

Brackish Groundwater Desalination to Increase Water Supply Resiliency and Reliability in the Lower Rio Grande Valley Region of New Mexico



Applicant: New Mexico Office of the State Engineer/Interstate Stream Commission
130 South Capitol Street
Concha Ortiz y Pino Building
Santa Fe, NM 87504-5102

Project Manager: John Longworth, PE
Sr. Executive Engineer &
Advisor to the State Engineer and NMISC Director
New Mexico Interstate Stream Commission
130 South Capitol Street
Concha Ortiz y Pino Building
Santa Fe, NM 87504-5102
Phone: 505.795.0728
Email: john.longworth@ose.nm.gov



Table of Contents

Title Page.....	i
Table of Contents.....	ii
1.0 Mandatory Federal Forms	iii
2.0 Executive Summary.....	1
3.0 Project Location	1
4.0 Project Description.....	2
5.0 Responses to Evaluation Criteria	6
5.1 Evaluation Criterion 1 – Project Planning and Analysis.....	6
5.2 Evaluation Criterion 2 – Stretching Water Supplies.....	9
5.3 Evaluation Criterion 3 – Environment and Water Quality	12
5.4 Evaluation Criterion 4 – Department of the Interior Priorities.....	14
5.5 Evaluation Criterion 5 – Watershed Perspective and Stakeholder Involvement.....	17
6.0 Project Budget.....	21
6.1 Funding Plan	21
6.2 Budget Proposal	21
6.3 Budget Narrative	21
7.0 Environmental and Cultural Resources Compliance.....	22
8.0 Required Permits or Approvals	23
9.0 Letters of Support	23
10.0 Overlap or Duplication of Effort Statement.....	23
11.0 Uniform Audit Reporting Statement.....	23
12.0 Conflict of Interest Disclosure Statement.....	23
13.0 References Cited in Technical Proposal.....	33

Figures

Figure 1 Census tracts containing underserved areas as identified by the US government Climate and Economic Justice Screening Tool	2
Figure 2 Initial preliminary proposed pipeline routes from the feasibility study currently underway by the New Mexico Interstate Stream Commission	4
Figure 3 El Paso Electric service area	6
Figure 4 Lower Rio Grande Water Planning Region.....	7
Figure 5 Preliminary schedule for proposed project	10

Tables

Table 1 Summary of non-federal and federal funding sources	21
Table 2 Summary of total project cost.....	21
Table 3 Budget proposal	22





2.0 Executive Summary

Date: February 28, 2023

Applicant Name: New Mexico Interstate Stream Commission

City, County, and State: City of Santa Fe, Santa Fe County, State of New Mexico

Project Summary: The New Mexico Office of the State Engineer and the New Mexico Interstate Stream Commission (OSE/ISC) seeks to plan for improving the resiliency and reliability of the water supply for growing and disadvantaged areas in Dona Ana County, New Mexico by evaluating the feasibility of desalination of brackish groundwater from the Salt Basin in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076. This area of southern New Mexico is subject to water shortage and stress due to growing population and border economic activity, aridification, diminishing local supplies, and conflict between regional water users, in particular the Texas v. New Mexico Original No. 141 Supreme Court Case. Because the project focuses on increasing resilience to climate change and supporting climate-resilient water supply development—groundwater is an inherently stable source of supply and responds slowly to changes in climate—it is consistent with *E.O. 14008: Tackling the Climate Crisis at Home and Abroad*. This project is also consistent with the New Mexico Water Policy and Infrastructure Task Force report *Facing New Mexico's 21st Century Water Challenges*, which identifies the core area of “Coping with the reality of climate change impacts”. In addition, the Task Force report includes a key recommendation call to “Equip state agencies, especially the New Mexico Office of the OSE, ISC, and the New Mexico Environment Department (NMED), to effectively address New Mexico’s 21st Century emerging water security challenges and help New Mexicans across the state improve their water resilience and adaption to reduced water supplies.” Funding of this project will help the State of New Mexico reach this goal. The Task Force report goes on to state, under Recommendation 2.3, that the State should “Increase water resilience by leveraging federal funds - particularly currently available federal funds - to ensure New Mexico’s water infrastructure is modernized for 21st century needs.”, which further supports the funding of this project.

Length of Project and Estimated Completion Date: The anticipated duration of the proposed project is two years with a scheduled completion date of October 31, 2025.

Project Conducted on Federal Facility or Land: The proposed planning efforts are not for a project on a Federal facility. However, it is possible that some of the infrastructure involved with this project may be located on Federal land at some point in the future.

3.0 Project Location

The proposed project will evaluate brackish groundwater aquifers throughout New Mexico as potential sources of supply, but will focus on aquifers located in the southern portion of the State since they are nearest to the delivery points being evaluated. These delivery points are located in the Lower Rio Grande area of New Mexico, a region affected by water stress, aridification, and conflict and competition over limited water resources. Since this area includes the cities of Las Cruces, New Mexico and El Paso, Texas, as well as the United State/Mexico



border and the Santa Teresa border crossing, it is an area poised for economic growth, which has been historically under-served.

As shown in **Figure 1**, census tracts that are overburdened and underserved, highlighted in grey, include the Cities of Las Cruces, New Mexico and El Paso, Texas; Mesilla, Anthony, Vinton, Chaparral, and Sunland Park, New Mexico; and communities situated in the vicinity of the United States Department of Defense’s Fort Bliss. Fort Bliss, in conjunction with El Paso Water, is currently undertaking a resilience study for water, wastewater, and stormwater infrastructure (El Paso Water - Public Service Board, 2022), and this project could contribute to these ongoing efforts.

One of the outcomes of this project will be to identify the most feasible recipient(s) of desalinated water. This may include any of the communities listed above and/or the local water utility that serves them. As part of preparing this grant application, we have initiated outreach efforts to the Camino Real Regional Utility (CRRUA), which serves the Cities of Sunland Park and Santa Teresa, New Mexico. CRRUA represents a strong candidate to receive desalinated water from this project once the facility is constructed, and have provided a letter of support for the project. We have also contacted the City of Las Cruces Utility to gauge their interest in the project.



Figure 1. Census tracts containing underserved areas (shaded), as identified by the US government Climate and Economic Justice Screening Tool (from [Explore the map - Climate & Economic Justice Screening Tool \(geoplatform.gov\)](https://www.geoplatform.gov/)).

4.0 Project Description

Applicant Category. The New Mexico Office of the State Engineer, Interstate Stream Commission is seeking funding under Funding Group I.

Eligibility of Applicant. As a state agency with authority to administer water, and one of the eligible applicant types described in Section C1.1. Funding Group I: “States, Indian Tribes, irrigation districts, and water districts; and any state, regional, or local authority.”, OSE/ISC is an eligible applicant to receive an award under C1.1. Funding Group I of the NOFO.

Goals. The primary goals of this project are to (1) increase the current understanding of brackish groundwater availability in southern New Mexico and (2) evaluate the feasibility of

desalinating brackish groundwater using green energy for the purpose of augmenting water-supply availability in the Lower Rio Grande Valley region in New Mexico.

Approach. The overall approach to the proposed project will be executed in three main phases:

- **Phase I** – Perform a desktop study to augment and increase our understanding of potential source aquifers for brackish water on the east and west sides of the Rio Grande in southern New Mexico.
- **Phase II** - Evaluate the feasibility of locating, building, and operating a desalination facility.
- **Phase III** - Evaluate the feasibility of operating the desalination facility with green energy such as solar power.

Details on each of these phases are provided below.

Phase I. Funding for this project will provide for additional characterization of brackish groundwater resources in southern New Mexico, including the Mount Riley aquifer. The State of New Mexico is actively evaluating brackish groundwater aquifers throughout the state (Graham, 2015; New Mexico Bureau of Geology and Mineral Resources, ongoing). Funding for this project will enhance and add to the existing and growing knowledge base of New Mexico brackish groundwater, and will allow the OSE/ISC to prioritize brackish groundwater reserves.

Phase I of the proposed project will entail a desktop study of brackish groundwater availability in New Mexico, based on existing references and data. This study will build on the foundation already developed under ongoing studies such as the New Mexico Bureau of Geology and Mineral Resources' *New Mexico: Regional Brackish Water Assessments*.

Phase I Outcomes: Ranking of southern New Mexico's available brackish groundwater aquifers, with estimates of annual production capacities and viable pumping timeline horizons.

Phase II. The desalination system to be evaluated under this proposed project may be associated with brackish groundwater originating from the Salt Basin. A feasibility study is currently being conducted, through a Memorandum of Understanding between the OSE/ISC and the Albuquerque Area Office of Reclamation, to examine options for brackish groundwater development in the Salt Basin and siting a pipeline to bring the water westward into the Lower Rio Grande Valley in New Mexico. Once the brackish groundwater from the Salt Basin is delivered to the Lower Rio Grande Valley, it will need to be purified via desalination. Initial preliminary proposed pipeline routes are shown in **Figure 2** (note that these have not yet received stakeholder input or review or acceptance by Reclamation). This work has included evaluation of potential aquifer capacity (S.S. Papadopulos and Associates, 2022) as well as preliminary evaluation of potential pipeline routes via analysis of existing rights-of-way, land ownership, and identification of potentially sensitive ecological and cultural resource areas.

The general activities for evaluating the feasibility of a desalination facility to be located within the Lower Rio Grande Valley in southern New Mexico include the following:

- **Site evaluation:** Evaluate the site to determine whether it is suitable for the proposed desalination system. Factors to consider include the quality and quantity of brackish

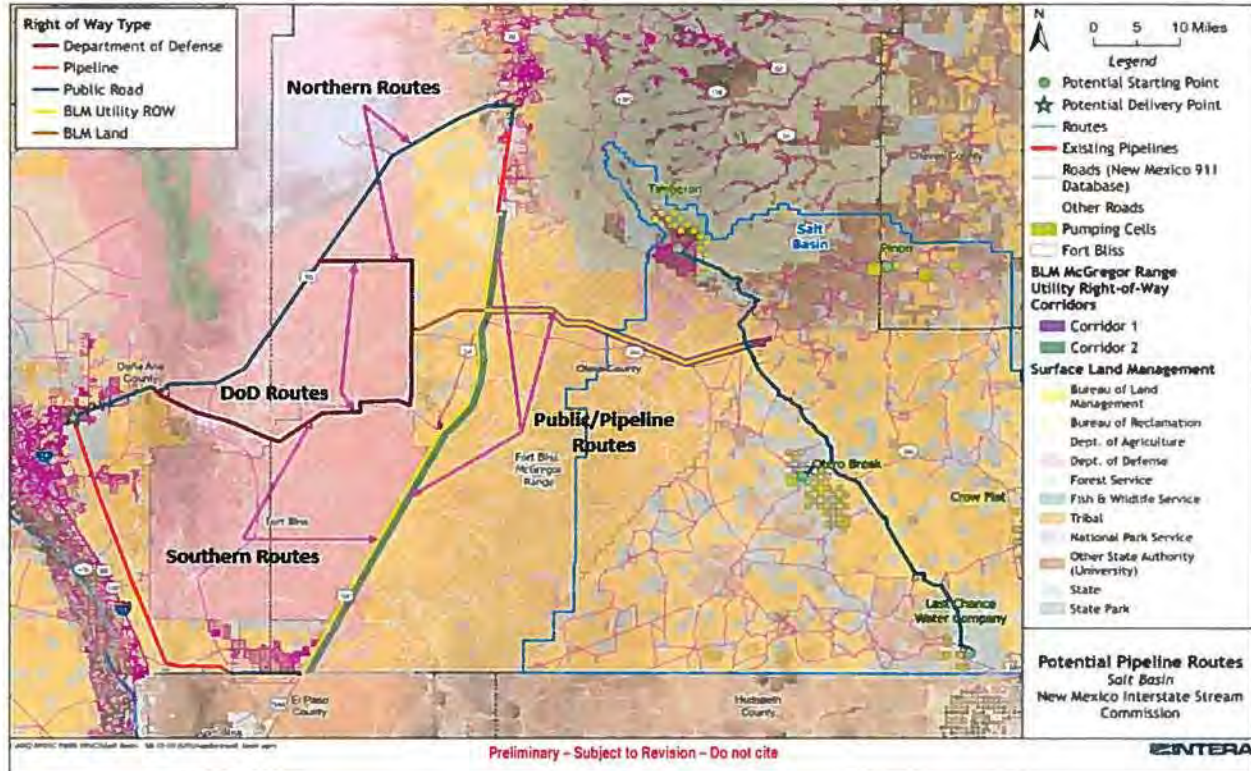


Figure 2. Initial preliminary proposed pipeline routes from the feasibility study currently underway by the New Mexico Interstate Stream Commission.

groundwater, geology, topography, access to utilities, proximity to markets and transportation, environmental factors, and potential impacts on nearby communities.

- **Preliminary design:** Based on the site evaluation, develop preliminary design concepts for the desalination system, including the type of treatment technology, methods of desalination residuals disposal, power source, storage and distribution system, and associated infrastructure.
- **Regulatory and permitting requirements:** Determine the regulatory and permitting requirements for the project, including local, state, and federal regulations and permits that may be needed, such as water rights permits, discharge permits, and land use permits.
- **Capital and operating costs:** Estimate the capital and operating costs of the proposed desalination system, including equipment, construction, labor, maintenance, and other associated costs. This will help determine the economic feasibility of the project.
- **Financing and funding options:** Evaluate financing and funding options for the project, such as grants, loans, and other public or private funding sources.

The treatment methods considered will create by-products that require disposal. Reverse osmosis (RO) creates a waste residual concentrate. The amount and properties of the concentrate depend on total dissolved solids quantity and quality. As part of this project, recommendations for disposing of the treatment residuals will be developed, including deep well injection or dewatering in an evaporation pond and land filling the solids. In general, the



American Water Works Association (AWWA) M69 Inland Desalination and Concentrate Management Manual of Water Supply Practices (AWWA, 2019) will be followed.

Phase II Outcomes: A ranked set of at least three potential desalination plant alternatives, with conceptual costs.

Phase III. Given that desalination is an energy-intensive process, to meet the goals associated with climate change and resiliency, the possibility of powering the process using green energy such as solar will be evaluated.

The general steps to evaluate the feasibility of using green energy to power the brackish groundwater desalination facility include the following:

- **Assess the energy requirements:** Determine the energy requirements for the brackish groundwater desalination system, including the energy needed for pumping, pre-treatment, reverse osmosis or other treatment processes, and post-treatment.
- **Develop preliminary design concepts:** Based on the site evaluation and energy requirements, develop preliminary design concepts for a solar-powered system, including the type and capacity of solar panels, batteries or other storage systems, and associated infrastructure.
- **Estimate capital and operating costs:** Estimate the capital and operating costs of the proposed solar-powered system, including equipment, installation, maintenance, and other associated costs. This will help to determine the economic feasibility of the project.
- **Conduct a comparative analysis:** Compare the cost and performance of a solar-powered system with other energy sources, such as grid electricity or diesel generators.
- **Evaluate the environmental and social benefits:** Analyze the potential environmental and social benefits of a solar-powered system, such as reduced greenhouse gas emissions, improved air quality, and reduced noise pollution.
- **Assess the regulatory and permitting requirements:** Determine the regulatory and permitting requirements for the project, including local, state, and federal regulations and permits that may be needed, such as interconnection agreements and permits for land use.

Electricity in the Lower Rio Grande Valley in New Mexico is provided by El Paso Electric whose service area is shown in **Figure 3**. One aspect of this project will be to engage with El Paso Electric to determine the feasibility of supplying green power to this project. Key to the success of this aspect of the project will be regulatory review and the ability of the project to dovetail with existing green energy initiatives.

Members of the project team participate in a coalition formed by Intel to develop technology solutions for the water industry, including a pilot program to develop solar power and battery storage solutions for water utilities ([Renewable Energy Technology Powered by Intel](#)). As a result, we have access to other Intel partners with specialized expertise in the design, construction, and operation of micro-grid control systems, solar and wind power generation, and large-scale battery storage systems. Through the water industry coalition, Intel provides grant funding of up to \$150,000 for feasibility studies and support for accessing grant and other



funding for project implementation. Intel has expressed interest in supporting the feasibility assessment for a renewables based micro-grid system for the proposed brackish groundwater desalination facility.

Phase III Outcomes: Feasibility analysis to determine if there is a reasonable probability to power the proposed desalination plant using green energy such as solar.

5.0 Responses to Evaluation Criteria

5.1 Evaluation Criterion 1 – Project Planning and Analysis

Subcriterion 1a - Water Recycling Needs and Opportunities

1. Problems and needs in project area

The Lower Rio Grande Valley of New Mexico is an area that has been identified as water short. Water shortages extend from climate change (decreasing surface-water supplies), aridification, growth in demand, and regional conflict associated with the Rio Grande Compact (currently before the Supreme Court of the United States).

2. Current and projected water supplies

As of 2017 (and conditions have worsened since then), the estimated shortage for the Lower Rio Grande Planning Region, shown in **Figure 4**, in 2060 during a drought year is expected to range from 217,000 to 243,000 acre-feet. Needless to say, that is a significant shortage (New Mexico Interstate Stream Commission, 2017). The current project seeks to narrow that gap by the range of 20,000 – 40,000 acre-feet annually.

Several key issues were identified in the Lower Rio Grande Regional Water Plan ((New Mexico Interstate Stream Commission, 2017), including:

- The Rio Grande stream system is fully appropriated. In general, any new water uses that impact the flow of the Rio Grande must be offset through return flow, the transfer of existing water rights, and/or supplementation by a new source of water.
- Groundwater pumping and depletions in New Mexico and Texas impact the flows of the Rio Grande and affect the operations of the Rio Grande Project. This issue continues to be



Figure 3. El Paso Electric service area (from [El Paso Electric Files EV Plan With New Mexico Regulators - CleanTechnica](#)).

a source of controversy and conflict among New Mexico, Reclamation, and the two U.S. irrigation districts supplied by the Rio Grande Project (Elephant Butte Irrigation District (EBID) in New Mexico and El Paso County Water Improvement District #1 [EPCWID#1] in Texas).

- In 2013, the State of Texas initiated a lawsuit in the U.S. Supreme Court over the Rio Grande Compact, specifically water management and use by New Mexico below Elephant Butte Dam, that names New Mexico and Colorado as defendants. The United States has joined this lawsuit.
- The demand for water in the Lower Rio Grande region has increased through time due to increasing population and increasing cultivation of high-water-demand crops such as alfalfa and pecans.
- The population of the Lower Rio Grande planning region is expected to expand from approximately 209,000 in 2010 to almost 350,000 in 2060.

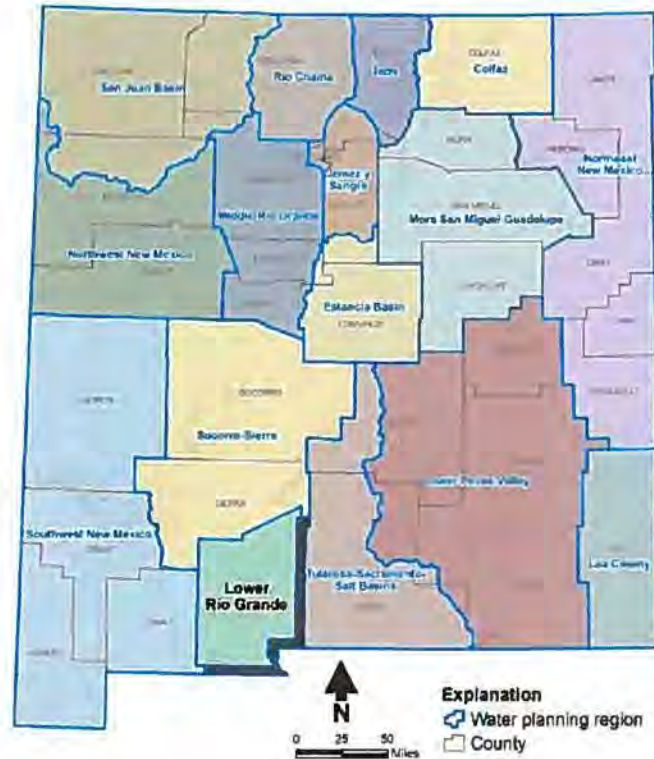


Figure 4. Lower Rio Grande Water Planning Region (from https://www.ose.state.nm.us/Planning/documents/Reg1_1_LowerRioGrande_RegionalWaterPlan2017.pdf)

3. Planning activities to investigate potential uses and markets

The proposed project will evaluate brackish groundwater aquifers throughout southern New Mexico as potential sources of supply. These aquifers are nearest to the delivery point(s) being evaluated which are located in the Lower Rio Grande Valley of New Mexico, a region affected by water stress, aridification, and conflict and competition over limited water resources. Since this area includes the cities of Las Cruces, New Mexico and El Paso, Texas, as well as the United States/Mexico border and the Santa Teresa border crossing, it is an area poised for economic growth that has been historically under-served.

This project will serve disadvantaged and underserved communities in rural southern New Mexico (locally known as “colonias”, and includes areas such as Sunland Park, New Mexico) by providing water to local mutual domestic water providers who may have no other access to additional supply. In addition, this project will bring additional supply into the economically important Santa Teresa border area, which serves as an important border crossing point between the United States and Mexico. Future growth is expected in the region and thus additional water supply will be needed.

The project may also benefit the Cities of Las Cruces, New Mexico and El Paso, Texas, as well as Mesilla, Anthony, Vinton, and Chaparral, New Mexico, as well as communities situated in the



vicinity of the United States Department of Defense's Fort Bliss. Fort Bliss, in conjunction with El Paso Water, is currently undertaking a resilience study for water, wastewater, and stormwater infrastructure (El Paso Water - Public Service Board, 2022), and the proposed project could dovetail with these ongoing efforts.

One of the outcomes of this project will be to identify the most feasible recipient(s) of desalinated water, and they may include any of the communities listed above and/or the local water utility that serves them. Outreach efforts have been initiated with the Camino Real Regional Utility (CRRUA), which serves the Cities of Sunland Park and Santa Teresa, New Mexico, and they have provided a letter of support for the project. CRRUA represents a strong candidate to receive desalinated water from this project once it is constructed. The City of Las Cruces Utility has also been contacted to gauge their interest in the project.

4. Source water

Funding for this study will provide for additional characterization brackish groundwater resources in southern New Mexico. The State of New Mexico is actively evaluating brackish groundwater aquifer throughout the state (Graham, 2015; New Mexico Bureau of Geology and Mineral Resources, ongoing). Another brackish groundwater aquifer in southern New Mexico which has been the focus of much study is the Capitan Reef. Funding for this project will enhance and add to the existing and growing knowledge base of brackish groundwater in New Mexico and will allow OSE/ISC to prioritize known brackish groundwater reserves.

Subcriterion 1b – Evaluation of Project Alternatives

1. Objectives that all alternatives will be designed to meet

The primary objective that any selected alternative will need to meet is to deliver water meeting all drinking-water quality standards to an existing water purveyor in a manner in which the delivered water can be seamlessly integrated into its existing supply. We will also seek to identify recipients that will derive the most benefit from the supply. These recipients may include underserved or economically disadvantaged communities. In addition, we will seek to minimize the carbon footprint of any proposed desalination plant by integrating a renewable energy component into the process, if practicable.

2. How planning activities will develop project alternatives

To develop project alternatives for the desalination facility, we will execute a feasibility-level planning study. The activities associated with this study are described above under Phase II of the Approach (pages 5 and 6). The alternatives will be ranked using a set of decision-analysis metrics that include:

- Reliability
- Regional Impact
- Technical Feasibility
- Permitting
- Time to Implement
- Cultural, Historical, and Aesthetic Values
- Socioeconomic Impact
- Ecosystem Protection
- Carbon Footprint (energy usage)
- Sustainability and resiliency
- Cost





Conceptual-design level construction cost estimates will be developed for each alternative, consistent with AACE Class 4. Cost estimates will include allowances for professional services for engineering, permitting, and other activities estimated as percentages of construction cost. Based on the conceptual designs, estimates of annual operating costs will be developed, including labor, energy, and maintenance.

For comparison of alternatives, we will complete life-cycle cost analysis of each alternative based on the estimated construction costs and annual operating costs. Analysis will be based on an assumed 40-year project life and appropriate discount rates. Costs will be presented as totals and per acre-foot per year (ac-ft/yr) capacity. Other parameters required for evaluation of alternatives will be calculated, including energy use and equivalent greenhouse gas (GHG) emissions per ac-ft/yr.

The general activities that will be completed to evaluate green energy alternatives to power the desalination plant are described above under Phase III of the Approach (page 7).

3. General description of selected project

The proposed project is a feasibility study that will use the decision-analysis metrics listed above to determine the feasibility of siting, constructing, and operating a solar-powered desalination plant in the Lower Rio Grande Valley region of southern New Mexico. Accordingly, a “selected project” has not yet been determined. However, if deemed feasible, the selected project is expected to generally consist of a desalination plant, powered via solar energy (with battery storage if feasible), likely to be co-located with an existing water supply or water treatment facility to facilitate delivery of the water directly into an existing drinking water system. The source of raw water for the desalination facility may be one of several potential sources, with one potential sources being the Salt Basin aquifer which has already been studied as a potential raw-water source for this project. A more detailed study of the Salt Basin aquifer production capacity and alternatives analysis for potential pipeline routes is currently being executed under a memorandum of understanding between the OSE/ISC and Reclamation (NMISC and Reclamation, 2019).

4. Preliminary schedule

Because this project is a feasibility study, an alternative for a specific project has not yet been selected. A preliminary schedule showing major tasks, dates, and costs for the planning portion of the project (Phases I through III described in the Approach section of the Project Description above and associated tasks), is provided in **Figure 5**.

5.2 Evaluation Criterion 2 – Stretching Water Supplies

1. Potential for project to reduce, postpone, or eliminate development of new or expanded non-recycled water supplies

This project has significant potential to augment existing water supplies in the Lower Rio Grande Valley region of New Mexico by bringing 20,000-40,000 ac-ft/yr of new water supply into an area characterized by water stress, aridification, and conflict and competition over limited water resources. Since this area includes the cities of Las Cruces, New Mexico and El Paso, Texas, as well as the United States/Mexico border and the Santa Teresa border crossing, it



- State of New Mexico (2020): “This Plan is designed to help promote the viable and emerging New Mexico renewable energy industry... the Plan simply encourages prudent investments in the New Mexico renewable energy industry.”

Renewable energy development in New Mexico is also supported by such agencies as the New Mexico Economic Development Department ([Sustainable & Green Energy - New Mexico EDD](#)): “New Mexico ...has tremendous solar energy potential.” and we currently have an Office of Renewable Energy, which is part of the New Mexico State Land Office ([About – Office of Renewable Energy | NM State Land Office \(nmstatelands.org\)](#)).

3. Potential for project to make water available to address a specific concern

The specific water-supply concerns for the Lower Rio Grande Valley region of New Mexico were outlined in the Lower Rio Grande Regional Water Plan ((New Mexico Interstate Stream Commission, 2017), including:

- The Rio Grande stream system is fully appropriated. In general, any new water uses that impact the flow of the Rio Grande must be offset through return flow, the transfer of existing water rights, and/or supplementation by a new source of water.
- Groundwater pumping and depletions in New Mexico and Texas impact the flows of the Rio Grande and affect the operations of the Rio Grande Project. This issue continues to be a source of controversy and conflict among New Mexico, Texas, Reclamation, and the two U.S. irrigation districts supplied by the Rio Grande Project (EBID in New Mexico and EPCWID#1 in Texas).
- In 2013, the State of Texas initiated a lawsuit in the U.S. Supreme Court over the Rio Grande Compact, specifically water management and water use by New Mexico below Elephant Butte Dam, that names New Mexico and Colorado as defendants. The United States has joined in this lawsuit. The suit is currently in mediation.
- The demand for water in the Lower Rio Grande region has increased through time due to increasing population and increasing cultivation of high-water-demand crops such as alfalfa and pecans.
- The population of the Lower Rio Grande planning region is expected to expand from approximately 209,000 in 2010 to almost 350,000 in 2060. The increasing demand for municipal water is likely to result in water rights transfers from agriculture through willing seller-willing buyer agreements. By creating a new water source, the proposed project will help minimize transfers.

These concerns highlight the need to bring additional water into the region to address current and future water-supply needs.

4. Potential for project to help create additional flexibility to address drought

Groundwater is an inherently stable source of supply, and responds slowly to changes in climate, and thus represents a key potential source of supply which can act as a buffer, particularly during periods of low surface-water availability. Groundwater can be thought of as a drought reserve – one that if carefully managed, can provide additional supply augmentation



during dry times. Given that we expect more climate variability in the future—the dry periods will likely be drier for longer and the wet periods may be wetter—there is an urgent need to develop stable supplies such as desalinated brackish groundwater. This is consistent with the New Mexico Water Policy and Infrastructure Task Force report *Facing New Mexico's 21st Century Water Challenges*, which identified the core area of “Coping with the reality of climate change impacts”. While brackish groundwater is a limited resource, careful management and understanding of its availability will allow it to be managed carefully. An additional outcome of this study will be more detailed characterization of existing brackish groundwater resources in New Mexico such as the Salt Basin and the Capitan Reef aquifers. Additionally, The Lower Rio Grande Regional Water Plan cites desalination as a strategy to meet future water demand (New Mexico Interstate Stream Commission, 2017, pES-7, p146, Appendix 8-A). This strategy was also identified in stakeholder meetings (New Mexico Interstate Stream Commission, 2017, pES-9) and follows from one of the key recommendations of *Facing New Mexico's 21st Century Water Challenges*, namely “Advance our scientific understanding of groundwater through measuring, monitoring, and models to protect the quantity and quality of groundwater resources.” The foundational aquifer characterization work already completed to set the stage for this proposed feasibility study are supported by Task Force report Recommendations 2.8 and 3.1: “Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources.” and “Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources.”

5.3 Evaluation Criterion 3 – Environment and Water Quality

1. Potential for project to improve quality of surface water or groundwater.

This project has the potential to provide drinking water quality supply to a region affected by water stress, aridification, and conflict and competition over limited water resources. Brackish groundwater, which in its natural state is unfit for human consumption, can be desalinated via a green energy powered process to provide additional high-quality drinking water to one or more municipalities in the Lower Rio Grande Valley region of southern New Mexico. Declines in surface-water availability for irrigation from the Rio Grande due to climate change and aridification are leading to salt buildup in the soil because sufficient water is not available to flush the soils appropriately. Increasing salinity in the Valley may ultimately impact water-supply wells. This project has the potential to provide high-quality water to local rural water providers and mutual domestics, that need additional supply.

2. Potential for project to improve effluent quality beyond levels necessary to meet State or Federal discharge requirements.

Because this project does not contemplate treatment of treated wastewater return flows from municipal or other sources, this criterion is not applicable. Source water will be naturally occurring brackish groundwater, which will be desalinated for municipal drinking water purposes.

3. Potential for project to improve flow conditions in a natural stream channel.

Currently there is significant conflict in the Lower Rio Grande Valley of New Mexico related to apportionment of the waters of the Rio Grande under the Rio Grande Compact (Texas v. New





Mexico and Colorado, No. 141 Original before the Supreme Court of the United States). This project has the potential to bring 20,000 – 40,000 ac-ft/yr into the region, thus decreasing stress on the surface waters of the Rio Grande which will likely result in the ability to leave additional water in the Rio Grande to improve flow conditions in that natural stream channel.

4. Potential for project to restore or enhance habitat for non-listed fish and wildlife species.

The Rio Grande in southern New Mexico is known for its rich diversity of flora and fauna. The area is a mix of desert and riparian ecosystems, which support a range of plant species. Along the banks of the river, cottonwood trees, willows, and salt cedar are common, providing shade and habitat for a variety of wildlife. The surrounding desert landscape includes yuccas, agaves, mesquite trees, and cacti. The flora of the Rio Grande is adapted to the hot and arid conditions of the region, with many species relying on the river's water for survival.

The fauna of the Rio Grande is just as diverse as its flora. The river supports a variety of fish species, as well as freshwater mussels and clams. Many birds can be seen fishing along the river, while the surrounding desert is home to roadrunners, quails, and hummingbirds. Larger mammals such as coyotes, bobcats, and mule deer also live in the area, as well as smaller animals like lizards, snakes, and insects. Despite the rich biodiversity of the Rio Grande, many species face threats from human development, climate change, and invasive species, making conservation efforts crucial to the preservation of this unique ecosystem.

This project has the potential to support the conservation and continued ecological health of this unique ecosystem by increasing the local water supply and decreasing stress on the river, thereby increasing flows in the river and its habitat.

5. Potential for project to provide water or habitat for federally listed threatened or endangered species.

The Rio Grande Valley in southern New Mexico is home to the endangered Southwestern Willow Flycatcher and the threatened Western Yellow-Billed Cuckoo. The Southwestern Willow Flycatcher (*Empidonax traillii extimus*/flycatcher) was added to the endangered species list in 1995 and the final rule for critical habitat designation was in 2013 (78 FR 343). The flycatcher range is from Central America, through as the southwestern United States and extends as far north as Colorado and Utah. The Southwestern Willow Flycatcher breeds and rears its chicks in the late spring and through the summer in southwestern states, including New Mexico's dense riparian vegetation along streams, rivers, wetlands.

The Western Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*) was listed as threatened in November 3, 2014 (79 FR 59991) and critical habitat designation is under review (79 FR 67154). The states in which the Western Yellow-Billed Cuckoo is known to or is believed to occur are Arizona, California, Colorado, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming. Traveling from their winter homes in South America, the birds arrive in the Western United States to breed from early June to late August in vegetated areas along rivers and streams. Once common between the Rocky Mountains and the Pacific Ocean and from lower British Columbia, Canada, south to northern Mexico, western cuckoos have now disappeared from the Pacific Northwest and Canada, and only a few pairs still breed in Utah, Idaho, Colorado, and Nevada. Most breeding occurs in isolated areas along rivers in





Arizona, California, and New Mexico. Cuckoos prefer breeding habitat dominated by native tree species, especially cottonwood-willow habitat.

This project has the potential to increase habitat for both of these endangered birds by decreasing the overall need to consume surface water from the Rio Grande, and thus increasing flows in the river and their natural habitat.

5.4 Evaluation Criterion 4 – Department of the Interior Priorities

A solar powered brackish groundwater desalination project in water-short southern New Mexico is an excellent example of how the Biden-Harris Administration's priorities, including ***E.O. 14008: Tackling the Climate Crisis at Home and Abroad***, can be supported. This project can help address the water shortage in the area by using renewable energy to power a desalination plant that converts brackish groundwater into clean drinking water. By doing so, the project can help reduce the stress on the local water resources and improve the access to clean and safe water for the residents in the region.

The use of solar power in the desalination process aligns with the Biden-Harris Administration's focus on clean energy and reducing greenhouse gas emissions. By replacing traditional fossil fuel-based energy sources with renewable solar power, the project can help reduce the carbon footprint of the water treatment process. Additionally, the use of brackish groundwater as a source of water for the project reduces the reliance on surface water sources, which can be heavily impacted by climate change and drought. This approach aligns with the Administration's efforts to promote water resiliency and adaptation to the effects of the climate crisis.

The project demonstrates support for the Biden-Harris Administration's priorities, including E.O. 14008, by promoting clean energy, water resiliency, and addressing the impacts of climate change. It is a great example of how innovative solutions can help address complex environmental challenges while also promoting economic development and social equity.

The project demonstrates support for ***E.O. 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, and the President's memorandum, Tribal Consultation and Strengthening Nation-to-Nation Relationships*** in the following ways.

- It is aimed at providing a sustainable source of clean drinking water for communities in the region that have historically been underserved and have limited access to reliable water resources. This addresses one of the key issues of environmental justice, which is the unequal distribution of environmental burdens and benefits among different communities. By providing a sustainable source of clean water, the project aims to improve the health and well-being of the residents in these underserved communities.
- It uses solar power to operate the desalination system, which is an environmentally friendly alternative to conventional fossil fuel-based energy sources. The use of renewable energy aligns with the goals of the President's memorandum, which seeks to address climate change and promote sustainable practices. The project's focus on sustainable practices, including the use of renewable energy, also aligns with the President's memorandum on Strengthening Nation-to-Nation Relationships, which encourages the



adoption of environmentally responsible practices that support the health and well-being of indigenous communities.

- It promotes local economic development by creating jobs and supporting the growth of the clean energy industry in the region. This is in line with the goals of the President's memorandum, which seeks to promote economic opportunity and reduce economic inequality for underserved communities.

Overall, the project demonstrates how infrastructure projects can be designed to promote environmental justice, sustainable practices, and economic opportunity for underserved communities.

Climate Change. A solar powered desalination plant in southern New Mexico can have several positive environmental impacts. These include:

- The use of renewable solar energy to power the plant will significantly reduce greenhouse gas emissions and climate pollution that would otherwise be associated with conventional fossil fuel-based energy sources. By reducing emissions, the project can help to mitigate the negative impacts of climate change, including rising temperatures, drought, and more severe weather events.
- By providing a sustainable source of clean water, the project can increase the resilience of the local communities to the impacts of climate change, such as prolonged drought and water scarcity. This is especially important in arid regions like southern New Mexico, where water resources are limited.
- The project will protect public health by providing a reliable and safe source of clean drinking water to the communities in the region. This can help to reduce the risk of waterborne diseases and other health issues associated with contaminated water.
- The project can help to conserve our lands, waters, oceans, and biodiversity by reducing the demand for water from other sources, such as rivers and groundwater. By reducing water withdrawals from these sources, the project can help to protect and preserve the natural ecosystems that depend on them.

The 2021 SECURE Water Act Report, published by Reclamation (Reclamation, 2021), outlines the major climate-related water resource challenges facing the western United States, including New Mexico. This project can help address some of the following key issues detailed in the report.

- **Water Scarcity:** The report identifies water scarcity as a major challenge in the western US, and notes that climate change is exacerbating this problem by reducing snowpack and runoff. The desalination project can provide a sustainable source of water in an arid region where water resources are limited.
- **Drought:** The report notes that drought is becoming more frequent and severe in the western US, and that droughts are expected to become longer and more intense due to climate change. The desalination project can help communities in southern New Mexico to better prepare for and adapt to drought conditions by providing a reliable source of water that is not dependent on rainfall or river flow



- **Groundwater Depletion:** The report highlights the need to reduce groundwater pumping to prevent aquifer depletion, which can have long-term negative impacts on water resources. By using brackish groundwater as a feedwater source for desalination, the project can help to reduce demand for freshwater and decrease the need for pumping groundwater.
- **Water Quality:** The report notes that climate change can impact water quality, through factors such as increased water temperature, altered precipitation patterns, and changes in streamflows. The desalination project can provide a reliable source of high-quality drinking water that is not affected by changes in climate and may also help to reduce contamination in groundwater and surface water sources by decreasing demand for these sources.

Disadvantaged or Underserved Communities. The term "colonias" is commonly used in New Mexico and other southwestern states to refer to unincorporated, low-income rural communities that lack basic infrastructure and services, such as running water, sewage systems, and paved roads. These communities are often located along the US-Mexico border and are primarily inhabited by Hispanic or Latino residents. In the Rio Grande Valley of southern New Mexico, colonias are typically located in areas that are historically underserved and lack access to basic services, including healthcare, education, and employment opportunities. Many residents of colonias work in low-wage, manual labor jobs, such as agriculture, construction, and service industries. Colonias often lack basic infrastructure and services due to a combination of factors, including a lack of public funding for rural areas, limited local resources, and the challenges of developing infrastructure in remote and arid regions. Residents of colonias may also face challenges related to transportation, as many lack access to reliable public transportation and may live far from essential services and amenities. Colonias face a range of challenges related to poverty, inadequate infrastructure and services, and limited opportunities for economic and social mobility. These challenges can have significant impacts on the health, well-being, and quality of life of residents in these communities. This proposed project has great potential to provide adequate clean water to these areas, improving both quality of life and economic opportunities for the region.

Tribal Benefits. Due to the proposed location of the project, which is far from most of the Pueblo communities of New Mexico, this project does not have significant potential to provide tribal benefits. One option is to consider providing water to the Fort Sill Apache reservation, which is somewhat west of the project area. The Fort Sill Apache reservation is a Native American reservation located in southern New Mexico, near the border with Texas. The reservation is home to the Fort Sill Apache Tribe, which is a federally recognized tribe with a population of around 700 members. The reservation is located in an arid region of New Mexico and faces many of the water resource challenges common to the area, including water scarcity, drought, and groundwater depletion. The Fort Sill Apache Tribe is engaged in efforts to develop sustainable water management strategies and increase access to clean, reliable sources of water on the reservation. As part of this project, we will seek to engage with the Fort Sill Apache Tribe to support their ongoing water-supply needs by considering them as a potential recipient of the desalinated brackish groundwater that will be produced by the project.



5.5 Evaluation Criterion 5 – Watershed Perspective and Stakeholder Involvement

This project can promote or apply a watershed perspective by implementing an integrated resources management approach, forming collaborative partnerships, and conducting public outreach. Such a project is consistent with the goals of the New Mexico 50-Year Water Plan (currently in draft form), the New Mexico Water Policy and Infrastructure Task Force report, and the Lower Rio Grande Regional Water Plan.

Integrated resources management involves taking a holistic approach to managing water resources and considering the interconnected nature of water, land, and ecosystems. A solar powered brackish groundwater desalination project can contribute to integrated resources management by identifying and prioritizing water demands and integrating multiple water sources. This project can also help identify opportunities to conserve and reuse water and reduce the demand for freshwater resources.

Collaborative partnerships are critical to promoting a watershed perspective, as water resources management often requires coordination and cooperation among multiple stakeholders. A solar powered desalination project can form partnerships with other entities, such as water utilities, government agencies, and non-governmental organizations, to share information, resources, and expertise.

Public outreach is another important element of promoting a watershed perspective, as it can help raise awareness of the importance of water resources management and encourage community engagement in water management efforts. A solar powered desalination project can include public outreach to inform local communities and stakeholders about the project and its potential benefits and to gather feedback and input.

The New Mexico 50-Year Water Plan, the New Mexico Water Policy and Infrastructure Task Force report, and the Lower Rio Grande Regional Water Plan all recognize the importance of integrated resources management, collaborative partnerships, and public outreach in promoting sustainable water management practices. A solar powered brackish groundwater desalination project in southern New Mexico can contribute to these goals by using a watershed perspective to manage water resources, forming partnerships with other entities, and conducting public outreach.

Specific responses to the key points presented under Evaluation Criterion 5 are provided below.

1. Implementing regional or state water plan or integrated resource management plan

As shown in numerous citations previously in this application, the proposed project is consistent with multiple State and Federal goals and objectives. The State of New Mexico and organizations within it have articulated many times both the need and the desire for a brackish groundwater desalination project, particularly one that includes a renewable energy component. Examples of how this project will help implement a regional or state water plan include the following:

- The Lower Rio Grande Regional Water Plan cites desalination as a strategy to meet future water demand (New Mexico Interstate Stream Commission, 2017, pES-7, p146, Appendix

8-A). This strategy was also identified in stakeholder meetings (New Mexico Interstate Stream Commission, 2017, pES-9).

- Since this is a brackish groundwater development project, it is consistent with E.O. 14008: Tackling the Climate Crisis at Home and Abroad, because the project focuses on increasing resilience to climate change and supporting climate-resilient development – groundwater is an inherently stable source of supply and responds slowly to changes in climate.
- This project is consistent with the New Mexico Water Policy and Infrastructure Task Force report Facing New Mexico’s 21st Century Water Challenges, which identified the core area of “Coping with the reality of climate change impacts”.
- The Task Force report includes a key recommendation call to “Equip state agencies, especially the Office of the State Engineer (OSE), the Interstate Stream Commission (ISC), and the New Mexico Environment Department (NMED), to effectively address New Mexico’s 21st Century emerging water security challenges and help New Mexicans across the state improve their water resilience and adaption to reduced water supplies.”
- Funding of this project will help the State of New Mexico to reach this goal. The Task Force report goes on to state, under Recommendation 2.3, that the State should “Increase water resilience by leveraging federal funds - particularly currently available federal funds - to ensure New Mexico’s water infrastructure is modernized for 21st century needs.”, which further supports funding this project.
- While the soon-to-be-released New Mexico 50-Year Water Plan is still in final draft form, early indications are that it likely supports a project of this type.
- This approach is consistent with Reclamation’s Sustainable Energy Mission, as put forward in its Sustainable Energy Strategy: (Reclamation, 2013): “Reclamation seeks to facilitate the development, production, and integration of renewable energy in an environmentally and economically sound manner in the interests of its water and power customers and the American public alike... In this pursuit, Reclamation will...[c]ollaborate with Power Marketing Agencies (PMAs), other Federal agencies, customers, Indian tribes (Tribes), state entities, and other stakeholders.”

2. Helping meet water supply needs of large geographic area, region, or watershed

This project will help to mitigate a known regional water-supply gap in the Lower Rio Grande Valley region of New Mexico. As of 2017 (and conditions have worsened since then), the estimated shortage for the Lower Rio Grande Planning Region in 2060 during a drought year is expected to range from 217,000 to 243,000 acre-feet. This represents a significant shortage (New Mexico Interstate Stream Commission, 2017). The current project seeks to narrow that gap by the range of 20,000 – 40,000 acre-feet annually.

Several key issues were identified in the Lower Rio Grande Regional Water Plan (New Mexico Interstate Stream Commission, 2017), including:

- The Rio Grande stream system is fully appropriated. In general, any new water uses that impact the flow of the Rio Grande must be offset through return flow, the transfer of existing water rights, and/or supplementation by a new source of water.

- Groundwater pumping and depletions in New Mexico and Texas impact the flows of the Rio Grande and affect the operations of the Rio Grande Project. This issue continues to be a source of concern between New Mexico, Texas, Reclamation, and the two U.S. irrigation districts supplied by the Rio Grande Project (EBID in New Mexico and EPCWID#1 in Texas).
- In 2013, the State of Texas initiated an Original Action in the United States Supreme Court over the Rio Grande Compact, specifically water management and water use by New Mexico below Elephant Butte Dam, that names New Mexico and Colorado as defendants. The United States has joined in this lawsuit. With respect to the Original Action, an agreement has been reached between the Compacting states and is under consideration by the United States Supreme Court.
- The demand for water in the Lower Rio Grande region has increased through time due to increasing population and increasing cultivation of high-water-demand crops such as alfalfa and pecans.
- The population of the Lower Rio Grande planning region is expected to expand from approximately 209,000 in 2010 to almost 350,000 in 2060. The increasing demand for municipal water is likely to result in water rights transfers from agriculture through willing seller-willing buyer agreements.

3. Promoting collaborative partnerships to address water-related issues.

The development of a solar-powered brackish groundwater desalination project in the Rio Grande Valley in southern New Mexico can promote partnerships between local water utilities and the State of New Mexico to address water-related issues in the following ways:

- **Shared Goals:** The project can bring local water utilities and the State of New Mexico together to work towards a shared goal of addressing water scarcity issues in the region. This can foster a sense of cooperation and a commitment to finding a sustainable solution to the problem.
- **Resource Sharing:** The desalination plant can provide an alternative source of water for municipal use, and this can encourage sharing of resources between different stakeholders. The project can help reduce the need for separate water supply infrastructure, which can be expensive and inefficient.
- **Improved Water Management:** The project can also encourage improved water management practices in the region by promoting the use of water conservation techniques and sustainable water use practices. This can help reduce the demand on existing sources of water and promote a more equitable distribution of water resources.
- **Economic Benefits:** The project can also provide economic benefits to the region by creating new jobs and promoting economic development. This can further strengthen the relationship between local water utilities and the State of New Mexico, leading to more effective collaboration in the future.
- **Environmental Sustainability:** The use of solar power in the desalination process can promote environmental sustainability by reducing greenhouse gas emissions and promoting the use of renewable energy sources. This can help align the goals of local water

utilities and the State of New Mexico in terms of reducing the environmental impact of water management practices.

Overall, this project can promote collaborative partnerships between local water utilities and the State of New Mexico, leading to more effective and sustainable water management practices in the region.

A stakeholder outreach process for siting a solar-powered brackish groundwater desalination project in southern New Mexico would involve engaging with a wide range of stakeholders, including local communities, government agencies, non-governmental organizations, and other relevant parties. The following steps could be taken to develop an effective stakeholder outreach process:

- **Identify key stakeholders:** Start by identifying key stakeholders who will be affected by the project, such as local residents, businesses, elected officials, environmental groups, and water management organizations.
- **Develop a communication plan:** Create a communication plan that outlines the project's goals, benefits, and potential impacts. The plan should include a timeline of outreach activities, messaging, and outreach methods.
- **Conduct outreach activities:** Conduct a series of outreach activities to engage stakeholders and gather feedback. This can include public meetings, one-on-one meetings, informational materials, surveys, and online engagement through social media and websites.
- **Listen to feedback:** Listen carefully to stakeholder feedback and address any concerns or questions. It is important to show that the project team is responsive to community input.
- **Adjust the project:** Consider modifying the project design or implementation approach based on stakeholder feedback. This may involve finding alternative locations, adjusting project timelines, or modifying design elements.
- **Continue to engage stakeholders:** Maintain ongoing engagement with stakeholders throughout the project's implementation to ensure that their concerns are addressed and that they remain informed about the project's progress.
- **Celebrate success:** Finally, celebrate the successful implementation of the project and its positive impact on the community. This can help build community support for future projects and encourage further engagement from stakeholders.

4. Including public outreach and opportunities for public to learn about project

As presented above under Item 3, the proposed project includes numerous opportunities for the public to learn about the project.

6.0 Project Budget

The budget associated with planning activities for a solar-powered brackish groundwater desalination plant in the Lower Rio Grande Valley region of southern New Mexico, including the funding plan, budget proposal, and budget narrative, is provided below.

6.1 Funding Plan

The non-Federal share of project costs will be funded by the grant applicant, OSE/ISC. These project costs to be provided by OSE/ISC include both monetary contributions towards the cost-share requirement and costs associated with the time expended for overall management and administration of the project by the OSE/ISC Project Manager, as well as contributions from OSE/ISC staff (Water Resources Specialist and Project Coordinator). We are requesting \$300,000 in matching Federal funds. Since no project funding to meet the cost sharing requirements is being provided by a source other than the OSE/ISC, no letters of funding commitment are required.

6.2 Budget Proposal

The total project cost for evaluating the feasibility of a solar-powered brackish groundwater desalination plant in the Lower Rio Grande Valley region of southern New Mexico is \$600,000. As shown in **Table 1**, there are two sources of funding for the project: the OSE/ISC and Reclamation. **Table 2** provides the total project cost, including information on the costs to be reimbursed with the requested Federal funding (from Reclamation) and the costs to be paid by the applicant (the OSE/ISC). **Table 3** provides a more detailed budget for the project.

Table 1. Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount
Non-Federal Entities	
1. New Mexico Interstate Stream Commission	\$300,000
Non-Federal Subtotal	\$300,000
Requested Reclamation Funding	\$300,000

Table 2. Summary of Total Project Cost

Source	Amount
Costs to be reimbursed with the requested Federal funding	\$300,000
Costs to be paid by the applicant	\$300,000
Value of third-party contributions	—
Total Project Cost	\$600,000

6.3 Budget Narrative

The following budget narrative provides a discussion of, or explanation for, items included in the budget proposal (Table 3).

Salaries and Wages. OSE/ISC costs will accrue only from staff salaries. No travel costs or indirect costs will be incurred. Salaries are for the Project Manager, a Water Resources Specialist, and a Project Coordinator. Costs by project task and unit rates (provided in parentheses to the right of each labor category) are shown in Table 3.

Table 3. Budget Proposal

Budget Item Description	Phase 1	Phase 2	Phase 3	Reporting & Meetings	Project Management	Total
Salaries and Wages						
Project Manager (\$60/hour)	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$100,000
Water Resources Specialist (\$40/hour)	--	\$10,000	\$10,000	--	--	\$20,000
Project Coordinator (\$30/hour)	--	--	--	\$5,000	\$5,000	\$10,000
Subtotal Salaries and Wages	\$20,000	\$30,000	\$30,000	\$25,000	\$25,000	\$130,000
Fringe Benefits						
-						
Equipment						
-						
Supplies and Materials						
-						
Contractors						
Water Resource Consultant						
Principal Geoscientist/Engineer (\$250/hour)	\$10,000	\$30,000	\$20,000	\$15,000	\$35,000	\$110,000
Senior Scientist/Engineer (\$220/hour)	--	\$60,000	\$40,000	--	--	\$100,000
Scientist/Engineer (\$165/hour)	\$30,000	\$60,000	\$50,000	--	--	\$140,000
Project Associate (\$155/hour)	\$20,000	\$80,000	\$20,000	--	--	\$120,000
Subtotal	\$60,000	\$230,000	\$130,000	\$15,000	\$35,000	\$470,000
Indirect Costs						
-						
Total Estimated Project Costs	\$80,000	\$260,000	\$160,000	\$40,000	\$60,000	\$600,000

Fringe Benefits. No separate fringe benefits are included.

Travel. There are no travel requirements for the project.

Equipment. There are no separate equipment costs.

Materials and Supplies. There are no separate costs for materials and supplies. All required materials and supplies are included under the “Contractors” line item in Table 3.

Contractual. The OSE/ISC will use the services of a water resource consultant to accomplish much of the project scope. Costs by project task and unit rates (provided in parentheses to the right of the contractor’s labor categories) are shown in Table 3. These costs were developed by a local consultant that has an existing working relationship with OSE/ISC.

Third-Party In-Kind Contributions. There are no third-party in-kind contributions.

Environmental and Regulatory Compliance Costs. There are no costs associated with environmental or regulatory compliance given that the project involves a feasibility study.

Other Expenses. There are no other expenses anticipated for the execution of this project.

Indirect Costs. There are no indirect costs that will be incurred on the project.

Total Costs. As shown in Tables 2 and 3, the total project cost is \$600,000. The Federal portion being requested is \$300,000, with OSE/ISC contributing the remaining \$300,000.

7.0 Environmental and Cultural Resources Compliance

Because the proposed project is a feasibility study, it does not involve any ground-disturbing activities that require environmental and/or cultural resources compliance.



8.0 Required Permits or Approvals

Because the proposed project is a feasibility study, no permits or approvals are required. Part of the work that we are proposing is to evaluate the necessary permits and approvals to ultimately develop the project. As part of the Phase II and Phase III feasibility analyses, we will evaluate and identify all necessary permits and approvals needed to potentially execute the project. Our deliverables for Phase II and Phase III will include a complete list of necessary permits and approvals, as well as identification of the primary steps that will be needed to acquire the permits, including any stakeholder outreach that may be necessary.

9.0 Letters of Support

Four letters of support from interested stakeholders that support the proposed project are provided on the following pages.

10.0 Overlap or Duplication of Effort Statement

This project has been carefully designed to augment, rather than duplicate or overlap with any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. Phase I will augment and add to existing work done by the State of New Mexico and others to refine the understanding of brackish groundwater as a potential water-supply source for southern New Mexico. As stated previously, Phases II and III of this project have the potential to significantly advance an ongoing Reclamation-funded feasibility study that is evaluating production of brackish groundwater from the Salt Basin and pipeline routes to the Lower Rio Grande Valley of New Mexico. The results of the project that is the subject of this grant application may contribute to the aforementioned ongoing study by identifying a feasible treatment option. However, as part of any brackish groundwater development that may occur in New Mexico, it will be important to determine the viability of a solar-powered brackish desalination plant, which this proposed project seeks to do.

11.0 Uniform Audit Reporting Statement

OSE/ISC did not expend \$750,000 or more in Federal award funds in fiscal year (FY) 2022. Accordingly, a Single Audit report for FY 2022 was not submitted through the Federal Audit Clearinghouse's Internet Data Entry System.

12.0 Conflict of Interest Disclosure Statement

OSE/ISC is not aware that any actual or potential conflict of interest exists at the time of this grant application submission.





LOWER RIO GRANDE Public Water Works Authority

325 Holguin Road

Vado, New Mexico 88072

(575) 233-5742

<http://LRGauthority.org>

February 21, 2023

RE: Letter of Support for NMISC Brackish Groundwater Desalination Feasibility Study

To Whom it May Concern:

The Lower Rio Grande Public Water Works Authority (LRGPWWA) stands in support of the New Mexico Interstate Stream Commission (NMISC) plan for improving the resiliency and reliability of the water supply for growing but disadvantaged areas in Dona Ana County, New Mexico by studying the feasibility of desalination of brackish groundwater from aquifers in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076.

The NMISC has provided us the following information about their project:

This area of Southern New Mexico is near the border of Texas, New Mexico, and Mexico and is subject to water shortage and stress due to growing population and border economic activity, aridification, diminishing local supplies, and conflicts between water users in the region.

Since this is a brackish groundwater development project, it is consistent with *Executive Order 14008: Tackling the Climate Crisis at Home and Abroad*, because the project focuses on increasing resilience to climate change and supporting climate-resilient development – groundwater is an inherently stable source of supply and responds slowly to changes in climate. This project is also consistent with the New Mexico Water Policy and Infrastructure Task Force report *Facing New Mexico's 21st Century Water Challenges*, which identified the core area of "Coping with the reality of climate change impacts". In addition, the Task Force report includes a key recommendation call to "Equip state agencies, especially the Office of the State Engineer (NMOSE), the NMISC, and the New Mexico Environment Department (NMED), to effectively address New Mexico's 21st Century emerging water security challenges and help New Mexicans across the state improve their water resilience and adaption to reduced water supplies." Funding of this project will help the State of New Mexico to reach this goal. The Task Force report goes on to state, under Recommendation 2.3, that the State should "increase water resilience by leveraging federal funds - particularly currently available federal funds - to ensure New Mexico's water infrastructure is modernized for 21st century needs.", which further supports funding this project.

The characterization work for the aquifers that will be characterized under this study adheres to one of the key recommendations of *Facing New Mexico's 21st Century Water Challenges*, namely to "Advance our scientific understanding of groundwater through measuring, monitoring, and models to protect the quantity and quality of groundwater resources." The foundational aquifer characterization work already completed to set the stage for this proposed feasibility study are supported by Task Force report Recommendations 2.8 and 3.1: "Advance scientific understanding and monitoring to support protection





of the quantity and quality of groundwater resources.” and “Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources.”

This project will also serve disadvantaged and underserved communities in rural Southern New Mexico (locally known as “colonias”, and includes areas such as Sunland Park, New Mexico) by providing water to local mutual domestic water providers who may have no other access to additional supply. This project will bring additional supply into the economically important Santa Teresa border area, which serves as an important border crossing point between the United States and Mexico. Future growth is expected in the region and thus additional water supply will be needed. It is also consistent with the Fort Bliss Resiliency Study for water, wastewater, and stormwater infrastructure being undertaken by El Paso Water and the United States Department of Defense.

The LRGPWVA is a regional water & wastewater utility created by the New Mexico Legislature in 2009 under New Mexico statute NMSA 1978 73-26-1 which provided for the merger of its initial five Mutual Domestic Water Consumers Associations (MDWCAs). With subsequent mergers and the acquisition of a small private system, the LRGPWVA now consists of twelve potable water systems and two wastewater collection systems in five separate Service Areas providing service to approximately 5,350 water connections in fourteen Colonias communities as designated by Doña Ana County under the HUD or USDA Rural Development Colonias definition.

The founders of the LRGPWVA recognized the need for “improving the resiliency and reliability of the water supply for (our) growing but disadvantaged areas” even prior to the initial merger of our first five MDWCAs as they began building interconnect pipelines to provide each other backup water supplies. Banding together and being joined by additional MDWCAs has allowed us to achieve tremendous benefits from the increased economies of scale and take strides in making those improvements. We clearly recognize the need for being prepared to utilize brackish water resources, but without the support and assistance of the State of New Mexico the high cost of developing this resource will keep it out of reach for our communities. Therefore, we urge the Bureau of Reclamation to provide funds for this proposed study.

Best regards,



Martin G. Lopez, General Manager





Camino Real Regional Utility Authority
PO Box 429 /4950 McNutt Rd
Sunland Park, NM 88063
Telephone: 575-589-1075 Fax: 575-589-1185

**Support for NMISC Brackish Groundwater Desalination Feasibility Study;
Notice of Funding Opportunity (NOFO) No. R23AS00076**

To Whom it May Concern:

On behalf of the Camino Real Regional Utility Authority (CRRUA), I want to express our support for the New Mexico Interstate Stream Commission's (ISC) feasibility study of desalination of brackish groundwater from aquifers in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076. This study seeks to improve the resiliency and reliability of the water supply for growing but disadvantaged areas in Doña Ana County, New Mexico. CRRUA provides water and wastewater service to the Sunland Park and Santa Teresa border region and recognizes that this and adjoining study areas greatly need additional water supply. These underserved areas suffer from water supply shortages, compounded by growing demand, due to population growth and economic development.

At present, CRRUA is working with the Border Industrial Authority and New Mexico State University on a desalination test project west of the CRRUA service area. The ISC's project would greatly advance the ongoing efforts and provide much needed additional benefits. The proposed project is consistent with *Executive Order 14008: Tackling the Climate Crisis at Home and Abroad*, because the project focuses on increasing resiliency to climate change and supporting climate-resilient development, given that groundwater is an inherently stable source of supply and responds slowly to changes in climate. This project is also consistent with the New Mexico Water Policy and Infrastructure Task Force report *Facing New Mexico's 21st Century Water Challenges*, which identified the core area of "Coping with the reality of climate change impacts".

This project will bring additional supply into the economically important Santa Teresa border area, which serves as an important border crossing point between the United States and Mexico. Future growth is expected in the region and thus additional water supply will be needed. It is also consistent with the Fort Bliss Resiliency Study for water, wastewater, and stormwater infrastructure being undertaken by El Paso Water and the United States Department of Defense. The project will also serve disadvantaged and underserved communities in the area by providing water to local mutual domestic water providers who may have no other access to additional supply.





We appreciate your attention to the ISC funding application and request your support.

Respectfully

Brent Westmoreland

Brent Westmoreland (Feb 22, 2023 16:46 MST)

Brent Westmoreland
Executive Director

Support for NMISC-Notice of Funding Letter
Final Audit Report 2023-02-22

Created:	2023-02-22
By:	Mary DeAvila (maryd@donaasacounty.org)
Status:	Signed
Transaction ID:	CBJCHBCAABAAT5rA5eCwgPupN2JF4Mxh7Pa2.dtm7G

"Support for NMISC-Notice of Funding Letter" History

- Document created by Mary DeAvila (maryd@donaasacounty.org)
2023-02-22 - 11:30:12 PM GMT
- Document emailed to brentw@donaasacounty.org for signature
2023-02-22 - 11:32:26 PM GMT
- Email viewed by brentw@donaasacounty.org
2023-02-22 - 11:34:43 PM GMT
- Signer brentw@donaasacounty.org entered name at signing as Brent Westmoreland
2023-02-22 - 11:46:05 PM GMT
- Document e-signed by Brent Westmoreland (brentw@donaasacounty.org)
Signature Date: 2023-02-22 - 11:46:07 PM GMT - Time Source: server
- Agreement completed.
2023-02-22 - 11:46:07 PM GMT

Adobe Acrobat Sign





New Mexico
Desalination
Association

www.nmdesal.com
7500 Jefferson NE
Albuquerque, NM 87109

VIA EMAIL

Mr. John Longworth, PE
Director
New Mexico Interstate Stream Commission
PO Box 25102
Santa Fe, NM 87504-5102

**RE: USBR Notice of Funding Opportunity
R23AS00076**

Dear Mr. Longworth:

We support the New Mexico Interstate Stream Commission (NMISC) plan for improving the resiliency and reliability of the water supply for growing but disadvantaged areas in Dona Ana County, New Mexico by studying the feasibility of desalination of brackish groundwater from aquifers in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076. This area of Southern New Mexico is near the border of Texas, New Mexico, and Mexico and is subject to water shortage and stress due to growing population, border economic activity, aridification, diminishing local supplies, and conflict between regional water users.

As a brackish groundwater development project, it is consistent with *Executive Order 14008: Tackling the Climate Crisis at Home and Abroad*, because the project focuses on increasing resilience to climate change and supporting climate-resilient development. Groundwater is an inherently stable source of supply and responds slowly to changes in climate. This project is also consistent with the New Mexico Water Policy and Infrastructure Task Force report *Facing New Mexico's 21st Century Water Challenges*, which identified the core area of "Coping with the reality of climate change impacts". In addition, the Task Force report includes a key recommendation call to "Equip state agencies, especially the Office of the State Engineer (NMOSE), the NMISC, and the New Mexico Environment Department (NMED), to effectively address New Mexico's 21st Century emerging water security challenges and help New Mexicans across the state improve their water resilience and adaption to reduced water supplies." Funding of this project will help the State of New Mexico to reach this goal. The Task Force report goes on to state, under Recommendation 2.3, that New Mexico should "Increase water resilience by leveraging federal funds - particularly currently available federal funds - to ensure New Mexico's water infrastructure is modernized for 21st century needs.", which further supports funding this project.

The characterization work for the aquifers that will be characterized under this study adheres to one of the key recommendations of *Facing New Mexico's 21st Century Water Challenges*, namely to "Advance our scientific understanding of groundwater through measuring, monitoring, and models to protect the quantity and quality of groundwater resources." The foundational aquifer characterization work already completed to set the stage for this proposed feasibility study are supported by Task Force report Recommendations 2.8 and 3.1: "Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources." and "Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources."





John Longworth, PE
February 27, 2023
Page 2

This project will also serve disadvantaged and underserved communities in rural Southern New Mexico (locally known as "colonias", and includes areas such as Sunland Park, New Mexico) by providing water to local mutual domestic water providers who may have no other access to additional supply. This project will bring additional supply into the economically important Santa Teresa border area, which serves as an important border crossing point between the United States and Mexico. Future growth is expected in the region and thus additional water supply will be needed. It is also consistent with the Fort Bliss Resiliency Study for water, wastewater, and stormwater infrastructure being undertaken by El Paso Water and the United States Department of Defense.

Respectfully yours,
New Mexico Desalination Association

By: Charles S. Leder, PE
President

cc: John D'Antonio, PE





Elephant Butte Irrigation District

Office of Treasurer-Manager
530 S Melendres
Las Cruces, NM 88005
575-526-6671
www.ebid-nm.org

February 27, 2023

Bureau of Reclamation
c/o Jennifer A Faler or other appropriate designee
555 Broadway Blvd, NE, Ste 100
Albuquerque, NM 87102

Letter of Support for NMISC Brackish Groundwater Desalination Feasibility Study

To Whom it May Concern:

The Elephant Butte Irrigation District supports the New Mexico Interstate Stream Commission (NMISC) in its general plans for improving the resiliency and reliability of the water supply for growing but disadvantaged areas in Dona Ana County, New Mexico by studying the feasibility of desalination of brackish groundwater from aquifers in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076. This area of Southern New Mexico is near the border of Texas, New Mexico, and Mexico and is subject to water shortage and stress due to growing population and border economic activity, aridification, diminishing local supplies, and conflict between regional water users.

EBID has long advocated for a more stable source of supply for border industrial and community growth as a mechanism for relieving the pressure on the dwindling Rio Grande supply. Since this is a brackish groundwater development project, it is consistent with Executive Order 14008: Tackling the Climate Crisis at Home and Abroad, because the project focuses on increasing resilience to climate change and supporting climate-resilient development – groundwater is an inherently more stable source of supply and responds slowly to changes in climate. Not only does EBID view this project as consistent with its own objectives, it understands this project to be consistent with multiple ongoing federal objectives across multiple agencies.

Further consistent with EBID's long term vision, this project will also serve disadvantaged and underserved communities in rural Southern New Mexico (locally known as "colonias", and includes areas such as Sunland Park, New Mexico) by providing water to local mutual domestic water providers who may have no other access to additional supply. This project will bring additional supply into the economically important Santa Teresa border area, which serves as an important border crossing point between the United States and Mexico. Future growth is expected in the region and thus additional water supply will be needed.

More comprehensive and multi-dimensional planning such as this project combined with others currently proposed by EBID will ensure the future viability of the Lower Rio Grande and all of its components (agriculture, municipal, industrial, etc). EBID encourages BOR to support this project through funding or otherwise. Please do not hesitate to contact me with any questions regarding our support.

Sincerely,
[Signature]
R. Patrick Sullivan, Ph.D
EBID Treasurer – Manager





6420 Canterbury NE
Albuquerque NM 87117

575 · 571 · 8166
jpkng@kingengr.com

February 27, 2023

To: Jennifer Faler (or other appropriate Designee)
United States Bureau of Reclamation

Thru: John Longworth, New Mexico Interstate Stream Commission/Office of the State Engineer

Re: New Mexico Interstate Stream Commission proposal for Brackish Water Desalination planning

To Whom it May Concern:

In addition to the letter of support the Elephant Butte Irrigation District provided for this proposed project, EBID has asked me to provide a separate letter of support to address matters I am personally aware of related to the importance of this project. As EBID's primary Engineering Contractor, I am intimately familiar with all of EBID's ongoing projects, and others I've worked on through other professional associations. As a general matter, the New Mexico Interstate Stream Commission's plans for improving the resiliency and reliability of the water supply for growing but disadvantaged areas in Dona Ana County, New Mexico by studying the feasibility of desalination of brackish groundwater from aquifers in New Mexico under the Bureau of Reclamation (Reclamation) Notice of Funding Opportunity (NOFO) No. R23AS00076 is a project that should be supported by all government at all levels. In this letter, I point to areas of State governance and planning goals this particular project is consistent with, in addition to those reasons EBID points to as support.

This project is consistent with the New Mexico Water Policy and Infrastructure Task Force report Facing New Mexico's 21st Century Water Challenges, which identified the core area of "Coping with the reality of climate change impacts". As a designee of the State Engineer, I sat on this Task Force and assisted with development of its objectives. I am familiar with all the reasons that Task Force made its recommendations and am confident this project is the type they had in mind when making those recommendations. The Task Force report includes a key recommendation call to "Equip state agencies, especially the Office of the State Engineer (NMOSE), the NMISC, and the New Mexico Environment Department (NMED), to effectively address New Mexico's 21st Century emerging water security challenges and help New Mexicans across the state improve their water resilience and adaption to reduced water supplies." Funding of this project will help the State of New Mexico to reach this goal. The Task Force report goes on to state, under Recommendation 2.3, that the State should "Increase water resilience by leveraging federal funds - particularly currently available federal funds - to ensure New Mexico's water infrastructure is modernized for 21st century needs.", which further supports funding this project.





The characterization work for the aquifers that will be characterized under this study adheres to one of the key recommendations of Facing New Mexico's 21st Century Water Challenges, namely to "Advance our scientific understanding of groundwater through measuring, monitoring, and models to protect the quantity and quality of groundwater resources." The foundational aquifer characterization work already completed to set the stage for this proposed feasibility study are supported by Task Force report Recommendations 2.8 and 3.1: "Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources." and "Advance scientific understanding and monitoring to support protection of the quantity and quality of groundwater resources."

In my role as a Professor, and now retired Professor at New Mexico State University, I have conducted multiple research projects investigating the potential for a brackish groundwater desalination plant in the border region of the Mesilla Aquifer system near Santa Teresa with funding from Reclamation. My colleagues and I have focused primarily on treatment and disposal alternatives for brackish groundwater in the area, which have been well developed in our work.

In parallel, Dr. John Hawley et. al. have completed New Mexico Water Resources Research Institute's Technical Completion Report 363, titled *Hydrologic Framework of the Mesilla Basin Region of New Mexico, Texas, and Chihuahua (Mexico) – Advances in Conceptual and Digital Model Development*. This report, whose publication is imminent, provides a thorough compilation of existing hydrogeological investigations in the border area of the Mesilla/Conejos-Medanos basin, and develops a more detailed mapping and interpretation of the groundwater resources in the area.

Planning and hydrogeological exploration aimed specifically at brackish groundwater treatment and use are the next logical steps in the development of the use of this valuable resource in the border region, and this proposal will continue our past efforts toward that goal.

For all the foregoing reasons, including those put forward by EBID, we support this project and ask the BOR to do the same.

Sincerely,

J. Phillip King, PE, Ph.D.





13.0 References Cited in Technical Proposal

- S.S. Papadopoulos & Associates, 2022. Draft Technical Memorandum for Groundwater Development Feasibility of the Salt Basin. Prepared for the New Mexico Interstate Stream Commission.
- Graham, J., 2015. Brackish and Saline Groundwater in New Mexico. New Mexico Earth Matters, Summer 2015. [Brackish and Saline Groundwater in New Mexico \(nmt.edu\)](#)
- New Mexico Bureau of Geology and Mineral Resources, ongoing. New Mexico: Regional Brackish Water Assessments. - [AMP - Brackish water assessments in New Mexico \(nmt.edu\)](#).
- United States Government, 2022. Climate and Economic Justice Screening Tool. [Explore the map - Climate & Economic Justice Screening Tool \(geoplatform.gov\)](#)
- New Mexico Interstate Stream Commission, 2017. Lower Rio Grande Regional Water Plan. https://www.ose.state.nm.us/Planning/documents/Reg11_LowerRioGrande_RegionalWaterPlan2017.pdf
- El Paso Water – Public Service Board, 2022. Request for Submittals, Fort Bliss Resiliency Study for Water, Wastewater, and Stormwater Infrastructure. RFS 114-22. October 4, 2022.
- US Bureau of Reclamation (Reclamation), 2013. The Bureau of Reclamation's Sustainable Energy Strategy, Fiscal Year 2013-2017. June 2013. [Bureau of Reclamation Sustainable Energy Strategy \(usbr.gov\)](#)
- NMISC and Reclamation, 2019. Memorandum of Understanding between the New Mexico Interstate Stream Commission and the U.S. Bureau of Reclamation – Albuquerque Area Office. Partnership for the New Mexico Salt Basin Assessment & Development Study. Executed July 2019.
- AWWA, 2019. Manual of Water Supply Practices - M69. Inland Desalination and Concentrate Management.
- State of New Mexico, 2020. A Strategic Plan for Investment in New Mexico Renewable Energy. November 2020. [2020 11 24 -Approved-Renewable-Energy-Plan.pdf \(state.nm.us\)](#)
- US Bureau of Reclamation (Reclamation), 2021. 2021 SECURE Water Act Report. <https://www.usbr.gov/climate/secure/docs/2021secure/2021SECUREREport.pdf>
- Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government - The White House
- Executive Order on Tackling the Climate Crisis at Home and Abroad - The White House

