Project Review Comments

PROJECT: 21-1103 R, Grays 4C Restoration

Sponsor: Cowlitz Indian Tribe Program: SALMON ST PROJ Status: Application Resubmitted

MEETING: Initial Review

Shared: 4/2/2021

Review Status: Needs more information

Considerations: Other

Topics	Comments
Review Status - Initial	
	This project proposes to modify existing very large debris jams to improve passage and re-allocate large amounts of sediment trapped behind the debris jams. The debris jams are being considered human made as they are a product of debris flows initiated from forest harvest and road building activities. In addition, other large wood structures, boulders and broadcast woody debris will be placed in the channel and on the floodplain to further restore wood loading and sediment transport processes. The sponsor did not clearly articulate the process and sequencing of the elements of the project, which is critical for the project to succeed in its objectives.
Review Panel Comments - Initial	
Questions (response required)	
	What is the likelihood of additional debris jams in or above the project area? A overall summary of slides in this area or a reference which documents them would be helpful.
	Reply: Cowlitz staff have hiked 1.5 miles upstream of the second debris and did not document any additional features that could be construed as a fish passage barrier. WDFW surveyors have hiked the entire 5.4 miles upstream of the bedrock falls and only documented the two debris flow barriers.
	What is the implementation sequence for dismantling the debris jams and implementing the additional log structures?

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	Reply: The implementation sequence for dismantling the debris jams will first begin by rerouting water around each of the debris jams. Excavators will dismantle the matrix of logs in each debris jam and repurpose the wood for building channel spanning log structures. Excavators will incorporate imported logs with debris jam wood to build channel spanning grade logs throughout the sediment plain, debris flow footprint and continue upstream to minimize the formation of a head cut. Excavators will transport some of the stored alluvium downstream and pre-load anchored log structures. Another portion of the estimated 12,000 cubic yards of sediment will be piled into berms along the channel margin. These alluvial berms will launch only during larger flood events and meter the flow of sediment downstream. We expect sediment to begin moving during the first highwater event. As sediment is transported downstream, mobile gravels and cobbles will encounter 1.5 miles of channel spanning logjam structures. We expect these structures will capture the majority of the transported alluvium and result in the creation of a new streambed, affectively burying exposed bedrock. The new accumulation of alluvium in the active channel will raise the surface water elevation, resulting in floodplain reconnection, groundwater recharge, creation of new side channels and result in additional floodplain sediment deposition. The culmination of these restoration efforts will create stable spawning substrate, increasing egg incubation survival rates and create complex rearing habitat to increase over-winter survival of rearing winter steelhead and coho salmon populations.
	How is the build up of gravels and sediments expected to impact the downstream habitat once the debris jams are removed? Will there be fine sediment and turbidity issues that could negatively affect downstream habitat?
	Reply: We expect to see a positive impact to downstream reaches, since we are converting bedrock channels into alluvial channels reconnected to their floodplain. Excavators will move large quantities of the stored sediment, preload log structures and create sediment berms that will launch during high flow events. Sediment will be transported downstream, periodically, and timed with each flood event, to ensure there isn't a large sediment pulse that could bury redds or cause a spike in turbidity. Any short-term negative impacts will be short in duration, however the long-term positive impacts will restore the sediment and wood transport processes to this watershed and allow steelhead access 5.4 miles of high quality.
Improvements to Make Project Technically Sound (response required)	
	The sponsor cites the Silver-Bluebird project as an analog for this project. Photos or other documentation from that project could help explain the proposed process and expected outcome.

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Reply: I would recommend clicking on this post and viewing the project summary and construction photos.

https://thefisheriesblog.com/2019/01/13/removing-migration-barriers-for-steelhead-trout/

This is an excellent time lapse video of the process of removing the log jams and excavating a new channel to ensure there wasn't a major head cut.

https://www.dropbox.com/s/toiofxv44l7x4tw/SB%20Compilation.mp4?dl=0

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Sponsor: Cowlitz Indian Tribe Program: SALMON ST PROJ Status: Application Resubmitted

MEETING: LE Review

Shared: 4/15/2021

Topics	Comments
Lead Entity Comments	
Questions For Applicant	
	Describe the process for taking apart existing large wood jams, and how this addresses sediment process needs in the Grays River watershed. Describe the sequencing of the proposed work relative to downstream large wood placement. Specify how you expect sediment to travel downstream in terms of quantities and timing. Additionally, clarify how this approach is informed by the similar Silver-Bluebird project in the Washougal watershed.
	Reply: We are removing wood structures that prevent fish passage and reorienting and placing the wood in the system to retain sediment. The water will be re-routed around each of the debris jams and fish salvage will occur. Excavators will slowly dismantle the matrix of logs in each log jam and repurpose the wood for building channel spanning log structures downstream. Logs will be picked from the top of the plug and placed downstream until the blockage is passable, once passage has been established no further dismantling will occur. The debris plugs are not natural and block sediment and wood transport processes as well as fish access to 5.4 miles of productive habitat. The demolition of these two debris jams will provide a source of alluvium to feed the sediment starved reaches directly downstream. The estimated 12,000 cubic yards of newly mobile sediment will begin to mobilize after the first bank full event. The mobile gravels and cobbles will encounter 1.4 miles of channel spanning logjams located downstream. We expect each structure will fill with new alluvium and lift the surface water into some of the surrounding floodplains. The newly engaged floodplain will also store some of the mobile fine sediment. The log structures will restore instream structure to create stable spawning substrate, increasing egg incubation survival rates and create complex rearing habitat to increase over-winter survival of rearing winter steelhead and coho salmon populations. This project is very similar to the Silver-Bluebird restoration project in the upper Washougal River and plans to use a very similar approach. Conversations with the project sponsor noted how quickly the trap sediment mobilized and migrated through the project site. Channel spanning log structures anchored and sealed to bedrock are critical to capture mobile bedload. The sponsor recommended placing lots of boulders and loose logs within the sediment plain, as well as grade logs within the footprint of the deconstructed logjams to keep the head cut from reaching the underlying bedrock. We plan to incorporate these recommendations in the final design.
	Does the geomorphology in the proposed restoration reach provide opportunities to widen the channel, connecting to floodplain habitat, in addition to aggrading the main channel?

	Reply: Yes. There are numerous sub-reach sections containing incised floodplain within the 1.5-mile-long project reach and the project designs have channel spanning logjams placed at these locations. The placed wood will increase channel roughness to partition shear stress, resulting in sediment deposition and increased water surface elevations, re-engaging the floodplain during each bank full event and creating new side channels while sorting and storing portions of the newly mobilized bedload.
	How do you propose to address passage issues associated with the eight foot bedrock falls?
	Reply: Please see, Grays River 4C Reach Restoration – Preliminary Basis of Design Report, pg 13. “We propose diverting the channel around the falls at an upstream flow split by moving an existing logjam that is blocking the inlet and placing a matrix of wood and alluvium in the existing channel upstream of the falls. A new channel will be cut extending from the moved logjam at the upstream end to the bottom of the falls at the downstream end, with the cut material placed in the existing channel immediately upstream of the falls. Should bedrock be encountered during channel excavation a track-mounted concrete breaker will be used to achieve proposed grade. Immediately upstream of the falls in the existing channel, a half dozen logs will be anchored to the bedrock channel bed or large boulders in the channel extending upstream to the new channel inlet. These logs will be covered in a mix of logs from the logjam removed at the new channel inlet and excavated alluvium from the new channel.”
	Why do you think the project reach is scoured down to bedrock?
	Reply: This project reach has been impacted by past forest practices of clearing trees within the riparian area and from past splash damming and stream cleaning actions. These historic disturbances have altered the hydrologic regime and directly eliminated roughness from the system, resulting in greater sediment transport capacity and evacuation of alluvial sediments from the reach. More recently, we believe this reach is further impacted and limited in its ability to restore itself due to the two large debris flow logjams located upstream. These debris flow jams operate like a dam, resulting in a disconnection of sediment of wood (and fish) transport processes through the reach. The sediment starved reach downstream of the debris flows has been stripped of all alluvial material, and lacks any habitat forming LWD. If any alluvium enters this project reach, it’s efficiently transported far downstream into overloaded depositional reaches in the lower river.
	Have you considered the likelihood that additional debris flows may be caused by harvest activities upstream of the project reach? How might your proposed work support watershed resilience against these activities?
	Reply: Yes. The geology, rainfall, steep hillsides, climate change, and frequent commercial timberland harvest rotations often result in numerous landslides and debris flows within the Grays River watershed. This is the primary reason why the Grays River watershed has such a huge sediment load each year. The project approach for Grays 4C is not unique and is intended to be replicated within other headwater reaches of the Grays River. This approach increases channel roughness by building logjams or placing hundreds of whole trees, trapping mobile sediment, encourage sediment deposition and retention on site, activate floodplains and alleviating pervasive sediment impacts to productive reaches lower in the Grays River watershed. We expect these changes to increase watershed resiliency and drive increased spawning success and improved juvenile survival rates for listed salmon and steelhead populations.

	What are the design steps included in the final design task in the proposed budget spreadsheet?
	Reply: Natural Systems Design will be in charge of developing the final designs, there scope of work will include the following deliverables: - developing special bid provisions (specs); - providing permitting assistance and design adjustments; - finalize water management approach/strategy; - identify helicopter staging areas; - classify and enumerate logs embedded within the debris flows; - model the fate of stored sediment upstream; - modeling to inform stability calculations; - increase design detail for the side channel around the bedrock falls; - determine use for the massive old growth logs within the 7800 road crossing; - final basis of design report; - updated engineers estimate; - construction staking and as-built drawings.
	What is the likely bid process for constructing this project?
	Reply: The Cowlitz Indian Tribe, following its internal procurement policies will put out to bid via a Request for Proposal (RFP) for the helicopter transport and placement, and the construction portions of the work. Proposals will be collected and scored using approach, experience, and cost as primary criteria.
	Ensure that the new large wood structures do not create fish passage barriers.
	Reply: The proposed engineered logjams are designed to not exceed the height of the bankfull flood, deform during a 2-yr flood event and capture mobilized LWD. These structures will trap mobilized sediment but remain porous to allow both juvenile and adult fish passage. The design engineering firm, Natural Systems Designs has a wealth of experience placing these types of ELJ's in high sediment yield watersheds similar to the Grays and have not encountered issues with creating fish passage barriers. Furthermore, returning populations of Grays River winter steelhead have evolved with the ability to navigate natural old growth logjams, these structures will be much smaller due to a lack of availability of old growth logs to emulate those types of natural features.
	Make sure large wood structures not only support sediment aggradation goals in the project reach, but also support transport to downstream structures so another sediment block is not created in the system.
	Reply: The proposed restoration actions at each site considered local conditions and constraints and were located where anticipated benefits would be maximized. These structures can extend the entire width of the channel, blocking approximately 80% of the cross-sectional areas to allow some flow and sediment to pass through the structure. ELJ locations were primarily sited at the crest of riffles in the channel, with slower water runs and pool segments upstream to maximize structure stability and with the greatest accommodation space to store sediment in the channel. The primary purpose of these structures is to arrest channel incision by dramatically increasing local channel roughness to slow flows and deposit sediment in the channel. Aggradation of the channel bed from these accumulated sediments will raise the channel bed, increasing floodplain connectivity and providing a substrate for pool formation and spawning.