# Appendix G-2: Response to Post-Application Review Panel Comments

NOTE: **By October 17**, applicants of projects assigned a status of Project of Concern, Conditioned, or Need More Information must update their PRISM applications and attachments, as needed, to respond to the review panel comments. In addition, this document **must be attached in PRISM.** Please label the attachment "*Response to Post-Application Review Panel Comments.*"

**PRISM Project Number: 13-1342**_____

**Project Name: Icicle Boulder Field Design**_____

**Project Sponsor: Trout Unlimited-Washington Water Project** _____

**Directions:** Please check all that apply:

**REMINDER:** To help speed the local and SRFB Review Panel evaluation process, if you update your project proposal based on SRFB Review Panel comments, please "accept" all current changes in PRISM, make all new changes using WORD "track changes" and re-attach your proposal in PRISM. This step will save time and focus the reviewers on the changes.

☐ I accept the review panel condition placed upon this project and have revised my application, as needed.

**X** My response to review panel comments is below and I have revised my application, as needed. *The proposal was not revised.*

TO: Review Panel

FR: Jason M Hatch, Trout Unlimited-Washington Water Project

DT: October 17, 2013

RE: ***Icicle Creek Boulder Field Passage Design***-Review Panel Designation-Project of Concern

Thank you for your careful consideration of the *Icicle Creek Boulder Field Passage Design* proposal and for forwarding your concerns and comments. In the content below we intend to address each of your concerns as best we can with the available science and understanding. Further, we provide additional background information on the development of this project as well as the regional context from which this emerged as a priority for recovery.

In the development of this project, we have followed regional guidance from local fisheries experts and the *Upper Columbia Salmon and Steelhead Recovery Plan*; established a rigorous review and planning process to examine all the potential risks and benefits of the project; explored numerous alternatives for potential design solutions; and laid out a conservative approach for addressing the needs of listed species while balancing the ecological integrity and character of Icicle Creek. The opportunity to provide connectivity within the Icicle watershed and access to an additional 23 miles of high quality habitat has been carefully considered. If we do not pursue passage at the Icicle Creek Boulder Field we severely constrain our ability to achieve regional recovery goals and the adaptive capacity for climate change available in the upper watershed.

**Regional Context for Recovery**

In the Upper Columbia Basin, there are three listed fish species: Upper Columbia Spring Chinook (*Oncorhynchus tshawytscha)*, Upper Columbia Steelhead (*Oncorhynchus mykiss*) and Bull Trout (*Salvelinus confluentus).* The **2007 *Upper Columbia Spring Chinook and Steelhead Recovery Plan*** set forth criteria for the de-listing of spring Chinook and steelhead. Although covered under the Upper Columbia Recovery Plan (UCSRB 2007), bull trout currently lack a formally-approved recovery plan. **The *Upper Columbia Recovery Plan*** was developed locally under the recovery objectives and criteria set by the Interior Columbia Basin Technical Recovery Team (ICBTRT) in collaboration with the Upper Columbia Regional Technical Team (RTT). The plan relied on the implementation of specific recovery actions coordinated with the RTT, local stakeholders and with a local process of assessing these actions through socio-economic considerations, cost/benefit and likelihood to contribute to recovery goals. Implementation of the recovery plan is through a robust adaptive management process that relies heavily on a regional Biological Strategy. The RTT established a list of regional priorities through this Biological Strategy beginning in 2000, 2009 and updated in 2013.

According to delisting criteria, steelhead recovery would require there be a 12 year geometric mean of least 3,000 steelhead spawners among the four basins (Methow, Okanogan, Wenatchee, Entiat) and or 1,000 in the Wenatchee. The plan calls for a minimum of 4 of the 5 major spawning areas (Chiwawa River, Nason Creek, Icicle Creek, Peshastin Creek and Chumstick Creek) to produce the greater of 5% of the total redds in the Wenatchee Basin or 20 redds (UCSRB 2007). Although not formally approved, the Recovery Plan outlines bull trout recovery "criteria." Bull trout recovery criteria requires a 12 year geometric mean of 1,612-2,257 bull trout spawners with "spawning to occur within the seven

interconnected areas (Chiwawa, White, Little Wenatchee, Nason, Icicle, Chiwaukum, and Peshastin), with 100 or more adults spawning annually within three to five areas." As is noted in the targets above, Icicle Creek is a critical tributary for achieving recovery goals in the Wenatchee.

As early as 2000, when the Regional Biological Strategy was developed, the UCRTT has prioritized the assessment of passage at the Boulder Field. The Boulder Field was the #3 priority in the Wenatchee Basin when the strategy was revised in 2009. The *2013 Upper Columbia Revised Biological Strategy* continues to value passage assessment at the Boulder Field and with regards to Anthropogenic Barriers, calls for removal or partial removal or to build passage. Regarding Natural Barriers, the restoration strategy is to "evaluate options." (Table 5, Pg. 21) Natural barriers in Icicle Creek are listed as the #1 ecological concern for the Assessment Unit (UCRTT 2013). Ecosystem Diagnosis and Treatment (EDT) and Interior Columbia Technical Review Team (ICTRT) intrinsic potential models predict very large capacity for steelhead in the upper Icicle above the Boulder Field site.

***Existing Monitoring Fish Populations in Icicle Creek***

*Steelhead*

WDFW installed a PIT tag array on Icicle Creek (ICL) at RKM 0.4 in August 2011. This system was funded by Bonneville Power Administration (BPA) and Yakama Nation Fisheries. As part of a larger study funded by BPA, returning adult steelhead are representatively sampled and PIT tagged annually at Priest Rapids Dam (PRD). Currently, approximately 10% of the annual steelhead run is tagged by WDFW at Priest Rapids Dam (N = 2,309 in 2012). This does not include the thousands of steelhead tagged at other dams (e.g., Bonneville Dam, Dryden Dam, Tumwater Dam), in hatcheries, or juvenile steelhead tagged throughout the Wenatchee River basin.

A total of 24 steelhead tagged at PRD in 2011 were detected at Icicle Creek in 2012, resulting in an estimated spawning escapement of 185 steelhead into Icicle Creek. This spawning escapement estimate includes the 28 steelhead that were PIT tagged at locations other than PRD, either as juveniles or other adult sampling locations.

A 2012 marine derived nutrient study completed by a Western Washington University graduate student in conjunction with the Mid-Columbia Fisheries Resource Office cored trees above the boulder field to determine if anadromous fish were present historically. The study proved inconclusive in terms of detecting a specific signal of anadromy. This could be due to absence or the low number of anadromous fish and so the question as to the distribution of steelhead above the Boulder Falls remains unknown.

*Resident Trout*

Resident *O.mykiss* and cutthroat trout (as well as resident bull trout) are known to exist above the Boulder Field. Between 1933 and 1993, 1.75 million rainbow trout were planted at various locations in Icicle Creek. It is unknown to what extent these populations are influenced by migratory populations that exist downstream of the Boulder Field (see below). It is believed that resident *O.mykiss* are producing anadromous offspring that return to Icicle Creek to spawn (currently below the Boulder Field). This would mean that it is likely there is already some genetic introgression downstream of the barrier.

A 2012 memo to the Regional Technical Team by Wild Fish Conservancy, *Icicle/Chiwaukum Creeks Rainbow Trout Population Study: Summary of Abundance and Genetics Data*, identified three distinct populations of resident rainbow trout above the Boulder Field. While the findings have not been published, it is anticipated that WFC may identify data which may demonstrate a genetic link between upper Icicle Rainbow Trout and Steelhead in the Wenatchee River. It appears that there is some genetic

distinction between the populations of *O.mykiss* either because of introgression with anadromous steelhead closer to the Boulder Field or other factors that segregate these genetic subpopulations (such as barriers).

*Bull Trout*
USFWS Mid-Columbia Region Fisheries Resource Office (MCRFRO) is monitoring and evaluating bull trout in Icicle Creek. A three year radio-telemetry study tracked migratory bull trout in Icicle Creek above and below the boulder falls but passage windows through the area were not documented (Nelson et al. 2009; 2011; 2012). MCRFRO is permitted to PIT tag 100 to 300 bull trout annually in the Icicle Creek watershed. MCRFRO also plans to install a PIT tag array at the mouth of French Creek (RKm 34.7) in order to determine the out-migration rate and the ratio of sub-adult to adult returns of bull trout. Radio-telemetry techniques and transmitter life may be too limited to adequately monitor passage and our monitoring efforts have shifted to PIT tags. To date, 10 sub-adult and 13 adult bull trout have been PIT tagged in Icicle Creek and the ICL array at the mouth is monitored for detections. Bull trout PIT tagged at other locations in the mid-Columbia basin have also been detected at the ICL array.

**Project Development**

Trout Unlimited initiated this project in 2011 in discussion with USFWS Mid-Columbia Region Fisheries Resources Office, US Bureau of Reclamation (USBR) and consultation with the Wenatchee Habitat Subcommittee. In 2012, TU applied for funding from Priest Rapids Coordinating Committee (PRCC), to develop a USBR-style Tributary Assessment (as well as a water conservation plan) since the USBR would not be completing this assessment. The PRCC, whose steering committee members are comprised of regional fisheries experts, encouraged TU to hone in on the #3 ranking Wenatchee basin priority, passage assessment at the Boulder Field. TU resubmitted the application, in partnership with the Icicle Peshastin Irrigation District (IPID) and received funding for the passage assessment. TU convened a technical committee to review responses to an RFP and a consultant team was selected which included a leading fish passage engineer, geologist and fish ecologist to assess passage and identify passage alternatives.

This project developed a Technical Advisory Group (TAG) comprised of representatives from WDFW, USFWS, Upper Colombia Salmon Recovery Board, NOAA-Fisheries, USFS, Icicle Creek Watershed Council, Trout Unlimited-Icicle Chapter, Wildfish Conservancy and others. This TAG met on at least five occasions to provide feedback and guidance for the assessment as it was developed and guided the suite of alternatives. TAG members evaluated a number of alternatives at both passage impediments and the discussion regarding the Anchor Boulder reach was guided toward an alternative (channel profile adjustment) that: enhanced passage at an existing modeled passage, addressed the impingement of the irrigation access road/road prism and provided the most naturalized solution. The report for the passage study and selection of preferred alternatives, *The Icicle Creek Boulder Field Fish Passage Assessment*, was released in May 2013. The design proposal for both Anchor Boulder and Diversion Dam impediments was submitted to the local SRFB funding round, evaluated and approved by both the RTT and local Citizen's Committee. An important piece of feedback from the RTT, consistent with the approach TU has pursued throughout, is proceed systematically, thoughtfully and with the regards to the *Channel Profile Adjustment*, proceed with care.

**Natural and Anthropogenic Barrier**

Observations from the *Icicle Creek Boulder Field Fish Passage Assessment* indicate that rocks within the channel are of both native and anthropogenic origin, particularly along the left bank. "The encroachment of the road on the left bank of Icicle Creek, primarily in the location from the Irrigation District access bridge to the Anchor Boulder may have altered the channel cross-sectional profile. The degree of encroachment cannot be determined unless more is known about the extent of the underlying bedrock. This would require excavation along that road to reveal the parent material extent and elevation." (p.13) To achieve a greater understanding of which boulders are native vs. anthropogenic, there would generally be three approaches:

1) *Drilling rocks and talus.* Drilling in talus is difficult, relatively expensive, and often does not provide a complete profile of the deposit. Drilling could be done selectively to evaluate individual rocks, but drilling boreholes may not be the most cost effective method for evaluating overall anthropogenic impacts.

2) *Test pits and trenches*. Test pits and trenches usually provide better observations of the talus deposit than can be obtained by examining samples removed from drilling of holes. Excavation of steep and potentially unstable slopes can be difficult and dangerous work that requires careful planning and safety measures. This approach will likely be most cost-effective for assessing anthropogenic impacts on the Icicle Creek channel.

3) *Geophysical exploration*. Geophysical techniques (such as ground-penetrating radar), have the advantage of not requiring subsurface excavation and can quickly provide a subsurface profile. These approaches work well for identifying buried utility lines or a soil-bedrock interface, but would likely have limited utility in this rock-dominated environment.

We are likely to employ option two as we examine the access road, road prism, and sidecast material in this preliminary design phase proposal.

Further, the Assessment reads: "In another observation, at 200 cfs in the Middle Reach, there appears to be passage opportunities, through the Anchor Boulder segment where there was enough surface flow and pool depth for a potential fish passage route (see Figure 7 and Photo 5). This is a viable route to develop an alternative for two reasons: 1) a velocity or drop could not be measured indicative of a barrier, and 2) while flows under boulders could be concentrated into a fish passage route."(p.21) The extent of the impact of the known anthropogenic influences would be evaluated through additional geotechnical investigation of the road prism and irrigation access road, which are key components of the Icicle Boulder Field Passage Design proposal.

None of the known data inputs indicate with definitive certainty the extent of anthropogenic influence on the channel at the study reach, excepting the road prism, side cast and road. It is anticipated that there is downstream passage of Bull Trout and Rainbow and it is modeled that there is a likely upstream passage route at very specific favorable conditions. Known anthropogenic influences may narrow the likelihood of these favorable conditions. The proposed design project will evaluate opportunities to extend the window of modeled passage beyond what is currently accessible but not to the point of

providing 100% passage at the site. Allowing for limited migration into the favorable habitat upstream will lead to increases in the production of fish for Icicle Creek and the Wenatchee River watershed overall.

**SRP Questions**

**Consideration of impacts on resident native fish populations above the falls?**

The target species for this project are bull trout and steelhead. Regional fisheries experts believe there is existing downstream passage for both species. The Recovery Plan assumed that there was existing passage for steelhead and bull trout but not Chinook (Revised Biological Strategy, Appendix E, p.35). Existing monitoring efforts to detect bull trout passage through the boulder field reach have proved inconclusive while some ad fluvial bull trout have been observed by Wild Fish Conservancy (WFC) above the boulder field demonstrating movement through the reach. Because *Oncorhynchus mykiss* and ***Salvelinus confluentus*** are found above and below the Boulder Field we anticipate no negative impact on resident species (bull trout, steelhead, redband, cutthroat), particularly as the project target steelhead and bull trout are the anadromous or migratory life history type of the same species. However we do anticipate numerous potential benefits, including improved gene flow and habitat connectivity. The only potential negative impact would be the introgression of genes from conspecifics below the boulder field, but that could also be perceived as a positive. Genetic drift is a threat to the persistence of small, isolated population, but preliminary research indicates as mentioned previously, there are three distinct populations of rainbow trout in Upper Icicle Creek, and that their genetic differentiation would likely remain intact. Segregated spawning would have caused differentiation and there is no reason to expect that dynamic to change. Anadromous individuals would likely spawn sympatrically with some individuals from the various rainbow trout sub-populations. This mixing among sub-populations is likely already occurring according to the most recent WFC report (2012):

> "We have identified three genetically distinct subpopulations within the upper Icicle. One population is in Jack Creek and its tributaries, Solomon and Meadow Creeks. A second population is associated with the Icicle mainstem upstream of the Chatter Gorge, and includes samples from French and Leland Creeks. The third population is centered at the Icicle_Brower site. Chiwaukum Creek samples constitute a fourth population, clearly part of the steelhead population in the Wenatchee basin. Between the Chatter Gorge and the Icicle_Brower site is a zone of genetic mixing primarily between the upper and lower mainstem populations. Strong signals from both the upper and lower populations are present as far upstream as the Icicle_Johnny site. The most appropriate interpretation of this data will have to await the publication of our analyses."

This information indicates that the rainbow trout population is already quite mixed, but maintains genetic differentiation in some areas through reproductive isolation. There is no reason to expect anadromy to have a negative effect of upstream rainbow trout.

Further, we consider the impacts to be beneficial to resident and migratory fish species by providing not only enhanced access to high quality habitat but also connectivity within the Icicle watershed. This connectivity is especially important given future climate change scenarios which may necessitate migration to and from habitat in the future. Given the low number of bull trout above the Boulder Field, genetic introgression may be absolutely necessary to avoid depensation and sustain the population over the long term.

**Evidence of no result in harm to other native fish aquatic fauna inadvertently?**

As stated above, the restoration of natural physical and biological processes should benefit all native species. Cutthroat trout, mountain whitefish, and other non-target taxa will experience improved passage conditions which will allow access to potentially important and underutilized feeding, spawning, or refuge habitats. In addition, reintroducing marine derived nutrients to the system would likely prove to improve productivity of the Icicle. This design project proposes to enhance passage, not create 100% passage. In general the project will re-establish natural species assemblages upstream of the barrier and we do not believe that there will be negative consequences to resident aquatic species that exist there now. Resident bull trout and *O.mykiss* already exist within the area and the addition of the migratory and anadromous forms is not likely to change species interactions that already exist.

**How will these populations (resident bull trout and rainbow trout found in Icicle Creek, as well as non-salmonid) be impacted by blasting passage?**

The proposal before the SRFB is a design only proposal. This design proposal would add significant understanding to the origin of rock in the area and examine how the *Channel Profile Adjustment* may be implemented. Implementation would carefully consider the impact to resident species and like other instream projects, this project would be governed by construction windows and regulatory requirements to limit any impacts. How rocks are removed or adjusted will be subject of this preliminary design proposal. If the project were to proceed to final design and subsequently construction, measures and conditions would be established by action agencies and by all necessary permits, which could include installing temporary exclusion barriers as well as removal of fish in the construction area. This proposal is for design only and significant additional planning, review and development will occur prior to any construction project to restore passage.

**Consider evaluation of only removing anthropogenic obstructions of road side cast by not notify the natural boulder field?**

The *Channel Profile Adjustment* approach will be an iterative approach, informed by this preliminary design proposal which will include additional geotechnical work on the irrigation access road, road prism and sidecast material. As suggested by the Panel, the goal would be to address the known anthropogenic influences first and evaluate how this would enhance the modeled fish passage window. This is a progressive approach which seeks to have a minimal impact on the natural function of Icicle Creek. After anthropogenic influences are addressed, passage would again be evaluated before additional measures are taken. Implementation of any solution will be further informed by the design phase. This preliminary design proposal is the next phase to further understand the passage impacts and provide more detail to the *Channel Profile Adjustment* as identified by stakeholders through the

*Icicle Creek Boulder Field Passage Assessment*. We believe this is the most logical strategy for achieving biological goals for Icicle Creek while meeting the need to maintain the ecological health of Icicle Creek.

**SRP concerned of providing passage through boulder field is inconsistent with the approach of restoring natural habitat forming processes?**

Restoring natural processes in our watersheds is always the highest priority of our regional restoration efforts (see UCRTT 2013). In cases where this is not possible the next possible solution for meeting recovery goals becomes mitigation for existing habitat impairments.

This design proposal seeks to address anthropogenic influences first and foremost, determining what passage can be achieved with these initial steps to enhancing existing modeled passage. Making further adjustments on suspected native rock would be a critical decision in which regional technical stakeholders, local stakeholders as well as action agencies would be consulted. It is an important conversation as we balance the many anthropogenic impacts which have influenced even our most natural of watersheds. The reach we have proposed for design is framed by an irrigation canal on river right and two roads on river left. On Icicle Creek alone, a Creek with wilderness origins, we have residential encroachment on the riparian area and within the river, a fish hatchery, major diverters, six wilderness reservoirs, campsites and roads as well as lakes and the upper Icicle Creek which have been subject to more than sixty years of fish stocking.

As noted, in the case of Icicle Creek many of the natural process that shape and maintain habitat have been affected by anthropogenic influences, narrowing the opportunities to achieve recovery goals for steelhead and bull trout. The process we have described to restore existing passage to the best of our ability at the site by first addressing anthropogenic influences inhibiting passage. Any further action that requires additional alterations at the site would undergo extensive review and careful consideration.

A key feature of this design proposal is what lies above it. An additional 23 miles of habitat which could serve as climate change refuge as well as additional relatively unaltered habitat for achieving recovery targets in the Wenatchee lie above the identified impediments. Like most projects, we are contending with a certain level of uncertainty as to the extent of anthropogenic influence, yet arguably the benefits and a cautious approach forward weigh heavily in favor of such a project.

**Proposals to change IPID point of diversion in Icicle Work Group in the foreseeable future?**

The Icicle Work Group, convened by the Office of Columbia River, has been meeting since December of 2013 with the intention of developing a consensus water resource management strategy, which may include a number of projects with the major out-of-stream water users, Leavenworth National Fish Hatchery and Icicle Peshastin Irrigation District (IPID). TU has been working closely with IPID and is the project lead on the *Icicle Creek Boulder Field Fish Passage Assessment, Icicle Creek Boulder Field Design* and on the funded *Icicle Peshastin Irrigation District Alternatives Assessment.* This study will provide preliminary evaluation of five alternatives for reducing the existing 117 cfs diversion at the existing dam, one alternative for changing storage capacity at the district's Eightmile Lake and one alternative which would move the diversion in its entirety to the Wenatchee River. This latter alternative is the only option which may potentially result in abandonment of the existing diversion dam. While this

conceptual study will be complete in 2014; this provides no guarantee that this solution will be supported by Icicle Peshastin Irrigation District, the Icicle Work Group, funders or be constructed in the foreseeable future.

When TU engaged in the Boulder Field Assessment in partnership with IPID, it was understood that the Anchor Boulder area to the diversion dam was the study area and ultimately both were deemed to be passage impediments. It is important to note that in the budget for this proposal, the design for the diversion dam from an engineering perspective is very straight-forward proposition and subsequently represents at most 20% of the total budget. Leaving out this portion of the project is not a wise course for several fold reasons: the diversion is not slated for removal, the diversion is a low-flow barrier (which is the critical time for passage of Bull Trout), the design approach is a standard and accepted fish passage method at irrigation diversion dams and there is a willing participating landowner (IPID) on whose property both identified impediments reside.