



MASSACHUSETTS WATER RESOURCES COMMISSION

MAY 2020 HYDROLOGIC CONDITIONS IN MASSACHUSETTS



The Commonwealth of Massachusetts
Charles D. Baker, Governor

Kathleen A. Theoharides, Secretary, Executive Office of Energy and Environmental Affairs

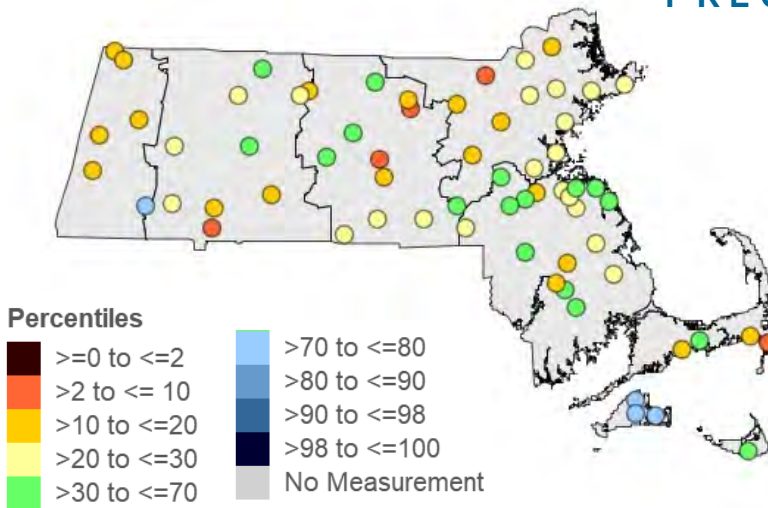
MAY 2020 HYDROLOGIC CONDITIONS

SUMMARY OF CONDITIONS

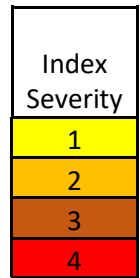
- Monthly temperatures were average for May.
- Precipitation was low. Index severity levels are at Level 1 for the Central and Northeast Regions and Level 2 for the Western and Cape Cod Regions.
- Monthly median streamflows were all greater than their respective 30th percentile values resulting in Index Severity levels at 0.
- Groundwater levels varied across the state. Index severity levels are 0 for all regions except the Western Region at Level 1.
- For June NOAA projects above-normal temperatures and below-normal precipitation.
- Appendices I and II provide additional precipitation data and information on the Massachusetts Drought Management Plan (DMP), respectively.



PRECIPITATION



Precipitation was low across most of MA for the month of May. All regions were below average except for the Islands. Several regions tripped SPI thresholds for the 1-month look-back period: the Western Region and Cape Cod are at Severity Level 2 and the Central and Northeast regions are at Severity Level 1.



REGION	NUMBER OF SITES	MONTHLY AVERAGE (IN)	DEPARTURE FROM HISTORICAL (IN)	DMP SPI 1-MONTH	DMP SPI 2-MONTH	DMP SPI 3-MONTH
WESTERN	6	2.40	-1.46	-1.05	-0.26	-0.15
CT RIVER VALLEY	9	2.35	-1.52	-0.51	-0.13	-0.09
CENTRAL	12	2.23	-1.48	-0.68	0.13	0.08
NORTHEAST	13	2.05	-1.47	-0.63	0.03	-0.07
SOUTHEAST	18	2.74	-0.92	-0.41	0.71	0.49
CAPE COD	4	2.04	-1.62	-1.15	-0.01	-0.21
ISLANDS	4	5.00	1.49	0.88	0.89	0.59

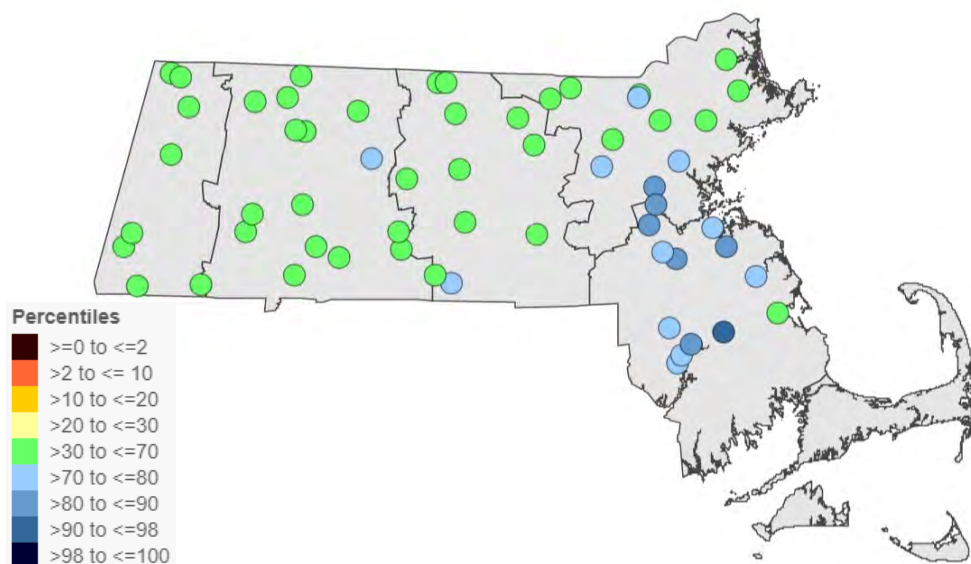
STREAMFLOW

Median Monthly Streamflows Compared to Historical Values

Monthly median streamflows were all greater than their respective 30th percentile values for May. Towards the end of the month, daily streamflow averages fell to below normal especially in the Central and Western regions.

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

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



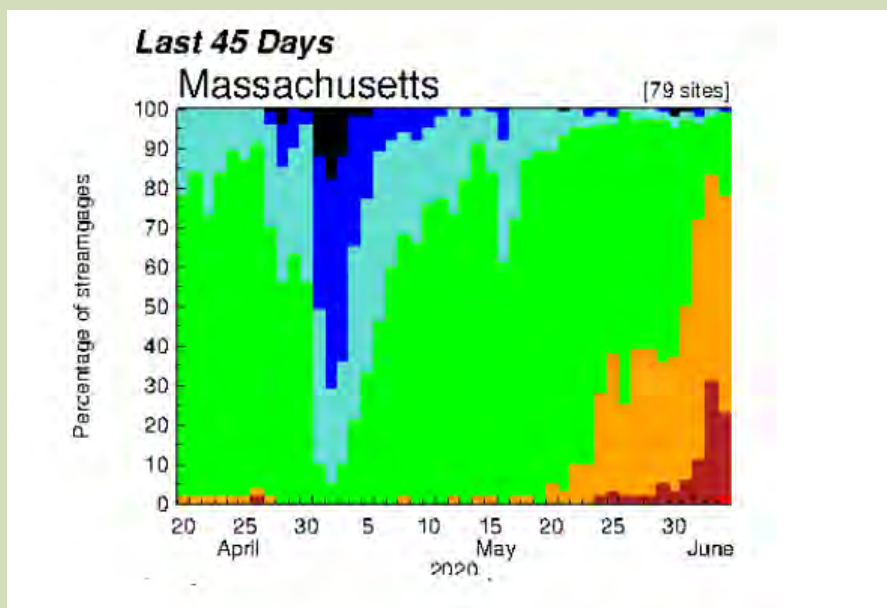
REGION	TOTAL GAGES REPORTING FOR MAY	≥0 TO ≤2 PERCENTILE	≥2 TO ≤10 PERCENTILE	≥10 TO ≤20 PERCENTILE	>20 to ≤30 Percentile	>90 PERCENTILE	MEDIAN OF INDIVIDUAL GAGE PERCENTILE	DMP INDEX SEVERITY
WESTERN	8	0	0	0	0	0	49	0
CT RIVER VALLEY	15	0	0	0	0	0	52	0
CENTRAL	11	0	0	0	0	0	61	0
NORTHEAST	13	0	0	0	0	0	60	0
SOUTHEAST	12	0	0	0	0	1	78	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

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		

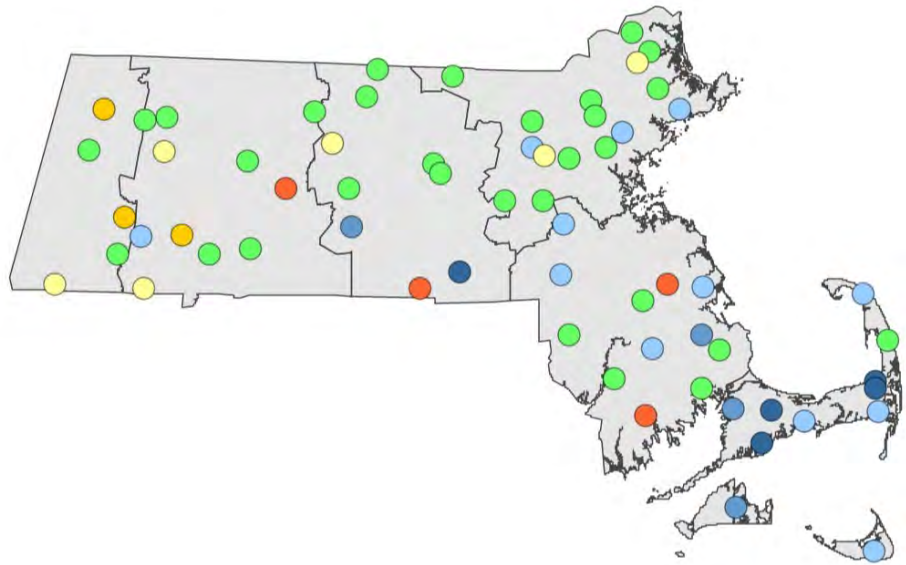


GROUNDWATER

Groundwater levels varied across MA . There were four wells in the 2-10th percentile while there were 5 wells greater than the 90th percentile. The medians of gages were above the 30th percentile for all regions except for the Western Region, which is at an Index Severity Level of 1.

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

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



REGION	TOTAL WELLS REPORTING FOR MAY	≥0 TO ≤2 PERCENTILE	≥2 TO ≤10 PERCENTILE	≥10 TO ≤20 PERCENTILE	≥20 TO ≤90 PERCENTILE	>90 PERCENTILE	MEDIAN OF INDIVIDUAL GAGE PERCENTILES	DMP INDEX SEVERITY
WESTERN	5	0	0	2	1	0	27	1
CT RIVER VALLEY	11	0	1	1	2	0	37	0
CENTRAL	10	0	1	0	1	1	48	0
NORTHEAST	15	0	0	0	2	0	64	0
SOUTHEAST	12	0	2	0	0	0	58	0
CAPE COD	9	0	0	0	0	4	81	0
ISLANDS	2	0	0	0	0	0	79	0

LAKES AND IMPOUNDMENTS

At the end of May, all drought regions were at Index Severity 0.

REGION	TOTAL REPORTING FOR THE MONTH	LAKES AND IMPOUNDMENTS: PERCENTILES OR LEVELS	DMP INDEX SEVERITY
WESTERN	2	100%; 99%	0
CT RIVER VALLEY	2	63	0
CENTRAL	2	100%; 101.8%	0
NORTHEAST	7	50	0
SOUTHEAST	2	98%; 97%	0
CAPE COD	1	94	0
ISLANDS	N/A	N/A	N/A

KEETCH BYRAM DROUGHT INDEX (KBDI) AND CROP MOISTURE INDEX (CMI)

As of June 3, 2020 KBDI values ranged from 35 to 216 across the state resulting in an index severity level of 0 for all regions except the Central Region. Values increased as of June 10 for all regions resulting in many regions above the level 1 threshold of 200, but still below 300: Western, CT River Valley, Central, Northeast, and Southeast.

The weekly CMI for the period ending May 30, 2020 was -0.9 to +0.9 (Slightly Dry/ Favorably Moist).



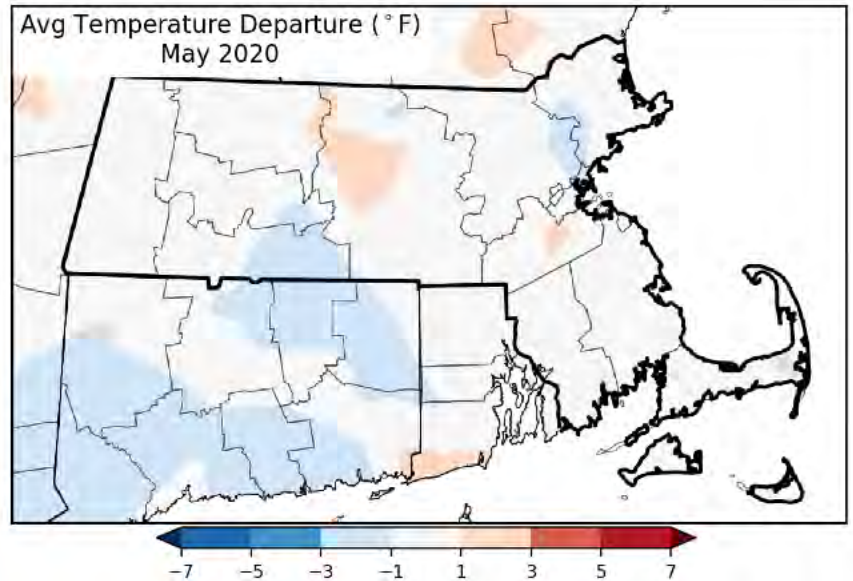
TEMPERATURE

Monthly average temperatures were mostly around historical averages for this time of the year.

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

However, daily temperatures ranged from 34 ° to 83 ° Fahrenheit (°F). Daily departures from historical averages ranged from +11.5 to -15.8 ° F.

<https://w2.weather.gov/climate/xmacis.php?wfo=box>



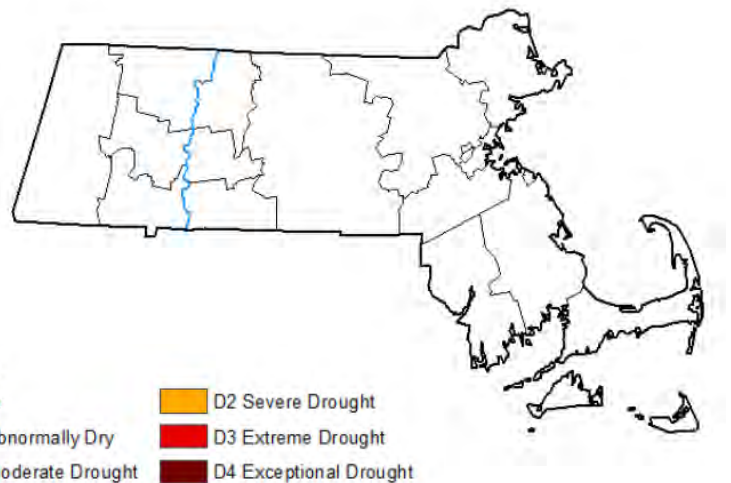
DROUGHT CONDITIONS AND FORECASTS BY NOAA AND PARTNERS

Summary: The U.S. Drought Monitor shows no drought conditions at the end of May.

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

<https://droughtmonitor.unl.edu>

U.S. Drought Map updated May 26, 2020; released May 28, 2020



NOAA Climate Prediction Center:

Temperature and Precipitation Outlook

June: The outlook projects a 33-40% chance of above-normal temperatures for all of MA. There is a 33-40% chance of below-normal precipitation for the western part of MA, and a 40-50% chance of below-normal for the rest of MA.

June through August: The outlook projects a 60-70% chance for above-normal temperatures, and equal chances for below-normal, normal, or above-normal precipitation for the northern part of MA, and a 33-40% chance of above-normal precipitation for the southern part of MA.

<https://www.cpc.ncep.noaa.gov/>

Monthly and Seasonal Drought Outlook The monthly outlook for June shows drought development likely in the northwest corner of MA as well as southern New Hampshire. The seasonal outlook valid through August, however, does 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 May 2020

REGION	NUMBER OF SITES	SPI1	SPI2	SPI3	SPI6	SPI9	SPI12	SPI24	SPI6	Key to Drought Plan SPI Severity Levels	
										0	>-0.52
WESTERN	6	-1.05	-0.26	-0.15	0.25	0.46	-0.01	1.15	0.60	1	≤ -0.52 and > -0.84
CT RIVER VALLEY	9	-0.51	-0.13	-0.09	0.14	-0.20	-0.55	1.40	1.10	2	≤ -0.84 and > -1.28
CENTRAL	12	-0.68	0.13	0.08	0.30	0.16	0.35	1.68	1.49	3	≤ -1.28 and > -2.05
NORTHEAST	13	-0.63	0.03	-0.07	-0.14	-0.26	0.32	1.12	0.67	4	≤ -2.05
SOUTHEAST	18	-0.41	0.71	0.49	0.37	0.28	0.40	1.33	1.09		
CAPE COD	4	-1.15	-0.01	-0.21	0.31	0.48	0.34	0.74	1.60		
ISLANDS	4	0.88	0.89	0.59	0.79	0.94	1.10	1.36	1.69		

Percent of Average Historical Precipitation

REGION	NUMBER OF SITES	HISTORICAL AVERAGE (IN)	MAY AVERAGE	DEPARTURE FROM HISTORICAL AVERAGE (IN)	PERCENT OF HISTORICAL (IN)
WESTERN	6	3.86	2.40	-1.46	61
CT RIVER VALLEY	9	3.87	2.35	-1.52	61
CENTRAL	12	3.71	2.23	-1.48	61
NORTHEAST	13	3.51	2.05	-1.47	58
SOUTHEAST	18	3.66	2.74	-0.92	75
CAPE COD	4	3.66	2.04	-1.62	56
ISLANDS	4	3.52	5.00	1.49	142

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	STANDARD PRECIPITATION	STREAMFLOW	LAKES AND IMPOUNDMENTS	GROUND WATER	KEETCH-BRYAM 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

