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Can omnivores mediate the effects of degradation?

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Title: Can omnivores mediate the effects of degradation?

Omnivores are generalists that feed at multiple trophic levels and have disproportionate effects on food-web stability. However, the magnitude and direction of omnivore effects still remains unresolved: do omnivores stabilize or destabilize communities? The ability and propensity of omnivores to shift diets, reduce predation pressure, and feed at multiple trophic levels might be of particular importance to community stability in degraded habitats where resources have been reduced. For example, omnivores may reduce the severity and time it takes for a community to recover by dampening the effects of a disturbance-mediated trophic cascade. Freshwater systems are ideal for studying trophic ecology due to the simplicity of their food webs, and in the Western U.S. streams are heavily degraded by overgrazing, beaver extirpation, and drought. In many of these systems, the omnivorous speckled dace (*Rhinichthys osculus*) has replaced trout as an important consumer. Using this species in observational and experimental studies, I propose to test the hypothesis that omnivore diet shifts play a stabilizing role by mediating community stability and increasing resilience during degraded conditions. The observational study will involve stable isotope analysis using speckled dace located in stream reaches of varying levels of habitat degradation in order to determine the dace trophic position. Experimentally, I will establish artificial mesocosms using 1000L cattle tanks with varying levels of two disturbance factors: high shade (greater shade mimicking an intact riparian zone) and nutrient levels (increased nutrients representing agricultural fertilizer inputs), and the presence or absence of dace. I will compare the rate of change of community composition by analyzing invertebrate biodiversity and biomass in mesocosms with dace or without dace in order to determine if dace play a stabilizing role in degradation conditions.