

FACTORS INFLUENCING BROOK TROUT INVASION AND THEIR REPLACEMENT OF WESTSLOPE CUTTHROAT TROUT^{AFS}

Bradley B. Shepard

Montana Fish, Wildlife and Parks and Montana Cooperative Fishery Research Unit
Ecology Department, Montana State University, Bozeman, Montana 59717
bshepard@montana.edu

Distribution and abundance of westslope cutthroat trout (*Oncorhynchus clarki lewisi*; WCT) and brook trout *Salvelinus fontinalis* and their relation to habitat characteristics were studied in three adjacent streams of the upper Jerry Creek watershed, a tributary to the Big Hole River in southwestern Montana. WCT dominated populations in Delano and upper Jerry creeks, while brook trout dominated populations in Libby Creek. Densities of WCT were significantly different among the three streams (ANOVA; $P = 0.001$) with Libby Creek containing significantly lower WCT densities than the other two streams. While small sample size precluded statistical testing, observations of habitat characteristics indicated that Libby Creek had higher average daily water temperatures (1 to 2 °C higher with maximums >14° C versus < 12° C in adjacent Delano Creek), more woody debris, a higher level of fine sediments within the streambed, and a higher proportion of pool habitats than the other two streams. The only known differences in management between these three streams was the fact that timber was harvested using clear-cut techniques along the stream channel of Libby Creek. While similar areas of timber were harvested in the Delano and Jerry watersheds, these harvests did not include riparian clear-cutting. While this evidence must be considered circumstantial, it appears that brook trout invasion and either displacement or replacement of WCT in this drainage may be related to one or more of the following factors, either operating alone or in synergy: increases in water temperature; increases in levels of fine sediments within the streambed; increases in frequency of woody debris; and/or increases in pool frequency. Since past studies have implicated timber harvest activities for raising water temperatures, increasing delivery of fine sediments to stream channels, and increasing woody debris delivered to the stream channel immediately following harvest; it is possible that timber harvest activities in Libby Creek contributed to the observed differences in species composition between these three streams. More research is needed to statistically validate these observations.