NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Instream Weir Stabilization/Recharge Pilot Project

PRIMARY CONTACT INFORMATION

Entity Name: Little Blue Natural Resources District

Contact Name: Mike Onnen

Address: 100 East 6th St, Davenport, NE 68335

Phone: 402-364-2145

Email: monnen@littlebluenrd.org

Partners / Co-sponsors, if any:

1. Dollar amounts requested: (Grant, Loan, or Combination)

   Grant amount requested. $ 100,979

   Loan amount requested. $ N/A

   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: No permits are anticipated for the project. During the final design, it will be confirmed with regulatory entities that no permits are needed.	N/A☑	Obtained: YES☐ NO☐

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

6. Complete the following if your project has or will commence prior to next July 1st.

As of the date of submittal of this application, what is the Total Net Local Share of Expenses incurred for which you are asking cost share assistance from this fund?

At the time of submittal, the District has incurred total local costs of $10,000 for the Feasibility Study of the project, which are considered part of the total eligible project costs for the Water Sustainability Fund.

Attach all substantiating documentation such as invoices, cancelled checks etc. along with an itemized statement for these expenses.

Estimate the Total Net Local Share of Expenses and a description of each you will incur between the date of submittal of this application and next July 1st for which you are asking cost share assistance from this fund.

The Total Net Local Share of expenses that are anticipated to be spent between application submittal and July 1, 2017 is $27,000. These costs will be utilized for site surveys, engineering, and the development of plans, specifications and bid documents and land rights so the project can move forward as soon as approved. The table below breaks out both the eligible and ineligible costs by timeframes relevant to the WSF.

Timeframe/Activity		Total Cost	NRD	WSF
May-July 2016				
	Feasibility Study	$ 10,000	$ 4,000	$ 6,000
December 2016-June 2017				
	Engineering Design	$ 25,000	$ 10,000	$ 15,000
	Legal	$ 2,000	$ 800	$ 1,200
July 2017-December 2018				
	Engineering Inspection	$ 10,000	$ 4,000	$ 6,000
	Construction	$ 80,098	$ 32,039	$ 48,059
	Land Rights	$ 7,000	$ 2,800	$ 4,200
	Monitoring, Assessment, & Outreach	$ 11,400	$ 4,560	$ 6,840
	Operation & Maintenance	$ 2,540	$ 2,540	$ -
2019				
	Monitoring, Assessment, & Outreach	$ 11,400	$ 4,560	$ 6,840
	Operation & Maintenance	$ 1,270	$ 1,270	$ -
2020				
	Monitoring, Assessment, & Outreach	$ 11,400	$ 4,560	$ 6,840
	Operation & Maintenance	$ 1,270	$ 1,270	$ -
2021-2066				
	Operation & Maintenance	$ 58,420	$ 58,420	$ -
Reimbursable Project Cost		$ 168,298	$ 67,319	$ 100,979
Non-Reimbursable Project Cost		$ 63,500	$ 63,500	$ -
Project Cost		$ 231,798	$ 130,819	$ 100,979

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);

The project would be implemented using a phased approach. Once funding is secured, the next phase of the project would include the engineering design. The conceptual layout is provided in Appendix A (Feasibility Study), and the engineering design will provide the detailed information necessary to construct the project. Further engineering analysis is needed to determine the exact locations on the project property for the structure, which requires detailed stream profiles, channel profiles, and determination of maximum allowable height. The more detailed data will allow for a more complete hydraulic analysis to determine the footprint, area, and storage volume of retained pools.

The following phases are necessary for successful project implementation:

- Engineering design
  - Detailed survey data
  - Hydraulic modeling
  - Engineering plans and specifications
- Construction
- Installation of monitoring equipment
- Annual monitoring
- Operation and maintenance

Please see Appendix A (Feasibility Study) for additional details regarding project development and implementation.

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

The Feasibility Study (Appendix A) was developed based on information from both desktop assessment and field investigations. The desktop assessment included:

- Analysis of aerial photographs
- Use of LiDAR to estimate grades, channel heights, impoundment areas, and volumes
- Use of information collected and compiled in the Little Blue Basin Water

Management Plan
- Analysis of hydrogeologic information from the Little Blue NRD Hydrogeologic Study
- Evaluation of streamgage data from DNR (adjusted to project site)
- Evaluation of groundwater level data from the University of Nebraska-Lincoln, Conservation and Survey Division

The field investigation was conducted to aid in site location, conceptual design, and the economic analysis. The field investigation included:

- Visual inspection of the proposed site
- Channel measurements at each proposed instream structure location
- Shallow soil probe sampling
- Screening for potential wetland areas to be avoided during construction activities
- Photographs to document site conditions

The field investigation confirmed the desktop assessment regarding, topography, soil types, and streambed downcutting. Channel measurement provided data to supplement the LiDAR information. Please See Appendix A, Section 2 (Feasibility Study) for a more thorough explanation of the results of the field investigation.

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

Both the Little Blue NRD Hydrogeologic Study and the Little Blue River Basin Water Management Plan provide detailed maps regarding the hydrogeology, land-use, irrigation development, surface water supplies, groundwater supplies, stream water quality, and other technical information. Figures, maps, and tables that are directly related to the project area are included in the Feasibility Study. Please See Appendix A, (Feasibility Report) for the complete list of maps, drawings, and other supporting information.

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

Construction and access easements will be necessary for this project. The current landowner has expressed interest in the project and the Little Blue Natural Resources District (LBNRD) has had multiple communications with the landowner to communicate goals and objectives of the project and confirm support from the landowner. Once project funding is secured, the LBNRD will negotiate an easement with the landowner for construction and access for operation and maintenance. Landowner response expressing their interest in having the project on their property are included in Appendix A (Feasibility Study).

The cumulative storage impoundment capacity of the four structures is less than 15 acre-

feet. Structures under 15 acre-feet do not require a storage permit from NDNR.

Water supply data used to determine water supplies included High Plains Regional Climate Center precipitation data, Conservation and Survey Division groundwater levels, and Department of Natural Resources stream gage data. These entities do not have data or measurement points at the proposed project location, but these were correlated to the project site to estimate water supplies. Other sources of water quantity and quality information were obtained from the Little Blue River Basin Water Management Plan. The planning document contained a detailed water budget that outlined the water supplies, water uses, and water deficits. See Appendix A, Section 2 (Feasibility Study) for further details regarding the proposed property, and relevant water supply information.

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

Required geologic investigation (004.01 E 1);

The Little Blue NRD Hydro-Geologic Study and the Little Blue River Basin Water Management Plan contained a significant geologic investigation of the Little Blue River Basin. Both documents are on the LBNRD website (www.littlebluenrd.org). These geologic investigations included mapping the aerial extent of the aquifer, using well logs to determine aquifer properties, determine the aquifer risk to contamination, and determining areas optimal for recharge projects. See Appendix A for relevant geologic and hydrogeologic figures from the hydrogeologic investigation and the basin plan.

Required hydrologic data (004.01 E 2);

The Little Blue River Basin Water Management Plain contains hydrologic analyses that detail the water supplies and water demands for the basin. Groundwater irrigation is the largest segment of water use, constituting over 98% of groundwater consumption in the basin. Significant level of groundwater development has caused depletions to streamflow and reduced groundwater levels. The basin plan estimates that at least 35,000 AF per year of additional induced recharge is necessary to stabilize groundwater levels. See Appendix A (Feasibility Study) for the additional hydrologic information.

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

The project will be designed to retain water for recharge, provide grade stabilization, and capture sediment without compromising the integrity of the stream either up or downstream of the structures. The design will also allow water to flow over the top of the structure and continue downstream. The structures will be designed so the volume of water retained will be below the minimum threshold that would require a DNR water storage permit. The design will avoid creating excessive flooding on surrounding properties. The design will seek to maximize benefits while performing within the given constraints. Designs that feature multiple, simple structures spread within the available

stream present advantages over designs focusing on a few larger, more complex structures. The structures will be small and simple, avoiding the needed for complex foundation, soil mechanics, or structural design criteria. The project site is dominated by Valentine-Thurman soils, specifically Inavale loamy fine sand and Valentine loamy fine sand. These soils have permeability rates of 6-20 inches per hour, with low water holding capacities. These soils provide optimum sites for groundwater recharge. Please see Appendix A (Feasibility Study) for a full description of design criteria.

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); Click here to enter text.

A description of field or research investigations utilized to substantiate the project conception (004.02 B); Click here to enter text.

A description of the necessary water and/or land rights, if applicable (004.02 C); Click here to enter text.

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). Click here to enter text.

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

The next best alternative to the concept of using small structures for recharge and grade stabilization is construction of a single, large reservoir. A large reservoir within the Little Blue River Basin is less cost-effective, has significant permitting issues, and does not have basin-wide benefits. A single reservoir would require an Individual Permit for wetlands from the U.S. Corps of Engineers, which would add several hundred thousand dollars to the project for planning, construction, monitoring, and wetland mitigation. Land acquisition for a large reservoir is also a major cost item, and is minimal for the small structures proposed for this project. Public acceptance of a large reservoir is also a significant challenge. The LBNRD recently conducted a Feasibility Study for a reservoir near Davenport, but the project was postponed indefinitely due to strong public opposition.

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). See below.
- 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). See below.
- 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). See below.
- 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). See below.

Relevant Cost Information

A summary of the relevant costs for project design and construction are presented in the following tables.

Item	Total
Engineering and Legal	$ 47,000
Land Rights	$ 7,000
Capital Construction	$ 80,098
Monitoring, Assessment, and Outreach	$ 34,200
Total	$ 168,298

A summary of annual costs for project Operation, Maintenance, and Replacement (OM&R) are presented in the following table.

Item	Quantity	Unit	Unit Price	Total
Annual Operation (Staff Time)	50	EA	$ 600	$ 30,000
Sediment Removal and Minor Repairs (Once Every 5 Years)	10	EA	$ 2,600	$ 26,000
Major Repair (Once During Project Lifetime)	1	EA	$ 7,500	$ 7,500
			Total	$ 63,500
			Average Annual Cost	$ 1,270

Please see Appendix A (Feasibility Study) for complete details regarding relevant cost

information.

Primary Tangible Benefits

A summary of the primary tangible benefits are include steam stabilization, groundwater recharge, and sediment and erosion control. A summary of the annual monetary benefit of the project is presented in the following table.

Primary Tangible Benefit	Annual Monetary Benefit	50-Year Benefit
Stream Stabilization	$ 3,960	$ 198,000
Groundwater Recharge	$ 4,400	$ 220,000
Sediment & Erosion Control	$ 750	$ 37,500
Total	$ 9,110	$ 455,500

A detailed discussion of the quantified benefits and computation methods is included in Appendix A (Feasibility Study).

Intangible Benefits

The project provides many intangible benefits that increase water sustainability directly at the site and, as a pilot project, a broader benefit to other NRDs across the State of Nebraska. These benefits cannot be readily defined in monetary terms, but collectively promote healthy watersheds and the improved quality of life for Nebraska citizens. Several of the intangible benefits are described below.

- The project will serve as a demonstration project of the effectiveness of using many small instream weirs for stabilization and recharge instead of trying to construction a single large structure. The project will be used as a demonstration site by the LBNRD to educate the general public within the basin and help recruit other landowners for installing similar projects on their properties.
- The project includes additional monitoring and assessment for a three year period to collected hard data on the performance of the project. The data will be used to ground truth several of the key assumptions regarding the project, particularly the frequency of events that fill the storage areas, and operation and maintenance requirements. The monitoring information collected will be used to help refine the design concept for future sites.
- The need for innovative approaches to water sustainability across Nebraska is great. This need was one of the driving forces behind the development of the Water Sustainability Fund. The information collected during the monitoring will not only be used the LBNRD, but will be made available to all the NRDs through outreach, providing benefit across the State of Nebraska. Several opportunities for distributing information regarding the effectiveness of the project include the preparation and distribution of a Case Study Report for the project to each of the NRD Managers. The information would also be disseminated through technical presentations at NARD conferences. The Case Study Report can also be posted on the LBNRD website.
- The project will provide increased diversity in habitat throughout the stream reach. The improved habitat will provide opportunities for wildlife viewing, hunting, and environmental appreciation for future generations.

Annual Cash Flow

The costs and benefits have been assessed over a 50-year lifetime as illustrated in the following cash flow table.

Project Year (s)	Calendar Year (s)	Cash Flow Categories	Costs	Benefits
0	2016			
		Feasibility Study	$ 10,000	
		Total Costs:	**$ 10,000**	
		Total Benefits:		$ -
1	2017			
		Engineering, Permitting, Construction Inspection	$ 35,000	
		Legal Services	$ 2,000	
		Land Rights	$ 7,000	
		Capital Improvement Costs	$ 80,098	
		Monitoring, Assessment, and Outreach	$ -	
		Operation and Maintenance Costs (O&M)	$ 1,270	
		Total Costs:	**$ 125,368**	
		Land Value Benefits		$ 750
		Sediment/Stream Stabilization		$ 3,960
		Groundwater Recharge		$ 4,400
		Total Benefits:		**$ 9,110**
2-4	2018-2020			
		Monitoring, Assessment, and Outreach	$ 34,200	
		Operation and Maintenance Costs (O&M)	$ 3,810	
		Total Costs:	**$ 38,010**	
		Land Value Benefits		$ 2,250
		Sediment/Stream Stabilization		$ 11,880
		Groundwater Recharge		$ 13,200
		Total Benefits:		**$ 27,330**
5-50	2021-2066			
		Operation and Maintenance Costs (O&M)	$ 58,420	
		Total Costs:	**$ 58,420**	
		Land Value Benefits		$ 34,500
		Sediment/Stream Stabilization		$ 182,160
		Groundwater Recharge		$ 202,400
		Total Benefits:		**$ 419,060**
		Total Lifetime Cost	**$ 231,798**	
		Total Lifetime Benefits		**$ 455,500**
		Benefit : Cost Ratio	1.97	

Benefit: Cost Ratio
The benefit to cost ratio computed from the total annual benefits and costs for the project is 1.97 for the 50-year project life.

4. Provide evidence that sufficient funds are available to complete the proposal.

The LBNRD established a Projects Sinking Fund in 2010 devoted to the development of various unspecified flood control, erosion control and groundwater recharge projects around the District. The fund currently has over $440,000 in reserve for such project development and a portion of these funds will be designated for this stabilization/recharge project.

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

The LBNRDs mill levy at the time of application is 0.01398 of a maximum NRD mill levy of 0.045 cents of valuation. The FY 2015 valuation of the LBNRD is $8,948,881,699. The FY 2016 mill levy generated $1,574,007 in tax revenues for District projects, activities and operations. Based on the 2015 District valuations, the District taxing authority could generate $4,026,997 in local tax revenues. Revenues generated from local taxes will be used for all necessary operation, maintenance and replacement costs of the structures in the future.

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

No loan will be involved with this project.

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

The project and its planned development minimize impacts to the environment by:

- Utilizing several small structures, which have little to no impact on the larger environment, including wetlands and stream biota
- Construction can be completed by small equipment, which do not require the construction of roads or bridges; therefore, impacts are minimal during construction activities
- Structures will not be constructed in wetland areas, eliminating impacts to wetlands
- Structures will not be constructed in perennially flowing stream channel, thus eliminating impacts to fish and other aquatic species
- Water will flow over the top of the small structures and continue downstream during significant rainfall events
- Designing the structures to avoid increasing negative impacts during flooding
- Stabilizing the streambed will improve the natural environment by reducing erosion

and sediment transport
- Increasing habitat diversity within the stream will improve the natural environment

One of main advantages of the design concept of using several small structures for recharge and grade stabilization is that the impacts to the natural environment are minimal in comparison to the potential impacts of a single, large structure.

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

The LBNRD has authority and jurisdiction, under its general purposes for erosion prevention and control, soil conservation, and management of water supplies for beneficial uses (Neb. Rev. Stat. 42-3229). Under Neb Rev. Stat. 2-3230 and 2-3232, the LBNRD also has the authorities for the development of facilities, works, studies, and demonstration projects that further the LBNRD's purposes for soil and water resource management.

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

NDNR's 2015 Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process outlines the following objectives for the state's water resources: 3) Support locally developed water management plans for managing hydrologically connected water supplies. This project would fall under this objective, as the Little Blue River Basin Water Management Plan outlined the need for small projects that induce recharge in hydrologically connected areas. Specifically, this project will help meet Plan Goal #2 and Plan Goal #3. Plan Goal #2 consists of obtaining sustainability of water resources in the Basin with a better understanding of groundwater and surface water quantities, and by facilitating the implementation of projects that utilize both resources to recharge groundwater aquifers and maintain flows. Plan Goal #3 consists of facilitating the stabilization of eroding streambanks and lake shorelines. Therefore, this project falls within the State's water planning objectives.

10. Are land rights necessary to complete your project?

YES☑ NO☐

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

The following land tract will be involved in the project:
- Section 29-T06N-R12W, located within Adams County
- All four structures would be located on the same land parcel.

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

The LBNRD does not currently have an easement for the property.

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

The LBNRD has authority to acquire the necessary easement for the land through Neb. Rev. Stat. 2-3235, which states that an NRD can enter into agreements with landowners for the purposes of carrying out projects for the benefit of the NRD and Neb. Rev. Stat. 2-3233 that allows the LBNRD to acquire interests in real property for projects.

The current landowner has expressed interest in the project and the LBNRD has had multiple communications with the landowner to confirm support for the project. Once project funding is secured the LBNRD will negotiate an easement with the landowner for construction and access for operation and maintenance.

Landowner responses expressing their interest in having the project on their property are included in Appendix A (Feasibility Study).

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

The LBNRD has authority and jurisdiction to manage groundwater resources through the Nebraska Groundwater Management and Protection Act (Neb. Rev. Stat. 46-702, 46-703,46-704), which states that NRDs have the legal authority and are the preferred regulators of groundwater quantity and quality management, and statutes listed above that outline the general purposes and capabilities of NRDs. Through their management authorities, the LBNRD adopted the Little Blue River Basin Water Management Plan in 2015, and the District is currently developing an Integrated Management Plan (IMP) with NDNR that will further address hydrologically connected areas. This plan formalized goals to address groundwater declines and streamflow effects due to groundwater pumping. The LBNRD authorities and the joint IMP with the NDNR provide the LBNRD with sufficient authority and capabilities to successfully implement this project.

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

The environmental consequences from the project are beneficial. The benefits include:

- Increased habitat diversity through creation of small ponded areas
- Increased induced aquifer recharge and associated streamflow accretions
- Reduced streambed downcutting and streambank erosion
- Increased water quality by reducing downstream sediment transport and settling of sediment during runoff events

The structures are intentionally small to avoid adverse environmental impacts that are inherent with larger structures, such as negative impacts to wetlands, riparian areas, and native fish species.

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.

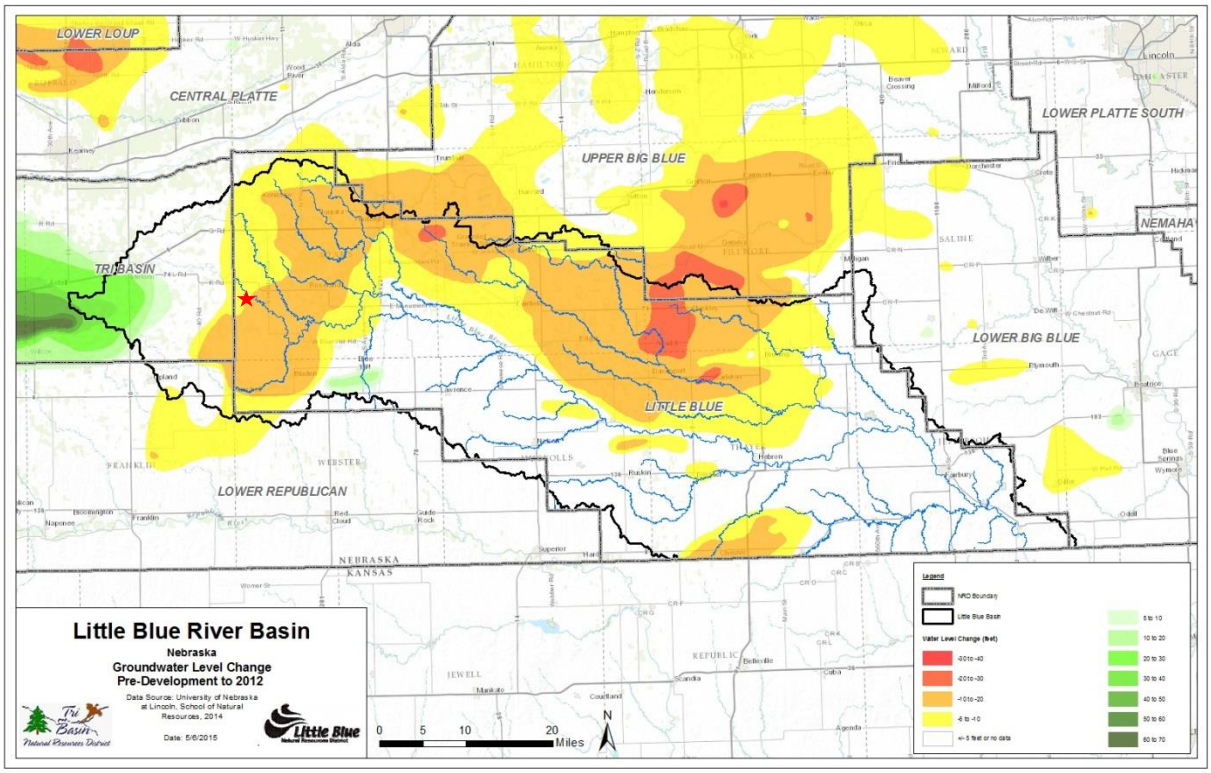
Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

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.

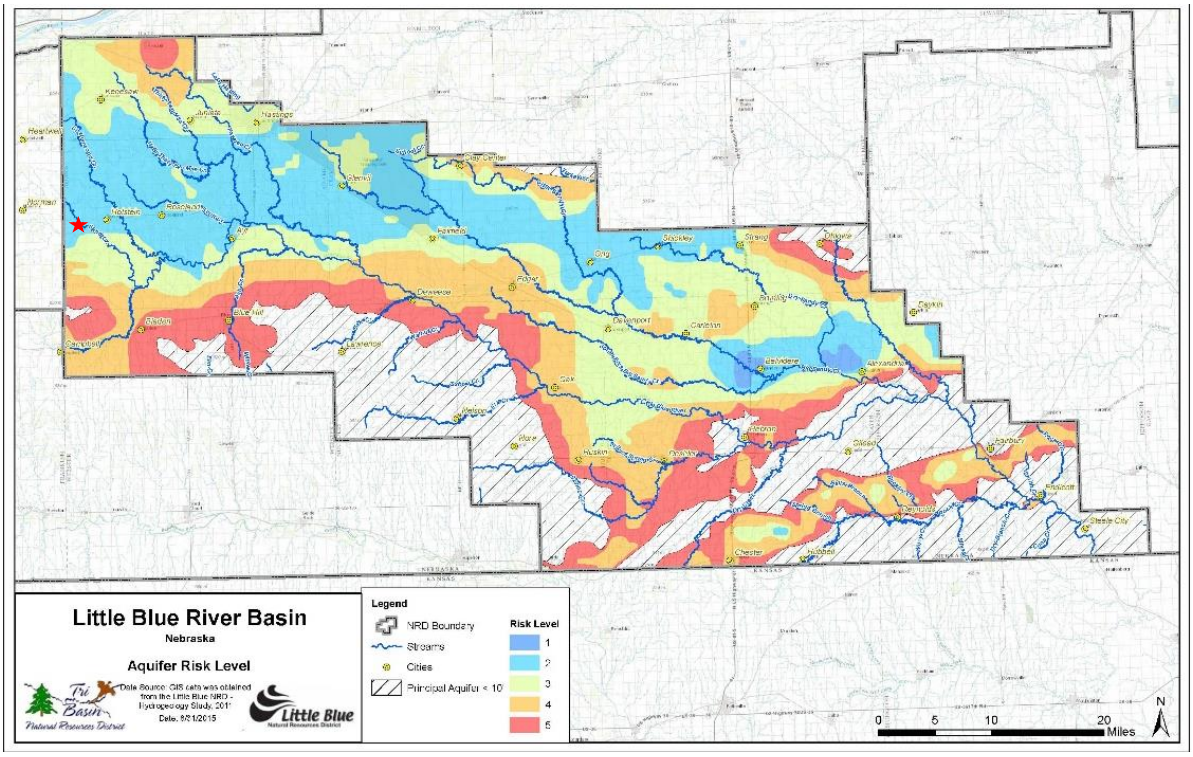
Drinking Water Issues: The instream weir pilot project provides multiple benefits including inducing groundwater recharge, directly mitigating threats to drinking water due to groundwater declines. These small-scale, instream structures have the potential to augment both surface and groundwater drinking water supplies during shortages, such as those that occurred during 2012. The summer of 2012 placed intense pressures on small domestic wells, as well as municipal water supplies throughout the state and Little Blue River Basin. This pilot project will showcase the potential for well-placed, small-scale structures to induce recharge near municipal well fields that could mitigate seasonal groundwater declines.

Drinking Water Effects & Mitigation: The instream weir pilot project benefits the aquifer and streamflows by retiming flood or excess waters through inducing groundwater recharge. Drinking water near the site and within the surrounding region is provided primarily through pumping groundwater from the primary alluvial aquifer. This is true for residential wells for individual farmsteads and for municipal water supplies throughout the Little Blue River Basin. The primary alluvial aquifer throughout the Little Blue River Basin is large and productive, an immensely valuable resource; however, groundwater water declines within the aquifer are serious threat to this resources. The Little Blue Basin Water Management Plan completed 2015 (2015 Basin Plan) addressed this concern. Figure 2-19 from the 2015 Basin Plan (below) illustrates long-term groundwater declines throughout the Little Blue Basin. If groundwater declines continue, the long range impacts would result in groundwater levels dropping below the screen intervals of many residential and municipal wells, placing a substantial financial burden upon individual residents and municipal governments.



The objective of the project is to use many small-scale, instream structures to collect excess water during times of high runoff and flooding and provide an opportunity to infiltrate the water as recharge. While the area in the immediate vicinity of the project site will receive the direct benefit of increase recharge, this projects serves a broader objective as a pilot project to demonstrate the effectiveness of multiple, small-scale recharge structures. The information provided through this project will help educate the public on the importance of water sustainability and can be used as demonstration sites when encouraging other landowners across the basin to support similar recharge project on their lands. The pilot project will also provide technical information regarding comparison of performance of multiple designs, particularly related to operation and maintenance. This information will obviously be extremely valuable to the Little Blue Natural Resources District (LBNRD), but would also be shared with other NRDs, municipalities, and state agencies that are pursuing similar recharge concepts.

Previous Management Actions: The LBNRD and Tri-Basin Natural Resources District (TBNRD) have taken management actions through rules and regulations and management practices. Several of these actions include the 2015 Basin Plan, current development of an IMP, development of an Aquifer Risk Map (below), designation of water quantity subareas, and other restrictions. The 2015 Basin Plan identified groundwater recharge projects as one of the key management practices to reduce or possibly reverse trends of declining groundwater levels.



Long-Range Impacts: Induced aquifer recharge benefits are typically long-term due to the time it takes for water to move through the aquifer system. The long-range impacts for an individual project are not substantial, but providing numerous small recharge structures throughout the basin could have significant, measureable impacts to aquifer levels. These structures would have long-term beneficial impacts to municipal water supplies, particularly if they are located near the municipal well fields.

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

Water Plan: The instream weir pilot project directly meets specific goals and objectives of a plan, the Little Blue River Basin Water Management Plan, adopted by the LBNRD and TBNRD. The LBNRD is also in the process to develop an IMP, with plan adoption expected for mid to late 2017.

Plan History: The LBNRD recently completed the Little Blue River Basin Water Management Plan (finalized and adopted in 2015). The Basin Plan provides a single coordinated strategy to identify both surface and groundwater water quality and quantity threats and needs, prioritize watersheds and areas for improvement, and identify practices and activities appropriate to address the known deficiencies in water quality and quantity in the Basin.

This plan was recently adopted, and as such, implementation of several recommendations identified in the plan are in progress. For example the NRDs have initiated the recommendation to develop an IMP, and the LBNRD implemented the recommendation to hire a Watershed Coordinator to help facilitate other recommendations within the 2015 Basin Plan.

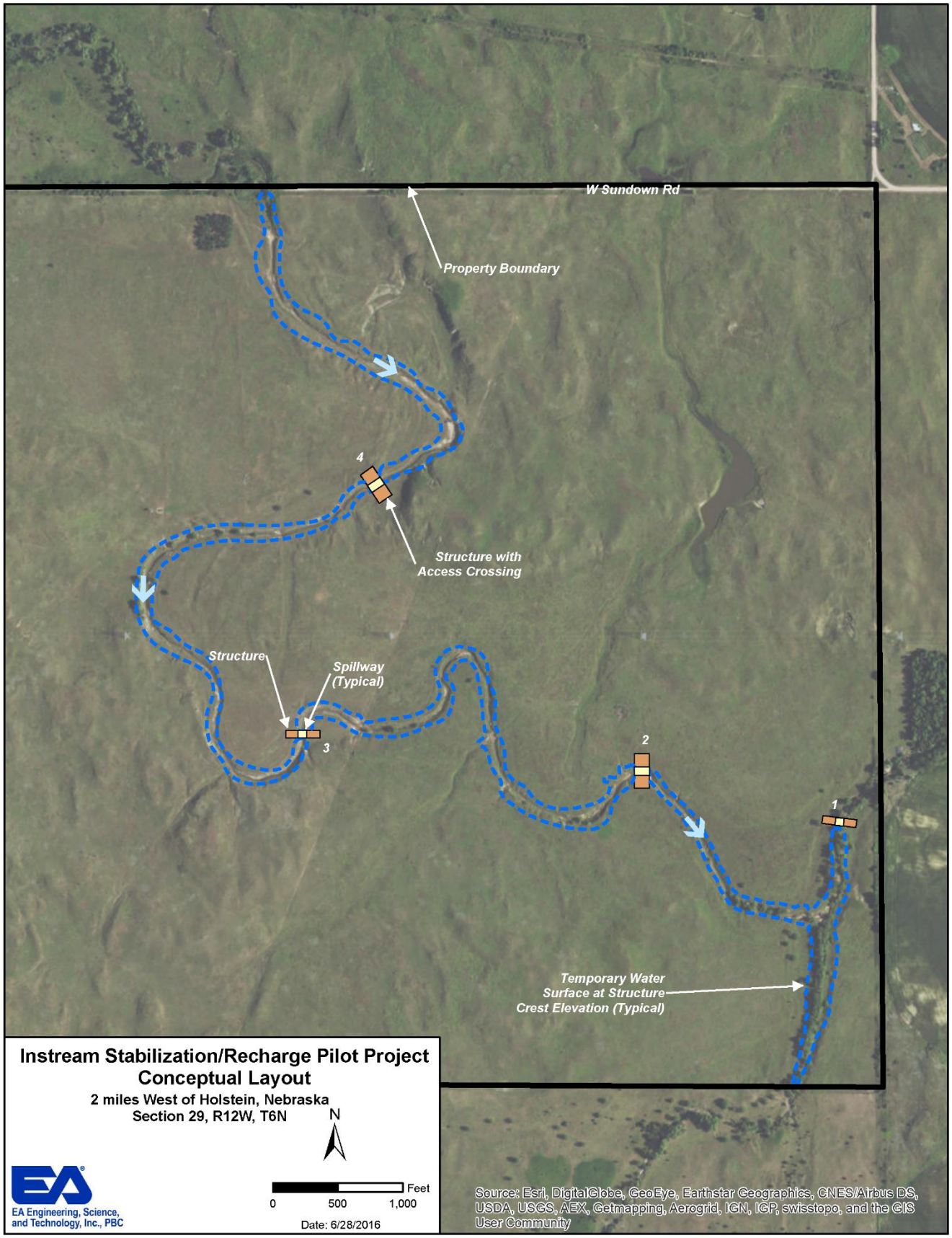
Plan Goals & Objectives: Groundwater recharge projects were identified as priorities to achieve the goals of the 2015 Basin Plan, including 'Pilot Projects to Evaluate Recharge Concepts', in particular the 'Instream Weir Concept' (2015 Basin Plan, page 115). The instream weir structures will induce aquifer recharge, and will also stabilize the streambed and reduce streambank erosion for segments of Sand Creek. Specifically, this project will directly support the following Goals/Tasks defined in the 2015 Basin Plan.

- Goal #2: The NRDs will achieve sustainability of water resources in the Basin with a better understanding of groundwater and surface water quantities, and by facilitating the implementation of projects that utilize both resources to recharge groundwater aquifers and maintain flows.
    - Task 3: Facilitate the construction of in-stream structural groundwater recharge practices.
- Goal #3: The NRDs will utilize the Plan as a comprehensive and collaborative program guide that efficiently and effectively implements actions to restore and protect water resources from impairment by nonpoint source pollution.
    - Task 3: Facilitate the stabilization of eroding streambanks and lake shorelines.

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.

The instream weir pilot project directly contributes to water sustainability goals by inducing groundwater recharge, reducing aquifer depletion, and over time, increasing streamflow.

Project Details: The project location and conceptual layout are shown in the following figure. The project includes multiple, small-scale, instream weir structures on a segment of Sand Creek, near Holstein, NE. The approximate areas for recharge are also shown on the figure.


W Sundown Rd
Property Boundary
4
Structure with
Access Crossing
Structure
Spillway
(Typical)
3
2
1
Temporary Water
Surface at Structure
Crest Elevation (Typical)
Instream Stabilization/Recharge Pilot Project
Conceptual Layout
2 miles West of Holstein, Nebraska
Section 29, R12W, T6N
N
EA Engineering, Science,
and Technology, Inc., PBC
Feet
0
500
1,000
Date: 6/28/2016
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS,
USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS
User Community

Aquifer Benefits: The 2015 Basin Plan also recommends a long-term target of 35,000 AF increased annual recharge throughout the Little Blue Basin. This target was established based the estimated annual aquifer depletion. Once constructed, the instream weir structures would backup 10.9 AF of water for each runoff producing storm event. The majority of the water held back by the structures will infiltrate through the sandy substrate to the aquifer. On average, the area typically receives 28 inches of precipitation, resulting from approximately 3-5 runoff producing storm events per year (data from High Plains Regional Climate Center). This estimates approximately 33-55 AF of induced recharge that results from the instream weir structures. This groundwater recharge from this project will be directly help reduce a portion of the aquifer depletion, and as is a pilot will help guide and improve future recharge projects to further reduce the aquifer depletion across the Little Blue Basin.

Stream Benefits: The 2015 Basin Plan identified and described the long-term decreasing in streamflow in the basin directly associated with the corresponding decreases in groundwater levels in the primary aquifer. The source of the water is excess water during surface runoff events that would normally flow down the River into Kansas. This project will help capture a portion of the excess flows, move to the water into storage within the primary aquifer, and eventually result in increased baseflow. The baseflow will be retimed so it will be available as streamflow during key times, such as needed for Compact compliance, instead of flowing out of the Little Blue Basin during periods of excess runoff. After construction of the instream structures, the monitoring protocol would include methods to estimate the quantity of water retained by the structures and the volume of water that recharges the aquifer. The distance of the structures from a permanent flowing stream, do not readily lend initial calculations of streamflow accretions that result from the recharge project.

Basin-wide Benefits: Implementation of larger-scale projects is quite difficult, as land rights, permitting, and construction costs often lead to non-feasible projects. Whereas numerous small-scale projects are often easier to permit and fund due to smaller adverse environmental impacts. Properly placed and designed small-scale projects can provide significant benefits to the hydrologic system over large geographic areas of the basin. The recharge benefit from a single diversion event or structure would not be large, but the intent is to prove through this pilot project that small-scale recharge projects do benefit the aquifer and augment streamflow. Successful implementation of this project would lead to other similar projects throughout the basin, where the cumulative benefits would be substantially larger.

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.

Project Goals: The instream weir pilot project will contribute to multiple water supply goals, including municipal use, agricultural use, improved water quality, increased wildlife habitat, preservation of water resources, stream baseflow augmentation, and improved flood control.

Project Benefits: The project will provide benefits related to helping sustain a reliable, high-quality water supply for residential, municipal, agricultural, industrial use by helping mitigate declining groundwater levels through induced recharge. These benefits are described in detail under Criteria Category 1 above. The increased groundwater recharge will help preserve water resources by diverting water during low use periods to induce recharge to the aquifer. Over time, the aquifer recharge returns to the streams and river as baseflow. Successful implementation of this project would lead to other numerous small projects that, cumulatively, could have meaningful impacts to the streams and aquifer.

The project will provide benefits related to improved flood control by providing a small amount of increased storage and increased infiltration in the upper reaches of the watershed. This is the same concept applied to 'green infrastructure' strategies to improvement management of stormwater runoff in urban settings. Green infrastructure strategies have proven that the many small improvements that provide additional storage and infiltration through a watershed can result in substantial decreases in the peak flow and volume in lower reaches during flood events. This project applies the same general strategy of green infrastructure, but at much larger scale within the rural setting.

The project will provide benefits related to water quality by stabilizing the stream bed. This will minimize erosion in the streambed and stream banks reducing sediment transport downstream. The instream structures will also help settle and trap sediment upstream of the structures.

Naturally, the water quality improvements will provide benefits to the wildlife. The temporary ponded areas will also provide increased habitat diversity for wildlife species.

Future Without Project: Without this project, the above long-term benefits would not exist. Streambed downcutting would continue within the stream reach and the aquifer recharge benefits would not occur.

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

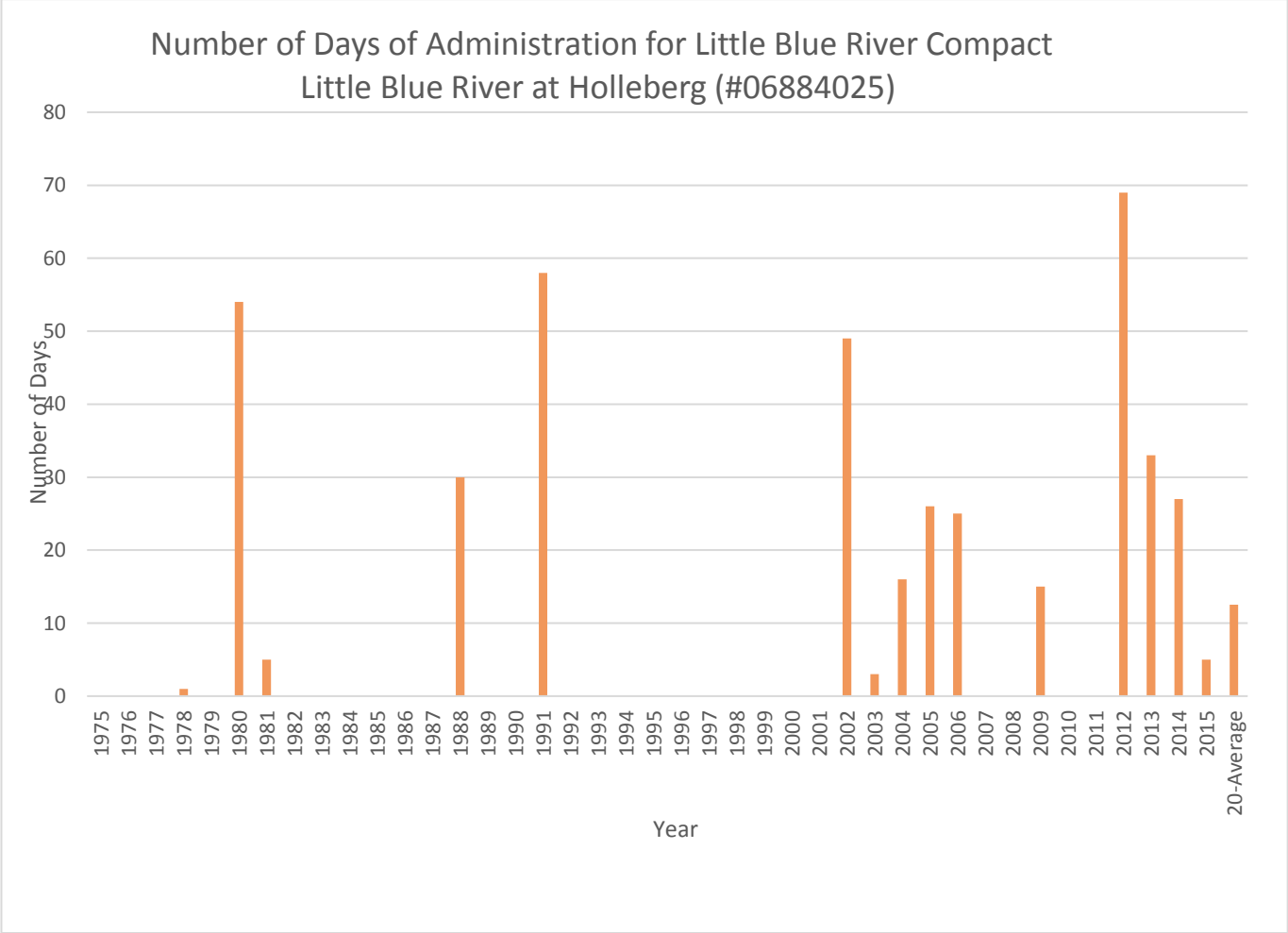
• Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
• Describe the beneficial uses that will be reduced, if any.
• Describe how the project provides a beneficial impact to the state's residents.

Project Beneficial Uses: The instream weir pilot project will help maximize use of Nebraska's water resources by Nebraska residents while helping reduce flow leaving Nebraska during periods of excess flow.

Water supply projects cannot increase the total volume of available water, but these types of projects can store and retime when that water is available. The instream weir structures will retime stream flows that exceed current needs to recharge the aquifer, reduce aquifer drawdown, and provide long-term streamflow benefits. This will help maximize the beneficial use of Nebraska's water by Nebraskans, particularly junior surface water users that frequently face administration for compliance with the Little Blue River Compact with the State of Kansas.

Adverse Impacts: This project will not reduce streamflow or aquifer benefits for any user or group of users.

State Benefits: The project provides a benefit to the state's residents by implementing cost-effective, small-scale projects that will not adversely impact land-owners or rely upon regulations to address aquifer drawdown and streamflow depletions. As a pilot project, the benefits will extend far beyond the immediate vicinity of the project site. Benefits also arise due to the overall aquifer benefits that increase baseflow conditions, particularly during periods where water use exceeds supplies. The information gathered from the pilot project will help educate the public on the importance of water sustainability and can be used as demonstration sites when encouraging other landowners across the basin to support similar recharge project on their lands. The pilot project will also provide technical information regarding comparison of performance of multiple designs, particularly related to operation and maintenance. This information will obviously be extremely valuable to the LBNRD, but would also be shared with other NRDs, municipalities, and state agencies that are pursuing similar recharge concepts.



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 instream weir pilot project is highly cost effective, and presents a far more practical and cost effective alternative to traditional large infrastructure projects.

Project Costs: The project costs have been estimated as follows:

- Engineering & Construction Cost: $127,098
- Annual Operation and Maintenance Costs: $1,270
- Land Acquisition Costs: $7,000
- Monitoring, Assessment, and Outreach: $34,200

A more detailed breakdown of costs are provided in the Feasibility Study Report (Attachment A).

The project has many design considerations to maximize cost-effectiveness. These include:

- Create structures which provide multiple benefits including: stream stabilization to minimize erosion, capture sediment to improve water quality, and induce infiltration to increase groundwater recharge
- Provide multiple, simple, structures distributed across a reach of stream instead of only one larger, more complex structure
- Position structures within the stream banks and will allow water from runoff events to initially pool upstream of the structure, then flow directly over the structure and continue downstream
- Size the structures to maximize the volume of water stored behind the structure, but not exceeding the minimum volume that require a DNR water storage permit
- Minimize construction cost
- Minimize operation and maintenance requirements and cost
- Carefully design the structures in minimize permitting requirements
- Provide instrumentation and monitoring to collect technical data to refine benefit assumptions
- Provide secondary benefits to the landowner, such as access crossings, when appropriate, to increase landowner interest in the concept
- Serve as a pilot project to demonstrate the effectiveness of the concept to landowners, and provide technical data that can be used to continually refine the design concept in the future
- Share and distribute the information gathered through the pilot project with the public locally and with other NRDs across the Nebraska
- Seek to maximize benefits while performing within the design constraints
- Avoid compromising the integrity of the stream either up or downstream of the structures
- Avoid caused increased flooding to adjacent properties
- Avoid impacts wetlands and other natural resources

The direct value of the estimated annual benefits gained in the direct vicinity of the site are $9,110 per year or $455,500 over 50 years, as provided in the Feasibility Study Report (Attachment A); however, as pilot project the true value of the benefits from the project are far greater. Several examples of the intangible benefits of the project include:

- The project will serve as a demonstration project of the effectiveness of using many small instream weirs for stabilization and recharge instead of trying to construction a single large structure. The project will be used as a demonstration site by the LBNRD to educate the general public within the basin and help recruit other landowners for installing similar projects on their properties.

- The project includes additional monitoring and assessment for a three year period to collected hard data on the performance of the project. The data will be used to ground truth several of the key assumptions regarding the project, particularly the frequency of events that fill the storage areas, and operation and maintenance requirements. The monitoring information collected will be used to help refine the design concept for future sites.
- The information collected during the monitoring will not only be used by the LBNRD, but will be made available to all the NRDs, providing benefit across the State of Nebraska
- The project will provide increased diversity in habitat throughout the stream reach.

Alternative Solutions: The two main alternatives to the small structures are regulations and construction of a single, large reservoir. Management preferences lend towards innovative solutions to address water issues, rather than rely upon regulations and enforcement, and therefore, is not a viable alternative. The second alternative, a large reservoir within the Little Blue River Basin lacks public support, has significant permitting issues, and does not have basin-wide benefits. A single reservoir would require an individual wetlands permit from the U.S. Corps of Engineers, which would had several hundred thousand dollars to the construction, monitoring, and wetland mitigation for the project. A single reservoir would also not provide the stream stabilization benefits that the small instream weirs would provide.

Cost Effectiveness: The project is highly cost effective, as the cost-benefit ratio is 1.97.

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.

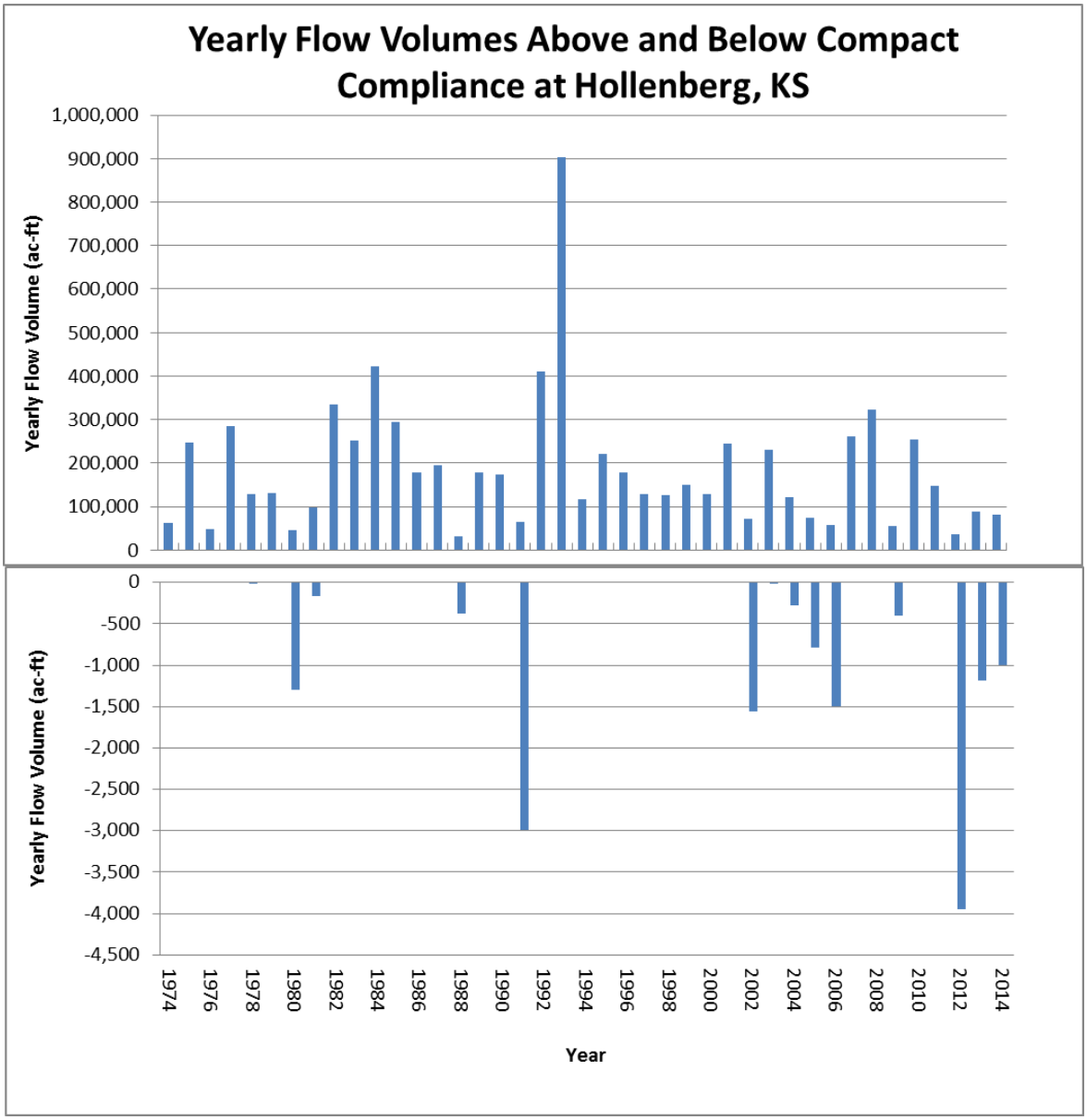
Interstate Compact: The instream weir pilot project will help meet State of Nebraska compliance with the interstate compact on the Little Blue River, while reducing adverse impacts to junior surface water appropriators.

Compact Compliance: The State of Nebraska signed an interstate compact on the Little Blue River in 1971. The flow requirements are 45 cubic feet per second (cfs) in May and June, 75 cfs in July, 80 cfs in August, and 60 cfs in September. There are no minimum flow requirements for October through April. The Hollenberg streamgage is the measuring point. If stream flows fall below the Compact minimum flow requirements, the NDNR implements water rights administration actions regarding surface water irrigators within the Basin. There are 244 water rights for surface water irrigation and 129 storage water rights within the Basin; 111 of the water rights and all of the storage water rights are administered for Compact compliance. Administration, or 'shutting off' these junior surface water users allows the state to remain in compliance, but has significant adverse impacts to those junior irrigators.

Current Deficiencies: Currently and historically, the State of Nebraska maintains and complies with its provisions of the interstate compact with the State of Kansas. However, junior surface water irrigators frequently face administration due to insufficient streamflows to fully meet all demands. Daily flow requirements were met at the Hollenberg gage during the compliance period (May 1st to September 30th) in all but 4 years between 1971 and 2002. However, during the period of 2000-2015, 10 of the 15 years

had flows falling below the compliance requirements, and an increase in the frequency of water rights administration. The increase in administration necessary for Compact compliance is highlighted in the gage results from 2012. Stream flows were unusually low during 2012, as shown in the Figure below. The daily mean flow of 24 cfs on 12 September 2012 was the lowest in the 38 years of record. On 20 July 2012 the flows of the Little Blue at Hollenberg gage fell below the compact target, and 111 junior irrigation rights and 129 storage rights in the Basin were closed. The 133 senior irrigators in the Basin were allowed to continue operating but were closely regulated. On 8 August 2012, the junior irrigation rights and the storage rights were closed again and they remained closed through September 30th which is the end of the compact period for target flows (Kansas-Nebraska Blue River Compact Annual Report 2013). In 2012, the Little Blue River was below the minimum mean daily flows for 69 days.

The graph below illustrates the increases in the frequency of administration for compact compliance. This pilot project would not significantly reduce the number of days of administration, but over time, the cumulative impacts of numerous small-scale recharge projects could increase the number of days per year that junior irrigators could divert water.



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 Untied 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.

Property: The instream weir pilot project will protect the property on which the structure is built from further erosion. This will prevent land value degradation due to severe erosion.

Reductions to Infrastructure Threats: Streambed degradation or streambed downcutting destabilizes streams and threatens surrounding property and infrastructure. This is a serious issue throughout Nebraska, particularly related to bridges. The cost for repairing and replacing bridges is very high and the environmental permitting requirements associated with large streambank stabilization projects is very challenging.

A specific example of this importance of this issue is the recent design and permitting efforts related to several bridges in the vicinity of Pauline, NE. Adams County.

Instream weir structures stabilize the streambed and prevent further downcutting that migrates towards the stream headwaters. The migration of streambed downcutting places county roads and bridges at risk, as the continual erosion compromises the foundation of those facilities. The instream weir structures would stabilize the stream in multiple places within a stream segment.

Cost Savings: The project provides a potential cost savings to the county by preventing upstream migration of the stream, which would undermine the integrity of the county road.

Public Safety Benefits: The project provides a public safety benefit by preventing the slow and gradual erosion of streambeds that can undermine the integrity of local roads.

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.

Water Quality Issues: Portions of the Little Blue River Basin have stream sedimentation issues. Sedimentation largely results from field runoff that enters small tributaries and streams or from excessive down-cutting of the streambed. The Sand Creek and its tributaries have several reaches where significant streambed down-cutting is destabilizing the stream and contributing to sediment issues within the

watershed. The instream weir structures will stabilize the streambed in areas of significant downcutting by two main methods. The first is that the instream structures slow the flow of water and water with slower velocities carries lower sediment loads and causes less erosion to streambed and banks. The second method is that the water held behind the structure will drop its sediment load, thereby replacing sediment in highly eroded areas. Thus, the instream structures will increase stream water quality by reducing downcutting of highly eroded streambeds and catching sediment high within the watershed.

Previous attempts by the LBNRD to reduce stream sedimentation issues included talks with land owners to adopt land and soil conservation measures to reduce field-scale erosion. These discussions have yielded varied results, which typically mirror crop prices. Therefore, the LBNRD is looking towards other solutions to reduce stream sediment levels.

Project Water Quality Benefits: The project would benefit stream and water quality by reducing the amount of streambed downcutting adjacent to the structures, and reducing the sediment volume in the stream, thus increasing the water clarity. The project site is also located in an area of sandy grazing lands, which serve as a buffer for overland runoff. This buffer helps to reduce sediment and contaminants that might otherwise enter Sand Creek.

Alternative Solutions: The two main alternatives to the small structures are regulations and construction of a single, large reservoir. Management preferences encourage innovative solutions to address water issues, rather than rely upon regulations and enforcement, and therefore, is not a viable alternative. The second alternative, a large reservoir within the Little Blue River Basin is less cost-effective, has significant permitting issues, and does not have basin-wide benefits that reduce downcutting and high volumes of sediment in the stream. The permitting and construction costs make the larger structures less cost-effective, as well as the reservoir only provides direct benefits to the area adjacent to the structure. Several structures, similar in design to the pilot project would provide stream quality benefits by reducing the stream sediment load for various streams throughout the basin.

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.

Local Jurisdiction: The LBNRD has authorities through Neb. Rev. Stat. 2-3225, 2-3230, and 2-3232 to levy taxes and to develop facilities, works, projects, and investigations to facilitate and carry out the intended purposes of NRDs. The LBNRD also has authority and jurisdiction to manage groundwater resources through the Nebraska Groundwater Management and Protection Act (Neb. Rev. Stat. 46-702, 46-703,46-704), which states that natural resources districts have the legal authority and are the preferred regulators of groundwater quantity and quality management.

Local Revenue: The LBNRD's mill levy at the time of application is 0.01398 of a maximum NRD mill levy of 0.045 cents of valuation. The FY 2015 valuation of the LBNRD is $8,948,881,699. The FY 2016 mill levy generated $1,574,007 in tax revenues for District projects, activities and operations. Based on the 2015 District valuations, the District taxing authority could generate $4,026,997 in local tax revenues. Revenues generated from local taxes will be used for all necessary operation, maintenance and replacement costs of the structures in the future.

Other Funding Sources: The LBNRD established a Projects Sinking Fund in 2010 devoted to the development of various unspecified flood control, erosion control and groundwater recharge projects around the District. The fund currently has over $440,000 in reserve for such project development and a portion of these funds will be designated for these groundwater recharge projects.

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.

Local Jurisdiction & Water Plans: The LBNRD has authority and jurisdiction to manage groundwater resources through the Nebraska Groundwater Management and Protection Act (Neb. Rev. Stat. 46-702, 46-703,46-704), which states that natural resources districts have the legal authority and are the preferred regulators of groundwater quantity and quality management. Through their management authorities, the LBNRD adopted the Little Blue River Basin Water Management Plan in 2015, and the District is currently developing an Integrated Management Plan with NDNR that will further address hydrologically connected areas. This plan formalized goals to address groundwater declines and streamflow effects due to groundwater pumping. As this plan is recent, there is no history of plan implementation or monitoring the progress of plan goals and objectives.

Plan Goals & Objectives: This project would be one of the first actions towards achieving plan goals. Specifically, this project will help meet Plan Goal #2 and Plan Goal#3:

Goal #2: The NRDs will achieve sustainability of water resources in the Basin with a better understanding of groundwater and surface water quantities, and by facilitating the implementation of projects that utilize both resources to recharge groundwater aquifers and maintain flows.

Task 3 of Goal 3: Facilitate the stabilization of eroding streambanks and lake shorelines.

This pilot project targets a small area of 640 acres within the Sand Creek watershed, but the intent is that through the success of this project to initiate and complete numerous other throughout the watershed and basin. The cumulative benefits of numerous small structures can, over time, be significant. Additionally, numerous small projects spread throughout a basin impact a larger area and population; whereas a single large, difficult to permit, project may benefit a small percentage of the basin.

Sustainable Water Use & Benefits: There are a total of 43 communities within the Basin each listed below with their 2010 census population. By using information from both NRDs, the total population of the basin area, including rural areas, was estimated at just below 50,000. These municipalities rely upon groundwater for their potable water supplies. Similar structures, placed near these municipal well fields could have significant benefits during dry years, such as 2012. That severe drought, even with significant

water restrictions, placed many communities in a concerned position regarding the wellfield ability to continue supplying water.

Project Stakeholders: Stakeholders involved include the LBNRD and the current land owner. The Nebraska Department of Natural Resources is not a stakeholder, as this project would store less than 15 acre feet of water. The Nebraska Department of Environmental Quality is a potential stakeholder, if a NPDES Construction Storm Water General Permit is necessary.

Project Beneficiaries: The most direct benefit is to the landowner who will experience less erosion of the grassland and streambed through installation of the instream stabilization structures. Other benefits include downstream users through decreased sediment turbidity. Over time, numerous small structures, placed strategically throughout the stream reach would significantly reduce sediment loads and increase water quality for downstream users. The recharge benefits indirectly benefit the residents of the basin, but any project that counteracts aquifer and stream depletions benefits municipalities, irrigators, and domestic wells.

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.

Statewide Issues: Compact compliance-while the state currently complies with the Little Blue River Compact, it requires administration of junior surface water users. Projects that enhance streamflows during compact delivery periods reduce the impacts to surface water users.

Statewide Benefits: The project address groundwater declines by enhancing aquifer recharge of approximately 44 AF per year, or 2,200 AF over 50 years. Surface water depletions—the project addresses streamflow depletions by re-timing surface water flows. The re-timing relies upon using the aquifer as a temporary storage facility that slowly seeps water back to the stream over time.

The nature of this project, as a small-scale pilot project, initially limits the benefits to a small number of individuals or acres. However, successful implementation of this project will lead to other small-scale recharge projects throughout the basin. The small vs large project approach has several long-term, cumulative advantages. First, small-scale projects are easy to permit and cost-effective than many sizeable reservoirs. Second, the small structural size makes it easier to install numerous structures in a larger geographic region. The larger geographic footprint allows for opportunities to address aquifer declines or streamflow depletions on a larger geographic scale than a single large project.

Benefit to the State—the State would benefit by addressing issues related to groundwater declines and streamflow depletions. The state would benefit by decreasing the adverse impacts to junior surface water users that face administration by augmenting streamflows. As a pilot project, the information gathered would be shared with the other NRDs across Nebraska through outreach.

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.

Other Partners: These projects are joint projects between the LBNRD and the landowners, for the benefit of the entire area. Besides the partnership of the NRC through the Water Sustainability Fund, no other partnerships are anticipated.

Other Funding Sources: The LBNRD does not anticipate any additional funding sources for these projects. The NRD has the funds dedicated to meet the local match for this project.

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.

Watershed Function: Watershed health and function is partially dependent upon maintaining the hydrologic system. Extensive use of surface and groundwater supplies can greatly effect surface-groundwater interconnectivity and sustainable use of water supplies. Projects that seek to re-time or store surface water supplies when not needed aid in watershed function by mitigating for water use during periods of high water demand. Over time, these recharge projects can lessen impacts to ecosystem function.

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.

Annual Report: This application utilizes the Nebraska Department of Natural Resources 2015 Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process.

Report Objectives: NDNR's 2015 Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process outlines the following objectives for the state's water resources:
3) Support locally developed water management plans for managing hydrologically connected water supplies

Project Support of Objectives: This induced recharge aspect of this project fulfills both a goal of the Little Blue River Basin Water Management Plan and an objective of the Department's annual planning document by focusing on management actions in hydrologically connected areas that seek to retime surface water supplies via aquifer storage.

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.

Federal Mandate: This project is not designed to meet a Federal Mandate.

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.

Sand Creek is an ephemeral tributary to the Little Blue River that relies upon precipitation events for flow through the channel. These intermittent flows through the un-vegetated channel cause significant downcutting of the streambed, erosion of the stream banks, and downstream sedimentation issues. Sand Creek also presents an opportunity for providing increased recharge during periods of excess flow. The project proposes to install four small instream weir structures. The Sand Creek instream structures have three main purposes; 1) stabilize the streambed and reduce in channel downcutting, 2) reduce stream bank erosion and subsequent loss of pastureland, and 3) induce aquifer recharge. The instream structures accomplish these three purposes by providing small check points in the stream channel that pool water behind the structures during runoff events. The structures also pool water upstream that then infiltrates through the streambed to the aquifer, thus providing a localized offset to groundwater level declines. The project is a pilot project to demonstrate the effectiveness of this design concept.

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 is a multi-year project with the following tasks and timeline.

Feasibility Study: 2016
A Feasibility Study was completed in 2016 to provide conceptual design of the stabilization/recharge structures and to provide accurate and reliable information for the WSF application process. See Appendix A (Feasibility Study) for additional details regarding project tasks and timeline.

Engineering Design and Land Rights: 2016-2017
Once funding is secured, the engineering design, planning permitting will be completed. Construction drawings and specifications will be issued to contractors for bidding. Easements will be negotiated with landowners. The design will also include a detailed Monitoring Plan.

Construction: 2017
Construction activities will be completed including installation of monitoring equipment. Construction phase engineering services would be provide to ensure that the project is constructed in accordance with the plans and specifications.

Monitoring, Assessment, and Outreach: 2018-2020
As a pilot project, additional monitoring information will be collected over a three year period and assessed. Monitoring data will be compiled into an annual report and at the end of the three year monitoring period, a Case Study Report will be prepared. Outreach activities will be conducted throughout the three year period.

Operation and Maintenance: 2017-2066
The LBNRD will be responsible for operation and maintenance of the project throughout the 50-year project life.

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.

These projects are joint projects between the LBNRD and the landowners, for the benefit of the entire area. Besides the partnership of the NRC through the Water Sustainability Fund, no other partnerships are anticipated.

One of the key aspects of this project is that it will serve as a pilot project to demonstrate the effectiveness of the design concept. This is particularly important for educating and recruiting willing landowners to consider similar projects on their lands. The information gathered from the monitoring and assessment of this project will be used for outreach within the Little Blue River Basin and to other NRDs across the Nebraska.

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 LBNRD does not anticipate any additional funding sources for these projects beyond the WSF and the LBNRD. The total cost of the project (excluding O&M) is $168,298. We are requesting $100,979 from the WSF and the LBNRD is contributing $67,319. The LBNRD will also be funding O&M, estimated to be $63,500 over the life of the project.

5. Support/Opposition

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

The District mailed exploratory letters to all landowners in the vicinity of the Sand Creek

located in the western part of the LBNRD, requesting a show of interest and cooperation for finding sites which could contribute to groundwater recharge and aquifer stabilization in the area. The focus area was on a region of soils containing Valentine sands which were too sandy for effective crop production and have high water infiltration rates. Because the area is devoted almost exclusively to grazing lands, the opportunities for small structural, non-intrusive recharge projects appeared very good and was supported by several landowners.

The LBNRD has had several follow-up discussions with the interested landowners. These interested landowners know the importance and value of groundwater for the area and recognize the opportunity that the Valentine sands offer for groundwater recharge. The projects will be located exclusively on the lands of those willing landowners and no adverse impacts to neighboring lands are anticipated.

There is no known opposition to the project.