

THERMAL REQUIREMENTS OF WESTSLOPE CUTTHROAT TROUT^{AFS}

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Westslope cutthroat trout have declined throughout their native range in the Northern Rockies and were considered for listing under the federal Endangered Species Act. Water temperature is widely regarded as playing a key role in determining their persistence, but specific thermal optima and lethal levels for this cutthroat trout subspecies have not been precisely defined. This laboratory study used the acclimated chronic exposure method to determine thermal optima and tolerances for westslope cutthroat trout and for rainbow trout a potential nonnative competitor now occupying much of the former range of westslope cutthroat trout. Optimum growth temperature for westslope cutthroat trout (13.6° C; 95% CI, 10.3-17.0 °C) over the 60-d test period was, unexpectedly, similar to that of rainbow trout (13.1 °C; 95% CI, 6.8-18.2 °C). However, rainbow trout grew significantly better at temperatures below 6.8 °C and above 20.8 °C. Increased growth by rainbow trout at these temperatures could be the mechanism by which rainbow trout are out-competing westslope cutthroat trout. In addition, the ultimate upper incipient lethal temperature (temperature at which 50% of the population can survive for 60-d) for rainbow trout (24.2 °C; 95% CI 22.9

– 25.4 °C) was 4 °C higher than that for westslope cutthroat trout (19.7 °C; 95% CI, 19.1-20.3 °C). The higher upper temperature tolerance of rainbow trout may account for its increased occurrence at lower elevations than cutthroat trout. The thermal requirements established in this study can help guide protection and restoration efforts for this unique cutthroat trout subspecies.