



**The Nebraska
Environmental Trust**

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NEBRASKA ENVIRONMENTAL TRUST FUND

APPLICATION COVER SHEET

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

Instructions to word processing users. Double click on each slash character (" \ "), including the ones above in the header, and replace them with your entry. Use your find function (Ctrl + F) to find the slash character "\". This will position your cursor at each response.

- 3. County(s) where project is located: Harlan, Franklin, Webster and Nuckols
- 4. Nearest town: Red Cloud
- 5. Total Amount Requested: \$343,000
- 6. Years of funding requested (select one): 2

Contact Person:

- 7. Name: Mike Delka
- 8. Title: Manager

9. Organization: Bostwick Irrigation District

10. Address, City, State & Zip: P.O. Box 446; Red Cloud, Nebraska 68970-0446

- 11. Daytime Phone: (402) 746-3424
- 12. Alternate phone: None
- 13. Fax: (402) 746-3424

- 14. E-mail bostwick@gpcom.net
- 15. Sponsor web page: None

- 16. Is this a continuation request for a project previously funded by the Trust: YES NO: No
- Is this a resubmission of a project application previously not funded by the Trust: YES NO: No

17. Please indicate which category best describes the applicant: Irrigation
 Selections are: Individual City or County Natural Resources District Federal Agency Private for Profit
 Private Nonprofit Consortium School, Irrigation, Power or Development District State Agency Other (specify):

18. Will this project receive federal funds or require a federal review or permit? YES NO: Yes
 If yes, identify the agency(s) and its role:

U.S. Bureau of Reclamation will provide some funds for pipeline projects.

19. Will this project receive other State of Nebraska funds or require a state review or permit? YES NO: No
 If yes, identify the agency(s) and its role:

20. In **300 words or less** provide an overview of the project for which you seek funding. If you are asking the Trust to fund only a portion of the project, indicate the components for which you seek funding.

The Bostwick Irrigation District (BID) seeks funding for a variety of projects which conserve water in a water-short area and will improve the capability of the State of Nebraska to comply with the Republican River Compact. BID receives water from the Harlan County Reservoir and delivers it to its customers through five separate canals. Additionally, at the Guide Rock Diversion Dam approximately 50 miles downstream from Harlan County Reservoir, the State of Nebraska is obligated to deliver water to the State of Kansas through the Courtland Canal pursuant to the Republican River Compact and the settlement of the case of Kansas v. Nebraska.

This proposal can be divided between those projects above and below Guide Rock. The projects below Guide Rock include improved utilization of water by BID and recovery of water in the river for delivery to Kansas through the Courtland Canal. These projects can provide more water to BID, reduce demand on Harlan County Reservoir and provide additional water to Kansas. Thus, these projects will provide benefits not only to BID but also to the State of Nebraska.



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Projects above Guide Rock include the study and, where feasible, the design of storage reservoirs on three tributaries below Harlan County Reservoir. The storage of water in these reservoirs during the non-irrigation season and later release during the irrigation season, reduces the draw on Harlan County Reservoir and from the balance of the Republican River Basin in Nebraska. These projects could thus supply water for both BID and Kansas, thereby benefiting the State of Nebraska.

Completing the projects will be possible through finances and in-kind contributions from BID and partners including the U.S. Bureau of Reclamation, Lower Republican NRD and the State of Nebraska.

On behalf of the sponsor(s) named above, I hereby certify that the information contained in this application, including all attachments, is true, accurate and complete.

	Manager	
Authorized Signature of Sponsor Organization	Title	Date
Name printed or typed: Mike Delka		



NEBRASKA ENVIRONMENTAL TRUST FUND

NARRATIVE SECTION

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

In five pages or less, provide a discussion of your project. Be sure to cover the points specified in the instructions.

INTRODUCTION

This project focuses explicitly upon developing water conservation and/or effective and efficient water management in the Lower Republican River area served by the Bostwick Irrigation District, which is an area designated as water short by the Department of Natural Resources. The project as described builds upon earlier work funded by the Nebraska Environmental Trust Fund and other governmental entities. The project utilizes the work done to this point and where necessary, requests funds for additional engineering, hydrologic and legal work to be performed to complete the feasibility assessment and design and implementation work for particular components described in more detail hereafter. In general, the project includes water efficiency and reuse components such as pipelines and small diversion structures as well as more complex components which may entail the design and construction of reservoirs and pumping stations. All of this work has to be done not only to improve the conservation and efficiency of the use of the water but it is the explicit intent of this project to not only save water but to also assure that water is made available to the state of Kansas pursuant to the settlement agreement in the *Kansas v. Nebraska* lawsuit. As a result, this project, based upon the reconnaissance level work already performed, could make as much as 35,000 acre feet a year available to the Bostwick District and/or the state of Kansas. This project, thus, is in a position to provide a significant contribution to the state of Nebraska's obligations to the state of Kansas pursuant to the Republican River Compact and the settlement of a lawsuit brought by Kansas against Nebraska.

BACKGROUND

A. Bostwick Irrigation District

The Bostwick Irrigation District is a political subdivision of the state of Nebraska pursuant to state law. It serves approximately 23,000 acres in the Republican River Basin immediately downstream from the Harlan County Dam along the Republican River until it enters the state of Kansas. The District serves lands contained in Harlan, Franklin, Webster and Nuckols Counties in Nebraska. The District is more than 80 miles long from west to east and utilizes five canals to deliver surface water to its users. The Franklin Canal is on the north side of the Republican River, is 49 miles long and originates out of the Harlan County Dam. The Naponee Canal also originates from the Harlan County Dam, is located on the south side of the Republican River and is approximately seven miles in length. The Franklin Pump Canal takes water out of the Republican River approximately 15 miles downstream from the Harlan County Dam and is approximately five miles long on the south side of the river.

One of the most significant physical features of the District is the Guide Rock Diversion Dam located just west of Guide Rock, Nebraska. The dam diverts the flow of the river into two canals. On the north side is the Superior Canal that is approximately 30 miles in length. On the south side is the Courtland Canal which is approximately 15 miles in length in Nebraska but continues into Kansas servicing the Kansas Bostwick Irrigation District. Thus, the canal serves lands not only located in Nebraska but also approximately 42,000 acres in Kansas. The Guide Rock Diversion Dam is critical in the determination of Nebraska's obligations to provide water to the state of Kansas pursuant to the Republican River Compact and the settlement of the lawsuit brought by Kansas against Nebraska in the U.S. Supreme Court.

The Bostwick Irrigation District in Nebraska (as well as the Bostwick Irrigation District in Kansas), initially receives its supply from the Harlan County Reservoir. Water released out of the reservoir is used by the five canals. The canals that divert out of the river downstream from the Harlan County Reservoir, also benefit from the return flows and groundwater recharge from the surface water irrigation provided by the two canals that receive water directly out of the Harlan County Reservoir. These return flows and groundwater recharge provide substantial benefits not only to Nebraska irrigators but also to users in Kansas.



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B. Kansas v. Nebraska lawsuit.

Kansas sued Nebraska in the U.S. Supreme Court alleging that Nebraska was violating the Republican River Compact by failing to deliver water that Kansas alleged it was entitled to receive. Kansas' allegations were based to a significant degree upon the allegation that Nebraska was consuming more than its share of the water as the result of the use of groundwater that depleted the flows of the Republican River. The lawsuit was recently settled and the settlement documents now specify obligations that the state of Nebraska has to deliver water to Kansas. In essence, to the extent that Nebraska Bostwick can increase its efficiency, especially below the Guide Rock Diversion Dam, it has the effect of increasing the water supply for Nebraska Bostwick without having to increase the withdrawal of water from the Harlan County Reservoir. The result is to make more water available to Kansas. Additionally, to the extent that Nebraska Bostwick can make water available to Kansas through the Courtland Canal, the result will be to reduce the demand for water from other sources including the rest of the Republican River Basin in Nebraska. This project has the effect of improving Nebraska Bostwick's supply and increasing the water available to Kansas. This project is thus a tremendous benefit for the entire Republican River Basin in Nebraska.

C. Work already performed which identifies projects with the greatest potential.

Several studies have been completed which have identified a number of potential projects which need further investigation or design work as a step in their construction.

In 1984, the Bureau of Reclamation completed a proposed rehabilitation and betterment report for the Bostwick Irrigation District. Within that report, the Bureau identified a number of projects that might be pursued which could improve the efficiency of water delivery. In particular, the installation of buried pipe in various locations could improve the efficiency of water delivery. The engineering data for those projects is contained in that report. At this time, installation of some of the most beneficial segments is proposed.

More recently, in conjunction with efforts to find some possible projects that could increase the water supply for the Lower Republican River, the Bureau of Reclamation prepared a Value Study Report dated December 17, 2002. At a reconnaissance level, the study identified several possible projects that the Bureau considered. Aspects of some of those projects are also proposed for more detailed study and design.

The Nebraska Environmental Trust Fund has also provided funding for a number of studies and other work in the Republican River Basin. Initially, the Trust Fund provided substantial financial assistance to the natural resources districts and irrigation districts in the basin as they formed an association to have Matt Landon of the U.S.G.S. prepare a groundwater model of the entire Republican River Basin. Subsequently, monies from the Trust Fund were also provided to groundwater users in the basin to assist in paying for meters for those users. Most significantly, the Trust Fund has also provided funding to the Integrated Irrigation Improvement Project being undertaken by the Nebraska State Irrigation Association along with its partners. As a part of this study, a number of potential projects have been identified which at the reconnaissance level reflect that as much as 35,000 acre feet a year may be available from conservation and reuse by Nebraska's Bostwick Irrigation District for it and/or the state of Kansas. Additional hydrologic, engineering and legal work needs to be completed on some of the elements to assure that the projects are able to deliver water in a cost effective manner without adversely affecting Nebraska's obligations to Kansas and where possible, to increase the water supply to Kansas.

PROJECT DESCRIPTION

The following projects are divided between those located at and upstream from the Guide Rock Diversion Dam and those downstream from the Guide Rock Diversion Dam. Projects upstream from the Guide Rock Diversion Dam will need to be very carefully designed and implemented in such a way as to first, avoid any adverse hydrologic consequences on the state of Kansas; second, operate in compliance with the laws of the state of Nebraska regarding the priority of any existing water rights that may be affected by the projects and third, designed and developed so that they maximize the amount of water

Electronic Grant Application
April 2003



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saved while recognizing existing obligations. The projects to be located downstream from the Guide Rock Diversion Dam will also need to comply with Nebraska state law regarding the prior rights of existing water users. However, projects located in this area have the potential for substantially increasing the benefits to Nebraska to the extent they can reduce needs in this area and thereby making more water available to Kansas or by directly providing additional water that can be delivered to the state of Kansas through the Courtland Canal as specified by the settlement of the Kansas v. Nebraska lawsuit. Because water which is flowing in the river below the Guide Rock Diversion Dam is not credited to Nebraska pursuant to the Republican River Compact, using that water in lieu of using water from above the Diversion Dam or providing that water to the state of Kansas in the Courtland Canal, projects located in this area which produce those results, are especially valuable to the state of Nebraska.

PROJECTS BELOW THE GUIDE ROCK DIVERSION DAM

I. Potential reservoir on Beaver Creek.

Beaver Creek is a tributary to the Republican River. Reconnaissance level investigations indicate that depending upon a suitable location for a reservoir, the potential savings could be between 5,000 and 10,000 acre feet. Such a reservoir could also provide improved water fowl habitat and a potential fishery. Engineering work needs to be performed to locate a suitable site for a dam and hydrologic and other investigations need to be conducted to determine yield from such a reservoir and demands that may be placed upon the storage water for downstream users. At the present time, approximately 10 to 15 cubic feet per second is dumped into Beaver Creek during the non-irrigation season from water which seeps into the Superior Canal. If estimates of the flow coming out of the canal are accurate, this could amount to approximately 5,000 acre feet per year. If flows in the creek from other sources could also be stored, the yield could be as high as 10,000 acre feet a year.

II. Sub-surface drains.

The U.S. Bureau of Reclamation's Value Study Report examined the existing sub-surface drains that are already in existence collecting water which is provided by the Superior Canal through surface water deliveries that then seep into the ground and into the sub-surface drains. The Value Study Report suggested piping the water across the river and to the Kansas Bostwick District. However, a much cheaper alternative could be developed that would provide the water to the Nebraska Bostwick Irrigation District at potentially a much lower cost. The consequence could be more water for the Nebraska Bostwick District which might result in a smaller demand being placed by it for water at the Guide Rock Diversion Dam and thus, more water could be available for the state of Kansas.

III. Pumping water from the Republican River into the Courtland Canal.

There are several possible locations for a pump station in the Republican River downstream from the Guide Rock Diversion Dam that are located relatively close to the Courtland Canal. Based upon water that bypasses the Guide Rock Diversion Dam, water that returns to the river from return flows from surface water irrigation, and from groundwater discharge into the Republican River, the Value Study Report estimated that between 2,600 and 3,600 acre feet a year could be pumped into the Courtland Canal. However, based upon subsequent consideration of the location of different potential pump sites, the cost to develop this water source is estimated to be substantially less than that identified in the Value Study Report. Additional feasibility work is necessary to better assess the quantity of water available and the cost to develop a pump station.

IV. Small tributary flows.

Three small creeks have been identified which presently bypass the Superior Canal and pass their flows directly into the river. Designing and constructing diversion structures that reroute these flows into the Superior Canal could yield 800 to possibly 1,500 acre feet per irrigation season. These flows have been identified by the District through the Integrated Irrigation Improvement Project as flows of Willow Creek, flows out of Pawnee Lake and flows of Simpson Creek.



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PROJECTS ABOVE GUIDE ROCK DIVERSION DAM**

Storage reservoirs on tributaries to the Republican River between the Harlan County Reservoir outlet and the Guide Rock Diversion Dam would have to be operated so as not to interfere with natural flow users located downstream from the reservoirs and so as not to interfere with Nebraska's obligation to provide water to the state of Kansas pursuant to the Republican River Compact. However, reconnaissance level reviews of the gauge data for Turkey Creek, Thompson Creek and Elm Creek all reflect that during the non-irrigation season the mean monthly flows could be as high as 30,000 acre feet in the aggregate. Possible reservoir sites need to be investigated, hydrologic data needs to be more carefully assessed and yield needs to be determined based upon prior existing rights. However, the location of geologically sound sites for reservoirs and determination of usable yields could result in the storage of potentially significant quantities of water available not only for irrigation season releases and use by the Bostwick Irrigation District but also more effective and timely releases of storage water for the use by Kansas.

ASSESSMENT OF ADDITIONAL WATER SAVING PROJECTS

Additional water saving projects include the implementation of burying pipelines as suggested in the 1984 Bureau of Reclamation study. The cost to convert open laterals to buried pipelines varies depending upon the location and size of pipe. Installation of pipelines reduces evaporation, use of water by non-beneficial plants and reduces maintenance and personnel costs, all while improving the flexibility in the use of the water delivered. It is proposed that in each of the next two years \$150,000 will be spent on pipes and fittings for buried pipelines. The district's contribution will be through the cost of labor and equipment usage. Priority will be given to the Superior and Courtland canals where the greatest benefits can be achieved for the State of Nebraska.



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**NEBRASKA ENVIRONMENTAL TRUST FUND
APPLICATION BUDGET SUMMARY**

H1. Project Sponsor: Bostwick Irrigation District

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BUDGET YEAR: SUMMARY

COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
Row 1: Source of Funds Budget Categories	Nebraska Environmental Trust Fund	Bostwick Irrigation District	U.S. Bureau of Reclamation	Lower Republican NRD/ State of Nebraska	TOTALS
2. Beaver Creek Reservoir	\$ 6,000	In Kind \$ 500	In Kind \$ 500	In Kind \$1,000	\$ 8,000
3. Reuse of Drain Water	\$ 4,000	In Kind \$ 500	In Kind \$ 500		\$ 5,000
4. Republican River Pump Station	\$ 4,000	In Kind \$ 500	In Kind \$ 1,000		\$ 5,500
5. Small Tributary Diversion Structures	\$ 16,000	In Kind \$ 5,000			\$ 21,000
6. Tributary Dam Designs	\$ 13,000		In Kind \$ 1,000	In Kind \$1,000	\$ 15,000
7. Pipeline Projects	\$300,000	In Kind \$400,000	\$40,000		\$740,000
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16.					
17.					
18. TOTALS	\$343,000	\$406,500	\$43,000	\$2,000	\$794,500



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APPLICATION BUDGET YEAR ONE

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

BUDGET YEAR: ONE

(This page is used by multi-year grants only. If your project is not a multi-year grant, then ignore or delete this page.)

COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
Row 1: Source of Funds Budget Categories	Nebraska Environmental Trust Fund	Bostwick Irrigation District	U.S. Bureau of Reclamation	Lower Republican NRD/ State of Nebraska	TOTALS
2. Beaver Creek Reservoir	\$ 6,000	In Kind \$ 500	In Kind \$ 500	In Kind \$1,000	\$ 8,000
3. Reuse of Drain Water	\$ 4,000	In Kind \$ 500	In Kind \$ 500		\$ 5,000
4. Republican River Pump Station	\$ 4,000	In Kind \$ 500	In Kind \$ 1,000		\$ 5,500
5. Small Tributary Diversion Structures	\$ 3,000	In Kind \$ 5,000			\$ 3,000
6. Tributary Dam Designs	\$ 13,000		In Kind \$ 1,000	In Kind \$1,000	\$ 15,000
7. Pipeline Projects	\$150,000	In Kind \$200,000	\$20,000		\$370,000
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18. TOTALS	\$180,000	\$201,500	\$23,000	\$2,000	\$406,500



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APPLICATION BUDGET YEAR TWO

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

BUDGET YEAR: TWO

(This page is used by multi-year grants only. If your project is not a multi-year grant, then ignore or delete this page.)

COLUMN A	COLUMN B	COLUMN C	COLUMN D	COLUMN E	COLUMN F
Row 1: Source of Funds Budget Categories	Nebraska Environmental Trust Fund	Bostwick Irrigation District	U.S. Bureau of Reclamation	Lower Republican NRD/ State of Nebraska	TOTALS
2. Beaver Creek Reservoir					
3. Reuse of Drain Water					
4. Republican River Pump Station					
5. Small Tributary Diversion Structures	\$ 13,000	In Kind \$ 5,000			\$ 18,000
6. Tributary Dam Designs					
7. Pipeline Projects	\$150,000	In Kind \$200,000	\$20,000		\$370,000
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14.					
15.					
16.					
17.					
18. TOTALS	\$163,000	\$205,000	\$20,000		\$388,000



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APPLICATION BUDGET JUSTIFICATION

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

1. Have other sources of funding not listed in the Budget Worksheet been approached for project support? If yes, name them and explain the outcome of your request.

No

2. If any of the contributing partners listed in the Budget Worksheet have not confirmed participation, list the date when confirmation will be made. Explain how you will implement the project if these sources do not confirm participation.

State of Nebraska is expected to provide technical advice. If it is not available, private contractors will be substituted.

3. If any of the project costs identified in Column B of the Budget Worksheet have been expended or if debt has been incurred for these costs or a sponsor or partner is obligated for these costs in any other way: List these costs here. Explain clearly why Trust grant funds are requested for these costs.

1. CATEGORY/COMPONENT (from Column A of the Budget Summary)	BASIS USED TO DETERMINE COST	ATTACHMENT? LABEL?
2. Beaver Creek Reservoir	Engineer's Estimate	No
3. Reuse of Drain Water	Engineer's Estimate	No
4. Republican River Pump Station	Engineer's Estimate	No
5. Small Tributary Division Structures	Engineer's Estimate	No
6. Tributary Dam Designs	Engineer's Estimate	No
7. Pipeline Projects	Bostwick Irrigation District Estimate	No
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NEBRASKA ENVIRONMENTAL TRUST FUND

PROJECT SPONSOR FINANCIAL INFORMATION

H1. Project Sponsor: Bostwick Irrigation District

H2. Project Name: Lower Republican River Water Savings Enhancements

Please see the instructions for section C-3. Attachments to this document may be necessary to complete this section. Include these attachments with your hard copy submission.

Income Sources

Acreage Assessments; Interest on operating income, etc.; Bureau of Reclamation (BOR) Grant

Current Revenue:

2003 estimated revenue:	Acreage Assessments	\$768,271.60
	Interest on Operating Income, etc.	16,250.00
	Bureau of Reclamation Grant	<u>45,000.00</u>
	Total	\$829,521.60

2003 Annual Budget

Receipts

Acreage Assessments	\$768,271.60
Interest on Operating Income, etc.	16,250.00
Bureau of Reclamation (BOR) Grant	<u>45,000.00</u>
Total	\$829,521.60

Expenditures

Administration	\$197,375.00
Operations	317,500.00
Fixed obligations	299,694.00 (payments to U.S. Government for BOR operations and repayment of construction costs)
Republican River Management	1,000.00
Conservation	<u>35,000.00</u>
Total	\$850,569.00



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TIMELINE

H1. Project Sponsor: Bostwick Irrigation District

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See instructions for section D.

Month/Year	Task Description:
April, 2004	Trust Grant Awarded
April, 2004	Engineer field investigations made for design work of all project components other than pipelines
April, 2004	BID reviews conservation plan and survey notes for Superior Canal and Courtland Canal to locate most suitable laterals for conversion to pipelines
May, 2004	If no water deliveries are made, then pipeline installation will begin and continue until first year's Project is complete. If deliveries are made, then pipeline installation will begin as soon as delivery ends And continue until project is completed.
June, 2004	Engineer will begin conceptual design for remaining components and continue until completed.
September, 2004	Small Tributary Diversion structures will be constructed
April, 2005	BID will choose next laterals for conversion to pipelines
July 1, 2005	Installation of pipelines will begin unless water is being delivered through laterals. If water is being Delivered, then conversion to pipelines will begin as soon as deliveries cease and continue until completed

