MA Drought Management Plan

MA Water Resources Commission

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DCR Office of Water Resources
Division of Water Supply Protection

October 11, 2012

2010 Draft—revised 727/2010

MASSACHUSETTS DROUGHT MANAGEMENT PLAN
AUGUST 2010

Massachusetts Emergency Management Agency
400 Worcester Rd, Box 1496
Framingham, MA 01701

Executive Office of Energy and Environmental Affairs
100 Cambridge Street
Boston, MA 02114

Governor Deval Patrick, Secretary Ian Bowles, Secretary Mary Elizabeth Heffernan

2010 Drought Management Plan

Developed after dry summer 1999

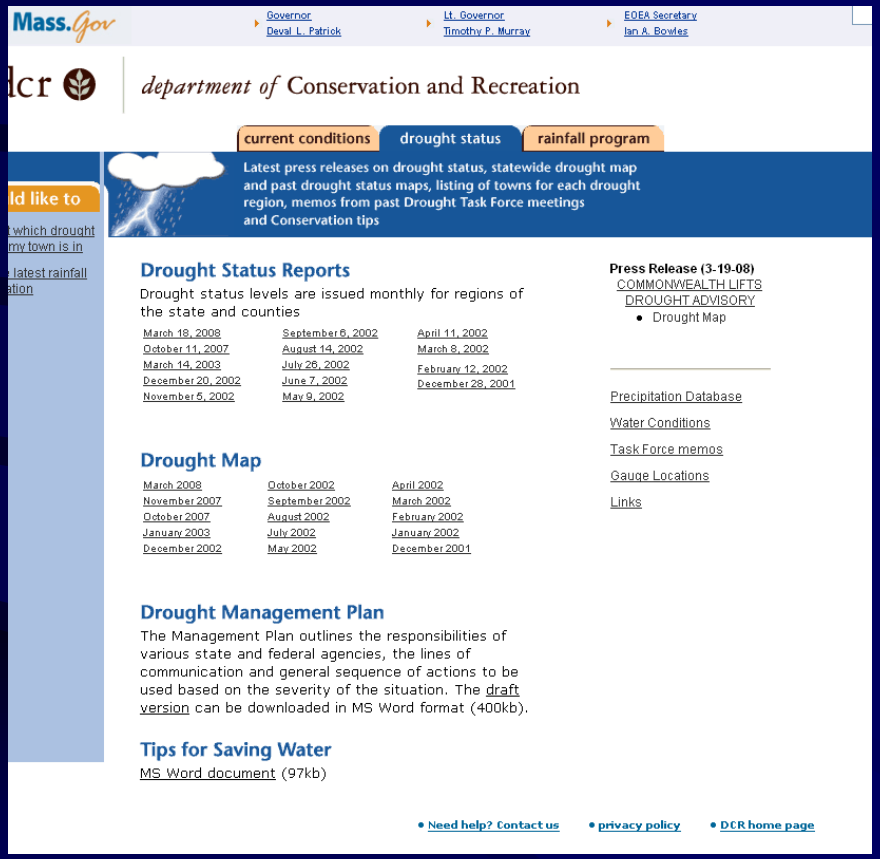
Revised 2012

Drought Management Task Force Chaired by MEMA and EEA

DCR—Water Resources, Forest Fire Control
NWS– Service Hydrologist
DEP– Water Supply, Wetlands, Water Management
MA Water Works Association
MA Water Resources Authority
MA Department of Health
MA Department of Agricultural Resources
MA Department of Telecommunications and Energy
MA Department of Fish and Game
US Army Corps of Engineers
US Geological Survey

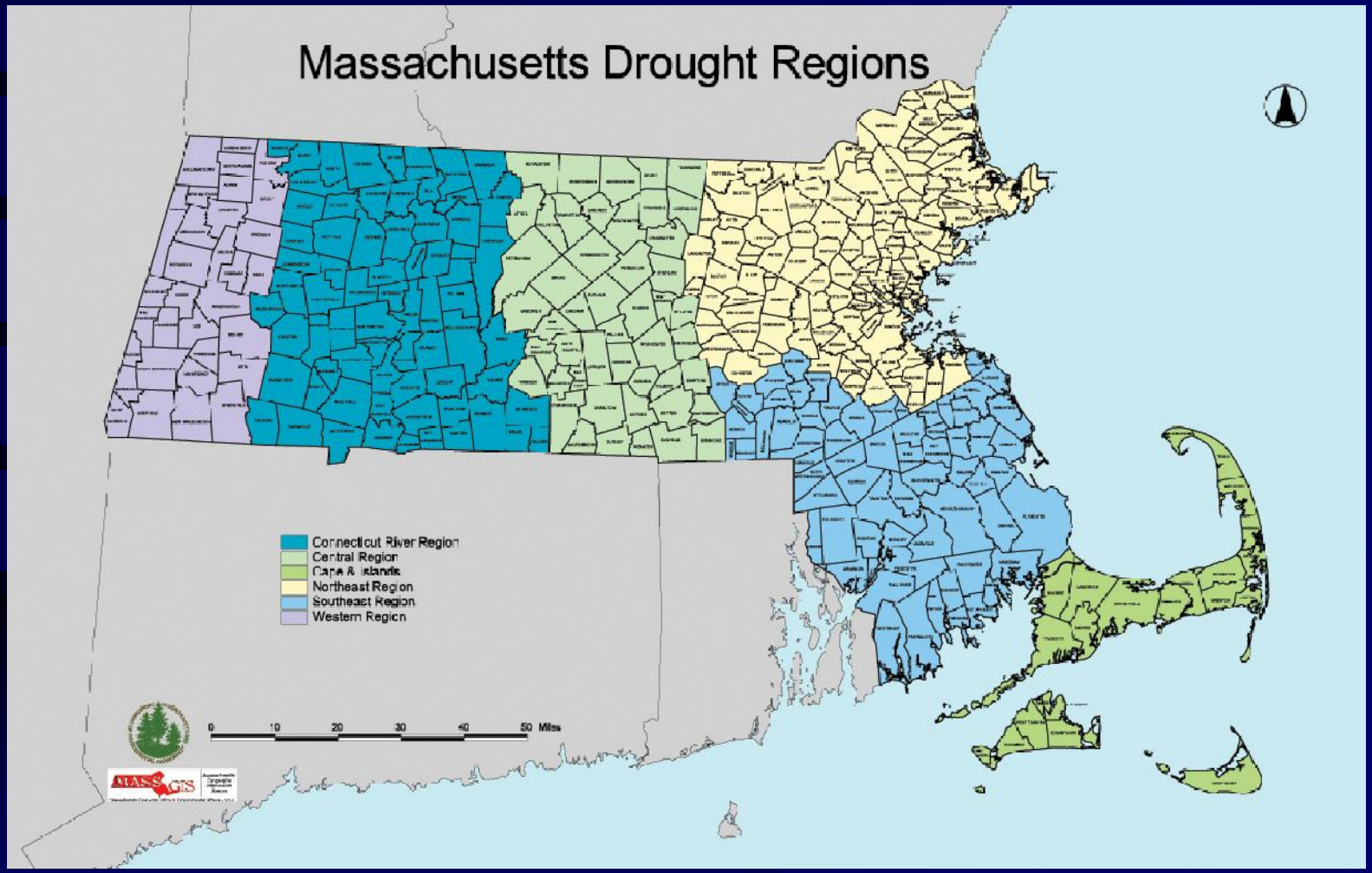
DCR Rainfall Web Page

Drought Status tab

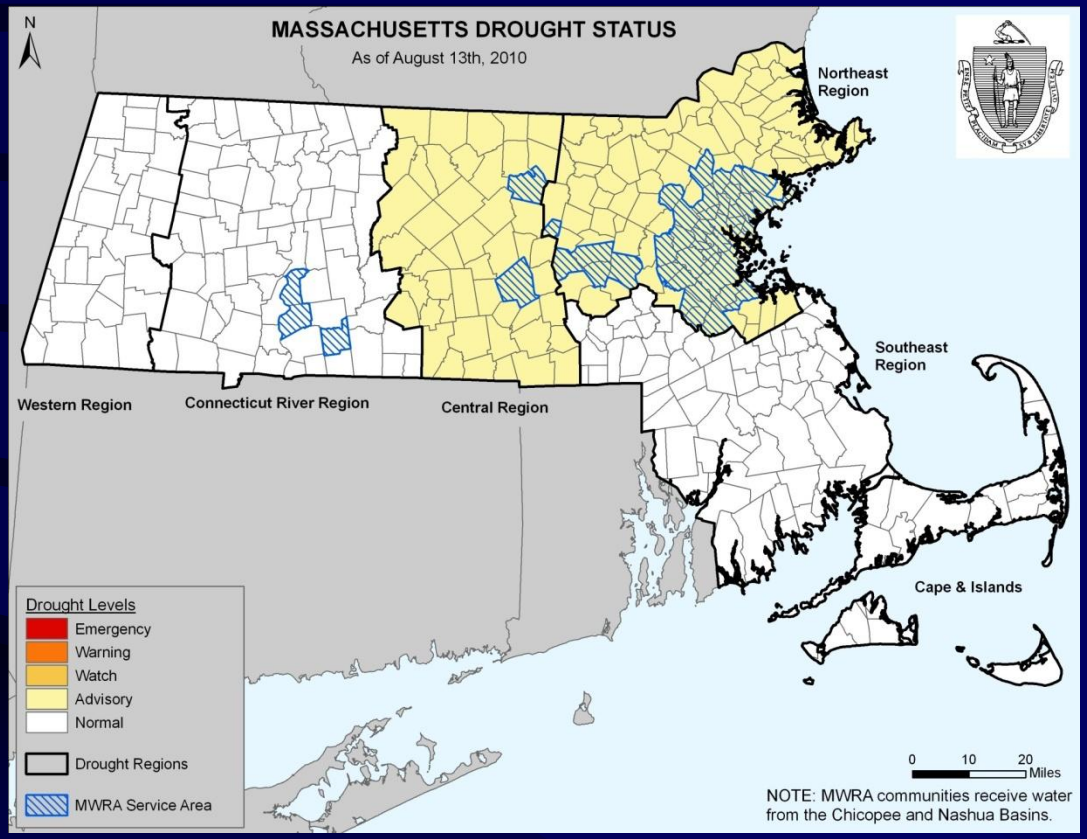


http://www.mass.gov/dcr/waterSupply/rainfall/drought.htm

6 Precipitation / Drought Regions

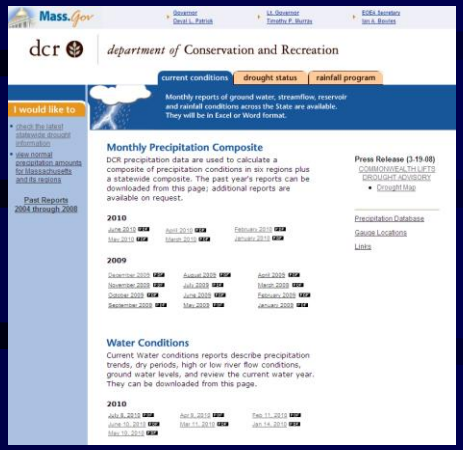


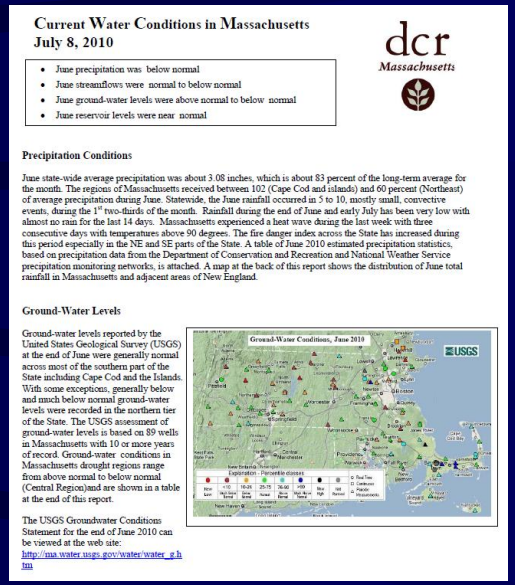
Drought Maps Issued as Needed by Drought Management Task Force

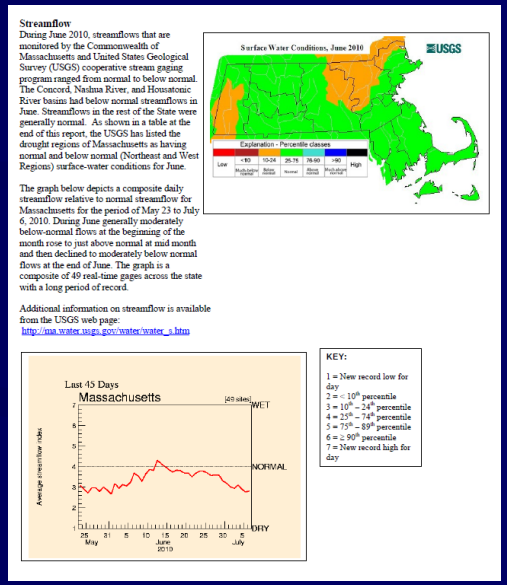


http://www.mass.gov/dcr/waterSupply/rainfall/drought.htm

DCR Monthly Water Conditions Reports



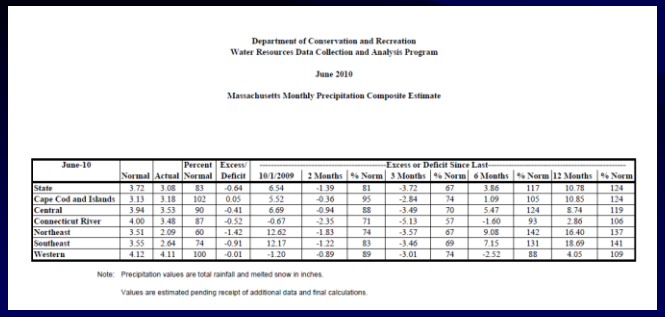




GENERAL WATER CONDITIONS IN MASSACHUSETTS - JUNE 2010
EOEEA and MEMA DROUGHT MANAGEMENT PLAN REGIONS

Massachusetts Regions	Surface-Water Conditions	Ground-Water Conditions
Cape and Islands	Normal	Above Normal
Southeast	Normal	Normal
Northeast	Below Normal	Normal
Central	Normal	Below Normal
Connecticut River	Normal	Normal
Western	Below Normal	Normal

Note: Surface- and ground-water conditions for individual streamflow-gaging stations and wells may differ from general conditions.



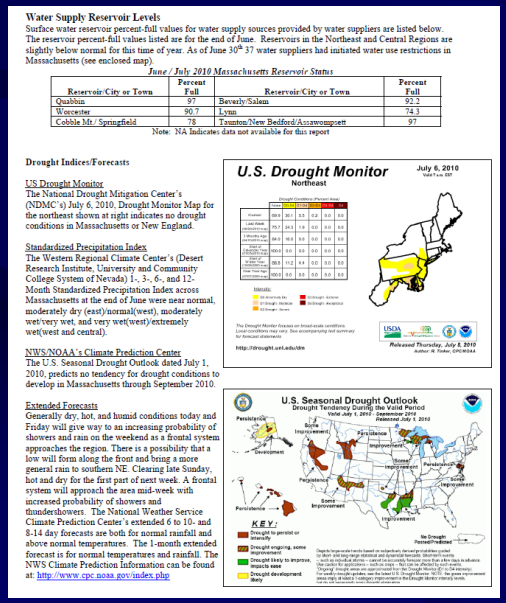
Department of Conservation and Recreation
Water Resources Data Collection and Analysis Program

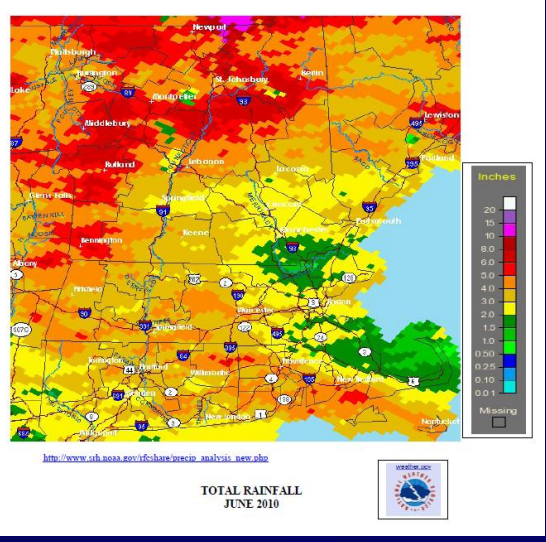
June 2010

Massachusetts Monthly Precipitation Composite Estimate

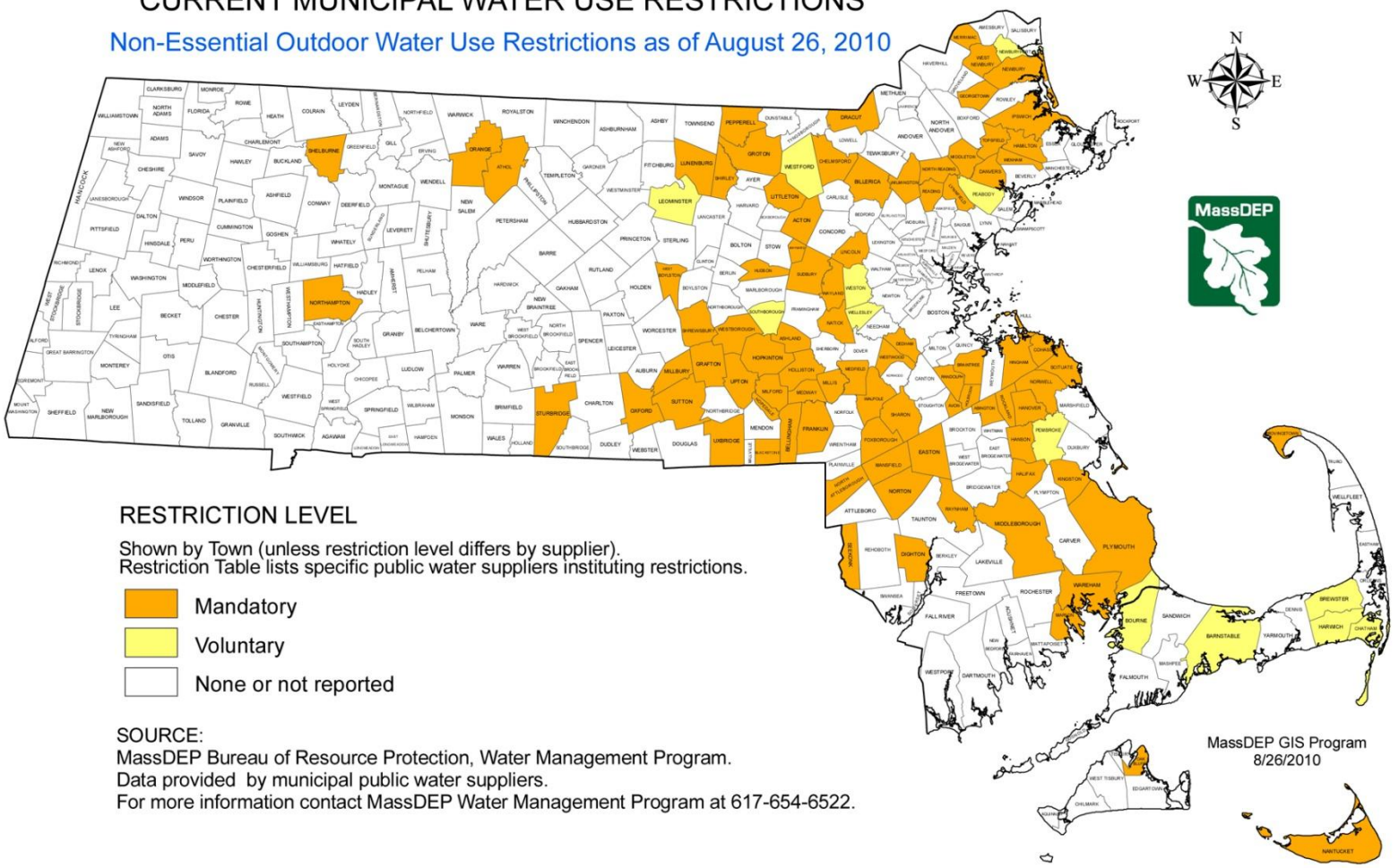
June-10			Percent	Excess/	Excess or Deficit Since Last								
	Normal	Actual	Normal	Deficit	10/1/2009	2 Months	% Norm	3 Months	% Norm	6 Months	% Norm	12 Months	% Norm
State	3.72	3.08	83	-0.64	6.54	-1.39	81	-3.72	67	3.86	117	10.78	124
Cape Cod and Islands	3.13	3.18	102	0.05	5.52	-0.36	95	-2.84	74	1.09	105	10.85	124
Central	3.94	3.53	90	-0.41	6.69	-0.94	88	-3.49	70	5.47	124	8.74	119
Connecticut River	4.00	3.48	87	-0.52	-0.67	-2.35	71	-5.13	57	-1.60	93	2.86	106
Northeast	3.51	2.09	60	-1.42	12.62	-1.83	74	-3.57	67	9.08	142	16.40	137
Southeast	3.55	2.64	74	-0.91	12.17	-1.22	83	-3.46	69	7.15	131	18.69	141
Western	4.12	4.11	100	-0.01	-1.20	-0.89	89	-3.01	74	-2.52	88	4.05	109

Note: Precipitation values are total rainfall and melted snow in inches.
Values are estimated pending receipt of additional data and final calculations.

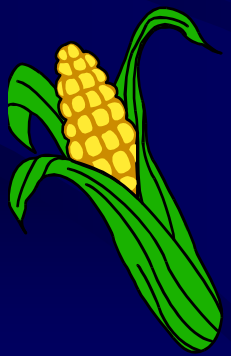




Water Supply Restrictions



Drought is not measured by precipitation alone!!



MA Drought Levels and Thresholds

6 Drought Indices

5 Drought Levels

Drought Level	MA SPI	CMI*	KBDI	Precipitation	Groundwater	Streamflow	Reservoir
Normal	3-month > -1.5 **or** 6-month > -1.0 **or** 12-month > -1.0	0.0 to -1.0 slightly dry	< 200	1 month below normal	2 consecutive months below normal**	1 month below normal**	Reservoir levels at or near normal for the time of year
Advisory	3-month -1.5 to -2.0 **or** 6-month -1.0 to -1.5 **or** 12-month -1.0 to –1.5	-1.0 to -1.9 abnormally dry	200 to 400	2 month cumulative below 65% of normal	3 consecutive months below normal**	At least 2 out of 3 consecutive months below normal**	Small index Reservoirs below normal
Watch	3-month < -2.0 **or** 6-month -1.5 to -3.0 **or** 12-month -1.5 to -2.0	-2.0 to –2.9 excessively dry	400 to 600	1 of the following criteria met: 3 month cum. < 65% **or** 6 month cum. < 70% **or** 12 month cum. < 70%	4-5 consecutive months below normal**	At least 4 out of 5 consecutive months below normal**	Medium index Reservoirs below normal
Warning	6-month < -3.0 **or** 12-month -2.0 to -2.5	< -2.9 severely dry	600 to 800	1 of the following criteria met: 3 month cum. < 65% **and** 6 month cum. <65% **or** 6 month cum. <65% **and** 12 month cum. <65% **or** 3 month cum. <65% **and** 12 month cum. <65%	6-7 consecutive months below normal**	At least 6 out of 7 consecutive months below normal**	Large index reservoirs below normal
Emergency	12-month < -2.5	<-2.9 severely dry	600 to 800	Same criteria as Warning **And** Previous month was Warning or Emergency	>8 months below normal**	>7 months below normal**	Continuation of previous month's conditions

Summary of Monthly Drought Indices

DROUGHT INIDICES SUMMARY
9/16/2010

Cape Cod and Islands — **Normal**

Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

Connecticut — **Normal**

Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

Northeast — **Normal (But GW still Below Normal)**

Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

Southeast — **Normal**

Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

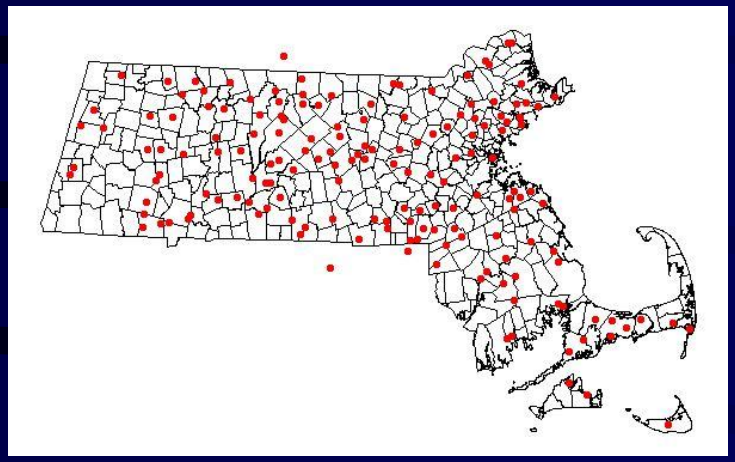
Central — **Advisory**

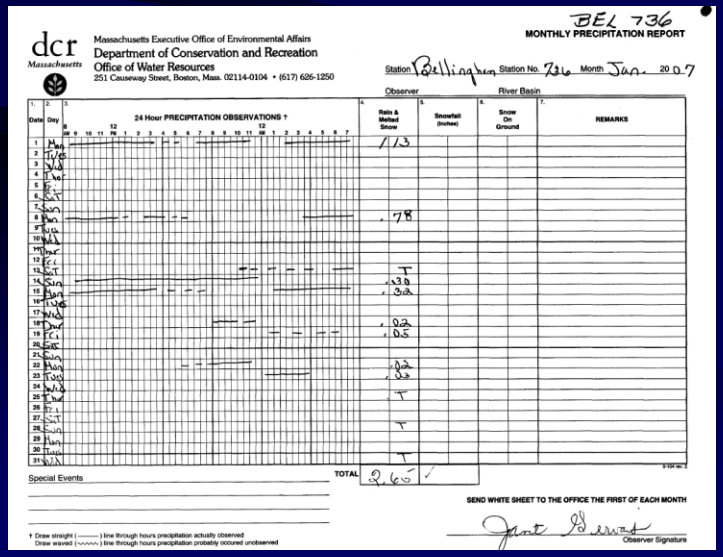
Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

Western — **Normal**

Level	SPI	CMI	Fire	Precip	Ground Water	Streamflow	Reservoir
Normal							
Advisory							
Watch							
Warning							
Emergency							

MA Precipitation Monitoring Network





BEL 736

MONTHLY PRECIPITATION REPORT

dcr Massachusetts

Massachusetts Executive Office of Environmental Affairs
Department of Conservation and Recreation
Office of Water Resources
251 Causeway Street, Boston, Mass. 02114-0104 • (617) 626-1250

Station Bellingham Station No. 736 Month Jan. 20 07

Observer River Basin

Date	Day	24 Hour PRECIPITATION OBSERVATIONS †	Rain & Melted Snow	Snowfall (Inches)	Snow On Ground	REMARKS
1	Mon		1.13			
2	Tue					
3	Wed					
4	Thu					
5	Fri					
6	Sat					
7	Sun					
8	Mon		.78			
9	Tue					
10	Wed					
11	Thu					
12	Fri					
13	Sat		T			
14	Sun		.39			
15	Mon		.52			
16	Tue					
17	Wed					
18	Thu		.02			
19	Fri		.05			
20	Sat					
21	Sun					
22	Mon		.32			
23	Tue		.33			
24	Wed					
25	Thu		T			
26	Fri					
27	Sat					
28	Sun		T			
29	Mon					
30	Tue					
31	Wed		T			

TOTAL 2.65 ✓

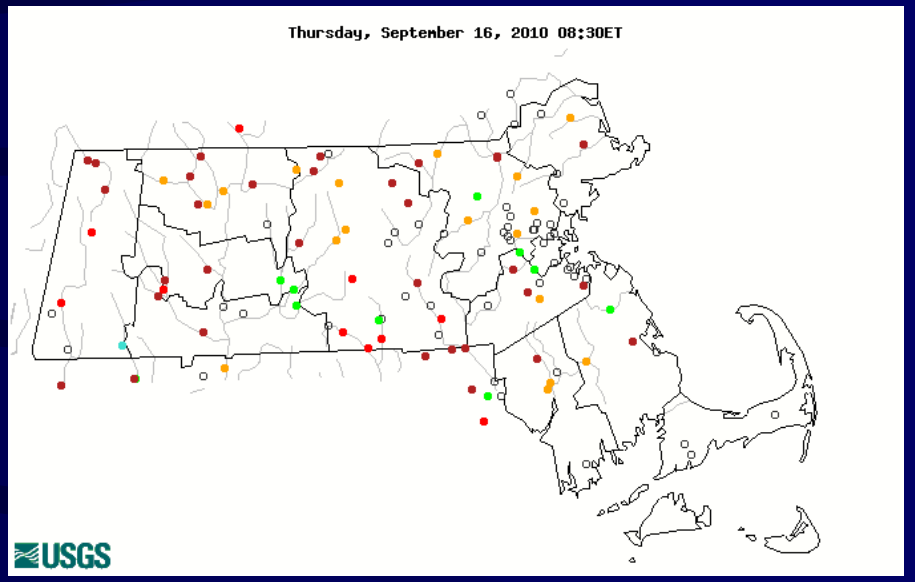
Special Events

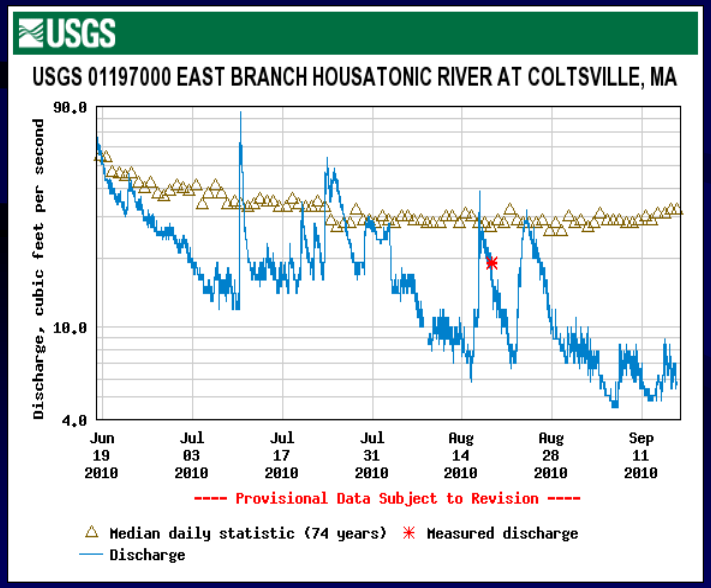
SEND WHITE SHEET TO THE OFFICE THE FIRST OF EACH MONTH

† Draw straight (———) line through hours precipitation actually observed
Draw waved (∿∿∿) line through hours precipitation probably occured unobserved

Observer Signature

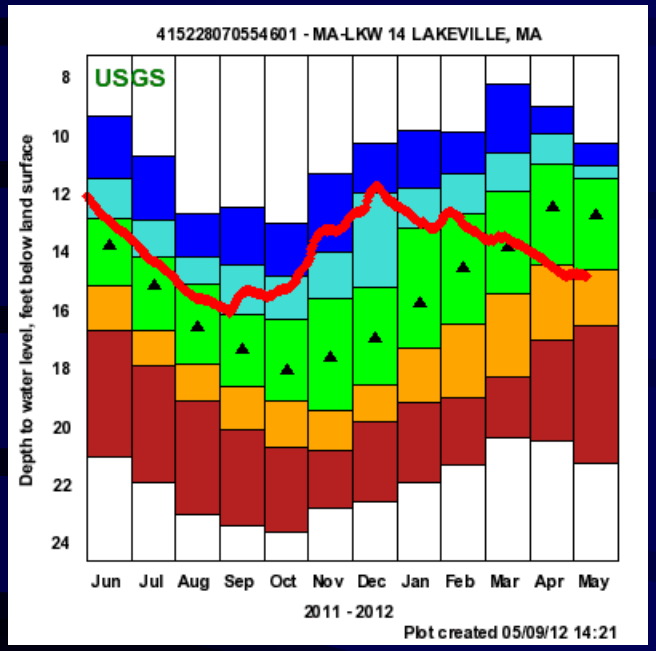
USGS/MA Cooperative Stream Gage Network





Explanation - Percentile classes							
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

USGS/MA Cooperative Ground Water Observation Network



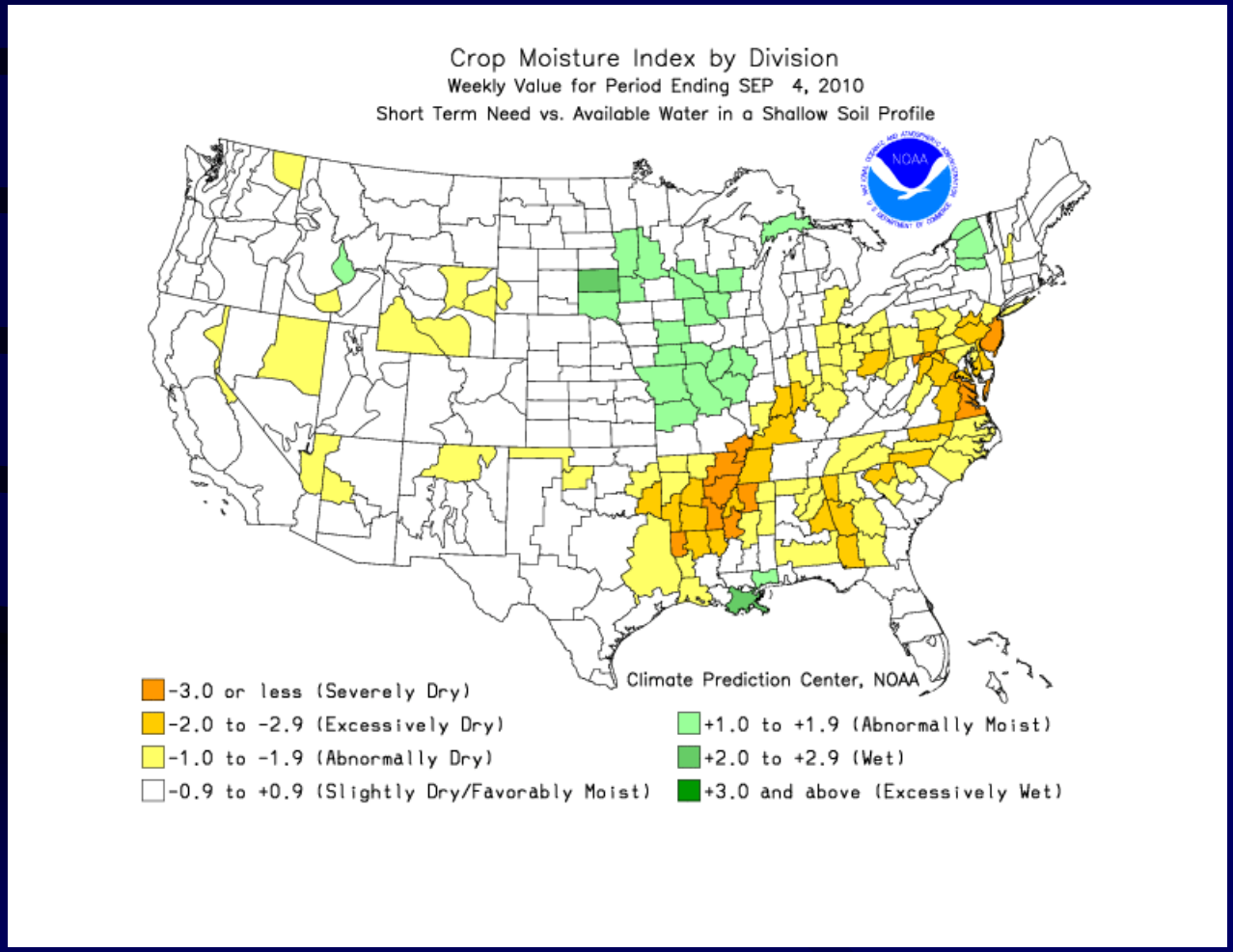
169 observation wells

22 Real-Time

Explanation - Percentile classes (symbol color based on most recent measurement)								
								○ Real Time
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked	□ Continuous
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			△ Periodic Measurements

http://ma.water.usgs.gov/

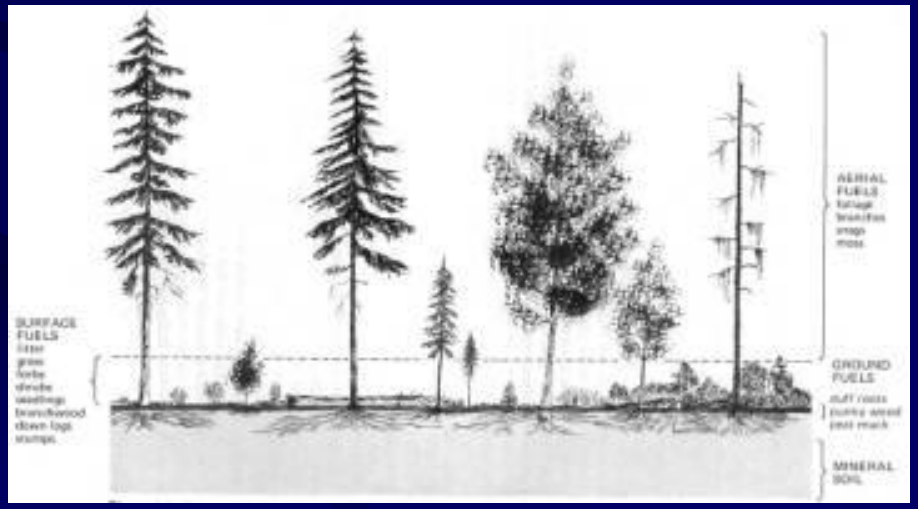
Weekly Crop Moisture Index



http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif

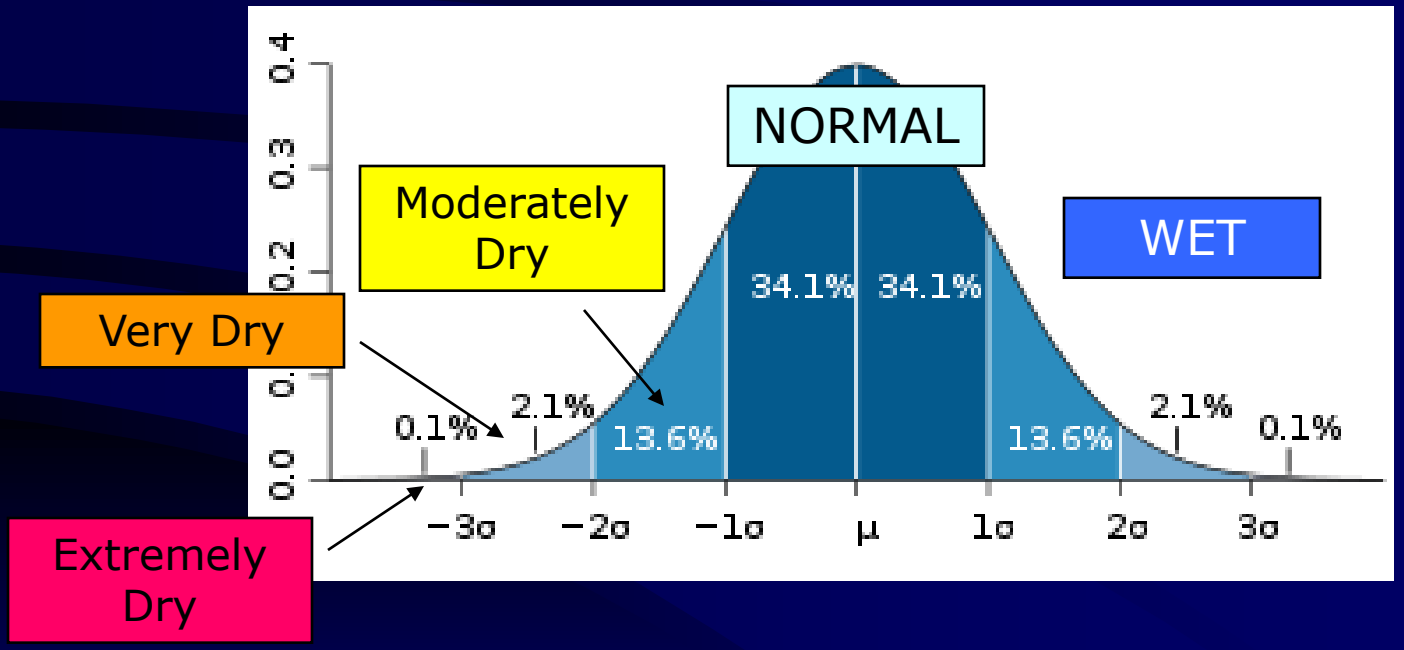
Keetch-Byram Drought Index

- Long-term indicator of fuel moisture
- Calculated daily for MA Fire Districts
- Values indicate amount of rain needed to return soil to saturated condition



Standardized Precipitation Index
MA SPI

Uses Normal Distribution,
Standard Deviations of Historic MA Precip Data



Historic frequency and severity indicator

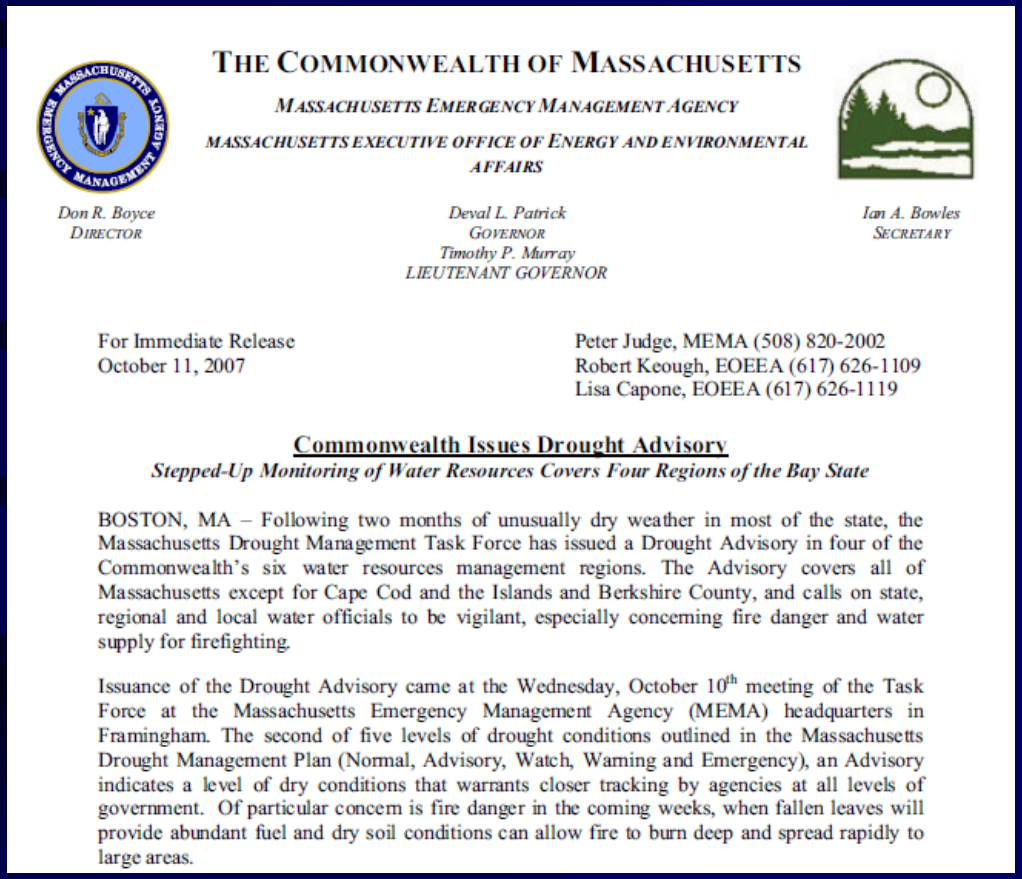
Drought Plan
Reservoir Monitoring

Region	Water System	Size Class
West	Lenox	Small
West	Pittsfield	Medium
CT River	Springfield	Medium
CT River	MWRA Quabbin	Large
Central	A-1 DCR reservoir	Small
Central	Rutland Muschopauge	Small
Central	Southbridge	Medium
Central	Worcester	Medium

Reservoir Monitoring (cont'd)

Region	Water System	Size class
Northeast	Breakheart/Pierce DCR	Small
Northeast	Rockport	Small
Northeast	Hudson	Medium
Northeast	North Andover	Medium
Northeast	Gloucester	Medium
Northeast	Salem-Beverly	Medium
Northeast	Lynn	Medium
Northeast	Cambridge	Medium
Southeast	Watson Pond DCR	Small
Southeast	Cohasset	Small
Southeast	Milford	Medium
Southeast	Assawompsett Taunton	Medium

Drought Statements Issued by EEA



THE COMMONWEALTH OF MASSACHUSETTS

MASSACHUSETTS EMERGENCY MANAGEMENT AGENCY

MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS

Don R. Boyce
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GOVERNOR
Timothy P. Murray
LIEUTENANT GOVERNOR

Ian A. Bowles
SECRETARY

For Immediate Release
October 11, 2007

Peter Judge, MEMA (508) 820-2002
Robert Keough, EOEEA (617) 626-1109
Lisa Capone, EOEEA (617) 626-1119

Commonwealth Issues Drought Advisory

Stepped-Up Monitoring of Water Resources Covers Four Regions of the Bay State

BOSTON, MA – Following two months of unusually dry weather in most of the state, the Massachusetts Drought Management Task Force has issued a Drought Advisory in four of the Commonwealth's six water resources management regions. The Advisory covers all of Massachusetts except for Cape Cod and the Islands and Berkshire County, and calls on state, regional and local water officials to be vigilant, especially concerning fire danger and water supply for firefighting.

Issuance of the Drought Advisory came at the Wednesday, October 10th meeting of the Task Force at the Massachusetts Emergency Management Agency (MEMA) headquarters in Framingham. The second of five levels of drought conditions outlined in the Massachusetts Drought Management Plan (Normal, Advisory, Watch, Warning and Emergency), an Advisory indicates a level of dry conditions that warrants closer tracking by agencies at all levels of government. Of particular concern is fire danger in the coming weeks, when fallen leaves will provide abundant fuel and dry soil conditions can allow fire to burn deep and spread rapidly to large areas.

http://www.mass.gov/dcr/waterSupply/rainfall/drought.htm