FBRB FINAL APPLICATION QUESTIONS

1. Project Type

This application is for a Restoration grant that will include final design, permitting, and construction to remove and replace a partial fish passage barrier at Motteler Road which crosses Chumstick creek near RM 0.52.

2. Total Requested Amount

The total project cost is \$261,000 which includes final design, permitting, and construction. The amount requested from FBRB is \$174,838. The remaining \$86,162 will be secured from SRFB and will be used as match towards the Alpenview Drive and Motteler Road culvert replacement projects (since both culverts will be one FBRB contract). A detailed cost estimate is attached.

3. Limiting Factors

The Wenatchee Sub-basin Plan identified a need to improve fish passage in the Wenatchee sub-basin and replacing culverts in the Chumstick Assessment Unit was listed as having a high effect on addressing the access limiting factor in this watershed (NPCC 2004).

Salmonid species present in the Chumstick sub-watershed include Chinook salmon (*Oncorhynchus tshawystcha*), steelhead salmon (*O. mykiss*), rainbow trout (*O. mykiss*) and coho. Historically, steelhead used the Chumstick Creek drainage for spawning and rearing. Mainstem Chumstick Creek was a meandering channel with beaver ponds, backwater areas and side channels; habitats that favor spring Chinook and steelhead rearing.

Recent pit tag array data (Figure 1) indicate that spring Chinook juveniles are present in lower Chumstick creek but they have not been documented in the middle to upper reaches. Spring Chinook juveniles are rearing in lower Chumstick creek. Adult steelhead have been documented throughout the lower 9 miles of Chumstick creek and adults are likely spawning in the middle to upper reaches to reestablish anadromy in a watershed that has recently removed fish passage barriers. Historically, bull trout may have been located in Chumstick Creek and it is hoped that they will re-establish in the watershed now that the lower barriers have been removed. Coho have also been documented in lower Chumstick creek.

The fish passage barrier removal proposed will improve up and downstream fish passage which is one of the habitat limiting factors in Chumstick creek. This will improve migration of salmonids to and from historical spawning and rearing habitat in Chumstick Creek, thus completing a 16+ year effort to remove 33 barriers within the first 9+ miles of Chumstick Creek. This effort will increase spatial structure, abundance, and productivity of salmonids in the Wenatchee watershed. Due to development along the creek a high concentration of stream crossings exist, some of which are barriers to salmonid migration.

Improving fish access to lower Chumstick creek also provides fish a temperature refugia from summer high temperatures and winter low temperatures in the mainstem. Mid-August temperatures recorded in mainstem Chumstick creek (below RM 9) were below 16°C in most areas (a few sites recorded temperatures in the range of 16°-18° based upon 2002-2003 watershed wide FLIR data) (Figure 2). The FLIR data could not be collected consistently throughout the watershed due to the dense riparian



shrub cover in many areas. Mainstem temperatures ranged from 18-20° in the mainstem Wenatchee river near the confluence with Chumstick creek during the same FLIR data collection in 2002-2003. Juvenile steelhead and spring Chinook in the mainstem Wenatchee river likely seek temperature refugia and off-channel rearing in lower Chumstick creek in late summer hot periods and during winter cool temperatures. Improved fish passage in lower Chumstick creek will increase the extent of fish access to off-channel rearing and temperature refugia habitat.

4. Level of Coordination

Coordinated efforts to improve fish passage in Chumstick creek started in 1996 with field surveys of existing fish passage barriers conducted by US Fish and Wildlife Service and Natural Resources Conservation Service. In 2009, funds from Bonneville Power Administration, Yakama Nation, and US Bureau of Reclamation were combined to remove 17 fish passage barriers in this watershed. Other partners that have contributed funding and/or staff time to improve fish passage and riparian habitat in Chumstick creek include the WA State Salmon Recovery Funding Board, Cascadia Conservation District, Department of Ecology, National Fish and Wildlife Foundation, and Chelan County (Public Works and Natural Resources Departments).

To date, 33 fish passage barriers have been removed in the mainstem of Chumstick Creek (Figure 3). Since 2010, 8 fish passage barriers have been removed in Chumstick creek:

- In 2010, one complete passage barrier was removed near RM 5.58;
- In 2011, three irrigation diversion passage barriers were removed near RM 7.8;
- In 2012, three partial barrier culverts under driveways near RM 8.2 8.5 were removed and replaced with fish passable structures;
- In 2013, one partial barrier culvert under a driveway near RM 7.09 was removed and replaced with a fish passable structure.

In 2017, a complete stream-based walking inventory identified three partial fish passage barrier culverts remaining in Chumstick creek: one near RM 0.52 (Motteler road 67% passable), a second near RM 1.48 (Alpen View Drive 67% passable), and a third at RM 2.05 (driveway 33% passable) (Figure 4). This proposal is to address the Motteler road fish passage barrier near RM 0.52. CCNRD has secured funds to replace the barrier at RM 2.05 through FFFPP and that will be implemented prior to 2021. CCNRD is seeking funds from FBRB to replace the barrier near RM 1.48 at AlpenView Drive. Once these last 3 partial fish passage barriers are removed, there will be unobstructed fish passage to 9.8 miles of Chumstick creek.

5. Project Scope

The goals of this project are to remove a fish passage barrier culvert on RM 0.52 of Chumstick creek in order to:

- increase the quantity and quality of accessible off-channel rearing and over-wintering habitat for juvenile steelhead, spring Chinook, and coho salmon in Chumstick Creek; and
- improve the quantity and quality of spawning and rearing habitat for steelhead in Chumstick creek.

The objectives of this project are to:

- a. Remove the partial fish passage barrier culvert and replace it with a structure that meets WDFW fish passage criteria.
- b. Improve fish access to >4 acres of off-channel rearing habitat, summer cool water refugia, and winter refugia habitat for juvenile steelhead, chinook, and coho (~lower 2 miles of Chumstick creek).
- c. Improve steelhead access to >9 miles of Chumstick creek for spawning and rearing habitat.

The scope of this project would include hiring an engineer, working with the project engineer to design a structure supported by stakeholders, securing permit authorizations for construction, hiring a construction contractor, and building the new stream crossing. Table 1 lists the milestones and schedule for each task. The text below Table 1 provides more detail about each project element.

Table 1. Tasks and timeline for project implementation.		
Task	Milestone Deliverables	Schedule
Notice of funding award	Grant contract	July 2019
Hiring design engineer	Sub-contract	August 2019
Survey and 30% Design	30% plans	September 2019
Regulatory agency site visits	Pre-application meetings	October 2019
60% Design	60% plans	November 2019
Permitting	Authorizations	Dec. 2019– April 2020
Final design	Final plans, specifications,	Jan. – March 2020
	and bid documents	
Construction bid	Contractor hired	April – May 2020
Construction	Culvert replaced	July – September 2020
Re-vegetation	Site restoration	October 2020
Close-out	As-built and final report	November – Dec. 2020

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Hiring a design engineer would follow Chelan County Financial Policy and procedures for selection of an engineering design consultant. Engineering designs will reflect the most current research regarding replacement of barrier culverts and designed for the 100 year flow event. The Washington Department of Fish and Wildlife "Design of Road Culverts for Fish Passage Manual" will be applied in designing the replacement structures. A simulated streambed channel will be constructed under the crossing and the project will include the placement of streambed gravels.

Project development would include pre-application meetings with WDFW and other regulatory staff to ensure that the project design meets fish passage requirements and to facilitate the process of securing all permit authorizations. This project would require local government review, a Fish Habitat Enhancement HPA, a Nationwide Permit 27, Water Quality Certification through the Statewide programmatic between DOE and the Corps, Section 7 ESA consultation through the Corps restoration programmatic, and Section 106 consultation.

Hiring the construction contractor would follow the Chelan County Financial Policy and procedures for a competitive bid process to select the construction contractor. Chelan County staff would be onsite throughout construction to ensure environmental compliance, direct the contractor, and coordinate with nearby landowners. The project engineer would also be on site during construction and would produce an as-built report.

6. Cost Effectiveness

Three design alternatives were evaluated as part of the development of the proposed cost estimate. The Cost Analysis Form (CAF) and detailed cost estimates for each alternative are attached. Conceptual plan view drawings (Figures 5-7) are also included and these graphics depict existing site conditions, Alternative 1 (arch culvert on concrete footings) and the Proposed Alternative 2 (bridge). The third alternative considered would be another culvert with a different configuration than Alternative 1, however, since those would likely cost more than Alternative 1, a detailed cost estimate was not prepared for multiple types of culvert design alternatives. The CAF briefly explains each of the three design alternatives considered. The following text provides additional explanation of the cost alternatives developed and reasoning behind selection of the proposed bridge alternative.

Design alternative #1 considered a 24' span arch culvert supported by concrete footings. This alternative costs more than a bridge and is a much narrower channel span so it was not selected.

The proposed alternative for this fish passage barrier replacement project is a 50' span bridge crossing over Chumstick creek. This alternative costs less than the culvert and the channel spanning width is much larger, thus providing more biological benefit for fish. A beaver dam was observed just downstream of the road crossing so a wider span will accommodate the complex instream channel conditions observed just upstream and downstream of the existing crossing.

Chelan County Public Works specified that the structure design would need to accommodate potential future widening if the parcel is developed in the future. Road width could be added to either the culvert or the bridge structure in the future, if needed.

7. Contribution to Recovery Plan and Additional Supporting Information

Improving fish passage in Chumstick Creek was identified as a high priority action in regional planning documents such as the Wenatchee Sub-basin Plan (NPCC 2004) and the Upper Columbia Salmon Recovery Plan (UCSRB 2007). The Upper Columbia Salmon Recovery Plan (UCSRB 2007) indicates that the short-term recovery actions for the Chumstick Creek Assessment Unit include reestablishing connectivity throughout the assessment unit by removing, replacing, or fixing artificial barriers (culverts and diversions). The Wenatchee Watershed Detailed Implementation Plan (DIP) also identifies barrier removal as the top priority for the Chumstick Sub-watershed (WWPU 2008). In addition, the Upper Columbia River Regional Technical Team finalized a fish passage barrier prioritization in 2008 which identified culvert replacement on Chumstick Creek as a high priority.

Barrier removal projects have been documented to register quick habitat improvement responses and provide significant long and short term improvements to the overall quality of habitat and instream conditions (Hillman, T., P. Roni, and J.O'Neal. 2016). This finding is supported by the pit tag array data collected in Chumstick creek over the past 5 years (Figure 1). Hundreds of fish have been documented using this stream habitat that has been made accessible through the fish passage barrier replacements implemented to date. Removal of these last few partial fish passage barriers will support the re-establishment of natural stream channel processes and physical characteristics such as connectivity, flows, habitat accessibility and streambed substrate composition. The improvement of these key characteristics would likely in turn improve the presence and abundance of salmonids within the watershed.

In the past 10 years, over 70 fish passage barriers have been removed or replaced with fish passable structures in the Wenatchee basin. These efforts have improved fish access to over 62 miles of streams (data pulled from Habitat Work Schedule). Data indicates that the average abundance of steelhead spawners in the Wenatchee basin is starting to reach the recovery abundance targets (Figure 8). Delisting will not occur until recovery targets are met within the other sub-watersheds of the Upper Columbia Distinct Population Unit, but it does appear that local efforts to improve steelhead access to tributary habitats may be improving the abundance of steelhead spawners and thus contributing to species recovery. Funding this project would contribute to steelhead recovery efforts in the Wenatchee basin.

References:

Hillman, T., P. Roni, and J. O'Neal. 2016. Effectiveness of tributary habitat enhancement projects. Report to Bonneville Power Administration, Portland, OR.

Northwest Power and Conservation Council. 2004. Wenatchee Sub-basin Plan.

Upper Columbia Salmon Recovery Board. 2007. Upper Columbia Salmon Recovery Plan

Wenatchee Watershed Planning Unit (WWPU). 2008. Wenatchee Watershed Planning Phase IV Detailed Implementation Plan (DIP).