WASHINGTON STATE Recreation and Conservation Office

Project Review Comments

PROJECT: 21-1128 P, East Fork Thermal Assessment & Design - Phase 2

Sponsor: Lower Columbia Estuary Partner Program: SALMON ST PROJ Status: Application Resubmitted

MEETING: Initial Review

Shared: 4/2/2021

Review Status: Needs more information

Considerations:

Topics	Comments
Review Panel Comments - Initial	
Questions (response required)	
	Add more detail about the potential conceptual designs that can be developed from the identification of cold water sources.
	Reply: There are several conceptual designs that we are considering, including: 1) mainstem large wood and grading; 2) beaver dam/floodplain enhancement; 3)off-channel habitat enhancements and 4) eliminating/reducing warm water impoundments on tributaries (see also response to question below).
	Have any conceptual designs been generated from the Phase 1 data?
	Reply: We are currently working on a Preliminary Conceptual Design sketch for the one of the tributaries that mimics the design sketch we did for thermal enhancement on the Columbia River (see Attachment "Cold Water Concept Design Example). Other conceptual designs that we are considering include: beaver dam/floodplain enhancement and off-channel habitat enhancements.
	The sponsor indicated that the ground truthing portion of the assessment was taking longer than expected. Is phase 2 likely to produce conceptual designs in the 18 month time period?
	Reply: Our understanding is that we will have more than 18 months due to the updates changes in assessment/design status. Due to water conditions in 2019 we elected to wait until August to do the remote sensing. As a result the TIR image data was not available until fall 2019, which precluded us being able to ground truth in 2019.
Improvements to Make Project Technically Sound (response required)	
	Please update the proposal to reflect the implementation, results and lessons learned from Phase 1.
	Reply: The results from the TIR survey have been very interesting. All -in-all there were more than 50 sites along the mainstem and tributaries that could offer thermal refuge for fish. When the mainstem was 21-23 C, these potential thermal refuge areas varied from 15-18 C. Along the mainstem there were several notable findings 1) cold water areas were found in mixed bedrock and alluvial sections of the river; 2) in areas where the channel had avulsed/created prominent side-channels significant cold water areas were found; 3) beaver dam complexes often overlapped with cold water areas on the floodplain and 4) several tributaries offered refuge opportunities. In addition, potential refuge areas were spatially distributed through the 19-mile project area. This could provide opportunity for fish to move between patches of cooler water.
	During the presentation the sponsor indicated that the extent of the survey changed from the initial plan for phase 1 & 2; but didn't provide any explanation.

	Reply: The initial survey plan for Phase 1 changed after we lost our drone pilot. Due to this factor, as well as the large project size, we elected to to use a helicopter to cover the distance. To do this we hired Quantum Spatial, who is a leader in the remote sensing world. The plan for Phase 2 is to again hire Quantum Spatial to cover the 20+ miles of river.

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MEETING: LE Review

Shared: 4/16/2021

Topics	Comments
Lead Entity Comments	
Questions For Applicant	
	How might conditions outside of adjacent development, such as snowpack, geomorphic changes, etc., drive temperature increases in the mainstem river?
	Reply: The E. Fork basin's upper elevations are relatively low (below 4,500 ft.) compared to other watersheds in the region (Rock Creek is much lower and would not be significantly effected). This makes it potentially vulnerable to climate scenarios (predictions) that show snow levels rising. This *could* lead to changes in snowpack, lower discharge during the spring/summer and elevated water temperatures. The predicted increase of 2-3 C in water temperatures by 2050 (NorWEST, see attachment in PRISM) uses climate scenarios that incorporate changes in snowpack. Due to the relatively stable nature of the East Fork and Rock Creek, geomorphic changes outside the project area are unlikely to drive changes in water temperatures within the mainstem.
	Describe how the Phase 2 methodology is informed by lessons learned in Phase 1. Include how Phase 1 lessons learned impact the proposed Phase 2 budget as well as details on how cold water refuges were identified in Phase 1, and what conceptual designs have come out of that work.
	Reply: First and foremost remote sensing using TIR sensors is a cost effective way to get an idea of the potential thermal refuge areas across large distances. We used this approach in Phase 1, in combination with field verification, and we will continue using this approach in Phase 2. The remote sensing data allowed us to identify patches of cooler water down to 10 ft2 over 19-miles of river (Phase 1). Based on the size and quantity of these patches we grouped them into priority sites for the ground crews to investigate. Again, we plan on using this approach as it is very cost effective and allows us to investigate a large amount of sites. We have attached an example in PRISM as an example of a Conceptual Design that could come out of Phase 2 efforts.
	What types of designs do you anticipate developing through this assessment? Add some example projects to your PRISM application, such as large wood placement and acquisition work, that could result from assessing thermal conditions.

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	Reply: We anticipate developing an array of different designs including, but not limited to 1) enhancing tributary junctions with the mainstem to help increase cool water plumes (see Conceptual Design attachment in PRISM); 2) improving habitat conditions within and around beaver dam complexes and within the main channels; 3) using large wood to encourage local geomorphic complexity to increase hyporheic flow; 4) acquisition of properties that could help protect cold water refuge areas and 5) identifying areas or point sources of warm water contributions. The Mason Creek project represents a good example of a project funded by RCO (#18-1412) that includes acquisition and restoration of an area that also provides cooler water than the mainstem. This creek is heavily used by juvenile salmonids.
	How might the causal drivers of cold water areas be identified through this project, such as subsurface flow inputs, and upland and riparian forest conditions? Understanding these drivers could help prioritize broader recovery efforts to work with partners on land use management and protection.
	Reply: After cold water areas are identified through remote sensing, we will collect field data at these sites to identify figure the source of the cooler water (upwelling or tributary, etc.). We will also map the extent of the cooler water and determine the temperatures at the streambed; remote sensing data only captures the top 1 foot of the water column. We will collect physical and habitat data, including channel and geomorphic conditions, riparian conditions, biotic conditions, wood availability and identify development pressure. We believe that our work will lead to broader recovery efforts and will continue working with Ecology and Clark County to address land management and protection.
	How would the results of this assessment inform broader conservation and restoration strategies? Consider how this thermal assessment could identify protection areas based on drivers of cold water influence, including through partnerships with land managers such as Clark County. Consider how project concepts may support broader, landscape-scale conservation strategies, rather than just site-scale restoration actions.

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Reply: We believe the incorporation of thermal refuge areas into habitat restoration efforts within the East Fork Lewis River is an example of a broader restoration strategy. Salmon recovery efforts within the Lower Columbia region have not historically considered protection and restoration of thermal significant areas, including cold water refuges. The results of our analysis and design efforts for Phase 1 and Phase 2 will be used to update the East Fork Habitat Restoration Plan.

We believe that identifying cold water refuge areas water over the lower 30 mile of the East Fork, including the lower 5- miles of Rock Creek, could facilitate climate reserves on a watershed scale. These reserves will help adult fish as they migrate up and down the river and juveniles as they mature. Explicitly identifying these areas, and improving habitat conditions within these areas, could be a critical factor in light of climate predictions. Certainly, there are other important conservation strategies that also need to occur, including addressing water withdrawals and development within the basin.

Over the last decade we have partnered with Clark County to develop restoration projects across 600 acres of county land. The county has acquired and set aside valuable floodplain habitat. This has allowed us to link restoration projects over 7-miles of river including tributaries, floodplains, wetlands, side-channels and along the mainstem.