

2013 WEATHER SUMMARY

West Henrico Co. - Glen Allen, VA

MOST UNUSUAL RECORDS

1. The year was the 12th wettest in the past 141 years at the Richmond Airport.
2. The summer was the 14th wettest in the past 141 years at the Airport.
3. Local Thunderstorm an unusual weather event at Glen Allen occurred on May 7th.

A small cell rapidly intensified into a slow moving thunderstorm. Light rain started at 1715 and heavy rain started between 1735 and 1740 and hail occurred around 1740-1745. Hail was small pea size and milky (not clear) with the largest being 3/8 inches in diameter. This left the deck about 50 percent covered by a layer of small hail during a period of heavy rain. The hail then started again about 1758 and was larger marble size (0.5 inches) with a milky center but clear ice on the outside layer. Most were rounded but some had a platelet shape and this second 3-4 minutes of hail damaged garden plants. This thunderstorm gave 2.39 inches of rain on May 7th which set a new daily rainfall record for May and gave 1.37 inches of rain in one hour. This was the most rain to fall in one hour here since August 24, 2009 when 1.44 inches was recorded. It also set a new May hourly record of 1.37 inches and a set a new 5 minute record of 0.67 inches.

Hurricane Andrea

Andrea was an early Atlantic tropical storm as it moved across northern Florida on a path toward SE Georgia and the Carolinas before heading north. On June 6 it lost its distinguishing tropical storm characteristics on June 7 as it combined with a frontal zone over North Carolina. Virginia received heavy rain along the coast. Andrea gave Glen Allen 1.79 inches of rain on June 7th helping make June the wettest on record at Glen Allen with 6.52 inches. The Richmond International Airport had 6.50 inches of precipitation for June. Only 9 Junes have been wetter since 1872 and the June record is 9.93 inches in 2004. On June 7th the Airport had 2.67 inches which was a record for the date. Only 11 Junes have had greater precipitation amounts for a day in the past 141 years. It is also interesting that only two storms made hurricane status in the Atlantic in 2013, the fewest number of hurricanes since 1982. This was well below the average of six hurricanes and the average of three major hurricanes in a season. Only Ingrid and Humberto reached hurricane status but neither became major hurricanes; both had maximum winds near 85 mph.

Wet and Humid Summer

2013 was the 14th wettest summer in the past 141 years at the Richmond Airport. All three months of the summer at the Airport were wet. The total rainfall for June was 6.50 inches, a departure of +2.57 inches. July had 5.88 inches giving a departure of +1.37 inches and August was the wettest with 7.61 inches, a departure of 2.95 inches. The summer total for the Airport was 19.99 inches for their 14th wettest summer and Glen Allen had 19.75 inches for the station's wettest summer. The precipitation totals are given for the Airport as Glen Allen records go back only 5 years. The average daily relative humidity at Glen Allen was 68.5 percent based on a 5 year period. The summer of 2013 at Glen Allen had an average of 75.7 percent relative humidity, a +7.2 percent departure, making it the most humid summer on record at Glen Allen with all three months setting new records. I do not have relative humidity records for the Airport.

Thunderstorms

Thunder was heard on 31 days in 2013. The average is 35.5 days. 2013 set a new record low number of thunderstorms, however, 2009 is a close second with 33 days. June had 8 thunder days which was the greatest number for one month.

Temperature

YEAR- The average temperature for 2013 at Glen Allen was 57.9°F which was negative departure of 1.5°F and the coolest year at Glen Allen. The year 2013 was also the coolest on record at Richmond International Airport since 2009. Glen Allen had only 31 days that the maximum temperature was 90°F or higher which tied the record low in 2009. In 2013, the maximum temperature dropped below 32°F for the high temperature only twice. There were 91 days that the minimum temperature was 32°F or lower. This was the second greatest number of days that the minimum temperature was 32°F or lower after 2010. Two months had a new record number of days $\leq 32^\circ\text{F}$. They were: March with 21 days (average 7.5) and April with 3 days (average 0.3). January generally has the greatest number of $\leq 32^\circ\text{F}$ day for the year. It is really rare that March has a greater number of $\leq 32^\circ\text{F}$ days than January and this is the first time this has occurred at Glen Allen. The lowest temperature of 2013 at Glen Allen was 11°F recorded on January 23rd. The Richmond Airport recorded 14°F on the same date.

MONTH- The coldest month for 2013 was February with a mean temperature of 39.2°F. But March had the greatest number of days (21 days) with the minimum temperature equal to or less than 32°F. March also had the greatest negative departure from normal (-8.9°F). January had the second greatest departure (+4.9) but it was a positive departure. August had the second greatest negative departure from normal with a (-3.7°F) departure. July had

the greatest number of days (14 days) with the maximum temperature equal to or greater than 90°F. January, November, and December all had new record number of warmest days for the month. April, May, August, and November all had the record number of coolest days for the month. Months with new record low average temperature ranges were April, July, August. May had a record number of high temperature ranges with a range of 21.8°F; the average is 20.3°F.

DAY- The hottest days of 2013 in Glen Allen were July 19th and 20th with the daily mean temperature of 85.0°F. But the highest maximum temperature occurred on July 17th and 18th with 95°F. The average highest annual maximum temperature for Glen Allen is 100°F. The coldest day of the year occurred on January 25th with the daily mean temperature of 19.0°F. The lowest minimum temperature, however, occurred on January 23 with a low of 11°F. The average lowest annual minimum temperature is 10°F.

RANGE- The greatest temperature range for the year was 38°F, which occurred on January 31st with a maximum of 67°F and a minimum temperature of 29°F. The smallest temperature range for the year was 2°F, which occurred on December 8th with a high temperature of 33°F and a low temperature of 31°F during an all-day precipitation event.

PRECIPITATION

YEAR- The total number of days this year with measurable precipitation at Glen Allen was 137 days. The previous record high number of precipitation days was 133 days set in 2009. Months that set new record number of days with precipitation were: January, June, July, and August. Four months set new monthly record for precipitation amounts; they were: January, April, June, and July. The total precipitation for 2013 was 54.54 inches which was the wettest year on record. The average annual precipitation for Glen Allen is 45.93 inches.

MONTH- June had 16 days with measurable precipitation, which was the most of any of the months of 2013. There were 12 days with daily precipitation amounts greater than 1 inch. Only three months had greater than 2 inches of precipitation in a calendar day; they were March, May, and July. September had the least with only five days. It was unusual that July had 7.03 inches, the greatest monthly precipitation recorded in 2013. This set a new record maximum rainfall amount for July. September had the least monthly total precipitation with only 1.52 inches and set a new minimum precipitation amount for September. Also new 24-hour record amounts of precipitation were set in the months of January, March, May, and July.

CALENDAR- The most precipitation recorded in a day occurred on July 3rd with 2.42 inches. The record for Glen Allen is 3.75 inches, which occurred on August 27, 2011 during Hurricane Irene. Four months set new monthly calendar day precipitation amounts; they were January, March, May, and July.

24-HOUR PERIOD- The maximum precipitation in a 24-hour period for the year was 2.63 inches on November 26th and 27th from a pair of coastal low pressures. The record for Glen Allen is 3.83 inches, which occurred on August 27 and 28th of 2011, during Hurricane Irene. Four months set new monthly 24-hour period precipitation amounts; they were January, March, May, and July.

HOUR- The maximum one-hour rainfall intensity was 1.46 inches, which occurred on August 10th. The record one-hour precipitation intensity for the Glen Allen weather station is 2.13 inches on June 3, 2009. Four months set new monthly one hour precipitation amounts; they were January, May, July and August.

FIVE-MINUTES- The greatest five-minute precipitation rate for 2013 was 0.67 inches, which fell on May 7th during a severe thunderstorm. The previous record for the most intense five-minute precipitation at Glen Allen was 0.55 inches, which occurred on November 15, 2008. Five months set new monthly five minute precipitation amounts; they were January, April, May, July, and August.

DROUGHT- The driest period was October 14th to November 14th with 0.17 inches of precipitation. The longest period without measurable precipitation for 2013 was from Sep 23rd to October 6th, a period of 14 days.

WIND

YEAR- The highest wind gust for the year was 43 mph from the SSW that occurred on January 30th at 1324 hours preceding a strong cold front and set a record for the highest wind gust yet in the month of January.

MONTH- The windiest month was April 2013 with a wind run of 2,521.1 miles. The following months were the windiest for the month in the five year period of records; they were May, June, and July.

DAY- The windiest day for 2013 was on January 30th with a wind run of 225.6 miles. The record wind run for Glen Allen during a calendar day was 284.1 miles set during Hurricane Irene on August 27th 2011. New record high average wind runs for the day were set in the months of May, June, and July.

SNOW

YEAR- The 2013 Glen Allen total snowfall was only 14.3 inches. There were 13 days during 2013 that Glen Allen had measurable snowfall and most were very light except two snowfalls in March. February 2013 had only 0.2 inches of snow. There were only seven days (the average is 9.8 days) in the year with more than a trace of snow on the ground at sunset, four of these occurring in March. The maximum snow on the ground at sunset during 2013 was 3.2 inches on March 24th.

MONTH- The greatest monthly snowfall total for Glen Allen was only 9.6 inches in the month of March which averages 3.0 inches. February is generally the snowiest month with an average of 5.8 inches but this year February only had 0.1 inches of snow.

STORM- The most snow to fall in any one storm was 4.7 inches that occurred on March 24th and 25th. The greatest snow in a calendar day was 3.9 inches on March 24.

BAROMETRIC PRESSURE

YEAR- The highest barometric pressure recorded for the year was 30.69 inches of mercury on November 29th and 30th. The lowest barometric pressure for the year was 29.22 inches of mercury recorded on January 31st.

MONTH- November had the highest average barometric pressure of any month in 2013 which was 30.21 inches. June had the lowest average barometer reading of any month at 29.95 inches.

RELATIVE HUMIDITY

YEAR- April's average relative humidity of 62.3 percent was the lowest for any month of 2013. The highest relative humidity was recorded in the months of August and October with an average relative humidity of 77.0 percent. The lowest daily relative humidity for the year was 17 percent recorded on November 14th. Every summer month set a new record high average relative humidity for the month (Records since 2008). This was the most humid summer of any of the five summers on record. The summer had a full 7% higher than the five year summer average relative humidity.

SKY COVER

The cloudiness average value is based on (0 as clear), (1 as partly cloudy), and (2 as cloudy).

MONTH- July (1.26) (average 0.95) and August were the cloudiest months of 2013 which is very unusual as they are often the sunniest. The summer of 2013 was the cloudiest on record with the value 1.23 and the average summer is 1.00. September was not only the clearest September (0.55) (average 0.95) but was the clearest of all months since records were started in 2008 at this station.

WINTER – DECEMBER 2012 to FEBRUARY 2013

December was very warm with a mean temperature of 42.1°F (average is 39.9) +6.1°F departure from the four-year Glen Allen average. It was the second warmest winter at Glen Allen. December had its first 75°F day at Glen Allen on December 4th and had 3 days of $\geq 70^\circ\text{F}$. The winter was mild as December was the 6th warmest in history at the Richmond International Airport and January was the 29th warmest; only February was below average by a small amount of -0.8°F. The winter season departure was +2.8°F. The Airport had a 3.4 inch snow deficit for February and 6.2 inch deficit for the winter. January precipitation had +2.29 inch departure, December had a -0.43 inch departure, and February was only 0.16 inches below normal. Thus, the winter had a deficit of 1.70 inches. Data used for the winter is mostly from the Richmond International Airport as Glen Allen still has a small data base of four years. The winter was the cloudiest on record (1.20) but was marginally higher than the 2010 average of 1.18. The average cloudiness of the winter season is 1.09.

SPRING – MARCH to MAY 2013

The Spring Season average at West Henrico Co. - Glen Allen, VA area was cooler by -4.2 and the coolest on record with a mean temperature of 55.6°F; the normal average is 59.0°F. It was also wetter by +0.95 inches than average. (4-year average) The Richmond International Airport had no new daily records for May but it was the coolest May since 2008 and had the coolest spring since 2005. May was the 41st driest in the past 141 years and the 45th warmest in the past 133 years. Spring 2013 was near average cloudiness with a value of 1.09, the average being 1.13.

SUMMER – JUNE to AUGUST 2013

West Henrico Co. - Glen Allen, VA had an August that was far from normal. August was the coolest with an average temperature of 76.4°F and the normal is 78.2°F. The summer was the cloudiest on record with the value of 1.23; the average of the summer is 1.00. The summer was also the most humid on record with an average relative humidity of 75.7% and the normal summer average is 68.5%.(Five-year basis) August also had the most days with rain and was the second wettest in the past five years. This summer was much cooler than the past five years, some of which have been record-breaking for heat like 2010 and 2011. This summer was more humid at the Glen Allen Station than any of the past five years by 7.2 percent. June, July, and August all set new high relative humidity records. Note July had a +9 percent relative humidity departure; this explains why my tomatoes did so poorly and the Septoria (a fungus disease) damaged my tomatoes. It was my worst tomato crop in my past five years in Glen Allen.

AUTUMN – SEPTEMBER to NOVEMBER 2013

Glen Allen recorded both the highest daily mean temperature on record for November on the first and the lowest daily mean on record for November on the 25th which was unusual. West Henrico Co. - Glen Allen fall season was -4.8°F departure based on a 5 yr. average. This was a coolest autumn with an average temperature of 58.4°F; the normal is 59.7. However 2008 and 2012 were nearly as cool. Glen Allen precipitation deficit for the fall season was -3.88 inches based on a 5 year average. The Airport's was less as the Airport received much greater rainfall on October 10th and 11th from a coastal low pressure than did Glen Allen. The Richmond International Airport's fall season was 1.4°F warmer than normal based on a 30 year average; only November was colder than average. The precipitation deficit for the fall season at the Airport was 1.65 inches based on a 30 year average and was the only season to be below average for 2013. The fall is slightly on the clear side (0.93) with the average being 0.99.

Annual Records **(Glen Allen 5 Years of Records)**

2013 was the wettest year on record at Glen Allen with 54.54 inches; the previous record was 53.76 inches in 2009. The Richmond International Airport had 53.68 inches of precipitation the wettest since 2004 with 58.50 inches.

2013 summer was the 14th wettest in the past 141 years at the Richmond Airport. 2013 was the 12th wettest in the past 141 years at the Richmond Airport.

2013 was the most humid at Glen Allen with an annual average relative humidity of 48.6%; the previous record was 48.1% in 2009.

2013 was the coolest on record at Glen Allen with an average annual temperature of 57.9°F; the previous low record was 58.3°F in 2009. The Richmond International Airport's annual temperature average was 59.2 °F the coolest since 2009.

2013 was the second cloudiest at Glen Allen on record with an annual average cloudiness of 1.10; the record is 1.17 in 2009.

2013 was the third snowiest on record at Glen Allen with 14.3 inches of snow. The record is 36.7 inches in 2010 and the least is 1.8 inches in 2011. The Richmond International Airport had only 4.5 inches of snow and its 30 year average is 10.3 inches.

2013 had thunder on 31 days at Glen Allen which is a new record low; the previous annual record was 33 days in 2009.

2013 was a little windier than average at Glen Allen with a yearly wind run of 22,607.6 miles and the annual average is 21,932 miles.