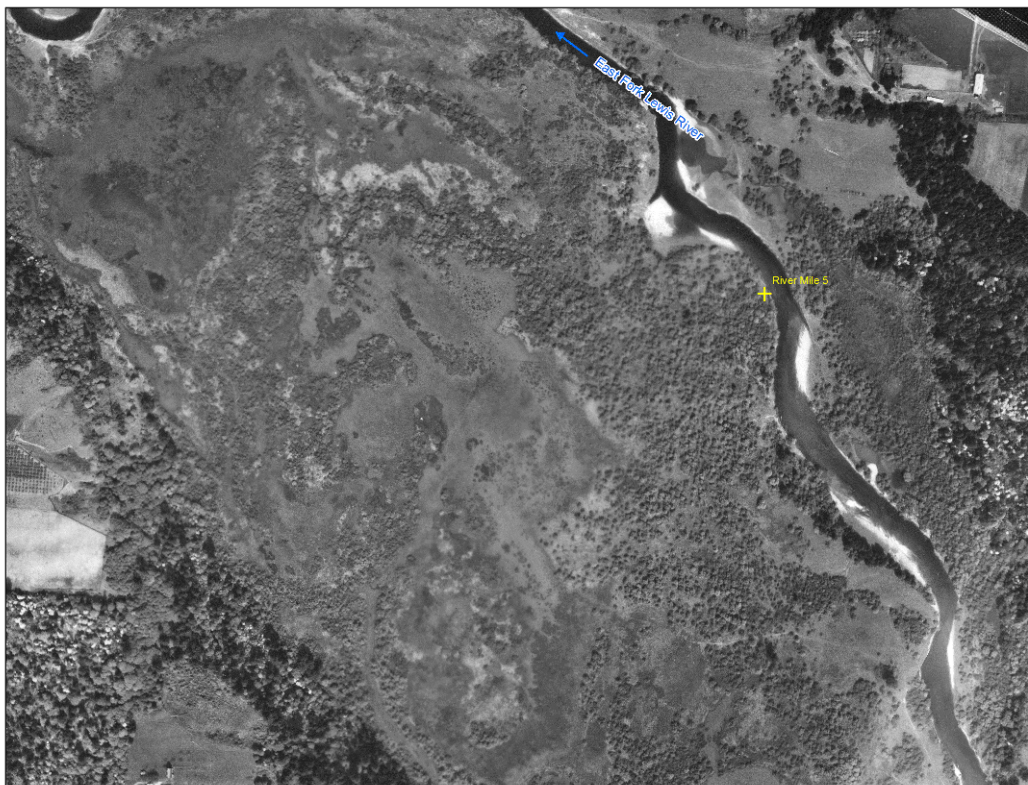


**EF 42****Levee and Drainage Ditch Removal – Conceptual Design**

|                                         |                    |
|-----------------------------------------|--------------------|
| <b>Reach:</b>                           | <b>EF Lewis 4B</b> |
| <b>River mile:</b>                      | <b>5.1</b>         |
| <b>Reference page in main document:</b> | <b>61</b>          |

**Site Description**

This is the levee and drainage ditch network near river mile 5 on the mainstem East Fork Lewis (see aerial overview on page 3). The levee is perpendicular to the river and extends from the west bank of the river across the entire valley floor to the hillslope toe. The levee appears to have been originally constructed primarily from local material, creating a drainage ditch network that drains the floodplain wetlands. The ditch and associated levee system was presumably created to support agriculture/ranching and possibly to provide flood control. The condition of the site in the 1939 can be seen in the aerial photograph below. Current land-use at the site no longer relies upon these improvements and removing the levee and drainage network will provide benefits to floodplain function, aquifer storage capacity, wetland habitat, and channel migration processes. As part of this project, it will be necessary to take into consideration the impacts on waterfowl habitat, wetlands, and habitat for terrestrial species. This project scored high in the project evaluation process due to its potential to benefit multiple species life-stages.



*1939 aerial photograph of project area (see page 3 for 2007 aerial photograph)*

**Treatment Strategy and Alternatives**

Recommended treatments:

- Remove the levee and drainage network by refilling ditches with levee material. Haul any excess material to the toe of the hillslope or to an off-site disposal area.
- Restore riparian, wetland, and floodplain vegetation in the vicinity of the project area and in any areas disturbed during construction.

Alternatives:

- There may be opportunities to conduct wetland restoration in this area, possibly connecting off-channel wetlands to the mainstem. These opportunities should be investigated as part of project design.

**Expected Benefits – Limiting Factors Addressed**

*Physical habitat* – This project will provide enhanced floodplain function, aquifer storage capacity, and channel migration processes.

*Biological* – Restoration of aquifer storage capacity in the alluvial terrace will prolong inputs of cool groundwater flow into the mainstem as flows recede throughout the summer. Restoration of floodplain function and channel migration processes will restore natural habitat-forming processes. Wetland enhancements will improve conditions for wetland aquatic and terrestrial species.

**Access and Landownership**

The project area spans Clark County and Washington Department of Fish and Wildlife properties. Access roads approach the site across County property from the north and the south.

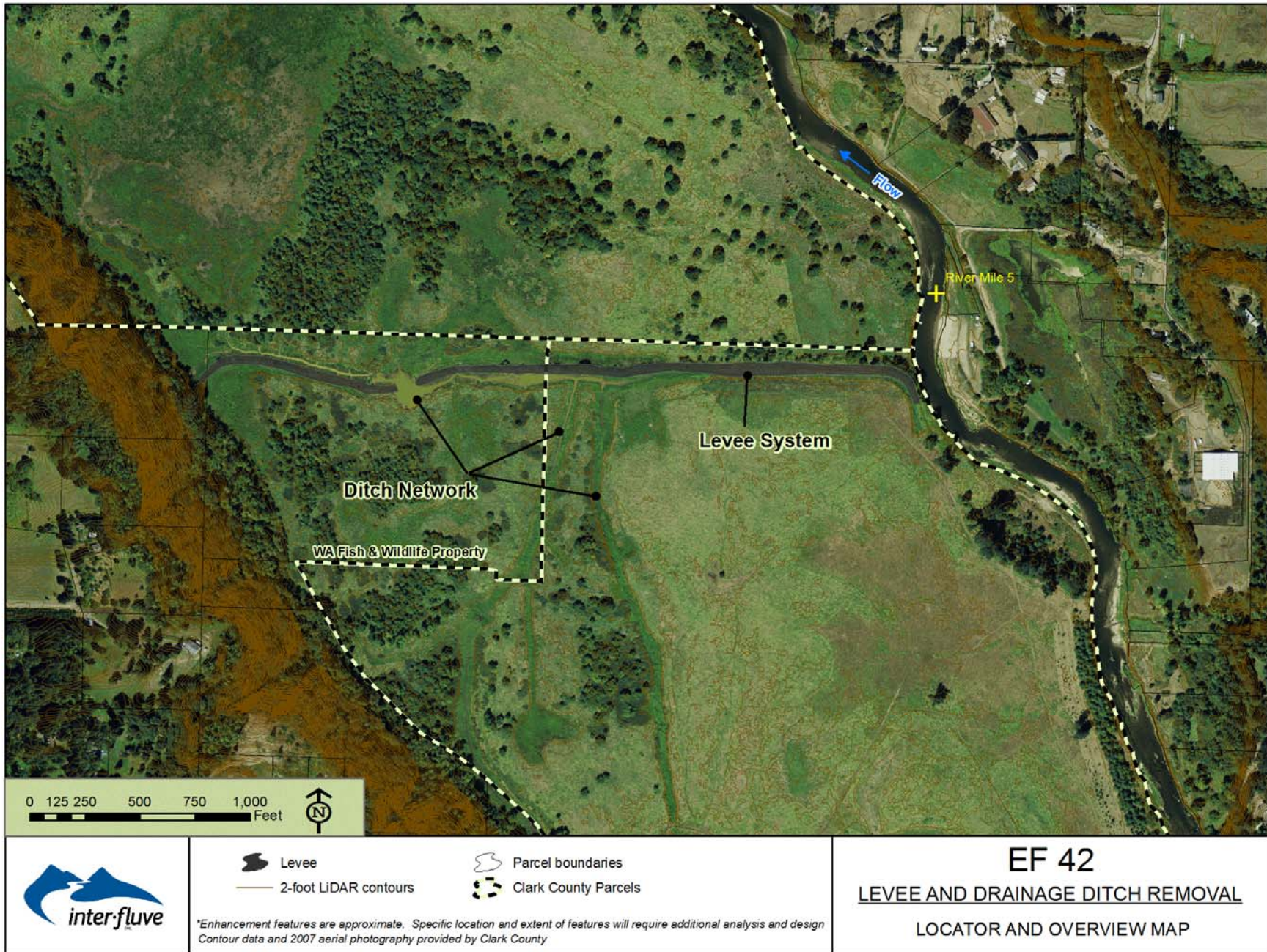
**Data and Analysis Requirements**

A topographic survey will be needed to determine specific levee dimensions and earthwork requirements. This project assumes the levee was constructed of material on-site and that it can be removed by re-filling borrow trench with minimal hauling for disposal. Analysis of levee needs to be conducted to determine the quantity, if any, of non-local rock material. If large rock is found, it may require hauling off-site. Impacts on wetlands and terrestrial habitat should be evaluated.

**LCFRB Habitat Strategy Summary**

| <b>EF Lewis 4B</b>                                  |                   |             |             |            |             |             |                      |  |
|-----------------------------------------------------|-------------------|-------------|-------------|------------|-------------|-------------|----------------------|--|
|                                                     | <b>Tier</b>       | <b>1</b>    |             |            |             |             |                      |  |
|                                                     | <b>Length (m)</b> | <b>853</b>  |             |            |             |             |                      |  |
|                                                     | <b>Population</b> | <b>WSTH</b> | <b>SSTH</b> | <b>FCH</b> | <b>Coho</b> | <b>Chum</b> | <b>Multi Species</b> |  |
| Recovery Plan Priority                              |                   | P           | P           | P          | P           | P           |                      |  |
| Species Reach Potential (H,M,L)                     |                   | L           | L           | L          | L           | H           |                      |  |
| Restoration Value                                   |                   | 53%         | 50%         | 26%        | 54%         | 69%         | 50%                  |  |
| Preservation Value                                  |                   | 47%         | 50%         | 74%        | 46%         | 31%         | 50%                  |  |
| Access to blocked habitats                          |                   | -           | -           | -          | -           | -           | L                    |  |
| Stream channel habitat structure & bank stability   |                   | H           | M           | M          | M           | H           | H                    |  |
| Off channel & side channel habitat                  |                   | H           | M           | M          | M           | H           | H                    |  |
| Floodplain function and channel migration processes |                   | H           | M           | M          | M           | H           | H                    |  |
| Riparian conditions & functions                     |                   | H           | M           | L          | M           | H           | H                    |  |
| Water quality                                       |                   | L           | M           | L          | L           | L           | H                    |  |
| Instream flows                                      |                   | H           | M           | M          | M           | H           | H                    |  |
| Regulated stream management for habitat functions   |                   | -           | -           | -          | -           | -           | L                    |  |
| Watershed conditions & hillslope processes          |                   | H           | M           | L          | M           | H           | H                    |  |





## Planning-level cost estimate for EF 42

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        | \$5,000   | \$5,000          | Calculated at 5% of construction sub-total.                                                        |
| Doze levee into borrow holes                 | CY   | 15,000   | \$4.50    | \$67,500         | Assumes bulldozed within 200 feet of levee.                                                        |
| Channel earthwork and reshaping              | LF   | 3,500    | \$4       | \$14,000         | Fine Grading and finish work.                                                                      |
| Revegetation                                 | AC   | 4        | \$5,000   | \$20,000         | Assumes re-seeding of site and low planting density. Assumes revegetation in disturbed areas only. |
| Construction oversight                       | HR   | 40       | \$130     | \$5,200          | Assumes 40 hours of total oversight.                                                               |
| <b>Construction Sub-Total</b>                |      |          |           | <b>\$111,700</b> |                                                                                                    |
| Concept Level Construction Contingency (20%) |      |          |           | \$22,340         |                                                                                                    |
| <b>Construction Total</b>                    |      |          |           | <b>\$134,000</b> |                                                                                                    |
| <b>Project Delivery</b>                      |      |          |           |                  | Items below are calculated as a percent of the construction sub-total                              |
| Permitting (4%)                              |      |          |           | \$4,468          |                                                                                                    |
| Detailed Engineering Design (15%)            |      |          |           | \$16,755         |                                                                                                    |
| Contract Administration (5%)                 |      |          |           | \$5,585          |                                                                                                    |
| <b>Project Delivery Sub-Total</b>            |      |          |           | <b>\$26,800</b>  |                                                                                                    |
| <b>TOTAL ESTIMATE</b>                        |      |          |           | <b>\$161,000</b> | rounded to nearest \$1,000                                                                         |

**General Notes:**

- Cost includes a 20% construction contingency
- Assumes 15,000 cubic yards of material is moved
- Costs do not include wetland inventory and impacts analysis
- Assumes no access road construction is necessary

**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