

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 January 2024

Anne Carroll & Viki Zoltay
DCR Office of Water Resources

Drought Management Task Force

February 07, 2024

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Management Plan Indices

Numbers in parentheses indicate number of data points across the state



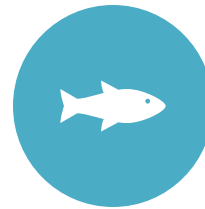
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(35)



EDDI -
Evapotranspiration
(national map)

MA Drought Management Plan

Index Severity Levels

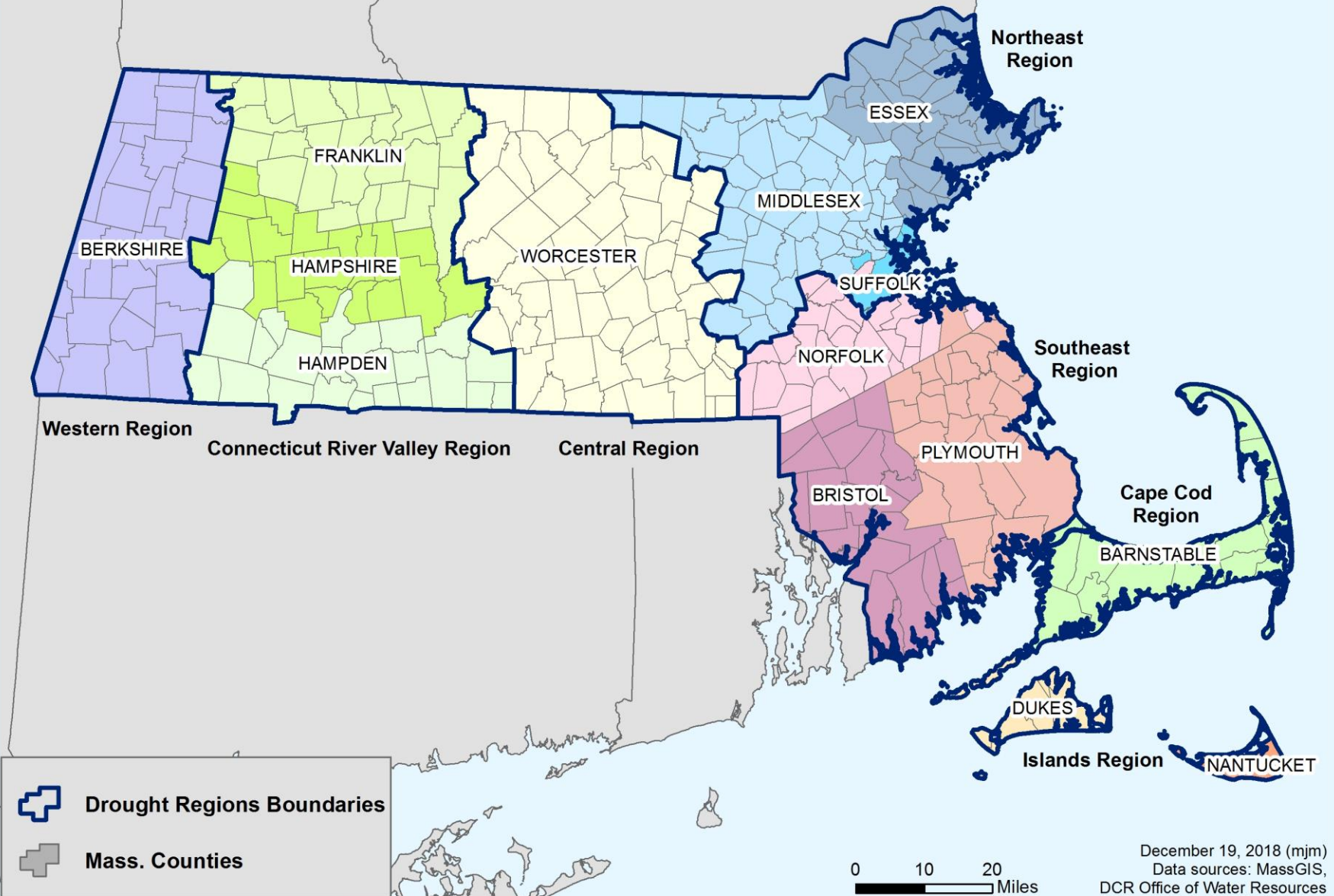
Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater, Evapotranspiration	Keetch-Byram Drought Index
0	>30 th percentile	< 200
1	≤30 and >20	200-400
2	≤20 and >10	400-600
3	≤10 and >2	600-700
4	≤2	700-800

MA Drought Management Plan

Drought Levels



MASSACHUSETTS DROUGHT REGIONS with Counties



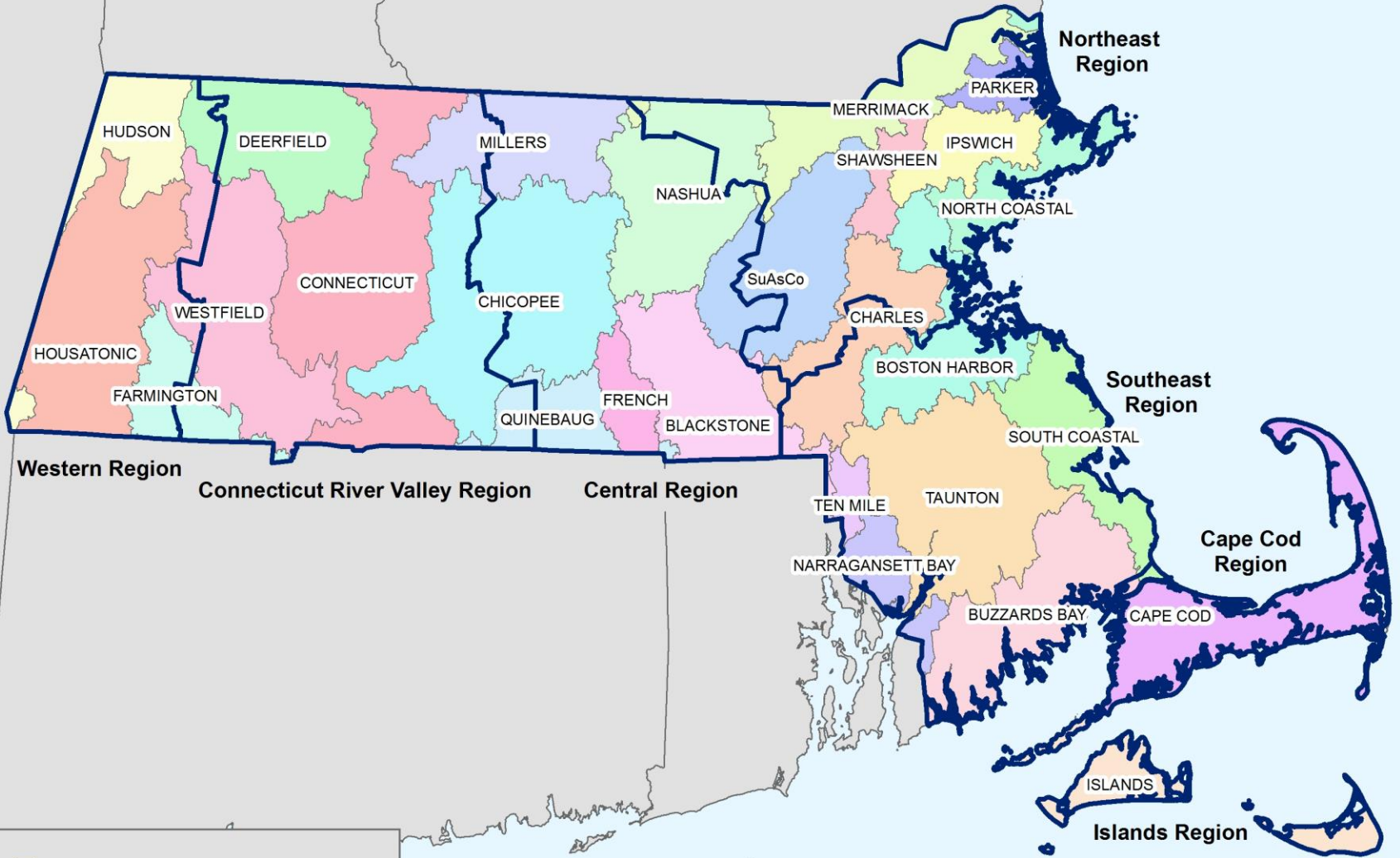
-  Drought Regions Boundaries
-  Mass. Counties

0 10 20
Miles

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

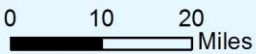


MASSACHUSETTS DROUGHT REGIONS with Watersheds



 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

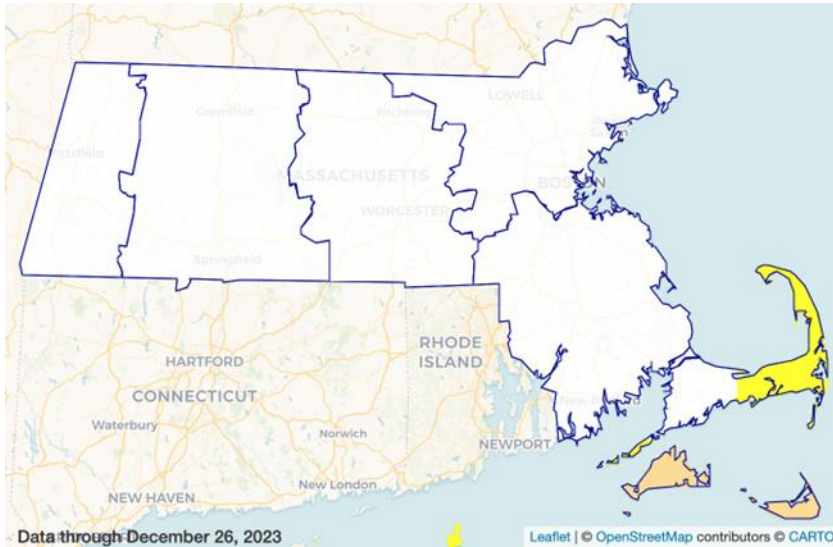


Public Health
Impacts

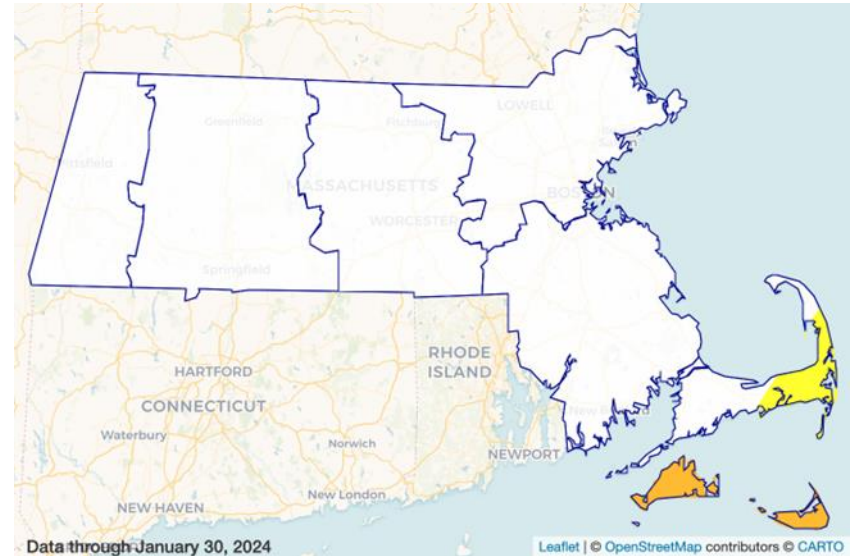
Recent Hydrologic History

- *June – September 2023*
 - Above-normal precipitation across state w/mostly normal on the Islands
 - Consistently declining and below-normal groundwater on the Islands and some on the Cape
- *October-November 2023*
 - Below-normal precipitation across the state
 - Below-normal groundwater on Islands and some on the Cape
- *December 2023*
 - Normal precipitation but 2- and 3- month still elevated for Islands and Cape
 - Well-below normal for groundwater on the Islands, Cape is variable
- *January 2024*
 - Above-normal precipitation with flooding in some areas of the state
 - Martha's Vineyard fared better than Nantucket for precipitation and groundwater improvements

US Drought Monitor



Data through December 26, 2023

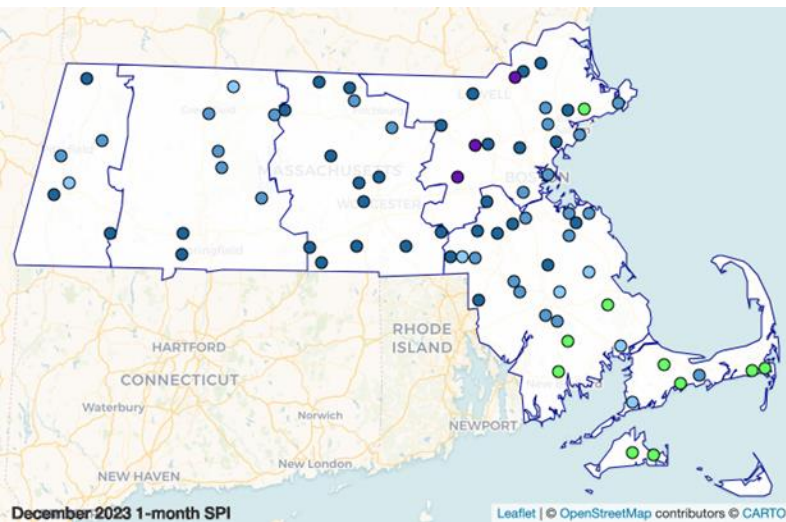
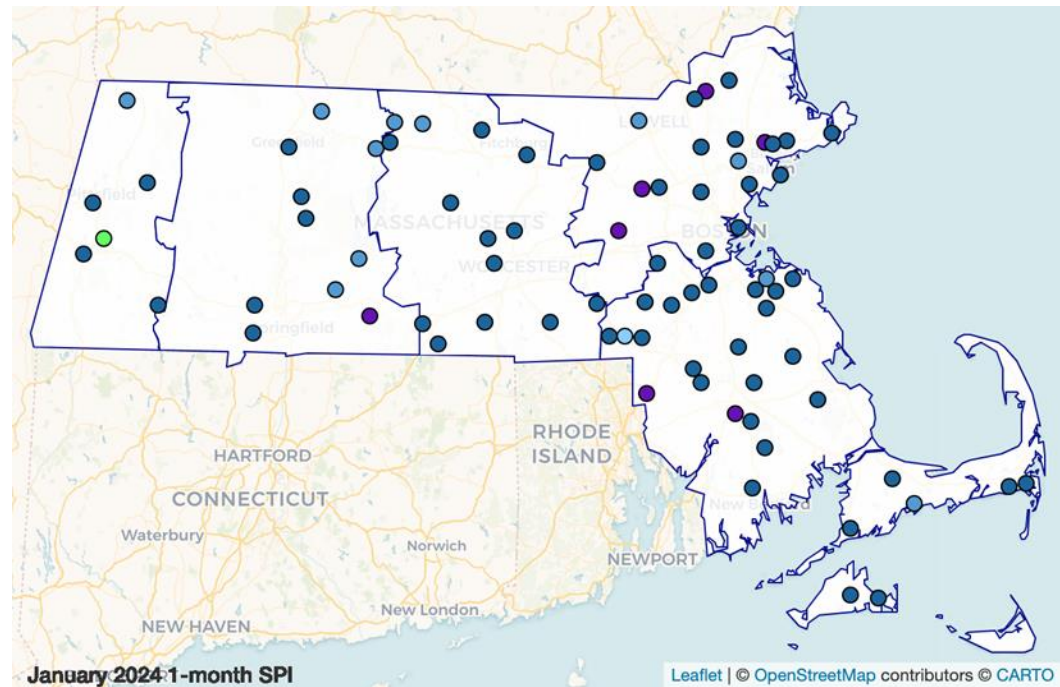
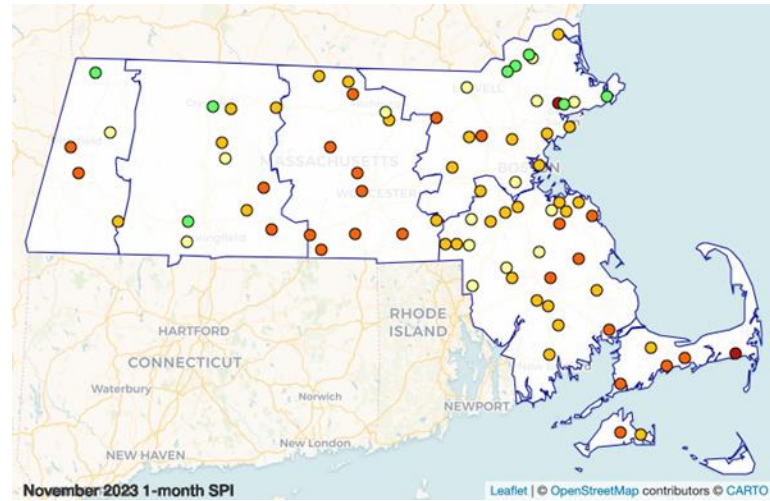


Data through January 30, 2024

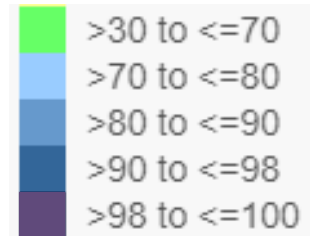
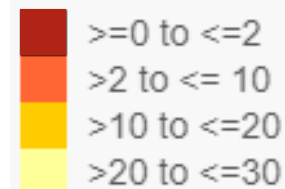
 None
 D0 (Abnormally Dry)
 D1 (Moderate Drought)
 D2 (Severe Drought)
 D3 (Extreme Drought)
 D4 (Exceptional Drought)

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

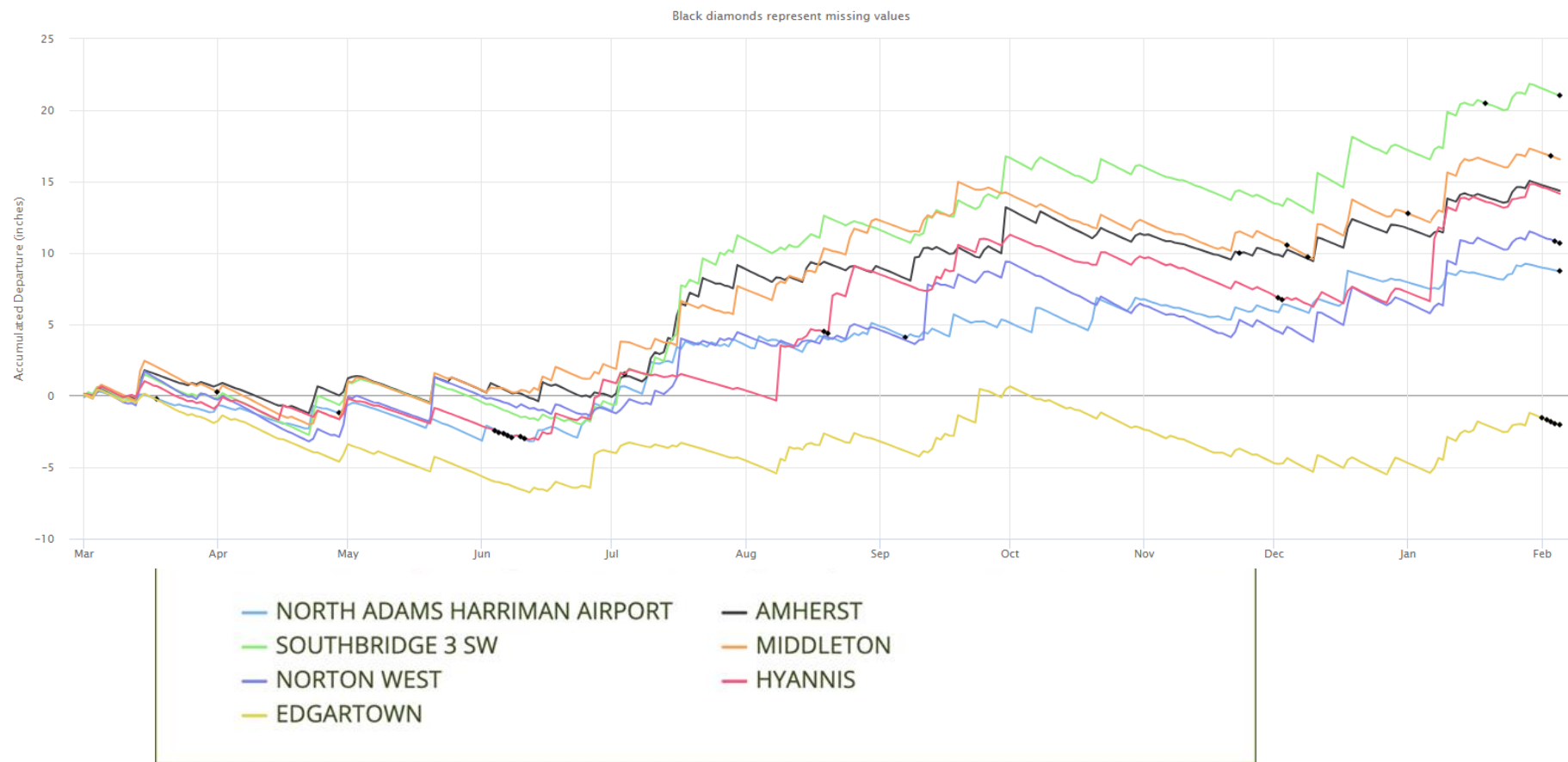
Standardized Precipitation Index



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.

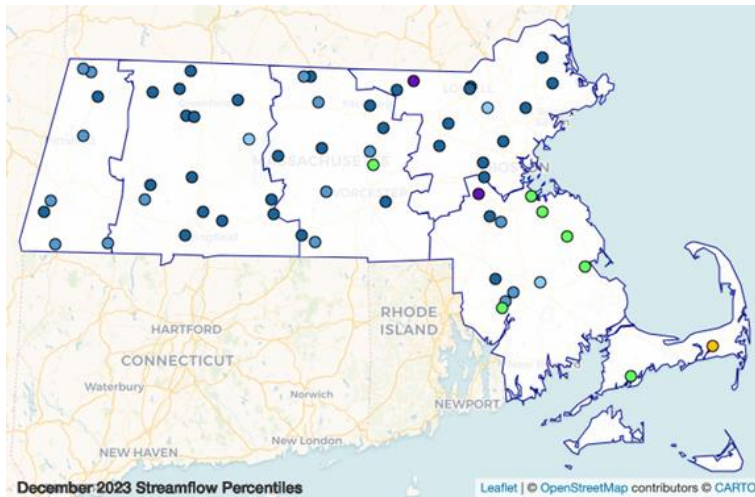
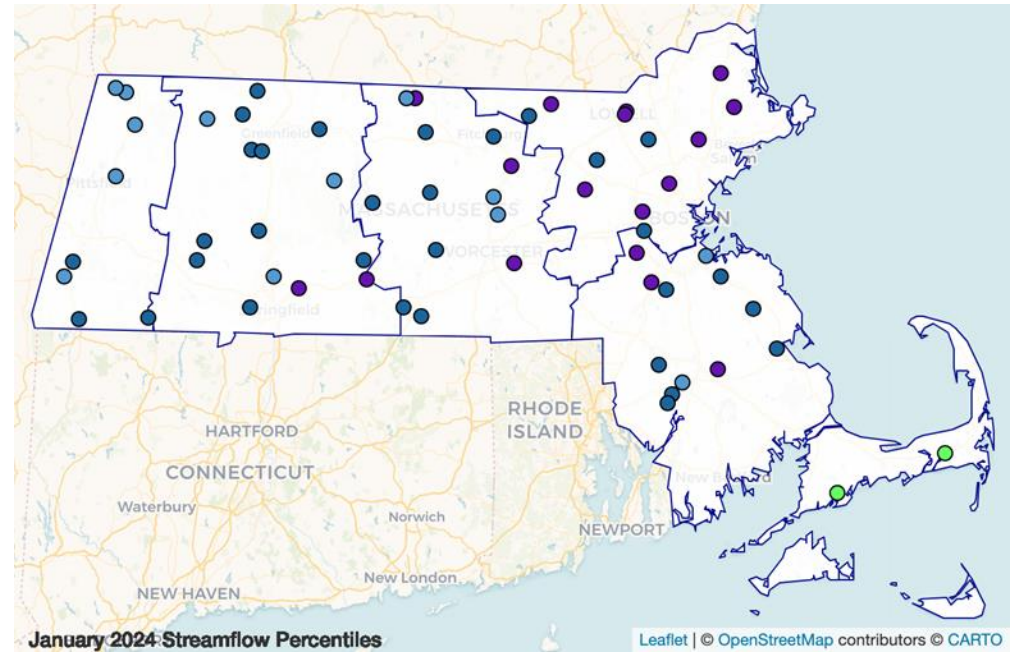
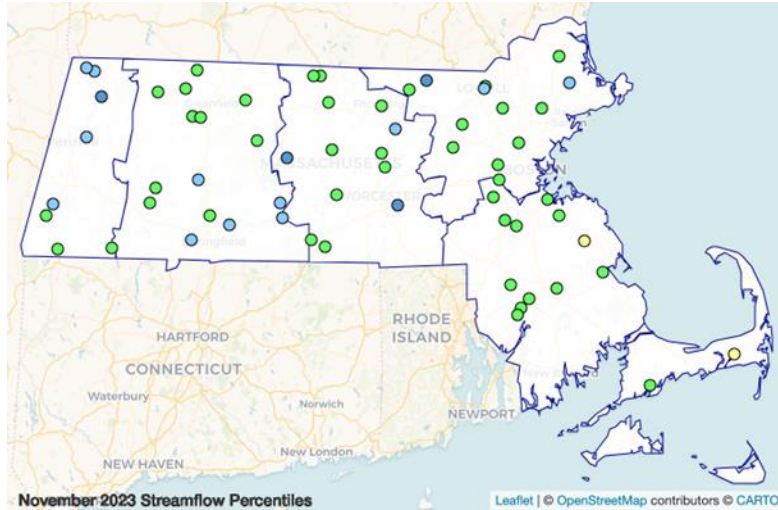
Standardized Precipitation Index as Percentile

REGION	NUMBER OF SITES	1-mo*	2-mo	3-mo	6-mo	9-mo	12-mo	24-mo	36-mo*
WESTERN	6	95	99	90	89	94	87	85	94
CTRV	10	95	98	90	88	97	94	85	92
CENTRAL	14	96	98	92	94	99	97	93	96
NORTHEAST	20	96	99	92	97	98	97	79	91
SOUTHEAST	24	96	98	89	89	95	88	80	89
CAPE COD	5	92	91	58	65	77	53	65	NA
ISLANDS	2	94	89	55	69	57	25	28	42

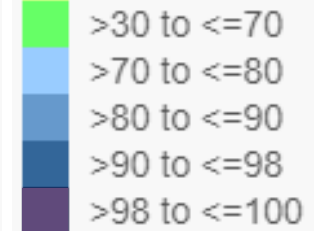
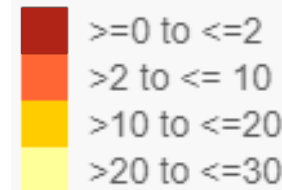
* 1- and 36-month SPI is for informational purposes only, not for drought determination. Of the 2- to 24-month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

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

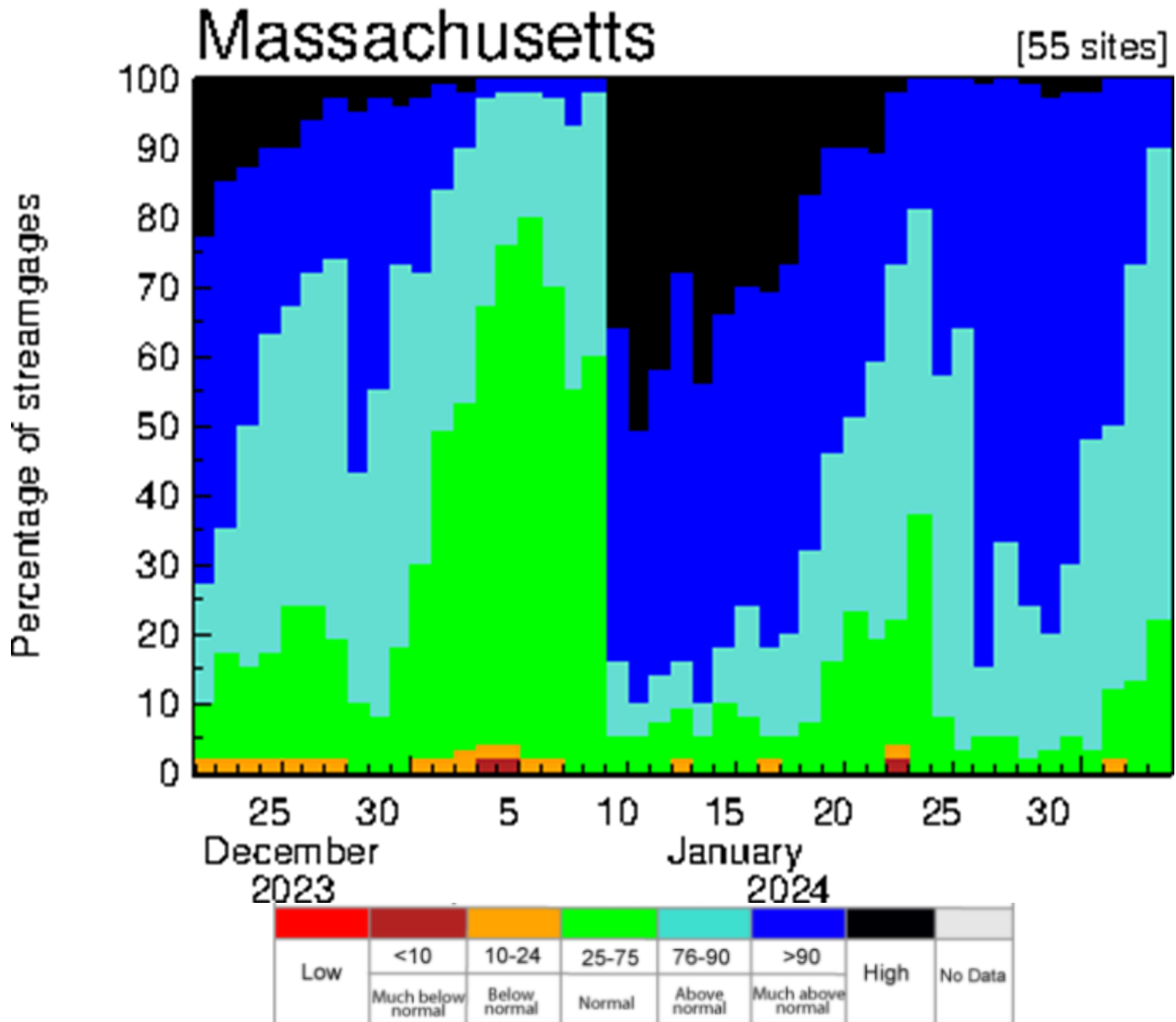
Streamflow Percentiles of Monthly Median



Percentiles



Percent of Gages at Various Percentiles



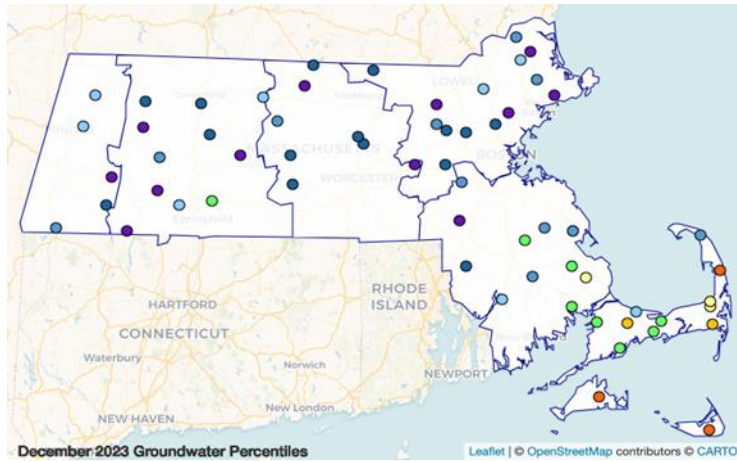
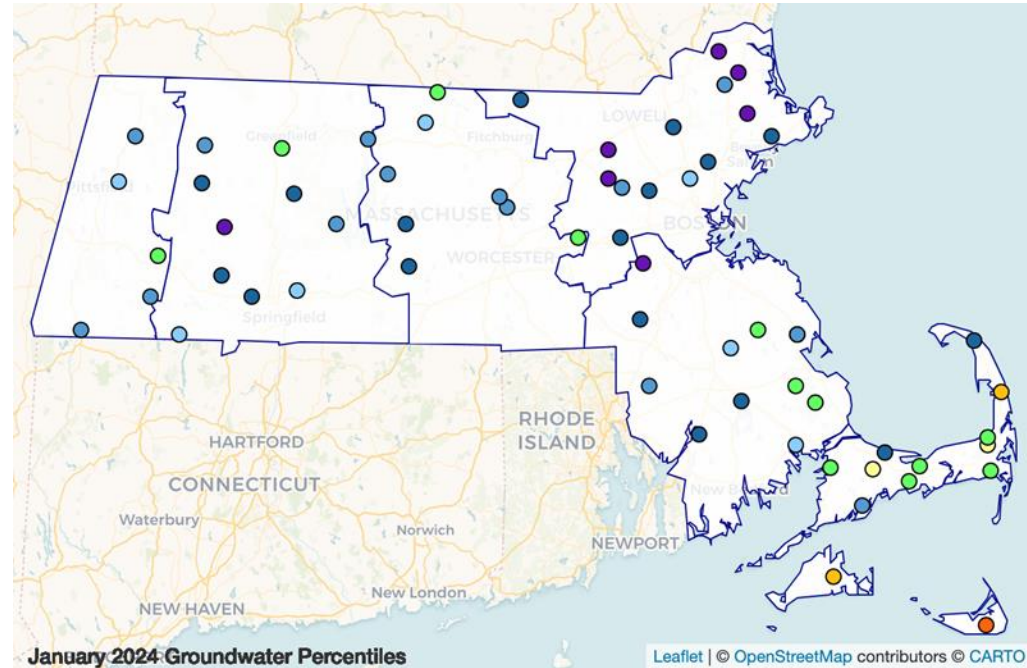
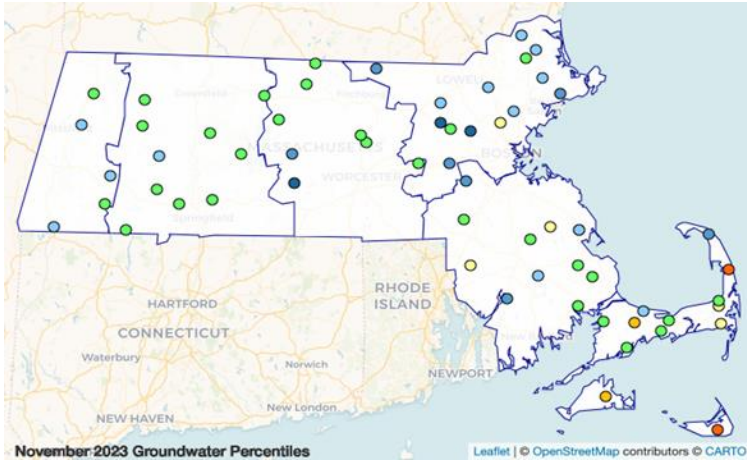
Streamflow Index

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	3	86
CTRV	15	0	0	0	0	12	97
CENTRAL	13	0	0	0	0	10	95
NORTHEAST	13	0	0	0	0	13	99
SOUTHEAST	12	0	0	0	0	10	97
CAPE COD	2	0	0	0	0	0	50

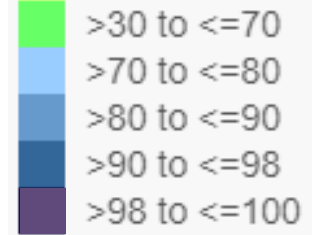
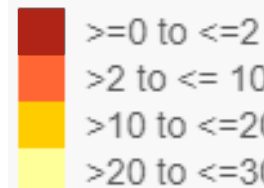
Notes: Not all gages report in all months due to ice, beaver dams or other conditions. The Islands region does not have any streamflow gages.

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

Groundwater Percentiles



Percentiles



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	84
CTRV	11	0	0	0	0	5	90
CENTRAL	8	0	0	0	0	2	85
NORTHEAST	14	0	0	0	0	11	98
SOUTHEAST	12	0	0	0	0	4	83
CAPE COD	11	0	0	1	2	2	39
ISLANDS	2	0	1	1	0	0	10

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

Lakes & Impoundments

REGION	NUMBER OF SITES REPORTING	MEDIAN OF INDIVIDUAL PERCENTILES OR PERCENT FULL
WESTERN	0	No data reported
CTRV	2	93rd
CENTRAL	2	60th
NORTHEAST	4	95th, 100%
SOUTHEAST	2	100th
CAPE COD	1	42nd

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, December 2023

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mos)	73	52	60	53	38	12	7
Streamflow	89	94	91	96	79	33	N/A
Groundwater	81	97	94	94	74	34	6
Lakes/ Impoundments	64th	89th	85th	86th	91st	37th	N/A
ET* 2-mos EDDI	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KBDI**	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>Declarations for December</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 2</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 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

Drought Indices by Region, January 2024

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation (3 mos)	90	90	92	92	89	58	55
Streamflow	86	97	95	99	97	50	N/A
Groundwater	84	90	85	98	83	39	10
Lakes/ Impoundments	ID	93rd	100th	95 th , 100%	100th	42nd	N/A
ET* 2-mos EDDI	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KBDI**	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Recommend (2/7 meeting)	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 2
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