

## **Linking physical habitat characteristics to Chinook spawning distribution in the Yakima River**

JEREMY CRAM<sup>1</sup>, CHRISTIAN TORGERSEN<sup>2</sup>, RYAN KLETT<sup>1</sup>, GEORGE PESS<sup>3</sup>, ANDREW DITTMAN<sup>3</sup>, DARRAN MAY<sup>3</sup>

1. University of Washington, College of Forest Resources

2. U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Cascadia Field Station, University of Washington, College of Forest Resources

3. NOAA Northwest Fisheries Science Center

Hatchery supplementation of spring Chinook salmon in the upper Yakima River basin has raised questions about the interbreeding of wild- and hatchery-origin fish. Acclimation facilities are intended to disperse hatchery-origin adults throughout the upper watershed, but if suitable spawning habitat is limited then undesirable competition and interbreeding may occur. The objectives of this study are to (1) evaluate spatial patterns of spawning by hatchery and wild Chinook salmon, and (2) identify physical habitat variables that characterize redd sites used by wild- and hatchery-origin spring Chinook. Extensive surveys of channel morphology and physical habitat (e.g., substrate, depth, wetted width, cover) were conducted in over 180 kilometers of mainstem, floodplain, and tributary river habitat in 2007. Longitudinally linked habitat units were identified based on broad-scale changes in gradient, substrate, or depth. To explain the fine-scale distribution (<250m) of wild- and hatchery-origin Chinook redds and the physical characteristics that affect their distribution, over 70 sites were intensively surveyed in 2008. Preliminary results suggest that redd densities of wild- and hatchery-origin Chinook peak upstream of the Cle Elum River confluence. Within that section, island braided reaches with multiple channels attract the most spawners. Desirable habitat factors include gravel substrate, proximity to deep water and cover, and downwelling zones above riffle crests.