model.

In addition, the District and the Department will use the Department's Integrated Network of Scientific Information and GeoHydrologic Tools (INSIGHT) system to compare annual water use data to historically reported water use data and information, and perform analyses to determine the effects of new water uses on existing water users within the District.

12.2 Increase Understanding of Hydrologically Connected Groundwater

The District is participating with the Upper Big Blue, Little Blue, and Tri-Basin NRDs and the Department to develop a Blue Basin Groundwater Model (a numerical model). The model is intended to:

- Refine the delineations of hydrologically connected waters of the Blue River Basin.
- Simulate groundwater level change and their impacts on stream baseflow and assess potential streamflow depletions, both spatially and temporally.
- Support the Department's evaluation of the appropriation status of the Blue River Basin and other management decisions related to how groundwater pumping impacts streamflows.
- Provide a platform and datasets representing the best available data for evaluation of local-scale water issues.

Although not inclusive, water issues which may be addressed through the modeling effort include:

- Potential impacts of additional groundwater development to the localized area.
- Questions about the nature and timing of static groundwater level impacts in certain areas related to declines in other areas.
- Impacts to streamflows and the aquifer from developing additional acres under current usage.
- Determining offset requirements for potential large water users.
- Determining how much additional development can be allowed, and in what areas.

The District and Department will investigate additional research or modeling needs as conditions dictate.

13 Modifications to the Integrated Management Plan

The District and the Department will hold an annual review to evaluate progress on implementation of the VIMP. The SAC will be invited to participate in the review. The first annual review will be performed by December 31, 2023, and will be performed every year thereafter.

Action items undertaken by the District and the Department will be reviewed to determine if these items are fulfilling the goals and objectives of the VIMP. The District and the Department will jointly determine if amendments to the VIMP are necessary. Amendments to the goals and objectives of the VIMP will require an agreement by both parties and may require reconvening of the SAC. If amendments to the

VIMP are necessary, the District and the Department will hold a joint hearing and issue the pertinent orders to formally adopt the revised VIMP. While the VIMP is under the joint authority of the District and the Department, District Rules and Regulations are under the sole authority of the District can only be changed with District Board approval and a public hearing.

APPENDIX A

Letters Initiating the Voluntary IMP Process

APPENDIX B

Glossary of Terms

Appendix B: Glossary of Terms

Aquifer: A geological formation or structure of permeable rock or unconsolidated materials that stores and/or transmits water, such as to wells and springs. Alluvial aquifers are comprised of unconsolidated materials, such as sand and gravel, while Bedrock aquifers are comprised of rock.

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.

Beneficial Use: That use by which water may be put to use to the benefit of humans or other species.

Certified Irrigated Acre: Lands identified and registered with the District greater than one acre which have water applied for irrigation.

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.

Consumptive Use: The amount of water that is consumed under appropriate and reasonable efficient practices to accomplish without waste the purposes for which the appropriation or other legally permitted use is lawfully made. The amount of water removed from available supplies without return to a water resources system.

Department: The Nebraska Department of Natural Resources, a state agency

District: The Lower Big Blue Natural Resources District, a political subdivision of the State.

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

Groundwater Management Plan: The District'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 District.

Hydrologically Connected: An area where groundwater and surface water are interconnected and withdrawals from one can affect the other. To determine if an area is hydrologically connected (as defined in Department Rules), one calculates if a well pumped for 50 years will deplete the river or a base flow tributary by at least 10 percent of the amount pumped in the 50-year period (the 10/50 area, from Title 457 Nebraska Administrative Code Ch. 24 001.02). 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. 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.

Irrigation: The artificial application of water to promote the growth of vegetation.

Monitoring Well: A well which is used to withdraw water for purposes of testing for contaminants and/or which is used to check the level of groundwater.

Recharge: A hydrologic process where water moves downward from surface water to groundwater, both naturally through the hydrologic cycle or through intentional practices.

River Basin: The land area that is drained by a river and its tributaries.

Stakeholder Advisory Committee (SAC): Representatives from various interest groups and professional fields who provide consultation on aspects of the Integrated Management Plan.

Surface Water: Water that is on the Earth's surface, such as a stream, river, lake, or reservoir unless such water body has been designated in rule or statute as something else (for example, a water storage lagoon or sand pit lake).

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

Water Quality: The measure of physical, chemical, and biological characteristics of water.

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

APPENDIX C
Stakeholder Advisory Committee

Appendix C: Stakeholder Advisory Committee

Invited Stakeholders:

Organization	Name	Title
Surface Water Irrigator	Dan Saathoff	
Surface Water Irrigator	Ron Walenburg	
Surface Water Irrigator	Randal Vana	
Surface Water Irrigator	Cody Vana	
Surface Water Irrigator	Tyler Binder	
Nebraska Game & Parks Commission	Michelle Koch	
NRCS	Kelli Evans	
FSA, Farm Loan Mgr.	Jeffrey Scott VanWinkle	
Gage County Board	Eddie Dorn	
Gage County Board	Matt Bauman	
Gage County Board	Erich Tiemann	
Gage County Board	Dennis M. Byars	
Gage County Board	Gary Lytle	
Gage County Board	John Hill	
Gage County Board	Terry Jurgens	
Beatrice Chamber of Commerce	Angie Bruna	
Smithfield	Amy Marks	Environmental Coordinator
Farmland Foods, Inc.		
Koch Fertilizer Beatrice, LLC		
NPPD		
City of Beatrice	Tobias Tempelmeyer	City Administrator/General Manager
City of Crete	Tom Ourada	
City of Friend		
City of Wilber	Jason Ripa	
City of Wymore		
Pawnee County Rural Water District 1		
Tri County Schools		
Village of Clatonia		
Village of Cortland		
Village of Daykin	Peggy Tilgner	Village Board Member
Village of Dewitt		
Village of Diller		
Village of Dorchester		
Village of Filley		
Village of Harbine		
Village of Jansen		
Village of Liberty		
Village of Odell		

Organization	Name	Title
Village of Pickrell		
Village of Plymouth		
Village of Swanton		
Village of Tobias		
Village of Western		
University of Nebraska - Lincoln	Nathan Mueller	Cropping Systems Extension Educator
	Mike Holtmeier	
	John Niemeyer	
	Mark Goes	

Stakeholder Meeting #1 Attendees:

Organization	Name	Title
Surface Water Irrigator	Ron Walenburg	
Surface Water Irrigator	Cody Vana	
NRCS	Kelli Evans	
City of Beatrice	Tobias Tempelmeyer	City Administrator/General Manager
City of Crete	Tom Ourada	
City of Wilber	Jason Ripa	
Village of Daykin	Peggy Tilgner	Village Board Member
University of Nebraska - Lincoln	Nathan Mueller	Cropping Systems Extension Educator
	Mike Holtmeier	
	John Niemeyer	
	Mark Goes	

Stakeholder Meeting #2 Attendees:

Organization	Name	Title
Beatrice Chamber of Commerce	Angie Bruna	
Smithfield	Amy Marks	Environmental Coordinator
City of Beatrice	Tobias Tempelmeyer	City Administrator/General Manager
City of Crete	Tom Ourada	
City of Wilber	Jason Ripa	
Village of Cortland	Donelle Moormeier	
Village of Cortland	Richard Douglas	
Village of Harbine	Elaine Blobaum	
Village of Jansen	Kesha Elridge	
University of Nebraska - Lincoln	Nathan Mueller	Cropping Systems Extension Educator

Stakeholder Meeting #3 Attendees:

Organization	Name	Title
City of Crete	Brad Bailey	
	Mark Goes	
University of Nebraska - Lincoln	Nathan Mueller	Cropping Systems Extension Educator
Village of Daykin	Peggy Tilgner	