

Hydrologic Conditions in Massachusetts for mid-November 2024

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DCR Office of Water Resources

Drought Management Task Force

November 18, 2024

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



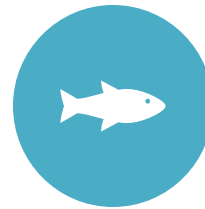
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(36)



Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

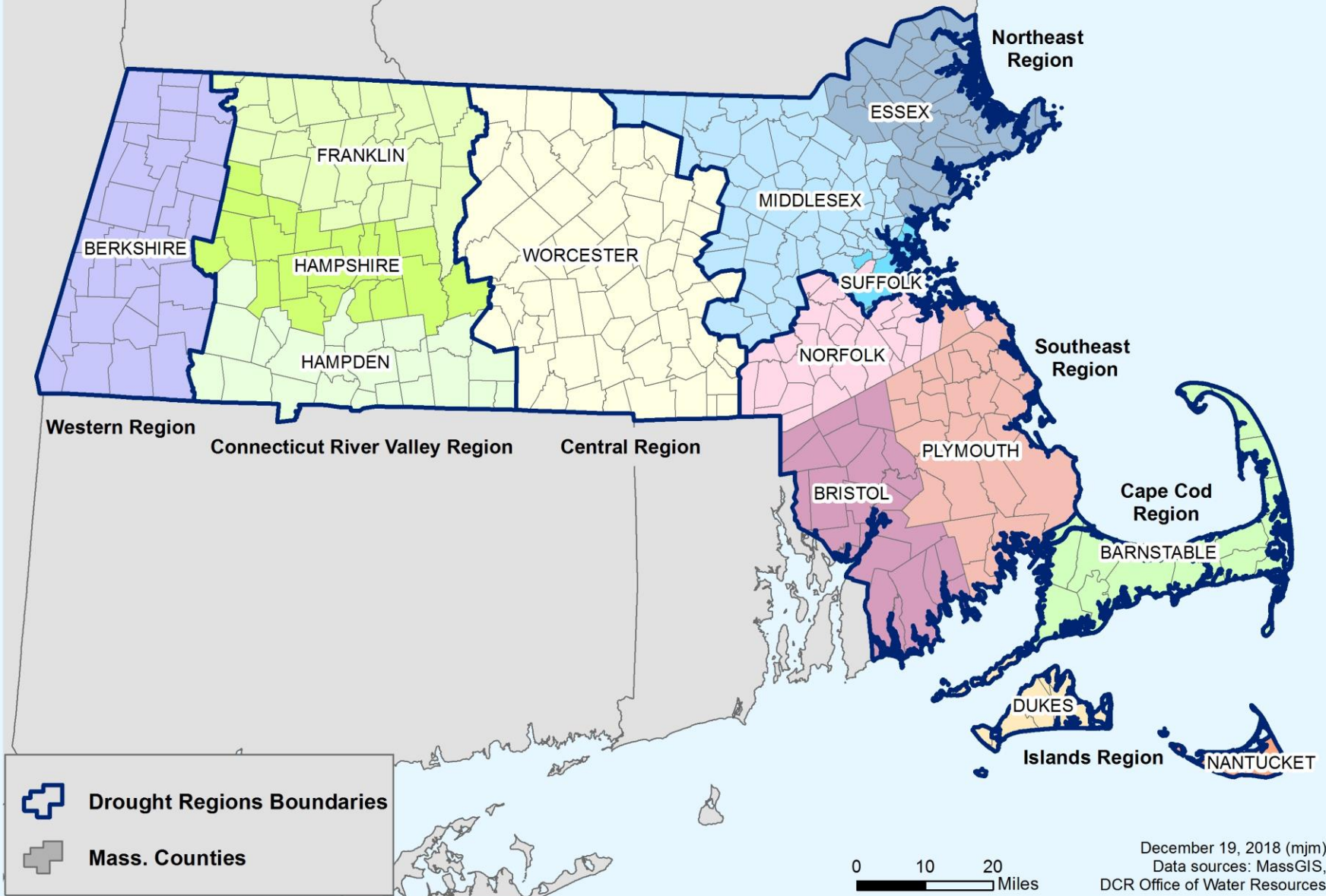
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties

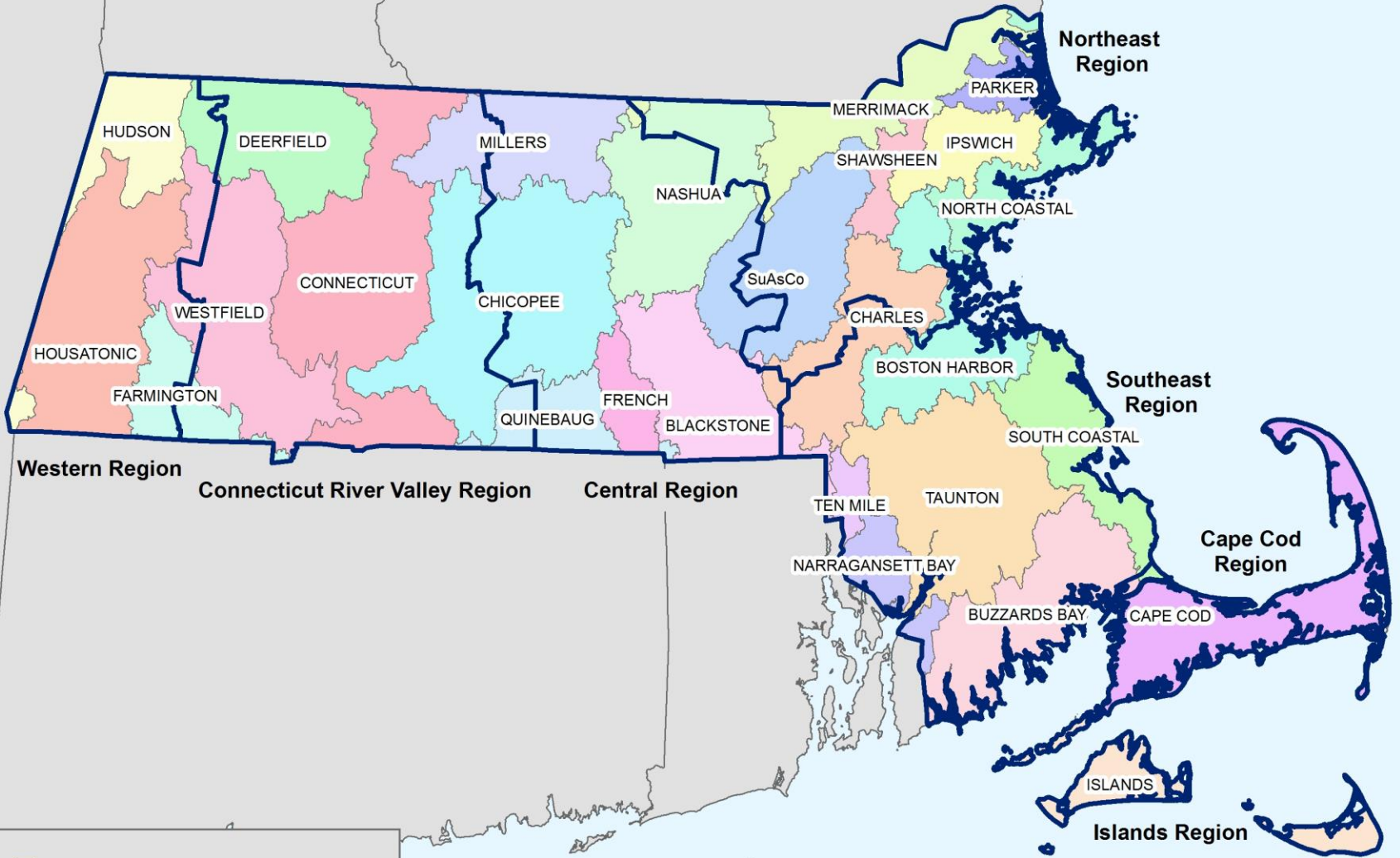


-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

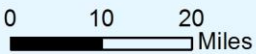
December 19, 2018 (mjm)
Data sources: MassGIS,
DCR Office of Water Resources

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



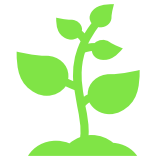
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts

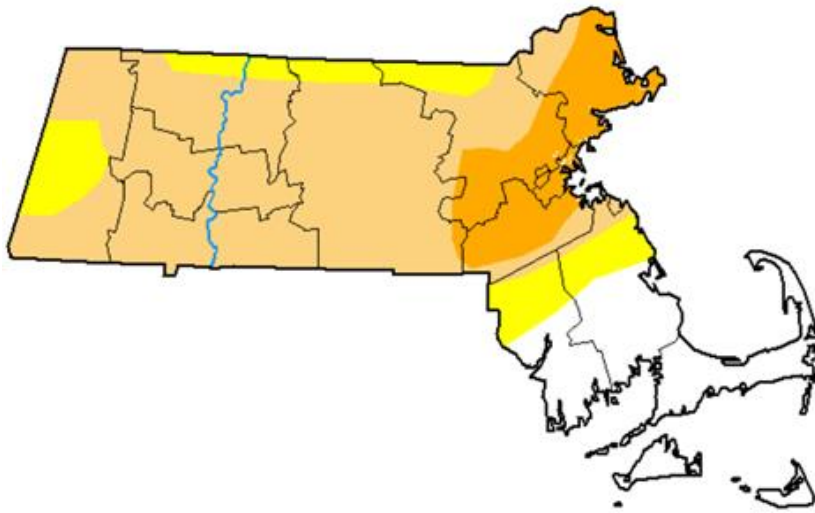


Public Health
Impacts

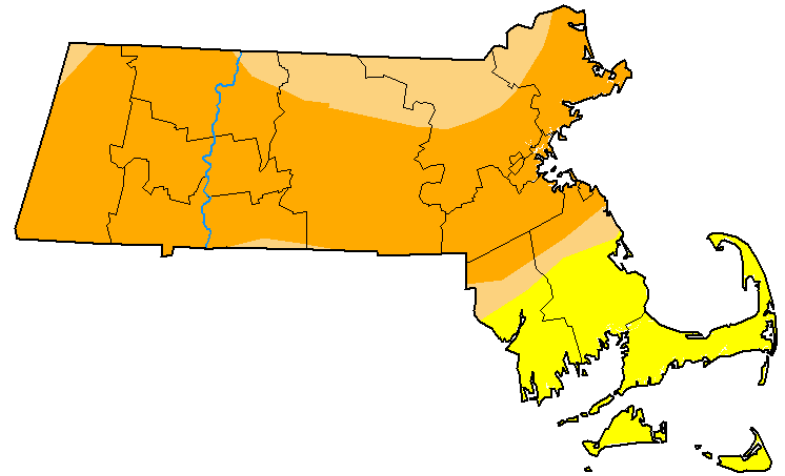
Recent Hydrologic History

- **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
- **Mid-November**
 - Continued lack of rain with windy and dry conditions
 - Increase in number of significant to record low streamflows

US Drought Monitor



Data through October 29, 2024

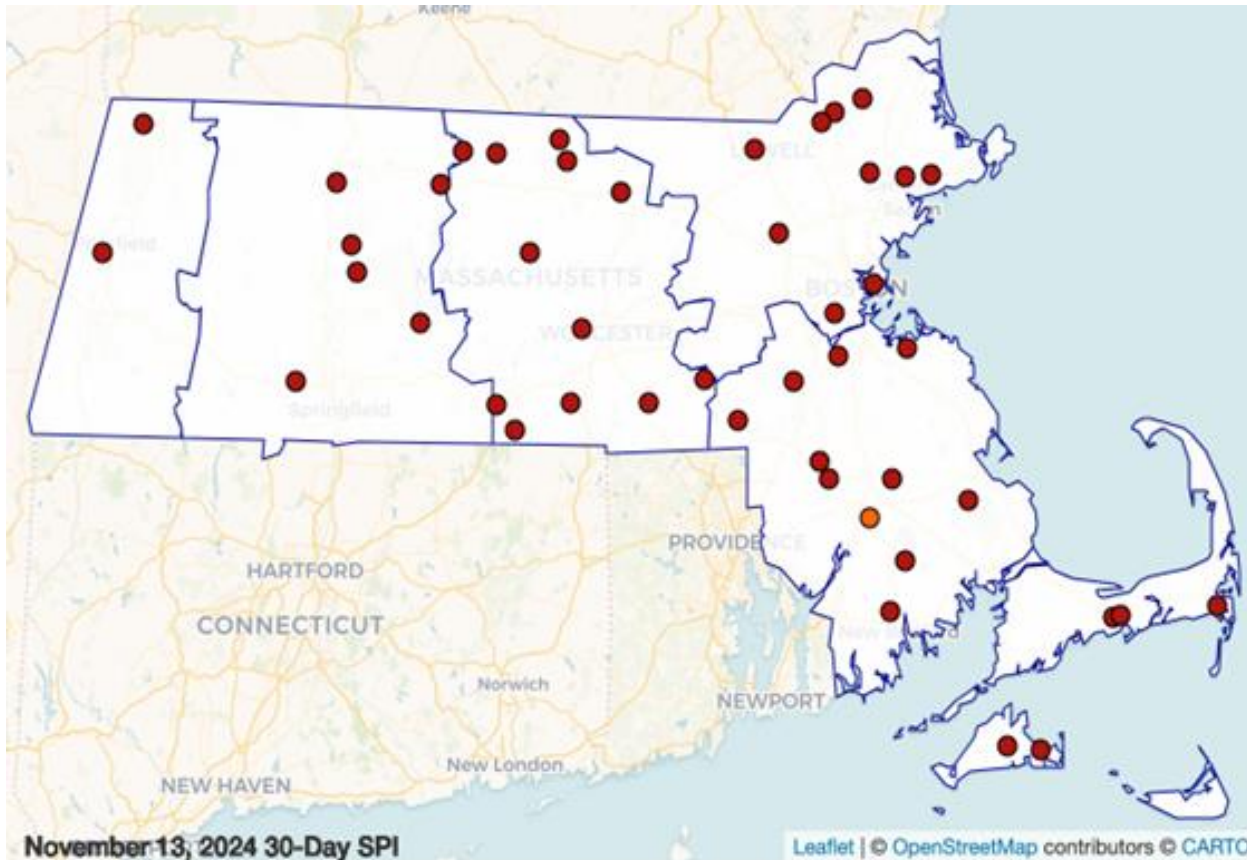


Data through November 12, 2024

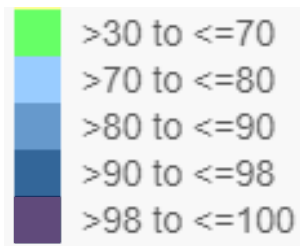
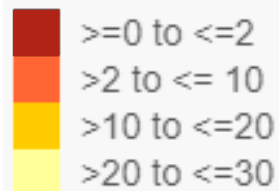
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

Standardized Precipitation Index



Percentiles



Index Severity Levels

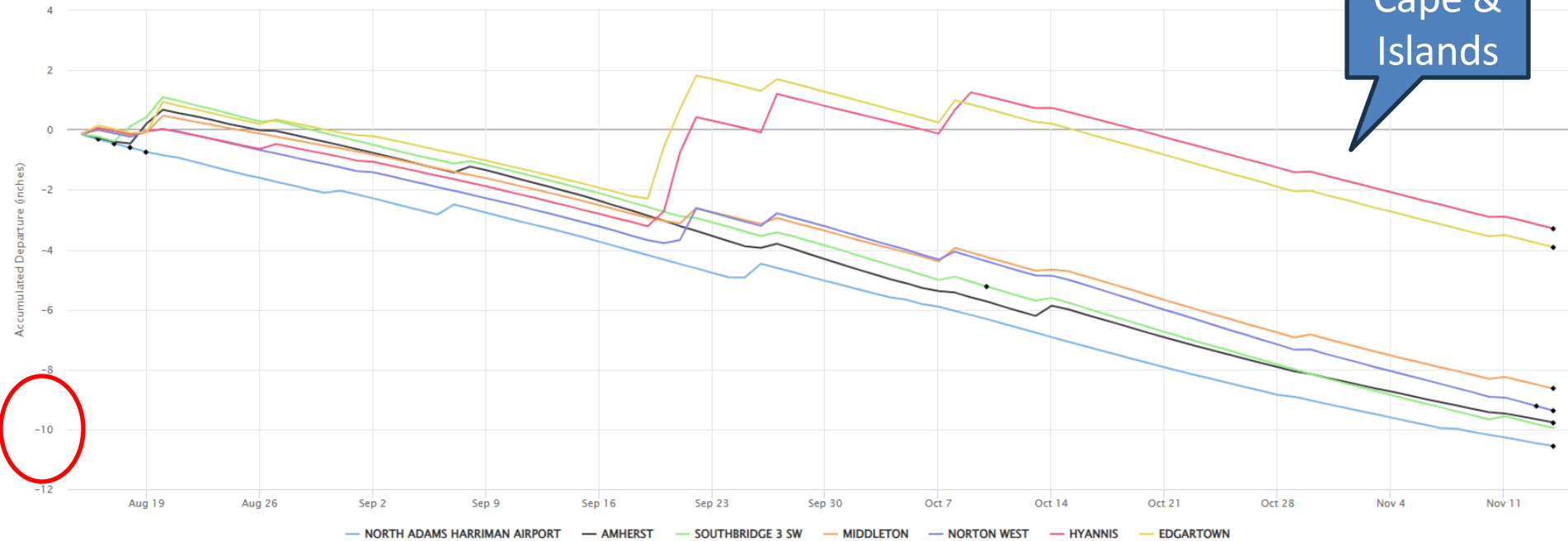


Up to 10" of Precipitation Deficit since mid-August

Accumulated Precipitation Departure from Normal (inches)

Black diamonds represent missing values

Cape & Islands



Accumulation start date
2024-08-15

Standardized Precipitation Index as Percentile

REGION	NUMBER OF SITES	30-day*	60-day	90-day	180-day	270-day	365-day	730-day	1095-day
WESTERN	2	0	1	0	9	22	31	55	61
CTRV	6	0	0	0	18	44	54	80	57
CENTRAL	12	0	0	0	5	34	66	90	77
NORTHEAST	10	1	2	1	6	26	46	82	43
SOUTHEAST	11	0	3	1	9	49	69	78	53
CAPE COD	3	0	56	29	31	30	36	53	67
ISLANDS	2	0	31	17	21	44	47	37	30

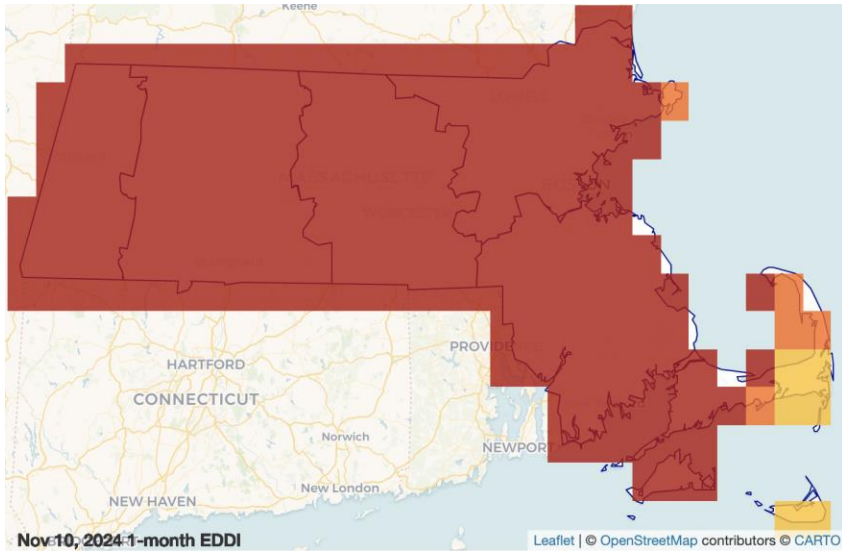
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

N/A: Not Available

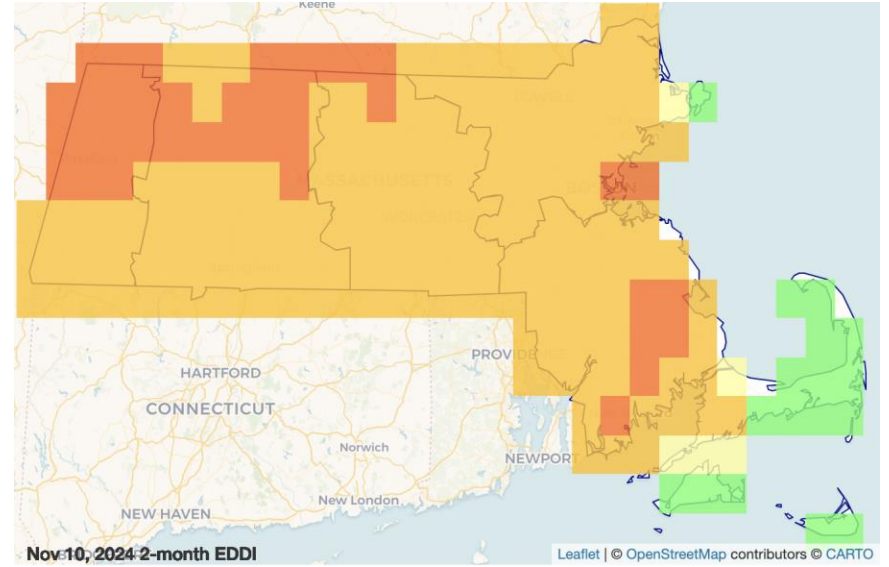
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

1-month



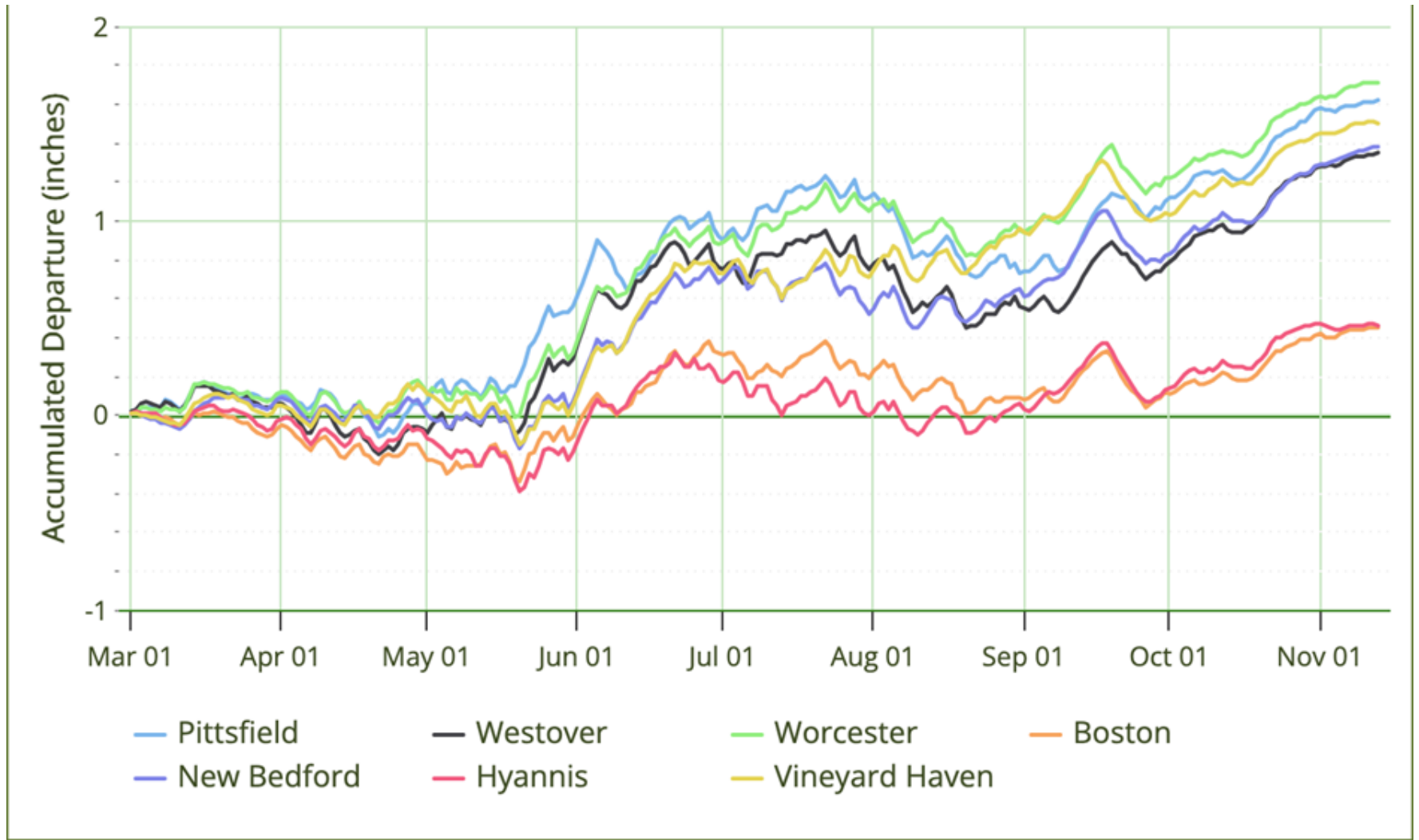
2-month



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

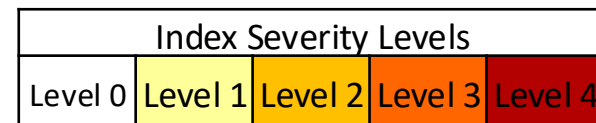
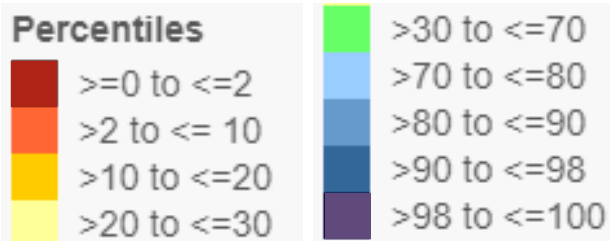
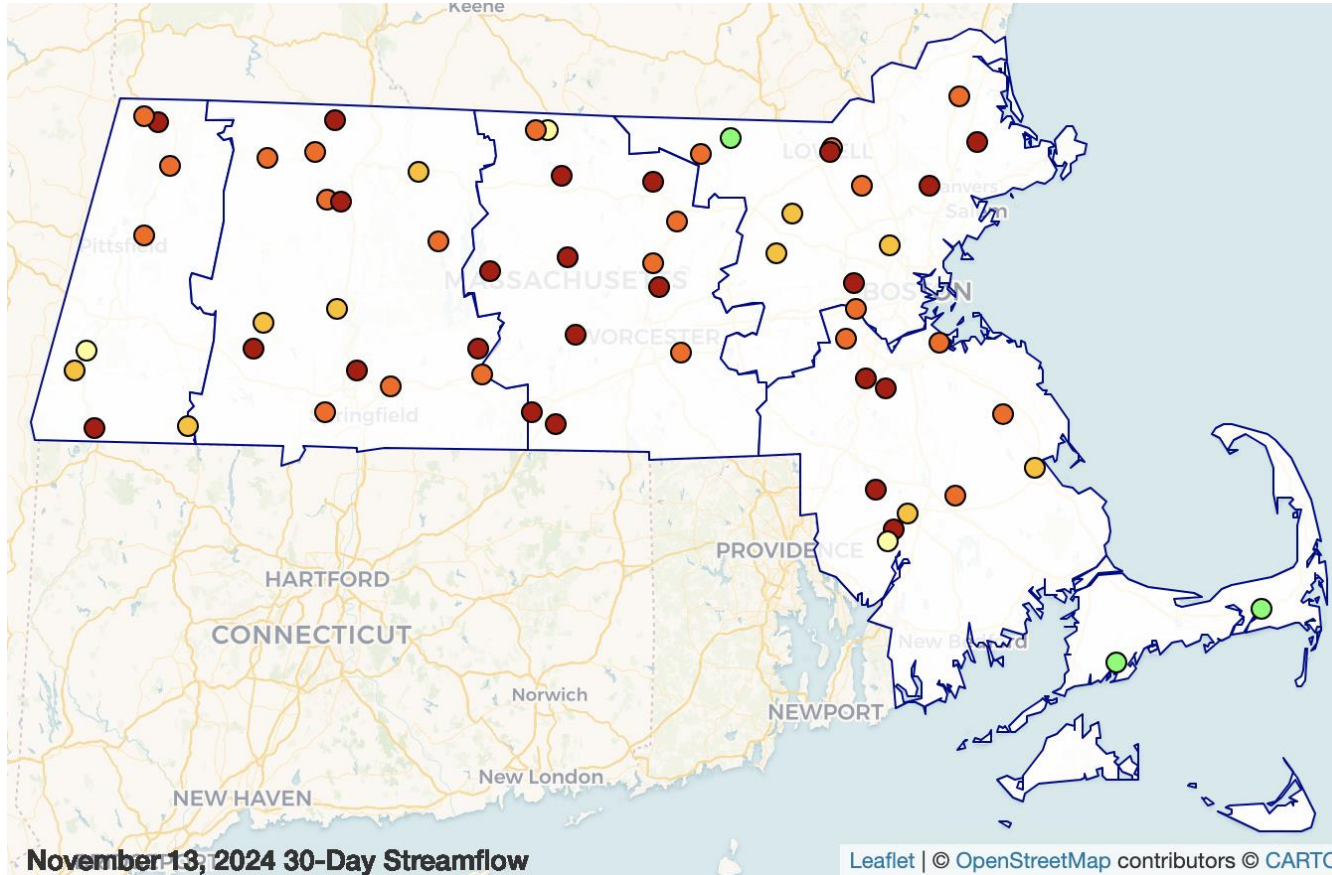
REGION	MEDIAN 2-MONTH EDDI (2024-11-10)
WESTERN	12
CTRV	14
CENTRAL	19
NORTHEAST	16
SOUTHEAST	14
CAPE COD	48
ISLANDS	42

Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches

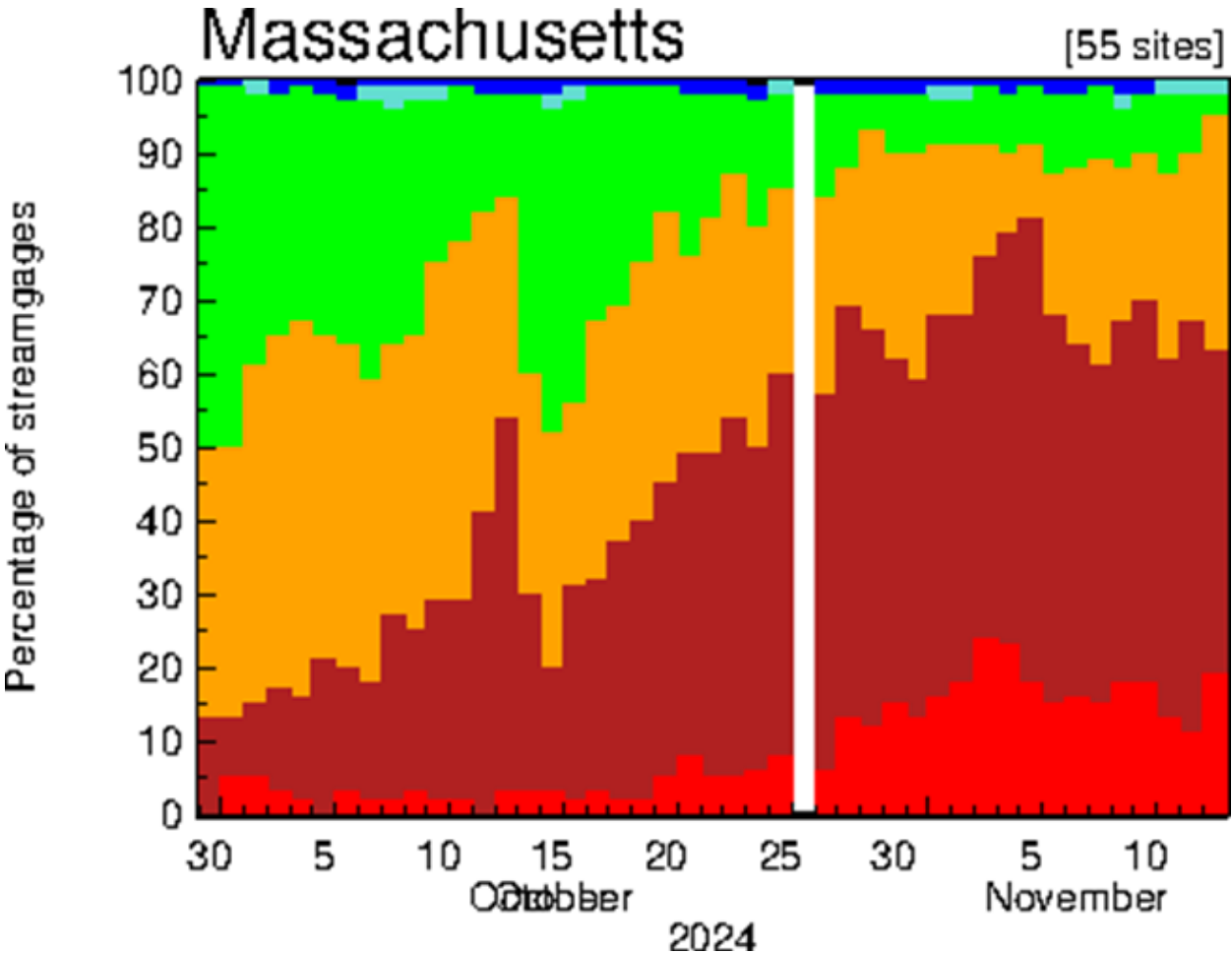


Streamflow

Percentiles of Monthly Median



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		

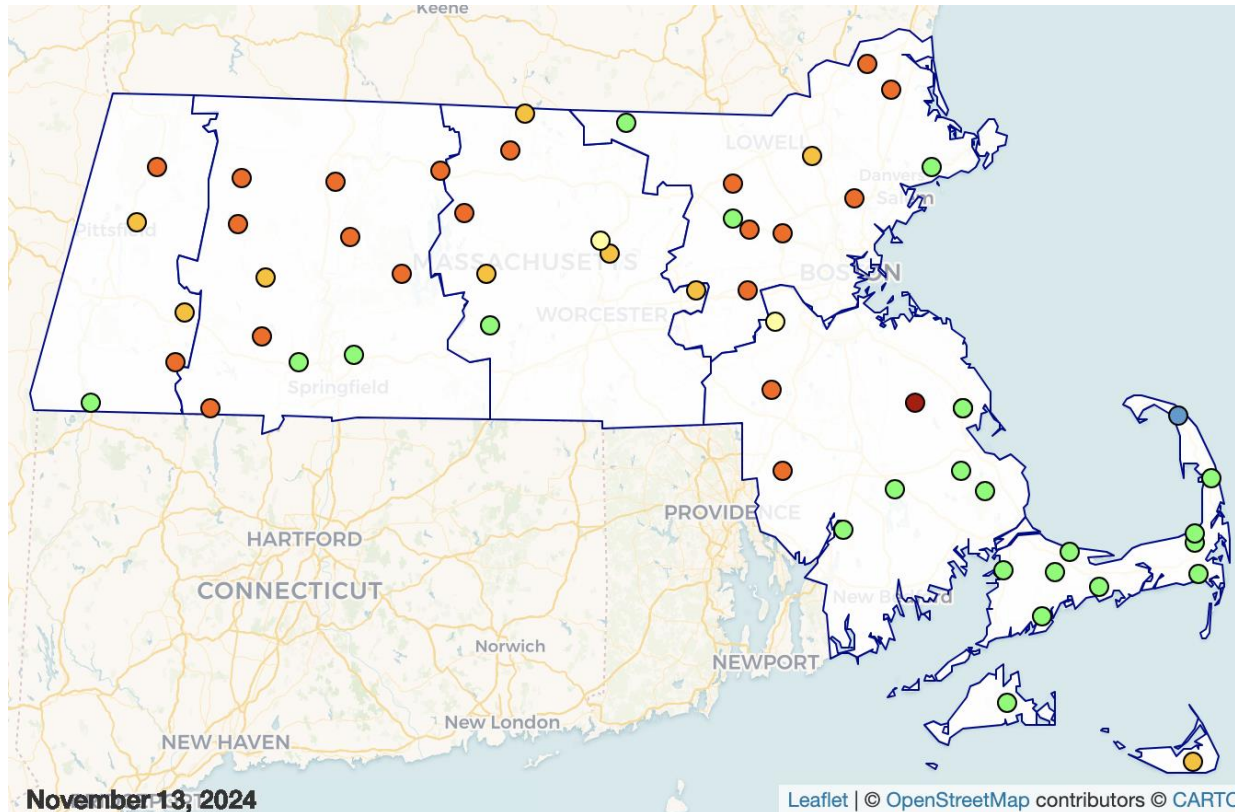
Streamflow Index

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	2	3	2	1	0	7
CTRV	15	6	6	3	0	0	4
CENTRAL	13	8	4	0	1	0	2
NORTHEAST	13	4	5	3	0	0	6
SOUTHEAST	11	4	4	2	1	0	3
CAPE COD	2	0	0	0	0	0	44

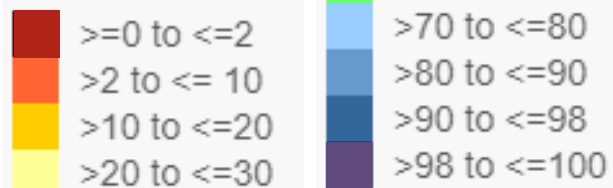
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

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

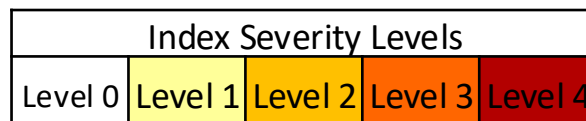
Groundwater Percentiles



Percentiles



Index Severity Levels

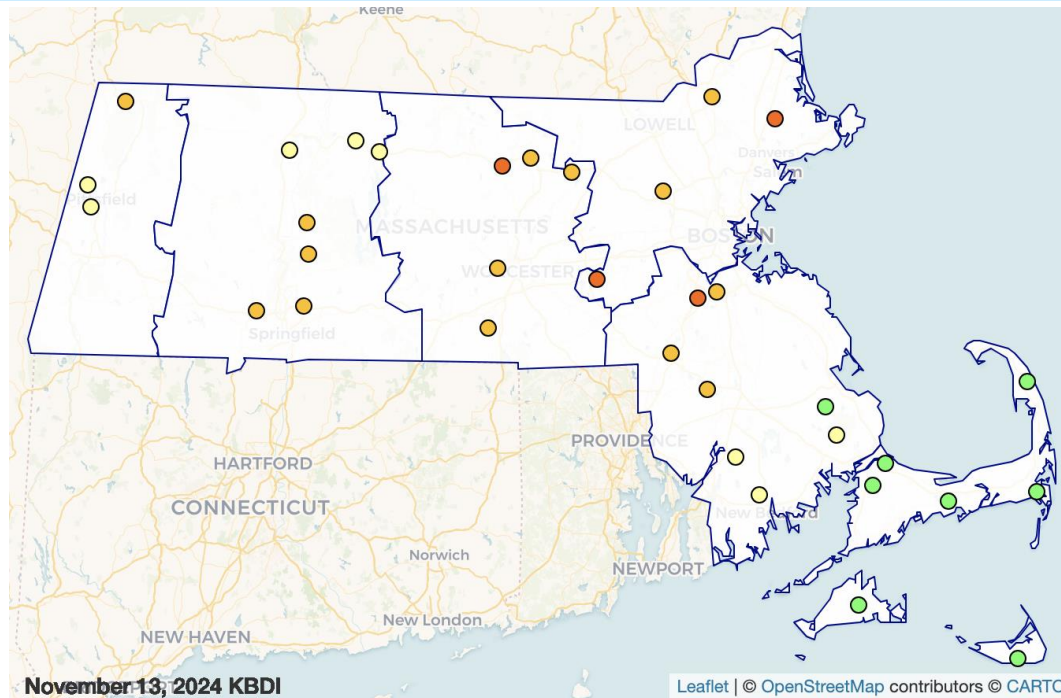


Groundwater Index

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	2	2	0	0	11
CTRV	11	0	8	1	0	0	5
CENTRAL	8	0	2	4	1	0	18
NORTHEAST	11	0	7	1	0	0	5
SOUTHEAST	10	1	2	1	1	0	33
CAPE COD	10	0	0	0	0	0	42
ISLANDS	2	0	0	1	0	0	34

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
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REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	3	429
CTRV	7	506
CENTRAL	5	602
NORTHEAST	4	602
SOUTHEAST	8	606
CAPE COD	5	178
ISLANDS	2	176

Index Severity Levels

Level 0	Level 1	Level 2	Level 3	Level 4
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Drought Indices by Region

October 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3-month)	14	8	4	10	9	34	20
Streamflow	7	11	4	9	14	51	N/A
Groundwater	28	19	33	18	41	54	37
Lakes/Impoundments	37	31	21	15	29	43	N/A
ET	19	23	26	23	26	33	31
KBDI	354	481	576	587	588	126	145
October declaration (11-6-24 mtg)	Level 2	Level 2	Level 3	Level 3	Level 2	Level 0	Level 0

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

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>Mid-November</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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