

Current Water Conditions in Massachusetts

January 12, 2012



- December precipitation was near normal
- December streamflows were generally above normal
- December ground-water levels were generally above normal
- December reservoir levels were above normal

Precipitation Conditions

Estimated December state-wide average precipitation is 4.18 inches, which is 107 percent of the long-term average for the month. The regions of Massachusetts received between 128 (Connecticut River) and 70 percent (Cape Cod and Islands) of average precipitation during December. December 2011 was the 39th wettest December in the last 117 years in Massachusetts according to the National Climate Data Center. Calendar Year 2011 was the 3rd wettest year on record. A table of December 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 December rainfall in Massachusetts.

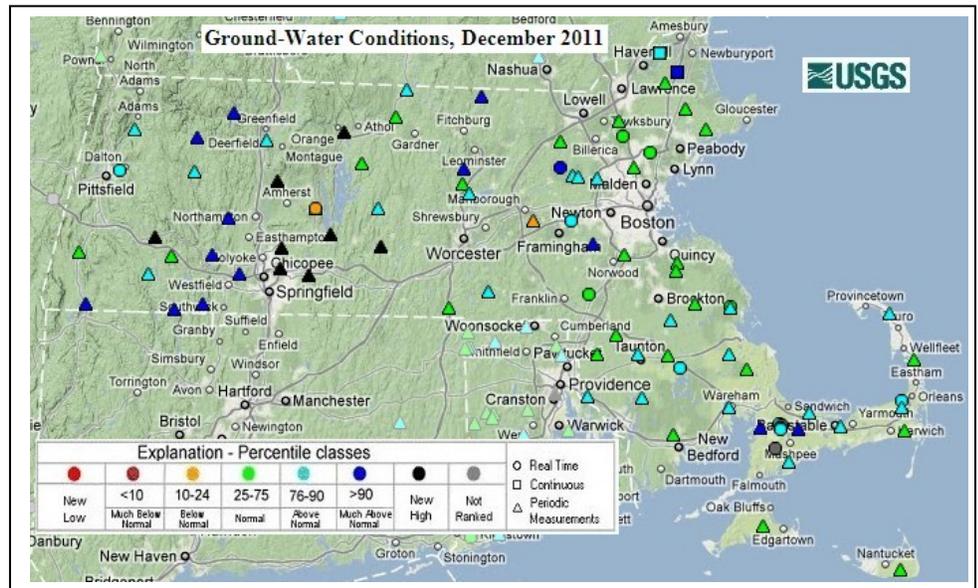
2011 was a year of contrasting and extreme weather that included tornados and major flood events. Notably Boston had the 10th warmest, 9th wettest, and 2nd snowiest October; the 2nd warmest November; and the 6th warmest and 2nd least snowiest December. In Worcester October was the 9th wettest and record snowiest, November was the record warmest November, and December was the record snowless month.

Ground-Water Levels

Ground-water levels reported by the United States Geological Survey (USGS) at the end of December were generally much above normal and high in the Connecticut Valley area and above normal in the remainder 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 December 2011 can be viewed at the web site:

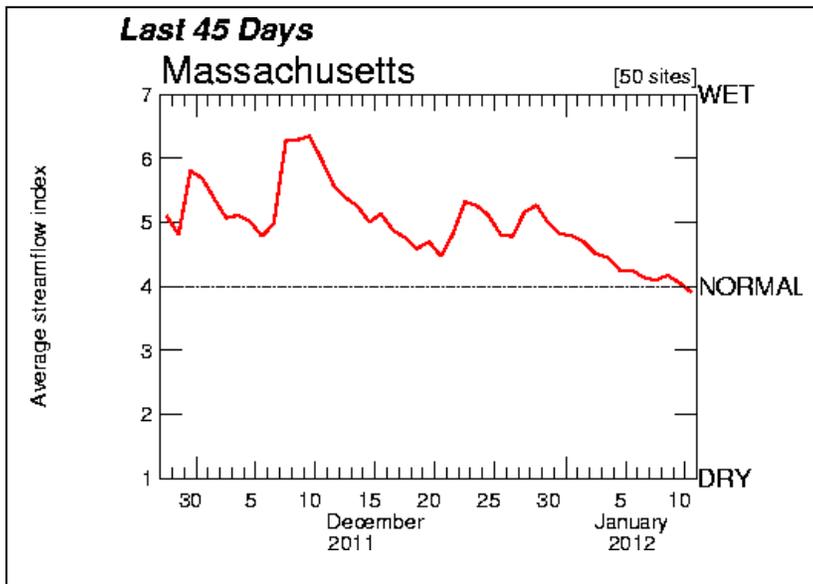
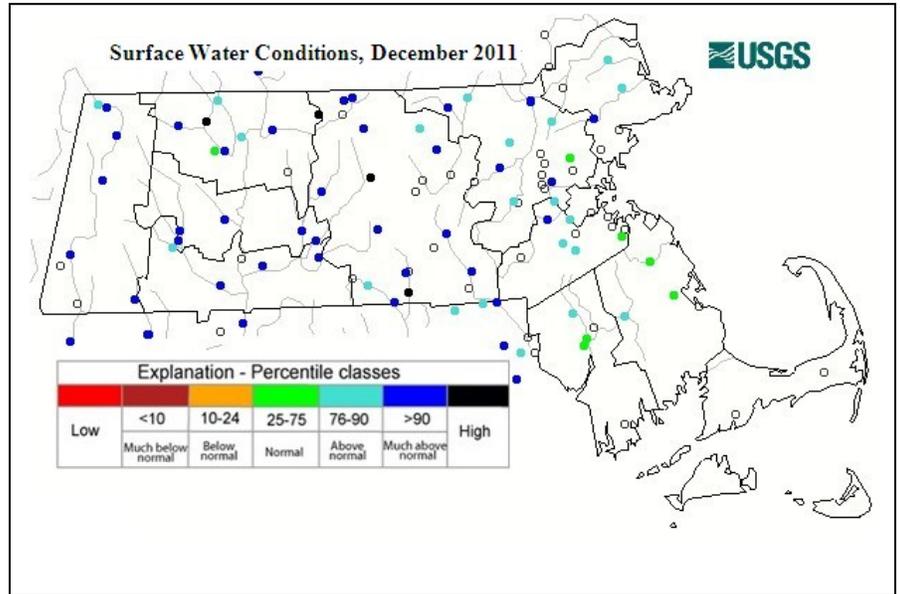
<http://groundwaterwatch.usgs.gov/State/MapsNet.asp?ncd=crn&sc=25>



Streamflow

Average December 2011 streamflows that are monitored by the Commonwealth of Massachusetts and United States Geological Survey (USGS) cooperative stream gaging program were generally normal in southeastern area and above to much above normal in the remainder 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 December.

The graph below depicts a composite daily streamflow relative to normal streamflow for Massachusetts for the period of November 27, 2011 to January 10, 2012. Well above normal flows that started in late August have declined somewhat but remained well above normal into late December. During late December flows dropped to near normal levels. 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 December 2011 or the beginning of January 2012. Reservoirs are generally above normal for this time of year.

December 2011 / January 2012 Massachusetts Reservoir Status

Reservoir/City or Town	Percent Full	Reservoir/City or Town	Percent Full
Quabbin	99.4	Beverly/Salem	91.3
Worcester	102.4	Lynn	81.1
Cobble Mt./ Springfield	90.8	Taunton/New Bedford/Assawompsett	100.7

Note: NA Indicates data not available for this report

Drought Indices/Forecasts

US Drought Monitor

The National Drought Mitigation Center's (NDMC's) January 10, 2012 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 at the end of December for the 3 Massachusetts climate regions were normal/moderately wet (west). The 3-month values were moderately wet/very wet (central). The 6-month values were extremely wet/very wet (east). Massachusetts SPI 1- and 3-month values for all the regions are in the normal range. Generally the 6- and 12-month values are above normal (wet) for all the drought regions with several record high values for the 12-month period.

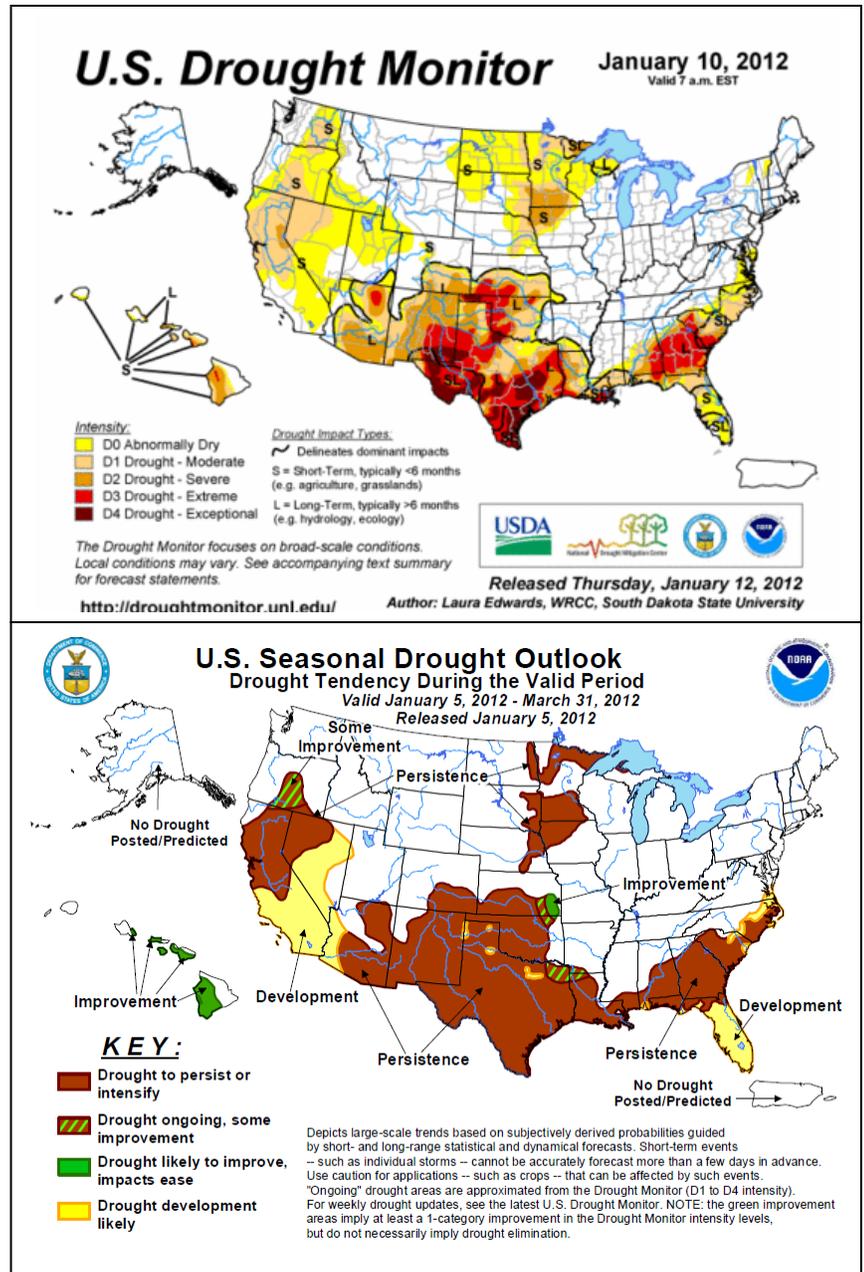
NWS/NOAA's Climate Prediction Center

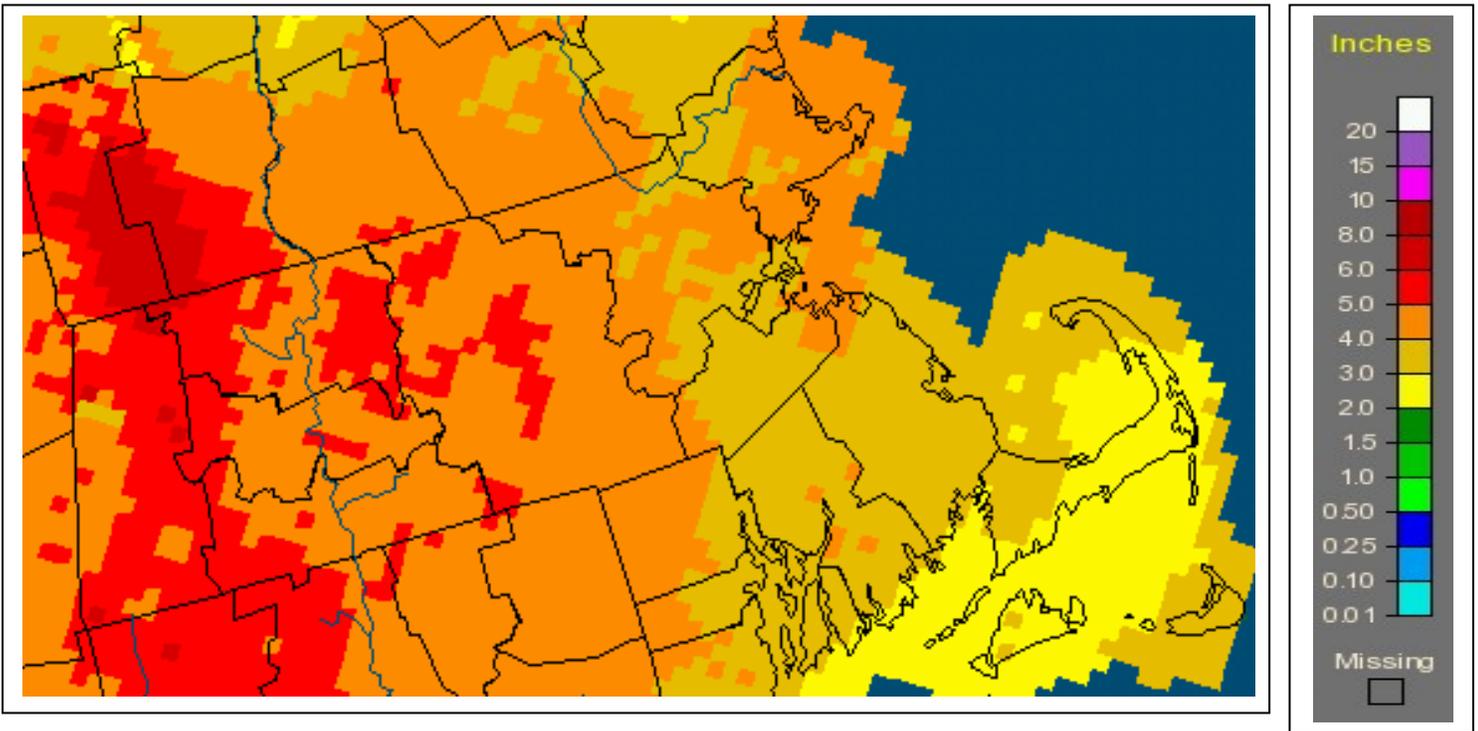
The U.S. Seasonal Drought Outlook dated January 5, 2012, predicts no tendency for drought conditions to develop in Massachusetts through March 2012.

Extended Forecasts

Rain and snow across the State today will give way to showers early Friday and to much colder windy weather late Friday after a strong cold front (possibly with showers) crosses the region. Very cold conditions Sunday into Monday will moderate somewhat further into next week. The National Weather Service Climate Prediction Center's extended 6 to 10 day forecast is for normal rainfall and above normal temperatures. The 8 to 14 day forecast is for above normal rainfall and temperatures. The 1-month forecast is for normal rainfall and 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
DECEMBER 2011**



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

Massachusetts Regions	Surface-Water Conditions	Ground-Water Conditions
Cape and Islands	ND	Above Normal
Southeast	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 --- http://www.washingtonpost.com/national/health-science/mild-weather-redefines-winter-landscape/2011/12/29/gIQAPV8vQP_story.html

Mild weather redefines winter landscape

By [Juliet Eilperin](#) and [Darryl Fears](#), Published: December 30

At the National Arboretum, the white petals of snowdrops — normally an early spring flower — have unfurled. In Maine’s Acadia National Park, lakes still have patches of open water instead of being frozen solid. And in Donna Izlar’s back yard in downtown Atlanta, the apricot tree has started blooming.

It’s not in your imagination. The unusually mild temperatures across several regions of the country in the past few months are disrupting the natural cycles that define the winter landscape.

What began as elevated temperatures at the start of fall in parts of the United States have become “dramatically” warmer around the Great Lakes and New England, according to Deke Arndt, chief of the Climate Monitoring Branch at the [National Oceanic and](#)

[Atmospheric Administration](#)'s National Climatic Data Center. And the Washington area is on track for its fourth-warmest year on record, along with its seventh-warmest December.

That, in turn, has created conditions in which plants are blooming out of season and some birds are lingering before moving south. "It's a weird kind of fall blending right into spring," said Scott Aker, head of horticulture at the National Arboretum.

Arndt said the pattern is most pronounced in eastern Montana, northeastern Minnesota and parts of North Dakota, where December temperatures so far have averaged 10 degrees above normal. But the mild weather extends through the Great Lakes region, along with New England and the mid-Atlantic, with temperatures this month averaging between six and eight degrees above normal.

Just 19.6 percent of the continental United States is covered with snow, according to the latest snow analysis by NOAA, compared with 50.3 percent this time last year.

Scientists — as well as those who question dire global warming predictions — emphasize that one warm season should not be interpreted as a broader sign of climate change. But several researchers said the decline in cold snaps in the United States fits with a pattern of warming driven in part by human activity.

"It's about long-term trends, and one year does not make a trend," said Doug Inkley, a senior scientist at the National Wildlife Federation. But he added, "We already, in the lower 48, have long-term warming that has had a large impact on us."

Temperature anomalies happen for many reasons, and Arndt said some of the mild weather stems from a persistent ridge of high pressure that has settled over the eastern third of the country, bringing southern winds in many areas. But he added that the shifts in seasonality now on display are in line with the [warming](#) the United States has experienced in recent years.

"We've seen consistently, in the last couple of decades, more consistent warm episodes for the season than cold episodes," Arndt said, adding that the "climate wrapper" that affects local weather is akin to the connection between parenting and how children behave. "There's always local factors to a kid's behavior. Maybe he was stressed out or didn't get enough sleep or was hanging out with other kids who don't behave. But when you see a pattern to that, you think, 'Maybe it is parenting.'"

The decreasing frequency of cold snaps should not lead anyone to conclude that there is dramatic warming across the globe, said Patrick J. Michaels, a senior fellow in environmental studies at the libertarian Cato Institute. Climate change is happening, he said, but not at the "magnitude" that some suggest.

Some researchers have detected warming trends in key habitats, but incomplete historic records make it difficult to measure these changes with precision. Abe Miller-Rushing, science coordinator for Acadia National Park, said it's clear that the time the lakes freeze no longer comports with conventional wisdom. "They typically freeze by January 1st," he said. "They're not close to freezing up."

Miller-Rushing collaborated with a Boston University biology professor, Richard Primack, to examine how the seasonality of plants and animals in Concord, Mass., has shifted since the 1850s, when naturalist Henry David Thoreau recorded their spring patterns with precision. They found that plants, including the highbush blueberry, are blooming an average of 10 days earlier because of warmer temperatures.

Primack said it's easier to detect these changes in the spring than in the fall, when a combination of temperature, precipitation and day length governs plant behavior. "There's a climate change signal, but it's much more complicated," he said.

Still, Primack added, New England lost almost its entire fall foliage season this year because there were few freezing temperatures in September and October and more rain than usual. Rather than having the leaves turn color at the start of October, he said, they stayed green until late October, and "in a matter of days, all the trees went from having green leaves to having no leaves."

While many have welcomed the balmy temperatures, they pose potential threats to habitat and humans. Western [bark beetles](#), whose reproductive cycles have sped up and numbers have increased because they don't face the same cold winter temperatures as in the past, have already ravaged pine trees out West. University of Maine researcher William Livingston recently published a study showing that *Cryptococcus fagisuga*, a different bark beetle species, boomed during warm winters between 1999 and 2002 and has feasted on Maine's [beech trees](#) ever since.

And in the Plains region, changes in vegetation pose a fire threat and can intensify allergies. The Minnesota Department of Natural Resources is requiring a permit to burn vegetation or trash in light of the state's dry conditions; a [recent wildfire](#) burned 750 acres of forest close to the Hangaard State Wildlife Management Area. Scientists have found that a roughly one-month delay in the onset of the first frost in the Central Plains allows more time for ragweed pollen production, which has extended the region's allergy season.

"We have been showing these very clear changes in the biota, the living world," said Jake Weltzin, an ecologist with the U.S. Geological Survey who tracks shifts in timing among plants and animals.

Weltzin, who teams up scientists with citizens to chronicle observational changes about plants and animals' seasonal rhythms as executive director of the [USA National Phenology Network](#), just started collecting data on plants in 2009 and animals last year.

"We just don't have observations of these patterns on a national scale," he said.

The recent mild weather may be affecting some birds' migration patterns, according to experts, but not to a significant extent.

[Michael Parr](#), vice president of the American Bird Conservancy, said that although some waterfowl species appear to be migrating more slowly, many birds have moved south for the winter.

"They wouldn't have known there was a nice, warm snap in D.C. because they would have already gone," Parr said.

The blooming of bushes and trees has been far more noticeable, whether it's flowering dogwoods on 16th Street, the roses and irises that Miller-Rushing spotted in Boston last week, or Izlar's apricot tree in Atlanta.

"I just noticed two days ago that it's in full bloom," she said Thursday.

A cold front is expected to hit the East Coast on Monday. But in the meantime, even Arndt has been surprised by what the warmer temperatures have brought to his surroundings in Asheville, N.C., where the National Climatic Data Center is based.

"We have daffodils blooming in Asheville, which is rare," he said. "It's natural botanical evidence that the instruments are getting it right."

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/>