

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

October 7, 2020

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Indices



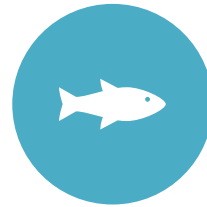
Precipitation (49)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (15)



KBDI - Fire Danger
(15)



Crop Moisture
(national map)

MA Drought Management Plan

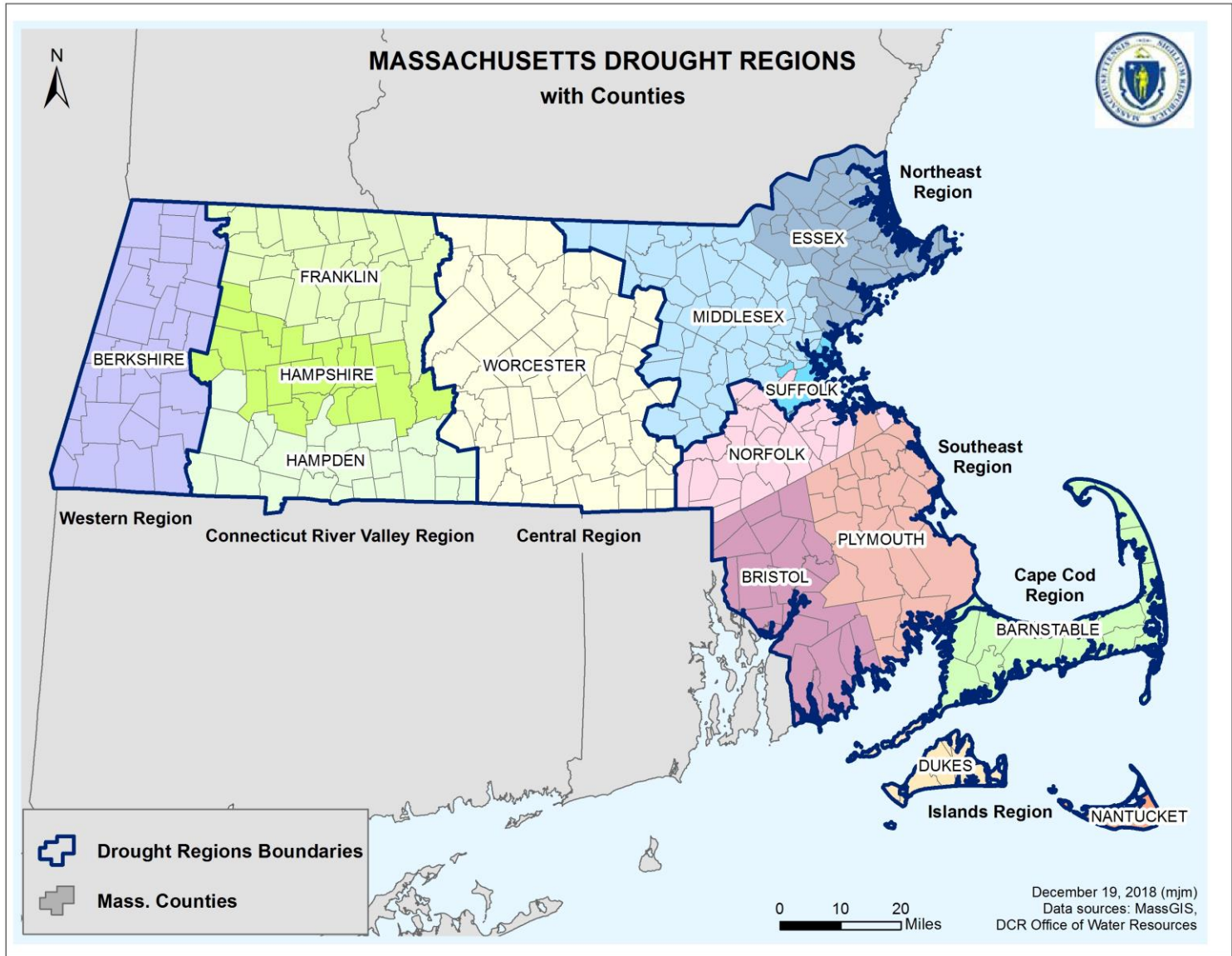
Drought Levels

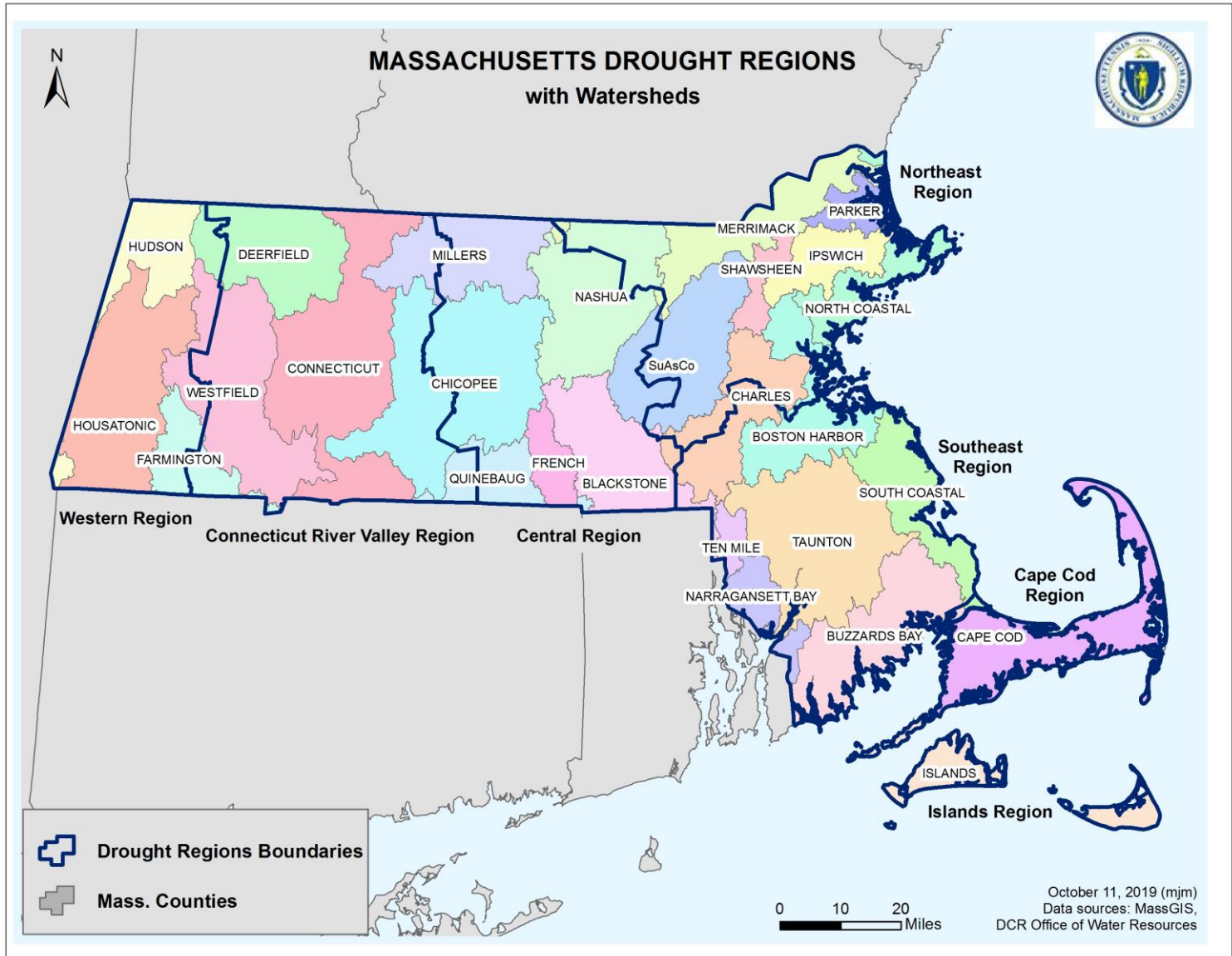


MA Drought Management Plan

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



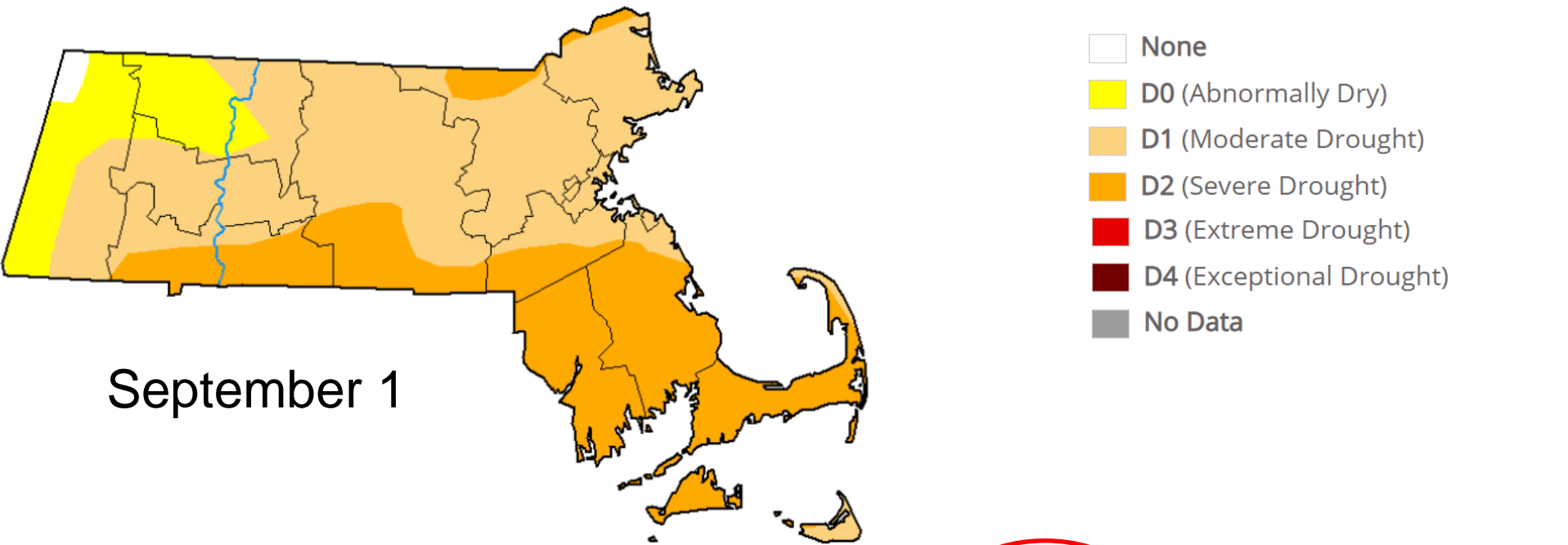
Fire Danger



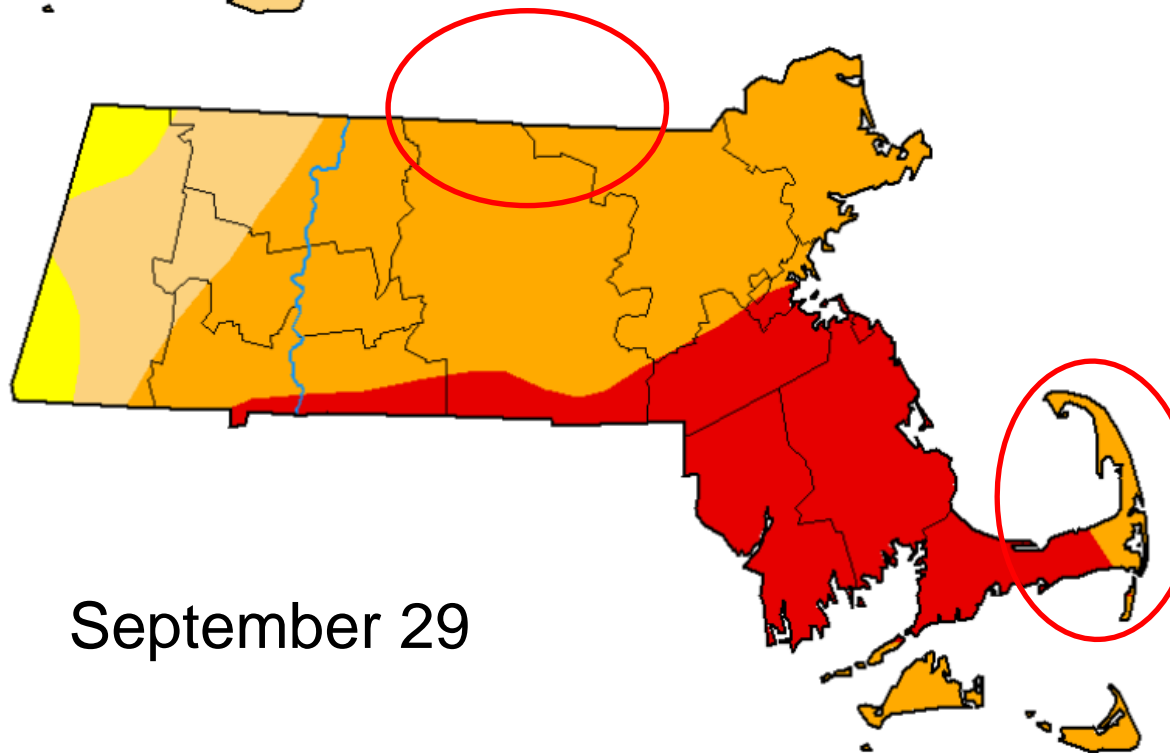
Engineering/
Infrastructure
Impacts



Public Health
Impacts



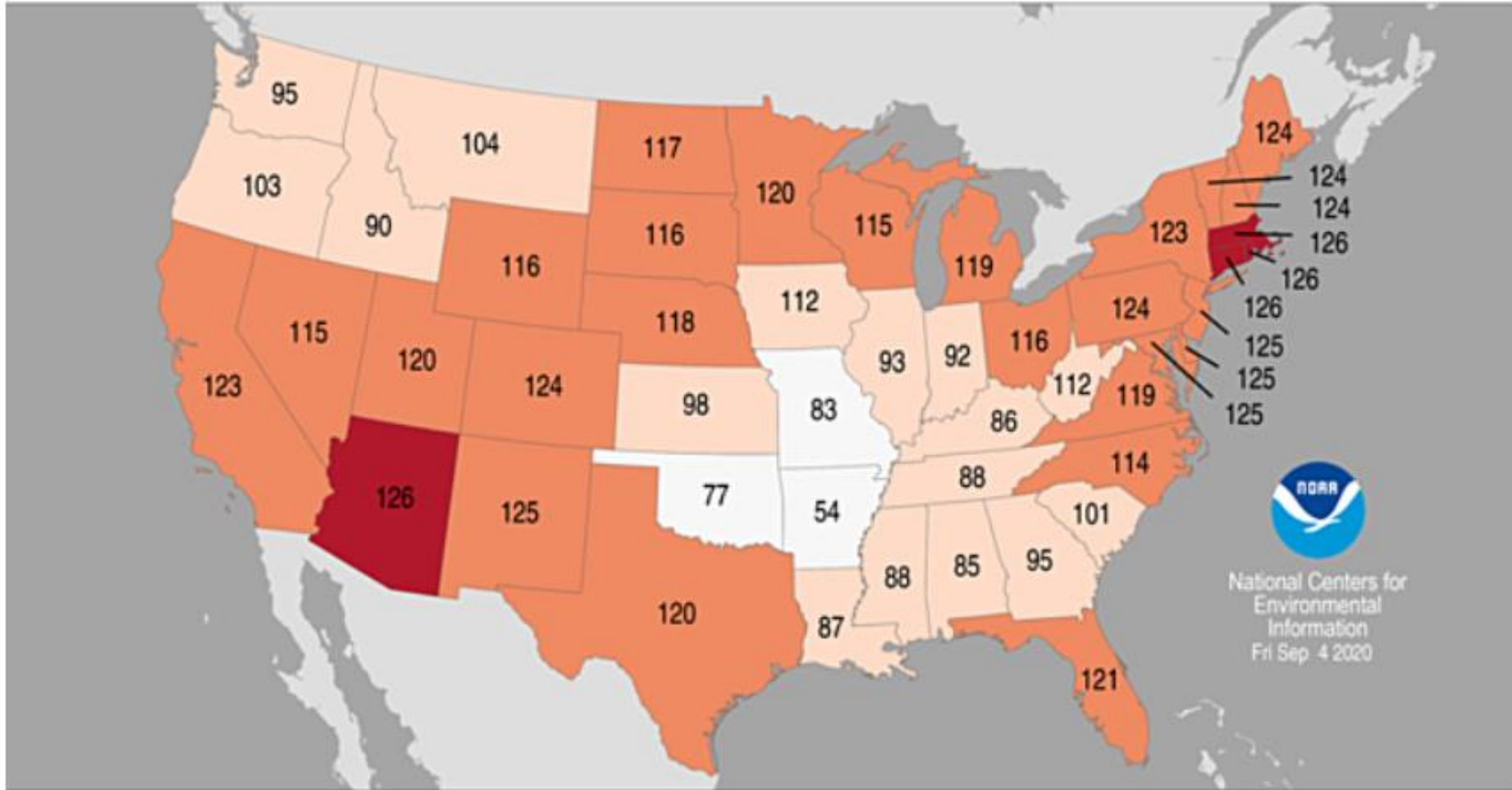
USDM Level 2&3
= MA DMP level 3



Statewide Average Temperature Ranks

June - August 2020

Period: 1895-2020



National Centers for Environmental Information
Fri Sep 4 2020

Record Coldest
(1)

Much Below Average

Below Average

Near Average

Above Average

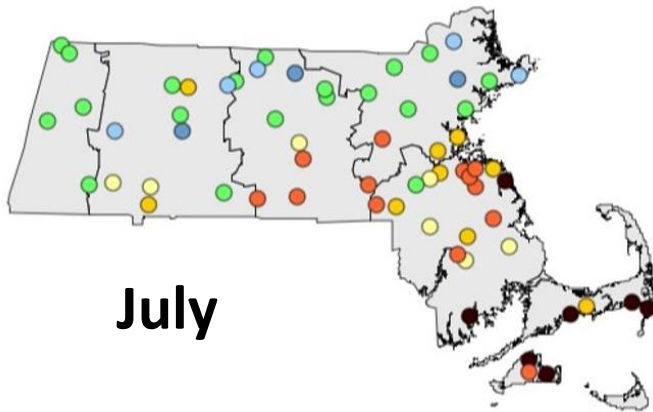
Much Above Average

Record Warmest
(126)

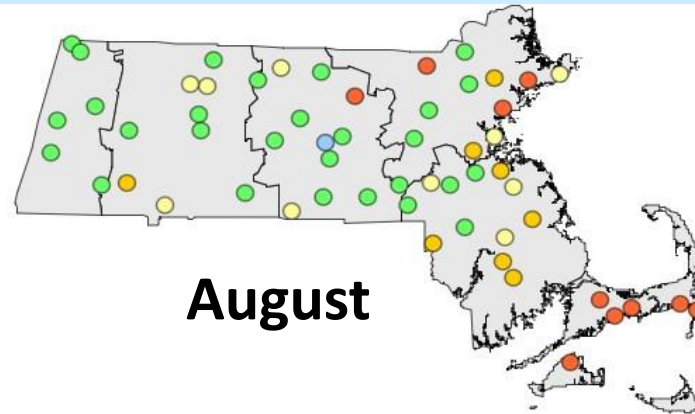
10/7/2020

MA DMTF

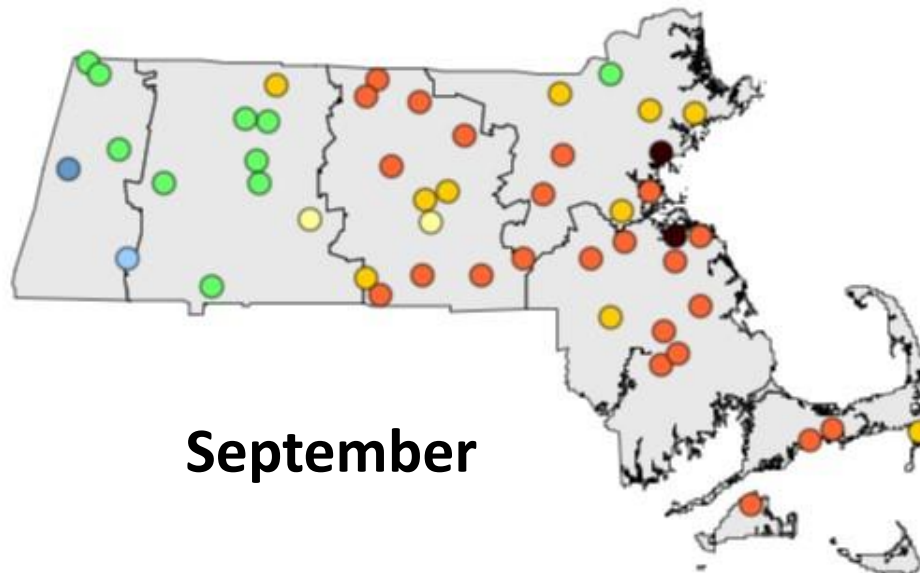
Precipitation – SPI, 1 month



July

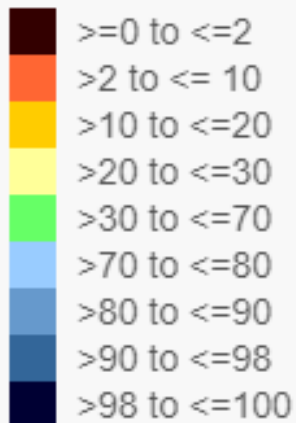


August



September

Percentiles



Precipitation Index – SPI

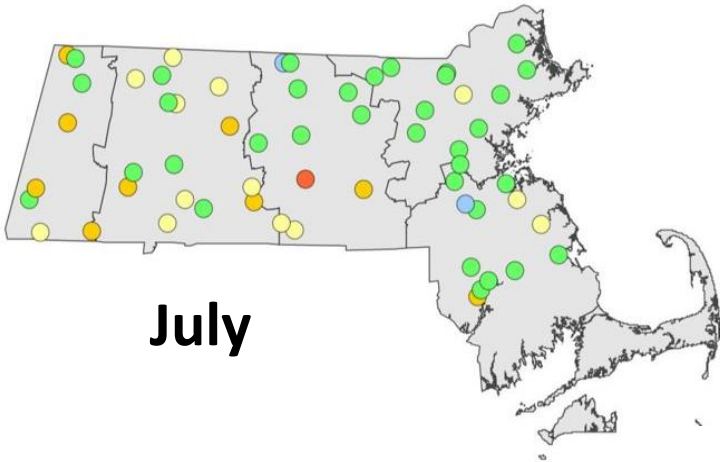
September

Region	Total Reporting for September	SPI 1*	SPI 2	SPI 3	SPI 6	SPI 9	SPI 12	DMP Index Severity
Western	5	0.03	-0.10	-0.07	-0.67	-0.61	0.02	1
CT River Valley	8	-0.22	-0.52	-0.55	-0.94	-1.15	-0.56	2
Central	13	-1.18	-0.98	-1.05	-0.71	-1.07	-0.20	2
Northeast	9	-0.88	-1.15	-1.24	-1.03	-1.36	-0.61	3
Southeast	10	-1.23	-1.12	-1.39	-0.64	-1.10	-0.21	3
Cape Cod	3	-1.48	-1.68	-2.59	-1.76	-1.67	-0.45	4
Islands	1	-1.34	-1.59	-1.94	-0.89	-0.91	-0.06	3

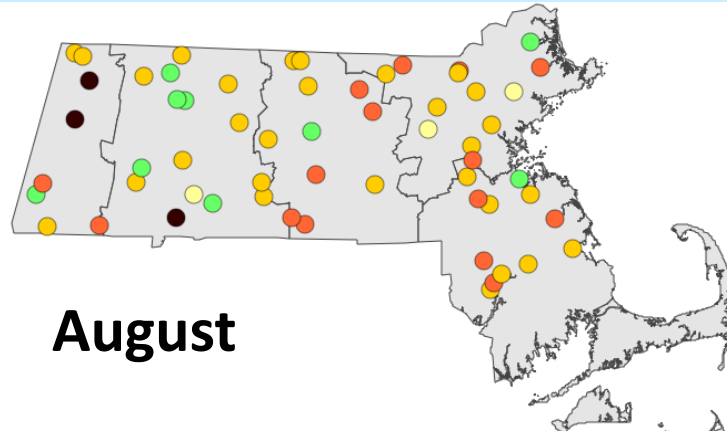
*1-month SPI is for informational purposes only, not for drought determination

Streamflow Percentiles of Monthly Median

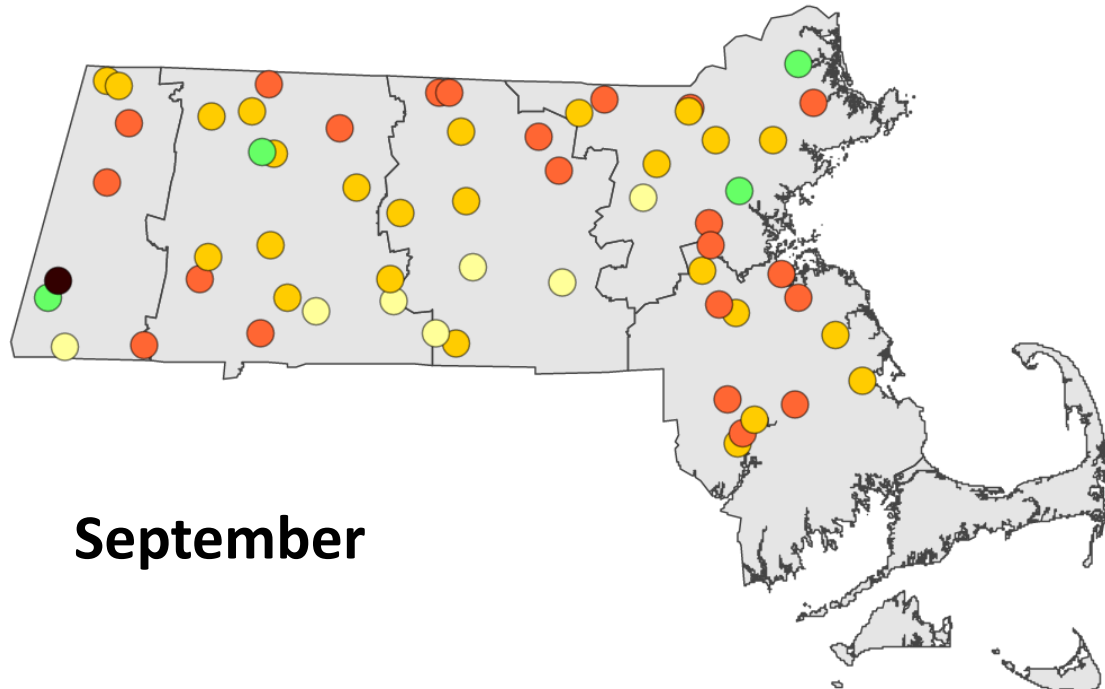
July



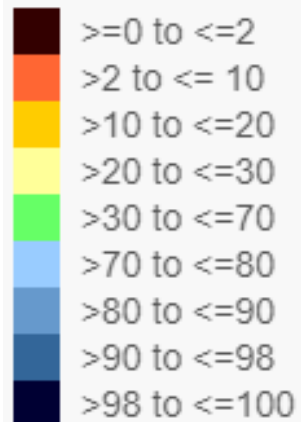
August



September



Percentiles



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

Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for September	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	8	1	3	2	1	0	11	2
CT River Valley	15	0	4	8	2	0	14	2
Central	11	0	4	4	3	0	11	2
Northeast	13	0	5	5	1	0	12	2
Southeast	12	0	6	6	0	0	10	3

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. Index Severity Levels

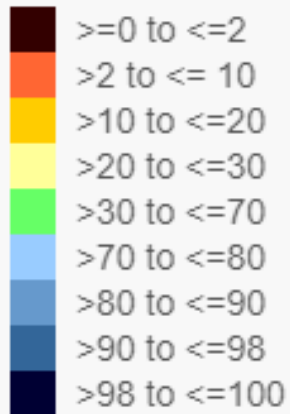
Groundwater Wells Percentiles

July

August

September

Percentiles



10/7/2020

Groundwater Index

By Drought Region

- April - All regions Level 0
- May - Western Level 1
- June - Western & Central Level 1; CT River Valley Level 2
- July - Western, CT River Valley, Central Level 1
- August- Western, CT River Valley, Central, Southeast Level 2

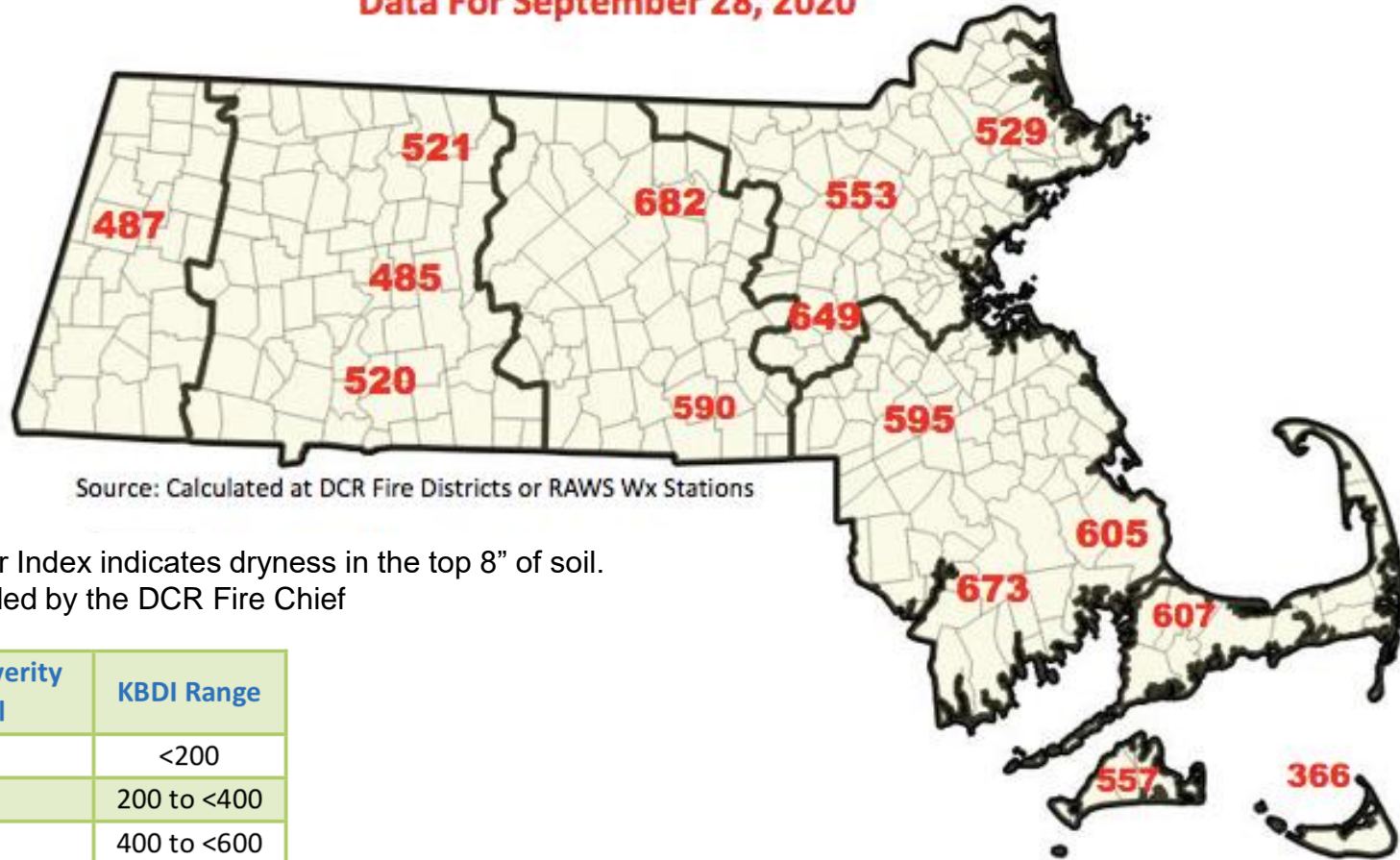
Region	Number of Wells						Median of Individual Well Percentiles	DMP Index Severity
	Total Reporting for September	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	5	0	2	2	0	0	16	2
CT River Valley	11	2	3	2	2	0	19	2
Central	9	1	1	3	1	0	19	2
Northeast	14	1	2	4	0	0	25	1
Southeast	12	2	0	6	2	0	15	2
Cape Cod	10	0	0	0	4	0	46	0
Islands	2	0	0	0	0	0	75	0

Index Severity Levels

KBDI

- Index Severity Level 2: **Western, CT River Valley, Islands**
- Index Severity Level 3: **Central, Northeast, Southeast, Cape Cod**

Data For September 28, 2020



Source: Calculated at DCR Fire Districts or RAWS Wx Stations

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

Crop Moisture Index

The week ending September 26, 2020:

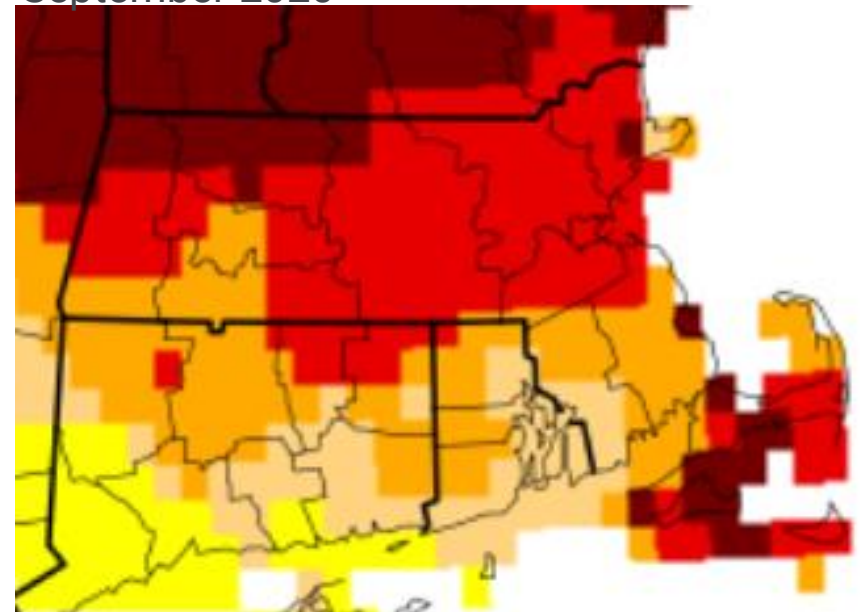
Index Severity Level 1 for: **Western Region, CT River Valley, Central**

Index Severity Level 2 for: **Northeast, Southeast, Cape Cod, & Islands Regions**

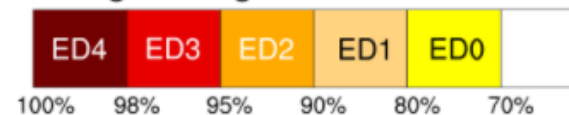


Index Severity Level	Crop Moisture Index
0	> -1.0
1	≤ -1.0 and > -2.0
2	≤ -2.0 and > -3.0
3	≤ -3.0 and > -4.0
4	≤ -4.0

Evaporative Demand Drought Index
September 2020



Drought 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

September

Drought Region	Number Reporting	Percentile	DMP Index Severity
Western	2	42	Level 0*
CT River Valley	2	25	Level 1
Central	2	40	Level 0
Northeast	6	26	Level 1
Southeast	2	8	Level 3
Cape Cod	1	56	Level 0
Islands	NA	NA	NA

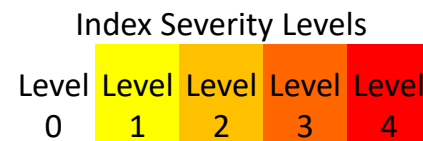
Notes:

* both communities have mandatory restrictions

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

10/7/2020

MA DMTF



Summary of Drought Indices by Drought Region

AUGUST 2020

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 1	Level 2	Level 1	Level 1	Level 2	Level 4	Level 3
Streamflow	Level 3	Level 2	Level 2	Level 2	Level 2	N/A	N/A
Groundwater	Level 2	Level 2	Level 2	Level 0	Level 2	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 1	Level 0	Level 1	Level 2	Level 0	N/A
Crop Moisture Index	Level 1	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2
KBDI	Level 2	Level 2	Level 3	Level 2	Level 3	Level 2	Level 2
<i>Declared 9/03/20 effective 08/01/20</i>	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2

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

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>Recommended 10/07/20 effective 09/01/20</i>	Level 2	Level 2	Level 2	Level 2	Level 3	Level 2	Level 2
From 09/03/20 mtg Effective 08/01/20	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2

Lakes & Impoundments Index does not reflect water supply status.

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Summary of Drought Indices by Watershed September 2020

Watershed	# site	SPI	Streamflow	Groundwater	KBDI	CMI
BLACKSTONE		2	1	2	2	
BOSTON HARBOR		3	2	2	3	
BUZZARDS BAY		-	-	1		
CAPE COD		4	-	0		
CHARLES	8	3	3	2	3	2
CHICOPEE		2	2	1	3	
CONCORD		2	2	2	3	
CONNECTICUT		2	2	2	2	
DEERFIELD		3	2	2	2	
FARMINGTON		0	3	2	2	
FRENCH		3	-	-		
HOOSIC		-	2	2		
HOUSATONIC		1	2	2	2	
HUDSON		2	-	-		
IPSWICH		2	3	0	2	
ISLANDS		3	-	0		
MERRIMACK		2	3	3	2	
MILLERS	9	3	3	3	3	1
NASHUA		2	3	0	3	
NORTH COASTAL		4	-	-	2	
PARKER		-	0	0	2	
SHAWSHEEN		-	2	0	2	
SOUTH COASTAL		3	2	2		
TAUNTON	12	3	3	2	3	2
TEN MILE		-	-	4		
WESTFIELD		2	3	2	2	
QUINEBAUG		4	2	-		
WEIR		-	3	-		

Summary of Drought Indices by Watershed September 2020

Watershed	# sites (P, Q, Gw)	SPI	Streamflow	Groundwater	KBDI	CMI	L&I	Suggested Level
CHARLES	8	3	3	2	3	2	0	3
MILLERS	9	3	3	3	3	1	N/A	3

DMTF Deliberation

