The Hydrology and Water Quality Dynamics Associated with an Urban Beaver Pond Complex

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An urbanized Piedmont beaver pond complex (BPC) was hydro chemically monitored from June 2022 to May 2023 with water quality samples collected approximately every 10 days. Precipitation, discharge in Inflow and outflow streams and pond water levels were continuously measured to develop monthly water balances for the pond complex. Water samples were analyzed for dissolved total phosphorus (DTP), dissolved total nitrogen (DTN), dissolved organic carbon (DOC), nitrate (NO_3^-), ammonium (NH_4^+), ortho phosphorus (PO_4^{3-}), total suspended solids (TSS), and turbidity. In situ measurements for dissolved oxygen (DO), pH, water temperature, and specific conductance were made at the time of each sample collection. Mass balances were calculated for individual ponds and the BPC. Monthly residence time for the BPC ranged from 681 hours (June) to 10 hours (January). Anoxic conditions were not detected in any of the four beaver ponds over the course of the study. Significant retention of TSS (-53%), DTP (-72%), DTN (-44%), and NO_3^- (-63%) was found for the BPC. Statistically significant retention or export was not found for DOC (-10%), NH_4^+ (+2%), or DON (-16%). Ortho-phosphorous was rapidly taken up and was generally not detectable in surface waters within the BPC. The portion of inorganic N (NH_4^+ + NO_3^-) declined from 80% of inputs to 60% of exports at the catchment outlet.