

Hydrologic Conditions in Massachusetts for September 2022

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DCR Office of Water Resources

Drought Management Task Force

September 7, 2022

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan

Indices

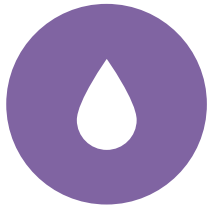
Numbers in parentheses indicate number of data points across the state



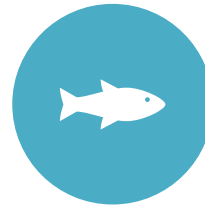
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

MA Drought Management Plan

Index Severity Levels

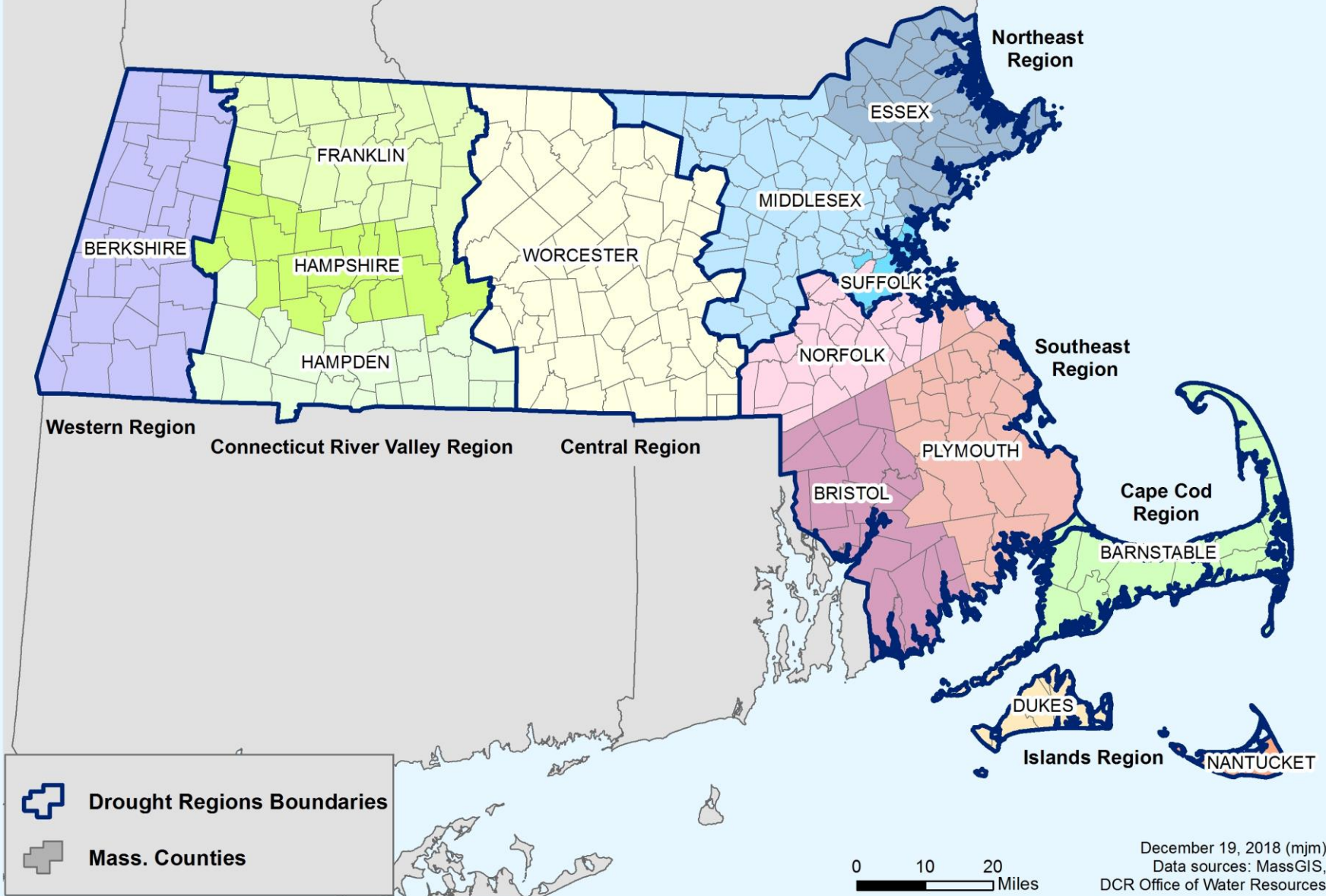
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch-Byram Drought Index	Crop Moisture Index
0	>30 th percentile	< 200	> -1.0
1	≤30 and >20	200-400	≤-1.0 and > -2.0
2	≤20 and >10	400-600	≤-2.0 and < -3.0
3	≤10 and >2	600-700	≤ -3.0 and > -4.0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

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



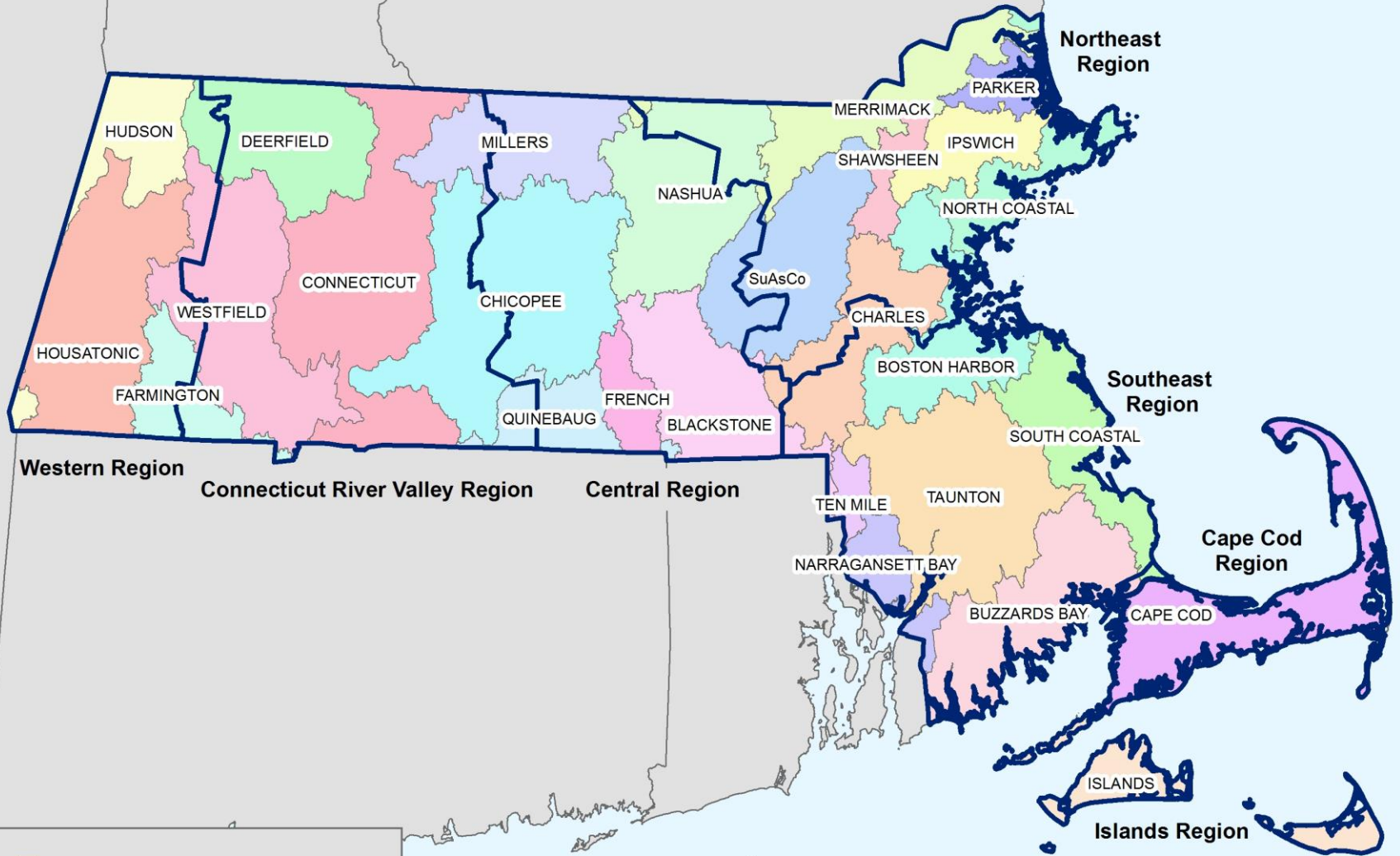
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

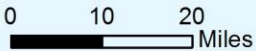


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 Drought Regions Boundaries

 Mass. Counties



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

Task Force Member Updates



Hydrologic
Conditions



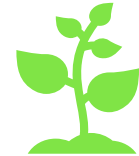
Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger



Engineering/
Infrastructure
Impacts

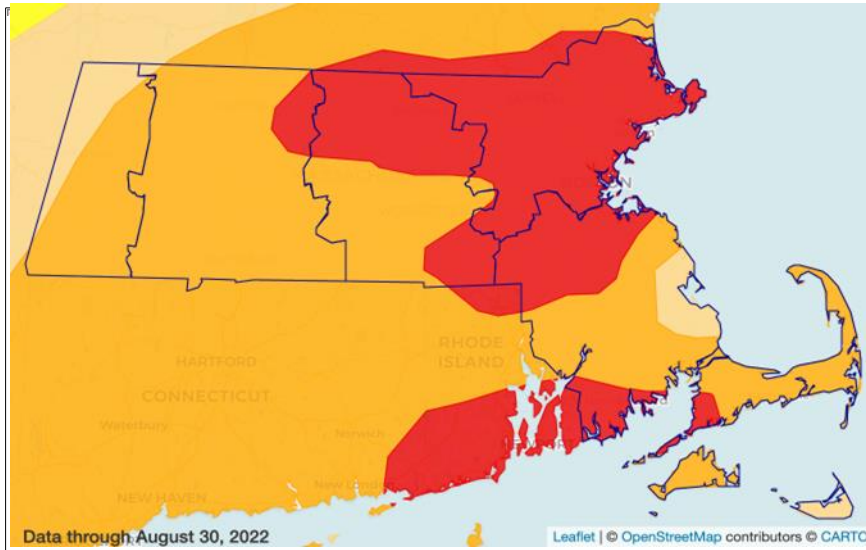


Public Health
Impacts

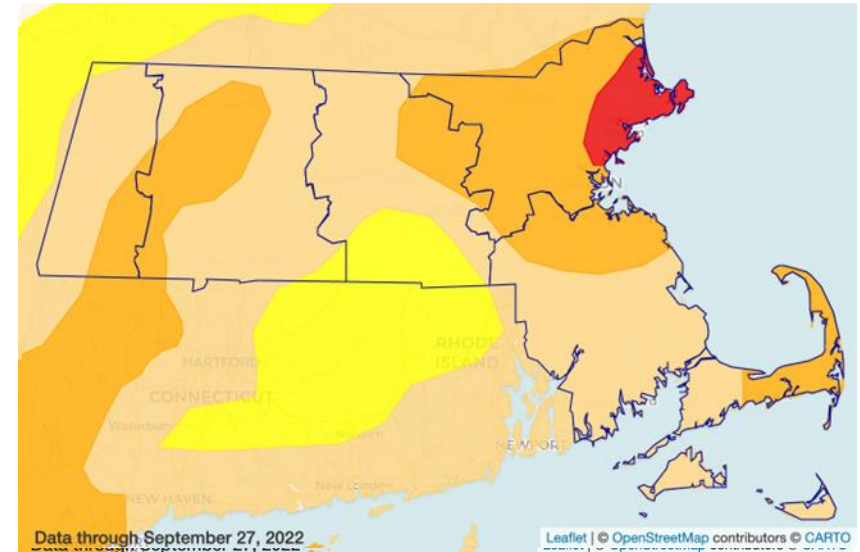
Recent Hydrologic History

- 2022
 - *April*
 - months of variable precipitation resulted in first drought call
 - *May*
 - continued low precipitation plus increased ET especially in NE and SE
 - *June through August*
 - minimal precipitation with high temperatures
 - storms in late August brought limited improvement to parts of the Southeast Region
 - *September*
 - more widespread precipitation events and improvement across the state except for the Northeast and Cape

US Drought Monitor



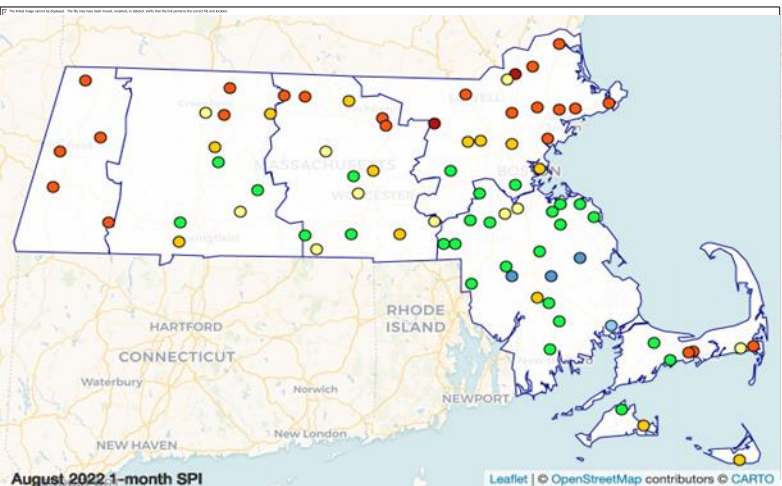
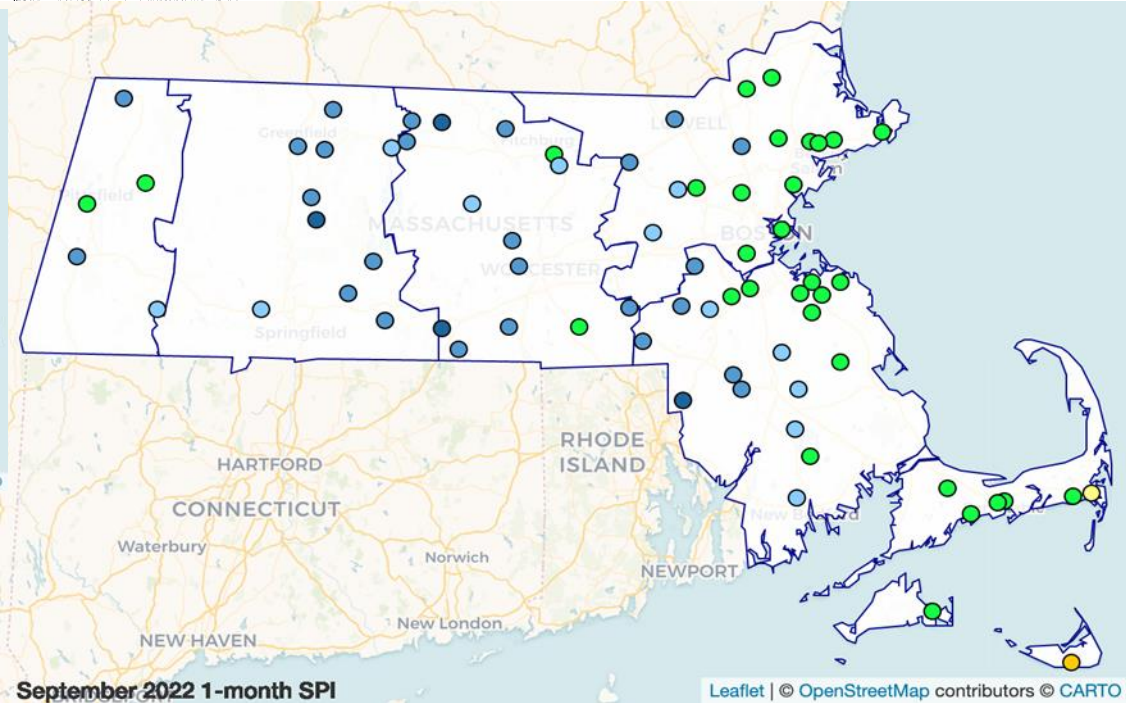
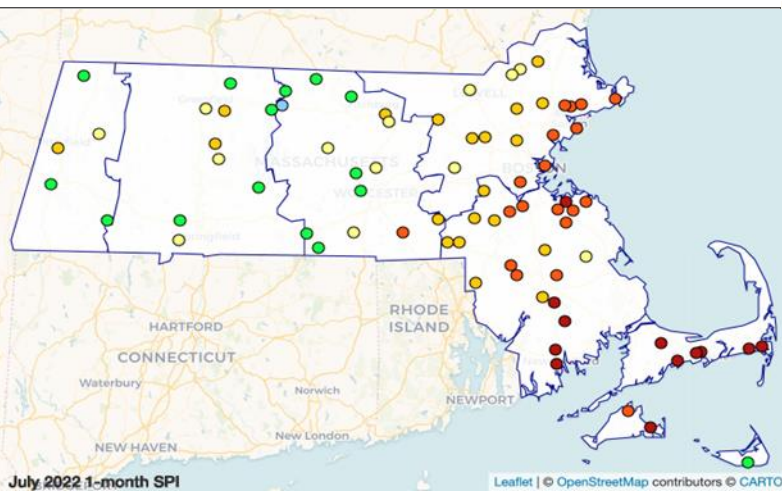
Data through August 30, 2022



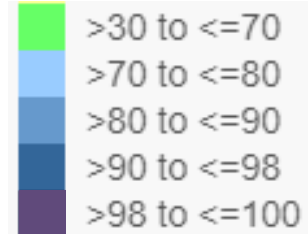
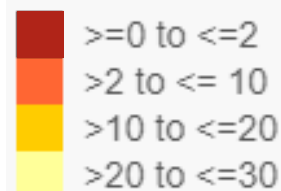
Data through September 27, 2022

	USDM	MA DMP
None	0	= 1
D0 (Abnormally Dry)	1	= 2
D1 (Moderate Drought)	2,3	= 3
D2 (Severe Drought)	4	= 4
D3 (Extreme Drought)		
D4 (Exceptional Drought)		

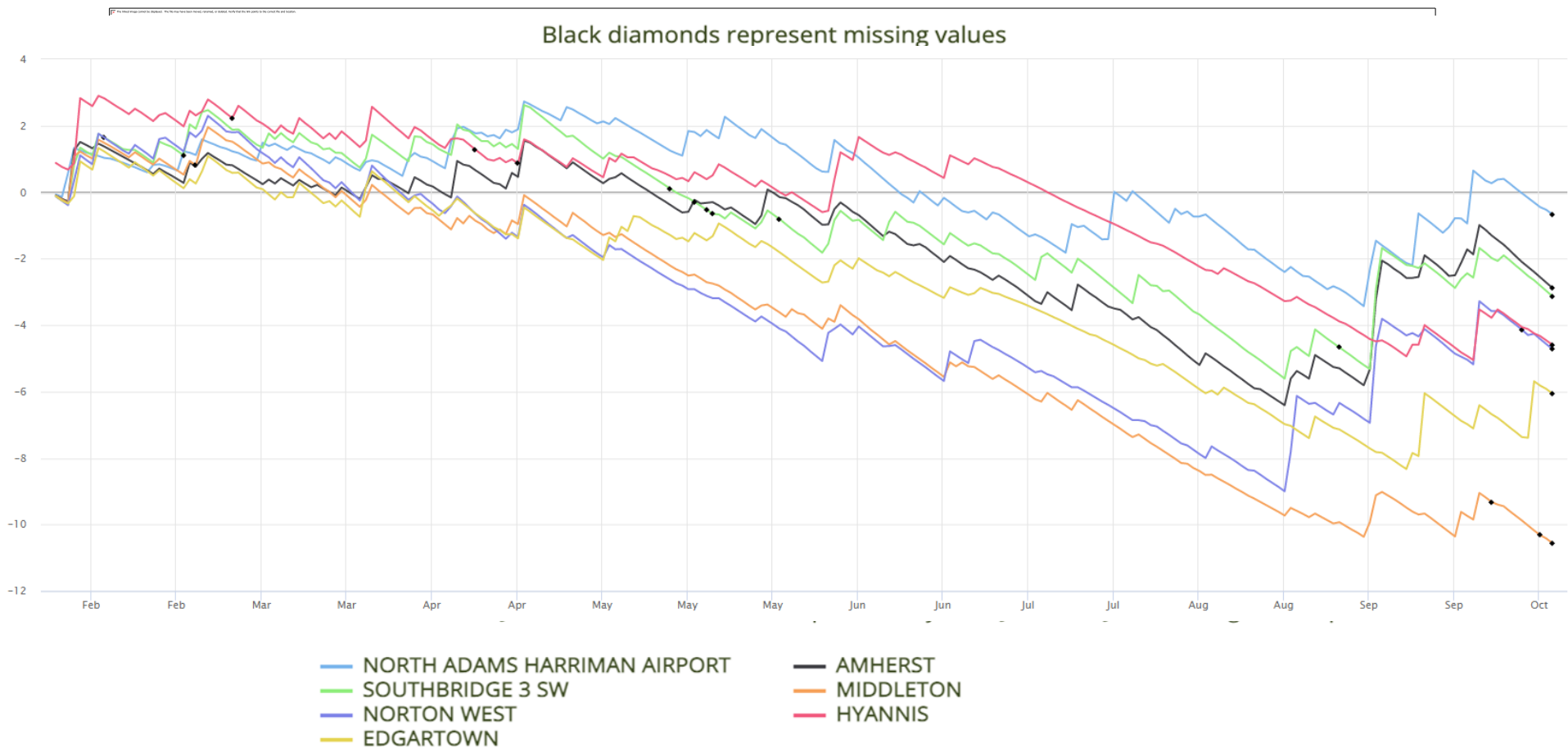
Standardized Precipitation Index



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.

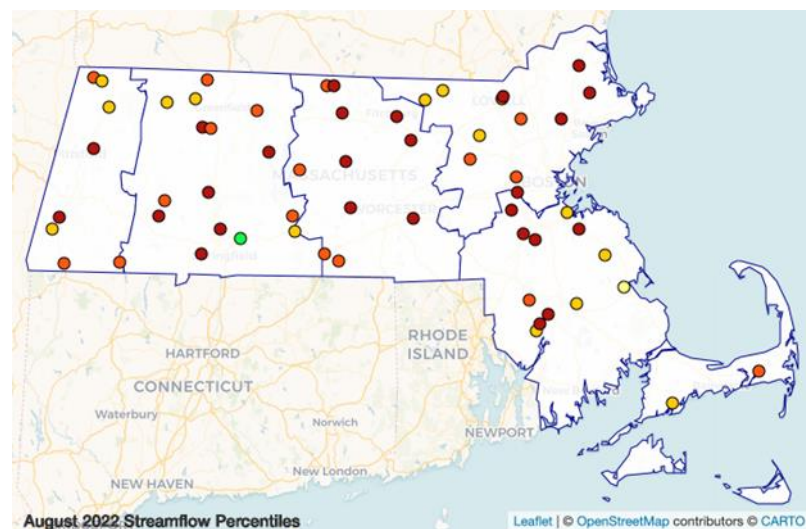
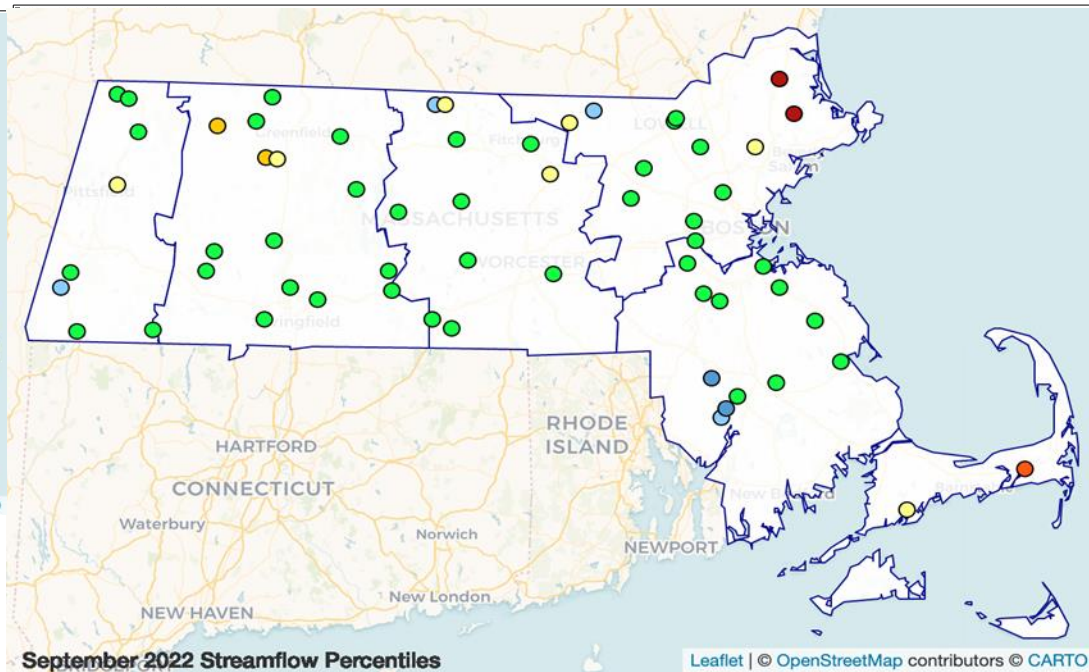
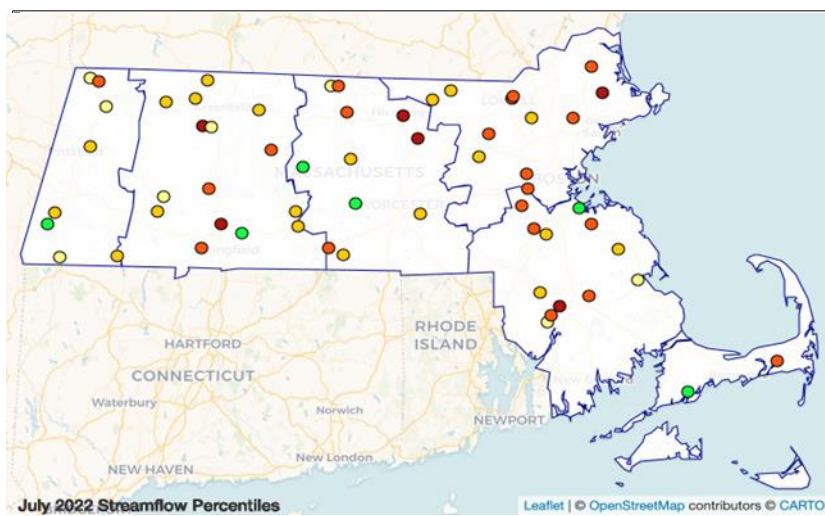
Standardized Precipitation Index as Percentile, September

REGION	NUMBER OF SITES	1-mo *	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo *
WESTERN	5	78	44	45	35	32	49	82	76
CTRV	10	86	66	56	34	30	33	79	69
CENTRAL	14	84	61	54	36	41	40	86	77
NORTHEAST	17	64	29	17	9	11	16	70	73
SOUTHEAST	20	74	64	42	18	23	25	73	65
CAPE COD	6	49	27	6	14	29	27	51	26
ISLANDS	2	38	17	9	12	16	10	27	27

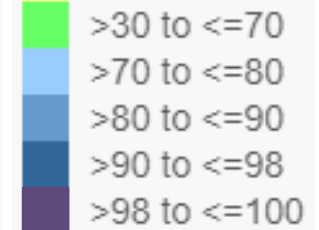
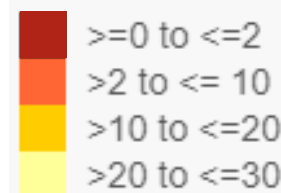
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

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

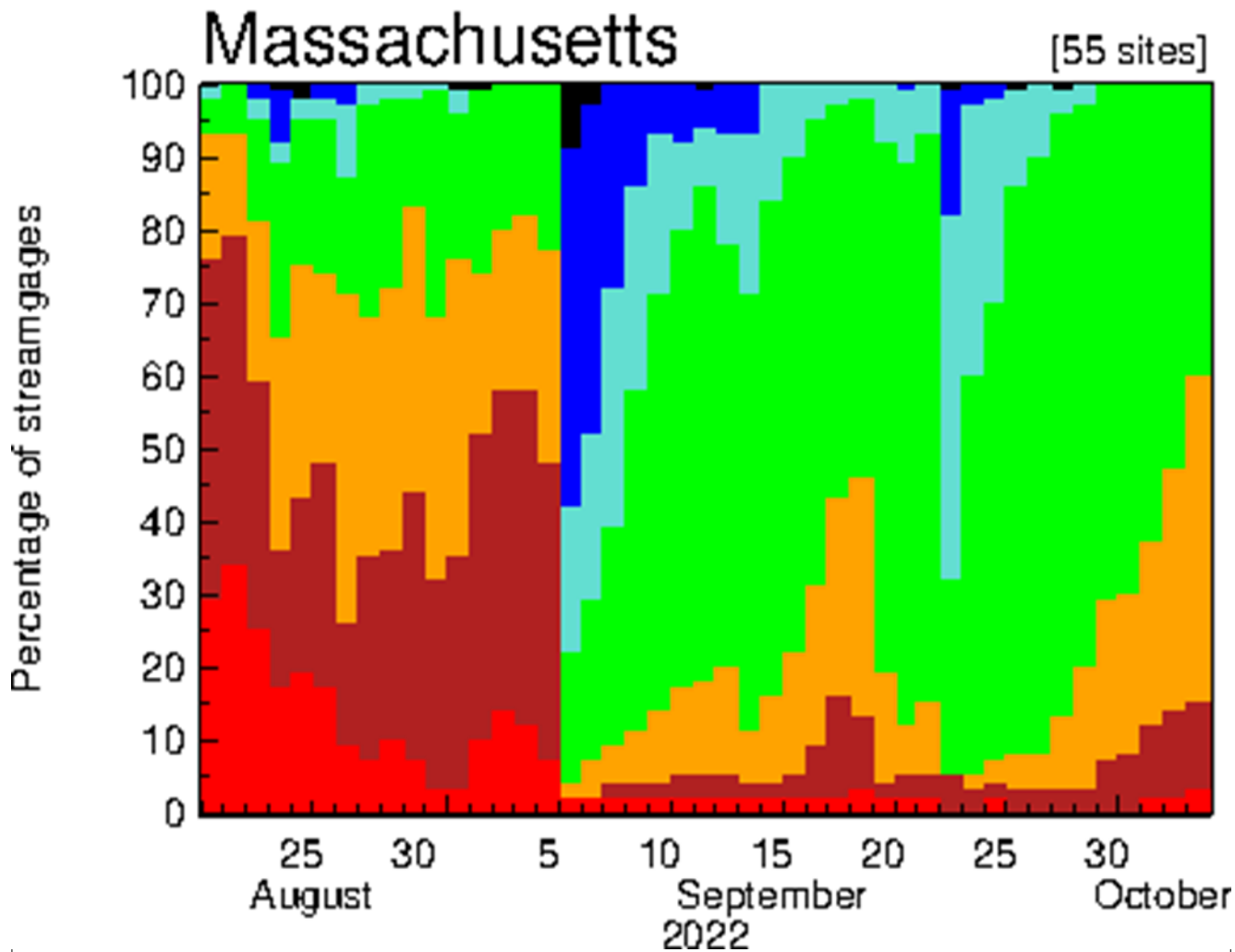
Streamflow Percentiles of Monthly Median



Percentiles



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		

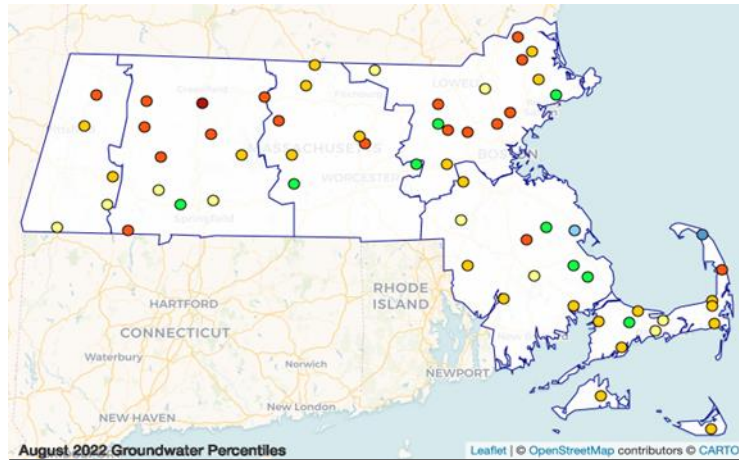
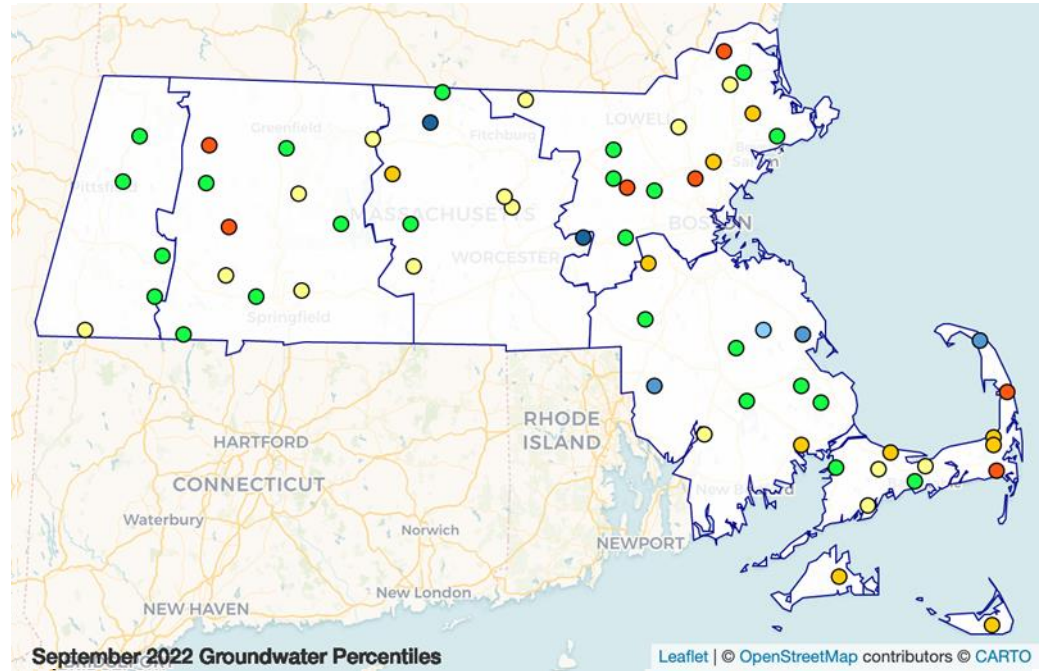
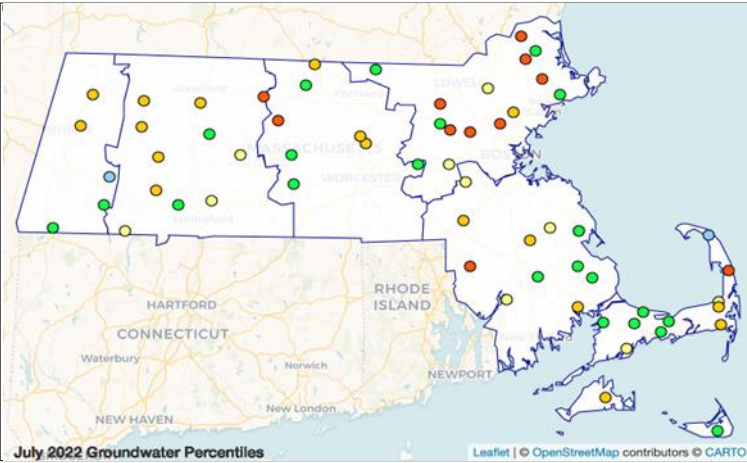
Streamflow Index September

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	60
CTRV	15	0	0	2	1	0	50
CENTRAL	11	0	0	0	2	0	61
NORTHEAST	13	2	0	0	2	0	48
SOUTHEAST	12	0	0	0	0	0	62
CAPE COD	2	0	1	0	1	0	19

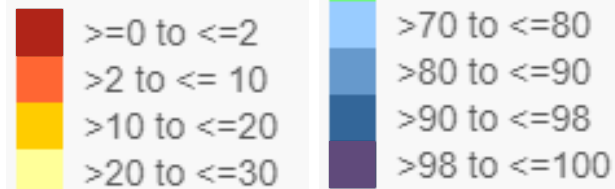
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

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	1	0	41
CTRV	11	0	2	0	4	0	29
CENTRAL	8	0	0	1	3	2	33
NORTHEAST	14	0	3	2	3	0	27
SOUTHEAST	12	0	0	2	1	0	45
CAPE COD	11	0	2	3	3	0	22
ISLANDS	2	0	0	2	0	0	14

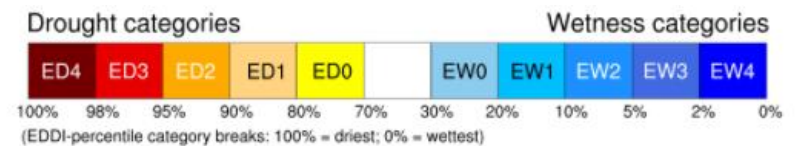
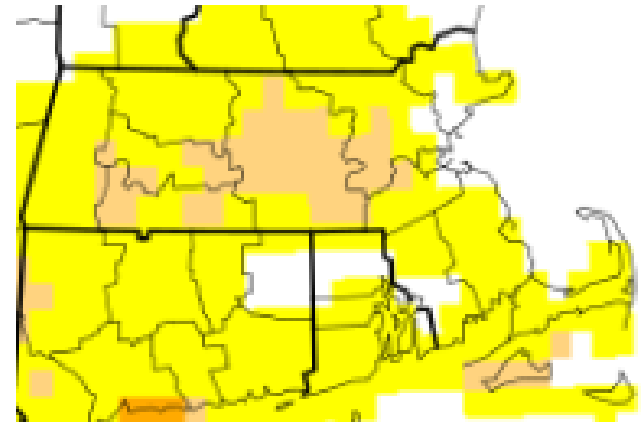
Index Severity Levels				
Level 0	Level 1	Level 2	Level 3	Level 4

Evapotranspiration

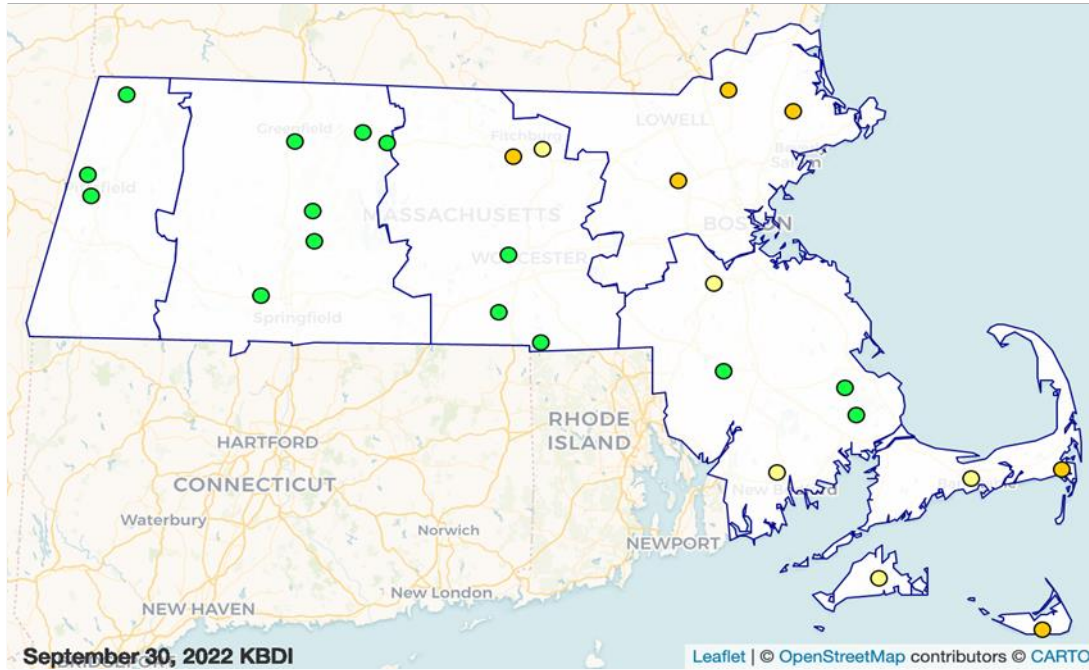
CMI week ending October 1st



2-month EDDI
Map dated September 29th



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	191
CTRV	6	136
CENTRAL	5	468
NORTHEAST	3	567
SOUTHEAST	5	377
CAPE COD	2	474
ISLANDS	2	450

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	1	38th
CTRV	2	19th
CENTRAL	3	25th
NORTHEAST	6	14th
SOUTHEAST	2	27th
CAPE COD	1	15th

Notes:

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

The Central Region now has one additional reservoir reporting (Horse Pond in North Brookfield).

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

Drought Indices by Region, August 2022

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mos)	7	8	11	6	24	15	29
Streamflow	7	4	1	4	2	7	N/A
Groundwater	15	5	15	10	27	19	16
Lakes/ Impoundments	ID	16	29	9	22	25	N/A
ET- CMI EDDI	Level 1 4	Level 1 4	Level 1 4	Level 1 4	Level 1 4	Level 1 4	Level 1 4
KBDI	Level 2	Level 2	Level 3	Level 3	Level 3	Level 2	Level 2

Recommend for (9/7 meeting)	Level 3	Level 3	Level 3	Level 3	Level 2/3	Level 3	Level 2
Declaration from 8/23 meeting	Level 2	Level 3	Level 3	Level 3	Level 3	Level 3	Level 2

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 2022

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (6 mos)	35	34	36	9	18	14	12
Streamflow	60	50	61	48	62	19	N/A
Groundwater	41	29	33	27	45	22	14
Lakes/ Impoundments	38	19	25	14	27	15	N/A
ET- CMI EDDI	Level 0 1	Level 0 1	Level 0 2	Level 0 1	Level 0 1	Level 0 1	Level 0 2
KBDI	Level 0	Level 0	Level 2	Level 2	Level 1	Level 2	Level 2

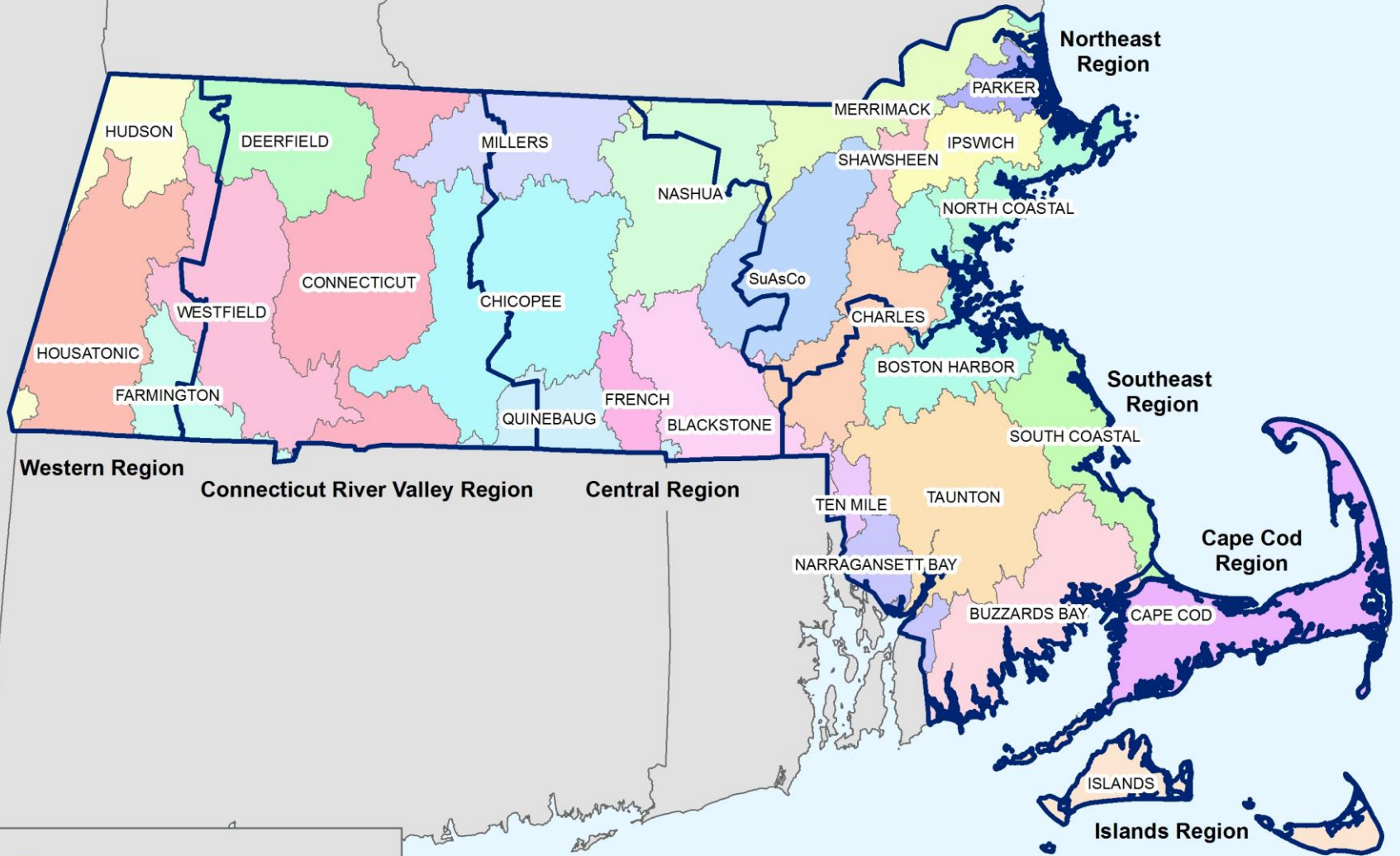
Recommend for (10/6 meeting)	Level 0	Level 1	Level 1	Level 2	Level 1	Level 2	Level 2
Declaration from 9/7 meeting	Level 2	Level 3	Level 3	Level 3	Level 2	Level 3	Level 2

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

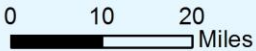


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 Drought Regions Boundaries

 Mass. Counties



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

Drought Indices by Major Basin – July 2022

Region	CTRV	West
Basin	Connecticut	Hudson
Precipitation	10	18
Streamflow	3	25
Groundwater	44	17
EDDI	3	3
KBDI	454	253
Recommended Level	3	2

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