Tucannon River LWD Restoration Project Description and Scope of Work

The primary project objective is to add LWD to an impacted (simplified) 2 mile channel reach of the Tucannon River, a major tributary of the Lower Snake River. The reach was identified through an assessment funded by the Snake River Salmon Recovery Funding Board. The assessment was conducted by an interdisciplinary team of biologist, hydrologist, environmental engineers, and forestry professionals. The project goals are to restore physical processes in the river by reconnecting the floodplain in confined reaches, increasing channel complexity, and improving spawning and rearing conditions for native fish in the Tucannon River. There are three ESA listed threatened fish in the Tucannon Basin, Spring Chinook, Bull Trout, and Snake River Steelhead. The Spring Chinook population is the only existing Spring Chinook population found in the Lower Snake River, and therefore Chinook are the focal species for the project. However, all of the ESA listed species will benefit from the restoration of physical processes in the river and improved habitat complexity resulting from the project.

The nature and extent of the problems that the project will address are the loss of large wood structure in the Tucannon River that is directly attributable to the systematic removal of large wood over the last century, and channel work done in response to large flood events, when D8 Caterpillar were used to remove logjams and simplified large reaches of the channel into a confined single thread channel in the mid 1960's. This combination of impacts has caused the Tucannon River to become an over simplified channel that is efficient at moving water and bedload, but lacking in habitat complexity, especially juvenile rearing habitat. The channel confinement and lack of LWD (structure and roughness) exacerbated conditions causing a cycle of channel incision and further channel confinement resulting in drops in base flow elevations, loss of spawning gravel, loss of secondary channels, less frequent riparian flooding, increased water temperatures, loss of surface water habitat and pool frequency, loss of over-winter habitat, and decreased ground water levels and hyporheic interactions within the channel. In response, fish populations dependant on the lost habitat complexity and channel function (Spring Chinook, Steelhead, and Bull Trout) have declined dramatically.

In 2005, the School Fire burned over 50,000 acres including major areas within the upper Tucannon River Basin. Although devastating to the basin, the fire represented the first major natural wood recruitment to the Tucannon River in decades, and therefore was recognized by local biologists as an opportunity to restore LWD and physical processes to these areas of the river. The need for this type of restoration action was further emphasized by the need to restore riparian function to large reaches that had total loss of riparian vegetation during the fire. A key purpose of the project is to agrade the channel back to floodplain connectivity and to capture secondary channels, and increase the frequency of riparian flooding. All of these factors will improve the natural riparian response following the fire.

The project location is between River Miles 42 and 44 on the Tucannon River. The physical area can be defined as the reach between Beaver/Watson Lake (RM 42) and North/South

Campground (RM 44) located on the Washington State Wooten Wildlife Area. This reach of the Tucannon River has moderately confined to heavily confined reaches with gradients between 1-4%. We intend to re-establish functional woody debris in single key pieces and/or complex log jams within the 2 mile reach designed to interact with the channel to scour pools, cause lateral channel movement, agrade the channel, provide cover and improve sediment and substrate sorting to improve spawning and rearing habitats. In addition to in-stream habitat complexity there are other benefits anticipated ranging from riparian benefits to overall productivity and biomass (food and nutrient) storage. We will use key pieces of large wood, which are large conifers with root wads, attached. Trees will be provided by the US Forest Service from the Umatilla National Forest blown-down during the winter 2010. Appropriately sized key pieces for the Tucannon River will have the following characteristics; Conifer (Pine or Fir) tree with an overall length exceeding 70 feet, a diameter between 18-36". Because access is limited both on the forest and the river, and in order to minimize project impacts on the landscape, helicopter placement techniques will be used for the project. Furthermore, the key pieces will be placed without anchors to allow for natural hydraulics and processes to take place. Tree length is critical to minimize LWD downstream movement over time, and consequently helicopter placement techniques are also the only feasible way to transport full length trees. The importance of minimizing LWD movement in the chosen reach is also significant because the riparian was almost completely burned during the School Fire and subsequently it will be decades before natural wood recruitment will occur there. Moreover, using whole trees that will stay in place addresses other risk management issues associated with LWD restoration projects.

A draft conceptual design has been completed that includes 50 identified LWD structures utilizing 230 key pieces and an additional 20 key pieces for random placement. There are three major LWD structures (with 25 or more key pieces) that have been identified to agrade the highly incised mainstem and capture old channels in order to improve stream sinuosity and add stream length. The other structures are designed to capture secondary channels identified from LiDAR, add stream length and channel complexity, and to add in-stream habitat complexity in the mainstem. Additionally, there are remnant "push-up" levees identified from channel work done after the 1964 flood that will be deconstructed as part of the project. Constructed logjams will be based on natural analogs (full spanning, apex, and sweeper complexes) and will require 2-8 individual key pieces, as these will form the core of the logjam matrix. In some cases smaller logs and course woody debris will be used to add height and ballast and "racking" to the key pieces, other structures are designed to recruit natural course woody debris as a result of stream processes. The fire has created a large amount of course wood that is mobilized in the river and will enhance and recruit to the constructed jams. It is also anticipated that upon capturing old channels, existing large wood on the landscape will also be recruited to the stream in overall project area. After the initial project is completed WDFW and local partners will assess opportunities to recruit racking and course wood within the project area. Techniques used will include recruiting wood to the channel manually, chainsaw winching, and possibly dropping dead conifers when appropriate. The project will be designed, constructed, and monitored by

WDFW staff and local partners, including the US Forest Service, Confederated Tribes of the Umatilla Indian Reservation, and the Snake Region Salmon Recovery Board. The results of the project are dependent on high flow events in order to develop or mature, and may take many years to express itself. WDFW will monitor and report on the project as it changes, and will provide a final report at an appropriate time based on the funding requirements and project development. We estimate the final report will be completed between 2-7 years from implementation.