

EF 41**Riparian Restoration – Conceptual Design**

Reach: EF Lewis 5A, 5B River mile: 5.7 to 7.3 Reference page in main document: 61
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Site Description

Riparian and floodplain vegetation along this 1.6 mile stretch of river (see overview map on page 4) has been impacted by past clearing, agricultural activities, stream channel changes, residential and commercial uses, and a proliferation of invasive species. Although there currently are patches of mature floodplain forest, much of the area is devoid of native riparian and floodplain vegetation. Invasive species, including primarily Himalayan blackberry and reed canary grass, dominate many areas and are preventing successional processes necessary for the establishment of climax species. A considerable amount of past planting has occurred in some areas by Clark County, local landowners, and restoration practitioners. Future planting work should build off of these efforts and should be conducted in close collaboration with landowners and other cooperating entities.

Restoration of native riparian, wetland, and floodplain forest communities is critical for the long-term recovery of stream habitat. Habitat in large alluvial river systems like the lower East Fork is heavily influenced by riparian and floodplain vegetation. Under natural conditions, these systems have a patchwork mosaic of vegetation types and ages that provide important natural structure and diversity for aquatic biota and terrestrial wildlife species. Vegetation helps to regulate channel adjustments and flood disturbance through the influence on overbank roughness and streambank stability. Trees recruited from riparian areas provide instream large woody debris that is important for aquatic habitat complexity. Trees also provide shade to cool stream temperatures and also serve important roles in the exchange of nutrients between river and floodplain/wetland areas.

To the extent possible, restoration of native vegetation should occur throughout the existing floodplain and channel migration zone of the river. Covering this extent will ensure that if and when the stream overflows its banks or re-adjusts its location that it will be buffered by mature forest vegetation. However, assuming that riparian restoration efforts will be phased, it will be important to first focus on restoring the following areas: 1) areas in close proximity to the river, 2) areas in and around connected off-channel habitat, and 3) areas with frequent overbank flows where vegetation roughness can moderate the potential for channel avulsion. A site map is attached that highlights a 200 foot riparian buffer that should be considered high priority for restoration. The extent of existing plantings, determined from aerial photo analysis, is also identified.



Typical condition of streambank through project area, with reed canary grass at water level, Himalayan blackberry covering streambanks, and scotchbroom up higher in dry areas.

Special Considerations

Due to rapid channel migration rates in this reach, it is possible that riparian plantings could be lost as a result of channel adjustments and erosion. Planting sites should therefore be prioritized based on the potential for loss. Combining this project with other project opportunities in this reach will alleviate the risk of loss in some areas. This is especially the case for projects EF-34 and EF-40, where there is currently rapid erosion of the unvegetated floodplain terrace and where habitat enhancement work would slow the rates of bank retreat. Other project opportunities in this reach include streambank and in-channel habitat enhancement work at EF-35, EF-36, and EF-37; and off-channel habitat enhancement at EF-38 and EF-39. All of these projects entail some degree of riparian enhancement. Planting activities at these sites should be coordinated with the broader riparian restoration objectives associated with this project.

Treatment Strategy and Alternatives

Recommended treatments:

- Establish a long-term riparian restoration plan in collaboration with Clark County and other landowners.
- Re-establish native riparian and floodplain forest vegetation to provide for long-term natural channel stability, shade, and LWD recruitment.
- Plant streambanks with native early-successional species including willow (*Salix* spp.), cottonwood (*Populus balsamifera*), dogwood (*Cornus stolonifera*), alder (*Alnus rubra*), and others. Plant above-bank areas with native hardwood and conifer species including alder (*Alnus rubra*), ash (*Fraxinus latifolia*), maple (*Acer macrophyllum*), fir (*Pseudotsuga menziesii*), cedar (*Thuja plicata*), and others.
- Focus initially on areas within a 200-foot buffer of the mainstem East Fork Lewis and connected off-channels. Expand efforts throughout the valley floor (channel migration zone and floodplain area) to the extent possible as time, resources, and landowner objectives allow.
- Work with Clark County to continue and expand past and on-going planting efforts.
- Incorporate considerations for waterfowl habitat, wetlands, and habitat for terrestrial species.

Alternatives:

- Available resources and landowner concerns will determine the specific locations of plantings and project phasing.

Expected Benefits – Limiting Factors Addressed

Physical habitat – This project addresses medium- and long-term physical habitat conditions including stream shade, bank stability, and large woody debris recruitment.

Biological – This project addresses medium- and long-term biological habitat conditions including reduction in stream temperature, reduced fine sediment contribution, enhanced channel stability, improved foraging opportunities for rearing fish, and enhanced habitat complexity and cover. All life-stages for all species will benefit from riparian enhancement.

Access and Landownership

Most of the project area to the south and west of the East Fork Lewis River is located on Clark County property. There are a few private parcels in this area. The north and east side of the river is primarily private land. No work will occur on private property without the consent of willing landowners. Access for riparian restoration can be obtained at numerous locations from both sides of the river throughout the project area.

Data and Analysis Requirements







There have already been extensive plantings conducted by Clark County and others within the project area. There are also areas of existing mature forest vegetation. These areas will need to be mapped in order to determine specific locations for riparian plantings. Soil types and seasonal soil moisture conditions will need to be investigated through site evaluations and reference to Natural Resources Conservation Service soil classifications. Irrigation requirements will need to be determined and a method for providing irrigation will need to be developed, if necessary. Locations of future planned restoration activities should be determined in order to ensure that riparian plantings are not later removed by construction activities. Landowner uses and objectives, including future planned uses by Clark County, will need to be addressed as part of the design for the restoration plan.

LCFRB Habitat Strategy Summary

EF Lewis 5A						
Tier	1					
Length (m)	2,076					
Population	WSTH	SSTH	FCH	Coho	Chum	Multi Species
Recovery Plan Priority	P	P	P	P	P	
Species Reach Potential (H,M,L)	L	L	L	L	H	
Restoration Value	57%	27%	28%	50%	56%	44%
Preservation Value	43%	73%	72%	50%	44%	56%
Access to blocked habitats	-	-	-	-	-	L
Stream channel habitat structure & bank stability	H	L	M	M	H	H
Off channel & side channel habitat	H	L	M	M	H	H
Floodplain function and channel migration processes	H	L	M	M	H	H
Riparian conditions & functions	H	L	M	M	H	H
Water quality	H	L	L	L	L	H
Instream flows	H	L	M	M	H	H
Regulated stream management for habitat functions	-	-	-	-	-	L
Watershed conditions & hillslope processes	H	L	M	M	H	H

EF Lewis 5B						
Tier	1					
Length (m)	579					
Population	WSTH	SSTH	FCH	Coho	Chum	Multi Species
Recovery Plan Priority	P	P	P	P	P	
Species Reach Potential (H,M,L)	L	L	H	H	H	
Restoration Value	64%	30%	43%	93%	56%	57%
Preservation Value	36%	70%	57%	7%	44%	43%
Access to blocked habitats	-	-	-	-	-	L
Stream channel habitat structure & bank stability	H	L	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	H	H	H	H
Water quality	H	M	H	H	L	H
Instream flows	H	L	H	H	H	H
Regulated stream management for habitat functions	-	-	-	-	-	L
Watershed conditions & hillslope processes	H	L	H	H	H	H



	<ul style="list-style-type: none">  Existing plantings  High Priority Riparian Planting Area 	<ul style="list-style-type: none">  Parcel boundaries  Clark County Parcels  2-foot LiDAR contours <p><small>*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</small></p>	<p>EF 41 RIPARIAN RESTORATION - MASON CREEK TO DEAN CREEK OVERVIEW AND LOCATOR MAP</p>
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Planning-level cost estimate for EF 41

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
Streambank revegetation	SF	85,000	\$0.75	\$63,750	Assumes average of 10 feet on each bank for half the length of the segment. Economy of scale factored into unit cost.
Riparian revegetation (above bank)	AC	37	\$8,000	\$296,000	This includes planting within the 200 ft buffer on each side of the stream minus well-forested areas and minus existing plantings and avoiding infrastructure. Includes follow-up maintenance. Economy of scale factored into unit cost.
Implementation Sub-Total				\$359,750	
Concept Level Implementation Contingency (10%)				\$35,975	
Implementation Total				\$395,700	
Project Delivery					Items below are calculated as percent of construction sub-total
Permitting (0%)				NA	Assumes minimal to no permitting required
Detailed Design (5%)				\$17,988	Includes development of a detailed planting plan and schedule
Contract Administration (5%)				\$17,988	
Project Delivery Sub-Total				\$36,000	
TOTAL ESTIMATE				\$432,000	rounded to nearest \$1,000

General Notes:

Cost includes a 10% implementation contingency

This estimate includes revegetation of a 200 foot buffer on each side of the stream along 1.6 stream miles. Costs could be reduced by reducing the extent of plantings.

Costs do not include plantings beyond the 200 foot buffer

Costs do not include wetland inventory and impacts 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