

EF 10

Side-Channel Habitat Enhancement – Conceptual Design

Reach: EF Lewis 8B
 River mile: 13 to 13.5
 Reference page in main document: 43

Site Description

This site consists of a high flow channel in the river right (north) floodplain area that is not active at summer low flow periods. The existing channel is approximately 2,600 feet long and flows through Lewisville Regional Park. The project area is located on County Park land except at the downstream end where the channel flows through State-owned land. Private property lies just to the west of the channel at the downstream terminus near the junction with the mainstem East Fork Lewis River. The channel enters the mainstem East Fork Lewis near river mile 13. There have been considerable alterations to the channel and surrounding park areas, primarily related to park infrastructure. Two bridges within the park span the channel. Approximately mid-length down the channel is an excavated pond that retains water throughout the summer. Roadways, parking lots, and park amenities are located nearby the channel in several places.

The channel offers a good opportunity to restore summer-active side-channel habitat. At the time of the survey, temperature was 4°F cooler in areas of standing water in the side-channel compared to the mainstem. The channel has gravel and cobble substrate and good riparian cover throughout most of the length. Average gradient is approximately 0.8%. Site observations of standing water during the summer and cool temperatures indicate significant groundwater connectivity.

This project scored high in the project evaluation process due to its benefit to multiple species life-stages and due to its large size.



Existing Conditions

Treatment Strategy and Alternatives

Recommended treatments:

- Excavate within existing channel as necessary to provide year-round surface water connectivity with the mainstem. Utilize existing flood channel and channel scar depressions. It is anticipated that some areas will not require excavation.
- Create and enhance pool-riffle sequences in side-channel.
- Install habitat enhancement features including large woody debris and spawning gravel (if necessary).

Alternatives:

- There may be alternative locations for the side-channel depending on constraints imposed by surrounding park infrastructure. These will be determined with further analysis.
- There may be opportunities to create backwater channels or off-channel wetlands that are connected to the side-channel.



Example of a restored side-channel

Expected Benefits – Limiting Factors Addressed

Physical habitat – 1) Enhanced availability of side-channel and off-channel habitat throughout the year, 2) Increased hyporheic flow connectivity, 3) Enhanced quantity and quality of habitat features including pools and riffles, bank complexity and cover, and instream woody debris.

Biological – 1) Enhanced winter high flow refuge for coho and steelhead, 2) Enhanced spawning for coho and steelhead, with potential benefits to chum and Chinook spawning, 3) Enhanced quantity and quality of cool-water summer rearing for coho and steelhead, 4) Increased habitat complexity and cover for rearing fish that will provide diverse foraging opportunities and protection from predators.

Access and Landownership

Access can be obtained through Lewisville Park. Property ownership is Clark County and WA State (downstream end). There is private land near the channel at the downstream end. It is possible that the optimal channel outlet location would be located adjacent to this parcel and landowner cooperation may therefore be required for implementation.

Data and Analysis Requirements

Evaluate effects of reduced flow in mainstem. At least one low-flow season of groundwater monitoring and pump tests are recommended to determine groundwater contribution rates and required excavation extents. Hydraulic analysis, flood inundation analysis, and a geomorphic assessment will be required to support final designs. Habitat enhancements will be subject to significant potential impact from beavers; these impacts should be addressed as part of project design.

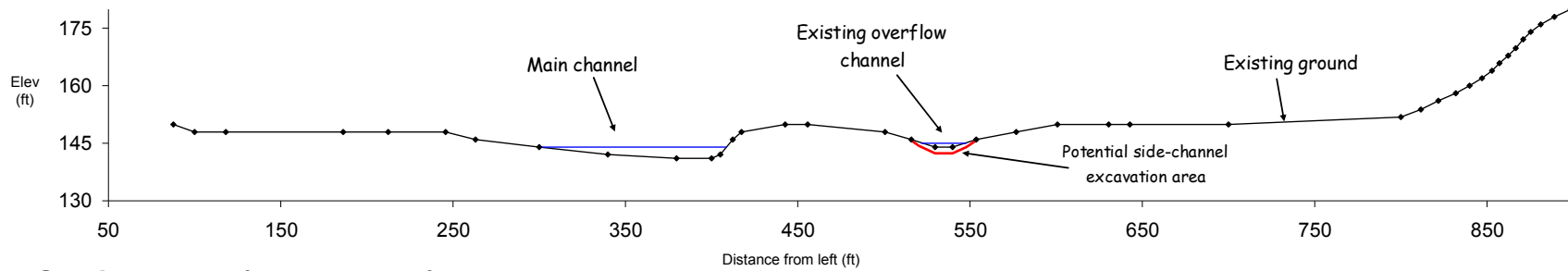
LCFRB Habitat Strategy Summary

EF Lewis 8B							
Tier	1						
Length (m)	8,801						
Population	WSTH	SSTH	FCH	Coho	Chum	Multi Species	
Recovery Plan Priority	P	P	P	P	P		
Species Reach Potential (H,M,L)	M	L	M	M	H		
Restoration Value	66%	43%	38%	83%	52%	56%	
Preservation Value	34%	57%	62%	17%	48%	44%	
Access to blocked habitats	-	-	-	-	-	L	
Stream channel habitat structure & bank stability	H	M	H	H	H	H	
Off channel & side channel habitat	H	M	H	H	H	H	
Floodplain function and channel migration processes	H	M	H	H	H	H	
Riparian conditions & functions	H	M	M	H	M	H	
Water quality	H	M	M	M	L	H	
Instream flows	H	M	H	H	H	H	
Regulated stream management for habitat functions	-	-	-	-	-	L	
Watershed conditions & hillslope processes	H	M	H	H	M	H	

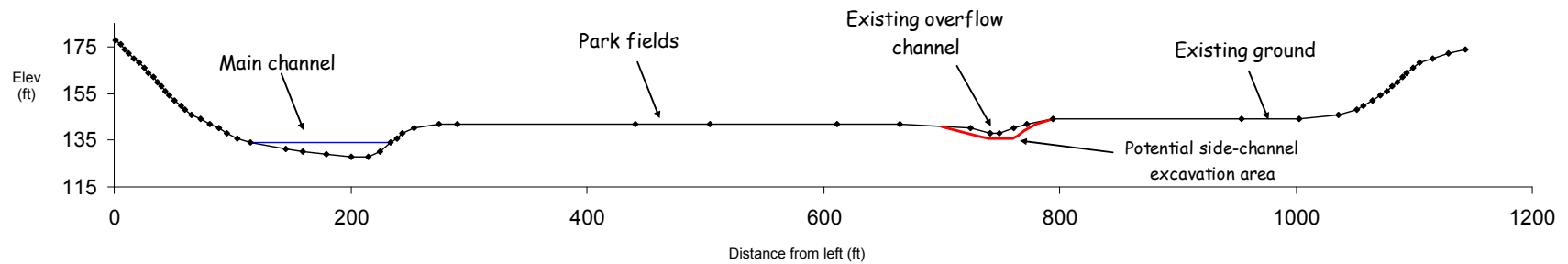


	<ul style="list-style-type: none">  Side-channel habitat enhancement area  2-foot LiDAR contours  Parcel boundaries  Clark County parcels  Log placements <p><i>*Enhancement features are approximate. Specific location and extent of features will require additional analysis and design. Contour data and 2007 aerial photography provided by Clark County</i></p>	<h2 style="margin: 0;">EF 10</h2> <h3 style="margin: 0;">SIDE-CHANNEL HABITAT ENHANCEMENT</h3> <h4 style="margin: 0;">OVERVIEW AND LOCATOR MAP</h4>
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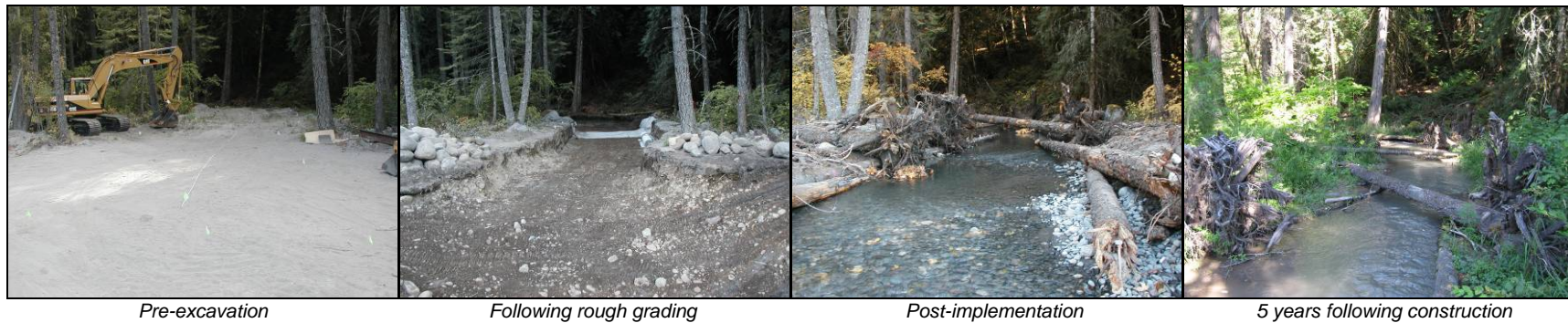
Section EF-10 (Upstream)




Section EF-10 (Downstream)



Standard Construction Sequence



	<p>CROSS SECTIONS AND CONSTRUCTION SEQUENCE</p> <p>Notes: Cross-sections are derived from LiDAR contours. Bathymetry is estimated based on site and aerial photograph observations. In some cases, minor corrections are made to LiDAR data that is believed to be representative of vegetation and not the ground surface.</p>	<p style="text-align: center;">EF 10</p> <p style="text-align: center;">SIDE-CHANNEL HABITAT ENHANCEMENT</p>
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Planning-level cost estimate for EF 10

Note: This is a preliminary cost estimate for planning purposes. Actual costs for design and construction activities may vary substantially from these estimates. Assumptions for time requirements and material quantities have been made based on limited information that is available for the site. Additional information obtained during site investigations will be needed to determine actual quantities and costs. Estimates based on 2009 costs.

Description	Unit	Quantity	Unit Cost	Total Cost	Comment
Mobilization and demobilization	LS	1	\$23,000	\$23,000	Calculated at 5% of construction sub-total
Temporary access road	LF	500	\$40	\$20,000	Assumes multiple access points are available through the park
Excavate & stockpile/dispose	CY	5,000	\$15	\$75,000	Excavation quantity is based on 2 CY per lineal foot (2,500 feet with 3-4 feet of cut). Finished side channel top width with approximately 15 feet. Final design criteria and analysis will likely alter these estimates up or down. Assume haul will be less than 1,500 feet. Haul distances greater than 1,500 feet off site on road will substantially increase haul costs.
Channel earthwork and reshaping	LF	900	\$50	\$45,000	Assumes one-third of the length receives significant re-grading to create pool and riffle habitat.
Large wood purchased and delivered to site	EA	200	\$400	\$80,000	Assumes 20% delivered with root wads attached. Frequency of LWD = >20 pieces/100 meters.
Boulder ballast purchased and delivered to site	EA	300	\$100	\$30,000	Assumes 1.5 - 2 yard boulders. Assumes 1.5 boulders per log.
Wood placement	EA	200	\$300	\$60,000	Wood placed in small jams and individual placements.
Dewatering and sediment control	LS	1	\$25,000	\$25,000	Assumes water will be encountered throughout construction.
Streambank revegetation	SF	25,000	\$1	\$25,000	Assumes average of 5 feet on each bank for entire length
Riparian revegetation (above bank)	AC	2.3	\$15,000	\$34,500	Assumes 20 feet revegetation on each side of channel. Includes follow-up maintenance.
Construction oversight	HR	540	\$130	\$70,200	Assumes 6 weeks of construction oversight, construction staking and associated coordination, 12 hour days, 1.5 staff.
Construction Sub-Total				\$487,700	
Concept Level Construction Contingency (20%)				\$97,540	
Construction Total				\$585,200	
Project Delivery					Items below are calculated as a percent of the construction sub-total
Permitting (4%)				\$19,508	
Detailed Engineering Design (15%)				\$73,155	
Contract Administration (5%)				\$24,385	
Project Delivery Sub-Total				\$117,000	
TOTAL ESTIMATE				\$702,000	rounded to nearest \$1,000

General Notes:

Cost includes a 20% construction contingency

Costs assume all materials (wood and rock) are purchased and hauled to the site from a nearby source. Significant savings could be accrued if materials are donated.

Considerable savings could be gained by reducing the total length of the side-channel

Assumes no spawning gravel supplementation. Importing gravels will increase costs.

Costs do not include wetland inventory and impacts analysis

Boulder ballast requirements may be able to be reduced depending on hydraulics analysis

Key

LS = Lump sum

CY = Cubic yard

LF = Lineal foot

SF = Square foot

AC = Acre

EA = Each

FF = Face foot (square foot of bank face)

HR = Hours