

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Nebraska Bostwick Storage Enhancement and Retiming Project

PRIMARY CONTACT INFORMATION

Entity Name: Nebraska Bostwick Irrigation District

Contact Name: Tracy Smith

Address: 1147 West Highway 136 Red Cloud Nebraska 68970

Phone: (402) 746-3424 or (308) 470-0761

Email: bostwick@gpcom.net

Partners / Co-sponsors, if any: Lower Republican Natural Resource District

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

Grant amount requested. \$ 2,000,000.00

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
[Click here to enter text.](#)

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? \$ 0

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

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.
\$ 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);

This project involves the installation of precise flow measurement and control gates along the length of the Franklin Canal. The feasibility report and plan of development for this project are presented in the attached Rubicon Scoping Study document which documents the flow measurement and control system. These control and measurement gates are integrated into a radio telemetry network which provides real-time field measurement of water levels and flows along the length of the canal. A central computer utilizes this information to continually update real-time flow setpoints for each check structure along the length of the canal so that the supplied flows precisely match the downstream demand, and unintended operational spill is eliminated. The gates and supporting telemetry and control system will be installed in a one year program, meaning that the resultant water savings will be realized on an ongoing basis beginning one year after program commencement.

A description of all field investigations made to substantiate the feasibility report (004.01 B); A canal system inspection has been performed to assess the condition of all regulating structures and to confirm the works required to install the flow measurement and control equipment described in this proposal. This inspection has confirmed the existing location and condition of the regulating structure assets against the original as-constructed plans. The Irrigation District has also worked with the equipment supplier to confirm the type and model of measurement and regulating equipment that will achieve the intended outcomes at the lowest whole of life cost.

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); This supporting information is contained in the Rubicon Scoping Study which is provided as an attachment to this application. The feasibility report is based upon a site inspection and the as-built plans for the canal as provided by the BOR engineering and construction records.

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

Nebraska Bostwick Irrigation District (NBID) utilizes the storage supply from Harlan Reservoir via Reclamation repayment contract no. 009D6B0121. Reclamation constructed the Canals, Drains and Laterals for this Irrigation Project, and NBID has a repayment obligation for the Project. Reclamation owns all the lands associated with this project and holds the Storage permits for the Reservoirs and the Storage Use permits on all the project acres (22,455 acres). NBID holds the natural flow permits for these 22,455 project acres. Within its repayment contract NBID maintains the Irrigation project and funds a percent of the O&M associated with the Harlan Reservoir. NBID has adopted a “District Operating Plan” that is approved by Reclamation and the Plan is an appendix to the repayment contract. Within this plan NBID has adopted Water Conservation Measures. The District has upgraded many of its canals, structures and gates over the past decade to improve operations and water deliveries, and extend the water supply longer into the growing season. Laterals on the Franklin Canal system have been buried into pipes to reduce system losses. The District has also added actuated gates and a SCADA system to better monitor and control flows on the Franklin Canal at specific locations. Canal automation and computerized water management using Rubicon Water’s Total Channel Control (TCC) fits well within the scope of NBID’s District Operating Plan.

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

Required geologic investigation (004.01 E 1); No geologic investigation is required to undertake this project. The project will provide more useful geologic information for future use by using precise flow measurement at each check structure within the canal to assess the recharge rate at each pool within the canal network and thereby quantify the recharge rates of the underlying geology. A better understanding of the recharge rates will help the Republican River Compact Administration (RRCA) investigate the beneficial consumptive use charged to Nebraska for water consumed by the canal systems. NBID will cooperate with the RRCA to better understand the total water balance of our canal systems.

Required hydrologic data (004.01 E 2); A significant number of observation wells have been installed within the Republican River Basin by The University of Nebraska, local Natural Resources Districts and the Bureau of Reclamation to collect data on canal recharge and groundwater levels. An additional layer of canal flow data along with the annual well readings would provide a good picture of the health of the river and streams of the basin.

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 fitting new flow measurement and flow control actuation to existing concrete check structures. These structure upgrades will not modify the structural loading of the upgraded check structures, and so there is no requirement to undertake a structural or foundation assessment on these existing check structures. Where new structures are proposed, these will be designed and constructed in accordance with existing approved plans to match existing check structures with consideration given to local geology and footing construction requirements.

- 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);

The plan of development is detailed in the accompanying Rubicon Scoping Study.

A description of field or research investigations utilized to substantiate the project conception (004.02 B); The Bureau of Reclamation Great Plains Region Hydromet System for the Franklin Canal data provides measured spill summaries for the Franklin Canal. The average yearly spill from the Franklin Canal is 2,721 acre-feet per year of unmanaged water losses. In addition to the recorded spills many spillback structures are un-measured and not recorded, these structures tend to spill water intermittently into a dry tributary to the Republican River and in most cases the spilled water does not reach the River. This recorded data provides a basis to quantify the volumes of water that could be retained in storage and retimed to return to the stream at times of peak demand and need in August. The saved water could also be utilized to retime Compact augmentation water before it is actually pumped from the ground. This would insure that Nebraska meets all deadlines associated with future Compact resolutions. Many case studies and customer references have been provided in the Rubicon Scoping Study to establish the fact that the proposed Total Channel Control solution eliminates spill and precisely matches supply to demand to reduce the draw-down of stored water and make it available for further beneficial use later in the season. Examples of references with contact details have been provided in Australia, California (Oakdale, Turlock and Solano Irrigation Districts), Washington (Naches Selah Irrigation District), Arizona (PIMA Maricopa Irrigation District) and Nebraska (Frenchman Cambridge Irrigation District). The proposed solution has been proven in often more than fifteen years of operation in the irrigation districts referenced and has been put through extensive due-diligence assessments conducted by State governments in Australia and irrigation district engineering and operations staff. The experience of these broad implementations over fifteen years is that the Total Channel Control solution eliminates spill and allows that water to be retained in the

reservoir to reduce draw down and be made available for managed streamflow retiming.

A description of the necessary water and/or land rights, if applicable (004.02 C); Same as (004.01 D) from above.

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 will enhance the operation of Harlan County Dam and Lake by providing real-time demand information which can be used to precisely set dam release flows to the exact value required to meet downstream demand. This information allows dam operators to operate with a high degree of precision to reduce draw down and release of water which is presently passing through the system at unmanaged times and so is not providing maximal managed benefits.

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative. This solution provides irrigation districts with the most economical means of eliminating operational spill. Alternatives are piping, which typically costs up to ten times more than the proposed method on the larger canal sizes encompassed in this project, or in-line balancing storages which also cost more to construct than the proposed solution. The recharge benefits realized by the proposal cannot be achieved with piping. Likewise the storage and recreational use benefits associated with reducing draw down on Harlan County Lake cannot be realized with in-line balancing storages, as this water is relocated to new smaller locations which do not readily provide recreational benefit. There are numerous alternative canal automation solutions, but these technologies are limited to either water level or flow control in smaller sub-sections of the canal network – and these approaches do not result in the elimination of spill and the resultant ability to retain this water in storage. This capability is unique to Total Channel Control technology which contains many years of academic research to enable entire canals to be controlled in a coordinated manner to eliminate spill.
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 engineering and inspection functions have already been performed, and all implementation costs have been priced at \$3,200,000. This price includes any remaining engineering and inspection costs and capital construction costs. The equipment installed in the project is designed with a 30 year economic life and the ongoing maintenance costs are estimated to be less than 2.5% of the up-front capital costs per year. These ongoing maintenance costs are largely offset by reduced vehicular and operations cost savings. The estimated construction period is 4 months commencing December 2017, and the estimated economic life of the installed equipment is 30 years.
- 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). NBID's main interest with this project is to be sustainable with the basin's water supply going forward. The goal of the project is not to increase the inches per acre, the goal is to have the ability each year to plan for next year's irrigation requirements. The ability to plan for the following year's irrigation activities is more valuable than unknown and unpredictable commodity prices. The primary tangible benefits will be a reduction in unmanaged operational spill of water stored in Harlan County Dam, presently amounting to an average of 2,721 ac-ft lost as unplanned spill out of the bottom of the Franklin Canal each year. This water will be recovered and retained in Harlan County Dam to be retimed for late season releases which will benefit a range of downstream interests including environmental, recreational, agricultural, and potentially interstate parties. This value will accrue each and every year of the 30 year asset life of the project, which will only require approximately 4 months to implement - resulting in these benefits being available in in the irrigation season immediately following the announcement of grant awards. When the up-front capital costs are compared to the benefits over the 30 year economic life of the project, the yearly cost benefit ratio can be determined as $\$3,200,000 / (30 \times 2,721 \text{ acre-feet per year}) = \$39.20 \text{ per acre-foot recovered}$ - which clearly represents a high level of economic feasibility. In addition to this primary benefit, the following secondary benefits are also delivered: 1. Useful geologic information on rate of

groundwater recharge to assist in RRCA operations. 2. Downstream users can benefit from the availability of this conserved surface water, which enables managed releases at times of peak demand in August. 3. This saved water can potentially be used to retime Compact augmentation water. 4. Early season enhanced groundwater recharge will enhance aquifer storage and assist in reducing aquifer depletion. 5. Enhanced recreational outcomes at Harlan County Lake resulting from an increase in the volume of water retained in the reservoir. 6. Wildlife benefits for migratory bird species. 7.Reduction in invasive vegetation with improved water quality outcomes

- 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). The project is not primarily intended to generate revenue – NBID’s main interest with this project is to be sustainable with the basin’s water supply going forward. The project is designed to be implemented in one year so that the full benefits of water savings can be realized in the first year following the winter construction program. Accordingly, the full project budget of \$3,200,000 will be spent within the first year, and the full project benefits will accrue equally over the 30 year economic life of the project. These benefits and costs are documented over the life of the project in the accompanying costings spreadsheet.
- 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). Storage is often required to maintain water availability in dry years. Basin sustainability is improved by maximizing the availability of stored water. Management of basin sustainability means managing the availability of stored water to meet the needs of users. The precise management of the volume and timing of supply releases improves basin sustainability by ensuring that water is available at the time of need of downstream users and that water does not pass through the system without benefit. This project will enhance water sustainability in the Republican River basin by providing the following benefits: 1. Enhanced groundwater recharge in wet years -water-tight gates can be used to run specific sections of canals deeper for longer and therefore provide targeted incidental recharge, adding water availability to the system. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. Improvements in water quality for downstream users and accompanying improvements in river health - water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. In addition river flows are increased along the

reaches parallel to irrigation districts, with associated environmental benefits. These benefits provide positive impacts to all users in the river basin.

4. Provide evidence that sufficient funds are available to complete the proposal. See the attached statement of support and commitment of matching funds from the Lower Republican Natural Resources District.

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

See attached 2017 Budget for NBID. Note: income is based on 22,455 acres X \$25.00 per acre plus \$3 per acre-inch per 20,000 acres allocated. The District's operating budget is sufficient to cover annual operating and maintenance costs.

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 is involved.

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

The plan of development will minimize the impact on the natural environment by ensuring the following: 1. Civil construction works will be limited to minimal modification to existing concrete structures and will not require excavation or moving of earth. 2. No chemicals will be released into soils or waterways as a part of these works. 3. The solution is a zero energy solar powered solution which will not create green-house gas emissions and which provides a zero energy zero emission alternative to groundwater pumping. 4. The solution provides wildlife benefits to sustain the environment by increasing instream flows. 5. The regulation of canal flows and water levels remotely via remote telemetry reduces vehicular usage and associated exhaust emissions and road wear and tear. 6. The regulation of canal flows and water levels remotely via remote telemetry provides early warning via SCADA utilizing text messaging and email warnings of high or low flows and or high and low water levels.

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

As General Manager and operator of NBID's assets, the governing Board for Nebraska Bostwick Irrigation District and Management is responsible and legally capable of carrying out the project. Our field operations crews have the qualifications, certification and operational experience to undertake the civil works required in this project. All control gate hardware, communications, and software is being installed by Rubicon Water, a specialist company who has more than 20 years'

experience installing and commissioning systems as specified in our proposal.

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

This plan will help Nebraska ensure compliance with the Republican River Compact by reducing the amount of storage water needed to operate the Franklin Canal each year. Harlan County Reservoir is the main source of supply for Kansas Bostwick Irrigation District. With the newly developed Integrated Management Plans (IMP) developed by the State of Nebraska and local Natural Resources Districts (NRD) one management action identified as a tool to help Nebraska achieve compliance is "Surface Water Leases". This concept was successfully implemented in 2007 when Nebraska Bostwick users on the Franklin Canal system agreed to forgo irrigation and allow Reclamation to move Storage water from Harlan Reservoir downstream to Kansas as an offset to groundwater depletions. The water was then available to the Kansas Bostwick Irrigation District. The water saved with this project could be available via this same marketing mechanism and used as an offset for any of the supporting NRDs. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE

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 governing Board for NBID adopted the enclosed resolutions at the July 26 2017 Board Meeting supporting this project.
12. Identify the probable environmental and ecological consequences that may result as the result of the project. There will be no adverse environmental or ecological consequences that may result from the project.

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.

This project will provide better control of water stored in Harlan County Reservoir and allow increased in-stream flows in the later season to better guarantee quantity and quality of drinking water supply. By precisely managing

the release of storage water, more water can be retained in storage in Harlan County Reservoir to provide greater certainty of supply during extended dry periods. Relatively recent periods of water scarcity have resulted in several years of canals not operating and providing recharge, and this has heavily impacted some domestic drinking water supplies in the basin. As an example, people in the Republican Basin have in the past experienced dry wells south of McCook. This project will help manage stored water to provide greater opportunity to manage future dry seasons and avoid a repeat of these impacts. In addition, maintaining storage levels in Harlan County Reservoir will reduce the impact of invasive vegetation species and prevent the reservoir from becoming impaired with pollutants such as Chlorophyll A, nitrogen and phosphorous. Maintaining higher flow rates through the Republican River can improve drinking water quality and security of supply for downstream users. Drinking water quality is enhanced because water is supplied direct to the river, rather than returned as agricultural irrigation spill flows. This maintains a cleaner water supply which is free of agricultural chemicals that can be added by irrigation spill water. This solution has been adopted by our neighbors Frenchman Cambridge Irrigation District to provide the above benefits upstream on the Republican River. This solution has also been adopted in response to water shortages in Australia and California to benefit the drinking water supplies of cities and municipalities.

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.

The three Natural Resources Districts (URNRD, MRNRD and LRNRD) located in the Republican River Basin have all developed an Integrated Management Plan (IMP). The last modification to the plan went into effect on January 15, 2016 when it was approved by the Board for each NRD and the Director of DNR. The main goal of the plan is to ensure compliance with the Republican River Compact. This project supports this goal by increasing the availability of stored surface water in Harlan County Reservoir and providing the opportunity to make this water available for release at times that would best suit the needs of end users and of the Republican River Compact. The history of work previously completed to achieve the goals of the Integrated Management Plan includes: 1. Conservation Reserve Enhancement Program (CREP) - Thousands of acres in the basin have utilized the CREP, including acres within the NBID project area. 2. Surface water and ground water leases. 3. Augmentation and retiming of stream flows. 4. Groundwater recharge using Federal projects. 5. Conjunctive management – irrigating co-mingled acres with

surface water during times of excess compact allocation. This project will support and expand upon many of these previous initiatives by making more surface water and groundwater available for leases, by providing additional augmentation and retiming of stream flows, by enhancing groundwater recharge, and by further encouraging and enabling conjunctive management. By providing these opportunities the project meets several goals of the IMPs: 1. It ensures that surface water users assume their share to keep Nebraska in compliance by allowing them to continue to grow a crop with less water diverted. 2. It improves the opportunity to grow a crop each year there and thereby reduces adverse economic, social, and environmental consequences. 3. It reduces the need for increased regulations by providing an opportunity for the NRD to lease or purchase some of the surface water saved. 4. It enhances the canal system's groundwater recharge to many wells (irrigation and domestic) that may not have a water supply without adequate recharge in dry periods that may occur in the future. Factoring in all of these opportunities that the project creates, it can be seen that it well supports the Republican River Basin's Integrated Management Plan.

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.

This project increases the sustainability of the Republican River Basin's aquifers and streams by increasing the opportunity for the surface water stored in Harlan County Dam to add to recharge and stream flow. At present, operational spills pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used. The precise management of the volume and timing of releases from Harlan County Dam improves basin sustainability by ensuring that water is available at the time of need to enhance stream flow and recharge aquifers and that water does not pass through the system without benefit. Maximizing the availability of this stored surface water provides additional opportunities and management options to enhance aquifer storage and increase streamflow. This project will provide the following benefits: 1. Enhanced groundwater recharge in wet years – the project's water-tight gates can be used to run specific sections of the Franklin Canal deeper for longer and therefore provide targeted incidental recharge, adding water availability to the system. The precise management of water-tight canal check structures allows a deeper storage / canal driving head which enhances the recharge rate both before and after the commencement of the

irrigation season, thereby adding water availability to the system along the length of the Franklin Canal. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. The additional stored water availability in Harlan County Reservoir means that river flows can be increased along the reaches parallel to Irrigation District, with associated environmental benefits. These benefits provide positive impacts to all users in the Republican River basin. The precise management of the volume and timing of supply releases ensures that water is available to instream flows and downstream users at their time of need, and does not pass through the system without benefit or become lost to non-beneficial use such as vegetation growth along the river corridor. It is much more efficient to move large amounts of water through the system during the winter months when vegetation is dormant and the river flows and alluvial aquifer have recovered from the mining of the aquifer during the irrigation season. The water saved with this project could be available via a "surface water lease" and used as an offset for the supporting NRD. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE. Increased stored water availability in Harlan County Reservoir reduces the need for river diversions and groundwater pumping – thereby increasing instream flows and reducing aquifer depletion. The cross-basin benefit that this provides is more opportunities and options to meet Republican River Compact obligations. This project will help Nebraska ensure compliance with the compact by reducing the amount of water needed to operate the Franklin Canal each year.

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.

This solution retains more surface storage water in Harlan County Reservoir, allowing retiming of the release of this conserved water to contribute to multiple water supply goals including stream augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources.

1. **Flood Control** - The ability to remotely control the flow control gates means that operational capability can be maintained when flood waters restrict vehicular access. This allows more capability to respond to flood events by maintaining the capability to operate structures when local access is not possible. The solution's water-tight gates can provide the capability to back water up and increase the rate of groundwater recharge to reduce the rate at which flood waters pass

downstream. The ability to operate the gates during a flood event also provides more routing opportunities and volume buffering opportunities to reduce localized flood damage.

2. Agricultural Use - The proposed solution will make more surface water available longer through the growing season and thereby extend water availability and resultant crop yields. For those farmers who rely solely on surface water, the additional water availability will increase crop yields. For farmers who use a mix of surface water and ground water, additional surface water will reduce pumping of groundwater and resultant aquifer overdraft and greenhouse gas emissions. In dry years, the additional water made available with this solution can mean the difference between a successful crop and a failed crop.

3. Municipal and Industrial Uses - Increased surface water security reduces farmers' needs for river diversions and groundwater pumping – thereby increasing instream flows and reducing aquifer depletion and making more water available for Municipal and Industrial Users. The retiming of release of storage water changes the time of availability of this water for downstream municipal and industrial users to times of scarcity later in the year around August. At present, operational spills pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used. In most years the spills enter a tributary that is normally dry and the flows never reach the river and in some years if the water does reach the river the river is found to be dry. The ability to control the release of this recovered water allows this water to be passed downstream later in the season when instream flows have recovered. This helps ensure that the water saved reaches the next Reservoir in the system. Water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river.

4. Recreational Benefits - Retaining more water in storage will sustain storage levels with resultant recreational benefits for reservoir users. This will benefit all recreational users of the Harlan County Reservoir. Nebraska Games and Parks has many examples demonstrating that higher reservoir levels increase the number of visitations per day. Additional recreational benefits are provided by the ability to retime storage releases so that more water is available when the river flows are improved, providing benefit to recreational river users.

5. Wildlife Habitat - The Republican River area within the District is host to many migratory bird species that use the Central Flyway on their annual journeys. The Franklin Canal is in the middle of the Sandhills Crane migration and Whooping Crane migration paths, which attract tourism revenue of \$80 Million to \$100 Million each year. Other migratory species, including shorebirds and songbirds, travel through by the millions and land on and near our lake and waterways, and although no longer listed as an endangered species, a significant population of protected Bald Eagles as well as Golden Eagles also remain resident in our district during portions of each year; several nesting pair of Bald Eagles now make a year-round home at Harlan County Reservoir. In addition, a very significant number of American White Pelicans utilize the Harlan County Reservoir within the boundaries of the District on their annual spring and fall migrations. A very large percentage of these birds rely heavily on the reservoirs within our local area as some of the only remaining feeding grounds still able to

support their migratory needs. The proposed project will make more water available to benefit these species and possibly help prevent some of the species from being re-listed as threatened or endangered. The species discussed above are not adversely impacted by any current Reclamation project; to the contrary, they are highly benefitted by the availability of Reclamation waters, low Reservoir pools at any of Reclamation Reservoirs in our area would pose a serious threat to these species. A low pool elevation for extended time also allows invasive vegetation to establish which also threatens animal habitat and recreation areas. The Environmental Protection Agency (EPA) has listed a few of the Federal Reservoirs as “impaired waters in Nebraska”; the 2010 pollutant identified Chlorophyll A, which is carried over from the 2008 list, total nitrogen and total phosphorus are new to the impaired waters list in 2010. Higher pool elevations would mitigate some if not all of these listed pollutants. (Species-specific information utilized above was obtained from the Nebraska Nature Conservancy, the Nebraska Game and Parks Commission, the Nebraska Bird Partnership, and the U.S. Army Corps of Engineers at Harlan County Lake). Wildlife habitat will benefit from an ability to retime release flows to buffer low flow situations that can occur late in the year. The solution provides improved water quality for downstream users and accompanying improvements in river health. Water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. River flows are also increased along the reaches parallel to irrigation districts, with associated environmental benefits.

6. Conservation of Water Resources - Better management and use of surface storages makes more water available to the river system in times of water scarcity – thereby conserving water resources. Several agencies would benefit from better canal flow data. First of all the water users of NBID would benefit from accurate and timely deliveries of the water supply. The State of Nebraska and the RRCA would benefit with a better understanding of the water balance of the Canal systems. Ground water irrigators would benefit from the recharge and perhaps in some areas of too much recharge, have good data would help with mitigating damages from too much recharge. Municipalities and small village along the River corridor would benefit from the canal recharge.

7. Preservation of Water Resources - The ability to manage the time of release of stored water allows more stored water to be banked for future dry years, thereby preserving the water resource. These benefits of enhanced groundwater recharge, increased instream flows and improved water quality provide positive impacts to all users in the river basin.

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.

This project will maximize the beneficial use of the storage water in Harlan County Dam for the benefit of the State's residents. The precise management of the volume and timing of supply releases maximizes the beneficial use of this water by ensuring that the water is best conserved in storage so as to be available at the time of need of downstream users and that water does not pass through the system without benefit earlier in the season. The project will maximize the beneficial use of Harlan County Dam's water by improving the management of the dam releases with real-time demand information which can be used to precisely set dam release flows to the exact value required to meet downstream demand. This information allows dam operators to operate with a high degree of precision to reduce draw down and release of water which is presently passing through the system at unmanaged times and so is not providing maximal managed benefits. The project will increase the beneficial use of Nebraska's water resources by making more surface water available at time of need, by reducing aquifer depletion, and by managed increases in instream flows to be available during times where these have been historically lower than required. The project will not result in any decrease or reduction in beneficial uses. The project provides a beneficial impact to the state's residents by sustaining agricultural yields, increasing instream flows to downstream users, ensuring cleaner water flows to downstream users, and reducing the requirement to pump groundwater with resultant reductions in greenhouse emissions and reduced load on electricity infrastructure. The project will also reduce the need for additional regulations. By making stored surface water available for beneficial use at its maximum time of need, this project can protect crops from water shortage, and can maintain stream flows during times of water shortage. By enhancing groundwater recharge in times of water surplus, the system can increase the availability of groundwater for the benefit of groundwater users and provide for enhanced and retimed stream flows. As well as conserving stored surface water, increasing instream flows and reducing aquifer depletion, the project will provide improved water quality for downstream users and accompanying improvements in river health by minimizing the spill of irrigation water back into the river. River flows are also increased along the reaches parallel to irrigation districts, with associated environmental benefits.

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 construction cost of this project is \$3,200,000. The outcome will be the ability to retime an average of 2,721 acre-feet of water each year for release at the time of need of downstream users. The O&M costs over the 30 year asset life of this solution are estimated at less than 2.5% of the capex – or less than \$80,000 per year. These O&M costs are expected to be largely offset by a reduction in existing costs such as vehicular usage and other operational costs. There are no land or water acquisition costs involved in this project. The benefits that will be realized are on average 2,721

acre-feet of water made available each year at the time of need of downstream users. When the capital costs of the project are amortized over the 30 year asset life, this water is made available at a cost of only \$39 per acre-foot per year – the value of this water is significantly greater than the cost of making it available. Experience shows that the adopted Total Channel Control automation solution typically costs as little as 1/10 the price of converting larger canals to pipeline, and generally is significantly cheaper than constructing balancing storages. The solution is economically attractive because it is adding to existing infrastructure investments and leveraging these previous investments. The costs of the project are a combination of control gate and telemetry hardware, civil works to modify existing structures, and labor associated with configuring the control system. These costs are documented in the attached product pricing spreadsheet. The water recovered by this project will be recovered and retained in surface reservoirs to be retimed for late season releases which will benefit a range of downstream interests including environmental, recreational, agricultural, and potentially interstate parties. This value will accrue each and every year of the project. The project is designed to be implemented in one year so that the full benefits of water savings can be realized in the first year following the winter construction program. Accordingly, the full project budget of \$3,200,000 will be spent within the first year, and the full project benefits will accrue equally over the 30 year economic life of the project.

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.

The Republican River Compact is a three state agreement between Colorado, Kansas, Nebraska and the Federal Government. This agreement sets out the amount of water that can be beneficially consumed by each state. Nebraska is allocated 49%, Kansas 40% and Colorado 11%. Most years Nebraska's consumption of its allocation exceeds their 49% share. Nebraska relies on the retiming of flows with conjunctive management and stream flow augmentation with N-CORPE to offset the overages in consumptions of its Compact allocation. The three states have agreed to yearly resolutions that provide Kansas Bostwick Irrigation District with 40,000 acre-feet or Nebraska projected overage whichever is the lesser amount. This water is to be in place in Harlan County Reservoir by June 1st of each year. This project helps Nebraska achieve the goal of placing 40,000 acre-feet into Harlan County Reservoir by June 1st by reducing surplus unplanned and unmanaged diversions from the reservoir. This saved water can then be supplied to Kansas in larger volume after the River flows have recovered from the irrigation season and when the vegetation along the river is dormant. At present, operational spills

pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used or credited. The current deficiency with the system is that the Franklin Canal has many waste ways or spillbacks and it is difficult to monitor and keep water from spilling due to surges in the canal flow. Most of the waste ways are located on dry tributaries to the Republican River and in most years the spills that enter these tributaries never reach the river. Another key compact management consideration is that it is much more efficient to move large amounts of water through the system during the winter months when vegetation is dormant and the river flows and alluvial aquifer have recovered from the mining of the aquifer during the irrigation season. The ability to control the time of release of the water recovered by this project allows this water to be passed downstream later in the season when instream flows have recovered. This helps ensure that the water reaches the next reservoir in the system and is not lost to non-beneficial use such as vegetation growth along the river corridor. By eliminating the unmanaged spill of surface water stored in Harlan County Reservoir the water can more effectively be used to achieve the goals of the Republican River Compact. With Rubicon's automated technology this project will ensure that the Franklin Canal wasteways will not spill and the recovered water will be stored in Harlan County Reservoir. Recovering and retiming of flows will help meet interstate compacts by retaining more water in Harlan County Reservoir to meet the requirements of the June 1st deadline.

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 project would reduce the risks of loss of property on all the lands located below the Franklin Canal project including farm land and residential property as the canal passes under and by the cities of Naponee, Franklin, Riverton and Red Cloud. With this project the risk of loss is greatly reduced. With this project any flows that enter the canal from runoff events or a power outage that would shut off nearly 80 center pivots at the same time would be safely passed through the system. This project also has early warning alarms that would trigger actions by NBID personnel and local agencies and villages if the canal was at risk of overtopping. The public safety is always a big concern when running canal water through areas such as villages and towns.

NBID currently operates a gage in Republican City Nebraska that is available online at: http://www.usbr.gov/gp-bin/hydromet_dayplt.pl?caoxne&qc&-4. The deficiency with this gage is that it has a 1-hour delay in the data stream and no ability for an early warning. This project can provide real-time telemetry alerts within seconds and can text or email alarms to the appropriate response team. The early warning and alarms are available at every check structure and can be monitored through the system or the canal could be evacuated at one of the waste-ways if needed.

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.

During normal canal operations chemicals are used to control algae and a variety of plant vegetation with the most common infestations being pond weed. The chemicals used have been deemed safe for this treatment. However, not allowing the chemicals to leave the canal system would be most desirable management approach, and this project would accomplish this outcome. Without this project it would be impossible to eliminate discharge from the canal, the other remedy would be to reduce the inflows during treatment which may not be practicable during high irrigation demands. Historically treatment has been applied as needed, there is always an attempt to make the applications at lower flows when less chemicals are required and less discharge from the canal due to the lower inflows. This project will also reduce the impact of invasive vegetation species and help prevent the Harlan Country Reservoir from becoming impaired with pollutants such as Chlorophyll A, nitrogen and phosphorous. Maintaining higher flow rates through the Republican River can improve drinking water quality for downstream users.

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.

Nebraska Bostwick Irrigation District has received a commitment of \$1 million in funding from the board of the Lower Republican NRD. This motion

committing LRNRD financial support stipulates that the Nebraska Department of Natural Resources must agree to provide an acceptable amount of credit for the water savings under the compact accounting procedures. This collaboration between LRNRD and the Nebraska Bostwick Irrigation District is a positive step in collaborative and cooperative management by these parties in managing the basin. For NBID to be sustainable in the future we acknowledge water conservation and technology will be a key component to achieve this goal. We have visited with Frenchman Cambridge Irrigation District and discussed their implementation of a very similar project and have agreed to collaborate with them in ensuring a knowledge and skill base for this solution in the Lower Republican basin.

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 Nebraska Legislature has passed legislation requiring the local NRDs to adopt a plan that puts the basin on a path of sustainable management of the basin's water supply within the next 30 years. This plan is currently in the development phase and is required by law to be adopted within three years of the legislation. The history of work completed to achieve the goals of the sustainable basin plan is described in the responses to Question 2. In summary, the history of work previously completed to achieve the goals of the Integrated Management Plan includes: 1. Conservation Reserve Enhancement Program (CREP) - Thousands of acres in the basin have utilized the CREP, including acres within the NBID project area. 2. Surface water and ground water leases. 3. Augmentation and retiming of stream flows. 4. Groundwater recharge using Federal projects. 5. Conjunctive management – irrigating co-mingled acres with surface water during times of excess compact allocation. The history of work completed to achieve the specific outcomes of this project includes the collaboration with the LRNRD, the US Bureau of Reclamation and the US Army Corps of Engineers to define the implementation and benefits and obtain support for this project. This project helps meet the goal of the basin plan to achieve sustainable management by preventing the average yearly spill of 2,721 acre-feet per year from the Franklin Canal and allowing retiming of the release of this conserved water to contribute to multiple water supply goals including stream

augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources. This project supports these goals by increasing the availability of stored surface water in Harlan County Reservoir and providing the opportunity to make this water available for release at times that would best suit the needs of end users and of the Republican River Compact. The project will benefit the 22,455 acres serviced by NBID and will also benefit the users of water downstream on the Republican River including Kansas. By enhancing the quantity and quality of water in Harlan County Dam and the quality and quantity of instream flows in the Republican River the project will benefit residential, industrial, agricultural and recreational users in the lower Republican River Basin. This solution retains more surface storage water in Harlan County Reservoir, allowing retiming of the release of this conserved water to benefit multiple users of this water supply including stream augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources. The stakeholders involved in the project are Nebraska Bostwick Irrigation District and The Lower Republican Natural Resources District as the funding partner who will commit the 40% cost share. NBID looks forward to the adoption of this plan.

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.

This project will help Nebraska ensure compliance with the Republican River Compact by reducing the amount of storage water needed to operate the Franklin Canal each year. Harlan County Reservoir is the main source of supply for the Franklin Canal. With the newly developed Integrated Management Plans (IMP) developed by the State of Nebraska and local Natural Resources Districts (NRD) one management action identified as a tool to help Nebraska achieve compliance is "Surface Water Leases". This concept was successfully implemented in 2007 when Nebraska Bostwick users on the Franklin Canal system agreed to forgo irrigation and allow Reclamation to move Storage water from Harlan Reservoir downstream to Kansas as an offset to groundwater depletions. The water was then available to the Kansas Bostwick Irrigation District. The water saved with this project could be available via this same marketing mechanism and used as an offset for the supporting NRD. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE. Compact compliance is a state wide issue. This project will help the State ensure the required compliance by the most practical and economic

means by banking the saved water within Harlan County Dam and Lake. This banked water could be made available to help the State meet its obligation. The water that will be retained in storage can be retimed to return to the stream at times of peak demand and need in August. The saved water could also be utilized to retime Compact augmentation water before it is actually pumped from the ground. This would help further insure that Nebraska meets all deadlines associated with future Compact resolutions. The project addresses the impact of water scarcity upon the state by increasing the available stored water which can help many parties prosper through dry conditions, including the agricultural economy, the tourism economy, and the municipal and urban water users who rely on aquifers and stream flows for their water supplies. In addition to this primary benefit, the following secondary benefits are also delivered: 1. Useful geologic information on rate of groundwater recharge to assist in RRCA operations. 2. Downstream users can benefit from the availability of this conserved surface water, which enables managed releases at times of peak demand in August. 3. This saved water can potentially be used to retime Compact augmentation water. 4. Early season enhanced groundwater recharge will enhance aquifer storage and assist in reducing aquifer depletion. 5. Enhanced recreational outcomes at Harlan County Lake resulting from an increase in the volume of water retained in the reservoir. 6. Wildlife benefits for migratory bird species. 7. Reduction in invasive vegetation with improved water quality outcomes

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 Lower Republican Natural Resources District is the funding partner and is willing to commit to 40% cost share. The attached letter confirms this commitment from LRNRD.

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.

This project will enhance water sustainability in the Republican River basin by providing the following benefits: 1. Enhanced groundwater recharge in wet years - water-tight gates can be used to run specific sections of canals deeper for

longer and therefore provide targeted incidental recharge, adding water availability to the system. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. Improvements in water quality for downstream users and accompanying improvements in river health - water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. In addition river flows are increased along the reaches parallel to irrigation districts, with associated environmental benefits. These benefits provide positive impacts to all users in the river basin. The NBID canal systems have been in place for over 60 years. People have relied on recharge from the canal systems to help maintain their domestic wells and maintain small springs that have come to be on their property because of the canal system and its recharge. Some of these springs provide livestock water in remote parts of pastures. Experience in the west parts of the Basin has shown what can happen when canals cease to exist or have intermittent operations. This project would help insure that the annual recharge would continue into the future.

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 important annual report utilized by the State for the Republican River basin is the final computation by the Republican River Compact Administration reporting the basin's water supply and the water consumed by each state. This report is adopted at the annual RRCA meeting held each year in August. From these numbers the compliance test is measured and that is the overall objective of the State and residents of the Republican River Basin. This project would capture spills from the Franklin Canal and consolidate them in Harlan County Reservoir and would make them available to better manage the approach to ensuring interstate Compact compliance.

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 Republican River Compact is a Federal mandate. The compact is very simple, don't consume more than your states' allocation. This project helps greatly reduce non-beneficial use of water stored of Harlan County Reservoir. NBID also has contract repayment obligations to the Federal Government until the year 2040. Implementing projects such as this project is a step in the right direction to ensure that this contract can be paid back as scheduled. See attached Contract 009D6B0121 and amendments.

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 Nebraska Bostwick Irrigation District Storage Enhancement and Retiming Project will enhance water sustainability in the Republican River basin by recovering on average more than 2,700 acre-feet of unmanaged operational spill from the Franklin Canal each year, retaining this water in Harlan County Reservoir and allowing retimed release to contribute to multiple water supply goals including enhanced groundwater recharge, stream augmentation, flood control, sustained crop production, preservation of wildlife habitat, and assisting with interstate compact compliance. The ability to precisely control flows through the Franklin Canal will allow enhanced groundwater recharge in wet years, reduced excess river extractions, enhanced groundwater and surface reservoir storage in dry years and improved water quality for downstream users and accompanying improvements in river health. Precise flow measurement and control gates will be installed on the Franklin Canal. A control system will continually update real-time flow setpoints through the canal so that the supplied flows precisely match the downstream demand, and unintended operational spill is eliminated.

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 construction which involves the installation of flow control gates into existing structures will be undertaken over the winter of 2017. The project will be installed and operational for the 2018 irrigation season.

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.

The LRNRD has provided letters of financial support and acknowledged the benefit to all irrigators in the basin and the long term benefit to all Nebraskans with regards to Compact compliance. The NRDs play an important role in the basin with regards to groundwater management and the associated depletions to the streamflow that is allowed under the Compact.

Additionally, the United States Bureau of Reclamation supports this project and the positive effect this project will have on the management of Federal Reservoirs in the basin and the many recreational benefits to the area from improved lake elevations. Reclamation has many water users under these federal projects that rely on the irrigation water for their livelihood. Reclamation can also take the information learned from this project and other projects like this and apply them to other areas in the western United States that they also manage.

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 costs of the entire project will be \$3,200,000. The Lower Republican Natural Resource District has committed funds of \$1,000,000 to this project, Nebraska Bostwick Irrigation District will commit \$200,000 and the remaining \$2.0 Million is being sought from the Water Sustainability Fund. NBID serves 22,455 acres. Each year NBID budgets approximately \$6 dollars per acre for water conservation and will increase that after this project is approved if needed.

5. Support/Opposition

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

Nebraska Bostwick Irrigation District and Rubicon Water have visited each of the NRD, the US Army Corp of Engineers and the Bureau of Reclamation. We have also visited with Kansas Bostwick Irrigation District about automating the head gate at Guide Rock Diversion Dam so that all the releases from Harlan County Reservoir would be captured by the Kansas Bostwick Irrigation District. Everyone has approved of the project and are interested in the technology. We have not received any opposition from groups or Individuals.