

WATER SHORTAGE RESPONSE PLAN (WSRP) GUIDELINES

Introduction

All public and privately owned water systems subject to G.S. 143-355 (l) are required to submit a Water Shortage Response Plan (WSRP) as part of their Local Water Supply Plan (LWSP). Recently adopted rules governing water use during droughts and water emergencies (15A NCAC 02E. 0607) stipulate specific issues that must be included in those plans. This document is written to help systems meet the above requirements by completing the [Water Shortage Response Summary](#) and develop this information into a community response plan tailored to local conditions.

Water shortage response planning should be considered separately and in addition to a year-round wise water use policy which encourages efficient use of water for all customers. A year-round water use policy is recommended for every community; however, normal conservation measures should not be included in your WSRP. Instead, identify your year-round water conservation policy as such and impress on your customers the value of conserving water everyday.

Keep in mind, drought is only one possible cause of drinking water shortage; water systems may also experience short-term problems with water treatment or distribution. For these reasons, it is essential to establish a WSRP responsive to all types of water shortage and before a shortage situation develops.

A. Authority for WSRP Implementation

Establish the authority and who will be responsible for enacting your WSRP and provide their name, position title, and contact information. In addition, identify who is able to declare a drinking water shortage and make decisions in their absence. This step is essential, as even the best written plans are ineffective if they cannot be implemented!

B-C. Notification of WSRP Activation and Conservation Measures

All water users and system employees should be notified when your WSRP has been implemented. Broadcast media outlets, including community television, local news, and radio public service announcements are particularly useful in communicating this information quickly. Any change in the water shortage situation should be announced through the same media outlets used initially.

Your WSRP should outline a variety of education and outreach strategies to inform customers about water use policies and restrictions. Again, consider your audience when deciding which methods will be most effective for your community. Below is a list of possible outreach options.

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| ▪ Independent Mailings to Users | ▪ Community Newspapers |
| ▪ Presentations/Workshops | ▪ Informational Videos |
| ▪ Bill Stuffers to All Customers | ▪ TV Ads (community television) |
| ▪ Signs and Posters | ▪ School Presentations |
| ▪ Websites | ▪ Radio (public service announcements) |
| ▪ Water Audits | ▪ Flyers/Handouts |

D. Measuring Severity

The next step in developing your WSRP is to establish multiple levels of severity for a drinking water shortage. Levels should be determined by specific measurements of available supply, demand, and system conditions, such as days of remaining storage, water demand as a percent of supply, or water quality indicators. For each level of severity, a corresponding set of required water shortage responses should be developed.

Below is an example of three levels of water shortage severity and a brief description of each.

- Level 1: Voluntary Conservation
Conditions indicate potential for water supply shortages; voluntary conservation is encouraged.
- Level 2: Mandatory Restriction
Water supplies are measurably lower than the seasonal norm and are diminishing. Mandatory restriction measures are imposed.
- Level 3: Emergency Response
The system is experiencing a water shortage; drinking water supply is clearly inadequate and more stringent restriction measures must be imposed.

E. Triggers

Once you have developed severity levels for your WSRP, determine specific triggers for moving to more and less restrictive drinking water use reduction measures at each level. As a reference point, be sure to include your system's water supply parameters under normal supply conditions. Examples of triggers as they apply to groundwater, run-of-river, and reservoir withdrawal systems are listed below.

SYSTEM SUPPLY TYPE	VOLUNTARY LEVEL US Drought Monitor indicates abnormally dry or moderate drought in your area	MANDATORY LEVEL US Drought Monitor indicates moderate or severe drought in your area	EMERGENCY LEVEL US Drought Monitor indicates severe or extreme drought in your area
RESERVOIR (Monitor lake levels daily during a water shortage situation.)	<ul style="list-style-type: none"> ▪ Less than ___ % of remaining usable storage. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days ▪ Reservoir levels less than ___ ft. of full pool. ▪ Finished water storage less than ___. 	<ul style="list-style-type: none"> ▪ Less than ___ % of remaining usable storage. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days ▪ Reservoir levels less than ___ ft. of full pool. ▪ Finished water storage less than ___. 	<ul style="list-style-type: none"> ▪ Less than ___ % of remaining usable storage. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days. ▪ Reservoir levels less than ___ ft. of full pool. ▪ Finished water storage less than ___.
RUN-OF-RIVER (Measure streamflow daily and inventory watershed for upstream water users during a water shortage situation.)	<ul style="list-style-type: none"> ▪ Stream flow less than ___ cubic feet per second. ▪ Water demand exceeds ___ % of flow above intake. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days ▪ Withdrawing ___ % of flow past the intake. ▪ Finished water storage less than ___. 	<ul style="list-style-type: none"> ▪ Stream flow less than ___ cubic feet per second. ▪ Water demand exceeds ___ % of flow above intake. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days ▪ Withdrawing ___ % of flow past the intake. ▪ Finished water storage less than ___. 	<ul style="list-style-type: none"> ▪ Stream flow less than ___ cubic feet per second. ▪ Water demand exceeds ___ % of flow above intake. ▪ ___ days of supply remaining. ▪ Average daily use > ___ MGD for ___ consecutive days. ▪ Withdrawing ___ % of flow past the intake. ▪ Finished water storage less than ___.
GROUNDWATER (Check water levels in wells weekly and monitor the number of hours each well is pumped daily during a water shortage situation.)	<ul style="list-style-type: none"> ▪ Aquifer levels ___ % (or ft.) below capacity ▪ Finished water storage less than ___. ▪ ___ days of supply remaining. ▪ ___ % increase in pumping times to maintain storage and meet demand. ▪ Pumping times required to maintain storage and meet daily demand exceed ___ hours. ▪ Average daily use > ___ MGD for ___ consecutive days 	<ul style="list-style-type: none"> ▪ Aquifer levels ___ % (or ft.) below capacity ▪ Finished water storage less than ___. ▪ ___ days of supply remaining. ▪ ___ % increase in pumping times to maintain storage and meet demand. ▪ Pumping times required to maintain storage and meet daily demand exceed ___ hours. ▪ Average daily use > ___ MGD for ___ consecutive days 	<ul style="list-style-type: none"> ▪ Aquifer levels ___ % (or ft.) below capacity ▪ Finished water storage less than ___. ▪ ___ days of supply remaining. ▪ ___ % increase in pumping times to maintain storage and meet demand. ▪ Pumping times required to maintain storage and meet daily demand exceed ___ hours. ▪ Average daily use > ___ MGD for ___ consecutive days
All Water Shortage Response Plans should also contain triggers for: <ul style="list-style-type: none"> • Contamination /change in raw water quality. • Equipment or facility failure. • Line breaks, etc. 			

Next, adapt conservation measures and water use restrictions to local water use patterns and conditions for each level. List the measures to be taken at each level in response to a water shortage to avoid the need for more extreme measures if conditions worsen.

Below is an example of severity levels and suggested responses that you might consider including in your plan in addition to specific measures which can be utilized to reduce water demand on your system. Notice how specific triggers are required for movement between each level. Finally, plan for incrementally returning to normal water use based on a reversal of triggers.

VOLUNTARY LEVEL: Water Use Reduction

What is the specific trigger initiating your Voluntary Level?

- Issue a water shortage advisory. Increase conservation educational campaign.
- ____% potable water use reduction goal (system-wide as well as individual users).
- Request voluntary conservation from all water users.
- Specific measures imposed by your system on water uses in your community

MANDATORY LEVEL: Water Use Restrictions (in addition to voluntary measures)

What is the specific trigger initiating your Mandatory Level?

- Issue a water shortage alert.
- ____% potable water use reduction goal (system-wide as well as individual users).
- Ban or restrict specific Class 3 (nonessential) uses (adapted to your community's needs)
- Restrict specific Class 2 (socially & economically important) uses (adapted to your community's need)
- Monitor compliance with water use bans and enforce when necessary
- Specific restrictions imposed by your system on water uses in your community

EMERGENCY LEVEL: Water Use Restrictions/Bans (and/or Rationing)

What is the specific trigger initiating your Emergency Level?

- Issue a water shortage emergency.
- Maximum____% potable water use reduction goal (system-wide as well as individual users).
- Ban on all Class 3 (nonessential) water uses.
- Ban or restrict specific Class 2 (socially & economically important) uses (adapted to your community)
- Aggressive compliance monitoring and enforcement.
- Enact advanced restriction pricing with fines for excessive use (can be done at Mandatory Level).
- Specific restrictions or bans imposed by your system on water uses in your community.

F. Levels of Response

Before determining levels of response, it is helpful to develop a drinking water use classification system. To begin, identify all of the water customers in your community and list them in subcategories of drinking water use according to the following types: essential, socially/economically important and non-essential drinking water uses. For each type, list customer groups and the minimum amount of daily water needed each day for each (as possible). Consulting with representatives of some of the major water using groups and individual large water users will provide better information on which to base realistic expectations on the ability of water users to reduce drinking water use.

ESSENTIAL DRINKING WATER USES

In the event of a water shortage, the following drinking water uses have been determined to be essential uses of potable water:

- Domestic
- Patient Care/Rehabilitative Services
- Public Use (e.g. Fire fighting, health and safety purposes; water needed to sustain human and animal life; and water necessary to satisfy federal, state and local public health, safety or environmental protection requirements)

SOCIALLY/ECONOMICALLY IMPORTANT DRINKING WATER USES

In the event of a water shortage, the following drinking water uses have been determined to be socially or economically important uses of potable water:

- Domestic (All Not Included in Class I & III)
- Industrial
- Outdoor (minimal levels for plant and animal survival)
- Agricultural
- Commercial
- Institutional

NON-ESSENTIAL DRINKING WATER USES

In the event of a water shortage, the following drinking water uses have been determined to be non-essential uses of potable water:

- Ornamental (without aquatic habitats)
- Outdoor Watering and Impervious Surface Washing (public/private)
- Public Use (e.g. non-essential use)

Next, determine what voluntary and mandatory conservation levels are most appropriate for your community. Three incremental (e.g. voluntary, mandatory, and emergency) levels and corresponding conservation measures are suggested in order to reduce demand and extend the life of supplies in the event of a water shortage.

G. Enforcement

Your WSRP should list the existing or proposed ordinance, code, regulation, resolution, etc. that details your system's protocols for water shortages and appropriate enforcement measures. List the enforcement measures to be used to ensure compliance with the water use restrictions for each level in your plan.

Consider how penalties and enforcement activities will change for first, second, and multiple offenses. Penalties may also increase according to the level at which an infraction was committed, the severity of the offense, or a combination of the above.

Additionally, emergency pricing rates, similar to conservation rates, may be used to enforce the water use restrictions in your plan and help your community reach its water conservation goals during water emergencies. Conservation pricing rates (e.g. increasing block rates, excess demand surcharges, etc.) can also alleviate revenue losses as a result of diminishing water sales. A common impact of reduced usage in response to supply shortages is a reduction in revenues. This impact can be tempered by implementing higher rates for water when supplies are short, similar to gasoline pricing.

H. Public Review

Without community support, even the best water shortage response plan will be unsuccessful. Invite public participation throughout the development of your WSRP and consider forming an advisory council representative of your customers to offer input in the planning process. Similarly, before your WSRP is finalized, establish times and opportunities for public comment and review. While a public review process is not mandatory, it can greatly improve community acceptance and cooperation in implementing the plan.

I-J. Variances and Variance Criteria

Outline procedures to receive and review variance applications, and determine protocols for considering and granting variances. Identify objective evaluation criteria to consider and grant variance requests. Establishing criteria ensures variance decisions are transparent, equitable, and hold both requesters and decision makers accountable for establishing these criteria.

K. Evaluation

It is important to evaluate the usefulness of your Water Shortage Response Plan's provisions once they are implemented. Collecting data before, after, and during each level of a water shortage emergency allows you to measure actual water conservation savings in your community. Similarly, setting specific water use reduction goals provides an objective method for evaluating your plan's effectiveness. A revised response plan may be necessary if expected savings are not achieved. Revisions might include establishing earlier trigger levels, escalating conservation and enforcement measures implemented at each level, or reclassifying select water uses.

In the example below, reduction goals of 5, 10, and 25 percent average daily water use were set for voluntary, mandatory, and emergency levels respectively. Entry at each level is triggered by the number of days of remaining storage which initiates a specific set of conservation measures designed to reduce total water demand. If expected reduction goals are not met, revised conservation measures are needed.

Level	Reduction Goal Average daily water use	Trigger Days of remaining storage	Example of Current Conservation Measures	Revised Conservation Measures
Voluntary	5%	50	<ul style="list-style-type: none">▪ Begin conservation pricing▪ Limit nonessential uses of water	<ul style="list-style-type: none">▪ Trigger voluntary level conservation measures at 60 days of remaining storage▪ Increase conservation pricing rates▪ Reclassify additional water uses as nonessential
Mandatory	10%	40	<ul style="list-style-type: none">▪ Continue conservation pricing and assess excess use surcharges▪ Limit socially/economically important and nonessential uses of water▪ Restrict times and duration of landscape irrigation	<ul style="list-style-type: none">▪ Trigger mandatory level conservation measures at 50 days of remaining storage▪ Assess fines for repeated excessive use▪ Ban all nonessential uses of water▪ Decrease times and duration of allowable landscape irrigation
Emergency	25%	30	<ul style="list-style-type: none">▪ Continue conservation pricing, excess use surcharges, and assess fines for repeated excessive use▪ Limit socially/economically important uses and ban all nonessential uses of water▪ Further restrict times and duration of landscape irrigation	<ul style="list-style-type: none">▪ Trigger emergency level conservation measures at 40 days of remaining storage▪ Discontinue service for repeated excessive use▪ Reclassify additional water uses as nonessential

L. Revision

Water Shortage Response Plans should be updated regularly in response to changing conditions within your community. Circumstances warranting an updated plan might include new development or changes in number or types of available water supplies. All plans must be submitted to the Division of Water Resources for review.

M-N. Impoundment Storage

It is important that all municipalities, water corporations, or companies who depend on water stored in impoundments owned by someone else adopt and enforce consistent WSRP provisions as a condition of their agreements. Upon the declaration of water shortage, all water systems that depend on water in impoundments owned by other systems should enforce the appropriate water use restrictions and percent

reduction goals for each level of response established by the WSRP written by the owner of the impoundment.

Conclusion

Please remember, Water Shortage Response Plans should be adapted to the specific needs, values, and characteristics of *your* community! For assistance or questions, please contact the Division of Water Resources at lwsp@ncmail.net or (919) 733-4064.