

# 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

**December 7, 2020**

Meeting Co-Chairs: EOEEA, MEMA



# MA Drought Indices



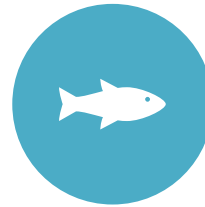
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and  
Impoundments (20)



KBDI - Fire Danger  
(16)



Crop Moisture  
(national map)

# MA Drought Management Plan

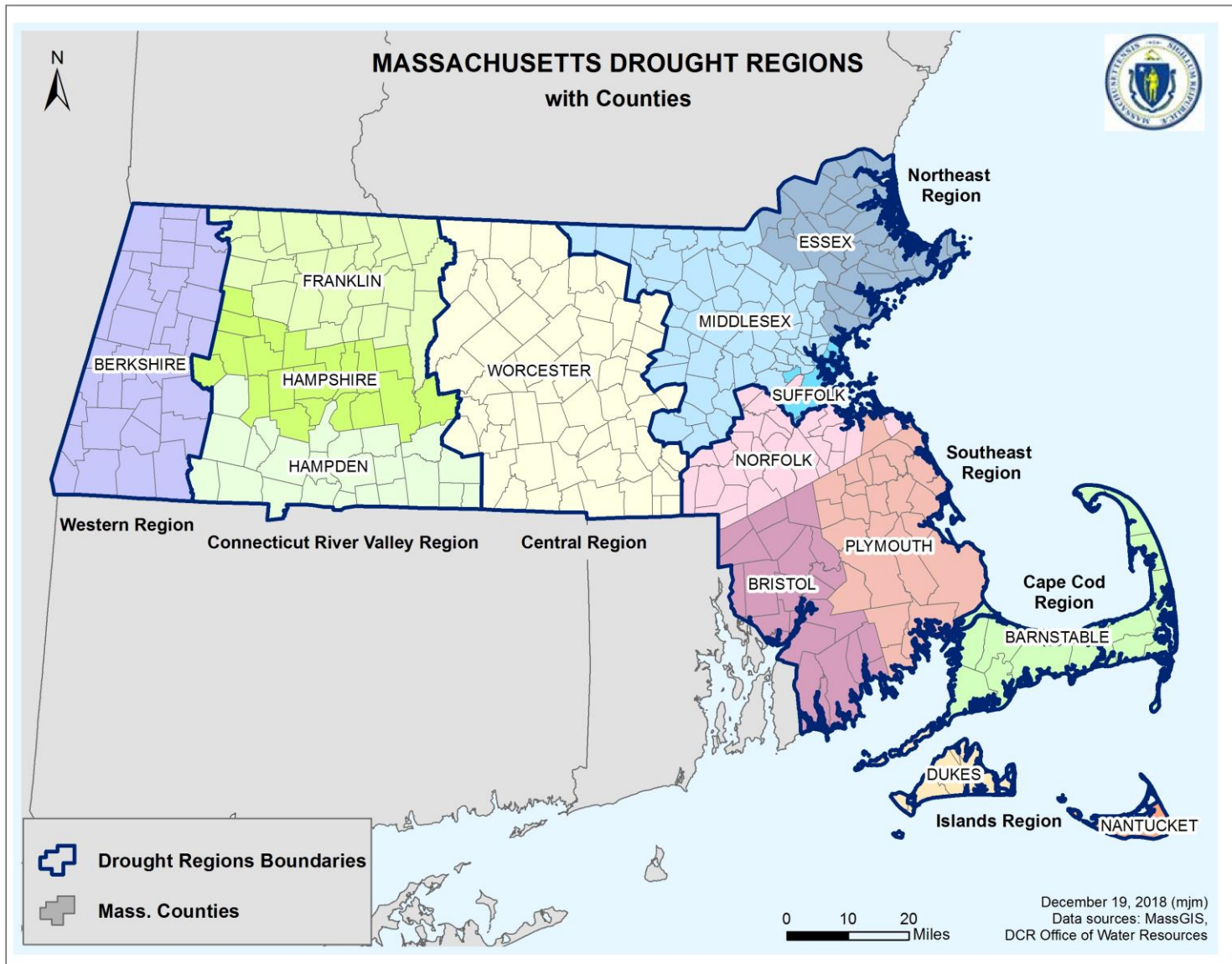
## Drought Levels

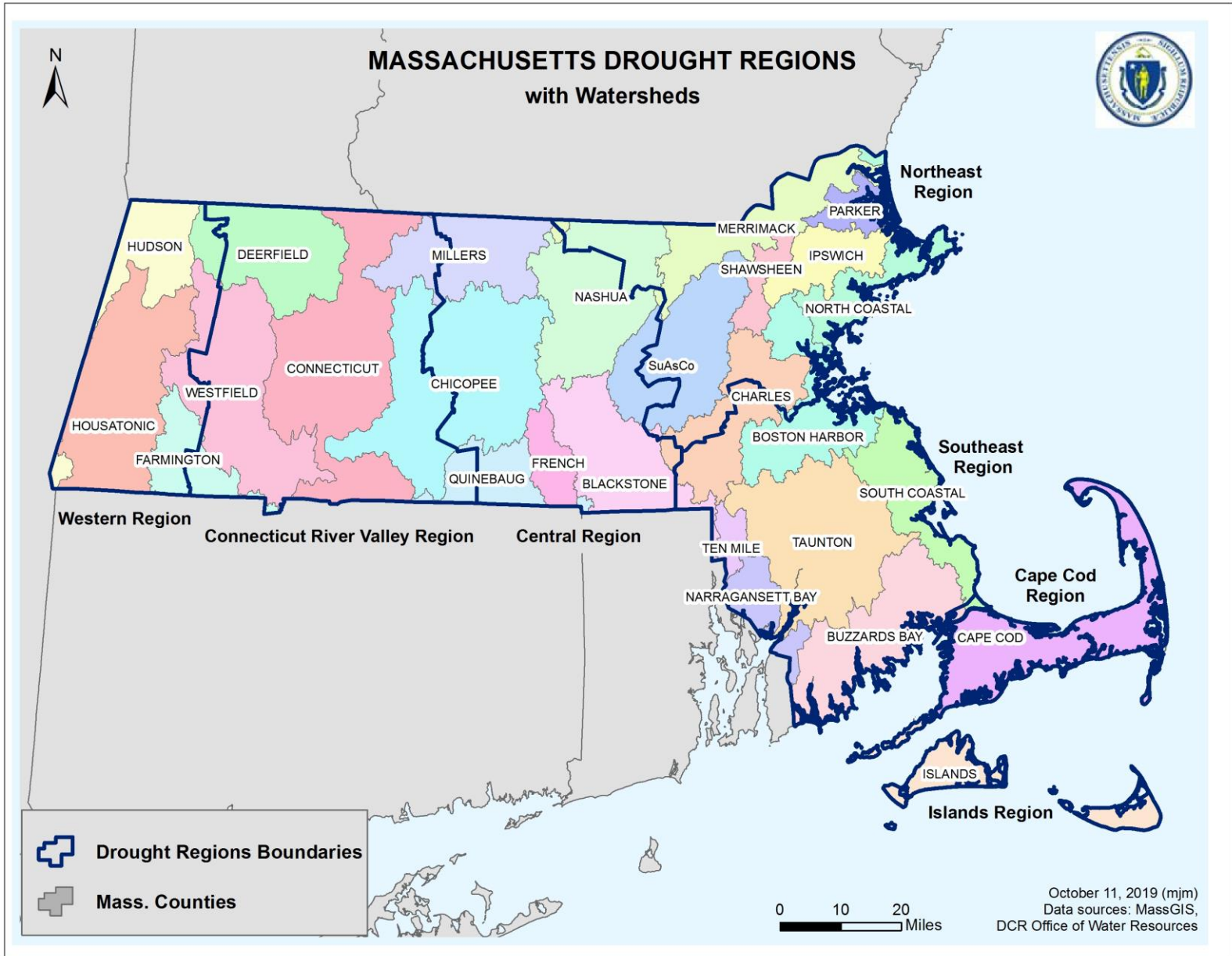


# MA Drought Management Plan

## Drought Indices

Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch-Byram Drought Index	Crop Moisture Index
0	>30 <sup>th</sup> 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



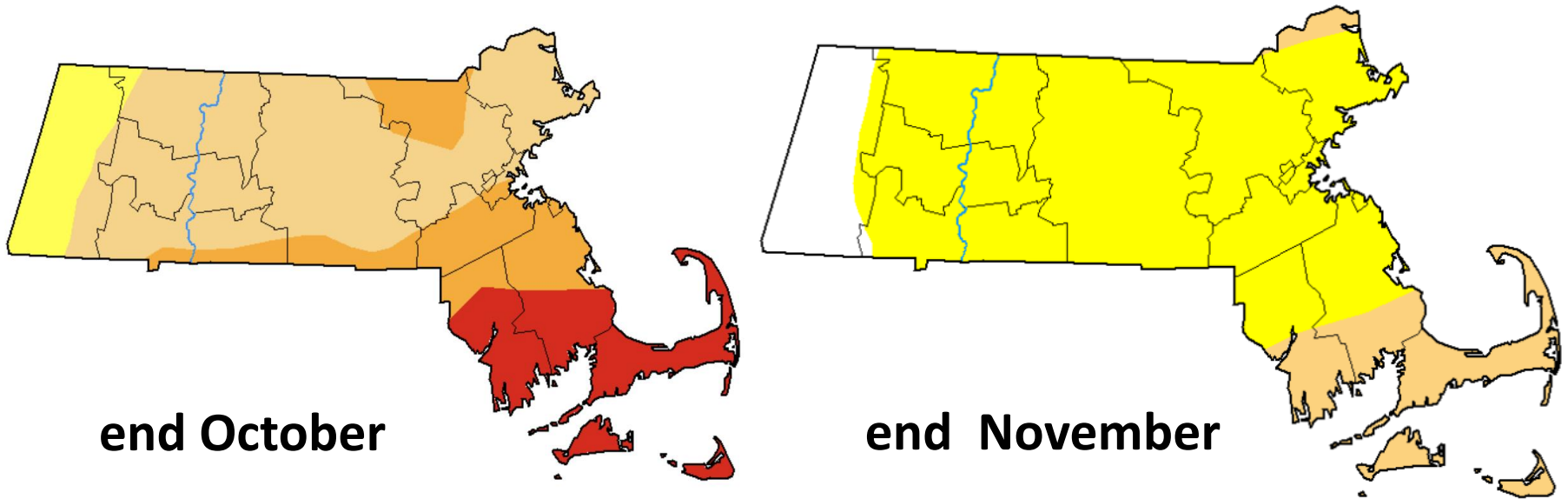
Engineering/  
Infrastructure  
Impacts










Public Health  
Impacts



# US Drought Monitor

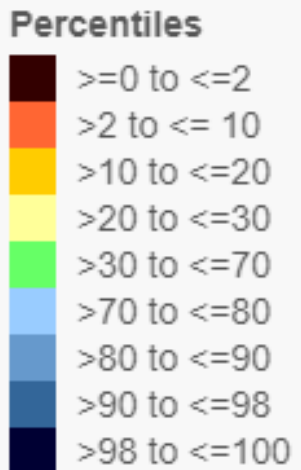
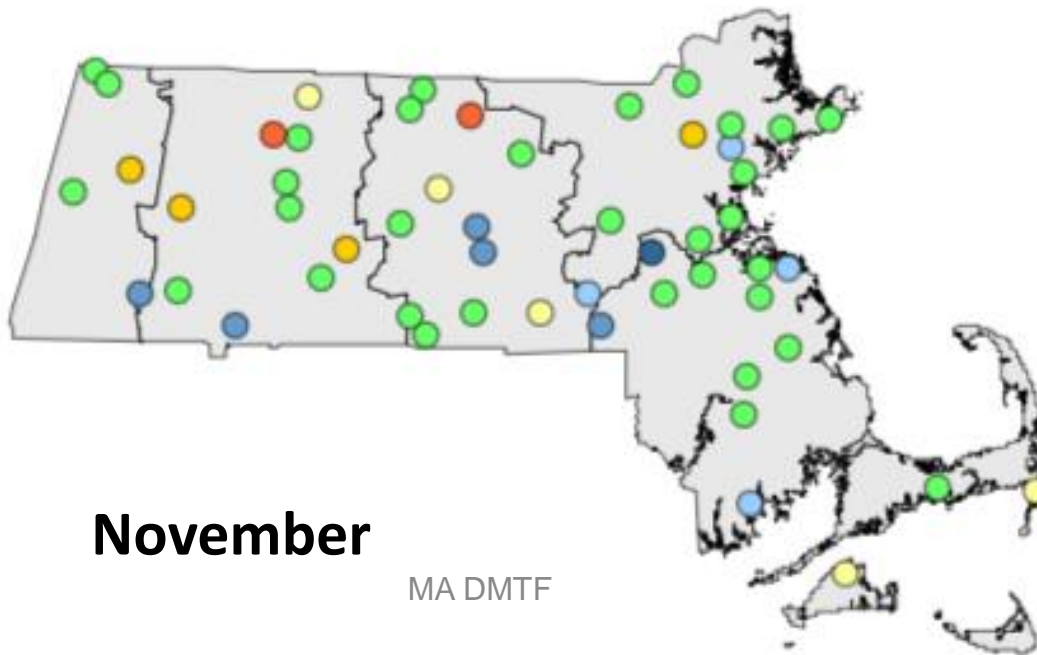
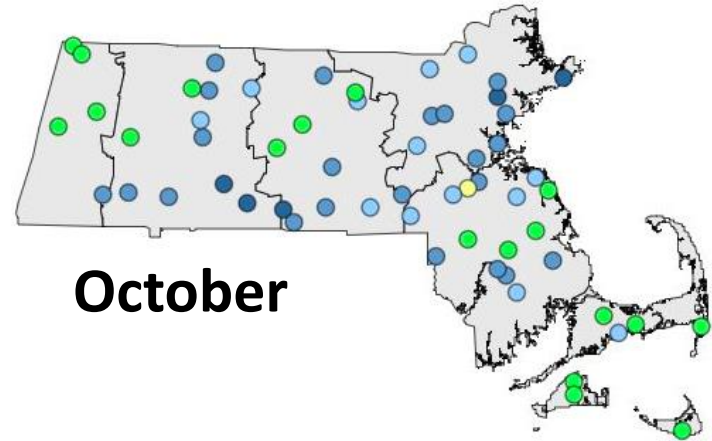
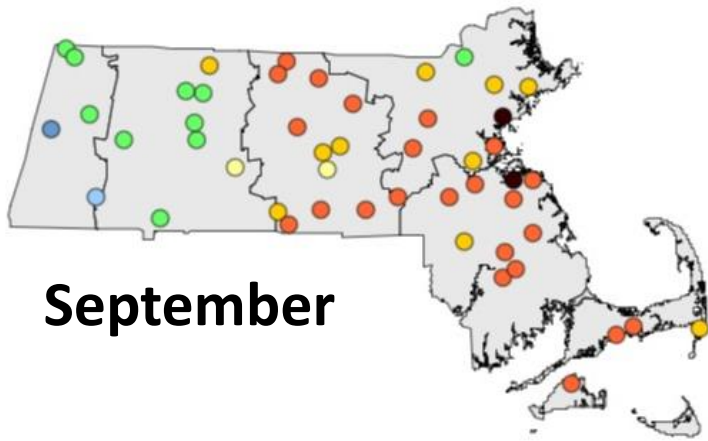


## Intensity:

-  None
-  D0 (Abnormally Dry)
-  D1 (Moderate Drought)
-  D2 (Severe Drought)
-  D3 (Extreme Drought)
-  D4 (Exceptional Drought)
-  No Data

USDM		MA DMP
0	=	1
1	=	2
2&3	=	3
4	=	4

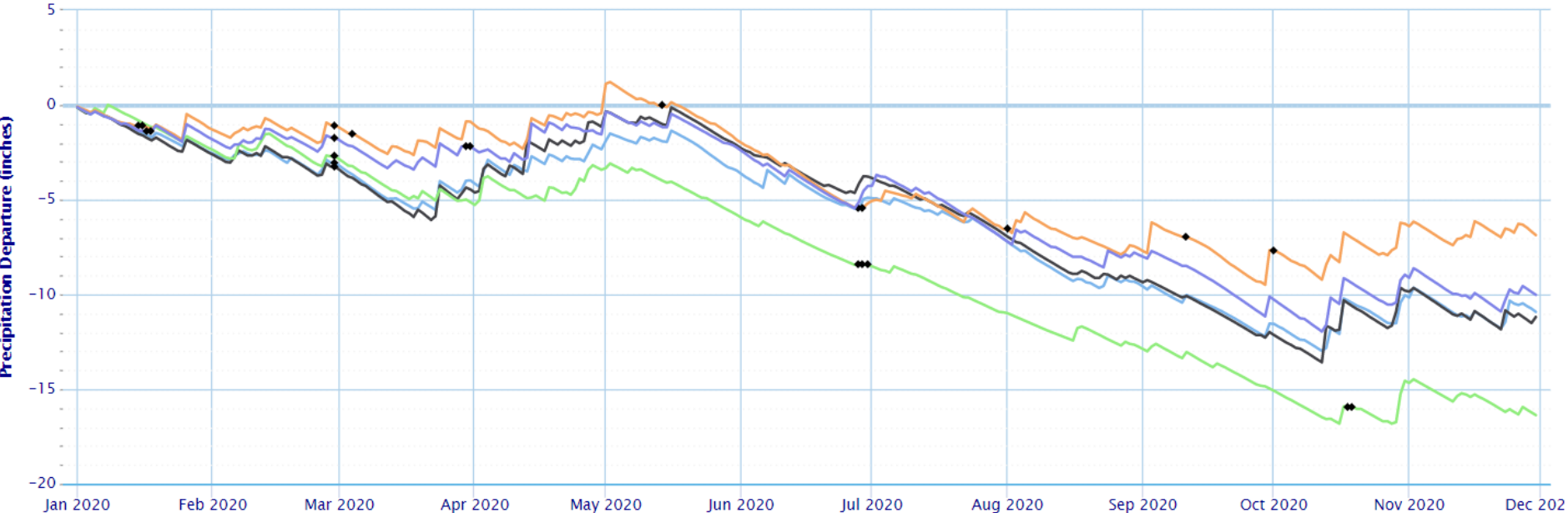
# Precipitation – SPI, 1 month



# Precipitation – Departure

## Accumulated Precipitation Departure from Normal

Green/black diamonds represent subsequent/missing values



(Click to hide/show lines)

- JAMAICA PLAIN, MA:Precip Dprt
- HINGHAM, MA:Precip Dprt
- CHATHAM, MA:Precip Dprt
- WESTFIELD 3 SW, MA:Precip Dprt
- SOUTHBRIDGE 3 SW, MA:Precip Dprt

Powered by ACIS

# Precipitation Index – SPI

Region	Total Reporting for November	SPI 1*	SPI 2	SPI 3	SPI 6	SPI 9	SPI 12	DMP Index Severity
Western	5	0.18	-0.27	-0.12	-0.92	-0.75	-0.49	2
CT River Valley	10	-0.52	0.32	-0.01	-0.59	-0.73	-0.64	1
Central	13	0.03	0.46	-0.18	-0.55	-0.48	-0.34	1
Northeast	11	0.07	0.56	0.02	-0.68	-0.63	-0.55	1
Southeast	11	0.11	0.61	-0.01	-0.49	-0.01	0.03	0
Cape Cod	2	-0.68	-0.50	-1.23	-2.60	-1.85	-1.17	4
Islands	1	-0.85	-0.20	-0.85	-1.75	-0.73	-0.37	3

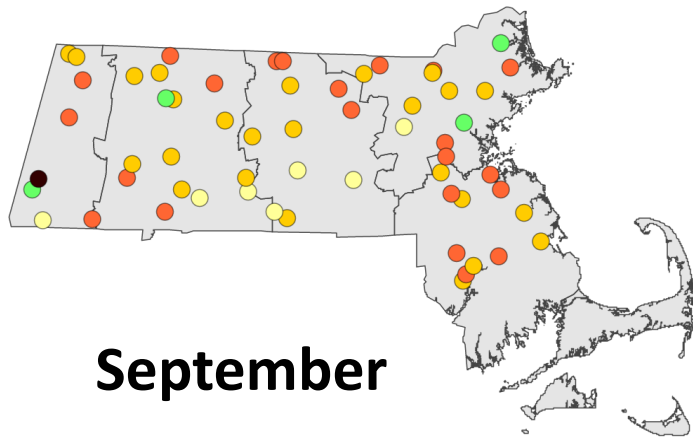
\*1-month SPI is for informational purposes only, not for drought determination

Of the 2-24 month look-back periods, the most relevant is selected each month depending on the phase of the drought  
 - onset, during or recovery.

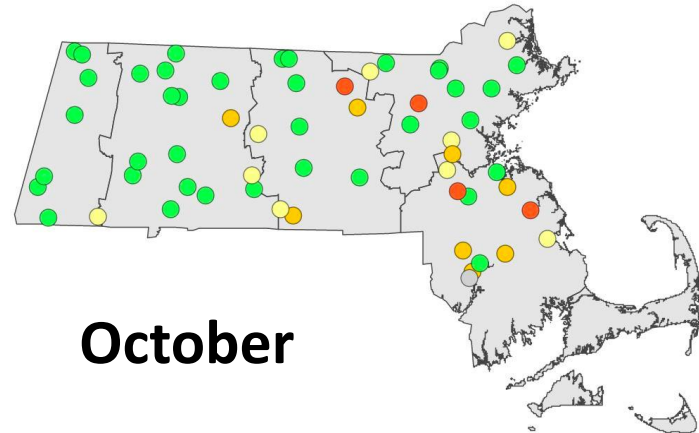
Index Severity Levels



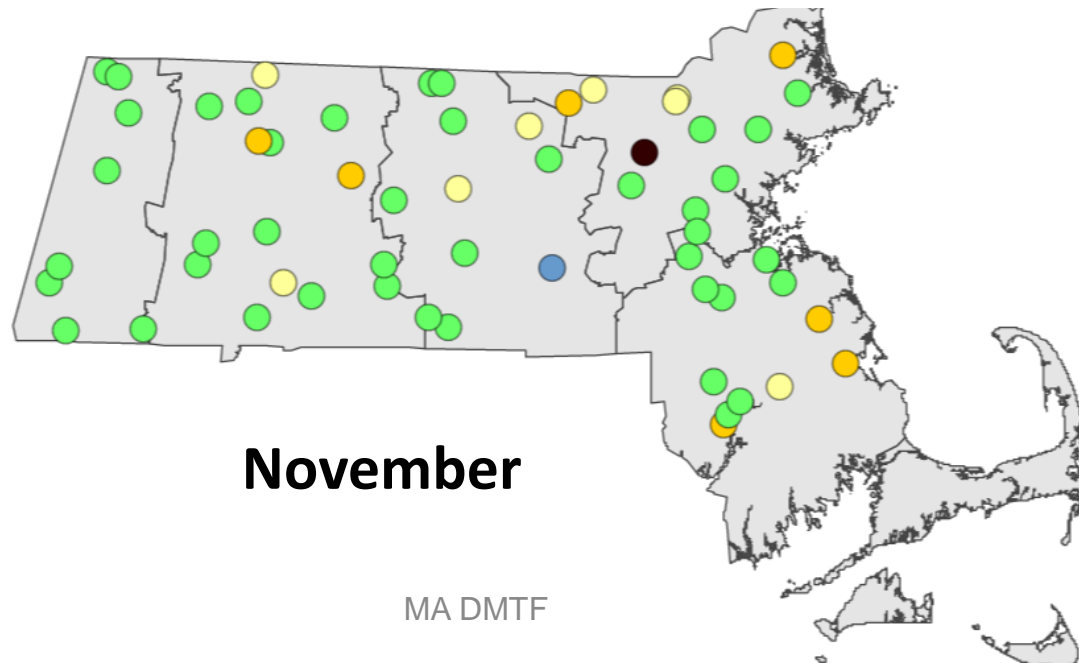
# Streamflow Percentiles of Monthly Median



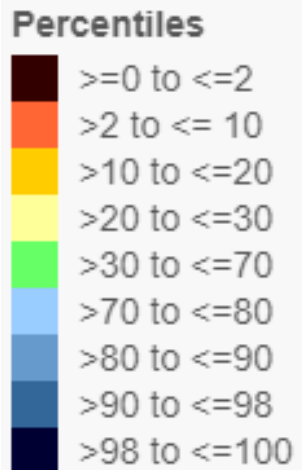
September



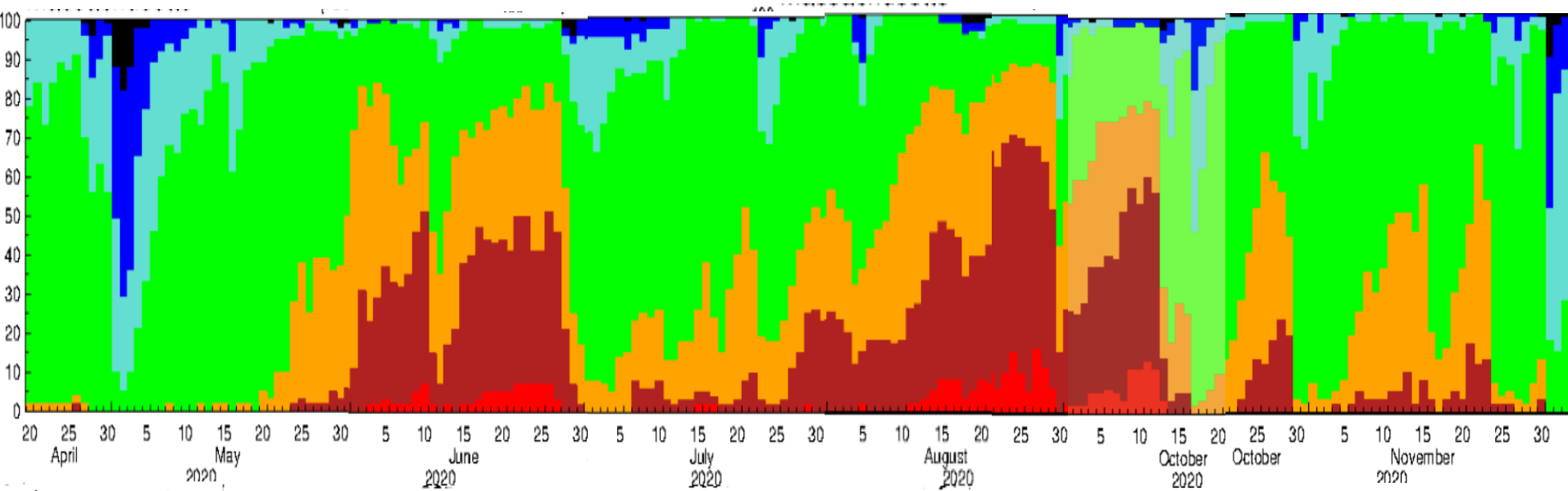
October



November



# Percent of Gages at Various Percentiles



# Streamflow Index

- September- 2: Western, CT River Valley, Central, Northeast, 3: Southeast
- October – 1: Central, 2: Southeast

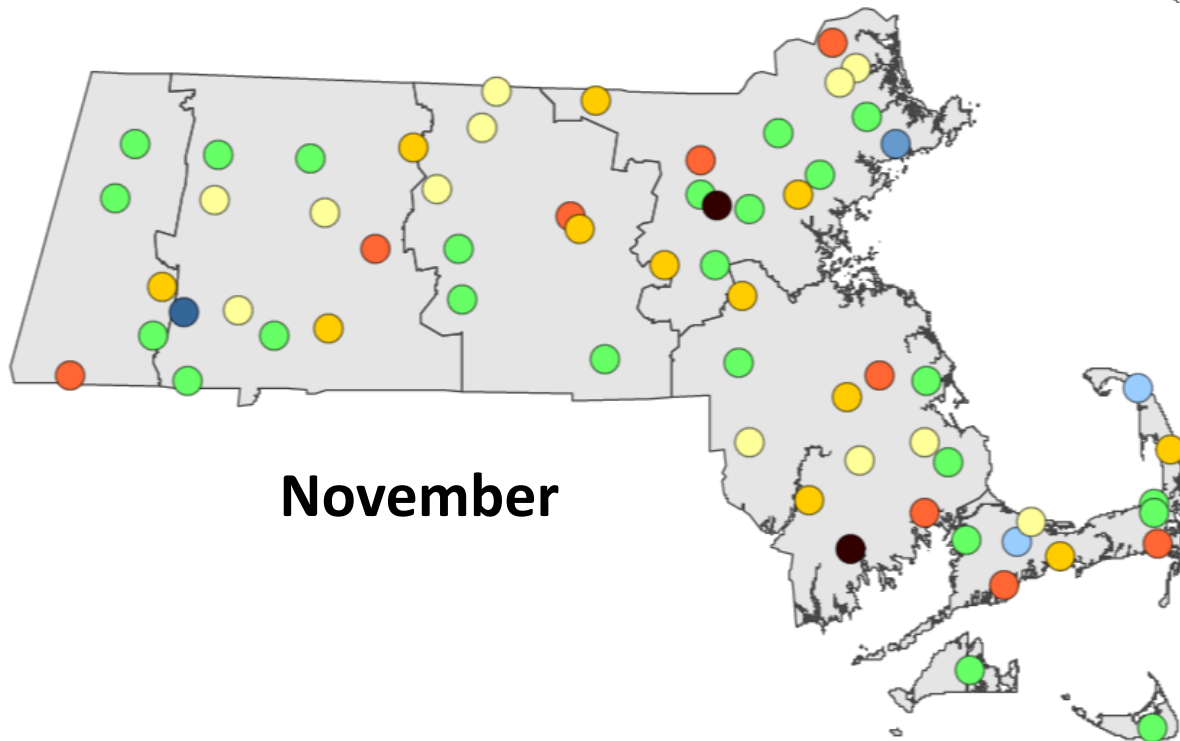
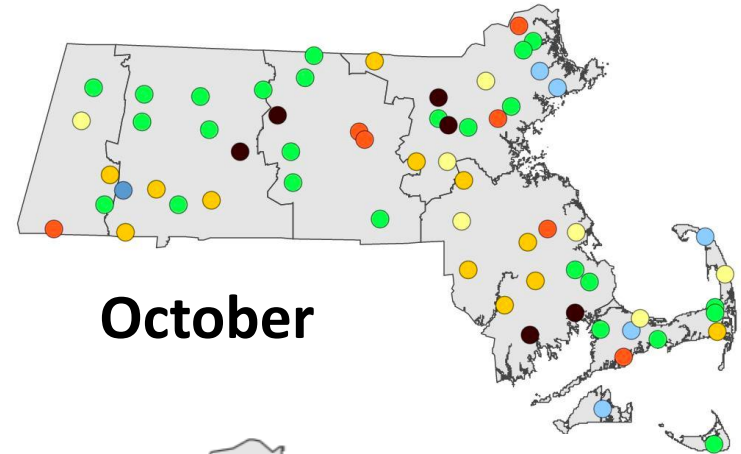
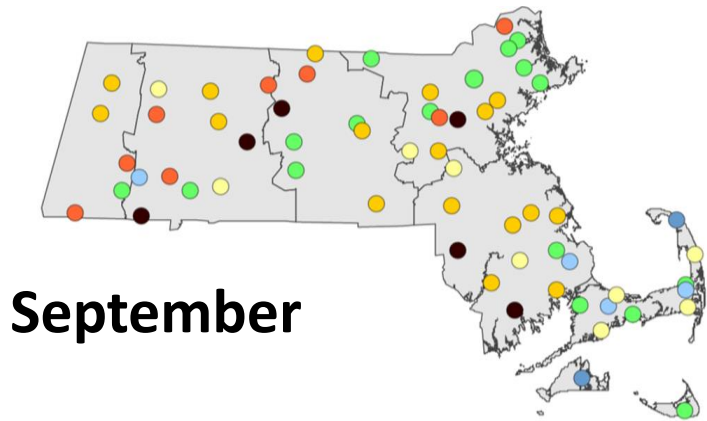
Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for Nov.	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	8	0	0	0	0	0	47	0
CT River Valley	15	0	0	2	2	0	41	0
Central	11	0	0	0	2	0	39	0
Northeast	13	1	0	2	3	0	32	0
Southeast	12	0	0	3	1	0	32	0

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.

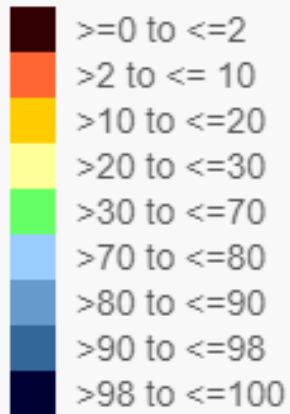
Index Severity Levels



# Groundwater Wells Percentiles



## Percentiles



12/7/2020



# Groundwater Index

- September – 2: Western, CT River Valley, Central, Southeast; 1: Northeast
- October – 2: Southeast; 1: Western, Northeast

Region	Number of Wells						Median of Individual Well Percentiles	DMP Index Severity
	Total Reporting for Nov.	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	5	0	1	1	0	0	32	0
CT River Valley	11	0	1	2	3	1	29	1
Central	9	0	1	2	3	0	27	1
Northeast	14	1	2	2	2	0	29	1
Southeast	12	1	2	3	3	0	24	1
Cape Cod	10	0	2	2	1	0	36	0
Islands	2	0	0	0	0	0	60	0

Index Severity Levels

# KBDI

- Index Severity Level 0:
- Index Severity Level 1:
- Index Severity Level 2:

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

## Crop Moisture Index

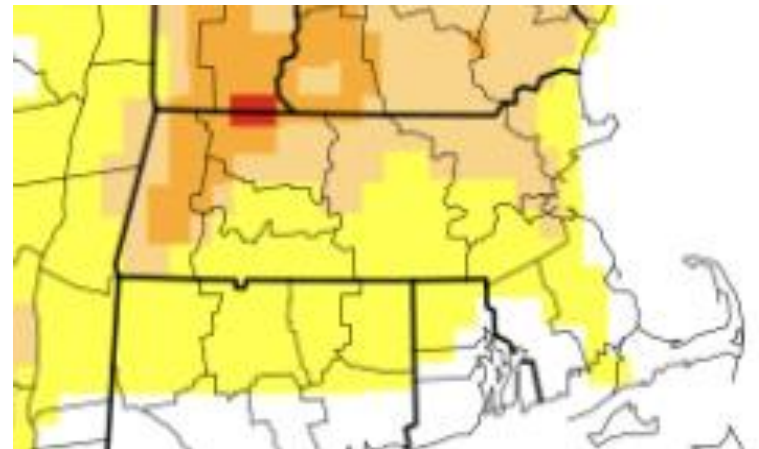
Week ending November 28, 2020

Index Severity Level 0 for all regions

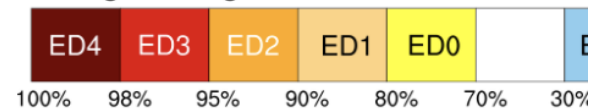


The NOAA CPC CMI shows the **short-term need versus available water** in a shallow soil profile and responds quickly to changing conditions. This indicator is **relevant during growing season**.

## 1-month Evaporative Demand Drought Index for November 27, 2020



### Drought categories



### Wetness categories



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

# Lakes & Impoundments

## November

Drought Region	Number Reporting	Percentile	DMP Index Severity
Western	1	32	Level 0
CT River Valley	2	34	Level 0
Central	2	32	Level 0
Northeast	6	31	Level 0
<b>Southeast</b>	2	8	<b>Level 3</b>
Cape Cod	1	50	Level 0
Islands	NA	NA	NA

Notes:

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



# 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>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 2</b>	<b>Level 1</b>
Effective 09/01/20 (10/07/20 mtg)	<b>Level 2</b>	<b>Level 2</b>	<b>Level 2*</b>	<b>Level 2*</b>	<b>Level 3</b>	<b>Level 2</b>	<b>Level 2</b>

\*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.

# Summary of Drought Indices by Drought Region

## NOVEMBER 2020

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
<b>Precipitation</b>	Level 2	Level 1	Level 1	Level 1	Level 0	Level 4	Level 3
Streamflow	Level 0	Level 0	Level 0	Level 0	Level 0	N/A	N/A
<b>Groundwater</b>	Level 0	Level 1	Level 1	Level 1	Level 1	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 0	Level 3	Level 0	N/A
Crop Moisture Index	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
KBDI							
<i>Suggested 12/7/20 (effective 11/1)</i>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>
<i>Effective 10/01/20 (11/5 meeting)</i>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 2</b>	<b>Level 1</b>

Lakes & Impoundments Index does not reflect water supply status.

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# DMTF Deliberation

