

Drought Management Plan

Purpose: Clemson University Drought Management Plan
Period: 2021 to 2022
Prepared: July 20, 2021
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To: Interested Parties

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Section I: Declaration of Purpose and Intent

The Clemson University Water System understands the fundamental need to make efficient use of the limited and valuable water resource under its stewardship to protect the public's health and safety and environmental integrity. The purpose of this document is to establish a plan and procedures for managing water demand and evaluating supply options before and during a drought-related water shortage. The intent is to satisfy the requirements of the Drought Response Act of 2000 (Code of Laws of South Carolina, 1976, Section 49-23-10, et seq., as amended) with the goal of achieving the greatest public benefit from domestic water use, sanitation, and fire protection and to provide water for other purposes in an equitable manner. Therefore, the Clemson University Water System has adopted this Drought Management Plan that provides the policies and the authority to fulfill this obligation. The Drought Management Plan outlines the framework by which the Clemson University Water System will internally prepare for water shortages. This plan provides the regulations by which the Clemson University Water System will manage and control its customer water usage during various levels of a drought.

Section II: Definition of Terms

For the purposes of this Plan and the accompanying Ordinance, the following definitions will apply:

Aesthetic Water Use: Water use for ornamental or decorative purposes such as fountains, reflecting pools and waterfalls.

Commercial and Industrial Use: Water use integral to the production of goods and/or services by any establishment having profit as its primary aim.

Conservation: Reduction in water use to prevent depletion or waste of the resource.

Customer: Any person, company or organization using finished water owned or supplied by the Clemson University Water System.

Domestic Water Use: Water use for personal needs or for household purposes such as drinking, bathing, heating, cooking, sanitation or for cleaning a residence, business, industry or institution.

Drought Alert Phases: There are four drought alert phases to be determined by the Drought Response Committee for the State of South Carolina. The four phases are:

- 1) Incipient Drought
- 2) Moderate Drought
- 3) Severe Drought
- 4) Extreme Drought

Drought Response Management Areas: There are four drought management areas corresponding to the major river basins in South Carolina. The four areas are:

- 1) West or Savannah
- 2) Central or Santee
- 3) Northeast or Pee Dee
- 4) Southern or Ashepoo, Combahee, and Edisto.

To prevent overly broad response to drought conditions, drought response measures shall be considered within individual drought management areas or within individual counties, as applicable.

Drought Response Committee: A committee composed of State and local representatives created for the purpose of coordinating responses to water supply shortages within Drought Management Areas and making recommendations for action to the South Carolina Department of Natural Resources and/or the Governor. The Committee is composed of State agency representatives from the South Carolina Emergency Management Division of the Office of the Adjutant General, South Carolina Department of Health and Environmental Control, South Carolina Department of Agriculture, South Carolina Forestry Commission, and South Carolina Department of Natural Resources, as well as local committees representing counties, municipalities, public service districts, private water suppliers, agriculture, industry, domestic users, regional councils of government, commissions of public works, power generation facilities, special purpose districts and Soil and Water Conservation Districts. (See Attachment A)

Essential Water Use: Water used specifically for firefighting, maintaining in-stream flow requirements and to satisfy Federal, State or local public health and safety requirements.

Finished Water: Water distributed for use after treatment. The terms "water use," "water user," and "water customer" refer to finished water use unless otherwise defined.

Institutional Water Use: Water used by government, public and private educational institutions, churches and places of worship, water utilities, and organizations within the public domain.

Irrigation Water Use: Water used to maintain gardens, trees, lawns, shrubs, flowers, athletic fields, rights-of-way and medians.

Non-essential Water Use: Categories of water use other than Essential Water Use. Examples of non-essential water use include landscape irrigation and the washing of buildings, parking lots, automobiles, etc.

Residential Equivalent Unit (REU): An equivalency unit defined to be equal to one single- family residence. Clemson University Water System's allocated water capacity equals 300 gallons per day per REU.

SC Dept. of Natural Resources: The State agency with primacy to implement the provisions of the Drought Response Act.

Water Supply Shortage: Lack of adequate, available water caused by drought to meet normal demands.

Section III: Drought Management Plan

- A. Introduction:** To ensure that Clemson University Water System adequately manages its water system during drought-related conditions, an organized plan is necessary for system operation and reliability, proper communications, effective coordination, and ultimate allocation of water use. Prior planning will complement the Clemson University Water System ability to respond to drought conditions and to enforce the Drought Management Plan.
- B. Designation of Water System Drought Response Representative:** Administrating a Drought Plan requires the skills needed to undertake a comprehensive public information program and the judgment required to deal with equity issues arising from enforcement of a mandatory program. Someone who has these skills will be selected by the water system to manage the water system's program and serve as the principal contact for the news media as the water system's Drought Response Representative. The Drought Response Representative for the Clemson University Water System is:
- Jarred L. Fleming, PE, PLS
Clemson University
310 Klugh Avenue
Clemson, SC 29634
(864) 364-4437
Email: jarredf@clemson.edu

- C. Description of Water System Layout, Water Sources, Capacities and Yields:**
The Clemson University (CU) Water System is located in the West (Savannah) Drought Response Management Area of South Carolina. The system serves Clemson University main campus and a few adjacent properties. The system lies within the area bounded by SC Highway 93, Perimeter Road, and US Highway 76. The system serves the following:

Total students housed in dormitories and apartments:	8,316
Other (President's Residence):	4
Total:	8,320

During the Spring and Fall semesters the number of students, faculty, and staff totals 31,991. On football Saturday's the population of the campus exceeds 80,000.

The system is a master-metered (consecutive) system that is supplied by a 24-inch line from a treatment plant located on Lake Hartwell that is operated by the Anderson Regional Joint Water System (ARJWS). The CU Water System owns and operates two (2) elevated tanks with a total storage capacity of 1,300,000 gallons. The contract with ARJWS specifies two supply points (main campus and Fants Grove) and a minimum flow rate such that:

- Minimum allowable pressure at the three metering points would be sufficient to fill the elevated tanks to an elevation of 945.6 MSL.
- A maximum daily usage of 2.00 MGD at the lower tier of the rate schedule.
- The main campus is also serviced by a 6" back-up connection from Seneca Light & Water located on Lake Keowee capable of supplying the campus with 300,000 gallons per day.

D. Identification of Water System Specific Drought or Water Shortage Indicators: Operators of every water system must develop historical trends that are valuable indicators of a system's ability to meet demand when demand begins to outpace supply. The ARJWS has developed triggers for use during drought or demand water shortages that describe when specific phases of the Drought Response Ordinance are implemented. The system triggers are as follows:

Moderate Drought Phase

1. Lake Hartwell elevation is less than 652 ft. MSL, and/or
2. ARJWS notifies Clemson University that their system is in the Moderate Drought Phase and/or

Severe Drought Phase

1. Lake Hartwell elevation is less than 646 ft. MSL, and/or
2. ARJWS notifies Clemson University that their system is in the Severe Drought Phase and/or

Extreme Drought Phase

1. Lake Hartwell elevation is less than 638 ft. MSL, and/or
2. ARJWS notifies Clemson University that their system is in the Extreme Drought Phase and/or

E. Cooperative Agreements and Alternative Water Supply Sources: Clemson University has an agreement with Seneca Light and Water as an alternate (emergency) water supply source. This source is to supply the campus with 300,000 gallons per day which is required for Insurance Services Office (ISO) Fire Flow Storage Requirements.

F. Description of Pre-Drought Planning Efforts: Before the occurrence of a water supply shortage and the need to implement the emergency provisions of the Ordinance, it is important that certain pre-response measures be taken with the aim of conserving the system's source water, as well as the water distributed to the customer. In regard to the conservation measures listed below, the CU Water System has taken the following actions:

1. Identification of all major water users of the system (top 10%, include wholesale water customers):
 - Campus Central Chilled Water Plants
 - Campus Dining Halls
 - Campus Research Buildings
 - Central Energy Steam Plant and Duke Energy CHP
 - Residence Halls
 - Cooper Library Spray Pond
 - Wastewater Treatment Plant
 - Athletic and Intramural Field Irrigation
2. Identification of those uses with whom there are conservation agreements: Not applicable.
3. A vigorous public education program is critical for achieving substantial water use reductions. An effective public outreach program will keep the public informed about the water supply situation, what actions will mitigate drought emergency problems, and how well the public is doing in terms of meeting the program goals. Keeping the public involved, informed, and participating in the decision-

making process is key to implementing an effective Drought Management Plan. Provide a description of your utility's efforts to develop an effective drought- related public education program:

The Clemson University Water System will supply information to the main campus through Clemson University News Services. Information to the water system customers will be conveyed via email, the faculty/staff newsletter Inside Clemson, and public announcements through local radio, television, and newspapers. Information to residents of dormitories and apartments will be prepared in consultation with News Services and the Department of Housing. Information to off campus business customers will be disseminated by Clemson University Utility Services.

- Irrigation water customers (University Landscape Services and Athletics Department) will be notified by Utilities Services regarding curtailments.
- Audits of annual water consumption data will be accomplished by Utilities Services.
- Irrigation will occur at night to minimize evaporation and reduce peak loads on pumping and storage facilities. Automated solenoid valves will also be utilized to reduce consumption.
- Low flow fixtures are utilized in University Housing.

G. Description of Capital Planning and Investment for System Reliability and Demand

Forecasting: In partnership with Seneca Light and Water, Clemson University contracted the services of Goodwyn-Mills-Cawood to conduct a study of Clemson elevated tank in Ravenel and back-up sources of water. Completion of this study resulted in both parties agreeing to and completing the installation of a back-up water connection which can serve portions of both water systems with 300,000 gallons per day in the event of emergencies.

H. Description of other system improvements the Utility should consider preparing for future droughts and increasing water demands:

The amount of water available to the Clemson University Water System during periods of drought is dependent on the following factors:

- Elevation of Lake Hartwell relative to the ARJWS water intake (the elevation is the responsibility of the USCOE)
- ARJWS treatment plant capacity
- ARJWS elevated storage and pumping capacity
- Policies of SC DHEC relative to dilution of wastewater treatment plant discharges

Therefore, the only prospective system improvements for a redundant source would involve seeking another water source such as Lake Keowee. This would involve:

- Construction of a new filter plant on Lake Keowee
- Purchasing water from the City of Seneca
- Purchasing water from the systems served by Adkins Water Treatment Plant on Lake Keowee

Drought Response Policy

A. Declaration of Policy and Authority: The objective of this Drought Response Policy is to establish policy and procedure by which the Clemson University Water System will take the proper actions to manage water demand during a drought-related shortage. The Policy satisfies the requirements of the Drought Response Act of 2000 and has the goal of achieving the greatest public benefit from limited supplies of water needed for domestic water use, sanitation, and fire protection and of allocating water for other purposes in an equitable manner.

This Policy outlines the actions to be taken for the conservation of water supplied by the Clemson University Water System. These actions are directed both towards an overall reduction in water usage and the optimization of supply.

To satisfy these goals, the Clemson University Water System hereby adopts the following regulations and restrictions on the delivery and consumption of water. This Policy is hereby declared necessary for the protection of public health, safety and welfare and shall take effect upon its adoption by the Clemson University administration.

If it becomes necessary to conserve water in its service area due to drought, the Clemson University Water System is authorized to issue a public notice that existing conditions prevent fulfillment of the usual water-use demands. The Policy is an attempt to prevent depleting the water supply to the extent that water-use for human consumption, sanitation, fire protection, and other essential needs becomes endangered.

Immediately upon issuance of such a Public Notice, regulations and restrictions set forth under this Policy shall become effective and remain in effect until the water supply shortage has ended and the Public Notice rescinded.

Water uses that are regulated or prohibited under this Policy are considered to be non-essential and continuation of such uses during times of water supply shortages is deemed to constitute a waste of water, subjecting the offender(s) to penalties.

B. Moderate Drought Phase: Upon notification by the West (Savannah) Drought Response Committee that a moderate drought condition is present and is expected to persist and/or upon determination by the Clemson University Water System that a moderate water supply shortage exists based on trigger levels, the Clemson University Water System will seek voluntary reductions from its customers in the use of water for all purposes and voluntary reductions on using water during certain peak water demand periods. Specifically, the goal during this phase is to achieve **a reduction of 20% in residential water use and 15% in other water uses such as commercial, industrial, institutional and irrigation, and a reduction in overall water use of 15%**. To accomplish this, the Clemson University Water System will take the following actions:

1. Issue a Proclamation to be released to local media, Clemson University Water System customers and to the South Carolina Department of Natural Resources Drought Information Center that Moderate drought conditions are present.
2. Provide written notification to the South Carolina Department of Natural Resources Drought

Information Center and routinely publish in a newspaper of general circulation in the service area of the water system the voluntary conservation measures that the customers are requested to follow during **moderate** drought conditions, including:

- a. Reduce residential water use to 75 gallons per person per day and a maximum of 300 gallons per household per day.
 - b. Eliminate the washing down of sidewalks, walkways, driveways, parking lots, tennis courts and other hard surfaced areas.
 - c. Eliminate the washing down of buildings for purposes other than immediate fire protection
 - d. Eliminate the flushing of gutters.
 - e. Eliminate the domestic washing of motorbikes, boats, cars, etc..
 - f. Eliminate the use of water to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.
 - g. Reduce watering of lawns, plants, trees, gardens, shrubbery and flora on private or public property to the minimum necessary. Encourage outdoor watering to be done during off-peak hours.
 - h. Reduce the amount of water obtained from fire hydrants for construction purposes, fire drills or for any purpose other than fire-fighting or flushing necessary to maintain water quality.
 - i. Limit normal water use by commercial and individual customers including, but not limited to, the following:
 - i. Stop serving water in addition to another beverage routinely in restaurants.
 - ii. Stop maintaining water levels in scenic and recreational ponds and lakes, except for the minimum amount required to support aquatic life.
 - iii. Cease water service to customers who have been given a 10- day notice to repair one or more leaks and have failed to do so.
3. Intensify maintenance efforts to identify and correct water leaks in the distribution system.
 4. Cease to install new irrigation taps on the water system.
 5. Continue to encourage and educate customers to comply with voluntary water conservation.

C. Severe Drought Phase: Upon notification by the Drought Response Committee that a severe drought condition is present and is expected to persist and/or upon determination by the Clemson University Water System that a severe water supply shortage exists, Clemson University Water System will seek voluntary reduction in the use of water for all purposes and mandatory restrictions on non-essential usage and restrictions on times when certain water usage is allowed. Specifically, the goal during this phase is to achieve a **reduction of 25% in residential water use, 20% in all other water use categories, and a reduction in overall water use of 20%**. To accomplish these goals, the Clemson University Water System will take the following actions:

1. Issue a Proclamation to be released to the local media, Clemson University Water System customers and to the South Carolina Department of Natural Resources Drought Information Center that Severe drought conditions are present.

2. Provide written notification to the South Carolina Department of Natural Resources Drought Information Center and routinely publish in a newspaper of general circulation in the service area of the water system the voluntary conservation measures and mandatory restrictions to be placed on the use of water supplied by the utility, including:
 - a. Voluntary reduction of residential water use to 65 gallons per person per day and a maximum of 250 gallons per household or REU per day.
 - b. Control landscape irrigation by the Utility's customers by staggering watering times.
 - c. Mandatory restriction on the use of water supplied by the Utility for activities including:
 - i. Eliminate the washing down of sidewalks, walkways, driveways, parking lots, tennis courts and other hard surfaced areas.
 - ii. Eliminate the washing down of buildings for purposes other than immediate fire protection.
 - iii. Eliminate the flushing of gutters.
 - iv. Eliminate the domestic washing of motorbikes, boats, cars, etc.
 - v. Eliminate the use of water to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.
 - vi. Eliminate filling or maintaining public or private swimming pools.
 - vii. Eliminate obtaining water from fire hydrants for construction purposes, fire drills or any purpose other than fire-fighting, or flushing necessary to maintain water quality.
 - d. Limit normal water use by commercial and individual customers including, but not limited to, the following:
 - i. Stop serving water in addition to another beverage routinely in restaurants.
 - ii. Stop maintaining water levels in scenic and recreational ponds and lakes, except for the minimum amount required to support aquatic life.
 - iii. Limit irrigating golf courses and any portion of its grounds.
 - iv. Cease water service to customers who have been given a 10- day notice to repair one or more leaks and have failed to do so.
 - v. Limit expanding commercial nursery facilities, placing new irrigated agricultural land in production or planting or landscaping when required by site design review process.
 - e. Intensify maintenance efforts to identify and correct water leaks in the distribution system.
 - f. Continue to cease to install new irrigation taps on the water system.
 - g. Publicize widely the penalties to be imposed for violations of mandatory restrictions and the procedures to be followed if a variance in the restrictions is requested.
 - h. Expand the use of education and public relations efforts and emphasize the penalties associated with violating the mandatory restrictions.
 - i. Provide written notification monthly to the South Carolina Department of Natural Resources Drought Information Center regarding the success of the voluntary and mandatory restrictions.

D. Extreme Drought Phase: Upon notification by the Drought Response Committee that an **extreme** drought condition is present and is expected to persist and/or upon determination by the Clemson University Water System that an extreme water supply shortage exists based on the trigger levels, Clemson University Water

System will impose mandatory restrictions in the use of water for all purposes and on the times when certain water usage is allowed. Specifically, the goal during this phase is to achieve a **reduction of 30% in residential water use, 25% in all other water use categories, and a reduction in overall water use of 25%**. To accomplish these goals, the Clemson University Water System will take the following actions:

1. Issue a Proclamation to be released to the local media, Clemson University Water System customers and to the South Carolina Department of Natural Resources Drought Information Center that Extreme drought conditions are present.
2. Provide written notification to the South Carolina Department of Natural Resources Drought Information Center and routinely publish in a newspaper of general circulation in the service area of the water system the mandatory restrictions to be placed on the use of water supplied by the utility, including:
 - a. Limiting residential water use to 55 gallons per person per day and a maximum of 225 gallons per household or REU per day.
 - b. Eliminate landscape irrigation by the Utility's customers.
 - c. Mandatory restriction on the use of water supplied by the Utility for activities including:
 - j. Eliminate the washing down of sidewalks, walkways, driveways, parking lots, tennis courts and other hard surfaced areas.
 - ii. Eliminate the washing down of buildings for purposes other than immediate fire protection.
 - iii. Eliminate the flushing of gutters.
 - iv. Eliminate the domestic washing of motorbikes, boats, cars, etc.
 - v. Eliminate the use of water to maintain fountains, reflection ponds and decorative water bodies for aesthetic or scenic purposes, except where necessary to support aquatic life.
 - vi. Eliminate filling or maintaining public or private swimming pools.
 - vii. Eliminate obtaining water from fire hydrants for construction purposes, fire drills or any purpose other than fire-fighting, or flushing necessary to maintain water quality.
 - d. Limit normal water use by commercial and individual customers including, but not limited to, the following:
 - i. Stop serving water in addition to another beverage routinely in restaurants.
 - ii. Stop maintaining water levels in scenic and recreational ponds and lakes, except for the minimum amount required to support aquatic life.
 - iii. Limit irrigating golf courses and any portion of its grounds.
 - iv. Cease water service to customers who have been given a 10- day notice to repair one or more leaks and have failed to do so.
 - v. Limit expanding commercial nursery facilities, placing new irrigated agricultural land in production or planting or landscaping when required by site design review process.
 - e. Intensify maintenance efforts to identify and correct water leaks in the distribution system.
 - f. Continue to cease to install new irrigation taps on the water system.
 - g. Outline other conservation measures, examples are:
 - i. Place a moratorium on the issuance of all new water service connections and contracts for all new water main extensions. As part of the public information process, provide notice to developers of the moratorium.

- ii. Encourage all residential water customers to voluntarily reduce overall monthly water usage to 70% of the customer's monthly average. If voluntary reduction of usage is not successful, the Clemson University Water System may, at its option, implement the following excessive use rate schedule for water:
For Extreme Drought

Tier I	0 – 225 gallons/REU	Regular Rate
Tier II	226 – 275 gallons/REU	2 Times Regular Rate
Tier III	Over 275 gallons/REU	3 Times Regular Rate
- iii. If the conservation measures of the Plan prove inadequate to mitigate the effects of the drought conditions or water supply availability, the Clemson University Water System may take additional actions including, but not limited to:
 - Decreasing the gallon/REU limits in the different tiers.
 - Reduction of water system pressure as needed.
- h. Publicize widely the penalties to be imposed for violations of mandatory restrictions and the procedures to be followed if a variance in the restrictions is requested.
- i. Expand the use of education and public relations efforts and emphasize the penalties associated with violating the mandatory restrictions.
- j. Provide written notification monthly to the South Carolina Department of Natural Resources Drought Information Center regarding the success of the voluntary and mandatory restrictions.

E. Rationing

If a drought threatens the protection of public health and safety, the Clemson University Water System is hereby authorized to ration water.

F. Enforcement of Restrictions

If any customer of the Clemson University Water System fails to comply with the mandatory water use restrictions of this Plan, the customer shall be given a written notice of such failure to comply, which cites the date of said violation, and shall be assessed surcharges in accordance with the following schedule:

First violation - \$ 50.00 surcharge shall be added to the customer's water bill.

Second violation - an additional \$100.00 surcharge shall be added to the customer's water bill.

Third violation - the customer's water service shall be terminated and restored only after payment of a surcharge of \$150.00 in addition to all previously assessed surcharges.

Designated Clemson University employees shall diligently enforce the provisions of the Drought Response Plan.

G. Variances

Customers, who in their belief are unable to comply with the mandatory water use restrictions of this Drought Response Plan, may petition for a variance from restrictions by filing a petition with the Clemson University Water System within ten (10) working days after the issuance of the Public Notice requiring water use restrictions.

All petitions for variance shall contain the following information:

- a. Name and address of the petitioner.
- b. Purpose of water usage.
- c. Special provision from which the petitioner is requesting relief.
- d. Detailed statement as to how the curtailment declaration adversely affects the petitioner.
- e. Description of the relief desired.
- f. Period of time for which the variance is sought.
- g. Economic value of the water use.
- h. Damage or harm to the petitioner or others if petitioner complies with the Drought Response Plan.
- i. Restrictions with which the petitioner is expected to comply and the compliance date.
- j. Steps the petitioner is taking to meet the restrictions from which the variance is sought and the expected date of compliance.
- k. Other information as needed.

In order for the variance to be granted, the petitioner must demonstrate clearly that compliance with the Plan cannot be technically accomplished during the duration of the water supply shortage without having an adverse impact upon the best interests of Clemson University. The Clemson University Water System is authorized to grant the request for variance.

In addition, the Clemson University Water System is authorized to grant temporary variances for existing water uses otherwise prohibited under the Plan if it is determined that failure to grant such variances could cause an emergency condition adversely affecting health, sanitation and fire protection for the public. No such variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance. Variances granted by the Clemson University Water System shall include a timetable for compliance and shall expire when the water supply shortage no longer exists, unless the petitioner has failed to meet specified requirements.