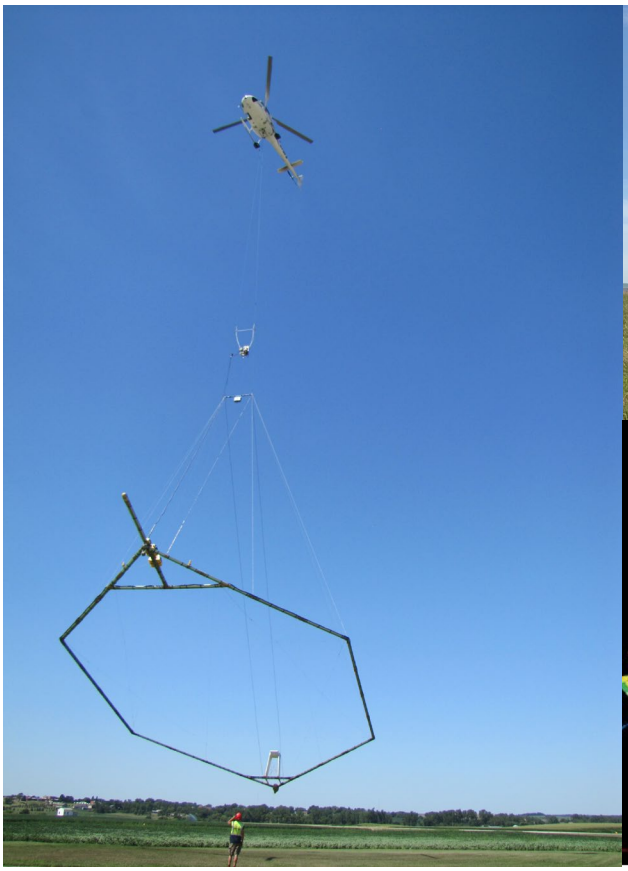
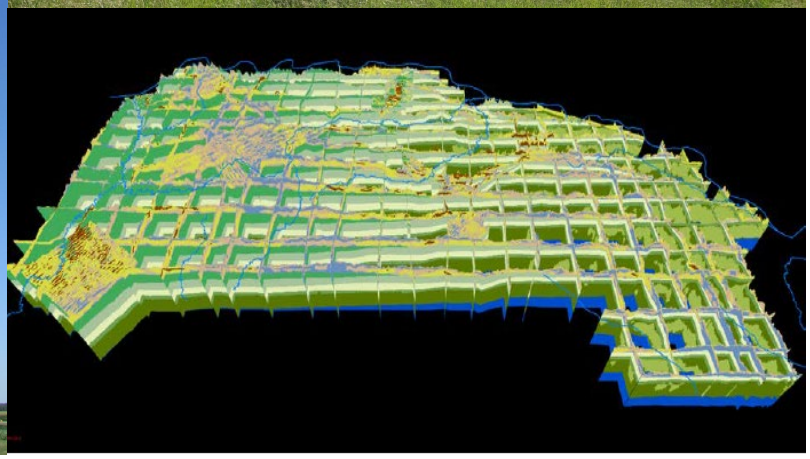
LEWIS AND CLARK NATURAL RESOURCES DISTRICT

MASTER PLAN





December 2019

LEWIS & CLARK
NATURAL RESOURCES DISTRICT

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608 N. Robinson Ave.
PO Box 518
Hartington, NE 68739
402-254-6758
lcnrd@hartel.net
lcnrd@nebraska.gov

LEWIS & CLARK NATURAL RESOURCES DISTRICT
2019 MASTER PLAN
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LEWIS AND CLARK NATURAL RESOURCES DISTRICT MASTER PLAN 2019

INTRODUCTION

The Lewis and Clark Natural Resources District (LCNRD) is one of 23 Natural Resources Districts (NRDs) created in 1969 with the passage of LB1357 by the Nebraska Unicameral. NRDs are established based on watersheds and initially created from the combination of local Soil and Water Conservation Districts and Special Purpose Districts that existed to meet resource related needs at the time NRDs were formed. LCNRD has been assisting people in the Upper Missouri Tributaries Basin to effectively develop and protect soil and water resources since its establishment in 1972.

Natural Resources Districts have statutory responsibility as outlined in Nebraska Revised Statutes Section § 2-3229, which states "The purposes of Natural Resources Districts shall be to develop and execute, through the exercise of powers and authorities contained in this act, plans, facilities, works, and programs relating to:

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

NRDs are authorized to levy taxes on property to generate funds to fulfill program needs. The Lewis and Clark NRD has an 11-member board that, in addition to approving a budget and setting a tax levy, also sets policy, establishes priorities, and makes decisions related to the work of the NRD. LCNRD is in northeast Nebraska and includes part of 3 counties; Cedar, Dixon and Knox and encompasses two cities, 19 villages, and several unincorporated communities and sanitary improvement districts (SIDs).

LCNRD has a staff of approximately 16 full and part time employees that operate and maintain 50 flood control structures, 3 Wildlife Management Areas (WMAs), 1 trail, the Cedar Knox Rural Water Project, monitor groundwater quantity and quality, and implement several other programs and projects. LCNRD provides or supports project planning and management for additional projects/studies, environmental education, and administers programs that provide cost share to landowners and producers to install best management practices including tree plantings, flow meters, buffer strips, well decommissioning, cover crops, and other practices to improve water quality and protect natural resources for the good of the district.

Successful implementation of these programs and projects is due, in large part, to a commitment of cooperation and collaboration with local, state, and federal agencies, private organizations and individuals. These partnerships are highly valued and nurtured to maintain a positive, innovative work environment to accomplish conservation that benefits the natural resources and residents of the Lewis and Clark Natural Resources District.

MASTER PLAN

The Master Plan was prepared by LCNRD staff and replaces a similar Master Plan adopted by the LCNRD board of directors in December 2009. This plan is intended to be a guide to assist the Lewis and Clark Natural Resources District implement programs to address natural resources concerns designated as NRD priorities for the ten-year period from 2019-2029.

A Master Plan is required by Nebraska Revised Statute §2-3276 which indicates a Master Plan shall be prepared and reviewed every 10 years. The Master Plan shall include goals for the purposes of natural resources protection, while objectives will describe district methods directed at achieving those goals. The goals reflect the responsibilities and authorities contained in state statutes as outlined above and consolidated below based on prioritization of LCNRD activities by the board of directors in October 2019.

1. soil conservation and erosion control
2. water quantity and quality
3. flood prevention and control
4. information and education
5. forestry and pasture
6. wildlife habitat
7. Missouri River/recreation

MISSION STATEMENT

To conserve, sustain, and improve our natural resources and environment for a better future.

BACKGROUND

LEWIS AND CLARK NRD PAST AND PRESENT

The Lewis and Clark Natural Resources District board of directors met for the first time on February 8, 1972. In those early days the board was concerned with conserving soil, maintaining or establishing wildlife habitat, and protecting property from flood risk particularly in the Aowa Creek Watershed of Dixon County and Antelope/Beaver Creek Watershed of Cedar County.

Soil loss and flood damage caused by Aowa and South Creeks impacted rural residents, bridges and roads and the communities of Ponca and Newcastle for many years. In response, the Aowa Creek Watershed Conservancy District was formed from members of the Dixon County Soil and Water Conservation Board and representatives from the Soil Conservation Service (SCS) in 1964. A project to address concerns was proposed in 1969. At the time there were 230 family farms in the watershed with an average size of 240 acres. The estimated total cost of the watershed project was 3.4 million dollars with a cost/benefit ratio of 1.2 to 1.0. The goal of the project was to bring all landowners and people in the area the benefits of water conservation, erosion control, flood abatement, recreation and wildlife development. There are approximately 55,350 acres of drainage in the project area protected by 50 flood retarding and grade stabilization structures constructed from the 65 initially planned. When completed in 2004 the final project cost was $7.3 million.

The Lewis and Clark NRD also inherited the Antelope/Beaver Watershed Project from the local county soil conservation districts. Two structures were built as part of the project one on Beaver Creek and Chalkrock dam built on Antelope Creek in 1986, the lake and adjacent acres are managed as a Wildlife Management Area by the Nebraska Game and Parks Commission (NGPC) and are under 50-year easements. The easements on the acres around Chalkrock lake will expire within the 10-year period of the Master Plan and negotiations to renew those agreements will begin prior to expiration.

Below are historical images of flooding in Dixon County.


Flood damage above Buckskin Hills.


Flooding in Ponca.

Governing Body

LCNRD is a multi-purpose local unit of Nebraska government with the responsibility of management, development and protection of the soil and water resources within its boundaries. An elected board of 11 directors (see Table 1) guides staff in management of local resources. Directors are elected via general elections to four-year terms. Two board members are elected every two years to represent each of five sub-districts (Figure 1) and one board member is elected to represent the district at large every four years. Sub-districts are divided geographically based on equal population as determined by the 2010 census.

Every two years a Board Chair, Vice-Chair, and Secretary/Treasurer are elected by the board from among the directors. A Cedar Knox Rural Water Project (CKRWP) Advisory Committee representative, Nebraska Association of Resources Districts (NARD) representative, and a NARD alternate are appointed by the board chair from among the directors. LCNRD operates with 3 standing committees, a planning and personnel committee, a budget and finance committee, and an operations and maintenance committee. Ad hoc committees are formed as needed to address other priorities as they arise. The NRD Board operates according to a set of operating policies which are kept on file at the district headquarters in Hartington, Nebraska.

SUB-DISTRICT	DIRECTOR	LOCATION
Sub-District 1	Russ Schmidt	St Helena
Sub-District 1	Jeff Steffen	Crofton
Sub-District 2	Chris Johnson	Bloomfield
Sub-District 2	Dave Condon	Creighton
Sub-District 3	Marcel Kramer	Crofton
Sub-District 3	Bill Christensen	Hartington
Sub-District 4	Carolyn Heine	St Helena
Sub-District 4	Matt Weinandt	Wynot
Sub-District 5	Leroy Hoesing	Newcastle
Sub-District 5	Curtis Armstrong	Ponca
At-Large	Gary Howey	Hartington

Table 1. LCNRD Directors 2018-2019

Committees are convened as needed based on the number of items or length of time needed to appropriately cover proposals up for consideration and to minimize the time required to cover information presented to the full board. When committee meetings are held, the committee recommendations are brought before the full board for consideration and the board votes to adopt or reject the proposal. In the months when there are no committee meetings, proposals for board action are taken before the full board for consideration and the board votes to adopt or reject the proposal. When the board adopts a policy, approves a project or program, or otherwise issues a directive through voting, it is the responsibility of the district staff to carry out those actions.

At the discretion of the board, citizen advisory groups may also be formed to assist the board in considering specific projects or activities. Members are appointed and represent a group of people or businesses with interest in the project or activity.

NRD Staff

LCNRD staff housed in the Hartington office currently consists of 5 full-time employees. The district employs 3 full-time program assistants who work in the Natural Resources Conservation Service offices located in Bloomfield, Hartington, and Ponca. The Cedar Knox Rural Water Project employs 4 full-time and 3 part-time positions that work in the LCNRD office in Hartington or remotely at the water treatment plant in the Devils Nest region of Knox County.

LCNRD partners with other agencies to provide technical support in the district including one full-time soil conservationist who assists with workload in the Hartington and Bloomfield NRCS offices. The position is partially paid by LCNRD with the remainder provided by grant funds from the National Association of Conservation Districts (NACD). Two employees working in the Bazile Groundwater Management Area for the specific purpose of educating and promoting conservation to positively impact groundwater nitrate concentrations are financially supported by LCNRD and housed at the Lower Elkhorn Natural Resources District in Norfolk. The positions are supported through a combination of financial resources including Lower Elkhorn, Upper Elkhorn, and Lower Niobrara Natural Resources Districts and partnering agencies including NRCS, Nebraska Department of Environment and Energy (NDEE), and the University of Nebraska at Lincoln (UNL). LCNRD staff as of December 2019 are listed in Table 2. In addition to the listed full-time and part-time positions, interns and/or seasonal employees may be hired to assist with water programs and maintenance of NRD projects.

LCNRD STAFF	
General Manager	Annette Sudbeck
Office Manager	Marilyn Schumacher
Resource Coordinator	Myles Lammers
Office Technician	Elle Bermel
Resource Technician	Vacant
Bow Creek Watershed Coordinator	Vacant
NRCS ADMINISTRATIVE SUPPORT	
NRCS Program Assistant	Diane Wieseler
NRCS Program Assistant	Jeni Olsen
NRCS Program Assistant	Jeanne Rosen
CKRWP STAFF	
Project Manager	Scott Fiedler
Program Assistant	Sue Sudbeck
Plant Technician	Cope Clark
Field/Plant Technician	Vince Lammers
Part time - Plant Technician	Gary Eckmann
Part time - Plant Technician	Nathan Fischer
Part time - Plant Technician	Chad Reifenrath
PARTNERSHIP POSITIONS	
BGMA Coordinator	Connor Baldwin
BGMA Extension Educator	Jeremy Milander
NARD Soil Conservationist	Ariel Fiedler

Table 2. LCNRD Staff as of December 2019

DESCRIPTION OF THE DISTRICT

Location

Located in extreme northeast Nebraska, LCNRD is part of the Missouri River Tributaries Basin and consists of the eastern half of Knox and the northern portions of Cedar and Dixon Counties (Figure 1). The district covers approximately 956,300 acres and stretches from the Missouri River east of Ponca westward 68 miles to the middle of Knox County just west of the Village of Center. Lewis & Clark Lake and the Missouri River makes up the northern border with the tributary watersheds as the southern boundary. The greatest distance from the northern to southern border is 30 miles.

The district is primarily rural, and farm oriented with the largest communities being the cities of Hartington and Creighton. Villages in the district include Ponca, Allen, Newcastle, Waterbury, Martinsburg, Wynot, Obert, Maskell, St. Helena, Coleridge, Crofton, Santee, Center, Bloomfield, Magnet, Menominee, Fordyce, Lindy, and Bazile Mills. The district borders on 4 other NRDs: the Papio-Missouri River NRD to the east, the Lower Elkhorn and Upper Elkhorn NRDs to the south; and the Lower Niobrara NRD to the west.

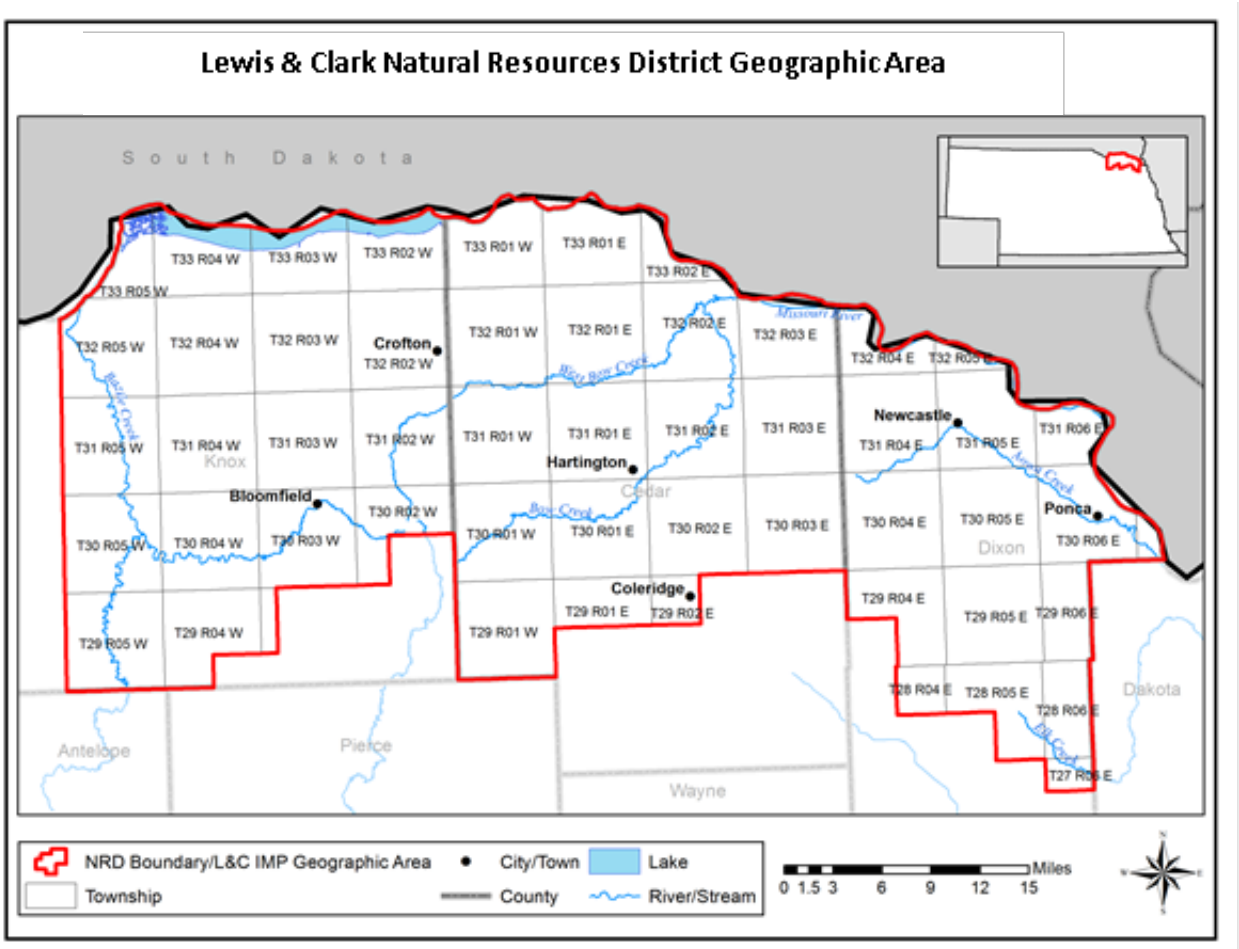


Figure 1. Map of district boundaries and Counties with major tributaries and communities

Population

The current population of LCNRD is estimated at approximately 15,000 based on the 2010 census.

Geology

A generalized block diagram of the subsurface geology of the district is represented in Figure 2. 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.

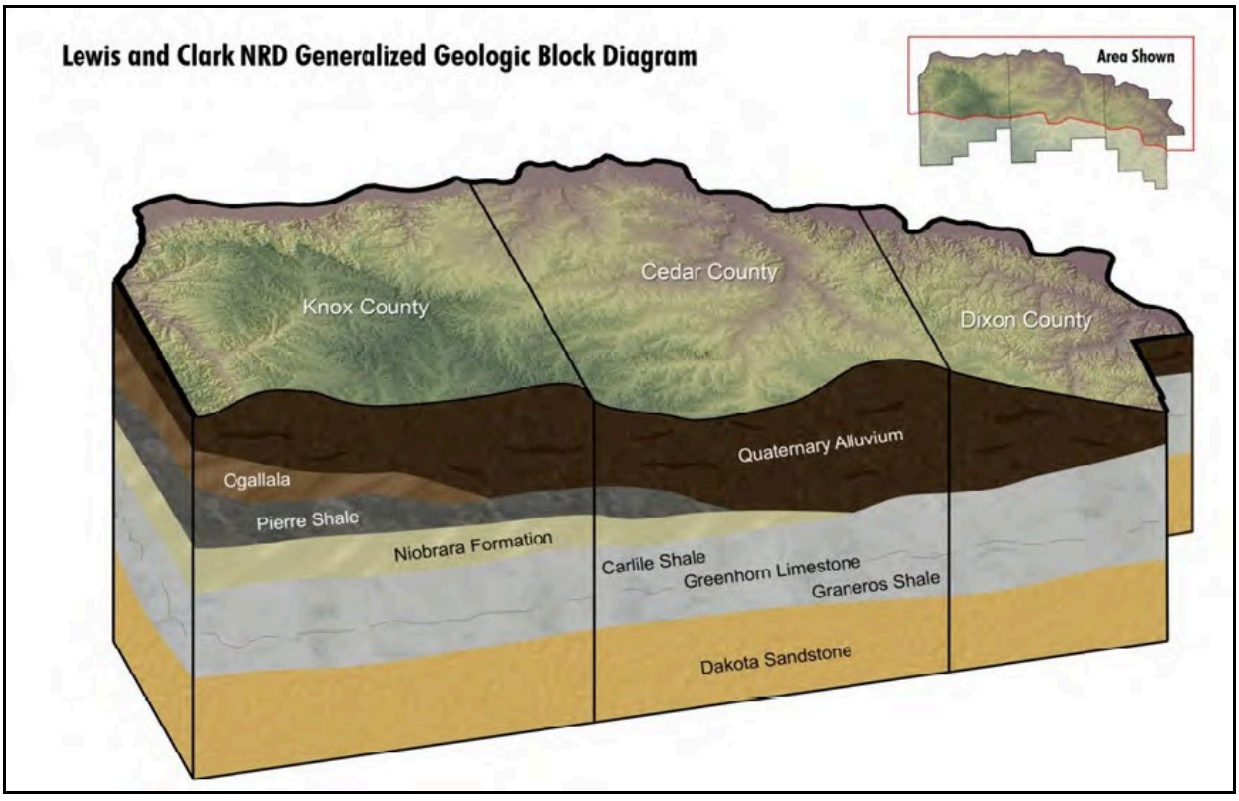


Figure 2: Generalized geologic block diagram of the district.

Topography and Soil

The recession of glaciers has left a diverse region of geologic material generally characterized by two major landform divisions: the uplands, which were formed in loess and glacial till, and the floodplains, which formed in alluvium along the Missouri River. The uplands consist of the hills and bluffs adjacent to the Missouri River and the rolling loess topography with lower slopes found to the west and central areas of the southern portion of the district. The floodplains are flat and exist about 100 to 300 feet below the uplands. Slopes in the most southwest region of the

district plateau into relatively flat slopes. The lowest elevation of 1,082 feet above sea level is located in the floodplain located in the eastern corner of the district. The highest elevation of 1,964 feet above sea level is found in the western portion of the district.

There are ten described soil associations in the district, with four main associations comprising over three quarters of the soils. The Crofton-Alcester-Nora, Nora-Crofton-Moody, and Moody-Thurman associations account for approximately 69% of the soils, and are similar in that they are very deep, well-drained silty soils found on uplands. However, the Crofton-Alcester-Nora soils are more strongly sloping, which is consistent with the topography of the more western and northeastern portions of the district. The Labu-Bristow-Sansarc soils are formed in weathered shale on uplands and account for approximately 8% of the total acres of the district. These are clayey soils; and are characterized as shallow to moderately deep, gently sloping to steep, and well drained but slowly permeable soils.

There are notable differences in the soils located in the southwestern region of the district in Knox County. They do not cover a large portion of the district, but the differences in the characteristics contribute to the localized groundwater contamination issues in the area. Bazile-Thurman-Boelus soils account for approximately 3% of the district soils and occur in southwestern Knox County. They are primarily formed in loess or outwash material over sandy sediments on uplands and stream terraces. These are silty soils that are characterized as very deep, well drained, moderate to steep sloping, with hydraulic conductivity that is moderately slow in the silty stratum to rapid in the sandy substratum. Thurman-Boelus-Nora also occurs in southwestern Knox County. These are described as deep, nearly level to strongly sloping, and well-drained to excessively-drained soils. They are sandy and silty soils found on uplands and stream terraces with high permeability.

District soils generally have moderate permeabilities, with smaller areas of low permeability in bottomlands with higher clay content. The exception to this is the southwest of the district where sandy soils are present, and the permeability is very high. Moderate to high permeability increases the vulnerability of groundwater to contaminant leaching, while low permeability increases the vulnerability of surface water.

Climate

Temperature across the district is typical of the North American temperate zone latitudes with warm summers and cold winters, and variable seasonal precipitation patterns. The average annual minimum and maximum temperatures for LCNRD are 39 degrees F and 61 degrees F, with an average of 50 degrees F. The average winter temperature is 24 degrees F and the average daily minimum is 14 degrees F. In the summer, the average temperature is 74 degrees F and the average daily maximum is 84 degrees F. These temperatures are conducive to agricultural land use practices, with the highest growing degree days occurring during the months of May through September.

The total annual precipitation ranges from 24 to 29 inches across the district. Approximately 22 inches of this total, or 76%, occurs from April through September. This precipitation pattern correlates with the annual distribution of growing degree days and produces a climate that is

well-suited for agricultural activities. The seasonal snowfall ranges from 33 to 36 inches, an average of 17 days of the year have at least one inch of snow on the ground. However, the number of snow-covered days varies significantly from year to year.

Vegetation

Historically, the dominant native vegetation on the bottom land and bluffs along the Missouri River was deciduous trees and tall grass prairie on the rolling uplands. However, very little of the land in the district remains in undisturbed or native cover of trees and grasses. Land use change has significantly altered the original vegetative cover. During the process of settlement, most of the native vegetation was removed and replaced by such cultivated plants as corn, sorghum, alfalfa, soybeans, and wheat. Much of the woodlands were cleared for agricultural and other purposes.

Today, remnants of the original prairie can be found in scattered plots and along railroad and highway right-of-ways or in rural settings where little disturbance occurs such as cemeteries. Participation in the USDA Conservation Reserve Program (CRP) has helped return thousands of acres to permanent vegetation approaching its original vegetative state. Woodlands persist along stream courses, especially on the bluffs above the Missouri Rivers, along local streams, and in planted shelterbelts.

Wildlife

A variety of wildlife is native to, or has adapted to, the habitat conditions in the district. Big game, upland game, furbearers, waterfowl and nongame species have been documented to reside within the district. Federally endangered species that are dependent on water resources include the Pallid Sturgeon, Interior Least Tern, and Whooping Crane. Federally threatened species include the Piping Plover.

Some of the most prevalent wildlife species in the district include the whitetail deer, ring-necked pheasant, cottontail rabbit, gray squirrel, coyote, turkey, racoon, striped skunk, beaver, opossum, hawk, and several kinds of duck and geese. Additional species which exist in lesser numbers include muskrat, red fox, badger, spotted skunk, black squirrel, blacktail jackrabbit, whitetail jackrabbit, mink, crow, mourning dove, eagle, and owl.

Land Use

Land use in the district is generally dominated by agriculture with corn and beans being the primary land cover, especially in the southern areas of the district. The northern portion has much higher grassland/pasture and forested area (Figure 3). Land cover changes associated with those categories can have a significant impact on resources including wildlife and water quality. An analysis of land use changes was performed from 2012 to 2017. The most significant land use changes were an over 30 thousand acre increase in soybeans and an over 40 thousand acre decrease in pastureland. The trend analysis reveals insignificant changes in total crop acres (5% increase) indicating minor changes in the amount of land added into production. Agriculture will remain the predominant land use in LCNRD.

The Upper Missouri Tributaries Basin including the majority of LCNRD contains 971,323 acres, or approximately 1.96 percent of Nebraska's land mass (49,479,833 acres). As shown in Figure 3., most of the land in the basin is used for crops (approximately 57 percent). The remaining acres comprise pasture/range, forest, and other land uses. Most of the district remains rural, as area located within city and village limits represents only a small percentage of the overall district. Table 3. provides a general breakdown of land use based on 2017 USDA estimates (Table 4.).

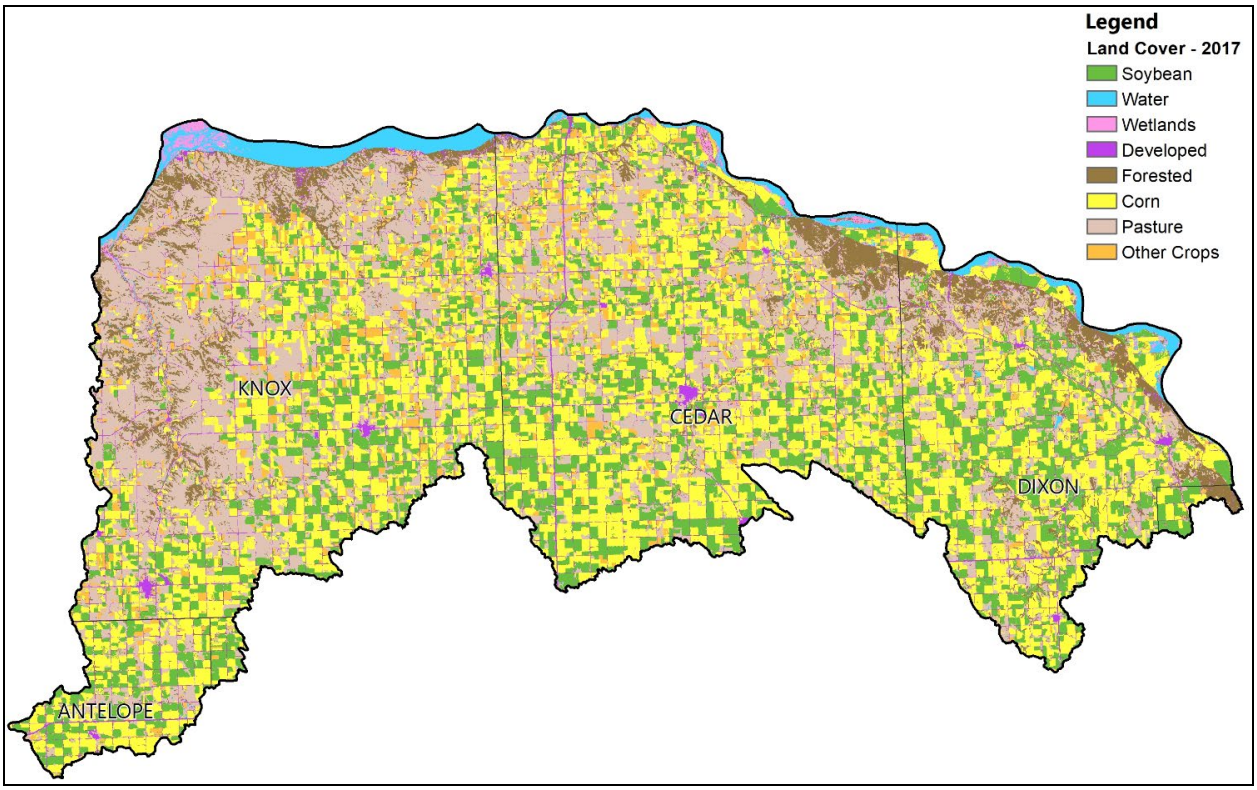


Figure 3. 2017 National Agricultural Statistics Service (NASS) Land Cover in the HUC8 Lewis and Clark Lake Watershed

Category	2012 Land Cover (ac)	2012 Land Cover (%)	2017 Land Cover (ac)	2017 Land Cover (%)	Change from 2012 to 2017 (ac)	Change from 2012 to 2017 (%)
Water	23,488	2%	27,863	3%	4,375	19%
Wetlands	10,201	1%	8,533	1%	-1,668	-16%
Developed	40,400	4%	40,163	4%	-237	-1%
Forested	58,325	6%	70,608	7%	12,283	21%
Soybean	156,450	16%	193,070	20%	36,621	23%
Corn	315,761	33%	298,023	31%	-17,738	-6%
Pasture	320,371	33%	278,835	29%	-41,536	-13%
Other Crops*	46,327	5%	54,228	6%	7,901	17%

*Includes sorghum, oat/rye/millet, winter wheat

Table 3. Land Cover Changes from 2012 to 2017

Category	2012 (ac)	2017 (ac)	Change (ac)	Change (%)
Crop*	518,538	545,322	26,784	5.2%
Non-Crop**	452,785	426,001	-26,784	-5.9%

*crops which require some level of tillage, including corn, soybeans, sorghum, and winter wheat
**non-crop includes all other categories, such as forest, developed, water, wetlands and grass/pasture

Table 4. Row Crop and Undeveloped Land Cover Changes

Water Resources

The water resources of the district take two forms: surface water resources in lakes, streams and wetlands, and groundwater resources stored in permeable sand, gravel, and rock formations beneath the land surface.

Groundwater

Groundwater is an important source of water in the NRD especially for domestic, stock and irrigation use. The LCNRD Groundwater Management Plan documents limited groundwater resources in the district and recognizes there are areas of increased potential for groundwater contamination from agricultural practices. Much of the district's complex groundwater system consists of glacial deposits which make it difficult to locate and withdraw significant quantities of water for irrigation or domestic uses and presents challenges for management.

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.

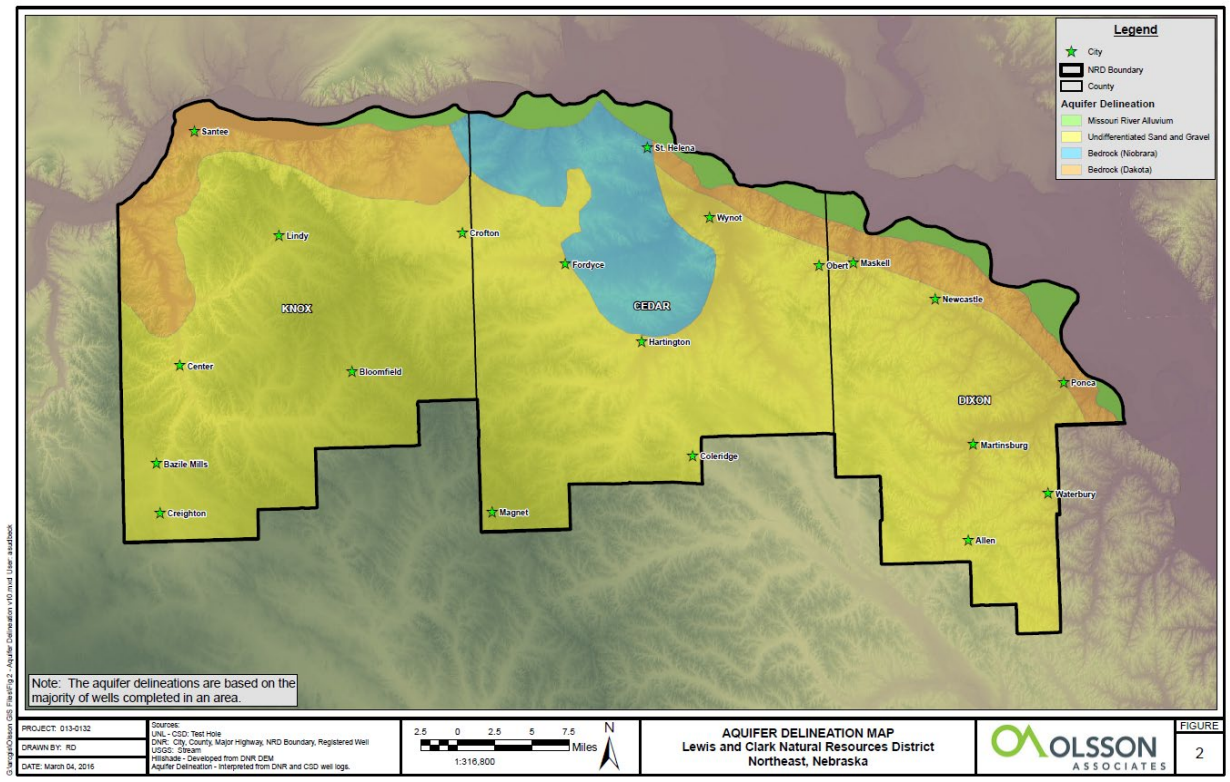


Figure 4. Aquifer delineation map based on the majority of wells completed in the area.

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.

Groundwater is used for drinking water by 16 communities and many rural residents of the district. NDEE has delineated a Wellhead Protection (WHP) Area for each of the public water supply systems to be used as a special priority area for management practices. Groundwater of the district is at risk of nonpoint source pollution most commonly from nitrate and *E.coli*. Nitrate and *E.coli* enter groundwater by leaching through the soil layers above the aquifer. The primary source derives from fertilizers (commercial and manure application) used for row crop

production, as well as from livestock production, manure storage, onsite wastewater systems, and influences to groundwater from surface waterbodies.

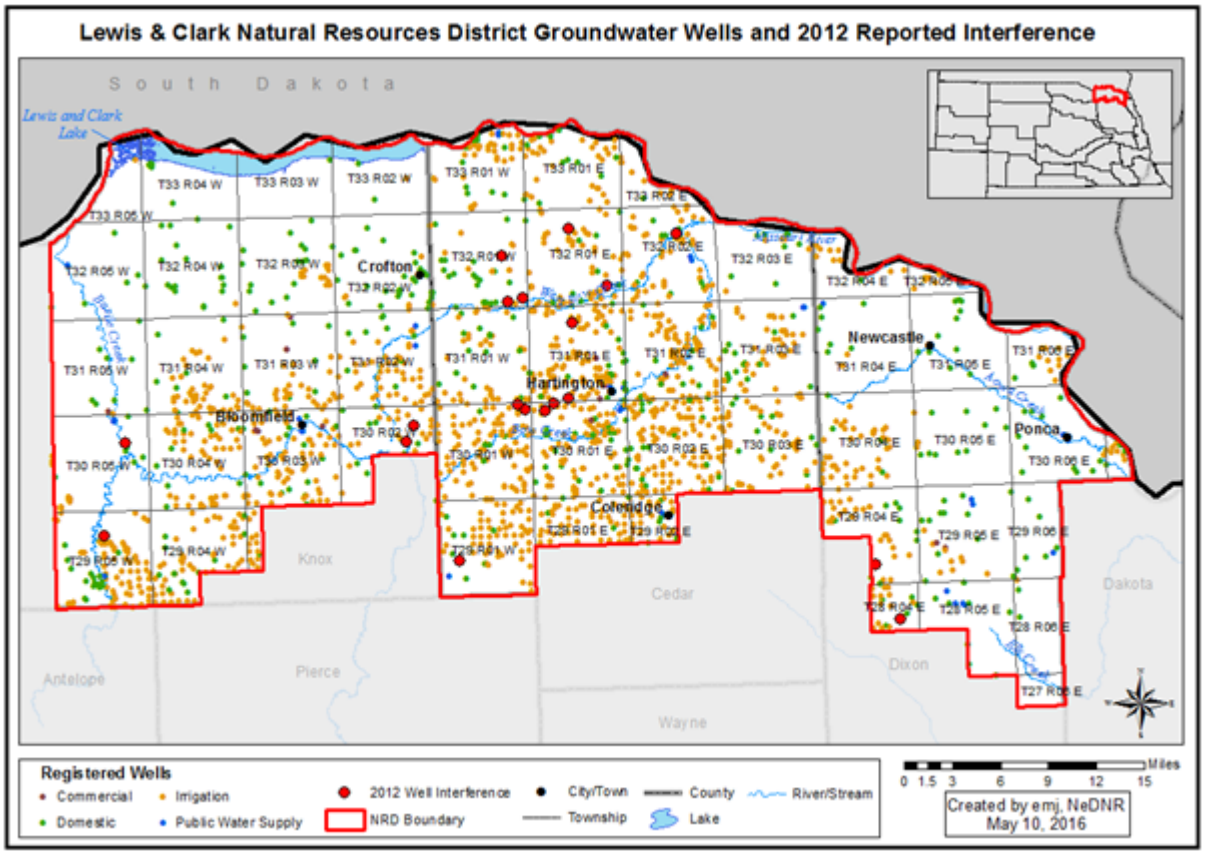


Figure 5. Distribution and types of registered groundwater wells in the District and reports of 2012 groundwater well interference.

Surface Water

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 LCNRD authorities. A map of the 10 primary subbasins of the district is provided in Figure 6.

There are 108 active surface water 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. There are no organized irrigation districts, canal companies, etc., within the district.

The quality of water in streams within the district is judged by the Nebraska Department of Environment and Energy (NDEE), according to how well the water meets three goals, called "beneficial uses." All streams in the basin are assigned the beneficial uses of Aquatic Life Support, Agricultural Water Supply, and Aesthetics and Public Health. The status of streams is

defined in NDEE's Surface Water Integrated Report and the district's Water Quality Management Plan.

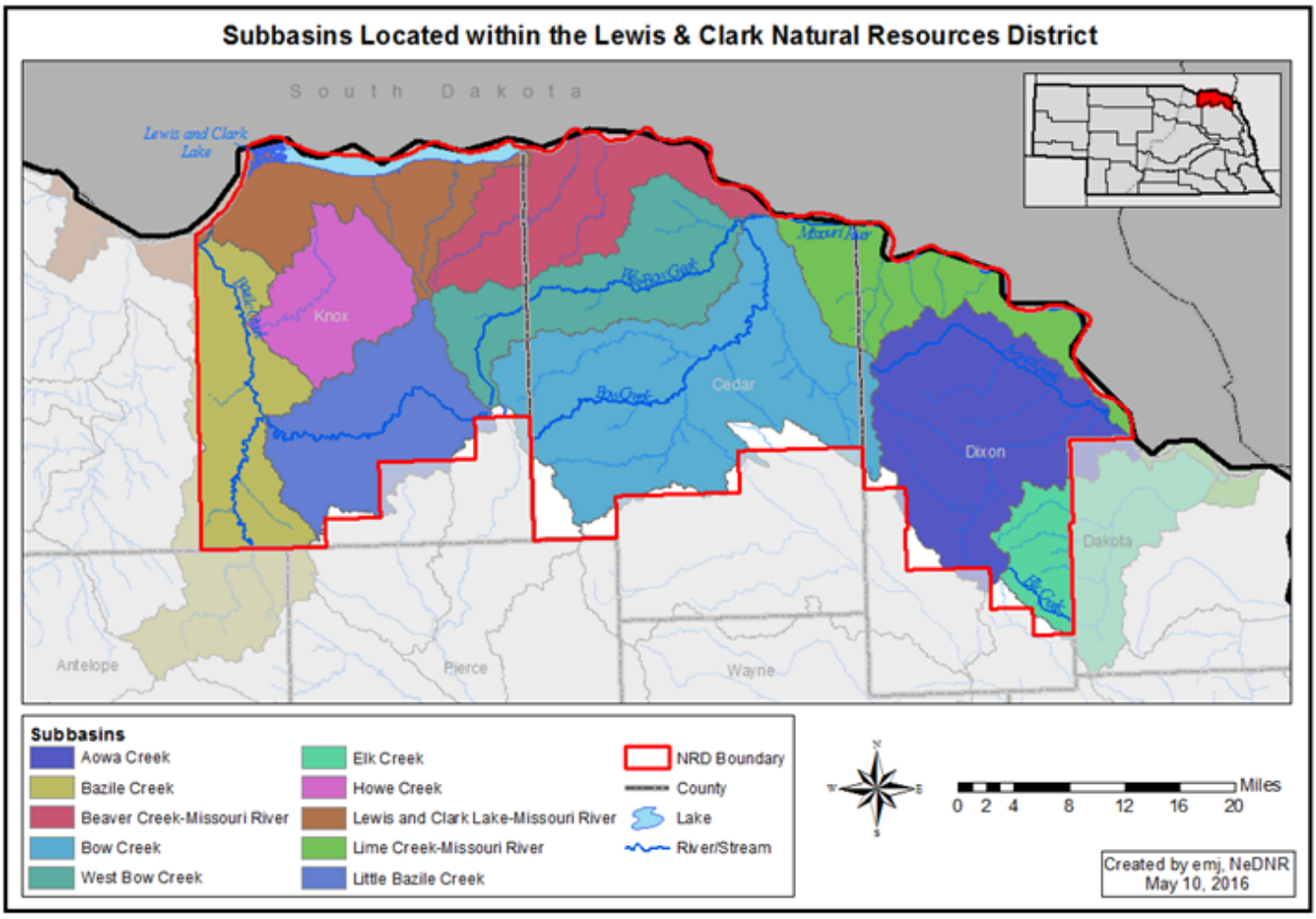


Figure 6. The ten primary surface water subbasins of LCNRD

The district operates 50 flood and erosion control dams and landowners operate hundreds of private dams. The resulting ponds and lakes along with streams in the district are most severely threatened by nonpoint source pollution, or storm runoff that carries sediment and harmful chemicals into virtually all surface water bodies.

Water Supply

Water supply for domestic use is significantly limited in the northern portion of the district. Glacial deposits make it difficult to locate and withdraw significant water supplies for domestic and stock use. Groundwater sources in the area also exhibit high levels of hardness and minerals. In response the district initiated and now administers the Cedar Knox Rural Water Project (CKRWP) which treats surface water from Lewis and Clark Lake to provide drinking water to residents in northern Cedar and Knox Counties as represented in Figure 7.

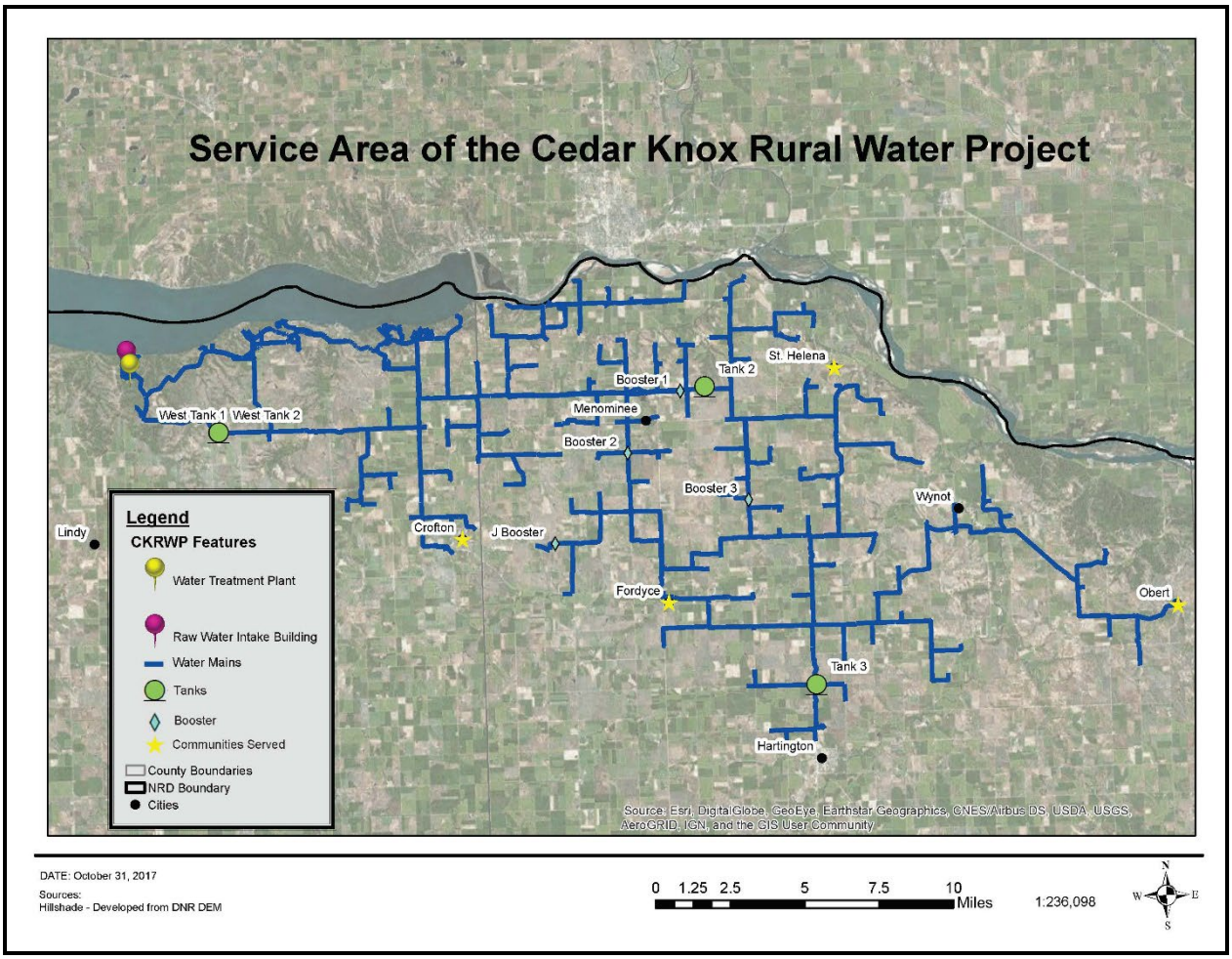


Figure 7. Cedar Knox Rural Water Project service area

Water supply across Nebraska is impacted by contaminants including nitrate-nitrogen. In response, LCNRD, along with the Lower Elkhorn NRD assisted the communities of Coleridge, Belden, Wausa, Magnet and McLean in development of a regional water system to provide water service to Belden, Magnet, McLean and rural residents.

CURRENT RESPONSES

LCNRD currently offers programs and is involved in projects that support the regulatory authority given to the NRDs by the legislature. Some of the programs are cost-share incentives, while others focus on education and public awareness. District projects vary from flood-control structures to water quality monitoring, and from joint agency interlocal agreement projects to projects solely funded by LCNRD. In addition to the 12 NRD purposes, other regulatory acts later adopted by the legislature also guide the district in some of the programs offered and projects undertaken.

SOIL CONSERVATION AND LAND TREATMENT

Lewis and Clark Natural Resources District directors identify soil conservation and erosion control as a primary resource concern. Soil erosion on cropped Highly Erodible Lands (HEL) and on grazed grassland continues to be a significant concern despite available technology, equipment, and soil health practices made available over the last several decades. LCNRD offers ongoing programs including cost-share incentive programs to address soil conservation and erosion although financial resources alone will not solve the soil erosion problem. Technical assistance, education and conservation ethics are also limiting factors that impact effective soil conservation.

The district administers state and local cost-share funds through the Nebraska Soil and Water Conservation Programs (NSWCP) to offer incentives to farmers for installation of land treatment practices. LCNRD staff also works with NRCS/FSA staff to utilize Farm Bill Programs and local NRD assistance programs to provide solutions to excess erosion.

GROUND AND SURFACE WATER

Groundwater

Groundwater Management Plan

Nebraska law requires each of Nebraska's 23 Natural Resources Districts (NRDs) to have an active and operational Groundwater Management Plan. The Lewis and Clark Natural Resources District has a Groundwater Management Plan that provides detailed information about the district, its geology, needs related to groundwater, programs, and plans.

The original LCNRD Groundwater Management Plan was adopted in 1986 and revised in 1993. Groundwater quality rules and regulations were added in 2004 and a third revision through an amendment and addition of quantity rules and regulations was made in 2014. The plan and adopted rules and regulations set guidelines for well permits, flow meters, certified irrigated acre tracking and other management components. It also allows criteria to be set for areas that become water short with rules and regulations to control water use for the shared benefit of all.

The Groundwater Management Plan identifies three Phases or Levels pertaining to quality and quantity. The entire district was declared and remains a designated Phase I Groundwater Management Area for water quality and a Level I Groundwater Management Area for groundwater quantity. As part of theses designations LCNRD monitors groundwater quality and quantity and offers educational information to constituents about maintaining the resource. LCNRD directors have designated one quality Phase III Groundwater Management Area, the Bazile Groundwater Management Area (BGMA), which was designated in 2004. Elevated levels of nitrates from nonpoint sources led to the designation. LCNRD works cooperatively with three neighboring NRDs in programs to address management, education and conservation programs for the BGMA. Five additional areas of increasing nitrate concentrations are tracked and considered for increased management as a continued increase in concentrations is observed.
There are currently no designations beyond the Level I designation for water quantity in the district.

Some of the various programs pertaining to the Groundwater Management Plan include:

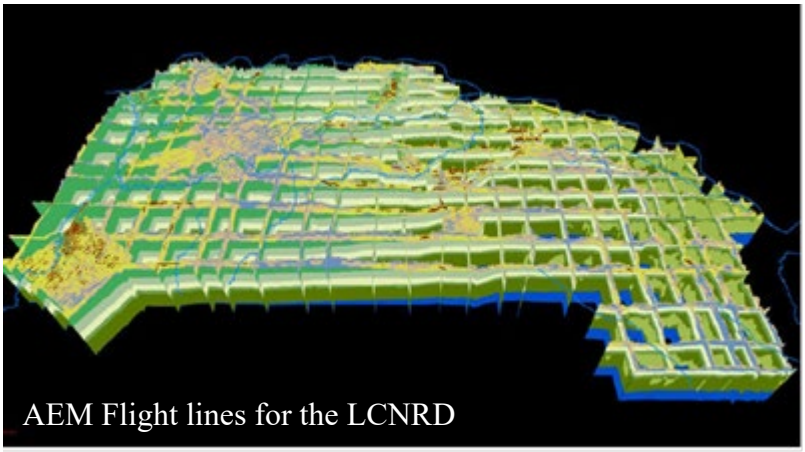
- Chemigation
- Nitrogen Certification
- Reporting
- Well Permits
- Flow Meters
- Irrigation Certification

Groundwater Monitoring/Inventory


Static water level measurements are taken semi-annually on 34 irrigation wells

A groundwater quality monitoring program has been established and is carried out based on the LCNRD Groundwater Management Plan. Approximately 220 irrigation and domestic wells across the district are sampled each spring through summer to track the level of nitrate-nitrogen in groundwater and is then reported to the Agrichemical Contaminant Database. The quantity monitoring program includes 34 irrigation wells measured for static water levels every spring and fall. Measurements are reported to U.S. Geological Survey (USGS) in Lincoln and to University of Nebraska-Lincoln Conservation and Survey Division (UNLCSD). In addition, 54 observation wells have been developed in discrete aquifers to monitor both water quality and water level trends to facilitate management of groundwater resources. Technicians collect water quality and quantity data from 48 observation wells distributed across the district and 6 multi-level observation wells in the BGMA around Creighton. These wells allow the district to track nitrate-nitrogen levels in three different layers of the aquifer from shallow to deep. Data collected through test hole drilling and sampling is being used to establish the hydro-geological framework of the district's water resources through assistance expertise provided by UNLCSD.

Because district groundwater systems are diverse and highly variable LCNRD is working with UNLCSD and the Eastern Nebraska Water Resources Assessment (ENWRA) to define the district's hydrogeologic framework through a test hole drilling program and through Aero Electromagnetic Surveys (AEM). A reconnaissance flight was completed in 2014 which included highly dispersed lines flown across the district to obtain detailed survey data and to determine effectiveness of the survey for evaluating subsurface geology. Surveys have continued through 2018 including focus surveys of WHPs, areas of concern or interest, and a 3-mile grid of the entire district.


AEM Flight lines for the LCNRD

LCNRD's use of the AEM data is on-going. The information is intended to help landowners access data showing the depth to aquifer material, the thickness of the aquifer, and other basic information. The data provides the district the ability to evaluate aquifer extent and recharge potential in addition to evaluating potential of groundwater availability. Additional AEM evaluation efforts are underway in hopes to provide more information on groundwater and aquifer characteristics. The most recent project flown in 2018 through the Eastern Nebraska Water Resources Assessment (ENWRA) is a multi-district project partially funded through the Natural Resources Commission (NRC) Water Sustainability Fund (WSF) covering areas of special interest for water quality and quantity concern or for potential as a source for the Cedar Knox Rural Water Project.

Water Supply

Although the district makes significant effort to protect existing groundwater resources, there is continued potential assistance may be requested to establish rural water districts due to water quality and quantity impacts to community water systems. Communities faced with the expense of maintaining a water system that meets all state and federal requirements can be challenging especially when faced with the need to make system modifications to meet those requirements. The district will continue to work with communities and other residents to address water supply and conflict needs and to evaluate the need for additional water projects in the future.

As a result of groundwater impacts in the district, LCNRD initiated and now administers the Cedar Knox Rural Water Project. The Cedar Knox Rural Water Project was developed in 1981 to meet the needs of water service in northern Knox and Cedar Counties. A special improvement project area, CKRWP was built and is operated entirely by user fees; no tax dollars are used in support of the project. CKRWP currently serves more than 900 rural connections, the communities of Crofton, Fordyce, Obert and St. Helena, and several sanitary improvement districts (SIDS).

CKRWP is currently evaluating the options for the source water and distribution system to address the production of Total Trihalomethane (TTHM), a by-product of chlorination, to increase plant capacity and to secure a water source for long term customer service. CKRWP is researching alternative water sources due to encroaching sediment in Lewis & Clark Lake, plant output capacity and other concerns. CKRWP and LCNRD are investigating groundwater, treatment of Missouri River water and contracting with Yankton SD as potential solutions. Groundwater research will also benefit the district and state in monitoring groundwater for the good of the area and the state.

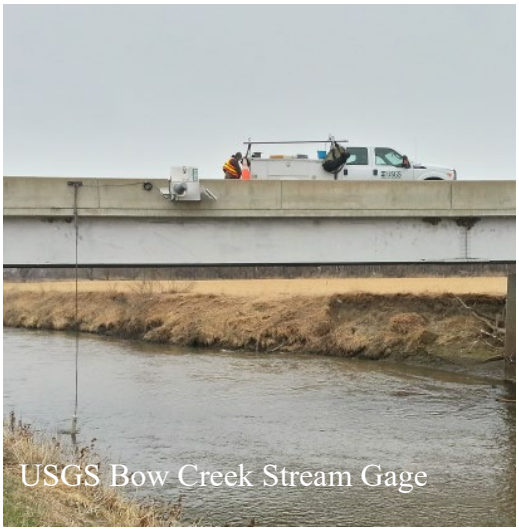
The district also co-sponsors the Wau-Col Regional Water System (Wau-Col) administered by the Lower Elkhorn NRD. Wau-Col was initiated in 2005 to help communities within the Lower Elkhorn and Lewis and Clark NRDs who were struggling to meet DHHS requirements. Wau-Col is two separate systems established under the same funding umbrella. On the west side of the system, Wausa (LENRD) provides water to the communities of Magnet (LCNRD) and McLean (LENRD). On the east side of the system, Coleridge (LCNRD) provides water to Belden (LENRD). LENRD is the primary project sponsor and oversees operation of the Wau-Col Rural Water Project. Lower Elkhorn NRD administers the Wau-Col Regional Water System which was completed in 2012 and LCNRD continues to serve on the advisory committee under an interlocal agreement.

Irrigated Acre Certification

LCNRD authorized certification of irrigated acres in 2014 and active certification began in 2019. When certifying irrigated acres is completed, it will provide a true inventory of the irrigation demands of the district, which is an important part of future groundwater management and planning. In addition to cataloging irrigated acres. When a landowner disagrees with the irrigated acres listed on their acre certification form, district staff works with a combination of sources including aerial imagery and FSA records to determine the correct irrigated acres. LCNRD staff has been actively working with NeDNR and local landowners to bring all irrigation wells in LCNRD into compliance with Nebraska Revised Statute §46-602 (7).

Surface Water

Surface water from streams and the Missouri River provide a source of water for irrigation and livestock in areas where groundwater supplies are limited. Irrigation usage is generally limited to the southern half of the district and some scattered development along the Missouri River. Supplies for irrigation are monitored with semi-annual static water level measurements.


USGS Bow Creek Stream Gage

Many of the streams in the NRD are of good quality while several are listed on Nebraska's 303d list of impaired water bodies. Portions of the Bow Creek and Bazile Creek watersheds are impacted by contaminants including *E.coli* and nutrients and are listed on Nebraska's 303d list. Present

programs are aimed to determine quality status by monitoring efforts of scope and trends. Programs are being developed with NDEE to address impairments in the identified impacted watersheds.

Water Quality Management Plan

In 2019, the district completed development of a districtwide Water Quality Management Plan (WQMP) that more closely evaluates the quality of water resources with an emphasis on surface water. The WQMP was jointly developed with NDEE and identifies the Bow Creek as the priority watershed within the district due to high levels of *E.coli* contamination. Two segments of the Bazile Creek were identified as special priority areas in the plan. The district is planning to hire a watershed coordinator to implement a watershed project in the Bow Creek with focus on adoption of best management practices by producers to reduce the pollution entering lakes, rivers, streams, wetlands and groundwater. Additional projects in the special priority areas of Bazile Creek may be undertaken by the NRD or other conservation partners including the Santee Sioux Tribe or the City of Creighton who can utilize the plan as a mechanism to secure funding for projects.

The large number of acres dedicated to agriculture in the district will make the realization of significant improvements in surface water quality difficult. However, LCNRD along with other agencies, is dedicated to making improvements through partnerships to implement conservation on practices that benefit water quality on agricultural land.

Integrated Management

Integrated Management-Hydrologically Connected Area

NeDNR has identified and mapped those areas in the district where the surface water supplies are considered to be hydrologically connected to the groundwater. NeDNR is currently in the process of updating the mapped hydrologically connected areas of the district. LCNRD will work closely with NeDNR to ensure the representation of hydrologic connectivity is as accurate as possible for the region of highly diverse geologic material. The current extent of these areas is generally the alluvium along the southern end of the Bazile Creek located in southwestern Knox County.

Integrated Management – Voluntary Integrated Management Plan

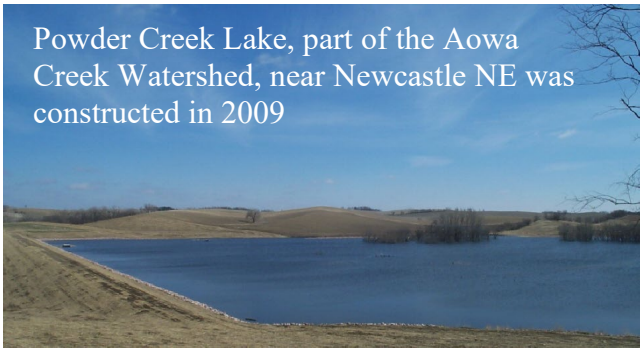
LCNRD and NeDNR have taken a proactive, comprehensive approach to sustaining the future water needs in the district through adoption of a voluntary Integrated Management Plan (vIMP) adopted in 2016. Some integrated management plans in Nebraska focus on management of the hydrologically connected ground and surface waters, however, the LCNRD plan is focused on integrating the management of all water supplies and uses within the district. Agriculture irrigation is an important water use in the district where adequate groundwater supply is available. Irrigation expansion is expected to continue in areas where adequate groundwater can be located. A growing trend toward rural residences will likely increase the need for domestic and stock water uses which will be both critical and challenging to satisfy.

The three goals of the vIMP are 1. to develop and maintain a district-wide water inventory, 2. protect existing water uses while allowing for future water development, and 3. increase public awareness and understanding of integrated water management. The voluntary Integrated Management Plan requires an annual exchange of information and report of activity over the last year related to IMP goals and objectives. It also requires a biennial review by LCNRD and NeDNR of the entire plan.

FLOOD CONTROL AND DAMAGE REDUCTION

LCNRD annual rainfall averages 22 to 24 inches and together with rolling hills and loess soils results in significant flooding potential. The district has been active in providing flood control and grade stabilization through construction of dams. Including three structures financed by the Natural Resources Commission; Antelope Creek (1986) and Aowa Creek (1980 & 2009).

The majority of the structures completed have been in the Aowa Creek Watershed of Dixon County where a PL-566 Watershed Project was completed with 50 grade stabilization and flood control dams installed by 2004. The project encompasses 55,000 acres and provides flood protection benefits to rural residents and the communities of Newcastle and Ponca.


Powder Creek Lake, part of the Aowa Creek Watershed, near Newcastle NE was constructed in 2009

The Antelope Creek Project in Cedar County called the Chalkrock Wildlife Management Area controls drainage off 11,500 acres and is a multipurpose structure that provides recreation. The land Chalkrock Lake is built on was donated by area farmers for flood control. An additional structure completed in the Beaver Creek Watershed protects rural property owners and the unincorporated community of Aten.

Monitoring and maintenance continues for the projects where LCNRD is the local sponsor. Much of the maintenance includes clearing of debris from high water and beaver activity, noxious weed control, channel preservation and other basic maintenance. Partners include the Natural Resources Conservation Service, Natural Resources Development Fund, and the Department of Natural Resources.

The district continues to consider the need for flood control and grade stabilization projects in the district. LCNRD offers limited local assistance for the construction of small dams that can help counties and/or landowners protect county roads, control erosion and provide water for livestock and wildlife

INFORMATION AND EDUCATION

Information and education efforts of LCNRD focus on making the public aware of NRD activities and conservation in the district and the state. The district provides conservation

material to residents through printed and digital materials. An assertive approach to education is necessary to promote the message of conservation.

The district provides public information through many avenues. The LCNRD website, lcnrd.nebraska.gov, provides information on programs and projects, public use areas, the Board of Directors, staff, the fiscal budget, statutes and more. The district distributes a minimum of three press releases about current activities to local newspapers each month. Two of the local newspapers include a dedicated LCNRD page in their papers one time per month. Programs and projects are featured in radio advertisements as deemed appropriate throughout the year. The district strives to maintain good working relationships with local and regional media outlets.


Area Range Judging Contest

The Lewis and Clark NRD offers youth education services to promote and encourage curiosity about nature and the outdoors. Youth education services are provided through a variety of programs as requested by the schools and include information about water resources, soil conservation, and forestry/wildlife habitat.

LCNRD works with neighboring NRDs and other partner agencies to carry out several youth education programs throughout eastern Nebraska including AquaFest (4th and 5th grade), Wonderful World of Water (middle school), Range Judging (high school), and Land Judging (high school). LCNRD offers 2 scholarships to graduating high school seniors planning to attend college with a major that relates to natural resources or agriculture. Instilling the importance of natural resource protection and conservation provides an effective mechanism for continued stewardship in the future.

FORESTRY AND RANGE

The Lewis and Clark NRD offers a tree program for landowners to purchase seedling trees and shrubs for spring planting suitable for windbreaks, wildlife habitat, and many other uses. Cost-share assistance is available.


Tree plantings benefits the land and wildlife

Forested acres in the district are limited and protection and enhancement woodlands provide important habitat for wildlife and vegetation. Forested areas are limited to approximately 5 percent of the Lewis and Clark NRD total land use and are located mostly along the bluff areas bordering the Missouri River and farmstead windbreaks. Native rangeland and pasture areas account for approximately 33 percent of the total acres in the district. Grasslands areas are at risk of over grazing which affects plant composition and can cause excessive erosion and impacts to ground and surface water. Grazing management and grassland improvement practices

offer increased protection of the resource. Maintenance and improvement practices implemented on forest and range land also frequently benefit wildlife.

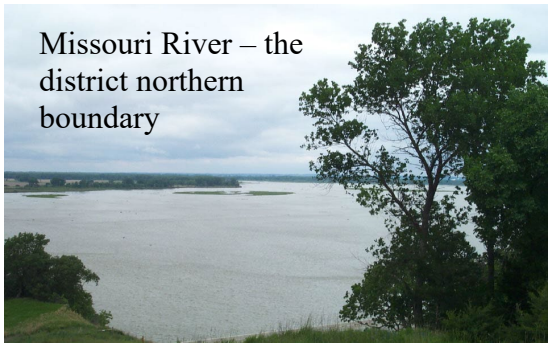
WILDLIFE HABITAT

Acres set aside for wildlife habitat

Recognizing that wildlife is an indicator of healthy resources in the district and that habitat for wildlife is the most limiting factor of any species, LCNRD has identified an obligation for a strong commitment to this resource area and the resulting benefit it provides. The district has a wide variety of native and adapted fish and wildlife species. Surface waters are mainly classified as warm water rivers, streams and ponds. Vegetation varies from cropland, to pasture, to native range over rolling hills intermixed with woodland mostly along streams or at farmsteads. The Missouri River, Lewis and Clark Lake, lakes of significant size created by NRD structures, and larger streams of the district are notable features that provide significant fish and waterfowl habitat.

The diverse habitats and wildlife communities of the district fluctuate with climate and private land use change. Efforts of the district are directed towards maintaining and improving habitat, not only for the sake of wildlife but for the intrinsic benefits to soil and water resources. LCNRD works cooperatively with private landowners, NRCS, and/or the Nebraska Game & Parks Commission to enhance district wildlife habitat.

MISSOURI RIVER / RECREATION


Missouri River – the district northern boundary

The northern boundary of LCNRD runs adjacent to the Missouri River where there is significant opportunity for recreation. Fishing, hunting and water related activities are important to the district making the Missouri River resource a valid project purpose to consider in formulation, design and management of recreation efforts. The present public facilities provided at Lewis and Clark Lake and along the Missouri River draw a substantial number of visitors both locally and regionally. The district sees a need to provide complementary public facilities as well as access to private lands along the Missouri River.

Based on the responsibility outlined in Nebraska Revised Statute § 2-3229, LCNRD may develop and manage recreational and park facilities. These facilities include community trails, lakes, and wildlife management areas.

Trail Corridors

The district has one completed multi-use trail project of approximately 1.2 miles in length located along the Missouri River which runs from just east of Gavins Point Dam to the west side of Aten.

Lakes and Wildlife Management Areas

The district owns three recreational lakes which are managed by the Nebraska Game and Parks Commission as Wildlife Management Areas. The recreational lakes include Powder Creek, Buckskin Hills, and Chalkrock.

Sealing wells keeps pollutants from entering groundwater

POLLUTION CONROL

Pollution Control is primarily managed as part of other management responsibilities in the NRD including through soil and water conservation measures addressed as priorities. The district also carries out state required programs as detailed in the section titled "Regulatory Programs" which includes the Chemigation Program and the Erosion and Sediment Control Program which address pollution sources in the district.

SOLID WASTE DISPOSAL AND DRAINAGE IMPROVEMENT

Nebraska Revised Statute §2-3229 assigns limited general responsibilities to Nebraska Natural Resources Districts relating to solid waste disposal and drainage improvement projects. Work under these authorities does not currently carry a high priority for the LCNRD board of directors (October 2019). Drainage issues, as defined by statute, have not been publicly raised to LCNRD and solid waste disposal has largely been addressed by state and local agencies. LCNRD remains open to future concerns related to drainage and solid waste.

REGULATORY ACTS

There are three regulatory acts that direct NRDs in their programs and projects.

Groundwater Management and Protection Act

This act defines broad policy goals concerning the utilization and management of groundwater and encourages local implementation of these goals. The Act grants enough groundwater to landowners to meet reasonable and beneficial use needs, and grants authority to local Natural Resources Districts to regulate groundwater use. The Act also discusses the required contents of groundwater and integrated management plans, groundwater management areas, groundwater contamination, allocation, and permitting requirements.

Erosion and Sediment Control Act

This Act represents a commitment by the State of Nebraska to reduce erosion of Nebraska lands and to reduce sedimentation and other problems that result from that erosion. The purpose of the Erosion and Sediment Control Act is to strengthen the already existing erosion and sediment control efforts of the individual landowners and of the federal, state and local governments. The Act's purpose will be accomplished by:

- Establishment of a system for the filing and processing of complaints concerning land where erosion is exceeding the soil loss limits established in accordance with the Act and whose sediment is causing damage to the complainant.

- The State and each Natural Resources District is to develop comprehensive and coordinated erosion and sediment control programs.

Nebraska Chemigation Act

The goal of this Act is to protect the groundwater and surface waters of the State from contamination by fertilizers or pesticides. To accomplish this goal, the Act provided the legal requirements for the future use of chemigation as a means of nutrient or pesticide application.
The Nebraska Department of Environment and Energy developed and implemented the rules and regulations necessary for irrigators to utilize the practice. Under the NDEE rules, the Natural Resources Districts were given the responsibility to manage the chemigation permit component that ensures that proper safety equipment is present and functioning properly.

ASSISTANCE/COST-SHARE PROGRAMS

LCNRD assists landowners in paying for improvements designed to enhance conservation of natural resources through cost-sharing programs. Each year, LCNRD cost-shares with approximately 75 or more landowners who make improvements to reduce soil erosion, enhance ground and surface water quality, or positively impact other resources concerns. In providing these cost-sharing programs, LCNRD works with partner agencies including:

- Natural Resources Conservation Service (NRCS): NRCS is a part of the United States Department of Agriculture (USDA), a federal agency with an office in most counties. NRCS provides technical assistance to install conservation practices, including design and layout of projects.

- Nebraska Department of Natural Resources (NeDNR): NeDNR is a state agency that allocates state funds to each Natural Resources District for cost-sharing on conservation practices. LCNRD prepares and inspects the cost-share claims with assistance from NRCS and they are then processed by NeDNR for payment.

The amount of LCNRD cost-share provided varies from program-to-program and year-to-year. Occasionally the district designates targeted areas where the cost-sharing is even higher than the listed amount to encourage best management practices in those areas.

Water Programs

Several cost-share programs are focused on improving groundwater quality. Eligibility for groundwater cost-share for district approved practices is dependent upon the acres being located within areas designated as a quality Phase or quantity Level areas of management, however, some programs are available district wide. These measures lead to better quality ground and surface water. Cost-share availability and terms may vary by the different program areas in the district. Programs relating to groundwater include the following:

- Flow Meter Program
- Chemigation Program
- Deep Soil Sampling Program
- Sealed Well Abandonment Program
- Irrigation Management (pivot nozzles, etc.

Land Treatment

The district offers programs to assist landowners in land treatment. Some of these treatments provide an opportunity for cost-share between the property owner and the district. Those land treatment programs include:

- Cover Crops
- Filter and Buffer Strips
- Flood Control Structures
- Tree Plantings
- Surface Water Quality Best Management Practices (terraces, grassed waterways, etc.)

Buffers planted along streams provide a filter between crops and streams

Urban Projects

LCNRD offers the Community Assistance Program (CAP) to aid cities and communities with local projects to address conservation needs for public benefit.

DIRECTION FORWARD

FUTURE NEEDS

The Lewis and Clark Natural Resources District is committed to natural resources conservation, protection and improvement. Protecting soil resources from abuse and erosion, whether the soils are put to agricultural, urban, recreational or industrial uses, will continue to be a priority focus of the district's technical, educational, and financial resources. Protecting water resources from overuse and contamination regardless of the origin is also a priority of the district and is a significant use of technical, educational, and financial resources. Reducing threats to property and lives from flooding also remains a top priority. The NRD, among local and state governments, is ideally structured to effectively address these critical natural resources issues. Environmental, political and financial times are constantly evolving; therefore, the district will continue to change in order to be able to address resource concerns effectively.

Soil conservation is a rural as well as an urban problem, and the nature of the problem has expanded from maintenance of crop-growing productivity to one of nonpoint source pollution by sediment, nutrients and chemicals. This nonpoint pollution threatens to contaminate both surface and groundwater, to fill lakes and streams with sediment, to impair recreation and fish and wildlife habitats and to cause property damage. Future district efforts must include education, financial assistance, technical assistance on the latest and most effective best management practices, and a mixture of both voluntary and regulatory applications.

Protection of both the quantity and quality of the district's groundwater resources will continue to be important and of greater importance in the future. The district will strive to ensure everyone, everywhere in LCNRD, will have access to adequate water supplies of appropriate quality. Protection of community water supplies from depletion or contamination will continue to be monitored by the district. Provisions for rural water supplies and distribution systems could increase in importance as the rural population grows impacting demands on the limited groundwater resource.

The traditional approaches to controlling floods with dams, channel improvements, and levees will continue to be considered where justified, however nonstructural practices will be more frequently utilized in flood management. The district acknowledges that floods are likely to occur and developing strategies and programs to reduce property losses and threat to lives is an important step for the district. Successful implementation of such practices will require long-range planning, cooperation with other local governments and agencies, use of science, technical assistance, education, and financial assistance.

Soil conservation and flood management, along with other resource issues, are better addressed on a comprehensive basis -- that of regional watershed basins. Many resources issues are interrelated and can be most effectively approached with programs and projects that recognize these relationships. Flexibility and adaptation by the district will be needed to have successful programs.

Education efforts will remain a priority for the district. Preparing the next generations for conservation stewardship and leadership is essential to the long-term successful management of our natural resources. LCNRD must consider the transition to social media, podcasts and other forms of outreach to educate those living in the district. A high percentage of youth and young adults prefer social media and digital sources of information over traditional methods of distribution.

The population of the district will likely remain somewhat constant with the majority living in the community setting and on farm or nonfarm acreages. The stresses and conflicts over land uses will likely increase, making comprehensive, long-range planning necessary.

As land use changes occur threats to unique resource areas may increase. The district, often in collaboration with other private and government organizations, is well suited to provide protection to wetlands, native prairies, woodlands and stream corridors. Flood plain easements, conservation and preservation easements, acquisition, and local zoning regulations are some the tools available to protect such unique areas.

The demand for open space and outdoor recreational opportunities will likely increase as land use changes occur across the district. While the state and communities within the district provide many of these opportunities, the district provides for a number of recreational areas, and has the authority to develop and manage areas and regional recreational spaces.

Interagency cooperation and collaboration with the private sector will be the rule rather than the exception in the future, just as it is today. Effectiveness and efficiency can best be obtained through cooperative efforts with the different partners playing different roles in each cooperative venture. In some cases, LCNRD will be the lead agency and in others will provide only minimal effort or support.

Innovative financing will be necessary to enable the district to maximize its responsibilities. Limitations on property taxes may require the district to seek grants, loans, and cost-share arrangements. Financing must be reviewed on the long-term, rather than annually, to allow the district to be positioned at the proper time to implement successful programs and projects.

The district must recognize changes occurring in our climate and adapt to those changes. The district should not necessarily concentrate on the cause, but rather on recognizing the effects and how to deal with change.

GOALS, DESIRED OUTCOMES, AND OBJECTIVES

The Master Plan is the document that expresses the board of directors' vision of the future and shapes the direction and activities of the Lewis and Clark Natural Resources District. Objectives define strategies or implementation steps to attain the identified goals.

The district must be a conservation leader for the residents, landowners, businesses and governmental agencies and through example, education and programs encourage and assist them to be responsible conservationists. Working together, our natural resources will flourish.

GOALS AND OBJECTIVES TABLE

The objectives are reflected in the district's Long-Range Implementation Plan (LRIP) as actions to be taken toward accomplishing the goals.

RESOURCE	GOAL	OBJECTIVES
SOIL CONSERVATION AND EROSION CONTROL	Address land treatment needs on district acres by increasing use of best management practices on erodible cropland and grassland.	1. Provide cost-share incentives for soil and water conservation practices that reduce soil erosion from cropland or grassland.
		2. Re-establish grass vegetation on marginal land by providing support for enrollment in conservation or habitat programs.
		3. Provide technical assistance support staff to facilitate the promotion of conservation practices through cooperative agreements.
		4. Promote conservation ethics through educational programs, demonstrations, awards and/or soil stewardship activities.
		5. Sponsor and promote construction of buffer strip practices.
		6. Monitor Conservation Agreement Plans for continued maintenance of existing land treatment methods.
		7. Continue education efforts of directors and staff on modern soil conservation and management techniques.
		8. Enforce compliance within tolerable soil loss limits according to the Erosion and Sediment Control Act.

GROUND AND SURFACE WATER RESOURCES	***WATER QUALITY & QUANTITY***	
	Protect the quantity and quality of groundwater and promote efficient, effective management of both ground and surface water to minimize potential quantity impacts and contamination.	1. Semi-annually monitor LCNRD water levels to evaluate groundwater supply.
		2. Annually monitor water level data from transducers installed in observation wells of discrete aquifers of the district.
		3. Increase knowledge and understanding of district aquifers and available water supply using test hole drilling, observation well development, AEM surveys, and the best science available.
		4. Promote and support adoption of best management practices to positively impact ground and surface water resources.
		5. Encourage proper irrigation management to conserve groundwater resources and reduce groundwater contamination.
		6. Implement the district's vIMP to address ground and surface water quantity concerns.
		7. Administer the chemigation permitting and inspection program to protect groundwater supplies from chemical contamination.
		8. Attempt to resolve water use conflicts by working with both sides to seek a mutually acceptable solution.
		9. Annually monitor groundwater quality from irrigation, domestic and stock wells throughout LCNRD for nitrate-nitrogen levels and periodically for pesticides.
		10. Annually monitor multiple parameters of groundwater quality of discrete aquifers from dedicated observation wells.
		11. Annually evaluate areas of quality or quantity concern for groundwater management needs.
		12. Coordinate solutions for contaminated water supplies with partners and stakeholders.
		13. Implement groundwater rules and regulations in areas that meet thresholds for quality Phase and quantity Level management.
		14. Investigate nutrient and sediment control in surface water of the district.
		15. Implement the district's WQMP to address priority and special priority areas of ground and/or surface water contamination.
	WATER SUPPLY	
	Protect and conserve water supplies through efficient and effective management and strive to identify adequate alternative sources when quantity and/or quality supplies are not available.	1. Participate in identifying alternative water supply through rural water projects and work to establish expanded or separate systems where economic potential and dedicated local interest warrants such action.
		2. Educate and/or train directors and staff about water supply management and Clean Water Act requirements.
		3. Provide guidance to communities and individuals about alternative sources for drinking water.
		4. Promote Wellhead Protection programs with communities to protect and prevent contamination of public water supplies.

FLOOD CONTROL AND DAMAGE REDUCTION	Work toward completion of active watersheds and their correlating land treatment and to continue planning efforts on other watersheds in the District.	1. Reduce flood damage in watersheds by providing sponsorship to build structures.
		2. Maintain existing watershed structures in functional condition for continued flood control.
		3. Reduce damage from flood by assisting individuals, communities, and county boards.
		4. Provide cost-share assistance to private landowners for flood control structures, grade stabilization practices, and other conservation practices to reduce erosion and sediment runoff.
		5. Work with individuals, communities, and counties on flood prevention solutions to reduce damage from heavy rain events.
		6. Work with agencies, communities and counties to develop plans to address flooding impacts.
INFORMATION AND EDUCATION	Inform the public of the purpose, function, and activities of the NRD and express the importance of natural resource stewardship.	1. Provide routine and special LCNRD press releases about NRD activities.
		2. Annually distribute information about natural resources conservation to churches, schools and other public institutions.
		3. Focus on youth education programs to encourage conservative natural resource use and stewardship in the future.
		4. As necessary host public information meetings about natural resource issues for the benefit of those affected.
		5. Strive to educate directors and staff in all methods of resources management.
		6. Provide award programs of recognition for those who strive to improve resource conservation.
		7. Promote demonstration projects and tours to allow public viewing of conservation efforts and programs.
		8. Provide local government, specifically counties and cities, information on NRD activity.
FORESTRY AND RANGE MANAGEMENT	Conserve, improve and increase forested, range and pasture land.	1. Assist landowners in establishing tree belts by providing an annual tree planting program.
		2. Provide cost-share for planting trees and seeding grass.
		3. Encourage establishment of conservation and riparian buffers.
		4. Encourage tree and grass planting with local landowners for establishing or re-establishing forested land or grasslands.
		5. Utilize information and education programs to promote efficient forest and grassland management on private land.
		6. Assist communities in developing tree and landscape projects through the Community Assistance Program.

MISSOURI RIVER / RECREATION	Provide recreational opportunities on private land and through select public facilities for outdoor recreation.	1. Cooperate with Nebraska Game and Parks Commission in management of existing Wildlife Management Areas or State Recreation Areas for public use.
		2. Work with the Missouri Sedimentation Action Coalition and the US Army Corps of Engineers to mitigate sediment entering Lewis and Clark Lake.
		3. Continue support of the Missouri National Recreational River concept and participate in its implementation on a federal level.
		4. Work with private landowners and the US Army Corps of Engineers to accomplish needed maintenance of Section 32 Bank Protection installations along the Missouri River.
		5. Assist communities, residents and other partners in the planning and design of conservation and park development.
		6. Provide incentives for public access to lands enrolled in the Wildlife Habitat Improvement Program.
		7.Maintain or establish public use trails to promote resource awareness and wellness benefits.
SOLID WASTE AND DRAINAGE	Facilitate, where necessary, the proper management of solid waste disposal and assist with individual requests for solutions on drainage problems.	1. Work with communities and private landowners to resolve conflicts and help them retain adequate technical guidance for potential solutions within the authority of the NRD.
		2. Review livestock waste control facility permit requests to determine if they pose a risk to groundwater quality or other natural resources in the district.