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Emergency Operations Plan – Incident Annex 5 *Drought*

Section 1: Introduction

1.1 Lead Agencies

- Maine Emergency Management Agency (MEMA)
- United States Geological Survey (USGS)

1.2 Supporting Agencies

- Department of Agriculture, Conservation, and Forestry
 - Maine Forest Service (MFS)
 - Maine Geologic Survey (MGS)
 - Soil & Water Conservation Program
- Department of Environmental Protection (DEP)
- Department of Health and Human Services (DHHS)
 - Maine Center for Disease Control and Prevention (Maine CDC)
- Department of Inland Fisheries and Wildlife (IFW)
- Department of Public Safety
 - Fire Marshal's Office (FMO)
- Maine State Housing Authority (MSHA)
- Maine Rural Water Association
- National Weather Service (NWS)
 - Caribou Weather Forecast Office
 - Gray Weather Forecast Office
- Public Utilities Commission (PUC)
- Public Water Suppliers
- University of Maine Cooperative Extension
- U.S. Department of Agriculture (USDA)
 - Farm Service Agency (FSA)
 - Rural Development (RD)

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Section 2: Purpose, Scope, Situation, and Assumptions

2.1 Purpose

The purpose of this annex is to help lead and supporting state agencies and other partners to:

- Coordinate activities in response to drought situations.
- Assign responsibilities for information collection needed to assess the impacts caused by drought.
- Establish criteria for evaluating the severity of drought situations.
- Identify the lines of communications that facilitate the smooth flow of information to and from decision-makers.
- Summarize the authority available to government agencies to respond to drought situations.

2.2 Scope

This annex describes the state response to drought conditions as defined in **Appendix A. State Drought Severity Triggers and Levels**. It applies to the lead and supporting agencies listed in sections 1.1 and 1.2. This annex may be used in conjunction with affected agency incident response plans and the state Emergency Operations Plan (EOP), its annexes, and/or other planning documents as required.

2.3 Situation

Drought is a period of below-average precipitation in a given region, resulting in prolonged shortages in its water supply, whether it be atmospheric, surface water, or groundwater. More specific definitions of drought are described below:

- **Meteorological Drought:** When dry weather patterns dominate an area.
- **Hydrologic Drought:** When low water supply becomes evident in streams, reservoirs, and groundwater levels. Hydrologic drought indicators lag significantly behind meteorological drought indicators.
- **Agricultural Drought:** When precipitation deficits, soil water deficits, reduced ground water, or reduced reservoir levels impact agricultural yields.
- **Socioeconomic Drought:** When drought conditions impact the supply and demand of economic goods.

Maine has suffered the effects of drought on multiple occasions. The drought of 1999-2002 was the most severe drought on Maine's rivers in more than 50 years. Ground-water levels in 2001-2002 reached record lows in much of the state. Maine and other northeastern states suffered a serious drought from 1961 to 1965, which was noteworthy for its duration if not for its severity.

Drought is a complex physical and social process of widespread significance, and impacts can vary significantly statewide. All Maine communities and residents are vulnerable to impacts of drought, as drought event is relative to climate norms.

Maine has 153 public water suppliers statewide which range significantly in customers served from a minimum of 12 to a maximum of 52,712 (Maine Public Utilities Commission, 2016). Maine has the lowest per capita daily water use from public water supply, with average daily water consumption of 51 gallons. However, 42 percent of Maine's population is dependent on private wells for water supply, the highest percent in the country and well above the national average of 14 percent (USGS 2014).

Households on private wells are highly vulnerable to water shortages because they are dependent on local ground water levels that are susceptible to localized drought events, and do not benefit from the redundant measures that are set to protect public water supply. The agricultural community is also vulnerable to drought as drought is historically the most significant risk factor to agriculture. Drought can exacerbate the impact of forest fires because fires take more time and resources to suppress and drought can limit availability of water resources to fight the fires.

Drought is a unique hazard because of how delayed its effects are. All drought events are precipitation driven, and begin with a precipitation deficiency. However, drought impacts are not felt until surface and groundwater hydrology is affected, which can lag significantly behind rainfall anomalies. This makes it difficult to define a clear beginning and end of a drought event, particularly during or shortly after a drought event.

Proactive and responsive measures such as conservation, monitoring, water resource planning, extension of distribution systems and public education are important. Proactive response can significantly prevent, mitigate, or alleviate the impacts caused by a drought. Emergency conditions created by a drought will require consideration of the following:

- Residential, commercial, and industrial conservation measures
- Rationing for essential or prioritized purposes such as subsistence, medical, agricultural, or industrial use
- Emergency distribution services, tankers, water treatment, or supplies from new sources
- Involvement of state resources

Early identification of the threat of drought is important in order to educate the public in conservation measures and minimize the impact of the drought.

2.4 Assumptions

- Local efforts to conserve water will precede state conservation efforts.
- A prolonged drought will increase the chances of, and may exacerbate other forms of disaster, particularly forest fires and related erosion and flood conditions, particularly flash flooding.
- Economic recovery assistance may be required for agriculture, business, industry, and individuals damaged by the drought condition. The economic effects on the state could be serious.

Section 3: Concept of Operations

3.1 General

a. Local Government Response

Local governments or water suppliers, either independently or in conjunction with DEP, PUC, and/or Maine CDC are responsible for the management of their water systems to ensure that they can provide sufficient supply to meet essential needs. Key functions include:

- Ensuring local suppliers have working emergency response plans that include plans for drought response and existing and potential emergency water supply identification; and
- Educating the public and elected officials at the local level on options, if necessary, to impose water restrictions and conservation measures early in order to manage demand and avoid severe deficits, pressure problems, or water quality issues to the greatest extent possible.

Though this drought plan is intended to coordinate state agencies as they work with local governments and federal partners to assess and respond to drought conditions, state agencies recognize the fundamental role that local governments play. Actions by local government and water suppliers can range from conservation messaging, requesting voluntary to mandatory reductions in water use to local water emergency declarations (either by ordinance or through petition to the PUC) based on the status of their local water supplies. These local decisions are made by individual water suppliers and independently of the state responses outlined below as it is the public water suppliers' responsibility to manage their resources. Regardless of drought conditions, water suppliers may have to institute non-essential outdoor water use restrictions to maintain water levels.

b. State Government Response

As dry conditions persist, agencies direct their drought response actions to regions of the state, based on the regional assessment of drought level, and where assistance is specifically requested. Agency responses range from: information collection and sharing during normal conditions; to increased coordination and communications; to voluntary or mandatory conservation orders; and, to the Governor's declaration of a state of emergency. These actions are not intended to limit or inhibit the discretion of the agencies on how they may undertake certain activities. Also, some actions may be triggered by particular drought indicators that provide input to the U.S. Drought Monitor index and not as the results of the Drought Monitor as a whole.

3.2 Drought Task Force

a. Role

The role of the DTF is to facilitate communication and situational awareness, provide an assessment of the situation, develop recommendations on potential responses, and to provide reports on drought situations. Therefore, the primary responsibilities of the DTF are to gather the information necessary to assess the impact of dry conditions and to make recommendations to the Governor's Office, or

others as needed. The DTF makes recommendations for declaring emergencies and for developing and implementing emergency responses. Each of these responsibilities is discussed in Section 4.

The DTF is not intended to infringe upon the statutory or other obligations of its member agencies or of others who are responsible for responding to any particular situation. Both the DTF and the coordinating agencies serve to facilitate the activities of the DTF members and ensure there is a coordinated response by state agencies to drought situations.

b. Membership

The DTF is comprised of public and private stakeholders that have responsibility for areas likely to be affected by drought conditions, as listed in subsections 1.1 and 1.2. Because the impacts of drought events are situationally driven by severity, location, extent, and duration, the DTF may add members as necessary.

c. Activation

The DTF can be activated in one of two ways:

1. When conditions that warrant a Drought Advisory are met, pursuant to **Appendix A. State Drought Severity Triggers**, or;
2. At the recommendation of any DTF member agency – after approval by both DTF chairs (MEMA and USGS).

d. Deactivation

The DTF can be deactivated in one of two ways:

1. When conditions no longer warrant a Drought Advisory, pursuant to **Appendix A. State Drought Severity Triggers**, or;
2. At the recommendation of any DTF member agency – after approval by both DTF chairs (MEMA and USGS).

3.3 Drought Indices

The DTF uses the U.S. Drought Monitor (USDM) to assess and characterize drought severity statewide. The USDM is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration (see **Appendix C. USDM Drought Severity Classification Scheme**).

3.4 Drought Severity Levels

Three levels of drought are used to assess and characterize statewide drought severity:

- Advisory
- Warning
- Emergency

These drought levels are based on the conditions depicted by the U.S. Drought Monitor and are intended to categorize the status of water resources statewide. The levels provide a basic framework from which to take actions to assess, communicate, and respond to drought conditions. Water restrictions might be appropriate at the warning stage, depending on the capacity of each individual water supply system. A

warning level indicates a severe situation and the possibility that a drought emergency may be necessary. A drought emergency is one in which mandatory water restrictions or use of emergency supplies is likely necessary.

The action levels specified in this annex are associated with potential actions to coordinate state response to drought situations. However, numerous individual agencies have particular responsibilities that they are responsible for implementing on an ongoing basis. These drought-triggered actions are not intended to limit or inhibit the discretion of the agencies as they undertake certain activities. Some actions may be triggered by a particular drought indicator, rather than the index created by the U.S. Drought Monitor. Individual communities have a range of actions they can take to manage their systems during droughts.

If conditions reach the criteria for the next drought level, the DTF will recommend that the severity of the drought action level be increased. If conditions improve, the DTF will recommend that the severity of the drought action level be reduced based on either site specific information or on progress toward returning to normal. If conditions persist but do not change significantly, the DTF will recommend that the drought action level be held constant. Due to the variables associated with drought, the DTF maintains final determination of Drought Level. See **Appendix A. State Drought Severity Triggers.**

3.5 Data Collection and Reporting

Monitoring trends and collecting pertinent information is vital to making timely and accurate decisions. This Drought Annex describes which agencies or organizations can be relied upon to provide information that is used to assess the severity of drought conditions and impacts to the public health, economic viability, and the natural environment of Maine.

MEMA will coordinate and assemble data for a report to the Governor after each DTF Meeting.

Table 1. Information Collection Responsibilities

Information	Agency or Organization
State groundwater levels, surface water levels, and streamflow conditions	MGS, USGS
Extended forecast	NWS
Precipitation levels	NWS
Communities with water bans and declared water emergencies	PUC, Maine CDC
Drinking water supply concerns	Maine CDC, PUC, DEP
Reservoir levels and flows	DEP, PUC
Forest fire conditions	MFS
Agricultural conditions and impacts and agricultural crop data	DACF
Impacts to natural resources	IFW
Water consumption data from utilities	Maine CDC
Water Well Database	MGS
Additional environmental information	DEP
Dry Well Reports	MEMA, 2-1-1 Maine

3.6 Communications

a. General Public

It is important that accurate and timely information about the current status of drought conditions and the resultant impacts are communicated to the public. MEMA will communicate drought-related advice from the DTF to state agencies. MEMA's public information personnel will be the primary vehicle through which information will be made available to the media and the general public. MEMA will utilize the Joint Information System (JIS) as defined in the EOP, ESF-15, External Affairs, when jointly released public announcements are needed to bring attention to the situation or to communicate specific response actions. If other agencies or groups determine that communication to the general public about drought response is necessary, it is recommended that they coordinate with MEMA on how best to accomplish this.

b. Target Audiences

State agencies are responsible for communicating with their particular constituents. Although this annex is intended to facilitate coordination between state agencies, it is understood that local governments and associations play a key role in communications with their constituents.

Table 2. Communication Responsibilities

Target Audience	Agency or Organization
General public	MEMA, Governor's Office
Public water suppliers	Maine CDC, PUC, DEP
Foresters	MFS
Farmers	DACF, USDA
Industrial water users	DEP
Fire departments	MFS, FMO
Wastewater discharge, hydropower, and permit holders	DEP

Section 4: Responsibilities

4.1 Lead Agencies

a. Maine Emergency Management Agency

- Serve as a Co-Chair of the DTF.
- Coordinate federal, state, local, voluntary and private resources during an emergency.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

b. United States Geological Survey

- Serve as a Co-Chair of the DTF.
- Collect and disseminate data on hydrologic drought conditions, to include surface and groundwater monitoring.
- Collect information as indicated in Table 1. Information Collection Responsibilities.

4.2 Supporting Agencies

a. Department of Agriculture, Conservation and Forestry

Maine Forest Service

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

Maine Geological Survey

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

Soil and Water Conservation Program

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

b. Department of Environmental Protection

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

c. Department of Health and Human Services – Maine Center for Disease Control and Prevention

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

d. Department of Inland Fisheries and Wildlife

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

e. Department of Public Safety – Fire Marshal’s Office

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

f. Maine State Housing Authority

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

g. Maine Rural Water Association

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

h. National Weather Service

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

i. Public Utilities Commission

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

j. Public Water Suppliers

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

k. University of Maine Cooperative Extension

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

I. U.S. Department of Agriculture

- Serve as a member of the DTF.
- Collect information as indicated in Table 1. Information Collection Responsibilities.
- Disseminate information as indicated in Table 2. Communication Responsibilities.

Section 5: References

- Maine Public Utilities Commission – Water: <http://www.maine.gov/mpuc/water/index.shtml>
- National Weather Service Climate Prediction Center: <http://www.cpc.noaa.gov/>
- United States Drought Monitor <http://droughtmonitor.unl.edu/>
- United States Geological Survey Estimated Use of Water in the United States in 2010 (2014). <http://pubs.usgs.gov/circ/1405/pdf/circ1405.pdf>
- United States Geological Survey Groundwater Watch: <https://groundwaterwatch.usgs.gov/StateMap.asp?sa=ME&sc=23>
- United States Geological Survey Water Watch: <https://waterwatch.usgs.gov/?m=real&r=me&w=map>

Section 6: Appendices

Appendix A. State Drought Severity Triggers and Levels¹

Levels	Triggers
	Percent of Land Area or Population Affected
Advisory	50% in D0 Classification
	40% in D1 Classification
	30% in D2 Classification
Warning	50% in D1 Classification
	40% in D2 Classification
	30% in D3 Classification
Emergency	50% in D2 Classification
	40% in D3 Classification

¹ See Appendix C. USDM Drought Severity Classification Scheme for descriptions of D0-D4

Appendix B. Potential State Actions during Drought Conditions

	<i>Advisory</i>	<i>Warning</i>	<i>Emergency</i>
Maine Emergency Management Agency	<ul style="list-style-type: none"> • Convene Drought Task Force, to meet throughout drought • Activate 2-1-1 Maine to report dry wells • Work with state and federal partners to assemble a guide of available assistance to residents 		<ul style="list-style-type: none"> • Recommend to Governor that a State of Emergency be issued to make state resources available for drought response
United States Geological Survey	<ul style="list-style-type: none"> • Convene Drought Task Force, to meet throughout drought 		
Department of Agriculture, Conservation, and Forestry	<ul style="list-style-type: none"> • Maine Forest Service monitors increases in fire potential and fire suppression challenges that are increased by drought 	<ul style="list-style-type: none"> • Soil and Water Conservation Districts and Cooperative Extension participate in drought surveys to support possible additional federal drought disaster declarations 	
Public Utilities Commission	<ul style="list-style-type: none"> • Initiate an inquiry into water supply statuses 		
Water Suppliers		<ul style="list-style-type: none"> • Issue Voluntary Water Conservation Orders (supply status dependent) 	<ul style="list-style-type: none"> • Issue Mandatory Water Conservation Orders (supply status dependent)
Department of Inland Fisheries and Wildlife		<ul style="list-style-type: none"> • Require regulatory changes to site-specific habitat management actions (conditions dependent) 	<ul style="list-style-type: none"> • Require regulatory changes to site-specific habitat management actions (conditions dependent)
Department of Environmental Protection	<ul style="list-style-type: none"> • Release water Best Management Practices and conservation tips as they relate to DEP permitting under drought conditions 	<ul style="list-style-type: none"> • Consult with DEP licensees on compliance issues related to drought conditions • Provide technical assistance to affected stakeholders and expedite permitting for any drought related projects 	<ul style="list-style-type: none"> • Consult with DEP licensees on compliance issues related to drought conditions

Appendix C. USDM Drought Severity Classification Scheme

Category and Description	Possible Impacts	Palmer Drought Severity Index	CPC Soil Moisture Model*	USGS Weekly Streamflow*	Standard Precipitation Index	Objective Drought Indicator Blends*
D0 <i>Abnormally Dry</i>	<ul style="list-style-type: none"> • Short-term dryness slowing planting, growth of crops or pastures (going into drought) • Some lingering water deficits, pastures of crops not fully recovered (coming out of drought) 	-1 to -1.9	21 to 30	21 to 30	-.5 to -.7	21 to 30
D1 <i>Moderate Drought</i>	<ul style="list-style-type: none"> • Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested 	-2 to -2.9	11 to 20	11 to 20	-.8 to -1.2	11 to 20
D2 <i>Severe Drought</i>	<ul style="list-style-type: none"> • Crop or pasture losses likely • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested 	-3 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3 <i>Extreme Drought</i>	<ul style="list-style-type: none"> • Major crop/pasture losses • Widespread water shortages or restrictions 	-4 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4 <i>Exceptional Drought</i>	<ul style="list-style-type: none"> • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies 	-5 or less	0 to 2	0 to 2	-2 or less	0 to 2

* Measured in Percentiles.

Courtesy of United States Drought Monitor. Visit <http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx> for more information.