

2014 Rainfall Analysis

Executive Summary

- 2014 total rainfall volume was 49.07 inches, 34.5% above historic average (1981-Present).
- While rainfall was 19 inches more than in 2013, there was only one additional day of rain.
- The city monitors rainfall at eleven locations throughout the city. Yearly rainfall ranged from 46 inches near Meydenbauer Bay, to over 60 inches near Forest Hills.
- Monthly variability ranged from a difference of only 0.39 inches in July (Cherry Crest receiving 1.45 inches vs. 1.06 inches near Meydenbauer Bay) to a difference of 2.74 inches in March (Forest Hills receiving 11.28 inches vs. 8.54 inches at Bellevue Service Center)
- Rainfall in March was the highest on record; October came within 0.2 inches from setting a record high.
- Monthly rainfall was above the expected range¹ for six months of the year.
- No months displayed rainfall totals lower than the expected range.
- Monthly rainfall was above average in all months but January, June, and November.
- 2014 was highlighted by several strong storm systems during the historically dry season.

Historical Rainfall Comparison

The average annual rainfall for the period of record (1981 to 2012) is 36.49 inches, while the 2014 total was 49.07 inches- just two inches shy of Bellevue's historical record².

The charts below indicate that Bellevue rainfall during 2014 did not follow historical trends, and the city experienced a number of short, but strong storm events. A summary of these interesting findings is outlined below.

- Five months of the year had rainfall volume totals outside the expected range. Rainfall in the month of March established a new historical record for monthly rainfall, and October was just two-tenths of an inch from setting a historical record. In contrast, January, June and November rainfalls were lower than average, but within expected ranges.
- Considerable variability in rainfall amounts were seen throughout the city. The lowest annual rainfall volume was recorded near Meydenbauer Bay (225 ft. above sea level), where gauges recorded 46 inches of rain. Our Forest Hills gauge sits at a higher elevation (721 ft. above sea level) and recorded an impressive 60.23 inches. This variability can be seen spatially in **Appendix A**. A number of factors determine this variability, including elevation, and proximity to spatially small, but strong summer storm cells.
- Bellevue experienced several large storms this year, the largest of which occurred on August 12th. During a six-hour period 2.65 inches of rain were recorded at Coal Creek near I-405. This corresponds to a 1,000 year storm event, and contributed to urban flooding.

Over the last two years, our rainfall patterns have been outside historical patterns and the variation has not been consistent between years. Nineteen additional inches of rain occurred in 2014 compared with

¹ Expected range of rainfall is defined as within confines of the 1st quartile and 3rd quartile of historic data. These months were February, March, April, August, September, and October.

² Rainfall totals refer to City of Bellevue gauge near I-405 & SR-520 interchange.

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2013 levels, and there were 22 additional days with greater than 0.10 inches recorded. It is uncertain whether the recent variability is an on-going trend as our period of record is not sufficient to make assumptions about climate change.

Monthly Averages

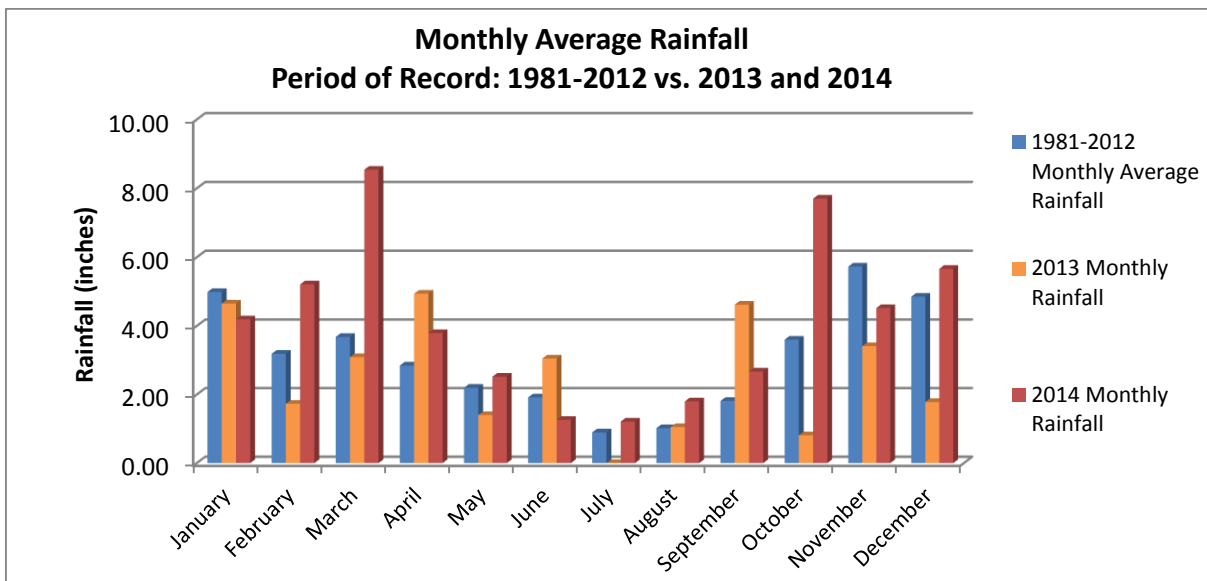
The charts on the following two pages show historical rainfall amounts. The first chart (bar graph) shows the historical average monthly rainfall (blue) and the 2013 and 2014 totals (orange and red, respectively). The second chart is a box plot³ showing historical monthly rainfall statistics with the monthly totals for 2013 and 2014 represented by the orange and red diamonds, respectively. Both charts include 2013 and 2014 in order to demonstrate the variability of recent rainfall patterns.

Number of Rain Days

In addition, on the last page is a box plot showing statistics for the number of rain days⁴ with 2013 represented by the orange diamond and 2014 represented by the red diamond. This graph was included to show how often it rains each month. Note that for this graph, the period of record begins in 1990 when the gage was moved to its present location because rainfall patterns can vary by location within the city.

Monthly Averages: Chart 1

This chart shows the historical average monthly rainfall (blue) and the 2013 and 2014 totals (orange and red, respectively). The second chart shows the percent difference in annual average rainfall for 2013 and 2014, compared to the average for the period of record 1981-2012.

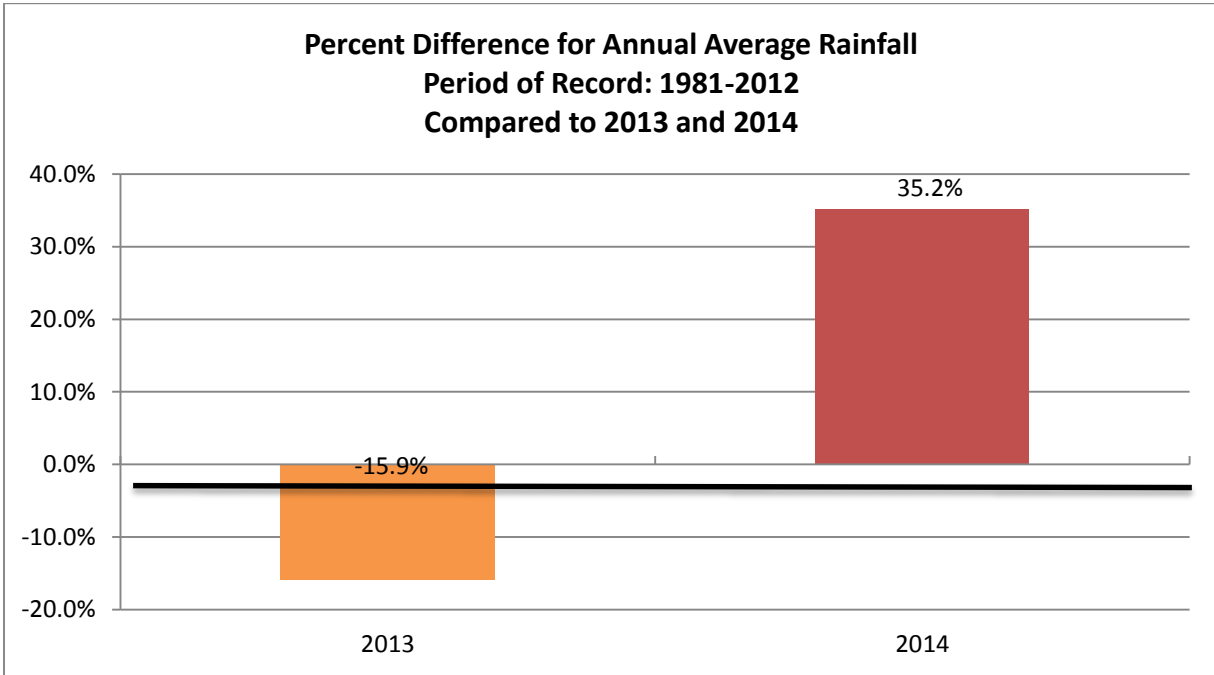


*Gauge location: near I-405 and SR 520 interchange, Bellevue, WA

³ A box plot is a graphical depiction of a statistical summary of a dataset. The upper-most and lower-most boundaries of the box represent the upper and lower quartiles (75th and 25th percentiles), respectively. The line in the center of the box represents the median data point (50th percentile). The upper and lower points, connected to the box by vertical lines, represent the highest and lowest observed data points.

⁴ A rain day is defined as a calendar day with greater than 0.10 inches of rain.

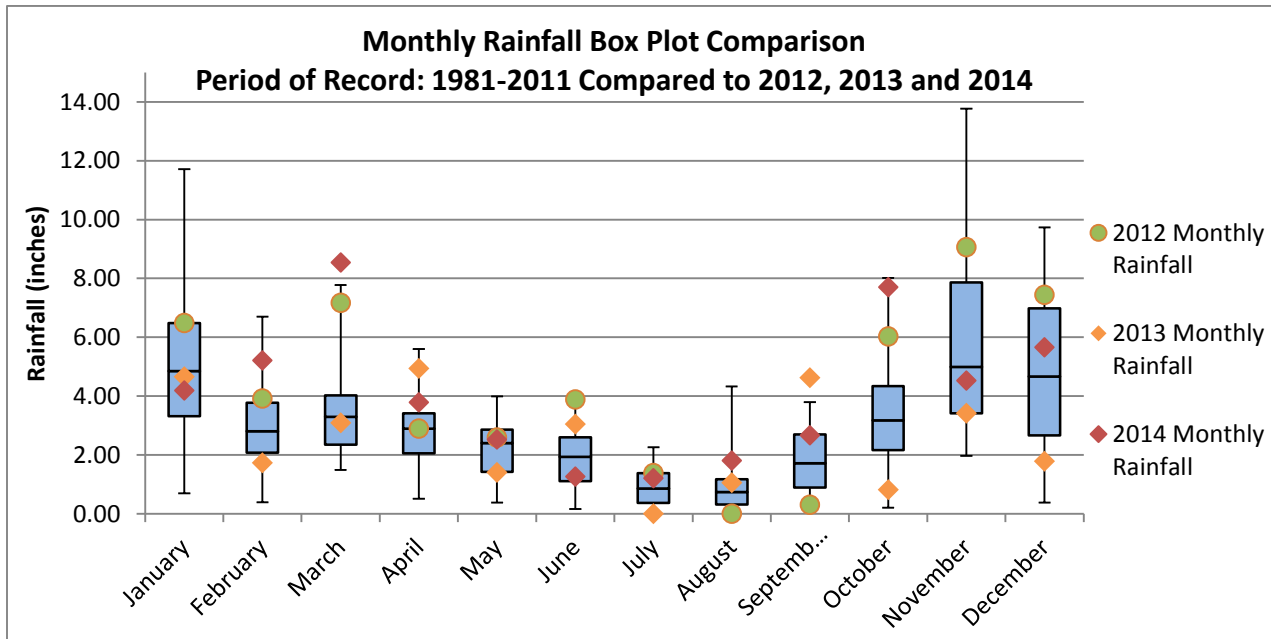
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*Gauge location: near I-405 and SR 520 interchange, Bellevue, WA

Monthly Averages: Chart 2

This chart is a box plot⁵ showing historical monthly rainfall statistics with the monthly totals for 2012, 2013, and 2014 represented by the green, orange and red diamonds, respectively.



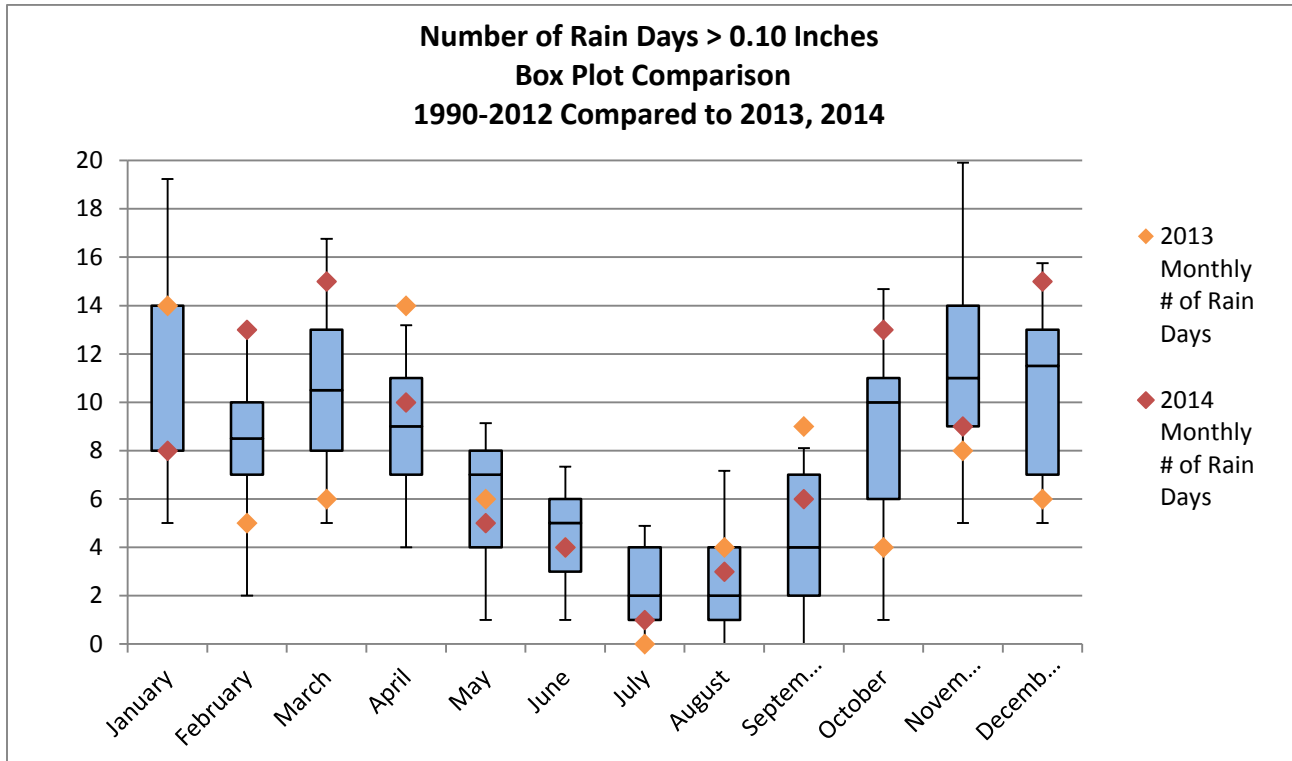
*Gauge location: near I-405 and SR 520 interchange, Bellevue, WA

⁵ A box plot is a graphical depiction of a statistical summary of a dataset. The upper-most and lower-most boundaries of the box represent the upper and lower quartiles (75th and 25th percentiles), respectively. The line in the center of the box represents the median data point (50th percentile). The upper and lower points, connected to the box by vertical lines, represent the highest and lowest observed data points.

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Number of Rain Days Chart

This chart is a box plot⁶ showing statistics for the number of rain days⁷ with 2013 represented by the orange diamond and 2014 represented by the red diamond. For this graph, the period of record begins in 1990 when the gage was moved to its present location.

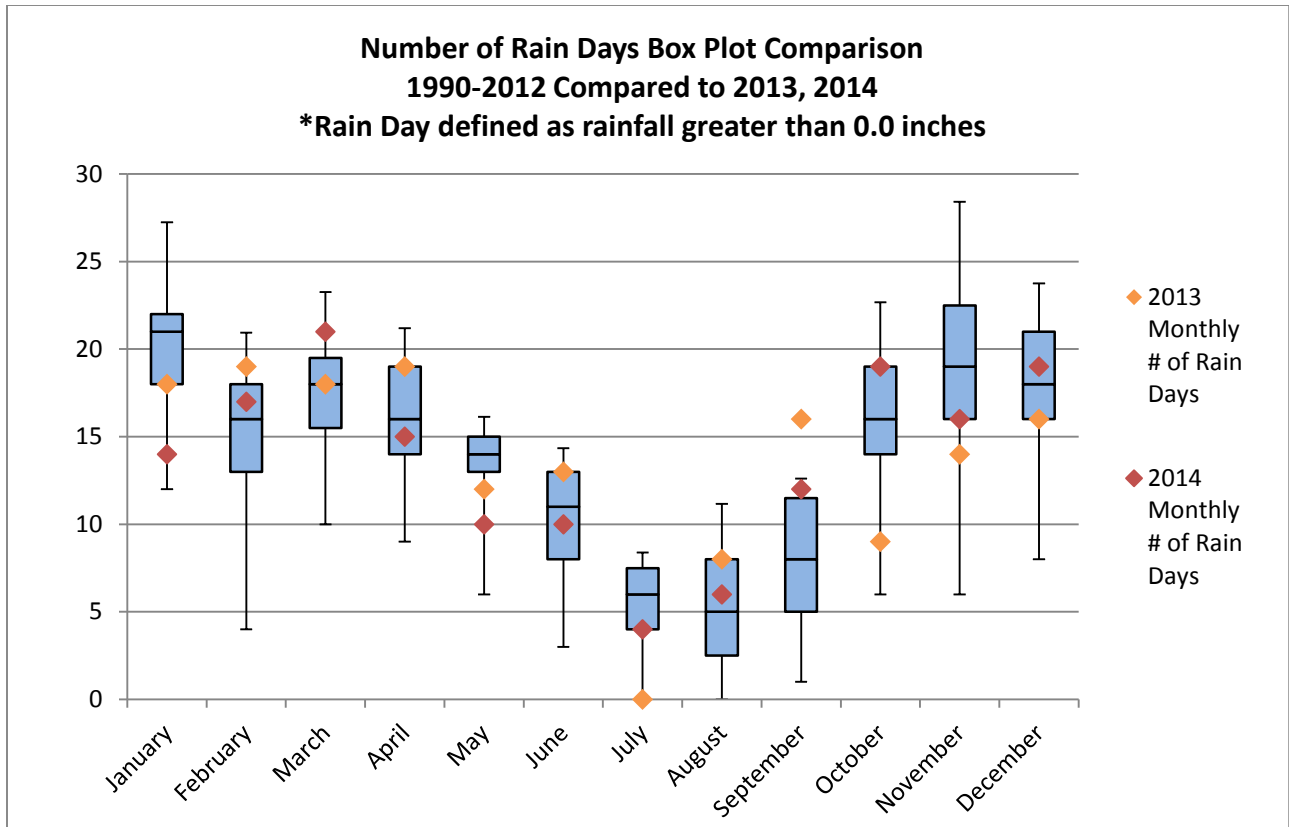


*Gauge location: near I-405 and SR 520 interchange, Bellevue, WA

⁶ A box plot is a graphical depiction of a statistical summary of a dataset. The upper-most and lower-most boundaries of the box represent the upper and lower quartiles (75th and 25th percentiles), respectively. The line in the center of the box represents the median data point (50th percentile). The upper and lower points, connected to the box by vertical lines, represent the highest and lowest observed data points.

⁷ A rain day is defined here as a calendar day with greater than 0.10 inches of rain.

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Appendix A

- Blue circles indicate relative amount (inches) of rainfall recorded in 2014.

