

Hydrologic Conditions in Massachusetts for July 2024

Anne Carroll & Viki Zoltay
DCR Office of Water Resources

Drought Management Task Force

August 6, 2024

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



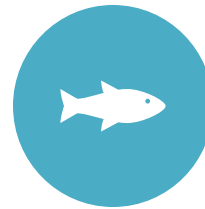
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(36)



Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

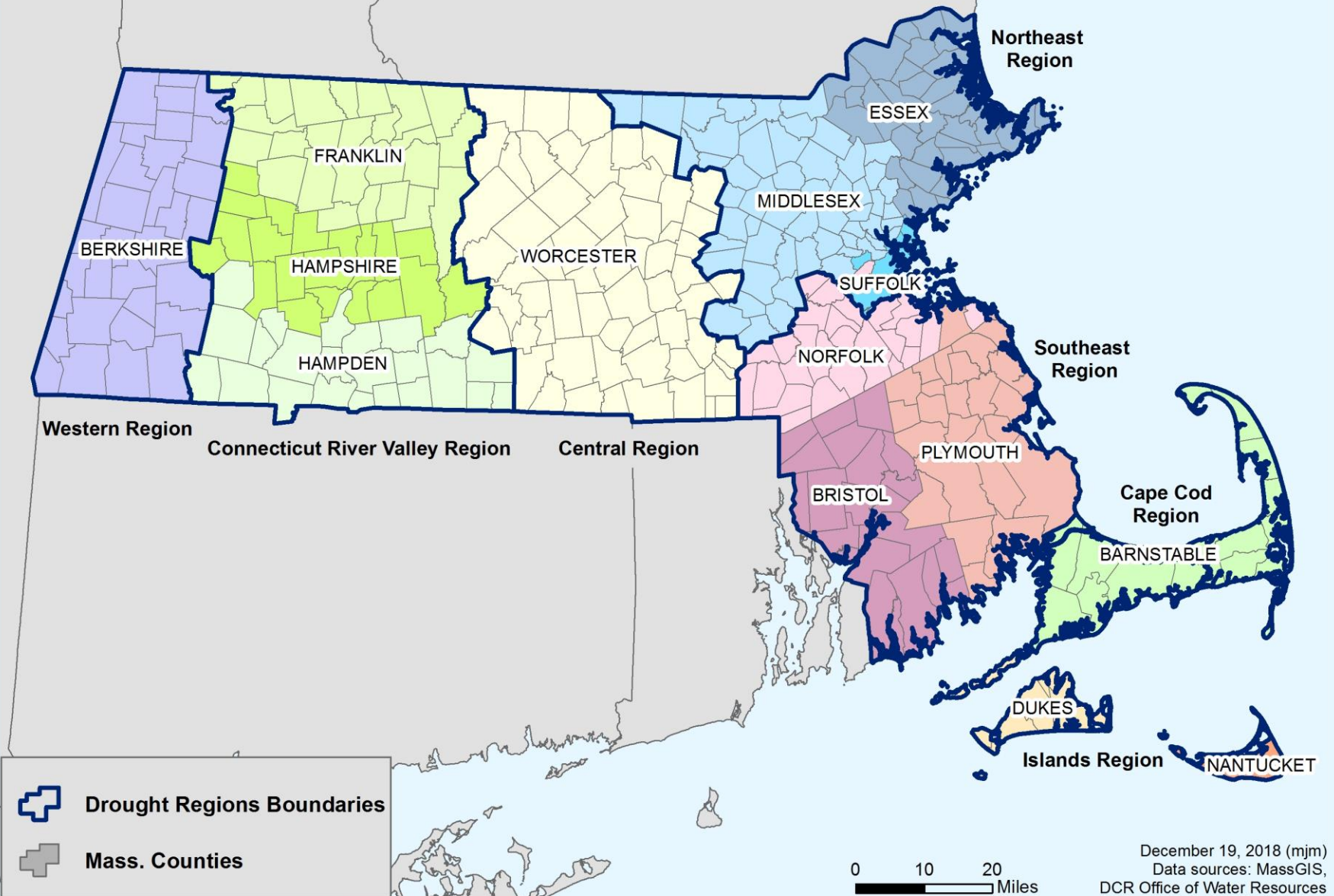
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties

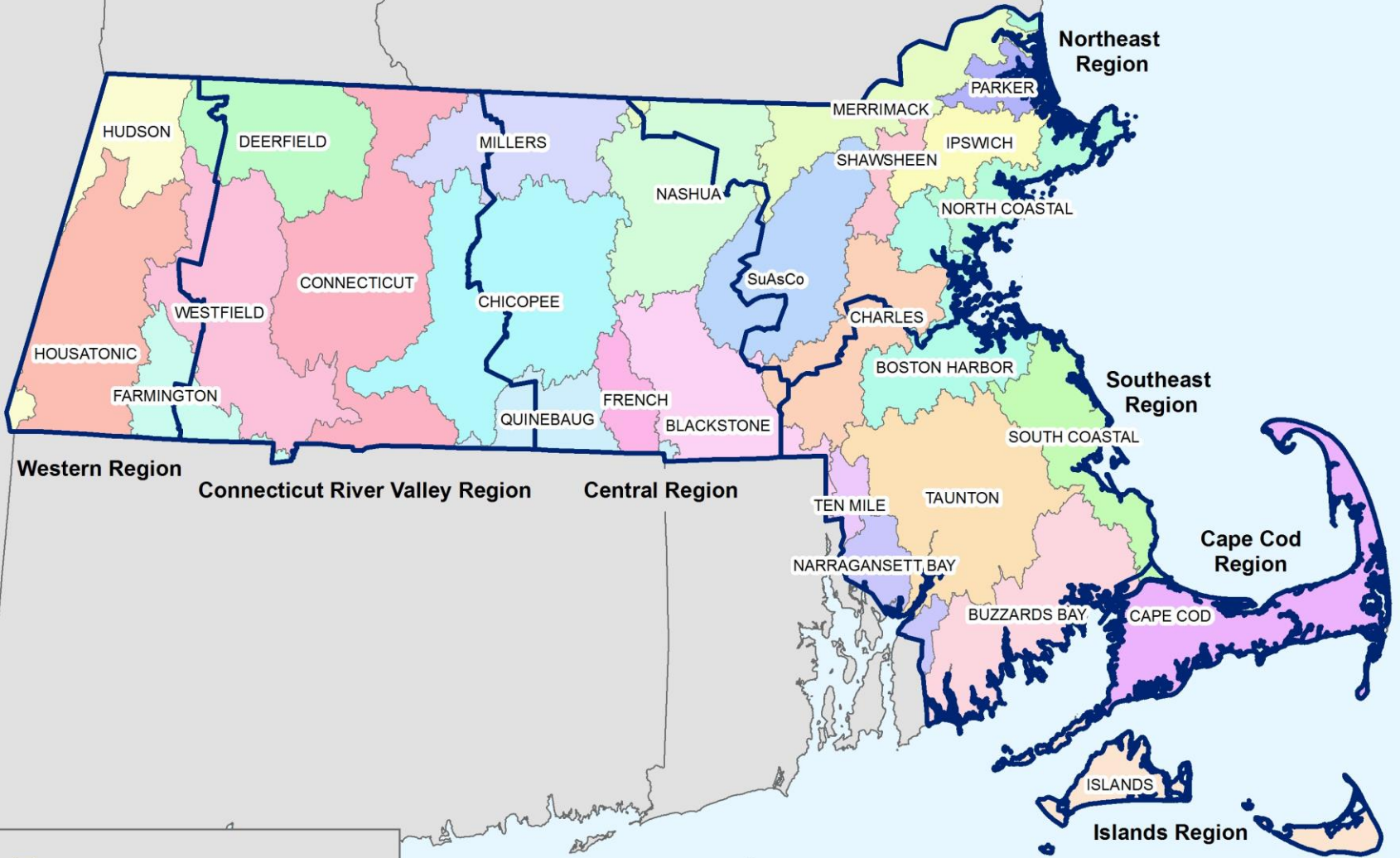


-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

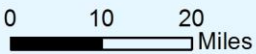
December 19, 2018 (mjm)
Data sources: MassGIS,
DCR Office of Water Resources

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

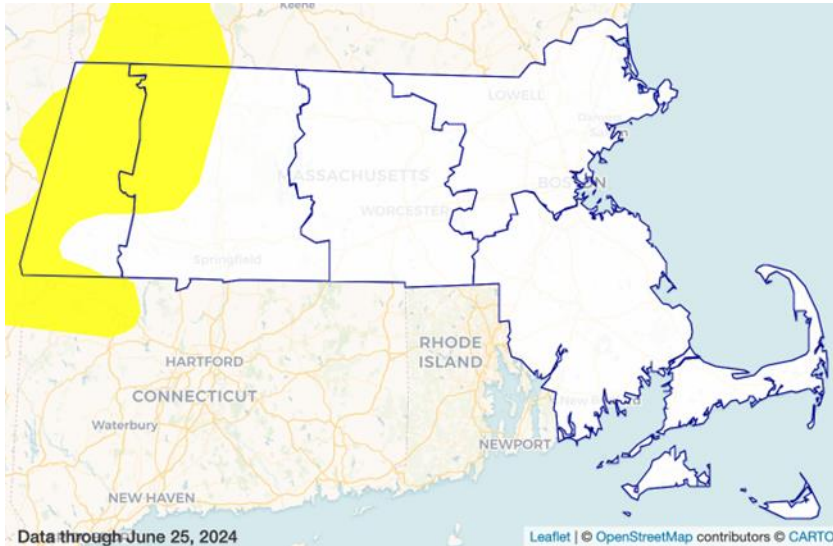


Public Health
Impacts

Recent Hydrologic History

- **Week of May 29 –through June**
 - **Western Region:** more than 1 below-normal index
- **July**
 - **Western Region:** easing of dry conditions
 - **Northeast Region and along northern border:** intensification of dry conditions

US Drought Monitor



Data through June 25 , 2024

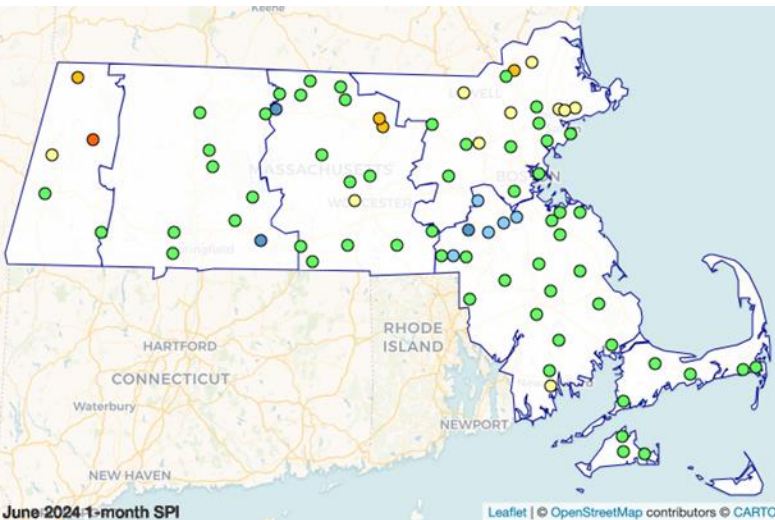
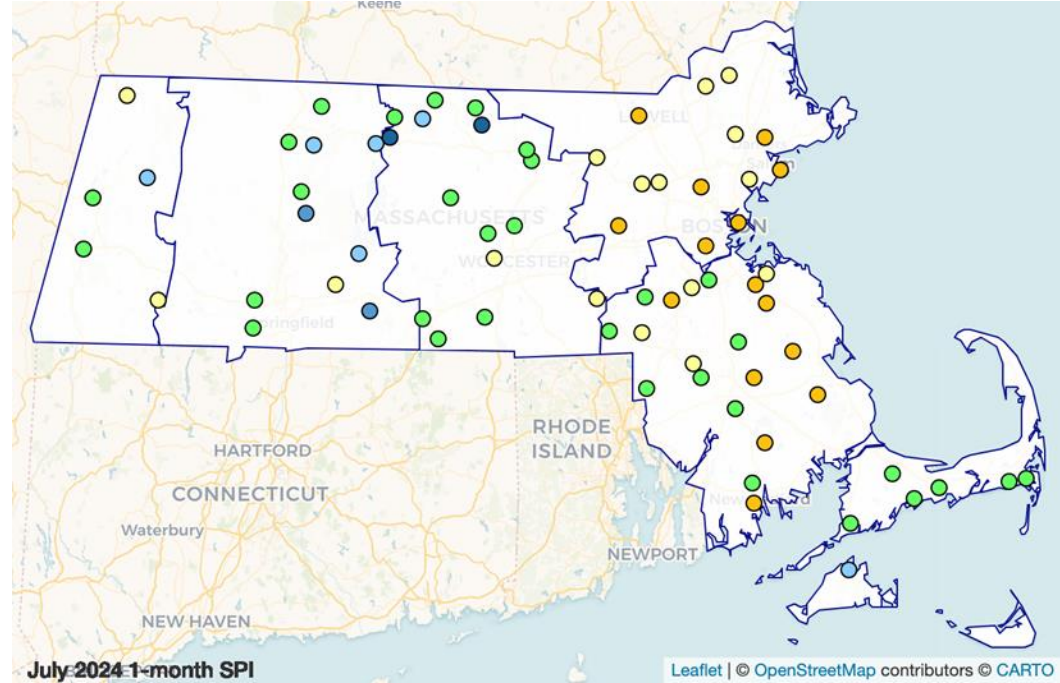
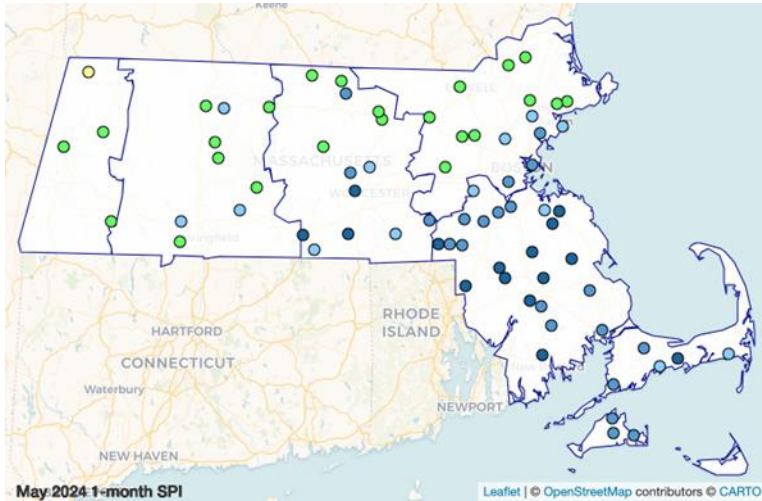


Data through July 30, 2024

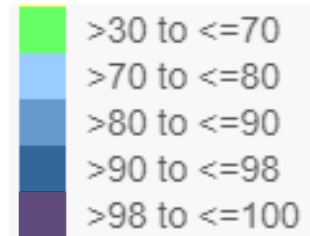
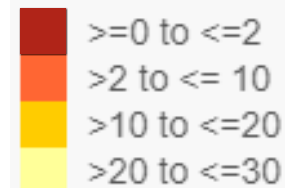
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

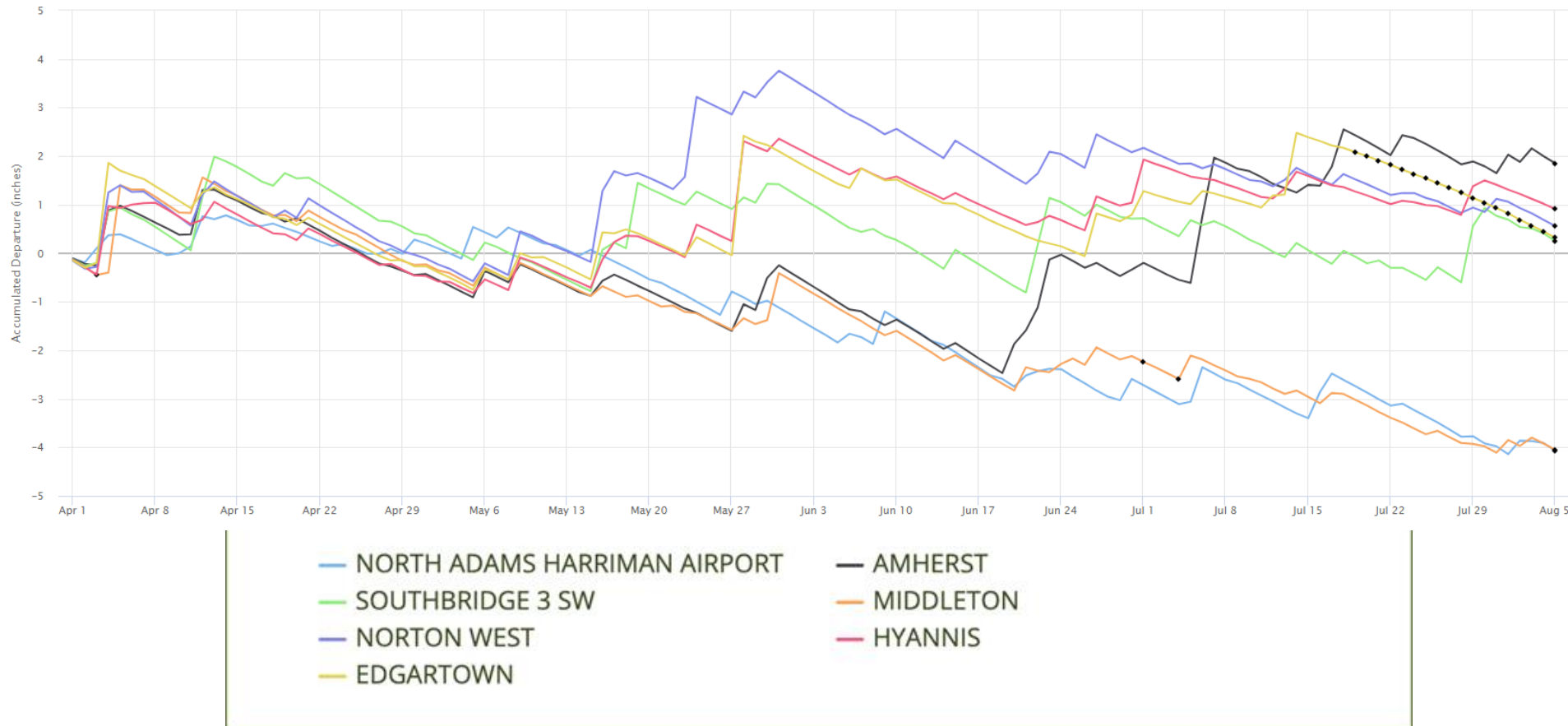
Standardized Precipitation Index



Percentiles



Accumulated Precipitation Departure from 30-Year Average in inches



- Graph does not consider starting condition's wetness/dryness
- Does not show summer heat waves with high ET
- Only 1 station per Drought Region is shown.

Standardized Precipitation Index as Percentile

REGION	NUMBER OF SITES	1-mo*	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo*
WESTERN	5	63	45	37	54	75	76	83	85
CTRV	11	70	64	61	77	87	91	95	85
CENTRAL	16	54	50	59	79	91	95	98	96
NORTHEAST	14	22	21	29	52	78	91	90	83
SOUTHEAST	20	26	37	67	85	91	93	94	87
CAPE COD	6	52	41	60	63	66	69	73	91
ISLANDS	1	73	57	78					

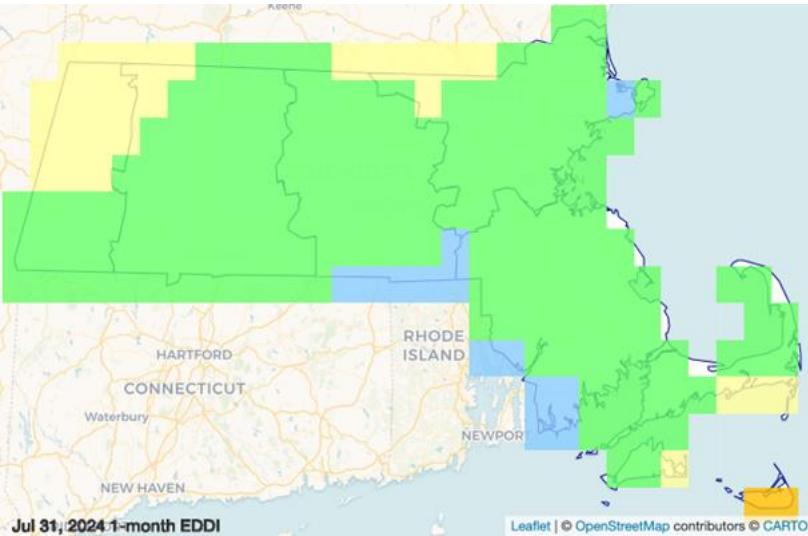
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

N/A: Not Available

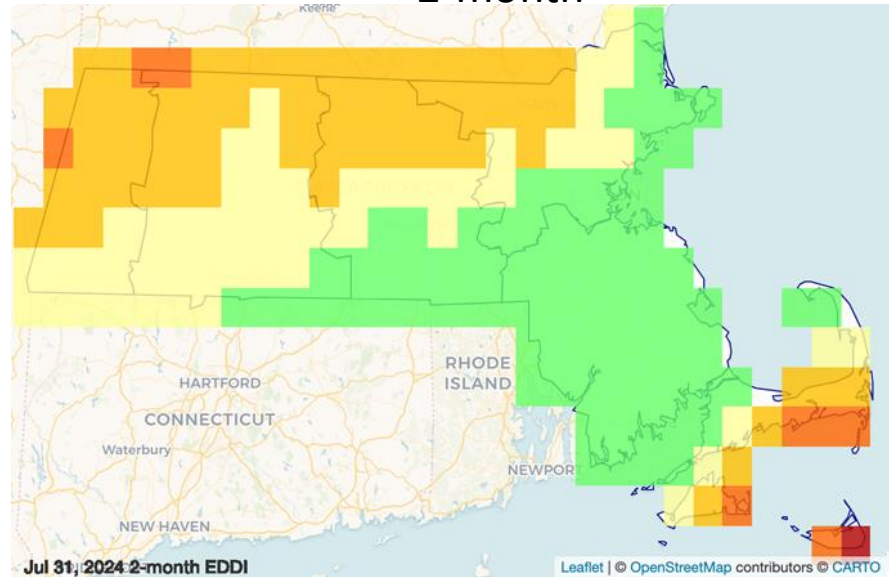
Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

1-month



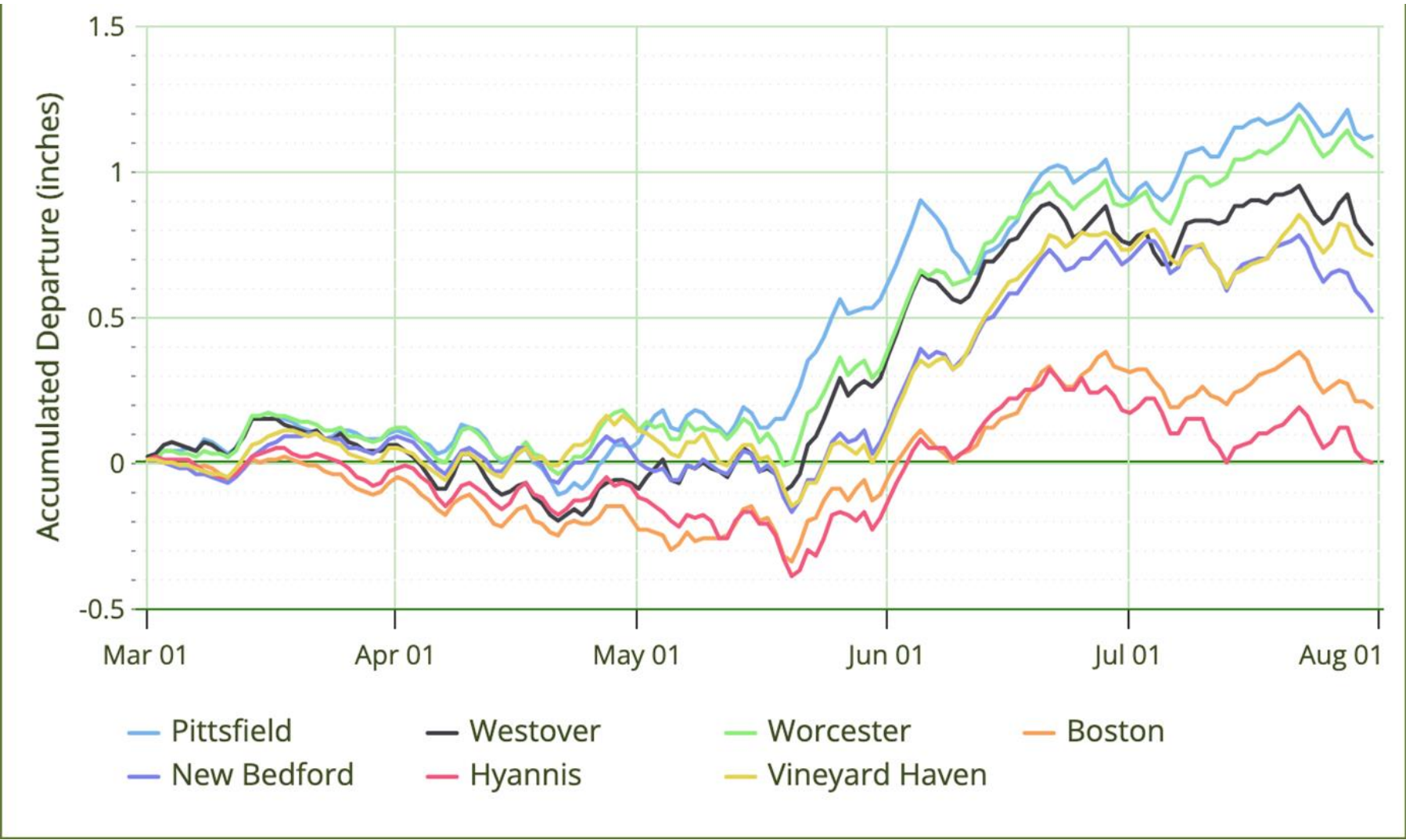
2-month



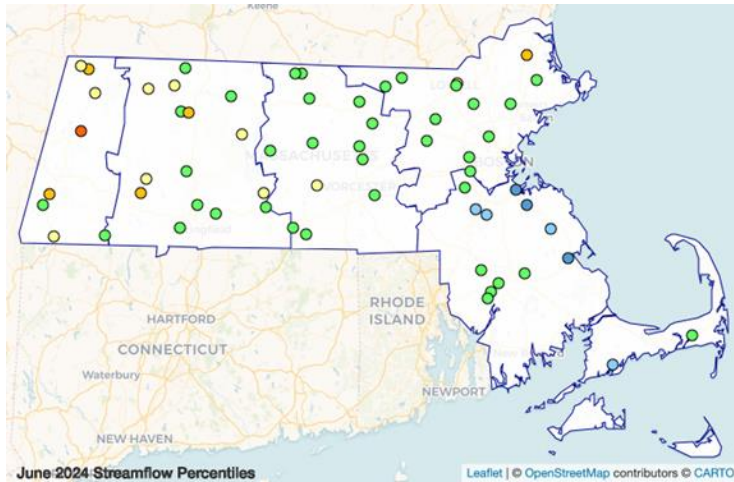
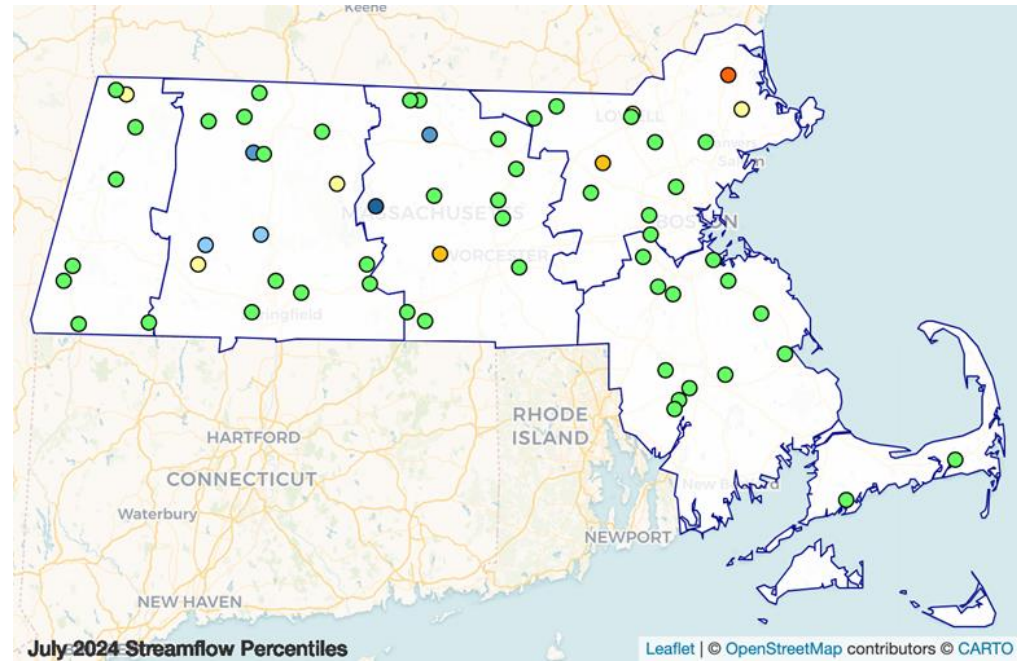
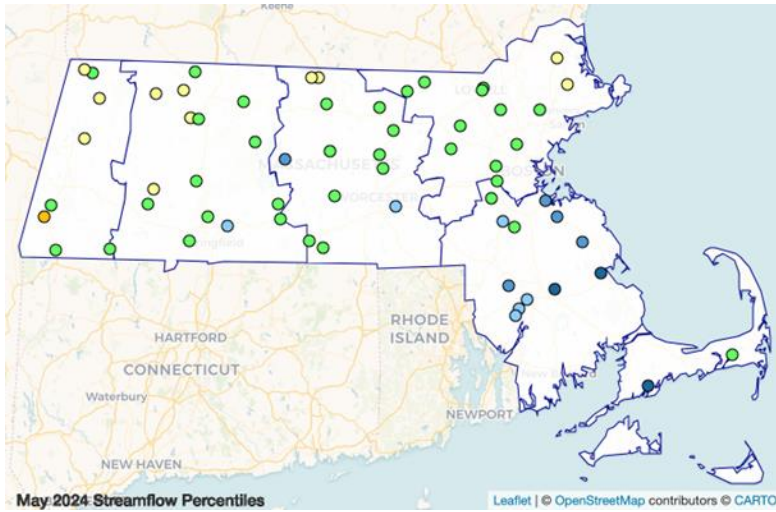
REGION	MEDIAN 2-MONTH EDDI (2024-07-31)
WESTERN	16
CTRV	21
CENTRAL	23
NORTHEAST	30
SOUTHEAST	47
CAPE COD	23
ISLANDS	16

Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

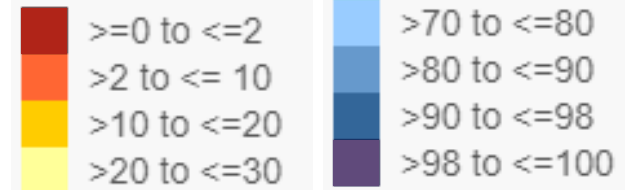
Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches



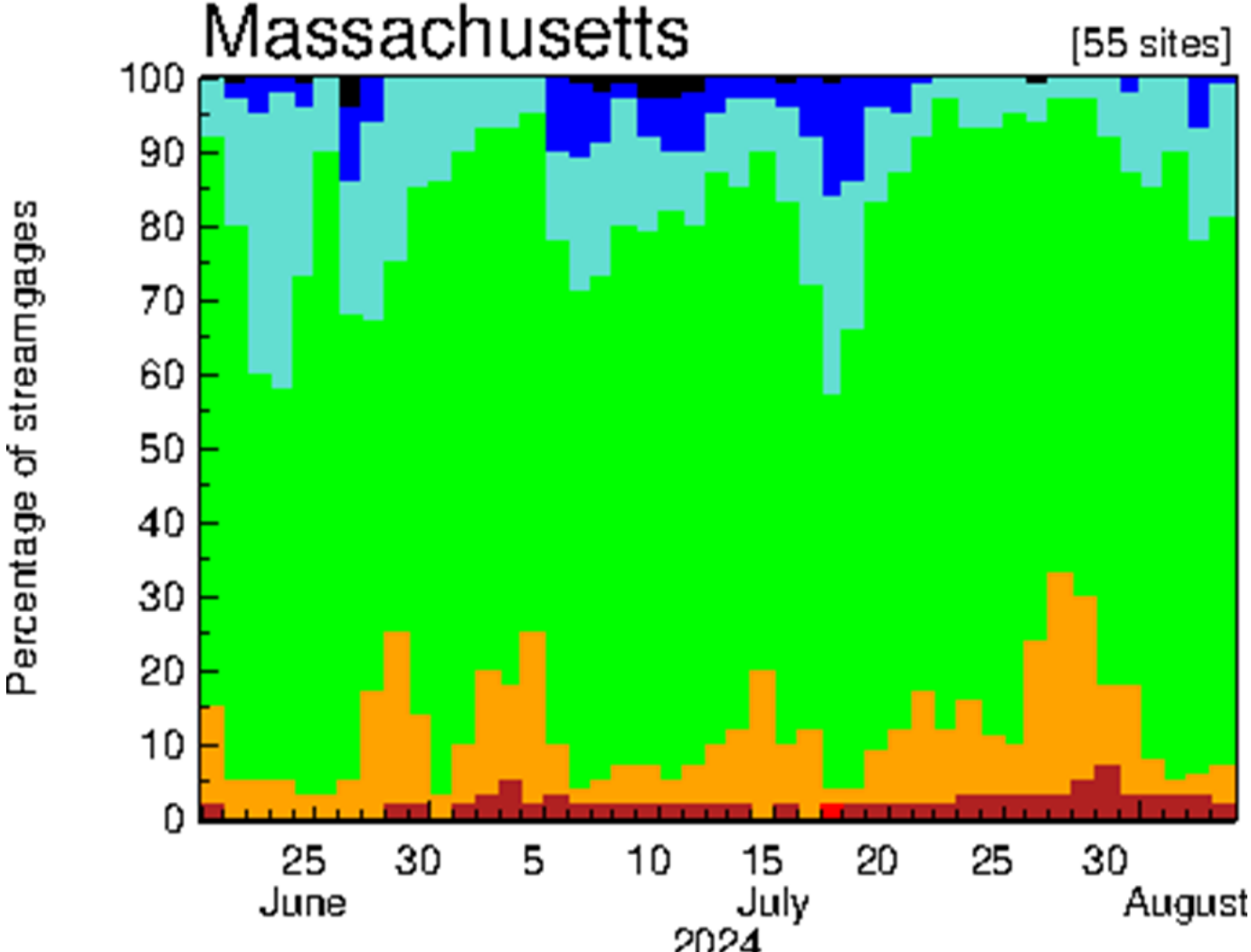
Streamflow Percentiles of Monthly Median



Percentiles



Percent of Gages at Various Percentiles



Explanation - Percentile classes

Low	<10	10-24	25-75	76-90	>90		High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal			

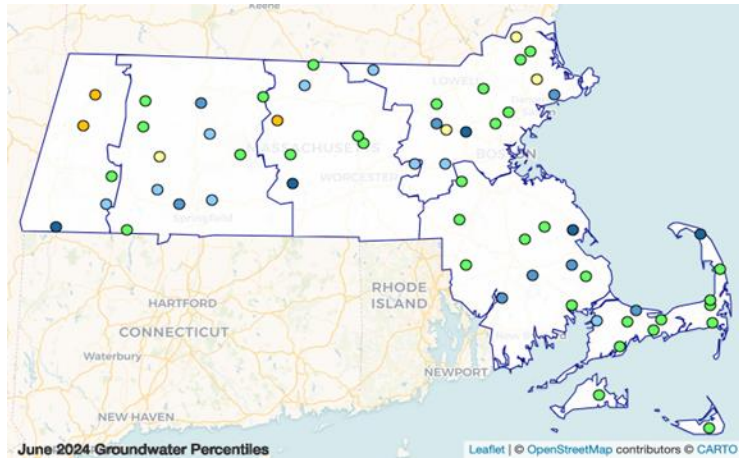
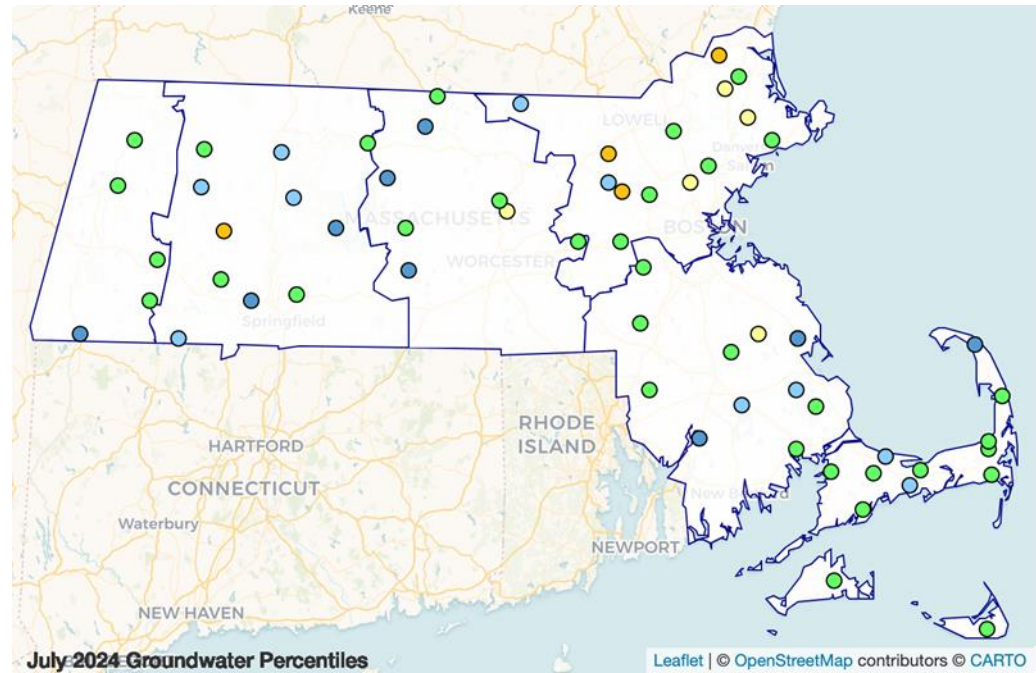
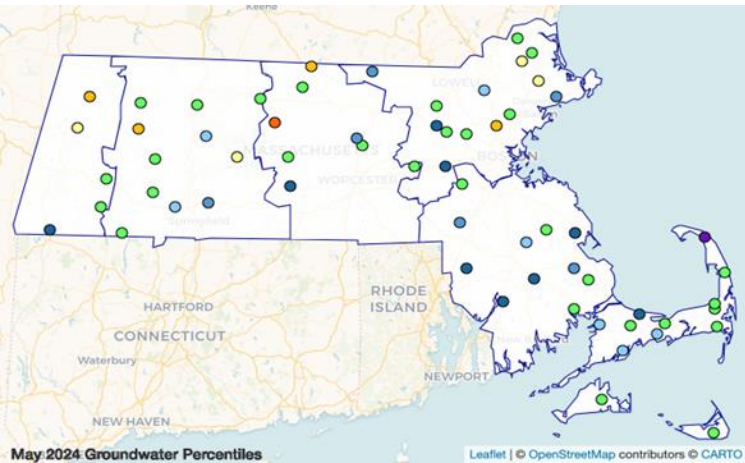
Streamflow Index

REGION	NUMBER OF GAGES REPORTING	≥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	0	1	0	34
CTRV	15	0	0	0	3	0	47
CENTRAL	13	0	0	1	0	1	51
NORTHEAST	13	0	1	1	2	0	49
SOUTHEAST	12	0	0	0	0	0	60
CAPE COD	2	0	0	0	0	0	52

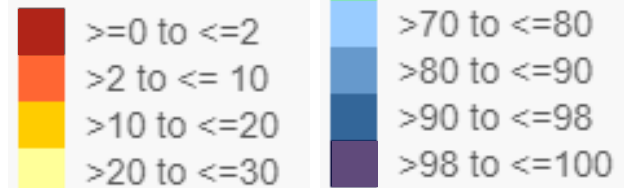
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Groundwater Percentiles



Percentiles

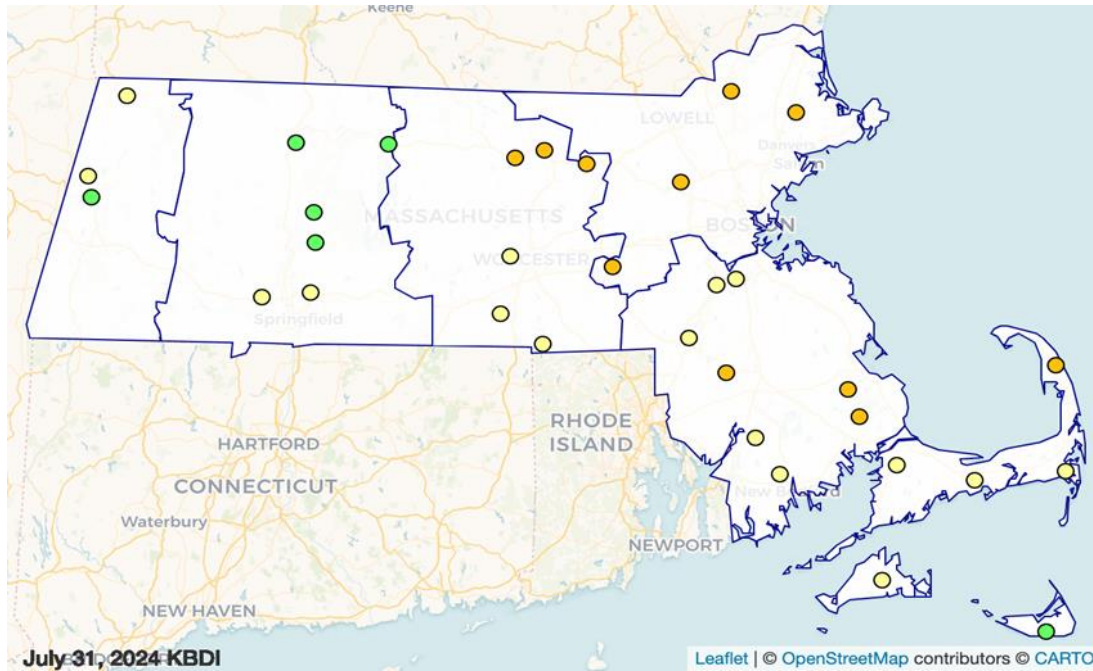


Groundwater Index

REGION	NUMBER OF WELLS REPORTING	≥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	0	0	0	0	57
CTRV	11	0	0	1	0	0	71
CENTRAL	8	0	0	0	1	0	50
NORTHEAST	14	0	0	3	3	0	43
SOUTHEAST	12	0	0	0	1	0	62
CAPE COD	11	0	0	0	0	0	64
ISLANDS	2	0	0	0	0	0	49

Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

KBDI - Top 8 inches of soil moisture



Point Values - KBDI Range

● ≥700 to ≤800	● ≥600 to <700	● ≥400 to <600	● ≥200 to <400	● ≥0 to <200
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REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	3	358
CTRV	6	309
CENTRAL	6	514
NORTHEAST	4	540
SOUTHEAST	8	472
CAPE COD	4	410
ISLANDS	2	220

Drought Levels

Level 0	Level 1	Level 2	Level 3	Level 4
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Lakes & Impoundments

REGION	NUMBER OF SITES REPORTING	MEDIAN OF INDIVIDUAL PERCENTILES OR PERCENT FULL
WESTERN	2	56th
CTRV	2	45th
CENTRAL	3	50th
NORTHEAST	4	34th
SOUTHEAST	1	65th
CAPE COD	1	57th

Notes:

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

Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Drought Indices by Region, June 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (2 mos)	22	59	63	43	83	67	75
Streamflow	24	33	52	47	71	57	N/A
Groundwater	61	62	57	53	67	65	54
Lakes/ Impoundments	17	52	47	69	89	57	N/A
ET	26	30	42	47	51	28	18
KBDI	239	251	405	402	199	250	84
<i>Declaration for June</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. This summary is provided for informational purposes. No changes in drought status are official until the Secretary of the Executive Office of Energy and Environmental Affairs makes the final drought declaration for the state after receiving a recommendation from the Drought Management Task Force. Data are preliminary and not final until all data are reported. N/A = not applicable. ID = insufficient data.

Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Drought Indices by Region, July 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mos)	37	61	59	29	67	60	78
Streamflow	34	47	51	49	60	52	N/A
Groundwater	57	71	50	43	62	64	49
Lakes/ Impoundments	56	45	50	34	65	57	N/A
ET	16	21	23	30	47	23	16
KBDI	358	309	514	540	472	410	220
Recommend (08/06 meeting)	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0

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