

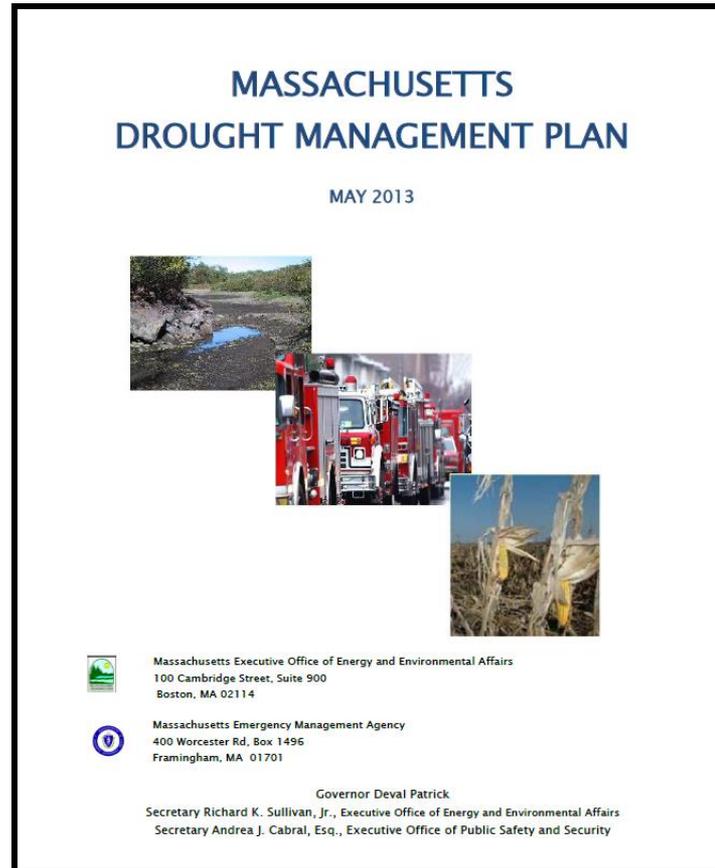
# **Current Hydrologic Conditions in Massachusetts**

## **Drought Management Task Force**

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DCR Office of Water Resources  
Division of Water Supply Protection

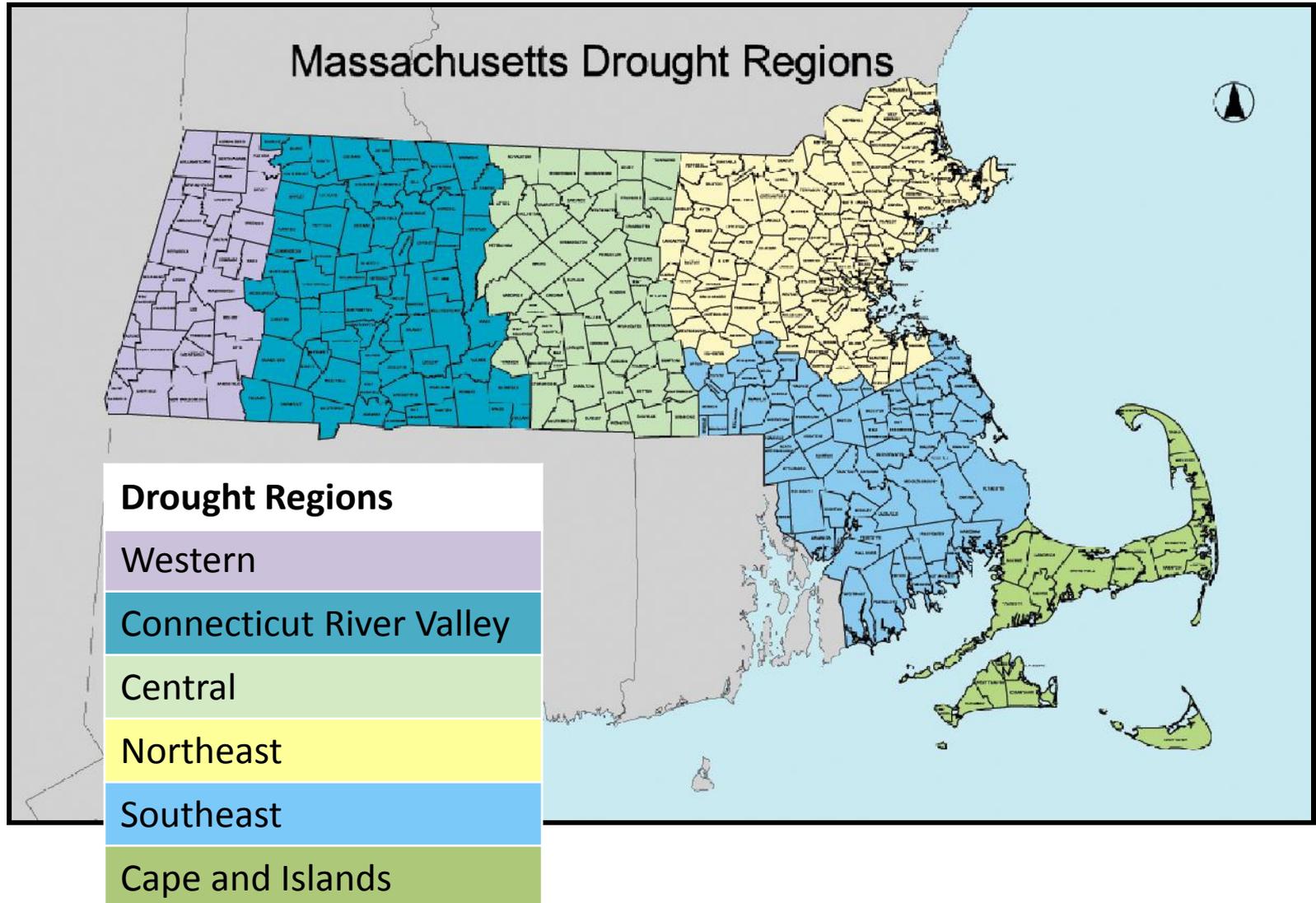
January 5, 2017

# MA Drought Management Plan Summary / Review



[www.mass.gov/eea/wrc-dmtf](http://www.mass.gov/eea/wrc-dmtf)

# Massachusetts Drought Regions



# Massachusetts Drought Indicators and Levels

Drought Indicator	Indicator Type
Standardized Precipitation Index	Precipitation
Precipitation Percent Below Normal	Precipitation
Streamflow Months Below Normal	Streamflow
Groundwater Level Months Below Normal	Groundwater
Size of Reservoir (S, M, L) Below Normal	Reservoirs
Crop Moisture Index	Crop Moisture
Keetch-Byram Drought Index	Fire Danger

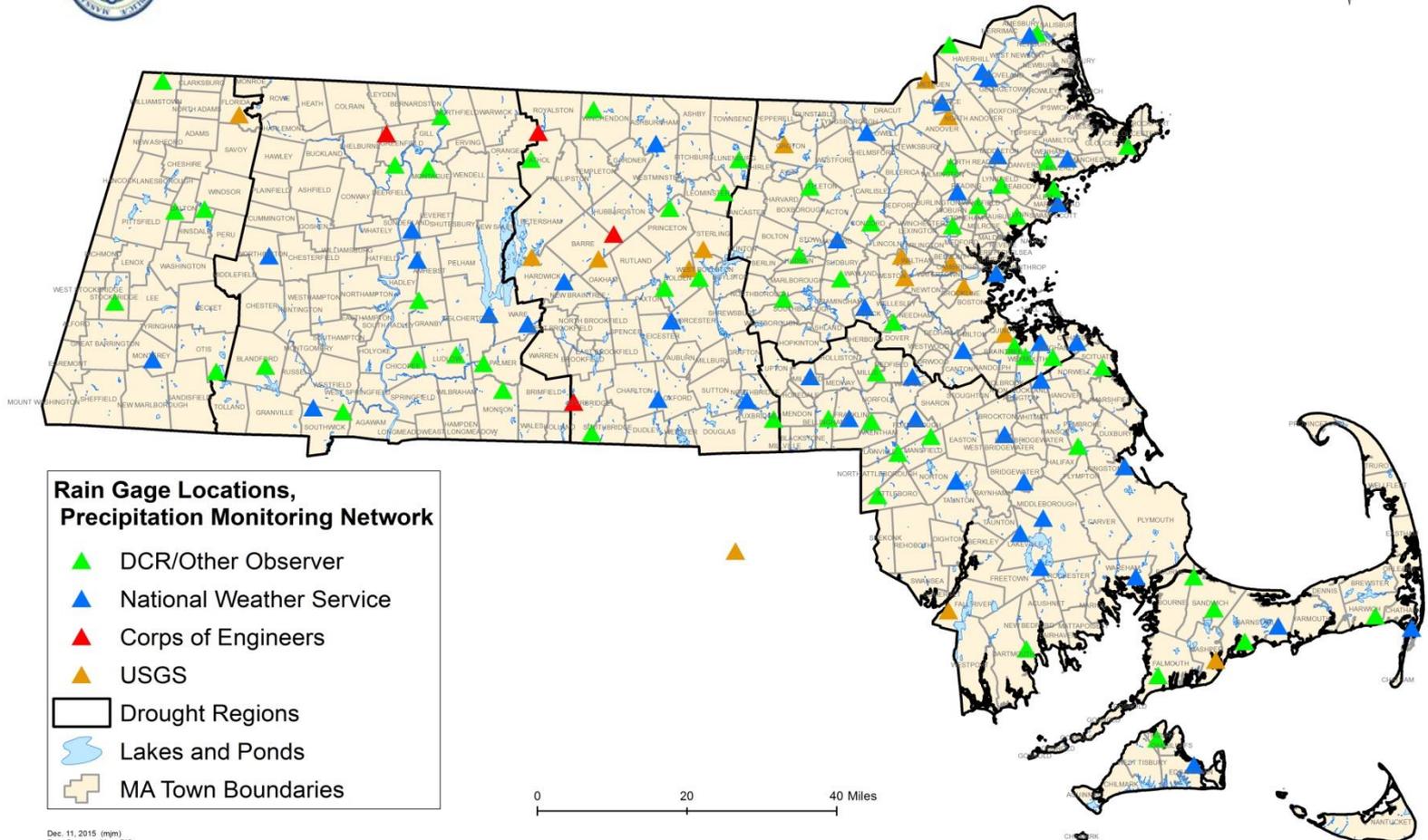
Drought Levels:
Normal
Advisory
Watch
Warning
Emergency

Drought declaration based on majority of indices

# Precipitation Data Sources



## Massachusetts Precipitation Monitoring Network



# Precipitation

Region	Estimated Rainfall (inches)	Departure from Average December (inches)	MA Drought Plan Levels	
			Standardized Precipitation Index (SPI)	Percent of Normal Index
Western	3.38	-0.02	Normal	Normal
CT River Valley	4.60	0.88	Watch (12 mo)	Normal
Central	3.65	-0.23	Advisory (12 mo)	Normal
Northeast	3.34	-0.38	Advisory (12 mo)	Normal
Southeast	3.11	-1.01	Advisory (6, 12 mo)	Normal
Cape Cod & Islands	2.41	-1.77	Advisory (6, 12 mo)	Advisory (2 mo)

# Reservoir Index

Drought Level	Reservoir Index*
Normal	Reservoir levels at or near normal for the time of year
Advisory	Small index reservoirs below normal
Watch	Medium index reservoirs below normal
Warning	Large index reservoirs below normal
Emergency	Continuation of previous month's conditions

\*Water suppliers should be consulted to determine if below normal reservoir conditions are due to operational issues

# Reservoirs

<b>General Reservoir Levels in Massachusetts at the end of December 2016</b>			
<b>Region</b>	<b>Number of Reservoirs Monitored</b>	<b>Reservoir Levels (majority)</b>	<b>MA Drought Management Plan Reservoir Index</b>
<b>Western</b>	2	No data	
<b>CT River Valley</b>	2	Below	Warning*
<b>Central</b>	3	Below	Watch
<b>Northeast</b>	7	Below	Watch
<b>Southeast</b>	3	Below	Watch
<b>Cape Cod &amp; Islands</b>	1	Below	Advisory

\*Quabbin reservoir is slightly below normal. This is a large reservoir which jumps the index to warning. The other monitored reservoir in the CT River Valley region is below normal, a medium reservoir and, therefore, indicates a watch drought category..

# Streamflow Index

Drought Level	Streamflow Index*
Normal	1 month below normal
Advisory	At least 2 out of 3 consecutive months below normal
Watch	At least 4 out of 5 consecutive months below normal
Warning	At least 6 out of 7 consecutive months below normal
Emergency	Greater than 7 months below normal

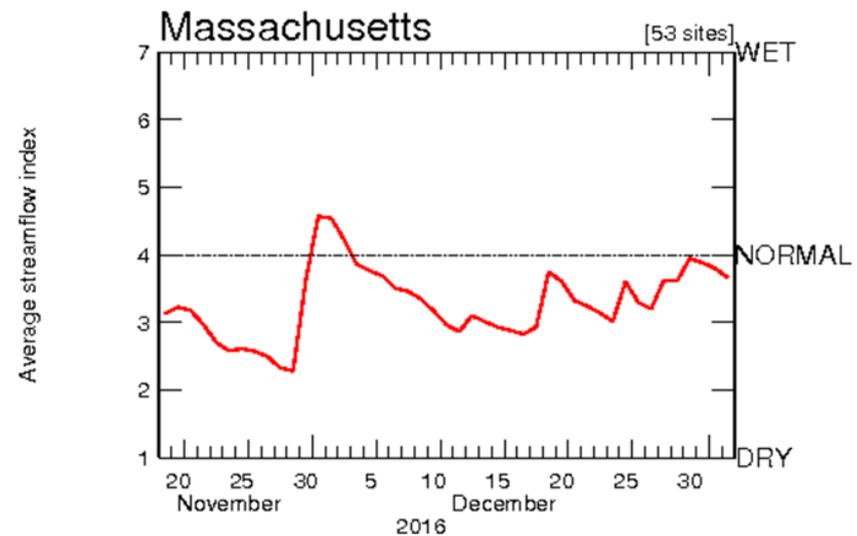
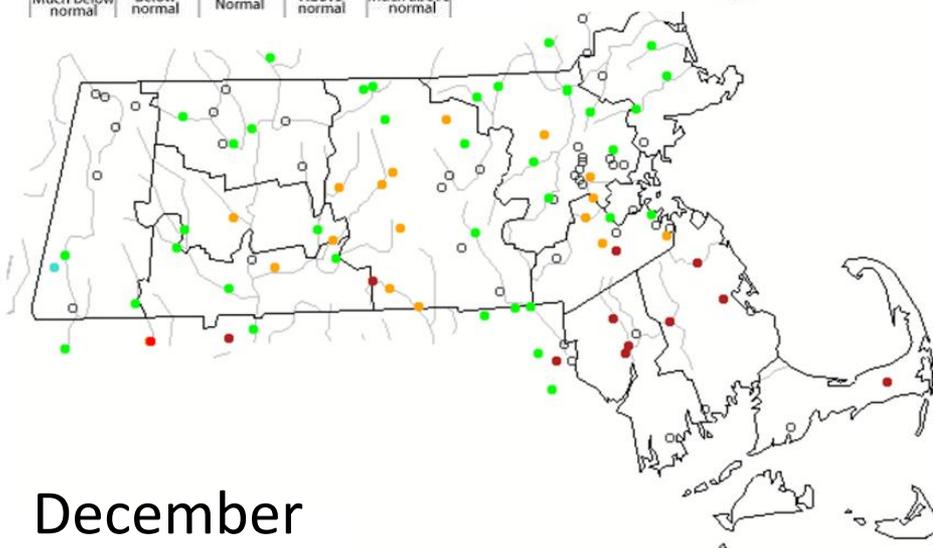
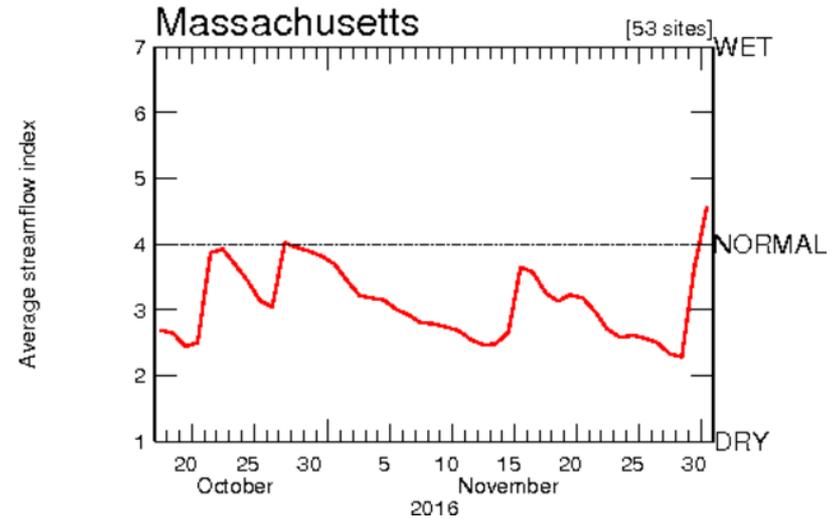
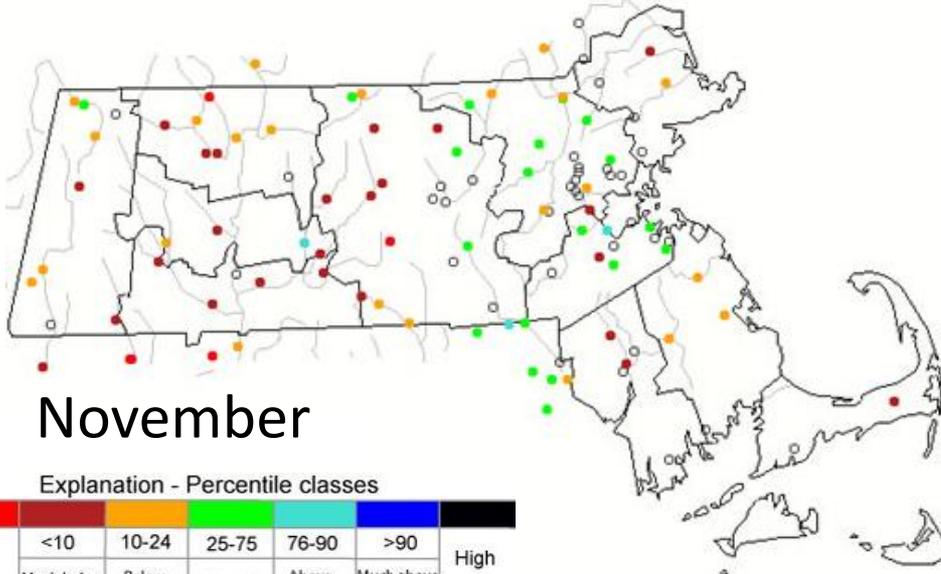
\*Below normal for streamflow is defined as being within the lowest 25<sup>th</sup> percentile of the period of record

# Streamflow Compared to Historical



## Average Monthly

## Average Daily



# Streamflow

Region	Month	Number of wells				MA Drought Plan Index (# consecutive months majority below 25 <sup>th</sup> percentile)
		Total Reporting	Below 25 <sup>th</sup> percentile	Below 10 <sup>th</sup> percentile	At Record Low	
Western	November	7	7	3	0	6 of 7
	December	5	1	1	1	2 of 3
CT River Valley	November	16	15	10	1	7 of 8
	December	11	3	0	0	6 of 7
Central	November	16	10	7	1	8 of 8
	December	16	8	1	0	6 of 7
Northeast	November	19	8	3	0	7 of 8
	December	19	7	1	0	0
Southeast	November	5	5	2	0	7 of 8
	December	6	6	6	0	8 of 8

Note: Light grey shading indicates that some gages did not report percentile flow values. These gages are excluded from the table.

# Groundwater Index

Drought Level	Groundwater Index*
Normal	2 consecutive months below normal
Advisory	3 consecutive months below normal
Watch	4 to 5 consecutive months below normal
Warning	6 to 7 consecutive months below normal
Emergency	Greater than 8 months below normal

\*Below normal for groundwater is defined as being within the lowest 25<sup>th</sup> percentile of the period of record

# Groundwater

Region	Month	Number of wells				MA Drought Plan Index (# consecutive months majority below 25 <sup>th</sup> percentile)
		Total Reporting	Below 25 <sup>th</sup> percentile	Below 10 <sup>th</sup> percentile	At Record Low	
Western	November	5	4	3	1	9
	December	5	3	1	1	10
CT River Valley	November	11	9	7	4	8
	December	11	7	6	4	9
Central	November	10	7	2	1	8
	December	10	4	1	0	0
Northeast	November	17	8	3	0	0
	December	17	7	2	0	0
Southeast	November	12	11	9	2	7
	December	12	10	9	1	8
Cape and Islands	November	13	6	2	0	0
	December	12	6	5	0	1

Note: Light grey shading indicates that not all wells for the region have data. The one missing well in Cape and Islands is borderline but based on trend may end up below normal.

# Crop Moisture and Fire Danger Indices

Drought Level	Crop Moisture Index*	Keetch-Byram Drought Index (KBDI)
Normal	0 to -1.0 Slightly dry	less than 200
Advisory	-1 to -1.9 Abnormally dry	200 to 400
Watch	-2 to -2.9 Excessively dry	400 to 600
Warning	< -2.9 Severely dry	600 to 800
Emergency	< -2.9 Severely dry	600 to 800

\* The Crop Moisture Index is subject to frequent change. The drought level for this indicator is determined based on the repeated or extended occurrence at a given level.

# Crop Moisture

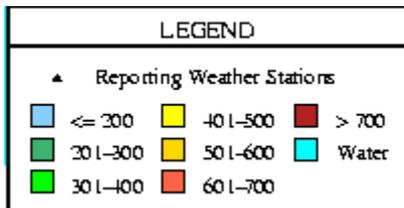


Region	MA Drought Plan Index
Western	Normal
CT River Valley	Normal
Central	Normal
Northeast	Normal
Southeast	Normal
Cape and Islands	Normal



\* The Crop Moisture Index is subject to frequent change. The drought level for this indicator is determined based on the repeated or extended occurrence at a given level.

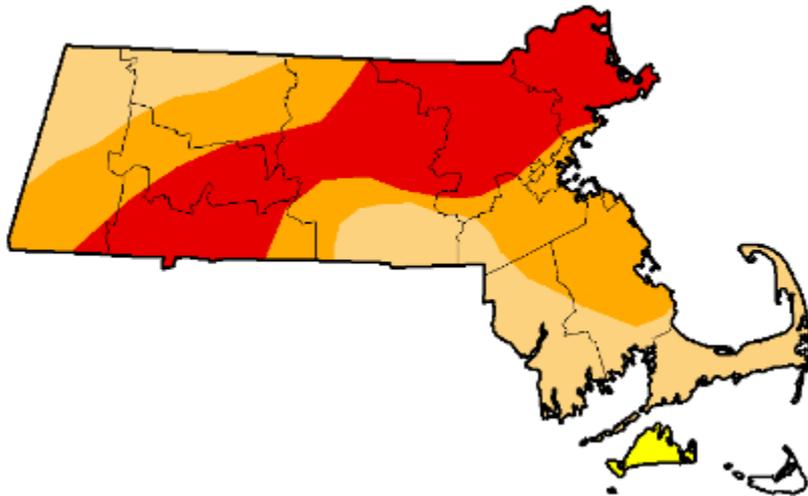
# Keetch-Byram Drought Index



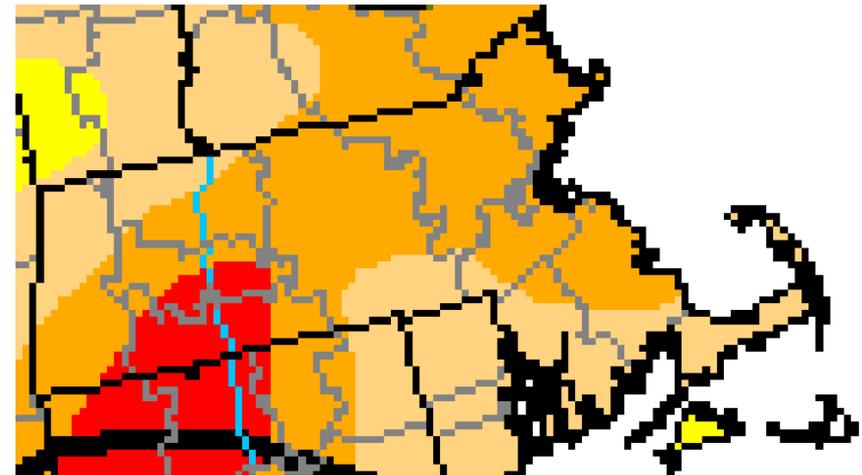
Region	MA Drought Plan Index
Western	Normal
CT River Valley	Normal
Central	Normal
Northeast	Normal
Southeast	Normal
Cape and Islands	Normal

# US Drought Monitor

December 27, 2016



Anticipated January 5, 2017



**Intensity:**

 D0 (Abnormally Dry)

 D2 (Severe Drought)

 D4 (Exceptional Drought)

 D1 (Moderate Drought)

 D3 (Extreme Drought)

# Summary of Drought Indices

	West	CT River Valley	Central	Northeast	Southeast	Cape and Islands
<i>November</i>	Warning	Warning	Warning	Warning	Warning	Advisory
<i>Recommended December</i>	Warning	Warning	Watch?	Watch?	Warning	Advisory
Standard Precipitation Index	Normal	Watch (12mo)	Advisory (12mo)	Advisory (12mo)	Advisory (6,12mo)	Advisory (6,12mo)
Precipitation as % of Normal	Normal	Normal	Normal	Normal	Normal	Advisory (2mo)
Streamflow	Advisory (4 of 5 normal)	Warning (8 of 11 normal)	Warning (8 of 16 normal)	Normal (12 of 19 normal)	Emergency (0 of 6 normal)	N/A
Groundwater	Emergency (2 of 5 normal)	Emergency (4 of 11 normal)	Normal (6 of 10 normal)	Normal (10 of 17 normal)	Emergency (2 of 12 normal)	Normal (6 of 12 normal)
Reservoirs		Warning*	Watch	Watch	Watch	Advisory
Crop Moisture	Normal	Normal	Normal	Normal	Normal	Normal
Fire Danger	Normal	Normal	Normal	Normal	Normal	Normal

\*Quabbin reservoir is slightly below normal. This is a large reservoir which jumps the index to warning. The other monitored reservoir in the CT River Valley region is below normal, a medium reservoir which would indicate a watch drought category.

This summary is provided for informational purposes. No changes in drought status are official until the Drought Management Task Force convenes and makes a recommendation accepted by the Secretary of the Executive Office of Energy and Environmental Affairs.

# Gw Measurement, Central MA, December 30, 2016

