
2017 Interbasin Transfer Certificate Drought Management Plan

Prepared for:
Pender County Utilities

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Prepared by:



HIGHFILL
INFRASTRUCTURE
ENGINEERING, P.C.

3804 Park Avenue, Suite A
Wilmington, NC 28403



CH2M HILL North Carolina, Inc.
3120 Highwoods Boulevard
Suite 214 - Magnolia Building
Raleigh, NC 27604
(919) 875-4311

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Drought Management Plan

1.1 Introduction

Pender County Utilities (PCU) is committed to effectively managing their water resources and ensuring safe and reliable water supply for the communities they serve while being good stewards of the natural environment. As part of long-range planning efforts, PCU is engaging in the planning process as a regional provider of surface water. PCU has reached out to other neighboring utilities, including all other utility providers within Pender County, to determine which entities may consider obtaining surface water through PCU's system in the future. These utilities are currently reliant on groundwater for their potable water needs. The utilities that have decided to partner with PCU as a co-applicant as part of the IBT certificate process include the Town of Burgaw, Town of Topsail Beach, Town of Surf City, Town of Wallace (in neighboring Duplin County), and Utilities, Inc. PCU and its co-applicants are requesting an authorized transfer between designated IBT river basins, from the Cape Fear River to the South River, Northeast Cape Fear River, and New River IBT basins of 14.5 MGD, calculated as a daily average of a calendar month. The proposed transfer amount is based on updated water demand projections for the next 30 years. In addition to the permitted transfer volume, the IBT statute includes a condition that requires the development of a Drought Management Plan (DMP) that specifies how the IBT shall be managed to protect the source river basin (Cape Fear River IBT Basin) during drought conditions or other emergencies that occur within the source river basin.

Currently, PCU and the co-applicants have Water Shortage Response Plans (WSRPs), as required by North Carolina General Statute (NCGS) 143-355(l). The rules governing water use during droughts and water emergencies (15A North Carolina Administrative Code [NCAC] 02E. 0607) stipulate specific items that must be included in those plans. The WSRPs were developed in accordance with the NCAC and the *Water Shortage Response Plan Guidelines* (NCDWR, 2009) provided by the Division of Water Resources (NCDWR), and were approved by the NCDWR in 2010. One co-applicant is projected to begin purchasing water from PCU by year 2025, and the remainder are projected to begin by year 2030. Since the co-applicants' current WSRPs are related to their current groundwater supplies, they are not germane to PCU's DMP. Each co-applicant will be required to adopt PCU's WSRP and comply with this DMP prior to receiving water from PCU.

PCU updated their WSRP in 2017 to include appropriate triggers and to ensure they are protecting the water source and be among the most stringent WSRPs in the basin. A comparison matrix comparing PCU's WSRP to those of Brunswick County and Cape Fear Public Utility Authority (CFPUA), two neighboring utilities utilizing the same water source, is included in Appendix A and is discussed further in Section 1.3.

In contrast to PCU's and co-applicants' long-term water conservation program, the purpose of the WSRP is to deal with short-term or immediate water shortages that may be caused by drought, water quality problems, or disruptions in facility operations. PCU has authority to enact water shortage response provisions identified in the WSRP through Pender County's Water and Sewer Ordinance adopted June 16, 2008 and amended June 2010.

The following sections of this DMP summarize the provisions of PCU's WSRP and how the implementation of the WSRP helps to protect the IBT source river basin (Cape Fear River IBT Basin) during droughts or other emergencies.

1.2 Water Shortage Response Plan

The IBT certificate condition requiring a DMP focuses on the protection of the source river basin during low flow conditions. The authority of PCU and the co-applicants to require water use reductions across their service area, including wholesale customers, as described in the WSRP, will provide for reduced water withdrawals from the Cape Fear River IBT Basin during periods of drought or other water emergencies. PCU's WSRP is included in Appendix B.

The WSRP includes an estimate of the expected effectiveness of the mandatory water use reductions for each stage of water shortage response. Table 1 provides a summary of water reduction measures, and an estimate of the range of percentage reductions that might be expected in IBT for each WSRP stage.

TABLE 1

Estimated Range of Interbasin Transfer Reduction for PCU and its Co-applicants Water Shortage Response Plan Stages

WSRP Stage	Reduction Measures	Potential Decrease in IBT from WSRP Implementation (%)
1 (Voluntary)	All water users asked to reduce their normal water use by 5%. Customer education and outreach programs will encourage water conservation including: irrigating landscapes a maximum of 1 inch per week; preventing water waste through runoff and irrigation of impervious surfaces; watering plants deeply to encourage root growth; washing only full loads in clothes and dishwashers; using spring-loaded nozzles on garden hoses; and identifying and repairing all water leak.	0-5
2 (Mandatory I)	All customers are expected to reduce their water use by 10% in comparison to previous month's bill. Irrigation is limited to a half inch per week between 8 PM and 8 AM; outdoor use of drinking water for washing impervious surfaces is prohibited; and all testing and training purposes regarding drinking water (i.e. fire protection) will be limited.	5-10
3 (Mandatory II)	Mandatory II: Customers must continue actions from previous stages and further reduce water use by 20% compared to their previous month's bill. All non-essential uses of drinking water are banned, and landscape irrigation must be reduced to minimum volume necessary for survival. A drought surcharge of 1.5 times the normal water rate applies.	10-20
4 (Emergency)	Customers must continue all action from previous stages and further reduce their water use by 25% compared to their previous month's bill. A ban on all use of drinking water except to protect public health and safety is implemented. Drought surcharges increase to 2 times the normal water rate.	20-25
5 (Rationing)	Provide drinking water to protect only public health (e.g. residences, residential health care facilities, correctional facilities). All customers are only permitted to use water at the minimum level required for public health protection. Firefighting is the only allowable outdoor water use. Drought surcharges increase to 5 times the normal water rate.	20-25

The ranges are based on the projected water demand, consumptive use, surface water discharge, and resulting IBT for the 30-year planning period used for the IBT certificate (2045), as well as the expected effect of the time of year when the WSRP is implemented. The ranges reflect the amount of uncertainty inherent in predicting the potential impact of water use reductions on the multiple factors that go into estimating IBT.

1.3 Protection of the Source Basin

NCGS 143-215.22L(n)(2) states that a Drought Management Plan, as a condition of an IBT certificate, should specify how the IBT will be managed to protect the source basin during drought conditions with its mandatory implementation.

1. The WSRP for PCU and its co-applicants will reduce water withdrawals and IBT from the Cape Fear River IBT Basin during drought conditions, thereby protecting the source basin.

2. The restrictions on water use from the Cape Fear River IBT Basin will increase, and IBT will decrease, in direct proportion to the severity and duration of drought conditions, thereby protecting the source basin.

The Water Shortage Response Plan Comparison Matrix included in Appendix A compares the triggers and conservation measures of PCU's WSRP with those recently approved for CFPUA and Brunswick County. The matrix shows that PCU's requirements are the most stringent. Some notable observations regarding PCU's WSRP are provided below:

1. PCU has listed up to five "trigger" criteria in which it can mandate a water shortage response at each level. The multiple trigger criteria ensure that PCU can initiate a timely response to water emergencies.
2. PCU provides a prescriptive list of specific actions that are required to be taken at each water shortage stage. These lists help clarify what activities are allowed and prohibited to foster greater compliance.
3. PCU implements drought surcharges of up to 5 times the normal water rate to ensure that nonessential uses are curtailed. Cape Fear PUA and Brunswick County do not implement drought surcharges at any water shortage stage.

1.4 Model Scenario Comparison

The *Environmental Assessment for an Interbasin Transfer from the Cape Fear River* (EA) evaluated the potential changes in the source basin, Cape Fear River IBT basin. Table 2 provides a comparison of the four scenarios developed to establish baselines for the years 2010 and 2045 (assuming no increase in IBT), and to allow evaluation of the potential effects of the proposed IBT. The 2045 Maximum Withdrawal scenario represents a conservative analysis of flow if 100% of Jordan Lake water supply is allocated. River flow statistics include average and median flows, which are representative of average climatic conditions, and 10th and 5th percentile flows, which are representative of "severe" and "extreme" droughts, respectively.

TABLE 2
Model Scenario Comparison - Cape Fear River Statistics Below L&D #1

Scenario	Average	Median	10 th Percentile	5 th Percentile
2010 Baseline - River Flow (CFS)	5,297	3,055	858	649
2045 Baseline - River Flow (CFS)	5,214	2,971	825	606
2045 Requested IBT - River Flow (CFS)	5,196	2,953	805	585
Difference from 2045 Baseline (CFS)	-19	-18	-20	-21
Difference from 2045 Baseline (percent)	-0.4%	-0.6%	-2.5%	-3.5%
2045 Maximum Withdrawal - River Flow (CFS)	5,112	2,881	747	538
Difference from 2045 Baseline (CFS)	-103	-90	-78	-68
Difference from 2045 Baseline (percent)	-2.0%	-3.0%	-9.7%	-11.6%

Source: Highfill Infrastructure Engineering, P.C. and CH2M, 2017

For the 2045 scenario, average flows decrease less than 0.5 percent, whereas the 10th and 5th percentiles flows decrease 2.5 and 3.5 percent, respectively. Even with a 3.5 percent reduction in the 5th percentile flow for the period of record (95 percent of flows during this period are greater) there is still 585 cfs (378 MGD) of flow passing at L&D #1. Similar results were observed for the 2045 Maximum Withdrawal scenario; less than 2.0 percent change on average and an 11.6 percent change for low flow periods, as indicated by the 5th percentile flows.

The effect below L&D #1 from PCU's IBT during drought periods, as well as other public water supplies accessing water from the Cape Fear River, will be further mitigated by the implementation of the State-required WSRPs. Per the NCAC, industrial users shall be "consistent with industry water efficiency and drought response guidelines." In addition, agricultural users shall "reduce water usage to the maximum extent possible." The language within the rule states that during exceptional drought designation "water users shall reduce water use by at least 20% below the amount used in the month prior." The WSRPs for public water supplies downstream of Jordan Lake are not built into the Cape Fear – Neuse River Hydrologic Model. Based on the 20% reduction target in the NCAC, the reduction in water withdrawal for those withdrawals downstream of Jordan Lake could be approximately 43 - 52 MGD (66 - 80 CFS) depending on the time of year of the drought occurrence. This estimate includes reductions for PCU and all withdrawals at L&D #1; therefore, the results of hydrologic modeling represent a conservative evaluation of flows during drought conditions.

1.5 Modifications to Water Shortage Response Plans

PCU has updated its WSRP to include triggers and required conservation measures that are among the most stringent in the source basin. The co-applicants will be required to update their WSRPs to include the same triggers and requirements as PCU prior to purchasing water from PCU. NCDWR approval of the updated plans will be required, and compliance will be monitored under this plan.

SECTION 2

References

Highfill Infrastructure Engineering, P.C. and CH2M. January 2017. Environmental Assessment for an Interbasin Transfer from the Cape Fear River.

North Carolina Administrative Code (NCAC). 2015. 15A NCAC 02E.0607: Publicly and Privately Owned Water System Water Shortage Response Planning Requirements.

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Appendix A
Water Shortage Response Plan Comparison Matrix

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Water Shortage Response Plan Comparison Matrix

No.	Stage	Triggers			Conservation Measures		
		PCU	Cape Fear PUA	Brunswick	PCU	Cape Fear PUA	Brunswick
1	Voluntary Reductions	Stage 1: 1) PCU DPU identifies an immediate water shortage OR 2) declaration of D0 drought	Normal Conditions (water conservation measures and best management practices encouraged at all times)	Stage 1: 1) Immediate water shortage declared by state/local officials OR 2) 3 consecutive days where the actual/anticipated potable water demand is $\geq 80\%$ of actual available treatment capacity (not necessarily rated capacity if available raw water supply or the treatment capacity is diminished)	1) Ask all water users to reduce normal water use by 5%. 2) Encourage water conservation & efficiency through customer education and outreach programs (including irrigating landscapes a maximum of one inch per week; preventing water waste, runoff and watering impervious surfaces; watering plants deeply to encourage root growth; washing only full loads in clothes and dishwashers; using spring-loaded nozzles on garden hoses; and identifying and repairing all water leaks. Include a prescriptive list of water conservation and efficiency measures.	Water conservation measures and best management practices are encouraged at all times.	No conservation measures are listed in the WSRP. All water use restriction information is listed in the Final EA - Brunswick IBT. The EA includes a prescriptive list of water conservation and efficiency measures.
2	Mandatory Reductions I	Stage 2: 1) PCU DPU identifies an immediate water shortage; 2) PCU DPU determines that Voluntary Reduction conditions have not resulted in sufficient reduction of the average day demand; 3) When there are three consecutive days where water demand exceeds 80% of the supply/treatment capacity; OR 4) Finished water storage less than 2.5 million gallons in the distribution system OR 5) declaration of a D1 drought	Stage 1: 1) voluntary restrictions have not resulted in "sufficient reduction" of average day demand; 2) necessary to implement additional mandatory water use rules to protect the public health, safety, and welfare; OR 3) declaration of a D1 drought	Stage 2: 1) declared immediate water shortage OR 2) 2 consecutive days where the actual/anticipated potable water demand is $\geq 90\%$ of available treatment capacity	1) All customers are expected to reduce their water use by 10% in comparison to their previous month's water bill. 2) In addition to continuing to encourage all voluntary reduction actions, the following restrictions apply: irrigation is limited to a half inch per week between 8PM and 8AM; outdoor use of drinking water for washing impervious surfaces is prohibited; and all testing and training purposes requiring drinking water (e.g. fire protection) will be limited. The following are specifically prohibited: washing vehicles; power washing buildings except for paint prep (permit required); jetting piles to facilitate construction; filling swimming pools except for the minimal volume to maintain structural integrity and filtration system.	Spray irrigation limited to 3 times per week at night time only. Low volume drip irrigation allowed at any time. Irrigation well users are excluded.	No conservation measures are listed in the WSRP. All water use restriction information is listed in the Final EA - Brunswick IBT. THE EA prohibits the following: spray irrigation (hand hoses are allowed); filling new swimming pools; washing vehicles (businesses of washing vehicles may continue to operate; serving water at restaurants except upon request; and using water to control or compact dust. Commercial and industrial users have mandatory reductions of 20%.
3	Mandatory Reductions II	Stage 3: 1) PCU DPU identifies an immediate water shortage; 2) PCU DPU determines that water use under Stage 2 conditions have not resulted in sufficient reduction of the average day demand; 3) When there are two consecutive days where water demand exceeds 90% of supply/treatment capacity; OR 4) Finished water storage less than 1.5 million gallons in the distribution system OR 5) declaration of a D2 drought	Stage 2: 1) immediate water shortage; 2) three consecutive days when water demand exceeds 80% of the water production capacity; 3) necessary to implement additional mandatory water use rules to protect the public health, safety, and welfare; OR 4) declaration of a D2 drought	Stage 3: 1) declared immediate water shortage OR 2) >24 hours where the actual/anticipated potable water demand = 100% of available treatment capacity	1) Customers must continue actions from all previous stages and further reduce water use by 20% compared to their previous month's water bill. 2) All non-essential uses of drinking water are banned and garden and landscape irrigation must be reduced to the minimum amount necessary for survival. 3) Apply a drought surcharge of 1.5 times the normal water rate. The following are specifically prohibited: no using water outside of structures except for emergencies involving fire; no introducing water into swimming pools; no serving water in restaurants except upon request. All other water uses are limited to meet essential health and safety needs.	Spray irrigation limited to 2 times per week at night time only. Low volume drip irrigation allowed at any time. Residents are limited to pressure washing and washing vehicles on weekends only. Restaurants prohibited from serving water unless requested by customer. Well irrigation users are excluded.	No conservation measures are listed in the WSRP. All water use restriction information is listed in the Final EA - Brunswick IBT. The EA prohibits the following: watering lawns, trees, and flowers (vegetables can be watered by hand); washing vehicles at commercial car wash establishments. Commercial and industrial users have mandatory reductions of 50%.
4	Emergency Reductions	Stage 4: 1) PCU DPU identifies an immediate water shortage; 2) PCU DPU determines that water use under Stage 3 conditions have not resulted in sufficient reduction of the average day demand; 3) When there is one day where water demand exceeds 100% of supply/treatment capacity; OR 4) Finished water storage less than 1.5 million gallons in the distribution system; OR 5) declaration of a D3 drought	Stage 3: 1) immediate water shortage; 2) two consecutive days when water demand exceeds 90% of the water production capacity; 3) necessary to implement additional mandatory water use rules to protect the public health, safety, and welfare; OR 4) declaration of a D3	Not listed in the WSRP. This stage is only mentioned in the Final EA - Brunswick IBT.	1) Customers must continue all actions from previous stages and further reduce their water use by 25% compared to their previous month's water bill. 2) A ban on all use of drinking water except to protect public health and safety is implemented. 3) Apply drought surcharge increase to 2 times the normal water rate.	Spray irrigation limited to 2 times per week at night time only. Low volume drip irrigation allowed at any time. Using potable water to fill swimming pools is allowed with an approved permit. Residents are limited to pressure washing and washing vehicles on weekends only. Restaurants prohibited from serving water unless requested by customer. Using potable water to control or compact dust is prohibited. Commercial car washes must reduce total water consumption by 10% from "previous month."	No conservation measures are listed in the WSRP. All water use restriction information is listed in the Final EA - Brunswick IBT. A ban on all use of drinking water except to maintain public health and safety. Residential water use shall be limited to the amount necessary to sustain life through drinking, food preparation, and personal hygiene.
5	Water Rationing	Stage 5: 1) PCU DPU identifies an immediate water shortage; 2) PCU DPU determines that water use under Stage 4 conditions have not resulted in sufficient reduction of the average day demand; OR 3) Finished water storage less than 1.0 million gallons in the distribution system; 4) declaration of a D4 drought	Stage 4: 1) immediate water shortage or severe emergency; 2) when there is one day when water demand exceeds 100% of the water production capacity; 3) it is necessary to implement additional mandatory water use rules to protect the public health, safety, and welfare; OR 4) declaration of a D4 drought		The goal of Stage 5 is to provide drinking water to protect only public health (e.g. residences, residential health care facilities and correctional facilities). 1) All customers are only permitted to use water at the minimum required for public health protection. 2) Firefighting is the only allowable outdoor water use and pickup locations for distributing potable water will be announced according to (PCU'S) Emergency Response Plan. 3) Drought surcharge increases to 5 times the normal water rate.	Using water for irrigation prohibited except for low volume drip irrigation for commercial containerized plants. No new lawn permits will be issued. Using hand held hoses for cleaning purposes is prohibited. Filling new swimming pools with potable water is prohibited. Washing vehicles is prohibited. Using potable water to control or compact dust is prohibited. No commercial or residential pressure washing. Commercial car washes must demonstrate 20% reduction from previous month.	

Appendix B
Pender County Utilities Water Shortage Response
Plan

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WATER SHORTAGE RESPONSE PLAN
PENDER COUNTY UTILITIES, NORTH CAROLINA

The procedures herein are written to reduce potable water demand and supplement existing drinking water supplies whenever existing water supply sources are inadequate to meet current demands for potable water.

I. AUTHORIZATION

The Pender County Utilities Director shall enact the following water shortage response provisions whenever the trigger conditions outlined in Section IV are met. In his/her absence, an authorized representative will assume this role.

Mr. Bryan McCabe, PE
Pender County Utilities Director
605 E. Fremont Street
Burgaw, NC 28425
910-259-1570
bmccabe@pendercountync.gov

II. NOTIFICATION

The following notification methods will be used to inform water system employees and customers of a water shortage declaration: employee e-mail announcements, notices at municipal buildings, notices in water bills. Required water shortage response measures will be communicated through *The Pender Post*, the *Topsail Voice*, PSA announcements on local radio and cable stations. Declaration of emergency water restrictions or water rationing will be communicated to all customers by telephone through the County’s Connect – CTY (reverse 911) system.

III. LEVELS OF RESPONSE

Five levels of water shortage response are outlined in the table below. A detailed description of each response level and corresponding water reduction measures are provided below.

Stage	Response	Description
1	Voluntary Reductions	Water users are encouraged to reduce their water use and improve water use efficiency; however, no penalties apply for noncompliance. Water supply conditions indicate a potential for shortage.
2	Mandatory Reductions I	Water users must abide by required water use reduction and efficiency measures; penalties apply for noncompliance. Water supply conditions are significantly lower than the seasonal norm and water shortage conditions are expected to persist.

3	Mandatory Reductions II	Same as in Stage 2, with more aggressive water use restrictions
4	Emergency Reductions	Water supply conditions are substantially diminished and pose an imminent threat to human health or environmental integrity.
5	Water Rationing	Water supply conditions are substantially diminished and remaining supplies must be allocated to preserve human health and environmental integrity.

Stage 1, Voluntary Reductions:

- All water users will be asked to reduce their normal water use by 5%.
- Customer education and outreach programs will encourage water conservation and efficiency measures including:
 - o Irrigating landscapes a maximum of one inch per week.
 - o Preventing water waste, runoff and watering impervious surfaces.
 - o Watering plants deeply to encourage root growth.
 - o Washing only full loads in clothes and dishwashers.
 - o Using spring-loaded nozzles on garden hoses.
 - o Identifying and repairing all water leaks.
 - o Watering shrubbery the minimum amount required.
 - o Limiting vehicle and boat washing to the minimum.
 - o Refraining from washing down outside areas such as sidewalks and patios.
 - o Using showers for bathing rather than baths, and limiting showers to no more than four minutes.
 - o Refraining from leaving faucets running while shaving or while rinsing dishes.
 - o Installing water-flow restrictive devices in showerheads.
 - o Using disposable and biodegradable dishes.
 - o Installing water-saving devices such as plastic bottles or commercial units in toilet tanks to reduce volume.
 - o Ensuring toilet flapper valves are not leaking: This flapper can be checked by adding a food coloring to the toilet tank and visually checking to see if the color appears in the bowl. If it does show color, the toilet is leaking.
 - o Storing drinking water in refrigerator to avoid trying to run it cool from the tap.

Stage 2, Mandatory Reductions I:

- All customers are expected to reduce their water use by 10% in comparison to their previous month's water bill.
- In addition to continuing to encourage all voluntary reduction actions, the following restrictions apply:
 - o Irrigation is limited to a half inch per week between 8PM and 8AM.
 - o Outdoor use of drinking water for washing impervious surfaces is prohibited.
 - o All testing and training purposes requiring drinking water (e.g. fire protection) will be limited.
 - o The use of water for washing or cleaning of equipment including vehicles, boats and fleet vehicles is prohibited unless water use is deemed essential to maintain the safe operational use or equipment integrity.

- o The use of water for power washing of buildings and other structures is prohibited, except for paint prep only (permit required).
- o The use of water from fire hydrants and hose bibs is prohibited, except for:
 - fighting fire and fire protection purposes
 - testing or training fire fighters if it is necessary to protect public safety
 - jetting piles to facilitate construction
 - construction site hose bibs
- o The filling of family, public or private swimming pools, including hot tubs, spas and whirlpool tubs, is prohibited, except for the minimal amount of make-up water necessary to maintain a pool's structural integrity and filtration system.

Stage 3, Mandatory Reductions II:

- Customers must continue actions from all previous stages and further reduce water use by 20% compared to their previous month's water bill.
- All non-essential uses of drinking water are banned and garden and landscape irrigation must be reduced to the minimum amount necessary for survival.
- No using water outside of structures for any use other than emergencies involving fire.
- No introducing water into swimming pools.
- No use of fire hydrants except for fighting fire.
- All other uses of water will be limited to uses necessary to meet the essential health and safety needs of the people of Pender County.
- No serving water in restaurants except upon request.
- Encourage use of disposable utensils and plates in homes and restaurants.
- Additionally, in Stage 3, a drought surcharge of 1.5 times the normal water rate applies.

Stage 4, Emergency Reductions:

- Customers must continue all actions from previous stages and further reduce their water use by 25% compared to their previous month's water bill.
- A ban on all use of drinking water except to protect public health and safety is implemented and drought surcharges increase to 2 times the normal water rate.

Stage 5, Water Rationing:

The goal of Stage 5, Water Rationing, is to provide drinking water to protect public health (e.g. residences, residential health care facilities and correctional facilities). In Stage 5, all customers are only permitted to use water at the minimum required for public health protection. Firefighting is the only allowable outdoor water use, and pickup locations for distributing potable water will be announced according to PCU's Emergency Response Plan. Drought surcharges increase to 5 times the normal water rate.

- It will be unlawful to fail to act in accordance with this section or use water contrary to this section or attempt to evade or avoid such water rationing restrictions.
- Fire protection will be maintained, but where possible, tank trucks shall use raw water.
- Close all swimming pools.
- No washing of any motor vehicles, including commercial washing.
- All industrial uses of water are prohibited.

- All other uses of water will be limited to those necessary to meet minimum health and safety needs of the customers.

IV. TRIGGERS

Pender County Utilities (PCU) draws raw surface water from the Lower Cape Fear Water and Sewer Authority's intake in the Cape Fear River in Bladen County. The triggers based on the potable water demand percentages below are dependent on this water source. A number of additional triggers are provided for each of the water shortage stages.

Stage 1, Voluntary Reductions:

1. PCU Utilities Director identifies an immediate water shortage or water quality emergency; OR
2. Declaration of D0 drought.

Stage 2, Mandatory Reductions I:

1. PCU Utilities Director identifies an immediate water shortage or water quality emergency; OR
2. PCU Utilities Director determines that Stage 1 conditions have not resulted in sufficient reduction of the average day demand; OR
3. When there are three consecutive days where water demand exceeds 80% of the supply/treatment capacity; OR
4. Finished water storage less than 2.5 million gallons in the distribution system; OR
5. Declaration of a D1 drought.

Stage 3, Mandatory Reductions II:

1. PCU Utilities Director identifies an immediate water shortage or water quality emergency; OR
2. PCU Utilities Director determines that Stage 2 conditions have not resulted in sufficient reduction of the average day demand; OR
3. When there are two consecutive days where water demand exceeds 90% of of supply/treatment capacity; OR
4. Finished water storage less than 1.5 million gallons in the distribution system; OR
5. Declaration of a D2 drought.

Stage 4, Emergency Reductions:

1. PCU Utilities Director identifies an immediate water shortage or water quality emergency; OR
2. PCU Utilities Director determines that Stage 3 conditions have not resulted in sufficient reduction of the average day demand; OR
3. When there is one day where water demand exceeds 100% of supply/treatment capacity; OR
4. Finished water storage less than 1.5 million gallons in the distribution system; OR
5. Declaration of a D3 drought.

Stage 5, Water Rationing:

1. PCU Utilities Director identifies an immediate water shortage or water quality emergency; OR
2. PCU Utilities Director determines that Stage 4 conditions have not resulted in sufficient reduction of the average day demand; OR
3. Finished water storage less than 1.0 million gallons in the distribution system; OR
4. Declaration of a D4 drought.

V. RETURN TO NORMAL

When water shortage conditions have abated and the situation is returning to normal, water conservation measures employed during each phase should be decreased in reverse order of implementation. Permanent measures directed toward long-term monitoring and conservation should be implemented or continued so that the community will be in a better position to prevent shortages and respond to recurring water shortage conditions.

VI. ENFORCEMENT

The provisions of the water shortage response plan will be enforced by Pender County Utilities personnel. Citations are assessed according to the following schedule depending on the number of prior violations and current level of water shortage.

Water Shortage Level	First Violation	Second Violation	Third Violation
Voluntary Reductions	N/A	N/A	N/A
Mandatory Reductions (Stages 2 and 3)	Warning	\$250	Discontinuation of Service
Emergency Reductions	\$250	Discontinuation of Service	Discontinuation of Service
Water Rationing	\$500	Discontinuation of Service	Discontinuation of Service

Drought surcharge rates are effective in Stages 3, 4 and 5.

VII. VARIANCE PROTOCOLS

Applications for water use variance requests are available from the office of Pender County Utilities. All applications must be submitted to Pender County Utilities for review by the Director or his designee. A decision to approve or deny individual variance requests will be determined within two weeks of submittal after careful consideration of the following criteria: impact on water demand, expected duration, alternative source options, social and economic importance, purpose (i.e. necessary use of drinking water) and the prevention of structural damage.

VIII. EFFECTIVENESS

The effectiveness of the Pender County Utilities water shortage response plan will be determined by comparing the stated water conservation goals with observed water use reduction data. Other factors to be considered include frequency of plan activation, any problem periods without activation, total number of violation citations, desired reductions attained and evaluation of demand reductions compared to the previous year's seasonal data.

IX. REVISION

The water shortage response plan will be reviewed and revised as needed to adapt to new circumstances affecting water supply and demand, following implementation of emergency restrictions, and at a minimum of every five years in conjunction with the updating of our Local Water Supply Plan. Further, a water shortage response planning work group will review procedures following each emergency or rationing stage to recommend any necessary improvements of the plan to the Pender County Utilities Board. The Pender County Utilities Director is responsible for initiating all subsequent revisions.