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June 7, 2022

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.fws.gov/refuge/steigerwald-lake>
- <https://www.nwcouncil.org/news/tag/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
- 2020 Program Addendum (see p. 28) <https://www.nwcouncil.org/reports/2020-9/>

Steigerwald Reconnection Project



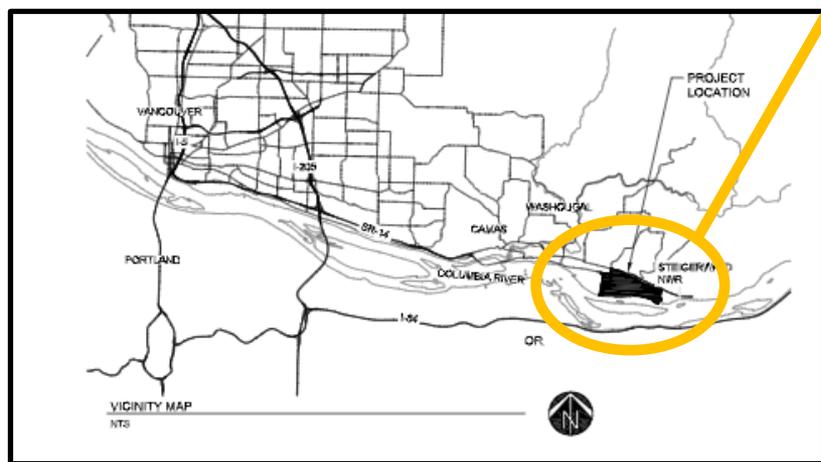
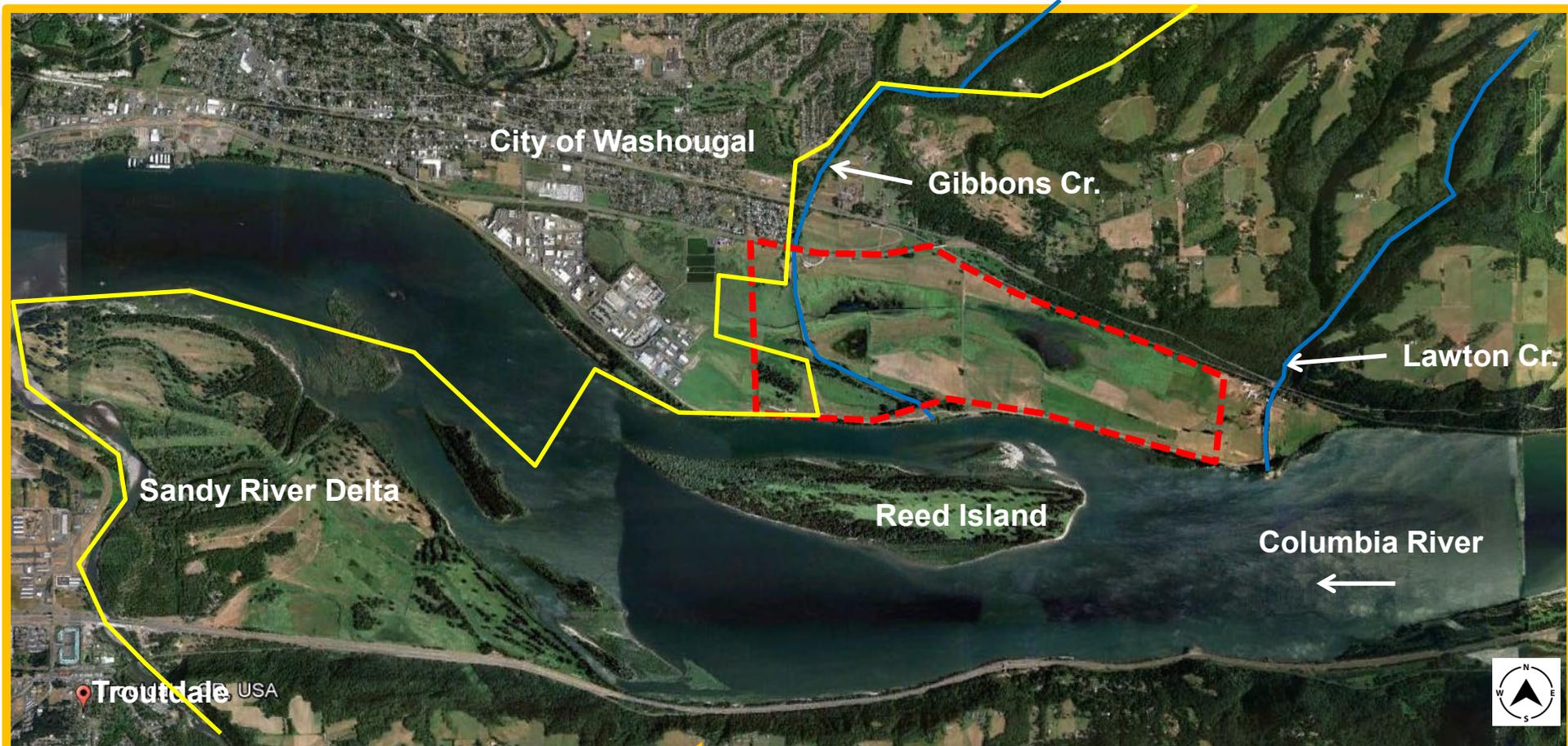
Lower Columbia Estuary Partnership



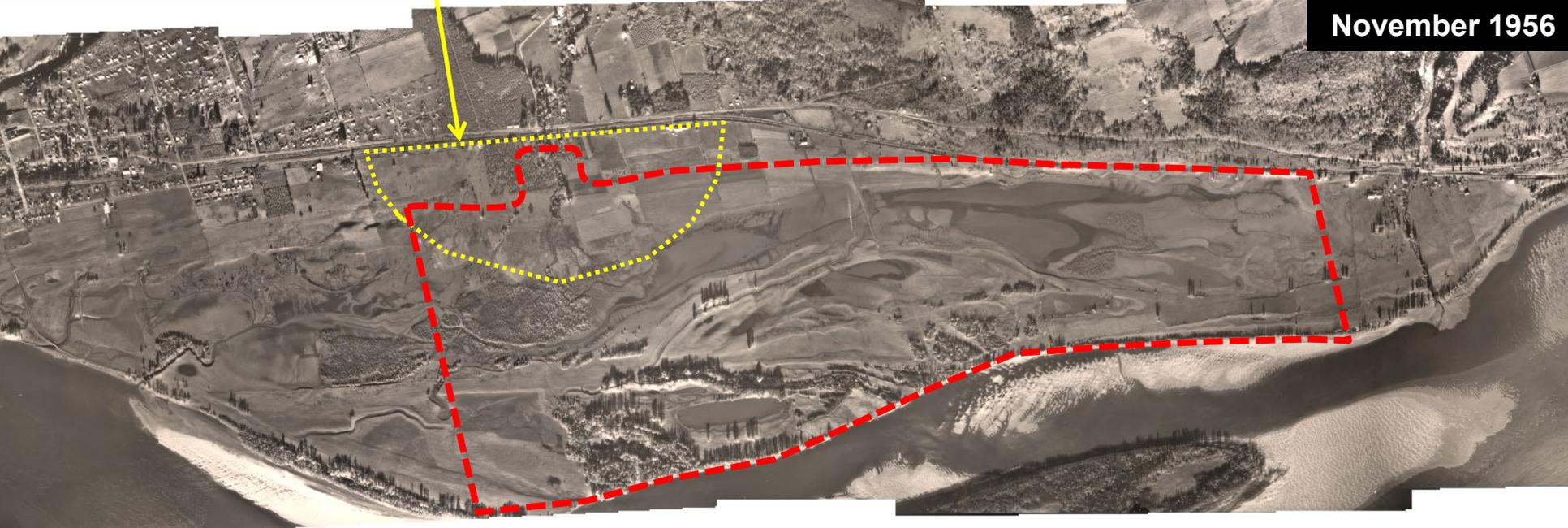
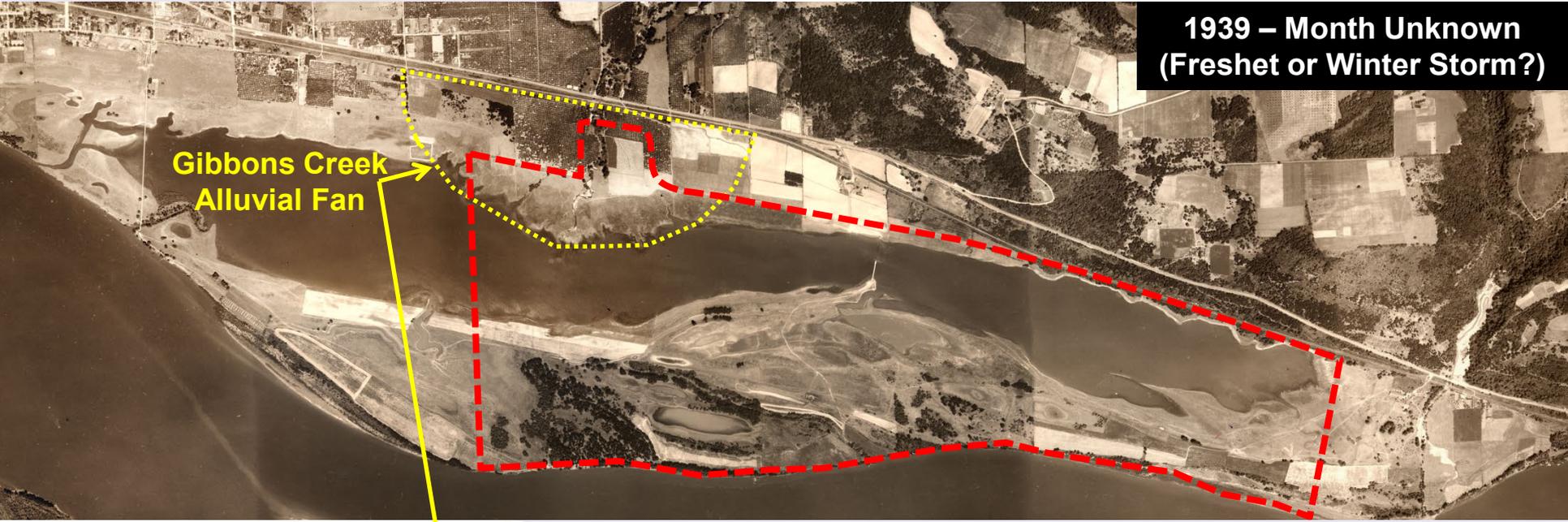
Steigerwald Reconnection Project – *Overview of Presentation*

- **Project Overview**
- **Carbon Emissions & Sequestration**
- **Effectiveness Monitoring**
- **Lessons Learned**
- **Questions**

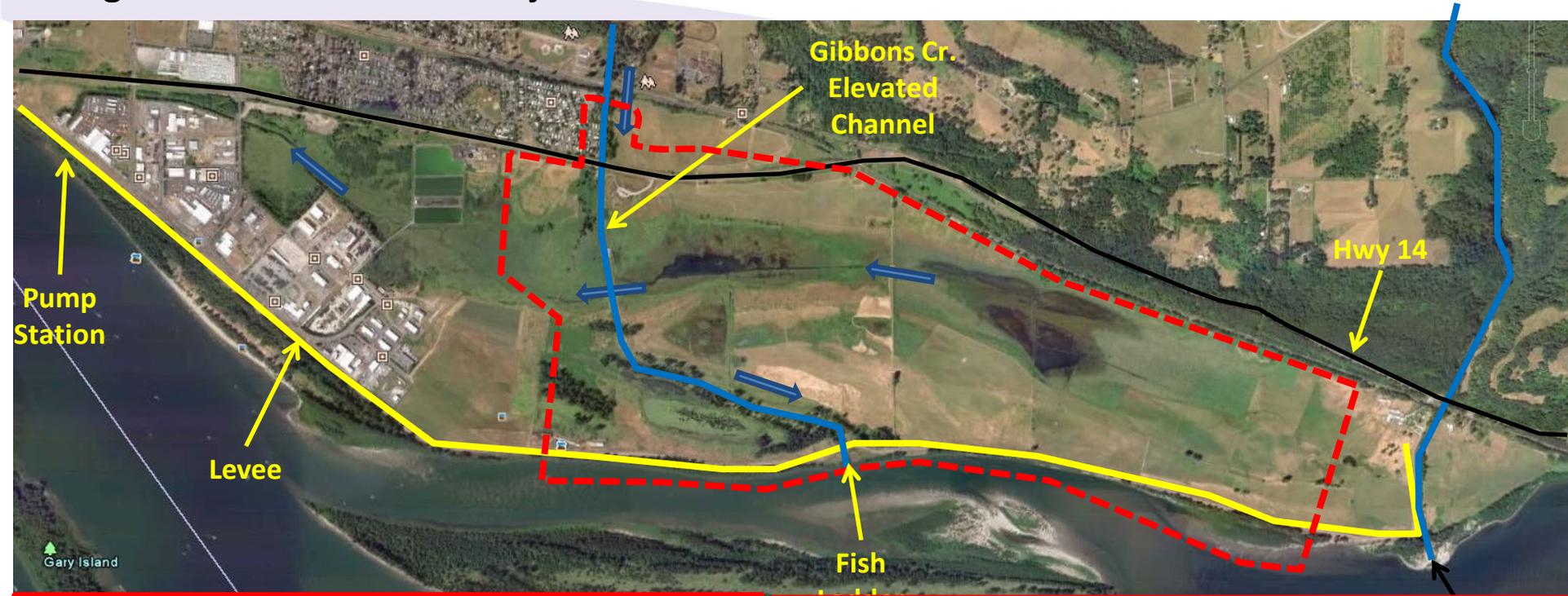




Steigerwald Reconnection Project - *Historic Conditions*



Steigerwald Reconnection Project - Current Conditions



Problem 1: Fish access

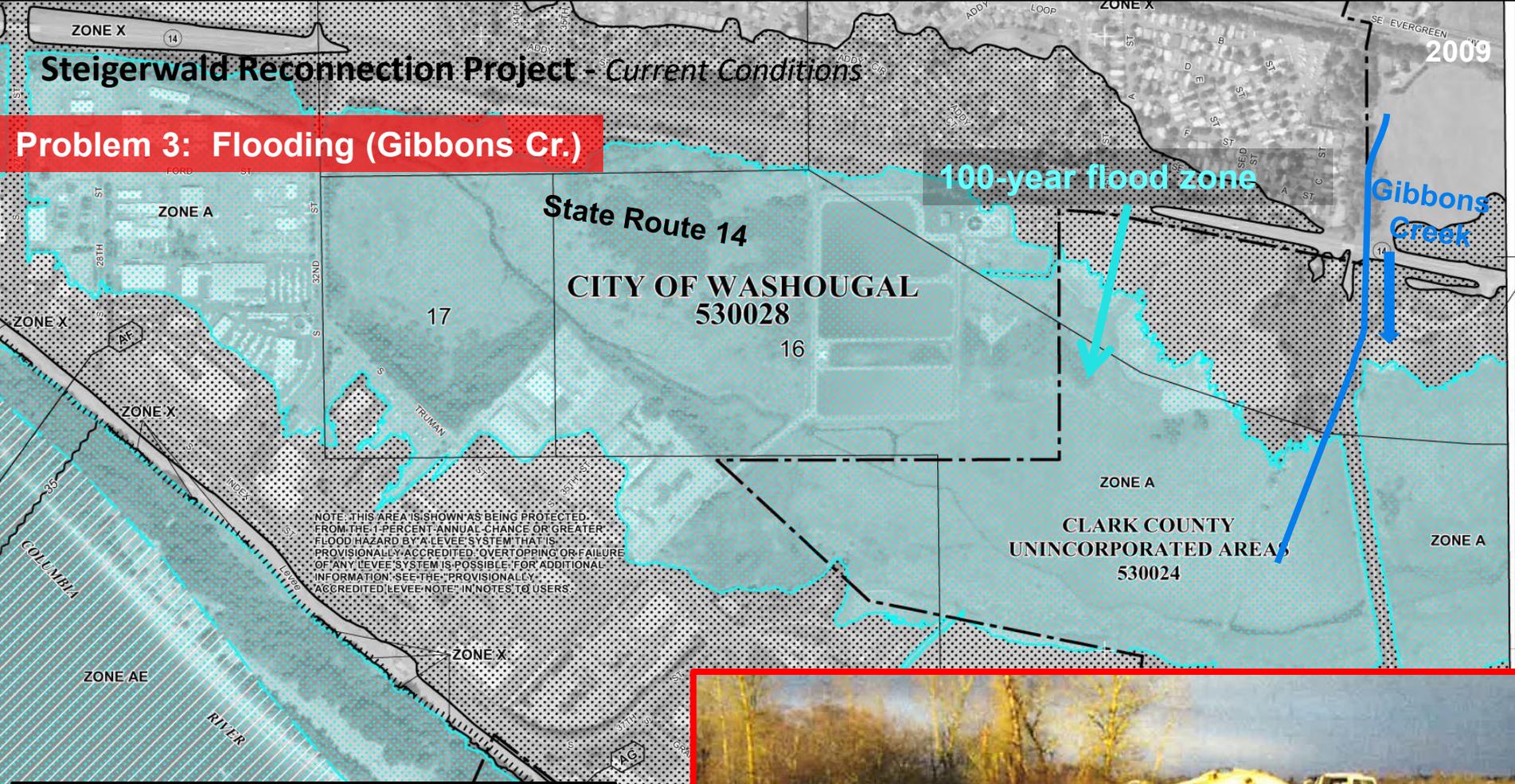


Problem 2: Degraded Habitat



Steigerwald Reconnection Project - Current Conditions

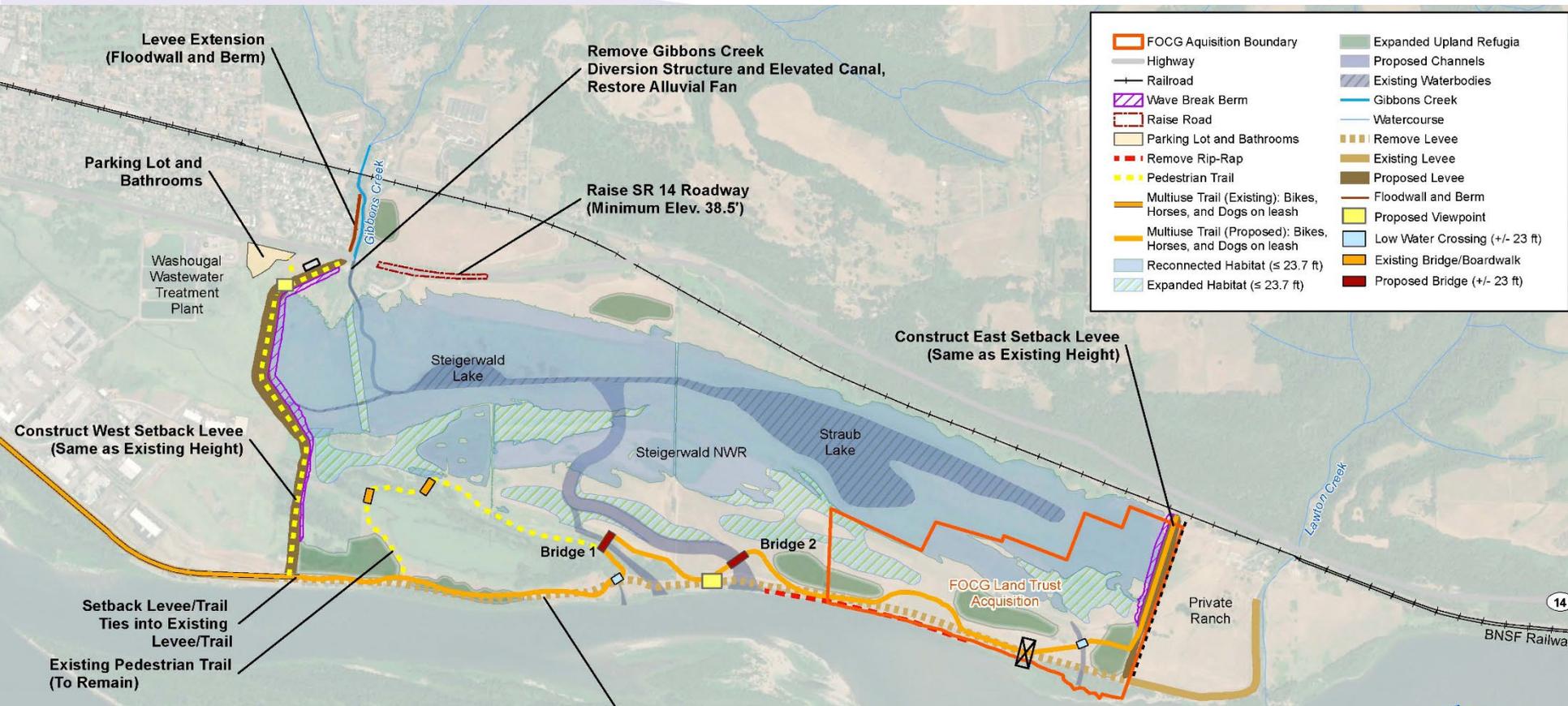
Problem 3: Flooding (Gibbons Cr.)



FEMA – Flood Insurance Rate Map (Map #53011C0554D)



Steigerwald Reconnection Project – Concept Map



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)

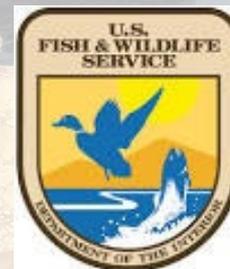
Steigerwald Reconnection Project – *Budget and Schedule*



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)



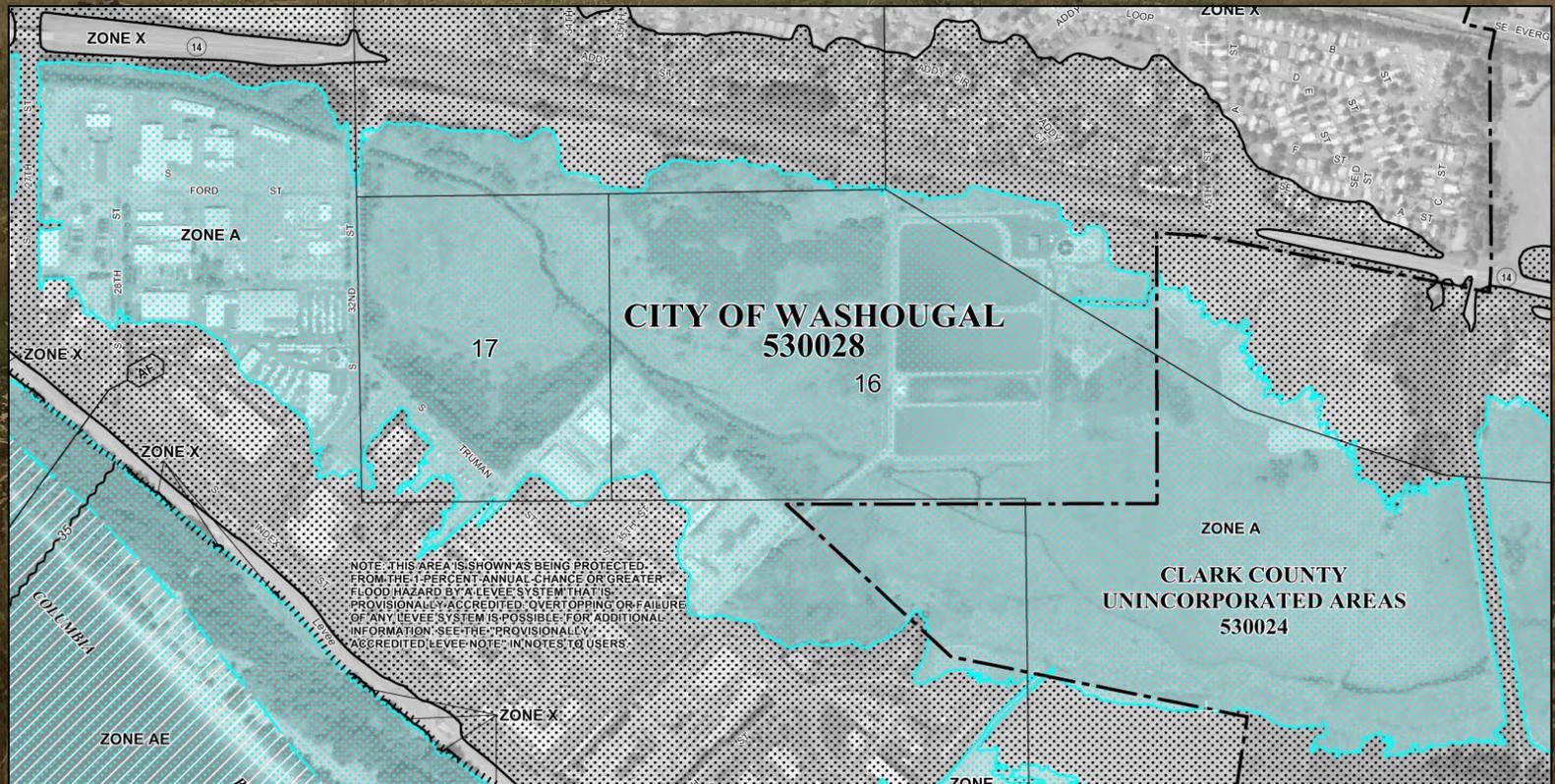
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3. Economics:

- \$32,000,000 project (>500 jobs)
- Political support, media exposure

Steigerwald Reconnection Project was ‘an enormous and ambitious undertaking’

Apr 18, 2022

Like 0



Chris Collins



Darin Kysar



David Ripp



Steigerwald Reconnection Project — *Project Benefits*

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3. Economics:

- \$32,000,000 project (>500 jobs)
- Political support, media exposure

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 Scenic Area

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)

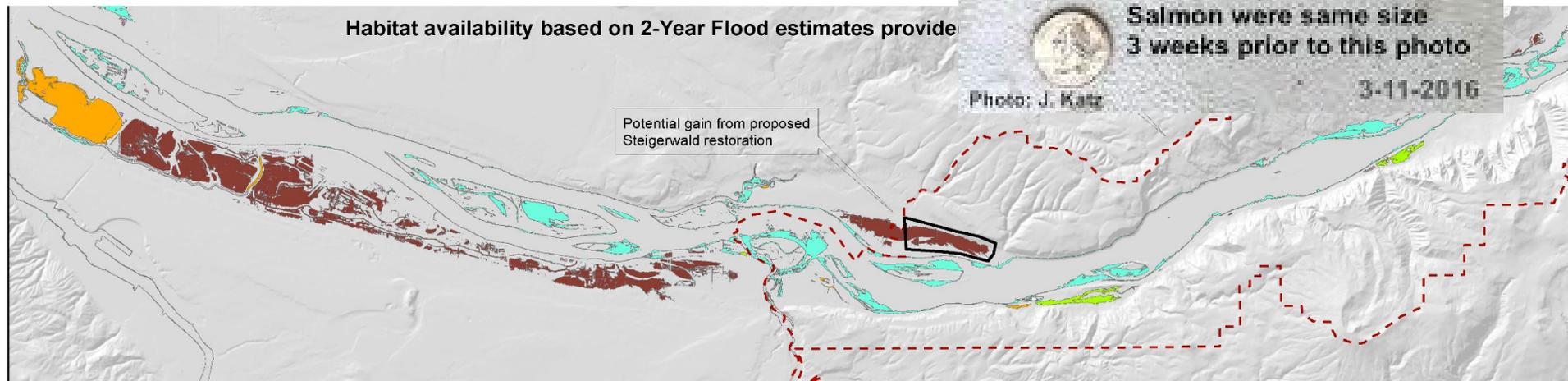
Potential Impact From Proposed Steigerwald Restoration

Habitat Access Level	Combined Reach G/H Analysis				
	Existing acreage based on:		habitat gain from proposed Steigerwald restoration:		
	2-Yr. Flood (See Map)	~1 Yr. Flood (not shown)	total acres	% increase in unrestricted/partial restricted habitat relative to 2 Yr. Flood	relative to ~1 Yr. Flood
unrestricted	3713	3073	965	15.9 % (591 ac.)	19.2 % (591 ac.)
partial restricted/restored	328	175			
restricted	1468	1240			
blocked	4916	4859			

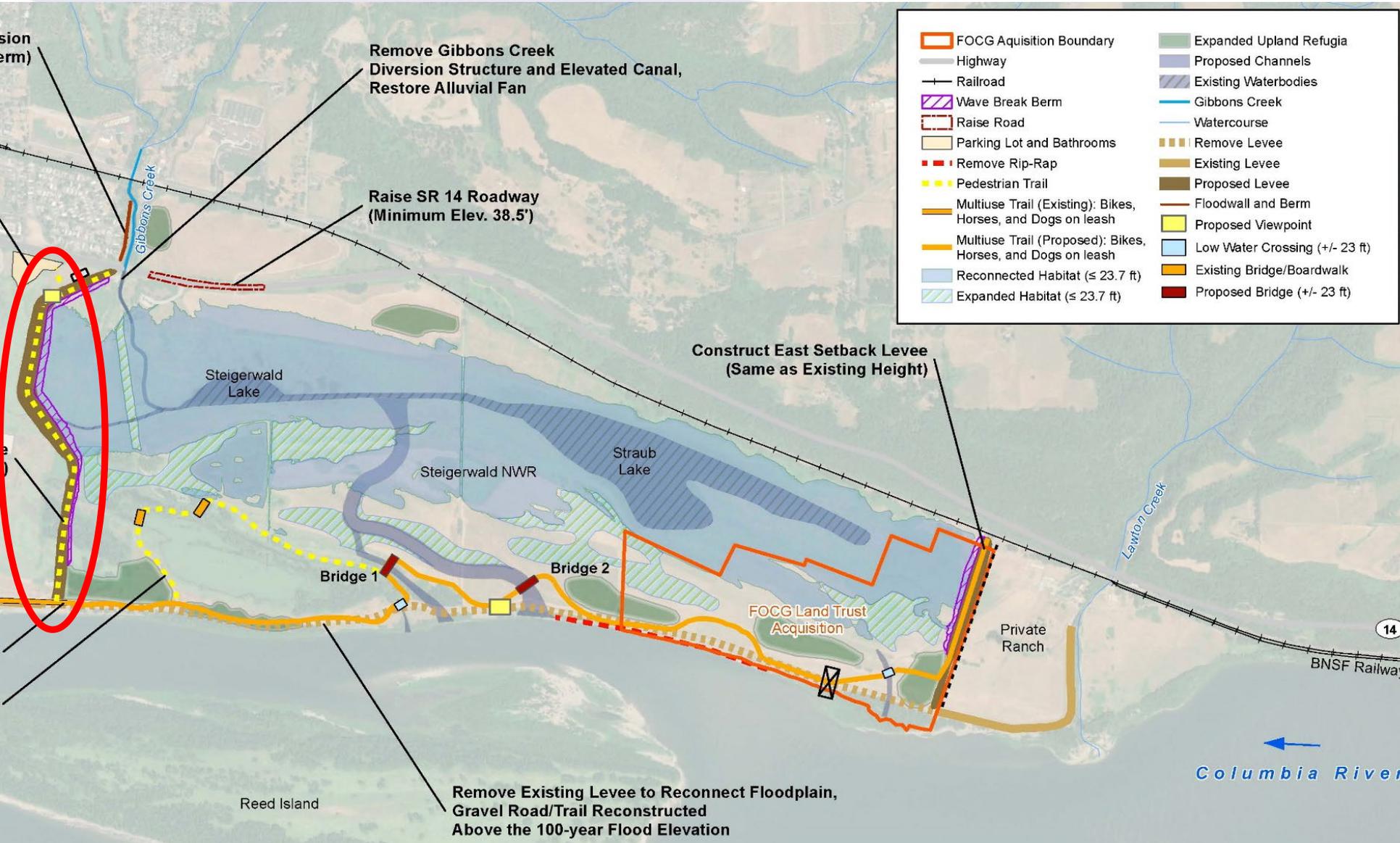
** Columbia Gorge NSA Analysis is for the lower Columbia Gorge only, up to the Bonneville Dam.



Salmon were same size
 3 weeks prior to this photo
 Photo: J. Katz
 3-11-2016



Steigerwald Reconnection Project



Steigerwald Reconnection Project

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



June 2020



October 2021

Steigerwald Reconnection Project

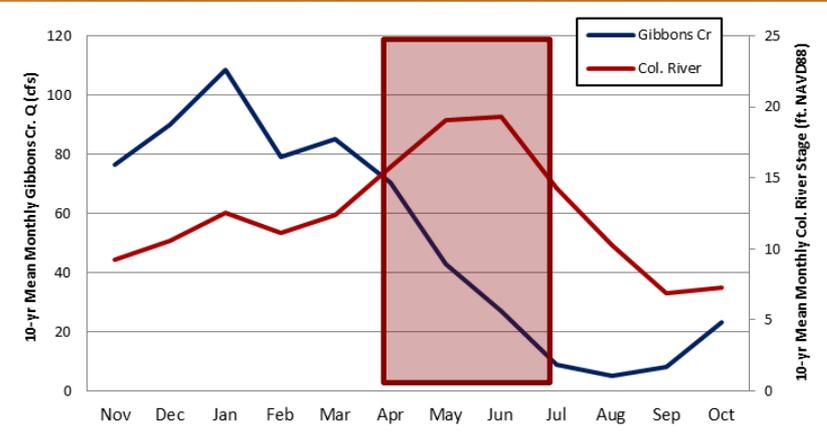
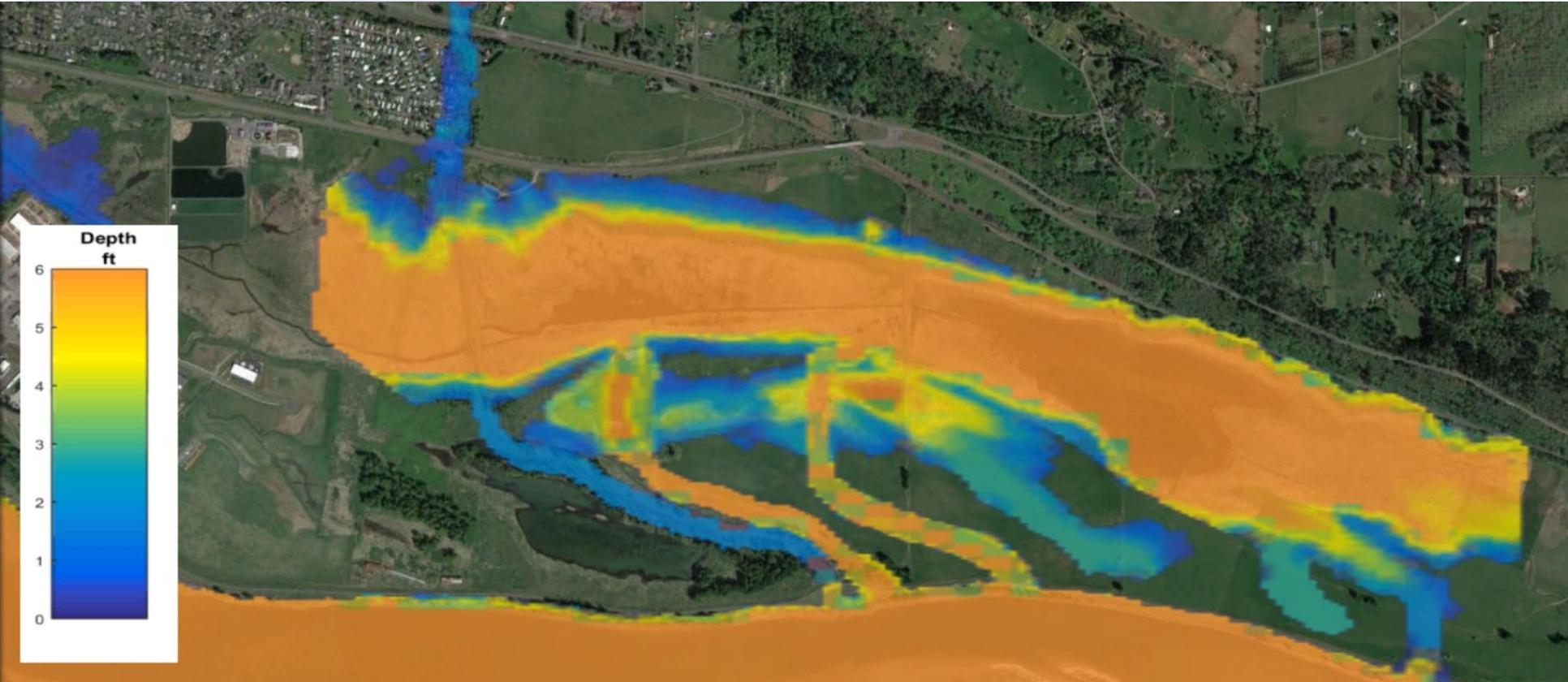
View of west setback levee and floodplain (looking SE from new overlook)



Steigerwald Reconnection Project – H&H Assessment



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



Main breach/bridge

State Route 14

Gibbons Creek

West setback levee



June 9, 2022

Steigerwald Reconnection Project



Nov 2021



March 2015



Steigerwald Reconnection Project

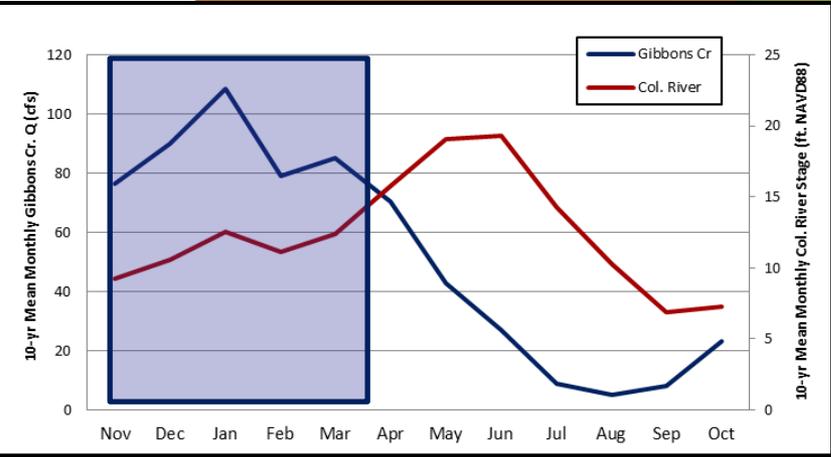
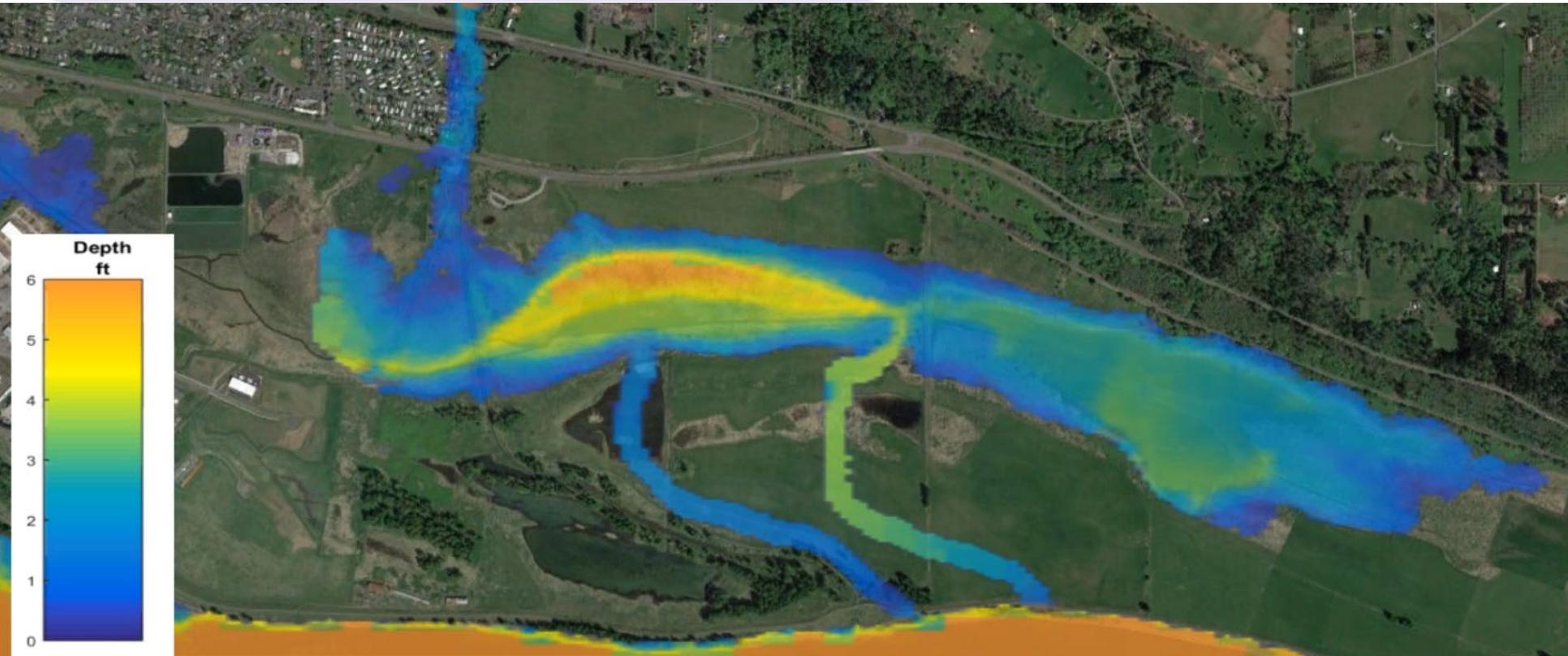


June 2022



March 2015

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

↑
East
setback
levee

Gibbons
Creek

West setback
levee



November 2021



Steigerwald Reconnection Project

↑
East
setback
levee



West setback
levee



Steigerwald Reconnection Project

↑
East
setback
levee



Gibbons
Creek



November 2021



Alluvial fan – planted 2019

Steigerwald Reconnection Project — Carbon Emissions and Sequestration



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*



Sept. 2020



Sept. 2020

Steigerwald Reconnection Project — *Carbon Emissions and Sequestration*



Steigerwald Reconnection Project — *Wapato* Establishment



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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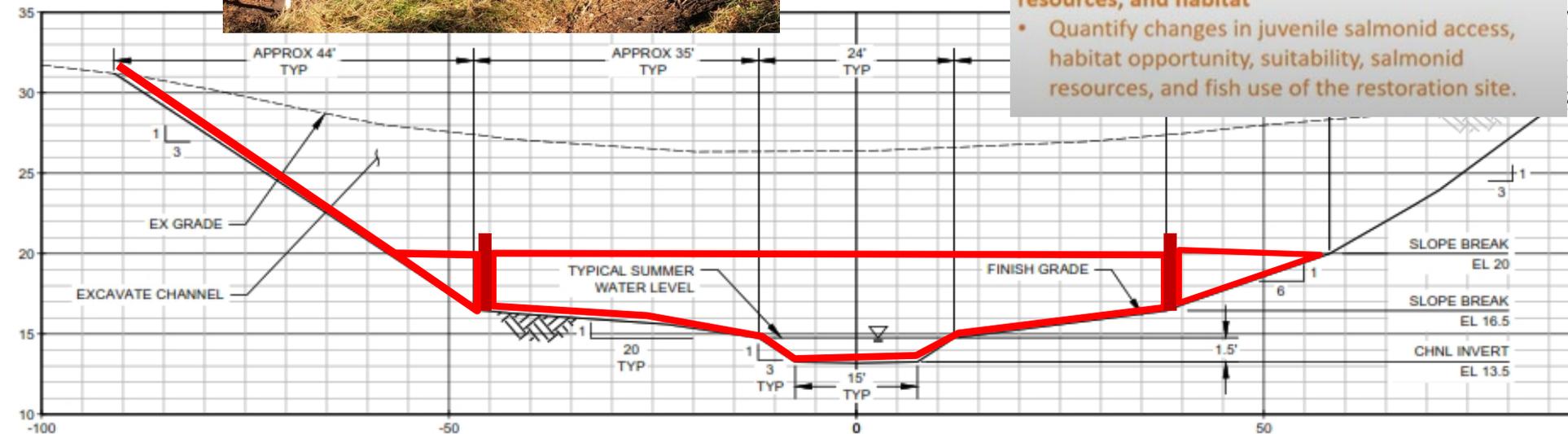
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B CH 3 LINE (GIBBONS CREEK) - SECTION NEAR BRIDGE

C1.8
SCALE (WHEN PRINTED 22"X34")
HORIZONTAL: 1" = 10'
VERTICAL: 1" = 5'

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)

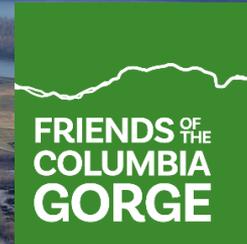
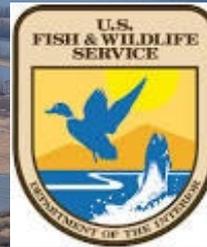


Steigerwald Reconnection Project — Acknowledgements

Funders:



Key Partners:



Prime Contractor:



Design/CM Team:



Steigerwald Reconnection Project

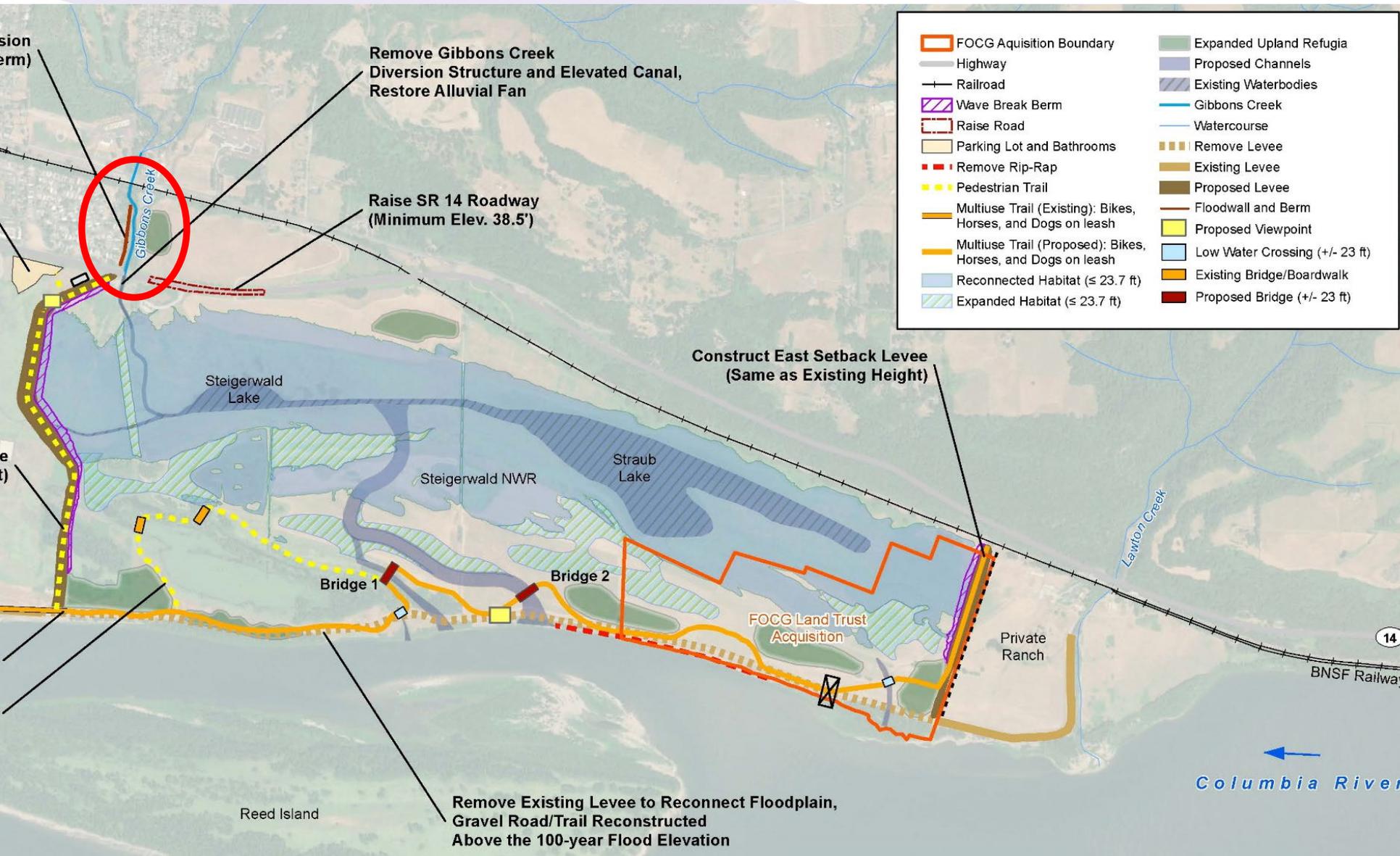
Questions?

Design, Permitting, Construction: Chris Collins, ccollins@estuarypartnership.org

Effectiveness Monitoring: Sarah Kidd, PhD, skidd@estuarypartnership.org



Steigerwald Reconnection Project



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

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

Steigerwald Reconnection Project



August 2021