

Current Hydrologic Conditions in Massachusetts

Drought Management Task Force

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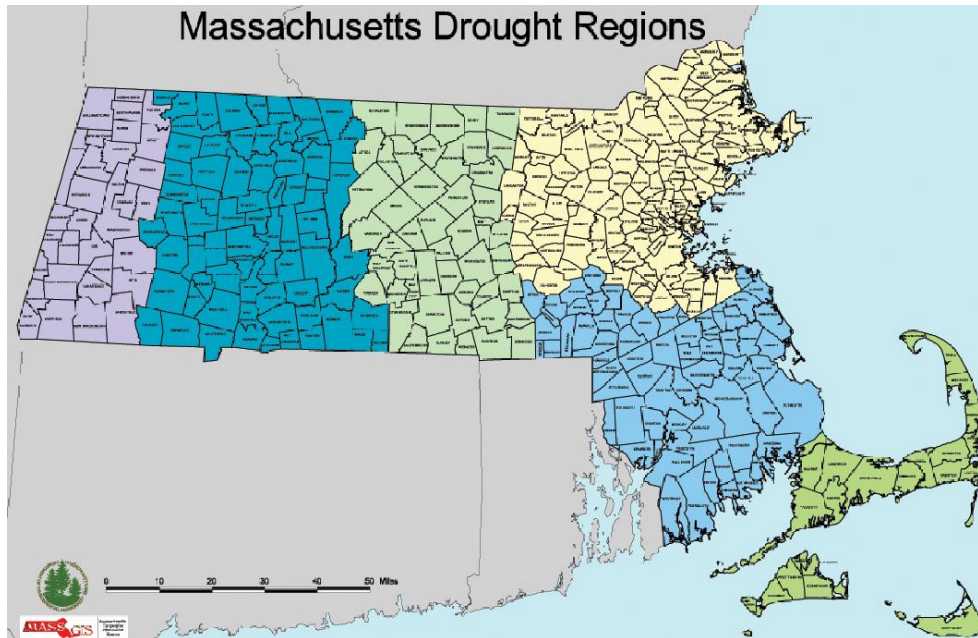
April 11, 2017

MA Drought Management Plan

Drought Indicators
Precipitation
Precipitation
Streamflow
Groundwater
Reservoirs
Crop Moisture
Fire Danger



Drought Levels
Normal
Advisory
Watch
Warning
Emergency



Western
Connecticut River Valley
Central
Northeast
Southeast
Cape and Islands

Precipitation

Region	Estimated Rainfall (inches)	Departure from Average March (inches)	MA Drought Plan Levels	
			Standardized Precipitation Index (SPI)	Percent of Normal Index
West	2.62	-0.76	Normal	Normal
CT River Valley	3.26	-0.47	Watch (12 mo)	Normal
Central	3.39	-0.76	Advisory (12 mo)	Normal
Northeast	4.12	0.20	Advisory (12 mo)	Normal
Southeast	3.74	-0.49	Advisory (12 mo)	Normal
Cape Cod & Islands	2.75	-1.52	Advisory (12 mo)	Normal

Streamflow Index

Drought Level	Streamflow Index*
Normal	1 month below normal
Advisory	At least 2 out of 3 consecutive months below normal
Watch	At least 4 out of 5 consecutive months below normal
Warning	At least 6 out of 7 consecutive months below normal
Emergency	Greater than 7 months below normal

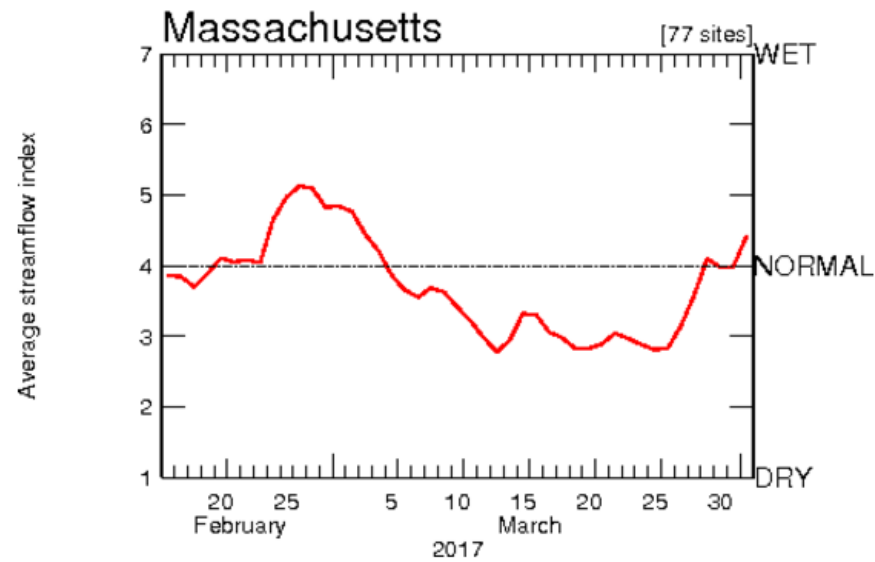
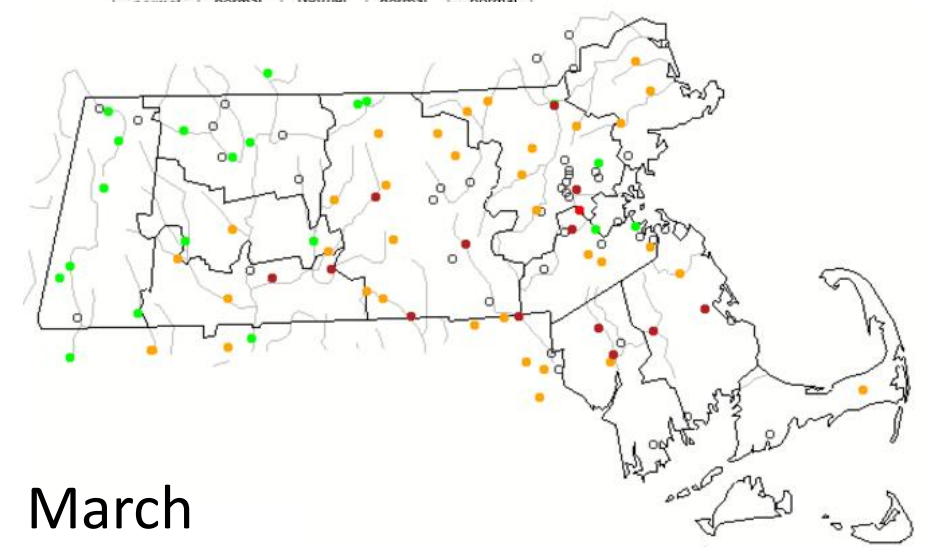
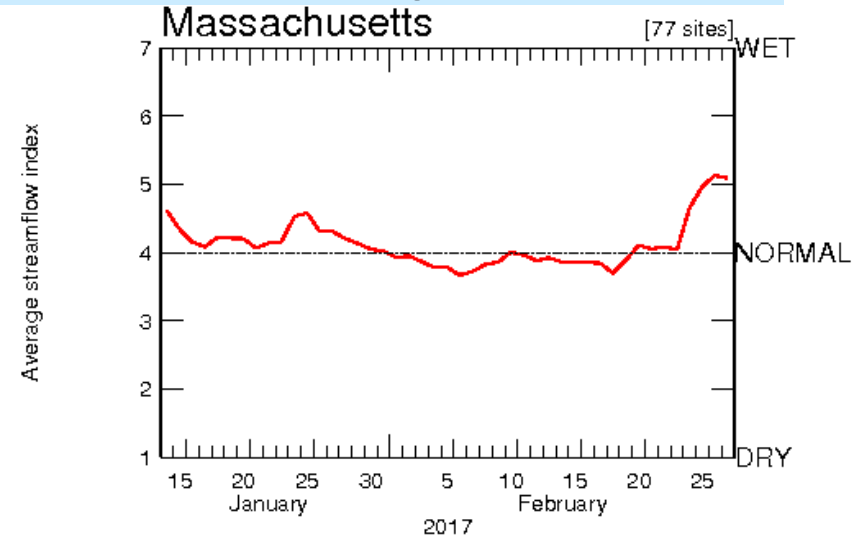
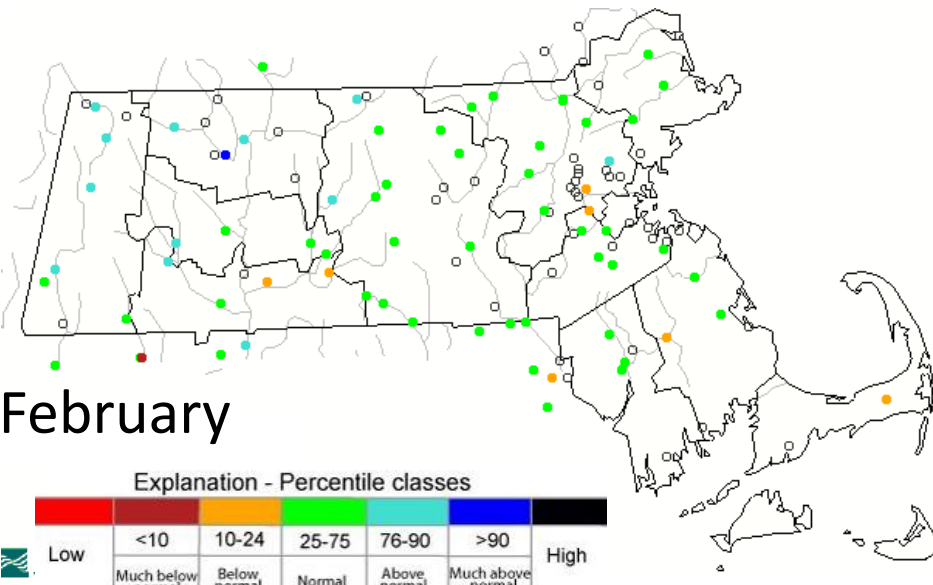
*Below normal = within the lowest 25th percentile of the period of record for a given month

Streamflow Compared to Historical



Average Monthly

Average Daily



Streamflow

Region	Month	Number of gages				MA Drought Plan Index (# consecutive months majority <25 th percentile)
		Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
Western	February	6	0	0	0	0/ Normal
	March	6	0	0	0	0/ Normal
CT River Valley	February	11	2	0	0	0/ Normal
	March	10	4	1	0	1/ Normal
Central	February	11	0	0	0	0/ Normal
	March	12	8	2	0	1/ Normal
Northeast	February	18	2	0	0	0/ Normal
	March	19	12	3	1	1/ Normal
Southeast						

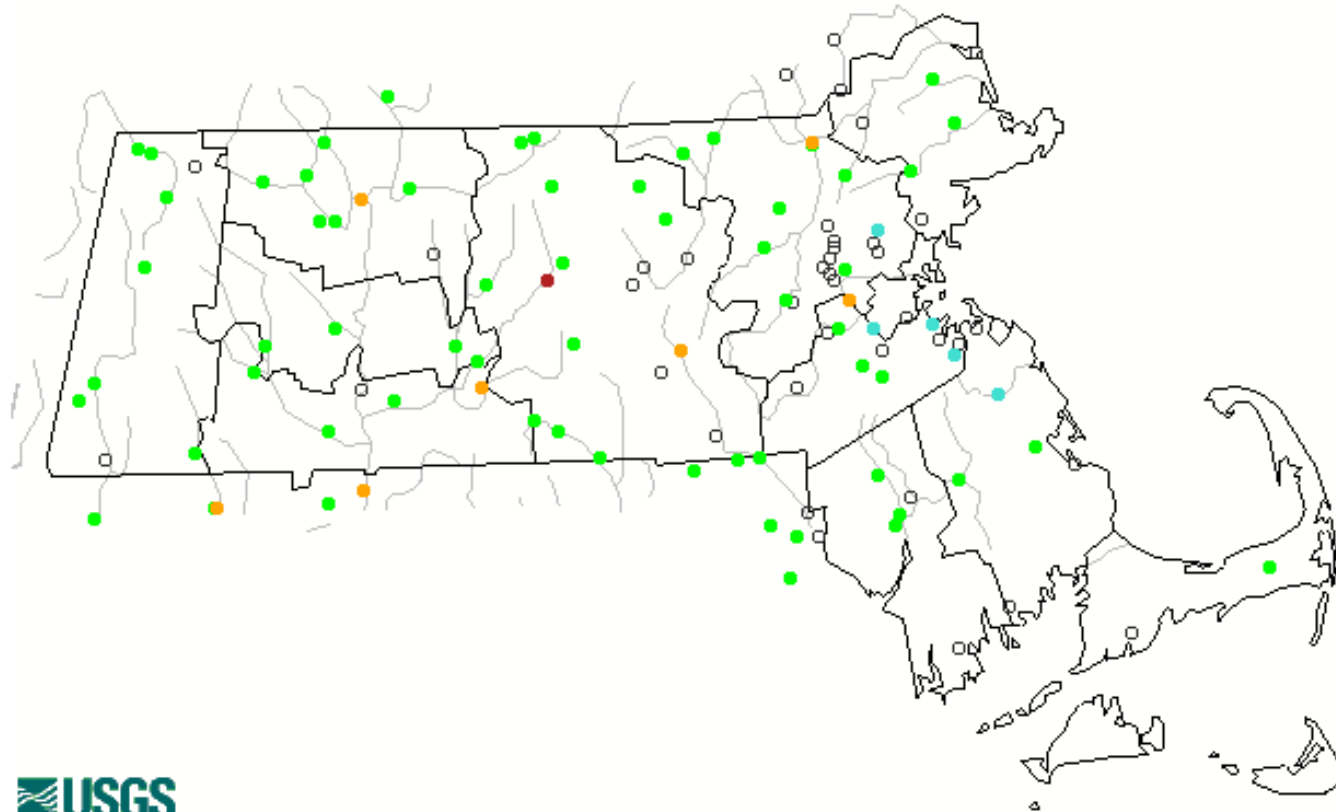
Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions. Streamflow index is not applicable to Cape Cod and the Islands.

Streamflow

Map of 14-day average streamflow compared to historical streamflow for the day of the year (Massachusetts)

Massachusetts ▼ or Water-Resources Regions ▼

Wednesday, April 05, 2017



Groundwater Index

Drought Level	Groundwater Index*
Normal	2 consecutive months below normal
Advisory	3 consecutive months below normal
Watch	4 to 5 consecutive months below normal
Warning	6 to 7 consecutive months below normal
Emergency	Greater than 8 months below normal

*Below normal = within the lowest 25th percentile of the period of record for a given month

Groundwater

Region	Month	Number of wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
		Total Reporting	<25th to 10th percentile	<10th percentile to above record low	Record Low	
Western	February	5	0	1	0	0/Normal
	March	5	0	1*	0	0/Normal
CT River Valley	February	10	1	1	2	0/Normal
	March	10	1	1	1	0/Normal
Central	February	9	3	0	0	0/Normal
	March	10	4	0	0	0/Normal
Northeast	February	16	2	0	0	0/Normal
	March	16	1	1	1	0/Normal
Southeast	February	12	4	0	1	0/Normal
	March	11	5	3	0	1/Normal
Cape and Islands	February	13	4	1	0	0/Normal
	March	12	6	1	0	1/Normal

Notes: Wells counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

*Well is recovering but not fast enough relative to past years.

Reservoir Index

Drought Level	Reservoir Index*
Normal	Reservoir levels at or near normal for the time of year
Advisory	Small index reservoirs below normal
Watch	Medium index reservoirs below normal
Warning	Large index reservoirs below normal
Emergency	Continuation of previous month's conditions

Below normal = 1 standard deviation from the average value in the same months in other years in the period of record

*Water suppliers should be consulted to determine if below normal reservoir conditions are due to operational issues

Reservoirs

Region	Number of Reservoirs Reporting	Reservoir Levels	MA Drought Management Plan Reservoir Index
West	2	Normal	Normal
CT River Valley	2	Near Normal	Warning ¹
Central	3	Below (Worcester)	Watch
Northeast	6	Below (Cambridge)	Watch
Southeast	3	Below (Milford)	Watch
Cape Cod & Islands	1	Below	Advisory

1 Quabbin reservoir is below normal. This is an exceptionally large reservoir which jumps the index to warning. However, the other monitored reservoir in the CT River Valley region has returned to and remains normal. It is a medium reservoir system.

Crop Moisture and Fire Danger Indices

Drought Level	Crop Moisture Index*	Keetch-Byram Drought Index (KBDI)
Normal	0 to -1.0 Slightly dry	less than 200
Advisory	-1 to -1.9 Abnormally dry	200 to 400
Watch	-2 to -2.9 Excessively dry	400 to 600
Warning	< -2.9 Severely dry	600 to 800
Emergency	< -2.9 Severely dry	600 to 800

* The Crop Moisture Index is subject to frequent change. The drought level for this indicator is determined based on the repeated or extended occurrence at a given level.

Crop Moisture

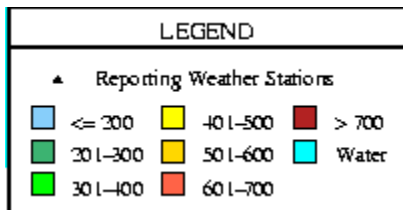


Region	MA Drought Plan Index
Western	Normal
CT River Valley	Normal
Central	Normal
Northeast	Normal
Southeast	Normal
Cape and Islands	Normal



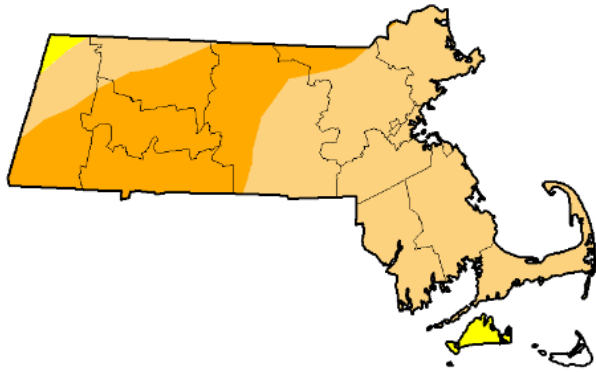
* The Crop Moisture Index is subject to frequent change. The drought level for this indicator is determined based on the repeated or extended occurrence at a given level. This indicator is most relevant during the growing season.

Keetch-Byram Drought Index

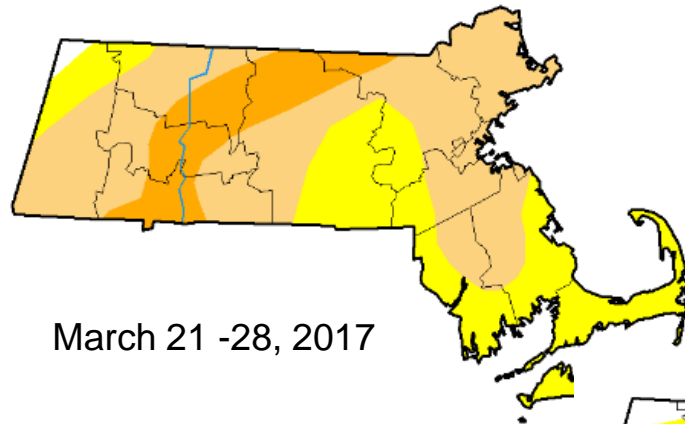


Region	MA Drought Plan Index
Western	Normal
CT River Valley	Normal
Central	Normal
Northeast	Normal
Southeast	Normal
Cape and Islands	Normal

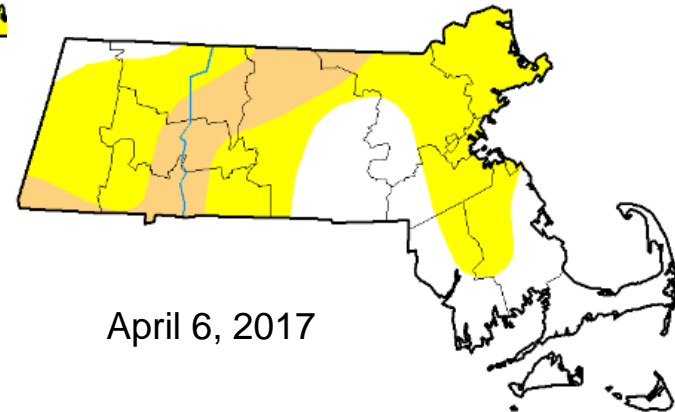
US Drought Monitor



February 14 - 28, 2017





March 21 -28, 2017



April 6, 2017

Intensity:

 D0 (Abnormally Dry)

 D1 (Moderate Drought)

 D1 (Moderate Drought)

 D3 (Extreme Drought)

 D4 (Exceptional Drought)

Summary of Drought Indices

Drought Indicator	West	CT River Valley	Central	Northeast	Southeast	Cape and Islands
Standardized Precipitation Index	Normal	Watch	Advisory	Advisory	Advisory	Advisory
Percent of Normal Precipitation	Normal	Normal	Normal	Normal	Normal	Normal
Streamflow	Normal	below Normal ¹	below Normal ¹	below Normal ¹	below Normal ¹	N/A
Groundwater	Normal	near Normal ²	near Normal ²	near Normal ²	near Normal ²	near Normal ²
Reservoir	Normal	Warning ³	Watch	Watch	Watch	Advisory
Crop Moisture Index	Normal	Normal	Normal	Normal	Normal	Normal
KBDI - Fire danger	Normal	Normal	Normal	Normal	Normal	Normal
<i>February</i>	Advisory	Watch	Advisory	Advisory	Watch	Advisory
<i>Recommended March</i>	Normal	Advisory	Advisory	Advisory	Advisory	Advisory

1 Gages are below normal; however, since it is the first month below normal, a drought level is not triggered.

2 Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered or majority is below normal but it is only the first month and a drought level is not triggered

3 Quabbin reservoir is below normal. This is an exceptionally large reservoir which jumps the index to warning. However, the other monitored reservoir in the CT River Valley region has returned to and remains normal. It is classified medium.

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West - Summary of Drought Indices

- Normal precipitation for all look-back periods.

Month	Number of streamflow gages				MA Drought Plan Index (# months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	6	0	0	0	0/ Normal
March	6	0	0	0	0/ Normal

Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions.

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	5	0	1	0	0/Normal
March	5	0	1*	0	0/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

*Well is recovering but not fast enough relative to past years.

- Lenox and Pittsfield reservoirs remain normal.

Drought Indicator	Status
Standardized Precipitation Index	Normal
Percent of Normal Precipitation	Normal
Streamflow	Normal
Groundwater	Normal
Reservoir	Normal
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
<i>February</i>	Advisory
<i>Recommended March</i>	Normal

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CT River Valley - Summary of Drought Indices

- Below normal precipitation for 12-month look-back period.

Month	Number of streamflow gages				MA Drought Plan Index (# months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	11	2	0	0	0/ Normal
March	10	4	1	0	1/ Normal

Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions.

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	10	1	1	2	0/Normal
March	10	1	1	1	0/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

- Springfield reservoir has recovered to and remains normal.
Quabbin remains slightly below normal.

Drought Indicator	Status
Standardized Precipitation Index	Watch
Percent of Normal Precipitation	Normal
Streamflow	below Normal ¹
Groundwater	near Normal ²
Reservoir	Warning ³
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
	<i>February</i>
	<i>Watch</i>
	<i>Recommended March</i>
	<i>Advisory</i>

1 Gages are below normal; however, since it is the first month below normal, a drought level is not triggered.

2 Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered or majority is below normal but it is only the first month and a drought level is not triggered

3 Quabbin reservoir is below normal. This is an exceptionally large reservoir which jumps the index to warning. However, the other monitored reservoir in the CT River Valley region has returned to and remains normal. It is classified medium.

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Central - Summary of Drought Indices

- Below normal precipitation for 12-month look-back period.

Month	Number of streamflow gages				MA Drought Plan Index (# months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	11	0	0	0	0/ Normal
March	12	8	2	0	1/Normal

Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions.

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	9	3	0	0	0/Normal
March	10	4	0	0	0/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

- North Brookfield and Southbridge reservoirs have recovered to and remain normal. Worcester, a medium reservoir remains below normal.

Drought Indicator	Status
Standardized Precipitation Index	Advisory
Percent of Normal Precipitation	Normal
Streamflow	below Normal ¹
Groundwater	near Normal ²
Reservoir	Watch
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
	<i>February</i>
	<i>Recommended March</i>
	Advisory
	Advisory

1 Gages are below normal; however, since it is the first month below normal, a drought level is not triggered.

2 Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered or majority is below normal but it is only the first month and a drought level is not triggered.

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Northeast - Summary of Drought Indices

- Below normal precipitation for 12-month look-back period.

Month	Number of streamflow gages				MA Drought Plan Index (# months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	18	2	0	0	0/ Normal
March	19	12	3	1	1/Normal

Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions.

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	16	2	0	0	0/Normal
March	16	1	1	1	0/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

- Rockport, Hudson, North Andover, Salem/Beverly, and Lynn reservoirs are normal. Cambridge, a medium system, is below normal.

Drought Indicator	Status
Standardized Precipitation Index	Advisory
Percent of Normal Precipitation	Normal
Streamflow	below Normal ¹
Groundwater	near Normal ²
Reservoir	Watch
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
	<i>February</i>
	<i>Recommended March</i>
	Advisory
	Advisory

1 Gages are below normal; however, since it is the first month below normal, a drought level is not triggered.

2 Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered or majority is below normal but it is only the first month and a drought level is not triggered

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Southeast - Summary of Drought Indices

- Below normal precipitation for 12-month look-back period.

Month	Number of streamflow gages				MA Drought Plan Index (# months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	6	1	0	0	0/ Normal
March	6	2	4	0	1/Normal

Notes: Gage counts are non-cumulative except for “total reporting”. Not all gages report in all months due to ice, beaver dams or other conditions.

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	12	4	0	1	0/Normal
March	11	5	3	0	1/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

- Cohasset and Assawompsett reservoirs have recovered and remain normal. Milford, a medium reservoir, remains below normal.

Drought Indicator	Status
Standardized Precipitation Index	Advisory
Percent of Normal Precipitation	Normal
Streamflow	below Normal ¹
Groundwater	near Normal ²
Reservoir	Watch
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
<i>February</i>	Watch
<i>Recommended March</i>	Advisory

¹ Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered.

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Cape & Islands - Summary of Drought Indices

- Below normal precipitation for 12-month look-back period.
- Streamflow – Not applicable

Month	Number of groundwater wells				MA Drought Plan Index (# consecutive months majority below 25 th percentile)
	Total Reporting	<25 th to 10 th percentile	<10 th percentile to above record low	Record low	
February	13	4	1	0	0/Normal
March	12	6	1	0	1/Normal

Notes: Well counts are non-cumulative except for “total reporting”. Not all data are available in time for reporting.

- Ashumet, a small reservoir, is below normal.

Drought Indicator	Status
Standardized Precipitation Index	Advisory
Percent of Normal Precipitation	Normal
Streamflow	N/A
Groundwater	near Normal ¹
Reservoir	Advisory
Crop Moisture Index	Normal
KBDI - Fire danger	Normal
	<i>February</i> Advisory
	<i>Recommended March</i> Advisory

¹ Some wells remain below normal; however, since the majority of wells in the region are not below normal, a drought level is not triggered.

N/A indicates Not Applicable

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