

AGENDA

1. Introductions & Drought Response Update: EOEEA, MEMA

2. Updates on Current Conditions and Impacts—DMTF member reports

- Hydrologic: DCR, USGS, NOAA-RFC
- Weather: NOAA-NWS
- Water Supply: DEP, MWRA, MWWA, DPU
- Environmental: DEP, DFG, MRA
- Agricultural: DAR
- Fire Danger: DCR
- Engineering/Infrastructure: DCR
- Public Health: DPH

3. Discussion

4. Recommendation



Hydrologic Conditions in Massachusetts

Drought Management Task Force

Anne Carroll and Viki Zoltay
DCR Office of Water Resources

January 6, 2021

Meeting Co-Chairs: EOEEA, MEMA



MA Drought Indices



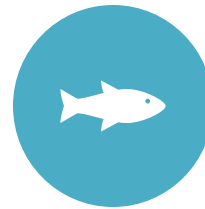
Precipitation (93)



Streamflow (59)



Groundwater (63)



Lakes and
Impoundments (20)



KBDI - Fire Danger
(16)



Crop Moisture
(national map)

MA Drought Management Plan

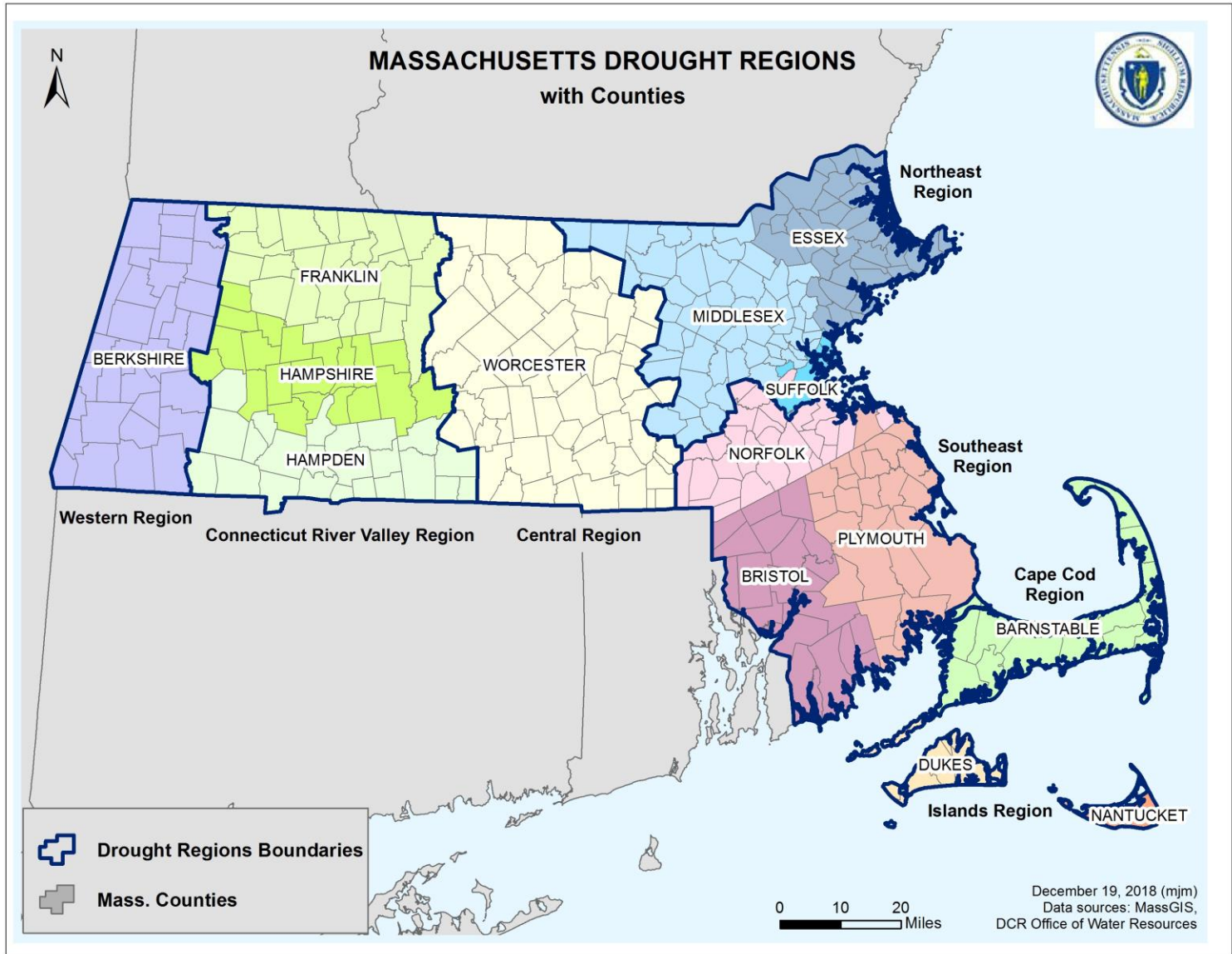
Drought Levels

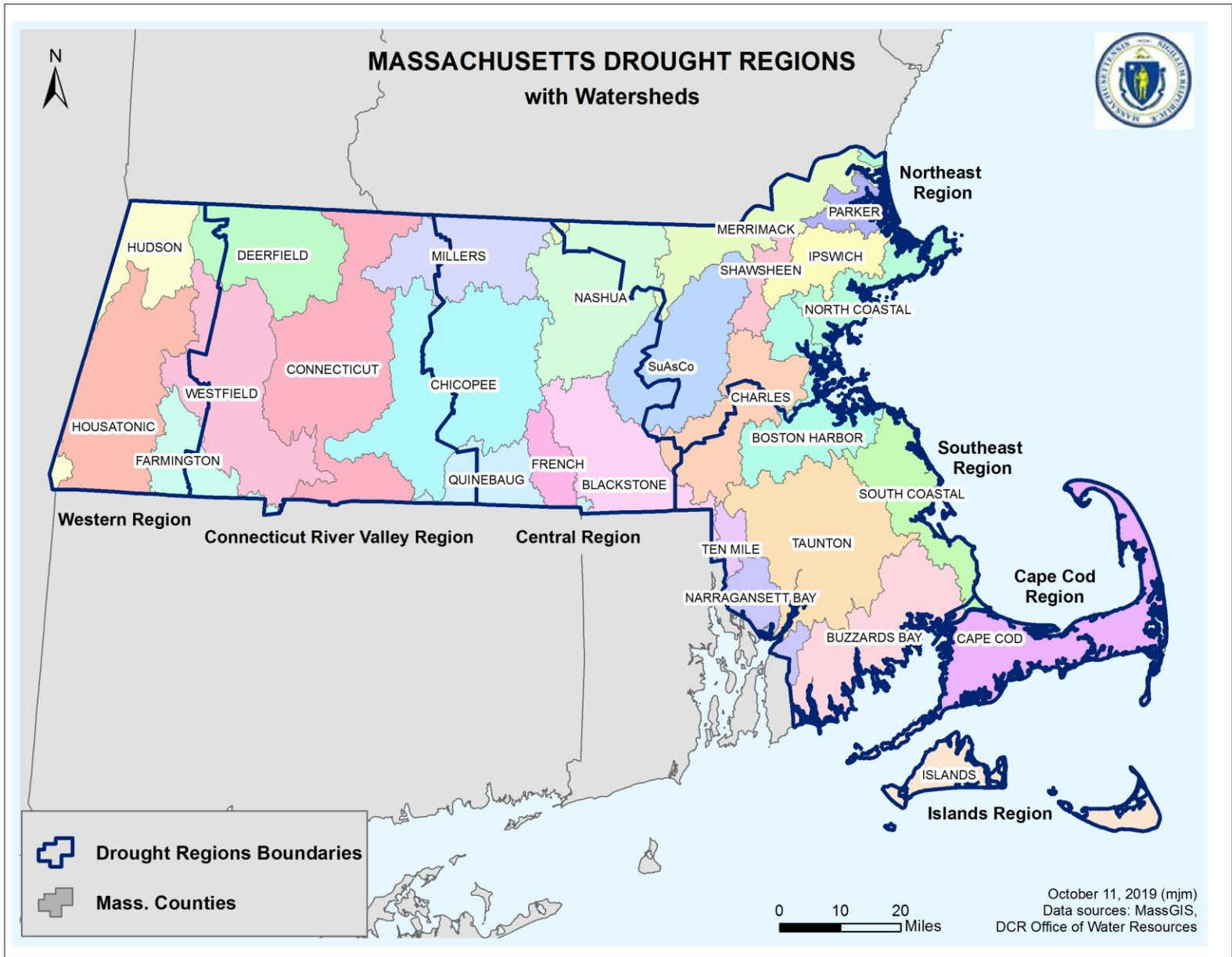


MA Drought Management Plan

Drought Indices

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





Task Force Member Updates



Hydrologic
Conditions



Weather &
Forecast



Water Supply
Impacts



Environmental
Impacts



Agricultural
Impacts



Fire Danger

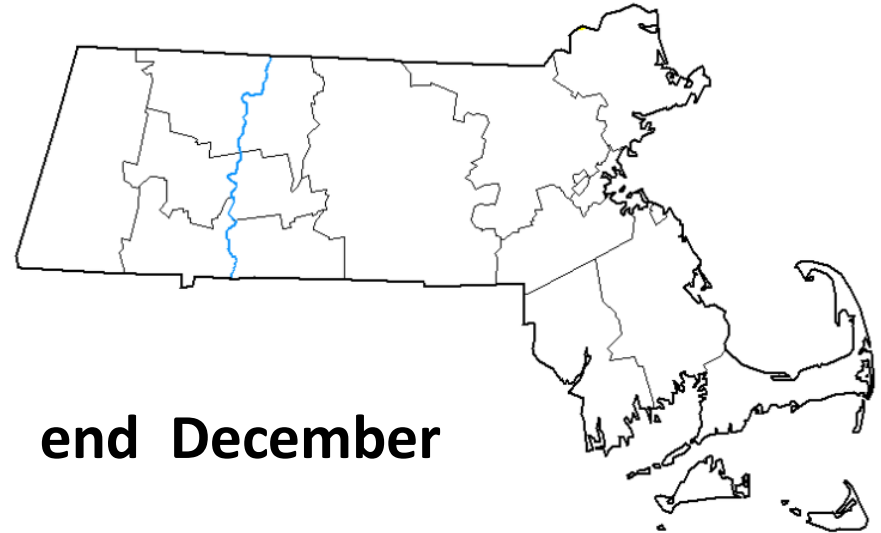
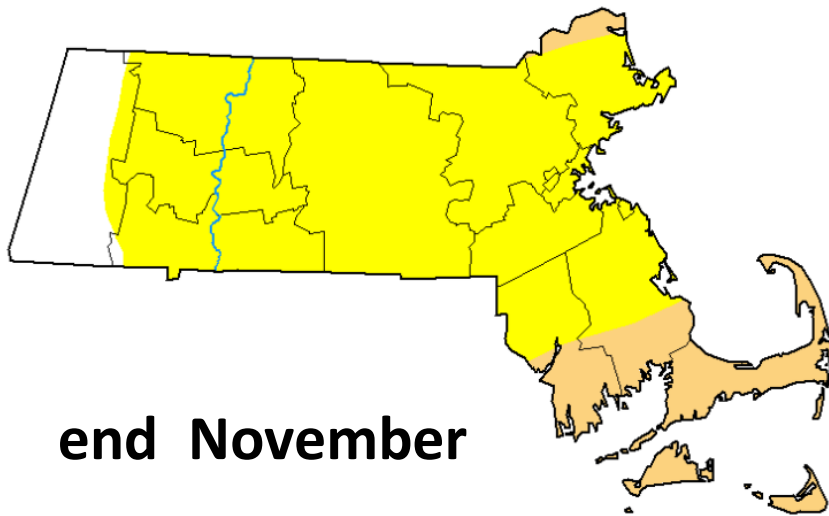


Engineering/
Infrastructure
Impacts










Public Health
Impacts

US Drought Monitor

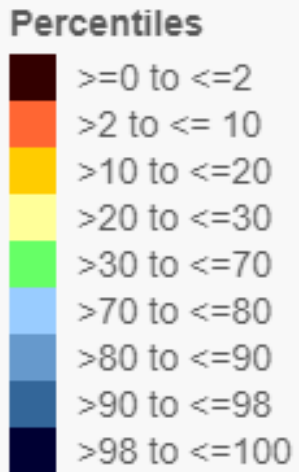
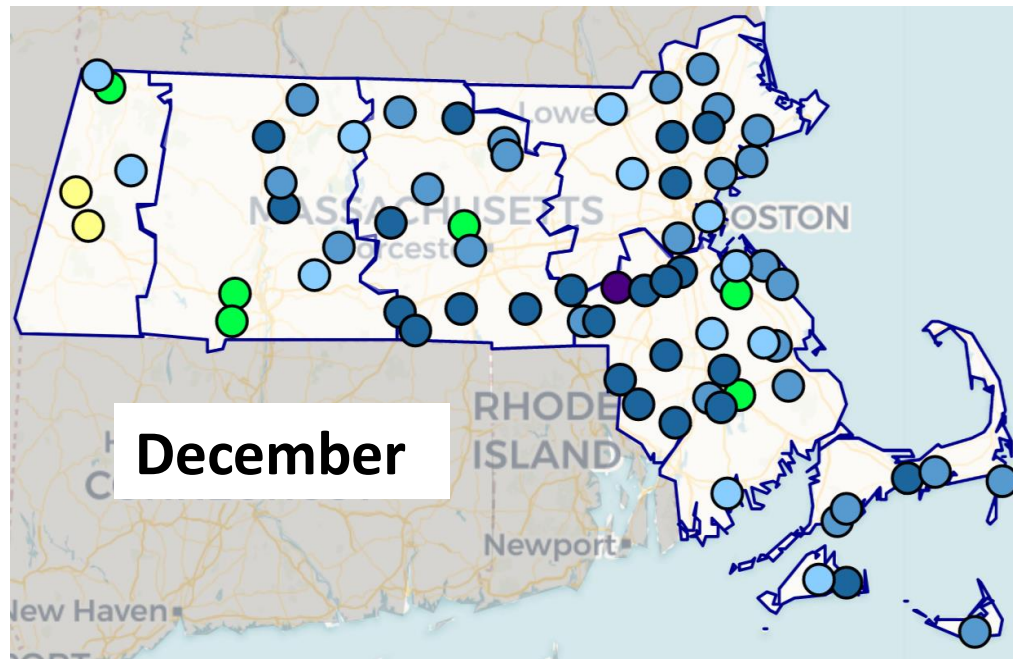
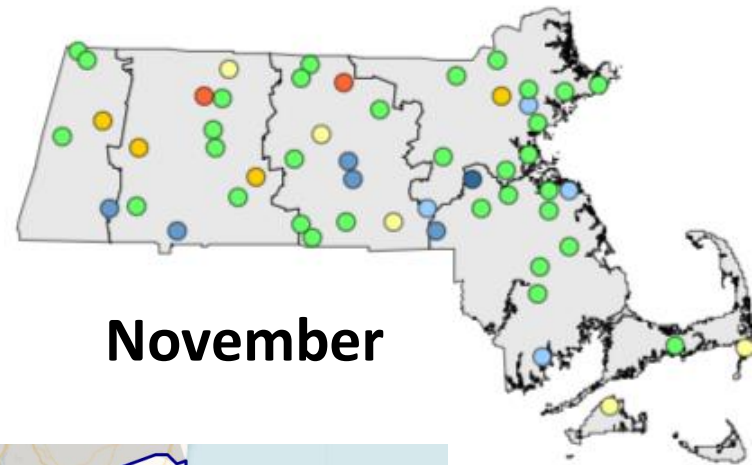
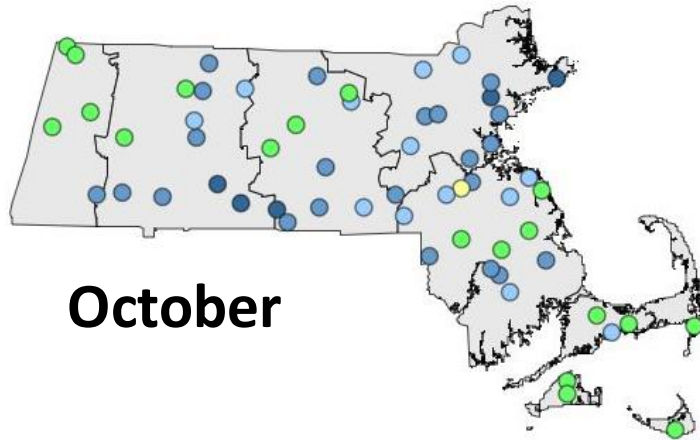


Intensity:

-  None
-  D0 (Abnormally Dry)
-  D1 (Moderate Drought)
-  D2 (Severe Drought)
-  D3 (Extreme Drought)
-  D4 (Exceptional Drought)
-  No Data

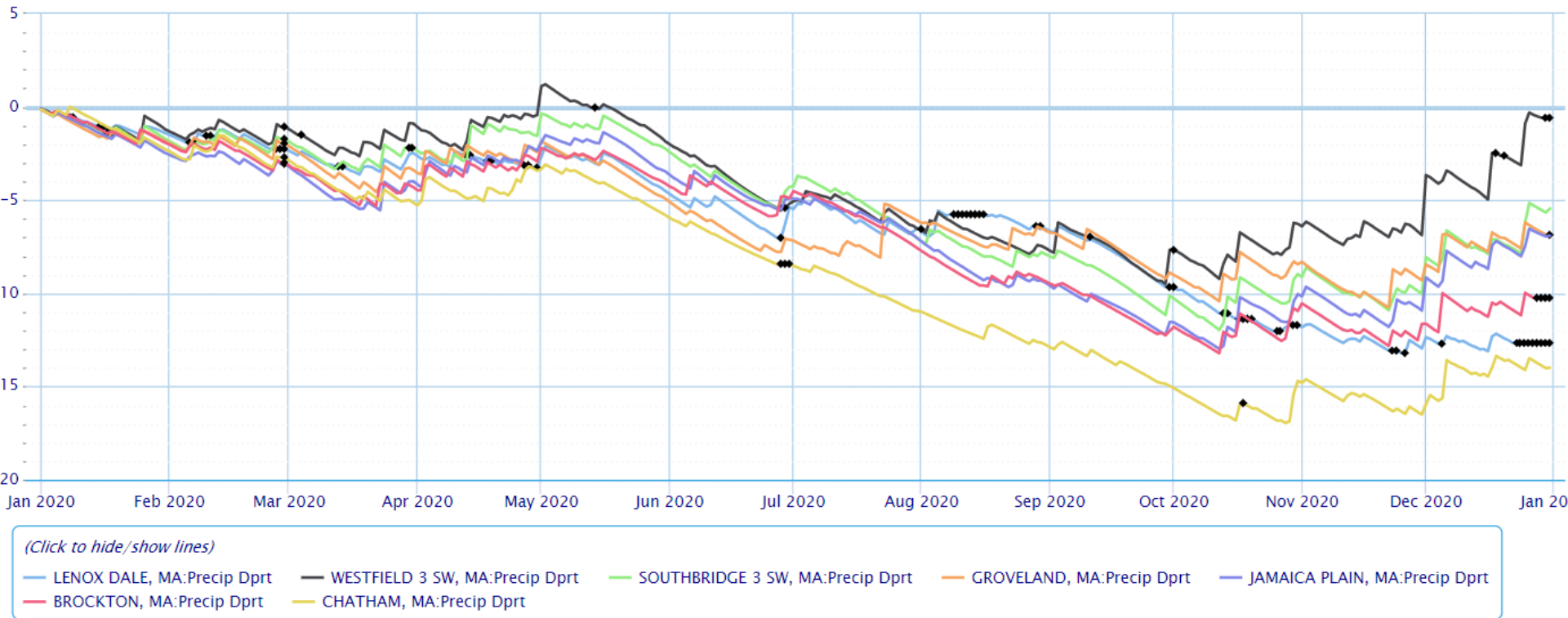
USDM	=	MA DMP
0	=	1
1	=	2
2&3	=	3
4	=	4

Precipitation – SPI, 1 month



Accumulated Precipitation Departure from Normal/Average (inches)

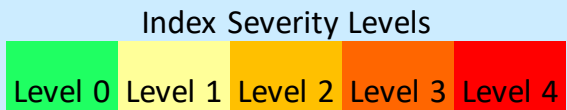
Green/black diamonds represent subsequent/missing values



Powered by ACIS

- Does not show starting condition wetness/dryness— Cape groundwater well above average in Jan 2020
- Does not show summer heat waves with high ET
- Only 1 station per region showing

Dec. Precipitation Index – SPI

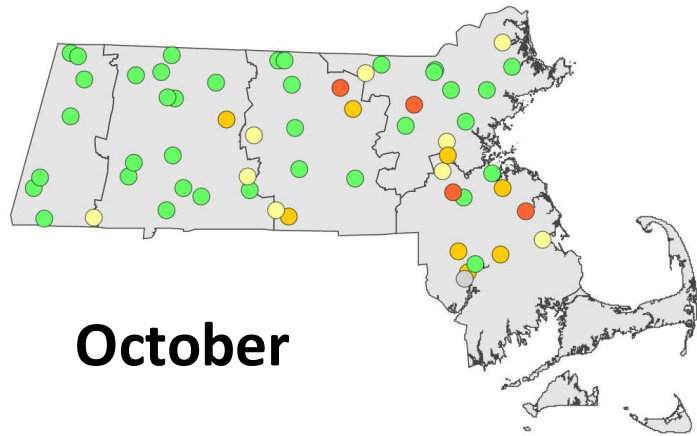


Region	1-month*	2-month	3-month	6-month
Western	-0.10	-0.03	-0.30	-0.52
CT River	1.07	0.75	0.97	0.13
Central	1.37	1.02	1.01	0.14
Northeast	1.02	0.76	0.74	-0.08
Southeast	1.23	0.97	0.92	-0.23
Cape Cod	1.18	0.44	0.15	-1.25
Islands	0.87	0.67	0.64	-1.46

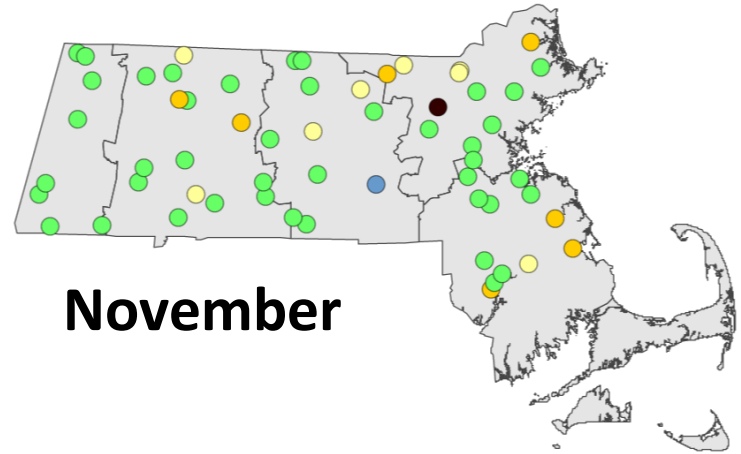
Region	9-month	12-month	24-month	36-month
Western	-1.09	-0.87	-0.78	0.28
CT River	-0.44	-0.53	-0.02	1.21
Central	0.07	-0.24	0.50	1.42
Northeast	-0.30	-0.63	0.20	0.96
Southeast	-0.03	-0.52	0.50	1.22
Cape Cod	-0.97	-1.30	0.38	0.43
Islands	-1.05	-1.24	0.50	1.25

* 1-month SPI is for informational purposes only, not for drought determination
 Of the 2-24 month look-back periods, the most relevant is selected each month depending on the phase of the drought - onset, during or recovery.

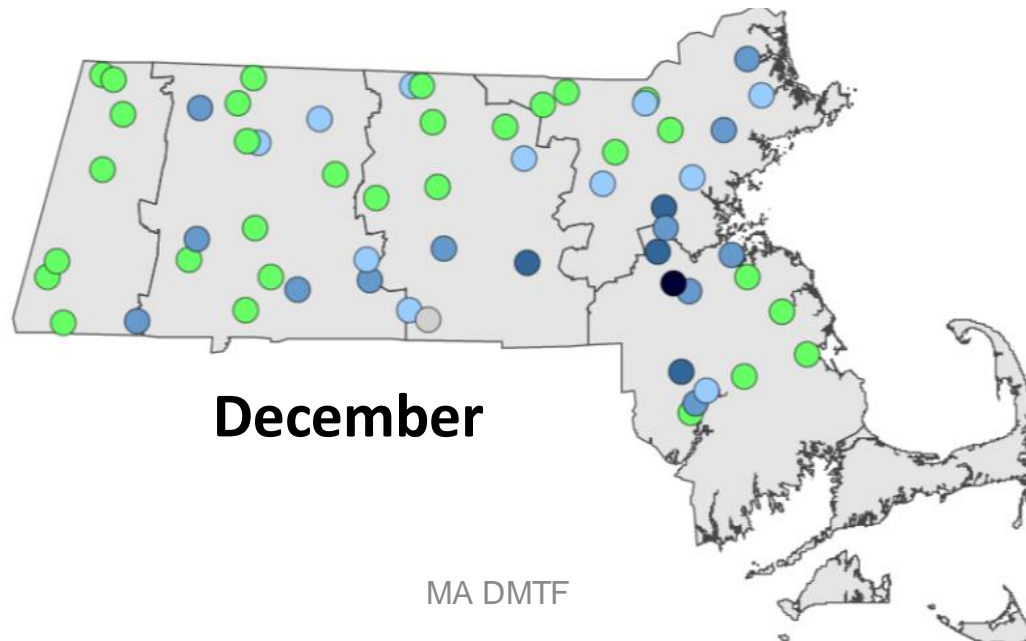
Streamflow Percentiles of Monthly Median



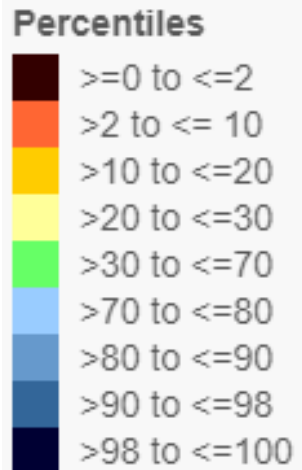
October



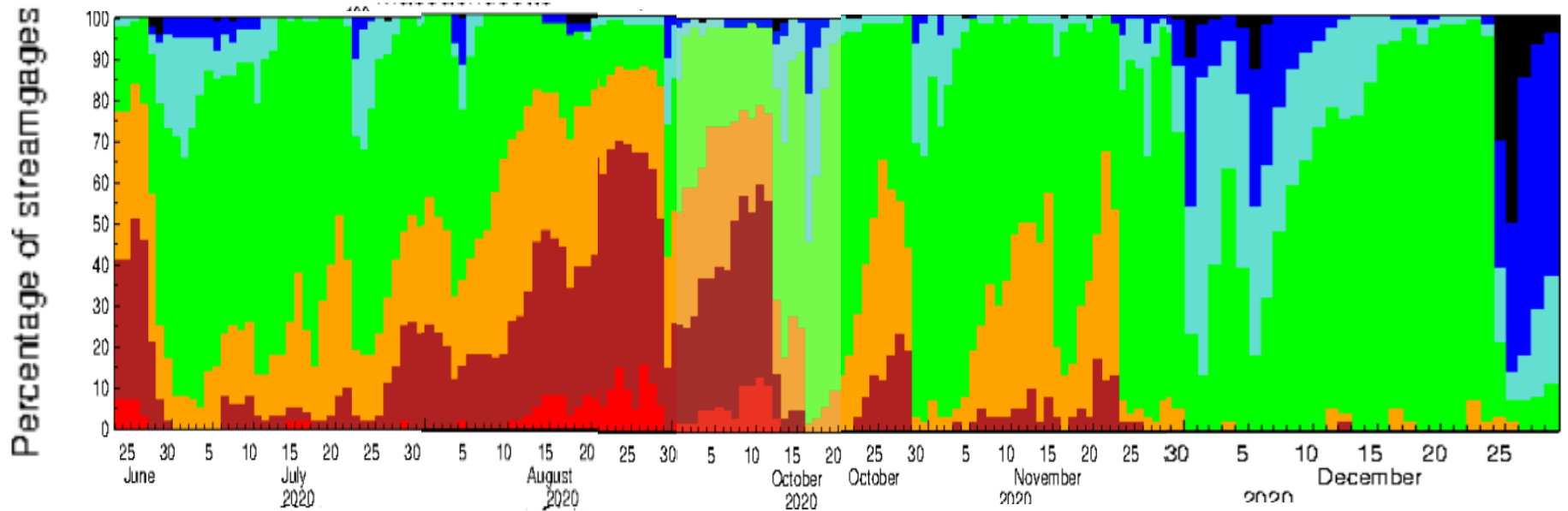
November



December



Percent of Gages at Various Percentiles



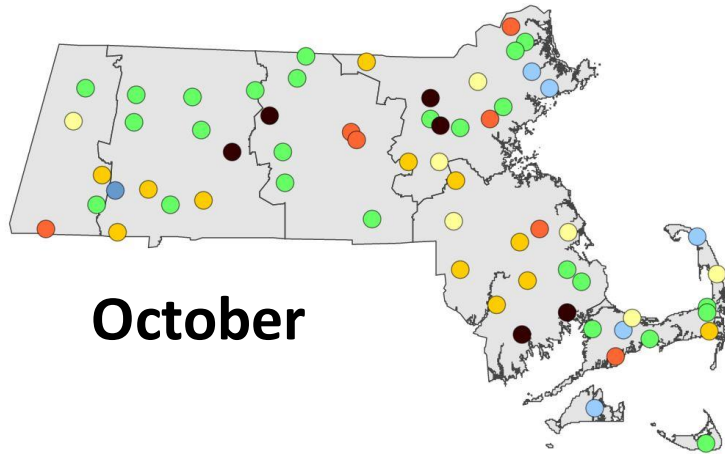
Streamflow Index

- October – 1: Central, 2: Southeast
- November – 0: all regions

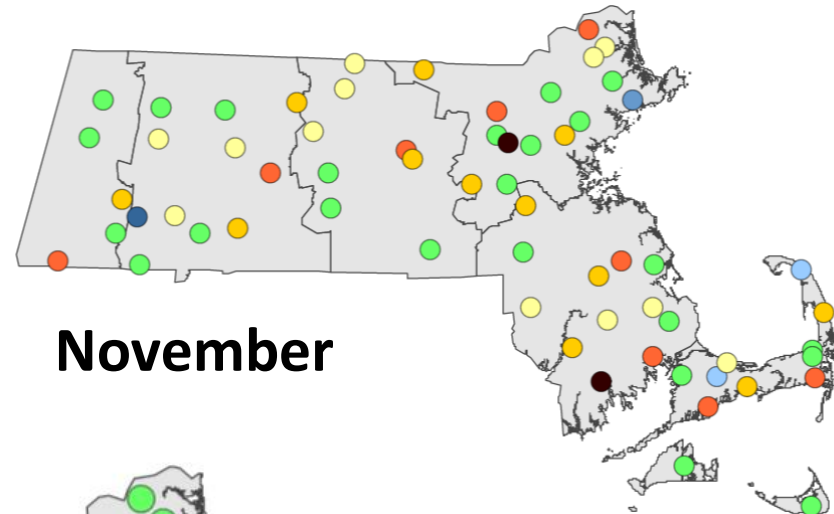
Region	Number of Gages						Median of Individual Gage Percentiles	DMP Index Severity
	Total Reporting for Dec.	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	8	0	0	0	0	0	59	0
CT River Valley	15	0	0	0	0	0	70	0
Central	10	0	0	0	0	1	70	0
Northeast	13	0	0	0	0	1	79	0
Southeast	12	0	0	0	0	3	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.

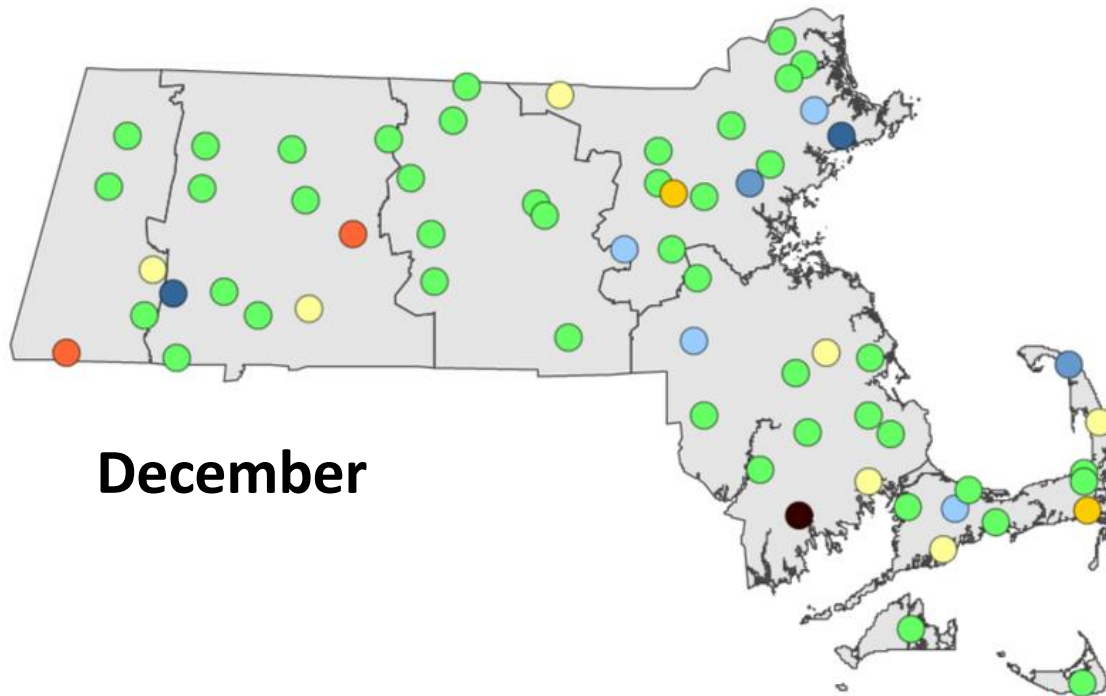
Groundwater Well Percentiles



October

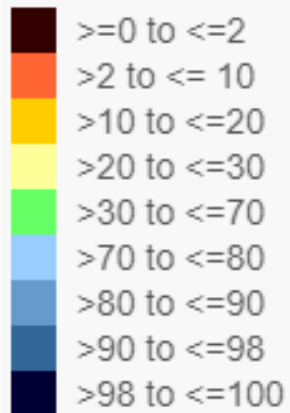


November



December

Percentiles



1/6/2021

Groundwater Index

- October – 2: Southeast; 1: Western, Northeast
- November – 1: CTRV, Central, NE, SE

Region	Number of Wells						Median of Individual Well Percentiles	DMP Index Severity
	Total Reporting for Dec.	≥0 to ≤2 Percentile	>2 to ≤10 Percentile	>10 to ≤20 Percentile	>20 to ≤30 Percentile	>90 Percentile		
Western	5	0	1	0	1	0	47	0
CT River Valley	11	0	1	0	1	1	44	0
Central	9	0	0	0	0	0	58	0
Northeast	14	0	0	1	1	1	54	0
Southeast	12	1	0	0	2	0	34	0
Cape Cod	10	0	0	1	2	0	52	0
Islands	2	0	0	0	0	0	53	0

Index Severity Levels

KBDI and CMI

- KBDI – no longer calculated; outside of fire season
- CMI – no longer applicable; outside of growing season

Lakes & Impoundments

December

Drought Region	Number Reporting	Percentile	DMP Index Severity
Western	2	39	Level 0
CT River Valley	2	50	Level 0
Central	2	44	Level 0
Northeast	5	50	Level 0
Southeast	2	59	Level 0
Cape Cod	1	50	Level 0
Islands	NA	NA	NA

Notes:

DMP index severity levels do not necessarily reflect water supply status.



Drought Indices by Region

NOVEMBER 2020

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
Precipitation	Level 2	Level 1	Level 1	Level 1	Level 0	Level 4	Level 3
Streamflow	Level 0	Level 0	Level 0	Level 0	Level 0	N/A	N/A
Groundwater	Level 0	Level 1	Level 1	Level 1	Level 1	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 0	Level 3	Level 0	N/A
Crop Moisture Index	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
KBDI							
<i>Suggested 12/7/20 (effective 11/1)</i>	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
<i>Effective 10/01/20 (11/5 meeting)</i>	Level 1	Level 1	Level 1	Level 1	Level 2	Level 2	Level 1

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.

Drought Indices by Region - **DECEMBER 2020**

Drought Index	Western	CT River Valley	Central	Northeast	Southeast	Cape	Islands
ST Precipitation*	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
LT Precipitation**	Level 2	Level 0	Level 0	Level 0	Level 0	Level 2	Level 2
Streamflow	Level 0	Level 0	Level 0	Level 0	Level 0	N/A	N/A
Groundwater	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0
Lakes/ Impoundments	Level 0	Level 0	Level 0	Level 0	Level 0	Level 0	N/A
Crop Moisture Index							
KBDI							
<i>Effective 12/1 (1/6 meeting)</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>	<i>Level 0</i>
<i>Effective 11/1 (12/7 meeting)</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>	<i>Level 1</i>

* ST Precipitation = Short-term precipitation values are for the 2- and 3-month lookback periods showing recovery from the 2020 drought.

** LT Precipitation = Long-term precipitation values are for the 9-month lookback period reflecting remaining deficit from the 2020 drought.

Lakes & Impoundments Index does not reflect water supply status. KBDI and CMI are not calculated outside of fire and growing seasons.

Conditions in all Major Basins were similar to their respective regions.

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DMTF Deliberation

