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Nason Kahler Instream C...

Submission Date
February 25, 2021 13:22

*Project Title	Nason Kahler Instream Complexity Project
*Sponsor	Chelan County Natural Resources Department
*Primary Contact	Allison Lutes
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*Anticipated Request - SRFB	510390
*Anticipated Request - Tributary Committee	323718
*Anticipated TOTAL Budget	834108
*Other Funding Source(s)	n/a
*Briefly describe the location of the project	The project will occur in the main stem Nason Creek starting at RM 6.0 and ending at RM 7.1
*Latitude (decimal degrees)	47.769841
*Longitude (decimal degrees)	-120.775542
*Project subbasin	Wenatchee
*Wenatchee Assessment Unit(s)	Lower Nason Creek
*Reach(es) Name	Kahler Reach - map portal reach layer not working
1. *In one or two sentences, what do you propose to do?	The project will complete the final phase of the Nason Kahler Instream Complexity Project and will include construction of areas 2 and 3. The purpose of the project is to increase instream complexity and access to peripheral off-channel habitat, thereby improving holding habitat for adult spring Chinook and steelhead and increasing winter rearing habitat for juvenile spring Chinook and steelhead in the Kahler Reach of Nason Creek.
2. *What species will the project benefit?	Spring Chinook, Steelhead, Bull Trout

3. *Select the project's objectives and the associated tracking metrics	Instream Habitat (Includes Floodplain & Off-Channel Reconnection)
Instream Habitat: Reporting Code	Acres of channel/off-channel connected or added Miles of instream habitat treated
4. *Does this project or any of its phases (e.g., design) already exist in Salmon Recovery Portal or PRISM?	Yes
5. *Has this project been submitted previously for funding through the SRFB and/or Targeted process(es)?	Yes
Please explain which process(es) and how this proposal differs from the previous submission (e.g., different phase, modified scope, etc.)	Funding was provided for Final Designs, all permitting, and construction of Site 1 in the 2020 SRFB round. This proposal is for construction of sites 2 and 3.
6. *What category is the project?	Restoration
7. *What project phase(s) are proposed for completion?	Construction
8. Is your project within a completed (or soon-to-be completed) Reach Assessment or other type of assessment (e.g., Rapid Site Assessment, other)?	2016 Kahler Creek Conceptual Design and Geomorphic Assessment
9. *Which limiting factors does the project propose to address?	Cover - Wood Off-Channel - Floodplain Off-Channel - Side-Channels Percent Fines/Embeddedness Pool Quantity & Quality Pools - Deep Pools Temperature - Adult Holding Temperature - Rearing
10. *Which life stages will the proposed project address?	Adult Non-Spawning (Bull Trout) Natal Rearing (Bull Trout) Holding and Maturation Spawning and Incubation Summer Rearing Winter Rearing

11. *Freshwater Benefits - To what extent will your project improve survival, capacity and/or distribution for target species at the project scale?

The purpose of this project is to improve adult spring Chinook and steelhead holding habitat and increase winter and summer rearing habitat for juvenile spring Chinook and steelhead by increasing instream complexity and increasing access to peripheral off-channel habitat in the Kahler Reach of Nason Creek. In 2016, CCNRD and Natural Systems Design (NSD) completed the Kahler Conceptual Design and Geomorphic Assessment, in order to evaluate habitat suitability for both adult holding and juvenile rearing based on summer low flow . Results inform the Final Designs, which have been developed to specifically address these reach-specific limiting ecological factors (summarized below) to increase both fish capacity and survival of the identified limited life stages.

Spring Chinook and steelhead spawning and holding habitat is very limited from River Mile (RM) 6.0 to -RM 7.4 in Nason Creek when compared to reaches up and downstream. The 2016 Geomorphic Assessment found that overall holding habitat for adult spring Chinnok is very poor in the project reach, with a mean Habitat Suitability Index (HSI) of 0.07 on a scale from 0 - 0.42. Furthermore, the majority of the reach is totally unsuitable for holding, as indicated by the majority of HSI scores being zero. Abnormally high prespawn mortality in the Upper Wenatchee basin is likely associated with poor holding habitat (Cram, personal communication).

Both winter and summer rearing habitat is also limited. The 2016 Assessment found rearing habitat for Chinook fry in the Kahler reach is moderate during the 58 cfs summer base flow condition, with a range in HSI values of 0 – 1.0 and an average value of 0.38. We did not look at winter flows to evaluate HSI, which are predominately above 100cfs from early November to late July with periodic spikes in flow associated with warm rain events. However winter rearing habitat for spring Chinook juveniles has been identified as a potential limiting factor in the Wenatchee and Entiat basins. Juvenile Chinook currently emigrate from the reach prior to winter, in part due to a lack of viable habitat (Cram, personal communication).

The reach is also temperature limited. The recently completed Thermal Refuge Assessment, as well as the 2001 - 2003 FLIR data showed a high rate of downstream warming in the project reach (compared to other reaches in Nason Creek) and maximum temperatures that reached above 19 – 22 deg C. This is well above the thermal limits of the species and life-stages present during that time, which includes juvenile spring chinook and steelhead, and adult spring Chinook.

Specific project objectives were designed to address the limiting habitat factors and associated life-stage above, including 1) increase adult holding habitat and raise pre-spawn survival by installing ELJs to improve the quantity and quality of pool habitat and reduce the width: depth channel ratios; 2) reduce stream temperature impacts by restoring vegetation structure in disturbed corridors, reducing width: depth ratios, and increasing floodplain water storage; 3) improve floodplain connectivity to activate existing floodplain areas and shallow margin flows for high flow refugia 4) increase fish cover and juvenile rearing capacity with ELJs 5) Restore fish access to a 1,140 ft ground water sourced wetland complex and off-channel rearing zone, providing both summer and winter temperature refuge. These improvements in habitat capacity will result in increased survival of both juvenile and adult spring Chinnok and steelhead by the mechanisms detailed above.

12. *Temporal Effect - Briefly describe how and to what extent the project would promote natural stream/watershed process consistent with reach-scale geomorphology?	The reconnaissance level 2016 Geomorphic Assessment developed a summary of baseline site conditions describing the geomorphic setting and hydraulic parameters of the project reach. Key findings of the Geomorphic Assesment, which describe current reach-scale geomorphology, are listed below: 1) The active channel averages approximately 120 feet in width, is generally lacking in physical complexity, and dominated by riffle and glide habitat types. 2) Large wood is generally absent from the channel with only 5 large wood assemblages observed over the 1.4 mile project reach. The low abundance of functional wood jams in the project reach is attributed to a lack of key pieces large enough to remain stable and resist forces exerted by flood flows. Only 6 pool features mapped over the 1.4 mile project reach. 3) Significant off-channel habitat exists in the reach but in one case a forested relic channel is completely disconnected by an unnecessary road and in another, the channel is severely degraded by the lack of surrounding vegetation and structure. 4) Riparian vegetation is completely missing from three large areas traversed by BPA Transmission line corridor constituting over ½ mile of shoreline. The project will promote natural stream/watershed process consistent with these findings by: 1) strategically adding Large Wood to: force scour pool(s); reduce local flow-velocities to provide holding habitat for adults; locally sort bedload for substrate complexity; and elevate stage near areas of low-lying floodplain. The resulting increase in floodplain connectivity will also improve water storage, increase hyporheic cooling effects, and improve riparian health. 2) Remove infrastructure that impedes floodplain connectivity and contribute to sediment inputs.
13. Temporal Effect - How long will it take for the benefits of the project to be realized?	1-10 years
14. Temporal Effect - How long will the restoration action and its benefits persist?	50+ years
15. Temporal Effect - What level and/or interval of maintenance is anticipated? What is the plan for any anticipated maintenance?	Little maintenance is anticipated, as this project has been designed by WA state licensed engineers and geologists within the knowledge of constraints of the BPA transmission lines, Highway 2, and other infrastructure. During the preliminary design phase of the project, NSD project engineer ran Engineered Log Jam Stability calculations and Developed Risk Matrices for the ELJ project elements (NSD 2020) to evaluate risks. Further, a Construction Considerations Memo (NSD 2020) was developed for the project to evaluate the construction and access considerations for the project including design factors of safety, stabilization methods, and force calculations. In 2020 a test pile driving effort was under-taken to inform the best method of ELJ constructability for the project. Post-project, CCNRD will maintain and monitor the project during high and low flow every year, in coordination with the USFS, for 10 years. Regular maintenance of riparian plantings are expected for 10 years post project, as needed.
16. Methods - Briefly describe the potential (for	River Mile (RM) 7.1 - 6 of the Kahler Reach of Nason Creek has been severely altered from its historic condition by wood

design) or proposed restoration methods and how they will achieve project objectives.

removal, highway construction, and construction and maintenance of transmission lines. Spring Chinook and steelhead spawning and holding habitat is very limited from River Mile (RM) 6.0 - RM 7.1 in Nason Creek when compared to reaches up and downstream. Abnormally high prespawn mortality of spring Chinook adults appears to be an issue in the Upper Wenatchee basin based on recent analysis (Cram, pers. com.). Juvenile Chinook currently emigrate from the reach prior to winter, in part due to a lack of viable habitat (Cram, personal communication). Previous work has shown that adult holding habitat in the reach is limited by a lack of pools greater than 5 ft in depth, which is likely due to the historic removal of large wood (Reclamation 2009). Chinook spawning in the Kahler reach is limited by a lack of suitable substrate and the majority of spawning takes place upstream in lower gradient channel segments (Reclamation 2009). Off-channel rearing habitat and low-velocity refugia in the reach have also been impacted by road construction, channelization, and wood removal. Riparian cover in the Kahler reach has been reduced by road and utility construction and historic logging (Reclamation 2009). These impacts, coupled with low pool frequency, severely impact thermal refugia available to holding adults and juveniles, increasing fish mortality during hot summer months (Reclamation 2008, Reclamation 2009). Restoring natural river processes in Nason Creek has been identified as a high priority in the region for ESA species recovery. Nason Creek, a tributary to the Wenatchee River, is an important creek within the upper Wenatchee Subbasin in that it currently supports major spawning areas for ESA-listed Upper Columbia River (UCR) spring Chinook salmon, UCR steelhead, and is a Columbia River bull trout core area, and also has a high potential for habitat restoration (UCSRB 2007, UCRTT 2014). Nason Creek is the highest priority assessment unit within the Wenatchee Subbasin for habitat restoration (UCRTT 2017).

As part of the 2016 Kahler Conceptual Design and Geomorphic Assessment, CCNRD and NSD evaluated habitat suitability based on summer low flow for both adult holding and juvenile rearing. Overall, holding habitat for migrating adult Chinook is poor in the Kahler project reach (RM 7.6 – 6). Habitat Suitability Index (HSI) values for adult holding habitat range from 0 – 0.42 in the project reach, with a mean HSI value of 0.07. With a max HSI value of 0.42, no portion of Kahler reach is considered to have good holding habitat. In addition, the majority of the reach is unsuitable for holding, as indicated by the majority of HSI scores being zero. Rearing habitat for Chinook fry in the Kahler reach is moderate during the 58 cfs summer base flow condition, with a range in HSI values of 0 – 1.0 and an average value of 0.38. We did not look at winter flows to evaluate HSI, which are predominately above 100cfs from early November to late July with periodic spikes in flow associated with warm rain events. Winter rearing habitat for spring Chinook juveniles has been identified as a potential limiting factor in the Wenatchee and Entiat basins.

The purpose of this restoration project is to improve adult spring Chinook and steelhead holding habitat and increase winter rearing habitat for juvenile spring Chinook and steelhead by increasing instream complexity and increasing access to peripheral off-channel habitat the in the 1.6 mile Kahler Reach of Nason Creek. This project, implemented in 4 phases (3 of which are already funded), is the final phase of the Kahler Reach project and will result in construction of Site 2 and 3. Final Design, all necessary permitting, and Construction of Site 1 are

in process (phase 3) and this project will be "shovel-ready" by time of contracting. Sites 2 and 3 include the construction and strategic placement of 15 ELJs designed to increase instream complexity, promote pool formation, reduce width to depth rations, and promote floodplain inundation.

Specific objectives include:

Objective 1: Increase the numbers of pools for adult holding and juvenile rearing in 1.2 mile reach of Nason Creek to 15/mile with target depths of 4-8 ft. by installing 1 Type 1 LWM deflector structures and 14 Type 2 LWM apex structures within 1 year of construction. Excavate starter pools around ELJs to ensure immediate project benefit.

Objective 2: Reduce stream temperature impacts for the benefit of all life stages by reducing width-to-depth ratios in channel and increasing pool habitat by installing 1 Type 1 LWM deflector structures and 14 Type 2 LWM apex structures within 1 year of construction.

Objective 2: Reduce stream temperature impacts by increasing stream shading and riparian bank structural integrity by re-establishing riparian vegetation along 0.5 miles of Nason Creek within 5 years.

Objective 3: Improve floodplain connectivity to off-channel habitat in Site 3 at RM 6.2 by strategically positioning one ELJ to encourage increased hydrologic connectivity to 0.2 acres wetland/off-channel habitat. The current off channel habitat is fed by cool groundwater and has been observed to have an average depth of 12" during the low-flow season and offers a rare opportunity for off-channel habitat for juvenile rearing in this reach.

Objective 4: Gain community support for the project by presenting project goals and objectives at 1 project meeting prior to project construction.

1. *What is the landownership?	United States Forest Service
2. *Have you secured landowner participation in or acceptance for this project?	Yes
*Please explain	Forest Service employees have been involved at every stage of this project. CCNRD has acquired a land owner agreement form.
3. Describe any land owner requirements (e.g., design elements, right-of-ways, access agreements, liability waivers, etc.) and if/how they could affect the project	The USFS completed NEPA, ESA and cultural resource consultation as well as are providing ongoing design review. No access issues are anticipated.
4. Will the project raise	A 2013 study of large wood and on-water recreation indicated

potential concerns for interest groups (e.g., recreational users) or the community at large (including upstream/ downstream/ adjacent landowners)?	that both access to and use of the Kahler Reach by recreational boaters is limited. Boaters that did use Nason Creek were typically experienced and informed kayakers and rafters that used the creek during spring runoff months. No commercial guided trips were reported on this section of the river (MIG Inc. 2013). Due to the presence of boaters, no channel spanning structures are proposed. Private property extends downstream from the USFS land beginning near RM 5.9. The project does not intend to increase flood or erosion risk adjacent to these properties.
5. Who will have the responsibility to manage and maintain the project? What is the responsibility of current or future landowners?	CCNRD is responsible for project management, overseeing landowner coordination and incorporation of feedback into the final design. The final designs are being developed (phase 3) by licensed engineers and geologists from Natural Systems Designs. The USFS is responsible for completing NEPA, ESA and cultural resource consultation as well as providing ongoing design review, also all implemented under the already funded phase 3 of this project. Construction oversight will be provided by CCNRD construction manager and NSD Licensed engineers. Post-project CCNRD will maintain and monitor the project in coordination with the USFS for 10 years.
6. Please describe the risk of failure associated with this project.	No high risk of failure. This project has been designed by WA state licensed engineers and geologists within the known constraints of the BPA transmission lines, Highway 2, and other infrastructure. During the preliminary design phase of the project, NSD project engineer ran Engineered Log Jam Stability calculations and Developed Risk Matrices for the ELJ project elements (NSD 2020) to evaluate risks. Further, a Construction Considerations Memo (NSD 2020) was developed for the project to evaluate the construction and access considerations for the project including design factors of safety, stabilization methods, and force calculations.
7. Is there any public outreach planned during and/or after implementation? Does the project build community support for salmon recovery efforts?	Details of this project have been and will continue to be shared at biennual community outreach meetings that CCNRD hosts in each sub-watershed of the Wenatchee basin. In general these meetings have been successful in building community support for salmon recovery.
8. Does the project represent an opportunity for economic benefit? How much benefit does the project create for the dollars invested?	The project provides a great opportunity to provide economic benefit within the local Chelan County community. Given the current economic downturn, with many local contractors unsure of construction opportunities that may be available - this project will provide living wage jobs for construction companies which can be significant. The project will be put out to public bid and work will be subject to prevailing wage. Many of the projects that are of similar scale and size currently managed by CCNRD are being constructed by contractors based in Chelan County. Additionally, plants for the project will be collected by seed from within the watershed and grown at local nurseries and then planted by planting crews subject to prevailing wage.
9. Describe any partnerships, their experience, and types of contributions supporting the project.	CCNRD has implemented over 60 salmon habitat restoration projects in the Wenatchee and Entiat subbasins. These projects range in complexity from small riparian planting projects on private land to fish barrier removals on both public and private land to large floodplain reconnection projects requiring multiple years of planning and design with multiple entity coordination and negotiated agreements. CCNRD has successfully

completed projects with USFS, WA Department of Transportation, BPA Transmissions, large organized private landowner groups, individual private landowners, irrigation districts and other local and state government landowners. As described above, USFS has been actively involved in the design and permitting phases of this project.