

# NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

## Section A.

### ADMINISTRATIVE

PROJECT NAME: Upper Republican NRD Groundwater Preservation and Stream Flow Enhancement Program

#### PRIMARY CONTACT INFORMATION

Entity Name: Upper Republican Natural Resources District

Contact Name: Nate Jenkins

Address: PO Box 1140, Imperial, NE 69033

Phone: 308-882-5173

Email: natejenkins@urnrd.org

Partners / Co-sponsors, if any: N/A

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

Grant amount requested. \$ 2,250,000

Loan amount requested. \$ N/A

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

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

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

Nebraska Game & Parks Commission  
(G&P) consultation on Threatened and  
Endangered Species and their Habitat

N/A  Obtained: YES  NO

Surface Water Right	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
USACE (e.g., 404 Permit)	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
Cultural Resources Evaluation	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
Other (provide explanation below) N/A	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>

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? Yes

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

The primary difference between the 2016 application and the current application is the removal of a water bank and the request for much less funding – the current request is for \$2.25 million compared to \$10.5 million last year. Additional information

regarding the benefits of irrigation retirement also led to modifications of answers to several questions.

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 1<sup>st</sup>.

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? \$ N/A

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 1<sup>st</sup> 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);  
N/A

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

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

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

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

Required geologic investigation (004.01 E 1); N/A

Required hydrologic data (004.01 E 2); N/A

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

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

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

Since 2011, the Upper Republican NRD (URNRD) has actively pursued programs and incentives to reduce depletions to stream flows and mitigate groundwater declines in areas that have experienced significant declines over time. The programs have included the permanent retirement of 1,546 acres utilizing more than \$2.1 million in URNRD funds and approximately \$1.47 million in federal funds through the Agricultural Water Enhancement

Program (AWEP) offered by NRCS. The AWEP program within the URNRD has since expired but demonstrated a significant demand for permanent irrigation retirement within the URNRD before commodity prices reached near record-high levels in 2012. The average 50-year stream flow depletion factor of the enrolled acres using the Republican River Compact model was approximately 86 percent and average irrigation usage was near the URNRD district-wide, annual average of 12 inches per acre.

As the URNRD has made clear in other grant requests to the Water Sustainability Fund this year, we are aggressively pursuing actions to reduce water use within the district in an effort to stabilize water levels, particularly in areas of the district with sharp rates of decline that potentially threaten the ability to fully irrigate crops in coming decades and where groundwater pumping has relatively significant impacts on stream flow.

The URNRD faces a challenge within the next few years of irrigated acres temporarily retired under the Conservation Reserve and Enhancement Program (CREP) exiting the program and having the potential to be irrigated again. There are currently 9,576 CREP acres within the URNRD that will incrementally expire by and during 2020. The District and State have an interest in keeping these acres retired from irrigation to prevent additional depletions to stream flow that could negatively impact efforts to comply with the Republican River Compact.

The district and State would also benefit from targeted retirement of irrigated cropland on non-CREP acres where there have been significant groundwater declines and/or groundwater pumping has substantial impacts on stream flow. The proposed retirement program will not substitute continually tightening water use regulations implemented by the URNRD or prevent regulatory changes that would have been made absent a retirement program. Retirement will instead complement regulatory measures by creating a more immediate beneficial impact on water quantity than what is possible via evolving regulations that have more incrementally beneficial impacts on water supplies.

The aforementioned conditions and experiences with retirement programs strongly indicate the existence of a need and market for the retirement of irrigated acres within portions of the URNRD where there have been significant groundwater declines and/or stream flow can be substantially increased by retiring water use from cropland production. Irrigated cropland retirement in such areas would benefit the district and State by helping achieve water-preservation goals and aiding Republican River Compact compliance and surface water users by increasing stream flow.

Retirement of uses in areas that maximize benefits to the URNRD and State would be prioritized.

Lands eligible for irrigated cropland retirement under the program will be: Acres in the hydrologically connected area of the District; land that has a 50-year stream flow depletion factor of at least 60%; land in areas where average groundwater declines have been at least 25' since 1980.

Payments using URNRD and WSF funds will be used to remove the certification status of irrigated acres that is granted by the URNRD. The certification status to irrigate, or not irrigate, is a legal control and authority of the URNRD. Because of this, decertifying irrigated acres using WSF and URNRD funds will ensure irrigated lands are permanently retired from irrigation.

To respond to variable market conditions so that project goals can be achieved, the price for retiring irrigated cropland will be established by the URNRD annually following an analysis of the market. The primary information used in the analysis will be the most recent payments for irrigation retirement that regularly occur in the private market. These transactions between landowners normally facilitate transfers of certified acres within the district pursuant to board approval and involve one landowner paying another to cease irrigating acres so the water rights associated with some of the “dried up” acres can be used on other irrigated lands so long as doing so doesn’t increase water use, impacts to stream flow or groundwater declines. The current market condition and the basis of the WSF funding request of \$1.8 million is a rate of \$2,750 per certified irrigated acre within the URNRD.

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

The project was conceived from, and we believe is substantiated by, the URNRD’s own experience retiring water rights in addition to interactions with landowners who retire water rights in an effort to transfer them to other parts of the District subject to approval by the URNRD Board of Directors. Such transfers, and the irrigation retirements that allow them to occur, have demonstrated the existence of a viable market for irrigation retirement. Over the past five years, there have been approximately 45 such variance requests. The range of per-acre prices paid in these private transactions to retire water rights that are then transferred has been approximately \$2,500-\$2,750 per acre. While the number of such transactions has been relatively high, we believe it may understate actual

demand for irrigation retirement because of the limited number of buyers in the current water rights transfer market. The URNRD's introduction as a large, heavily publicized buyer under the proposed program we believe would stimulate the market.

The District's recent experience with a permanent retirement program suggests this would occur. During the three years that the URNRD partnered with the USDA on an AWEP retirement program in the district, there were approximately 50 applicants for permanent retirement and overall demand exceeded available funds. The relatively high demand existed despite historically high corn prices during that time period that ranged from approximately \$6 to \$8 per bushel, or approximately 50% to 100% higher than corn prices at the time of this writing. URNRD and NRCS payments to retire irrigated acres and resulted in permanent easements held by the URNRD averaged approximately \$2,200 per acre.

We believe it is appropriate and beneficial that the URNRD enter and be a lead participant in this market because the commodity being bought and sold is a public one, owned by the State and managed by the URNRD, and the consequences of its use relative to preservation of water and Republican River Compact compliance are of keen interest to the State and URNRD. Rather than simply trying to control the market more than what occurs now, the proposed retirement program can transform and develop it into a tool with significant water preservation benefits in areas where preservation is most needed.

Consideration of a retirement program partially emerges from a recent analysis of available water supplies within the District relative to rates of groundwater level declines. The saturated thickness of the aquifer throughout the District was estimated using available well logs and reductions in water levels that have occurred since wells were drilled. The decline rates applicable to wells that helped determine saturated thickness were estimated using annual groundwater level measurements taken from approximately 400 wells in the district over the past 37 years.

The analysis needs to be refined with aid from a groundwater model the District is proposing in another WSF grant application and that will help determine usable aquifer life for irrigation purposes under different pumping scenarios. However, the current analysis provides us with a clear enough picture to understand that the proposed retirement program will help the District meet its water supply challenges. The program would supplement the continually tightening regulations on water use in these high-impact areas in reaching a balance between uses and supplies.

As expected, the analysis showed widely variable aquifer saturated thickness – from approximately 50 feet in alluvial areas to approximately

400 feet in some upland regions. Using current rates of decline throughout the District – the life of the aquifer varies significantly depending on location – we were able to estimate approximately when aquifer saturated thickness would be at 50 percent of its pre-irrigation level.

It indicated that under current water usage rates the aquifer underlying 70,000 acres within the URNRD will not be able to provide a full irrigation supply within approximately 40 years. That number of acres represents more than 15 percent of all irrigated acres within the district. Of those 70,000 acres, approximately 20,000 acres have a 20-30 year water supply adequate for irrigation and 50,000 acres have a useful irrigation life of 30-40 years. The remainder of the URNRD has a water supply estimated to last between 40 and 500 years without changes in pumping levels or location of pumping.

Relative to stream flow, the proposed project, depending of course upon the number and location of acres enrolled, has the potential to significantly aid State and URNRD efforts to comply with the Republican River Compact. Annual depletions to stream flow resulting from groundwater pumping within the URNRD as calculated by the Republican River Compact model have averaged approximately 80,000 acre feet since 2003. Since 2013, actual depletions within the URNRD have exceeded allowable depletions by an average of approximately 13,000 acre feet annually. Should half of the enrolled acres be CREP acres eligible because of their close proximity to streams and have an average 2-year stream flow depletion factor of 67%, which was the average 2-year SDF of acres enrolled in the AWEPP program in the URNRD from 2012-2014, stream depletions over a two-year period could be reduced by approximately 2,000 acre feet. This represents approximately 17% of the 13,000 acre feet of average annual depletions that have exceeded allowable depletions in the past five years. If 2/3 of the enrolled acres had the previously described impact on stream flow, stream depletions over the same time period could be reduced by approximately 3,000 acre feet, or about 23% of the 13,000 acre feet of annual depletions that have recently exceeded allowable depletions in the URNRD.

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

The URNRD, through its certification of irrigated acres, legally controls what lands can be irrigated and new retirement of irrigated acres in high-priority areas that are decertified will remain permanently decertified.



Payments will be made for lands to have their certified irrigation status removed by the URNR.

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).  
N/A

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 project has the capability to reduce water uses more than any other known method because it would result in complete elimination of water uses in high priority areas. The other means of achieving the same level of water savings in localized areas is severely reducing allocations or eliminating the ability to irrigate. While those uniform regulations are one tool utilized, the allocation does not allow users the flexibility to retire tracts that are less productive in order to keep a higher allocation on tracts that are more productive. Also, there are potential legal issues associated with complete elimination of irrigation via regulatory actions by the NRD since landowners have the statutory right to beneficially use groundwater owned by the state. Assuming it was possible, however, the economic costs of barring irrigation on select parcels would exceed the costs in this proposal. The average difference between irrigated and dryland corn yields within the URNRD is approximately 100 bushels per acre and the long-term average irrigation usage on a per acre basis is 12". Corn prices as of this writing are approximately \$3.90 per bushel, so a 100-bushel/acre difference in dryland versus irrigated yields has a corresponding difference of \$390 per acre in gross revenues. The approximate, current value of irrigation on a corn crop within the District, then, is \$32.50 per inch of applied water, or \$390 for the average of 12" applied per acre. Under the proposed program, approximately 1,100 acres could be retired at a cost of \$2,750 per acre. If allocations were eliminated on the same number of acres, after just 7 years ( $\$2,750/\$390$ ) the economic costs of eliminating irrigation via regulations would exceed the costs of paying to retire the land from irrigation.

Should the URNRD be able to entice additional or renewed CREP enrollments by paying \$750 an acre with agreement that such payment will require permanent retirement at the end of the CREP contract, approximately 4,000 acres could be retired at a cost of \$3,000,000. Under this scenario, the economic costs of eliminating irrigation via regulations

would exceed the costs of paying to permanently retire the land from irrigation after about 2 years.

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). N/AN
  - 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).

The retirement of irrigation water uses in areas where the supply is insufficient to meet current demands and Republican River Compact requirements will aid in balancing uses and supplies.

As defined by the Republican River Water Sustainability Task Force in 2012, sustainability consists of “Management...allowing the beneficial use of water, in an effective and efficient manner, to satisfy our socio-economic needs and obligations while minimizing the risk that water resources will be insufficient for future generations to meet their socio-economic needs and obligations.”

As indicated in an earlier section, under current water usage rates the aquifer underlying approximately 15 percent of all irrigated acres in the URNRD will not be able to provide a full irrigation supply within approximately 40 years. Retiring irrigated acres in high-decline areas will help balance uses with supplies and prolong usability of the aquifer for ag purposes to the economic benefit of the URNRD and State.

- 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).

<b>Year</b>	<b>Purchase Description</b>	<b>Cost</b>	<b>Total</b>
<b>2018</b>	Payments to decertify 815 acres of irrigation use in high-decline, high-stream flow-impact areas.	WSF: \$1,125,000 NRD: \$750,000	<b>\$1,875,000</b>
<b>2019</b>	Payments to decertify 1,000 acres of irrigation use in high-decline, high-stream flow-impact areas.	WSF: \$1,125,000 NRD: \$750,000	<b>\$1,875,000</b>
<b>Total</b>	Payments to decertify 1,815 acres of irrigation use in high-decline, high-stream flow-impact areas.	WSF: \$2,250,000 NRD: \$1,500,000	<b>\$3,750,000</b>

- 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 retirement program will establish water-rights purchase prices annually based on the market conditions and water rights will be acquired using URNRD tax revenues and funds from the WSF. The current market condition and the basis of the WSF funding request of \$2.25 million is a rate of \$2,750 per certified irrigated acre within the URNRD and \$750 per acre to permanently retire CREP land. Under 10-year contracts and current average CREP payment rates of \$200 per acre in the URNRD,

total payments for the term of a 10-year contract are \$2,000 per acre. The URNRD will offer \$750 per acre for landowners to enroll land in CREP via new or re-enrollments for a total of \$2,750 per acre. Once the CREP contracts expire, the URNRD will acquire water rights on the CREP ground that will permanently retire it from irrigation. Acres decertified via participation would still be allowed to be farmed as dryland, thus the \$2,750 per acre rate that is significantly lower than the cost of irrigated land. This market price has been established within the District over the last year by private sales of land in which certified irrigated acres have been transferred to other areas, turning tracts or partial tracts where certified acres once existed into dryland acres and allowing water use that previously occurred on those acres to be transferred to other areas.

Assuming a \$2,750 per acre cost to decertify acres, the total estimated cost of water rights under the proposed project that would be purchased is \$3.75 million over a two-year period. Of this amount, \$2.25 million would come from the WSF and \$1.5 million from the URNRD.

The cost-benefit information in the preceding table assumes that 2/3 of the CREP acres set to expire in each of the next two years are re-enrolled with the proposed \$750 per acre from the URNRD in addition to normal CREP payments of approximately \$200 per acre annually, and that remaining funds are used to retire water rights at a cost of \$2,750 per acre.

Similar benefits related to Compact compliance and general preservation of water to stabilize groundwater levels to prolong aquifer life could be achieved by regulating all groundwater use in the District to an extent that would achieve the same benefits of the proposed project. However, this would come at a steep economic cost to the three counties of the District and the State.

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

The URNRD has a cash balance of approximately \$8 million and has the ability to levy a \$10/irrigated acre occupation tax that generated approximately \$4.4 million annually. The property tax levy will generate approximately \$2,035,000 in 2017-2018.

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

There are no O/M&R costs associated with the project because the project entails using WSF and URNRD funds to pay for the decertification of irrigated acres, i.e. the purchase of water rights.

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

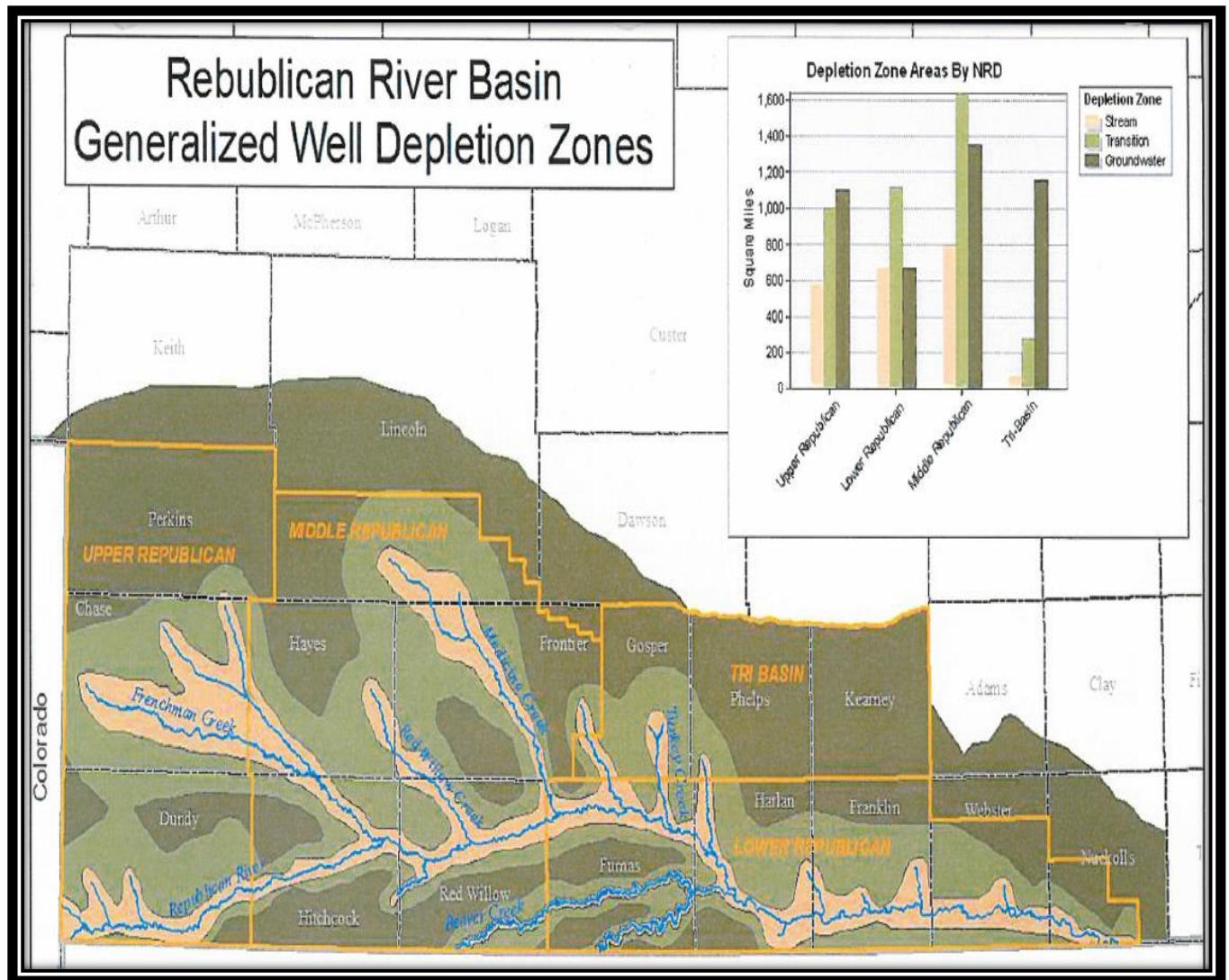
N/A

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

The proposed project minimizes impacts on the environment by causing reduced water use in the District. This is achieved by retiring irrigation uses in areas where groundwater pumping has high impacts on stream flows or where there are significant groundwater declines that threaten future water availability.

The underlying goals and objectives of the retirement program that will be reflected in the strategic policy that guide operation of the program include:

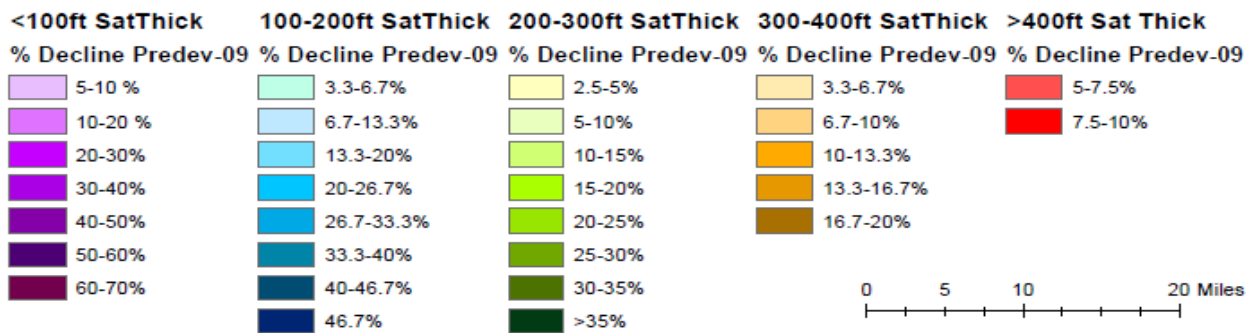
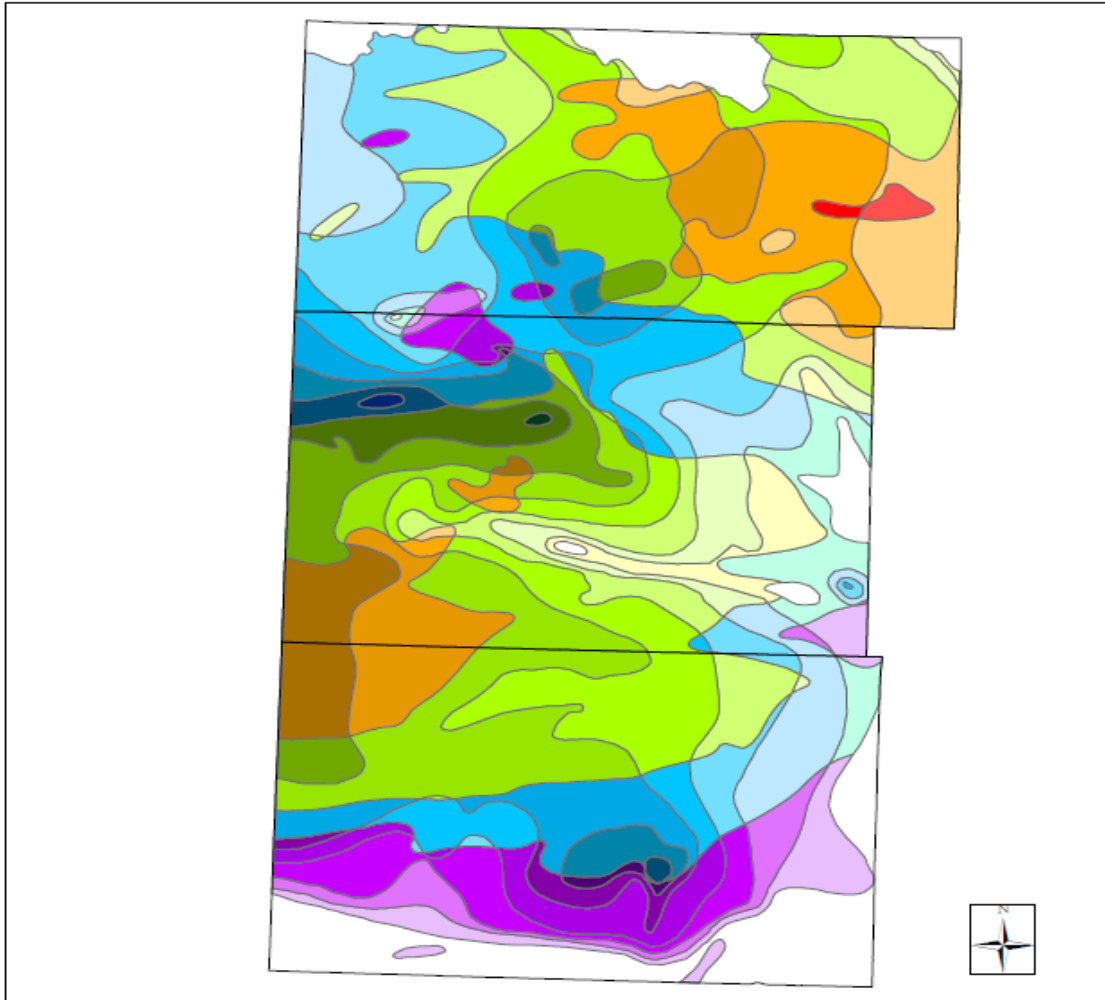
- Retiring uses that will benefit Republican River Compact Compliance by reducing depletions to stream flow. Estimates of stream flow depletion (sdf) reductions caused by ceasing irrigation on such acres will be made using the sdf factors within one mile-by-one mile tracts made available by the Republican River Compact Model. This will allow us to know how much additional stream flow can be expected to accrue over time by retiring irrigation from individual wells/parcels within the District. Tracts with a higher sdf will be given preference over those with a comparatively lower sdf. In order to be considered for participation to mitigate impacts on stream flow, tracts must be within an area of the District considered hydrologically connected to streams. For the purposes of the retirement program, hydrologically connected will mean areas where modeling indicates that groundwater pumping has a 10 percent sdf over a 50-year period, commonly called the "10-50" area. The map below illustrates the 10-50 area in the URNRD and the rest of the Republican Basin. It is all areas shaded in tan and light green. Approximately 2/3 of the URNRD is within the 10-50 area; Perkins County, the northernmost county in the District, is not within the 10-50 year except for the southeast corner of the county.



- Retiring uses in areas where at least 10 percent of the saturated thickness of the aquifer as it existed before irrigation development has been depleted since after the time in which groundwater irrigation began or where declines since the time in which groundwater measurements began have exceeded 25'. Areas with higher percentages of declines relative to pre-development groundwater levels will be given preference over those with comparatively lower decline rates. The map below shows the areas in which there have been declines of at least 10 percent. All regions of the URNRD except for the east-central portion of the district have areas with declines of at least 10 percent.

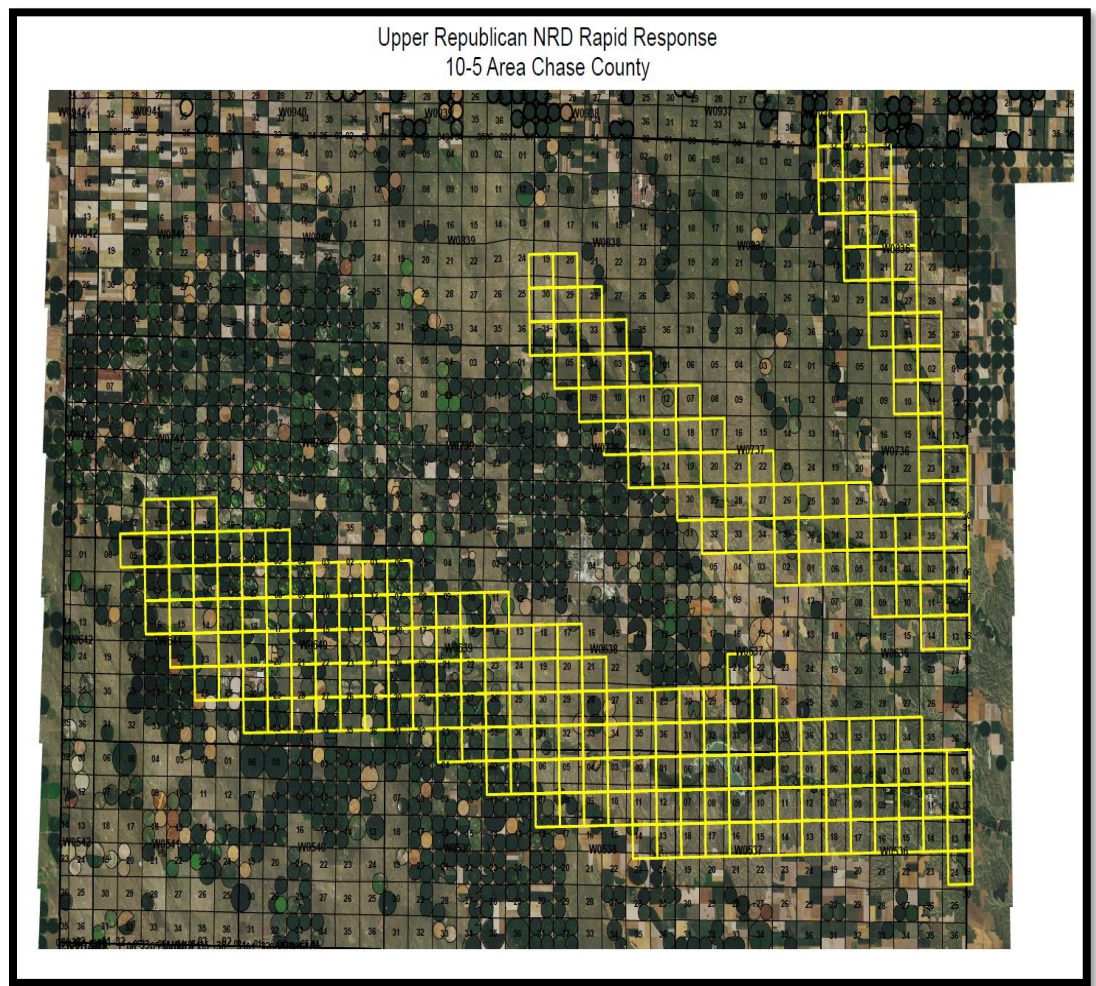


## URNRD Declines Relative To Saturated Thickness



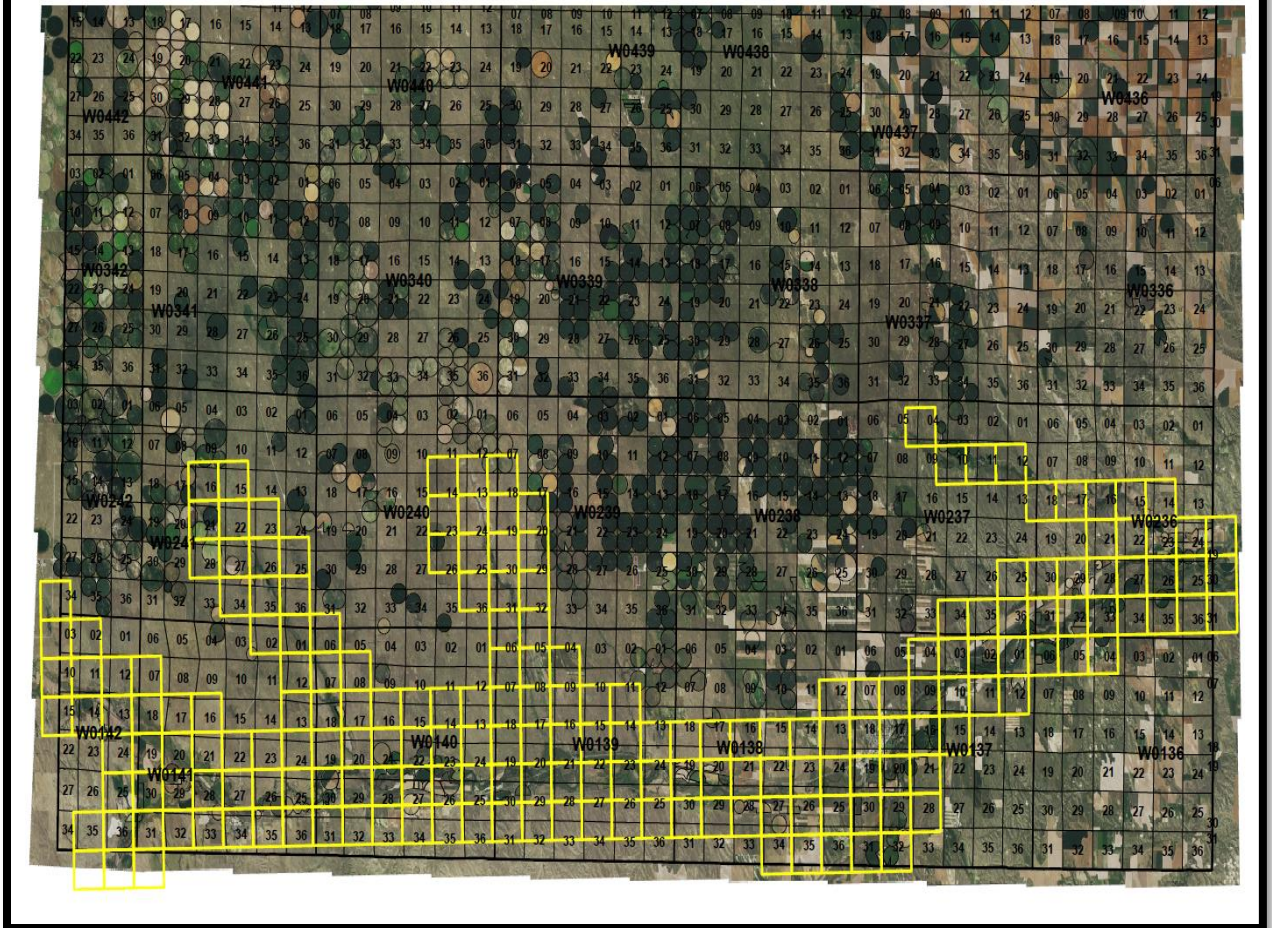
- Lessen the burden of Republican River Compact compliance management actions. Augmentation projects developed by the URNRD and other NRDs in the Republican Basin can offset depletions to stream flow to the extent necessary to maintain compliance with the compact during Compact Call years. However, the URNRD's Integrated Management Plan (IMP), similar to the IMPs of other NRDs in the basin, have a backstop option whereby

the URNRD would impose more stringent restrictions in certain areas of the district during Compact Call years to reduce impacts on stream flow and maintain compliance with the Compact. This area where special regulations can be set is the area in which the Republican River Compact model estimates that at least 10 percent of groundwater pumped would have otherwise resulted in stream flow within a five-year period, or the 10-5 area. There are 44,445 such acres in the district, illustrated in the maps below. The retirement program presents an opportunity for landowners/farmers in the 10-5 area to retire water uses to prevent the possible, albeit unlikely, consequence of an irrigation shutdown during Compact Call years.





Upper Republican NRD Rapid Response  
10-5 Area Dundy County



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

The URNRD's groundwater management authorities provided by the Groundwater Management and Protection Act give it the legal capabilities needed to institute a retirement program that will fulfill URNRD and State objectives concerning conservation of water and compliance with an interstate Compact, the Republican River Compact. The management of groundwater the URNRD has conducted since the 1970's, particularly as it pertains to institution of a water allocation system, makes it qualified to establish a retirement program. As the regulatory agency that collects, manages, and oversees all information on certified irrigated acres, the URNRD is uniquely qualified to institute a retirement program. Additionally, an important attribute of a retirement program to ensure enrollment is that it be instituted by an entity that is widely viewed within

the community as an impartial and competent curator of water, a role we believe the URNRD plays within the district.

The program will harness existing market demand for retirement and manage the market in such a way that the URNRD purchases water rights that benefit the district. In this respect, the URNRD is the most qualified and responsible entity to establish the retirement program.

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 considers plans and programs of the State because it is largely an outcome of plans and programs of the State. The existing demand for transfer of certified acres long distances within the URNRD is largely due to the URNRD's record of allowing such transfers, if other criteria are met, so long as the acres are being transferred from an area with a relatively high sdf to one with a lower sdf. The URNRD has been willing to allow such transfers in many cases because it can aid compliance with the Republican River Compact by lessening impacts on stream flow. This market can be beneficially exploited and grown by a retirement program because it will exist as a buyer of water rights that has as a primary purpose what is now an ancillary consequence of landowners who seek transfers: Reducing depletions to Republican River stream flow.

The reduced depletions to stream flow also of course result in increased storage of water in areas where groundwater pumping is eliminated. The State in recent years has strongly encouraged NRDs and other entities to implement conjunctive management projects, and in many cases has helped implement such projects, such as along the Platte. The proposed retirement program represents a conjunctive management effort because it will result in increased storage of water that if withdrawn for irrigation would be considered use as part of Nebraska's allocation under the Compact. Reduced use of Nebraska's allocation during dry years will aid compliance and create new supplies that can be managed during years when Nebraska is not at risk of exceeding its Compact allocation. The proposed retirement program will help increase surplus allocation that can be more fully utilized via other conjunctive management projects such as intentional recharge and potentially help create surplus supplies in years when surpluses otherwise would not have existed.

The State and URNRD also have an interest in reducing conflicts between water users. As depletion of a shared resource continues, conflicts are inevitable unless steps are taken to reduce or eliminate uses in areas with a high density of irrigation development and relatively low water supplies. There are three areas in the URNRD where those conditions exist.

Preference for irrigation retirement could be given to certified irrigated acres in those areas to help prevent potential future conflicts. Conflicts between groundwater users and surface water users could also be mitigated by the retirement of irrigation near the Republican River and its tributaries resulting in less impacts on stream flow surface water users rely upon. This represents a current conflict that could be aided by a retirement program and it would have benefits outside the URNRD because reduced stream depletions would create benefits downstream of the URNRD. It is worth noting that surface water irrigation districts downstream of the URNRD have long requested the retirement of irrigation and condoned irrigation shutdowns to comply with the Republican River Compact and related settlement agreement.

Finally, the retirement program considers the URNRD's and State's interest in preserving water for future use: "Management, protection and conservation of groundwater...is essential to the economic prosperity and future wellbeing of the State...and the public interest demands procedures for the implementation of management practices to conserve and protect groundwater supplies" (Neb. Rev. Stat. 46-702). The retirement program, through its ability to reduce water consumption in high-priority areas of the URNRD, achieves goals and objectives contained in the URNRD's Long Range Plan, Master Plan, Groundwater Management Plan and Integrated Management Plan.

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.

Pursuant to the Nebraska Groundwater Management Act, the entire District has been established as a Groundwater Management Area wherein the URNRD has the authority to implement policies and programs such as the proposed retirement program designed to preserve water. The District also has responsibilities contained within its IMP related to

Republican River Compact compliance which the District is obligated to fulfill using its authorities under state law.

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

No known negative environmental or ecological aspects of the project exist since the primary intent is to preserve water to help meet multiple goals of prolonging aquifer life, increasing stream flows and maintaining compliance with the Republican River Compact. We expect positive environmental and ecological impacts including the innate benefit of preserving a finite resource and additional stream flow benefitting fish and wildlife.

## 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 criterion 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.

Under the proposed program, preference points will be given to applications to retire land in areas where nitrate levels exceed acceptable drinking water standards. Two of the areas where high nitrate levels exist in the URNRD –

the southwest and southeast parts of the District – are also near streams where irrigation retirement will significantly benefit stream flow. It is our hope and reasonable belief, then, we will be able to achieve dual objectives in many cases: Increasing stream flow, and aiding groundwater quality via the targeted retirement of cropland from irrigation. Currently, approximately 20% of the District is estimated to have nitrate levels that exceed the acceptable drinking water standard of 10ppm. The areas are primarily located in the southwest, southeast and east-central parts of the District. Nitrate concentrations in the District have doubled the last 40 years by an average of 2ppm and are expected to create increasingly higher risks to drinking water within the URNRD.

Two of the largest towns in the Upper Republican NRD, Benkelman and Wauneta, in the past two years have faced significant threats to their drinking water supplies because of high levels of contaminants in municipal wells adjacent to streams.

The Village of Wauneta has recently addressed a significant issue of arsenic levels exceeding federal drinking water standards. The Nebraska Department of Health and Human Services has worked closely with the village to assess the extent and source of the arsenic problem. Rising arsenic levels have also been detected in the City of Imperial's water supply and high arsenic levels combined with high levels of uranium prompted the City of Benkelman recently to drill new municipal wells and install water-delivery pipeline from the wells to the city at significant cost.

Benkelman's former municipal wells that provided contaminated water, forcing the city to source and install new wells, were located immediately adjacent to the Republican River. Similarly, two of Wauneta's four municipal wells are within approximately ½ mile of Frenchman Creek, the largest tributary of the Republican River within the URNRD. The other two wells are also in proximity to the Frenchman Creek.

To date, research has not been done to establish whether high nitrate levels can trigger elevated levels of arsenic. However, the possibility of such a link exists and Frenchman Creek's proximity to one of the most densely irrigated/farmed areas of the District where abundant applications of nitrate-based fertilizers occur makes the creek a potential carrier of nitrates influencing wells such as Wauneta's. A recent University of Nebraska-Lincoln study established a link between nitrates and uranium levels in groundwater aquifers. "...Results indicate that nitrate, a primary contaminant, should be considered as a factor leading to secondary groundwater uranium contamination..." (Nolan J, Weber K, 2015).



Land retired from irrigation under the program may continue to be farmed without irrigation. However, nitrogen applications on dryland fields will significantly lessen chances of nitrates leaching into groundwater supplies used for human consumption and/or accreting into streams where nitrates can contaminate drinking water supplies downstream. “The more irrigation takes place, the greater the chances for nitrate leaching,” (Haller L, McCarthy P, O’Brien T, Riehle J, Stuhldreher T, 2013). In normal years, the chances of nitrates leaching into the groundwater supply on non-irrigated fields is greatly reduced because of the semi-arid climate of the URNRD where annual precipitation averages 17”-20”.

It is reasonable to assert that, because of the prevalence of irrigated agriculture in the District that increases the risk of nitrate leaching into drinking water supplies, all 9,000 residents of the District will potentially benefit from efforts such as those in this proposal to reduce irrigation withdrawals. The three towns mentioned above represent more than 1/3 of the URNRD’s population and about 45% or 4,050, live outside a city or village and rely upon domestic wells for their water supplies. A significant majority of domestic wells are in close enough proximity to irrigated cropland that they face a potential future risk of nitrate contamination above federally accepted levels.

The project will address the issue by using WSF and URNRD funds to retire irrigation uses via water-rights purchases in areas where there is a significant hydrologic connection between groundwater and surface water, and in areas of the District where there is a high density of irrigation development that both leads to relatively high rates of groundwater declines and poses higher risk for future nitrate contamination. In other words, the areas in which the URNRD hopes to reduce and/or prevent water uses through the retirement program are in many cases the same areas where there are more potential problems associated with nitrates.

The rate of increase in nitrate levels makes it prudent now to take management steps to prevent unacceptable levels from occurring throughout the District. The long-range impacts of not acting now are costly because they could include expensive remediation steps, especially relative to municipal water supplies, and imposing regulations for example on how much fertilizer farmers can apply, which could have negative economic impacts on the District.

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 proposed program will help achieve 9 of the 12 goals and objectives in the URNRD's Integrated Management Plan jointly approved with the Nebraska Department of Natural Resources. This high proportion is primarily due to the IMP's general focus on reducing the consumptive use of water and maintaining Compact compliance. The proposed program achieves both.

The Integrated Management Plan addressed by this project has been jointly developed and approved by the URNRD and Nebraska Department of Natural Resources four times and modified twice. The initial plan became effective June 2, 2005; it was revised and approved and then became effective on April 3, 2008; was revised and approved and became effective on Nov. 1, 2010; and recently was revised, approved and became effective on Jan. 15, 2016. The URNRD also has a Groundwater Management Plan, Master Plan and Long Range Implementation Plan.

The District has taken a series of actions to achieve the IMP goals including:

- 1) Implementing the Rock Creek and NCORPE augmentation projects that have achieved, and will continue to ensure, compliance with the Republican River Compact as adopted in 1943 and as implemented in accordance with the Settlement Agreement approved by the U.S. Supreme Court in 2003. The augmentation projects kept Nebraska in compliance with the compact in 2013, 2014, 2015, 2016 and 2017. These actions have helped achieve the IMP goal of maintaining compliance with the Compact.
- 2) Reached agreements with the other NRDs in the Republican Basin and the State that apportion Compact compliance responsibilities to the NRDs based on depletions to stream flow that occur within their respective Districts. This has helped achieve the second IMP goal of ensuring that water users within the URNRD assume their share, but only their share of the responsibility to maintain compliance with the Compact.
- 3) Implemented a uniform groundwater allocation system whereby all water users within the District have the same allocation. By implementing the augmentation projects, the District has prevented water users close to the Republican and River and its tributaries from being subject to lower water allocations. This has helped achieve the third IMP goal of the District apportioning its share of Compact compliance responsibility equitably to minimize adverse economic, social, and environmental consequences arising from Compact compliance activities.
- 4) Continued to prohibit expansion of new irrigated acres and permanently retired approximately 1,500 acres from irrigation using URNRD and federal funds. This has helped achieve the fourth IMP goal of protecting groundwater users whose water wells depend on recharge from the river or stream and the surface water appropriators on such rivers or streams from stream flow



depletions caused by water uses begun after the time in which the Republican Basin was designated fully appropriated.

5) Tightened rules and regulations to decrease groundwater pumping across the District in an effort to achieve a 20 percent reduction compared to 1998-2002 baseline levels during years of average precipitation. Specifically, recent rules changes have included limitations on the use of “banked” allocation - that which was allocated but not used by individual farmers during previous allocation periods - during the current allocation period and future periods without incurring a penalty.

The primary goal in the District’s Groundwater Management Plan is to keep groundwater levels at present levels or minimize declines to ensure future generations have an adequate water supply. The district’s allocation system, prohibition on new irrigation wells, spacing requirements between irrigation wells and other rules and regulations have been efforts to achieve that goal.

### **Attainment of IMP Goals**

The proposed retirement program will help achieve the following goals and objectives within the IMP.

#### 1. Maintain compliance with the Republican River Compact:

Certified irrigated acres will be retired from irrigation using WSF and URNRD funds consistent with the 60 percent (WSF), 40 percent (URNRD) project cost split required under WSF rules. Payments to decertify certified irrigated acres will cause irrigation retirement in areas where pumping has significant impacts on stream flow.

Retirement of uses with high impacts on stream flow has the potential to significantly reduce Nebraska’s use of its allocation under the Compact. Pursuant to a settlement agreement between the Compact states of Nebraska, Kansas and Colorado approved by the U.S. Supreme Court in 2003, Nebraska’s allocation of Republican River water under the Compact has included variable volumes of groundwater used by crops that, unused, would have resulted in stream flow as calculated by the Republican River Compact Model. Eliminating groundwater uses modeled to cause significant impacts on stream flow and therefore significant usage of Nebraska’s Compact allocation will help Nebraska not exceed its compact allocation. Allowing transfers of such high-impact uses to areas with low impacts on stream flow produces benefits in the same manner.

Compliance with the Compact aided by reduced water use achieved under the project helps prevent statewide liability for noncompliance that include significant penalties. For instance, the State of Kansas recently sought but did

not successfully receive a court judgement of approximately \$70 million for Nebraska's noncompliance with the Compact in 2005-2006.

2. Provide the URNRD's share of compliance responsibility and impact be apportioned within the URNRD in an equitable manner and to the extent possible, minimize adverse economic, social and environmental consequences arising from compliance activities:

By retiring irrigation on acres that have high impacts on stream flow, equity is created for landowners that currently face the potential for bearing a larger share of Compact compliance responsibility than owners of land with low impacts on stream flow.

Recently developed augmentation projects in the Republican Basin, the Rock Creek Augmentation Project in Dundy County and the NCORPE Augmentation Project in Lincoln County, have successfully kept the state in compliance with the Compact. But should their capacity at some point be insufficient to ensure compliance, the only other available option to the NRDs in the Republican Basin including URNRD would be to impose stricter allocations, or prohibit irrigation altogether, on acres close to the Republican River and its tributaries (42,445 acres in URNRD) in dry years when compliance action was needed. By reducing water use and therefore the impacts on stream flow caused by groundwater pumping that are considered usage of Nebraska's Compact allocation, the project could help prevent or at least mitigate special regulations on water users close to the Republican and its tributaries.

This option to lower or eliminate allocations on the so-called "rapid response" acres where modeling suggests at least 10 percent of groundwater pumped for irrigation would have otherwise resulted in stream flow with five years is in the IMP.

3. Protect groundwater users whose wells are dependent from recharge from the river or stream and the surface water appropriators on such river or stream from stream flow depletions caused by surface water uses and groundwater uses begun after the date the river basin was designated as fully appropriated.

Elimination of irrigation via the program in areas close to streams where pumping has significant impacts on stream flows will cause more stream flow to exist than if the retirement had not occurred. This additional stream flow will increase recharge available for groundwater wells close to the stream, protecting those groundwater users from depletions to stream flow. Likewise, the additional stream flow generated by the project will be available for surface

water users and protect them from surface water depletions caused by groundwater pumping.

4. Reserve any stream flow available from regulation, incentive programs, and purchased or leased surface water and groundwater 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.

Retiring groundwater irrigated acres reduces depletions to stream flow caused by groundwater pumping. For Compact purposes, the extent of the reduced depletions will be calculated using the Republican River Compact Model and accounting which consider, among other factors, estimated stream depletions caused by pumping that varies depending on proximity to streams and the volume of pumping. So, in addition to the presence of more physical surface water, there is a significant Compact accounting benefit caused by irrigation retirement in the form of reduced depletions to stream flow, i.e. less use and overuse of Nebraska's Compact allocation. The additional stream flow that is generated will be available to be used by surface water irrigators, benefitting them, and the reduced depletions will aid the URNRD by requiring less augmentation pumping or other management actions to offset depletions that exceed what may be allowed under the Compact.

### **Attainment of IMP Objectives**

1. Reduce existing groundwater use within the URNRD by 20 percent from the 1998 to 2002 baseline pumping volumes under average precipitation conditions so that, when combined with stream flow augmentation and incentive programs, the URNRD's groundwater depletions are maintained within their portion of Nebraska's allowable groundwater depletions as computed using the Republican River Compact Model. Additionally, voluntary reductions in baseline pumping volumes will continue to be pursued by the URNRD with the incentive of limiting the level of long-term management actions that are necessary during compact call years:

Pumping reductions caused by retirement of irrigation will help meet this objective. The requested grant of \$2,250,000 and URNRD match of \$1,500,000 could potentially retire approximately 1,815 acres at an average cost of \$2,066 per acre. This cost assumes a portion of acres currently enrolled in a temporary retirement program can be permanently retired at a lower cost than retiring acres currently being irrigated. Average annual irrigation withdrawals in the district are 12" per acre. Retirement of

1,815 acres, then, would reduce water use by 1,815 acre feet annually, significantly helping the District meet its pumping reduction target.

It's important to note that the intent of the IMP objective is to reduce depletions to stream flow. Since the retirement program will target retirement of irrigation that has significant impacts on stream flow, pumping reductions achieved under the retirement program will have a larger proportional, positive impact on stream flow than pumping reductions that would occur via other programs or regulations that did not target areas near streams.

2. Make such additional reductions in Compact call years as are necessary, after considering any reduction in beneficial consumptive use achieved through basin-wide incentive and stream flow augmentation programs, to achieve a reduction in beneficial consumptive use in the URNRD that ensures the district limits its groundwater depletions to the Allowable Groundwater Depletions for the URNRD:

Should reductions in Compact call years be needed, reductions in pumping already achieved by the retirement project preceding and during Compact call years will lessen further reductions in pumping that have to be made during Compact call years so as not to exceed allowable groundwater depletions to stream flow.

3. Cause the reductions in water use required for Compact compliance to be achieved through a combination of regulatory, incentive, and augmentation programs designed to reduce consumptive use. To the extent funds are available, incentive programs will be made available through targeted incentive programs:

The retirement program represents an incentive program to lessen stream flow impacts for Compact compliance purposes. It is helpful to both the URNRD and State to distribute across multiple methods our efforts to reduce stream flow impacts and offset them. In much the same way it makes sense to diversify a financial portfolio to reduce risks, it's prudent to diversify our compliance methods. Irrigation retirement represents the third compliance effort in addition to augmentation and pumping limitations.

4. Develop a program to provide offsets for new consumptive uses of water so that economic development in the District may continue without producing an overall increase in groundwater depletions as a result of new uses:

The URNRD would have the option of using some of the retired irrigated acres as offset for new industrial/economic development uses. Currently,

new industries such as ethanol plants must offset their new consumption of water by purchasing and retiring irrigated acres. This can pose a significant and costly barrier to businesses in a region of Nebraska where more business development is needed.

5. Prevent the initiation of new or expanded uses of water, with limited exceptions, that increase Nebraska's computed beneficial consumptive use of water within the URNRD, as required for Compact compliance and by Nebraska law.

This objective's intent is beneficially surpassed by the proposed program because it eliminates water uses instead of merely preventing them.

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 three above-listed goals – recharge, reducing aquifer depletion and increasing stream flow – are also the three primary goals of the proposed retirement program. In all areas where retirement occurs, the recharge rate will increase by 100% and aquifer depletion will decrease 100% because water use will completely cease in the area of the retirement. Increases in stream flow will be relative to the proximity of the retirement to streams and the volume of pumping that would have occurred without retirement.

URNRD and WSF funds will be used to pay landowners in high decline and high stream flow-impact areas to relinquish the irrigation certification status, which is granted by the URNRD, of their land. In the nomenclature of the URNRD and other NRDs that certify irrigated acres, removing this status such as for transfers or to penalize is simply called decertification of certified acres.

It is our intent to make water rights in all areas of the District where remaining aquifer saturated thickness is at least 10 percent less than it was before irrigation development began to be eligible for purchase. This constitutes roughly 60 percent – 75 percent of the district's 430,000 irrigated acres, or about 260,000-320,000 acres. Similarly, all acres where groundwater is considered to have a hydrologic connection to streams of at least 10 percent

impact within a 50-year period will be eligible, with priority given to acres where there is at least a 60% impact within a 50-year period. Most of these acres are also located in areas where saturated thickness is at least 10 percent less than it was before irrigation development. In sum, then, roughly 75 percent of the irrigated acres in the district, or about 320,000 irrigated acres, will be eligible. However, not all acres that meet those criteria will be considered equally for retirement. Water uses in areas with higher declines and/or higher impacts on stream flow will receive preference over acres in areas with comparatively lower declines and/or impacts on stream flow. As stated earlier, additional points will be given to applications to retire irrigation in areas where nitrate levels exceed 10ppm.

The amount that aquifer depletion will be reduced in high-decline areas of the district at the location where water uses will be purchased and relinquished is 100 percent. Average annual irrigation withdrawals in the district are 12" per acre and field size is typically 160 acres. Average water saved on a per-field basis, then, would be approximately 160 acre feet annually. Using WSF and URNRD funds, it is our hope to cease water use on 1,815 acres within high-priority areas, resulting in an annual savings of 1,815 acre feet.

As for increased stream flow, the amount of benefit will largely depend on the location of acres where water rights are purchased. As mentioned earlier, the Republican River Compact Model has calculated the estimated impact of groundwater pumping on stream flow in all areas throughout the Republican Basin and URNRD. Within the URNRD, the average impact is approximately 35 percent over a 50-year period, i.e. 35 percent of groundwater pumped would have resulted in stream flow within 50 years. From 2012-2014, the District participated in a program with the Natural Resources Conservation Service where \$2.1 million in URNRD funds and \$1.47 million in NRCS funds were spent to retire 1,546 acres. The intent of that program was very similar to the retirement proposal – to retire acres near streams and in areas of high declines. The average impact on stream flow of those acres was 86 percent.

If all the estimated 1,815 acres we hope to retire have a similar stream flow depletion factor of 86 percent, annual increases to stream flow will be approximately 1,560 acre feet in a 50-year period.

The project will result in cross-basin benefits because the additional stream flow will reach water users in areas downstream of the URNRD. This downstream region that could benefit includes all or part of the Middle and Lower Republican NRDs.

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.

Because all water uses are dependent on water supplies, and supplies in the URNRD are declining, the program's main objective contributes to all goals related to water supplies in the District. Significant reductions in uses achieved under the program will increase supplies for nearby groundwater users and downstream surface water users, as well as municipal and industrial uses to the extent their wells are either near areas of irrigation retirement or their water supplies depend on recharge from stream flow increased by irrigation retirement. The three major outdoor recreation areas in the District are surface water impoundments heavily dependent on stream flow that has declined and therefore will benefit from retirement aimed at increasing flow, and fish and other wildlife at the reservoirs will benefit from increased water supplies. As for the last stated goal of preserving water resources, the project achieves this goal in the most direct manner possible - by eliminating water use in areas where preservation is imperative.

Agricultural use: Retiring uses from willing sellers will prevent negative water-supply impacts on neighboring irrigators because there will be less demand for water in the area of retirement. In high-decline areas especially, preservation of water that would otherwise be used will help preserve, hopefully indefinitely, usable volumes of water for irrigated agriculture in the future. Additional stream flow generated by retirement of uses close to the stream will benefit irrigators who rely on surface water. It will also increase groundwater recharge in alluvial areas, aiding groundwater irrigators in those areas. Finally, to the extent that irrigation retirement will aid compact compliance, it could help keep the URNRD from severely limiting or barring irrigation on 42,445 acres close to the Republican River and tributaries in years known as Compact call years when action is needed to maintain compliance. The District's IMP specifies this action as a potential tool for compliance.

Municipal and industrial uses: The Village of Wauneta's municipal wellfield is located near the Frenchman Creek and relies upon recharge from the river. Increased recharge and therefore municipal supplies can be expected from retiring water uses via the w. All other municipal wellfields in the URNRD serving approximately 5,000 people are in or near areas where there have been groundwater declines so could benefit by retirement that could increase

water availability. The same is true for remaining residents who rely on domestic wells. Finally, retirement of irrigation may reduce nitrate leaching into municipal and domestic water supplies.

Recreation and wildlife: Two recreation areas, Enders Reservoir and Champion Lake, have been negatively impacted by decreasing inflows from the Frenchman Creek. Retirement of water uses near the Frenchman could help boost inflows into both recreation areas. Recreation areas downstream of the district along the Republican River including Swanson Reservoir in the Middle Republican NRD and Harlan County Lake in the Lower Republican NRD would also be positively impacted by increasing base flow produced by retiring acres with high-impacts on stream flow. Generally, increased stream flow will of course aid wildlife including fish.

Conservation and preservation of water resources: In general, the project seeks to conserve and preserve groundwater in an area where there have been significant groundwater declines over time. Retiring water uses in high-decline areas will help lower decline rates, preserving and conserving water resources.

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 best use of water within the URNRD for the benefit of both District and State residents is that which efficiently produces the largest possible yields without exceeding water-use restrictions imposed by the District. Retiring water rights purchased from willing sellers will help prolong, hopefully indefinitely, the time in which this can occur by helping preserve water supplies. The State, like the URNRD, is heavily dependent on the ag economy and activities designed to preserve water supplies are necessary to sustain the agricultural economy.

To the extent that the project helps reduce water use so that the District and State stay within their allowable depletions to stream flow caused by groundwater pumping under the Republican River Compact, the project will help maintain Compact compliance and reduce the State's liability for noncompliance. In its most recent lawsuit against the State, the State of Kansas sought \$70 million from Nebraska for noncompliance in 2005-2006.



The project also provides a beneficial economic impact to residents of the State by helping sustain water resources and therefore income tax revenue derived from irrigated crops. The total, average annual market value of agricultural products produced in Chase, Dundy and Perkins Counties that comprise the URNRD is approximately \$840 million. Should groundwater availability decline to the point that a 15 percent reduction in irrigation and resulting decreases in yields occur in upland areas with more water availability and a 40 percent reduction in irrigation near streams where there tends to be less groundwater available occur, annual economic output impacting state revenues could drop by an estimated \$27 million (UNL Bureau of Business research, 2007).

Beneficial uses of water may be reduced on retired irrigated acres, but it is important to note that the decertification will not be forced and instead occur by participation from willing landowners. Land that is retired from irrigation can continue to be farmed as non-irrigated cropland so that economic benefits relative to production remain. Increased water availability will allow for beneficial uses in the future that might not otherwise occur. Because the URNRD is in a region of declining water supplies, this approach uses what we believe is the necessary “long-view” to ensure that Nebraska’s water resources are available for as long as possible for the benefit of the District and the State as a whole.

The potential exists for a substantial local and State tax benefit as well. Over the long and possibly mid-term, the number of irrigated acres able to remain irrigated because of water preserved under the program is expected to exceed the number of irrigated acres retired via the program. Within the URNRD, irrigated land values are on average roughly three times higher than dryland values, producing more local tax revenue and therefore less reliance on State tax dollars, namely in the form of state aid to schools. Currently, the extent school districts within the URNRD rely on state aid varies from very little to none.

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 URNRD’s experiences purchasing water in the basin suggests the cost of permanently retiring water rights is significantly cheaper on a per-acre-foot basis than acquiring water rights through other means. In 2007, the URNRD purchased surface water for approximately \$300 per acre foot which adjusted for inflation would cost approximately \$350 per acre foot in

2017 dollars. The water was available for just one year. Water rights purchased under the retirement program will range from approximately \$750 per acre foot for CREP land to be permanently retired to \$2,750 per acre foot for land not enrolled in CREP. The water rights will be permanently retired so within a little more than two years the amount paid for water rights purchased for \$750 per acre (\$750/\$350) will be less than the expected cost of a one-time purchase of surface water at \$350 per acre foot. Within approximately eight years the amount paid for water rights purchased for \$2,750 per acre (\$2,750/\$350) will be less than the expected cost of a one-time purchase of surface water at \$350 per acre foot.

There are no O/M costs associated with the project because the project entails using WSF and URNRD funds to pay for the decertification of irrigated acres, i.e. the purchase of water rights.

Under the retirement program, water-rights purchase prices will be established annually based on the market conditions and water rights will be acquired using URNRD tax revenues and funds from the WSF. The current market condition and the basis of the WSF funding request of \$2.25 million is a rate of \$2,750 per certified irrigated acre within the URNRD. Acres decertified via participation would still be allowed to farmed as dryland, thus the \$2,750 per acre rate that is significantly lower than the cost of irrigated land. This market price has been established within the district over the last year by private sales of land in which certified irrigated acres have been transferred to other areas, turning tracts or partial tracts where certified acres once existed into dryland acres and allowing water use that previously occurred on those acres to be transferred to other areas so long as the transfers don't conflict with water-conservation goals.

Assuming a \$2,750 per acre cost to decertify acres, the total estimated cost of water rights under the proposed project that would be purchased by the water URNRD is \$3.75 million over a two-year period. Of this amount, \$2.25 million would come from the WSF and \$1.5 million from the URNRD.

2018: Water rights on 815 acres purchased for \$1.875 million (\$1.125 million from WSF; \$750,000 from URNRD).

2019: Water rights on 1,000 acres purchased for \$1.875 million (\$1.125 million from WSF; \$750,000 from URNRD).

The number of acres retired in each year as stated above vary because more CREP contracts expire in 2019 than 2018 and it is expected that the program will incentivize permanent retirement of approximately 2/3 of

CREP up for renewal at a lower cost than retiring acres not enrolled in CREP.

Similar benefits related to Compact compliance and general preservation of water to stabilize groundwater levels to prolong aquifer life could be achieved by regulating all groundwater use in the District to an extent that would achieve the same benefits of the proposed project. However, this would come at a steep economic cost.

For example, if all 1,815 acres worth of water rights purchased over a two-year period had an average 50-year stream flow depletion factor (sdf) of 86 percent similar to what was experienced under a previous retirement program in the District, depletions to stream flow would eventually be reduced by about 1,560 acre feet annually. Achieving the same benefit by regulating irrigated acres in the District with an average sdf of 35 percent, which is the district-wide average, would require prohibiting irrigation entirely on about 4,500 acres, which is more than 10% of all irrigated acres in the URNRD. The economic cost of such a policy would far exceed the \$3.75 million cost of permanent retirement as proposed. Using the average per bushel corn value of \$5.11 under the WSF guidelines provided by the Natural Resources Commission, 100 bushel per acre yield reductions caused by an irrigated-to-dryland conversion on 18,000 acres would reduce economic output in terms of grain sales by approximately \$2.3 million annually. Of course, yield reductions can be expected from retirement of water rights but that economic output is significantly offset by landowner revenue generated from the sale of the water rights.

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 Compact the project will help meet is the Republican River Compact between Nebraska, Kansas and Colorado as adopted in 1943 and as implemented in accordance with the Settlement Agreement approved by the U.S. Supreme Court in 2003.

Water consumption reduced under the project will help ensure Nebraska doesn't overuse its Compact allocation. It will also reduce the amount of water use in excess of the allocation that must be offset by increasing stream flow

via stream flow augmentation projects developed in the Republican River Basin or other activities. The project will help prevent and/or reduce statewide liability for noncompliance that include significant penalties. As an example, the State of Kansas recently sought but did not successfully receive a court judgement of approximately \$70 million for Nebraska's noncompliance with the compact in 2005-2006.

Pursuant to a settlement agreement between the Compact states of Nebraska, Kansas and Colorado approved by the U.S. Supreme Court in 2003, Nebraska's allocation of Republican River water under the Compact has included variable volumes of groundwater used by crops that, unused, would have resulted in stream flow as calculated by the Republican River Compact Model. Eliminating groundwater uses modeled to cause significant impacts on stream flow and therefore significant usage of Nebraska's Compact allocation will help Nebraska not exceed its Compact allocation. Allowing transfers of such high-impact uses to areas with low impacts on stream flow produces benefits in the same manner.

Recently developed augmentation projects in the Basin, the Rock Creek Augmentation Project in Dundy County and the NCORPE Augmentation Project in Lincoln County, have successfully kept the state in compliance with the Compact. But should their capacity at some point be insufficient to ensure compliance, the only other available option to the NRDs in the Republican Basin including URNRD would be to impose stricter allocations, or prohibit irrigation altogether, on acres close to the Republican River and its tributaries (approximately 42,445 acres in URNRD) in dry years when compliance action was needed. By reducing water use and therefore the impacts on stream flow caused by groundwater pumping that are considered usage of Nebraska's Compact allocation, the project could help prevent or at least mitigate special regulations on water users close to the Republican and its tributaries.

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 lack or overabundance of groundwater is not commonly viewed as a threat to infrastructure or property, however a significant link exists that is increasingly being analyzed by infrastructure security officials.

The U.S. Department of Homeland Security (DHS) Office of Cyber and Infrastructure Analysis in 2015 used Dundy County, one of the three counties within the URNRD, as its primary example of how dwindling water supplies could threaten critical infrastructure by eventually causing shortages in the food and agriculture, energy, and chemical sectors. Continued aquifer depletion that the proposed project will help mitigate could impact both critical infrastructure and the economy at the local, regional and national levels, according to the analysis.

“As groundwater availability decreases over time,” according to the report, “it is possible that more agricultural land will be converted from irrigated to dryland farming.” DHS modeling showed that in the future, dryland crop yields might decline slightly and reliance on groundwater irrigation could be more tenuous because of lower supplies.

Counties of highest concern overlying the aquifer are those the modeling described in the report showed as having 25 or fewer years of groundwater use available. No such counties in Nebraska were shown to be facing that imminent of a problem. But of the seven counties in Nebraska where the life of the aquifer usable for irrigation was shown to be 50-100 years, two are in the URNRD (Dundy and Chase). One of the four counties in the Nebraska with a usable aquifer life of 100-200 years was in the District (Perkins).

Food and fuel (ethanol) prices could rise due to less crop production and water and wastewater systems could be negatively impacted by growing populations and declining groundwater levels. Transportation systems infrastructure could be affected by potentially less demand for transportation services as a result of less agriculture and ethanol production.

The proposed program will help mitigate these threats by prolonging aquifer life, therefore increasing food and fuel security.

#### 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.

Approximately 20% of the District is estimated to have nitrate levels that exceed the acceptable drinking water standard of 10ppm. The areas are primarily located in the southwest, southeast and east-central parts of the district. Nitrate concentrations in the District have doubled the last 40 years by an average of 2ppm and are expected to create increasingly higher risks to drinking water within the URNRD. The proposed project will help reduce nitrate levels by giving preference points to irrigation retirement applications in areas where nitrate levels that exceed acceptable drinking water standards exist.

The majority of the areas with high nitrate levels are also in parts of the District – the southwest and southeast - that are good candidates for irrigation retirement because they are relatively close to streams where groundwater pumping has high impacts on stream flow. This fact makes it likely that a significant portion of the retired acres could be in areas with high nitrate levels aided by the retirement of irrigation.

Under the program, retired lands may still be farmed as non-irrigated cropland. However, dryland farming in the semi-arid climate that exists in the URNRD significantly reduces instances of nitrate leaching into the groundwater caused by an abundance of soil moisture. “The more irrigation takes place, the greater the chances for nitrate leaching,” (Haller L, McCarthy P, O’Brien T, Riehle J, Stuhldreher T, 2013).

Rising nitrate and arsenic levels currently pose risks, and are expected to create increasingly higher risks, to drinking water within the URNRD. The proposed retirement program’s ability to retire irrigation uses, especially those close to streams, will contribute to efforts to protect drinking water. For example, the Village of Wauneta is currently addressing the significant issue of arsenic levels exceeding federal drinking water standards. The Nebraska Department of Health and Human Services has worked closely with the village to assess the extent and source of the arsenic problem. Rising arsenic levels have also been detected in the City of Imperial’s water supply and high arsenic levels combined with high levels of uranium prompted the City of Benkelman to drill new municipal wells and install water-delivery pipeline from the wells to the city at significant cost.

Benkelman’s former municipal wells, which provided contaminated water and were located immediately adjacent to the Republican River, forced the city to source and install new wells. Similarly, two of Wauneta’s four municipal wells are within approximately ½ mile of Frenchman Creek, the largest tributary of

the Republican River within the URNRD. The other two wells are also in proximity to the Frenchman Creek.

To date, research has not been done to establish whether high nitrate levels can trigger elevated levels of arsenic. However, the possibility of such a link exists and Frenchman Creek's proximity to one of the most densely irrigated/farmed areas of the District where abundant applications of nitrate-based fertilizers occur makes the creek a potential carrier of nitrates influencing wells such as Wauneta's. A recent University of Nebraska-Lincoln study established a link between nitrates and uranium levels in groundwater aquifers. "...Results indicate that nitrate, a primary contaminant, should be considered as a factor leading to secondary groundwater uranium contamination..." (Nolan J, Weber K, 2015).

It is reasonable to assert that, because of the prevalence of irrigated agriculture in the District that increases the risk of nitrate leaching into drinking water supplies, all 9,000 residents of the district will potentially benefit from efforts such as those in this proposal to reduce irrigation withdrawals. The three towns mentioned above represent more than 1/3 of the URNRD's population and about 45%, or 4,050, live outside a city or village and rely upon domestic wells for their water supplies. A significant majority of domestic wells are in close enough proximity to irrigated cropland that they face a potential future risk of nitrate contamination above federally accepted levels.

The project will address the issue by using WSF and URNRD funds to retire irrigation uses via water-rights purchases in areas where there is a significant hydrologic connection between groundwater and surface water, and in areas of the District where there is a high density of irrigation development that both leads to relatively high rates of groundwater declines and poses higher risk for future nitrate contamination.

Because nitrate levels haven't exceeded the federally accepted drinking water standard or come close to the standard in large swaths of the District, efforts to date to control nitrate levels has been confined to water-quality testing. However, the rate of increase in nitrate levels makes it prudent now to take management steps to prevent unacceptable levels from occurring throughout the District. The long-range impacts of not acting now are costly because they could include expensive remediation steps, especially relative to municipal water supplies, and imposing regulations for example on how much fertilizer farmers can apply, which could have negative economic impacts on the District.

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 jurisdiction that supports the project is the URNRD. We believe our regulating and managing all agricultural water use in the area since the 1970's makes us uniquely qualified to pursue the proposed project.

The District's 2016-2017 tax levy is \$.055216 per \$100 of valuation and will generate \$2,108,812 of revenue. The District's other source of revenue is the \$10-per-irrigated-acre occupation tax that generates approximately \$4.4 million annually.

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 Upper Republican NRD is the local jurisdiction applying for the grant. The URNRD has a Groundwater Management Plan, Long Term Implementation Plan, Master Plan and Integrated Management Plan with water sustainability goals. Slowing and eventually stopping groundwater declines is the URNRD's overarching goal. Specifically, the District has formally adopted goal of "developing, promulgating and enforcing rules and regulations that provide for appropriate protection of the aquifer to slow and eventually stop water table declines in order that beneficially usable quantities of water remain in the aquifer; incentives to use water efficiently; conservation of groundwater; and maintaining or enhancing groundwater quality." (URNRD Master Plan, 2010-2020).

The district's Integrated Management Plan has been approved and revised four times since 2005 and has a purpose of "sustaining a balance between water uses and water supplies so that the economic viability, social and



environmental health, safety and welfare of the river basin...can be achieved and maintained for both the near and long term.”

Collectively, plans approved by the District have goals relative to decreasing impacts on stream flows and preserving water that will be addressed by the project because it will retire water uses in high priority areas of the District.

The URNRD is believed to be possibly the first entity in the country, and was the first in Nebraska, to limit agricultural water use by establishing an allocation on the use of groundwater in 1979. Since that time, allocations have been reduced by approximately 40%. The regulations have slowed groundwater declines compared to what was predicted to occur absent regulations. Average groundwater declines are approximately 60% less than what USGS predicted they would be if regulations weren't established (Lappala, 1978) and the most significant groundwater declines are approximately half what USGS estimated would occur without regulations.

In addition to allocations, regulations limiting proximity of irrigation wells to one another were approved in 1979 and again in 1992. In 1997, the URNRD approved and implemented the first well-drilling moratorium in Nebraska. Larger declines in areas that abut the URNRD in Kansas and Colorado which do not have regulations or whose regulations are less stringent also illustrate the beneficial impact of these actions within the URNRD. Average annual declines in areas of Kansas with a similar climate have been more than double what has occurred in the URNRD over a similar time period.

Most recently, in 2013, the District made some of its most significant rules changes in its history when it restricted the use of unused allocation, or “carry-forward”, and created new penalties for water users who use more than their water allotments. All agricultural water use has been metered since the late 1970's and approximately 400 wells are measured in the spring and fall. Metering, well measurements and allocations have created an extensive database from which the URNRD can base decisions to further its long-term goal of slowing groundwater declines in the URNRD.

The primary goals which the project will help achieve are to preserve groundwater for future use and slow groundwater declines, and reduce depletions to stream flow caused by groundwater pumping to aid compliance with the Republican River Compact. This is consistent with the primary goal in the district's Groundwater Management Plan to keep groundwater levels at present levels or minimize declines to ensure future generations have an adequate water supply.

The project will also help achieve the following objectives contained in the URNRD's Long Range Implementation Plan:

- Develop, promulgate and enforce rules and regulations that provide for appropriate protection of the aquifer, incentives to use water efficiently, conservation of ground water, and maintenance and enhancement of groundwater quality: The retirement program represents an incentive program to encourage retirement of water rights within high-decline areas and those with high impacts on stream flows in addition to reducing nitrate leaching into groundwater.
- Reduce the potential for non-point contamination of ground and surface water through education, research, management practices, incentives and rules that protect the water but also minimize adverse effects on the economy of the area: Less water use and subsequently less leaching of nitrates into the groundwater supply via retirement of water uses will help achieve this objective.

The target area of the project is the 1.7 million-acre land area of the URNRD and specifically the approximately 430,000 irrigated acres in the District. It is our intent to make water rights in all areas of the District where remaining aquifer saturated thickness is at least 10 percent less than it was before irrigation development began to be eligible for purchase. This constitutes roughly 60 percent – 75 percent of the district's 430,000 irrigated acres, or about 260,000-320,000 acres. Similarly, all acres where groundwater is considered to have a hydrologic connection to streams of at least 10 percent impact within a 50-year period will be eligible. Most of these acres are also located in areas where saturated thickness is at least 10 percent less than it was before irrigation development. In sum, then, roughly 75 percent of the irrigated acres in the district, or about 320,000 irrigated acres, will be eligible and are the target area of the project.

Over the two-year period in which WSF and URNRD funds are proposed to be used to retire uses in high-priority areas, it is expected that water use will be retired on approximately 1,815 acres in such areas, reducing water use by an estimated 1,815 acre feet annually assuming average use on the acres is approximate to the district-wide, annual average use of 12" per acre.

The population of the area directly benefitting from the project is the 9,000 residents of the district and all residents of the Republican Basin and Nebraska generally that benefit from the agricultural output and stream flow generated in the URNRD.

The URNRD considers all residents of the District stakeholders in and beneficiaries of the project.

The project also helps leverage funds from a federal irrigation retirement program, the U.S.D.A Conservation Reserve and Enhancement Program (CREP). Over the last 10 years, the URNRD has contributed approximately \$3 million to the program.

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.

Preservation of a State resource, water, to help prolong the local and statewide benefits of use will occur under the program. In regards to who the proposed project benefits, the State has explicitly identified in statute (46-702) protection and conservation of groundwater as being essential to the economic prosperity and wellbeing of the State. The proposed project we believe corresponds with this statewide objective and therefore benefits all residents of Nebraska. The direct economic benefit to the whole State of preserving water in one portion of the State such as our district is sustaining tax revenues and economic outputs associated with irrigated agriculture that touch people outside our district and across Nebraska.

Specifically:

1. Balancing Water Uses with Supplies: By focusing in part on high decline areas, the District will be able to retire uses in areas that unabated will contribute to significant water supply problems within a fairly short time period – roughly 30-40 years. Irrigation development within the URNRD and State has occurred under a reasonable standard that residents have the right to beneficially use groundwater of the State, with much if not the majority of the development occurring before local policies were implemented to prevent levels of development that could jeopardize long term water availability. Within the URNRD, for example, most of the irrigation development that exists in the District was initiated before the URNRD had the legal authority to limit water use. This is the case in most of the rest of Nebraska with significant irrigation development. The URNRD's use of this management authority, as is the case with other NRDs, has produced immense benefits in terms of groundwater preservation for future use. Within the URNRD, for example, groundwater modeling conducted by the USGS shortly before regulations were imposed in the late 1970's projected water level declines of up to 140 feet and average declines in the range of 60 feet would occur without limits on development or use. Due to regulations implemented by the URNRD, average declines have been approximately 25 feet and the worst declines 60-70 feet. Additionally, comparisons to declines in regions of other states

with similar climates, as noted before, clearly show regulations have mitigated declines.

However, in many cases regulations have not been enough to offset impacts caused by rapid irrigation development that occurred before legal authority existed to control it. This is a difficult issue to remedy, and irrigation retirement may be the most effective tool to address it. Widespread irrigation development can't be undone, but uses can be retired to prevent exacerbation of water supply problems in localized areas.

2. Market response to market demand: Groundwater declines and efforts to reduce stream depletions within the URNRD have in and of themselves created a demand for irrigation retirement that prevents a purely regulatory response to the issues. This condition may not exist in many other parts of Nebraska now, but may in the future.

It is well known within the URNRD that our IMP has as an option the shutdown of 42,445 acres of irrigation as a tool to maintain compliance with the Republican River Compact in dry years. Concern over this shutdown option is one reason there has been a desire to enroll in programs such as the USDA's Conservation Reserve and Enhancement Program (CREP) and Agricultural Water Enhancement Programs (AWEP) that targeted acres with high impacts on stream flows. The same concern is what has prompted some requests within our District to transfer water rights from river bottoms to upland areas.

Similarly, concerns over declining groundwater supplies have led to consideration of water transfers out of such areas. Under current water usage rates, it is estimated the aquifer underlying 70,000 acres within the URNRD will not be able to provide a full irrigation supply within approximately 40 years. Of those 70,000 acres, approximately 20,000 acres have a 20-30 year water supply adequate for irrigation and 50,000 acres have a useful irrigation life of 30-40 years. The remainder of the URNRD has a water supply estimated to last between 40 and 500 years without changes in pumping levels or location of pumping.

These two conditions have created a demand for irrigation retirement that can be met by the program. Coupled with progressive limitations on groundwater use, retirement can help create a multipronged approach to water management and conservation that will be more effective than regulations alone.

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.

There are no other funding sources for the project but it has the potential to help attract federal grant dollars for water management entities that have demonstrated the willingness and ability to reduce water consumption.

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.

There are seven watersheds in the District defined by the U.S. Environmental Protection Agency as impaired that are entirely or partially contained within the URNRD: Arikaree; Red Willow; Stinking Water; North Fork of the Republican; South Fork of the Republican; Upper Republican; and Frenchman. They are impaired waters for the following reasons:

Arikaree – E. Coli

Red Willow – E. Coli, Biointegrity; Chlorophyll; Dissolved Oxygen; Phosphorus

Stinking Water – E. Coli

North Fork of the Republican – E. Coli

South Fork of the Republican – E. Coli

Upper Republican – E. Coli; Chlorophyll; Dissolved Oxygen; Nitrogen; Phosphorus; Selenium

Frenchman – E. Coli; Chlorophyll; Selenium

To the extent that reduced groundwater pumping under the proposed project can mitigate decreases in stream flow, the project could reduce impairment of the Red Willow, Upper Republican and Frenchman watersheds by increasing dissolved oxygen and dilution of phosphorus, nitrogen and selenium. Less leaching of nitrogen and phosphorus due to reduced irrigation may decrease their presence in groundwater and therefore natural discharges to streams (base flow), improving watershed health.

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 project meets the following objective cited in the NeDNR September 2016 Annual Report and Plan of Work for the Nebraska State Planning and Review Process:

Republican River Basin IMPs (p. 24): The annual report states that NDNR and the NRDs in the Republican Basin including URNRD will continue to meet annually to “review the IMPs and progress made towards achieving the goals of each plan. These reviews focus on the assessment of two key compliance standards: limitations on groundwater depletions and limitations on groundwater pumping.” The proposed project will help achieve IMP goals of reduced pumping – specifically, reducing pumping over the long term and during periods of average precipitation by 20 percent compared to 1998-2002 baseline pumping volumes.

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.

Congressional approval was required for the Republican River Compact to be entered into by Nebraska, Colorado and Kansas and Congressional approval would be required to dissolve it. Therefore, it is reasonable to consider the Compact a federal mandate. The retirement of irrigated acres will help meet the mandate by reducing Nebraska’s use of its Compact allocation.

It was entered into with Congressional approval in 1943 and allocates the annual, average supply of the Republican River among the three states thusly: 49 percent to Nebraska; 40 percent to Kansas; and 11 percent to Colorado. The amount of water subject to those percentages varies annually depending upon stream flows.

Before a 2002 settlement agreement between the Compact states, the accounting that determined each state’s consumptive use under the Compact

included surface water and alluvial groundwater for irrigation, municipal and industrial uses, and evaporation from U.S. Bureau of Reclamation Reservoirs. Subsequent to the 2002 agreement approved by the U.S. Supreme Court, depletions to stream flow caused by all groundwater use including from upland wells is included in the calculations. A groundwater model was developed to compute depletions to stream flow caused by groundwater pumping.

Annually, the State, using estimates of surface water supplies and depletions, forecasts whether action will need to be taken the following year to ensure compliance with the Compact. A primary intent of the IMPs developed by the NRDs in the Republican Basin and NEDNR is to ensure Compact compliance. One way it seeks to do this is by mitigating impacts on stream flow caused by establishing goals to reduce groundwater pumping. Reducing groundwater pumping is the main intent of the proposed project and, if achieved as projected, will therefore aid the federal mandate of Compact compliance.

The Compact, by constraining uses to allocations between the states, is a naturally a limiting force on groundwater pumping and this has been demonstrated in many ways over the past approximately 20 years. All wells in the Lower and Middle Republican NRDs were metered because of the Compact (wells in URNRD were metered because of water quantity concerns that predated compact issues); moratoriums on new irrigation development were established because of efforts to comply with the Compact; and water use restrictions, or allocations, were implemented in the Lower and Middle Republican NRDs because of the Compact (water quantity concerns predating compact concerns caused allocations in the URNRD). In this way, there is a direct connection between the federal mandate of Compact compliance and water sustainability goals.



## 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 Upper Republican NRD (URNRD) wishes to harness market demand that exists for the retirement of groundwater irrigation uses to address problems of declining water tables, depletions to stream flow, and water quality issues. We propose to do this by using WSF and URNRD funds to retire irrigation in high decline areas, those where pumping has significant impacts on stream flow, and where water quality problems exist.

The URNRD controls the certification of irrigated acres within its boundaries and this certification is what payments will be made to landowners to decertify acres to retire water uses. The three main objectives of the retirement program will be to reduce stream depletions caused by groundwater pumping, preserve water in high-decline areas of the URNRD, and improve water quality by reducing nitrate contamination.

Payments using URNRD and WSF funds will be for retirements of irrigation on ground that is currently being irrigated and to permanently retire irrigation on land enrolled in temporary irrigation retirement programs. This will be done by removing the certification status of irrigated acres that is granted by the URNRD. The certification status to irrigate, or not irrigate, is a legal control and authority of the URNRD. Because of this, decertifying irrigated acres using WSF and URNRD funds will ensure irrigated lands are permanently retired from irrigation.

Under the retirement program, water-rights purchase prices will be established annually based on the market conditions and water rights will be acquired using URNRD tax revenues and funds from the WSF. The current market condition and the basis of the WSF funding request of \$2.25 million is a rate of approximately \$2,750 per certified irrigated acre within the URNRD for land currently being irrigated and \$750 per acre for land enrolled in temporary retirement programs to become permanently retired from irrigation once the contract for temporary retirement expires.

There is significant need for a multipronged approach to water management within the URNRD. The URNRD has the most widespread and severe groundwater declines within the State, with water levels, on average, 25 feet lower now than they were before irrigation development began. The average, annual rate of decline is approximately .75 feet and the most significant declines

have been a total of 60-70 feet. This has occurred despite the URNRD having limited irrigation withdrawals via an allocation system across the whole District since 1979, and allocations having been reduced by approximately 40 percent since that time. The restrictions, as described in more detail in the scoring section of the grant application, have achieved significant results such as average groundwater declines being approximately 60 percent less than what was projected to occur in the late 1970's without regulations. However, the high density of irrigation within the URNRD is difficult to offset solely with pumping limitations and declines persist. Retirement of irrigation in such areas is a key tool that must be used to prolong water supplies and meet the District's goal of eventually stopping groundwater declines.

Most are aware of the challenges the State and NRDs within the Republican Basin have faced over the past 15 years maintaining compliance with the Republican River Compact. The State was recently sued by the State of Kansas for noncompliance in 2005-2006 and sought approximately \$70 million. That lawsuit was subsequent to a lawsuit filed by Kansas against Nebraska in 1998 that led to a settlement agreement among the Compact states of Nebraska, Kansas and Colorado approved by the U.S. Supreme Court in 2003. A key piece of the settlement agreement was an entirely new Compact accounting method that included groundwater withdrawals and crop use of that water, to the extent they are modeled to impact Republican River stream flow, as part of Nebraska's use of its Republican River Compact allocation.

Since then, mitigating and offsetting stream flow depletions from groundwater pumping has been imperative to the NRDs in the Republican Basin and the State. Under the proposed project, WSF and URNRD dollars will also target retirement of water uses near the Republican River and its tributaries to reduce depletions to stream flow. The program will also target retirement of acres where nitrate levels exceed federal acceptable drinking water standards.

Combined with progressively tightening regulations within the URNRD, an irrigation retirement program such as that proposed in the grant application has the ability to improve Compact compliance capabilities of the URNRD and State and stabilize groundwater levels.

## 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.

Upon grant approval in early or mid-2018, general operating policies for the retirement program will be established. This will include specific criteria for acceptance into the retirement program following guidelines that are explained elsewhere in this grant

application. This aspect of the project will occur over an approximately three-month time period.

Upon establishment of the retirement program in 2018, the water-rights purchase price of approximately \$2,750 per certified acre will be advertised through a variety of means including the URNRD website. Water rights proposed to be purchased will be analyzed to determine whether their associated uses meet program criteria related to reducing stream flow depletions, stabilizing groundwater levels in areas of high declines, and improving water quality. Water rights associated with an estimated 1,815 acres will be purchased at an estimated cost of \$3.75 million, with 60 percent paid by the WSF and 40 percent paid by the URNRD. The same process will occur in 2019 and it is estimated that water rights associated with a more acres than in 2019 may be retired. This is due to the fact more CREP contracts will expire in 2019 than 2018 and the program will target CREP acres for permanent retirement by offering enrollees payments of approximately \$750 per acre for their land re-enrolled in CREP to be permanently retired from irrigation at the expiration of their CREP contract. Total project costs will be an estimated \$3.75 million, with \$2.25 million of that amount coming from WSF funds and \$1.5 million from the URNRD.

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.

N/A

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.

N/A

5. Support/Opposition

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

Previous retirement programs within the URNRD have demonstrated district-wide support for retiring uses with high impacts on groundwater levels and stream

depletions and the same support is expected for the proposed program. There is no known opposition.