

FISH COMMUNITY RESPONSE TO HABITAT IMPROVEMENTS IN WESTERN WASHINGTON RIVERS^{AFS}

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Habitat enhancement and restoration techniques are used in streams throughout the world in an effort to increase and conserve fish stocks. However, few of these techniques have been thoroughly evaluated. Since 1996, we have been systematically evaluating various habitat restoration techniques in the Pacific Northwest United States. Here we summarize the results of almost a decade of our research evaluating anadromous fish response to habitat improvement techniques including: large woody debris (LWD) and boulder weir placement, reconnection of off-channel habitats, and constructed side-channels. In 30 small streams, higher levels of coho salmon (*Oncorhynchus kisutch*), steelhead (*O. mykiss*), cutthroat trout (*O. clarki*), and larval lamprey (*Lampetra* spp.) were found in reaches treated with LWD though the level of response varied by season and species. Higher levels of coho salmon were also found in streams treated with boulder weirs in 12 southwest Oregon streams. An increase in juvenile and adult salmon abundance and species richness was found in habitats associated with constructed logjams in two large western Washington rivers. We analyzed existing smolt-trapping data from over 30 off-channel habitat enhancement projects and found that constructed groundwater channels were particularly productive for juvenile coho salmon. We then examined groundwater channels intensively and found that constructed channels supported higher densities of coho salmon during the winter, but fish diversity was higher in naturally-occurring channels. Our results suggest that common habitat improvement techniques increase the abundance of salmonids as well as species richness, but results vary by species habitat preferences, season, and magnitude of habitat improvement.