



Project Number	#17-1169
Project Name	Crow/Quartz Creek Instream Large Wood Recruitment
Sponsor	Mid-Columbia Fisheries Enhancement Group

List all related projects previously funded or reviewed by RCO:

Project # or Name	Status	Status of Prior Phase Deliverables and Relationship to Current Proposal?
NONE	Choose a status	
	Choose a status	
	Choose a status	

1. Project brief. *In one or two sentences, what do you propose to do?*

This project aims to restore floodplain connectivity and instream habitat for Mid-Columbia DPS steelhead, bull trout, and Spring Chinook in the lower reaches of Crow and Quartz Creeks, tributaries to the Little Naches River, by adding 250 – 300 pieces of large wood in 2.2 miles of stream.

2. Project location. *Describe the geographic location, water bodies, and the location of the project in the watershed, i.e. nearshore, tributary, main stem, off-channel, etc.*

The project is located on the lower 1.3 miles of Crow Creek, and lower 0.9 mile of Quartz Creek, in Yakima and Kittitas Counties. The project would occur within the active channels and floodplains of both streams. Both streams are significant tributaries to the Little Naches River, near river mile 3.5.

3. Problem statement. *What are the problems your project seeks to address? Include the source and scale of each problem. Describe the site, reach, and watershed conditions. Describe how those conditions impact salmon populations. Include current and historic factors important to understand the problems.*

Stream habitat survey data show that instream large wood densities in Crow and Quartz Creeks are well below reference conditions. Reference conditions from the American River, located southwest from the Little Naches watershed, have observed instream large wood densities of approximately 130 pieces counted as “medium or large” per stream mile (2001 FS survey). Observed instream large wood frequency in lower Crow Creek was 55 medium or large pieces per stream mile (2017 survey), and 51 medium or large pieces per stream mile in Quartz Creek (2017 survey). The most probable reasons for observed decreased instream wood in these stream reaches is historical instream wood removal after flooding (1970’s), timber harvest, and recreational firewood gathering. Diminished instream wood impairs salmonid habitat by reducing spawning gravel

retention, decreases pool and off channel habitat formation, and can increase channel incision/floodplain disconnection.

4. List the fish resources present at the site and targeted by this project.

Species	Life History Present (egg, juvenile, adult)	Current Population Trend (decline, stable, rising)	Endangered Species Act Coverage (Y/N)
MCR steelhead and Critical Habitat	All	Rising	Y (threatened)
Columbia River bull trout and Critical Habitat	Sub-adult in Quartz, adult migration in Crow, which has only local spawning population in Little Naches River watershed	Declining	Y (threatened)
MCR spring chinook salmon	Spawning and rearing	Stable	N
Westslope Cutthroat trout	Spawning migration route	Stable	N

5. Describe the limiting factors, and limiting life stages (by fish species) that your project expects to address.

Haring (2001) describes low pool frequency, low large woody debris frequency, shallow water, and cobble embeddedness as the “most likely” primary factors limiting Chinook production in the Little Naches watershed. Quality of spawning habitat is described as the primary factor limiting steelhead production. Large wood additions to Crow and Quartz Creek will increase pool frequency and trap spawning gravels.

A. What are the project’s goals?

The goal of this project is to restore floodplain connectivity and instream habitat for Mid-Columbia DPS steelhead, bull trout, and Spring Chinook in the lower reaches of Crow and Quartz Creeks, tributaries to the Little Naches River.

B. What are the project’s objectives?

The project aims to:

- 1) Restore the function of large wood in the lower 1.3 miles of Crow Creek by increasing large wood frequency by from an average of 55 medium or large pieces/mile to an average of 200 medium or large pieces/mile by 2020;
- 2) Restore the function of large wood in 0.9 mile of lower Quartz Creek by increasing large wood frequency from an average of 51 medium or large pieces/mile to an average of 200 medium or large pieces/mile by 2020;
- 3) Stimulate the creation of at least 100 new pools through the addition of 300 pieces of large wood in lower Crow and Quartz Creeks by 2020; and
- 4) Reconnect floodplains along 2.2 miles of Crow and Quartz Creeks through the addition of in-stream roughness by 2020.

C. What are the assumptions and constraints that could impact whether you achieve your objectives?

The project budget assumes that the Forest Service will complete NEPA and ESA analysis under the Little Crow environmental assessment. If that project is delayed, MCF and the FS will determine whether to analyze this project separately.

6. Project details. *Please answer the questions below and all pertinent supplemental questions at the end of the application form.*

A. Provide a narrative description of the proposed project.

This project will involve placement of approximately 250-300 trees into tributary streams to improve spawning and rearing habitat for steelhead trout and Chinook salmon, and migratory/foraging habitat for bull trout. Approximately 2.2 miles of stream within Crow Creek and Quartz Creek would be treated. The proposed work would involve using hand crews to fell live trees up to 15 inches diameter at breast height (DBH) that are within 300 feet of the streams. The trees would be yarded for placement within stream channels and floodplains, using a variety of hand tools, jacks, winches, cable pulley systems, or mid-size machinery. Where feasible access allows, an all-terrain mobile walking excavator or similar machinery may be used for moving, winching, and cable yarding trees from the cutting areas for placement into stream channels. Standing dead trees $\geq 15"$ DBH that could be directly felled into the floodplains of Crow or Quartz Creek may also be cut.

B. Provide a scope of work and detailed list of project deliverables.

Task	Parties Responsible	Time Schedule
Field Design	MCF/USFS	August, 2017
Environmental Analysis	USFS	Winter, 2017 - 2018
Contract felling	MCF	July, 2018
Wood placement		July – September, 2018 and 2019
Grant management and reporting	MCF	December, 2017 - December, 2020

C. Explain how the sponsor determined cost estimates.

The cost estimates were based on similar projects, including large wood replenishment in Oak Creek, SRFB #14-1238. In the summer of 2016, 299 logs were placed in SF Oak Creek, at a cost of \$58 per log in technician time only. Coordination, management, bookkeeping, travel, technician and camping costs totaled \$30,299.37 during the project timeframe, raising the cost per log to \$101. The logs placed in 2016 had already been down for some time, and were light and easy to move. With that in mind, MCF estimated the costs for logs in Quartz and Crow Creek to be greater (\$150/log).

D. Describe the design or acquisition alternatives considered to achieve the project's objectives.

The stream reaches proposed for treatment are located on National Forest, and are relatively free of infrastructure concerns. Large wood replenishment is an appropriate technique in this setting, and will accomplish the restoration goals at a lower cost than many other restoration approaches.

E. How have lessons learned from completed projects or monitoring studies informed this project?

This project benefits from lessons learned from other Yakima Basin wood replenishment efforts including the Yakama Nation's work in Taneum Creek and SF Cowiche Creek and Mid-Columbia Fisheries' work in Oak Creek. Successful approaches pioneered on these projects will be replicated in Crow/Quartz Creeks including use of grip hoists and hand tools, site selection, contracted felling, safety protocols, and having workers spike out at remote sites to reduce travel costs.

F. Describe the long-term stewardship and maintenance obligations for the project or acquired land.

This project will not have maintenance or stewardship obligations beyond project implementation. The Forest Service and Mid-Columbia Fisheries will establish photo points and monitor in-stream conditions in the project area over time.

7. Explain why it is important to do this project now instead of later.

The value of well-functioning floodplains is increasing as weather patterns change in the Yakima basin. Climate models predict that the Yakima basin will begin to receive most of its precipitation as rain, rather than as snow. With the current channel conditions in the project area, more frequent, higher discharge run-off events would worsen incision, further reduce in-stream structure, and reduce the availability of spawning gravels. By reconnecting the floodplain in selected areas and adding in-stream wood, this project would allow the channel to build back up, restore floodplain access in areas, and create in-stream structures that trap spawning gravels.

In addition to the biological objectives, this project should be implemented now because it is the first step in implementing the aquatic restoration priorities of the Little Naches Aquatics working group. This multi-agency group has worked with the Forest Service and other stakeholders to identify and prioritize restoration actions in concert with the larger Little Naches/Little Crow watershed restoration NEPA process.

8. If the project is a part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps is included in this application for funding.

This project is among the restoration priorities identified by the aquatics working group of the Little Naches watershed restoration collaborative. Additional restoration priorities include road relocation, culvert replacement, additional large wood placement, and willow planting.

9. Describe the sponsors experience managing this type of project.

Mid-Columbia Fisheries has successfully managed dozens of salmon recovery projects, including similar large wood projects and partnerships with the USDA Forest Service. As described above, MCF is currently managing a similar project on Oak Creek. MCF technicians placed 299 pieces of wood in one mile of South Fork Oak Creek in the summer of 2016.

10. List all landowner names.

USDA Forest Service

11. List project partners and their role and contribution to the project.

USDA Forest Service will provide most of the environmental analysis and project permitting and will help to supervise wood placement.

12. Stakeholder outreach. *Discuss whether this project has any opposition or barriers to completion, besides funding. Describe the sponsor's public outreach and feedback received. Are there any public safety concerns with the project? How will the sponsor address those concerns?*

Planning for the Little Naches/Little Crow watershed restoration project has included a wide variety of stakeholders and interested citizens through a collaborative process facilitated by The Nature Conservancy. The aquatics working group has discussed the need for large wood replenishment with the stakeholders in the collaborative.

The wood replenishment is proposed adjacent to very popular camping areas. The Forest Service will install "wildlife tree" signs on placed wood, and front-country rangers will explain to campers how wood works to restore stream and floodplain function.

Supplemental Questions

Restoration Project Supplemental Questions

Answer the following supplemental questions:

A. Will the sponsor complete, or already completed, a preliminary design, final design, and design report (per [Appendix D](#)) before construction?

No

- i. This project will use the large wood replenishment method described in the Stream Habitat Restoration Guidelines. MCF and the USFS will walk the project reaches in the summer of 2017 and identify target locations for wood placement. These locations will be indicated on a map and submitted to RCO prior to the completion of environmental analysis.

B. Will a licensed professional engineer design the project?

No

- i. This project will use typical drawings developed for other large wood replenishment projects, and will utilize the guidelines found in the Stream Habitat Restoration Guidelines.

C. If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish habitat recovery.

This project does not include any bank stabilization.

D. Describe the steps the sponsor will take to minimize the introduction and spread of invasive species during construction and restoration. *Specifically consider how the sponsor will use un-infested materials and clean equipment entering and leaving the project area.*

MCF crews will sanitize any in-stream gear (waders, boots, etc.) before beginning work in Crow and Quartz Creek, and will keep the gear for this watershed separate from other gear. Upland equipment, such as cables and grip hoists, will be carefully inspected for weed seeds before the equipment is moved on site, and then again inspected before movement to another project. All weed seeds and plant material will be removed from equipment and disposed of in appropriate facilities.

Comments

Use this section to respond to the comments received after the initial site visits, and then again after submitting the final application.

Response to Site Visit Comments

Please describe how the sponsor responded to the review panel's initial site visit comments. *RCO recommends that the sponsor list each review panel comment and question and identify the response. The sponsor may use this space to respond directly to the comments.*

**Yakima Basin Fish & Wildlife Recovery Board
Application Comment Matrix with SRFB Review Panel Comments**

[Crow/Quartz Creek Large Wood Recruitment](#)

TAG/CC Question, Request, or Comment	Response: Where / how is the comment addressed in the final application
<p>Some tour participants expressed interest in mapping specific locations of proposed wood placements, and to show before project and proposed after project wood loading, pool frequency/depth and or gravel availability.</p>	<p>See map attached. A more comprehensive stream habitat survey would need to be implemented to document before/after channel habitat metrics. The Forest receives a very small budget annually to conduct Forest Service Region 6 stream surveys, to complete protocol. Of the habitat metrics measured in the habitat survey protocol, only large wood densities have been documented in support of this project proposal.</p>
<p>Describe specific goals for wood placements and how gradient and floodplain character play a factor in different area.</p>	<p>Match wood placements to mimic natural large wood accumulations, with random angles to streambanks, and the construction of multi piece log jams. Low gradient stream reaches in the project area should see channel aggregation, off channel habitat formation, pool formation, and spawning gravel accumulation as a result of the additional channel structure. These are not transport reaches, so logs are not expected to export out to the Little Naches River, but only move minimally within the project area.</p>
<p>Clearly identify how treatment streams were selected and their role/priority of this habitat for targeted fish species.</p>	<p>Both lower Crow and Quartz Creek are important spawning habitat for MCR steelhead and sub-adult foraging habitat for bull trout. Crow Creek is also migration habitat for bull trout moving to the upper reaches to spawn. Improved habitat with added cover or pools will enhance security of these</p>

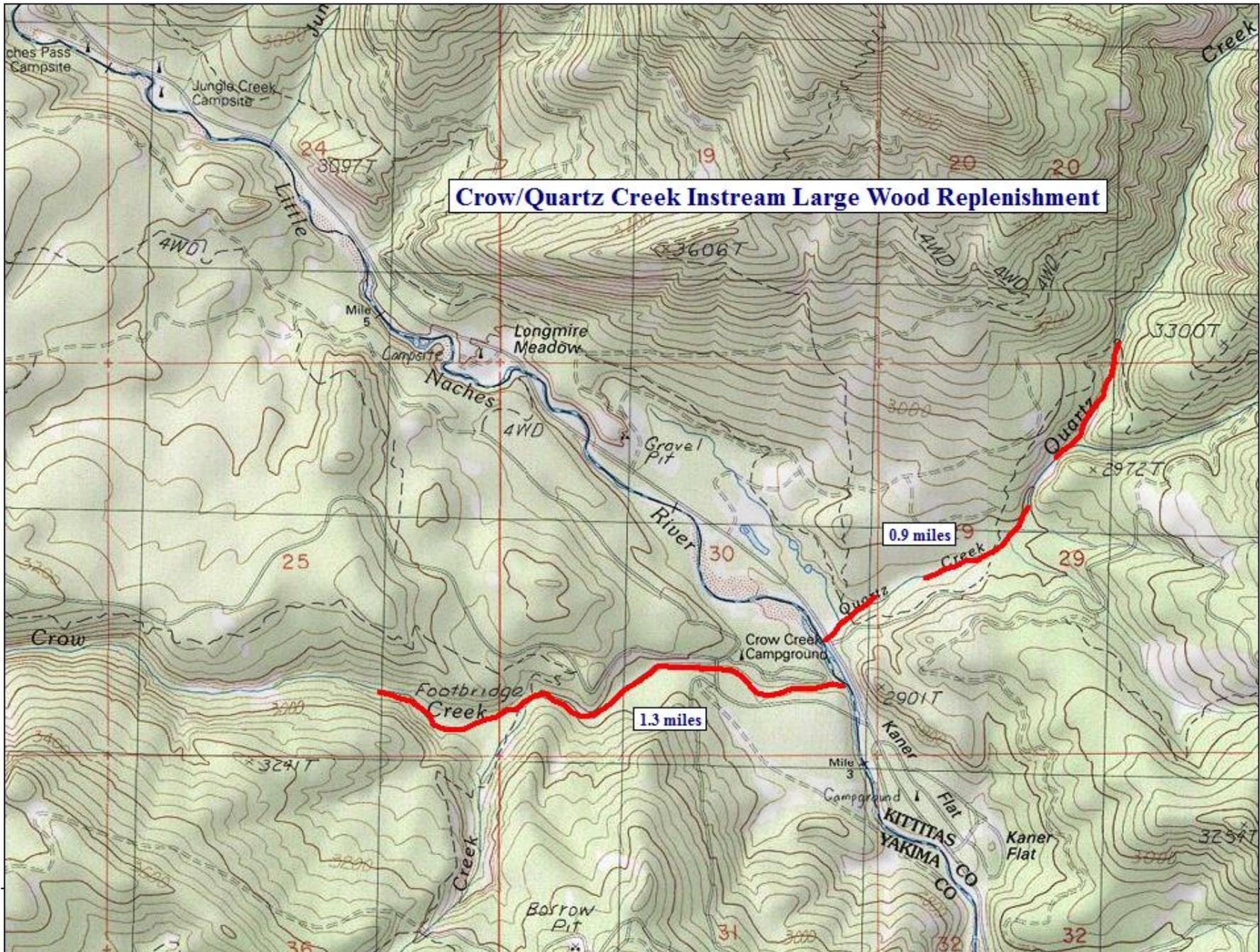
Appendix C-3: Restoration, Acquisition, and Combination Project Proposal

	individuals from human disturbance within the adjacent camping areas.
Will USFS do some of the construction oversight?	Yes, the FS anticipates four weeks of construction supervision, approximately half of which would be supported with FS program funds.
For comparison, with wood loading streams in mind, is Crow Creek a fairly high gradient stream than we've loaded with wood?	On past projects, Mid-Columbia Fisheries has used 3% gradient as a screening criterion for identifying streams for large wood replenishment. In the treatment reach, Crow Creek's gradient is less than 3%.
Wonder about longevity of the project at those gradients. Would you have wood that would stay? Going to be long low stuff that gets caught up in the vegetation on the side, to withstand the velocity/force and stay.	As the comment suggests, the full length trees will get hung up on riparian vegetation and existing in-stream structure.
Is there a tie-in to YBIP funding? Little Naches Working Group and USFS being ready to discuss how they could use funding is a good idea.	There will be better information about this by the time the TAG and CC meet; Mid-Columbia Fisheries does not have any information about the YBIP funding plan at this time.

SRFB Technical Review Panel Question, Request, or Comment	Response: Where / how is the comment addressed in the final application?
Before submitting final application, walk streams to identify 1) specific locations for planned wood placement and 2) the size of material to be placed. For each stream reach provide a table of channel slope, width and typical bed material size. The added field survey could be done in one day and will allow for a refined methodology and a more precise	Specific LWD placement areas in Quartz Creek have been, based on an instream wood survey on June 20, 2017 (See project map below). One omitted segment already has high recruitment due to lateral bank scour from the 2011 flood. The other segment omitted is in a small canyon, and there is a lack of feasible wood supply to harvest from. Large wood placed instream would be live trees $\leq 15"$ DBH that would be yarded/winched into

<p>cost estimate. The Quartz Creek site visit revealed terrific amounts of wood and this may be identified in other stretches as well. Sponsor indicated that the size of material to be placed will depend on what is in the vicinity of the stream and the equipment available to the successful contractor. The landowner must weigh the trade-off between the size of habitat effect that can be achieved with mechanized equipment and the degree of site impact associated with that equipment. However in either event, the review panel recommends that the project requirements should drive the contractor selection rather than the other way around. If larger pieces will be necessary to achieve the desired habitat response and are available within 300' of the site to be treated, a contractor with access to a spider hog would be desirable, unless it is the landowner's opinion that this equipment would result in too much impact to the project site.</p>	<p>place, and larger snags up to 35" DBH that could be directly felled into the stream channel or floodplain. These size classes match observed instream wood pieces. The Quartz Creek project area has a stream gradient of <3 percent. The bankfull channel width is approximately 27 feet, and the dominated by gravel and cobble substrate size. Because of an abundance of standing dead trees adjacent to Quartz Creek, an excavator is not needed to accomplish instream wood placement objectives.</p> <p>The Crow Creek project area has a stream gradient of <3 percent. The bankfull channel width is approximately 45 feet, and the dominated by cobble and gravel substrate. Large wood sizes to be placed would be the same as in Quartz Creek. Because of an abundance of standing dead trees adjacent to Crow Creek, an excavator is not needed to accomplish instream wood placement objectives.</p>
<p>Describe observations of fish use within the project site, current habitat conditions and the habitat features you hope to affect. Elaborate on the importance of this reach for fish; if critical habitat for listed species has been designated within the project area, the proposal should so indicate. Elaborate on the habitat qualities that you are trying to improve upon. While the bed material was coarse in Crow Creek except around instream wood structures, the site is in mature forest that is protected from development and will continue to recover (albeit slowly) from legacy logging activities.</p>	<p>Both Crow and Quartz Creek segments are low gradient reaches, with gravel accumulations. Both reaches are critical habitat for MCR steelhead and bull trout. MCR steelhead spawning has been observed in Quartz Creek, and assumed to be occurring in Crow Creek. Replenishing large wood densities to reference reaches will promote gravel accumulation, off channel formation, and pool formation. This would benefit both ESA listed species.</p>
<p>The project offers a cost-effective approach to enhancing salmonid habitat in an area with few infrastructure constraints. The sponsor and</p>	

<p>landowner (USFS) have a productive collaboration that provides certainty in project success.</p>	
<p>Staff comments: To help determine the necessary size of wood, look at the size of in-stream wood that appears stable in the stream. Note that I will be sending you additional comments to help improve the clarity of your application shortly. Refer to the final application checklist http://www.rco.wa.gov/documents/manuals&forms/Manual18Appendices/ApplicationChecklist%20 Final.docx and Section 3 of Manual 18 http://www.rco.wa.gov/documents/manuals&forms/Manual_18.pdf for final application requirements.</p>	<p>Crow Creek has 55 pieces, and Quartz Creek has 51 pieces of instream medium and large wood per mile (USDA Forest Service Region 6 Stream Survey protocol). The Wenatchee Forest Plan has an instream wood standard of 105 medium/large pieces per mile, and reference conditions observed on the American River had 130 pieces of medium/large wood per mile.</p>



Response to Post-Application Comments

Please describe how the sponsor responded to the review panel's post-application comments. *RCO recommends that the sponsor list each of the review panel's comments and questions and identify the response. The sponsor may use this space to respond directly to the comments.*