

## **Nutrient Limitation in Swauk Creek River Basin**

TANYA LAMB; *Central Washington University, Mentor: CLAY ARANGO, Biology*

Historically, salmon subsidized Pacific Northwest streams with marine-derived nitrogen and phosphorus, important nutrients that control stream food web productivity. With regional salmon decline, many streams have become nutrient limited. Swauk Creek, in the upper Yakima River basin, holds promise for salmon restoration because it currently supports a small run of steelhead, and coho salmon will be reintroduced within the decade. However, decades of curtailed nutrient subsidies may have decreased food web productivity, which could impede salmon restoration. I studied three headwater streams in Swauk basin in summer and autumn using nutrient diffusing substrata to measure nutrient limitation. In this method, nitrogen, phosphorus, or both diffuse from agar through a glass disk or a cellulose sponge that select for autotrophic or heterotrophic biofilms respectively. Although Iron and Hovey creeks responded significantly to nutrient treatments, Swauk Creek did not, although a larger sample size may have detected a significant response. Autotrophic and heterotrophic biofilms were co-limited by nitrogen and phosphorus in the summer and the fall in Iron Creek, but only heterotrophic biofilms were co-limited in the summer and fall in Hovey Creek. Importantly, nitrogen or phosphorous alone did not induce a significant response in any creek. Co-limitation by nitrogen and phosphorus in Iron and Hovey Creek is consistent with patterns in other streams with long-term salmon decline. Despite having no baseline to compare historic and current nutrient limitation patterns in Swauk basin, food web productivity would likely increase if salmon runs are successfully recovered.