ENHANCING CLIMATE RESILIENCE: THE CASTO AND DRY SPRINGS TREATMENT PLANT PROJECT

Notice of Funding Opportunity No. R25AS00013

WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025

JORDAN VALLEY WATER
CONSERVANCY DISTRICT

8215 S. 1300 W., West Jordan, UT, 84088

Project Manager: Conor Tyson

8215 S. 1300 W., West Jordan, UT, 84088 | (801) 565 4304 | conort@jvwcd.org

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D.2.2.2. Technical Proposal

D.2.2.2.1 Executive Summary

Applicant name, city, county, and state and a brief explanation of how you meet the applicant eligibility requirements

Jordan Valley Water Conservancy District (JVWCD) is pleased to submit this grant application for the Bureau of Reclamation's (BOR) **WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025 (No. R25AS00013)** for the Casto and Dry Springs Water Treatment Plant Construction Project (Casto Springs Project). JVWCD is located in West Jordan, UT, and supplies both wholesale and retail culinary water across Salt Lake County.

The Task Area you are applying under and what funding group

JVWCD is applying for Task A – Increasing Reliability of Water Supplies through Infrastructure Improvements. The Casto Springs Project proposes a new treatment facility, which will treat the water of Casto and Dry Creek Springs for use in JVWCD's distribution system. **JVWCD is applying under Funding Group II**.

Indicate whether you are a Category A or Category B applicant

JVWCD is a Category A applicant. JVWCD meets the eligibility criteria as a water district located in the State of Utah.

A one-paragraph project summary

JVWCD, a wholesale and retail water provider in Salt Lake County, will build a treatment plant in Holladay, Utah capable of treating 5 million gallons per day (MGD) from Casto and Dry Creek Springs. The springs are not currently in use for culinary water supply and adding this water source will increase our resilience to climate driven shortages in surface water by 1) adding to our groundwater supply capacity that can be used in a drought year and 2) allowing area groundwater wells to rest more during wet years. Utah is the second driest state in the nation and has experienced moderate to extreme drought conditions for the past seven out of ten years. During times of drought, JVWCD is reliant on groundwater to meet demand. This project will allow for a stronger recovery of our aquifer storage during wet years. This project has been prioritized in JVWCD's official Drought Contingency Plan as well as in its 10-year Capital Projects Plan.

Length of time and estimated completion date for the proposed project

This Project commenced in the spring of 2024 with a water quality study. Project design is expected between December 2025 and September 2026. Construction will begin December 2026 with an estimated completion date of January 2028.

Federal facility/lands

Work for the proposed project will not take place on a Federal facility or Federal lands.

Relevant background information about the applicant

JVWCD is a wholesale and retail water provider in Salt Lake County, UT. It is a political subdivision of the State of Utah and one of the largest water districts in the state, serving water to more than 775,000 people (roughly one quarter of Utah's population). Much of the water delivered by JVWCD is transported by the Jordan Aqueduct, a 72-inch, 40-mile pipeline owned by BOR and operated by JVWCD.

Water use in Salt Lake County is primarily municipal and industrial (M&I). Agricultural use within the county has declined from 16,030 acres of irrigated land in 1987 to 2,213 acres of irrigated land in 2022[1]. This decline is expected to continue.

JVWCD supplies approximately 65% of the M&I water within its service area, while its 17 member agencies supply the remaining 35%. Most of the agricultural water use within JVWCD's service area is delivered by private irrigation companies that divert water from the Jordan River near the Salt Lake County and Utah County border.

Details regarding water supplies

JVWCD has a diverse portfolio of water resources it uses to deliver drinking water supplies to its wholesale member agencies and retail customers. The water resources include Central Utah Project (Jordanelle Storage), Provo River Project (Deer Creek Storage), Provo River unstored flows, Salt Lake Valley high quality groundwater[2], local unstored mountain streams, purchased Central Water Project, and Southwest Groundwater Project (low quality groundwater with reverse osmosis treatment). JVWCD conjunctively manages its surface and groundwater supplies, reducing groundwater production during normal precipitation years and increasing groundwater production during drought years. **Exhibit 1** shows the general water supply utilization strategy employed by JVWCD.

Year	Surface Water Total (acre-feet)*	Agency Groundwater (acre-feet)	Recycled M&I Water (acre-feet)	Other (acre-feet)	Total
2014	83,760.40	7,360.33	0	968.14	92,088.87
2015	79,299.77	5,950.73	0	933.05	86,183.55
2016	71,242.40	13,303.89	0	1,021.73	85,568.02
2017	79,767.59	10,014.96	0	965.90	90,748.45
2018	83,555.37	7,762.57	0	1,011.77	92,329.71
2019	79,168.57	8,056.82	0	1,250.49	88,475.88
2020	111,570.72	7,133.39	0	1,119.00	119,823.11
2021	84,600.14	16,747.80	0	1,191.87	102,539.80
2022	87,020.66	15,908.06	0	844.41	103,773.13
2023	98,402.75	5,203.94	0	879.97	104,486.66
Total Average Annual Water Supply for 2014-2023 in AFY =					**858,388**
Average Annual Water Supply = 85,839 acre-feet (Divide Total Supplies for 2014-2023 above by 10)					
*Include water transfers and exchanges that occur on a long-term basis. Exclude single year transfers					

Exhibit 1. JVWCD General Water Supply

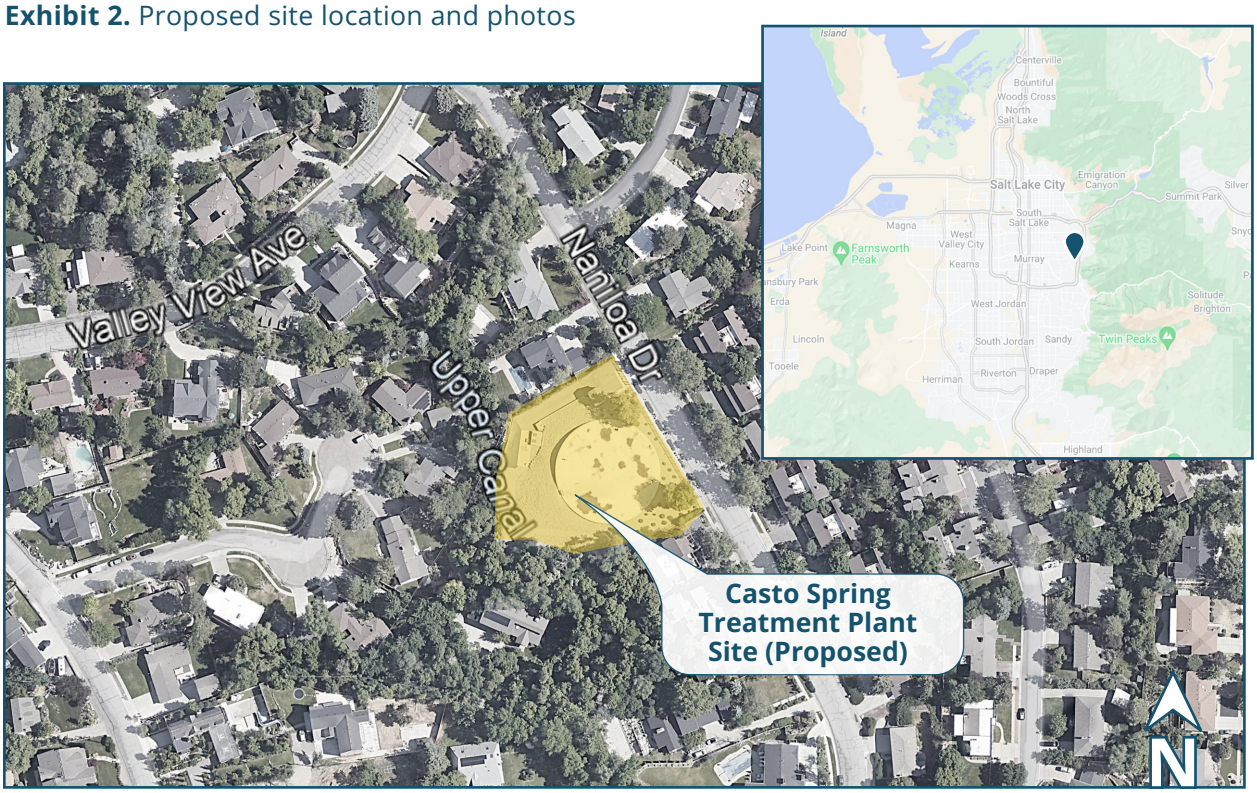
Project Location

The Casto Springs Project is located in Salt Lake County, UT within the town of Holladay. The project coordinates are 40°39'56.09"N, 111°48'38.52"W. See **Exhibit 2** (following page) for the location of the project and site photos.

1 USDA. 2022 Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Utah/st49_2_001_001.pdf (accessed 08/13/24)

2 High quality groundwater does not require any treatment before introduction into JVWCD distribution system other than fluoride and chlorine to maintain an adequate chlorine residual in the system

Exhibit 2. Proposed site location and photos




Standing in northeast corner looking southwest


Standing in northwest corner looking south


Standing in southwest corner looking north


Standing on south end looking northeast

Project Description

The primary objective of this project is to ensure the reliable delivery of safe, high-quality drinking water to our customers, especially during periods of drought.

The new treatment plant will treat up to 5 MGD of water. The treatment processes in the plant will be compartmentalized to allow the plant to run at lower flows, maintaining operation whenever there are sufficient minimum flows. This process will produce high quality water at a high elevation point in the distribution system allowing greater operation flexibility. The highest flows will be during the early irrigation season (April to June), allowing well operations to be delayed and increasing water availability for groundwater injection.

The specific objectives include:

- Increasing system resiliency and reliability
- Optimizing operational efficiency
- Enhancing data-driven decision making

The project's technical components, which will help us meet our objectives are:

- Water Quality Evaluation: The project's initial phase involves a water quality evaluation including measuring particle counts, turbidity levels, conductivity, pH, hardness, and microbial levels. The data obtained during this phase will serve as a baseline for determining the necessary treatment processes.
- Treatment Plant Design: The treatment plant design will prioritize the production of high-quality water, worker safety, and operational efficiency. This will include the construction of a new building for housing the water treatment process, necessitating geotechnical analysis and structural design.
- Treatment Processes: The treatment plant will incorporate several essential components, including a pre-filter system to remove larger particles from the water and extend the lifespan of downstream equipment. The main filtration system will comprise ultrafiltration, cartridge filters, or other suitable techniques identified during the study. The treatment process will also encompass UV or chlorine disinfection.
- Chemical Feed System: An existing building will be repurposed to house the chemical feed system, which will include chlorine injection for residual disinfection and fluoride injection to meet county requirements.
- Water Quality Monitoring: Water quality monitoring instruments will assess raw water from the springs before treatment and ensure the treated water meets JVWCD's quality standards. This monitoring system will provide real-time data to guide operational adjustments as needed.
- Piping and Flow Management: The project's piping system will transport raw water to the treatment plant, allow for water diversion when necessary (e.g., during non-operational periods or when incoming water exceeds capacity), and direct the finished water into the JVWCD distribution system. Flow meters will be employed to measure both raw water and treated water, ensuring precise control and management of the water supply.

Preliminary technical drawings of the site plan and process drawings are shown on the following pages as **Exhibits 3 and 4**, respectively.

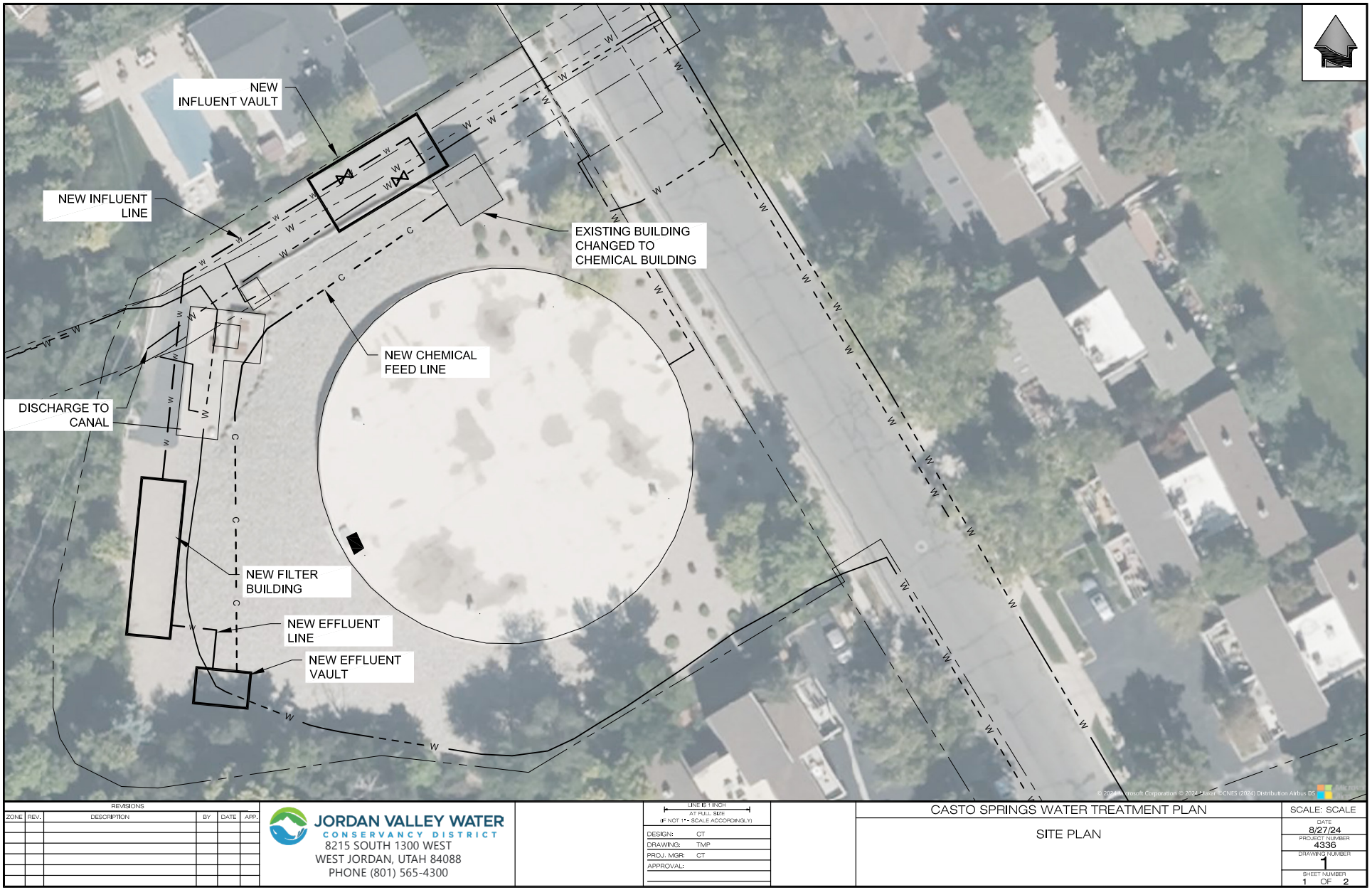


Exhibit 3. Site plan

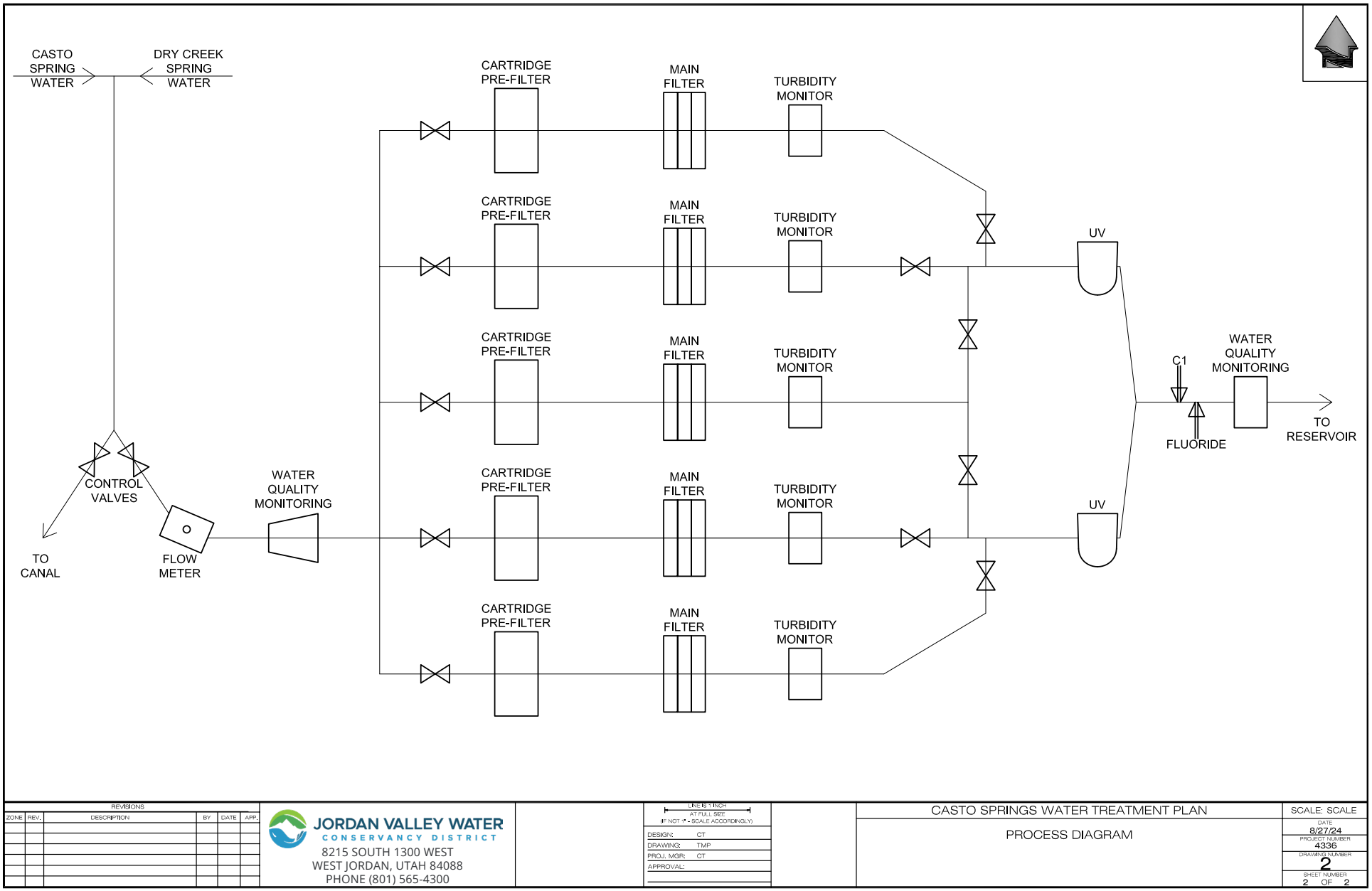


Exhibit 4. Process Diagram

D.2.2.2.2 Evaluation Criteria

E.1.1 Evaluation Criterion A. Severity of Drought or Water Scarcity and Impacts

Recent, existing, or potential drought conditions in the project area

Utah is a semi-arid state, the second driest in the nation. Over the past 128 years, there have been seven periods of extended drought within Salt Lake County, where 80 percent of Utah's population lives (**Exhibit 5**[3]).

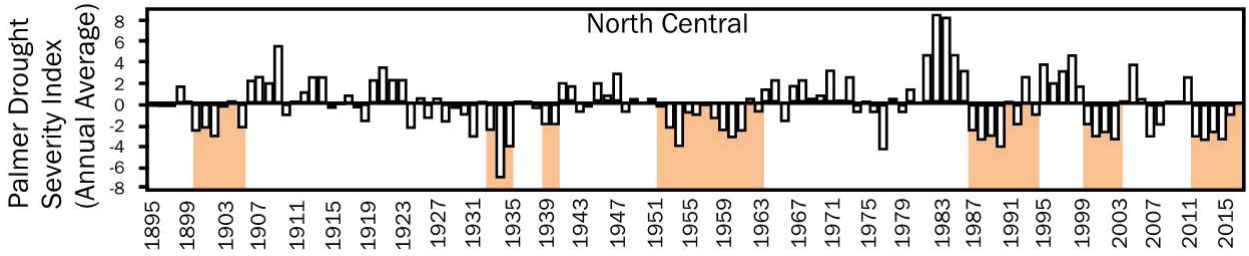


Exhibit 5. North Central Utah Palmer drought severity index.

The chart below (**Exhibit 6**) highlights drought patterns from recent years, including D4 (Exceptional Drought) conditions that have been accompanied by widespread crop failures and water emergencies[4].

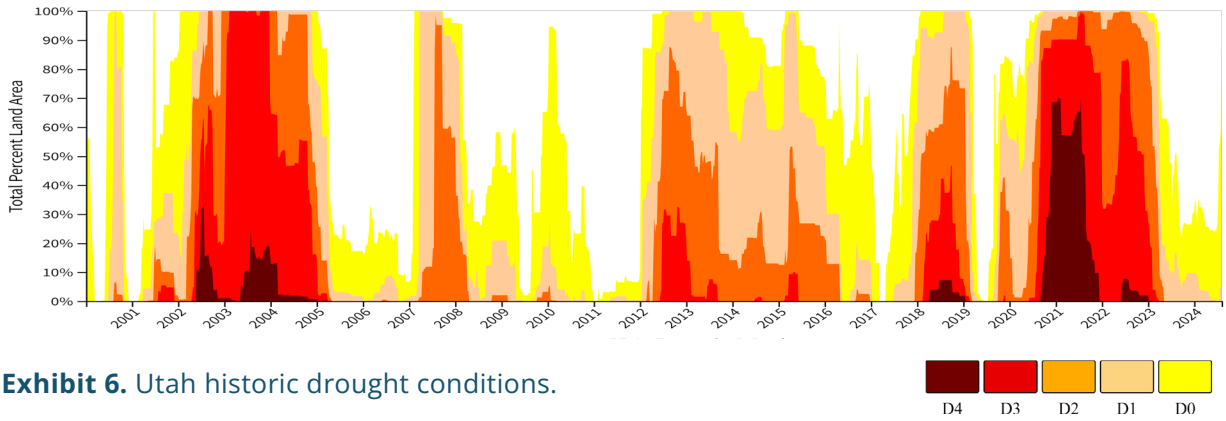


Exhibit 6. Utah historic drought conditions.

Given Utah's climate history as well as projected climate changes, the length and intensity of droughts is expected to increase[5] .

While previous drought periods have created significant public-health risks that have threatened state economic growth and placed restrictions on agricultural users and recreational activities, future impacts are expected to be even more severe.

3 Recreated and adapted from original figure provided at https://hazards.utah.gov/wp-content/uploads/Utah-SHMP-Ch6-Drought.pdf (accessed 08/13/24)

4 US Drought Monitor – Time Series. https://www.drought.gov/states/utah (accessed 08/13/24)

5 IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-33, doi:10.1017/9781009325844.001. (Accessed 09/25/24).

A significant risk associated with the anticipation of more frequent droughts occurring shortly after one another, is the inability of reservoirs to recharge between dry periods. **Exhibit 7** outlines some of the drought impacts that may be experienced within JVWCD's service area across multiple sectors. Additional impacts are outlined below.

Table 4-5. Drought Impacts Across Sectors

Risk Factor and Drought Impact	M&I	Environmental	Agriculture	Recreation
Dry Year Supply Limitations				
Supply limitations due to in-stream flow requirements	x	x	x	x
Groundwater production capacity limitations and supply reduction	x		x	
Climate Change				
Early runoff pattern	x	x	x	x
Reduced reservoir levels	x	x	x	x
Reduced stream flows	x	x	x	x
Increased evapotranspiration	x	x	x	x
Regulatory, environmental, and water rights constraints				
Reduction of contracted water exchanges	x		x	
Increased State and Federal regulation on supply sources to support environmental flows	x	x	x	x
Cost constraints and affordability				
Rising water rates	x		x	
Source water quality degradation				
Water quality impacts from anthropogenic sources (chemical spill, urbanization)	x	x	x	x
Water quality impacts from wildfires	x	x		
Increased occurrence of algal blooms and algae by-products	x	x	x	x
Increased nutrient levels	x	x	x	
Increased water temperatures	x	x		x
Asset/Facility Susceptibility to Disruption				
Asset damage from seismic events	x		x	x
Asset failure due to aging infrastructure	x		x	

Exhibit 7. Table from JVWCD's DCP, discussing the impacts risks of future drought conditions.

Water Quality: In 2016, after several years of drought conditions that started in 2012, Utah Lake dropped to levels causing the Utah State Engineer to prohibit diversions of more than 100,000 acre-feet of junior water right holders in Utah Lake. The low water levels also intensified a wide-spread algal bloom in Utah Lake, prompting public health advisories. Declining water levels and algal blooms caused by drought conditions are a chronic issue that may become worse as droughts intensify.

Premature snowmelt: Premature snowmelt resulting in inefficient conversion of snowmelt runoff to reservoir inflow occurred between 2000-2004 during a drought that affected most Utah watersheds. This is an example of what could be expected to continue with increasing temperatures. Other impacts include potential increase in the rate of evapotranspiration due to increased temperatures, shifting timelines for snow runoff, as well as an increase in the intensity of rainfall events.

Water Availability: The M&I sector relies on each water source in the JVWCD portfolio, and the various assets used to store, convey, or treat the water. Any form of disruption to these sources can heavily impact this sector.

Agricultural: Groups within this sector rely on quality water, free of high salinity concentrations or toxic algae byproducts. Impacts to the water quality due to drought can quickly interrupt water sources that this sector relies on. The previously mentioned 2016 algal blooms in Utah Lake that prompted secondary water systems to shut down are an example of this.

Without the ability to use these secondary water systems, this sector's demand on the JVWCD system increased. These events can trigger further economic hardship to agriculture groups due to raising water rates or loss of agricultural products and income.

Recreation: Many of JVWCD's water sources and reservoirs are home to various recreational interests including bird watching, fishing, sailing, swimming, kayaking, hunting, and water skiing. Reservoir levels and river levels are reduced during times of drought, which can limit recreational activities. Additionally, degraded water quality may cause recreation area closures to protect public health. Recreational closures already regularly occur due to harmful algae blooms. The Utah Department of Environmental Quality has established a recreational water monitoring program to facilitate recreational closures and protect the public.

What are the ongoing or potential drought or water scarcity impacts to specific sectors in the project area if no action is taken and how severe are those impacts?

Without action to develop new water sources such as the Casto Springs Treatment Plant, the project area faces significant risks of water scarcity, particularly during periods of extreme drought. Over-reliance on deep well groundwater will lead to declining groundwater levels, making water extraction more difficult and costly due to increased energy requirements for pumping from deeper aquifers. This unsustainable groundwater usage threatens the long-term viability of the water supply for the region.

Additionally, the local economy, especially sectors dependent on consistent water availability such as landscaping, agriculture, and recreation, will be vulnerable to negative impacts. In the event of extreme drought, insufficient water for irrigation may result in economic losses due to damaged landscaping and reduced recreational activity. The Casto Springs Treatment Plant, along with other self-funded new water supply projects, is crucial to mitigating these risks by providing an alternative water source and enhancing overall system resilience. These efforts are essential for ensuring the sustainability and economic stability of the region.

E.1.2 Evaluation Criterion B. Project Benefits

E.1.2.1 Sub-criterion B1. Project Benefits (Tasks A, B, and D Only)

What is the estimated quantity of additional supply the project will provide and how was this estimate calculated? Provide this quantity in acre-feet per year as the average annual benefit over ten years.

This project is estimated to be able to provide an average annual volume of water of 1500 acre-feet. This amount will vary greatly by year depending on the amount of water flowing in the springs. In wet years, this could increase to about 2200 acre-feet, while in dryer years this could be about 750 acre-feet. This was calculated by looking at historical flows in average years, dry years, and wet years, and then calculating how much of the total water would be captured with a 5 MGD treatment facility.

What percentage of the total water supply does the additional water supply represent? How was this estimate calculated?

The system will be designed to treat a maximum flow of 5 MGD, which is about 3% of JVWCD peak daily demands. This project will increase average annual yield to the JVWCD system by about 1500 acre-feet per year. This represents about 1.7% of the JVWCD annual yield from all sources. This estimate was calculated by looking at measured flow over multiple years at the springs (see **Exhibit 8**). Currently, flows are recorded by visual inspections performed multiple times each month.

Total Project Water Yield in AFY	1,500
Average Annual Water Supply in AFY (from Table in Section D.2.2.2 Technical Proposal, Executive Summary)	85,839
Percentage Yield (Divide Total Project Water Yield by Average Annual Water Supply)	1.7%

Exhibit 8. Percent of total water supply

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits?

Water supply shortages during drought can occur in two ways. Either source water yields are lower than annual water demand, or supply production capacity is lower than the peak day maximum demand. The proposed project builds long-term drought resiliency for JVWCD's service area by mitigating impacts of both types of water supply shortages.

First, treating the water from Casto and Dry Creek Springs will increase JVWCD's ability to meet water demands during the early irrigation season, allowing the District to store runoff from other sources for later in the season. It will also reduce well pumping during wet years, by 1000 to 1500 acre-feet, resting the aquifer for greater extractions during drought years. During drought years, the springs will still produce about 500 to 800 acre-feet of water, lowering well extraction in these years by 350 to 550 acre feet.

Second, adding this additional source increases our total system production capacity from a source that is not subject to reduction due to surface water shortages. Additionally, since the Casto and Dry Creek Springs are not connected to other water sources, adding this new

water source to the system will not negatively impact any other existing water sources (i.e. will not deplete the deep aquifer or take water from other reservoirs).

The project is expected to provide these benefits for the lifetime of the treatment facility (approximately 50+ years).

Provide a qualitative description of the degree/significance of anticipated water management benefits.

Additional drought resilient source options will reduce reliance on JVWCD's Central Utah Project and Provo River Water Sources during drought. Because the Central Utah Project currently makes up 40% of JVWCD's supply portfolio, the water provided through this project will contribute significantly to reducing JVWCD's vulnerability to drought.

The project will improve the District's conjunctive management of surface and groundwater resources by reducing well pumping up to 1500 acre-feet per year when surface water runoff is abundant. It will also facilitate increased utilization of existing JVWCD artificial groundwater recharge facilities.

How will the project supply help buffer against water shortages, reduce the need for emergency responses, and enhance the resilience of water systems?

The Project is designed to enhance JVWCD's resilience to water shortages by tapping into previously unused spring water sources, adding an estimated 1500 acre-feet of water per year to the District's supply, which is crucial for meeting demand during drought conditions. This additional source will help reduce reliance on groundwater pumping, allowing aquifers to recharge during wet years and providing a buffer against water shortages during dry periods.

Furthermore, the project's ability to treat up to 5 MGD will ensure that even during peak demand periods, such as the early irrigation season, JVWCD can meet water needs without overtaxing existing resources. This will be especially crucial during emergency response situations, since JVWCD provides water to hydrants and hospitals throughout Salt Lake Valley.

E.1.2.2 Sub-Criterion B.2. Project Benefits (Task C Only)

N/A

E.1.2.3 Sub-Criterion B.3. Additional Project Benefits (All Tasks)

Sub-Criterion B.3.a: Climate Change

According to BOR's 2021 SECURE Water Act Report, "[watershed] basins throughout the West are projected to experience increasing temperatures, snowpack declines, and earlier seasonal peak runoff. The magnitude of impacts becomes greater with time and varies based on location.[6]" JVWCD's storage reservoirs are sized based on historic snowpack levels and rely on snowpack to ensure they are filled gradually during spring runoff. As the climate warms and more precipitation falls as rain, JVWCD's reservoirs may not reach optimal levels, even in relatively high water years, which can further stress the supply in low water years. The Casto Springs Project helps to keep the water stored in the reservoirs for use in drier years.

6 Reclamation (Bureau of Reclamation) 2021. Water Reliability in the West - 2021 SECURE Water Act Report. Prepared for the United States Congress. Bureau of Reclamation, Water Resources and Planning Office. Denver, Colorado

The report also recognizes that turfgrass is one of the largest irrigated crops in the urban US, and its future water demand is expected to increase significantly due to climate change. By the 2080s, evapotranspiration is projected to increase by 8% to 36%, and irrigation water requirements per acre by 9% to 54%, driven mainly by higher temperatures and longer growing seasons. JVWCD is making significant investments to reduce water use including providing incentives to reduce turfgrass within its service area, however it is important to develop a resilient supply such as the Casto Springs project to meet the increased demand and longer growing seasons.

Additionally, the Casto Springs Project will reduce the District's reliance on pumped well water, which uses a significant amount of electricity. Because the Casto Springs is located at an elevation that can feed by gravity into JVWCD's system (no pumping), it is estimated that the District will save approximately 574,000 kw-hours per year by replacing groundwater well production with the annual Casto Springs production. Since energy in Utah is primarily derived from non-renewable resources (coal (36.1%) and natural gas (22.4%)[7]), reducing the District's electric footprint will reduce air pollution in the Salt Lake Valley and contribute to climate change resiliency by eliminating 401 tons of CO_2 emitted per year. **Appendix A** includes a report from Rocky Mountain Power (RMP) that details the energy savings. RMP also included a cash incentive estimate, however JVWCD is not including it as a cost-share since the incentive has not yet been finalized.

Sub-Criterion B.3.b. Ecological Benefits

The lower Provo River is designated as a critical habitat for the June Sucker, an endangered species endemic to Utah Lake. Current recovery projects for this species are closely related to the water quality, quantity, and hydrology of Utah Lake and its tributaries. When surface water supplies are strained during drought, habitats and natural life cycles can be damaged. Water quality degradation due to drought can also cause adverse impacts to ecosystems.

JVWCD's proposed project will reduce strain on surface water sources during drought, including the lower Provo River, protecting needed water for this endangered species.

Sub-Criterion B.3.c. Other Benefits

By reducing the amount of needed groundwater in a given year, this project will help maintain aquifer levels in Salt Lake County. The Project uses water flowing into the basin; there is no diversion or drawing from aquifers. As such, it should be a more sustainable water supply with fewer negative effects on other basins and groundwater supplies.

E.1.3 Evaluation Criterion C. Planning and Preparedness

Plan Description and Objective

When was the plan developed and how often is it updated?

The Casto and Dry Springs Project is supported by JVWCD's Drought Contingency Plan (DCP). The DCP was developed in 2021 and will be updated every 5 years. The full DCP can be accessed at https://jvwcd.org/public/highlights. Excerpts are included in **Appendix B** and summarized in the following sections.

7 2023 Power Content Label, Rocky Mountain Power. https://www.rockymountainpower.net/savings-energy-choices/blue-sky-renewable-energy/product-content-label.html (accessed 08/29/24)

What is the purpose and objective of the plan?

JVWCD developed the DCP to bring about a cohesive understanding of drought and its impacts on supplies, deliveries, water quality, and shortages by taking into account past and future drought conditions for the Salt Lake Valley and the surrounding area. The DCP is an effort to foster long-term resilience to drought, particularly given the increased likelihood of more extreme drought events due to changing hydrologic conditions.

What is the geographic scope of the plan?

The plan addresses impacts of drought on JVWCD's water sources and its service area. The geographic scope therefore covers northern Utah, specifically the Uintah Mountains, Wasatch Mountains, and Salt Lake Valley.

Explain how the applicable plan addresses drought

The District's DCP was developed in 2021 to support JVWCD's efforts to build drought resilience for the communities it serves. JVWCD developed the DCP with funding provided by the BOR through the WaterSmart Program. The planned drought mitigation measures discussed in the DCP and the identified drought response actions will help reduce JVWCD's drought vulnerabilities and provide a base for JVWCD's future decision making.

Elements of JVWCD's Drought Contingency Plan:

Drought Monitoring

Section 3 of the DCP addresses drought monitoring. The DCP uses water supply shortage conditions to define five water supply availability levels (**Exhibit 9**).

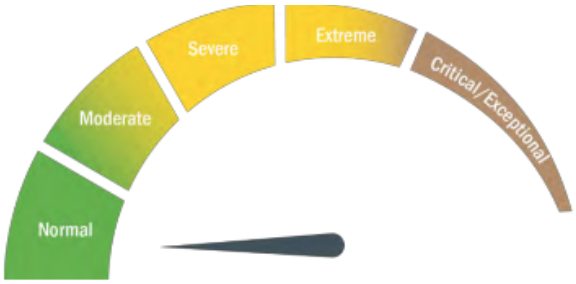


Figure 3-1 Shift in water supply shortage conditions visualized from normal (green) to critical/exceptional (brown)

Table 3-1. Water Supply Availability Level

Water Supply Availability Level	Advisory Code	Water Shortage Description
Level 0		Normal: Normal or near normal water supply conditions exist
Level 1		Moderate: Water supplies are moderately below normal
Level 2		Severe: Water supplies are severely below normal
Level 3		Extreme: Water supplies are extremely below normal
Level 4		Critical/Exceptional: Water supplies are exceptionally and critically below normal

Exhibit 9. Water Supply Availability Levels outlined in JVWCD's Drought Contingency Plan

JVWCD uses the following three criteria to guide the determination of water supply availability:

1. Supply availability of Central Utah Project (CUP) with storage in Jordanelle reservoir as provided by CUWCD.
2. Supply availability (declared allocation) of Provo River Project (Deer Creek storage) as determined by Provo River Water Users Association.
3. Supply availability of high-quality groundwater.

Drought Projections that Consider Climate Change

Section 4 of the DCP is a vulnerability assessment, which discusses potential for future supply shortfalls, including drought projections. Potential reductions to each source were assessed considering climate change impacts such as altered precipitation patterns, increased frequency and severity of drought, higher water temperatures driving water quality issues, reduced snow pack, and altered runoff patterns.

Identification of Drought Mitigation Projects

Section 5 of the DCP lists the drought mitigation measures prioritized for implementation. Nearly 50 proposed mitigation measures were evaluated for their ability to address the vulnerabilities specific to JVWCD's service area supply sources. 15 measures scored high enough on impact and feasibility to be included in an implementation schedule. The Casto Springs Project uniquely aligns with three of the 15 measures since it utilizes a spring (see *Plan support for the project*, on the following page).

Drought Response Actions

Section 6 of the DCP discusses the response actions JVWCD will implement during times of drought. The actions focus on enhanced water supply management and water use reductions, and are tied to the specific water supply availability levels shown in **Exhibit 9**.

Operational and Administrative Framework

Section 7 of the DCP provides an operational and administrative framework that provides clear direction on how the District will carry out drought monitoring activities, establish the drought mitigation measures to prepare for drought, and support efficient implementation of response actions at various water supply availability levels. This includes a drought committee of service area stakeholders that has met regularly since the plan was completed and stayed engaged in implementing the plan.

Plan Development Process

Was the drought plan developed through a collaborative process?

The DCP was developed by JVWCD with assistance from an outside consultant. Throughout its planning process, JVWCD provided opportunities for input and discussion from a task force that included individuals representing municipal and industrial (M&I), agricultural, recreational, and environmental interests. A Stakeholder Outreach Group was also created that included representatives from across JVWCD's service area.

Workshops to present and discuss key milestones in DCP development and content were held with both groups, and DCP sections were provided for review and comment. JVWCD also provided the DCP for review and comment to its 17 Member Agencies.

Plan Support for the Project

Does the plan identify the proposed project by name and location?

The Casto Springs Project is identified in the DCP as a Potential [Drought] Mitigation Measure in the screening and evaluation process table.

Explain how the proposed project was prioritized in the plan over other potential projects/measures

The Casto Springs Project uniquely aligns with three of the 15 mitigation measures identified for implementation in JVWCD's DCP, since it utilizes a spring:

1. Develop high quality groundwater wells
2. New shallow groundwater wells, and
3. Aquifer storage and recovery.

The springs are a high-quality groundwater source requiring minimal treatment, but without the energy costs or consumption associated with well pumping. The springs also yield from shallow groundwater, therefore avoiding additional burden to heavily utilized deep aquifers in the county. This also supports aquifer storage and recovery objectives of allowing the aquifer to recharge by allowing JVWCD to reduce groundwater pumping during wet years and allowing us to still deliver groundwater to the system while we inject water to the deep aquifer.

Relevant sections of the DCP are included in **Appendix B.**

E.1.4 Evaluation Criterion D. Readiness to Proceed and Project Implementation

Implementation Plan

The proposed Project Schedule is shown in **Exhibit 10** and detailed on the following page.

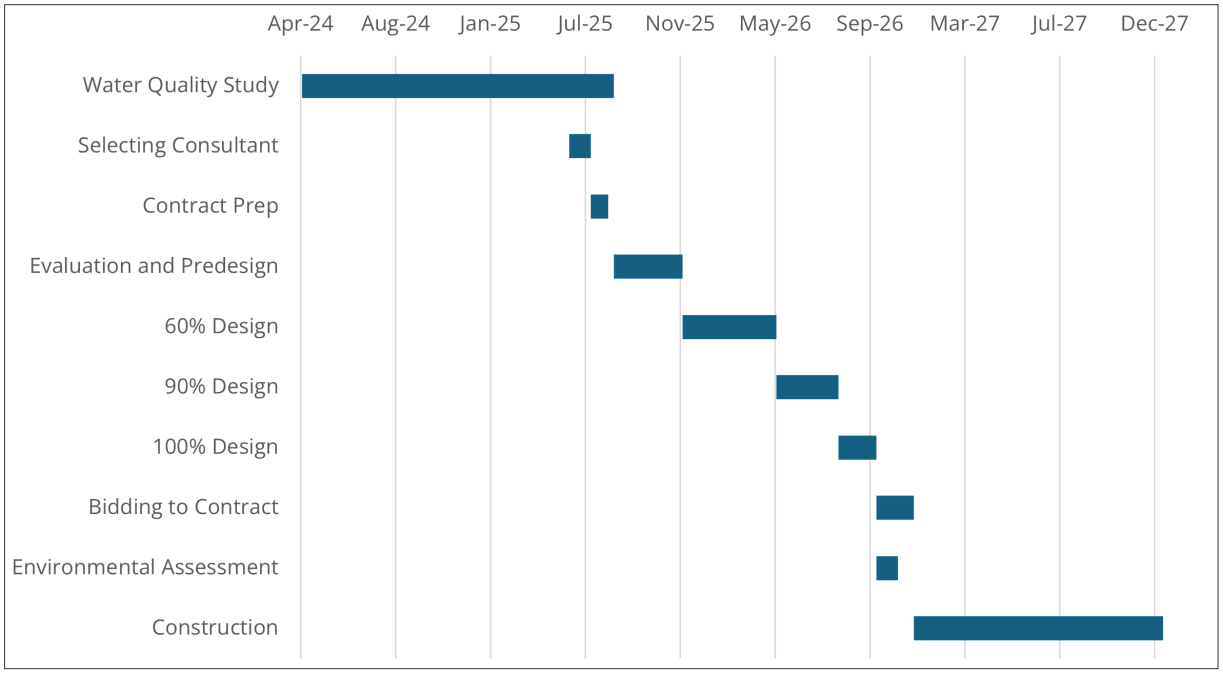


Exhibit 10. Project Schedule.

- Water quality study: Q2 2024 to Q3 2025
  - This will determine the quality of the spring water and the required treatment needed. It will also provide the required data for obtaining State of Utah approval on the plant.
- Selecting consultant Q2 2025 to Q3 2025
  - Using qualification-based procurement, select engineering consultant to help design treatment plant.
  - The process will begin while water study is ongoing to ensure design can start quickly.
- Predesign Q3 2025 to Q4 2025
  - Evaluate water quality data to determine required treatment.
  - Factor pH, temperature, and time of year to determine best treatment option.
  - Perform hydraulic study to help configure piping.
  - Work with State of Utah to inform them of project and discuss steps for approval.
- Design: Q4 2025 to Q4 2026
  - Design a fully functioning water treatment plant, factoring available space, ease of operation, and finished water quality.
  - Create mechanical, civil, and electrical plans.
  - Create specifications for full treatment plant.
  - Work with State of Utah for approval of treatment plan.
- Permitting: Q4 2026 to Q1 2027
  - Final approval from Division of Drinking Water (DDW) on treatment plan.
  - Environmental and Cultural assessment from BOR.
  - Operating permit from Utah DDW, building permit and conditional use permit from Holladay City.
  - Final operating permit to be requested during bidding. Building permit to be by contractor after bidding
- Construction and Installation: Q1 2027 to Q1 2028
  - Completion by January 2028.

Describe any permits or approvals that will be required

Utah Division of Drinking Water (DDW) Operation Permit: All projects having any effect on water quality need to be approved by the DDW and receive an operating permit. We will involve the State early in the process, specifically upon study completion and treatment process selection. Once plans and specifications are prepared, they will be submitted to the DDW for approval during the bidding process. A final operating permit will be applied for once construction is completed.

Conditional Use Permit (CUP): Acquiring a CUP will depend on the city of Holladay and their existing classification for the existing property. Of note, JVWCD already operates and maintains a water storage tank and other water system facilities on the subject property. If Holladay deems the permit required, we will start the process early in the design stage to obtain a permit prior to construction.

Reclamation environmental assessment: All projects need Federal Environmental and Cultural compliance from the Bureau of Reclamation. Since the project is on developed land, it is anticipated this can occur during bidding and contract preparation.

Building Permit: A building permit will be required by the City of Holladay and will be obtained by the contractor once they are awarded the project.

Water rights for the spring water are already held by JVWCD.

Identify and describe any engineering or design work performed specifically in support of the proposed project.

JVWCD has commenced the water quality study. In March 2024 JVWCD's water quality staff began taking weekly grab samples to analyze at our in-house laboratory. Samples are analyzed for alkalinity, conductivity, oxidation reduction potential, pH, total dissolved solids, temperature, turbidity, coliforms, E. coli, total organic carbon, and UV 254 absorbance. Additionally, water monitoring probes were installed in July 2024 to monitor temperature, conductivity, pH, and turbidity. This monitoring will continue for at least a year to ensure data is collected during all seasons.

During the study period, JVWCD staff have begun early preliminary design. This has included evaluating site conditions, meeting with treatment process vendors, and discussing different options. Early drawings have been drafted (see **Exhibits 3 and 4**) to help begin the design process. This work being done will help streamline the later design process with consulting engineers.

While we are collecting the data, JVWCD will seek and obtain the services of licensed engineers to help select the treatment process and prepare drawings and specifications for the selected treatment system. The engineering predesign services will include analyzing the water quality data, evaluating treatment options, seeking JVWCD input, and selecting the best treatment option for the springs. This predesign will be complete by December 2025.

During the design phase, the selected consultant will include prepare drawings and specifications, help obtain required permits, and create a bid package. This will be an iterative process with frequent feedback from JVWCD engineering, operations, and maintenance staff to ensure the designed plant will produce high quality water, be operationally efficient, and require little maintenance. It is anticipated that final designs will be ready by October 2026.

Finally, engineering services will include construction management services. These services will be employed to ensure the built plant matches the drawings and specifications created in design. These services will continue until construction is completed, anticipated by January 2028.

Describe any land purchases that must occur before the project can be implemented.

N/A – JVWCD owns the land on which this project will be built.

If the project is completely or partially located on Federal land, explain whether the agency supports the project?

N/A – the project is not located on Federal land

Describe any new policies or administrative actions required to implement the project

N/A – JVWCD has implemented similar projects in the past and operates multiple treatment facilities within its system. The District and State of Utah regulatory agencies already have well established policies that will guide the implementation of this project.

E.1.5 Evaluation Criterion E. Presidential and DOI Priorities

Disadvantaged or Underserved Communities

Using data from the Climate and Economic Justice Screening Tool, there are 32 census tracts in Salt Lake County that are considered disadvantaged communities with a total population of approximately 173,500 people. Of those, 20 are within JVWCD's service area, with a combined population of approximately 112,000 people (see **Exhibit 11**). Thus, JVWCD serves approximately 65% of disadvantaged communities in Salt Lake County[8]. Since the Casto Springs Project will benefit the District's entire service area, all of these communities will benefit from the project. Increasing JVWCD's supply increases our communities' resilience toward drought, and allows them to thrive. Further, the reduction in groundwater pumping will reduce carbon emissions, benefiting the air quality in Salt Lake County and reducing climate impact.

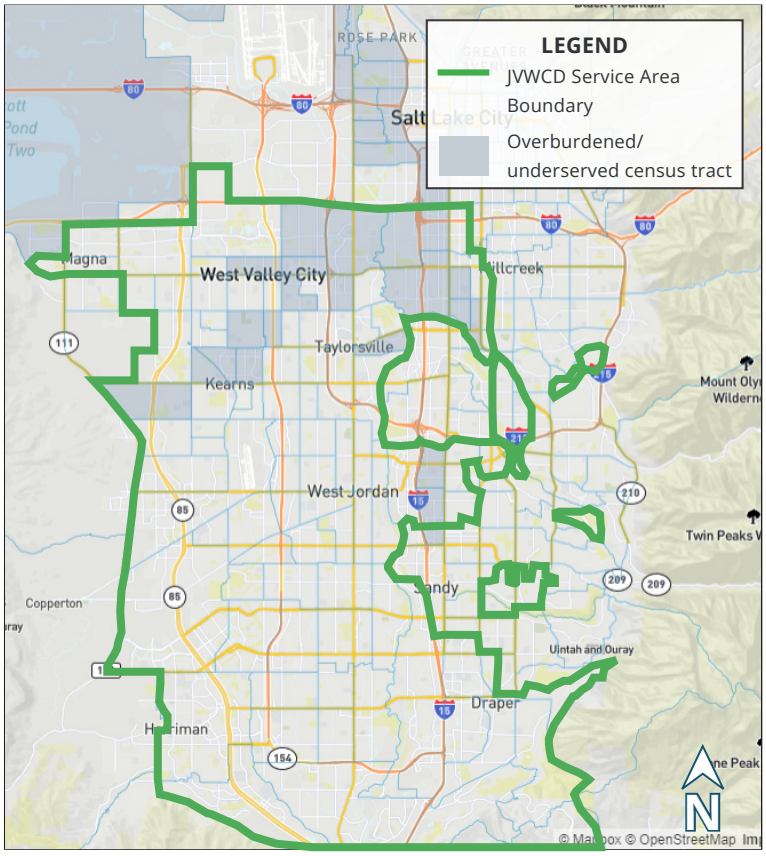


Exhibit 11. JVWCD service area shown over the map produced by Climate and Economic Justice Screening Tool[8].

Tribal Benefits

N/A

8 Climate and Economic Justice Screening Tool. https://screeningtool.geoplatform.gov/ (accessed 8/15/2024)

E.1.6 Evaluation Criterion F. Nexus to Reclamation

JVWCD is the largest petitioner of the BOR's Central Utah Project Bonneville Unit M&I water, contracting to receive 66,400 acre-feet annually. JVWCD receives deliveries associated with a substantial portfolio of water rights, including Deer Creek Reservoir storage rights (a Reclamation project facility constructed as part of the Provo River Project), direct flow water rights in the Provo and Weber rivers systems, and Echo Reservoir storage rights on the Weber River (a Reclamation project facility constructed as part of the Weber River Project). JVWCD also operates and maintains the Jordan Aqueduct, a 72-inch, 40-mile pipeline owned by BOR.

Water treated and delivered through the Casto Springs Project will provide an important supplement and beneficial resilience through diversification to the above listed BOR sources.

E.1.7 Evaluation Criterion G. Stakeholder Support for Proposed Project

Eight of JVWCD's member agencies have expressed support for this project, as well as Salt Lake County Deputy Mayor Catherine Kanter, Congressional Representatives Maloy and Owens, and Senators Romney and Lee (see **Appendix C**). Rocky Mountain Power, the local electric utility, has also expressed support (see **Appendix A**).

D.2.2.2.3 Performance Measures

The success of JVWCD's project will be measured using the metrics identified below:

- **Increased groundwater production capacity:** The project is intended to increase reliable capacity from the collective groundwater sources by 5 MGD.
- **Increased aquifer storage:** This project will allow JVWCD to reduce the amount of water pumped from the aquifer by up to 2200 acre-feet per year during those years that there are sufficient supplies to rest groundwater wells.
- **Increased water supply:** This project is intended to provide an additional 1500 acre-feet of water per year on average, and 750 acre-feet in a dry year. It is anticipated this extra water would reduce the amount of water pulled from wells or other sources by the same amount.
- **Access to high quality water:** It is anticipated the additional water provided by this project would be of high quality (<0.05 NTU), helping maintain JVWCD's high quality water in the system.
- **Chlorine and fluoride boost:** By adding chemical feed at this site, the project will help maintain the chlorine residual in this region of the distribution system, maintaining clean water. By adding fluoridation feed, this project will ensure residents in this area of the distribution system have access to fluoridated water.
- **Reduce energy consumption:** It is estimated that the District will save approximately 574,000 kw-hours per year by replacing groundwater well production with the annual Casto Springs production, equivalent to 401 tons of CO_2.

D.2.2.3 Project Budget

See Budget Narrative Attachment for more details.

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
Jordan Water Valley Conservancy District	$5,458,200
Non-Federal Subtotal	$5,458,200
REQUESTED RECLAMATION FUNDING	**$5,458,200**

Summary **Figures in this summary table are calculated from entries made in subsequent categories, only blank white cells require data entry.**			
6. Budget Object Category	**Total Cost**	**Federal Estimated Amount**	**Non-Federal Estimated Amount**
a. Personnel	$0		
b. Fringe Benefits	$0		
c. Travel	$0		
d. Equipment	$0		
e. Supplies	$0		
f. Contractual	$684,500		
g. Construction	$7,773,700		
h. Other Direct Costs	$0		
i. Total Direct Costs	$8,458,200		
i. Indirect Charges	$0		
Total Costs	$8,458,200	$3,000,000	$5,458,200
Cost Share Percentage		**35%**	**65%**

D.2.2.4 Environmental and Cultural Resources Compliance

N/A – This project does not require fieldwork. All monitoring at this project will be done at existing JVWCD facilities, and the project will not effect any environmental or cultural resources.

D.2.2.5 Required Permits or Approvals

See Section *E.1.4, Readiness to Proceed and Project Implementation*, for a list of required permits or approvals.

D.2.2.6 Overlap or Duplication of Effort Statement

There is no overlap between the proposed project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel.

The proposal submitted for consideration under this program does not in any way duplicate any proposal or project that has been or will be submitted for funding consideration to any other potential funding source—whether it be Federal or non-Federal.

D.2.2.7 Conflict of Interest Disclosure

JVWCD does not have any conflict of interest to the US Bureau of Reclamation in accordance with 2 CFR 200.112. If any conflict should arise during the duration of this grant, JVWCD will follow procedures to identify, disclose, and eliminate identified conflicts of interest.

D.2.2.8 Uniform Audit Reporting Statement

In accordance with2 CFR §200 subpart F, JVWCD will submit a single year audit report for any year in which it receives at least $750,000 of federal funding. JVWCD was not required to submit a Single Audit Report for the most recently audited fiscal year.

D.2.2.9 Certification Regarding Lobbying

JVWCD has included with this application an SF424 form that represents our certification of the statements 43 CFR Part 18.

D.2.2.10 SF-LLL: Disclosure of Lobbying Activities

JVWCD has included Form SF-LLL with its application.

D.2.2.11 Letters of Support

See **Appendix C**.

D.2.2.12 Letter of Partnership

N/A – JVWCD is not a Category B applicant.

D.2.2.13 Official Resolution

See **Appendix D**.

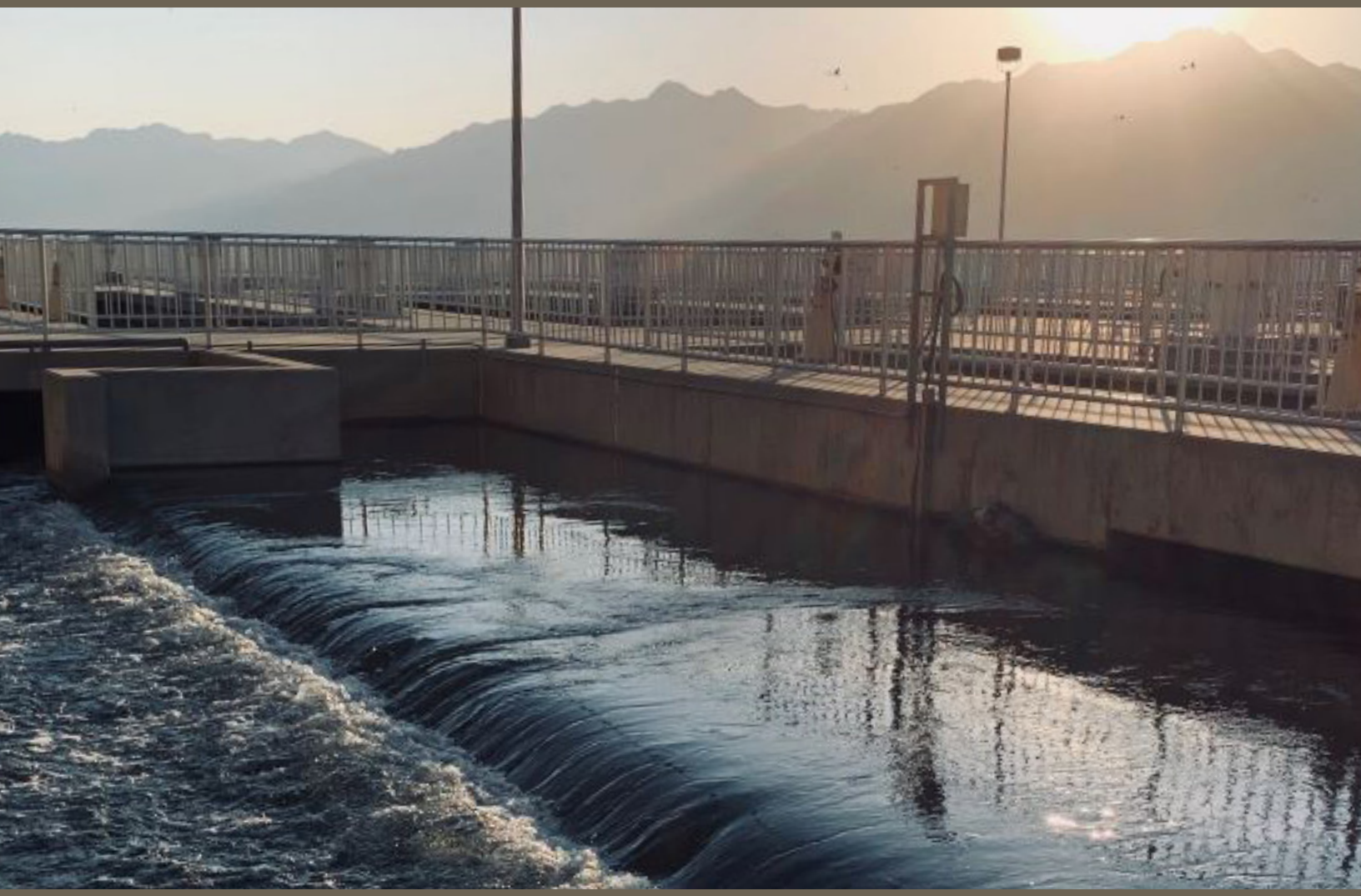
D.2.2.14 Letters of Funding Commitment

N/A – cost share funding will not be sought for this project.

ENHANCING CLIMATE RESILIENCE: THE CASTO SPRINGS TREATMENT PLANT PROJECT

Notice of Funding Opportunity No. R25AS00013

WaterSMART Drought Response Program: Drought Resiliency Projects for Fiscal Year 2025



JORDAN VALLEY WATER
CONSERVANCY D STR CT

Budget Narrative Supporting Documents

Budget Narrative

6a. Personnel

JVWCD's engineering department will manage the contract and grant and supervise project implementation. JVWCD will dedicate two primary staff members to the successful completion of this project. JVWCD is not seeking reimbursement for staff time.

6b. Fringe Benefits

Fringe benefits are based on hours for each staff member and include benefits and required taxes paid for each position. JVWCD is not seeking reimbursement for fringe benefits.

6f. Contractual

Item	Units	Unit Cost	Total
Project Manager	400	$260	$104,000
Project Engineer	575	$200	$115,000
Technical Engineer	275	$300	$82,500
Electrical Engineer	200	$260	$52,000
Process Engineer	400	$200	$80,000
Staff Engineer	900	$140	$126,000
Clerical	100	$100	$10,000
Geotechnical	325	$200	$65,000
Hydraulic	250	$200	$50,000
		Total	**$684,500**

Consultants will be hired to help design the new treatment plant. The design costs were estimated using the Utah Division of Facilities Construction and Management calculations. For a project of average complexity (which includes water treatment facilities), costing $7-$12 million in construction, they estimate design costs should equal about 6.63% of the total construction cost. Geotechnical and hydraulic analysis, required for this project, are not included in these calculations and were added separately based upon costs seen in past projects.

JVWCD's procurement policy requires that we obtain statements of qualification from interested consulting firms containing information about their team, their work plan, and past references. A committee of District employees evaluates the statements and determines which firm is best qualified to perform the work. The District will then enter into a contract with that firm, provided they provide a cost proposal that is deemed reasonable by the General Manager.

6g. Construction

Contractual

Item	Units	Unit Cost	Total
New Chemical Feed System	1	$450,000	$450,000
New Building	1	$1,032,000	$1,032,000
UV Disinfection System	1	$260,000	$260,000
Prefilter System	1	$675,000	$675,000
Ultrafiltration System	7	4,650,000	$4,650,000
		Total	**$7,067,000**

JVWCD will bid out the construction of the treatment plant to interested general contractors. The construction contract award will be made to the lowest cost bidder meeting the set requirements for bidders. Requirements for bidders typically include licenses with the State, previous project experience, and positive references. Costs for the chemical feed and new building were based on recent projects done by the district. The costs from the recent projects were averaged and then modified according to the requirement for this new project. The costs for the UV and prefilter systems were based on similar JVWCD projects done several years ago and then adjusted for inflation. The cost for the ultrafiltration system was calculated by obtaining quotes from manufacturers for potential ultrafiltration systems. The total amount of units required for each system was determined, then the total costs from these systems were averaged, with a 30% addition to include costs for the general contractor to install the system.

Item	Units	Unit Cost	Total
Construction Management Services	1	$780,752	$706,700

JVWCD will maintain the services of the design consultant for construction management services. These include holding progress meetings, inspecting construction, approving change orders and payments, answering technical questions, and other services as needed. The costs were estimated by calculating 10% of the total construction. This is based upon other projects done for JVWCD and is at the higher end of construction management costs.

APPENDIX A

Rocky Mountain Power Savings and Incentive Report

Savings and Incentive Report

JVWCD | Casto Springs | 10/3/2024

Project Opportunities

1. Casto Springs Water Collection

Financial Benefit

The energy improvements discussed in this report will save you money on energy costs and earn you incentives. The table below shows your total estimated savings and incentives.

Energy Savings Estimate	574,000	kWh/yr
Annual Energy Cost Savings	$ 31,063	per year
Estimated Total Cost of Upgrade	$ 9,000,000	
Baseline or Non-Eligible Costs	$ -8,665,396	
Eligible Project Cost	$ 334,604	
Wattsmart® Incentive Estimate	$ 86,100	
	(25.7% of eligible costs)	
Net Cost after Incentive	$ 248,504	

To Be Eligible for an Incentive

- ☐ Sign Incentive Offer Letter before proceeding with project.
- ☐ Notify your Rocky Mountain Power Project Manager of any changes to the project scope or completion.

Receive a total incentive of

$86,100

Lower your annual electric costs by

$31,063

Reduce CO_2e emissions (metric tons) by

401 tonnes/yr

Eligible Project Cost

$334,604

Next Steps

Note: A common delay in paying out incentives is collecting invoices.
Invoices can be collected and sent to Cascade at any time during the process.

1 INCENTIVE OFFER LETTER

- ☐ Discuss estimated project timeline with the Project Manager
- ☐ Sign Incentive Offer Letter before making equipment purchases

2 IMPLEMENTATION REQUIREMENTS

Measure 1: Casto Springs Water Collection

- ☐ Use Casto Springs to supplement flow from wells

3 PROJECT COMPLETION

- ☐ When your project is complete and ready for verification, notify Dustin Bunderson at dustin.bunderson@cascadeenergy.com

4 VERIFICATION REQUIREMENTS

Qualified personnel will be required to:

- ☐ Collect and provide spring flow and well data
- ☐ Collect invoices

Further details into verification requirements are provided in the report.

5 PROJECT INVOICES

Send Invoices

- ☐ Email all project invoices to dustin.bunderson@cascadeenergy.com
- ☐ Document internal labor if applicable. Forms are available upon request

Project Name: Jordan Valley Water Conservancy District - Casto Springs
Project Number: WBUT_549533
Project Phase: SIR

Rate Schedule: UT-6 (Effective: 03/08/2024)
Energy Rate: $0.04210 / kWh
Demand Rate: $14.370 / kW-mo

Measure Number	Measure Name	kWh Savings, Annual	kW Savings, avg per mo	Electric Cost Savings, Annual	Eligible Project Cost	Payback Before Incentive	Wattsmart® Incentive	Payback After Incentive	Measure Type	TRL Number
1	Casto Springs Water Collection	574,000	40.0	$ 31,063.00	$ 334,604.00	10.8	$ 86,100.00	8.0	CM	11222013-098_v2
	Project Totals	574,000	40.0	$ 31,063.00	$ 334,604.00	10.8	$ 86,100.00	8.0		

Installed Cost after Incentive	$ 248,504.00
Percent of Eligible Cost covered by Incentive	25.7%

Note regarding Wattsmart Business incentives:

Incentive values shown here are estimates only and may change if equipment, setpoints, or costs as-installed differ from details represented in this report. Amounts actually paid will be based on savings and costs in the Savings Verification Report. The total incentive above assumes implementation of all Energy Efficiency Measures shown.
If any measure is not implemented, the total incentive may change. The incentive listed above for each individual Measure is an allocated portion of the total incentive amount, based on the fraction of total savings contributed by each measure.

Site Information

Jordan Valley Water Conservancy District
8215 S 1300 W
West Jordan, UT 84088

Rate Schedule: UT-6
Project Type: New Construction

Customer Contacts

Conor Tyson
385-236-2510
conort@jvwcd.org

Rocky Mountain Power Contacts

Wattsmart Project Manager:
Dustin Bunderson
385-233-3421
dustin.bunderson@cascadeenergy.com

Regional Business Manager:
Brad Knoles
801-220-4437
brad.knoles@rockymountainpower.net

Report Engineer:
Justin Bright
385-301-2892
justin.bright@cascadeenergy.com

Engineering Reviewer:
Peter Georgiou
801-396-2460
peter.georgiou@cascadeenergy.com

Disclaimer

The intent of this report is to provide an estimate of energy savings associated with recommended energy efficiency upgrades. This report is not intended to serve as an engineering design document. Detailed design efforts may be required in order to implement the recommended upgrades. While the recommendations in this report have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates only and actual results may vary. As a result, neither Rocky Mountain Power nor the report's author(s) shall be liable if estimated savings or projected economic results are not actually achieved. All savings and cost estimates in this report are for informational purposes only and are not to be construed as design documents or as guarantees. CO_2 Emissions savings estimates, as outlined on the executive summary, are based on the U.S. Environmental Protection Agency's most recent Greenhouse Gas Emissions data. Customer shall independently evaluate any advice or direction provided in this report. In no event will Rocky Mountain Power or the report's author(s) be liable for any incidental or consequential damages of any kind in connection with this report, with the installation of recommended measures, or with the operation of customer's facilities. Wattsmart® is registered in the U.S. Patent and Trademark Office.

Overview of Project

Measure 1: Casto Springs Water Collection

Measure Description

Jordan Valley Water Conservancy District, or JVWCD, is planning to reduce the water pumped from five of its wells by collecting water from Casto Springs. Water from the spring flows by gravity into their water treatment facility; this flow does not consume energy.

Implementation Requirements

- Collect water from Casto Springs and reduce water pumped from the 13 & 70 S, College St, 4670 S & 1590 E, 6400 S, and 11 & 45 S wells

Savings Summary

Annual Savings	**31,063**	**$/yr**
CO_2 Reduction	401	tonnes/yr
Energy Savings	574,000	kWh/yr

Cost Estimate

Costs are an important factor in determining the correct payback timing of the project, the amount of the incentive, and whether caps may apply to the incentive. For this measure, the payback timing for energy savings alone is over 20 years, but there are significant maintenance, operational, and/or environmental benefits included in this measure. JVWCD does not have payback criteria, but the payback for water projects is typically 20 years, so the portion of the costs that are considered eligible for the energy upgrade are adjusted to meet this criteria. Adjusting this cost does not have any effect on the incentive available and is mainly a tool to estimate the portion of costs attributed to energy benefits.

Total costs for this measure are shown in the following table. Project cost details can be found in the Appendix.

Measure Costs

Description	Cost Source	Qty	Cost Each	Line Total
Estimated Project Cost	Customer	1	$ 9,000,000.00	$ 9,000,000.00
Subtotal				**$ 9,000,000.00**

Cost Adjustments

Description	Cost Source	Qty	Cost Each	Line Total
Estimated Grant	Customer	1	$ 3,000,000.00	$ -3,000,000.00
Long Payback Adjustment	Wattsmart	1	$ 5,665,396.00	$ -5,665,396.00
Subtotal				**$ -8,665,396.00**

Eligible Measure Cost	**$ 334,604.00**

****Eligible project costs are total costs minus any baseline or non-eligible costs.**

Verification Plan

Savings verification is the process of ensuring that measures are properly installed and operating as designed for energy savings. This process is dependent on the size of the project and can vary from project to project. The incentive will be recalculated based on verified operation and project costs.

Savings verification for this project are as follows:

Measure 1: Casto Springs Water Collection

Data Collection

- Monitoring over time – minimum one month of spring and well data
  - Record flow and power for all five wells
  - Record flow from Casto springs
- Collect invoices to substantiate project cost
  - Grant value awarded
  - Internal labor tracking
  - Installation and construction invoices

M&V Methodology

- Logged data will be used to update calculations

Appendix

Project Background

Jordan Valley Water Conservancy District provides wholesale water to cities within Salt Lake County. Five wells are used to pump stored water to the surface for use. JVWCD has the rights to two springs, one of them being Casto Springs. Currently the customer discharges excess flow into a canal. JVWCD is proposing a grant for their water treatment facility to capture the discharged water and put it into their system. This would allow the wells to pump less water and achieve energy savings. Due to other operational and maintenance efficiencies it is more than an energy savings project.

This project came about in the spring of 2024 through the monthly meetings with Cascade Energy and JVWCD; Dustin discussed with Shane Swenson, the city engineer, a combined Jordan Valley water project where Casto Springs was mentioned.

Utah State Energy Code does not apply.

Detailed Engineering Analysis & Key Assumptions

Assumptions used in calculations are shown in red.

Measure 1: Casto Springs Water Collection

Baseline

- The baseline for this measure is the five wells, listed below, pumping water to the surface
  - 13 & 70 S Well
  - College St Well
  - 4670 S 1590 E Well
  - 6400 S Well
  - 11 & 45 S Well
- The only information available was from customer provided annual reports of the cumulative annual flows of each well from 2013 to 2024; flows were provided in acre-ft and converted to millions of gallons

Min	0	0	0	0	0	0
Avg	**602**	**196**	**122**	**40**	**202**	**66**
Max	1,303	425	371	121	518	169
Average On	723	236	292	95	269	88
Utilization	0.83	**0.83**	0.42	**0.42**	0.75	**0.75**
	13 & 70 S Well		**College St Well**		**4670 S 1590 E Well**	
Date YYYY	**13 & 70 S Well Annual Flow acre-ft**	**13 & 70 S Well Annual Flow Mg**	**College St Well Annual Flow acre-ft**	**College St Well Annual Flow Mg**	**4670 S 1590 E Well Annual Flow acre-ft**	**4670 S 1590 E Well Annual Flow Mg**
2013	0	0	0	0	152	49
2014	0	0	0	0	518	169
2015	525	171	0	0	0	0
2016	282	92	0	0	0	0
2017	940	306	0	0	212	69
2018	461	150	331	108	200	65
2019	151	49	289	94	405	132
2020	967	315	371	121	389	127
2021	965	314	208	68	168	55
2022	746	243	261	85	0	0
2023	1,303	425	0	0	46	15
2024	889	290	0	0	332	108

Min	0	0	0	0	514
Avg	**1,020**	**332**	**199**	**65**	**699**
Max	2,519	821	531	173	1,062
Average On	1,113	363	239	78	699
Utilization	0.92	**0.92**	0.83	**0.83**	1.00
	6400 S Well		**11 & 45 S Well**		
Date **YYYY**	**6400 S Well Annual Flow** **acre-ft**	**6400 S Well Annual Flow** **Mg**	**11 & 45 S Well Annual Flow** **acre-ft**	**11 & 45 S Well Annual Flow** **Mg**	**Total Wells Flow** **Mg**
2013	1,733	565	365	119	733
2014	1,103	359	316	103	631
2015	1,231	401	222	72	645
2016	2,519	821	215	70	983
2017	1,578	514	531	173	1,062
2018	735	240	11	4	566
2019	732	239	0	0	514
2020	927	302	0	0	865
2021	105	34	142	46	517
2022	1,372	447	22	7	782
2023	208	68	183	60	567
2024	0	0	386	126	524

- Rocky Mountain Power provided data, which was normalized to start at the first of each month; the portion of the previous month's power and energy that carries over into the next month was added to the portion of the power and energy that is recorded for the current month

Min	0	0	**Min**	0	0
Avg	**88**	**44,684**	**Avg**	**88**	**44,137**
Max	274	207,360	**Max**	278	198,809
13 & 70 S Well			**Normalized Data**		
Date	**Power**	**Energy**	**Date**	**13 & 70 S Well Power**	**13 & 70 S Well Energy**
MM/DD/YYYY	**kW**	**kWh**	**MM/DD/YYYY**	**kW**	**kWh**
9/13/2021	272	154,080			
10/12/2021	272	59,580	10/1/2021	276	94,639
11/10/2021	0	0	11/1/2021	80	17,581
12/14/2021	0	0	12/1/2021	0	0
1/14/2022	0	0	1/1/2022	0	0

Min	1	440	**Min**	1	446
Avg	**16**	**3,672**	**Avg**	**13**	**2,208**
Max	144	65,920	**Max**	96	9,460
College St Well			**Normalized Data**		
Date	**Power**	**Energy**	**Date**	**College St Well Power**	**College St Well Energy**
MM/DD/YYYY	**kW**	**kWh**	**MM/DD/YYYY**	**kW**	**kWh**
9/3/2021	144	65,920			
10/5/2021	5	920	10/1/2021	23	9,460
11/3/2021	104	1,120	11/1/2021	96	1,089
12/7/2021	8	1,960	12/1/2021	27	1,827
1/8/2022	8	2,760	1/1/2022	8	2,622

Min	1	400	**Min**	2	459
Avg	**42**	**14,348**	**Avg**	**38**	**12,069**
Max	253	122,960	**Max**	246	109,537
4670 S 1590 E Well			**Normalized Data**		
Date	**Power**	**Energy**	**Date**	**4670 S & 1590 E Well Power**	**4670 S & 1590 E Well Energy**
MM/DD/YYYY	**kW**	**kWh**	**MM/DD/YYYY**	**kW**	**kWh**
9/3/2021	2	560			
10/5/2021	3	800	10/1/2021	3	782
11/3/2021	4	880	11/1/2021	4	860
12/7/2021	10	1,600	12/1/2021	9	1,485
1/8/2022	12	2,240	1/1/2022	12	2,130

Min	2	400	**Min**	4	438
Avg	**79**	**29,960**	**Avg**	**70**	**26,412**
Max	265	133,200	**Max**	265	130,950
6400 S Well			**Normalized Data**		
Date	**Power**	**Energy**	**Date**	**6400 S Well Power**	**6400 S Well Energy**
MM/DD/YYYY	**kW**	**kWh**	**MM/DD/YYYY**	**kW**	**kWh**
9/8/2021	261	133,200			
10/11/2021	220	126,760	10/1/2021	237	130,950
11/12/2021	230	94,080	11/1/2021	223	104,324
12/16/2021	14	3,680	12/1/2021	120	48,199
1/12/2022	15	4,080	1/1/2022	15	4,003

Min	1	160	**Min**	1	173
Avg	**32**	**16,841**	**Avg**	**34**	**17,708**
Max	123	88,400	**Max**	124	82,542
	11 & 45 S Well		**Normalized Data**		
Date	**Power**	**Energy**	**Date**	**11 & 45 S Well Power**	**11 & 45 S Well Energy**
MM/DD/YYYY	**kW**	**kWh**	**MM/DD/YYYY**	**kW**	**kWh**
9/3/2021	2	240			
10/5/2021	2	160	10/1/2021	2	173
11/3/2021	1	240	11/1/2021	1	231
12/7/2021	1	240	12/1/2021	1	244
1/8/2022	11	720	1/1/2022	9	622

- Power, energy, and flow for all wells were collected in a table
- Well efficacies were calculated from average flow and energies
- Annual operating hours were calculated using the well's utilization, which was taken from the JVWCD annual flow data, and a basis of 8,760 possible hours of annual operation

Well Info						
Well	**13 & 70 S Well**	**College St Well**	**4670 S 1590 E Well**	**6400 S Well**	**11 & 45 S Well**	**Unit**
Annual Average Flow	196	40	66	332	65	**Mg/yr**
Monthly Average Power	88	13	38	70	34	**kW**
Monthly Average Energy	44,137	2,208	12,069	26,412	17,708	**kWh**
Annual Efficacy, Calculated	2,698	668	2,202	953	3,269	**kWh/Mg**
Utilization	0.83	0.42	0.75	0.92	0.83	**-**
Annual Operating Hours	7,300	3,650	6,570	8,030	7,300	**hr/yr**
Total Average Annual Flow from Wells			699			**Mg/yr**

- Annual energy usage for each well was calculated using their annual flows and efficacies
- Power for each well was calculated using their annual energies and hours of operation

		13 & 70 S Well	**College St Well**	**4670 S 1590 E Well**	**6400 S Well**	**11 & 45 S Well**	
Baseline	**Annual Average Flow**	196	40	66	332	65	**Mg/yr**
	Efficacy	2,698	668	2,202	953	3,269	**kWh/Mg**
	Average Energy	530,000	26,000	145,000	317,000	212,000	**kWh/yr**
	Power	73	7	22	39	29	**kW**
	Total Annual Energy			**1,230,000**			**kWh/yr**

Upgrade

- The upgrade for this measure is a portion of flow from the wells is supplemented with water from Casto Springs
- The customer estimates that a combined total of 1,000 acre-ft of water will be saved from the five wells annually

Setup		
Annual Water Savings	1,000	acre-ft/yr
Acre-ft:Mg	0.326	-
Annual Water Savings	326	Mg/yr

- The portion of the total flow that each well provides was calculated
- Water savings were distributed across each of the wells proportionally to the percentage of the total flow they provide, the upgrade annual flows were calculated
- Annual energy usage for each well was calculated using their reduced annual flows and efficacies, total annual energy savings was calculated
- Power for each well was calculated using their annual energies and hours of operation

		13 & 70 S Well	College St Well	4670 S 1590 E Well	6400 S Well	11 & 45 S Well	
Baseline	Annual Average Flow	196	40	66	332	65	Mg/yr
	Efficacy	2,698	668	2,202	953	3,269	kWh/Mg
	Average Energy	530,000	26,000	145,000	317,000	212,000	kWh/yr
	Power	73	7	22	39	29	kW
	Total Annual Energy			**1,230,000**			kWh/yr
Upgrade	Percantage of Total Flow	28.1%	5.7%	9.4%	47.6%	9.3%	-
	Annual Flow Savings	91	18	31	155	30	Mg/yr
	Annual Average Flow	105	21	35	178	35	Mg/yr
	Average Energy	283,000	14,000	77,000	169,000	113,000	kWh/yr
	Power	39	4	12	21	15	kW
	Demand Realization			0.5			-
	Total Power Savings			40			kW
	Total Annual Energy			**656,000**			kWh/yr
	Total Annual Energy Savings			**574,000**			kWh/yr

Eligible Costs and Vendor Quotes

JVWCD estimates the project cost to be $9,000,000. They are currently applying for grants on this project as well to make it feasible for installation.

Additional Program Offerings

Rocky Mountain Power is committed to sustainable energy, including developing innovations for the energy grid of the future. With the Rocky Mountain Power **Wattsmart Battery** program, we are connecting with customers who want to take the journey with us to a more sustainable energy grid. When you participate, Rocky Mountain Power will utilize your battery for short durations to help manage energy on the electric grid. At the same time, your battery storage system may serve as back-up energy and to reduce customers peak loads for your business. By participating, you will earn an upfront enrollment incentive (up to $600 per KW) and ongoing bill credits while helping to keep electricity prices in Utah among the nation's lowest. For more information, please visit RockyMountainPower.net/battery.

Rocky Mountain Power continues to find new ways for our community to use energy efficiently. Participation in the **Wattsmart Business Demand Response** program benefits the environment and keeps costs down for all Utahns. Large commercial and industrial customers located in Utah with a flexible peak demand greater than 500 kW are eligible to participate. Participating customers can earn incentives for curtailing electricity. For more information, please visit Demand-Side Management (pacificorp.com).

Rocky Mountain Power's **Blue Sky** program provides a convenient way for customers to support renewable energy growth and participate in the building of new solar and wind projects across Utah, Idaho and Wyoming. The Blue Sky Program buys renewable energy certificates on your behalf equal to your purchase, and any remaining funds are then made available for grants to help build renewable energy projects for community-serving organizations. Renewable energy credits can be purchased in 100 kWh increments, called blocks, for just $1.95 more per block per month. You can join more than 53,000 Blue Sky customers that are making a difference in your communities. For more information, please visit RockyMountainPower.net/savings-energy-choices/blue-sky-renewable-energy.

Rocky Mountain Power's **Subscriber Solar** program allows businesses to support and receive solar energy in Utah, even if their builds are not suitable for rooftop solar panels or are prohibited from installing panels by lease agreements. Businesses can subscribe in 200-kWh solar blocks to replace that same amount of your monthly energy use with solar power. You can purchase as many blocks as you want, up to your average monthly kWh usage. There are a limited number of blocks available for customers and they will be reserved on a first-come, first-served basis. For more information, please visit RockyMountainPower.net/savings-energy-choices/blue-sky-renewable-energy/subscriber-solar.

Date: 10/03/2024

Customer Name: JORDAN VALLEY WATER CONSERVANCY DISTRICT
RE: Incentive Offer Letter
Project: Jordan Valley Water Conservancy District - Casto Springs
Project Number: WBUT_549533

Dear Shane Swensen,

Attached is your Wattsmart Business Incentive Offer which outlines the expected energy savings and incentive for your project. The final incentive amount will be based on the verified savings of the actual equipment installed.

This Incentive Offer is an important document for your project and should be completed prior to any equipment purchased for the project.

Next Steps-

1. You must sign and return the attached Incentive Offer to the contact information listed below.
2. Contact Rocky Mountain Power during project implementation if there are changes affecting the energy savings potential of the project, costs, or the schedule.
3. We recommend that you set up tracking for project costs so invoices and other project cost documentation can easily be provided to Rocky Mountain Power when you have finished the project installation.
4. Complete the installation and provide written notice (email preferred) of completion to Rocky Mountain Power by the completion date specified in your incentive offer.

Sincerely,

Rocky Mountain Power
Dustin Bunderson – Project Manager
dustin.bunderson@cascadeenergy.com

Wattsmart Business – Incentive Offer Letter

attn: Shane Swensen
JORDAN VALLEY WATER CONSERVANCY DISTRICT
8578 S MONITOR DR, UT, 84093
Re: WBUT_549533 - Jordan Valley Water Conservancy District - Casto Springs

Rocky Mountain Power
Dustin Bunderson – Project Manager
dustin.bunderson@cascadeenergy.com

After reviewing your application, we are pleased to provide you an incentive offer for the successful implementation of the approved energy efficiency measures described in the attached exhibit(s).

Cash Incentive Estimate

Issue Date: 10/03/2024
Estimated Annual Savings: 574,000 kWh
Estimated Incentive: $86,100.00
Completion Date: XX/XX/XXXX
Project Number: WBUT_549533

For this offer to remain valid and to receive an incentive, it is the responsibility of the participant to:

1. Sign and return this offer to the contact above within 60 days of the issue date.
2. Implement the project by the Completion Date.
3. Notify Rocky Mountain Power of any changes that materially affect the implementation schedule, measure costs or the savings.
4. Upon project completion, notify Rocky Mountain Power via email that the project has been completed.
5. Provide all required documentation and participate in any required inspections no later than 60 days from the Completion Date

Acknowledgement

I understand: (1) my responsibilities listed above; (2) the incentive offer is an estimate; (3) the incentive paid will be based on verified electric energy savings and approved costs.

_____ _____
Name (please print) Title

_____ _____
Signature Date

Exhibit A - Estimated Project Economics for WBUT_549533 - Jordan Valley Water Conservancy District - Casto Springs

Project Name: Jordan Valley Water Conservancy District - Casto Springs
Project Number: WBUT_549533
Project Phase: SIR

Rate Schedule: UT-6 (Effective: 03/08/2024)
Energy Rate: $0.04210 / kWh
Demand Rate: $14.370 / kW-mo

Measure Number	Measure Name	kWh Savings, Annual	kW Savings, avg per mo	Electric Cost Savings, Annual	Eligible Project Cost	Payback Before Incentive	Wattsmart® Incentive	Payback After Incentive	Measure Type	TRL Number
1	Casto Springs Water Collection	574,000	40.0	$ 31,063.00	$ 334,604.00	10.8	$ 86,100.00	8.0	CM	11222013-098_v2
	Project Totals	574,000	40.0	$ 31,063.00	$ 334,604.00	10.8	$ 86,100.00	8.0		

Installed Cost after Incentive	$ 248,504.00
Percent of Eligible Cost covered by Incentive	25.7%

Notes regarding Wattsmart Business Custom incentives:
While the above energy savings results have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates and actual results may vary.

Incentive repayment obligation: If Participant terminates a material portion of its electric service requirements from Rocky Mountain Power for Participant's Facility within 60 months of the date of the final incentive payment, and the Facility remains in operation, Participant is obligated to repay the final incentive to Rocky Mountain Power within 30 days of written request. The repayment ("Repayment") will be determined as follows: Repayment = final incentive x (60-Savings Delivery Term)/60, where Savings Delivery Term = number of months between the month the Final Incentive payment was made and the month the Facility terminated a material portion of its electric service. For determining the repayment, the dates will be the first day of the month in which they occur.

Issue Date: 10/03/2024

APPENDIX B

Relevant Sections of JVWCD's Drought Contingency Plan

Section 3

Drought Monitoring

Drought monitoring establishes a process for determining short-term and long-term water availability and for confirming existing drought. The section explains the collection, interpretation, and dissemination of data and information used in this monitoring process. Several steps are undertaken to determine drought levels represented by water supply availability levels, and to identify and establish metrics and triggers. Establishing this process enables local agencies and communities to recognize potential drought events and strengthens resilience against impacts through informed drought recognition and preparation.

3.1 Overview

In determining appropriate water supply availability levels designations and associated drought response actions, it is important to use indicators that are as reliable and consistent as possible. The two largest sources of supply upon which JVWCD relies are; 1) CUP (Jordanelle storage) operated by the CUWCD, and 2) PRWUC shares which provide access to the Provo River Project (Deer Creek storage) operated by the PRWUA. CUWCD and PRWUA both use various water supply forecast tools and each organization informs JVWCD of the planned yield of their respective projects in the late spring of each calendar year. JVWCD is relying on the information provided by CUWCD and PRWUA as data for two of the three supply availability level defining criteria described in Section 3.3. Another important source of JVWCD supply is its high-quality groundwater wells. A metric related to the condition of the Salt Lake Valley deep aquifer will also be used to determine the availability of this source of supply and serves as the third water supply availability level defining criteria listed in Section 3.3. The availability of other JVWCD water supplies can be reasonably estimated using these water supply availability level criteria for these three supply sources.

Several of JVWCD's Member Agencies operate pressurized secondary irrigation systems which rely on shares of Utah Lake/Jordan River rights held by private irrigation companies. These private irrigation companies operate canals and as members of the ULWUA, these companies jointly own the Utah Lake pump station. Although neither JVWCD nor its Member Agencies directly control the distribution of ULWUA supplies, secondary irrigation deliveries constitute a significant portion (approximately 25 percent) of the total M&I water delivered in the JVWCD service area. Therefore, it is important that this DCP include provisions to coordinate with ULWUA and develop consistent water supply availability level criteria and complementary responses to the extent possible.

3.2 Water Supply Availability Levels

This JVWCD DCP will use water supply shortage conditions to define five water supply availability level designations. These conditions are visualized using a gradual shift from normal (green) to critical/exceptional (brown) conditions as represented in the dial shown in Figure 3-1. To provide a further breakdown, Table 3-1 summarizes each water supply availability level with their associated water shortage condition.

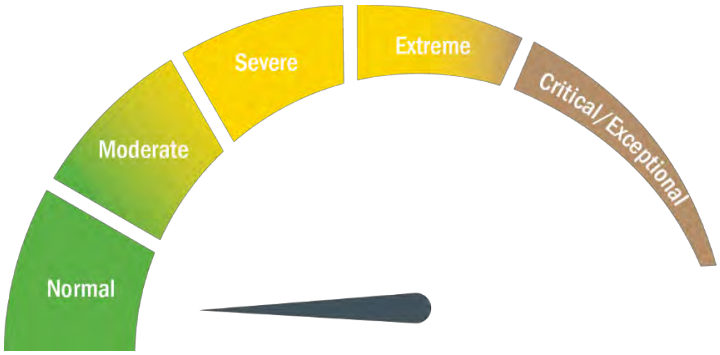
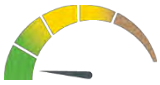
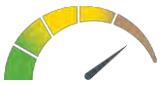


Figure 3-1 Shift in water supply shortage conditions visualized from normal (green) to critical/exceptional (brown)

Table 3 1. Water Supply Availability Level		
Water Supply Availability Level	Advisory Code	Water Shortage Description
Level 0		Normal: Normal or near normal water supply conditions exist
Level 1		Moderate: Water supplies are moderately below normal
Level 2		Severe: Water supplies are severely below normal
Level 3		Extreme: Water supplies are extremely below normal
Level 4		Critical/Exceptional: Water supplies are exceptionally and critically below normal

3.3 Water Supply Availability Level Triggering Criteria

JVWCD will use the following three criteria to guide the determination of water supply availability level. Specific triggering parameters in each of the three criteria will apply to the various water supply availability levels and typically, all three parameters need to be satisfied to establish the applicable water supply availability level.

1. **Supply availability of CUP with storage in Jordanelle reservoir as provided by CUWCD** – CUWCD administers the CUP supply stored in Jordanelle reservoir to accommodate single year deliveries which can exceed the JVWCD contract amount (50,000 AF) so long as the 5-year running average of the delivery amounts is less than the contract amount. This provides valuable flexibility and supply resiliency to JVWCD. JVWCD can develop multiple water supply forecast scenarios based on the current multi-year running average amount (i.e. account balance and amount of "overdraft" which may be committed to the current year supply) and the current year snowpack and water supply forecast. For the current year snowpack and water supply forecast, CUWCD uses forecasts published by the Colorado Basin River Forecast Center (CBRFC) section of the National Weather Service/National Oceanic and Atmospheric Administration.
2. **Supply availability (declared allocation) of Provo River Project (Deer Creek storage) as determined by PRWUA** – For the current year snowpack and water supply forecast, PRWUA uses

forecasts published by the Colorado Basin River Forecast Center section of the National Weather Service/National Oceanic and Atmospheric Administration (CBRFC).

3. **Supply availability of high-quality groundwater** – Condition of Salt Lake Valley deep aquifer as reported in Groundwater Conditions in Utah annual report published by Utah Dept of Natural Resources, Utah Dept of Environmental Quality, and United States Geological Survey (most recent version is the conditions as of spring 2018). JVWCD will manage to the safe yield of the Salt Lake Valley deep aquifer. Triggering criteria for various water supply availability levels will be determined based on the quantity of diversions to compensate for shortages, and whether the 3-year average exceeds safe yield. Groundwater is naturally more resilient to climatic changes than surface water resources, responding more slowly to shifts in precipitation and temperature patterns. Utilizing groundwater as a resource, when sustainably managed, supports a climate resilient water supply portfolio.

JVWCD leverages studies by DeRose et al. (2015) and Bekker et al. (2014), which used dendrochronology[1] along the Weber and Bear Rivers to understand and plan for potential future projections. These studies provide tree ring data dating thousands of years that indicate significant climate variability including longer and drier drought periods than experienced in recent history. JVWCD has conducted and considered water supply scenarios under adverse climate conditions to understand supply side impacts (see example in Figure 3-2 from Forsyth and Schultz, 2018), and will continue to look for long-term predictive indicators and will use those for future updates.

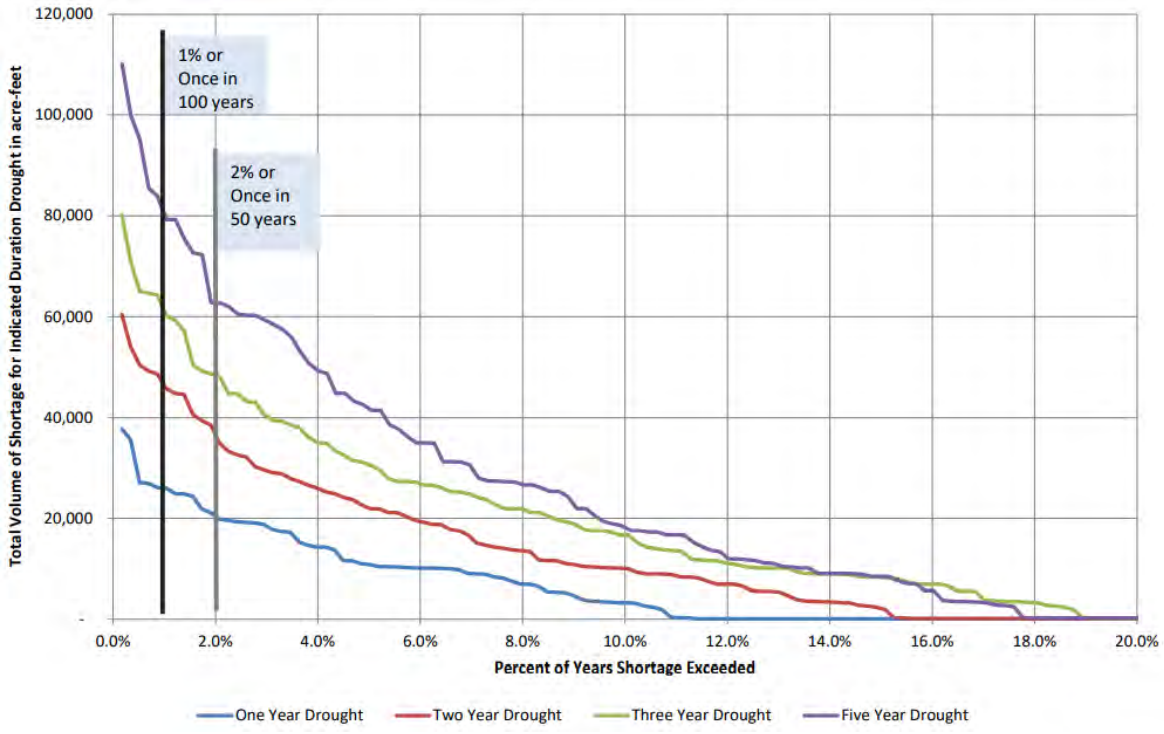


Figure 3-2. Simulated JVWCD M&I System Shortages versus Frequency by Drought Duration, from 578 years of Weber River Paleo Hydrology Data adjusted for Adverse Climate Variation from the CUP Water Supply Variability Study by HDR in Appendix C of in Forsyth and Schultz (2018).

[1] Dendrochronology is the science and study of annual growth rings of timber and trees (e.g. tree ring data) to determine dates and chronological orders of past events (e.g. drought).

Further elaboration on the understanding and accounting of climate change risks for JVWCD's future supply portfolio is provided in subsection 4.5 Climate Change Risk presented in Section 4 Vulnerability Assessment.

3.4 Framework for Characterization and Confirmation of Drought

JVWCD will generally determine the water supply availability level condition between April 15th and June 15th in each calendar year. During this period, there will be reasonable confidence in the snowpack conditions and runoff forecasts for CUWCD and PRWUA to determine the water supply availability of the respective projects which they operate and administer. JVWCD will also evaluate the Salt Lake Valley deep principle aquifer water level conditions during this period.

Each year JVWCD will convene a drought monitoring committee which will include one representative from each Member Agency and applicable JVWCD staff. This drought monitoring committee will initially meet in March and at that meeting, JVWCD will present M&I water supply forecast information and Utah Lake conditions affecting the ULWUA supply. The committee will determine a preliminary water supply availability level recommendation based on a majority vote of the committee members, which will be presented at the JVWCD annual Member Agency meeting in April of each calendar year. Following the presentation of the preliminary water supply availability level recommendation at the annual Member Agency meeting, the committee will consider feedback and updated water supply forecast information and will determine a final recommendation no later than May 1. JVWCD will establish the water supply availability level by formal action of its Board of Trustees at its May Board meeting and will encourage each Member Agency to similarly establish the water supply availability level by formal action of their respective governing bodies.

In developing its recommendations, the drought monitoring committee will consider the three determining criteria defined in each of the water supply availability levels. The criteria are intended to provide guidance to the committee, but it is expected that the committee will need to exercise conservative judgement to hedge against more extreme consequences resulting from potential multi-year drought events beyond the current year being evaluated.

The established water supply availability level will typically remain in effect until the end of the calendar year, but JVWCD will conduct monthly re-assessments throughout the year and will inform its Member Agencies of changes that may be considered. JVWCD will re-reconvene the drought monitoring committee prior to making any changes to the established water supply availability level. Figure 3-3 shows the timeline of the drought monitoring process.

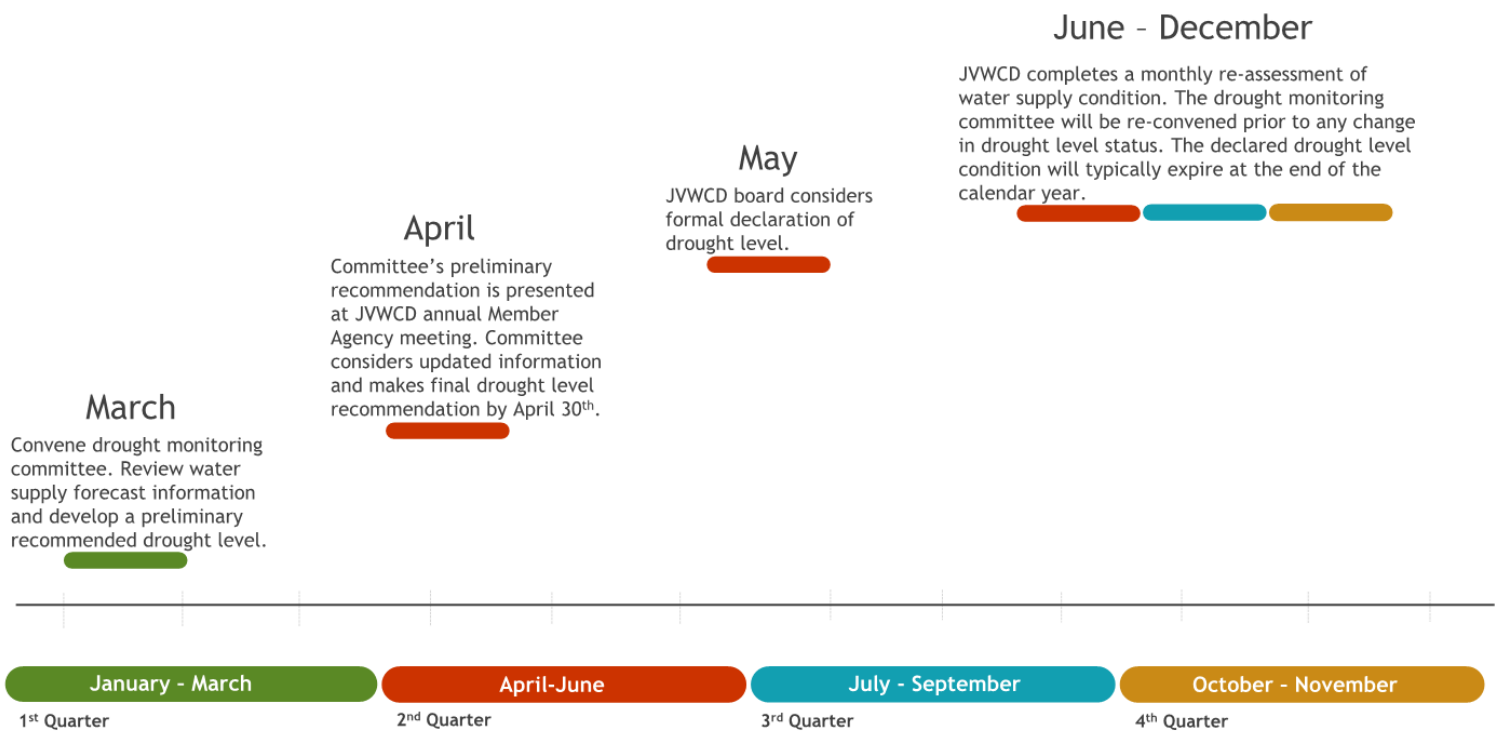


Figure 3-3. JVWCD drought monitoring process timeline

JVWCD will coordinate with the ULWUA as it establishes the water supply availability level and will seek to develop consistent and complementary responses to water supply availability level conditions. The ULWUA will determine its own criteria for each water supply availability level (primarily based on the level of Utah Lake) and response actions. Drought response actions are discussed in greater detail in Section 5.

The U.S. Drought Monitor Intensity Classification (DMIC) system is based on precipitation measurements and provides an indication of various levels of drought conditions relative to normal precipitation. Most of the JVWCD water supply is based on projects which include storage reservoirs (e.g. Jordanelle, Deer Creek, Salt Lake Valley deep aquifer) which can yield water supplies in drought years using water stored from previous years of normal precipitation. The DMIC does not consistently correlate with the availability of the JVWCD water supply, so it will not be directly used as criteria to determine water supply availability level.

The triggering criteria for each water supply availability level are summarized in Table 3-2 and described in more detail in the following subsections.

Table 3 2. Water Supply Availability Levels and Triggering Criteria

Water Supply Availability Level	Water Shortage Description	Triggering Criteria Applied to Water Supply Availability Levels[a]		
		CUWCD Supply Availability (Jordanelle storage of CUP)	PRWUA Supply Allocation (in the Provo River Project)	Salt Lake Valley Groundwater Conditions
 Level 0	Normal	at least 95% supply availability	at least an 80% supply allocation	3 year average diversions less than safe yield
 Level 1	Moderate	at least a 95% supply availability	75-80% supply allocation	JV gw diversions to compensate for shortage exceeds 12,000 AF, or 3 year average exceeds safe yield
 Level 2	Severe	at least 90-95% supply availability	75-80%supply allocation	JV gw diversions to compensate for shortage exceeds 16,000 AF, or 3 year average exceeds safe yield
 Level 3	Extreme	at least 90-95% supply availability	<75%supply allocation	JV gw diversions to compensate for shortage exceeds 20,000 AF, or 3 year average exceeds safe yield
 Level 4	Critical/Exceptional	less than 90% supply availability	less than 45% supply allocation	JV gw diversions to compensate for shortage exceeds 20,000 AF, or 3 year average exceeds safe yield

a. Typically all three criteria need to be satisfied to establish a water shortage level condition

Level 0 (Normal)

Level 0 will be established when normal or near normal water supply conditions exist. In Level 0, JVWCD expects to have adequate supplies to satisfy all retail customer needs and all wholesale minimum contract amounts. JVWCD expects it will also be able to provide for the 20 percent contingency amount noted in the wholesale water purchase agreements plus additional deliveries beyond 20 percent of minimum contract amount. The following criteria will be considered in the establishment of this water supply availability level:

1. CUWCD confirms at least 95 percent supply availability of Jordanelle storage of CUP
2. PRWUA declares at least an 80 percent supply allocation in the Provo River Project
3. The 3 year moving average of total groundwater diversions from Salt Lake Valley deep principal aquifer is less than 165,000 AF (100 percent of the safe yield established in the State Engineer's Salt Lake Valley Groundwater Management Plan). The source of this data is the annual "Groundwater Conditions in Utah" cooperative investigations report published by Utah Dept of Natural Resources, Utah Dept of Environmental Quality, and United State Geological Survey

Examples of past years with below average water supply conditions that would be classified as Level 0 (Normal) include 2015 and 2018.

Water Supply Availability Level 1 (Moderate)

Water supply availability level 1 will be established when water supplies are moderately below normal. Through the implementation of Level 1 drought response actions, JVWCD expects to have adequate supplies to satisfy retail customer needs, and wholesale minimum contract amounts plus 20 percent, but will likely be unable to provide any deliveries beyond the minimum contract amount plus 20 percent. The following criteria will be considered in the establishment of this water supply availability level:

1. CUWCD confirms at least a 95 percent supply availability of Jordanelle storage of CUP
2. PRWUA declares a 75 to 80 percent supply allocation in the Provo River Project, and JVWCD does not have sufficient holdover amounts from previous years to make up the shortfall
3. JVWCD groundwater diversions from the Salt Lake Valley deep principal aquifer necessary to replace the water supply shortages resulting from criteria 1 or 2 projected to exceed 12,000 AF, or the 3-year moving average of total groundwater diversions exceeds 165,000 AF (which is the fixed safe yield established in the State Engineer's Salt Lake Valley Groundwater Management Plan, unless modified by the State Engineer)

Examples of past years with below average water supply conditions that would be classified as water supply availability level 1 (Moderate) include 2003 and 2013.

Water Supply Availability Level 2 (Severe)

Water supply availability level 2 will be established when water supplies are severely below normal. Through the implementation of Level 2 drought response actions, JVWCD expects to have adequate supplies to satisfy retail customer needs, and wholesale minimum contract amounts plus modest amounts (5 to 10 percent) beyond minimum contract amounts. The following criteria will be considered in the establishment of this water supply availability level:

1. CUWCD confirms at least 90 to 95 percent supply availability of Jordanelle storage of CUP
2. PRWUA declares a 75 to 80 percent supply allocation in the Provo River Project, and JVWCD does not have sufficient holdover amounts from previous years to make up the shortfall

3. JVWCD groundwater diversions from the Salt Lake Valley deep principal aquifer necessary to replace the water supply shortages resulting from criteria 1 or 2 projected to exceed 16,000 AF, or the 3 year moving average of total groundwater diversions exceeds 165,000 AF (safe yield established in the State Engineer's Salt Lake Valley Groundwater Management Plan)

Examples of past years with below average water supply conditions that would be classified as water supply availability level 2 (Severe) include 1991-92 and 2004.

Water Supply Availability Level 3 (Extreme)

Water supply availability level 3 will be established when water supplies are extremely below normal. Through the implementation of Level 3 drought response actions, JVWCD expects to have adequate supplies to provide for restricted retail customer needs, and wholesale deliveries restricted to minimum contract amounts. The following criteria will be considered in the establishment of this water supply availability level:

1. CUWCD confirms at least 90 to 95 percent supply availability of Jordanelle storage of CUP
2. PRWUA declares less than 75 percent supply allocation in the Provo River Project, and JVWCD does not have sufficient holdover amounts from previous years to make up the shortfall
3. JVWCD groundwater diversions from the Salt Lake Valley deep principal aquifer necessary to replace the water supply shortages resulting from criteria 1 or 2 projected to exceed 20,000 AF, or the 3 year moving average of total groundwater diversions exceeds 165,000 AF (safe yield established in the State Engineer's Salt Lake Valley Groundwater Management Plan)

Examples of past years with below average water supply conditions that would be classified as water supply availability level 3 (Severe) include 1977.

Water Supply Availability Level 4 (Critical/Exceptional)

Water supply availability level 4 will be established when water supplies are exceptionally and critically below normal. Through the implementation of Level 4 drought response actions, JVWCD projects to have adequate supplies to support essential needs of its retail and wholesale customers while minimizing economic damage. JVWCD expects it will be unable to deliver wholesale minimum contract purchase amounts and will need to allocate reduced supplies in proportion to the minimum contract amounts. The following criteria will be considered in the establishment of this water supply availability level:

1. CUWCD confirms less than 90 percent supply availability of Jordanelle storage of CUP
2. PRWUA declares less than 45 percent supply allocation in the Provo River Project, and JVWCD does not have sufficient holdover amounts from previous years to make up the shortfall
3. JVWCD groundwater diversions from the Salt Lake Valley deep principal aquifer necessary to replace the water supply shortages resulting from criteria 1 or 2 projected to exceed 20,000 AF, or the 3 year moving average of total groundwater diversions exceeds 165,000 AF (safe yield established in the State Engineer's Salt Lake Valley Groundwater Management Plan)

Conditions that would trigger a water supply availability level 4 designation have not been experienced since the completion of the M&I System of the Bonneville Unit of the CUP (mid 1990's). However, as mentioned earlier in this section, multiple dendrochronology (tree ring) studies conclude that droughts significantly more severe and longer duration than identified in the historical record have occurred in the past and are likely to occur again.

Section 4

Vulnerability Assessment

This section summarizes the approach, analysis, and results of the JVWCD DCP vulnerability assessment. The plan will focus on the drought measures and response actions that can be implemented over the next 10 years. Therefore, the assessment is focused on understanding future conditions using a 2030 planning horizon. Subsections delve into potential future supply shortfalls, risk factors potentially impacting these supplies, water supply source vulnerability, as well as further consideration for climate change risk and sector-specific impacts. The section rounds out with priority areas on which to focus for development of mitigation measures and response actions.

The approach to the vulnerability assessment involves identifying potential supply shortfalls, and the risks that could exacerbate potential deficits and their impacts on JVWCD's water resource portfolio. This chapter provides the description of the risk assessment and its main components, likelihood and consequence of source impairment for a one in 50-year, 5-year drought during the year 2030. Likelihood for the purpose of this assessment is defined as a qualitative score based on risk factors that contribute to reduced supply (see Section 4.2), while consequence is characterized as a quantitative score based on significance (reliance) of supply source (see Section 4.3). The relationship between these components is provided in the following equation:

Risk of reduced JVWCD supply = Likelihood of reduced JVWCD supply x Consequence of reduced JVWCD supply

Section 4.4 provides the analysis and results of the likelihood and consequence components described above and indicates which critical supplies for JVWCD are most vulnerable for JVWCD's water portfolio. The sections on climate change (Section 4.5) and on sector impacts (Section 4.6) provide further insight, taking into consideration the results of this analysis and connecting this to longer planning horizons considered in JVWCD's past climate change-impact related studies, and to how impacts may affect specific sectors. The culmination of this chapter's contents provides support for how to identify and consider alternatives for mitigating vulnerability to drought.

4.1 Potential for Future Supply Shortfalls

Drought supply shortfall can occur in two ways, a shortfall of source water yields as compared to annual water demand and/or a shortfall in supply production capacity compared to maximum day demand in a hot, dry year.

4.1.1 Annual Yield Shortfall

For source water yields compared to annual demand JVWCD has established a level of service goal to have adequate water supply for 105 percent of system demands in a 1 in 50-year, 5-year duration drought. The additional 5 percent serves as a buffer for uncertainty in demand projections. Through careful long-term planning and acquisition of water rights JVWCD has secured the water resources to meet this level of service for what is currently understood to be a 1 in 50-year, 5-year duration drought. Figure 4-1 shows a comparison of the demand projections to the estimated 1 in 50-year, 5-year drought yields for the sources to which JVWCD has acquired water rights. The figure shows that, based on the supply requirements (dashed line) supply capacity for the next set of water rights (ULS water) is needed by 2029.

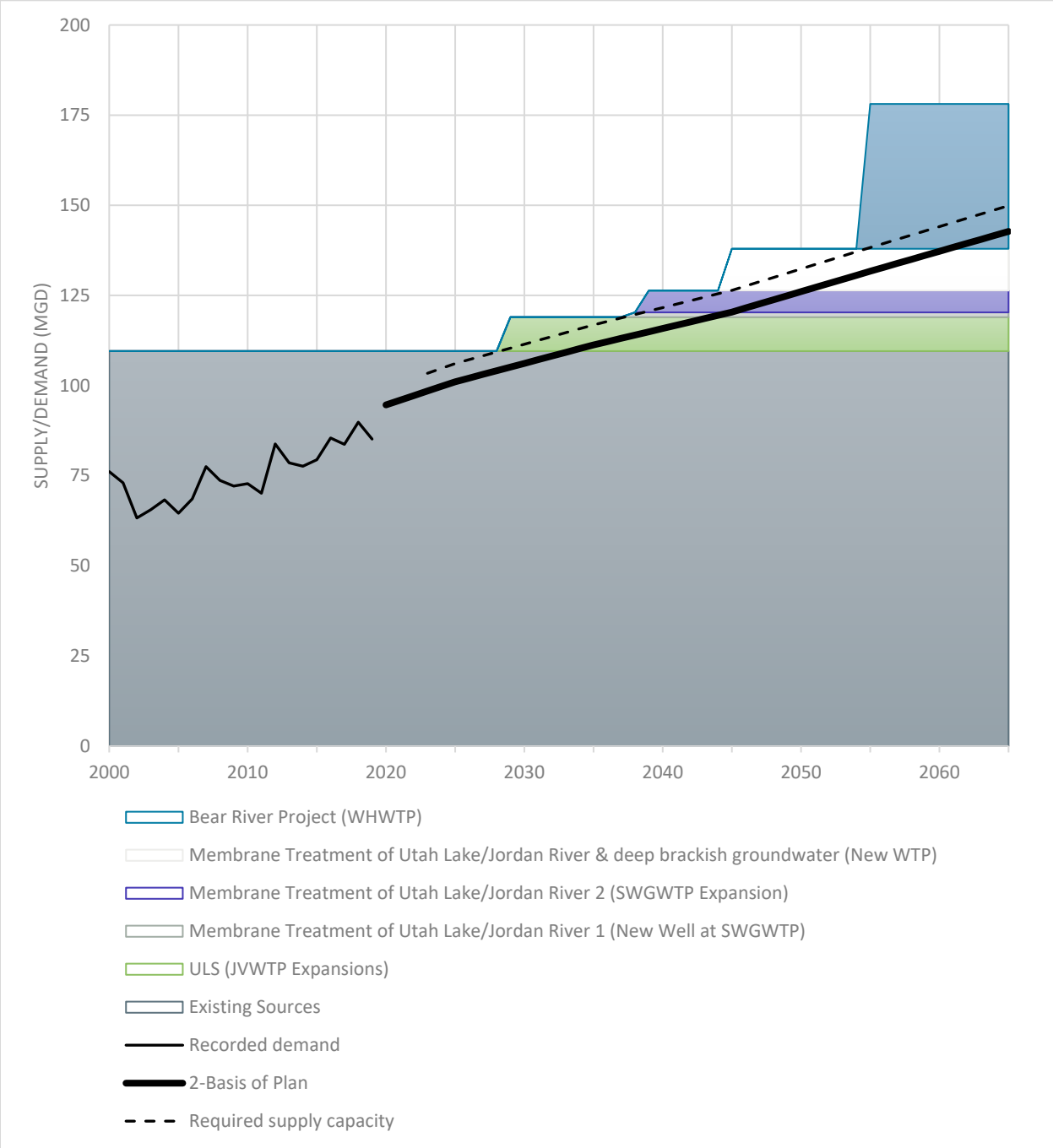


Figure 4-1. Comparison of demand projections to estimated 1 in 50-year, 5-year drought yields for sources with acquired water rights

It should be noted that the source water yields shown in the figure are for yields for a recurrence interval drought that is estimated from historical paleo hydrology records. As discussed in greater detail in Sections 4.2.2 and 4.5, climate change presents significant uncertainty in how drought levels will be elevated at various recurrence intervals, and subsequently how source water yields will be impacted at each interval. CUWCD estimates that the surface water allocations that JVWCD relies on could go from a 25 percent reduction for a 1 in 50-year, 5-year duration drought to a 50 percent reduction with adverse climate change impacts, and from a 27 percent reduction for a 1 in 100-year, 5-year duration drought to a 54 percent reduction with adverse climate change impacts as shown in Table 4-1.

Table 4 1. CUP Supply CUPSIM Modeling Results for Five Year Duration Drought (adapted and recreated from Forsyth and Schultz 2018, p.33)

Water Supply	Avgerage Annual Allocation	Average Annual Reduction[a]	Percent reduction	Average Annual Reduction[a] Adverse Climate	Percent reduction	Average Annual Reduction[b]	Percent reduction	Average Annual Reduction[b] Adverse Climate	Percent Reduction
CUP Supply	50,000	2,640	5.3%	12,560	25.1%	3,660	7.3%	15,840	31.7%
CUP - ULS Supply	16,400	5,860	35.7%	13,580	82.8%	6,460	39.4%	14,960	91.2%
Lower Provo Natural Flow	100,000	33,400	33.4%	57,600	57.6%	35,200	35.2%	59,400	59.4%
Total	166,400	41,900	25.2%	83,740	50.3%	45,320	27.2%	90,200	54.2%

a. 1 in 50, 5year Duration
b. 1 in 100, 5year Duration

Approximately, 70 percent of JVWCD supply is surface water. The other 30 percent coming from groundwater has proven to be resilient to drought. With adverse climate change impacts reducing JVWCD surface water supplies by 50 percent or more under drought conditions, JVWCD and its customers must be prepared to restrict deliveries to 65 percent (30 percent from groundwater plus 1/2 the typical surface water supply) or less of typical year supplies.

4.1.2 Production Capacity Shortfall

Figure 4-2 shows the projected maximum day demand for hot, dry conditions compared to the JVWCD maximum supply capacity. The comparison shows that the new wells must be developed immediately and that the JVWTP Phase 1 expansion must be completed by 2024 to continue meeting maximum day demand in the system. JVWCD's level of service goal is to maintain adequate capacity for 110 percent of the projected maximum daily demand (MDD) to account for uncertainty in demand projections. JVWCD is taking efforts, like its WES, to reduce outdoor water use that has the highest influence on maximum day demand, but it will take many years for those measures to have significant impact on the demands.

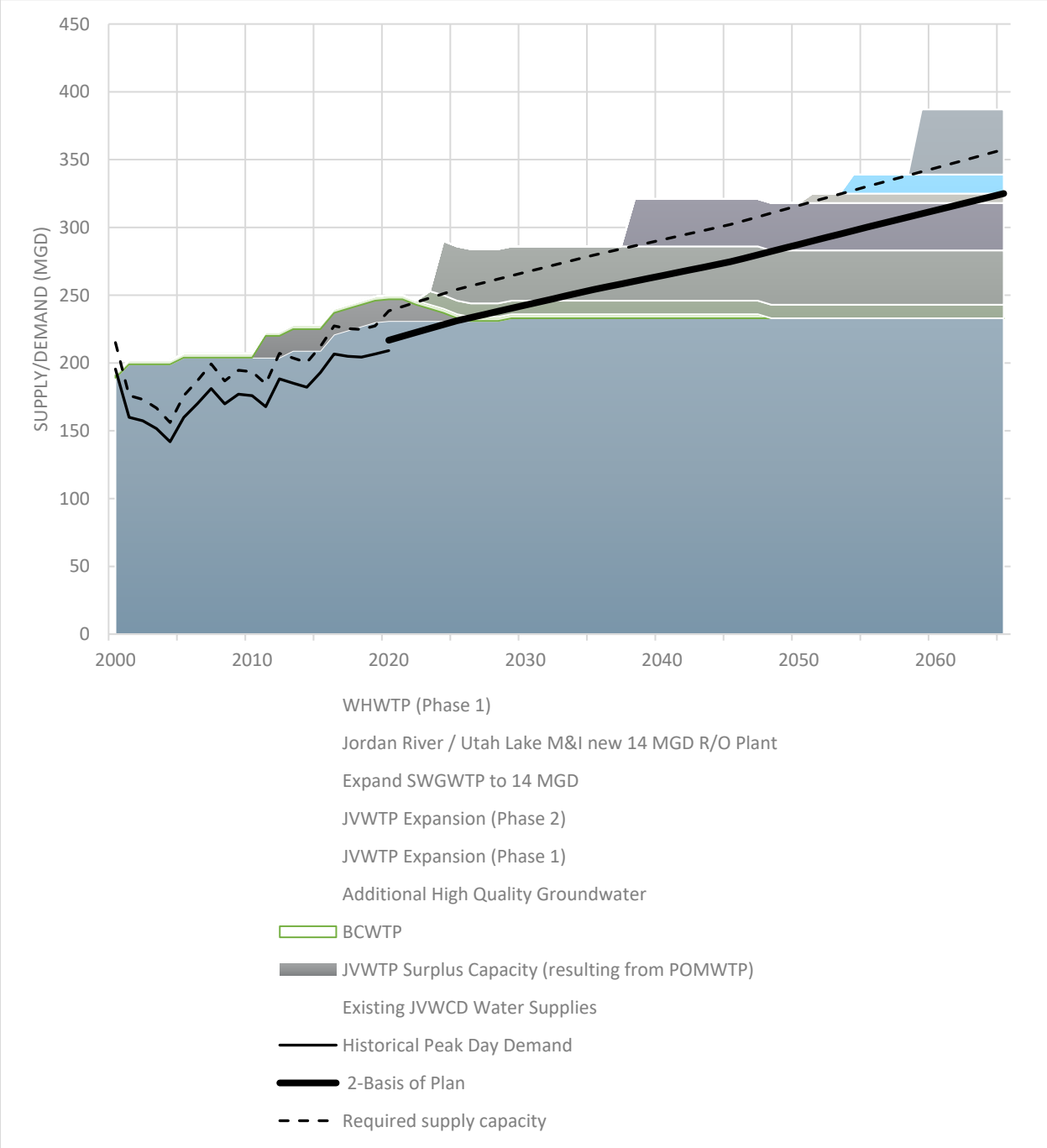


Figure 4-2. Projected maximum day demand for hot, dry conditions compared to the JVWCD maximum supply capacity

4.1.3 Supply Improvement Summary

The annual yield and production capacity analyses were used to determine the critical year by which each supply improvement is needed. This timing is summarized in Table 4-2. All sources except for the CUP are new sources, and all production facilities except the SWFWTP are new facilities.

Table 4 2. Supply/Production Capacity Timing		
Source(s)	Production Facility	Completion Year
Additional High-Quality Groundwater	New wells	2022
CUP, PRWUC Shares, Additional Provo River sources	JVWTP Expansion (Phase 1)	2024
ULS		2029
ULS	JVWTP Expansion (Phase 2)	2037
Membrane Treatment of Utah Lake/Jordan River water	Existing SWGWTP	2038
Additional Membrane Treatment of Utah Lake/Jordan River water	Expand SWGWTP to 14 mgd	2039
Membrane Treatment of Utah Lake/Jordan River & deep brackish groundwater	Jordan River/Utah Lake M&I new 14 mgd RO Plant	2045
Bear River Project	West Haven WTP (Phase 1)	2055

4.2 Risk Factors

Likelihood for reduced supply can be investigated through the use of "risk factors" that focus on potential impacts to critical supply resources. A list of six uncertainties or "risk factors" was developed in coordination with JVWCD staff and input from Task Force members to understand future conditions. These risk factors address future changes that may impact critical resources for JVWCD's water supplies and distribution and are listed in Table 4-3. Further description of these risk factors is provided following Table 4-3 within this section.

Table 4 3. Risk Factors	
Risk Factor	Description
1. Dry year supply limitations	• Limitations due to in-stream/downstream flow requirements • Groundwater production capacity limitations
2. Climate Change	• Altered or extreme precipitation patterns • Increased frequency and or severity of droughts, including beyond historical record • Higher water temperatures • Reduced snowpack and earlier runoff patterns
3. Regulatory, environmental, and water rights constraints	• Water rights and contract limitations • More stringent water quality regulations (State and Federal) • More stringent environmental protection regulations
4. Cost constraints and affordability	• Aging infrastructure and rising costs for infrastructure improvements • Pumping costs • Increased treatment requirements
5. Source water quality degradation	• Algae by-products • Salinity and nutrients • Constituents of concern • Groundwater contamination • Differing water quality • Contamination spill • Forest/Rangeland wildfires
6. Asset/Facility Susceptibility to Disruption	• Potential for disruption through asset failure • Susceptibility to hazards (including seismic, flooding, land subsidence) • Lack of redundancy for critical facilities

4.2.1 Dry Year Supply Limitations

Water shortages during drought may be exacerbated due to in-stream or downstream flow requirements in the form of a change in the amount of flow, the timing of releases (including for fish spawning or recreational purposes). Groundwater sources can also be affected by production capacity limitations due to the need to stay within sustainable pumping levels, and to meet demands for groundwater-dependent ecosystems.

4.2.2 Climate Change

With impacts from climate change the timing or method of source water delivery may change entirely, and supplies need to be resilient and flexible to these changes. This risk factor also includes reductions in water supply due to the effects of warming, including greater evapotranspiration, and potential increased water demand. Current modeling associated with the CUP anticipate surface water supply reductions due to climate change (see Section 4.5 for impacts beyond the 2030 planning horizon).

4.2.3 Regulatory, Environmental, and Water Rights Constraints

Regulatory, environmental, and water rights constraints due to current or future water rights and contracts could impact supply reliability. Some of the water rights are direct flow only and have limitations when JVWCD can start diverting flow. Additionally, some supplies are subject to strict agreements or contract terms that may be inherently unmet during drought. Limitations due to regulatory changes and changes in environmental protection regulations can also affect the water quality and water delivery of each source.

4.2.4 Cost Constraints and Affordability

This risk factor points to ways in which rising water rates (whether due to needed infrastructure improvement costs, pumping, or treatment) can make some sources unaffordable for customers within the service area.

4.2.5 Source Water Quality Degradation

Some water sources are more susceptible to natural or anthropogenic degradation of water quality. This includes degradation due to continued urbanization near the water sources. Changing surfaces from pervious to impervious causes more runoff and less infiltration allowing water to collect additional contaminants. Other potential sources of water quality degradation include increased nutrient loading from wastewater discharges or agriculture that may cause algae blooms and algae by-products. Forest or rangeland fires can also cause water quality challenges. Additionally, past events have demonstrated potential vulnerability to contamination due to chemical spills for some sources.

4.2.6 Asset/Facility Susceptibility to Disruption

Asset/facility susceptibility to disruption includes disruption due to seismic, flooding, or land subsidence events that may cause a major disruption or complete shutdown of key system assets or facilities. Water supply vulnerability increases for sources without redundant systems or with aging assets. Seismic events are likely along the Wasatch Front, making assets that are properly designed to withstand these events critical within this area.

These risk factors were analyzed for each critical supply source and a summary of potential impacts is identified in Table 4-4.

Table 4 4. Summary of Risk Factors Contributing to Potential Reduction or Loss of Critical Resources (scale of 1 to 5, low to high likelihood of impairment beyond a 1 in 50 year, 5 year drought in 2030)

Supply Source	Dry Year Supply Limitations	Climate Change	Regulatory, Environmental, and Water Rights Constraints	Cost Constraints and Affordability	Source Water Quality Degradation	Asset/Facility Susceptibility to Disruption	Likelihood – Cumulative Effect of Factors	Consequence – Significance to Drought Supply Portfolio
Likelihood	1	3	2	2	3	2		
CUP Federal project administered by CUWCD, storage in Jordanelle Reservoir	• Limitations due to in-stream/downstream flow requirements • Dry year supply limitations, especially for multiple dry years	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield) • Increase in demand based on longer growing seasons (may mean supplies do not go as far in the future given changed conditions)	• Increased environmental regulations • Unforeseen changes in release requirements and storage rights • Potential changes in current water rights and water rights law (e.g. recent local news articles and reports, and water rights for upper Colorado River Watershed) • Flexibility through a +/-20% of JVWCD allocation provision (maintaining average over 5-7yr period)	• Failure due to aging infrastructure • Customer affordability issues with rising cost of water (e.g. potential cost of infrastructure improvements) • Costs associated with increases/alteration of environmental regulations. • Gravity systems have lowered costs	• Algal by-products/blooms during drought (e.g. State-level studies in progress on this topic) • Weeds • Salinity and nutrients (esp. more recent issues with nutrient loading and need to address nitrates more than in the past) • Water quality impacts from wildfires • Misc. manmade events (e.g. diesel spill) • Urbanization impacts on source water quality (increase in impervious surfaces - esp. around Jordanelle Reservoir, e.g. parking lots, roads, as well as sediment and organic matter). Note: All top three seem pretty likely. Urbanization may be biggest risk to Jordanelle and Provo River Water.	• Conveyance lines cross fault lines (e.g. Wasatch Fault Zone) • Jordanelle Reservoir and Dam built to withstand 7.5 Richter scale magnitude at Wasatch Fault Zone, and 6.5 magnitude for local earthquake (directly below dam). • Flood risk in Provo River and upper tributaries.	2	40%
Likelihood	1	2	3	2	2	4		
High Quality Groundwater Wells primarily in southeast region of Salt Lake Valley deep aquifer. No treatment required other than adding chlorine and fluoride. Show lower production in average years to provide more reliable production of drought year yield.	• Dry year supply limitations • Groundwater production capacity limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • More frequent and severe droughts (adverse impacts to reliable yield, including for groundwater replenishment) • Inefficient runoff impacts to groundwater replenishment	• Increased environmental regulations • Potential changes in current water rights • Unforeseen changes in allocation or withdrawal requirements • More stringent water quality regulations (State and Federal) • Potential requirements or planning enacted in response to increased urbanization (e.g. reduction of pervious surfaces) Note: At least a 3, need to consider in-practice water rights on paper may differ from what is available in practice	• Low treatment costs (limited treatment required) • Groundwater pumping costs	• Generally very good supply source quality • Salinity and nutrients (Brackish groundwater migration) • Wastewater discharges • Contamination (intentional and unintentional events)	• Failure due to aging infrastructure (e.g. age of wells) • Seismic risk due to proximity of infrastructure to faults (e.g. Wasatch Fault Zone) • Difficulty in reliably maintaining well equipment. Wells are unpredictable in terms of when they go down, but can anticipate 1/3 wells down at any one time	2	15%

Table 4 4. Summary of Risk Factors Contributing to Potential Reduction or Loss of Critical Resources (scale of 1 to 5, low to high likelihood of impairment beyond a 1 in 50 year, 5 year drought in 2030)

Supply Source	Dry Year Supply Limitations	Climate Change	Regulatory, Environmental, and Water Rights Constraints	Cost Constraints and Affordability	Source Water Quality Degradation	Asset/Facility Susceptibility to Disruption	Likelihood – Cumulative Effect of Factors	Consequence – Significance to Drought Supply Portfolio
Likelihood	4	3	3	2	4	4		
Canal Company Sources Primarily Utah Lake and also Jordan River	• Since 2008 several voluntary shutoffs have been performed due to supply limitations (e.g. early shutdown of canals due to lower level of Utah Lake in the past) • In 2018, due to lack of water availability in Utah Lake, secondary storage rights were not allowed to divert	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield)	• Increased environmental regulations • Additional regulation at state level to address water loss may impact canal companies' financial stability in the case that no state funding is provided • Potential changes to distribution which could impact canal diversions. State Engineer is currently developing a new Jordan River distribution plan. • Potential increased instream flow requirements or regulations addressing the water level of Great Salt Lake may leaving less water for canal use	• Utah Lake water is very inexpensive, cost to deliver the water to the canals is approximately $2 per acre-foot.	• Utah Lake Water Quality Study (currently about halfway through 5 year study) to be implemented by 2030 with the goal to reduce nutrient loading from point and non-point sources and decrease algal bloom events. • Utah Lake Island project could improve water quality by increasing depth and decreasing evaporation. • Higher frequency of Cyanotoxin contamination in the next 10 years • Growth of grasses • Past examples of shutdown for a week due to water quality issues and reliance on culinary supply	• Utah Lake Pump Station - New pump station built in 2013 and now operational, Turner Dam, JNPS, Several Diversion Structures. Overall facilities are in good shape. • Flood risk from canal breach can be very costly and could shutdown a canal for an entire season		The Canal Company Sources are not a direct critical supply source for the JVWCD portfolio. However, they are included in this analysis due to their importance as a source for agricultural users, and also as a source of secondary irrigation M&I deliveries by some JVWCD Member Agencies. There is potential for increased demand for JVWCD's resources should the Canal Company Supplies be compromised.
Likelihood	1	3	1	2	3	2		
PRWUC Shares JVWCD owns majority shares in PRWUC which has direct flow rights and some storage rights in Deer Creek Reservoir (This source includes Deer Creek Reservoir and direct stream flow from Provo River)	• Limitations due to in-stream/downstream flow requirements • Dry year supply limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield)	• Potential changes in current water rights • Unforeseen changes in release requirements and storage rights	• Pumping costs • Failure due to aging infrastructure • Customer affordability issues with rising cost of water (e.g. potential cost of infrastructure improvements)	• Issues due to nutrients likely (e.g. algal by-products/blooms during drought, agricultural runoff, wastewater discharges) • Water quality impacts from wildfires likely (e.g. sediment loads) • Misc. manmade events (e.g. truck submersion)	• Infrastructure (e.g., storage) costs, including rehabilitation and replacement • Conveyance lines cross fault lines (e.g. Wasatch Fault Zone) • Flood risk in Provo River and upper tributaries.	2	20-25%
Likelihood	3	3	1	2	3	2		
Additional Provo River sources Provo River rights per former West Union Canal Co shares owned. Also shares in other Provo River irrigation Co.	• Limitations due to in-stream/downstream flow requirements • Dry year supply limitation	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield)	• Increased environmental regulations • Potential changes in current water rights • Unforeseen changes in release requirements and storage rights	• Pumping costs • Infrastructure (e.g., storage) costs, including rehabilitation and replacement • Customer affordability issues with rising cost of water (e.g. potential cost of infrastructure improvements)	• Issues due to nutrients more likely (e.g. algal by-products/blooms during drought, agricultural runoff, wastewater discharges) • Water quality impacts from wildfires likely (e.g. sediment loads) • Misc. manmade events (e.g. truck submersion)	• Issues due to low flow, or higher than average peak flows • Failure due to aging infrastructure • Seismic risk due to proximity of infrastructure to faults (e.g. Wasatch Fault Zone) • Flood risk in Provo River and upper tributaries.	2	2%

Table 4 4. Summary of Risk Factors Contributing to Potential Reduction or Loss of Critical Resources (scale of 1 to 5, low to high likelihood of impairment beyond a 1 in 50 year, 5 year drought in 2030)

Supply Source	Dry Year Supply Limitations	Climate Change	Regulatory, Environmental, and Water Rights Constraints	Cost Constraints and Affordability	Source Water Quality Degradation	Asset/Facility Susceptibility to Disruption	Likelihood – Cumulative Effect of Factors	Consequence – Significance to Drought Supply Portfolio
Likelihood	1	2	2	2	2	2		
CWP Non-federal project owned by CUWCD. The supply is primarily from groundwater in Utah County (Vineyard area) supplemented by treated water from Provo River.	• Dry year supply limitations • Groundwater production capacity limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield, including for groundwater replenishment)	• Increased environmental regulations • Potential changes in current water rights • Unforeseen changes in allocation or withdrawal requirements • More stringent water quality regulations (State and Federal)	• Groundwater pumping costs • Infrastructure (e.g., storage) costs, including rehabilitation and replacement	• Salinity and nutrients • Agriculture runoff • Wastewater discharges	• Seismic risk due to proximity of infrastructure to faults (e.g. Wasatch Fault Zone)	2	9%
Likelihood	1	4	1	2	2	3		
ULS (future source in 2030) Federal Project - last phase of CUP. Administered by CUWCD, storage in Strawberry Reservoir	• Limitations due to in-stream/downstream flow requirements • Dry year supply limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack • More frequent and severe droughts (adverse impacts to reliable yield)	• Increased environmental regulations • Potential changes in current water rights • Unforeseen changes in release requirements and storage rights • Current petition contract for additional CUP water	• Customer affordability issues with rising cost of water (e.g. potential cost of infrastructure improvements) Gravity systems have lowered costs	• Algal by-products/blooms during drought • Salinity and nutrients • Water quality impacts from wildfires	• Issues due to low flow, or higher than average peak flows • Seismic risk due to proximity to faults (e.g. Wasatch Fault Zone) • Flood risk	2	8%
Likelihood	1	2	3	4	2	3		
SWJVGW Project Membrane treatment of brackish groundwater in southwest region of Salt Lake Valley deep aquifer. Part of Kennecott groundwater cleanup project and includes both the BCWTP and SWGWTP	• Dry year supply limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • More frequent and severe droughts (adverse impacts to reliable yield, including for groundwater replenishment) • Inefficient runoff impacts to groundwater replenishment	• Increased environmental regulations • Potential changes in current water rights for Utah Lake/Jordan River • Unforeseen changes in allocation or withdrawal requirements • Changes in requirements for groundwater dependent ecosystems (GDEs)	• High costs to operate RO systems required to treat this water. • Groundwater pumping costs	• Potential for new groundwater contaminant	• Newer plant built to current seismic codes. • Mechanical failure of well or treatment equipment	3	6%
Likelihood	1	3	3	4	3	3		
Membrane Treatment of Utah Lake/Jordan River SWGWTP was built to accommodate 2K AF of shallow groundwater treated with reverse osmosis membranes. Water rights supporting this shallow groundwater production are Utah Lake/Jordan River rights	• Dry year supply limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • More frequent and severe droughts (adverse impacts to reliable yield, including for groundwater replenishment)	• Increased environmental regulations • Potential changes in current water rights • Unforeseen changes in allocation or withdrawal requirements • Changes in requirements for groundwater dependent ecosystems (GDEs)	• High costs to operate RO systems required to treat this water. • Significant capital cost to dispose of treatment by-products. • Groundwater pumping costs	• Potential susceptibility to cyanotoxins from Utah Lake	• Newer plant built to current seismic codes. • Mechanical failure of well or treatment equipment	3	1%

Table 4 4. Summary of Risk Factors Contributing to Potential Reduction or Loss of Critical Resources (scale of 1 to 5, low to high likelihood of impairment beyond a 1 in 50 year, 5 year drought in 2030)

Supply Source	Dry Year Supply Limitations	Climate Change	Regulatory, Environmental, and Water Rights Constraints	Cost Constraints and Affordability	Source Water Quality Degradation	Asset/Facility Susceptibility to Disruption	Likelihood – Cumulative Effect of Factors	Consequence – Significance to Drought Supply Portfolio
Likelihood	3	4	1	2	3	4		
Local Mountain Streams Five small streams from Bell Canyon stream to Big Willow stream collected and treated at the SERWTP. No storage.	• No holdover storage capacity in the watershed to mitigate drought impacts from one-year to the next. Dry year supply limitations	• Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter) • Premature snowmelt and reduced snowpack (small steep watershed in which moderate increases in winter snowpack elevation can have a significant spring runoff) • More frequent and severe droughts (adverse impacts to reliable yield)	• Increased environmental regulations • Potential changes in current water rights	• Treatment costs	• Water quality impacts from wildfires with increased likelihood during drought (e.g. warmer, drier conditions) and increased risk to quality of local canyon creeks	• Conveyance lines from intake structures are currently showing signs of failure for which rehabilitation is needed. • Conveyance lines cross or are in close proximity to fault lines Flood risk	3	1%

Assumptions for above table:

- *Reservoirs and other surface water sources are assumed to have similar likelihood of impacts for climate change due to warmer temperatures and evaporative losses for lakes, reservoirs, and stream and inefficient runoff due to premature snowmelt.*
- *Groundwater supply source likelihood of impact from seismic events assumed to be mixed and depend on aquifer characteristics (see further information from the USGS "Groundwater Effects from Earthquakes" website in the DCP references list)*
- *Many of the same potential impacts occur across supply sources. However, differences exist related to potential infrastructure susceptibility, water rights (and in some cases existing petitions), and potential in-stream/downstream flow requirements.*
- *"Additional Provo River Sources" assumed to have similar likelihoods of impact as the PRWUC.*

4.3 Reliance on Critical Supply Sources

The consequence of critical supplies is demonstrated in the percentage of these supplies as part of JVWCD's water resource supply portfolio. The percentages as demonstrated in Figure 4-3 represent the portion of the supply as anticipated during the year 2030 and includes assumed impacts from climate change factored into the total supply source availability.

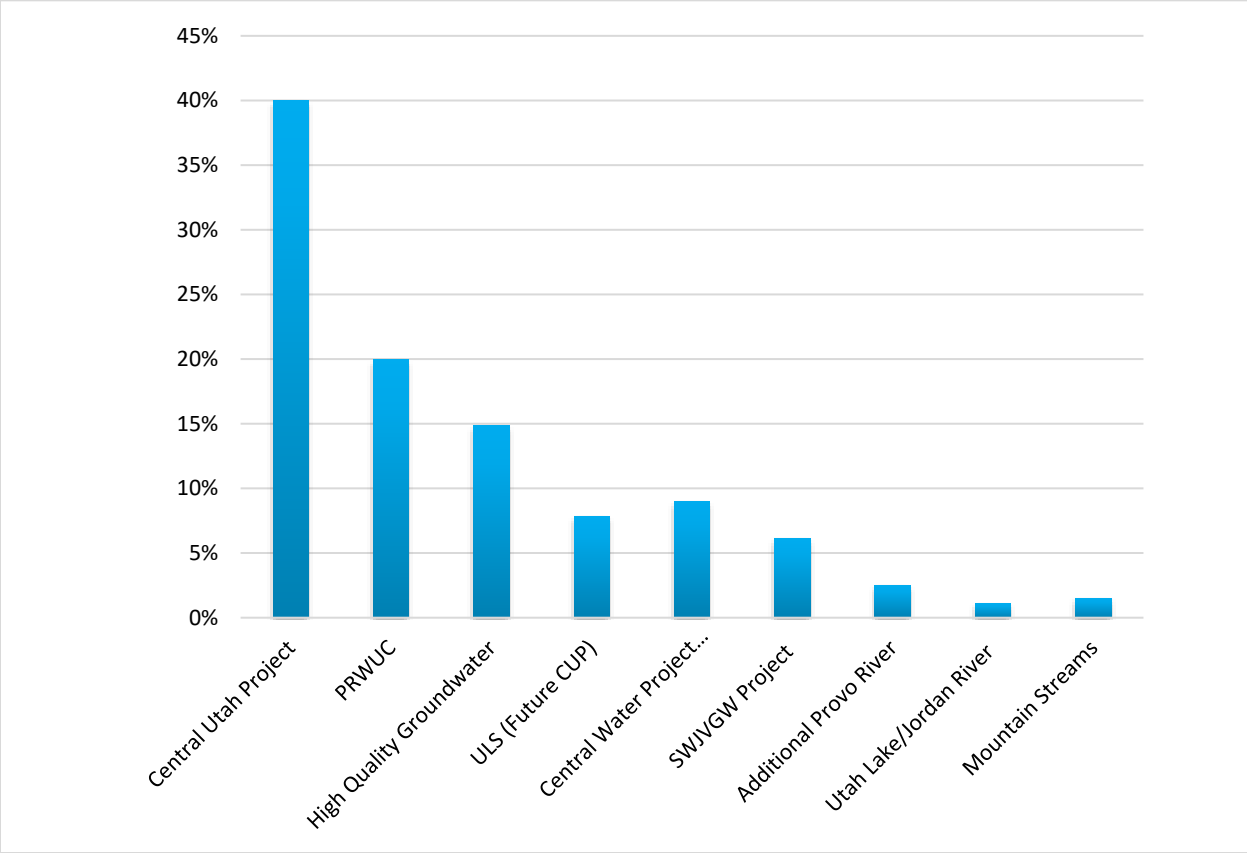


Figure 4-3. Reliance on critical supply sources

The percentages indicate the upper bound limit of potential impact to JVWCD's portfolio should the supply source become unusable or unavailable. JVWCD's long history of discerning supply planning is evidenced in the fact that no one source constitutes more than 50 percent of JVWCD's supply portfolio. This provides inherent resiliency in the system that is reflected in the vulnerability assessment below.

4.4 Supply Source Vulnerability

Results of the vulnerability assessment indicate which supplies JVWCD should focus on for the consideration and development of drought mitigation measures. The results of the assessment are presented in Table 4-4 which features a description of potential impacts of each risk factor for each of the critical supply sources for JVWCD's water supply portfolio.

Likelihood values for the risk factors presented in Section 4.2 are developed and applied to each of JVWCD supply sources. A likelihood score is given based on a scale of one to five (low to high)

likelihood of impact for the year 2030 under multi-year drought conditions. A cumulative likelihood score is provided and represents an average of the individual risk factors scores. As shown below in Figure 4-4, the supply sources with the highest likelihood of potential impact include Utah Lake, Jordan River, Mountain Streams, and the SWJVGW Project.

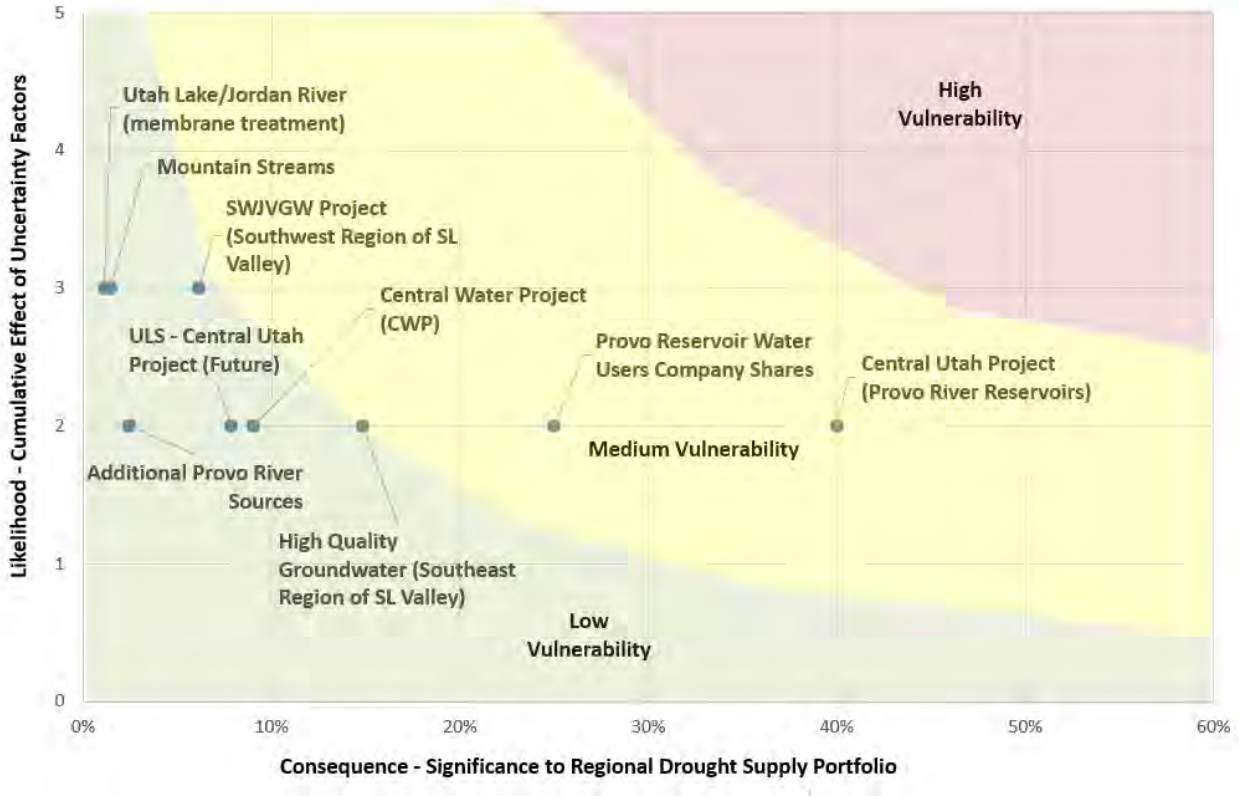


Figure 4-4. Vulnerability of critical supply sources indicated by combined values for likelihood and consequence

The summary also features the consequence, representing the significance of the supply source in terms of percentage of drought supply portfolio. Consequence is the percentage of the total drought supply portfolio the critical supply source provides for a 1 in 50 year, 5-year drought in 2030. As shown below in Figure 4-4, the supply sources with the highest consequence of potential impact include Central Utah Project (CUP), Provo Reservoir Water Users Company (PRWUC) Shares, and High-Quality Groundwater.

The values expressed for the risk factor likelihood and the consequence of potential impact of these supplies for JVWCD's portfolio can be expressed in a risk matrix (see Figure 4-4 below) to identify the supply sources that represent a high, medium, or low vulnerability for JVWCD's water portfolio.

Results of the vulnerability assessment indicated that there are no supply sources that fall within the "High Vulnerability" category. Therefore, the sources that represent the highest vulnerability, a combination of likelihood and consequence, in JVWCD's water supply portfolio fall within the "Medium Vulnerability" category and include the following:

- Central Utah Project (CUP), (40 percent of the supply portfolio)
- Provo Reservoir Water Users Company (PRWUC) Shares (20-25 percent of the supply portfolio)
- High Quality Groundwater (15 percent of the supply portfolio)

As indicated in Figure 4-4, the majority of the JVWCD's portfolio critical supply at the 2030 planning horizon fall within low to medium vulnerability. JVWCD's system has the highest potential for vulnerability from its CUP supply in in large part due to the higher percentage of the portfolio's reliance on this individual source. Sources with the highest likelihood of potential impact on JVWCD's supply portfolio include Utah Lake, Jordan River, Mountain Streams, and the SWJVGW Project.

4.5 Climate Change Risk

Climate change impacts are anticipated to exacerbate existing extreme weather events, including the length and intensity of drought and floods through changes in precipitation and temperature. Although there is uncertainty in the degree of potential changes in the hydrologic cycle, projected trends according to the Intergovernmental Panel on Climate Change indicate a high likelihood for increases in temperature and changes in the severity and intensity of precipitation events (Intergovernmental Panel on Climate Change [IPCC] 2013). At the regional and local level, studies by DeRose at al. (2015) and Bekker et al. (2014) using dendrochronology along the Weber and Bear Rivers in Utah have yielded relevant information on paleohydrology and have demonstrated "significant annual and decadal climate variability, including drought periods that are much longer and drier than those experienced in the recorded history" (Forsyth and Schultz 2018, p.4). The JVWCD service area makes use of these studies and past palaeohydrological data to understand what potential, more severe droughts occurred in the past, and may potentially impact or recur in the future. These impacts to JVWCD may include changes in precipitation and general hydrologic patterns, reduction of snowpack and water supply, water quality impacts, and potential increases in water demand.

4.5.1 Precipitation and Temperature

The climate of the State of Utah has seen high variability across the past 1,000 years, with greater variability in terms of extremes for both wet and dry periods experienced in recent instrumental period (Forsyth and Schultz 2018, p.5). The State has demonstrated an increasing trend in temperature that corresponds to trends predicted by global climate models. The impacts of this changing condition include changes in snowmelt flows, and the anticipation of greater inefficiencies of these flows in the future. Premature snowmelt resulting in inefficient conversion of snowmelt run-off to reservoir inflow occurred between 2000-2004 during a drought that effected most Utah watersheds, and is an example of what could be expected to continue with increasing temperatures. This early snowmelt shifts average peak streamflow periods that are currently relied upon by existing water supplies. Other impacts include potential increase in the rate of evapotranspiration due to increased temperatures, as well as an increase in the intensity of rainfall events.

Research from Strong and team from the University of Utah Department of Atmospheric Sciences summarizes and indicates potential key changes for temperature and precipitation may result in the following by the year 2100:

- Temperature increase between 1.5 to 5 degrees Celsius (°C)
- Precipitation increase between 5 to 10 percent (Wasatch), 20 percent (Uinta)
- Snowpack increase of 10 percent above 8,500 feet and decrease of 11 percent below 8,500 feet (Strong et al. 2018).

4.5.2 Supply and Demand Beyond 2030

JVWCD considered various scenarios for water supply and demand patterns under adverse climate conditions in the 2018 report, Preparing for Climate Change – A Management Plan (Forsyth and Schultz, 2018). Parameters for these climate change scenarios included scenarios involving one in

50 year and one in 100 year droughts including both paleo drought conditions and predicted impacts due to climate change to understand supply side impacts. For the water demand side, scenarios were identified involving increased water demand in the JVWCD service area using predicted climate changes by year 2060 from global climate models.

Results from the scenario analyses are summarized in Figure 4-5. The analysis shows that with projected climate change impacts, the existing sources may not provide enough water to meet projected demand shortly after 2030. It also shows that by 2065 the water supply shortfall could be as much as 56 mgd with predicted climate change impacts.

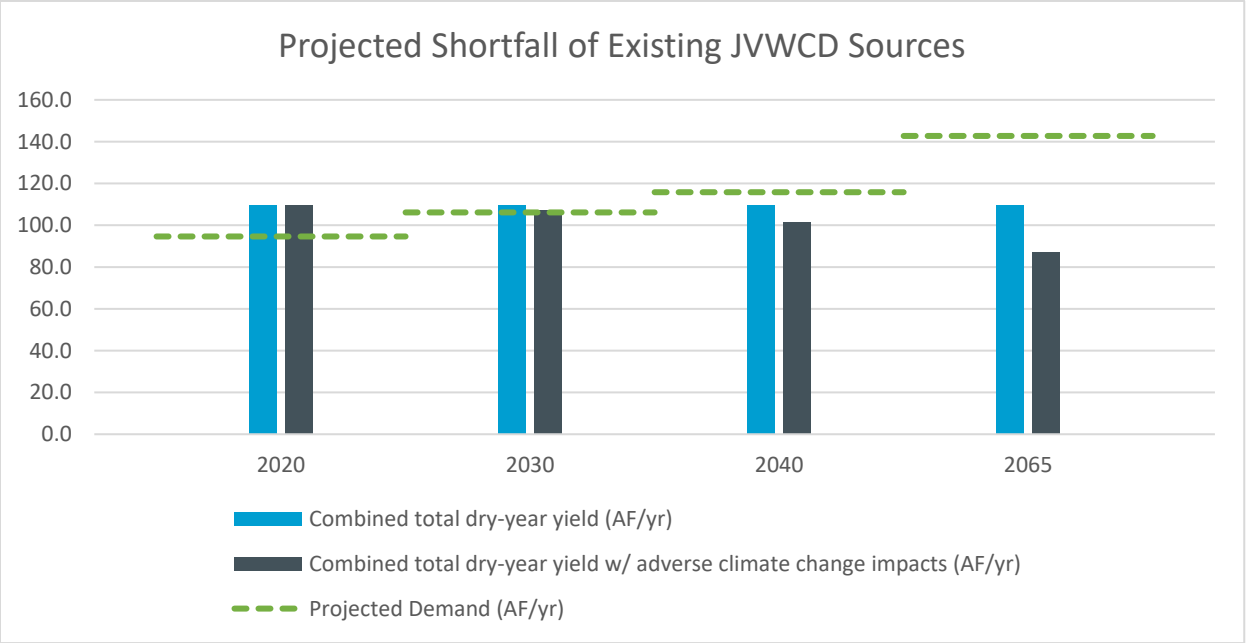


Figure 4-5. Projected shortfall based on climate change scenario results

A key consideration for this assessment and beyond is the potential for multiple droughts to occur shortly after one another, reducing the ability of reservoirs to recharge between drought periods. Impacts to water rights holders is another important consideration, especially for rights holders relying on river direct flow or natural flow without a storage right like JVWCD. With climatic changes, there is an anticipated reduction in flows during the later summer months. There may be a shift to greater direct flows during spring run-off periods, which exceed existing demand during this period and result in less water availability during later periods when demand is higher. Climate change is assumed to have an increasing impact and is anticipated to reduce supply gradually over time, as modeled over a 40 year period from 2020-2060 for the purpose of the scenario analysis (Forsyth and Schultz 2018, p.39).

4.6 Impacts to Water Quality

Adverse impacts to water quality could occur with increasing temperatures and may appear in the form of algae blooms in Utah Lake. This is a concern particularly when reservoir levels are low during dry periods. Quality degradation in Utah Lake may reduce confidence in the usability of this source as a supply for secondary water systems, which may increase pressure for JVWCD water supply and capacity.

These potential impacts, particularly in the consideration of adverse climate change effects, can be used as a starting point to develop mitigation measures. The next section also contributes to the development of measures by providing further insight into how the risk factors presented previously impact specific sectors.

4.7 Sector Impacts

The M&I, environmental, agriculture, and recreation sectors reflect the interests and priorities of JVWCD and Stakeholders in the service area. Drought affects each sector differently as shown in Table 4-5.

Table 4 5. Drought Impacts Across Sectors

Risk Factor and Drought Impact	M&I	Environmental	Agriculture	Recreation
Dry Year Supply Limitations				
Supply limitations due to in-stream flow requirements	x	x	x	x
Groundwater production capacity limitations and supply reduction	x		x	
Climate Change				
Early runoff pattern	x	x	x	x
Reduced reservoir levels	x	x	x	x
Reduced stream flows	x	x	x	x
Increased evapotranspiration	x	x	x	x
Regulatory, environmental, and water rights constraints				
Reduction of contracted water exchanges	x		x	
Increased State and Federal regulation on supply sources to support environmental flows	x	x	x	x
Cost constraints and affordability				
Rising water rates	x		x	
Source water quality degradation				
Water quality impacts from anthropogenic sources (chemical spill, urbanization)	x	x	x	x
Water quality impacts from wildfires	x	x		
Increased occurrence of algal blooms and algae by-products	x	x	x	x
Increased nutrient levels	x	x	x	
Increased water temperatures	x	x		x
Asset/Facility Susceptibility to Disruption				
Asset damage from seismic events	x		x	x
Asset failure due to aging infrastructure	x		x	

4.7.1 M&I

The M&I sector relies on each water source in the JVWCD portfolio and the various assets used to store, convey, or treat the water. Any form of disruption to these sources can heavily impact this sector.

4.7.2 Environmental

Lower stream and groundwater flows and altered runoff patterns impact ecosystems that rely on surface and groundwater. They can damage habitat and alter natural lifecycles. Water quality degradation due to drought can also cause adverse impacts to ecosystems. For example, the lower Provo River is designated as a critical habitat for the June Sucker, an endangered species endemic to Utah Lake. Current recovery projects for this species are closely related to the water quality, quantity, and hydrology of Utah Lake and its tributaries.

4.7.3 Agricultural

Groups within this sector rely on quality water, free of high salinity concentrations or toxic algae by-products. Impacts to the water quality due to drought can quickly interrupt water sources this sector relies on causing them to be temporarily or permanently unusable. The previously mentioned 2016 algal blooms in Utah Lake that prompted secondary water systems to shut down are an example of this. Without the ability to use these secondary water systems, this sector's demand on the JVWCD system increased. These events can trigger further economic hardship to agriculture groups due to raising water rates or loss of agricultural products and income.

This sector relies on existing canal infrastructure to deliver the water needed. Disruptions to assets, such as pumping stations, may leave agricultural water sources unusable. These disruptions may occur from lower lake water levels causing pumping systems to be inoperable.

4.7.4 Recreation

The sources within the project area are home to various recreational interests including bird watching, fishing, sail boating, swimming, kayaking, hunting, and water skiing. Reservoir levels and river levels are reduced during times of drought, which can limit recreational activities.

Additionally, degraded water quality may cause recreation area closures to protect public health. Recreational closures already regularly occur due to harmful algae blooms. The Utah Department of Environmental Quality has established a recreational water monitoring program to facilitate recreational closures and protect the public.

4.7.5 Stakeholder Input of Sector Impacts

Input from the DCP Task Force and Outreach Group was requested to help identify specific sector impacts from drought. For the Outreach Group, which includes representatives of JVWCD's Member Agencies, questions were asked to solicit information on which risk factors most impact their sectors and how their sector was impacted during the last drought. The most common responses are captured below in Table 4-6.

Table 4 6. Outreach Group Feedback Considered when Developing Mitigation Measures
Which risk factors most impact your sector?
Dry year limitation (7 responses)
Climate change (2 responses)
Cost-affordability (5 responses)
Water quality (1 response)
All of the above (1 response)
How was your sector impacted during the last drought?
Habitat impacts
Struggles to reduce water waste
Challenges educating the public
Decreased economic output
Enhanced conservation emphasis

4.8 Vulnerability Assessment Summary and Opportunities to Reduce Drought Vulnerability

The vulnerability assessment evaluated the vulnerability of JVWCD's different water supply resources based on risk factors that contribute to reduced supply (determining likelihood of risk) and based on the reliance JVWCD has on this supply source as a percentage of its portfolio (which determined the consequence). Results of the assessment, as previously shown in Figure 4-4, indicated that the following supply sources represent the highest vulnerability in JVWCD's water supply portfolio:

- CUP, (40 percent of the supply portfolio)
- PRWUC Shares (24 percent of the supply portfolio)
- High Quality Groundwater (15 percent of the supply portfolio)

Key vulnerabilities consisting of risk factor likelihood scores of 3 or more were identified along with risks contributing to the vulnerability. Risks contributing to the vulnerabilities developed from the discussions held with JVWCD, the DCP Task Force, and the Outreach Group while performing the vulnerability assessment are summarized in Table 4-7.

Table 4 7. Summary of Key Vulnerabilities

Key Drought Vulnerability	Risks Associated with Vulnerability
Water supply uncertainty in dry years	• Local mountain streams lack holdover storage • Provo river sources are subject to instream/downstream flow requirements during drought
Some surface water supplies lack resiliency and flexibility to impacts from climate change	• More frequent and severe droughts (multi-year drought) • Altered/extreme precipitation patterns (less in spring, higher intensity storms in winter) • Reduction in available water supply due to usability timeframes impacted by premature snowmelt and reduced snowpack • Increased demand based on longer growing seasons
Water supply uncertainty due to water rights, environmental regulations, or other regulations	• Urbanization causing certain plans or requirements to enact for groundwater sources • Increased environmental regulations impacting use of the source (e.g. changes to requirements for groundwater dependent ecosystems)
Costly treatment of water sources	• Reverse osmosis technology required to treat Utah Lake and brackish groundwater sources • Groundwater pumping costs are 2 times greater than JVWTP treatment costs.
Source water quality degradation during drought	• Algal by-products/blooms impacting usability of sources • Sudden inability to use secondary water sources due to algal blooms (imparts higher demand on JVWCD supplies) • Salinity and nutrients from urbanization (increase in impervious surfaces) • Increased wildfires • Misc. anthropogenic water quality degradation events (e.g. diesel spill)
Inability to utilize supplies due to aging infrastructure and equipment reliability	• Aging wells • Operations typically expects 1/3 of high-quality groundwater wells down at any one time due to equipment reliability • Canal breaches/failure causing higher demand on JVWCD supplies • Mechanical failure of wells or treatment equipment • Current conveyance lines for local mountain streams source showing signs of failure
Failure due to seismic events	• Infrastructure proximity to faults (e.g. Wasatch Fault Zone)
Heavy reliance on CUP and PRWUC water sources	• These sources combined make up more than 50% of the supply portfolio

Note: Includes any risk factor with a score of 3 or more. Excludes canal company sources vulnerabilities but includes the impacts of canal company sources failure.

Considerations for areas of vulnerability based on the assessment provided in this section include the following:

- Surface water supplies due to their susceptibility to climate change impacts, and particularly when considering longer term forecasts than the 2030 planning horizon
- Consideration for adjustments to existing water rights to enable diversion and storage would be an important part of developing these capacities
- Risks to secondary source supplies, like water quality in Utah Lake, that may if compromised mean greater demand for JVWCD's supplies and infrastructure
- Continued need to develop supply and continue conservation efforts is needed and assumed will support reducing supply shortfalls
- Consideration for increased demand and identifying further opportunity for individual consumption efficiencies will be important when considering impacts of increased temperatures
- Understanding impacts to groundwater yield (and limitations for sustainable yield)

Both the CUP and PRWUC are critical supply sources at potential risk to limitations (or reduced available supply) due to in-stream or downstream flow requirements and potential dry year supply limitations. Altered/extreme precipitation patterns (less in spring, higher-intensity storms in winter)

and premature snowmelt and reduced snowpack may further reduce these flows and adversely impact these sources. The primary water quality concern is wastewater and agricultural nutrient loading exacerbating algal bloom issues. These supply sources as well as JVWCD's High Quality Groundwater may experience more frequent and severe droughts, generating adverse impacts to reliable yield. Although unlikely, they all may also be impacted by potential future changes in existing water rights and release requirements.

These risk factors corresponded to notable impacts including supply limitations due to in-stream flow requirements, changes in early runoff patterns, and potential for increased occurrence of algal blooms and algae by-products. In Sections 5 and 6, this DCP identifies strategies aimed to reduce some of the vulnerabilities identified in this Section (Section 4).

Section 5

Drought Mitigation Measures

This section identifies, evaluates, and prioritizes mitigation measures that will build long-term resiliency. Mitigation measures are defined as preemptive actions or activities put in place before drought to reduce risk and impacts of drought. For example, mitigation measures may include construction of new facilities for additional storage or treatment of new and existing water sources. These measures occur outside of regular water management activities and are separate from what this section defines as drought planning activities. Drought planning activities are those that may take less than one year to implement, and/or do not need additional funding (either existing funding is in place or no funding is necessary to implement).

The drought mitigation measures presented reduce sector vulnerabilities, support activation of drought response actions needed during times of drought, and by enabling preemptive actions reduce the need for further response actions. In contrast, response actions are reactive strategies, programs, or activities put in place to decrease the severity of immediate drought impacts. They include triggers tied to specific stages of drought or water supply availability levels. Response actions may include water curtailments and rate increases for various sectors. Further information related drought response actions can be found in Section 6.

5.1 Existing Drought Mitigation Measures and Coordination

JVWCD's current drought mitigation efforts include water conservation and water resource planning. JVWCD's level-of-service criteria for water resource planning includes 1) meeting total system demand for a 1 in 50 year, 5 year-duration drought, and 2) maintaining a surplus capacity that is 5 percent greater than the projected average annual demand. The supply planning details are provided in Section 2. The water conservation efforts are summarized below.

As previously mentioned, in 1998, the Utah State legislature passed the Water Conservation Plan Act, which requires culinary water providers and conservancy districts to submit water conservation plan updates to the Utah Division of Water Resources (UDWRe) every 5 years. JVWCD submitted its first water conservation plan in 1999, with updates in 2004, 2009, 2014, and 2019.

The 2019 Water Conservation Plan Update (2019 Plan) outlines JVWCD's overall water conservation goal of 187 gpcd by 2030. This goal is based on the Salt Lake regional goal established in Utah's Regional M&I Water Conservation Goals Report, which was published in 2019 and sponsored by UDWRe.

Many factors can significantly impact how much water is consumed from year to year, including changes in rainfall, temperature, regulations, or population density. Many of these influences were assumed to have an effect on water consumption through 2030.The 2019 Plan showed that JVWCD's increasing population and water demand projections would result in a 11,064 AF deficit in available supply to meet future 2030 demand relative to the 2030 goal. However, if widescale adoption of the WES are achieved, that supply gap could be reduced to 2,770 AF.

Reducing overall water use can be accomplished by persuading water users to modify their behaviors (water conservation) or by creating structural changes that allow water-consuming tasks to be accomplished using less water (water efficiency). To meet JVWCD's goal, both approaches are needed.

Effective strategies for water conservation and efficiency for JVWCD are built upon three pillars: education, incentives, and regulations. Effective education helps water users make sound choices and preserve water resources for the future. Effective incentive programs can influence water users to make structural changes that reduce water demand. Effective regulations have indoor and outdoor WES to help create more sustainable communities. JVWCD offers a variety of programs, initiatives, and measures to target each of these pillars as listed in Table 5-1.

Table 5 1. Existing Water Conservation Programs in JVWCD's Service Area

Education	Incentives	Regulations
Slow the Flow	Localscapes Rewards	WES
Localscapes	Flip Your Strip	Indoor Fixtures
Conservation Garden Park	Toilet Rebates	Residential Landscapes
Landscape Consultations	Smart Controller Rebates	Irrigation Design
Customer Feedback Tools	Landscape Leadership Grants	Commercial, Industrial, and Institutional Landscapes
Leak Mitigation	Member Agency Grants	
Strategic Water Management	Custom Incentive Program	

Two recent accelerators to JVWCD's water conservation efforts include the development of UtahWaterSavers.com and a set of WES for new development. In 2017, UtahWaterSavers.com was developed to host several turnkey water conservation programs for its service area. In 2018, the website was expanded in partnership with UDWRe to host additional statewide rebate programs. This project is mutually beneficial to JVWCD and UDWRe because it allows the agencies to share promotional, hosting, and development costs and provides a single go-to resource for the public. Currently the following programs are managed through the Utah Water Savers website: Localscapes Rewards, Flip Your Strip, toilet replacement rebates, smart controller rebates, and landscape consultations. Widescale public recognition and use of the Utah Water Savers website will be essential to escalate the programs to the levels described in this DCP.

In 2019, JVWCD developed a set of WES based on extensive research into landscape ordinances, water conservation programs, and indoor future standards of many western water providers and cities. These standards are now being used to guide JVWCD's planning, programs, initiatives, model landscape ordinances, and future indoor recommendations.

The standards prohibit the installation of turf grass in park strips and parking lot landscape islands. The standards also place a cap on the amount of turf grass that can be installed in residential front and side yards (35 percent) and limit commercial, industrial, and institutional turf grass installations (20 percent). JVWCD also implements policy changes to encourage each of its Member Agencies to adapt the standards by municipal ordinance or other similar regulatory mechanism. As of September 1, 2021, Herriman City, South Jordan City, Bluffdale, and West Jordan City have adopted these standards into their respective city code.

Building off JVWCD's existing robust programs, future mitigation measures can continue to reduce the gap in JVWCD's projected demand and supplies.

5.2 Development and Evaluation of Future Drought Mitigation Measures

Drought mitigation measures developed for this DCP take into account the results of the vulnerability assessment completed in Section 4, and specifically consider vulnerabilities of supply sources, sector impacts (including M&I, environmental, agricultural, and recreational impacts), and the general benefits that can be derived from each measure. Mitigation measures also include measures that establish frameworks or programs that enable future drought response actions. These considerations are made to ensure that mitigation measures reduce vulnerabilities specific to the JVWCD's system and are actionable and achieved within a specific timeframe. The following subsections identify the steps taken to establish the mitigation measures as illustrated on Figure 5-1.

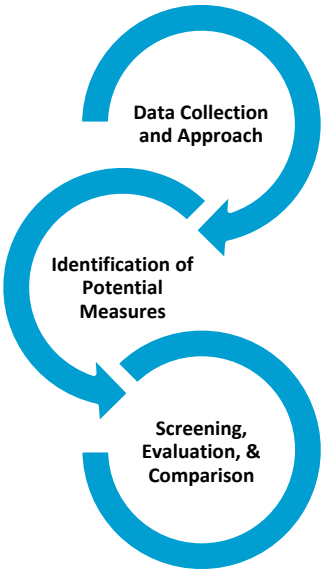


Figure 5-1. Steps taken to develop and evaluate future mitigation measures

5.2.1 Data Collection and Approach

The approach for developing an initial list of mitigation measures included a review of results from the vulnerability assessment that indicated which water resource supplies provide the highest vulnerability for JVWCD's system, and which supplies should, therefore, be addressed by mitigation measures to reduce drought impacts. The approach and results of the vulnerability assessment were reviewed and discussed with the DCP Task Force and the Outreach Group as described in Section 4.

The results of the vulnerability assessment indicated the following risk factors have the highest likelihood to impact supplies out of all risk factors evaluated:

- Climate change (contributing to changing precipitation and temperature patterns and influencing snowmelt and snowpack)
- Asset/facility susceptibility to disruption (related to potential seismic vulnerabilities, aging infrastructure, and flood risk in Provo River and upper tributaries)
- Source water quality degradation (especially issues related to nutrients)

In addition to the input received from the Task Force and Outreach Groups, existing JVWCD plans and studies were reviewed to identify current and planned projects that serve as potential mitigation

measures to reduce drought impacts. These plans and studies included the 2019 Water Conservation Plan Update and the Climate Change Management Plan. This review was complemented by meetings and discussions with JVWCD staff.

5.2.2 Identification of Initial Potential Mitigation Measures

When developing and refining the initial list of potential mitigation measures the categories listed below were considered. Some mitigation measures on the initial list were determined to instead be drought planning activities. Based on the data collected and understanding established from the vulnerability assessment and outreach efforts, the following categories were established and used to group mitigation measures (abbreviations are indicated in parentheses):

- **Agreements & Regulatory (Agr&Reg):** This category is important to consider potential changes in future regulations, water and storage rights, and service agreements.
- **Conservation & Demand Management (Cons&DM):** Feedback from outreach groups indicated that this category is especially important given the impacts to the region during the past drought and the continued need for conservation. JVWCD maintains a robust water conservation program with annual investments to help prepare for and be used in the case of drought.
- **Education & Outreach (Ed&Outrch):** Closely tied to conservation and demand management activities, this category increases customer awareness of current water supply status and programs JVWCD has in place to help prepare the region for future drought conditions.
- **Conveyance (Conv):** This category was developed to consider enhancing system reliability and efficiency through conveyance-related projects and efforts.
- **Treatment Process (Tre):** This category was developed to consider improving system reliability and efficiency through adjustments and or use of new treatment processes.
- **New Water Supplies (NewSup):** This category supports further portfolio diversification to address risk factors and increase supply redundancy and flexibility.
- **Groundwater Management (GWMgnt):** This category addresses the need to further develop supplies and diversify the water supply portfolio in anticipation of drought impacts to surface supplies.
- **Supply Storage (Stor):** This category was developed because additional supply storage increases operational flexibility and may act as a supply buffer in drought years.
- **Watershed Protection & Management (WSPro&Mgnt):** This category includes measures that would target the need for amplified watershed programs that protect source water quality (e.g., Utah Lake).

5.2.3 Screening, Evaluation, and Comparison

A preliminary list of measures was developed for further screening and evaluation. These measures were ranked for comparison before being narrowed to a shortlist of final drought mitigation measures for this DCP. The full list included 49 mitigation measures, which are provided in Appendix B.

The evaluation criteria listed in Table 5-2 were developed to screen and prioritize the list of considered mitigation measures.

APPENDIX C

Letters of Support

BLUFFDALE
EST. 1848

City of Bluffdale
2222 West 14400 South, Bluffdale, UTAH 84065

September 18, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan,

Bluffdale City is proud to offer its full support for Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. The proposed Casto Springs Treatment Plant represents a crucial step toward securing a reliable and high-quality water supply for the region. As our community continues to grow and the impacts of climate change become more pronounced, the need for robust and forward-thinking infrastructure is more pressing than ever.

This project will enhance our ability to manage water resources efficiently, strengthening the overall water supply system and improving operational flexibility during times of uncertainty. By investing in long-term solutions like this treatment plant, JVWCD is not only safeguarding our immediate needs but also ensuring resilience for future generations.

We believe the Casto Springs Treatment Plant will make a significant positive impact on our region and contribute to the long-term stability of our water supply. Bluffdale City fully supports JVWCD's efforts and looks forward to seeing this vital project come to fruition.

Sincerely,

Mark Reid
City Manager
City of Bluffdale

DRAPER CITY HALL

City Manager | 1020 E. Pioneer Rd. Draper, UT 84020

September 23, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan:

Draper City appreciates the opportunity to participate as a stakeholder in the development of the Jordan Valley Water Conservancy District Drought Contingency Plan (Plan).

We support JVWCD's efforts to implement the Plan including building the Casto Springs Treatment Plant. Draper relies on JVWCD for approximately 100% of our drinking water supplies and it is important that new, drought-resilient supplies are developed.

We support JVWCD's application for a USBR WaterSMART Drought Resiliency Project grant.

Sincerely,

Mike Barker
Draper City Manager

CC: Scott Cooley, Draper Public Works Director

801-576-6322 | mike.barker@draperutah.gov

September 23, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan,

On behalf of Herriman City, I am writing to express our strong support for Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. JVWCD's leadership in pursuing innovative solutions to secure water supplies in a challenging climate is critical to our region's long-term sustainability.

The proposed Casto Springs Treatment Plant is an essential step in ensuring a reliable water source for our community. This project will enhance our capacity to manage water resources efficiently and provide the resiliency we need to face future droughts. We fully endorse this important initiative and look forward to its success.

Sincerely,

Justun Edwards
Herriman City
Director of Public Works

Kearns Improvement District

EPA WaterSense 2023 EXCELLENCE AWARD

September 17, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR WaterSMART Drought Resiliency Project Grant

Dear Alan,

The Kearns Improvement District (KID) is proud to support Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. As we understand the project, the Casto Springs Treatment Plant represents a forward-thinking approach to water management that will strengthen the infrastructure and secure the water supply for our community. With increasing environmental challenges, this project demonstrates JVWCD's commitment to ensuring a sustainable future for all. We fully support this initiative and believe it will have a lasting, positive impact on the region.

Sincerely,

F. Greg Anderson

F. Greg Anderson, P.E.
General Manager/CEO

Midvale City
7505 S Holden Street
Midvale, UT 84047
801-567-7200
www.MidvaleCity.org

DATE, September 17, 20242024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan,

I am writing on behalf of Midvale City to support Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. The proposed Casto Springs Treatment Plant will be a vital resource in ensuring the availability of clean and reliable water in the region.

By investing in projects like this, JVWCD continues to demonstrate its commitment to sustainable water management and regional resilience. We strongly support this project and believe it will contribute greatly to the long-term well-being of our community.

Sincerely,

Glen Kennedy
Midvale City Public Works Director

Congress of the United States
Washington, DC 20510

September 27, 2024

The Honorable Camille Calimlim Touton
Commissioner
U.S. Bureau of Reclamation
1849 C Street, Northwest
Washington, DC. 20240

RE: Funding for Jordan Valley Water Conservancy District's Casto Springs Treatment Plant Project – FY2025 WaterSMART Drought Resiliency Projects

Dear Commissioner Touton,

I am writing to urge full and fair consideration for the Casto Springs Treatment Plant Project in Holladay, Utah. Jordan Valley Water Conservancy District (JVWCD) is seeking $3 million in federal funding for this project, which will allow them to build a treatment plant capable of treating five million gallons per day (MGD) from Casto and Dry Creek Springs. The Casto Springs Treatment Plant Project will play a vital role in safeguarding Utah's water future and promoting environmental sustainability.

This project is critical to ensuring the long-term sustainability of Salt Lake County's water supply, which is essential for the health and prosperity of residents. Notably, the project has been prioritized in JVWCD's official Drought Contingency Plan as well as in its 10-year Capital Projects Plan, underscoring its importance.

Given Utah's ongoing challenges with drought and rapid population growth, it is more important than ever to invest in projects that will strengthen our water infrastructure. Utah is the second driest state in the nation and has experienced moderate to extreme drought conditions for the past seven out of ten years. During times of drought, JVWCD is reliant on groundwater to meet demand. This project will increase resilience to climate driven shortages in surface water by adding to groundwater supply capacity that can be used in a drought year as well as by allowing area groundwater wells to rest more during wet years.

The Casto Springs Treatment Plant represents a significant step forward in building a resilient water system that will support both our communities and our economy for years to come. As you review proposals as part of the FY2025 WaterSMART Drought Resiliency Projects application process, I strongly urge you to provide your full and fair consideration to JVWCD's application. Thank you for your attention to this important matter. I look forward to working together to make this project a reality.

Sincerely,

Celeste Maloy
Member of Congress

U.S. CONGRESSMAN
BURGESS
OWENS

September 18, 2024

The Honorable Camille Calimlim Touton
Commissioner
U.S. Bureau of Reclamation
1849 C Street, Northwest
Washington, DC. 20240

RE: Funding for Jordan Valley Water Conservancy District's Casto Springs Treatment Plant Project – FY2025 WaterSMART Drought Resiliency Projects

Dear Commissioner Touton,

I am writing to express my full support for the Casto Springs Treatment Plant Project, which is in Holladay, Utah. Jordan Valley Water Conservancy District (JVWCD) is seeking $3 million in federal funding for this project, which will allow them to build a treatment plant capable of treating five million gallons per day (MGD) from Casto and Dry Creek Springs. The Casto Springs Treatment Plant Project will play a vital role in safeguarding Utah's water future and promoting environmental sustainability.

This project is critical to ensuring the long-term sustainability of Salt Lake County's water supply, which is essential for the health and prosperity of residents. Notably, the project has been prioritized in JVWCD's official Drought Contingency Plan as well as in its 10-year Capital Projects Plan, underscoring its importance.

Given Utah's ongoing challenges with drought and rapid population growth, it is more important than ever to invest in projects that will strengthen our water infrastructure. Utah is the second driest state in the nation and has experienced moderate to extreme drought conditions for the past seven out of ten years. During times of drought, JVWCD is reliant on groundwater to meet demand. This project will increase resilience to climate driven shortages in surface water by adding to groundwater supply capacity that can be used in a drought year as well as by allowing area groundwater wells to rest more during wet years.

The Casto Springs Treatment Plant represents a significant step forward in building a resilient water system that will support both our communities and our economy for years to come. As you review proposals as part of the FY2025 WaterSMART Drought Resiliency Projects application process, I strongly urge you to provide your full and fair consideration to JVWCD's application.
Thank you for your attention to this important matter. I look forward to working together to make this project a reality.

Sincerely,

Burgess Owens
Member of Congress

MITT ROMNEY
UTAH

COMMITTEES
FOREIGN RELATIONS
HEALTH, EDUCATION, LABOR, AND PENSIONS
HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS
BUDGET

United States Senate

SR-354
RUSSELL BUILDING
WASHINGTON, DC 20510

125 S. STATE STREET
#8402
SALT LAKE CITY, UT 84138

September 18, 2024

The Honorable Camille Calimlim Touton
Commissioner
U.S. Bureau of Reclamation
1849 C Street, Northwest
Washington, DC. 20240

RE: Jordan Valley Water Conservancy District's Casto Springs Treatment Plant Project – FY2025 WaterSMART Drought Resiliency Projects

Dear Commissioner Touton,

I write today to express support for Jordan Valley Water Conservancy District's (JVWCD) Casto Springs Treatment Plant Project, located in Holladay, Utah. The Casto Springs Treatment Plant Project will play a vital role in safeguarding Utah's water future by promoting environmental sustainability. This project is critical to Salt Lake County's water supply and is a priority in JVWCD's official drought contingency plan and the 10-year Capital Projects Plan.

Given Utah's ongoing challenges with drought and rapid population growth, it is more important than ever to invest in projects that will strengthen the state's water infrastructure. Utah is the second driest state in the nation and has experienced moderate to extreme drought conditions for the past seven years. During times of drought, JVWCD is reliant on groundwater to meet demand. This project will increase resilience to climate driven shortages in surface water by adding to groundwater supply capacity that can be used in a drought year and allow area groundwater wells to rest during wet years.

The Casto Springs Treatment Plant represents a significant step forward in strengthening Utah's resilient water system that is critical to the state's communities and economy. On behalf of the Jordan Valley Water Conservancy District, I respectfully ask that you give full and fair consideration to this important project. Should you have questions, please contact my State Director, Mandee Grant, at Mandee_Grant@Romney.senate.gov.

Sincerely,

Mitt Romney
United States Senate

MIKE LEE
UTAH

MARK WAIT
CHIEF OF STAFF

United States Senate

WASHINGTON, DC 20510–4404

COMMITTEES:

JUDICIARY

ENERGY AND
NATURAL RESOURCES

JOINT ECONOMIC
COMMITTEE

BUDGET

September 18, 2024

The Honorable Camille Touton
Commissioner
U.S. Bureau of Reclamation
1849 C Street, Northwest
Washington, DC. 20240

RE: Jordan Valley Water Conservancy District's Casto Springs Treatment Plant Project – FY2025 WaterSMART Drought Resiliency Projects

Dear Commissioner Touton:

I write to request your full and fair consideration of the Casto Springs Treatment Plant Project in Holladay, Utah. Jordan Valley Water Conservancy District (JVWCD) is seeking $3 million to build a plant capable of treating five million gallons of water per day from Casto and Dry Creek Springs.

This project can ensure the long-term sustainability of Salt Lake County's water supply, which is essential for meeting the area's growing demand. Notably, JVWCD prioritized the project in its official Drought Contingency Plan and 10-year Capital Projects Plan, underscoring the District's commitment to the project.

Given Utah's ongoing challenges with drought and rapid population growth, investments in projects that strengthen our water infrastructure are critical. Utah is the second driest state in the nation and experienced moderate to extreme drought conditions for the past seven out of ten years. During times of drought, JVWCD relies on groundwater to meet demand. This project will increase resilience to shortages in surface water by increasing the groundwater supply capacity that can be used in a drought year and by allowing area groundwater wells to rest during wet years.

The Casto Springs Treatment Plant represents a significant step forward in building a resilient water system to support Utah's growing communities. As you review the FY2025 WaterSMART Drought Resiliency Projects proposals, I urge you to provide your full and fair consideration to JVWCD's application.

Sincerely,

Michael S. Lee
United States Senator

SALT LAKE COUNTY

September 25, 2024

Alan Packard
General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of Support for JVWCD Application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan:

The Salt Lake County Mayor's Administration is pleased to support the Jordan Valley Water Conservancy District (JVWCD) application for the USBR Water SMART Drought Resiliency Project grant. Over 775,000 residents in Salt Lake County rely on JVWCD for essential drinking water supplies. Salt Lake County appreciates working collaboratively with JVWCD on various initiatives including water conservation related programs to efficiently use our scarce water resources.

Salt Lake County supports JVWCD in developing and completing the Casto Springs Treatment Plant project which will result in improved drought resilience for both current conditions and future conditions that will be further stressed by our changing climate.

Sincerely,

Catherine Kanter
Deputy Mayor of Regional Operations

Salt Lake County Government Center
2001 South State Street, Suite N-2100 | PO Box 144575 | Salt Lake City, UT 84114-4575
Tel: 385.468.7000 | Fax:385.468.7001 | www.slco.org

Taylorsville-Bennion Improvement District

Chairman Donald G. Russell
Trustee Matthew G. Swensen
Trustee Kelton L. Kleinman
General Manager Mark E. Chalk

September 24, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan,

Taylorsville-Bennion Improvement District enthusiastically supports Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. The Casto Springs Treatment Plant is an essential development for securing a stable and high-quality water supply for the region.

As water demands continue to grow and climate uncertainties increase, projects like this one are critical to ensuring that we have the infrastructure needed to meet future challenges. This treatment plant will help strengthen the water supply system, improve operational flexibility, and provide long-term reliability. We fully support JVWCD's efforts to advance this project and look forward to the positive impact it will have on our community.

Sincerely,

Mark Chalk
General Manager

1800 West 4700 South • PO Box 18579 • Taylorsville, Utah 84118 (801) 968-9081 company@tbid.org

WaterPro Inc. *a Draper Irrigation Company*
12421 South 800 East/PO Box 156/Draper, Utah 84020/Ph 801.571.2232, Fax 801.571.8054
www.waterpro.net

September 18, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant

Dear Alan,

I am writing on behalf of WaterPro, Inc., an irrigation and drinking water company in Draper, Utah to support Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. WaterPro Inc. relies on JVWCD for approximately 15% of our drinking water supplies and it is important that new, drought-resilient supplies are developed, including the proposed Casto Springs Treatment Plant.

We fully support JVWCD's efforts and are confident that this project will make a significant contribution to the overall resilience of our region's water infrastructure. Thank you for your attention to this important matter.

Sincerely,

Darrin Jensen-Peterson
CEO/General Manager
Draper Irrigation Co/WaterPro, Inc

Korban Lee
Chief Administrative Officer
City of West Jordan
8000 South Redwood Road
West Jordan, Utah 84088
korban.lee@westjordan.utah.gov
(801) 569-5100
Fax (801) 565-8978

September 17, 2024

Alan Packard, General Manager
Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

Subject: **Letter of support for JVWCD application for FY2025 USBR Water SMART Drought Resiliency Project Grant**

To Whom it May Concern,

I'm writing on behalf of the City of West Jordan to express our strong support for Jordan Valley Water Conservancy District's application for the USBR WaterSMART Drought Resiliency Project grant. The Casto Springs Treatment Plant is a critical initiative that will address the growing water demands in our region and help us prepare for the challenges posed by ongoing drought conditions and climate change.

Having diversified and resilient infrastructure like this treatment plant is essential as water becomes an increasingly precious resource. The Casto Springs project will not only enhance the reliability of our water supply but also provide greater flexibility in how we manage and allocate water during periods of scarcity. This kind of forward-thinking approach is exactly what we need to ensure our communities are well-equipped to handle future water challenges.

West Jordan is proud to stand behind JVWCD in this important effort, and we fully support their grant application. We believe the benefits of this project will be felt for many years to come.

Sincerely,

Korban Lee
Chief Administrative Officer
City of West Jordan

APPENDIX D

Board Resolution

Resolution of the Board of Trustees

JORDAN VALLEY WATER
CONSERVANCY DISTRICT

RESOLUTION NO. 24-15

APPROVING AN APPLICATION FOR A
UNITED STATES BUREAU OF RECLAMATION
WATERSMART DROUGHT RESILIENCY PROJECT GRANT

WHEREAS, the Jordan Valley Water Conservancy District ("Jordan Valley") has a diverse portfolio of water supplies for existing and future customers in its service area;

WHEREAS, severe drought conditions may reduce the reliability of Jordan Valley water supplies, and may result in economic damage to water users within its service area;

WHEREAS, the United States Department of Interior, Bureau of Reclamation (USBR), under its WaterSMART Program, has made available to qualifying applicants grant funding for drought resiliency projects;

WHEREAS, Jordan Valley has prepared an application for the USBR WaterSMART Drought Resiliency Projects grant program;

WHEREAS, Jordan Valley previously received USBR WaterSMART grant funding to assist with the preparation of a Drought Contingency Plan (Plan);

WHEREAS, Jordan Valley completed and adopted its Plan, and the Plan has been approved by USBR;

WHEREAS, the Plan identified mitigation measures which are preemptive actions Jordan Valley can take to increase its resiliency against droughts;

WHEREAS, Jordan Valley has budgeted for and intends to complete a new groundwater development spring treatment project to address two mitigation measures identified in the Plan (develop additional high quality groundwater and operational expansion of Jordan Valley ASR facilities).

NOW, THEREFORE, BE IT RESOLVED by the Jordan Valley Water Conservancy District Board of Trustees:

1. Jordan Valley's General Manager will submit to the United States Bureau of Reclamation a WaterSMART Grant Application prior to the deadline of October 7, 2024.

2. If Jordan Valley's Grant Application is selected for funding under the WaterSMART Grant Program, (i) the General Manager of Jordan Valley is

authorized to negotiate a satisfactory cooperative agreement with the Bureau of Reclamation and provide the funding amounts specified in the WaterSMART Grant Proposal; and (ii) the General Manager is authorized to execute that contract on behalf of Jordan Valley; and,

3. This Resolution shall take effect immediately upon execution by an authorized member of the Board.

PASSED, ADOPTED, and APPROVED this 11th day of September 2024.

Corey L. Rushton
Chair of the Board of Trustees

ATTEST:

Alan E. Packard
Clerk