

AGENDA

1. Introductions & Drought Response Update: EOEEA, MEMA

2. Updates on Current Conditions and Impacts—DMTF member reports

- Hydrologic: DCR, USGS, NOAA-RFC
- Weather: NOAA-NWS
- Water Supply: DEP, MWRA, MWWA, DPU
- Environmental: DEP, DFG, MRA
- Agricultural: DAR
- Fire Danger: DCR
- Engineering/Infrastructure: DCR
- Public Health: DPH

3. Discussion

4. Recommendation



Hydrologic Conditions in Massachusetts for May 2022

Anne Carroll & Viki Zoltay
DCR Office of Water Resources

Drought Management Task Force

June 9, 2022

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan

Indices

Numbers in parentheses indicate number of data points across the state



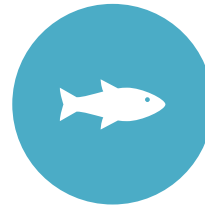
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

MA Drought Management Plan

Index Severity Levels

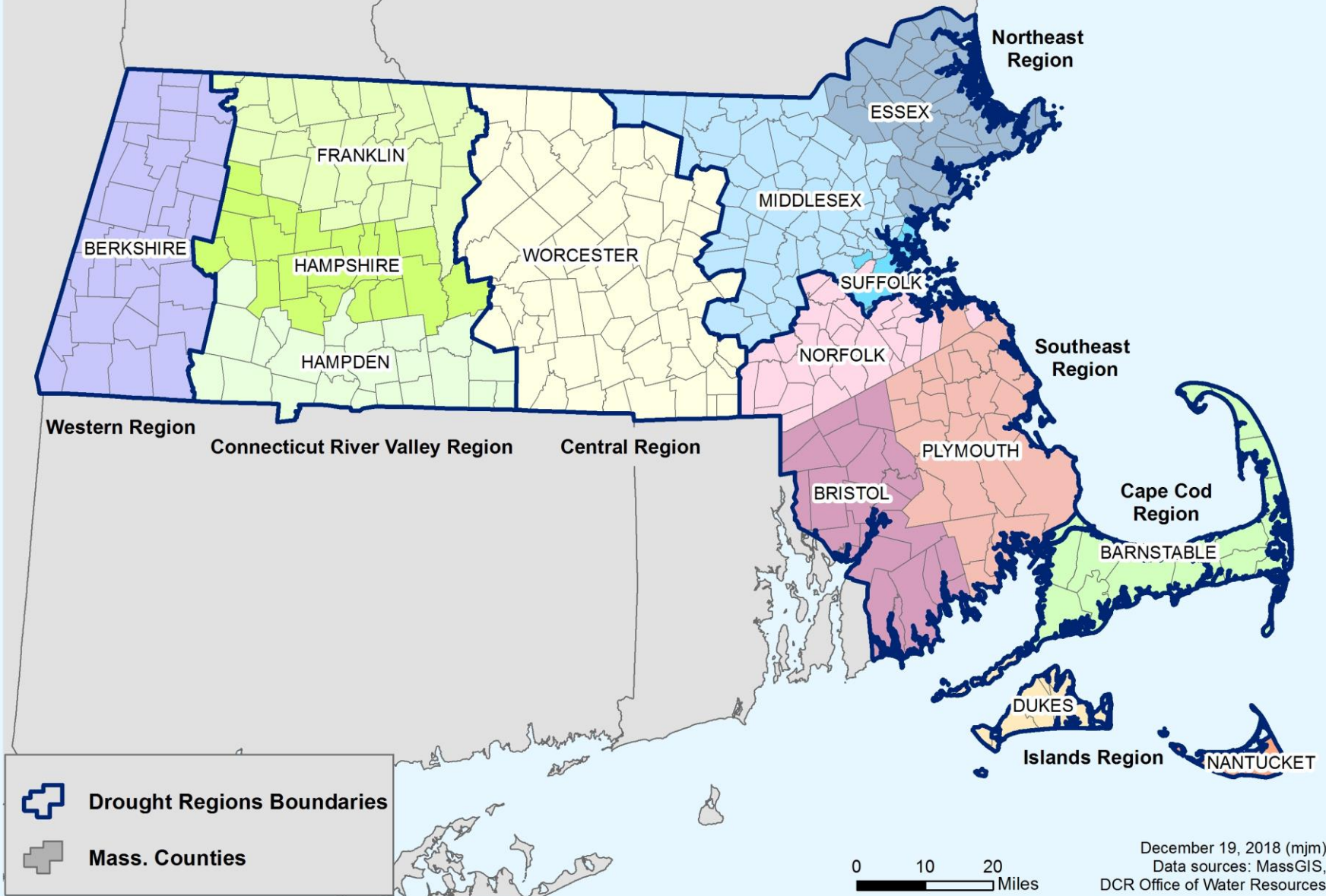
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch-Byram Drought Index	Crop Moisture Index
0	>30 th percentile	< 200	> -1.0
1	≤30 and >20	200-400	≤-1.0 and > -2.0
2	≤20 and >10	400-600	≤-2.0 and < -3.0
3	≤10 and >2	600-700	≤ -3.0 and > -4.0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

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



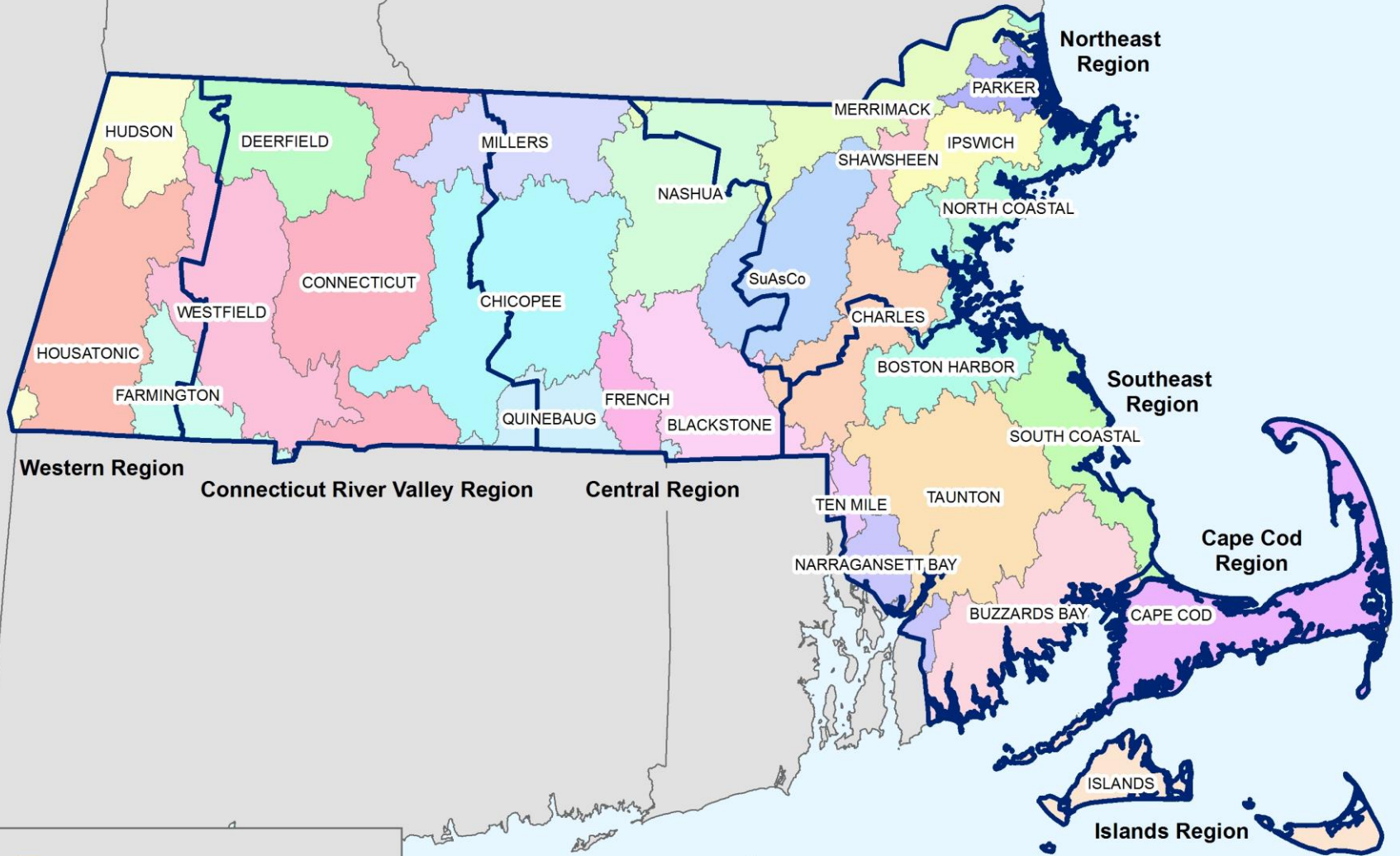
-  Drought Regions Boundaries
-  Mass. Counties

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



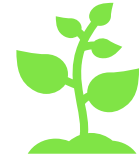
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts

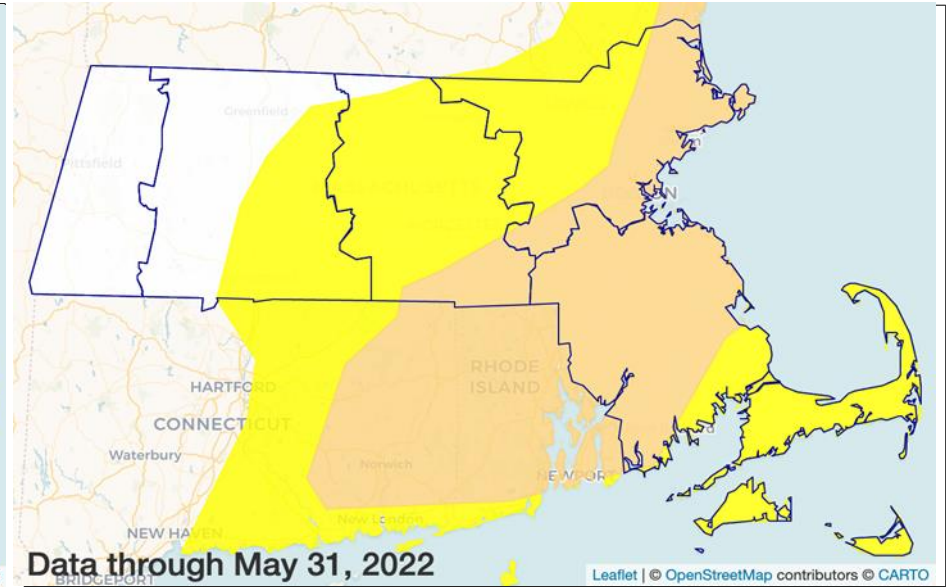
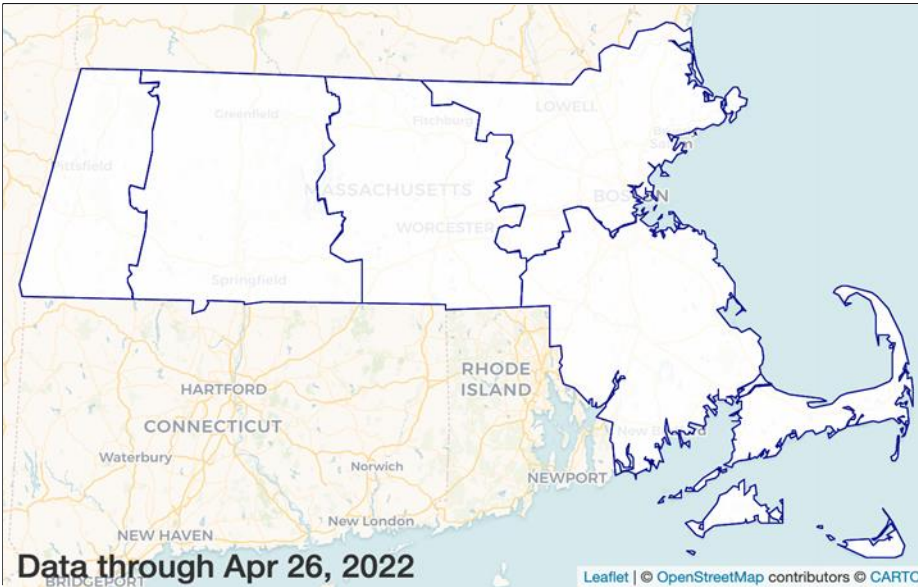


Public Health
Impacts

Recent Hydrologic History

- 2022
 - January through March
 - variable precipitation with
 - scattered, minimal impacts on streamflow and groundwater
 - April
 - areas of continued low precipitation
 - impacts on streamflow and groundwater

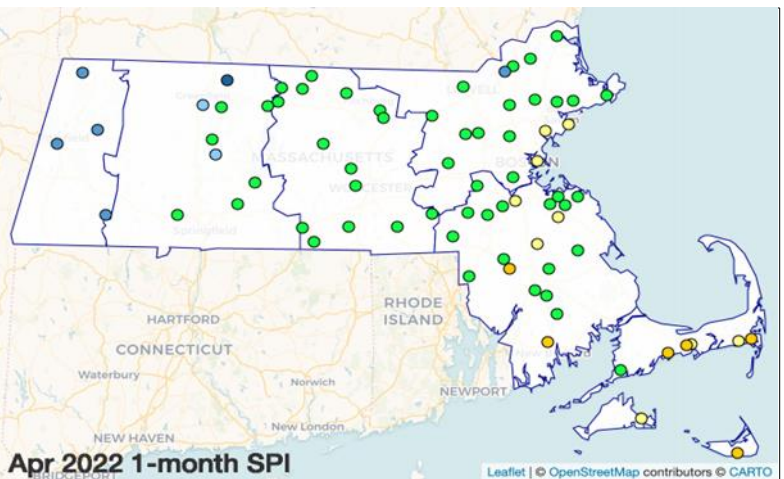
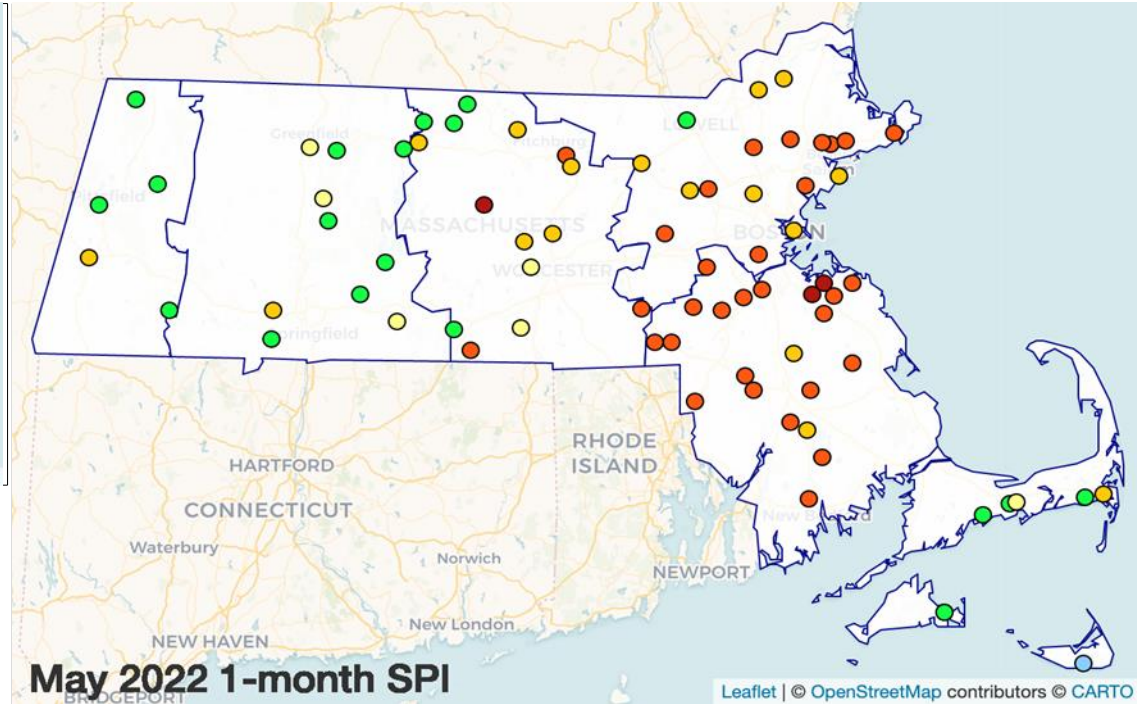
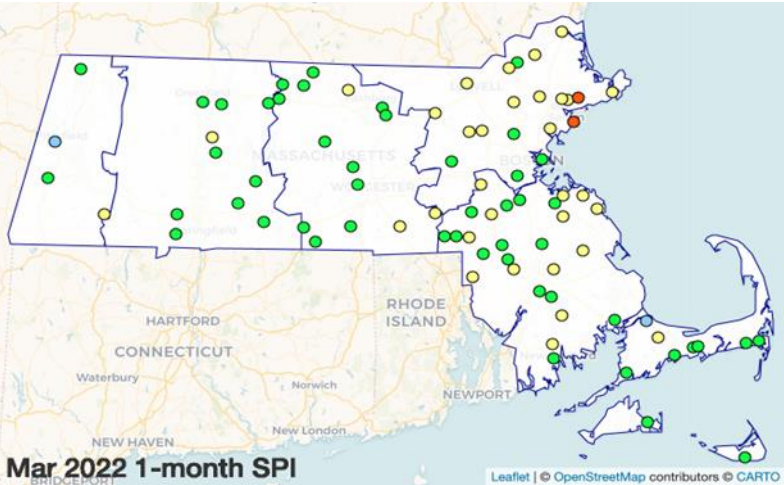
US Drought Monitor



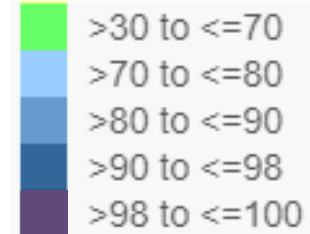
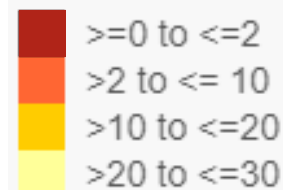
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

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

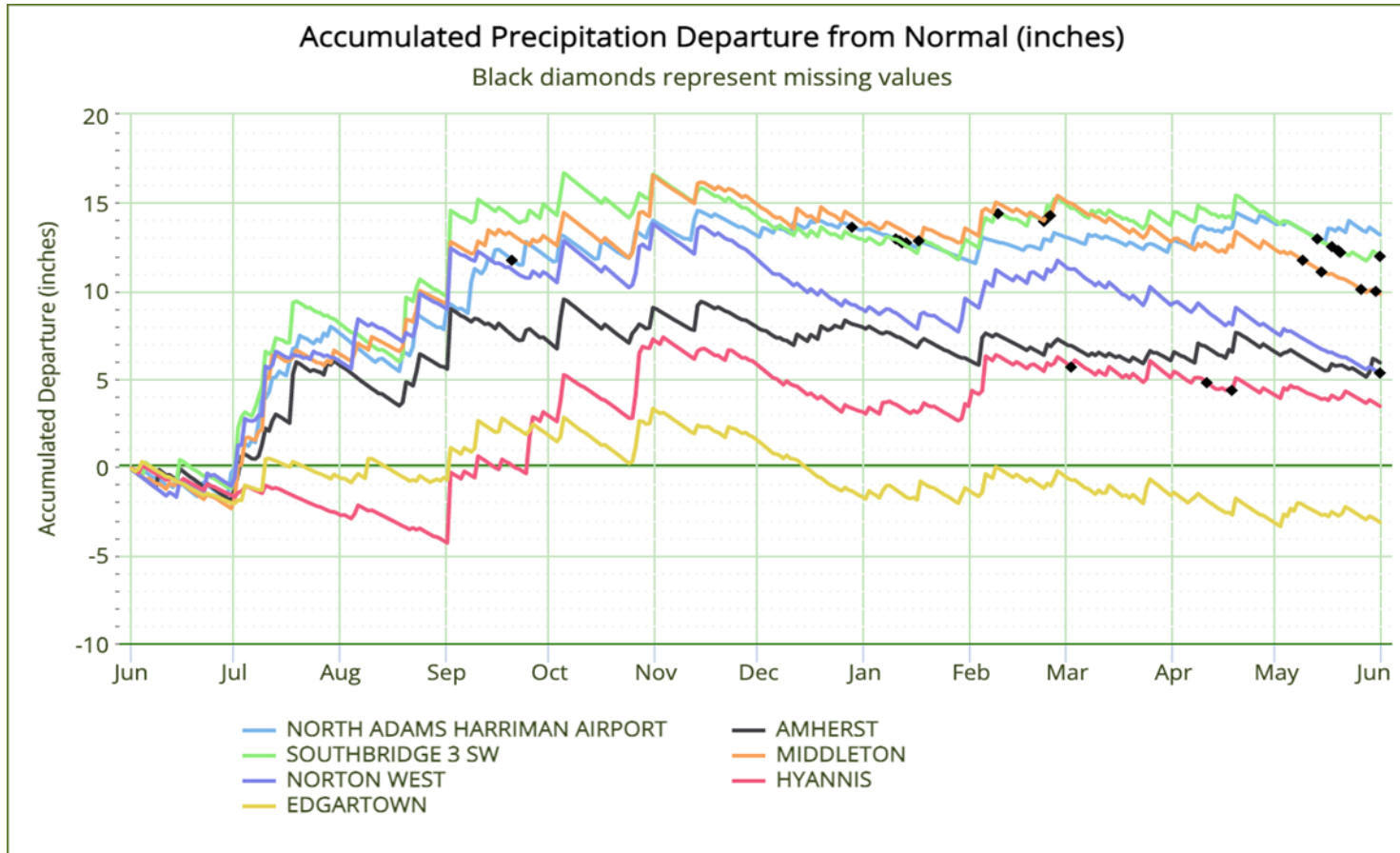
Standardized Precipitation Index, 1 month



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.

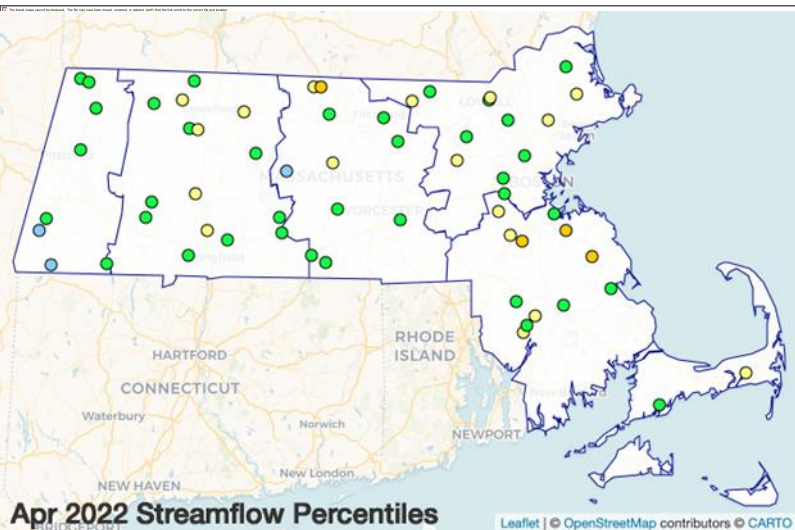
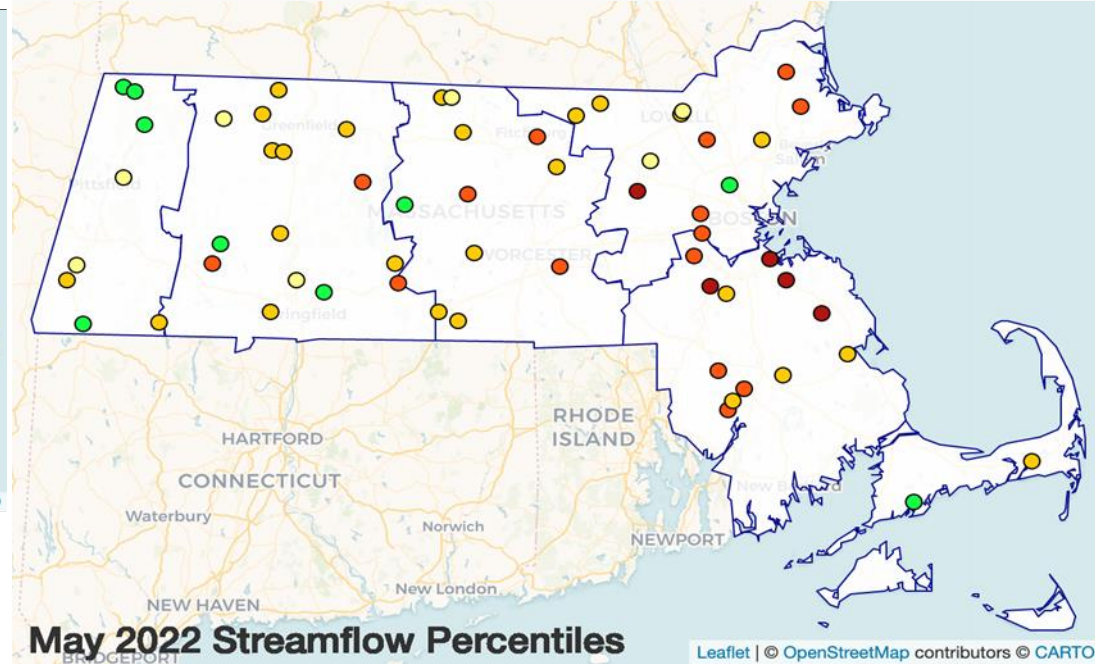
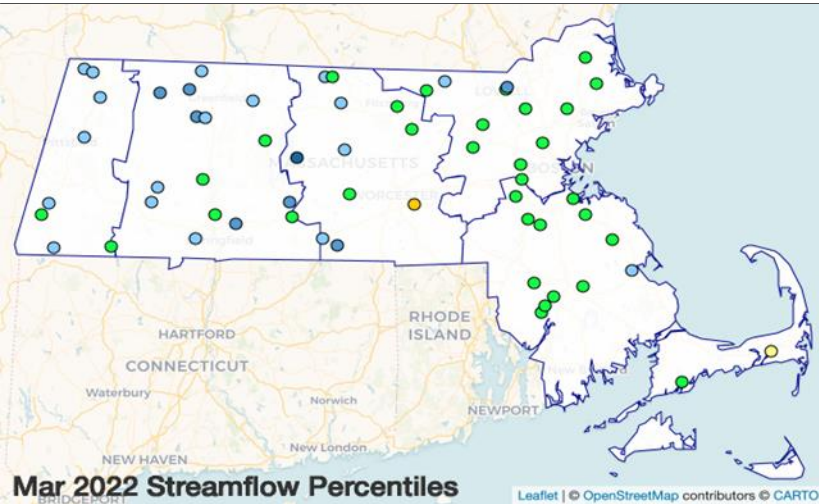
Standardized Precipitation Index as Percentile, May

REGION	NUMBER OF SITES	1-mo*	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo*
WESTERN	5	35	64	61	60	88	98	84	80
CTRV	10	33	42	38	34	51	86	70	63
CENTRAL	15	18	27	24	41	70	91	78	78
NORTHEAST	18	9	17	9	18	50	87	80	84
SOUTHEAST	22	6	10	7	14	46	80	62	66
CAPE COD	5	40	13	15	16	75	56	8	16
ISLANDS	2	63	36	30	21	45	41	21	56

*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

Streamflow Percentiles of Monthly Median

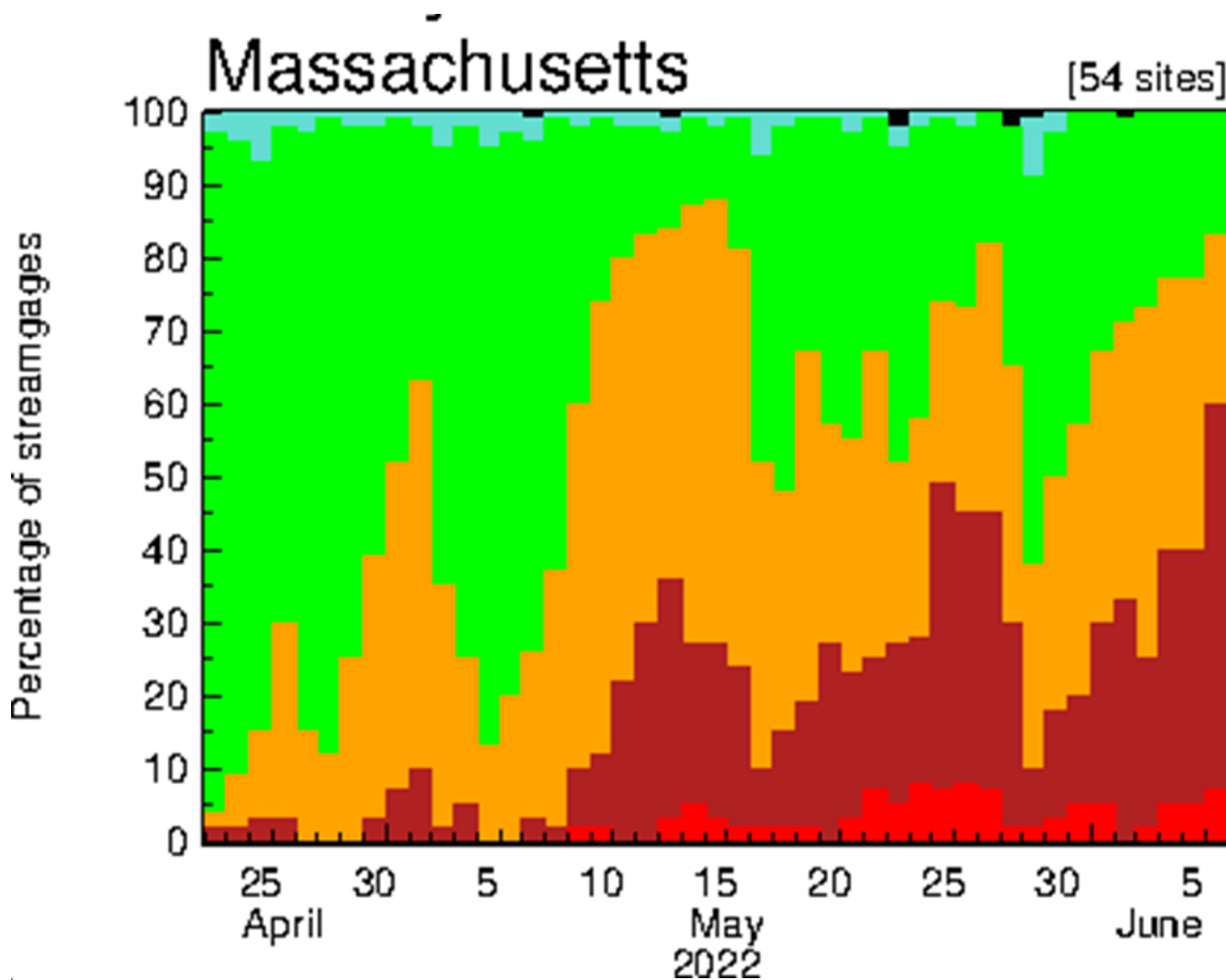


Percentiles

- ≥ 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

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		

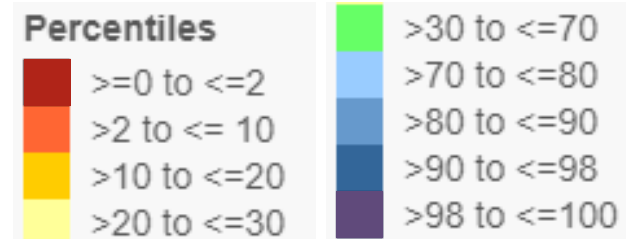
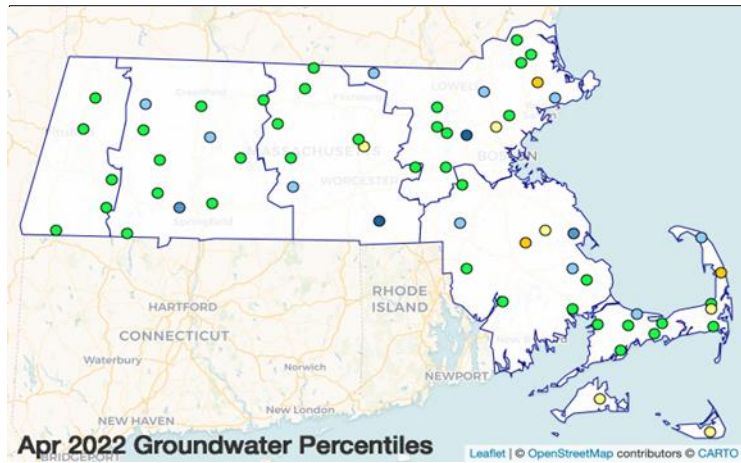
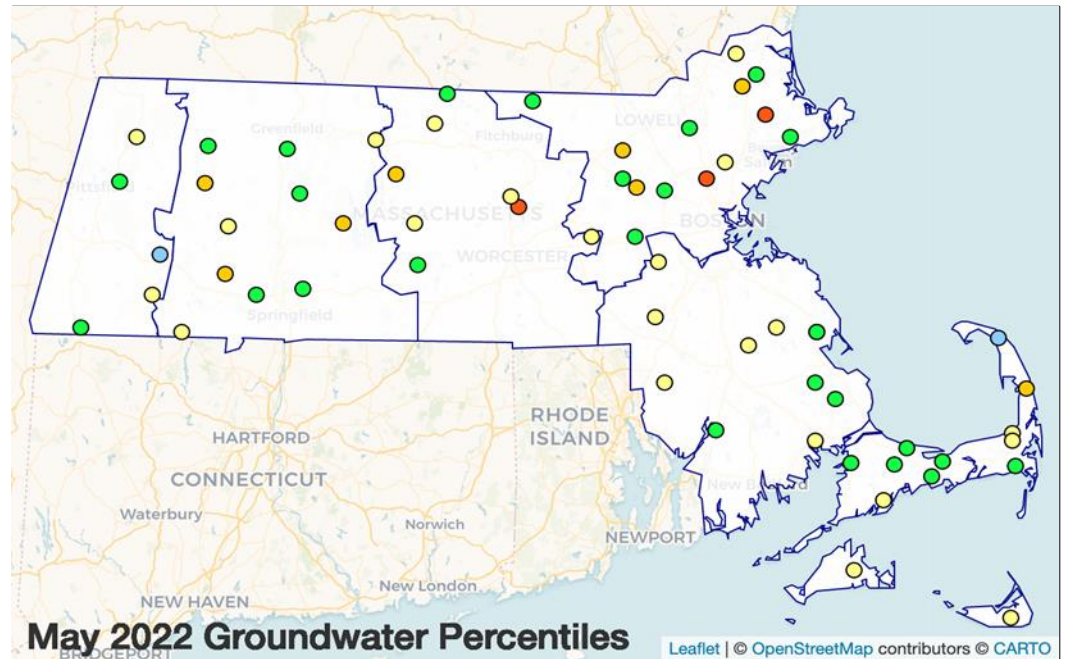
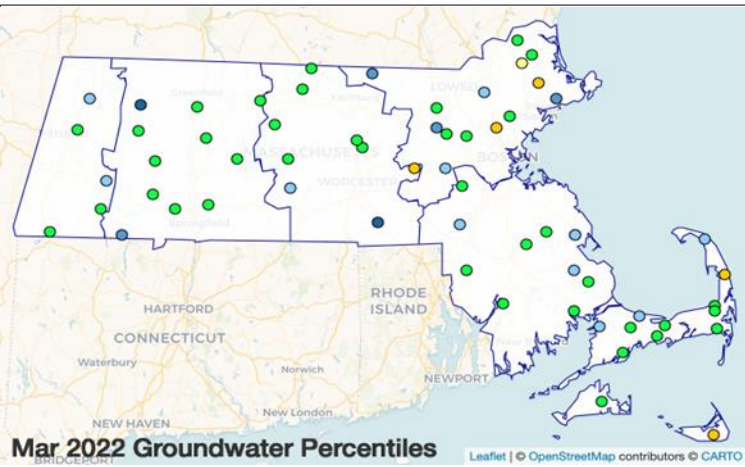
Streamflow Index May

REGION	TOTAL GAGES REPORTING FOR MAY	≥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	2	2	0	29
CTRV	15	0	3	8	2	0	16
CENTRAL	11	0	3	6	1	0	18
NORTHEAST	13	1	5	4	2	0	11
SOUTHEAST	12	4	4	4	0	0	5
CAPE COD	2	0	0	1	0	0	33

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 at the end of Month



Groundwater Index

REGION	TOTAL WELLS REPORTING FOR MAY	≥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	2	0	41
CTRV	11	0	0	3	3	0	28
CENTRAL	8	0	1	1	4	0	24
NORTHEAST	14	0	2	3	2	0	28
SOUTHEAST	11	0	0	0	6	0	29
CAPE COD	11	0	0	1	3	0	41
ISLANDS	2	0	0	0	2	0	29

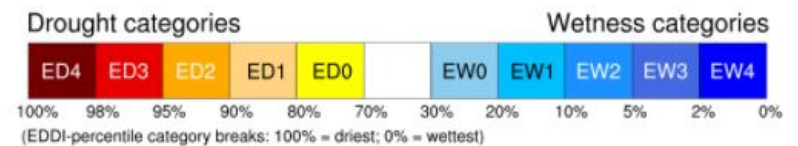
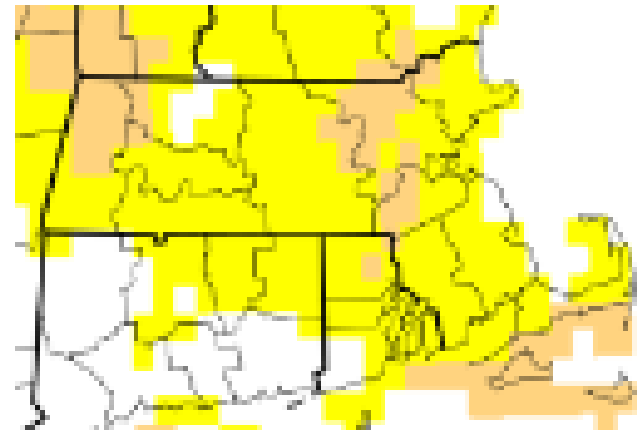
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

CMI week ending May 28th

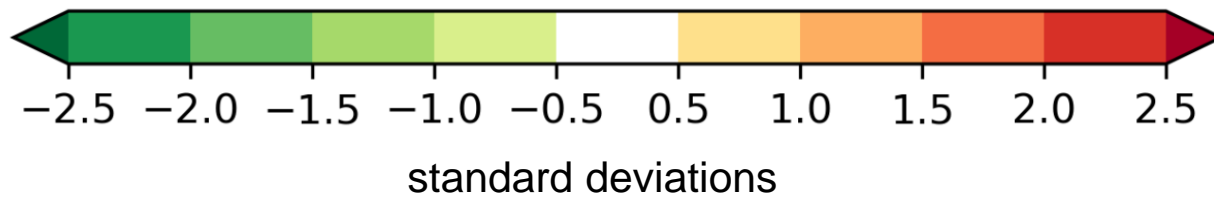


2-month EDDI
Map dated June 1st

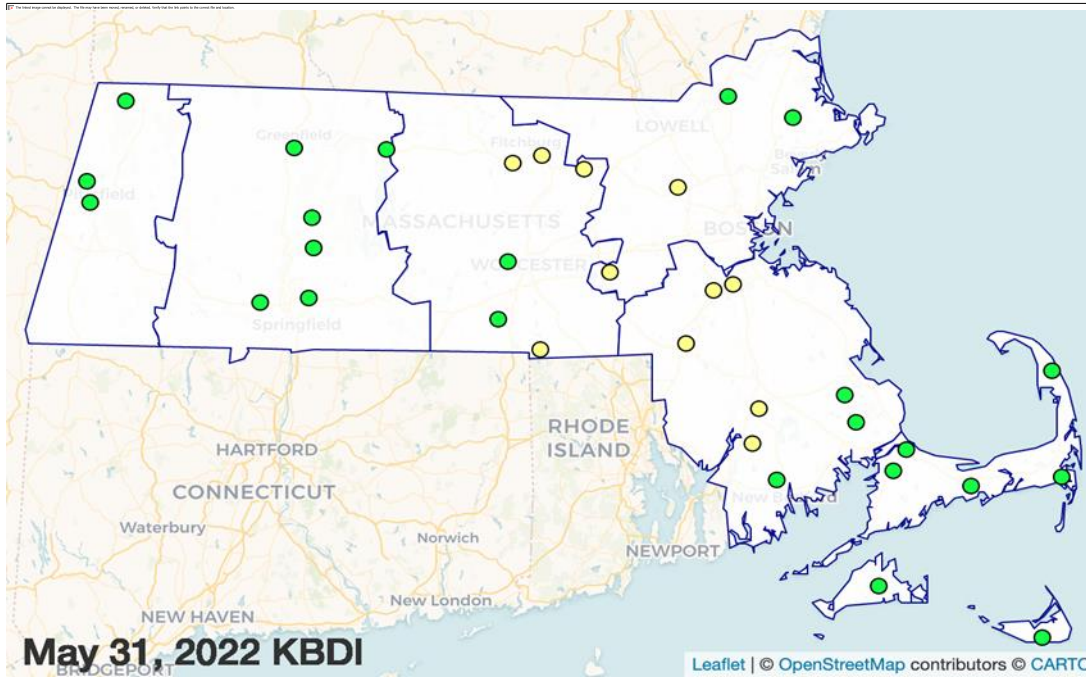


EDDI Forecast for June and July 2022

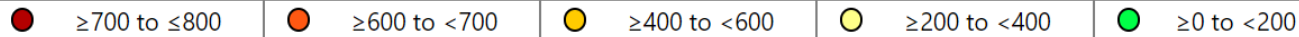
<https://www.ncdc.noaa.gov/temp-and-precip/drought/recovery/eddi>



KBDI - Top 8 inches of soil moisture



Point Values - KBDI Range



REGION	NUMBER OF SITES REPORTING	HIGHEST OF SITE VALUES
WESTERN	3	130
CTRV	6	171
CENTRAL	6	284
NORTHEAST	4	238
SOUTHEAST	8	262
CAPE COD	5	116
ISLANDS	2	67

Index Severity Levels



Lakes & Impoundments

REGION	TOTAL REPORTING FOR MONTH	MEDIAN OF INDIVIDUAL PERCENTILES OR PERCENT FULL
WESTERN	1	100% full
CTRV	2	41st
CENTRAL	3	25th; 100% full
NORTHEAST	6	26th
SOUTHEAST	2	91st
CAPE COD	1	33rd

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 – April 2022

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (2 mo)	81	49	42	28	25	24	22
Streamflow	44	34	37	32	29	39	N/A
Groundwater	54	52	48	53	53	53	27
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	N/A
ET- CMI EDDI	Level 0	Level 0 1	Level 0 2	Level 0 1	Level 0 3	Level 0 3	Level 0 2
KBDI	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
<i>Effective 4/1 (5/6 meeting)</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 1</i>	<i>Level 0</i>	<i>Level 1</i>

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 Drought Management Task Force convenes and makes a recommendation accepted by Secretary of the Executive Office of Energy and Environmental Affairs. Data are preliminary and not final until all data are reported.

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

Drought Indices by Region – May 2022

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mo)	61	38	24	9	7	15	30
Streamflow	29	16	18	11	5	33	N/A
Groundwater	41	28	24	28	29	41	29
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 1	Level 0	Level 0	N/A
ET- CMI EDDI	Level 0 2	Level 0 1	Level 0 1	Level 0 2	Level 0 1	Level 0 1	Level 0 2
KBDI	Level 0	Level 0	Level 1	Level 1	Level 1	Level 0	Level 0
<i>Recommend 5/1 (6/9 meeting)</i>	<i>Level 0</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 2</i>	<i>Level 2</i>	<i>Level 0</i>	<i>Level 1</i>
<i>Effective 4/1 (5/6 meeting)</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 1</i>	<i>Level 0</i>	<i>Level 1</i>

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