

# Hydrologic Conditions in Massachusetts

## Drought Management Task Force

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DCR Office of Water Resources

**August 12, 2020**

Meeting Co-Chairs: EOEEA, MEMA



# MA Drought Indices



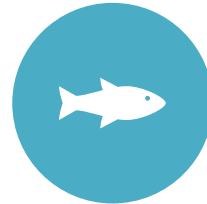
Precipitation (64)



Streamflow (59)



Groundwater (65)



Lakes and  
Impoundments (17)



KBDI - Fire Danger  
(16)



Crop Moisture  
(national map)

Numbers in parentheses indicate number  
of data points across the state

# MA Drought Management Plan

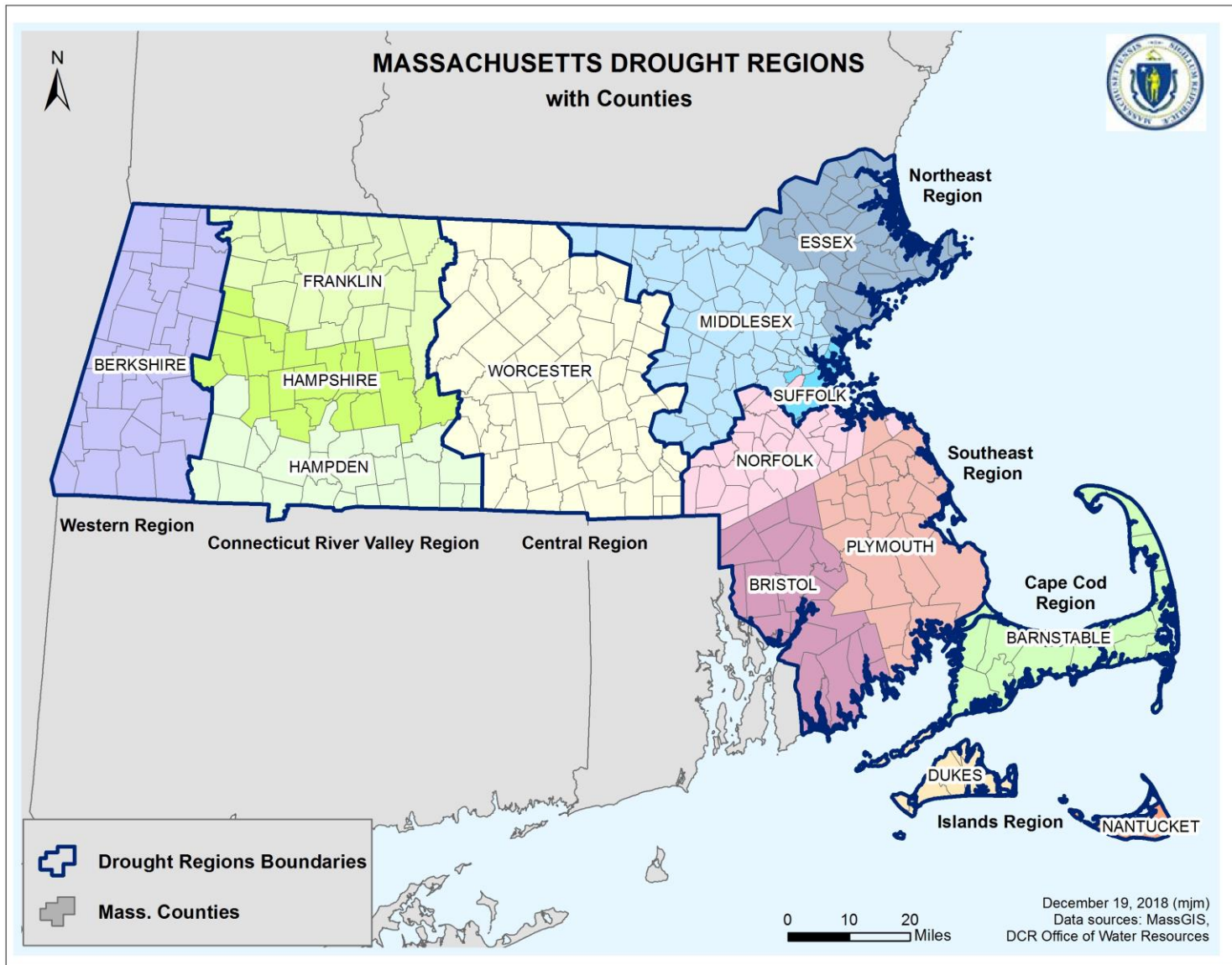
## Drought Levels

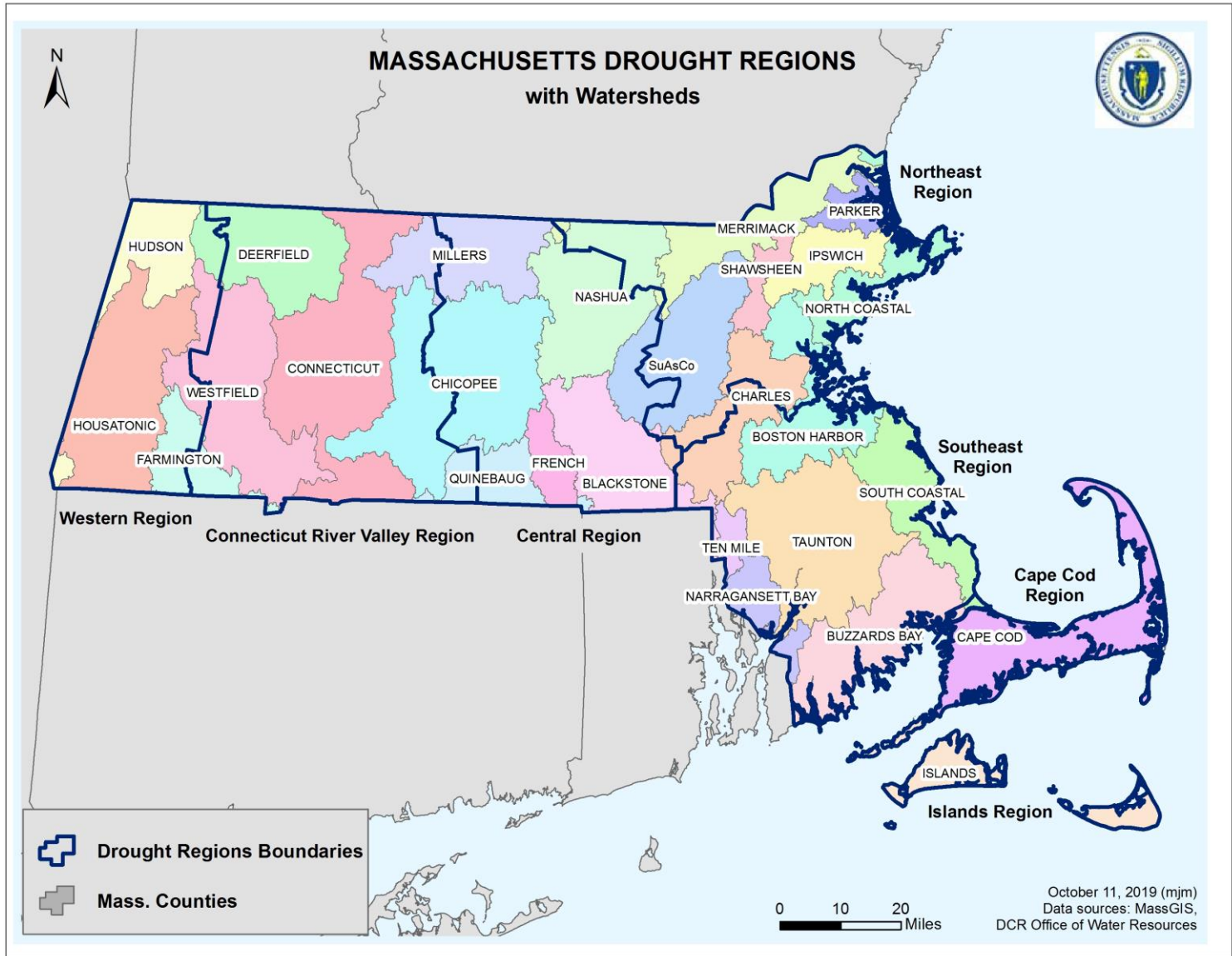


# MA Drought Management Plan

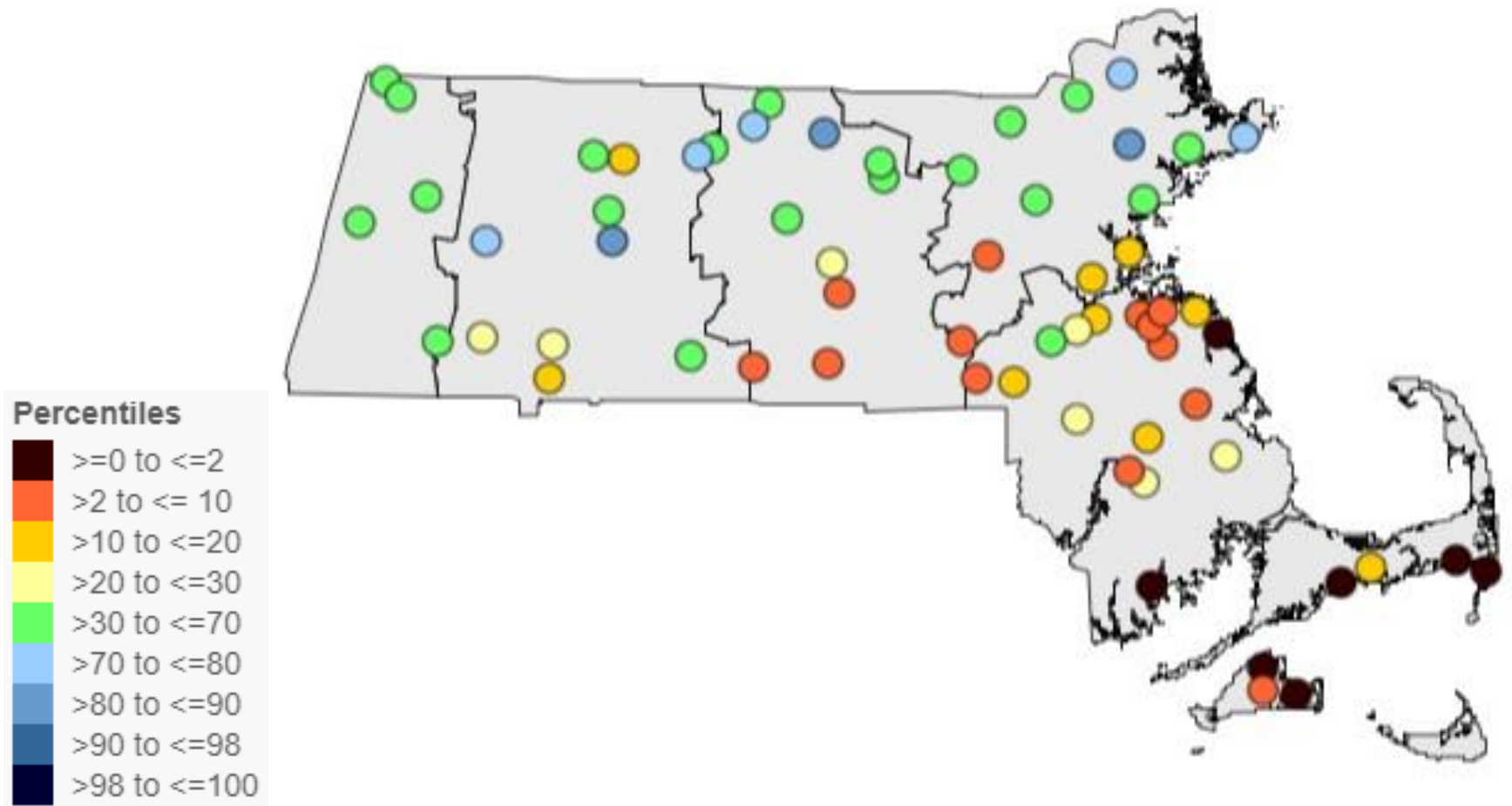
## Drought Indices

Index Severity Level	Percentiles for: Precipitation, Streamflow, Lakes and Impoundments and Groundwater	Keetch- Byram Drought Index	Crop Moisture Index
0	>30 <sup>th</sup> 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





# Precipitation – SPI July

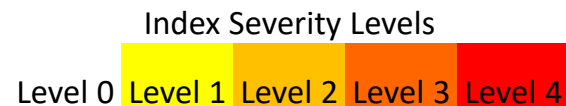


# Precipitation Index – SPI

## July

Drought Region	Number of Sites	JULY SPI 1*	SPI 2	SPI 3	SPI 6	SPI 12
Western	5	0.18	-0.62	-1.11	-0.34	-0.11
CT River Valley	10	-0.52	-0.92	-1.16	-0.79	-0.51
Central	12	0.06	-0.83	-1.21	-0.45	-0.10
Northeast	12	0.07	-0.55	-0.86	-0.55	-0.47
Southeast	18	-1.15	-0.37	-0.59	-0.21	0.06
Cape Cod	4	-2.05	-2.01	-2.01	-0.81	-0.12
Islands	3	-1.77	-1.56	-0.77	0.10	0.31

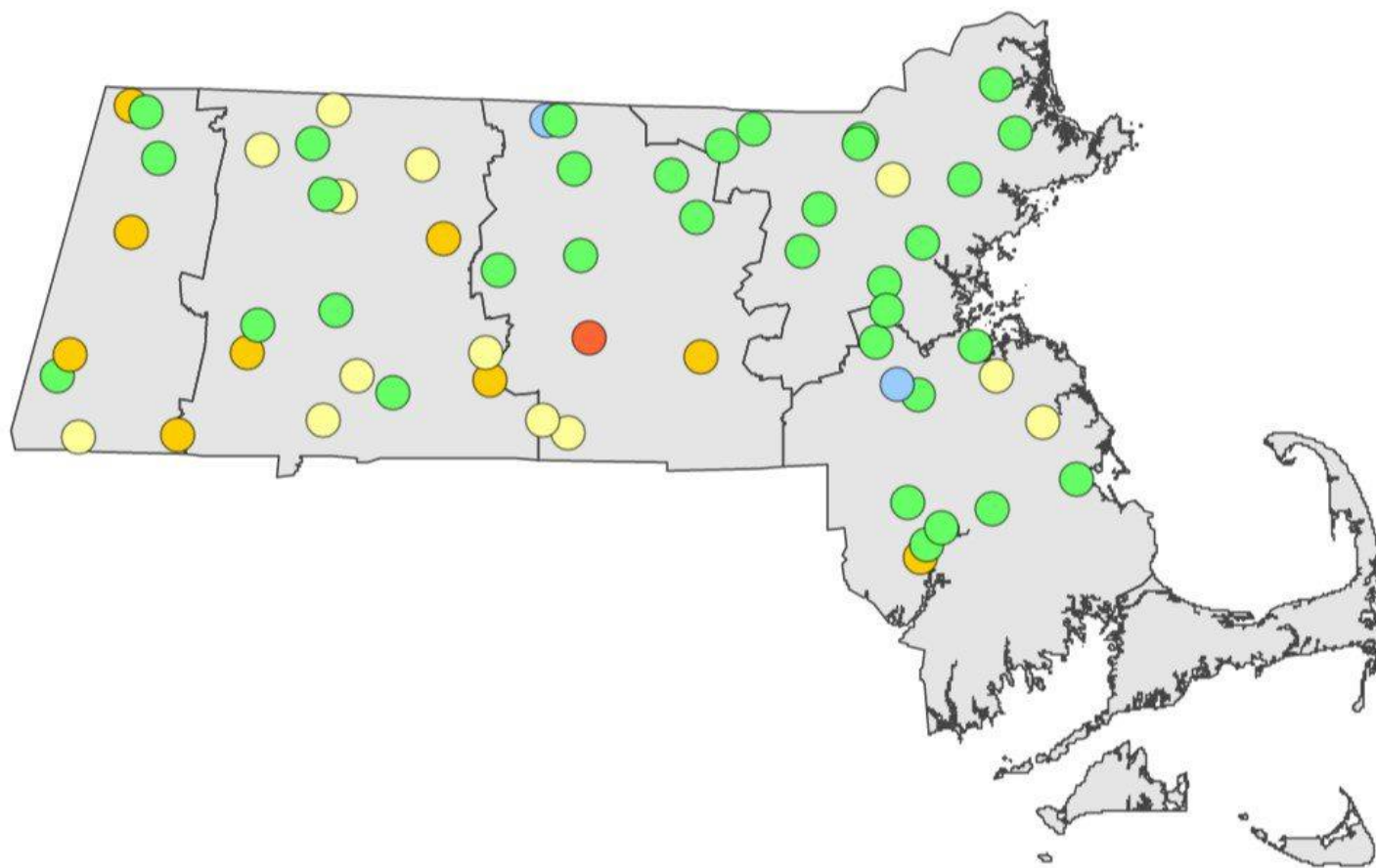
\*1-month SPI is for informational purposes only, not for drought determination



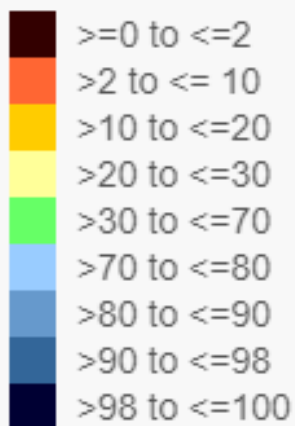


# Streamflow

## Percentiles of Monthly Median for July



### Percentiles



# Streamflow Index - July

## By Drought Region

- April - All regions at Index Severity Level 0
- May - All regions at Index Severity Level 0
- June - Western, CT River Valley, Central Level 3; Northeast Level 2; Southeast Level 0

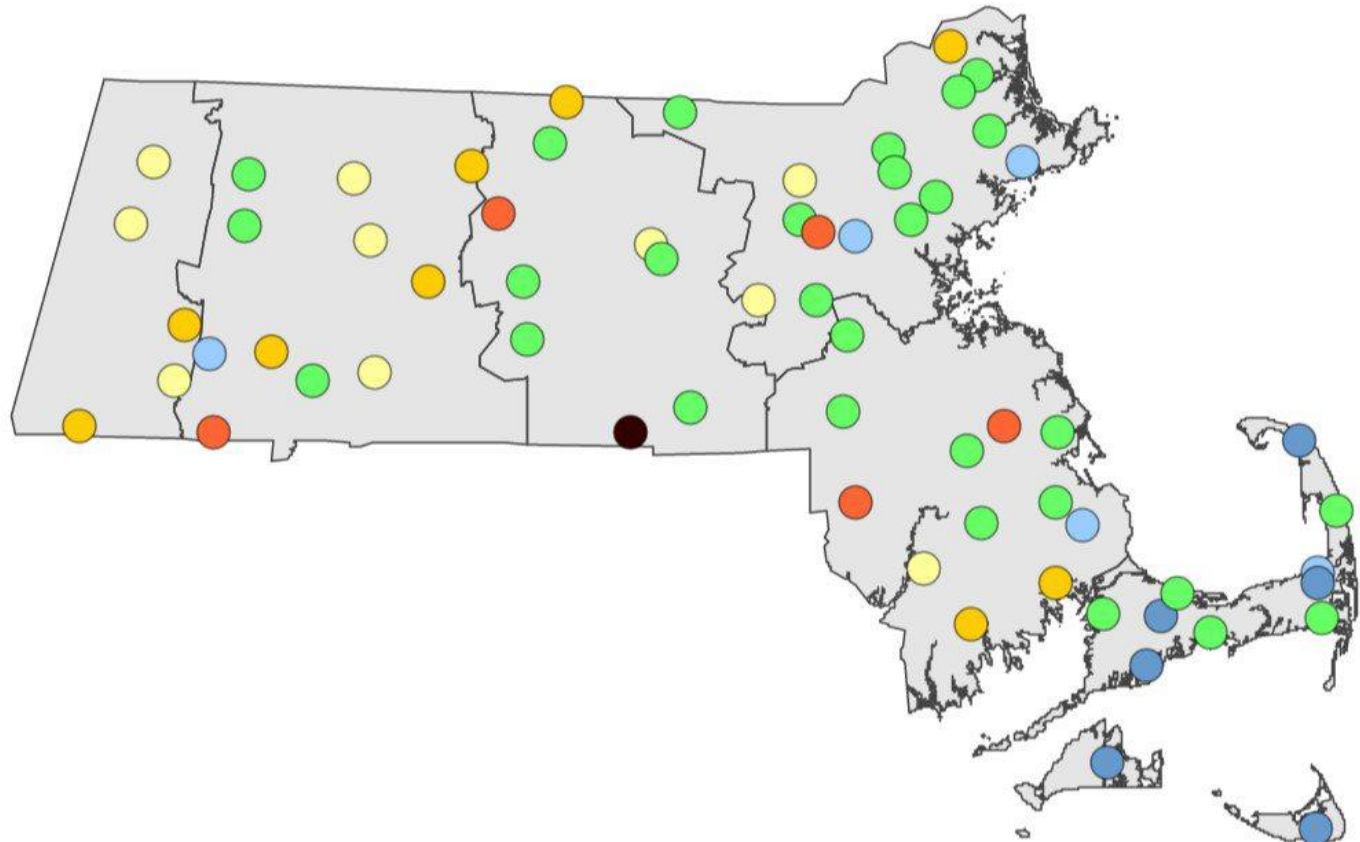
REGION	TOTAL GAGES REPORTING FOR JULY	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 TO ≤30 PERCENTILE	>90 PER-CENTILE	MEDIAN OF INDIVIDUAL GAGE PERCENTILES	DMP INDEX SEVERITY
WESTERN	8	0	0	4	1	0	22	1
CT RIVER VALLEY	15	0	0	3	7	0	27	1
CENTRAL	11	0	1	1	2	0	36	0
NORTHEAST	13	0	0	0	1	0	45	0
SOUTHEAST	12	0	0	1	2	0	46	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.

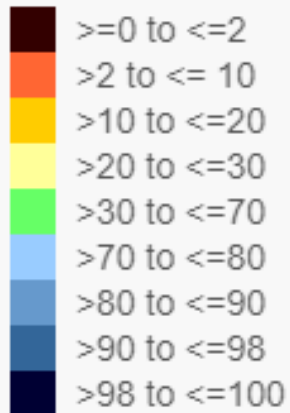
Index Severity Levels



# Groundwater Wells Percentiles July



## Percentiles



8/12/2020

# Groundwater Index - July

## By Drought Region

- April - All regions at Index Severity Level 0
- May - Western Region at Index Severity Level 1
- June - Western & Central Level 1; CT River Valley Level 2

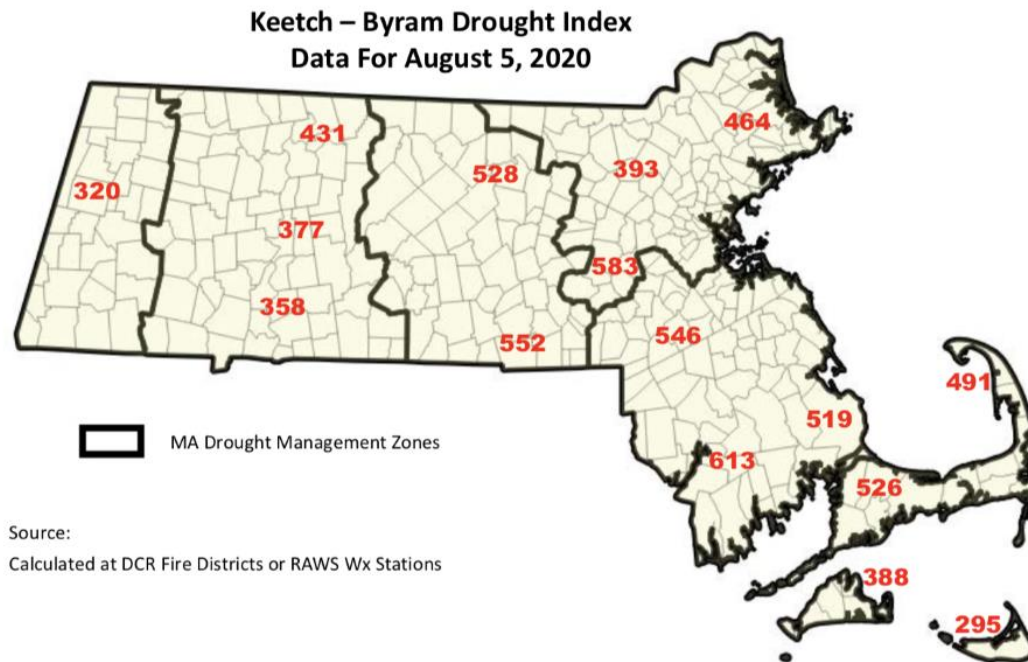
REGION	TOTAL WELLS REPORTING FOR JULY	≥0 TO ≤2 PERCENTILE	>2 TO ≤10 PERCENTILE	>10 TO ≤20 PERCENTILE	>20 TO ≤30 PERCENTILE	>90 PERCENTILE	MEDIAN OF INDIVIDUAL GAGE PERCENTILES	DMP INDEX SEVERITY
WESTERN	5	0	0	2	3	0	22	1
CT RIVER VALLEY	11	0	1	3	3	0	28	1
CENTRAL	10	1	1	1	2	0	30	1
NORTHEAST	15	0	1	1	1	0	47	0
SOUTHEAST	12	0	2	2	1	0	35	0
CAPE COD	10	0	0	0	0	0	70	0
ISLANDS	2	0	0	0	0	0	84	0

Index Severity Levels

# KBDI

As of **August 5, 2020:**

- Drought Index Severity **Level 1: Western, Islands**
- Drought Index Severity **Level 2: CT River Valley, Central, Northeast, Cape Cod**
- Drought Index Severity **Level 3: Southeast**



Index Severity Level	KBDI Range
0	<200
1	200 to <400
2	400 to <600
3	600 to <700
4	700 to <800

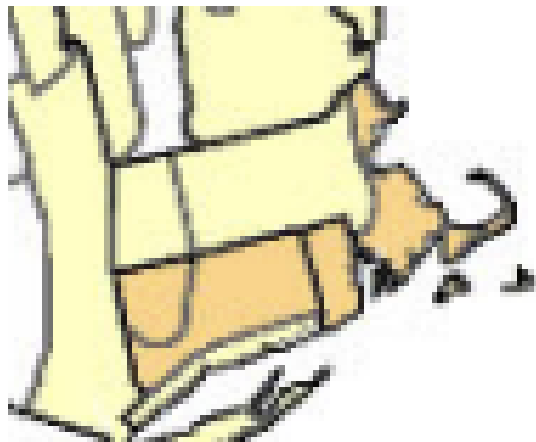
Fire Danger Index indicating dryness in the top 8" of soil.  
Data provided by the DCR Fire Chief

# Crop Moisture Index

The CMI map week ending **August 1, 2020** shows:

Drought Index Severity **Level 1** for: **Western, CT River Valley, & Central Regions**

Drought Index Severity **Level 2** for: **Northeast, Southeast, Cape Cod, & Islands Regions**



Index Severity Level	Crop Moisture Index
0	> -1.0
1	$\leq -1.0$ and $> -2.0$
2	$\leq -2.0$ and $> -3.0$
3	$\leq -3.0$ and $> -4.0$
4	$\leq -4.0$

The CMI shows the **short-term need versus available water** in a shallow soil profile and responds quickly to changing conditions. This indicator is **relevant during growing season**.

[https://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/cmi.gif](https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif)

# Lakes & Impoundments

## July

Drought Region	Number Reporting	Percentile	DMP Index Severity
Western	2	25	Level 1
CT River Valley	2	31	Level 0
Central	4	33	Level 0
Northeast	6	26	Level 1
Southeast	2	15	Level 2
Cape Cod	1	65	Level 0
Islands	NA	NA	NA

Western, NE, & SE Regions reservoirs are lower than usual; does not reflect water supply status

# Summary of Drought Indices by Drought Region

## July 2020

Drought Indicator	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 2	Level 2	Level 2	Level 2	Level 1	Level 3	Level 3
Streamflow	Level 1	Level 1	Level 0	Level 0	Level 0	N/A	N/A
Groundwater	Level 1	Level 1	Level 1	Level 0	Level 0	Level 0	Level 0
Lakes/ Impoundments	Level 1	Level 0	Level 0	Level 1	Level 2	Level 0	N/A
Crop Moisture Index	Level 1	Level 1	Level 1	Level 2	Level 2	Level 2	Level 2
KBDI - Fire Danger	Level 1	Level 2	Level 2	Level 2	Level 3	Level 2	Level 2

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 Drought Management Task Force convenes and makes a recommendation accepted by Secretary of the Executive Office of Energy and Environmental Affairs. Data are preliminary and not final until all data are reported.



# DMTF Deliberation