Title: Chemical Cocktails from Coast to Coast: Is there a Universal Water Quality Signature of Urbanization in Streams?

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In urban systems, a wide variety of processes, including increasing impervious surface cover, road salt application, sewage leaks, and weathering of the built environment, contribute to novel chemical cocktails that are made up of metals, salts, nutrients, and organic matter. Due to heterogeneous land use and a myriad of pollution sources, water quality is highly variable as streams flow through urban areas. National sensor data sets reveal that water quality in many U.S. streams in different metropolitan areas is influenced by the urban environment; however, these datasets lack concurrent measurements of multiple contaminants over local spatial scales. To investigate if urban streams in different U.S. cities have similar water quality characteristics, we conducted synoptic-style sampling campaigns for nine rivers in five major metropolitan areas (i.e., Baltimore, Maryland; Washington, DC; Cincinnati, Ohio; Denver, Colorado; and Portland, Oregon). We collected 10-65 samples along the flowpath of each stream as the water flows through progressively more urban areas and analyzed for base cation, trace element, carbon, and nitrogen concentrations and organic matter optical properties. Results demonstrate an urban water quality signal in many of the sampled streams where salts/weathering ions, such as Ca^{2+}, Mg^{2+}, Na^{+}, Sr, and K^{+}, increased along rural to urban flowpaths. These ions are often significantly correlated to one

another and drive much of the overall dataset variability. Some streams with wide riparian buffer zones and stream restorations did not demonstrate these systematic increases in salt ions, suggesting that green spaces may disrupt this urban signal.