

Large Wood in King County Projects

Nancy Faegenburg, Meeting Facilitator

Mercer Island Community and Event Center
June 8, 2016

Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section
Rural and Regional Services Section



King County



**KING COUNTY
FLOOD CONTROL
DISTRICT**

Meeting Overview

- Background and Context
- Third Party Review of Projects
- Natural Wood Update
- Project Presentations
- Q & A
- Open House



Green River

Use of Large Wood in Rivers and Streams

Flow deflection and redirection



Belmondo Revetment Repair

Use of Large Wood in Rivers and Streams

Habitat enhancement and mitigation



Belmondo Revetment Repair

Natural Deposition in Rivers and Streams



Tolt River 2011



Key Features of Procedures

- **King County Ordinance, Public Rule and DNRP Procedures for Placed Wood (2010)**
 - Consider public safety in project design
 - Seek input through annual meetings and at 30% design
- **Project review by professional engineer and ecologist**
- **Applies to all KC projects that place wood or where natural wood is likely to deposit**

Website: [www.kingcounty.gov\rivers](http://www.kingcounty.gov/rivers)

Complementary Elements

- **Independent 3rd party review of projects:**
 - How well does it meet goals and objectives
 - Design vs. as-built
 - How was input used and what are the results
- **Annual safety awareness campaign**
 - Coordinate with Public Health and KCSO on water safety messaging
- **Conduct studies of recreational uses and impacts**
- **Respond to concerns about naturally-occurring wood**

Project Locations



Status update on projects previously presented

White River:

- **Countyline Levee Setback Project**
 - Presented in 2011 (30%) and 2013 (60%)
 - 3rd-Party recreational review in 2015
 - Design revisions at 60% and 90% to incorporate input
 - Construction scheduled to start late-May 2016; finish in fall 2017

Snoqualmie/Tolt River:

- **Tolt Pipeline Protection / Winkelman Project**
 - Presented in 2014 and 2015
 - Construction scheduled to start spring 2017; finish in fall 2017

Looking Ahead

Snoqualmie/Tolt River:

- **SE 19th Way Road Protection Revetment Repair Project**
 - Located Between Fall City and Carnation:
Snoqualmie River (left bank RM 31.5)
 - Construction planned for summer 2017
 - 30% Design ~ November 2016

Questions?



Q



A

Nancy Faegenburg, Program and Project Manager
206 477-4688

nancy.faegenburg@kingcounty.gov

www.kingcounty.gov/rivers

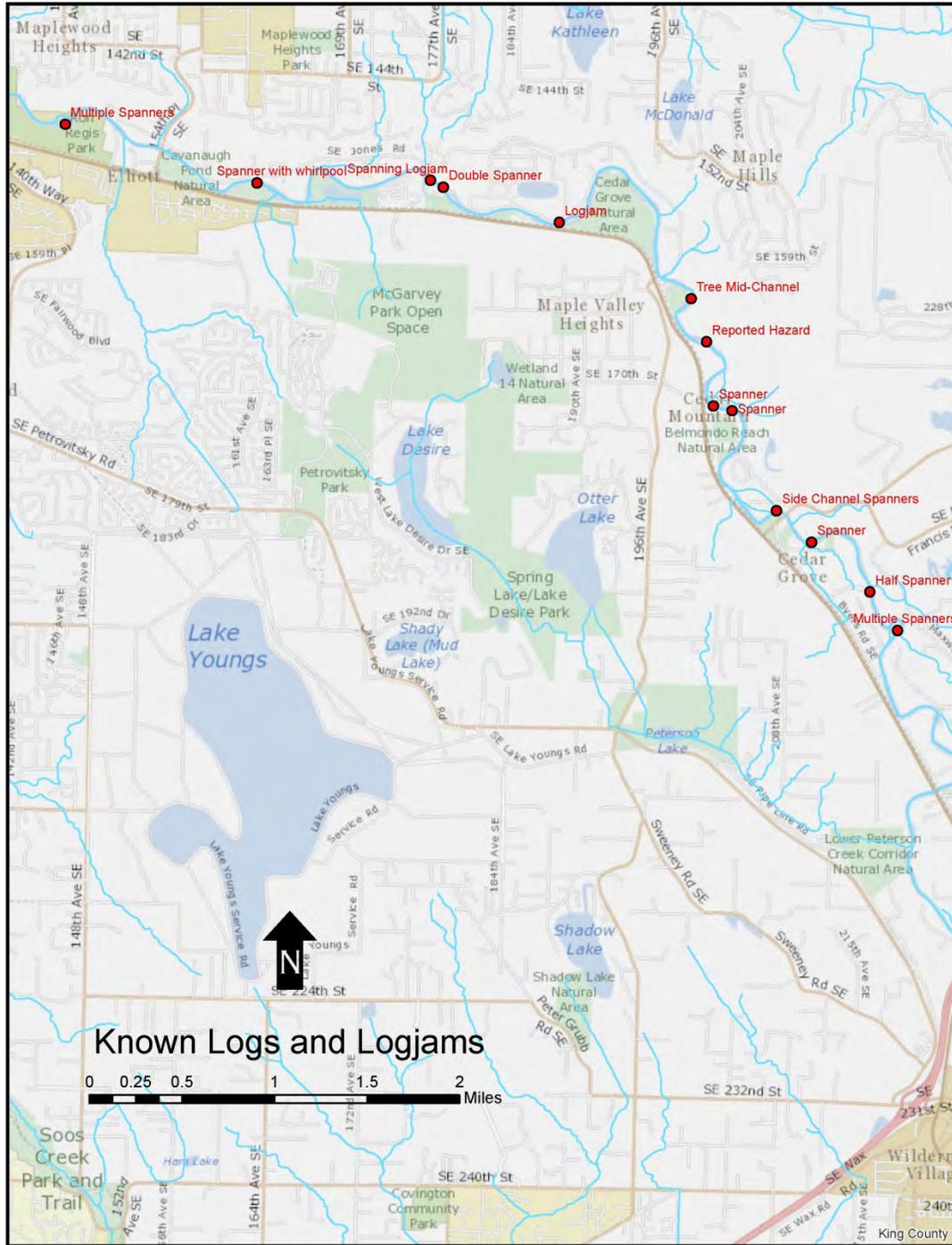
***For project-specific information, please contact the
Project Manager or Contact listed on today's agenda

A photograph of a river with a large fallen tree trunk in the foreground and a dense forest in the background. The text is overlaid on the image.

Natural Large Wood in the Cedar River

John Engel, WLRD

Dan Christian, KC Sheriff's Office



Byers



Cedar Rapids



Belmondo



Royal Arch Slide



Links and more information

John Engel: john.engel@kingcounty.gov or 206-477-4685

Known Hazards in King County Rivers:

<http://www.kingcounty.gov/services/parks-recreation/boating/rivers.aspx>

Reporting Wood Hazards on King County Rivers:

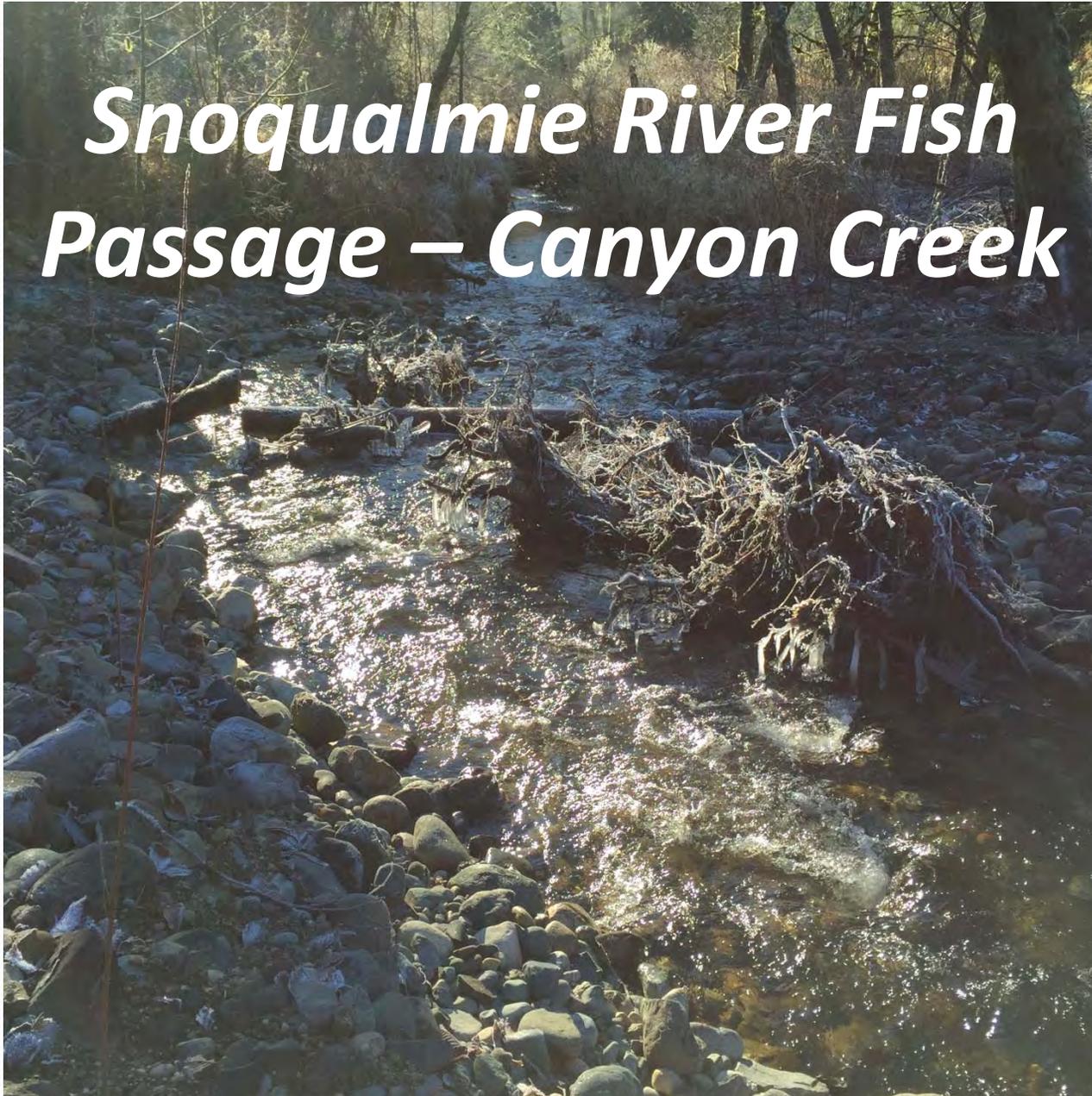
<http://www.kingcounty.gov/safety/sheriff/Enforcement/Specialized/MarinePatrol/River%20Hazards.aspx>

Third Party Review Presentation



Projects on Small Streams with No Recreational Floating

*Snoqualmie River Fish
Passage – Canyon Creek*





Goals and Objectives:

Restore fish passage above Aldarra Golf Club by:

- Removing 11 weirs that block fish passage
- Use boulders and logs to stabilize the steep channel and maintain water depths and velocities to maintain fish passage.



Project Schedule

- 30% Design;
- Large Wood Public Comment Process this summer;
- Construction in 2017



Project Manager: Carolyn Butchart

206-477-4659

Carolyn.butchart@kingcounty.gov



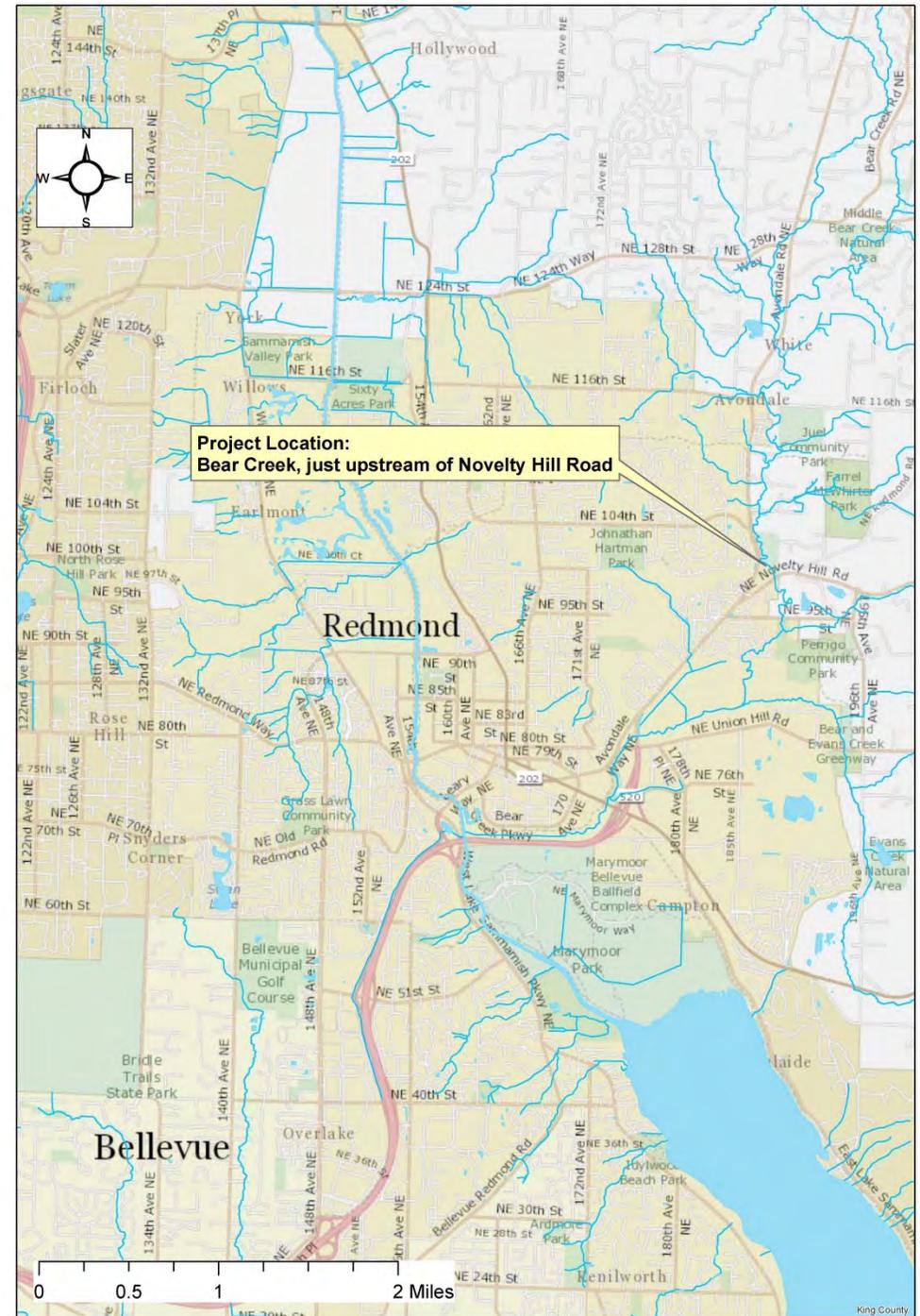
Bear Creek – Doyle Property Habitat Restoration Project

Project Manager: Laird O'Rollins



King County

- Cooperative partnership with City of Redmond
- Average summer flow of about 25 c.f.s.
- Only passive recreation--no recreational floating



- Reach about 600 feet long;
- All wood will be anchored in some form;
- Fox and Bolton wood quantities:
 - 55 pieces total of varying sizes



Schedule

- 30% Design and Large Wood Public Comment process: Summer/Fall, 2016;
- Construction: Summer, 2017





Project Manager: Laird O'Rollins
Laird.orollins@kingcounty.gov
206-477-4790



***Middle Boise Creek – Evans
Adaptive Management***



5,000 2,500 0 5,000 Feet



Background

Project constructed in 2013 to improve margin and off-channel spawning and rearing habitat in Boise Creek for Chinook and steelhead.

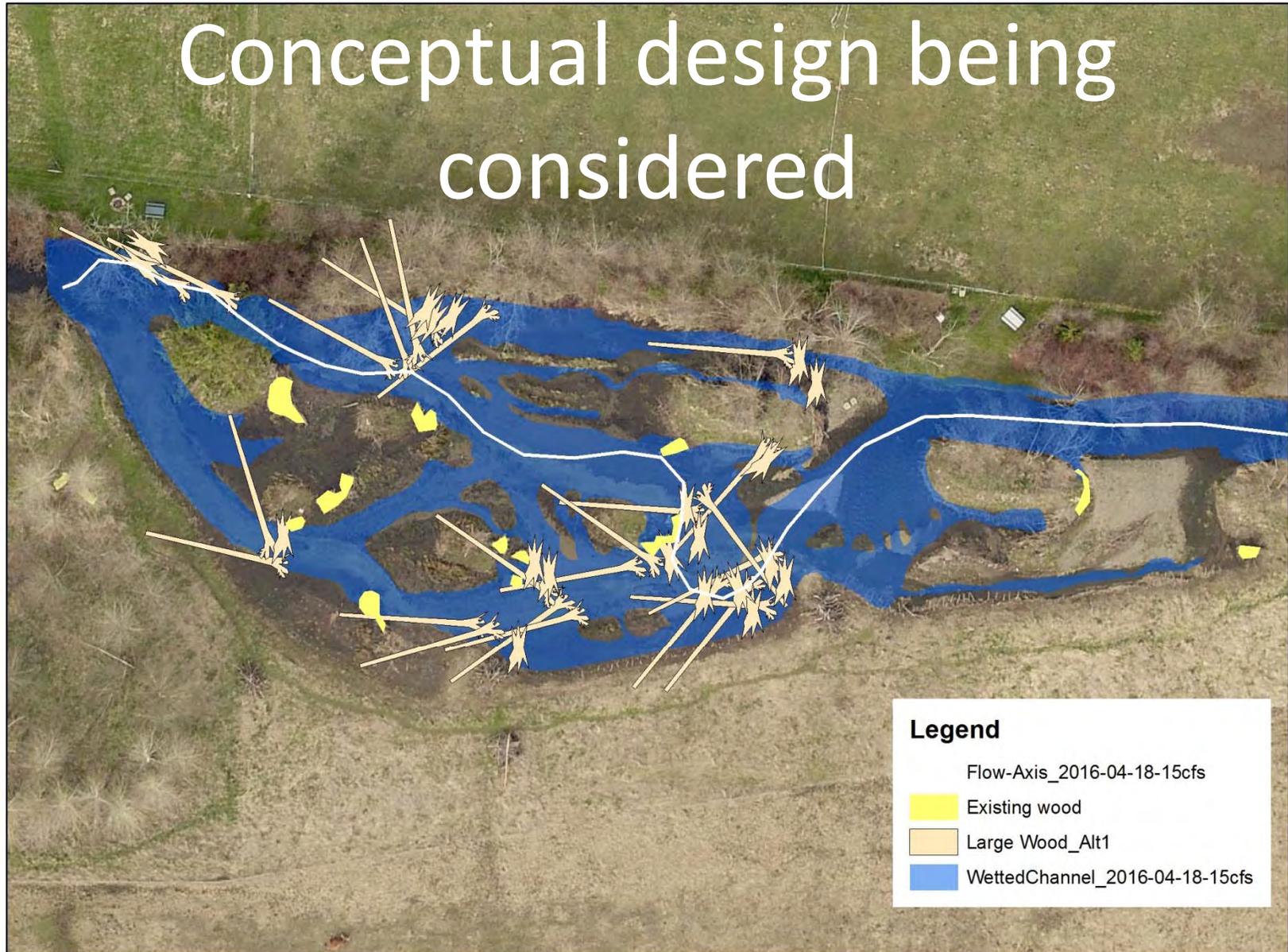




Adaptive Management

- Concern during original design process that too much wood would cause too much sediment deposition;
- Agreement with WDFW and Tribes during permitting that we would add more wood to the project in the future if conditions warranted;
- Sediment deposition has been less than anticipated.

Conceptual design being considered





Schedule:

- Large Wood Public Comment Process in Summer or Fall of 2016 (Original Public Comment Process completed in 2013);
- Construction in either Summer 2016 or Summer 2017.



Project Manager: Josh Latterell

206-477-4748

Josh.latterell@kingcounty.gov

Elliott Bridge Reach Off-Channel Habitat and Floodplain Reconnection

Jon Hansen, Project Manager



King County



Ron Regis
Park

154th Pl SE
SE Jones Rd

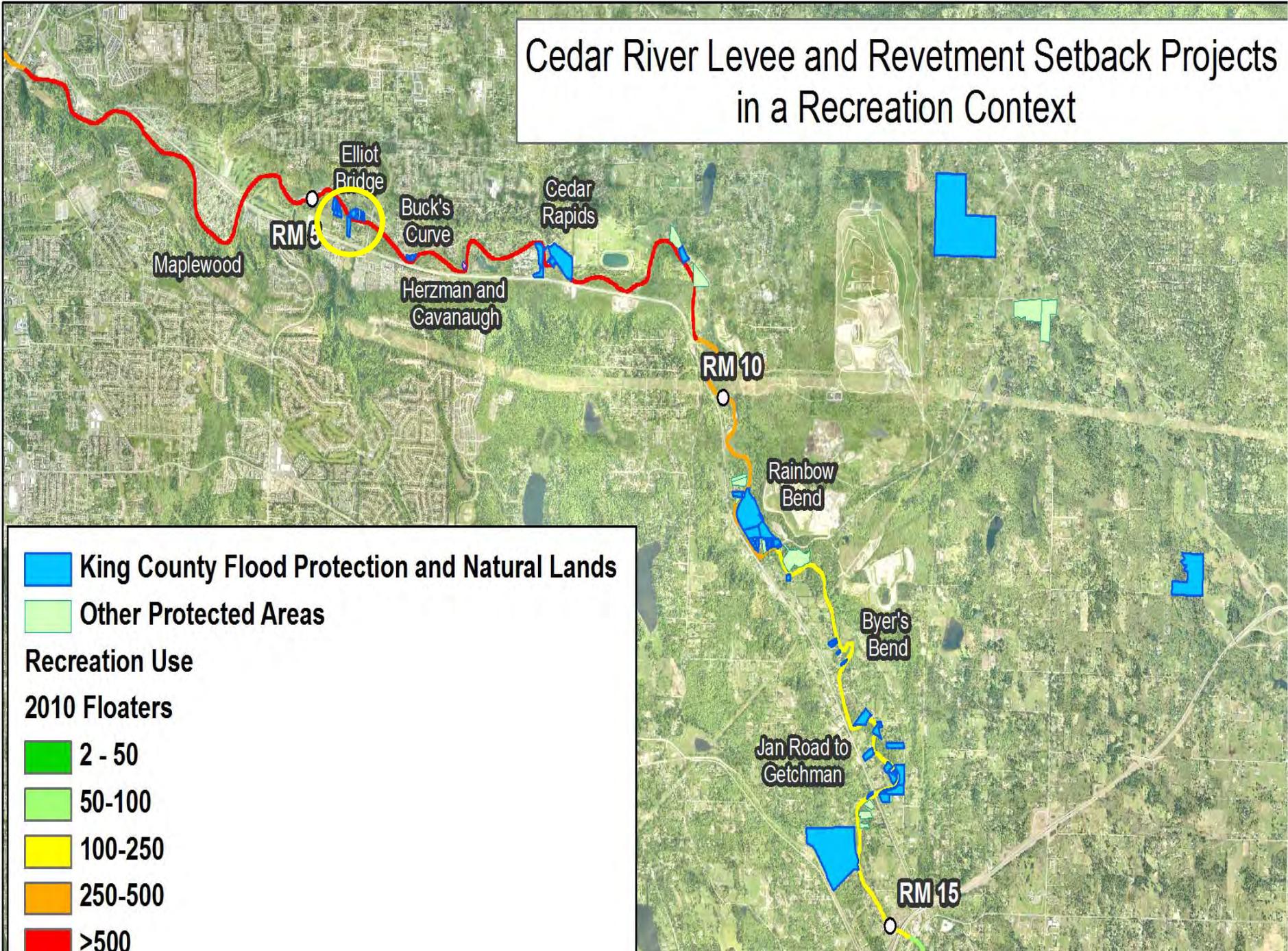
SR 169



Goals and Objectives

- **Satisfy Mitigation Obligations**
 - Wetland
 - Off-channel habitat
 - **Mainstem Scour structure**
- **Maintain Flood hazard protection**
- **Address Recreational safety issues**
- **Compatibility with future plans**

Cedar River Levee and Revetment Setback Projects in a Recreation Context

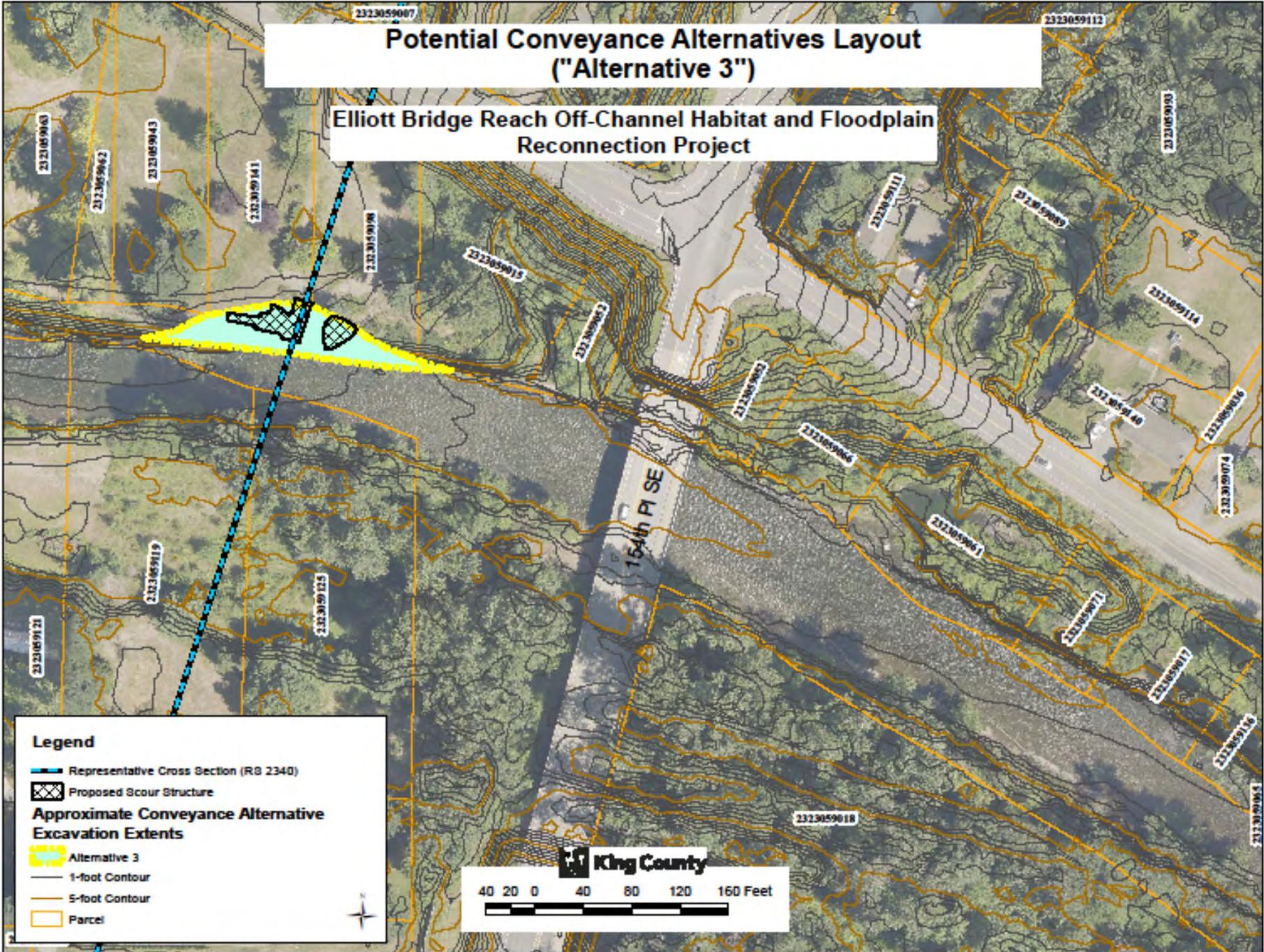


January 18, 2011 5,870 cfs



Potential Conveyance Alternatives Layout ("Alternative 3")

Elliott Bridge Reach Off-Channel Habitat and Floodplain Reconnection Project



Legend

— Representative Cross Section (RB 2340)

▣ Proposed Scour Structure

Approximate Conveyance Alternative Excavation Extents

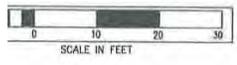
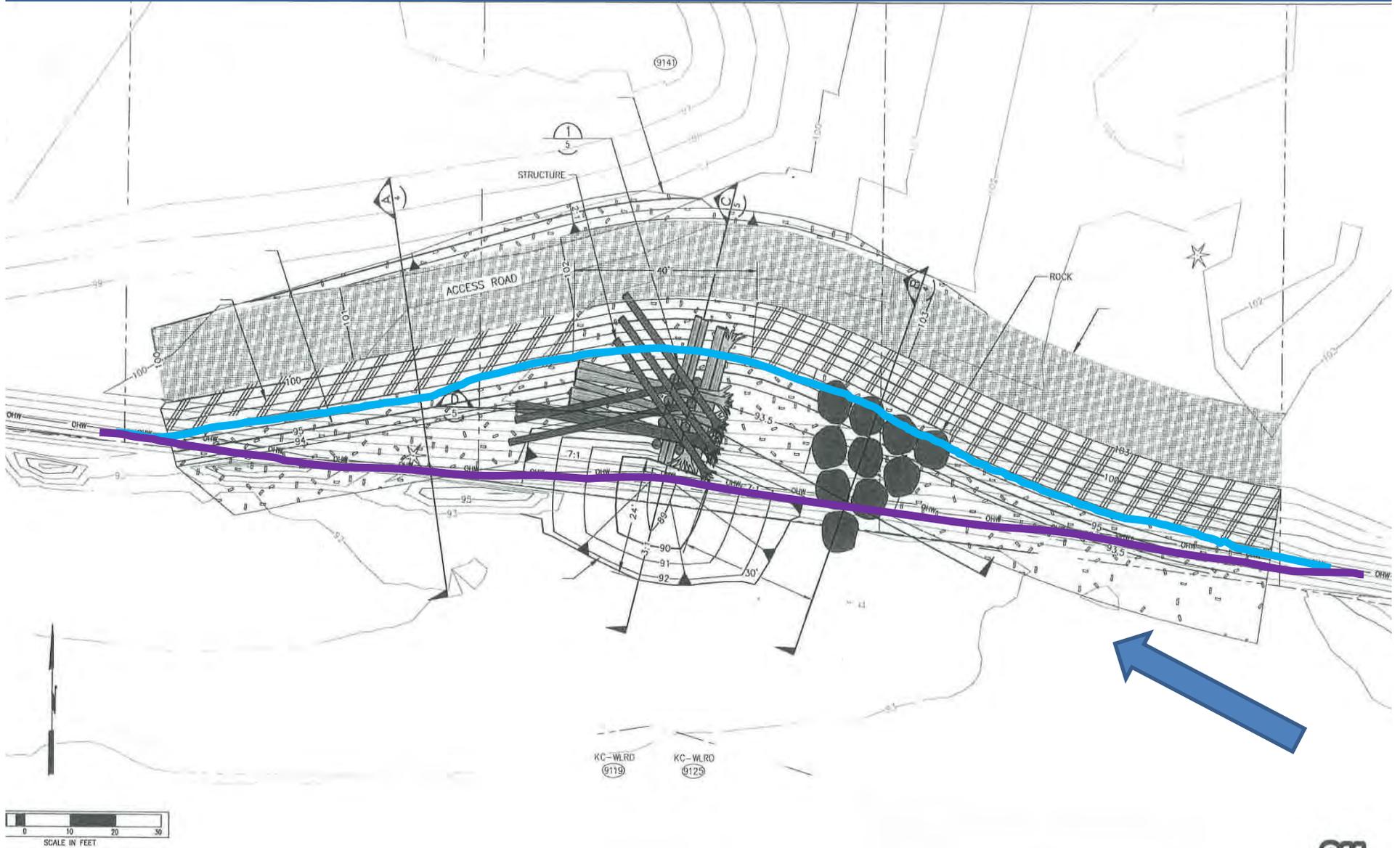
Alternative 3

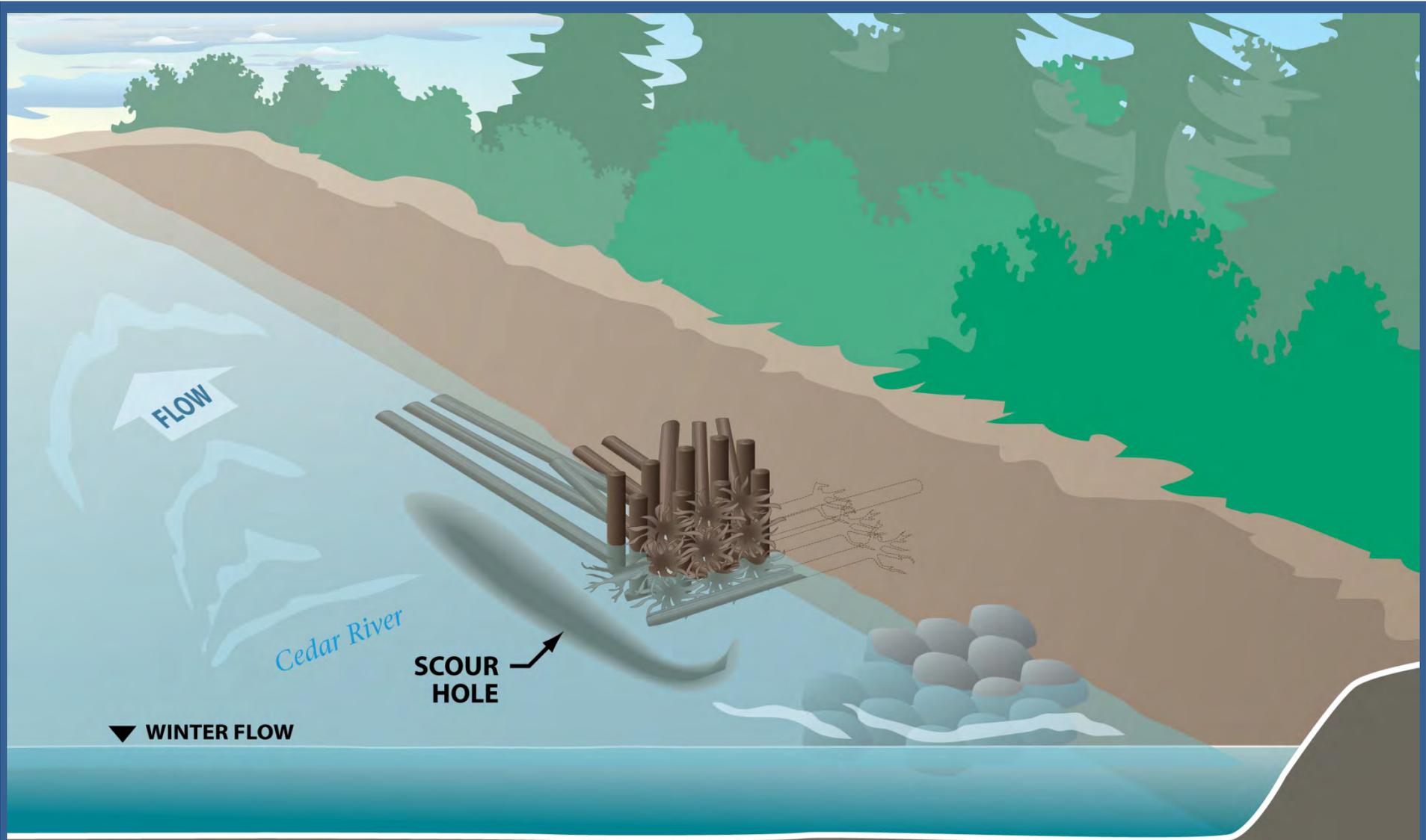
— 1-foot Contour

— 5-foot Contour

▭ Parcel







PHASE 2 – SUMMER 2016
ELLIOTT REACH SCOUR STRUCTURE

Project Schedule

Phase 2 - 2016

- Final Design March
- Phase 2 Checklist March
- Procurement May-June
- Notice to Proceed end of June
- Construction July-Sept
- Planting Oct-Dec



King County

Contact Information

Jon Hansen, Project Manager

jon.hansen@kingcounty.gov

206-477-4706

Project webpage:

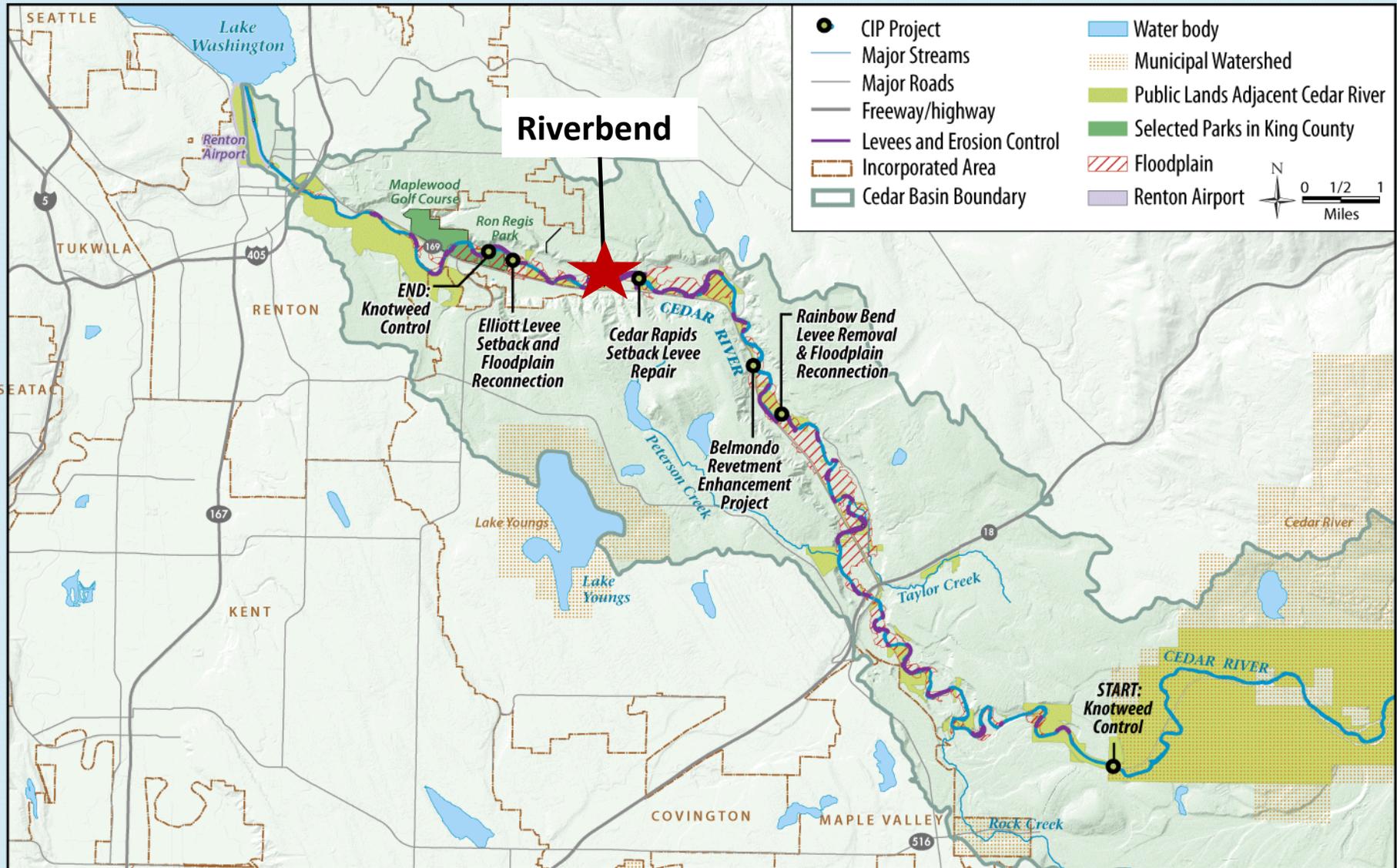
<http://www.kingcounty.gov/environment/wlr>

Search for Elliott Bridge Reach Mitigation

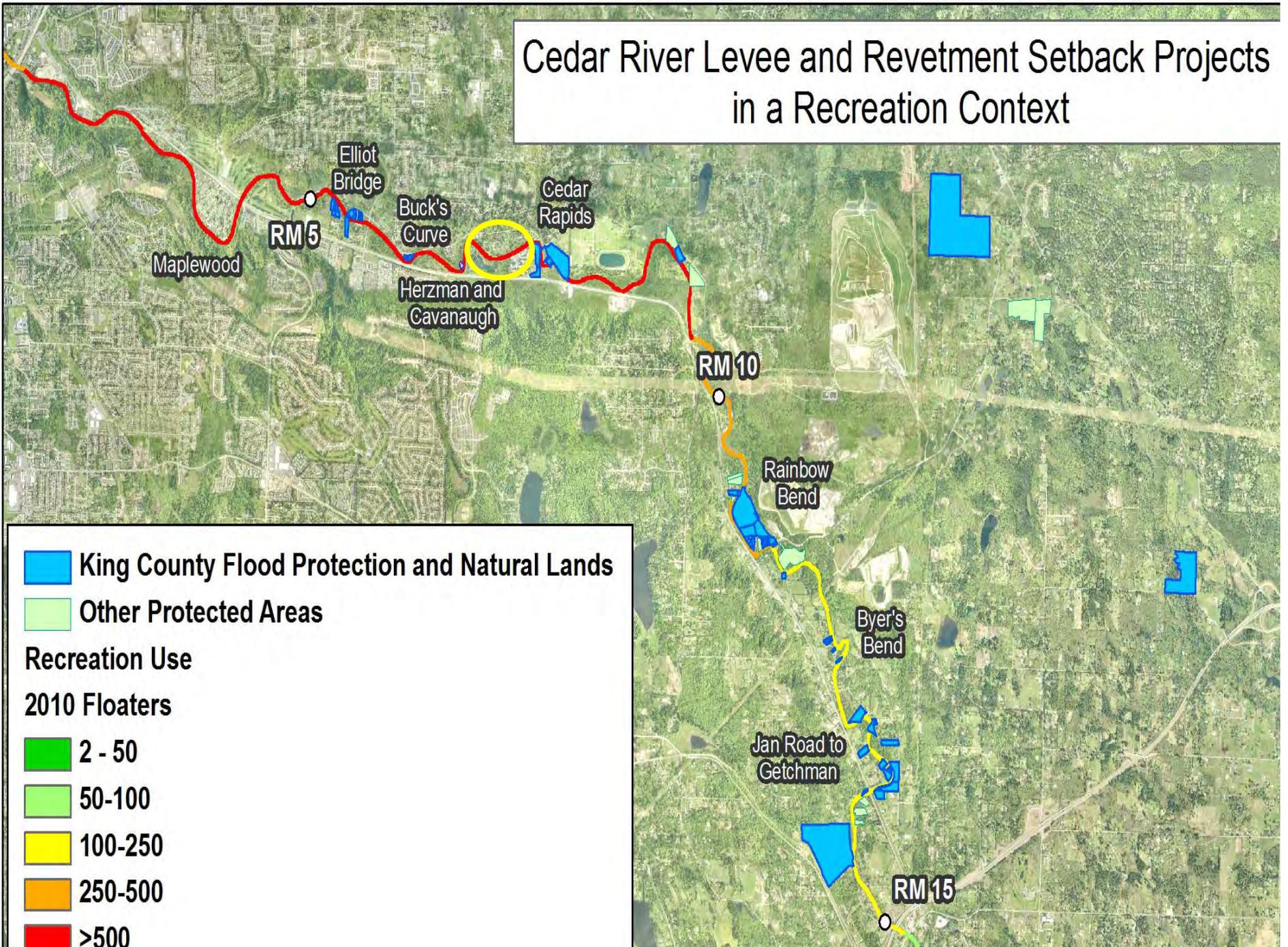
Riverbend Levee Setback and Floodplain Restoration



Riverbend Levee Setback and Floodplain Restoration

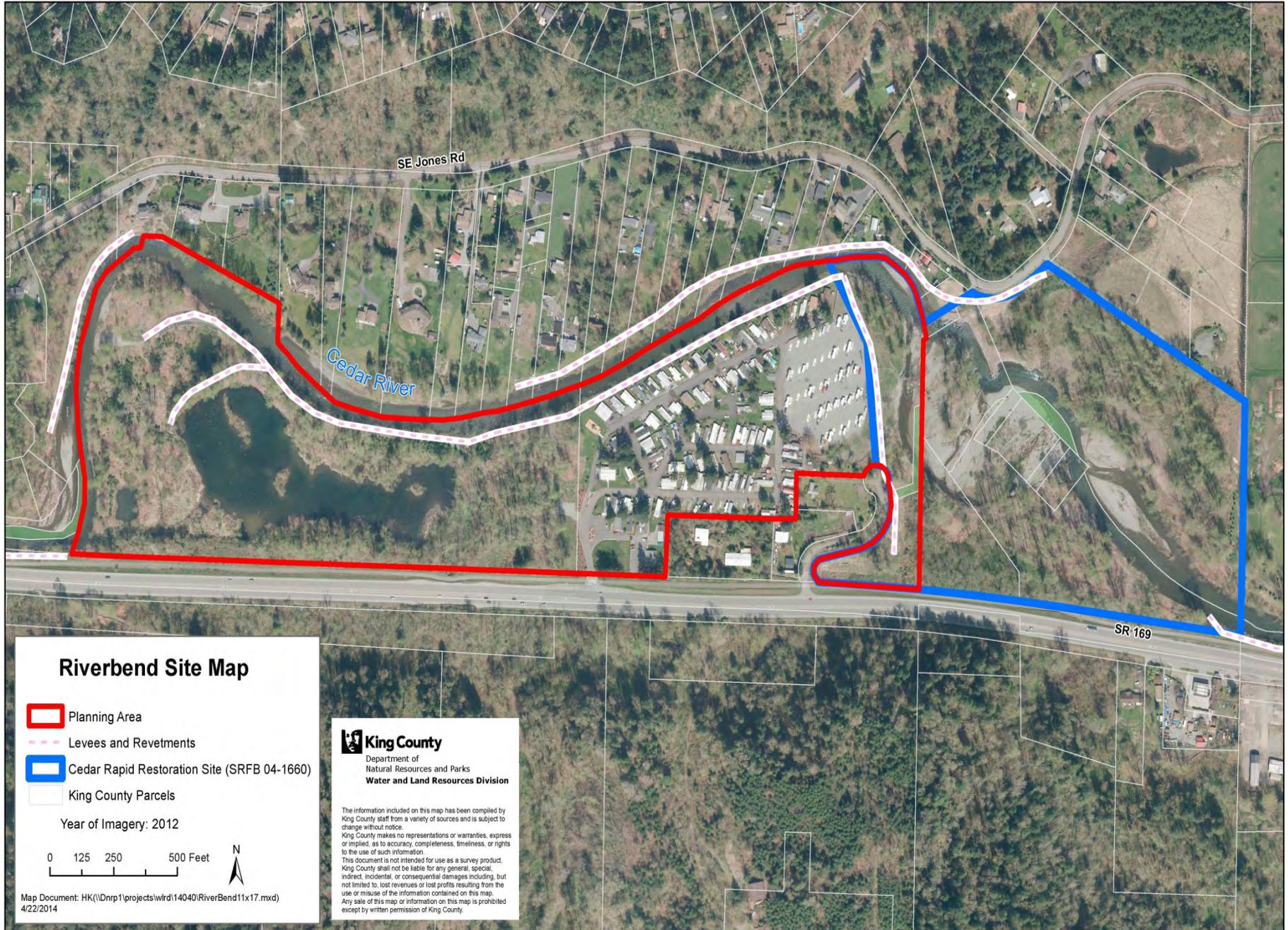


Cedar River Levee and Revetment Setback Projects in a Recreation Context



Project Goals

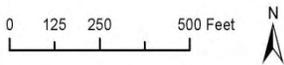
- **Reduce flood and erosion risk** to people, property and infrastructure
- **Improve in-stream and off-channel habitat** for Chinook and other salmon
- **Revegetate floodplain** and riparian buffer to provide terrestrial habitat, shade, cover and future large wood input into the river.
- **Where feasible, re-initiate natural river processes** via setback levee/revetments



Riverbend Site Map

- Planning Area
- Levees and Revetments
- Cedar Rapid Restoration Site (SRFB 04-1660)
- King County Parcels

Year of Imagery: 2012

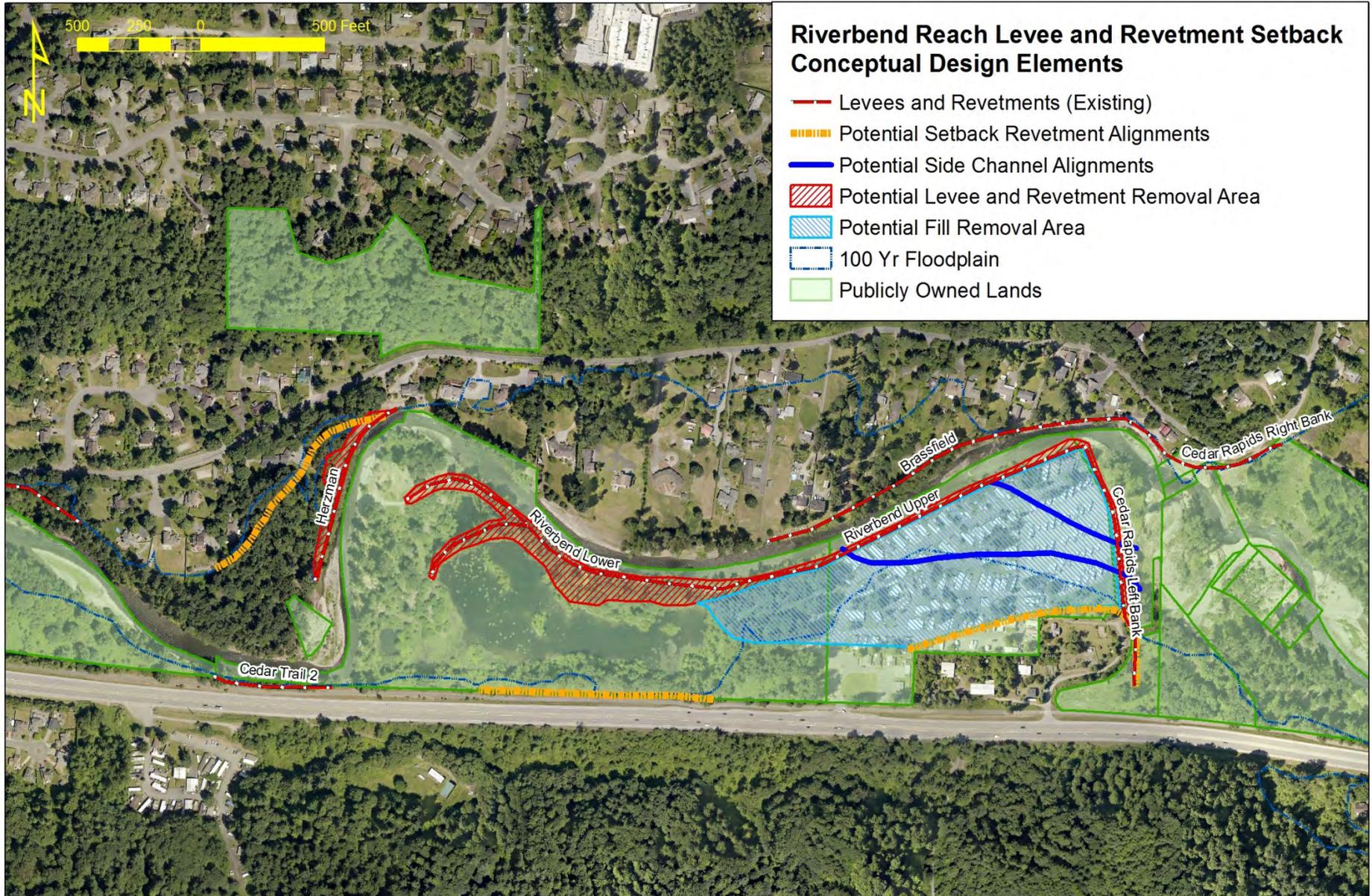


Map Document: HK:\Dnrp\projects\wird\14040\RiverBend11x17.mxd
4/22/2014

King County
Department of
Natural Resources and Parks
Water and Land Resources Division

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Potential Project Elements



Schedule

- 2015 – 2016 - Planning and Pre-Design
- July 2016 – Alternative Analysis
- Jan 2017 - 30% Checklist
- Sept 2017 – 60% Design
- March 2018 – Final Design
- June-Sept 2018 – Construction target

Contact Information

Jon Hansen, Project Manager

jon.hansen@kingcounty.gov

206-477-4706

Project webpage:

<http://www.kingcounty.gov/environment/wlr>

Search for Elliott Bridge Reach Mitigation

Teufel Nursery-Large Wood Mitigation

Jennifer Rice, Green River Coordinator

Fatin Kara, Green River Supervising Engineer

June 8, 2016

Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section



King County



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Project Location

Green River-Right Bank-River Mile 20.35



Vicinity Map



Site Map

Project Purpose:

one of three mitigation sites for past tree cutting on Green River Levees

- Foster Golf Course (completed 2015) 13 Logs
 - Fenster Park/ (completed 2015) 32 Logs
Green River Natural Area
 - Teufel Nursery Site (planned 2017) 85 Logs
-
- Total Mitigation 130 Logs

Project Goals and Objectives

- Fulfill habitat impact mitigation requirements for past tree cutting along Green River Levees in 2009.
- Restore riverine processes and functions within the project area in order to enhance salmonid rearing and refuge habitat.
- Minimize exposure to potential recreational users of the river channel.
- Maintain or improve flood protection in the surrounding community.

Existing Site Conditions



Winter view of site from across the river

Existing Site Conditions



View upstream from across the river



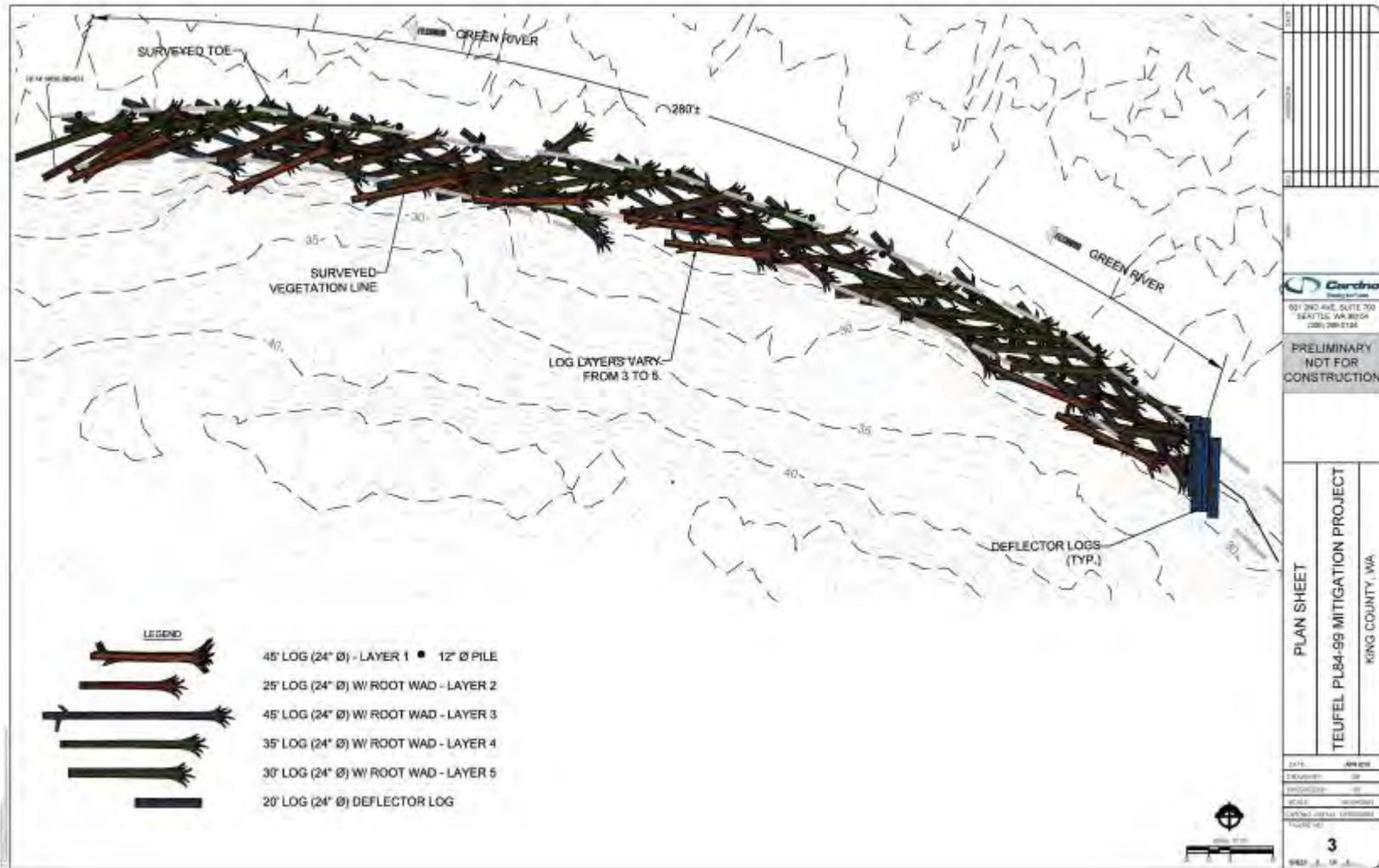
View downstream from across the river

Lower Green River Recreational Users

Table 7. 2013 Remote Camera Results - Green River.

	Whitney Bridge RM 41.3 and 41.1 LB	Auburn-Black Diamond RM 33.4 LB to Isaac Evans Park RM 29.1 RB	Russell Woods Park RM 19.4 LB to Briscoe Park RM 15.9 RB	Totals for Green River System
Number of Remote Cameras	2	5	4	11
Number of Days of Camera Operation	106	376	313	795
Total Groups Recorded	701	860	81	1,642
Average Groups Recorded per Day	6.6	2.3	0.3	2.1
Total People Recorded	2,312	2,626	167	5,105
Adults (18+)	2,128 (92.0%)	2,220 (84.5%)	157 (94.0%)	4,505 (88.2%)
Youth (12 to 17)	106 (4.6%)	260 (9.9%)	7 (4.2%)	373 (7.3%)
Children (1 to 11)	78 (3.4%)	146 (5.6%)	3 (1.8%)	227 (4.4%)
Male	1,441 (62.3%)	1,726 (65.7%)	129 (77.2%)	3,296 (64.6%)
Female	871 (37.7%)	900 (34.3%)	38 (22.8%)	1,809 (35.4%)
Average People Recorded per Day	21.8	7.0	0.5	6.4
People Wearing Life Vests	254 (11.0%)	322 (12.3%)	118 (70.7%)	694 (13.6%)
Total Vessels Counted	2,016	2,103	131	4,250
Rafts	281 (13.9%)	526 (25.0%)	12 (9.2%)	819 (19.3%)
Canoes	29 (1.4%)	49 (2.3%)	14 (10.7%)	92 (2.2%)
Kayaks	58 (2.9%)	103 (4.9%)	84 (64.1%)	245 (5.8%)
Inner tubes	1,556 (77.2%)	1,204 (57.3%)	8 (6.1%)	2,768 (65.1%)
Other	92 (4.6%)	221 (10.5%)	13 (9.9%)	326 (7.7%)
Vessels with Paddles	283 (14.0%)	566 (26.9%)	112 (85.5%)	961 (22.6%)

Conceptual Design Plan View



Project status and input opportunities

- Alternatives Analysis through June 2016
- 30% design through October 2016
- 60% design and public meeting Winter/Spring 2017
- Construction planned Summer 2017

Project website

- To learn more about this project and sign up for project updates visit:

Teufel Mitigation, Flood Risk Reduction, and Salmon Habitat Restoration Project

<http://www.kingcounty.gov/depts/dnrrp/wlr/sections-programs/river-floodplain-section/capital-projects/teufel-mitigation.aspx>

Questions?



Q



A

Jennifer Rice, Green River Coordinator,
River and Floodplain Management Section
206-477-4813
Jennifer.Rice@KingCounty.gov
www.kingcounty.gov/rivers



Porter Reach Restoration Project

Fauna Nopp, Project Manager

June 8, 2016

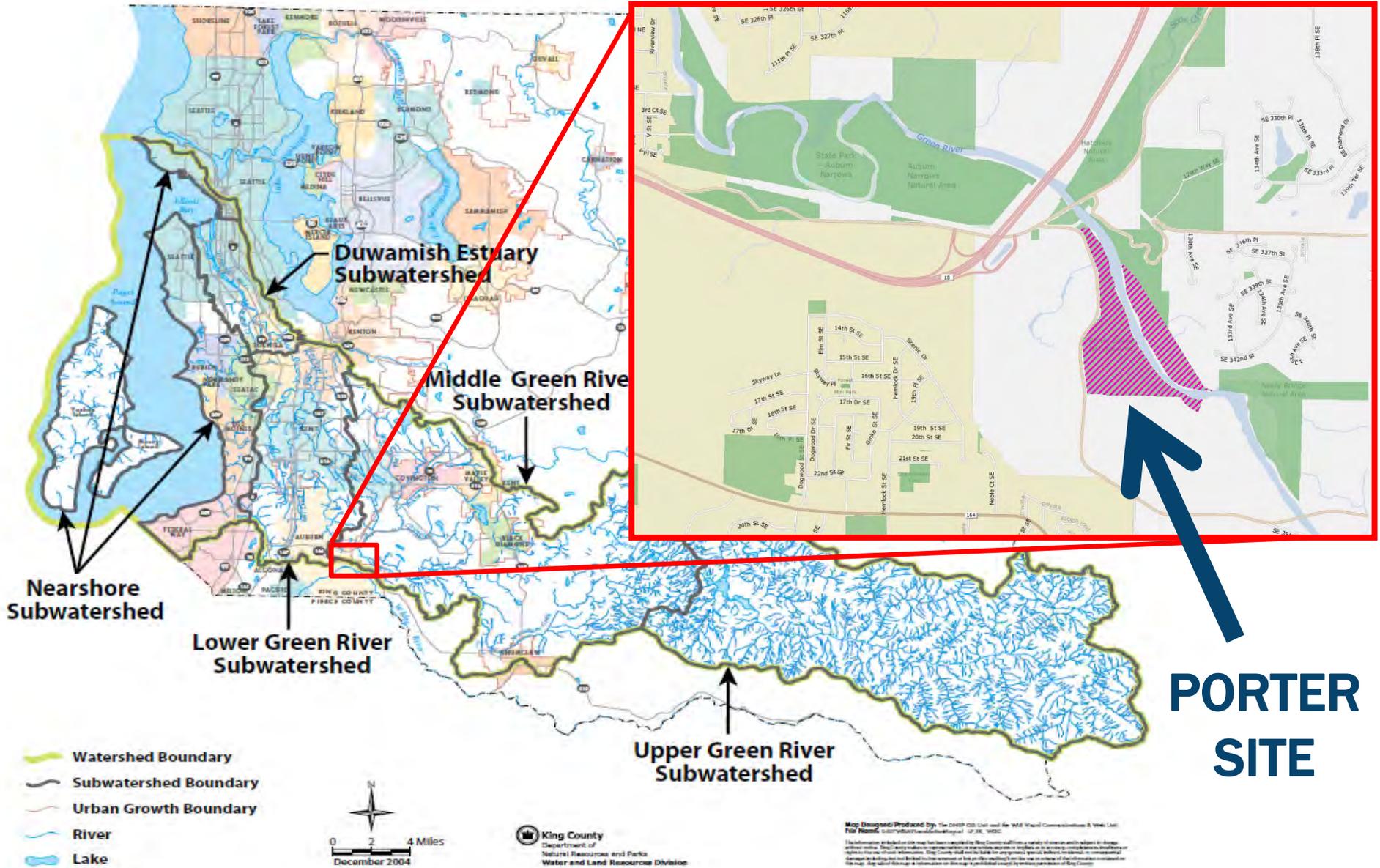
Department of Natural Resources and Parks
Water and Land Resources Division
Ecological and Engineering Services Unit



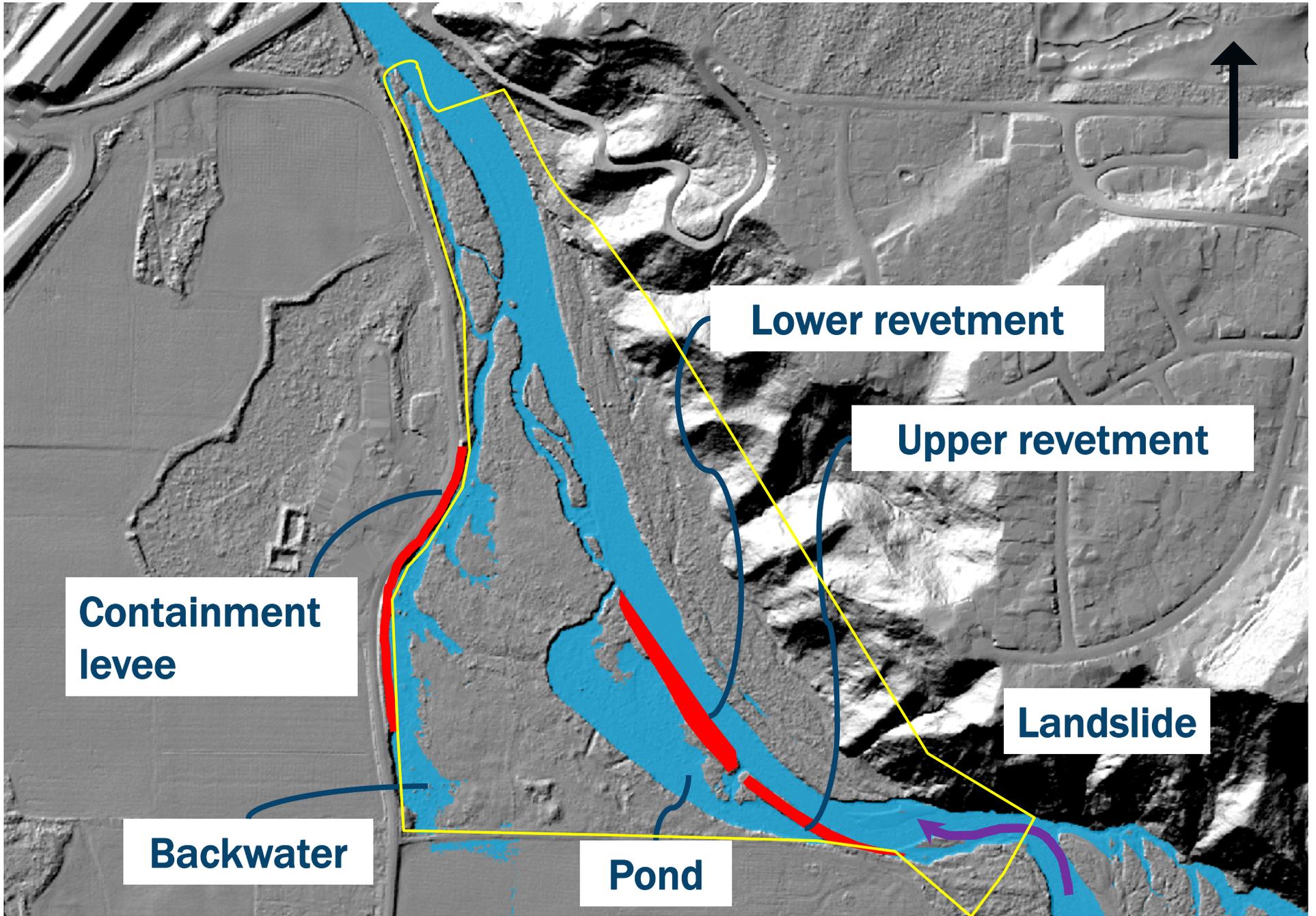
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**PORTER
SITE**



**Containment
levee**

Backwater

Pond

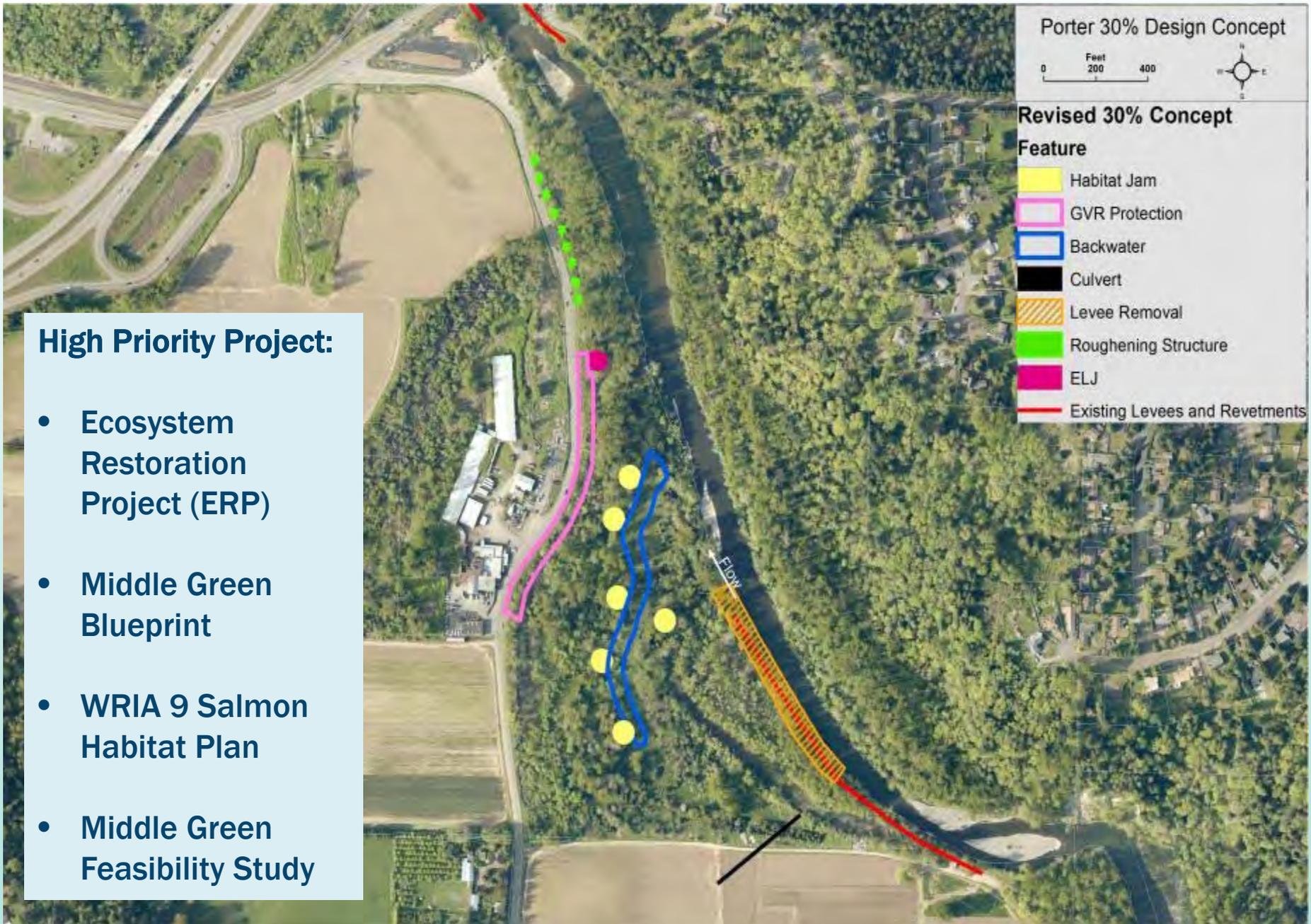
Lower revetment

Upper revetment

Landslide

Existing Site Conditions





High Priority Project:

- Ecosystem Restoration Project (ERP)
- Middle Green Blueprint
- WRIA 9 Salmon Habitat Plan
- Middle Green Feasibility Study

30% Design Concept

Project Purpose

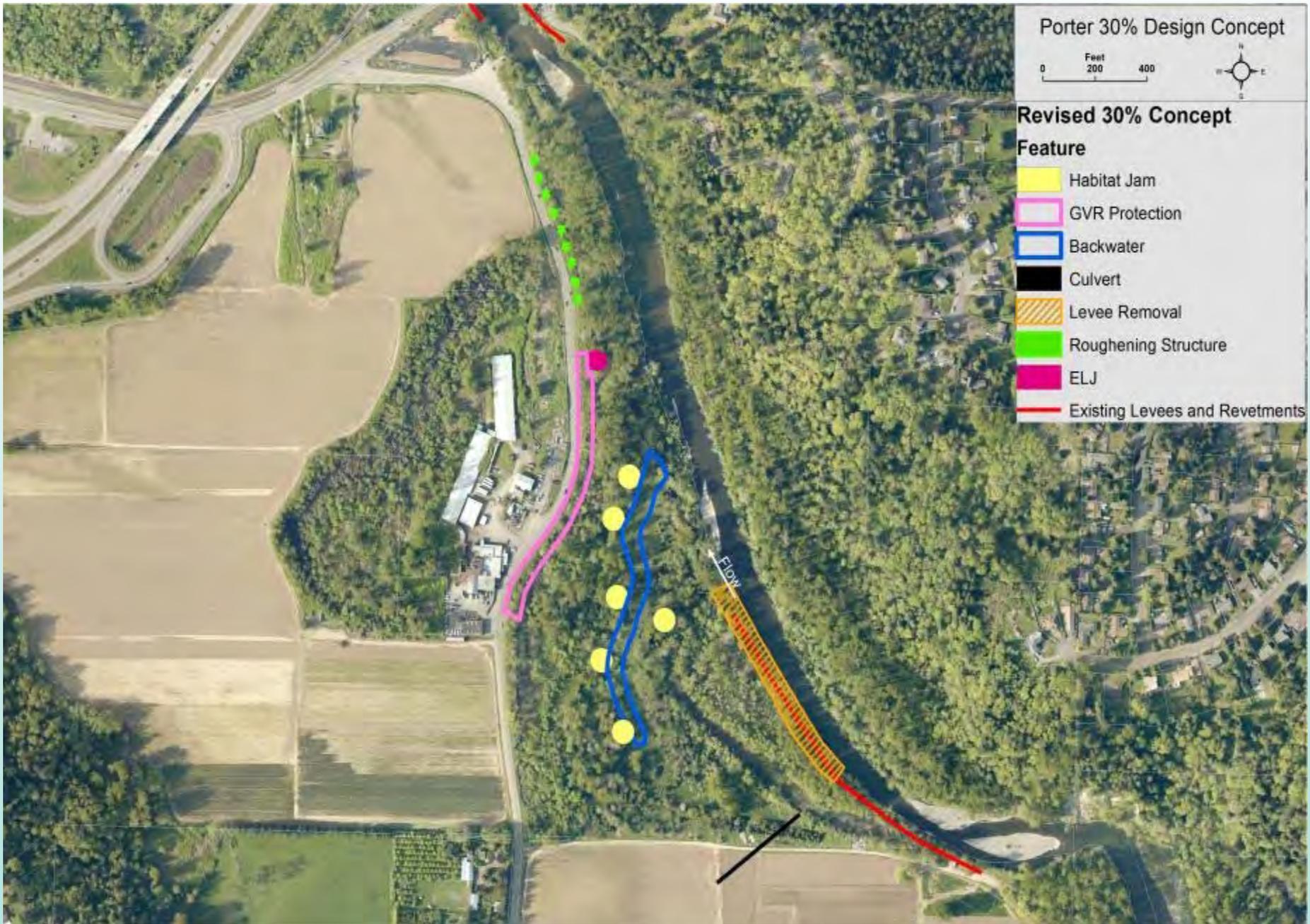
To meet the salmon recovery goals by allowing the river to create riverine and floodplain habitats.

Goals & Objectives

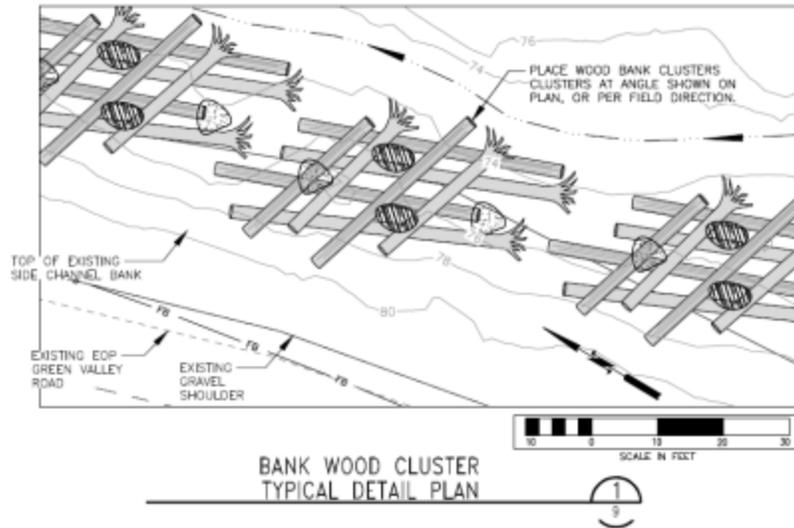
- To promote natural floodplain processes
- Improve salmon/steelhead spawning and rearing habitat
- Enhance and maintain native vegetation communities

While also:

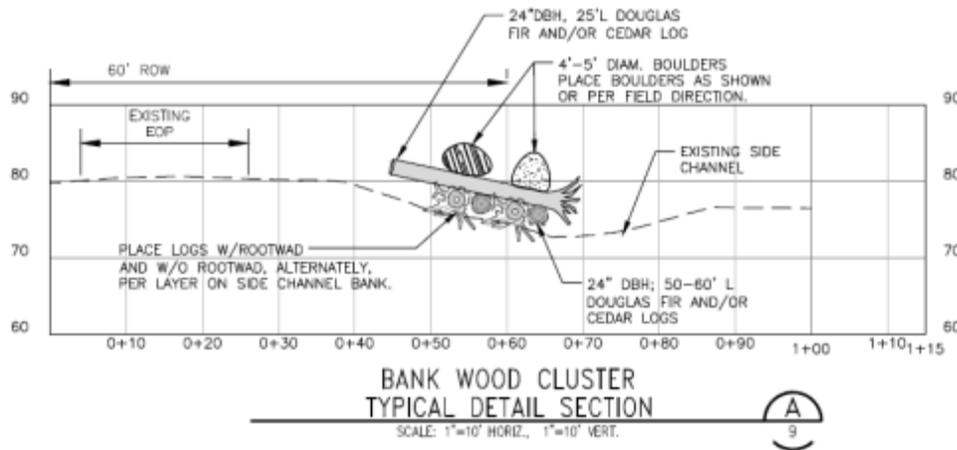
- Maintaining or improving current levels of flood risk & erosion protection
- Addressing potential impacts to recreational boater safety
- Protecting agricultural viability



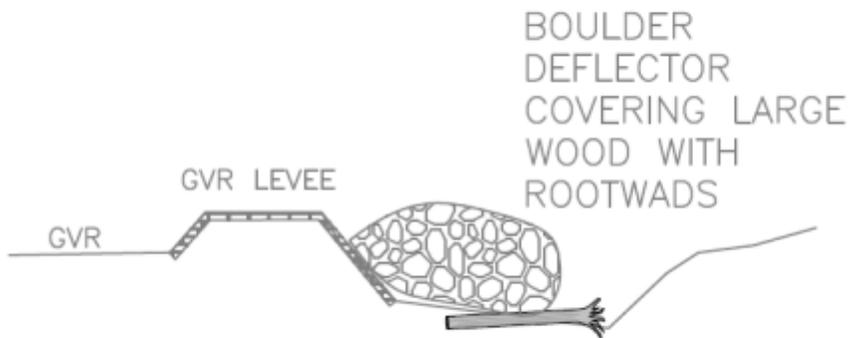
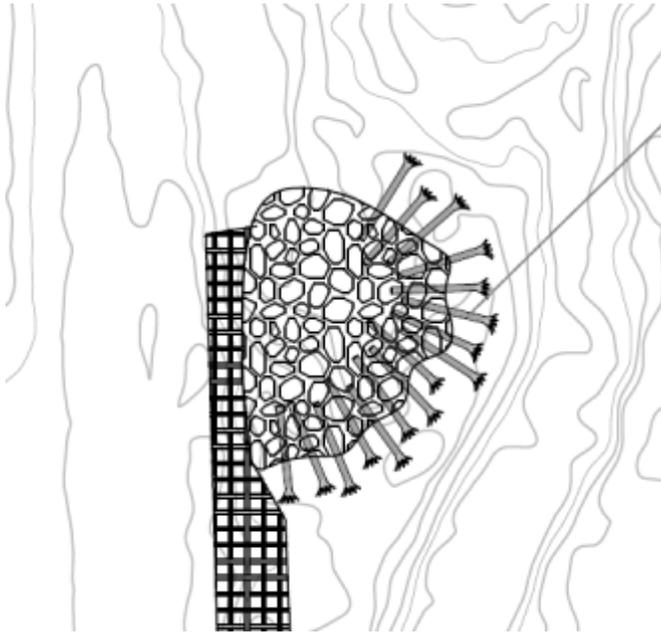
30% Design Concept



BANK WOOD CLUSTER SCHEDULE				
MATERIAL	DBH (IN.)	LENGTH (L.F.)	QUANTITY (EACH CLUSTER)	QUANTITY (TOTAL)
LOG W/ROOTWAD	24	25	2	20
LOG W/O ROOTWAD	24	25	2	20
LOG W/ROOTWAD	24	50-60'	2	20
LOG W/O ROOTWAD	24	50-60'	2	20
4'-5' BOULDER	N/A	N/A	4	40



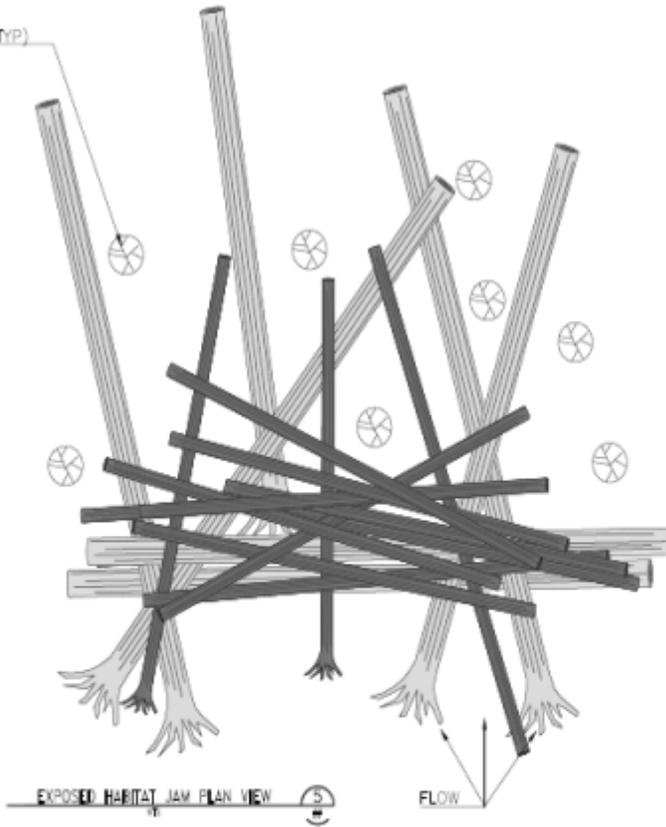
Bank Roughening Structures



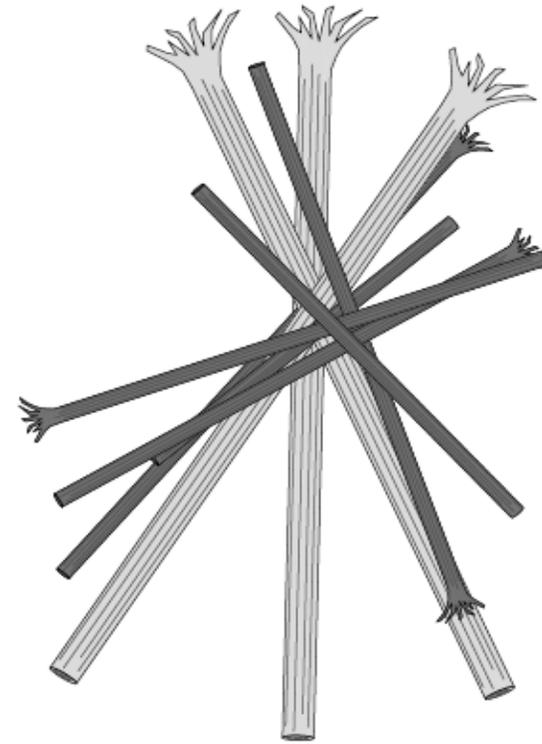
Deflector Jam

EXISTING STANDING TREES (TYP)

2) FOR NOTES



EXPOSED HABITAT JAM LOG SCHEDULE			
MATERIAL	DBH (IN.)	LENGTH (L.F.)	TOTAL QUANTITY (EACH JAM)
LOG W/ROOTWAD	24	50	5
LOG W/O ROOTWAD	24	50	2
LOG W/ROOTWAD	10-15	30-40'	10
LOG W/O ROOTWAD	10-15	30-40'	M



BURIED HABITAT JAM LOG SCHEDULE			
MATERIAL	DBH (IN.)	LENGTH (L.F.)	TOTAL QUANTITY (EACH JAM)
LOG W/ROOTWAD	24	50	3
LOG W/ROOTWAD	10-15	30-40'	3
LOG W/O ROOTWAD	10-15	30-40'	3



Know what's below. Call before you dig.

(EXPOSING UTILITIES LOCATIONS ARE APPROX.)



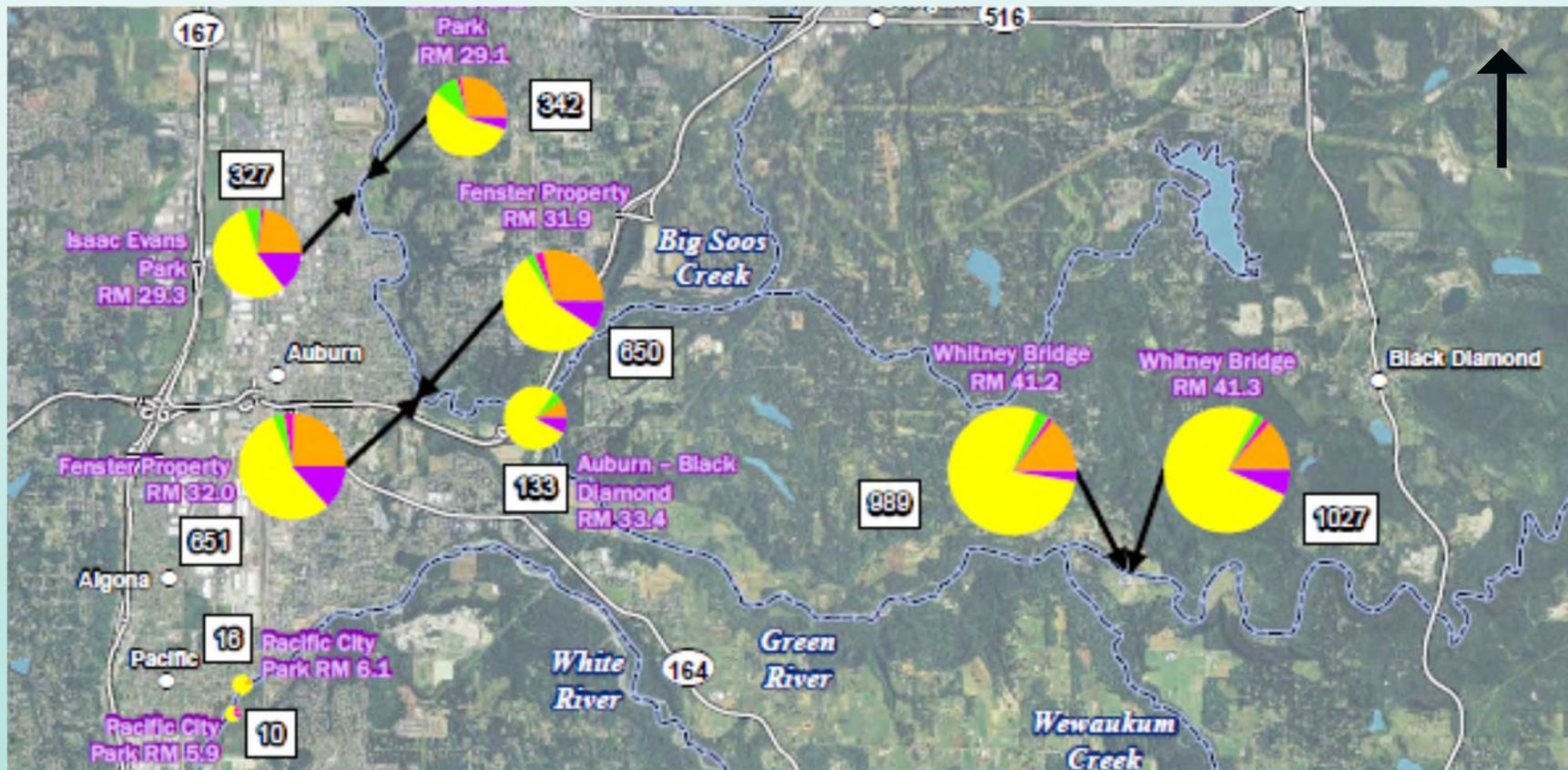
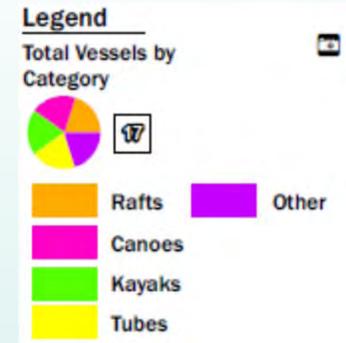
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Recreational Use

King County River Recreation Study, 2013



Reducing Risks from Wood

Site Management Plan tbd

- Continued application of large wood protocols
- Warning/Advisory Signs
- Public outreach and education
- Monitor for unacceptable hazards

Post-Project Adaptive Management Plan

- develop with input from stakeholders

Project Schedule

2016	Preliminary to Final Design Permitting
2017	100% Design Permitting Contract Award
Summer 2017	Construction
2017-2018	Planting

Contact Information

Fauna Nopp, Project Manager

206-477-4787

Fauna.nopp@kingcounty.gov

Project Website

<http://www.kingcounty.gov/services/environment/animals-and-plants/restoration-projects/porter-levee.aspx>

Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section

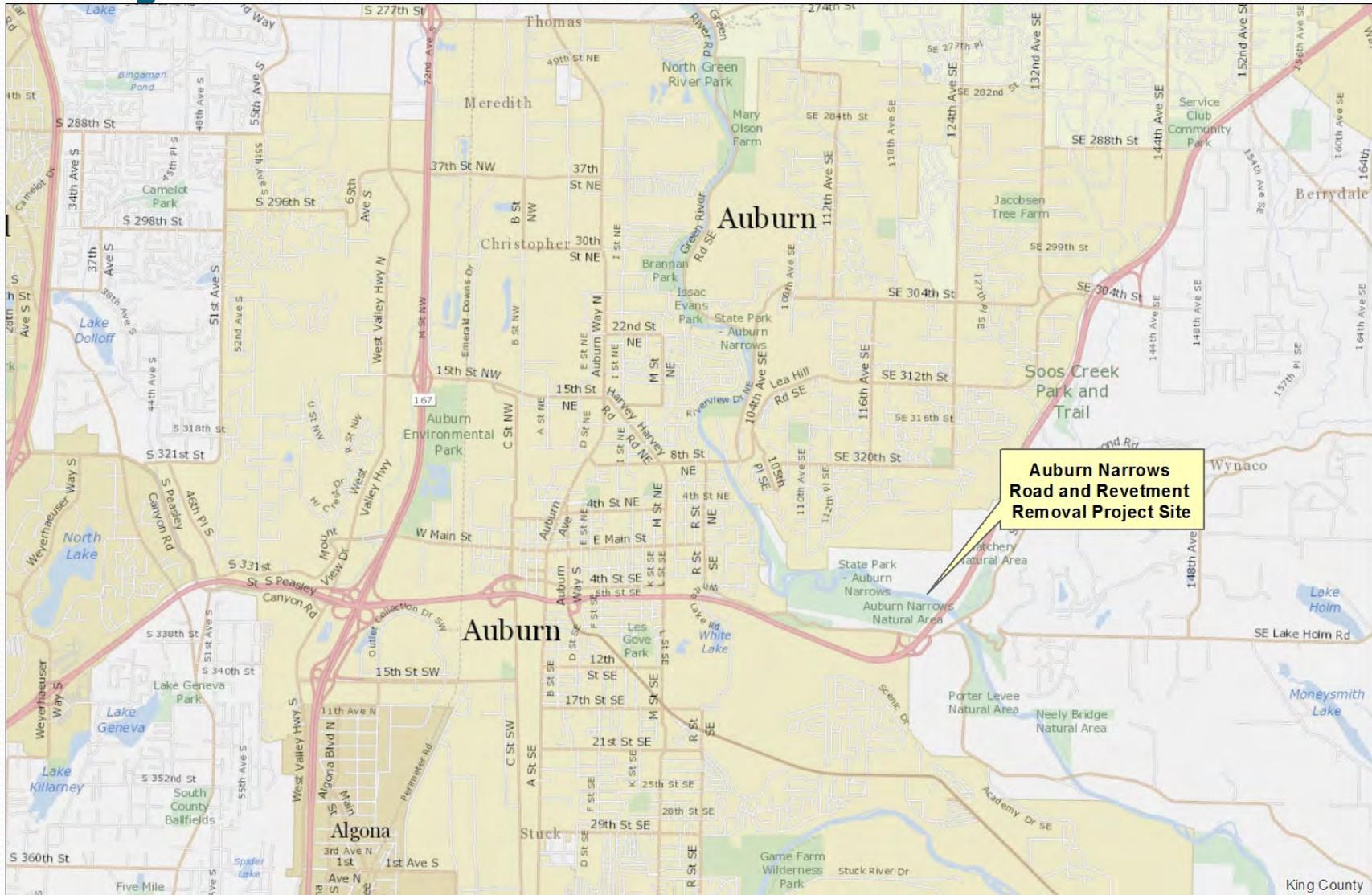


Auburn Narrows Road and Revetment Removal



02/12/2015 - 06/27/2015

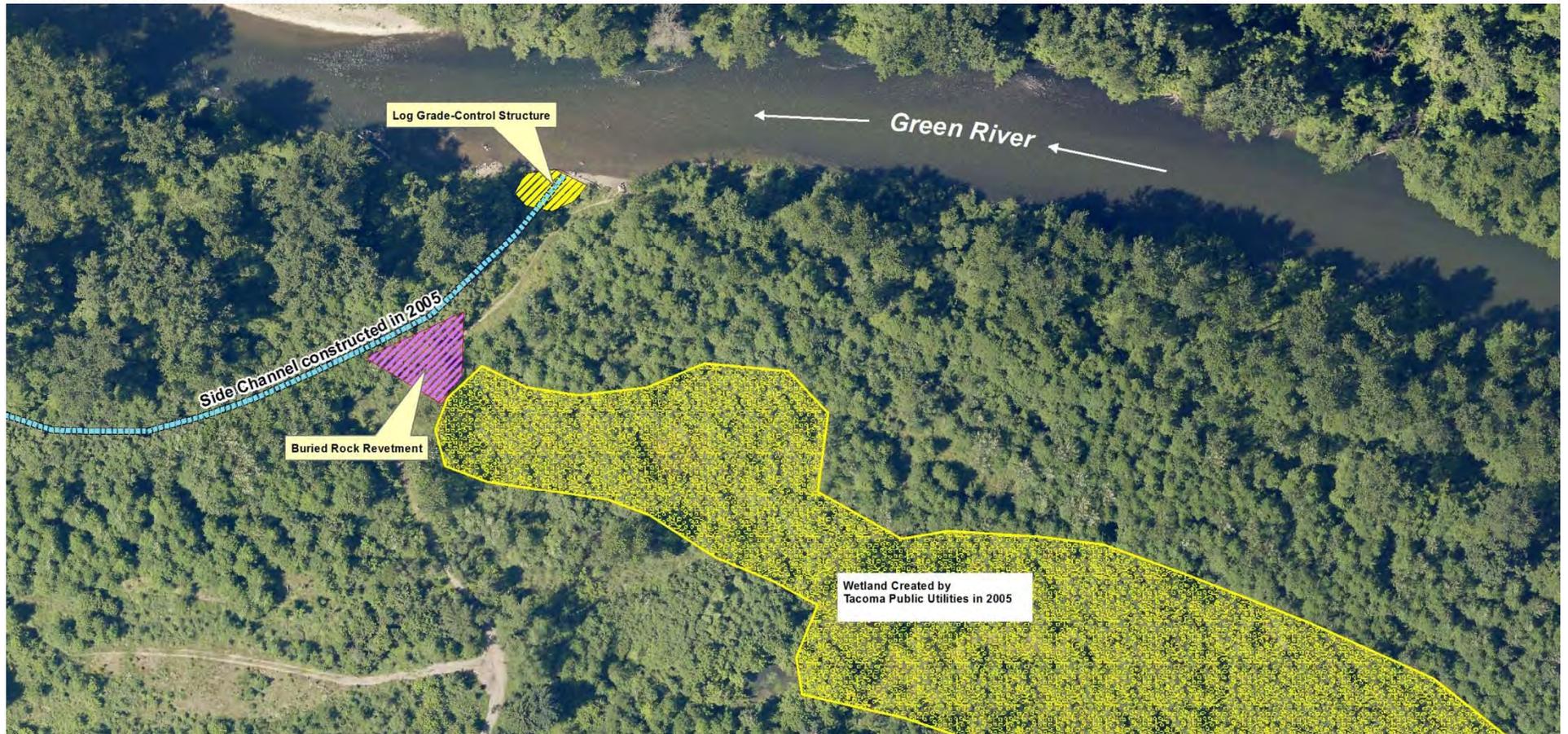
Project Location



Auburn Narrows Natural Area



Existing Conditions



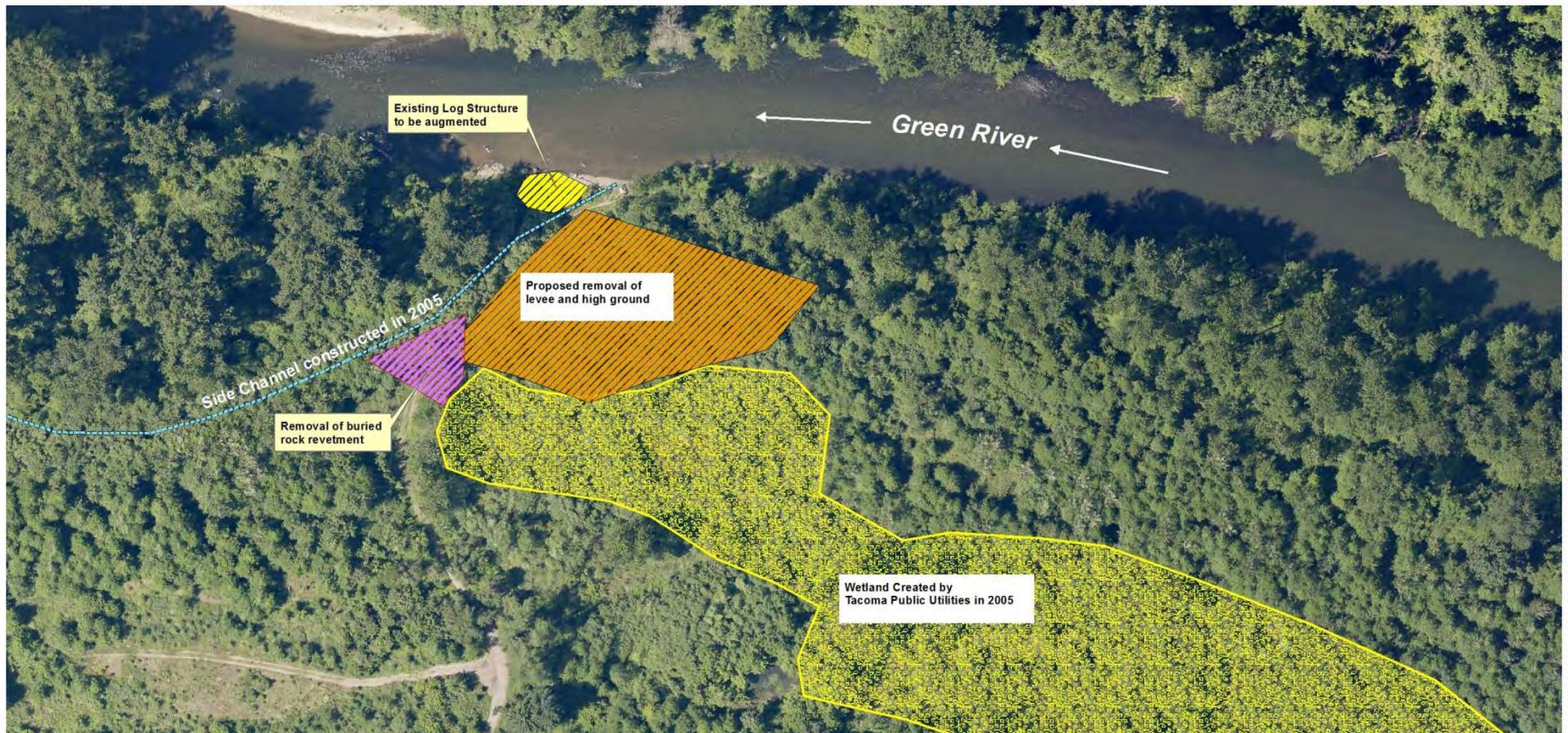


Goals and Objectives

Goal: Create more rearing habitat for juvenile salmonids by connecting existing habitat features to the mainstem river.

- Remove buried rock barrier between created wetland and side channel;
- Remove levee/high ground separating wetland from the mainstem river;
- Move side channel inlet slightly upstream to improve flow-through; and
- Augment existing log structure to provide scour and habitat.

Project Overview





Recreational Use

- Large natural log jam just downstream of the project site makes the reach unsafe for boating. Warning signage has been installed upstream at the WDFW boat ramp take-out.
- 2013 Recreational Use Study shows 167 users (average 2.7/day) during 2013 boating season at the WDFW Boat Ramp upstream of the Project reach.
- The vast majority are taking out at the WDFW Boat launch upstream of the project site.
- Site is well used by anglers fishing from the banks.

Recreational Use



Function of Large Wood in Project Design

Wood structure will be located outside of main channel, but will interact with high flows, cause local scour to help maintain connection with side channel and wetland.





04/19/2015

© 2015 Pictometry



Project Schedule

- Still in conceptual design;
- 30% design and Large Wood Public Comment process likely this summer;
- Construction in Summer, 2017



Auburn Narrows Road and Revetment Removal

Project Manager: Laird O'Rollins

206-477-4790

Laird.orollins@kingcounty.gov

Lower Russell Road Levee Setback Project

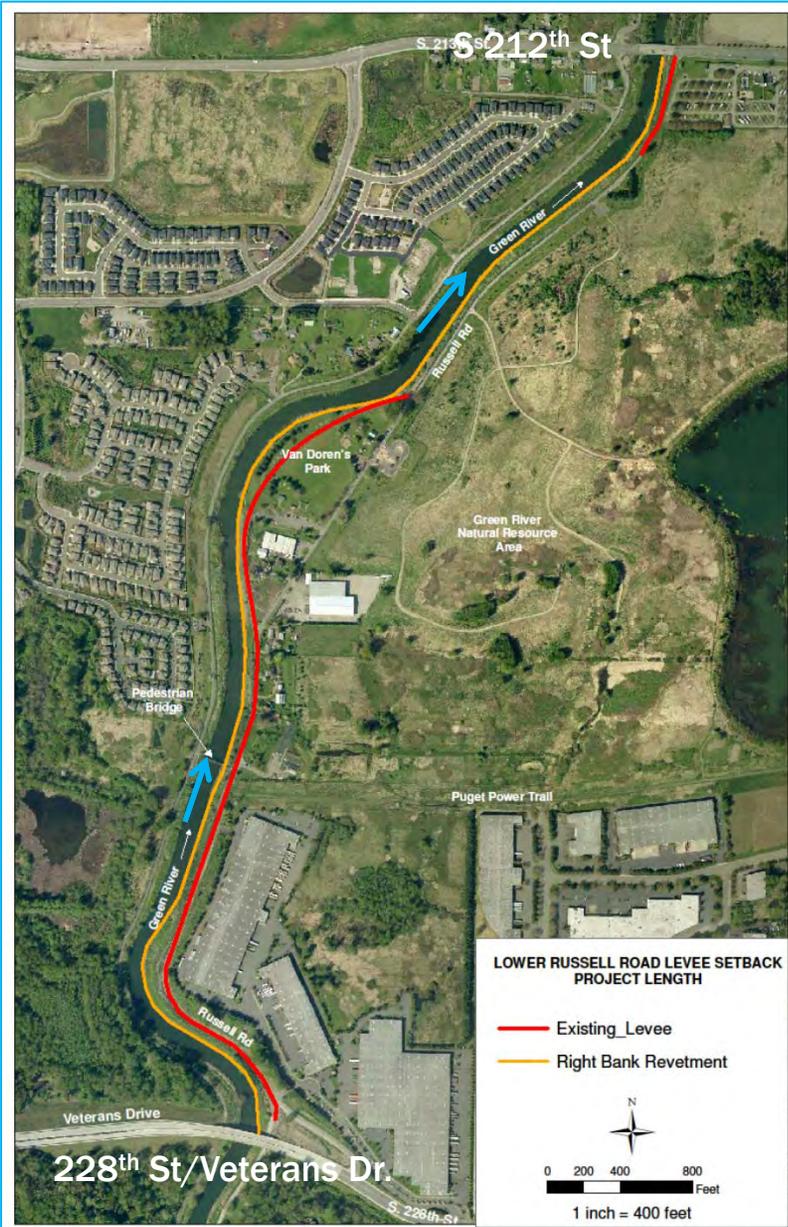


Briefing for Large Wood Meeting

June 8, 2016

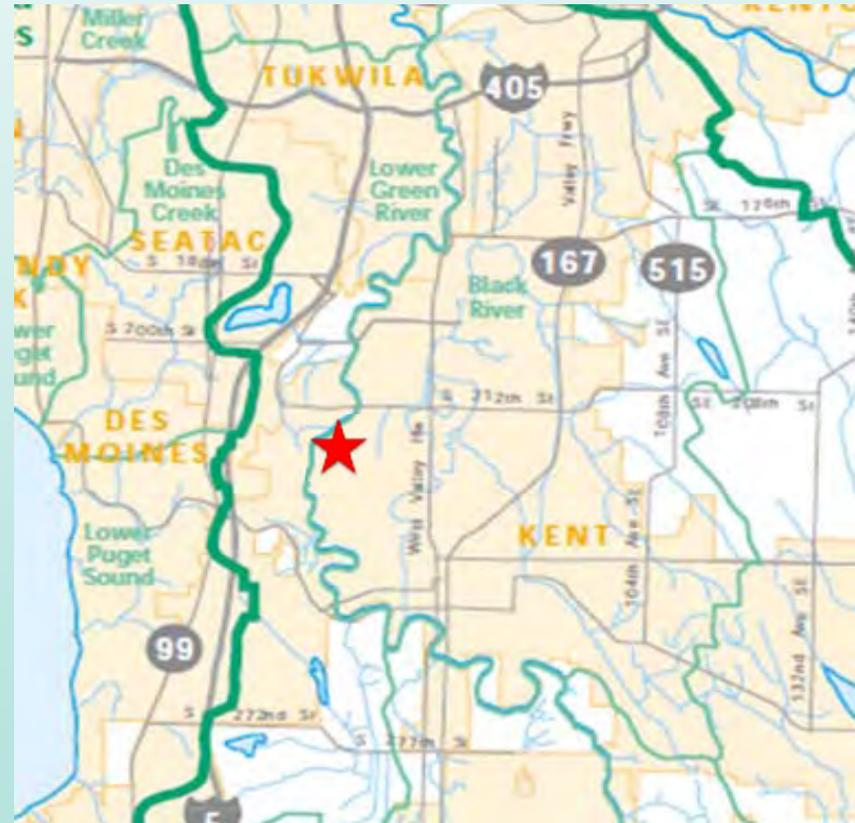
Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section

Lower Russell Rd Levee Setback Project



Location: City of Kent – Right Bank Green River between River Mile 17.85 (S. 212th St) and RM 19.25 (S. 228th St)

Need: Existing system of levees and revetments do not meet current engineering standards - risk for flooding.



Lower Green River Recreational Users

Table 7. 2013 Remote Camera Results - Green River.

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Total Vessels Counted	2,016	2,103	131	4,250
Rafts	281 (13.9%)	526 (25.0%)	12 (9.2%)	819 (19.3%)
Canoes	29 (1.4%)	49 (2.3%)	14 (10.7%)	92 (2.2%)
Kayaks	58 (2.9%)	103 (4.9%)	84 (64.1%)	245 (5.8%)
Inner tubes	1,556 (77.2%)	1,204 (57.3%)	8 (6.1%)	2,768 (65.1%)
Other	92 (4.6%)	221 (10.5%)	13 (9.9%)	326 (7.7%)
Vessels with Paddles	283 (14.0%)	566 (26.9%)	112 (85.5%)	961 (22.6%)

Lower Russell Rd Levee Setback



Existing Riverbank



Constructed Floodplain Habitat
example - Reddington Levee Project

Project Goal: Construct a flood protection system that balances policy directives regarding flood protection (e.g., flow containment, scour protection, stability, and vegetation maintenance), habitat restoration, and recreational use.

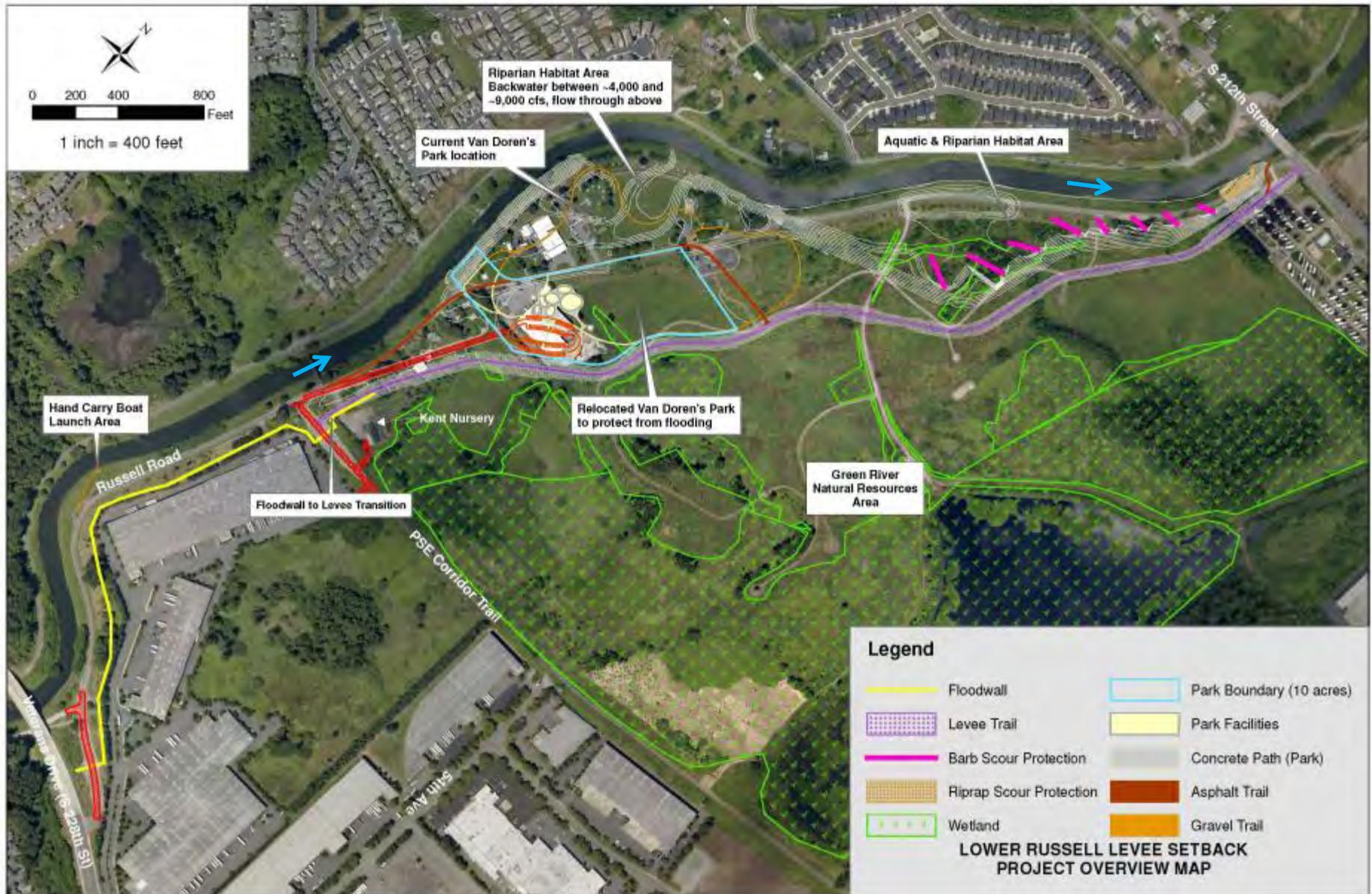
Project Elements:

- 5,000 linear feet of setback levee
- 2,800 linear feet of floodwall
- Relocation of Van Doren's Park and removal of Russell Rd north of park.
- Scour protection: Largely flow deflectors/barbs composed of rock and/or wood
- Large Wood: Log clusters and engineered log jams (ELJs)

Project Cost: \$43 Million total cost (30% design estimate assuming 2018 construction)

Project Funding:

- \$17.4 Million – Flood Control District
- \$4.9 Million – WA State Floodplains by Design grant funding



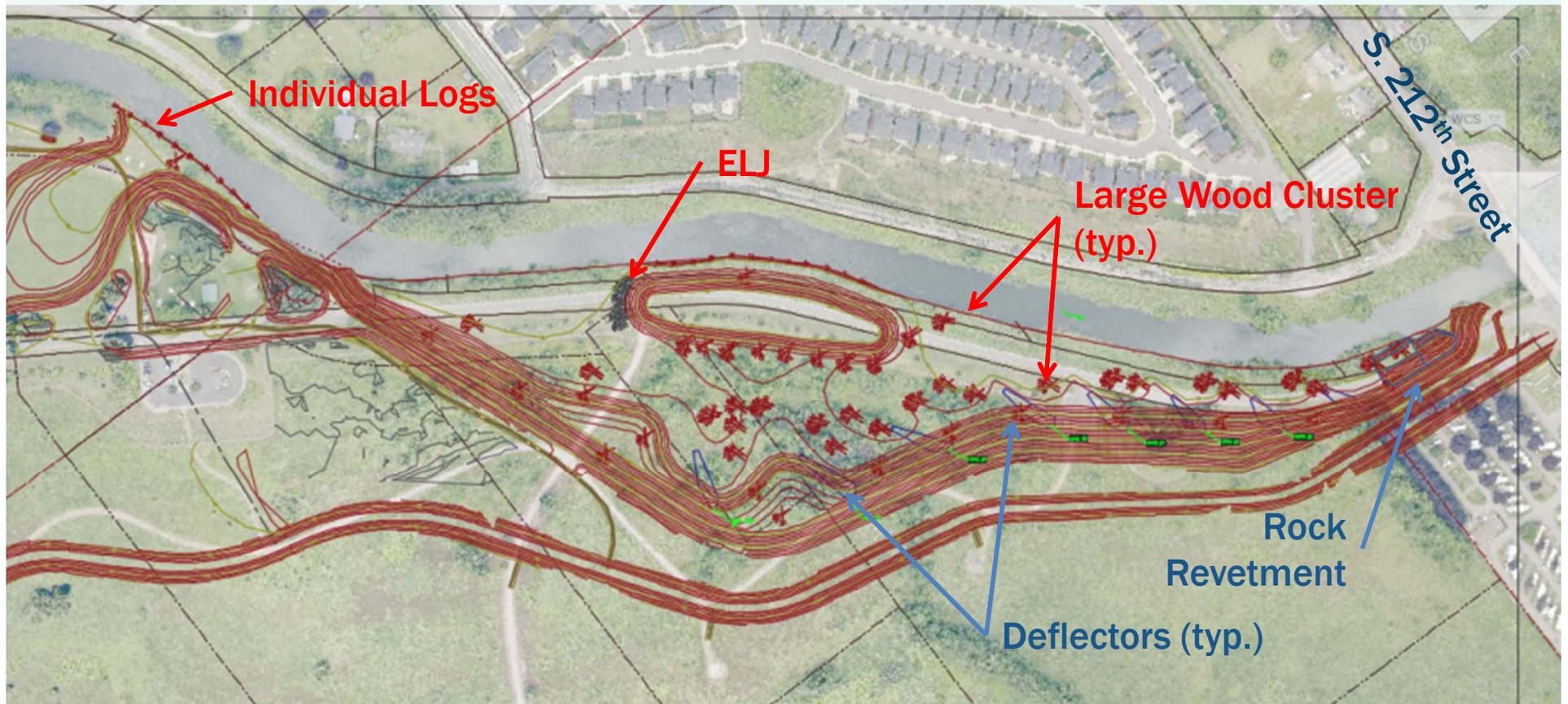
Flood Protection, Habitat Restoration and Recreation Enhancements

Lower Russell Rd Habitat Construction



- Construct 31 acres of floodplain rearing and refuge habitat for salmon
- Plant native trees to shade 5,900 linear feet of river
- Construct 50 large wood clusters (within constructed floodplain habitat)
- Install 44 individual logs along existing riverbank
- Install 1 pile supported ELJ (in front of constructed island)

Lower Russell Rd Levee Setback



30% Design Large Wood and Deflector Layout

Lower Russell Rd Levee - Timeline

- Project initiated – Jan. 2014
- Predesign (Aug 2014 – Jan 2016)
 - Selected alternative – August 2015
 - 30% design – January 2016
- Design (May 2016 to Dec 2017)
- Complete Instream Project Design Checklist and solicit public comments – by early July, 2016
- Construction (April 2018 to June 2019)

Questions?

Additional Project Information:

- Search for project web page within www.kingcounty.gov
- Project Manager: Erik Peters
(206) 477-4797
Erik.Peters@KingCounty.gov



Open House



Q



A

Project Managers and Presenters are available to answer questions in an informal setting.