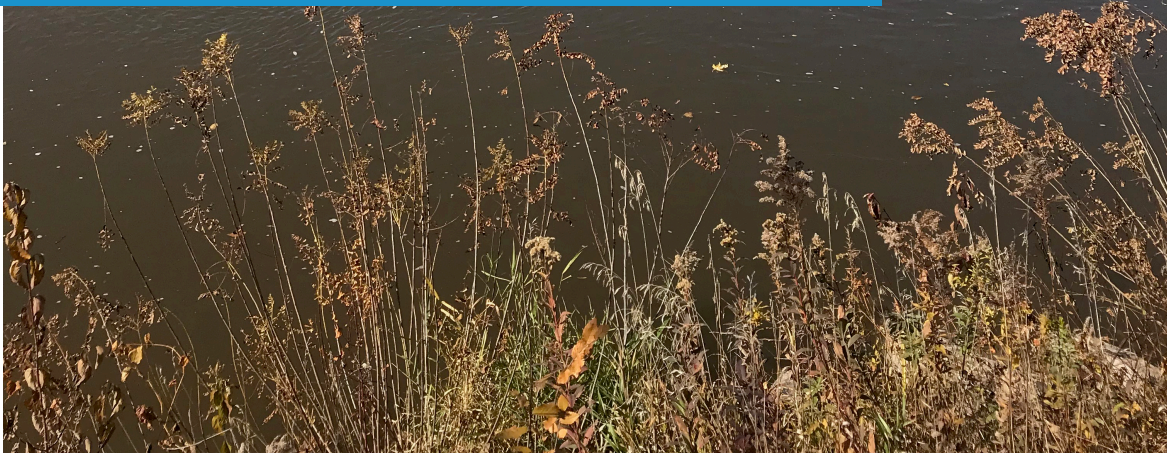




2020 Master Plan



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Introduction -

MASTER PLAN

The Lower Elkhorn Natural Resources District (LENRD) staff, under the guidance of the district's Board of Directors, has prepared the LENRD's Master Plan. The 2020 Master Plan, as approved by the board of directors, will replace the outdated master plan prepared in 2010, as required by state statute.

In Nebraska, we are truly fortunate to enjoy productive soils, flowing creeks, rivers and groundwater, rolling hills lush with prairie grass, and serene forested river valleys. These precious natural resources are managed by our nationally unique watershed-based system in cooperation with landowners. We are the only state that has established this progressive statewide system of Natural Resources Districts (NRDs).

As a political subdivision of the State of Nebraska, the LENRD serves citizens in all or parts of 15 counties in northeast Nebraska and is governed by a 15-member, locally elected, Board of Directors. This Master Plan will highlight past accomplishments, briefly explain current programs and projects, and define challenges and opportunities for the next 10 years.

A historical review of the LENRD is provided, describing how the district's current conservation system evolved from the original county Soil and Water Conservation Districts into the modern, dynamic NRD system of "Grassroots Government" which is unique in the United States.

The physical nature of the district is provided, describing topography, soils, climate, vegetation, water resources, fish and wildlife, and population. Most of the land surface within the LENRD is agriculture-based. LENRD programs and projects address a wide variety of issues, including flood control, soil erosion, water quality, and outdoor recreation.

The major feature of the master plan is the response to the GOALS AND OBJECTIVES as approved by the LENRD Board of Directors (revised -1993). These GOALS AND OBJECTIVES are the foundation of the district's policies and are related to all programs and projects. The GOALS AND OBJECTIVES reflect the authority and direction in which the LENRD has moved, since 1972, and will continue to proceed in the next 10-year planning cycle while very closely following the LENRD's responsibilities as provided by state statute.

As public demand for the management of natural resources grows more intense, significant soil and water conservation efforts continue to be provided by the LENRD to rural areas as well as a

variety of programs offered for urban conservation. Strong effort is made to respond with a comprehensive, proactive approach to solving conservation issues rather than a reactive style. Success is achieved by following the MASTER PLAN GOALS AND OBJECTIVES.

LEGAL AUTHORITIES

The Nebraska Legislature enacted laws in 1972 consolidating 154 special purpose entities into 24 (later merged to 23) Natural Resources Districts (NRDs). These districts have broad authority to manage related resource needs while protecting soil, groundwater, wildlife, and forestry resources. The Unicameral altered formal planning for the state's 23 NRDs with passage of LB 783 (Revised Statutes of Nebraska, 1943, sections 3-3201 through 2-3261) in 1978. Local property taxing authority was granted to fund projects and programs and those funds comprise approximately 1/3 of the total annual budget.

As required by Section 2-3276, each district shall prepare a Master Plan every 10 years, focusing on NRD purposes set forth in Section 2-3229 including:

1. Erosion prevention and control
2. Prevention of damages from flood waters and sediment
3. Flood prevention and control
4. Soil Conservation
5. Water supply for any beneficial use
6. Development, management, utilization/conservation of ground 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
12. Forestry and range management

MISSION STATEMENT

“STRIVING TO IMPROVE THE QUALITY OF LIFE FOR ALL CITIZENS OF THE LOWER ELKHORN NATURAL RESOURCES DISTRICT BY PROMOTING AND DEMONSTRATING SOUND METHODS OF STEWARDSHIP WHICH CONSERVE, DEVELOP, AND MANAGE ALL NATURAL RESOURCES.”

Historical Perspective

PAST & PRESENT

It is often wise to look in the rear-view mirror to keep from losing our direction. This district is no different than any other NRD, proud of many past accomplishments, but realizes that many issues still fill our agenda. Many efforts to conserve, develop, and protect Nebraska's natural resources are ongoing.

Nebraska has a long and colorful history of soil and water conservation. Never afraid to be bold and creative, several key leaders and state senators forged a new way of thinking and doing business in order to manage and protect our vast natural resources with creation of the NRD system. As innovative as the Unicameral (One House Legislature) born in the 1930's, the NRDs are often called "Grassroots Government." Unique in the United States, the NRDs today are a model for the nation, and the envy of many.

Historically, when the Legislature responded to soil and water conservation problems, the response was to create special-purpose governmental units that worked to resolve specific issues, but often without enough funding or authority to provide effective solutions. By the late 1960s, more than 500 of these entities existed, including: irrigation districts created in 1895; drainage districts formed in 1905; Soil Conservation Districts in 1937 (one in each of the 93 counties) and later called SWCDs, adding "water" in the 1950s; watershed districts organized in 1959; rural water districts in 1967; advisory watershed improvement boards; reclamation districts; and sanitary/drainage improvement districts. All functioning at the local level.

For many years, several state agencies were empowered to address natural resource problems, from weeds to predatory animals. This approach to management was ineffective and overlapping. In 1969, the Unicameral passed LB 1357, the basic reorganization and consolidation law replacing 154 special-purpose districts, and in 1970 the state Soil and Water Commission (parent to the Nebraska Natural Resources Commission) began to define the watershed boundaries that made up 24 NRDs. On July 1, 1972, the NRD system officially began operation and in 1974 the first permanent board of directors was elected to serve each district. The NRDs were named according to river basin locations with watershed boundaries. After the merger of the Papio NRD and the Middle Missouri Tributaries NRD into the Papio-Missouri River NRD in 1989, there are now 23 districts. Created as stand-alone agencies, the NRDs are charged with 12 specific areas of authority and are responsible for setting local priorities utilizing property tax funds. Since 1972, we have grown stronger as our youthful exuberance matures into competent decision making.

Historic roots for many in northeast Nebraska today are entwined deeply into the period of westward expansion following the Civil War. Settlers pushed forward searching for economic opportunity and religious freedom. Pioneers of European descent settled the lush Elkhorn Valley. On May 14, 1866, 42 German families consisting of about 125 people started for Nebraska territory. They came in a 3-train caravan of prairie schooners from Ixonia and Watertown, Wisconsin and arrived on July 17, 1866. Attracted by rich farmland and many trees along the Elkhorn River they were soon joined by others from Wisconsin and formed the village of Norfolk (officially founded in 1881), building a grist mill operated by hydro power on the North Fork of the Elkhorn. After statehood on March 1, 1867, many other immigrants also came to northeast Nebraska, predominantly from Ireland, Sweden, and Czechoslovakia. They eventually lived peacefully with Native Americans in the area and with sweat and toil founded the 50 communities that today account for the population in the Lower Elkhorn Natural Resources District (LENRD).

Most of the early pioneers were farmers and by many accounts were very successful raising crops of corn and hay, and even sugar beets at one time. As these early settlers set about the hard work of tilling valleys and rolling hills in fertile soils with horse drawn equipment, they soon understood that Mother Nature did not always provide bountiful harvests. Over the years they battled drought, soil erosion, and flooding from heavy spring and summer thunderstorms. Most farming communities survived and prospered, and citizens today recall their heritage with pride.

The LENRD declared soil erosion as the top priority for programs and expenditures in the early 1970s, continuing the work of the SWCDs. The rolling hills of northeast Nebraska are still farmed extensively, with corn and soybeans as the primary row crops. With relatively deep soils and long, steep slopes, the LENRD fights a continuous battle against wind and water erosion. A very aggressive cost-share program designed to install structural conservation practices (terraces, waterways, sediment basins, and farm ponds) on farmland has produced the saving of enormous volumes of topsoil. Millions of dollars from years of local/state NRD funding combined with state cost-share funds have provided farmers with tools to combat this nemesis of Mother Nature. Sedimentation is the major surface water pollutant, heightened by severe flooding that occurs in the Elkhorn River Basin.

The LENRD originated a Lands for Conservation program in 1977 to supplement the land treatment program, which pays farmers for constructing land treatment during summer months, extending construction season which typically occurs before spring planting and after fall harvest. Improved engineering by the USDA-Natural Resources Conservation Service (NRCS) permitted parallel terraces on row crops which allows easier turning of large equipment and

the installation of tile outlets, rather than grass waterways, helps drain the terraces after heavy rains.

Over the years a steady increase of no-till and minimum tillage practices by innovative farmers has dramatically reduced soil erosion and increased water holding capacity of heavy soils. In the past, the LENRD has provided cost-share for no-till practices.

The Nebraska Sediment and Erosion Control Act was passed in 1986 providing recourse for landowners who are harmed by soil erosion from neighboring land. All complaints are investigated by the LENRD and efforts are made to resolve the problem between owners. If that fails, a legal process involving district court and eventually the Nebraska Supreme Court does exist. Ironically, the SECA evolved from the LENRD board and staff in the early 1980s and a case was filed by the City of Oakland against an individual landowner in 1991. The case progressed from the LENRD to the district court and on to the high court without resolution. The Supreme Court sent the case back to the district court and a new court date was set for December 6, 1999. This was the first real test of the law.

The Elkhorn River Basin annually suffers a large percentage of flood damage in the state. Major storm events with 6 to 10-inch rainfall occur somewhere within the LENRD almost every year. The effects of flooding on the population of the district have been dramatic - lives lost, families evacuated, roads and bridges damaged, while private property and cropland are devastated. For these reasons, the LENRD has designated flood control and protection as an extremely high priority. Several flood control projects were constructed over the years by the LENRD to protect towns from high water flowing down from large watersheds. Responding to floods requires the efforts and cooperation of many levels of government - federal, state and local agencies are all involved with the planning, designing and funding. The U.S. Army Corps of Engineers and the Nebraska Natural Resources Commission provided funding to construct major levees for Scribner in 1992, Howells in 1995, and Pender in 1999. These projects provide a total of \$7.6 million of critical flood protection for homes, businesses, and infrastructure. Federal and state funds totaled 75% with the LENRD and towns splitting the 25% local share.

Comprehensive watershed management is always the preferred method for erosion and flood control. Multi-purpose projects are very popular, cost-effective, and are constructed when and where possible. The LENRD has completed excellent examples of these dams with lakes that permit public water-based recreation, including boating, fishing, camping, swimming beaches, and hunting. The largest is the **Willow Creek State Recreation Area** located southwest of Pierce and dedicated by Governor Bob Kerrey in 1984. Managed by the Nebraska Game & Parks Commission, the \$5.2 million project includes a 700-surface acre lake located on 1600 acres of public property providing outdoor experiences for more than 200,000 visitors annually. The **Maskenthine Lake Recreation Area**, north of Stanton, contains a 100-surface acre lake and

many recreation features, including swimming beach, handicap accessible fishing pier, hiking and mountain bike trails, disc golf course, and camping pads for 33 RVs. This beautiful site is managed by the LENRD and 75,000 visitors each year enjoy the public investment. It was opened to the public for recreation in 1979. The **Maple Creek Recreation Area**, west of Leigh, opened to the public on May 21, 2011. This multi-purpose project was originally part of a series of 28 dams in the Maple Creek watershed that were rejected in 1980. The East-West Dry and Middle Fork Watershed Protection Program replaced the 28 dams with land treatment and was administered by USDA. However, in 2000, community leaders with the village of Leigh came to the LENRD seeking assistance with flood relief. The LENRD voted to begin a feasibility study. Eleven years later, the area opened to the public for recreation. There are fifty 50-amp camper pads available, and 10 primitive tent camping areas. Guests can enjoy swimming, fishing, and hiking/biking at the 160-surface acre lake. The dam protects Leigh and downstream landowners, county roads, and bridges from flood waters.

A smaller dam is located north of Pilger and protects that community from flooding. The LENRD assumed this project from the old SWCD after construction through the PL 566 program, which built many small watershed structures around the state and nation. Skyview Lake provides flood protection for Corporation Gulch, which drains a large part of western Norfolk and totals 50-surface acres. The lake is now part of the Norfolk City Parks and was also a PL 566 project when the SWCD assisted with funding for this dam in the late 1960s. Many other smaller examples of flood control are found throughout the LENRD, ranging from the Scribner Airbase Dam, Raasch Project in Norfolk, Laurel and Howells city dams, and a host of smaller dams and farm ponds all providing protection from storm events. The LENRD has a long history of support for dams, cooperating with many of our 15 counties and landowners to construct more than 75 road structures to replace old, unsafe bridges. The road dams are usually 10-20 surface acres in size and are ideal for flood control, wildlife/fishing and conservation.

The Dodge County Improvement Project Area (IPA) was an effort to stabilize a large section of the Elkhorn River from erosion. Although the project received funding approval from the Natural Resources Commission and LENRD, it was defeated in 1985 by a vote of the affected landowners. The Butterfly Creek Dam was a proposed multi-purpose 225-surface acre lake south of Stanton, which received strong support from landowners and the Game & Parks Commission for funding but failed in 1993 due to poor geology that would contribute to unsafe dam conditions.

After strong public opposition in 1980 defeated a series of 28 dams in the Maple Creek PL 566 Watershed Project, a creative approach to fighting soil erosion emerged as an alternative. The East-West Dry and Middle Fork Watershed Protection Program replaced the dams with land treatment and was administered by USDA. The 33,088 acres in the watershed were selected by USDA and EPA as one of seven national projects to improve soil and water quality. The Model

Implementation Program (MIP) initially was a five-year effort to encourage farmers to install land treatment and practice reduced tillage as part of Section 208-Federal Clean Water Act. In some areas of the watershed soil loss annually exceeded 100 tons per acre (22 tons average) with 5 tons per acre considered acceptable. This resulted in a net loss of 724,000 tons moving down the waterways, which was not acceptable. After the five-year period, great strides were made as land treatment was installed and farmer attitudes changed. The MIP was extended for 10 more years as progress continued.

Another great success story for conservation unfolded with the Logan Creek Special Project (LCSP). This project was requested by farmers in the early 1980s to combat severe soil erosion. Primarily conducted by the University of Nebraska-Lincoln Cooperative Extension Service and USDA-Soil Conservation Service while funded by the NRD and USDA-ASCS, the project included 44 innovative farmers who were willing to implement Best Management Practices (BMPs). The project also included 16 other agencies that focused on 49,224 acres in the watershed south and west of Pender in Wayne, Thurston and Cuming counties. Completed in 1990, after a very successful five-year period, the project boasted over 305,000 feet of terraces and 125,000 feet of underground tile outlets. The LCSP promoted and demonstrated no-till and minimum tillage operations to save massive amounts of soil. This model program provided extremely valuable conservation lessons.

Water quality management for surface and groundwater emerged as a major issue in the LENRD in 1983 with passage of the Nebraska Groundwater Quality Management Act, which required all NRDs to prepare plans to address groundwater contamination, although a baseline study was implemented in Pierce County in 1980. The original Groundwater Management Act was passed in 1975, but focused more on quantity, which was not a major issue for the LENRD at that time. The LENRD began to gather baseline data in 1985, sampling 85 irrigation wells for a broad spectrum of pollutants. Fortunately, large concentrations of pesticides and herbicides are not showing up in the groundwater. The leading concern is nitrate, which primarily occurs from over application of fertilizer to row crops, and to a lesser extent, livestock waste.

Over the years, thousands of samples have been collected, from both privately owned irrigation wells and the district's monitoring well network which are geographically dispersed throughout the district. The majority of Pierce County and a portion of northern Madison County have been delineated as Phase 2 & 3 Groundwater Management Areas due to excessive groundwater nitrate contaminations, requiring farm operators to adopt management practices such as split applications of nitrogen fertilizer, deep soil sampling, use of nitrogen stabilizers and inhibitors, limits on amount of nitrogen applied (per application) and fertilizer application certification.

The Chemigation Act was also passed in 1986 and mandated that all NRDs cooperate with the Department of Environmental Quality to inspect/permit all irrigation wells applying chemicals and fertilizer through the center pivot systems. The LENRD is currently processing approximately 2,100 permits annually.

In response to non-point source pollution in other areas of the LENRD, the Board declared the entire district a Groundwater Quality Management Area in 1993. Monitoring continues for the status of groundwater quality via periodic collection of samples from irrigation wells and the monitoring well network. A program for proper abandonment and sealing of old irrigation and domestic wells began in 1991 with state and LENRD cost-share available. Thousands of wells have been sealed through this program.

Among the first Clean Lakes Programs in the state, Willow Creek and Maskenthine Lake were EPA funded projects in 1989-90 that were tested for a wide variety of pollutants. Willow Creek lake, near Pierce, suffers severe toxic blue-green algae blooms during the summer months. Studies have shown that the cyanobacteria thrive on elevated phosphorus levels, which are present in lake sediments and transported to. Recent studies have shown that much of the lake by Willow Creek and the tributaries, therefore making it very difficult to manage. A recent study by the United States Geological Survey (USGS) concluded that the nutrients are phosphorus is coming from agricultural lands that drain into tributaries upstream of application upstream the lake. A large sediment trap constructed above Maskenthine Lake, near Stanton, helps keep silt from entering and a large portion of shoreline was stabilized.

Under the original law that formed the NRDs, authority was provided to plan and construct rural water systems to provide high quality water for domestic and livestock consumption. The systems are important to rural economic health and welfare and were funded with grants and loans from USDA Rural Development. The law also provided systems that were operating before 1972 the right to operate independently without NRD oversight or involvement.

Logan East Rural Water System - The largest rural water delivery system in the state (geographically) began with requests from concerned landowners in the Oakland (Burt County) area in 1988. In 1989, the Logan East Rural Water System (LERWS) was formed and eventually constructed in four phases through 1997. The system became operational in 1991 with one storage tower at Oakland and 2 groundwater wells, serving 150 rural customers in the Oakland area. Today the LERWS serves over 1,200 customers including the villages of Herman, Winslow, and Uehling, with a project office located in Oakland. The system stretches over a large portion of Burt, Dodge and Washington counties and contains nearly 750 miles of buried delivery pipe, 3 large storage tanks near Oakland, Scribner, and Fontenelle, and 3 groundwater supply wells. The \$12.5 million LERWS was funded by FMHA and the LENRD.

[Wau-Col Regional Water System](#) – In August of 2012, the Wau-Col Regional Water System was dedicated. The system provides high quality water to the villages of Belden, Magnet, and McLean. Water is purchased from Coleridge and sent to Belden, and water is purchased from Wausa and sent to 16 rural customers as well as Magnet and McLean. The name “Wau-Col” is derived from Wausa-Coleridge. The system goes across three county lines – Knox, Cedar, and Pierce Counties. The \$3.1 million project was made possible by a grant from the U.S. Department of Agriculture - Rural Development and area sponsors including the Lower Elkhorn and the Lewis & Clark Natural Resources Districts. The project is owned by the Lower Elkhorn Natural Resources District.

The Thurston County Rural Water System, managed by the Papio-Missouri River NRD, is located near Pender and serves 145 customers.

The Cuming County Rural Water District continues to operate as an independent system within the county.

In the last twenty years, wise and sensible development of certain natural resources, especially managing surface water for flood control, has become increasingly difficult as environmental concerns compete for river and stream water “needs and rights,” primarily for fish and wildlife. The Federal Endangered Species Act, and to some extent the EPA Clean Water Act, has hindered and even stopped projects over the years. The LENRD, as members of a large and diverse statewide coalition, opposed in-stream flow applications submitted by the Nebraska Game & Parks Commission to the Department of Water Resources (DWR) in 1993. The Nebraska Game & Parks Commission requested certain annual flows in the Platte River that would ultimately negatively affect the Elkhorn River Basin. After several months of hearings, a decision was handed down in early 1998 by the DWR that resulted in a compromise on flows, resolving the issue.

The Platte River in-stream flow confrontation was not only very expensive in terms of public funds, but also cost both sides political capital. A new environmental controversy soon emerged on the Lower Platte in late 1998 as the Endangered Pallid Sturgeon was proposed for protection by U.S. Fish and Wildlife and Game & Parks. This species is an ancient type of fish that was historically found in the Missouri River and its tributaries, including the lower Platte and Elkhorn. Rather than spend time and money opposing each other, the two sides agreed in 1999 to jointly support and fund a five-year study of the Pallid Sturgeon to determine flow requirements.

Various forms of outdoor recreation are funded and supported by the LENRD including hiking and biking trails. A 2.2-mile connector for the Cowboy Trail which extends into Norfolk’s Ta-Ha-Zouka city park was completed in 2001. The 321-mile Cowboy Trail extends from Norfolk to Chadron on the old Chicago-Northwestern railroad bed and is the longest “Rails to Trails”

conversion in the U.S. The LENRD has also provided grants for the development of trails in many communities within the district. A 9 ½ mile hiking trail extending from Pierce out to Willow Creek SRA and back into town was also funded in part by the LENRD. The hiking/biking trails at the Maple Creek Recreation Area also total approximately 5 miles. The LENRD has also approved just over \$1 million in funding for the Riverfront development project in Norfolk. This project will not only provide recreation for the City of Norfolk, but for citizens across the 15-county LENRD boundaries.

The tree planting program is very popular with many landowners. Cooperators who purchase seedlings from the district work closely with our staff to select appropriate species and to develop planting and tree care plans. Approximately 80,000 trees are planted each year in this district alone. Community tree plantings, shelterbelt renovations and outdoor classrooms continue to be popular and successful.

As the district has grown, the continuing need for information and education efforts has increased. The I&E program is designed to communicate, advertise, and promote all projects and programs to the public. The mediums used over the years have changed, but the process of educating the public has remained the same. Another important aspect of the I&E program is building teacher/student awareness of conservation issues. A large variety of popular workshops and field days are also offered to the public throughout the year.

BOARD & STAFF

The LENRD downsized the board of directors from 19 to 15 to move closer to the “one person-one vote concept.” This move has also saved election costs and demonstrates a smaller board is efficient and responsible while serving all citizens.

A special highlight for the LENRD was purchasing their own office space and moving to their new location in May of 2018. Over the years the LENRD has rented 3 different locations. The previous location being the Lifelong Learning Center on the campus of Northeast Community College in Norfolk. They had been stationed at the college for 20 years, since December of 1997. In 2018, office space on Square Turn Boulevard became available the same month that the lease was due at Northeast. The board decided it was time to purchase their own office space to save tax dollars and prepare for future growth. The move has brought a new era of cooperation and shared offices with several partners, including the Nebraska Department of Natural Resources, UNL Extension, the Bazile Groundwater Management Area, and the Nebraska Forest Service.

Board members serve 4-year terms and our 15 members are locally elected on a staggered rotation - 8 members during one election cycle and 7 members the next. The District is divided

into 7 sub-districts (based upon population) for voting purposes with 2 members representing each sub-district and 1 member elected at large – [LENRD BOARD OF DIRECTORS](#).

Our staff is currently comprised of 22 full-time employees as well as part time/seasonal helpers for maintenance at Maskenthine Lake and the Maple Creek Recreation Area – [LENRD STAFF](#).

DESCRIPTION OF THE DISTRICT

LOCATION & LAND USE - The LENRD covers all or parts of 15 counties in northeast Nebraska. All of Madison, Pierce, Wayne, Stanton and Cuming counties are included and considered the “core counties” while portions of Antelope, Knox, Cedar, Dixon, Dakota, Thurston, Burt, Dodge, Colfax, and Platte are also included. The LENRD makes up the eastern portion of the Elkhorn River Basin. It comprises approximately 4,000 square miles (2,560,000 acres) and is primarily row crop agriculture, with a mix of cropland and pasture in the upper basin.

The Elkhorn River has total valley length of approximately 335 miles. The area of the entire basin totals 7,000 square miles or 4,480,000 acres. Surface elevation in the basin ranges from 2,700 feet to approximately 1,100 feet above Mean Sea Level.

Principal tributaries/sub-watersheds include South Fork (333 sq. mi.), North Fork (861 sq. mi.), Maple Creek (416 sq. mi.), Logan Creek (1,052 sq. mi.), and Union Creek (357 sq. mi.). The Elkhorn River drains all of Wayne, Stanton and Cuming counties and portions of 21 other counties. The LENRD borders four other NRDs with Lower Platte North to the south, Papio-Missouri River to the east, Upper Elkhorn to the west and Lewis and Clark to the north.

TOPOGRAPHY AND SOILS

The Elkhorn River Basin is characterized by three basic geographic regions, which were mapped and described by the University of Nebraska-Lincoln, Conservation & Survey Division, and the USDA-Natural Resources Conservation Service.

THE SANDHILLS REGION – located in the upper reaches of the basin in Rock, Holt, Wheeler, Antelope and western Pierce counties. The surface mantle of the region consists primarily of sandy, highly permeable soils, which readily accept precipitation. Groundwater is extremely abundant and most of the sandhills are located over the famous Ogallala Aquifer, which is generally very deep with a saturated thickness of several hundred feet. Water tables are high with many wet meadows and natural shallow lakes scattered throughout the region.

EAST CENTRAL DISSECTED PLAINS REGION – lies adjacent to and just east of the Sandhills region. The region comprises major portions of Pierce, Madison, Platte, Boone and Antelope counties. The boundary between the Upper and Lower Elkhorn NRDs on the east line of Antelope County essentially bisects the geographic region. The surface mantle of the region consists of loess soils with moderately low permeable soil, which overlies Pleistocene age silt, sand, and gravel. Groundwater well capacity for irrigation and other needs is available.

NORTHEAST NEBRASKA GLACIAL DRIFT REGION – comprises the remainder of the Elkhorn River Basin as this region is interspersed with the sandhills, sandy till plains, and alluvial sub-regions.

GLACIAL DRIFT AREA - formed from glacial till as the great ice masses pushed down from the north and then melted leaving rock rubble behind. This material covers a large portion of the eastern LENRD, Lower Platte North NRD and most of the Papio-Missouri River NRD. Till consists mostly of non-stratified silty clay mixed with pebble to boulder sized rock. Glacial till cover varies from a few feet to 300 feet in thickness. Because of these complex deposits, predicting and locating a volume of groundwater supply is difficult while water quality is poor.

Surface mantles are generally loess soils that overlay glacial till. The eastern portion of the basin contains Peoria loess on the surface that is largely underlain by other loess and Kansas/Nebraska Glacial Till. Peoria loess is a fine-grained, silt and clay sized windblown deposit. A huge amount of glacial till is oxidized and primarily reddish/yellowish colored clay with some silt/sands containing scattered pebbles, cobbles and boulders. The till is exposed in many areas, particularly in road cuts, stream banks, and stepper slopes. Bedrock in this area is generally mantled with variable thickness of Pleistocene deposits and consists of westward dipping Cretaceous formations of sandstone, limestone, shale, and chalk in the east. In the western part of the basin, less consolidated eastward dipping Tertiary (Ogallala formation) sandstone, sands, and silt (somewhat lime cemented) make up the formations.

SANDHILLS SUB-REGION - located in a portion of south-central Stanton County and is nearly identical to the Sandhills region previously described. Soils other than sand have a coarse texture and are highly permeable. Groundwater is relatively abundant.

SANDY TILL PLAINS SUB-REGION – is characterized by gently rolling topography with valleys in a northwesterly direction. In most areas, soils are extremely sandy and permeable except in a few areas where clay type glacial till is exposed at ground surface where soils are not readily permeable. Groundwater is abundant and high capacity wells are easily obtained.

ALLUVIAL SUB-REGIONS – consist of areas only one-fourth to two miles wide along all major streams of the LENRD. Topography is somewhat flat, with dense vegetation (trees, shrubs and weeds) found along these stream bottoms and fertile, alluvial soils located in terraces (level and

relatively narrow plains with steep fronts bordering a stream) deposited on the floodplains. Local relief also consists of stream meandering scars and small washout sand dunes.

VEGETATION AND CROPS – Row crop acreage in northeast Nebraska historically increased as pastures were planted for livestock feed. The USDA-CRP did idle thousands of acres on marginal lands in the mid and late 1980s returning those acres to native grass, however, many of these former CRP acres are now being converted to production as CRP contracts expire. Primary row crops are hybrid corn and soybeans, with sorghums, alfalfa, oats, and wheat also planted in some areas. Today, approximately 70% of the LENRD land surface is planted to row crops with terraces and strip cropping on contours considered the best choice for conservation farming on rolling hills.

FOREST RESOURCES IN NEBRASKA – Nebraska’s forestland totaled 1.5 million acres as of 2016. Timberland accounts for about 92% of all forestland, while the remaining 8% of forestland is reserved or unproductive. The area of forest land, number of trees, biomass, removals, and net volume of live trees decreased since 2011, while mortality has increased. The recent increase in mortality is mainly attributed to severe weather events, fire, and insects. Disease primarily affected American elm, other elm species, and ash, while fire was the leading cause of ponderosa pine, eastern redcedar, and bur oak mortality.

FOREST RESOURCES IN THE ELKHORN RIVER BASIN – The inventory data for the Elkhorn River Basin includes both the Lower Elkhorn and Upper Elkhorn NRDs. The total land area for the Elkhorn River Basin is approximately 4.5 million acres. As of 2018, there were approximately 57,000 acres of forestland in the Elkhorn River Basin.

GRASS AND PASTURE – Nebraska’s grazing lands blanket over half the state, covering over 23 million acres (55 percent of the state’s total area). The NRDs encourage pastureland stewardship by providing financial assistance for planned-grazing systems, including constructing cross-fencing systems and pipelines for livestock water. Cooperating with the USDA-Natural Resources Conservation Service, and the Nebraska Extension Service, NRDs sponsor grazing land field tours and other educational programs to promote sustainable conservation practices.

The preservation of the west is due to past, present, and future grassland management practiced by our ranching families. This quality of life supports families, wildlife, clean air, and clean water and will ensure the future of our grasslands.

CLIMATE – The climate of the Elkhorn Basin is transitional between the humid east and semi-arid western plains. The lower reaches of the basin lie mostly in a moist, humid climate while the upper reaches endure a dry, and sometimes humid climate. The entire basin is agricultural in

nature and is suited for growing livestock feed, grain, and various types of livestock. Spring months are cool, normally with considerable rain while summers can be very hot and dry. Autumn is pleasant with occasional rain and winters are usually cold, especially in late December, January, and February.

Average annual precipitation ranges from approximately 29 inches in the eastern portion to 21 inches in the west. Normally, 65 to 67 percent of the annual precipitation occurs during the growing season (May-September) in the form of rain. The average number of frost-free days is approximately 160 with the average temperature at 50 degrees Fahrenheit. Flood records dating back to 1881 indicate that damaging floods occur within the Elkhorn Basin nearly every year. The extent of late winter and early spring flooding may be aggravated by ice jams. About 354,000 acres of land in the Elkhorn Basin are subject to inundation by a flood event expected to occur once in every hundred years representing about 8 percent of the land surface.

FISH AND WILDLIFE – The LENRD is very supportive of efforts by various agencies, especially the Nebraska Game & Parks (NG&P), to perpetuate, sustain, and conserve fish and wildlife resources of northeast Nebraska. The recreational, esthetic, educational, and scientific purposes of these natural resources cannot always be measured. Conservation of healthy fish and wildlife populations has positive economic value for our state and nation.

Preserving opportunities for current and future generations to share the many benefits and sheer enjoyment of hunting or fishing continues to be supported by the LENRD. Fish and wildlife are products of land and water and are renewable natural resources. The opportunity for harvest of fish and game should be managed as equitably as possible for the enjoyment of all citizens. Laws that are written according to reasonable and sound stewardship practices, including migratory waterfowl and non-game species, should protect all game birds and animals. Professional fish and wildlife managers are encouraged to provide fair and consistent administration of state and federal laws, ever mindful that Nebraska depends upon agriculture, with developed water resources, to sustain our economy.

Warm water fishing is immensely popular in northeast Nebraska. Fishery resources consist of warm water species found in most lakes, rivers, streams, and ponds within the LENRD. The most common sport fish are channel catfish, crappie, largemouth bass, bluegill, walleye, and northern pike. The LENRD and the NG&P cooperate with ongoing stocking programs for the lakes at Willow Creek, Maskenthine, and Maple Creek. Taylor Creek is a unique spring fed cold water trout stream located in Madison County. The Topeka Shiner, protected by the Endangered Species Act, is also found in Taylor Creek.

Wildlife is a product of the land. The quantity and quality of wildlife habitat determines the diversity of species and the sheer numbers of wildlife that will continue to exist on the land.

Nebraska has approximately 49.4 million acres of land and water within its boundaries, and 97% of these acres are under private ownership. As the primary agency charged with protection, enhancement, restoration, and development of wildlife, the NG&P is responsible for present and future management of wildlife. Administering approximately 147,000 acres (0.3 %) of the total land as Wildlife Management Areas, NG&P attempts to positively impact the wildlife populations on private lands with cooperation from NRDs and other interested partners such as Pheasants Forever.

WATER RESOURCES

Nebraska is one of the most groundwater rich regions in the world. The great Ogallala Aquifer underlies a large percentage of the State, and together with several smaller regional aquifers, provides fresh water for 85% of our residents, as the public water supply for the City of Omaha receives half of its water from the Missouri River. Groundwater also sustains activities related to our #1 industry – agriculture.

Most of Nebraska experiences variable amounts of precipitation throughout a typical year, so irrigation is common. Major row crops include corn, soybeans, and edible beans. In the LENRD, the Ogallala Aquifer can be found in Pierce and parts of Madison Counties, while the Eastern portion of the district is highly glaciated and groundwater is random and difficult to locate. There are approximately 638,539 certified irrigated acres in the LENRD.

STREAM AND AQUIFER RELATIONSHIPS - The Elkhorn River Basin, especially the eastern portion that comprises the LENRD, is blessed with abundant water resources, both surface and ground. The major river system in the LENRD is the Elkhorn, which rises in Rock County and flows generally east-southeast to Cuming County before veering south-southeast following the valley to the confluence with the Platte River in northern Sarpy County. Almost all tributaries to the Elkhorn River are gaining streams, which are streams whose flow is increased by the inflow of groundwater. Seepage measurements and observations conducted by the U.S. Geological Survey dating back to the late 1970s indicate stream flow gained from groundwater influence. Data was collected from Pierce, Madison, Wayne, Stanton, Platte, Cuming, and Dodge Counties.

The Elkhorn River is replenished by groundwater seepage for nearly its full length. There is some evidence that groundwater recharge from the river may occur near Oakdale and Meadow Grove in the western portion of the LENRD. The Sandhills region in the upper reaches of the basin contributes little runoff to streams, so virtually all flow in the river and its tributaries upstream from the North Fork results from groundwater seepage. The North Fork enters the Elkhorn River immediately east of the city of Norfolk. Downstream from the North Fork, intermittent surface runoff from the loess mantled Glacial Drift Region adds significantly to the

total flow of the river. Groundwater seepage to lower reaches of tributaries downstream from the North Fork does occur but is relatively small compared to surface runoff. Storm events may cause flooding.

AQUIFERS – An aquifer is defined as any water-bearing stratum of rock or sediment capable of yielding supplies of water. Groundwater occupies the pore spaces of aquifer materials such as sand and gravel. The aquifers found within the LENRD are from the Quaternary, Tertiary, and Cretaceous geologic periods. Depth to groundwater ranges from shallow to more than 200 feet. Groundwater in alluvial (stream/flood) plains is usually less than 10 feet from the surface.

SANDHILLS – The western one third of Pierce county and a small portion of northwest Madison county are in the sandhills. The Ogallala formation (Tertiary Period) has overlying sand/gravel deposits from the Quaternary period which are permeable and virtually all precipitation percolates rapidly into the groundwater or is discharged into the streams as recharge. Groundwater is plentiful for irrigation, but high nitrates create water quality issues.

EAST CENTRAL DISSECTED PLAINS – All of Madison County except the northern and eastern edges are in this region. Loess mantles are underlain by saturated Pleistocene deposits of sand and gravel covered with clay and silt. Saturated thickness may exceed 100 feet and groundwater is relatively easy to locate for irrigation, domestic, municipal, and industrial needs.

GLACIAL DRIFT – Is the complex area formed from glacial till. Lenses of sand and gravel are scattered, as there are extensive areas where material suitable for deep well construction is nonexistent. If wells are developed, they are of small capacity while another area not far away may hold deposits producing 700 to 1,200 gallons of groundwater per minute.

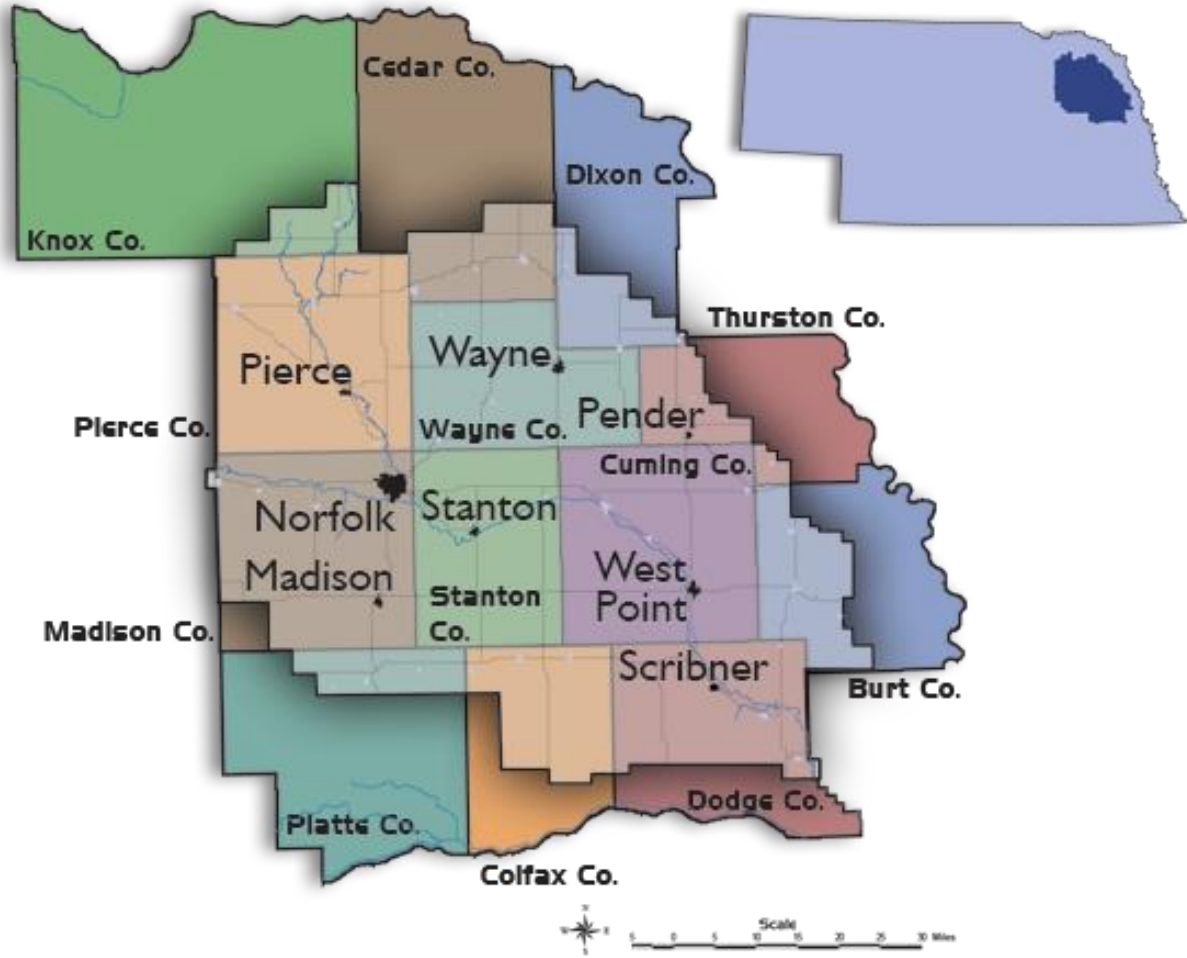
NATURAL LAKES – Natural lakes occurring within the LENRD generally are associated with the Elkhorn River. Most of these are old oxbow lakes that occupy former meanders in the river channel, but some of the lakes have resulted from, or were enlarged by, sand and gravel dredging. Some of these lakes have begun to fill with sediment, and marshes now occupy those lakes that are nearly filled. The U.S. Geological Survey identified and mapped more than twenty of these lakes in the early 1990s.

WETLANDS – Most wetlands occur in the Elkhorn River bottom or in the bottoms of associated tributaries. As mentioned previously, these wetlands include sediment filled oxbow lakes, which are located in former meanders of the river channel. Wetlands isolated from the river channels are rarely found, and if so, are usually less than 5 acres in size. These wetlands commonly lie within a basin or channel excavated by man or are created by a barrier obstructing the outflow or inflow of water and are not natural wetlands. Some small isolated wetlands (1-5 acres) which appear to be natural may be found in certain areas usually emergent

after seasonal flooding. Scientific definition of wetlands agreed upon by the U.S. Army Corp of Engineers, USDA, and EPA determines the category of all wetlands for critical resource management and regulation.

SANDPITS - Twenty active sand/gravel pits are located within the LENRD, along the Elkhorn River, and its tributaries. They are relatively large, containing several acres of water. Often, these pits have been converted to recreational or wildlife areas and housing developments. The University of Nebraska-Lincoln Conservation & Survey Division considers active gravel-sandpits as mining operations and has identified and mapped these pits for resource planning.

POPULATION – The LENRD is home to almost 90,000 residents across 2,526,700 acres and 50 communities in northeast Nebraska.



Response to Master Plan Goals and Objectives -

The LONG RANGE IMPLEMENTATION PLAN (LRP) is the district's working document and is revised annually. This document is followed by the board and staff for day to day implementation of programs, and contains detailed information about district projects, outlining the district's GOALS AND OBJECTIVES. The board favors a multi-purpose approach to natural resources management with voluntary cooperation by landowners as the most effective method.

The following summaries are examples of district activities and responses, providing insight into the planning process. A current LRP is available to the reader upon request.

The LRP – Milestone Chart sets a schedule from October 1st each year to September 30th the following year, for the purpose of reviewing existing programs and projects and receiving input from our Board. The LRP is submitted to various State agencies and finally to Nebraska Department of Natural Resources for review and approval. Refer to the current LRP for more detail on the following goals and objectives:

CONSERVE SOIL

Objectives:

1. Complete 80% of remaining treatment needs (1985 base) by 2030 and reduce soil loss on all lands to T by 2035.
2. Construct or cooperate with county governments to construct 3 grade stabilization structures in place of old, dangerous bridges.
3. Accelerate land treatment in specified areas to protect the land within a specified watershed, at least 75 percent of watershed down to T, ultimately protecting current and future LENRD water projects.
4. Utilize all land within the district for its most suitable purposes, with consideration given to conserving the resources and their continued productivity for future generations.

Cost-share programs are either directly administered to cooperators by the district or funded in conjunction with other agencies, like the USDA-Natural Resources Conservation Service (NRCS). The largest cost-share program is the LENRD's land treatment program, which continues to provide an average of \$500,000 annually for cover crops, terraces, waterways, small farm ponds, sediment basins, etc. to address soil erosion. Combined with the Nebraska Natural Resource Commission's Soil and Water Conservation fund, which accounts for nearly the same amount each year (both funds offering 50% - landowner paying 50%), a large amount of soil conservation is installed. The popular ***Lands for Conservation*** program, which permits installation of terraces and waterways during the summer season, has also boosted treated acres. According to USDA-NRCS there are approximately 1.3 million acres of highly erodible cropland in the district.

Many factors are considered by landowners before they decide to participate in cost-share, including current rural economy, relationship to payments from USDA Farm Bills, available contractors, and weather. Today's farmer is interested in soil and water conservation, but individual economic conditions always dictate when and how much will be voluntarily spent.

Supplemental cost-share programs offered by USDA-NRCS have provided several options for landowners. This includes the popular Conservation Reserve Program (CRP), paying for cropland set-aside contracts up to 10-15 years, placing millions of acres into vast grasslands nationwide. The Environmental Quality Improvement Program (EQIP) targets watersheds for various conservation practices including Best Management Practices (BMPs) for land treatment and water quality.

The National Conservation Buffer Strip Initiative, which is offered to all farmers for the purpose of setting aside crop acres parallel to streams, has gained momentum and participation with thousands of acres enrolled for annual payment. Buffer strip practices provide grass and trees to slow water runoff and trap sediment and chemicals before entering waterways.

The planting of cover crops prevents erosion, improves soil's physical and biological properties, supplies nutrients, suppresses weeds, improves the availability of soil and water, and breaks pest cycles along with various other benefits. Cover crops can also potentially be grazed. Cover crops have increased in popularity and this continues to be one of our largest conservation cost-share programs.

Flood Control and Prevention:

Objectives:

1. Protect existing improvements from flood water.
2. Utilize flood prone land for improvements not damaged by flooding.
3. Sponsor or cooperate on projects which include flood control benefits.

The LENRD continually strives to address flood control problems which plague private and public property almost on an annual basis. With a yearly precipitation of 23-28 inches in Northeast Nebraska, rains are usually distributed somewhat evenly; however, it's not uncommon to endure an 8 to 10-inch storm event. Even 3 to 6-inch rains now can cause severe flooding for many communities, especially in the rolling hills that drain large watersheds. Maple Creek, Pebble Creek, Union Creek, and Logan Creek watersheds have a long history of flooding, although many other areas of the district have suffered floods at some time.

FLOOD CONTROL PROJECTS -

MASKENTHINE LAKE RECREATION AREA – opened to the public in 1979 and consists of a 100-surface acre lake with full recreation features including camping pads and swimming beaches. This project was the first DNR-RDF project in the State and provides flood control for the City of Stanton.

PILGER RECREATION AREA – was constructed by USDA-NRCS in the late 1960s as a PL 566 Federal project and the LENRD assumed the operation and maintenance in 1972 when NRDs became operational. This 50-surface acre dam and lake provides important flood control to the Village of Pilger and the watershed.

VILLAGE OF DODGE DRY DAM – This small project (12 surface acre lake) was constructed in 2001 protecting the Northwest section of the community from historical flooding.

ROAD DAMS REPLACE OLD DANGEROUS BRIDGES – LENRD has constructed 72 of these dams since 1972, cooperating with county government and landowners. These dams/small lakes provide soil conservation, limited recreation, and wildlife enhancement.

RAASCH DAM – This small flood control dam was constructed in the 1970s providing significant flood benefit for residential and commercial property in Northeast Norfolk.

SCRIBNER AIRBASE DAM – constructed in the early 1970s, this small project is still serving landowners in the immediate area with flood protection.

WILLOW CREEK STATE RECREATION AREA – opened to the public in 1984 and owned by the LENRD, this project consists of a 700-acre lake located on 1600 acres of land managed (through lease) by the Nebraska Game & Parks Commission as a State Recreation Area. The popular flood control dam and lake protects the Pierce and the City of Norfolk downstream. The area is now 35 years old with all recreation roads, camping pads, and boat dock parking paved in 2009.



Willow Creek State Recreation Area, southwest of Pierce: This flood control project is owned by the Lower Elkhorn NRD and managed by the Nebraska Game & Parks Commission. The structure held back over 18,000 acre-feet of water during the historic flood event in March of 2019, totaling over 5.86 billion gallons of water.

MAPLE CREEK RECREATION AREA – Consists of a 160-surface lake located on 556 acres in Colfax County. The dam provides flood control for the Village of Leigh, downstream county road bridges, and the Colfax County fairgrounds. The recreation area with camping pads, beach, trails, boat docks, and a shower facility was completed in 2010 and opened to the public on May 21, 2011.

BATTLE CREEK is considering a project after devastating floods have affected the community over the last 15 years. The Lower Elkhorn NRD is working with the City of Battle Creek to find a workable solution to their flooding problems. During the March 26th, 2020 board meeting, the LENRD board approved a contract with JEO Consulting Group for the Battle Creek Watershed Improvement Project Work Plan. This contract will allow for an environmental assessment of the watershed as well as developing an approved Watershed and Flood Prevention Operations

(WFPO) plan with the Natural Resources Conservation Service (NRCS). After nearly a year in the making, all the necessary paperwork with the USDA has been signed and approved to secure the WFPO grant with NRCS. This grant in the amount of \$390,000 will complete a watershed study in the Battle Creek area and offer further information for a flood prevention plan for the entire watershed. This study will take approximately 18 months to complete.

MAPLE CREEK WATERSHED – In 2020, the LENRD board instructed staff to apply for a WFPO grant through NRCS to develop a watershed plan for the Maple Creek Watershed. This grant was funded, and staff is in the process of completing the paperwork to begin this plan.

RANDOLPH FLOOD CONTROL PROJECT has progressed slowly since 2002, with the City, US Army Corps of Engineers, and LENRD as partners. The LENRD board approved a payment request in March of 2020 from the City of Randolph for \$834,723 for their flood risk management project. The board signed an inter-local agreement with the city in 2017. This payment request will assist with Phase 1 of the project and will keep the project moving forward. The entire project includes the widening of the channel and the replacement of several bridges through the city.

SCRIBNER – ELKHORN RIVER BANK STABILIZATION consists of cooperation with the City of Scribner, Dodge County, and US Army Corps of Engineers attempting to protect a section of the East Bank of the Elkhorn River as new channel(s) are now nearly established by flooding which in turn could relocate flows from the historic floods of 2010 and 2019.

FLOOD CONTROL LEVEES – constructed by the LENRD (since 1990) for the communities of Pender, Scribner, Wakefield, Howells, and Winslow. Other flood levees constructed before 1986 (Norfolk, Pierce, Clarkson, West Point and Meadow Grove) are not officially LENRD projects.

FLOOD LEEVE CERTIFICATION – LENRD has 11 flood levees of differing scope and levels of protection within our 15-county area protecting life and property for the communities of Pender, Scribner, Howells, Wakefield, Winslow, Norfolk, Pierce, Clarkson, West Point, Meadow Grove, and Hooper.

HAZARD MITIGATION PLAN – Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation planning is the process used by state, tribal, and local leaders to understand risks from natural hazards and develop long-term strategies that will reduce the impacts of future events on people, property, and the environment. The mitigation plan is a community-driven, living document that is required to be updated every 5 years. To help guide future hazard mitigation projects, the LENRD updated their Hazard Mitigation Plan and approved it in April of 2020. Once a community, county, or district is part of an approved plan they become eligible for up to a 75% cost share for a wide variety of

projects listed in the plan. JEO Consulting Group, Inc. (JEO) was hired to update the plan. JEO assisted in completing the LENRD's original and previous plans in 2009 and 2014. This hazard mitigation plan update is funded by a FEMA planning grant. The cost is shared 75% through federal funding and 25% through a local match. For this plan update, the LENRD provided the 25% local match.

Stormwater Drainage Improvements

Objectives:

1. To assist local units of governments in correcting stormwater drainage problems.

The district responds to landowners and communities who request assistance with stormwater drainage problems. Over the years, many staff hours were spent with landowners to negotiate solutions over drainage complaints on cropland, especially with upstream property owners. A recent series of wet years have caused high water tables, especially in sandy soils, and with these years come complaints. The LENRD works with the Department of Natural Resources to resolve as many complaints as possible.

The district cooperated with the city of Norfolk, providing \$200,000 for a large wetland detention cell which is a key component of the 25th Street Stormwater Drainage Project. Located in a rapidly growing section of western Norfolk, heavy rains bring floodwaters from steep hills in the urban residential area down to the lower lands in the south, which are expanding with commercial and industrial buildings. A concrete lined channel carries water through the wetlands and out to the Elkhorn River. The project has not been tested with a large storm event, although several small rainfalls have provided evidence the project will work.

Another very successful effort completed in 1998 was the Skyview Lake Wetlands Project. Funded by the Nebraska Environmental Trust, and administered by the district, three shallow detention ponds and a broad serpentine channel intercept stormwater drainage carried from rapidly expanding housing developments and a golf course, filtering runoff for Norfolk's 50-surface acre Skyview Lake below. The water quality has shown significant improvement since constructing the wetlands. The lake is owned by the city of Norfolk and operated as a very popular park and recreation area. Other partners were Norfolk High School FFA students and the Game & Parks Commission.

The village of Pilger has also greatly benefited by a drainage project constructed by the district that diverts stormwater flowing from hilly ground north of town and channels the water on to the Elkhorn River. The district will cooperate with towns on these types of projects if the project is engineered properly and there are high cost-benefits for public protection. Private

landowners have not received stormwater drainage projects to protect farmland due to lack of public benefit.

Conserve Groundwater Quantity and Quality

Objectives:

1. Monitor groundwater to detect changes, trends, or problems.
2. Improve groundwater conservation practices through education and information dissemination.
3. Assist agricultural producers in proper irrigation and agrichemical usage.
4. Protect municipal and domestic groundwater supplies.
5. Increase our general knowledge of the hydrogeologic characteristics of the district.

Groundwater resources have been utilized for a variety of purposes across all or parts of the 15-counties, with approximately 6,500, active high capacity wells in the LENRD. Most of these wells are for agricultural irrigation, but other uses include commercial/industrial, livestock, and public water supply wells. Precipitation patterns have a direct, but delayed correlation with groundwater supplies. Above average precipitation occurred during the early 1980s in this area of the state with groundwater tables rising, on average, providing ample supply of water for corn and soybeans, the two major crops grown. However, prolonged dry cycles can dramatically change cropping patterns and the economy. In 2012 the area experienced an acute, but short-term, drought that caused a spike in groundwater demand and caused a significant decrease in groundwater supplies. Fortunately, this dry period receded with more normal precipitation returning in 2013 to help assist in replenishing groundwater supplies.

Mandated by the Legislature's LB 1106 (passed in 1986) all NRDs were required to submit a Groundwater Management Plan to the Nebraska Department of Water Resources (DWR). The LENRD's Groundwater Management Plan is complex and is focused on both quantity and quality. A two-fold approach was chosen by the Board which tracks groundwater quantity and precipitation. Numerous ongoing data collection methods are utilized while various methods of monitoring help understand and protect groundwater quality.

RESERVOIR LIFE GOAL – summarizes the overall mission for groundwater management of both quantity and quality as stated: "To provide an adequate supply of acceptable quality groundwater to forever fulfill the reasonable groundwater demands within the LENRD for

domestic, municipal, agricultural, industrial, wildlife, and other uses deemed beneficial by the Board.”

The Legislature then passed LB 51 in 1991 which required all NRDs to amend the groundwater quality sections of their plans. These amendments required additional information and policies that would identify the levels and sources of groundwater contamination and address long-term solutions to stabilize, reduce, and prevent further contamination. The LENRD began revising their plan in 1990 and completed the first revision in 1991 to comply with a format recommended by DWR and the Department of Environmental Quality (NDEQ). With the passage of LB 51, the NDEQ became the state oversight agency responsible for assisting NRDs with their groundwater management quality concerns to ensure orderly implementation of the complex plans.

Continuing statewide concerns for groundwater quality led to passage of LB108 in 1996, the Groundwater Management and Protection Act, which further recognized the need for more intense management of water quality in “high potential contamination areas.” This was a very significant act, which legally recognized the hydrologic connection between ground and surface water for the first time in the history of Nebraska water law. Since DWR administers surface water regulations (irrigation pumping from streams and rivers, dam permits, etc.) and the NRDs are charged with groundwater management, especially non-point source pollution problems, LB 108 called for more inter-agency cooperation than ever.

As a result of LB 108, major revisions were amended into the LENRD Groundwater Management Plan in 1996, including establishment of certain “triggers and controls” which provides a “phased” approach to groundwater pollution and treats nitrate-nitrogen separately from all other contaminants. Certain areas of the LENRD, especially Pierce County’s sandy soils, are very susceptible to the leaching of nitrogen fertilizer. Over-application of fertilizer through many years has caused documented rising of nitrates in the groundwater beyond the 10 milligrams per liter that is set as a Maximum Contaminant Level (MCL) and national standard by EPA. Anything above this level is considered a health risk to humans. For the purposes of management and monitoring, the LENRD has established a three-phase approach which allows rules and regulations to be imposed when and where needed. Other areas of the LENRD are being carefully monitored for contamination and may soon require appropriate management. It seems that additional “hot spots” for nitrates are beginning to appear in Madison, Dodge and Cuming counties. *Current copies of the LENRD Groundwater Management Plan, as well as the updated rules and regulations for the three phase areas, can be obtained by contacting the LENRD or visiting their website – [Groundwater Management](#).*

INTEGRATED WATER MANAGEMENT - In 2004, the Nebraska Legislature passed LB 962, which required the Nebraska Department of Natural Resources (NDNR) to annually consider and decide whether any river basin, sub-basin, or reach is fully appropriated. The term fully appropriated means that the supply of water is equal to the demands for surface water in a river basin, sub-basin, or reach.

When the NDNR declares that an area is fully appropriated, they and the NRDs must jointly develop an Integrated Management Plan. The two entities will develop and agree to common management goals. For their part of the plan, NRDs must consider the impacts of new groundwater development on streamflow and must ensure that new groundwater uses do not adversely affect surface water users.

On December 16, 2008, the Director of the NDNR made a preliminary determination that the Lower Platte Basin was Fully Appropriated. Then, on April 8, 2009, the Director reversed the preliminary determination that the Basin was Fully Appropriated, causing a status change in the Basin. LB483, passed in 2009 by the Legislature, required the NRDs affected by a status change to prepare a plan to ensure that if new groundwater irrigation was allowed, that this new development would not cause the Basin to be declared fully appropriated over the following four years. Each NRD in the Basin then submitted a plan to the DNR stating that each NRD would allow no more than 10,000 acres of new irrigated land through the end of 2012.

Roughly one-third of the LENRD is considered to have hydrologically connected surface water and groundwater, which is the area affected by LB483. The district enacted rules in 2009 to also control new irrigation development in the remaining two-thirds of the district, which is non-hydrologically connected.

To decide where to allow new irrigated acres in each area, the LENRD Board created a process to score and rank applications for new irrigated acres. The Board uses this scoring system as a guide when recommending approval or denial of applications within the limits established by district rules and regulations. Categories and subcategories used for this system are objective and quantifiable. Each subcategory is assigned a numerical weight, or score, by the board prior to ranking any variance application and is structured so that higher scores will result in a better ranking.

Since 2012, when the District's four-year plan under LB483 was completed, LENRD rules and regulations have required the Board to decide annually how many new groundwater irrigated acres to allow. The Board chooses from at least three options: to continue to allow 2,500, or some other number of new irrigated acres per year; to allow no new irrigated acres; or to allow an unlimited number of new irrigated acres.

In early 2012, the LENRD board took action to initiate the development of a voluntary Integrated Management Plan (IMP) with the NDNR to provide a needed framework for wise, long-term management and protection of finite water resources. A desire to be proactive in the conjunctive management of groundwater and surface water is what led to the board's decision.

In 2013, the NDNR and the seven NRDs that make up the Lower Platte River Basin formed the Lower Platte River Basin Coalition. The Coalition's mission is to coordinate efforts to protect the long-term balance of the Basin's water uses and water supplies. A primary action of the Coalition was to voluntarily develop a Lower Platte Basin Water Management Plan, which was adopted by all parties as of January 10, 2018.

The LENRD continued to move forward with their individual plan and developed a Stakeholder Advisory Committee consisting of representatives from: Agriculture, Industry, Public Water Supply, Domestic well owners, Environmental, as well as County and City officials. This Committee met in 2014 and 2015 to help prioritize goals and action items of the IMP. The district continued to work with the NDNR to develop a working draft over the next several years.

The NDNR and the LENRD jointly held a public meeting to discuss and answer public questions on the IMP on August 9, 2018. A public hearing was then held on August 23, 2018 where public testimony on the final version of the plan was recorded. After reviewing the testimony, the LENRD board voted to approve the IMP at their September 27, 2018 board meeting.

The purpose of this voluntary IMP is to achieve and sustain a long-term balance between water uses and water supplies. Protection of existing users is also a major factor since there is still available water in the Basin, and the District is continuing to add new users on an annual basis. This will be achieved through coordinated management of hydrologically connected groundwater and surface water resources. The voluntary IMP is considered a proactive approach to protecting available water supplies to better ensure that the resource will be available for future generations. It also makes the district eligible to apply for grant funding through the NDNR Water Sustainability Fund.

LENRD's [Integrated Management Plan](#)

Many factors will continue to influence the future of the LENRD groundwater management program. Our groundwater resources provide supplies for domestic consumption, livestock, municipalities, irrigation of crops, cooling water for industry, power generation, sub-irrigation of wetlands, and stream flows for fish and wildlife, including threatened and endangered species which may be plants, fish, or animals. Groundwater development may impact these

species or supporting habitat. For example, the Western Prairie Fringed Orchid or the Topeka Shiner may need further evaluation since suitable habitat is identified within the LENRD for the plant and the Shiner was discovered in Madison county's Taylor Creek by the Department of Environmental Quality in the mid-1990s.

LENRD's [Drought Management Plan](#)

GROUNDWATER QUANTITY

The LENRD has a complex hydrologic system. Understanding this system is necessary for effective groundwater management. Glaciers covered much of the LENRD and certain terrain has been labeled a "geologic junkyard" by hydrogeologists that have completed some studies over the years, but more effort is needed. A large volume of existing hydrologic information remains to be interpreted for a more complete picture of the physical nature of the aquifers. The UN-L Conservation & Survey Division (CSD) continues with ongoing efforts to understand groundwater in the LENRD. A series of monitoring wells was installed by CSD in 1998 and 1999, funded by utilizing fees on fertilizer sold to farmers.

The LENRD has conducted a groundwater quantity monitoring program since 1976 with approximately ~235 irrigation wells measured for depth-to-groundwater annually. The CSD originally established this network of wells in 1976. The LENRD also cooperates with the U.S. Geological Survey (USGS) gathering data from continuous recorder wells placed in strategic locations to help build the quantity database.

To monitor groundwater quantities the district collects annual depth-to-groundwater measurements from the aforementioned network of irrigation wells, in addition to the collection of water levels captured from the monitoring well network. Spring groundwater levels indicate short-term changes in the groundwater table do occur. However, there have been no long-term groundwater mining events that have been detected in the district. Water levels have declined for short periods but have fortunately recovered to previously established levels when ample precipitation returns to alleviate the demand on groundwater. The monitoring program will continue to be evaluated by LENRD, CSD, and the USGS.

- Irrigation well groundwater quantity network – The district collects depth-to-groundwater measurements from this network of ~235 irrigation wells each spring to evaluate groundwater quantity. Measurements from this network can trigger groundwater quantity regulation if spring depth-to-groundwater levels decline to specific levels. Data collection for many of these wells began in 1976, giving the district a long record of measurements.

- Installation of flow meters – the LENRD requires flow meters on all high capacity wells (irrigation and industrial) for the purpose of collecting and measuring groundwater data, encouraging conservation of pumping, and promoting stewardship among all groundwater users.
- Certification of irrigated acres - To best conserve, protect, develop, and manage the natural resources within the district, the LENRD has certified the number and location of irrigated acres. One of the primary goals for the certification of acres is to allow irrigation only on acres classified as Certified Irrigated Acres within the district. This effort will also provide information necessary for calculating an accurate accounting of the annual groundwater withdrawals associated with agricultural irrigation.
- The LENRD also has permanent monitoring wells located throughout the district. These wells have been used for indicating groundwater quality and quantity since 1986. In the spring, static water levels from irrigation wells are measured to indicate depletion and recharge. Using GPS equipment, the static water level is measured from a known elevation. The elevation in feet below the ground surface will help the LENRD and geologists learn more about the relationship between surface water and groundwater.
- Elkhorn-Loup Model (ELM) is a cooperative study/computer model with Upper Loup, Lower Loup, and Upper Elkhorn NRDs, USGS, CSD, and NDNR designed to study the relationship of ground and surface water and impacts of irrigation. In 2004 and 2005, the NDNR met with CSD, USGS, and the eight NRDs with land in the hydrologically connected area of the Loup and Elkhorn Rivers to discuss surface water and groundwater management needs. LB962, passed by the Nebraska Legislature in 2004, sought to minimize the conflicts between surface water and groundwater users by requiring the DNR to determine when new groundwater uses would adversely affect surface water users and when groundwater regulation by the NRDs would be required to protect streamflow. The DNR recognized that a better understanding of the geology, groundwater, and surface water resources of the area would substantially improve their ability to determine this. The group agreed to begin a study of the area and named it the Elkhorn-Loup Model (ELM) study. Field data collection and a groundwater flow model are the basic components of this study. The CSD and the USGS have led the efforts to collect data and model the area. The third phase was completed in 2014. Model runs have refined the boundaries of the hydrologically connected area, improved the calculations of the depletion factors for each square mile in the hydrologically connected area, and projected the impacts of groundwater use on streamflow under various management strategies. Test hole studies refined our knowledge of the base of the principal aquifer in the area, 531 streamflow measurements in the Loup and Elkhorn basins in 2006 provided a snapshot of relative base-flow in the basins, and stream-aquifer relationships were estimated in several canals and in the North Loup and Middle Loup River beds using geophysical techniques.

- The Eastern Nebraska Water Resources Assessment (ENWRA) is a cooperative hydrological study with the USGS, CSD, NDNR, and 6 NRDs (Lewis and Clark, Lower Elkhorn, Papio-Missouri River, Lower Platte North, Lower Platte South, and Nemaha). This study is combining current geologic knowledge, computer modeling, and best science available to reach goals that will eventually provide sustainability and manage interconnected surface water and groundwater. It was initiated in 2006 for the purpose of cooperatively characterizing the geology and hydrogeology of the glaciated portion of Eastern Nebraska. The study will increase the understanding of the hydrogeologic complexity of this region and will advance fair and sustainable management of its water resources.
- Contract and cooperate with the USGS, CSD, and private consultants to perform groundwater/hydrogeologic research for the purpose of understanding our complex glaciated regions – including AEM flights.
- LB 962, passed in 2004, is landmark legislation which strengthens surface/groundwater law and provides comprehensive management methods for NRDs and other agencies to avoid conflict. Under this law, river basins may be declared fully appropriated. Fully appropriated status brings a full moratorium of well drilling and extensive management of groundwater.
- LB 483 was passed in 2008 providing temporary options for irrigated land allocation (up to 2,500 acres annually). This formula is applied to 36% of the LENRD, while remaining land area can be allocated up to 5,000 acres annually.
- Assist irrigators to calibrate and improve water management by determining pumping rates and performing flow measurements.
- The LENRD also provides cost-share for soil moisture sensors that can provide information that is beneficial for irrigation water scheduling.
- Hydrogeologic Groundwater Model – The LENRD, in partnership with the NeDNR, recently began the development of a sub-regional groundwater model that will integrate existing datasets along with the AEM (aerial electromagnetic) interpretations that have been obtained in multiple phases with the district. As of this writing the development of the hydrogeologic framework that will support the modeling efforts is complete, and efforts are currently underway to develop a project scope that will guide the modeling efforts. The project is scheduled for completion in 2021.
- In 2020, the LENRD installed telemetry equipment on dedicated monitoring wells. This equipment will provide real-time measurements of groundwater levels, and a user interface will be developed that will allow the general public to view this information via the internet.

AEM FLIGHT DATA

The district has invested heavily in the collection of geologic information that can be utilized as the technical basis for groundwater management policies. The AEM (aerial electromagnetic) concept is one of the activities that has been utilized to build upon the existing geologic framework. The information is collected via the use of equipment that is equipped to transmit and receive an electronic signal as it is being carried above the earth's surface by a helicopter. The District has utilized this concept to collect data from different densities – flying grid lines that may sometimes be separated by three (3) miles and in block flights where the separation of flight-lines has been ~1000 feet.

GROUNDWATER QUALITY

Since 1972, the LENRD has devoted a great deal of effort, manpower, and expenditures to monitor our groundwater quality, primarily for nitrates. This effort continues on an annual basis, with specific portions of the district targeted each year to collect water samples that will be used to monitor groundwater quality conditions. Nitrates are one of the major contaminants that are closely watched for, but pesticides are also included as part of a suite of contaminants that are regularly monitored.

GROUNDWATER MONITORING - The LENRD's basic goal for managing groundwater is to work with groundwater users and other entities to ensure an adequate supply of acceptable quality groundwater. To help achieve this goal, the board decided to develop long-term groundwater management strategies and to assess groundwater conditions systematically.

The district measures specific physical and chemical properties in streams, ponds, reservoirs, and groundwater wells throughout the district. The data helps the district to detect groundwater quantity and quality changes, trends, or problems.

- Irrigation well groundwater quality network – NRDs, in cooperation with the Nebraska Department of Environmental Quality, now the Department of Environment and Energy, established a statewide monitoring network to assess long-term groundwater quality trends. The district collects samples from 55 of the approximately 1,400 groundwater wells in the statewide network. Over the next decade, the district will cooperate with the state to continue this monitoring.
- Monitoring well network – the CSD and the LENRD have installed and equipped 79 monitoring wells at 48 sites to monitor both groundwater quantity and quality. Pressure transducers installed in the wells automatically measure and store depth-to-groundwater information every eight hours, so the district can understand the response of groundwater under pumping and non-pumping conditions. Submersible pumps

installed in the wells allow the district to collect samples from the wells without risk of cross-contamination. District staff collect samples from these wells either monthly, semiannually, or annually to detect changes and trends in groundwater quality. The district will continue to add to the monitoring well network to enhance groundwater monitoring as manpower and funding allows.

- Monitor LENRD groundwater quality annually from 169 dedicated wells and 500 irrigation wells
- LENRD irrigation wells added to Statewide data network in 2006 which is managed by Nebraska Association of Resources Districts.
- Department of Environment and Energy issues an annual report to the Legislature based upon Statewide/NRD network of irrigation well data
- A system of 79 dedicated monitoring wells provide ongoing quality data collected on a pre-determined schedule that varies by location
- Inspection of Chemigation systems began in 1986 by an independent consultant. The LENRD now has internal staff completing the inspections on approximately 2,100 irrigation wells for safety to protect groundwater.
- The entire LENRD was placed in a Groundwater Management Area in 1997 for the purpose of targeted and improved regulation while attempting to work with landowners on a voluntary basis.
- Best Management Practices (BMPs) for landowners are encouraged to prevent further groundwater contamination.
- Continue to promote soil sampling, irrigation well sampling, cornstalk nitrate sampling and livestock manure sampling. Cost share is available for some cooperator/landowner practices.
- Collect groundwater samples for public water suppliers through the Wellhead Protection Program (WHP) and assist with protection plans. The LENRD participates in WHP with Norfolk, Belden, Stanton, Dodge, Plainview, Osmond and Logan East RWS. Wellhead protection plans for communities have proven effective to protect municipal drinking water supplies and are usually designed with Nebraska Department of Environment and Energy (DEE).
- Assist public water suppliers with new production wells – Pay 50% of test wells, up to \$5,000 maximum per location.
- Provide incentives to landowners to seal abandoned wells.
- Continue Phase 2 & 3 management for groundwater quality in Pierce and northern Madison County.
- All livestock operations in the LENRD are monitored for runoff and pollution problems in partnership with NRCS staff in each county. Reports are filed in cooperation with DEE. Livestock waste disposal is an issue that has rapidly emerged as a concern for water quality in the late 1990s. Northeast Nebraska is a national leader in livestock

production, especially for cattle and hogs, as we claim 19% of the state's cattle on feed and 26% of the hogs. Cuming County is the top-producing county for cattle on feed (8 % of the state's total) and 6% of the state's hogs.

- Collect soil samples for groundwater quality impacting "Vadose Zone" - which is the area between plant roots and the upper surface of groundwater.

BAZILE GROUNDWATER MANAGEMENT AREA

The Bazile Groundwater Management Area is a multi-agency partnership focused on mitigating excessive groundwater nitrates in portions of Antelope, Knox, and Pierce Counties. Formed in 2013 by four Natural Resources Districts (NRDs) - the Lewis & Clark NRD, Lower Elkhorn NRD, Upper Elkhorn NRD, Lower Niobrara NRD, and the Nebraska Department of Environmental Quality, the partners have leveraged numerous funding sources to incentivize the adoption of Best Management Practices to protect and improve groundwater quality.

The BGMA encompasses twenty-one townships or 756 square miles in northeast Nebraska.

Knox, and Pierce and parts of four Natural Resource Districts (NRDs): Lewis and Clark (LCNRD), Lower Elkhorn (LENRD), Lower Niobrara (LNNRD), and Upper Elkhorn (UENRD).

Precipitation and irrigation runoff feed into three major river basins: Elkhorn, Missouri, and Niobrara as well as parts of three different groundwater regions: Sandhills, North-Central Tableland, and northeast Nebraska Glacial Drift.

The BGMA was originally identified as the Bazile Triangle area of concern in the late 1980s as a result of nitrate contamination affecting municipal wells in the vicinity of the Villages of Brunswick, Creighton, Orchard, Osmond, Plainview, Royal, and Wausa. The BGMA currently supplies water resources to ten communities and over seven thousand area residents. The area was deemed the Bazile Triangle due to the Bazile Creek drainage in the center.

Bazile Groundwater Management Area Plan

Develop and manage surface water

Objectives:

1. Develop surface water projects consistent with local desires for flood control, recreation, conservation irrigation, water supplies, and wildlife protection.

For the LENRD, the development of surface water is usually tied to planning and constructing multi-purpose dams and reservoirs for flood control and public water-based recreation, which includes wildlife enhancement. Past projects developed by the LENRD such as the Willow Creek SRA, Maskenthine Lake, and Maple Creek illustrate those commitments. Feasible sites are always investigated.

Environmental concerns are also a challenge when constructing large projects. The Federal Endangered Species Act has made it more difficult to pursue large surface water projects.

Establish and Preserve Fish and Wildlife Habitat

Objectives:

1. Establish and preserve fish and wildlife habitat on private lands.
2. Establish and preserve fish and wildlife habitat on public lands.

This goal is always a top priority as the LENRD pursues protecting fish and wildlife on public and private lands.

The “Corners for Wildlife” program establishes habitat in field corners (usually 6-7 acres) left over from center pivot irrigation systems. Landowners who enroll receive up to \$75 per acre annually. Wildlife supporters such as *Pheasants Forever* also promote and fund cost-share programs in cooperation with the LENRD. The popular CRP program placed millions of acres nationwide in the conservation reserve, creating grasslands which benefits wildlife. Pheasant numbers boomed in the late 1980s when large tracts of land were enrolled in CRP, but recently older stands of grass have become less productive. As contracts expired, many fields were taken out of CRP and returned to cropland, but Nebraska still has thousands of acres (especially in the Northeast) which are highly productive habitat for all types of birds and animals. Ongoing efforts by all agencies will remain strong to protect and enhance wildlife habitat.

The LENRD has promoted, developed, and managed fish and wildlife habitat where possible since the early 1970s. These efforts include instilling “a sincere appreciation for the declining value of wildlife in the public; attaining a positive balance of wildlife habitat to cropland while

preserving and conserving existing fish and wildlife species for the benefit of future generations.”

- Continue to support the Nebraska Game & Parks Commission as our partner in efforts to manage fish and wildlife.
- Continue to encourage NG&P in providing fair and consistent administration of all related state and federal laws, especially regarding surface water and endangered species.
- Nebraska depends upon agriculture to sustain our economy and wildlife species must be managed in harmony with human activity.
- Discourage practices by public agencies and private individuals that result in the unnecessary destruction of permanent vegetation and trees.
- Continue to promote Nebraska Buffer Strip program which has become quite popular.
- Local Pheasants Forever Chapters have provided leadership and cost-share to landowners with growing success - LENRD supports their work with cost-share and promotions.
- Two Federally listed endangered species were discovered within LENRD - Topeka Shiner is a small minnow found in Taylor Creek (unique cold-water stream approximately 6 miles long in Madison County) and Prairie Fringed Orchid is also found in certain wet meadow conditions.
- Pallid Sturgeon Study over 5 years (endangered fish) did help determine new scientific data but may have raised more questions than answers regarding Lower Platte River flows and impact to the Elkhorn.

Provide adequate outdoor recreation opportunities within the District

Objectives:

1. Develop multipurpose projects which include outdoor recreation facilities.
2. Assist other entities in development of outdoor recreation facilities.
3. Preserve selected areas of historic, educational, archaeological, and scenic value associated with district projects.

The major emphasis for outdoor recreation from the LENRD perspective is continued development of existing projects. Several features, including showers and fishing piers, have greatly improved visitor appreciation of the Willow Creek SRA, Maskenthine Lake, and Maple Creek. Very popular handicapped accessible fishing piers and boat dock upgrades were added

at Willow and Maskenthine. Maskenthine has new beach showers and handicapped accessible picnic shelters. Playground equipment was also provided for each site.

RECREATION TRAILS

Recreational (hiking/biking/horseback riding) trails have become very popular across Nebraska. Trails have many advocates and local support remains very high. LENRD has provided support with planning and funding for several major trail efforts.

The Cowboy Trail is the Nation's longest Rails to Trails conversion in the United States and the State's first major recreational trail extends 323 miles from Norfolk to Chadron. Historic Chicago & Northwestern Railroad right of way (now called the Cowboy Recreation and Nature Trail) passes through spectacular scenery in the Elkhorn River Valley on its way to the expansive and historic Sandhills.

The 2.2 mile connector from Norfolk's Ta-Ha-Zouka Park trailhead to the official start of the Cowboy Trail was constructed in the late 1990s. Acting as lead agency, the LENRD worked with the City of Norfolk, the Department of Roads, and Union Pacific Railroad in acquiring property right-of-way. The trail passes under a four-lane expressway, is parallel to the Elkhorn River, and crosses under railroad tracks and winds on top of the city flood control levee before connecting to the Nebraska Game & Parks managed Cowboy Trail west of the city. The connector opened to the public in 2002.

The 9.5-mile Willow Creek Trail connects the city of Pierce with the Willow Creek SRA and loops around the 700-acre reservoir and recreation facilities. The trail is made possible by a breakwater crossing on the west-end of the lake featuring recycled tire bales, rocks, and a steel bridge.

URBAN CONSERVATION AND RECREATION

For several years the LENRD has pursued a two-phased approach for continued development of outdoor recreation facilities on District owned property and cooperation and cost-share with communities for Urban Conservation/Recreation Area Development as they present properly planned and engineered projects. Examples may include hiking/biking trails, improvements to playgrounds in parks and ball fields, park restrooms, etc. These grants are open to all communities across our district.

Promote the Planting and Conservation of Trees

Objectives:

1. Stimulate tree planting on private lands for all beneficial purposes.
2. Stimulate tree planting on public lands for all beneficial purposes.

The LENRD has always maintained a strong tree planting program, determined to carry on the stewardship ethic established by the SWCDs.

The primary tree planting program begins with sales of the seedlings to cooperators in the fall, transporting the trees from the U.S. Forest Service nursery at Halsey in April, and holding the seedlings in cold storage until crews complete various shelterbelts, windbreaks, and wildlife plantings. The program averages sales and planting of anywhere from 40,000 to 100,000 seedlings annually. Additional service is provided for care and growth of the trees with the sale of weed barrier mats that can be placed over the trees to conserve moisture and restrict weed growth. The USDA-NRCS staff in the county field offices are very important partners for the tree program, assisting with general promotion of all components of the program including tree sales, planting plans, and project designs. The LENRD Program Assistants, assigned in area NRCS offices, are trained to assist and provide valuable tree program information to landowners. The LENRD has distributed more than 4 million trees through this program.

The Agroforestry Incentives Program provides cost-share for windbreak plantings and renovation.

The Community Forestry Incentives Program provides cost-share for communities to establish, improve, and maintain their tree resources. Assisting in the establishment of a certified community tree board to pursue the coveted Tree City USA recognition is also a goal.

Forestry Incentives for Public Facilities (on privately owned property) was recently established to provide tech assistance for golf courses, green space, etc. which must be open to the public.

Each year, the LENRD supports NRCS and NFS staff with conducting workshops, trainings, field days, and tours.

Information and Education

Objectives:

1. To ensure public awareness of the district's responsibilities, programs, projects, and goals, and to increase public concern for the proper management and conservation of our natural resources.

The LRP details each program and project to be carried out by the LENRD. As required by the Unicameral, the LRP consists of the board's goals and objectives, measured accomplishments, funds requested and budgeted, and man-hours needed to complete all programs and projects. Also mandated by the Legislature, the Master Plan, which is prepared every 10 years, contains the goals and objectives, historical perspective of accomplishments, current response to project and program responsibilities, physical descriptions, and future direction for the LENRD.

Various forms of public outreach, including: radio, newspapers, television, email, and social media are utilized to inform citizens of all ages about protecting and conserving our natural resources. The LENRD conducts and participates in a variety of workshops, field days, water festivals, the Envirothon, and FFA contests.

- Provide grants to schools to develop outdoor classrooms on school property
- Provide the public with information regarding LENRD activities utilizing a bi-monthly electronic newsletter
- Promote the National Association of Conservation Districts (NACD) Soil and Water Stewardship Week, providing information to churches and schools across the district.
- Promote LENRD programs and events utilizing multimedia advertising (radio, newspapers, farm shows, county fairs, community events/meetings/tours, website, television, email marketing, social media, etc).
- Increasing awareness of the LENRD's mission by recognizing farm families, individuals, and communities with awards for completing outstanding conservation work. The Omaha World Herald Master Conservationists, Nebraska Association of Resources Districts, NACD, and local awards all bring recognition to our efforts to promote soil and water stewardship.
- Promote LENRD programs and environmental education to students across the district with classroom materials, presentations, special events, water festivals, earth day festivals, and other family-oriented events.
- Provide various scholarships for teachers and students to attend 4-H camps and environmental education workshops.
- Sponsor learning programs and contests across the state, including: Regional and State Envirothon competitions, FFA Land & Range Judging contests, 4-H & Scout events.

- Provide funding to USDA-Resource Conservation & Development (RC&D) councils for the purpose of recycling tires and other materials
- Public outreach has multiplied with the use of our website, email marketing, social media, and television advertising.
- Provide scholarships to graduating seniors going on to pursue a degree in natural resources.

Summary & Future Needs

Many of the future natural resource management issues will be as diverse as those addressed by the LENRD in the past ten years. Total watershed management and water quality improvements remain top priorities throughout the United States, and Nebraska will remain a leader to continue these efforts. Management of the entire ecosystem (watersheds) is the appropriate approach to conservation. Implementing projects and programs with all these concepts in mind requires a delicate balancing act between development and preservation. For example, constructing a flood control dam may be very necessary for one area, but environmental issues may end up dictating the outcome and success of the project. Providing a fair and reasonable solution to public and private resource problems is a constant challenge.

The LENRD's major function is to provide leadership and solutions within the framework of the state statutes. One of the most important tasks of the LENRD is overall support of agriculture while developing and implementing stewardship practices that minimize runoff of sediment and nutrients. Reducing the over-application of Ag-chemicals continues to be a top priority. Strong efforts to protect surface and groundwater quality for all needs will continue.

Future planning for management of Nebraska's diverse natural resources must meet the challenge of a highly productive agriculture state while maintaining a quality environment. Working to ensure safe and profitable production of food and fiber requires creative strategies to balance profitable and efficient farming with conservation of the soil while protecting ground and surface water quality and ensuring future water supply.

Nitrates in our groundwater is one of the largest concerns in northeast Nebraska and will be a major focus for this district in the next 10 years. This issue is being addressed most heavily in the Bazile Groundwater Management Area.

CHALLENGES AND OPPORTUNITIES

WILLOW CREEK ALGAE STUDY - This study is ongoing and the board is willing to consider new ideas to address this recurring issue.

INCREASED GROUNDWATER QUALITY MANAGEMENT – especially in Pierce and Northern Madison Counties will be critical to prevent further contamination of the aquifer. It is vital to protect and sustain our water resources with regulation and education as increased landowner participation is more necessary than ever.

CONTINUE STUDIES OF COMPLEX GEOLOGIC FRAMEWORK – will be vital to understanding aquifer conditions and management of groundwater. This effort must be on-going using as much sound science as possible.

INCREASE PROMOTION OF FORESTRY PROGRAMS – Nebraska is rapidly losing populations of various trees in rural and urban areas due to storms and disease. As the Nebraska’s leading tree planters, NRDs will need to become more creative with incentives to plant more trees.

COMPREHENSIVE STUDY OF THE ELKHORN RIVER BASIN – As a result of the record flooding of the Elkhorn River in 2010 and 2019, massive damage was suffered by private landowners and public infrastructure.

CONTINUE STUDYING THE MAPLE CREEK WATERSHED – based on successful planning, construction, and opening of the Maple Creek Recreation Area near Leigh in 2011, future studies could assist in protecting other areas. As studied by the USDA–NRCS in the 1960s-70s, completion of the 27 dam sites will provide 72-75 % flood protection downstream in the 266,000-acre Maple Creek Watershed.

CONSIDER IMPOUNDMENT SITES FOR ALTERNATE USE – several dam sites in the District could very well be studied for so called “timed release” of water for the purpose of fish and wildlife enhancement.

The reality of working in today’s public policy arena is that no one individual, board, or organization can make significant policy changes alone. It takes cooperation among many; cooperation that grows from strong working partnerships built over time around common goals to achieve real success. In fact, building partnerships that have capacity to affect change is one of the most important goals that agencies such as the LENRD can accomplish. The ultimate challenge of the future is to work with all citizens to meet the soil and water conservation needs of a rural and urban population which continues to grow. The LENRD will move forward

into the next 10 years with enthusiasm as we strive to solve our natural resources challenges, with locally elected officials and locally driven decisions.

We can and will address present day issues such as soil erosion, flood control, and improving ground/surface water quality. We will continue to provide high quality water for human and livestock consumption delivered through rural water systems. We will plant trees and construct dams. Conservation will always go on. The LENRD has the ability and willingness to administer and fund new ideas. The district can offer a balanced effort, providing programs and projects within our means that will fulfill our mission statement: "STRIVING TO IMPROVE THE QUALITY OF LIFE FOR ALL CITIZENS OF THE LOWER ELKHORN NATURAL RESOURCES DISTRICT BY PROMOTING AND DEMONSTRATING SOUND METHODS OF STEWARDSHIP WHICH CONSERVE, DEVELOP, AND MANAGE ALL NATURAL RESOURCES."