Drought Response Plans



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Presentation Overview

1. Purpose
2. Elements of Plan Development
3. EPA Template
4. Questions

Purpose of Water Shortage/Drought Planning

- Address water shortages through demand reduction *and* supplemental supplies
- Prepare for changes to water quality and treatment needs
- Reduce impacts to infrastructure (e.g., clogged intakes, pump stress failure, leaks)
- Reduce impacts to customers and the community
- Reduce unexpected financial impacts to utility

ELEMENTS OF PLAN DEVELOPMENT

Elements of Plan Development to Focus On

1. Establishing a Drought Team
2. Determining Policy, Authority, Public Involvement
3. Assessing Water Supply and Demand
4. Defining Stages and Triggers
5. Identifying Response Measures/Actions
6. Communication and Messaging
7. Implementation of the Plan
    - Public Education
    - Enforcement

Establish a Drought Team

- The team should include system managers and operators, the system's financial expert, system or local engineers, board or council members (or other decision makers), legal and regulatory experts
- Defines goals and objectives for the plan
- Obtains authority to develop and enforce the plan
- Develops the local drought response plan, including identifying:
  - Potential impacts from drought
  - Weaknesses in the system
  - Goals to minimize impacts

Source: Modified from MO DNR Fact Sheet

Policy, Authority, Public Involvement

Policy

- The overarching policy or legislative intent of the plan, including why it was created and intended use. It also establishes priorities for water uses (essential water users, critical or sensitive customers, etc.)
- The policy section is where the goals and objectives the drought team developed, such as reducing water demands, prioritizing essential water over non-essential uses, or maintaining adequate system pressure, are included.

Policy, Authority, Public Involvement

Authority

- Identifying and documenting the legal authority to develop the plan is important for validity and enforcement. The system may obtain authorization to develop and implement the plan through state regulations, governing body ordinances or a board of directors charter.

Policy, Authority, Public Involvement

Public Involvement

- Many states have a defined requirement for public notices, hearings or other opportunities for comment prior to developing plans or ordinances.
- If public notice isn't required, it is still critical for the system to engage the public during plan development.
  - Will go a long way to getting buy-in and positive responses from the public if restrictions become necessary.

Assess Water Supply and Demand

Estimating Supply

- Identify all water supply sources
  - Who ultimately controls the sources?
- What are your sources capable of?
  - Determine safe/maximum yield of current sources
- Measure elevation of water in storage
- Daily flows into or out of the reservoir

Estimate the length of time your system can operate without any supplemental water sources

Assess Water Supply and Demand

Estimating total demand

- Include water losses (%)
- How much additional demand can you accommodate?
- Compare total demand with supply yield
- Forecast potential deficits

Identify short-intermediate, and long-term options for supplemental water sources

Define Stages and Triggers based on YOUR system

- Consider several stages (per RCSA 25-32d-3, req. for those >1,000 customers)
  - Drought Advisory
  - Drought Watch
  - Drought Warning
  - Drought Emergency
- Four stages are not required by the state, but highly encouraged
- Establish clear criteria for each stage
  - Drought indicators or indices (Standardized Precipitation Index (SPI), Palmer Drought Severity Index, etc.)
  - Stream flow
  - Reservoir storage
  - Pump run times
  - Peak demand/operating conditions

Identify Response Measures/Actions

Demand Reduction

- System efficiencies
  - Repair Leaks
  - Reduce hydrant flushing
- Customer information
  - Bill inserts
  - Door hangers
  - Electronic and mass media
- Outdoor water use restrictions
  - Lawn and garden irrigation
  - Car washing
  - Pools, hot tubs and fountains
  - Impervious surfaces
  - Day of week watering restrictions
- Rate surcharges
  - Based on volume
  - Connection restrictions
  - Enforcement
    - Fines
    - Disconnections
- Prioritize customer classes
  - Class 1 – essential (domestic, firefighting, health care)
  - Class 2 – socially and economically important (ag, nurseries, arboretums, restaurants)
  - Class 3 – non-essential uses
  - (outdoor watering, pools, car wash)

Identify Response Measures/Actions

Alternate and Emergency Sources to Consider (need short-, intermediate- and long-term options)

- Inter-connections
  - Nearby systems
  - This works both ways – others may request your help
- Emergency/ supplemental sources
  - Groundwater – deeper aquifer or one with lower water quality?
  - Surface water – rivers or reservoirs
  - Blending lower quality source with higher quality one
- Alternate sources
  - Bottled water
  - Trucked water - are there state regs/transportation regs? Certified trucks available?
- Conservation is considered an alternate source by some utilities

Response Measures/Actions

Source: Modified from RCSA

Stage	Criteria/Triggers	Actions
Stage 1 Advisory	Static water levels drop in wells, pumping rates decline, drawdowns increase while pumping (measure weekly) Streamflow abnormally low or demand is 20-40% of flow Less than 240 but more than 180 days supply remaining	Notify the state and your customers and conduct an intensive public information campaign Request voluntary conservation to as a percentage of normal use – Reduce demand by 10% Enlist support of the Drought Response Team Develop action plans for alternate supply sources and establish water conservation ordinances, if not already done, that are enforceable.
Stage 2 Watch	Supplies significantly lower than seasonal norm and diminishing Large decrease in static water level or rapid increase in drawdown Demand is 40-65% of stream flow (measured twice weekly) Less than 180 but more than 120 days supply remaining	Notify the state Issue a water shortage alert to customers and inform the public of the problem Utility should work to reduce water loss to 10-15% Request voluntary conservation of all water uses to reduce demand by 15% Monitor and enforce compliance

Response Measures/Actions

Source: Modified from RCSA

Stage	Criteria/Triggers	Actions
Stage 3 Warning	Static water level or drawdown continues to go down, an emergency should be declared based on knowledge of the well Demand is 65-75% of stream flow (measured daily) Less than 120 but more than 60 days supply remaining	Notify the state and issue a water shortage statement and inform the public Initiate mandatory water use restrictions to reduce demand by 20%, such as: • Ration non-essential uses • Restrict socially or economically important uses Enact water conservation pricing/rate structures Monitor and enforce water restrictions Put alternate supply sources into service upon approval by the state
Stage 4 Emergency	Well level is unsafe for pumping Demand is 75% or more of stream flow Less than 60 days supply remaining	Notify the state Reduce usage by 25% Ban all non-essential and socially or economically important uses Enforce all restrictions and allocations

Effective Communication and Messages

- Have messaging in place so that you are prepared for a water shortage
- Coordinate with systems in your region on messaging
- Know who will be speaking for the water system
- Communicate early and often
- Be upfront and honest. What we know right now is _____
- Let your consumers know what is going on and what they can do
- Develop a relationship with the media
- Thank people for their effort
- Congratulate them for getting through the shortage

Example Messages to Customers

Stage	Messages
Stage 1 Advisory	"We may soon experience less-than-normal water supplies. Customers are advised that water use restrictions may be necessary to make sure we don't run out of water. We will be communicating with you regularly." "Please use water wisely. Please refer to water conservation guidance materials provided."
Stage 2 Watch	"Our water supplies are being affected by the current drought situation. Well levels are declining at a rate higher than normal. Please use water wisely during this time." "We respectfully request customers to conserve water" by implementing water conservation measures."
Stage 3 Warning	"Due to a continuing decline in our source water supply, we need to impose mandatory water use restrictions "Until further notice, everyone is require to conserve water in the following ways:" (Develop list)
Stage 4 Emergency	"You may obtain water for emergency use from _____. We will be able to assist you from ____ to ____ or you may call _____"

Source: Modified from WA DOH Presentation at WA Drought and Water Loss Workshop, Feb. 2019

Example of Criteria, Actions and Messages Put Together

Stage	Criteria	Actions	Messages
Stage 3 Mandatory	System estimates 10 percent or larger reduction in source supply, including decreased well level or below-normal surface water flow. Short term power outage where water system is running on generator or storage. Pump or other equipment failure, but water system is able to produce and supply. A reduced supply of water. Severe drought conditions likely will affect well yield.	Initiate mandatory water use restrictions, such as: • Limiting lawn watering to 1 day per week, less than 2 hours, between 8 p.m. and 6 a.m. • Prohibiting all daytime irrigation. • Limiting outside watering to odd-number days, after 8 p.m. and no more than 1 hour. Implement a water-conservation rate structure. Inform customers about the situation. Monitor well level twice a week at varying intervals. Post notices around neighborhoods. Implement water use rates if well declines below 20 percent of normal.	"Due to a continuing decline in our source water supply, we need to impose mandatory water use restrictions. Until further notice, everyone is required to conserve water in the following ways: (Develop list)
Stage 4 Emergency	Well level is unsafe for pumping, pumps are cavitating, or there is air in the distribution system. Earthquake shuts down the water system or affects sources, lines and so on. Flood inundates water system facilities and sources. Storm significantly damages power grid and water system facilities.	Mandatory rationing. Initiate intertie with neighboring water system. Bring in bottled and trucked water.	"You may obtain water for emergency use from the storage reservoir. We will be available to assist you from ___ to ___, or call..." If you use water from this source, bring it to a rolling boil for one minute and let it cool before using.

Source: Modified from WA DOH Presentation at WA Drought and Water Loss Workshop, Feb. 2019

Implement the Drought Response Plan

- Formally adopt the plan
  - Approval of drought response team
  - Approval of local officials
  - Approval of water board, etc.
- Have a schedule set to review the plan (after each drought or once every 5 years, etc.)
- Have a schedule to train and exercise on the drought response plan

Public Education

- Again, know who will be speaking for the water system and dealing with the media
- Let your consumers know where to go for questions
- Provide bill stuffers and post fliers around highly trafficked areas (library, town or city hall, grocery stores, etc.
- Attend local events to provide information and answer questions
- Work with local businesses, churches and other community organizations to help get the word out about the plan

Enforcement

- Make sure to have the ability to enforce drought restrictions through local, county, or state ordinances.
  - Be able to issue and collect fines and penalties
  - Have the authority to disconnect service
- Monitor drought restrictions
  - Through customers, operators who are out in the field, local authorities, community organizations, etc.
- Incentive programs can be helpful
  - Provide discount on next months bill for achieving X amount of savings
  - Supply low-flow devices

Additional Actions of Effective Water Shortage/Drought Planning

- Identify infrastructure weaknesses and critical or sensitive water customers
- Evaluate the utility's financial capabilities and possible financing options
- Include a systematic checklist or process to assess impacts and responses
- Identify potential assistance providers
- Consider regional impacts of drought; regional drought response planning teams share information and provide coordinated actions

Best time to plan for a drought is while it's raining, and water supply is plentiful!

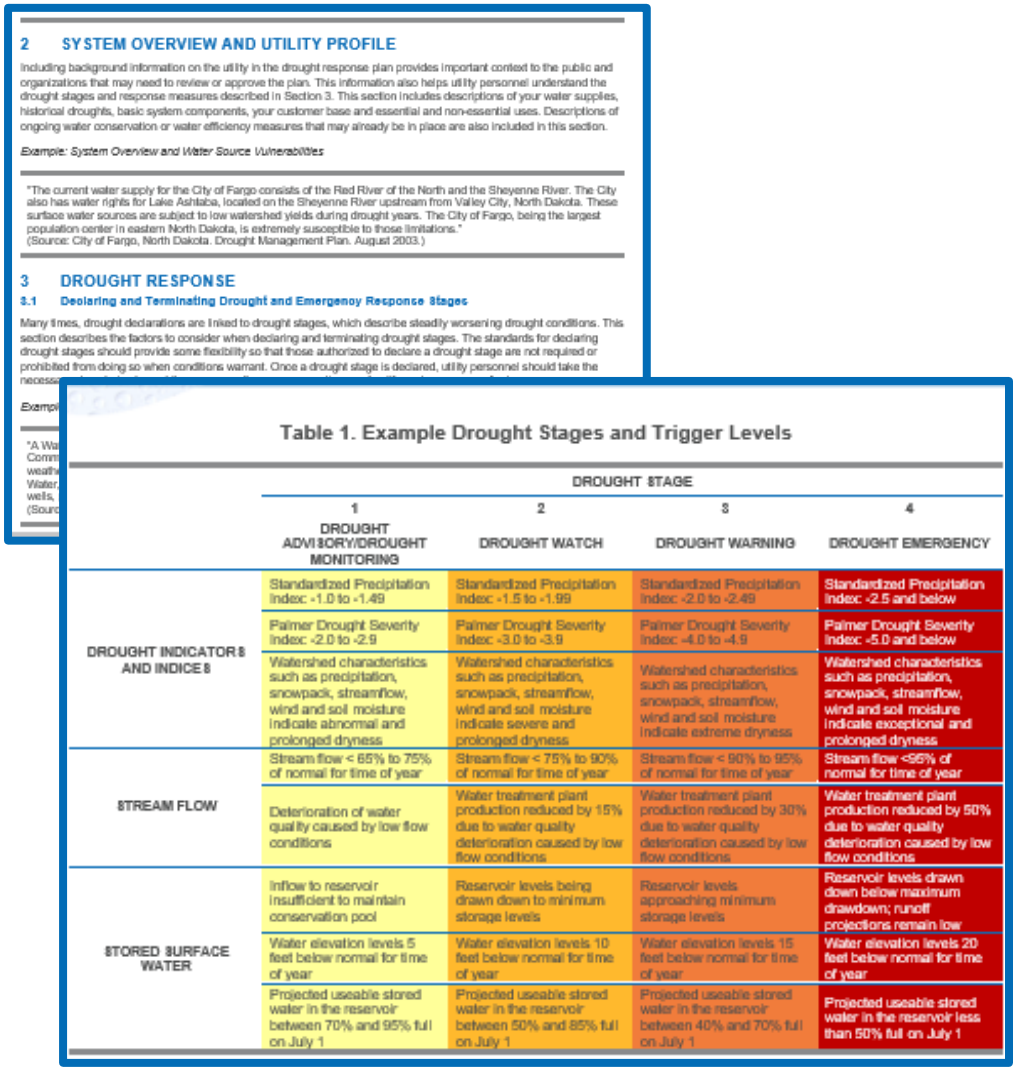
Source: Modified from MO DNR Fact Sheet

EPA Drought Response Plan Template

- EPA has prepared an on-line template you can customize to prepare your own Drought Response Plan
- Find it on-line via the Drought Guide at: **www.epa.gov/waterutilityresponse/drought-response-and-recovery-for-water-utilities**
  - Will most likely need to download the Guide to your computer then open via Adobe Reader

Drought Response Plan Template

Instructions



2 SYSTEM OVERVIEW AND UTILITY PROFILE

Including background information on the utility in the drought response plan provides important context to the public and organizations that may need to review or approve the plan. This information also helps utility personnel understand the drought stages and response measures described in Section 3. This section includes descriptions of your water supplies, historical droughts, basic system components, your customer base and essential and non-essential uses. Descriptions of ongoing water conservation or water efficiency measures that may already be in place are also included in this section.

Example: System Overview and Water Source Vulnerabilities

"The current water supply for the City of Fargo consists of the Red River of the North and the Sheyenne River. The City also has water rights for Lake Ashtabula, located on the Sheyenne River upstream from Valley City, North Dakota. These surface water sources are subject to low watershed yields during drought years. The City of Fargo, being the largest population center in eastern North Dakota, is extremely susceptible to those limitations." (Source: City of Fargo, North Dakota. Drought Management Plan. August 2003.)

3 DROUGHT RESPONSE

3.1 Declaring and Terminating Drought and Emergency Response Stages

Many times, drought declarations are linked to drought stages, which describe steadily worsening drought conditions. This section describes the factors to consider when declaring and terminating drought stages. The standards for declaring drought stages should provide some flexibility so that those authorized to declare a drought stage are not required or prohibited from doing so when conditions warrant. Once a drought stage is declared, utility personnel should take the

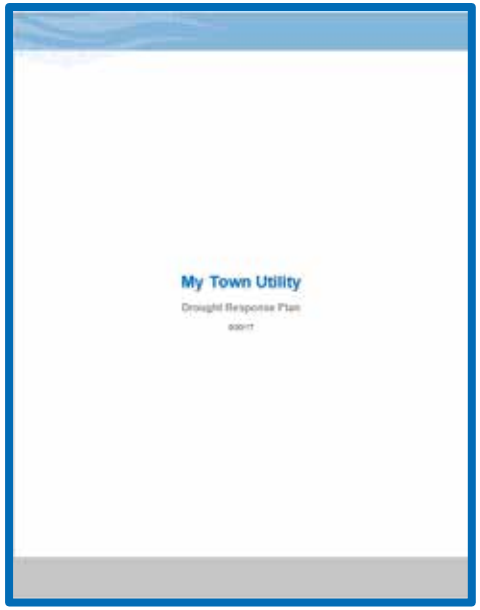
Table 1. Example Drought Stages and Trigger Levels

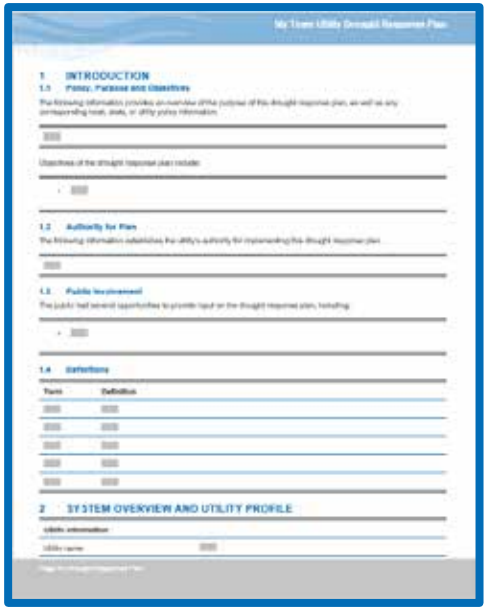
	DROUGHT STAGE			
	1 DROUGHT ADVISORY/DROUGHT MONITORING	2 DROUGHT WATCH	3 DROUGHT WARNING	4 DROUGHT EMERGENCY
DROUGHT INDICATORS AND INDICES	Standardized Precipitation Index: -1.0 to -1.49	Standardized Precipitation Index: -1.5 to -1.99	Standardized Precipitation Index: -2.0 to -2.49	Standardized Precipitation Index: -2.5 and below
	Palmer Drought Severity Index: -2.0 to -2.9	Palmer Drought Severity Index: -3.0 to -3.9	Palmer Drought Severity Index: -4.0 to -4.9	Palmer Drought Severity Index: -5.0 and below
	Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate abnormal and prolonged dryness	Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate severe and prolonged dryness	Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate extreme dryness	Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate exceptional and prolonged dryness
STREAM FLOW	Stream flow < 65% to 75% of normal for time of year	Stream flow < 75% to 90% of normal for time of year	Stream flow < 90% to 95% of normal for time of year	Stream flow <95% of normal for time of year
	Deterioration of water quality caused by low flow conditions	Water treatment plant production reduced by 15% due to water quality deterioration caused by low flow conditions	Water treatment plant production reduced by 30% due to water quality deterioration caused by low flow conditions	Water treatment plant production reduced by 50% due to water quality deterioration caused by low flow conditions
STORED SURFACE WATER	Inflow to reservoir insufficient to maintain conservation pool	Reservoir levels being drawn down to minimum storage levels	Reservoir levels approaching minimum storage levels	Reservoir levels drawn down below maximum drawdown; runoff projections remain low
	Water elevation levels 5 feet below normal for time of year	Water elevation levels 10 feet below normal for time of year	Water elevation levels 15 feet below normal for time of year	Water elevation levels 20 feet below normal for time of year
	Projected useable stored water in the reservoir between 70% and 95% full on July 1	Projected useable stored water in the reservoir between 50% and 85% full on July 1	Projected useable stored water in the reservoir between 40% and 70% full on July 1	Projected useable stored water in the reservoir less than 50% full on July 1

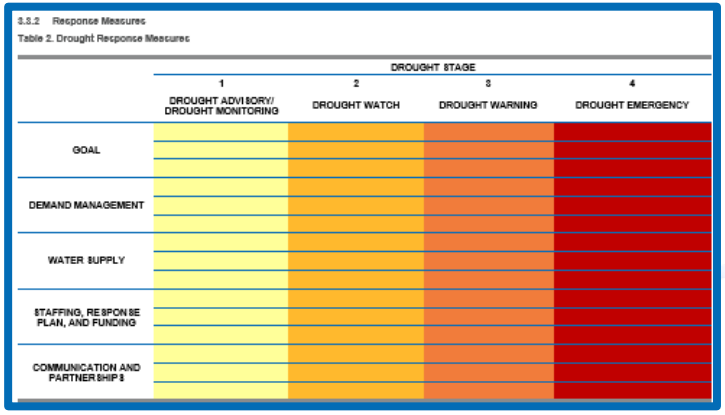
- Assists water and wastewater utilities with developing a drought response plan
- Instructions guide users through the process
- Diverse examples of drought response plans
- Addresses 3 key components
  1. Policy, purpose and objectives
  2. System overview and utility profile
  3. Drought response actions

Drought Response Plan Template

Fillable Template







- Customizable, fillable document
- Flexible and adaptive to unique utility needs

QUESTIONS?

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