



CENTENNIAL
WATER AND SANITATION DISTRICT

DROUGHT RESPONSE PLAN



2021

Mission: To provide safe, sustainable and reliable water and wastewater utility services to our customers with superior quality and value.

Vision: To set the standard of excellence for community-based water and wastewater utility services through innovative practices in finance, operations and resource management.

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The goal of a coordinated Drought Response Plan is to maintain the health, safety and economic vitality of the community to the extent possible. This Drought Response Plan (Plan) is designed to maximize available water supplies and reduce water use during times of water shortage caused by drought.

Providing a reliable supply of water, which is the central mission of Centennial Water and Sanitation District (Centennial Water), requires being prepared for droughts of varying degrees and duration. Proper planning before a water shortage occurs from drought allows for the selection of appropriate drought responses consistent with the varying severity of droughts.

This Plan outlines guidelines that Centennial Water will use to manage water supply and water use during a period of drought. These guidelines are designed to maintain the health, safety and economic vitality of the community; to avoid adverse impacts to public activity and quality of life for the community; and to consider the needs of differing customer categories as much as possible. The Plan also outlines communication strategies Centennial Water may implement during a period of drought.

Because each water shortage event from drought is different, developing a set of hard-and-fast rules to apply to all drought situations is not practical. Rather, these guidelines are intended to provide a framework for timely drought response while maintaining flexibility to respond to unique water-shortage conditions. The guidelines define objectives and tactics for drought responses that Centennial Water staff may recommend to the Centennial Water Board of Directors (the Board) for implementation. The Board may adjust or refine its response as it determines appropriate.

This Plan is a product of lessons learned from past drought conditions in Centennial Water's service area and the Denver metropolitan area and will be updated as needed. The Plan is in accordance with Centennial Water's Rules and Regulations (Article V, Water Conservation; Article VII, Violations, Penalties, and Complaints; and, Article VIII, Fees and Charges) and the Highlands Ranch Metropolitan District Rules and Regulations (Article VI, Water Conservation; Article VIII, Violations Penalties and Complaints; and, Article IX, Fees and Charges).

Centennial Water recognizes the need to develop a drought response plan that provides a menu of options that can be implemented to ensure Centennial Water can provide sufficient water for essential purposes in its service area. This Plan is also intended to be a guide for the Board to facilitate decision-making.

Drought response plan implementation is a dynamic process that evolves as conditions change and new information becomes available. This Plan includes specific mandatory measures and communication strategies that may need to be implemented when certain water-shortage conditions occur due to drought. All drought response actions taken by Centennial Water are subject to approval by the Board.

1.1 Drought Response Plan Components

The Plan consists of:

- Drought Severity Indicators – A variety of factors that should be considered in choosing an appropriate water-shortage response.
- Drought Response Tools – A description of the most common tools Centennial Water may use during a water shortage.

- Drought Response Actions – Guidelines for augmenting water supplies and reducing water use during times of drought conditions.

1.2 Defining Drought

A drought, in the most general sense, is a deficiency of precipitation over an extended period, resulting in a water shortage for some beneficial activity or environmental purpose. A water shortage from drought occurs when available water supply from anticipated runoff and storage is reduced to a level that supporting customer demands is at risk. Not knowing exactly when a drought begins, when it will end, and its severity makes uncertainty one of the defining characteristics of drought.

Drought is a normal, recurring feature of the climate in most parts of the world. Water shortages from drought can occur quickly and require immediate response or may occur gradually, with multiple months or years passing before any response is required. A variety of factors are at play in determining how long a drought response will be required.

1.3 Supply

Colorado's climate is generally characterized as semi-arid and, in the South Platte River basin, much of the water supply in the non-mountainous areas is dependent on the seasonal snowpack accumulation in the mountains that is then delivered to the various tributaries, diversion ditches, and storage reservoirs. Nontributary groundwater stored in the Denver Basin aquifers beneath Centennial Water's service area is also a source of supply, but this water is essentially nonrenewable.

Centennial Water's water supply includes both surface water and nontributary groundwater, which in most years is more than sufficient to meet the annual demands of Centennial Water's customers. The surface water supply is comprised of a combination of junior and senior water rights on the South Platte River, surface water leases, and storage rights. Centennial Water's surface water is stored in three reservoirs with a combined storage volume of more than 17,200 AF. However, in a dry year the estimated yield of surface water is only about 7,700 AF.

The nontributary ground water supply is stored in three Denver Basin bedrock aquifers beneath Highlands Ranch with an annual appropriation of about 18,000 AF. However, well pumping capacity limits the potential annual groundwater yield to approximately 8,000 AF to 9,000 AF, or from about 7.25 MGD to 8.0 MGD flow rate.

Shifts in weather patterns can be substantial from year-to-year and decade-to-decade, affecting both water supply and water use. Centennial Water constantly monitors reservoir levels and ensures they are managed effectively and efficiently.

1.4 Long-term Customer Water Efficiency Efforts

Centennial Water has always been committed to water efficiency and customer outreach. The water-use restrictions described in this Plan should not be confused with ongoing water efficiency efforts, described in Centennial Water's Water Efficiency Plan that can be viewed on Centennial Water's website. The Water Efficiency Plan is reviewed annually and updated at least every seven years. These efforts for all customers include the use of low water-use fixtures, creation of individual water budgets since 2003, an escalating rate structure and the following permanent lawn watering rules, which are summarized below (Highlands Ranch

Metropolitan District Rules and Regulations, Exhibit A-2, Water Conservation Measures):

- Water budgets specific for each property combined with a tier rate structure.
- No lawn watering with sprinklers from 10 a.m. to 6 p.m. from May 1 to September 30.
- No water waste by allowing it to pool in gutters or streets.
- No water waste by letting sprinklers spray on concrete and asphalt.
- Repair leaking sprinkler systems as soon as possible. (An irrigation system may be operated outside the watering schedule for installation, repair or reasonable maintenance, so long as the system is attended throughout the period of operation and water waste does not occur.)
- Hand-watering of landscape materials is allowed at any time as long as it is from a hand-held hose with a shut-off valve or from a water-conserving irrigation method (e.g. drip).
- Car washing is allowed at any time as long as either a bucket or hose with shut-off valve is used.
- Non-residential irrigation customers receiving water under a service agreement from Centennial Water must be equipped with rain sensing shut-off devices.

There will be times when drought response actions are needed in addition to standard water efficiency efforts. Water-use restrictions are one example of a response action that is reserved for water shortage events caused by drought; but such restrictions are not intended for long-term application. Restrictions are used to minimize the impacts to community safety and quality of life and to assist in the return of normal water-supply and storage levels. Water use restrictions will be lifted if the water-supply and storage levels return to normal or, in the case of a new normal for water availability, these restrictions, in part or whole, may become permanent as the Centennial Water service area adapts to new conditions.

Drought severity indicators can generally be divided into two categories: (1) water supply and (2) environmental, social and economic.

Drought severity indicators are used to inform and help guide Centennial Water's staff in its recommendations to the Board. During a period of drought, the Board will carefully consider each of the drought indicators in choosing the appropriate drought response actions. When considering these actions, the Board will take into account the severity and immediacy of the situation.

Drought severity indicators include, but are not necessarily limited to, the following:

- Current and projected reservoir storage levels (as a percentage of total volume) for:
 - Reservoirs used by Centennial Water
 - Downstream agricultural and municipal reservoirs
 - Upstream municipal reservoirs
- Watershed characteristics in the South Platte River basin, such as precipitation, snowpack, stream flow, and soil moisture:
 - Snowpack measurements in March, April, May and June
 - Average daily temperatures compared to long-term (30 yr) average
 - Precipitation received compared to long-term (30 yr) average
 - Local soil moisture deficit conditions (as a percentage saturation of normal) from federal, state and local sources
 - Flows at the South Platte at South Platte gage compared to average flows and forecasts for the summer months
- Water rights call history in the last 3-, 6- and 12-month periods
- Water use, including projected water use
- Weather forecasts:
 - Monthly outlook
 - Three-month outlook
 - Six-month outlook
- Actions taken by local, regional and/or state governments or other water suppliers regarding water use
- Drought response actions taken by state water officials
- Water availability conditions and/or drought conditions in the South Platte River basin
- Ambient water treatment capacity:
 - Algae conditions in each of the reservoirs used by Centennial Water
 - Filter run times at the Joseph B. Blake Water Treatment Plant
 - Other pertinent water quality or operational limitations
- System demand factors:
 - Measured and anticipated landscape irrigation demands as compared to the computed five-year average
 - Measured and anticipated evaporation losses as compared to long-term averages

2.1 Water Supply Indicators

Water supply indicators include snowpack, precipitation, average daily temperature, predicted reservoir storage, forecasted water use, evaporation, stream flow, soil moisture and weather forecasts. Centennial Water considers numerous drought indices such as, but not limited to, the U.S. Drought Monitor as published NDMC in conjunction with NOAA and USDA; the Surface Water Supply Index of the Natural Resources Conservation Service (SNOTEL); the Standardized Precipitation Index (SPI) as prepared by the National Center for Atmospheric Research and the University Corporation for Atmospheric Research; and, the Palmer Drought Severity Index, as published by the National Oceanic and Atmospheric Administration. Each tool integrates multiple measurements and is referenced as appropriate for a particular drought situation as water shortage indicators. The U.S. Drought Monitor provides a visual drought index and is often referenced in combination with other indices to determine a water shortage condition due to drought.

The use of drought indicators to inform Centennial Water's water shortage response due to drought varies by season. For example, from January through May, snowpack and early spring runoff are important indicators; from April through June, stream flow is an important indicator of likely senior calls on the South Platte River; and from June through December, reservoir storage, water use and precipitation in the South Platte basin are important indicators. Each drought event is unique, and the impact of each drought indicator can vary greatly based on the time of year.

Reservoir storage is the result of multiple factors affecting supply, including weather, snowpack, soil moisture, runoff, water rights, bypass requirements, collection system limitations and water use.

Aggregate reservoir storage in Centennial Water's surface-water system usually peaks in May or June during the early spring snowmelt. For this reason, forecasted system-wide June 1 reservoir storage is an important indicator for drought response during the runoff season.

System wide reservoir storage is forecasted and closely monitored throughout each year. Forecasts of reservoir storage are updated monthly. Predictions are based on measurements of snowpack, stream flows, bypass requirements, soil moisture, water usage, precipitation and the previous year's reservoir carryover storage.

Regardless of the water supply situation, Centennial Water staff routinely monitor hydrologic conditions, and this monitoring intensifies during dry periods. If conditions change after a water shortage and response have been declared, the declaration can be lifted, or the level of drought response can be adjusted.

2.1.1 Response Guidelines

There are no hard-and-fast relationships between reservoir storage and appropriate drought response. The Board will evaluate many factors in addition to reservoir storage when making its drought response decisions. A list of drought indicators the Board will consider can be found at the beginning of this section. The Board is not limited to just these indicators and may also use other tools, information and/or resources.

2.2 Environmental, Social and Economic Indicators

In addition to hydrologic data and reservoir storage information, Centennial Water's water-shortage response due to drought will take into account public perceptions about the water shortage, the drought response activities of other local, regional and/or state governments or water providers, media coverage and economic considerations. Although environmental, social, and economic indicators may not always be quantitative, they can be monitored and described for consideration in the Board's decisions about the appropriate drought response.

2.2.1 Response of Other Water Suppliers

Water shortages due to drought affect the water supplies of the Denver metropolitan area water providers in different ways. For example, systems, like Centennial Water, that rely principally on a single watershed (in Centennial Water's case, the South Platte basin) may be better or worse off during a drought, depending on localized water supply conditions. Additionally, metro-area systems, like Centennial Water, that partially rely on junior water rights could be impacted earlier or more severely than Denver Water's system.

The Board will weigh the effects of implementing restrictions on Centennial Water customers' water use if those restrictions differ from other utilities, either in timing or level of restrictions. Alternately, the Board may consider participating in a unified metropolitan area response with restrictions consistent with those of other utilities. Because of Denver Water's service area size, and corresponding local media influence, Denver Water's response decisions can influence the drought response decisions of other local water utilities, including Centennial Water.

Centennial Water is also mindful of water shortage conditions across Colorado, especially in the South Platte River basin.

2.2.2 Media Response

Much of the information customers receive about drought comes from traditional and social media outlets. Members of the news media can be helpful in conveying factual information to customers, and they also play a key role in shaping public perception of water shortage. Centennial Water staff will work closely with the news media, and share information via social media and Centennial Water's website to keep customers as informed as possible.

2.2.3 Economic Impacts

One of the principles guiding Centennial Water's drought response is to maintain the economic vitality of the Highlands Ranch community to the greatest extent possible. Water restrictions imposed in response to water shortage due to drought can impact businesses in different ways. Centennial Water recognizes our customers benefit from maintaining greenbelts and sports fields for recreational activities. As part of its public outreach efforts, Centennial Water will continue to carefully coordinate restriction programs with water-reliant governmental and commercial customers so that the economic activity of the community, recreation activities and other individual customer needs are considered as much as possible.

2.2.4 Environmental Effects

A water-shortage event due to drought that reduces stream flow within the South Platte River system will reduce inflows to Centennial Water's reservoirs. Water use restrictions, and subsequent reductions in customer water demand, support the conservation of water stored in

Centennial Water's reservoirs. However, water-use restrictions and subsequent reductions in customer usage in Centennial Water's service area will not directly result in increased water in the South Platte River. There are several factors that affect diversion rates from streams in the South Platte River basin, such as water right priority, reservoir storage levels, treatment plant operations, various operations and maintenance needs, and resiliency of water supply sources among other factors besides customer demand rates.

2.3 Uncertainty Associated with Forecasts

Although Centennial Water's water resources staff are continually monitoring weather reports and water shortage indicators throughout the year, future weather, precipitation and temperature cannot be predicted with absolute certainty. Forecasting a future drought and resulting water shortage or knowing with certainty if one currently exists can be difficult. When a dry year occurs, for example, it is unknown whether it is the first year of a three-, five-, 10-year or longer drought, or if it is merely a dry year somewhere in a series of average-to-wet years. Even though droughts cannot always be predicted, Centennial Water will continue to prepare for drought contingencies and continue to advise customers about water use efficiency, conservation and leak detection.

The Plan must be flexible to address both short-duration droughts lasting several consecutive months or long-duration droughts lasting multiple consecutive years. Water supply assumptions may remain largely static, with the exception of groundwater production, which may gradually decline over time as pumping levels in each well drops. Additionally, from time-to-time, some wells will be off-line for maintenance and equipment replacement.

Also, each of Centennial Water's surface-water leases include provisions allowing for some reduction in water delivery quantities, at the discretion of the lessor during drought conditions. Water deliveries from the WISE water project can also be reduced, or suspended all-together, during a severe drought.

3.1 Drought Response Plan Goals

In order of priority, the Plan goals to be achieved through improved water-use efficiency and conservation measures are as follows:

- Provide sufficient water supply to maintain the health, safety and economic vitality of the community; and, meet the indoor water requirements for all customers, but with a priority for hospitals, health clinics, residences, schools, government offices and businesses.
- Provide sufficient water supplies for the maintenance of heavily-used irrigated landscapes and facilities such as, but not limited to, school play areas, irrigated sports fields, golf courses, irrigated outdoor wedding venues, indoor recreation and athletic facilities, historic sites, botanic gardens and amphitheaters to the extent achievable depending upon the drought severity.
- Provide sufficient water supplies for the maintenance of irrigated residential property and parks to the extent achievable depending upon the drought severity.
- Provide sufficient water supplies for the maintenance of irrigated common areas such as government property within the community to the extent achievable depending upon the drought severity.
- Provide sufficient water supplies for the maintenance of irrigated commercial property to the extent achievable depending upon the drought severity.

3.2 Water-supply Assumptions

- Estimated build-out water demand: 19,500 acre feet AF/YR
 - Includes estimated billable demand: 17,000 AF/YR
 - Includes reservoir storage evaporation (including Chatfield Reservoir): 1,500 AF/YR
 - Includes potable water-system loss due to leaks, meter under-registration, hydrant flushing and sampling, and non-billed water usage: 1,000 AF/YR potable water system loss (6%)
- Reservoir storage capacity (including Chatfield Reservoir): 17,200 AF

Section 3 Goals and Assumptions

- Groundwater production into the water distribution system (after treatment and disinfection) as limited by existing well pumping capacity: 7.25 to 8 MGD; approximately 8,000 AF/YR to 9,000 AF/YR depending upon which wells are operating.
- Dry-year surface-water yield : 7,700 AF
- WISE deliveries: 0 to 1,000 AF/YR
- Desired minimum surface-water storage prior to the start of irrigation season: 6,000 AF
- Water production from wastewater treatment plant reuse system: 400 AF/YR current capacity

As water shortage indicators emerge due to drought, efforts to add water supplies and reduce water use increase.

This Plan consists of two components: the **indicators** that inform and help guide Centennial Water staff recommendations to the Board regarding an appropriate drought response, and the corresponding **tools** and **actions** the Board may decide to use and take in response to drought. Centennial Water has an inter-departmental drought response committee comprised of the general manager, director of finance, director of public works, director of operations, water resources manager, water rights administrator, water conservation and efficiency coordinator and manager of community relations who meet regularly throughout the year and monitor drought indicators and appropriate drought responses. The drought coordinator is the water rights administrator. When there is an ongoing water shortage due to drought, this committee will evaluate the effectiveness of any current drought response and the need for additional responses. Recommendations for adjusting the response will be submitted to the Board by the committee. Because every drought is different, the Board may refine drought response actions based on actual conditions, as determined by the Board.

The framework for the Board's drought response actions includes four stages of drought severity. Each stage is based on drought indicators, as well as various environmental, social and economic indicators discussed in the previous section.

4.1 Four Stages of Drought

For each drought stage, progressively more stringent responses are recommended. Some drought response measures — particularly those designated for mild episodes of drought — require minimal modification of customer usage. However, measures can become mandatory, more costly and potentially intrusive as water shortage intensifies due to drought. The four stages of drought include:

- Drought Watch – increased communication and education.
- Stage 1 Drought – mandatory water use restrictions, including limited outdoor watering.
- Stage 2 Drought – increased mandatory water use restrictions, including certain prohibitions on outdoor watering.
- Stage 3 Drought – prohibition of outdoor water use and potential water rationing.

To activate a particular drought stage, the Board in a public Board meeting declares a drought stage and adopts an effective date for imposing the applicable and appropriate restrictions. Because many water shortages due to drought involve mandatory restrictions, they must be consistent with and become enforceable pursuant to Centennial Water's Rules and Regulations and provisions in Centennial Water's water service agreements. The decision of the Board will be communicated to Centennial Water customers and other stakeholders, as provided in Appendix B.

Fact sheets for each of the four drought stages can be found in Section 5.2 of this Plan.

4.2 Toolbox of Drought Response

Centennial Water's primary response to drought is to reduce water use so supplies will be available for the most essential uses throughout the drought. Where possible Centennial Water will also take steps to augment supply. A variety of actions, rather than one single approach, is generally more effective at creating an overall atmosphere that promotes water use reductions. The actions discussed in the sections that follow include water use restrictions, drought pricing, water use education and enforcement, and monitoring and evaluation.

Restricting the number of days and times allowed for watering landscapes can be an effective method for reducing water use. Other methods, such as public information efforts and drought pricing, complement those watering restrictions. Other actions may not substantially reduce water use, but will heighten public awareness of drought severity and may eliminate discretionary uses of water.

4.2.1 Water Use Restrictions

Once the Board has declared a drought stage, Centennial Water will activate the corresponding set of recommended responses. Centennial Water's goal for drought response is to maintain the health, safety and economic vitality of the community to the extent possible in the face of water shortage caused by the drought.

The character of Centennial Water's service area and surrounding communities includes a verdant tree canopy, greenbelts, and important recreational amenities for the residents and visitors. Centennial Water will strive to avoid completely prohibiting outdoor water use to protect those resources during periods of water shortage due to drought. While Centennial Water staff and the Board recognize future uncertainties may limit the ability of Centennial Water to meet this goal, projects and programs will be put in place to reasonably maintain suburban landscapes, with a priority on public spaces that provide a community benefit.

Centennial Water, as directed by the Board, will strive to follow the principles below as much as practical when restricting outdoor water use during a water shortage caused by drought.

Avoid loss of natural resources.

- Allow for watering of trees and shrubs, if possible.
- Avoid damaging perennial landscaping, if possible.
- Tailor watering restrictions to known landscape needs as much as possible.

Restrict less-essential uses before essential uses.

- In Drought Stages 2 and 3, customers must follow Centennial Water's rules for outdoor water use throughout the entire year.
- Centennial Water will curtail less-essential outdoor water use before restricting essential outdoor use. For example, limiting or prohibiting irrigation of residential/commercial/government lawns first while allowing watering of trees and shrubs.

Prioritize the preservation of public and community spaces.

- Prioritize water use for heavily-used irrigated landscapes (as defined in Section 3).
- Preserve community pool use before residential pool use.

Minimize adverse financial effects to customers.

- Be respectful of water-based businesses that will be financially impacted by restrictions.

Implement extensive public information and media relations programs.

- Provide clear and accurate information to customers about conditions and actions they can take to reduce water use.
- Increase the frequency and modes of communicating with customers and stakeholders.
- Maintain the trust of customers and other stakeholders.
- Ensure communications and education are appropriate and tailored to the needs of customers, including strategies for communities that may have more challenges in receiving the information.

4.2.2 Drought Pricing

Drought pricing may be implemented as part of a drought response or declaration by the Board. Drought pricing is designed to increase awareness of the drought's severity and provide a motivation for customers to reduce water use, which will help meet water-use reduction targets through pricing signals. Drought pricing is different from the regular rate structures for water service in that it is temporary in nature. The drought declaration will define the criteria for implementing and removing drought pricing.

Centennial Water may consider several guiding principles in developing drought pricing, including, but not limited, to:

- The relationship between price, supply and demand reduction – that is how much of an increase is necessary to achieve a specific percent water demand reduction based on industry research or experience.
- Different rate structure adjustments for residential customers and irrigation only customers.
- Projected amount of time expected from the date of adopting drought pricing to a measurable reduction in water demand.
- The ability to incorporate drought pricing into an overall program to increase customer awareness of the drought's severity and importance of saving water.
- The applicability of drought pricing to current water demands or other demands on the water supply.
- The severity of the drought and response philosophies.
- The ability to integrate drought pricing into existing Centennial Water and master meter billing systems.
- Public information and education necessary to help customers understand drought pricing in a short timeframe.

4.2.3 Water Use Education and Enforcement

During a water shortage due to drought, Centennial Water will continue to educate customers about efficient water use, conservation, leak detection, the enforcement of water waste rules and drought restrictions, and help customers to save water. Centennial Water will also monitor its service area to identify non-compliance with drought restrictions. The primary goal of the program is to educate and inform customers and, secondarily, to enforce penalties against violators.

Centennial Water will distribute educational materials, help customers reduce their water use and answer questions about the water shortage caused by the drought. Customers are also able to

report water waste to Centennial Water's customer service department at 303-791-0430 or info@centennialwater.org. Violators may receive written warnings and may be fined for violations. All customers (owner or occupant of a property) are responsible for complying with drought restrictions and exemption terms.

4.2.4 Drought Response within Master Meter Districts

Northern Douglas County Water and Sanitation District (NDCWSD), which receives water from Centennial Water through a master meter, is governed by its service agreement with Centennial Water and as such must fully abide by any drought restrictions imposed by the Board. NDCWSD retains the right to make and enforce its own rules, including more restrictive rules, as long as the rules are not inconsistent with Centennial Water's Rules and Regulations.

4.2.5 Monitoring and Evaluation

When drought conditions emerge, staff will intensify its monitoring and evaluation activities. The monitoring and evaluation program will track information, such as snowpack, soil moisture, stream flow, precipitation, water right priority, reservoir levels, and weather forecasts. In addition, water usage and its corresponding revenue will be compared to normal use and weather-adjusted expected use. If water-use reduction goals are not being met, the Board may increase public outreach and/or the level of drought response.

4.2.6 Increasing Water Supply

In addition to reducing water use during a drought, Centennial Water will continue to evaluate the potential for increasing its supplies by gaining access to other water sources.

Each augmentation option presents unique intergovernmental, technical and financial issues, and each will depend on current conditions.

4.2.7 Use of Recycled Water

Centennial Water has the right to make additional use of its reusable water, as allowed by its water right decrees. Centennial Water has a recycling facility located at the Marcy Gulch Wastewater Treatment Plant that takes previously treated wastewater, treats it to state standards for recycled water, and delivers it to certain customers which are located near the Joseph B. Blake Water Treatment Plant, for irrigation purposes. At the present time, these customers include Redstone Park (Highlands Ranch Metro District), Highlands Ranch Golf Course and Windcrest.

Recycled water has different supply characteristics than potable water. Customers who use recycled water are subject to regulations on usage that do not apply to customers of potable water. In recognition of these differing circumstances, Centennial Water reserves the right to adopt different water use restrictions for recycled water customers, or to refrain from imposing any water use restrictions on recycled water customers, depending on the availability of the recycled water source at the time of a declaration.

5.1 Program Actions by Stage

The table of drought stages and potential responses in Appendix A is meant to be a guide to water uses under various levels of water-shortage restrictions because of drought. Centennial Water reserves the right to modify these program elements as needed to meet changing water-supply conditions.

5.2 Drought Response Fact Sheets

As discussed in Section 4.1, given below is a fact sheet for each of the 4 stages of drought that might be declared by the Board. The potential responses for each stage are described in both the fact sheet and in Appendix A.

5.2.1 Drought Watch: Increased Communication and Education; Possible Outdoor Water Use Restrictions

Description:

A Drought Watch will increase communication to customers to alert them that water supplies are below average, conditions are dry, and continued dry weather could lead to mandatory outdoor water use restrictions.

General Indicators (applicable for each of the four drought stages):

During a water shortage due to drought, each of the drought indicators will be carefully considered in choosing the appropriate drought response actions as determined by the Board. When considering these actions, the Board will take into account the severity and immediacy of the situation as determined by the Board.

Drought indicators include, but are not necessarily limited to, the following:

- Current and projected supply reservoir storage.
- Watershed characteristics in the South Platte River basin, such as daily average temperature trends, precipitation, snowpack, stream flow, evaporation and soil moisture.
- Water use, including projected water use.
- Weather forecasts and regional weather patterns.
- Actions taken by local, regional and/or state governments or water suppliers regarding water use.
- Drought response actions taken by state water officials.
- Water availability conditions and/or drought conditions in the South Platte River basin.

Specific Drought Watch Indicators for the Drought Watch stage:

1. Projected useable reservoir storage between 40% and 45% full (6,900 AF to 7,700 AF) on April 30.

2. Watershed characteristics, such as precipitation, snowpack, stream flow, evaporation and soil moisture, indicate abnormal and prolonged dryness.
3. Service-area precipitation indicates abnormal and prolonged dryness.
4. Other local, regional and/or state governments or water suppliers are preparing to respond to the dryness.
5. News media are sending messages that imply drought may be pending.
6. Customer water use is significantly above recent average.
7. Denver Water and other water providers in the Denver metropolitan area adopt a Drought Watch or similar response.
8. There are water availability issues and/or drought conditions inside of the South Platte River basin.

Use Reduction Target: 5% to 10% of customer average use (currently (2021) 16,500 AF/YR), or approximately 825 AF to 1,650 AF.

Potential Centennial Water Responses:

1. Increase communication and education to customers and stakeholders to explain that we are beginning to see indicators of drought (see the communications plan in Appendix B).
2. Encourage customers to continue to use water efficiently and provide suggestions for voluntarily reducing water use to reduce the risk of progressing to mandatory restrictions.
3. Prepare external stakeholders and internal staff for the possibility of mandatory restrictions.
4. Enhance the water use education and enforcement program.
5. Employ voluntary “drinking water upon request” program for food service operations.
6. A table of drought stages and potential responses is presented in Appendix A.

Note: See Appendix C for potential response impacts to irrigated properties owned and managed by the Highlands Ranch Metro District.

5.2.2 Stage 1 Drought Response: Mandatory Outdoor Water Use Restrictions, Including Limited Outdoor Watering

Description:

A Stage 1 Drought Response imposes mandatory outdoor water use restrictions and requires greater effort on the part of customers. The Board will adopt a plan to set specific customer watering days once they declare Stage 1 restrictions. Stage 1 allows for one or two day(s) per week watering.

General Indicators: Same as General Indicators listed in 5.2.1, Drought Watch Stage

Specific Stage 1 Drought Indicators:

1. Projected useable reservoir storage between 30% and 40% full (5,200 AF to 6,900 AF) on April 30.
2. Watershed characteristics, such as precipitation, snowpack, stream flow, evaporation and soil moisture, indicate severe and prolonged dryness.
3. Other local, regional and/or state governments or water suppliers are planning to enact mandatory restrictions.
4. Customers believe that mandatory water use restrictions are appropriate.
5. State water officials are engaged in drought response activities.
6. Circumstances warrant possible adverse impacts on water-dependent businesses involved in outdoor water use.
7. Customer water use is significantly above recent average.
8. There are water availability issues and/or drought conditions inside of the South Platte River basin.

Use Reduction Target: 15% to 20% of customer average use (currently (2021) 16,500 AF/YR), or approximately 2,500 AF to 3,300 AF.

Potential Centennial Water Responses:

1. Increase communication and education to customers and stakeholders to explain Stage 1 Drought restrictions (see the communications plan in Appendix B).
2. Existing watering rules will still be in effect as specified in Centennial Water's Water Efficiency Plan; monitoring and enforcement will be increased.
3. Outdoor watering shall be limited to one or two day(s) per week.

Section 5 Drought Response Actions

Below is a sample of what a watering schedule could look like:

Example: 2-day per week watering schedule	
Single-family and small multi-family (less than 7 units) residential properties with odd-numbered addresses	Sunday Wednesday
Single-family and small multi-family (less than 7 units) residential properties with even-numbered addresses	Saturday Tuesday
Multi-family (7 or more units) and apartment properties	Monday Thursday
Office Buildings	Tuesday Friday
Properties that are managed for the sole enjoyment and recreation of the public, including parks and schools	Any day(s) of the week, but entities must stay equal to or under their water budget
All others	Monday Friday

4. Trees, shrubs, and perennials may be watered by means of a hand-held hose or low-volume non-spray irrigation on any day, but not between 10 a.m. and 6 p.m. during all months of the year.
5. Annuals and vegetables may be watered any day by means of a hand-held hose or low-volume non-spray irrigation, but not between 10 a.m. and 6 p.m. during all months of the year.
6. An irrigation system may be operated outside the watering schedule for installation, repair, or reasonable maintenance, so long as the system is attended throughout the period of operation and water waste does not occur. All irrigation control systems must be reprogrammed for operation in compliance with the Stage 1 Drought watering schedule approved by the Board or must be operated manually.
7. Voluntary “drinking water upon request” program for food service operations.
8. A table of drought stages and potential responses is presented in Appendix A.

Note: See Appendix C for potential response impacts to irrigated properties owned and managed by the Highlands Ranch Metro District.

Drought Pricing:

A Stage 1 Drought pricing program may be used to increase awareness of the drought’s severity and assist in meeting water-use reduction targets through pricing signals.

5.2.3 Stage 2 Drought Response: Increased Mandatory Water Use Restrictions, Including Certain Prohibitions on Outdoor Watering.

Description:

A Stage 2 Drought Response imposes mandatory outdoor water use restrictions on Centennial Water's customers. The Board will adopt a plan to set specific customer watering days once they declare Stage 2 restrictions. Stage 2 allows at most for one day per week watering. Stage 2 Drought restrictions are severe and may result in damage to or loss of landscapes.

General Indicators: Same as General Indicators listed in 5.2.1, Drought Watch Stage

Specific Stage 2 Drought Indicators:

1. Projected useable reservoir storage between 25% and 30% full (4,300 AF to 5,200 AF) on April 30.
2. Watershed characteristics, such as precipitation, snowpack, stream flow, wind and soil moisture, indicate extreme and prolonged dryness.
3. Other local, regional and/or state governments or water suppliers have enacted or are considering severe restrictions on outdoor water use.
4. Customers believe that increased mandatory water use restrictions are appropriate.
5. State water officials have declared a drought emergency.
6. Lack of water begins restricting some water-dependent businesses.
7. Customer water use is significantly above recent average.
8. Drought conditions inside of the South Platte River basin.

Use Reduction Target: 25% to 35% of customer average use (currently 16,500 AF/YR), or approximately 4,100 AF to 5,800 AF.

Potential Centennial Water Responses:

1. Increase communication and education to customers and stakeholders to explain Stage 2 water use restrictions (see the communications plan in Appendix B).
2. Existing watering rules will still be in effect as specified in the Centennial Water's Water Efficiency Plan; monitoring and enforcement will be increased.
3. Outdoor watering shall be limited to one day per week.
4. Existing trees, shrubs and perennials may be watered by means of a hand-held hose or low-volume non-spray irrigation no more than once a week in accordance with the schedule set forth in the declaration. Such irrigation may not occur between the hours of 10 a.m. and 6 p.m. during all months of the year. No new trees, perennials, or shrubs may be planted.

Section 5 Drought Response Actions

5. Existing annual and vegetable plantings in household and community gardens may be watered any day of the week by means of a hand-held hose or low-volume non-spray irrigation. Such irrigation may not occur between the hours of 10 a.m. and 6 p.m. during all months of the year. No new annual or vegetable plantings may be planted.
6. An irrigation system may be operated for installation or repair, so long as the system is attended throughout the period of operation and water waste does not occur.
7. Mandatory “drinking water upon request” program for food service operations.
8. A table of drought stages and potential responses is presented in Appendix A.

Note: See Appendix C for potential response impacts to irrigated properties owned and managed by the Highlands Ranch Metro District.

Drought Pricing:

A Stage 2 Drought pricing program may be used to increase awareness of the drought’s severity and assist in meeting water-use reduction targets through pricing signals.

5.2.4 Stage 3 Drought Response: General Prohibition of Outdoor Water Use and Potential Water Rationing

Description:

A Stage 3 Drought Response activates a general prohibition of outdoor water use for Centennial Water's customers. Conditions that would lead to a Stage 3 Drought are highly unlikely. However, if conditions warrant, the Board may also implement a rationing program for an indefinite period of time to ensure, to the extent possible, that there is adequate water for essential uses (e.g., domestic indoor use). Stage 3 Drought restrictions may have an adverse effect on the quality of life in Centennial Water's service area, including the long-term loss of landscapes.

General Indicators: Same as General Indicators listed in 5.2.1, Drought Watch Stage

Specific Stage 3 Drought Indicators:

1. Projected useable reservoir storage less than 25% full (less than 4,300 AF) on April 30.
2. Watershed characteristics, such as precipitation, snowpack, stream flow, wind and soil moisture, indicate exceptional and prolonged dryness.
3. Other water suppliers are rationing water.
4. News media are sending messages that we are in a crisis situation.
5. Customers believe we are in a crisis situation.
6. Elected officials are saying that water rationing is appropriate.
7. The situation suggests that severe impacts to water-dependent businesses are unavoidable.
8. There are drought conditions inside of the upper Colorado River or South Platte River basins.

Use Reduction Target: 35% to 50% of customer average use (currently 16,500 AF/YR), or approximately 5,800 AF to 8,200 AF.

Potential Centennial Water Responses:

1. Increase communication and education to customers and stakeholders to explain Stage 3 Drought restrictions (see the communications plan in Appendix B).
2. A Stage 3 Drought activates a general prohibition of outdoor water use, including watering trees, shrubs, perennials and vegetables.
3. A Stage 3 Drought also activates a potential rationing program for Centennial Water's customers. The Board may implement a rationing program for an indefinite period of time to ensure, to the extent possible, there is adequate water for essential uses (e.g., domestic indoor use). Voluntary residential and commercial indoor water use reductions will be emphasized through extensive outreach efforts including contacts with customers who have

a history of indoor use over 120% of historic averages.

4. Monitoring and enforcement will be rigorous.
5. A table of drought stages and potential responses is presented in Appendix A.

Note: See Appendix C for potential response impacts to irrigated properties owned and managed by the Highlands Ranch Metro District.

Drought Pricing:

A Stage 3 Drought pricing program shall be used to achieve water-use reduction targets through pricing strategies that will provide a clear incentive for customers to make lifestyle changes with irrigation practices and indoor use through economic impacts to their cost of water.

Appendix A Table of Drought Stages and Potential Responses

The table below is meant to be a guide to water uses under various levels of water shortage restrictions. Centennial Water reserves the right to modify these program elements as needed to meet changing water supply conditions.

<i>Element</i>	<i>Normal</i>	<i>Drought Watch</i>	<i>Stage 1</i>	<i>Stage 2</i>	<i>Stage 3</i>
Outdoor Watering and Irrigation					
Turf grass irrigation	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; restricted to 1 or 2 days per week	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; restricted to 1 day per week	Prohibition of outdoor water use
Irrigation of new turf grass from seed or sod	Additional water budget and daytime watering allowance in April/May or Sept/Oct by permit only	Additional water budget and daytime watering allowance in April/May or Sept/Oct by permit only	No additional water budget available; Daytime watering allowance in April/May or Sept./Oct. by permit only	No additional water budget or daytime watering allowance for daylight hours.	Prohibition of outdoor water use
Irrigation of trees, shrubs, perennials, flowers and community vegetable gardens	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; restricted to 1 or 2 days per week	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; restricted to 1 day per week	Prohibition of outdoor water use

Element	Normal	Drought Watch	Stage 1	Stage 2	Stage 3
Irrigation of sports fields, wedding venues, historic sites, botanic gardens, amphitheaters and golf courses	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; All are exempt from daily restrictions but subject to obligation of reducing overall water use from water budgets by 20%.	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; All are exempt from daily restrictions but subject to obligation of reducing overall water use from water budgets by 35%.	Prohibition of outdoor water use
Irrigation of common area landscapes, parks, greenbelts and school playgrounds	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30); hand watering with shut-off nozzle and maintenance allowed any time; a water-conserving method (drip, trickle, micro-spray, deep-root, or watering can) can be used any time.	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; All are exempt from daily restrictions but subject to obligation of reducing overall water use from water budgets by 20%.	Same as Drought Watch and no sprinkler irrigation from Oct. 1 through Apr. 30; All are exempt from daily restrictions but subject to obligation of reducing overall water use from water budgets by 35%.	Prohibition of outdoor water use
Turf grass sprinkler irrigation using treated reuse water and raw water from selected orphan wells	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30)	Sprinkler irrigation prohibited from 10 a.m. to 6 p.m. (May 1 to Sept. 30)	Same as Drought Watch and no irrigation from Oct. 1 through Apr. 30; restricted to 1 or 2 days per week.	Sprinkler irrigation prohibited from 10 AM and 6 PM (May 1 through Sept. 30); no irrigation from Oct. 1 through Apr. 30	Prohibition of outdoor water use

Element	Normal	Drought Watch	Stage 1	Stage 2	Stage 3
Water budgets	Normal allocated budget	Normal allocated budget	Normal allocated budget	Normal allocated budget	Prohibition of outdoor water use
Water Features					
Unlined ponds	Filled using approved backflow	Filled using approved backflow	No filling allowed unless used for irrigation	Not allowed	Prohibition of outdoor water use
Swimming pools/lined ponds	N/A	N/A	N/A	N/A	Prohibition of outdoor water use
Spray grounds/ wading streams/ water play features	N/A	N/A	Prohibited	Prohibited	Prohibition of outdoor water use
Outdoor ornamental water features (fountains, waterfalls, etc).	N/A	N/A	Prohibited	Prohibited	Prohibition of outdoor water use
Outdoor misting devises	N/A	N/A	Prohibited	Prohibited	Prohibition of outdoor water use
Washing/Events					
Cars - washing at home	With bucket or hand-held hose with shut-off nozzle	With bucket or hand-held hose with shut-off nozzle	With bucket or hand-held hose with shut-off nozzle	Not allowed	Prohibition of outdoor water use
Cars - commercial car washes (drive-through and self-service)	N/A	N/A	N/A	N/A	Prohibition of outdoor water use
Charity events car washes	With bucket or hand-held hose with shut-off nozzle	With bucket or hand-held hose with shut-off nozzle	With bucket or hand-held hose with shut-off nozzle	Not allowed	Prohibition of outdoor water use

Element	Normal	Drought Watch	Stage 1	Stage 2	Stage 3
Street cleaning equipment	N/A	N/A	N/A	NA	Prohibition of outdoor water use
Washing/impermeable outdoor surfaces	NA	NA	NA	NA	Prohibition of outdoor water use; use dry clean-up methods only
Commercial-Industrial processes					
Restaurants	N/A	N/A	Voluntary participation in the "water served only on request" program. Participants asked to comply with Centennial's signage standards.	Voluntary participation in the "water served only on request" program. Participants asked to comply with Centennial's signage standards.	Voluntary participation in the "water served only on request" program. Participants asked to comply with Centennial's signage standards.
Lodging	N/A	N/A	N/A	Innkeepers requested to limit laundry services	Innkeepers requested to limit laundry services
Construction water	N/A	N/A	Best management practices; no water waste; permit rescinded for violations.	Best management practices; no water waste; permit rescinded for violations.	Prohibition of outdoor water use
Hydrant special use permits	N/A	N/A	Limited uses only; permit rescinded for violations	Limited uses only; permit rescinded for violations	Prohibition of outdoor water use

Appendix B

Drought Communications and Education Plan

This plan focuses on communicating with our customers to provide information about drought response and water conservation measures. Community Relations staff will work with fellow staff to determine the timely, evolving messaging, as appropriate for conditions. We will use the following communications channels and activities to educate customers about the measures noted below:

Normal Conditions

The Community Relations staff will provide information about drought conditions and strategies, water supply, conservation and usage through these channels, as we have in the past under normal conditions.

Websites – Communicate through the Centennial Water, Metro District, HRCA, Douglas County, Chamber of Commerce and Douglas County Libraries websites.

eNewsletters – There are more than 10,000 contacts in our water conservation eNewsletter list. This is sent out monthly, approximately the third week of each month. Frequency can be increased and a specific theme can be created for special messaging as needed.

Water Wise Guide – Mailed to all customers in early April and an electronic version is posted to the website. This resource guide can include special messages based on conditions. We have discussed adjusting the appearance of the Water Wise Guide for drought conditions.

Water Quality Report – Mailed to all customers and posted to the website in April, this document can also include special messaging.

Social Media – A social media editorial plan can be customized, based on conditions, for both Centennial Water's and the Metro District's Facebook pages. Specific drought messaging and educational articles can also be posted on Centennial Water's LinkedIn account. The Metro District's social media accounts, which include, Facebook, Nextdoor, Twitter, LinkedIn and Instagram, can also be used to communicate key messages.

Messenger magazine – Articles and key messages can be included in the *Metro District Messenger*, which is published four times annually -- in early January, mid-March, early July and early October. It is mailed to all Highlands Ranch homes, posted to the Metro District website, and distributed to all recreation centers and local businesses.

Postcards featuring targeted, timely messaging – Develop and mail targeted messaging to all customers.

Create educational flyers and posters to display around community – Post at high profile locations including parks, recreation centers, library, Chamber of Commerce and local businesses.

Newspaper articles, letters to the editor and editorials – Pitch articles or submit letters to the editor on specific drought topics to local newspapers and media, or ask newspaper editor to write an editorial on the importance of drought response.

Events – Share information/timely key messages and create educational activities and displays at volunteer projects and community events. Specifically at KidFest, Ice Cream Social and the

Holiday Celebration. Depending on staff availability, we can investigate the coordination of having booths at other organizations' community events: farmer's markets, library events, etc.

Conservation magnets on fleet vehicles – Throughout the spring and summer, magnets featuring a simple conservation theme will be displayed on fleet vehicles traveling the community. This would be a traveling billboard.

Community message board signs – Located along major streets throughout the community, we can target messages as needed, and as space is available on the signs. Contact HRCA about posting to their signs in front of recreation centers.

Targeted messaging to customers exceeding water budgets – We can design specific communications and/or door hangers to target those customers who have exceeded their water budgets. These items could be mailed.

Attachments to water bills – Paper flyers in mailed water bills and pdf files attached to eBills can target specific messaging.

External eNewsletters – Send consistent messaging and graphics to other organizations for inclusion in their eNewsletters and email blasts: HRCA, Chamber of Commerce, Douglas County Libraries and HOAs.

Spring webinars on conservation – Scheduled for May 5 at 5:30 p.m.

Online drought resource center – Develop an online drought resource center at centennialwater.org. This could be designed similar to the Open Space Information Center, located at <https://www.highlandsranch.org/explore/open-space-trails/open-space-information-center>

Water Shortage Watch Measures

All of the above standard communications strategies, plus the strategies below. This will be determined through timely discussions based on conditions and messages to be shared.

Design a resource card for field staff to distribute to customers – This card will include key messages, contact information, conservation tips, website and social media contact information.

Create video messaging or PSAs – Create brief, 30 – 60 second, public safety announcements that share information about stage 1 measures. Can be shared via social media, website, eNewsletters, and more.

Stage 1 Measures

All of the above standard communications strategies, plus the strategies below. This will be determined through timely discussions based on conditions and messages to be shared.

Enhance the online drought resource center – A resource center can be enhanced on Centennial Water's website with links to key resources, both on our website and on other industry websites. Communications will be enhanced to direct customers to this online resource center.

Ramp up Communications in Other Organizations' Newsletters – Newsletter articles and

messaging can be shared with the HRCA, the Chamber of Commerce, Douglas County Libraries and sub HOAs.

Develop key messages for landscape companies – Based on specific conditions, these messages will be targeted specifically to landscape companies.

Partner with local restaurants to offer table tents – The table tents will feature drought-related messages to customers.

Community open house – Coordinate a community open house where we will share information about stage 2 measures, drought information, why we are in a drought, tips homeowners can implement to conserve water at home, etc.

Lunch & Learn – Organize 45 minute to one-hour long educational lunch and learn sessions for both employees, and externally, for water customers. This is an opportunity to share information about the current drought, our water supply and tips homeowners can implement to conserve water at home.

Stage 2 Measures

All of the above standard communications strategies, plus the strategies below. This will be determined through timely discussions based on conditions and messages to be shared.

Postcard mailings – Regular postcards with timely messaging can be sent to all customers to provide timely updates on evolving drought conditions.

Coordinate regional messaging with fellow local water providers – Monitor and align our messaging with Douglas County and regional water providers to coordinate similar messaging, as necessary and as is practical.

Local Media – Contact will be made, with a greater sense of urgency/importance, as needed, with the *Highlands Ranch Herald*, television and radio news stations and other local media.

Stage 3 Measures

All of the above standard communications strategies, plus the strategies below. This will be determined through timely discussions based on conditions and messages to be shared.

Advertising – Pay for advertising in print publications like the *Highlands Ranch Herald*, or on movie screens, and busses traveling Highlands Ranch routes, etc.

Appendix C

Highlands Ranch Metro District Responses and Challenges for Various Stages of Drought

The Highlands Ranch Metropolitan District (Metro District) is a major water user in the Highlands Ranch community and, since it is also a governmental entity and leader, its vigorous response to drought will be a key leadership role and visible leadership example for the community. Below is a detailed articulation of the various responses and the challenges those responses result in for each drought response stage for the Metro District:

Water Shortage Watch

Response:

- Reduce overall water consumption in parks and parkways by 10%

Challenges:

- Increase in dry spots and dormant areas in grass
- Possible increase of turf disease such as Ascochyta
- Possible increase in tree disease/pests

Stage 1

Response:

- Reduce overall water consumption in parks and parkways by 20%
- Reduce watering of passive areas in parks while maintaining sports fields at safe levels
- Raise mowing heights from three to four inches in parks (parkways is already four inches)
- Reduce mowing frequency when possible in parks and parkways
- Eliminate fall lawn aeration in parks and parkways if condition too dry
- Reduce nitrogen fertilizer applications in parks
- Defer annual flower planting
- Defer large landscape restoration projects
- Supplement water to new trees with direct watering devices
- Turn off non-interactive water features/fountains

Challenges:

- Increase in dry areas and dormant landscape; prolonged 20% water reduction will result in some loss of turf due to desiccation
- Increased weed control due to reduced cultural practices and reduced watering
- Increased scarring to parkway landscape if unable to restore damage created by utility contractors
- Increase of turf disease such as Ascochyta
- Increase of tree disease/pests
- Unable to water the entirety of most sites if only able to water on certain days of the week due to size of most irrigation systems. Would likely need a variance to water on most days as long as 20% water reduction goal still being met

Stage No. 2

Response:

- Reduce overall water consumption in parks and parkways by 35%
- Reduce watering of passive areas in parks while maintaining sports fields at safe levels
- Raise mowing heights from three to four inches in parks (parkways is already four inches)
- Reduce mowing frequency when possible in parks and parkways
- Eliminate fall lawn aeration in parks and parkways if condition too dry
- Reduce nitrogen fertilizer applications in parks
- Defer annual flower planting
- Defer large landscape restoration projects
- Supplement water to new trees with direct watering devices
- Turn off non-interactive water features/fountains

Challenges:

- Increase in dry areas and dormant landscape; prolonged 35% water reduction will result in significant loss of turf due to desiccation and tree/shrub damage
- Increased weed control due to reduced cultural practices and reduced watering
- Increased scarring to parkway landscape if unable to restore damage created by utility contractors
- Increase of turf disease such as Ascochyta
- Increase of tree diseases
- Unable to water the entirety of most sites if only able to water on certain days of the week due to size of most irrigation systems. Would likely need a variance to water on most days as long as 35% water reduction goal still being met
- Unable to water large trees with direct watering devices, above ground irrigation is the best means to water large trees due to expansive root systems and high volume of mature trees

Stage No. 3

Response:

- Shut down all irrigation systems
- Defer all cultural practices activities
- Defer all mowing operations
- Defer all landscape projects
- Turn off non-interactive water features/fountains
- Shut down interactive water features

Challenges:

- Irreversible damage to most plant material
- Cancellation of most sports programs
- Significantly impactful to Mansion rentals/programming
- Significantly impactful to shelter rentals
- Significant loss in revenue from cancellations
- Imminent loss of jobs
- Plan for increased costs for multiyear rehabilitation of landscape