



KING COUNTY  
FLOOD CONTROL  
DISTRICT



King County

# Large Wood Projects

**2014 (and future)  
Construction Seasons**

# Meeting Overview

- King County Large Wood Policies and Procedures
- King County River Recreation Study
- Project Presentations
- Q&A
- Open House

# Background

- River and Floodplain Management Practices in King County
- Endangered Species Act Listing
- King County Ordinance and DNRP Procedures for Placed Wood (2010)
- King County DNRP and KCSO Procedures for Natural Wood (2013)

# Key Provision of Ordinance

- Seek public input and consider public safety in design of projects placing large wood in rivers and streams;
- “...Design and locate wood placement to maximize project benefits and to minimize risks to public safety;”
- “...Design options affording the greatest safety for river users shall be of primary consideration in design concerns involving a balancing of important public purposes;”
- Conduct independent monitoring and inspection of projects.

# Applicability of Rules and Procedures

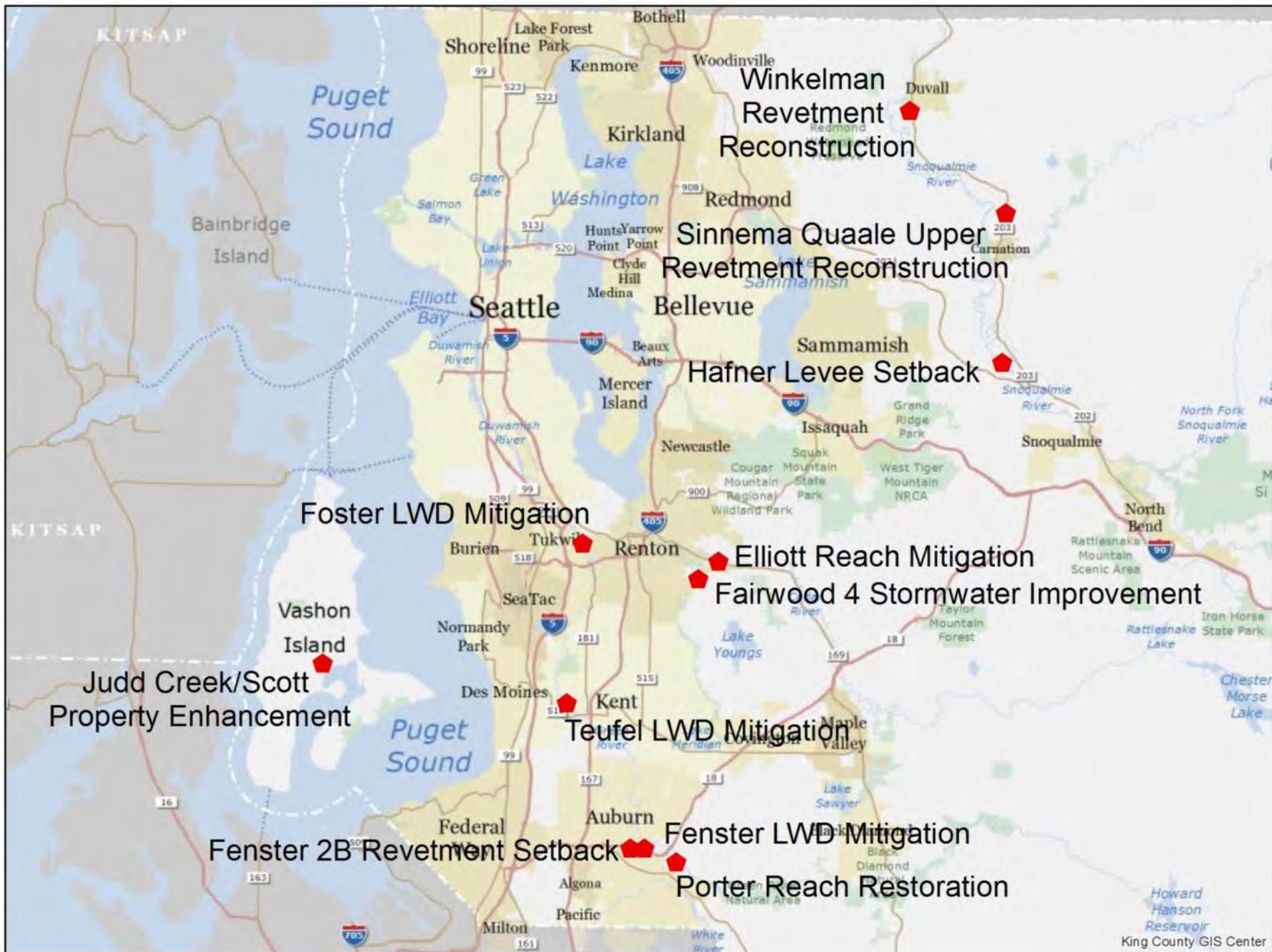
- All DNRP Projects
- All Rivers and Streams
- Any Large Wood Placement

# Key Features of Procedures

- Public Meetings (annual)
- Email List of Interested Parties
- Review by Professional Engineer/Ecologist
- Project Information
  - Posting of 30% plans and Project Design Checklist on website for comment
  - Seek Input on Conceptual/30% Design (ongoing)
- Website:  
<http://www.kingcounty.gov/environment/watersheds/general-information/large-wood.aspx>

# Procedures for Managing Naturally Occurring Wood

- KCSO and DNRP Coordinate Response to Reports of Concern
- Design and Outreach for Projects Expected to Recruit Wood:
  - Develop a Public Safety Management Plan;
  - Prepare an Instream Project Design Checklist;
  - Post 30% Designs on Webpage and Seek Input;
  - Monitoring and Outreach.



# Questions?

## General Information:

Nancy Faegenburg, (206) 477-4688

[Nancy.faegenburg@kingcounty.gov](mailto:Nancy.faegenburg@kingcounty.gov)

## Project-Specific Information:

Contact Project Manager or Contact listed on agenda

# Recreation Safety and King County Rivers

## 2013 River Recreation Studies



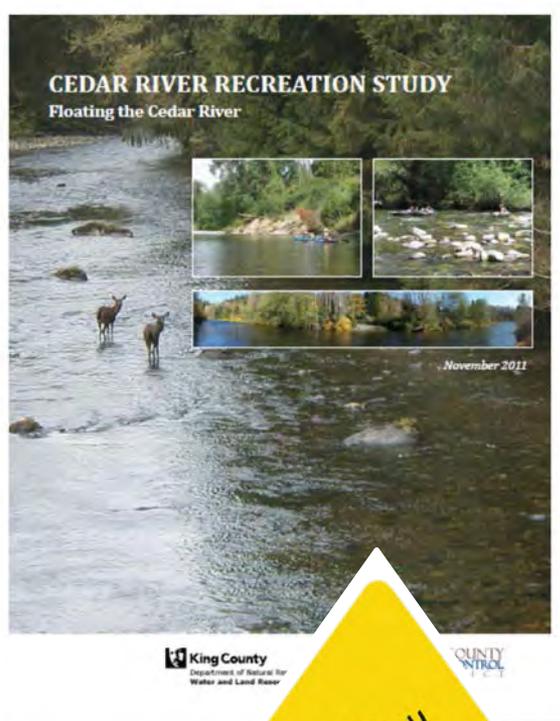
- Why
- What
- How
- Findings
- Next Steps



## Floodplain Management

- Multi-objective
- Sustainable

- *Natural river processes*
- *Less predictable*



**Wear it for safety.**

**It's the law on King County rivers.**

**Wear a lifejacket.**

**Because nobody plans to drown.**

King County  
Public Health  
Seattle & King County  
SHERIFF  
KING COUNTY

**WARNING  
RIVER IS  
DANGEROUS**

Facebook logo

PANDORA



# 2013 River Recreation Study Overview

- WHO:

river floaters

- WHERE:

on river reaches where future capital projects are planned

- WHY:

to better understand who they are, where and when they float, attitudes and awareness regarding rivers *to inform the development of sustainable projects.*

# Study Overview

- HOW

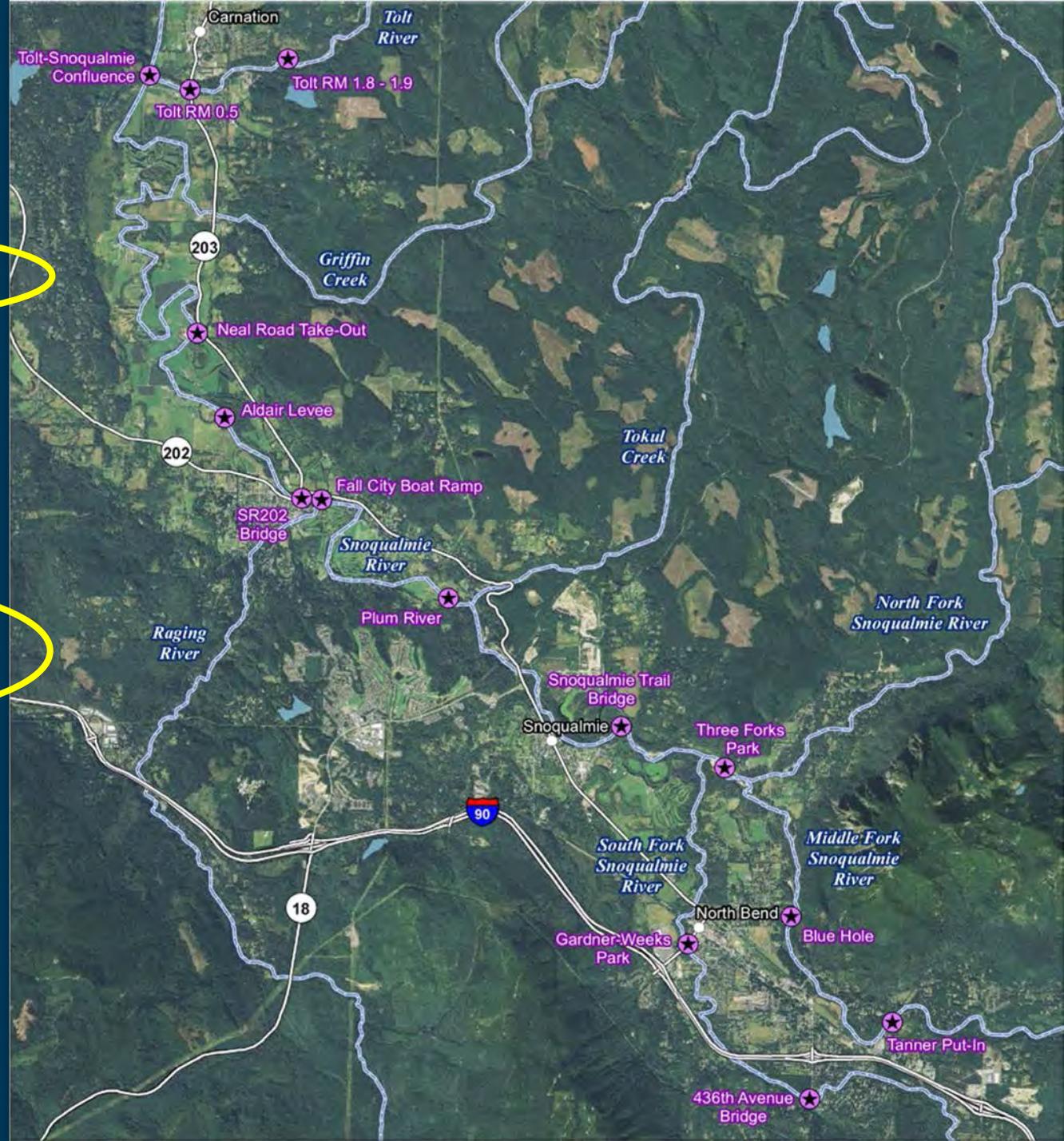
1. Where intensive use was known or expected, applied observational method (per Cedar Recreation Study 2010)
2. Where use is unknown or expected to be low, used time-lapse cameras (compare method)
3. Conduct aerial survey of full basins, to test our assumptions on high use areas (compare method)
4. In-person interviews of users
5. Synthesize all data collection methods in one report

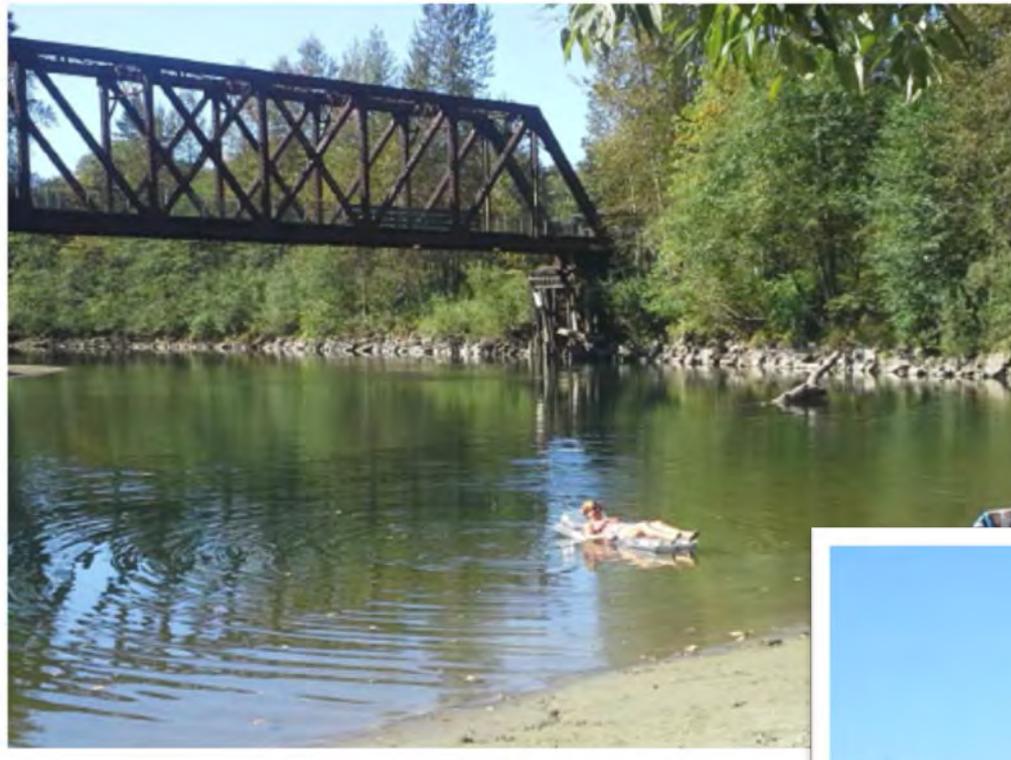


# Field Observations

## Snoqualmie sites

- Days with max temp over 70F
- Each observation day 11am – 7pm
- 7 days at each of 14 sites
  - 3 weekdays
  - 4 weekend days
- Collected #s and characteristics





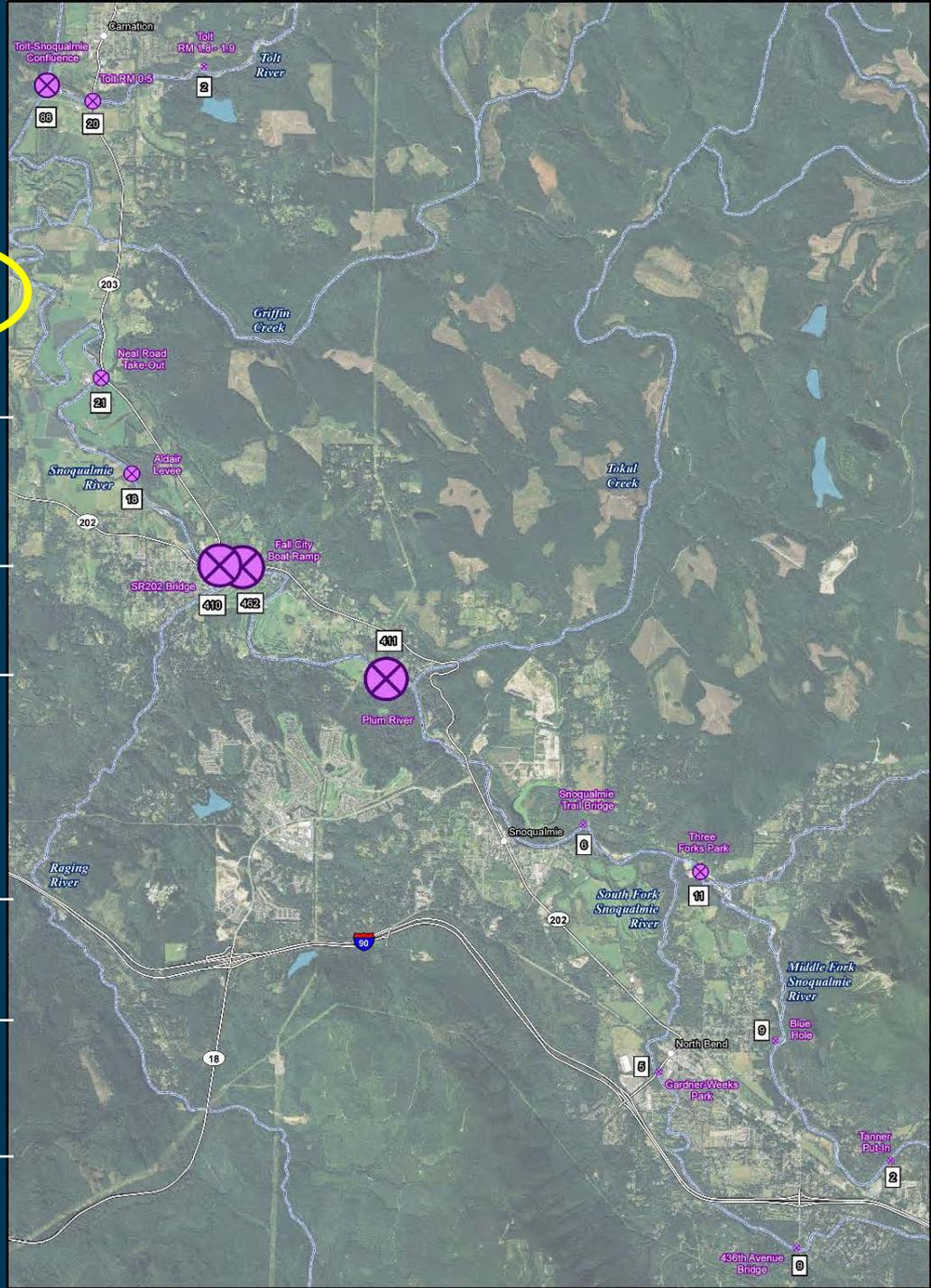
Snoqualmie Trail Bridge  
Observation Site, Snoqualmie River



Plum Creek Boat Ramp  
Observation Site, Snoqualmie River

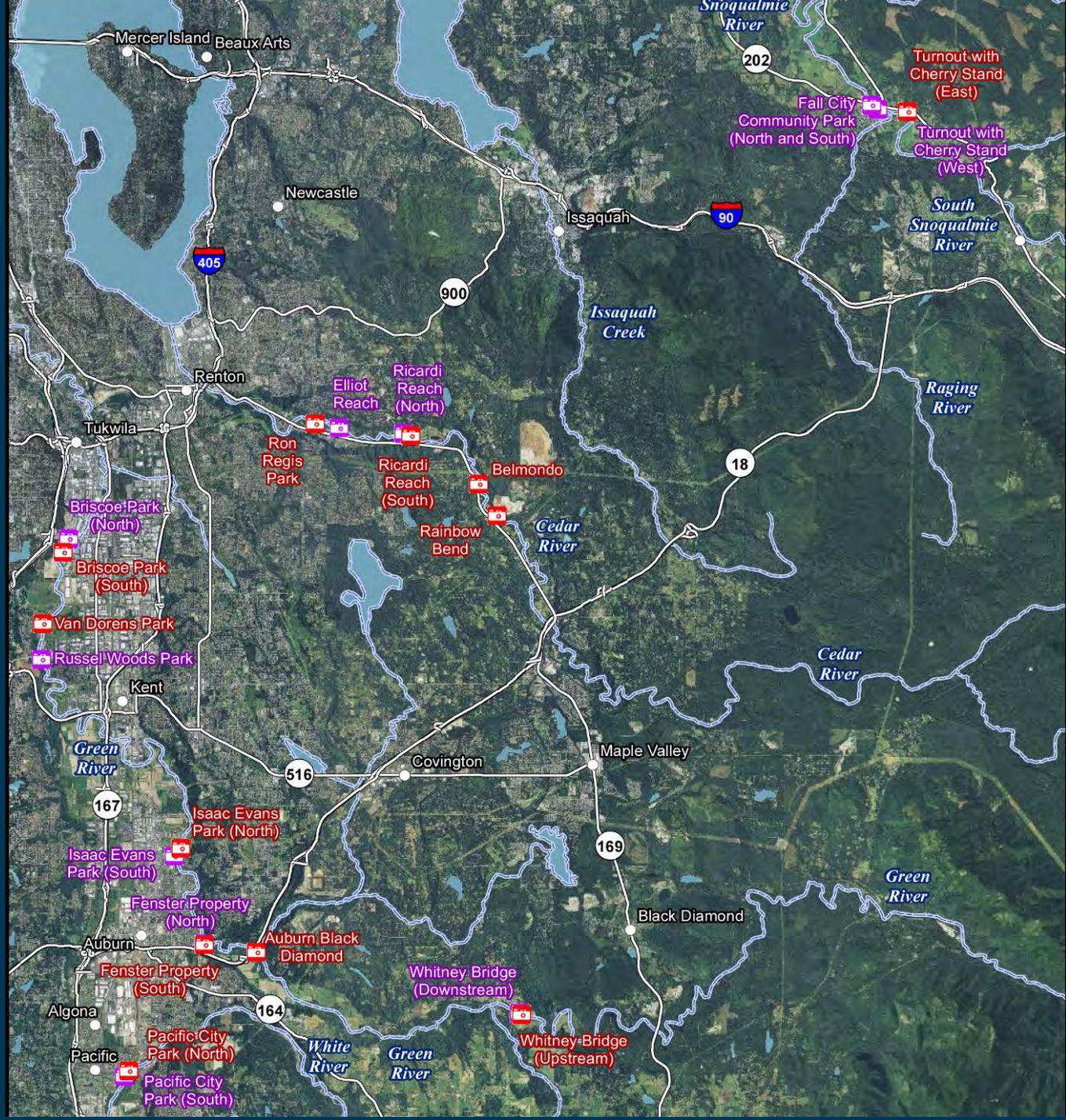
# Field Observations

GROUPS / PEOPLE / VESSELS	1474 / 5938 / 4602
ADULT / YOUTH / CHILDREN	88% / 8% / 4%
MALE / FEMALE	55% / 45%
TUBES-MATTRESSES	62%
RAFTS	28%
KAYAKS--CANOES-OTHER	10%
VESSELS WITH OARS OR PADDLES	27%
WEARING PERSONAL FLOTATION DEVICES	12%
GROUPS WITH ALCOHOL VISIBLE	26%



# Remote Camera Observations

- 23 cameras at 15 locations
- 21 cameras installed mid June - Sept
- Photos taken every 10 seconds
- Photos converted to videos for data capture





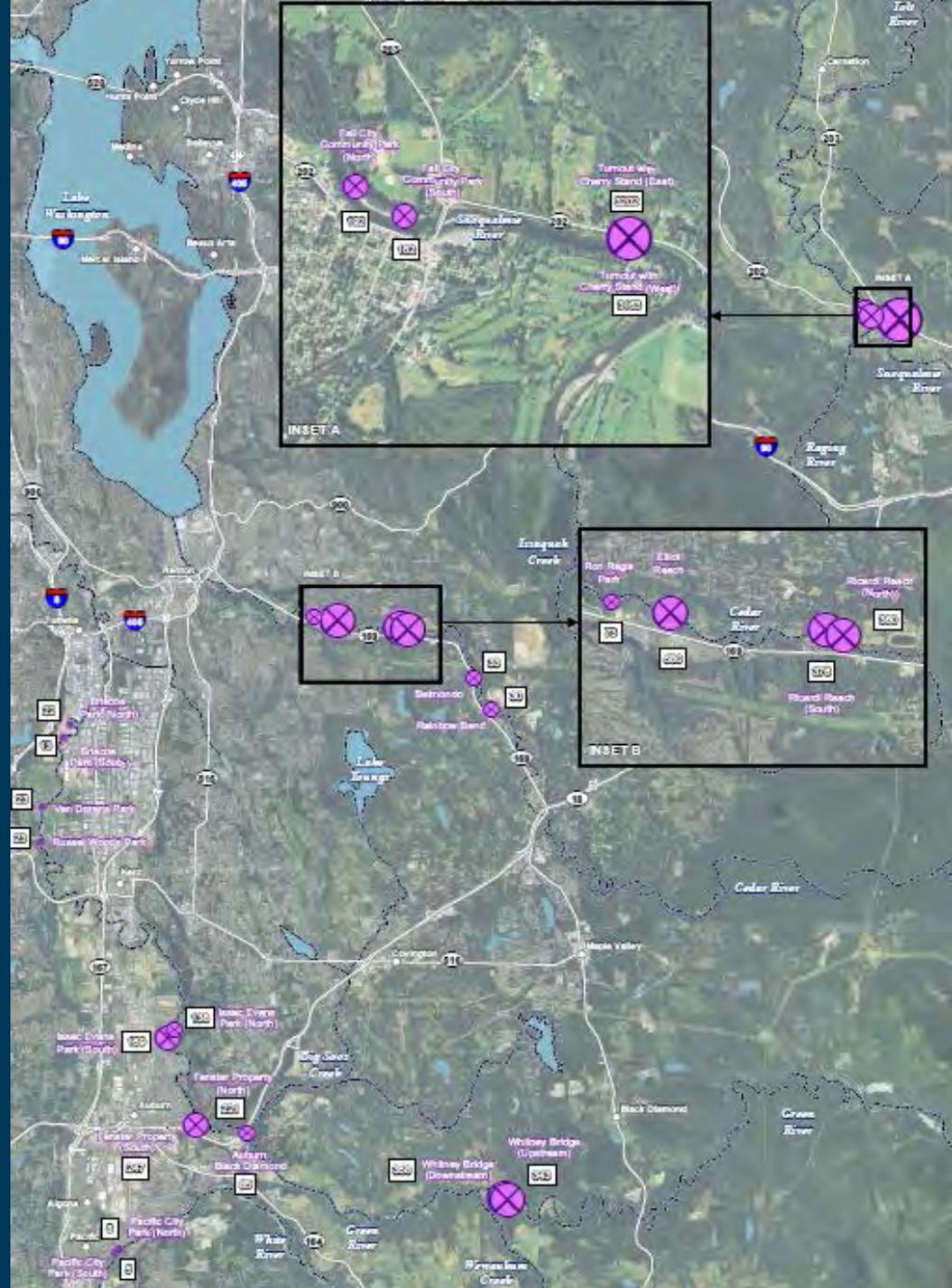
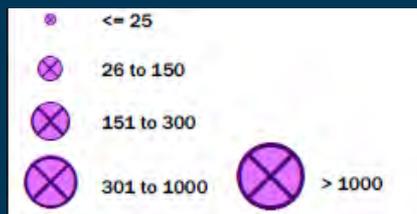
Briscoe Park Remote Camera,  
Green River



Elliott Reach Remote Camera,  
Cedar River

# Remote Camera Visual Summary

- Snoqualmie Fall City
- Mostly male
- Mostly 18+
- Mostly innertubes
- 20% or less with paddles

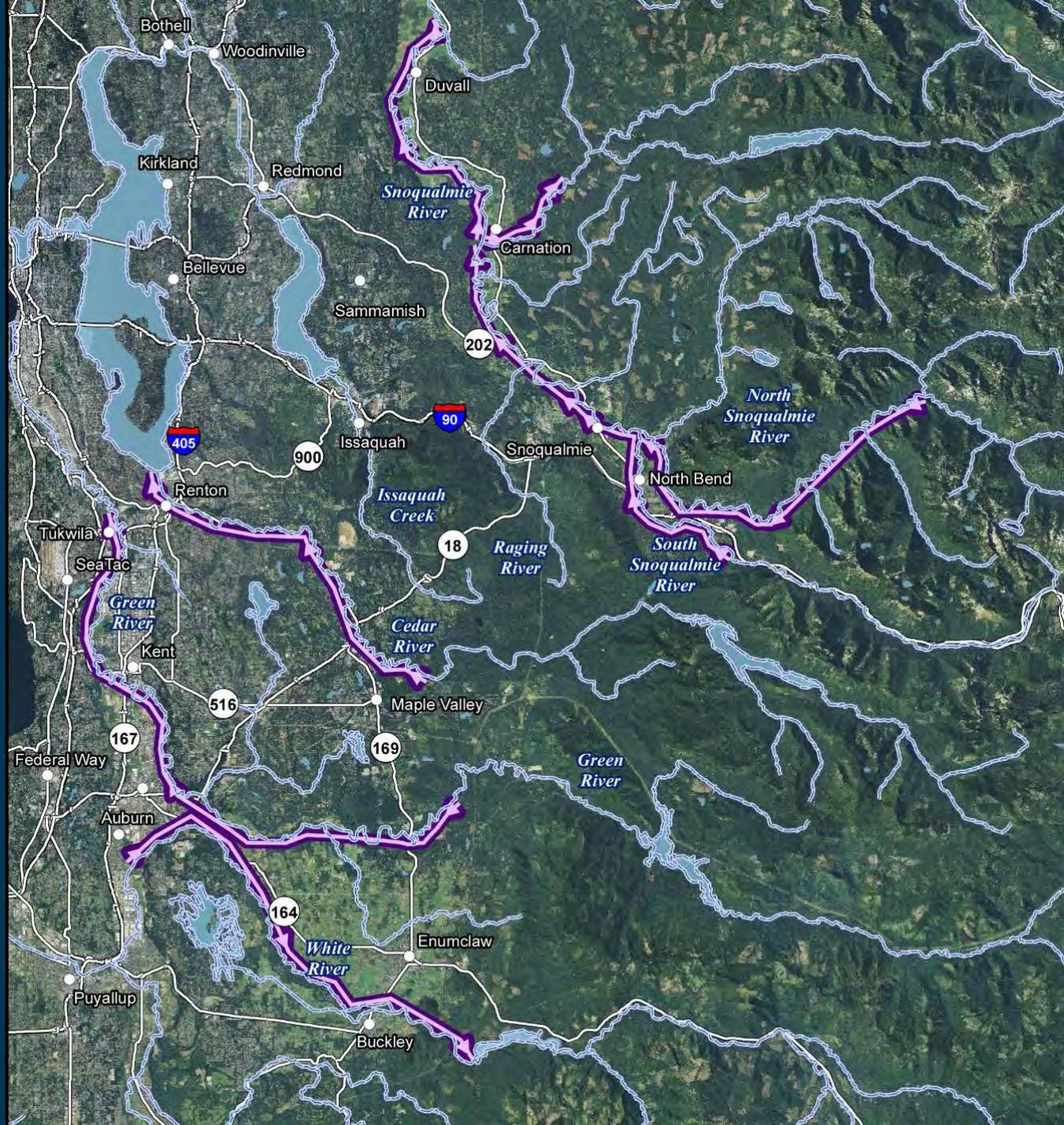


# Remote Camera Data Summary

	SNOQUALMIE	CEDAR	GREEN	WHITE
Number of Cameras	4	6	11	2
Total Groups Observed	6,719	1,389	1,642	13
Total People Observed	26,355	3,525	5,105	30
% Adults (18+)	95.7%	92.6%	88.2%	100%
% Youth (12-17)	3.3%	5.8%	7.3%	-
% Children (1-11)	0.9%	1.6%	4.4%	-
% Male	61%	69.3%	64.6%	80%
% Female	39%	30.7%	35.4%	20%
People Wearing Life Vests	5.4%	11.9%	13.6%	20%
Vessels	21,518	3,181	4,250	26
% on innertubes	62.6% (13,481)	78.6% (2,500)	65.1% (2,768)	80.8% (21)

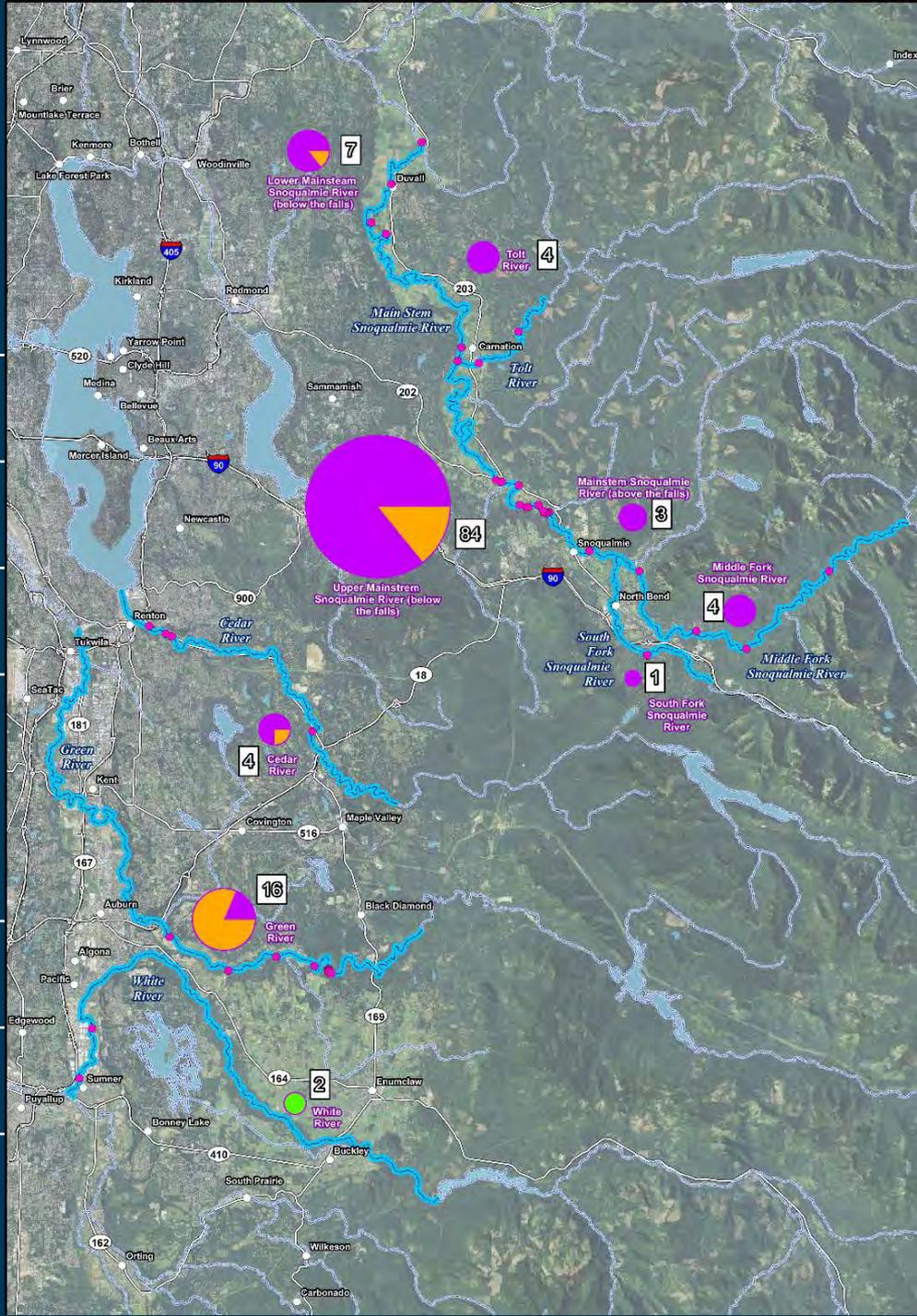
# Aerial Surveys

- 1 aerial video survey - July-August
- 1 aerial still photo survey – August



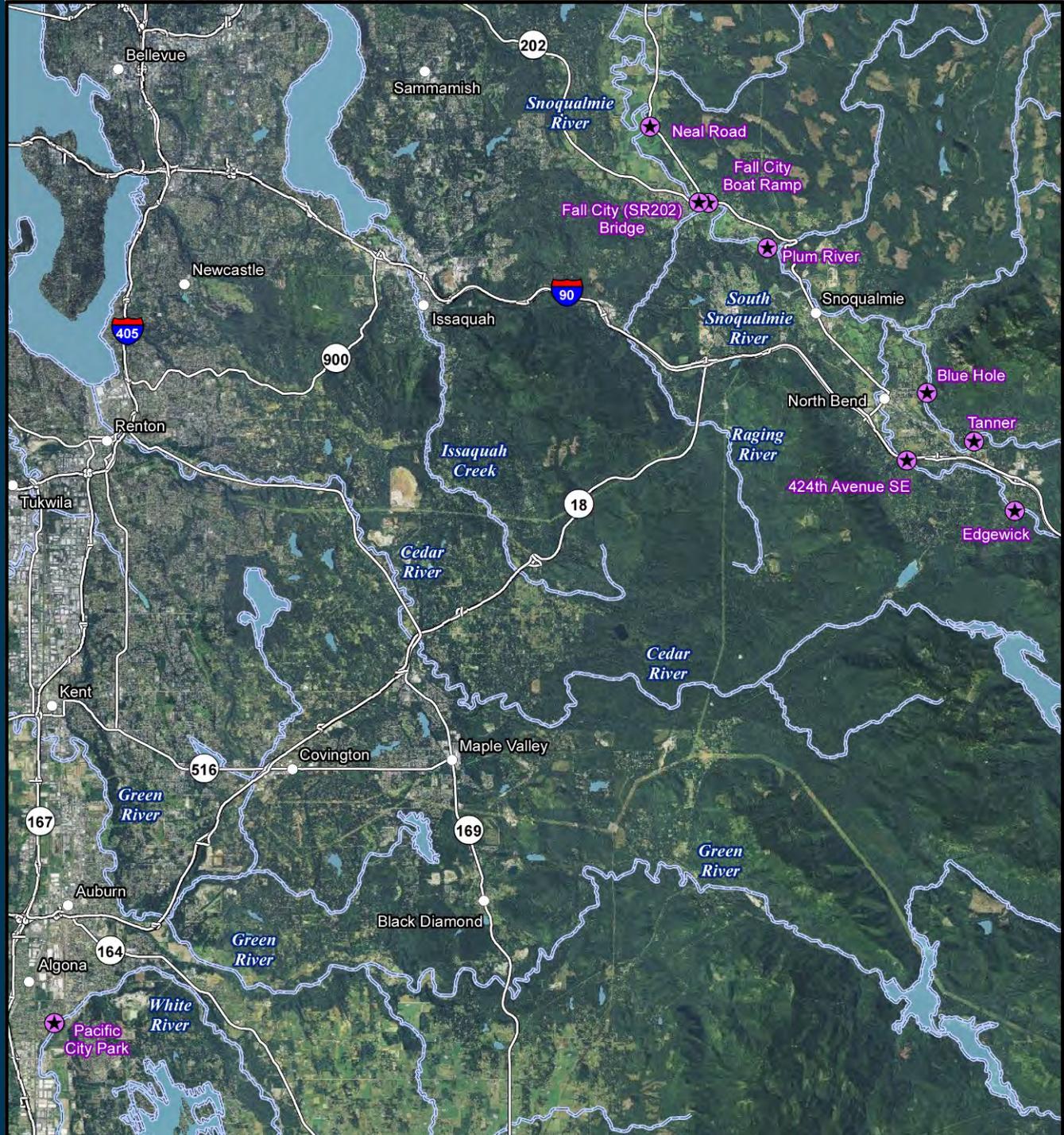
# Aerial Survey

Total Groups Observed	125
Total People Observed	597
% adult/% youth/% children	93/3/3
% male / % female	58/42
tubes-mattresses	61 %
rafts	23 %
kayaks-canoes-other	15 %
% vessels with oars or paddles	19
% wearing personal flotation devices	15
% groups with alcohol visible	35



# Interviews

- 26 interviews on 3 days



# Interview Questions - Subjects

- How often and where the interviewee floats.
- Information about the day's float: group size, vessels used, put-in location, and hours spent on river.
- Location of residence.
- Use of PFDs.
- Perception of group's ability.
- Understanding of river conditions and perception of boating hazards.
- Support for / opposition to regulations and outreach techniques.

# Comparing 2013 Observations with Previous Studies

	2010 Cedar Field Observation	2011 Lifejacket Monitoring	2013 Remote Cameras	2013 Aerial Surveys	2013 Snoqualmie Field Observation
# of Observations (Groups / People)	550 / 1,960	130 / 438	9,826 / 35,171	125 / 597	1,474 / 5,938
% adult / % youth / % children	73/18/9*	56/41/3**	94/4/2*	93/3/3*	88/8/4*
% male / % female	65/35		62/38	58/42	55/45
% tubes-mattresses / % rafts / % kayaks-canoes-other	84/12/5	77/18/4	65/23/12	61/23/15	62/28/10
% vessels with oars or paddles	13	14	19	19	27
% wearing personal flotation devices	8 (5/2/39)*	30 (20/38/100)**	7 (12 – Cedar)	15	12
% groups with alcohol visible	26		3-45 <sup>1</sup>	35	26
Average daily people in Lower Cedar River <sup>2</sup>	18.7		17.7		
Average daily people at Cedar Grove Road (Cedar River) <sup>3</sup>	12.8		0.8		

\* Adults defined as 18 and older    \*\* Adults defined as 22 and older

<sup>1</sup> range due to uncertainty in observation

# Next Steps

- Data informs projects
- Future study of project areas
- Careful consideration of study methods
- Corridor Planning
- Qualitative study

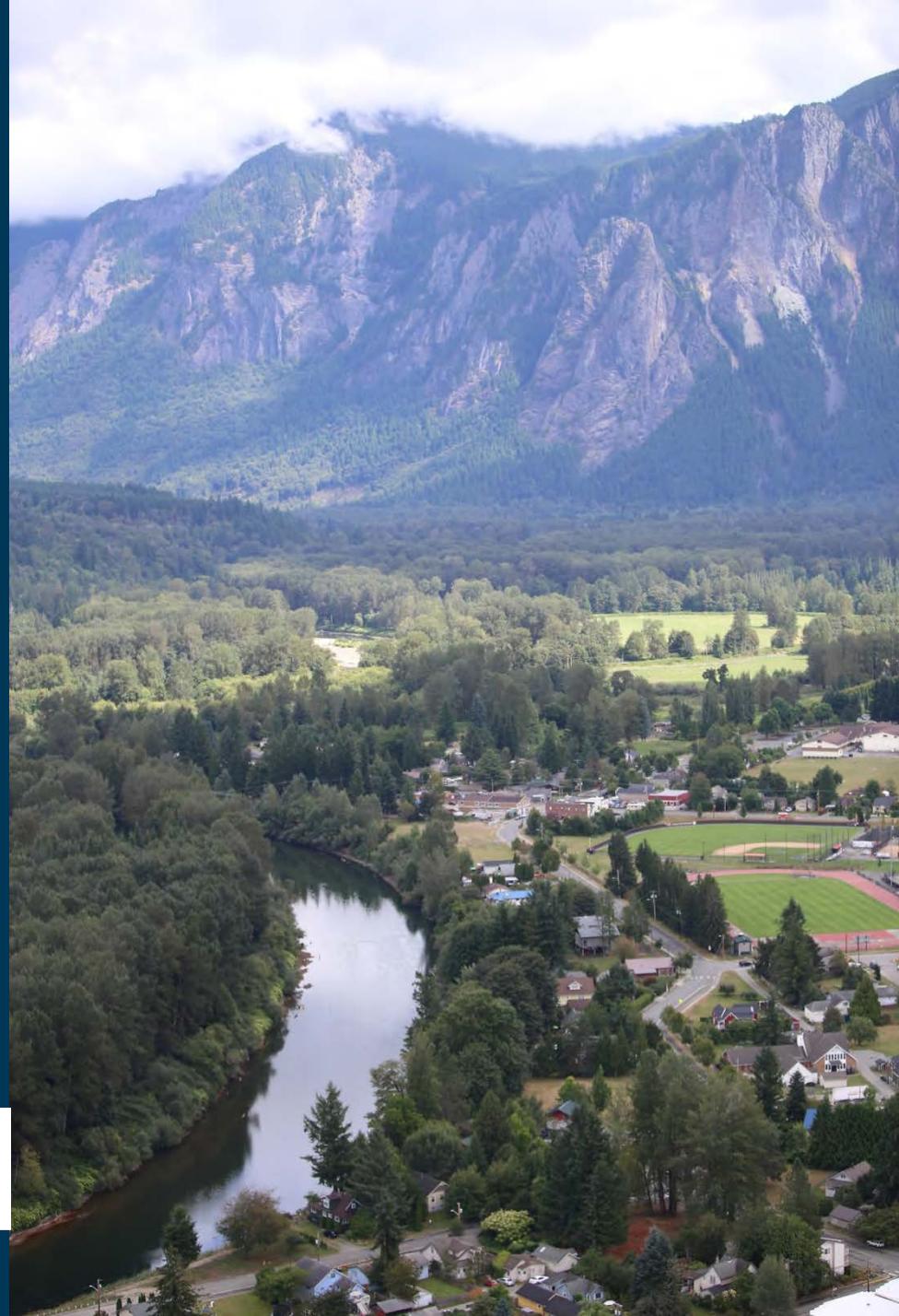


# Questions?

**Katy Vanderpool**

King County Dept. of Natural Resources and Parks  
206-477-4841  
katy.vanderpool@kingcounty.gov

[kingcounty.gov/riversafety](http://kingcounty.gov/riversafety)



# Snoqualmie River Basin

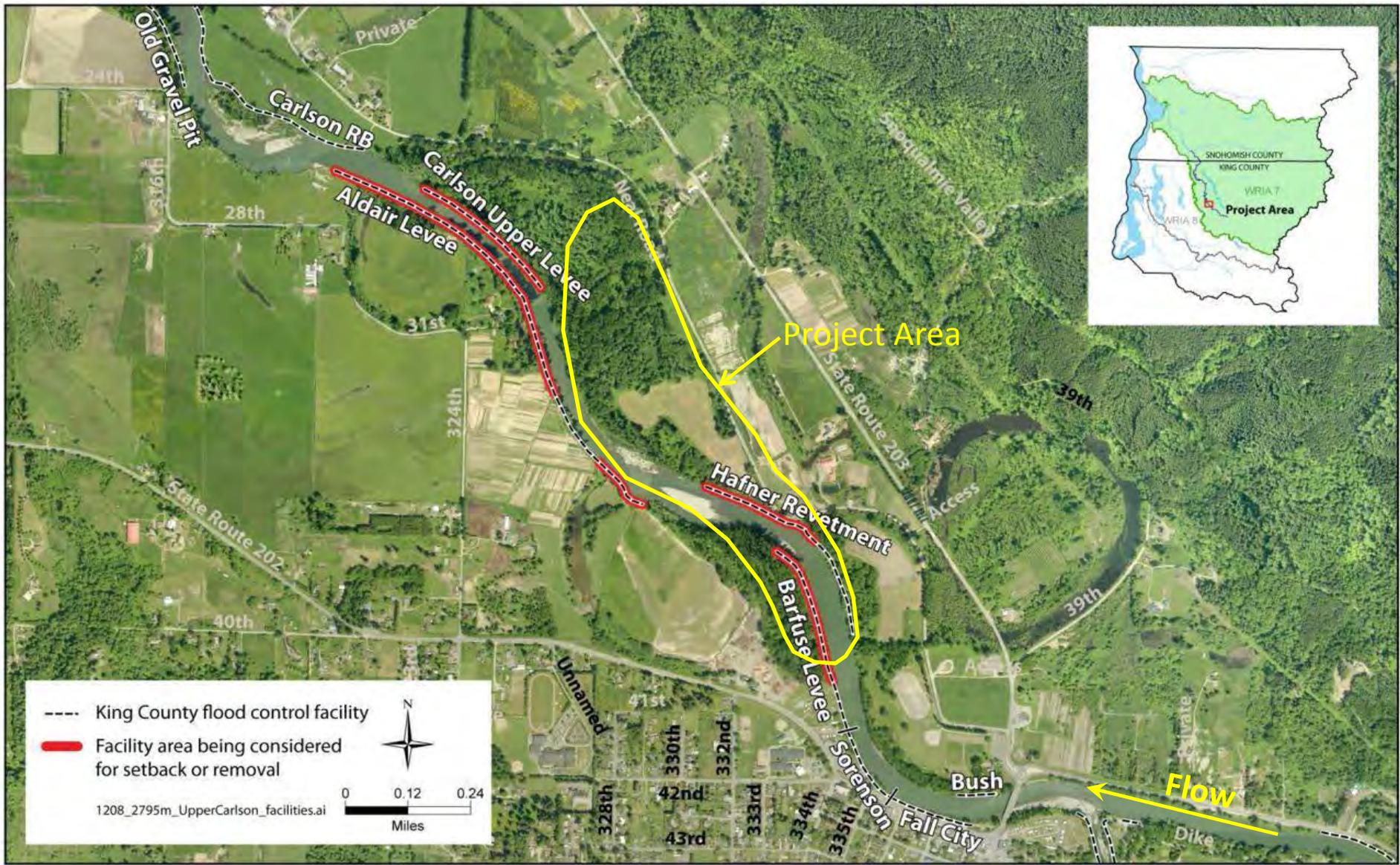
# Hafner Floodplain Restoration Project



# Hafner Project Description

## **Problem Statement**

Training levee & revetment disconnects the river from natural habitat-forming processes like floodplain channel migration and adjustment, and interferes with wood recruitment, and logjam formation.



- - - King County flood control facility  
 - - - Facility area being considered for setback or removal

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0 0.12 0.24  
 Miles

N



# County Goals for the Reach

- Fish – protect and restore habitat consistent with Snohomish River Basin Salmon Conservation Plan
- Farm – protect agricultural resource lands, increase ag viability, improve stewardship on farms.
- Flood – reduce flood and erosion risks homes/farms; increase storage capacity for flood waters and sediment through levee setbacks.

# Project Objectives

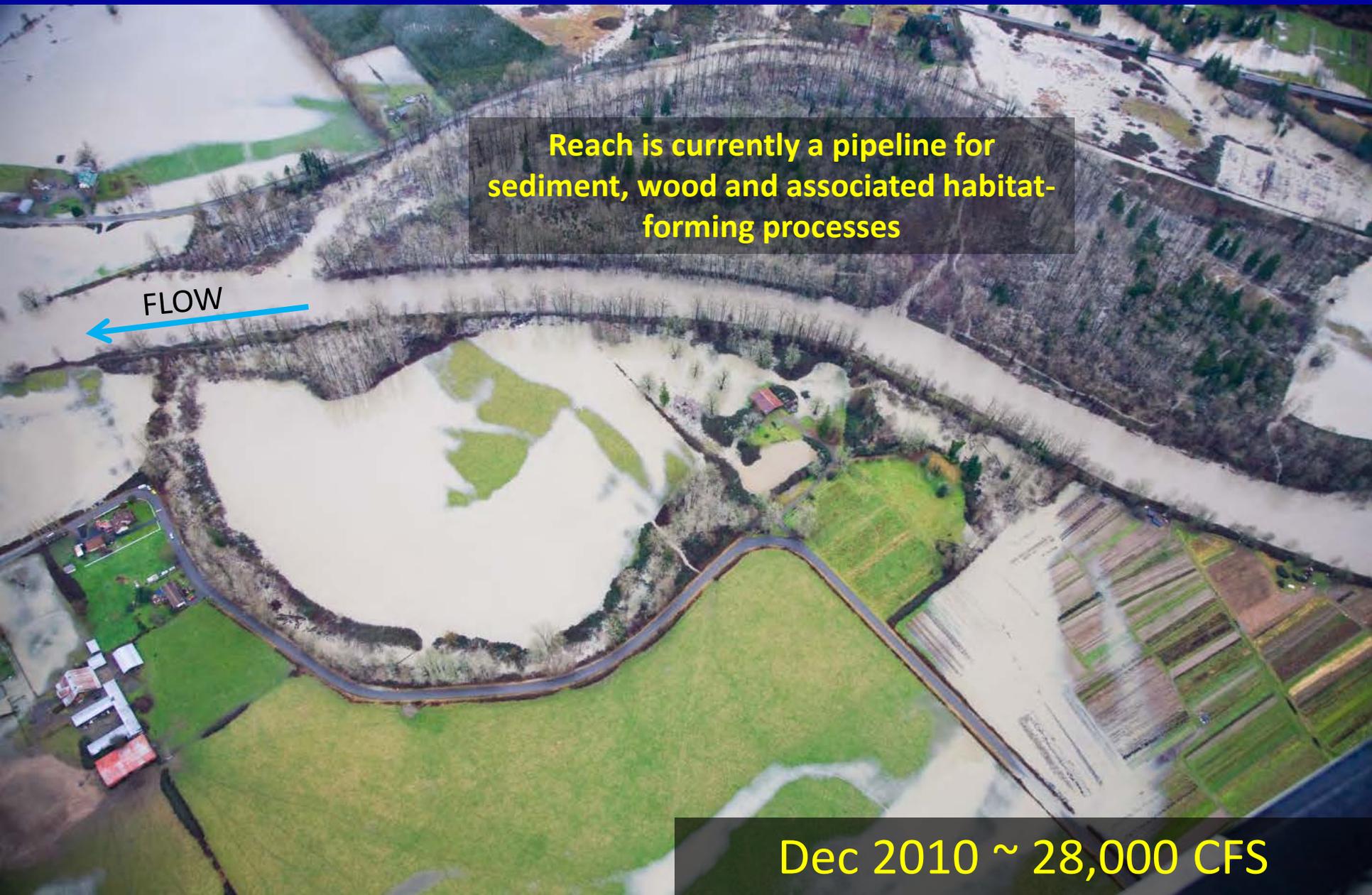
- To promote natural rate/frequency of channel & floodplain processes
- Improve salmon/steelhead spawning and rearing habitat
- Enhance and maintain native vegetation communities

While also:

- **Maintaining or improving current levels of flood hazard protection**
- **Addressing potential impacts to recreational boater safety**
- **Protecting agricultural viability**

**Challenge – Natural Process is inherently unpredictable**

# Existing Conditions - Channel migration and sediment

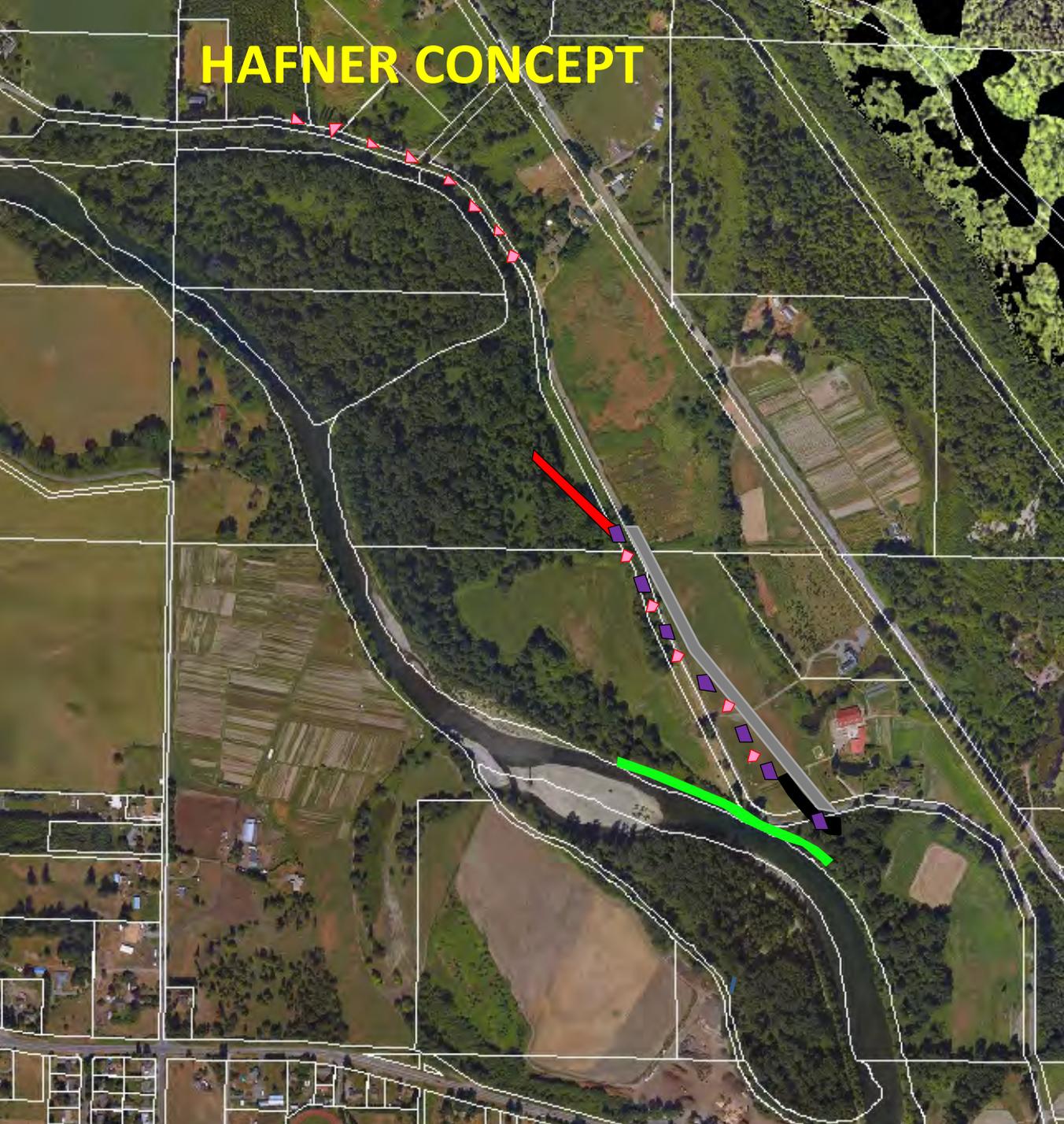


Reach is currently a pipeline for sediment, wood and associated habitat-forming processes

FLOW

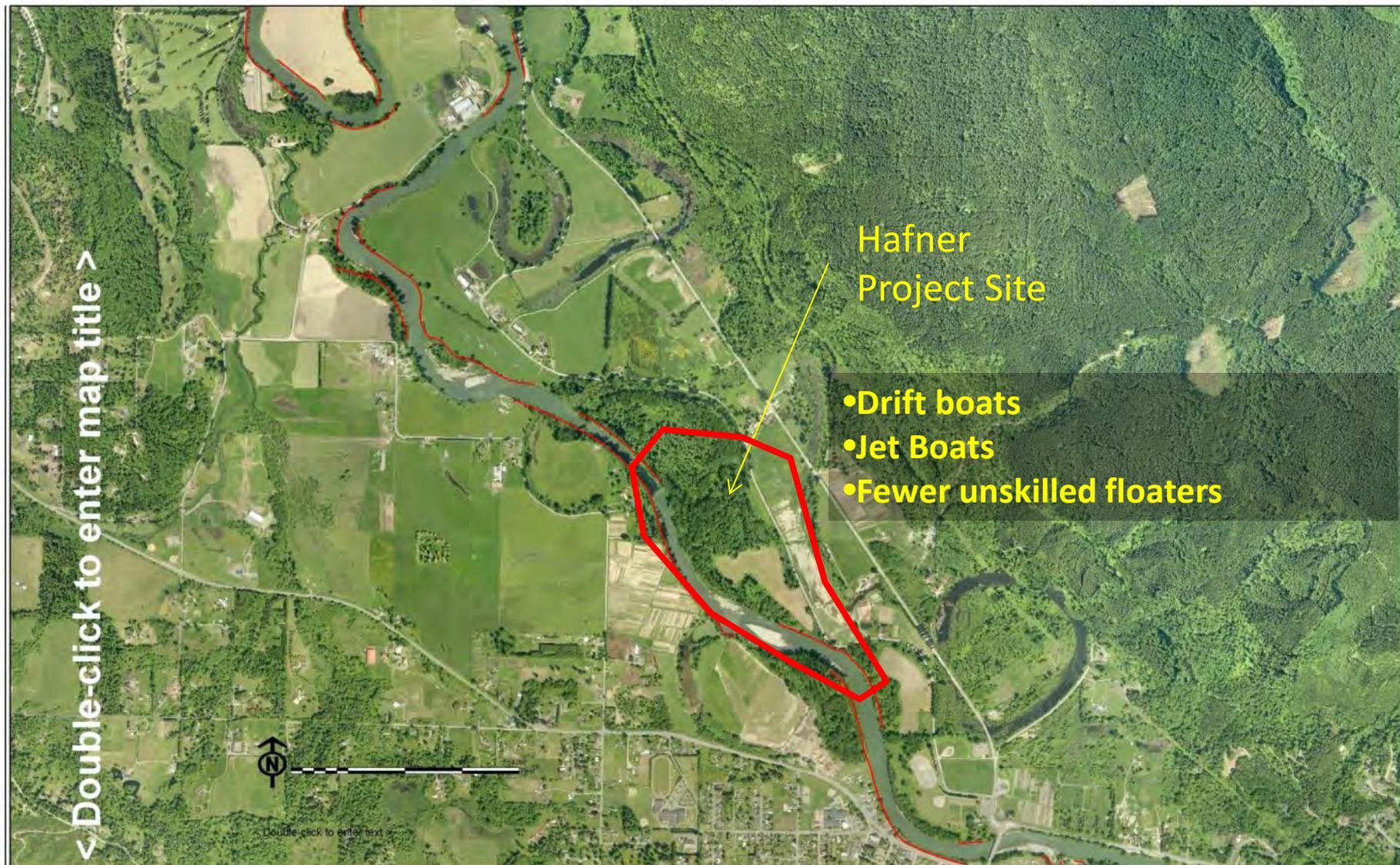
Dec 2010 ~ 28,000 CFS

# HAFNER CONCEPT

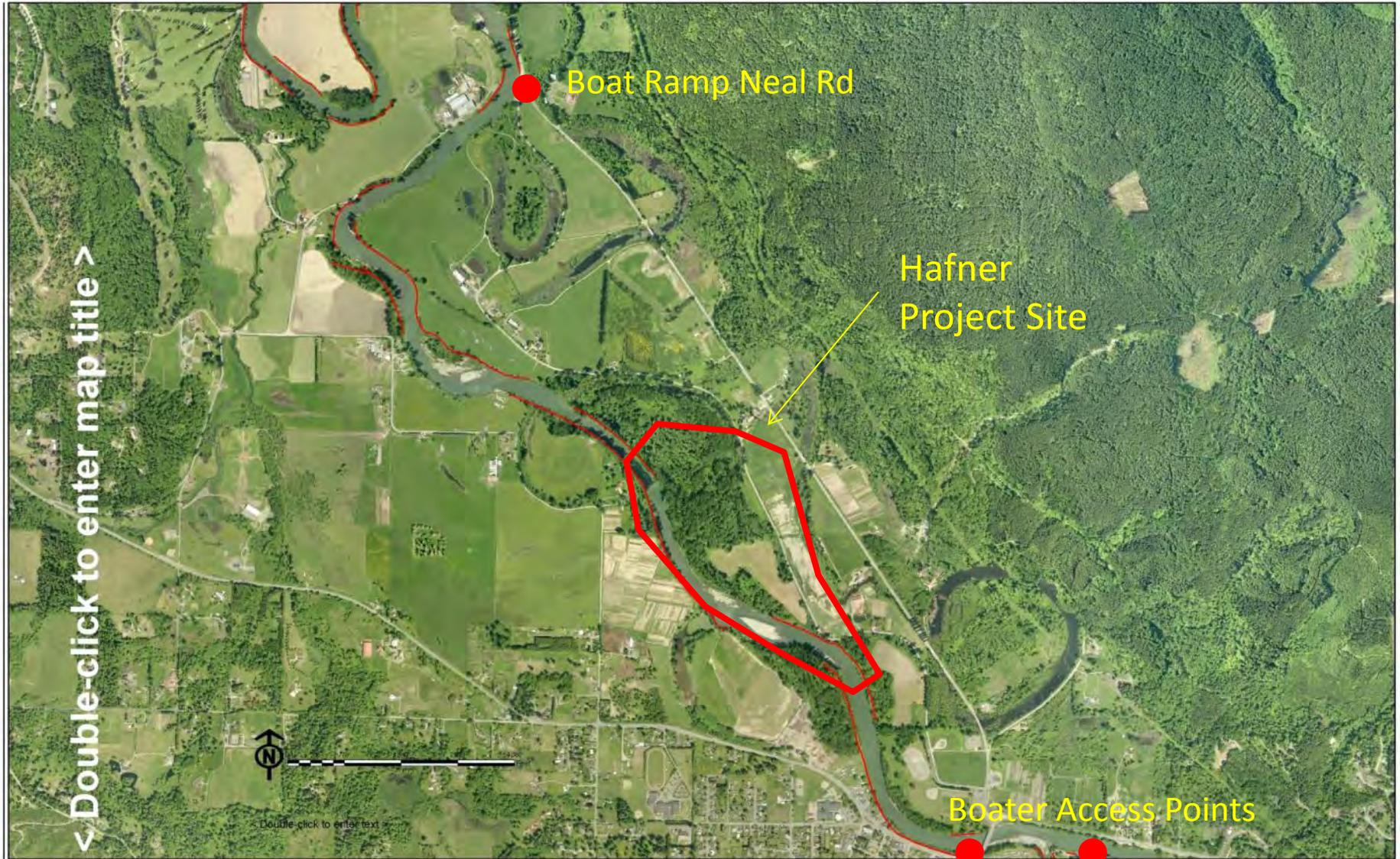


-  New Rock Revetment
-  New Road and ROW
-  Revetment Removal
-  New Launch revetment
-  Large ELJ
-  Small ELJ

# Level & Type of Use in this reach

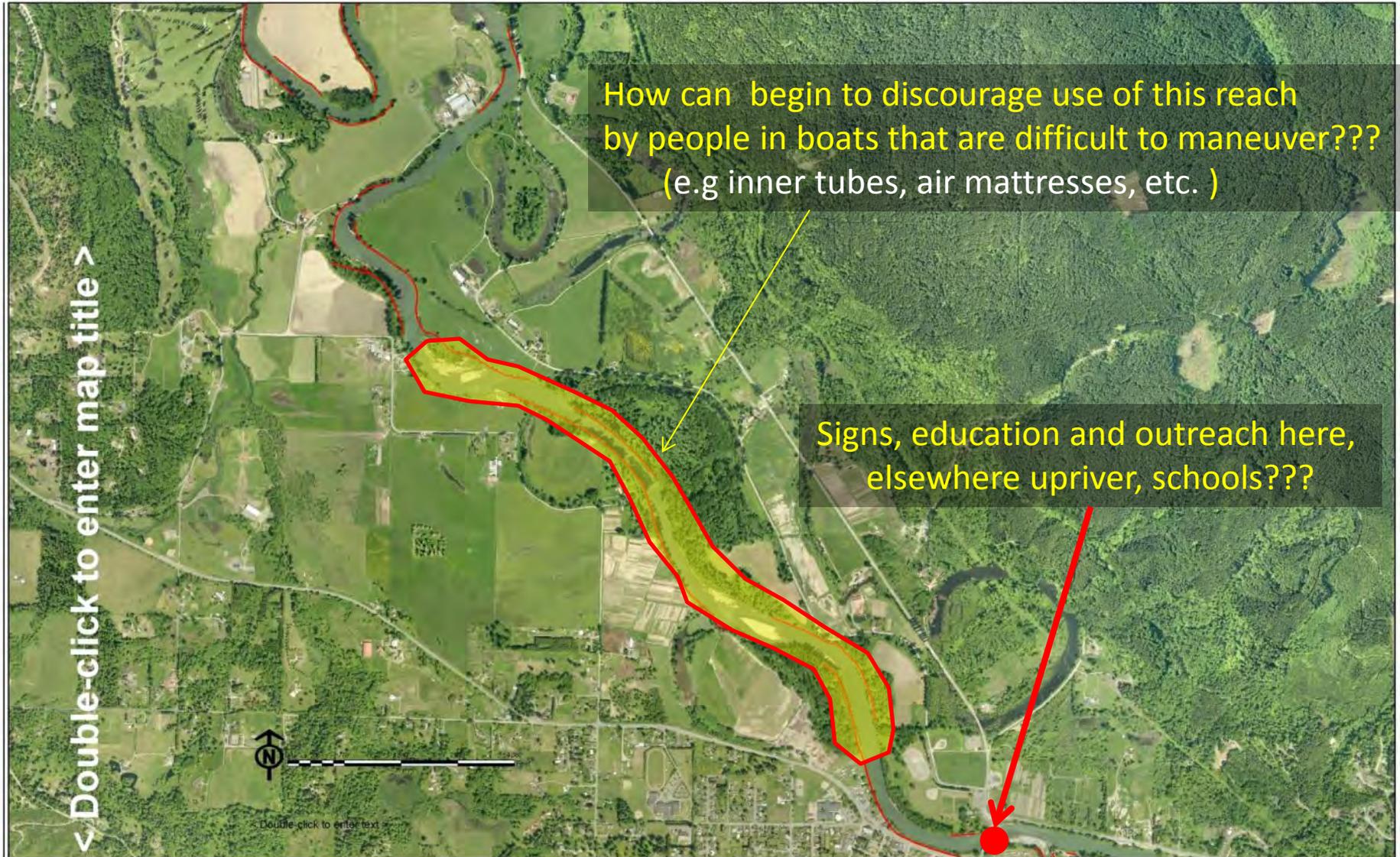


# Current Access points



# Snoqualmie at Fall City Corridor Reach

Signage, education, outreach is VERY important



# Reducing Risks from wood Site Management Plan tbd

- Warning/Advisory Signs Best methods/locations???
- Extensive public outreach and education Best methods/location ???
- Modification of unacceptable hazards When/how much/sustainable strategy???

## Post-Project Adaptive Management plan

- Develop with input from local workgroup.

# Hafner Floodplain Restoration Project Schedule Overview

*with upcoming opportunities for public input shown in yellow*

- Alternative Selection Summer 2014
- Draft 30% design Feb. 2015
- Public Input via LWD meetings **today, 30%, 60%**
- Public input via Public Meeting **Winter, 2015**
- SEPA Comment Period **Summer, 2015**
- Local work-group meetings (reach effort) **on-going**
- 60% plans/lwd checklist posted **Summer, 2015**
- Final Plans Complete Feb. 2016
- Construction Summer 2016

# Project Partner

Coordinated Investments in Floodplains

## Contact Information

Project Manager: Fauna Nopp, 206-477-4787  
fauna.nopp@king.county.gov

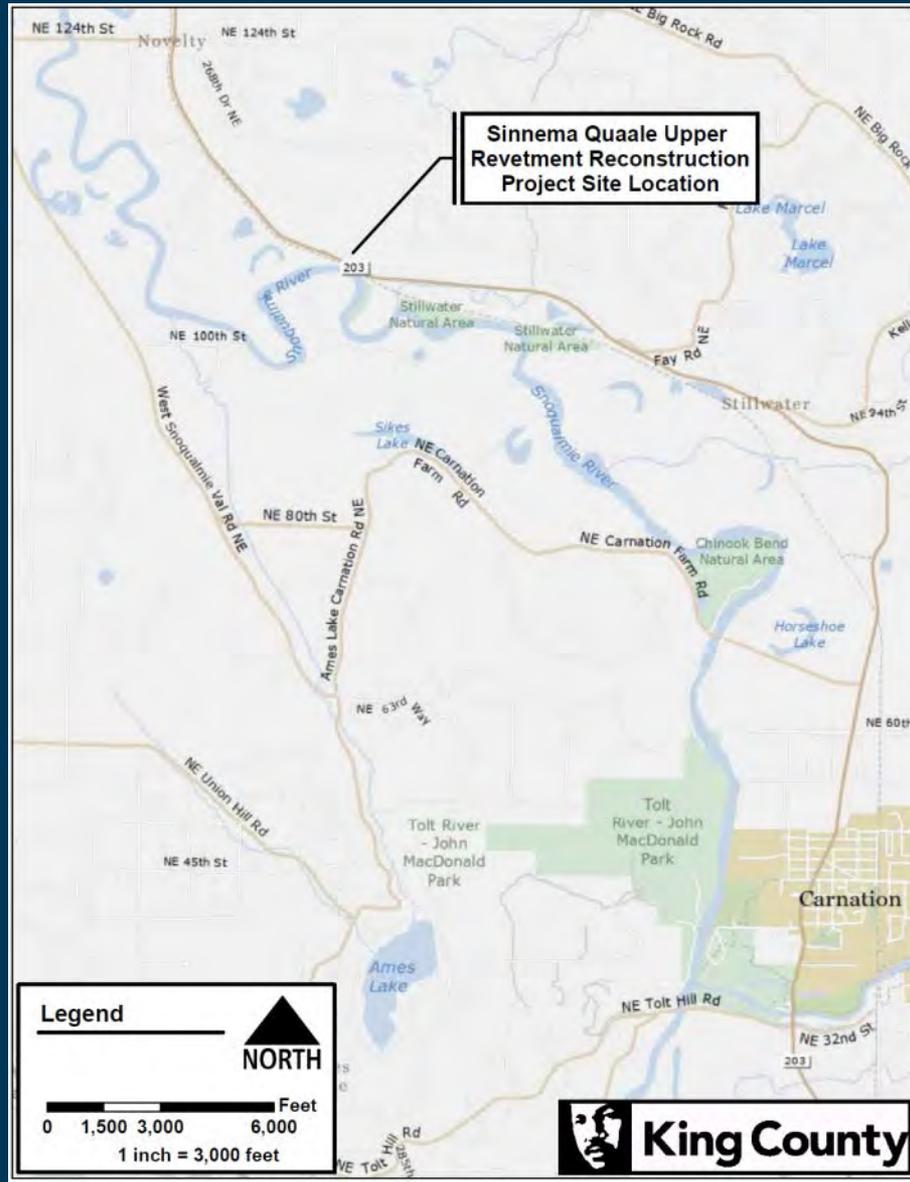
# Sinnema Quaale Upper Revetment Reconstruction Project

Large Wood Public Meeting  
June 10, 2014

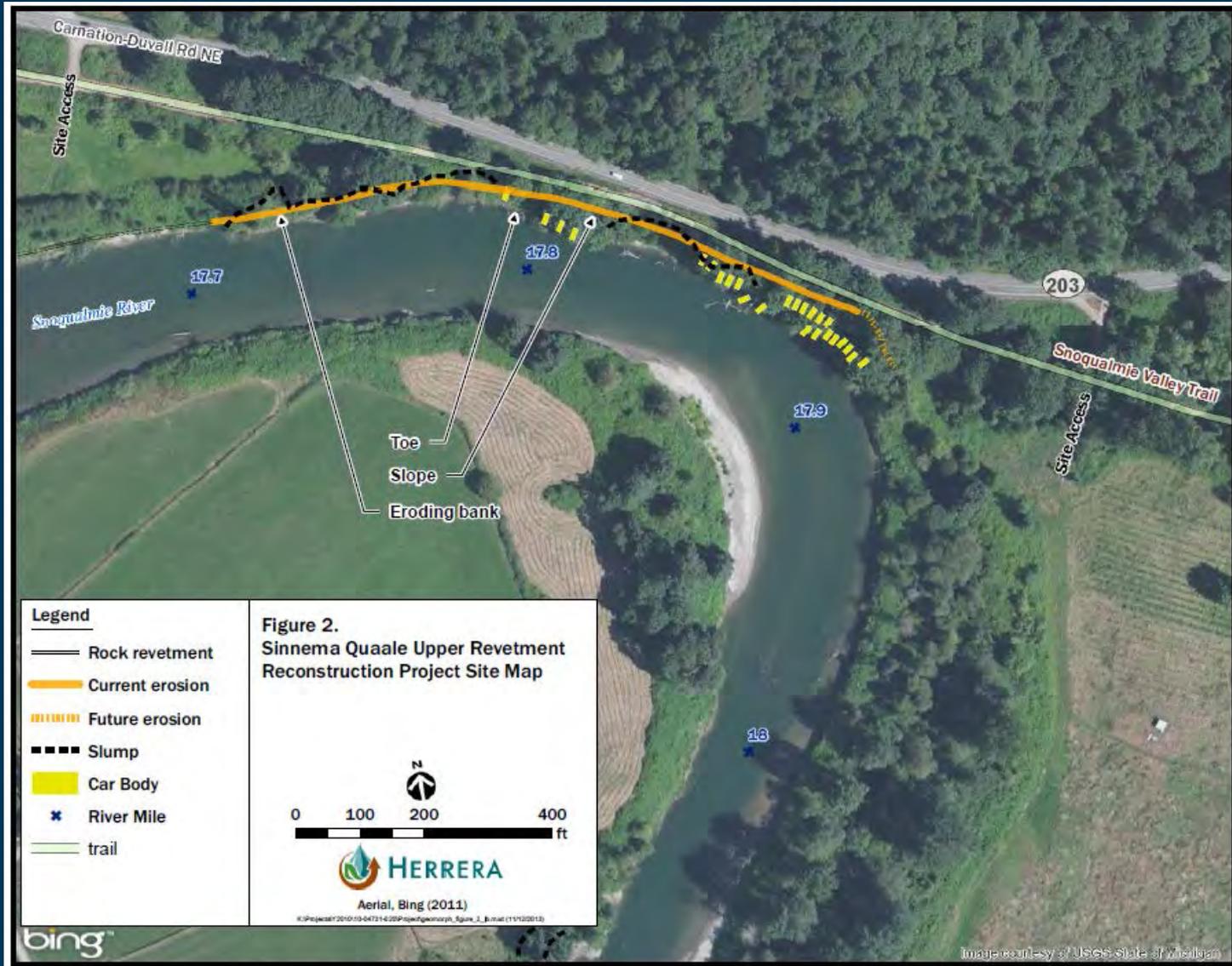
Chase Barton, PE, LG, Project Manager  
River and Floodplain Management Section  
King County Water and Land Resources Division



# Project Site Location



# Project Site Details



# Project Objectives

- Reconstruct the revetment to protect the Snoqualmie Valley Trail and the regional fiber optic line located in the trail.
- Reduce the long-term costs of flood hazard management associated with repeated repairs and the likelihood of emergency actions.
- Reduce the maintenance costs associated with trail repairs resulting from ongoing bank instability.
- Provide increased slope stability to the embankment supporting State Route 203 to the extent practicable.
- Provide riparian and aquatic habitat benefits to the extent practicable.

# Project Site Conditions



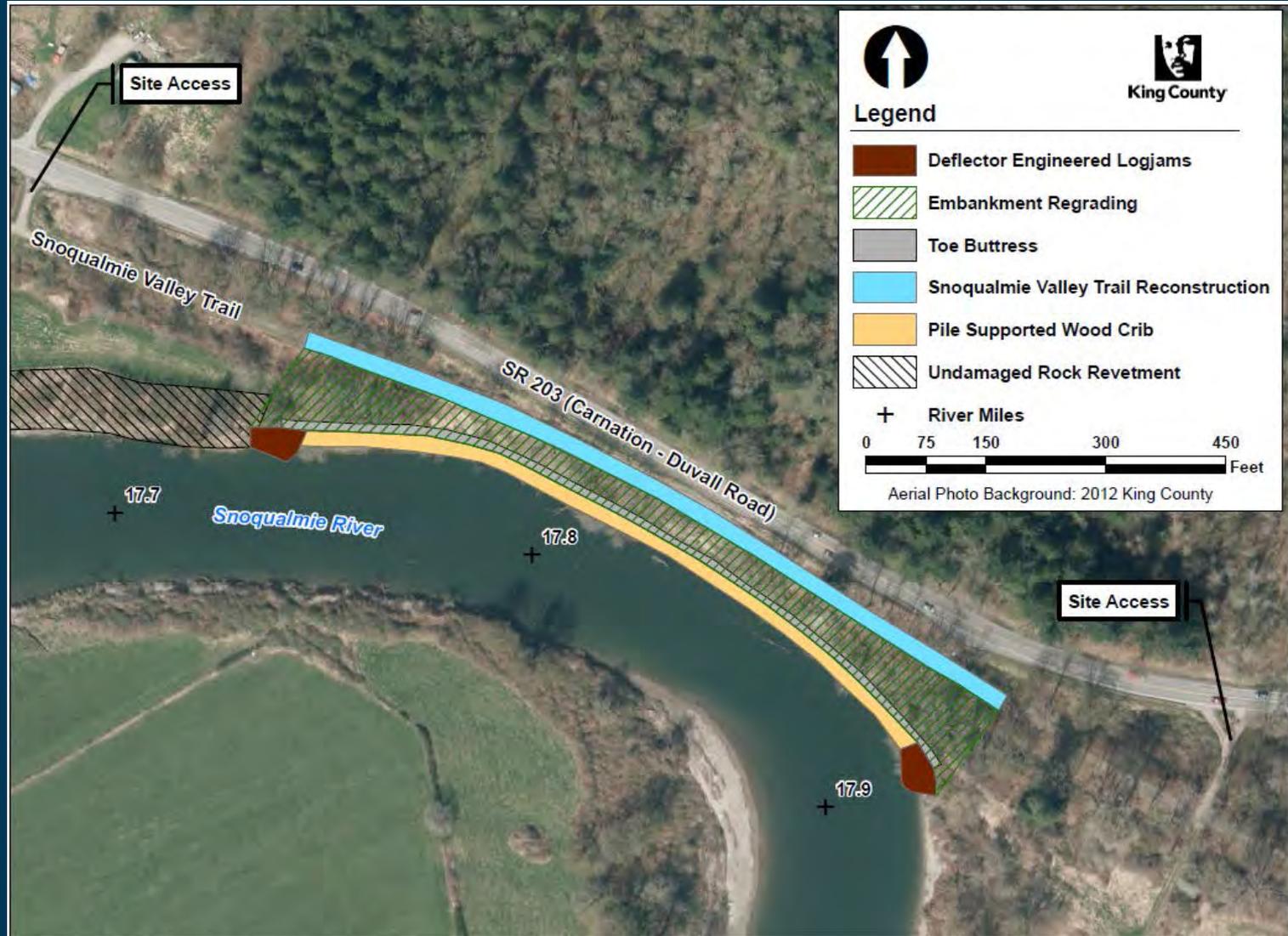
# Project Site Conditions



# Project Site Conditions



# Proposed Conditions/Project Elements



# Recreational Use

- Infrequent to moderate use by fisherman and motorized boats.
- Access to project reach is limited.
  - Upstream access from Carnation
  - Downstream access from Duvall
- Passive recreation (walking, running, bicycling) on Snoqualmie Valley Trail.
- Slow velocities in project reach.
- Long sight lines to wood placement locations.

# Project Schedule

- 30% plans available August 2014
- Permit applications to be submitted August 2014
- 60% plans available December 2014
- 100% design complete March 2015
- Construction July 2015 – October 2015

# Questions?

- Contact Information:

Chase Barton

email: [chase.barton@kingcounty.gov](mailto:chase.barton@kingcounty.gov)

phone: (206) 477-4854

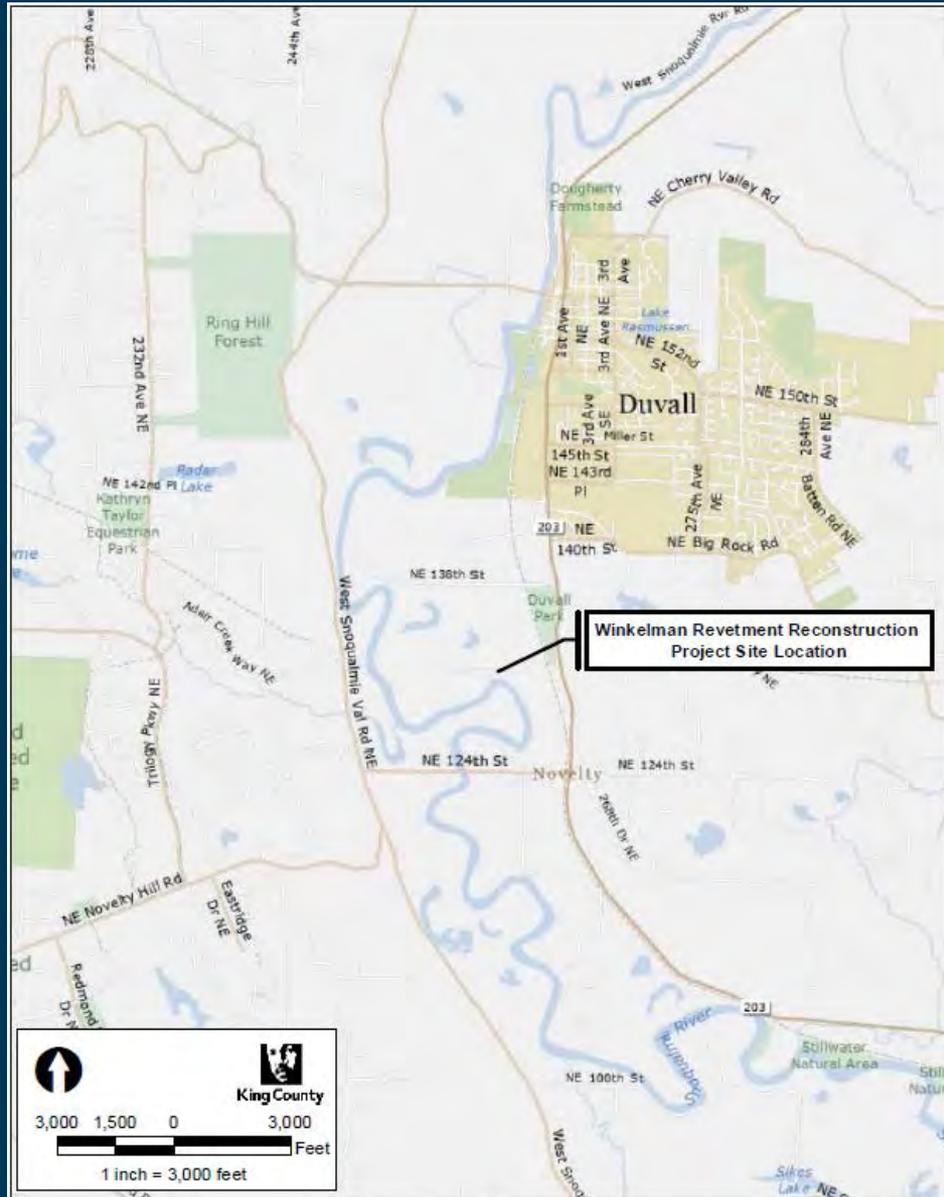
# Winkelman Revetment Reconstruction Project

Large Wood Public Meeting  
June 10, 2014

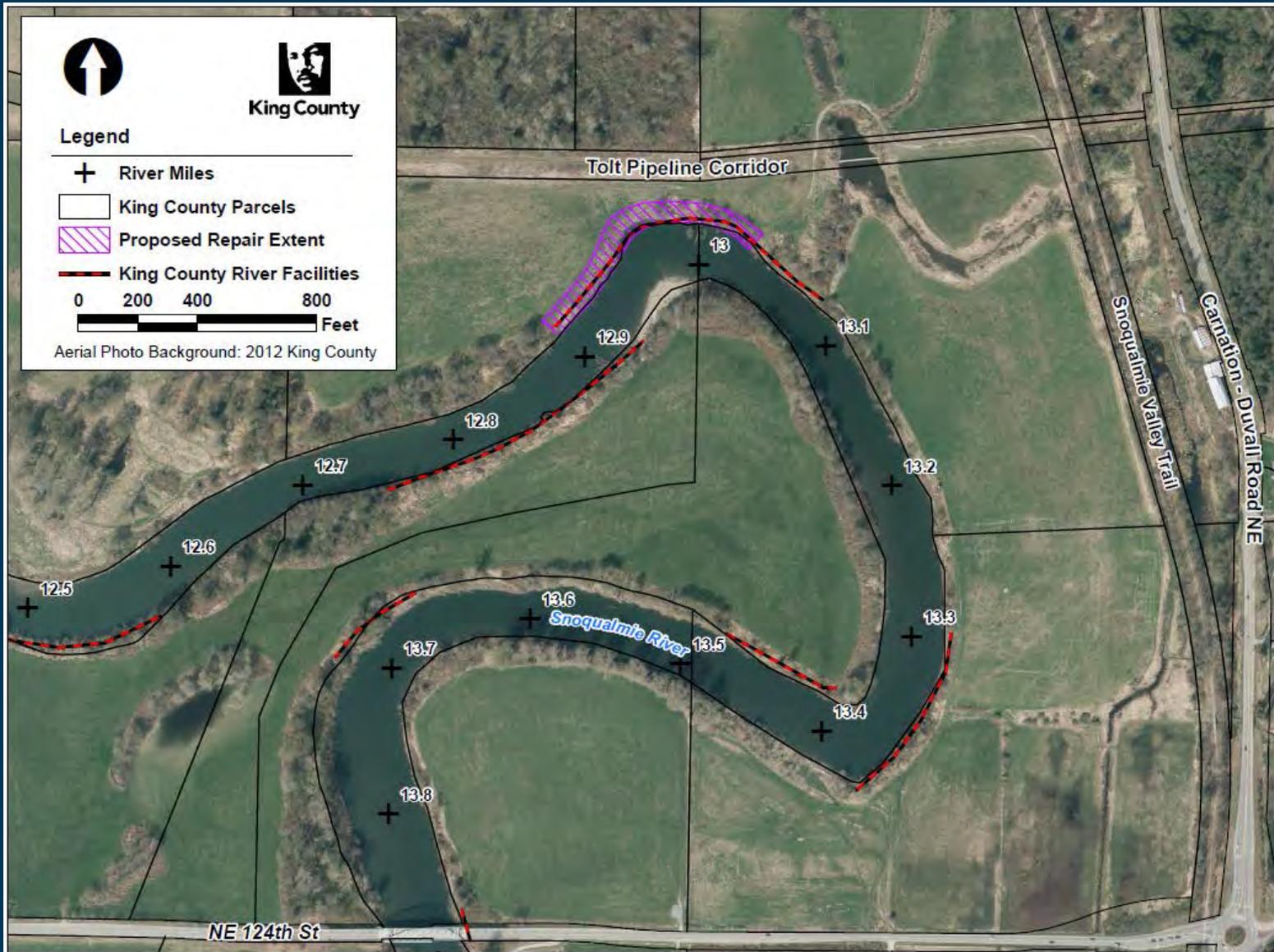
Chase Barton, PE, LG, Project Manager  
River and Floodplain Management Section  
King County Water and Land Resources Division



# Project Site Location



# Project Site Details



# Project Objectives

- Reconstruct the revetment to protect the City of Seattle's Tolt River Water Supply Pipeline.
- Minimize long-term maintenance needs and costs of flood hazard management associated with repeated repairs and the likelihood of emergency actions.
- Provide riparian and aquatic habitat benefits to the extent practicable.
- Limit impacts to agricultural land near the project site.

# Project Site Conditions



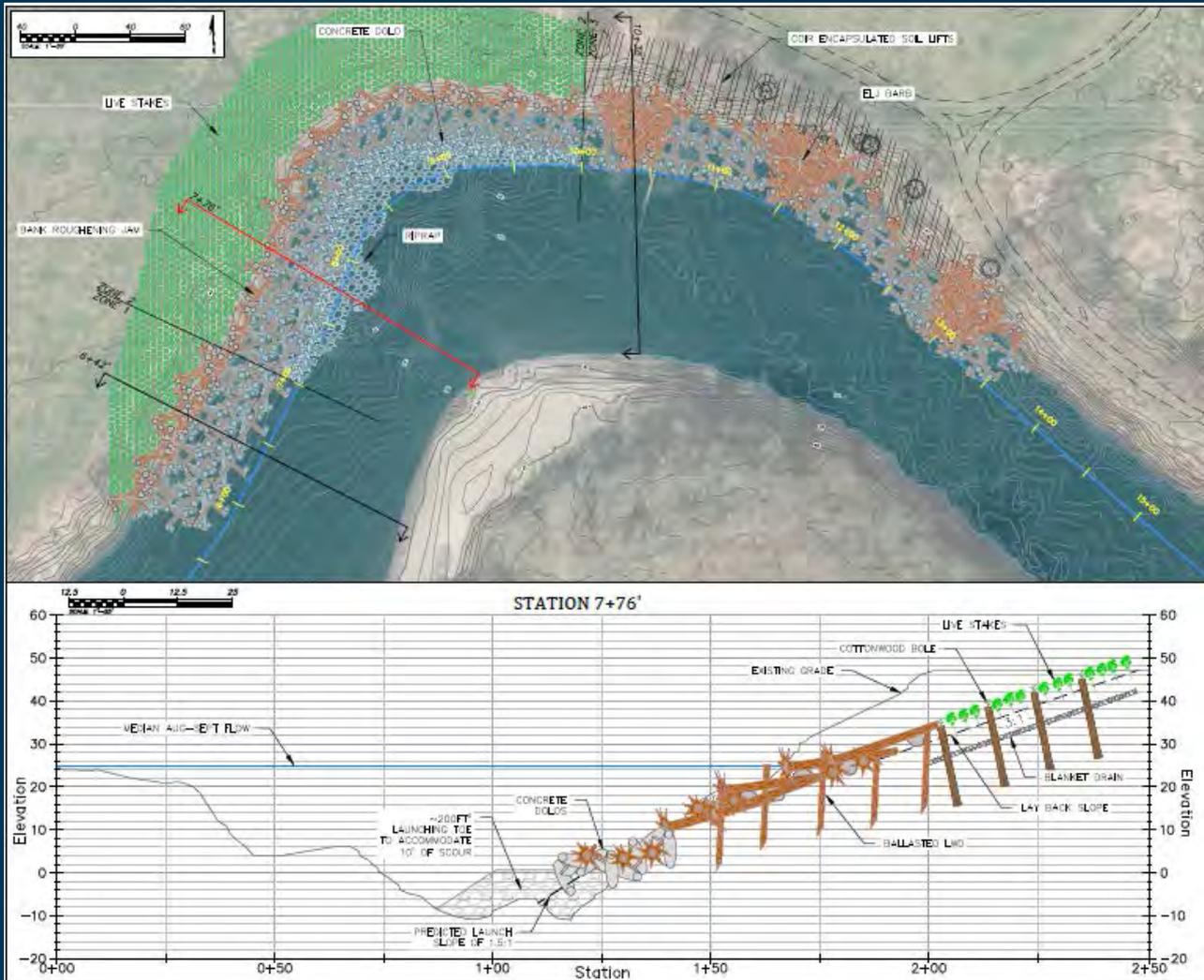
Looking Upstream from floodplain surface

# Project Site Conditions



Looking downstream from toe of bank during low flow conditions

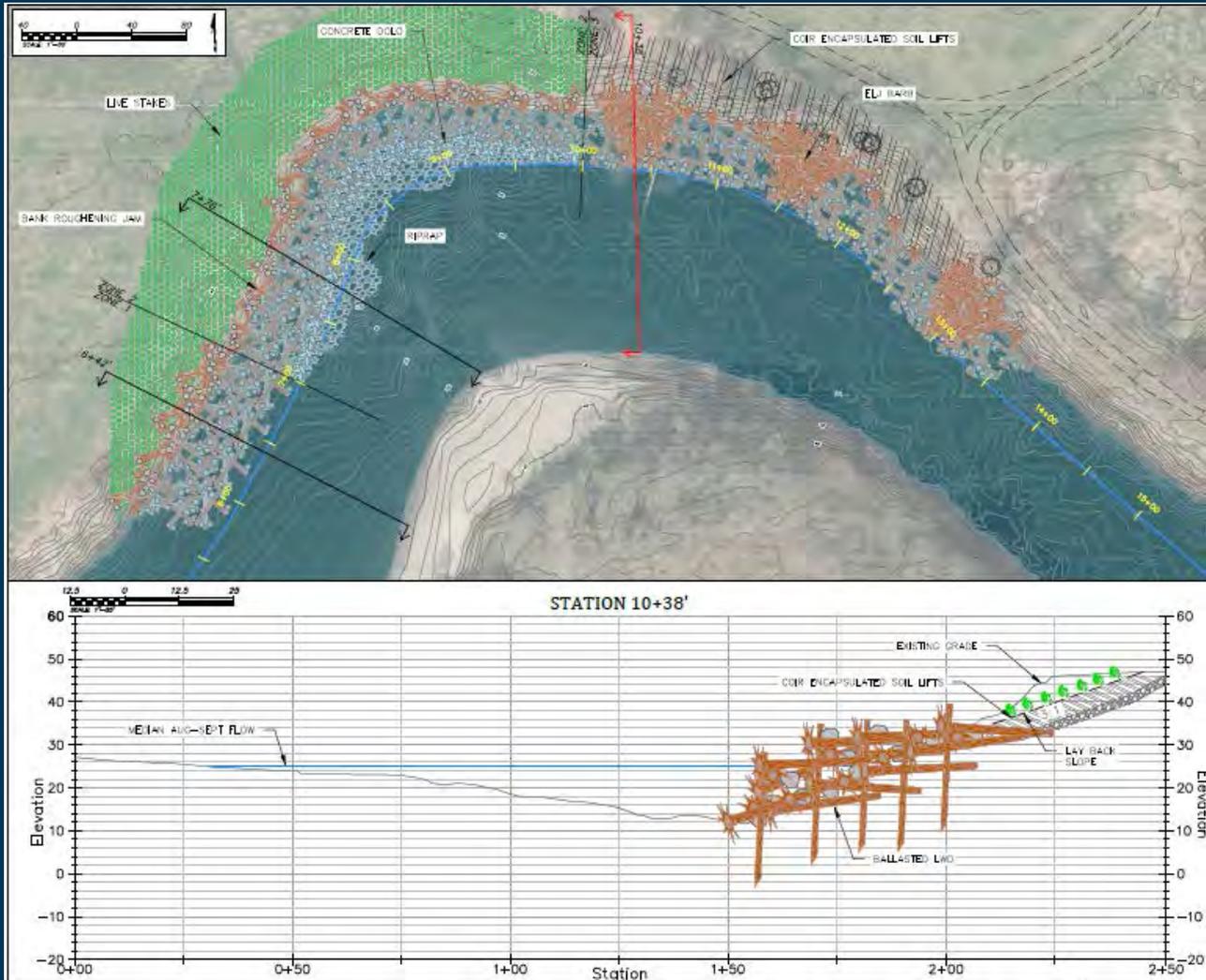
# Potential Conditions



## Project Elements:

- Toe:
  - Dolo/riprap toe
- Lower Bank:
  - Pile supported bank roughening jam
  - Bank resloping
- Upper Bank:
  - Live stakes
  - Coir encapsulated soil lifts
  - Bank resloping

# Potential Conditions



## Project Elements:

- Toe/Lower bank:
  - Engineered logjams and pile supported bank roughening structures
  - Bank resloping
- Upper Bank:
  - Live stakes
  - Coir encapsulated soil lifts
  - Bank resloping

# Recreational Use

- Infrequent to moderate use by fisherman and motorized boats.
- Access to project reach is limited.
  - Upstream access from Carnation
  - Downstream access from Duvall
- Slow velocities in project reach.
- Long sight lines to wood placement locations.

# Project Schedule

- 30% plans available January/February 2015
- 60% plans available June 2015
- Permit applications to be submitted by June 2015
- 100% design complete December 2015
- Construction July 2016 – October 2016

# Questions?

- Contact Information:

Chase Barton

email: [chase.barton@kingcounty.gov](mailto:chase.barton@kingcounty.gov)

phone: (206) 477-4854

# Vashon Island

# Scott Property, Judd Creek Habitat Enhancement Small Habitat Restoration Project.

**King County DNRP Public Meetings  
2014 Projects Involving Large Wood Placement**

June 10, 2014,  
3:00–5:00 p.m.

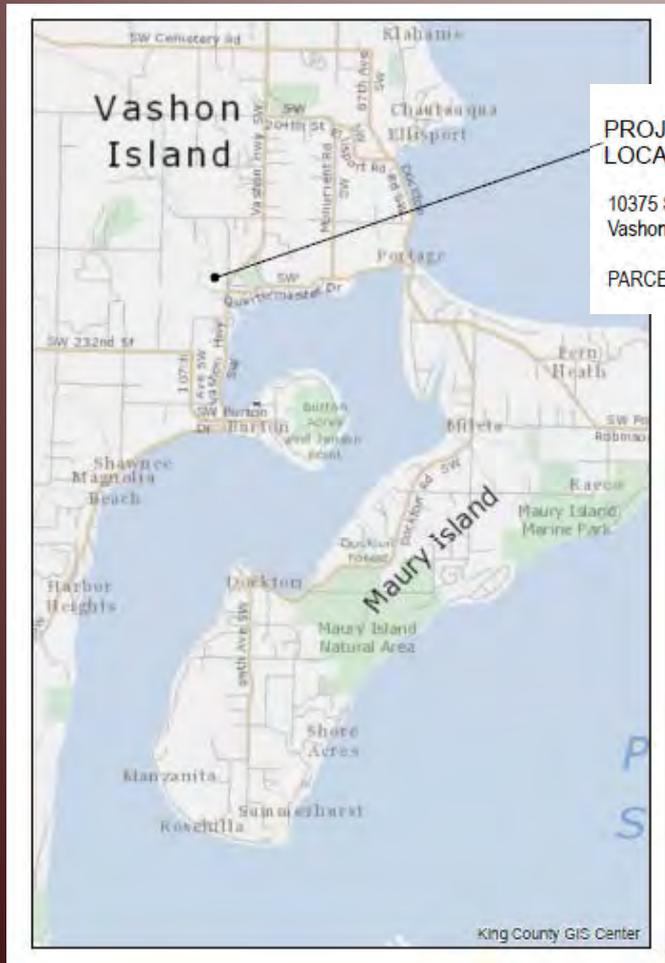
&

6:00–8:00 p.m.

Issaquah Fish Hatchery  
Watershed Science Center Conference Room,  
125 Sunset Way, Issaquah



# Scott Property, Judd Creek Habitat Enhancement Small Habitat Restoration Project.



The purpose of the project is to restore natural habitat forming processes by placing large and small woody debris into Judd creek and the Judd Creek estuary.

The project is located at the mouth of Judd Creek in Quartermaster Harbor on Vashon Island and within the WRIA 9 Marine Nearshore Subwatershed Priority Habitat Protection Area.

The conservation and restoration of Judd Creek estuary is specified in the WRIA 9 Salmon Habitat Plan\* (Project NS-17.)

The project addresses these conservation goals from the plan\*:

- Protecting/increasing vegetated shallow nearshore and marsh habitats (Near-2)
- Protecting and restoring nearshore sediment transport processes (Near-3)
- Protecting and expanding forage fish spawning areas (Near-4)
- Protecting and enhancing pocket estuaries and tributary stream mouths (Near-5)

\* Green/Duwamish and Central Puget Sound Watershed (WRIA 9) Salmon Habitat Plan (Green/Duwamish and Central Puget Sound Watershed Water Resource Inventory Area 9 Steering Committee, August 2005)

# Log Placement in Judd Creek



**CONCEPTUAL  
PLANS  
05/23/2014**

Approved	Will Mansfield	
Project Manager	Paul Adler	
Design	Paul Adler	1/1/2014
Engineering	Alex Hallenius	



King County Department of Natural Resources and Parks  
Water and Land Resources Division  
Rural and Regional Services Section  
Ecological Restoration and Engineering Services Unit

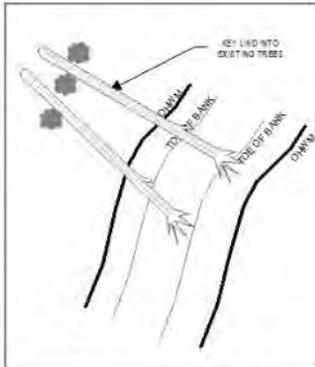
Christie True, Director

**Scott Property, Judd Creek  
Habitat Enhancement SHRP**

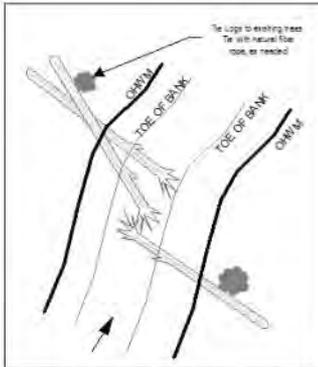
**STREAM LWD  
PLAN**

**SHEET  
4  
of  
7  
SHEETS**

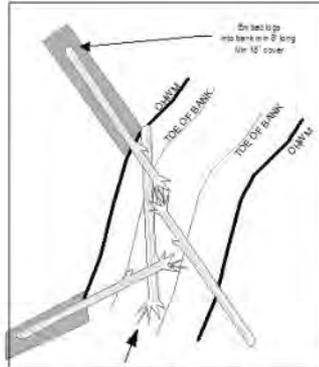
# Log Placement in Judd Creek - Details



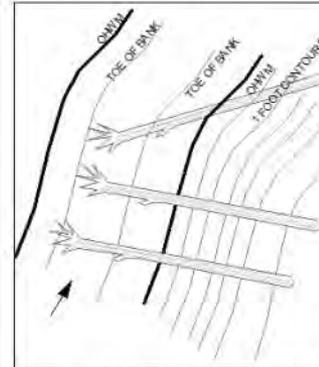
LOGS KEYED INTO EXISTING TREES  
STREAM LWD DETAIL



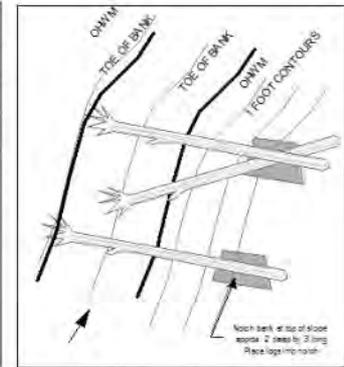
LOGS KEYED INTO EXISTING TREES ON BOTH BANKS  
STREAM LWD DETAIL



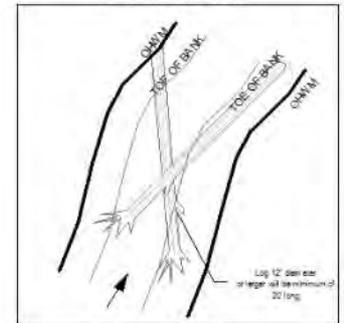
LOG COMPLEX WITH KEY LOGS EMBEDDED INTO BANK  
STREAM LWD DETAIL



LOGS PLACED ON SLOPE GREATER THAN 6' HIGH  
STREAM LWD DETAIL



LOGS PLACED ON SLOPE LESS THAN 6' HIGH  
STREAM LWD DETAIL



UNANCHORED LWD COMPLEX  
STREAM LWD DETAIL

**GENERAL NOTES**

1. ALL PLACEMENTS TO BE DETERMINED BY ENGINEER OR ECOLOGIST
2. ALL IN-WATER WORK WILL BE DONE USING BMPs TO MINIMIZE TURBIDITY AND IMPACTS TO AQUATIC ORGANISMS.
3. ALL IN-WATER WORK TO BE DONE UNDER THE DIRECTION OF AN EXPERIENCED ENGINEER OR ECOLOGIST, WHO IS A CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CECL).
4. AREAS OF GROUND DISTURBANCE WILL BE LIMITED TO AREA SHOWN AND AREAS SURVEYED FOR CULTURAL RESOURCES.

**LWD NOTES:**

1. ADDITIONAL SMALL WOOD CONSISTING OF > 12" DIAMETER BRUSH TO BE ADDED TO LWD COMPLEXES TO ADD COVER AND COMPLEXITY (NOT SHOWN).
2. ALL LWD TO BE NATIVE CONIFER SPECIES 12" TO 30" DBH
3. LWD TO BE PLACED IN COMPLEXES. LWD MAY BE TIED TOGETHER WITH NATURAL FIBER ROPE OF MARINE GRADE CHAIN

CONCEPTUAL PLANS  
05/23/2014

Approved	Will Mansfield	
Project Manager	Paul Adler	
Design	Paul Adler	
Engineering	Alex Hallenius	

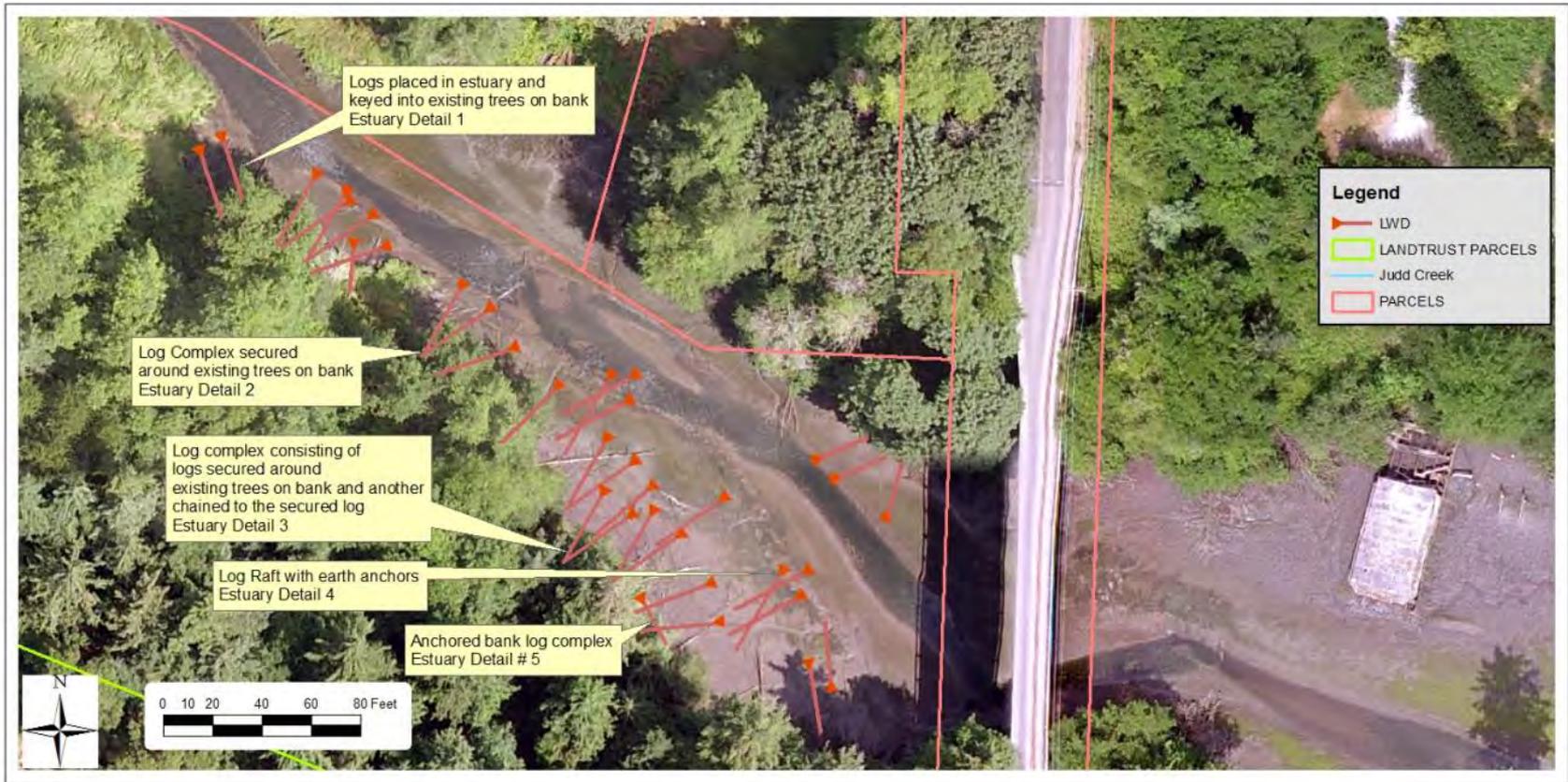


King County Department of Natural Resources and Parks  
Water and Land Resources Division  
Rural and Regional Services Section  
Ecological Restoration and Engineering Services Unit  
Christie True, Director

Scott Property, Judd Creek  
Habitat Enhancement SHRP  
STREAM LWD  
DETAILS

SHEET  
7  
of  
7  
SHEETS

# Logs Placement in the Estuary



CONCEPTUAL  
PLANS  
05/23/2014

Sup. Engineer/PS	Will Mansfield
Project Manager	Paul Adler
Design	Paul Adler
Engineering	Alex Hallenius



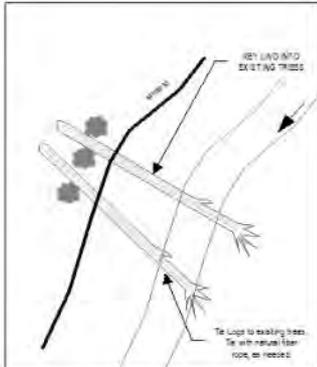
King County Department of Natural Resources and Parks  
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Christie True, Director

Scott Property, Judd Creek  
Habitat Enhancement SHRP

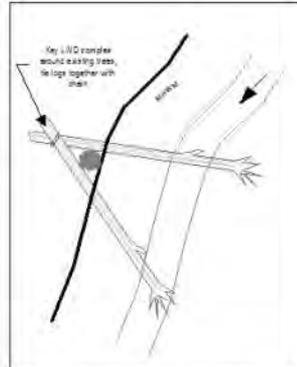
ESTUARY  
LWD  
PLAN

SHEET  
5  
of  
7  
SHEETS

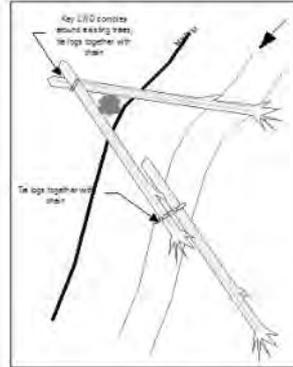
# Log Placement in the Estuary - Details



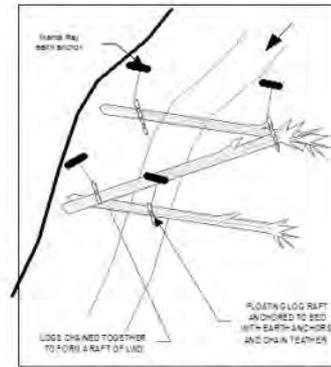
LOGS KEYED INTO EXISTING TREES  
ESTUARY LWD DETAIL -



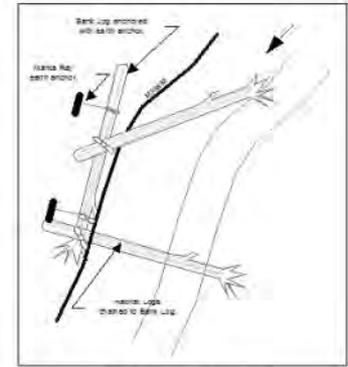
LOG COMPLEX ANCHORED AROUND EXISTING TREE  
ESTUARY LWD DETAIL



LOG COMPLEX ANCHORED AROUND EXISTING TREE WITH ADDITIONAL BED LOG CHAINED TO KEYED LOGS  
ESTUARY LWD DETAIL



LOG RAFT WITH EARTH ANCHORS  
ESTUARY LWD DETAIL



ANCHORED BANK LOG WITH LOGS CHAINED TO BANK LOG  
ESTUARY LWD DETAIL

**GENERAL NOTES**

1. ALL PLACEMENTS TO BE DETERMINED BY ENGINEER OR ECOLOGIST
2. ALL IN-WATER WORK WILL BE DONE USING BMPs TO MINIMIZE TURBIDITY AND IMPACTS TO AQUATIC ORGANISMS.
3. ALL IN-WATER WORK TO BE DONE UNDER THE DIRECTION OF AN EXPERIENCED ENGINEER OR ECOLOGIST, WHO IS A CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CECL).
4. AREAS OF GROUND DISTURBANCE WILL BE LIMITED TO AREA SHOWN AND AREAS SURVEYED FOR CULTURAL RESOURCES.

**LWD NOTES:**

1. ADDITION SMALL WOOD CONSISTING OF > 12" DIAMETER BRUSH TO BE ADDED TO LWD COMPLEXES TO ADD COVER AND COMPLEXITY (NOT SHOWN).
2. ALL LWD TO BE NATIVE CONIFER SPECIES 12" TO 30" DBH
3. LWD TO BE PLACED IN COMPLEXES. LWD MAY BE TIED TOGETHER WITH NATURAL FIBER ROPE OF MARINE GRADE CHAIN

CONCEPTUAL  
PLANS  
05/23/2014

Approved	Will Mansfield	
Project Manager	Paul Adler	
Design	Paul Adler	
Engineering	Alex Hallenius	



King County Department of Natural Resources and Parks  
Water and Land Resources Division  
Rural and Regional Services Section  
Ecological Restoration and Engineering Services Unit  
Christie True, Director

Scott Property, Judd Creek  
Habitat Enhancement SHRP

ESTUARY  
LWD  
DETAILS

SHEET  
6  
of  
7  
SHEETS

## Recreational Use- Stream

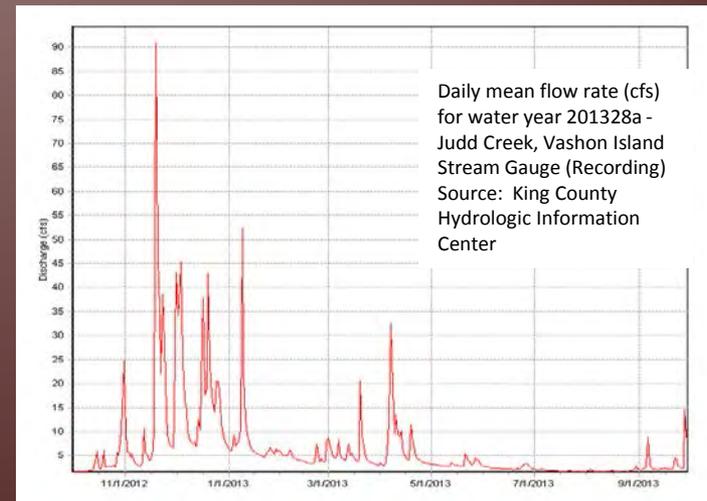
Judd Creek is a wadable creek that averages 15' wide and has summer stream flows of < 10 CFS.



- Prior to 2013, this reach of stream was privately owned.
- The previous property owners maintains a lease on the property, public access is currently limited.

The property is owned and managed by the Vashon Maury Island Land Trust for Open Space. King County holds a conservation easement on the property.

Future use of the property will be for passive recreation, such as bird watch, and hiking.



## Recreational Use- Estuary

In the estuary, the tide lands are privately owned by the Vashon Maury Island Land Trust and other private property owners.

At low tide, the shallow Judd creek low flow channel averages 20' wide and 18" deep.

At high tide the estuary is accessible from Quartermaster Harbor by small boats with minimal draft. An existing log blocks the deeper water access to the estuary.

Kayaks and small boats with trawling motors are known to explore the estuary.

The proposed wood placement will not block existing low flow channel and will not exclude recreational use of the estuary.



Judd Creek estuary near low tide

Existing large log limits access to estuary

## Acknowledgements and Contact Information



### Funding Agencies

- King County Flood Control District Cooperative Watershed Management Grant
- King County Small Habitat Restoration Program



- Project Partners
  - Vashon Maury Island Land Trust
  - The Green/Duwamish and Central Puget Sound Watershed Forum (WRIA 9)



*For more information contact,*  
Paul Adler , Project Manager  
King County Department of Natural Resources and Parks  
201 South Jackson Street, Suite 600  
Seattle, WA 98104  
206.477-4606  
[paul.adler@kingcounty.gov](mailto:paul.adler@kingcounty.gov)

# Cedar River/Lake Washington Basin

# Elliott Bridge Reach Off-Channel Habitat and Floodplain Reconnection Project



# Elliott Bridge Reach Off-Channel Habitat and Floodplain Reconnection

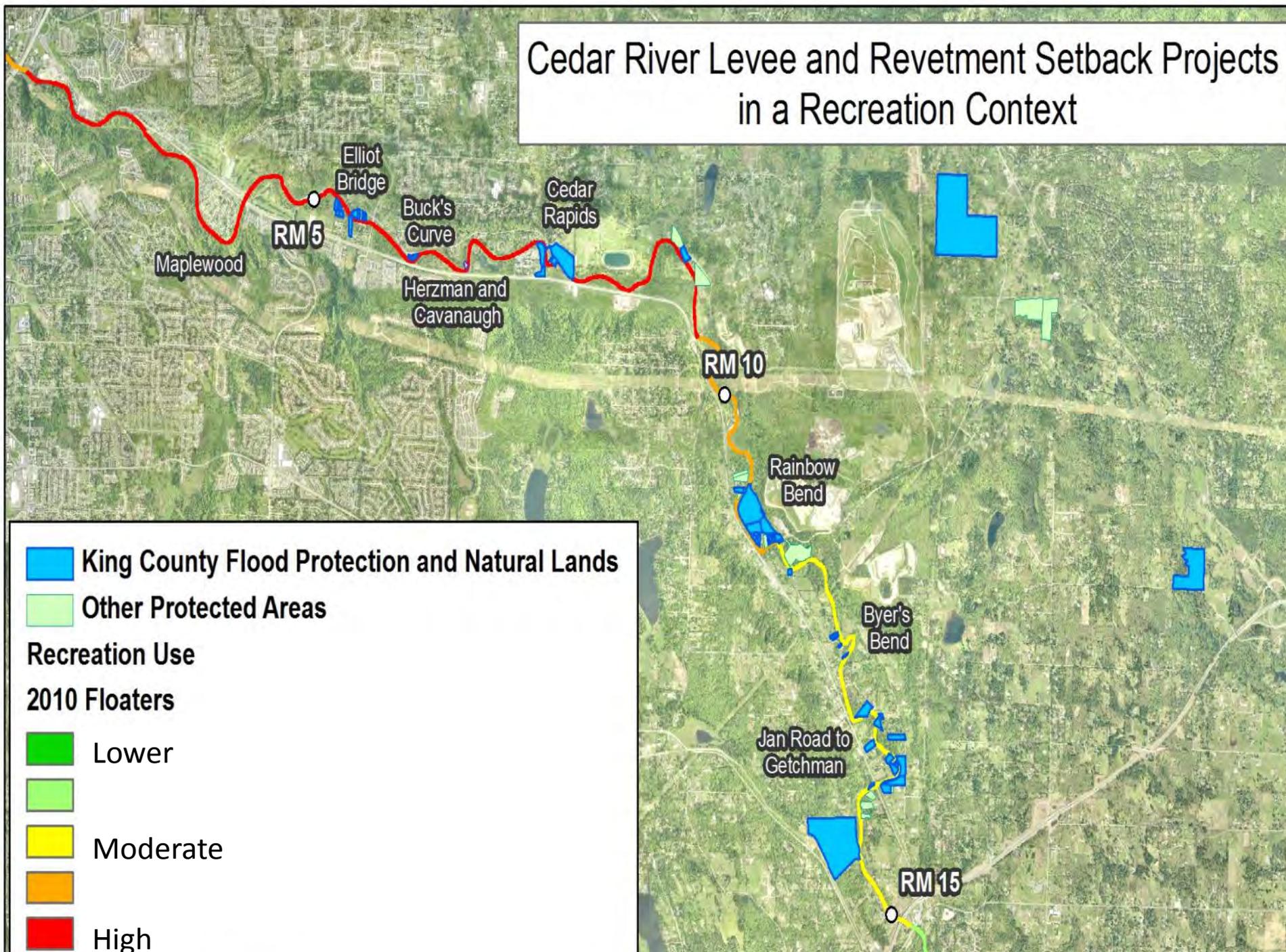
Ron Regis  
Park

154<sup>th</sup> Pl SE  
SE Jones Rd

SR 169



# Cedar River Levee and Revetment Setback Projects in a Recreation Context



 King County Flood Protection and Natural Lands

 Other Protected Areas

Recreation Use

2010 Floaters

 Lower



 Moderate



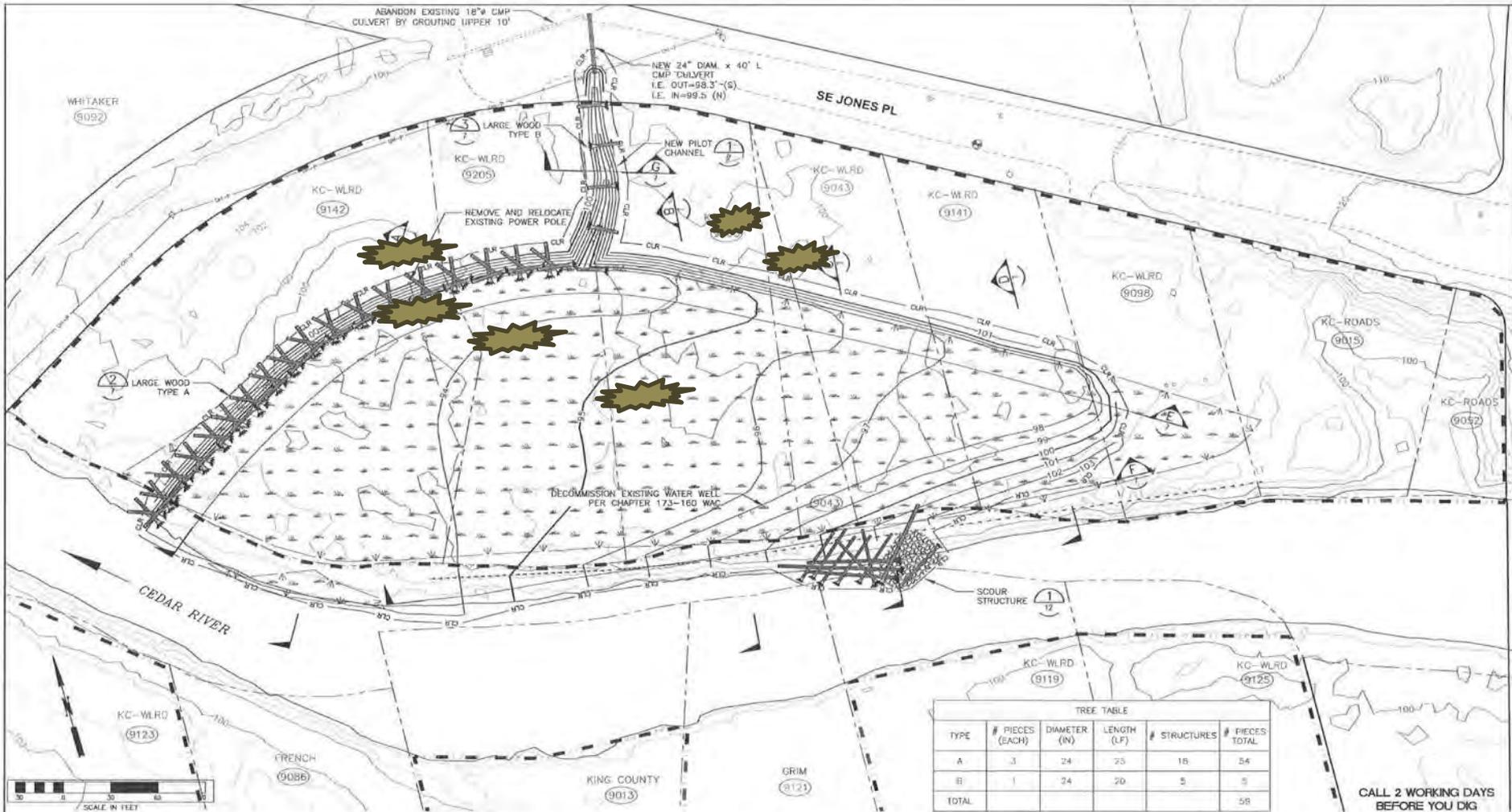
 High

# Goals and Objectives

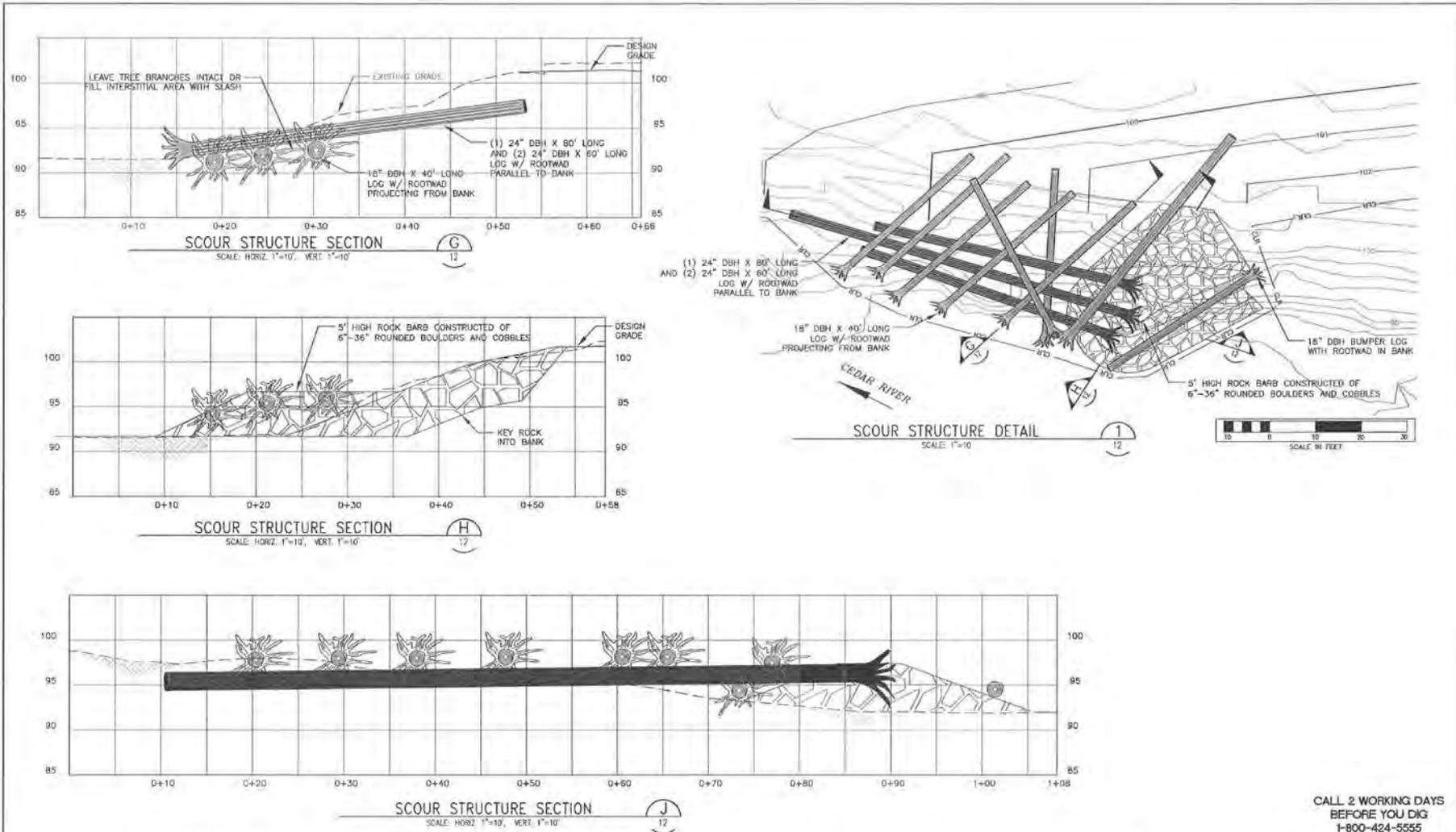
- Satisfy Mitigation Reserve Program Obligations
  - Wetland
  - **Off-channel habitat**
  - **Mainstem Scour structure**
- Maintain Flood hazard protection
- Address Recreational safety issues
- Compatibility with future plans



# Right Bank Overview



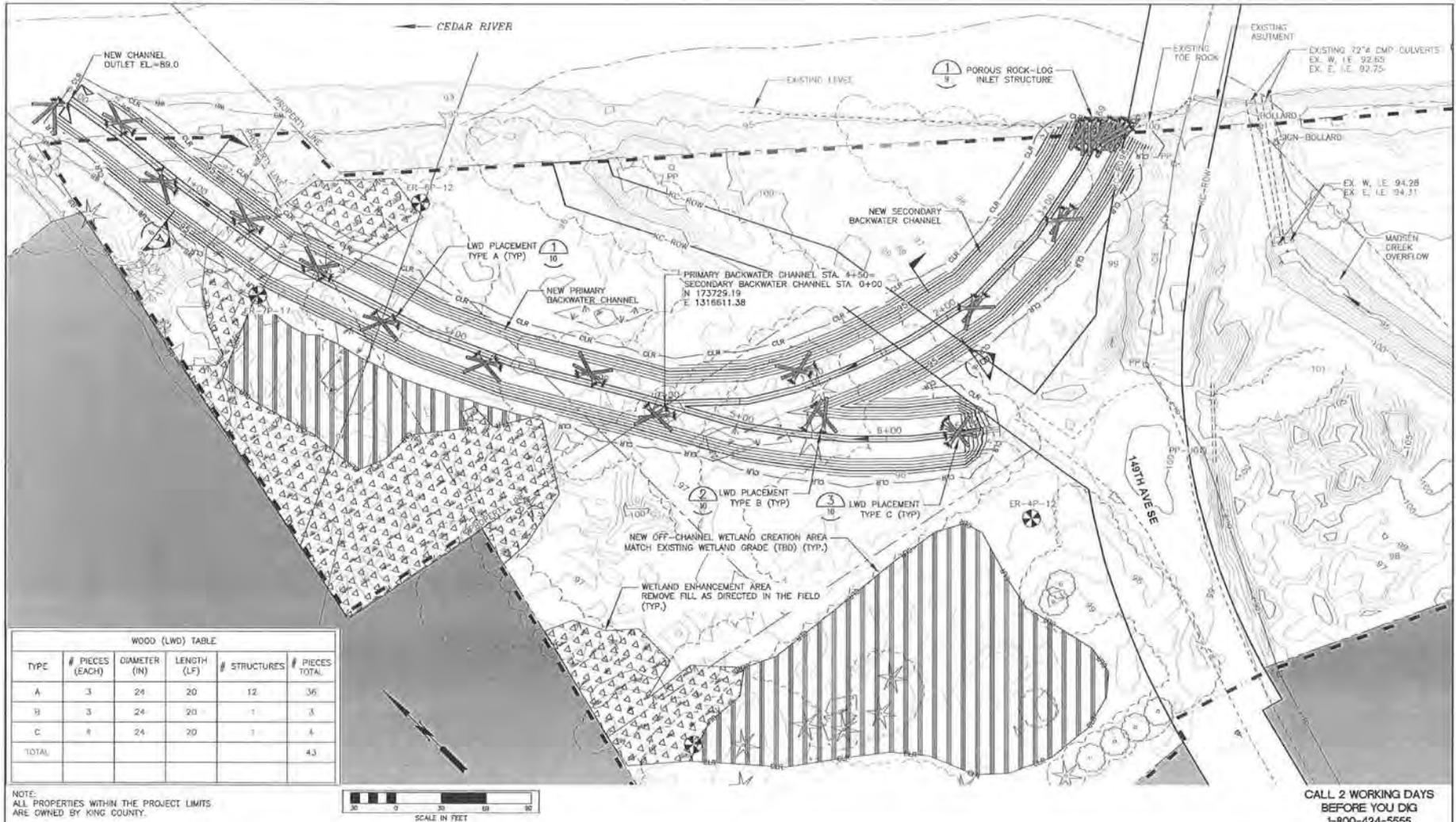
# Right bank Scour Structure



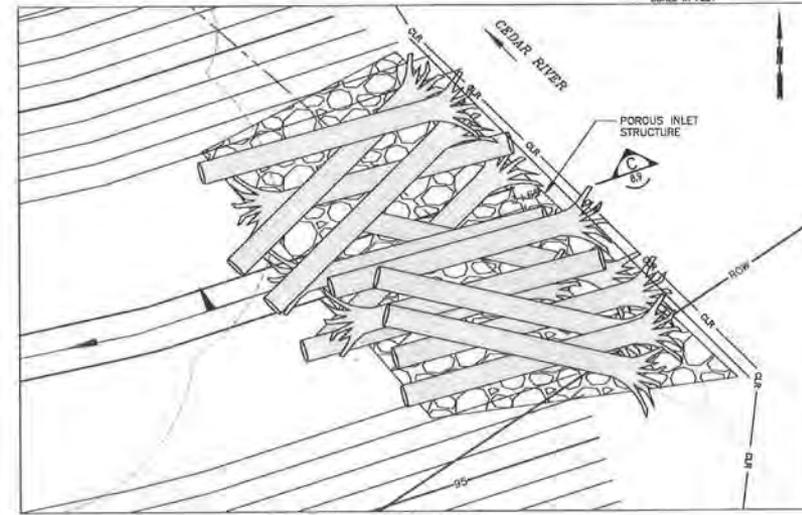
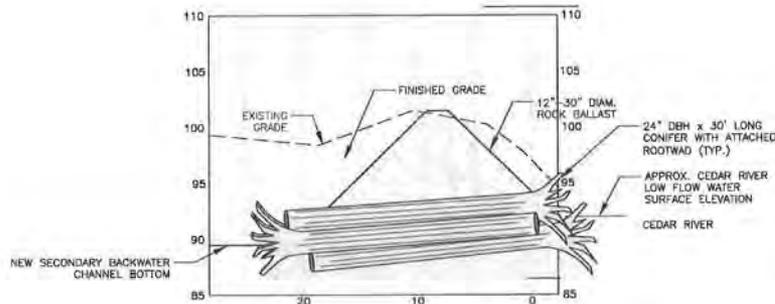
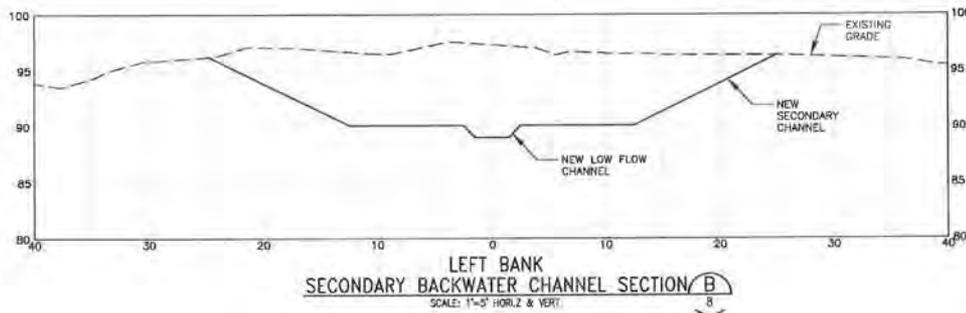
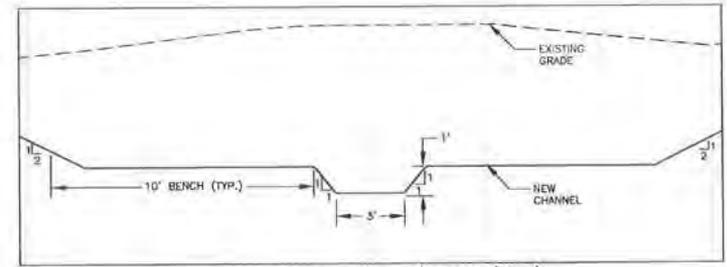
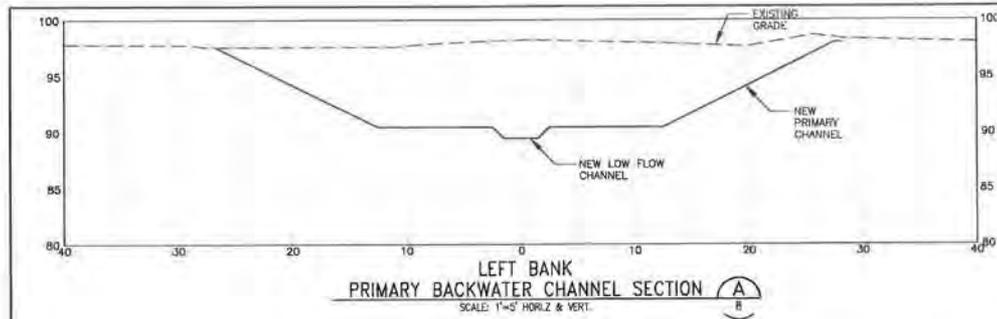
CALL 2 WORKING DAYS BEFORE YOU DIG  
1-800-424-5555

(UNDERGROUND UTILITY LOCATION AND APPROVAL)

# Left Bank Overview



# Left Bank inlet constricted and stable





# Contact Information

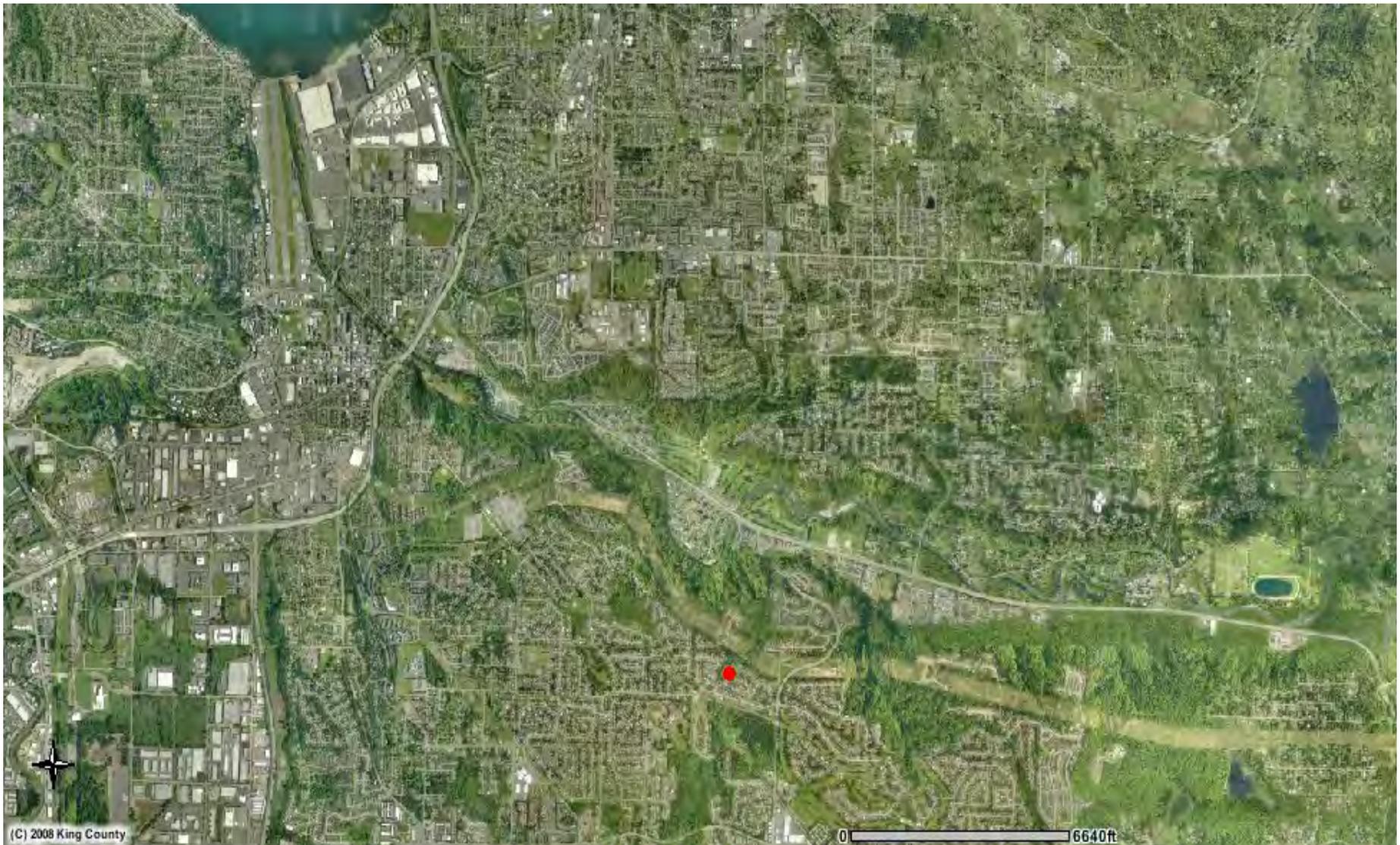
Jon Hansen, Project Manager

[jon.hansen@kingcounty.gov](mailto:jon.hansen@kingcounty.gov)

206-477-4706

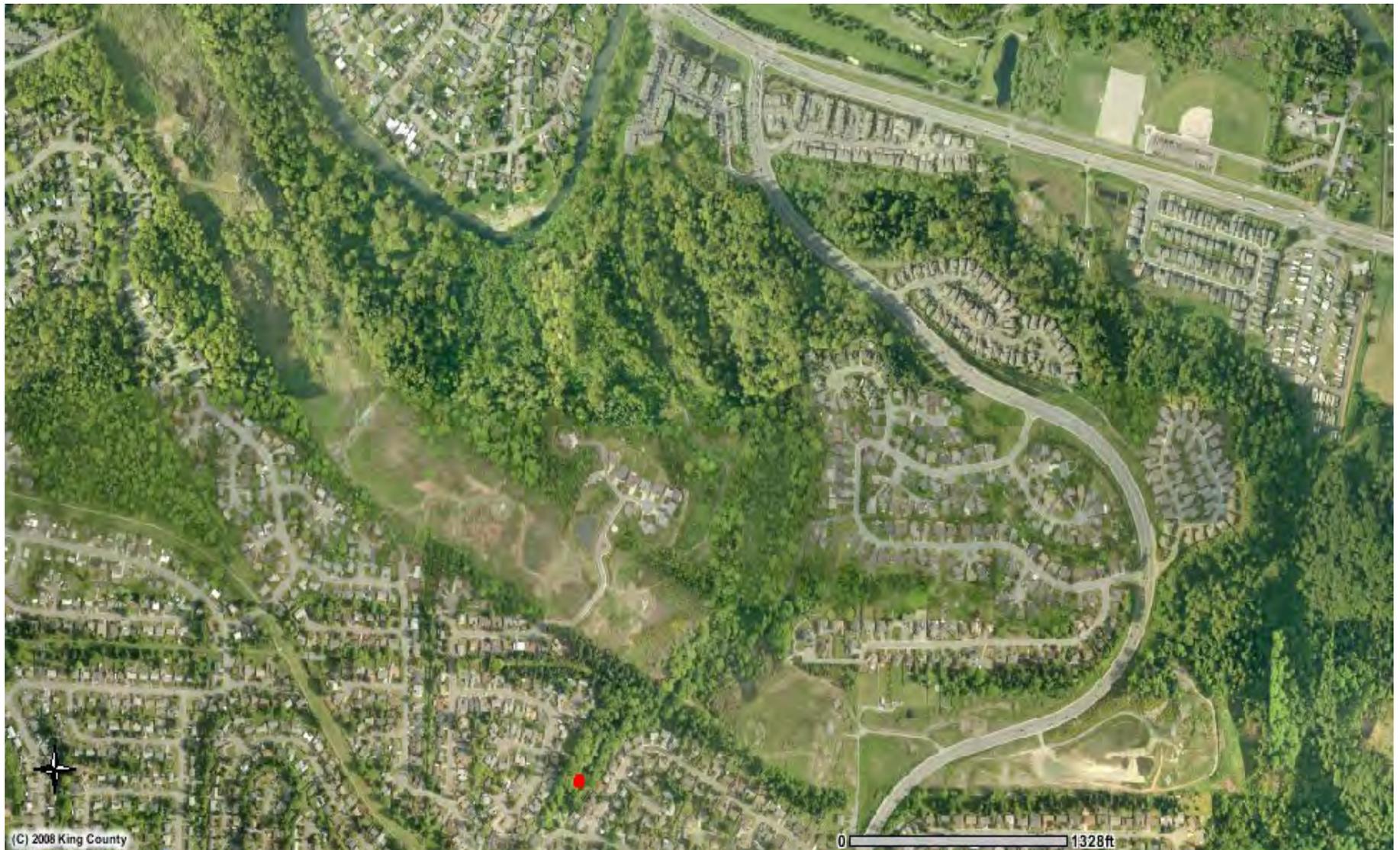
**Fairwood West Homeowners'  
Association Stormwater  
Improvement – Molasses Creek**

Rachel Berryessa, Project Manager



**Fairwood West Homeowners' Association Stormwater Improvement – Molasses Creek  
Proposed 2015 Summer Construction**

Rachel Berryessa, Project Manager (206) 477-4644, [rachel.berryessa@kingcounty.gov](mailto:rachel.berryessa@kingcounty.gov)



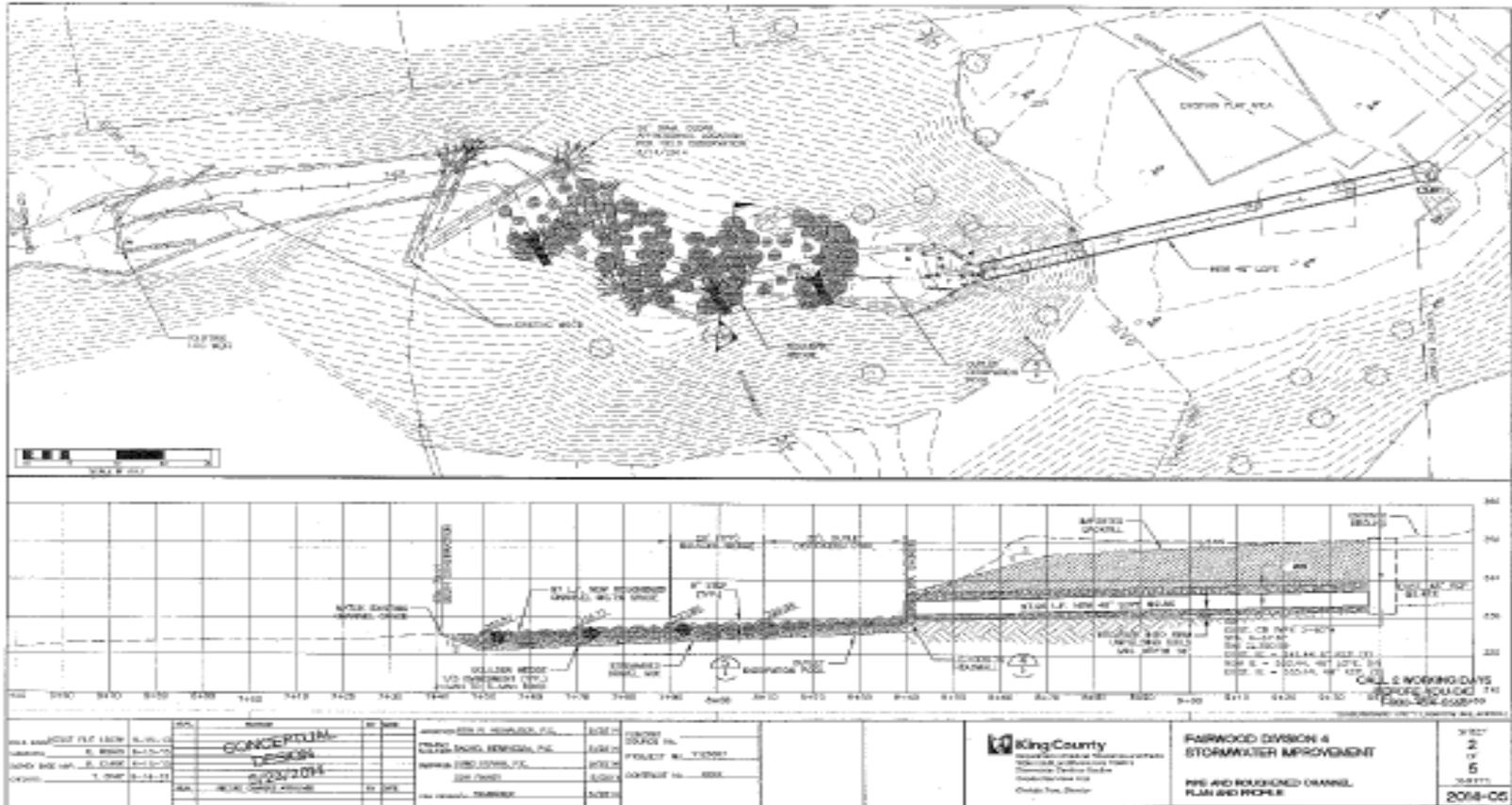
### **Fairwood West Homeowners' Association Stormwater Improvement – Molasses Creek**

Repair 100 feet of 48-inch pipe, Place large rock for fish passage,  
Place large wood for habitat and plant slopes for stabilization.



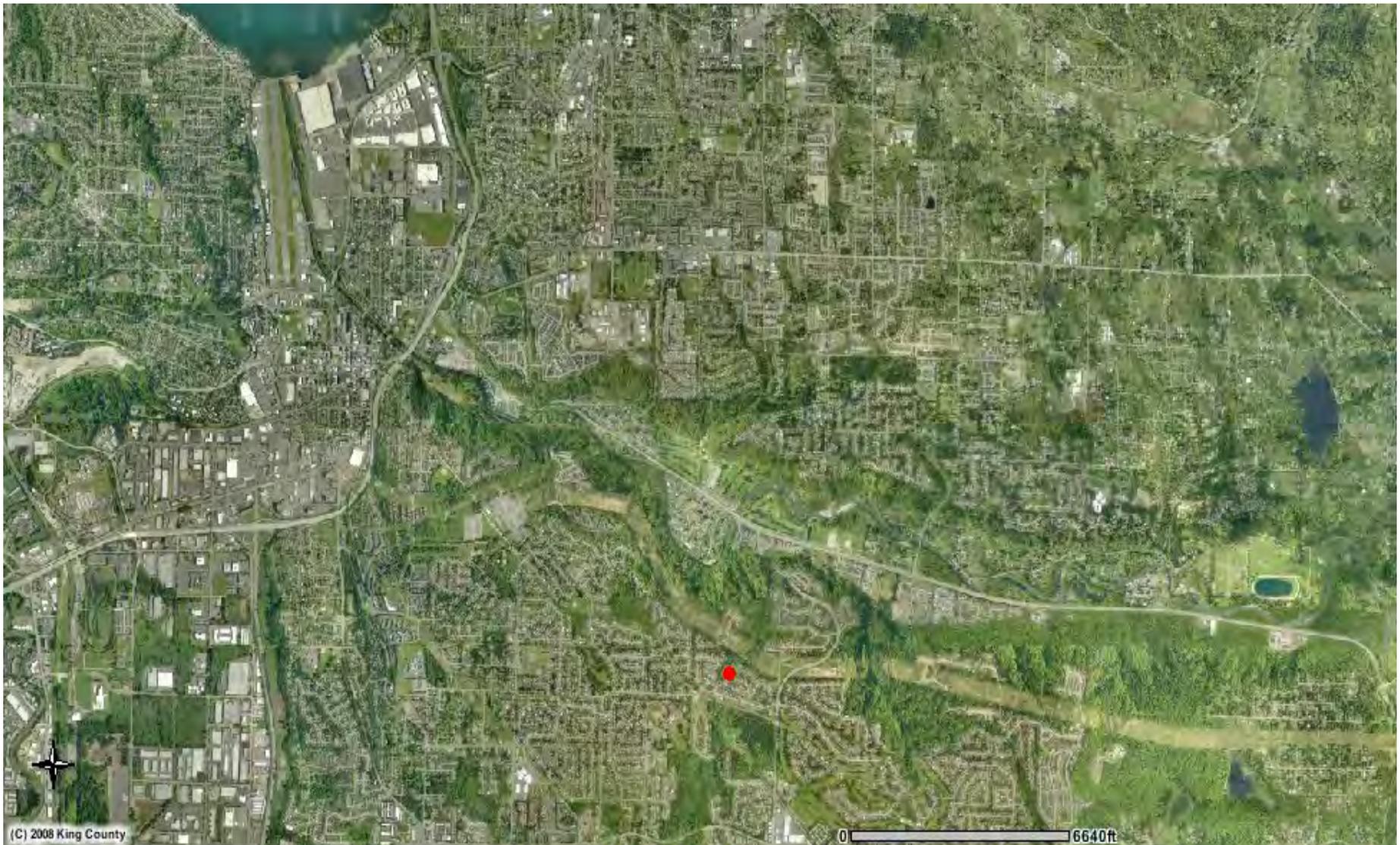
**Fairwood West Homeowners' Association Stormwater Improvement – Molasses Creek**

The large wood placement is intended to provide habitat and enhance fish passage to the culvert system.



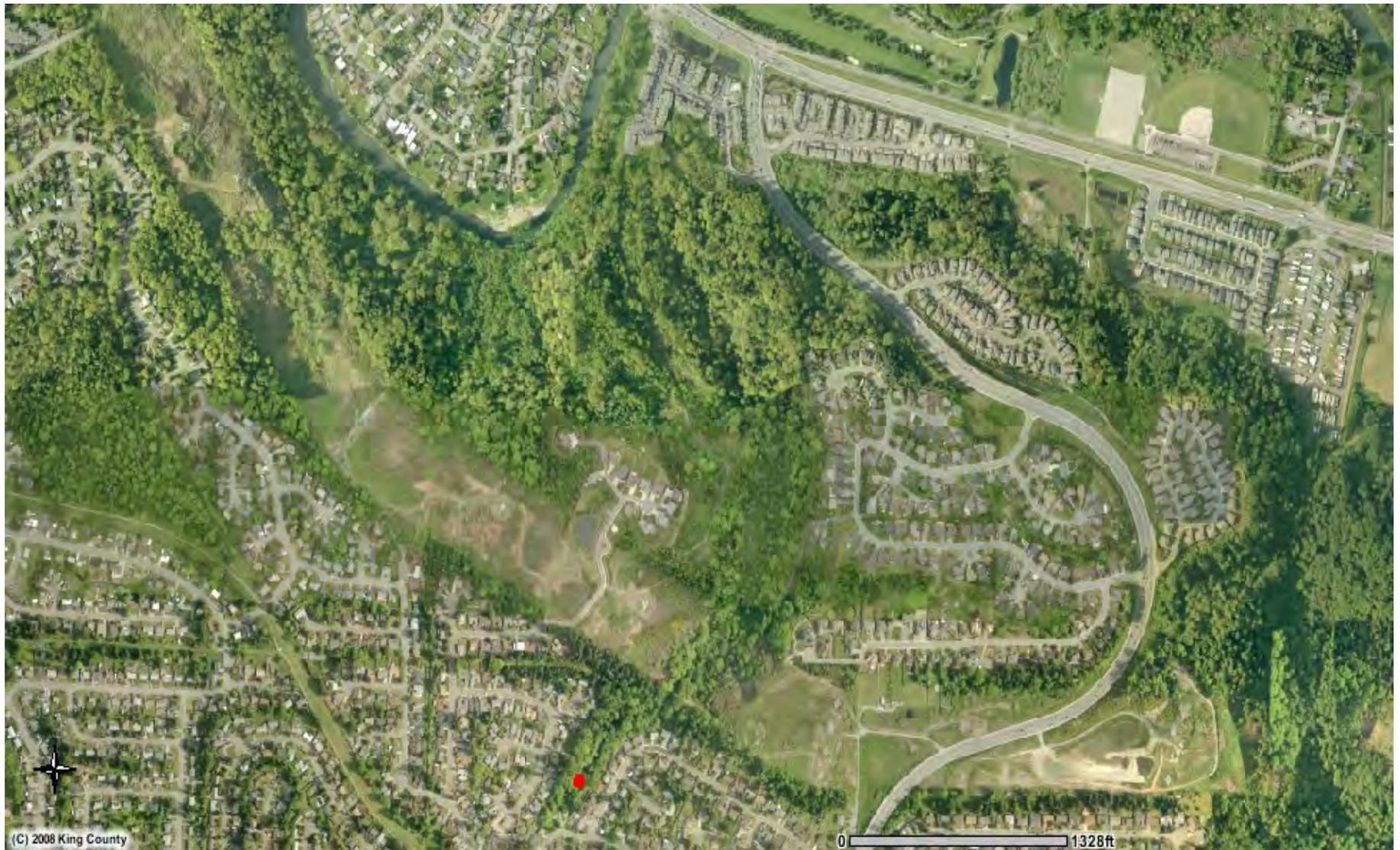
## Fairwood West Homeowners' Association Stormwater Improvement – Molasses Creek

Rachel Berryessa, Project Manager (206) 477-4644, [rachel.berryessa@kingcounty.gov](mailto:rachel.berryessa@kingcounty.gov)



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Proposed 2015 Summer Construction

Rachel Berryessa, Project Manager (206) 477-4644, [rachel.berryessa@kingcounty.gov](mailto:rachel.berryessa@kingcounty.gov)



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Repair 100 feet of 48-inch pipe, Place large rock for fish passage,  
Place large wood for habitat and plant slopes for stabilization.



**Fairwood West Homeowners' Association Stormwater Improvement – Molasses Creek**

The large wood placement is intended to provide habitat and enhance fish passage to the culvert system.  
Note that in-water recreation is very unlikely in this creek, due to its size.



# Green/Duwamish River Basin

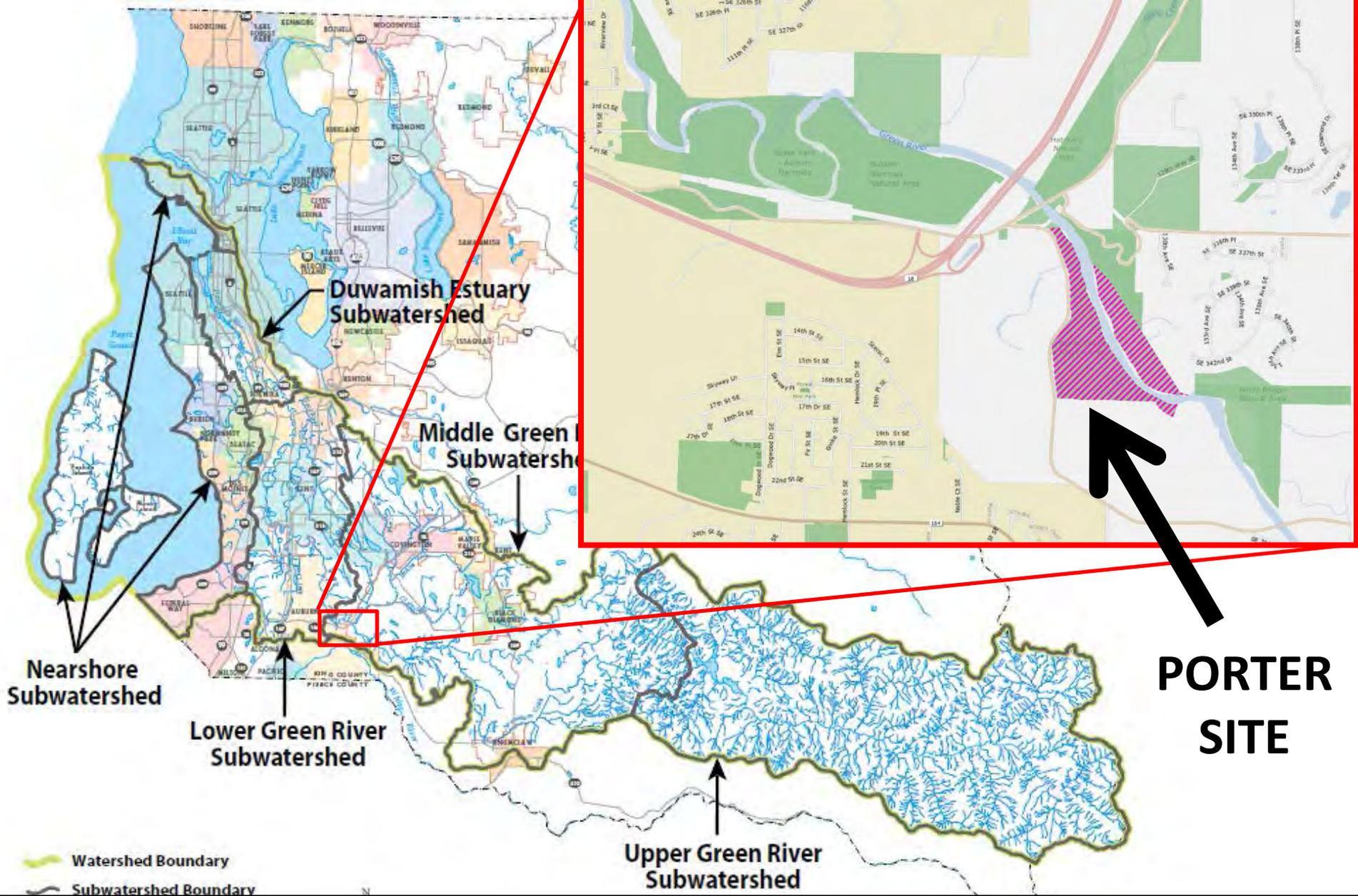
# Porter Reach Restoration Project



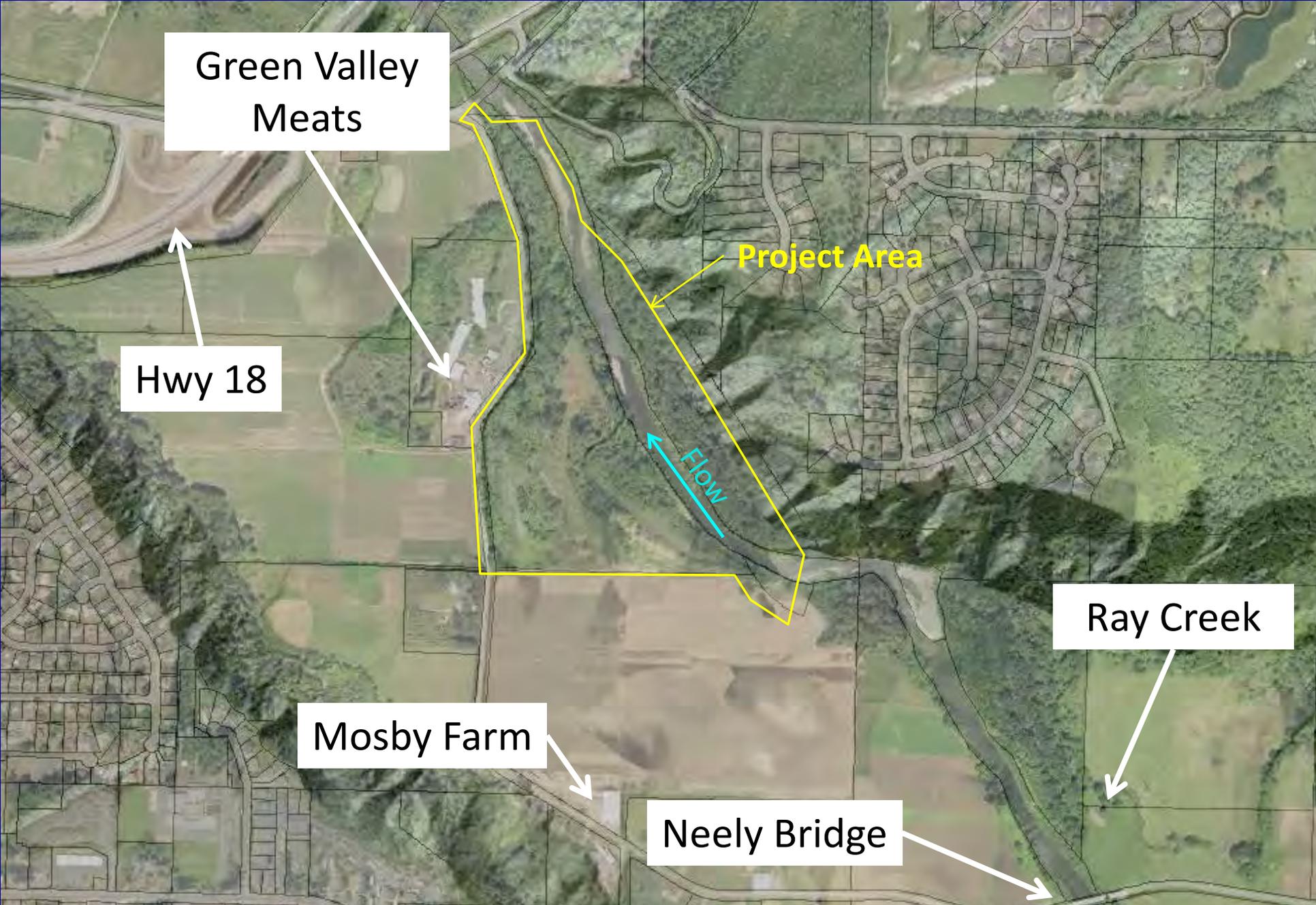
# Porter Project Description

## **Problem Statement**

Training levee & revetment disconnects the river from natural habitat-forming processes like floodplain channel migration and adjustment, and interferes with wood recruitment, and logjam formation.



High priority: Ecosystem Restoration Project (ERP), MGB Blueprint, W9 Salmon Habitat Plan, **MGR Levee Setback Feasibility study**



Green Valley Meats

Hwy 18

Project Area

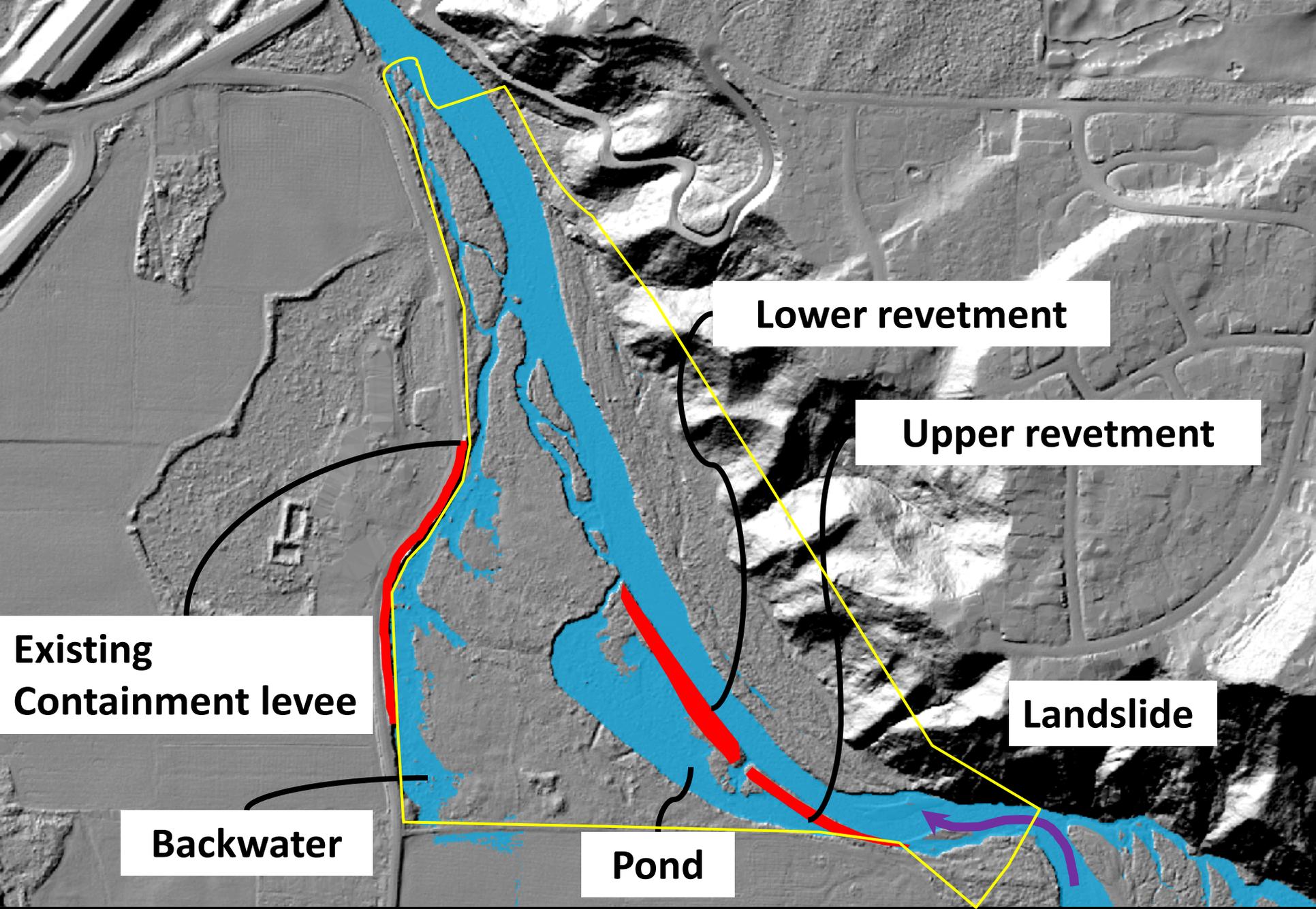
Flow

Mosby Farm

Neely Bridge

Ray Creek

Area Landmarks



**Lower revetment**

**Upper revetment**

**Existing  
Containment levee**

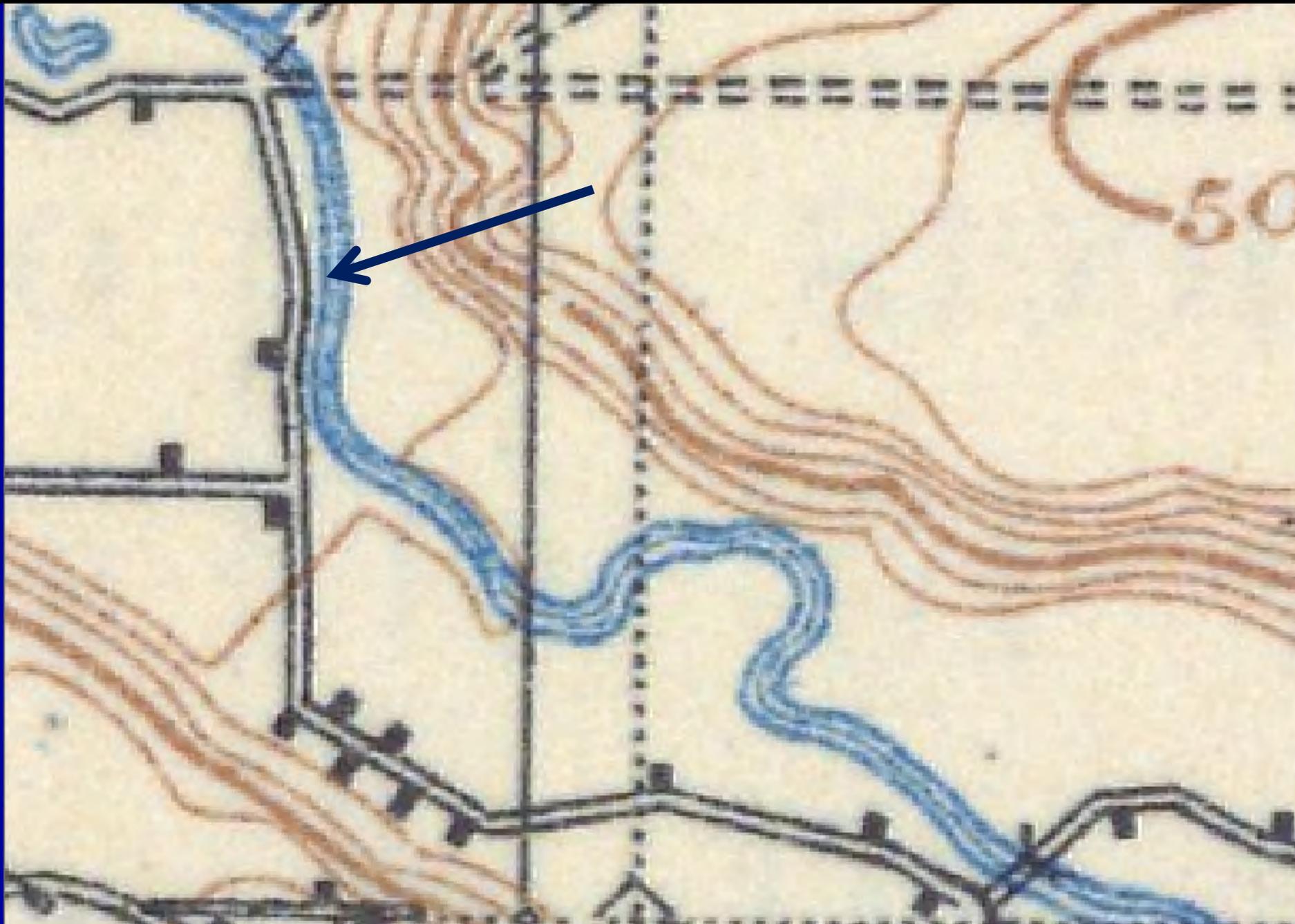
**Landslide**

**Backwater**

**Pond**

**Existing Features**

# Historic Channel Location along Green Valley Road (1890)



1936





11/28/2012 10:52

Upper revetment (1870 cfs)

# County Goals for the Reach

- Fish – protect and restore habitat
- Farm – protect agricultural resource lands, increase ag viability, improve stewardship on farms.
- Flood – reduce flood and erosion risks homes/farms; increase storage capacity for flood waters and sediment through levee setbacks.

# Project Objectives

- To promote natural rate/frequency of channel & floodplain processes
- Improve salmon/steelhead spawning and rearing habitat
- Enhance and maintain native vegetation communities

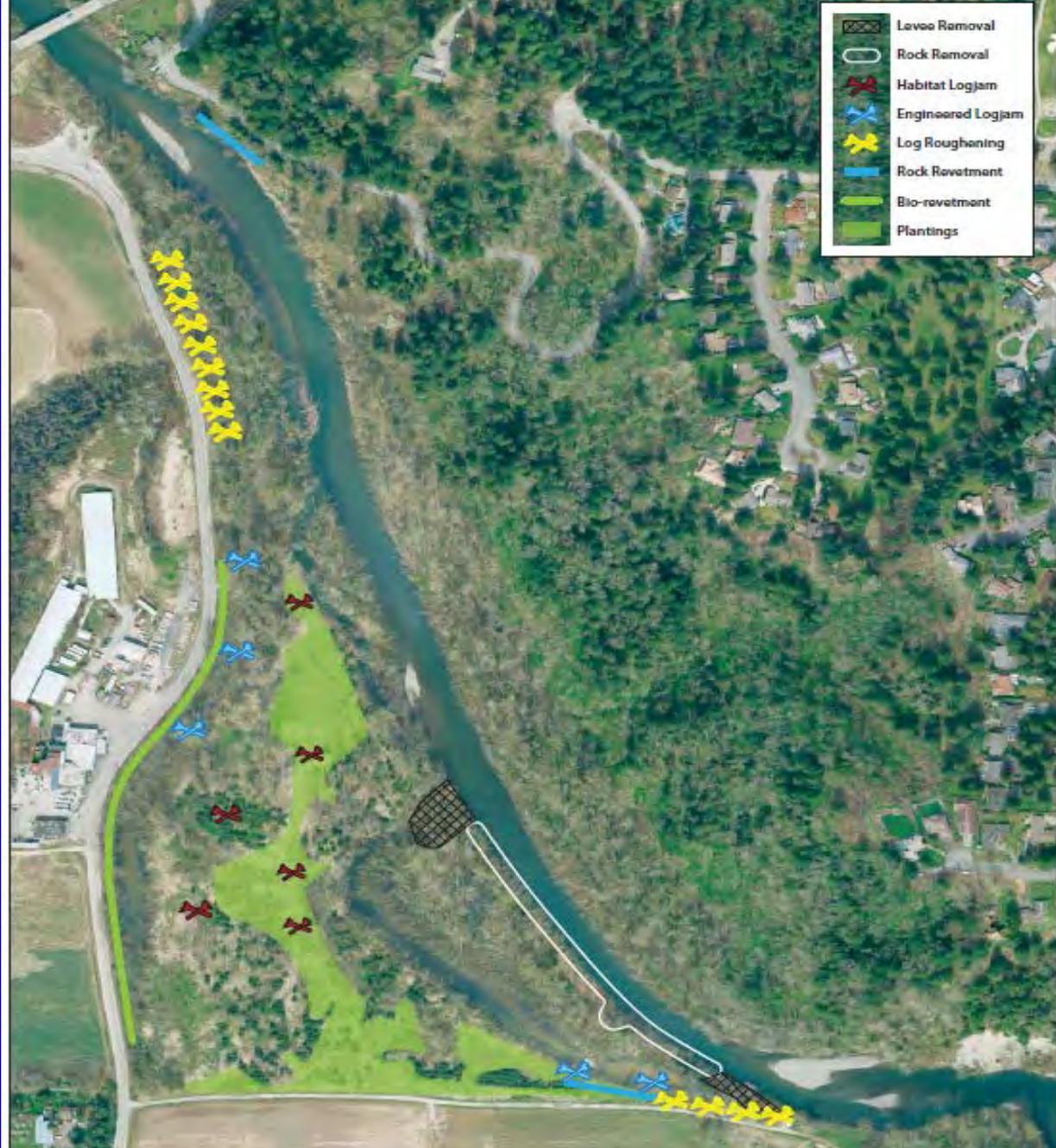
While also:

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

**Challenge – Natural Process is inherently unpredictable**



Wallace Reach Reference Site



Preferred Alternative

# Reducing Risks from wood Site Management Plan tbd

- Continued application of large wood protocols
- Warning/Advisory Signs Best methods/locations???
- Public outreach and education Best methods/location ???
- Monitor for unacceptable hazards When/how much/sustainable strategy???

## Post-Project Adaptive Management plan

- Develop with input from stakeholders

# Porter Reach Restoration Project Schedule Overview

*with upcoming opportunities for public input shown in yellow*

- Alternative Selection complete
- Draft 30% design July 2014
- Public Input via LWD meetings **today, 30%, 60%**
- Public input via Public Meeting **Spring 2015**
- SEPA Comment Period **Summer 2015**
- 60% plans/lwd checklist posted **Fall, 2015**
- Final Plans Complete Feb. 2016
- Construction Summer 2016

# Project Partners

Salmon Recovery Funding Board

Potentially partnering with Army Corps of Engineers

## Contact Information

Project Manager: Fauna Nopp, 206-477-4787

[fauna.nopp@king.county.gov](mailto:fauna.nopp@king.county.gov)

# Fenster 2B Revetment Setback and Floodplain Restoration Project

City of Auburn

Designed by King County Dept. of  
Natural Resources and Parks, Water and  
Land Resources Division



King County



- City of Auburn Project (property, funding/grants);
- Funded by:
  - Salmon Recovery Funding Board
  - King Conservation District
  - City of Auburn
  - King County Flood Control District
  - King County DNRP/WLRD (in kind)
- Designed by King County WLRD under a Technical Services Agreement;

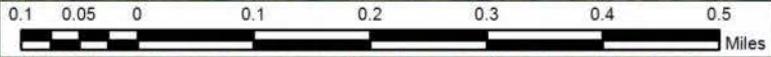


### **Project Vicinity Map**

***Fenster 2B Revetment Setback and Floodplain Restoration Project***

# Goals and Objectives

- Restore habitat forming processes and improve flood conveyance of the local reach by widening the channel cross-section;
- Slow floodwater velocities and increasing flood refugia for juvenile salmonids;
- Restore quantity and quality of floodplain and riparian habitat in the reach; and,
- Minimize risk to public safety and private property.



Fenster Levee Seback Project,  
Phase 1; Constructed 2008.

Project  
Site

Pautzke Levee Setack  
and Floodplain Restoration  
Project; Constructed 2009-10

Auburn Narrows Floodplain  
Habitat Restoration Project;  
Constructed 2004-5.

Large Log Jam

Green River

Burlington Northern Railroad ROW

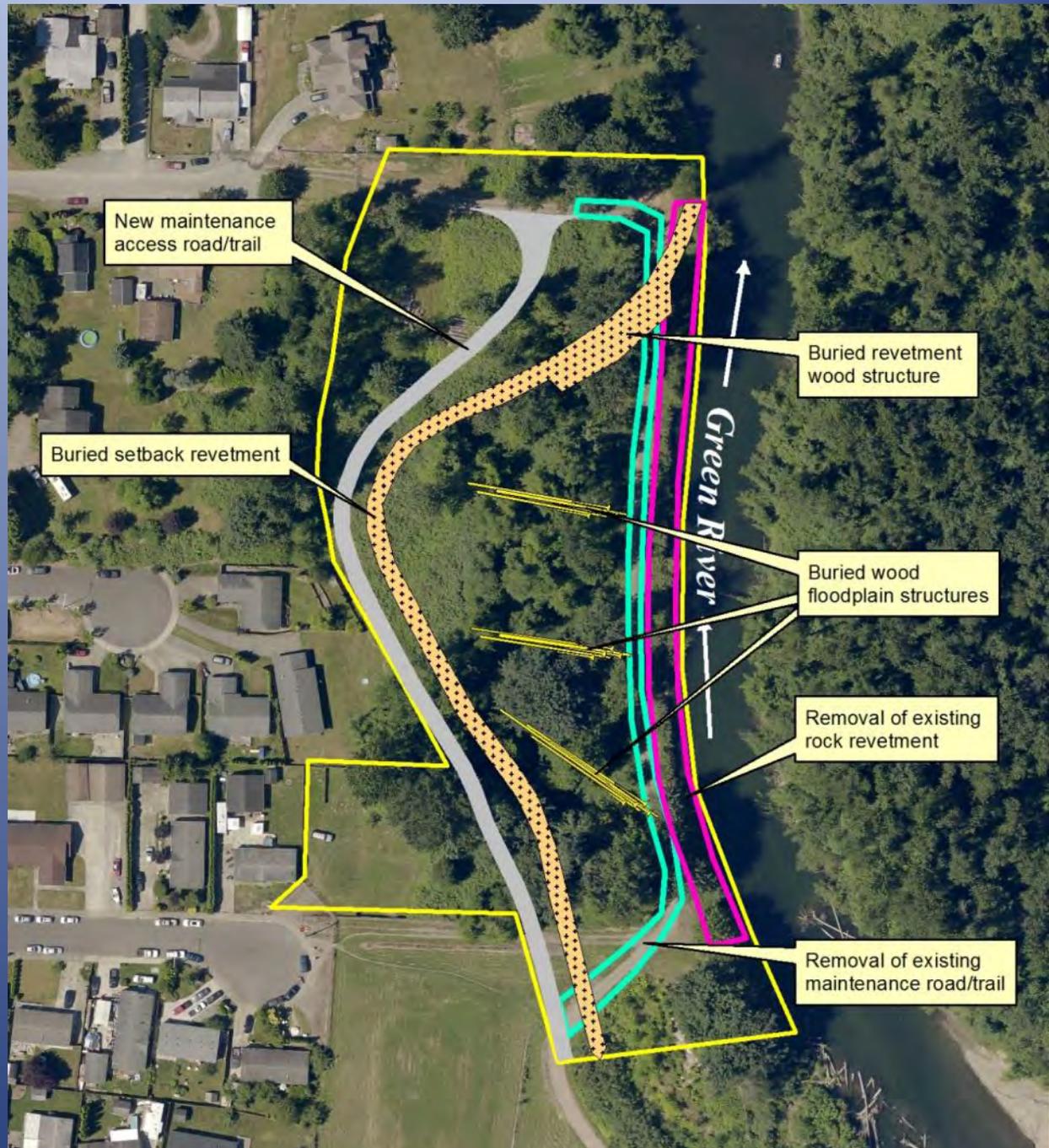
State Hwy 18

Fenster Slough Reconnection  
Project; Constructed 2004.

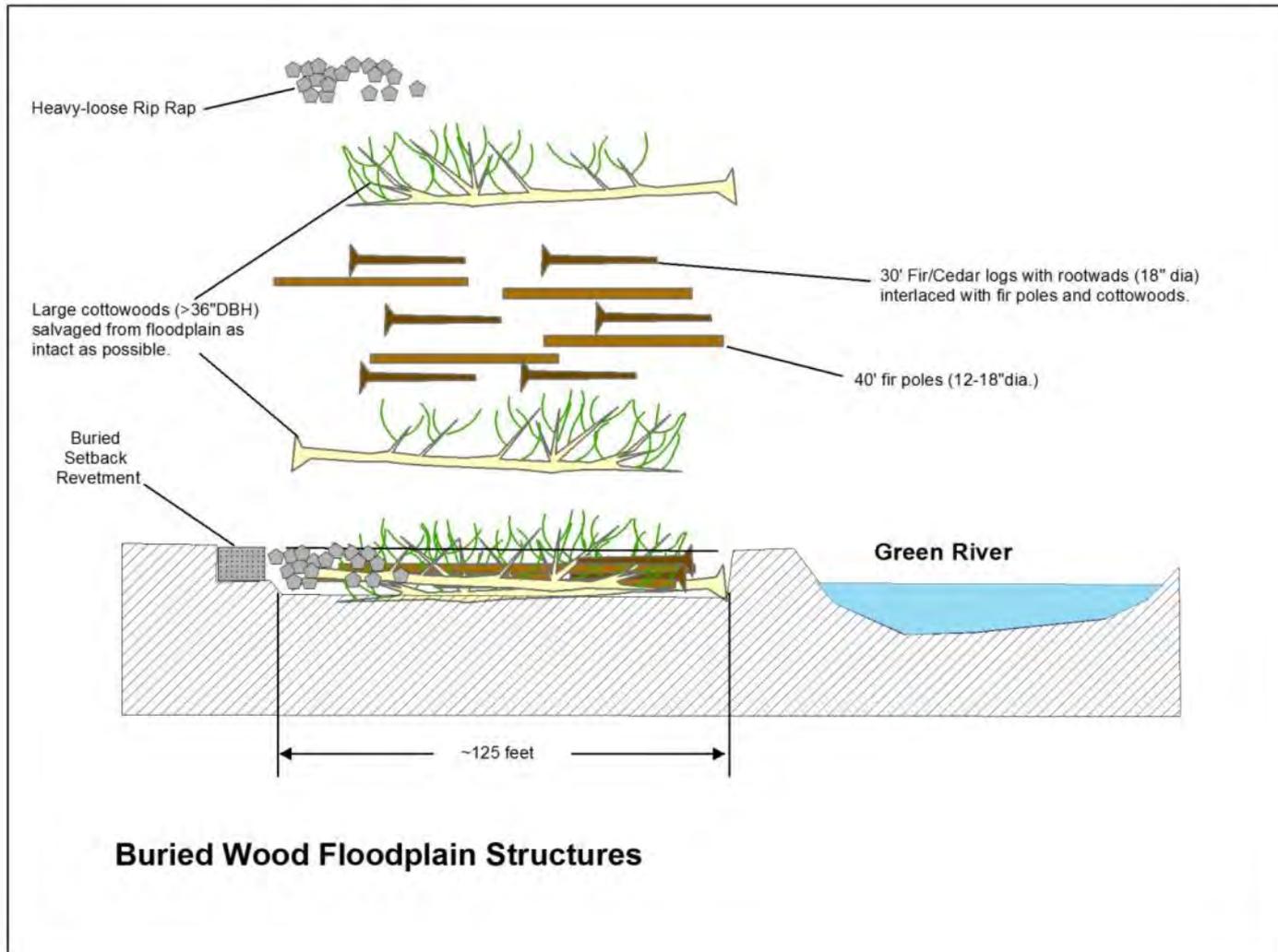


# Project Elements:

- Remove 520 linear feet of rock revetment;
- Construct 913 linear feet of buried setback revetment;
- Remove 800 feet of access road (de facto levee);
- Construct new access road at the same elevation;
- Install 3 buried wood floodplain structures;
- Install wood structure in downstream end of buried setback revetment;
- Leave all trees on site;
- Revegetate with riparian species.



# Buried Wood Floodplain Structures

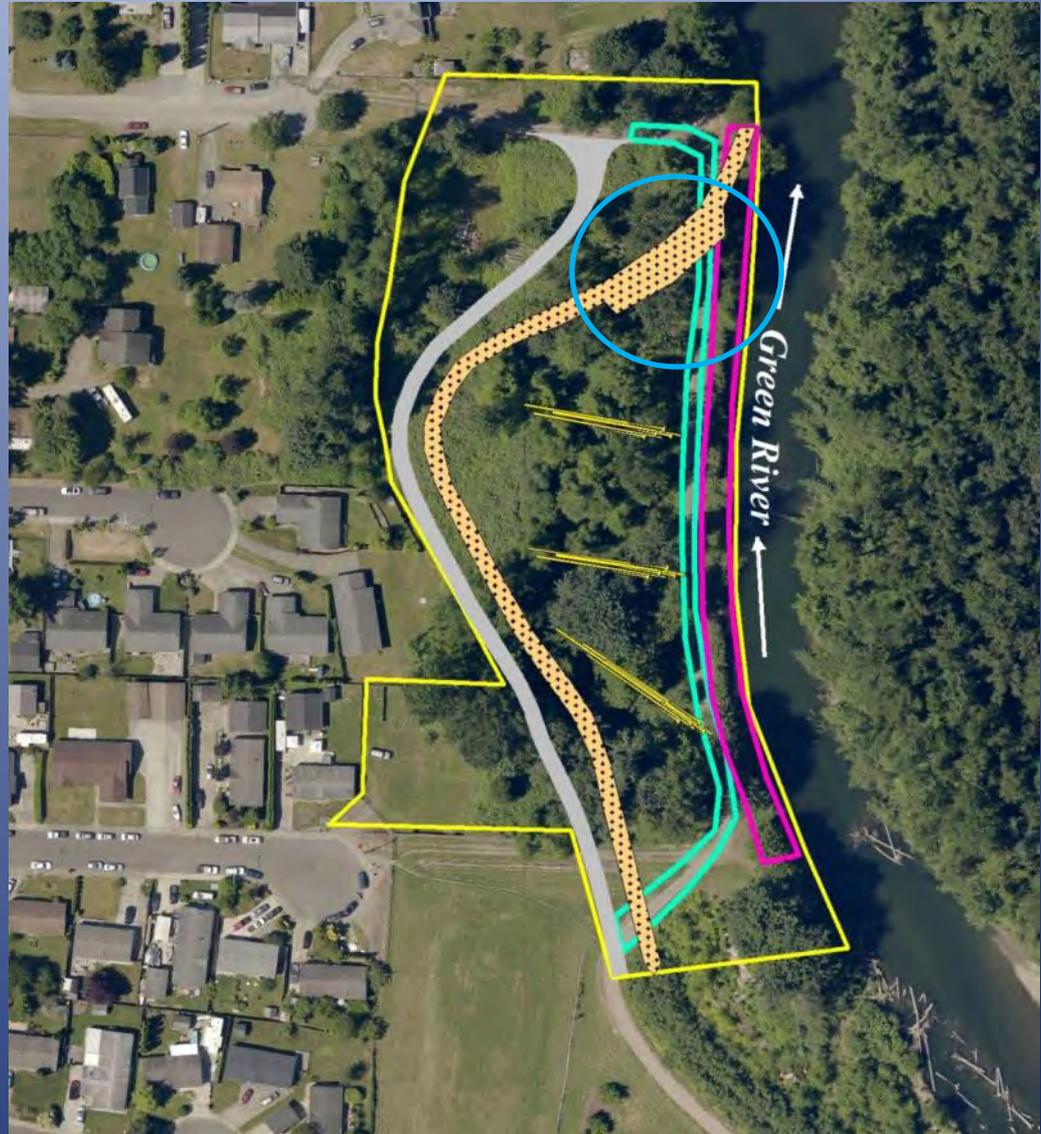


# Buried Wood Floodplain Structures

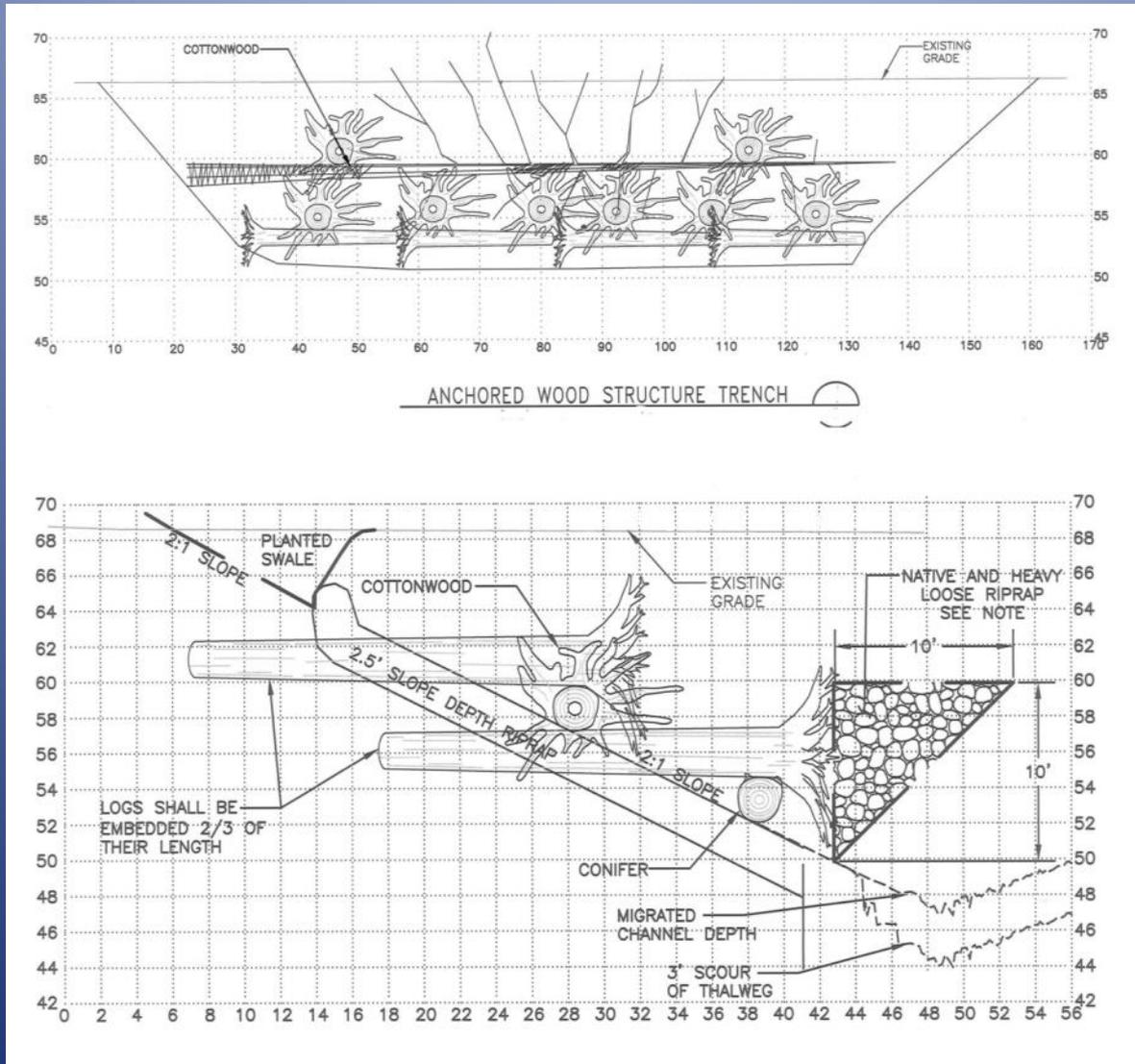
- Not in active channel at time of construction
- Bank will erode and retreat over time to expose structures
- At or slightly above low-flow water levels;
- Provide roughness to retreating bank;
- Shorter logs will be mobilized one at a time after exposure by the retreating bank;
- Will be monitored yearly after exposure.

# Revetment Wood Structure

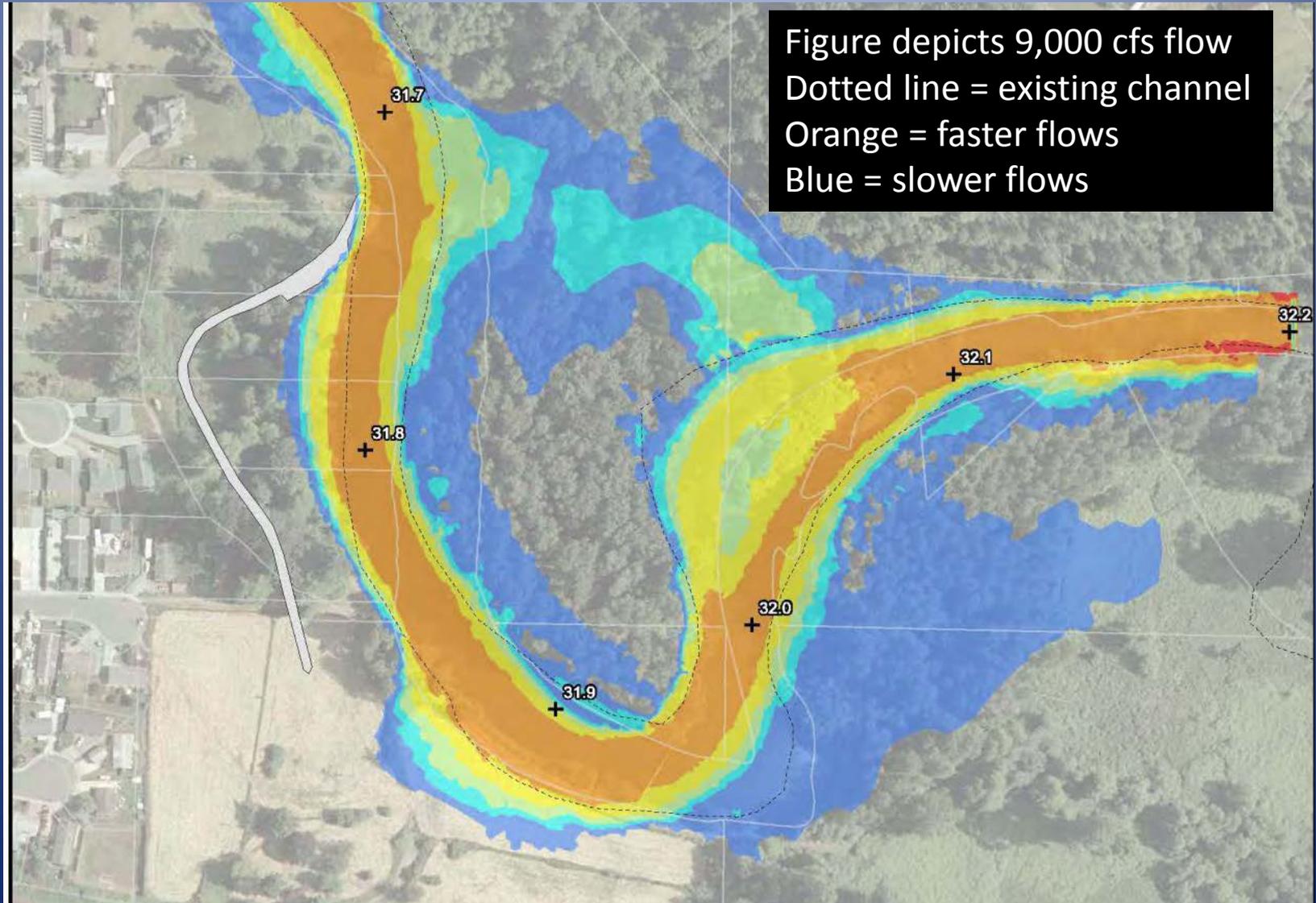
- Protects downstream end of buried setback revetment;
- Not in active channel (yet);
- Area most likely to be exposed;
- Wood embedded into the buried revetment;
- Elevations range from low-flow to flood stage.



# Revetment Wood Structure



# Modeled Bank Retreat in 2034



# Recreational Use

- 805 individuals in 651 different watercraft (summer 2013);
- Float trips originate at sand bar upstream;
- Fishing, passive recreation (walkers, etc.)
- Current is relatively slow;
- Long sight line to wood sites;
- Thalweg likely to stay in mid-channel and go straight through project; and,
- Yearly monitoring of potential hazard.

# Project Schedule:

Construction July through August, 2014

## Questions?

Project Manager: Laird O'Rollins

Email: [Laird.orollins@kingcounty.gov](mailto:Laird.orollins@kingcounty.gov)

Phone: 206-477-4790

# Green River 2014 Log Placement Projects



# Green River Log Placement Projects Mitigate for 2009 Levee Clearing

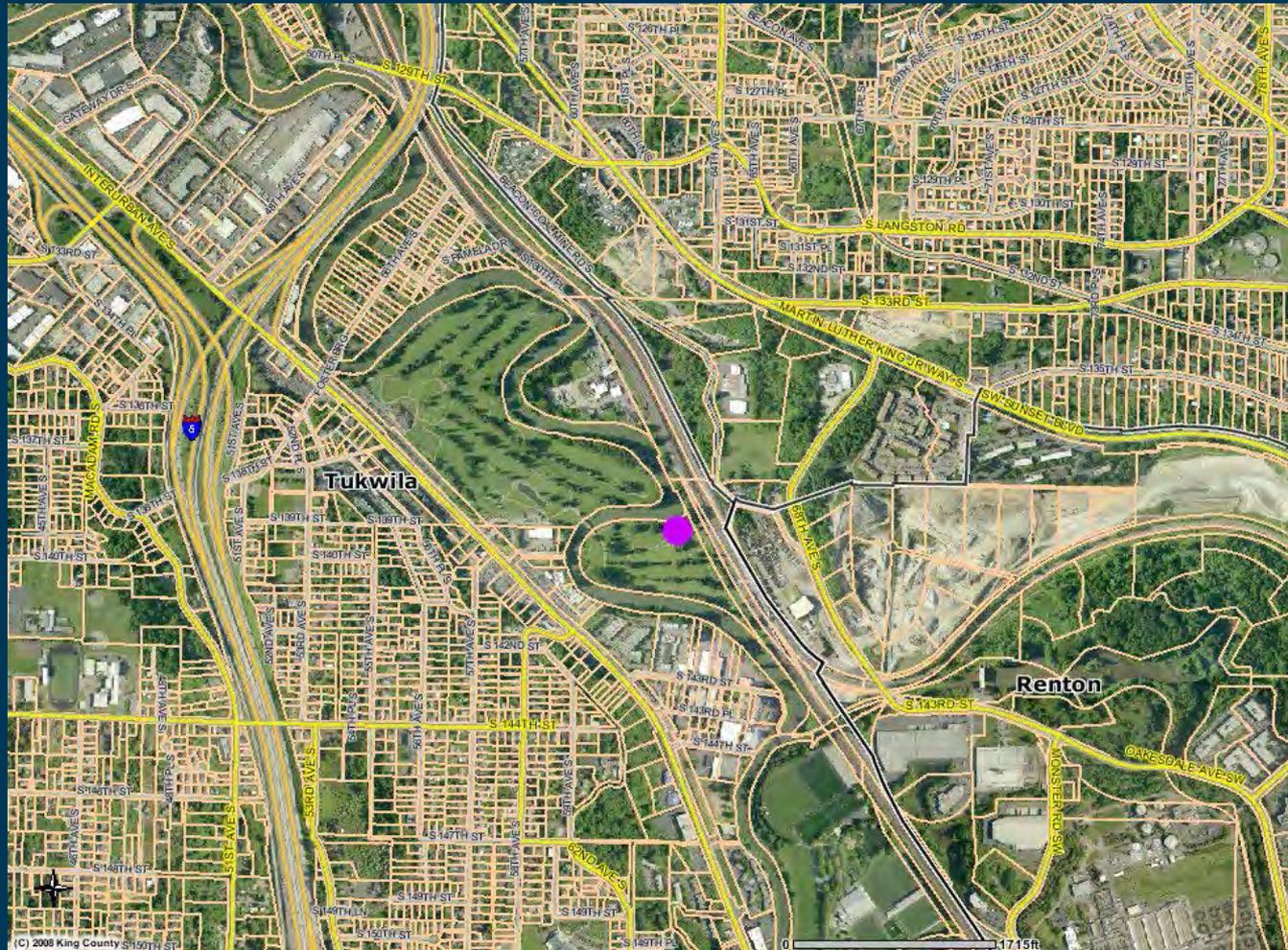


# Three Green River Sites Designated for Tree Cutting Mitigation

- Foster Golf Course (2014) 13 Logs
  - Teufel Nursery (2015) 89 Logs
  - Fenster Park (2014) 32 Logs
- 
- Total Mitigation (2014-2015) 134 Logs
  - 2014 Mitigation 45 Logs

# Foster Golf Course

## Tukwila, Right Bank, River Mile 10.26



# Foster Golf Course Aerial Site View



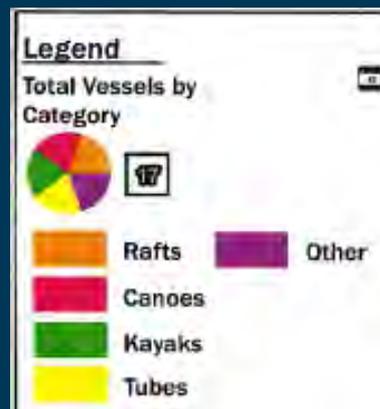
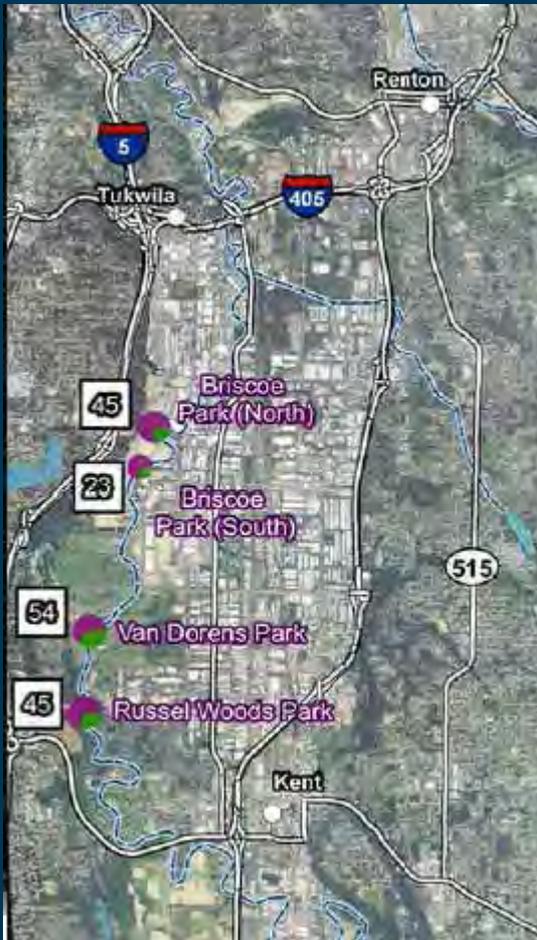
# Foster Golf Course View Upstream



# Foster Golf Course View Downstream



# Lower Green River Recreational Use at Foster Golf

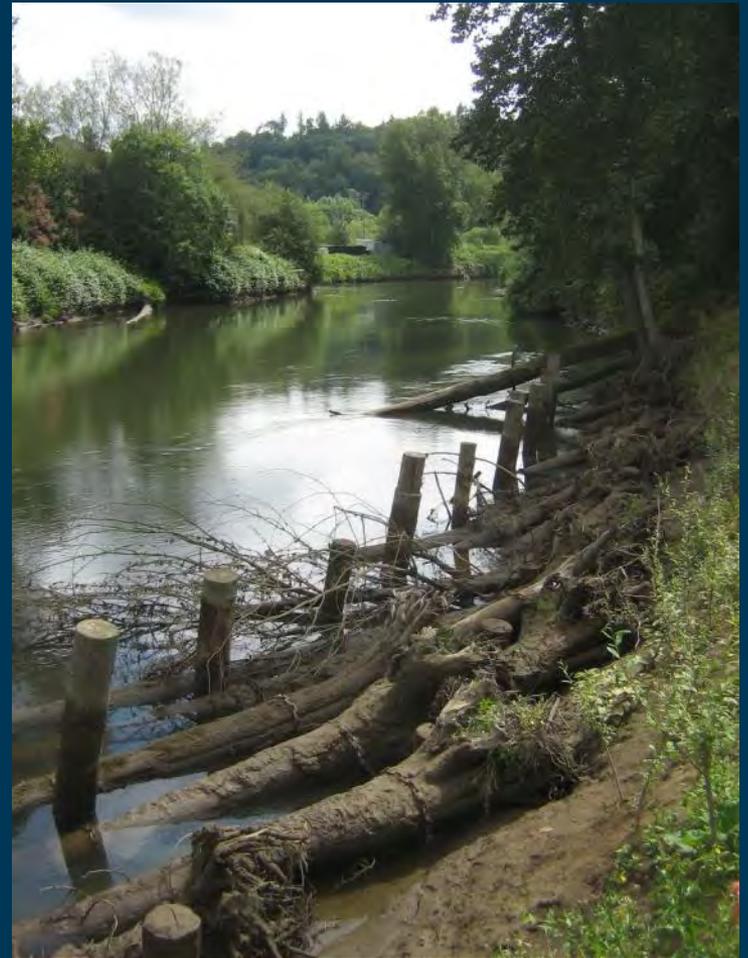


# Lower Green River Recreational Users



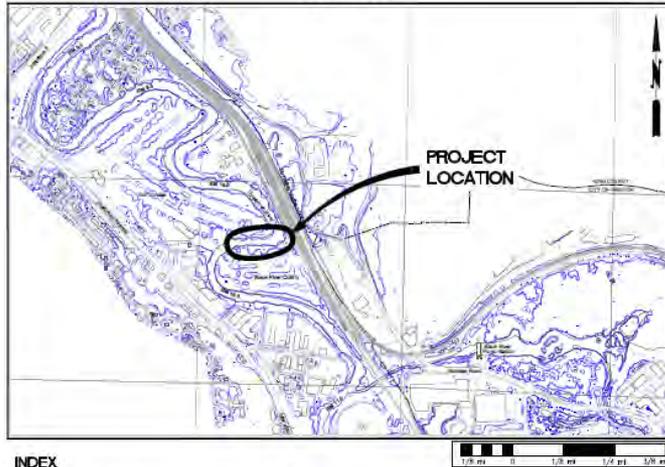
Foster Golf  
River Users

# Foster Golf Course 2008 Log Placement Example



# Foster Golf Draft Project Alternatives

VICINITY MAP



INDEX

SHEET	DESCRIPTION
1	VICINITY MAP AND SHEET INDEX
2	OPTION 1 PLAN AND SECTION
3	OPTION 2 PLAN AND SECTION

EXISTING LEGEND

---	PARCEL BOUNDARY
0924579081	PARCEL NUMBER
---	VEGETATION CANOPY BOUNDARY
---	APPROX WETLAND BOUNDARY
---	ORDINARY HIGH WATER LINE
---	ROAD/EDGE OF PAVEMENT
---	EXISTING LEVEE/REVIEWMENT
---	EXISTING SLOUGH
---	EXISTING MAJOR CONTOUR (10 FT)
---	EXISTING MINOR CONTOUR (2 FT)
---	EXISTING BUILDING
---	EXISTING LARGE TREE
---	EXISTING UTILITY POLE
---	LEVEE CENTERLINE

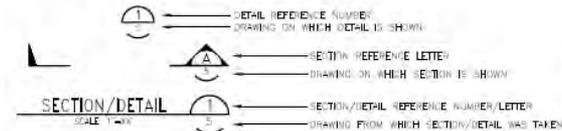
ABBREVIATIONS

ALCAP	ALUMINUM CAP	MR	MINIMUM
ALI	ALIES	MFL	MALE
APPROX	APPROXIMATE	NC	NUMBER
AVG	AVERAGE	NTS	NOT TO SCALE
BSD	BANK SLOPE	OH	ORDINARY HIGH WATER
BMP	BEST MANAGEMENT PRACTICE	PHS	PROFESSIONAL LAND SURVEYOR
BRLS	BANK SLOUGHING LOG	PLT	PLANT
CF	CUBIC FEET	REBAR W/ CAP	
CFS	CUBIC FEET PER SECOND	RR	ROCK REMOVAL
CP	CONTROL POINT	RRR	ROCK REMOVAL
CW	COTTONWOOD	SSR	SETBACK ROCK REVETMENT
CV	CUBIC YARD	STA	STATION
DBH	DIAMETER AT BREAST HEIGHT	SY	SQUARE YARD
DET	DETAIL	TEMP	TEMPORARY
DIAMETER	DIAMETER AT BREAST HEIGHT	TESSC	TEMPORARY EROSION AND SEDIMENT CONTROL
EL	ELEVATION	TFP	TREE FELLING AND PLACEMENT
ELJ	ENGINEERED LOGJAM	TOT	TOTAL
EXIST	EXISTING	TYP	TYPICAL
FEET	FEET	VBT	VERTICAL
HORIZ	HORIZONTAL	WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
IN	INCHES	WET	WETLAND
LF	LINEAR FEET	WQS	WATER QUALITY STANDARDS
MAX	MAXIMUM	WSPMP	WATER QUALITY PROTECTION AND MONITORING PLAN
		WSE	WATER SURFACE ELEVATION



## GREEN RIVER TREE CUTTING MITIGATION WITH LARGE WOOD PLACEMENT AT FOSTER GOLF COURSE

RIVER MILE 10.28 RIGHT BANK  
WORKING DRAFT 30% CONCEPTUAL DESIGN  
CONTRACT NO. E00201E10



--- INDICATES THAT THE DETAIL/SECTION IS SHOWN ON THE SAME DRAWING  
TYP INDICATES THAT THE DETAIL/SECTION IS UNIFORMLY TYPICAL THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED

VAR SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM VARIOUS DRAWINGS  
NOTE AND DETAIL/SECTION REFERENCING



CALL 2 WORKING DAYS  
BEFORE YOU DIG  
1-800-424-5555  
(UNDERGROUND UTILITIES LOCATING AND APPROVAL)

FIELD BOOK		APPROVED			
SURVEYED		PROJECT			
SURVEY BASE MAP		SUPERVISOR			
CHECKED		PROJECT MANAGER	A. LESIGUE, P.E.	4-2014	
PROJECT NO.		DESIGNER	C. WOOD, P.E. & S. SCOTT	4-2014	
SURVEY NO.		DESIGN ENGINEER	J. HESLOTT	4-2014	
DATE		DATE			

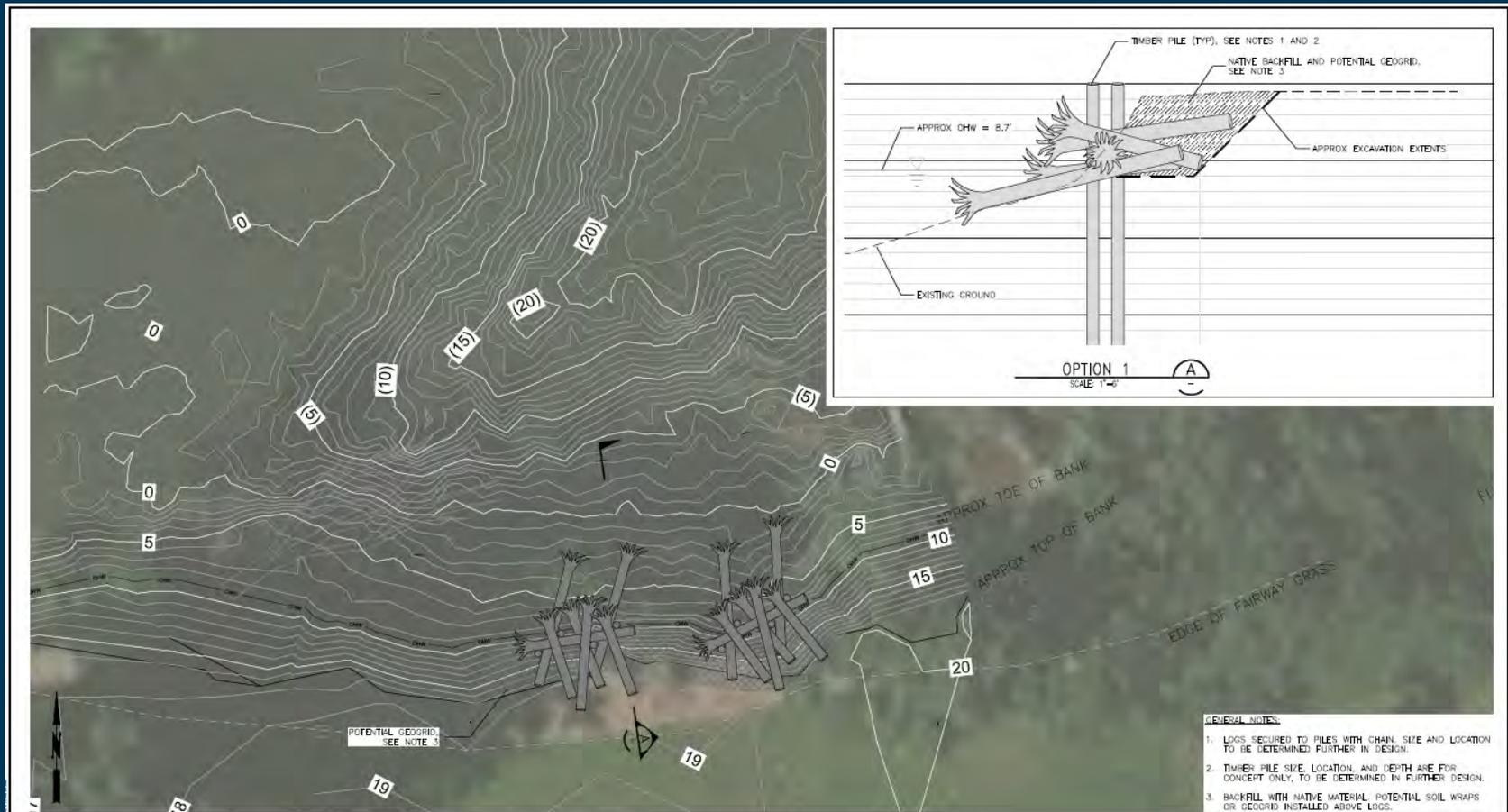


**GREEN RIVER TREE CUTTING  
MITIGATION AT FOSTER GOLF COURSE  
RM 10.28**

VICINITY MAP, SHEET INDEX, LEGEND  
AND ABBREVIATIONS

SHEET  
1  
OF  
3  
SHEETS  
XXXX-XX

# Foster Golf Draft Alternative 1



OPTION 1: TWO STRUCTURES, SOME EXCAVATION – PLAN

- GENERAL NOTES:**
1. LOGS SECURED TO PILES WITH CHAIN, SIZE AND LOCATION TO BE DETERMINED FURTHER IN DESIGN.
  2. TIMBER PILE SIZE, LOCATION, AND DEPTH ARE FOR CONCEPT ONLY, TO BE DETERMINED IN FURTHER DESIGN.
  3. BACKFILL WITH NATIVE MATERIAL, POTENTIAL SOIL WRAPS OR GEGRID INSTALLED ABOVE LOGS.

**CALL 2 WORKING DAYS  
BEFORE YOU DIG  
1-800-424-6666**

(UNDERGROUND UTILITY LOCATIONS ARE APPROX)

FIELD BOOK: _____	APPROVED: _____
SURVED: _____	PROJECT: _____
SURVEY BASE MAP: _____	SUPERVISOR: _____
CHECKED: _____	PROJECT MANAGER: A. LEVESQUE P.E. 4-2014
PROJECT No. _____	DESIGNED: C. AVILAJO P.E., B. SCOTT 4-2014
SURVEY No. _____	DESIGN ENTERED: T. PHESCOTT 4-2014
NUM. _____	REASON _____
BY _____	DATE _____

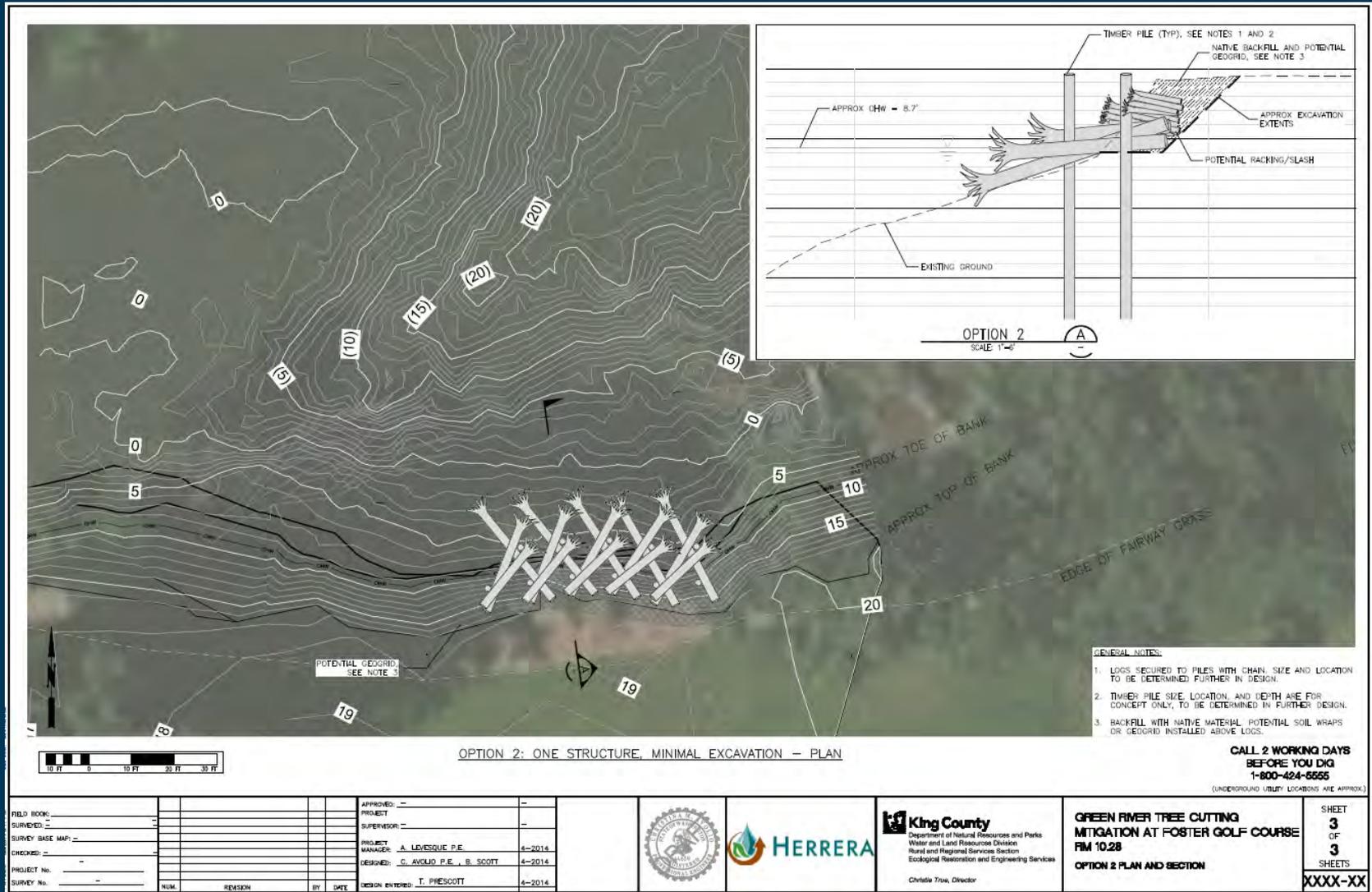


**King County**  
Department of Natural Resources and Parks  
Water and Land Resources Division  
Rural and Regional Services Section  
Ecological Restoration and Engineering Services  
Christie Tru, Director

**GREEN RIVER TREE CUTTING  
MITIGATION AT FOSTER GOLF COURSE  
FM 10.28  
OPTION 1 PLAN AND SECTION**

SHEET  
**2**  
OF  
**3**  
SHEETS  
XXXX-XX

# Foster Golf Draft Alternative 2



OPTION 2: ONE STRUCTURE, MINIMAL EXCAVATION – PLAN

- GENERAL NOTES:**
- LOGS SECURED TO PILES WITH CHAIN. SIZE AND LOCATION TO BE DETERMINED FURTHER IN DESIGN.
  - TIMBER PILE SIZE, LOCATION, AND DEPTH ARE FOR CONCEPT ONLY, TO BE DETERMINED IN FURTHER DESIGN.
  - BACKFILL WITH NATIVE MATERIAL. POTENTIAL SOIL WRAPS OR GEGRID INSTALLED ABOVE LOGS.

**CALL 2 WORKING DAYS BEFORE YOU DIG**  
1-800-424-5555  
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

FIELD BOOK: _____	APPROVED: _____
SURVEYED: _____	PROJECT: _____
SURVEY BASE MAP: _____	SUPERVISOR: _____
CHECKED: _____	PROJECT MANAGER: A. LEVESQUE P.E. 4-2014
PROJECT No. _____	DESIGNED: C. AVILA P.E., B. SCOTT 4-2014
SURVEY No. _____	DESIGN ENTERED: T. PRESCOTT 4-2014
NUM. _____	REASON _____
BY _____	DATE _____



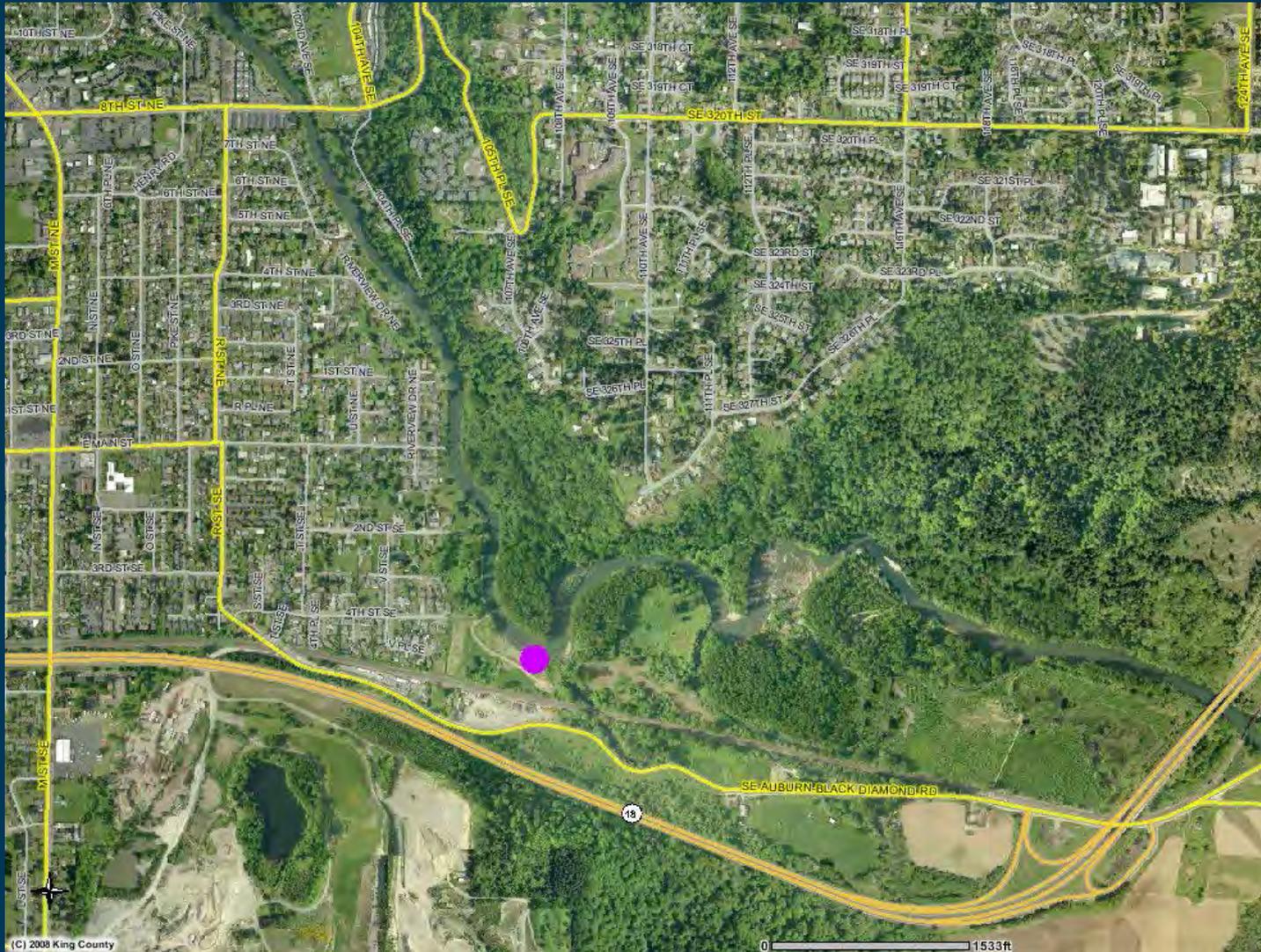
**King County**  
Department of Natural Resources and Parks  
Water and Land Resource Division  
Rural and Regional Services Section  
Ecological Restoration and Engineering Services  
Chivida Tron, Director

**GREEN RIVER TREE CUTTING  
MITIGATION AT FOSTER GOLF COURSE  
FM 10.28  
OPTION 2 PLAN AND SECTION**

SHEET	3
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SHEETS	
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# Fenster Park

## Auburn, Left Bank, River Mile 32.0





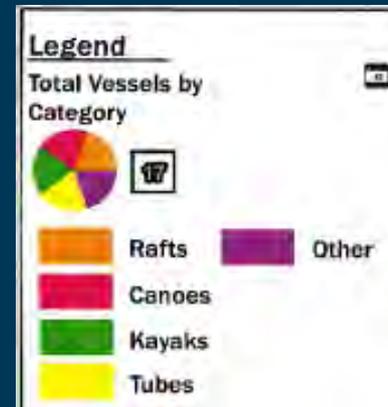
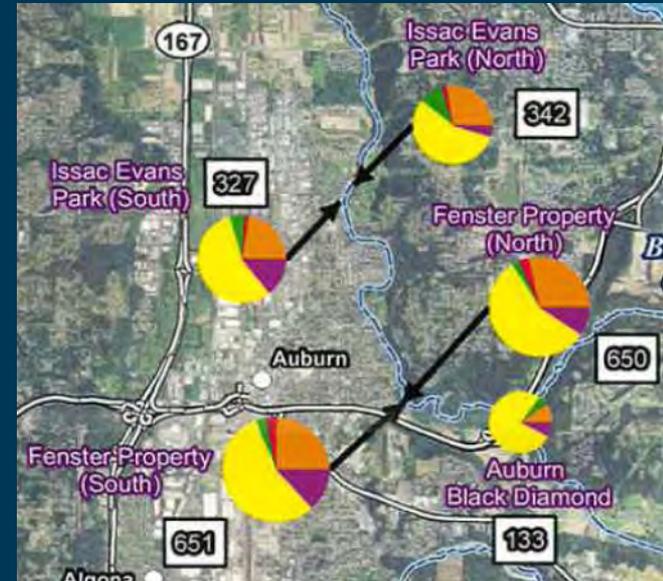
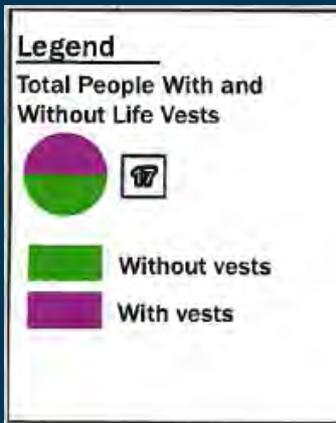
# Auburn Narrows Log Jam River Closed to Boating



# Fenster Park Aerial Site View



# Lower Green River Recreational Use at Fenster Park



# Lower Green River Recreational Users at Fenster Park



# Fenster Park

## Existing Site Conditions

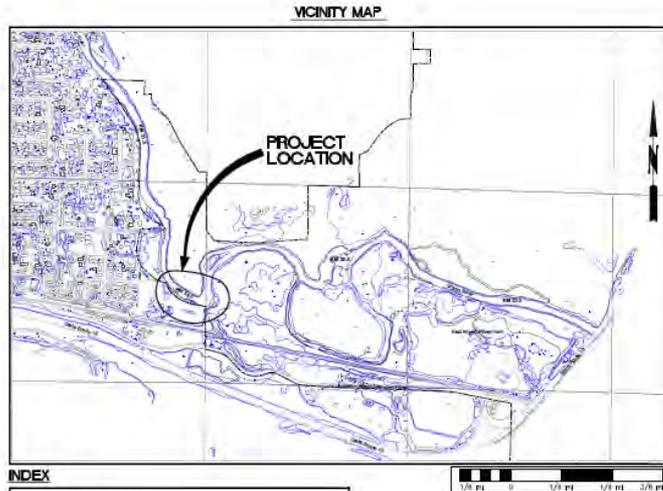


# Fenster Park King County Sheriff's Findings



“Removal is a good idea.”

# Fenster Park Draft Project Alternatives



**INDEX**

SHEET	DESCRIPTION
1	VICINITY MAP, SHEET INDEX, LEGEND AND ABBREVIATIONS
2	OPTION 1: WOOD SEVERMENT PLAN AND SECTION
3	OPTION 2: FLOW DEFLECTOR CLIP'S PLAN AND SECTION
4	OPTION 3: LOG CLUSTERS PLAN AND SECTION

**EXISTING LEGEND**

	PARCEL BOUNDARY
0224079061	PARCEL NUMBER
	VEGETATION CANOPY BOUNDARY
	APPROX WETLAND BOUNDARY
	ORDINARY HIGH WATER LINE
	RIBBON/EDGE OF PAVEMENT
	EXISTING DRAINAGE
	EXISTING SLOUGH
	EXISTING MAJOR CONTOUR (10 FT)
	EXISTING MINOR CONTOUR (2 FT)
	EXISTING BUILDING
	EXISTING LARGE TREE
	EXISTING UTILITY POLE
	LEVEE CENTERLINE

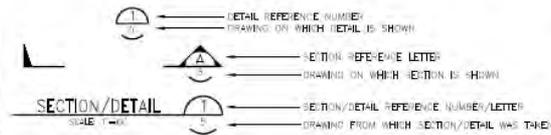
**ABBREVIATIONS**

ALCAP	ALUMINUM CAP	MIN	MINIMUM
ALD	ALLEY	MPL	MAPLE
APPROX	APPROXIMATE	NO.	NUMBER
AVG	AVERAGE	NTS	NOT TO SCALE
BD	BRASS DISK	OC	ON CENTER
BMP	BEST MANAGEMENT PRACTICE	OHW	ORDINARY HIGH WATER
BRLS	BANK ROUGHENING LOG STRUCTURE	PLS	PROFESSIONAL LAND SURVEYOR POINT
CF	CUBIC FEET	RSC	REBAR W/ CAP
CFPS	CUBIC FEET PER SECOND	RR	ROCK REMOVAL
CP	CONTROL POINT	RSR	SETBACK ROCK REVEMENT
CM	COTTONWOOD	STA	STATION
CY	CUBIC YARD	SY	SQUARE YARD
DCH	DIAMETER AT BREAST HEIGHT	TEMP	TEMPORARY
DET	DETAIL	TEMC	TEMPORARY EROSION AND SEDIMENT CONTROL
DM	DIAMETER	TRF	TREE FELLING AND PLACEMENT
EL	ELEVATION	TOT	TOTAL
ELU	ENGINEERED LOGJAM	TY	TYPICAL
EXIST	EXISTING	VERT	VERTICAL
FEET	FEET	WASH	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
FOUR	HORIZONTAL	WET	WETLAND
IN	INCHES	WQS	WATER QUALITY STANDARDS
LF	LINEAR FEET	WQMP	WATER QUALITY PROTECTION AND MONITORING PLAN
MAX	MAXIMUM	WSE	WATER SURFACE ELEVATION



## GREEN RIVER TREE CUTTING MITIGATION WITH LARGE WOOD PLACEMENT AT FENSTER PARK

RIVER MILE 31.95 LEFT BANK  
WORKING DRAFT 30% CONCEPTUAL DESIGN  
CONTRACT NO. E00201E10



"L" INDICATES THAT THE DETAIL/SECTION IS SHOWN ON THE SAME DRAWING.  
"TYP" INDICATES THAT THE DETAIL/SECTION IS UNIFORM THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED.

"VAR" SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM VARIOUS DRAWINGS.

**NOTE AND DETAIL/SECTION REFERENCING**



CALL 2 WORKING DAYS  
BEFORE YOU DIG  
1-800-424-5655

(UNDESIGNED/UNPLANNED/UNAPPROVED)

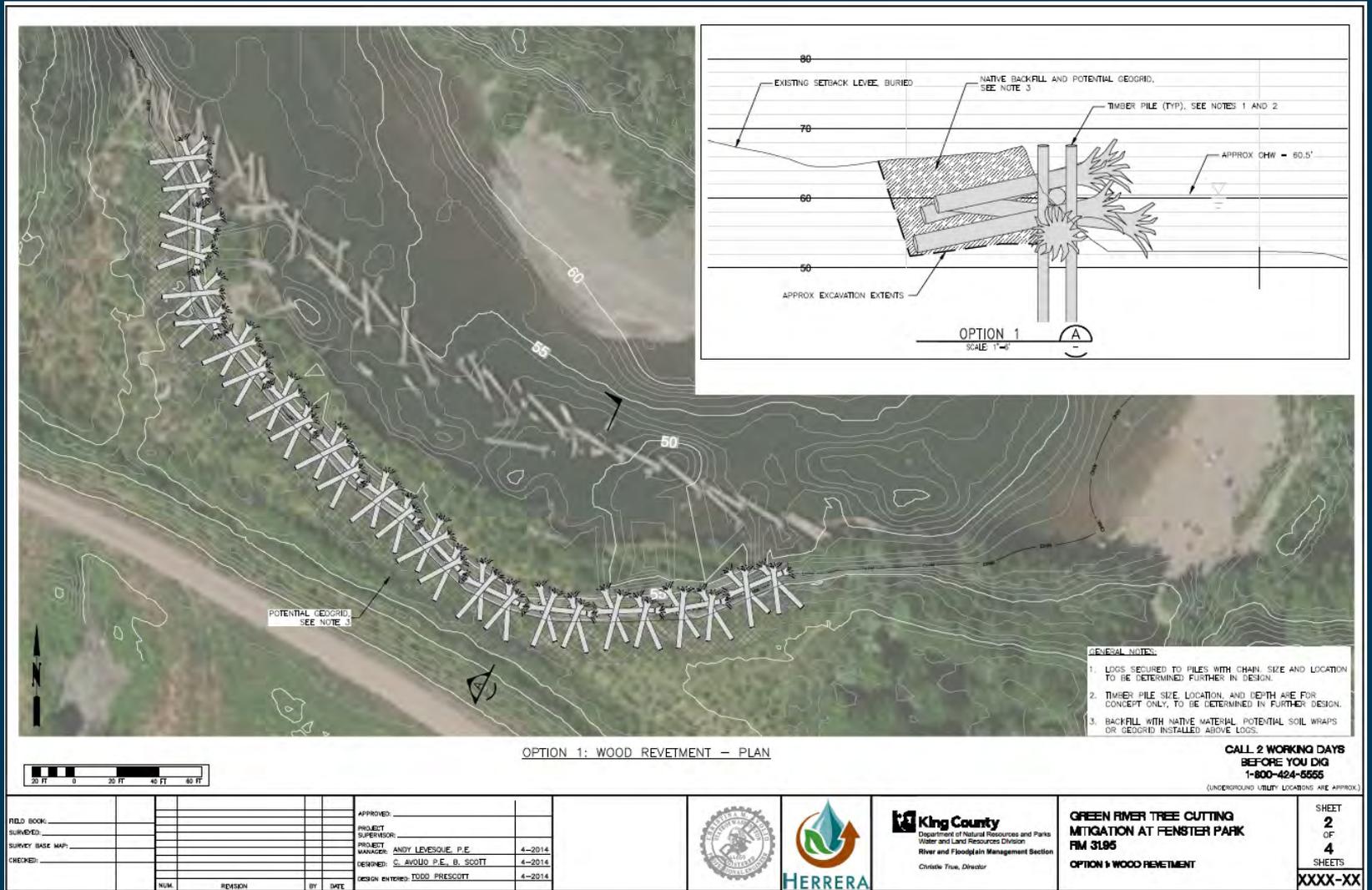
FIELD BOOK	DATE	BY	DATE	APPROVED
SURVEYED				PROJECT SUPERVISOR
SURVEY MADE MAP				PROJECT MANAGER: AMY LEVINSKY P.E. 4-2014
CHECKED				REVISOR: C. AVILA P.E. U. SQUITT 4-2014
				DESIGN CHECKER: DORO PEREGRINO 4-2014



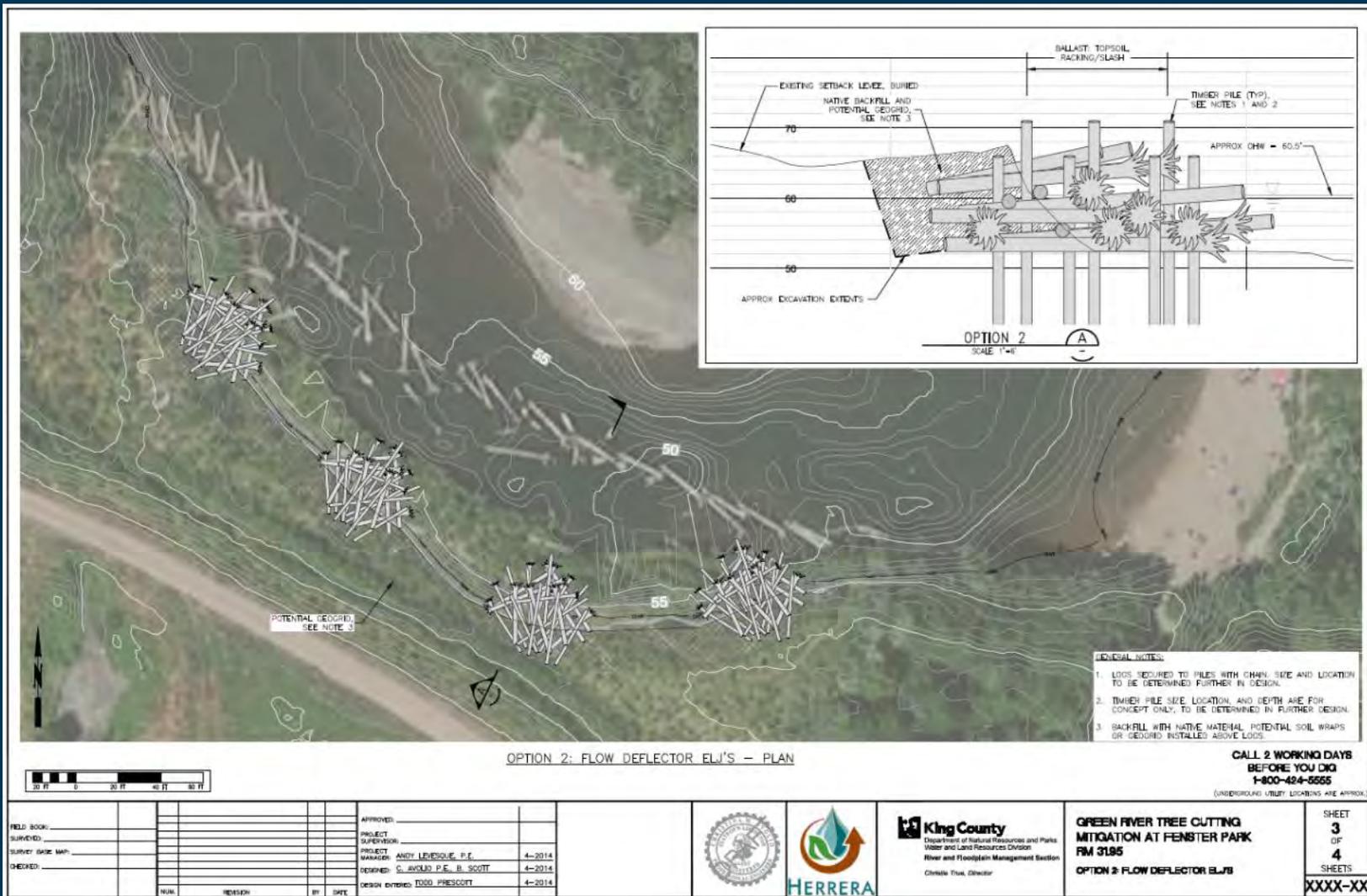
**GREEN RIVER TREE CUTTING  
MITIGATION AT FENSTER PARK  
RM 31.95**  
VICINITY MAP, SHEET INDEX, LEGEND AND ABBREVIATIONS

SHEET  
**1**  
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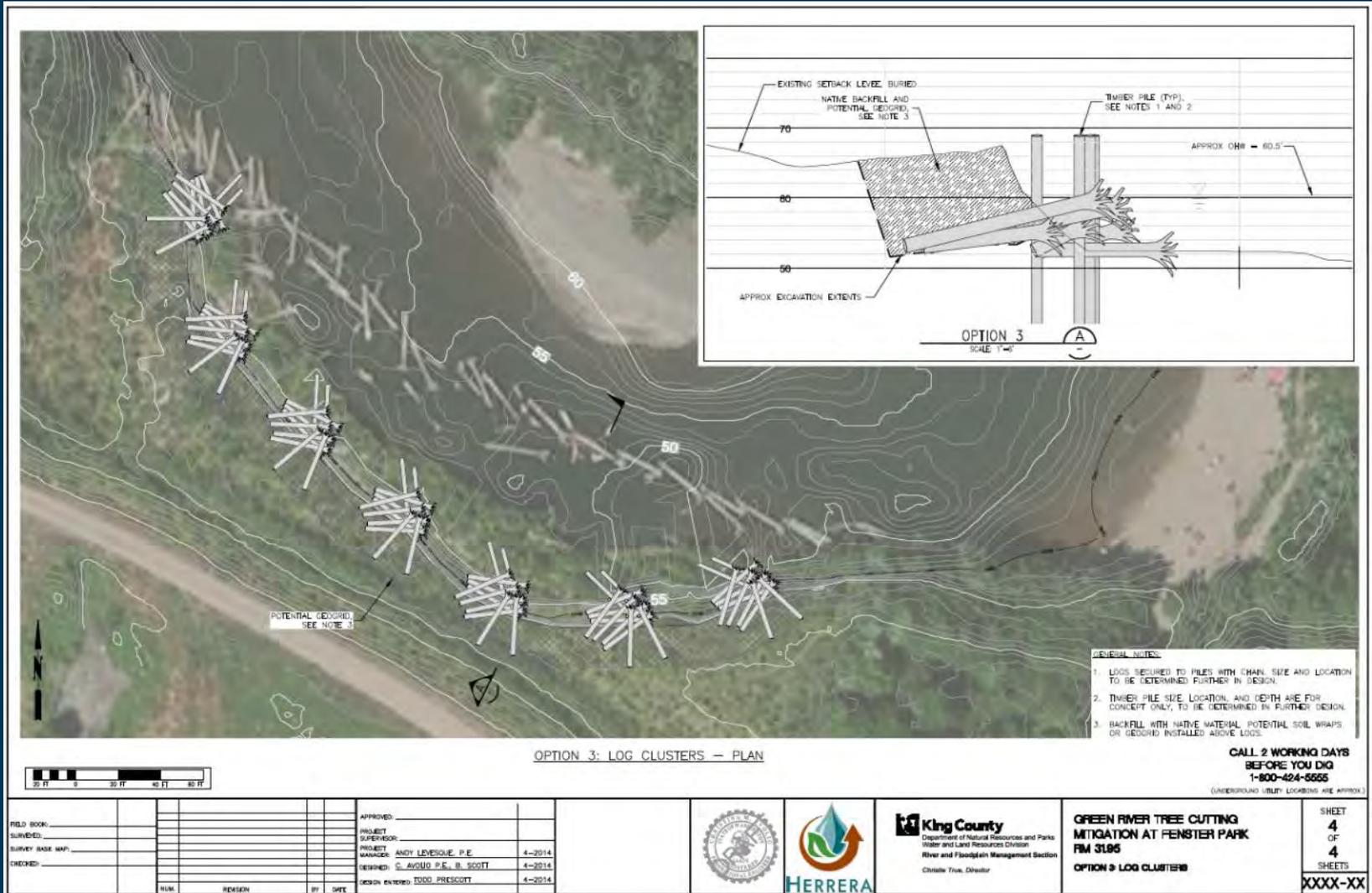
# Fenster Park Draft Alternative 1



# Fenster Park Draft Alternative 2



# Fenster Park Draft Alternative 3



## Questions?

**Project Manager: Andy Levesque**

**Andy.levesque@kingcounty.gov**

**(206) 477-4753**

**On the Web:**

**[www.kingcountyfloodcontrol.org](http://www.kingcountyfloodcontrol.org)**

