

SEASONAL MOVEMENT AND HABITAT USE BY SUB-ADULT BULL TROUT IN THE UPPER FLATHEAD RIVER SYSTEM, MONTANA^{APS}

Clint C. Muhlfeld and Brian Marotz, Montana Fish, Wildlife, and Parks, 490 North Meridian Rd., Kalispell, MT 59901-3854, cmuhlfeld@state.mt.us

Despite the importance of large-scale habitat connectivity to the threatened bull trout, little is known about the life history characteristics and processes influencing natural dispersal of migratory populations. We used radiotelemetry to investigate the seasonal movements and habitat use by subadult bull trout (e.g., fish that emigrated from natal streams to the river system) tracked for varying periods from 1999 to 2002 in the upper Flathead River system in northwestern Montana. Telemetry data revealed migratory ($n = 32$ fish) and nonmigratory ($n = 35$) behavior, indicating variable movement patterns in the subadult phase of their life history. Most migrating subadults (84%) made rapid or incremental downriver movements (mean distance, 33 km; range, 6-129 km) to lower portions of the river system and to Flathead Lake during high spring flows and as temperatures declined in the fall (to below 12 °C) and winter (to below 4 °C). Conversely, some migrants (16%) moved upriver (mean distance, 22 km; range, 6-46 km) as flows subsided following spring runoff and as mean daily temperatures gradually rose above 7 °C. Bull trout subadults used complex daytime habitat throughout the upper river system, including deep runs that contained unembedded boulder and cobble substrates, pools with large woody debris, and deep lake-influenced areas of the lower river. Our data indicate that bull trout exhibited variable movement patterns in the subadult phase of their life history, and that water temperature and river discharge appeared to influence movement. Results elucidated importance of maintaining natural connections and a diversity of complex habitats over a large spatial scale to conserve the full expression of life history traits and processes influencing natural dispersal of bull trout populations. Managers should seek to restore and enhance critical river corridor habitat and remove migration barriers, where possible, for recovery and management programs.