**Abstract** *(350 words for ecology)*

Marine-derived nitrogen (MDN) enters nutrient poor terrestrial and freshwater ecosystems through direct consumption by predators and primary production when Pacific salmon (*Oncorhynchus* spp.) return to spawn and die in these environments. The ecological impacts of the direct consumption pathway are well establlished, however many studies examining the primary production pathway document the presence of MDN, not necessarily its ecological impacts. This knowledge gap is particularly pronounced in terrestrial systems, where research does not consider the important role of soil nitrogen processing and its potential impact on plant available nitrogen pools. To test the long-term importance of salmon on plant available N pools in soils, salmon were systematically removed from one bank and deposited on the opposite bank of a 2 km stream in southwestern Alaska. In July, 2017 soil core samples were taken for 9 paired transects along the stream at distances 1m, 3m, 6m, 10m, and 20m from the bank full point. The ecological importance of MDN was measured by the [NH4+], [NO3-], [organic N], net mineralization, and net nitrification for each soil sample and the presence of MDN was documented using stable isotope value of nitrogen, δ15N of bulk nitrogen, δ15N of NH4+, and δ15N of NO3-. Gravimetric water content and carbon:nitrogen were also measured to determine differences in soil substrate quality between the two banks. Using linear mixed effects models, stable isotope analysis showed MDN was elevated on the salmon enhanced bank compared to the salmon depleted bank, however this increase in MDN did not produce measurable ecological responses in soil nitrogen concentrations and transformations. Additionally, stable isotope analysis of NH4+ demonstrated soil microbial processing can enrich δ15N to values higher than salmon, which could bias MDN measurements in vegetation. These results demonstrate salmon enhancement has no measurable ecological response on plant available nitrogen pools during peak vegetative growth season on long time scales. Variations in plant available nitrogen pools is likely more dependent on other factors, such as substrate quality, water content, and microbial communities rather than salmon presence.