Dissolved Organic Matter Composition in Three Urbanized Streams

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Urbanization has induced rapid physical changes to rivers and introduced novel inputs that have the potential to alter the transport and transformation of nutrients including carbon. Dissolved organic matter (DOM) plays an important role in many biogeochemical cycles and both its composition and chemistry are heavily influenced by watershed characteristics including soil type, climate, and hydrology. DOM is also known to be altered by anthropogenic inputs such as persistent organic pollutants. To understand how urbanization could impact DOM, we chose three urban headwater streams with a range of land cover (ex. suburb, industry, golf course, parkland) and collected monthly baseflow samples from 8-10 locations over the course of one year. Samples sites were chosen based on changes in land cover or water chemistry (i.e.; conductivity, temperature) observed when scouting locations. Water samples were collected for common anions and cations as well as DOM analysis and sonde measurements of conductivity, temperature, dissolved oxygen, and FDOM were taken at each location. DOM composition and concentration was analyzed via fluorescence and dissolved organic carbon (DOC) analysis. The two streams with more intensely urbanized watersheds, including commercial and industrial land use, had higher temperatures and DOC concentrations and greater variability in chemistry across the year. DOC concentrations decreased after ponds and remained more stable than upstream. Total nitrogen in the more industrial/suburban stream jumped during early spring. Streams consisting of shale substrate showed less variability in DOC and conductivity than stream reaches consisting of glacial outwash. Overall, we found that urbanization and anthropogenic manipulation of streams was associated with greater seasonal variability in temperature, conductivity and dissolved organic matter across the streams with constructed ponds acting as a filter on concentrations of dissolved organic matter.