Using Stable Isotopes and Stomach Content Data to Compare the Food webs of a Regulated and Unregulated River of South-Central Newfoundland

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Abstract

Disturbances, such as flow regulation have the potential to alter energy flow and resource availability for downstream river inhabitants. Dam operation modifies river ecosystems by altering natural flow regimes, physical habitat and affecting resource use by consumers in regulated reaches. Few studies have attempted to quantify spatial or temporal variability in consumer resource and food web structure use in regulated and unregulated rivers. A combination of stable carbon (δ13C) and nitrogen (δ15N) isotopes and stomach content analysis was used to evaluate how seasonally variable flow regimes affected consumer resource use, consumer trophic position and food web relationships among fishes within the rivers. Three-spined stickleback (*Gasterosteus aculeatus*) did not exhibit large differences in resource use, and had similar trophic positions in the altered and unaltered river. In contrast, Atlantic Salmon (*Salmo salar*) and Brook Trout (*Salvelinus fontanalis*) had lower trophic positions than conspecifics in the unaltered river. Trophic position also varied seasonally, likely corresponding to the change to increased flows in the summer. Thus food web related studies can provide important insights for flow and habitat management in this region and in other rivers affected by variable flow regimes.