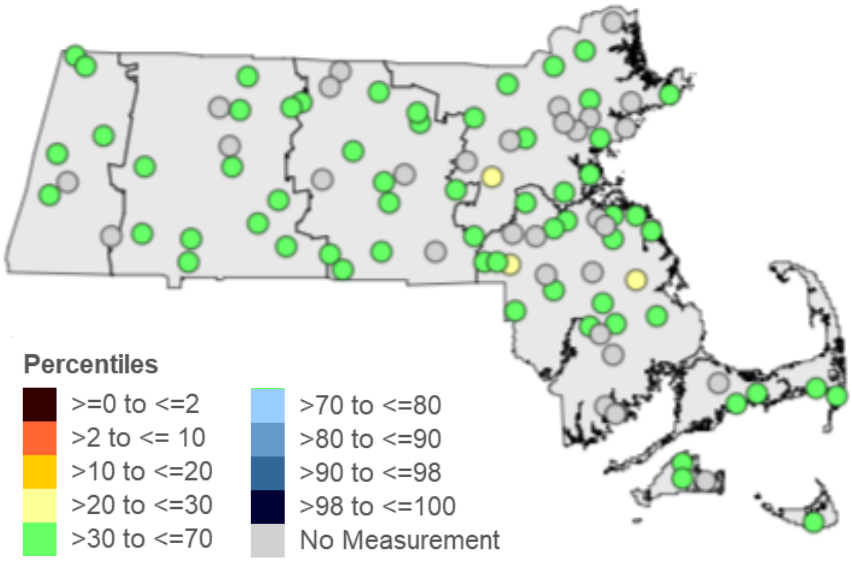
MASSACHUSETTS WATER RESOURCES COMMISSION

February 2020 Hydrologic Conditions in Massachusetts

SUMMARY OF CONDITIONS

- Monthly temperatures were above average for February. It was the 3rd warmest on record for Boston.
- Precipitation was mainly near average for February. The Index severity levels for the 2-month SPI are at Level 1 or Level 2 for six out of seven drought regions due to low January precipitation amounts.
- Streamflow and groundwater were greater than 30th percentile values. Index severity levels are 0.
- Lakes and Impoundments were greater than 30th percentile values. Index severity levels are 0.
- For March, NOAA projects a 50% chance for 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.

PRECIPITATION



Precipitation ranged from 0.5” below average to 0.7” above average in February. However, the low January precipitation amounts are affecting the 2-month SPI values. For the 2-month SPI, four regions are at Severity Level 1 and two regions are at Severity Level 2. All other look-back periods for the SPI are at Severity Level 0.

Region	Number of Sites	February Average (inches)	Departure from Historical (inches)	DMP SPI 1-month	DMP SPI 2-month	DMP SPI 3-month
Western	5	3.33	0.60	0.63	-0.23	0.52
CT River Valley	11	3.21	0.16	0.23	-0.72	0.43
Central	11	3.28	0.10	0.00	-0.77	0.48
Northeast	12	3.05	-0.29	-0.05	-0.91	0.19
Southeast	17	3.10	-0.52	-0.24	-1.08	0.19
Cape Cod	4	3.80	-0.19	0.12	-0.73	0.78
Islands	3	3.88	0.70	0.59	-0.83	0.70

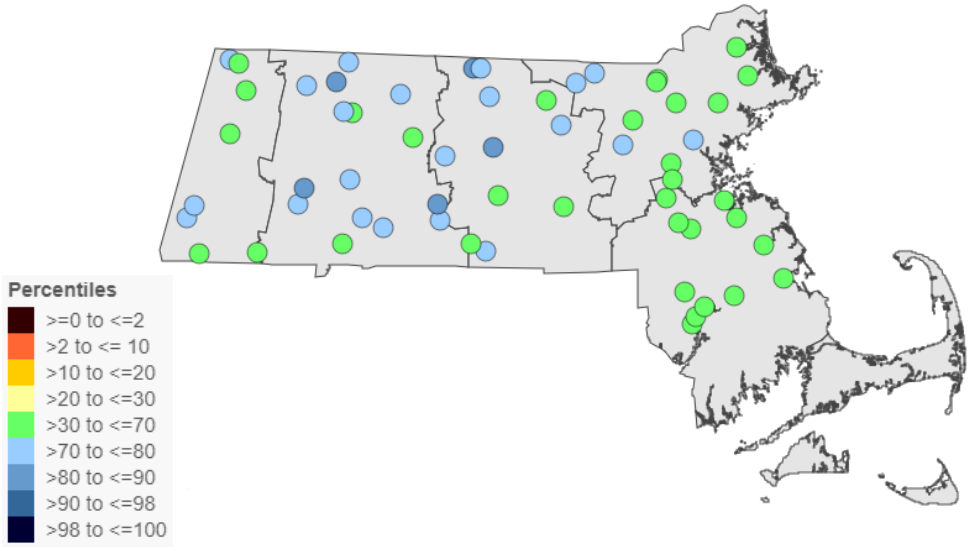
STREAMFLOW

Monthly median streamflows were all greater than their respective 30th percentile values for February. All regions are at an Index Severity of Level 0.

Median Monthly Streamflows Compared to Historical Values

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

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

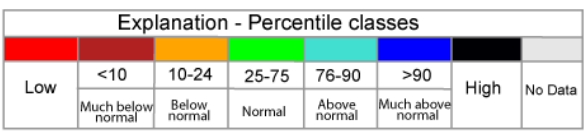


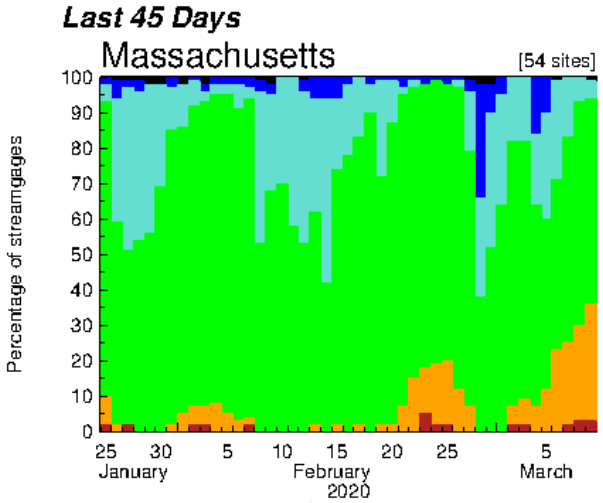
Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for February	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	> 90 Percentile		
Western	8	0	0	0	0	0	66	0
CT River	15	0	0	0	0	0	73	0
Central	11	0	0	0	0	0	74	0
Northeast	13	0	0	0	0	0	66	0
Southeast	12	0	0	0	0	0	44	0

Notes: 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.

Time Series of Average Daily Streamflows Compared to Historical Values

https://waterwatch.usgs.gov/index.php?id=real&sid=w__plot_sum&r=ma



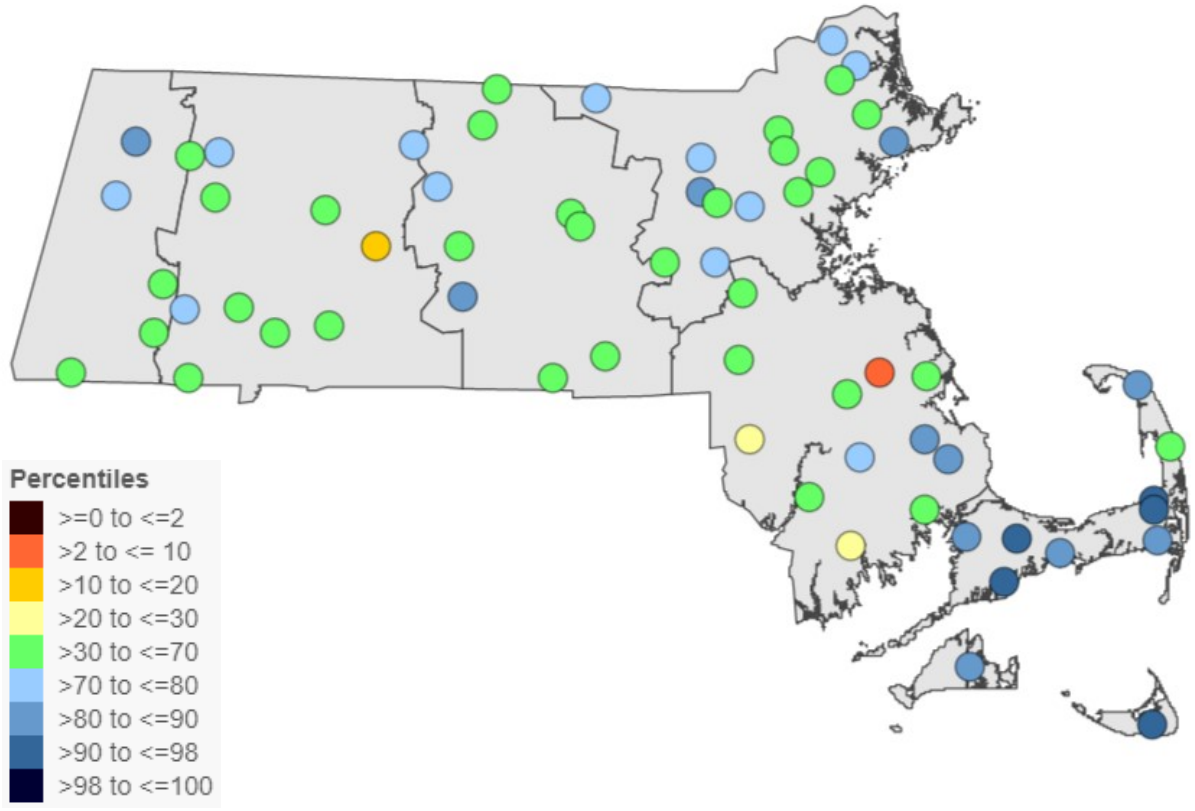


GROUNDWATER

The Pelham 23 well (in the Connecticut River Valley Region) has been lower than its 30th percentile value since June. Three wells in the Southeast Region are below their 30th percentile values. All other wells are above their 30th percentile values, with 5 wells greater than their 90th percentile values. All regions are at an Index Severity of Level 0.

End of February Groundwater Compared to Historical in the Climate Response Network

https://groundwaterwatch.usgs.gov/NetMapT1L2.asp?ncd=crn&sc=25



Region	Number of Wells						Median of Individual Percentiles	DMP Index Severity
	Total Reporting for February	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	> 90 Percentile		
Western	5	0	0	0	0	0	66	0
CT River Valley	11	0	0	1	0	0	51	0
Central	10	0	0	0	0	0	61	0
Northeast	15	0	0	0	0	0	71	0
Southeast	12	0	1	0	2	0	48	0
Cape Cod	9	0	0	0	0	4	86	0
Islands	2	0	0	0	0	1	92	0

LAKES and IMPOUNDMENTS

At the end of February, all drought regions were at Index Severity 0. Five of the reporting reservoirs were full.

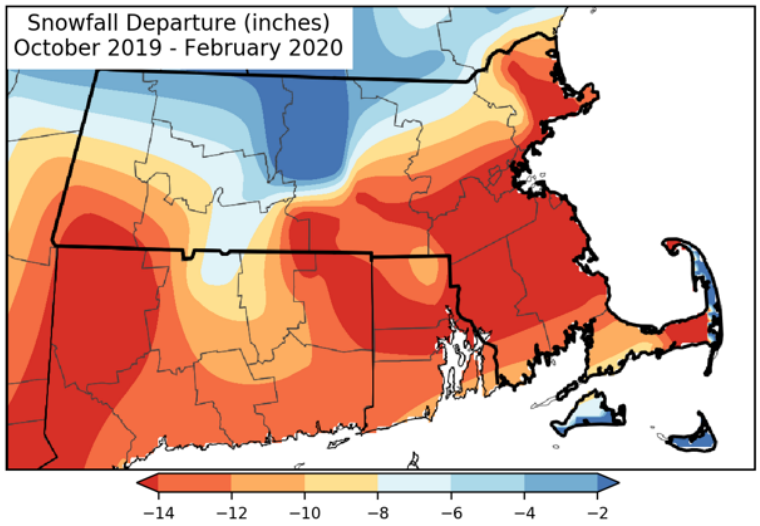
Region	Total Reporting for February	Median of Lakes and Impoundments Percentiles	DMP Index Severity
Western	1	N/A*	0
CT River Valley	2	79	0
Central	3	88*	0
Northeast	6	63	0
Southeast	2	40*	0
Cape Cod	1	92	0
Islands	N/A	N/A	N/A

*Median value does not include certain reporting lakes and impoundments at 100% full

KEETCH BYRAM INDEX (KBDI) and CROP MOISTURE INDEX (CMI)

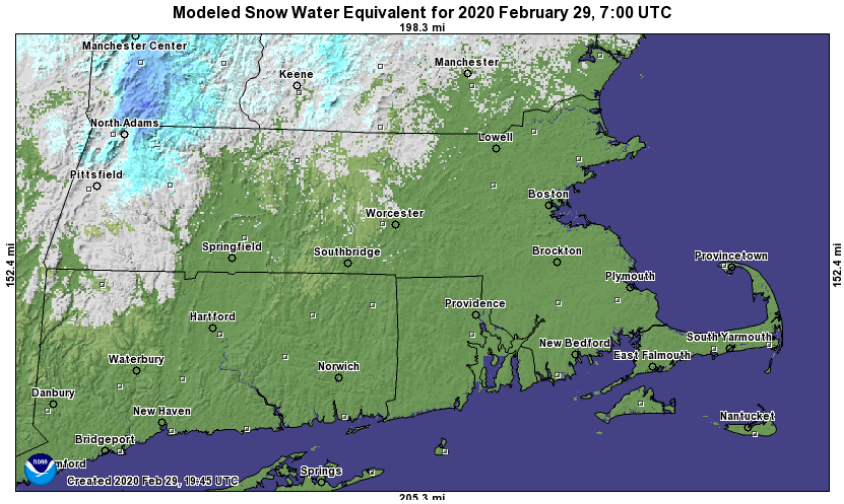
KBDI and CMI are reported seasonally during the months of March - November.

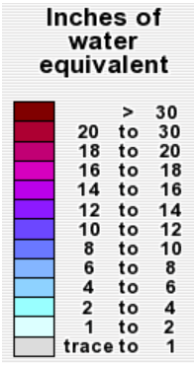
SNOW



Season-to-date snowfall departure

At the end of February the season-to-date snowfall departure ranged from two inches below normal to more than 14 inches below normal across the state.
http://www.nrcc.cornell.edu/regional/monthly/monthly.html

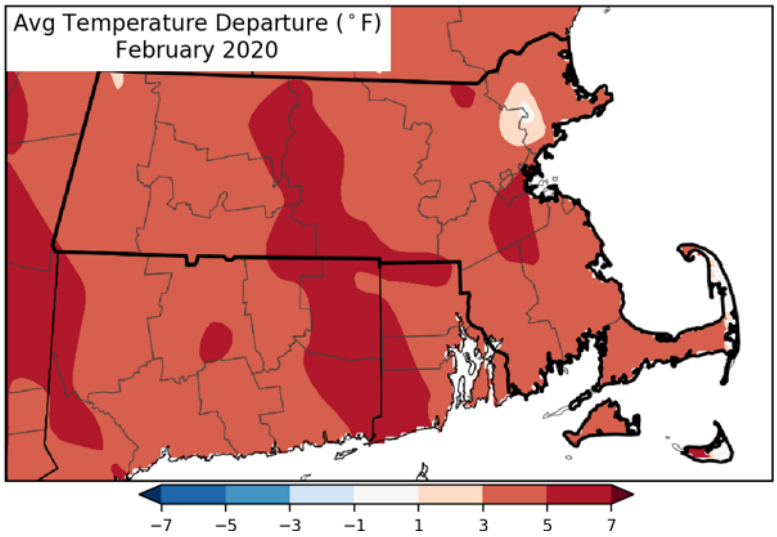




Snow cover

At the end of February, snow remained only in the northern and western portions of the state.
https://www.nohrsc.noaa.gov/interactive/html/map.html

TEMPERATURE



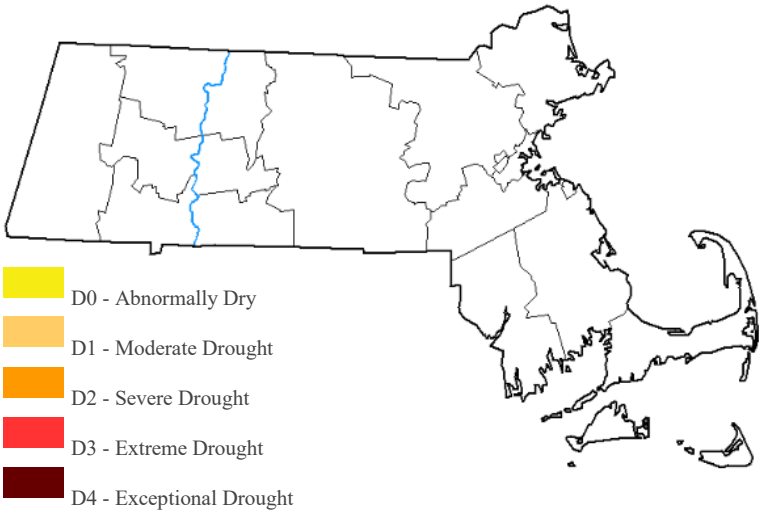
Monthly average temperatures were above historical averages for this time of the year. http://www.nrcc.cornell.edu/regional/monthly/monthly.html
According to NOAA, Boston had its 3rd warmest February on record and Worcester had its 12th warmest. Boston daily temperatures ranged from 12 to 64 degrees Fahrenheit (deg F). Daily departures from historical averages ranged from +16.1 to –10.2 deg F.
https://w2.weather.gov/climate/xmacis.php?wfo=box

DROUGHT CONDITIONS AND FORECASTS BY NOAA AND PARTNERS

U.S. Drought Monitor as of February 25, 2020

Summary: The USDM does not show drought conditions at the end of February.

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



NOAA Climate Prediction Center: Temperature and Precipitation Outlook

March: The outlook projects 50% chance of above normal temperatures and equal chances for below-normal, normal, or above-normal precipitation.

March through May: The outlook projects 33% chance of above normal temperatures and a 33% chance for above-normal precipitation.
https://www.cpc.ncep.noaa.gov/

Monthly and Seasonal Drought Outlook

The monthly outlook for March and the seasonal outlook valid through May do not project drought conditions. 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.

Appendix I— Additional Precipitation Data

Standardized Precipitation Index February 2020

Drought Region	Number of Sites	SPI1	SPI2	SPI3	SPI6	SPI9	SPI12	SPI24	SPI36
Western	5	0.63	-0.23	0.52	0.60	-0.11	-0.13	1.02	0.71
Connecticut River	11	0.23	-0.72	0.43	0.04	-0.01	0.12	1.45	1.24
Central	11	0.00	-0.77	0.48	0.27	0.43	0.67	1.58	1.59
Northeast	12	-0.05	-0.91	0.19	-0.06	0.43	0.57	1.26	1.08
Southeast	17	-0.24	-1.08	0.19	-0.01	0.20	0.53	1.41	1.17
Cape Cod	4	0.12	-0.73	0.78	0.85	0.79	0.91	1.03	1.89
Islands	3	0.59	-0.83	0.70	0.83	0.89	0.86	0.88	1.32

Key to Drought Plan SPI Severity Levels	
0	>-0.52
1	≤ -0.52 and > -0.84
2	≤ -0.84 and > -1.28
3	≤ -1.28 and > -2.05
4	≤ -2.05

Percent of Average Historical Precipitation

Drought Region	Number of Sites	Historical Average (inches)	February Average (inches)	Departure from Historical (inches)	Percent of Historical
Western	5	2.73	3.33	0.60	122
Connecticut River	11	3.06	3.21	0.16	105
Central	11	3.18	3.28	0.10	103
Northeast	12	3.34	3.05	-0.29	91
Southeast	17	3.62	3.10	-0.52	87
Cape Cod	4	3.99	3.80	-0.19	96
Islands	3	3.18	3.88	0.70	122

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 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, how Drought Levels are determined, 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	Stream-flow	Lakes and Impoundments	Ground-water	Keetch-Byram Drought	Crop Moisture
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