

Current Water Conditions in Massachusetts

December 8, 2011



- November precipitation was slightly below normal
- November streamflows were generally above normal
- November ground-water levels were generally above normal
- November reservoir levels were above normal

Precipitation Conditions

Estimated November state-wide average precipitation is 3.87 inches, which is 95 percent of the long-term average for the month. The regions of Massachusetts received between 107 (Central) and 71 percent (Western) of average precipitation during November. November 2011 was the 54th Driest November in the last 117 years in Massachusetts according to the National Climate Data Center. A table of November 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 November rainfall in Massachusetts.

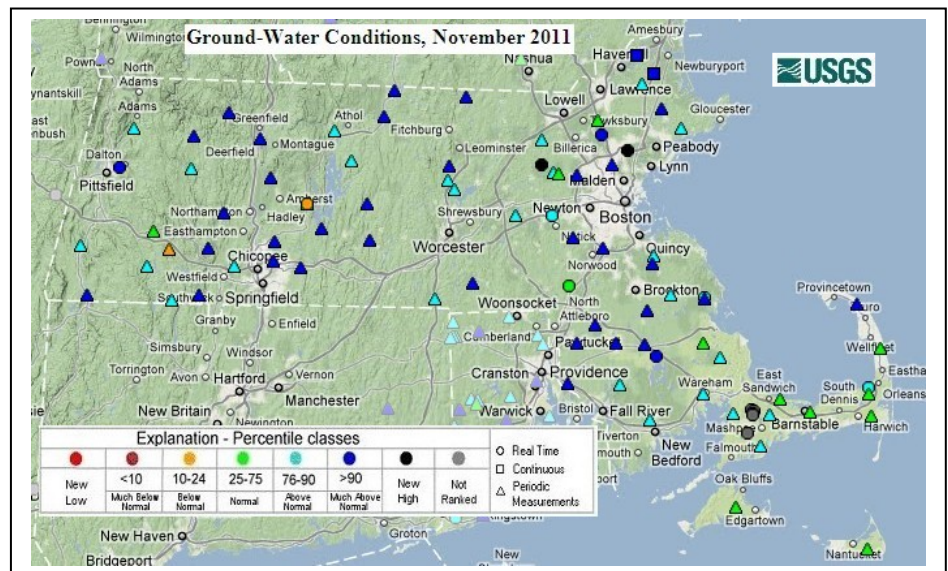
Meteorological autumn (Sept, Oct, and Nov) was the warmest on record in Boston and 8th warmest in Worcester. As a result of the nor'easter on the 7th and 8th December precipitation to date across the State is generally much above normal.

Ground-Water Levels

Ground-water levels reported by the United States Geological Survey (USGS) at the end of November were generally normal on the Cape and Islands and above to 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 November 2011 can be viewed at the web site:

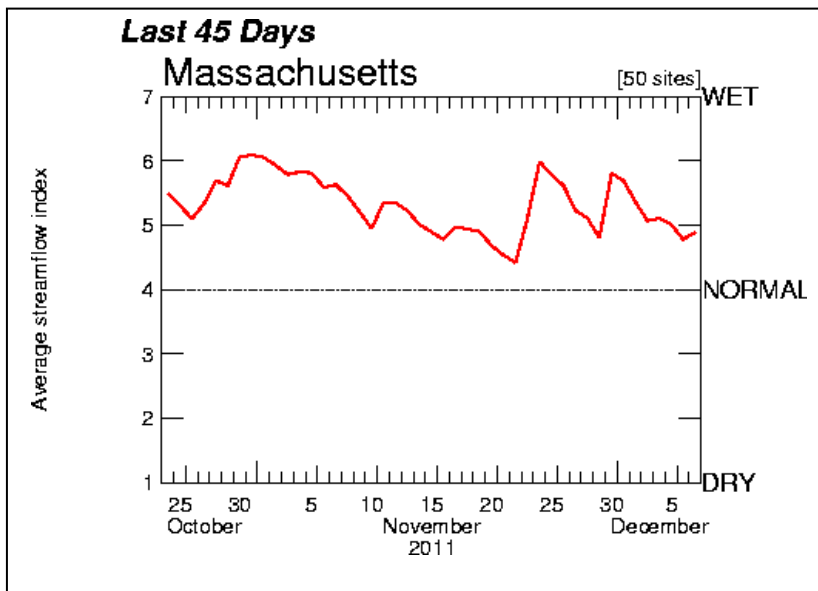
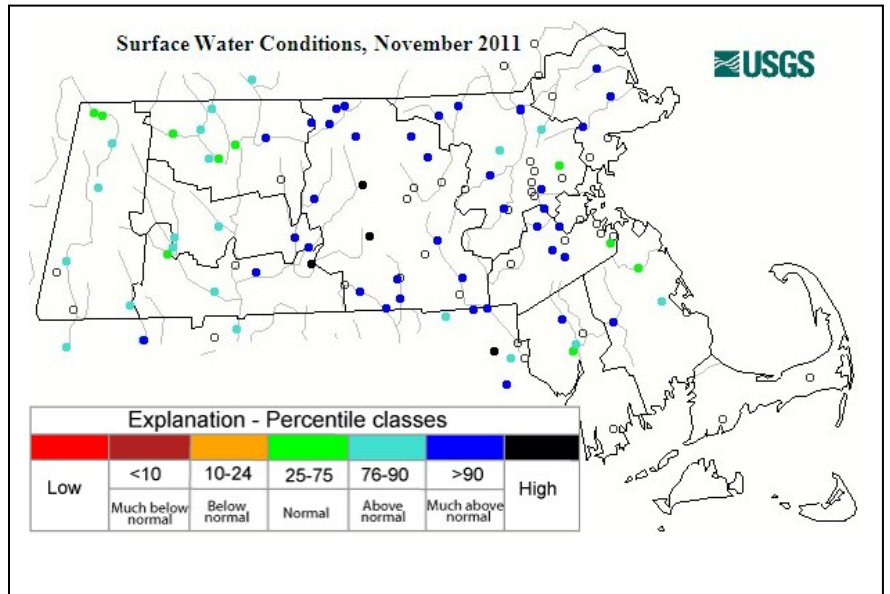
<http://groundwaterwatch.usgs.gov/State/MapsNet.asp?ncd=crn&sc=25>



Streamflow

Average November 2011 streamflows that are monitored by the Commonwealth of Massachusetts and United States Geological Survey (USGS) cooperative stream gaging program were generally above normal in southeastern and western areas and much above normal in the northeastern and central areas 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 above normal, and no data (Cape Cod and Islands) surface-water conditions for November.

The graph below depicts a composite daily streamflow relative to normal streamflow for Massachusetts for the period of October 23 to December 7, 2011. Well above normal flows that occurred in late August through October have decreased somewhat but were still significantly above normal in November and early December. 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

Selected 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 November. Reservoirs are generally above normal for this time of year.

November / December 2011 Massachusetts Reservoir Status

Reservoir/City or Town	Percent Full	Reservoir/City or Town	Percent Full
Quabbin	99.4	Beverly/Salem	86.3
Worcester	101	Lynn	81.2
Cobble Mt./ Springfield	94.9	Taunton/New Bedford/Assawompsett	103

Note: NA Indicates data not available for this report

Drought Indices/Forecasts

US Drought Monitor

The National Drought Mitigation Center's (NDMC's) December 6, 2011 Drought Monitor Map for the United States shown at right indicates no drought conditions in Massachusetts.

Standardized Precipitation Index (SPI)

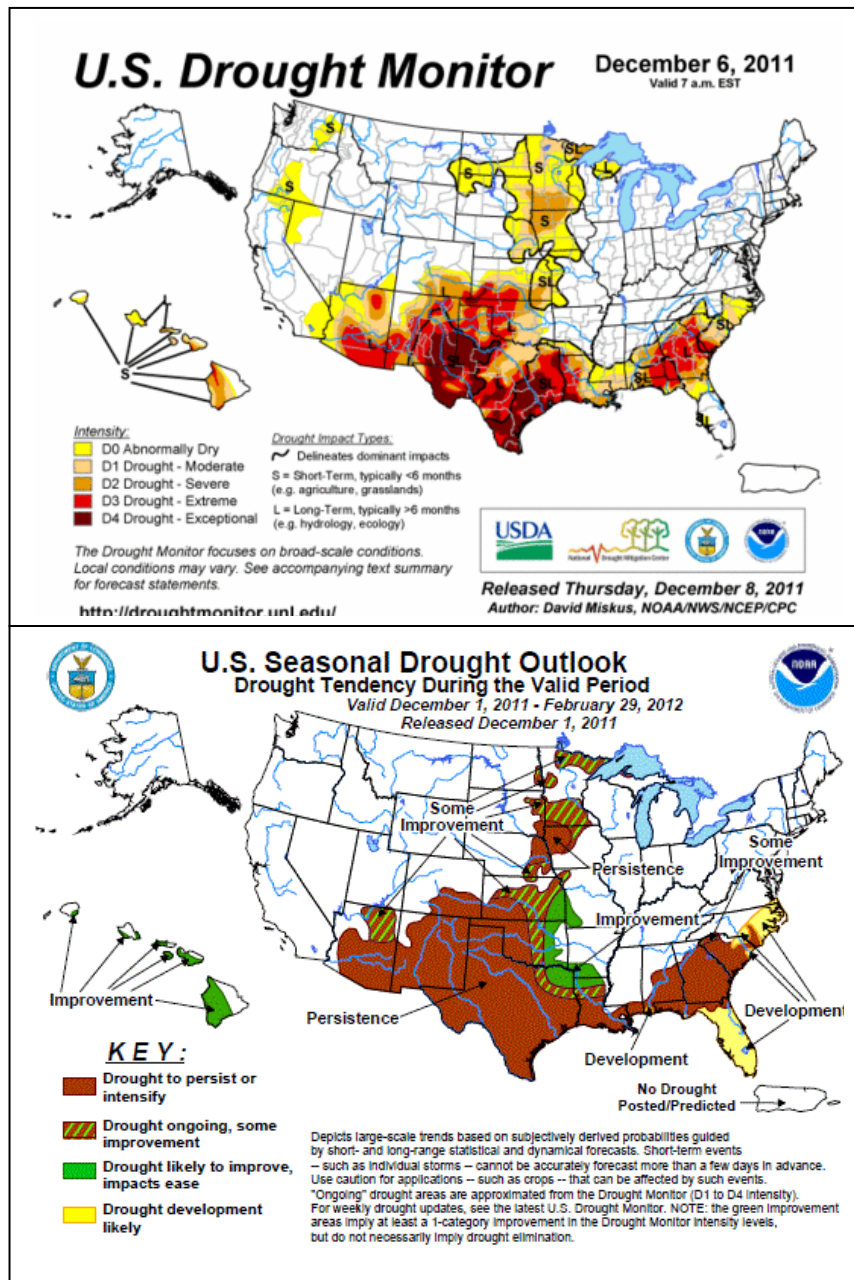
The Western Regional Climate Center's (Desert Research Institute, University and Community College System of Nevada) 1-, 3-, 6-, and 12-Month Standardized Precipitation Index values at the end of November for the 3 Massachusetts climate regions were not available as of December 8th. Massachusetts SPI 1-, 3-, 6-, and 12-month values for all the drought regions are all normal for the 1-month period and increasingly above normal (wet) for the longer time periods with several new maximum values for the 12-month period.

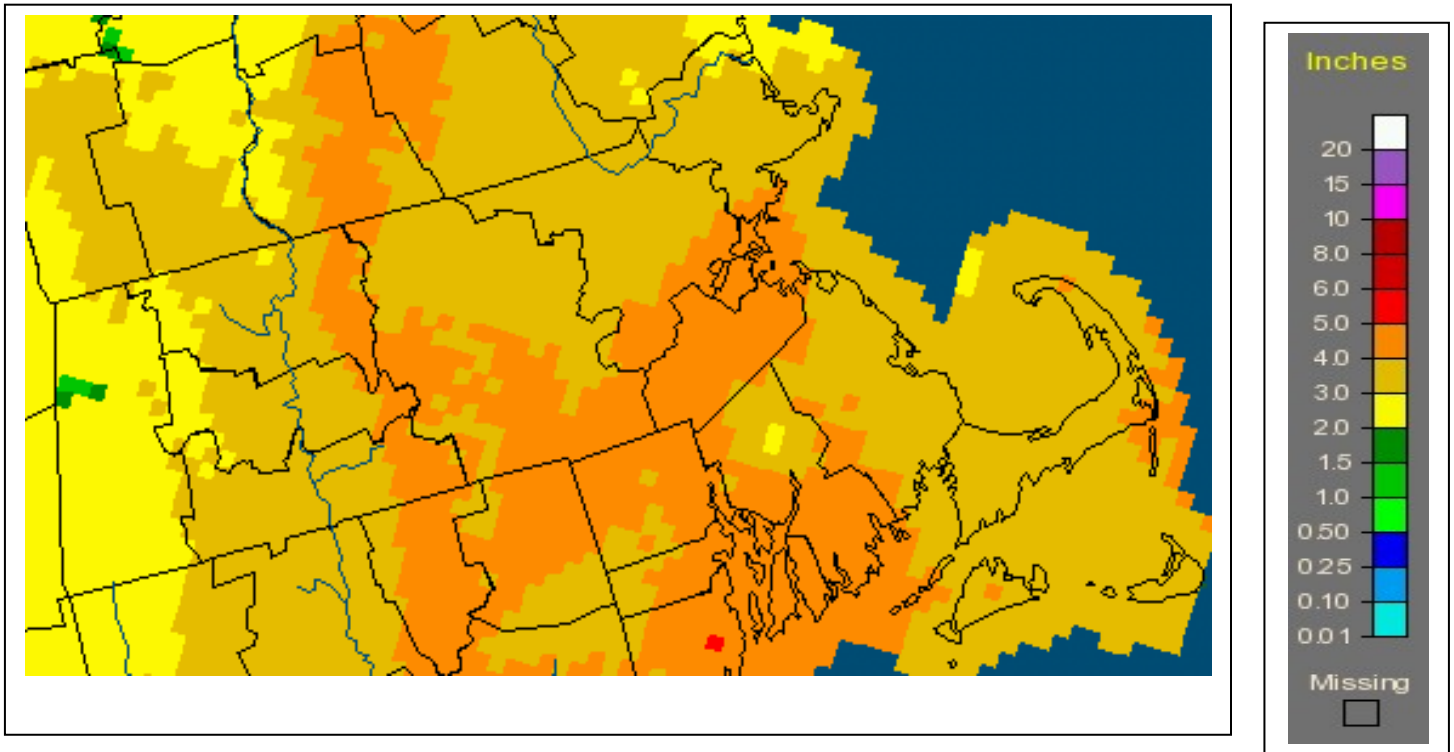
NWS/NOAA's Climate Prediction Center

The U.S. Seasonal Drought Outlook dated December 1, 2011, predicts no tendency for drought conditions to develop in Massachusetts through February 2012.

Extended Forecasts

Clearing weather today following the fast departing wet Nor'easter will bring blustery slightly above normal cool weather into Friday. A cold front passage on Friday will bring slightly below normal temperatures on Saturday which will moderate on Sunday on into the first of next week. This period should be mostly dry. The National Weather Service Climate Prediction Center's extended 6 to 10 day, 8 to 14 day, and 1-month forecasts are for normal precipitation. The temperature forecasts are for normal temperatures with the exception of slightly above normal temperatures in the western part of the State in the 6 to 10 day period. The NWS Climate Prediction Center Information can be found at: <http://www.cpc.noaa.gov/index.php>





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

**TOTAL RAINFALL
NOVEMBER 2011**



GENERAL WATER CONDITIONS IN MASSACHUSETTS - NOVEMBER 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 ---

Climate Study Finds Mysterious Rise in Erratic Weather

<http://news.yahoo.com/climate-study-finds-mysterious-rise-erratic-weather-125005163.html>

The world isn't just warming, in parts of the planet the weather is becoming more erratic, new research indicates.

By looking at measurements of sunlight striking the planet's surface as well as precipitation records, a study has found that in certain places, daily weather is increasingly flip-flopping between sunny and cloudy, and downpours and dry days. It's not yet clear why this is happening.

This is the first global climate study to examine variation in day-to-day weather. So far, climate science has [focused on extremes](#) — record temperatures or intense storms, for example — or on averages, such as estimates that [global temperatures](#) have risen 0.7 degrees Celsius (1.3 degrees Fahrenheit) since the Industrial Revolution.

"I think it turns out day-to-day [variability](#) is actually important and perhaps more attention should be paid to it," said [David Medvigy](#), the lead researcher and an assistant professor in the department of geosciences at Princeton University.

This is because increases in weather [fluctuations](#) have important implications, particularly for plants — which currently pull about 25 percent of the greenhouse gas carbon dioxide emitted by humans out of the air.

Photosynthesis, the process by which plants use carbon dioxide and water to create sugars and oxygen, makes [the planet's air breathable](#) and feeds the rest of the food chain. It requires both water and [sunlight](#), and fluctuations in these can reduce photosynthesis. Increasing fluctuations have other consequences, including changing the composition of ecosystems, with different plants dominating while others dwindle, and potentially decreasing the efficiency of at least some forms of [solar power](#).

Medvigy and Princeton postdoctoral researcher Claudie Beaulieu looked at data produced by satellites that measured radiation bouncing off the Earth from 1984 to 2007. This information was then used to infer how much solar radiation was hitting the Earth's surface.

Over this 24-year period, they saw that variability in sunlight reaching the surface changed significantly over 35 percent of the planet, primarily over tropical land in Africa and Asia, and seasonally in parts of the Amazon. Here, they found that, over that period, the flip-flopping between sunny and cloudy days increased on average by just under 1 percent a year, reaching a total change of 20 percent for the whole study period.

Using [precipitation](#) data collected by satellites and rain gauges from 1997 to 2007 around the globe, they found that changes in variability of precipitation overlapped with the increased fluctuations in solar radiation. These regions saw a 25 percent increase in the variability in precipitation over the 11-year period. [[Study: It Rains Less on Weekends](#)]

It's not clear why daily sunlight and precipitation are becoming more variable in parts of the world, but the researchers suspect it may have something to do with giant convective clouds, created by rising warm air. These clouds, which play a role in rainfall and in blocking sunlight from reaching the ground, were found over areas where the changes in variability occurred, he said.

His research group is now investigating the connection between these clouds and the increases in weather variability.