Lower Platte River Basin Coalition

Basin Water Management Plan

October
2017

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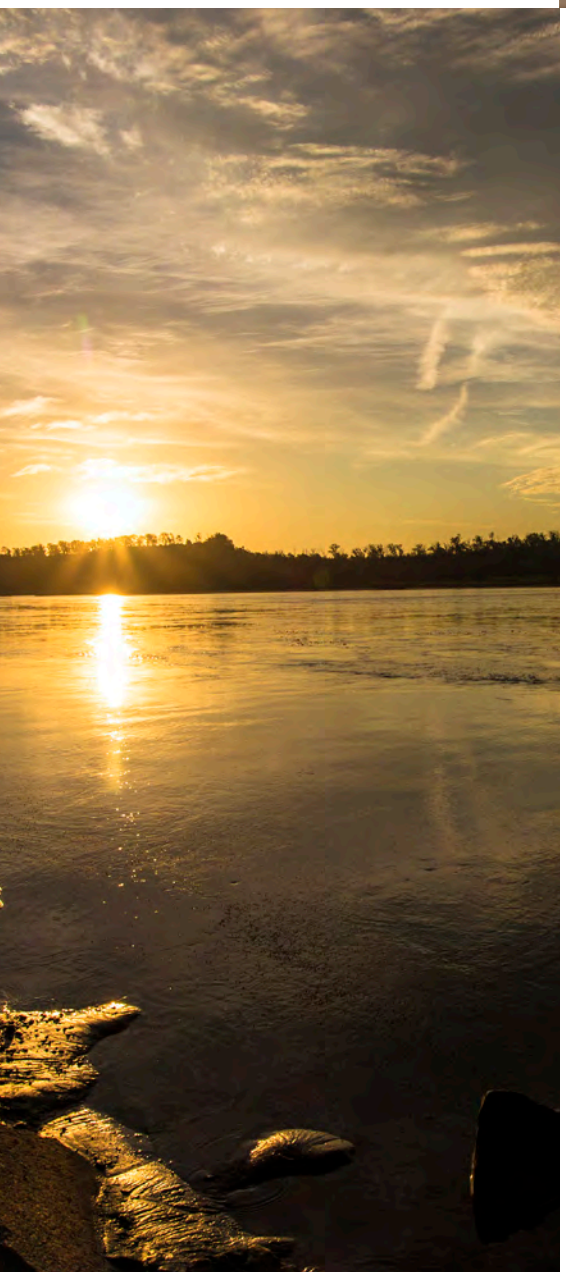
1.0 Introduction

The Lower Platte River Basin (Basin) is one of the state's most valuable resources and is integral to the state's development and sustainability - from an agricultural, social, industrial, and municipal perspective. The Basin is geographically large and diverse in its geology, hydrology, land use, ground and surface water supplies, and water uses. The water resources of the Basin are managed by the Nebraska Department of Natural Resources (NeDNR) and seven Natural Resources Districts (NRDs), including:

- Lower Platte South NRD
- Lower Platte North NRD
- Papio-Missouri River NRD
- Lower Loup NRD
- Lower Elkhorn NRD
- Upper Elkhorn NRD
- Upper Loup NRD

Together with the NeDNR, the seven NRDs entered into an Interlocal Cooperative Agreement (Appendix A) in April 2013 to form the Lower Platte River Basin Water Management Plan Coalition (Coalition). The Nebraska Association of Resource Districts (NARD) serves as the coordinator on behalf of the NRDs. The Coalition recognizes the interrelation of water resources inherent within the basin and has embarked on a critical mission to protect and sustain the long-term balance between the water uses and water supplies throughout the Basin within the seven represented NRDs.



The first action taken by the Coalition is the development of this voluntary Basin Water Management Plan (Plan). The purpose of this Plan is to:

- Provide guidance and a framework for Coalition members to develop water use policies and practices that contribute to the protection of existing surface and groundwater uses, while allowing for future water development.
- Assist in the development and maintenance of a water supply and use inventory, based on the best available data and analysis.
- Provide consistency and information for incorporation into individual NRD Integrated Management Plans.

1.1 Background

The Nebraska Legislature passed Nebraska Legislative Bill 962 (LB 962) on July 16, 2004 to address conflicts between surface and ground water users and provide a framework for joint management of water resources. As required under LB 962, each year the NeDNR evaluates the expected long-term availability of hydrologically connected water supplies to meet both existing and new ground and surface water uses for each river basin in the state. Under Neb. Rev. Sat. §46-713(3), a basin is considered fully appropriated when certain conditions for hydrologically connected surface water and groundwater are met, namely:

- When current uses of hydrologically connected surface water and groundwater will, in the reasonably foreseeable future, cause the surface water supply to be insufficient to sustain over the long term the beneficial or useful purposes for which existing natural flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted.
- When current uses of hydrologically connected surface water and groundwater will, in the reasonably foreseeable future, cause the streamflow to be insufficient to sustain over the long term the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved.
- When current uses of hydrologically connected surface water and groundwater will, in the reasonably foreseeable future, cause reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws.

On December 16, 2008, NeDNR made a preliminary determination that the Basin was fully appropriated. Following the preliminary determination, NeDNR held four public hearings February 17, February 24, March 11, and March 12 in 2009, where new information was brought forward. On April 8, 2009, the NeDNR reversed its preliminary determination.

Subsequent to the NeDNR's reversal of the preliminary determination, Nebraska Governor Heinemann signed Nebraska Legislative Bill 483 (LB 483), which established procedures to limit new irrigation development in areas like the Lower Platte River Basin. In accordance with LB 483, whenever the NeDNR reverses the preliminary determination that a basin is fully appropriated, the NRDs subject to LB 483 adopt a 4-year plan to limit the number of new wells, so that the basin remains "not yet fully-appropriated". If the NeDNR does not approve the NRDs' plan within 60 days, the number of new wells is limited to no more than 2,500 new irrigated acres annually or increasing existing irrigated acres no more than 20%, whichever is less. The formation of the Coalition and this planning effort, largely a result of LB 962 and LB 483, focuses on maintaining a "not fully- appropriated" status for the Basin.

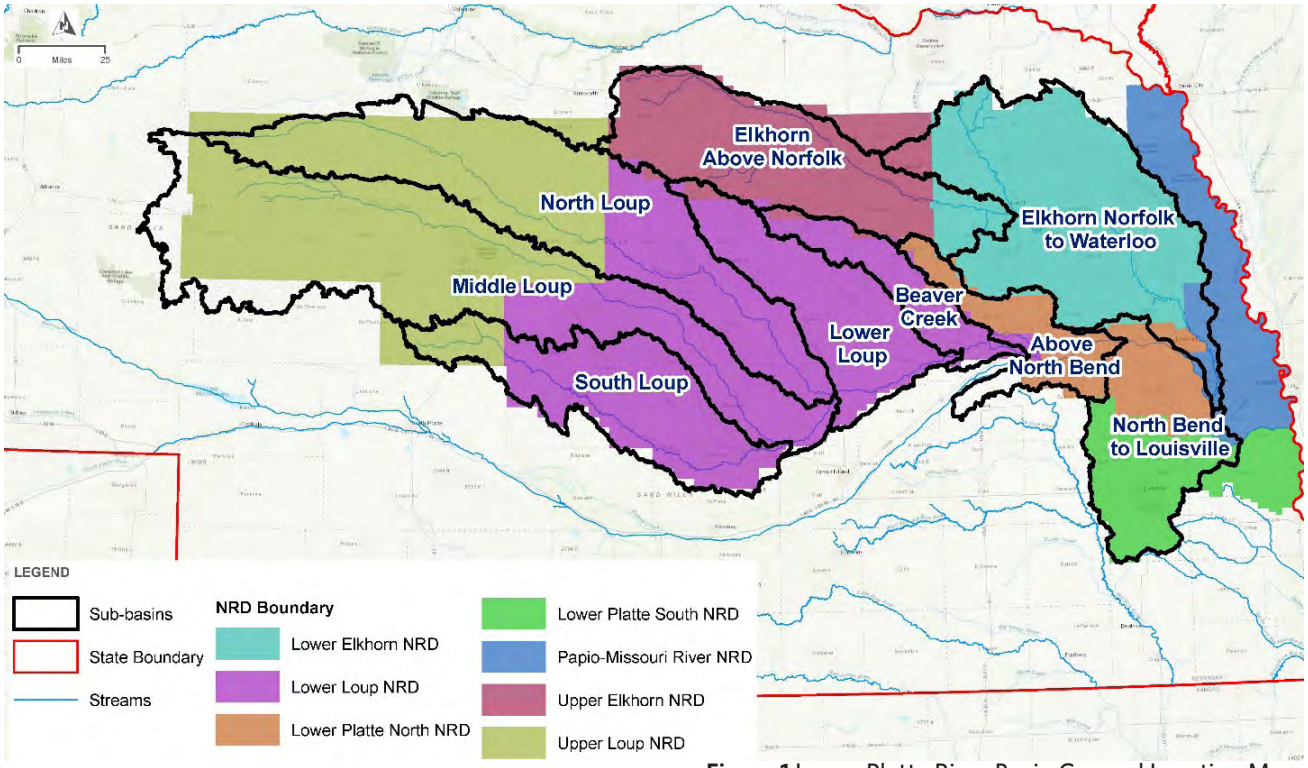


Figure 1 Lower Platte River Basin General Location Map

1.2 Basin Description

The Lower Platte River Basin, shown in Figure 1, is comprised of three distinct river basins, including:

- Loup River Basin
- Elkhorn River Basin
- Lower Platte River Basin

Basin supply and demand data was obtained from the Nebraska NeDNR's INSIGHT database (**https://nednr.nebraska.gov/insight**). During the course of the project, the technical committee requested that demand scenarios more conservative than the demand scenario of the INSIGHT methodology be investigated. After considering the various demand scenarios and assessing the benefits and constraints on the individual subbasins, the management committee agreed to utilize a demand scenario that would maintain 40% of the 25-year average streamflow at Louisville (without hydropower considered) to calculate the volume of water supply within the Lower Platte River Basin that exceeds the near term demand.

An additional variance between the INSIGHT methodology and the basin-wide accounting methodology used in the development of this Plan, is that the Above North Bend sub-basin was divided above and below Columbus to break out the Beaver Creek basin for inclusion in the Loup River basin, consistent with the basin topography.– (Action items 1.1.1 (A) & 2.3 (B))

[1]Section 2.4.5 and 3.0 describe these alternative demand scenarios in more detail.

[2]For reference, the draft NeDNR INSIGHT methodology considers the maximum of either the induced groundwater recharge demand or the adjusted instream flow demand in the North Bend to Louisville subbasin. This adjusted instream flow demand (948,984 AF) corresponds to maintaining approximately 20% of the 25-year average streamflow in the Platte River at Louisville.

1.2.1 Loup River Basin

The Loup Basin is located in central Nebraska, and primarily includes the Upper Loup NRD and the Lower Loup NRD. The Loup Basin has an area of approximately 14,900 square miles.

At its farthest western extent, the Loup Basin boundary is about halfway between Alliance, Nebraska, and Hyannis, Nebraska, in Sheridan and Garden Counties. The Loup River headwaters are about seven miles northwest of Hyannis, Nebraska. The basin is defined as draining to the confluence of the Loup River and Platte River at Columbus, Nebraska. The Loup Hydropower facility, a major water user in the Basin, is located near the bottom of the Loup River Basin, approximately 32 miles upstream of the Loup River/Platte River confluence.

According to the 2010 U.S. Census, the largest city in the basin is Columbus with a population of about 22,000. In descending order, the next largest cities include Broken Bow (3,600), St. Paul (2,300), Ord (2,100), Ravenna (1,400), and Fullerton (1,300).

The primary aquifer in the Loup Basin is the Ogallala Formation, which is part of a vast system of related sediments that make up the High Plains Aquifer. The eastern margin of the basin is underlain by undivided Quaternary-aged units of the Great Plains Aquifer. Large saturated thicknesses, high porosity and yield, and high hydraulic conductivity are common in the basin.

Encompassing portions of the Sandhills, most of the Upper Loup Basin is used as pasture and rangeland; water table lakes and wetlands are common, especially in the north and west portions of the basin. In the remainder of the basin, primarily in river valleys, the primary crop grown is corn, followed by soybeans.

There are three reservoirs with normal pool surface area greater than 1 square mile in the Loup Basin. The Calamus Reservoir has a normal storage volume of almost 130,000 acre-feet, Sherman Reservoir has a normal storage volume of almost 70,000 acre-feet, and the Davis Creek Reservoir has a normal storage volume of more than 47,000 acre-feet.

There are five surface water irrigation districts (Sargent, Farwell, Middle Loup, North Loup, and Twin Loups) which serve approximately 129,000 acres of the approximately 1,081,481 total irrigated acres within the basin. Loup Public Power District is a hydropower district located within the Loup sub-basin with a natural flow appropriation of 3,500 cfs. The Loup Power Canal diverts Loup River flows upstream of Genoa and the canal returns flow to the Platte River downstream of Columbus. Irrigators along the Loup Power Canal divert surface water from the Loup Canal to irrigate approximately 7,500 acres. These individual appropriations are independent and junior to Loup Public Power District's appropriation and the appropriators have entered into interference agreements with Loup Public Power to fulfill their appropriation. Average annual precipitation varies from 16-18 inches per year in the westernmost end of the basin up to 28 inches per year in the easternmost end of the basin. The Loup River basin has an average basin water supply of 2.2 million acre-feet per year, an average near-term demand of 1.4 million acre-feet per year, and an average long-term demand of 1.8 million acre-feet/year (excluding hydropower demand).

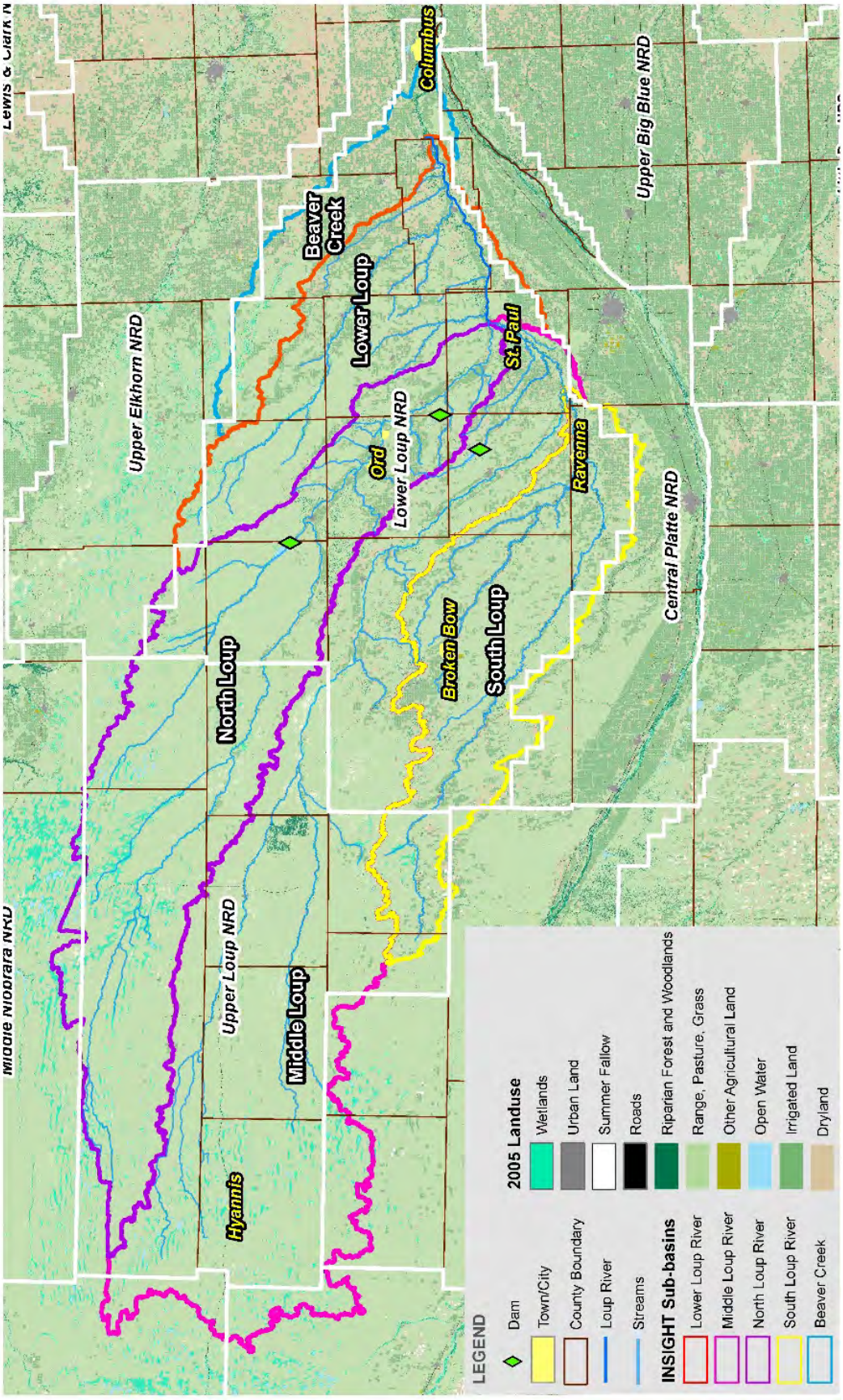


Figure 2 Loup River Basin

1.2.2 Elkhorn River Basin

The Elkhorn Basin is located in northeastern Nebraska, and primarily includes the Upper Elkhorn NRD and the Lower Elkhorn NRD. There are approximately 7,000 square miles in the Elkhorn Basin.

At its farthest western extent, the Elkhorn River's headwaters feed into three major tributaries all in Rock County, Nebraska. The Elkhorn River extends to its junction with the Platte River just west of Gretna, Nebraska.

The largest city intersecting the basin is Omaha with some of its western suburbs being within the basin. A portion of Fremont, with about 26,000 citizens, is also within the basin. Based on the 2010 U.S. Census, Norfolk (24,000) is the largest city entirely within the basin, followed by Wayne (5,700) and O'Neill (3,700).

A majority of the basin is underlain by the High Plains aquifer (which includes the Ogallala Formation). Pleistocene sand and gravel units overlie the Ogallala Formation and comprise the primary aquifer unit in the western half of the Elkhorn River Basin. The eastern portion of the basin is mostly underlain by the Great Plains aquifer system (which includes the Dakota Formation).The High Plains aquifer and alluvial sand and gravel aquifers are generally characterized by large saturated thicknesses, high porosity and yield, and high hydraulic conductivity, capable of supporting high capacity well development. Much of the Dakota aquifers groundwater availability remains unknown; however, there is generally good quantity in areas with sandstone dominant formations that are readily recharged by surface water. Glacial loess and till cover much of the eastern 1/3 of the basin, and where saturated, have much lower porosity and hydraulic conductivity, and are not usually suitable as aquifers (cf. Korus et al., 2013).

In the western third of the Elkhorn Basin, the land is primarily used as pasture and rangeland; water table lakes and wetlands are common. In the remainder of the basin, the primary crop grown is corn, followed by soybeans, with small amounts of alfalfa and open pasture and range lands.

There are no reservoirs with normal pool surface area greater than 1 square mile in the Elkhorn Basin. The largest reservoir (at just over 6,800 acre-feet of normal storage) is Willow Creek Reservoir, on Willow Creek in Pierce County.

There are approximately 900,000 irrigated acres within the Elkhorn River basin. Average annual precipitation varies from 20 inches per year in the westernmost end of the basin up to 30 inches per year in the easternmost end of the basin. The Elkhorn River basin has an average basin water supply of 1.39 million acre-feet per year, an average near-term demand of 0.8 million acre-feet per year, and an average long-term demand of 1.0 million acre-feet/year.

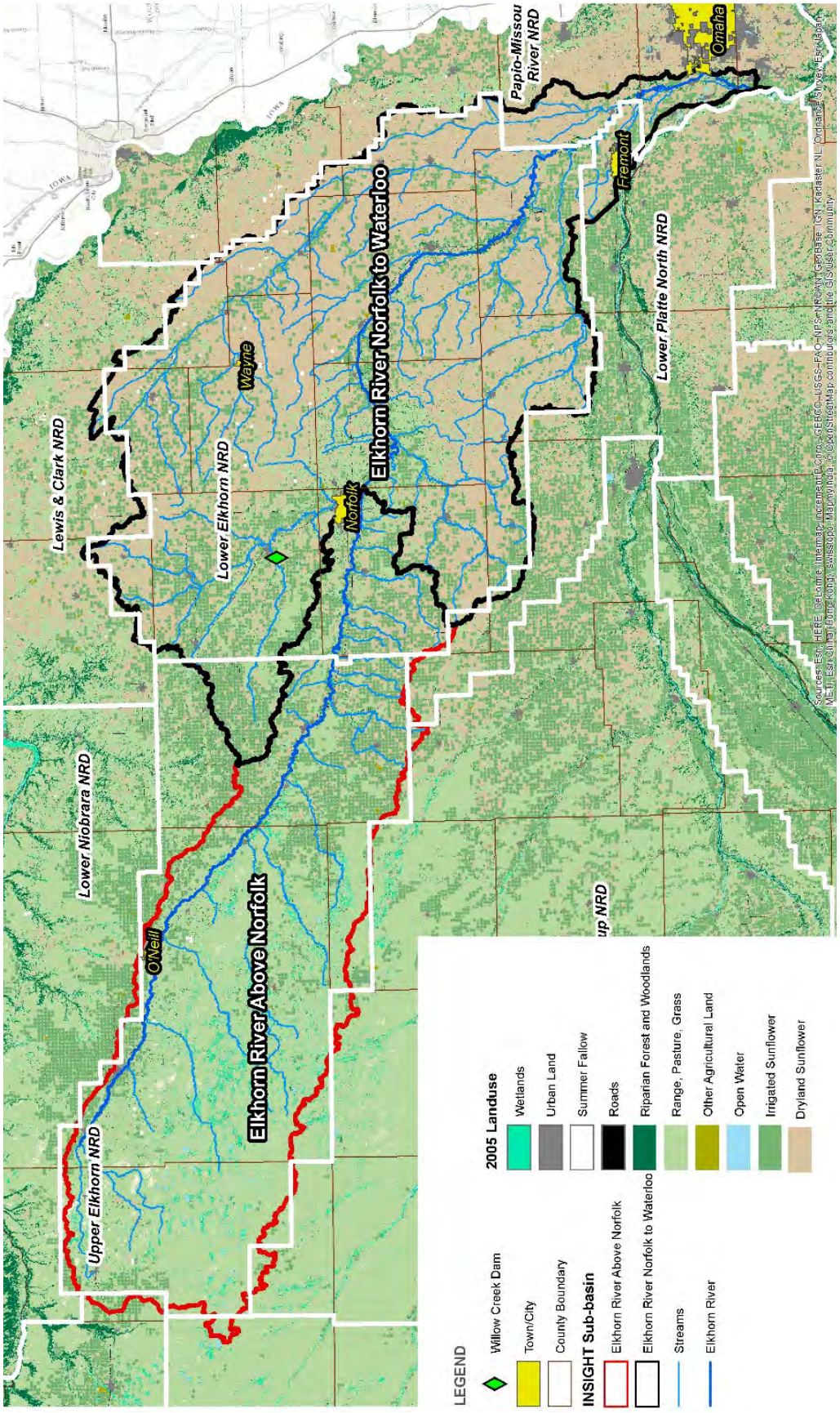


Figure 3 Elkhorn River Basin

1.2.3 Lower Platte River Sub-basin

The Lower Platte River Sub-basin includes the Platte River and its tributaries (except the Elkhorn River) beginning at the confluence of the Loup and Platte Rivers at Columbus, Nebraska. It primarily includes a majority of the Lower Platte South NRD and Lower Platte North NRDs as well as a smaller portion of the Papio-Missouri River NRD. There are approximately 3,400 square miles in the Lower Platte River Sub-basin. The basin extends from northeastern Boone County downstream to the confluence of the Platte River and the Missouri River near Plattsmouth, Nebraska. It is noted that the analysis, planning, and the applicability of this plan is based on the Louisville gage location as the downstream boundary of the sub-basin.

The capital of Nebraska, Lincoln, is the largest city wholly contained within the Lower Platte River Sub-basin, with a 2010 U.S. Census population of almost 260,000. The next largest city intersecting the Lower Platte River Sub-basin is Fremont, with about 26,000 citizens (Fremont is also in the Elkhorn Basin). The next largest cities in the basin include Plattsmouth (6,500) and Schuyler (6,200). While Omaha itself is not contained within the Lower Platte River Sub-basin, several municipal well fields that serve the metropolitan area are located within the sub-basin.

The High Plains Aquifer underlies the western third of the basin in the Lower Platte North NRD. Pleistocene sand and gravel units form the primary aquifer available along the Platte and Elkhorn Rivers in the Lower Platte River Sub-basin. The Great Plains Aquifer (which includes the Dakota Formation aquifers) mostly underlies much of the basin except the eastern edge. The High Plains aquifer and alluvial sand and gravel aquifers are generally characterized by large saturated thicknesses, high porosity and yield, and high hydraulic conductivity, capable of supporting high capacity well development. Much of the Dakota aquifers groundwater availability remains unkown; however, there is generally good quantity in areas with sandstone dominant formations that are readily recharged by surface water. Portions of the Dakota aquifer are too saline for a useable groundwater supply. The eastern half of the basin is covered by glacial loess and till. The glacial loess and till, where saturated, have much lower porosity and hydraulic conductivity, and are not usually suitable as aquifers (cf. Korus et al., 2013).

In the northwestern corner and along the southwestern margins of the Lower Platte River Sub-basin the land is primarily used as pasture and rangeland; water table lakes and wetlands occur in limited areas in the northwest. The remainder of the sub-basin is primarily agricultural production, with corn the primary crop.

High flow demands in the basin include the instream flow demand in the Lower Platte River to maintain the fish community and the Lincoln and Omaha municipal well fields located near Ashland.

There is one reservoir in the basin with normal pool surface area greater than 1 square mile, Branched Oak Lake, with a capacity of about 27,000 acre-feet.

There are approximately 460,500 irrigated acres within the Lower Platte River sub-basin. Average annual precipitation varies from 26 inches per year in the westernmost end of the basin up to 32 inches per year in the easternmost end of the basin. Based on the 25-year average (water year 1988 – 2012), the Lower Platte River sub-basin has an average basin water supply of 2.66 million acre-feet per year, an average near-term demand of 2.55 million acre-feet per year, and an average long-term demand of 2.64 million acre-feet/year.

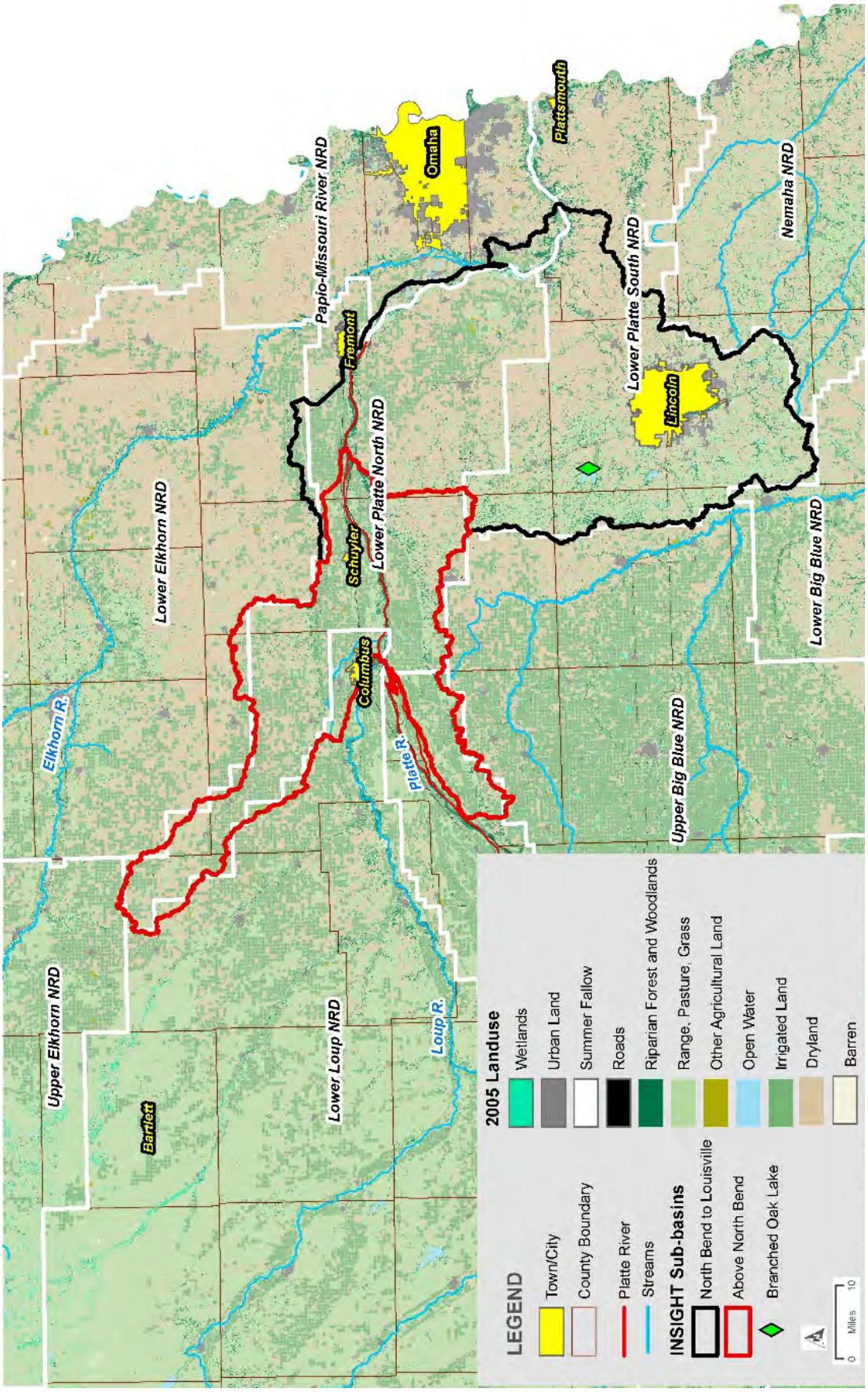


Figure 4 Lower Platte River Sub-basin

1.3 Planning Activities

The Plan was developed collaboratively with the Coalition members through a stakeholder process that involved a Technical Committee, a Management Committee, and the Coalition Board. Each of these entities were comprised of representatives from each member of the Coalition, with the responsibilities and authorities of each Committee and the Board outlined in the governing Interlocal Cooperative Agreement (Appendix A). This collaborative process included:

- Eleven (11) Technical Committee meetings – Provide insight on technical and scientific elements of the planning process and developing recommendations for Management Committee consideration.
- Eleven (11) Management Committee meetings – Provide administrative, technical, and financial oversight of the planning effort.
- Three (3) Coalition Board meetings – Provide overall direction for planning effort and ultimately plan approval.
- Three (3) Water Banking/Conjunctive Management Workshops – Meetings focused on water bank fundamentals, examples, and opportunities; as well as conjunctive management project types, examples, and potential projects within the Basin.
- Three (3) Sub-basin Workshops – Working sessions with NRD board members and staff for each of the respective major basins (Loup River, Elkhorn River, and Lower Platte River).

A project website was created by NeDNR (**http://lprbc.nebraska.gov**) and used to disseminate project information and updates throughout the planning process. Through this collaborative effort, the draft goals and objectives originally developed by the Coalition were refined and finalized, and supporting action items for each objective identified. Documentation of the facilitation supporting the planning process can be found in Appendix B.

2.0 Goals and Objectives

The Coalition Board initially developed draft Goals and Objectives for the Plan in April, 2013. These goals and objectives were refined and finalized through the collaborative planning process. The three final goals that were developed include:

1. Develop and maintain a water supply and use inventory based on the best available data and analysis.

2. Implement a water management plan for the Basin that maintains a balance between current and future water supplies and demands.

3. Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.

These goals, as well as objectives for each, are presented in detail in Table 2.1. Specific action Items to support these goals and objectives are presented in Section 3.0.

TABLE 2.1. GOALS AND OBJECTIVES

Goal 1. Develop and maintain a water supply and use inventory based on the best available data and analysis.	
OBJECTIVES OF GOAL 1	1. Develop a comprehensive inventory of the location and source of the Basin's current and future water supplies, water uses and outflows. Maintain and update on a schedule that is coincident with the 5-year update of the INSIGHT database.
	1.1 Develop a better understanding of basinwide inflows/outflows to enable development of a more comprehensive water inventory.
	1.2 Project changes to water inventory due to changes in urban and rural population and land use.
	1.3 Evaluate potential effects on water inventory of coordination, innovation and technology.
	1.4 Refine the extent of hydrologically connected ground and surface waters in the Lower Platte River Basin.
	1.5 Evaluate variations in water inventory due to climate cycles.
	2. Monitor current and future water demands in the Basin. Provide report at the annual Basin meeting that will be used for NeDNR's FAB analysis.
Goal 2. Implement a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.	
OBJECTIVES OF GOAL 2	1. Collaborate with state and local governments to identify a minimum of three (3) opportunities to augment water supplies within the Lower Platte River Basin and, if necessary, identify opportunities to supplement with imported water from outside the Lower Platte River Basin.
	2. Monitor the instream flow needs in the Lower Platte River Basin to foster an understanding of the existing appropriation priorities and locations, and provide a basis for evaluating impacts of existing and future uses. Provide report at the annual Basin meeting that will be used for NeDNR's FAB analysis.
	3. Evaluate options for Basin water banking methodologies.
Goal 3. Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.	
OBJECTIVES OF GOAL 3	1. Identify available water storage opportunities throughout the Lower Platte River Basin.
	2. Evaluate, understand, and develop policies to address impacts on stream flows of uses outside of management control.
	3. Expand public education programs on general awareness of water supplies and to encourage water conservation measures. Provide annual reporting and press release that includes, at a minimum, activities from previous year, supporting data, education statements and on-going work.

3.0 Action Items

Action items to support implementation of the plan were developed through collaboration with Coalition members. The action items are tasks directly linked to the specific objectives, and ultimately the overarching goals they help to accomplish.

GOAL 1: Develop and maintain a water supply and use inventory based on the best available data and analysis.

OBJECTIVES

1. Develop and maintain a comprehensive inventory of the location and source of the Basin's current and future water supplies, water uses and outflows.

1.1 Develop a better understanding of basinwide inflows/outflows to enable development of a more comprehensive water inventory.

1.2 Project changes to water inventory due to changes in urban and rural population and land use.

1.3 Evaluate potential effects on water inventory of coordination, innovation and technology.

1.4 Refine the extent of hydrologically connected ground and surface waters in the Lower Platte River Basin.

1.5 Evaluate variations in water inventory due to climate cycles.

ACTION ITEMS

- A. Compile a tabular summary of basinwide inflows and outflows using existing gage measurements where available, and estimates or calculated components where unavailable.
- B. Evaluate and prioritize estimated components based on uncertainty and relative impact of water inventory.
- C. Identify locations where additional gaging data or further study/modeling would reduce uncertainty in the basinwide water inventory.

- A. Develop projected municipal and industrial growth estimates, incorporating current city growth plans if available.
- B. Develop projected agricultural land use trends to estimate future change in inventory.
- C. Utilize existing tools to evaluate the impacts on water inventory due to changes in both urban and rural land use scenarios.

- A. Evaluate impacts of soil and water conservation practices on the water inventory.
- B. Review scientific studies that quantify consumptive water use reductions that result from applying water saving conservation practices.
- C. Evaluate potential new supply due to new or improved technology (deep aquifer recover, horizontal wells, etc.).

- A. Utilize best available data and tools to develop refined extents of the hydrologically connected ground and surface waters in the Lower Platte River Basin.

- A. Work with other state and federal agencies to develop a baseline climate scenario as well as a set of projected climate scenarios.
- B. Utilize available tools to test and evaluate resiliency of water inventory under baseline and projected climate scenarios. Evaluation to consider delta between baseline and projected climate scenarios and consider both elements of use and supply.

2. Monitor current and future water demands in the Basin.

ACTION ITEMS

- A. Develop a standard data collection and reporting system for all NRDs in Lower Platte River Basin for documenting water uses in Basin.
- B. Identify significant unmeasured demands and develop and maintain a standard methodology for estimating. Unmeasured demands may include unmetered groundwater irrigation pumping, livestock use, riparian ET, unmeasured municipal and industrial use, environmental remediation.

GOAL 2: Implement a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.

OBJECTIVES

1. Collaborate with state and local governments to identify opportunities to augment water supplies within the Lower Platte River Basin and, if necessary, identify opportunities to supplement with imported water from outside the Lower Platte River Basin.

ACTION ITEMS

- A. Utilize information from the water inventory to determine need, quantities, and locations of water shortages to define water augmentation needs and goals of augmentation projects.
- B. Identify potential excess surface water sources within the basin and determine locations, timing, quantities, and reliability of excess surface water sources.
- C. Identify potential groundwater sources within the basin and determine locations, timing, quantities, and reliability of groundwater sources.
- D. Based on potential supplies and goals, identify potential partners, develop and prioritize augmentation plans.
- E. Identify potential partners and collaborate to develop opportunities for imported water supplies, as necessary.

2. Monitor the instream flow needs in the Lower Platte River Basin to foster an understanding of the existing appropriation priorities and locations, and provide a basis for evaluating impacts of existing and future uses.

ACTION ITEMS

- A. Assess USGS and NeDNR gage flows as well as NeDNR administrative records and actions to identify change of use or location of existing appropriations, new appropriation applications, and priority calls within the basin.

3. Evaluate options for Basin water banking methodologies.

ACTION ITEMS

- A. Identify potential water banking methods that have applicability in the Lower Platte River Basin relative to current physical, administrative, legal and legislative framework.
- B. Establish uniform and consistent accounting methodology (depletions, offsets, etc.) for use in developing and maintaining a water bank.
- C. Develop an administrative framework (agreements, rules, etc.) for establishing a water bank in the Lower Platte River Basin.

GOAL 3: Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.

OBJECTIVES

1. Identify available water storage opportunities throughout the Lower Platte River Basin.

ACTION ITEMS

A. Inventory past project studies (US Bureau of Reclamation, US Army Corps of Engineers, Natural Resource Conservation Service, individual NRDs) to assess if any opportunities exist to utilize those analyses, whole or in part, as potential projects for purposes of this Plan.

B. Inventory existing infrastructure to assess potential for rehabilitation/expanding/modifying physical or operational components for purposes identified in this Plan.

C. Identify potential new opportunities for water storage in consideration of proximity to available water, return flow options, physical site characteristics, etc.

2. Evaluate, understand, and develop policies to address impacts on stream flows of uses outside of management control.

ACTION ITEMS

A. Inventory and review existing studies/reports on uses outside management control (conservation measures , riparian uses, etc.) and determine impacts on water inventory.

3. Expand public education programs on general awareness of water supplies and to encourage water conservation measures .

ACTION ITEMS

A. Support and coordinate research, training, and incentive programs concerning invasive plant species in the Platte River system, and assist with information and education efforts to distribute research results.

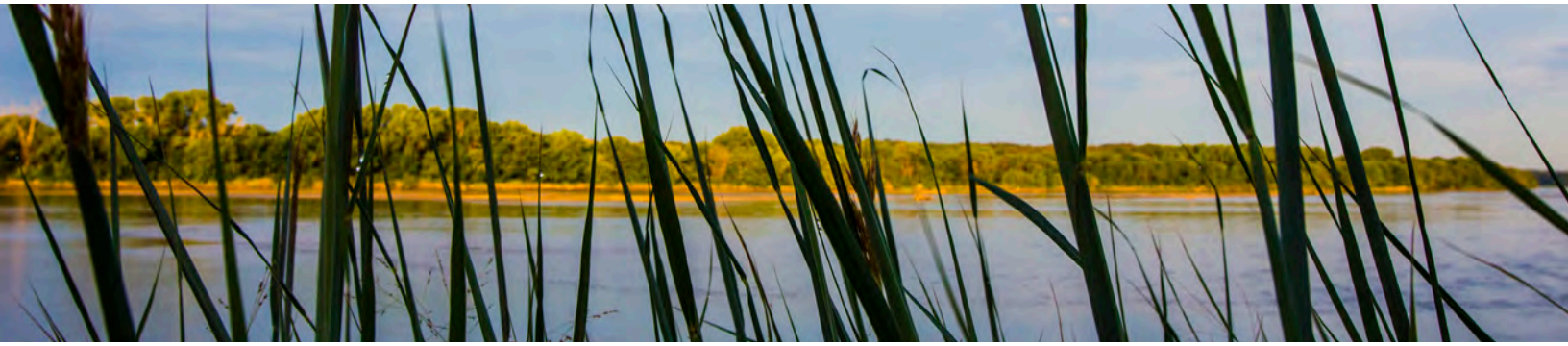
B. Coordinate with public water systems to develop or expand educational materials and programs on water supplies, water quality, and best conservation practices.

C. Coordinate with cities, counties, and others to encourage water education and conservation.

D. Promote water use education that addresses both rural and urban water conservation efforts.

E. Support school environmental education programs focused on water.

F. Impose mandatory educational requirements designed to stabilize or reduce the incidence of groundwater depletion, or conflict between users and appropriators.



3.1 Action Items Completed During Plan Development

Several action items in support of objectives have been completed, wholly or in part, as part of the Plan development and are summarized below. Supporting documentation of these efforts can be found in the Plan appendices, as noted.

Evaluation and Application of NeDNR INSIGHT Methodology (Appendix C). Data and methodology used in the NeDNR's INSIGHT database was evaluated, modified as noted in Section 1.2, and applied to the Lower Platte River Basin as a whole, and to sub- basins where applicable. The sensitivity of water supply and use terms on the overall balance was evaluated. – Action items 1.1.11 (A) & 2.3 (B)

Development of a Basinwide Accounting Methodology (Appendix C). The NeDNR INSIGHT databases and methodology were also evaluated for appropriateness as a basin-wide accounting tool.

During the course of the project, the technical committee requested that alternative demand scenarios be investigated that are more conservative than the demands considered by the draft NeDNR methodology.[1] After considering the various demand scenarios and assessing the benefits and constraints on the individual subbasins, the management committee agreed to utilize the demand scenario that would maintain 40% of the 25-year average streamflow at Louisville (without hydropower considered) to calculate the volume of water within the Lower Platte River Basin that exceeds the long term demand.[2]

An additional variance between the INSIGHT methodology and the basin-wide accounting methodology, is the Above North Bend sub-basin was divided above and below Columbus to break out the Beaver Creek basin for inclusion in the Loup River Basin, consistent with basin topography.– Action items 1.1.1 (A) & 2.3 (B)

Summary of Existing Surface and Groundwater Controls (Appendix D). Existing ground and surface water control measures currently employed by each Coalition member, as well as control measures used in other portions of Nebraska and other states were summarized. – Supports Action Item 2.3 (C).

Data Collection Efforts (Appendix E). Existing available datasets for relevant water budget terms and on-going data collection efforts were summarized. On-going and completed study efforts within the basin were also compiled. Recommendations for additional data collection efforts were included. – Supports Action Item 1.1.1 (C).

[1] Section 2.4.5 and 3.0 of Appendix C describe these alternative demand scenarios in more detail.

[2] For reference, the draft NeDNR INSIGHT methodology considers the maximum of either the induced groundwater recharge demand or the adjusted instream flow demand in the North Bend to Louisville sub-basin. This adjusted instream flow demand corresponds to maintaining approximately 20% of the 25-year average streamflow in the Platte River at Louisville.

Evaluation of Potential Conjunctive Management and Water Banking Opportunities (Appendix F). A sampling of potential conjunctive management and water banking opportunities in the Basin were evaluated. Fundamental to this effort was development of a consistent water accounting methodology (Appendix C) for assessment, tracking, and accounting of accretions and depletions to the hydrologically connected streams and rivers within the Basin. – Supports Action Items 2.3 (A) and 3.1 (B) and 3.1 (C)

- ***Conjunctive Management Opportunities.*** Conceptual examples of several types of conjunctive management projects within the Basin were developed. These examples identified water sources, necessary infrastructure, functional operations and potential benefits of each conceptual example.
- ***Water Banking.*** Existing water banking systems and pertinent statutory and regulatory authorities available to establish a water banking system were summarized. Example water banking instruments from Nebraska and other states were identified and administrative and operational function summarized.

3.2 Plan Implementation Activities

The first increment implementation of the Plan will occur over a 5-year period. The Plan activities consist of identifying goals and objectives for implementation over the first 5-yr planning increment and include the following:

GOAL 1: DEVELOP AND MAINTAIN A WATER SUPPLY AND USE INVENTORY BASED ON THE BEST AVAILABLE DATA AND ANALYSIS.

OBJECTIVE 1: DEVELOP AND MAINTAIN A COMPREHENSIVE INVENTORY OF THE LOCATION AND SOURCE OF THE BASIN'S CURRENT AND FUTURE WATER SUPPLIES, WATER USES, AND OUTFLOWS.

During the planning effort, the NeDNR INSIGHT database was evaluated and verified at the basin and sub-basin level as an appropriate tool to quantify basin water supplies and uses. The Coalition has approved the use of the INSIGHT database and methodologies, as modified for development of this Plan, for inventorying of water supplies and uses in the basin and for basin- wide tracking and accounting of supplies and uses.

During the first planning increment, Coalition members will update the uses within the Basin as part of their annual reporting. Basinwide supplies will be updated approximately every 5 years, with the first update coincident with the end of the first planning increment.

Action items to enhance or supplement the basin-wide inventory of supplies and uses are planned during the first increment. These action items can loosely be grouped into three categories: 1) Supplemental information or refinements; 2) Forecasts and projections; and 3) Data collection efforts to fill data gaps. The individual Coalition members will implement action items.

1. **Supplemental information and refinements**
    a. Update basin-wide accounting with updated numerical modeling tools (ELM Phase III, CENEB, and Lower Platte and Missouri River Tributaries groundwater models) as they become available to refine the extent of the hydrologically connected ground and surface water in the Basin.

b. Develop and incorporate supplemental information to INSIGHT database as they become available. These include unmeasured uses such as riparian ET, unmetered M&I use, livestock use, and environmental remediation.

c. Refine the spatial extent of supplies and uses to better correspond to NRD boundaries.

2. **Forecasts and projections**

a. Project future municipal and industrial demands.

b. Project future land use and irrigation requirements, including innovations in technology.

c. Project variations in water supply and demand due to climate variability.

d. Project uses using both current depletive levels and the ultimate full consumptive use of current uses.

3. **Data collection**

To better align with NRD boundaries (and thus refine the estimate of demands and supplies within each NRD), it may be beneficial to include additional stream gage locations in the basin accounting to break the current INSIGHT sub-basins along NRD boundaries. Currently, approximations have been utilized to assign supplies and demands between multiple NRDs within a single sub-basin.

Suggestions for utilizing additional stream gage locations in the inventory and analyses or potential new stream gage locations include:

a. Existing USGS Station 0677500: Middle Loup River at Dunning, Nebraska or an additional gage on the mainstem Middle Loup above the Sargent Canal diversion to divide the Middle Loup sub-basin between the Upper Loup NRD and the Lower Loup NRD.

b. Existing USGS Station 06781600: South Loup River at Arnold, Nebraska to divide the South Loup sub-basin between the Upper Loup NRD and the Lower Loup NRD.

c. Existing USGS Station 06785500: North Loup River at Brewster, Nebraska or an additional gage on he mainstem North Loup River below this gage on the NRD boundary to divide the North Loup sub-basin between the Upper Loup NRD and the Lower Loup NRD.

d. A new gage on the Calamus River at the Upper Loup NRD/Lower Loup NRD boundary.

e. NeDNR gage Elkhorn River near Tilden better aligns with Upper Elkhorn NRD/Lower Elkhorn NRD boundary.

f. New gage at the confluence of the Platte River and Clear Creek to better match the divide between the Lower Loup NRD and the Lower Platte North NRD.

g. A new gage at the confluence of Wahoo Creek and the Platte River to better match the boundary between the Lower Platte South NRD and the Lower Platte North NRD.

h. A new gage at the confluence of the Elkhorn River and Maple Creek to better match the boundary of the Lower Elkhorn NRD and the Papio-Missouri River NRD.

i. A new gage at the confluence of the Elkhorn River and the Platte River to better isolate the reach of Elkhorn River in the Papio-Missouri River NRD.

OBJECTIVE 2: MONITOR CURRENT AND FUTURE WATER DEMANDS IN THE BASIN.

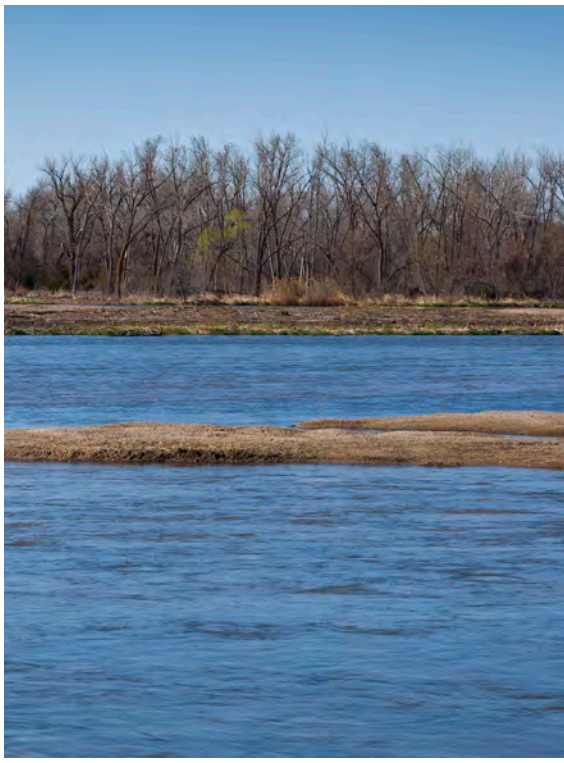
Coalition members will collaborate on consistent methods to be used in reporting annual uses. Estimates of uses will utilize the best available information and tools. Standard methodologies for estimating unmeasured uses of significance (unmetered pumping, riparian ET, livestock use, etc.) will be developed by the Coalition. This coordination of collecting and reporting uses will provide consistency within the basin as well as with INSIGHT database.

GOAL 2: IMPLEMENT A WATER MANAGEMENT PLAN FOR THE LOWER PLATTE RIVER BASIN THAT MAINTAINS A BALANCE BETWEEN CURRENT AND FUTURE WATER SUPPLIES AND DEMANDS.

OBJECTIVE 1: COLLABORATE WITH STATE AND LOCAL GOVERNMENTS TO IDENTIFY OPPORTUNITIES TO AUGMENT WATER SUPPLIES WITHIN THE LOWER PLATTE RIVER BASIN AND, IF NECESSARY, IDENTIFY OPPORTUNITIES TO SUPPLEMENT WITH IMPORTED WATER FROM OUTSIDE THE LOWER PLATTE RIVER BASIN.

During the planning effort, extensive evaluation of the balance of supplies and uses at the basin and sub-basin level were completed, primarily focused on surface water supplies. These evaluations identified timing, location, and relative frequency of surpluses and deficits in streamflow. The results generally indicate that shortages are likely to occur during the peak season (June, July, and August) and are amplified during drought conditions within the basin. Surpluses are likely to occur during the non-peak season and occasionally during the peak season during normal or wetter than normal conditions. Several types of conjunctive management projects aimed at retiming flows (from times of surplus to times of deficit) were identified throughout the basin and potential water supply benefits of each identified.

During the first increment, Coalition members will continue to investigate and pursue conjunctive management opportunities and potential partners to augment streamflows during times of shortage, with the intent of implementing at least one conjunctive management project in each of the three primary river basins.



OBJECTIVE 2: MONITOR THE INSTREAM FLOW NEEDS IN THE LOWER PLATTE RIVER BASIN TO FOSTER AN UNDERSTANDING OF THE EXISTING APPROPRIATION PRIORITIES AND LOCATIONS, AND PROVIDE A BASIS FOR EVALUATING IMPACTS OF EXISTING AND FUTURE USES.

As part of the annual meeting reporting, NeDNR will report changes to existing surface water appropriations or new appropriation applications. In addition, NeDNR will summarize a report on the streamflow conditions throughout the basin, shortages, and administrative calls during the previous year.

OBJECTIVE 3: EVALUATE OPTIONS FOR BASINWIDE WATER BANKING METHODOLOGIES.

During the planning effort, several examples of water banking instruments currently in operation in Nebraska and throughout the western United States were summarized with respect to administration, operation, and function. In addition, pertinent legislation and authorities from State statutes related to the formation of water banks in Nebraska were summarized. Finally, a basinwide accounting tool based on the NeDNR INSIGHT database was developed. This accounting system is needed to be able to fairly and consistently track water supplies and uses within the Coalition area, and to allow for water banking or transfer actions between different NRDs. The basinwide accounting system is designed to serve as the administrative backbone for future water management actions by the Coalition, and can be adapted to account for any form of water banking and conjunctive management projects that may be chosen by individual NRDs, or groups of NRDs.

As work on the water banking efforts commenced, it quickly became apparent that Coalition managers, and other stakeholders in the basin, were strongly against a "one-size-fits-all" approach, and that the goals and priorities of individual NRDs should be respected, and emphasized, as part of the water banking efforts. The geography, hydrology, and infrastructure within each NRD are clearly different, and suggest that multiple types of water banking projects would be more effective than attempting to force a single implementation strategy on all Coalition members. In addition, areas such as the Lower Loup NRD already have water-banking operations in place, and the need in that area appears to be not for a new implementation strategy, but instead for a way to ensure that banking operations conducted by the NRD are acknowledged, and protected, into the future.

As the Coalition moves forward and begins to consider setting up a collaborative or individual water bank, two useful sources should be consulted: a water banking "guidebook"[1] developed by Dr. Bonnie Colby at the University of Arizona in 2010, and an "Analysis of Water Banks in the Western States"[2] prepared by the Washington Department of Ecology and WestWater Research in 2004. In addition, Appendix F provides "checklist" summaries of several existing water banks and the administrative, operational, and financial characteristics of each.

[1] http://ag.arizona.edu/arec/sites/cals.arizona.edu.arec/files/publications/ewsr-Banks-final-5-12-10.pdf

[2] https://fortress.wa.gov/ecy/publications/publications/0411011.pdf

GOAL 3: DEVELOP AND IMPLEMENT WATER USE POLICIES AND PRACTICES THAT CONTRIBUTE TO THE PROTECTION OF EXISTING SURFACE AND GROUNDWATER USES WHILE ALLOWING FOR FUTURE WATER DEVELOPMENT.

OBJECTIVE 1: IDENTIFY AVAILABLE WATER STORAGE OPPORTUNITIES THROUGHOUT THE LOWER PLATTE RIVER BASIN.

Previous planning efforts undertaken by the member NRDs, USACE, USBR, and NRCS had identified sites throughout the basin including Sherman Reservoir in the Loup Basin, Battle Creek in the Elkhorn Basin, and Skull Creek Reservoir in the Lower Platte Sub-basin. During the planning effort, water storage opportunities in each of the three primary basins were investigated and the most feasibly opportunities identified. These opportunities include new structures as well as the re-purposing of storage within existing structures. Available water for storage and operational characteristics were identified, and ultimately the impacts on streamflows were estimated. During the first increment, Coalition members will continue to investigate and pursue new storage as a conjunctive management opportunity to augment (both active and passive management) water supplies during times of shortage.

OBJECTIVE 2: EVALUATE, UNDERSTAND, AND DEVELOP POLICIES TO ADDRESS IMPACTS ON STREAM FLOW OUTSIDE OF MANAGEMENT CONTROL.

During the first increment, Coalition members will conduct a literature review of previous studies that estimate or quantify the impacts of significant uses outside of Coalition member jurisdictional control, including riparian uses and the effects of conservation measures. Using the findings of this literature review, Coalition members will apply the results in a consistent manner across the Basin to estimate impacts on the basin water inventory.

OBJECTIVE 3: EXPAND PUBLIC EDUCATION PROGRAMS ON GENERAL AWARENESS OF WATER SUPPLIES AND TO ENCOURAGE WATER CONSERVATION MEASURES.

During the first increment, the individual Coalition members will coordinate with public water systems, cities, counties, and others as appropriate to develop outreach and education materials that focus on water supply, water quality, and water conservation practices. The Coalition members will also coordinate with others, such as the Invasive Species Task Force, to support and coordinate research and incorporate results of the research into the outreach and education materials.

4.0 New Depletion Limits

Based on the evaluations of basin water supplies and uses conducted as part of the planning effort and consistent with the stated goal of developing and implementing water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development (Goal 3), the Coalition recommended the development and implementation of limits on new water depletions over the first 5-year increment of the plan (January 1, 2017 through December 31, 2021). The limits on new depletions will allow the Coalition to manage the growth of new uses while still providing protection to current uses. The limits on new depletions were developed using the basinwide water accounting methodologies agreed upon and accepted by the Coalition. Excess supplies in the basin were calculated using the period-of-analysis from 1988 to 2012. For purposes of tracking and reporting new depletions (as well as full consumptive use) under this Plan, the limits on new depletions are applicable to those uses initiated (both pending and in place) after July 1, 2016.

4.1 Allowable New Depletions

For the first 5-year increment of the Plan:

- The total depletive effect of allowable new surface water and groundwater uses will be limited to 10% of the 25-year average (consistent with INSIGHT) annual basinwide excess during the peak season (June, July, August) (see Table 4.1).
- Allowable new depletions are apportioned to the Elkhorn, Loup, and Lower Platte River sub-basin based on each sub-basin's contribution of flows at Louisville gage.
- Peak and non-peak season depletions will be computed and reported.
- The full consumptive use (long-term effects) of new development, for both the peak and non-peak seasons will be computed and reported.

The allowable new depletions shown in Table 4.1 correspond to the impact new development (both agricultural and non-agricultural uses) would have on a stream in 50 years. Depletion estimates for new uses will be made using the best available data and models.[5]

TABLE 4.1. FIRST 5-YEAR INCREMENT ALLOWABLE DEVELOPMENT (DEPLETIONS) BY BASIN

Basin	First 5-year Increment Allowable Development (Depletions) – Peak Season (AF) [1/2]
Loup Basin	8,651
Elkhorn Basin	6,018
Lower Platte Sub-basins	4,138

The allowable new depletion is for all new uses. Apportionment between new surface water and groundwater uses will be made according to each individual NRD Integrated Management Plan. Implementation of new uses will need to comply with each individual NRD Integrated Management Plan.

Example of determining the new depletions due to a new groundwater-irrigated agricultural use:
Given:

- 160 acres of corn
- Net irrigation requirement of 12 inches = 1 ft
- Stream Depletion Factor at this location of 0.50
- 30% of depletions occurring during the peak season

[5] *For agricultural uses, the allowable number of irrigated acres in the hydrologically connected area can be determined using the following formula: Allowable Irrigated Acres of Development = Acre-Feet of Allowable Depletions/(Net Irrigation Requirement in feet x Stream Depletion Factor at location of use (decimal) x Percentage of Depletions occurring during the Peak Season)*

New depletions then can be calculated as:

(# of Acres) x (Net Irrigation Requirement in feet) x (SDF as decimal) x (% of Depletions during Peak Season)

Or

(160 acres) x (1 ft) x (0.50) x (0.30) = 24 AF of new depletions during the peak season.

This new use would then utilize 24 AF of allowable new depletions allocated by the plan during the first increment.

This Plan pertains to all surface water drainages tributary to the Platte River at Lousiville gage location and groundwater resources within each NRD that are hydrologically connected to the Platte River. The limits on new groundwater uses is only applicable to those areas that are hydrologically connected to the Platte River within each Coalition NRD.

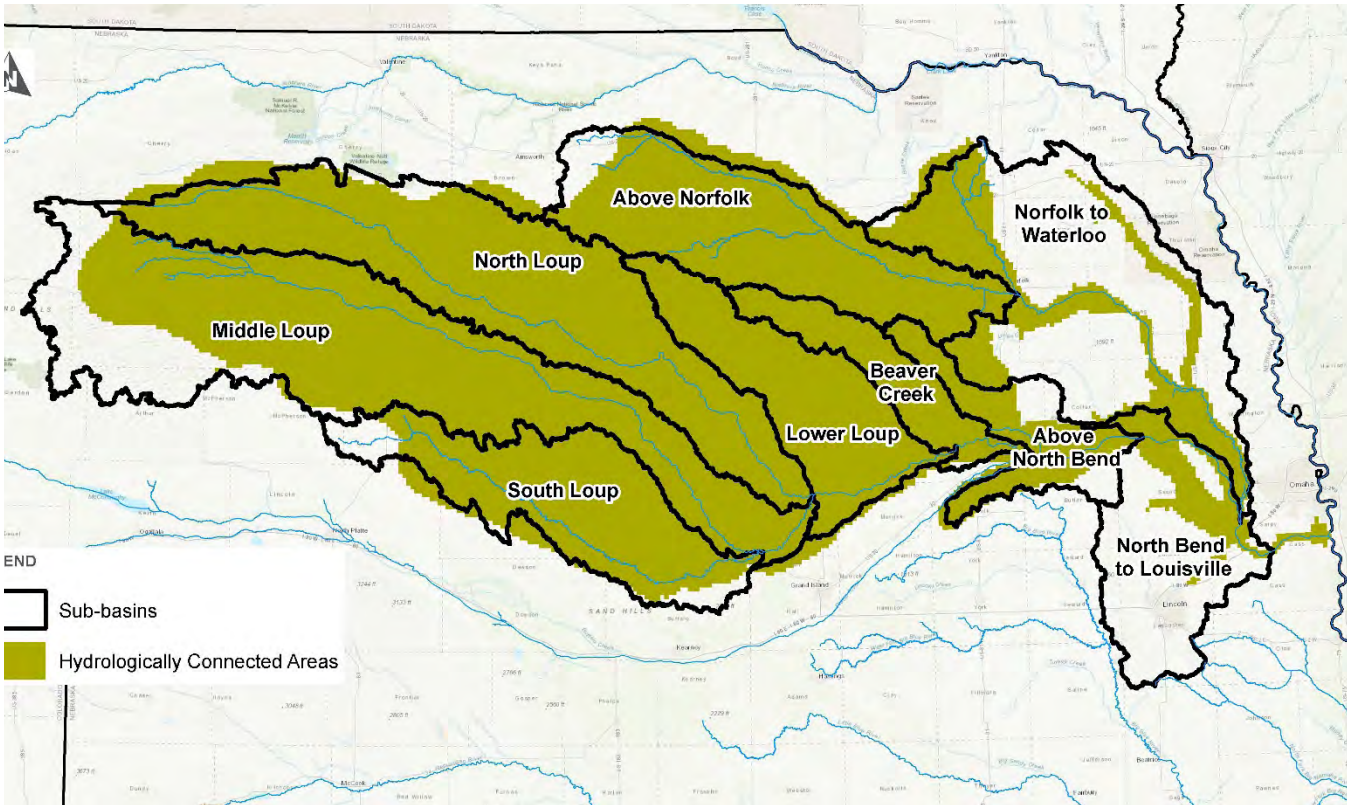


Figure 5 Hydrologically Connected Area

Table 4.1 provides the allowable new depletions by sub-basin for the first 5-year increment of the plan. As supplemental information for managing new uses during the first increment becomes available, the NRDs in each sub-basin will work cooperatively to distribute the allowable new depletions among each NRD within that sub-basin. Each sub-basin NRD will populate Table 4.2 by the first annual reporting meeting in the spring of 2018. Subsequent changes to each NRD's allowable new depletion (through transfers, etc.) during the first increment will be reported at the annual reporting meeting.

TABLE 4.2. FIRST 5-YEAR INCREMENT ALLOWABLE NEW DEVELOPMENT (DEPLETIONS) BY NRD

NRD	Sub-Basin	First 5-year Increment Allowable New Development (Depletions) – Peak Season [1]	
		% Sub-Basin	AF
Upper Loup NRD	Loup River	32%	2,768
Lower Loup NRD	Loup River	68%	5,883
Upper Elkhorn NRD	Elkhorn River	25%	1,504
Lower Elkhorn NRD	Elkhorn River	75%	4,514
Papio-Missouri River NRD	Lower Platte River	21%	869
Lower Platte South NRD	Lower Platte River	24%	993
Lower Platte North NRD	Lower Platte River	55%	2,276

[1]*The allowable new depletion is for all new uses. Apportionment between new surface water and groundwater uses will be made according to each individual NRD Integrated Management Plan.*

4.2 Implementation

Each NRD will incorporate allowable new depletion limits into their individual IMPs, groundwater and surface water controls and/or NRD rules and regulations. The new depletions limits include depletions from both new groundwater uses (regulated by NRDs) and surface water uses (regulated by NeDNR), with the distribution between the two as stated in the individual Integrated Management Plans. Sections 4.3 through 4.6 provides the framework for addressing: carryover of allowable new depletions to the next increment, crediting and accounting for new projects, and transfers across NRD or basin boundaries.

4.3 Allowable New Depletion Carryover to Next Increment

Any allowable new depletions not utilized during the first 5-year increment will carry-over to the second increment and be prioritized in the second increment allowable new depletions for those NRDs. Any carryover of allowable new depletions will be removed from the calculated water supply when conducting the analysis of allowable new depletions for the second increment so that future depletion limits can accommodate the allowable new depletions that are

4.4 Effects of New Projects

New projects not previously incorporated into the basin-wide accounting that either retime supplies (non-peak to peak season; e.g. groundwater recharge pits and linear canal recharge projects) or otherwise increase available supplies during the peak season - e.g. reservoir storage projects, retirement of irrigated acres, or transfer of uses to locations of lower depletion) will be reviewed at the annual Coalition meeting. Supporting documentation and analysis of the project will be submitted by the project Sponsor to the Technical Committee for review.

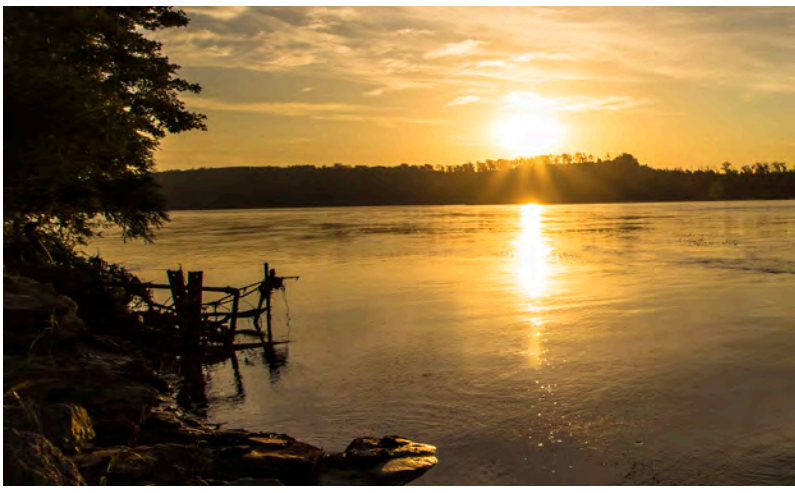
The Technical Committee will review the calculations of project benefits for conformance with the basin-wide accounting methodology and provide a recommendation to the Coalition Management Committee. Upon approval by the Coalition Management Committee, appropriate credit for additional new use will be granted to project Sponsors for use during the current planning increment. Projects may be implemented prior to Coalition Management Committee approval and accrue credits for additional allowable new depletions from the time of implementation. If the credit is not used during the current planning period, the additional allowable new depletions that results from the project will be removed from the calculated water supply when conducting the analysis of allowable new depletions for the second increment so that future depletion limits can accommodate the allowable new depletions that are carried forward.

4.5 Transfer of Allowable New Depletions

Should agreements be made between Parties to transfer allowable new depletions from one of the primary sub-basins (Loup River, Elkhorn River, and Lower Platte River) to another (either by compensation or some other agreement), the amount listed in Table 4.2 will be adjusted by an amount equal to the transfer for each sub-basin included in the agreement and the updated values for Table 4.2 included in the annual Coalition report. Supporting documentation and analysis of the agreement will be submitted by the project Sponsors to the Technical Committee for review.

4.6 Exceedance of Allowable New Depletions

Any new use depletions that would exceed the allowable new depletions stated and agreed upon in Table 4.2 requires prior approval by the Coalition Management Committee. Should a member NRD (or NeDNR) allow more development than what was agreed upon in Table 4.2 without prior approval, said member NRD (or NeDNR) could be subject to a reduction of allowable new depletion in subsequent increments.



5.0 Plan Review and Monitoring

Each NRD will incorporate allowable new depletion limits into their individual IMPs, groundwater and surface water controls, and/or NRD rules and regulations.

Each NRDs IMP and/or NRD rules and regulations will serve as the primary instruments to implement this Plan. The Coalition will hold an annual review meeting to report on the status of plan action items, reporting of uses, and to coordinate efforts on specific projects as needed. In addition, the Coalition will hold a comprehensive review of the plan every 5 years, anticipated to be coincident with the update to the INSIGHT database. The first increment of the plan will begin on the date of the Plan approval by Coalition members) and end on December 31, 2021.

The first annual meeting will be held in April 2018 at a time and place designated by Coalition members. Thereafter the annual meeting will be held in April, ahead of the NeDNR's public notice requesting input on data for consideration during the annual Fully Appropriated Basin evaluation to allow the Coalition to prepare and submit data to NeDNR in a timely manner, unless agreed to otherwise.

Each Coalition member will submit documentation for the annual plan review meeting, which requires Technical Committee review (those items regarding basinwide accounting, new project documentation, etc.) will be submitted to the Technical Committee a minimum of 90 days prior to the annual meeting date. Documentation for Technical Committee review should include the following:

- Each Coalition member will submit documentation that includes the geographic location of new uses, depletion calculated for each new use (both peak and non-peak season), method (or models) utilized in calculating the depletions, as well as estimated total consumptive use associated with each new use (peak and non-peak season).
- Additionally, the documentation should include any transfers (both in-basin and inter-basin) including geographic location, quantity of transfer, depletions estimate associated with transfer (peak and non-peak season), method (or models) utilized in calculating the depletions, as well as estimated total consumptive use associated with the transfer.
- Finally, the documentation should include any mitigation or new projects that have occurred including geographic location, description of type and operations of project, source water of project, and calculated benefits associated with project. If the project is groundwater augmentation, the report should include the calculated accretions as well as method (and models) used to estimate accretion values.
- The Technical Committee will develop documentation format prior to reporting period.

TABLE 5.1. KEY DATES OF THE BASINWIDE PLAN FIRST INCREMENT

Date	Description
July 1, 2016	Baseline date for tracking allowable new depletions
December 1, 2017 (or date of formal plan approval)	Beginning of First Increment Submit documentation for annual plan review meeting.
January 1, 2018	Submit documentation for those items requiring Technical Committee Review (those items regarding basinwide accounting, new project documentation, etc.)
March 1, 2018	Annual member report due (July 1, 2016 – December 31, 2017 activities)
January 1, 2019	Submit documentation for those items requiring Technical Committee Review (those items regarding basinwide accounting, new project documentation, etc.)
March 1, 2019	Annual report due (January 1, 2018 – December 31, 2018 activities)
April 2019	Annual Coalition Meeting
January 1, 2019	Submit documentation for those items requiring Technical Committee Review (those items regarding basinwide accounting, new project documentation, etc.)
March 1, 2020	Annual report due (January 1, 2019 – December 31, 2019 activities)
April 2020	Annual Coalition Meeting
January 1, 2021	Submit documentation for those items requiring Technical Committee Review (those items regarding basinwide accounting, new project documentation, etc.)
March 1, 2021	Annual report due (January 1, 2020 – December 31, 2020 activities)
April 2021	Annual Coalition Meeting Second Increment Planning Meeting
December 31, 2021	End of First Increment
January 1, 2022	Submit documentation for those items requiring Technical Committee Review (those items regarding basinwide accounting, new project documentation, etc.)
March 1, 2022	Annual report due (January 1, 2021 – December 31, 2021 activities)
April 2022	Annual Coalition Meeting & Approval of Second Increment Plan

Each Coalition member's annual documentation is to be submitted to the Management Committee by March 1. A final jointly issued annual report will be issued after the annual meeting. Key dates of the first increment and annual reporting are provided in Table 5.1.

Contents of the each Member's annual report and discussion items at the annual meeting shall include, but not be limited to the following:

1. Reporting on water supplies and uses.

TABLE 5.2. DATA COLLECTION REPORTING AND RESPONSIBLE PARTIES

Lower Platte Basin Coalition Annual Data Collection/Reporting	
NRD	**DNR**
Certified irrigated acres	Irrigation water surface water use
(GW, SW, Co-mingled)	Municipal and Industrial surface water use
Municipal and Industrial GW uses	New surface water appropriations granted (natural flow, storage, groundwater recharge, etc.)
New GW consumptive uses (Agricultural, Municipal, Industrial)	New groundwater permits issued
Transfers	Department stream gage measurements from NeDNR maintained gages
Well Construction Permits granted	Transfers/cancellations of surface water appropriations
Retirement of GW consumptive uses	Surface Water administrative actions taken
(Agricultural, Municipal, Industrial)	New depletions accounting report
Flow Meter data (if meter data collected)	New data collected or model/study results (conservation measures, riparian ET, etc.)
Water banking activities (if bank exists)	
Stream Flow Accretion activities (new projects, conjunctive management projects, etc.)	
Groundwater Elevation data	
Stream gage measurements on NRD maintained gages	
NRD regulations/management activities (designated GW management areas, use restrictions, etc.)	
New depletions accounting report	
New data collected or model/study results (conservation measures, riparian ET, etc.)	

2. Revisions to this plan;
3. Coalition budget and member contributions for the upcoming fiscal year,
4. Any other topic on which the Coalition members have mutually agreed.

The meeting will be public noticed and a proposed agenda will be made available to the public, along with any available supporting documents, at least two weeks prior to the annual meeting. As a result of actions taken at the annual meeting, the Plan may be revised as necessary. Stakeholder and/or public feedback concerning the Basinwide Plan will be received at the annual meeting. The Coalition will jointly issue a final Annual Report that summarizes each member's report and includes each report as an Appendix.

6.0 Glossary of Terms

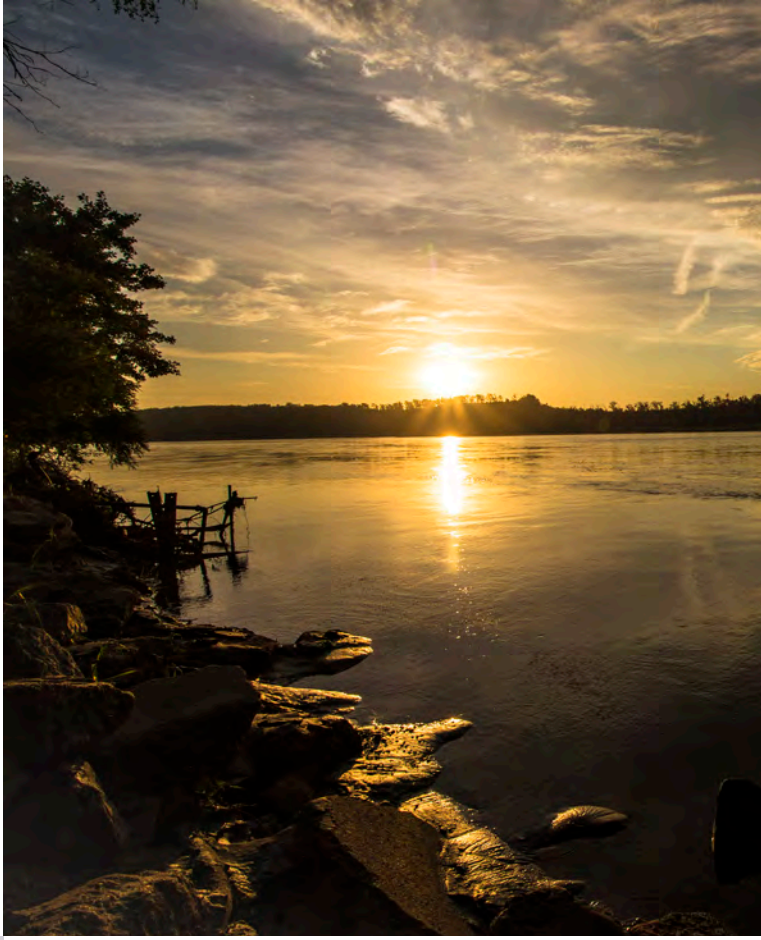
TERM	DEFINITION
Accretion	Addition to streamflow that results from an offset/mitigation action or project.
Acre-foot (AF)	Volume of water required to cover 1 acre of land (43,560 square feet) to a depth of 1 foot, equivalent to 325,851 gallons.
Allowable New Depletion	A term coined for purposes of this Plan. Corresponds to an agreed upon limit on depletions associated with new development (both agricultural and non-agricultural uses) in the peak season for the first increment of the Plan.
Appropriation	A permit granted by NeDNR to use surface water for a beneficial use in a specific amount, purpose and location, and is based on first-in-time, first-in-right.
Aquifer	A geological formation or structure of permeable rock or unconsolidated materials that stores and/or transmits water, such as to wells and springs.
Certified Irrigated Acre	Lands identified and registered with the District which has water applied for irrigation.
Conjunctive Management	The coordinated and combined process that utilizes the connection between surface and groundwater to maximize water use, while minimizing impacts to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the reliability of that supply.
Consumptive Use	The amount of water that is consumed under efficient practices, which satisfies a beneficial use without waste and does not return to a water resources system.
Cubic Foot Per Second	The rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second. It is equivalent to 7.48 gallons per second, or 448.8 gallons per minute.
NeDNR	The Nebraska Department of Natural Resources; a State Agency
Depletion	Reduction to streamflow that results from a new use of either groundwater or surface water.
Excess Supply	Basin water supply in excess of long term demands.

TERM	DEFINITION
Fully Appropriated	From 46-713, subsection (3): A river basin, subbasin, or reach shall be deemed fully appropriated if NeDNR determines based upon its evaluation conducted pursuant to subsection (1) of this section and information presented at the hearing pursuant to subsection (4) of section 46-714 that then current uses of hydrologically connected surface water and groundwater in the river basin, subbasin, or reach cause or will in the reasonably foreseeable future cause (a) the surface water supply to be insufficient to sustain over the long term the beneficial or useful purposes for which existing natural-flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted, (b) the streamflow to be insufficient to sustain over the long term the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved, or (c) reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws.
Groundwater	Water which occurs in or moves, seeps, filters, or percolates through ground under the surface of the land, and shall include groundwater which becomes commingled with waters from surface sources.
Groundwater Recharge	The addition of water to the zone of saturation. Infiltration of precipitation and its movement to the water table is one form of natural recharge.
Hydrologically Connected	Describes a geographic area designated by the NeDNR where the existing amount of groundwater and surface water each has significant influence on the other and where appropriate regulations exist.
Hydropower Demand	A non-consumptive use demand for streamflows appropriated for hydropower generation purposes.
INSIGHT	Developed and maintained by NeDNR, INSIGHT stands for an Integrated Network of Scientific Information and GeoHydrologic Tools. The purpose of INSIGHT is to provide an annual snapshot of water conditions across the state. Hydrologic data are consolidated from several different sources, including the NeDNR, U.S. Geological Survey, U.S. Bureau of Reclamation, and local natural resources districts and presented in charts for the following categories: water supplies, water demands, nature and extent of use, and water balance. These data are presented in a consistent format and become more local as the user drills down from the statewide level to the basin-wide and subbasin levels using the database interface.

TERM	DEFINITION
Instream Flow Demand	Demands for streamflow taking place within the stream and is not withdrawn from a surface water source.. These demands are based on current appropriations held by the Nebraska Game and Parks Commission or any local Natural Resources Districts.
Integrated Management Plan (IMP)	A plan cooperatively developed by NeDNR and individual NRDs for a specific area. The objective of an integrated management plan is to manage such river basin, subbasin, or reach to achieve and sustain a balance between water uses and water supplies for the long term.
LB 483	On December 12, 2008, the NeDNR reached a preliminary determination that the Lower Platte River Basin was fully appropriated. Subsequent to this determination, NeDNR reached a final determination that the Lower Platte River Basin was not fully appropriated. Following this reversal, on April 6, 2009 the Legislature passed LB 483 which requires that when a basin status change occurs, the affected NRDs must adopt rules and regulations that: 1) allow a limited number of total new groundwater irrigated acres annually; 2) are created with the purpose of maintaining the status of not fully appropriated based on the most recent determination; 3) be for a term of not less than four years; and 4) limit the number of new permits so that total new groundwater irrigated acres do not exceed the number set in the rules and regulations.
LB 962	A bill passed by Nebraska Legislature in 2004 that allows leases of surface water, changes administration of surface water rights, establishes a proactive approach to the integrated management of hydrologically connected groundwater and surface water and creates funds to direct money towards data gathering, research, conservation and implementation of integrated management plans in fully and overappropriated basins.
Long-term Demand	The total demand for consumptive and non-consumptive uses of streamflow by surface water and groundwater uses. For the INSIGHT methodology, these demands include: Groundwater Consumption, Surface Water Demand, Hydropower Power Demand, Instream Flow Demand, Net Surface Water Loss, and Downstream Demands. Near-term demand calculation considers the groundwater depletion (current effect of wells on the stream) while the long-term calculation considers the groundwater consumption (full impact of wells on a hydrologically connected stream).

TERM	DEFINITION
Lower Platte River Basin Coalition (Coalition)	Formed through an Interlocal Cooperation Act agreement among the NeDNR and the following seven Natural Resources Districts (NRDs) that encompass the Lower Platte River Basin: Upper Loup Natural Resources District (ULNRD); Lower Loup Natural Resources District (LLNRD); Upper Elkhorn Natural Resources District (UENRD); Lower Elkhorn Natural Resources District (LENRD); Lower Platte North Natural Resources District (LPNNRD); Lower Platte South Natural Resources District (LPSNRD); Papio-Missouri River Natural Resources District (PMRNRD)
Moratorium	A legally authorized suspension of drilling of groundwater wells or approval of new surface water appropriations.
Natural Resources District (NRD)	A political subdivision of the State that governs the natural resources within the subdivision.
Near-term Demand	The total demand for consumptive and non-consumptive uses of streamflow by surface water and groundwater uses. These demands include: Groundwater Depletion, Surface Water Demand, Hydropower Power Demand, Instream Flow Demand, Net Surface Water Loss, and Downstream Demands. Near-term demand calculation considers the groundwater depletion (current effect of wells on the stream) while the long-term calculation considers the groundwater consumption (full impact of wells on a hydrologically connected stream).
Non-consumptive Use	Non-consumptive use demands are demands on the water supply that are available to meet other demands such as hydropower demands, instream flow, induced groundwater recharge, or downstream demands for consumptive uses.
Non-peak Season	September 1 through May 31
Offset	A reduction in water use that corresponds with an increased use of water. An offset may be used as a management strategy to balance uses and supplies. The offset will have a corresponding amount, time, and location. Also referred to as mitigation.

TERM	DEFINITION
Overappropriated	From 46-713, subsection (4a): A river basin, subbasin, or reach shall be deemed overappropriated if, on July 16, 2004, the river basin, subbasin, or reach is subject to an interstate cooperative agreement among three or more states and if, prior to such date, NeDNR has declared a moratorium on the issuance of new surface water appropriations in such river basin, subbasin, or reach and has requested each natural resources district with jurisdiction in the affected area in such river basin, subbasin, or reach either (i) to close or to continue in effect a previously adopted closure of all or part of such river basin, subbasin, or reach to the issuance of additional water well – permits in accordance with subdivision (1)(k) of section 46-656.25 as such section existed prior to July 16, 2004, or (ii) to temporarily suspend or to continue in effect a temporary suspension, previously adopted pursuant to section 46-656.28 as such section existed prior to July 16, 2004, on the drilling of new water wells in all or part of such river basin, subbasin, or reach.
Peak Season	June 1 through August 31
Streamflow	The discharge that occurs in a natural channel of a surface stream course.
Surface Water	Water which occurs or moves on the surface of the planet such as in a stream, river, lake, wetland, or ocean.
Temporary Recharge	A temporary (for one year) surface water permit issued for the purpose of diverting excess streamflow (unappropriated water) to recharge groundwater, intended to supply baseflow accretions back to the river.
Transfer	To allow for the historic consumptive use of water to be changed, in location and/or purpose. Impacts of a transfer may include an increase in depletions to the river or an impact to existing surface water or groundwater uses.
Use	The legally accepted use of a well or water appropriation.
Water bank	A mechanism used to facilitate the transfer of water between parties, often using market-driven transactions. Water banks can be institutional, physical, or mixtures of both.
Watershed	The area of land where all of the water that is under it or drains off of it goes into the same place.



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