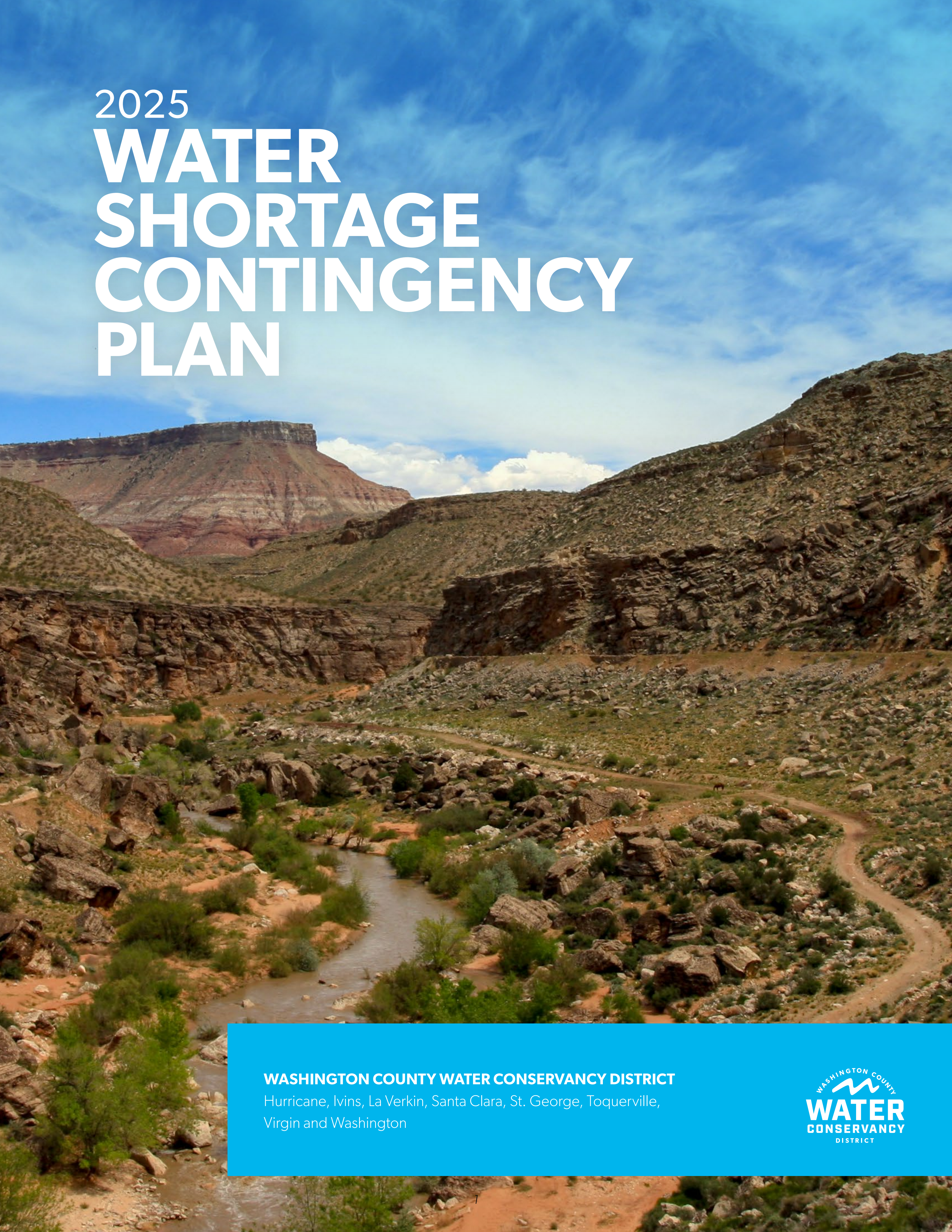


2025
WATER SHORTAGE CONTINGENCY PLAN

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT
Hurricane, Ivins, La Verkin, Santa Clara, St. George, Toquerville, Virgin and Washington

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT

Table of Contents

EXECUTIVE SUMMARY

As one of Utah's hottest and driest regions, and one of the nation's fastest growing metropolitan areas, Washington County is vulnerable to impacts of reduced water supply and shortage. To prepare for emergency water shortage conditions, the Washington County Water Conservancy District (district) developed this Water Shortage Contingency Plan (plan). The plan was developed in partnership with its municipal partners to provide a collaborative system for prioritizing drinking water under circumstances of diminishing supply. The district's municipal partners are the cities of St. George, Washington, Hurricane, Santa Clara, Ivins, Toquerville, La Verkin, and the town of Virgin.

An established task force (Appendix A) guided and informed the planning process. In addition, guidance was sought from more than 60 elected officials and technical experts through a survey instrument. The plan includes mitigation measures, drought monitoring, identification of shortage stages, response actions, a vulnerability assessment, operational framework, and an update process.

While drought is an ever-present threat in the region, other circumstances can result in water shortages; earthquakes, power interruptions or necessary infrastructure repairs can interfere with the ability to deliver water. The measures in this plan may be used to curtail demand in any scenario that diminishes the supply or distribution of water.

Vulnerability Assessment

This assessment identifies areas of vulnerability in existing facilities, system capabilities, and water practices of the district and its customers. Additionally, the vulnerability assessment factors in climate, Utah state policy, supply, demand, and climate change.

Mitigation Measures

The district and municipal partners have invested more than $70 million in conservation measures and programs to reduce water demand, successfully reducing per capita usage by nearly 50% from the year 2000. The county's ongoing conservation efforts serve to increase shortage resiliency and mitigate impacts of water supply issues.

Drought Monitoring

The district developed a drought monitoring tool for identifying drought and assessing drought severity. The tool processes historical and current data to classify water supply conditions into five categories of increasing drought severity. The tool will be used to inform decision-makers as they consider the potential necessity of declaring a water shortage condition.

Water Shortage Stages

The five shortage stages range from "0" (normal conditions) to "4" (extreme shortage). The descriptors for each stage were carefully selected with consideration of public perception, and response actions were set to best communicate desired responses to varying shortage conditions. The key words describe how the district, its municipal partners, and the public should respond to the shortage stage.

Water Availability and Response Stages

Stage	0	1	2	3	4
Condition	Normal	Dry	Prolonged Shortage	Escalated Shortage	Extreme Shortage
Key Word	Conserve	Caution	Concern	Critical	Crisis
Response Target	0	-10%	-20%	-40%	-60%

Response Action Plans

If the district Board of Trustees (board) declares a shortage condition, water budgets will be issued to municipalities commensurate with the shortage response target. The municipalities are responsible for initiating a response plan to ensure operation within the water budget. Water use in excess of the budget will bear a substantial financial penalty.

Communication Plan

The task force will meet periodically to review technical information and make recommendations to the Administrative Advisory Committee (AAC) created by the Regional Water Supply Agreement (RWSA) and the district's board of trustees, which makes shortage determinations.

The district will coordinate with its municipal partners to provide information to the public via websites, social media, and newsletters. Public outreach will extend to include press announcements, advertising, signage, and enhanced collaboration as necessary.

Plan Maintenance and Updates

The district will evaluate and update the plan as needed. Evaluation of the plan will focus on the accuracy of the shortage model and associated dashboard, response actions, and the communication plan.

CHAPTER 1

PLAN INTRODUCTION AND BACKGROUND

Introduction

Washington County is Utah's hottest and driest region and one of the nation's fastest growing metropolitan areas. Population projections estimate a 155% increase in the county by the year 2060. The sole water source for Washington County's population centers, the Virgin River basin, is a small desert tributary prone to drought and climate variability that is fully appropriated. As the county approaches full utilization of its annual reliable water supply, the need for more stringent water resource management increases. Local municipal partners depend on the district to manage water supplies and provide for current and future use.

Background

To prepare for emergency shortage conditions and comply with Utah's water conservation requirements, the Washington County Water Conservancy District (district) developed this Water Shortage Contingency Plan (plan) in partnership with municipal partners that include the cities of St. George, Washington, Hurricane, Santa Clara, Ivins, Toquerville, La Verkin, and the town of Virgin.

This collaborative process designed a system for prioritizing drinking water under circumstances of diminishing water supply. A task force was developed to help guide this system, which included 18 technical experts from the district and its municipal partners (Appendix A).

In developing the strategies for this plan, the district surveyed more than 60 stakeholders, including the elected council members, mayors, and city managers of all municipal partners.

Elements

The plan includes six elements: vulnerability assessment, mitigation actions, monitoring, response actions, operational and administrative framework, and plan development and update process.

Implementation

The task force reviews technical information and makes recommendations to the district's Administrative Advisory Committee (AAC) and Board of Trustees (board). The board is the body politic that makes shortage declarations and determines plan implementation.

The task force membership is comprised of representatives well-versed in water management and technical resources. The AAC is comprised of the mayor and city manager of each of the district's eight municipal partners. The board is comprised of appointed officials who represent various regions of Washington County and serve as the district's policy makers.

CHAPTER 2

VULNERABILITY ASSESSMENT

The goal of the vulnerability assessment is to identify areas in which the district and its municipal partners are vulnerable to shortage. The assessment quantifies the impacts of climate change, drought, and water demand on supply.

Climate

Washington County is an arid region subject to frequent and prolonged dry periods and is one of the fastest growing areas in the US. These dynamics make it challenging to plan, manage, and operate a water system. Climate uncertainty further compounds this challenge and presents additional vulnerabilities. Washington County is vulnerable to shortage for the following primary reasons:

- Exclusive reliance on the Virgin River basin for its supply
- Prone to meteorological drought with long periods of drier than normal conditions
- Virgin River May-July streamflow is predicted to decline 20% based on the Bureau of Reclamation's 2014 climate analysis[1]
- Population increases averaging nearly 3.5% per year over the past 10 years
- Current water demand is approaching the annual reliable supply

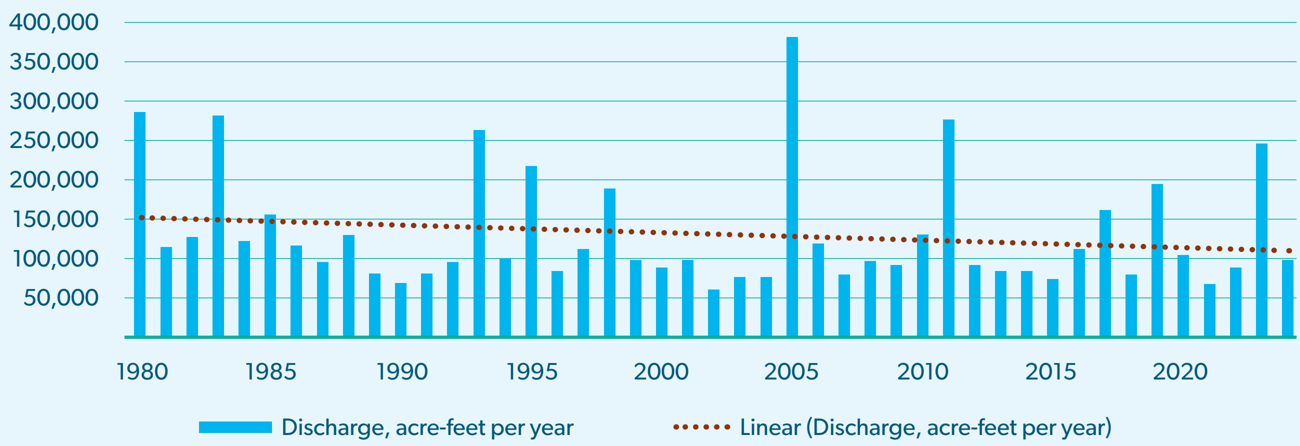
The district and the Utah Department of Natural Resources have taken a proactive approach to these challenges by frequently assessing water supplies, demand dynamics, and developing plans to improve resiliency. Visit wcwcd.gov for previous studies and reports related to this issue.

Water Supply

The region's water supply is approximately 70% surface water and 30% groundwater, all derived from the Virgin River watershed. Surface water storage is highly dependent on annual flow in the Virgin River. While precipitation, snowmelt, and soil moisture that determine the flow in the Virgin River are variable, there has been a demonstratable drop in available yield over the last century.

[1] *Utah Board of Water Resources. 2016. Lake Powell Pipeline: Final Climate Change Study Report. April 2016*

Virgin River Discharge at Virgin Gauge 1980-2024



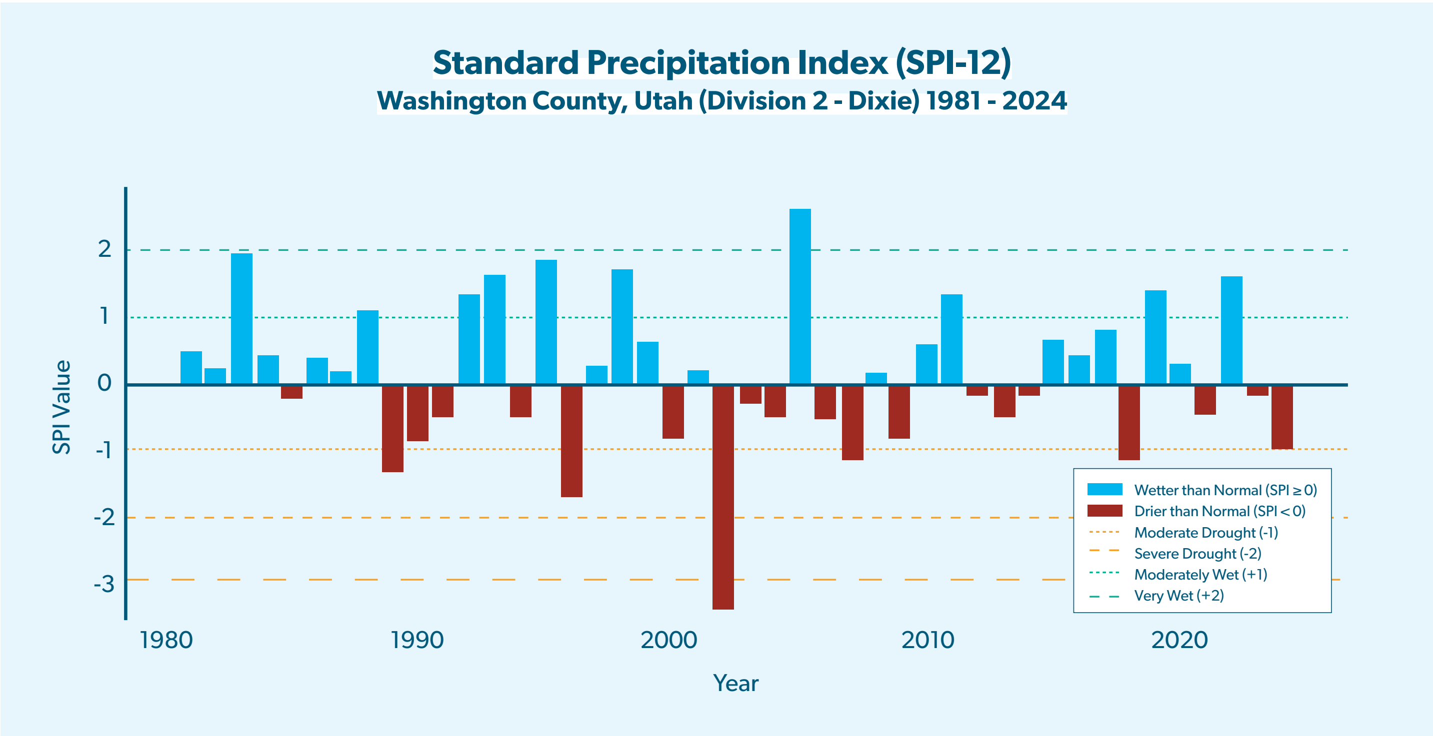
Water Demand

The district is a wholesale water provider to its municipal partners. In 2024, combined monthly production of the municipal partners and the district averaged approximately 2,200 acre-feet during winter months (Dec-Feb), and approximately 6,500 acre-feet during peak growing season (Jun-Sep).

Drought History

The district is within a drought-prone region. The Standardized Precipitation Index (SPI) for Washington County from 1980 through 2024 demonstrates high variability in precipitation. The district's reservoir and groundwater supplies provide drought resilience; however, future climate scenarios predict more extreme drought conditions, in both magnitude and duration.

[2] Reclamation. 2011. SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water 2011. April



Climate Impacts

Recent studies[3] suggest the Colorado River Basin will likely see hotter and drier patterns in the future. Climate models for the Virgin River predict a reduction in streamflow of 20% from May through July – coinciding with peak water demand.

In addition, future climate trends[4] are predicted to cause the runoff season to arrive one month earlier in the year. With temperatures in the Virgin River Basin anticipated to be 4.5 to 5°F warmer from 2050 to 2079 compared to the 1950 to 1979 historical mean, precipitation in Washington County may shift from snow to rain. Whereas snowmelt moderates the flow of the Virgin River, intense rainstorms could hinder diversion through the Quail Creek pipeline, diminishing the district's ability to capture runoff. This issue cannot be resolved by increasing water storage.

[3] *United States Bureau of Recreation. 2014. Virgin River Climate Change Analysis Statistical Analysis of Streamflow Projections*

[4] *Reclamation. 2009. Technical Memorandum 86-68210-091. Literature Synthesis on Climate Change Implications for Reclamation's Water Resources. Prepared by Technical Service Center, Water Resources Planning and Operations Support Group, Water and Environmental Resources Division*

CHAPTER 3

MITIGATION MEASURES

Drought mitigation refers to actions and strategies outside of regular water management activities that reduce the risks and impacts associated with shortage. Proactive mitigation is more efficient than reactive strategies. The mitigation strategies described here are intended to reduce the risk of water shortage and increase the district's shortage preparedness. The current and planned mitigation measures support the plan's primary goals to:

- Protect and extend the region's limited water resources
- Prepare for a rapidly expanding population
- Provide regional economic resiliency
- Preserve the natural environment
- Prolong longevity of water infrastructure

The mitigation measures are compatible with the district's Joint Agency Regional Water Conservation Plan and Best Management Practices suggested by the Utah Division of Water Resources. These include current, in-progress, and future or planned mitigation strategies, which are broken down into two general categories:

Institutional Strategies: These are non-engineered, administrative or legal strategies that include economic incentives, education and outreach, and development standards. Mitigation measures in this category reduce water demand.

Water Supply Augmentation Strategies: These are engineered strategies that increase the district's water supply resiliency to water shortages. These may include new water sources, increased storage capacity, and expanded distribution systems for both potable and secondary supplies.

Water Supply Augmentation Strategies

The district and its municipal partners have projects underway to increase the resiliency of the water supply. These projects include:

- Recharging 5,000 to 18,000 AF per year to the Sand Hollow Aquifer, as available
- Adding storage for Cottam, Sand Hollow, Quail Creek, and Sullivan wells
- Expanding well fields in the Cottam, Sullivan, and Sand Hollow regions
- Expanding surface water storage in Graveyard Wash, Chief Toquer, and Kolob reservoirs
- Expanding Quail Creek Water Treatment Plant from 60 to 90 million gallon per day (MGD)
- Performing groundwater studies in the Gunlock region
- A regional reuse purification system to produce an additional 24,000 AF per year
- Enhancing system connectivity between Toquerville Springs, the town of Virgin, and wells in the Sand Hollow region
- Constructing the Lake Powell Pipeline

Detailed project information is available in the district's 20-Year Plan to Secure New Water Supplies for Washington County, Utah and the Regional Water Master Plan on wcwcd.gov.

Summary of Current Shortage Mitigation Measures

Mitigation Measures		Description
Institutional Strategies		
Current	Tiered Water Conservation Rate	Increased charges for higher use customers to incentivize conservation.
Current	Excess Water Use Surcharge	Substantial surcharges of up to $10/1,000 gallons for accounts with excess water use.
Current	Financial Incentives for Conservation Efforts	Weather-based irrigation controllers, water-efficient fixtures, and water-wise landscaping.
Current	Education and Outreach	Provide education on outdoor water use to the public, municipalities, and schools.
Current	Water Loss Reduction	Water Loss Management Committee identifies projects to minimize non-revenue water throughout the system.
Current	New Development Standards	Coordinate with municipalities to enact new construction standards requiring water efficient fixtures and landscapes.
Current	Advanced Metering Infrastructure (AMI)	Most municipal connections have AMI meters. Completion is underway.
Current	Advanced Water Modeling	Refinement of the Virgin River Daily Simulation Model for increased real-time data on the impact of river changes on the overall water supply.
Water Supply Augmentation Strategies		
Current	Aquifer Recharge at Sand Hollow Reservoir	Recharge of the Navajo Sandstone Aquifer by the Sand Hollow Reservoir to supplement supply.
Current	Water Reuse	The St. George Water Reclamation Facility produces Type I reuse water for agricultural, commercial, institutional and residential irrigation. Capacity is 7 MGD but may expand to more than 20 MGD.
Planned	Additional Storage, Wells, and Pipelines	Addition of several new wells, pipeline, and water storage to increase distribution system flexibility.
Planned	Secondary Water System Expansion	Replace irrigation connections to secondary water sources from potable water sources.
Planned	Quail Creek Water Treatment Plant Expansion	Expand treatment plant capacity and storage to capitalize on high flows to offset periods of drought.
Planned	Gunlock Groundwater Optimization Study	Study Gunlock aquifer recharge and define the actual sustainable yield for supply optimization.
Planned	Regional Reuse Purification System	Expand non-potable reuse. Exchange reuse water for high quality agricultural water. Purify and store reuse water for production into potable water.
Planned	System Connectivity Strategies	New interconnections to enhance redundancy and reliability.
Planned	Lake Powell Pipeline Project	Utilize a portion of Utah's Colorado River water allocation.

Mitigation Measure Prioritization

Mitigation measures are prioritized based on three evaluation criteria: water savings/addition, ease of implementation, and drought tolerance. Criteria were scored on a 5-point scale. The sum of criterion scores for each strategy determined overall priority. Scores of 10 and above are high priority, 8-9 are medium priority, and 7 or below are low priority. The results are displayed below.

Mitigation Measure Prioritization Matrix

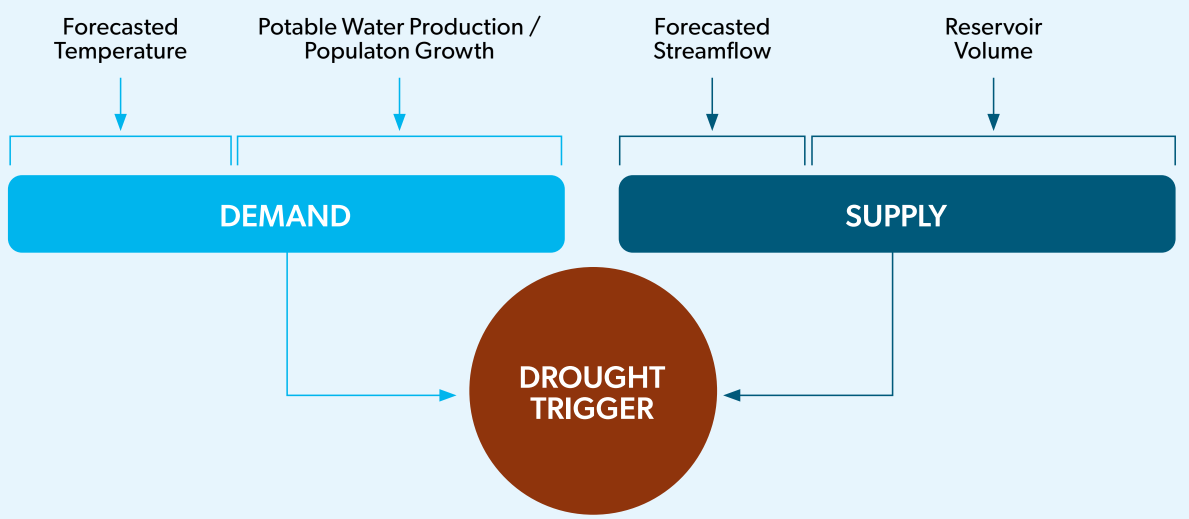
Mitigation Measures					
	Resource Improvement	Ease of Implementation	Drought Tolerance	Total Score	Priority
Institutional Strategies					
Water Loss Reduction	4	3	4	11	High
New Development Standards	3	3	3	9	Medium
Advanced Water Modeling	2	3	3	8	Medium
Advanced Metering Infrastructure (AMI)	3	2	2	7	Low
Water Supply Augmentation Strategies					
Regional Reuse Purification System	5	3	4	12	High
Gunlock Groundwater Optimization Study	4	3	4	11	High
System Connectivity Strategies	3	3	4	10	High
Additional Storage, Wells, and Pipelines	3	3	4	10	High
Lake Powell Pipeline Project	5	1	3	9	Medium
Quail Creek Water Treatment Plant Expansion	2	2	3	7	Low

CHAPTER 4

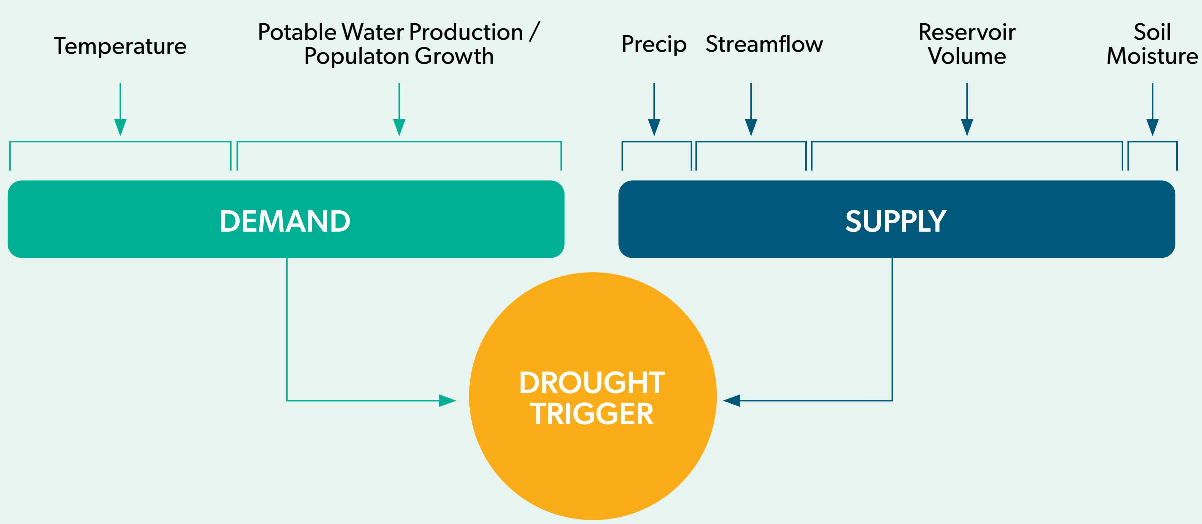
DROUGHT MONITORING

Drought is likely to be the most common cause of shortage. The district's drought monitoring tool quantifies conditions to recognize drought and assess its severity. The tool processes historical and current data to characterize conditions. These assessments inform the district's board, which is responsible for making shortage declarations. The drought tool uses inputs for past conditions and attempts to project future conditions. The inputs are illustrated in the following figures.

Forecasted | January - June



Observed | January - June



Supply Data Sources

Precipitation

The precipitation record used consist of measurements taken from nearly 13,000 stations owned by COOP, SNOTEL, Snowcourse, RAWS, CDEC, Agrimet, and EC (Canada). The data period of record ranges from January 1895 to the present.

Reservoir Volumes

Reservoirs used in the model include Gunlock, Ivins, Kolob, Quail Creek, and Sand Hollow. Quail Creek and Sand Hollow Reservoirs constitute 86% of the district's reservoir storage and are used as an indicator of total capacity.

Observed Streamflow

Monthly streamflow volumes are calculated from daily average flow and then ranked against the period of record.

Forecasted Streamflow

Winter streamflow forecasts are used to predict water supply in the spring. Forecasts for the Santa Clara River near Pine Valley (USGS 09408400) and Virgin River at Virgin, UT (USGS 09406000) stations come from the Natural Resources Conservation Service (NRCS) Web Service tool. The NRCS uses statistical models to produce streamflow forecasts.

Demand Data Sources

Air Temperature

Air temperature data are used to calculate the irrigation component of the demand score. Temperature data are accessed using the same methodology as precipitation data. The period of record covers January 1895 to the present day on a monthly timestep.

Forecasted Air Temperature

Forecasted air temperatures in winter are used to predict irrigation-driven demand in spring. Seasonal temperature forecasts are available in 3-month increments and provided by the National Weather Service's Climate Prediction Center. Forecasts are given in terms of percentages above and below normal. Seasonal temperature forecasts are based on climate and weather models, recent trends, and historical records.

Population

Annual Washington County population estimates are used to calculate the component of the demand score until 2020. Historical population data from 1900-1940 were linearly interpolated from available U.S. Census Bureau decennial census data. Population estimates from 1941-2020 were collected from the Kem C. Gardener Policy Institute of the University of Utah. The model uses percentage change from the rolling 3-year average as the population indicator.

Production

Production data refers to water pumped and diverted by the district and its municipal partners. The historical record for production data consists of monthly volumes beginning in 2017. Monthly production volumes are uploaded each month by the district. The model uses percentage change from the rolling 3-year average as the production indicator. Production data is used to estimate the component of the demand score after 2020.

CHAPTER 5

SHORTAGE STAGES

The AAC may make shortage recommendations to the board, but only the district's board may make a water shortage declaration or advance or repeal a shortage stage.

Shortage stages range from "0" for wet or normal conditions to "4" for extreme shortage. These stages communicate the severity of shortage and water supply conditions to district partners and the public. Stage descriptions help communicate conditions and necessary response actions (see Chapter 6).

To declare shortage, or transition from one stage to another, the Task Force recommends the condition persist for ninety days. This is intended to avoid messaging "whiplash" that could be disruptive to response actions. This guidance is advisory; the district board may advance or repeal a stage declaration at any time and for any duration if conditions merit such action.

Each stage is intended to produce enough water savings to abate the shortage and decrease the likelihood of worsening conditions. The key words and color schemes for each stage are intended to communicate the desired response and influence public understanding.

Water Availability and Response Stages

Stage	0	1	2	3	4
Condition	Normal	Dry	Prolonged Shortage	Escalated Shortage	Extreme Shortage
Key Word	Conserve	Caution	Concern	Critical	Crisis
Response Target	0	-10%	-20%	-40%	-60%

Stage 0 – Normal
(No reduction required)

Water supply meets current demands and is adequate to maintain or increase stored supplies. In this stage, normal conservation efforts are sufficient.

Stage 1 – Dry
(10% reduction advised)

Water demands are depleting supplies faster than they can be replenished.

Stage 2 – Prolonged Shortage
(20% reduction advised)

Water supply has been diminished (e.g. reservoir levels are low) and the meteorological conditions have failed to replenish the supply. This may occur if Stage 1 actions were ineffective, or due to below normal precipitation for an extended time. Responses become more aggressive to conserve available water in case the dry meteorological conditions persist.

The following table shows the results of applying the shortage model to 30 years of past conditions in Washington County. A historic review of the model for a period of more than 50 years showed the region would have been in stage 0 (normal) conditions 62% of the time, stage 1 conditions 29% of the time, and stage 2 conditions 9% of the time.

Historic Frequency and Severity of Drought Conditions (1996-2025)

	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Jan	1	0	0	0	0	0	0	1	1	2	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0
Feb	1	0	0	0	0	0	0	1	1	2	2	0	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	1	0	1
Mar	1	0	0	0	0	0	0	2	1	2	2	0	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	1	0	1
Apr	2	0	0	0	0	0	0	2	1	2	2	0	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	2
May	2	0	0	0	0	0	1	2	2	2	2	1	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Jun	3	0	0	0	0	0	1	2	2	2	2	1	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Jul	2	0	0	0	0	0	1	2	2	2	2	1	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Aug	3	0	0	0	0	0	1	2	2	2	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0	1	1	2	2	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Oct	0	0	0	0	0	1	0	1	2	2	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	1	0	1	2	2	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
Dec	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	

CHAPTER 6

RESPONSE ACTION PLANS

Despite relying upon the same primary source of water, each of the district's eight municipal partners have unique demands and resource scenarios. To allow municipal partners to select a suite of response actions that best fit their community, the district's board may call for municipal-scale water budgeting. In this approach, each municipality will be provided a water budget based upon the number of Equivalent Residential Connections (ERC) within the municipal service area. An ERC is an amount of water capable of serving a single-family home for one year. Commercial, industrial, and institutional customers have been allocated multiple ERC's based upon their water demands.

Each municipality must devise its own strategies to reduce water demand. In some cases, a municipality with a culture of conservation may already have lower than the per-ERC allocation provided by the district. If this occurs, the municipality will be expected to sustain the current average use per-ERC within their community.

In lieu of, or in addition to, water budgets, the board maintains discretion to direct municipalities to implement specific measures. The board may also call for a prohibition on new connections to the system if conditions merit such action.

Water Budget Methodology

Water budgets will be based upon the region's average annual water demand per ERC for the most recent three calendar years in which no shortage had been declared. This value will become the baseline for normal conditions. During a shortage declaration, each municipal partner will be allocated a water budget calculated as follows:

Total ERCs in municipality X Regional avg annual use per ERC X Shortage Coefficient = Annual Municipal Water Budget

Total ERC – The number of ERCs submitted to the district by the municipality as part of a surcharge collection report. Because communities are growing, the average of ERC in each of the twelve months will be used as the ERC served in any calendar year.

Regional Average Use per ERC – Calculated as an average use per-ERC for the most recent three calendar years in which no shortage was declared. All municipal and district water deliveries subject to the Regional Water Supply Agreement (RWSA) will be included. The three-year total water use will be divided by the total ERC reported by all municipal partners in July of each reference year.

Shortage Coefficient – A number less than 1 used to calculate the desired water use reduction per ERC. For example, if the intent was to reduce water demand by 20%, the shortage coefficient would be calculated within a model to reduce the average water use per ERC by 20%. It is important to note that because most end users demand less than the average, achieving a reduction in the regional average may require a coefficient that is more aggressive. If the coefficient is not achieving the desired demand reduction, the district and the municipal partners may calibrate the coefficient to be more effective.

The RWSA requires municipalities to apply all available municipal sources toward their demands before accepting augmentation from the district. For example, if a municipal partner was issued an annual water budget of two billion gallons and had a municipal capacity to produce 1.1 billion gallons, the district would augment the remaining 0.9 billion gallons.

On recommendation of the Task Force, water supplies deemed to be unrecoverable if conserved will be exempt from the water demand calculation. For example, Type I reuse water is currently used for urban irrigation. If the facilities served reduced their water use, the conserved water would become effluent discharged to the Virgin River and lost from the regional system.

Water budgets are non-transferable. If a community uses less water than their budget, they may not allocate excess to another municipal partner.

Performance Monitoring and Adjustments

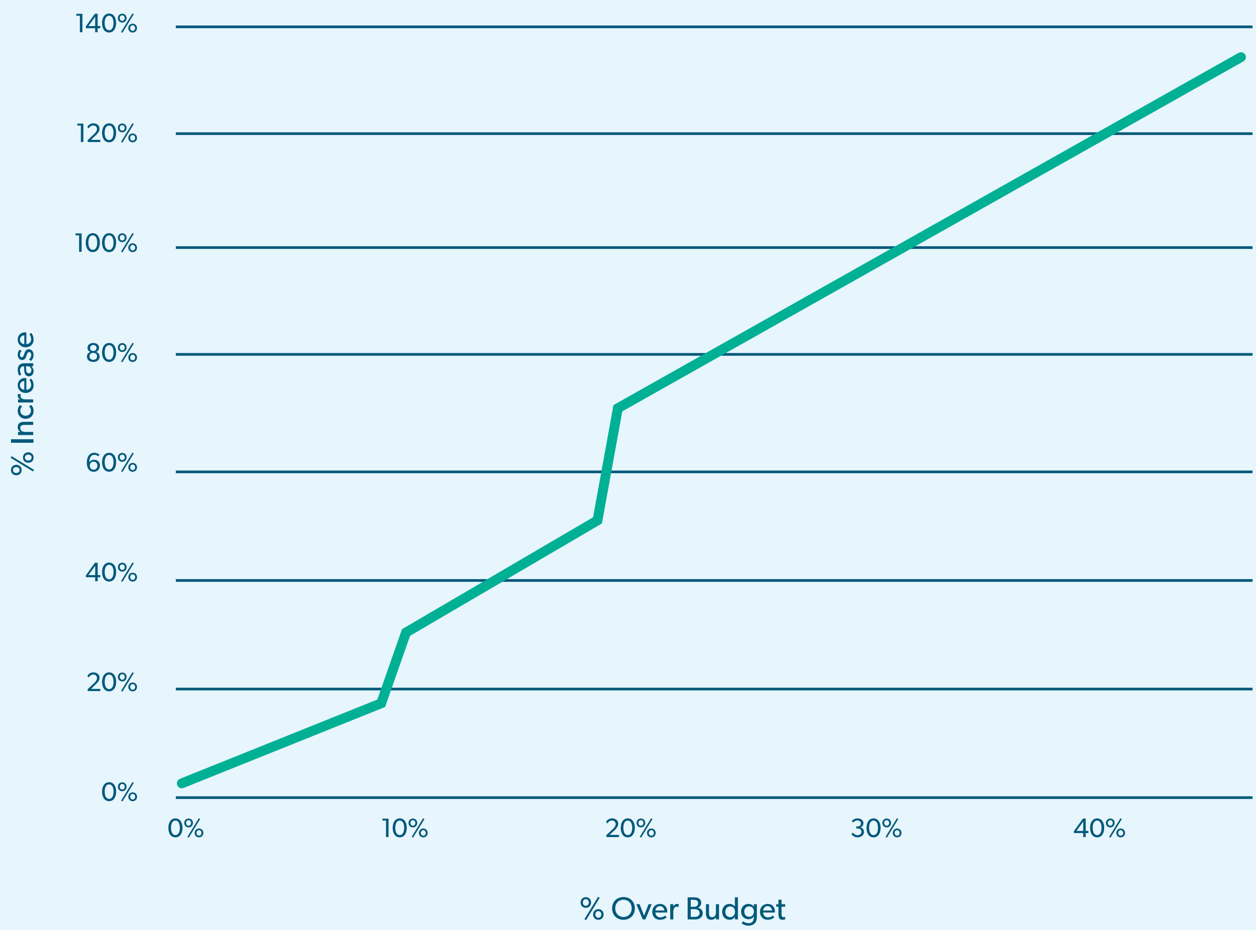
For purposes of monitoring performance, the district may establish monthly targets using historic monthly demand profiles or evapotranspiration data. This approach allows for frequent performance feedback to the district board, municipal partners and the public.

Each municipal partner's water budget will be augmented periodically as the number of ERCs increase. ERCs added during a budgeted period will receive a pro-rata allocation.

In the event there is a stage change during a water budgeted year, the district will recalibrate budget amounts appropriately. Whereas this process hasn't been used before, calibration methodology may be subject to change as experience is gained. Calibrations will be made in consultation with the municipal partners.

Because suspension of deliveries for a municipality that exceeds its water budget could negatively impact public welfare, the district will first apply an aggressive rate structure to water deliveries in excess of the budget. In calculating overages, the percentage excess will be the actual use divided by the budgeted amount, including both municipal and district sources. Only the district water in excess of the budget will be assessed the amplified price.

Impact of Exceeding Budget on Annual Average Annual Wholesale Water Cost



Percent Excess	District Wholesale Water Charge
1-10% over budget	300% of standard cost
11-20% over budget	400% of standard cost
21%or more over budget	500% of standard cost

CHAPTER 7

COMMUNICATION PLAN

During a shortage declaration, the Task Force will engage monthly to review technical information. Information will be conveyed to the district board and AAC at all regular public meetings. The AAC is comprised of local municipalities' Mayors and City Managers who meet quarterly and may make recommendations to the district board. The district board is responsible for deciding if, and when, to declare shortage or change the shortage stage based upon supply and demand conditions. Stage changes will be communicated to municipal partners and the district's website will reflect the updated stage.

The district will maintain information on its website to allow access to shortage information for all eight communities. Because each municipality may have selected different response actions, a significant communication burden will be upon the cities to inform and guide their residents.

Public awareness and adoption are vital to the plan's success. The district will coordinate with its municipal partners to provide information regarding water supply availability and response stages to the public via the following sources:

- Website – the district will have dedicated pages on wcwcd.gov with information; the district will encourage the county and all municipal customers to link their website
- Social media – the district will post information on its various social media platforms and encourage the county and all municipal partners to do the same
- E-newsletter – the district will distribute information in its electronic newsletter and share content with county and municipal partners for distribution to their subscribers
- Press announcement– the district will distribute information to media representatives with the intent of generating news coverage
- Advertising – the district has a robust media campaign that includes online, social media, broadcast production and billboard advertisements that will be used
- Speakers' bureau – District representatives will speak at community and civic events

CHAPTER 8

PLAN MAINTENANCE AND UPDATES

The district will update the plan as needed. These changes will consider recommendations from stakeholder committees, as well as any new federal or state requirements.

Evaluation of the plan will center around three main topics to assure it is working effectively. These topics include:

- Plan Performance – Individual and collective performance will be measured monthly.
- Shortage Response – Response actions will be reviewed to determine which measures are effective and concepts for amplifying effectiveness.
- Communications - Ongoing evaluation will allow stakeholders to revise or implement additional strategies to communicate more effectively.

APPENDIX A

TASK FORCE MEMBERS

Doug Bennett
WCWCD Representative
doug@wcwcd.gov

Whit Bundy
WCWCD Representative
whit@wcwcd.gov

Lester Dalton
Washington City Representative
ldalton@washingtoncity.org

Bryon Davis
Virgin Town Representative
publicworks@virgin.utah.gov

Chuck Gillette
Ivins City Representative
cgillette@ivinsutah.gov

Dave Jessop
WCWCD/TSWSRepresentative
DaveJ@wcwcd.gov

Tom Jorgensen
Ivins City Representative
tjorgensen@ivinsutah.gov

Darrin LeFevre
Toquerville City Representative
darrin@toquerville.org

Kyle Lovelady
La Verkin City Representative
kyle.lovelady@laverkincity.org

Steve Meismer
Virgin River Program Representative
steve@wcwcd.gov

Dustin Mouritsen
Santa Clara City Representative
dmouritsen@santaclarautah.gov

Marie Owens
AE2S Representative
marie.owens@ae2s.com

Zach Renstrom
WCWCD Representative
zach@wcwcd.gov

Ken Richins
Hurricane City Representative
kenr@hurricane.utah.gov

Scott Taylor
St. George City/St. George Canal Company Representative
Scott.taylor@sgcity.org

Brie Thompson
WCWCD Representative
brie@wcwcd.gov

Dallan Wadsworth
Washington City Representative
dwadsworth@washingtoncity.org

Ryan White
WCWCD Representative
RyanW@wcwcd.gov

Kory Wright
Hurricane City Representative
wright@hurricane.utah.gov

APPENDIX B

SHORTAGE RESPONSE GUIDANCE FOR MUNICIPALITIES

Whereas water is critical to the region's economy, response plans should seek to protect core economic functions to the extent possible. This is accomplished by focusing heavily upon discretionary water uses, consumptive water uses and large water users. Plans should use incremental measures to moderate user impacts and negative economic consequences.

Plans should anticipate water use reductions across every sector: residential, commercial, industrial and institutional. Some sectors may be more impacted than others due to the nature of water use (landscape vs. domestic), the relative value of the use (ornamental lawns vs. active spaces), or the enormity of the demand (top tier water users).

Landscape

Almost 70% of urban water in the region is used consumptively, meaning it is lost to the atmosphere after use. Consumptive uses include, but are not limited to, landscape irrigation, evaporation from water surfaces, mist cooling systems, water system leakage and evaporative cooling systems. Collectively, consumptive uses are estimated at 12 billion gallons annually. Irrigated landscape is estimated to be 75% of consumptive use, or 9.4 billion gallons.

Irrigated lawn areas consume about 75% of all landscape water use, or about 7 billion gallons. A 2023 analysis conducted by the district estimated there are 180 million square feet of lawn in the region and as much as 70 million square feet are primarily ornamental.

Ornamental lawns provide no recreational function, either because of their size, shape or accessibility. Whereas irrigated lawns use four times as much water as drip irrigated plantings, spray irrigation and ornamental lawns should be restricted before drip irrigated plantings. Where development has been allowed, the installation of irrigated lawn areas may be deferred or prohibited.

Prohibiting irrigation of ornamental lawns could yield up to a 16% reduction in water demand without sacrificing active areas or risking loss of mature trees and shrubs.

For purposes of shortage response, ornamental lawns could include decorative lawns at businesses and homeowners' associations and front lawns of residential homes. Areas that don't meet a municipality's definition of an active recreation area should also be considered.

Allowing drip irrigated landscape to be installed and sustained is critical to sustaining the region's mature plants and trees and will help sustain economic activity in the landscape industry. By converting lawn areas to drip irrigated plantings during water shortage, the region will also improve long-term water security.

Water Recreation

Water recreation is a discretionary use. Residential swimming pools are typically 400 to 700 square feet in surface area and require 20,000 to 40,000 gallons annually to maintain. Homes with pools may use 20% more water than those without. Most of a pool's water demand is attributable to evaporation, however, estimates suggest 30% of pools have leaks that lose water into the surrounding soil.

Municipal plans may consider improved management practices on existing pools and a reduction of new pools during a declared shortage condition. Because swimming pools may not be left empty without damage to the shell, and unmanaged pools pose health and safety hazards, it may be appropriate to allow the water level to be maintained in existing pools but call for more efficient operational practices, such as the use of a vapor barrier (cover) to reduce evaporation and a prohibition on draining and refilling.

Community swimming pools provide recreation for hundreds or even thousands of people. In areas where a community pool exists, homeowners are less likely to install private swimming pools. Due to the economy of scale, municipalities may consider allowing new community swimming pools to be constructed to a conservation standard during some shortage stages. This allows community pools to serve as a viable option to private swimming pools and helps sustain employment.

Commercial water parks use 15 to 30 million gallons annually, which places them among the top one percent of commercial and industrial users in the region. Water parks typically operate for just 4-5 months each year and cater to a limited sector of the population. During shortage, permits for new water parks may be suspended and operations of existing parks may be curtailed in later stages of shortage.

Splashpads are water-play areas, most of which are associated with municipal parks. These facilities use about 300 gallons per square foot of play area annually and typically operate 5 months of the year. Most splashpads operate as single-pass water use, where water delivered through nozzles sprays onto bathers and then flows to the wastewater system where it may be recovered for reuse. Some splashpads recirculate water through a swimming pool filtration system or recover water for landscape irrigation on-site. Seventy percent of splashpad use is estimated to be captured to the drain, while the remaining 30% is lost to evaporation from the play surface and bathers. Operations of these facilities may be curtailed or suspended with little or no concern about damaging infrastructure.

New Development

Increasing water demand during a water shortage is precarious. New permits for non-critical facilities may be restricted at various stages of shortage, but projects with existing water commitments and appropriate permits that have already initiated construction may have a legal basis to proceed. Allowing previously permitted projects to advance while simultaneously restricting issuance of "non-essential" new permits creates a "glide path" for reduction of activity in the construction and development industries. This approach can soften economic impacts as compared to sudden and absolute prohibition.

In some cases, the shortage plan may merit district or municipalities to prohibit new service for certain types of water-intensive facilities.

Even in shortage, there may be necessity to construct facilities that meet a critical need for the community. There are also benefits in approving the construction of facilities that have nominal water demands during and after construction. Municipalities will determine what constitutes a critical facility, a low water use project, or a project that merits additional permits to reach completion. Municipalities should consider the following guidelines for determining whether a project merits the additional water demands:

» The most conspicuous critical facilities are those that meet a pressing need for the general population, such as health care facilities or public safety infrastructure.

» Depending upon supply conditions, housing may be deemed a critical facility, but preference should be given to multi-family dwellings and ultra-water efficient (UWE) communities intended to serve as primary residences. Where UWE housing development is occurring, communities should be afforded consideration to develop community parks or swimming pools subject to the UWE design standard.

» Construction already permitted may proceed, subject to specific direction or intervention by a municipality. For example, if building lots have been prepared and transportation and utility infrastructure installed, construction of homes may be a nominal part of the total water demands of the project. However, if a permitted project has substantial water demands, a municipality may determine water shortage is a compelling reason to suspend or defer the project, within the scope of the jurisdiction's legal authority.

» Permits for facilities that require nominal water to construct or operate may be approved, even if they are not critical facilities.

» Permits issued should include clear stipulations that allow the municipality to suspend construction if water supply shortage becomes more severe.

Water Rates

Water rates are a powerful tool. An aggressive increasing block rate structure helps ensure affordable water to meet basic needs for health and safety and moderate landscape demands. Higher water use blocks may be priced to send a strong conservation message, but they also allow property owners to make their own decisions about strategies to reduce use without specific regulatory intervention.

Having high monthly service fees mutes the financial benefit of a customer reducing their water use. If possible, lower the monthly service fee and move the revenue requirement. A volume of water should not be included in the service fee, as this discourages conservation.

A small percentage of heavy users typically accounts for a disproportionate fraction of water demand. For example, in the commercial sector, the top one percent of customers account for almost half of all commercial demand. In the residential sector, it is not uncommon for the top 25% of customers to use more water than the remaining 75%.

Since these "super users" may cause a municipality to exceed a district-mandated water budget, thus incurring additional cost for the utility's entire customer base, an appropriate strategy may be to implement a water shortage rate structure that strongly discourages high water use. This approach incentivizes heavy water users to choose their own conservation measures without imposing a regulatory burden or cost upon low and moderate water users.

The following guidance are suggested measures that may be commensurate with the severity of conditions and the targeted water use reduction. In the absence of a specific resolution from the district board, municipalities are not required to follow the guidance and may make their own policy determinations.

Shortage Stage 0: Conserve

» Implement Conservation Plan

Shortage Stage 1: Caution

» Promote Stage 1 watering guidelines
» Reduce irrigation of public facilities by 10%
» Implement Stage 1 water rate structure
» Stage 0 actions plus:

- Leverage smart metering systems to strengthen messaging
- Prevent lawn installations May through September
- Limit residential swimming pool permits to 500 square feet or less surface area
- Reject new connections for non-critical facilities with demands over 9 MGY
- Increase enforcement of municipal water waste policies

Shortage Stage 2: Concern

- » Deploy Stage 2 communications
- » Promote Stage 2 watering guidelines
- » Reduce irrigation of public facilities by 20%
- » Implement Stage 2 rate structure
- » Stage 1 actions plus:
  - – Defer new grass installation. Drip irrigated, water-efficient plants only
  - – Prohibit irrigation of ornamental lawns in all sectors
  - – Defer new private swimming pool permits
  - – Require new housing to meet ultra efficient water standard
  - – Reduce operation of public splashpads
  - – Reject new connections for non-critical facilities with demands over 3 MGY
  - – Restrict car washing frequency
  - – Prohibit ornamental fountain operation
  - – Prohibit comfort mist cooling systems
  - – Implement golf water budgets for 20% reduction
  - – Increase incentives for water efficient landscape 50%

Shortage Stage 3: Alarm

- » Deploy Stage 3 communications
- » Promote Stage 3 watering guidelines
- » Reduce irrigation of public facilities by 30%
- » IImplement Stage 3 rate structure
- » Turn off outdoor water features, including splashpads
- » Stage 2 actions plus:
  - – Spray irrigation prohibited except for communal active recreation areas
  - – Watering limited to drip irrigation or hand-held hose with positive shut-off nozzle
  - – Implement water budgets for golf courses to reduce demand 30%
  - – Planting only allowed for conversion of lawn areas to water-efficient landscape
  - – No new connections approved except critical facilities or low-water demand facilities
  - – Swimming pools covered when not in use. Only make up water allowed
  - – Recreational water parks and splashpad operations suspended

Shortage Stage 4: Crisis

- » Deploy Stage 4 communications
- » Deploy Stage 4 watering guidelines
- » Reduce irrigation of public facilities by an additional 20% (60% total)
- » Implement Stage 4 rate structure
- » Golf course irrigation budgeted at 60%reduction
- » Stage 3 actions plus:
  - – Outdoor irrigation prohibited except communal active recreation areas which are budgeted at 40% of average.
  - – All outdoor water recreation suspended
  - – Car washing prohibited, except dry wash products