

Hydrologic Conditions in Massachusetts for September 2024

Anne Carroll & Viki Zoltay
DCR Office of Water Resources

Drought Management Task Force

October 8, 2024

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



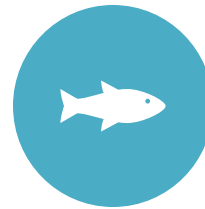
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(36)



Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

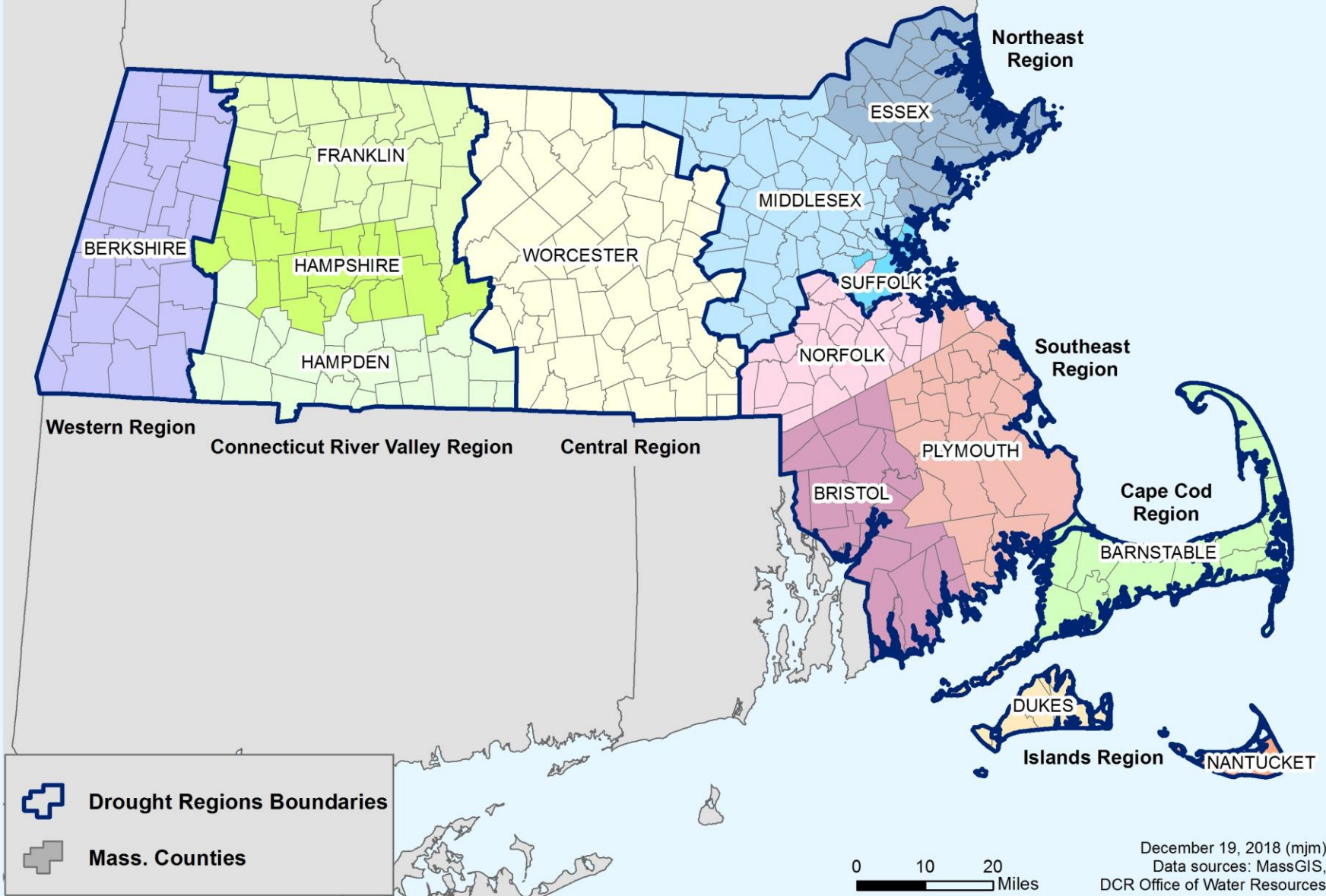
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



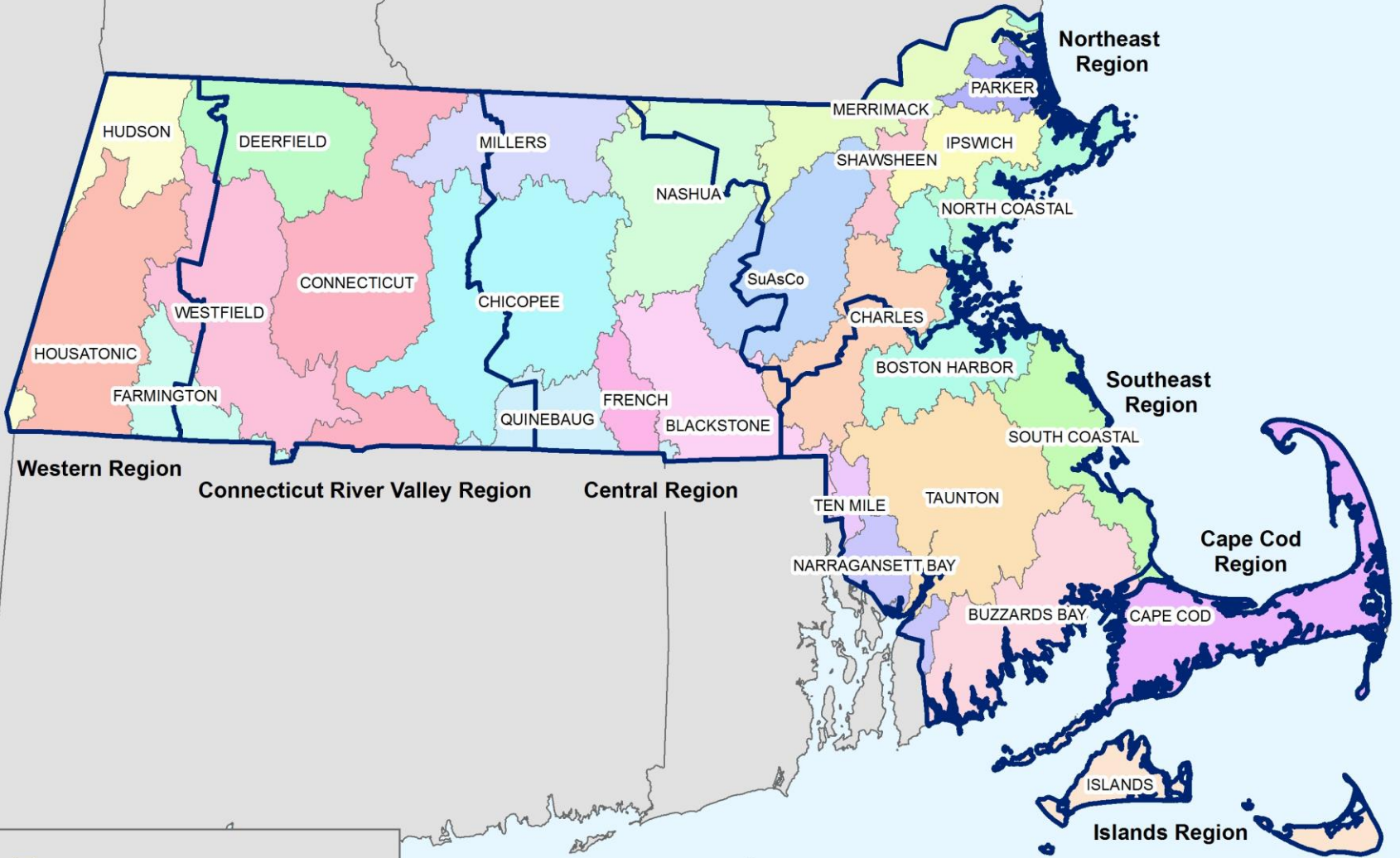
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

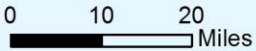


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 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

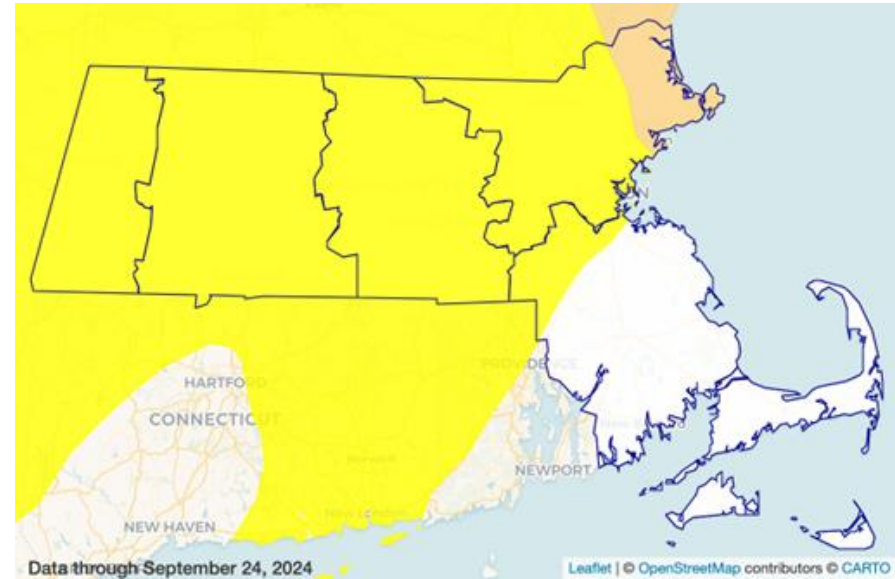
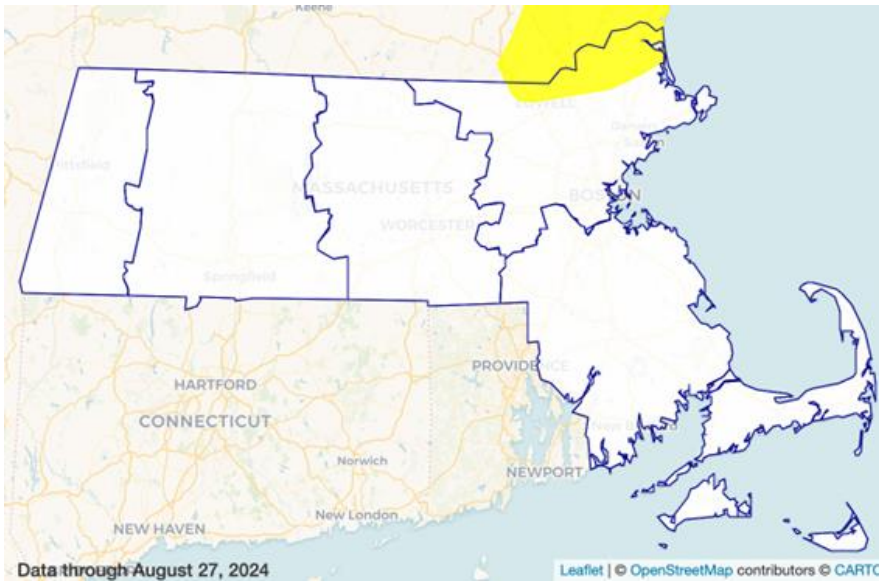


Public Health
Impacts

Recent Hydrologic History

- **July**
 - **Northeast Region and along northern border:** intensification of dry conditions especially in the Parker River Basin
- **August**
 - **Parker River Basin:** easing of dry conditions but streamflow remains significantly low
 - **Cape and Islands:** dry conditions developing
- **September**
 - **Cape and Islands:** Above-normal rainfall eases dry conditions
 - **Western, CTRV, Central, Northeast:** Significantly below-normal precipitation drying out areas with mild to significant impacts to streamflow

US Drought Monitor



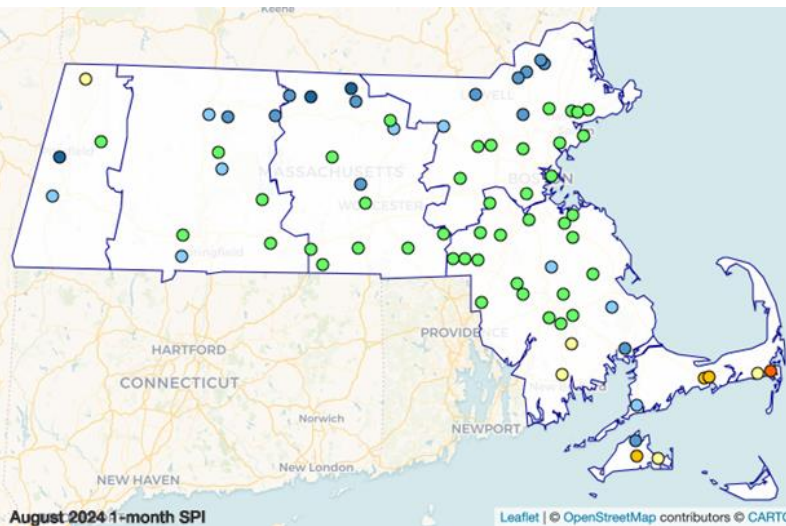
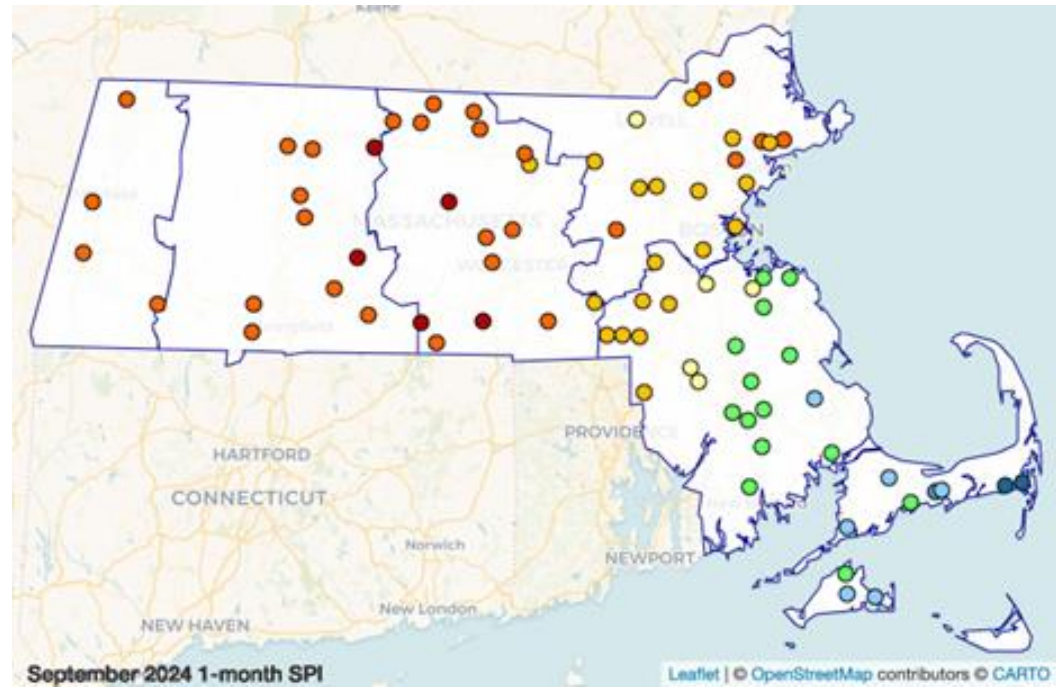
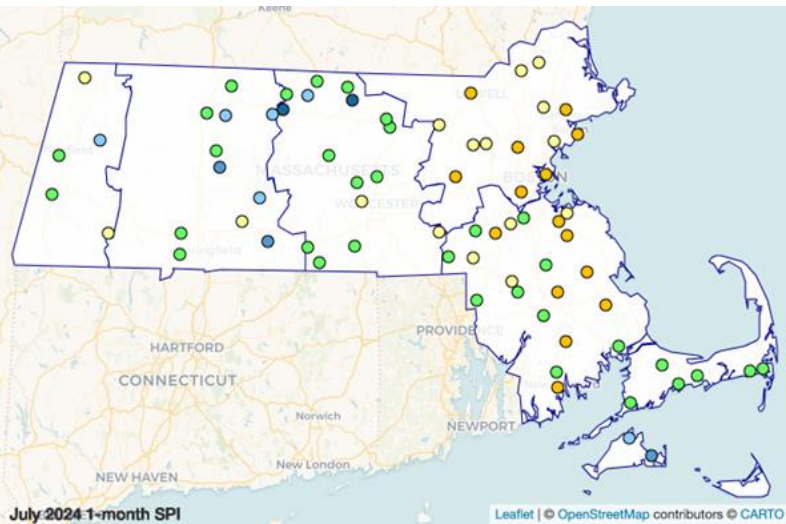
Data through August 27 , 2024

Data through September 24, 2024

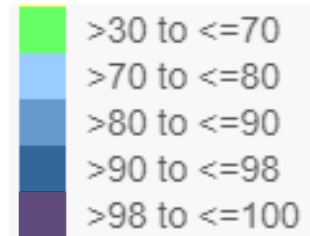
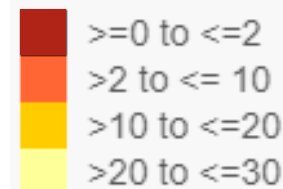
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

Standardized Precipitation Index

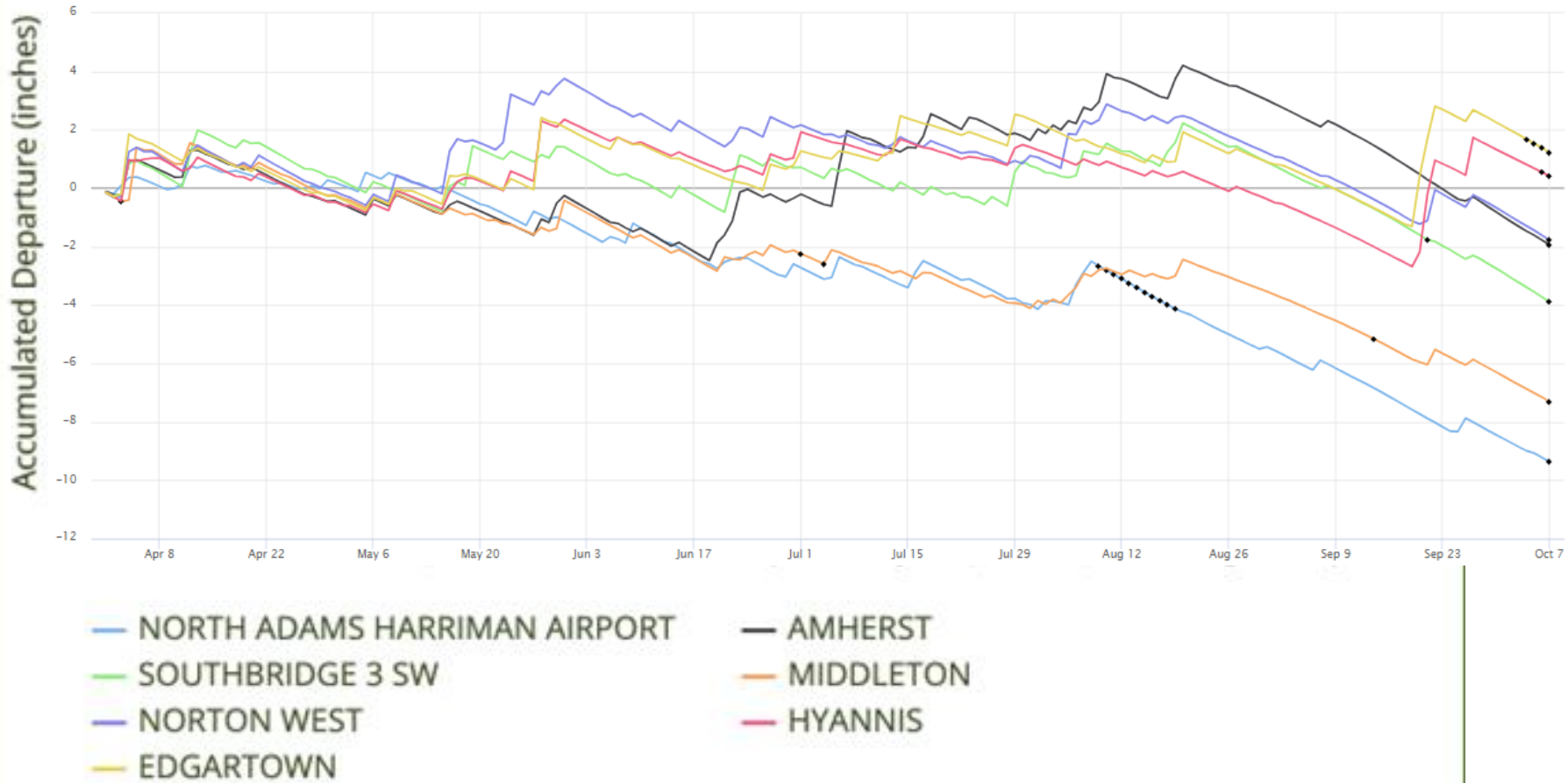


Percentiles



Accumulated Precipitation Departure from 30-Year Average in inches

Black diamonds represent missing values



- 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

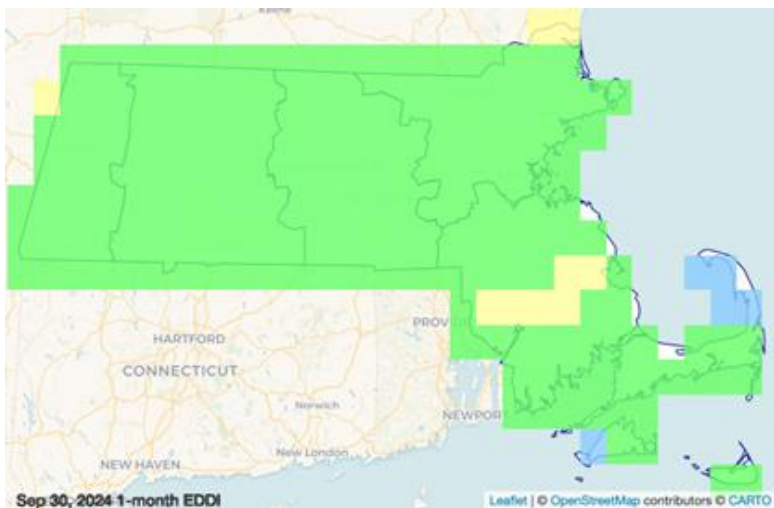
REGION	NUMBER OF SITES	1-mo *	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo*
WESTERN	4	6	32	33	43	72	76	86	80
CTRV	10	3	29	44	48	82	80	93	78
CENTRAL	16	5	30	29	45	81	79	95	88
NORTHEAST	17	12	28	18	25	60	62	90	68
SOUTHEAST	24	34	34	24	50	85	77	90	75
CAPE COD	7	78	56	56	60	82	53	81	83
ISLANDS	3	71	55	68	59	84	53	71	50

* 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

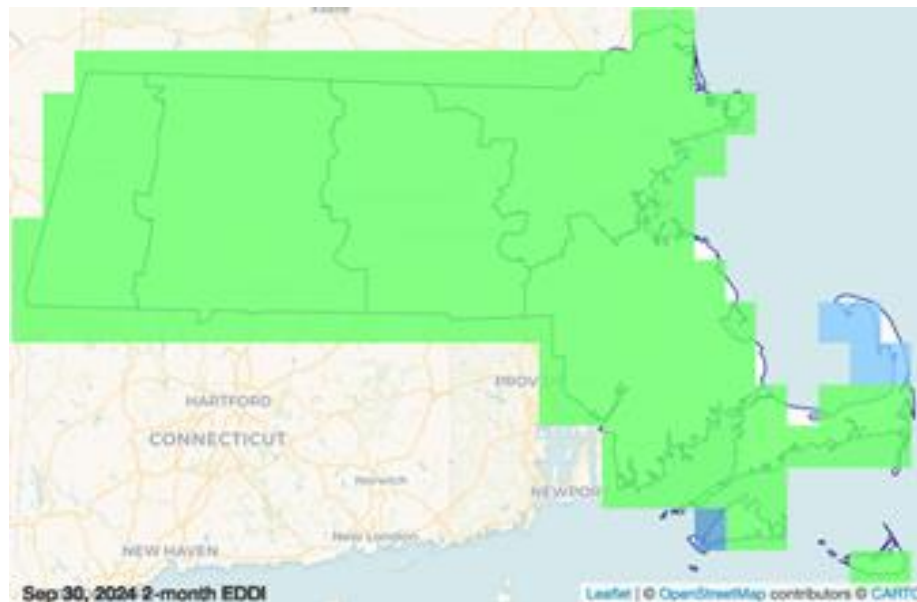
Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

1-month



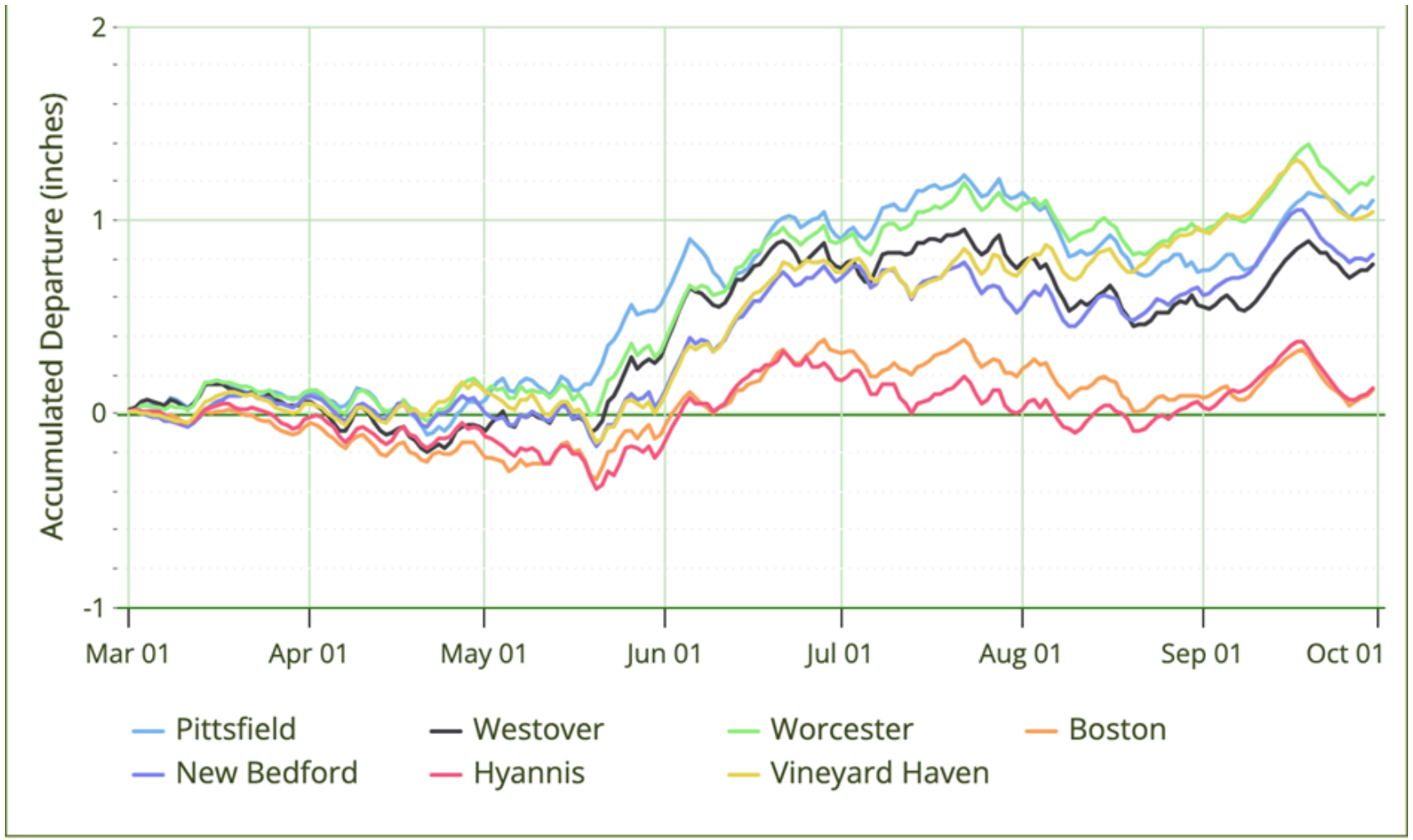
2-month



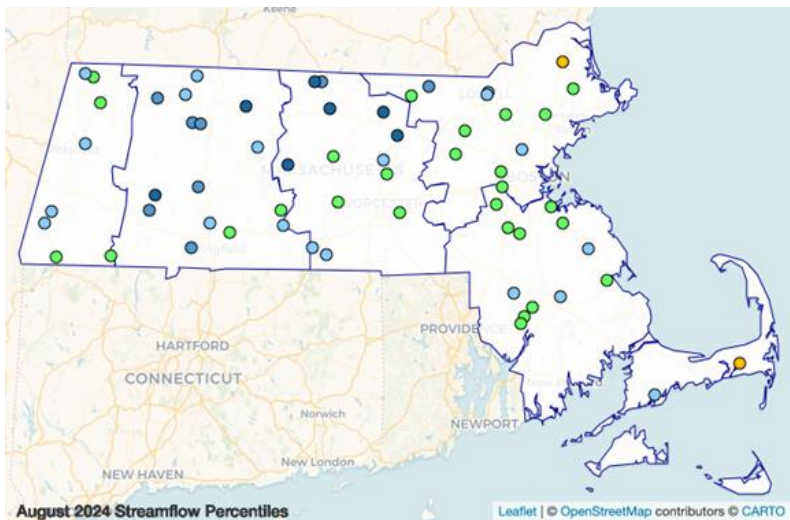
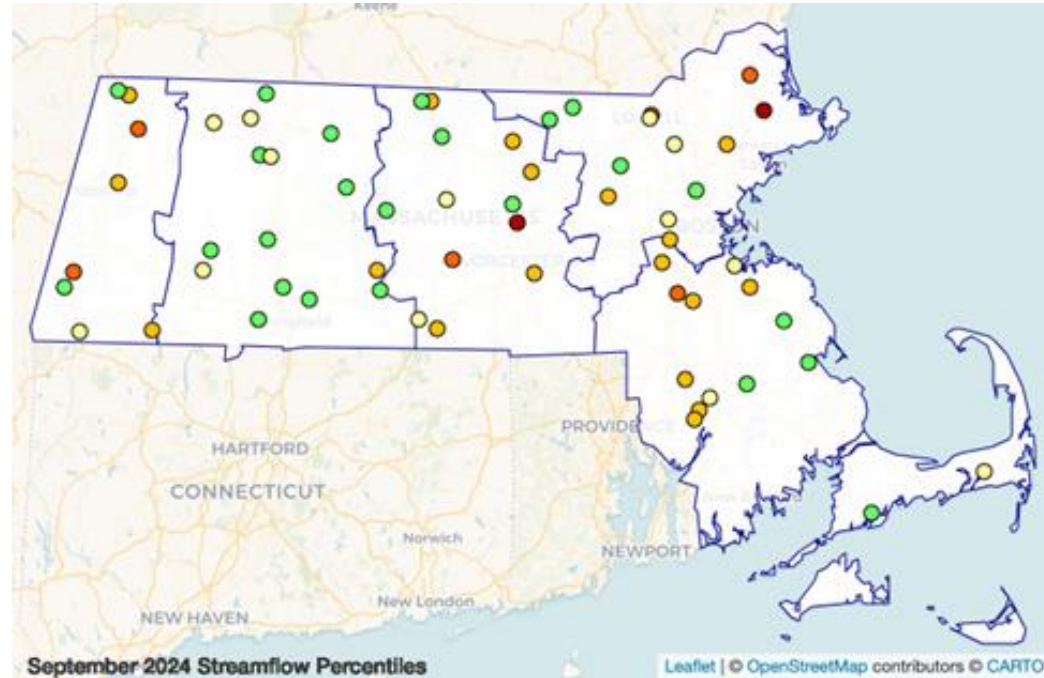
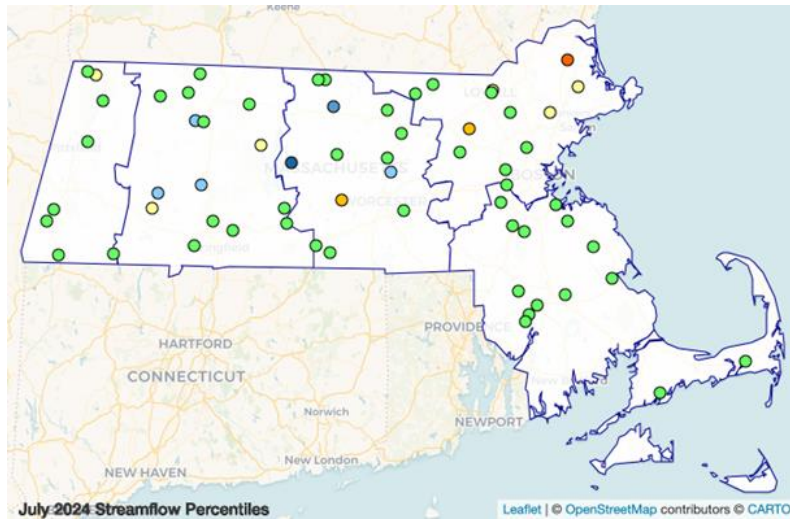
Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

REGION	MEDIAN 2-MONTH EDDI (2024-09-30)
WESTERN	56
CTRV	58
CENTRAL	58
NORTHEAST	51
SOUTHEAST	49
CAPE COD	55
ISLANDS	52

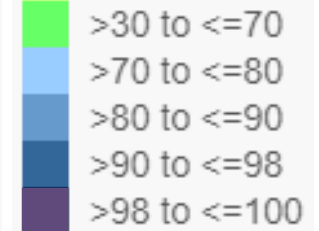
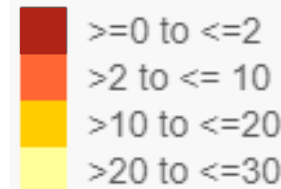
Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches



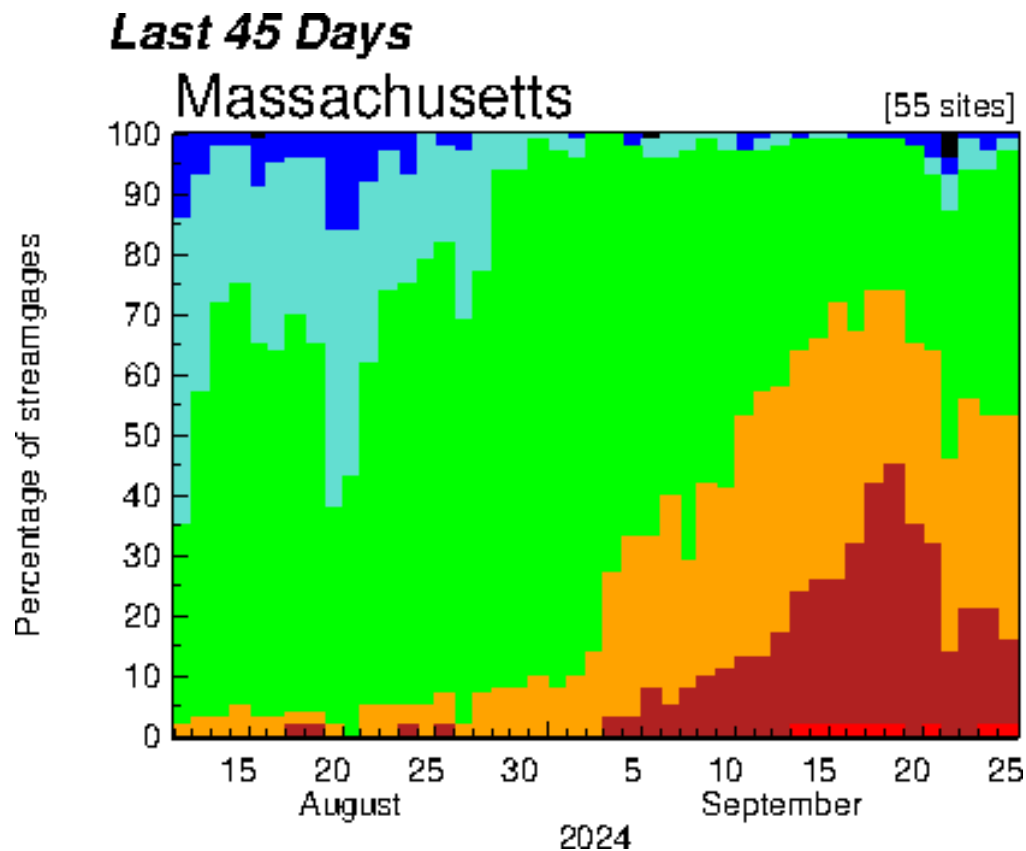
Streamflow Percentiles of Monthly Median



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		

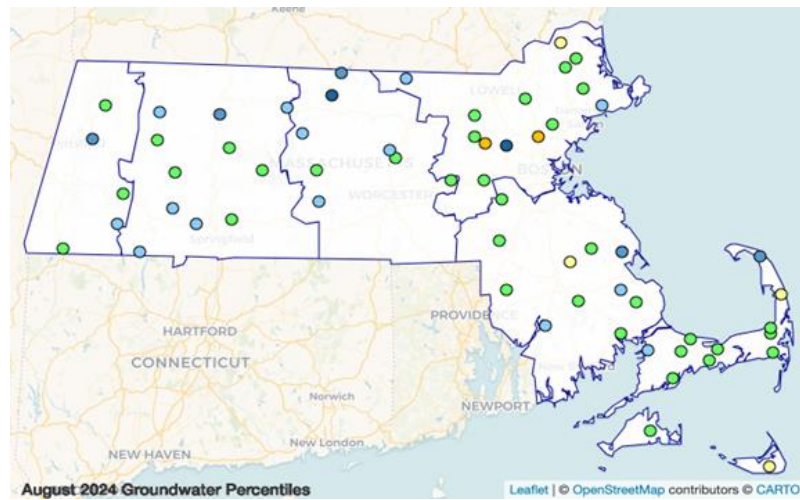
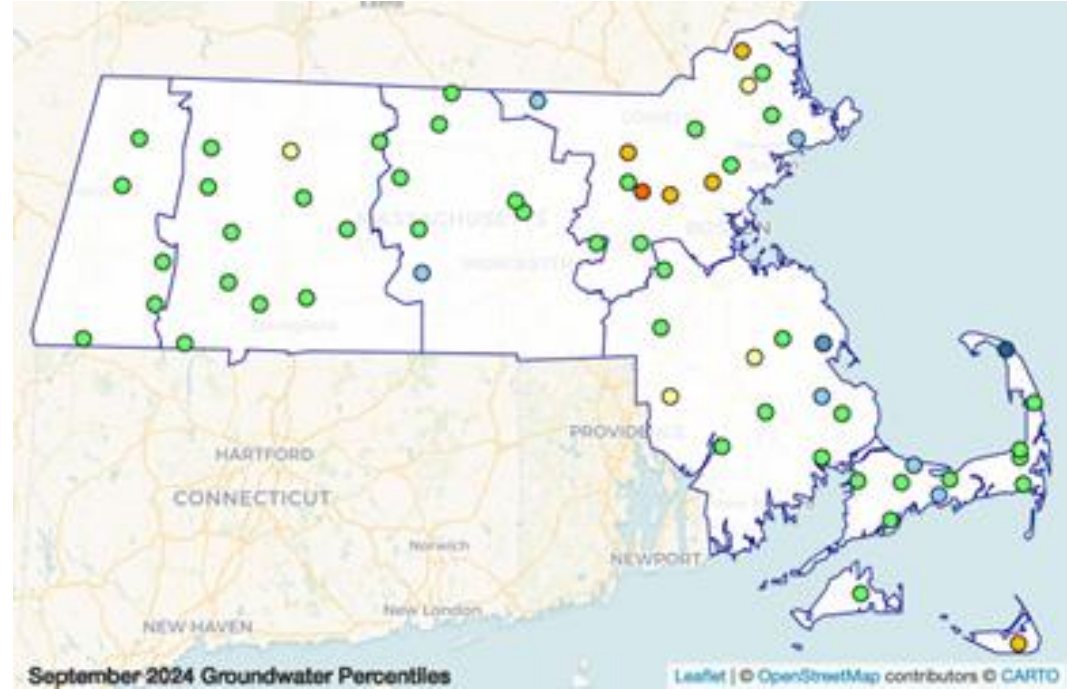
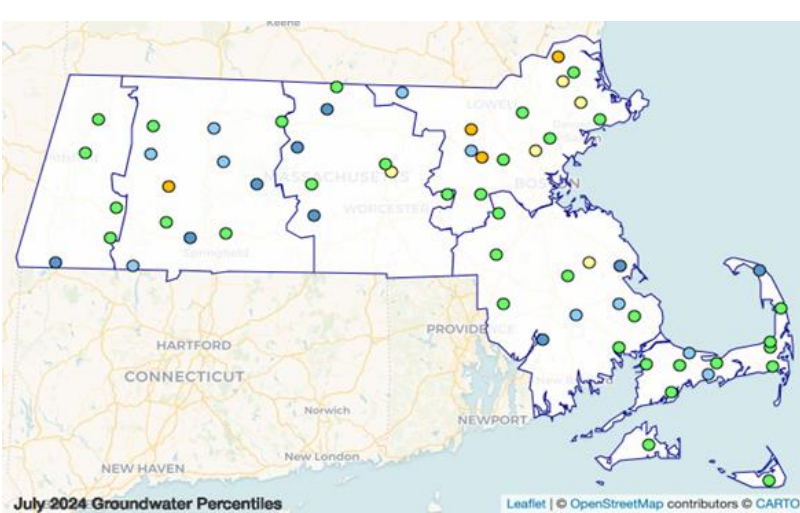
Streamflow Index

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	2	3	1	0	13
CTRV	15	0	0	1	4	0	38
CENTRAL	13	1	1	5	2	0	19
NORTHEAST	13	1	2	3	3	0	21
SOUTHEAST	12	0	1	6	2	0	20
CAPE COD	2	0	0	0	1	0	43





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

-  ≥ 0 to ≤ 2
-  > 2 to ≤ 10
-  > 10 to ≤ 20
-  > 20 to ≤ 30

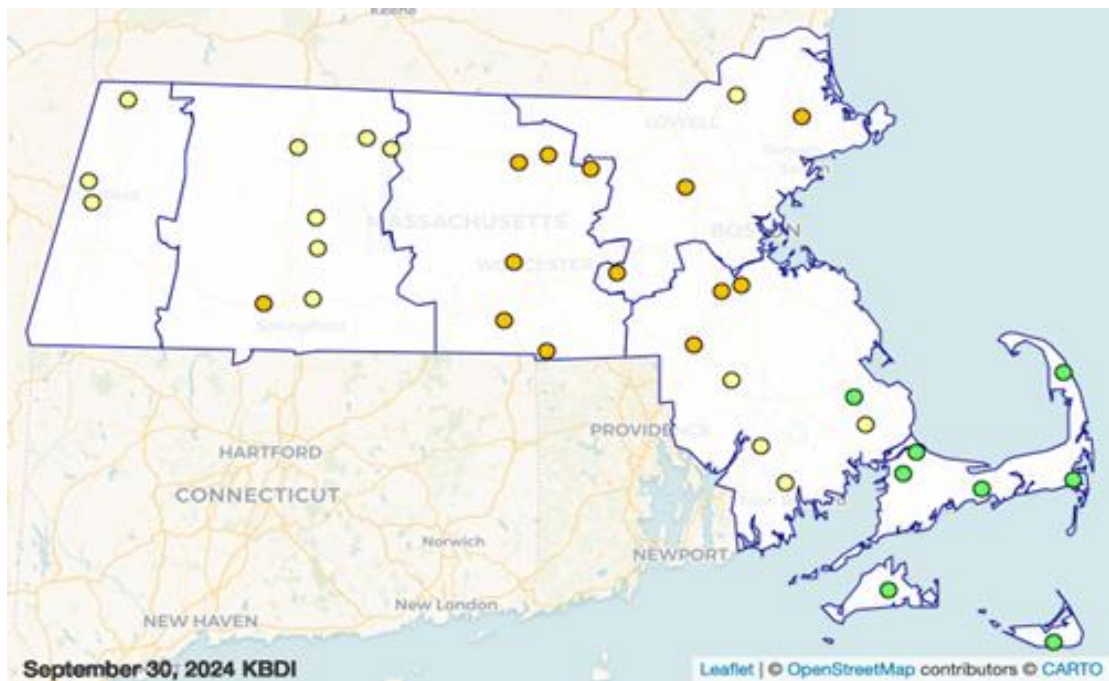
-  > 30 to ≤ 70
-  > 70 to ≤ 80
-  > 80 to ≤ 90
-  > 90 to ≤ 98
-  > 98 to ≤ 100

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	42
CTRV	11	0	0	0	1	0	41
CENTRAL	8	0	0	0	0	0	57
NORTHEAST	14	0	1	4	1	0	36
SOUTHEAST	12	0	0	0	2	0	54
CAPE COD	11	0	0	0	0	1	57
ISLANDS	2	0	0	1	0	0	40

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	306
CTRV	7	409
CENTRAL	6	548
NORTHEAST	4	555
SOUTHEAST	8	532
CAPE COD	5	45
ISLANDS	2	71

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	0	ID
CTRV	2	45th
CENTRAL	4	42nd
NORTHEAST	5	36th
SOUTHEAST	2	49th
CAPE COD	1	68th

Notes:

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

ID = insufficient data

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

Drought Indices by Region, August 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mos)	61	65	50	33	34	25	75
Streamflow	70	79	78	60	63	45	N/A
Groundwater	69	72	78	53	60	59	42
Lakes/ Impoundments	85	42	67	29	56	59	N/A
ET	67	65	63	60	63	53	47
KBDI	185	266	455	504	547	495	378

Declaration (09/09 meeting)	Level 0	Level 0	Level 0	Level 1 Parker RiverBasin	Level 0	Level 0	Level 0
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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, September 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (2 mos)	32	29	30	28	34	56	55
Streamflow	13	38	19	21	20	43	N/A
Groundwater	42	41	57	36	54	57	40
Lakes/ Impoundments	ID	45	42	36	49	68	N/A
ET	56	58	58	51	49	55	52
KBDI	306	409	548	555	532	45	71

<i>Recommend (10/08 meeting)</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 0</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

All Basins with Potential Drought Level >0 Except Central & NE which are expected at L1

Basin	Drought Region	2-month SPI	Streamflow	Groundwater	KBDI	ET	Potential Drought Level
Hudson	W	8	14	33	268	52	2
Deerfield	CTRV	29	29	25	348	52	1
Quinebaug	CTRV/Central	17	20	-	-	63	1
Boston Harbor	SE	23	19	13	532	49	2
Ten Mile	SE	18	-	25	-	49	1