



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

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Interim Director

February 12, 2018

Lake Waccamaw

Michael Prostinak, ORC L.W. Water System

P.O. Box 145

Lake Waccamaw, NC 28450

PWSID:	04-24-045
Access Code:	4337

Re: Water Shortage Response Plan 5-Year Update

Dear Water System Manager or Administrator:

All local governments and community water systems subject to G.S. 143-355(1) are required to update their Water Shortage Response Plans (WSRP) based on their procedures for revising and updating their plans in order to improve plan effectiveness and adapt to new circumstances. An updated or reviewed WSRP is due to the Division of Water Resources (DWR) no later than **June 1, 2018**.

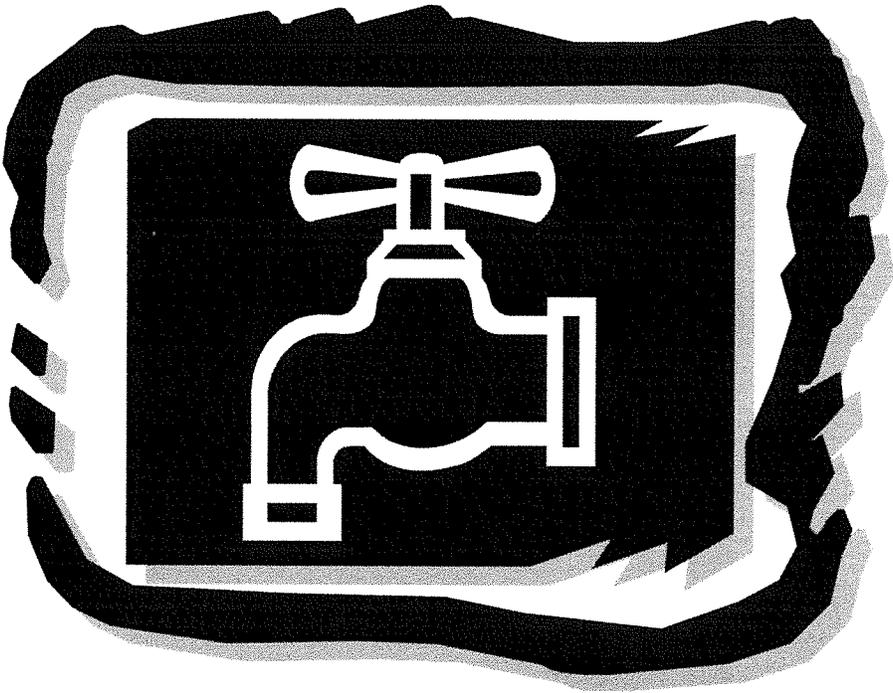
Revised or reviewed plans can be submitted to the DWR's WSRP system at https://www.ncwater.org/Water_Supply_Planning/Water_Shortage_Response_Plans/. To submit your WSRP update, click the "Upload" tab. Then, please follow Steps 1 through 3 and then click the "Upload Your Plan" button to submit your revised WSRP for review. If no changes are required, please upload the current WSRP or send an electronic copy to the review engineer listed in the following paragraph.

If you have questions about updating or submitting your revised Water Shortage Response Plan, please contact Vardry Austin at (919) 707-9002 or vardry.austin@ncdenr.gov or other DWR staff at (919) 707-9000. We encourage anyone who needs assistance to contact DWR prior to the deadline. We appreciate this opportunity to work with you to assure that North Carolina can meet its future water needs.

Sincerely,

Linwood Peele
Water Supply Planning Branch

Emergency Water Shortage Response Plan for Lake Waccamaw Water Supply Systems



Introduction

The Town of Lake Waccamaw receives an average of 50 inches of rainfall annually, spread fairly evenly throughout the year. During rainy periods, groundwater is recharged and wells are filled. Extended droughts, however, can severely diminish the amount of water in the town's two (2) wells and groundwater aquifers.

The best place to address water shortages is at the local level. Thus, any program to deal with a drought or other water shortage emphasizes the essential role of local officials and the local community. This handbook describes how a multi-level water shortage response program can be developed and implemented. This will enable Lake Waccamaw to respond to water shortages early and thus avoid the necessity for extreme measure later on. However, it must be emphasized that a program must be tailored to fit the situation of Lake Waccamaw since the vulnerability of a water system to water shortages depends on our system's size, the number and types of water sources, availability of alternative emergency sources, and other factors.

Four different phases of water shortage severity, guidelines for identifying each phase, and appropriate response measures are described as the following:

- **Voluntary Conservation Phase:** conditions indicate a potential for serious water supply shortages, and voluntary conservation should be encouraged.
- **Mandatory Conservation Phase:** there are visible or measurable signs that supplies are significantly lower than the seasonal norm and are diminishing, and mandatory conservation measures must be imposed.
- **Emergency Phase:** the system is experiencing a water shortage, and more stringent conservation measures must be imposed.

- **Rationing Phase:** the supply is clearly inadequate and mandatory water allocation and other emergency measures should be implemented.

Local preparedness, community action, and cooperation are the keys to coping with a water shortage. Local officials must organize their community, monitor local conditions, and implement necessary action. The handbook describes how a Water Shortage Management Task Force may be established to support local officials as they make difficult decisions and to assist with implementing community response.

Timely, responsible action at the local level is essential in responding to water shortage conditions.

Defining Water Use Classification

Different water uses are of differing levels of importance to the people of your community. Thus, conservation measures must necessarily be applied differently to different classes of water use, based on their importance to the community. Within this plan, there are three (3) classes of water users. *Essential* water uses (Class 1) are those necessary for maintenance of public health. *Non-essential* water uses (Class 3) can be restricted or totally banned without significant economic or social impacts. *Socially or economically important* uses (Class 2) are those which fall in between Class 1 and Class 3. The following table shows recommended response levels for each classification of water use.

**Recommended Conservation Response Levels for Different
Combination of Water Shortage Level and Water Use Class**

Water Shortage Phases	Voluntary Conservation Phase	Mandatory Conservation Phase	Emergency Phase	Rationing Phase
Class 1: Essential	Voluntary	Voluntary	Voluntary	Mandatory
Class 2: Socially or Economically Important	Voluntary	Voluntary	Mandatory	Mandatory
Class 3: Non-Essential	Voluntary	Mandatory	Mandatory	Mandatory

A list of water uses with suggested classification levels is included in the Water Shortage Ordinance and in the Appendices of this Plan. This list should not necessarily be accepted verbatim, since priorities may be different for different communities. Public involvement in the definition of water uses is very important.

Evaluating Vulnerability to Water Shortages

Determination of Ability to Meet Demand

Another action to take quickly is to determine how much water the community has available and how much will be needed. Vulnerability to water shortages is determined by examining demand, raw water supply and storage capacity, treatment and distribution systems, unaccounted-for water losses, and management. Each should be considered when water supply adequacy is evaluated.

In Lake Waccamaw, there are extreme variations in types and character of water supplies. Furthermore, changes in population and industrial and agricultural water uses can directly or indirectly affect both the demand for water and the supply. Each situation

will be analyzed separately in order for local government officials and the Town Manager to determine how to respond to a water shortage.

Demand should be projected from past records and adjusted for changes such as new development. Several factors influence the determination of whether raw water supply and storage are adequate: reliability, resiliency, and flexibility. Thus, an evaluation of supply adequacy would not only assess current supply, but also incorporate the following questions:

1. Reliability: How often has the source failed in the past and under what conditions?
2. Resiliency: How quickly would the source recover from a failure?
3. Flexibility: How accessible are alternative sources?

Unaccounted-for Water

A well-operated water utility may have as much as 15 percent “unaccounted-for” water. Unfortunately, many have 30 percent or more. Allowing such losses to continue is poor management at any time, but becomes a very serious problem with the threat of shortages. Unaccounted-for water can easily exist in even well managed systems, since it is caused by several factors. These include true losses related to leakage, and administrative losses related to the metering and billing systems. Each should be examined to isolate the significant causes.

To examine unaccounted-for water, begin by comparing the amount of water at the intake with the amount pumped into the distribution system. Does reasonable usage at the plant account for the difference? Is the master meter correctly calibrated? Are

there meters at each branch off the main? These help in locating leaks. Are the records accurate?

Second, consider the metered uses of water: residential, commercial, industrial, and other metered uses. What percent of total water pumped is accounted for at service meters? These meters frequently have mechanical problems. Defective meters can mean loss of revenue from inaccurate billing.

How much water, then, is unmetered? Estimates usually must be made for unmetered, unbilled water use in public buildings (sometimes including hospitals or schools) and for hydrant uses. These amounts should be subtracted from the total unmetered water figure to determine how much unaccounted-for water is being used or lost.

Correcting leaks and metering system and billing errors can result in substantial revenue for a water utility, save a community from social and/or economic distress during droughts, and prolong the useful life of a drinking water treatment plant.

Implementing The Water Shortage Response

If the assessment of supply and demand shows the potential for a water shortage, officials and the Task Force should begin planning to take the following actions as needed.

1. Locate and correct leaks
2. Explore possibilities for supplementing the water supply. While in some cases, officials or water utilities should consider installing wells as a long-range response, in most cases finding additional supplies should be viewed as a last resort. In order to avoid last minute attempts to supplement local supplies, water

officials should consider establishing purchase or exchange agreements with other utilities on a permanent basis. If such agreements are feasible, they should be put in place before a drought occurs.

3. Consider changing the price of water to discourage unnecessary use.
4. Direct the community to take conservation measures, according to the severity of the shortage.
5. Begin monitoring water supply conditions and the effectiveness of conservation measures. Continue this monitoring throughout the water shortage.

Monitoring supply and demand is the basis for changing response levels and deciding how to allocate existing supplies. At a minimum, the community should prepare availability estimates and evaluate remaining supplies at current usage and at different levels of reduced use. Once established, monitoring should be continued on a year-round basis so that officials will be aware of changing patterns of water use in the community. This publication describes four phases of severity, matched to specific conservation and related activities.

- Voluntary Conservation Phase
 - Issue water shortage advisory
 - Set conservation goals and prepare for decreasing supply
 - Inform the public about the potential problem
 - Request voluntary conservation
- Mandatory Conservation Phase
 - Issue water shortage alert
 - Set increased conservation goals

- Restrict or ban all Class 3, non-essential uses
- Inform the public about the problem
- Request voluntary conservation for all water uses
- Monitor compliance with the ban on Class 3 use and enforce when necessary
- Emergency Phase
 - Issue water shortage declaration
 - Set increased conservation goals
 - Continue restrictions or ban on all Class 3 (non-essential), and restrict Class 2 (socially and economically important) water uses
 - Inform the public. Enact conservation pricing
 - Monitor all drought-related activities, especially compliance with the bans. Enforce as necessary.
- Rationing Phase
 - Begin mandatory allocation of water
 - Immediately reduce usage by at least 25 percent
 - Inform the public. Enact conservation pricing
 - Set new conservation goals and monitor all shortage-related activities, especially compliance with the allocations. Enforce as necessary.

In most shortage situations, finding additional supplies is difficult. Planning and conservation measures to maintain adequate supplies are far more effective than last minute attempts to supplement water supplies. Remember, it's essential to have a plan,

and to know what you will do. You can always return to normal water use at any time your monitoring shows the supply is sufficient.

Voluntary Conservation Phase

When to Institute Voluntary Conservation

Voluntary Conservation should be placed in effect when conditions indicate the potential for serious water supply shortages. This section explains how to relate your supply situation to this phase. Other sections of this publication explain methods for assessing your supply.

A potential shortage in a well is suspected when water supply conditions in the area are especially low, or when another nearby well, which draws from the same aquifer, is showing signs of reduced supply. It can also be indicated when the static water level is declining faster than usual or when drawdown is increasing faster than historically normal for the season. Such changes in water level could indicate the need for a Mandatory Conservation declaration, and a hydrologist should be consulted. While wells, which draw from the deep confined aquifers in eastern North Carolina, are not typically sensitive to droughts, heavy pumping can result in increased drawdown and shortages at any time of year.

Measurements of the static and pumping water levels and the yield during pumping should be made at least weekly, year-round, and daily when problems exist or are suspected.

What to Do in the Voluntary Conservation Phase

The public must be notified and requested to use voluntary conservation measures to reduce demand. The notification and request should be accompanied by an educational campaign to show how individuals can conserve water.

In most circumstances, voluntary measures can be expected to reduce water use by only 5 to 15 percent. Actual water use should be closely monitored to determine whether the required reduction is actually being obtained. If it is not, the need for voluntary conservation should be more strongly emphasized or more stringent water use limitations should be adopted.

The Mandatory Conservation Phase

When to Declare Mandatory Conservation

A Mandatory Conservation declaration should be placed in effect as soon as there are visible or measurable signs that supplies are significantly lower than the seasonal norm and are diminishing. This explains how to relate your supply situation to the Mandatory Conservation phase.

Mandatory conservation should be imposed upon the advice of a hydrologist, after an investigation of drawdown problems in the well suggest that such conservation measures could alleviate the drawdown problems. Measurements should be taken daily.

What to Do in a Mandatory Conservation Phase

During a Mandatory Conservation Phase, mandatory measures should be chosen and implemented by relying first on the least restrictive and least costly measures. Bans or restrictions on specific uses constitute the most effective initial mandatory program

measures available for use because of the ability to apply them on both metered and unmetered systems. However, in order to ensure compliance, system users must fully understand that **penalties for non-compliances WILL be used**.

Penalties for violating use bans or restrictions must be equitably applied and should be graduated for repeated violations. They may include written warnings, monetary fines, or discontinuation of water services. The first violation will result in a warning. The second and third violation will result in monetary fines according to the Water Shortage Ordinance. The fourth violation will result in a service disconnection.

Educational efforts to encourage water conservation will need to be intensified during the Mandatory Conservation phase. Since initial mandatory measures can reduce system use from 15 to 30 percent, monitoring to ascertain decreases in water use must continue to determine whether more stringent measures, such as full rationing or pricing changes, are necessary.

The Water Shortage Emergency

When to Enact Emergency Measures

Emergency Conservation is required when a water utility is experiencing a water shortage. This section explains how to relate your supply situation to the Emergency phase.

If the pumping water level drops to the pump level, a hydrologist should be contacted and a water shortage Emergency should be declared. Measure water levels daily and reduce pumping periods to allow water levels to recover and to remain above the pump setting during pumping.

What to Do in an Emergency Phase

During an Emergency Phase, stringent conservation measures are needed. Pricing measures and additional mandatory restrictions should be used to significantly reduce water usage during the Emergency Phase. In effect, pricing measures constitute economic rationing by allowing a user to continue to use water at any rate desired, but high rates of use will result in a greatly increased cost. Types of pricing practices that should be used include (1) excess demand or use charges, (2) penalty charges, (3) discounts, and (4) increasing block rates. When using the first three pricing approaches, specific criteria for determining the fixed amounts of water above or below which economic penalties or rewards will be imposed must be clearly delineated.

The Town of Lake Waccamaw will assess excess demand charges according to the Water Shortage Ordinance.

The educational effort aimed at informing the public and customers about the need to use water wisely must be expanded to include advice about mandatory use limitations, penalties, and new water rates.

Water Shortage Rationing

When to Declare Rationing

Rationing should take place when supply is clearly inadequate to meet projected demands. This section explains how to relate your supply situation to the Rationing phase. Rationing is required when the allowable pumping period is too short to maintain water supplies. Measure levels daily.

What to Do in Rationing

When Rationing is used to address a water shortage situation, three points must be considered. First, rationing is difficult to impose on unmetered systems. Second, the decision to employ rationing must acknowledge and address questions of fairness or equity. Third, the type of rationing most appropriate for an individual community must be selected.

The amount of water allotted to users under a rationing program can be determined in one of several ways. A **flat percentage** requires customers to reduce use to a given percentage of their average uses. This method penalizes conservative users and allows wasteful users to be less conservative.

A **variable percentage** requires customers who use larger amounts to reduce use by more than customers who use lesser amounts, causing wasteful users to reduce relatively more than conservative users.

Setting a **maximum allowable usage** requires customers to limit use to a predetermined amount.

Flat percentage and maximum use are easier to administer. Variable percentage is better for smaller systems. Maximum usage is only equitable if it is levied per capita, which is difficult.

The measures that have the greatest potential for significantly reducing water use are rationing and pricing. Together, these can reduce usage from 30 to 70 percent.

During extremely severe water shortage conditions, the Environmental Management Commission, under its authority under State law [G.S. 143-354a(3)], can

impose mandatory allocation of supplies in communities not adequately responding to their water shortage.

The Town of Lake Waccamaw will use the **variable percentage** method. Violations will be assessed according to the Water Shortage Ordinance.

Return to Normal

When water shortage conditions have abated and the water supply situation is returning to normal, water conservation measures employed during the Voluntary Conservation, Mandatory Conservation, Emergency and Rationing phases 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 future shortages and response to recurring water shortage conditions.

Water Quality Problems

Drought or water shortage conditions can cause reduction of water quantity and deterioration of water quality in North Carolina's streams and reservoirs. Deterioration of water quality usually increases the costs of treating raw water for drinking water purposes. Recreational opportunities are often reduced because higher numbers of potentially harmful bacteria survive below wastewater treatment plants and nuisance growths of algae and aquatic weeds occur more extensively. These are a result of nutrient enrichment through lack of dilution and lack of sufficient flow to flush the algae downstream. Fish kills happen more frequently due to oxygen depletion and concentration of toxic substances. Toxic blue-green algae blooms may restrict agricultural uses of streams and ponds.

Water quality is affected when reduced streamflows result in the development of stagnant pools in streams and low lake levels. Adverse effects of both wastewater treatment plant and agricultural and industrial discharges are intensified because less water is available for dilution.

During extended low-flow conditions, the ability of streams and lakes to break down wastes is reduced because of lower stream flows, higher water temperatures, and lower dissolved oxygen levels. Large daily fluctuations of pH and dissolved oxygen occur as a result of extensive blooms or mats of algae. Oxygen is depleted from the water when the algae die and are decomposed by bacteria and fungi, causing considerable stress to aquatic life and possibly leading to extensive fish kills.

During an extended drought, when flows fall below the seven day ten year low flow levels, both surface water and groundwater quality tend to deteriorate, owing to the concentration of dissolved metals, salts, and other constituents. If high temperatures and low rainfall coincide with extended periods of low water in streams and reservoirs, microorganisms will develop which cause taste and odor problems in drinking water and operational problems (e.g. clogging of filter by algae) at water treatment plants. The cost of treating drinking water will increase; for example, purchase of additional supplies of activated carbon may be required for treatment of taste and odor problems. Increased bacteriological monitoring of recreation areas will be needed to warn of the necessity for closing sites that experience contamination by bacteria. Industrial discharges containing potentially harmful contaminants may also become concentrated during droughts. In such cases, water treatment plants must utilize more sophisticated and expensive

treatment techniques to provide safe drinking water. Further, such contamination can have a devastating effect on the aquatic life of the stream, lake, or reservoir.

In summary, the projected effects of a severe drought on North Carolina streams and reservoirs include reductions in water quantity and quality, which may impair domestic, industrial, agricultural, and recreational uses. Increased costs may be anticipated for water treatment and water quality monitoring. The public should be informed of potential water quality impacts, including: recreational areas where use should be restricted because of poor water quality; the occurrence of microorganisms which impart off-flavor tastes or odors to drinking water; and the incidence of farm animal deaths following ingestion of water containing large amount of certain blue-green algae.

Public Comment

Prior to the amendment of this document, there will be a public hearing before the Lake Waccamaw Board of Commissioners at which time, the public is welcome to speak. The town shall follow the standard NCGS regarding public hearing notifications. As a part of the public hearing the following rules shall apply:

Policy

1. Anyone desiring to address the Council must state their name and address upon being recognized by the Mayor or Chairperson for the meeting for recordation in the minutes of the meeting by the Town Clerk.
2. The Public Hearing section of the agenda will be placed at the beginning of the agenda

3. Only one speaker at a time will present comments to the Council, and each speaker must be recognized by the Mayor or Chairperson as having the exclusive right to be heard.
4. The Public Hearing section will be for a maximum of thirty (30) minutes. This time frame may be altered by a majority vote of the Town Council if necessary.
5. Each speaker will be afforded not more than three (3) minutes to address the Council. The Town Attorney or Town Manager will keep the time for each speaker. A speaker cannot yield any of their allotted time to another speaker to increase that speaker's allotted time.
6. Individuals whom cannot speak at the Public Hearing section will be carried over to the next month's regular Council meeting where they will be placed first on the Public Comment section of the agenda.
7. The Town Council will not take action on any item which is presented during the Public Hearing/Comment section. They may instead refer the issue to the Town Manager, Town Attorney, or any other appropriate individual for investigation or for a future report back to the Council.
8. Speakers will address all comments to the Council as a whole and not to an individual Council member. Discussion between a speaker and members of the audience will not be allowed.
9. Speakers will be courteous in their language and presentation.
10. Speakers who have prepared written remarks or supporting documents are encouraged to distribute to each Council member, Town Attorney, Town Manager, and Town Clerk.

11. The Mayor or any other Council member may ask questions of the speaker for clarification.

VARIANCE REQUESTS

Variance Request shall be made to the Town Manager to be forwarded to the Lake Waccamaw Board of Commissioners. Such request shall be in writing and must be submitted not less than ten (10) days prior to the Board meeting date.

Before a variance is granted, it shall be shown that special circumstances exist with the particular business or resident such that if the shortage is complied with, life, health or the safety of the owners/patrons are in danger or it would adversely affect the business economy within the town. A variance may be granted only when the practical difficulty of undue hardship complained of is an undue stringency on the property owner. A hardship peculiar to the applicant, as distinguished from others affected by the general rule, must be shown. The variance should not put any other users at risk of not having potable water and if granted, other conditions may be placed on the variance by the Board of Commissioners as to when and how the user will utilize the water, such as a particular time of day.

EFFECTIVENESS

Once water restrictions are put into effect, staff will monitor closely the water production of the town's wells as well as the water billed on a monthly basis. In reviewing these figures, staff will take into account any water used in system maintenance or any other unusual circumstance where water was used (i.e. firefighting/training, major leaks). Staff will also monitor lines in remote areas as well as

along streets and investigate any standing water along streets where water lines are nearby.

Staff will prepare reports to forward to the Board of Commissioners to keep the board informed as to how the restrictions are working. Should more frequent monitoring be necessary, staff will begin preparing the same reports every two weeks. As conditions worsen, monitoring may be done on a daily basis if needed.

REVISIONS

Staff will review the plan as a whole and will bring suggested changes to the Board of Commissioners at least every five (5) years. Should issues arise between revisions (i.e. new water sources, plan activation), the plan will be reviewed for any new updates that may be applicable as a result of new regulations or any situations that are warranted as a result of plan activation. After each plan activation, a debriefing will be conducted to determine if there are any problems with the way in which the situation was handled as well as any revisions to the plan that could have made the incident more clear to the residents.

Appendices

Local Assessment of Water Supplies

Measuring the Specific Capacity of a Well

The current specific capacity of a well can be measured by dividing the volume of water withdrawn by the drawdown (the distance the water level falls in the well pipe when the pump is turned on). Instructions for measuring drawdown follow.

$$\text{Specific Capacity (gpm/ft.)} = \frac{\text{volume withdrawn in gallons per minute (gpm)}}{\text{feet of drawdown}}$$

1. If there are past records of specific capacity, or if the original specific capacity of a well is known, these data can be used to determine the present decrease of water available in the well. Current specific capacity can also be expressed as a percent of original specific capacity by dividing the new specific capacity by the old specific capacity and multiplying by 100.

$$\text{Percent of Original Capacity} = \frac{\text{new specific capacity} \times 100}{\text{old specific capacity}}$$

2. If specific capacity falls to 80 percent of original specific capacity, a hydrologist should be consulted.
3. If the static and drawdown levels have only been measured for a short time and the specific capacity has decreased 6 percent over a two-month period, a hydrologist should be consulted.
4. Increased filling time for water storage tanks is a similar quantity to decreased well capacity. Both measures reflect decreased inflow to the well. As drought conditions evolve, both the tank refill rate and the specific capacity of the well will gradually decrease.

5. If historic records are not available, begin collecting data immediately.
6. If a facility has a maintenance contract for its wells, the maintenance company should have calculated the change in specific capacity. Many large well drilling companies should have resident hydrologists who can analyze well data and be consulted about your supply.

All municipal wells should be measuring static water level (the water level when not pumping) and the pumping water level of the well. These measurements should be made on a daily basis during supply shortages and weekly during normal conditions. Static groundwater levels should tend to fall during dry periods and rise during wet periods.

If pumping water levels decline to the level of the well screen or pump, or if there are other problems with your well, a hydrologist should be consulted. If a well cannot be measured for the pumping level or static water level, a well drilling and engineering firm should be contacted to modify the well.

Measuring Water Levels

Static Water Level: Daily or weekly measurements of depth to static water level (the level when no pumping is occurring) indicate trends in the amount of groundwater available for use. These readings should be taken when the pump is off and the water level has stabilized. Some wells may take several hours to stabilize after the pump is shut off. The best time to measure static water level is just before the well enters a pumping cycle.

Pumping Water Level: Another useful water well measurement is the pumping water level (water level while the pump is running). The pumping water level is measured

shortly before the pump is turned off for the day or after 24 hours of continuous operation, whichever comes first.

A comparison of pumping water level and static water level measurements taken over time allows you to recognize drops in well efficiency caused by incrustation of screens or decreases in aquifer levels.

Devices such as electric tapes, pressure transducers, sonar devices, airlines, or chalked tapes can be used to determine water levels in a well. The water level measured should be tied to mean sea level by surveying the reference point from which static or pumping depths are measured.

Sources of Assistance

Personnel from the following agencies can provide assistance to local water systems with water management problems. Use the following tables to determine which office to call with different types of problems.

Problem	Assistance Code
<u><i>Raw Water Supply</i></u>	
Existing & New Source	
Quantity	1A
Quality	1B
<u><i>Distribution System</i></u>	
Assistance in locating water system leaks and conducting water audits	1A
Assistance in determining potential health hazards due to pressure drops and leaks	1C
Finished Water Quality	1C
Cross Connections	1C
Loan of lead detection equipment	1A, 1C, 2, 3, 4
<u><i>User Conservation</i></u>	
Mail-Out Material	1A
Advice	1A, 1C, 2
<u><i>Emergency Assistance</i></u>	
Transport of potable water	1A, 1C, 2
Loan of pumps and distribution lines	1A, 1C, 2

Assistance Code	Agency	Telephone
1	N.C. Department of Environment and Natural Resources	
1A	Division of Water Resources (DWR)	(919) 733-4064
1B	Division of Water Quality (DWQ)	
1C	Division of Environmental Health, Regional Offices	
	Asheville	(828) 251-6786
	Mooresville	(704) 663-1699
	Winston-Salem	(336) 771-4633
	Raleigh	(919) 571-4700
	Fayetteville	(910) 486-1191
	Wilmington	(910) 395-3900
	Washington	(252) 975-3716
2	N.C. Department of Crime Control and Public Safety Division of Emergency Management	(919) 733-3867 1-800-662-7956 (24 hours)
3	N.C. Rural Water Association (for its members)	(910) 731-6963
4	Tennessee Valley Authority, Division of Water Resources (for systems in the TVA region)	(931) 648-2297

CONSERVATION MEASURES

Direct users to adopt the following conservation measures:

INDOOR RESIDENTIAL USE:

***Conservation for Voluntary (Phase I) and Mandatory Conservation (Phase II)**

- Use dishwashers only when they are full. Washing dishes by hand (don't let the tap run!) Saves about 25 gallons
- Adjust water level on clothes washing machines, if possible. Use full loads only, if not adjustable.
- Turn off faucets while brushing teeth, etc. Saves about 5 gallons per day
- Reduce water used per flush by installing toilet tank displacement inserts, a plastic jug may often be used as an alternative. DO NOT USE BRICKS - they disintegrate when soaked and the resulting grit hinders closing of the flap valve.
- Do not use the toilet as a trash can.
- Use sink and tub stoppers to avoid wasting water.
- Keep a bottle of chilled water in the refrigerator for drinking.
- Find and fix leaks in faucets and water-using appliances. Faucets can usually be fixed cheaply and quickly by replacing washers.
- Adapt plumbing with flow-restricting or other water-saving devices. These are usually inexpensive and easy to install.
- Learn to read your water meter so you can judge how much water you use and what difference conservation makes.
- Take shorter showers and shallow baths. Saves about 25 gallons.
- Reduce the number of toilet flushes per day. Each flush uses about 5 gallons (2-3 if you have water saving toilets).
- Don't use a garbage disposal
- Use non-phosphate detergent and save laundry water for lawns and plants.

****Conservation for Emergency Conservation or Rationing Phase (In addition to measures listed above).**

- Turn off shower while soaping up.
- Use disposable eating utensils.

OUTDOOR RESIDENTIAL USE

***Conservation for Normal Conditions and Voluntary Conservation (Phase I) Lawns**

- Water before 10:00 a.m. to prevent evaporation which occurs during the hottest part of the day. Morning is better than evening, when the dampness encourages growth of fungus.
- Water only when lawn shows signs of wilt. Grass that springs back when stepped on does not need water.
- Water thoroughly, not frequently: long enough to soak roots, a light sprinkling evaporates quickly and encourages shallow root systems. Water slowly to avoid runoff.
- Don't let the sprinkler run any longer than necessary. In an hour, 600 gallons can be wasted.
- Allow maximum of one inch of water per week on your lawn. To measure, place cake tins outside to collect rain and water from sprinklers.

- Use pistol-grip nozzles on hoses to avoid waste when watering flowers and shrubs.
- Aerate lawns by punching holes 6 inches apart. This allows water to reach roots rather than run off surfaces.
- Position sprinklers to water the lawn, not the pavement.
- Avoid watering on windy days when the wind not only blows water off target, but also causes excess evaporation.
- Keep sprinkler heads clean to prevent uneven watering.
- Adjust hose to simulate a gentle rain. Sprinklers that produce a fine mist waste water through evaporation.
- Know how to turn off an automatic sprinkler system in case of rain.
- Use an alarm clock or stove timer to remind you to shut off sprinklers that don't have timers.

Vegetables and Flower Gardens

- Water deeply, slowly and weekly. Most vegetables require moisture to a depth of 6 to 8 inches.
- Keep soil loose so water can penetrate easily.
- Keep weeds out to reduce competition for water.
- Put the water where you want it and avoid evaporation by using soil-soakers or slow-running hoses, not sprinklers.

Trees and Shrubs

- Water deeply using a soil-soaker or drip-irrigation.
- Water only when needed. Check the depth of soil dryness by digging with a trowel.
- Mulch to reduce evaporation, a 2" to 3" layer of wood chips, pine needles, grass clippings, or straw keeps the soil cool in summer.
- Dig troughs around plants to catch and retain water.
- Water trees growing in full sun more often than those in shade.
- Do not use sprinklers. Apply water directly at base.
- Do not fertilize during the summer. Fertilizing increases a plant's need for water.
- Postpone planting until fall or spring when there is generally less need for water.
- Install trickle-drip irrigation systems close to the roots of your plants. By dripping water slowly, the system doesn't spray water in to the air. Use soil probes for large trees.
- Water during early morning hours

OUTDOOR RESIDENTIAL USE

***Conservation for Voluntary Conservation (Phase I) (in addition to measures listed above).**

- Do not allow children to play with hose or sprinklers.
- Limit car washing.
- Be ready to catch rainfall that occurs. Place containers under drain spouts.
- Use leftover household water if available.
- Consider delaying the seeding or sodding of new lawns.
- Determine the amount of water being used outdoors by comparing water bills for summer and winter.

***Conservation for Mandatory Conservation (Phase II) (In addition to measures listed above).**

- Vegetable gardens and food trees should be given minimal amounts of water on an individual basis only.
- Do not water lawns and inedible plants.
- Do not use sprinklers.

***** ALL OUTDOOR WATERING is PROHIBITED under Emergency Conservation conditions.**

HOSPITAL AND HEALTH CARE FACILITY USE

- Reduce laundry usage or services by changing bed linens, etc. only when necessary to preserve the health of patients or residents.
- Use disposable food service items.
- Eliminate, postpone, or reduce, as they may be appropriate, elective surgical procedures during the period of emergency.

INDUSTRIAL USE

- Identify and repair all leaky fixtures and water-using equipment. Give special attention to equipment connected directly to water lines, such as processing machines, steam-using machines, washing machines, water-cooled air conditioners, and furnaces.
- Assure that valves and solenoids that control water flows are shut off completely when the water-using cycle is not engaged.
- Adjust water-using equipment to use the minimum amount of water required to achieve its stated purpose.
- Shorten rinse cycles for laundry machines as much as possible; implement lower water levels wherever possible.
- For processing, cooling, and other uses, either re-use water or use water from sources that would not adversely affect public water supplies.
- Advise employees, students, patients, customers, and other users not to flush toilets after every use. Install toilet tank displacement inserts; place flow restrictors in showerheads and faucets; close down automatic flushes overnight.
- Install automatic flushing valves to use as little water as possible or to cycle at longer intervals.
- Place water-saving posters and literature where employees, students, patients, customers', etc. will have access to them.
- Check meters on a frequent basis to determine consumptive patterns.
- Review usage patterns to see where other savings can be made.