

Large Wood in King County Projects

Nancy Faegenburg, Meeting Facilitator

Mercer Island Community and Event Center
June 7, 2017

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
- Cedar River Natural Wood Update
- River Safety in the Schools
- Project Presentations
- 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

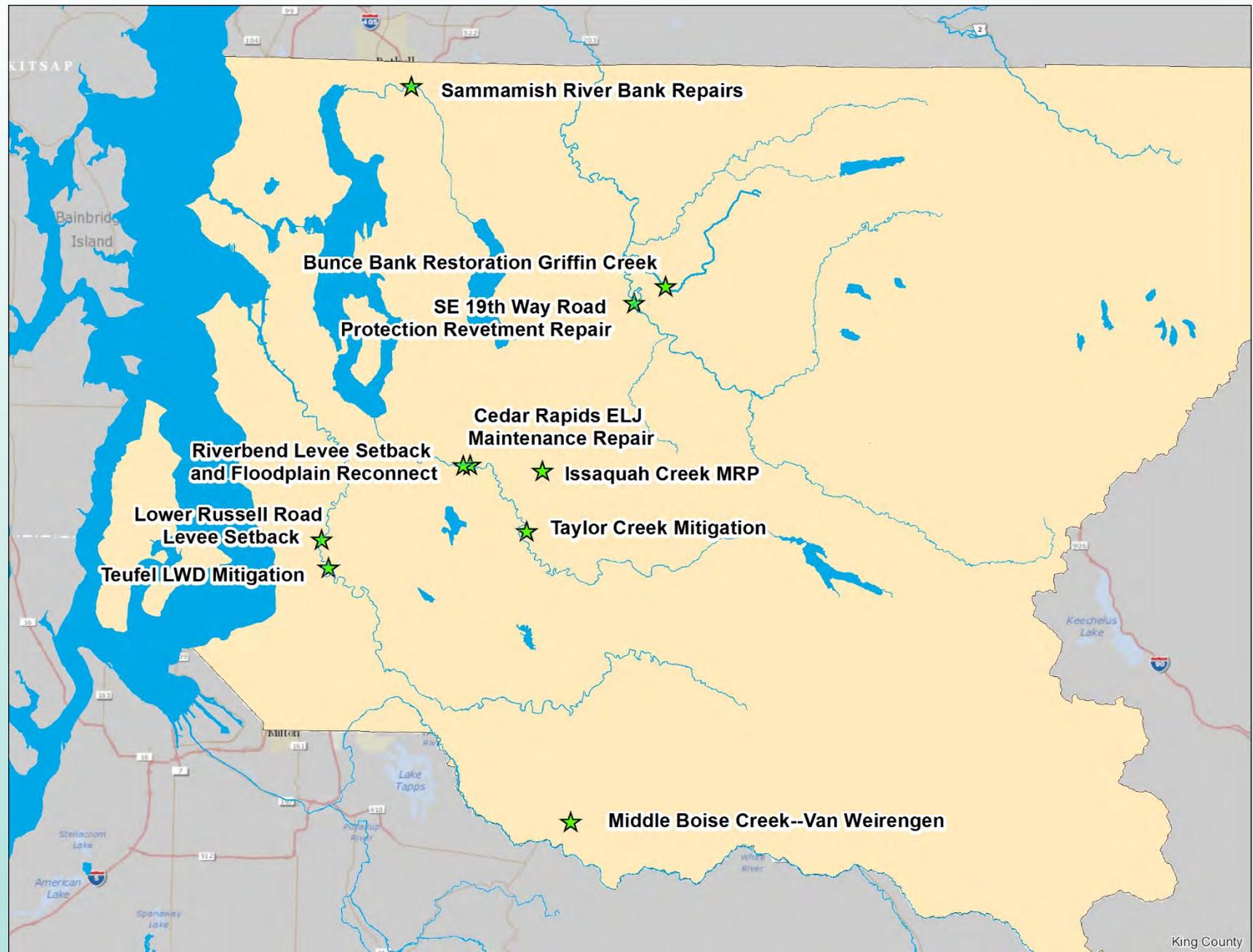
- **King County Ordinance, Public Rule and DNRP Procedures for Placed Wood (2010)**
 - Consider public safety in project design
 - Seek public input during design
 - Annual meetings
 - 30% design
 - 60% design
- **Applies to all KC projects that place wood or where natural wood is likely to deposit**

Website: www.kingcounty.gov/rivers

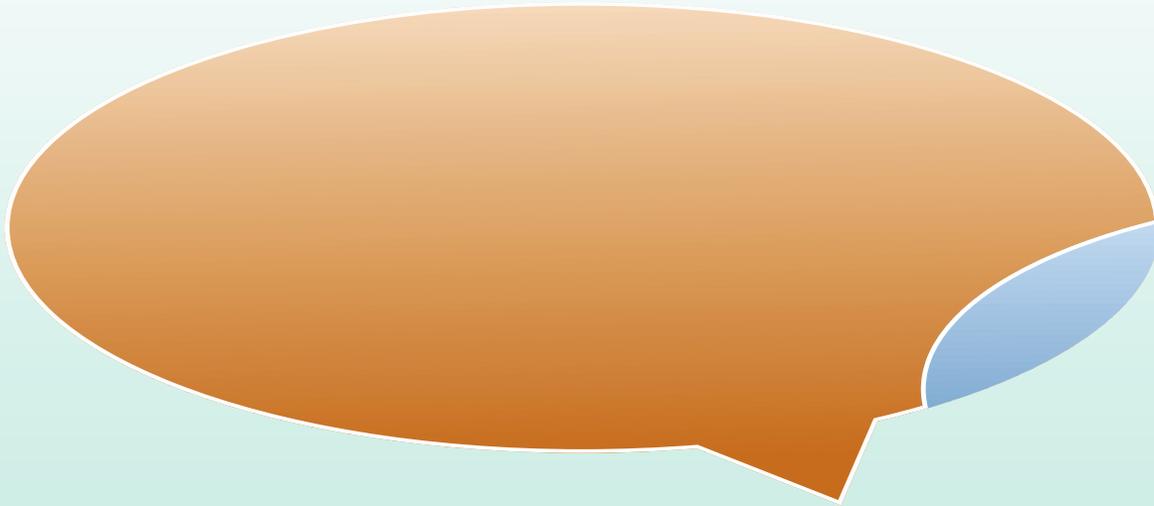
Complementary Elements

- **Outreach**
 - Annual safety awareness campaign
 - River Safety Programs in the Schools
- **Manage project sites**
 - Repairs and modifications
 - Independent review
- **Respond to concerns about natural wood**
 - Modify wood, signage, and close unsafe sections
 - Website describing projects, known hazards, and river safety tips

Project Locations



Questions?



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

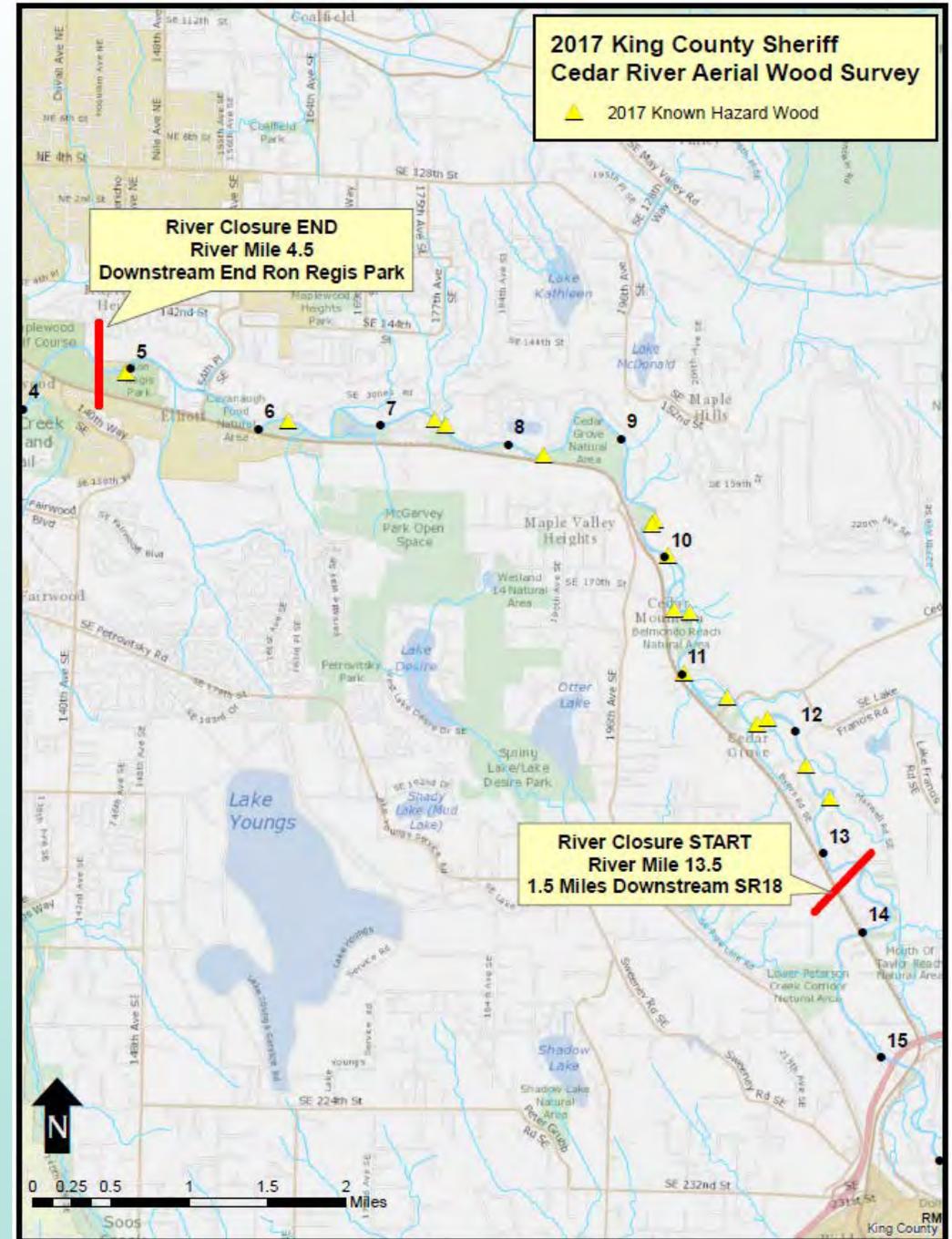
Naturally Occurring Large Wood Cedar River, 2017

Kate Akyuz, Environmental Scientist

June 7, 2017

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

2017 Known Naturally Occurring Wood Hazards



RM 5.0 - Ron Regis



RM 6.3 - Camp Freeman



RM 7.4 – Cedar Rapids Downstream Log Jam



RM 7.6 – Cedar Rapids Upstream Double Spanner



RM 9.7 - Cummins



RM 10.6 – Above Belmondo



RM 11.0 – Cedar Trail 6



RM 11.7 – Lion's Camp Downstream



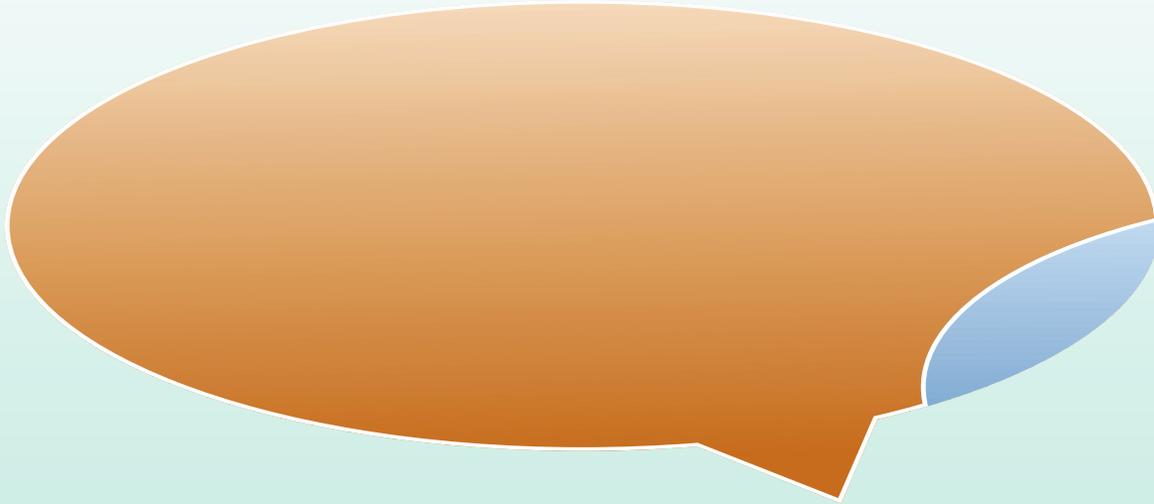
RM 11.7 – Lion's Camp Upstream



RM 12.6 – Byer's Bend



Questions?



Kate Akyuz, Environmental Scientist
(206) 265-0525
kate.akyuz@kingcounty.gov
www.kingcounty.gov/rivers

Welcome to the River Safety Road Show

**Reaching 1,800 students in schools near King
County rivers**









Learn to swim



Look and listen



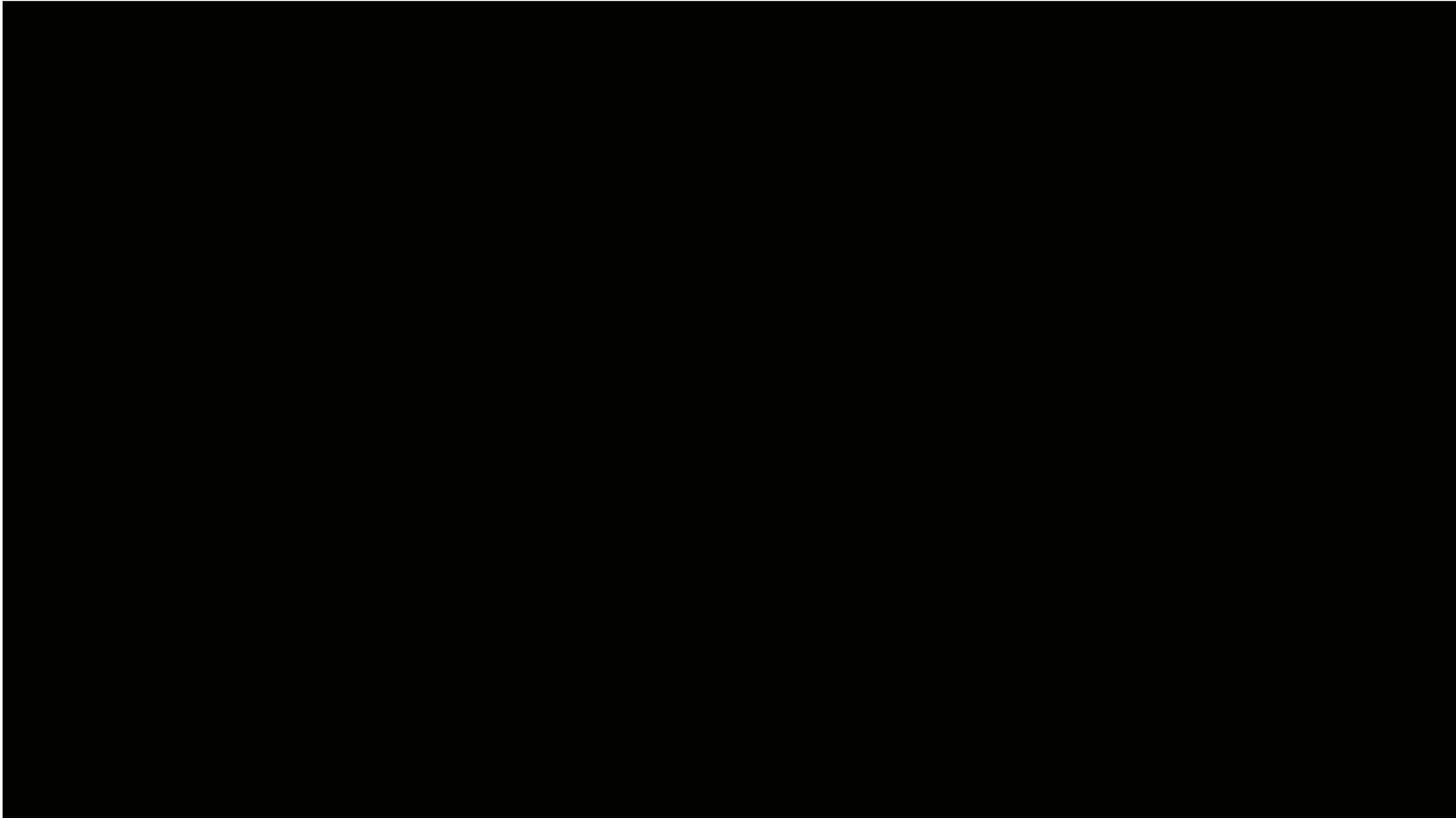
Ask a grown up



Wear a life jacket



What do you think Marta's favorite fashion accessory is?





Stay safe this summer. Wear a
lifejacket. Thank you.

www.martathriverotter.org

Presented by

Marie Trigona

Online Public Engagement Specialist

DNRP, King County

marie.trigona@kingcounty.gov



Snoqualmie River Basin Projects

SE 19th Way Road Protection Revetment Repair Project

Mary Lear, Project Manager

June 7, 2017

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

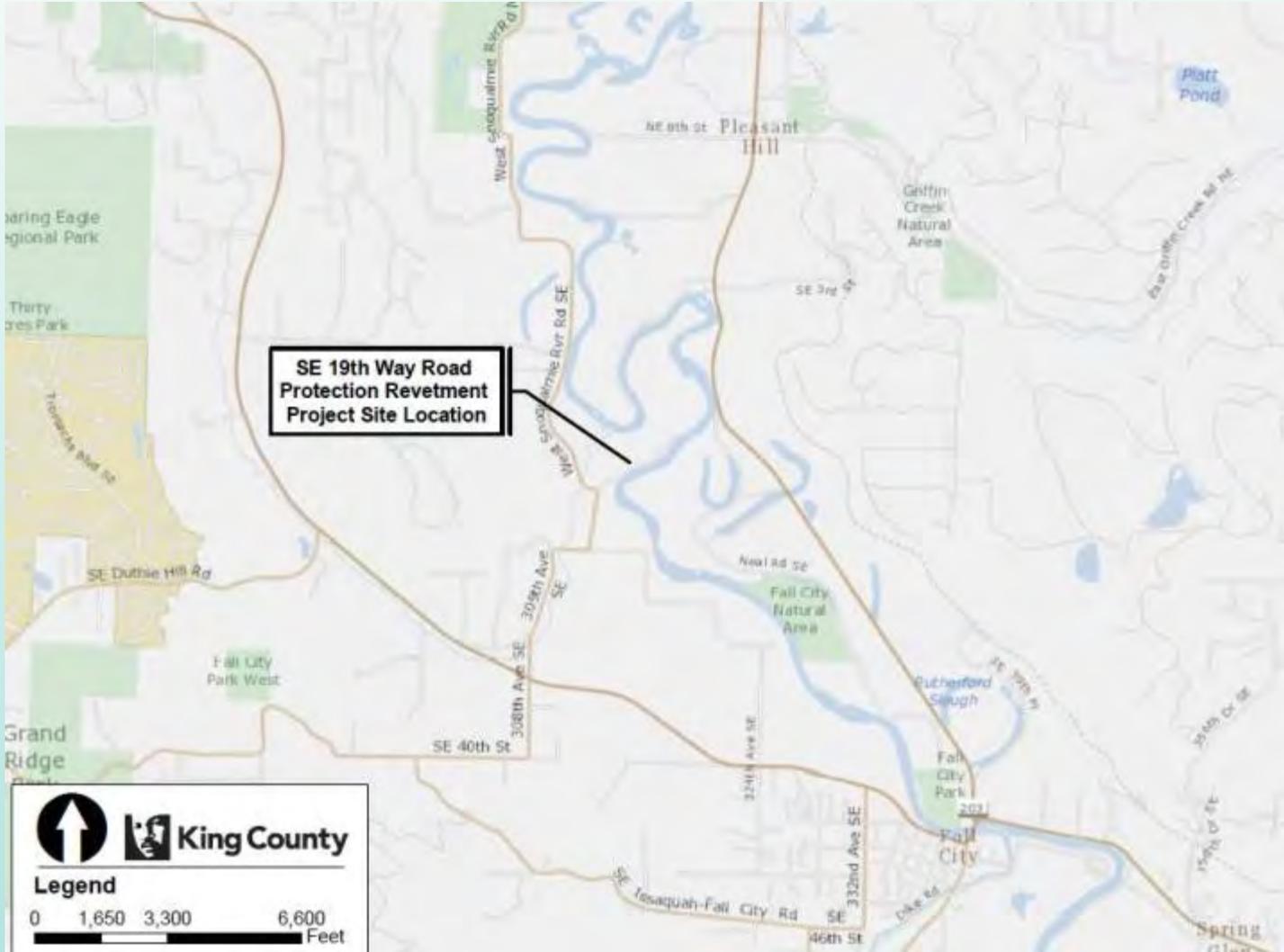


King County



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Project Location



Project Objectives

- Repair damages and improve stability of revetment
- Reduce impacts of overtopping of SE 19th Way
- Design project for long term solution
- Provide aquatic and riparian habitat benefits
- Preserve agricultural practices on the properties adjacent to the revetment

Project Timeline

- **30% design complete – Summer 2017**
- **90% design complete – Fall 2017**
- **Revetment repair construction – Summer 2018**

Project Description

- **Repair 200 feet of revetment**
 - Rock to be placed along the toe of the revetment
 - Top portion of the revetment to be vegetated with native plants
 - No large wood incorporated in revetment repair
 - Relocate large wood on site

Large Wood at Project Site



Large Wood At Project Site



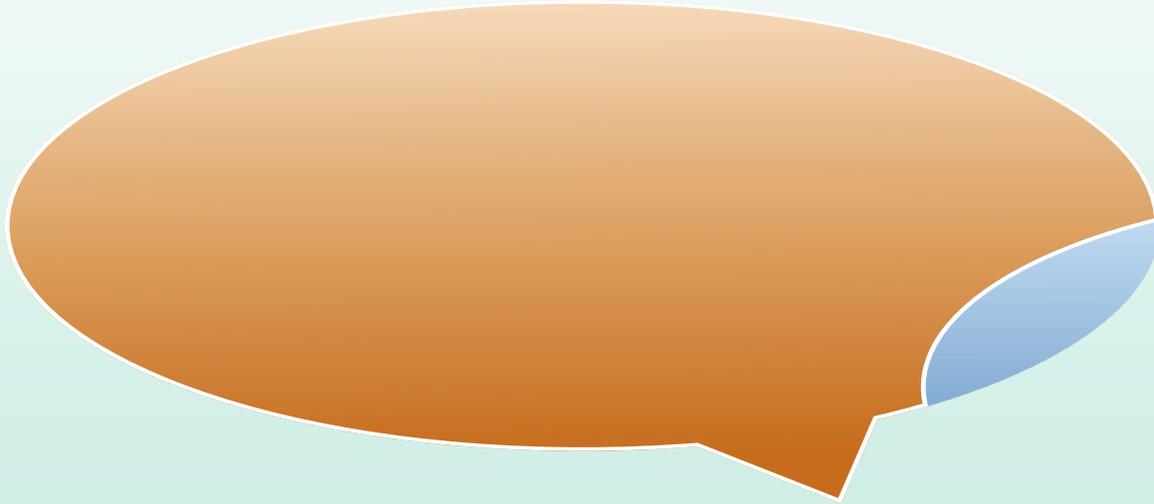
Large Wood At Project Site



Large Wood Proposal

- Remove large wood at start of repair
- Replace large wood at completion of repair

Questions?



Mary Lear, Project Manager
206-477-4749
mary.lear@kingcounty.gov
www.kingcounty.gov/rivers

An aerial photograph showing a wide, winding river with light-colored sandbars and rapids, cutting through a dense, green forest. In the upper right corner, a small residential area with several houses is visible. The text "Cedar River / WRIA 8 Projects" is overlaid in white, bold font across the center of the image.

Cedar River / WRIA 8 Projects

Sammamish River Bank Repairs Project

Dan Heckendorf, Project Manager

June 7, 2017

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

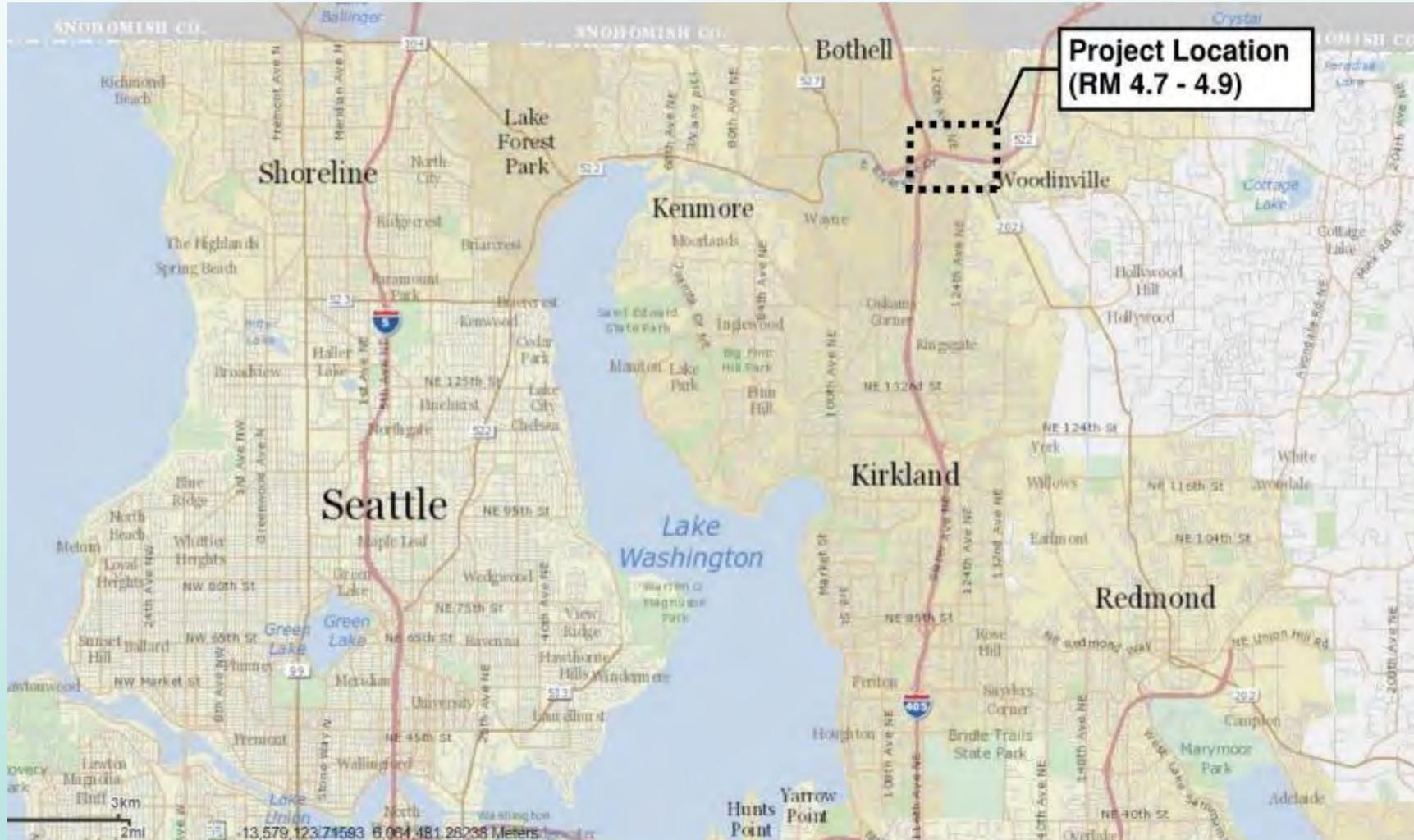


King County



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Vicinity Map



Site Map



Existing Site Conditions



West Site



East Site

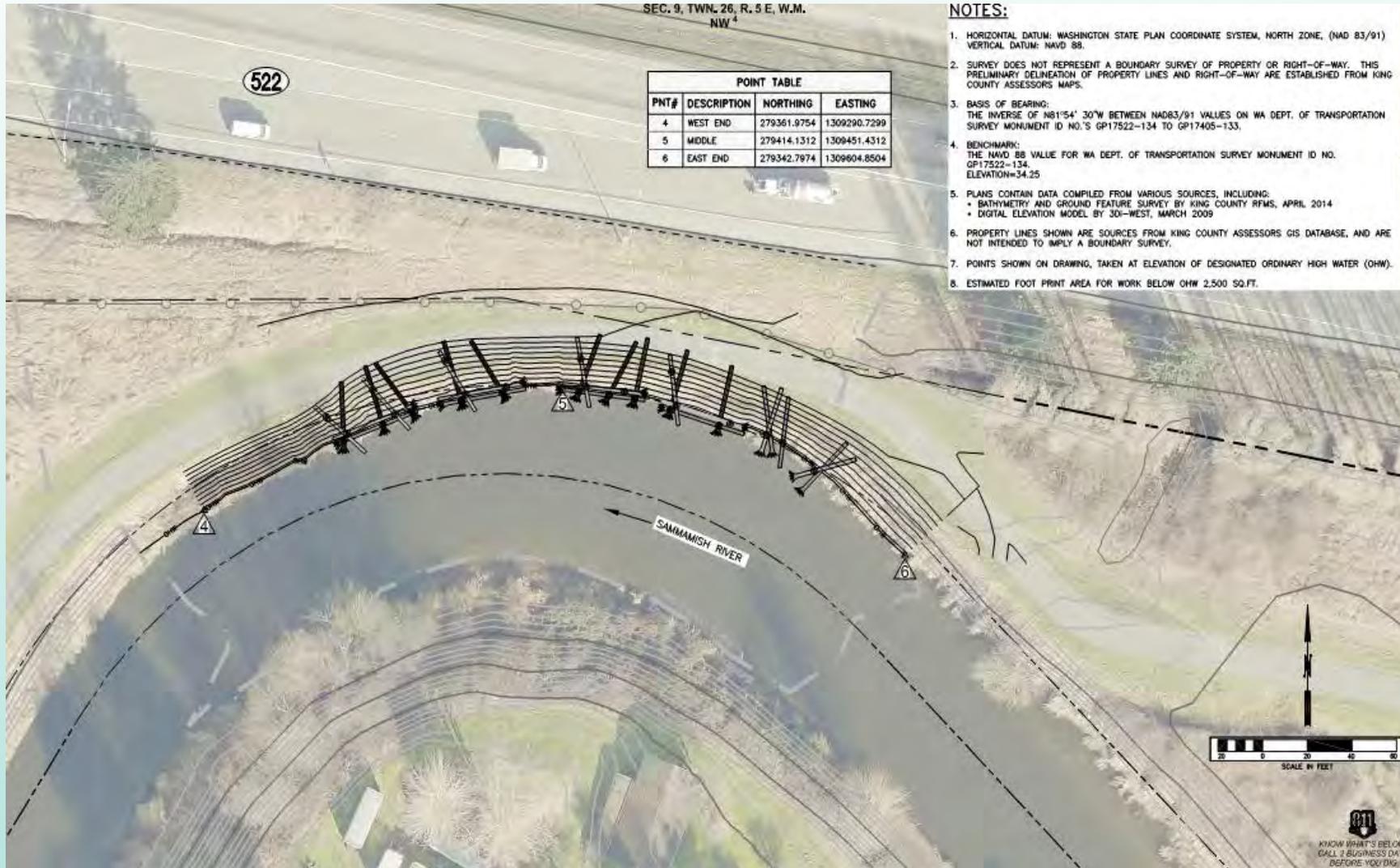
Project Purpose

Stabilize the levee bank in the locations of identified failure

Goals & Objectives

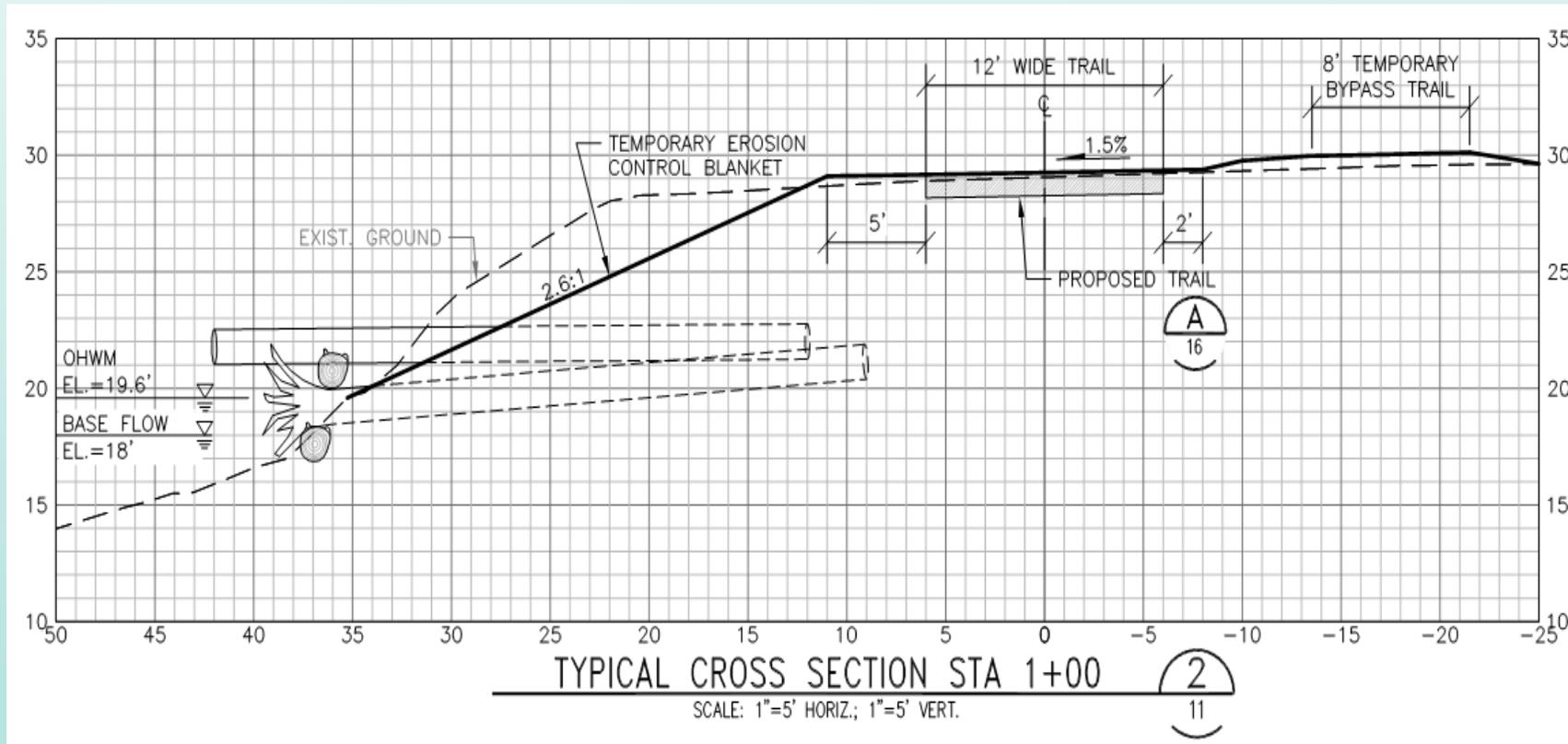
- Reduce risks to trail users
- Maintain the Federal (USACE) Flood Control Facility (levee) in accordance with the existing Operations and Maintenance Agreement

Project Description



Intended Function of Large Wood

- Toe protection
- Roughen bank
- Flow deflection



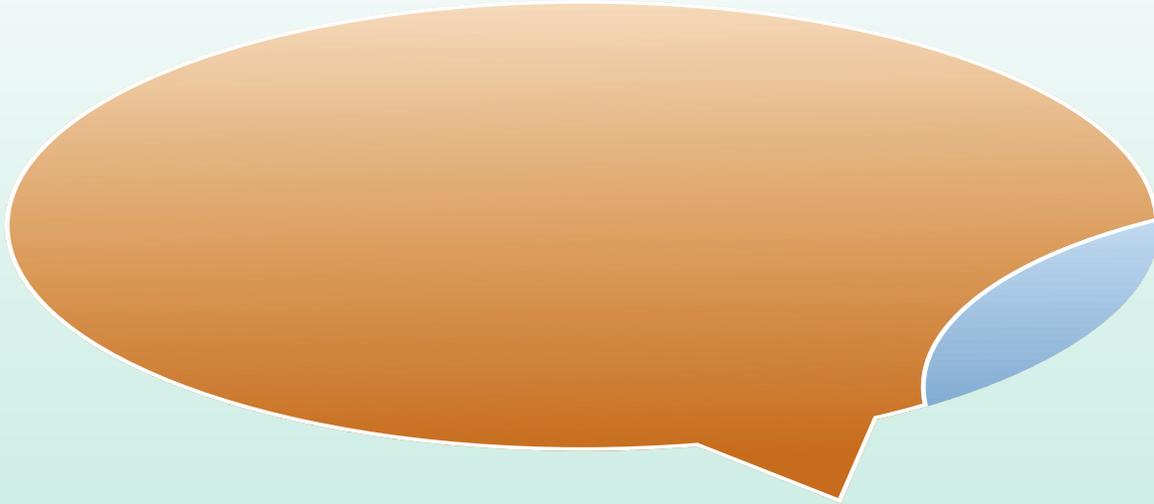
Recreational Use



Project Schedule

Large Wood Checklist posted at 30% design and request for comments	May 2017
Large Wood Checklist posted at 60% design and request for comments	July 2017
Complete design	Fall 2017
Construction	Summer 2018

Questions?



Dan Heckendorf, Project Manager
Rivers and Floodplain Management Section
206-477-8459
dan.heckendorf@KingCounty.gov
www.kingcounty.gov/rivers

Riverbend Levee Setback and Floodplain Restoration

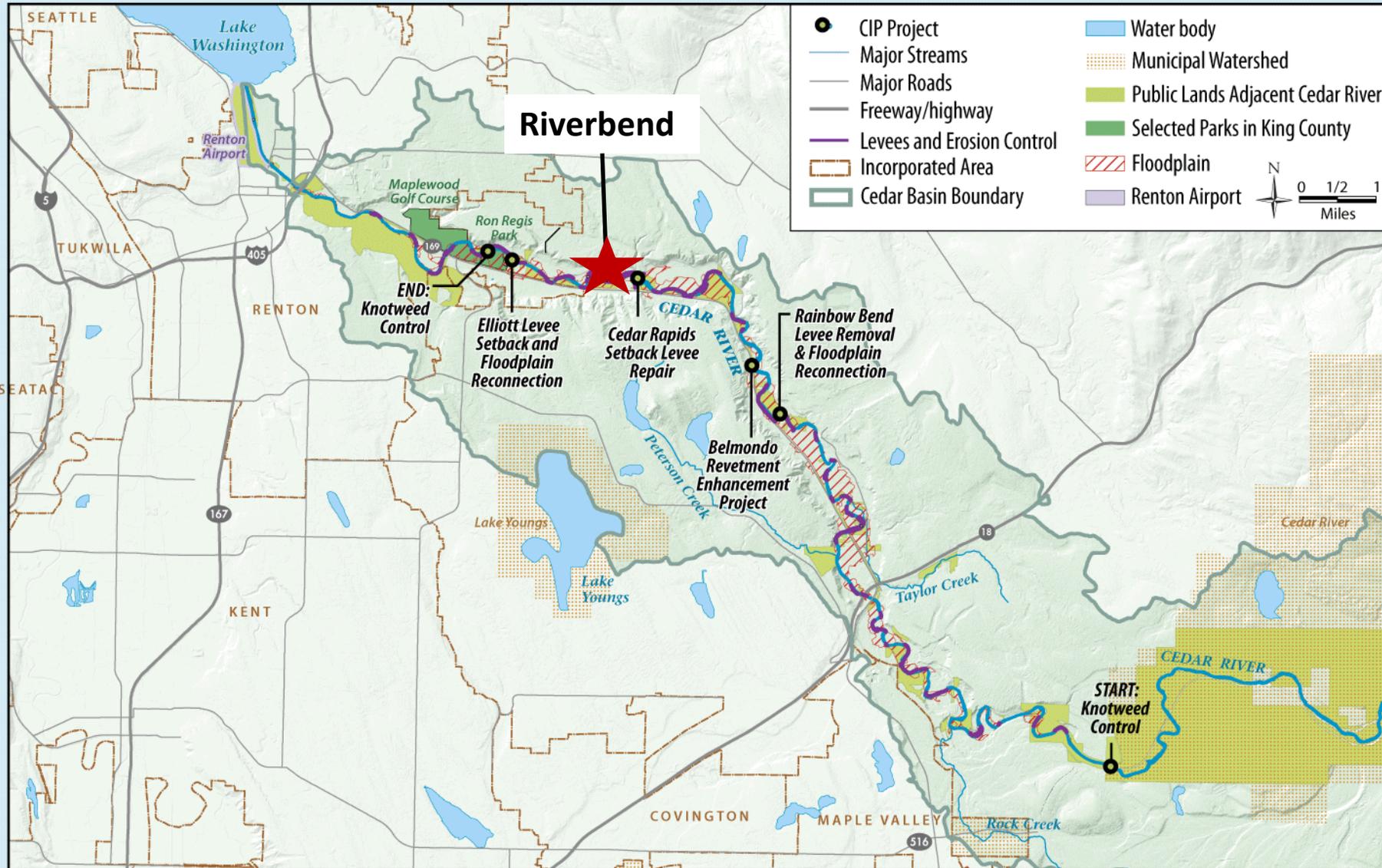
Sarah McCarthy, Senior Ecologist

June 7, 2017

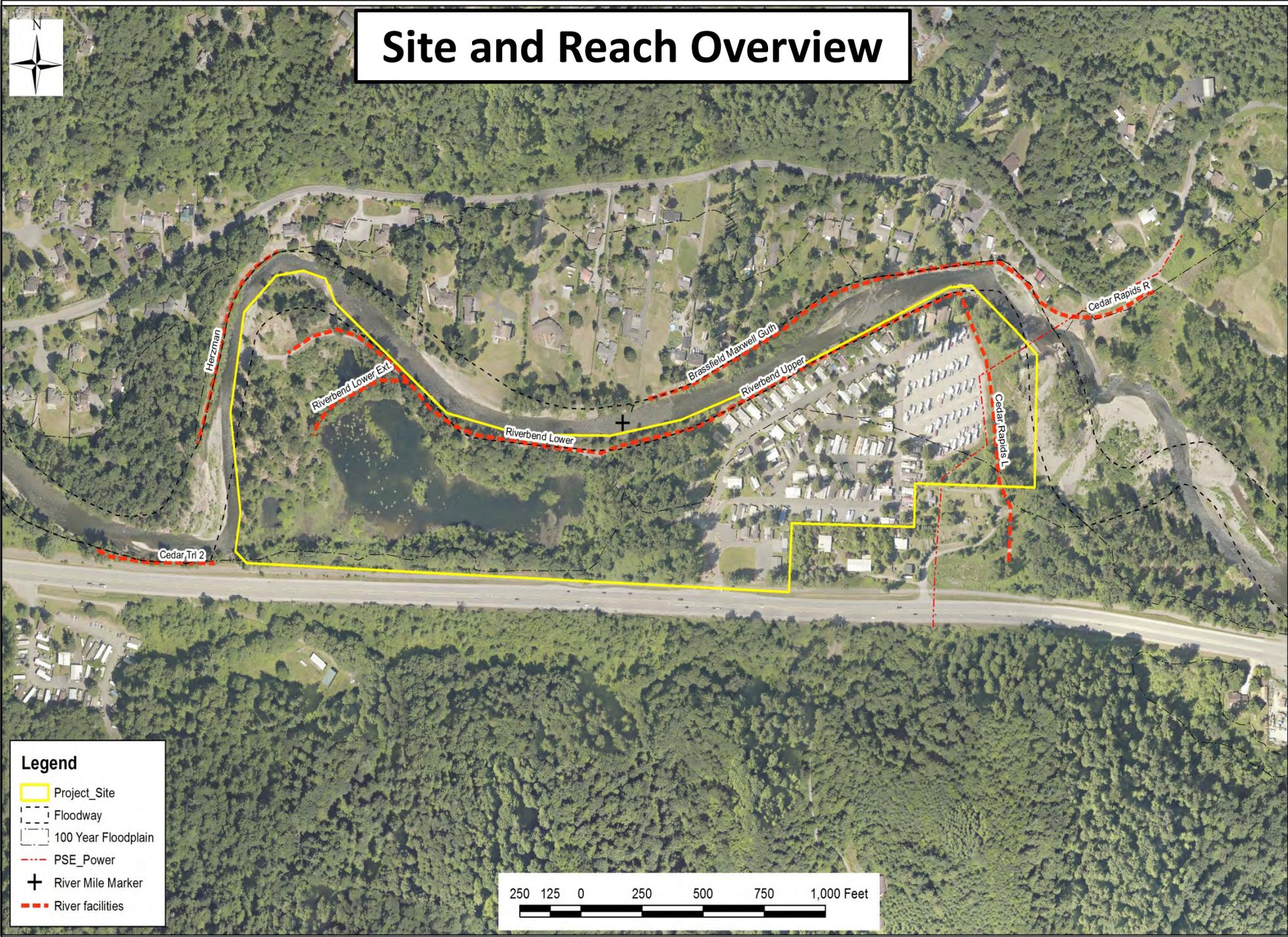
**Department of Natural Resources and Parks
Water and Land Resources Division
Rural and Regional Services Section**



Riverbend Levee Setback and Floodplain Restoration

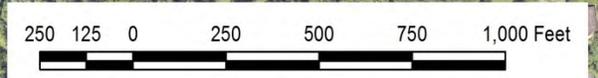


Site and Reach Overview



Legend

- Project_Site
- Floodway
- 100 Year Floodplain
- PSE_Power
- River Mile Marker
- River facilities



Recreational Use

2013 Data

~3,700 Cedar River floaters

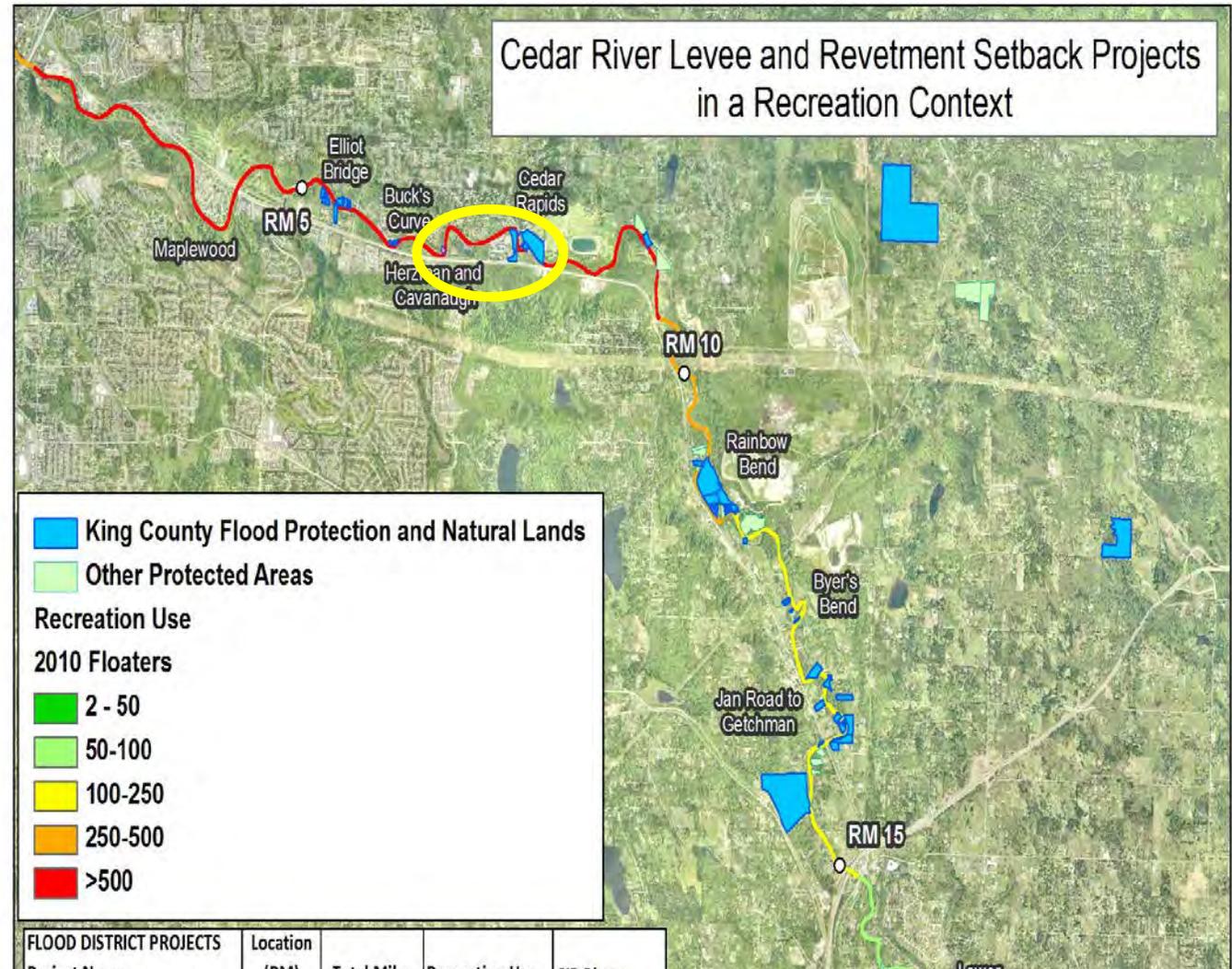
~1,900 in Ricardi Reach

78% Inner tubes

15% Rafts

5% Kayaks

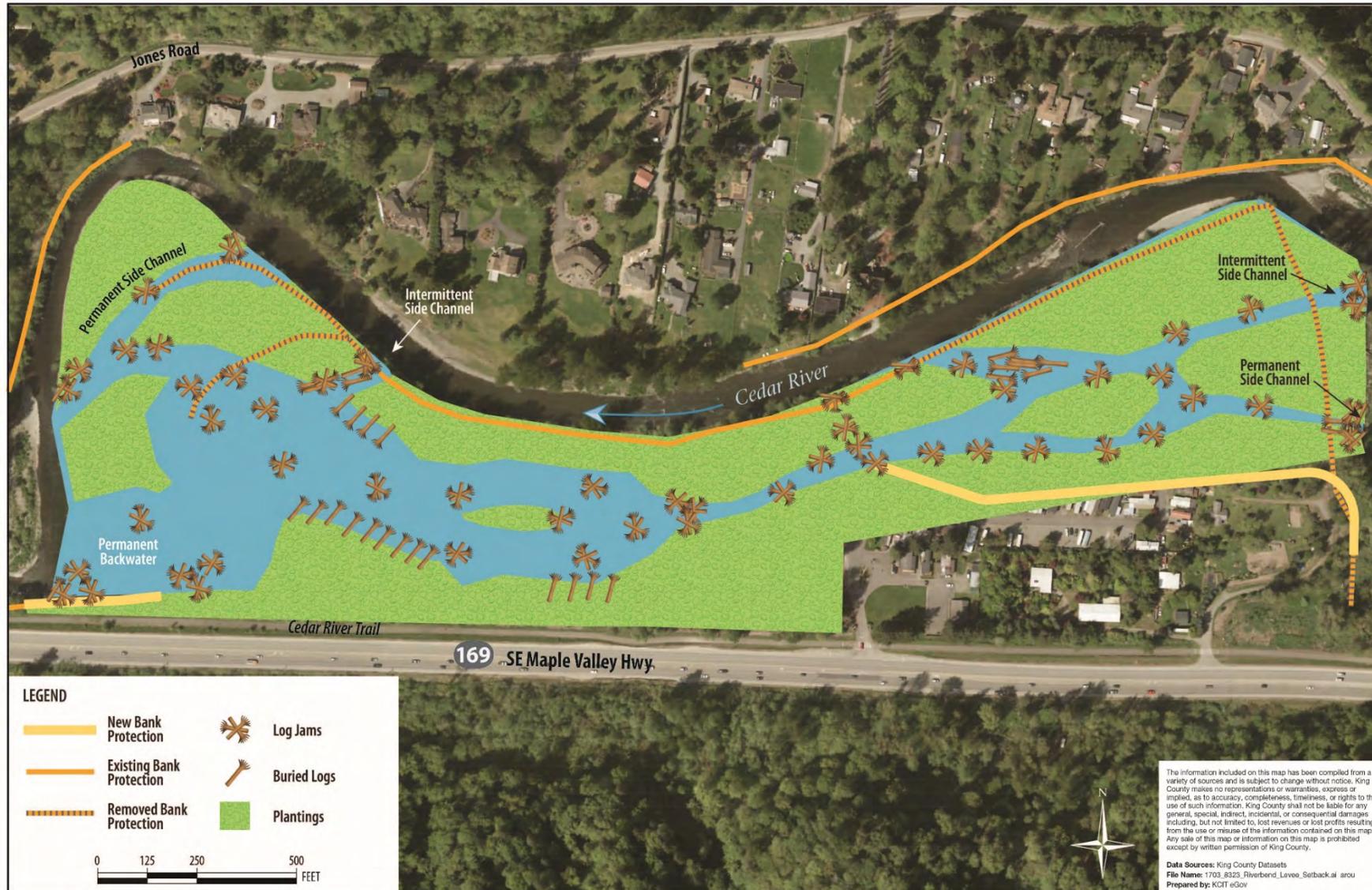
~13% Wearing Life vests



Project Goals

- *Improve quality, quantity and sustainability of salmonid spawning and rearing habitat*
- *Reduce flood and erosion risks to people, property and infrastructure*
- *Accommodate public use consistent with future ecological conditions on site*
- *Balance flood and ecological benefits and other objectives with project costs*

Preliminary Design Features



Large Wood Proposed

- **Preliminary estimates 450-600 logs**
 - All located in the floodplain
 - Majority placed in jams/clusters
 - Anchoring not yet designed, but majority stabilized with rock and soil ballast
 - A few may require piles for greater stability
- **In newly created channels to:**
 - Stabilize inlets and restrict/meter flow
 - Restrict channel expansion and headcutting
 - Increase complexity, roughness and provide cover and stability
- **In floodplain to increase roughness, dissipate energy and trap wood and sediment**

Schedule

- **June 2015 – Project Initiation**
- **2015 -2016 – Data Collection and Analysis**
- **Spring 2017 – Preliminary Design**
 - Large Wood Checklist ~ June 23, 2017
- **Winter 2017 – 60% Plans and Specifications**
- **Winter 2018 – Final Plans Complete**
- **Summer 2019 – Construction Target**

Contact Information

Jon Hansen, Project Manager

jon.hansen@kingcounty.gov

206-477-4706

Project webpage:

<http://www.kingcounty.gov/habitat-restoration-projects.aspx>



Cedar Rapids ELJ Maintenance Repair Project

Jay Smith, Project Manager

June 7, 2017

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

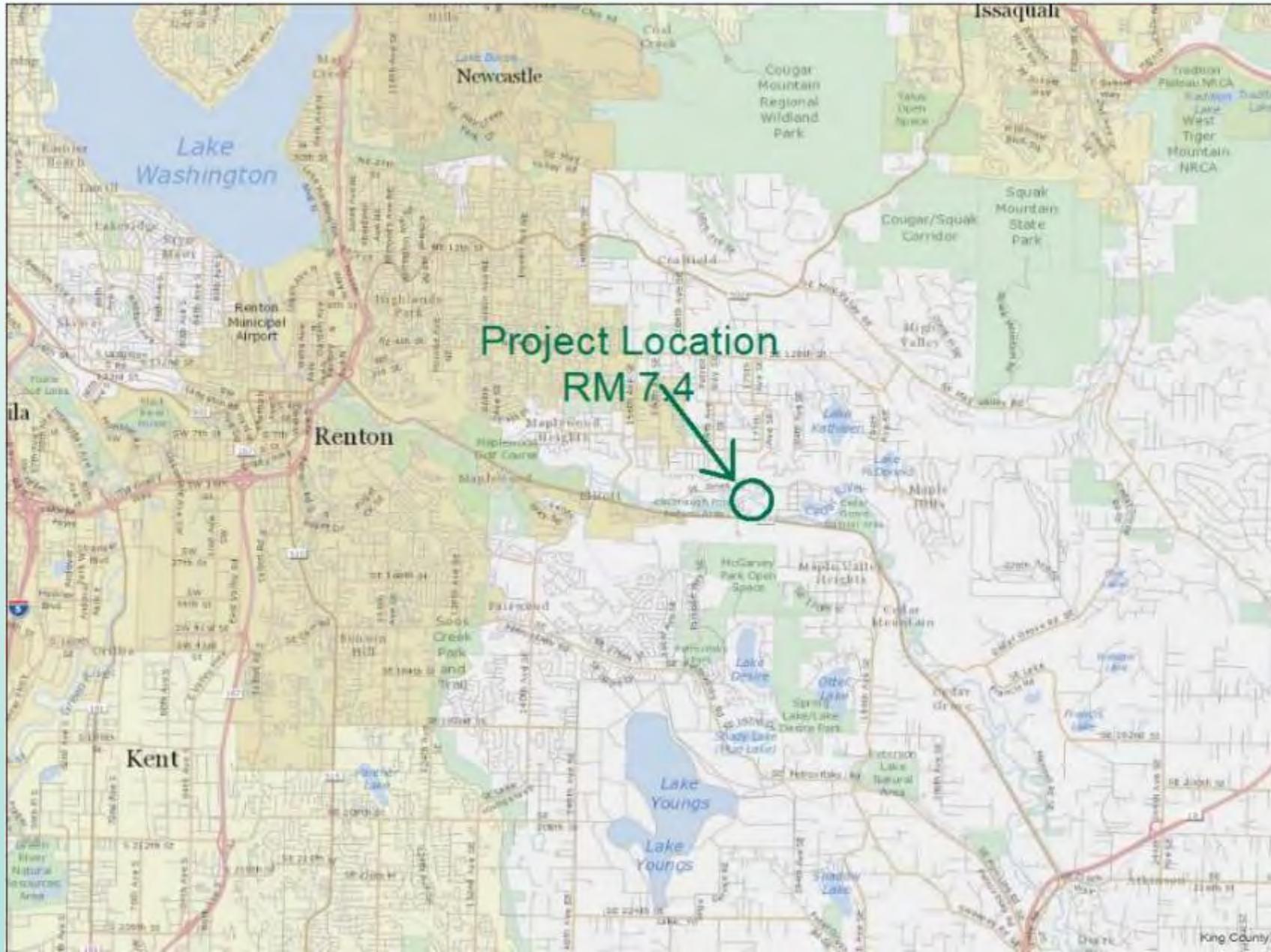


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Vicinity Map



Site Map



Project Purpose

Maintenance Repair of Engineered Log Jam (ELJ) 6
at Cedar Rapids Site

Goals & Objectives

- Reduce risks to pedestrians on floodplain
- Reduce risks to recreational boaters
- Restore ELJ to originally designed condition

While also:

- Maintaining current levels of erosion protection

2010 Site Conditions



2012 Site Conditions



Existing Site Conditions



$Q = 400 \text{ cfs}$

Photo Taken Looking Upstream

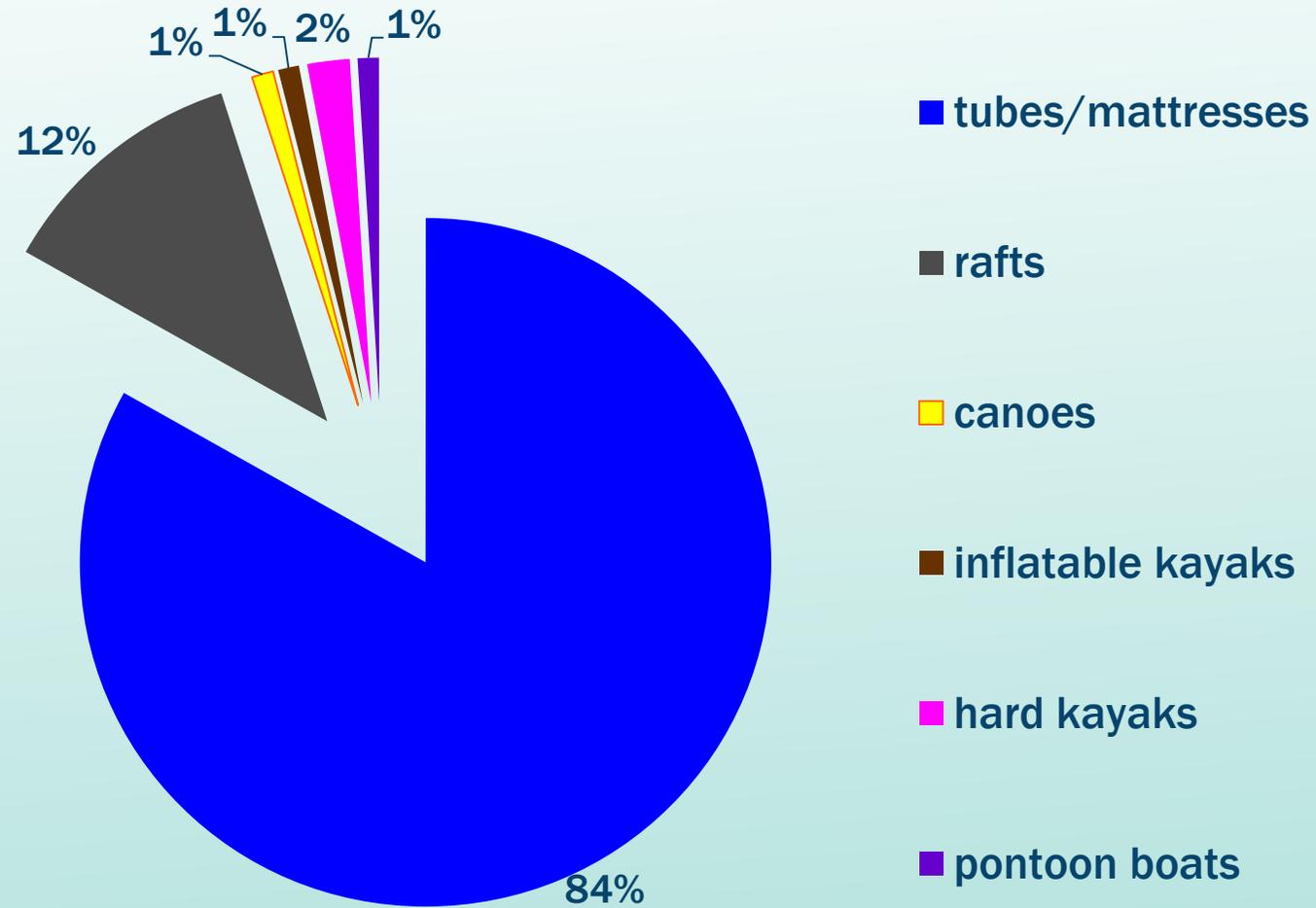
Existing Site Conditions



$Q = 1500$ cfs

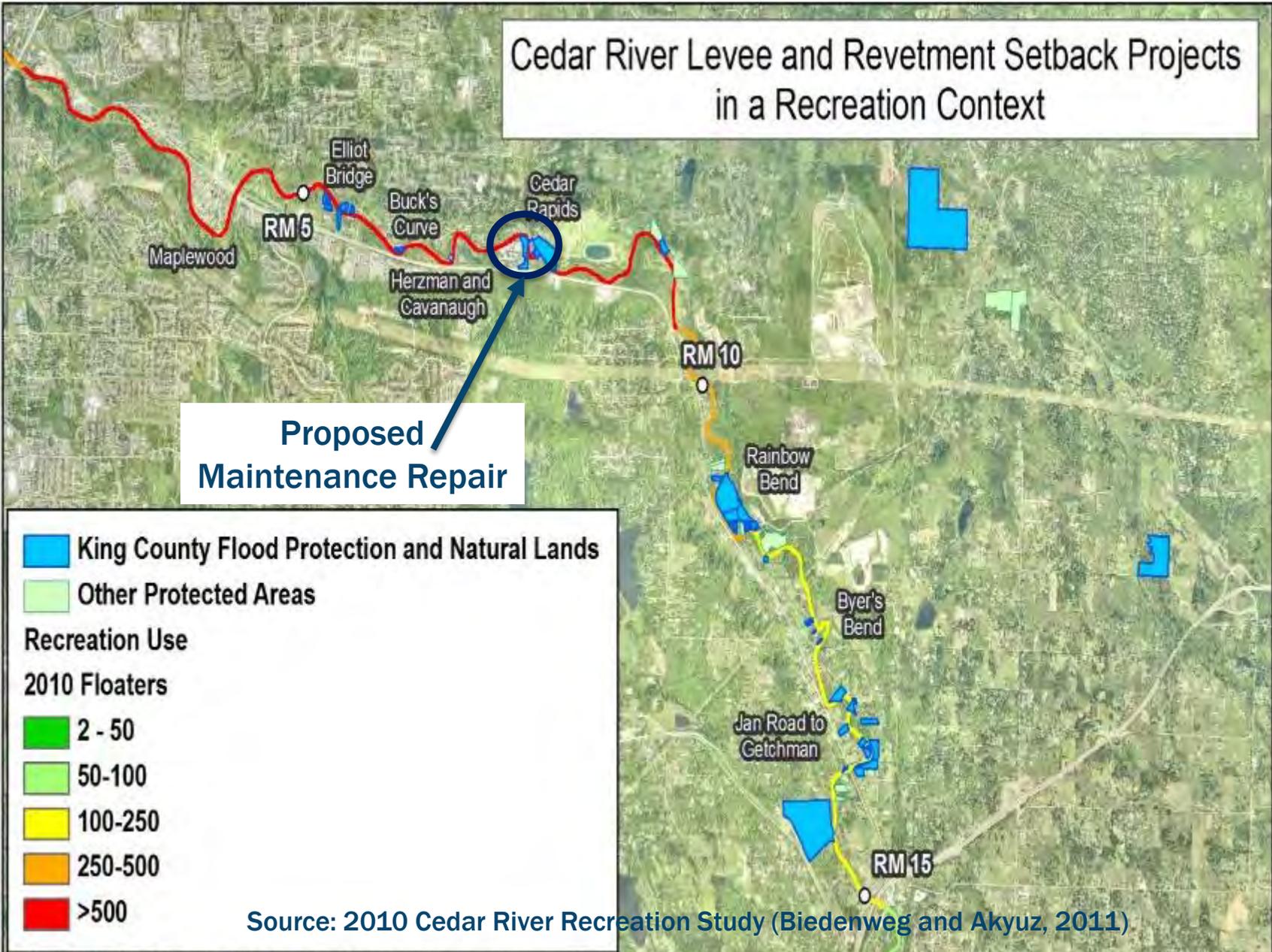


Types of Floating Vessels on the Cedar River



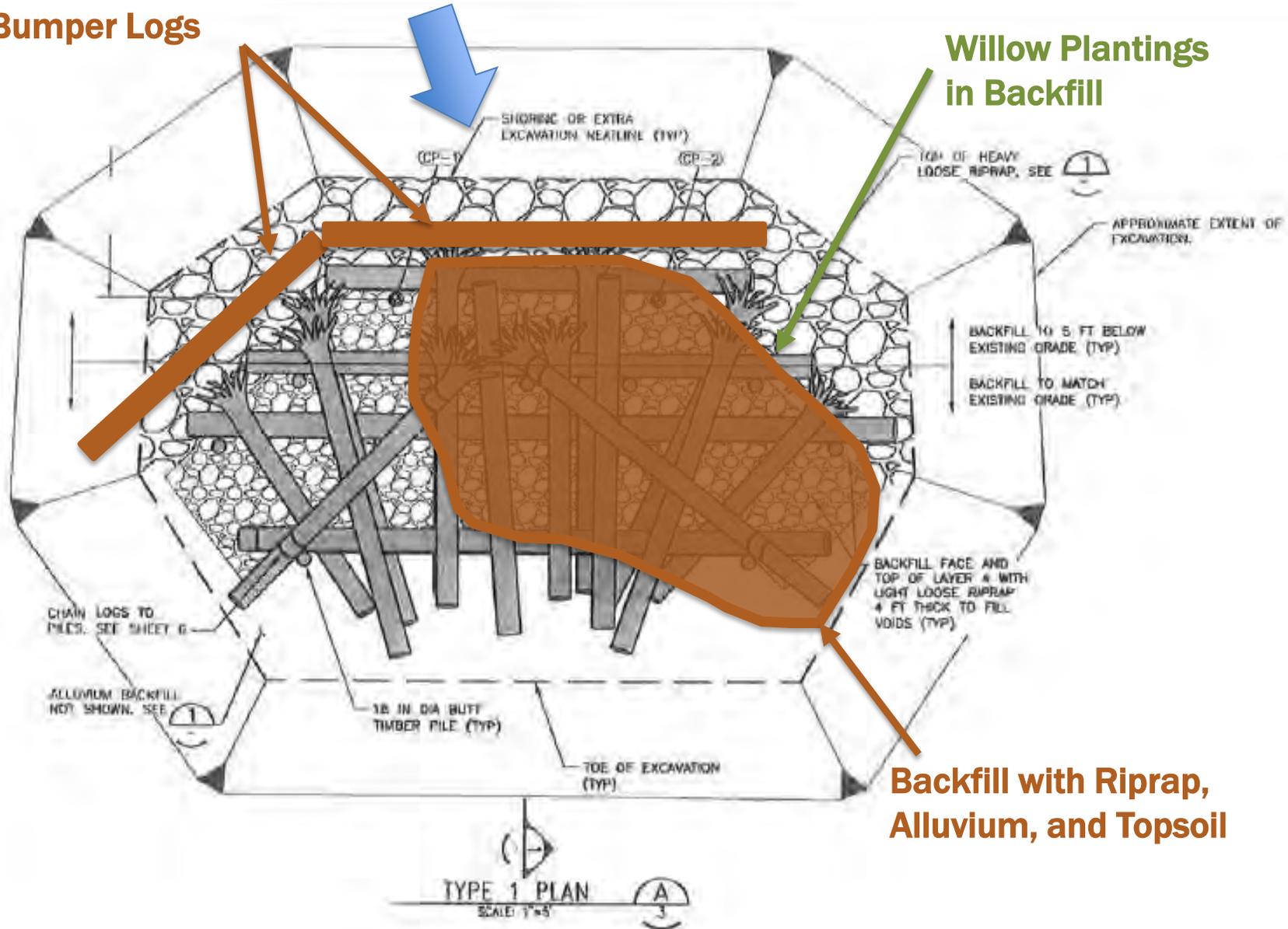
Source: 2010 Cedar River Recreation Study (Biedenweg and Akyuz, 2011)

Cedar River Recreational Use



Proposed Actions

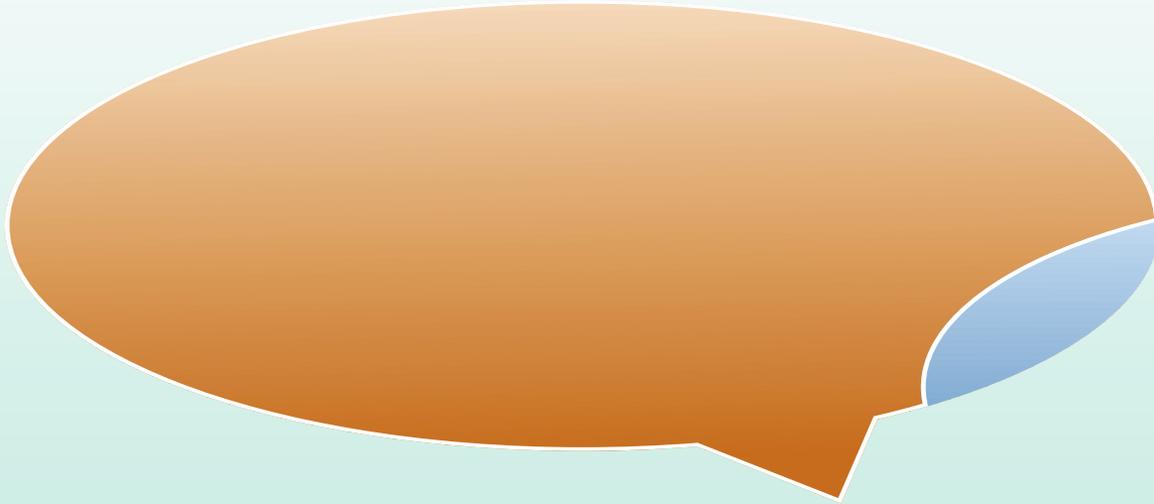
Bumper Logs



Project Schedule (2017)

February – April	Site Assessment and Alternatives Evaluation
May – June	Design
June – August	Permit
August	Construction

Questions?



Jay Smith, Project Manager
(206) 477-4356
jay.smith@kingcounty.gov
www.kingcounty.gov/rivers

<http://www.kingcounty.gov/depts/dnrp/wlr/sections-programs/river-floodplain-section/capital-projects/cedar-rapids.aspx>



Green River Basin Projects

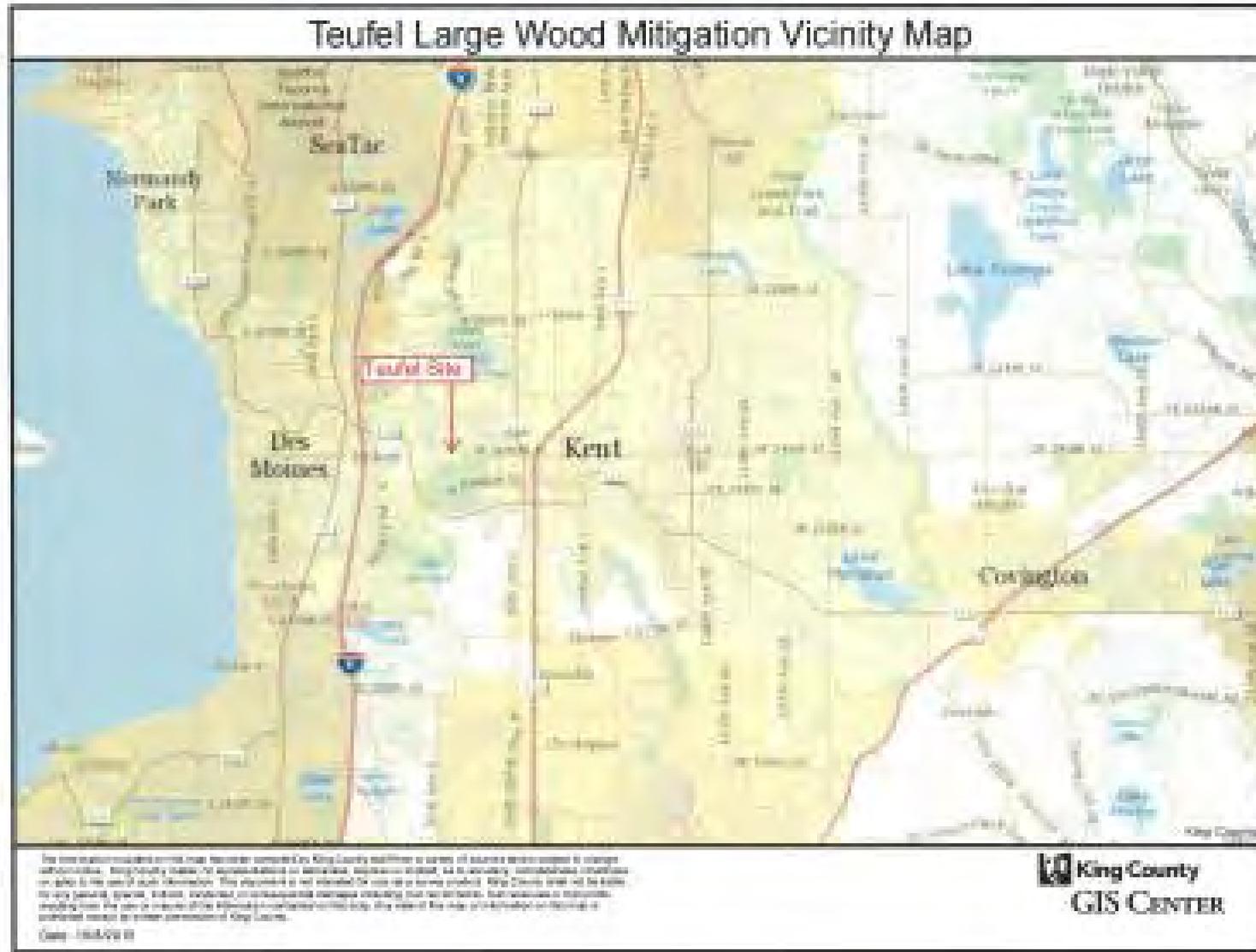
Teufel Nursery-Large Wood Mitigation

Fatin Kara, Green River Supervising Engineer
Jennifer Rice, Green River Coordinator

June 7, 2017

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

Project Location: Green River-Left Bank-River Mile 20.35



Vicinity Map

Project Purpose: mitigation for past tree cutting on Green River levees

- Place 85 logs in the Green River to provide juvenile salmon rearing habitat
- Plant 1,043 tree along the north perimeter of the property to provide shade to the Green River

Project Goals and Objectives

- Fulfill habitat impact mitigation requirements for past tree cutting along Green River Levees in 2009.
- Minimize exposure to recreational users of the river channel.
- Maintain or improve flood protection in the surrounding community.
- Provide shade for the Green River.

Existing Site Conditions



View of large wood project site from across the river

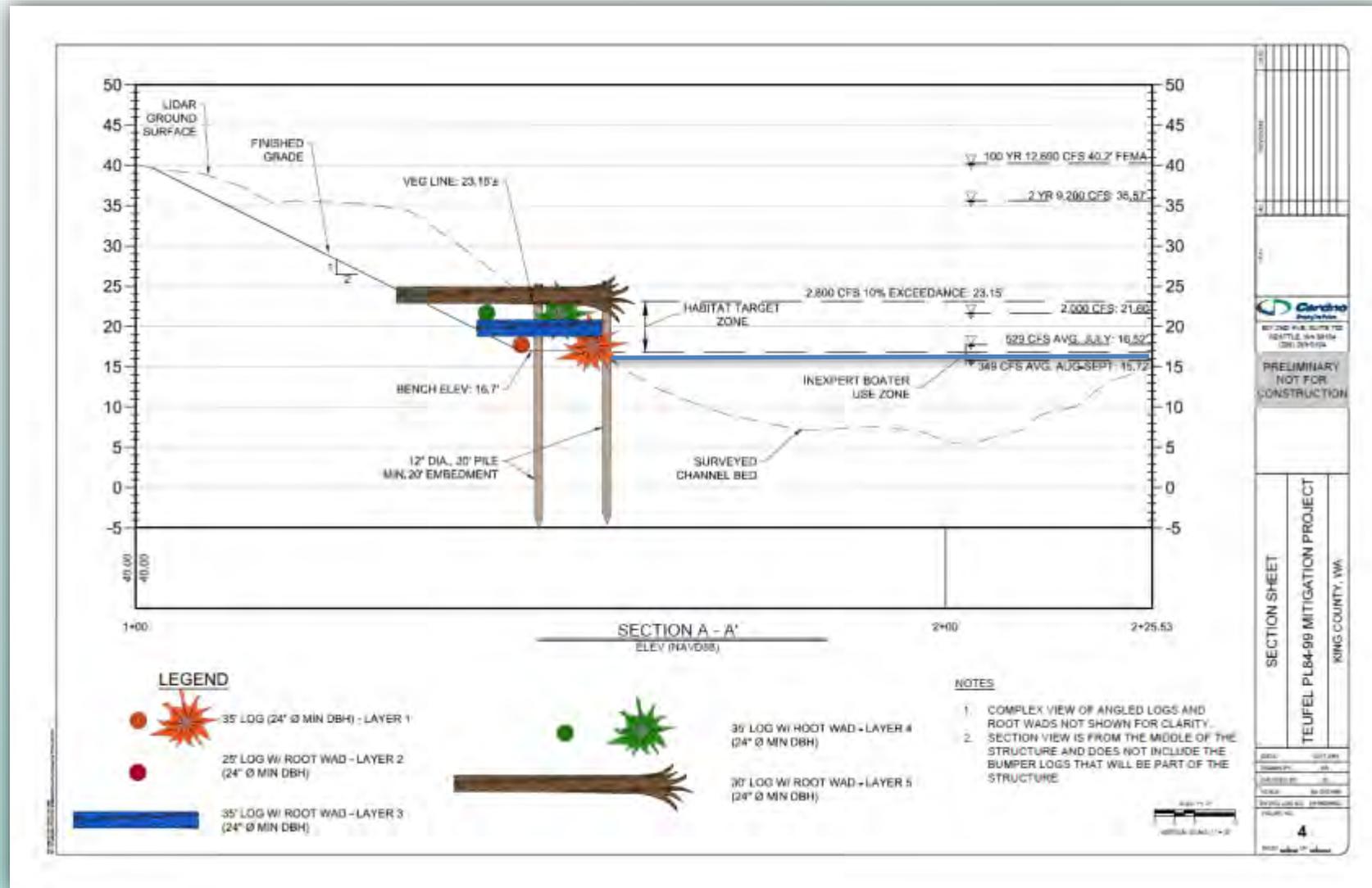
River Recreation Safety Considerations

- Located on inside bend in river reach without much river recreational use.
- Line of sight from 350 feet upstream. Visual approach time is about 4 minutes during low summer flows.
- The structure will be almost entirely out of the water during low summer flows.
- Project includes a log deflector at upstream end for higher flows.
- Riverward extent of structure limited to maximum of 10 ft. beyond current bank line.

Site Overview



Large Wood Design Section View



Project Status and Input Opportunities

Preliminary design presented at 2016 Large Wood Meeting	June 8, 2016
Large Wood Checklist posted at 30% design and request for comments	October- November 2016
Present 90% design at 2017 Large Wood Meeting	June 7, 2017
Public/Neighborhood meeting	Spring 2018
Construction	August - October 2018

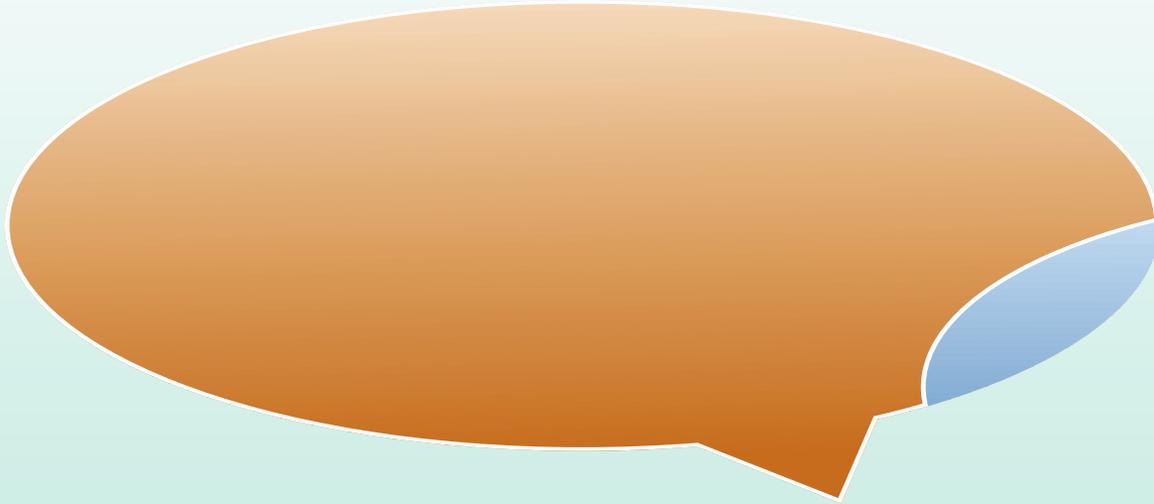
Project Website

- 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?



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

Lower Russell Road Levee Setback Project



Briefing for Large Wood
Meeting

June 7, 2017

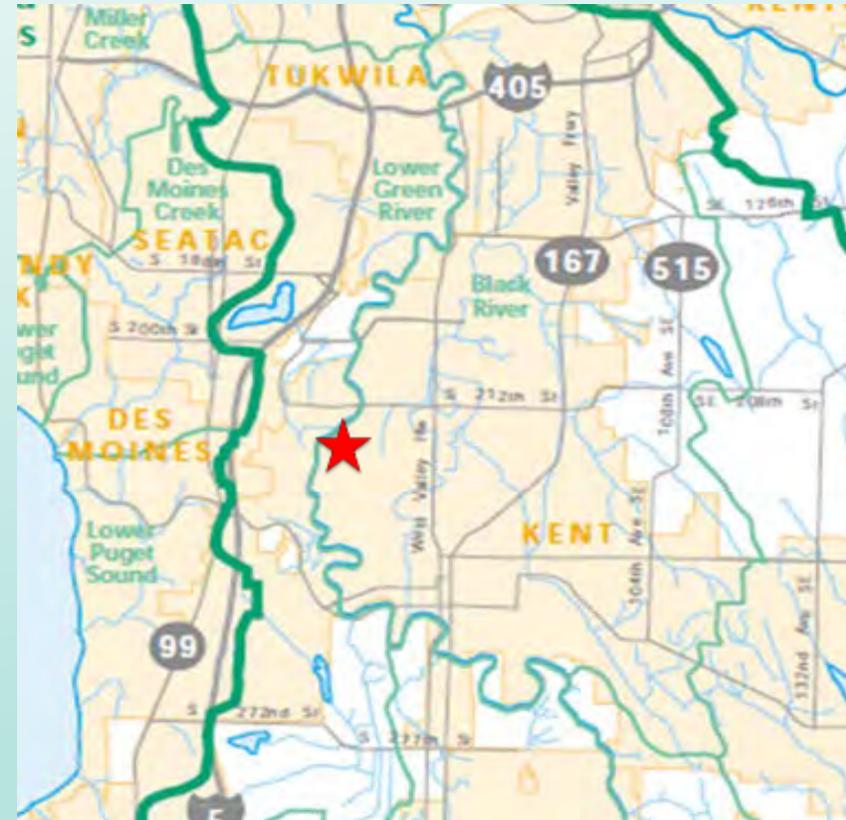
Department of Natural Resources and Parks
Water and Land Resources Division
River and Floodplain Management Section

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 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:

- Increases flood conveyance and containment within project reach
- 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: Flow deflectors/barbs composed of rock upstream of 212th St Bridge (similar to Reddington Levee barbs along Brannan Park in Auburn)
- Large Wood: Log Bumper Toe, Wood Rafts, Log Jams and misc. wood

Project Cost: \$52 Million total cost (Design estimate assuming 2019 construction)

Lower Green River Recreational Users

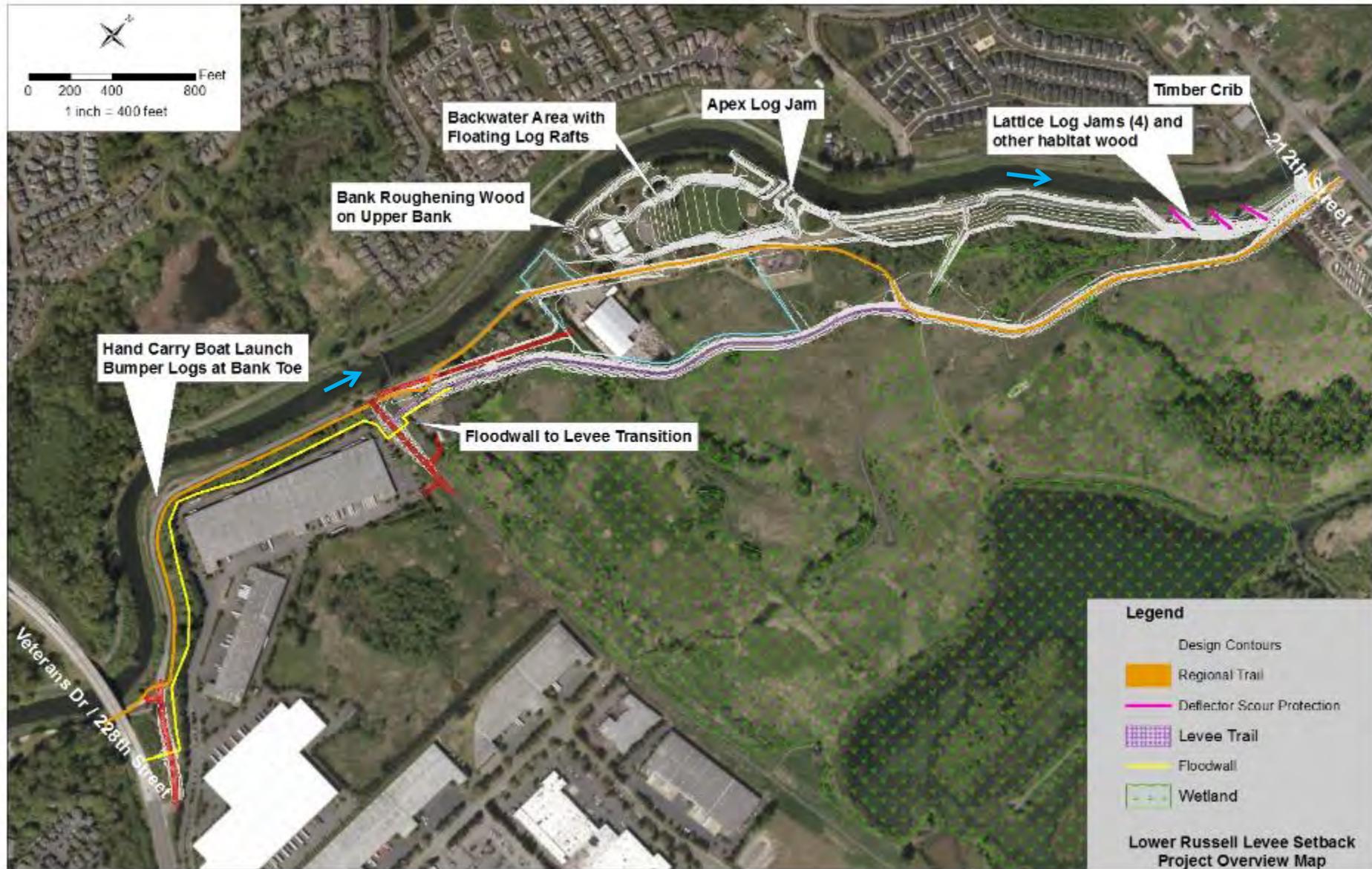
Table 7. 2013 Remote Camera Results - Green River.

	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%)

Lower Russell Rd Large Wood Design

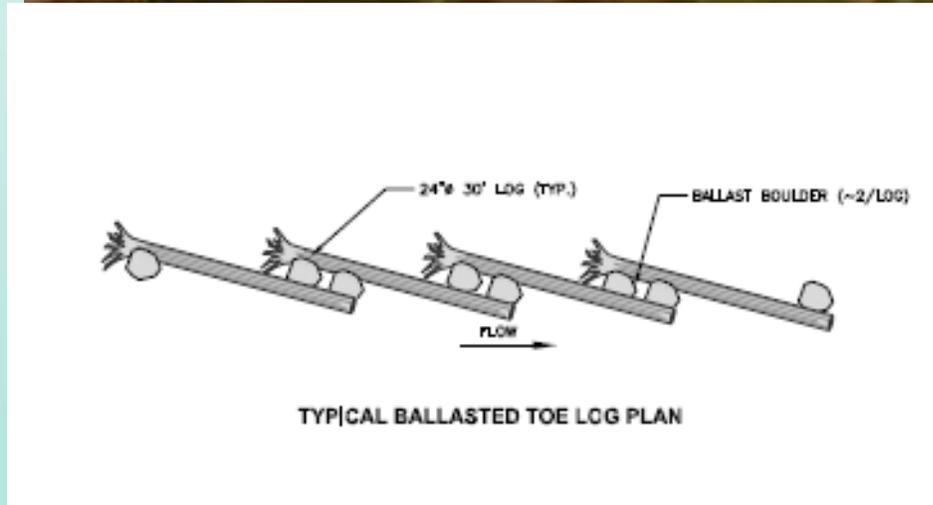


- Install roughly 280 large logs in various configurations (~130 logs in or along channel margin)
- Install 5 pile supported ELJs (Lattice Jams and Apex Jam)



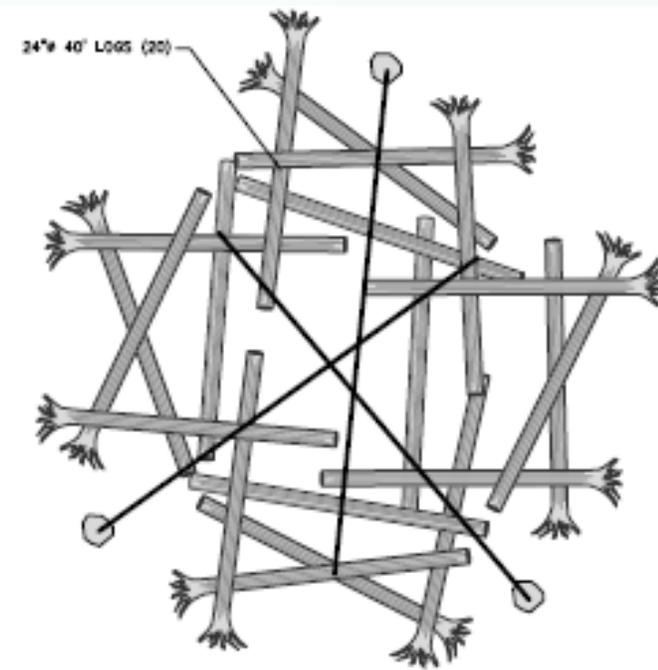
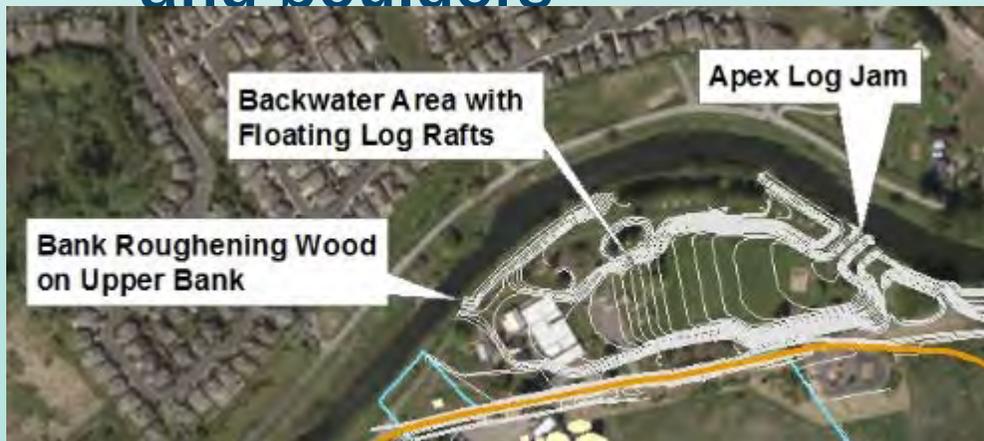
Flood Protection, Habitat Restoration and Recreation Enhancements

Log “Bumper” Toe Along Riverbank

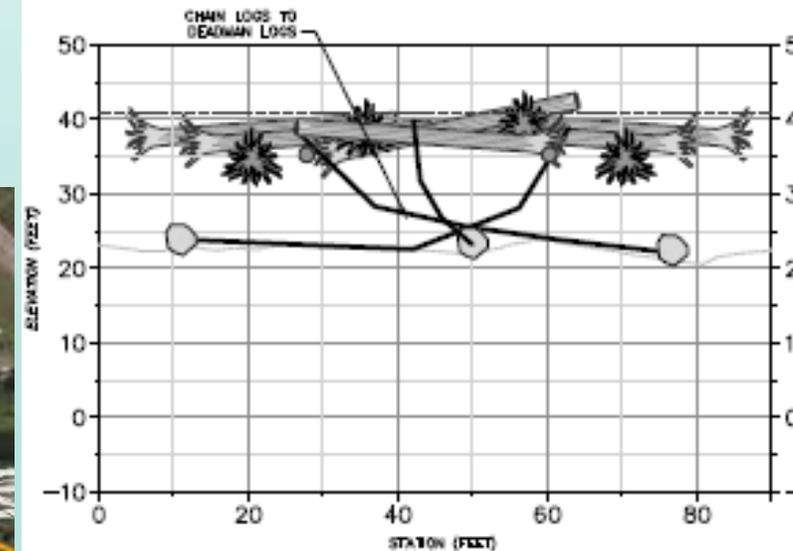


Floating Log Raft

- 4 each are planned
- Located in backwater area off main channel
- Designed to float and remain tethered with chain and boulders



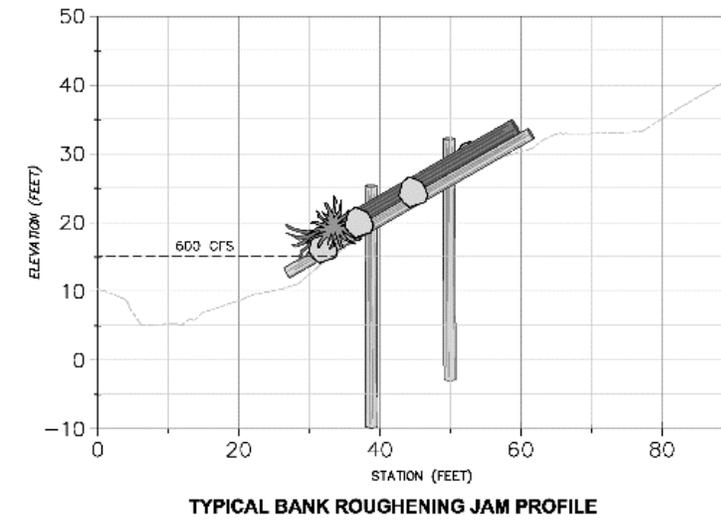
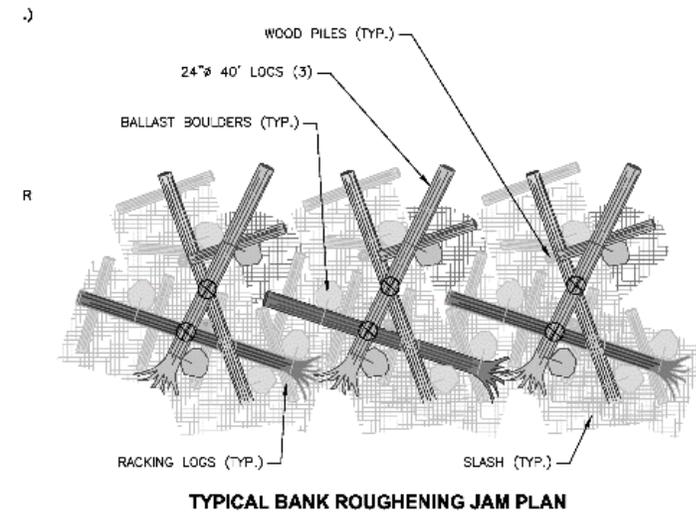
TYPICAL FLOATING RAFT (BOULDER ANCHOR) JAM PLAN



TYPICAL FLOATING RAFT (BOULDER ANCHOR) JAM PROFILE

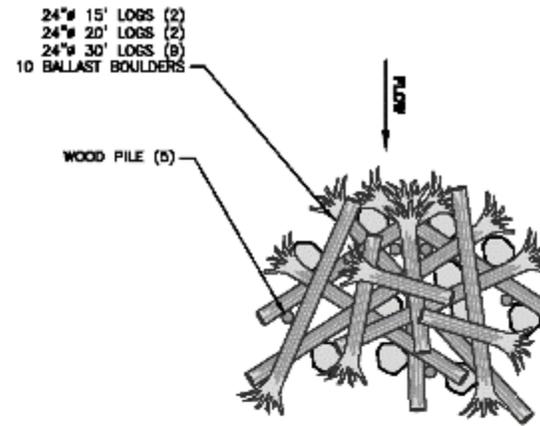
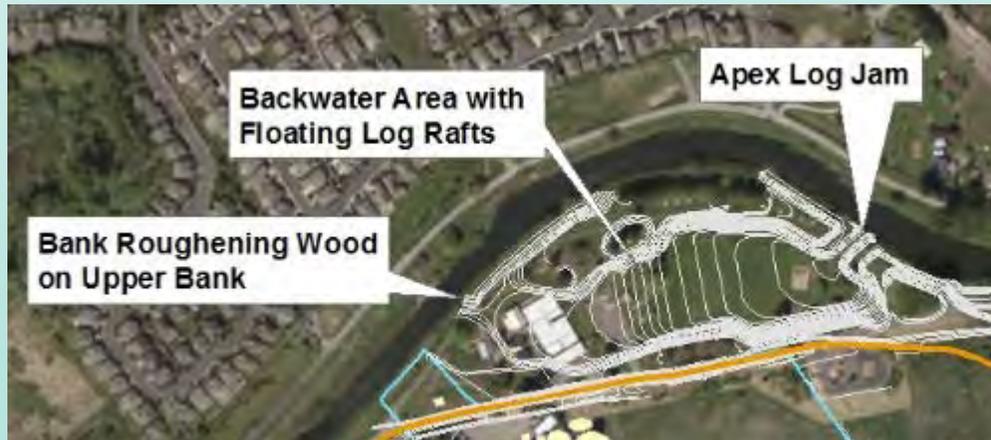
Bank Roughening Wood

- Intended primary placement is back from or above Summer flows (above 500 cfs)

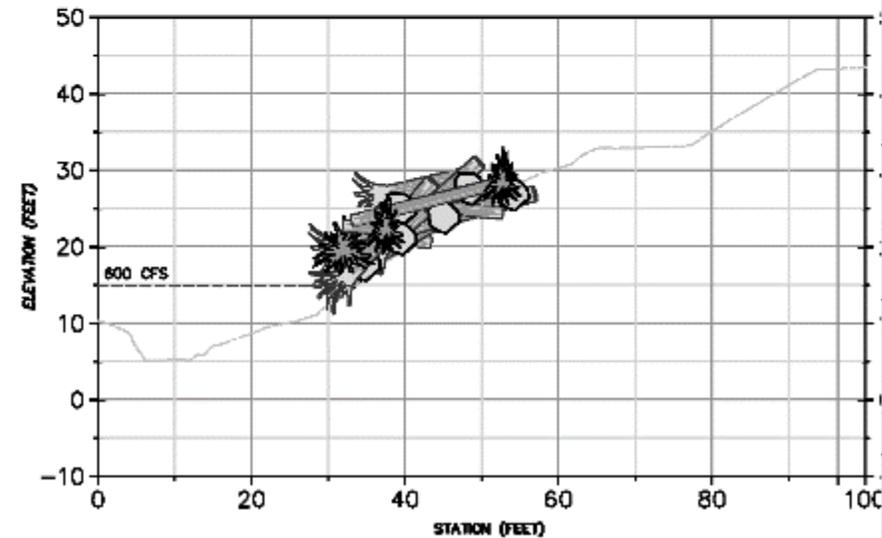


Apex Wood Jam

- 1 planned
- Located on riverbank at backwater channel entrance
- Scour along bank downstream and adjacent to structure is anticipated



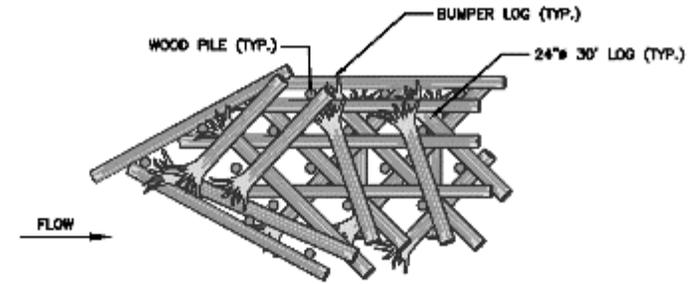
TYPICAL APEX JAM PLAN



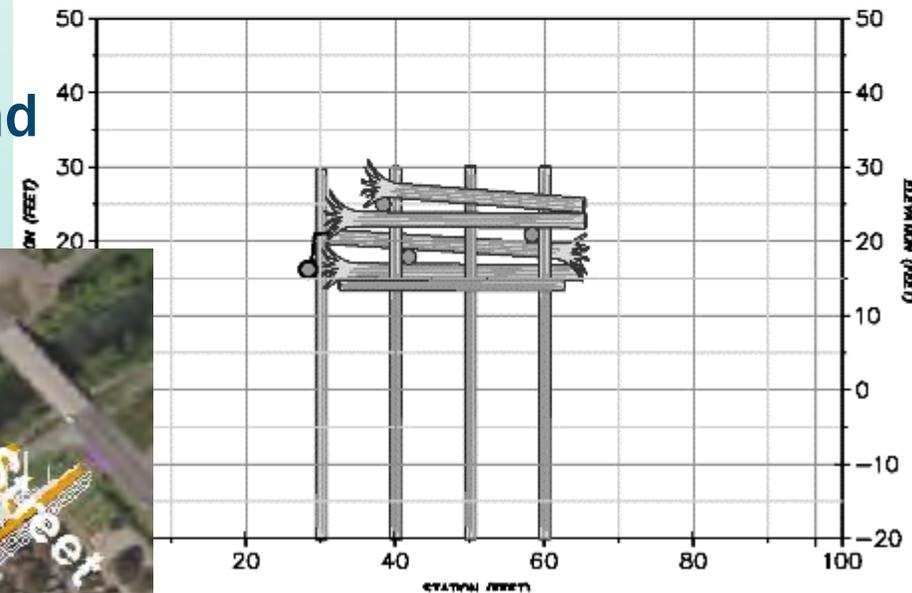
TYPICAL APEX JAM PROFILE

Lattice Wood Jam

- 3 each are planned
- Located between and in front of tips of barb deflectors
- Channel migration expected to fully engage wood jams and barb tips at summer flows
- Flow expected to split around jams at flows ~ 500 cfs.



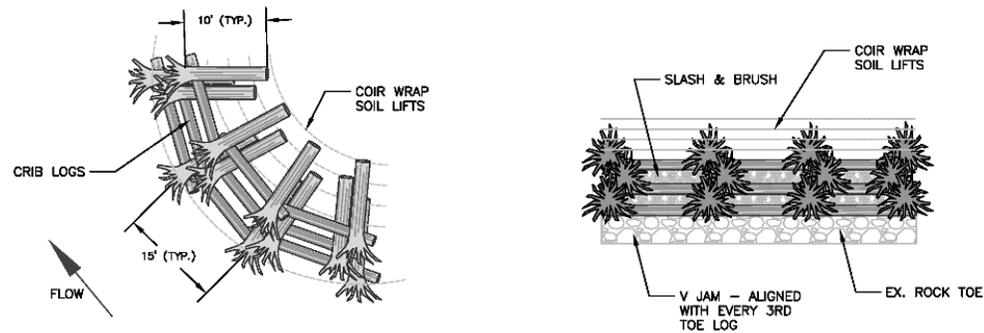
TYPICAL LATTICE JAM PLAN



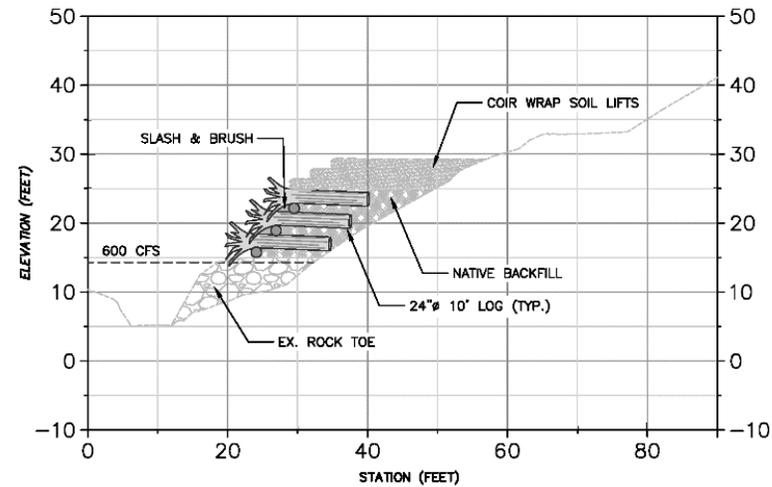
TYPICAL LATTICE JAM PROFILE

Timber Crib

- One is planned
- Located at northern end of project reach
- Use to support transition between constructed revetment and existing bank slope



TYPICAL TIMBER CRIB JAM PLAN



TYPICAL TIMBER CRIB JAM PROFILE

Lower Russell Rd Levee - Timeline

- Project initiated: Jan. 2014
- Predesign: Aug 2014 – Jan 2016
 - Selected alternative – August 2015
 - 30% design – January 2016
- Instream Project Design Checklist and solicited public comments – July, 2016
- 60% Design Completion: Nov. 2017
- Permitting: 2018
- Planned Construction: 2019-2020

Questions?

Additional Project Information:

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

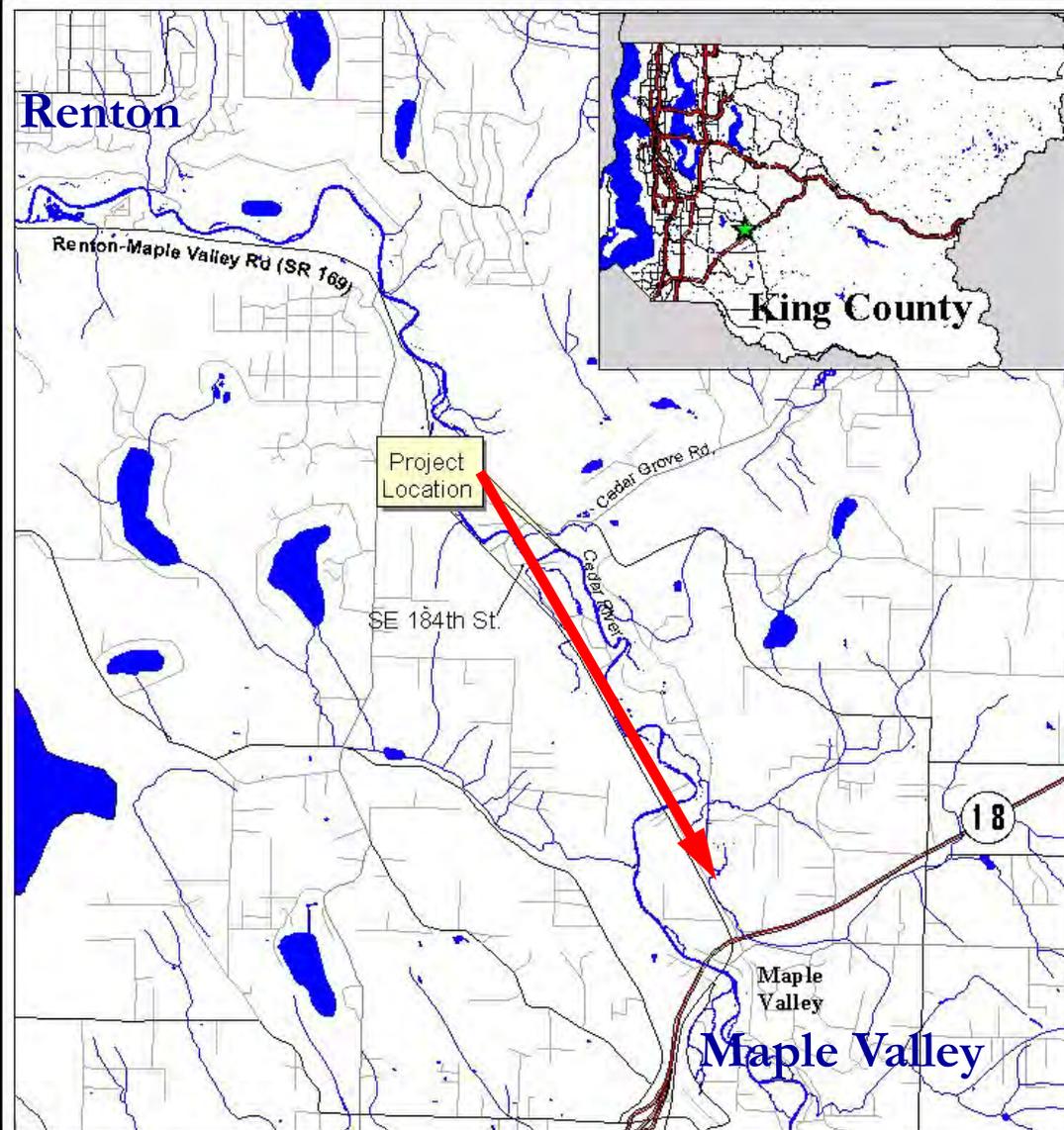
Small Projects on Non-Recreational Rivers and Streams

Taylor Creek Floodplain Restoration Project

Project Manager: Dan Eastman



King County



Vicinity Map

Taylor Creek Lee MRP project

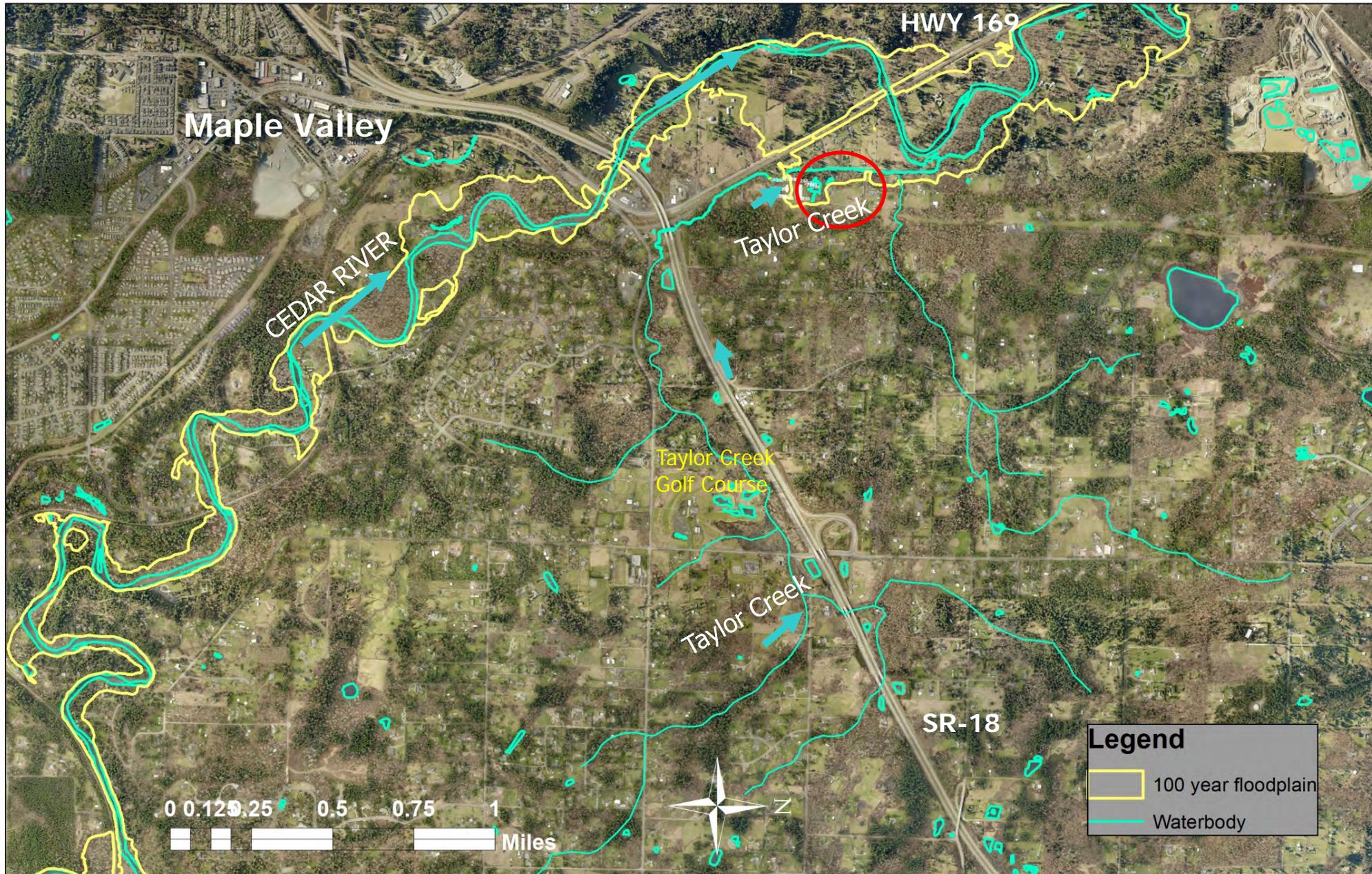


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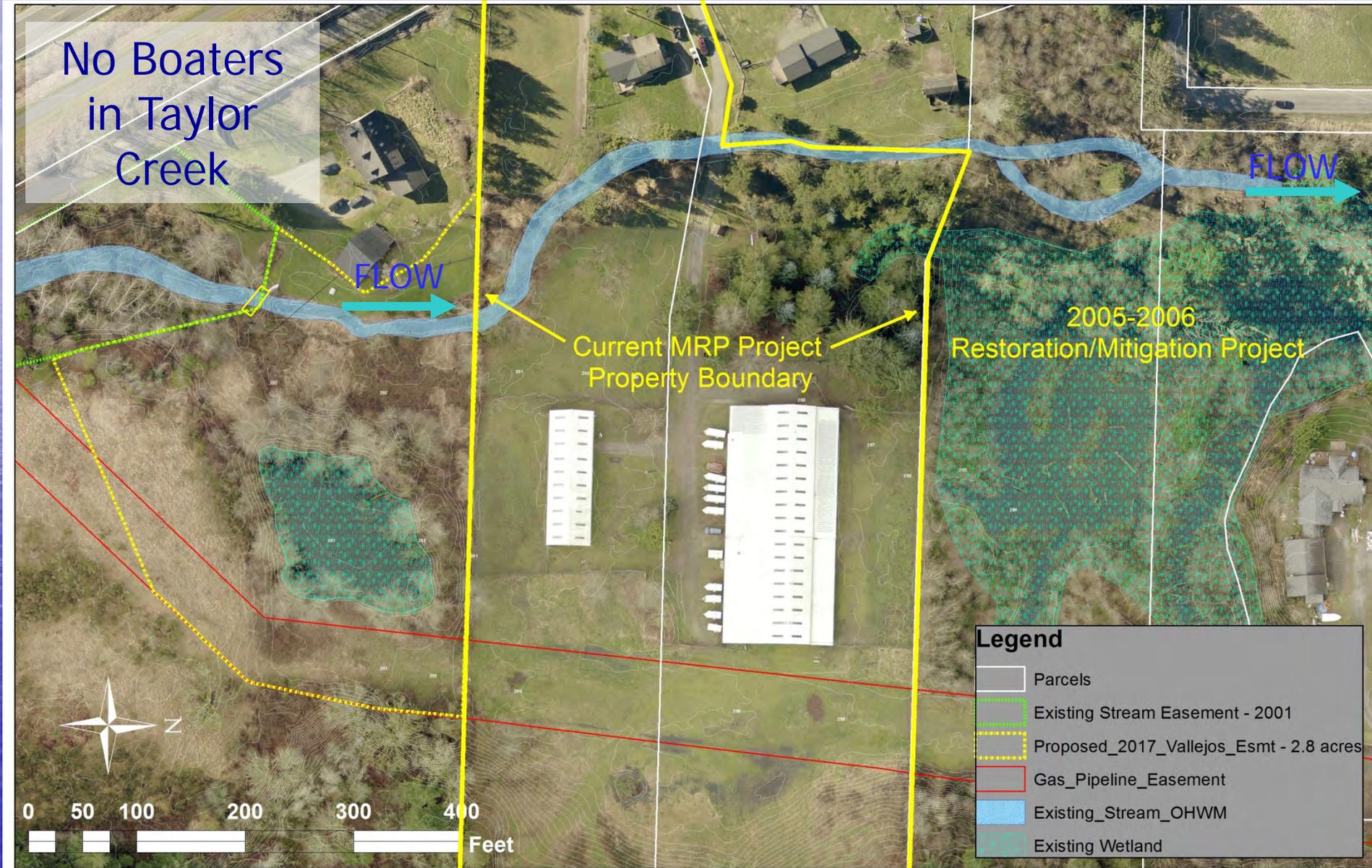
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Basin Overview



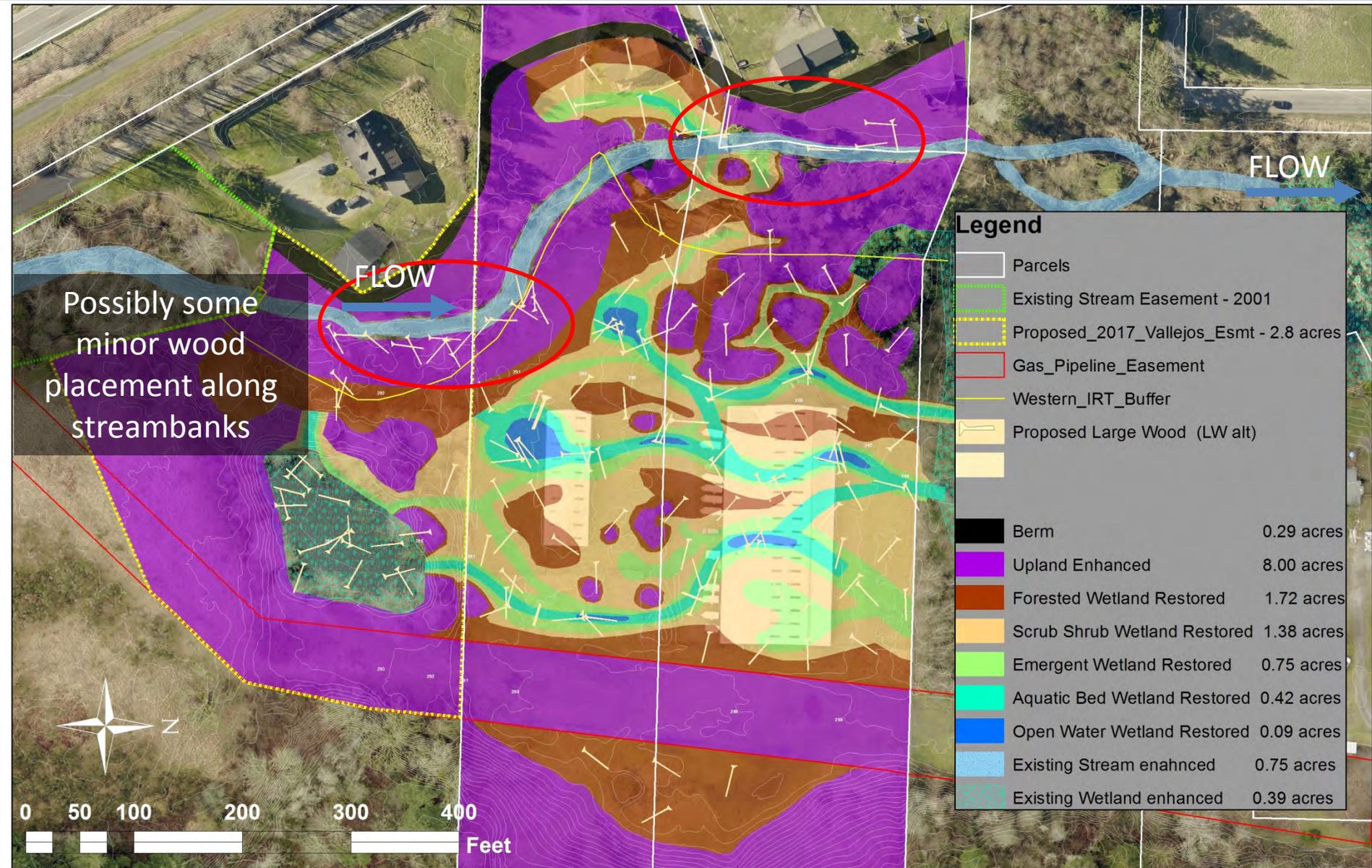
Existing Site Conditions

2015 Orthophoto



Proposed Site Conditions

Large wetland, mostly isolated from stream



Schedule

- **30% Design: November, 2017**
- **60% Design: June, 2018**
- **Final Design: January, 2019**
- **Construction: Summer, 2019**

Questions?

Project Manager: Dan Eastman

Dan.Eastman@kingcounty.gov

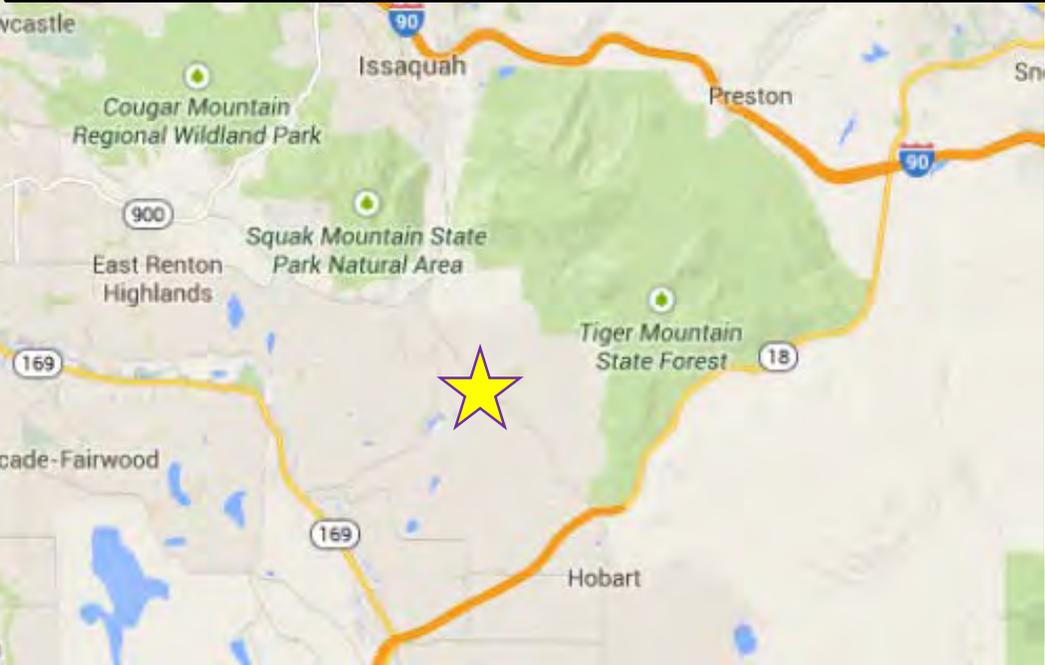
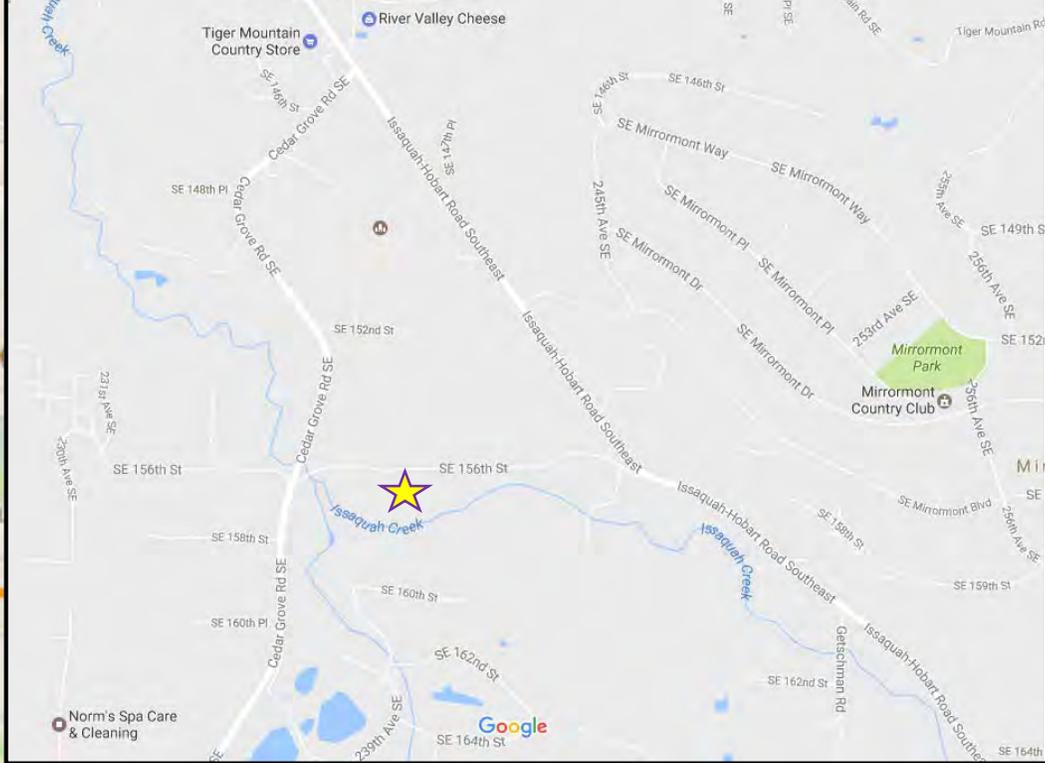
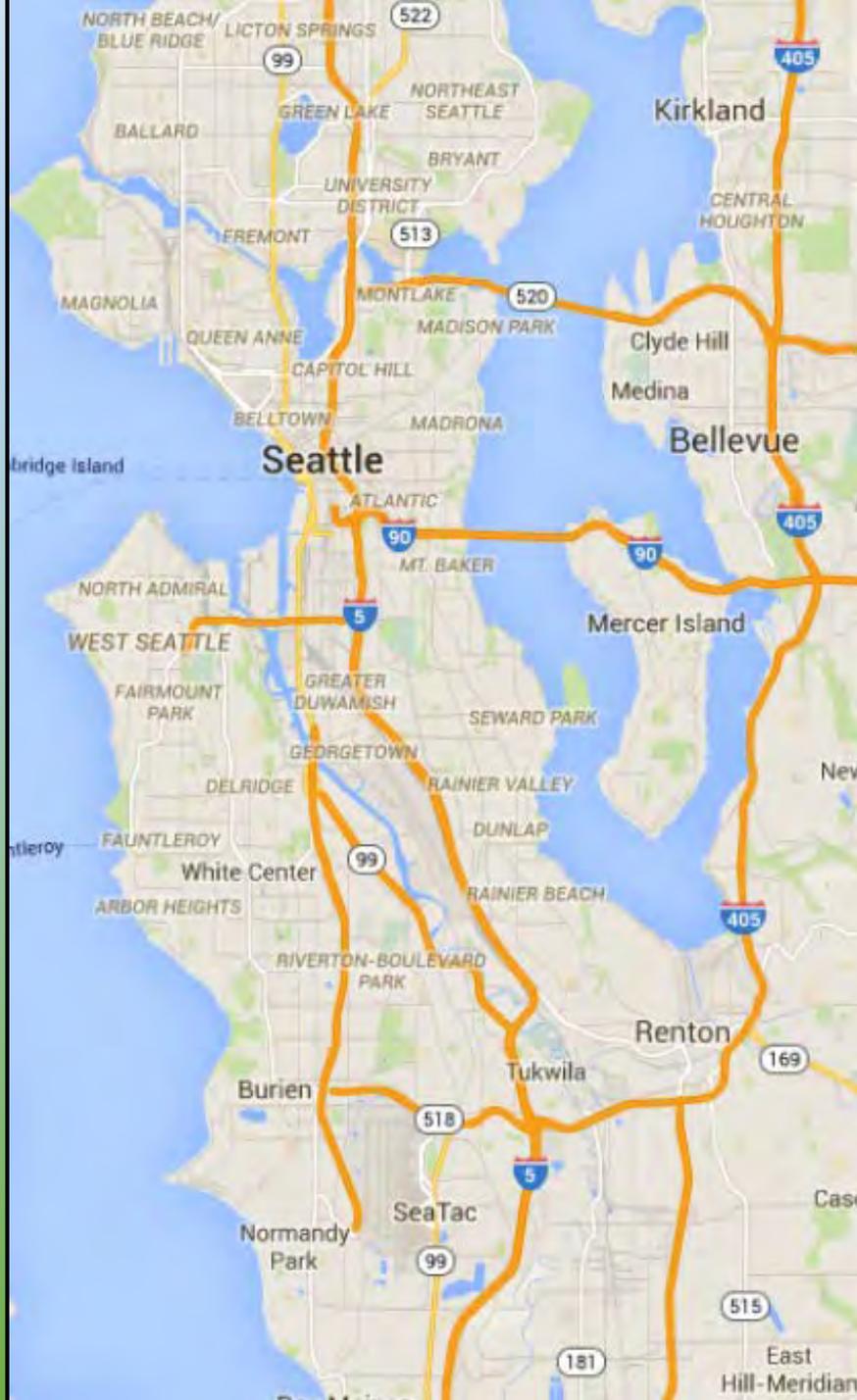
206-477-4684

Issaquah Creek Wetland Mitigation Project

Project Manager: Josh Latterell



King County



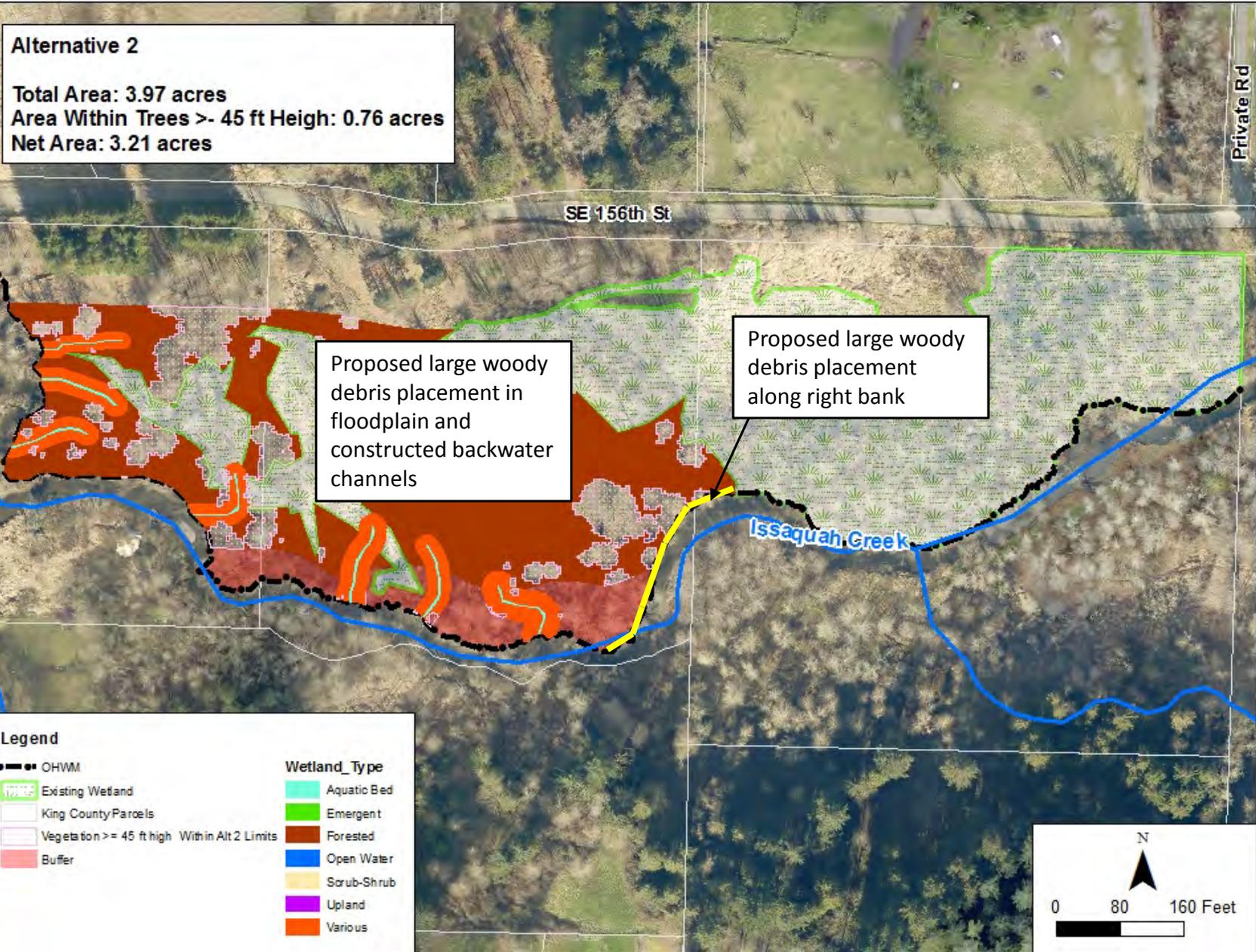
Objectives

Proposed Construction 2019

- >44.8 wetland mitigation credits
- Water quality
- Flood & erosion protection
- Habitat functions



07/18/2013 10:18



Schedule:

30% Design—Nov., 2017

60% Design—June, 2018

Permits—December, 2018

Construction—Summer, 2019



Questions:

Josh Latterell
Project Manager, Senior Ecologist
206-477-4748
josh.latterell@kingcounty.gov

Middle Boise Creek Stream Restoration Van Wieringen

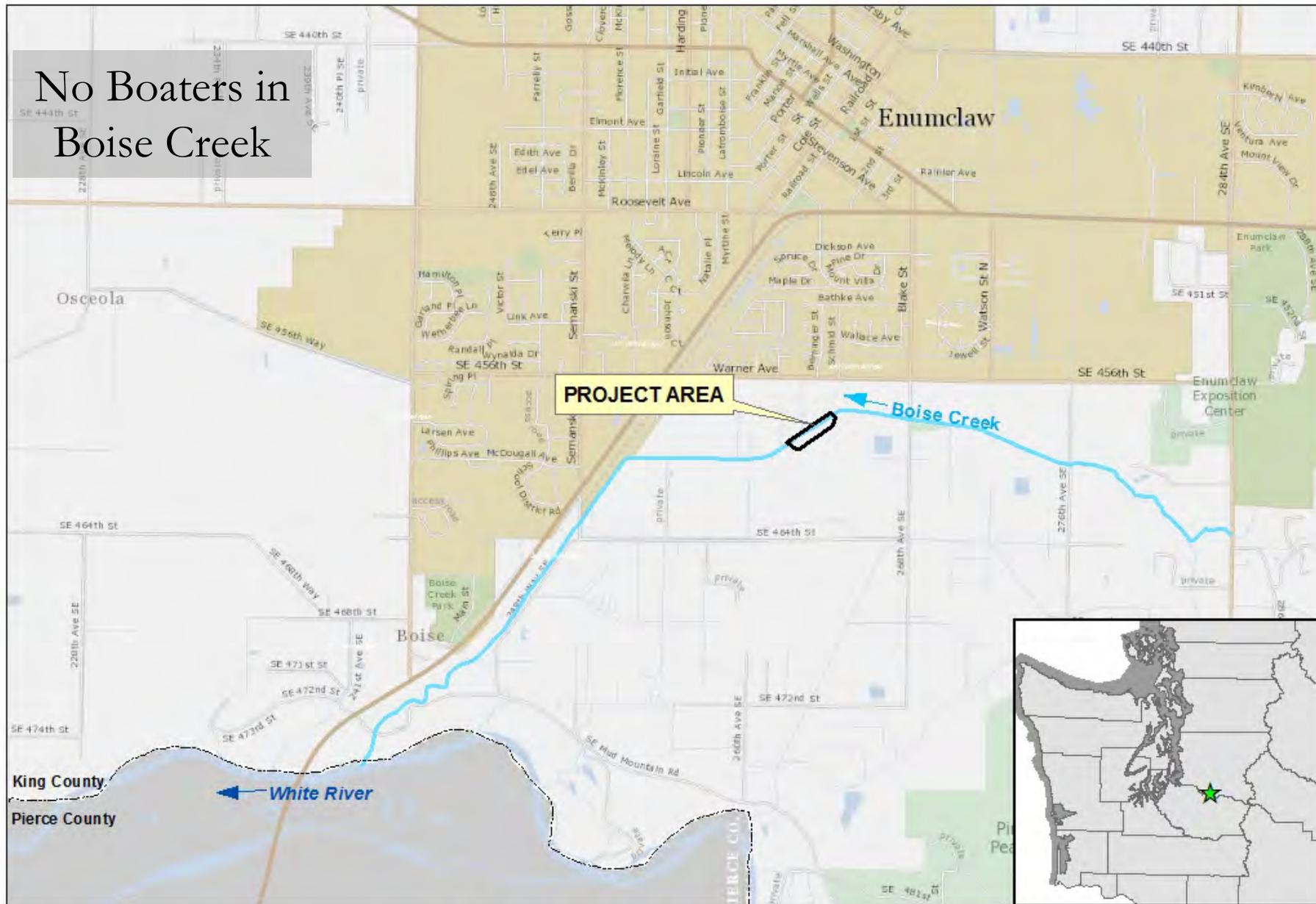


Sarah McCarthy, Project Manager
King County Department of Natural Resources and Parks



King County

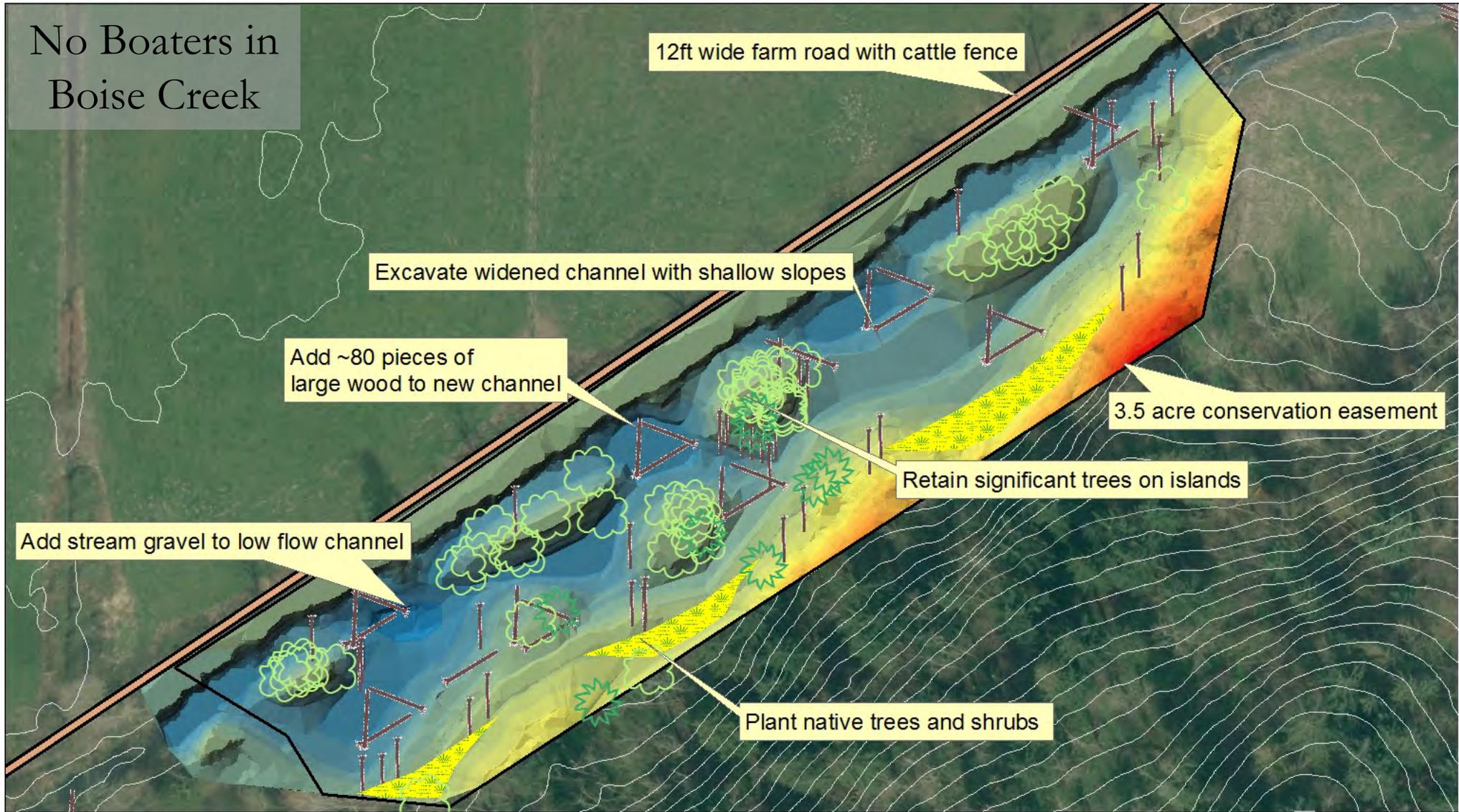
No Boaters in
Boise Creek



**Middle Boise Creek Restoration
Van Wieringen
Vicinity Map**



No Boaters in
Boise Creek



Middle Boise Creek - Van Wieringen Preliminary Design Concept



Schedule

Activity	Timing
30% Design complete	June 2017
60% Design complete	Fall 2017
Permit applications submitted	Fall 2017
Construction	Summer 2018
Planting	Fall 2018-Winter 2019

Contact Information

Sarah McCarthy, Project Manager

sarah.mccarthy@kingcounty.gov

206-477-4766

OPEN HOUSE!

Feel free to find the Project Manager or representative of any projects you are interested in and ask questions