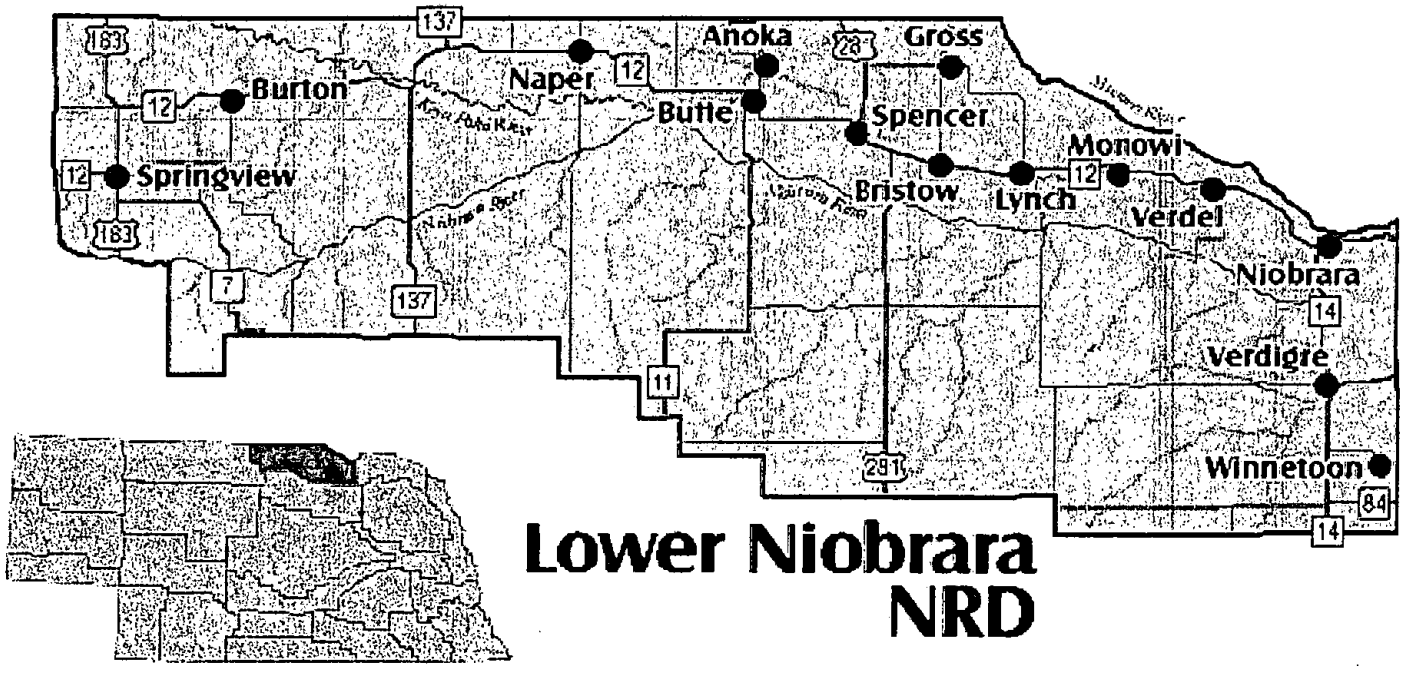
Lower Niobrara
Natural Resources District



MASTER PLAN

February 2012

Protecting Live – Protecting Property – Protecting the Future

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LOWER NIOBRARA NATURAL RESOURCES DISTRICT
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I. Introduction

The Master Plan for the Lower Niobrara Natural Resources District was prepared by the District staff under the direction of the Long Range Planning Sub-committee and approved by the District Board of Directors in February of 2012. It replaces a similar Master Plan approved in September of 1999.

On July 1st 1972, over 150 special purpose districts were merged to form 24 Natural Resources Districts, encompassing the State of Nebraska. In 1989, the Middle Missouri Tribs and Papio NRDs were merged, leaving the State with 23 districts. Boundaries of each district followed natural river drainage basins.

II. Responsibilities and Authorities

As stated in section 2 – 3229 of the Nebraska State Statues, the purpose of the Natural Resources Districts shall be to develop and execute through the exercise of powers and authorities contained in this act, plans, facilities, works and programs relating to:

1. Erosion prevention and control
2. Prevention of damages from flood water and sediment
3. Flood prevention and control
4. Soil conservation
5. Water supply for any beneficial use
6. Development, management, utilization, and conservation of groundwater and surface water
7. Pollution control
8. Solid waste disposal and sanitary drainage
9. Drainage improvement and channel rectification
10. Development and management of fish and wildlife habitat
11. Development and management of recreational and park facilities
12. Forestry and range management

NRDs were empowered to provide for effective planning, development, and management of the State's natural resources. To accomplish this goal NRDs were given authority to levy property taxes. The current property tax levy is not to exceed 4.5 cents per 100 dollars valuation. This funding mechanism has allowed districts to fund a variety of natural resources programs and hire the personnel to successfully see these programs through.

III. Description of the Lower Niobrara Natural Resources District

Location

The Lower Niobrara Natural Resources District includes 2,641 square miles of central and eastern Keya Paha County, 18% of the District, northern Holt County, 40.5 % of the District, western Knox County, 13.7 % of the District, northeastern Rock County, 7.5% of the District, and Boyd County, 20.3 % of the District. Bordered by South Dakota and

the Missouri River on the north, the District is 96 miles long and ranges from 24 to 36 miles wide.

Population
There are 11 municipalities with in the District. The largest of these is Verdigre, followed by Spencer, Niobrara, Butte, Springview, Lynch, Naper, Bristow, Winnetoon, Verdel, Monowi, Burton and Gross.

In 2010, the population of the Lower Niobrara NRD was estimated to be 6985. Boyd County makes up about 36 % of the District population, followed by Knox County at 31%, Holt County at 21%, Keya Paha County at 11%, and Rock County at 1%.

Governing Body
The Lower Niobrara Natural Resources District is governed by a board of 17 directors elected by voters in a general election. Each director serves a four year term. The District is divided in to eight sub-districts with two directors from each sub-district and one at large.

Geology
The District has four major drainage areas: The Ponca Creek, the Verdigre Creek, the Keya Paha River, the Niobrara River and a small area that drains directly into the Missouri River.

The Niobrara and Pierre formations of the cretaceous age are the oldest geologic exposures in the Lower Niobrara NRD. They are exposed on the bluffs along the Missouri, Niobrara, and Keya Paha Rivers and their tributaries, and along the valley sides of the Ponca and Verdigre Creeks. The most recent geological formation is the Ogallala formation of the tertiary age. It overlies the other geological formations except north of the Niobrara River in Boyd and northwestern Knox County where it is generally absent.

Unconsolidated sediments of Quaternary age overlay the geologic bedrock formations throughout the Lower Niobrara NRD. These deposits of alluvial clay, silt, sand, and gravel along with wind deposited silt and sand have been deposited over most of the landscape in widely different topographic positions. Wind deposited sand called eolian sand is the most common unconsolidated material at the surface in the District.

Along the entrenched rivers and major streams in the area the landscape consists of strongly to very steep sloping upland side slopes and narrow bottomlands along the streams. The soils on the upland side of the slopes formed in residuum from shale siltstone and sandstone and in some cases eolian sand and gravel. These soils are well to excessively drained and deep to shallow over the underlying bedrock or gravelly material and subject to severe water erosion when the surface is not protected. The soils on the bottomlands formed in sandy, loamy, and clayey alluvium and are subject to flooding. They are excessively drained to poorly drained with water tables that range from at the surface to 10 feet below the surface.

In the area south of the Niobrara River and to the west of the Keya Paha River the landscape consists of nearly level and gently sloping tablelands, rolling Sandhills and valleys, to very steep sloping dissected uplands. The soils on the tablelands formed in sandy and loamy material and are deep to shallow over gravelly sand and coarse sand. They are well drained to excessively drained and subject to wind erosion when the surface is not protected by vegetative cover. The soils in the rolling Sandhills and valleys formed in eolian sand. The hills are excessively drained, droughty and subject to severe wind erosion when the native grass cover is destroyed. Soils in the valleys are generally poorly drained to with water tables within 1 to 6 feet of the surface during the growing season. On the sloping dissected uplands the soils were formed in sandy and loamy material and are deep to shallow over gravelly sand, weakly cemented sandstone and shale. They are well drained to excessively drained and subject to wind and water erosion when the surface is left unprotected.

In the area north of the Niobrara River and to the east of the Keya Paha River the landscape consists of nearly level to sloping tablelands surrounded by very steep sloping dissected uplands. The soils on the table lands formed in silty wind deposited material called loess. They are deep and well drained to moderately well drained with the sloping area being subject to water erosion when unprotected. The soils on the dissected uplands formed in loamy and clayey material weathered from shale and in a few places eolian sand. These soils are well drained or excessively drained and moderately deep or shallow over shale bedrock. Water erosion is a severe hazard on unprotected surfaces.

Groundwater Supplies

Groundwater occurrence and extent varies widely in the District. There are two distinctively different groundwater reservoir areas. The area generally north of the Niobrara River is in what is referred to as the North Central Tableland Region. Underlying the upland surface is the eastwardly thinning Ogallala Formation, which is a source of medium to moderately large supplies of good quality water, where the zone of saturation is thick. The lower lying rough rolling terrain was developed on shale of the Cretaceous age. Throughout this area supplies of water are almost unavailable except by drilling several hundred feet to tap the Dakota Sandstone. Medium to moderately large supplies of good quality water can be obtained from thicker deposits of the Pleistocene sands and gravels underlying the flood plains. In some of the eastern areas of this region wells tapping the Dakota will flow at lower elevations. Dakota water is often highly mineralized.

Much of the south half of the District lies in what is referred to as the Sandhills Region. Much of this area, though now having yielded to farm development, includes sand covered dunes, some flat inter-dune meadows, and some area of undefined drainage. As the sandy soils absorb precipitation and transmit it downward very little runoff results.

Much of this southern half of the District is underlain by permeable water bearing rock of the Tertiary and Quaternary age. There are two aquifers of importance to the O'Neill five county areas: 1) the Ogallala formation of the Tertiary age and, 2) the overlying sand and gravel deposits of the Pleistocene age.

Although the two aquifers are in hydraulic connection with each other, the hydraulic characteristics are quite different. The Ogallala formation, which is the lower aquifer, is typically tighter and less permeable than the overlying Pleistocene deposits. When a well penetrates both aquifers a large portion of the wells yield may be derived from the upper formation because of its greater permeability. Permeability of the Ogallala formation generally ranges from 50 to 150 gallons per day per square foot, whereas the permeability of the Pleistocene sands and gravels range from 500 to more than 2000 gallons per day per square foot. Thus it is possible for 20 feet of saturated Pleistocene sands to produce as much as 200 feet of the saturated Ogallala formation.

Precipitation, which is a substantial contributor to the recharge of the groundwater reservoir ranges from an average 20 inches in the western part of the District to 26 inches in the east. Approximately two thirds of the total annual precipitation falls during the growing season.

Land Use

The NRCS classifies all soils into eight classes based on their ability to produce crops without eroding. Class I land is the best land with no restrictions while class VIII has the most restrictions for use. Following is a brief description of each capability class and the percent of each within the District.

I. These soils have very few limitations that restrict their use. Class I land makes up 1 percent of the Lower Niobrara NRD.

II. These soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. Class II lands make up 12 percent of the Lower Niobrara NRD

III. These soils have severe limitations that reduce the choice of plants or that require special conservation practices. Class III land makes up 11 percent of the Lower Niobrara NRD. Fifty percent of this is cropland.

IV. These soils have severe limitations that reduce the choice of plants and require special conservation practices. Class IV land makes up 27 percent of the Lower Niobrara NRD. Thirty-six percent of this land is used for crop production and presents a serious erosion hazard. These soils can be protected through conservation tillage and good range management.

V. These soils are not likely to erode but have other limitations that are very impractical to remove. Class V land makes up 2 percent of the Lower Niobrara NRD.

VI. These soils have severe limitations that make them generally unsuitable for cultivation. Class VI land makes up 39 percent of the Lower Niobrara NRD. Eighty-six percent of this is in permanent vegetation.

VII. These soils have very severe limitations that make them unsuitable for cultivation. Class VII land makes up 5 percent of the Lower Niobrara NRD. This land is protected by permanent vegetation.

VIII. These soils have limitations that make them generally unsuitable for commercial use. Class VIII land makes up less than 1 percent of the Lower Niobrara NRD. This land is protected with permanent vegetation.

Misc. This includes urban and build-up land, rural transportation land, and water areas. Miscellaneous land makes up 3 percent of the Lower Niobrara NRD.

IV. Goals and Objectives

Soil Conservation and Erosion Prevention and Control

Goals:
It is the goal of the Lower Niobrara Natural Resources District to see that the lands within the District boundaries are managed in such a manner they adhere to the soil loss tolerance levels set forth by the Natural Resources Conservation Service (NRCS).

Objectives:
A. Provide technical support to District cooperators through NRCS and NRD personnel.

B. The District will carry out the rules and regulations adopted under the Nebraska Sediment and Erosion Control Act.

C. The District will provide cost share for eligible conservation practices utilizing state and local funds.

D. The District will continue to promote educational brochures, and sponsor educational seminars for area cooperators.

E. Continue to provide NRCS support programs of clerical and technical aids at Spencer, Ainsworth, O'Neill and Bloomfield.

F. Provide grass seed, conservation mulch, trees and tree planting service at a reasonable cost, where private enterprise does not provide these services.

G. Encourage private landowners to implement erosion control measures.

H. Consider District cost share programs in the event Federal and State conservation cost share funds are insufficient.

Flood Control and Prevention of Damages from Flood Waters

Goals:
It is the goal of the Lower Niobrara Natural Resources District to assist the public to minimize damages to property and Natural Resources caused by flooding.

Objectives:
A. Encourage practices which will reduce flooding and sedimentation problems.

B. Support flood and sedimentation control studies deemed necessary concerning the Niobrara River Basin.

C. Assist in the development of flood control structures.

Pollution Control and Sanitary Drainage

Goals:
It is the goal of the Lower Niobrara Natural Resources District to protect and improve the quality of the air, water, and land within the District.

Objectives:
A. Provide technical assistance for the development of waste control facilities.

B. Continue to work toward the reduction of sediment, the Basins leading pollutant.

C. Continue support of programs and studies which may reduce nitrate pollution in the Districts groundwater supply.

Ground and Surface Water Quantity and Quality

Goals:
It is the goal of the Lower Niobrara Natural Resources District to assure an adequate supply of quality water is available for beneficial use by residents of the District.

Objectives:
A. Continue to update and implement the Districts Groundwater Quality Management Plan

B. Work with the Nebraska Department of Natural Resources to develop and maintain a Voluntary Ingrated Management Plan for ground and surface water of the district to insure water for beneficial use into the future.

C. Continue monitoring static water levels throughout the District semiannually.

D. Encourage irrigation Best Management Practices which will reduce water use, runoff, and leaching of agriculture chemicals to improve overall quality and quantity of the groundwater of the district.

E. Support projects which will bring about local utilization of existing water resources.

F. Support and encourage construction of structures which will contain runoff and provide for off stream storage.

G. Support, cooperate in, or sponsor attempts to reduce nitrates in groundwater that is reasonable and economically feasible.

H. Offer nitrate testing of water samples brought to the office.

Recreation, Fish and Wildlife

Goals:
It is the goal of the Lower Niobrara Natural Resources District to pursue development of recreational facilities to meet the needs of residents and visitors to the District and to preserve and enhance fish and wildlife resources.

Objectives:
A. Continue to update and administer a Wildlife Habitat Improvement Program in conjunction with the Nebraska Game and Parks Commission.

B. Promote and support development of recreational facilities in conjunction with construction of proposed projects.

C. Assist communities with technical and financial support in the development of recreational facilities.

D. Participate in the Corners for Wildlife Program and Department of Agriculture Buffer Stripe Program.

Water Supply

Goals:
It is the goal of the Lower Niobrara Natural Resources District to assure residents of the District an adequate supply of quality water for present and future needs.

Objectives:
A. Continue to operate, update and expand, where possible, the Districts West Knox Rural Water System.

B. To pursue and develop new water systems where desired and feasible.

C. Continue to support existing water supply systems within the District.

D. Support activities which seek to maintain or improve domestic water supplies.

E. Inventory, monitor and evaluate groundwater quantity and quality.

Forestry

Goals:
It is the goal of the Lower Niobrara Natural Resources District to develop and protect forestry areas for the production of wood products, reduction of wind and water erosion, protection of wildlife, and for the enhancement of the environment.

Objectives:

A. Develop, improve, and encourage maintenance of forests and tree plantings on private property

B. Cooperate in the development and improvement of forests and tree plantings with other entities.

C. Continue to offer trees and tree planting service along with conservation mulch to District cooperators at a reasonable cost.

Range

Goals:
It is the goal of the Lower Niobrara Natural Resources District to develop, improve, and manage range for the protection of soil and the production of livestock.

Objectives:

A. Cooperate in the development, improvement, and maintenance of range land with other entities.

B. Support and sponsor range judging contests and workshops.

C. Encourage control of noxious and other undesirable weeds and shrubs.

D. Encourage installation of livestock watering facilities and planned grazing systems that will result in better grazing distribution and promote the growth of desirable grass species.

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Natural Resources District
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