

AGENDA

1. Introductions & Drought Response Update: EOEEA, MEMA

2. Updates on Current Conditions and Impacts—DMTF member reports

- Hydrologic: DCR, USGS, NOAA-RFC
- Weather: NOAA-NWS
- Water Supply: DEP, MWRA, MWWA, DPU
- Environmental: DEP, DFG, MRA
- Agricultural: DAR
- Fire Danger: DCR
- Engineering/Infrastructure: DCR
- Public Health: DPH

3. Discussion

4. Recommendation



Hydrologic Conditions in Massachusetts

Drought Management Task Force

Anne Carroll and Viki Zoltay
DCR Office of Water Resources

November 5, 2020

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Indices



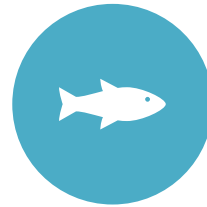
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

MA Drought Management Plan

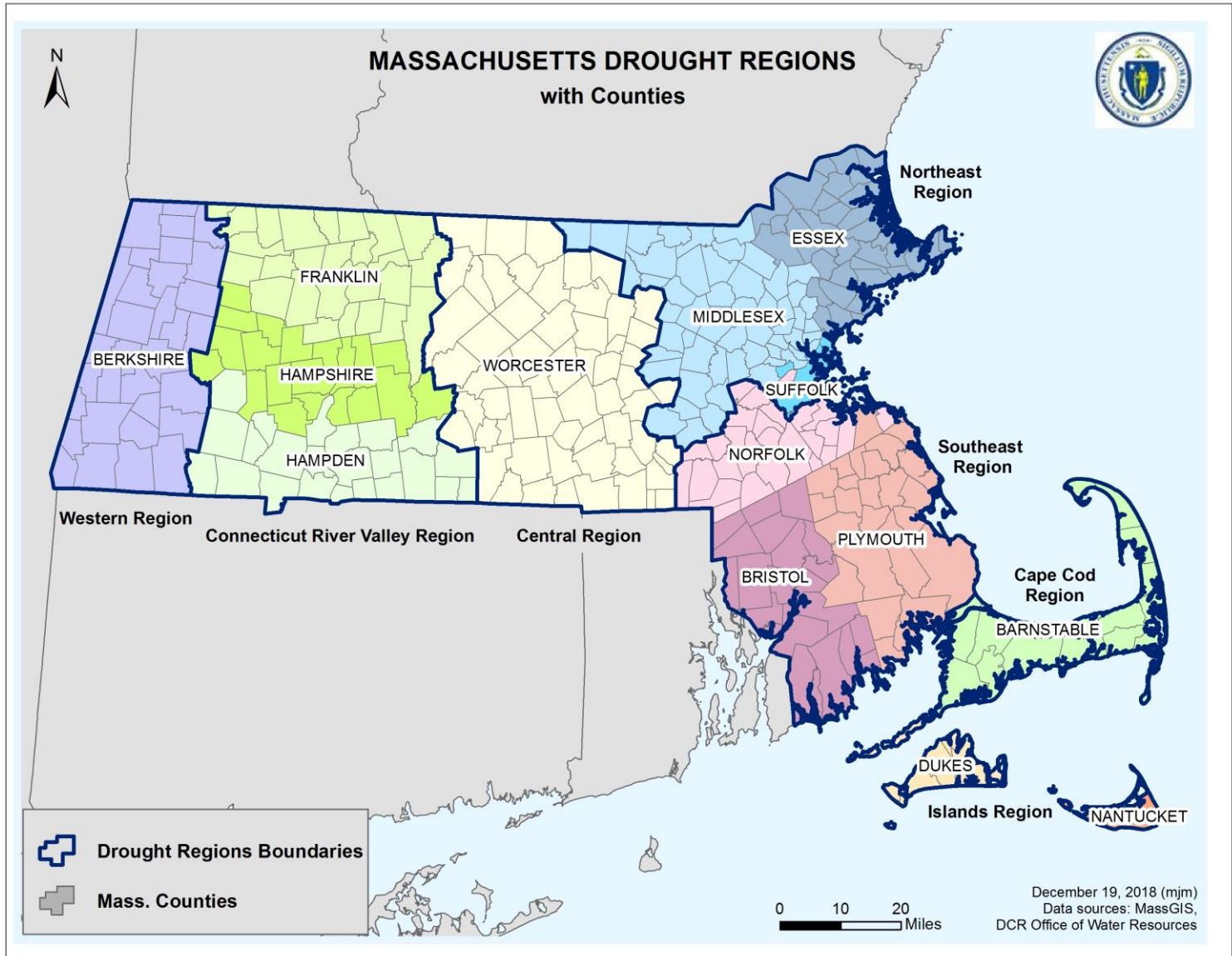
Drought Levels

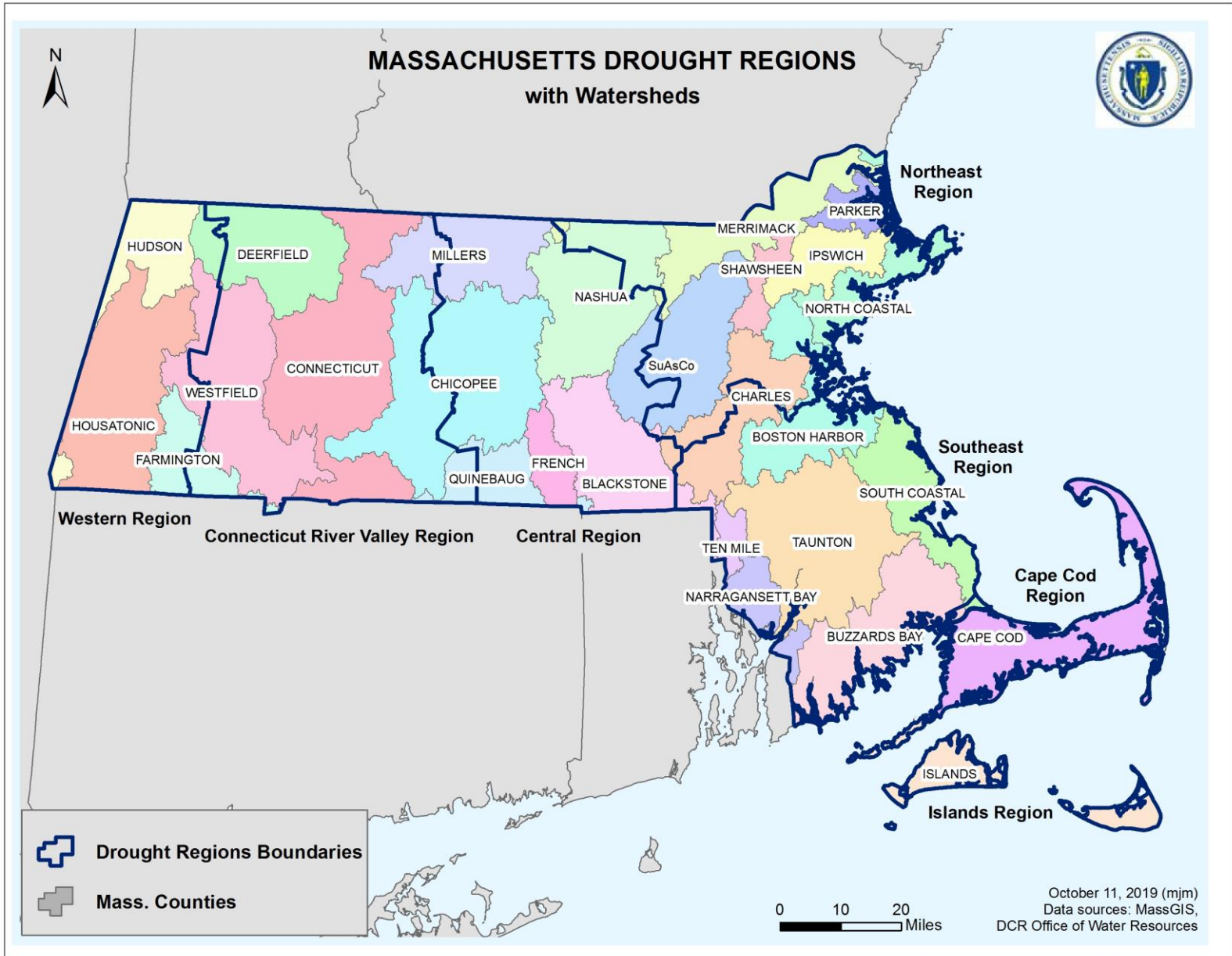


MA Drought Management Plan

Drought Indices

Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch- Byram Drought Index	Crop Moisture Index
0	>30 th percentile	< 200	> -1.0
1	≤30 and >20	200-400	≤-1.0 and > -2.0
2	≤20 and >10	400-600	≤-2.0 and < -3.0
3	≤10 and >2	600-700	≤ -3.0 and > -4.0
4	≤2	700-800	≤-4.0





Task Force Member Updates



Hydrologic
Conditions



Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger

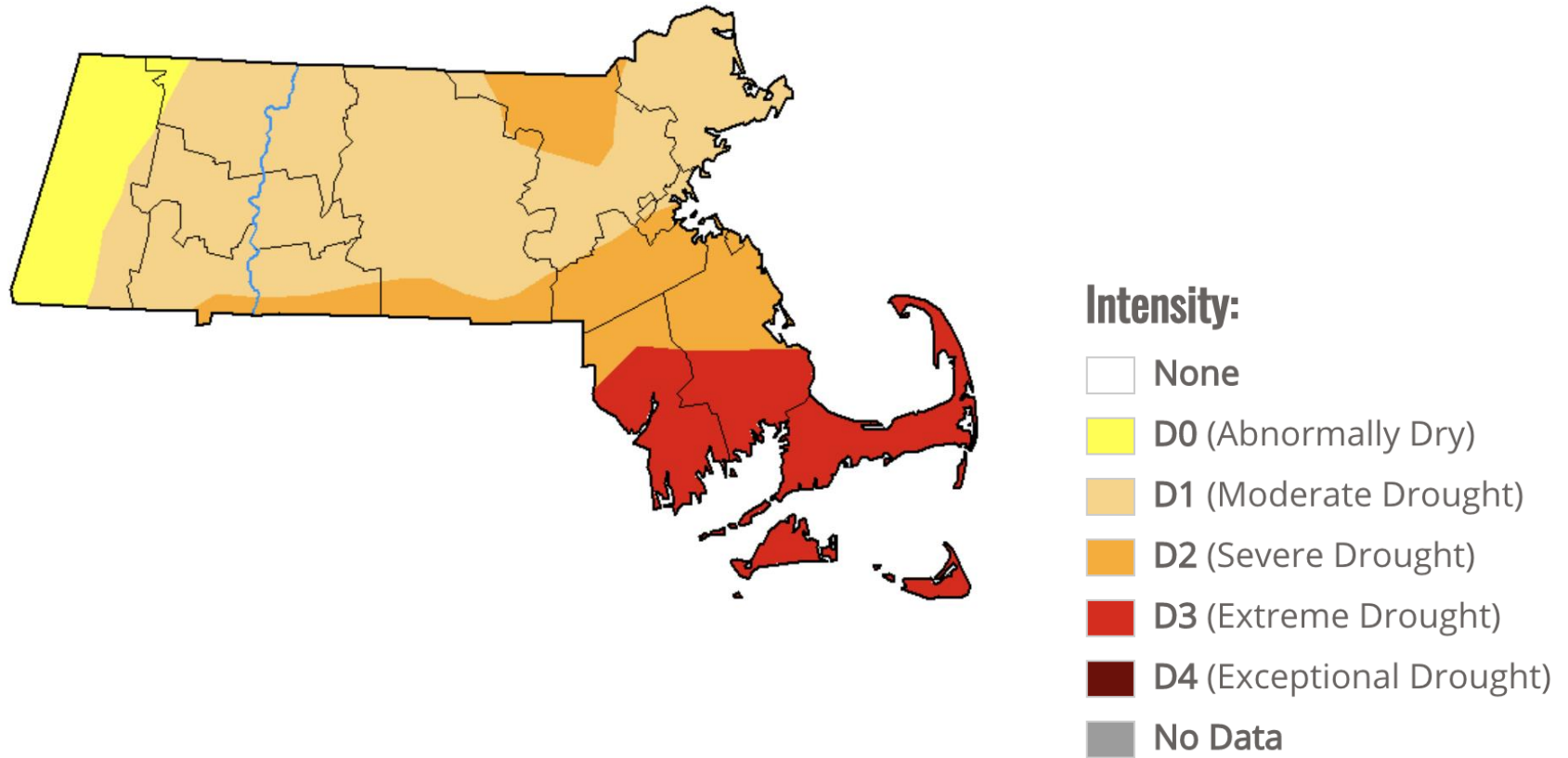


Engineering/
Infrastructure
Impacts

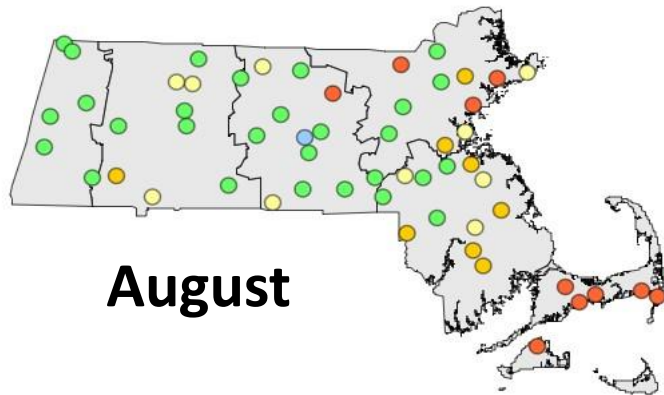


Public Health
Impacts

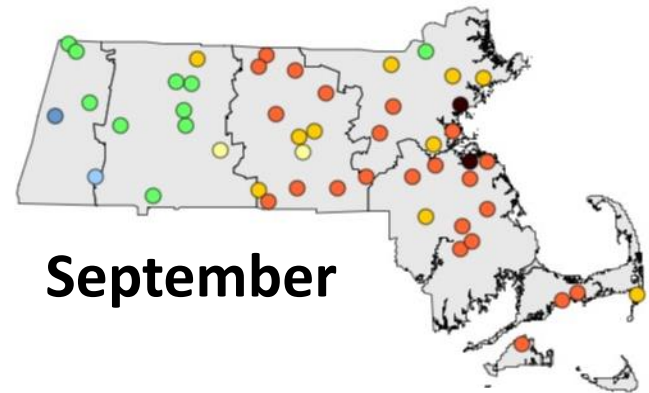
US Drought Monitor - October 29 map, data through Oct 27



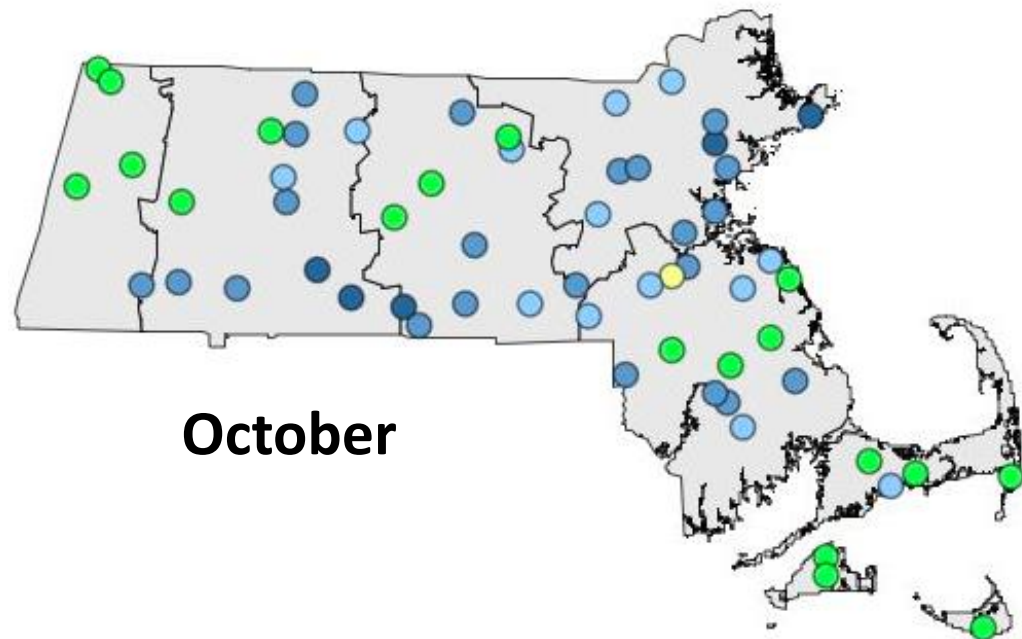
Precipitation – SPI, 1 month



August

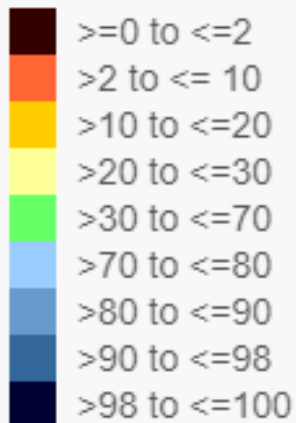


September



October

Percentiles



Precipitation Index – SPI

October

Region	Total Reporting for October	SPI 1*	SPI 2	SPI 3	SPI 6	SPI 9	SPI 12	DMP Index Severity
Western	5	-0.40	-0.24	-0.55	-1.29	-0.78	-0.32	3
CT River Valley	11	0.81	0.18	-0.05	-0.78	-0.77	-0.64	1
Central	11	0.72	-0.30	-0.32	-0.98	-0.47	-0.44	2
Northeast	11	0.84	0.03	-0.38	-0.84	-0.65	-0.59	2
Southeast	15	0.50	-0.37	-0.63	-0.64	-0.47	-0.17	1
Cape Cod	4	0.22	-0.69	-1.17	-2.08	-1.15	-0.39	4
Islands	3	0.29	-0.43	-1.05	-1.07	-0.79	-0.60	2

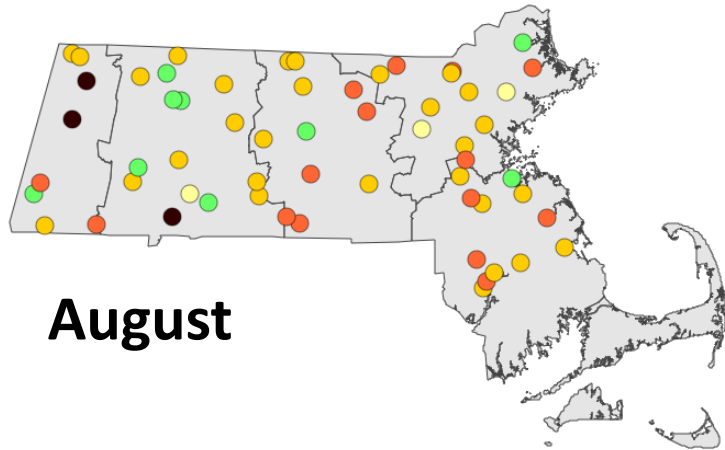
Some precipitation fell as snow in late October.

*1-month SPI is for informational purposes only, not for drought determination

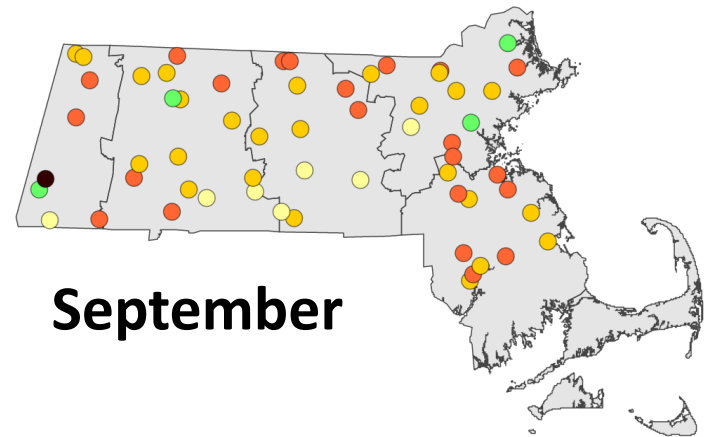
Index Severity Levels



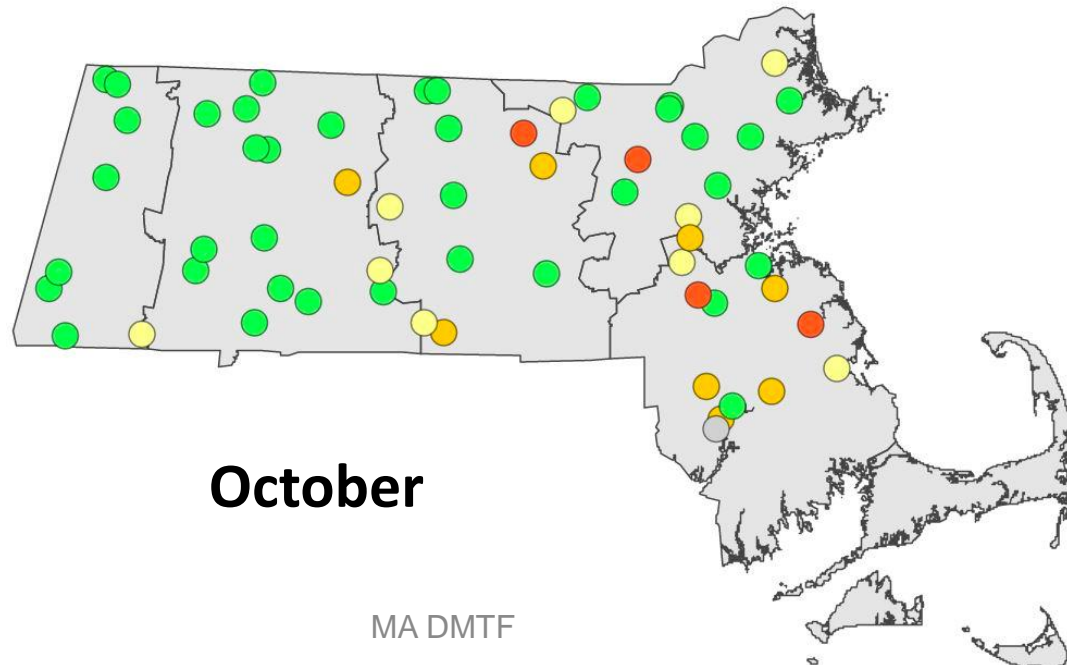
Streamflow Percentiles of Monthly Median



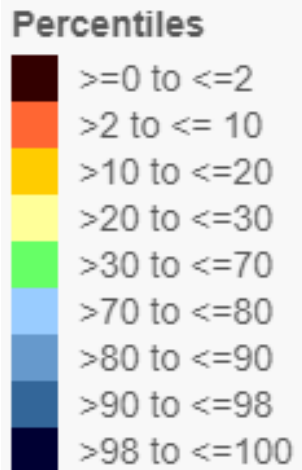
August



September



October



Streamflow Index

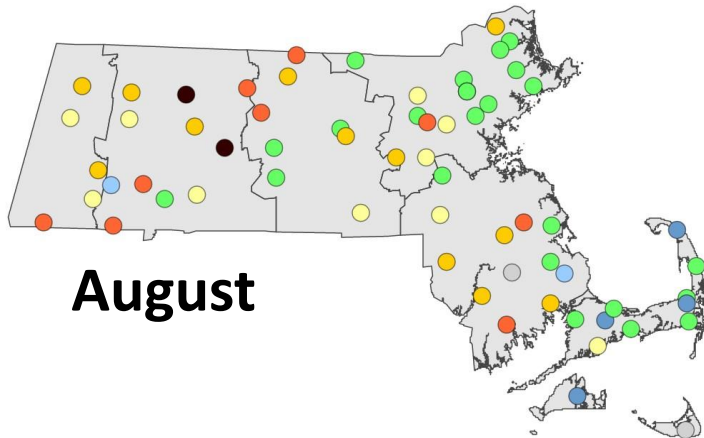
By Drought Region

- April, May - All regions at Index Severity Level 0
- June - Western, CT River Valley, Central Level 3; Northeast Level 2; Southeast Level 0
- July – Western, CT River Valley Level 1
- August – Western Level 3; CT River Valley, Central, Northeast, Southeast Level 2
- September- Western, CT River Valley, Central, Northeast Level 2; Southeast Level 3

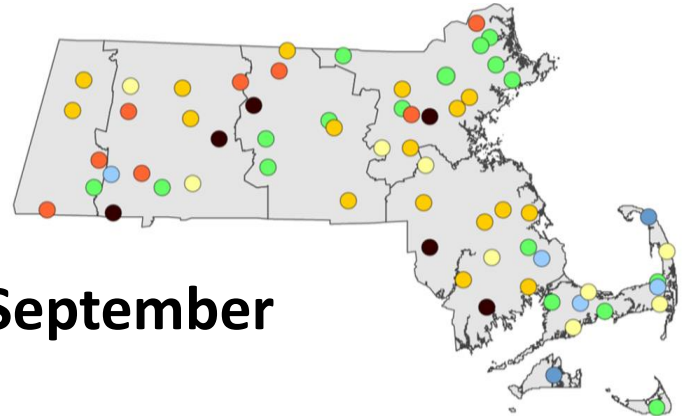
Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for October	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	8	0	0	0	1	0	36	0
CT River Valley	15	0	0	1	1	0	37	0
Central	11	0	1	2	2	0	30	1
Northeast	13	0	1	1	3	0	33	0
Southeast	11	0	2	4	2	0	18	2

Notes: Not all gages report in all months due to ice, beaver dams or other conditions. Streamflow index is not applicable to Cape Cod and the Islands.

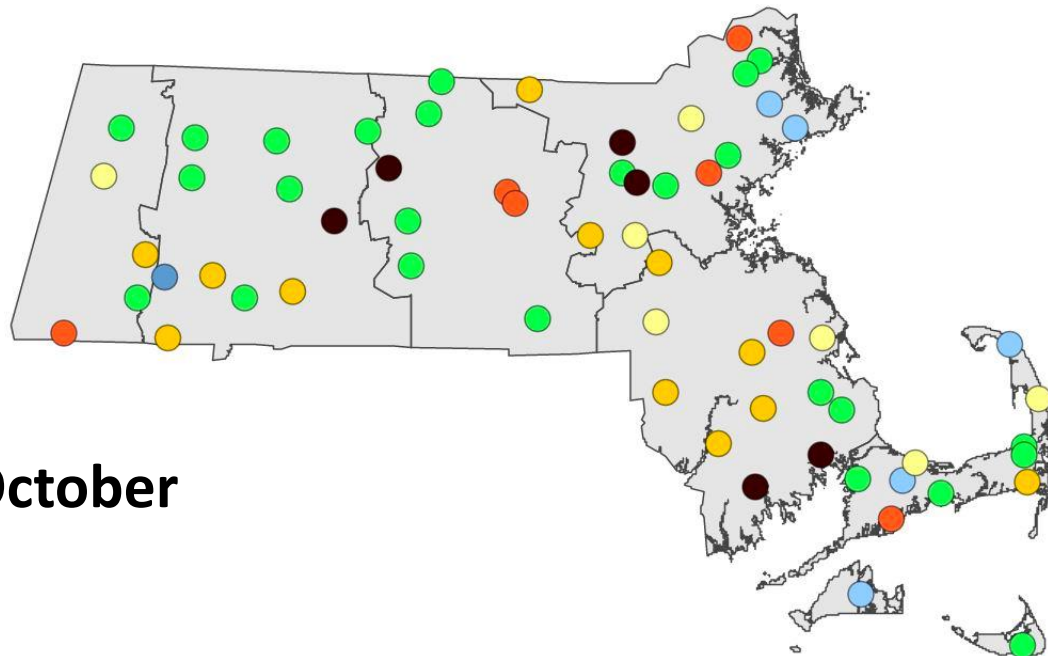
Groundwater Wells Percentiles



August

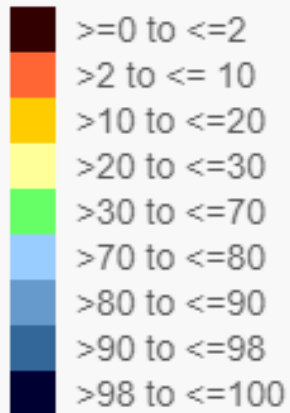


September



October

Percentiles



Groundwater Index

- August- Western, CT River Valley, Central, Southeast Level 2
- September - Western, CT River Valley, Central, Southeast Level 2;Northeast Level 1

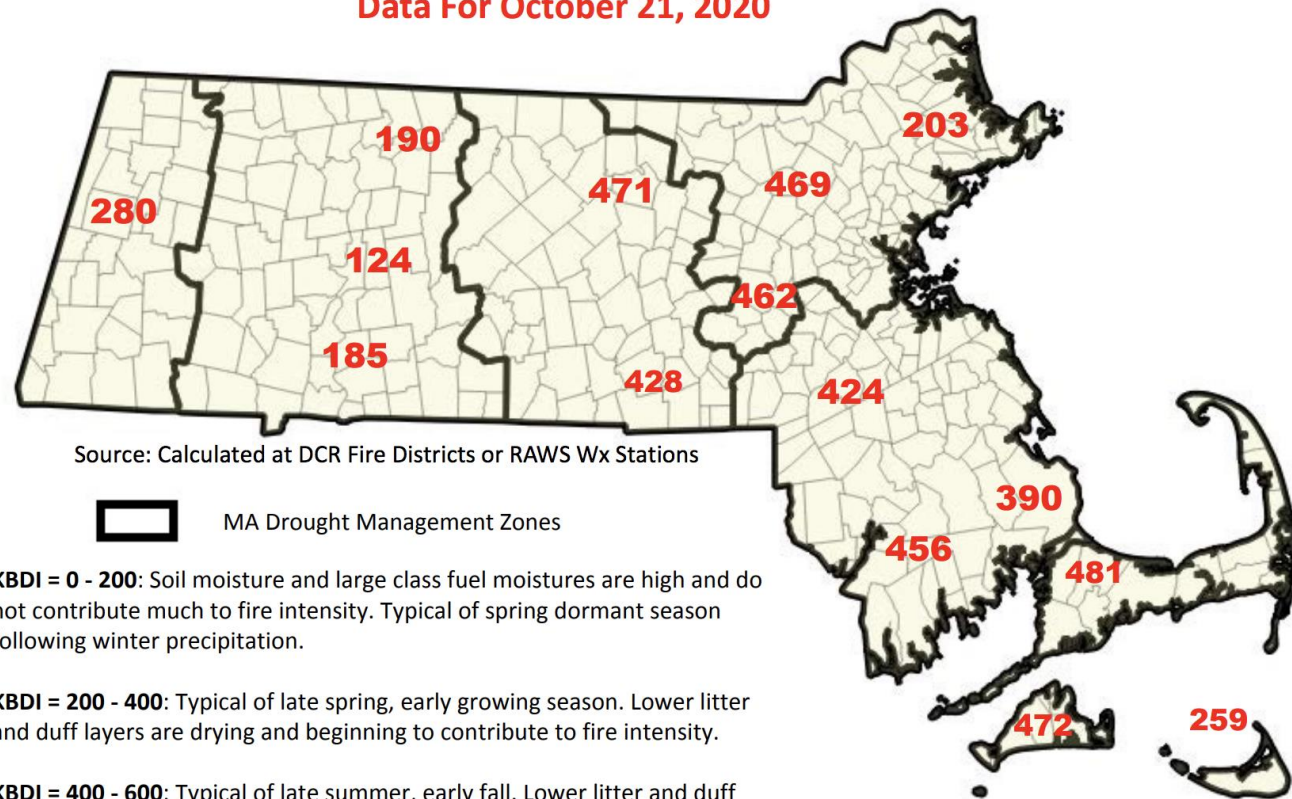
Region	Number of Wells						Median of Individual Well Percentiles	DMP Index Severity
	Total Reporting for October	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	5	0	1	1	1	0	28	1
CT River Valley	11	1	0	3	0	0	36	0
Central	9	1	2	1	0	0	31	0
Northeast	14	2	2	1	2	0	30	1
Southeast	12	2	1	5	2	0	15	2
Cape Cod	10	0	1	1	2	0	41	0
Islands	2	0	0	0	0	0	67	0

Index Severity Levels

KBDI

- Index Severity Level 0: **CT River Valley**
- Index Severity Level 1: **Western**
- Index Severity Level 2: **Central, Northeast, Southeast, Cape Cod, Islands**

Keetch – Byram Drought Index
Data For October 21, 2020



Fire Danger Index indicates dryness in the top 8" of soil.
 Data provided by the DCR Fire Chief

Index Severity Level	KBDI Range
0	<200
1	200 to <400
2	400 to <600
3	600 to <700
4	700 to <800

KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.

KBDI = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.

KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.

Crop Moisture Index

The week ending October 31, 2020:

Index Severity Level 0 for: **Entire State (Western Region, CT River Valley, Central, Northeast, Southeast, Cape Cod, & Islands Regions)**



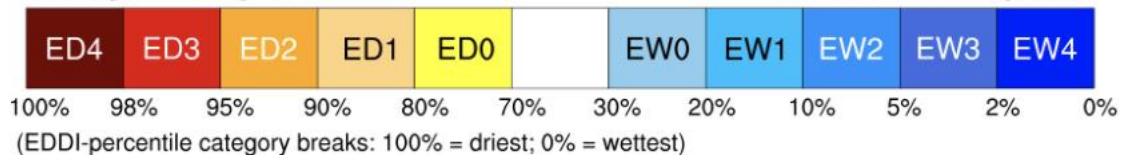
1-month Evaporative Demand Drought Index for October 28, 2020



Index Severity Level	Crop Moisture Index
0	> -1.0
1	≤ -1.0 and > -2.0
2	≤ -2.0 and > -3.0
3	≤ -3.0 and > -4.0
4	≤ -4.0

Drought categories

Wetness categories



The NOAA CPC CMI shows the **short-term need versus available water** in a shallow soil profile and responds quickly to changing conditions. This indicator is **relevant during growing season**.

- "the thirst of the atmosphere"
- temperature, humidity, windspeed, and solar radiation

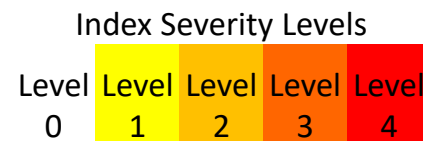
Lakes & Impoundments

October

Drought Region	Number Reporting	Percentile	DMP Index Severity
Western	2	31	Level 0
CT River Valley	2	24	Level 1
Central	2	31	Level 0
Northeast	6	31	Level 0
Southeast	2	2	Level 4
Cape Cod	1	59	Level 0
Islands	NA	NA	NA

Notes:

DMP index severity levels do not necessarily reflect water supply status.



Summary of Drought Indices by Watershed

October 2020

Watershed	# sites (P, Q, Gw)	SPI	Streamflow	Groundwater	KBDI	CMI
BLACKSTONE	5	0	0	0		0
BOSTON HARBOR	10	0	0	3		0
BUZZARDS BAY	5	3	-	2		0
CAPE COD	14	4	-	0		0
CHARLES	8	2	1	1		0
CHICOPEE	16	1	0	2		0
CONNECTICUT	7	2	0	0		0
DEERFIELD	7	2	0	0		0
FARMINGTON	4	0	1	0		0
FRENCH	1	2	-	-		0
HOUSATONIC	8	2	0	2		0
HUDSON	2	3	0	0		0
IPSWICH	5	0	0	0		0
ISLANDS	5	2	-	0		0
MERRIMACK	4	3	0	3		0
MILLERS	8	2	0	0		0
NARRAGANSET BAY	0	-	-	-		0
NASHUA	10	3	2	3		0
NORTH COASTAL	2	0	-	0		0
PARKER	3	-	1	0		0
QUINEBAUG	4	3	2	-		0
SHAWSHEEN	3	3	0	1		0
SOUTH COASTAL	8	2	2	2		0
SuAsCo	5	2	0	2		0
TAUNTON	12	2	2	2		0
TEN MILE	2	1	-	2		0
WESTFIELD	12	2	0	0		0

Summary of Drought Indices by Watershed October 2020

Previously higher level than their respective regions but the same this month if stay within the proposed levels								
Watershed	# sites (P, Q, Gw)	SPI	Streamflow	Groundwater	KBDI	CMI	L&I	
CHARLES (C, NE, SE)	8	2	1	1	2	0	0	
MILLERS (CTRV, C)	8	2	0	0	2	0	-	
C and NE are both recommended at level 1 or 2								
Watershed (regions)	# sites (P, Q, Gw)	SPI	Streamflow	Groundwater	KBDI	CMI	L&I	
NASHUA (C, NE)	10	3	2	3	2	0	NA	
MERRIMACK (NE)	4	3	0	3	2	0	0	
SHAWSHEEN (NE)	3	3	0	1	2	0	-	
SuAsCo (NE, C)	5	2	0	2	2	0	NA	
QUINEBAUG (C)	4	3	2	-	2	0	3	
West is recommended at level 1								
Watershed (regions)	# sites (P, Q, Gw)	SPI	Streamflow	Groundwater	KBDI	CMI	L&I	
HOUSATONIC (W)	8	2	0	2	1	0	0	

Summary of Drought Indices by Drought Region

SEPTEMBER 2020

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 1	Level 2	Level 2	Level 3	Level 3	Level 4	Level 3
Streamflow	Level 2	Level 2	Level 2	Level 2	Level 3	N/A	N/A
Groundwater	Level 2	Level 2	Level 2	Level 1	Level 2	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 1	Level 0	Level 1	Level 3	Level 0	N/A
Crop Moisture Index	Level 1	Level 1	Level 1	Level 2	Level 2	Level 2	Level 2
KBDI	Level 2	Level 2	Level 3	Level 3	Level 3	Level 3	Level 2
<i>Suggested 10/07/20 effective 09/01/20</i>	Level 2	Level 2	Level 2	Level 2	Level 3	Level 2	Level 2
Millers River & Charles River Basins			Level 3	Level 3			

Lakes & Impoundments Index does not reflect water supply status.

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 Secretary of the Executive Office of Energy and Environmental Affairs. Data are preliminary and not final until all data are reported.

Summary of Drought Indices by Drought Region

OCTOBER 2020

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 3	Level 1	Level 2	Level 2	Level 1	Level 4	Level 2
Streamflow	Level 0	Level 0	Level 1	Level 0	Level 2	N/A	N/A
Groundwater	Level 1	Level 0	Level 0	Level 1	Level 2	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 1	Level 0	Level 0	Level 4	Level 0	N/A
Crop Moisture Index	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
KBDI	Level 1	Level 0	Level 2	Level 2	Level 2	Level 2	Level 2
<i>Suggested 11/05/20 effective 10/01/20</i>	Level 1	Level 1	Level 1	Level 1	Level 2	Level 2	Level 1
Effective 09/01/20 (10/07/20 mtg)	Level 2	Level 2	Level 2*	Level 2*	Level 3	Level 2	Level 2

*Charles and Millers River Basins Level 3

Lakes & Impoundments Index does not reflect water supply status.

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 Secretary of the Executive Office of Energy and Environmental Affairs. Data are preliminary and not final until all data are reported.

DMTF Deliberation

