

Current Water Conditions in Massachusetts

October 13, 2011



- September precipitation was much above normal
- September streamflows were generally much above normal
- September ground-water levels were generally above normal
- September reservoir levels were above normal

Precipitation Conditions

Estimated September state-wide average precipitation is 7.45 inches, which is 199 percent of the long-term average for the month. The regions of Massachusetts received between 309 (West) and 141 percent (Cape and Islands) of average precipitation during September. Several moderate and large rain events were spread over the month of September. September 2011 was the 17th wettest September in the last 117 years in Massachusetts according to the National Climate Data Center. A table of September 2011 estimated precipitation statistics, based on precipitation data from the Department of Conservation and Recreation and National Weather Service precipitation monitoring networks, is attached. A map at the back of this report shows the distribution of September rainfall in Massachusetts.

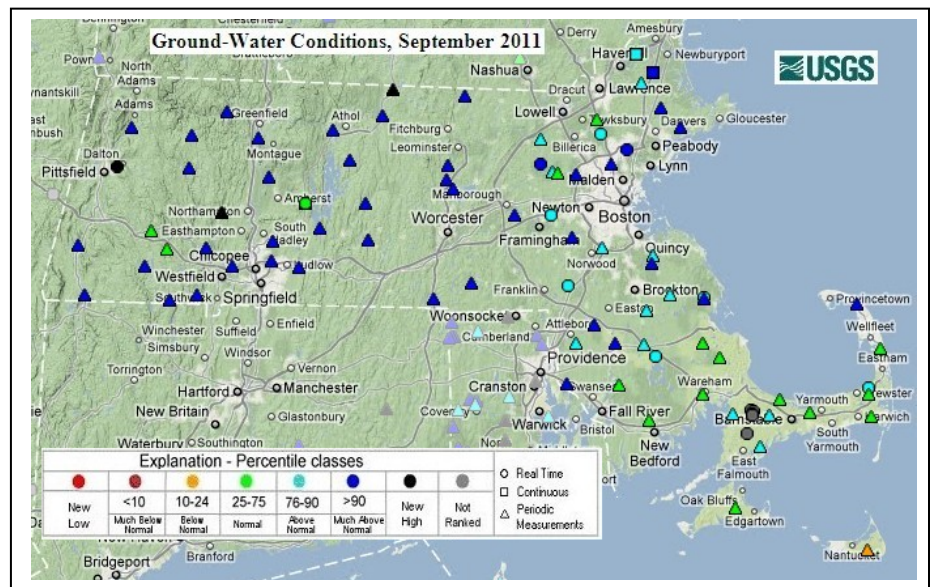
All of the regions ended the water year (12 months ending in September) with above normal precipitation. The Western and Connecticut River regions had record high water year totals of more than 65 inches. October precipitation to date across Massachusetts has ranged from 1 to 5 inches (25-300 % of normal). On the morning of October 4th intense persistent rainfall, totaling more than 5 inches in some north shore locations, caused local street and urban flooding in the northeast part of the State.

Ground-Water Levels

Ground-water levels reported by the United States Geological Survey (USGS) at the end of September were generally normal on the Cape and Islands, above normal in the Southeast, and much above normal in the rest of the State. An assessment of ground-water conditions in the Massachusetts drought regions is shown in a table at the end of this report.

The USGS Groundwater Conditions for the end of September 2011 can be viewed at the web site:

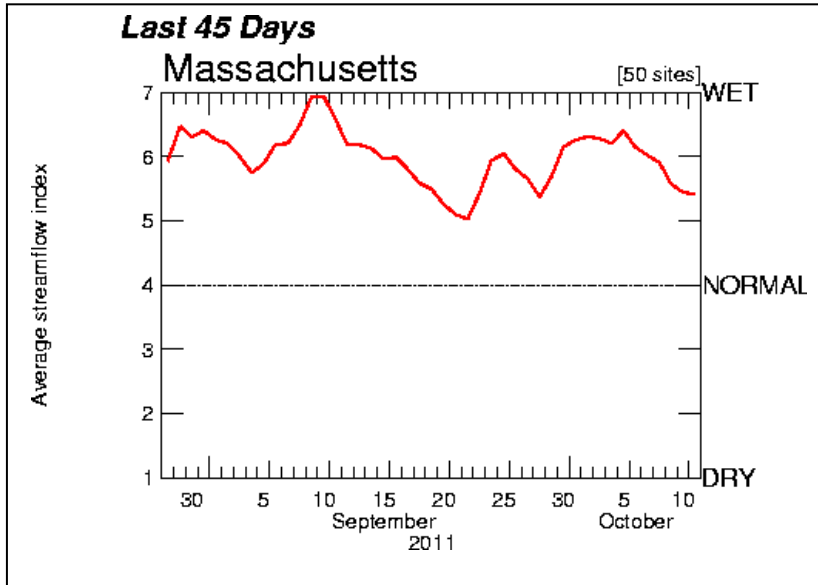
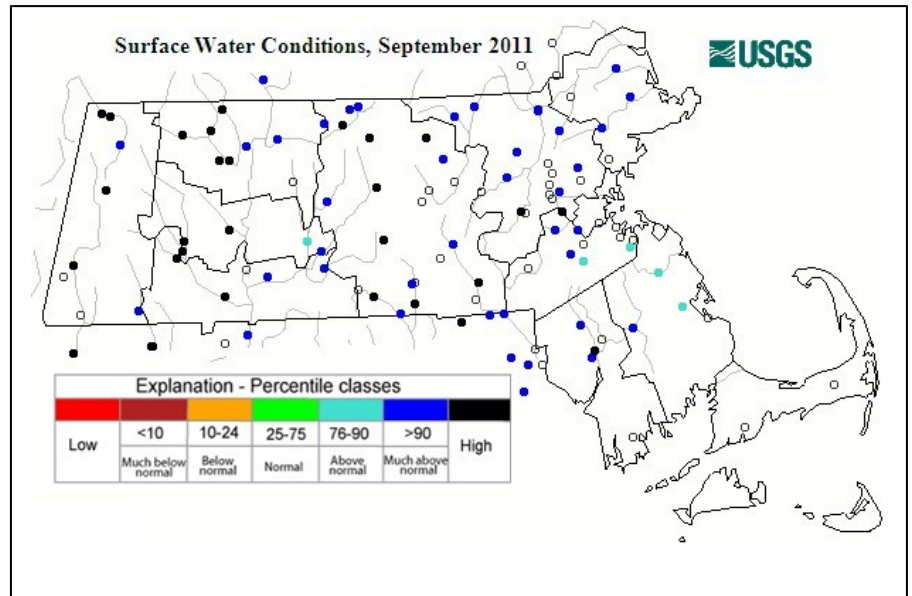
<http://groundwaterwatch.usgs.gov/State/MapsNet.asp?ncd=crn&sc=25>



Streamflow

Average September 2011 streamflows that are monitored by the Commonwealth of Massachusetts and United States Geological Survey (USGS) cooperative stream gaging program were generally above normal to high throughout the eastern half of the State and much above normal to very high in the western half of the State. As shown in a table at the end of this report MA DCR has listed the drought regions of Massachusetts as having normal, above normal, and no data (Cape Cod and Islands) surface-water conditions for September.

The graph below depicts a composite daily streamflow relative to normal streamflow for Massachusetts for the period of August 27 to October 7, 2011. Well above normal flows were present throughout the month and into early October. These above normal streamflows were the result of moderate to large precipitation events in late August, September and Early October. The graph is a composite of 50 real-time gages across the state with a long period of record.



KEY:

- 1 = New record low for day
- 2 = < 10th percentile
- 3 = 10th – 24th percentile
- 4 = 25th – 74th percentile
- 5 = 75th – 89th percentile
- 6 = ≥ 90th percentile
- 7 = New record high for day

Water Supply Reservoir Levels

Surface water reservoir percent-full values for water supply sources provided by water suppliers are listed below. The reservoir percent-full values listed are for the end of September. Reservoirs are generally above normal for this time of year.

September / October 2011 Massachusetts Reservoir Status

Reservoir/City or Town	Percent Full	Reservoir/City or Town	Percent Full
Quabbin	97.3	Beverly/Salem	83.3
Worcester	N.A.	Lynn	76.6
Cobble Mt./ Springfield	95.5	Taunton/New Bedford/Assawompsett	94.6

Note: NA Indicates data not available for this report

Drought Indices/Forecasts

US Drought Monitor

The National Drought Mitigation Center's (NDMC's) October 11, 2011 Drought Monitor Map for the United States shown at right indicates no drought conditions in Massachusetts.

Standardized Precipitation Index (SPI)

The Western Regional Climate Center's (Desert Research Institute, University and Community College System of Nevada) 1-Month Standardized Precipitation Index values for Massachusetts at the end of September were normal/very wet/extremely wet (west). The 3-month values were moderately wet/extremely wet/exceptionally wet (west). The 6 and 12-month values were moderately wet/extremely wet/exceptionally wet (west). Massachusetts SPI values for the southeast and Cape Cod drought regions are normal and the rest of the regions are above normal. The SPI values for the Western and Connecticut River regions are record highs with 3- and 6-month values above 3.

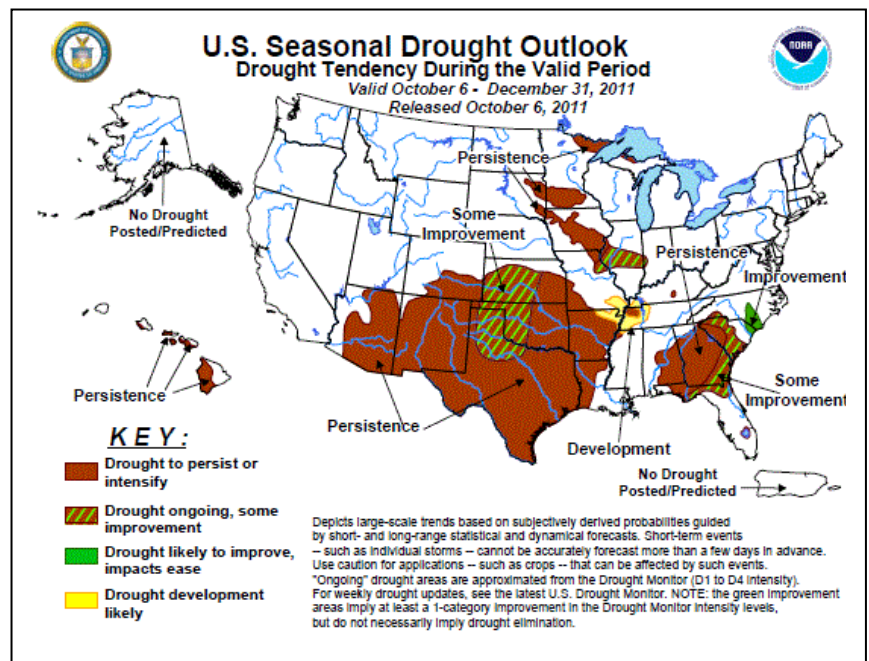
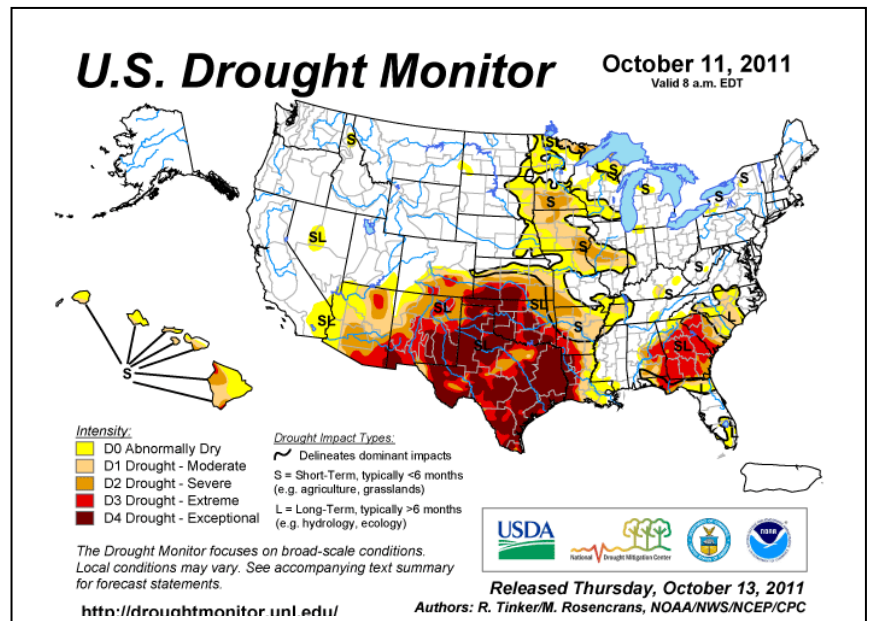
NWS/NOAA's Climate Prediction Center

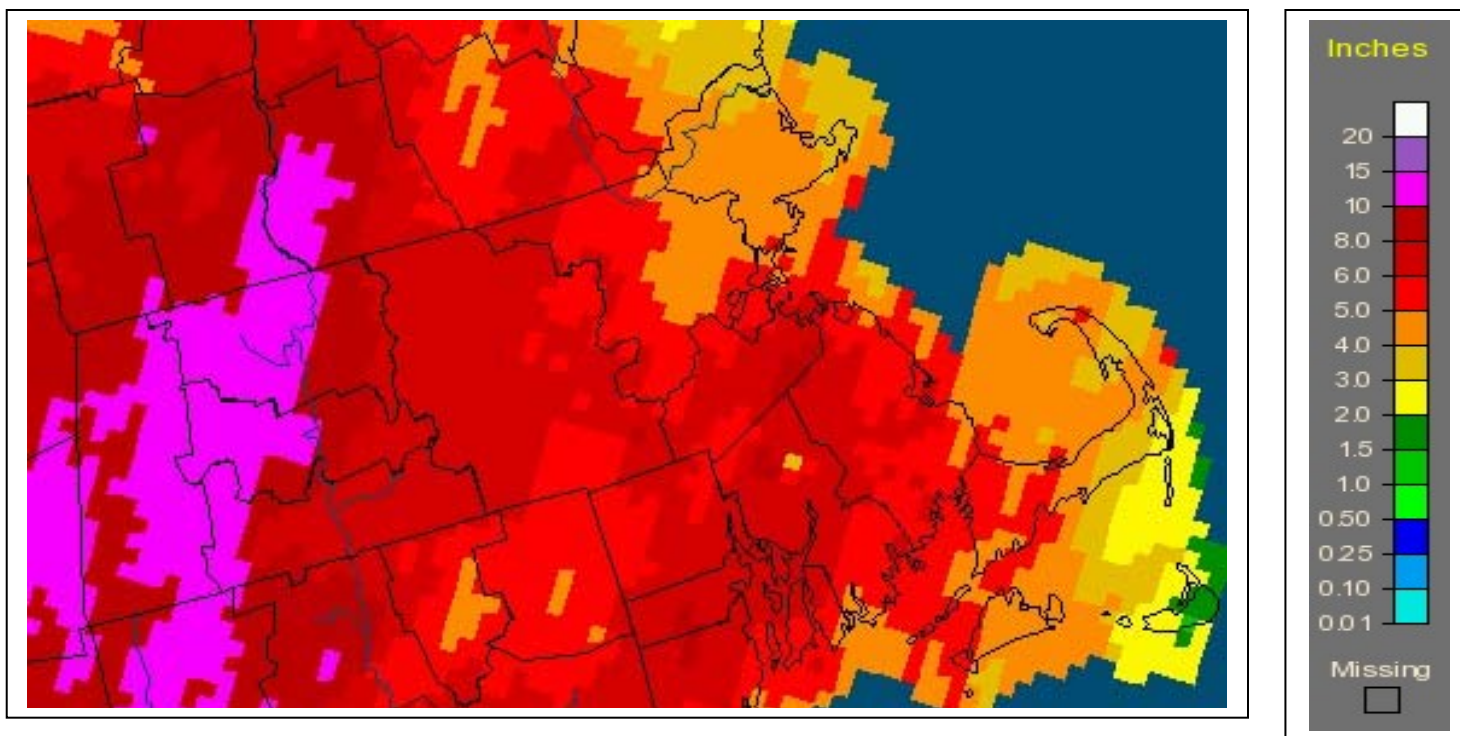
The U.S. Seasonal Drought Outlook dated October 6, 2011, predicts no tendency for drought conditions to develop in Massachusetts through December 2011.

Extended Forecasts

The unsettled rainy condition today continues with periods of showers tonight and Friday. Breezy and seasonably cool fall weather is forecast for the weekend. Rain is predicted for Sunday night followed by dry conditions until mid-week.

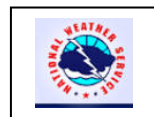
The National Weather Service Climate Prediction Center's extended 6 to 10 day and 8 to 14 day forecasts are for above normal precipitation and temperatures. The 1-month forecast is for normal precipitation and above normal temperatures. The NWS Climate Prediction Center Information can be found at: <http://www.cpc.noaa.gov/index.php>





<http://water.weather.gov/precip/>

TOTAL RAINFALL SEPTEMBER 2011



GENERAL WATER CONDITIONS IN MASSACHUSETTS - SEPTEMBER 2011 EOEEA and MEMA DROUGHT MANAGEMENT PLAN REGIONS

Massachusetts Regions	Surface-Water Conditions	Ground-Water Conditions
Cape and Islands	ND	Normal
Southeast	Above Normal	Above Normal
Northeast	Above Normal	Above Normal
Central	Above Normal	Above Normal
Connecticut River	Above Normal	Above Normal
Western	Above Normal	Above Normal

Note: Surface- and ground-water conditions for individual streamflow-gaging stations and wells may differ from general conditions. ND, no data

Weather Ramblings ---

Weather disasters keep costing U.S. billions this year

By Mary Wisniewski

CHICAGO (Reuters) - Blizzards. Tornadoes. Floods. Record heat and drought, followed by wildfires.

The first eight months of 2011 have brought strange and destructive weather to the United States.

From the blizzard that dumped almost two feet of snow on Chicago, to killer tornadoes and heat waves in the south, to record flooding, to wildfires that have burned more than 1,000 homes in Texas in the last few days, Mother Nature has been in a vile and costly mood.

Climate experts point to global warming, meteorologists cite the influence of La Nina or natural variability, and, in the case of tornadoes hitting populated areas, many simply call the death and destruction bad luck.

But given the variety and violence of both short-term weather events and longer-term effects like a Southwestern drought that has lasted years, more scientists say climate itself seems to be shifting and weather extremes will become more common.

"A warmer atmosphere has more energy to power storms. We've loaded the dice," said Jeff Masters, co-founder and director of meteorology for Weather Underground, Inc. speaking on Wednesday at a news conference on climate. "Years like 2011 may become the new normal in the United States in coming decades."

The year has been expensive, in terms of crops, property and lives lost. The National Oceanic and Atmospheric Administration has kept track of the cost of weather disasters since 1980, and 2011 has seen 10 separate natural disasters with economic losses of \$1 billion or more, according to Chris Vaccaro, spokesman for the National Weather Service.

The previous record was nine, set in 2008. The costs go ever higher, with the nine 2011 disasters even before Hurricane Irene two weeks ago costing \$35 billion, Vaccaro said.

Other years have been more expensive overall due to single events, such as Hurricane Katrina in 2005. But 2011 has already moved into the top 25 percent of the costliest years, and the hurricane season isn't half over, Vaccaro said. that starts October 1. But that doesn't include Hurricane Irene, which caused devastating flooding in Vermont and New Jersey, and is expected to cost at least \$1.5 billion in relief, FEMA says.

FIRE AND RAIN

The year began with what was jokingly called "Snowmageddon" -- heavy snows in multiple states, including the south. Kansas got up to 40 inches in some areas in a month -- the same as a typical total for the whole winter. New York had its snowiest January on record.

Snow melt, combined with a wet spring, caused flooding on the Mississippi, Ohio, Souris and Missouri Rivers. On the Mississippi, records set in the historic floods of 1927 and 1937 were challenged and exceeded along the nation's largest main river artery, resulting in evacuations and millions of acres of flooded farmland.

In the Missouri River valley, flow rates broke previous records, damaging levees and highways.

The year has also been the 4th deadliest tornado year in U.S. history with 546 deaths, according to the NWS.

The May 22 tornado that hit Joplin, Missouri took 160 lives, making it the deadliest single tornado since 1947.

This summer, the country also baked under days of 100-plus degree heat, with records smashed in northern towns like Newark, New Jersey, which saw a high of 108 degrees.

Texas saw what looks to be its hottest summer, making that vast state into a tinderbox. Wildfires have scorched more than 3.6 million acres since November, fed by a drought that has caused more than \$5 billion in damage to the state's farm industry.

In Oklahoma, the average statewide temperature of 86.8 degrees from June to August 31 broke the 85.2 degree mark set in 1934, according to Gary McManus, associate state climatologist. The heat killed 21 people in Oklahoma alone.

Finally, the beginning of hurricane season caused flooding in the aftermaths of Irene and Tropical Storm Lee.

The country is already on pace to break the all-time record for the number of tropical storms strong enough to merit names, Masters said.

NEW EXTREMES

Many years have extreme weather events. Americans who are old enough can recall the "Dust Bowl" of the 1930s, or the bitter Midwest winters of the late 1970s.

Judith Curry, a climate scientist at Georgia Tech, noted in a blog post this week that active hurricane seasons, heavy snowfalls, and floods and severe drought in Texas are reminiscent of the 1950's.

"Natural variability is a plausible explanation for variations in extreme frequency and also clustering of events," Curry said.

While most climate scientists agree that human actions are causing global warming and climate change, not everyone does.

Republican presidential front-runner Rick Perry said last month he does not believe in man-made global warming, calling it a scientific theory that had not been proven. Other political conservatives have questioned evidence of man-made climate change and government plans that could slow it.

Katharine Hayhoe, an atmospheric scientist at Texas Tech University, said policy is not black and white, and there has public doubting climate change even as more to be debate over policies to address climate change.

But policy opinions are one thing and scientific facts another, she said, adding that she is troubled to see more of the general scientific evidence piles up to support it.

"The evidence is what the planet is telling us," Hayhoe said. "These are not political opinions."

(Writing by Mary Wisniewski, additional reporting by Steve Olafson in Oklahoma City; Editing by [Peter Bohan](#))

This report was prepared by the Massachusetts Department of Conservation and Recreation. Data were obtained from the sources described in the report and may be preliminary in nature. Additional information, previous and future water conditions reports can be found on our web site: <http://www.mass.gov/dcr/watersupply/rainfall/>