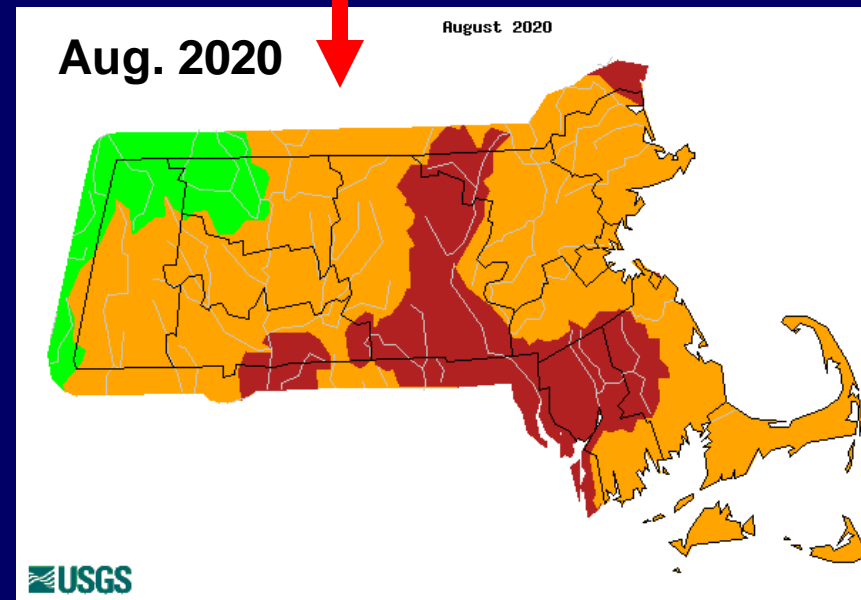
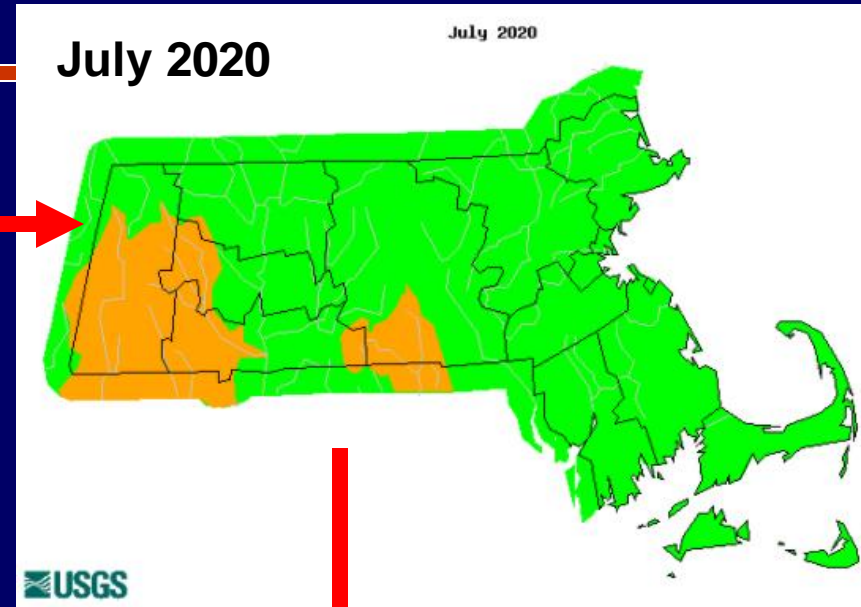
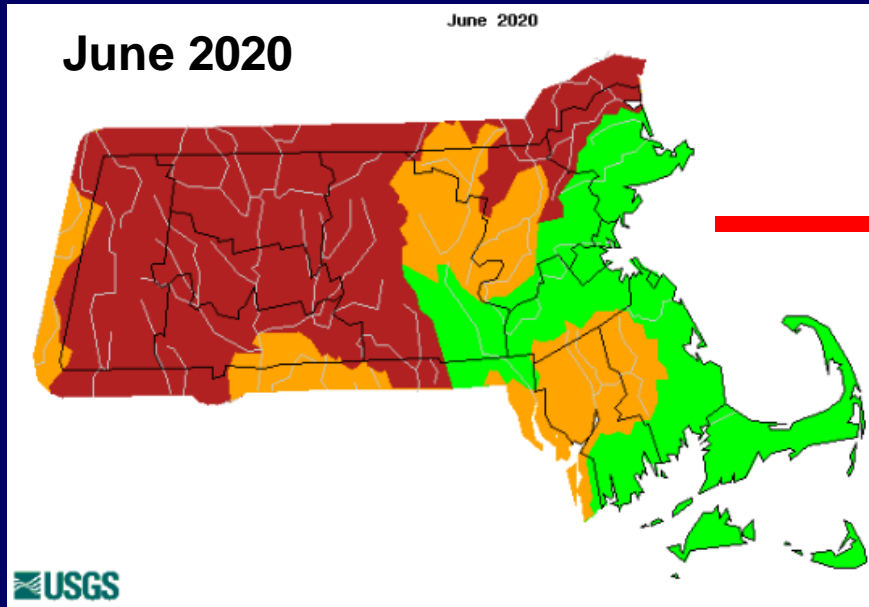

Streamflow and Groundwater Conditions in Massachusetts

Jan. 6, 2021

Gardner Bent
U.S. Geological Survey
New England Water Science Center



Average Streamflow Conditions – June-Aug. 2020



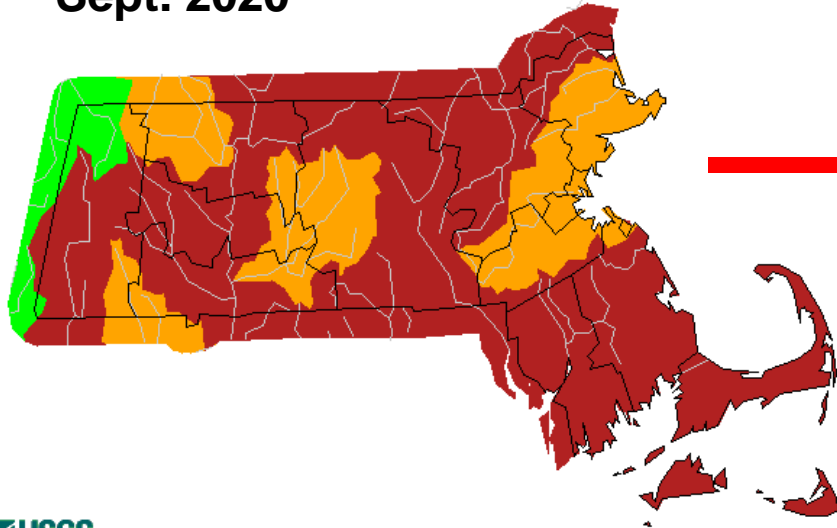
Explanation - Percentile classes

Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Average Streamflow Conditions – Sept. - Nov. 2020

Sept. 2020

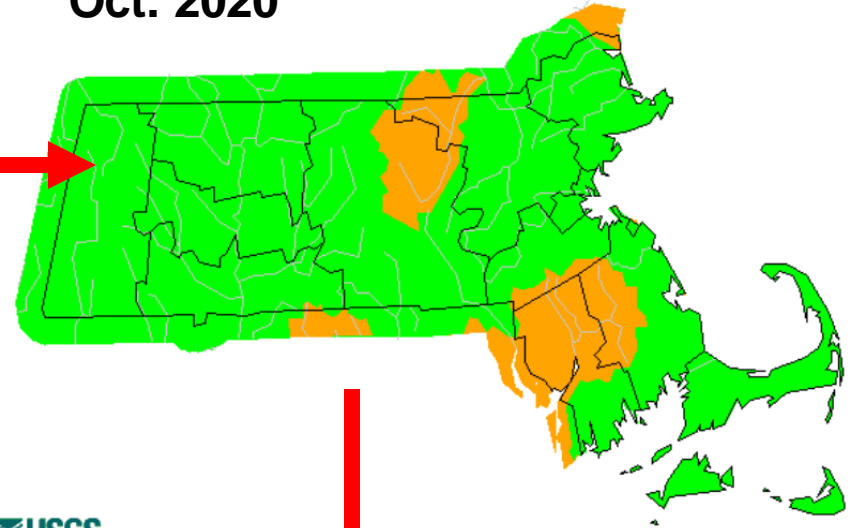
September 2020



USGS

Oct. 2020

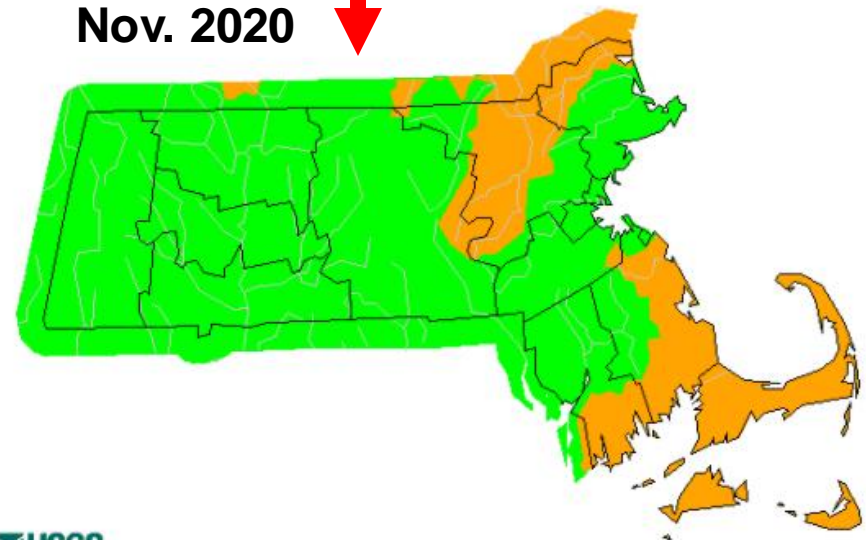
October 2020



USGS

Nov. 2020

November 2020



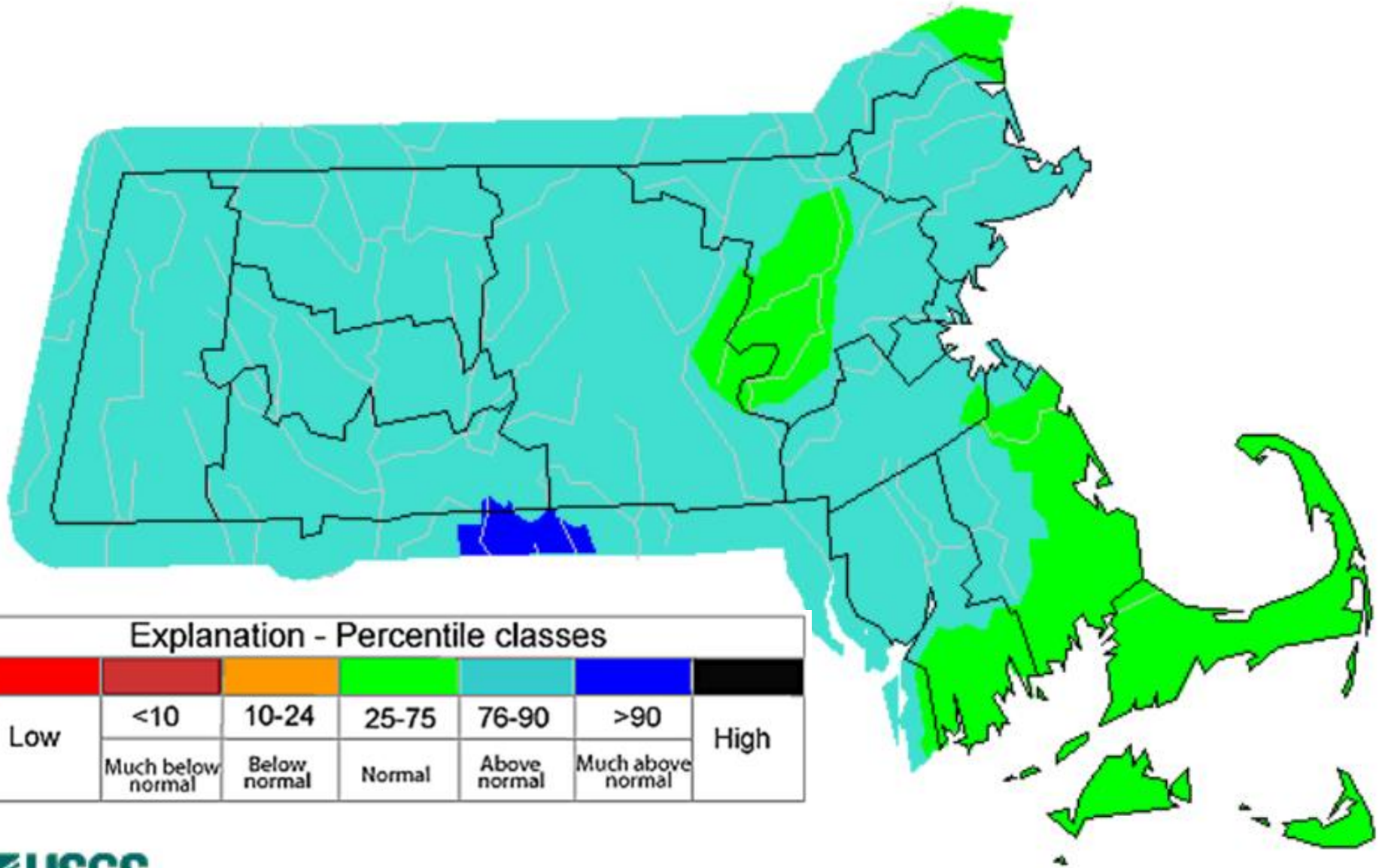
USGS

Explanation - Percentile classes

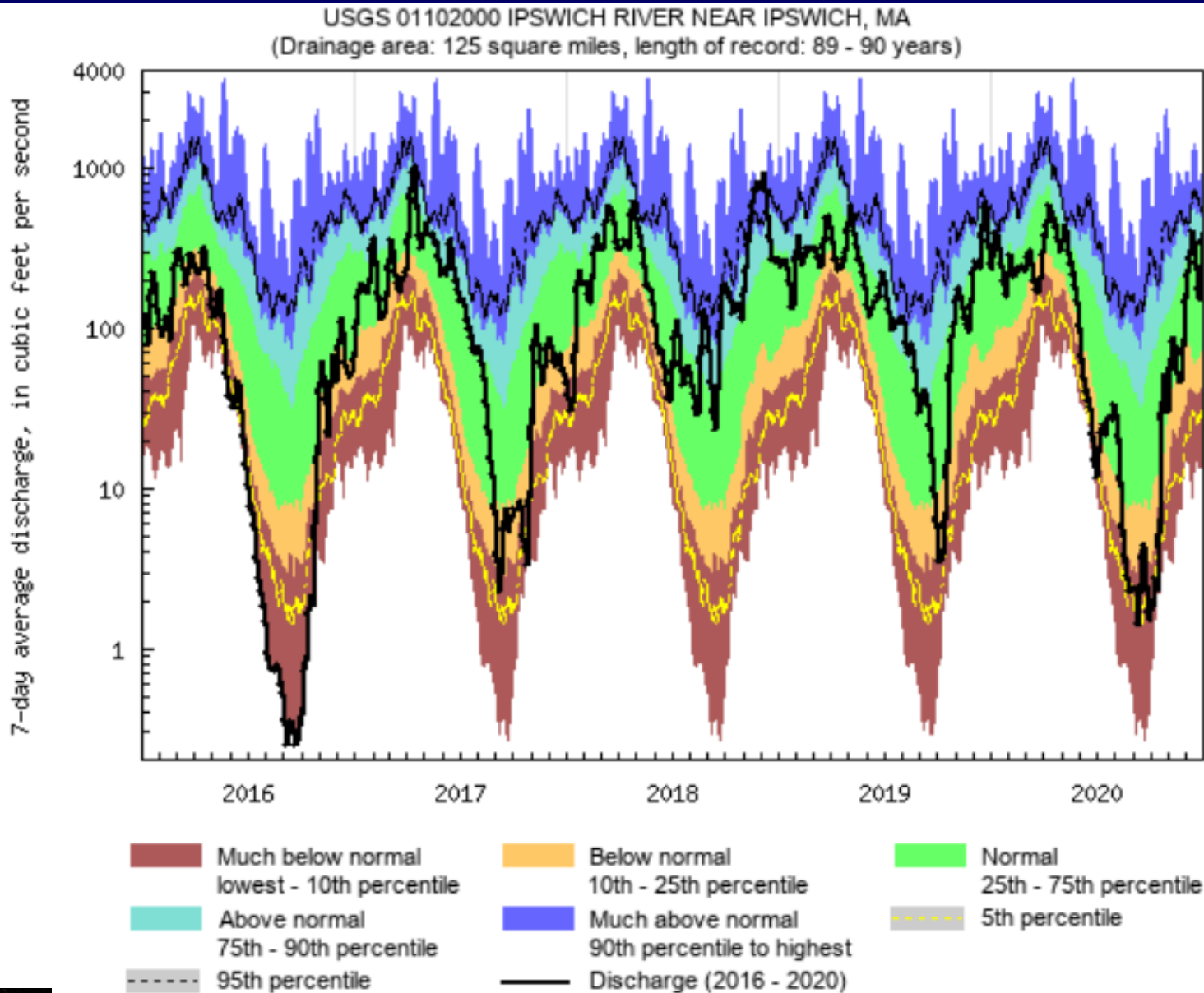
Low	<10	10-24	25-75	76-90	>90			High
	Much below normal	Below normal	Normal	Above normal	Much above normal			

Average Streamflow Conditions – Dec. 2020

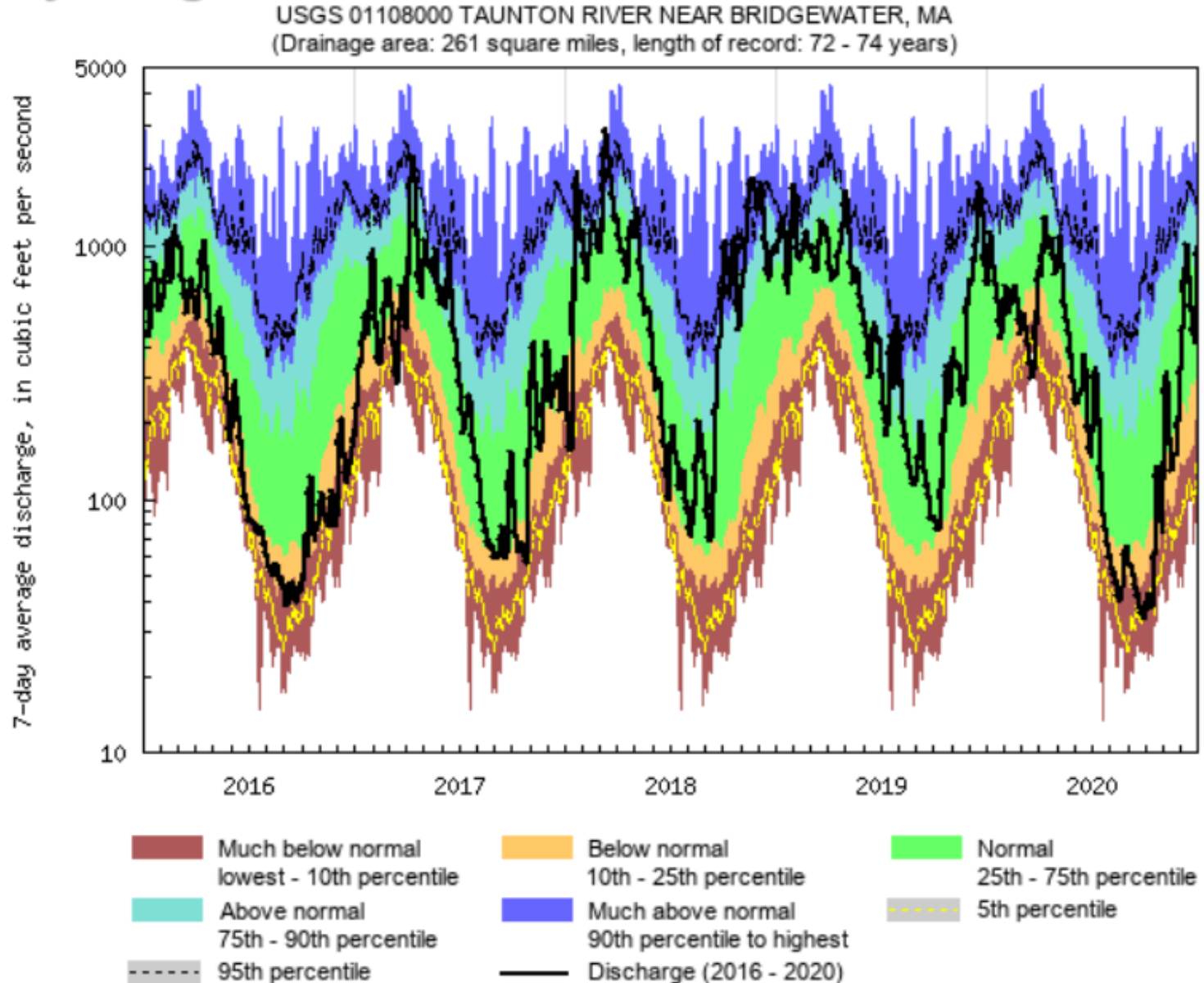
December 2020



7-Day Avg. – Ipswich River – northeastern MA

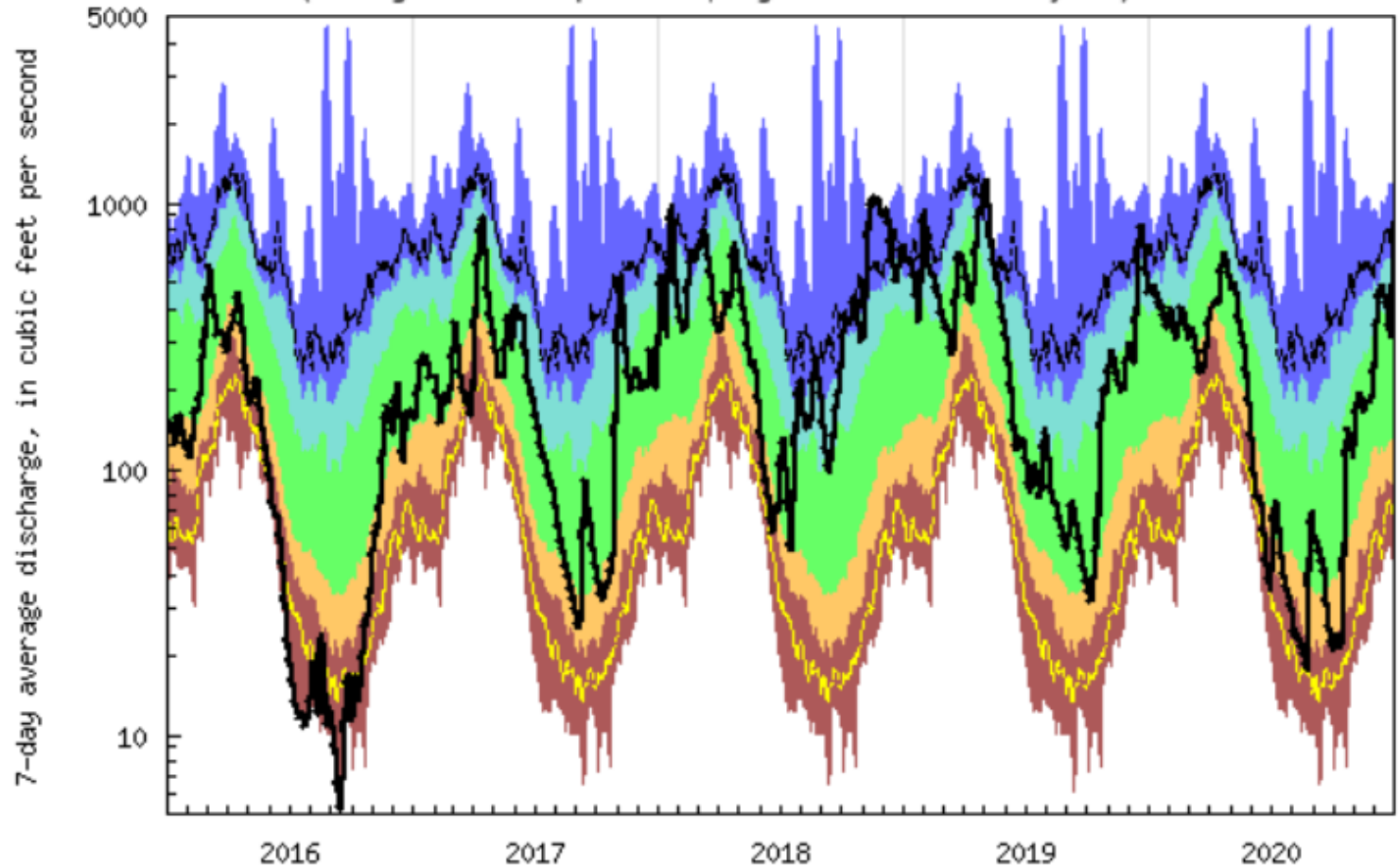


7-Day Avg. – Taunton River – southeastern MA



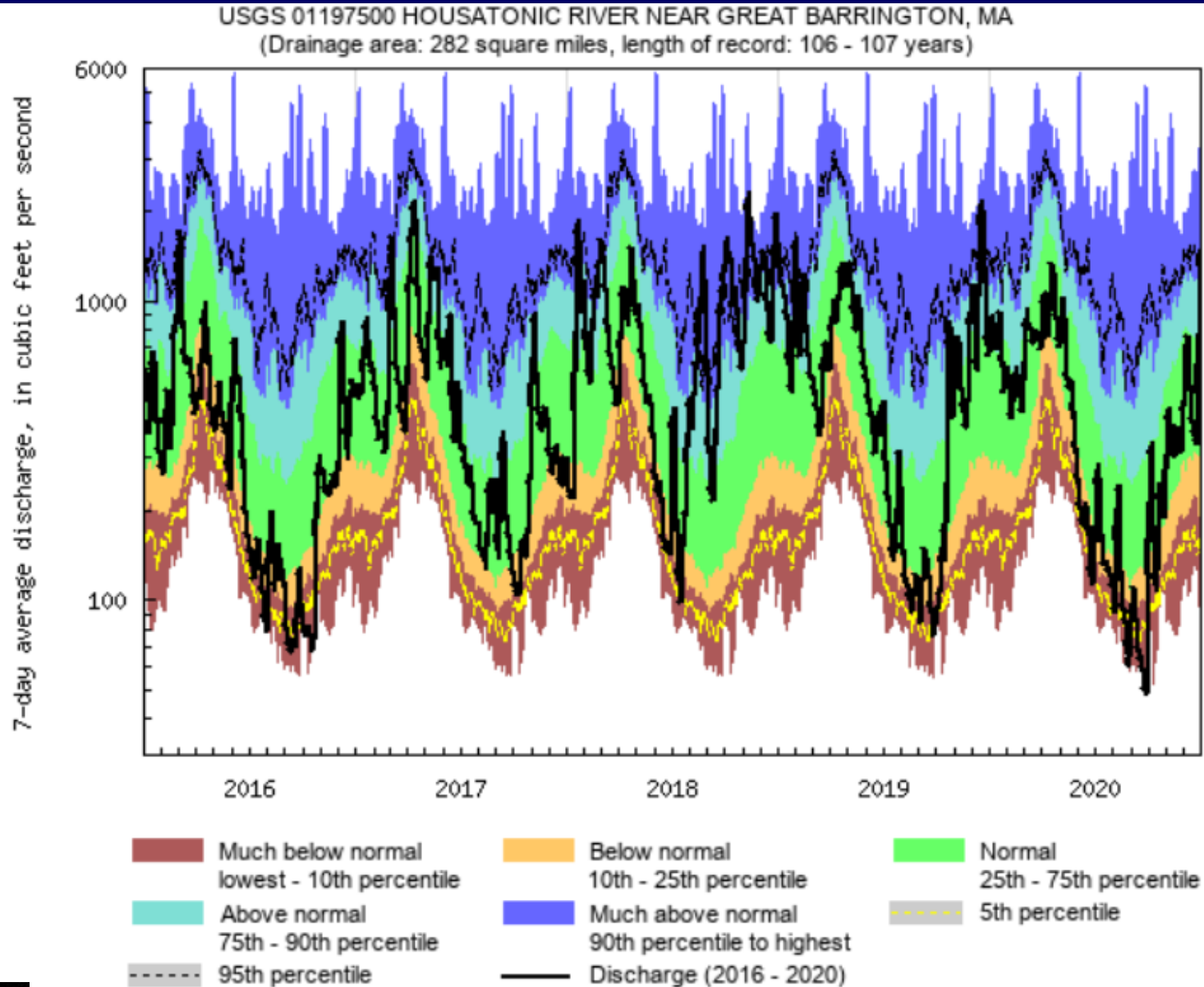
7-Day Avg. – Quaboag River – central MA

USGS 01176000 QUABOAG RIVER AT WEST BRIMFIELD, MA
(Drainage area: 150 square miles, length of record: 107 - 108 years)

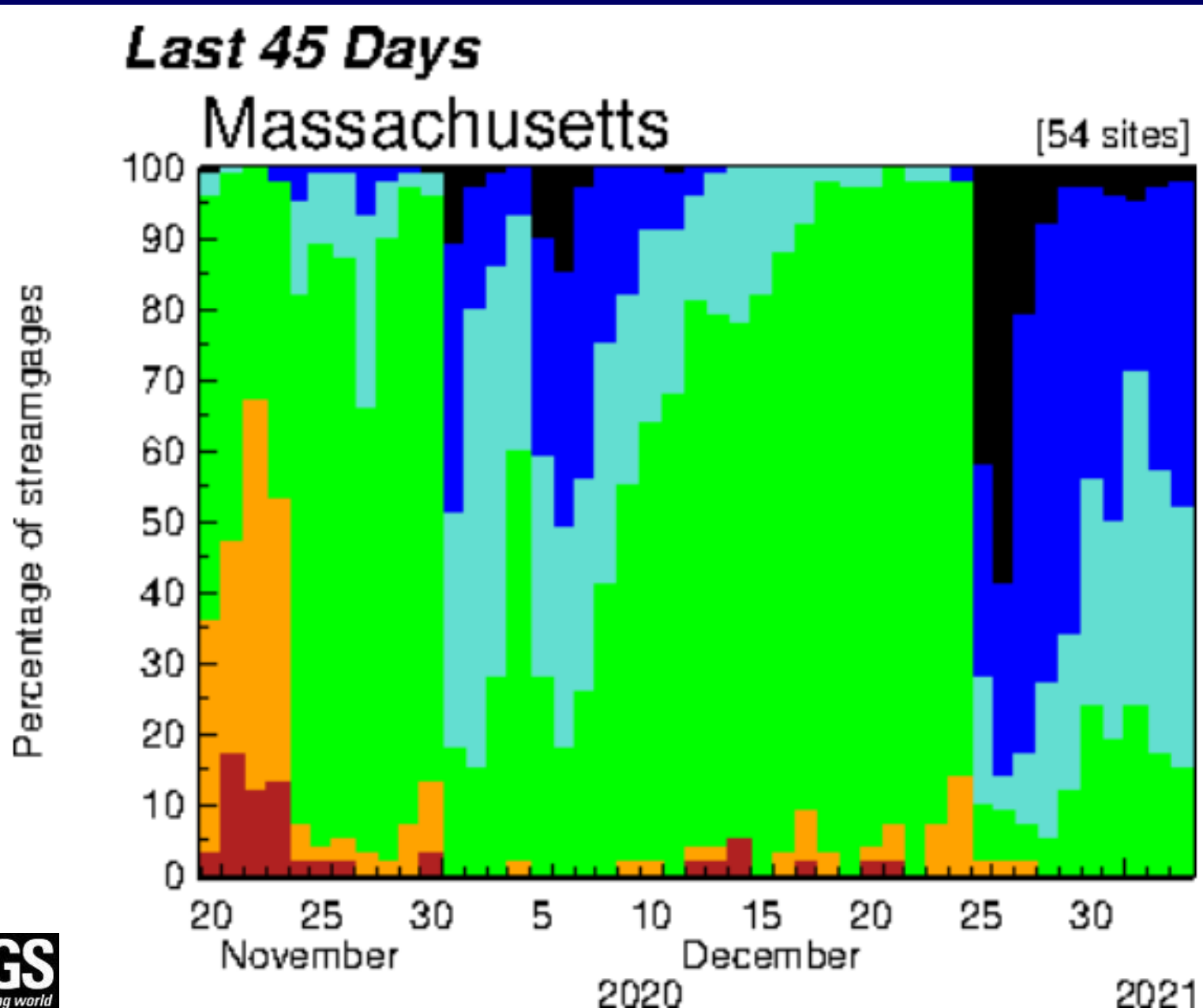


- | | | |
|---|---|----------------------------------|
| Much below normal
lowest - 10th percentile | Below normal
10th - 25th percentile | Normal
25th - 75th percentile |
| Above normal
75th - 90th percentile | Much above normal
90th percentile to highest | 5th percentile |
| 95th percentile | Discharge (2016 - 2020) | |

7-Day Avg. – Housatonic River – western MA

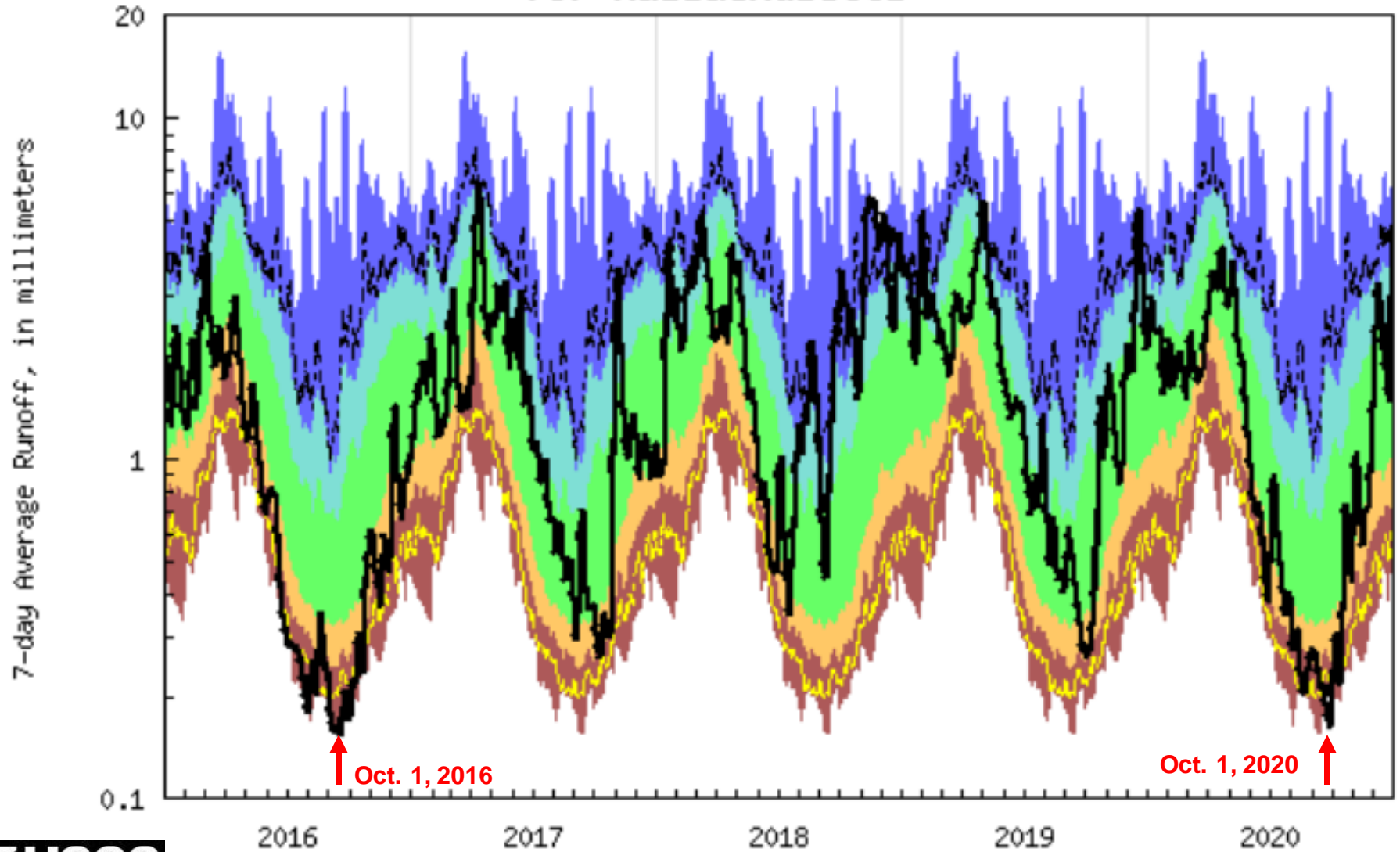


Average runoff – Massachusetts – last 45 days



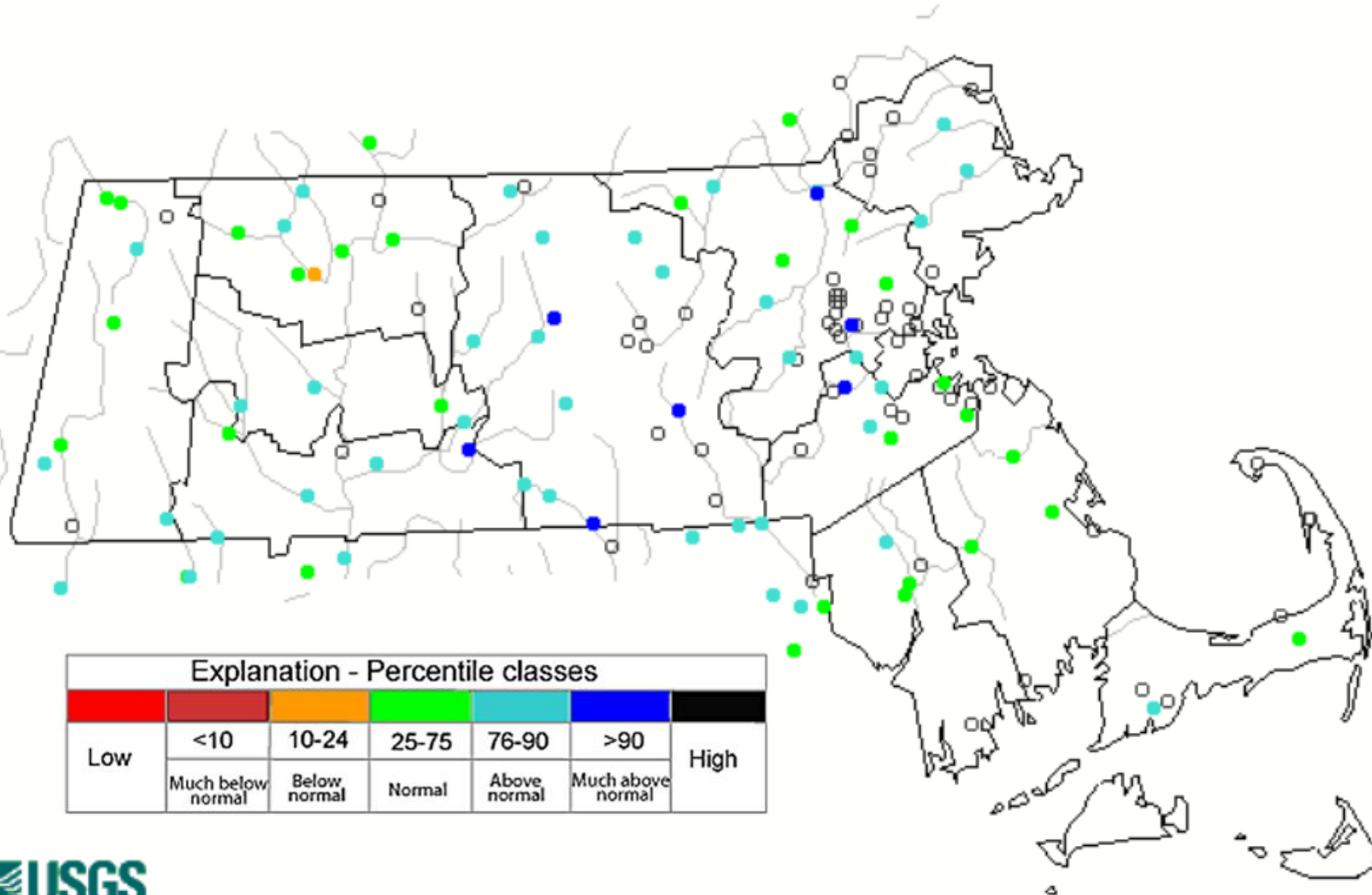
Avg. runoff – Massachusetts – last 5 years

Duration hydrograph of 7-day average runoff for Massachusetts

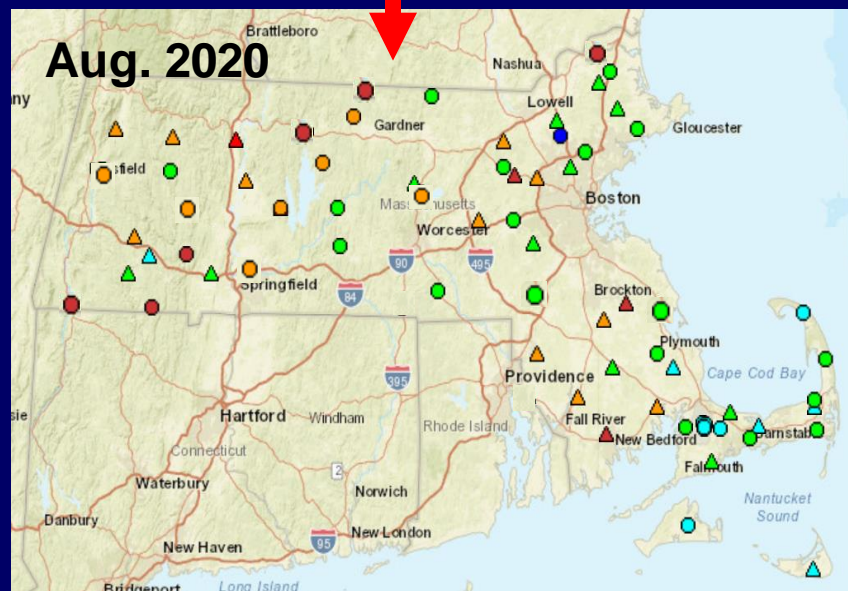
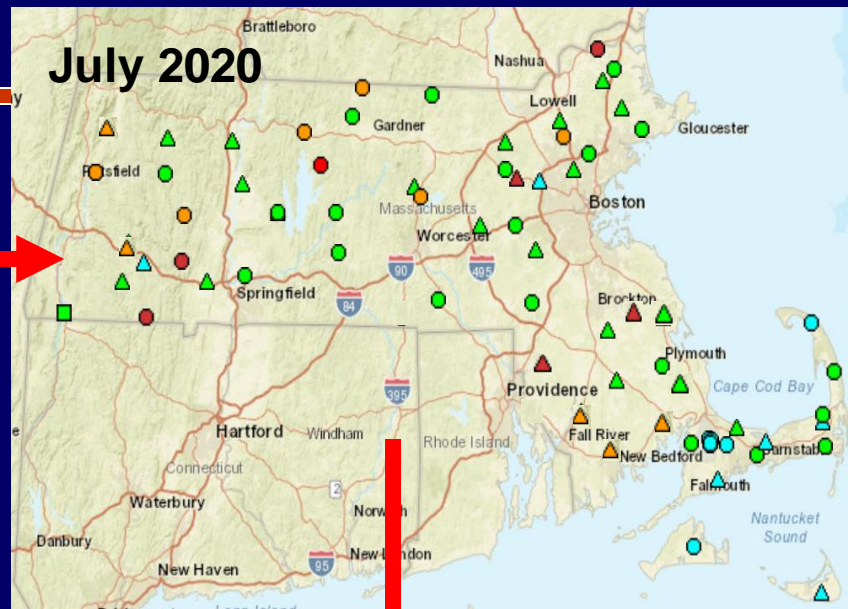


Streamflow Conditions – Jan. 5, 2021

Tuesday, January 05, 2021 18:30ET



GW Conditions Late June – Late Aug. 2020

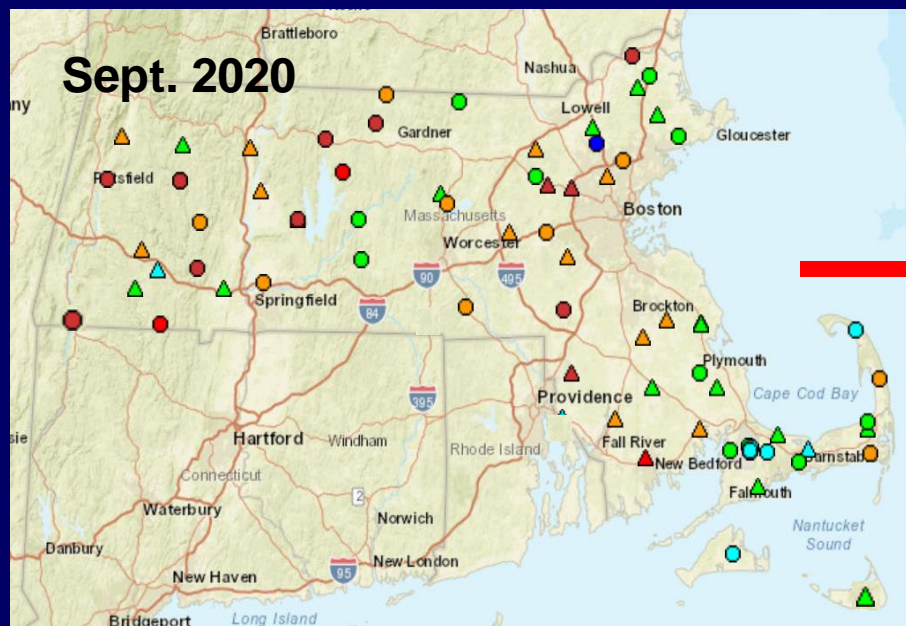


Explanation - Percentile classes							
●	●	●	●	●	●	●	●
New Low	<10	10-24	25-75	76-90	>90	New High	Not Ranked
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal		

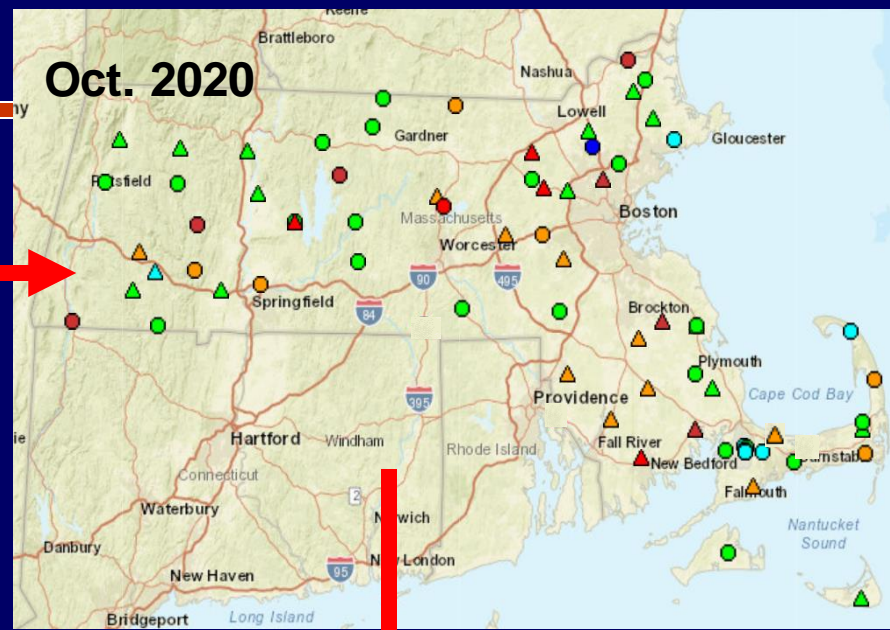
○	Real Time
□	Continuous
△	Periodic Measurements

GW Conditions Late Sept. – Late Nov. 2020

Sept. 2020



Oct. 2020



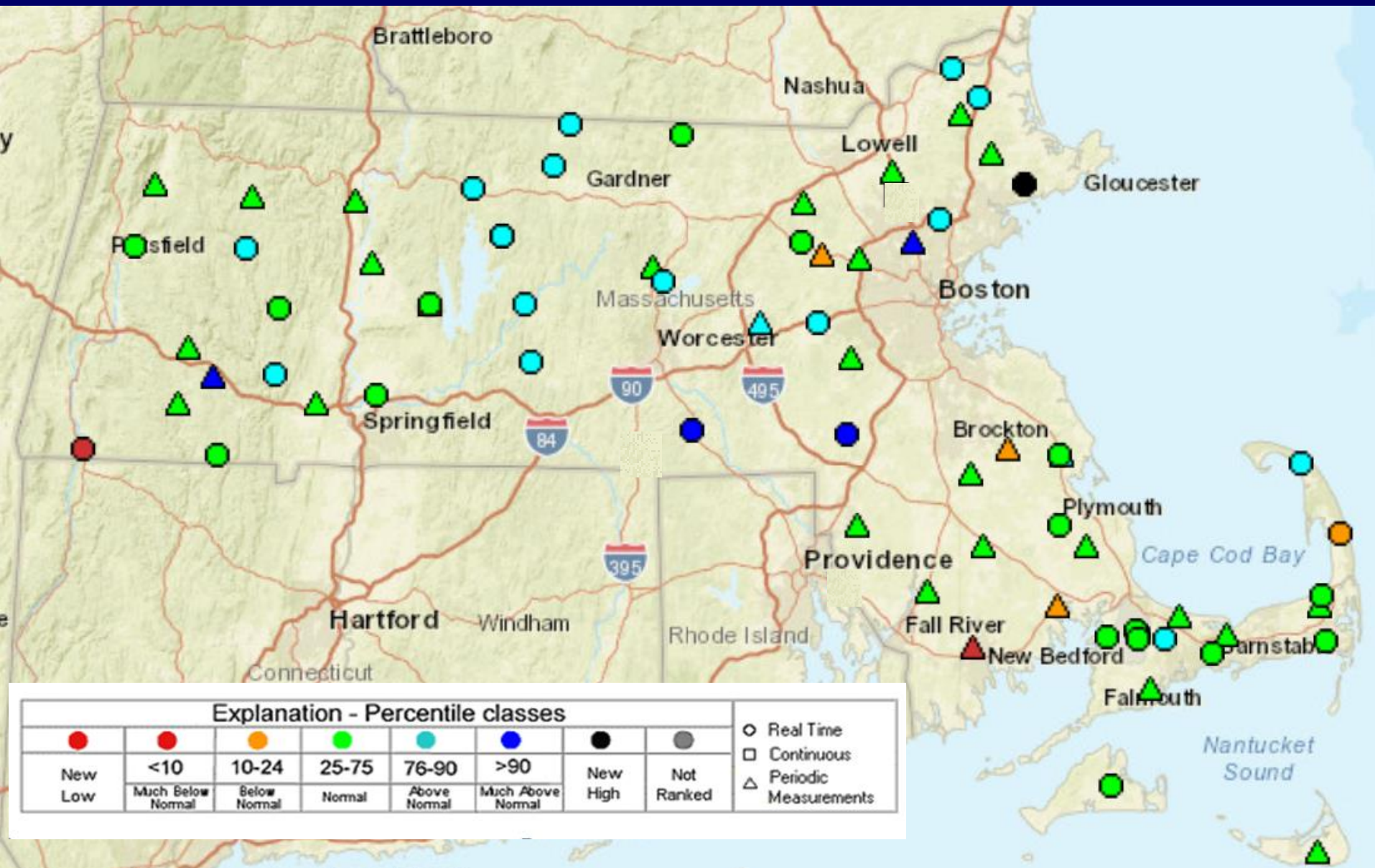
Nov. 2020

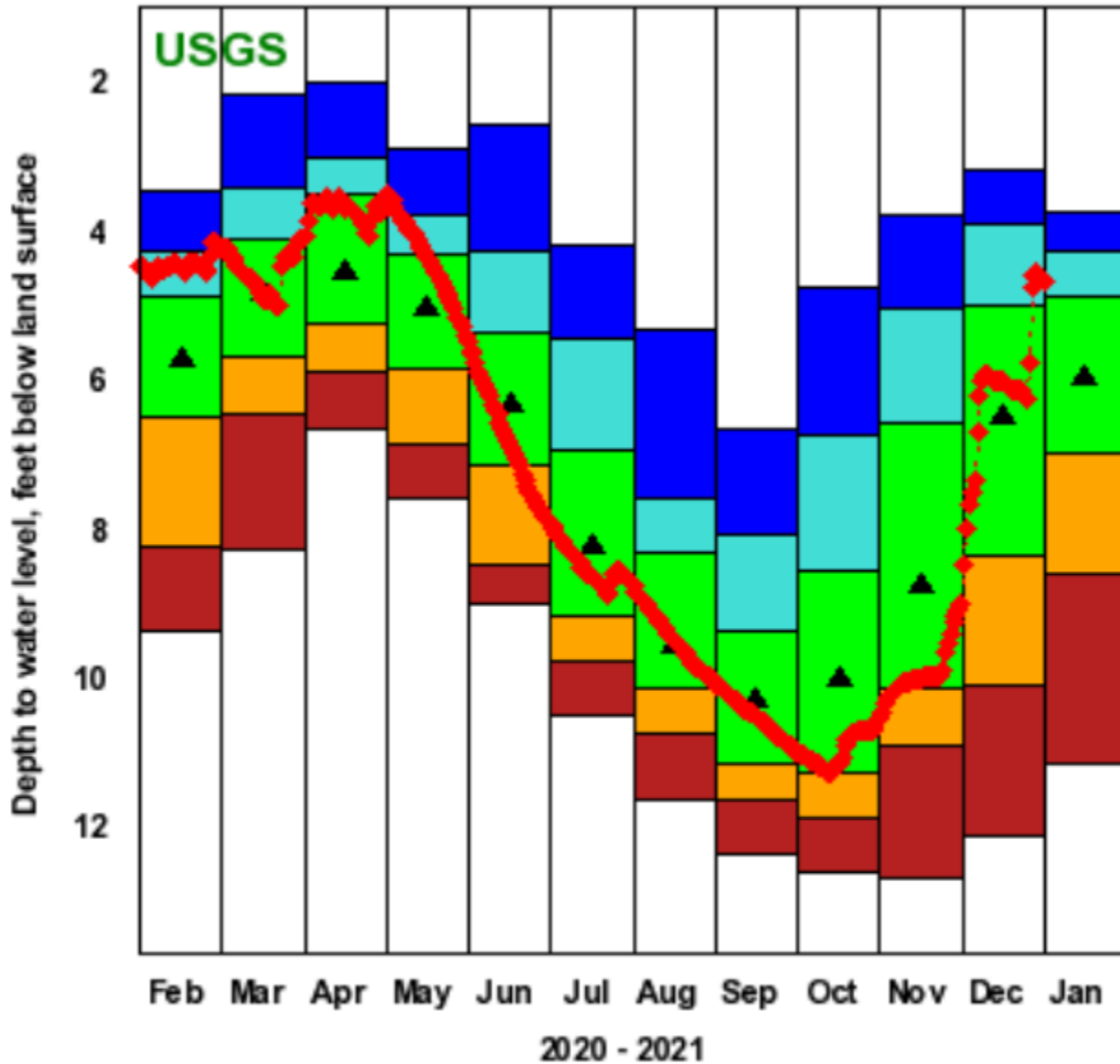


Explanation - Percentile classes

New Low	<10	10-24	25-75	76-90	>90	New High	Not Ranked
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal		
							Real Time Continuous Periodic Measurements

GW Conditions Late December 2020





Period of Record

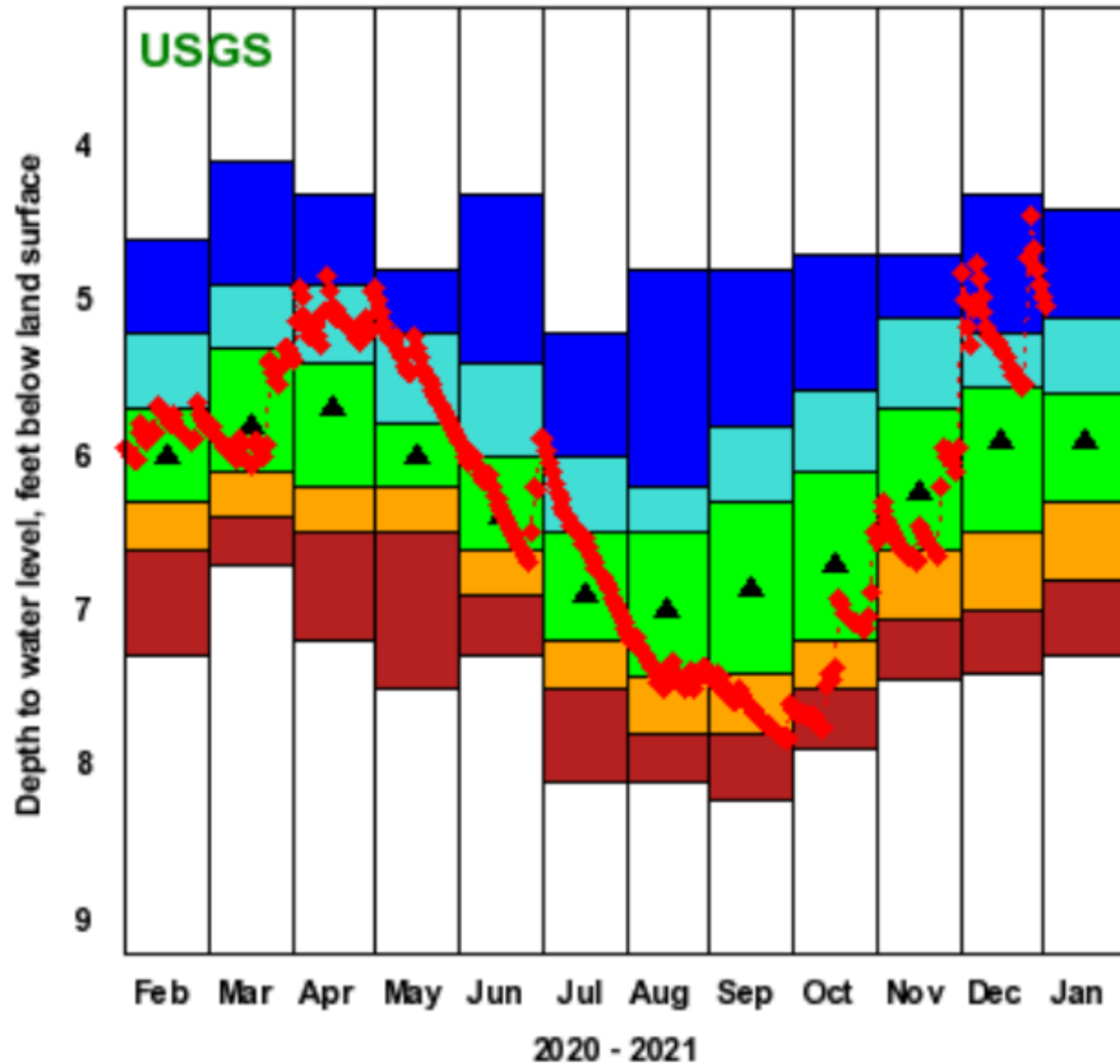
All data
July 1959 – present

Continuous data
Oct. 1984 - present

Explanation - Percentile Classes

- ● < 10
- ● 10 - 24
- ● 25 - 75
- ● 76 - 90
- ● > 90

▲ Monthly Median



Pbt created 01/03/21 02:12

Explanation - Percentile Classes

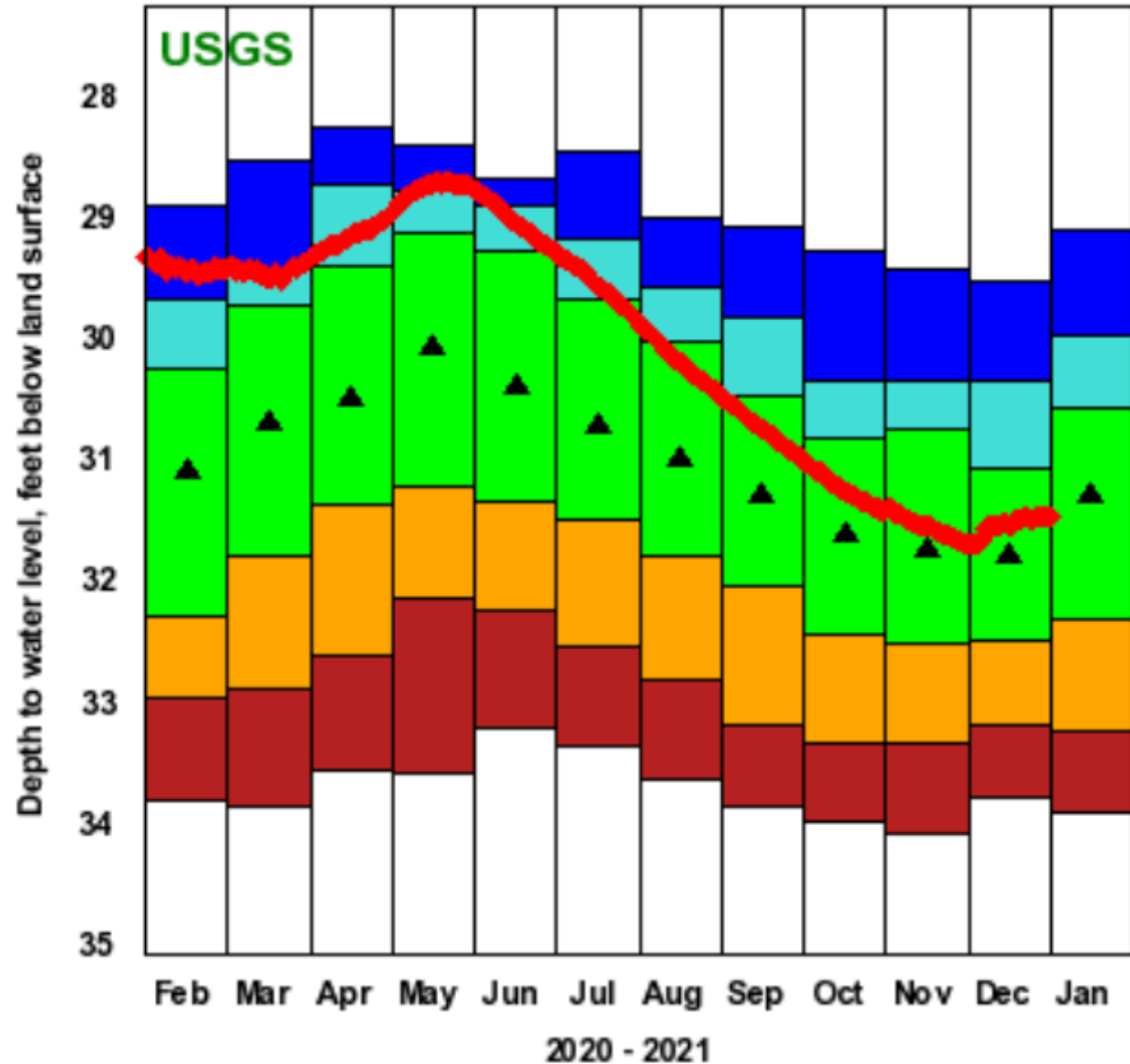


▲ Monthly Median

Period of Record

All data
Dec. 1964 – present

Continuous data
Aug. 2001 - present



Plt created 01/03/21 02:12

Explanation - Percentile Classes

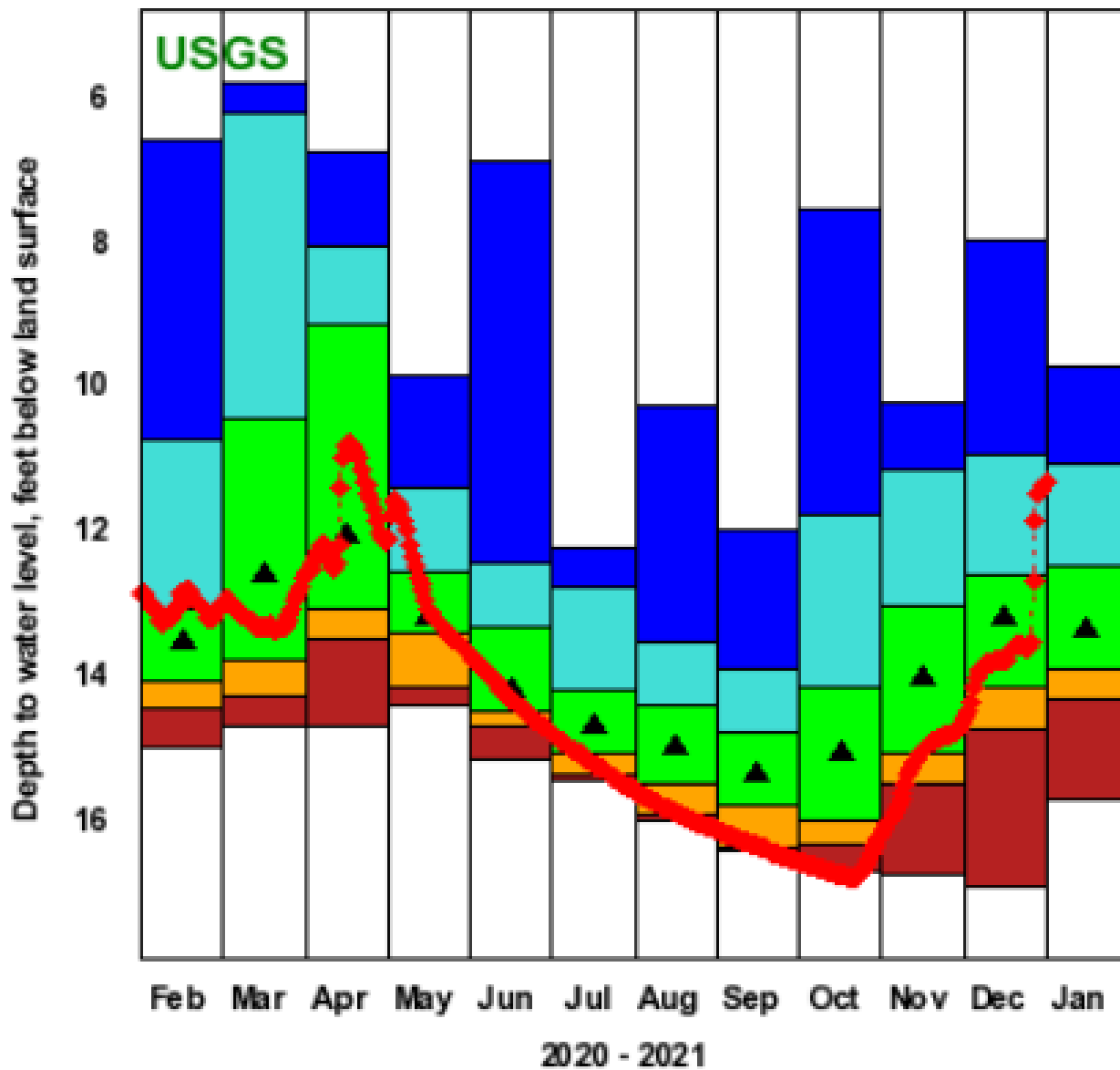


▲ Monthly Median

Period of Record

All data
Nov. 1962 – present

Continuous data
Dec. 2001 - present



2020 - 2021

Plot created 01/03/21 02:12

Explanation - Percentile Classes

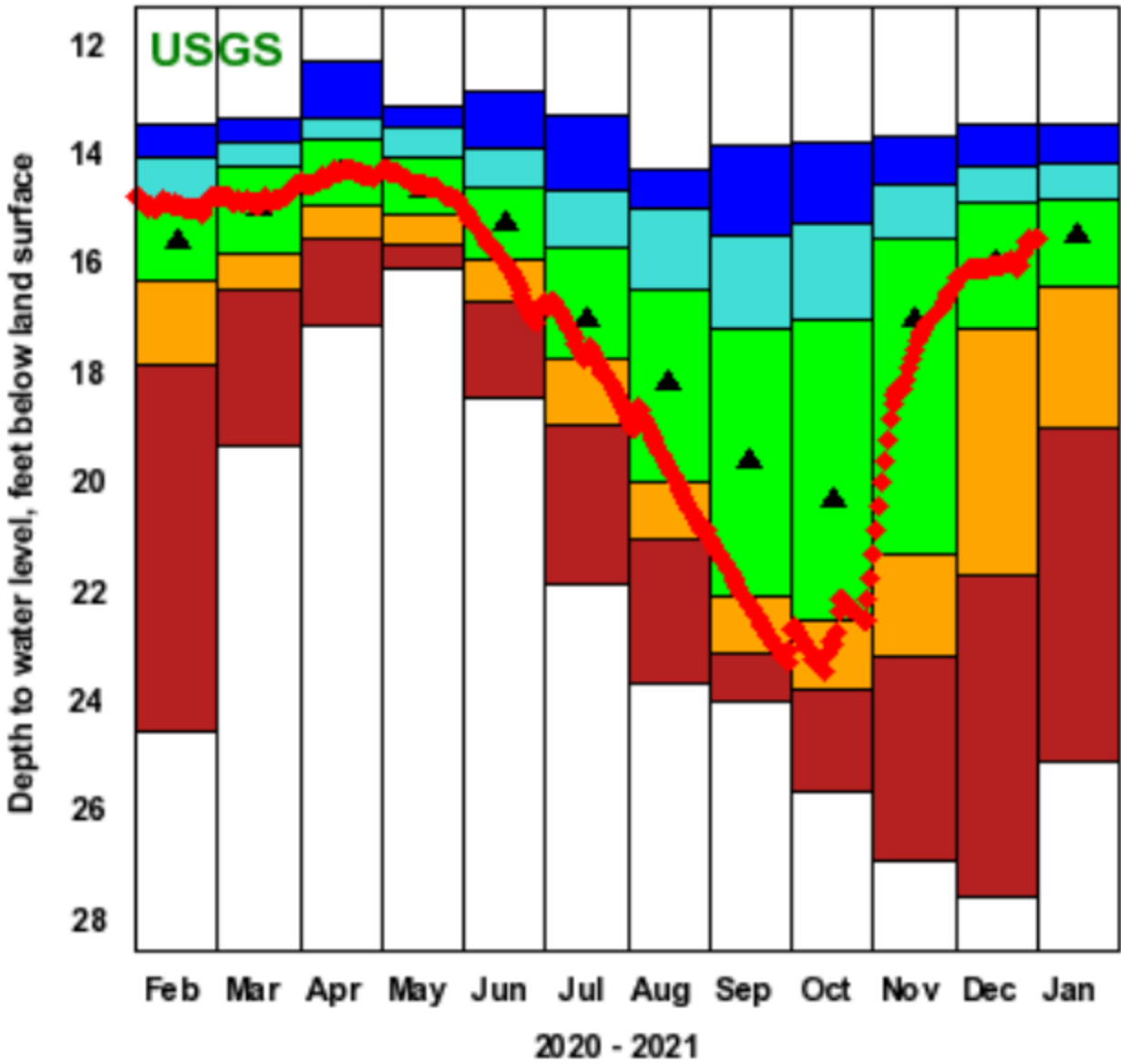


▲ Monthly Median

Period of Record

All data
Jan. 1984 – present

Continuous data
May 2012 - present



Plot created 01/03/21 02:12

Explanation - Percentile Classes

- < 10
- 10 - 24
- 25 - 75
- 76 - 90
- > 90
- ▲ Monthly Median

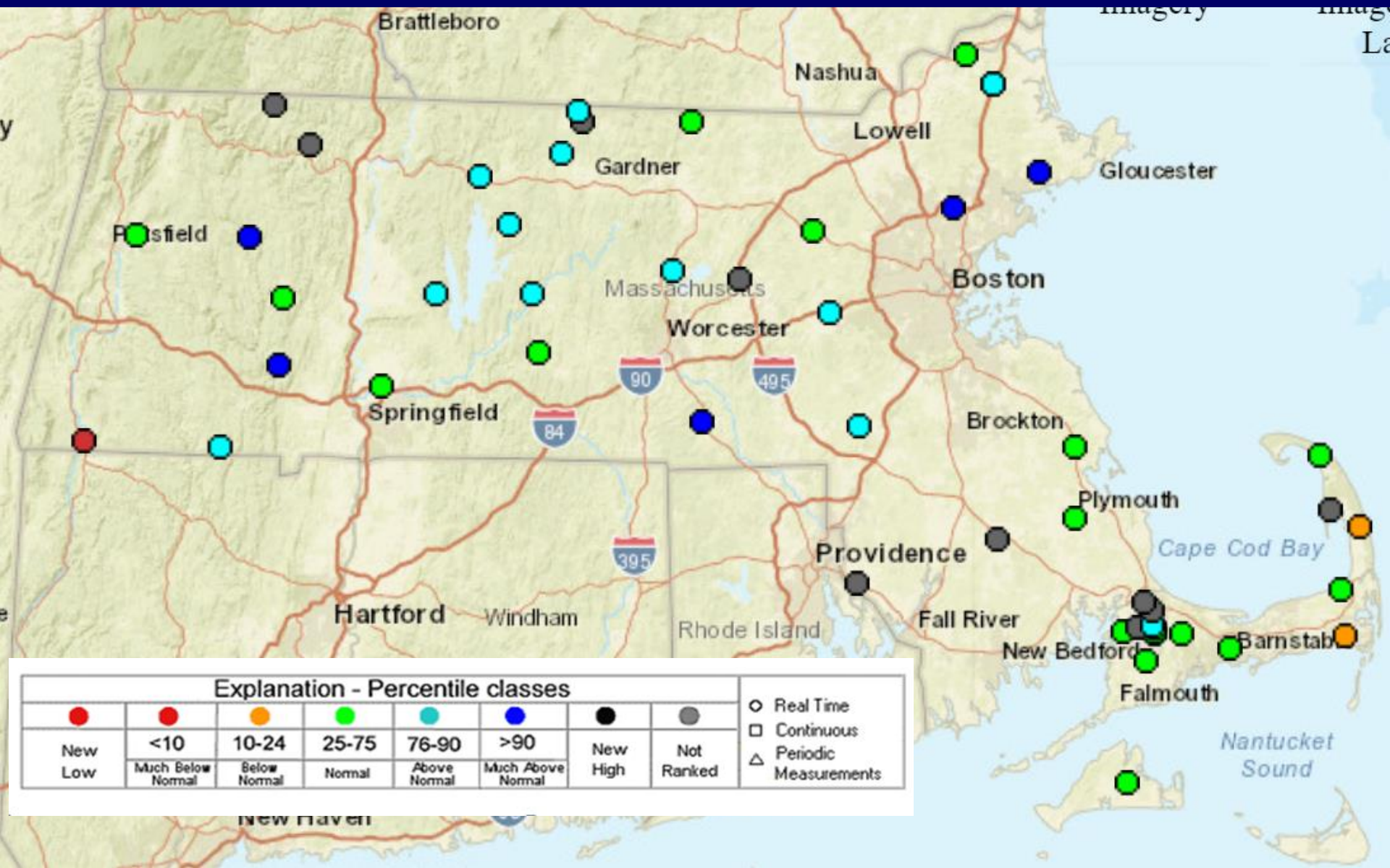
Period of Record

All data
Aug. 1963 – present

Continuous data
Oct. 1984 - present



Real-Time GW Conditions January 5, 2020



2020 Drought in New England

Below average and infrequent rainfall from May through September 2020 led to an extreme hydrologic drought across much of New England, with some areas experiencing a flash drought, reflecting its quick onset. The U.S. Geological Survey (USGS) recorded record-low streamflow and groundwater levels throughout the region. In September, the U.S. Department of Agriculture (2020) declared Aroostook County in Maine and Hillsborough and Merrimack Counties in New Hampshire as crop disaster areas. By the beginning of October, 166 community water systems and 5 municipalities in New Hampshire, more than 100 municipalities in Massachusetts, and several community water supplies in Connecticut, Maine, and Rhode Island had mandatory water restrictions in place (Northeast Regional Climate Center, 2020b).



Photograph of a dry stream channel at Mill River at Cook Hill Road near Cheshire, Connecticut, at U.S. Geological Survey streamgage 01196588 on September 3, 2020; photograph by Narcyz Dubicki, USGS.

Highlights

- Much of the scarce precipitation during summer 2020 fell in a few storms, leaving long periods with little to no rain.
- Northern and central Maine were in a flash drought by the beginning of July; southeastern Massachusetts, northern Rhode Island, and northeastern Connecticut, by the beginning of August.
- During September, 15 USGS streamgages recorded the lowest 7-day average streamflows in the past 30 years; the USGS recorded the lowest streamflow measurements in the past 30 years at 14 streamgages.
- The lowest monthly groundwater levels in the past 25 years were recorded at 24 USGS monitoring wells during the summer; 14 of these measurements were the lowest on record.

Recent 2020 Drought Report

Published Dec. 2020

Photograph of Kingsbury Stream at Abbot Village, Maine, from U.S. Geological Survey streamgage 01031450 on September 29, 2000, photograph by Andrew Cloutier, USGS.