



Vermont State Climate Office
Climate Impacts Summary
September 2010

Dr. Lesley-Ann Dupigny-Giroux
Stephen Hogan

Introduction

Early September was characterized by a period of record breaking heat. In particular, high pressure anchored at the surface and aloft over the eastern US resulted in these near or record breaking high temperatures during the first week of September 2010. As students headed back to school between September 1st and the 3rd, daily high temperatures averaged 90° - 94° F. Thereafter, temperatures generally returned to more seasonable values, averaging about 3°F and 1.5-3°F above normal in western/southeastern Vermont and northeast Vermont respectively.

Additionally, moderate drought continued across southern Vermont in Bennington and Windham counties through late September. Farmers reported dry powdery subsurface soil with vegetable crop losses. A quick glance at the observed data highlighted below normal precipitation through September 29th. For example, Ball Mountain Lake (Windham County) reported 1.84 inches (normal 3.57 inches), while Pownal (Bennington county) reported 1.08 inches (normal 3.90 inches).

Temperature summary

In each of Vermont's three climate divisions (Fig. 1), September 1-3 saw at least one station experience a heat wave (i.e., at least three days with maximum temperatures of 90°F or greater). In fact, a number of record high temperatures were established during this period of September, as heat wave conditions continued from 30-31 August. These new records are summarized in Table 1.

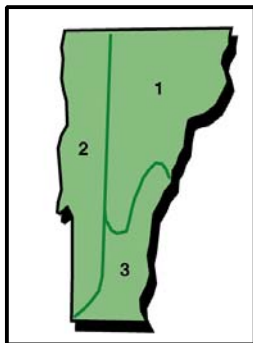


Figure 1. Climate divisions of Vermont

TABLE 1: SUMMARY OF RECORD HIGH TEMPERATURES

Climate division	Station	New Tmax (°F) & date	Length of station record (years)
1	Northfield	92 - 1 st & 3 rd	109
	Montpelier	94 - 1 st & 2 nd	10
	Barre-Montpelier (Knapp) Airport	89 - 1 st 88 - 2 nd	62
2	Burlington International Airport	92 - 1 st & 3 rd 91 - 2 nd	70 (current location)
	Essex Junction 1N	94 - 3 rd	48
	Salisbury	93 - 1 st	44
3	Union Village Dam	92 - 1 st 93 - 2 nd	59
	North Springfield	92 - 1 st 94 - 2 nd	10
	Woodstock	92 - 1 st & 2 nd	118

Apart from the values listed in Table 1, other noteworthy observations included the record high minimum temperature of 71°F at the NWS ASOS site at the Burlington International Airport on the 2nd.

The remainder of the month was dominated by more seasonable temperatures under the influence of a series of upper level troughs moving eastwards from the Great Lakes and across southern Canada. However, notably cool weather occurred on the 16th-18th and on the 21st of September. Record low temperatures for the 21st were set at the following sites; 30°F at Plainfield, and 32°F at both Union Village and Danby Four Corners. Table 2 summarizes the lowest temperatures observed across the three climatic zones.

TABLE 2: SUMMARY OF LOWEST MINIMUM TEMPERATURES

Climate Division	Station	Tmin (°F) & date
1	East Haven, Sutton 2NE	34 - 18 th
	East Haven, Sutton 2NE	28 - 21 st
	Plainfield	30 - 21 st

TABLE 2: SUMMARY OF LOWEST MINIMUM TEMPERATURES

2	Danby Four Corners	32 - 21 st
	Rutland	33 - 21 st
	Hanksville	35 - 18 th
3	Union Village Dam	36 - 16 th , 32 - 21 st

Precipitation summary

Moderate drought continued across the southern counties of Bennington and Windham through late September. Farmers reported dry powdery subsurface soil with vegetable crop losses. This below normal precipitation the first 28 days of September was reflected at Ball Mountain Lake (Windham County) with only 1.84 inches (normal 3.57 inches), while Pownal (Bennington county) reported 1.08 inches (normal 3.90 inches). Figure 2 compares conditions in northwestern and southeastern Vermont.

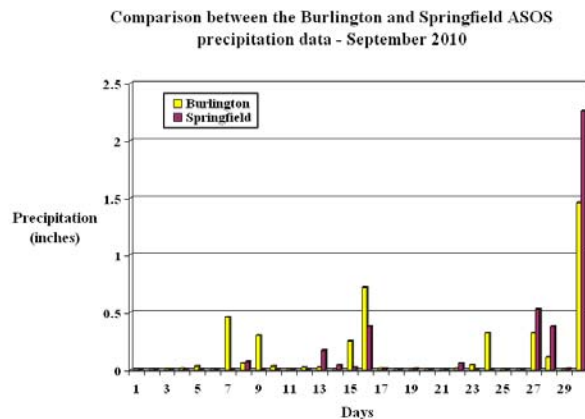


Figure 2: Daily precipitation data at the NWS ASOS sites of Burlington International Airport (climate division 2) and Springfield Hartness Airport (climate division 3). Note the precipitation deficit at the latter as well as the statewide impacts of Tropical Storm Nicole's remnants at month's end.

In western and northeast Vermont, precipitation was a bit more plentiful through the month, most of it being associated with frontal passages. During the late night of September 7th into the early morning of the 8th, a warm front resulted in showers and thunderstorms across the northern half of the state, resulting in precipitation amounts of 0.25- 0.75 inches. In the Champlain Valley, these thunderstorms also resulted in wind gusts of up to 48 mph at Burlington International Airport at 1144 PM on September 7th. On September 13, another batch of thunderstorms resulted as a weak cold front moved across the area during the afternoon. These thunderstorms struck west-central Vermont with brief, heavy rain (0.25-0.50 inches) and small hail near Brandon in Rutland County.

Otherwise, periods of showers or rain occurred on several days during the month associated with storm systems moving from the Great Lakes into southern Canada. During September 16th-17th, a warm frontal associated precipitation resulted in 0.5-1 inch of rain across west and northeast Vermont. Lesser amounts fell in southeast Vermont with generally less than 0.5 inch. A few days later, a similar pattern developed on the night of the 23rd into the 24th. Precipitation from this system

More widespread precipitation fell across the state toward the end of the month. A warm front moved across Vermont on the 27th and 28th producing showers and about 0.5 inch of rain. The associated cold front moved slowly into western New England on the 29th, setting the stage for a significant low pressure system to move north along the east coast as rain developed on the night of the 29th in southern Vermont and steady rain developed across the entire state during the 30th. This generally resulted in 1.5-2.5 inches across Vermont, with the heaviest rainfall in Orange and Windham counties where 2.5-3.5 inches fell by the end of September. This rain event continued into October.

Figure 3: Precipitation totals for 0700 (30 September) to 0700 (1 October) of the NWSFO area.

Saturated soils combined with strong winds resulted in some trees being blown down with scattered power outages on the night of September 30th. Across northeast Vermont, winds gusted as high as 49 mph in Lyndon and 45 mph at Morrisville, with 58 mph gusts recorded Cambridge VT (western VT).