

Water Quality Baseline Data of the Delaware River Basin in PA and NJ

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Abstract

Over two hundred water samples were collected from various stream sites in the Delaware River Basin in New Jersey and Pennsylvania by dozens of volunteers from Musconetcong Watershed Association, Delaware RiverKeeper Network, and Stroud Water Research Center. The samples were collected on a monthly, quarterly, and semi-annual bases respectively during late last year and early this year and were analyzed for their metal, phosphate, nitrate, and sulfate concentrations, and alkalinity in our laboratory. Sodium and chloride which are the elements that we are particularly interested in showed clear patterns of spatial variations. Their concentrations in water are generally higher downstream and near dense road network than their concentrations in water from upstream and rural regions based on our GIS analysis. The sodium concentrations for water samples in the spring season were higher than sodium concentration for water samples in the late fall due to the apparent road salt applications. The data collection will help us establish the base line salt, metal, and nutrient concentrations in the large Delaware River Watershed and can be used for future geochemical and source identification studies.

Figure 1. Sample site location maps for the studied watersheds. The top watershed is the Centennial Lake watershed.

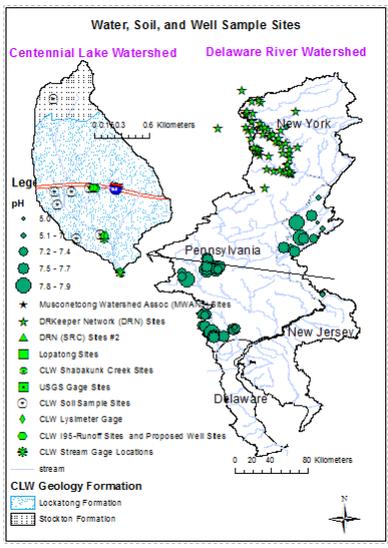
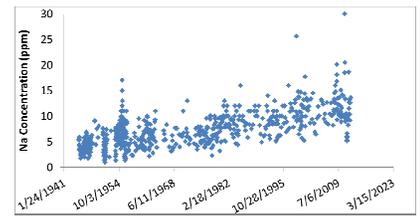
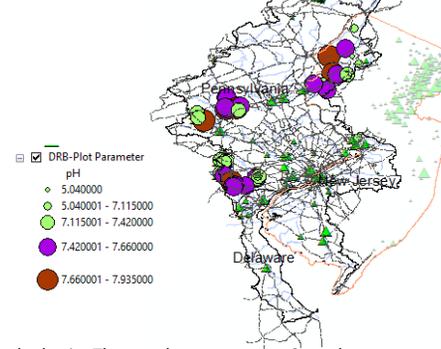


Figure 2. Sodium Concentration (ppm) in the Delaware River at Trenton
There are many incidence that Na level surpassed the max 25 mg/l in drinking water recommended by EPA. Na is not treated in Philadelphia water intake plants

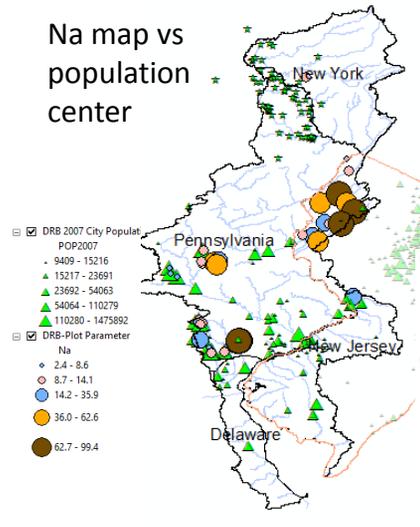


pH map vs road network

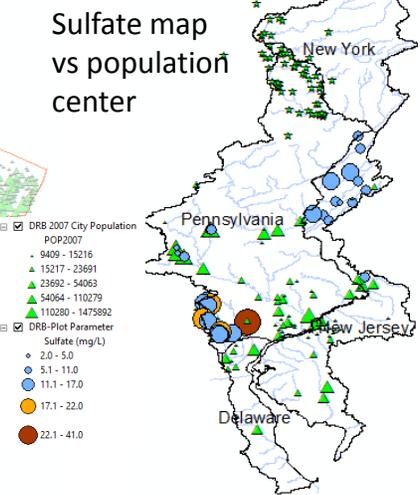


We would like to build water quality baseline data for the basin. Three volunteer groups: Stroud Water Research Center in PA, Delaware River Keeper Network in PA, and Musconetcong Watershed Associations in NJ are helping us collect water samples in the field. We collect the water samples from two locations at Rider as well. The maps underneath show some of the data we collected and analyzed since last fall (between 6/15/2015-2/29/2016)

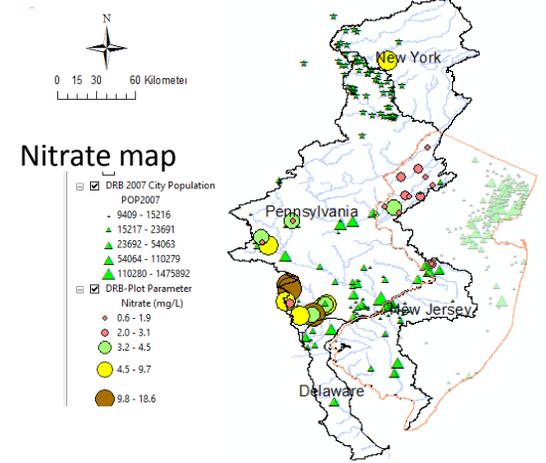
Na map vs population center



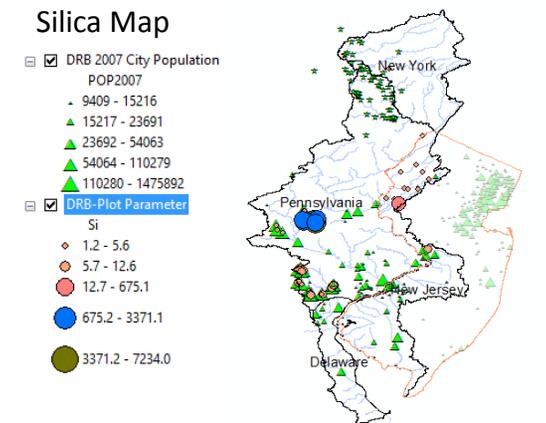
Sulfate map vs population center



Nitrate map



Silica Map



Conclusions

1. Na concentrations increased downstream for almost all the creeks measured, including the large Delaware River.
2. Salt levels in the streams are higher in the spring than in the fall.
3. Salt level, pH, and sulfate concentrations in the streams vary depending on the road density in the basin.