

NWS Form E-5 (04-2006) (PRES. BY NWS Instruction 10-924)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE	HYDROLOGIC SERVICE AREA (HSA) Boston/Norton MA
		REPORT FOR: MONTH YEAR September 2021
MONTHLY REPORT OF HYDROLOGIC CONDITIONS		SIGNATURE Nicole M. Belk Senior Service Hydrologist
TO: Hydrologic Information Center, W/OS31 NOAA's National Weather Service 1325 East West Highway Silver Spring, MD 20910-3283	DATE October 25th 2021	

When no flooding occurs, include miscellaneous river conditions below the small box, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924).

An X inside this box indicates that no flooding occurred within this hydrologic service area.

September 2021 rainfall ranged from above normal to substantially above normal. The highest rainfall totals were along south coastal MA and Cape Cod, ranging from 9.5 inches to 14.5 inches. This rainfall was 5 or more inches above normal. Across the remainder of the region, rainfall totals ranged from 5 to 9 inches, with spot higher and lower totals. This was 1.5 to 5 inches above normal. Map 4 depicts the rainfall totals across the region, with Map 5 showing the rainfall departure from normal.

More details for major climate sites in southern New England are included in Table 1. Where applicable, the table also includes rankings for wettest and warmest September on record at each given station.

State Drought Declarations were in place on Cape Cod in MA. No other State Drought Declarations were in place in RI, CT and the remainder of MA.

<i>Location</i>	<i>September Rainfall (Inches)</i>	<i>Precipitation Departure from Normal (Inches)</i>	<i>Temperature Departure from Normal (Degrees F)</i>	<i>Ranking for Wettest September on Record</i>	<i>Ranking for Warmest September on Record</i>
<i>Boston</i>	7.47	+3.91	+4.1	7 th	2 nd
<i>Worcester</i>	7.60	+3.36	+2.1	10 th	NA
<i>Providence</i>	5.18	+1.01	+2.7	NA	Tied for 5 th
<i>Hartford</i>	6.81	+2.42	+1.3	NA	NA

Table 1. September 2021 rainfall and departure from normal, temperature departure from normal, and rankings for wettest and warmest September on record, for major climate sites within southern New England. Information is preliminary.

Flooding During Early September

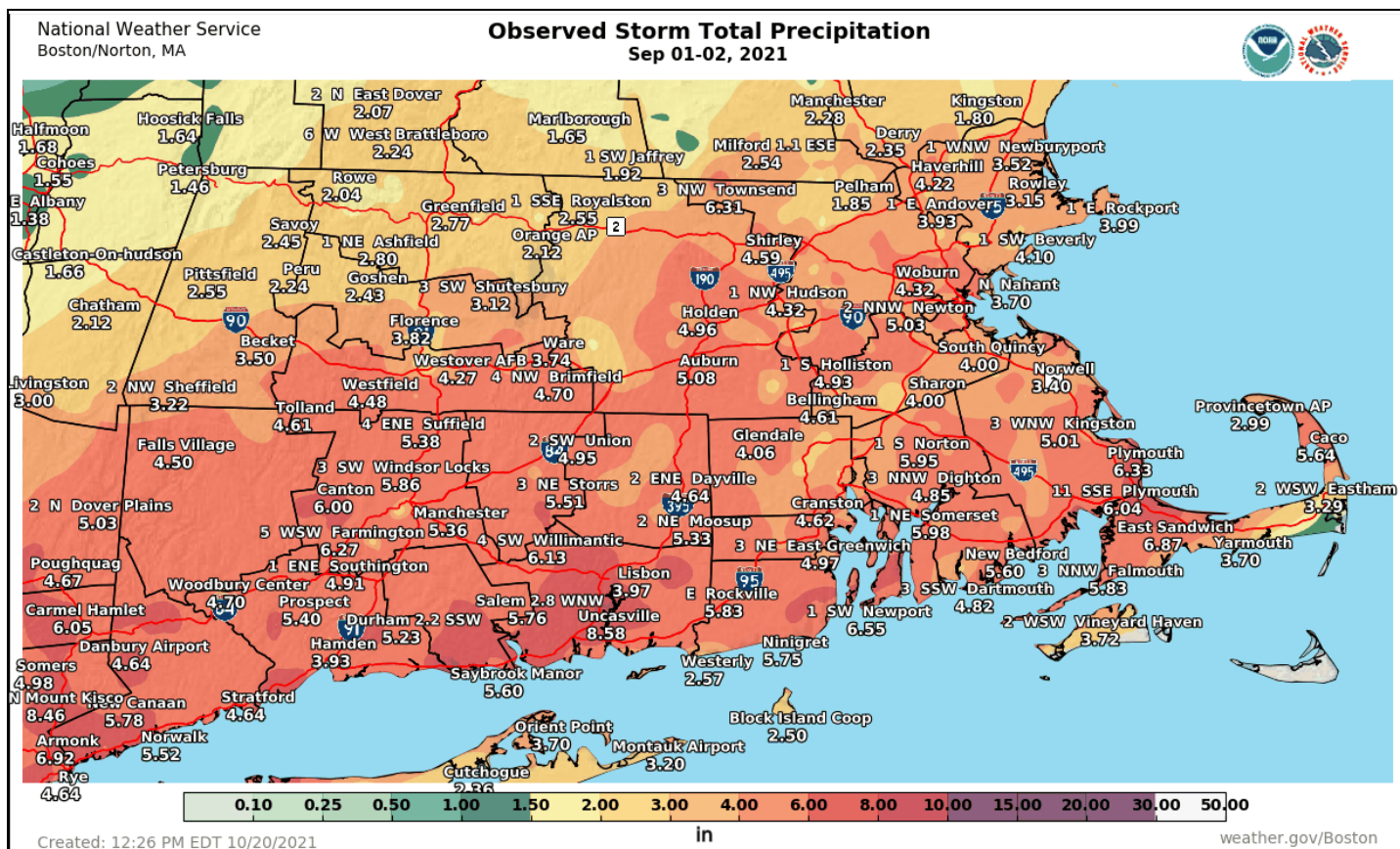
There was one flood event in southern New England during September, at the very beginning of the month- but it was substantial.

On September 1st, Tropical Depression Ida tracked northeastward from the Central Appalachians, arriving in southern New England late in the day as a remnant low. The low moved rather swiftly across southern New England, reaching the coastal waters east of MA by 7 am on the 2nd. For southern New England, the most intense rainfall occurred during the evening of the 1st through the early morning of the 2nd. Rainfall from this

event (Map 1) was highest in the vicinity of the I-90 corridor and points south, ranging from 4 to 7 inches. Even higher rainfall totals fell across southern CT. Further north of I-90 in MA as well as on the elbow of Cape Cod and Nantucket, rainfall totals generally ranged from 2 to 4.5 inches.

This rainfall brought a considerable amount of freshwater flooding. Table 2 shows River Forecast Points in NWS Boston/Norton’s Hydrologic Service Area (HSA) that went into flood. Table 3 shows other area streams and small rivers in the HSA that went into flood.

Following is a summary describing some of the flood impacts from Ida. This is not a comprehensive listing.



Map 1. Rainfall totals in southern New England from Ida (September 1-2, 2021).

North central and Northeast CT:

As a result of the heavy rainfall and extensive flooding, [Governor Lamont issued a State of Emergency](#) for the State of Connecticut. Significant flooding occurred in the area. Street flooding was reported Statewide.

In Bristol, boat rescues occurred at a small condominium complex on East Main Street, along the Pequabuck River. Copper Mine Brook overflowed its banks at the intersection of Mix Street and Farmington Ave, flooding the busy intersection, nearby roadway, and some adjacent businesses and parking lots. Multiple additional roads were flooded out in town from both the Pequabuck River and Copper Mine Brook.

In Vernon CT, for the second time in 2 months, swiftly flowing floodwaters from the Hockanum River inundated a roadway connecting Hartford Turnpike to the Colonial Corners shopping plaza, a hotel, and a few

other businesses. Over 100 guests at the hotel were stranded, with local officials creating an off-road path onto I-84 to get stranded guests out.

In Manchester, Bigelow Brook inundated a large portion of Charter Oak Park.

In South Windsor, the Podunk River overflowed its banks, flooding the first floor of the Mill River Restaurant.

In East Hartford, Rentschler Field (adjacent to Willow Brook) had inundation of area parking lots and roadways. Roads and buildings were also flooded elsewhere in town, including several homes.

NWS Location Identifier	River	Location	Flood Stage	Time/date above FS (EDT)	Crest	Crest Date/Time (EDT)	Below FS (EDT)
UNVC3	Farmington	Unionville	12.0	9/2/2021 2:45 AM	14.01 ft Moderate Flood	9/2/2021 5:45 AM	9/2/2021 11:30 AM
SIMC3	Farmington	Simsbury	12.0	9/2/2021 10:45 AM	14.38 ft	9/3/2021 10:00 AM	9/4/2021 5:45 PM
NBRM3	Blackstone	Northbridge	9.0	9/2/2021 9:00 AM	10.43 ft	9/2/2021 2:15 PM	9/2/2021 10:45 PM
CRAR1	Pawtuxet	Cranston	9.0	9/2/2021 5:00 AM	10.58 ft	9/2/2021 11:30 AM	9/2/2021 9:45 PM
SAXM3	Sudbury	Saxonville	10.0	9/2/2021 4:45 AM	10.51 ft	9/2/2021 9:45 AM	9/2/2021 10:15 PM
WSFM3	Westfield	Westfield	13.0	9/2/2021 6:45 AM	13.72 ft	9/2/2021 8:30 AM	9/2/2021 10:45 AM
MAYM3	Assabet	Maynard	5.0	9/3/2021 10:30 AM	5.27 ft	9/3/2021 4:45 PM	9/4/2021 11:30 AM
WOOR1	Blackstone	Woonsocket	9.0	9/2/2021 5:30 PM	9.94 ft	9/3/2021 2:00 AM	9/3/2021 12:15 PM
WSTR1	Pawcatuck	Westerly	5.0	9/2/2021 12:30 PM	7.74ft	9/2/2021 7:15 PM	9/4/2021 2:15 PM
HOPR1	Wood	Hope Valley	5.0	9/2/2021 1:45 PM	5.97 ft	9/3/2021 3:30 AM	9/3/2021 1:30 PM
BDGM3	Taunton	Bridgewater	8.0	9/2/2021 11:00 PM	9.1 ft	9/3/2021 11:00 PM	9/5/2021 1:45 PM
ANDM3	Shawsheen	Andover	29.0	9/3/2021 11:15 PM	29.17 ft	9/4/2021 6:30 AM	9/4/2021 3:30 PM
WLMM3	Shawsheen	Wilmington	7.0	9/2/2021 11:45 PM	7.31 ft	9/3/2021 6:30 AM	9/3/2021 6:30 PM

Table 2. River Forecast Points in NWS Boston/Norton's Hydrologic Service Area that went above Flood Stage due to Ida's rainfall. Provisional data courtesy of USGS. *Farmington River at Unionville crested 0.01 ft above Moderate Flood Stage (10 ft).

Southeast MA and RI:

Multiple roadways in the area were closed due to flooding, and some schools had a delayed start time or had classes canceled due street flooding in their communities. In Portsmouth RI, a large stretch of Fairview Lane in Portsmouth was ripped up and destroyed due to floodwaters rushing down the road and undermining the roadway. Flooding also closed I-95 in Providence for a time.

In Fall River, numerous roadways were flooded and impassable. Busy Route 24 was shut down in both directions due to flooding, with stalled vehicles blocking the roadway. In addition, the Northbound Ramp on I-195 to Route 24 was flooded with cars stuck. Part of Spencer Street had significant damage due to the rains. On South Main Street, a building under renovations collapsed due to the heavy rainfall.

On Cape Cod, the Bourne Rotary was flooded with 2 cars stuck. Basement flooding was also common.

Central and Northeast MA, including Boston:

Flooded roadways were also common in central and northeast MA, including Worcester and Boston. Some of the more significant impacts follow.

In Boston, an underpass of Storrow Drive Eastbound had floodwaters 3-4 feet deep. A driver was trapped in these floodwaters and was rescued. On the MBTA line, train tracks on the Orange Line were flooded in the vicinity of Ruggles, Back Bay and Hyde Park. In nearby Quincy, the Exit ramp off of I-93 to Thomas E Burgin Parkway was flooded and impassable.

In Waltham adjacent to Lexington Street, significant flooding occurred in a parking lot full of school buses. Eight school buses were not able to be moved due to floodwaters reaching as high as the engine battery levels.

In West Boylston, a driveway was washed out by floodwaters, with a sedan hanging over the washed out road.

Western MA:

Within NWS Boston/Norton’s Hydrologic Service Area, flooding in western MA was largely confined to the Greater Springfield Area. Flood impacts included sports fields and some roadways closed due to flooding. In Springfield, a substantial amount of flooding occurred in Forest Park and its roadways.

NWS Location Identifier	River	Location	Flood Stage	Time/date above FS (EDT)	Crest	Crest Date/Time (EDT)	Below FS (EDT)
MUDM3	Muddy	Brookline MA	15.0 ft	9/2/2021 4:42 AM	15.24 ft	9/2/2021 5:21 AM	9/2/2021 6:22 AM
BLGC3	Bunnell Brook	Burlington CT	7.0 ft	9/2/2021 1:15 AM	8.35 ft Moderate Flood	9/2/2021 3:00 AM	9/2/2021 7:15 AM
EHDC3	Hockanum	East Hartford CT	9.0 ft	9/2/2021 1:45 AM	11.50 ft Moderate Flood	9/2/2021 7:45 AM	9/2/2021 6:00 PM
NMIM3	Mill	Northampton MA	11.0 ft	9/2/2021 3:30 AM	11.45 ft	9/2/2021 5:15 AM	9/2/2021 6:45 AM
NBPC3	North Branch Park	Hartford CT	8.0 ft	9/1/2021 11:15 PM	12.43 ft Moderate Flood	9/2/2021 6:00 AM	9/2/2021 7:15 PM
HNTM3	West Branch Westfield	Huntington MA	9.0 ft	9/2/2021 2:45 AM	9.30 ft	9/2/2021 3:30 AM	9/2/2021 6:00 AM
KNGM3	Jones	Kingston MA	4.5 ft	9/2/2021 2:45 PM	4.69 ft	9/2/2021 8:00 PM	9/3/2021 6:30 AM
QPCC3	Qunnipiac	Southington CT	8.5 ft	9/2/2021 4:00 AM	10.13 ft Moderate Flood	9/2/2021 11:45 AM	9/3/2021 3:00 AM
DIGM3	Segregansett	Dighton MA	5.0 ft	9/2/2021 7:45 AM	5.49 ft	9/2/2021 12:30 PM	9/3/2021 5:30 AM
WRNC3	Mount Hope	Warrenville CT	7.0 ft	9/2/2021 2:30 AM	9.22 ft Moderate Flood	9/2/2021 6:15 AM	9/2/2021 12:15 PM
QBGC3	Quniebaug	Quinebaug CT	6.0 ft	9/2/2021 5:00 AM	6.53 ft	9/2/2021 7:45 AM	9/2/2021 11:15 AM
CVTC3	Willimantic	Coventry CT	8.0 ft	9/2/2021 2:45 AM	10.47 ft	9/2/2021 8:15 AM	9/3/2021 6:15 AM
WTHM3	Old Swamp	Weymouth MA	4.5 ft	9/2/2021 5:00 AM	4.51 ft	9/2/2021 5:15 AM	9/2/2021 5:45 AM

Table 3. Additional rivers and streams in NWS Boston/Norton’s Hydrologic Service Area that went above Flood Stage after Ida’s Rainfall. Provisional data, courtesy of USGS.

MA State Drought Declaration Update

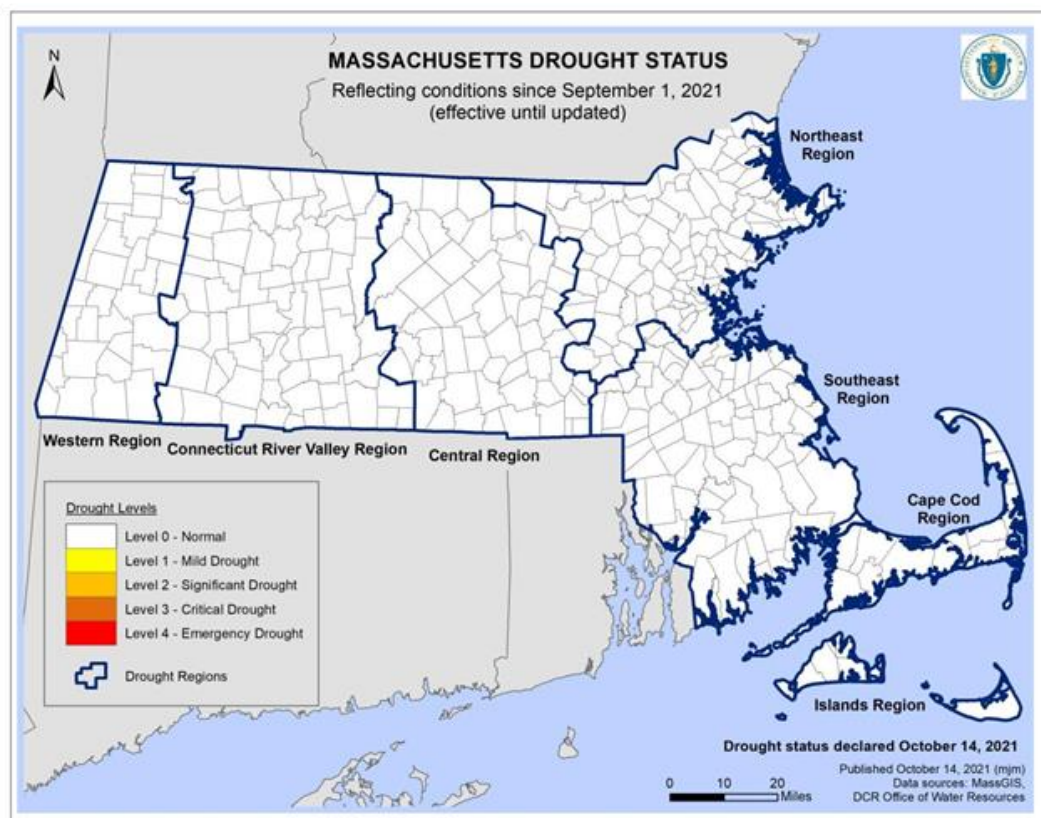
The MA Drought Management Task Force (DMTF) convened on September 8th to review conditions from August. August data showed that Cape Cod had below normal rainfall, and continued have below normal groundwater. A Level 1- Mild Drought was continued on Cape Cod. The remaining Drought Regions stayed at normal conditions (no drought).

On October 6, 2021, the MA DMTF reconvened to discuss conditions from September. On Cape Cod during September, there was a combination of both excessive rainfall and improved groundwater conditions. On October 15th, the MA EEA Secretary announced a return to normal conditions for Cape Cod (Map 2). The remaining regions were already under normal conditions with respect to drought.

U.S. Drought Monitor

On the August 31st rendition of the US Drought Monitor (as shown in the August E-5), about ½ of Cape Cod was under D0, or Abnormally Dry Conditions. Nantucket and a portion of the mid Cape were under D1, or Moderate Drought Conditions. A small area of D2, Severe Drought, was in place at the elbow of the Cape.

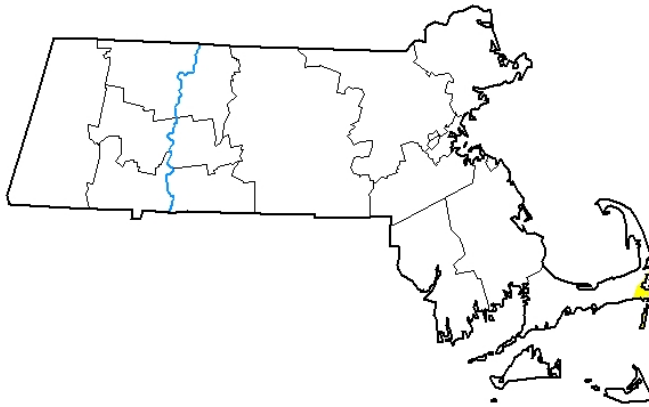
By the September 28th rendition of the US Drought Monitor (Map 3), all that was left of drought was a small area of D0 near Chatham, at the elbow of the Cape. The remainder of southern New England was not in drought.



Map 2. MA Drought Declaration map from October 15th 2021, retroactive to September 1st 2021. All Regions had returned to normal conditions, with respect to drought. Map from MA DCR, Office of Water Resources.

U.S. Drought Monitor Massachusetts

September 28, 2021
(Released Thursday, Sep. 30, 2021)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	99.71	0.29	0.00	0.00	0.00	0.00
Last Week <i>09-21-2021</i>	99.06	0.94	0.29	0.00	0.00	0.00
3 Months Ago <i>06-29-2021</i>	83.21	16.79	2.30	0.00	0.00	0.00
Start of Calendar Year <i>12-29-2020</i>	99.99	0.01	0.00	0.00	0.00	0.00
Start of Water Year <i>09-29-2020</i>	0.00	100.00	95.92	83.01	28.36	0.00
One Year Ago <i>09-29-2020</i>	0.00	100.00	95.92	83.01	28.36	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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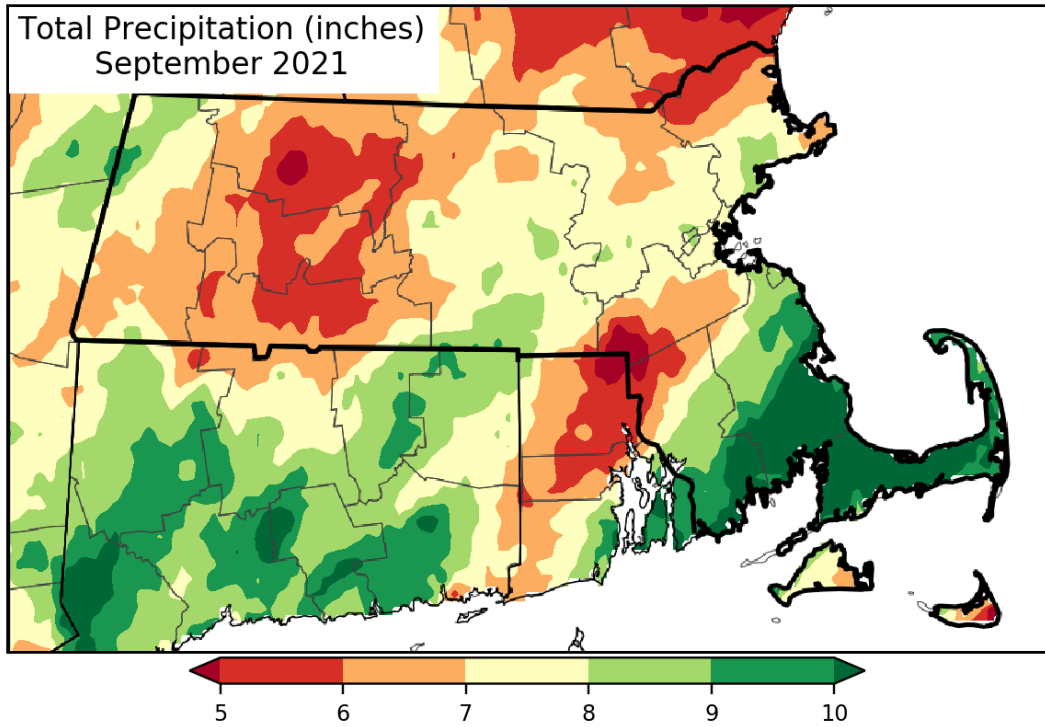


droughtmonitor.unl.edu

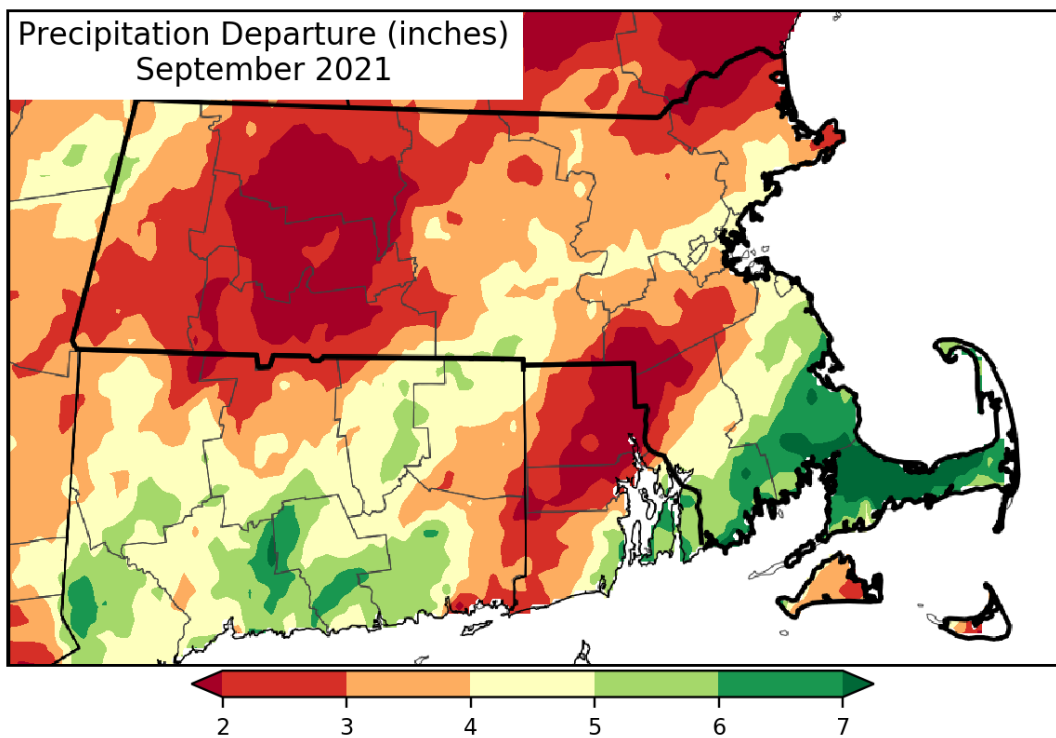
Map 3. US Drought Monitor for Massachusetts, effective September 28th, 2021. Only a small area of D0 lingered near Chatham MA.

Streamflow and Groundwater

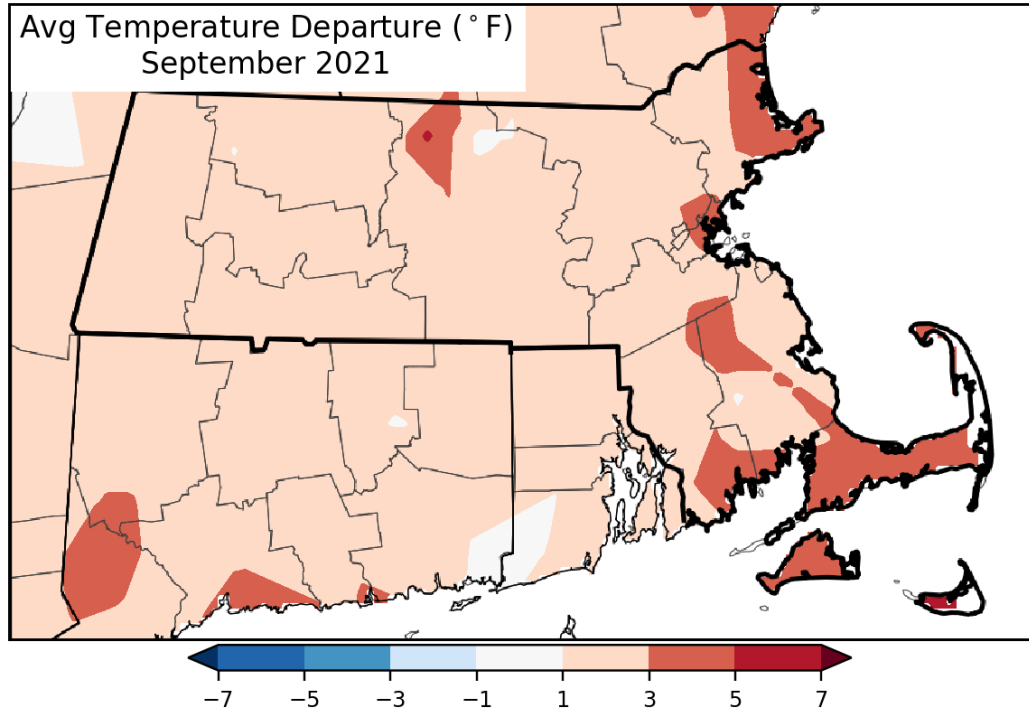
During September, USGS gages indicated streamflows were above normal to much above normal (or even record high flows) for any given day. The exception was on Cape Cod, where streamflow returned to normal. During September, USGS groundwater levels were mainly above to much above normal. The exception was on the Cape and Islands, where groundwater levels ranged from normal to above normal at most wells. A few wells measured mid-month on the Cape were below normal.



Map 4: September 2021 rainfall for southern New England. From the Northeast Regional Climate Center.



Map 5. September 2021 rainfall departure from normal for southern New England. From the Northeast Regional Climate Center.



Map 6. Average temperature departure from normal across southern New England for September 2021.
From the Northeast Regional Climate Center.