MEMORANDUM

TO: Fish & Wildlife Committee
FROM: Cathy P. Kellon
SUBJECT: Update on Steigerwald Island Reconnection Project

BACKGROUND:

Presenter: Chris Collins, Restoration Program Lead, Lower Columbia Estuary Partnership (Estuary Partnership)

Summary: Chris Collins of the Estuary Partnership will share the results of its largest restoration project to date at Steigerwald Lake National Wildlife Refuge, about twenty miles east of Vancouver, Washington. This project reconnected Gibbons Creek and the Columbia River to historic floodplain, after levees disconnected them half-a-century ago. As a result, floodplain habitat on the mainstem Columbia increased by over 14% in the stretch between Bonneville Dam and the Willamette River, benefitting five species of salmonids, two species of lamprey, as well as other native and migrating upriver fish, and numerous different bird and wildlife species.

Relevance: The Steigerwald Reconnection Project (BPA Project Number 2003-011-00) addresses multiple aspects of the 2014 Fish and Wildlife Program, including the measure, “Continuing actions to reconnect the river to its floodplains wherever possible in the mainstem, with special emphasis on the estuary and lower Columbia River,” and the Estuary sub-strategy, “Restore ecosystem function to protect and enhance critical habitat and spawning and rearing grounds in the estuary and lower Columbia.” This project will make a significant contribution towards the 2020 Program Addendum’s Estuary Strategy Indicator of “acres of estuary floodplain protected or restored per hydrogeomorphic reach.”
Background: The $31 million Steigerwald Reconnection Project was completed this spring after seven years of planning and three years of construction. Located within the Steigerwald Lake National Wildlife Refuge (Refuge)*, east of Washougal, Washington, the project reconnected the Columbia River and a tributary, Gibbons Creek, to 965 acres of historic floodplain; restored 115 acres of wetlands; and re-established 250 acres of riparian habitat.

It is the largest restoration project on the Lower Columbia River; notable given the site’s proximity to the densely developed Portland-Vancouver metro area. Led by the Lower Columbia Estuary Partnership, the multi-phase project also involved the U.S. Fish and Wildlife Service (USFWS), the Port of Camas-Washougal (Port), and a dozen other partners. The Bonneville Power Administration provided approximately $17 million in funding, and match was provided by Washington Department of Ecology, National Fish and Wildlife Foundation, USFW, and Bonneville Environmental Foundation.

Project sponsors removed 2.2 miles of Army Corps of Engineers’ levee plus diversion structures; placed more than eighty-four large wood structures; reconfigured multiple water channels and water bodies; planted over 500,000 trees and shrubs; elevated a section of state highway; and more.

The Estuary Partnership incorporated climate adaptation into the project’s design. Specifically, they used a 500-year flood event, instead of the standard 100-year, as the engineering design standard and they forgo traditional riprap to harden the toe of the setback levees, and instead put in a living shoreline, a gently sloping area of overbuild with native vegetation. They also planted more areas with Wapato, an important First Food, in order to provide future harvest opportunities for northwest Tribes.

With the project’s completion, Coho, steelhead, and lamprey now have unobstructed passage to rearing and spawning habitat in Gibbons Creek, and the recovery of mainstem floodplain processes creates a patchwork of cool and slow water refuges for migrating salmon and steelhead in a stretch of the Columbia where it is otherwise lacking. Project sponsors anticipate that chum salmon will also make use of the restored alluvial fan of Gibbons creek.

Enhanced terrestrial, riparian, and wetland habitats also benefit local wildlife like beaver, cougar, Western Pond Turtle, and black bear and the two hundred bird species that frequent the Refuge. In addition to its significant ecological benefits, the project added 1.1 miles of public recreational trails within the 1,049-acre Refuge and reduced flooding for residences, Highway 14, the Port’s industrial park, and more.

*Steigerwald was designated as a Refuge in the 1980s as partial mitigation for the fish and wildlife impacts of the construction of the second powerhouse at Bonneville Dam about twenty-five miles upriver.
More Info:

News and information about Steigerwald Lake NWR and the Reconnection Project:

- [https://www.estuarypartnership.org/our-work/habitat-restoration/steigerwald-reconnection-project](https://www.estuarypartnership.org/our-work/habitat-restoration/steigerwald-reconnection-project)
- [https://www.fws.gov/refuge/steigerwald-lake](https://www.fws.gov/refuge/steigerwald-lake)

NPCC Fish and Wildlife Program references:

- 2014 Program (see esp., pp.41-43 and 68-69) [https://www.nwcouncil.org/sites/default/files/2014-12_1.pdf](https://www.nwcouncil.org/sites/default/files/2014-12_1.pdf)
- 2020 Program Addendum (see p. 28) [https://www.nwcouncil.org/reports/2020-9/](https://www.nwcouncil.org/reports/2020-9/)
Steigerwald Reconnection Project
Steigerwald Reconnection Project – Overview of Presentation

- Project Overview
- Carbon Emissions & Sequestration
- Effectiveness Monitoring
- Lessons Learned
- Questions
Steigerwald Reconnection Project - *Historic Conditions*

1939 – Month Unknown (Freshet or Winter Storm?)

November 1956

Gibbons Creek Alluvial Fan
Steigerwald Reconnection Project - Current Conditions

Problem 1: Fish access

Problem 2: Degraded Habitat
Problem 3: Flooding (Gibbons Cr.)

Steigerwald Reconnection Project - Current Conditions

100-year flood zone

FEMA – Flood Insurance Rate Map (Map #53011C0554D)
Major Project Actions:

- Built two setback levees (1.6 miles total)
- Fully removed 2.2 miles of existing levee
- Fully removed all Gibbons Creek infrastructure (diversion, fish ladder, etc.)
- Raised 1,300 linear feet of State Route 14
- Rebuilt trail network (~95% complete)
- Re-establish 250 acres of native riparian forest (on-going)
Steigerwald Reconnection Project – Budget and Schedule

Schedule:
✓ Initiated in 2013
✓ Construction: August 2019 – Sept. 2022
✓ Reforestation: 2019 – 2024

Budget: $32M total cost
Steigerwald Reconnection Project — *Project Benefits*

1. Recreation/Education:
   - Improves trail system (one mile longer, two new bridges, more diverse habitats)
   - Public education (>2,000 local students & volunteers helped plant trees; more this winter)
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   - $32,000,000 project (>500 jobs)
   - Political support, media exposure

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Steigerwald Reconnection Project was ‘an enormous and ambitious undertaking’

*Apr 10, 2022*
Steigerwald Reconnection Project — *Project Benefits*

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3. **Economics:**
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4. **Habitat:**
   - Restores unobstructed fish passage
   - Reconnects 965 acres of floodplain
     - Re-establishes 250 acres of native riparian forest
     - Creates/restores 115 acres of floodplain wetland
     - Enhances several hundred acres of wetland
Steigerwald Reconnection Project – *Landscape Scale Benefits*

Steigerwald Restoration Project:
Potential Contribution of Off-Channel Juvenile Salmonid Habitat within:
Lower Columbia River Reaches G and H, Columbia Gorge National Scen

Map Key: Level of Juvenile Fish Access
- Unrestricted
- Partially Restricted / Restored
- Restricted (by partially passable point barrier)
- Blocked ((by levee or non-passable point barrier)

**Potential Impact From Proposed Steigerwald Restoration**

<table>
<thead>
<tr>
<th>Habitat Access Level</th>
<th>Existing acreage based on 2-Yr. Flood (See Map)</th>
<th>Combined Reach G/H Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>~1 Yr. Flood (not shown)</td>
<td>habitat gain from proposed Steigerwald restoration:</td>
</tr>
<tr>
<td></td>
<td>total acres</td>
<td>% increase in unrestricted/partial restricted habitat relative to 2 Yr. Flood</td>
</tr>
<tr>
<td>unrestricted</td>
<td>3713</td>
<td>965</td>
</tr>
<tr>
<td>partial restricted/restored</td>
<td>328</td>
<td></td>
</tr>
<tr>
<td>restricted</td>
<td>1468</td>
<td></td>
</tr>
<tr>
<td>blocked</td>
<td>4916</td>
<td></td>
</tr>
</tbody>
</table>

** Columbia Gorge NSA Analysis is for the lower Columbia Gorge only, up to the Bonneville Dam.**

Habitat availability based on 2-Year Flood estimates provide:
Steigerwald Reconnection Project

- Remove Gibbons Creek Diversion Structure and Elevated Canal, Restore Alluvial Fan
- Raise SR 14 Roadway (Minimum Elev. 38.5')
- Construct East Setback Levee (Same as Existing Height)
- Remove Existing Levee to Reconnect Floodplain, Gravel Road/Trail Reconstructed Above the 100-year Flood Elevation

Legend:
- FOGC Acquisition Boundary
- Highway
- Railroad
- Wave Break Berm
- Raise Road
- Parking Lot and Bathrooms
- Remove Rip-Rap
- Pedestrian Trail
- Multiuse Trail (Existing): Bikes, Horses, and Dogs on leash
- Multiuse Trail (Proposed): Bikes, Horses, and Dogs on leash
- Reconnected Habitat (≤ 23.7 ft)
- Expanded Habitat (≤ 23.7 ft)
- Expanded Upland Refugia
- Proposed Channels
- Existing Waterbodies
- Gibbons Creek
- Watercourse
- Floodwall and Berm
- Proposed Viewpoint
- Low Water Crossing (+/- 23 ft)
- Existing Bridge/Boardwalk
- Proposed Bridge (+/- 23 ft)
Steigerwald Reconnection Project

View of west setback levee (looking south from SR 14)

June 2020  October 2021
Steigerwald Reconnection Project

View of west setback levee and floodplain (looking SE from new overlook)

June 6, 2022
Steigerwald Reconnection Project – H&H Assessment
Columbia River – 2yr discharge event
Gibbons Creek – 104 cfs
Inundation extent: 561 acres
Average depth: 6.3 feet
Steigerwald Reconnection Project

Nov 2021

March 2015
Steigerwald Reconnection Project

March 2015

June 2022
Steigerwald Reconnection Project – *H&H Assessment*

**Columbia River** – 14ft (*not backwatering the site*)

**Gibbons Creek** – 2yr discharge event (370 cfs)

Inundation extent: 320 acres
Average depth: 2.5 feet
Steigerwald Reconnection Project

November 2021

East setback levee

Gibbons Creek

West setback levee
Steigerwald Reconnection Project

East setback levee

Gibbons Creek

Alluvial fan – planted 2019

November 2021
Two Sources for Estimating Sequestration:
1. I-Tree Design (USFS)
2. Carbon Riparian Estimator for California (Matzek, Stella & Ropion, 2018)
Steigerwald Reconnection Project — *Carbon Emissions and Sequestration*
Steigerwald Reconnection Project — Carbon Emissions and Sequestration
Steigerwald Reconnection Project — Wapato Establishment
Steigerwald Reconnection Project — Monitoring

Objective 1: Wetland Physical Conditions
- Quantify the changes in hydrologic, topographic, soil characteristics related to tidal reconnection in the floodplain, and alluvial fan habitats.

Objective 2: Gibbons Creek Physical Conditions
- Quantify the changes in hydrologic, topographic, and thermal regime.

Objective 3: Wetland Plant Community
- Quantify the changes in wetland plant community and composition related to changes in inundation regime.

Objective 4: Floodplain Planting Survival
- Track planting survival to ensure the establishment of restored riparian areas.

Objective 5: Target fish species access, use, prey resources, and habitat
- Quantify changes in juvenile salmonid access, habitat opportunity, suitability, salmonid resources, and fish use of the restoration site.
Steigerwald Reconnection Project — Monitoring

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Steigerwald Reconnection Project — Lessons Learned

- Reduce emissions during design phase
  - Can authorized levee heights be adjusted relative to current flood risk?
**Steigerwald Reconnection Project — Lessons Learned**

- Reduce emissions during design phase
  - Can authorized levee heights be adjusted relative to current flood risk?
  - Do the emissions of “habitat only” wood justify its installation in floodplains?
Steigerwald Reconnection Project — Lessons Learned

- Reduce emissions during design phase
- Risk management is KEY
  - Extended in-water work window
  - Lamprey salvage
  - Procurement
  - Intermediate completion dates
  - Balanced disincentives with incentives
  - Professional construction management
Steigerwald Reconnection Project — Construction Management

- Constructability/Biddability Review
- Relationships
  1. Validates us as an owner
  2. Generates interest amongst desired contractors
  3. Incentive to perform
- Plan for Construction Phase Risk
- Procurement (2-step process)
  1. Pre-qualify bidders
  2. Bidding (50/50 consideration of cost & approach)
- Construction (primary POC, pay estimates, technical expertise, work/life balance)
Steigerwald Reconnection Project — Acknowledgements

Funders:
1. Bonneville Power Administration
2. Floodplains by Design
3. U.S. Fish & Wildlife Foundation
4. U.S. Fish & Wildlife Service
5. BEF

Key Partners:
1. The Port
2. Friends of the Columbia Gorge
3. WSDOT
4. City of Washougal

Prime Contractor:
Rotschy Inc.

Design/CM Team:
1. Cornforth Consultants
2. Murraysmith
Steigerwald Reconnection Project

Questions?
Design, Permitting, Construction: Chris Collins, ccollins@estuarypartnership.org
Effectiveness Monitoring: Sarah Kidd, PhD, skidd@estuarypartnership.org
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Steigerwald Reconnection Project

View of North Gibbons Creek (looking north)

January 2015

November 2021
Steigerwald Reconnection Project

View of flood wall and North Gibbons Creek (looking south)

June 2020

November 2021