MASSACHUSETTS WATER RESOURCES COMMISSION

FEBRUARY 2021 HYDROLOGIC CONDITIONS IN MASSACHUSETTS

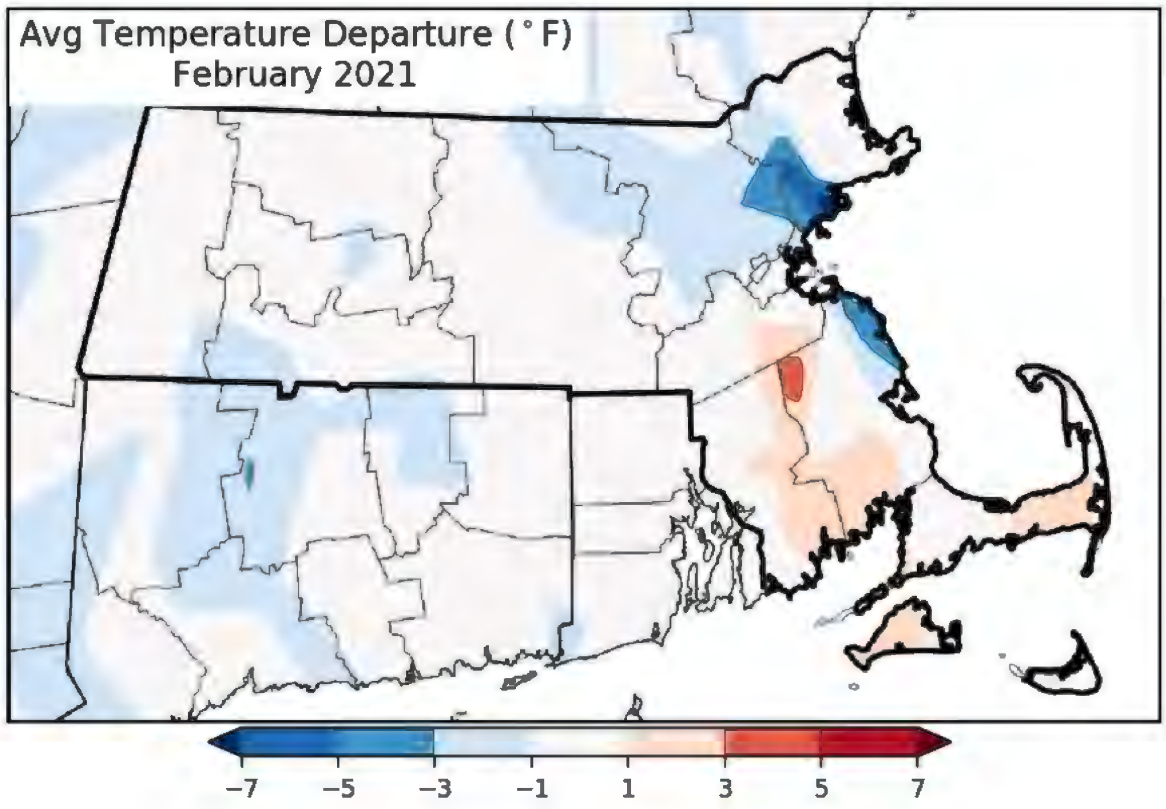
The Commonwealth of Massachusetts
Charles D. Baker, Governor
Kathleen A. Theoharides, Secretary, Executive Office of Energy and Environmental Affairs

FEBRUARY 2021 HYDROLOGIC CONDITIONS

SUMMARY OF CONDITIONS

- Monthly average temperatures were near normal across most of the State.
- Precipitation was below normal in the Western Region and near normal for the remaining Regions. The 1-month Standardized Precipitation Index is at Index Severity Level 1 for the Western Region.
- Streamflows were below normal in the Western Region and near normal in the remaining Regions. The Western Region is at Index Severity Level 1.
- Groundwater levels were below normal in the Western Region and near normal in the remaining Regions. The Western Region is at Index Severity Level 1.
- Lakes & Impoundments levels were in the normal range except for the one monitored pond in the Cape Cod Region which was below-normal.
- NOAA's March outlook projects chances for above-normal temperatures and equal chances for below-normal, normal, or above-normal precipitation.
- NOAA's 3-month outlook projects above-normal temperatures and equal chances for below-normal, normal, or above-normal precipitation.
- Appendices I and II provide additional precipitation data and information on the Massachusetts Drought Management Plan (DMP), respectively.

TEMPERATURE

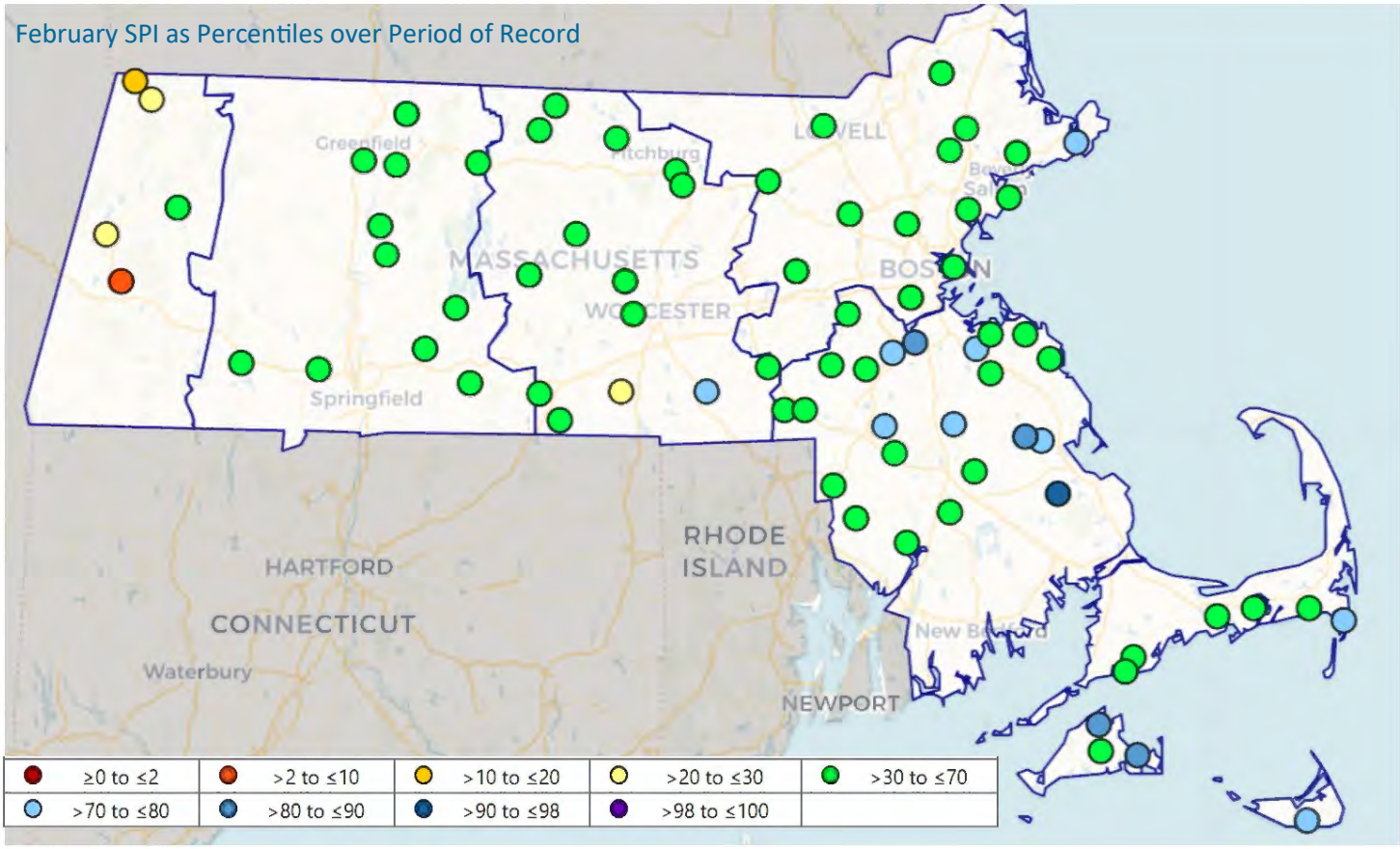


Monthly average temperatures were near normal across most of the state with some small areas of above– and below-normal.

http://www.nrcc.cornell.edu/regional/monthly/monthly.html

PRECIPITATION

Precipitation in February was below normal for the Western Region. Other Regions were normal with a few areas of above-normal precipitation in the Southeast, Cape, and Islands Regions. The 1-month Standardized Precipitation Index is at Index Severity Level 1 for the Western Region. Longer look-back periods for the Western, CT River Valley, Northeast, and Cape Cod Regions are still showing some deficits from the 2020 drought. Appendix I provides additional details for precipitation data.



REGION	NUMBER OF SITES REPORTING	FEBRUARY MONTHLY AVERAGE (IN)	DEPARTURE FROM HISTORICAL (IN)	SPI * 1-MONTH	SPI 3-MONTH	SPI 6-MONTH
WESTERN	5	1.87	-0.86	-0.77	-1.16	-0.69
CT RIVER VALLEY	11	2.59	-0.47	-0.21	0.28	0.26
CENTRAL	14	2.99	-0.24	0.01	0.73	0.31
NORTHEAST	14	3.32	-0.06	0.07	0.12	-0.1
SOUTHEAST	23	4.38	0.80	0.53	0.63	0.00
CAPE COD	6	4.82	0.88	0.46	0.55	-0.82
ISLANDS	4	4.83	1.40	1.01	0.83	0.06

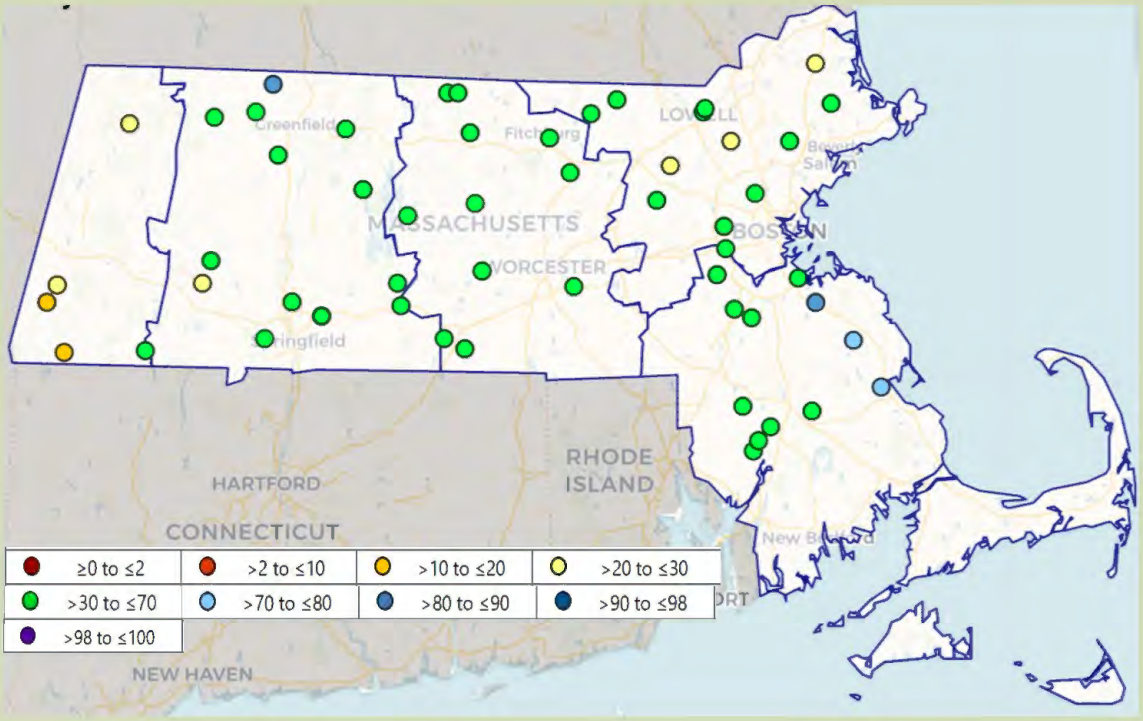
*SPI is the Standardized Precipitation Index used in the Drought Management Plan (DMP) and represents the variation, in standard deviations, from long-term precipitation averages.

DMP Index Severity Levels			
1	2	3	4

STREAMFLOW

Monthly Median Streamflow Percentiles Compared to Historical Values

The monthly median streamflow was below normal in the Western Region. Four of the five reporting gages were below the 30th percentile, and the Region is at a Level 1 Index Severity. Other regional medians were in the normal range with three gages below the 30th percentile in the Northeast and one gage in the CT River Valley.



REGION	TOTAL GAGES REPORTING FOR FEB	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 to ≤30 PERCENTILE	>90 PERCENTILE	MEDIAN OF GAGE PERCENTILES
WESTERN	5	0	0	2	2	0	21
CT RIVER VALLEY	13	0	0	0	1	0	50
CENTRAL	11	0	0	0	0	0	46
NORTHEAST	13	0	0	0	3	0	36
SOUTHEAST	12	0	0	0	0	0	62

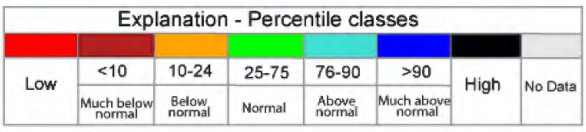
Note: Not all gages report in all months due to ice, beaver dams or other conditions. Streamflow index is not applicable to Cape Cod and the Islands.

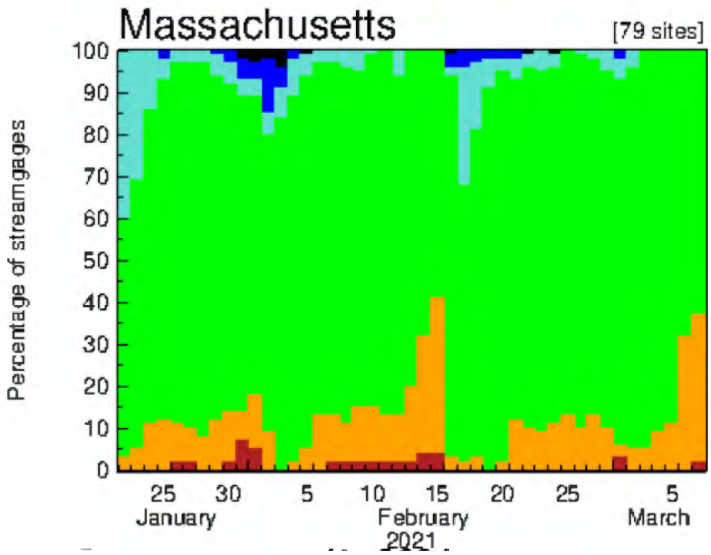
DMP Index Severity Levels			
1	2	3	4

Time Series of the Percent of Gages at Their Respective Percentile Flows for Average Daily Streamflows Compared to Historical Values

Streamflow is monitored by the Commonwealth of Massachusetts and United States Geological Survey cooperative stream gaging program.

https://waterdata.usgs.gov/nwis/sw

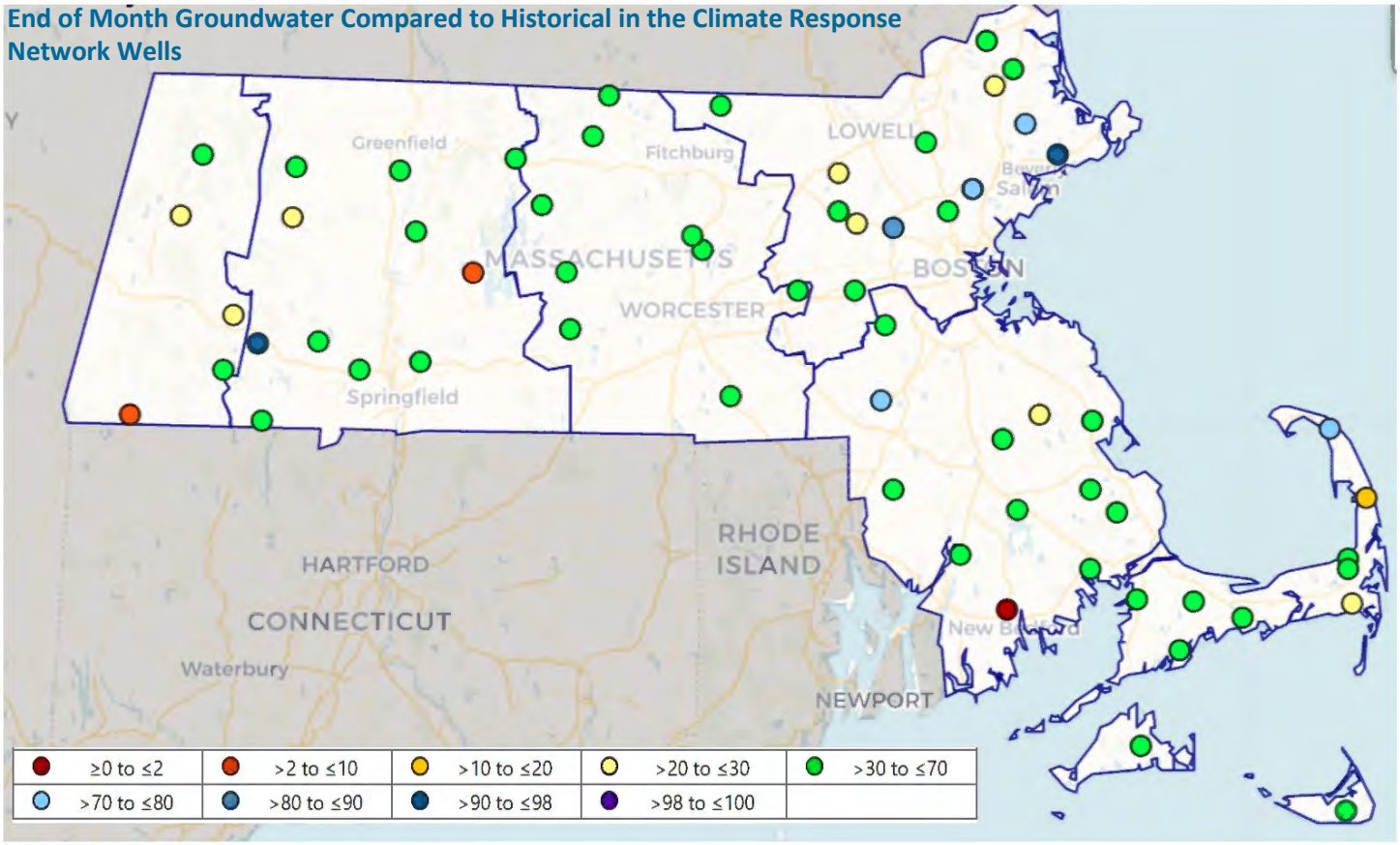




GROUNDWATER

The majority of groundwater wells are in the normal range. All regions except the Central and Islands have wells below the 30th percentile and there are two wells in the CT River Valley and Northeast above the 90th percentile. Median regional percentiles decreased or nearly stayed the same since last month; however, groundwater levels at most wells are expected to rise at this time of the year. The Western Region is at Index Severity Level 1.

End of Month Groundwater Compared to Historical in the Climate Response Network Wells



REGION	TOTAL WELLS REPORTING FOR FEB.	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 TO ≤30 PERCENTILE	>90 PERCENTILE	MEDIAN OF WELL PERCENTILES
WESTERN	5	0	1	0	2	0	29
CT RIVER VALLEY	11	0	1	0	1	1	45
CENTRAL	9	0	0	0	0	0	48
NORTHEAST	14	0	0	0	3	1	54
SOUTHEAST	12	1	0	0	1	0	46
CAPE COD	9	0	0	1	1	0	45
ISLANDS	2	0	0	0	0	0	49

DMP Index Severity Levels			
1	2	3	4

LAKES AND IMPOUNDMENTS

REGION	TOTAL REPORTING FOR FEBRUARY	MEDIAN OF INDIVIDUAL PERCENTILES or PERCENT FULL	DMP INDEX SEVERITY
WESTERN	2	100% & 94% full	0
CT RIVER VALLEY	2	43	0
CENTRAL	2	51	0
NORTHEAST	6	63	0
SOUTHEAST	1	100% full	0
CAPE COD	1	20	2

At the end of February, most lakes and impoundments were greater than their 30th percentile value for this time of the year. The pond monitored in the Cape Cod Region is below normal.

DMP Index Severity Levels			
1	2	3	4

Note: Islands Region does not have any monitoring locations for Lakes and Impoundments
DMP Index Severity Levels do not necessarily reflect water supply status.

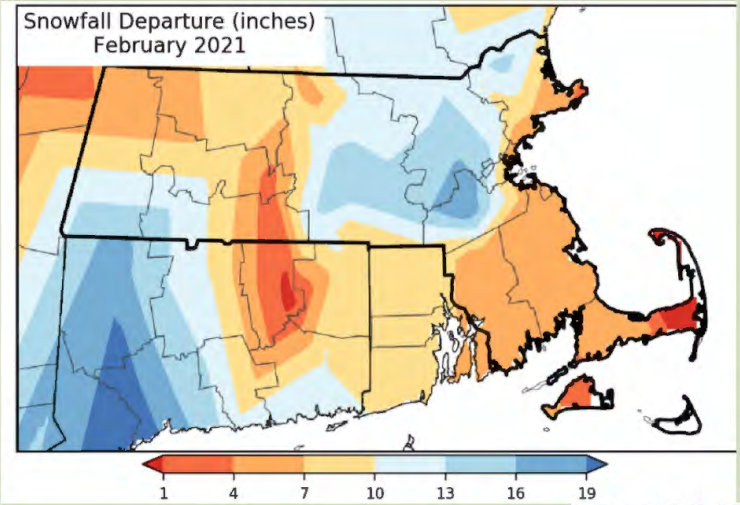
KEETCH BYRAM DROUGHT INDEX (KBDI)

KBDI is provided seasonally.

CMI

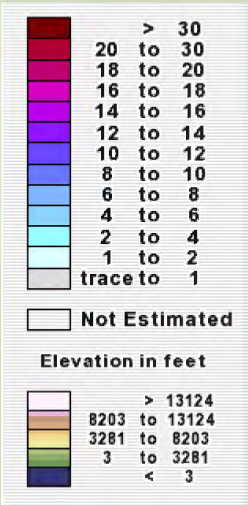
CMI is provided seasonally.

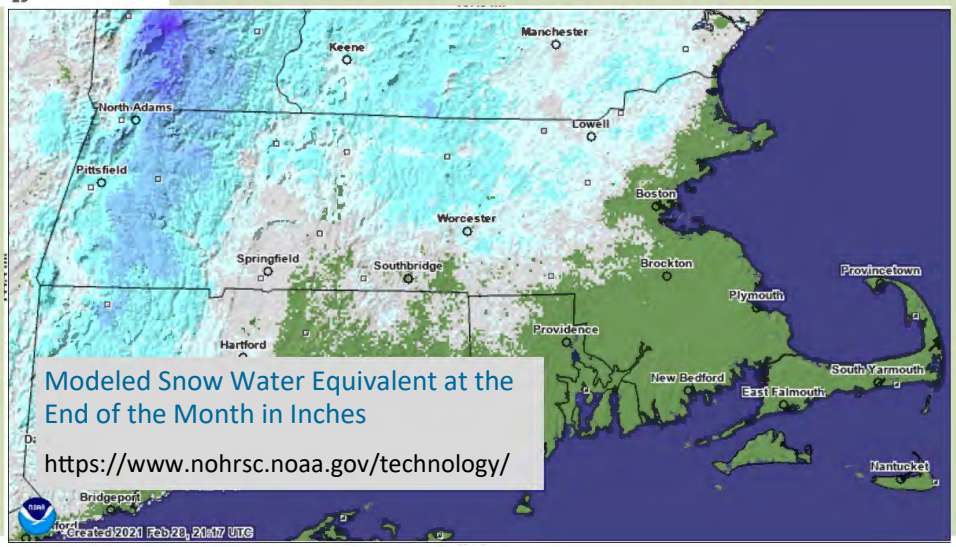
SNOWFALL



This month's snowfall was near-average to above-average.

http://www.nrcc.cornell.edu/





Modeled Snow Water Equivalent at the End of the Month in Inches

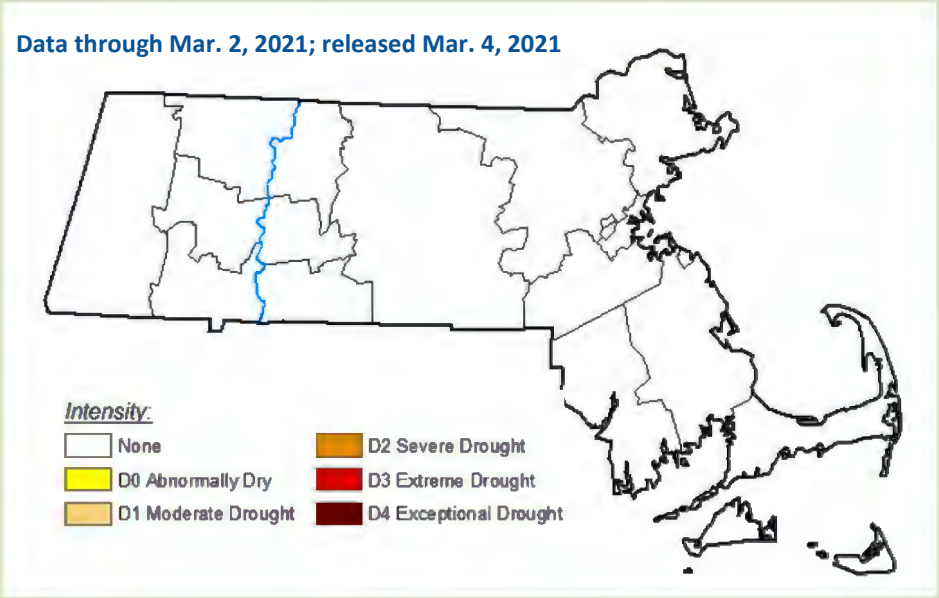
https://www.nohrsc.noaa.gov/technology/

DROUGHT CONDITIONS AND FORECASTS

U.S. Drought Monitor (USDM)

Throughout the month of February, and as of March 2nd, there were no drought conditions shown on the USDM.

USDM maps are produced by the National Drought Mitigation Center (NDMC). For methods and weekly updates see: https://droughtmonitor.unl.edu



NOAA Climate Prediction Center

Temperature and Precipitation Outlook

March: The outlook released 2/28 shows 40-50% probability of above normal temperatures and equal chances of below-normal, normal, or above-normal precipitation.

March through May: The outlook released 2/18 projects a 40-50% probability of above-normal temperatures for the southern part of the State, a 33-40% probability of above-normal temperatures for the mid and northern parts; and equal chances of below-normal, normal, or above-normal precipitation. https://www.cpc.ncep.noaa.gov/

Monthly and Seasonal Drought Outlook

The monthly outlook for March released on 2/28 shows no drought development. The seasonal outlook released on 2/18 and valid through May shows no drought development.

http://www.cpc.ncep.noaa.gov/products/Drought

This report was prepared by the Massachusetts Department of Conservation and Recreation. Data may be preliminary. Additional information, previous reports, and drought management information can be found at: https://www.mass.gov/water-data-tracking

DCR Precipitation Reports are available at https://www.mass.gov/service-details/precipitation-composite-estimates-1 and https://www.mass.gov/service-details/standardized-precipitation-index-spi-0

APPENDIX I – ADDITIONAL PRECIPITATION DATA

Standardized Precipitation Index February 2021

REGION	NUMBER OF SITES	SPI1	SPI2	SPI3	SPI6	SPI9	SPI12	SPI24	SPI36
WESTERN	5	-0.77	-1.20	-1.16	-0.69	-1.11	-1.06	-1.30	-0.14
CT RIVER VALLEY	11	-0.21	-0.56	0.28	0.26	-0.36	-0.58	-0.26	1.00
CENTRAL	14	0.01	-0.39	0.73	0.31	-0.17	-0.14	0.28	1.26
NORTHEAST	14	0.07	-0.60	0.12	-0.10	-0.66	-0.53	0.04	0.61
SOUTHEAST	23	0.53	-0.38	0.63	0.00	-0.37	-0.17	0.34	1.26
CAPE COD	6	0.46	-0.28	0.55	-0.82	-1.80	-1.33	-0.01	0.45
ISLANDS	4	1.01	0.08	0.83	0.06	-1.10	-0.49	0.32	0.65

Key to Index Severity Levels
0
1
2
3
4

Percent of Average Historical Precipitation

REGION	NUMBER OF SITES	HISTORICAL AVERAGE (IN)	FEBRUARY AVERAGE (IN)	DEPARTURE FROM HISTORICAL AVERAGE (IN)	PERCENT OF HISTORICAL
WESTERN	5	2.73	1.87	-0.86	68%
CT RIVER VALLEY	11	3.06	2.59	-0.47	85%
CENTRAL	14	3.23	2.99	-0.24	93%
NORTHEAST	14	3.38	3.32	-0.06	98%
SOUTHEAST	23	3.58	4.38	0.80	122%
CAPE COD	6	3.94	4.82	0.88	122%
ISLANDS	4	3.43	4.83	1.40	141%

APPENDIX II – DROUGHT MANAGEMENT PLAN INFORMATION

The Massachusetts Drought Management Plan (DMP) can be found at https://www.mass.gov/doc/massachusetts-drought-management-plan/download. The document provides details on the Drought Indices, methods for Drought Levels determination, and actions associated with each Drought Level.

Drought Levels (Section 3.1 of the DMP)

Level 0 Normal

Level 1 Mild Drought

Level 2 Significant Drought

Level 3 Critical Drought

Level 4 Emergency Drought

Index Severity Levels (Section 3.4 of the DMP)

SEVERITY LEVEL	STANDARDIZED PRECIPITATION INDEX (SPI)	STREAMFLOW	LAKES AND IMPOUNDMENTS	GROUNDWATER	KEETCH-BRYAM DROUGHT INDEX (KBDI)	CROP MOISTURE INDEX
0	> 30th 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