

# Yakima River Steelhead: Habitat Restoration (~15 yrs) + Kelt Reconditioning (~10 yrs) = Population Response?

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Yakama Nation Fisheries is collaborating with a number of agencies including the Yakima Subbasin Fish and Wildlife Recovery Board and the Columbia River Inter-Tribal Fish Commission to recover ESA-listed steelhead populations in the Yakima River Basin (Figure 1). We are using a combination of habitat actions and steelhead kelt reconditioning to achieve restoration goals.

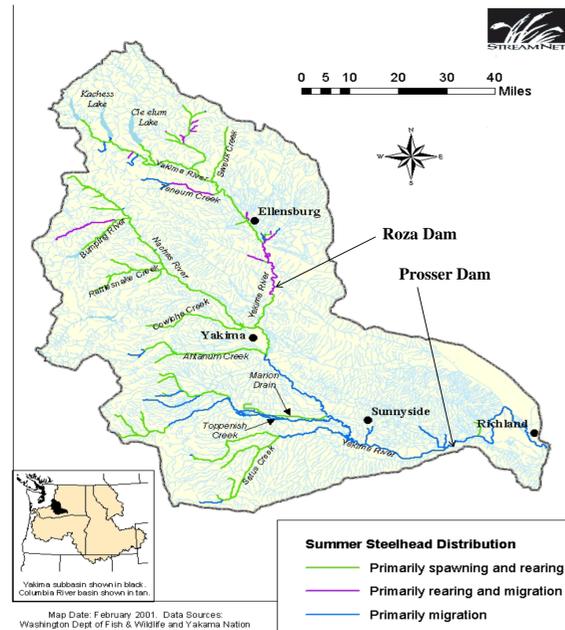
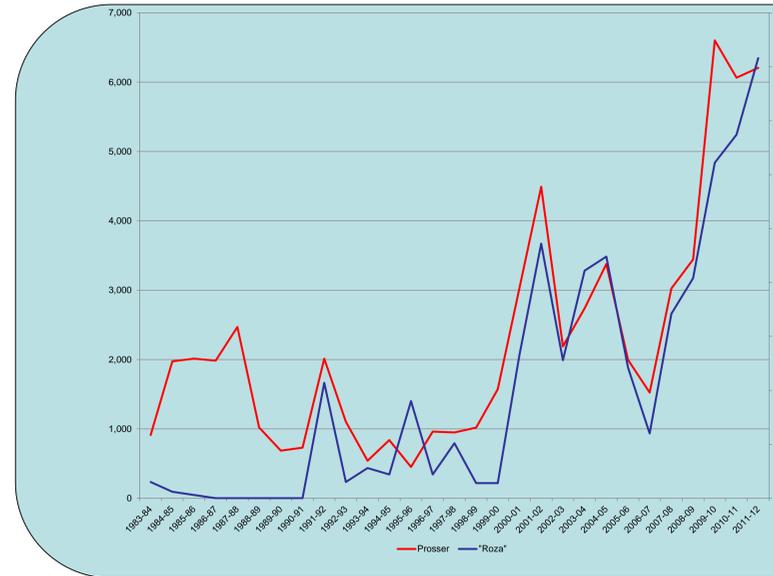


Figure 1. Summer Steelhead Distribution in the Yakima River Subbasin. Population groups include Satus, Toppenish, Naches system (including Ahtanum Creek), and Upper Yakima.



Adult Counts: Steelhead populations in the Yakima River Basin may well be responding to the combined results of these efforts. Wild steelhead counts at Prosser Dam have exceeded 6,000 fish every year since 2009. This compares to an annual average of fewer than 2,000 fish from 1983-2008 (Figure 2). Counts at Roza Dam in the Upper Yakima Basin exceeded 400 steelhead for the 2011-12 return year, likely the highest count recorded since the dam was constructed in 1939 (Figure 2).

Figure 2. Wild steelhead abundance at Prosser (red, left axis) and Roza (blue, right axis) dams for adult return years (July 1 to June 30) 1983-84 to present.

**Major Habitat Actions:** In cooperation with local irrigators, diversion dams have been removed on Satus, Toppenish, Cowiche, and Taneum Creeks (Figure 3). Additional watershed restoration activities include: (1) headwater wetland rehabilitation; (2) adult and juvenile fish passage restoration; (3) stream channel and riparian area restoration including bringing stream channels back to grade, reconnecting side channels and floodplains, planting native vegetation in conjunction with riparian and range fencing; and (4) minimum instream flow implementation and modification of irrigation water sources and uses.



September 2003 October 2011



Figure 5. Vegetation recovery in Renchler's Meadow, Satus Creek: before (L) and after (R) restoration actions.

Figure 3. Taneum Creek before (L) and after (R) Bruton Dam removal.



Figure 4. Renchler's Meadow, Satus Creek before (L) and after (R) fence removal. Experience has shown us that if cattle and horses are excluded from the meadow areas, drastic improvements are made in meadow health.



Figure 6. Reconditioned Steelhead Female in process of constructing her redd in Satus Creek, April 1, 2002 (tracked with radio telemetry).



**Steelhead Kelt Reconditioning** is the practice of capturing, holding, and feeding post-spawned salmon or steelhead in an artificial rearing environment for the purpose of regeneration of gonads for repeat spawning. From 2001 to 2011 we evaluated the characteristics of Yakima River steelhead populations and reconditioned steelhead kelt (Hatch et al. 2012, in peer review). We captured about 27% of annually returning wild steelhead as downstream migrating kelt at an irrigation diversion facility. Captured kelt were reared for 4.5-10 months in an artificial environment, treated for diseases and parasites, and fed both krill and pellets. Surviving reconditioned fish were released into the Yakima River coincident with the upstream 'maiden' steelhead migration. Reconditioned steelhead kelt were predominantly (>92%) female. Survival to release ranged from 20-62% and averaged 38% with reconditioned kelt showing positive changes in fork length, weight, and Fulton's K condition factor. Kelt condition and color at time of collection was correlated with survival. Migration timing of reconditioned kelt was correlated with run timing of upstream maiden migrants. Given adequate collection opportunity the empirical results we observed demonstrate the potential of steelhead kelt reconditioning to provide recovery benefits for imperiled wild steelhead populations in the Columbia River Basin.