

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

July 8, 2020

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan

Drought Indices

Index Severity Level	Standardized Precipitation Index	Streamflow	Lakes and Impoundments	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

MA Drought Management Plan

Drought Levels

Level 0 – NORMAL

Level 1 - MILD Drought (formerly Advisory)

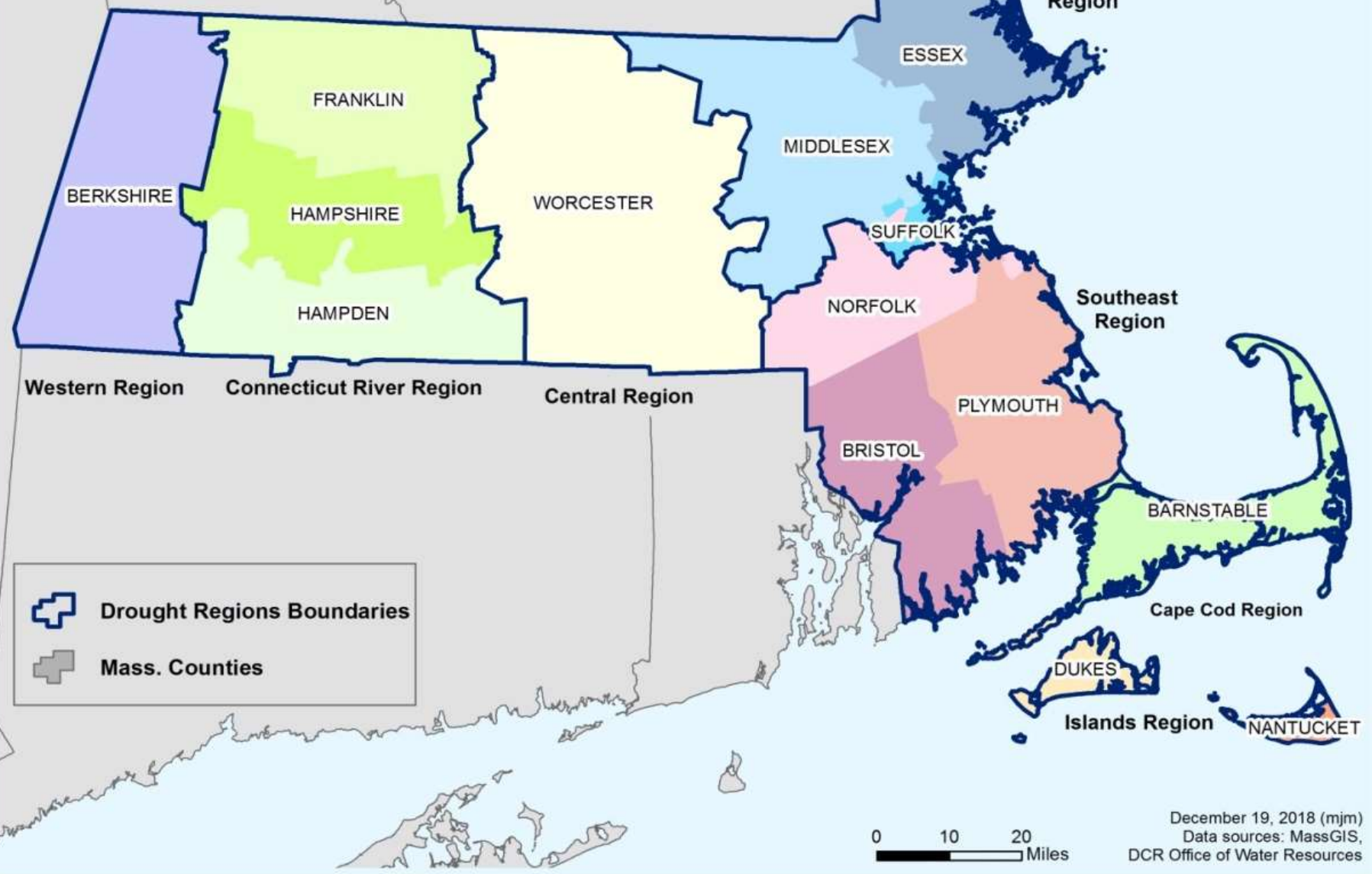
Level 2 - SIGNIFICANT Drought (formerly Watch)

Level 3 - CRITICAL Drought (formerly Warning)

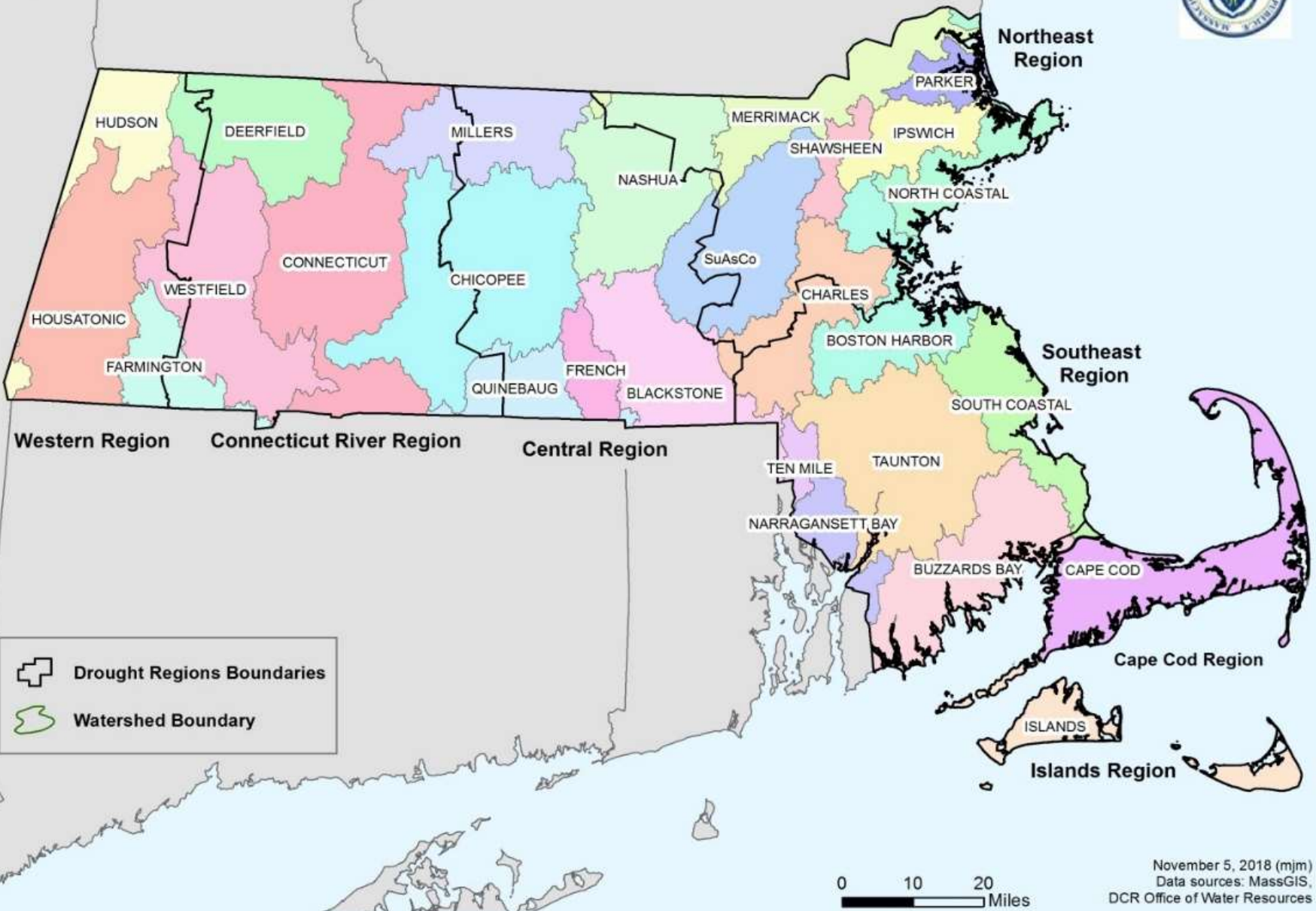
Level 4 – EMERGENCY Drought



MASSACHUSETTS DROUGHT REGIONS with Counties



MASSACHUSETTS DROUGHT REGIONS with Watersheds



 Drought Regions Boundaries

 Watershed Boundary

0 10 20
Miles

November 5, 2018 (mjm)
Data sources: MassGIS,
DCR Office of Water Resources

Summary of Drought Indices by Drought Region

28 days ending June 24, 2020

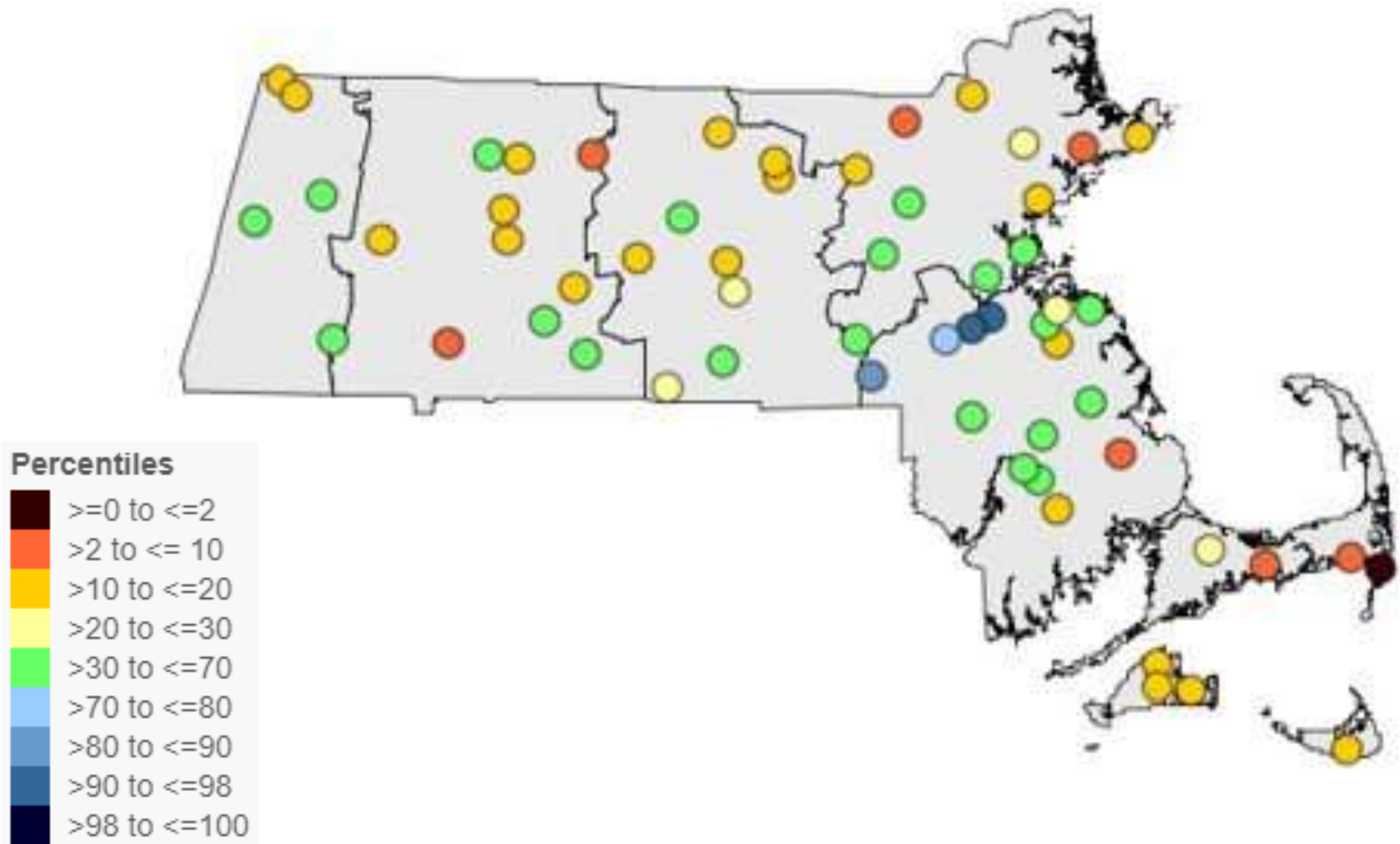
Drought Indicator	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 2	Level 3	Level 3	Level 2	Level 0	Level 1	Level 0
Streamflow	Level 3	Level 2	Level 3	Level 2	Level 0	N/A	N/A
Groundwater	Level 1	Level 2	Level 1	Level 0	Level 0	Level 0	Not Available
Lakes/ Impoundments	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	N/A
Crop Moisture Index	Level 1	Level 1	Level 1	Level 1	Level 0	Level 0	Level 0
KBDI - Fire danger	Level 1	Level	Level 2	Level 1	Level 1	Level 1	Level 0
6/24/20	Level 2	Level 2	Level 2	Level 2	Level 0	Level 0	Level 0

Lakes & Impoundments Index does not reflect water supply status.

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Precipitation – SPI

June



Precipitation Index – SPI

June

Drought Region	Number of Sites	SPI 1*	SPI 2	SPI 3	SPI 6	SPI 12
Western	5	-0.75	-1.35	-0.93	-0.82	-0.27
CT River Valley	10	-1.07	-1.48	-1.22	-1.40	-0.62
Central	10	-0.80	-1.17	-0.36	-0.68	0.13
Northeast	11	-0.51	-0.77	-0.22	-0.76	0.15
Southeast	15	0.10	-0.24	0.67	-0.25	0.49
Cape Cod	4	-1.11	-1.22	-0.08	-0.86	0.55
Islands	4	-0.80	-0.03	0.31	-0.24	0.54

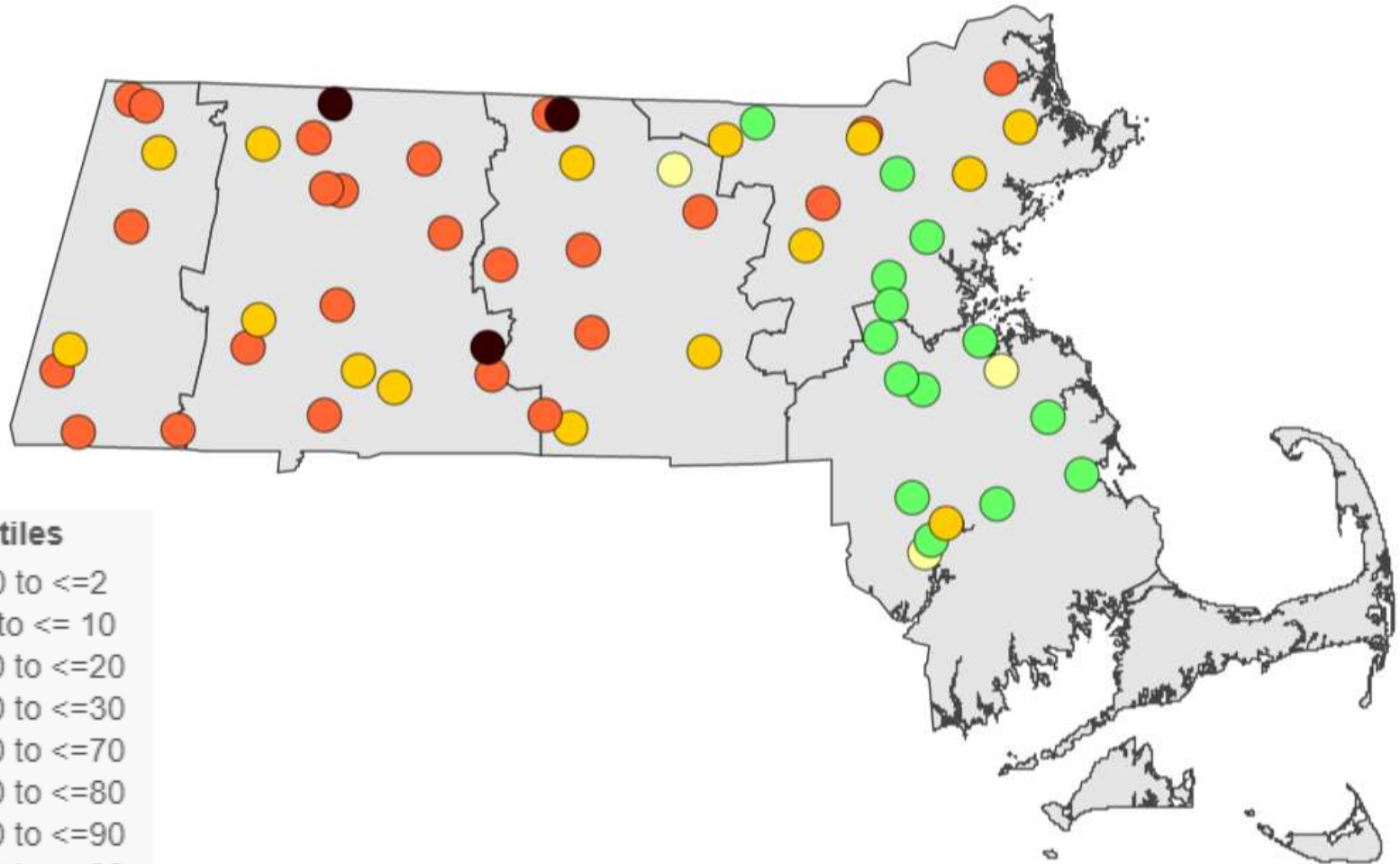
Index Severity Levels



*1-month SPI is for informational purposes only, not for drought determination
 Only those look-back periods are shown that have a Level 1 or higher severity level.

Streamflow

Percentiles of Monthly Median for June



Streamflow Index

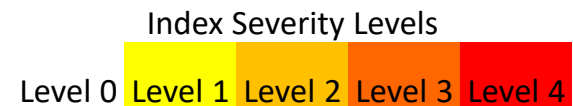
By Drought Region

- April - All regions at Index Severity Level 0
- May - All regions at Index Severity Level 0
- June 22nd – Two regions at Level 2, two regions at Level 3

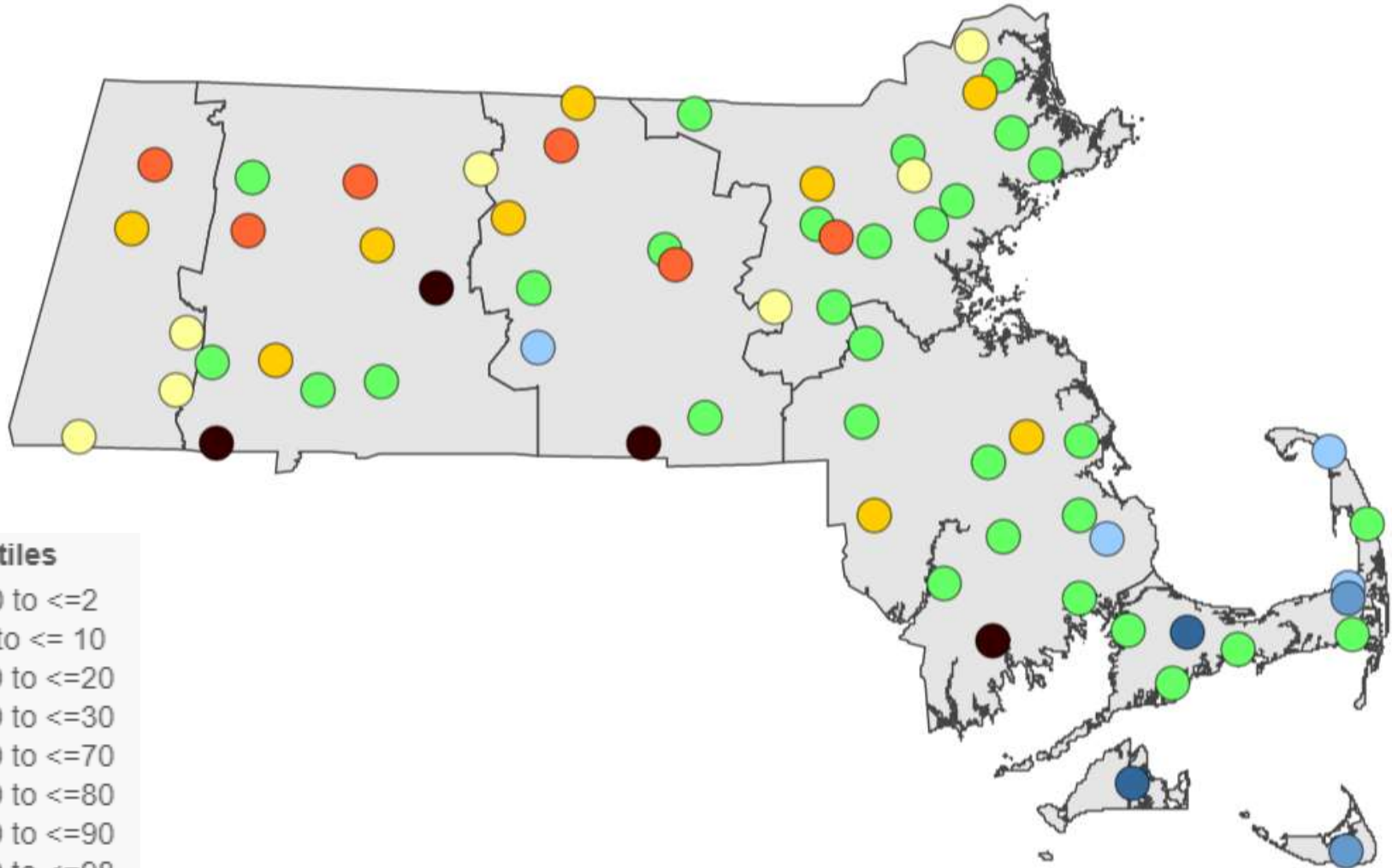
June

Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for June	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	> 90 Percentile		
Western	8	0	6	2	0	0	6	3
CT River Valley	15	2	9	4	0	0	8	3
Central	11	1	6	3	1	0	8	3
Northeast	13	0	3	5	0	0	18	2
Southeast	12	0	0	1	2	0	34	0

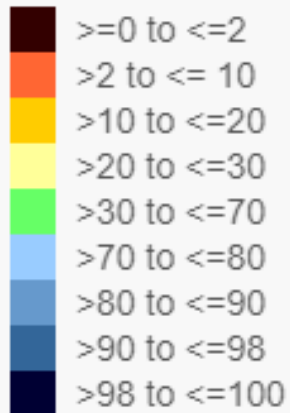
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. Streamflow index is not applicable to Cape Cod and the Islands.



Groundwater Wells Percentiles for June



Percentiles



Groundwater Index

By Drought Region

- April - All regions at Index Severity Level 0
- May – Western Region at Index Severity Level 1
- Month ending June 22 (Real-time only)- Two regions at Level 1, one region at Level 2

June

Region	Number of Wells						Median of Individual Percentiles	DMP Index Severity
	Total Reporting for Jun	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	> 90 Percentile		
Western	5	0	1	1	3	0	21	1
CT River Valley	11	2	2	2	1	0	18	2
Central	10	1	2	2	1	0	25	1
Northeast	15	0	1	2	2	0	43	0
Southeast	12	1	0	2	0	0	34	0
Cape Cod	9	0	0	0	0	1	70	0
Islands	2	0	0	0	0	1	89	0

Index Severity Levels

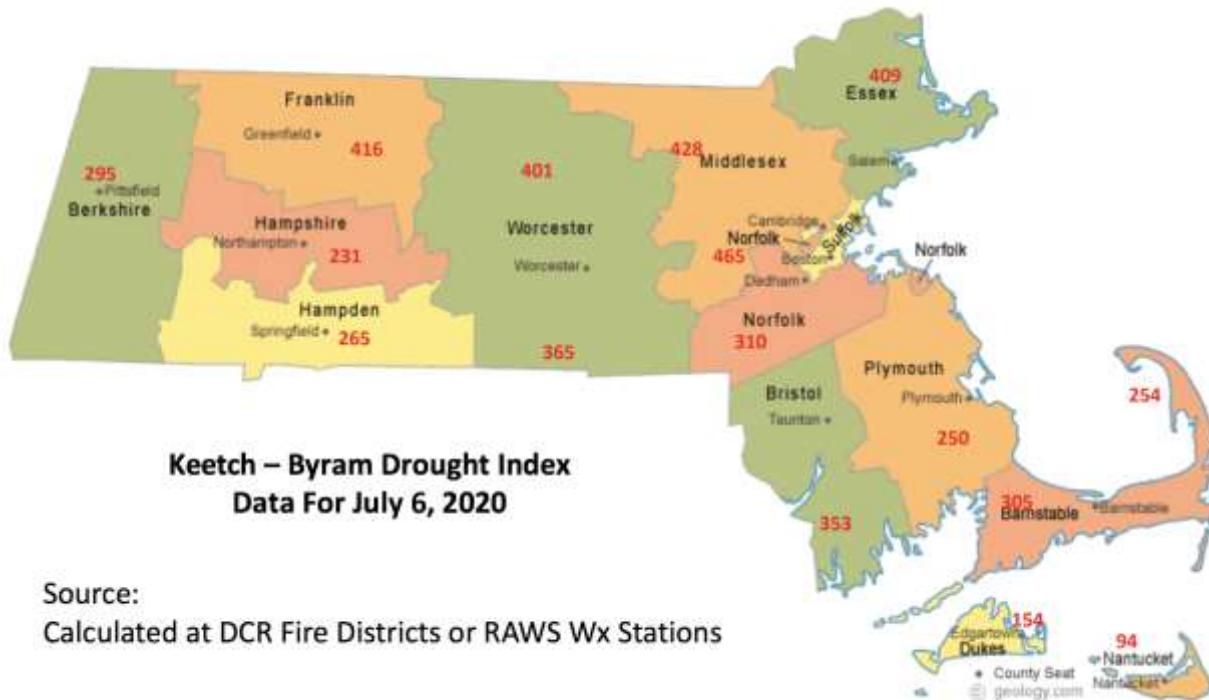
Level 0 Level 1 Level 2 Level 3 Level 4

KBDI

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

As of **July 6, 2020:**

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



Keetch – Byram Drought Index
Data For July 6, 2020

Source:
Calculated at DCR Fire Districts or RAWS Wx Stations

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 CMI map week ending **June 27, 2020** shows **Drought Index Severity Level 1** for: all regions

The 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*. https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif



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



Lakes & Impoundments

June 2020

Drought Region & System	Percent Full or Percentile	Comments
Western: Lenox; Pittsfield	95%; 92%	Level 1: Both percentiles below 30th; Lenox lower than 2016, camp & resort closures have helped; Pittsfield lowest in 16 years
CT River Valley: Quabbin; Springfield	97%; 85%	Level 0: Springfield lower than 2016, but still above their drought threshold; Quabbin normal- lower spillway stopped in June
Central: North Brookfield; Southbridge; Milford	96%; 98%;88%	Level 0: Worcester not reporting yet, but above 100% last month; all reservoirs above 2016 levels ; Milford has restrictions
Northeast: Rockport; N. Andover; Salem/Beverly; Lynn; A-1; Cambridge	88%; 92%; 77%; 17th per.; 50th per.	Level 1:Overall percentile 23rd; Rockport lower than 2016, rains have helped; reservoir percentiles on low side; A-1 level lowest 13 years (no 2016 data)
Southeast: Cohasset; Taunton	88%; 92%	Level 1: Cohasset at 30th per., Taunton 20th per and below target level
Cape Cod: Ashumet	88th percentile	Level 0
Islands	NA	NA

West, NE, & SE Regions reservoirs are lower than usual; does not reflect water supply status



Summary of Drought Indices by Drought Region

28 days ending June 24, 2020

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Streamflow	Level 3	Level 2	Level 3	Level 2	Level 0	N/A	N/A
Groundwater	Level 1	Level 2	Level 1	Level 0	Level 0	Level 0	Not Available
Lakes/ Impoundments	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	N/A
Crop Moisture Index	Level 1	Level 1	Level 1	Level 1	Level 0	Level 0	Level 0
KBDI - Fire danger	Level 1	Level	Level 2	Level 1	Level 1	Level 1	Level 0
6/24/20	Level 2	Level 2	Level 2	Level 2	Level 0	Level 0	Level 0

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Summary of Drought Indices by Drought Region

Month of June

Drought Indicator	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 3	Level 3	Level 2	Level 1	Level 0	Level 2	Level 0
Streamflow	Level 3	Level 3	Level 3	Level 2	Level 0	N/A	N/A
Groundwater	Level 1	Level 2	Level 1	Level 0	Level 0	Level 0	Level 0
KBDI - Fire danger	Level 1	Level 2	Level 2	Level 2	Level 1	Level 1	Level 0
Crop Moisture Index	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
Lakes/ Impoundments	Level 1	Level 0	Level 0	Level 1	Level 1	Level 0	N/A

Lakes & Impoundments Index does not reflect water supply status.

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DMTF Deliberation