

Hydrologic Conditions in Massachusetts for December 2024

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DCR Office of Water Resources

Drought Management Task Force

January 7, 2025

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



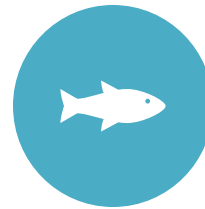
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(36)



Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

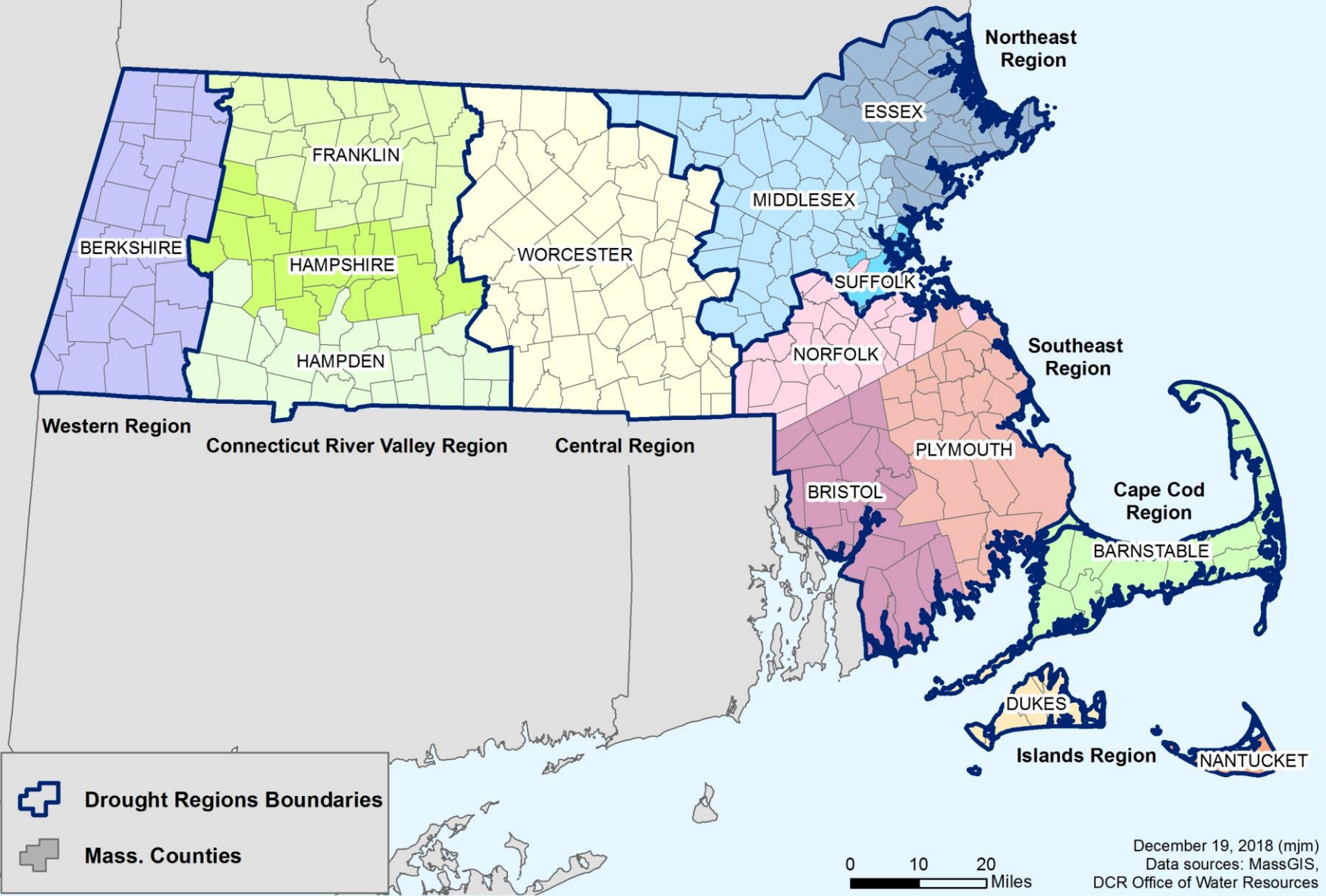
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



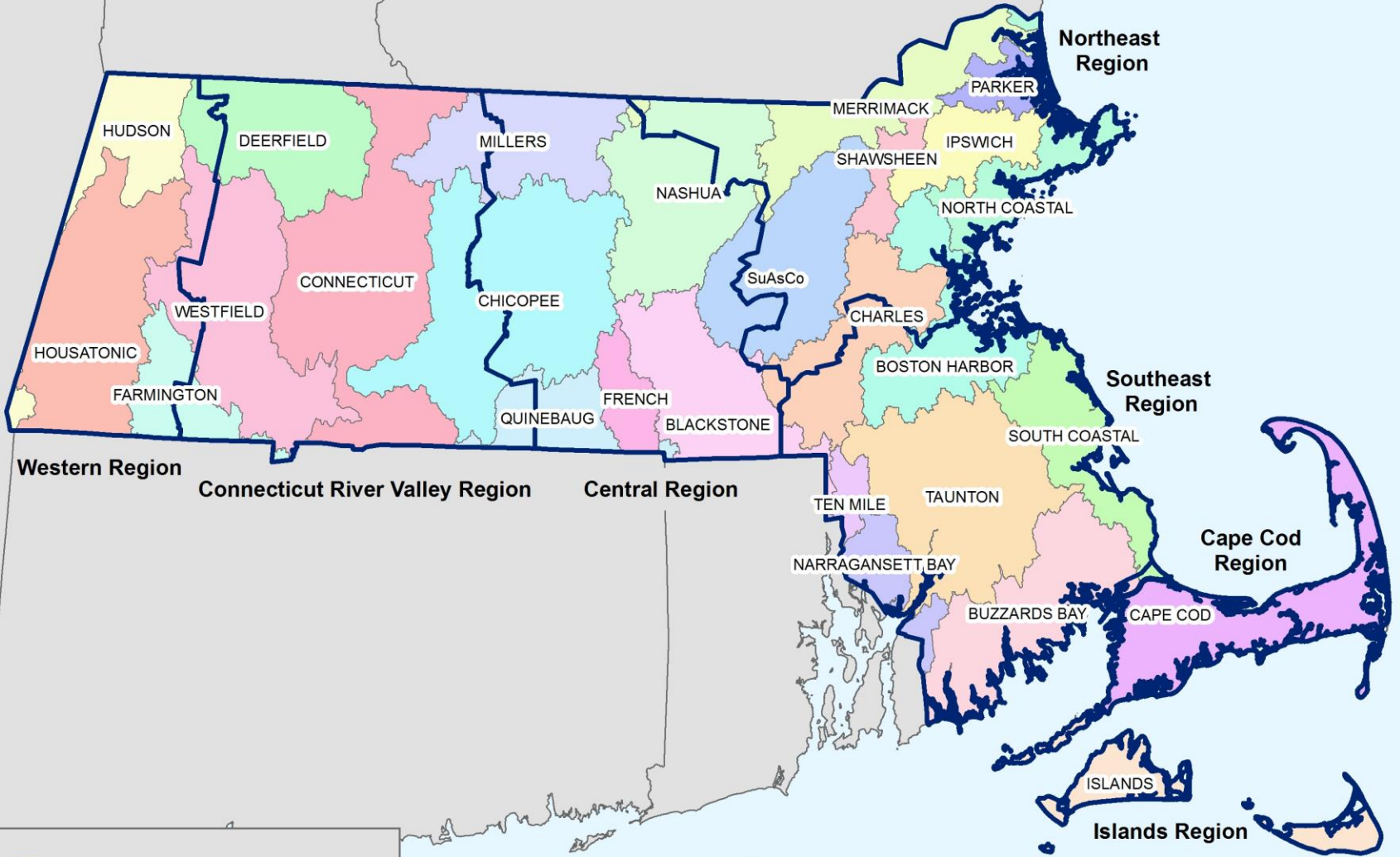
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

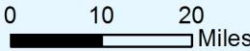


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 Drought Regions Boundaries

 Mass. Counties



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

Task Force Member Updates



Hydrologic
Conditions



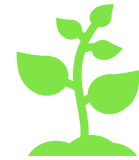
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts

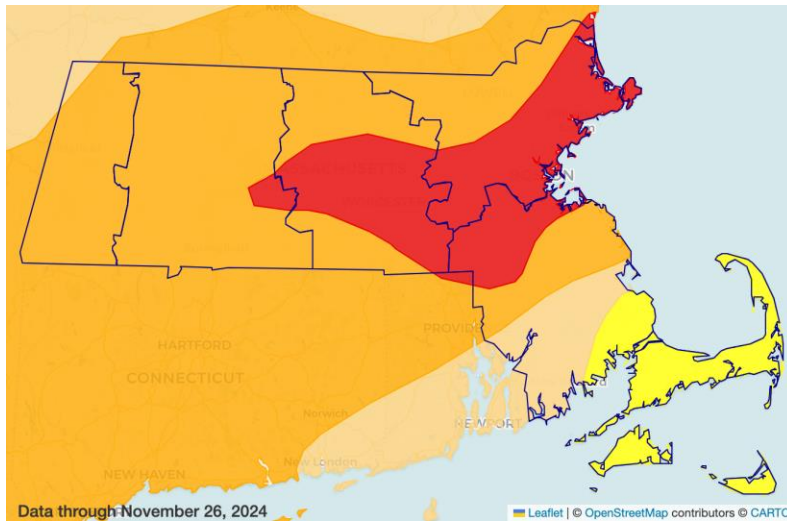


Public Health
Impacts

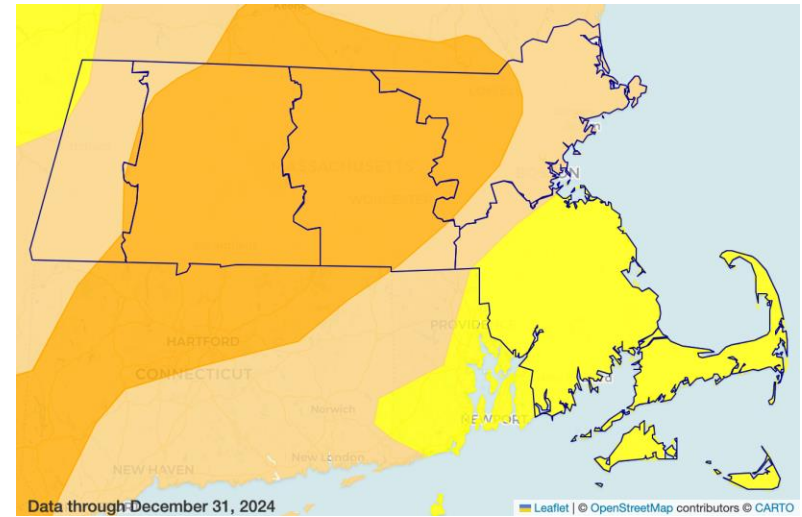
Recent Hydrologic History

- **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
- **December**
 - Normal to above-normal precipitation improved conditions
 - Longer-term precipitation deficits and impacts to streamflow and groundwater remain

US Drought Monitor



Data through November 26 , 2024

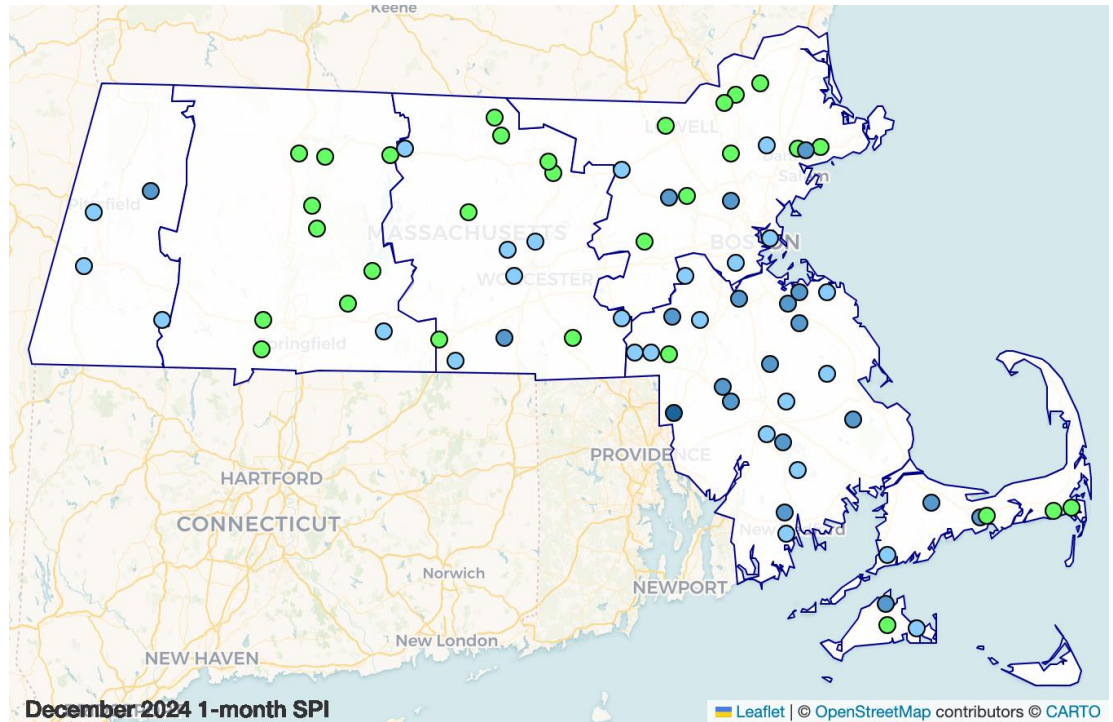
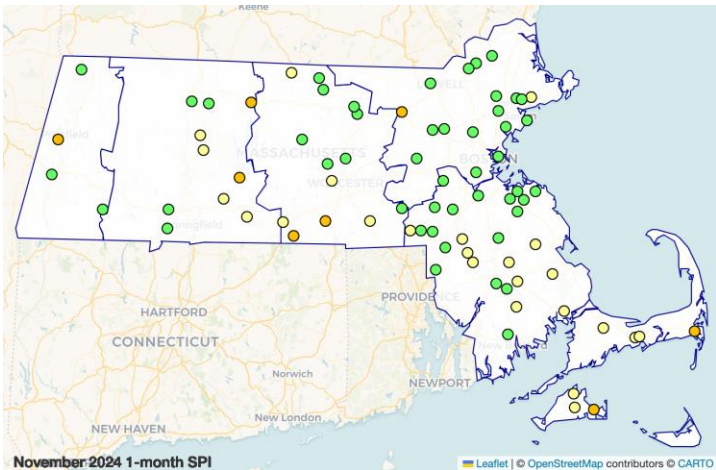
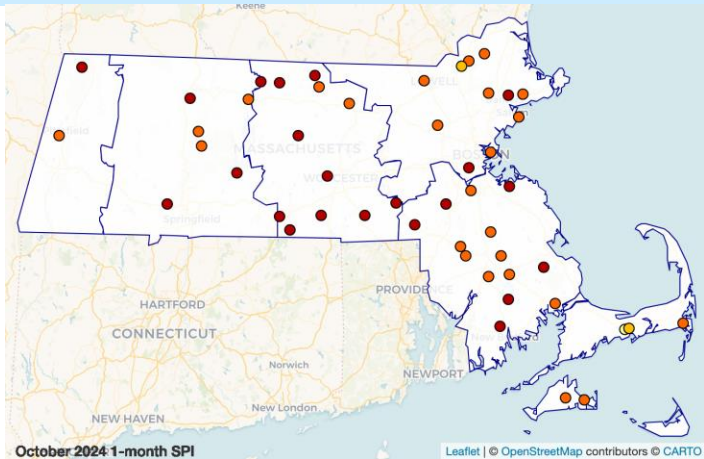


Data through December 31, 2024

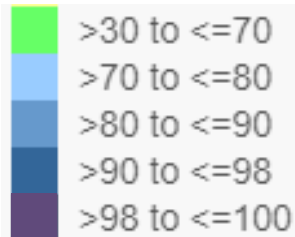
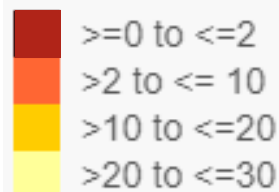
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

Standardized Precipitation Index



Percentiles



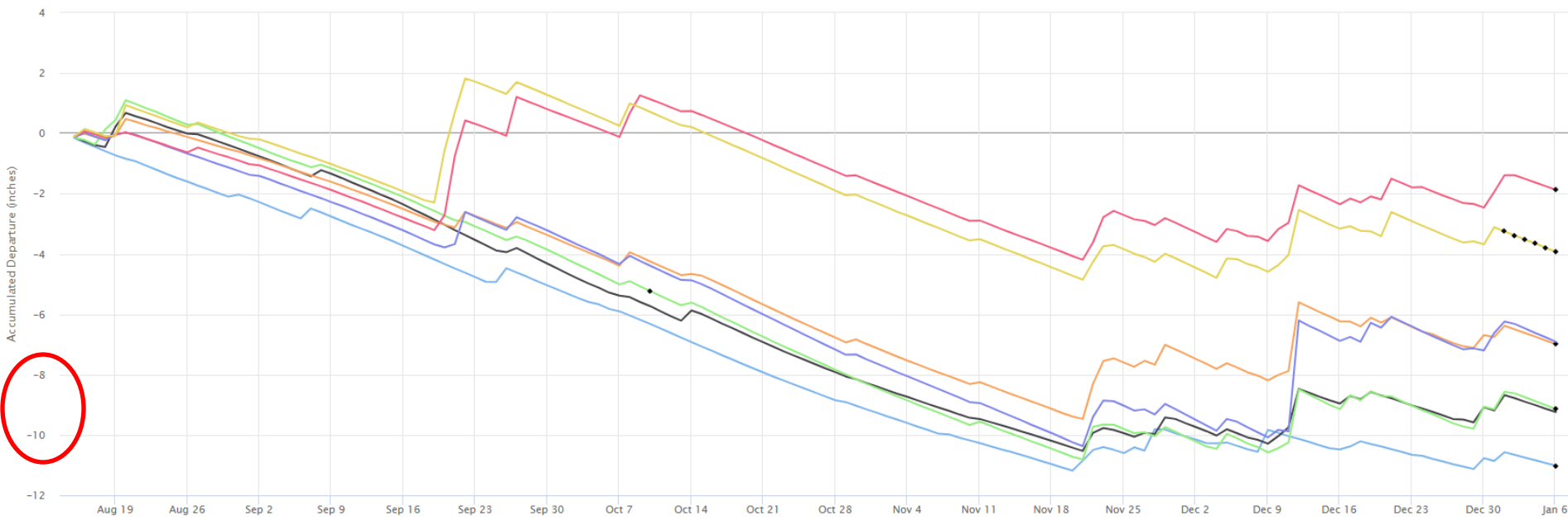
Index Severity Levels



Up to 8"-10" of Precipitation Deficit since mid-August

Accumulated Precipitation Departure from Normal (inches)

Black diamonds represent missing values



Accumulation start date
2024-08-15

- NORTH ADAMS HARRIMAN AIRPORT
- SOUTHBRIDGE 3 SW
- NORTON WEST
- EDGARTOWN
- AMHERST
- MIDDLETON
- HYANNIS

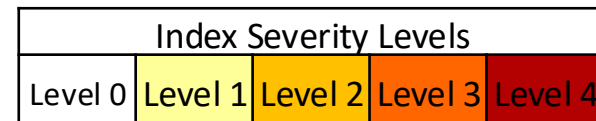
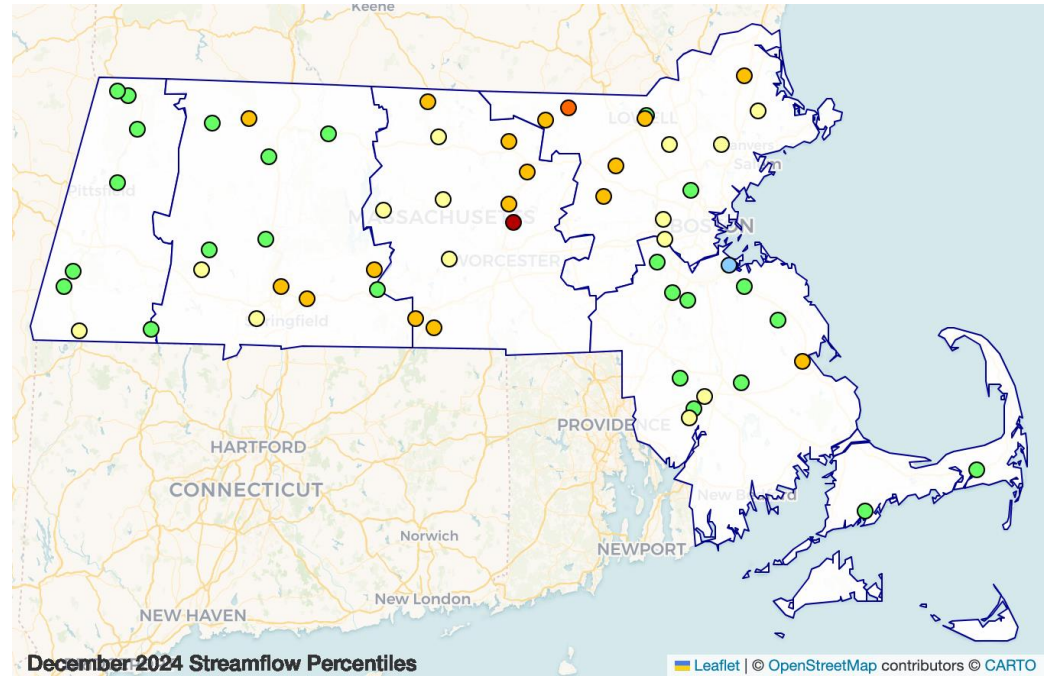
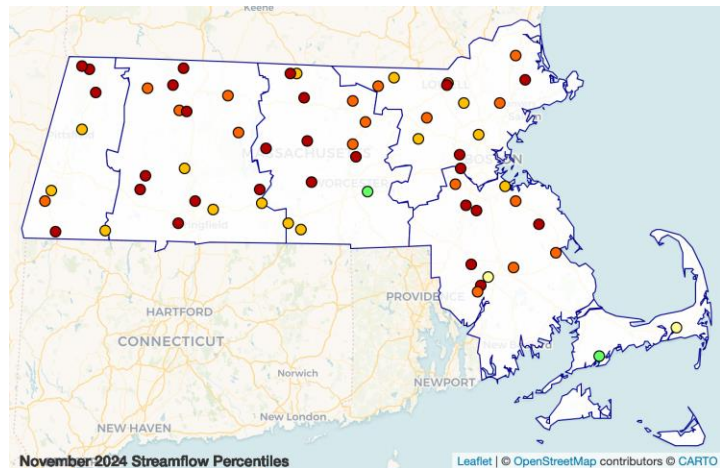
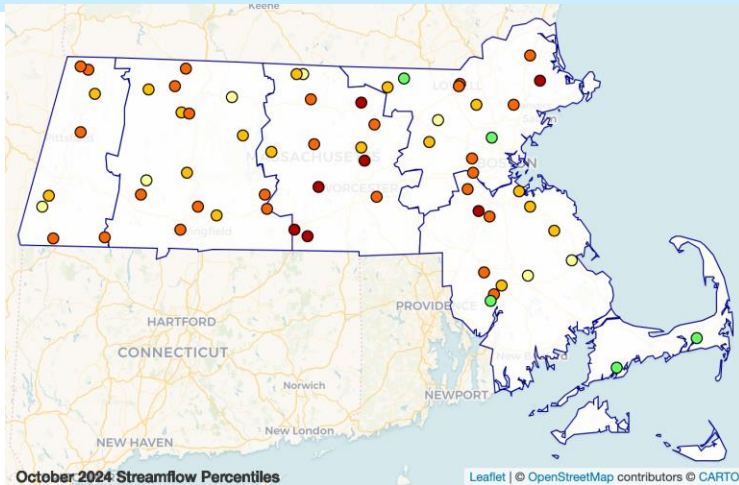
Standardized Precipitation Index as Percentile

REGION	NUMBER OF SITES	1-mo*	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo *
WESTERN	4	77	61	33	30	36	62	84	76
CTRV	10	63	41	11	18	22	58	87	76
CENTRAL	14	70	48	10	10	19	57	90	85
NORTHEAST	16	69	54	21	13	15	41	85	68
SOUTHEAST	23	81	66	26	16	33	74	84	75
CAPE COD	6	74	46	24	30	25	51	67	80
ISLANDS	3	78	46	16	34	26	52	41	47

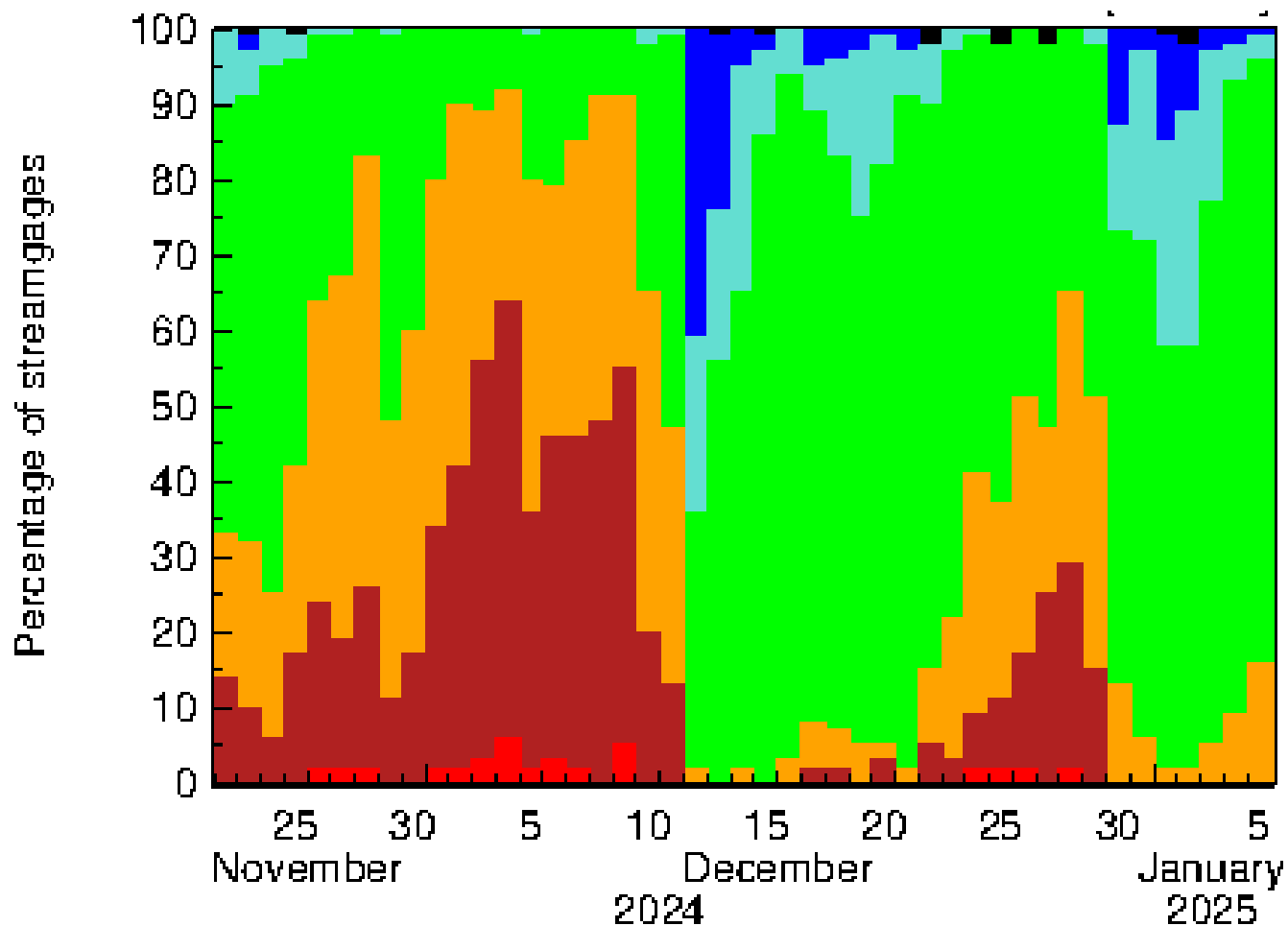
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.
N/A: Not Available

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

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		

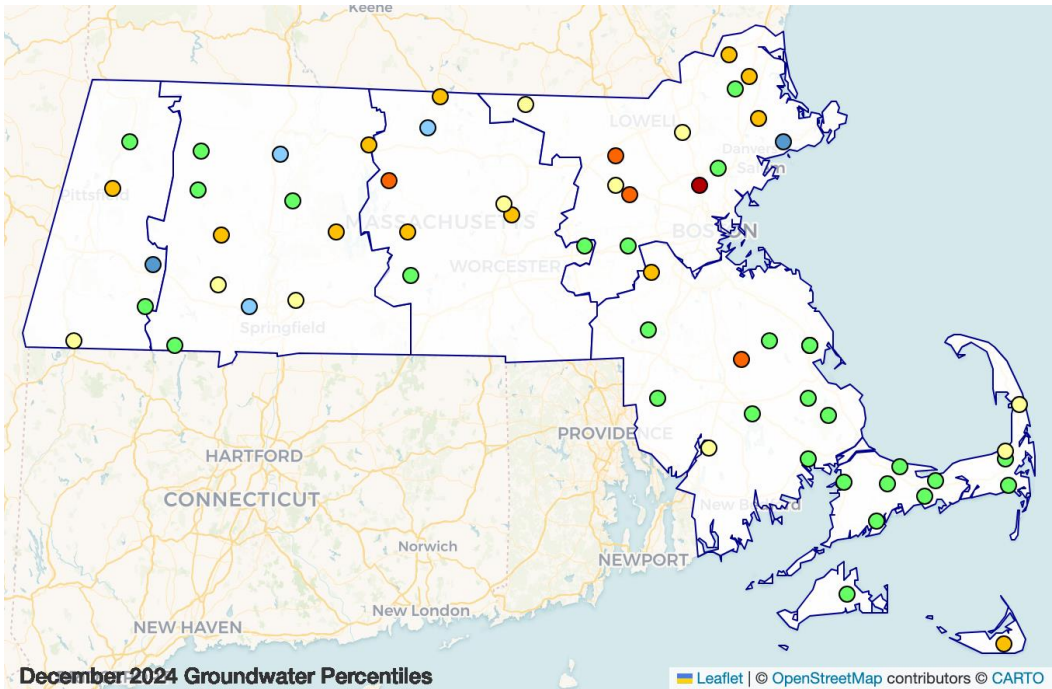
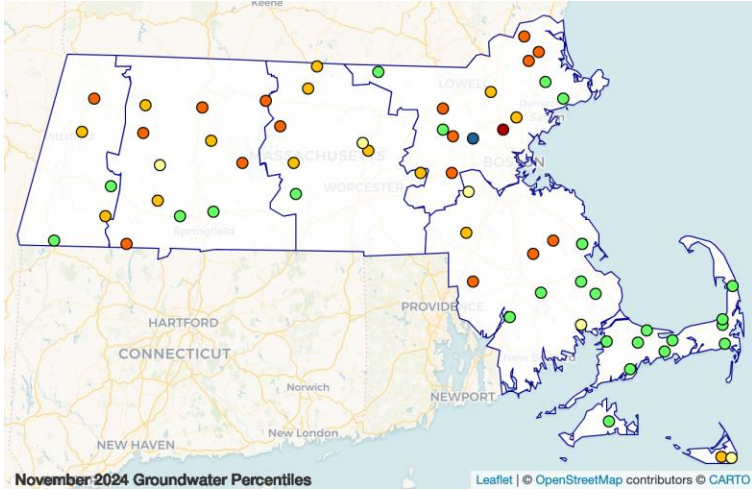
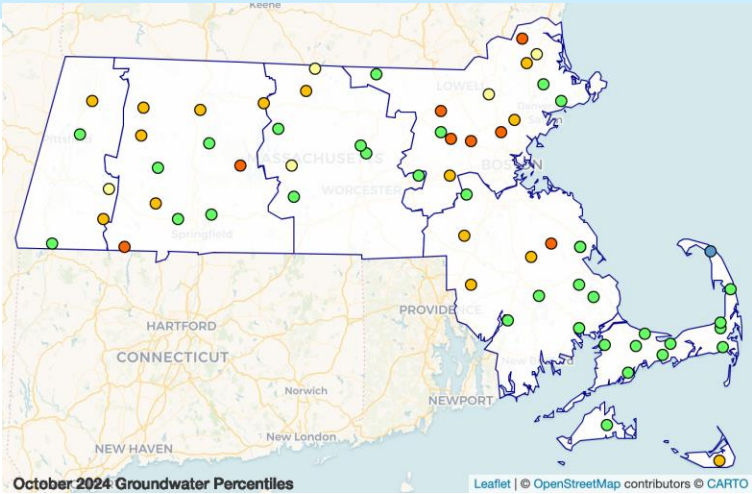
Streamflow Index

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	0	0	0	1	0	40
CTRV	12	0	0	4	2	0	30
CENTRAL	11	1	0	6	4	0	17
NORTHEAST	13	0	1	5	5	0	21
SOUTHEAST	12	0	0	1	2	0	38
CAPE COD	2	0	0	0	0	0	35

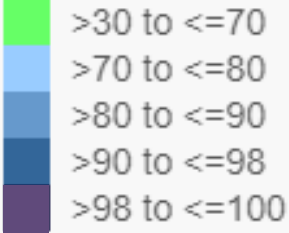
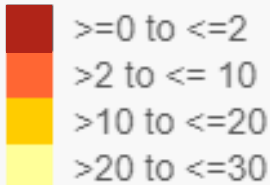
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

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	0	1	1	0	32
CTRV	11	0	0	3	2	0	39
CENTRAL	8	0	1	3	1	0	22
NORTHEAST	13	1	2	3	3	0	24
SOUTHEAST	12	0	1	1	1	0	43
CAPE COD	10	0	0	0	2	0	35
ISLANDS	2	0	0	1	0	0	30

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	25th
CTRV	2	27th
CENTRAL	2	17th
NORTHEAST	4	16th
SOUTHEAST	2	30th
CAPE COD	1	40th

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

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

November declaration	Level 3	Level 3	Level 3	Level 3	Level 3	Level 1	Level 1
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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.
mos=month

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

Drought Indices by Region

December 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (6-mos)	30	18	10	13	16	24 ^(3-mos)	16 ^(3-mos)
Streamflow	40	30	17	21	38	35	N/A
Groundwater	32	39	22	24	43	35	30
Lakes/ Impoundments	25	27	17	16	30	40	N/A
ET*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KBDI**	N/A	N/A	N/A	N/A	N/A	N/A	N/A

December	Level 1	Level 2	Level 2	Level 2	Level 1	Level 1	Level 1
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**KBDI not reported Dec-March outside fire danger season

mos=month

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