

Hydrologic Conditions in Massachusetts for May 2023

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DCR Office of Water Resources

Drought Management Task Force

June 8, 2023

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



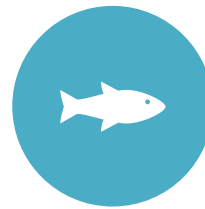
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

Data through January 31, 2023

MA Drought Management Plan

Index Severity Levels

Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch-Byram Drought Index	Crop Moisture Index
0	>30 th percentile	< 200	> -1.0
1	≤30 and >20	200-400	≤-1.0 and > -2.0
2	≤20 and >10	400-600	≤-2.0 and < -3.0
3	≤10 and >2	600-700	≤ -3.0 and > -4.0
4	≤2	700-800	≤-4.0

MA Drought Management Plan

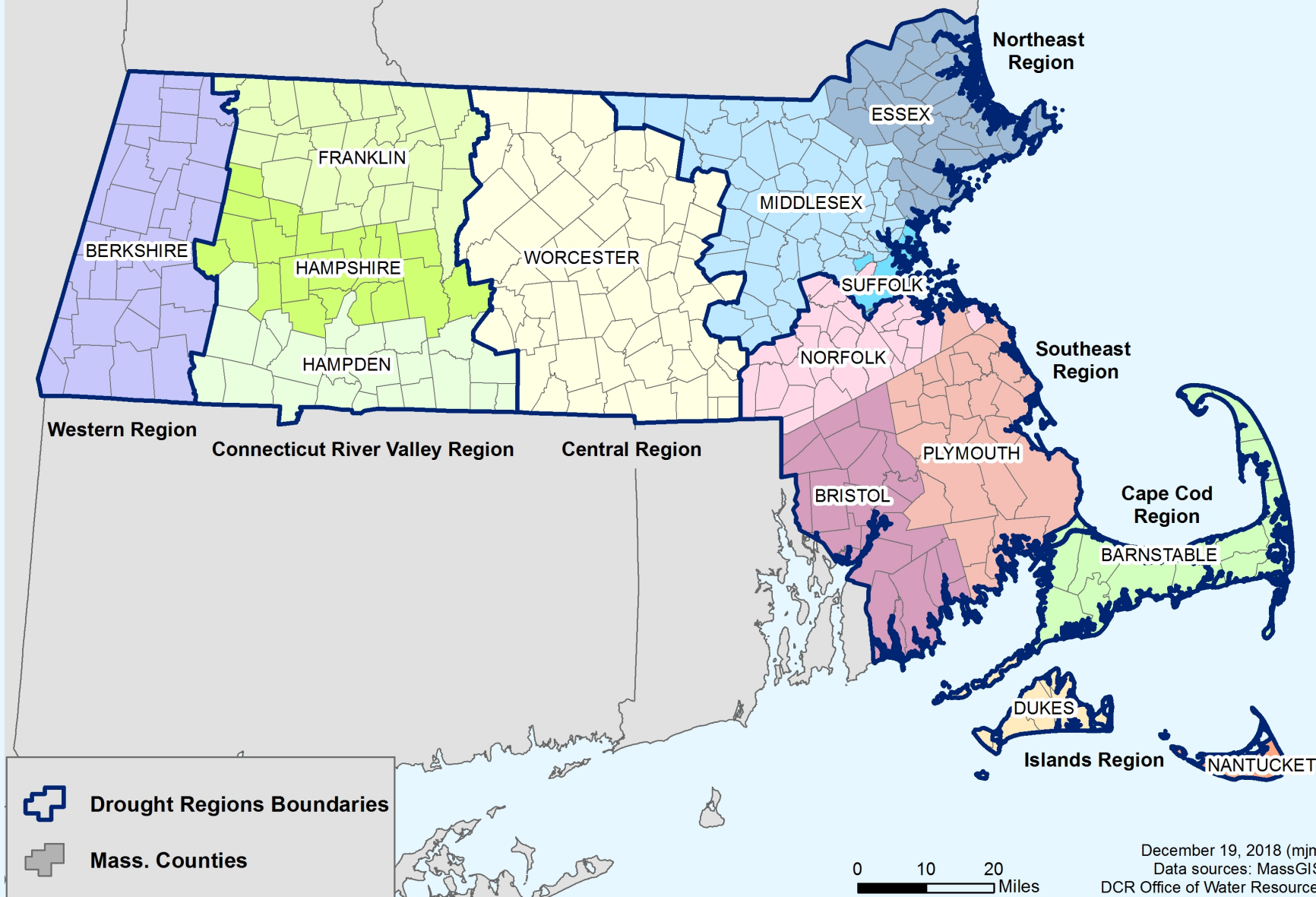
Drought Levels



Data through January 31, 2023

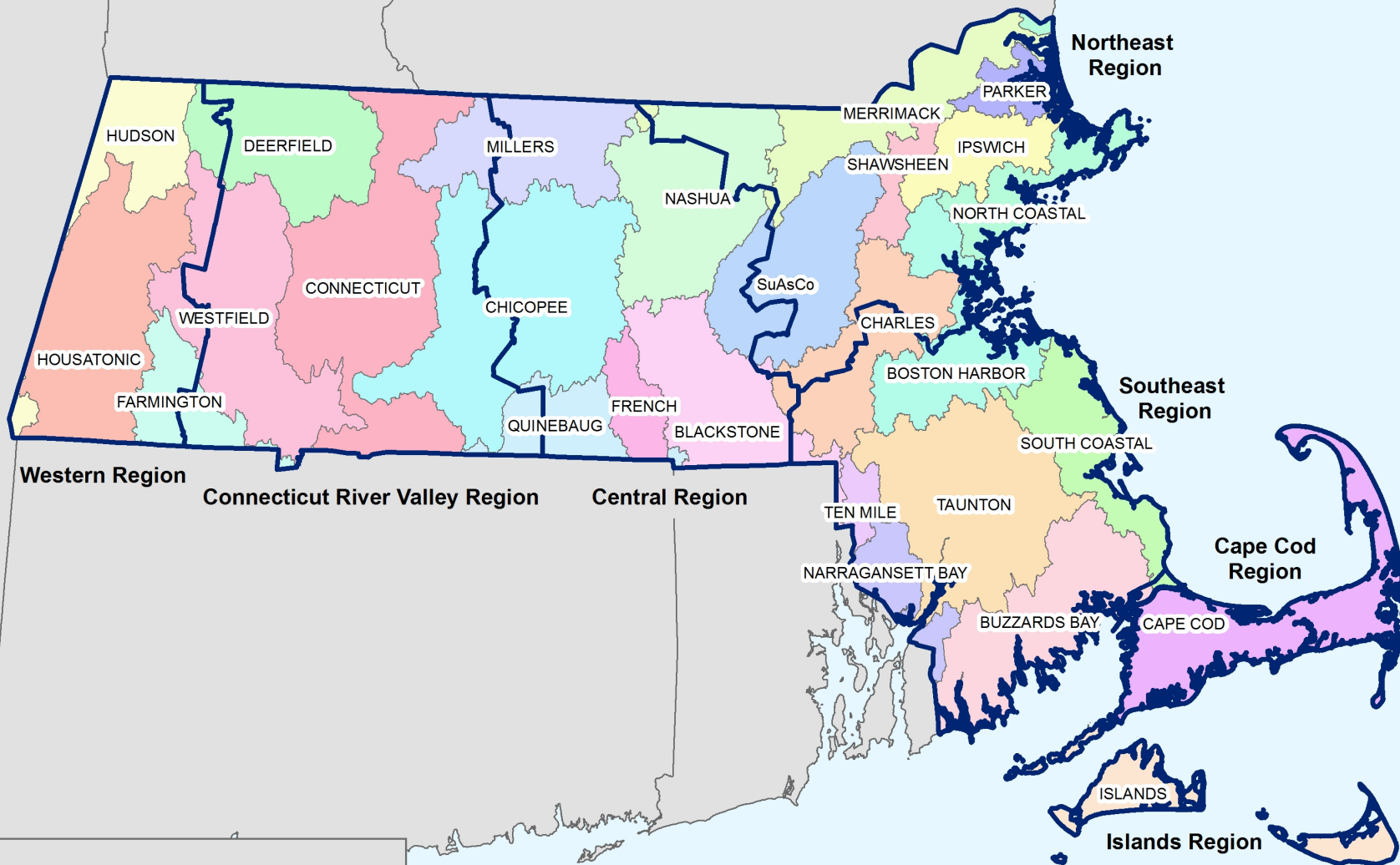



MASSACHUSETTS DROUGHT REGIONS with Counties





MASSACHUSETTS DROUGHT REGIONS with Watersheds



-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

Task Force Member Updates



Hydrologic
Conditions



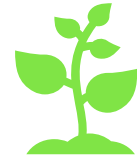
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts



Public Health
Impacts

Recent Hydrologic History

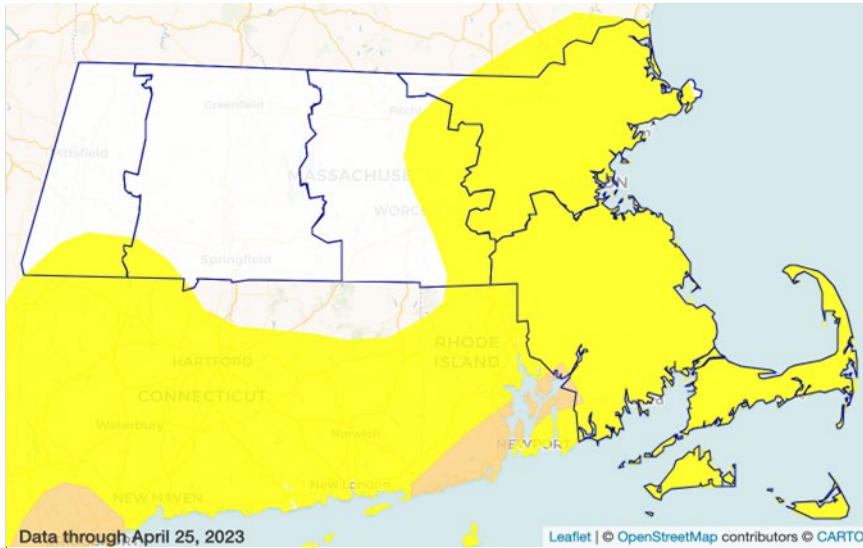
2022

- *April-December:* drought conditions

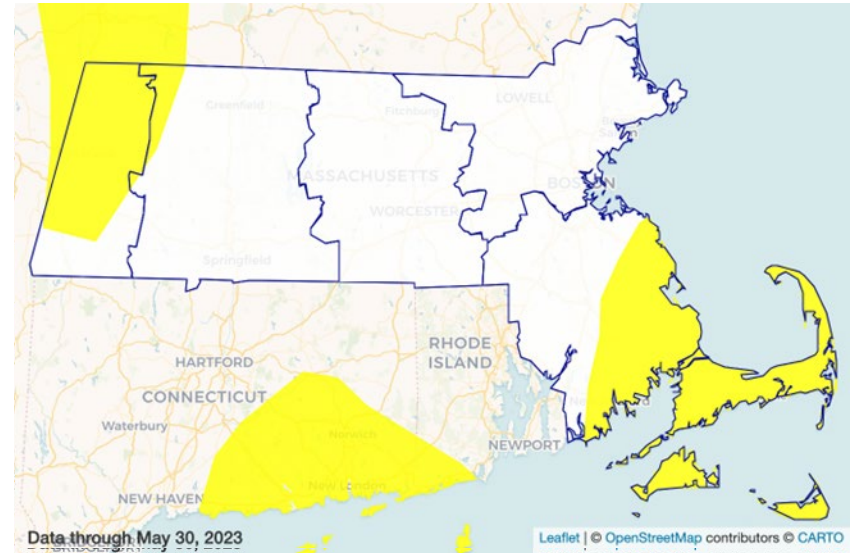
2023

- *February - May:*
 - variable precipitation across months and across the state
 - some above-normal temperatures including multiple heat waves
 - fluctuating impacts on streamflow and groundwater







US Drought Monitor



Data through April 25, 2023

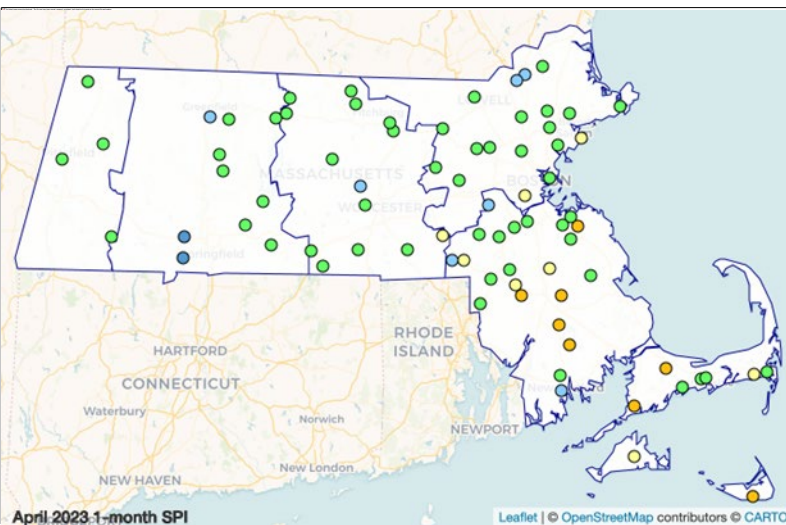
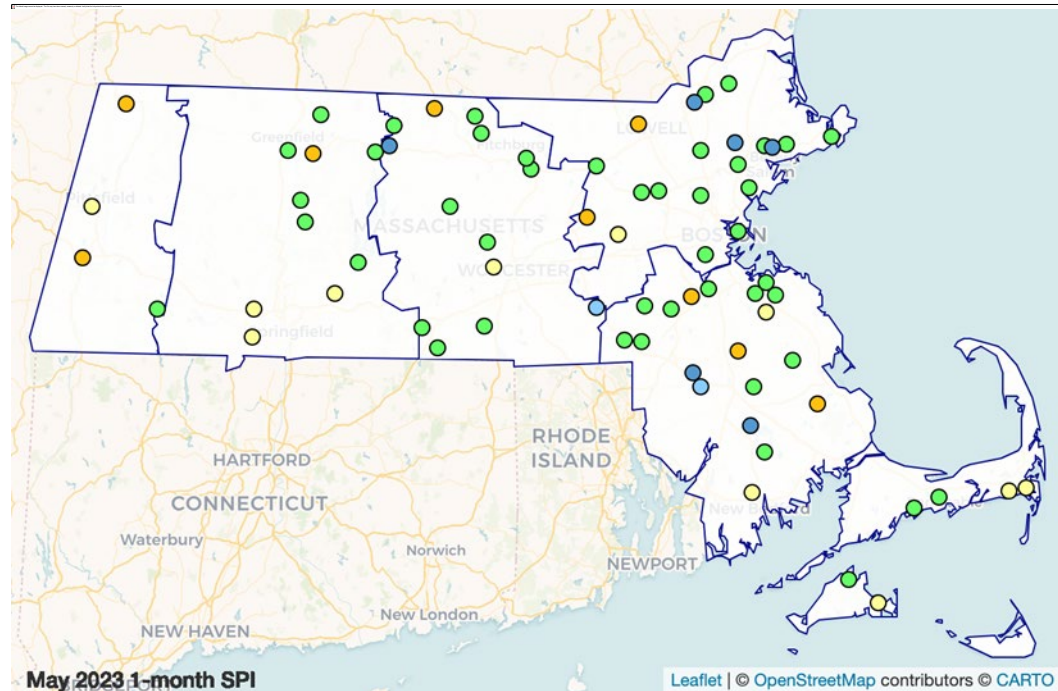
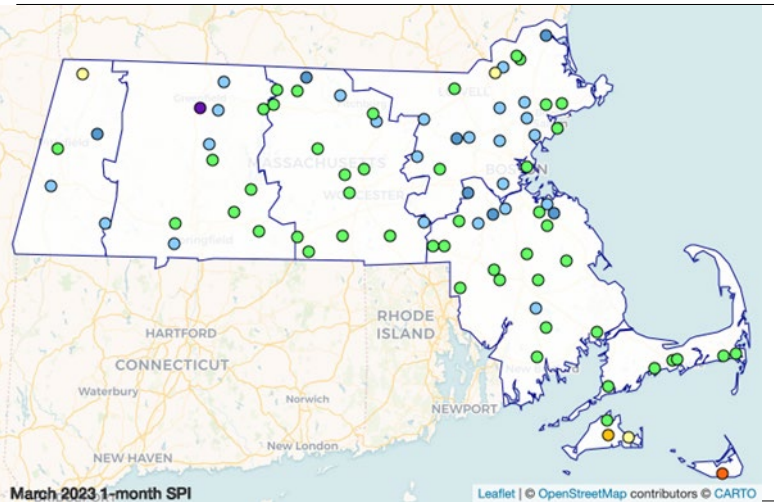


Data through May 30, 2023





	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

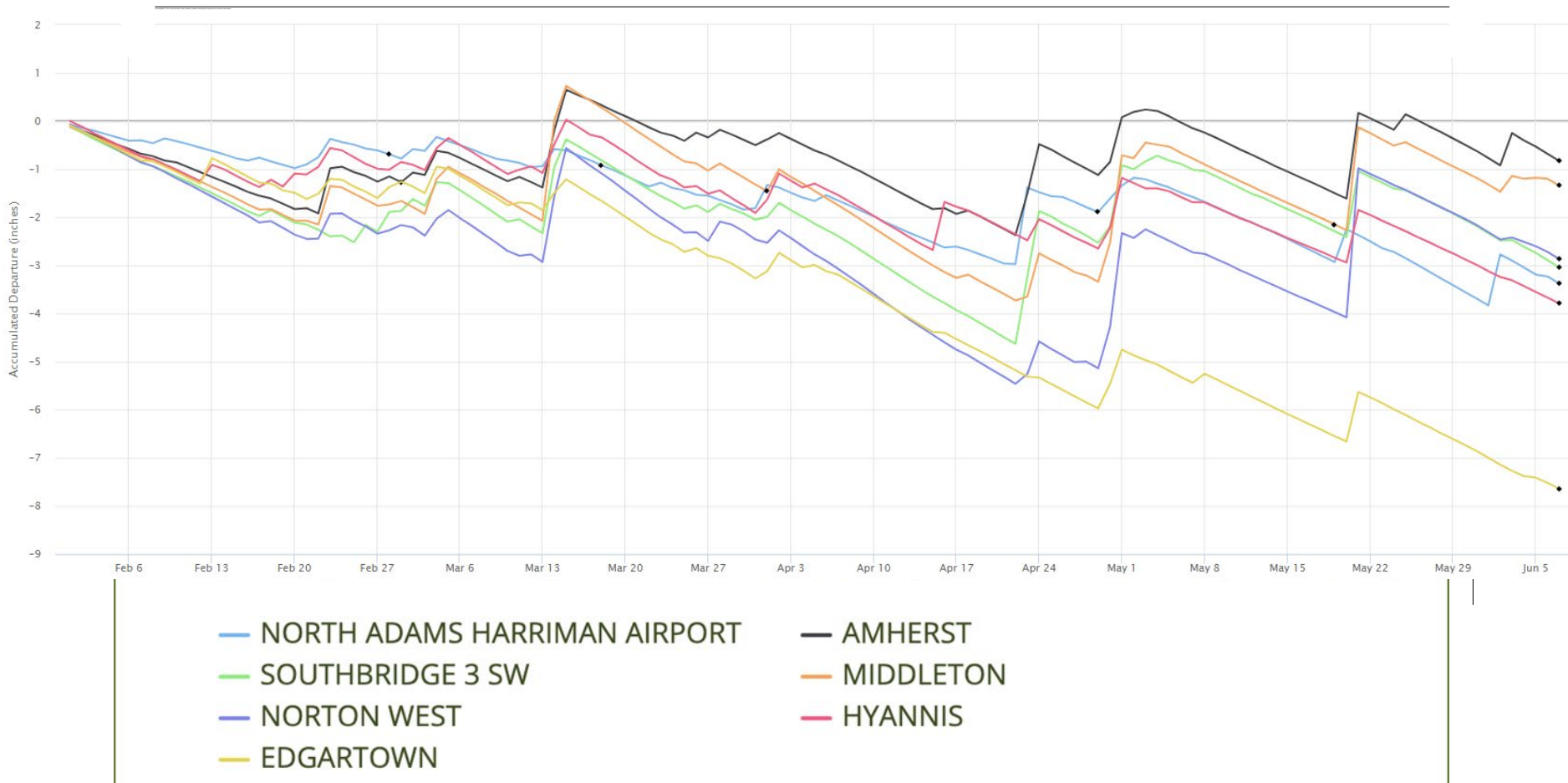


Percentiles

 ≥ 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

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.

Data starting February 1, 2023

Standardized Precipitation Index as Percentile, May

REGION	NUMBER OF SITES	1-mo *	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo*
WESTERN	4	16	26	38	58	74	43	83	70
CTRV	10	40	49	56	75	78	51	76	69
CENTRAL	14	50	46	55	82	85	61	87	77
NORTHEAST	20	45	47	58	76	60	32	67	73
SOUTHEAST	19	51	34	46	65	68	55	71	61
CAPE COD	4	31	27	25	81	85	69	73	27
ISLANDS	2	37	21	20	56	61	44	22	10

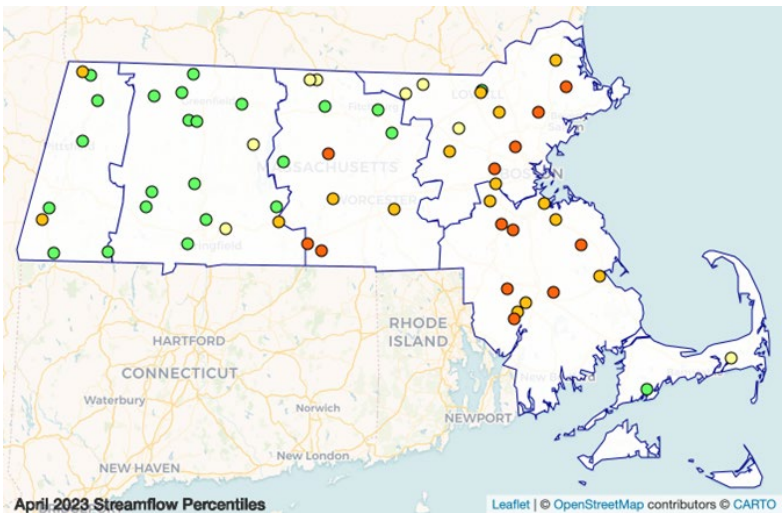
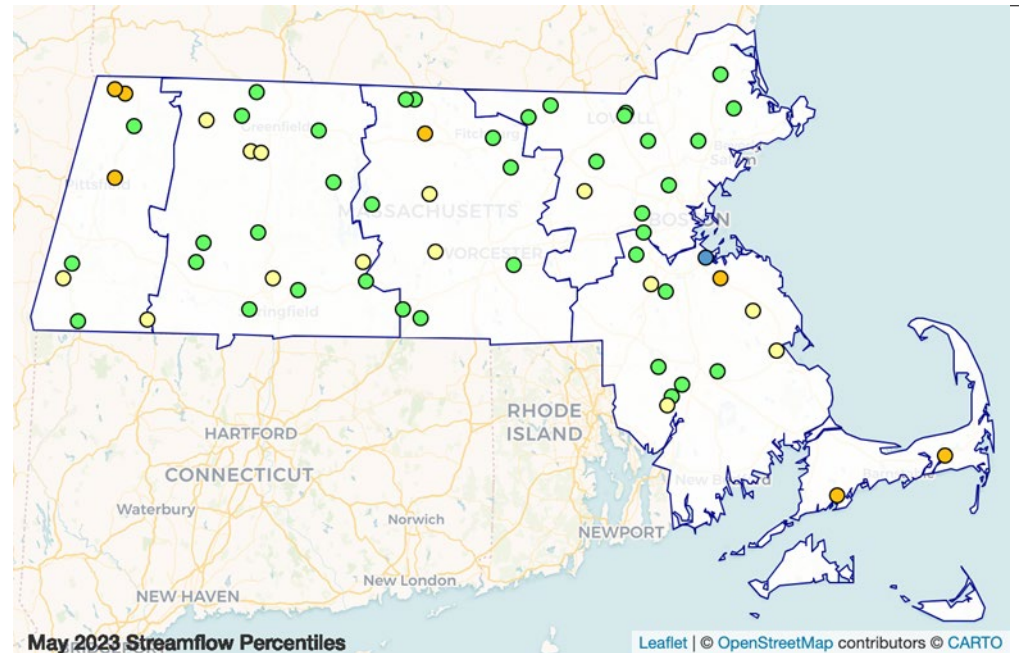
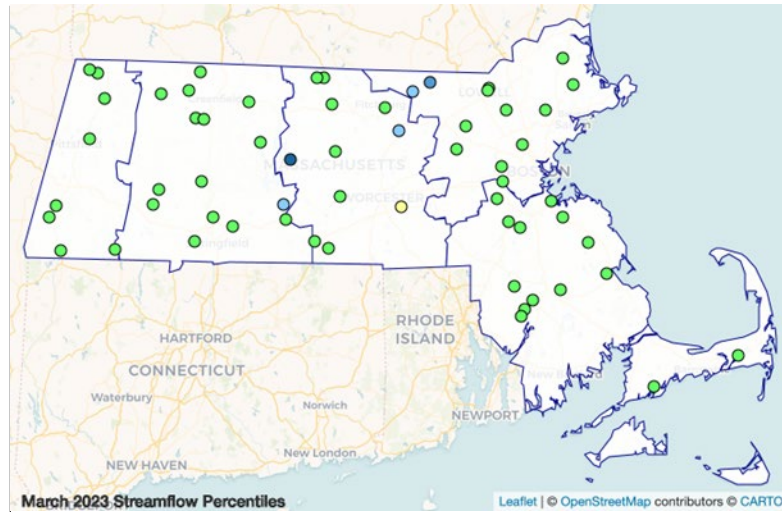
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

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

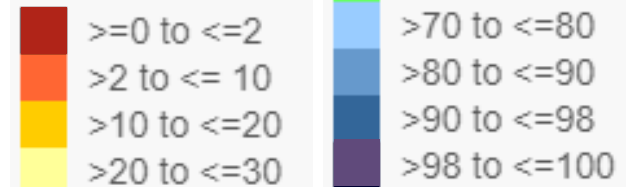
Data through May 31, 2023

Streamflow

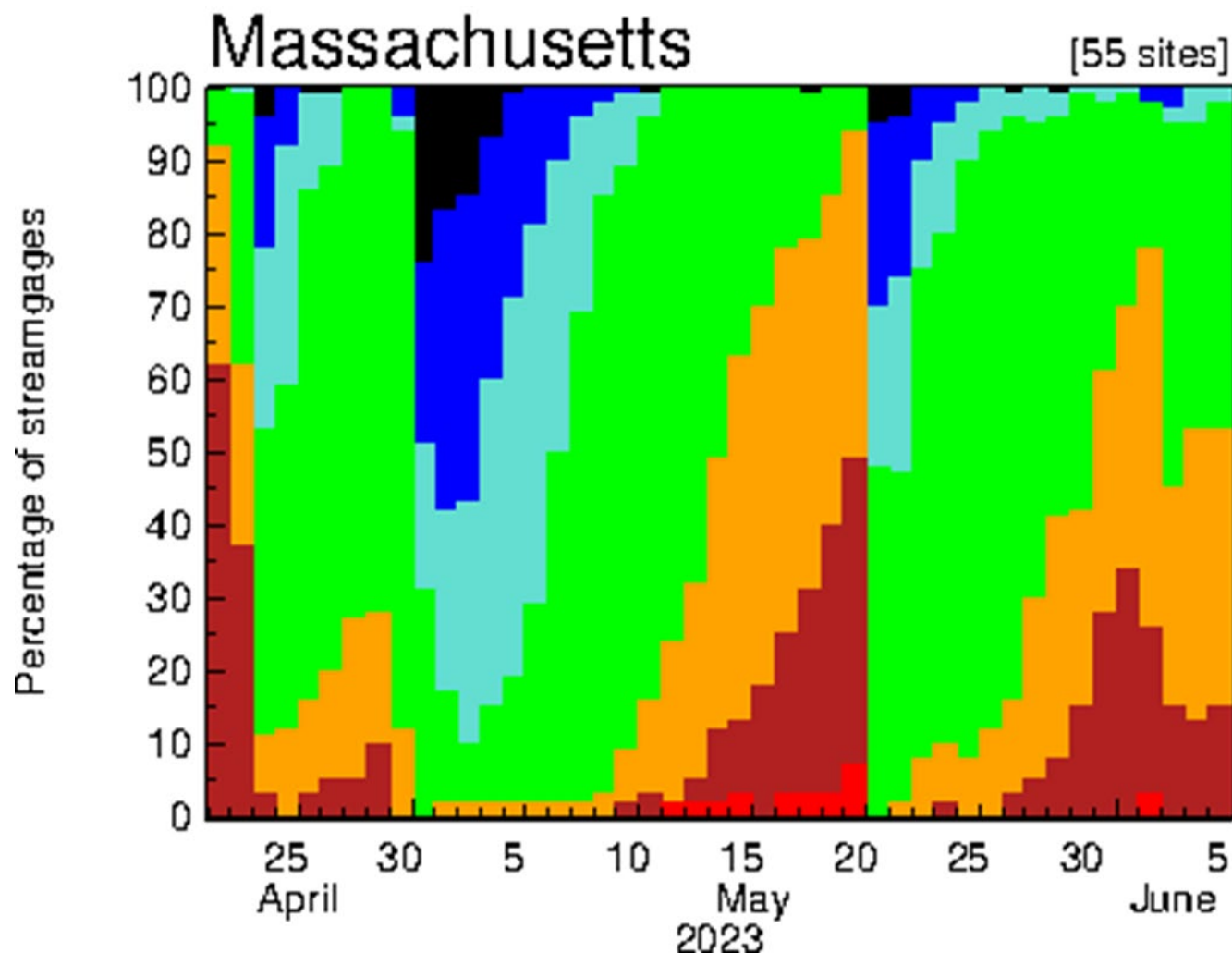
Percentiles of Monthly Median



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		

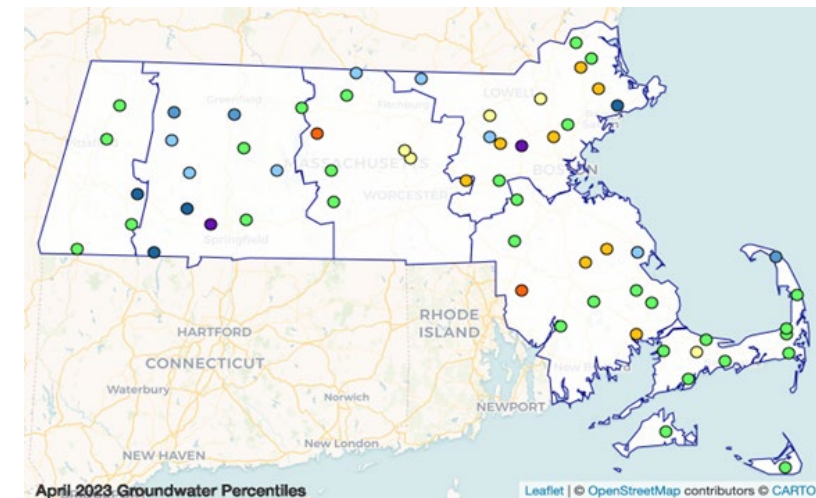
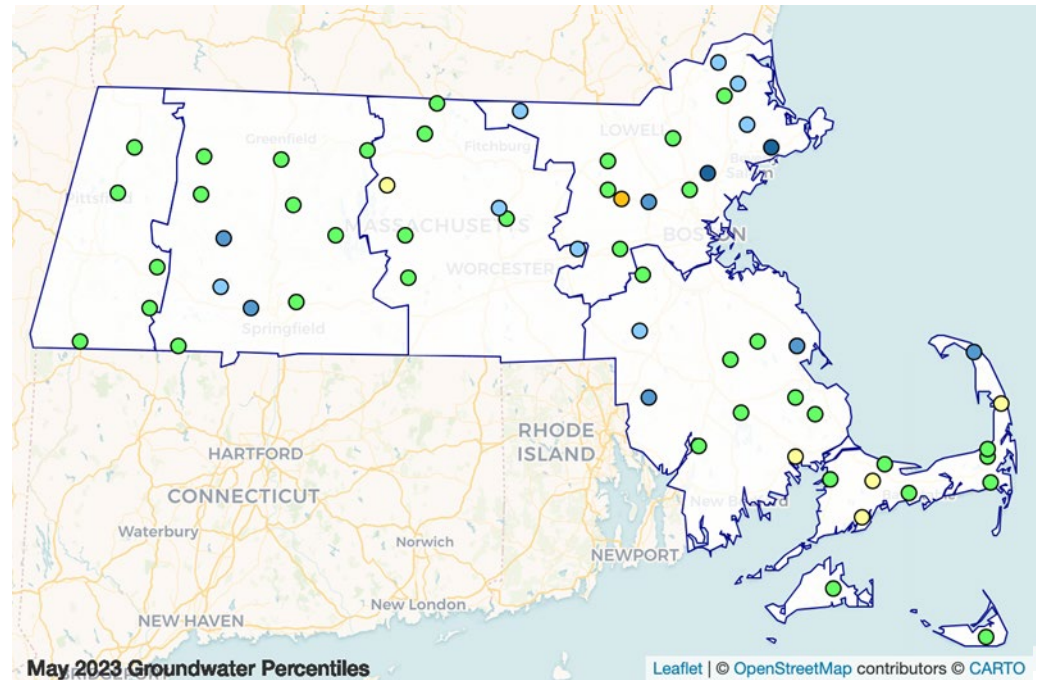
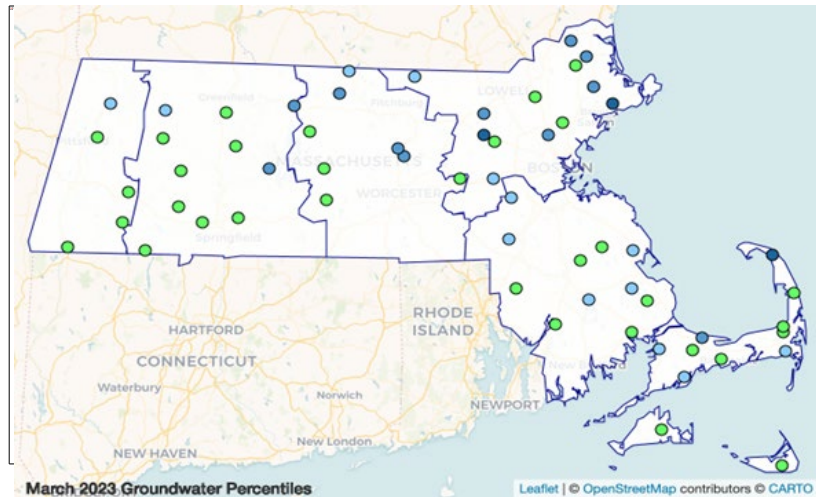
Streamflow Index May

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	3	2	0	26
CTRV	15	0	0	0	5	0	33
CENTRAL	11	0	0	1	2	0	36
NORTHEAST	13	0	0	0	1	0	45
SOUTHEAST	12	0	0	1	4	0	35
CAPE COD	2	0	0	2	0	0	15

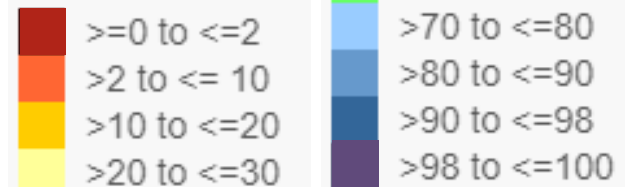
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

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

Groundwater Percentiles



Percentiles



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	44
CTRV	11	0	0	0	0	0	61
CENTRAL	8	0	0	0	1	0	50
NORTHEAST	14	0	0	1	0	2	70
SOUTHEAST	12	0	0	0	1	0	54
CAPE COD	10	0	0	0	3	0	43
ISLANDS	2	0	0	0	0	0	34

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

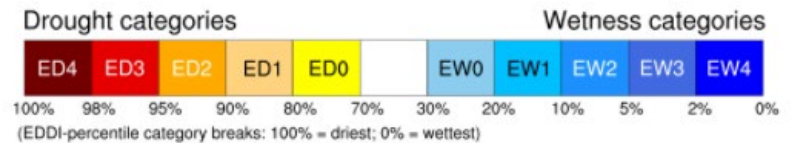
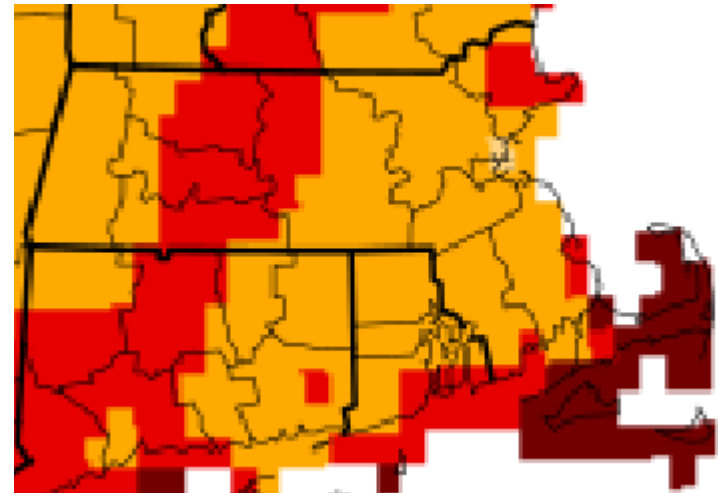
Evapotranspiration

CMI week ending May 27th



2-month EDDI*

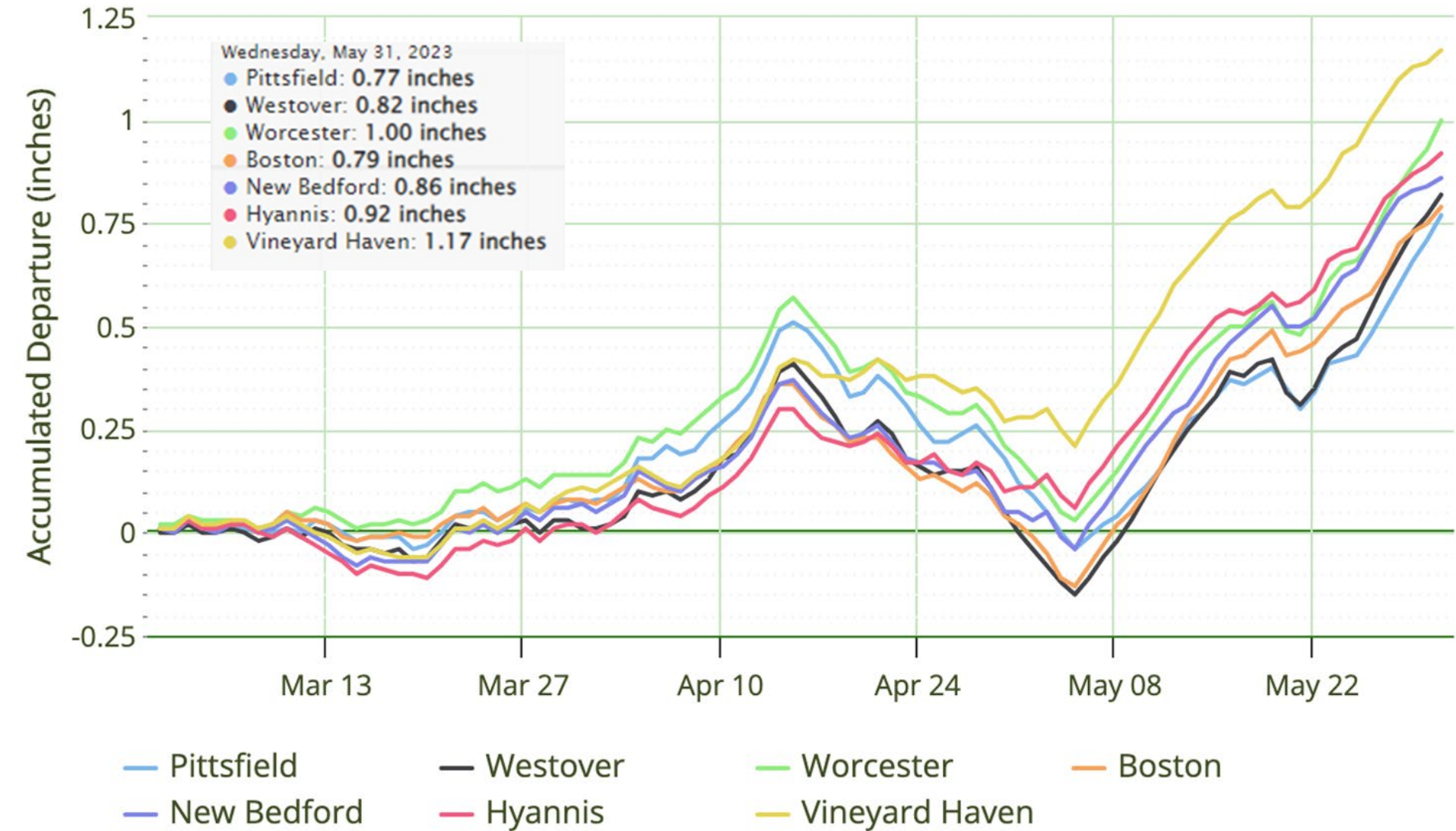
Map dated May 31st



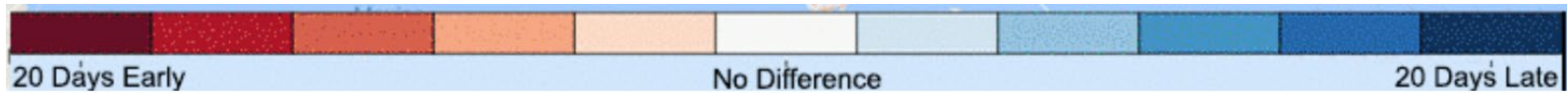
Generated by NOAA/ESRL/Physical Sciences Laboratory

*See warning regarding the potential for EDDI to be showing higher values than observed data. <https://psl.noaa.gov/eddi/warn.html>

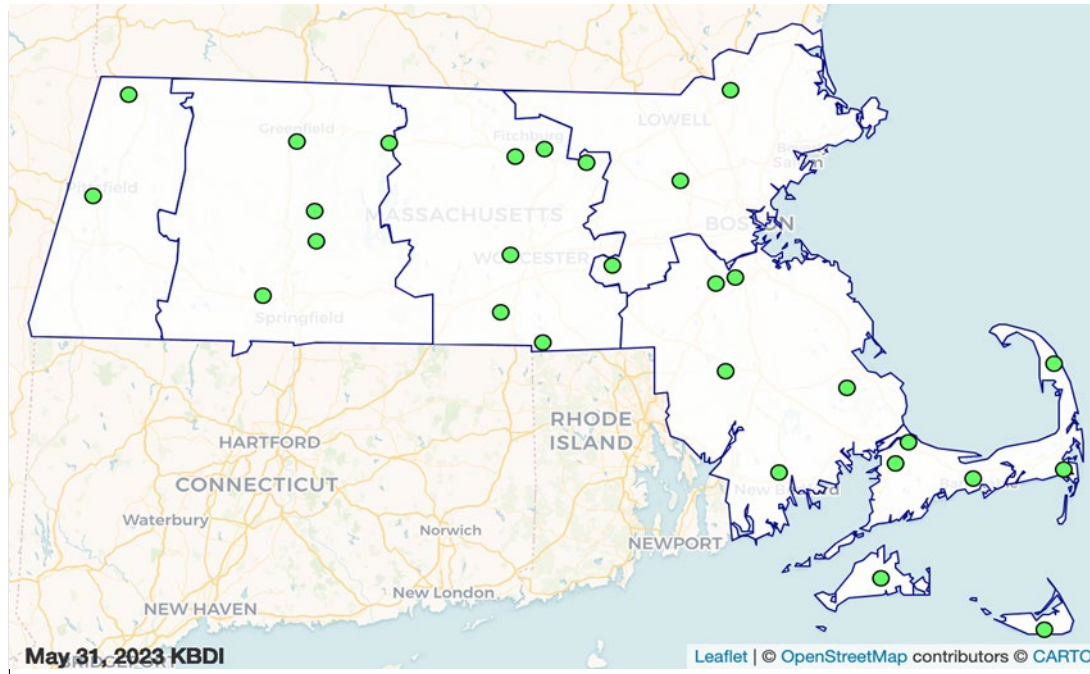
Accumulated Potential Evapotranspiration Departure from 30-Year Average in inches



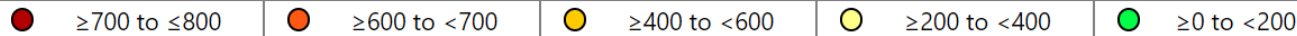
Spring Bloom Index Anomaly



KBDI - Top 8 inches of soil moisture



Point Values - KBDI Range



REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	2	137
CTRV	5	109
CENTRAL	6	171
NORTHEAST	3	95
SOUTHEAST	5	112
CAPE COD	5	104
ISLANDS	2	66

Index Severity 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	2	100%
CTRV	2	70th
CENTRAL	6	64th
NORTHEAST	4	35th
SOUTHEAST	2	52nd
CAPE COD	1	16th

Notes:

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

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

Drought Indices by Region, May 2023

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (2 mos)	26	49	46	47	34	27	21
Streamflow	26	33	36	45	35	15	N/A
Groundwater	44	61	50	70	54	43	34
Lakes/ Impoundments	100%	70	64	35	52	16	N/A
ET*- CMI EDDI	0 3	0 3	0 3	0 3	0 3	0 4	0 4
KBDI**	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0

Recommend (6/8 meeting)	Level 1	Level 0	Level 0	Level 0	Level 0	Level 1	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. *ET not reported, Nov-Mar, outside growing season
 **KBDI not reported, Nov-Mar, outside fire danger season.

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