Peshastin Creek RM 4.3 Side Channel Reconnection Project

Project Sponsor: Chelan County Natural Resources Department - Design Engineer: Inter-Fluve

30% Designs Comment Matrix November 2021

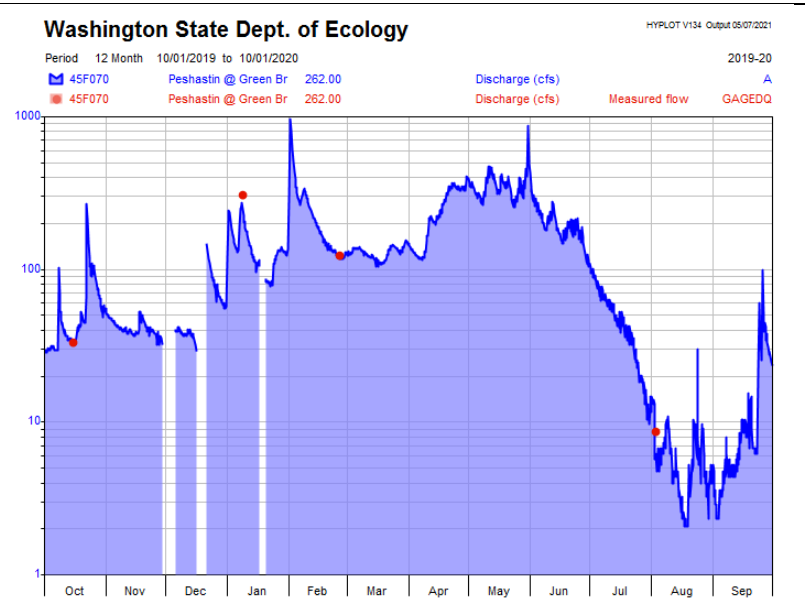
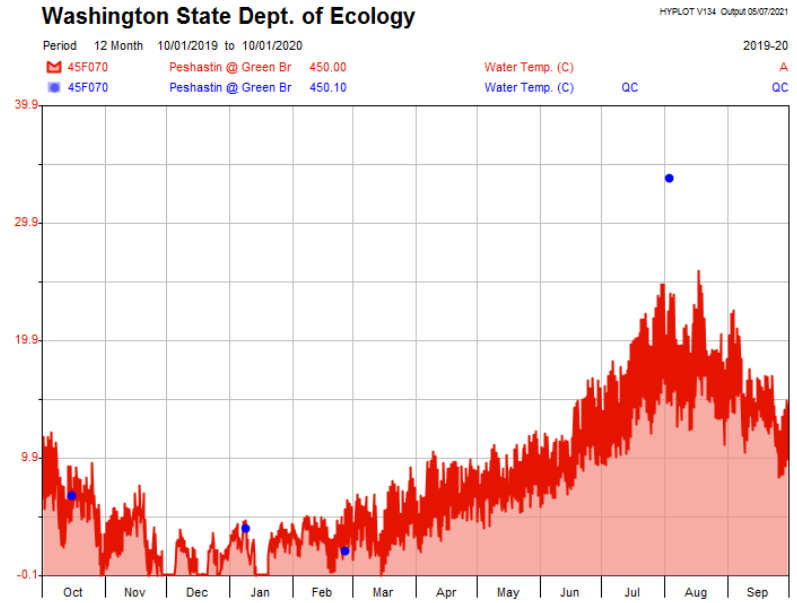
Commenter	Comment	Response
Marc Duboiski, RCO Project Manager	1. The constructed riffles. It would be helpful to overlay any documented spawning redds in your project reach. With all the boulders, there may be no spawning. But, CF is struggling with getting permitters to approve a constructed riffle in Nason Creek, with lots of redds.	To address concerns expressed by some reviewers and to avoid constructability/feasibility issues associated with channel-spanning constructed riffles we have removed the riffle structures from the mainstem Peshastin Creek in the 60% design iteration. The following discussion applies to other potential actions that we are considering in the mainstem, which may include installations of wood structures and/or boulder clusters. A depiction of historical steelhead spawning redds is included in the Basis of Design Report and historical redd locations will be depicted relative to proposed design elements in subsequent versions of the report. Although limited steelhead spawning has been observed within the project reach, the substrate in the reach is dominated by boulders and cobbles and, therefore, the project reach does not provide high-quality spawning habitat. The side channel component of the proposed project is expected to improve spawning habitat quality in the mainstem by reducing stream power, which will encourage deposition of smaller substrate than currently exists in the reach. In-stream elements as noted above, also are expected to improve spawning habitat quality by promoting pool formation and facilitating sediment deposition and sorting. Redd data sourced from the Upper Columbia Salmon Recovery Board documents steelhead spawning in Peshastin Creek from 2005-2017, and the previous riffle footprints overlapped with only four discrete redd locations documented in 2011, 2012, and 2013. To minimize potential for impacts, we will focus on areas outside of the historical redd locations as we explore mainstem boulder or log elements in subsequent design iterations.

	2. The quantity of wood appears high for the entire project length, especially in the middle section. Again, not a technical analysis, just a first impression when looking at the drawings. Maybe an area to revisit to reduce costs, if desired.	The quantity of wood and types of structures will be refined in the next design phase based on cost and feasibility and upon review of upstream reference conditions.
Randy Betz and Jeri Freimuth (Landowners)	3. Log jam at outlet of split flow channel 1: move downstream all the way to end of channel to protect that point of contact with mainstem channel from erosion.	Location of this structure will be reassessed to protect areas of concern.
	4. Make sure to accommodate future vehicle crossing of side channel (ford crossing). While wet crossing with a vehicle is not needed, we want an area to cross during dry periods that does not scour or become difficult to cross because of channel deformation.	Additional detail for landowner site access will be included in subsequent design iterations. There is currently an unimproved access road on this parcel and its alignment crosses the proposed side channel alignment. We expect the alignment of the road leading from the residence will remain the same, and will provide for a seasonal vehicle crossing where the current access alignment crosses the proposed channel alignment.
	5. Provide for a foot bridge to cross the side channel when it is flowing.	We will identify an area where a foot bridge can be constructed to facilitate pedestrian access to the upper floodplain when the side channel is active.
	6. Will the floodplain side channels still be considered our property? We don't want these channels to be considered navigable and open to recreationists.	Property will continue to be owned by Landowners. Floodplain side channels could potentially be accessed by recreationists during periods of high flow. However, given their design and target flows the constructed channels are not expected to be attractive for recreational users, and design measures to discourage use (such as signage, constrictions, etc.) will be considered.
	7. Avoid disturbing large conifers to maximum extent possible.	Our intent is to limit impacts to existing vegetation, especially large conifers.
Lori White, Washington Dept of Ecology	8. I do not see any flags at the moment. It looks like you have even thought through the BMPs and water quality concerns. Maybe adding a water quality protection plan.	A water quality protection plan will be incorporated in subsequent design iterations.

Amanda Barg, WDFW	9. We'd like to see the plans updated to show a low flow thalweg defined in the cross sections of the constructed side channels. For the HPA, we typically require "The streambed must include a sinuous low-flow channel expected under common conditions in the reach and a high-flow bench on both sides of the channel."	Additional channel shaping, including the inclusion of a low flow channel will be depicted in subsequent design iterations. Please also see response to comment 16.
	10. Will side channel have vertical complexity as shown on sheet 15 (Detail 2 shows a pool), or be straight as shown on sheet 9?	Simplified grading was shown on the concept plans. Channel profile complexity (e.g., pools and riffles) will be added in subsequent design iterations.
	11. Sheet 15 shows a buried log in the typical side channel detail, if this is used it could create a barrier. We suggest omitting buried log altogether or placing in at an angle (not buried).	Sheet 15 of the plans is a typical schematic of "field-fit" logs in the side channels. Buried channel-spanning logs will not be proposed as part of this project. We will remove that detail from sheet 15 is subsequent iterations.
	12. Are the riffle crest boulders (weir) required for the roughened channel or can the larger boulders be integrated into a more cohesive rock mix? Our concern is the rock weir could create a drop when the water spills over and then could potentially mine out the smaller rock downstream due to the increased velocity.	Riffle structures will be removed from subsequent design iterations.
	13. Since steelhead spawning is documented within the project reach, how will the project design avoid permanent impacts associated with the constructed riffles (roughened channels) and flow split?	While constructed riffles are no longer being included in the design, we are considering other in-stream elements (wood structures or boulder clusters). To minimize potential for impacts, we will focus on areas outside of the historical redd locations as we explore mainstem boulder or log elements in subsequent design iterations. See also responses to questions 1 and 12
	14. Is there any need for inlet control structure on split flow channel #1? The other inlets show a control structure currently.	The design will need to limit erosion potential near the highway while balancing the need to maintain the split flow path. Flow split design will be revisited and a small wood structure or boulder cluster will be considered in this area (we are also considering an adjustment to the inlet location).

	15. As part of the further evaluation of the flow split mentioned in the Basis of Design report, we would like to know the intended low and high flow percentage split in each of the three side channel entrances, as well as ensure that the flow split does not lead to a permanent loss of fish habitat in the mainstem of Peshastin Creek.	Flow percentages for low and high flows will be determined during the next model runs and then shared in the updated basis of design report. The project aims to limit flow splits into the side channels to a max of ~20% at all flow conditions, except 100% of Summer low flow will be kept in the mainstem.
	16. The proposed side channel width seems really large for Peshastin creek. While maintaining minimum channel depth and velocity criteria intended to benefit the target species and life histories, could the constructed channels be narrowed, along with incorporating a more complex cross section in areas including inset floodplain benches to encourage a more diverse riparian? The site currently has only minimal upland vegetation.	Side channel widths and cross-section alterations, including inset benches, will be refined during the next phase of the design. These refinements will include narrowing side channels in over-widened sections and creation of low-flow channels within the cross-section. Please also see response to comment 9.
	17. I'd like to request additional information regarding the proposed upstream side channel (currently the 200 CFS side channel). Because the side channel would potentially only be activated during high flows (~3 months), and during that time spawning may occur, we would like more information on the risk of the potential for dewatering steelhead redds. If the upper entrance is only activated at high flows, we would like to see whether the channel would or would not stay watered up sufficiently to protect incubating eggs through mid-July. If not, we would recommend considering abandoning the upper channel.	The design intent was to create a high flow bypass to reduce stream energy through this relatively steep and erosive segment of the main channel while also managing flood stage to meet regulatory floodplain permit conditions (no-rise). For the next design iteration, we are reducing excavation and increasing the activation flow to 550 cfs, above the mean average daily flow for all days throughout the year (for quick reference, an annual hydrograph has been attached at the end of this comment response log). This change will maintain benefits to the mainstem by reducing stream power during high flow events. It should also minimize potential for spawning in this segment of the side channel by limiting the amount of time water will be in this segment and limiting water depths when the segment is flowing. The design will also focus on providing positive downstream drainage and minimizing potential for isolated pools in this segment.

Tributary Committee	18. There is concern that diverting flows into side channels when stream flows are low in Peshastin Creek will increase water surface area resulting in warmer water temperatures and reduced rearing habitat. It is important to maintain a certain flow in the main channel.	For the next design iteration, we have re-visited flow data and factored in the influence of the downstream irrigation diversion on gage data. For reference, the annual hydrograph has been attached at the end of this comment response log. In the 60% designs, the side channels will no longer be activated during the period of summer low flows when stream temperatures are most concerning. The lower side channel (and split flow channel) will only engage when flows exceed 45 cfs, and the upper high flow channel will connect at 550 cfs. This connection frequency should allow all of the flow to remain in the main channel during the period when summer temperatures are most concerning (Note: split flow channel #1 is being redesigned so that it will not be engaged during the summer low flow period and #2 has been dropped from the plans). As a result, the proposed project should not contribute to an increase in water temperature during summer low flow conditions. Review of historical flow and temp data at the Green Bridge Road gage (RM 1.4 - see example below) indicates that stream temps typically don't rise to a problematic level until flows drop below ~45 cfs. Mean daily flows usually drop below 45 cfs at the gage by mid-July, corresponding to water temp increase from ~15-20°C (daytime). However, it should be noted that the project site (RM 4.3) is located upstream of the Peshastin irrigation diversion (RM 2.5), and typical flows through the design reach do not drop below 45 cfs until early August (see hydrograph at end of comment matrix).

		 
	19. The excavation depth (up to 8 ft) for one of the flow splits appears excessive. This does not appear to follow an existing depression on the floodplain.	Split flow channel #2 as depicted in the 30% designs will be eliminated from subsequent design iterations due to the excessive earthwork required, location, and concerns about splitting flow during summer high temperature periods.

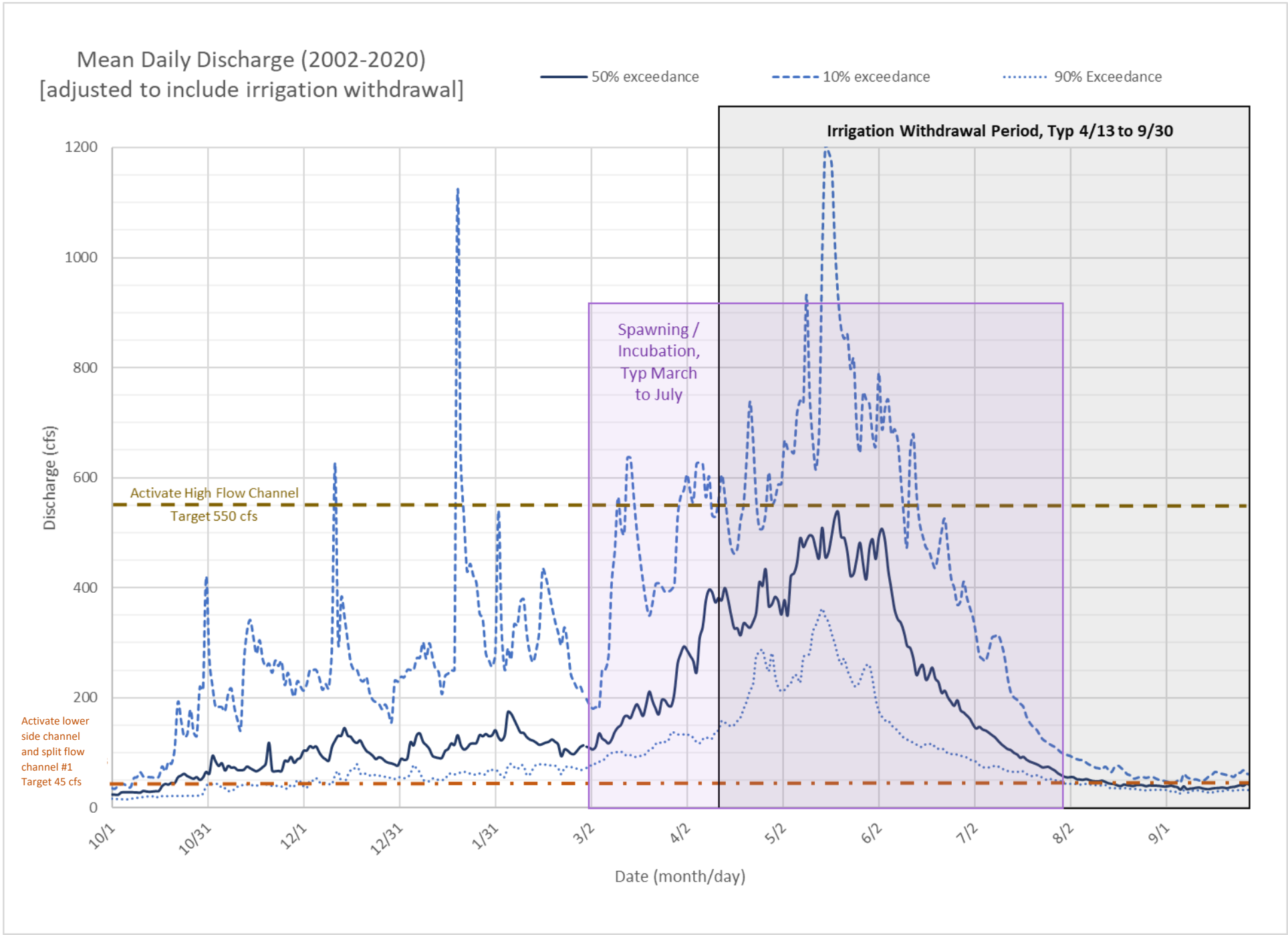
	20. Appreciate the use of pilot channels and existing natural flow paths. This will result in less excavation. There is a concern, however, that the diverting of some flow into side channels will increase water temperatures. It will be necessary to restore riparian vegetation to maintain or reduce water temperatures.	We have re-evaluated stream hydrology factoring in the influence of irrigation diversion on gage data and are advancing designs based on this updated hydrology (see below). In the next design iteration, the lower side channel will be set to activate at 45 cfs. With this configuration, the lower side channel will likely remain wetted through the steelhead incubation period (end of July) and be de-activated by the time stream temperatures are most concerning (early August). Also, the connection frequency of split flow channel #1 is being revisited to maintain 100% flow in the main channel during summer low-flow conditions. Split flow channel #2, as depicted in the 30% designs, will be dropped from the plans. Based on the above, flow diversion associated with the proposed project should not contribute to an increase in Peshastin Creek water temperature during summer low flow conditions. Additionally, native riparian plantings will be included to provide shading to mitigate water temperature concerns. We are exploring planting techniques like an excavator-mounted stinger that will facilitate planting deep-rooted stock and/or cuttings on the rocky floodplain to improve growth and survival of planted specimens. Finally, we anticipate that the project will improve conditions of the floodplain for native riparian tree and shrub species by providing more available water and that this should result in a more dense and robust riparian community than the project area currently supports. Also, see above response to comment #18 for temperature discussion.
	21. Because of the high porosity of floodplain materials, there is a concern that at certain low flows the water within side channels will go subsurface. This can lead to fish stranding and entrapment.	To mitigate fish stranding concerns, the side channels are being designed to activate during the rising limb of the typical annual hydrograph, and avoid wetting and drying during stages at which Peshastin Creek tends to fluctuate. For quick reference, see the annual hydrograph attached at the end of this comment response log. For the 60% design iteration, the activation flows for the side channels are being selected to coincide with wetter weather that begins in the fall (45 cfs –

		lower side channel) and peak flow periods typically associated with storm events and/or snowmelt (550 cfs – upper side channel). The lower side channel is expected to remain wetted from approximately November to July and to deactivate during the falling limb of the hydrograph, which is typically characterized by a consistent drop in stage over an extended period (rather than rapid fluctuations of wetting and drying). This consistent drop in side channel flow should cue fish to outmigrate and give them time to do so before the side channel dries. Further, LiDAR indicates that the flow paths we are using are historical channel alignments and we have observed that there is a considerable amount of fine material in the floodplain substrate. As a result, we expect the side channels to seal so that there is low likelihood that flows will go subsurface once continuous flow is established.
	22. Because side channels will be activated during higher flows, there is a possibility adult steelhead will move into the side channels and spawn there. There is a concern that the progeny of those spawners will be dewatered when the side channels become disconnected. Thus, biological benefit will be lost during the period when the side channels are not activated.	Based on input we are modifying the designs during the 60% design iteration so that the side channel inlets activate at 45 (lower) and 550 cfs (upper). The common outlet of this channel system (and split flow channel #1) will likely remain at least partially wetted at flows below 45 cfs (functioning somewhat like a seasonal alcove). With this configuration, the lower side channel is expected to remain wetted through the steelhead incubation period (end of July). The upper side channel will be wetted infrequently and for short period (and flows in this segment should remain shallow). These characteristics should minimize potential that this segment will be used by spawners. For reference, see annual hydrograph attached to end of comment matrix. These activation flows were selected based on the following criteria: 1. Largely avoid activating during stages at which Peshastin Creek frequently fluctuates to promote juvenile ingress and egress while minimizing potential for fish stranding. 2. Provide high quality off-channel habitat for juvenile salmonids during flow periods when they are present to the extent feasible. 3. <u>Do not</u> maintain a perennial connection with the mainstem to avoid increasing summer water temperatures and reducing mainstem water quantity, at low flow.

		4. Minimize excavation and disturbance by utilizing existing topography of floodplain swales at the site. The side channels are expected to reduce stream power in the mainstem during high flows. This reduced stream power, along with the addition of mainstem structure, is expected to promote sediment sorting and gravel deposition in the mainstem channel. This is expected to improve spawning and rearing habitats in the mainstem even during periods when the side channels are not activated.
	23. Because riffles are proposed for the main channel, are the side channels and flow splits needed under FEMA to address flood risk?	We are removing constructed riffles from the 60% design iteration, and will instead add in-stream structure through placement of log structures and/or boulder clusters. While the need to address flood risk for regulatory purposes is reduced through this approach, the side channels and split flow channel(s) will continue to reduce flood risk for neighboring developed areas by improving connectivity of the undeveloped project floodplain, among other benefits.
	24. Rather than reconnecting the floodplain at higher flows, would re-meandering be a better restoration action at this site?	LiDAR data indicates that the creek did not historically flow through this area in a meandering fashion, but rather as a multi-thread stream with side channels, mid-channel bars, floodplain channels and other similar features. As a result, designing a meandering channel for this segment is inconsistent with its historical configuration. Further, construction of a meandering channel is not an option the landowners are willing to consider since this would limit access to much of their properties.
	25. Consider adding more wood to the mainstem.	Addition of mainstem wood structures will be explored in subsequent design iterations. Constraints to addition of large wood do exist, including the stream power in this location and recreational kayak use of this reach.
	26. Give serious consideration to dropping the side channels and focus more on increasing complexity within the mainstem and split-flow channels.	The preliminary design project that was funded by both the Tributary Committee and Salmon Recovery Funding Board proposed side channel reconnection at this location to address deficiencies identified by the UCRTT in both the former and current version of its biological strategy. Opportunities to re-connect historical side channels along Peshastin Creek are limited, and the current prioritization strategy identifies both off-channel floodplain and off-channel side-channels as unacceptable for the reach of Peshastin Creek in which the project is located. This project site affords an

		opportunity to re-connect multiple floodplain flow paths at moderate and high flows. This, in turn, facilitates adding structure to the mainstem that may not be permittable under FEMA floodplain management requirements without the side channel components of this design. In addition, the alternatives analysis and hydraulic modeling results completed under the 30% design iteration indicate that a project that includes improvements to both floodplain connectivity (during moderate and high flows) and mainstem complexity (during low flows) will maximize the benefits to target species (and will be consistent with floodplain regulatory requirements and the UCRTT prioritization strategy). It is also worth mentioning that the stream segment immediately upstream of the project site was observed to have quality side channel habitat, much of which appears to be connected during low and high flows, and supports a healthy riparian zone. This stretch of river has served as reference for the proposed project.
	27. Minimize or eliminate side channel connections at low flows to maintain flow levels in the main channel.	In the 60% design iteration, the side channels and split flow channel(s) will not be connected at summer low flows, so 100% of the flow will remain in the mainstem during this period
	28. It is not clear if the side channel above the downstream riffle provides much benefit for the amount of excavation that would occur there. Consider removing that feature from the project. (Similar to #19)	*We assume that this comment is in reference to the upstream-most split flow channel, Split Flow Channel #2 in the 30% design iteration.* The design for Split Flow Channel #2 was intended to increase margin habitat in a segment of the mainstem that lacks hydraulic and habitat diversity. We agree that this channel would require extensive grading and this feature (as depicted in the 30% designs) will be eliminated from subsequent design iterations due to the excessive earthwork required, location and concerns about splitting low flow.

	29. In general, the Committee has several concerns with the proposed side channels. It may be best to focus on split-flow channels and improving complexity within the mainstem channel.	See comments and responses to #18, 20, 21, 22, 24, 26, 27 and 28. The side channels provide floodplain/riparian benefits while reducing mainstem velocities and providing a considerable amount of lower-velocity off-channel refuge habitat during high flow events. The side channels are being designed to maximize biological benefits and minimize negative impacts, including stream temperature increases and potential stranding of emergent fry and other juveniles. Split Flow Channel #2 will be removed during the 60% design iteration. The Design Team will continue to work with the Tributary Committee and other stakeholders as the design process proceeds.
Jenae Churchill, Army Corps of Engineers	30. Thank you for letting me know about the future project impacting Peshastin Creek. At this time I do not have any comments or questions, but it looks like a good candidate for Nationwide Permit 27 – Aquatic Habitat Restoration, Establishment and Enhancement Actives. I look forward to hearing more about the project.	Comment noted.
Max Nelson, et al., Washington Dept. of Transportation	31. Opening up the side channel habitat actually improves conditions along the highway so there are no concerns from a hydraulics perspective.	Comment noted.
	32. At what flows does the side channel become activated?	Under the 60% design iteration, the lower side channels will be activated at 45 cfs, and the upper high flow channel will be activated at 550 cfs. The annual hydrograph has been attached to the end of this comment response log for quick reference.
	33. Will any closures of highway lanes be required? If so, WSDOT would need to review traffic control plans. No work on US 97 on any Friday between Memorial Day and Labor Day. Delays to vehicles shall not be longer than 20 minutes.	We don't anticipate that there will be any need to close highway lanes as part of this project. We do, however, expect truck traffic in and out of the project site to deliver equipment and materials and it is likely that signage or other actions will be needed to assure traffic safety. We will continue communications with WSDOT as the project proceeds and will work with them to assure that the project is consistent with their traffic safety requirements. The final plan set will likely include a traffic control plan to ensure safe access.


Mean Daily Discharge (2002-2020)
[adjusted to include irrigation withdrawal]
50% exceedance
10% exceedance
90% Exceedance
Irrigation Withdrawal Period, Typ 4/13 to 9/30
Spawning / Incubation, Typ March to July
Activate High Flow Channel
Target 550 cfs
Activate lower side channel and split flow channel #1
Target 45 cfs
Discharge (cfs)
0
200
400
600
800
1000
1200
10/1
10/31
12/1
12/31
1/31
3/2
4/2
5/2
6/2
7/2
8/2
9/1
Date (month/day)