

**Murdoch, Andrew R. – Washington Department of Fish and Wildlife**

**Presentation Title: Abundance and Migration Success of Overshoot Steelhead in the Upper Columbia River**

Abstract for the 2020 Pacific Coast Steelhead Management Meeting

Andrew R. Murdoch (WDFW, Wenatchee, WA), Kevin See (BioMark, Seattle, WA), Benjamin L. Truscott (WDFW, Wenatchee, WA)

[Andrew.Murdoch@dfw.wa.gov](mailto:Andrew.Murdoch@dfw.wa.gov), [Kevin.See@biomark.com](mailto:Kevin.See@biomark.com),  
[Benjamin.Truscott@dfw.wa.gov](mailto:Benjamin.Truscott@dfw.wa.gov)

In response to an altered environment, adult summer steelhead *Oncorhynchus mykiss* may exhibit complex behaviors during upstream migration in the Columbia River Basin. Steelhead may migrate upstream of their natal tributary or overshoot from days to several months and subsequently migrate downstream or fallback to their natal tributary to spawn. An existing Bayesian patch occupancy model that used adult steelhead tagged with passive integrated transponder (PIT) tags to estimate population-specific abundance upstream of the tagging location was modified to also to estimate the abundance of overshoot fallbacks. Overshoot abundance at the tagging location was estimated using the relationship between known fallbacks and their estimated abundance. The annual mean (SD) proportion of overshoot steelhead that successfully migrated downstream of the tagging location (i.e., Priest Rapids Dam) was 0.66 (0.25). The spatial distribution (i.e., number of dams detected upstream of Priest Rapids Dam) of overshoot steelhead suggested the number of dams negatively affected migration success probability. This is the first study to estimate the abundance of overshoot and fallback steelhead and can be replicated using existing models in the Snake River Basin. Studies have consistently shown that surface flow passage routes (e.g., sluiceways and temporary spillway weirs) are very effective in guiding and passing adult steelhead downstream of a hydroelectric project. Overshoot rates are expected to increase (i.e., both magnitude and number of populations) in response to increasing water temperatures. In response, steelhead and to a lesser extent other anadromous salmonids have shown their resilience in adapting to these unfavorable migration conditions. However, without significantly increasing the downstream migration success of both pre-spawn (i.e., overshoot) and post-spawn (i.e., kelts) steelhead, greater uncertainty in the efficacy of recovery efforts in other areas (i.e., habitat, hatchery and harvest) may be the consequence.