

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Research and Data Collection for a Supplemental Water Supply

PRIMARY CONTACT INFORMATION

Entity Name: City of Lincoln, Public Works and Utilities, Lincoln Water System

Contact Name: Steve R. Owen

Address: 2021 N 27 St, Lincoln, NE 68503

Phone: 402-441-5925

Email: sowen@lincoln.ne.gov

Partners / Co-sponsors, if any: None

1. **Dollar amounts requested:** Grant

Grant amount requested: \$ 382,200

Loan amount requested: \$ 0

If Loan, how many years repayment period? N/A

If Loan, supply a complete year-by-year repayment schedule. N/A

2. **Permits Needed - Attach copy for each obtained (N/A = not applicable)**

Nebraska Game & Parks Commission (G&P) consultation on Threatened and Endangered Species and their Habitat N/A Obtained: YES NO

Surface Water Right N/A Obtained: YES NO

USACE (e.g., 404 Permit) N/A Obtained: YES NO

Cultural Resources Evaluation N/A Obtained: YES NO

Other (provide explanation below) N/A Obtained: YES NO

Temporary well permits from the Lower Platte South Natural Resources District will be required for this research and data acquisition project.

3. Are you applying for funding for a combined sewer over-flow project?

YES NO

If yes, do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality?

YES NO

If yes attach a copy to your application. N/A

If yes what is the population served by your project? N/A

If yes provide a demonstration of need. N/A

If yes and you were approved for funding in the most recent funding cycle, then resubmit the above information updated annually but you need not complete the remainder of the application.

4. If you are or are representing an NRD, do you have an Integrated Management Plan in place, or have you initiated one?

N/A YES NO

5. Has this application previously been submitted for funding assistance from the Water Sustainability Fund and not been funded?

YES NO

If yes, have any changes been made to the application in comparison to the previously submitted application? N/A

If yes, describe the changes that have been made since the last application.
N/A

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) N/A

Section B.

DNR DIRECTOR'S FINDINGS

Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES NO

1(a). If yes (structural), submit a feasibility report (to comply with Title 261, CH 2) including engineering and technical data and the following information:

A discussion of the plan of development (004.01 A);

N/A

A description of all field investigations made to substantiate the feasibility report (004.01 B);

N/A

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C);

N/A

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate (004.01 D);

N/A

A discussion of each component of the final plan including, when applicable (004.01 E);

Required geologic investigation (004.01 E 1);

N/A

Required hydrologic data (004.01 E 2);

N/A

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3).

N/A

1(b). If no (non-structural), submit data necessary to establish technical feasibility including, but not limited to the following (004.02):

A discussion of the plan of development (004.02 A);

This project will provide the research and data needed to site a supplemental water supply well field along the Missouri River. The Missouri River well field will provide the required raw water supply to meet projected demands that will occur beginning as early as 2045 and will increase the reliability of the City of Lincoln's water supply through source diversification. This project is required to improve the understanding of both the hydrogeologic and water quality conditions in the area before the city decides to move forward with purchase and development of the project.

The City of Lincoln has taken a very responsible and proactive approach to planning for second water source of water supply. This is evidenced by ongoing master planning to ensure an adequate time period is available to implement such a project. A 2013 benchmarking survey published by the American Water Works Association lists the median number of years that water utilities have for available water supply is 47 years. Currently, the City of Lincoln's available water supply is only 28 years. This demonstrates the City of Lincoln is not premature in planning for a second source of water relative to the industry and needs to begin pursuing options including a second wellfield located in a separate water source.

The current Facilities Master Plan (Master Plan) for the City of Lincoln also suggests that a second source of water supply will likely result in a regional supply for surrounding communities and those located near the water transmission pipeline to Lincoln (Attachment A). This project has positive implications for future water supplies beyond just Lincoln. This project is the all important first step in the future water supply for Lincoln and potentially others in southeast Nebraska.

The goals of the project are to:

- Assess the depth to bedrock and the vertical/lateral extent of the aquifer
- Characterize the hydraulic properties and water quality of the aquifer
- Evaluate recharge from the Missouri River
- Estimate the projected long-term yield of the proposed collector well at each site
- Define the well design characteristics

The research and data collection will be conducted in phases. Phases I and II will include drilling soil borings and installing monitoring wells. The results of the first two phases of work will be used to identify the locations for four horizontal collector wells. Once a location for the four collector wells is identified, the remaining three phases will be completed including detailed aquifer testing, temporary well abandonment, and reporting.

- **Phase I, Test Hole Drilling** – Drill 12 test holes to determine depth to bedrock

- **Phase II, Observation Well Installation** – Install 12 four-inch diameter observation wells (three wells at each of four sites). Perform a four-hour multi-rate step test at each of four sites to identify the optimal pumping test rate.
- **Phase III, Test Well Installation and Testing** – Install an additional 12 two-inch diameter observation wells (three wells at each of four sites) and four twelve-inch diameter test pumping wells (one at each site). Perform a 72-hour constant rate pumping/recovery test at each of the test wells.
- **Phase IV, Well Abandonment** – Abandon all but four four-inch observation wells.
- **Phase V, Oversight, Analysis and Reporting** – Engineering field oversight, temporary well permitting, data analysis and report preparation.

Property acquisition is not included in this project and will follow if results of the investigation are favorable.

A description of field or research investigations utilized to substantiate the project conception (004.02 B);

Water utilities must continuously plan to address system needs and challenges such as system growth, aging infrastructure, and increasingly stringent regulatory requirements. The City of Lincoln completed a comprehensive Master Plan in 2002, an update in 2007 and the most recent update in 2014 (Attachment A). Additionally, in 2005, four locations along the Missouri River were evaluated for siting a supplemental well field (Black and Veatch, 2005). The results of the 2005 report were summarized in the 2014 Master Plan and based on the analysis of the short- and long-term planning horizons, only two of the four sites were viable based on the long-term projected water demand. The 2014 Master Plan included investigations that were used to substantiate completion of the research for a supplemental water supply in the Missouri River alluvium. The following is a summary of the research completed to substantiate this project conception:

Two location options were evaluated in the 2014 Master Plan. The locations are considered confidential because of the future real estate transaction. For this reason, the locations of Option 1 and 2 are not included in this application.

Option 1 was to construct a well field along the Missouri at Site A:

- Located approximately 40 miles from Lincoln
- In an area where the Missouri River Valley is 1-2 miles wide
- Depth to bedrock is greater than 110 feet below ground surface
- Aquifer materials are described as a coarsening downward sequence of sand and gravel
- Depth to water 15 feet below ground surface

Based on the theoretical drawdown equation developed by Hantush and Papadopoulos (1962), a horizontal collector well with a centerline depth of 100 feet with 85 feet of water column has an estimated yield of 15 to 20 million gallons per day with a transmissivity of 180,000 to 250,000 gallons per foot per day. Therefore, Site A would require four collector wells to meet the 2060 demand.

Option 2 was to construct a well field along the Missouri at Site B:

- Located approximately 67 miles from Lincoln
- In an area where the Missouri River Valley is 3-4 miles wide
- Depth to bedrock is 75 to 80 feet below ground surface
- Aquifer materials are described as a coarsening downward sequence of sand and gravel
- Depth to water 10 feet below ground surface

Based on the theoretical drawdown equation developed by Hantush and Papadopoulos (1962), a horizontal collector well with a centerline depth of 65 feet with 55 feet of water column has an estimated yield of 8 to 10 million gallons per day with a transmissivity of 125,000 to 170,000 gallons per foot per day. Therefore, Site B would require six to seven collector wells to meet the 2060 demand.

In summary, the analysis showed that Option 2 would be substantially more expensive to build because it would require up to three more collector wells and 27 additional miles of pipeline to provide the supplemental water supply to the City of Lincoln. For this reason Option 1, to conduct research and collect data on the hydrogeology of Site A, was selected for this project.

A description of the necessary water and/or land rights, if applicable (004.02 C);

No land acquisition is required to complete this project. A standard drilling access agreement will be implemented with the current landowner. Well permit applications for the test and observation wells will be submitted to the Lower Platte South Natural Resources District (LPSNRD) for approval.

A discussion of the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D).

The proposed project area lies within the Missouri River floodplain. The area is used for agricultural production. Development of a well field for the City of Lincoln in the area will require reducing the area available for agricultural production during construction; however, after purchase of the land by the City of Lincoln, it is anticipated that the area will function similar to the current Lincoln Water System (LWS) Platte River well field near Ashland where the city currently maintains agricultural production on a portion of the site.

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

For the City of Lincoln, the long-term water supply alternatives evaluated to meet the demands to 2060 included the Missouri River and the Platte River alluvial aquifers. As stated in the 2014 Master Plan, the Platte and the Missouri are the only two viable

sources for the development of a large-scale, reliable water supply. Missouri River was selected as the preferred alternative for the following reasons:

- A supply located on the Missouri River Basin would diversify the city’s water supply sources, thereby increasing reliability.
- The Missouri River is operated as a navigable channel, and the streamflow is regulated from upstream reservoirs. A well field constructed in the Missouri River alluvium would be less susceptible to low streamflow during the summer months when demands for water are highest.
- A new well field in the Platte River alluvial aquifer would need to be located sufficiently far enough from the city’s existing well field so as not to impact or impair streamflow or groundwater elevations near the city’s well field. To accomplish this, the new well field would have to be located at a significant distance, which significantly increases the capital cost.
- Permitting for a new Platte River alluvial aquifer well field would require a much larger effort than development of a similar supply on the Missouri River. For example, it took 10 years for the LWS to obtain the current induced groundwater recharge permit for the Ashland well field. In contrast, a permit for induced groundwater recharge from a well field in the Missouri River alluvium would not have the same constraints because of the volume of recharge realized by the Missouri River.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].

- **Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).**

The estimated cost for the research and data collection to identify a supplemental water supply site for the City of Lincoln in the Missouri River alluvium is \$637,000 (Table 2).

Table 2 Opinion of Probable Cost

Description	Cost Estimate
Phase I Test Hole Drilling	\$38,000
Phase II Observation Well Installation	\$93,000
Phase III Test Well Installation and Testing	\$368,000
Phase IV Well Abandonment	\$42,000
Phase V Oversight, Analysis, and Reporting	\$96,000
Total	\$637,000

The cost information includes engineering and inspection (oversight) costs, well construction, abandonment, and testing costs. There are no annual operation and maintenance costs or any land and water acquisition costs associated with this research and data collection project. Land acquisition will be completed upon successful completion of this project. Access to the property for the well field investigation will be accomplished through an access agreement between the City of Lincoln and the current landowner. The projected life of the project is 2018 and therefore no additional long-term costs are presented.

The cost to conduct the research and data collection is based on the engineering cost estimate in the 2014 Master Plan. In the plan, the 2014 costs were projected into the future using a standard inflation rate. To ensure that the cost estimate was still valid, two estimates were provided by local drilling companies. The drilling estimates confirmed the Master Plan estimates.

- **Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02).**

A meeting was held on July 19, 2017, with NDNR staff members Kris Reed, Kent Zimmerman, and LeRoy Sievers to discuss using a “least-cost analysis” to document Economic Feasibility for the Lincoln Water System Research and Data Collection for a Supplemental Water Supply Project. This approach is the same as was used by the City of Hastings in their 2015 application and the City of Lincoln in the 2016 application. Both applications were accepted using the “least-cost analysis” method. It was agreed that this would be an appropriate method for the current application.

A least-cost analysis involves comparing the costs of various mutually exclusive, technically feasible project options and selecting the one with the lowest cost. Mutually exclusive project options must be alternative ways of producing the same output of a specified service quality. The alternative with lowest present value of costs is the least-cost alternative. (Guidelines for the Economic Analysis of Projects – Economics and Development Resource Center, February 1997).

The analysis contained in the Lincoln Water System Facilities Master Plan (Attachment A) compared two aquifers and two locations within the selected aquifer to address the long-term (2041 to 2060) water supply deficits and these alternatives and costs are summarized below:

As stated in the LWS Master Plan, the Missouri and Platte River aquifers are the only two viable sources of water to meet the long-term demand for the City of Lincoln. Of the two, the Missouri River aquifer was selected as the preferred alternative because:

- A supply located on the Missouri River Basin would diversify the city’s water supply sources, thereby increasing reliability.
- The Missouri River is operated as a navigable channel, and the streamflow is regulated from upstream reservoirs. A well field constructed in the Missouri River alluvium would be less susceptible to low streamflow during the summer months when demands for water are highest.

In 2005, five Missouri River well field locations were analyzed and in the 2014 Master Plan the cost to investigate the top two Missouri River well field location options was estimated. Table 3 presents the costs of the two options. Option 1 was selected as the least-cost alternative.

Table 3 Cost Estimates for Missouri River Well Field Hydrogeologic Investigations

Option or Site Designation	Number of Collector Wells to meet Long-term Demand based on hydrogeologic characteristics of the site	Estimated Cost of Investigation
Option 1 (Site A)	Four collector wells	\$637,000
Option 2 (Site B)	Seven collector wells	\$1,050,000

Secondary Benefits

Other benefits of this project include the protection of upstream junior irrigators above the Ashland well field, which encompasses nearly 50% of the state. With the addition of a supplemental water supply, the LWS will be able to produce water from the Missouri River aquifer during times of drought instead of the Platte River, which minimizes adverse impacts to upstream existing water users. For example, during the 2012 drought, at a critical time in August the Platte River was barely flowing. At that time, the city had the right to “make a call on the river” due to its induced groundwater recharge permit. The city could have asked the NDNR to restrict upstream withdrawals by junior surface water users any time the Platte River flow fell below 704 cfs. Although the city could have exercised its right in 2012, it chose not to. The intent of this project is to provide the research and data necessary to decide where to purchase property for a well field within the Missouri River alluvium. It is another important tool in reducing the potential to exercise the LWS water right. Exercising the LWS water right would require many upstream surface water users to discontinue water use. The potential economic impact of suspending the withdrawals for upstream junior surface water users during the critical period of late summer corn and soybean production would be devastating to this State of Nebraska’s economy.

- **All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03).**

Table 4 presents the annual cash flow for the fifty-year life of the project. The annual cash flow table includes a comparison of Option 1, which is the current research and

data collection project at Site A and Option 2 which is an alternative well field site along the Missouri River. Over the 50-year period, including operation and maintenance costs, Option 1 is still the least cost option by \$413,000.

Table 4 – Annual Cash Flow and Least Cost Comparison

Option 1 to Research and Collect Data on a well field along the Missouri

Year	2017		
#0	Capital Items	\$27,000	
	O&M and Replacement Items	\$0	
			\$27,000
Year	2018		
#1	Capital Items	\$610,000	
	O&M and Replacement Items	\$0	
			\$610,000
Year	2018		
#2-50	Capital Items	\$0	
	O&M and Replacement Items	\$0	
			\$0
	Total Project Cost over 50 period		\$637,000

Option 2 to Research and Collect Data on a well field along the Missouri

Year	2017		
#0	Capital Items	\$52,000	
	O&M and Replacement Items	\$0	
			\$52,000
Year	2018		
#1	Capital Items	\$998,000	
	O&M and Replacement Items	\$0	
			\$998,000
Year	2018		
#2-50	Capital Items	\$0	
	O&M and Replacement Items	\$0	
			\$0
	Total Project Cost over 50 period		\$1,050,000

Table 4 presents a least cost alternative analysis and therefore benefits are not included in this table. Capital items include fees for test well design, permitting, bidding, oversight, well construction, testing, analysis and reporting. O&M includes operation and maintenance fees and equipment replacement costs are not included because this project will end in 2018. There are no annual operation and maintenance costs or any land and water acquisition costs associated with this research and data collection project. Years represent calendar years. The cost estimate is based 2014 Facilities Master Plan adjusted for inflation.

- **In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04). N/A**
- 4. Provide evidence that sufficient funds are available to complete the proposal.**

Each year the Lincoln City Council reviews the water rates to be charged to cover capital, operations, and maintenance costs for the water system. The council can implement changes to the rates charged or consider bonding certain costs of providing water service. Cited below are the state statutes that allow the city to issue bonds and set rates for providing water services:

- Authority to Issue Bonds - Neb. Rev. Stat. § 16-693
- Rate Making Authority - Neb. Rev. Stat. § 16-679
- Rate Regulation Authority - Neb. Rev. Stat. § 16-681

The entire cost of the project is \$637,000. As documented in the Mayor's Letter of Support (Attachment B) for this application, the City of Lincoln is committed to funding 40% of this project.

- 5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).**

Each year the Lincoln City Council reviews the water rates to be charged to cover capital and operations and maintenance costs for the water system. The council can implement changes to the rates charged or consider bonding certain costs of providing water service. Cited below are the state statutes that allow the city to issue bonds and set rates for providing water services:

- Authority to Issue Bonds - Neb. Rev. Stat. § 16-693
- Rate Making Authority - Neb. Rev. Stat. § 16-679
- Rate Regulation Authority - Neb. Rev. Stat. § 16-681

The entire cost of the project is \$637,000. As documented in the Mayor's Letter of Support (Attachment B) for this application, the City of Lincoln is committed to funding 40% of this project. Attachment C is a copy of the Public Work and Utilities Department adopted budget for 2016-17 and 2017-18. The budget is provided as evidence of sufficient revenue. There are no long-term operational, maintenance or replacement costs associated with this application.

- 6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.**

N/A

7. Describe how the plan of development minimizes impacts on the natural environment.

Well drilling and aquifer testing operations will follow a written plan to minimize impacts to surface water and wetlands. The plan will be prepared by the city's selected consulting engineering firm overseeing the project and will be implemented by the drilling subcontractor. The drilling operations will likely include rotary drilling, percussion hammer, jetting, excavation, and augering. These methods commonly include the use of heavy equipment, water, bentonite clay, and related byproducts. As a result, well drilling operations may generate solids, referred to as suspended solids when transported by water movement or discharged directly to a wetland or surface water. When not properly contained, the generated solids may adversely impact wetlands and surface waters. To minimize these potential impacts, the Surface Water Protection Plan elements will include the following:

- *Containment of well drilling operation:* Well drilling operations shall be contained to a footprint that minimizes the disturbed area. Additionally, the well site shall be contained by digging a containment pit on-site and/or installing hay bales and silt fencing (as needed) and managing overflow so that it will not carry sediment into wetlands or surface water.
- *Well location:* Wells shall be constructed outside wetlands and surface waters.
- *Heavy equipment:* Heavy equipment shall stay outside surface waters and wetlands. If permanent or temporary surface water or wetland impacts are necessary for well construction, all required permits will be completed. Areas subject to earth disturbance shall be contained with hay bales and silt fence, if the potential to adversely impact wetlands or surface water exists.
- *Containment pit:* During the well drilling process a containment pit, or mud pit, is often necessary to contain drilling fluids. If required for well installation, the mud pit shall have sufficient capacity to prevent overflow or shall discharge to uplands. Should overflow occur, the discharge shall be spread out to prevent channeling of water, which could lead to erosion and possible adverse impacts to nearby wetlands and surface waters.
- *Well drilling materials:* Water and bentonite clay will be used during the well construction process. Disposed water shall be managed such that it infiltrates in the ground without impacting wetlands and surface waters or channeling off-site.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

Steve Owen, Superintendent of Water Production, Lincoln Public Works & Utilities Department, LWS Division, will provide overall project leadership and oversight, working with selected contractors, designated LWS staff and project stakeholders. Mr. Owen has a bachelor of science in Civil Engineering, is a Licensed Professional Engineer (Nebraska) and a Grade 1 Nebraska Water Operator. He has 32 years of experience in utility management positions, involving wastewater, solid waste, and public water supply. Work experience includes industrial wastewater permitting, solid waste planning

and facilities management, water supply, treatment and distribution system planning and management. He also possesses experience in project management, involving multi-million dollar water system capital improvement projects, and management of annual operating and capital improvement project budgets for LWS.

The City of Lincoln / Lincoln Water System has the authority to operate a water system as per the Nebraska Department of Health and Human Services, license number NE3110926 (Attachment D). Furthermore, the City of Lincoln has the authority and obligation to provide its citizens with basic drinking water and sanitation services. This includes the development and operation of the public water supply and wastewater system. The first city-owned water well designated for public use was drilled in 1857. The City of Lincoln has authority through its ordinances to require connection to the water system and assess user fees and rates.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

There are two specific Integrated Management Plans (IMPs) that this project will address. The IMP Jointly Developed by the Department of Natural Resources (NDNR) and the Lower Platte South Natural Resources District (LPSNRD) dated May 15, 2014 and the IMP jointly developed by the NDNR and the Papio-Missouri River Natural Resources District (P-MRNRD), August 31, 2014. The project has been endorsed by both the LPSNRD and the P-MRNRD because the project helps meet the goals of their IMPs (Attachment F and Attachment G).

For the LPSNRD IMP, the goals that the project benefits are as follows:

- Goal Area: Water Supply Management - Ensure a sustainable water supply is available in the amounts and location of the demands through management actions to meet the District's short and long-term needs.
- Goal Area: Water Use Management - Manage the expansion of new water uses in the District so as to not adversely affect current water users.

For the P-MRNRD IMP, the goals that the project benefits are as follows:

- Goal 1 – 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.

Additionally, this project meets the goals and objectives of the Master Plan prepared for the City of Lincoln in 2014 (Attachment A). For a history of the work completed to achieve the goals of the plan, excerpts from current Master Plan are provided below followed by a description of the work completed.

Water utilities must continuously plan to address system needs and challenges, such as system growth, aging infrastructure, increasingly stringent regulatory requirements, and the need for a well-planned and efficient Capital Improvement

Program (CIP). Recognizing this need, the City of Lincoln has historically conducted master planning efforts at 5-year intervals with a comprehensive master planning effort every 10 years, and updates to address system growth and distribution system needs every 5 years. The city last completed a comprehensive Master Plan in 2002 and an update in 2007. The 2014 Master Plan provides a guide for the short- and long-term improvements for the infrastructure of the Lincoln Water System (LWS) through the year 2060.

Source Water Availability to Meet Short- and Long-term Planning Horizons

A hydrologic analysis was performed to evaluate streamflow conditions in the Platte River. The long-term yield of the city's raw water supply is correlated to the streamflow in the Platte River; therefore, understanding the flow regime of the river is an important part of the Master Plan effort. The objective of this analysis was to determine reoccurrence intervals (or frequency) of prolonged droughts and to understand the duration of these events.

The drought experienced by the city during the summer of 2012 was a 50- to 100-year reoccurrence interval event for the 7- and 30-day duration events, and a 50-year reoccurrence interval event for the 60-day duration event. With a 50-year planning horizon and the reoccurrence interval of the 2012 event being approximately 50 years, there is a strong probability (64 percent) that the city will experience at least one drought event similar to the 2012 event during the planning horizon.

The city's well field, in its current configuration, will not be able to meet projected demands through the planning horizon of 2060. Therefore, an evaluation was conducted of raw water supply alternatives that would increase the raw water capacity of the city to meet both the short-term and long-term demands. This analysis also considered increasing the reliability of the raw water supply by diversifying the raw water source. Three planning horizons were identified for this evaluation, as defined below.

Short-term horizon

In the short-term horizon, the projected raw water demand could exceed the 60- to 90-day pumping capacity as early as 2018 depending on the magnitude and duration of a drought. The instantaneous and short-term pumping capacity could be exceeded by 2022. These short-term supply alternatives should be able to increase the instantaneous and short-term water supply capacity by 20 million gallons per day and should be able to increase the summer seasonal yield by 10 million gallons per day. Because this short-term supply alternative must be developed in the near future, the alternative must be considered relatively easy to permit and construct.

Short-term supply alternatives evaluated in the Master Plan include:

- *Expansion of existing well field with completion of a fourth HCW*
- *New well field in the High Plains Aquifer*

- *Aquifer storage and recovery as peak shaving*
- *Metropolitan Utilities District (MUD) interconnection*
- *Water reuse*

Long-term horizon

The long-term supply alternatives evaluated to meet the demands to 2060 included the Missouri River and the Platte River alluvial aquifers. As stated in the plan, the Platte and the Missouri are the only two viable sources for the development of a large-scale, reliable water supply. The Missouri River was selected as the preferred alternative for the following reasons:

- *A supply located on the Missouri River Basin would diversity the city's water supply sources, thereby increasing reliability*
- *A new well field in the Platte River alluvial aquifer would need to be located sufficiently far enough from the city's existing well field so as not to impact or impair streamflow or groundwater elevations near the city's well field. To accomplish this, the new well field would have to be located at a significant distance which significantly increases the capital cost.*
- *The Missouri River is operated as a navigable channel, and the streamflow is regulated from upstream reservoirs. A well field constructed in the Missouri River alluvium would be less susceptible to low streamflow during the summer months when demands for water are highest.*
- *Permitting for a new Platte River alluvial aquifer well field would require a much larger effort than development of a similar supply on the Missouri River.*

For the purposes of the Master Plan, it was assumed that the long-term alternative would supply a maximum of 60 million gallons per day, which is sufficient to meet the water supply needs of the city through 2060. The development of a 50 to 60-million gallons per day supply along the Missouri River would provide the city with a diversified source of supply that is more resistant to drought and could provide opportunities to develop this supply option as a regional water supply.

Based on the analysis completed in for the 2014 Master Plan, it was recommended that research and data collection for well field site selection be conducted in 2016 and that land acquisition for the well field facility occur in approximately 2018 in order to secure a site for future source development.

The Water Sustainability Grant awarded to the City of Lincoln in 2016 helped the city meet the short-term requirements that were needed to increase the instantaneous and short-term pumping capacity by completing the fourth horizontal collector well and associated pipeline. We thank Nebraska's Natural Resources Commission for helping LWS move forward with the fourth horizontal collector well, however, the city has not completed the research and data collection necessary to identify a well field site along the Missouri River due to funding constraints.

This project to conduct research and gather data to identify a supplemental water supply for the City of Lincoln will directly support all three IMP goals in the following manner. Currently, the Platte River well field is projected to support the short- and mid-term needs of the City of Lincoln. According to the LWS Master Plan, the Platte River well field will not meet the long-term needs. The future projected demand for the city is an additional 50 to 60 million gallons of water per day above and beyond what can be produced from the Platte River well field. As described in the plan, building a well field along the Missouri River was identified as the only viable option to meet the needs of the community as it continues to grow. This project will ensure that a location to build a supplemental water supply for the City of Lincoln is identified and thoroughly researched so that it can be purchased and protected for future use.

The project will benefit the first LPSNRD goal on water supply management since it is designed to identify an alternative water source for the City of Lincoln to meet both the short- and long-term needs of one of the largest water users in the district. It helps meet the second goal of water use management by identifying a second source of water for the City of Lincoln so the city's increasing demands will not adversely affect current water users in the lower Platte River.

For the P-MRNRD, the same benefits are realized for the water users in the district and across the entire lower Platte River basin. A new source of water within the Missouri River alluvial aquifer will allow for future development within the City of Lincoln while protecting the existing surface and groundwater users along the Platte.

10. Are land rights necessary to complete your project?

YES NO

If yes, provide a complete listing of all lands involved in the project.

N/A

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.

N/A

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.

N/A

11. Identify how you possess all necessary authority to undertake or participate in the project.

The City of Lincoln has the authority and obligation to provide its citizens with basic drinking water and sanitation services. This includes the development and operation of the public water supply and wastewater system. The first city-owned water well designated for public use was drilled in 1857. The City of Lincoln has authority through its ordinances to require connection to the water system and assess user fees and rates.

The City of Lincoln has eminent domain authority to acquire easements and land rights for the construction of a water system. The City of Lincoln / Lincoln Water Systems have the authority to operate a water system as per the Nebraska Department of Health and Human Services, license number NE3110926 (Attachment D).

12. Identify the probable environmental and ecological consequences that may result as the result of the project.

Temporary impacts include access roads to drilling sites and short-term groundwater discharges to Missouri River during aquifer testing.

Section C.

NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

Notes:

- The responses to one criterion ***will not*** be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;
 - Describe the specific threats to drinking water the project will address.
 - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
 - Provide a history of issues and tried solutions.
 - Provide detail regarding long range impacts if issues are not resolved.

In 2013, it was reported by a national news organization that the City of Lincoln ranked as one of the top eleven most vulnerable water supplies in the nation (Attachment E). The report pointed out that the local water supply for the City of Lincoln was not

sustainable and cannot supply sufficient water to meet the needs of the community. While the report was not an entirely accurate representation of Lincoln’s vulnerability, it does point to the fundamental fact that Lincoln relies solely on the Platte River and underlying aquifer for its water supply. As witnessed during the 2012 drought, the Platte River is subject to drought, which is a significant threat to the drinking water supply for the city. This project is designed to conduct research and gather data that can be used by the City of Lincoln to verify the Missouri River well field site selected to provide a second source of drinking water. This project is the all important first step in developing Lincoln’s future supplemental water supply.

The Platte River well field has served the City of Lincoln well for nearly 100 years; however, even with strict water conservation measures in place, as the city continues to grow, the Platte River aquifer will not be able to meet the demands. In 2016, Lincoln’s population was estimated at 280,364 by the US Census Bureau. As described in the Master Plan (Attachment A) and illustrated in Figure 1, Lincoln’s projected population using a 1.2% growth will be over 450,000 in 2060. Recent Census reports indicate that Lincoln’s growth rate maybe as high as 1.5% annually, indicating the urgency in conducting this project.

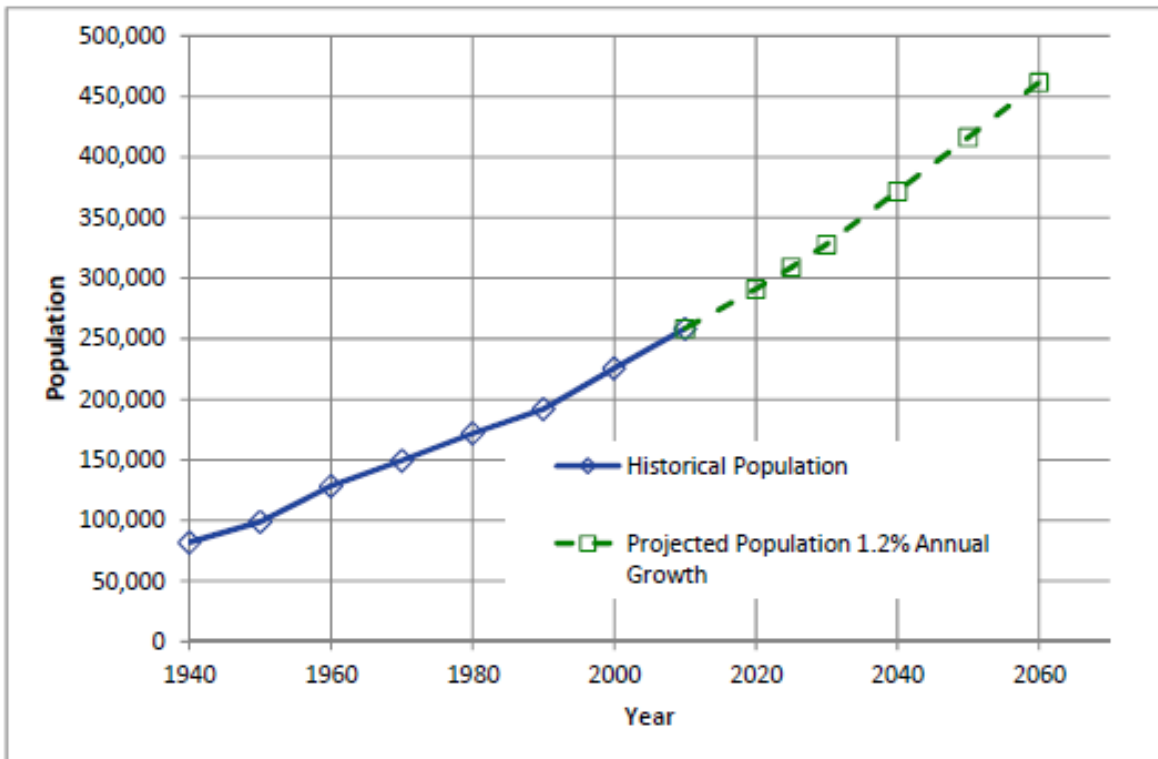


Figure 1 Historic and Projected City of Lincoln Population (from Master Plan, 2014)

As presented in the Master Plan (Attachment A), the short-term (2014 to 2025) and mid-term (2026 to 2040) water supply will be met with the improvements to the Platte River well field currently underway. The long-term planning horizon for the Master Plan is 2041 to 2060 and it is clear that the Platte River aquifer will not be able to sustain the

City of Lincoln for the long-term. The supply difference between the projected maximum day demand in 2060 and the short-term water production rate that can be sustained by the Platte River well field is between 50 and 60 million gallons per day. For this reason, the City of Lincoln is proposing a research and data gathering project to identify a supplemental source of water in the Missouri River aquifer.

Lincoln Water System (LWS) has been providing safe water to residents since 1883. The first city owned well designated for public use was drilled in 1857 in the center of Market Square, near Old City Hall. The water was too salty for drinking, but the artesian well became famous for its curative powers and people traveled from miles around to fill buckets and jars. In the late 1920s, water use was severely curtailed through water conservation practices when the city faced a major water crisis. The persistent problem of salt water wells combined with Lincoln's growing need for more water meant the city had to find another water source. It was in the 20s that the city made the decision to purchase land along the Platte River and pump water from the Platte River aquifer.

The droughts of 2002 and 2012, and the floods of 1993, 1997, 2001, and 2011 were strong reminders to the citizens of Lincoln and the LWS how vulnerable the Platte River wellfield is. Due to these events, the city has evaluated and implemented several interim solutions. To address the water shortage issues and be good stewards of a critical natural resource, the City of Lincoln has completed significant conservation efforts that have reduced the per capita water usage by 25% in the last 36 years. According to the LWS Water Management Plan (Attachment A), it is the policy of the City of Lincoln to promote water conservation. The water supply to the City of Lincoln is a limited resource, and everyone shares in the responsibility for appropriately using and preserving this resource. All customers of the LWS are therefore encouraged to voluntarily reduce water usage by daily practicing water conservation, regardless of whether voluntary or mandatory water restrictions are implemented or certain water shortage rates are applied. Other water conservation practices completed by the city include:

- Implementing an increasing block rate structure whereby the customer's water rate increases when more water is used
- Development of a Water Management Plan that specifies voluntary and mandatory restrictions
- Development of a Water Conservation Task Force in the 1980s

If a supplemental water supply is not identified, there will be significant long-term impacts for LWS and Lincoln. The impacts include the potential risk that Lincoln's water supply is interrupted, putting Nebraska's public security, health, and safety in jeopardy. As with the forward-thinking decision to purchase land for a well field along the Platte in the 1920's, it is time again for the City of Lincoln to identify property for purchase along the Missouri River to supply the growing needs of the community.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

- Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
- Provide the history of work completed to achieve the goals of this plan.
- List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

There are two specific Integrated Management Plans (IMPs) that this project will address. The IMP Jointly Developed by the Department of Natural Resources (NDNR) and the Lower Platte South Natural Resources District (LPSNRD) dated May 15, 2014 and the IMP jointly developed by the NDNR and the Papio-Missouri River Natural Resources District (P-MRNRD), August 31, 2014. The project has been endorsed by both the LPSNRD and the P-MRNRD because the project helps meet the goals of their IMPs (Attachment F and Attachment G).

For the LPSNRD IMP, the goals that the project benefits are as follows:

- Goal Area: Water Supply Management - Ensure a sustainable water supply is available in the amounts and location of the demands through management actions to meet the District's short and long-term needs.
- Goal Area: Water Use Management - Manage the expansion of new water uses in the District so as to not adversely affect current water users.

For the P-MRNRD IMP, the goals that the project benefits are as follows:

- Goal 1 – 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.

Additionally, this project meets the goals and objectives of the Master Plan prepared for the City of Lincoln in 2014 (Attachment A). For a history of the work completed to achieve the goals of the plan, excerpts from current Master Plan are provided below followed by a description of the work completed.

Water utilities must continuously plan to address system needs and challenges, such as system growth, aging infrastructure, increasingly stringent regulatory requirements, and the need for a well-planned and efficient Capital Improvement Program (CIP). Recognizing this need, the City of Lincoln has historically conducted master planning efforts at 5-year intervals with a comprehensive master planning effort every 10 years, and updates to address system growth and distribution system needs every 5 years. The city last completed a comprehensive Master Plan in 2002 and an update in 2007. The 2014 Master Plan provides a guide for the short- and long-term improvements for the infrastructure of the Lincoln Water System (LWS) through the year 2060.

Source Water Availability to Meet Short- and Long-term Planning Horizons

A hydrologic analysis was performed to evaluate streamflow conditions in the Platte River. The long-term yield of the city's raw water supply is correlated to the streamflow in the Platte River; therefore, understanding the flow regime of the river is an important part of the Master Plan effort. The objective of this analysis was to determine reoccurrence intervals (or frequency) of prolonged droughts and to understand the duration of these events.

The drought experienced by the city during the summer of 2012 was a 50- to 100-year reoccurrence interval event for the 7- and 30-day duration events, and a 50-year reoccurrence interval event for the 60-day duration event. With a 50-year planning horizon and the reoccurrence interval of the 2012 event being approximately 50 years, there is a strong probability (64 percent) that the city will experience at least one drought event similar to the 2012 event during the planning horizon.

The city's well field, in its current configuration, will not be able to meet projected demands through the planning horizon of 2060. Therefore, an evaluation was conducted of raw water supply alternatives that would increase the raw water capacity of the city to meet both the short-term and long-term demands. This analysis also considered increasing the reliability of the raw water supply by diversifying the raw water source. Three planning horizons were identified for this evaluation, as defined below.

Short-term horizon

In the short-term horizon, the projected raw water demand could exceed the 60- to 90-day pumping capacity as early as 2018 depending on the magnitude and duration of a drought. The instantaneous and short-term pumping capacity could be exceeded by 2022. These short-term supply alternatives should be able to increase the instantaneous and short-term water supply capacity by 20 million gallons per day and should be able to increase the summer seasonal yield by 10 million gallons per day. Because this short-term supply alternative must be developed in the near future, the alternative must be considered relatively easy to permit and construct.

Short-term supply alternatives evaluated in the Master Plan include:

- *Expansion of existing well field with completion of a fourth HCW*
- *New well field in the High Plains Aquifer*
- *Aquifer storage and recovery as peak shaving*
- *Metropolitan Utilities District (MUD) interconnection*
- *Water reuse*

The recommended option is expansion of the existing well field with the construction of the fourth Horizontal Collector Well (HCW). The project was funded by a Water Sustainability Fund grant last year.

Long-term horizon

The long-term supply alternatives evaluated to meet the demands to 2060 included the Missouri River and the Platte River alluvial aquifers. As stated in the plan, the Platte and the Missouri are the only two viable sources for the development of a large-scale, reliable water supply. The Missouri River was selected as the preferred alternative for the following reasons:

- *A supply located on the Missouri River Basin would diversify the city's water supply sources, thereby increasing reliability*
- *A new well field in the Platte River alluvial aquifer would need to be located sufficiently far enough from the city's existing well field so as not to impact or impair streamflow or groundwater elevations near the city's well field. To accomplish this, the new well field would have to be located at a significant distance which significantly increases the capital cost.*
- *The Missouri River is operated as a navigable channel, and the streamflow is regulated from upstream reservoirs. A well field constructed in the Missouri River alluvium would be less susceptible to low streamflow during the summer months when demands for water are highest.*
- *Permitting for a new Platte River alluvial aquifer well field would require a much larger effort than development of a similar supply on the Missouri River.*

For the purposes of the Master Plan, it was assumed that the long-term alternative would supply a maximum of 60 million gallons per day, which is sufficient to meet the water supply needs of the city through 2060. The development of a 50 to 60-million gallons per day supply along the Missouri River would provide the city with a diversified source of supply that is more resistant to drought and could provide opportunities to develop this supply option as a regional water supply.

Based on the analysis completed in for the 2014 Master Plan, it was recommended that research and data collection for well field site selection be conducted in 2016 and that land acquisition for the well field facility occur in approximately 2018 in order to secure a site for future source development.

The Water Sustainability Grant awarded to the City of Lincoln in 2016 helped the city meet the short-term requirements that were needed to increase the instantaneous and short-term pumping capacity by completing the fourth horizontal collector well and associated pipeline. We thank Nebraska's Natural Resources Commission for helping LWS move forward with the fourth horizontal collector well, however, the city has not completed the research and data collection necessary to identify a well field site along the Missouri River due to funding constraints.

This project to conduct research and gather data to identify a supplemental water supply for the City of Lincoln will directly support all three IMP goals in the following manner. Currently, the Platte River well field is projected to support the short- and mid-term needs of the City of Lincoln. According to the LWS Master Plan, the Platte River

well field will not meet the long-term needs. The future projected demand for the city is an additional 50 to 60 million gallons of water per day above and beyond what can be produced from the Platte River well field. As described in the plan, building a well field along the Missouri River was identified as the only viable option to meet the needs of the community as it continues to grow. This project will ensure that a location to build a supplemental water supply for the City of Lincoln is identified and thoroughly researched so that it can be purchased and protected for future use.

The project will benefit the first LPSNRD goal on water supply management since it is designed to identify an alternative water source for the City of Lincoln to meet both the short- and long-term needs of one of the largest water users in the district. It helps meet the second goal of water use management by identifying a second source of water for the City of Lincoln so the city's increasing demands will not adversely affect current water users in the lower Platte River.

For the P-MRNRD, the same benefits are realized for the water users in the district and across the entire lower Platte River basin. A new source of water within the Missouri River alluvial aquifer will allow for future development within the City of Lincoln while protecting the existing surface and groundwater users along the Platte.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

- **The location, area and amount of recharge;**
- **The location, area and amount that aquifer depletion will be reduced;**
- **The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;**
- **Provide a detailed listing of cross basin benefits, if any.**

Ultimately, the results of this research and data collection project will lead to a significant reduction of aquifer depletion in the Platte River alluvial aquifer by supporting development of a well field in the Missouri River alluvium. This will transfer the current projected long-term water supply needs for the City of Lincoln of 50 to 60 million gallons per day by the year 2060 from the Platte River to the Missouri River alluvial aquifer. Additionally, the results of this research and data collection project will lead to a significant recharge to the Platte River aquifer since the City of Lincoln's wastewater treatment plant will discharge the treated water from the Missouri River into Salt Creek. This will increase aquifer recharge and increase streamflow in the Lower Platte River from the confluence of Salt Creek and the Platte at Ashland downstream to the confluence of the Platte and the Missouri Rivers.

The cross-basin benefits of this transfer of future water demands out of the Platte River system include:

- Benefits to agriculture

- Benefits to municipal and industrial users
- Benefits to recreational users
- Benefits to wildlife habitat
- Benefits to the conservation of water resources
- Preservation of water resources

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

- List the goals the project provides benefits.
- Describe how the project will provide these benefits
- Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The multiple water supply goals this project will contribute to are described separately below:

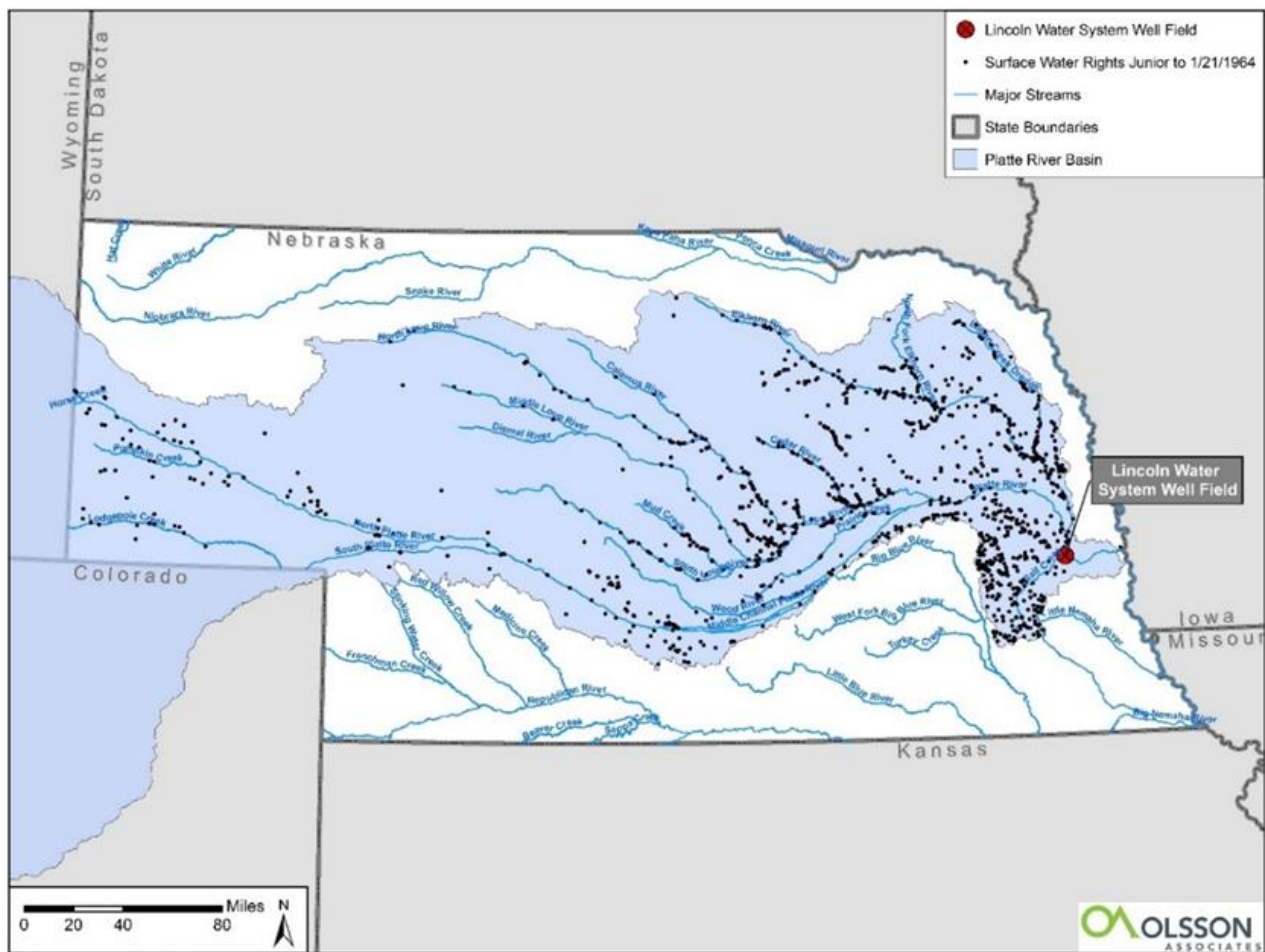


Figure 2 Locations of water rights in the Platte Basin junior to the city's water right.

Agricultural water use

This project will contribute to agricultural water supply goals by allowing the City of Lincoln to extract the future water supply needs from the Missouri River aquifer, instead of the Platte River aquifer. This is very important to agricultural water users because the vast majority of agricultural water users in Nebraska lie within the Platte River Basin upstream from the city and they rely on Platte River streamflow for their irrigation supply. In particular, surface water users that have a junior priority date to the city's induced water supply permit, could be curtailed by a water right call from the city. Figure 2 shows the locations of surface water rights in the Platte River Basin upstream from the city's Platte River wellfield that could potentially be impacted by a water right call by the city. By developing a well field along the Missouri River to meet the future demands of the city, the city's water demands on the Platte River aquifer will be held steady thus reducing the future pressure and potential for water right calls on the Platte River.

Municipal and industrial use

The Lincoln Water System provides the water supply for the municipal and industrial water users in the City of Lincoln. According to the LWS Master Plan (Attachment A) a Missouri River well field needs to be developed to meet the long-term deficit currently projected based on a population growth rate of 1.2%. Recent Census reports indicate that Lincoln's growth rate maybe as high as 1.5% annually, indicating the urgency in conducting the proposed project. Furthermore, droughts on the Platte River are only are predicted to increase. According to Dr. Don Wilhite, University of Nebraska professor emeritus and founder of the National Drought Mitigation Center, "Droughts are expected to become more frequent and severe in Nebraska... there's a fundamental need to help communities improve their water supplies" (Omaha World Herald, July 18, 2016). Conducting research and data collection to identify a supplemental water supply for the City of Lincoln will help alleviate the city's vulnerability to drought along the Platte. A stable water supply is critical for Lincoln to remain a vibrant city with the potential for continued municipal and industrial growth.

Recreational benefits

Recreational use along the lower Platte River has continued to grow with the popularity of tubing, stand-up paddle boarding, and kayaking. For example, in 2013, Platte River Rentals, a new family-owned and operated business opened its doors in Louisville, Nebraska. Platte River Rentals rents canoes, kayaks, tubes, stand-up paddle boards, bikes and provides free shuttle service for its patrons. With the major improvements underway at the Ak-Sar-Ben Aquarium at Schramm Park State Recreation Area, tourism and recreation along the lower Platte River will only continue to grow. By



Figure 3 Tubers on the Platte River (platteriverrentals.com)

building a well field along the Missouri River, future recreational benefits along the lower Platte River will be protected.

Wildlife habitat

According to the Lower Platte River Corridor Alliance, the lower Platte River provides a unique environment not only for the people who live near it, but also for the species that call it home. Most of us have heard of the three endangered species of the lower Platte - the pallid sturgeon, piping plover and interior least tern. There are many more species that are at risk as described on the Corridor Alliance website (www.lowerplatte.org). For example, river otters were once nearly hunted to extinction and since the 1980s the Nebraska Game and Parks Commission has worked to reintroduce river otters to the lower Platte River. Blanding's Turtle lives in marshes, ponds, and streams with sandy substrates such as the Platte River. Blanding's turtle is currently under review by the US Fish and Wildlife service for listing as endangered or threatened. And although the bald eagles have made a comeback and are no longer listed as endangered or threatened by the federal government and the state of Nebraska, their numbers are carefully monitored. In 2014, twelve nests were observed alongside the lower Platte River and seven were active. Through research and data collection and ultimately building a well field along the Missouri River, wildlife habitats along the lower Platte River will be protected from the future water demands as the City of Lincoln continues to grow.



Figure 4 Bald eagle on the Platte (lowerplatte.org)

Conservation and preservation of water resources

Streamflow in the Platte River is one of the most important water resources in the State of Nebraska. After the North Platte River flows past Lake McConaughy and several reservoirs in the Loup River Basin, there is little to no ability to retain these streamflows in the state if they are not used at the time they occur. Many times, it has been said, how can we better conserve and protect this resource? By researching and identifying a supplemental water source along the Missouri River, the water resources of the Platte River will be conserved. The City of Lincoln will not need to extract additional water beyond the current capacity to meet the future demands of its growing population. This is a significant benefit to the citizens of Nebraska that continue to look for ways to conserve and protect this vital resource.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
- Describe the beneficial uses that will be reduced, if any.
- Describe how the project provides a beneficial impact to the state's residents.

As stated in the Nebraska Constitution (Article XV Water), “those using the water for domestic purposes shall have preference over those claiming it for any other purpose”. As stated in Nebraska State Statute 46-613, “Preference in the use of ground water shall be given to those using the water for domestic purposes. They shall have preference over those claiming it for any other purpose. Those using the water for agricultural purposes shall have the preference over those using the same for manufacturing or industrial purposes. As used in this section, (1) domestic use of ground water shall mean all uses of ground water required for human needs as it relates to health, fire control, and sanitation.”

Thus, as defined by the state constitution and state statute, domestic water use is the highest beneficial use of waters of the state. By researching, securing, and ultimately building a well field along the Missouri River, other beneficial uses of water along the lower Platte River will be protected from the future water demands as the City of Lincoln continues to grow. No beneficial uses will be reduced by this project.

By identifying a supplemental water source for the City of Lincoln, the LWS will be able to provide water to meet the projected demand to 2060 that are anticipated to occur as early as 2045. The LWS supplies the entire community including hospitals, fire departments, schools including the main campus of the University of Nebraska, and both state and federal government offices.

6. Is cost-effective;

- **List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.**
- **Compare these costs to other methods of achieving the same benefits.**
- **List the costs of the project.**
- **Describe how it is a cost effective project or alternative.**

The estimated cost for the research and data collection to identify a supplemental water supply site for the City of Lincoln in the Missouri River alluvium is \$637,000 (see Table 2). There are no land and water acquisition costs for this research and data collection project. Land acquisition will be completed upon successful completion of this project. Access to the property for the well field investigation will be accomplished through an access agreement between the City of Lincoln and the current landowner.

Table 2 Opinion of Probable Cost – Long-Term Projects (from 2014 Master Plan)

Description	Current Cost Basis	Future Cost Basis (3 percent inflation)*	Future Cost Basis (5 percent inflation)**
Collector Well Investigation for Missouri River	\$550,000	\$601,000	\$637,000
Missouri River Project Property Purchase	\$2,410,000	\$2,800,000	\$3,100,000

* Inflated to projected year dollars at 3 percent inflation rate through 2017

** Inflated to projected year dollars at 5 percent inflation rate for years beyond 2017

The cost to conduct the research and data collection is based on the engineering cost estimate in the 2014 Master Plan. In the plan, the 2014 costs were projected out to 2017 using a standard inflation rate. To ensure that the cost estimate was still valid, two estimates were provided by local drilling companies. The drilling estimates confirmed the Master Plan estimates.

The long-term water supply alternatives evaluated to meet the demands to 2060 included the Missouri River and the Platte River alluvial aquifers. As stated in the 2014 Master Plan, the Platte and the Missouri are the only two viable sources for the development of a large-scale, reliable water supply. There are no other sources of water available to meet the demand. The Missouri River was selected as the preferred alternative for the following reasons:

- A supply located on the Missouri River Basin would diversify the city's water supply sources, thereby increasing reliability
- A new well field in the Platte River alluvial aquifer would need to be located sufficiently far enough from the city's existing well field so as not to impact or impair streamflow or groundwater elevations near the city's well field. To accomplish this, the new well field would have to be located at a significant distance which significantly increases the capital cost.
- The Missouri River is operated as a navigable channel, and the streamflow is regulated from upstream reservoirs. A well field constructed in the Missouri River alluvium would be less susceptible to low streamflow during the summer months when demands for water are highest.
- Permitting for a new Platte River alluvial aquifer well field would require a much larger effort than development of a similar supply on the Missouri River.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- **Identify the interstate compact, decree, state contract or agreement or federal law.**
- **Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.**
- **Describe current deficiencies and document how the project will reduce deficiencies.**

For the Lower Platte Basin, currently there are no interstate compacts or decrees, or other formal state contracts or agreements in the Lower Platte River Basin that could be affected by reduced streamflows. There are, however, state and federally endangered and threatened species in the Lower Platte River Basin including the Pallid Sturgeon, Least Tern, and Piping Plover. The requirements of the Nebraska Nongame and Endangered Species Conservation Act (NNECSA) and the federal Endangered Species Act (ESA) prevent actions that could cause harmful stream flow reductions. According to the 2017 Annual Report, there currently is sufficient water supply in the basin to comply with NNECSA and the ESA, but this will likely change as the demand for water in the Lower Platte Basin increases over time. By completing the research and data

collection to identify a supplemental water supply for the City of Lincoln within the Missouri River alluvium, the projected reduction in stream flow to meet the needs of the growing city will be transferred out of the Platte River Basin. This is a significant reduction in pressure on the Lower Platte.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- Identify the property that the project is intended to reduce threats to.
- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

The benefits to public security, public health and safety are difficult to quantify, but their impacts are enormous. Potential project benefits to public security, public health and safety include looking at the public systems that are in jeopardy should the only source of drinking water for the City of Lincoln be incapacitated for a period of time. The main offices for both State and Federal government agencies are operated out of Lincoln. As the second largest community in Nebraska and as the state's capital, the LWS provides water to the entire community including hospitals, schools including the main campus of the University of Nebraska, and both state and federal government offices. Continued operation of the state and federal offices in Lincoln benefits the citizens of the state by providing security through operations of the local police force, state sheriffs, and National Guard. Public health and safety is provided through fire departments and hospitals with critical care facilities that serve the majority of the state and region. A fundamental purpose of a large public water supply such as Lincoln's is to provide fire suppression. Lincoln currently has a favorable fire protection rating from the Insurance Services Office (ISO) which specifically looks at adequate and reliable supply to the community. Any potential issues with supply can affect the ISO rating and cause significant insurance cost increases. Additionally, Lincoln serves as hub for transcontinental rail and fiber networks, serving the entire country. The rail and fiber networks are critical infrastructure that would be in jeopardy of suspended service if an adequate water supply was not provided by the LWS. Interruption of service could potentially have a debilitating effect on the public security of the region and country, and on the public health and safety of Lincoln's citizens. This project is a direct benefit for the public security, public health and safety by providing the information needed to protect for future development, a supplemental water supply for the City of Lincoln.

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits,

what is the usage of the water: residential, industrial, agriculture or recreational.

- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

As written in the 2016 Groundwater Management Plan Review (LPSNRD, 2017 – Attachment H), one of the primary areas of responsibility delegated to NRDs is the management and conservation of groundwater, both in terms of its quality and quantity. In Nebraska, some 85% of the state’s population relies on groundwater as the primary source of drinking water. Many of the state’s rivers, streams, and wetlands are fed by groundwater discharge, and the aquatic and terrestrial plants and animals associated with them depend on groundwater of adequate quality and quantity. Groundwater for irrigation is also fundamental to the state’s agricultural economy, and a wide variety of industries depend on its availability and quality. Clearly, groundwater is one of Nebraska’s most precious resources, and the LPSNRD is committed to implementing programs that protect it.

In the 2016 Groundwater Management Review, nitrates-nitrogen results were the first contaminants cited because of the persistent problem of elevated nitrates in Nebraska’s groundwater. As shown in Figure 5, the 2016 results for the LPSNRD indicate areas primarily along Salt Creek and to a lesser extent within the Dwight-Valparaiso and Crete-Princeton-Adams areas with elevated nitrates in the groundwater. Sampling results within the Missouri River Valley aquifer indicate that nitrates are below 5 parts per million, which is another reason why the City of Lincoln is interested in identifying a new well field in the area.

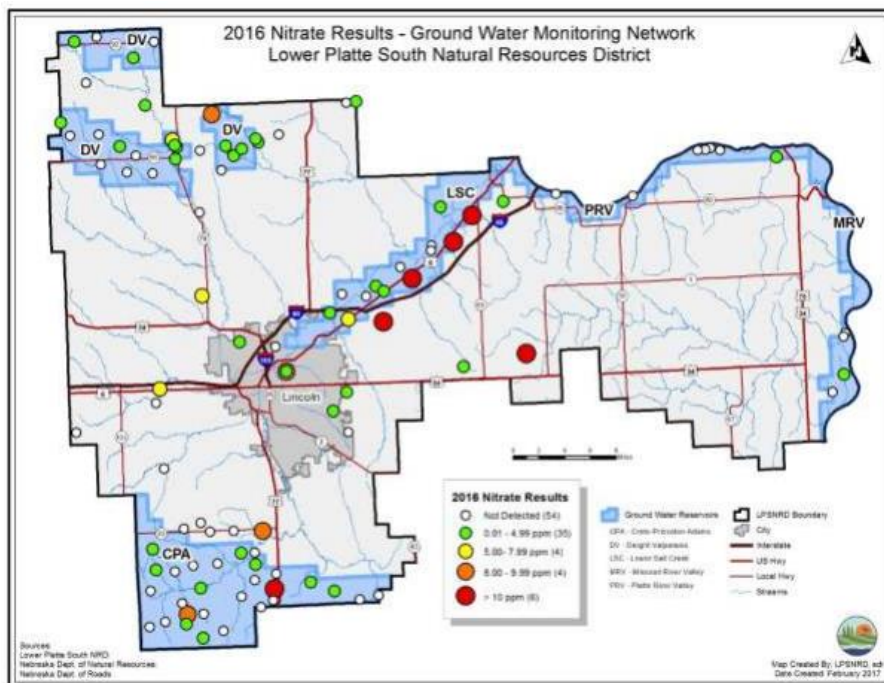


Figure 5 Results of the 2016 groundwater monitoring for nitrate-nitrogen in the LPSNRD (LPSNRD, 2017)

The intent of this project is to identify a suitable location for an alternate water source for the City of Lincoln. With the research and data gathered through this project, the city will then negotiate purchase of the property and set up a well head protection area (WHPA) for the proposed new well field. Working with the Nebraska Department of Environmental Quality (NDEQ), a well head protection plan will be designated in order to prevent contamination of the groundwater supply. The target area will be defined as the area that encompasses the fifty-year travel time that replenishes the proposed new well field. The population that will be served with the protected water supply will be the projected 450,000 residents of the City of Lincoln in 2060 that will use the water for residential and industrial beneficial uses.

Other possible solutions to remedy groundwater contamination once it is present is through treatment. Treatment plants used to treat groundwater contaminated with nitrates require an extremely expensive reverse osmosis system. It is for this reason that the City of Lincoln, working with the LPSNRD and the NDEQ will work to protect the quality of groundwater before nitrates become a problem. A WHPA will be delineated and the area will further be protected through the LPSNRD's Community Water System Protection Area (CWSPA) designation. The LPSNRD has an excellent record of managing its groundwater for the protection from nitrate contamination. As written in the 2016 Groundwater Management Review, for groundwater quality, if levels of a contaminant exceed 50 percent of the federal maximum contaminant level (MCL) for that contaminant in 50 percent of the District's groundwater monitoring network wells for two consecutive years, the NRD can designate a Phase II groundwater management area, and adopt rules and regulations for management of that contaminant. If contaminant levels exceed 80% of the MCL in 80 percent of the NRD's network wells, again for two consecutive years, the NRD can designate a Phase III groundwater management area, and adopt additional, more stringent rules and regulations for dealing with the situation.

Currently, the Lower Salt Creek groundwater reservoir and the Valparaiso, Otoe County RWD #3/Weeping Water, Davey, Hickman, Pleasant Dale, and Union CWSPAs are in Phase II management, and the Elmwood CWSPA is in Phase III management for groundwater concerns due to elevated nitrate levels. By funding this research and data collection project, the new well field area will be protected from nitrate and other groundwater contaminants through the WHPA and CWSPA programs before contamination becomes an issue because what is said for your health also holds true for groundwater, "an ounce of prevention is worth a pound of cure."

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- **Identify the local jurisdiction that supports the project.**
- **List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.**
- **List other funding sources for the project.**

The local jurisdiction that supports this project is the LWS within the Public Works and Utilities department of the City of Lincoln.

The property tax levy in the City of Lincoln is not relevant to this application since the source of local matching funds for this project is generated from the residents of Lincoln's utility bills. With that said, the City of Lincoln's property tax levy currently is 33.366 per \$100 in valuation and the 2016 preliminary valuation is \$ 18,870,825,564. The County Assessor will finalize valuation totals within a few weeks after property tax protests have concluded. LWS is not in the position to increase the property tax levy, and it is possible that the City Council will not use all this year's increase in property valuations due to concerns that this places a burden upon taxpayers. Instead, LWS relies on usage revenues to fund projects.

The City of Lincoln uses both an inclining block rate and water shortage rate structure to secure local sources of funding for the project while at the same time encouraging water conservation. The LWS designed and implemented the inclined block rate structure to reflect the increasing capital and O&M costs incurred to deliver adequate water supplies for outdoor water use such as turf irrigation that is over and above base use associated with health, sanitation, and safety. For many years the City of Lincoln has used the multidimensional tiered rate structure that increases the individual's cost of water with the amount of water used to promote water conservation. Water shortage or drought rates are yet another step in reducing unnecessary water usage that the City of Lincoln has successfully implemented. The rate structures and other conservation measures implemented by the city have worked well as demonstrated by the 25% reduction in per capita water use since the 1980s.

The Drinking Water State Revolving Fund (DWSRF) was created to provide low cost financing for construction of publicly or privately owned public water systems. The DWSRF is created from a series of Environmental Protection Agency (EPA) capitalization grants, a required 20% state match from State general fund appropriations, the program's Administration Cash Fund, and Nebraska Investment Finance Authority (NIFA) public offered bond issues. In the last 6 years, the City of Lincoln has utilized \$14.9 million of DWSRF monies.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- **List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.**
- **Provide the history of work completed to achieve the goals of these plans.**
- **List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.**
- **Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.**

- List all stakeholders involved in project.
- Identify who benefits from this project.

The City of Lincoln has incorporated extensive water conservation measures into city ordinances and has demonstrated significant conservation efforts in past years. As written into the City of Lincoln Water Management Plan (Attachment I):

“It is the policy of the City of Lincoln to promote water conservation. The water supply to the City of Lincoln is a limited resource, and everyone shares in the responsibility for appropriately using and preserving this resource. All customers of the Lincoln Water System are therefore encouraged to voluntarily reduce water usage by daily practicing water conservation, regardless of whether voluntary or mandatory water restrictions are implemented or certain water shortage rates are applied. There are many simple, cost-effective ways to lower water use and reduce strain on water resources and infrastructure without compromising Lincoln’s quality of life. Customers of the Lincoln Water System are encouraged to follow at all times the water conservation measures found at lincoln.ne.gov, keyword: water conservation.”

Lincoln’s water conservation efforts date back many years and has been a fundamental part of effectively managing water supply. Efforts include:

1. A Water Conservation Task Force to advise policy and promote water conservation efforts.
2. Use of an inclining block rate fee structure where the price per unit of water is increased with high water use beyond normal health, sanitation, and safety.
3. Development of a Water Management Plan that has specific actions to taken during period of water shortages including voluntary and mandatory restrictions. The plan includes all the necessary ordinances required to implement enforcement of mandatory restrictions.
4. The use of incremental water shortage rates during both voluntary and mandatory restrictions to provide a financial incentive to customers for reduced water use.
5. Ordinance requiring all new irrigation systems to have a rain sensor installed.

The Mayor's Water Conservation Task Force, formed in the late summer of 1988, was created to develop positive approaches to water conservation. They determined voluntary cooperation was the best approach to accomplish conservation practices.

The goals of the task force were to maintain a public awareness program to keep peak day water use within the water system's ability to deliver; encourage participation and support for water conservation practices from business, industry and the community; and to identify and promote the adoption of water conserving plant materials and landscape practices.

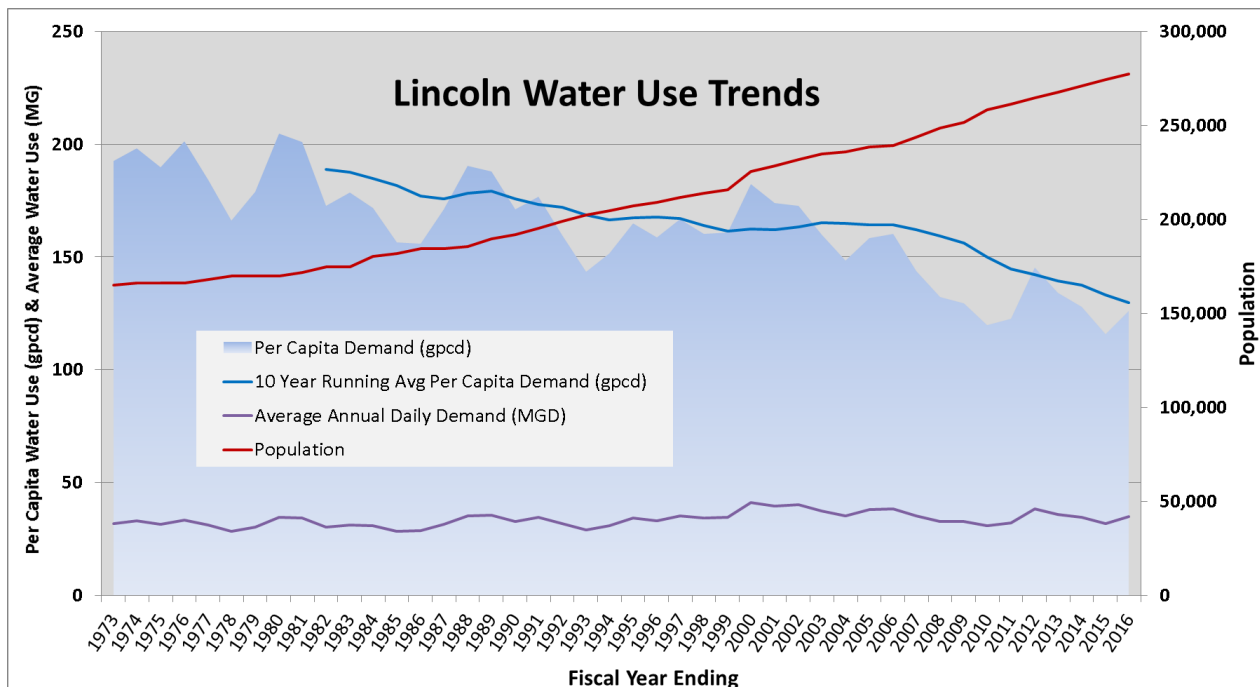
The Task Force's purpose was:

- Inform and educate the citizens of Lincoln about the importance of conserving our water resources.
- Increase the acceptance of water conservation measures to reduce outdoor water consumption.
- Improve domestic in-home water conservation.
- Improve water conservation and use efficiency of industrial, commercial and business water users.
- Inform customers regarding water quality issues.

Lincoln's history of sustainable water use is best illustrated by Figure 6. This figure illustrates the per capita water use and population over time. As shown in the graph, Lincoln's population has nearly doubled since the early 70s. Conversely, the per capita water use has decreased by 25% since the early 80s. The result is that the average daily demand has stayed the same.

In July 2017, the Mayor of Lincoln announced an Environmental Action Plan whereby water conservation and future water supply planning will be a priority (see Attachment J). Pending City Council approval, this plan will be used to continue promoting the value of a reliable and safe water supply for Lincoln far into the future. Having public discussion and education on the importance of water resources and water supply will be invaluable as Lincoln begins to plan and fund a second water source. Again, this project represents the all important first step in developing this new supply.

Figure 6 Decline in water use per capita in the City of Lincoln



This is a remarkable record of water conservation that should be a model for many communities across the nation. There is always more that can be done and the City of Lincoln continues to implement water conservation policies that encourage the wise use of water. The citizens that benefit from these practices include over a quarter of million people that live within the City of Lincoln are receive water from the LWS. Additionally, the benefits of the project include the upstream water users that draw their water from the Lower Platte River watershed. The project will provide a direct benefit to the citizens of Lincoln and upgradient water users by conducting research and collecting data to identify the location for a supplemental water supply that is not in the Lower Platte Basin watershed. Upgradient users will, therefore, have the opportunity to use their water rights and maintain their agricultural operations for longer periods of time when it is most critical, during drought.

12. Addresses a statewide problem or issue;

- **List the issues or problems addressed by the project and why they should be considered statewide.**
- **Describe how the project will address each issue and/or problem.**
- **Describe the total number of people and/or total number of acres that would receive benefits.**
- **Identify the benefit, to the state, this project would provide.**

The issue addressed by the project is the balance of water supplies and water uses within the Platte River Basin, by far the largest river basin in Nebraska covering nearly 50% of the total land area of the state (or more than 24,700,000 acres). With anticipated conflicts between the largely agricultural water users upstream of Lincoln with the future water supply needs of the City of Lincoln, this project will provide the research and data needed to identify an additional water source for the city, enhance the reliability of the city's water supply without reducing the water available for agricultural use in the state.

In particular, surface water users that have junior priority dates to the city's induced groundwater recharge permit, could be curtailed by a water right call from the city. Figure 2 shows the locations of surface water rights in the Platte River Basin upstream from the city's wellfield that could potentially be impacted by a water right call by the city.

Furthermore, as Lincoln is the state's capital, a majority of state government functions are located in Lincoln; the continued viability of the City of Lincoln's water supply is clearly a statewide issue. Development of a 60-mgd supply along the Missouri River would provide the City with a diversified source of supply that is more resistant to drought and could provide opportunities to develop this supply option as a regional water supply.

13. Contributes to the state’s ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- **List other funding sources or other partners, and the amount each will contribute, in a funding matrix.**
- **Describe how each source of funding is made available if the project is funded.**
- **Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.**
- **Describe how you will proceed if other funding sources do not come through.**

The local jurisdiction that supports this project is the LWS within the Public Works and Utilities department of the City of Lincoln. There are no other funding sources or financial partners. The source of local matching funds for this project is generated from the residents of Lincoln’s utility bills. The City of Lincoln uses both an inclining block rate and water shortage rate structure to secure local sources of funding for the project while at the same time encouraging water conservation. The LWS designed and implemented the inclined block rate structure to reflect the increasing capital and O&M costs incurred to deliver adequate water supplies for outdoor water use such as turf irrigation that is over and above base use associated with health, sanitation, and safety. For many years, the City of Lincoln has used the multidimensional tiered rate structure that increases the individual’s cost of water with the amount of water used to promote water conservation. Water shortage or drought rates are yet another step in reducing unnecessary water usage that the City of Lincoln has successfully implemented. The rate structures and other conservation measures implemented by the city have worked well as demonstrated by the 25% reduction in per capita water use since the 1980s.

Since there are no other sources of funding the last two bullet points for this question are not applicable.

14. Contributes to watershed health and function;

- **Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.**

Currently the Lincoln well field in Ashland is near the downstream terminus of the Platte River system, which drains over 85,000 square miles in Nebraska, Wyoming, and Colorado (Figure 7). Further development of the Platte River alluvial aquifer to provide the additional 50 to 60 million gallons of water per day for the citizens of Lincoln could significantly impact watershed health and function upstream.



Figure 7 A map of the entire Platte River Basin

the preparation of the Annual Evaluation of Availability of Hydrologically Connected Water Supplies Report required by state law. As illustrated in Figure 8, from the NDNR website interactive Integrated Network of Scientific Information & GeoHydrologic Tools or INSIGHT (<http://nednr.nebraska.gov/INSIGHT>), the average total surface and groundwater demand in the seven major basins of Nebraska continues to increase with the highest demand on the Lower Platte basin.

By developing a new well field in the Missouri River alluvial aquifer, the demand on the Lower Platte basin is diminished by 50 to 60 million gallons per day, which, in turn, significantly affects the health and function of the Loup and Elkhorn basins that feed the Lower Platte. By protecting the Lower Platte basin from the additional water development needed to supply the growing demand of the City of Lincoln, flows within the Lower Platte will be maintained, leading to habitat preservation for the species that depend on flow in the Lower Platte. It will also protect the function of the watershed, not only for the threatened and endangered species, but also for the recreational users of the system. And finally, function of the system is maintained for agricultural development in areas where additional water development is available because where unappropriated water remains within the system, the NDNR will be able to grant additional surface water rights and the NRDs will be able to allow additional groundwater development.

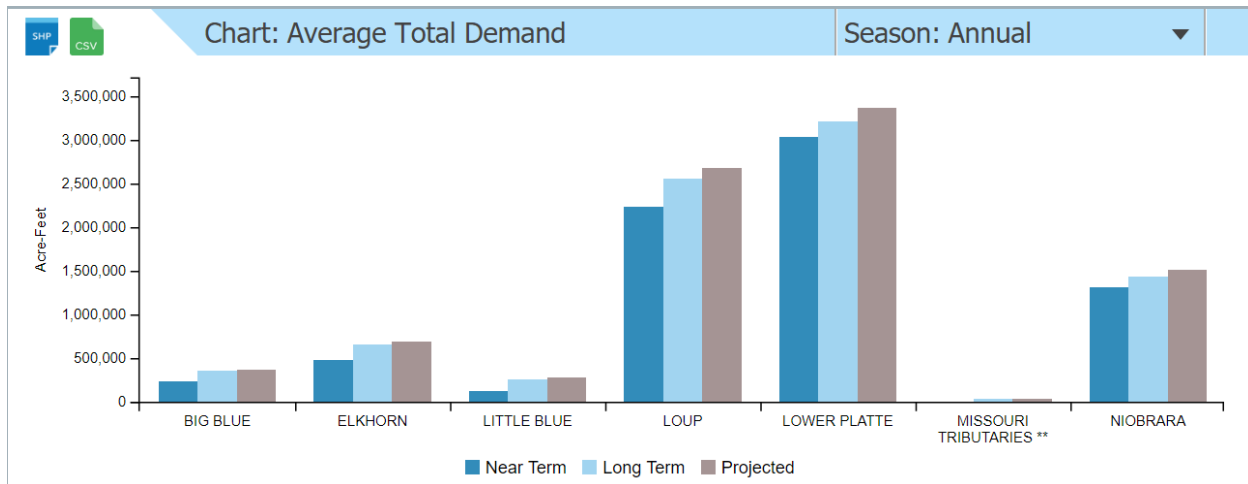


Figure 8 Average total surface and groundwater demand for the seven primary basins in Nebraska (NDNR, 2017)

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

The most recent annual report of work for the state water planning and review process was issued by the Nebraska Department of Natural Resources on December 30, 2016 (2017 Annual Evaluation of Availability of Hydrologically Connected Water Supplies). The purpose of the Annual Report is to evaluate the expected long-term availability of hydrologically connected water supplies. As required by statute, the report describes the nature and extent of present water uses in the basins, shows the geographic areas considered to have hydrologically connected surface water and groundwater supplies, and predicts how the Department’s preliminary conclusions might change if no new legal restrictions are placed on water development in the basins.

For the Lower Platte Basin, currently there are no interstate compacts or decrees, or other formal state contracts or agreements in the Lower Platte River Basin that could be affected by reduced streamflows. There are, however, state and federally endangered and threatened species in the Lower Platte River Basin. The requirements of the Nebraska Nongame and Endangered Species Conservation Act (NNESCA) and the federal Endangered Species Act (ESA) prevent actions that could cause harmful stream flow reductions. According to the 2017 Annual Report, there currently is sufficient water supply in the basin to comply with NNESCA and the ESA, but the demand for water in the Lower Platte Basin will likely increase over time. By completing the research and data collection to identify a supplemental water supply for the City of Lincoln within the Missouri River alluvium, the projected reduction in stream flow to meet the needs of the growing city will be transferred out of the Platte River Basin. This is a significant reduction in pressure on the Lower Platte.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- **Describe the federal mandate.**
- **Provide documentary evidence of the federal mandate.**
- **Describe how the project meets the requirements of the federal mandate.**
- **Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.**

The research for a supplemental water supply for the City of Lincoln project helps the state meet the obligations of Federal Law 93-523, otherwise known as the Safe Drinking Water Act (SDWA) United States Code 42 § 300f. As a public water system, the LWS must comply with the SDWA. The LWS currently relies on the Platte River alluvial aquifer to supply clean water to the community. This project provides the necessary research and data needed to identify a supplemental source of drinking water to efficiently and reliably provide the future supply of safe drinking water needed for the citizens of Lincoln in compliance with the SDWA.

This project is a perfect example of how the funds from the Water Sustainability Fund furthers the goals of water sustainability in the state of Nebraska. If this project is not completed, the City of Lincoln will be in jeopardy of non-compliance with the SDWA requirement to provide clean drinking water to the community. The Platte River well field cannot provide the additional demand that LWS will be required to provide as the city grows to the projected population of over 450,000 in 2060. As stated in the LWS Water Management Plan, water is a finite resource and must be managed accordingly. By identifying and protecting a supplemental water supply along the Missouri River, the City of Lincoln will be able to meet the demand of the growing city without impacting the junior water rights along the Platte River.

Section D.

PROJECT DESCRIPTION

1. Overview

In 1,000 characters or less, provide a brief description of your project including the nature and purpose of the project and objectives of the project.

The City of Lincoln relies on one source of drinking water, the alluvial aquifer along the Platte River at Ashland, Nebraska. As the city continues to grow, the Platte River well field will not be sufficient to meet the needs of the community. As described in the Lincoln Water System Master Plan, even with continued conservation, in as soon as 2045, the city will need an additional 50-60 million gallons per day of production capacity. Equally important is risk mitigation that a second source affords. The Omaha’s Metropolitan Utilities District recognized the value of having two sources and a second was established within the Platte River alluvium years ago. According to the Master Plan, the most cost-effective alternative source of water, sufficient to supply the needs of the city as it continues to grow, is the Missouri River aquifer. This project is designed to conduct research and collect data that will be used to verify the best location for a Missouri well field. Diversification of water sources will greatly improve the reliability of the water system during prolonged drought events and will ensure that the city can reliably meet projected water demands.

2. Project Tasks and Timeline

Identify what activities will be conducted by the project. For multiyear projects please list what activities are to be completed each year.

The project tasks and schedule are provided in Table 5.

Table 5 Project Tasks and Timeline

FY 17-18	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Missouri River Wellfield Research Project															
Phase I – Test Hole Drilling															
Phase II – Observation Well Installation															
Phase III – Test Well Installation and Testing															
Phase IV – Well Abandonment															
Phase V - Oversight, Analysis and Reporting															

3. Partnerships

Identify the roles and responsibilities of agencies and groups involved in the proposed project regardless of whether each is an additional funding source. List any other sources of funding that have been approached for project support and that have officially turned you down. Attach the rejection letter.

No other sources of funding have been applied for at this time, and therefore, none have been turned down.

4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

The entire cost of the project is \$637,000. As documented in the Mayor's Letter of Support (Attachment B) for this application, the City of Lincoln is committed to funding 40% of this project.

5. Support/Opposition

Discuss both support and opposition to the project, including the group or interest each represents.

Letters of Support from the Lower Platte South Natural Resources District and the Papio-Missouri River Natural Resources District are included in Attachments F and G. The project has been endorsed by both the LPSNRD and the P-MRNRD because the project helps meet the goals and objectives of their Integrated Management Plans. Additionally, a letter of support for the project from the Mayor of Lincoln, Mr. Chris Beutler, is included in Attachment B.