

Hydrologic Conditions in Massachusetts for November 2024

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DCR Office of Water Resources

Drought Management Task Force

December 5, 2024

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan

Indices

Numbers in parentheses indicate number of data points across the state



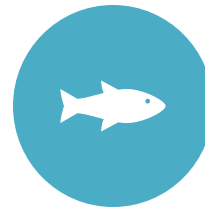
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(36)



Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

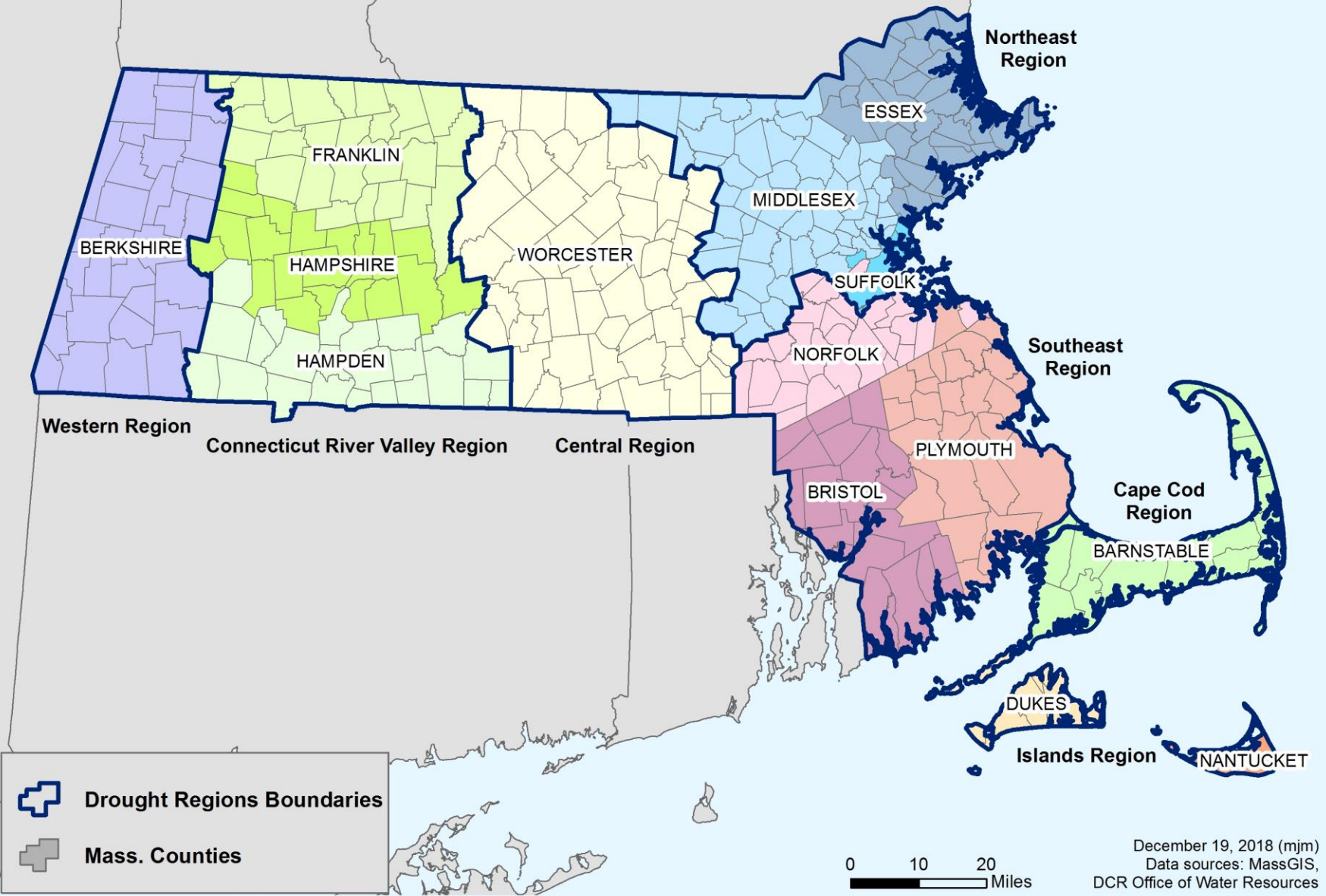
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



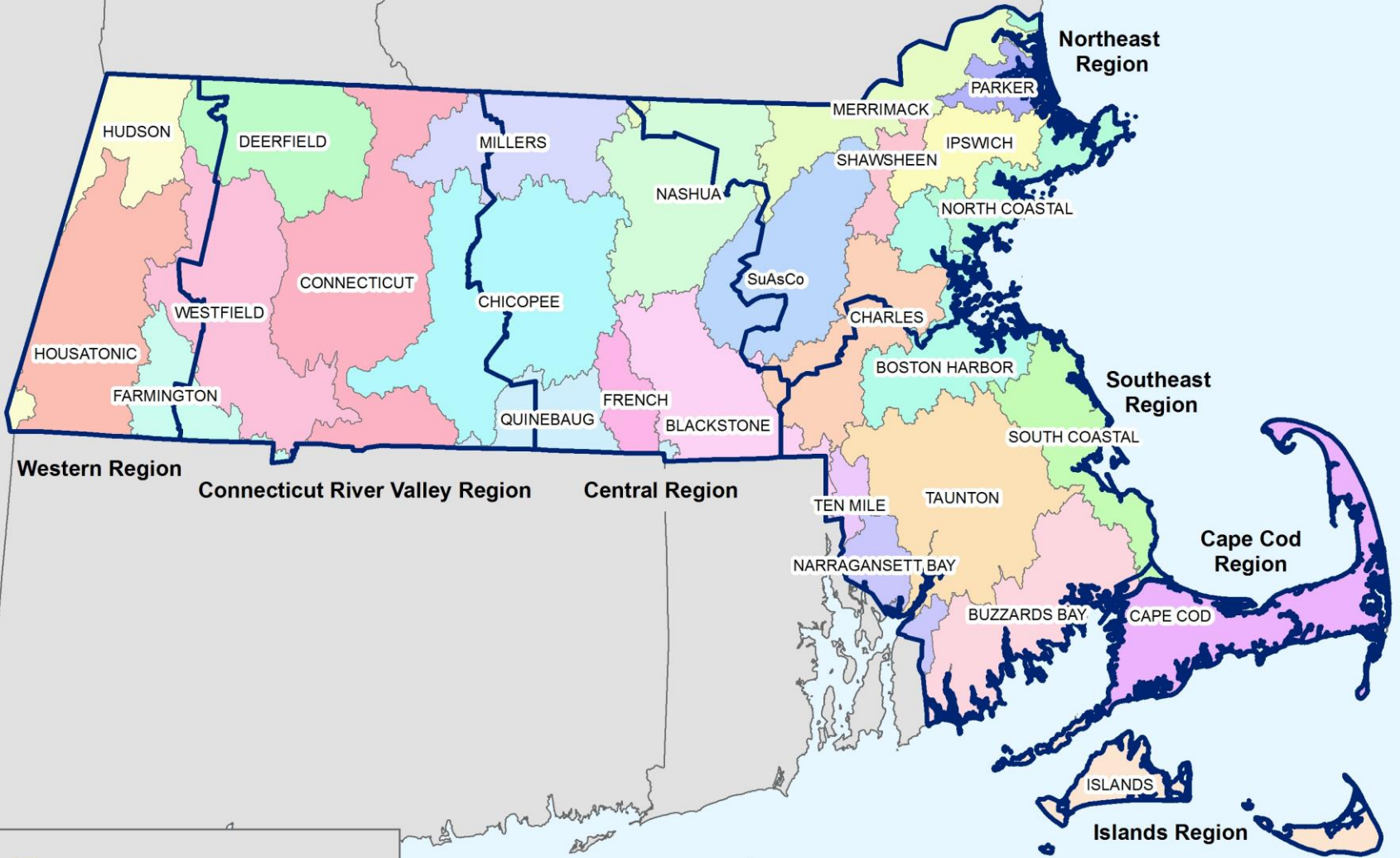
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

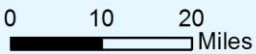


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 **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

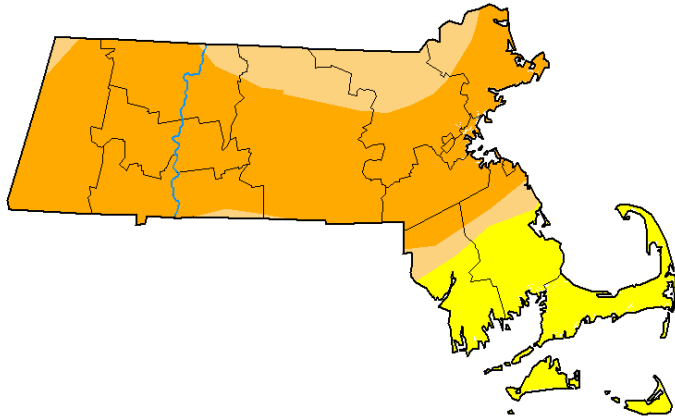


Public Health
Impacts

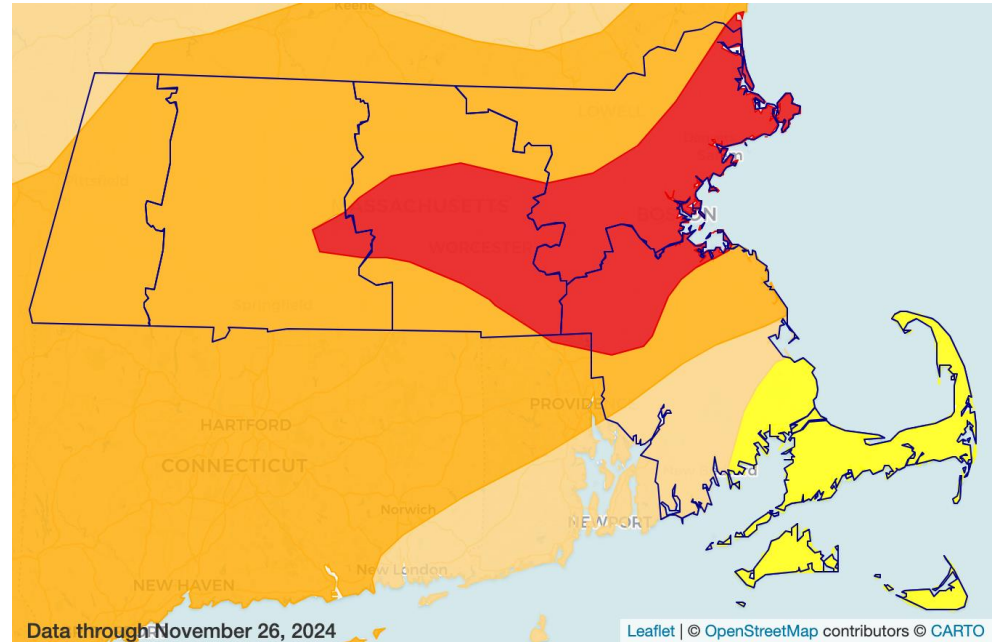
Recent Hydrologic History

- **Mid-August**
 - Precipitation deficit starts its significant decline
- **September**
 - Significantly below-normal precipitation drying out areas with mild to significant impacts to streamflow
- **October**
 - Continued lack of rain with windy and dry conditions
 - Significant to record low streamflows across most of the state
- **November**
 - Continued below-normal precipitation with some areas of normal precipitation from events late in the month

US Drought Monitor



Data through November 12 , 2024

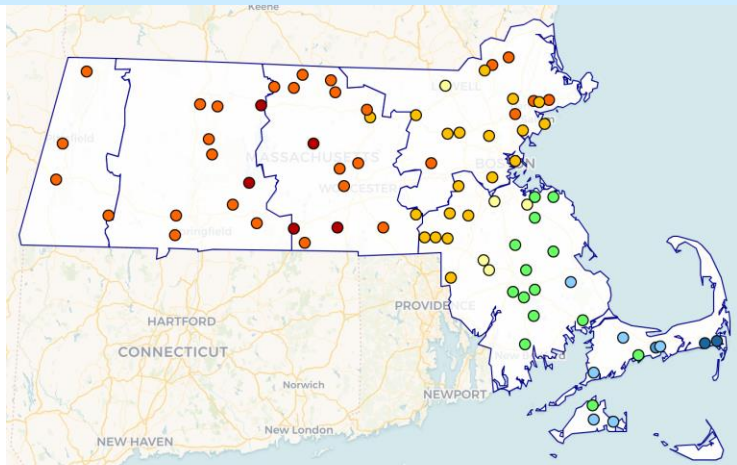


Data through November 26 , 2024

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

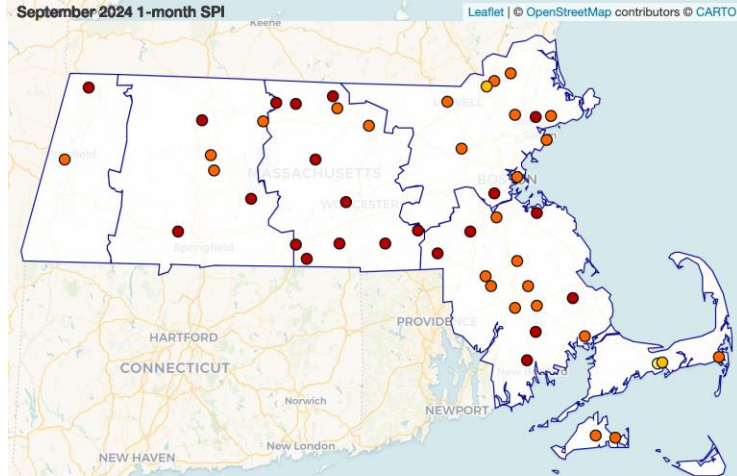
USDM		MA DMP
0	=	1
1	=	2
2,3	=	3
4	=	4

Standardized Precipitation Index



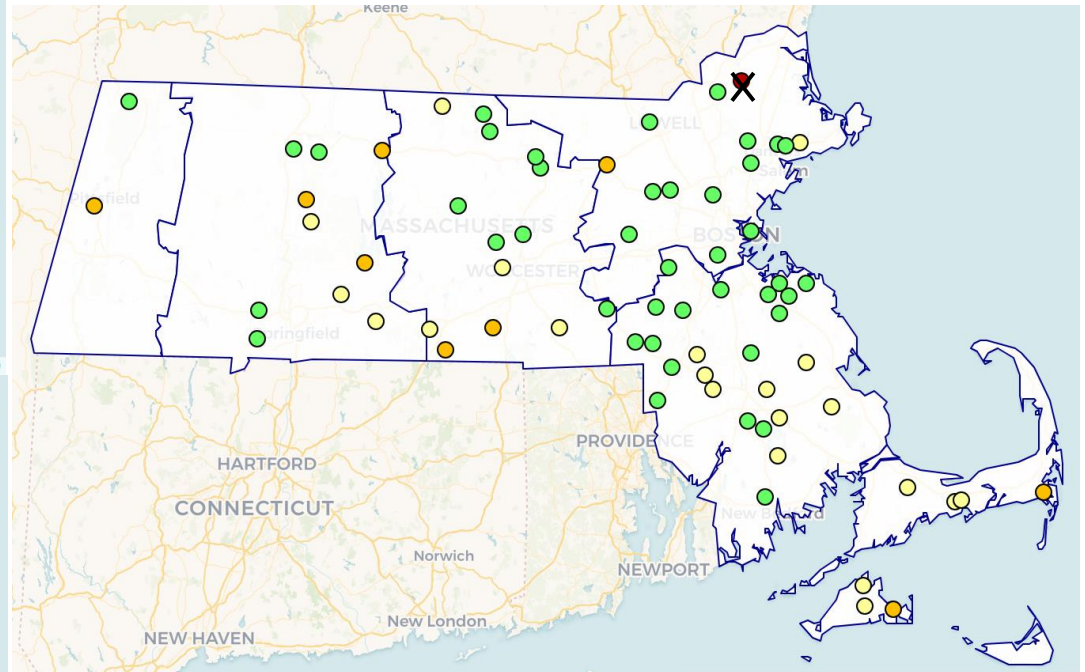
September 2024 1-month SPI

Leaflet | © OpenStreetMap contributors © CARTO



October 2024 1-month SPI

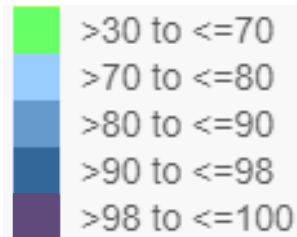
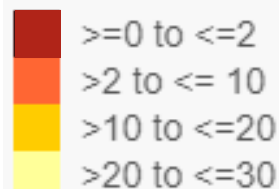
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November 2024 1-month SPI

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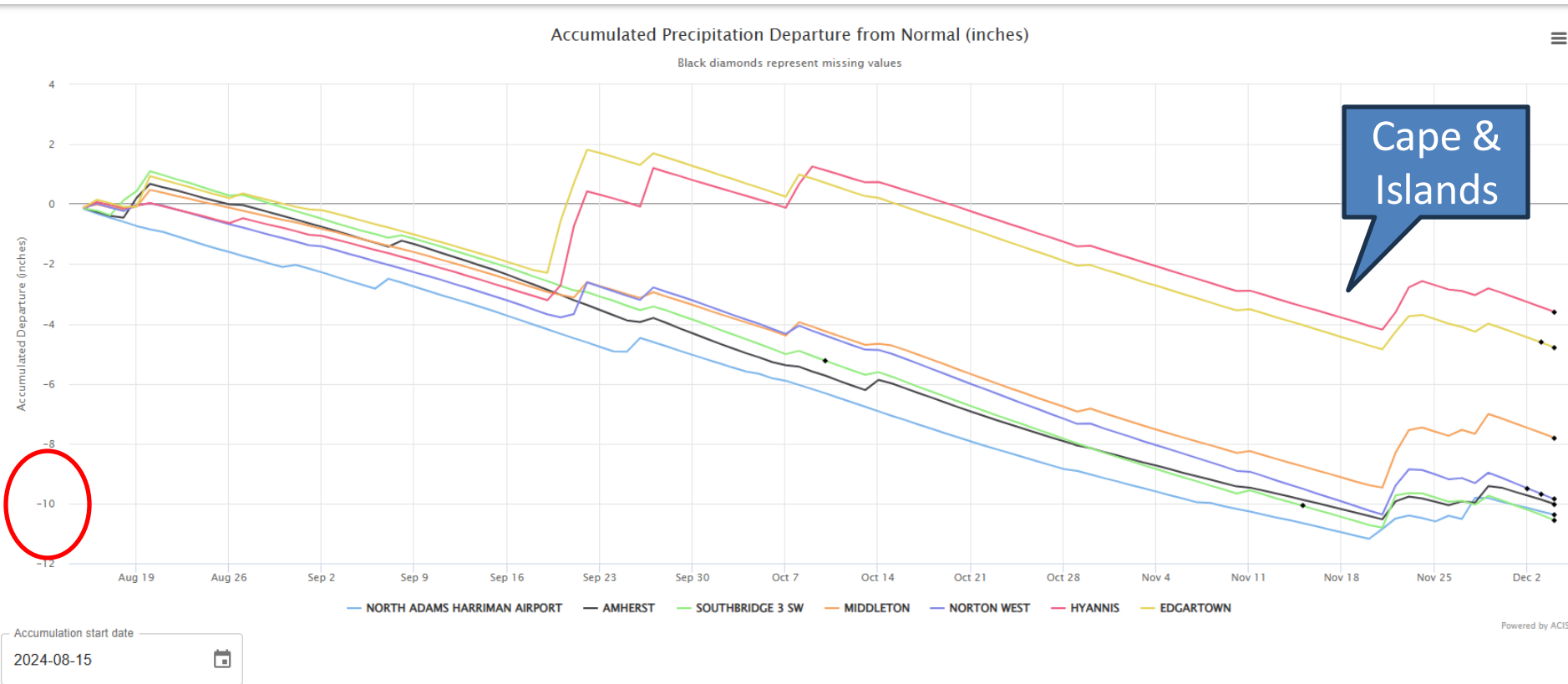
Percentiles



Index Severity Levels

Level 0	Level 1	Level 2	Level 3	Level 4
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Up to 10" of Precipitation Deficit since mid-August



Standardized Precipitation Index as Percentile

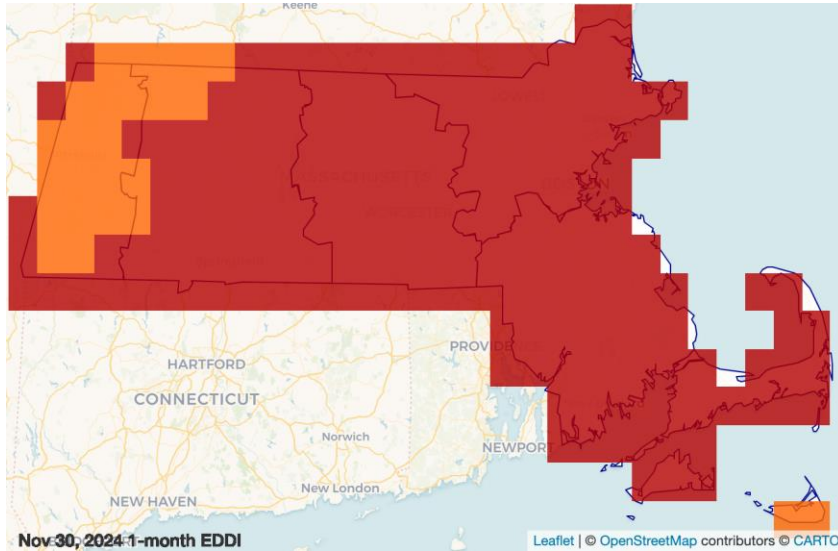
REGION	NUMBER OF SITES	1-mo*	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo
WESTERN	2	27	3	0	9	22	32	55	46
CTRV	10	26	4	1	19	45	72	89	68
CENTRAL	14	35	5	1	5	40	70	92	82
NORTHEAST	15	47	12	3	6	32	54	86	63
SOUTHEAST	25	36	6	6	9	56	76	83	65
CAPE COD	4	26	9	37	16	32	46	59	72
ISLANDS	3	21	4	16	18	38	51	38	31

* 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

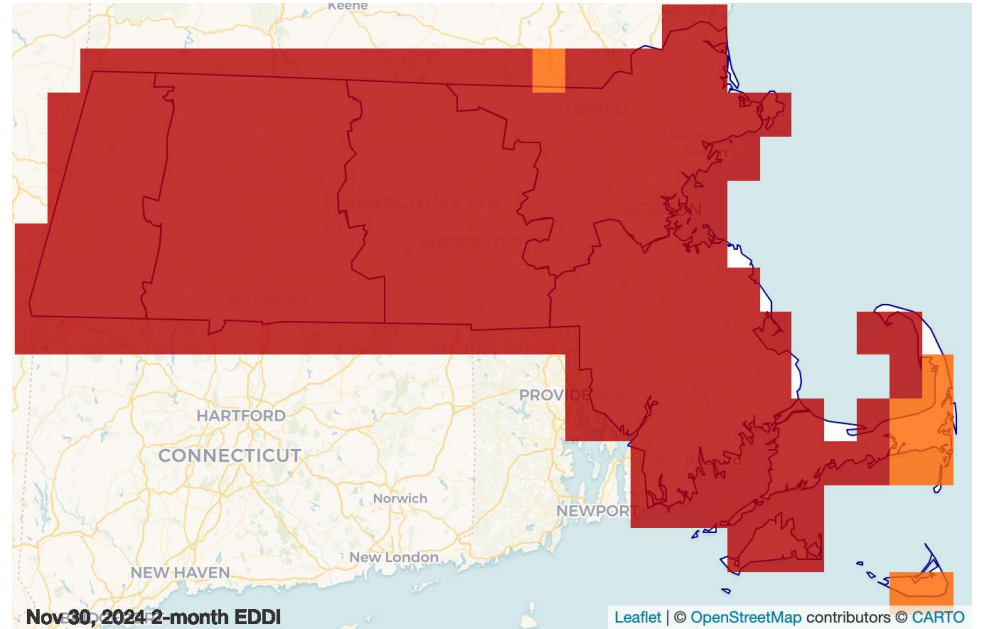
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

1-month



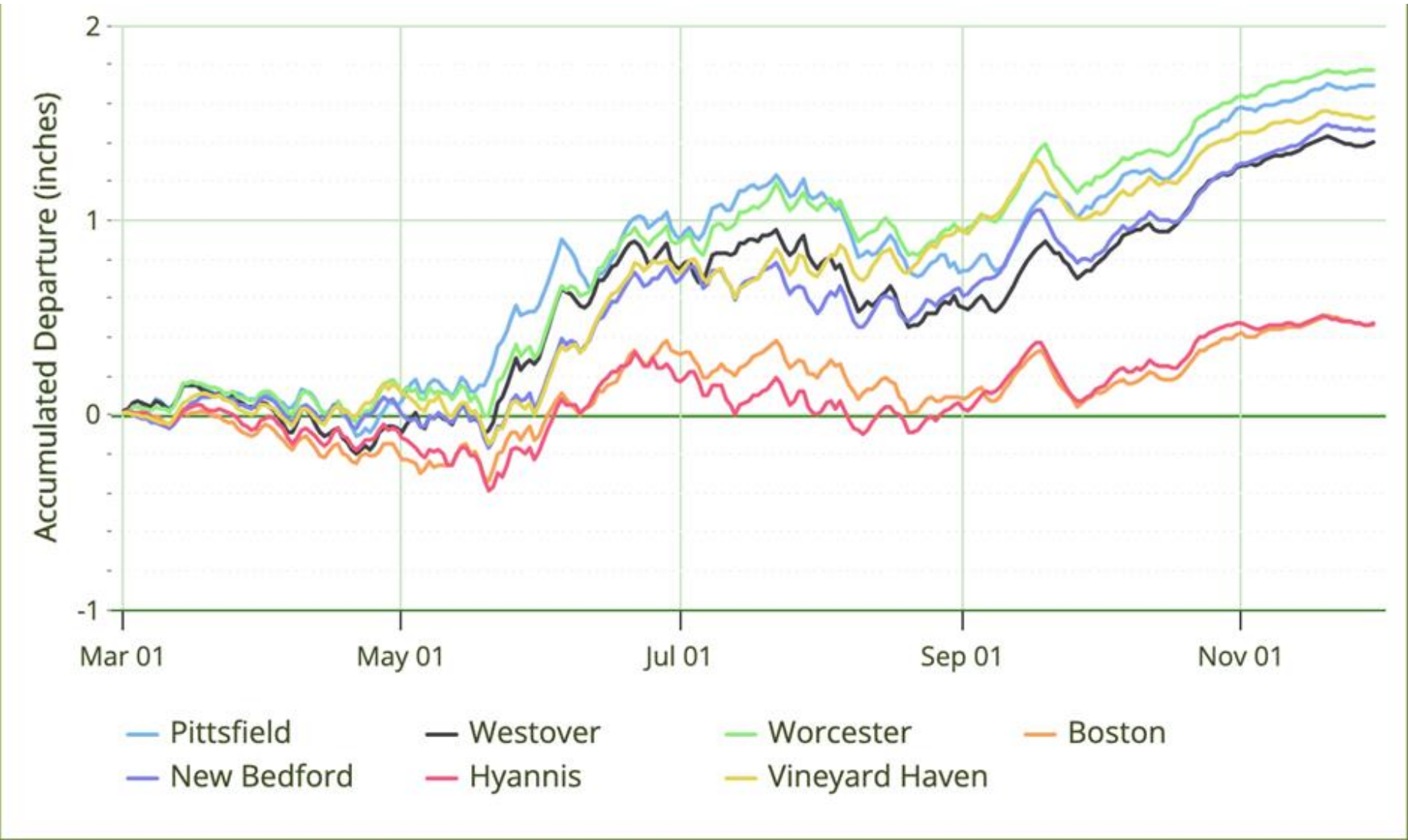
2-month



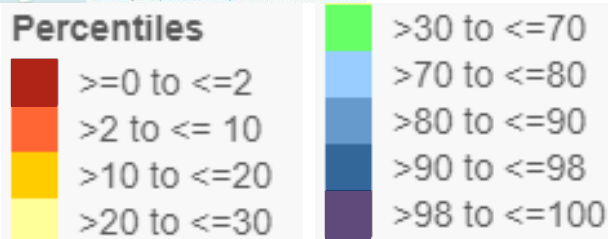
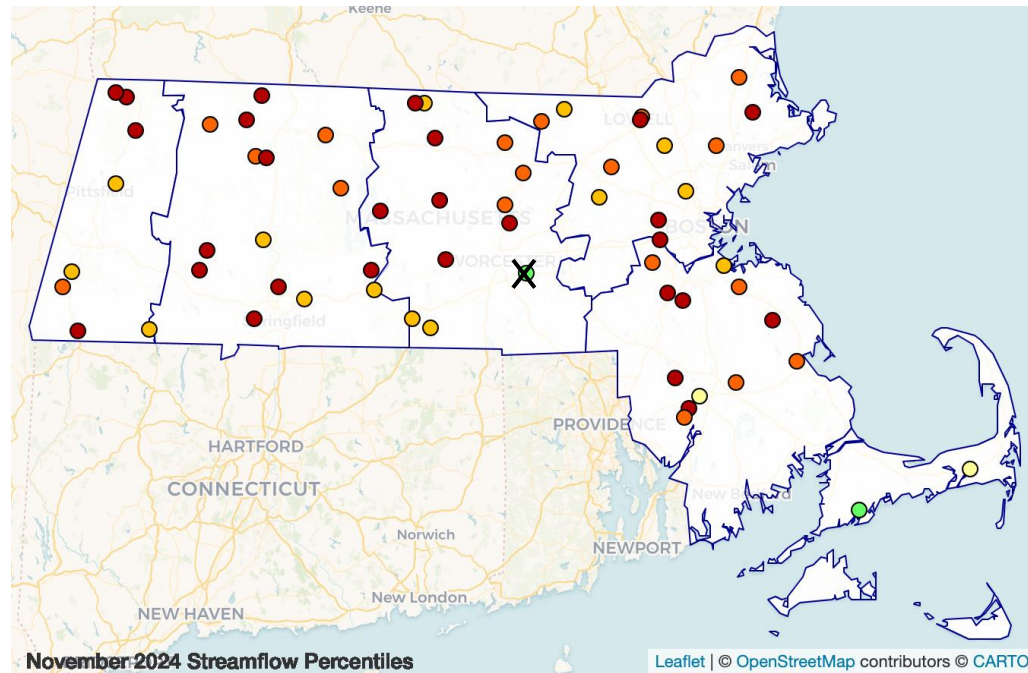
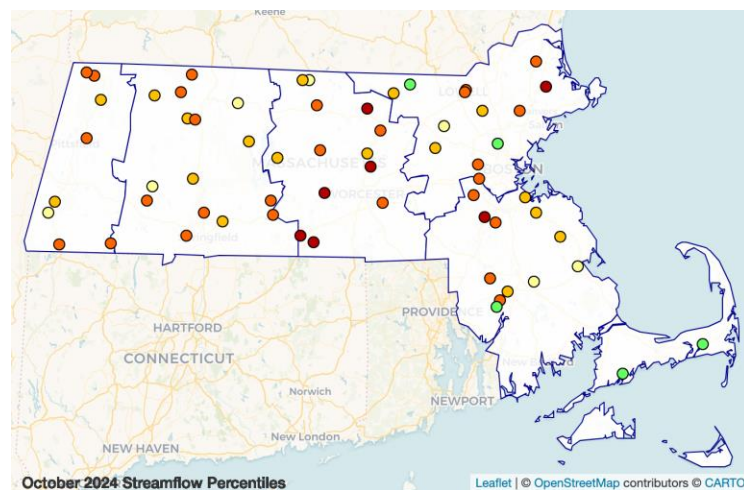
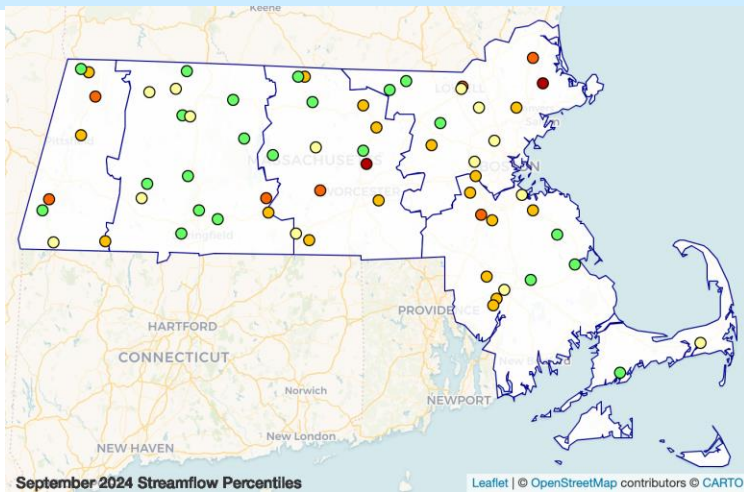
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

REGION	MEDIAN 2-MONTH EDDI (2024-11-30)
WESTERN	2
CTRV	2
CENTRAL	0
NORTHEAST	2
SOUTHEAST	2
CAPE COD	0
ISLANDS	0

Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches

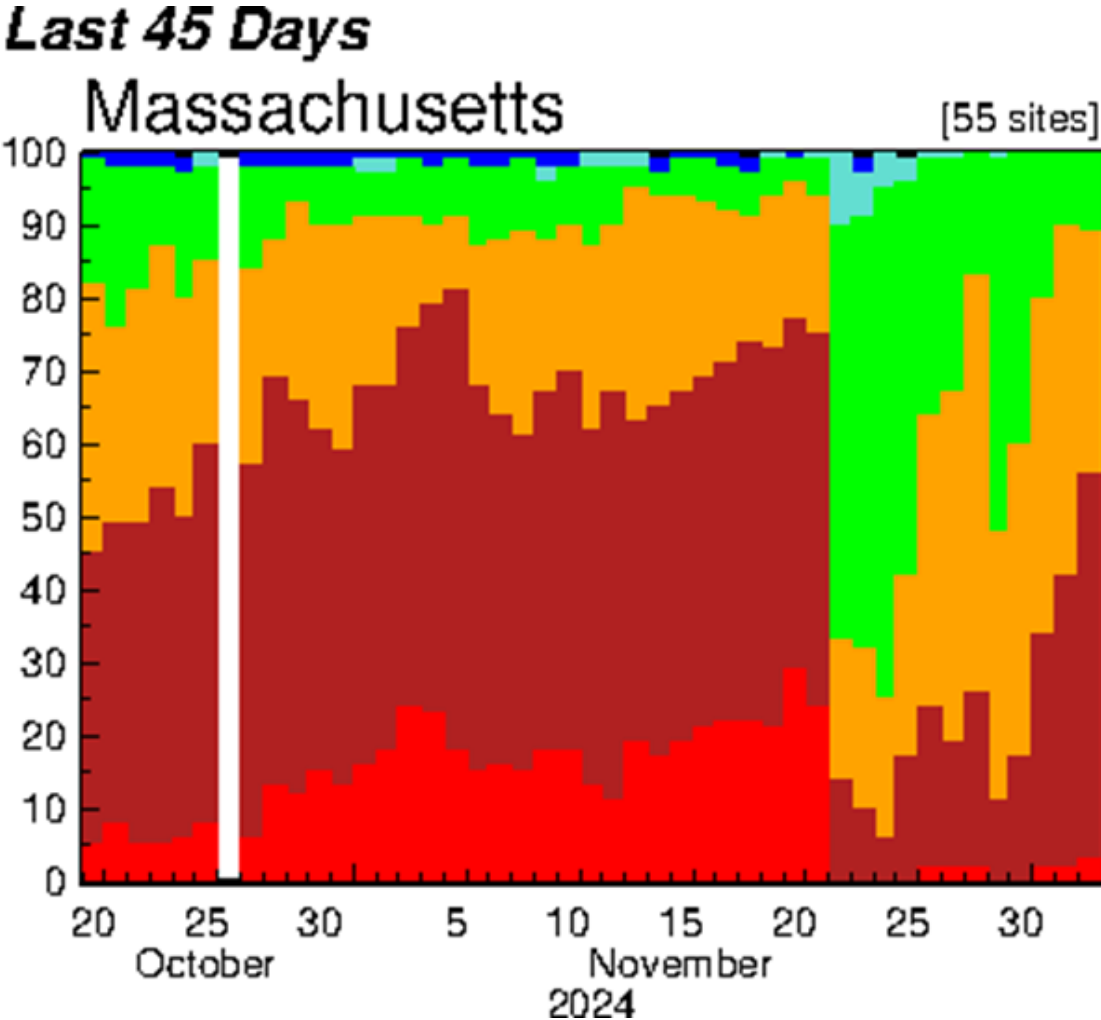


Streamflow Percentiles of Monthly Median



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

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		

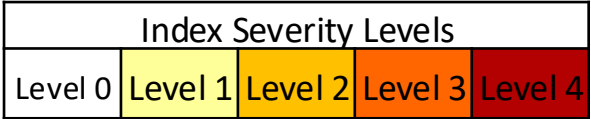
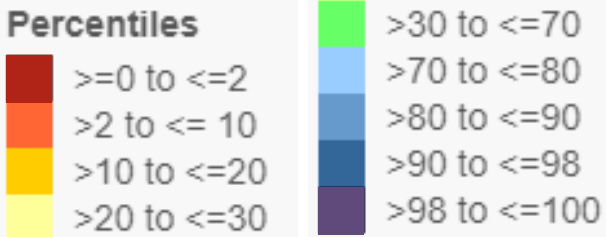
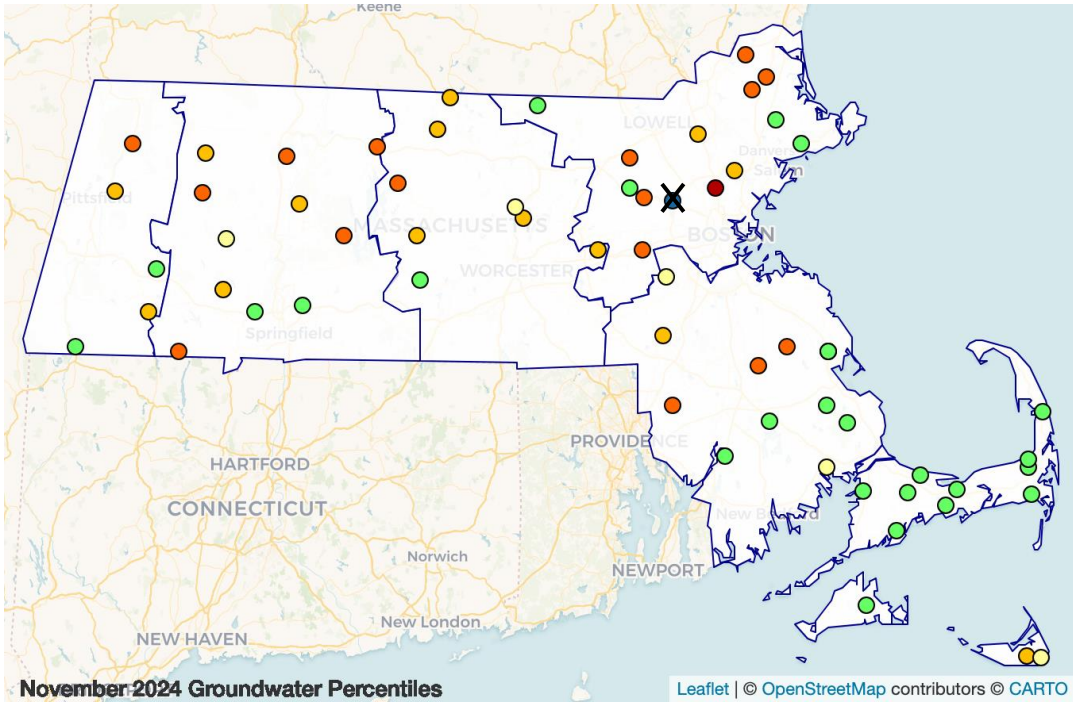
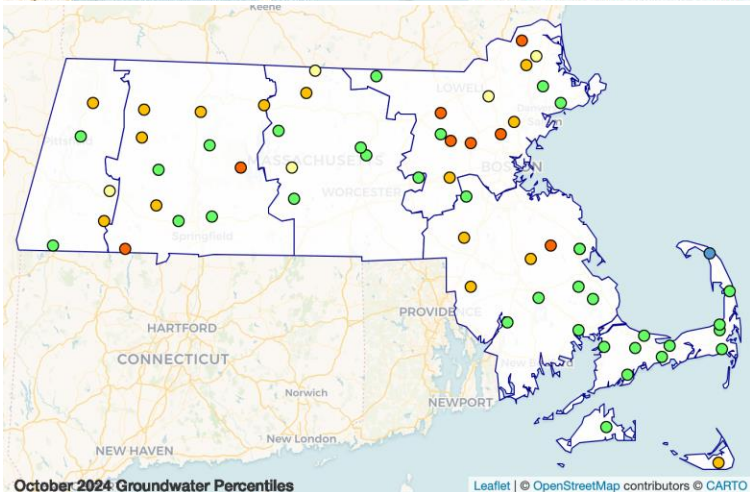
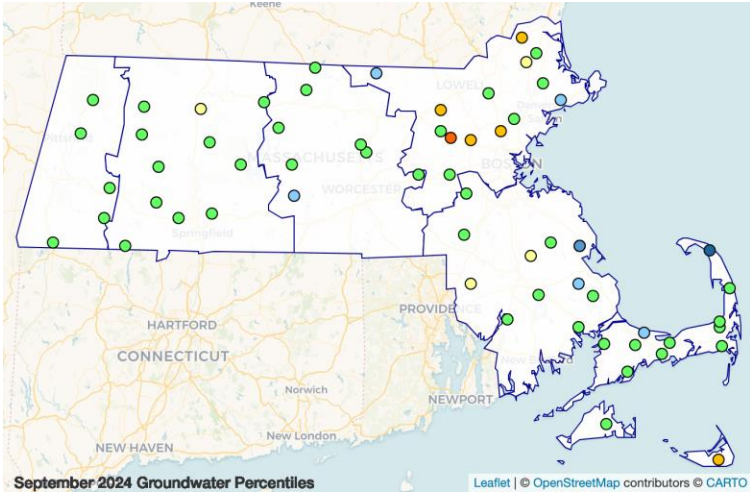
Streamflow Index

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	4	1	3	0	0	3
CTRV	15	8	4	3	0	0	2
CENTRAL	13	6	3	3	0	0	3
NORTHEAST	13	4	5	4	0	0	4
SOUTHEAST	12	5	5	1	1	0	4
CAPE COD	2	0	0	0	1	0	31

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.

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

Groundwater Percentiles

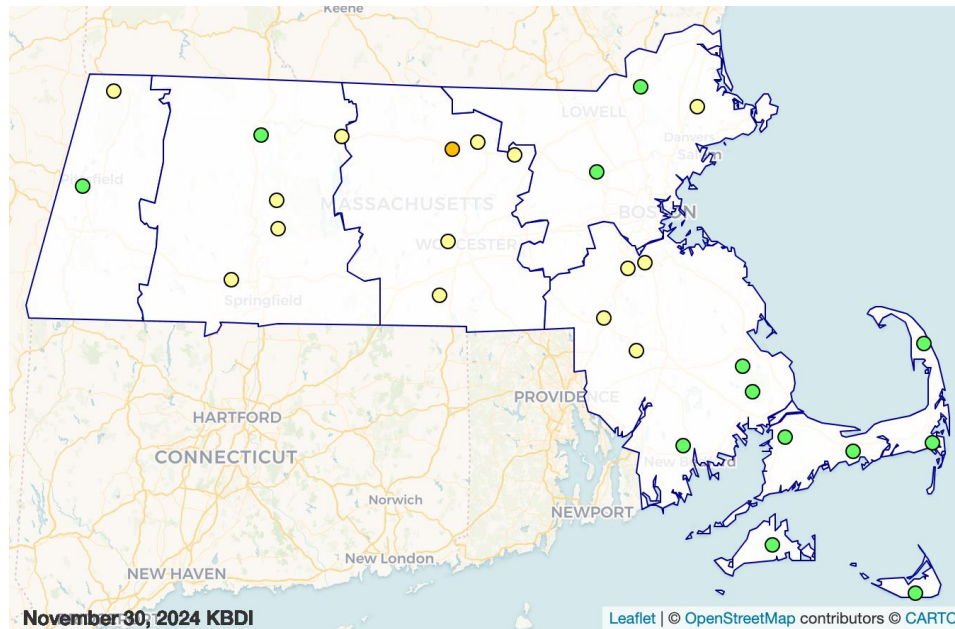


Groundwater Index

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	1	2	0	0	14
CTRV	11	0	5	3	1	0	11
CENTRAL	8	0	1	5	1	0	16
NORTHEAST	14	1	6	2	0	1	12
SOUTHEAST	12	0	3	2	2	0	24
CAPE COD	10	0	0	0	0	0	46
ISLANDS	3	0	0	1	1	0	23

Index Severity 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

REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	2	262
CTRV	5	337
CENTRAL	5	418
NORTHEAST	3	376
SOUTHEAST	7	379
CAPE COD	4	2
ISLANDS	2	98

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

Lakes & Impoundments

REGION	NUMBER OF SITES REPORTING	MEDIAN OF INDIVIDUAL PERCENTILES OR PERCENT FULL
WESTERN	2	36th
CTRV	2	28th
CENTRAL	3	17th
NORTHEAST	5	9th
SOUTHEAST	2	19th
CAPE COD	1	41st

Notes:

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

ID = insufficient data

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

Drought Indices by Region

mid-November 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (90-day)	0	0	0	1	1	29	17
Streamflow	7	4	2	6	3	44	N/A
Groundwater	11	5	18	5	33	42	34
Lakes/ Impoundments	ID	ID	ID	ID	ID	ID	N/A
ET	12	14	19	16	14	48	42
KBDI	429	506	602	602	606	178	176

<i>November 19, 2024 declaration</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 0</i>	<i>Level 0</i>
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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

end-of-November 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3-mos)	0	1	1	3	6	9 ^(2-mos)	4 ^(2-mos)
Streamflow	3	2	3	4	4	31	N/A
Groundwater	14	11	16	12	24	46	23
Lakes/ Impoundments	36	28	17	9	19	41	N/A
ET	2	2	0	2	2	0	0
KBDI	262	337	418	376	379	2	98

<i>November</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 3</i>	<i>Level 1</i>	<i>Level 1</i>
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mos=month

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