

**Title:**

DNA technology for stock and parentage classification

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**Summary of Presentation:**

Microsatellites are abundant in salmonid genomes, relatively easy to assay, and many are highly polymorphic so they provide access to lots of discrete trait data. When data from multiple microsatellite loci are combined, we have enough discriminating power to identify individuals, to assign parentage, to classify individuals to their stocks of origin, to estimate the stock proportions in population mixtures, and to study population structure. WDFW used a microsatellite-based parentage analysis method to estimate the reproductive output of hatchery and wild origin chinook salmon released into the Cle Elum experimental spawning channel. WDFW used a mixture analysis method developed in-house to simultaneously classify individual chinook smolts captured at the Chandler trap to their stocks of origin and to estimate the relative abundance of the component populations passing the trap during the sampling period. Simulations suggest that we achieve high accuracy and precision in those classifications. The US Bureau of Reclamation recently purchased a water right in the Naches River, WA. The USBR will use this water to maintain discharges in the "Wapatox reach" at approximately 300 cfs greater than discharges observed in recent years. In this presentation we will describe our research design including the population estimate techniques to be used, Multispectral Imaging (MIS) techniques, and the Geographical Information System to be constructed. In addition to the research design presentation, we will show some baseline data that was collected in 12/02. These data on *Oncorhynchus mykiss* densities are for the treatment (Wapatox) reach and the reference (immediately downstream of the Wapatox reach). We will show that the density of *O. mykiss* in the treatment reach is lower than the density in the reference reach. In addition, the densities of *O. mykiss* were highest in slow habitats with more cover. Finally, invertebrate dry mass obtained in dusk drift samples was much higher in secondary channels compared to mainstem habitats. The US Bureau of Reclamation operates 5 dams in the Yakima River (WA, USA) watershed. Downstream of two of these dams (Keechelus and Cle Elum) we have investigated the

influence of dam discharge on the hyporheic environment. In this presentation, we will report the results of this work. First we will discuss the relationship between surface discharge and hyporheic flow. We found that when discharge increased the hyporheic flow became more upwelling in spring chinook redds. In a different year, we found that when discharge decreased the hyporheic flow became less upwelling in spring chinook redds. Second, we intend to discuss the results of experiments we are currently conducting. In these experiments, we are investigating the influence on hyporheic flow on egg survival. We have installed egg plates (loaded with 32 spring chinook eggs) adjacent to 10 spring chinook redds and we have installed egg plates in another 10 locations that are not adjacent to the redds. We will discuss the physical and biological properties of these locations and the resulting egg survival in each.