

EF 20

Side-Channel and Backwater Habitat Enhancement – Conceptual Design

Reach: EF Lewis 8B
 River mile: 10.7 to 11.1
 Reference page in main document: 50

Site Description

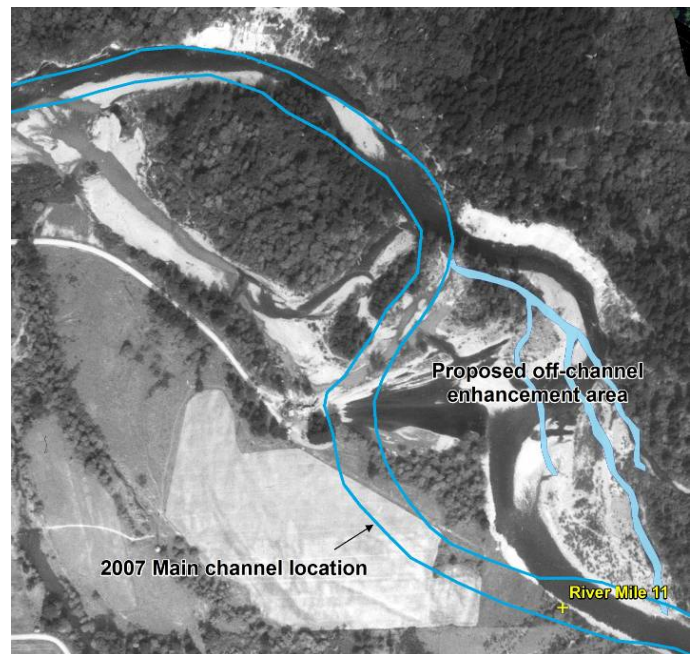
This site consists of an old meander scar / flood flow channel in the river right (north) floodplain area that is not active at summer low flow periods. The existing channel scar is approximately 1,500 feet long and joins the mainstem at its downstream end at approximately river mile 10.7 (see overview photo on page 3). The site is located primarily on Clark County property. A complex of historical mainstem meander scrolls are located throughout the floodplain area and offer numerous possibilities for locating side-channel and connected off-channel habitats. This area was the site of extensive river bar gravel mining (scalping) in the early-to-mid 1900s (see 1939 aerial photograph below).

The channel offers a good opportunity to restore summer-active side-channel and off-channel habitat. At the time of the survey, temperature was 6°F cooler in areas of standing water in the side-channel (50°F) compared to the mainstem (56°F). The channel has gravel substrate and good riparian cover throughout its length. Average gradient is approximately 0.6%. 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 channel, September 2008



1939 aerial photo of project area showing 2007 channel alignment. Note evidence of extensive gravel bar scalping.

Treatment Strategy and Alternatives

Recommended treatments:

- Excavate ~1,500 ft long side-channel connected with the main channel in the summer. Utilize existing flood channel and channel scar depressions.
- Excavate additional off-channel (backwater) habitats connected to the side-channel. Use existing channel scar depressions.
- Create pool-riffle sequences in side-channel. Install habitat enhancement features including large woody debris.

Alternatives:

- Several alternative locations exist for the side-channel and off-channels. These will be determined with further analysis.



Example of restored side-channel

- A long backwater channel (not connected to mainstem at upstream end) could be constructed in lieu of the side-channel if analysis indicates significant impacts to aquatic habitat from flow reductions in mainstem.
- This project could potentially extend further upstream and be combined with off-channel enhancement at project EF-16.

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

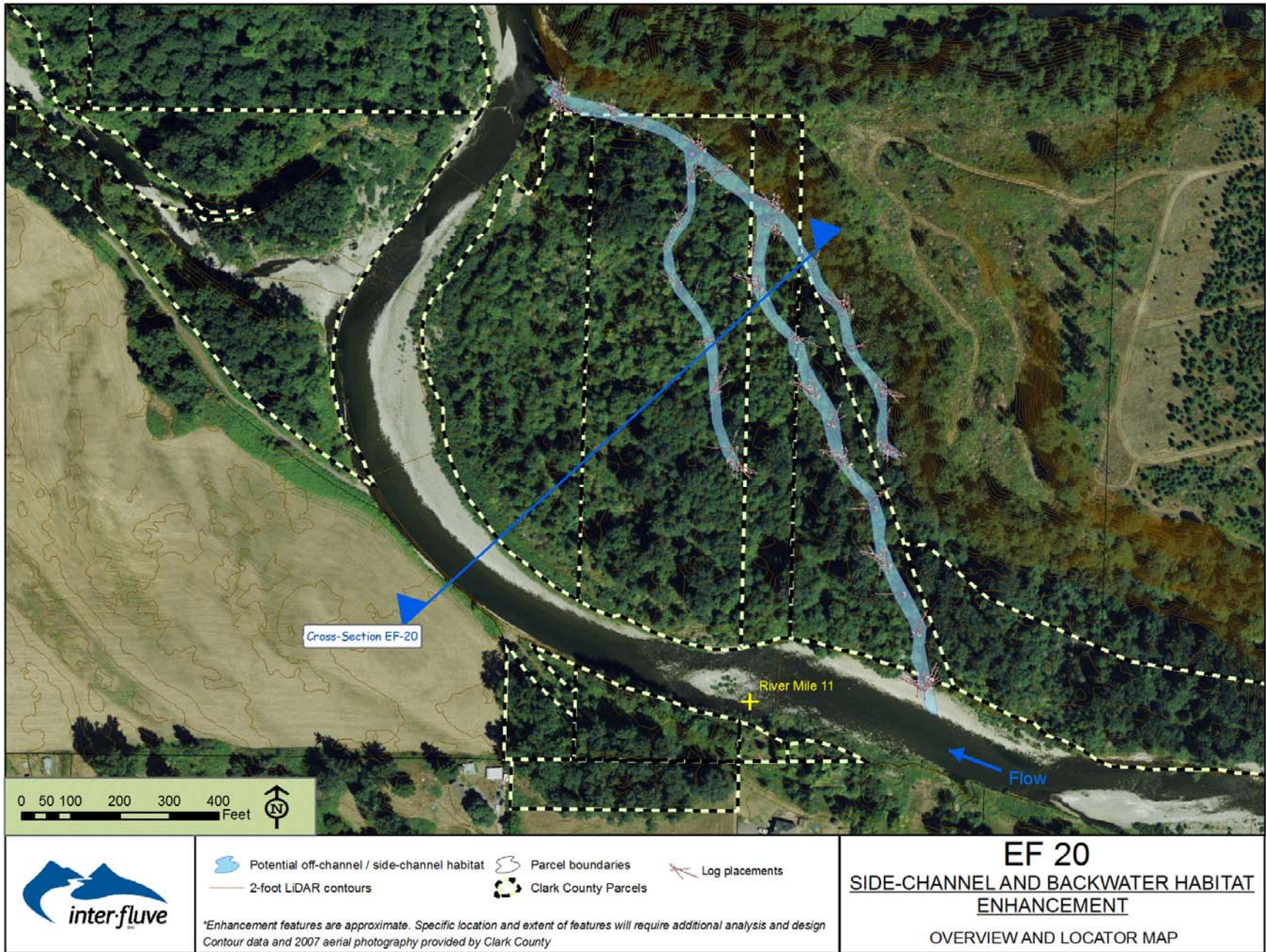
The site is located primarily on Clark County property, with the exception of a portion of the upstream end and a portion of the downstream end, which are located on private land. It is possible to design the project to avoid private property altogether if landowner partnerships cannot be obtained. Access can be obtained from the north through private property (if landowner permission is granted) or from County Property (Daybreak Park) across the mainstem East Fork Lewis.

Data and Analysis Requirements

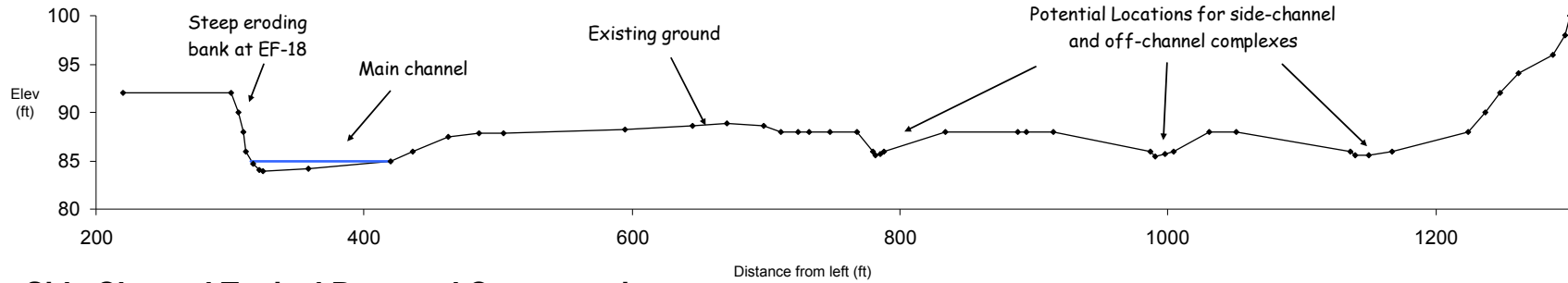
Evaluate effects of reduced flow in mainstem; in particular, ensure there is adequate flow entering the left bank active side-channel throughout the summer. Continued rapid erosion of the unvegetated south bank of the mainstem at project EF-18 should be addressed in order to reduce avulsion risk into the project area. 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

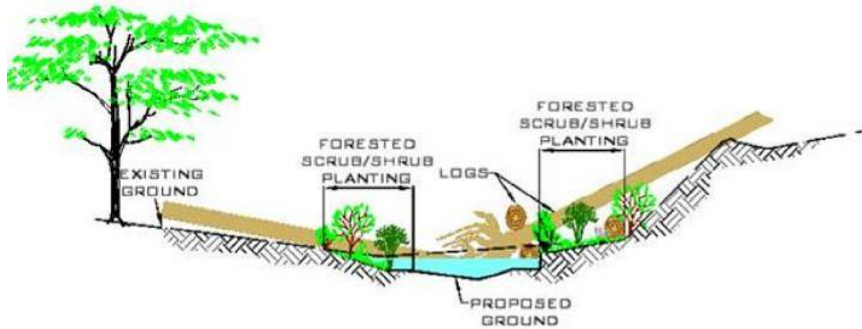
EF Lewis 8B							
Tier 1							
Length (m) 8,801							
	Population	WSTH	SSTH	FCH	Coho	Chum	Multi Species
Recovery Plan Priority	P	P	P	P	P	P	
Species Reach Potential (H,M,L)	M	L	M	M	M	H	
Restoration Value	66%	43%	38%	83%	52%	56%	
Preservation Value	34%	57%	62%	17%	48%	44%	
Access to blocked habitats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



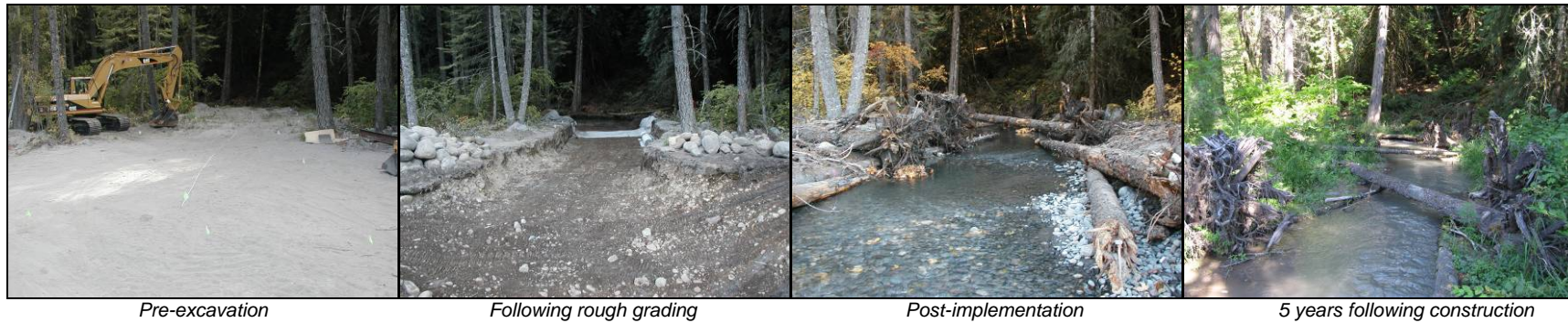
Cross-Section EF-20



Side Channel Typical Restored Cross-section



Standard Construction Sequence



	<p>CROSS-SECTIONS AND CONSTRUCTION SEQUENCING</p> <p>Notes: Cross-section EF-20 is 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>EF 20 SIDE-CHANNEL AND BACKWATER HABITAT ENHANCEMENT</p>
--	--	--

Planning-level cost estimate for EF 20

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	\$20,000	\$20,000	Calculated at 5% of construction sub-total
Temporary access road	LF	1,000	\$40	\$40,000	Assumes access from north side and post construction rehabilitation.
Excavate & stockpile/dispose	CY	4,000	\$15	\$60,000	Excavation quantity is based on 2 CY per lineal foot (2,000 feet with 3-4 feet of cut). Finished side channel top width approximately 15 feet. Final design criteria and analysis will likely alter these estimates up or down. Assumes 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	700	\$50	\$35,000	Assumes one-third of the length receives significant re-grading to create pool and riffle habitat.
Large wood purchased and delivered to site	EA	150	\$400	\$60,000	Assumes 20% delivered with root wads attached. Frequency of LWD = >20 pieces/100 meters.
Boulder ballast purchased and delivered to site	EA	225	\$100	\$22,500	Assumes 1.5 - 2 yard boulders. Assumes 1.5 boulders per log.
Wood placement	EA	150	\$300	\$45,000	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	20,000	\$1	\$20,000	Assumes average of 5 feet on each bank for entire length.
Riparian revegetation (above bank)	AC	1.8	\$15,000	\$27,000	Assumes 20 feet revegetation on each side of channel. Includes follow-up maintenance.
Construction oversight	HR	450	\$130	\$58,500	Assumes 5 weeks of construction oversight, construction staking and associated coordination, 12 hour days, 1.5 staff.
Construction Sub-Total				\$413,000	
Concept Level Construction Contingency (20%)				\$82,600	
Construction Total				\$495,600	
Project Delivery					Items below are calculated as a percent of the construction sub-total
Permitting (4%)				\$16,520	
Detailed Engineering Design (15%)				\$61,950	
Contract Administration (5%)				\$20,650	
Project Delivery Sub-Total				\$99,100	
TOTAL ESTIMATE				\$595,000	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

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