DEVELOPMENT/RESTORATION FINAL REPORT

Sponsor Name: Yakama Nation Fisheries **IAC Project Number:** 05-1067

Project Name: Tepee Cr.-IXL Meadows Restoration **IAC Invoice Voucher Number:**

1. Reporting period: Contract Start: Project Completion: July 2007

2. Provide a site plan identifying the development completed in this project [2 copies, no larger than 11" x 17" size]. Please date the plans.

3. Did this project include elements as part of a mitigation plan? No **X** Yes ☐ If yes, explain:

4. Type and number of facilities developed [be specific]:

- A 140' coarsened riffle (0.03 ft/ft) was constructed at the downstream end of the reach for grade-control
- Ninety-five feet of new channel constructed
- Reconnected 135' of historic channel
- Imported gravel to raise bed elevation (~3') and reconstruct pool/riffle sequences along 1850' 0.95% average slope and bankfull width of 18.4'
- Overall reach lengthened to 1990'
- 28 LWD jams constructed along channel margins, logs were buried within the channel to provide extra stability where hydraulic modeling indicated excess stream power.
- Numerous (50+) floodplain LWD placements constructed for floodplain roughness
- Removed 2 culverts and related fill from an abandoned cross-valley road alignment
- Extensive salvage of existing vegetation (sod mats and shrubs) was employed for bank protection and to hasten the recovery rate
- Conifer thinning has reinvigorated a roughly 0.5 acre aspen stand

Sponsor Comments:

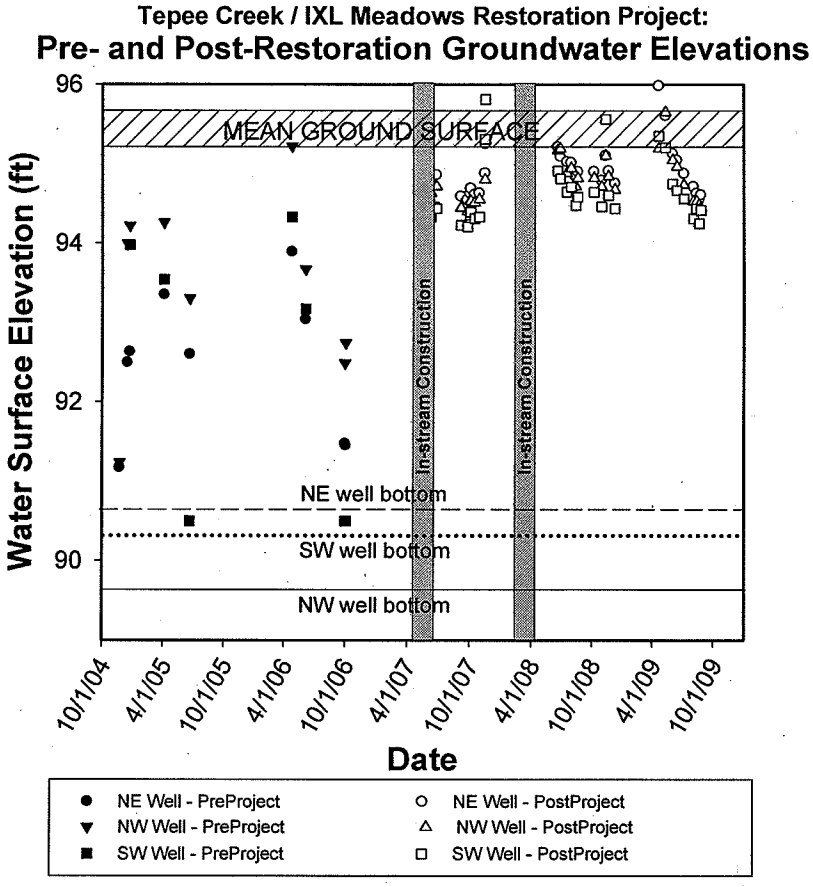
The Tepee Creek/IXL Meadows Restoration Project was implemented to address channel incision on an 1880' stream reach. Unlike traditional treatment approaches for incised reaches that involve excavation of new floodplain or the use of channel-spanning structures, the approach at Tepee Creek involved importing gravels to raise the bed elevation to restore overbank flow frequency to the pre-disturbance floodplain, and renew beneficial meadow functions such as water storage, flow moderation, extended late season flow, and establishment of wetland and riparian vegetation.

HEC-RAS was used to characterize the level of impairment to the existing stream and to develop design dimensions to restore overbank flooding during 1.5-year (approximately 80

cfs) and greater floods. Modeling of pre-project conditions indicated floodplain access through the majority of the 1880' long reach occurred at the 10-year flood. Design dimensions were cross-checked with nearby analogues and regional geometry equations. The design was implemented with fit-in-the-field oversight by a combination of professional staff that included a hydrologist with extensive fisheries experience, geomorphologist, and hydraulic engineer.

Results:

- Flow Duration: perennial pools maintained both years since construction (the reach dried-up in 4 out of 5 years pre-project)
- Groundwater: 2 - 4' increase in summer water table, average annual groundwater surface increase between 1.3 – 2.4'



- High Flow Access: at bankfull or lower flows to four side channels totaling 835 lineal feet
- Number of Pools: increased from 15 to 23 (65%); mean RPD increased 1.05'
- Wetlands: ~3100 ft^2 of emergent wetland created

- Riparian Vegetation: Rapid recovery, particularly of salvaged plant materials
- Spawning: at least five steelhead redds observed
- Rearing: 2x – 3x increase in juvenile *O. mykiss* abundance
- Macroinvertebrates: Rapid colonization by multiple species of caddisflies and mayflies

Groundwater levels, steelhead spawning, and photo-monitoring has conducted on the project reach in 2007, 2008, and 2009. The project sponsors are committed to project monitoring and will continue to photo document and monitor groundwater into the future. Additionally, the project is assessed annually for maintenance issues. To date, the primary maintenance actions have been maintaining livestock exclusion (fence repair) and control of invasive species (primarily bull thistle).

To date, the project has been presented at the 2008 River Restoration Northwest Design Symposium, the 2008 Western Division American Fisheries Annual Meeting, and the 2009 SRFB Salmon Habitat Conference.

I hereby certify that this project has been completed in accordance with the Project Agreement. Further, I certify the completed project is consistent with both the scope of the project approved (as amended) by the Interagency Committee for Outdoor Recreation (IAC) or Salmon Recovery Funding Board (SRFB) and with the project application.

Sponsor Signature	Date	Title	Telephone Number