

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Lower Republican Natural Resources District Management Action Opportunities Project

PRIMARY CONTACT INFORMATION

Entity Name: Lower Republican Natural Resources District

Contact Name: Mike Clements

Address: 30 North John Street
PO Box 618
Alma, NE
68920

Phone: 308-928-2182

Email: mclements@lrnrd.org

Partners / Co-sponsors, if any: [Click here to enter text.](#)

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

Grant amount requested. \$ 111,000

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. [Click here to enter text.](#)

If yes what is the population served by your project? [Click here to enter text.](#)

If yes provide a demonstration of need. [Click here to enter text.](#)

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? [Click here to enter text.](#)

If yes, describe the changes that have been made since the last application.
Click here to enter text.

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) Click here to enter text.

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.

This project is projected to be completed by July 1, 2017. A breakdown of project costs is included in the following table. The Total Net Local Share of Expenses that will be incurred under this project and timeframe is 40% of the Total shown, or \$74,000. The Total Net Local Share of Expenses that is estimated to be incurred before December 15, 2016 is \$11,100.

Phase 1	Construction of Analysis Tool, Management Action Opportunities (MAO) Development Process, MAO cost estimator	\$105,000
Phase 2	MAO Evaluation	\$52,500
Phase 3	User's Manual and User Workshop	\$27,500
	Total	\$185,000

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](#));
[Click here to enter text.](#)

A description of all field investigations made to substantiate the feasibility report ([004.01 B](#)); [Click here to enter text.](#)

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report ([004.01 C](#)); [Click here to enter text.](#)

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate ([004.01 D](#));
[Click here to enter text.](#)

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

Required geologic investigation ([004.01 E 1](#)); [Click here to enter text.](#)

Required hydrologic data ([004.01 E 2](#)); [Click here to enter text.](#)

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria ([004.01 E 3](#)). [Click here to enter text.](#)

- 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 purpose of this project is to provide the Lower Republican Natural Resources District (LRNRD) with the ability to evaluate potential water sustainability Management Action Opportunities (MAOs) that may be available to assist the LRNRD with meeting the requirements of its Integrated Management Plan (IMP).

This project is supported by the Frenchman Cambridge Irrigation District and the Nebraska Bostwick Irrigation District (Attachments A and B)

The potential MAOs can be policy or project oriented groundwater and surface water management alternatives. The project will allow the NRD to pursue the water management actions that will maximize reductions of groundwater depletions and/or increase surface water supplies, thereby helping to ensure state compliance with the Republican River Compact. This project will:

- 1. Develop the processes for evaluation of up to ten types of MAOs (e.g., groundwater recharge, interbasin diversion, converting surface water uses to groundwater uses),**
- 2. Conduct an analysis of five specific MAOs (e.g., recharge in the Franklin Canal, retirement of the Franklin Pump Canal and conversion to groundwater irrigation),**
- 3. Present the results of those specific evaluations, and**
- 4. Train NRD staff on the use of the tools that are developed so that the LRNRD can conduct future evaluations for other specific MAOs.**

Phase I – Development of MAO analysis toolkit

Task 1 – Construct hydrologic analysis toolkit

A toolkit will be developed that will be capable of evaluating selected MAOs for their potential to provide improvements in the Republican River Compact Administration (RRCA) annual accounting and the LRNRDs Integrated Management Plan (IMP) balance of actual and allowable depletions.

- Using existing information from the RRCA annual accounting for 1995-2015, RRCA groundwater model simulations conducted by the NDNR, and locations of groundwater and surface water irrigated acres in the LRNRD, an analysis will be completed to look at the sensitivity of the RRCA annual accounting results and IMP balances to changes in the accounting inputs that could result from potential management actions undertaken by the LRNRD.**
- The results of this sensitivity analysis will be used to create a screening tool that will allow for the analysis of specific management actions taking into account the relative location and magnitude of the management action over specific timeframes (i.e., 1, year, 10 years, 50 years, 100+ years etc.).**
- A list of management actions types will be prepared that the screening tool will be able to evaluate.**
- The screening tool will be developed in such a manner to allow for updates/modifications in the future should new opportunities arise that were not initially considered.**

- Establish a long-term direction for sustainable water projects that can provide for full cost – benefit analysis.

Task 2 – Develop MAO Implementation Process

A “roadmap” will be prepared describing the steps that will be required in order to fully implement each type of MAO.

- For each type of MAO, the process of implementing the management action will be documented, including but not necessarily limited to permitting requirements, funding options, design requirements, necessary partnerships, landowner agreements, and any required changes to the RRCA accounting procedures.
- Each roadmap will take into consideration the best order in which to pursue implementation in order to ensure that the most likely or most challenging “roadblocks” are addressed as early as possible in the process.
- This task shall include up to ten potential MAO’s

Task 3 – Develop MAO Cost Estimation Process

A process will be developed for evaluating the potential cost of implementing each MAO.

- For each type of MAO, The potential cost considerations and a process for estimating the potential cost will be developed. This will include a full description of all assumptions that are being made in order to provide the cost estimate.
- This cost estimation process will take into account the relative magnitude of each specific MAO, and will attempt to take into account specific cost considerations given the location of each MAO, but will not include specific engineering design criteria that would be determined during a complete design process.
- This task shall include up to ten potential MAO’s.

Phase II – Evaluation of Specific MAOs

Task 1 – Inventory and Rank Potential MAOs

A list of potential projects for potential evaluation will be prepared. These will be ranked to determine five potential projects for further evaluation.

- Two workshops will be held with the LRNRD and any potential stakeholders or partners that the LRNRD wants to be involved.

- The first workshop will be a brainstorming session designed to identify any and all potential specific MAOs. Consultant shall be responsible for documenting the results of the workshop and providing minutes to workshop attendees.
- The second workshop will provide an opportunity to zero in on the best MAOs identified during the initial workshop through a ranking process.
- A full documentation of the results of the two workshops with the five MAOs identified by the workshop participants will be prepared.

Task 2 – Evaluation and Report on Five MAOs

Using the tools and procedures developed during Phase II, the five specific MAOs identified by the LRNRD will be evaluated.

- The potential benefits, roadblocks, and costs of the identified projects will be determined.
- This evaluation will be fully documented in a project report that will be provided to the LRNRD in draft form and finalized after incorporating comments on the draft report.

Phase III – Handover of Evaluation Tools

Task 1 – Development of User’s Manual

A user’s manual that will allow the LRNRD to independently utilize the tools developed under Phase II will be developed.

- The user’s manual will detail all data sources needed for application of the tool and how to interpret the results generated by these tools.
- The user’s manual shall use the evaluations from Phase III to illustrate application of the tools.

Task 2 – User’s Workshop

A one-day workshop with the LRNRD and any other participants of their choosing will be conducted.

- The workshop will also provide an overview of the user’s manual to familiarize the LRNRD staff with the manual and tools.
- The workshop will involve interactively applying the tools to the potential projects that were evaluated, and learning how to change project design to optimize project benefits and minimize project costs.

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

As stated above, the purpose of this project is to provide the LRNRD with the ability to evaluate potential water sustainability MAOs that may be available to assist the LRNRD with meeting the requirements of its IMP. The most fundamental aspect of the IMP is the requirement to undertake management actions during years in which the IMP forecasting mechanisms indicate these actions are necessary to comply with the Republican River Compact (Compact). The specific provisions and formulae of the IMP forecast were developed by the Department of Natural Resources (DNR) based on the best available data including the Compact accounting and associated data and information. As described in Nebraska's expert report developed pursuant to the recent interstate litigation with Kansas (See Attachment C), the forecast was back tested against a recent period of very dry conditions during which the state failed to comply with the Compact (2002-2006). This analysis demonstrated that the forecast was reliable in indicating the extent to which management actions were needed during dry years to ensure Compact compliance.

More recently, beginning with the DNR's forecast for 2013, the IMPs forecasting provisions indicated additional management actions would be needed to ensure compliance with the Compact. The LRNRD, along with the Middle Republican NRD and the Upper Republican NRD, implemented their share of the required actions, and the State was in compliance with the Compact in 2013. This has continued through 2016, with Nebraska in compliance in 2014 and 2015 with the same result expected for 2016. The MAO Project will build directly upon the forecasting provisions and formulae to allow the LRNRD to evaluate other untried management actions to test their effectiveness at providing the required result as well as to assess the relative efficiency of these potential management actions.

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

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).

There is no currently known structural measures that may be affected by the project, however, the MAO project will provide the analysis tool upon which a number of projects will be evaluated in the future because of the requirements of the IMPs for the LRNRD.

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

The next best alternative to this project would be a continuation of the status quo with regard to project evaluation, which is currently done on a project by project basis. Over the long term, this way of doing project evaluations will be much more expensive than the development of the MAO Project. For example, the Republican River Basin Study¹ recently completed by the U.S. Bureau of Reclamation in conjunction with the States of Colorado, Kansas, and Nebraska cost a combined \$848,000 and resulted in the analysis of four specific management alternatives, which were generally found to be infeasible.

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).

A breakdown of project costs is included in the following table. These costs are for payment to consultants to complete the scope of work outlined in the plan of development described in 1(b).

Phase 1	Construction of Analysis Tool, MAO Development Process, MAO cost estimator	\$105,000
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- 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

¹ <http://www.usbr.gov/watersmart/bsp/docs/finalreport/republican/republican-river-basin-study-final-report.pdf>

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).

The project will directly increase water sustainability by providing a means to analyze the impacts of water management actions in the LRNRD and to determine the extent to which those actions provide for water sustainability. The extent can be measured over set durations extending from 1 year to greater than 100 years. The MAO Project is essential to the LRNRD as they implement management actions required within their Integrated Management Plans, evaluate the effectiveness of those actions, and ultimately reach and maintain a level of water use in the districts that is sustainable over the long term. The derived results will direct future actions as the best cost-benefit for all future water projects in the Lower Republican.

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

See Attached Table (Attachment D).

- 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).

The economic feasibility for the MAO Project is demonstrated in the same manner that was used for the Western Water Use Management Model Project (Application #4121) that was funded in the 2015 grant cycle.

The MAO Project is a mandatory project for the LRNRD. This is because the NRDs have a number of goals and objectives in their Integrated Management Plans that they are required to accomplish, and the MAO Project is essential to ensuring these goals and objectives will be met. Moreover, the LRNRD is required to utilize the “best available information” (Nebraska Rev. Statutes §46-709) in carrying out these duties. The MAO Project is the most cost-effective means to determine the most effective and efficient approaches to meeting the goals and objectives of the IMPs. These goals and objectives are inherently beneficial because they are designed to meet statutorily mandated requirements that are in place to ensure long-term water sustainability in the area of the project.

Specifically, many of these goals and objectives are related to obligations that the State of Nebraska has under the Republican River Compact (Compact), an interstate compact between the states of Nebraska, Colorado, and Kansas that was officially ratified by the legislatures of the three states and the United States in 1943. The Compact and the more recent Final Settlement Stipulation (FSS), which

resolved interstate litigation concerning the Compact in 2002, lays out specific limitations on Nebraska use of the water supply of the Republican River Basin. Nebraska Rev. Statutes §46-715 requires the IMPs to ensure compliance with the Compact and the FSS.

When Nebraska subsequently failed to meet those requirements in 2005-6, the State of Kansas sought upwards of \$80 million from Nebraska through additional litigation. This litigation also challenged Nebraska's ability to comply with the Compact and FSS in the future. Nebraska successfully demonstrated that its IMPs will ensure Compact compliance through a regulatory backstop, which, if required in the future, would shut down approximately 77,000 groundwater irrigated acres in the LRNRD. The MAO Project will assist the NRD in developing projects and programs that will help to avoid this result, which would be economically devastating to the local economy. For example, the 2016 Farm Real Estate Report from the University of Nebraska Institute of Agriculture and Natural Resources² indicates that the difference between irrigated and non-irrigated cropland in the area of the LRNRD (South region) exceeds \$3000 per acre. Applying this value to the potentially impacted area in the LRNRD indicates the potential economic impact of not pursuing the MAO project and subsequent programs and projects could result in an economic impact to the area of over \$200 million. When compared to the cost of the MAO Project, it is clear that the benefits of the project significantly outweigh the cost and the project is clearly cost-effective.

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

The LRNRD board of directors has approved the MAO Project (See Attachment E) and the LRNRD possesses the following statutory funding sources that are available to allow the LRNRD to complete the MAO Project.

Nebraska Rev. Statutes §2-3225.

Districts; tax; levies; limitation; use; collection.

(1)(a) Each district shall have the power and authority to levy a tax of not to exceed four and one-half cents on each one hundred dollars of taxable valuation annually on all of the taxable property within such district unless a higher levy is authorized pursuant to section 77-3444.

(b) Each district shall also have the power and authority to levy a tax equal to the dollar amount by which its restricted funds budgeted to administer and implement ground water management activities and integrated management activities under the Nebraska Ground Water Management and Protection Act exceed its restricted funds budgeted to administer and implement ground water management activities and integrated management activities for FY2003-04, not to exceed one cent on

² <http://agecon.unl.edu/realestate/2016-farm-real-estate-report>

each one hundred dollars of taxable valuation annually on all of the taxable property within the district.

(c) In addition to the power and authority granted in subdivisions (1)(a) and (b) of this section, each district located in a river basin, subbasin, or reach that has been determined to be fully appropriated pursuant to section 46-714 or designated overappropriated pursuant to section 46-713 by the Department of Natural Resources shall also have the power and authority to levy a tax equal to the dollar amount by which its restricted funds budgeted to administer and implement ground water management activities and integrated management activities under the Nebraska Ground Water Management and Protection Act exceed its restricted funds budgeted to administer and implement ground water management activities and integrated management activities for FY2005-06, not to exceed three cents on each one hundred dollars of taxable valuation on all of the taxable property within the district for fiscal year 2006-07 and each fiscal year thereafter through fiscal year 2017-18.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).
N/A
6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.
N/A
7. Describe how the plan of development minimizes impacts on the natural environment.

The project will have no negative impact on the natural environment.

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

The LRNRD has a wide range of statutory responsibilities and authorities, including but not limited to Nebraska Revised Statutes §2-3,201 through 2-3,243 and the Ground Water Management and Protection Act (Nebraska Rev. Statutes §46-701 through 46-756). As Nebraska’s preferred regulator of groundwater, the LRNRD is clearly both qualified and responsible to carry out the proposed project. Specifically, Nebraska Rev. Statutes §46-707(f) confers to the NRDs the power to “conduct investigations and cooperate or contract with ... public or private corporations, or any association or individual on any matter relevant to the administration of the [Ground Water Management and Protection] act.” The NRDs have a number of potential funding sources available to use in meeting their share of the project cost.

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

The project is being implemented to fulfill, in part, the requirements of the LRNRDs Integrated Management Plan (IMP). The IMPs are written in accordance with the Groundwater Management and Protection Act (GWMPA) as well as the Republican River Compact and the Final Settlement Stipulation (FSS) between Nebraska, Kansas, and Colorado. This project will assist the LRNRD and the State of Nebraska to meet its obligations under the Republican River Compact and the FSS. Finally, the LRNRD has a groundwater management plan (GMP) pursuant to the GWMPA. The MAO Project will assist Nebraska and the LRNRD in meeting the requirements of all of these plans.

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 Lower Republican Natural Resources District (LRNRD) has a wide range of statutory responsibilities and authorities, including but not limited to Nebraska Revised Statutes §2-3,201 through 2-3,243 and the Ground Water Management and Protection Act (Nebraska Rev. Statutes §46-701 through 46-756). As Nebraska’s preferred regulator of groundwater, the LRNRD is clearly both qualified and responsible to carry out the proposed project. Specifically, Nebraska Rev. Statutes §46-707(f) confers to the NRDs the power to “conduct investigations and cooperate or contract with ... public or private corporations, or any association or individual on any matter relevant to the administration of the [Ground Water Management and Protection] act.”

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

There will be no negative environmental or ecological consequences as a result of 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.

The approximately 16,000 people that live in the Lower Republican Natural Resources District (LRNRD) rely on the High Plains Aquifer for drinking water. The Nebraska Department of Environmental Quality's 2015 Nebraska Groundwater

Quality Monitoring Report³ indicates there are already five community public water supply systems with mandatory requirements triggered by high levels of nitrates. The annual maps included in the report clearly indicate that the nitrogen contamination has become an increasingly important concern over the last several decades. In a recent study, the U.S. Geological Survey concludes that the conversion of rangeland to irrigated cropland has an effect on groundwater quality⁴. Future alternate drinking water supplies will likely need to be identified, most likely coming from other groundwater sources. By taking into account potential benefits to groundwater quality through various water management alternatives, the MAO Project can directly mitigate potential threats to existing drinking water supplies.

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.

This project will assist the LRNRD in meeting the goals and objectives its Integrated Management Plan (IMP). The LRNRD's IMP was jointly adopted by the LRNRD and the DNR on June 24, 2005, and most recently updated on January 15, 2016⁵. The goals and objectives that the MAO Project will provide benefits for are listed below:

Goals:

1. Ensure that ground water and surface water users within the LRNRD assume their share of the responsibility to keep Nebraska in compliance with the Republican River Compact.
2. Provide that LRNRD's share of that responsibility be distributed in an equitable manner and to minimize adverse economic, social, and environmental consequences to the extent possible.
3. Sustain a balance between water uses and water supplies within the LRNRD so that the economic viability, social and environmental health, safety, and welfare of the LRNRD can be achieved and maintained for both the near and long term.
4. Reserve any streamflow available from regulation, incentive programs, and purchased or leased surface water and ground water required to maintain Compact compliance from any use that would negate the benefit of such regulations or programs, to the extent allowed by statute and the surface water controls of this IMP.

³ <http://deq.ne.gov/publica.nsf/Pages/WAT230>

⁴ <http://pubs.usgs.gov/circ/1337/pdf/C1337.pdf>

⁵ http://www.dnr.nebraska.gov/Media/iwm/republican/20151210_LRNRD_Final_IMP.PDF

Objectives:

- 1. With limited exceptions, prevent the initiation of new or expanded uses of water that increase Nebraska's computed beneficial consumptive use of water within the LRNRD, as required for Compact compliance and by Nebraska law.**
- 2. Achieve the required reductions in water use through a combination of regulatory and incentive programs designed to reduce beneficial consumptive use.**
- 3. Make such additional reductions in ground water use in Compact Call Years as are necessary, after taking into account any reduction in beneficial consumptive use achieved through basin-wide incentive and streamflow augmentation programs, to achieve a reduction in beneficial consumptive use in the LRNRD that ensures the District limits its ground water depletions to the Allowable Ground Water Depletions for the LRNRD. Compact Call Years will be determined through the procedures outlined in Section IX of this IMP.**
- 4. To assist in ensuring long-term Compact compliance, reduce existing ground water use within the LRNRD by 20 percent from the 1998 to 2002 baseline pumping volumes under average precipitation conditions so that, when combined with streamflow augmentation and incentive programs, the LRNRD's ground water depletions are maintained within their portion of Nebraska's Allowable Ground Water Depletions as computed through use of the Republican River Compact Administration Groundwater Model. Additionally, voluntary reductions in baseline pumping volumes will continue to be pursued by the LRNRD with the incentive of limiting the level of long-term management actions that are necessary during Compact Call Years.**
- 5. The LRNRD and the DNR will continue to investigate and explore augmentation projects that would add to or retime the water supply within the basin. Such augmentation and retiming projects include, but are not necessarily limited to, the following:**
 - a. Leasing or purchasing surface water and/or ground water.**
 - b. Augmentation wells, both within and outside of the Republican River Basin.**
 - c. Exploring trans-basin diversion projects.**
 - d. Conjunctive management of surface water irrigation projects.**

The MAO Project will assist the LRNRD in achieving these goals and objectives by providing the capability to evaluate the LRNRDs progress in meeting these goals as well as to provide information on the most optimum future actions to better address these goals and objectives. The MAO Project is supported by the Frenchman Cambridge Irrigation District and the Nebraska Bostwick Irrigation District, which comprise most of the surface water use in the LRNRD (See Attachments A and B).

The history of work that has gone into meeting the goals and objectives of the LRNRD's IMP begins with the original adoption of the IMP in 2009. Since then the NRDs and the DNR have amended the IMPs on three separate occasions. Also, the DNR and the LRNRD, in conjunction with the other Republican River Basin NRDs, hold meetings at least annually to review their progress in meeting the goals and objectives of the IMP.

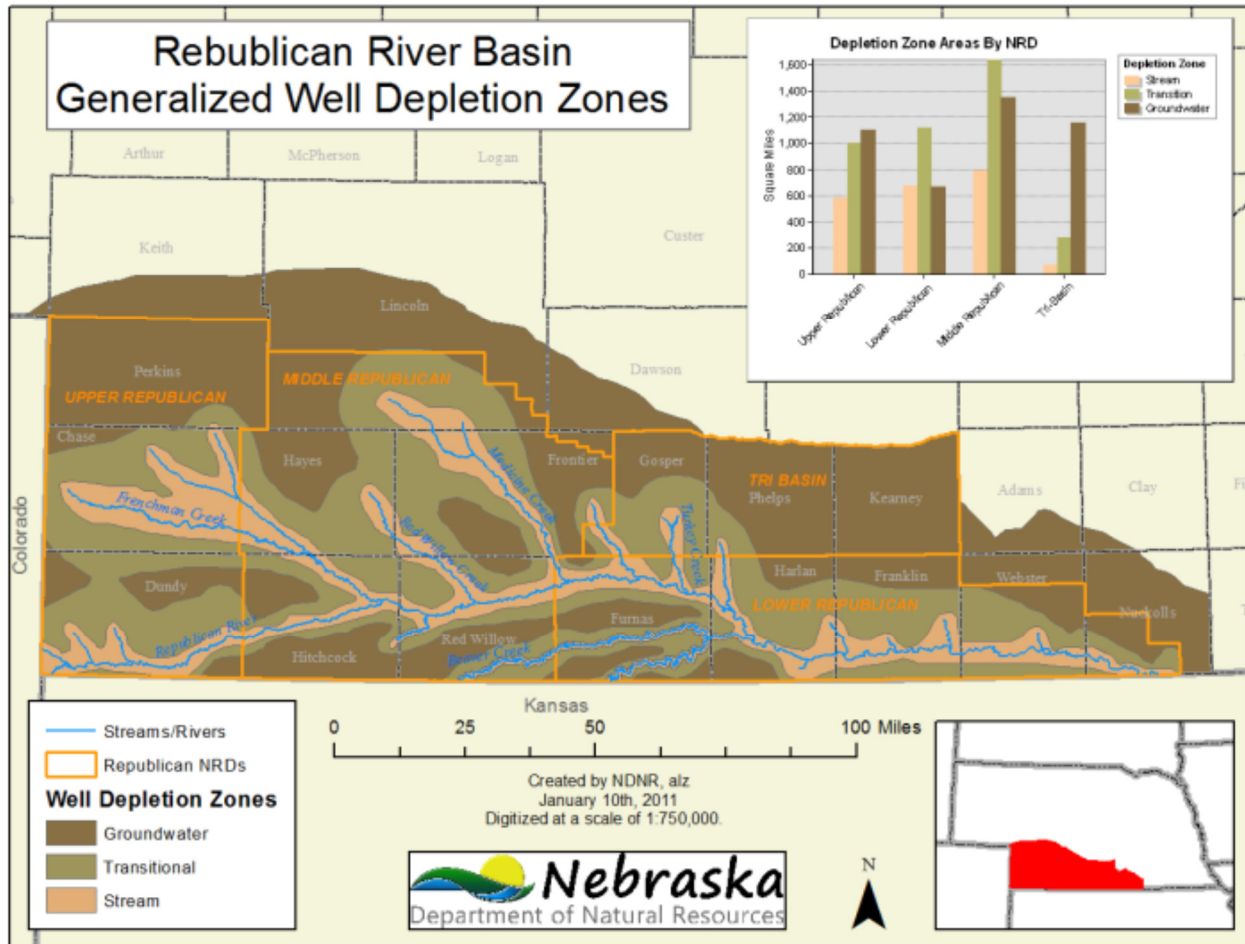
3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

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

The MAO Project will contribute to water sustainability by providing the necessary tools to evaluate and implement management actions that will increase aquifer recharge, reduce aquifer depletion, or increase streamflow by facilitating informed decision making by the LRNRD. Aquifer recharge can be increased through diversions of surface water during times of excess flows, allowing the water to soak into the ground beneath canals and laterals. The MAO Project is supported by the Frenchman Cambridge Irrigation District and the Nebraska Bostwick Irrigation District, whose cooperation will facilitate these types of efforts (See Attachments A and B). The MAO Project tools will help these efforts by providing information on potential diversion times and amounts. The MAO Project tools can also assist the LRNRD in reducing aquifer depletion and increasing streamflow by providing the information required to make future regulatory decisions.

The MAO project will provide the information and analysis tools that will identify potential water projects that may reduce aquifer depletions and increase aquifer recharge and streamflow. The following figure demonstrates the type of information that the MAO Project will utilize to target areas that will most effectively reduce aquifer depletion (groundwater well depletion zone), areas to most effectively implement projects that will increase streamflow (stream well depletion zone), and areas that can potentially provide both (transitional well depletion zone).



4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;
- List the goals the project provides benefits.
 - Describe how the project will provide these benefits
 - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The MAO Project may contribute to multiple water supply goals such as flood control, agricultural use, municipal and industrial uses, and preservation of water resources, by providing essential information that will be used to drive informed decision making on various future structural projects. The LRNRD needs the MAO Project to predict the potential benefits of various management actions and make future adjustments in management decisions in an informed manner. The MAO Project will allow the LRNRD to more efficiently and effectively evaluate structural projects, leading to better use of existing resources. Over the long term, the ability to make informed management decisions will ensure these water supply goals will

be met. Without the MAO Project the success of meeting these goals cannot be ensured.

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.

The IMP for the LRNRD addresses hydrologically connected surface and groundwater, and, along with the other Republican River Basin NRDs, has the overarching goal of ensuring compliance with the Republican River Compact (Compact). The Compact limits Nebraska's use of the water supplies of the Basin, which are generally the lowest during the dry years when they are in highest demand. While the LRNRD has rules and regulations that limit the amount of groundwater that can be pumped per irrigated acre, the LRNRD strives to strike the appropriate balance between maximizing beneficial consumptive use and limiting impacts to the aquifers and streamflow. The MAO Project will allow the LRNRD to make informed decisions regarding the appropriate level of regulation, when combined with other water management projects and programs, to accomplish both goals. This provides a beneficial impact to Nebraska's residents by ensuring that the contribution of the residents of the LRNRD to the state's economy will be impacted only to the extent required as a result of any necessary regulations on water use.

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 total cost of the project is \$185,000. There is no other technically comparable way of achieving the same benefits and the MAO Project is a mandatory project for the LRNRD. This is because the LRNRD have a number of goals and objectives in their Integrated Management Plans that they are required to accomplish, and the MAO Project is essential to evaluating the means of doing so. These goals and objectives are inherently cost-effective because they are designed to meet statutorily mandated requirements that are in place to ensure long-term water sustainability in the area of the project.

Moreover, many of these goals and objectives are related to obligations that the State of Nebraska has under the Republican River Compact (Compact), an

interstate compact between the states of Nebraska, Colorado, and Kansas that was officially ratified by the legislatures of the three states and the United States in 1943. The Compact and the more recent Final Settlement Stipulation (FSS), which resolved interstate litigation concerning the Compact in 2002, lays out specific limitations on Nebraska use of the water supply of the Republican River Basin. Nebraska Rev. Statutes §46-715 requires the IMPs to ensure compliance with the Compact and the FSS.

When Nebraska subsequently failed to meet those requirements in 2005-6, the State of Kansas sought upwards of \$80 million from Nebraska through additional litigation. This litigation also challenged Nebraska's ability to comply with the Compact and FSS in the future. Nebraska successfully demonstrated that its IMPs will ensure Compact compliance through a regulatory backstop, which, if required in the future, would shut down over 77,000 groundwater irrigated acres in the LRNRD. The MAO Project will assist the NRD in developing projects and programs that will help to avoid this result, which would be economically devastating to the local economy. For example, the 2016 Farm Real Estate Report from the University of Nebraska Institute of Agriculture and Natural Resources⁶ indicates that the difference between irrigated and non-irrigated cropland in the area of the LRNRD (South region) exceeds \$3000 per acre. Applying this value to the potentially impacted area in the LRNRD indicates the potential economic impact of not pursuing the MAO project and subsequent programs and projects could result in an economic impact to the area of over \$200 million. When compared to the cost of the MAO Project, it is clear that the benefits of the project significantly outweigh the cost and the project is clearly cost-effective.

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 MAO Project is critical to providing the LRNRD the tools and information it needs to assist the state in meeting its obligation to the Republican River Compact. Pursuant to the LRNRDs Integrated Management Plan, the Department of Natural Resources conducts a forecast of available water supplies for each upcoming year. This forecast utilizes the Compact accounting to determine if this water supply will be sufficient to ensure that Nebraska is projected to use no more than its share during that upcoming year. When Nebraska is projected to overuse its available

⁶ <http://agecon.unl.edu/realestate/2016-farm-real-estate-report>

supply, the Republican River Basin NRDs are required to implement management actions that will offset this overuse and ensure that Nebraska remains in compliance with the Compact.

The first year that this forecasting process required the LRNRD to implement management actions to ensure Compact accounting was 2013. Additional years with required management actions have followed since then. The LRNRD has always had the capacity within its available management actions to satisfy its IMP requirements to date. However, the MAO Project will provide the LRNRD with both the ability to enhance their portfolio of available management actions as well as to optimize existing and future available management actions so that the LRNRD is managing in the most efficient and effective manner possible.

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 groundwater supply in the LRNRD is vital to the State of Nebraska and the United States. Without this supply there would be a debilitating effect on public security, public health and safety. The ability to manage this supply through an informed decision making process is vital to ensuring the sustainability of this supply, and the MAO Project is a critical component of this process. As an example of the concern, the United States Department of Homeland Security's Office of Cyber and Infrastructure Analysis recently released a report entitled *Analysis of High Plains Resource Risk and Economic Impacts*.⁷ The report analyzed how continued depletions of the High Plains aquifer in Kansas and Nebraska might impact critical infrastructure and the economy at the local, regional, and national levels.

A key finding of this report is that “[if] current water use practices are continued into the future, sixty counties in Kansas and seven in Nebraska are projected to face exhaustion of groundwater supplies in 100 years or less.” It is clear that water use practices will need to be carefully managed to ensure that groundwater is available in the future. This clear benefit to public security, public health and safety will be provided by the MAO Project. It will provide information on the current

⁷ See Attachment F

status of groundwater availability and how that might change over time, allowing the LRNRD to make well informed management decisions.

Furthermore, in the time since the Republican River Compact and Final Settlement Stipulation were signed and implemented, the United States has become increasingly aware of the impacts that climate change may have on agriculture, industry, and our quality of life. On May 6, 2014, the White House issued a comprehensive, authoritative scientific report on the impacts of current and future climate change on every region of the country. The Great Plains assessment cites this language:

“Great Plains – Wyoming, N. Dakota, S. Dakota, Montana, Nebraska, Kansas, Oklahoma, and Texas: The Great Plains region “experiences multiple climate and weather hazards, including floods, droughts, severe storms, tornadoes, hurricanes, and winter storms. In much of the Great Plains, too little precipitation falls to replace that needed by humans, plants, and animals. These variable conditions already stress communities and cause billions of dollars in damage. Climate change will add to both stress and costs.” “Rising temperatures lead to increased demand for water and energy and impacts on agricultural practices.” (NCA Highlights: Great Plains; NCA Highlights: Overview)”

The MAO project is preparing the region and citizens of the LRNRD for proper decision making ability from the increased risk of prolonged droughts and, thus, from a shortage of adequate water supply. The MAO tool, which will support decisions that mitigate threats from climate variability, allows the LRNRD to address these critical threats to public security and public health.

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.

The approximately 16,000 people that live in the Lower Republican Natural Resources District (LRNDR) rely on the High Plains Aquifer for drinking water. The Nebraska Department of Environmental Quality’s 2015 Nebraska Groundwater Quality Monitoring Report⁸ indicates there are already five community public water supply systems with mandatory requirements triggered by high levels of nitrates. The annual maps included in the report clearly indicate that the nitrogen

⁸ <http://deq.ne.gov/publica.nsf/Pages/WAT230>

contamination has become an increasingly important concern over the last several decades. In a recent study, the U.S. Geological Survey concludes that the conversion of rangeland to irrigated cropland has an effect on groundwater quality⁹. Future alternate drinking water supplies will likely need to be identified, most likely coming from other groundwater sources. By taking into account potential benefits to groundwater quality through various water management alternatives, the MAO Project can directly mitigate potential threats to existing drinking water supplies.

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

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

The local jurisdiction that supports the MAO Project is the LRNRD. The LRNRD will support the proposed project through their tax levy authority. The current tax levy for the LRNRD is 2.3522¢ per \$100 valuation. The LRNRD also plans to collect approximately \$3.5 million in occupation taxes during FY 2017. The LRNRD has also utilized other funding sources for related efforts in the past, including the Interrelated Water Management Plan Program Fund administered by the NDNR and the Agricultural Water Enhancement Program administered by the Natural Resources Conservation Service.

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 LRNRD is a local jurisdiction with plans in place that support sustainable water use, including an Integrated Management Plan (IMP). The LRNRD has completed an extensive amount of work to achieve the goals of these plans, including the development and implementation of rules and regulations concerning groundwater

⁹ <http://pubs.usgs.gov/circ/1337/pdf/C1337.pdf>

quality and quantity, extensive monitoring of the status of groundwater quality and quantity, and extensive implementation of information and educational programs.

The goals and objectives that the MAO Project will provide benefits for are listed below:

Goals:

1. Ensure that ground water and surface water users within the LRNRD assume their share of the responsibility to keep Nebraska in compliance with the Republican River Compact.
2. Provide that LRNRD's share of that responsibility be distributed in an equitable manner and to minimize adverse economic, social, and environmental consequences to the extent possible.
3. Sustain a balance between water uses and water supplies within the LRNRD so that the economic viability, social and environmental health, safety, and welfare of the LRNRD can be achieved and maintained for both the near and long term.
4. Reserve any streamflow available from regulation, incentive programs, and purchased or leased surface water and ground water required to maintain Compact compliance from any use that would negate the benefit of such regulations or programs, to the extent allowed by statute and the surface water controls of this IMP.

Objectives:

1. With limited exceptions, prevent the initiation of new or expanded uses of water that increase Nebraska's computed beneficial consumptive use of water within the LRNRD, as required for Compact compliance and by Nebraska law.
2. Achieve the required reductions in water use through a combination of regulatory and incentive programs designed to reduce beneficial consumptive use.
3. Make such additional reductions in ground water use in Compact Call Years as are necessary, after taking into account any reduction in beneficial consumptive use achieved through basin-wide incentive and streamflow augmentation programs, to achieve a reduction in beneficial consumptive use in the LRNRD that ensures the District limits its ground water depletions to the Allowable Ground Water Depletions for the LRNRD. Compact Call Years will be determined through the procedures outlined in Section IX of this IMP.
4. To assist in ensuring long-term Compact compliance, reduce existing ground water use within the LRNRD by 20 percent from the 1998 to 2002 baseline pumping volumes under average precipitation conditions so that, when combined with streamflow augmentation and incentive programs, the LRNRD's ground water depletions are maintained within their portion of Nebraska's Allowable Ground Water Depletions as computed through use of the Republican River Compact Administration Groundwater Model. Additionally, voluntary reductions in baseline pumping volumes will

continue to be pursued by the LRNRD with the incentive of limiting the level of long-term management actions that are necessary during Compact Call Years.

5. The LRNRD and the DNR will continue to investigate and explore augmentation projects that would add to or retime the water supply within the basin. Such augmentation and retiming projects include, but are not necessarily limited to, the following:
 - a. Leasing or purchasing surface water and/or ground water.
 - b. Augmentation wells, both within and outside of the Republican River Basin.
 - c. Exploring trans-basin diversion projects.
 - d. Conjunctive management of surface water irrigation projects.

The MAO Project will assist the LRNRD in achieving these goals and objectives by providing the capability to evaluate the LRNRDs progress in meeting these goals as well as to provide information on the most optimum future actions to better address these goals and objectives. The history of work that has gone into meeting the goals and objectives of the LRNRD's IMP begins with the original adoption of the IMP in 2009. Since then the NRDs and the DNR have amended the IMPs on three separate occasions. Also, the DNR and the LRNRD, in conjunction with the other Republican River Basin NRDs, hold meetings at least annually to review their progress in meeting the goals and objectives of the IMP.

The MAO Project will support sustainable water use by providing the information required to properly manage the groundwater and hydrologically connected water supply in the LRNRD. The LRNRD is home to nearly 16,000 people and covers nearly 1.6 million acres of the state. The aquifer in this area is used for many beneficial purposes, including agricultural, domestic, livestock, industrial, and municipal uses.

The stakeholders in this project are the nearly 16,000 people that live in the LRNRD and will benefit from this project.

12. Addresses a statewide problem or issue;

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

The MAO Project will assist the State of Nebraska in meeting its obligations to the Republican River Compact. The Nebraska Legislature has provided a significant amount of general fund appropriations through the Department of Natural Resources toward this goal. The population of the LRNRD is nearly 16,000 and the

LRNRD covers nearly 1.6 million acres. The MAO Project will assist the state in ensuring compact compliance and water sustainability in the Republican River Basin.

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 LRNRD will pay 40% of the cost of the MAO Project, thereby contributing \$74,000 to the project. Attached is a letter from the LRNRD showing their commitment to the MAO project (Attachment E). This commitment ensures that the project will proceed and be completed.

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.

The MAO Project will assist the LRNRD in managing the hydrologically connected supply of the Republican River and its tributaries within the LRNRD. The MAO Project will contribute to watershed health and function by providing the information required to make appropriate management decisions regarding consumption of these water supplies, and potential replacement of water supplies through managed recharge or streamflow augmentation.

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 MAO Project is significant to the Department of Natural Resources' (DNR) efforts in the Republican River Basin. This can be seen on page 23 of the Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process¹⁰, submitted to the Governor and Legislature by the DNR in September of 2015. As stated in the report, "[t]he Department and the Republican River Basin

¹⁰ <http://dnr.nebraska.gov/2015-annual-report-and-plan-of-work>

NRDs continually assess the implementation of IMPs in the basin. This year's accounting forecast indicated the potential for non-compliance with the Republican River Compact (Compact), unless certain management actions were put into place. Those actions are specified in the IMPs, and are proactively being implemented by both the NRDs and the Department to help ensure Compact compliance for Nebraska."

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 federal mandate is the Republican River Compact (Compact), which is a federal law. The MAO Project will be integral to the LRNRDs efforts to assist the State in ensuring compliance with the requirements of the Compact. Ensuring compliance with interstate compacts is one of the stated goals of the Water Sustainability Fund (Nebraska Revised Statutes §2-1,506(1)(h)).

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 purpose of this project is to provide the Lower Republican Natural Resources District (LRNRD) with the ability to evaluate potential water sustainability Management Action Opportunities (MAOs) that may be available to assist the LRNRD with meeting the requirements of its Integrated Management Plan (IMP). The potential MAOs can be policy or project oriented groundwater and surface water management alternatives. The project will allow the LRNRD to pursue the water management actions that will maximize reductions of groundwater depletions and/or increase surface water supplies in the most efficient and effective way, thereby helping to ensure state compliance with the Republican River Compact.

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 following activities will be conducted by the MAO Project:

- 1. Develop the processes for evaluation of up to ten types of MAOs (e.g., groundwater recharge, interbasin diversion, converting surface water uses to groundwater uses),**
- 2. Conduct an analysis of five specific MAOs (e.g., recharge in the Franklin Canal, retirement of the Franklin Pump Canal and conversion to groundwater irrigation),**
- 3. Present the results of those specific evaluations, and**
- 4. Train NRD staff on the use of the tools that are developed so that the LRNRD can conduct future evaluations for other specific MAOs.**

All activities will be completed in FY 2017

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 is the sole entity involved in the project and their general responsibilities involve hiring a consultant to complete the project on time and within budget. The MAO Project is supported by the Frenchman Cambridge Irrigation District and the Nebraska Bostwick Irrigation District, who would be likely partners in the implementation of projects identified by the tools developed through the MAO Project (See Attachments A and B).

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 cost of the entire project is \$185,000. The LRNRD will provide 40% of this total, with the Water Sustainability Fund providing the other 60%. There are no other sources of funding for the project.

5. Support/Opposition

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

There is a high level of support for the project from the LRNRD board of directors. The MAO Project is also supported by the Frenchman Cambridge Irrigation District and the Nebraska Bostwick Irrigation District, which comprise most of the surface water use in the LRNRD (See Attachments A and B). There is no known opposition to the project.