EAGLE RIVER WATER & SANITATION DISTRICT

UPPER EAGLE REGIONAL WATER AUTHORITY

2025 Water Shortage Response Plan

Clean Water. Quality Life.™

LRE WATER

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Authority	Upper Eagle Regional Water Authority
AMI	Advanced Metering Infrastructure
District	Eagle River Water & Sanitation District
D/A	Eagle River Water & Sanitation District/Upper Eagle Regional Water Authority
DRP	Drought Response Plan
DWR	Colorado Department of Water Resources
CDPHE	Colorado Department of Public Health and Environment
cfs	Cubic Feet Per Second
CWCB	Colorado Water Conservation Board
Edwards DWF	Edwards Drinking Water Facility
EPA	US Environmental Protection Agency
EPR	Eagle Park Reservoir
ERWSD	Eagle River Water & Sanitation District
HCU	Historical Consumptive Use Credit
MGD	Million Gallons per Day
NIDIS	National Integrated Drought Information System
SHOP	Shoshone Outage Protocol Agreement
SNOTEL	Snow Telemetry Station
SPI	Standardized Precipitation Index
SWE	Snow Water Equivalent
NRCS	Natural Resources Conservation Service
USDM	US Drought Monitor
USGS	US Geological Survey
UERWA	Upper Eagle Regional Water Authority
VWWTF	Vail Wastewater Treatment Facility
WSRP	Water Shortage Response Plan
WSRC	Water Shortage Response Committee
WY	Water Year

Executive Summary

What Is the Purpose of This Plan?

During years with water shortages, including acute drought and system emergencies, the Eagle River Water & Sanitation District (District) and Upper Eagle Regional Water Authority (Authority), hereafter referred to jointly as the D/A, may be required to use strategic water supply reserves to ensure that water demands, and the associated augmentation requirements, are met. This plan is designed to help the D/A anticipate those periods and implement measures to effectively reduce water use to conserve supplies and prevent water shortages.

What does “Water Shortage” mean?

In this plan, a water shortage occurs when the D/A lacks the physical or legal water supplies needed to meet the augmentation requirements for their diversions. It can also mean the District and Authority must begin drawing from strategic reserves to meet customer demand. Several scenarios can trigger this situation, including:

- **Extended Periods with Senior Mainstem Colorado River Calls**
  For example, a prolonged call from the Shoshone hydropower plant, coupled with limited storage in Green Mountain and Wolford Mountain Reservoirs.
- **Prolonged Low Streamflows Leading to Instream Flow Calls**
  Long periods of reduced streamflows can trigger an extended instream flow call, limiting available water supplies.
- **Low Storage Levels in Local Reservoirs**
  Insufficient storage in Eagle Park Reservoir or Black Lakes 1 and 2, whether due to prior-year drawdowns, a failure to refill in the current spring, or maintenance issues.

This plan aims to help the D/A reduce the risk of a true water shortage, ensuring sufficient water remains available to meet customer needs under even the most challenging conditions and that impacts to aquatic resources are minimized.

What is the “Critical Period”?

The critical period, as referenced throughout this study, refers to the number of days each summer when the D/A must rely on water stored in Eagle Park Reservoir and/or Black Lakes to meet customer demands. This reliance is caused by flows in the river dropping below the instream flow thresholds typically at Eagle River between Avon and Edwards and Gore Creek below the VWWTF.

The length of each year’s critical period varies, with some years never needing to use in-basin reservoir supplies while others last longer than two months. As the length of the critical period

increases, so does the risk of a water shortage. The length of each year's critical period also directly correlates to several of the drought indicators used in the Eagle River Valley such as April 1 snowpack and the magnitude of peak streamflow.

Severe Drought: Years with critical periods over 50 days:

- 2002, 2012, 2018

Drought Warning: Years with critical periods between 30 and 50 days

- 2020, 2021

Figure 1 below shows the hydrograph of the Eagle River Below Wastewater Treatment Plant at Avon (USGS 09067020) (Eagle River at Avon) through 2018. The late summer hatched period denotes the critical period when much of the Authority's water rights portfolio is out of priority, and there is an increased reliance on in-basin storage. The red dashed line shows the average pattern of D/A demands; From Aug. 1 to Sep. 30, demands are high, streamflows are low, and the instream flow call is on, which is when reductions in demands will be most impactful to local water security.

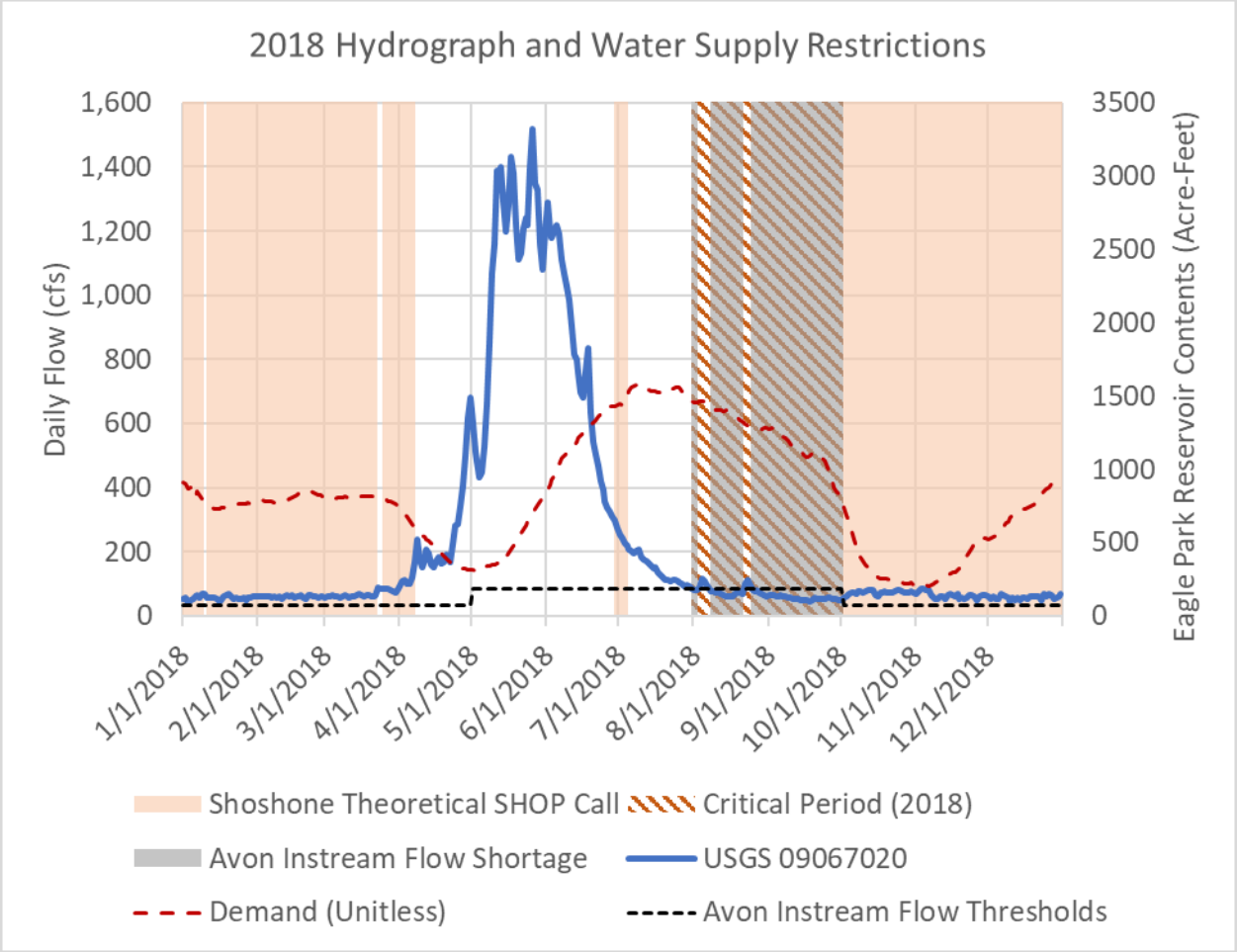


Figure 1. 2018 Drought Year Hydrograph and Critical Period

When is a water shortage likely in the Eagle River Valley?

The D/A actively engages in water supply security planning, which includes assessments of its water supply portfolio, anticipated demand growth, conservation strategies, and contingency resources. These efforts help the D/A plan for future water needs and ensure service reliability. As part of this planning, the D/A operates with a water supply reliability standard designed to maintain “business as usual” service levels, except during a 1-in-20-year drought event (a 5% probability each year). This framework equips the D/A with the tools needed to predict and respond to more severe events that exceed the 1-in-20-year threshold.

Given that flows in the Eagle River watershed are closely tied to snowpack, snowpack measurements provide valuable insights into the likelihood of water shortages each year. The D/A have identified key indicators and thresholds that signal potential shortage conditions. These indicators are summarized in Table 1, along with the optimal timing for their use. The severity of these indicators directly relates to the length of the critical late-summer period, during which the D/A must rely on in-basin storage. These in-basin storage supplies have more limited capacity compared to the rest of the D/A water rights portfolio, underscoring the importance of early planning and response efforts.

Table 1. Eagle River Valley Water Shortage Risk Indicators

Monitoring Timeline	Indicator	Data Source	Data Link	Moderate and Severe Water Shortage Threshold
January - March	Drought Monitor Classification	Average U.S. Drought Monitor Severity Level	https://www.drought.gov/states/colorado/county/Eagle	**Moderate:** N/A **Severe:** < -3.0
April 1	Snowpack	Combined average SWE from three stations: Vail Mountain 842 (Avg 20") Copper Mountain 415 (Avg 15") Fremont Pass 485 (Avg 15")	NRCS Report Link	**Moderate:** 15" SWE, Average of 3 Stations **Severe:** 13" SWE, Average of 3 Stations
May - July	Peak Streamflow	Eagle River at Avon gage (USGS 09067020)	USGS Link	**Moderate:** 1,600 cfs **Severe:** 1,200 cfs
May - July	First Day Below 100 CFS	Eagle River at Avon gage (USGS 09067020)	USGS Link	**Moderate:** Aug. 12 **Severe:** Aug. 5
July	Eagle Park Reservoir Account Levels	Helton & Williamsen Reservoir Accounting		Threshold reached if SWE and Peak Streamflow Shortage Thresholds achieved and Conservation Storage Account is not projected to be adequate to refill Class A, Series 2 shareholder accounts on September 1

No single indicator should be relied upon to determine the likelihood of a water shortage. Instead, all indicators should be evaluated together, as each provides valuable insight into different aspects of potential water scarcity. If these indicators show a worsening trend over time, it should prompt the D/A to take proactive measures to mitigate the risk of a shortage.

What Steps Can the District and Authority Take to Reduce Water Use During a Critically Dry Year?

The most effective way for the D/A and its customers to mitigate the risk of water shortages is by aggressively reducing outdoor water use, especially during late summer in critically dry years. Late summer typically brings peak water demand, with a high proportion of that use being consumptive, meaning the water is not returned to the system. During these critical periods,

when instream flow calls are active, the D/A relies more heavily on in-basin water storage to meet demand. Reducing outdoor irrigation during this time is crucial to minimize impacts on the aquatic environment, protect the D/A's water supply portfolio, and ensure long-term water security in the basin.

Once a shortage is declared, District staff can implement the following strategies:

- **Proactive Customer Communication**
  Regular updates to all customers, with targeted messaging for high water users.
- **Water Use Reduction Targets**
  Establishing clear targets for water reduction to guide customers and operations during the drought period.
- **Outdoor Water Use Restrictions**
  Adjusting irrigation to achieve between 30% to 60% reduction depending on the severity of the shortage.
- **Water Overuse Fines**
  Implementing fines for excessive water use on top of the tiered rate structure. These fines would be adopted as part of the annual budget and rate structure.
- **Active Enforcement**
  District staff will use available tools such as Advanced Metering Infrastructure to monitor and enforce water use restrictions, ensuring compliance through inspections and penalties as necessary.

By taking these steps, the D/A can effectively manage water demand, protect storage reserves, mitigate environmental impacts, and maintain water security during critical periods.

What happens when a shortage is predicted/imminent?

When indicators suggest a high risk of a prolonged critical period, District staff must act swiftly to mitigate the impact. The following initial steps are essential:

1. **Notify the Boards of Directors**
   District staff will communicate with the District and Authority Boards about the heightened shortage risk and the potential need for a Water Shortage Declaration.
2. **Initiate Proactive Communication**
   Begin outreach to customers, stakeholders, and the community to raise awareness about the potential shortage and encourage early conservation efforts.
3. **Activate the Water Shortage Response Committee**
   Assemble a multi-departmental Water Shortage Response Committee to coordinate drought management efforts and oversee enforcement actions. This committee should include representatives from finance, water conservation, communications, water resources, and operations to ensure a comprehensive response.

The first and most critical action in managing a shortage is for the District and Authority Boards to issue a Water Shortage Declaration. This declaration empowers District staff to enact and

enforce water use restrictions and levy fines on accounts with excessive consumption. It also officially activates the Water Shortage Response Committee, which will guide the response strategy and ensure all departments work in coordination to manage the shortage effectively.

Recommendations and Actions for our Customers

Every water user plays an essential role in reducing demand and helping the community get through periods of drought and water shortages. Here are some actions customers can be encouraged to take to be prepared for potential water shortages:

- **Read Their Water Bills**
  Customers should regularly review their water bills to understand consumption patterns and identify any unexpected increases in use. This awareness can help customers make informed decisions to conserve water.
- **Sign Up for WaterSmart to Monitor Use and Set Alerts**
  The WaterSmart platform (erwsd.watersmart.com) can be used to track water use in real time, set usage alerts, and get personalized tips to improve efficiency. When customers monitor their water consumption, it helps them stay proactive in conserving resources.
- **Follow Recommended Conservation Measures**
  The D/A provides several of conservation measures to ensure customers are using water responsibly and moving away from inefficient practices. Customers can visit https://www.erwsd.org/conservation/use-water-wisely for practical tips and guidelines to reduce unnecessary water use.
- **Read D/A Communications during Dry Periods**
  During years with critically dry conditions, announcements and communications from the D/A are the best source of information on hydrologic conditions, restrictions, and other important updates. Customers should be encouraged to read these since timely actions based on these communications can help reduce the strain on the water supply.
- **Reduce Outdoor Water Use During Droughts and Water Shortages**
  Outdoor water use, such as lawn irrigation, can account for a significant portion of water consumption. During droughts and water shortages, customers should minimize outdoor watering by adjusting sprinkler systems, using drought-tolerant plants, and following any watering restrictions set by the D/A. As a preventive measure, customers can familiarize themselves with the settings on their irrigation systems and how to quickly adjust watering schedules to reduce overall use.

By encouraging customers to adopt these practices, the D/A can help its customer base contribute to preserving water resources and ensuring that essential services remain available during periods of drought and water shortage.

Introduction/Purpose

Eagle River Water & Sanitation District Background

The Eagle River Water & Sanitation District (District) is a Colorado special district responsible for the operation of regional public water and wastewater treatment systems that serve the towns of Vail and Avon, plus other communities in eastern Eagle County, Colorado. The District provides full contract water operations and management (O&M) services to the Upper Eagle Regional Water Authority (Authority), which provides water to its six member entities and two contracting districts, including:

- Town of Avon
- Arrowhead Metropolitan District
- Beaver Creek Metropolitan District
- Berry Creek Metropolitan District
- Eagle-Vail Metropolitan District
- Edwards Metropolitan District
- Other Contracting Districts (Bachelor Gulch and Cordillera)

This plan has been developed in support of both the District and Authority. The Eagle River Water & Sanitation District and Upper Eagle Regional Water Authority operate an integrated public water system. However, to maintain clarity in this document, the term “D/A” will refer specifically to the two entities themselves. All communications with customers, including the website and billing details come from the Eagle River Water & Sanitation District. Figure 2 below shows the D/A’s source watersheds and service area boundaries.

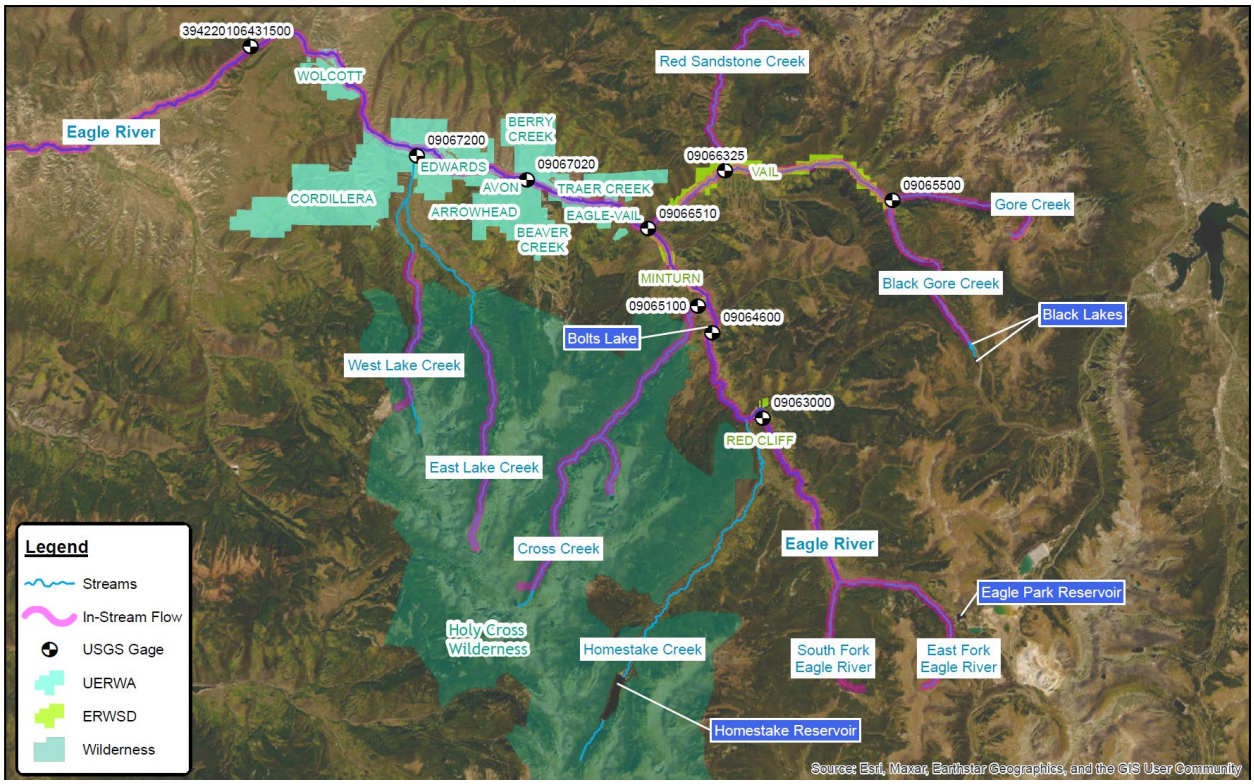


Figure 2. District and Authority Supply and Service Areas

The D/A in basin water source is the 945 square mile Eagle River watershed and manages water supplies in Black Lakes 1 & 2 near Vail Pass, Eagle Park Reservoir near the Climax Molybdenum mine, and an account in Homestake Reservoir, on Homestake Creek.

The D/A provides water service to 10,019 individually metered residential, multi-family residential, mixed-use, commercial, and irrigation only accounts, totaling 7,100 acre-feet per year, with the bulk delivered during the summer months for outdoor irrigation. To treat this water, the D/A operates 3 surface water treatment plants and 18 groundwater wells, collectively capable of delivering 24.93 MGD (91.9 acre-feet per day) of high-quality, treated potable water. Treated water is distributed to the D/A's customers through 240 miles of water mains, and other infrastructure required to meet customer water demands in the high mountain topography of the Eagle River Valley.

To treat domestic wastewater, the District operates the Vail, Avon, and Edwards wastewater treatment facilities. Collectively, these can treat up to 9.95 MGD (36.6 acre-feet per day) of wastewater, and return it to the stream system, meeting all regulatory requirements under EPA/CDPHE guidelines.

Planning Process

The development of this plan was funded by a generous grant from the Colorado Water Conservation Board through the Water Plan Grant program. This plan was developed by LRE Water in close collaboration with District staff. During the planning process a Water Shortage Response Committee was formed to coordinate with LRE Water, provide insight into D/A operations, and coordinate local stakeholders. This committee included LRE Water, as well as District staff from various departments including Operations, Water Resources, Communications and Public Affairs, and Business Administration.

LRE Water relied on lessons learned, and planning processes from the CWCB guidance document, “Drought Management Planning: A Guide for Water Providers” (CWCB 2020). Additionally, plans from other municipalities around the State were used as a starting point for many of the plan components.

At the project's outset, a Drought Planning Committee was formed and included members of various operations and business functions of the District. The committee was selected based on staff members’ knowledge of local water resources issues. The following staff were part of the committee:

Siri Roman, General Manager
Jason Cowles, PE, Director of Engineering and Water Resources
Justin Hildreth, PE, Water Resources Engineer
Tim Friday, PE, Planning and Water Resources Manager
Diane Johnson, Communications and Public Affairs Manager
Sarah Crawford, Community Relations Specialist
David Norris, Director of Business Administration
Page Weil, PE, Senior Water Resources Engineer, LRE Water

The Eagle River Water Shortage Response planning process followed these steps:

1. Planning Process, Plan Objectives
2. Drought Vulnerability Assessment
3. Drought Monitoring
4. Drought Stages, Triggers, and Response
5. Drought Mitigation and Support Strategies
6. Staged Drought Response Program
7. Drought Response Operational Framework
8. Plan Approval and Adoption

This drought planning process included several internal and public meetings, including:

- Multiple presentations to the District and Authority Boards of Directors
- Multiple meetings with the Water Shortage Response Committee
- External Stakeholder presentation to community leaders, Aug. 1, 2024

- “Lunch With the Locals” public presentation, Aug. 28, 2024

Water Shortage Response Plan

The purpose of this plan is to document the research, development, and implementation of the 2025 Eagle River Water & Sanitation District and Upper Eagle Regional Water Authority Water Shortage Response Plan (WSRP). At the request of the D/A, LRE Water has prepared a new WSRP based on current needs identified by the D/A.

The final WSRP is designed to provide a reliable water supply for essential public services and fire suppression for structure fires during a water shortage while maintaining environmental health and the recreational economy of the Eagle River Valley. It is important to note that the D/A water system is not designed for or intended to provide water to fight wildfires. The plan is also intended to assist the D/A in providing equitable, efficient, and appropriate response measures and communications during a water shortage. The completed plan features the following components:

- Drought Vulnerability Assessment
- Drought Monitoring and Key Metrics
- Drought Stages
- Drought Response Actions and Strategies
- Operational and Administrative Framework

The D/A has intentionally chosen to name this plan the Water Shortage Response Plan rather than a “Drought Response Plan” (DRP) because of the different meanings and interpretations of drought, as well as the hydrology of the Eagle River Watershed. The D/A’s water rights portfolio is robust and allows for sufficient supply and low risk during years when other parts of Colorado may be under a drought declaration. The risks, vulnerabilities, indicators, and response strategies outlined in this document are focused on the extreme cases where there is a significant risk of water shortage to D/A customers, hence the name “Water Shortage Response Plan”.

Since the general public is used to both terms and for consistency throughout this document:

- Drought**:** Refers to drier than average hydrologic conditions like streamflow, soil moisture, and snowpack.
- Water Shortage**:** Refers to times when the D/A water supply system sees decreased availability in supply and potentially impacts usage.

Goals and Objectives

The D/A prioritizes water use in this way:

- Essential Water Needs
    - Structure fire suppression
    - Residential indoor use

- Maintain the Health of the Aquatic Environment and Legal Compliance
    - Stream health
    - Legal Compliance with ISF and the D/A Water Right Portfolio.
- Minimize Impacts to the Recreation Economy
    - Commercial indoor use
    - Commercial non-irrigation outdoor use
    - River recreation includes fishing, kayaking and rafting
- Non-essential Use
    - Outdoor irrigation

The Eagle River Valley's primary economic driver is tourism. Hundreds of thousands of visitors per year come to the Eagle River Valley for a wide variety of recreational opportunities (Vail Valley Economic Development, 2024). Many of the recreational opportunities are driven by the pristine mountain environment, so maintaining environmental health is a driving principle of this plan. The objectives of the WSRP were laid out to address the D/A priorities in order:

- Preserve the public water supply for public safety and health (i.e. fire suppression and indoor use).
- Protect the aquatic environment from damage due to human diversions and consumptive use.
- Protect the local recreational economy to the extent practicable because it is dependent on both the available water supply and water quality of the Eagle River Watershed.
- Maintain system reliability and minimize service disruptions.

During a critical water shortage due to a drought or major system interruption, the D/A should apply restrictions, enforcement measures, and communications strategies to reduce water use, while meeting as many of the plan objectives as possible. These measures should be targeted to reduce outdoor water use, especially during the mid-to-late summer period when streamflows drop and instream flow thresholds are not met.

Review of Existing Plans

To assist the D/A in the preparation of this WSRP, DRPs from 20 other Colorado cities and entities were thoroughly investigated. Each DRP was assessed for relevant approaches to categorizing drought stages, impacts, and response strategies. Particular interest was given to DRPs from cities located in areas geographically similar to the Eagle River Valley, like the City of Aspen. Components of plans that were relevant to the D/A were compiled and presented to District staff through a series of planning meetings for evaluation.

Reviewing these plans and their associated components was essential for several reasons. First, reviewing the plans allowed the District and LRE to explore new drought indicators and impacts that may be useful for the development of the D/A's WSRP. Many of the plans also had response strategies not previously used by the D/A that could be implemented by the D/A. Finally, researching other successful plans ensured that the D/A's completed WSRP has the components necessary to be effective.

2012 Drought Response Plan

Along with the 20 other plans, the D/A's previous DRP was also reviewed. This plan, developed in response to the 2012 drought, included four drought stages with associated triggers and response targets. The triggers used to indicate each drought stage were primarily based on instream flow levels. The DRP also included specific actions for different local stakeholders and water users to take depending on which drought stage had been triggered. Details on drought monitoring and public outreach efforts were also documented in this version of the plan. Although this plan had all the components needed to create an effective DRP, the District ultimately decided to move away from this version as it was a reactive approach rather than a proactive planning document.

Other Plans

During this planning process, the Water Shortage Response Committee reviewed nearly 20 other drought response plans from other municipalities around Colorado. These plans were used to create a comprehensive list of drought response strategies that were evaluated by the D/A. Relevant strategies from these plans and the D/A's previous DRP were included in the final plan. The D/A also found it useful to analyze the number and type of drought stages used by other cities/entities in the state of Colorado. Creating too many or not enough drought stages can be a downfall of a WSRP, so the D/A developed a series of drought stages tailored to their system.

Relevant details from the other plans reviewed are included in Appendix 2. These details include:

- Drought indicators and monitoring variables
- Drought stages
- Response strategies
- Links to recent planning documents

Of the other plans reviewed, nearly every plan was created around a series of drought stages tailored to fit each entity's needs. Stages were often based on a series of environmental triggers, such as April 1 SWE or flow in a nearby stream, which have historically indicated a future potential water shortage. The type and number of stages used by each entity varies depending on the entity's needs and current environment. The drought plans of entities located in similar regions in Colorado usually had similar environmental triggers and drought impacts (such as Thornton and Westminster or Breckenridge and Dillon). Other similarities include the importance of effective communication, taking early action when necessary, and increasing monitoring as droughts progress. Many of the plans were also easily adaptable and left room to incorporate lessons learned during future droughts and water shortages.

Drought Vulnerability Assessment

Drought is generally defined as a deficiency of precipitation over an extended period of time that can eventually lead to a water shortage. However, drought definitions vary greatly by state and region and directly depend on the effects of localized impacts. For the Eagle River Watershed, a water shortage will have direct impacts on local water operations and the recreation economy. Additionally, due to the nuances of Colorado Water rights, a drought will increase reliance on in-basin water storage, which may be affected by drier conditions.

Overview of Water Supply Planning Efforts

Over time the D/A have conducted various planning processes to address water security issues. These plans address changing demands, per-capita use, development of contingency supply sources and inter-agency water-sharing agreements. These planning efforts and agreements are all targeted at improving water security through understanding and reducing demands, as well as increasing amount and reliability of supplies. Some key planning efforts include:

Demand Forecasting and Conservation:

- Regular accounting reports on demand and projected demand growth by account type.
- Development of a Water Efficiency Plan, per state requirements.
- Public outreach campaigns on water conservation
- Automated metering and billing systems to track overall use and highlight excessive water users.

Development of Additional Supplies:

- Actively pursuing the redevelopment of Bolts Lake Reservoir.
- Acquisition of storage contracts in Homestake, Green Mountain, and Wolford Mountain Reservoirs

Water Sharing Agreements and Other Efforts:

- The Water System Interconnection Agreement which allows for water sharing throughout the D/A service areas, as well as multiple points of diversion for the D/A augmentation supplies.
- Adoption of a Strategic Reserve Policy that defines levels of service, system reliability, and contingency water reserves.

From the Strategic Reserve Policy, the D/A functions with water supply reliability criteria of “business as usual” levels of service for all but the 1-in-20 year (5% chance per year) drought event. This WSRP is designed to give the D/A tools to predict and reduce demand during drought events that exceed that 1-in-20-year threshold.

Streamflows and Drought Recurrence

Streamflows are a primary indicator of drought information in the Eagle River watershed as they drive how much water is available for diversion and use. The Eagle River below Gypsum, CO gage (USGS 09070000) has the longest available period of record for the Eagle River Valley area from 1946 to the present day. This gage data was used to assess historical variability and drought recurrence within the Eagle River Valley. Figure 3 shows the total water flow for each year including the driest 3-year sequences. The 10 driest years on record and recent historic droughts are highlighted in orange. The dashed black line illustrates the 95th percentile of the driest years on record. This figure shows that streamflows on the Eagle River have high interannual variability. The past droughts shown on this graph also do not occur at regular intervals.

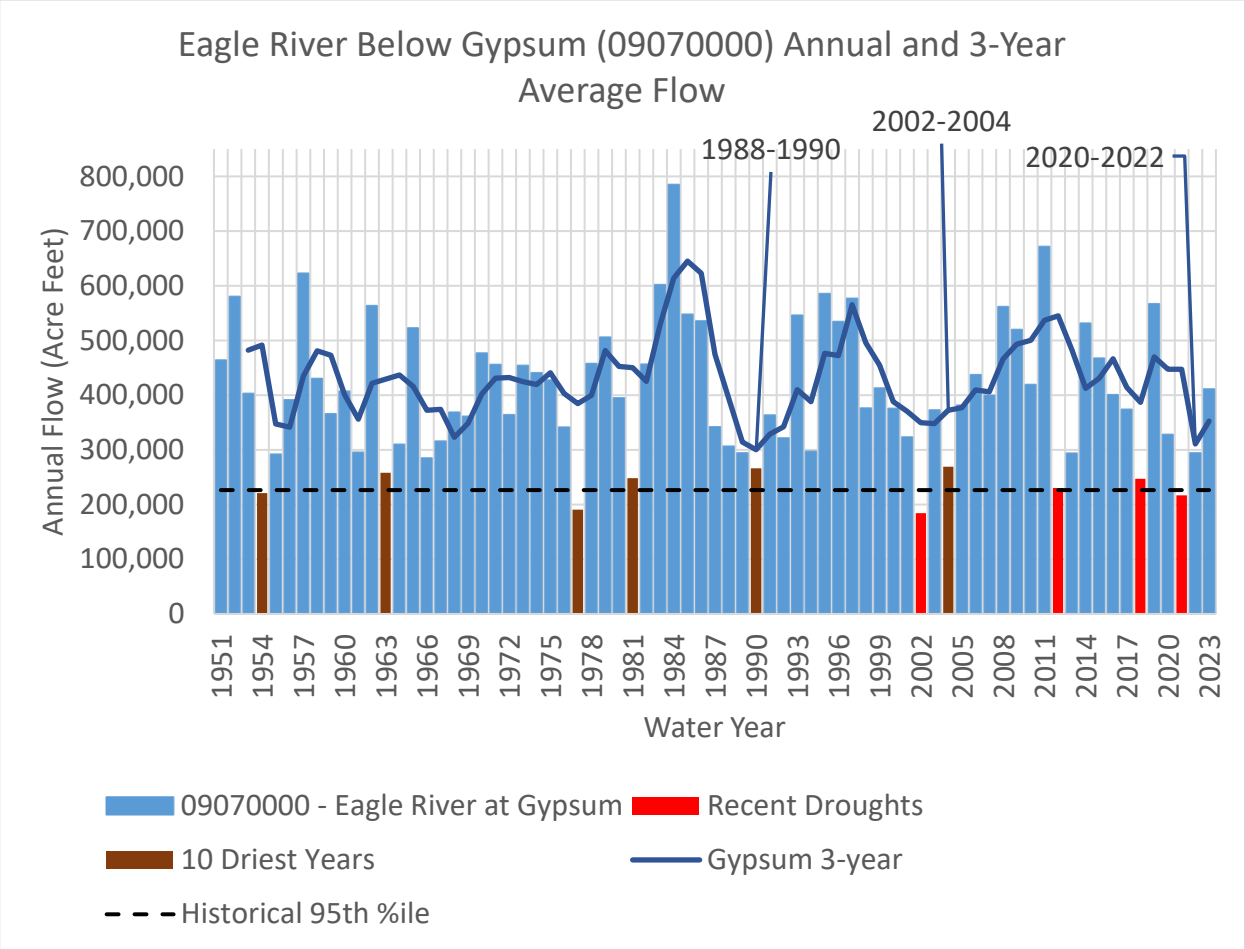


Figure 3. Historical Annual Total Streamflows, Eagle River below Gypsum (09070000)

Figure 4 was created using the same historical streamflow analysis described previously. This plot illustrates drought recurrence within the Eagle River Valley by plotting the average annual flow against the year's exceedance percentile. The droughts during 2002, 2012, 2018 and 2021, all of which are among some of the worst droughts experienced by the Eagle River Valley, met

or exceeded the 1-in-20 driest year. The current D/A water shortage response plan is based around a 1-in-20-year event.

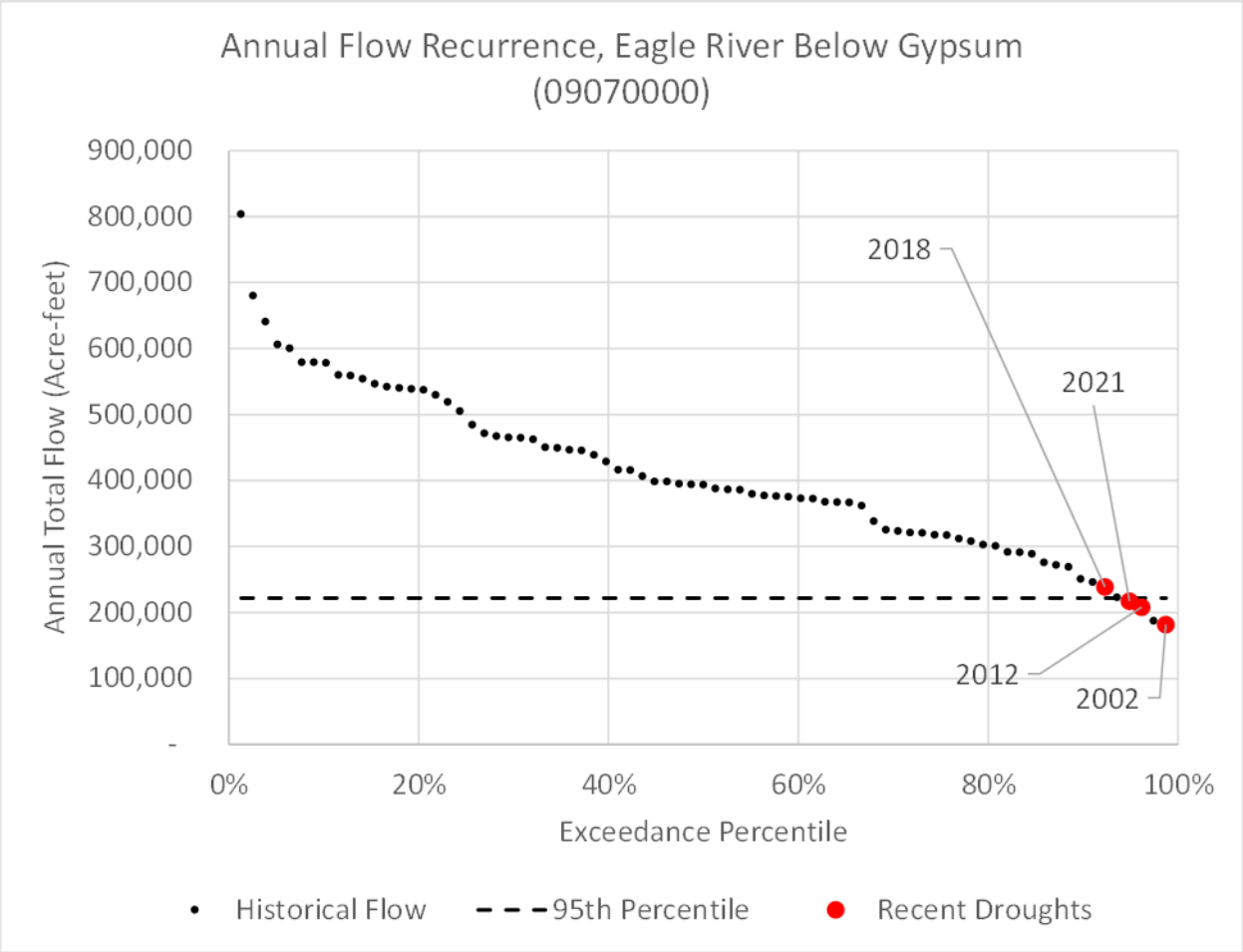


Figure 4. Ranked Annual Total Streamflows, Eagle River below Gypsum, CO (09070000)

Climate Change Context

Climate change projections for Colorado indicate an increased likelihood of more frequent and more severe droughts in the coming decades (CWCB 2019). Figure 5 shows the exceedance of different climate scenarios, and the annual natural flow associated with each year. The historical 95th percentile is also shown. Although climate change projections show decreases in the average annual flow, interannual variability is uncertain. and could lead to normal years becoming dry years and dry years becoming extremely dry years. Based on these projections, the drought with a 1-in-20-year historical recurrence could become as common as 1-in-10 years. Ultimately, more dry and extreme years overall will lead to more frequent acute years, and more need for the response actions in this plan.

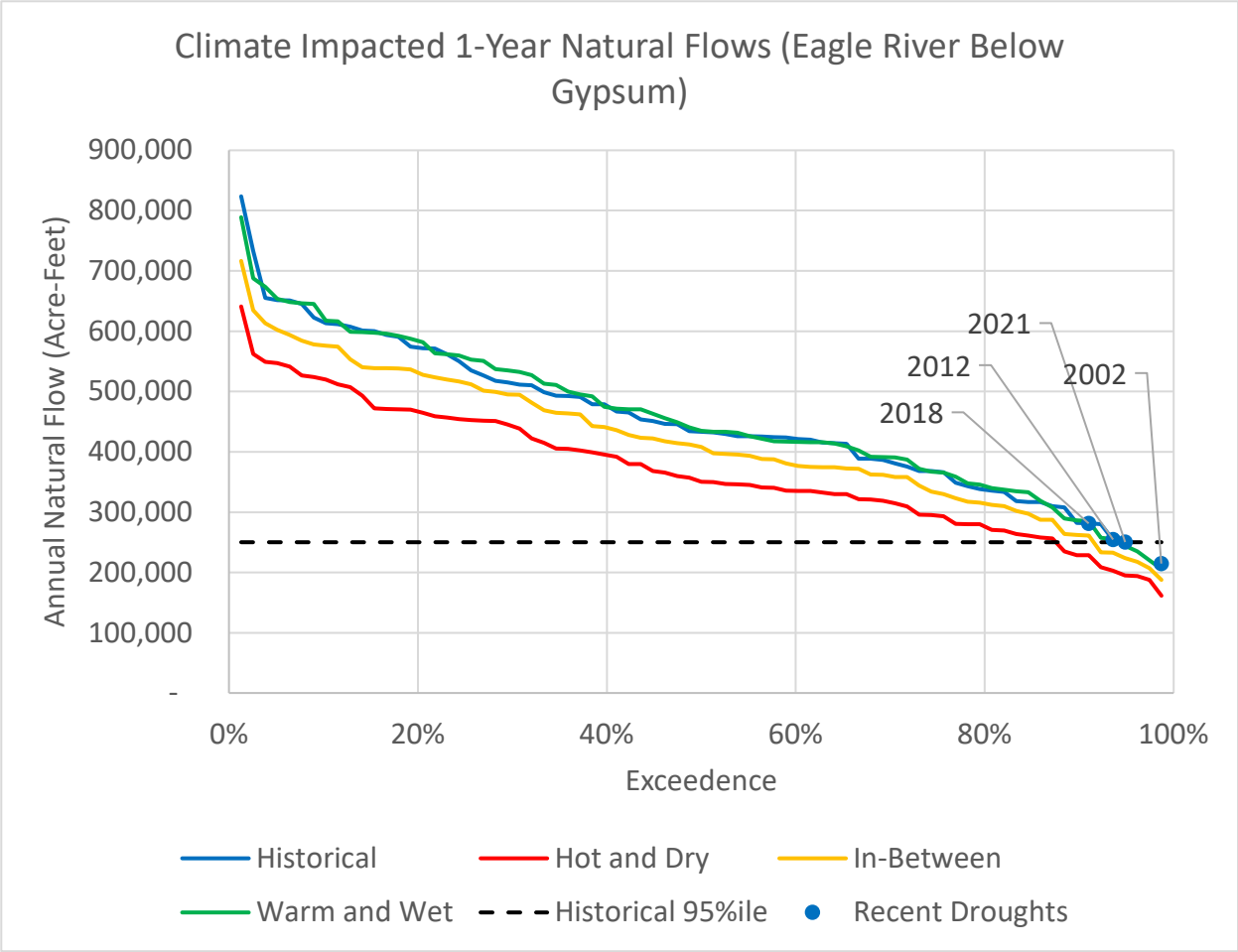


Figure 5. Climate Change Streamflow Context, Eagle River Below Gypsum (09070000)

District/Authority Water Demands

The D/A supplies water for both indoor and outdoor use, with most of the demand occurring outdoors between mid-May and early October. Under Colorado water law, the D/A is only required to offset the consumptive use associated with a specific diversion. Indoor demands across the D/A's service area are estimated to be 5% consumptive, while outdoor uses are about 75% consumptive on average.

Figure 6 shows average daily water demands within the D/A's service area from water years 2011 through 2022. These demands are divided into indoor and outdoor components, with outdoor demand corresponding to the irrigation season in the Eagle River Valley. The blue area represents the average indoor demand, while the orange area indicates the average outdoor demand.

Indoor water use remains consistent throughout the year, averaging around 7 cfs of total demand for the D/A. In contrast, outdoor water use is highly seasonal, with the bulk occurring between mid-April and mid-October. Outdoor demand peaks in early July at around 12 cfs and stays high over the irrigation season.

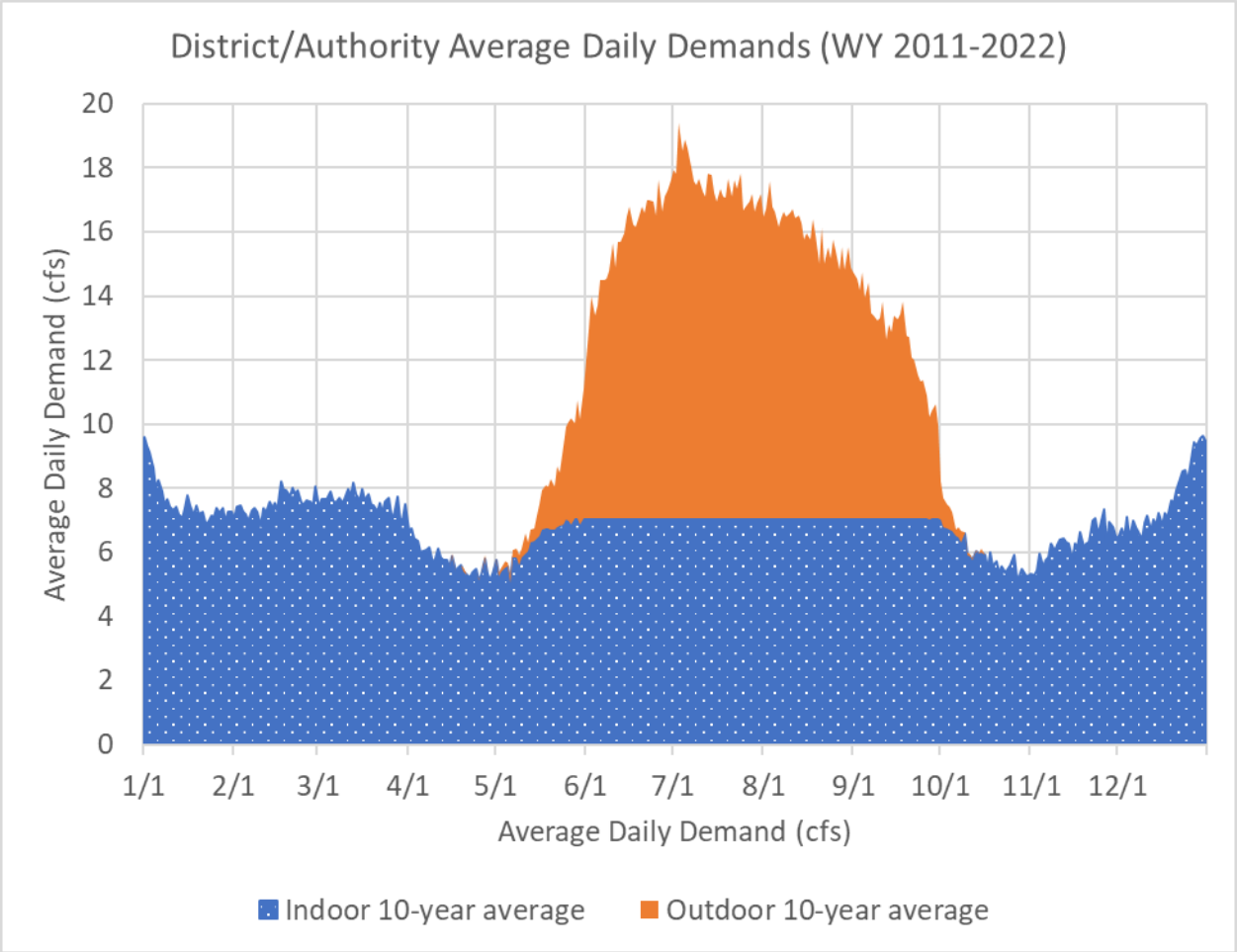


Figure 6. Average Daily Water Demands Across the District and Authority

While tracking water demands is important, understanding the consumptive use associated with those demands provides deeper insight. Figure 7 highlights the patterns and relative magnitudes of indoor and outdoor consumptive use. From this, it is clear that outdoor water use in mid to late summer has the highest consumptive demand, requiring the most significant portion of the D/A's water rights portfolio.

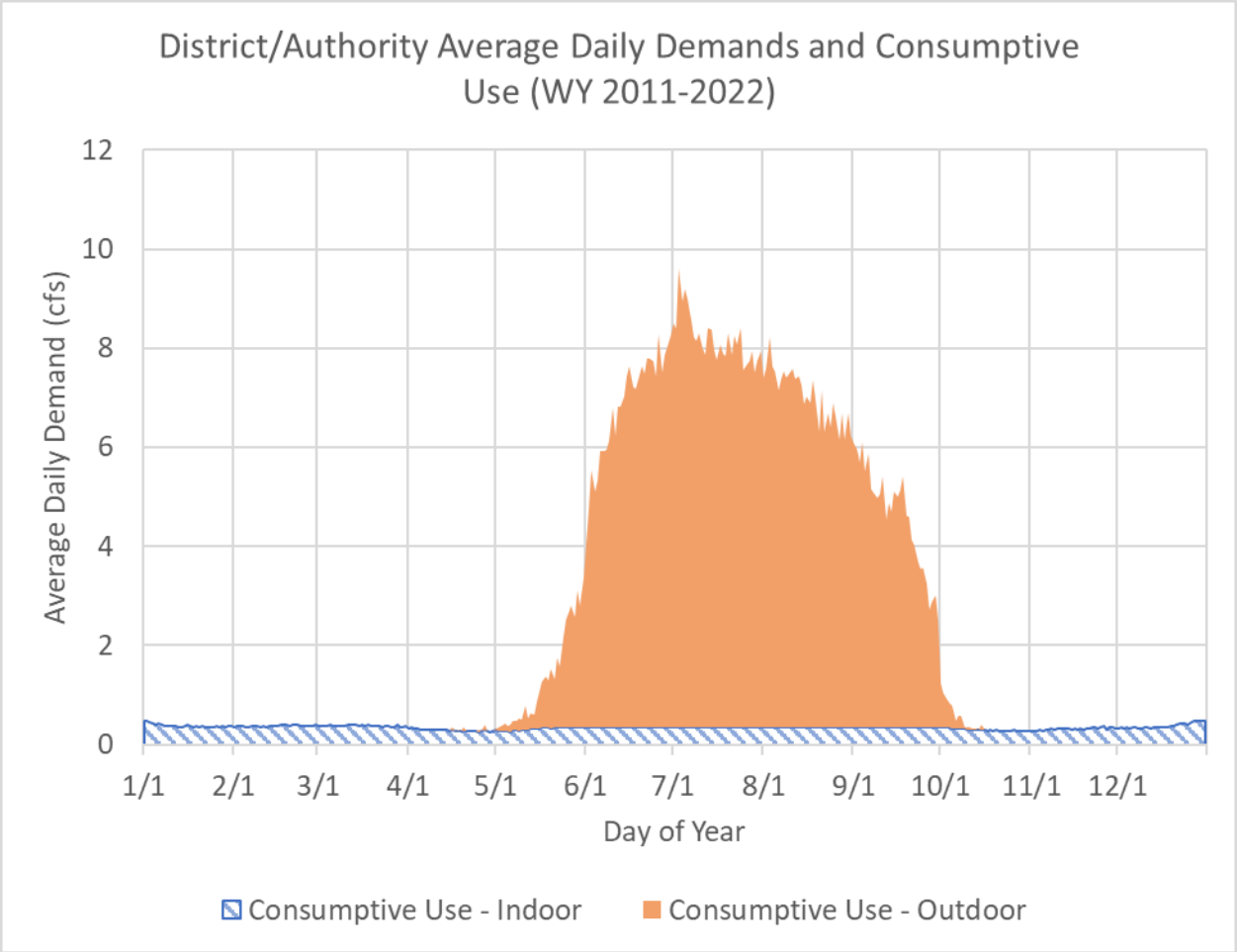


Figure 7. Average Daily Consumptive Use of Water Across the District and Authority

Table 2 below shows the average monthly demands and consumptive use across the D/A. The late summer critical period will be discussed in later sections, but during dry years, water use during July, August and September typically requires the release of in-basin reservoir storage to meet augmentation requirements. Outdoor demands during this late summer critical period totals around 1,150 acre-feet on average, which is a significant portion of the D/A's reservoir storage.

Table 2. Approximate District and Authority Average Monthly Demands and Consumptive Use (2011-2022)

	Monthly Average Demands (acre-feet)			Monthly Average Consumptive Use (acre-feet)		
Month	**Indoor**	**Outdoor**	**Total**	**Indoor[1]**	**Outdoor[1]**	**Total**
Jan	467	0	467	23	0	23
Feb	432	0	432	22	0	22
Mar	466	0	466	23	0	23
Apr	341	1	342	17	1	18
May	389	82	471	19	62	81
Jun	421	514	935	21	386	407
Jul	435	643	1,078	22	482	504
Aug	435	549	983	22	412	433
Sep	421	338	758	21	253	274
Oct	364	11	375	18	8	26
Nov	372	0	372	19	0	19
Dec	468	0	468	23	0	23
Annual	**5,010**	**2,138**	**7,148**	**251**	**1,603**	**1,854**

[1]This is based on a District/Authority-wide average of 5/75% of consumptive use for indoor/outdoor demands.

When exploring potential water savings, it's important to recognize that indoor demands are considered **"**hardened**"**—they represent essential needs such as drinking, dishwashing, laundry, and other basic domestic uses. Due to the relatively low consumptive nature of indoor water use and the D/A's promotion of conservation, further reductions in indoor demand would impose significant hardship on customers.

In contrast, outdoor water use presents substantial opportunities for savings. With its high consumptive use and elective nature, outdoor irrigation is a key target for conservation efforts. Reducing outdoor water use is essential to the D/A's water conservation strategy and drought response, ensuring a more sustainable supply for the Eagle River Valley.

Driver of Impacts

As previously defined, drought is a deficiency of precipitation over an extended period of time that eventually results in a water shortage. The Eagle River Valley depends predominantly on streamflow to meet the region's water demands, which are driven by snowpack. Extended periods of low rain and snowfall early in the year can lead to low streamflows later in the year, which increases the risk of a water shortage.

In the Eagle River Valley, water shortage risk is driven by the D/A's water supply portfolio and augmentation requirements. Even though many of the D/A's water rights are senior to the Eagle

River instream flows, it is a general District guideline to maintain instream flows when possible. Broadly, the District's portfolio and augmentation requirements include:

- Historical Consumptive Use (HCUs) credits during the summer
- Storage Exchanges from Green Mountain and Wolford Mountain Reservoirs during a mainstem Colorado River (Shoshone, Cameo) administrative call
- Use of In-Basin Reservoir storage supplies from Eagle Park Reservoir, Black Lakes, and Homestake Reservoir

During a drought, the D/A can experience a shorter season for HCU use, long periods of time with instream flow shortages, and below average reservoir storage. All of these scenarios can lead to water shortages.

When streamflows are low due to a drought, the D/A's water system is impacted in several ways. In general, there is less water available for all uses, but water demands increase due to an earlier start of irrigation season and increased summertime temperatures. When there is less flow in the stream, or an earlier spring snowmelt, water rights fall out of priority sooner, forcing the D/A to become more reliant on in-basin water supplies. Stream temperatures also increase as air temperatures increase and the available water instream decreases, affecting water chemistry, aquatic wildlife, and treatment operations.

Impacts to the D/A's water system can impact other sectors in the Eagle River Valley. Economically, water shortages increase water treatment costs and decrease revenue from water sales. Reduced recreational opportunities, such as boating and fishing, can also lead to a decrease in local tourism which can affect other non-water related industries that depend on visitors. Environmentally, water shortages can lead to degraded water quality and increased water temperatures which can be detrimental to local fisheries and other aquatic wildlife. Social impacts of a water shortage can include changes in the public's perception of the D/A as restrictions are put into place and a contradictory early increase in water demands if future restrictions are anticipated.

Drought Monitoring, Stages and Triggers

Historic Droughts

The State of Colorado and the Eagle River Valley have both experienced several severe droughts over the past few decades. 2002, 2012, 2018, and 2021 stand out as recent examples. Figure 8 shows the daily flow on the Eagle River during these years, as well as average conditions. April 1 average Snow Water Equivalent (SWE) values in each of those years are shown to highlight how this critical indicator predicted lower peak streamflows. There are thresholds shown on this plot for April 1 SWE and Peak Streamflow corresponding to key monitoring thresholds. These thresholds are discussed in more detail below.

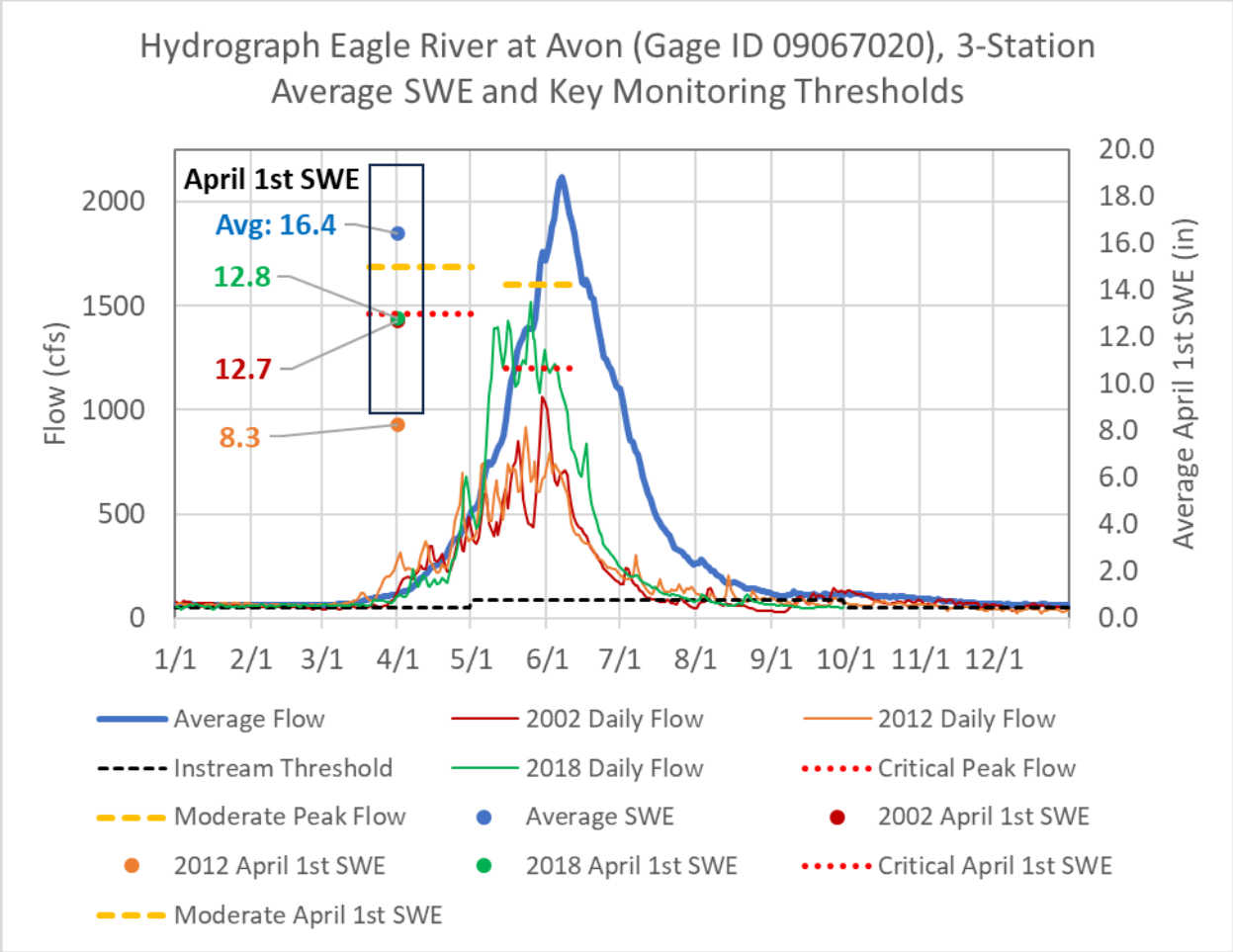


Figure 8. Hydrograph of Recent Drought Years, Showing Key Monitoring Thresholds

The 2002 drought drove widespread interest in drought planning statewide, including the development of drought planning processes like the one used to write this plan. Although multiple droughts have impacted the D/A's service area, until the 2012 drought there was not a formal drought plan in place. During exceptionally dry periods in past years, the response measures used by the D/A were primarily demand side measures. Broad communication on drought conditions was shared through newspapers, radio, and other local media. Over time, the D/A have worked towards supply side measures, though many take longer to implement than a single drought event. Some supply side measures used by the D/A include:

- Water conservation plans
- Contingency storage in Homestake Reservoir
- D/A Strategic Reserve Policy

Since the D/A did not have a formal drought response plan in place during any of these drought events, information on how the D/A responded is not easily available. The biggest lesson

learned from all historical events was that a formal drought response plan was a necessary part of the D/A's water supply planning portfolio.

2002 Drought
The 2002 drought is widely regarded as one of the worst in Colorado's history. Low April 1 SWE and precipitation numbers across the state warned of a future shortage and led to low runoff and streamflows as the year progressed. During this year, Eagle River's streamflow peaked in early June and April 1 SWE reports were approximately 50% of normal. Eagle Park Reservoir did not refill during 2002. Due to the severity of the 2002 drought, many planning processes were put in place by the CWCB to give municipalities tools to prepare for future drought risk. For the D/A, Water Use Regulations to limit the number of watering days each week, were developed and implemented after the 2002 drought. At this time, the D/A did not have an official drought plan in place.

2012 Drought
The droughts in 2002 and 2012 had very similar low snowpack and precipitation conditions. Streamflow on the Eagle River at Avon peaked above 900 cfs and Eagle Park Reservoir did not refill this year. This was also the first year the D/A attempted to develop guidance around a short-term water shortage response. During 2012, the D/A developed many policies and programs as the drought unfolded. The D/A Boards of Directors approved policies and response actions in April so staff could establish an Incident Command structure to react to the event. Public and stakeholder communications were initiated early while increased monitoring and response tools were developed through June and evolved over the summer. These actions and activities were then documented into a general response plan.

Based on the community response that occurred in 2002, the D/A focused on positive, proactive messaging for customers. The D/A also sent focused messages to stakeholder groups, such as local golf courses, regarding their summer water use. These tactics helped prevent unnecessary use of water during the summer of 2012 and encouraged voluntary reductions in use during critical flow periods to benefit streams.

2018 Drought
The 2018 drought was not as severe as the droughts in 2002 or in 2012 but is still considered one of the worst in recent history. Eagle Park Reservoir did refill this year, but instream flow calls caused large drawdowns later in the year.

In 2018, the D/A relied on water usage data through the early summer to identify potential water shortage risk. When the dry trend continued through the summer of 2018, several actions were taken, beginning in early August, including weekly meter reads, establishing weekly use limits, mailing those limits to customers, follow-up calls and emails, threats of fines, and/or disconnection for non-compliance. Though a record was not available, District staff indicated that at least one fine was given. The result of the D/A's 2018 drought response was a somewhat unstructured and very labor-intensive effort, with a late start and limited guidance on appropriate response actions and goals.

2021 Drought
Colorado recently suffered from a drought in 2021 though coordinated drought response was somewhat muted in 2021 due to the ongoing COVID-19 pandemic. In 2021, streamflows peaked just under 1500 cfs and Eagle Park Reservoir managed to refill in mid-July.

Drought Monitoring

In hindsight, identifying the risk of water shortages during drought years may seem straightforward. However, it is essential to actively monitor and track the conditions that contribute to water shortage risks in the Eagle River Valley. Accurately assessing these risks requires a clear understanding of the specific periods and circumstances that require reliance on the D/A's limited in-basin reservoir supplies. These periods are referred to as the "Critical Period."

A Critical Period lasting 30 to 50 days is associated with moderate to severe water shortage risks. Once the nature and timing of the Critical Period are identified, it becomes crucial to determine which drought indicators can effectively predict its duration. This proactive approach enables better planning and response to potential water shortages.

Critical Period

Water shortage risk in the Eagle River Valley is largely determined by the timing of water administration, which is influenced by two primary factors:

- The Shoshone call on the Colorado River
- Shortages along the instream flow reaches of the Eagle River, particularly between the Colorado River confluence and the Gore Creek confluence.

The Critical Period refers to the timeframe when the D/A must rely on releases from in-basin reservoirs to augment diversions. The length and severity of the Critical Period directly impact how deeply the D/A must tap into its in-basin storage supplies.

If the Critical Period extends beyond 40 days, the D/A may need to use reserves from Eagle Park Reservoir and Homestake Reservoir. Critical Periods over 50 days further deplete these reserves.

Historical flow analysis at USGS gage 09067020, Eagle River at Avon, provides insight into when the D/A are more reliant on in-basin storage. The instream flow threshold for this reach is 85 cfs from May 1 to Sep. 30 and 353 cfs from Oct. 1 to Apr. 30. Figure 9 illustrates the timing of the Critical Period during the dry year of 2018, when the flow in the river dropped below that instream flow threshold, and in-basin storage was required to meet demands.

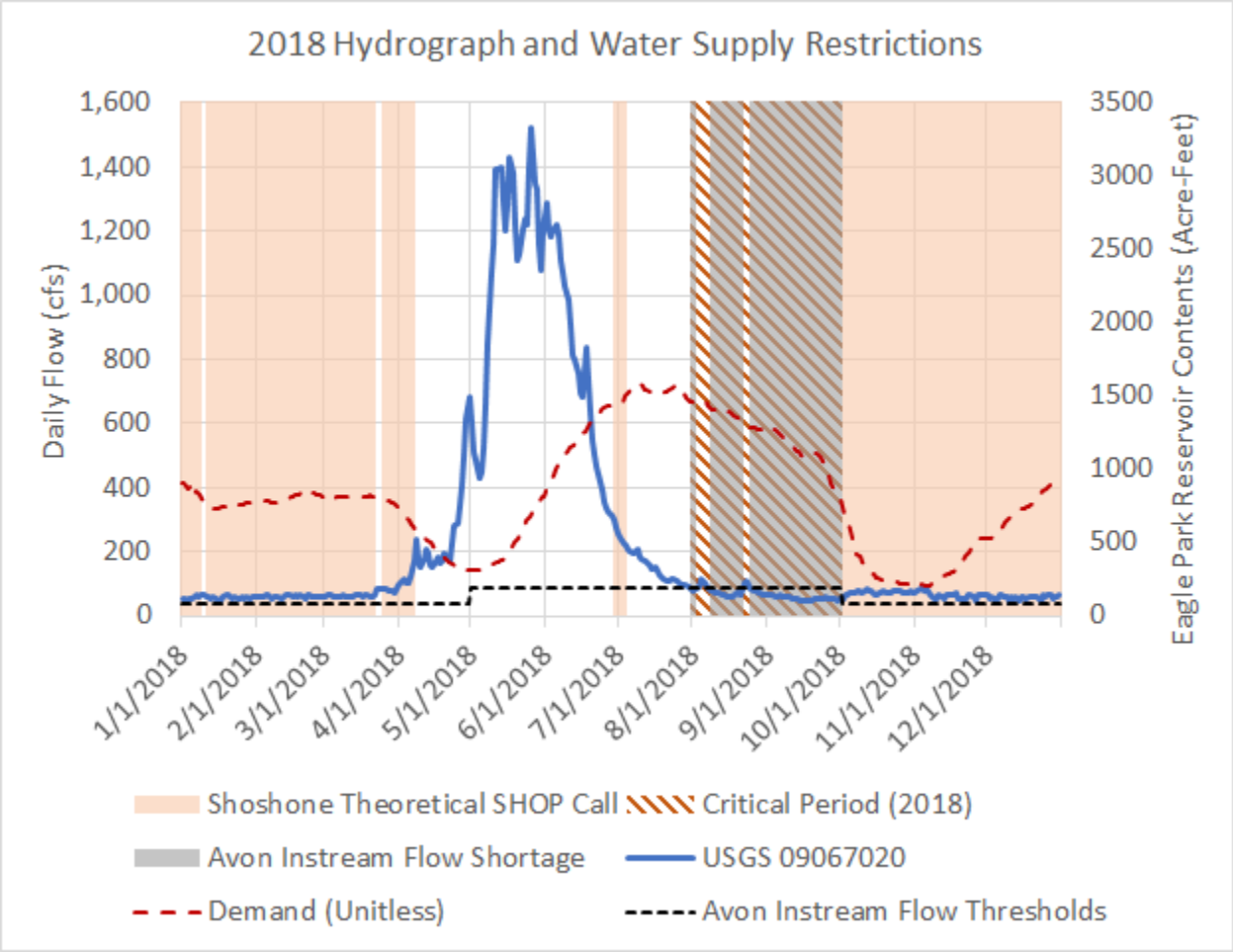


Figure 9. 2018 Drought Year Hydrograph and Critical Period

Additionally, Figure 10 shows the length of the Critical Period for each water year from 2001 to 2023. Recent drought years—2022, 2012, and 2018—are highlighted in orange. The chart also includes benchmarks for Critical Periods of 30, 60, and 90 days. Each major drought year far exceeds the 30-day threshold, demonstrating the severity of water shortages during these periods.

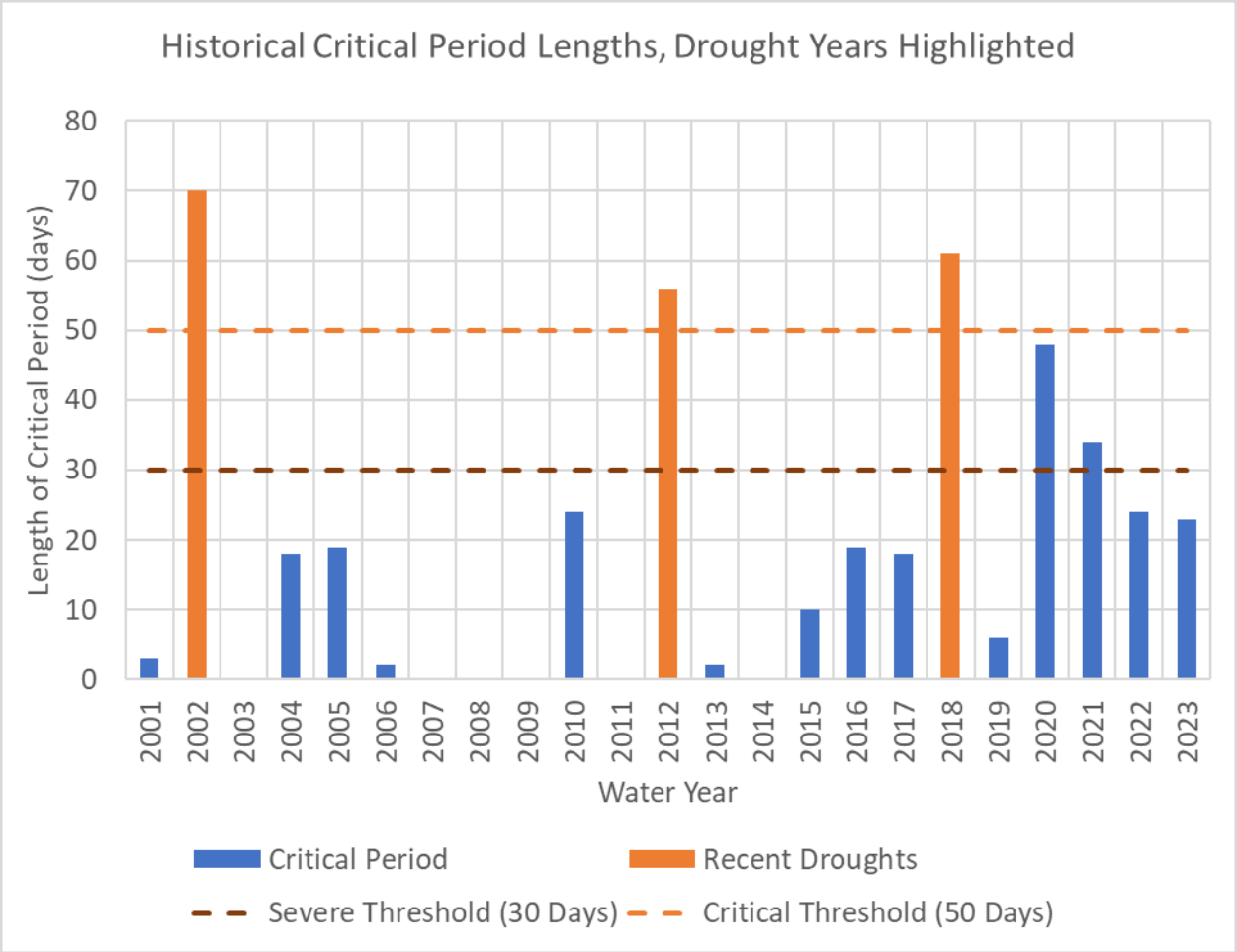


Figure 10. Critical period length for water years 2001 through 2023.

Typical Drought Indicators

Drought indicators are environmental triggers that signal the potential for dry conditions or future droughts by tracking changes in water availability. These indicators vary by region and depend on the data sources available. For the D/A, they are essential tools for predicting potential water shortages ahead of each runoff season. Key indicators include:

- **U.S. Drought Monitor**
  The U.S. Drought Monitor (2000–present) tracks the location and severity of drought across the country. Every Thursday, experts from NOAA, USDA, and the National Drought Mitigation Center publish an updated map based on current data and input from local observers. The map categorizes conditions into five levels: Abnormally Dry (D0), signaling areas entering or exiting drought, and four drought levels from D1 to D4. (Source: Drought.gov)

- **April 1 Snowpack**
  The mountain snowpack, monitored by SNOTEL stations across the western U.S., is a key predictor of future water supplies. In Colorado, snowmelt runoff is the primary source of annual streamflow. The most reliable predictor is the Snow Water Equivalent (SWE), which measures the water content within the snowpack and provides insight into how much runoff can be expected.
- **Streamflow**
  Streamflow in the Eagle River Valley is monitored by the USGS at several stations, including locations upstream of the D/A's municipal diversions. While total streamflow reflects drought conditions, the final values aren't known until after the runoff season. However, specific streamflow metrics—such as peak streamflow, days below 100 cfs, and days below instream flow thresholds—can help predict water shortage risks.
- **Customer Demands**
  Outdoor water use rises significantly during the summer months, leading to higher customer demand. Tracking customer usage can offer early warning signs of potential water shortages, whether due to drought or infrastructure issues. Abnormal spikes or drops in demand can indicate emerging challenges.

The usefulness of drought indicators depends on the location and type of monitoring equipment available. Some indicators are more relevant than others, and certain metrics may not be feasible to implement due to data limitations. Table 3 below summarizes the indicators most relevant to the D/A's operations.

Table 3. Eagle River Valley Drought Indicators

Variable	Station ID	Location	Link	Key Thresholds
Snowpack	842	Vail Mountain	Link	Apr. 1 SWE
Snowpack	415	Copper Mountain	Link	Apr. 1 SWE
Snowpack	485	Fremont Pass	Link	Apr. 1 SWE
Streamflow	09067020	Eagle River Below Wastewater Treatment Plant at Avon, CO	Link	May – Sep. = 85 cfs[1] Oct. – Apr. = 35 cfs[1]
U.S. Drought Monitor Standardized Precipitation Index (9-Month, D2 Percentage)	N/A	Eagle County	Link	10% of the County at D2 and higher
Customer Demands	N/A	D/A water production facilities	Internal D/A data	Depends on historical use and season

[1]*These are the instream flow thresholds, flows below these levels indicate higher demand for releases from reservoir reservoirs.*

Comparison of Indicators vs Length/Timing of Critical Period

Using the calculation of the critical period length, the predictive skill of several drought indicators was assessed. To provide early warning of potential water shortages, various physical indicators and their timing were compared to the length of the critical period. These indicators were found to have strong correlations with potential water shortage conditions.

Drought Indicator - US Drought Monitor

The U.S. Drought Monitor is a joint effort of the National Drought Mitigation Center, USDA, and NOAA. It considers several climatic conditions that influence drought such as precipitation, streamflow, reservoir levels, and temperature, and is commonly used as a measure of overall drought severity across the United States. (Link: https://www.drought.gov)

The landing page for Eagle County includes weekly updates on the USDM conditions for the county. (Link: https://www.drought.gov/states/colorado/county/Eagle) This page shows USDM data, recent precipitation and temperature trends, agricultural impacts, streamflows, and public

health vulnerabilities. There are also short term and seasonal forecasts of conditions. Historical data is also available for all values.

In terms of predictive skill, all historical datasets on the USDM page were assessed and the "Standardized Precipitation Index" (SPI) was found to be the most skillful. From the data description:

> *The Standardized Precipitation Index (SPI) measures water supply, specifically precipitation. SPI captures how observed precipitation (rain, hail, snow) deviates from the climatological average over a given period—in this case, over the 9 months leading up to the selected date.*

Figure 11 shows the 9-month running SPI for Eagle County from 2000-2024. Recent droughts in 2002, 2012, 2018, and 2021 stand out.

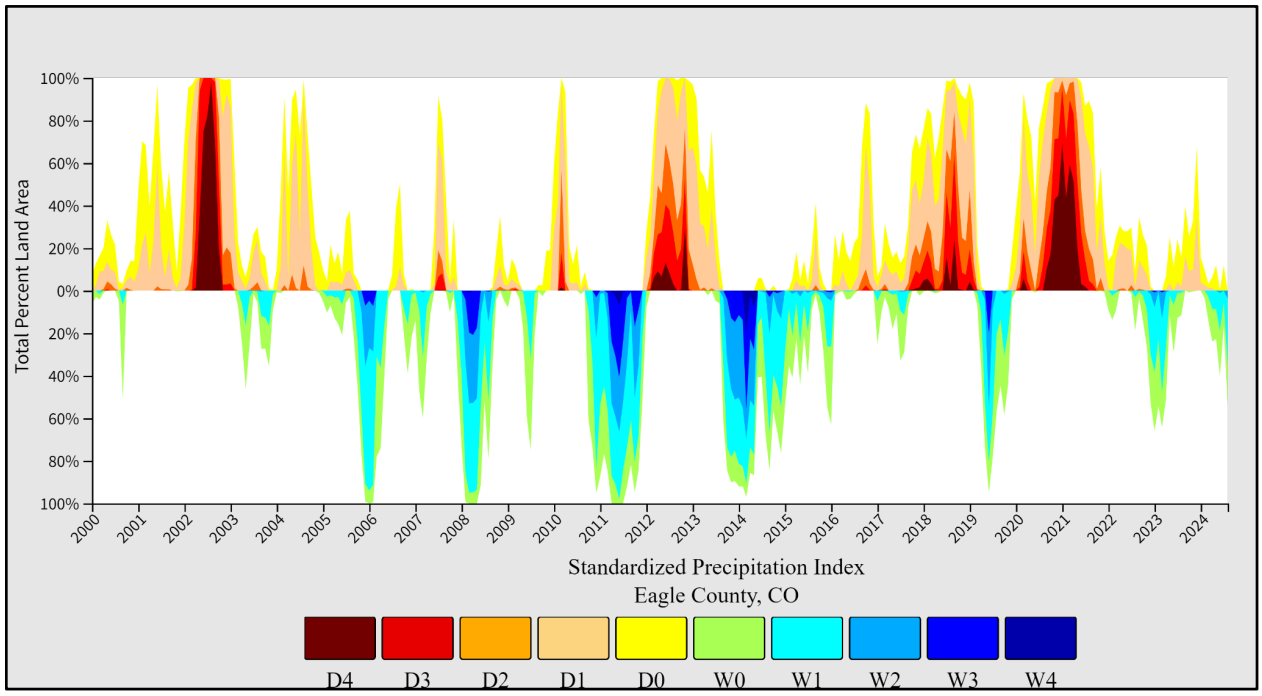


Figure 11. Eagle County SPI, 2000 through 2024

Figure 12 below shows a comparison between the length of the critical period, and the percent of Eagle County in D2 SPI as of April 1. This captures the portion of the watershed that is abnormally dry, at the D2 level, over the preceding 9 months, which is a good indication of the

snowpack accumulation and soil moisture conditions. Note that all recent droughts have been captured, and there are no false negatives when the 10% threshold is used.

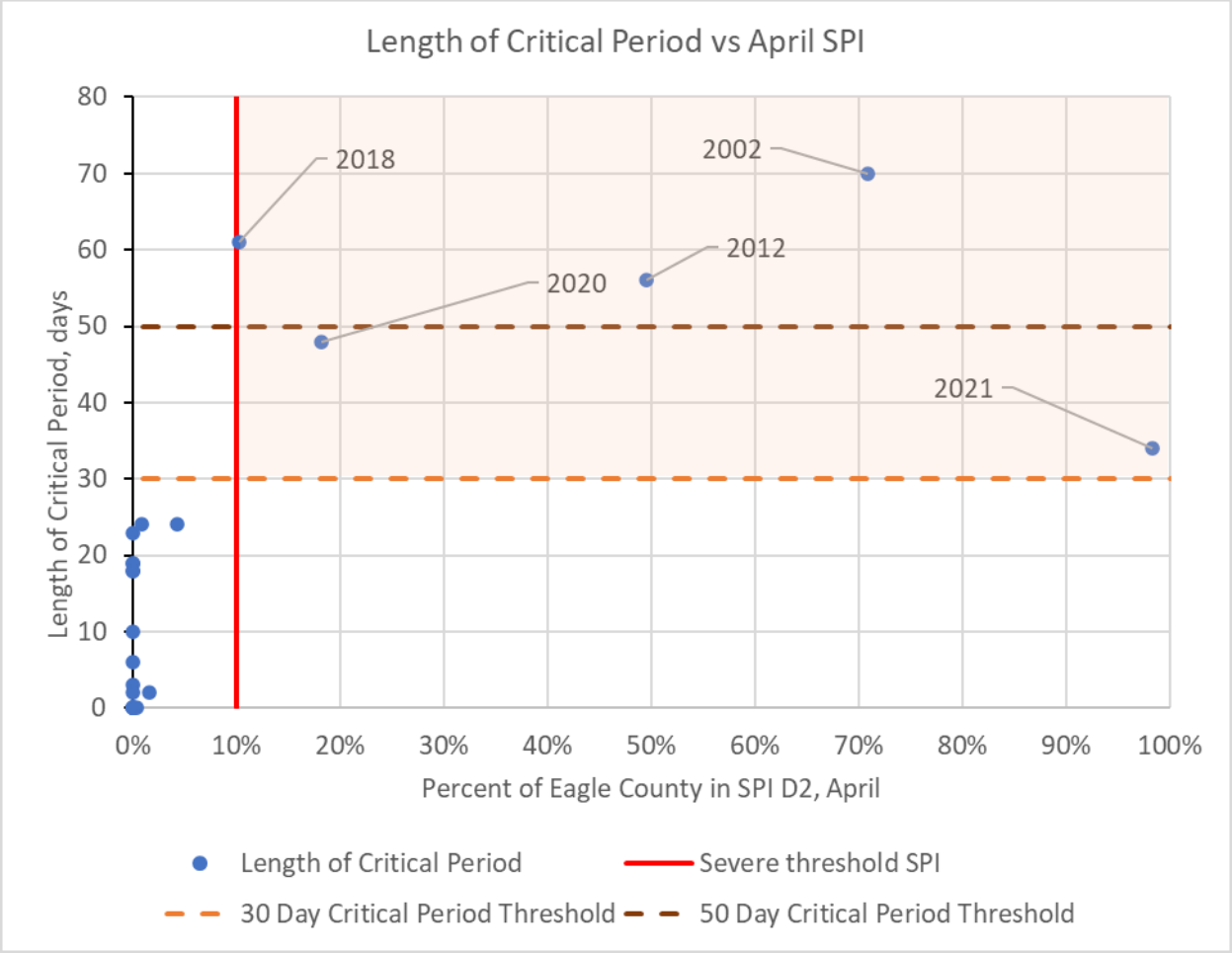


Figure 12. District Critical Period Length Compared to SPI

While the April 9-month D2 SPI does not do a good job accurately predicting the length of critical period, it can be used as a good filtering threshold for whether a year is likely to be a drought of any severity.

Drought Indicator - April 1 SWE

Snowpack is monitored by SNOTEL stations across the western United States and serves as a key predictor of future water availability. In Colorado, streamflows are heavily dependent on snowmelt runoff, making snowpack a critical factor for assessing water supply conditions. The most relevant variable for this purpose is the Snow Water Equivalent (SWE), which measures the water content within the snowpack and helps predict the volume of runoff expected.

Peak SWE typically occurs between early and mid-April, marking the point when snow accumulation gives way to melting, and streamflows begin to rise. April 1 SWE is widely used by water managers as a benchmark to forecast streamflow for the coming season and guide water management decisions.

The D/A rely on data from three key SNOTEL sites:

- Vail Mountain (site 842)
- Copper Mountain (site 415)
- Fremont Pass (site 485)

Figure 13 shows the location of these stations, located south and east of the D/A's service area, providing valuable information on the snowpack contributing to the D/A's water supply. Figure 14 illustrates the annual April 1 SWE time series for each station, along with their 3-station average. Recent drought years are highlighted to demonstrate trends.

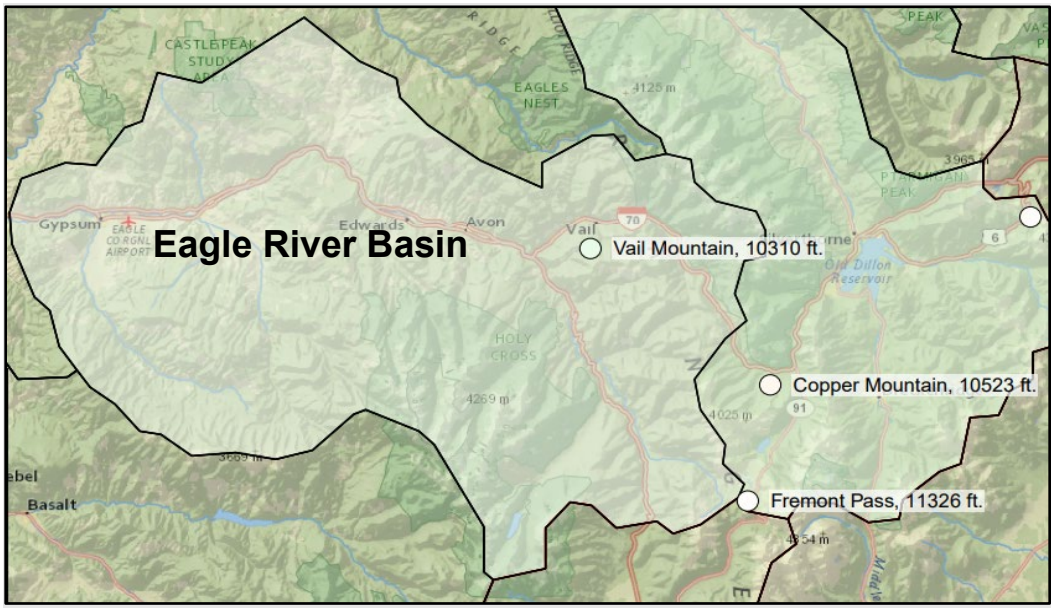


Figure 13. Map of District SNOTEL sites

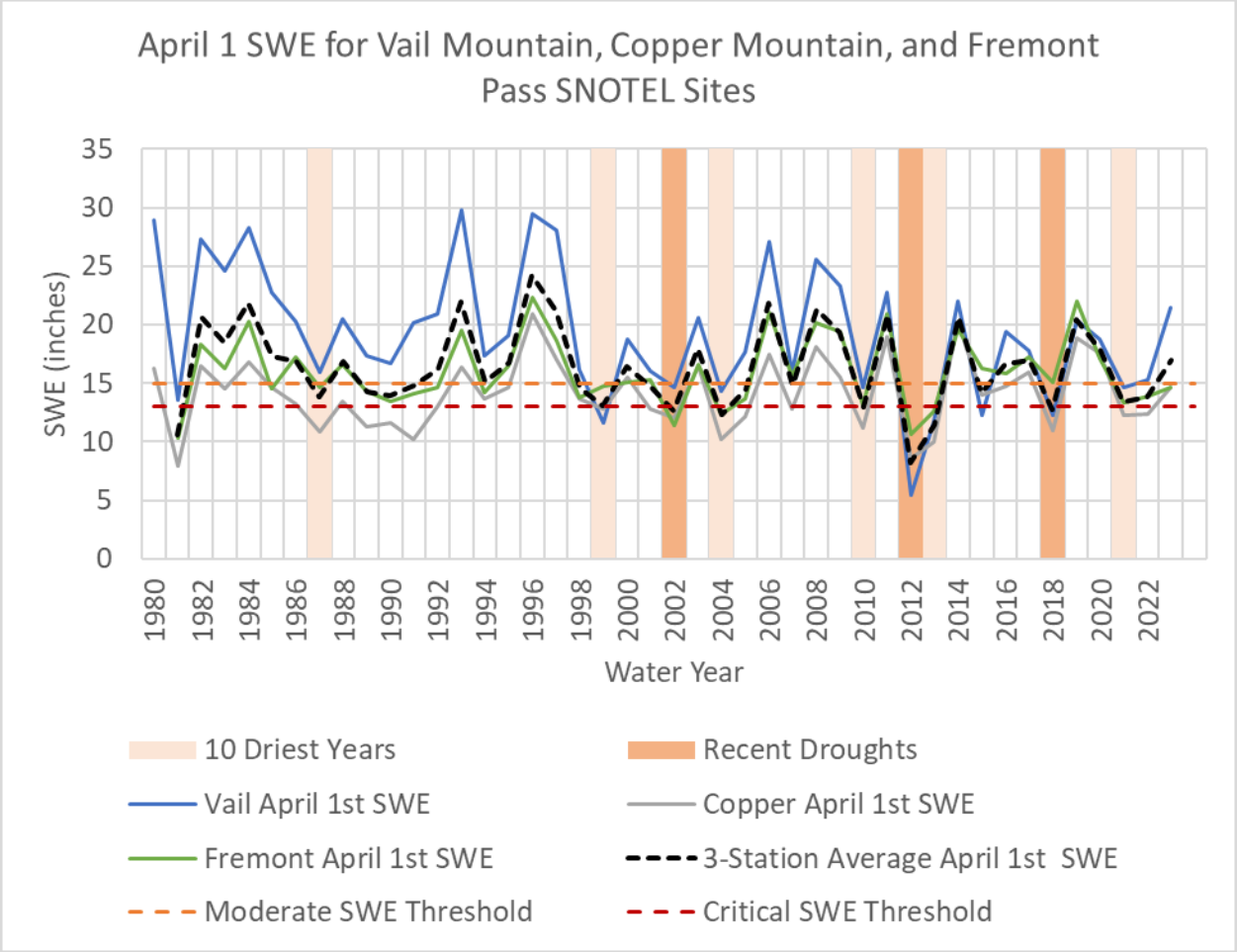


Figure 14. April 1 SWE and 3-Station Average for Eagle River SNOTEL Stations

Figure 15 shows a strong relationship between the 3-station average April 1 SWE and the length of the Critical Period. SWE values below 13 to 15 inches indicate an increased risk of moderate to severe water shortages. However, it is important to note that SWE alone cannot fully predict water shortage conditions—2018 and 2020 had prolonged Critical Periods that were

not anticipated based solely on SWE values. This highlights the need to use multiple drought indicators for more reliable forecasting.

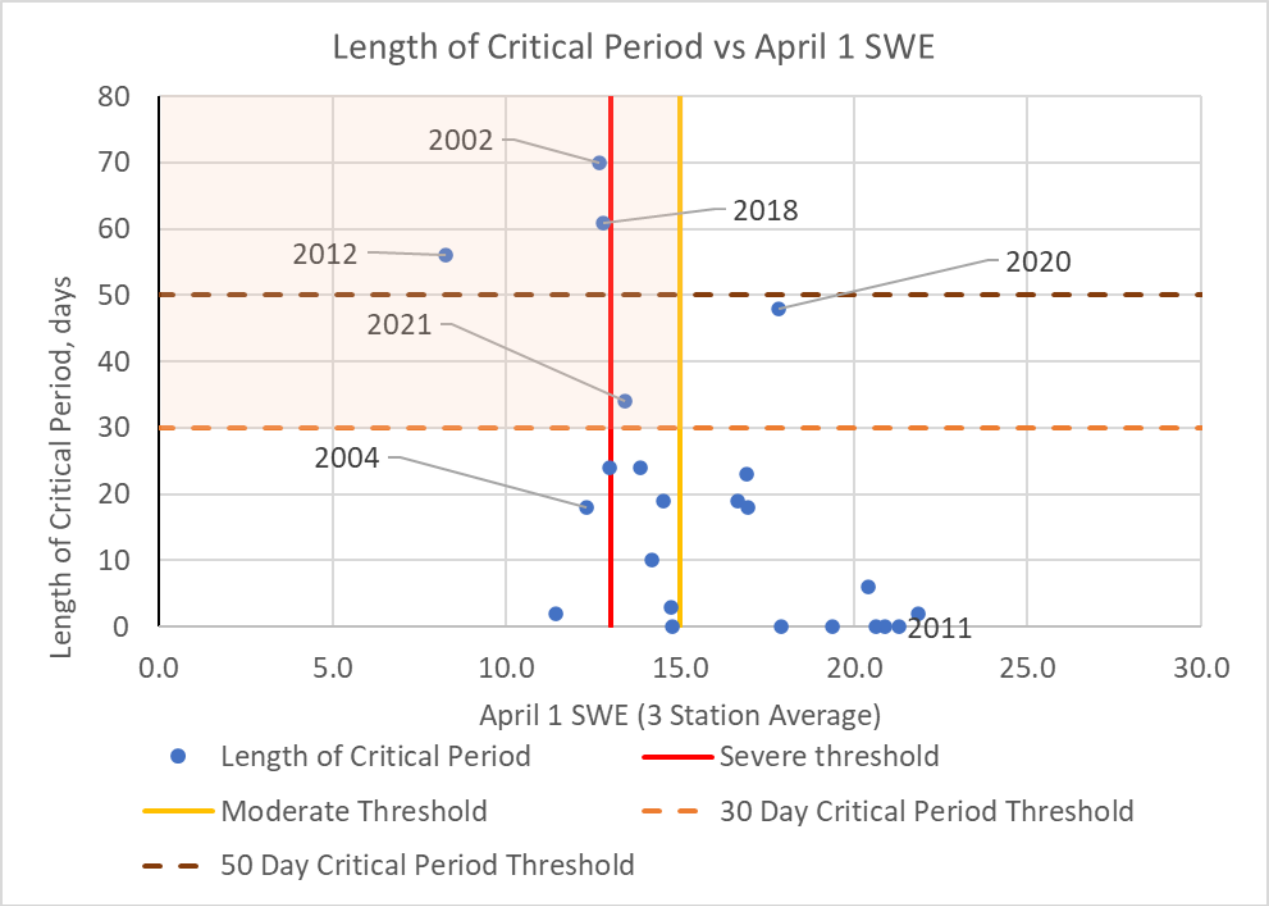


Figure 15. District and Authority Critical Period Length Compared to April 1 Snow Water Equivalent

Drought Indicator - Peak Streamflow

Streamflow is an excellent drought indicator since physical and legal water availability are based on flow in the river on a given day. For the D/A, dropping streamflows indicate a long critical period. Unusually low peak streamflows below 1600/1200 cfs at the Eagle River at Avon, CO Gage (09067020) indicate a risk of moderate/severe water shortage.

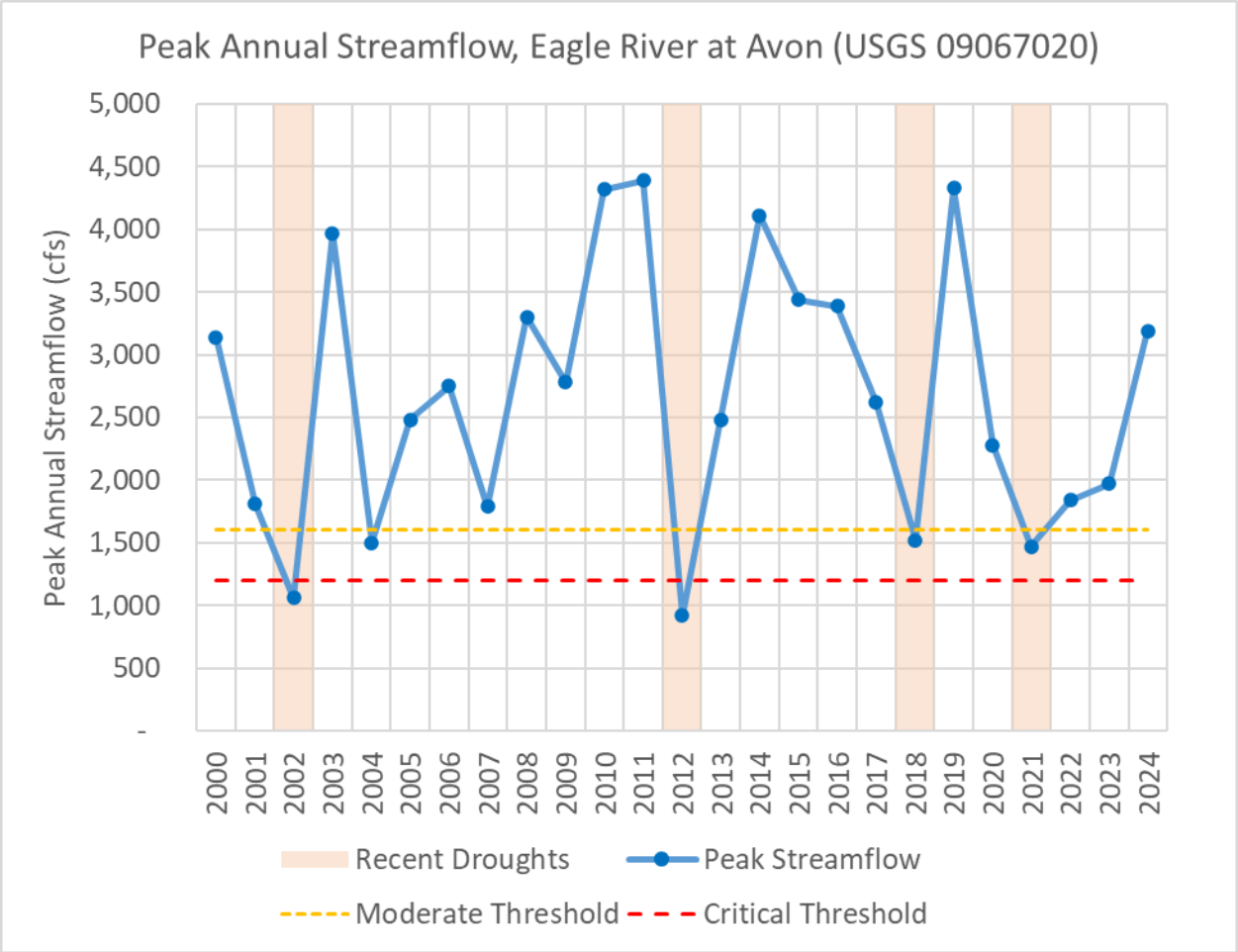


Figure 16. Peak Annual Streamflow, Eagle River at Avon, Showing Recent Droughts

Figure 17 shows the relationship between lower peak streamflows and longer critical periods. The 1200 cfs critical threshold captures the worst recent droughts. Conversely, there are several false positives at the 1600 cfs threshold, where a year was classified as a moderate water shortage risk but did not end up having a long critical period. This highlights the importance of relying on multiple indicators to make a drought declaration.

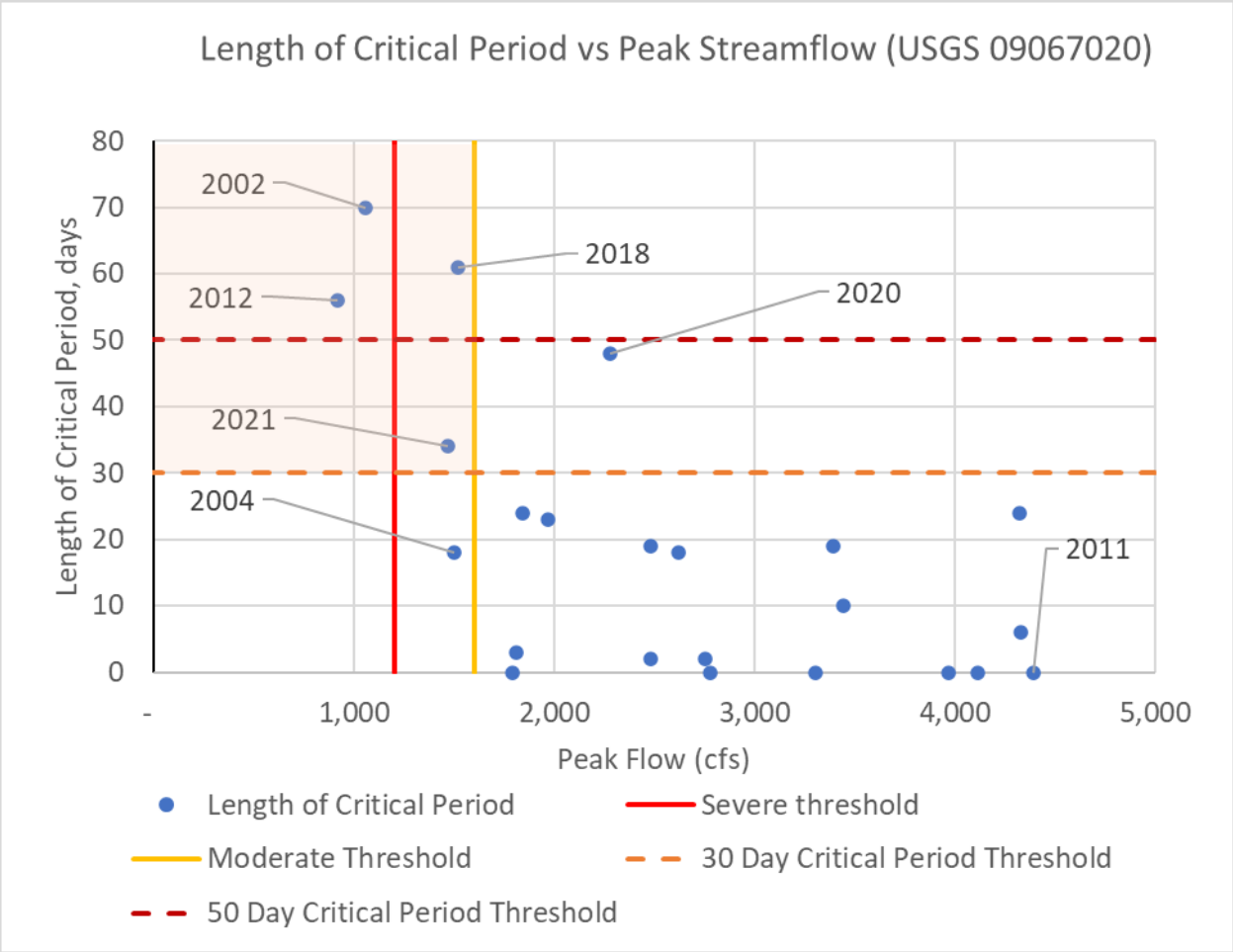


Figure 17. Critical Period Length Compared to Peak Streamflow at the Eagle River at Avon, CO Gage (USGS 09067020)

Drought Indicator - Days Below 100 cfs

In addition to peak streamflow, the timing of the first day when the Avon gage (USGS 09067020) records a flow below 100 cfs is a strong indicator of potential water shortages later in the year. The earlier the flow at Avon drops below this threshold, the sooner the Eagle River will fall below its instream flow requirements, extending the length of the Critical Period.

Figure 18 highlights the correlation between an early first day below 100 cfs and a prolonged Critical Period. When flows fall below 100 cfs before Aug. 7, the risk of a severe water shortage increases significantly.

However, this indicator has a limitation—it offers limited lead time for predicting shortages, as the 100 cfs threshold is typically not reached until mid-July at the earliest. While useful for tracking evolving conditions, it should be combined with other indicators to provide more comprehensive and timely predictions of water shortages.

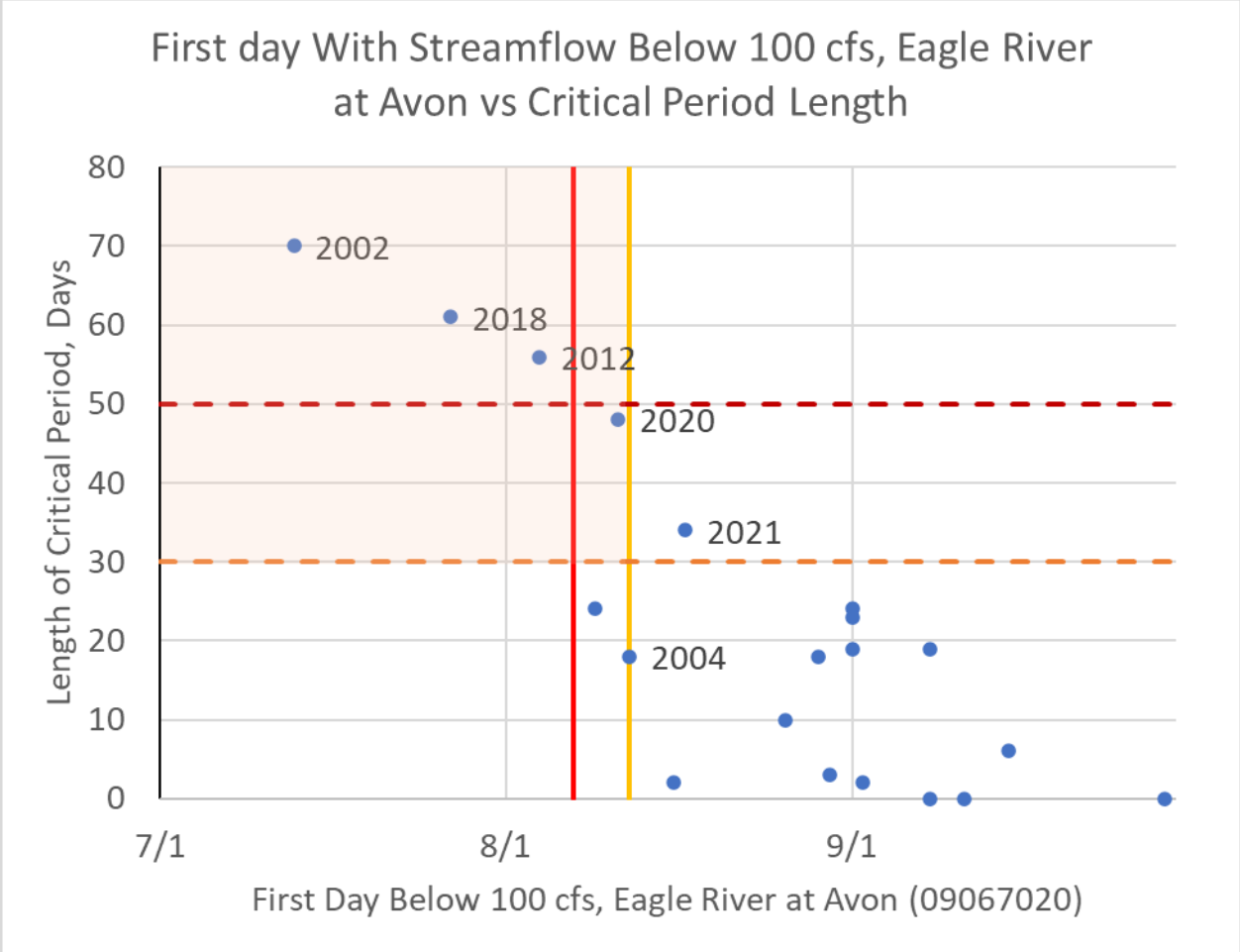


Figure 18. Critical Period Length Compared to the Exceedance of 100 cfs Flow at Eagle River at Avon Gage

Drought Indicator – Total Water Demand

Once a water shortage is declared, it is important to track trends in water demands to evaluate the impact of the D/A response, and if real water savings are being met. Running 7-day average demands can be tracked against historical averages to show relative performance and whether targeted savings are achieved.

Example Monitoring Timeline

Rather than relying on a single indicator to predict a potential water shortage, it is essential to evaluate multiple indicators together. Each indicator provides valuable insight at different points throughout the year, helping the D/A identify whether drought conditions are developing and, later, assess the likelihood of a water shortage. Figure 12 to Figure 18 illustrate how these indicators can be used in sequence to provide early warning and guide decision-making throughout the season. Below is an example monitoring timeline:

- **January–March**:
  Monitor SWE (Snow Water Equivalent) and the 9-Month Standardized Precipitation Index (SPI) for signs of unusually low precipitation, snowpack or early snowmelt. See Figure 15 and Figure 17.
- **April 1**:
  Assess peak SWE. Below-average SWE on this date is a strong indicator of low flows for the year. See Figure 15.
- **June 1**:
  Focus on peak flow at USGS gage 09067020 (Eagle River at Avon). A peak flow below 1,200 cfs suggests the possibility of a prolonged Critical Period in late summer. See Figure 17.
- **June 1 onward**:
  Track flows below 100 cfs. If this threshold is reached early in the summer, it signals a heightened risk of water shortages later in the season. See Figure 18**.**
- **July 1**:
  Assess Eagle Park Reservoir accounting. Reservoir levels and shareholder accounting on this date will provide critical information on whether an active water shortage response and aggressive conservation measures are needed.

By monitoring these indicators throughout the year, the D/A can develop an early awareness of an impending water shortage. Key insights should be available by April 1 from tracking SWE and PDSI. June 1 serves as the next major checkpoint, as peak streamflow is usually observed by this time, confirming whether the year will have low flows. Early detection is critical, as the Eagle River's Critical Flow Period usually begins in early August and continues through September 30.

Table of Critical Thresholds

The indicators above, their thresholds, and monitoring timelines, have been further summarized in Table 4 below. These thresholds serve as actionable triggers, helping staff anticipate potential water shortages and initiate appropriate water shortage response measures in a timely manner.

Table 4. Critical Thresholds for Water Shortage Indicators

Critical Thresholds				
Indicator	**SPI**	**April 1 SWE**	**Peak Streamflow**	**First day at Avon below 100 cfs**
Description	9-Month Percent of D2 Area for Eagle County, CO, from Drought.gov	3-Station Average Snow Water Equivalent from the Vail Mountain (site 842), Copper Mountain (site 415) and Fremont Pass (site 485) stations.	Maximum Daily Streamflow at the Eagle River at Avon, CO gage (USGS 09067020)	The first day where streamflow at the Eagle River at Avon, CO gage (USGS 09067020) falls below 100 cfs
Timeline	January-March	April 1	June	June-July
Moderate Risk Threshold *(30-day critical period)*	10%	15 inches	1,600 cfs	August 12
Severe Risk Threshold *(50-day critical period)*	10%	13 inches	1,200 cfs	August 5
Data Links	Drought.gov Link	NRCS Report Link	USGS 09067020 Link	USGS 09067020 Link

Drought Stages

Drought stages are a way of categorizing how severe a drought is to a particular area. Defined by environmental triggers specific to the region, drought stages are helpful in ensuring an effective drought response through associated response targets and measures.

After reviewing the stage used by other cities and entities, the D/A decided on four different drought stages for the WSRP: Watch, Warning, Severe, and Emergency. These stages are defined below.

- **Watch:** The Watch stage is intended to be the default or normal stage the D/A are always at. This stage is categorized by drought metrics that are well outside the range of water shortage risk. No special communications are needed at this stage.
- **Warning:** The Warning stage should be enacted as indicators, such as SWE and EPR contents, begin to warn of a potential future shortage. Begin early communications with large water users, such as golf courses and ski resorts. Voluntary conservation measures are still in place.
- **Severe:**
    - **Severe 1:** The Severe 1 stage will be enacted when low peak streamflow is observed and a critical period greater than 30 days is expected. The Water Shortage Response Committee will also be activated, and frequent public outreach will occur when this stage is anticipated. Active enforcement and a targeted 30% overall reduction in outdoor water use will be implemented when streamflows approach minimum instream flow levels.
    - **Severe 2:** The Severe 2 stage will be activated when a critical period greater than 50 days is expected. Active enforcement and a targeted 60% overall reduction in outdoor water use will be implemented when streamflows approach minimum instream flow levels. Active enforcement and public outreach will continue.
- **Emergency:** The Emergency stage is intended to only be enacted during a very severe drought or if a sudden interruption to service occurs. Communications from the District will happen more frequently and mandatory restrictions will be put into place. During a water supply emergency, depending on the exact conditions, there may be an outright ban on outdoor water use for the duration of the emergency.

Each stage also has an associated trigger, water reduction response target, as well as associated staff and board actions. The D/A's augmentation plan decreed in case no. 82CW328 has specific requirements for water use restrictions during low streamflow conditions that should be adhered to. Appendix 1: Drought Severity Levels Table outlines the various drought stages and the different response actions associated with each one.

Note on Public Trust: It is important to carefully manage public messaging and timing of declaring a water shortage. An early water shortage declaration, one that is later rescinded, can erode public trust and attention, and lead customers and the general public to ignore messaging. Conversely, a declaration that is made too late, or not at all, can leave the D/A in a critical water-short condition without sufficient time to respond.

Monitoring Frequency

When a water shortage is declared, it is important to increase the frequency of monitoring. In addition to the hydrologic indicators described above, water demand will be monitored to track water savings.

- **Before a Declared Shortage:** Monthly monitoring is sufficient to identify trends in drought conditions.
- **During a Declared Shortage:** Monitoring frequency should increase to weekly, and should include water demand in addition to flow, snowpack and hydrologic conditions.

Staff Responsible for Monitoring

The D/A must actively monitor the drought indicators in this section each year to be prepared for a potential water shortage response. Drought monitoring will be conducted by the water resources department with specific staff assigned to it each year. The responsibilities of the drought monitoring task include:

- Retrieving data on the drought indicators listed in this section.
- Comparing those indicators to key thresholds and previous years
- Making recommendations to the D/A boards of directors to make a water shortage declaration.
- Providing context and relevant updates on regional conditions
- Archiving reports on drought conditions

At the time of this plan, monitoring is the responsibility of the Water Resources Engineering staff overseen by the Director of Engineering and Water Resources.

The most critical role in monitoring drought conditions is making a recommendation to the D/A boards to take action and declare a water shortage condition. The process to make that declaration is outlined in the Operational and Administrative Framework section below.

The Example Monitoring Timeline above gives D/A staff time to monitor several hydrologic indicators while preparing to make a water shortage declaration. An April 1 decision point will give the D/A sufficient time to respond and reduce demand significantly ahead of a projected critical period.

Drought Mitigation and Response Strategies

To develop a comprehensive list of drought mitigation and response strategies for the D/A, a review of other drought plans was conducted. Drought response plans, water shortage response plans, drought management plans, and water conservation plans from 20 other Colorado cities and entities were compiled and analyzed. Table 6 in Appendix 2 lists the plans and their associated city/entity.

To begin, each plan was summarized by plan type, listed drought stages, identified drought impacts, and chosen response strategies. The drought stages and type of response action from cities and entities located in regions similar to the Eagle River Valley were of particular interest to this analysis as these were the most applicable to the D/A's operations. The response measures from each plan were then compiled into a master list and further analyzed to determine if they were feasible to establish within the Eagle River Valley. The potential

effectiveness and ease of implementation for each strategy was also considered. The most relevant and applicable strategies were identified and presented to the D/A for further discussion. The final list of response measures was developed from this list of measures and through discussion with the D/A.

Many of the plans used similar strategies such as limiting outdoor irrigation, increasing communication efforts, and encouraging more efficient water use. Strategies that appeared across multiple plans were assumed to be both easy to implement and effective strategies as they worked in multiple locations under various conditions. All of the plans also had extensive monitoring components describing the types of data used to make drought declaration decisions. All plans reviewed used data from state or national resources such as USGS streamflow or the U.S. Drought Monitor. Many plans also use more local data sources to make decisions such as localized soil moisture and customer demands.

Several common response themes were found across many of these plans:

- Monitoring
- Communication
- Conservation and efficient water use
- Active outdoor water use restrictions

Each plan discussed the importance of early and thoughtful communication with customers during a potential water shortage. A few of the plans even cited early communication as something that helped reduce the overall impacts of a water shortage. In these instances, using multiple forms of communication, clearly outlining restrictions, and involving local organizations were listed as key strategies.

Response Measures

Response measures are specific actions that the D/A, its customers, and other local stakeholders need to take to reduce the risk of a water shortage during drought. Different response measures are more useful in certain situations than others and some of the response strategies researched for the WSRP were not useful to implement within the D/A. In order to determine which response measures were the most applicable and useful to the D/A, the measures were organized into five categories. Actions the D/A can take to reduce water use are listed in Appendix 2 along with the categories below.

Active vs Passive- Active response measures are response measures taken that directly reduce or conserve water. Passive response measures are response measures that indirectly contribute to water conservation.

Strategy Type (Supply, Demand, Monitoring, or Communication)- Strategy type indicates what a strategy accomplishes. Supply and demand strategies are taken by either the supply side of the ERWSD water system or the demand side, respectively. Monitoring strategies are conducted by District staff and can involve monitoring of water quality, flows, and demands.

Communication strategies include which groups to contact at what drought stage in order to be effective.

Voluntary vs Mandatory- Voluntary response measures are suggested response measures that are not required to be completed. Mandatory response measures are required to be completed by the D/A customers, as well as the various metro districts, large irrigators, and excessive users.

Conservation vs Response- Conservation strategies are strategies that can be taken at any time to conserve water. Response strategies are strategies that can be taken immediately to reduce the effects of an ongoing drought.

Feasibility- Feasibility refers to how easy a response measure is for the D/A to complete. Some response measures may significantly help reduce water use but may not be easy to implement.

Cost- Cost refers to how much it will cost to implement a response measure. Some response measures may be too expensive to implement effectively.

Target Water Use Reduction

The strategies identified in this section are intended to incentivize reductions in water use. Specifically, these strategies target reductions in use during an extended late-summer critical period with low streamflows, when the D/A relies heavily on their in-basin reservoir storage.

Table 5 below shows the total consumptive use during late summer critical periods of various lengths. As a reminder, the D/A water rights portfolio only requires the use of augmentation supplies, like reservoir water, to meet the consumptive use portion of their demands, and not the total water use. Using this table, during a 50-day critical period, if the D/A is targeting a 60% reduction in outdoor water use, which means a reduction of 3 cfs per day or a savings of 272 acre-feet compared to an average year.

Table 5. Target Demand Reductions

Critical Period Length	Total Consumptive Use During Critical Period (acre-feet)			Target Outdoor Use Reduction (acre-feet)		
	Indoor[1]	Outdoor[1]	Total	30%	60%	100%
30 days (Sept)	20	242	**262**	73	145	242
50 days (Mid-Aug to Sep)	32	453	**486**	136	272	453
90 Days (July-Sep)	64	1,131	**1,195**	339	679	1,131

Excessive Use Definition

The response strategies in this section are targeted at reducing overall demand, with proactive communication and financial penalties directed at high water use accounts. Each year District staff will prepare and present the fine schedules and excessive use thresholds for a water shortage declaration as part of the annual budget approval process. .

Since each year's demands and supplies will be different, District staff may decide to target more or fewer accounts based on several factors including:

- Previous year's total outdoor water use
- Total consumptive use
- Expected compliance by account type
- Severity of the water shortage or drought

Water Shortage Response Strategies

Response strategies are approaches the D/A can use to encourage customers to reduce water use by encouraging the response actions described above. These strategies have been developed with the D/A and are described below:

Key Strategies

Enforcement of existing policies: The D/A already has several water shortage response strategies in place. Ensuring that these strategies are being fully used before introducing new policies will help the D/A respond more efficiently to water shortages.

Communications: Setting up a water shortage communications plan can help the D/A issue warnings, restrictions, and other necessary information more efficiently. Efficient communication will also improve the speed of response actions.

Reducing outdoor water use: One of the most effective ways of reducing water use is to focus reduction efforts on outdoor use. As previously discussed, indoor water demands are difficult to reduce, given they are primarily driven by essential daily activities like drinking, cooking, and

sanitation, while outdoor demands have large potential savings due to their high variability and consumptive use. The higher the consumptive use, the more water the D/A is required to augment using a substitute water supply, placing an additional burden on its water resources.

Supply-Side Strategies: In addition to reducing demand, the D/A have several existing water sharing agreements with other entities in the Eagle River Valley. These agreements include water in Homestake and Eagle Park Reservoirs, which is not intended for use every year, but is available to meet demands during critical dry periods.

Operational Efficiencies: Ensuring that the D/A's system is operating efficiently going into a drought can reduce potential maintenance costs and system outages as the drought progresses.

Activate Water Shortage Response Committee: The Water Shortage Response Committee is composed of the following District staff members:

- **General Manager** will lead the District in the implementation of the plan and ensure coordination between different departments.
- **Director of Engineering and Water Resources** will coordinate water supply operational strategy.
- **Water Resources Engineer** will track the key water shortage indicators.
- **Finance Manager** will manage the impacts of usage changes and fines on the D/A's finances.
- **Water Conservation Manager** will coordinate the implementation of any water restrictions.
- **Communications and Public Affairs Manager** will lead communications efforts with the public and stakeholders.
- Other staff members will support the committee.

This committee organizes and coordinates drought response efforts. Activating the committee will allow the D/A to respond to periods of drought.

Water Use Monitoring Program: The Water Use Monitoring Program, described below in detail, would leverage data and technology to identify, warn, and potentially fine high-water users who do not respond to water use restrictions during a severe drought.

Drought Fines: Drought fines are a financial penalty applied to the water use bills of customers who, during times of drought, use more than a pre-defined threshold of "excessive use". Fines may be used to enforce mandatory watering restrictions or other regulations during a drought such as when a user exceeds a predetermined threshold of water use. These are usually a fixed amount per infraction or escalating penalties for repeated violations.

Logistical Considerations for Enforcement Measures

Several logistical considerations must also be addressed prior to the implementation of any water shortage response strategies. The overall goal of the response is to reduce water use, not penalize customers. Implementation of enforcement must be done early enough to allow for it to be communicated broadly, and for customers to react.

Overuse fines and thresholds for excessive use need to be clearly defined and published well in advance of any drought to give customers time to prepare. Given the relatively short window when water reductions are most impactful, it is essential to communicate potential enforcement measures like fines early so users have adequate time to change their behavior. Supply-side strategies requiring discussions with other agencies, or water sharing agreements, must be discussed early in the year as drought conditions begin to evolve.

Enforcement of Existing Policies

The D/A already has several water conservation strategies in place, including mandatory water use regulations. The D/A's current three-day per week outdoor water use schedule, shown in Figure 19 below, allows for outdoor watering up to three days per week on alternating days, based on the last digit of a customer's street address, and no outdoor water use on Mondays.

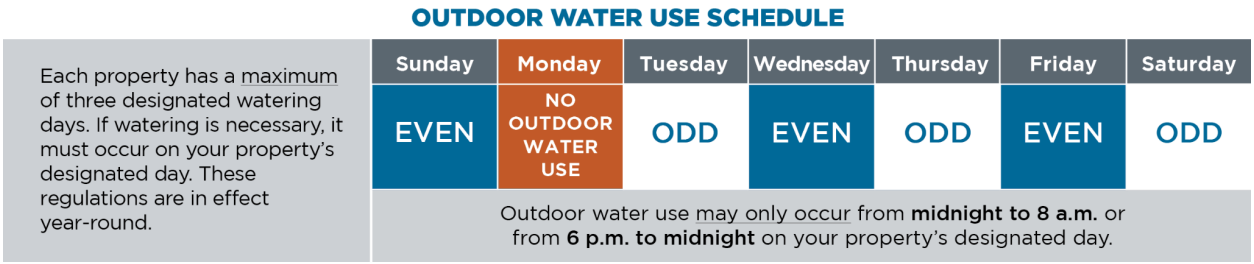


Figure 19. D/A-Wide Outdoor Watering Schedule, Showing Weekly Restrictions

Non-price strategies for water use reduction (like the D/A's designated watering days) are common and can be effective. Studies have found that designated watering days are an effective way to reduce water consumption during a drought period, especially when combined with restrictions on time of irrigation (Mini 2015, Boyer 2018, Anderson 1980). Another study (Kenney 2008) reviewed drought response measures by the City of Aurora during the 2002 drought, as well as other possible drought response measures. Mandatory water use restrictions are found to be effective in reducing water use by up to 30% or more, though the authors admit that assessing the impact of restrictions programs is difficult since those restrictions are usually combined with other price and non-price related efforts.

This policy was designed to allow for limited watering while giving the D/A's system a chance to refill storage tanks. However, as seen in Figure 20, not all customers adhere to this policy. If this policy was followed, the 7-day minimum line would, theoretically, resemble the wintertime average when there is no outdoor use. This policy has served as a balanced approach to

demand reduction and the operational needs of the D/A but is insufficient for response during a water shortage.

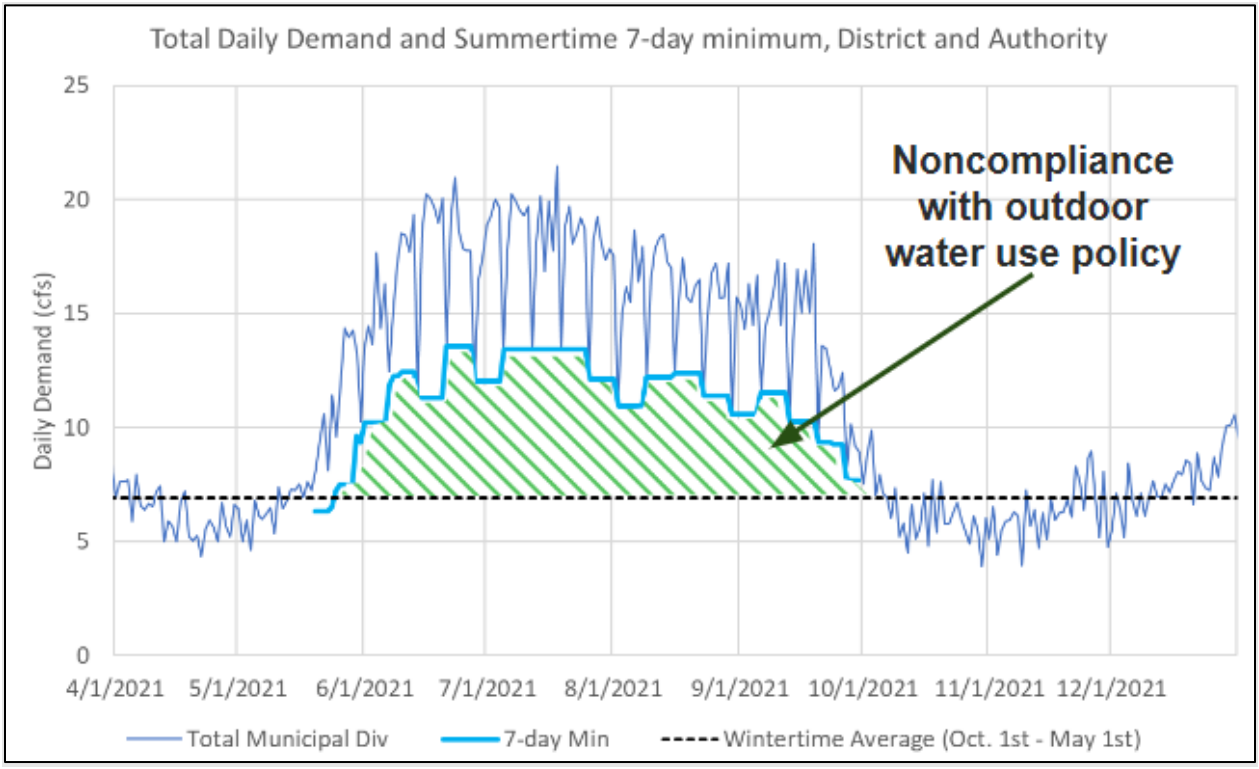


Figure 20. District and Authority Water Demand in 2021, Highlighting Non-Compliance with Outdoor Water Use Policy

Similarly, studies have found that voluntary restrictions alone are not enough to promote water conservation (Alliance for Water Efficiency, 2020). Voluntary reductions have historically shown very little compliance when used. Mandatory restrictions are the most effective when it is clear that restrictions have been put into place for a reason and are effective in helping the water shortage situation. The easiest and most effective way to share this information is through early communication efforts.

Communications Strategy

Effective communication strategies must be tailored to specific audiences, and the D/A has a capable team with robust plans in place to address service interruptions and deliver key messages to its customers. Clear, actionable communication during a drought is essential to the success of any drought response plan.

According to the National Integrated Drought Information System (NIDIS), drought messaging should be "easy to understand and focus on solutions that people can implement to respond to drought, rather than describing drought impacts." Additionally, organizations such as the American Meteorological Society (AMS) and the Environmental Protection Agency (EPA) provide guidelines to help water providers develop effective communications strategies.

For a communications plan to be impactful, the water provider must be prepared to implement it swiftly and effectively when needed. Using established news platforms ensures messages are shared promptly and widely. It is also critical to prepare messaging in advance, distinguishing between raising awareness, recommending voluntary actions, and announcing mandatory restrictions to avoid confusion and ensure the right actions are taken at the right time. Providing climate context—explaining how current conditions are driving the need for restrictions—can increase public understanding and compliance.

During periods of high water shortage risk, the D/A will prioritize proactive communication, including early notices about potential restrictions and clear warnings regarding fines for non-compliance. Internal billing tools will enable the D/A to send targeted alerts to customers with abnormally high water use, encouraging early adjustments to behavior.

Here are some specific communications strategies the D/A have used in the past:

- **Concierge Approach**: Provide personalized warnings and guidance to high-use customers before issuing fines.
- **Monthly Water Bill Messaging**: Include conservation reminders or updates through bill inserts or on billing portals.
- **WaterSmart Notifications**: Use automated phone calls, email, and SMS alerts to keep customers informed about restrictions and their water usage.
- **Direct Outreach**: Engage customers through mail, email, or phone calls to ensure critical messages are received.
- **Media Outreach**: Share stories, ads, and updates in Vail Daily, including a "Drought Watch" graphic for easy tracking.
- **Local Radio Announcements**: Broadcast drought updates on stations like 97.7 KZYR and others.
- **Community Engagement**: Participate in local events, presentations, and outreach efforts to spread awareness and encourage conservation.

Communications Campaign Examples

The D/A Communications and Public Affairs staff have a robust system for outreach and know its customer base very well. Here are a few example communications campaigns the D/A could consider helping with water use reduction during a drought or potential water shortage event.

Campaign: Current/Projected drought conditions
Timeline: April
Messaging:

- Present data on current vs historical hydrologic conditions during critical periods (streamflow, SWE, USDM)
- Share drought stage changes and response measures associated with different stages.

Campaign: Voluntary restrictions and suggestions about water savings
Timeline: April-May-June, before shortage is declared

Messaging:

- Recommend voluntary outdoor use reductions
- Share general conservation messaging
- Reminder about Water Use Regulations (no watering on Mondays, up to three days for outdoor use)

Campaign: Mandatory water use restrictions
Timeline: June-July, after shortage is declared
Messaging:

- Inform large stakeholders and excessive outdoor water users first, such as golf courses, ski resorts, and local governments or HOAs with large irrigated areas. Subsequently go more public with communications based on internally determined priorities
- Describe active enforcement measures
- Clearly communicate triggers for excessive use fines (if any)

Campaign: General reminders and explanations/water shortage stories
Timeline: Ongoing
Messaging:

- “Restrictions are favorable if people believe that the restrictions are actually helping to save water”
- Specifically address how these restrictions might affect critical business activities such as snowmaking/golf courses”
- Ongoing District conservation measures: “Even though we are in dry conditions, our conservation efforts have put us in a good position”

Campaign: Highlighting Community Efforts and Success Stories
Timeline: July–August
Messaging:

- Showcase businesses, HOAs, and residents who are successfully conserving water motivate others to follow suit.
- Share data on how much water the community has saved so far and the positive impact of these efforts.
- Use testimonials, social media posts, and local news outlets to recognize “Water Heroes” who make meaningful contributions to conservation.
- Encourage friendly competition between neighborhoods or stakeholders (e.g., “Which community can save the most water this summer?”).

Supply-Side Strategies

The D/A have several existing water sharing agreements with other entities in the Eagle River Valley. These agreements include water in Homestake Reservoir, which is not intended for use every year, but is available to meet demands during critical dry periods. Homestake Reservoir is

upstream of all D/A demands and can make direct releases to meet in-basin demands, which makes it an optimal location for drought contingency supplies. The agreements are:

2010 Consolidated Water Exchange Agreement: This agreement gives the D/A access to up to 1000 acre-feet per year of storage in Homestake Reservoir. This agreement also outlines the ability to refill that storage through a complicated, and infrequent exchange. This water will be a key supply source during a critical dry period.

Aurora Water Delivery Agreement: This agreement with the City of Aurora provides an additional 500 acre-feet of water from Homestake Reservoir when the active storage capacity of Eagle Park Reservoir falls below 1,200 acre-feet. There are other conditions on the use of this water, but it can be used by the D/A as an additional buffer supply.

The D/A expect that during a water short period, they will rely on one or more of these agreements to provide additional water supplies.

Water Use Monitoring Program

One potential strategy for the D/A to encourage water conservation during a drought is the implementation of a Water Use Monitoring Program. This program would leverage the District's AMI data to identify excessive water use. Customers that do not adjust their water use to comply with outdoor watering restrictions can be contacted directly by Water Conservation staff, sent notices, and/or penalized with fines for non-compliance.

Several logistical considerations must be addressed before implementing the program:

- **Define Excessive Use:** Each year during the annual budget cycle, the Water Conservation staff will recommend to the D/A boards an excessive use threshold amount.
- **Documentation**: Identify what data will be needed to accurately track and document overuse cases and develop operating procedures. Diligent accounting of past years' water use is essential to identifying overuse cases, since water use during a drought will need to be compared to some historical average or baseline.
- **Integration with Existing Fines**: Review the District's current fine structure to ensure consistency and evaluate how fines from the Water Use Monitoring Program will align with or supplement existing penalties.

With these elements in place, the Water Use Monitoring Program has the potential to become a highly effective tool in curbing water overuse and promoting conservation during drought periods.

Excessive Use Fines

Fines can be an effective tool for regulating water use during drought periods by discouraging excessive consumption. One task for District staff will be to determine the threshold for excessive use, which will set which accounts may receive overuse fines. During the course of a drought, accounts with excessive use (likely Tiers 4 and 5) will be fined, with fines escalating across rate tiers and primarily targeting outdoor water use, where the potential for conservation is greatest. Similar to the Water Use Monitoring Program, fines are intended to encourage behavioral change.

However, implementing fines at the right time is crucial for their effectiveness. According to the response timeline in this plan, fines may not achieve meaningful behavioral change if delayed. For example, if a potential water shortage is identified in April and confirmed by June, the fines might not take effect until July or August, meaning customers would receive high bills only after the critical water savings period has passed. As a result, the fines may come too late to influence water use during the most crucial period. To address this issue, the D/A will likely need to notify customers with clear and targeted communication as soon as a shortage is declared and begin assessing excessive use fines with the first irrigation season bill that arrives in June (based on May use).

The D/A can send pre-bill warnings to customers, outlining potential cost increases or projected fines if water use is not reduced. Additionally, targeted messaging could highlight savings opportunities and suggest specific actions to avoid fines, helping customers make adjustments in time to achieve the desired conservation impact.

"Price inelasticity" refers to a situation where the demand for a good or service, such as water, does not significantly decrease in response to price increases or fines. In the context of District water customers, this means that even with rising water rates or penalties for excessive use, many customers do not change their behavior to conserve water.

Many properties in the Eagle River Valley are second homes and vacation rentals. Second homeowners may not be directly engaged with day-to-day water usage or closely monitor their landscape water consumption. For vacation rentals, even if fines or penalties are applied to water bills, the owner might consider them just another operating cost, passing the charges onto tenants without addressing the root issue of overconsumption.

This inelastic behavior limits the effectiveness of pricing strategies to promote water conservation. Therefore, the D/A may need to explore non-price approaches, such as broad public communication, water-use education, or targeted outreach, to influence water use practices among these groups. Local governments also have the authority to issue citations through municipal codes or land use regulations for excessive water use, which can be enforced immediately and may have a significant and immediate impact on water use. During a water shortage emergency, the D/A can engage local governments to issue citations to excessive users. However, some local governments may need to update their existing regulations to include regulations for water use.

Excessive Use Fine Strategies:

The D/A is evaluating several strategies to reduce water usage during critical periods of potential water shortage. Proactive communication with high water users will be a priority, giving customers the opportunity to adjust their water use before fines take effect. Fines will only target accounts that exceed high use thresholds or use water within high-use tiers and will be enforced exclusively during critical drought events, with normal rates and pricing restored when the water shortage ends. Additionally, all fines must be pre-established before a water shortage occurs and approved by the D/A Boards to ensure transparency and fairness.

The D/A must also have a process in place to adjust thresholds and rates as needed to respond to changing conditions. Ensuring that any fines or financial penalties can be seamlessly integrated into the D/A's billing software is another key factor for smooth implementation and accurate enforcement.

Financial Issues for Drought Response

Water shortage responses carry several financial implications for the D/A, including both increased costs and potential revenue changes. Key impacts include:

- **Decreased Billing Revenue**:
  Lower water deliveries, driven by conservation efforts or mandated restrictions, will reduce water usage and, in turn, billing revenue. This reduction is not anticipated to negatively impact operational budgets because revenues from fixed fees are designed to cover a significant share of its operating expenses.
- **Increased Staff Time and Operational Costs**:
  Implementing a water shortage response requires additional staff time for tasks such as monitoring water use, issuing fines, preparing and sending communications, and ensuring compliance. Additional administrative and enforcement responsibilities may require reallocating existing personnel or hiring temporary staff. This could also result in higher operational costs related to fuel, equipment, and customer communications.
- **Increased Revenue from Fines**:
  Although fines may generate some additional revenue, they are not intended to replace lost billing revenue, but rather to encourage water conservation. The primary purpose of financial penalties is to reduce water consumption, particularly during critical periods, rather than provide a reliable revenue stream.

It is important to emphasize that the enforcement measures recommended in this plan are not designed to offset the full costs of a drought response. Given the District's limited backup supplies and strategic reserves, the primary focus of fines must be on achieving tangible water savings during critical periods, rather than recouping financial losses.

Any financial penalties should be carefully structured to ensure they encourage meaningful reductions in water use. For example, fines could escalate progressively across rate tiers to

discourage excessive outdoor use, with higher penalties for accounts in the upper usage tiers. The design of the fine structure should align with conservation goals, ensuring water savings are prioritized over revenue generation.

In addition, the D/A will need to manage public expectations, as drought-related restrictions and fines may result in dissatisfaction among customers. Transparent communication about the purpose and timing of fines—and how they contribute to water security—will be critical to maintaining community support during a drought.

Funding the Water Shortage Response

To ensure the D/A is financially prepared, it is recommended that the D/A maintain sufficient cash reserves earmarked for operating expenses to reduce the D/A's reliance on fines, which can be unpredictable and insufficient. The D/A boards have adopted new fund balance policies geared to maintain a minimum and maximum number of days of cash reserves on hand, and when achieved, these reserves can be used to fund drought related operating deficits.

Each year District staff will analyze water usage in tiers 4 and 5, which represent the highest amount of per-account water use. Based on the data, staff will make recommendations on a fine schedule to the D/A boards during the annual budget process. The fine schedule will be anchored to a potential reduction in revenue expected during a drought year. When combined with the fund balance policy described above that maintains operating cash reserves, the D/A are not anticipated to require additional financial planning or reserves to prepare for a drought year.

Operational and Administrative Framework

The sections above outline the conditions under which a water shortage should be declared, along with the appropriate response actions and strategies to minimize the impact on the D/A's water supplies. Successful implementation of these actions requires clear roles, responsibilities, and internal accountability to ensure fair and timely execution.

Water Supply and Drought Monitoring

The Engineering and Water Resources Department monitors key drought indicators and regularly reports their status to the District leadership team and Boards of Directors. The Water Resources Engineer tracks these indicators twice a week and Communications and Public Affairs updates their status on the District's webpage. Additionally, the engineer prepares a monthly report that is presented to the D/A Boards. If, by April, the drought indicators suggest a drought is likely during the summer, the reports will be shared with local media, stakeholders, and the public.

The Water Shortage Response Committee (WSRC) will operate as a key component of the D/A's broader emergency response plan to ensure seamless coordination during water shortages. Given the overlapping nature of drought events and other emergencies—such as infrastructure failures or wildfire impacts—the WSRC will align its activities with the D/A's ICS-based Emergency Response Plan. This integration ensures that all response efforts, whether related to water shortages or other emergencies, follow a standardized approach with clear communication channels and defined responsibilities.

This committee can operate within the framework of the D/A's existing ICS-based emergency response plans, ensuring seamless coordination with established protocols. The WSRC should include the following representatives from key departments:

- Director of Engineering and Water Resources to coordinate water supply operations strategy
- Water Resources Engineer will track the key water shortage indicators
- Finance Manager will assess the usage changes to the D/A's finances
- Water Conservation Manager will coordinate the implementation of the mitigation measures including water restrictions. This role will also evaluate water use thresholds to be used for fines, targeted outreach and other enforcement measures.
- Communications and Public Affairs Manager will lead communications efforts with the public and stakeholders, including the development and dissemination of media campaigns.
- Incident Command Staff. During a water shortage emergency, ICS staff may have been activated to respond to other aspects of the D/A's system. A representative from the ICS will be included in this committee.
- Relevant staff members to support the committee.

WSRC Responsibilities

The specific responsibilities of the WSRC will vary based on the severity of the water shortage, available staffing, and enforcement requirements. Key tasks may include:

- Actively monitoring hydrologic and river administration conditions (i.e. mainstem Colorado River calls)
- Informing the Boards about evolving drought conditions
- Developing and delivering messaging on water use restrictions to metro districts and the general public
- Managing internal communications and coordination among District staff
- Communicating with other local governments on water use restrictions
- Coordinating enforcement responsibilities among staff
- Implementing and assessing fines through the D/A's billing software

The WSRC should be activated in any year where multiple drought indicators suggest a moderate or severe water shortage (e.g., a Critical Period exceeding 30 days). The committee

may meet early to discuss preliminary options, even before a formal water shortage declaration is issued.

During any potential water shortage event, the WSRC will work closely with the District and Authority Boards to ensure effective decision-making. The authority to declare or rescind a water shortage should lie with the Boards, given the financial and operational implications of such actions. Key Board responsibilities include:

- Issuing the initial water shortage declaration
- Receiving regular updates from staff on hydrologic and drought conditions
- Rescinding the declaration when conditions improve

This structure ensures that the D/A's water shortage response is well-coordinated, defensible, and aligned with the operational and financial realities of the situation.

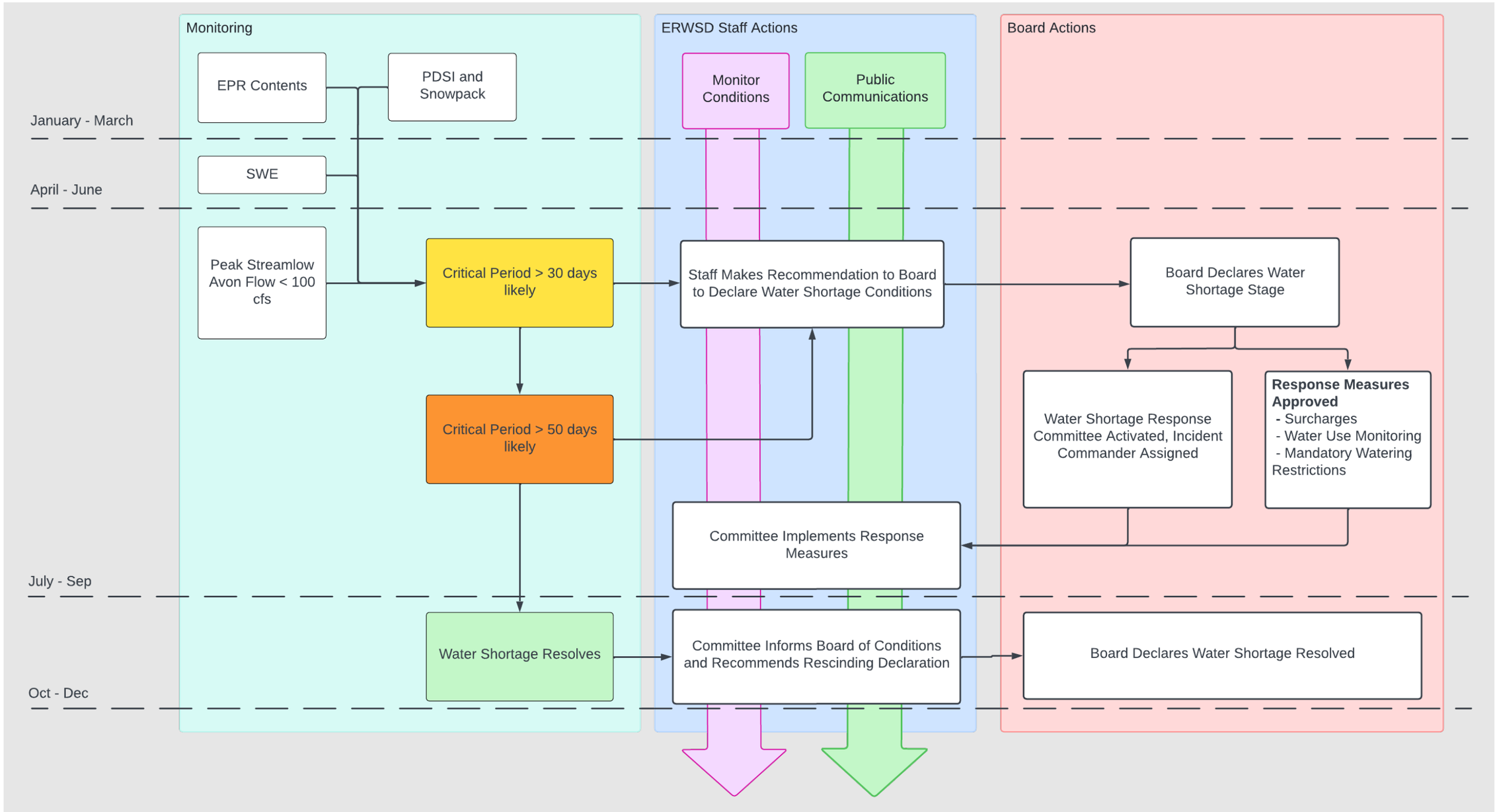


Figure 21. Example Timeline of Monitoring and Response Actions

Figure 21 describes how monitoring actions trigger responses from District staff and the Boards throughout the year. Following the monitoring timeline outlined in previous sections, District staff will track key indicators to assess drought conditions. When it becomes likely that the D/A will experience a 30-day Critical Period later in the year, staff will recommend that the Board declare water shortage conditions.

Once a declaration is made, the Boards will determine which strategies to implement, such as proactive Water Use Monitoring, defining excessive use thresholds based on the previous year's demands, and possibly introducing excessive use fines. Throughout the shortage, District staff will continue to monitor relevant indicators, ensuring that response efforts remain aligned with evolving conditions. Public communications will occur continuously, with frequency increasing when key indicators are triggered or restrictions are tightened.

To end the water shortage declaration, District staff will notify the Boards when the indicators return to normal, falling outside the threshold range. Based on this recommendation, the Boards will decide whether to rescind the declaration, ensuring that the response aligns with improved conditions and operational needs.

Formal Adoption of WSRP

The formal adoption of the Water Supply Response Plan (WSRP) will require updates to Article XI - Water Supply Response Plan within the D/A's Rules and Regulations (R&R). These updates will align the R&R with the newly developed WSRP, ensuring consistency between policy and operational procedures. The WSRP should be finalized and approved prior to the R&R updates, allowing Article XI to be rewritten and retitled to reflect the new plan. Once the WSRP is in place, the revised R&R—including Article XI—will be presented to the Boards for formal approval during the annual review. This coordinated approach ensures the WSRP is fully integrated into the D/A's governance framework, providing clear guidelines for water supply management and response moving forward.

The D/A boards approved this WSRP as a foundational document for water shortage response. There are a few outstanding issues around enforcement that need to be resolved in future years. While this plan makes recommendations around enforcement measures, determination of fines, and the specifics of enforcement tactics are planned for evaluation by District staff in late 2025.

Interaction with Other Agencies

During any water shortage period, extensive coordination with other entities will be necessary to properly implement the actions in this plan. The D/A have existing agreements in place to allow for communication, enforcement, customer outreach within all neighborhoods in their service area. Additional agreements are already in place with the companies that manage Homestake

and Eagle Park reservoirs, when contingency supplies are requested. There are no additional intergovernmental agreements necessary to execute the actions in this plan.

Future Plan Updates

During the development of the current WSRP, several areas for improvement were identified. While these could not be fully explored or incorporated due to resource limitations and other constraints, they represent valuable opportunities for future updates:

- **Incorporating Excessive Use Fines into the Annual Budgeting Process**
  Ensure that any excessive water use fines are integrated into the D/A's annual budget process, providing transparency and alignment with financial planning.
- **Expanded Details on the Water Use Monitoring Program**
  Include specific guidelines for the Water Use Monitoring Program, such as staffing requirements, monitoring protocols, reporting procedures, and enforcement policies to enhance operational clarity.
- **Clarifying Exceptions to Water Use Restrictions**
  Identify and document exceptions to water restrictions (e.g., for agricultural operations, public parks, or critical infrastructure) to ensure fair and consistent application of restrictions.
- **Water Resources Infrastructure Upgrades**
  Outline the role of infrastructure improvements, including the development of Bolts Lake, in enhancing the D/A's water security and capacity to manage future droughts.
- **Improving Understanding of Climate Change Impacts on the Eagle River watershed**
  Regularly incorporate the latest research and data on climate change and its effects on runoff patterns in the Eagle River watershed. This will ensure the plan remains adaptive to evolving hydrologic conditions.
- **Performance Reviews After Each Drought Event**
  Implement a structured review process after drought events to assess the effectiveness of response strategies and make improvements based on lessons learned.
- **Incorporation of New Drought Indicators and Predictive Models**
  As new technologies and data sources become available, like Airborne Snow Observatories lidar snowpack measurements and streamflow forecasts, integrate them into the monitoring framework to improve early warning capabilities and forecasting accuracy.
- **Periodic Review and Update.** The Engineering and Water Resources Department will review the WSRP every five years or after a major drought to determine if an update is required. If the WSRP requires an update, the Engineering and Water Resources Department will take the lead in updating the plan. The next update to this plan is scheduled for 2030.

References

Alliance for Water Efficiency. (2020). Use and effectiveness of municipal irrigation restrictions during drought: Executive summary. Alliance for Water Efficiency. https://www.allianceforwaterefficiency.org/sites/default/files/assets/Final%20AWE%20Use%20%26%20Effectiveness%20of%20Municipal%20Irrigation%20Restrictions%20During%20Drought-Executive%20Summary-January%202020.pdf

Anderson, R.L.; Miller, T.A.; & Washburn, M.C., 1980. Water Savings From Lawn Watering Restrictions During a Drought Year, Fort Collins, Colorado. Journal of the American Water Resources Association, 16:4:642. https://doi.org/10.1111/j.1752-1688.1980. tb02443.x

Aspen Global Change Institute. (2022). Roaring Fork Watershed – Evaluation of soil moisture for water planning: Grant application to Colorado Water Conservation Board. Basalt, CO.

Aurora Water. (2017). Aurora water management plan. City of Aurora.

Boyer, Mackenzie J., et al. "Water conservation benefits of long-term residential irrigation restrictions in Southwest Florida." *Journal-American Water Works Association* 110.2 (2018): E2-E17.

City of Aspen. (2020). Drought mitigation and response plan. ELEMENT Water Consulting.

City of Boulder Utilities Department. (2022). Drought plan (2022 update). City of Boulder.

City of Durango Utilities Department. (2017). Grant application for drought management plan: Submission to the Colorado Water Conservation Board. Durango, CO: City of Durango.

City of Durango Utilities Department. (2020). Municipal drought management plan. Durango, CO: Wood Environment & Infrastructure Solutions.

City of Fountain Utilities Department. (2022). Water scarcity response plan. Fountain, CO.

City of Glenwood Springs. (2018). Drought management plan. Glenwood Springs, CO.

City of Grand Junction, Clifton Water District, & Ute Water Conservancy District. (2018). Drought response plan. Grand Junction, CO.

City of Montrose Public Works Department. (2016). Water conservation plan. Montrose, CO.

City of Steamboat Springs & Mount Werner Water and Sanitation District. (2020). Water conservation plan. Steamboat Springs, CO.

City of Thornton Water Resources Division. (2021). Drought management plan. Thornton, CO.

City of Westminster. (2019). Drought management plan. Westminster, CO.

Colorado Water Conservation Board. (2012). Colorado River Water Availability Study. Colorado Department of Natural Resources

Colorado Water Conservation Board. (2018). Colorado drought mitigation and response plan. Colorado Department of Natural Resources.

Colorado Water Conservation Board. (2019). Analysis and Technical Update to the Colorado Water Plan. Colorado Department of Natural Resources

Colorado Water Conservation Board. (2019). Colorado River Availability Study Phase II Task 7: Climate Change Approach and Results. Colorado Department of Natural Resources

Colorado Water Conservation Board. (2020). Drought Management Planning: A Guide for Water Providers. Colorado Department of Natural Resources

Denver Water. (2020). Water shortage response implementation plan. Denver, CO.

Eagle River Water & Sanitation District. (2012). Drought response plan. Eagle River Water & Sanitation District.

Fort Collins Utilities. (2020). Water shortage action plan. Fort Collins, CO.

Fort Collins-Loveland Water District. (2021). Water efficiency plan update: Grant application to Colorado Water Conservation Board. Fort Collins, CO.

Hindi, S. (2023, February 27). Aurora implements lawn watering restrictions amid Colorado drought concerns. The Denver Post. https://www.denverpost.com/2023/02/27/aurora-lawn-watering-restrictions-drought-colorado/

Katz & Associates. (2022). Designing and evaluating effective and ongoing drought communication: Report prepared for the American Water Works Association. American Water Works Association.

Kenney, Douglas S., et al. "Residential water demand management: lessons from Aurora, Colorado 1." *JAWRA Journal of the American Water Resources Association* 44.1 (2008): 192-207.

Mini, C., T. S. Hogue, and S. Pincetl. "The effectiveness of water conservation measures on summer residential water use in Los Angeles, California." Resources, Conservation and Recycling 94 (2015): 136-145.

Multiplier. (2023). Advancing high impact water efficiency solutions in Colorado communities: Grant application to the Colorado Water Conservation Board. San Francisco, CA.

National Integrated Drought Information System. (n.d.). Communicating about drought. U.S. Drought Portal. https://www.drought.gov/drought-in-action/communicating-about-drought

Sneffels Energy Board & EcoAction Partners. (2021). Ouray & San Miguel County regional climate action plan. Ouray, CO: Sneffels Energy Board.

Town of Breckenridge. (2018). Water efficiency plan. Breckenridge, CO.

Town of Castle Rock Water. (2018). Municipal drought management plan. Castle Rock, CO: Amec Foster Wheeler Environment & Infrastructure.

Town of Castle Rock. (2017). Application for drought management plan: Grant submission to Colorado Water Conservation Board. Castle Rock, CO: Amec Foster Wheeler Environment & Infrastructure.

Town of Dillon. (2018). Water efficiency plan. Dillon, CO.

Town of Firestone. (2012). 2012 drought management plan. Clear Water Solutions, Inc.

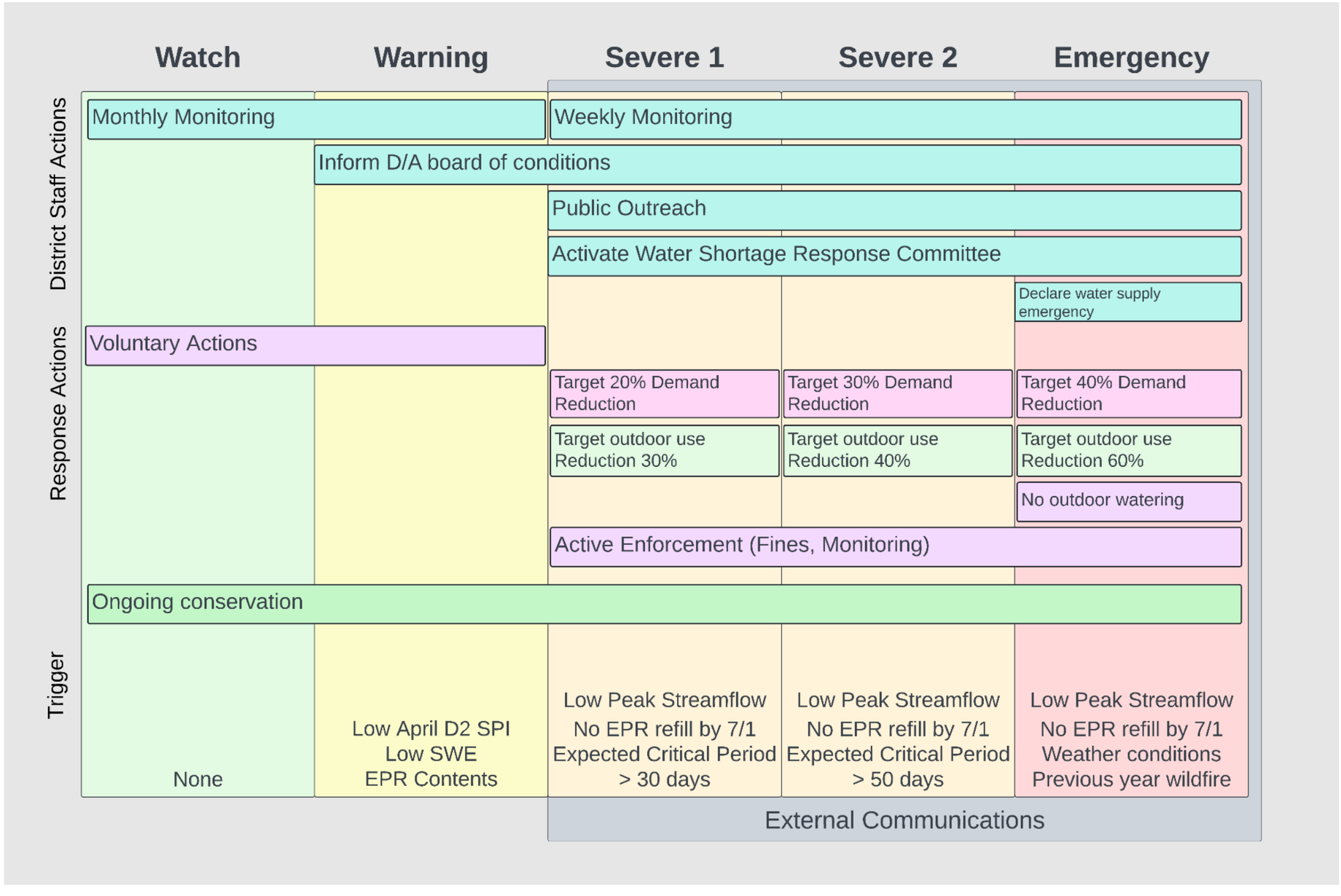
Town of Telluride. (2020). Water efficiency plan (2020-2027). Telluride, CO.

Vail Valley Economic Development (2024). https://vailvalleymeansbusiness.com/data-center/tourism-research/

Vickers, A. (2001). Handbook of Water Use and Conservation. United States: Waterplow Press.

Zieburtz, B., AWWA Staff. (2012). Principles of Water Rates, Fees, and Charges. United States: American Water Works Association

Appendix 1: Drought Severity Levels Table



Appendix 2: Summaries of Response Actions from Other Drought Plans

Below are summaries of other Drought Plans reviewed during the creation of this plan. This includes which plans were reviewed, the response actions identified within each one, and the final table of District Response actions.

Table 6. Other Drought Plans Reviewed

City/Entity	Name of Plan	Date
Aspen	Drought Mitigation and Response Plan	2020
Aurora	Aurora Water Management Plan	2017
Boulder	City of Boulder Drought Plan	2022
Breckenridge	Breckenridge Water Efficiency Plan	2018
Castle Rock	Town of Castle Rock Municipal Drought Management Plan	2018
Denver Water	Water Shortage Response Implementation Plan	2020
Dillon	Water Efficiency Plan	2018
Durango	Drought Management Plan Application	2020
DWSD	Drought Management Plan	2023
Eagle River	Eagle River Water & Sanitation District Drought Response Plan (former plan)	2012
Firestone	2012 Drought Management Plan	2012
Fort Collins	Water Shortage Action Plan	2020
Fort Collins/Loveland	Joint Water Plan Application	2021
Glenwood Springs	City of Glenwood Springs Drought Management Plan	2018
Grand Junction	Drought Response Plan	2018
Montrose	Water Conservation Plan	2016
Steamboat Springs	Water Conservation Plan	2020
Telluride	Water Efficiency Plan	2020
Thornton	Thornton Drought Management Plan	2021
Westminster	Drought Management Plan	2019

Table 7. Drought Response Actions from Other Plans, Showing Occurrence by Drought Stage

	Count of Occurrences within Other Plans, By Drought Stage		
Response Action	**Mild**	**Moderate**	**Extreme**
ACTIVE			
Limit lawn irrigation	3	5	
No lawn irrigation			6
Limit garden irrigation	3	5	
No garden irrigation			6
Limit public facility Irrigation	1	5	
No public facility irrigation		2	6
No new landscapes		6	4
No decorative water feature use	1	3	3
Outdoor water savings target	1	1	
Increase water rates	2	2	2
No car washing (home)		4	4
No car washing (commercial)		1	4
Surcharges		4	5
Fire hydrant for fighting fire only		4	4
No construction			1
No new water connections		2	3
Limit pool filling	2		
No pool filling		2	
Water rationing			3
Adjust/Reduce water budgets		2	3
Watering/irrigation schedule	3	6	
Indoor water use restrictions			3
Voluntary restrictions	3	2	1
Mandatory restrictions		4	3
Increase leak detection/repairs	1	3	2
No washing hard surfaces		3	1
No dust control		1	
Reduce govt entity use by 35% to lead by example		1	1
Lease municipal water	2	2	2
Lease agricultural water		1	1
Treat raw water for potable purposes	1	1	
Pump tributary wells		1	1
Negotiate water lease		1	1
Permits for new trees/sod		1	
Establish a drought advisory committee	1		

	Count of Occurrences within Other Plans, By Drought Stage		
Response Action	**Mild**	**Moderate**	**Extreme**
Require specific area to implement specific measures	1	1	1
Purchase available water	1	1	1
Ban herbicide, fertilizer, and pesticide applications		1	1
Distribution for low flow devices		1	1
Offer toilet leak detection tablets	1		
Offer rebates for low flow devices		1	1
Reduce annual water use	1	1	1
Implement increased temperatures in cooling tower		1	1
Focus on large water users		1	
Increase water rates	1		1
No green roof irrigation		1	1
Target HOAs to reduce water use	1		
Prepare a drought response budget (financial)	1		
Implement water waste fines or bans	1		
Flow restrictor placed on the water service			1
City owned property will not use potable water		1	
Restaurants only serve water if asked		1	1
PASSIVE			
Educate public on water use	3	4	2
Drought communications	4	4	4
Encourage efficient water use	2	1	
Discourage landscape changes	4		
Monitor response effectiveness	1		
Highlight unusually high uses on customer bills		1	
Contact special interest groups (with heavy water use) for ideas/support	1		
Suggestions for temp. reducing water use	1		
Consider diversion of senior water rights			1
Explore new storage opportunities		1	1
Consider diverting poorer quality water		1	1
Consider new regional water supply options		1	1
Consider developing infrastructure for potable use		1	1
Consider reducing water supply system pressure		1	1
Rehabilitate existing wells		1	1

	Count of Occurrences within Other Plans, By Drought Stage		
Response Action	**Mild**	**Moderate**	**Extreme**
Explore non-tributary GW options		1	1
Consider leasing agricultural	1		
Consider filing SWSP	1	2	1
Initiate discussions w/ City contractors	1		
Consider reducing use of city water to fill lakes		1	
Request facilities make plans to save water	1	1	
Evaluate expenditures and funding sources	1		

Table 8. Evaluation of Potential Water Shortage Response Actions

Response Action	Active or Passive?	Who will take action?	Strategy Type (Supply, Demand, Communication, Monitoring)	Feasibility	Costs	Water Savings (Low medium high)	Data available to quantify impact?	Qualitative benefits	Extraneous impacts	Impact to tourism/ economics	Mandated or Voluntary
Encourage water conservation in hotel rooms	Passive	Commercial	Communication	Less feasible		Low/medium	?	Increases water conservation efforts, decreases water use	Could cause conflict/dislike, may not be possible, difficult to enforce, public may disregard	May decrease visitors	Voluntary
Highlight unusually high uses on customer bills	Passive	District/Authority	Communication	Feasible		Low	?	Increased drought awareness and future water conservation	Customers may disregard	N/A	Voluntary
Increase water quality monitoring	Passive	District/Authority	Monitoring	Feasible	Equipment costs	Low	?	Encourages water conservation	Could be costly, may lack participants	N/A	Mandatory
Have local govt decrease use and advertise	Active	Municipal	Communication	Feasible		Low/medium	?	Lead by example, encourages collaboration	May not be worth it, public could be unresponsive	?	Mandatory
Publish drought communications on a weekly basis	Passive	District/Authority	Communication	Feasible		Low	?	Encourages drought awareness	May be ignored	N/A	Mandatory
Activate drought advisory committee	Active	Internal to District/Authority	Communication	Feasible		?	Yes	Increased drought preparedness, better awareness of future events	May potentially leave out an interested party	N/A	Voluntary
Indoor water use restrictions	Active	General Public	Communication	Less feasible		Low	?	Reduced water use	Health impacts, negative public perception of District/Authority	Less visitors	Voluntary
Increase drought communications	Passive	District/Authority	Communications	Feasible		Low/Medium	?	Increased drought awareness and future water conservation	Public may disregard communications, could cause extra water use	N/A	Mandatory
No new water connections	Active	District/Authority	Supply	Less feasible		Low/medium	?	No new water uses	No new dwellings	Reduced revenue for District/Authority, no new construction, negative public perception of District/Authority	Mandatory

Response Action	Active or Passive?	Who will take action?	Strategy Type (Supply, Demand, Communication, Monitoring)	Feasibility	Costs	Water Savings (Low medium high)	Data available to quantify impact?	Qualitative benefits	Extraneous impacts	Impact to tourism/ economics	Mandated or Voluntary
Limit lawn irrigation (Warning)	Active	General Public	Demand	Feasible		Medium	Yes	Water available for other essential uses	Damaged/dead landscaping, could cause extra water use	Aesthetics	Voluntary
Discourage landscape changes	Passive	District/Authority	Communication	Feasible		Low	?	Increased drought awareness and future water conservation	Public may disregard	N/A	Voluntary
No garden irrigation (Emergency)	Active	General Public, Golf Courses, Ski Resorts	Demand	Less Feasible	Enforcement	High	?	Less Feasible	Damaged/dead landscaping or food crops, could cause extra water use, unfavorable opinion of District/Authority	Aesthetics, food availability	Mandatory
Limit public facility irrigation (Watch)	Active	District Customer List	Demand	Feasible		Medium	Yes	Decreased water use, increased drought awareness	Damaged/dead landscaping, could cause extra water use	Aesthetics	Voluntary
Limit public facility irrigation (Warning)	Active	District Customer List	Demand	Feasible		Medium	Yes	Decreased water use, increased drought awareness	Damaged/dead landscaping, could cause extra water use	Aesthetics	Voluntary
Explore alternative water sources	Passive	District/Authority	Supply	Feasible	Staff costs	Low/Medium	?	May increase available water	May not increase available water, could be expensive if alternatives are found and pursued	N/A	Voluntary
City owned property will not use potable water for outdoor uses	Active	District Customer List	Demand	Feasible		Low	? (most likely no)	Increased drought awareness, leading by example	Conflict between city and District/Authority	?	Mandatory
No car washing (District vehicles)	Active	Municipal	Demand	Feasible		Low	?	Decreases water use	?	N/A	Mandatory
Limit garden irrigation (Warning)	Active	General Public, Golf Courses, Ski Resorts	Demand	Feasible		Medium	Yes	Water available for other essential uses	Damaged/dead landscaping or food crops, could cause extra water use	Aesthetics, food availability	Voluntary
Limit lawn irrigation (Watch)	Active	General Public	Demand	Feasible		Medium	Yes	Water available for other essential uses	Damaged/dead landscaping, could cause extra water use	Aesthetics	Voluntary
Watering/irrigation schedule (warning)	Active	General Public	Demand	Feasible		Medium	Yes	Increased drought awareness	Damaged/dead landscaping, could cause extra water use	Aesthetics	Voluntary

Response Action	Active or Passive?	Who will take action?	Strategy Type (Supply, Demand, Communication, Monitoring)	Feasibility	Costs	Water Savings (Low medium high)	Data available to quantify impact?	Qualitative benefits	Extraneous impacts	Impact to tourism/ economics	Mandated or Voluntary
No pool filling (Emergency)	Active	General Public, District Customer List	Demand	Less Feasible		Low/medium	?	No unnecessary water use	Less pool use, no income for pool owners	Reduced income for pool owners	Voluntary
No garden irrigation (Severe)	Active	General Public, Golf Courses, Ski Resorts	Demand	Less Feasible	Enforcement	High	Unclear	Less Feasible	Damaged/dead landscaping or food crops, could cause extra water use, unfavorable opinion of District/Authority	Aesthetics, food availability	Mandatory
Escalate water monitoring program (detect significant waste, fines)	Active	Internal to District/Authority	Demand	Feasible	Staff and repair costs	High	Unclear	Reduce losses	Potential fines	N/A	Mandatory
Enforce weekly outdoor use limits	Active	General Public, Commercial	Demand	Feasible		Low/Medium	Unclear	Encourages water conservation	Dislike of D/A	N/A	Mandatory
Limit garden irrigation (Watch)	Active	General Public, Golf Courses, Ski Resorts	Demand	Feasible		Medium	Yes	Water available for other essential uses	Damaged/dead landscaping or food crops, could cause extra water use	Aesthetics, food availability	Voluntary
No public facility irrigation (Emergency)	Active	District Customer List	Demand	Less Feasible		Medium	Yes	Significant decreased water use	Damaged/dead landscaping, could cause extra water use	Aesthetics	Mandatory
No lawn irrigation (Emergency)	Active	General Public, Golf Courses, Ski Resorts	Demand	Less Feasible	Enforcement	High	Unclear	More water available for essential uses	Damaged/dead landscaping, could cause extra water use, unfavorable opinion of District/Authority	Aesthetics	Mandatory
No new landscapes	Active	General Public, Golf Courses, Ski Resorts	Demand	Feasible		Medium	Unclear	No new water uses	Institutional resistance from D/A, lack of aesthetics	Aesthetics	Mandatory
Target specific neighborhoods to reduce water use	Active	District Customer List	Communication	Feasible		Medium	Yes	Increases drought awareness	Could cause conflict between HOAs and District or HOAs and homeowners	May decrease visitors	Mandatory
No dust control	Active	General Public, Golf Courses, Ski Resorts	Demand	Less feasible		Low	Unclear	Reduces unnecessary water waste	Increased dust, health or aesthetic impacts	Aesthetics	Mandatory
Implement modified rate structure for drought periods	Active	District/Authority	Demand	Feasible		Low/Medium	Unclear	Encourages water conservation	Institutional resistance from D/A	N/A	Mandatory
No public facility irrigation (Severe)	Active	District Customer List	Demand	Less Feasible		Medium	Yes	Significant decreased water use	Damaged/dead landscaping, could cause extra water use	Aesthetics	Mandatory

Response Action	Active or Passive?	Who will take action?	Strategy Type (Supply, Demand, Communication, Monitoring)	Feasibility	Costs	Water Savings (Low medium high)	Data available to quantify impact?	Qualitative benefits	Extraneous impacts	Impact to tourism/ economics	Mandated or Voluntary
No lawn irrigation (Severe)	Active	General Public, Golf Courses, Ski Resorts	Demand	Less Feasible	Enforcement	High	Unclear	More water available for essential uses	Damaged/dead landscaping, could cause extra water use, Institutional resistance from D/A	Aesthetics	Mandatory
No decorative water feature use	Active	General Public, Golf Courses, Ski Resorts	Demand	Feasible		Low	Unclear	Increase drought awareness, limits unnecessary water use	Institutional resistance from D/A, lack of aesthetics	Aesthetics	Mandatory
No washing hard surfaces	Active	General Public, Golf Courses, Ski Resorts	Demand	Less feasible		Low	Unclear	Reduces unnecessary water waste	Increased dust, health or aesthetic impacts	Aesthetics	Mandatory
No green roof irrigation	Active	General Public	Demand	Not Feasible		Low	No	Increases drought awareness, more water available	Damage to plants	Unclear	Mandatory
Install automated flow restrictors on service connections	Active	District/Authority	Monitoring	Less Feasible	Cost of restrictor/installation	Medium	Unclear	Decreased water availability	Could cause infrastructure issues in the future, institutional resistance by D/A	Unclear	Mandatory
Permits for new trees/sod	Active	Internal to District/Authority	Demand	Less feasible		Low	Unclear	No new water uses	Aesthetics, dislike of District/Authority	Unclear	Voluntary
Watering/irrigation schedule (Severe/Emergency)	Active	General Public	Demand	Feasible		Medium	Yes	Increased drought awareness	Damaged/dead landscaping, could cause extra water use	Aesthetics	Mandatory
Monitor response effectiveness	Passive	District/Authority	Monitoring	Feasible		Low/Medium	Unclear	Creates ability to intervene if responses are not working	Unclear	N/A	Voluntary
Create a dedicated drought response fund	Passive	Internal to District/Authority	Supply	Feasible	Staff costs	N/A	Unclear	Ensures available financing for drought emergencies	Funds may not be available or may have to be pulled from other programs	N/A	Voluntary
Implement water waste fines or bans	Active	General Public	Supply	Feasible		Medium	Unclear	Increased drought awareness	Dislike of District/Authority	May decrease tourism activities	Mandatory
Increase water rates/Fines	Active	Internal to District/Authority	Supply	Feasible		Medium	Unclear	Decreases excessive water use, increases drought awareness	Legal Ramifications, Dislike of District/Authority	Events or places that need large amounts of water may have to cut back	Mandatory

Response Action	Active or Passive?	Who will take action?	Strategy Type (Supply, Demand, Communication, Monitoring)	Feasibility	Costs	Water Savings (Low medium high)	Data available to quantify impact?	Qualitative benefits	Extraneous impacts	Impact to tourism/ economics	Mandated or Voluntary
Prepare a drought response budget (financial)	Active	District/Authority	Supply	Feasible		N/A	Likely	Increases drought preparedness, encourages creative thinking to deal with drought	Unclear	N/A	Voluntary
Engage flow restrictors	Active	District/Authority	Supply	Less Feasible		Medium	No	Decreased water availability	Potential legal issues		Mandatory
Outdoor water savings target	Active	Internal to District/Authority, General Public	Supply	Feasible		Medium	Unclear	Increased drought awareness	Damage to landscaping, dislike of District/Authority	Unclear	Mandatory
Prepare reports on effectiveness of past/current strategies	Passive	Internal to District/Authority	Monitoring	Feasible	Staff costs	Low	Unclear	Evaluates effectiveness of drought response actions, could be useful to present/share with others	May not be useful	N/A	Voluntary
Annual evaluation of triggers	Passive	Internal to District/Authority	Monitoring	Feasible	Staff costs	Low	Unclear	Evaluates effectiveness of triggers as triggers may change	May not be useful	N/A	Voluntary
Track weekly water demand during water shortage	Active	Internal to District/Authority	Monitoring	Feasible	Staff costs	Medium	Likely	Decreases unnecessary water use, only affects large users	May unintentionally target groups, may cause conflict	N/A	Mandatory
Consider emergency water sharing agreements	Active	Internal to District/Authority	Supply	Less feasible	Cost of lease	N/A	Unclear	Increases available water	Customers' costs may go up	N/A	Voluntary
Prioritize Homestake Exchange for Filling Accounts	Active	Internal to District/Authority	Supply	Feasible		N/A	Yes	Prevent multi-year drought issues		N/A	Mandatory
Prioritize Wolford/Green Mountain Exchange for Filling EPR	Active	Internal to District/Authority	Supply	Feasible		N/A	Yes	Prevent multi-year drought issues		N/A	Mandatory
Release Columbine Water	Active	Internal to District/Authority	Supply	Feasible		N/A	Yes	Prevent multi-year drought issues		N/A	Mandatory
Increase detection/repairs of major breaks (transmission lines)	Active	Internal to District/Authority	Supply	Feasible	Likely expensive	Low	Unclear	Ensures system is fully functioning	Cost is likely high, disruption to system while repairs are being done		Voluntary