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Forging the link: using a conservative mixing framework to characterize connections between rivers and Great Lakes in river-lake transition zones

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River-to-Great Lake transition zones are hydrologically, biogeochemically and biologically dynamic areas that regulate nutrient and energy fluxes between rivers and Great Lakes. Our goal is to characterize the biogeochemical properties of the river-lake transition zones and understand their relationship to food webs. We focused our initial research on south shore Lake Superior tributaries of contrasting geomorphology and land use. Differences along the transition zone were described using a conservative mixing model that is based on the geochemical gradient that arises from river and lake water mixing. We found that the upstream displacement of the transition zone varied with respect to both tributary morphology and discharge. Organic matter and nutrient sources to transition zones reflect anthropogenic activity within the watershed. Principal components analysis revealed that variability in nutrients and particulates along the transition zone is strongly influenced by physical mixing of river and lake water; however, deviations from conservative mixing reveal internal sources of nutrients and phytoplankton within mixing zones, indicating metabolic ‘hot spots’. Stable isotope gradients that arise from the mixing of river and lake water can be used to connect areas of high productivity to higher trophic levels. This abstract does not necessarily reflect U.S. EPA policy.