

WSDOT SR 20 Skagit O’Brian Reach Feasibility Study

EVALUATION CRITERIA– January 26, 2023

Input from Workshop #1 incorporated

Project Goals:

- Enhance salmon habitat in the floodplain and river margins
- Reduce flood and erosion risk to SR 20
- Does not increase flood or erosion risk to adjacent property or infrastructure

CATEGORY	STUDY OBJECTIVE	METRIC FOR COMPARISON	FLOWS TO BE MODELED AND WHAT WE EXPECT TO LEARN FROM THE HYDRAULIC AND HSI MODELS
Fish Habitat	Benefit multiple salmonid species	Habitat Suitability Index (HSI), Weighted Usable Area for multiple species (Chinook, chum, and steelhead) and life stages. The model outputs will be informed by temperature data and fish observations to help validate.	90% exceedance (summer low flow) 50% exceedance (overwinter/spring flow) Q1 Habitat Suitability model inputs
	Increase low-flow rearing habitat	Limit analysis to areas with high HSI scores, specifically in spring to identify key side and off-channel areas From modeling: For spring: Compare area of habitat that is > 0.5 ft deep in June between existing and proposed conditions. For Fall: Compare area of habitat that is >0.5 ft in September between existing and proposed conditions.	90% exceedance (summer low flow) 50% exceedance (overwinter/spring flow) The area (acres) and expected duration of water depths >0.5ft in side channels during low flow (Aug-Sept) and spring/winter months (June). HSI weighted usable area (WUA) and high end summary, as informed by temperature and fish data
	Increase high-flow refuge habitat	Quality and quantity of flood refuge during an annual flood event measured from the difference in the areas of inundation and HSIs in the floodplain and river margins under existing and proposed conditions.	Q1 Areas of inundation and HSI in floodplain and river margins

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	Does not reduce the diversity and quality of other valuable habitat types	<p>Compare HSI under existing conditions to HSI under proposed conditions to determine range (diversity) of depths and velocities within a given alternative.</p> <p>Qualitatively evaluate trade-off with habitat types not related to HSI.</p>	HSI
	Minimize Risks of stranding fish in floodplains during receding flows	<p>Qualitatively identify areas that are likely to pool or pond and consider enhancing connections in the project concept.</p> <p>We expect that:</p> <ul style="list-style-type: none"> • Fish will outmigrate volitionally as the river recedes. • Juvenile salmon can rear in isolated habitats for months at a time. • Alternatives that enhance connection to the mainstem are likely to more readily allow water to leave the system, especially those connected at lower flows. • If areas are cooler and connected longer, there is less risk of stranding with the project than currently. 	<p>90% exceedance 50% exceedance</p> <p>Compare the difference in water surface areas to identify areas where water might pool.</p>
Infrastructure and property risk	Reduce flood risk to SR 20	Compare water surface elevations during flood events along SR 20 between existing and proposed conditions.	<p>Q10. Q100, Nov 2021</p> <p>Flood extent and elevation under each flow/ depth/velocity</p>
	Reduce erosion risk to SR 20	Length and robustness of necessary bank protection along SR 20 at existing and proposed conditions evaluated from Sheer stress on the SR 20 embankment above the threshold where bank protection is required.	<p>Q1, Q2, Q10. Q100, Nov 2021</p> <p>Sheer stress on the SR 20 embankment under each flow/depth/velocity.</p>
	Does not increase flood or erosion risk to adjacent property or infrastructure	Water surface elevations and shear stress at and near adjacent structures, roadways, and private land (not in conservation use). Evaluate potential for environmental conditions that may influence these results, such as increased risk of avulsion.	<p>Q1, Q2, Q10. Q100, Nov 2021</p> <p>Flood extent/depth/velocity/shear stress under each flow near private land within the model extent.</p>
	Does not reduce potential effectiveness of the downstream Barnaby Project at meeting its objectives	<p>Potential to increase or decrease flows entering the Barnaby Project above a threshold.</p> <p>Water surface elevations, velocity and depth in the Barnaby reach calculated from the change in flows in the Illabot outlet, using the stair-step output from the existing Barnaby model.</p>	<p>Q1, Q2, Q10. Q100, Nov 2021</p> <p>Flood extent under each flow/ depth/velocity</p>

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Other	Cost and ease of construction	Relative comparison of cost, property acquisition (from willing landowners), logistics, and vegetation management. High-level cost estimate based on equipment needs, excavation quantities, wood placement, acres of planting, and invasives treatment. Qualitative estimate of logistical requirements. Presence of invasives with intensive maintenance requirements.	N/A
	Sustainable	Qualitative assessment of durability and need for little to no maintenance, based on likelihood of sedimentation, longevity of any ELJs, or need to manage invasive vegetation.	Use modeled velocities to identify locations where sediment is likely to deposit due to a shift from high to low velocity.
	Timing of habitat benefits	Minimal lag time and maximum duration of habitat benefits.	N/A
	Opportunity to collaborate and coordinate with other nearby habitat and infrastructure efforts, or leverage funds from other sources	Contact county, city and other entities and project sponsors to review plans for road or habitat restoration work and identify potential opportunities to partner or coordinate.	N/A
	Wildlife effects	Review species list and habitat types to qualitatively evaluate positive or negative effects on wildlife likely to inhabit the study area.	N/A
	Recreation	Qualitative assessment of potential impacts to safety and useability for boating, fishing, and recreating.	N/A
	Aesthetically appropriate	Qualitative estimate of aesthetic impacts on private landowners and the public.	N/A
	Perceived risk of flooding at adjacent properties	Qualitative assessment and input from stakeholders of the appearance or perception of a risk.	N/A