

Food, Phenology, and Flow—How Prey Phenology and Streamflow Dynamics
Affect the Behavior, Ecology, and Recovery of Pacific Salmon

PhD Finishing Talk Abstract

Dr. Gabriel J. Rossi

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Pacific salmon (*Oncorhynchus*) are an iconic genus of anadromous fish whose decline over the last century has linked indigenous peoples, government agencies, fishers, advocates, and scientists in the common, albeit messy, cause of salmon recovery. While the history of ecology, and the earliest research on Pacific salmon, is grounded in the understanding that food web and prey dynamics control the abundance and distribution of predators, the last half-century of salmon management has focused primarily on hatchery production and physical habitat suitability. The continued decline of Pacific salmon, after decades of efforts to restore them, has recently prompted salmon ecologists to remember what Charles Elton (1927) understood nearly a century ago: “*Food is the burning question in animal society, and the whole structure and activities of the community are dependent upon questions of food-supply.*” My PhD research proceeds from the observation (shared with other researchers) that both salmon management and salmon ecology have placed *too little* emphasis on aquatic food webs, animal behavior, and biotic interactions as key drivers of salmon production and resilience—and thus as chief mechanisms of salmon recovery.

This talk will focus on a series of studies and experiments from 2016 to 2019, in two different salmon-bearing California streams. Elder Creek, a tributary of the Eel River, is perennial, shaded, and cold; while Porter Creek, a Russian River tributary, is intermittent, sunny, and seasonally warm. These experiments explore how the interaction of physical habitat, prey phenology, and foraging behavior affects juvenile salmon growth and performance in different streams and how salmon managers can capitalize on this knowledge. My results highlight the importance of seasonal timing in growth potential and behavioral flexibility to changing flow and food web conditions – and ultimately point towards a “foodscape” which integrates physical habitat, river food webs, and salmonid life history diversity over scales relevant to population recovery.