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2018 was a notably wet year in New Jersey (See "2018 Sets Precipitation Record across the State" in this issue, and Melisurgo, 2019).

Several locations in the state received more than 70 inches of precipitation in 2018. This compares to a 30-year normal of, say, 45 to 50 inches a year in Central New Jersey (U.S. Climate Data, 2019).

The Delaware River Basin Commission reported that 2018 had the highest median flow since 1940 for the Delaware River at Montague and the second highest in Trenton since 1913 (DRBC, 2019).

The watershed draining to Montague is largely upstream of the Delaware Water Gap, without much contribution from New Jersey. The watershed draining to Trenton includes parts of New York State, Pennsylvania, and New Jersey.

Here, discharge data for the Delaware River in Trenton and for five rivers in southern New Jersey were summarized across years. Only years with complete data were used, and available data varied by site. Data are from USGS (2019). Some data are provisional. The geometric mean of daily values was calculated for each year.

As analyzed here, the geometric mean discharge at Trenton for 2018 was tied for second highest since 2013, slightly lower than in 2011, and tied with 2003 (Figure 1). There was a significant though small increasing trend in geometric mean discharge (p < 0.01,  $r^2 = 0.06$ ). On average, discharge increased about 21 cubic feet per second per year.



Figure 1. Discharge by year for Delaware River at Trenton, Mercer County. Error bars represent the 95% confidence interval. There was an increasing trend (p < 0.01,  $r^2 = 0.06$ ). On average, discharge increased about 21 cfs per year.



Figure 2. Discharge by year for Cohansey River at Seeley, Cumberland County. Error bars represent the 95% confidence interval.

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## Was River Discharge Unusually High in 2018 in Southern New Jersey?... continued

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In contrast, among the five rivers in Southern New Jersey, discharge in 2018 was not unusually high relative to previous years (Figures 2–6).

Furthermore, none of these rivers showed an increasing or decreasing trend over time.

This is probably a positive result. On the one hand, current weather and climate trends are not causing an increase in high flows in these rivers. This was confirmed by a separate analysis looking at maximum daily discharge (data not shown). Perhaps somewhat worrying, 2011 had the highest daily discharge for the Cohansey, Mullica, Raccoon, and Salem. For the Maurice, 2011 had the highest daily discharge except for 1940.

On the other hand, flows in these rivers aren't decreasing over time, as might be feared if water consumption is increasing in these areas.

## References

[DRBC] Delaware River Basin Commission. 2019. 2018: A Record Year for River Flows. <u>www.nj.gov/drbc/home/spotlight/</u> <u>approved/20190104 record-flows.html</u>.

Melisurgo, L. The wettest year in N.J. history: County-by-county breakdown; 15 wettest towns of 2018. NJ.com. <u>www.nj.com/expo/</u> <u>news/g66l-2019/01/54d83f928c6946/the-</u> <u>wettest-year-in-nj-history.html</u>.



Figure 3. Discharge by year for Maurice River at Norma, Cumberland County. Error bars represent the 95% confidence interval.



Figure 4. Discharge by year for Mullica River near Batsto, Atlantic and Burlington Counties. Error bars represent the 95% confidence interval.

U.S. Climate Data. 2019. Climate New Brunswick, 1981–2010. <u>www.usclimatedata.com/climate/new-brunswick/new-jersey/united-states/usnj0348</u>.

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# Was River Discharge Unusually High in 2018 in Southern New Jersey?... continued

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[USGS] U.S. Geological Service. 2019. National Water Information System.

- Cohansey River at Seeley NJ, <u>wa-terdata.usgs.gov/nwis/uv?</u> <u>site no=01412800</u>
- Maurice River at Norma, <u>wa-</u> <u>terdata.usgs.gov/nwis/uv?</u> <u>site no=01411500</u>
- Mullica River near Batsto, <u>wa-terdata.usgs.gov/nwis/uv/?</u> <u>site\_no=01409400</u>
- Raccoon Creek near Swedesboro, <u>wa-terdata.usgs.gov/nj/nwis/uv?</u> <u>site no=01477120</u>
- Salem River at Woodstown, <u>wa-terdata.usgs.gov/nj/nwis/uv?</u> <u>site no=01482500</u>
- Delaware River at Trenton, <u>wa-terdata.usgs.gov/nwis/uv/?</u> <u>site no=01463500</u>



Figure 5. Discharge by year for Raccoon Creek near Swedesboro, Gloucester County. Error bars represent the 95% confidence interval.



Figure 6. Discharge by year for Salem River at Woodstown, Salem County. Error bars represent the 95% confidence interval.

