Thinking About Drought?

Drought Contingency Guidance for
Maine Public Water Systems

March 2013

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Maine Center for Disease Control and Prevention
An Office of the Department of Health and Human Services
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Contingency Planning for Drought – What's New?

Planning for drought is difficult in a state that sees drought infrequently. With all the pressures of daily management and seasonal inclement weather, who has time? The Maine Drinking Water Program (DWP) would say that **NOW**, actually , is a good time. We may not have a drought on the horizon, but we can clearly see that ***planning for an event that will eventually happen*** **cannot** start soon enough. The DWP has prepared this document as guidance. 2012 was a challenging year for public water systems nationwide. While drought was the most frequent challenge in the western states, flooding incidents were nationwide, as well as flash storms.

What is new with drought preparedness planning is the **sharing of experiences** from those who just went through it. ***Lessons learned*** are powerful and relevant because it doesn't matter what state, allocation of water resources when water sources are threatened is difficult and controversial. Voluntary water conservation has shown to be highly effective when the educational efforts behind it are strong. When water use needs to be tightened to the point of mandatory water restrictions, the ***anxiety about who is priority*** for water use gets controversial.

The value of preparedness planning is answering the difficult questions up front. It allows time for community input, decision making and education about the limitations of the public water system. It allows for research to take place to see what other local and state ordinances and rules might be in effect and can be taken into account. Drought is unique in that we can see it coming. When the options and realities are lined out in advance, the extreme anxiety will lessen.

"The solution to drought, climate change, environmental flows, etc. is to keep demand below supply. That's a management issue, not a nature issue."

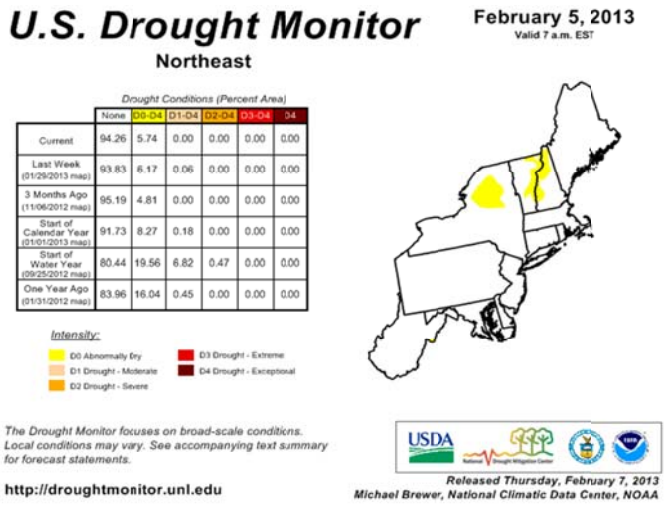
-David Zetland, Aquanomics.com

Who's monitoring drought and how can I find this information?

The River Flow Advisory Commission (RFAC) is the source of drought information in Maine. They utilize the US Geological Survey (USGS) stream gage network and USGS groundwater level monitoring network *in addition* to the US Drought Monitor to set Maine parameters for drought conditions.

The Department of Environmental Protection (DEP) uses the Palmer Drought Severity Index in addition to USGS tools for Maine specific areas. History has shown drought moves around the state, and one area might be at risk while another part of the state is doing well. The US drought monitor website is updated weekly (Thursdays) and includes Maine.

http://droughtmonitor.unl.edu/dm_northeast.htm



Other resources:
www.stateclimate.org
www.nncdc.noaa.gov/sotc
www.umaine.edu/maineclimatenews
http://waterdata.usgs.gov/usa/nwis/nwsis

Definition- Natural Drought Condition: means moisture conditions as measured by the Palmer Drought Severity Index with values of negative 2.0 or less.

What is in place already in Maine for drought planning, resources, and rules?

- **Department of Environmental Protection**

Here in Maine, the DEP has a reporting program for reporting thresholds for withdrawals from rivers, streams and brooks; lakes and groundwater. Water users who make withdrawals larger than the threshold amounts are required to report their water withdrawals. *In times of drought, strong communication with the DEP is important.* Exemptions and variances to withdrawal amounts may be given in times of drought, or public emergencies. More information and planning guidance can be found at DEP regarding chapter 587 In-Stream Flows and Lakes and Pond Water Levels.
http://www.maine.gov/dep/water/swup/587qa.htm

Additional information can be found by contacting Mark Margerum, 207-287-7843.

- **Maine Public Utilities Commission**

The Maine Public Utilities Commission has one small paragraph delegated to drought or emergency water supply issues and that is found in Chapter 62, Section 2 K:
Conservation. A water company shall take all reasonable steps to prevent unnecessary waste of water. A water company shall not supply water at flat rates for any continuous flow device. If a company concludes that a customer charged at flat rates is unnecessarily wasting water, the water company may convert the customer's service to a metered basis. When necessary to conserve the water supply, a water company may restrict or prohibit the use of hoses or sprinklers for both flat and metered customers.
http://www.maine.gov/mpuc/

- **Maine Water/Wastewater Agency Response Network (MEWARN)**
  www.mewarn.org

MEWARN facilitates pre-disaster planning and training and encourages sharing information and lessons learned from other disasters. As of February 2013, 111 utilities have joined. MEWARN offers a practical and affordable approach with multiple benefits for utility members and Maine's communities. Recently MEWARN hosted a drought webinar featuring Texas WARN and the resources and lessons learned were valuable and on target to public water systems nationwide. From a water utility's ***lessons learned***:

What happens when you run out of water? Keep the perspective:
- *It is a local level issue.*
- *Emergency water may be delivered from outside.*
- *It is temporary*
- *One day of rain can change everything*

Potential Goals of drought planning:

Each PWS is going to have a different approach and different priorities. The stakeholders involved can be large or limited. A public water system can perform a good deal of research and groundwork before collaborating with stakeholders. The benefit of this level of groundwork can put everyone on the same playing field or education level quickly and then

move from that point towards a shared vision of what drought planning will look like in all stages, for all users of the water.

- Active useable plan for drought
- Active useable plan for water management, conservation, stewardship
- Monitoring tool for timely decision making
- Proactive efforts at water management
- Monitoring tool for developing SOP's
- Provide guidelines for monitoring water levels
- Establish benchmarks for normal and dry conditions
- Establish response activities (plan)
- Identify financial limitations of alternate water sources
- Identify financial limits of lost revenue

Preplanning Research

This is the groundwork that can be done beforehand by public water utilities. Having this information lined out in advance can save time and may introduce some of the more difficult aspects of planning that need to be accommodated, such as surface water sources that have multiple users (safe yield will not be as accurate) conservation ordinances will affect future planning and might even enhance water use. This stage of planning might introduce new stakeholders not previously thought of.

- Identify existing plans, state, county and local plans
- Identify partnerships, MOU, MOA, mutual aid agreements, neighboring PWS
- Policies and procedures already in place
- Current emergency plans
- Current drought plans
- Old drought plans that might have value
- Backup resources that worked in the past under emergency situations
- Legal ordinances or requirements
- Water restrictions
- Preservation ordinances
- Conservation/water use ordinances that might apply

PWS profile, summary and water history

These can be as simple or complex as the system is. A public water system with multiple wells and sources has a greater challenge. Surface water suppliers have other factors such as other users, evapotranspiration issues, water quality issues such as algae blooms and other side effects of drought not always considered.

- Number of wells
- Source of surface water
- Safe yield established (mgd)
- Average daily yield (mgd)
- Permitted withdrawal averages
- Storage tanks
- Emergency connections

Historical and current efforts

Drought is one of the few challenging disasters that can be seen coming. The largest responsibility the public water systems have- is recognizing when the "problem" needs to be elevated. This would most likely occur months before the public or consumers are aware of it. Drafting out resources and language needed for public education should be researched in advance and ready to go.

As the drought intensifies over time, new issues (political, financial) will be emerging and needing immediate attention. The message you send to your consumers will be a grab and go item, letting you work on more pressing issues.

- Historical water data
- Historical and current precipitation
- Historical and current flows
- historical and current levels
- Historical and current monitoring efforts

Look for patterns over time to help determine drought risk and unique circumstances.

Realize drought can include fast evaporation rates, higher consumer use, more fire suppression efforts (wild fires, local grass fires)

Evaluate all alternative water sources

There is a need to be resourceful, plan for a difficult time frame (the length of the drought) *and be innovative.*

Internal:	***External:***
Emergency connections	*Interconnection with adjacent PWS*
New wells	*Bulk Haul*
Potential of extending surface water intake into deeper water	

Combination:

- *Keep water pressure stable for fire suppression only (Do not use order) Provide bottled water or alternative water source for residents.*
- *Keep water pressure stable for fire suppression (Do not drink order) Provide bottled water or alternative water source for residents.*
- *Keep water pressure stable for fire suppression, residential use limited (Boil water order)*

Water Quality

There is a possibility that water quality will diminish. The means the PWS may be getting multiple "complaints" or concerned consumers regarding odor, look or taste. Plans should be in place to have resources and language drafted out to explain the water quality.

Drafting water restrictions

Drafting water restrictions - a full understanding of who is currently using the water is critical to setting potential water restrictions. Each community is different and might have unique circumstances that need to be considered, to maintain a functional community.

General water use priorities can be simple;

1. health
2. safety
3. environment
4. economic
5. recreation
6. aesthetic

General water use priorities can be more complex;

1. Hospital and medical facilities
2. Nursing homes and elderly care facilities
3. Human consumption (drinking water, domestic cooking, bathing, toilet use)
4. Fire protection, structural facilities, hazardous situations
5. Pets (animal hospitals, kennel, livestock)
6. Environmental (erosion control, aquatic habitat)
7. Commercial uses (restaurant, laundry, office, retail)
8. Industry and manufacturing (sanitation, process, cooling)
9. Recreation (pools, spas, athletic fields, golf courses, fountain)
10. Landscape (watering, home and garden)
11. Residential/ commercial use (lawn watering, vehicle washing)

One example of drought restrictions response

Drought Triggers and Response – this chart is extremely basic and for illustration. Each PWS should customize the response according their own measure of water levels, supplies, storage, recharge and consumer usage. Water use can be seasonal, such as higher consumer use in summer.

Action	Precipitation+	Groundwater =	Response
Normal	1 month below normal	2 months below normal	Monitor
Advisory*	3 months below normal	4 months below normal	Voluntary Restrictions
Watch**	6 months below normal	6 months below normal	Mandatory water restrictions
Warning	12 months below normal	12 months below normal	More mandatory water restrictions
Emergency	12 months below normal	24 months below normal	More mandatory water restrictions

*Identify the point where it might be handy to have a task force or delegated group that can perform an in-depth:

- Full Evaluation of situation (might need daily updates)
- Funding needed for alternative sources
- Full financial plan (or planning) for loss of revenue (insurance, disaster relief, state and federal funds and requirements)

**Identify a point where alternative water sources need to be confirmed and lined out for implementation.

Financial Planning and other considerations….

Financial

The Maine Drinking Water Program has Emergency State Revolving Loan *funds*. This is first come, first serve. This is probably not a resource to count on.

Lessons learned from other states indicate the loss of revenue and outlay of more resources to obtain water is not always predictable. There is no reason to provide bottled water when bulk water will do. There would be no reason to truck and pay for bulk water when a neighboring utility who is not experiencing the same level of drought will "loan" water or sell outright at a price that beats bulk hauling. Laying temporary pipes above ground might be an option not believed possible.

Initiating water restrictions may result in revenue loss that might be a financial consideration. Financial reimbursement for disasters is getting more difficult due to the increase in climate related disasters nationwide. Drought is expensive on many fronts and each PWS has a responsibility to identify vulnerabilities and financial limitations.

Additional resources

National Study of Water Management During Drought -ACE (1995)
http://www.iwr.usace.army.mil/docs/iwrreports/94-NDS-12.pdf

Sustainable water allocation and rulemaking for Maine's surface Waters: Adaptation consideration in a changing climate- 2009
http://water.usgs.gov/wrri/09grants/2009ME176B.html

Past climate, future perspective: An exploratory analysis using climate proxies and drought risk assessment to inform water resources management and policy in Maine. 2010 University of Maine http://www.ncbi.nlm.nih.gov/pubmed/21075507

Stream Flow Regulations and Impact on Industry Jan 2011-Kristen Miller, Legislative Analyst II http://www.cga.ct.gov/2010/rpt/2010-R-0436.htm

http://www.ready.gov/drought

Adaptive Response Framework for Drinking Water and Wastewater Utilities
http://water.epa.gov/infrastructure/watersecurity/climate/upload/epa817f12009.pdf

Climate Resilience Evaluation and Awareness Tool CREAT
http://water.epa.gov/infrastructure/watersecurity/climate/index.cfm

The Effects of 2001-2002 Drought on Maine Drinking Water Supplies
http://www.umaine.edu/WaterResearch/outreach/drought_digest.htm

All Hazard Consequence Management Planning for the Water Sector
-Preparedness, Emergency Response, and Recovery, CIPAC Workgroup
http://www.gillelandcreekpress.com/All-HazardCMP200911.pdf