

Temperature conditions and thermal tolerances: a comparison across salmonids

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Abstract

Temperature is often considered the ecological master factor for fish, and the accurate measurement of this environmental covariate has become increasingly relevant as a changing climate threatens to displace native species and disrupt their ecology and survival. Temperature influences a wide range of biological responses from species phenology (e.g., emergence, migration) and growth, to community composition. Specifically, the metabolism of fish is directly regulated by their thermal environment with temperature influencing the rate of physiological processes that can leave fish vulnerable. The Oregon Department of Fish and Wildlife (ODFW) has developed a temperature research and monitoring program to better understand current thermal regimes throughout the state and how thermal conditions (current and future) influence fish. This presentation will focus on two aspects of that program; the improvement of the temporal and spatial extent of temperature data and understanding the differential tolerances to temperatures that exist across salmonids species. We compare physiological trait data for Coastal cutthroat trout, summer steelhead, redband trout, and spring Chinook, relate those data to thermal regimes and highlight how functional thermal limits can inform management decision making.