Tucannon River LWD Restoration Project Site Assessment

Project # 1832 (&1573)

Prepared for Washington State RCO Salmon Recovery Funding Board by Washington State Dept. of Fish and Wildlife Watershed Steward, David Karl

Introduction

The Washington Department of Fish and Wildlife (WDFW) have undertaken restoration of Large Woody Debris (LWD) to the Tucannon River in SE Washington State. The Tucannon River is a tributary of the Lower Snake River, and the only tributary in the Lower Snake River that has a Spring Chinook population. There are three fish species in the Tucannon River that are listed under the Endangered Species Act (ESA) as "Threatened" , Snake River Steelhead, Bull Trout, and Snake River Spring Chinook .

The original proposed project #10-1832 was intended to improve/restore naturally functioning river conditions by adding whole trees (key LWD structure) to approximately 1/2 miles of Tucannon river habitat. The scale of the project would later be increased from ½ mile to a 2 mile reach. Additional funding for the expanded project was obtained through grants from BPA and SRFB (project # 11-1573).

Historic anthropogenic alterations to the Tucannon River Basin have occurred since pioneers arrived in the mid 1850's. Originally, the Tucannon River was a complex anabranching channel with a robust, valley spanning riparian zone. Over the past 150 years, land use practices, such as livestock grazing, agriculture, logging, and road building associated with those activities have changed the Tucannon into a shortened, moderately incised and confined single thread channel that has lost in-stream habitat complexity, pool frequency, floodplain connection, and a severely degraded riparian zone. Additionally, after World War II, large machinery (i.e. bull dozers, excavators) have been used to manipulate the river to accommodate new land use activities and "clean up" the river after flood events. These "clean up" activities included the systematic removal of LWD jams throughout and "sugar diking" which involved pushing up river cobbles to increase the elevation of the river banks. These activities exacerbated river confinement and created conditions that forced the channel to headcut and become more incised and confined over time. Finally, rock structures and cobble dikes were built to maintain the river in a specific area and for many decades the river has been held in place.

The project is designed to restore LWD to a 2 mile reach located within the WDFW Wooten Wildlife Area with the goal of developing more natural floodplain connection, in-stream habitat complexity, with an emphasis on increasing pool frequency. Restoring floodplain

connectivity will increase linkages between the river and secondary channels that have historically been either cut-off from the river through incision and/or artificial confinement. Furthermore, floodplain connection will encourage riparian flooding to occur at a more natural frequency, improving local aquifer recharge and riparian function within the floodplain. A 2011 Habitat Assessment was completed for the Tucannon River by Anchor QEA. The following exert is a narrative for future channel evolution that emphasizes the importance of LWD restoration in regards to improving natural stream and floodplain function in the Tucannon Basin:

The Tucannon River is currently in the process of recovering from anthropogenic disturbance and re-establishing more natural conditions for the system. The river has been slowly recovering from clearing and straightening of the channel, although many simplified portions of the channel remain because of confinement by infrastructure. In unconfined areas, the channel is attempting to recover via channel migration, recruitment of LWD, and deposition of LWD and sediment. Through time, additional channel migration will further extend the length of the channel network, increase floodplain connectivity, and reduce in channel velocities. Introduction of maturing riparian trees and LWD material will lead to the formation of log jams, which promote sediment deposition in the lee of the structures. Log jams also promote split flow and side channel development, leading to hydraulic conditions that often provide preferred habitat for juvenile salmonids, and distribute sediment load and organic debris across the floodplain. In addition, split flows and side channels reduce the hydraulic energy of the mainstem, increasing the ability for the channel to retain LWD and sediment. In this manner, the recovery of the system is a feedback loop where channel migration leads to LWD deposition on bars and shallow areas, which leads to log jams and split flow conditions, which reduces hydraulic energy in the channel, leading to additional deposition of LWD and sediment, and the feedback loop continues. The result of the process is an overall widening of the active channel and better hydraulic connectivity between the river, side channels, and floodplain. The projects identified in this plan are developed to help achieve these desired conditions over time as natural processes are restored in selected areas. (Anchor QEA, 2011).

During the project development process WDFW and Snake River Salmon Recovery Board staff identified an opportunity with the United States Forest Service (USFS), Umatilla National Forest to acquire trees that had been blown down in an area identified for a timber sale associated with the 2005 School Fire. In short, we had an opportunity to acquire more trees than we had anticipated during the first grant application, and subsequently decided to restore a larger reach. The project goals were changed from treating a half mile to up to 2 miles.

Concurrently, in 2011 WDFW and local partners started an assessment of three reaches that had been identified for the original LWD restoration. The uppermost Reach A (RM 50 to 48.65), middle Reach B (RM 44 to 42.3), and bottom Reach C (RM37.8 to 37.2) are all located on the WDFW Wooten Wildlife Area.

Reach Summaries

Reach A (RM 50 to 48.65)

The river channel in reach A extends from Panjab Bridge downstream to the private property line upstream from Cow Camp Bridge. Reach A is characterized by a single thread with little habitat variability or complexity. This reach has several channel spanning rock and log weirs that both cause some of the problems with the channel morphology, but also provide much of the habitat variability that exists.

There is very little natural large wood (LWD) found throughout the reach and consequently the stream habitat complexity and pool frequency/quality is poor. The riparian is in fair to good condition in this reach with a mix of deciduous and conifers, dominated by conifers Doug Fir, Ponderosa Pine, and White Fir. The lack of natural LWD is also significant because Reach A was the reach least impacted by recent fires in the Tucannon Valley and has the best riparian conditions of all three reaches that were assessed. It suggests that both natural recruitment and large wood retention is limited in this reach.

The floodplain connectivity throughout Reach A is fair; however, many side channels have been stranded by rock weirs, rootwad revetments, and other similar structures. Restoring LWD to this reach will increase floodplain connectivity and provide improved in-stream habitat complexity. However, additions of large wood with the specific intent of enhancing the existing rock and root wad structures is also needed, because these structures maintain a static point for the channel

Photo 1. Reach A – Straight, simple channel form; rare LWD on right bank. (Photo - Anchor QEA, 2011)

Reach B (RM 44 to 42.3)

Reach B begins just downstream from Big Four Lake at RM 44 and continues downstream to approximately 200 feet upstream from the Beaver/Watson Lake intake at RM 42.3. LWD restoration was implemented within this reach after the 2005 School Fire and again in 2008. The projects were done by dropping burned (dead) trees into the channel where and when the opportunity presented itself. The results were generally successful, but influenced only a small percentage of the reach. The majority of Reach B is much like Reach A, characterized by a single thread channel with little habitat variability or complexity.

The majority of Reach B is incised with very little floodplain connectivity. Subsequently, off channel habitat is poor through large sections of the reach and instream habitat complexity is limited. Most instream habitat features are a result of large wood recruitment resulting from the School Fire or recent post-fire LWD restoration efforts conducted by WDFW and USFS.

The riparian in this reach is in early stages of recovery following the fire and provides limited shading and little potential LWD recruitment for many decades. The riparian is dominated by Ponderosa Pine that survived the fire and rebounding deciduous understory mostly Cottonwood and Alder. The addition of LWD structures designed to agrade the channel and improve floodplain connection throughout this reach will benefit post fire riparian conditions and LWD recruitment in the future.

Photo 2. Reach B – Channel is highly confined, riparian has been degraded by recent fires.

Reach C (RM 37.8 to 37.2)

Reach C begins at the Spring Lake Bridge (RM 37.8) downstream to the private property line downstream from the Wooten WA Headquarters (RM 37.2). Reach C is also a single thread channel with limited stream habitat complexity. Most of the stream habitat features result from a few natural LWD jams found within the reach.

Floodplain connectivity in this reach is fair to good; however because of a lack of LWD structure there is still very limited off-channel habitat with only two small side channels identified. Restoration of LWD in this reach would provide more stream habitat complexity and increase river/floodplain interaction.

The riparian is in fair condition with a mix of Cottonwood, Alder, Willow, and P. Pine. The riparian in this reach was also impacted by the School Fire, but not nearly as badly as Reach B. A large wetland complex dominates the lower extent of the reach on the right bank. This wetland is connected to springs and channels that extend almost a mile downstream. LWD restoration in these areas could improve linkages between the river habitat and the wetland.

Photo 3. Channel with natural wood recruitment in Reach C (photo - Anchor QEA)

Conclusion

The RTT members that participated in the assessment and design of this project were Steve Martin, SRSRB, Kris Buelow, SRSRB, Jim Webster, CTUIR, Eric Hoverson, CTUIR, Mark Grandstaff, WDFW, Glen Mendel, WDFW, Bruce Heiner, WDFW, Del Groat, USFS, Bill Bowles, USFS and Dave Karl, WDFW (project sponsor). The process to assess and prioritize the reaches for restoration of LWD was included in the original proposal (project # 10-1832). The goal was to choose an appropriate ½ mile reach-scale restoration project with Regional Technical Team (RTT) input and also establish project information for future LWD restoration projects in the Tucannon River. The availability of a large number (250+) of trees with root-ball intact from the Umatilla National Forest was a "stroke of luck" that we did not anticipate when applying for the original grant.

The Team members agreed that we would pursue additional funding to increase the scale of the project. The project reach scale would be increased from ½ mile to two miles keeping in mind that we wanted to meet the SRSRB criteria for LWD restoration "2 key pieces per stream width".

Reach B immediately became a focal reach, and through the assessment became the clear priority among the three original reaches. Reach B has the poorest floodplain connection compared to the other reaches, and therefore has the most restoration potential for an LWD restoration project. Restoring LWD loading through the reach will increase the number of pools, improve stream habitat complexity, increase off channel habitat, and provide hydraulic connection with the floodplain that will improve conditions for the riparian areas adjacent to the stream. Additionally, the riparian in Reach B was heavily burned during the School Fire, limiting future LWD recruitment in the area. Downed trees on the floodplain currently cannot recruit to the highly confined channel, reconnecting the floodplain increases the potential for natural LWD recruitment. Also, because the fire had such a devastating impact on the riparian throughout the reach, it will be decades before natural LWD recruitment will occur in key areas of Reach B. Comparatively, reaches A & C both had better floodplain connection and riparian conditions. LWD restoration will benefit reaches A & C by increasing in-stream habitat complexity, improving floodplain conditions, and increasing off-channel habitat. Reaches A & C both border private landownership at the downstream end of the reach. Reach B is closer to the tree source and therefore more cost effective in regards to helicopter placement of the trees. The project for Reach B has a draft design and the design will be finalized in March 2012.

An independent assessment of the entire Tucannon River Basin was conducted by Anchor QEA in 2011 through the Columbia County Conservation District and Snake River Salmon Recovery Board. The assessment done by Anchor for the three reaches assessed for this project recommended LWD placement to restore stream function and floodplain connection. For the three reaches assessed for this project Anchors conclusions regarding prioritization, project conceptual design, and restoration goals were identical to the conclusions developed through this assessment.