

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 for April 2021

Anne Carroll and Viki Zoltay
DCR Office of Water Resources

Drought Management Task Force

May 6, 2021

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan

Indices

Numbers in parentheses indicate number of data points across the state



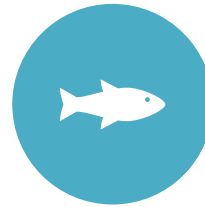
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

MA Drought Management Plan

Index Severity Levels

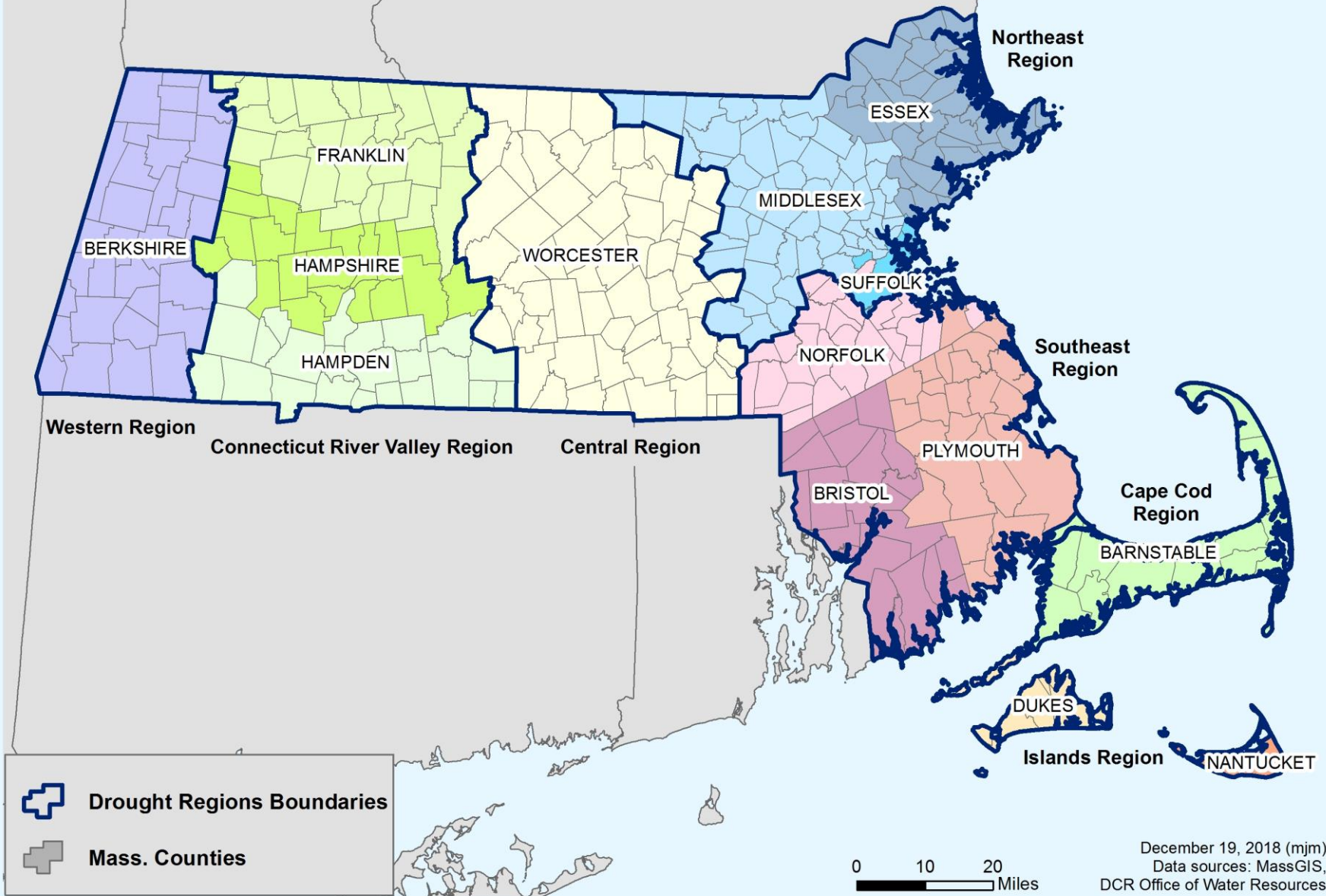
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch-Byram Drought Index	Crop Moisture Index
0	>30 th percentile	< 200	> -1.0
1	≤30 and >20	200-400	≤-1.0 and > -2.0
2	≤20 and >10	400-600	≤-2.0 and < -3.0
3	≤10 and >2	600-700	≤ -3.0 and > -4.0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

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



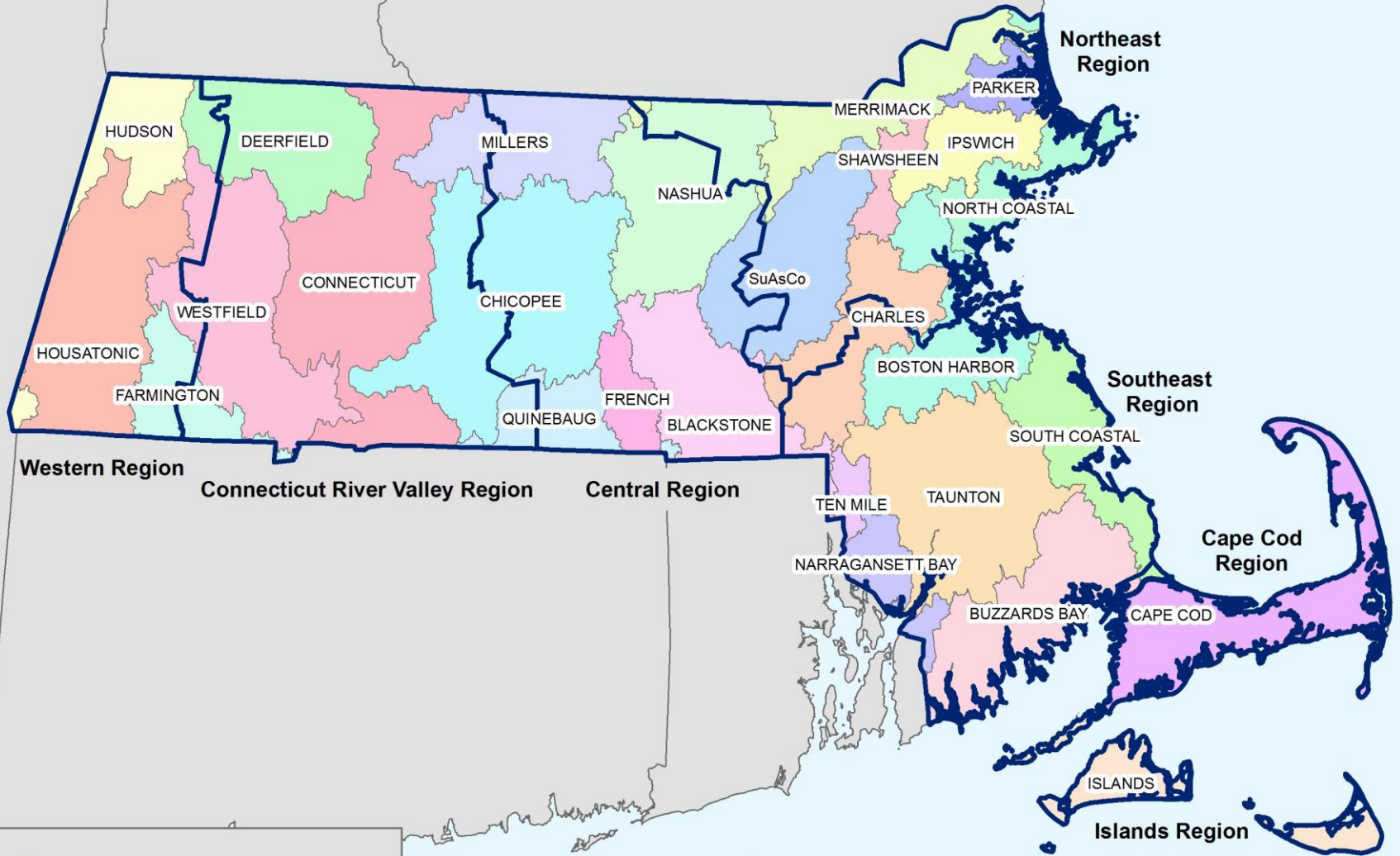
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

December 19, 2018 (mjm)
Data sources: MassGIS,
DCR Office of Water Resources



MASSACHUSETTS DROUGHT REGIONS with Watersheds



-  Drought Regions Boundaries
-  Mass. Counties



October 11, 2019 (mjm)
Data sources: MassGIS,
DCR Office of Water Resources

Task Force Member Updates



Hydrologic
Conditions



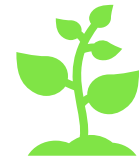
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts



Public Health
Impacts

Recent Hydrologic History

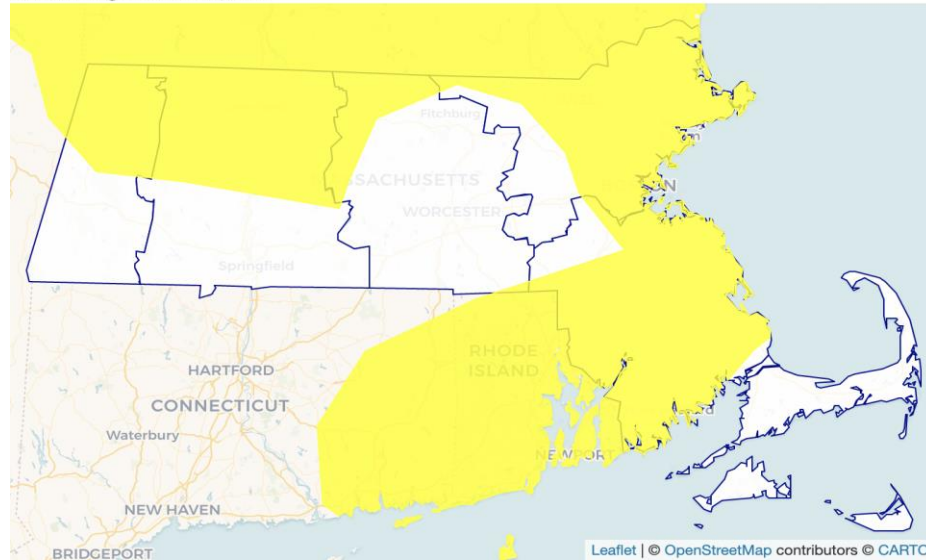
- 2020 Drought – May through November
- 2020 December – Hydrology above 30th percentiles but most regional values hover in the 40th and 50th percentile range
- 2021 January through March – low precipitation across the state with variable impacts on streamflow and groundwater

US Drought Monitor

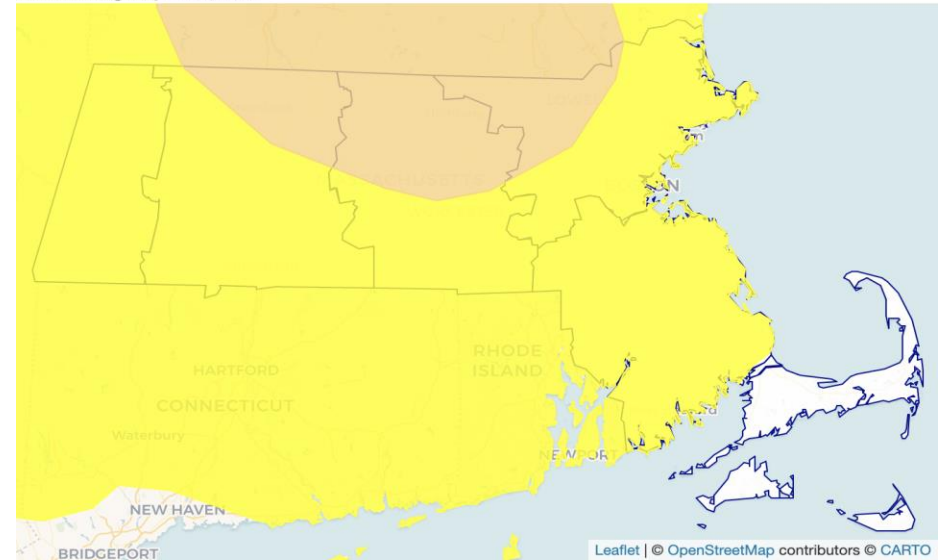
For data as of March 30

For data as of April 27

Data through March 30, 2021



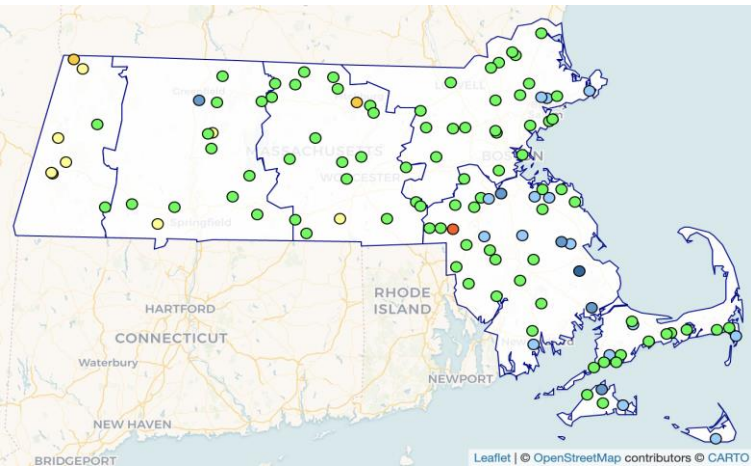
Data through April 27, 2021



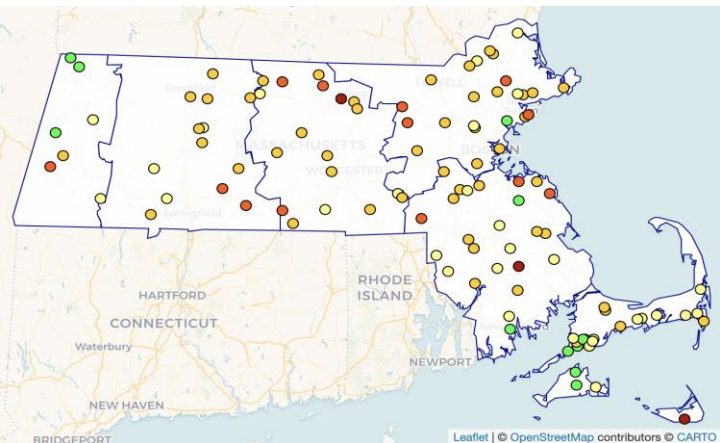
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

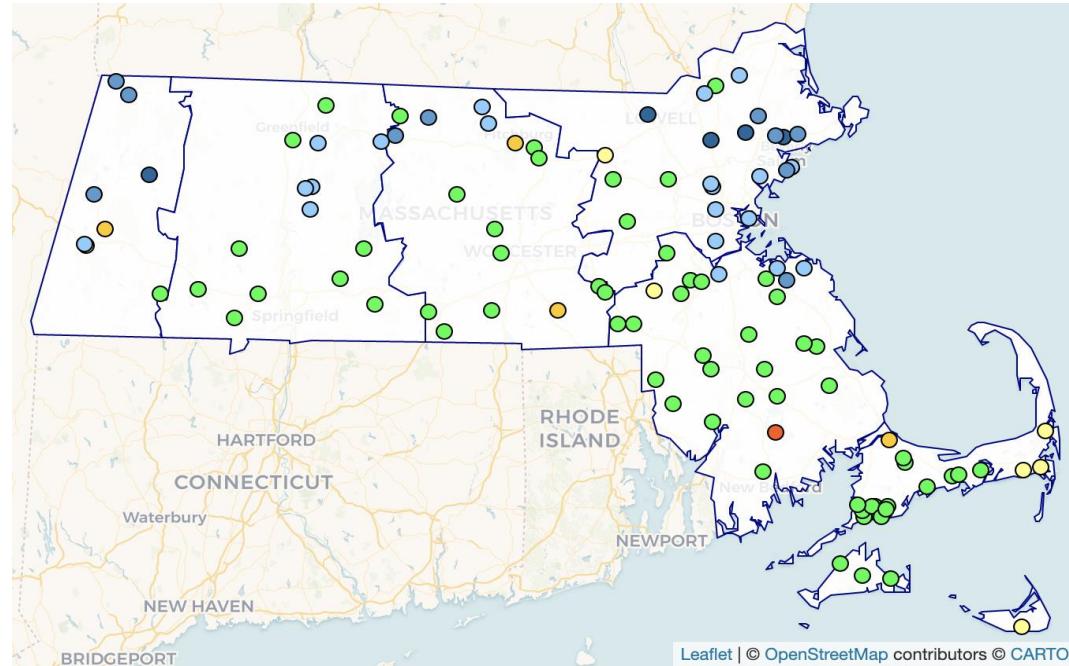
Precipitation – SPI, 1 month



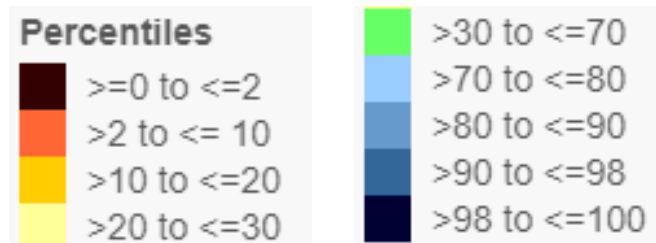
February



March



April



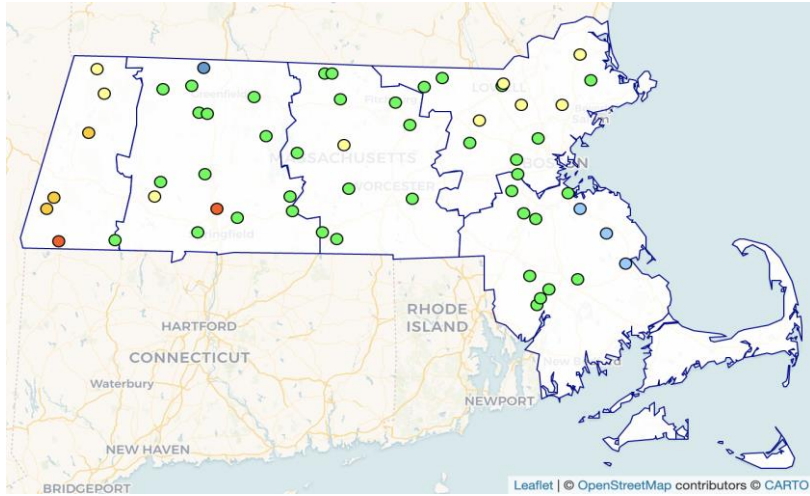
Standardized Precipitation Index – Percentile, April

REGION	NUMBER OF SITES	1-mo	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo
WESTERN	8	79	60	46	33	31	10	18	67
CT RIVER VALLEY	14	61	34	30	46	44	24	27	81
CENTRAL	17	52	23	24	50	41	24	46	86
NORTHEAST	22	76	41	42	51	33	22	45	68
SOUTHEAST	27	50	22	34	46	31	27	42	79
CAPE COD	18	46	24	34	34	13	5	29	41
ISLANDS	4	51	34	52	38	16	11	52	72

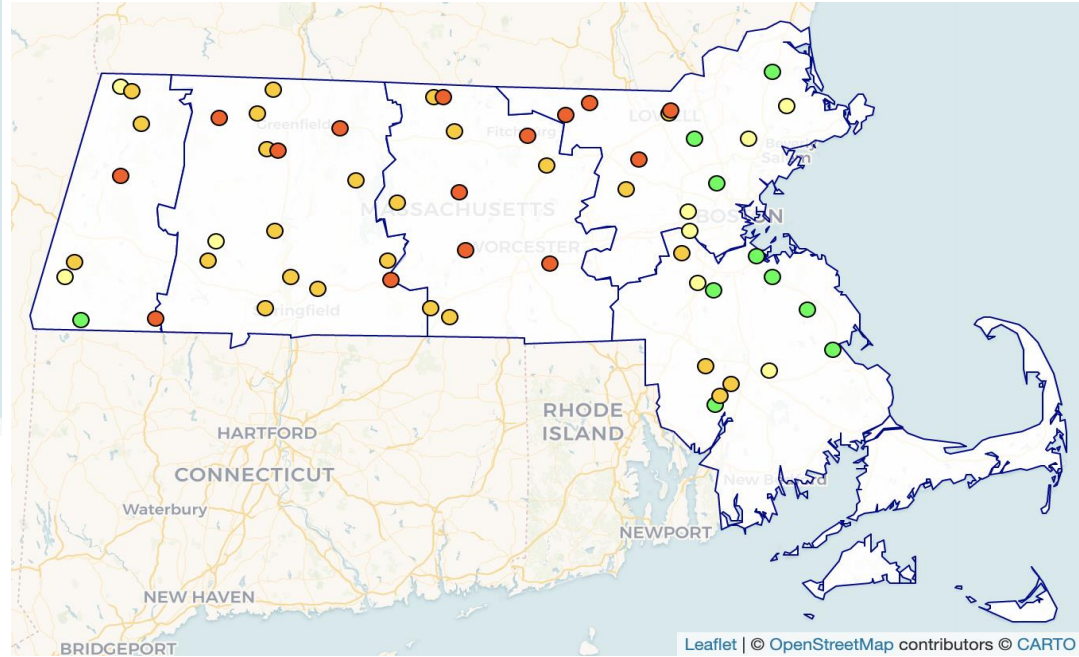
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

* 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.

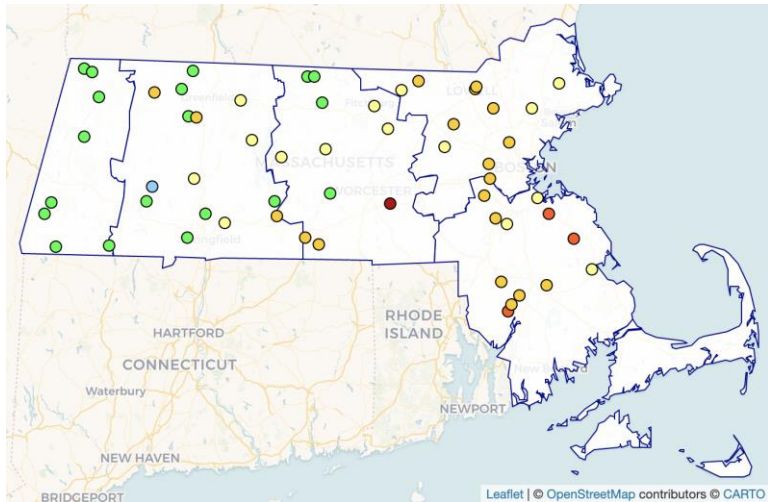
Streamflow Percentiles of Monthly Median



February

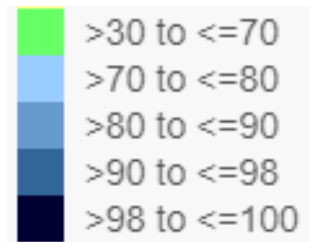
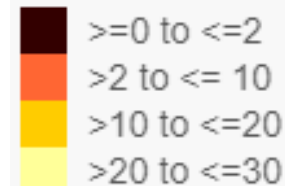


April



March

Percentiles



Streamflow Index

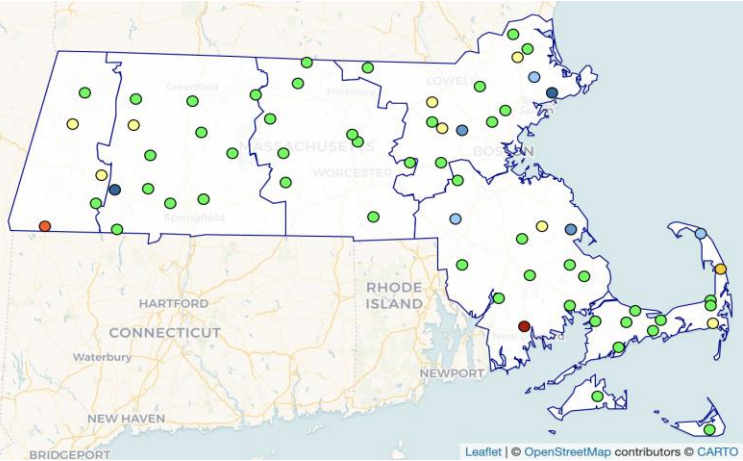
- December and January were at Index Severity Level 0
- February: Western Region at Level 1
- March: Central & Northeast at Level 1; Southeast Level 2

REGION	TOTAL GAGES REPORTING FOR APR	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 TO ≤30 PERCENTILE	>90 PERCENTILE	MEDIAN OF INDIVIDUAL GAGE PERCENTILES
WESTERN	8	0	0	5	2	0	16
CT RIVER VALLEY	15	0	4	10	1	0	16
CENTRAL	11	0	4	7	0	0	11
NORTHEAST	13	0	3	3	4	0	24
SOUTHEAST	12	0	0	4	2	0	31

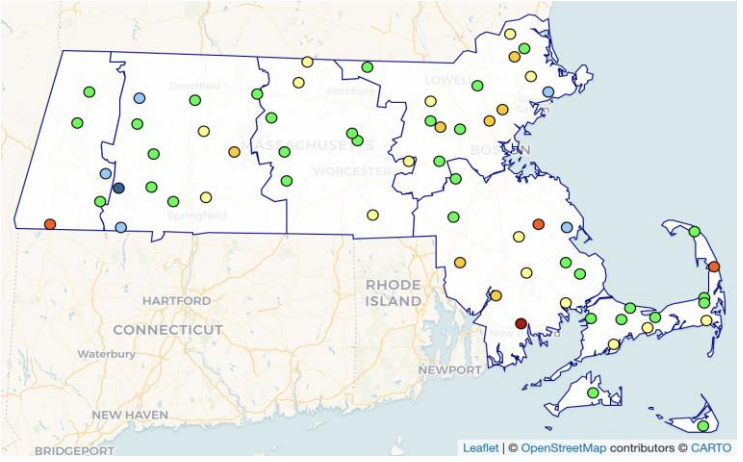
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

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.

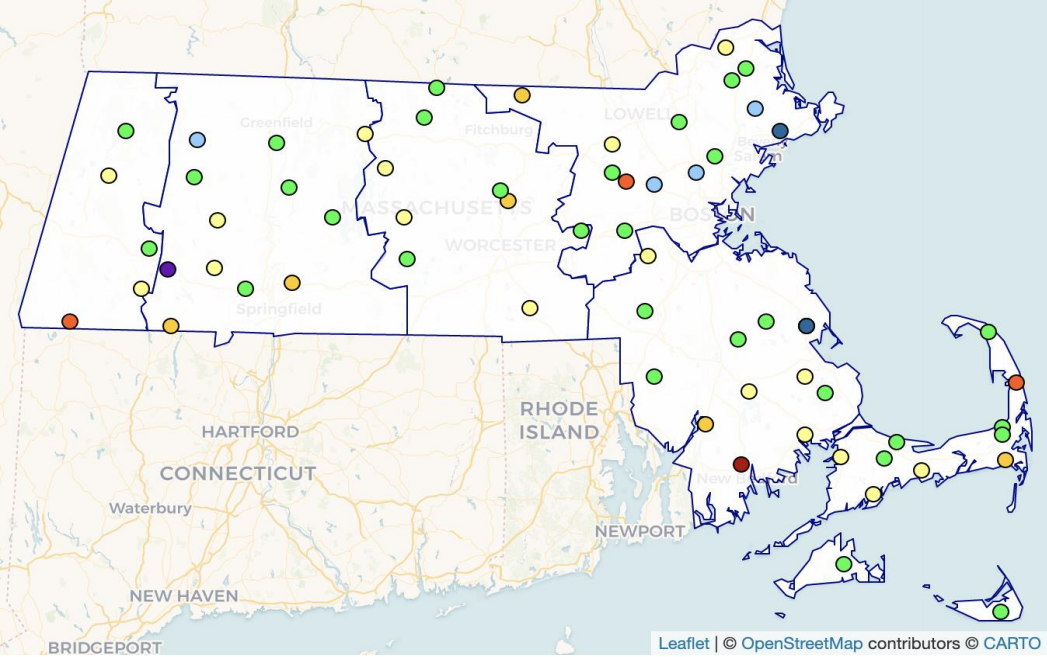
Groundwater Percentiles at the end of Month



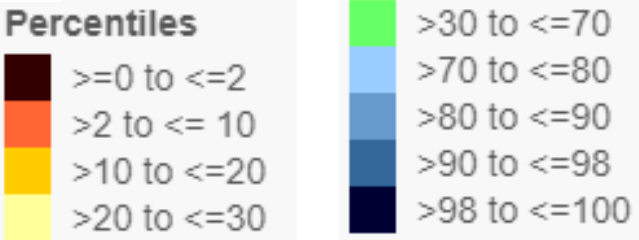
February



March



April



Groundwater Index

- December and January were at Index Severity Level 0
- February: Western Region at Level 1
- March: Southeast Region at Level 1

REGION	TOTAL WELLS REPORTING FOR APR	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 TO ≤30 PERCENTILE	>90 PERCENTILE	MEDIAN OF INDIVIDUAL WELL PERCENTILES
WESTERN	5	0	1	0	2	0	25
CT RIVER VALLEY	12	0	0	2	3	1	32
CENTRAL	9	0	0	1	3	0	36
NORTHEAST	14	0	1	1	2	1	42
SOUTHEAST	13	1	0	1	4	1	31
CAPE COD	10	0	1	0	4	0	31
ISLANDS	2	0	0	0	0	0	49

Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

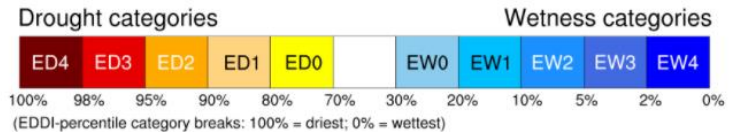
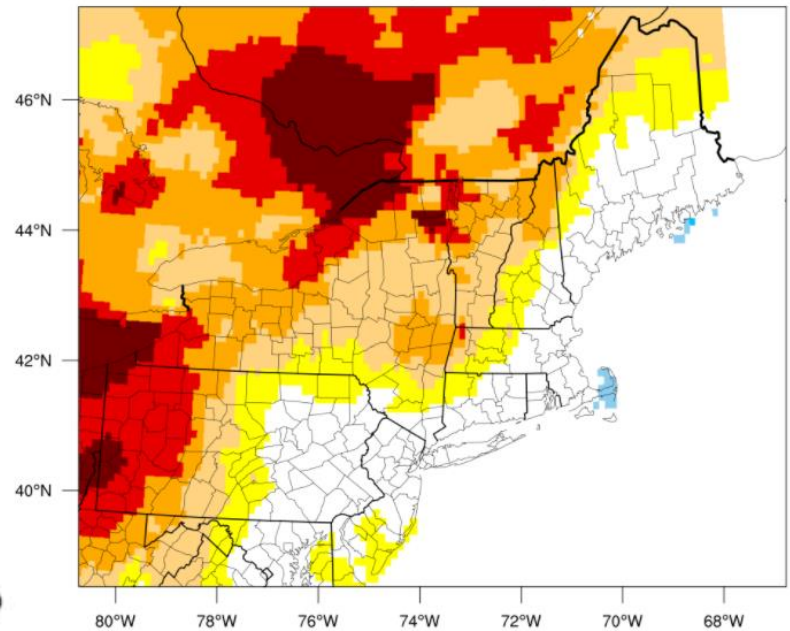
Evapotranspiration

CMI ending May 1
ISL=0

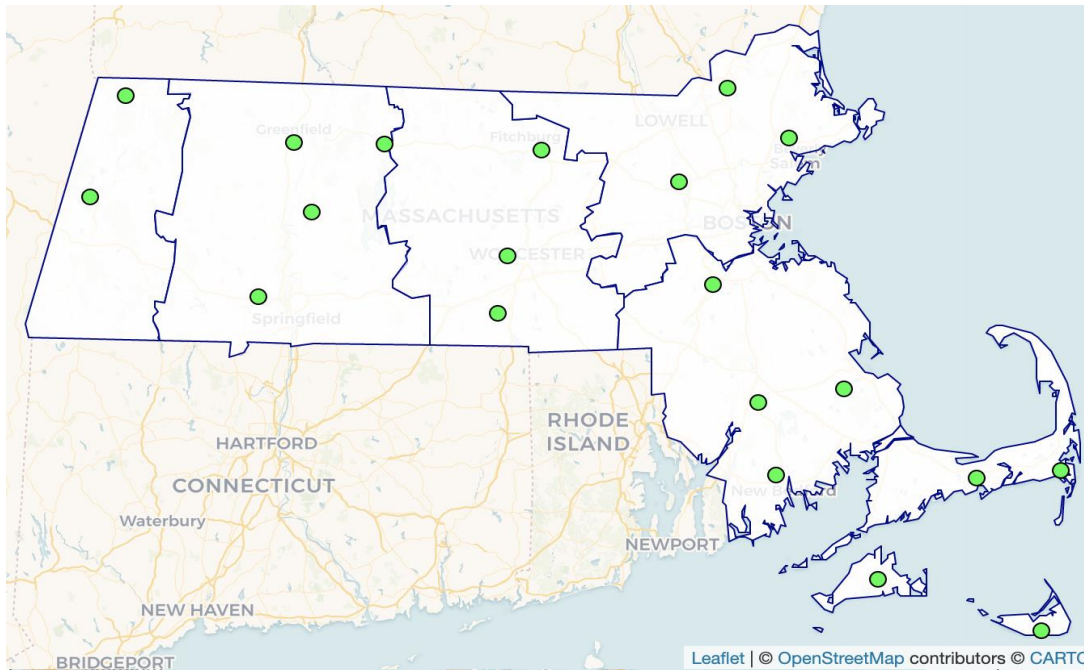


EDDI
(index under consideration to replace CMI)

1-month EDDI categories for April 20, 2021



KBDI



Point Values - KBDI Range



REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	2	0
CT RIVER VALLEY	4	4
CENTRAL	3	0
NORTHEAST	3	42
SOUTHEAST	4	23
CAPE COD	2	13
ISLANDS	2	10

Lakes & Impoundments

Drought Region	Number Reporting	Percentile/% Full	DMP Index Severity
Western	2	100% & 100% full	Level 0
CT River Valley	2	57th	Level 0
Central			
Northeast	5	70th	Level 0
Southeast	1	98% full	Level 0
Cape Cod	1	6th	Level 3
Islands	NA	NA	NA

Notes:

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



Drought Indices by Region - March 2021

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 2	Level 2	Level 2	Level 2	Level 2	Level 1	Level 1
Streamflow	Level 0	Level 0	Level 1	Level 1	Level 2	N/A	N/A
Groundwater	Level 0	Level 0	Level 0	Level 0	Level 1	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 0	Level 0	Level 2	N/A
Crop Moisture Index							
KBDI							
<i>Recommend 3/1 (4/6 meeting)</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 2</i>	<i>Level 1</i>	<i>Level 0</i>
<i>Effective 2/1 (3/10 meeting)</i>	<i>Level 1</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>

Lakes & Impoundments Index does not reflect water supply status. KBDI and CMI are not calculated outside of fire and growing seasons.

Conditions in all Major Basins were similar to their respective regions except as may be shown on following slides.

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.

Drought Indices by Region - April 2021

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 0	Level 1	Level 1	Level 0	Level 1	Level 1	Level 0
Streamflow	Level 2	Level 2	Level 2	Level 1	Level 0*	N/A	N/A
Groundwater	Level 1	Level 0	Level 0	Level 0	Level 0*	Level 0*	Level 0
Lakes/ Impoundments	Level 0	Level 0		Level 0	Level 0	Level 3	N/A
ET							
KBDI							
<i>Recommend 4/1 (5/6 meeting)</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 1</i>	<i>Level 0</i>
<i>Effective 3/1 (4/6 meeting)</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 2</i>	<i>Level 1</i>	<i>Level 0</i>

*Median of individual stations is at the 31st percentile.

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