

**South Cumberland
Regional Drought Plan**

**Adopted on:
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Contents

1. Overview.....	3
2. System Characteristics.....	3
3. Purpose of the Drought Management Plan.....	5
4. Goals, Objectives, and Priorities of the Plan.....	6
5. Alternate Resource Planning.....	7
6. Interconnections, Mutual Aid Agreements and Backup Sources.....	8
7. Drought Plan Phases.....	8
7.1 Drought Alert with Voluntary Reductions.....	8
7.2 Mandatory Water Restrictions.....	9
7.3 Mandatory Restrictions with Surcharge.....	10
7.4 Emergency Water Management.....	10
8.0 Implementation.....	11
9.0 Drought Management Phases.....	11
9.1 Drought Alert with Voluntary Water Reductions.....	11
9.2 Mandatory Water Restrictions.....	12
9.3 Mandatory Water Restrictions with Surcharge.....	12
9.4 Water Emergency Management.....	12
10.0 Plan Enforcement.....	12
11.0 Plan Adoption.....	13

1. Overview

The South Cumberland Region is a group of water utility districts and municipalities organized under the laws of the State of Tennessee. This region consists of all utilities and municipalities in Grundy County and small portions of Sequatchie, Franklin, and Marion Counties.

Among the chartered powers of these utility districts and municipalities is the authority to “acquire, construct, own, operate, and maintain, or sell, lease, mortgage, pledge, or otherwise dispose of public utilities or any estate or interest therein, or any other utility of service” within the legal boundaries of their respective service areas.

In the South Cumberland Region of Tennessee all powers of the cities and utility districts are vested in its respective form of government including mayor, council, general manager, and in some instances a board of commissioners, which oversee the water and wastewater department. In addition, the council or board may prescribe the manner in which the powers of each city or utility district are to be exercised. Specifically, each city’s and utility district’s charter enables it to: “Prescribe reasonable regulations regarding the construction, maintenance, equipment, operation and service of public utilities and public services and from time to time compel the reasonable extension of facilities for such services.” In accordance with the city’s and utility’s powers, the mayor or board through his (her)/(their) designated representative(s) has the authority to activate drought management responses as outlined in this plan. This plan was reviewed by each utility’s attorney, departmental managers and, by executive authority, was adopted (*provide the date it was officially adopted*) by the mayor and/or board of each respective utility as the plan for addressing drought. Concurrence with city and county departments and agencies was sought because some of the responses and measures outlined in the plan would need to be taken and or coordinated with other agencies, potentially impacting staffs and budgets. The only other component of the plan that required separate public hearing was the adoption of a three-tier rate structure providing for emergency-drought standby surcharges that can be activated during a declared drought according to pre-established trigger points and a process as prescribed by the plan. It was agreed that each utility would set these surcharges rather than set a standard rate structure that all utilities would adopt. A general figure is included in this document as a guide, but each system will set its own rates based on the unique circumstances within their respective service areas. Additional revenues collected as a result of the surcharges are dedicated to monitoring and compliance activity, public education and to offset any other additional expenditures incurred as a result of implementing this plan.

2. System Characteristics

The South Cumberland Region of Tennessee serves portions of Grundy, Marion, Sequatchie, and Franklin counties and a combined population of 19,500 people. The various water systems operating under this drought management plan include: Big Creek Utility District,

The Sewanee Utility District of Franklin and Marion Counties, Tracy City Municipal Utility, and City of Monteagle (hereinafter the “systems”). The systems wholesale water to Foster Falls Utility District, Griffith Creek Utility District, and Cagle Fredonia Utility District. Agreements are in place with these wholesale systems and they will abide by all provisions of this plan, including drought rates. All systems obtain their water from individual reservoirs and have their own water treatment plants. The reservoirs include: Lake O’Donnell, Lake Jackson, Lake Dimmick, Ranger Creek Reservoir, Big Fiery Gizzard Reservoir, Laurel Lake, and Lake Louisa. The combined treatment capacity of the systems is 4.436 MGD. The treatment plants use various processes including conventional filtration, membrane filtration, and direct filtration. The systems supply a total of 8,500 connections and approximately 19,500 people.

The systems are all interconnected and can supply one another with water. The supply of water at these interconnections is at the sole discretion of the supplying utility system. In some instances pressure across these interconnections will require booster pumps to be installed. Provisions are included in each system’s Emergency Operation Plan identifying the locations of these interconnections, pumping requirements needed, and contacts of companies that can supply the needed pumps under these circumstances. The systems have a combined 11 standpipes, 4 elevated tanks, and 3 clearwells with an overall finished storage capacity of 3,565,000 gallons.

The systems have a combined 8,500 connections of which 8,150 are residential connections. On an average day, 66 percent of the systems water is sold to residential customers. Some of the residential customers are users who have farms (and use ponds and springs to water livestock). The systems have 350 connections classified as “commercial institutional.” 19 of the 350 connections are apartment complexes, representing approximately 600 residential units. Other commercial institutional customers include a hospital, four hotels, several dental health facilities and doctor’s offices, several nursing homes and elderly care facilities, one college, two high schools, seven elementary schools, and eight daycares. The remaining commercial connections serve a mix of manufacturing facilities, retail, restaurants, auto services, athletic fields, golf courses, religious facilities, government, entertainment facilities, animal clinics, and a mortuary. 14 percent of all water sold is to commercial-institutional users. Public use and water loss amounts to 20 percent of the system’s water. Uses include firefighting, line flushing, line breaks, and leaks.

On days of peak water demand (but not a severe drought) customer account-categories typically reflect the following demands:

66% - Residential (human consumption including domestic sanitation, livestock watering and residential lawn watering)

14% - Commercial - Institutional (medical, nursing homes, elderly, apartments, restaurants, offices, retail space, schools, commercial car washes, recreation including golf courses, etc.)

20% - Public Use and system losses (fire protection, flushing to maintain water quality, line breaks and leaks, erosion control)

On average, water use demand is 1.9 million gallons per day. Lowest monthly use or base demand occurs in December and March, dropping to 1.6 million gallons per day. Peak demand typically occurs in June, July and August with average peak demands of 2.4 million gallons per day.

3. Purpose of the Drought Management Plan

The purpose of this plan is to reduce water demand and supplement available drinking water supplies in the event of a drought where existing water supplies are inadequate to meet current demand for potable water. The significance of taking into account water use on average and during peak water demand (though it may not reflect an extreme or exceptional drought) is that system officials can identify water uses that have the potential to be reduced more easily. The point here is to identify potential discretionary or non-essential water uses. It is evident from the data above that water use by residential users typically increases 57% percent over average water use (and even more over base use). Managers might also note that this increase is primarily lawn and landscape watering, swimming pool, sidewalk-driveway washing, and personal bathing-clothes washing. The 82 percent increase in commercial use was due to increases in apartment complex lawn and landscape water use, pool and spa use, golf course irrigation and commercial car washes. Internally, decreases in commercial water use were a result of the summer closure of schools. “Public” use increased slightly by 16,000 gallons, due to increased flushing to maintain water quality. Overall, peak water use over base demand was 50 percent greater.

Water Use Table	Water Use in Gallons March Average	Water Use Percent of Total	Water Use in Gallons August Peak Use	Water Use as Percent of Total	Increase in Gallons	Percent Increase Peak over Base Use
Residential	1,056,000	66%	1,656,000	69%	600,000	57%
Commercial	224,000	14%	408,000	17%	184,000	82%
Public	320,000	20%	336,000	14%	16,000	5%
Total	1,600,000	100%	2,400,000	100%	800,000	50%

Because water use data reflects a typical peak summer water use but not necessarily a moderate, severe or extreme drought, managers believed additional water use could be expected by residential customers on the system to water cattle and other livestock, though they usually rely on ponds and small streams which are likely to be depleted in a severe drought. Where a drought level and water use can be correlated, planning for a drought can be more finely tuned. Lacking that information, water system managers might assume they could reduce demand to base water use plus some additional uses (such as for cattle) to be the system’s drought management goal. This level of use would likely correspond to the water systems average monthly use of 1.9 MGD.

Given the increases in water use (peak over average) during the summer months, it would appear that most of the increase in demand is the result of lawn and landscaping watering, including golf courses and athletic and sports field watering. Analyzing a system's water use is extremely important, because a drought management plan is in reality a comprehensive risk assessment of all water uses. The smaller the difference between peak and average water use, the more difficult the task in establishing priorities and reducing non-essential water use, given a fluctuating source.

Total water demand was met by obtaining 2.4 MGD from the system's water treatment plants and their available reservoirs respectively. The water treatment plants have enough capacity to compensate for the peak demand increases, therefore there is little or no concern for limits on plant capacity. The problems the systems face is a raw water supply issue stemming from limits on the amount of water available in their reservoirs. These problems are the main reason for creation of a drought management plan.

Development of the South Cumberland Regional drought management plan was assigned to the director of each utilities water department. They organized a team of individuals, including customers and utility consultants to help organize and frame the plan. Each utility's EOP addresses line breaks, ice storms, tornados, thunderstorms, railroad and truck spills and potential terrorist threats. The drought management plan focuses attention on managing supplies and demand during a declared drought. Unlike the EOP to which the drought plan is an "annex," the drought plan includes a standby rate structure, restricts some water uses and in some cases bans other water uses at times. The drought management plan was adopted by the mayor and city council or board of commissioners of each municipality and utility district.

4. Goals, Objectives, and Priorities of the Plan

The initial goal of the drought management plan was to provide water to all priority uses as established by the water system under worsening drought conditions (three levels). The water uses and levels of water availability take into account the maintenance of public health and safety, sustaining economic activity, preserving critical environmental resources and life activities.

It is important to note also that the priority given to uses may actually vary among communities. In some communities the relative importance of non-essential uses may be higher relative to other communities and therefore the need to have a reliable and sustainable supply would be greater. Because of these differences, every community will assess risk in their own way and want to minimize the risk to the uses they value. In some communities, landscape and lawn irrigation will be highly valued water uses. Unlike rural and less affluent communities some users will be more willing to build larger impoundments, construct larger transmission lines, or do whatever it takes to maintain lawns and landscapes. Where communities regard the risk to uses as too great, water system managers may need to undertake water resources planning to develop needed resources (wells, caves, springs, streams or rivers) and/or storage (abandoned quarries, or impoundments, either in- or off-stream). Where these resources have already been developed, managers may need to explore any commitments to the use of any resource to determine if additional water can be made available as a result of modifying an operating curve

or instream flow requirement, such as for waste assimilation or aquatic species. To determine if an existing allocation can be modified, it may be the water system will need to develop a hydrologic model and engage in a dialogue with the appropriate regulatory agencies. For some communities with little capacity for risk, water availability to sustain all necessary uses may mean substantially higher water rates to fund needed infrastructure.

Modeling the flow or supply of a source to assess its reliability and understanding the priorities and needs of customers and their willingness to reduce water use is both science” and “art when it comes to planning for a potential and uncertain drought. Because no one can predict events with 100 percent certainty, a water system needs some sort of drought management plan despite what is modeled. Additional water use is the result of increased flushing (to reduce disinfection byproducts).

General Water Uses in Order of Priority:

- Hospital and medical facilities
- Nursing homes and elderly care facilities
- Human Consumption (Drinking water, domestic cooking, bathing, toilet use)
- Fire protection (structural facilities, and hazardous situations)
- Pets (animal hospitals, kennels) and livestock
- Environment (Erosion, Aquatic Habitat)
- Commercial Uses (Restaurant, Laundry, Office, Retail)
- Industry and Manufacturing (Sanitation, Process, Cooling)
- Recreation (Pools, Spas, Athletic Fields, Golf Courses, Fountains)
- Landscape (shrubbery) watering (Home and Commercial)
- Lawn watering, Vehicle Washing (Home and Commercial)

The recognition of specific uses within this ordering of priorities does not preclude the water system’s expectations regarding efficiency and/or use prescriptions as prescribed in the system’s 4 management phases (i.e., “Voluntary Water Reductions,” “Mandatory Water Restrictions,” “Mandatory Restrictions with Surcharge,” and “Emergency Water Management”) as outlined later in this document. Water systems with sources that are substantially unreliable may even need to include a rationing phase, where only the highest priority uses are provided minimal amounts of water.

5. Public Involvement

Each utility has an Emergency Operation Plan (EOP) addressing major line breaks, tanker truck spills, major electrical failures, water treatment plant flooding, a major area fire, potential terrorist attack schemes, and ice storms. The EOP is separate from the city’s “Drought Management Plan.” The EOP is unavailable for public scrutiny. Because droughts emerge more slowly, public involvement in the development of a drought management plan can have significant advantages. Communities generally deal with limited water availability over a much longer period of time requiring longer-term reductions in water use during a drought. Public involvement when the plan is developed greatly increases community understanding and acceptance of it when it has to be implemented. A copy of the South Cumberland Regional

Drought Plan will be kept on file with each utility and is available for public viewing upon request.

6. Interconnections, Mutual Aid Agreements and Backup Sources

The utilities are all interconnected in some form, so that is why the drought plan was pulled together by all the utilities as a single document. There are some cases where pumps may be required to reverse the normal flow of water during drought conditions; however this will be paid by the revenues generated from the surcharges of the different stages of the drought plan. It is the goal of the South Cumberland Drought Task Force to actively work towards improving the inter-connectivity between the utilities and thereby increasing the capacity of each utility to assist each other in mitigating the effects of drought. To this end, as part of the quarterly meetings by the Task Force, attention will be paid to improving and upgrading these existing connections and planning new connections if needed.

7. Drought Plan Phases

The drought response plan is broken into four phases: Drought Alert with Voluntary Reductions, Mandatory Water Reductions, Mandatory Water Restrictions with surcharge, and Emergency Water Management. The drought management phases and sets of trigger points along with their associated goals are described below. Failure to achieve a management phases goal within a reasonable time shall call for the next phase to be implemented. The stage levels are for guidance only and the General Managers of each utility shall, by consensus, make the final declaration of when to activate each phase of the plan.

7.1 Drought Alert with Voluntary Reductions

In the drought alert phase with voluntary reductions, the South Cumberland Region utilities will focus on monitoring conditions, prepare for the possible implementation of “Mandatory Water Reductions,” and call its drought task force group together to review the plan and next-step actions. “Voluntary Reductions” will be requested and the South Cumberland Utilities have established a water use reduction goal of 10 percent. This figure corresponds to approximately 2.1 million gallons per day water use. As a first step, system managers thought it was essential to reduce water demand to this more sustainable level. Daily water use above 2.1 MGD places the systems at risk. This would severely deplete the reservoirs and keep them at levels where water quality could be diminished. In addition, water use at higher levels cannot be maintained, excessively drawing down water levels in tanks, and stressing the system hydraulically. Managers believe encouraging customers to more efficiently use water allows the system to have breathing room. The goal of a 10 percent reduction in water use (from historical

peak demands) would be accomplished by a public appeal to customers to reduce water use and an educational effort.

Among the trigger points for implementing this phase would be the observance of drought conditions and a dropping of lake levels below normal operating parameters. The 120 day supply level is the key trigger point to begin a Tier 1 drought alert with voluntary reductions. The public appeal would consist of news releases to the media (weekly newspaper, local radio and regional television stations). In addition, a few utility staff would be assigned to visit major users of water (schools, businesses, golf courses) to distribute information regarding reducing water use during the various management phases outlined in the drought management plan.

7.2 Mandatory Water Restrictions

The goal of activating a “Mandatory Water Restrictions” phase would be to reduce water demand by customers by 20 percent (from estimated peak demand) corresponding to the system’s base demand of approximately 1.9 MGD. The level of demand was deemed by the South Cumberland Regional Utilities to be “do-able” given it has a reliable supply of 1.9 MGD from the various reservoirs and treatment plants in the region. The trigger point for this phase will be when a reservoir drops to or below the 90 day supply level. Reductions in use would be accomplished by requiring customers to observe the following water use restrictions:

Restricted:

- a) watering of lawns, flower gardens, trees, shrubs, etc., are restricted to assigned days of the week and only from 5:00 AM to 10:00 AM: addresses ending in an even number may water on Wednesday, Friday, or Sunday, and addresses ending in an odd number may water on Tuesday, Thursday, or Saturday;
- b) watering of fairways on any golf course and all ball/athletic fields restricted to sprinkling/irrigation to the hours of 12:01 AM to 5:00 AM; and
- c) normal scheduled fire hydrant testing is restricted to 50% of the schedule.

Prohibited:

- a) washing sidewalks, driveways, parking areas, tennis courts, patios, or any other hard surfaces by commercial, industrial or residential customers except for sanitary or safety purposes;
- b) filling or re-filling of swimming pools;
- c) non-commercial and commercial washing of motor vehicles, trailers or boats;
- d) use of water for dust control or construction compaction; and
- e) fire fighting training.

7.3 Mandatory Restrictions with Surcharge

The goal of activating a “Mandatory Water Restrictions with Surcharge” phase would be to reduce water demand by customers by 25 percent (from estimated peak demand) corresponding to the system’s base demand of approximately 1.8 MGD. This level of demand was deemed by the South Cumberland Regional Utilities to be low enough to allow reservoirs to recharge even during drought conditions. The trigger point for this phase will be when a reservoir drops to or below the 60 day supply level.

The cost of compliance activities would be partially funded by fines, reconnection fees and the increase in water rates as outlined in each system’s respective rate structure.

Reductions in use would be accomplished by requiring customers to observe the following water use restrictions:

Restricted:

- a) commercial farms and growers (e.g. animal farms, nurseries, vegetable growers, etc.) will be restricted to absolute minimum usage to keep animals and plants alive and may be required during the drought/water shortage event to institute water saving methods such as shading, mulching, and drip irrigation, as may be necessary;
- b) watering of golf course tees and greens may only be watered on Monday, Wednesday, and Fridays from 12:01 AM to 5:00 AM, and game fields may only be watered on Tuesday, Thursday, or Saturday from 12:01 AM to 5:00 AM; and
- c) water served for drinking purposes at restaurants or other public or non-public eating establishments is restricted to be served only as requested by the patron or customer.

Strictly Prohibited:

- a) residential watering of trees, shrubs, lawns, or flower gardens;
- b) watering of golf course fairways; and
- c) all non-state-mandated line flushing by utilities and fire departments.

7.4 Emergency Water Management

The “Emergency Water Management” phase of the drought plan would be triggered by severe water pressure or other hydraulic issues, or the city’s reserve water falls below a 40-day supply. The purpose of this phase would be to reduce water use to 75 percent of its base water use, a reduction of 30 percent from its peak demand (of 2.4 MGD). The purpose of that goal would be to preserve water in the city’s reservoir to meet any unexpected critical need. (See “Trigger points by Management Phase.”)

Reductions in water use would be accomplished by a 15 percent increase in water rates and by requiring customers to observe the following water use restrictions:

Restricted:

commercial farms and growers (e.g. animal farms, nurseries, vegetable growers, etc.) will be restricted to absolute minimum usage to keep animals and plants alive and may be required during the drought/water shortage event to institute water saving methods such as shading, mulching, and drip irrigation, as may be necessary;

Strictly Prohibited:

Watering of any golf course, ball, or athletic field.

8.0 Implementation

The South Cumberland Regional Drought Management Task Force established four (4) drought management phases. All four phases are described below. In addition, numerous trigger points were identified signaling the beginning of a phase. In the event two or more of the regional utilities goes into phase two “Mandatory Water Restrictions,” all other utilities will issue a system wide phase two notification. This will apply to all phases from two through four. All utilities must be above the trigger point of a given phase before any utility will be allowed to climb out of a phase. As long as one regional utility is under phase two restrictions, all other utilities will remain there. Once all utilities have sufficient water supplies to ease restrictions back to phase one, any utility may voluntarily lift all phase restrictions at that point. This agreement was key to ensure all the utilities are working together to maintain water for essential uses in the region should a drought develop.

9.0 Drought Management Phases

The South Cumberland Regional Drought Management Plan created four different phases to categorize the differing needs in various drought situations. Each phase is given a trigger point that will serve as the sole identifier of enacting a drought phase.

9.1 Drought Alert with Voluntary Water Reductions

The trigger point for this phase is when a system’s reservoir falls below the 120-day supply level. The goal of this phase is to bring water use demand to a level that at users current demand supplies would be met for at least 120 days. This phase calls for some restraint by users, with the expectation that rainfall is likely (at least statistically). The phase would likely correspond to conditions described by the US Drought Monitor as either abnormally dry or moderate drought however it is possible that conditions might even be described as a severe drought. It is possible for only one utility to fall into this phase, while the other utilities continue to operate under normal conditions.

9.2 *Mandatory Water Restrictions*

The trigger point for this phase is when a system's reservoir falls below the 90 day supply level. The goal of this phase is to bring water use demand to a level that at users current demand supplies would be met for at least 90 days, while the reservoir's level remains steady. This phase calls for some restraint by users, with the expectation that rainfall is likely (at least statistically). The phase would likely correspond to conditions described by the US Drought Monitor as either a severe or extreme drought however it is possible that conditions might even be described as an exceptional drought. It is possible for only one utility to issue a phase two "Mandatory Water Restriction," however should a second utility from the region issue a phase two notice; all other utilities will initiate this plan and also issue a phase two notice.

9.3 *Mandatory Water Restrictions with Surcharge*

The trigger point for this phase is when a system's reservoir falls below the 60 day supply level. The goal of this phase is to bring water use demand to a level that at users current demand supplies would be met for at least 60 days, while the reservoir's level remains steady. This phase calls for serious restraint by users, with the expectation that rainfall is likely (at least statistically). The phase would likely correspond to conditions described by the US Drought Monitor as either a severe or extreme drought however it is possible that conditions might even be described as an exceptional drought. It is possible for only one utility to issue a phase three "Mandatory Water Restrictions with Surcharge," however should a second utility from the region issue a phase three notice; all other utilities will initiate this plan and also issue a phase three notice.

9.4 *Water Emergency Management*

The trigger point for this phase is when a system's reservoir falls below the 40 day supply level. The goal of this phase is to bring water use demand to a level where water supplies would meet demand for an extended period of time beyond the 40-day supply currently. This phase calls for sacrifices by users, with the expectation that rainfall is not likely to occur) and that extremely limited supplies must be reserved for supporting life and necessary sanitary uses (human consumption). The phase would likely correspond to conditions described by the US Drought Monitor as an exceptional drought.

10.0 Plan Enforcement

The South Cumberland Regional Drought Plan includes the naming of a drought management team with responsibility/authority to hire/contract/assign staff to hang door notices,

conduct additional meter reading, issue warnings and citations (with penalties for non-compliance according to a well-developed scheme), along with staff to shut-off water to customers who repeatedly do not comply. The members of this team include the managers from each water system acting on behalf of their respective systems. Each member has an equal say in the Drought Management Process, however a vote will be taken during the first such meeting to declare a spokesman for the group until the current drought situation subsides.

The plan tentatively calls for the team to meet quarterly to review the status of the system: water supply (raw and/or purchased), overall demand and by user group, system hydraulics (time of day and accumulative), current staffing and resources (such as vehicle availability, in-print educational resources, etc). The plan also calls for additional meetings (or teleconferences, phone trees) if they are needed

Funds for these additional activities are to come from the additional monies collected when the various phases are implemented. The final two phases call for activation of water customer rate changes, which include drought surcharges of 10 percent and 15 percent corresponding to each more restrictive phase. It is the liberty of each member utility to charge a different surcharge based on the needs of their respective systems.

In addition to establishing trigger points, the South Cumberland Regional Drought Plan calls for the following enforcement provisions:

(1) *Penalties.* Any person violating the mandatory restriction provisions or the emergency management provision of the drought management plan shall be penalized as called for in each individual utility policy.

(2) *Discontinuance of Water Service.* Water service may be discontinued for the willful disregard of water mandatory restrictions or emergency water management provisions as determined by the affected utility.

(3) *Drought Surcharges.* During periods of extended and extreme drought when mandatory restrictions and emergency water management restrictions are necessary, additional drought surcharges may be applied to customer's bills based on the financial needs of each individual utility system.

11.0 Plan Adoption

This drought plan was presented to each council and board falling under the plan and was approved by each body. Next, the Drought Management Team came together and formally adopted the plan on 10 March, 2011. It is the policy of this plan to review the document within one year of any phase being put in action. The Drought Management Team will also come together once every four years to consider any new circumstances affecting water supply and/or demand and to also familiarize any new elected officials to the scope of the South Cumberland Regional Drought Plan. The Activation Review requires a review of the procedures activating the phases and their effectiveness. Refinements to the drought management plan will be made as

necessary. The drought manager is responsible for making the review and presenting that review before council.