

DROUGHT MANAGEMENT PLAN

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Madison Suburban Utility District

PWS ID: 0000424

Revised

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DISTRICT INFORMATION

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Introduction

STATEMENT OF PURPOSE

Madison Suburban Utility District (District) provides safe and reliable drinking water of consistently high quality and at adequate pressure to serve all domestic, commercial, and fire protection needs. This Drought Plan considers various situations and assists the District in responding quickly and effectively to dry weather conditions and droughts, and in time of low water supply, which could first jeopardize public health and safety, and secondly, place economic hardships on industry within its service area.

The District understands the vital role it plays in the health and well-being of not just its customers but the community as well and is an important part of the local infrastructure and economy. The District is committed to managing our regional water resources for long-term sustainability.

To this end, due to the unpredictable nature of climate and the associated rainfall, it is reasonable and prudent that the Drought Management Plan be implemented when such a need arises.

EMERGENCY PLANNING

Public water systems in Tennessee are required by TDEC to have an Emergency Operation Plan (EOP). The Drought Management Plan is a necessary aspect of the EOP. This document is a stand-alone and detailed plan for managing drought conditions. The EOP will only include highlights from this plan and encourage planners and personnel to utilize the Drought Plan when necessary.

This policy will utilize several system and climatological factors as trigger levels, including, but not limited to, water demands or usage, tank levels, source water quality, and river flow. Precipitation deficits, drought indices and seasonal drought assessments can be viewed at the *U.S. Drought Monitor* website, which focuses on broad-scale and local conditions. The website is located at <http://drought.unl.edu/MonitoringTools.aspx>.

PLANNING COMMITTEE and MANAGEMENT

The District's General Manager has granted the Drought Management Committee authority to develop this Plan with the goal of conserving our water supply and reducing the affects of drought or low supply on the District's customers.

The Committee consists of District management and relevant personnel, contract engineers, and input from State officials. Frequent discussions with the State and with neighboring infrastructures ensures the Plan is kept current and effective. All contact information for relevant parties can be found in the Emergency Plan and with District Management.

The Drought Management Committee and Managers of the District have been granted authority by the District Commissioning Board to enforce conservation protocols including, but not limited to, those described here.

In the event of a catastrophic drought event, the District may subordinate their actions to a higher-level authority, such as TEMA, in its decision-making role, by taking appropriate parallel actions.

The General Manager is designated as having the responsibility to activate phases at any given time when drought conditions signal that the Drought Management Plan may need to be implemented.

SYSTEM CHARACTERISTICS

Source: Cumberland River, Madison, TN

Withdrawal Limits: none (authority of USACE)

Demand: average daily demand of 8 million gallons

Supply Risks: The Cumberland River is well managed by the USACE, with river transportation, power generation, and drinking water supply being the top priorities. Competition for water from the Cumberland would come from TVA and other water utilities.

Seasonal variation: Winter minimum of 189 million gallons per month. Summer maximum of 230 million gallons per month.

Treatment Process:

The District hosts a conventional filtration treatment facility utilizing dual media beds. Chlorine is the primary disinfectant. Fluoride and corrosion inhibitors are added post treatment prior to entering the distribution system. An estimated 7% of the water withdrawn from the Cumberland River is taken up by the treatment process, and discharged back into the River after primitive treatment per our General Discharge Permit, number TN000413.

The Treatment Facility is rated by TDEC to produce up to 15 million gallons a day of potable water meeting Primary Drinking Water Standards. Impaired source water may significantly lower capacity.

System Storage: 12 million gallons maximum

Customer diversity: 88% residential, 12% commercial/industrial

Planning Process

GOALS

- To detect and monitor a drought condition.
- To project the longevity and severity of a water shortage or drought.
- To establish trigger points or circumstances by which execution of mitigation steps must be taken by the District, residential customers, commercial customers, industry and manufacturing customers, and supporting agencies.
- To implement mitigation policies and actions that are fair, orderly, reasonable, and functional.
- To protect the health of our customers in monitoring water quality and notify customers of any appropriate protective actions (e.g.: issue Boil Water notices).
- To remain in compliance with State and Federal Drinking Water Regulations during drought conditions.
- To repair damaged system components as priority dictates, to return the system to normal operating standards as soon as possible.

PRIORITY IN SERVICES

The process of developing the Plan is critical to the economy and health of the community. As such public involvement is encouraged. Water conservation by our customers will be the primary focus of the mitigation efforts. **Public education and awareness is essential.**

Customers of the District can expect water mitigation and availability to be governed in the following categorization:

- Health (medical, elderly, sanitation)
- Safety (fire protection)
- Environment (aquatic habitat)
- Economic (sanitation, process, cooling)
- Recreation Use (pools, lawn/golf courses)

The District's General Manager shall have the authority to permit reasonable use of water to maintain public health, safety, and sanitary standards.

Existing Plans and Agency Cooperation

EMERGENCY OPERATIONS PLAN

Public water systems in Tennessee are required by TDEC to have an Emergency Operation Plan (EOP). The Drought Management Plan is a necessary aspect of the EOP. This document is a stand-alone and detailed plan for managing drought conditions. The EOP will only include highlights from this plan and encourage planners and personnel to utilize the Drought Plan when necessary.

A complete listing of the District's largest customers and the most critical customers can be found in the EOP.

INTERCONNECTIONS and MUTUAL-AID AGREEMENTS

Regional drought conditions would affect water availability and quality state wide. Interconnections between neighboring water systems would have to be carefully considered in regards to public health, fire protection, and system capacity. To date, interconnection agreements are contractual and the District is under no obligation to provide water to neighboring systems if in doing so the District's customers face undue hardship or the public safety be compromised.

White House Utility District

A permanent connection with WHUD is established in the Goodlettsville area.

WHUD gets its water from Old Hickory Lake, a reservoir for the Cumberland River, upstream from the District WTP. In severe regional drought conditions it is likely WHUD would need water from the District. The Cumberland River water supply is carefully maintained by the USACE and a series of dams and reservoirs. Old Hickory Lake water levels and water quality would be sacrificed before the River as a whole.

But if the District's water source were to be directly contaminated and untreatable an interconnection with OHUD could be to our benefit and necessary.

Metro Water Services

A permanent connection with MWS has not been established; however temporary connections have been used in the past and could again until a permanent installation can be negotiated.

Both of MWS treatment facilities are on the Cumberland River, one upstream and one downstream of the District. If the Cumberland River as a whole were to be adversely affected by drought or contamination, an interconnection would not be beneficial. However, if upstream facilities were operational while downstream were not an interconnection may be beneficial to either or both parties.

COOPERATIVE AGENCIES and LEGAL CONCERNS

The District's drought management plan and policies are available at the Business Office and at the District website, www.msud.net.

Governing agencies (below) may direct the District in providing water to neighboring systems in a time of crisis or disaster. Water quantity would be limited by treatment capacity and Federal SDWA Regulations, unless subjugated by State authority, TDEC.

Governing Agencies include the Federal and State Offices of the EPA, Department of Homeland Security, FEMA/TEMA, Tennessee Valley Authority, and the USACE. The District would work with cooperative agencies to ensure adequate water supply is available as situations permit; ie: the area Chambers of Commerce, Metro Nashville Fire and Police Departments, area medical centers.

Navigation is the primary concern of the USACE. The Cumberland River would normally be kept at a minimum operational depth of 15 feet in the channel. At this depth the WTP intake will be operational as well. If water levels could not be maintained at this depth a variety of problems will arise, apart from drinking water supply. Communication between relevant parties and TDEC will ensure conflicts in interests can be addressed. TEMA and even the legislative branch may be called upon to resolve more serious problems.

All efforts will be taken to conserve water supply, protect public health, and mitigate environmental impact in drought conditions and in the District's use of our water source.

All communications and authority must be granted by the General Manager or Emergency Response Coordinator.

CUSTOMER CONTRACTUAL AGREEMENT

The General Manager shall have the right to determine what constitutes water waste and may act when necessary to restrict the use of water or cut off same in order to stop such waste.

The District shall have the right at any time by action of its Board of Commissioners to make changes and put into effect rules and regulations governing the use of water, as well as establishing, setting, and changing of fees.

Implementation

During a drought event, the General Manager or appointed spokesperson will be responsible for issuing public announcements via any communication format deemed suitable. This may include, but not be limited to, television, radio, printed releases, automated customer calling, website and social media. Contact information for each media outlet is included and kept current in the District's Emergency Operations Plan, available to District personnel.

Press releases will be specific to the situation presented. Communication will be coordinated with any applicable communications from State or Federal agencies.

The table found on the following page identifies trigger points, actions, and goals for a system wide drought scenario. The required actions described here are considered the minimum action required once the associated trigger point has been reached. The alternative actions identified here are possible actions the General Manager may choose to enact to enable the District to meet stated goals.

The General Manager may, at his or her discretion, elect to enter a particular phase prior to its trigger point being reached. Because it is impossible to plan for all circumstances, the General Manager may amend the alternative actions during a drought event. These actions may be amended to meet a specific need of the community, better utilize the available resources, or to comply with orders or mandates issued by State or Federal agencies.

The General Manager has the authority to end a phase once conditions no longer warrant contingencies.

ENFORCEMENT

Under the terms of this Plan, the District's General Manager is authorized to delegate the distribution of customer notices (as described above), conduct meter readings, and to shut off water to customers that do not comply with water restriction measures during a declared drought. If the customers fail or refuse to immediately comply with restrictions, service shall be cut off by the District.

Any customer whose service is disconnected because of failure to comply with the requirements of a declared drought shall have the right, after the first such disconnection, to have service reinstated upon payment to the District of customary reconnection charge and upon execution of a written statement that the customer will comply with the requirements of the drought management plan. If service is disconnected because of subsequent failure to comply, such customer shall have the right to reinstatement of service only after approval of the Board and subject to such terms and conditions as the Board shall impose.

Through the use of its electronic water meters, the District is able to monitor customer usage on a real time basis at the District's office. This data can be employed to enforce the terms of this Plan. The District utilizes billing software that is capable of administering surcharges if authorized by the Board.

WATER QUALITY

The District has included raw and finished water quality among the parameters to be monitored as part of its drought plan. Taste and odor are the two most common water quality issues experienced by the District. The District monitors customer complaints in regard to these issues on a consistent basis.

Treatment processes will be optimized to handle anticipated taste and odor concerns, and organic content closely monitored as well.

Flushing of distribution mains will be restricted to manage quality concerns only. Annual operation of hydrants and maintenance will be postponed until after the drought phase has been lifted unless directed by the General Manager.

Table 1: Drought Management Trigger Points and Action Plan

Phase	Observation/Trigger	Required Action	Alternative Action	Mitigation Goal
Drought Alert	Customer demand exceeds 75% rated treatment capacity for more than 48hrs <i>or</i> Nashville District of USACE issues a low flow alert	<ol style="list-style-type: none"> 1. Monitor source water supply and customer demand daily 2. Monitor quality of raw and finished waters 3. Notify TDEC of current drought management phase 	<ol style="list-style-type: none"> 1. Issue press release requesting customers reduce non-essential water use 2. Share conservation tips 	Not applicable
Voluntary Reduction	Customer demand exceeds 80% of rated treatment capacity or available water supply for more than 48 hrs <i>or</i> tanks cannot be sufficiently filled over a 48hr period	<ol style="list-style-type: none"> 1. Monitor source water supply and customer demand daily 2. Monitor quality of raw and finished waters 3. Notify TDEC of current drought management phase 4. Issue press release explaining current drought phase and requesting a voluntary reduction in non-essential water use 	<ol style="list-style-type: none"> 1. Contact large users directly to request voluntary water curtailment 2. Publically request a voluntary reduction in water use the is not directly related to health, safety, or welfare 	Reduce customer demand to below 80% of water supply or rated treatment capacity
Mandatory Water Restriction	Customer demand exceeds 85% of rated treatment capacity or available water supply and tanks cannot be sufficiently filled in a 48hr period	<ol style="list-style-type: none"> 1. Monitor source water supply and customer demand daily 2. Monitor quality of raw and finished waters 3. Notify TDEC of current drought management phase 4. Issue press release explaining current drought phase and a mandatory reduction in non-essential water use 	<ol style="list-style-type: none"> 1. Purchase water from surrounding utilities 2. Notify the public that water not required for health, safety, or welfare should be completely eliminated 3. Lock meters that supply commercial and/or industrial water users where use is deemed not required for public health, safety, or welfare 4. Lock irrigation meters 5. Adjust billing rates for water 	Reduce customer demand to below 85% of water supply or rated treatment capacity
Emergency Management	Customer demand exceeds 90% of rated treatment capacity or available water supply and tank levels cannot be sufficiently maintained to provide required pressure	<ol style="list-style-type: none"> 1. Monitor source water supply and customer demand daily 2. Notify TDEC of current drought management phase 3. Issue press release explaining current drought phase and that non-essential water use is prohibited and restrictions enforced 	<ol style="list-style-type: none"> 1. Purchase water from surrounding utilities 2. Lock meters that supply commercial and/or industrial water users where use is deemed not required for public health, safety, or welfare 3. Lock irrigation meters 4. Adjust billing rates for water 	Reduce customer supply to below 90% of available water supply or rated treatment capacity

CONSERVATION GUIDE

The following conservation guidelines can be summarized for distribution to our customers at the initiation of a drought phase. Voluntary conservation measures include but are not limited to:

- a. Reduce the watering of lawns and landscaping.
- b. Water in the early morning.
- c. Raise the height of your mower.
- d. Use mulch to maintain moisture around plants.
- e. Consider planting drought-tolerant plants.
- f. Do not hose down your sidewalk or driveway.
- g. Verify your home is leak free.
- h. Install a water displacement device to reduce the amount of water needed for each flush.
- i. Store drinking water in the refrigerator.
- j. Don't let the water run while brushing your teeth, shaving or washing your face.
- k. Avoid flushing the toilet unnecessarily.

Outdoor Conservation Tips:

1. Reduce the watering of lawns, shrubs, trees and landscaped areas. As a general rule, established lawns do not need to be watered more often than every five to seven days.
2. A hearty rain eliminates the need for watering for up to two weeks. Buy a rain gauge and use it to determine how much water/rain your yard has received.
3. Water lawns during the early morning hours when temperatures and wind speeds are the lowest. This reduces water losses from evaporation.
4. Don't allow sprinklers to water your street, driveway or sidewalk. Position them so water lands on the lawn and shrubs, not the paved areas.
5. Install the most water efficient irrigation devices for each use. Drip and micro irrigation and soaker hoses are examples of water efficient irrigation methods.
6. During dry weather, raise the height of your mower so that you are cutting your grass at the highest recommended height. A higher cut encourages grass roots to grow deeper, shades the root system and holds soil moisture better than a closely clipped lawn.
7. Avoid over fertilizing your lawn. Fertilizer applications increase the need for water. Apply fertilizers, which contain slow-release, water-insoluble forms of nitrogen.
8. Use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water.
9. Consider planting drought-tolerant grasses, ground covers, shrubs and trees. Once established, they do not need to be watered as frequently and usually survive a dry period without watering. Group plants together based on similar water needs. Talk to the County Extension Service or your local nursery.
10. Do not hose down your driveway or sidewalk. Use a broom or blower to clean leaves and other debris from these areas.
11. Use a shut-off nozzle on your hose so that water flows only as needed. When finished, turn it off at the faucet instead of at the nozzle to avoid leaks. Check hose connectors to ensure plastic or rubber washers are in place. Washers prevent leaks.
12. Do not leave sprinkler or hoses unattended. A garden hose can pour out several hundred gallons or more of water in only a few hours.
13. If you wash your own car, park on the grass and use a hose with an automatic shut-off nozzle.

14. Refrain from using water for ornamental purposes including fountains, artificial waterfalls and reflecting pools.

Indoor Conservation Tips:

1. Verify that your home is leak free. Many homes have hidden water leaks. To check your home for leaks: Make sure no one in your home is using water and check to make sure the dial on the face of the water meter is not moving. If the flow indicator on the water meter is turning, you have a leak.
2. Replace worn out flappers. These are three ways to determine if you need to replace the flapper. (1) Add a dye tablet or dark food coloring to the toilet tank and wait 15 minutes. Do not flush. If the water in your toilet bowl changes colors, replace the flapper, or (2) Shut off water to the tank and flush. Once the tank is empty, touch the flapper. If a rubbery residue from the flapper comes off on your hand, replace the flapper, or (3) Once the toilet is full, turn the supply valve off and wait one hour. If the water level in the toilet tank drops, replace your flapper.
3. Check the toilet for worn out, corroded or bent parts. Most replacement parts are inexpensive, readily available and easily installed.
4. If the toilet handle frequently sticks in the flush position letting water run constantly, replace or adjust it.
5. Install a toilet dam or water displacement device such as a bag or bottle to reduce the amount of water needed for each flush. Be sure the installation does not interfere with the operating parts in the tank.
6. Take shorter showers or alternatively take a shower by turning the water on to get wet; turning off to lather up; then turning back on to rinse off. Repeat when washing your hair.
7. Operate automatic dishwashers and clothes washers only when they are fully loaded. Set the water level for the size of load you are using.
8. When washing dishes by hand, fill one sink or basin with soapy water. Quickly rinse under a slow-moving stream from the faucet.
9. Store drinking water in the refrigerator. Don't let the tap run while you are waiting for cool water to flow.
10. Do not use running water to thaw meat or other frozen foods. Defrost food overnight in the refrigerator or use the defrost feature on your microwave.
11. Don't let water run while shaving or washing your face. Brush your teeth first while waiting for water to get hot, then wash or shave after filling the basin.
12. Avoid flushing the toilet unnecessarily. Dispose of tissues, insects and other similar wastes in the trash rather than the toilet.

Review and Evaluation

PLAN EFFECTIVENESS

Once a Drought Event is completed, the Drought Management Committee (DMC) will initiate a review of all Plan actions, records, and results to determine the effectiveness of the Plan within 6 months of said event.

If areas are found to be lacking or need to be updated, the DMC will prepare an update of the Plan for adoption by the District’s General Manager and the Board of Commissioners.

A review shall be performed every three years to evaluate and update Plan policies. The Plan shall also be updated if any significant change is made to the water system.

Once an updated Plan is completed it will be sent to TDEC for approval and adopted by the Board of Commissioners for use in subsequent drought events.

REVISIONS LIST

Revision Date	Version	Reason for Revision	Reviser
11/3/2009	0	Original Plan	Lynne Bonnar
12/28/2012	2012.01	Triennial revision and update.	Samantha Kramer
03/25/2013	2013.01	Additions needed for TDEC approval	Samantha Kramer
11/18/2013	2013.02	revisions needed for TDEC approval, and mgmt changes	Samantha Brewer
12/11/2013	2014.01	completed revisions for TDEC and mgmt approval	Samantha Brewer
6/10/2016	2016.01	Mgmt changes, resubmit to TDEC per 0400	Samantha Brewer

APPROVAL LIST

Cynthia Ellis, General Manager By Cynthia H. Ellis, G.M. Date: 6-15-16

David Amburgey, Plant Manager D. Amburgey Date: 6-15-16