

# Canadian River and Lake Meredith Water Supply Desalination Feasibility Studies

Sustainably supplying water to CRMWA's eleven member cities and four municipalities.

**Application for:**

Notice of Funding Opportunity  
No. R23AS00076

WaterSMART: Water Recycling  
and Desalination Planning



February 28, 2023

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Harbor Bay Lake Meredith 2004, Harbor Bay Lake Meredith 2011, Lake Meredith 2013

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# Technical Proposal and Evaluation Criteria

## Executive Summary

### Project Title

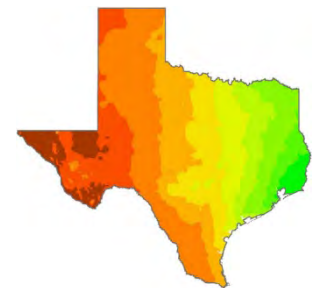
Canadian River and Lake Meredith Water Supply Desalination Feasibility Study - Sustainably supplying water to CRMWA’s eleven member cities and four municipalities

Applicant	Eligible Project	Region	State	Requested Funding	In-Kind Contributions
drew@crmwa.com	Desalination Feasibility Studies	Arkansas-Rio Grande-Texas Gulf	TX	\$1,000,000	\$1,000,000

### Project Summary

The Canadian River Municipal Water Authority (CRMWA), applicant, will conduct desalination feasibility studies as a water supply strategy to meet water demands for municipalities in 11 counties and 15 municipalities with a total population of over 600,000 located in the Texas Panhandle and South Plains

**Figure 1. Precipitation gradient across Texas**



(**Figure 1**). The studies are for the Salinity Control Project (SCP) Phase II (in New Mexico) and a desalination facility (proposed near Lake Meredith) such as reverse osmosis (RO). The studies support the Bureau of Reclamation’s many investments that led to the development of Lake Meredith. If Lake Meredith becomes unusable as a water supply due to a lack of salinity management, then these investments and the multiple benefits of Lake Meredith will be lost harming the local communities and industries along with tribal history of area and raising water rates for the disadvantaged and underserved. CRMWA’s desalination project would provide a water resilience measure to provide a secure water future for Texas and its citizens. The communities in the Panhandle and South Plains face various disadvantages that impact their quality of life and economic development. Resilience may include ecological aspects of water quality or flood mitigation, engineered infrastructure to ensure safe and reliable water supply and to mitigate floods, and the socially inclusive and equitable governance of these systems.

The Bureau of Reclamation constructed Sanford Dam in 1965. Sanford Dam impounds the Canadian River to form Lake Meredith. Lake Meredith is estimated to have supplied over half a trillion gallons of water to communities in the semi-arid Panhandle and South Plains since its construction. Due to a lack of rainfall in the Canadian River watershed and the subsequent reduction of inflow to Lake Meredith, water has never been released from Sanford Dam. Low water levels impede water supply as noted by others, a “drastic example is Lake Meredith on the Canadian River, which historically was a

major source of drinking water for cities in the Texas Panhandle. By 2012, however, the lake level has dropped to the point that no water was delivered” to some customers.<sup>1</sup>

Low inflows and prolific salt sources upstream resulted in high salinity contributing to the rise in chloride content. The chloride concentration is currently more than three times higher than the Federal secondary drinking water standard, which limits the amount of water that can be delivered to the region. CRMWA currently mitigates this via the SCP and blending with groundwater of lower chloride concentration. Desalination feasibility studies to evaluate removing chloride from the water will enable CRMWA to assess the potential to produce more lake water, while using existing infrastructure (dam, pump stations, and pipelines). Desalination would reduce the amount of water CRMWA has to produce from the Ogallala Aquifer, which is a non-renewable resource being mined at a much faster rate than it is being replenished/recharged. CRMWA will begin a selection process to engage an engineering firm with the appropriate expertise to conduct these desalination feasibility studies. The scope of work will include Title XVI Feasibility Reports for the SCP Phase II and RO and will include the following scope items.

- Examine the treatability of Lake Meredith water
- Develop costs (Capital & Operations and Maintenance)
- Develop brine disposal options, including injectability of subsurface formations
- Investigate alternate water sources such as brackish groundwater that could be used during times of extreme drought if the lake is inaccessible
- Develop a permitting strategy for all local, state, and federal permits
- Assess what treatment changes might need to be made if zebra mussels or other invasive species arrive in the lake
- Assess potential seismic risks associated with injecting reject/brine water in subsurface formations near the Sanford Dam
- Update calculations of firm yield
- Forecast projected improvement in water quality
- Investigate Canadian River alluvial chloride content
- Study hydrology and hydrogeology of chloride contamination

These desalination feasibility studies, estimated to be completed no later than October 2025, may consider alternatives that include siting facilities on Federal land as the Bureau of Reclamation owns land around Lake Meredith. The Bureau of Reclamation has active studies on the Canadian River and Lake Meredith. This desalination feasibility studies intersects with these projects to advance the understanding of water supply for the region and is supported by many as demonstrated by the included letters.

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<sup>1</sup> Jia Yang, Chris Zou, Rodney Will, Kevin Wagner, Ying Ouyang, Chad King, Abigail Winrich, Hanqin Tian. 2023. River flow decline across the entire Arkansas River Basin in the 21<sup>st</sup> Century. *Journal of Hydrology*. Volume 618.

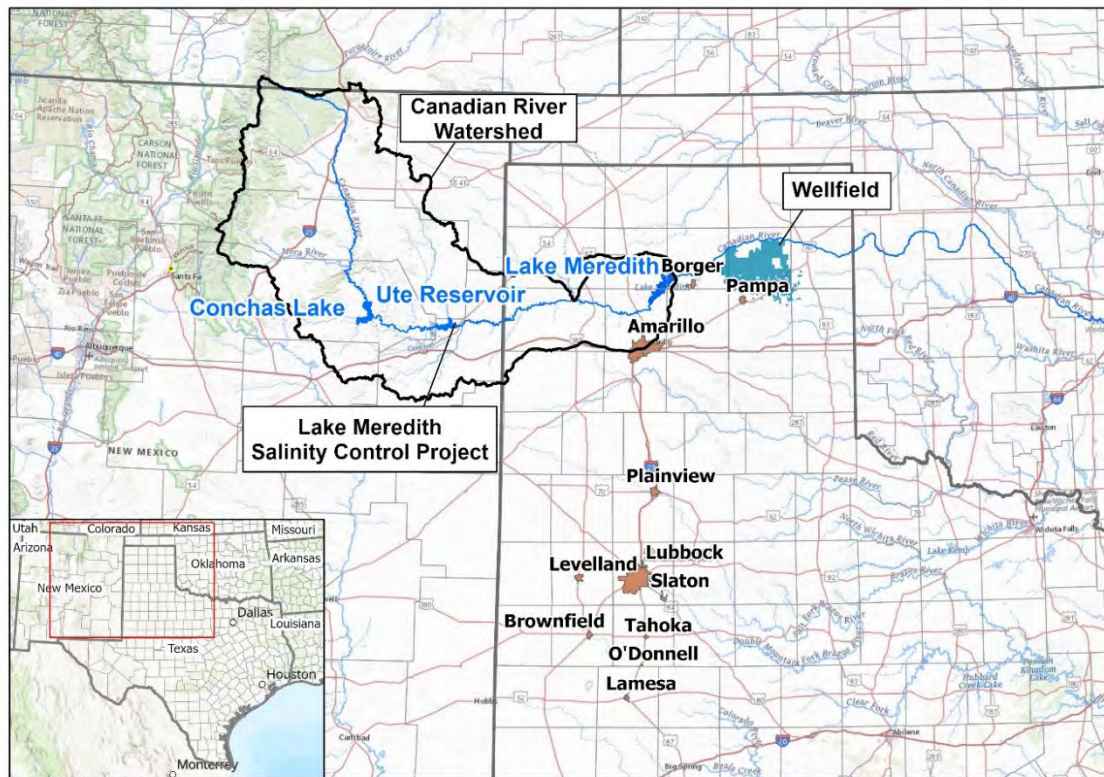


## Project Location

CRMWA serves its 11 member cities, along with 4 other cities indirectly receiving water from CRMWA, in the Texas Panhandle and South Plains<sup>2</sup> (**Figure 2**). The headquarters office is near Lake Meredith at Sanford Dam; a project built and financed by the Bureau of Reclamation. In 1947, project supporters requested a study by the Bureau of Reclamation. In 1960, the Bureau of Reclamation cost estimate was \$96,090,000 (approximately \$963,000,000 in 2023 dollars). Groundbreaking for construction of Sanford Dam was on June 30, 1962, and water impoundment in Lake Meredith began in 1965. The desalination feasibility studies will be managed out of the headquarters office in Hutchinson County, Texas, and located approximately 37 miles northeast of Amarillo, Texas. The project is desalination feasibility studies for a facility likely to be sited near Lake Meredith with water delivery via a 358-mile aqueduct system to over a half million people.

The project location will likely be along CRMWA’s 35-mile aqueduct segment between the intake structure at Lake Meredith and the regulating reservoir in Amarillo. Alternative locations will be assessed as part of this desalination feasibility studies and will likely be heavily influenced by the brine disposal options to be evaluated.

**Figure 2. Project watershed**

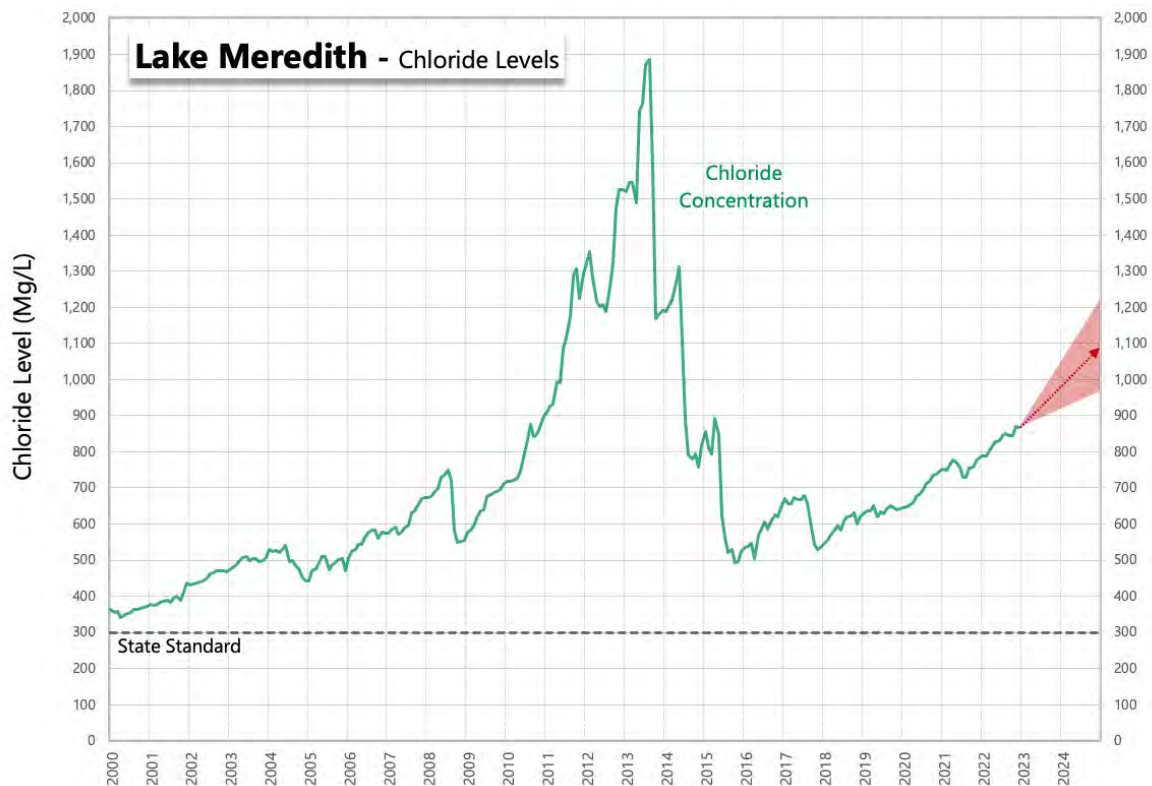


<sup>2</sup> CRMWA. 2023. <https://www.crmwa.com> Accessed February 2023.

## Project Description

The proposed work is for the development of desalination feasibility studies for the SCP Phase II and a desalination facility. These desalination feasibility studies will be beneficial for providing dependable and safe sources of municipal and industrial water from Lake Meredith. The Canadian River is the major source of inflows for Lake Meredith. The Canadian River is brackish water due to watershed geology, high saline source water, drought and flood events, low precipitation, and high evaporation rates. Brackish water has a salinity greater than fresh water but less than salt water, with concentrations generally in the range of 500 to 10,000 milligrams per liter (mg/L). Lake Meredith salinity (or chloride) concentrations have been as high as 1,900 mg/L (**Figure 3**). CRMWA has a history of proactively facing this issue throughout the Lake Meredith watershed. Funding would allow for the continued development of this Bureau of Reclamation project. The SCP design and construction was funded in thirds by the Bureau of Reclamation, CRMWA and the Texas Water Development Board.

**Figure 3. Lake Meredith chloride levels**



**Applicant Category:** CRMWA is seeking funding for Funding Group I.

**Eligibility of Applicant:** CRMWA is a regional water authority located in the Western United States as identified in the Reclamation Action of June 17, 1902 (Texas).

**Goals:** The goal of these desalination feasibility studies is the continued supply of high-quality water to CRMWA's 11 member cities. The objectives of these desalination feasibility studies are to determine the cost, effectiveness, and reliability of using desalination to meet the goal. Lake Meredith is an important water source for 15 municipalities and the water quality is compromised by increasing salinity in the Canadian River. CRMWA needs to start implementing solutions to be able to continue to provide high-quality water from their only renewable source.

**Approach:** The planned approach for these desalination feasibility studies is to assess desalination options for Lake Meredith and their potential to improve water quality, including location, regulatory issues, environmental and socioeconomic impacts, and mitigation measures. Assessment of desalination options includes an overview of current use worldwide, overview of major desalination processes, membrane processes, brackish water desalination with reverse osmosis, alternative energy sources, material of construction, and developments in desalination technology. The approach will review the water supply needs for the region and the role of desalination in the continuation of supplying high-quality water to meet the demands.

**Letters of Support:** CRMWA has received multiple letters of support for these desalination feasibility studies. Entities working in the Panhandle and South Plains want to see Lake Meredith maintained and used, which may not be possible without desalination. The entities have a vested interest in CRMWA's ability to provide the quantity and quality of water necessary for the Panhandle and South Plains from Lake Meredith. Support includes the Texas Water Development Board's regional water plans that cite desalination water management strategies<sup>3</sup>. The stakeholders are committed to the water resources of the region and are engaged in the practice, policies, and partnerships involved in managing and protecting water supplies.

## About the Applicant

The Texas Legislature created CRMWA in 1953 for the purpose of distributing water from the Canadian River Project, in compliance with the Canadian River Compact between Texas, New Mexico, and Oklahoma. The Bureau of Reclamation began construction on the project in 1962 and completed Lake Meredith in 1965.

Sanford Dam was constructed on the Canadian River 9 miles west of Borger, Texas, and an aqueduct was constructed to deliver water from the reservoir to the member cities. Under the Canadian River Compact, Texas is entitled to store up to 500,000 acre-feet of water in conservation storage. CRMWA received a permit from the State of Texas to impound that water in Lake Meredith and to divert up to 100,000 acre-feet of water per year from Lake Meredith for use by the member cities and 51,200

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<sup>3</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

acre-feet of water per year for use by industries. The SCP was built in 2001 with the Bureau of Reclamation providing design and a third of the cost.

The aqueduct is mostly concrete pipe, with a maximum diameter of 96 inches down to a minimum diameter of 18 inches, which can deliver up to 118 million gallons daily to the cities. The CRMWA system, with 322 miles of pipeline, 10 pumping plants, and 3 regulating reservoirs, has furnished municipal and industrial water to the following 11 member cities since 1968: Amarillo, Borger, Pampa, Plainview, Lubbock, Slaton, Brownfield, Levelland, Lamesa, Tahoka, and O'Donnell. The members also provide water to New Deal, Post, Canyon, and Wolfforth.

## Technical Proposal and Evaluation Criteria

### Evaluation Criterion1: Project Planning and Analysis

#### **WATER RECYCLING NEEDS AND OPPORTUNITIES**

##### **Problems and Needs**

CRMWA has been challenged with the quality of water available from Lake Meredith. Total basin drainage area in Texas above Lake Meredith is 3,943 square miles. An additional 15,666 square miles of drainage in New Mexico contributes to the Canadian River in Texas. Increasing chloride levels in Lake Meredith have limited the performance of the supply source since construction. "Because the Canadian River cuts into the Permian rocks that contain salt, gypsum, and anhydrite in Oldham, Potter, and Hutchinson Counties, salt springs and seeps cause high total dissolved solids (TDS) in the surface water. At the Texas-New Mexico State line, the average TDS in the river ranges from 6,000 to 11,000 mg/L. Above Lake Meredith, the river contains about 4,800 mg/L." A generally increasing trend of chloride content (salt) has occurred, with drought cycles producing chloride contents over 1,800 mg/L (over 7 times the Federal drinking water standard) in Lake Meredith. Problems with corrosiveness and mineral deposition accompany the salty taste, which is objectionable to the citizens it serves.

Lake Meredith is one of three major reservoirs (also Palo Duro Reservoir and Greenbelt Reservoir) in the Panhandle Water Planning Area (PWPA). "According to the TCEQ's [Texas Commission on Environmental Quality] State of Texas Water Quality Inventory, the principal water quality problems in the Canadian and Red River Basins are elevated dissolved solids, nutrients, nitrates and dissolved metals.<sup>4</sup>" Salinity issues were recognized in the 1970s. In 1987, the Texas legislature amended CRMWA's Enabling Act to allow for salinity control. CRMWA has been working on the issue ever since. The need for reliable water of high quality continues to grow.

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<sup>4</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.



Local needs, as described by the Bureau of Reclamation<sup>5</sup>, include maximizing Lake Meredith as an important water supply, addressing limited use due to high salinity levels, and improving blending opportunities of surface and groundwater that achieve lower total dissolved solids in the drinking water.

### **Current and Projected Water Supplies and Demands**

Lake Meredith is located in the Texas Water Development Board's Panhandle (Region A) Regional Water Planning Area and also delivers water via an aqueduct to the Llano Estacado (Region O) Regional Water Planning Area. The planning areas include Groundwater Management Areas 1 and 2, created to provide for the conservation, preservation, protection, recharge, waste prevention of the groundwater and groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water. Current and projected water supplies provided by CRMWA are based on the demands of member cities in Region A and Region O. The combined population served by Lake Meredith is over 500,000. The total quantity of water used in 2020 and projected to be used in 2070<sup>6</sup> by CRMWA customers located in the Llano Estacado Region is 45,656 acre-feet per year and is 59,855 acre-feet per year, respectively.

Climate change studies indicate the potential for reduced supply from available surface water sources. The Canadian River is a tributary to the Arkansas River which has been affected by climate change as well as its tributaries. "Arkansas River and its tributaries provide critical water resources for agricultural irrigation, hydropower generation, and public water supply in the Arkansas River Basin (ARB). However, climate change and other environmental factors have imposed significant impacts on regional hydrological processes, resulting in widespread ecological and economic consequences. Low water levels impede water supply as noted by others, a "drastic example is Lake Meredith on the Canadian River, which historically was a major source of drinking water for cities in the Texas Panhandle. By 2012, however, the lake level has dropped to the point that no water was delivered" to some customers.<sup>7</sup> Impacts of climate change have been evident in the Canadian River watershed as they have been in the other western states. Over the last 23 years, the average inflow to Lake Meredith has been less than 50 percent of the average inflow from the previous 50 years. Climate change also magnifies many of the issues of concern for water supply in the region, including aquifer depletions due to pumping that significantly exceeds recharge; surface water and groundwater quality;

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<sup>5</sup> Bureau of Reclamation. Date unknown. WaterSMART Applied Science Grant Application, Quantifying Risk Exposure and Tolerance of Conjunctively-Managed Water Supplies to Enhance Drought Preparedness and Response.

<sup>6</sup> Llano Estacado Regional Water Planning Group. 2020. 2021 Llano Estacado Regional Water Plan.

<sup>7</sup> Jia Yang, Chris Zou, Rodney Will, Kevin Wagner, Ying Ouyang, Chad King, Abigail Winrich, Hanqin Tian. 2023. River flow decline across the entire Arkansas River Basin in the 21<sup>st</sup> Century. *Journal of Hydrology*. Volume 618.

invasive brush; and drought-related needs for both surface water and groundwater. Potential water quality degradation may supersede water quantity as a consideration in evaluating the amount of water available for use. Increasing the ability to use brackish water such as from desalination projects will become progressively more important. Of the three (3) major reservoirs in the Texas Panhandle, Lake Meredith is 30.4 percent full. The other two (2), Palo Duro and Greenbelt Reservoirs, are currently at 0.3 percent and 11.7 percent full<sup>8</sup>. This is further evidence that climate change is significantly affecting this region and the water supplies.

### **Potential Uses and Markets for Desalinated Water**

The Enabling Act authorizes CRMWA to store, control, conserve, protect, distribute, and use water for maximum public benefit. Member cities have signed water supply contracts, many since the 1950s, with CRMWA. Firm markets exist with growing populations for municipal and industrial water demands for the use of desalinated water.

The supply of desalinated water would offset the use of groundwater. Groundwater in the region is very important for other users who do not purchase water directly from CRMWA such as farmers, ranchers, and other municipalities that are not CRMWA members. Producing less groundwater will directly benefit these other users by leaving more groundwater in place for other uses. Increased availability of surface water from a renewable source, particularly from Lake Meredith, can meet municipal water needs and allow CRMWA to better manage their sources conjunctively to continue to use Lake Meredith for long-term sustainability and resiliency.<sup>9</sup>

### **Source Waters Assessed in Feasibility Studies**

Water in Lake Meredith, and the 130 Canadian River miles upstream of Lake Meredith, will be considered for these desalination feasibility studies. Lake Meredith is projected to be able to meet an allocation supply of approximately 25,000 acre-feet per year from 2020 through 2070. As seen in **Table 1**, Lake Meredith provides approximately a quarter of the water demand for the Panhandle and South Plains. Desalination of Lake Meredith water, and the contributing section of the Canadian River, may be the only means for this important water supply to continue being a reliable source.

## **EVALUATION OF ALTERNATIVES**

### **Objectives for Feasibility Alternatives**

Objectives of these desalination feasibility studies are to assess the implementation of a desalination project and the SCP Phase II. Considerations include locations; treatment options; design and construction issues; pipeline alignment and connections; brine management; cost; environmental, socioeconomic, and additional studies. The Texas

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<sup>8</sup> Water Data for Texas. 2023. [Water Data For Texas](#) Accessed February 2023.

<sup>9</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

Water Development Board’s regional water plans present alternative water management strategies for comparison to desalination. These plans recognized desalination as an option for Lake Meredith along with brackish groundwater sources, which would have to be desalinated. The Texas Water Development Board’s mission is to lead the state's efforts in ensuring a secure water future for Texas and its citizens. The objectives of these desalination feasibility studies align with the Texas Water Development Board’s mission and planning.

**Table 1. CRMWA projected demands<sup>10</sup>**

Member	Projection (acre-feet)	
	2020	2070
Amarillo (Region A)	46,000	50,000
Borger (Region A)	7,054	7,063
Brownfield (Region O)	1,500	1,750
Lamesa (Region O)	1,750	2,750
Levelland (Region O)	2,301	2,743
Lubbock (Region O)	35,600	47,000
O’Donnell (Region O)	124	132
Pampa Municipal Water System (Region A)	2,361	4,680
Plainview (Region O)	2,500	3,500
Slaton (Region O)	1,405	1,477
Tahoka Public Water System (Region O)	476	503
<b>Llano Estacado (Region O) Total</b>	<b>45,656</b>	<b>59,855</b>
<b>Panhandle (Region A) Total</b>	<b>55,415</b>	<b>61,743</b>
<b>CRMWA Total</b>	<b>101,071</b>	<b>121,598</b>

**Development of Feasibility Alternatives**

The studies are for the SCP Phase II and a desalination facility. These studies will investigate at least two alternatives (SCP and reverse osmosis) to address the chloride issues in the Canadian River and Lake Meredith. The results of the desalination feasibility studies will indicate if both projects are beneficial to the long-term management of salinity in the Canadian River and Lake Meredith. Desalination feasibility studies will focus on alternatives for location, treatment process, and total costs. A review of Bureau of Reclamation, State of Texas, and other relevant desalination feasibility studies will inform the development of alternatives, which will include a no action alternative and at least one alternative considering limited funds for the proposed desalination and the potential outcomes.

<sup>10</sup> Llano Estacado Regional Water Planning Group. 2020. 2021 Llano Estacado Regional Water Plan.

### General Description of Feasibility Studies

The desalination feasibility studies will follow directives and standards in Reclamation manual WTR 11-01<sup>11</sup>. The desalination feasibility studies will include required elements, including introductory information, statement of problems and needs, desalination opportunities, description of alternatives, economic analysis, recommended desalination project, environmental consideration and potential effects, legal and institutional requirements, financial capability, and research needs. The economic analysis section will describe benefits and costs. The desalination feasibility studies will identify the degree to which the desalination alternative is cost effective and the economic benefits that are to be realized after implementation.

### Preliminary Schedule

A preliminary schedule for these desalination feasibility studies, based on the available time and elements, is shown in **Table 2**.

**Table 2. Preliminary schedule**

<b>Task</b>	<b>End Date</b>
Award, Contracting, and Project Initiation	10/31/2023
Introductory Information Gather and review existing data and information related to the project location, water supply and demand, environmental and regulatory conditions, etc. and perform water quality characterization.	11/17/2023
Statement of Problems and Needs Identify and define the problem and needs for desalination, based on the review of existing data and information.	12/1/2023
Desalination Opportunities Evaluate the source water for desalination	1/19/2024
Description of Alternatives Develop and analyze different alternatives for desalination, such as reverse osmosis, thermal desalination, and membrane distillation.	5/10/2024
Economic Analysis Conduct a comprehensive economic analysis of the alternatives, including cost estimation, life cycle cost analysis, and benefit-cost analysis.	10/18/2024
Recommended Desalination Project Select the preferred feasible and cost-effective desalination alternative(s), based on the results of the economic analysis.	11/22/2024
Environmental Consideration and Potential Effects Assess the environmental impact of the preferred desalination alternative(s).	3/14/2025
Legal and Institutional Requirements Review the legal and institutional requirements, such as permits, regulations, and agreements, for the implementation of the preferred	5/9/2025

<sup>11</sup> Reclamation 2023. Reclamation Manual WTR 11-01 Directives and Standards [Reclamation Manual final \(usbr.gov\)](#) Accessed February 2023.

Task	End Date
desalination alternative(s).	
Financial Capability Evaluate the financial capability for the implementation and operation of the preferred desalination alternative(s).	6/13/2025
Research Needs Identify the research needs for further development and improvement of the preferred desalination alternative(s).	7/11/2025
Draft Report	7/25/2025
Final Report	10/31/2025

## Evaluation Criterion 2: Stretching Water Supplies

### POTENTIAL OFFSET OF NEW WATER SUPPLY DEVELOPMENT

Desalination would maintain Lake Meredith as a supply and would reduce, postpone, or eliminate the need to develop new well field(s). The need for the well field(s) is based on the water management strategies from the Texas Water Development Board’s state water planning. For example, if CRMWA is unable to further manage chlorides in Lake Meredith, a new well field and aqueduct will have to be constructed in Roberts County, Texas, to continue to meet the needs of the region. The more Lake Meredith water that can be used, the less groundwater will have to be developed and produced, which will preserve the non-renewable groundwater resource that will become more scarce and important to the region in the future.

### POTENTIAL ALLEVIATION OF PRESSURES ON EXISTING WATER SUPPLIES

High chloride levels in the Canadian River affect water quality in Lake Meredith. CRMWA continues to operate chloride control projects to alleviate this problem<sup>12</sup>. As chloride levels in Lake Meredith continue to rise, CRMWA is forced to increase the groundwater component of their blend to keep the concentrations of delivered water below the state and federal drinking water standards. Assuming the long-term climate trends do not improve, the water quality in Lake Meredith will eventually become too brackish, resulting in additional pressure on groundwater sources. The existing water supplies in the region are primarily groundwater. Lake Meredith is one of the few surface water reservoirs (i.e., renewable water sources) in the Panhandle. Historical supplies of Lake Meredith water to CRMWA members are shown in **Figure 4**.

### POTENTIAL TO ALLEVIATE SPECIFIC CONCERNS

CRMWA’s specific concern is the continuance of Lake Meredith providing the quantity and quality of water necessary for its 11 member cities. Lake Meredith is an important source of water that is being compromised and threatened by the increasing salinity of its source water and management. The trend is severe, (chloride content [salt] has been

<sup>12</sup> Llano Estacado Regional Water Planning Group. 2020. 2021 Llano Estacado Regional Water Plan.



increasing since the 1970s), with drought cycles particularly intensifying high chloride concentrations in Lake Meredith. To better understand some of the contributing factors, a special study on the Lake Meredith watershed was conducted as part of the Texas Water Development Board's Region A 2011 regional water plan<sup>13</sup>. In conjunction with others, the Bureau of Reclamation conducted a concurrent study on drought in the Canadian River Basin.<sup>14</sup> Several additional studies<sup>15,16,17,18,19,20,21,22,23,24,25</sup>, have been published about Lake Meredith since its construction in 1965. Studies on salinity control efforts have been inconclusive. Salinity concentrations in Lake Meredith continue to trend upward. Alternatives, such as these desalination feasibility studies, and enhancement of CRMWA's SCP are needed to further examine the future of Lake Meredith and the Canadian River.

### **FLEXIBILITY TO ADDRESS DROUGHT**

The recent critical drought has impacted Lake Meredith (**Figure 5**). However, if the reliability of surface water supplies decreases due to on-going droughts, the reliance on groundwater will increase<sup>26</sup>. During the recent critical drought, there was still water in Lake Meredith, but CRMWA could not use it due to the poor water quality; it was undeliverable due to the lack of a desalination process. The volume of Lake Meredith water that could be delivered would also be increased with the addition of desalination facilities. CRMWA has flexibility to adjust the sources of delivered water by blending surface and groundwater. While Lake Meredith is subjected to impacts from drought, during periods of high inflow, Lake Meredith can reduce the demand on groundwater. Drought conditions are of concern in the Panhandle and South Plains. The Bureau of Reclamation has conducted studies on drought in the Canadian River Basin and is currently working with Texas on an enhanced drought response and reservoir

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<sup>13</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

<sup>14</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

<sup>15</sup> CRMWA. 2023. HDR Technical Memorandum Lake Meredith Salinity Control Project Evaluation – Phase I. (Appendix 1. List of Previous Studies and Project Data).

<sup>16</sup> 1979 | Lake Meredith Salinity Study Canadian River Texas – New Mexico | Bureau of Reclamation

<sup>17</sup> 1984 | Lake Meredith Salinity Control Project | Bureau of Reclamation

<sup>18</sup> 1984 | Preliminary Findings Report - Salinity Control Project | Bureau of Reclamation

<sup>19</sup> 1985 | Technical Report on the Lake Meredith Salinity Control Project | Bureau of Reclamation

<sup>20</sup> 1994 | Data and Analyses of TW 3 and TW 2 Aquifer Pumping Tests and Water Quality | Bureau of Reclamation

<sup>21</sup> 1994 | Geologic Report | Bureau of Reclamation

<sup>22</sup> 1995 | Data and Analysis of TW 4 Aquifer Pumping Test and Water Quality Sampling | Bureau of Reclamation

<sup>23</sup> 1995 | Environmental Assessment Salinity Control Project | Bureau of Reclamation

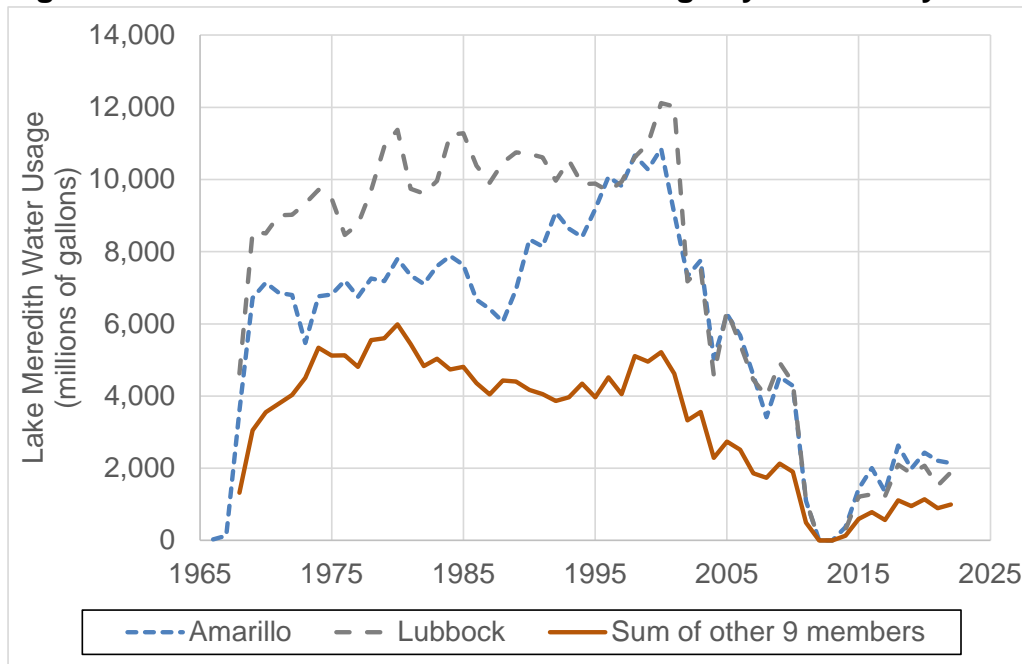
<sup>24</sup> 1995 | Supplement No. 1 to the Geologic Report on the Logan New Mexico Area | Bureau of Reclamation

<sup>25</sup> 1998 | Lake Meredith Salinity Control Project-Bid Drawings | Bureau of Reclamation

<sup>26</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

operations model<sup>27</sup>. Texas requires drought contingency plans that CRMWA has developed. The purpose of a drought contingency plan is to conserve available water supply in times of drought and temporary water supply shortages by limiting the water available for non-essential uses and maintain supplies for essential uses, such as drinking water, sanitation, and fire protection, to protect and preserve public health, welfare, and safety. The Texas Commission on Environmental Quality reviews drought contingency plans when they are submitted to check that the requirements are met. The Texas Commission on Environmental Quality supports water suppliers who are implementing or revising drought contingency plans but does not have a role in determining what water restrictions are implemented at the local level or what restrictions should be applied. **Figure 6** compares the water level in Lake Meredith at the same location pre-drought and then during the 2011 drought.

**Figure 4. Historical Lake Meredith water usage by community**



### Evaluation Criterion 3: Environment and Water Quality

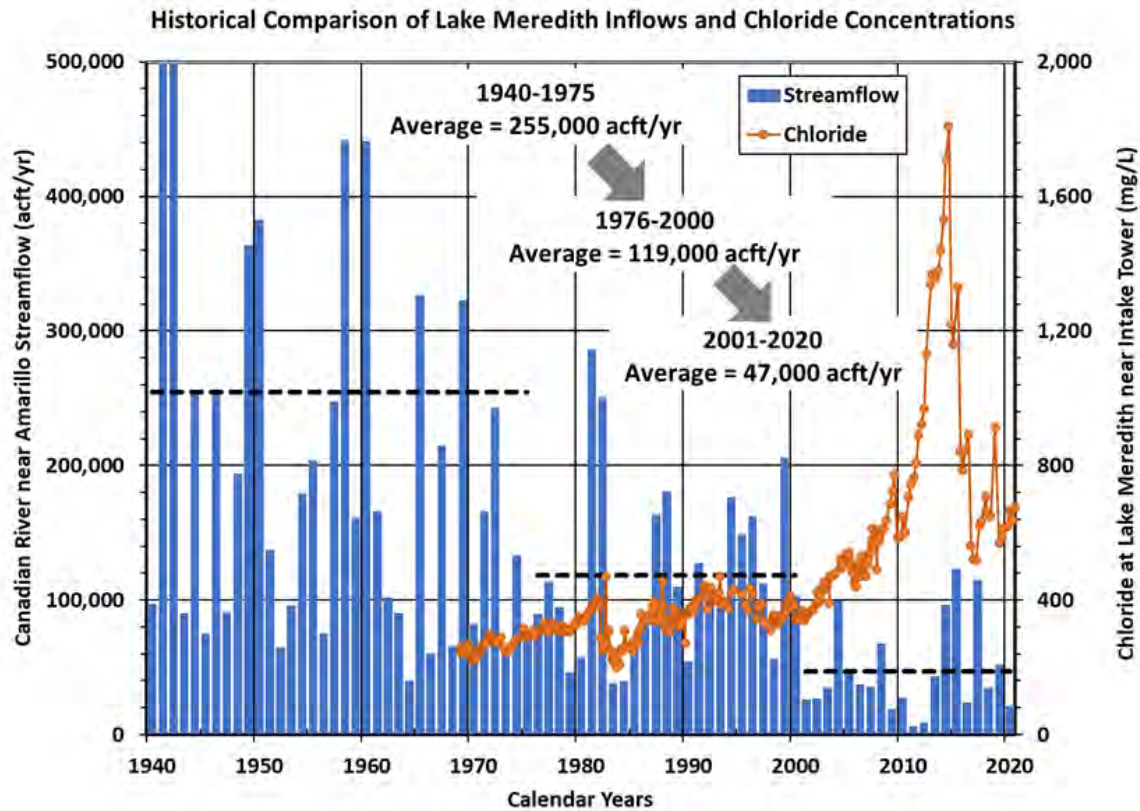
#### POTENTIAL TO IMPROVE THE QUALITY OF SURFACE WATER AND GROUNDWATER

Desalination of Lake Meredith water for use as a water supply would improve effluent discharge quality, since reclamation facilities do not reduce salinity, and downstream water uses. After the water supply is used, wastewater collection and treatment results in the discharge of water. This effluent will have a lower salinity concentration. The two

<sup>27</sup> Bureau of Reclamation. Date unknown. WaterSMART Applied Science Grant Application, Quantifying Risk Exposure and Tolerance of Conjunctively-Managed Water Supplies to Enhance Drought Preparedness and Response.

largest water users, Amarillo and Lubbock, have existing and planned reuse programs for industrial and municipal uses along with discharges to surface and groundwater. Desalination would have multiple long-term benefits to water users. In addition, improvement through the use of an expanded SCP would improve water quality in the Canadian River watershed that flows by the Alibates National Monument. Improvement of the water quality in the Canadian River will provide a better habitat for the Arkansas River Shiner (threatened species) and the Peppered Chub (endangered species only found in this reach of the Canadian River).

**Figure 5. Annual inflows and historical storage contents - Lake Meredith**



**POTENTIAL TO IMPROVE EFFLUENT QUALITY BEYOND STATE AND FEDERAL REQUIREMENTS**

These desalination feasibility studies will examine the cost benefits of different water quality levels. Chloride concentrations are currently more than three times higher than the Federal secondary drinking water standard of 250 mg/L. These desalination feasibility studies will evaluate and compare incremental effluent quality levels less than regulatory requirements. The desalination process will also reduce other water quality parameters. Benefits from these reductions will be included in the desalination feasibility studies' results and recommendations.

**Figure 6. Lake Meredith water level pre-drought and during the 2011 drought**



**POTENTIAL TO IMPROVE FLOW CONDITIONS IN NATURAL STREAM CHANNELS**

Springs are a surface expression of groundwater and an important dynamic of limited surface water in the region. Evidence of aquifer declines include the disappearance of many springs in the region that once contributed to the constant flow in creeks that are now ephemeral. Use of Lake Meredith water would reduce demands on groundwater and potentially improve natural streams. Optimizing the SCP would improve water quality in the 130 river miles upstream, which would provide a more suitable habitat for the endangered and threatened species that exist in the reach of river.

**POTENTIAL TO RESTORE OR ENHANCE HABITAT FOR NON-LISTED FISH AND WILDLIFE SPECIES**

Desalination of brackish water can restore or enhance habitat for non-listed fish and wildlife species by improving water quality and increasing the availability of fresh water in the environment. Desalination removes salt and other dissolved solids from brackish water, reducing the salinity levels and making the water more suitable for a wider range of uses. By providing an additional source of fresh water, desalination can be used as a tool to manage water resources. It may also avoid the potential for future fish kills, which have happened in the past (**Figure 7**).

The National Park Service became involved with the recreational use of Lake Meredith in 1961 through a memorandum of understanding and agreement with the Bureau of Reclamation. In 1990, Public Law 101-628 established the area as National Park Service land, stating “In order to provide for public outdoor recreation use and enjoyment of the lands and waters associated with Lake Meredith in the State of Texas, and to protect the scenic, scientific, cultural, and other values contributing to the public enjoyment of such lands and waters, there is hereby established the Lake Meredith National Recreation Area.” The national recreation area, containing over 44,977 acres, preserves one of the largest man-made lakes in the Texas Panhandle, many



archeological sites, and flora and fauna of the area, making it a valuable part of American heritage.

**Figure 7. Fish kill at Lake Meredith**



**POTENTIAL TO PROVIDE WATER OR HABITAT FOR THREATENED OR ENDANGERED SPECIES**

Desalination allows for the continued viability of Lake Meredith as a municipal water supply. Lake Meredith provides fish and wildlife benefits and is the largest reservoir in the Panhandle. The Canadian River provides important habitat for the peppered chub and Arkansas River shiner (**Figure 8**)<sup>28</sup>. There is designated critical habitat for the endangered peppered chub along the Canadian River through the watershed. CRMWA’s management of the Canadian River and Lake Meredith influences the salinity and water quantities for these vulnerable fisheries. Increasing salinity in the basin has already contributed to fish kills attributed to golden algal blooms in Lake Meredith. Limited water availability increases the likelihood of similar kills occurring on the Canadian River.<sup>29</sup> The Texas Parks and Wildlife lists multiple species of birds in the region as threatened or endangered. Lake Meredith provides important habitat for migratory and indigenous species of birds. Several state-listed birds and reptiles also depend upon riparian or mesic habitats, which could be indirectly affected by changes in water quality if their food sources are affected.

**Evaluation Criterion 4: Department of the Interior Priorities**

**ADDRESSING THE IMPACTS OF CLIMATE CHANGE**

Desalination of brackish water would address the impacts of climate change and combat the climate crisis by improving the water quality, and ultimately volume of drinkable water in this area, which has been affected by drought and increased water scarcity. The frequency and intensity of droughts are increasing in many regions (**Figure 5**), leading to a growing demand for fresh water and the degradation of water

<sup>28</sup> U.S. Fish & Wildlife Service. 2023. [Species Profile for Peppered chub\(Macrhypopsis tetranema\)](https://www.fws.gov/species-profiles/peppered-chub) (fws.gov) Accessed February 2023.

<sup>29</sup> TPWD. 2017. Canadian River Basin Bioassessment. River Studies Report No. 26. Austin, Texas.



quality in the Canadian River and Lake Meredith. Desalination of brackish water would be an effective solution to meet this demand in regions where other water sources, such as surface water or groundwater, are scarce or contaminated. Since desalination projects can be energy intensive, alternative energy sources such as solar and wind will be examined as part of the feasibility alternatives to offset the energy usage to combat the climate crisis.<sup>30</sup>

**Figure 8. Photos of imperiled species Peppered Chub (left) and Arkansas River Shiner (right)**



### **WATER SUPPLY SUSTAINABILITY AND RESILIENCE TO CLIMATE CHANGE**

The proposed projects, desalination of Lake Meredith water and the Canadian River, would strengthen water supply sustainability for the region and increase resilience to climate change. Desalination would provide a more reliable source of fresh water in this region that has been affected by drought or water scarcity related to climate change by converting brackish water into fresh water. Desalination would help to reduce the demand for other sources of fresh water that are becoming scarce due to changing climate conditions. Desalination is being considered as part of a comprehensive and sustainable water management plan that considers the needs and capacities of local communities.

### **SERVING DISADVANTAGED OR HISTORICALLY UNDERSERVED COMMUNITIES**

According to the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) mapping tool<sup>31</sup>, portions of the Panhandle and South Plains are labeled as persistent poverty and/or historically disadvantaged communities. The 11 member cities of CRMWA have at least a portion of the city limits mapped as persistent poverty and/or historically disadvantaged communities. Desalination will result in the delivery of drinking water with improved water quality. The Texas Water Development Board disadvantaged communities worksheet<sup>32</sup> lists a below average median household

<sup>30</sup> World Economic Forum. 2022. How technology and entrepreneurship can quench our parched world. [Can desalination be a sustainable solution to the water crisis? | World Economic Forum \(weforum.org\)](https://www.weforum.org/articles/2022/02/22/how-technology-and-entrepreneurship-can-quench-our-parched-world/) Accessed February 2023.

<sup>31</sup> U.S. Department of Transportation. 2023. Areas of Persistent Poverty and Historically Disadvantaged Communities. [Grant Project Location Verification \(dot.gov\)](https://www.transportation.gov/raise/) Accessed February 2023.

<sup>32</sup> Texas Water Development Board. 2023. Disadvantaged Communities Worksheet. [https://www.twdb.texas.gov/financial/programs/cwsrf/doc/SFY17/CW\\_Disadvantaged\\_Update.docx](https://www.twdb.texas.gov/financial/programs/cwsrf/doc/SFY17/CW_Disadvantaged_Update.docx)

income at \$39,432. Some CRMWA-served communities are near or below that income threshold (**Table 3**).

**CHARACTERISTICS OF DISADVANTAGED COMMUNITIES AND WATER SUPPLY**

The communities in the Panhandle and South Plains face various disadvantages that impact their quality of life and economic development. Characteristics such as higher-than-national averages for people experiencing poverty, unemployment, and costs of healthcare are indicators (**Table 3**). The region is primarily rural and offers a limited number of job opportunities, leading to high unemployment rates and poverty levels. The region lacks adequate infrastructure, such as transportation networks, healthcare facilities, and communication systems, which can limit access to essential services and hinder economic growth. The region is vulnerable to extreme weather conditions, such as extreme heat, droughts, and tornadoes, which can disrupt daily life and cause damage to infrastructure and homes. The region is known for its semi-arid climate, which often results in water scarcity and drought conditions that can impact agricultural production and limit the growth of certain industries. For example, agricultural production in the region is significant. If the area was considered its own state, it would rank in the top three states for value added from fed beef, and in some years, would rank first; in the top three states for cotton production; in the top five states for sorghum production; and in the top 15 states for dairy, corn, and wheat production.<sup>33</sup>

**Table 3. Community characteristics<sup>34</sup>**

Member	People in Poverty	Unemployment	Median Income
Amarillo (Region A)	16.6%	4.3%	\$55,174
Borger (Region A)	13.8%	6.0%	\$49,705
Brownfield (Region O)	26.5%	6.1%	\$45,557
Lamesa (Region O)	25.3%	7.0%	\$36,351
Levelland (Region O)	17.5%	6.0%	\$47,314
Lubbock (Region O)	18.0%	4.5%	\$54,060
O'Donnell (Region O)	2.9%	4.3%	---
Pampa (Region A)	17.1%	6.7%	\$48,010
Plainview (Region O)	18.4%	6.1%	\$45,526
Slaton (Region O)	19.4%	4.5%	\$47,050
Tahoka (Region O)	21.7%	4.3%	---

**CHARACTERISTICS OF UNDERSERVED COMMUNITIES AND WATER SUPPLY**

The desalination of Lake Meredith water supplied to the member communities, which include areas that have been underserved, will provide a higher quality and quantity drinking water supply. Lack of access to clean water is detrimental to underserved communities. The goal of these desalination feasibility studies is the continued supply of

<sup>33</sup> TAMU. Date unknown. The Impact of AgriBusiness in the High Plains Trade Area. [Impact-of-AgriBusiness.pdf \(tamu.edu\)](#) Accessed February 2023.

<sup>34</sup> U.S Census Bureau. 2023. <https://data.census.gov>

high-quality water to CRMWA's 11 member cities, which includes access to clean, safe, and affordable drinking water and wastewater services, including for low-income households and rural communities in the Panhandle and South Plains, who face persistent barriers to accessing clean water.

### **SERVING TRIBAL INTERESTS**

There are no Federally recognized tribes in the Texas Panhandle. However, archeological traces of prehistoric Indian homes, workshops, and campsites dot the entire Canadian River region of the Panhandle, with a significant site being the Alibates Flint Quarries near Lake Meredith. The Alibates National Monument, managed by the National Park Service, includes a visitor center showing the importance of this site to the survival, commerce, and culture of the people of the High Plains. Improved water quantity and quality of Lake Meredith increases recreation, leading to increases in visitation to the monument, which increases the awareness about native American tribes who resided in the regions.

### **SUPPORTING TRIBAL RESILIENCE TO CLIMATE CHANGE AND DROUGHT IMPACTS**

As many Federally recognized tribes are located in arid regions, these desalination feasibility studies will further the science of salinity management and benefit tribal knowledge about maintaining and improving their water supplies. The successes and challenges with this project will be shared with any interested group or person, including tribes, who are facing water supply challenges.

## **Evaluation Criterion 5: Watershed Perspective and Stakeholder Involvement**

### **IMPLEMENTING A STATE WATER PLAN**

The proposed projects are desalination feasibility studies that are one of the water management strategies recognized in the Texas Water Development Board's Region A and Region O water plans. Water quality improvements allow for the use of impaired water for municipal or other uses. The Canadian River watershed includes areas with impaired water quality, specifically elevated salts. Water quality improvement for these sources is typically accomplished through desalination. This strategy is considered for users with sufficient water quantity, but impaired water quality.<sup>35</sup>

### **MEETING WATER SUPPLY NEEDS FOR A LARGE GEOGRAPHIC AREA**

The proposed project would help meet water supply needs of a large geographic area, including the 11 member cities along a 358-mile aqueduct system. Desalination of Lake Meredith water is supported by Texas Water Development Board Region A and Region

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<sup>35</sup> Panhandle Regional Water Planning Group. 2020. 2021 Panhandle Regional Water Plan.

O water plans. Region A consists of 21 counties and Region O consists of 21 counties. The proposed desalination feasibility studies involve water supplies for 42 counties in the Panhandle and South Plains.

### **PROMOTING COLLABORATIVE PARTNERSHIPS**

The scarcity of water in the region necessitates that CRMWA participate in collaborative partnerships. CRMWA was created to collaborate and regionalize water supply efforts on behalf of 11 member cities in the region. CRMWA uses a holistic approach of practice, policies, and partnerships for water management.<sup>36</sup> CRMWA's governing board consist of 17 members appointed by the member cities. Cities with a population over 10,000 have two directors, while cities with less than 10,000 have one director. CRMWA leverages partnerships with the Bureau of Reclamation, Texas Desalination Association, and the Texas Water Development Board. CRMWA will coordinate with the Bureau of Reclamation on studies that intersect the topics of the Canadian River, Lake Meredith, and salinity. These may include project 22102 Long-Term Arid Region Reservoir Usability Evaluation due to Salinity Induced Degradation of Water Quality<sup>37</sup> and project 2768 Climate Change: Methodology to Evaluate the Influence of Joint Changes in Climate and Land Cover on Water Availability<sup>38</sup>. The Bureau of Reclamation has a research project to model water supply in Lake Meredith and desalination is one of the alternatives to potentially evaluate after model development<sup>39</sup>.

### **PUBLIC OUTREACH AND OPPORTUNITIES FOR THE PUBLIC TO LEARN ABOUT WATER SUPPLY**

CRMWA will leverage its partnerships for public outreach. The Texas Desalination Association's mission is to encourage better use of Texas' water resources through the development of brackish, marine, and other saline waters. The mission is accomplished through advocacy and education of state and local decision makers, the public, industry leaders and other stakeholders. The regional water planning process includes public participation. Since this is a water management strategy identified in the plan, it will be recognized in the next round of planning, including public participation.

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<sup>36</sup> WERF. 2023. Holistic Approach to Improved Nutrient Management. Project 974. Water Research Foundation.

<sup>37</sup> Bureau of Reclamation. 2023. Reclamation R&D Research Projects Long-Term Arid Region Reservoir Usability Evaluation due to Salinity Induced Degradation of Water Quality. [Bureau of Reclamation : Research and Development | Research and Development Office \(usbr.gov\)](#) Accessed February 2023.

<sup>38</sup> Bureau of Reclamation. 2023. Reclamation R&D Research Projects Climate Change: Methodology to Evaluate the Influence of Joint Changes in Climate and Land Cover on Water Availability. [Bureau of Reclamation : Research and Development | Research and Development Office \(usbr.gov\)](#) Accessed February 2023.

<sup>39</sup> Bureau of Reclamation. Date unknown. WaterSMART Applied Science Grant Application, Quantifying Risk Exposure and Tolerance of Conjunctively-Managed Water Supplies to Enhance Drought Preparedness and Response.

## BUDGET NARRATIVE

# Canadian River and Lake Meredith Water Supply Desalination Feasibility Studies

Sustainably supplying water to the Canadian River Municipal Water Authority's eleven member cities and four municipalities.

February 28, 2023

### **Application for:**

Notice of Funding Opportunity No. R23AS00076

WaterSMART: Water Recycling and Desalination Planning

### **Applicant:**

Canadian River Municipal Water Authority Headquarters

PO Box 9

9875 Water Authority Rd

Sanford, TX 79078

Phone: 806-865-3325

Fax: 806-865-3314

DUNS #066397977

SAM KUQDGLZURVK3

### **Applicant Project Manager:**

Drew Satterwhite – General Manager

PO Box 9

9875 Water Authority Rd

Sanford, TX 79078

[drew@crmwa.com](mailto:drew@crmwa.com)

Phone: 806-865-3325



# Project Budget

Included is a project budget with the following elements:

- Funding plan
- Budget proposal
- Budget narrative
- Letters of commitment (if applicable)

This budget narrative explains items included in the following budget categories:

- Personnel
- Fringe Benefits
- Travel
- Equipment
- Supplies
- Contractual
- Construction
- Other Direct Costs
- Total Direct Costs
- Indirect Costs
- TOTAL

The budget includes the minimum Federal to non-Federal required cost share. The Canadian River Municipal Water Authority is seeking funding for Funding Group I, which requires the applicant is capable of cost-sharing 50 percent or more of the total study costs. The Canadian River Municipal Water Authority is committed to this cost sharing as shown in this budget.

## Funding Plan

The Canadian River Municipal Water Authority (Authority) will provide the non-Federal cost share from the annual operating budget. The Canadian River Municipal Water Authority's fiscal year runs from October 1 to September 30 of each year. The Authority measures the full cost of providing water to the member cities for the purpose of fully recovering that cost through charges to the member cities. Charges to member cities are computed on a cost-reimbursement basis. The Authority's basic financial statements are reported using the economic resources measurement focus and the full accrual basis of accounting.

# Budget Proposal

The budget proposal, shown in SF424A, is summarized by all funding sources in **Table 1**. A summary of the cost contributions is shown in **Table 2**.

**Table 1. Summary of non-Federal and Federal funding sources**

Funding Sources	Amount
<b>Non-Federal Entities</b>	
The Canadian River Municipal Water Authority	\$1,000,000
Non-Federal Entities Subtotal	\$0
REQUESTED Reclamation Funding	\$1,000,000

**Table 2. Total project cost table**

Source	Amount
Costs to be reimbursed with the requested Federal funding	\$1,000,000
Costs to be paid by the applicant	\$1,000,000
Value of third-party contributions	\$0
<b>TOTAL project cost</b>	<b>\$2,000,000</b>

## Budget Narrative

### Personnel

The Canadian River Municipal Water Authority will manage this desalination feasibility study, perform some support activities for the tasks related to data specific knowledge of the pipeline operation, and administer a contract with an engineering firm with the appropriate expertise to conduct this desalination feasibility study (**Table 3**). The general manager will manage all tasks for each budget year. The deputy general manager will provide technical assistance. The salaries of administrative and clerical personnel are included as a portion of the stated indirect costs. The hourly rate for future years includes a 4 percent increase, which is the average annual increase in compensation for all employees. The hourly rate is based on the average of all personnel occupying this position. Compensation rates are consistently applied to Federal and non-Federal activities.

**Table 3. Personnel budgeting**

<b>Task</b>	<b>Year</b>	<b>General Manager (hours)</b>	<b>Deputy General Manager (hours)</b>	<b>Total (\$)</b>
<b>Rate</b>	2023	\$110	\$100	n/a
	2024	\$114	\$104	
	2025	\$119	\$108	
1 Project management	2023	12	70	\$8,320
	2024	60	58	\$12,896
	2025	44	56	\$11,292
2. Award, contracting, kick-off	2023	8	16	\$2,480
3. Introductory Information	2023	16	24	\$4,160
4. Statement of Problems and Needs	2023	4	4	\$840
5. Desalination Opportunities	2024	16	20	\$3,910
6. Description of Alternatives	2024	20	32	\$5,616
7. Economic Analysis	2024	8	12	\$1,031
8. Recommend Desalination Project	2024	8	24	\$3,411
9. Environmental Consideration and Potential Effects	2024	8	24	\$3,411
	2025	16	16	\$3,634
10. Legal and Institutional Requirements	2025	32	40	\$8,134
11. Financial Capability	2025	24	32	\$6,317
12. Research Needs	2025	8	20	\$3,115
13. Draft Report	2025	24	40	\$7,182
14. Final Report	2025	4	16	\$2,206
<b>TOTAL</b>		312	504	\$88,000

### **Fringe Benefits**

The Canadian River Municipal Water Authority fringe benefits costs are estimated at 50 percent of employee compensation costs and consist of Federal Insurance Contributions Act (FICA) (8 percent), unemployment insurance (6 percent) workers compensation (1 percent), medical and dental (18 percent), retirement (3 percent) and annual/sick leave/holidays (14 percent). Fringe benefits are estimated as \$44,000.

### **Travel**

The budget includes travel costs to drive to alternative sites to investigate feasibility for desalination siting. The total mileage is not known at this time, but the estimate is based on travel costs for 10 trips, estimated at 80 miles roundtrip, at 2022 mileage reimbursement rates (800 miles x 0.655/miles = \$5,240).

## **Equipment**

The budget includes \$0 for equipment.

## **Supplies**

The budget includes \$0 for supplies.

## **Contractual**

The Canadian River Municipal Water Authority will hire consultant(s) to conduct technical assessments and prepare the desalination feasibility study. A preliminary price analysis found average fees of consultant firms in the area are approximately \$200 per hour. The estimate would provide approximately 8,600 hours (approximately two staff full-time for 2 years) based on a contract value of \$1,750,000. The Canadian River Municipal Water Authority procurement policies require a qualifications-based procurement method.

## **Construction**

The budget includes \$0 for construction.

## **Other**

The project budget includes planning, study coordination, and desalination feasibility study assistance services from the Bureau of Reclamation, Oklahoma-Texas Area Office. The objective is to create a coordinated and stronger feasibility study report that will help with future projects. The budgeted amount is \$50,000.

## **Indirect Costs**

The Canadian River Municipal Water Authority does not have a current Federal negotiated indirect cost rate agreement. Indirect costs were estimated as less than 10 percent de minimis of the total direct costs. Indirect costs are estimated at \$62,760.

## **Letters of Commitment**

The Canadian River Municipal Water Authority is committed to the cost share for this desalination feasibility study.

# Panhandle Water Planning Group

P.O. Box 9257  
Phone: 806-372-3381

Amarillo, Texas 79105  
Fax: 806-373-3268

Ben Weinheimer  
*Chairman  
Agriculture*

Judge Vernon Cook  
*Vice-Chairman  
Counties*

David Landis  
*Secretary  
Municipalities*

Janet Guthrie  
*Executive Committee  
Water District*

Steve Walthour  
*Executive Committee  
Water District*

Drew Satterwhite  
*River Districts*

Floyd Hartman  
*Municipalities*

Dr. Brent Auvermann  
*Higher Education*

Dean Cooke  
*Water Utilities*

Spencer Cave  
*Industries*

Rusty Gilmore  
*Small Business*

Glen Green  
*Elec. Generating  
Utility*

Rick Gibson  
*Environmental*

Bobby Kidd  
*Water Districts*

Roy Messer  
*Industries*

Dillon Pool  
*Environmental*

Janet Tregellas  
*Agriculture*

Joe Baumgardner  
*Agriculture*

Dr. Gary Marek  
*Environmental*

Danny Krienke  
*GMA#1*

Lynn Smith  
*GMA#6*

Megan Eikner  
*Public*

February 21, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The Region A Water Planning Group is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. The function of the Region A Panhandle Regional Planning group is the creation of the five-year Regional Water Plan and, as such to assess the long-range water supply planning in the region, CRMWA has a vested interest in the ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects to manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

The Region A Panhandle Water Planning Group agrees that desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer.

The Region A PWPG agrees with CRMWA, and supports the request for the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,



Ben Weinheimer  
Chairman | Region A - Panhandle Water Planning Group



# Llano Estacado

REGIONAL WATER  
PLANNING GROUP 

February 23, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

To Whom it May Concern:

The Llano Estacado Regional Water Planning Group (Region O) supports the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. Region O covers a 21 county area inclusive of seven CRMWA member cities: Plainview, Lubbock, Levelland, Brownfield, Tahoka, O'Donnell, and Lamesa. These CRMWA member cities have depended on Lake Meredith water for the last 55 years. Our Planning Group and these cities have a vested interest in CRMWA's ability to provide a reliable water supply that includes an appropriate quality of water for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been a persistent issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions to manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable and reliable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing water extractions from the Ogallala aquifer which is being removed at a much faster rate than it is being recharged. We urge the Bureau of Reclamation to place a high priority on CRMWA's efforts to manage the chlorides in this reach of the Canadian River and provide the necessary support and funding for these efforts.

Sincerely,



Aubrey A. Spear, P.E.  
Chairperson  
(806) 775-2585



PANHANDLE GROUNDWATER  
CONSERVATION DISTRICT

PANHANDLE GROUNDWATER  
CONSERVATION DISTRICT

201 W 3rd Ave  
White Deer, TX 79097  
(806) 883-2501

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February 14, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The Panhandle Groundwater Conservation District (PGCD) is pleased to support the Canadian River Municipal Water Authority's (CRMWA) effort to conduct a desalination feasibility study of the Lake Meredith Water Supply to Main Aqueduct. We have a vested interest in CRMWA's ability to provide dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. Completed studies and projects have not changed this declining trend in water quality. This proposed desalination feasibility study is an important step toward finding a solution. PGCD's mission is to protect water resources for the benefit of our citizens, economy, and environment. We believe maintaining this important surface water source creates a sustainable approach to reduce groundwater declines and helps support that mission.

Production from the Ogallala aquifer is being produced at a much faster rate than it is being recharged. This desalination feasibility study will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas, thereby reducing production from the Ogallala. We are a committed stakeholder in the water resources of the region and are engaged in the practices, policies, and partnerships involved in managing and protecting our water supplies.

We urge the Bureau of Reclamation to recognize the importance of this desalination feasibility study and the need for support and funding.

Sincerely,

Britney Britten  
PGCD General Manager

February 22, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

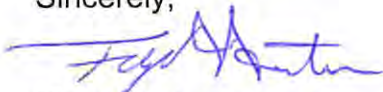
The City of Amarillo is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,



Floyd Hartman

Assistant City Manager, City of Amarillo



**City of Borger**  
**Office of City Manager**  
600 N. Main Street  
PO Box 5250  
Borger, TX 79008-5250  
[www.borgertx.gov](http://www.borgertx.gov)

(806) 273-0902  
FAX (806) 273-0911

February 28, 2023

Bureau of Reclamation mail services

**Attn: NOFO Team**

Denver Federal Center

Bldg. 67, Rm. 152

6th Avenue and Kipling Street

Denver, CO 80225

**Re: Canadian River Municipal Water Authority Water Recycling & Desalination Planning**

As a founding member of the Canadian River Municipal Water Authority (CRMWA), the City of Borger and our industrial partners have depended on Lake Meredith water for the last 55 years. CRMWA's ability to provide dependable water quality and supply impacts the entire Texas Panhandle, South Plains, and the City of Borger directly. The City of Borger supports CRMWA's efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River.

Since the 1970s, the declining water quality of Lake Meredith, particularly chlorides, has been an issue. In 2001 with funding from the Bureau of Reclamation, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River. This project improved the declining trend in water quality but has not eliminated the need for further actions to manage the water quality. The proposed desalination studies included in CRMWA's application will provide an essential step toward finding new and additional solutions to ensure the continued use of Lake Meredith. The water quality issues increase our use of non-renewable groundwater. Without improvement, our semi-arid region faces the loss of one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help improve the long-term usability of water from Lake Meredith. Increased lake usage allows the Panhandle and South Plains of Texas to reduce production from the Ogallala aquifer, which is being depleted faster than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this area of the Canadian River and the need for support and funding.

Respectfully,

Garrett Spradling  
City Manager

**Boomtown PRIDE**

**Professional – Responsive – Innovative – Diverse – Empowered**

February 27, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Brownfield is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

  
Jeff Davis, CPM., City Manager





February 21, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

To Whom It May Concern:

The Hemphill County Underground Water Conservation District is pleased to support the Canadian River Municipal Water Authority's (CRMWA) effort to conduct a desalination feasibility study of the Lake Meredith Water Supply to Main Aqueduct. We have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. Completed studies and projects have not changed this declining trend in water quality. This proposed desalination feasibility study is an important step toward finding a solution. Maintaining this important surface water source would also create a sustainable approach to reduce groundwater declines which the Groundwater Conservation Districts are charged with its stewardship.

We believe this desalination feasibility study will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged. We are a committed stakeholder in the water resources of the region and are engaged in the practice, policies, and partnerships involved in managing and protecting our water supplies.

We urge the Bureau of Reclamation to recognize the importance of this desalination feasibility study and need for support and funding.

Sincerely,

Janet Guthrie  
General Manager  
Hemphill County UWCD



# CITY OF LAMESA

601 SOUTH FIRST  
LAMESA, TEXAS 79331

Phone 806/872-4321  
Fax 806/872-4338

February 17, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Lamesa is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith. We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

A handwritten signature in blue ink that reads "Josh Stevens".

Josh Stevens, Mayor





February 20, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center- Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Levelland is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

A handwritten signature in blue ink that reads "Brandon Anderson".

**Brandon Anderson**  
*City Manager*  
City of Levelland

*Discover a Texas Treasure*





February 23, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center, Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

To Whom it May Concern:

The City of Lubbock supports the Canadian River Municipal Water Authority's (CRMWA) project to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. The City of Lubbock is one of CRMWA's major member cities. CRMWA member cities have depended on Lake Meredith water for the last 55 years. The City of Lubbock, as well as other member cities, have a vested interest in CRMWA's long-term ability to provide a reliable water supply that includes an appropriate quality of water for the South Plains of Texas.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been a persistent issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions to manage the water quality. These proposed desalination studies are an important step toward finding additional solutions so that the City of Lubbock can continue to utilize one of our few renewable and reliable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the South Plains of Texas thereby reducing water pumped from the Ogallala aquifer which is being removed at a much faster rate than it is being recharged. We urge the Bureau of Reclamation to place a high priority on CRMWA's efforts to manage the chlorides in this reach of the Canadian River and provide the necessary support and funding for these efforts.

Sincerely,

A handwritten signature in blue ink that reads "Bill Howerton, Jr." The signature is written in a cursive, flowing style.

Bill Howerton  
Deputy City Manager



February 17, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of O'Donnell is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

A handwritten signature in blue ink that reads "Kim Parker".

Kim Parker, Mayor



February 17, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Pampa is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects to manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,



Shane Stokes

City Manager



# PLAINVIEW, TX

*city of plainview*

February 17, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

To Whom it May Concern:

The City of Plainview is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

Jeffrey Snyder  
City Manager

# SLATON

---

YOUR KIND  OF TOWN

February 17, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Slaton is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,



Wade Willson, CPM  
City of Slaton



P.O. Box 300  
1807 Main St.  
Tahoka, TX 79373  
806-561-4211

February 27, 2023

Bureau of Reclamation mail services  
Attn: NOFO Team  
Denver Federal Center  
Bldg. 67, Rm. 152  
6th Avenue and Kipling Street  
Denver, CO 80225

The City of Tahoka is pleased to support the Canadian River Municipal Water Authority's (CRMWA) efforts to evaluate the feasibility of further managing chlorides in Lake Meredith and the Canadian River. As a CRMWA Member City that has depended on Lake Meredith water for the last 55 years, we have a vested interest in CRMWA's ability to provide a dependable water quality and supply necessary for the Texas Panhandle and South Plains.

A declining trend in the water quality of Lake Meredith, particularly chlorides, has been an issue since the 1970s. In 2001, CRMWA constructed the Salinity Control Project upstream of Lake Meredith in the Canadian River which was built alongside and with funding contributions from the Bureau of Reclamation. This project has improved the declining trend in water quality but has not eliminated the need for further actions/projects manage the water quality. These proposed desalination studies are an important step toward finding additional solution(s) so that this semi-arid region can continue to utilize one of our few renewable water supplies in Lake Meredith.

We believe the desalination studies will help provide the long-term availability of Lake Meredith water to the Panhandle and South Plains of Texas thereby reducing production from the Ogallala aquifer which is being produced at a much faster rate than it is being recharged.

We urge the Bureau of Reclamation to recognize the importance of CRMWA's efforts to manage the chlorides in this reach of the Canadian River as well as the need for support and funding.

Sincerely,

A handwritten signature in blue ink, appearing to read "Julie Arrington".

Julie Arrington, MPA, TRMC

City Administrator