

# Hydrologic Conditions in Massachusetts for August 2024

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DCR Office of Water Resources

## **Drought Management Task Force**

September 9, 2024

Meeting Co-Chairs: EOEEA, MEMA



# MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



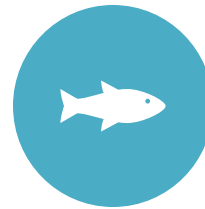
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and  
Impoundments (20)



KBDI - Fire Danger  
(36)



Evapotranspiration  
(national map)

# MA Drought Management Plan

## Index Severity Levels

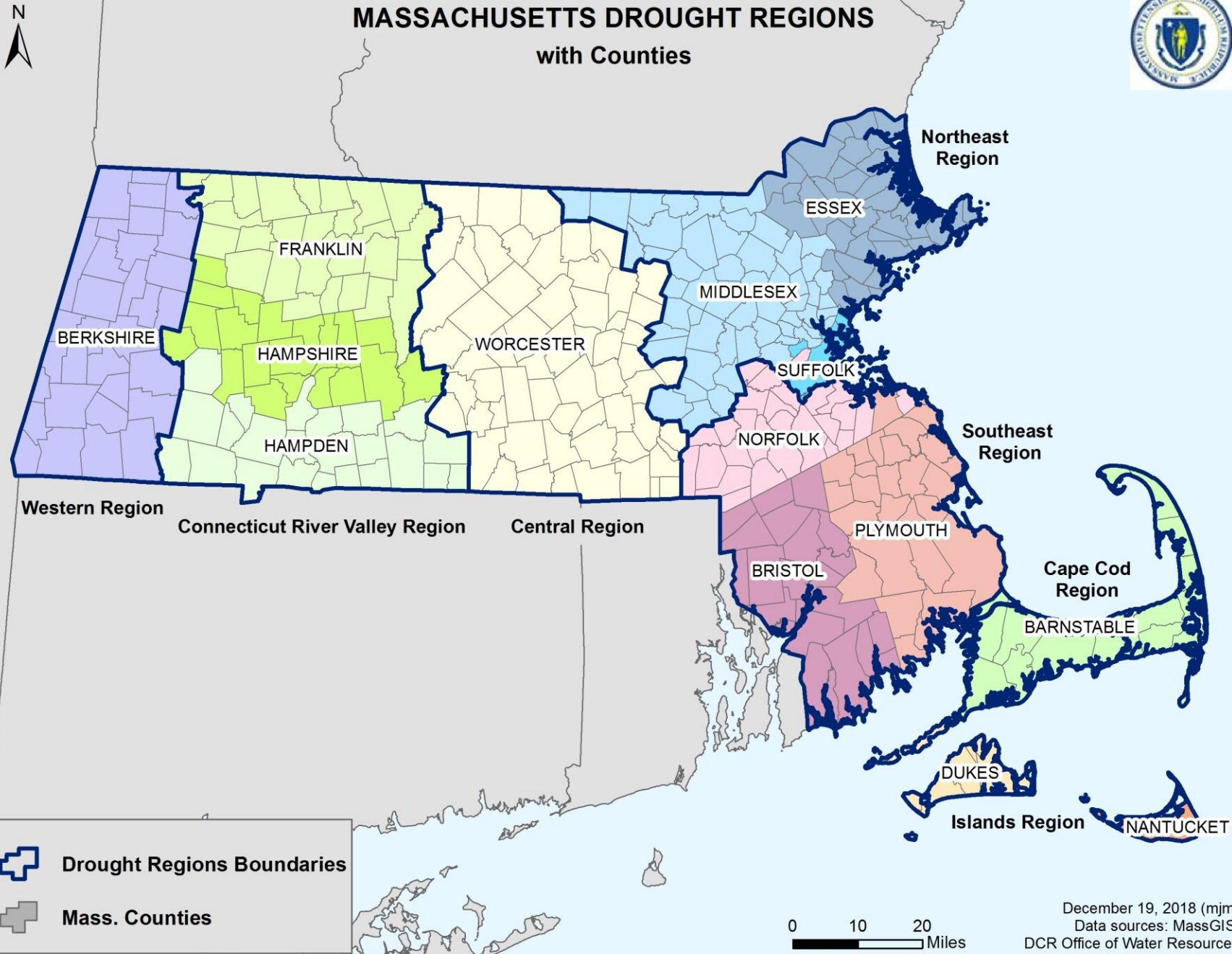
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments, Groundwater, and Evapotranspiration	Keetch-Byram Drought Index
0	>30 <sup>th</sup> percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

# MA Drought Management Plan

## Drought Levels



# MASSACHUSETTS DROUGHT REGIONS with Counties



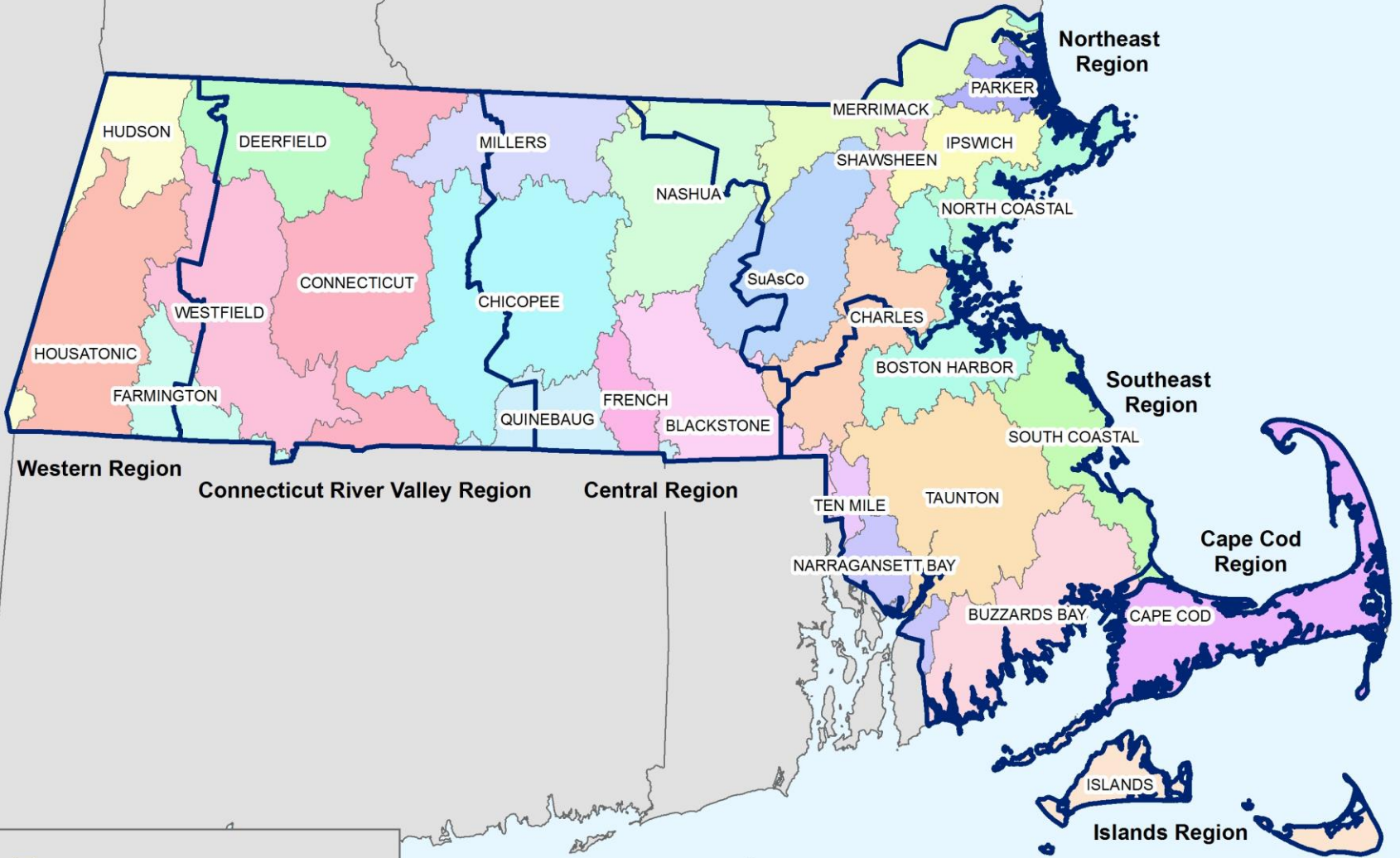
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20  
Miles

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

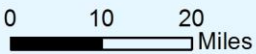


# MASSACHUSETTS DROUGHT REGIONS with Watersheds



 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



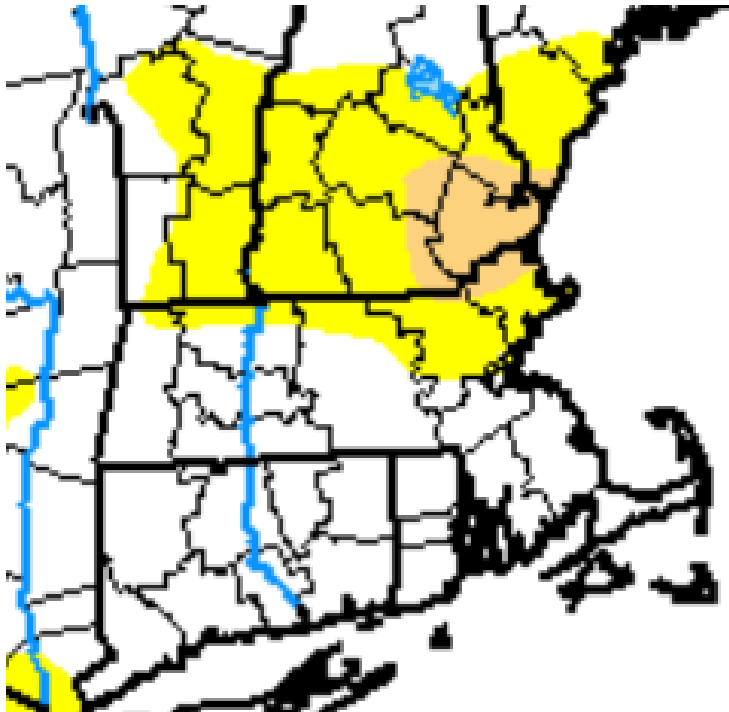
Public Health  
Impacts

# Recent Hydrologic History

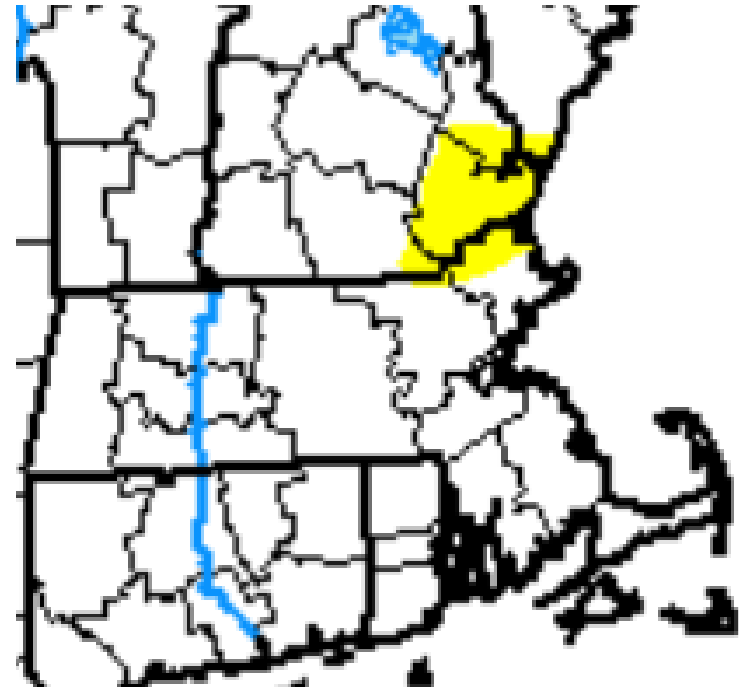
- **Week of May 29 –through June**
  - **Western Region:** more than 1 below-normal index
- **July**
  - **Western Region:** easing of dry conditions
  - **Northeast Region and along northern border:** intensification of dry conditions especially in the Parker River Basin
- **August**
  - **Parker River Basin:** easing of dry conditions but streamflow remains significantly low
  - **Cape and Islands:** dry conditions developing



# US Drought Monitor



Data through July 30 , 2024

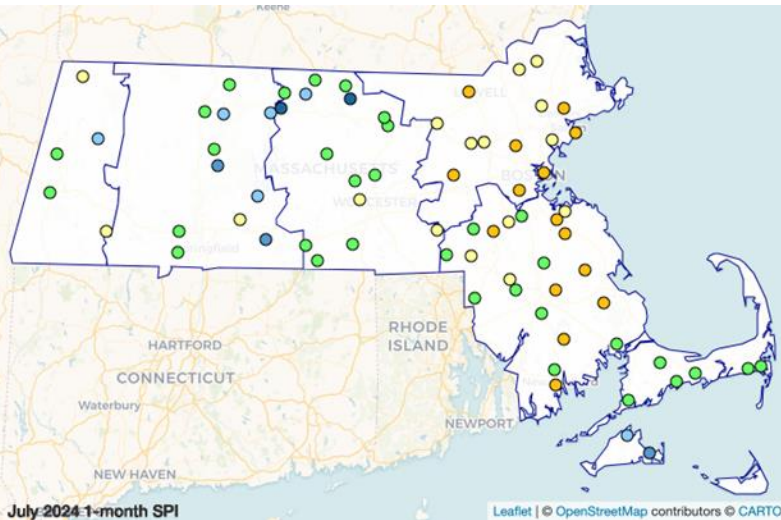
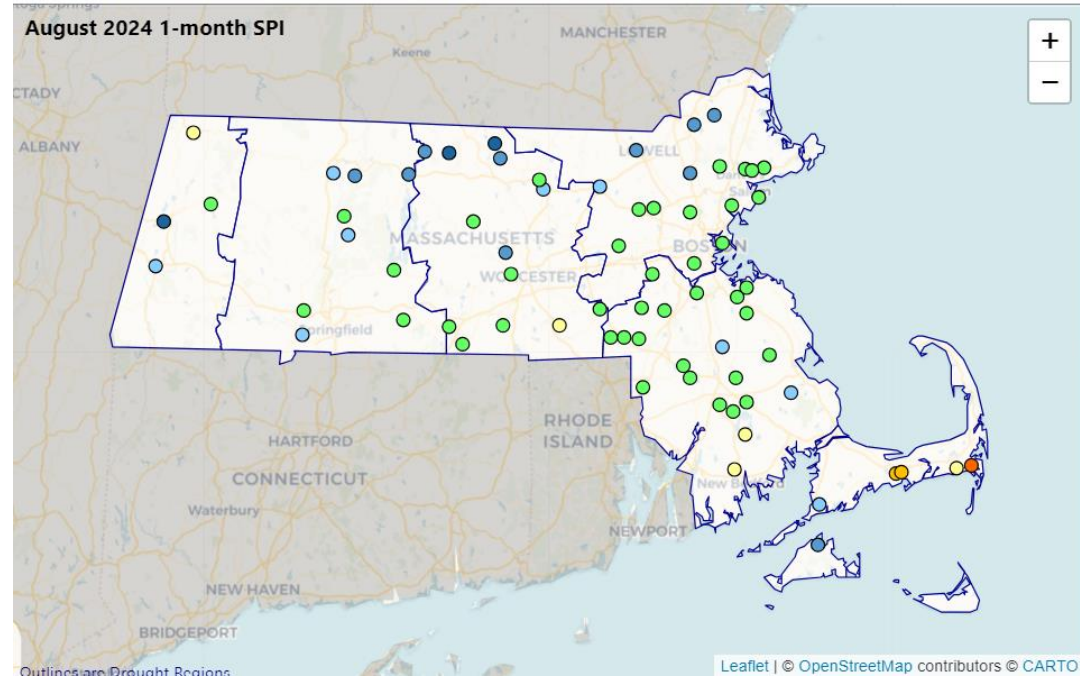
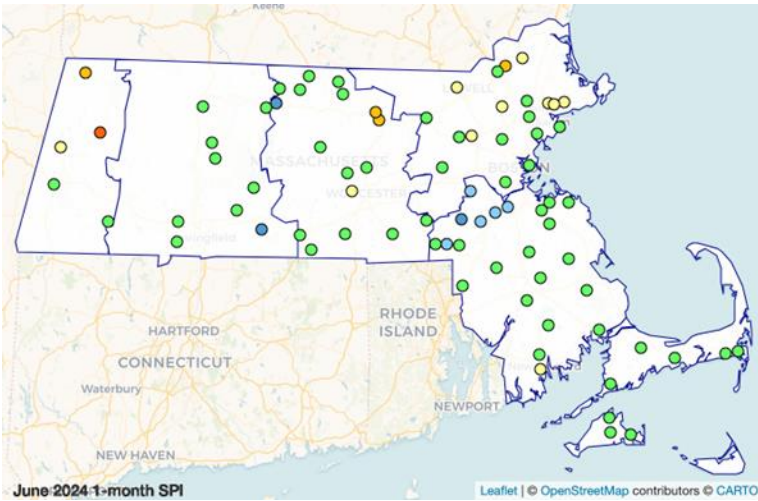


Data through August 27, 2024

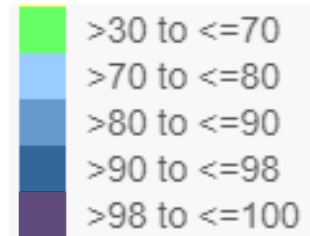
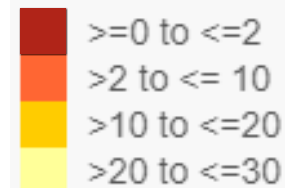
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

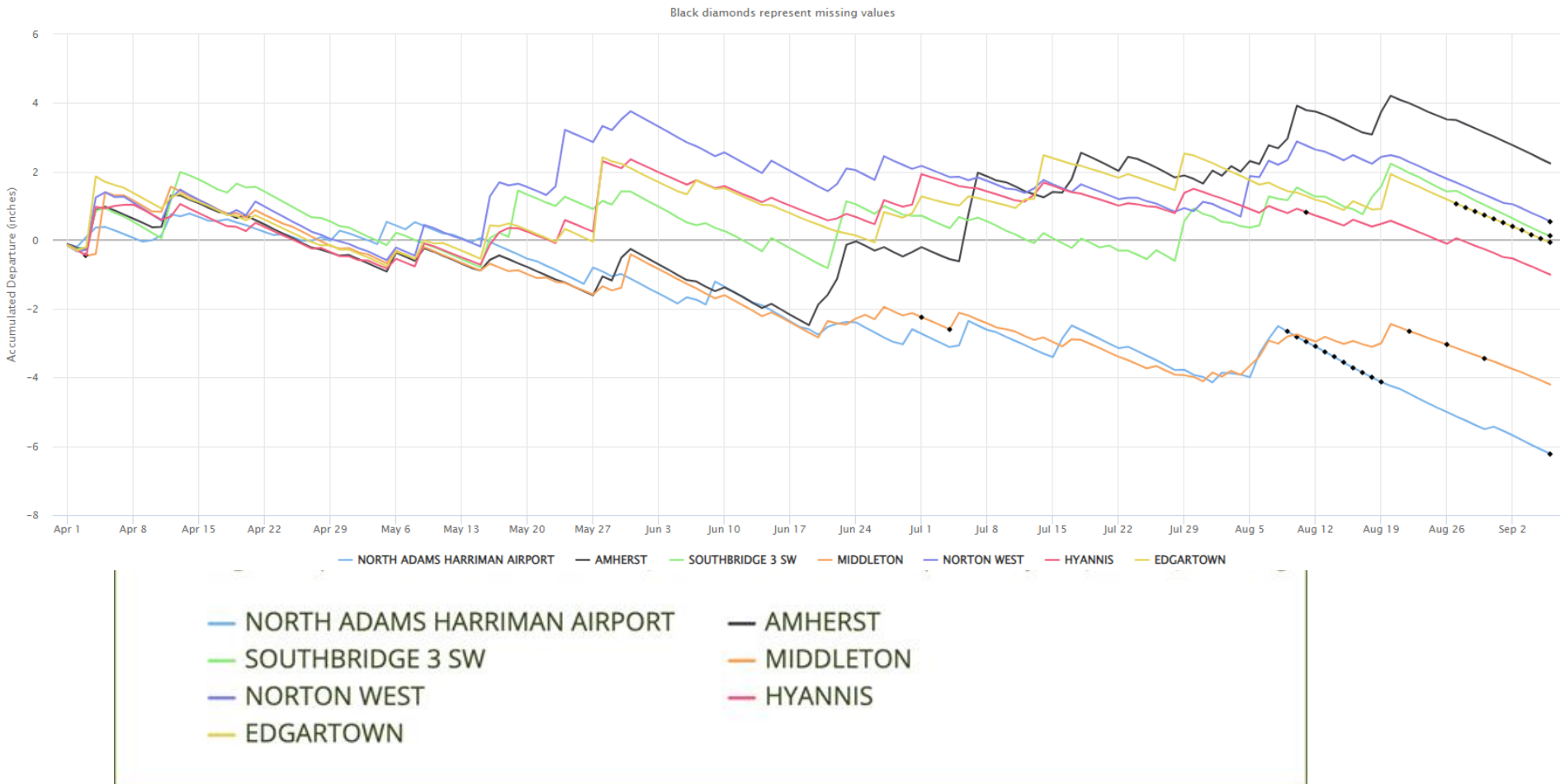
# Standardized Precipitation Index



## 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	4	69	74	61	70	82	67	83	80
CTRV	9	71	75	65	89	95	93	95	83
CENTRAL	14	67	58	50	85	96	93	98	95
NORTHEAST	17	58	35	33	70	84	75	93	79
SOUTHEAST	22	45	29	34	86	94	90	92	85
CAPE COD	5	19	28	25	52	61	32	75	90
ISLANDS	1	84	85	75	NA	NA	NA	NA	NA

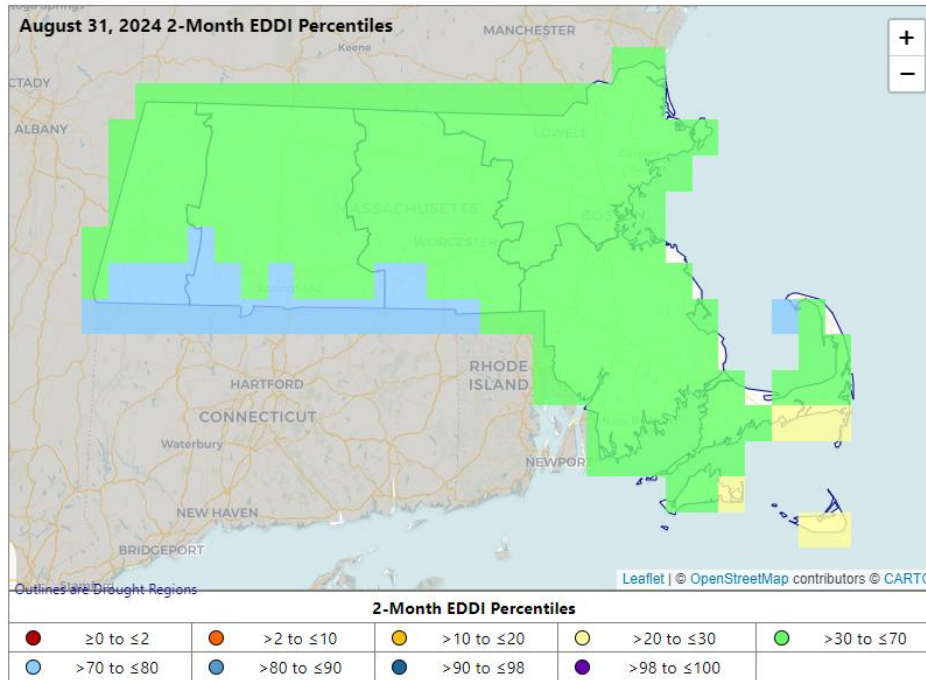
\* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

N/A: Not Available

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

# Evapotranspiration

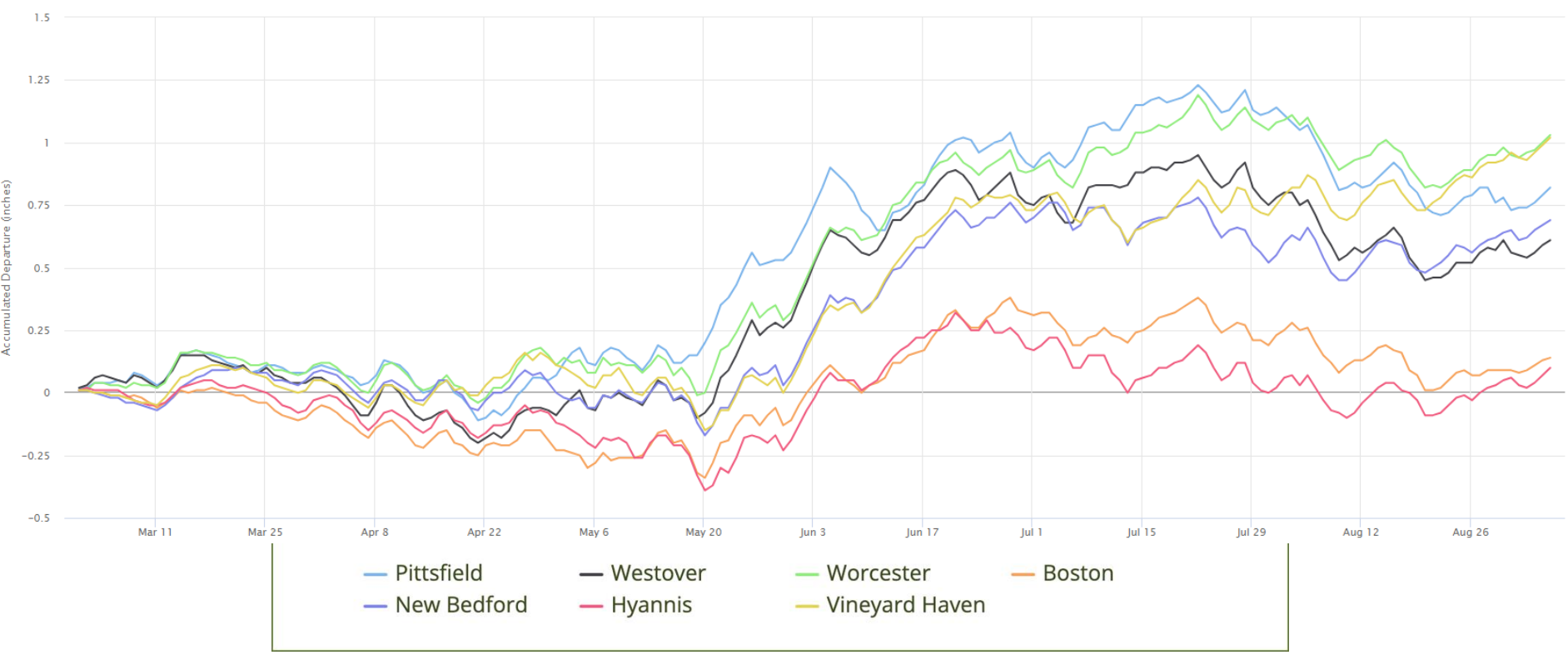
2-month



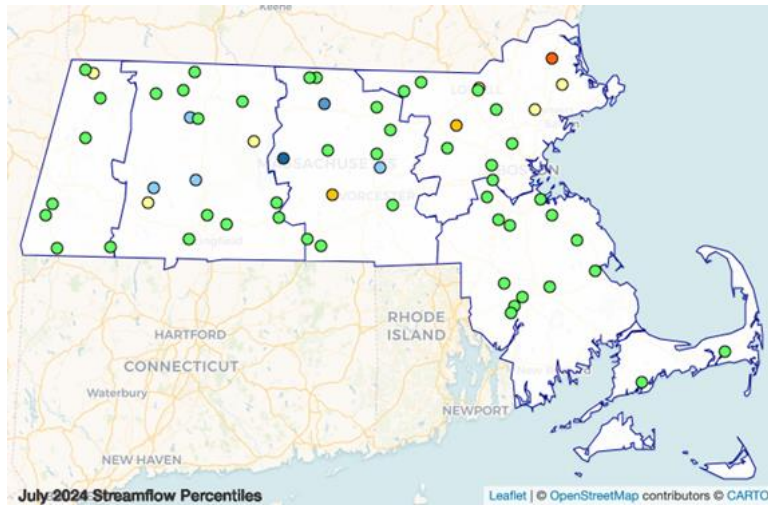
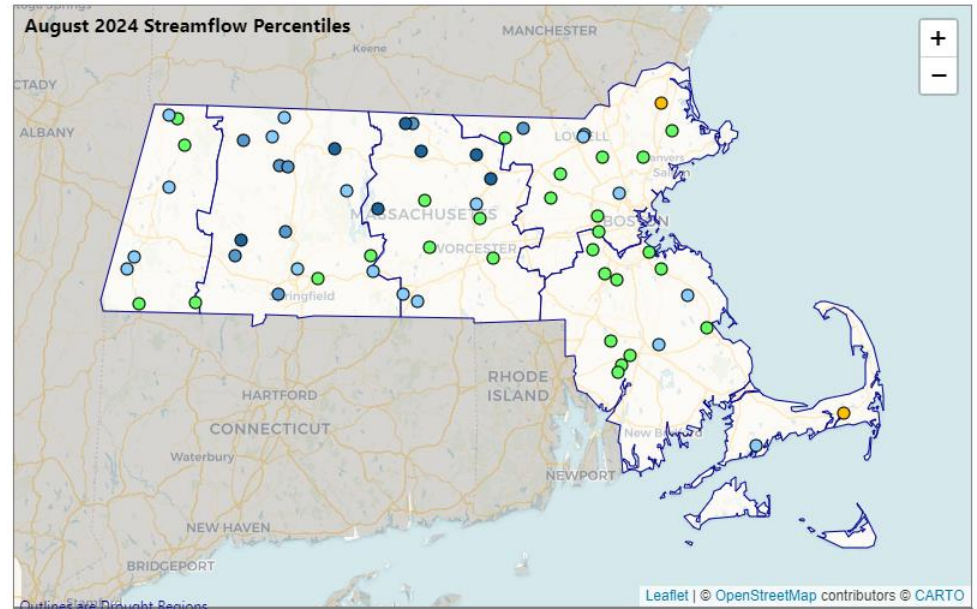
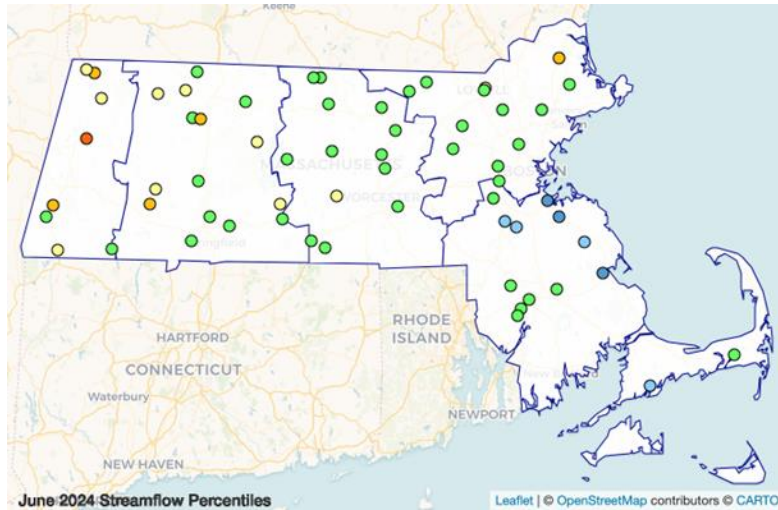
REGION	MEDIAN 2-MONTH EDDI (2024-08-31)
WESTERN	67
CTRV	65
CENTRAL	63
NORTHEAST	60
SOUTHEAST	63
CAPE COD	53
ISLANDS	47

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

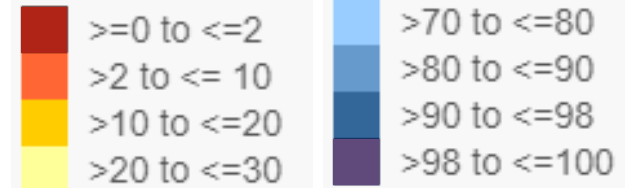
# Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches



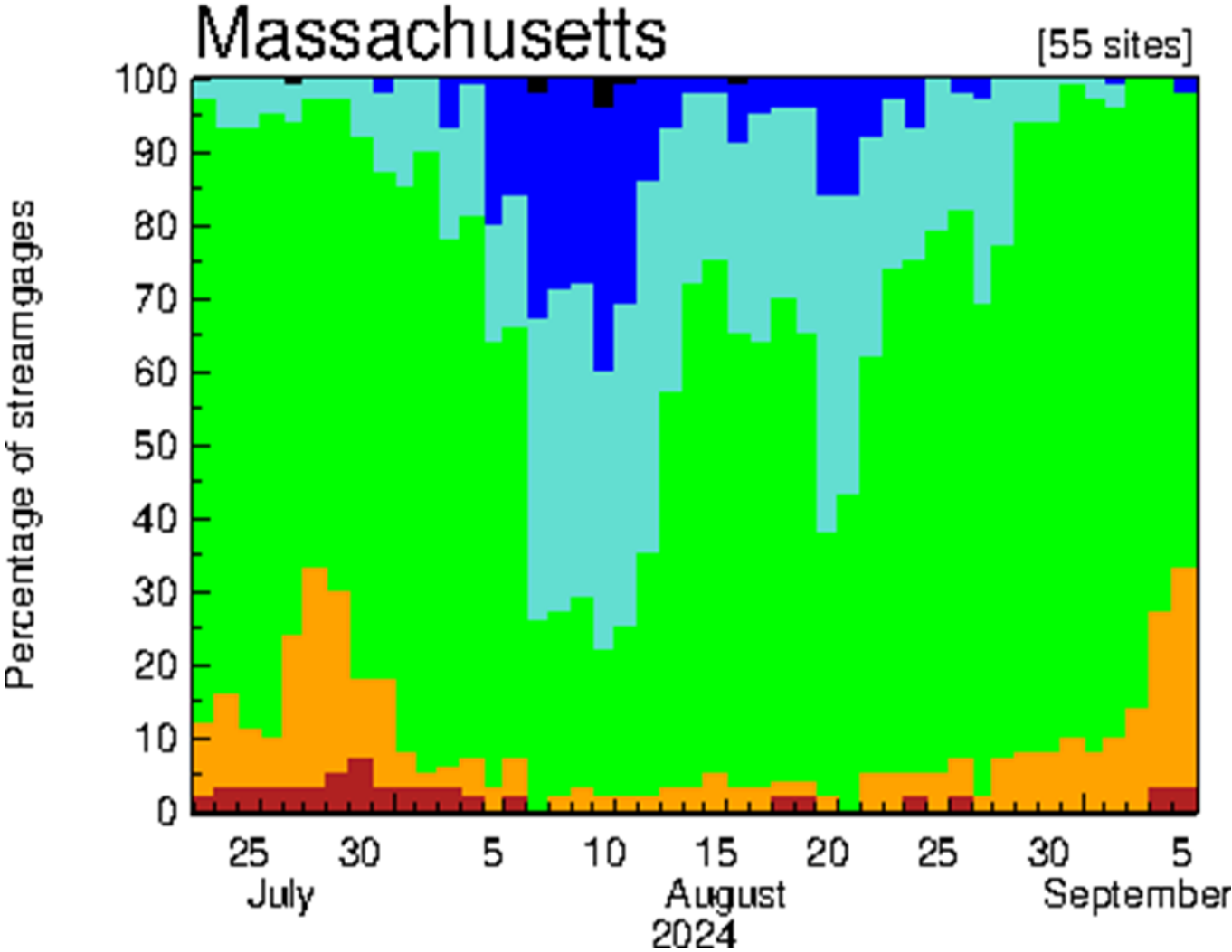
# Streamflow Percentiles of Monthly Median



## 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		



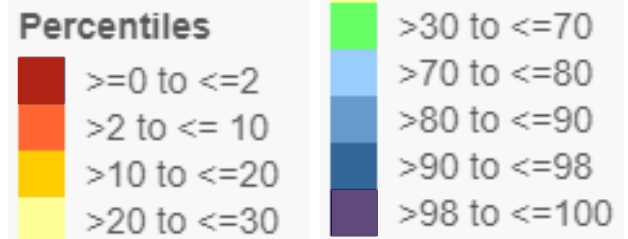
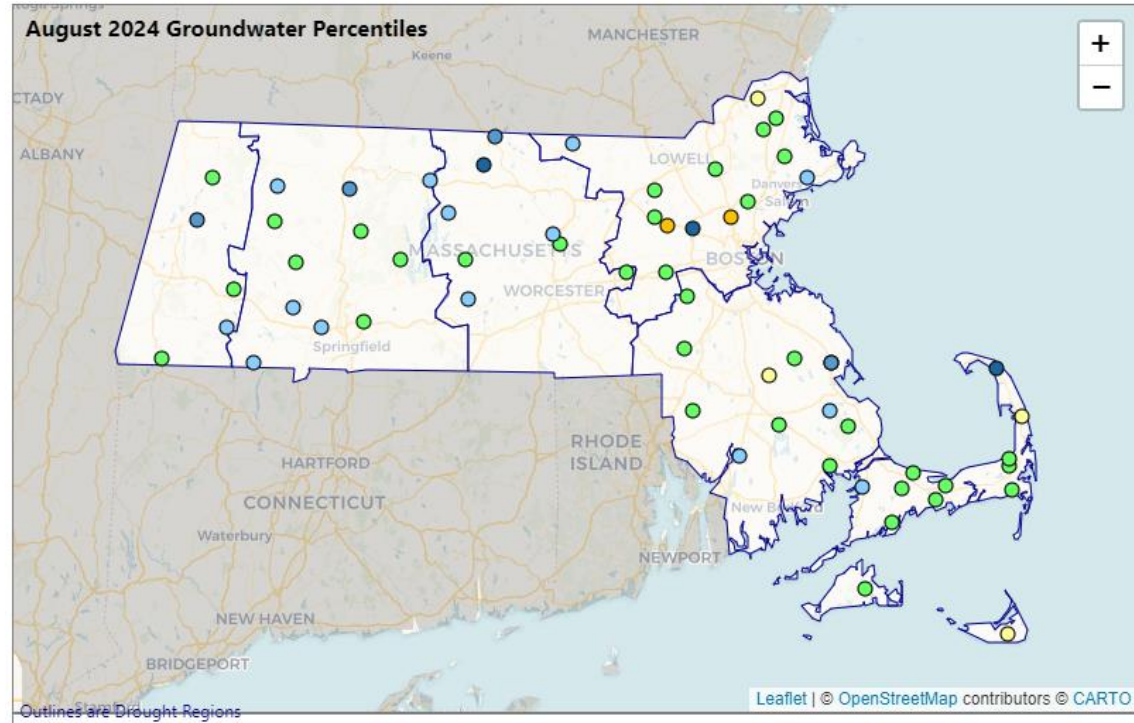
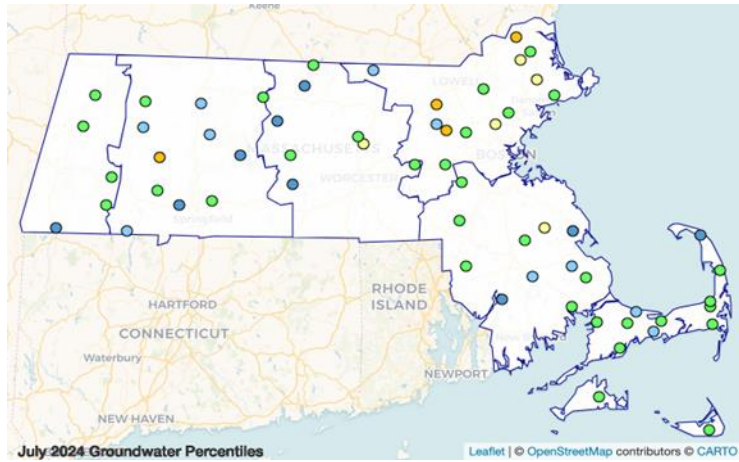
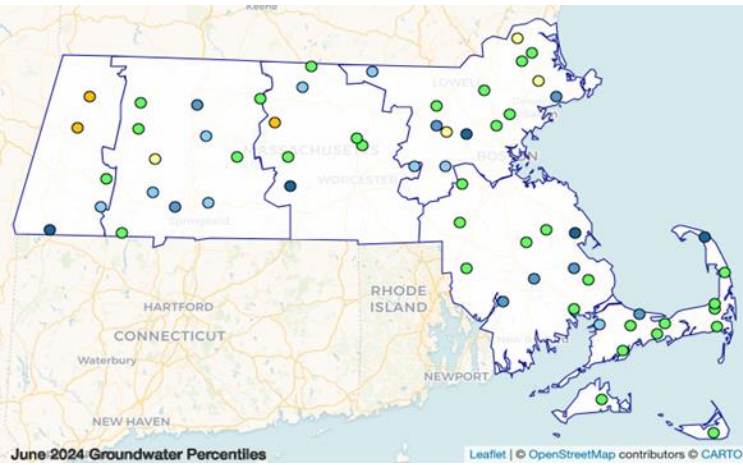
# Streamflow Index

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	0	0	70
CTRV	15	0	0	0	0	2	79
CENTRAL	13	0	0	0	0	5	78
NORTHEAST	13	0	0	1	0	0	60
SOUTHEAST	12	0	0	0	0	0	63
CAPE COD	2	0	0	1	0	0	45

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

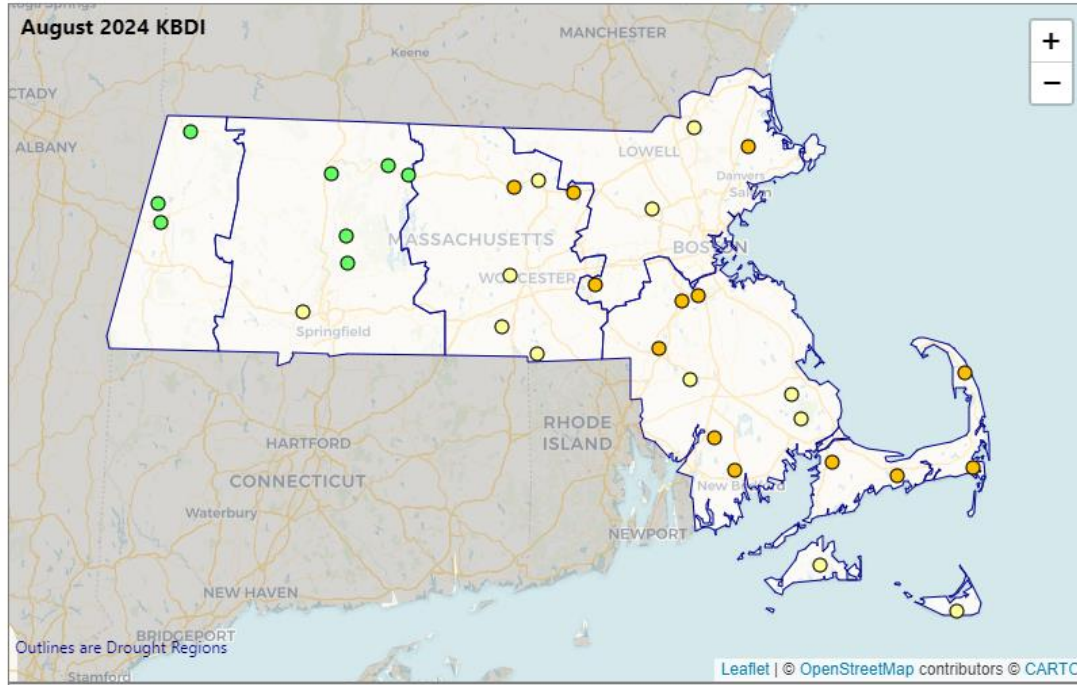


# Groundwater Index

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	69
CTRV	11	0	0	0	0	0	72
CENTRAL	8	0	0	0	0	1	78
NORTHEAST	14	0	0	2	1	1	53
SOUTHEAST	12	0	0	0	1	0	60
CAPE COD	11	0	0	0	1	1	59
ISLANDS	2	0	0	0	1	0	42

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

# KBDI - Top 8 inches of soil moisture

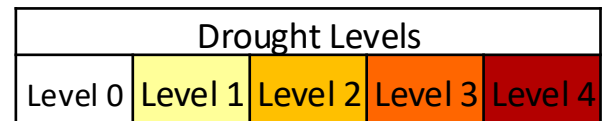


**Point Values - KBDI Range**



REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	3	185
CTRV	6	266
CENTRAL	6	455
NORTHEAST	4	504
SOUTHEAST	8	547
CAPE COD	4	495
ISLANDS	2	378

**Drought Levels**



# Lakes & Impoundments

REGION	NUMBER OF SITES REPORTING	MEDIAN OF INDIVIDUAL PERCENTILES OR PERCENT FULL
WESTERN	1	85th
CTRV	2	42nd
CENTRAL	1	67th
NORTHEAST	3	29th
SOUTHEAST	2	56th
CAPE COD	1	59th

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, 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
<b><i>Declaration for August</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 1 Parker RiverBasin</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>

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, 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

<b><i>Recommend (09/09 meeting)</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>	<b><i>Level 0</i></b>
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Drought Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

# Parker River Basin, July and August 2024

Index	July	August
Precipitation*	L1	L0
Streamflow	8 <sup>th</sup>	16 <sup>th</sup>
Groundwater	38 <sup>th</sup>	49 <sup>th</sup>
Lakes/ Impoundments	NA	NA
ET	34 <sup>th</sup>	64 <sup>th</sup>
KBDI*	L1	L1/L2

\*Derived from nearest sites and the Northeast Drought Early Warning System website because no precipitation or KBDI stations within the Parker River Basin.