Projects with Large Wood in King County Rivers and Streams 2019

Nancy Sandford, Project Manager

Issaquah Hatchery - June 12, 2019
Mercer Island Community Center - June 13, 2019

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

KING COUNTY FLOOD CONTROL DISTRICT

King County

Background

- **Pacific Northwest rivers historically have had large amounts of wood**
- **Wood affects channel processes:**
  - Deflect flows, reducing or concentrating erosion
  - Dampen velocities
  - Trap and store sediment
  - Create aquatic habitat and flood refuge
- **Shift in thinking and management in 1980s-90s**
  - Natural floodplain functions are more efficient at conveying and storing flood flows
  - Projects need to be self-mitigating

Lower Green River - 2006

Cedar River Landslide Reach

Designing Projects with Large Wood

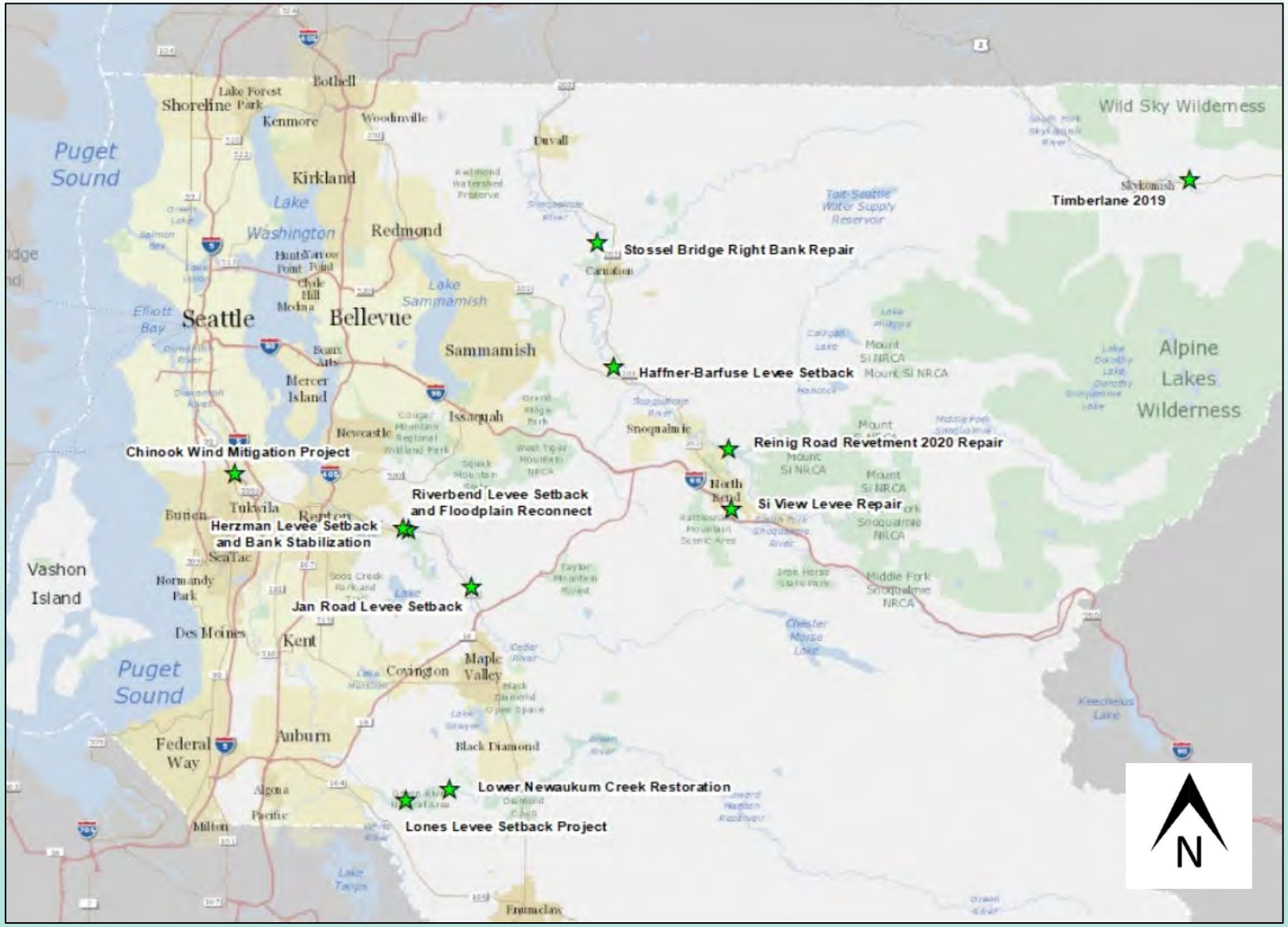
Policy Guidance:
King County Council Ordinance 16581 and Public Rule (2009)

- Design to maximize ecological benefits, minimize risks to people and property
- Engage with stakeholders at conceptual design phase

Key Elements:

- Annual Large Wood public meeting
- Instream Project Design Checklist
- 30% designs posted for review/comment
- Monitor and maintain project for safety

2019 Large Wood Projects



Large Wood Website

Project Name	Year Completed	River	Approx. Number of Logs Installed	Approx. Linear Feet	Bank	Approx. River Mile
Camp Gilead	1998	Snoqualmie River	6	140	Left	23.2
McCrone Peasco	1996	Snoqualmie River	16	275	Right	23.5
Hallmer	1997	Snoqualmie River	3	110	Right	34.9
Williams	1997	Snoqualmie River	2	150	Left	38.4
Meadowbrook	2000	Snoqualmie River	300 & 190 pilings	1170	Left	41.7
Reif Road (1998 Repair)	1998	South Fork Snoqualmie	9	375	Left	3.2
S. View 3.3	1998	South Fork Snoqualmie	3	150	Right	3.3
Reif Road (1996 Repair)	1996	South Fork Snoqualmie	18	205	Left	3.7
S. View 4.0	1998	South Fork Snoqualmie	1	100	Right	4.0

Links to:

- CIP projects
- Known hazards
- Policies and Procedures

www.kingcounty.gov/services/environment/watersheds/general-information/large-wood.aspx

2019 Natural Wood Response

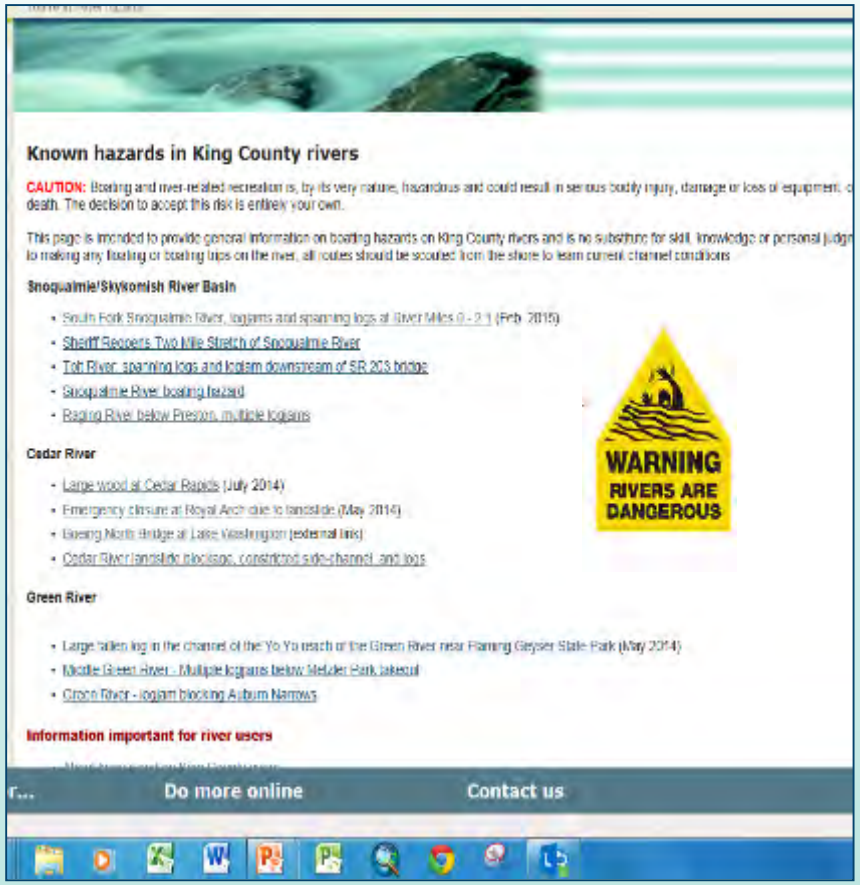
- King County Sheriff's Office (KCSO) is lead in responding to public safety concerns
- All reported concerns will be investigated – actions may include signage, wood repositioning, or closing the river

Cedar River - 2011

Cedar River - 2019

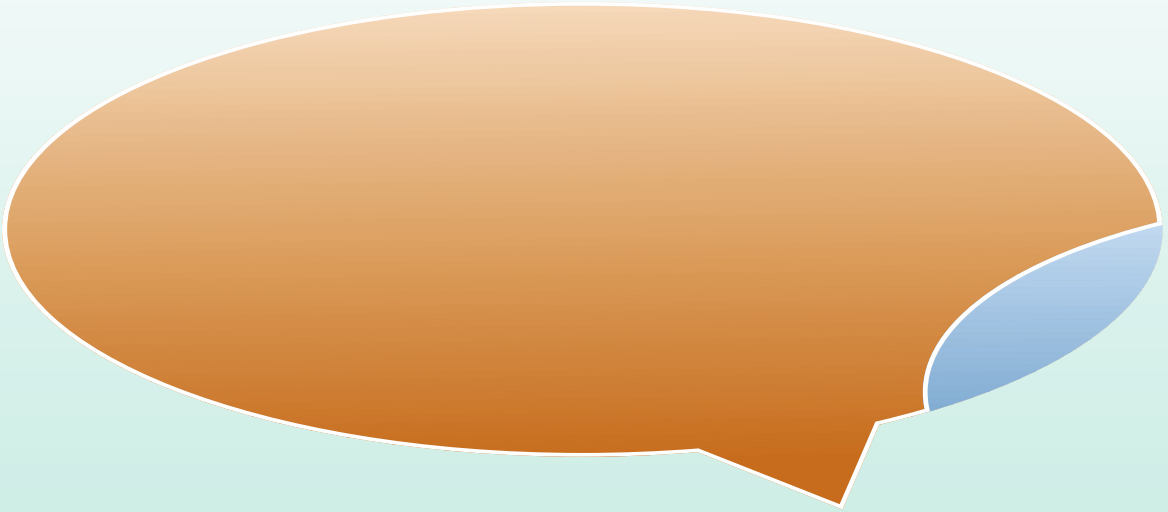
- Unlikely permit authority to modify wood on Cedar River in 2019
- Pre-season river safety assessment by KCSO

Known Hazard Information on Website



www.kingcounty.gov/recreation/boating/rivers.aspx

Questions?



Nancy Sandford, Project Manager
River and Floodplain Management Section
206-477-4688
nancy.sandford@kingcounty.gov
www.kingcounty.gov/rivers

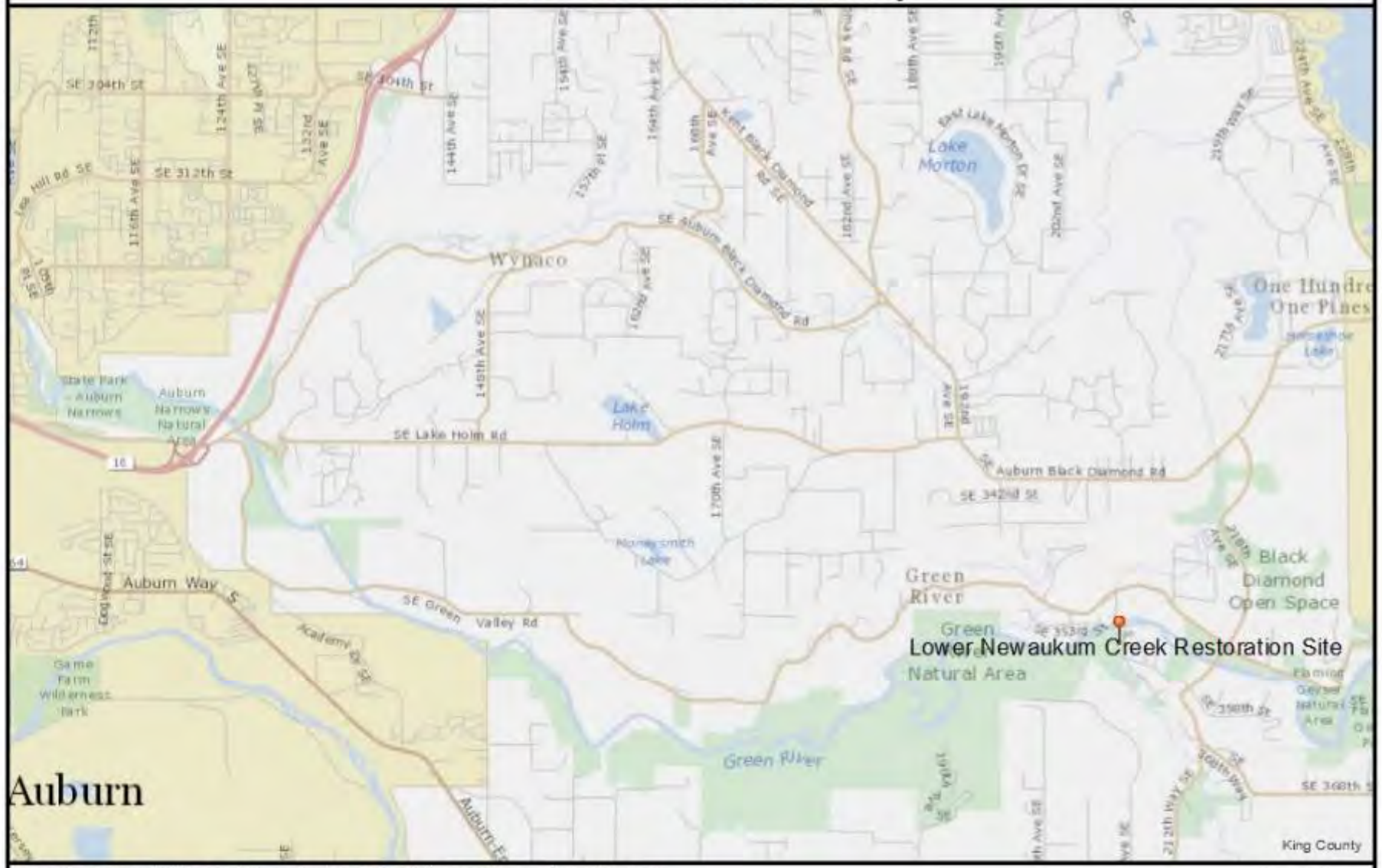
Lower Newaukum Creek Restoration

Dan Eastman, Project Supervisor

June 12, 2019 – Issaquah Fish Hatchery
June 13, 2019 – Mercer Is. Community Center

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

Lower Newaukum Vicinity



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Date: 6/6/2019 Notes:

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Project Description

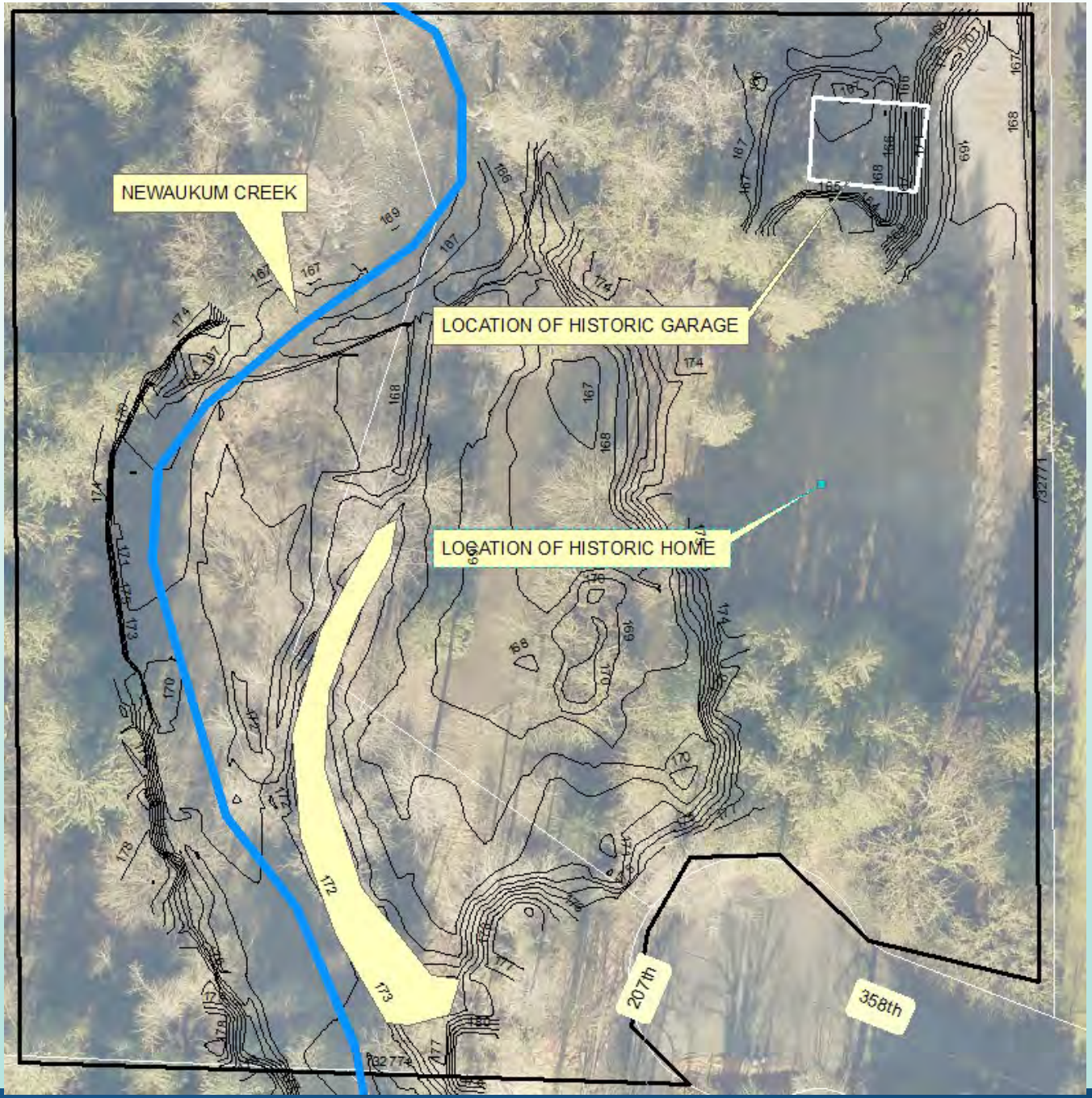
- Remove 120 linear feet of old levee
- Place 13 pieces of wood in floodplain and Newaukum Creek
- Plant 17,000 square feet of riparian buffer

Goals and Objectives

- Restore connection to 0.6 acres of floodplain isolated by 120 lf of levee
- Restore spawning and rearing habitat for Chinook salmon and steelhead trout

Existing Conditions

- 120 lf of levee constructed to protect residential home and garage – no longer in existence
- No recreational boating in Newaukum Creek


NEWAUKUM CREEK
LOCATION OF HISTORIC GARAGE
LOCATION OF HISTORIC HOME
207th
358th

NEWAUKUM CREEK
LEVEE TO BE REMOVED
207th
358th

NEWAUKUM CREEK
LARGE WOOD ADDED TO FLOODPLAIN AND CHANNEL
207th
358th

Planned Construction

- July – August 2019 (three weeks)

Questions?

Mason Bowles, Project Manager
206-477-4651
Mason.Bowles@kingcounty.gov

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Capital Strike Team Repair Projects

Stella Torres, Capital Project Manager
Capital Strike Team

Large Wood Public Meeting
Issaquah Hatchery - June 12, 2019
Mercer Island Community Center - June 13, 2019

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

KING COUNTY FLOOD CONTROL DISTRICT

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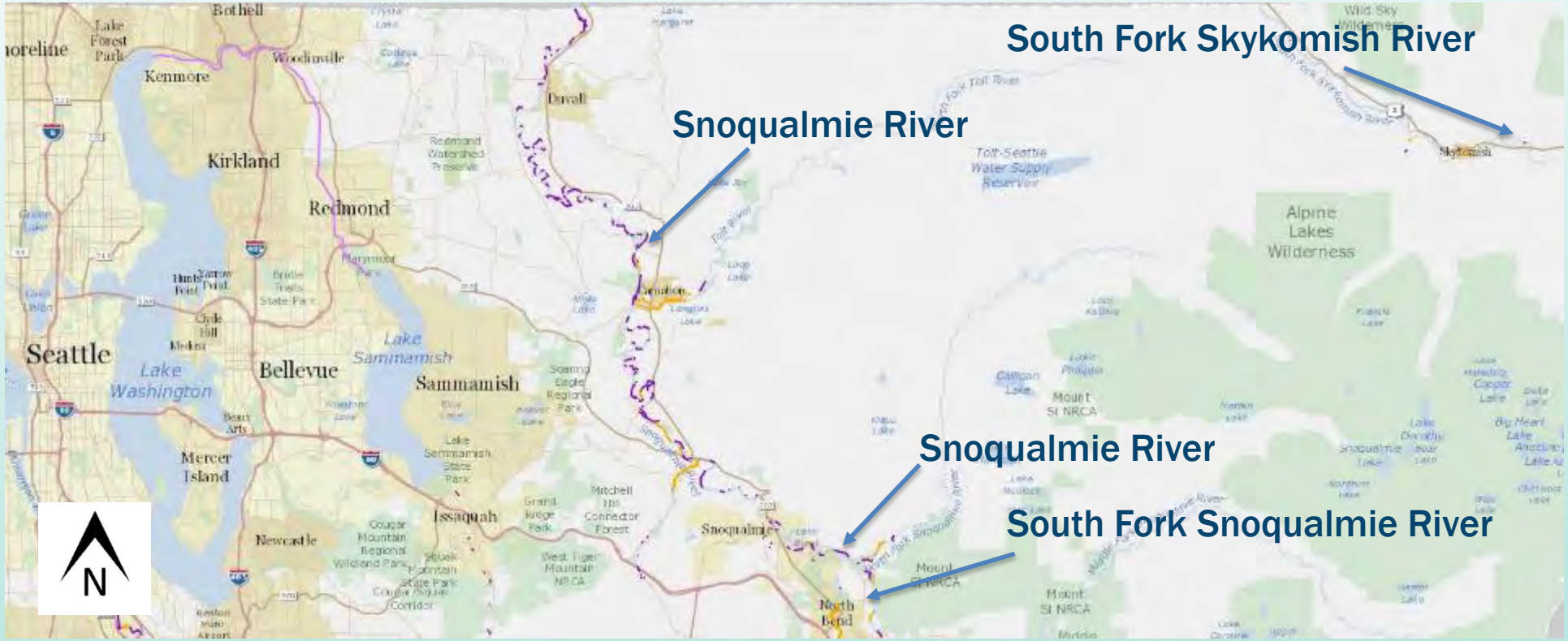
Project Locations (4)

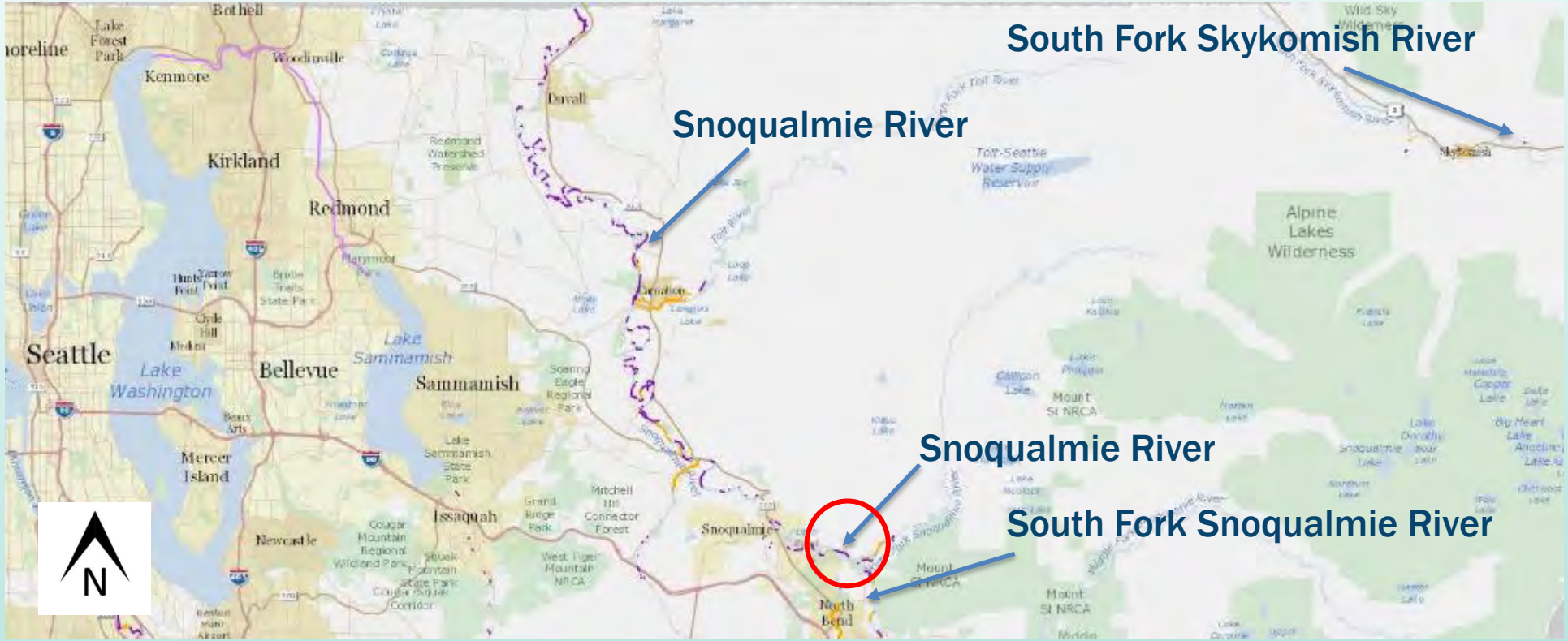
Snoqualmie River and South Fork Skykomish River



Vicinity Map

Snoqualmie River

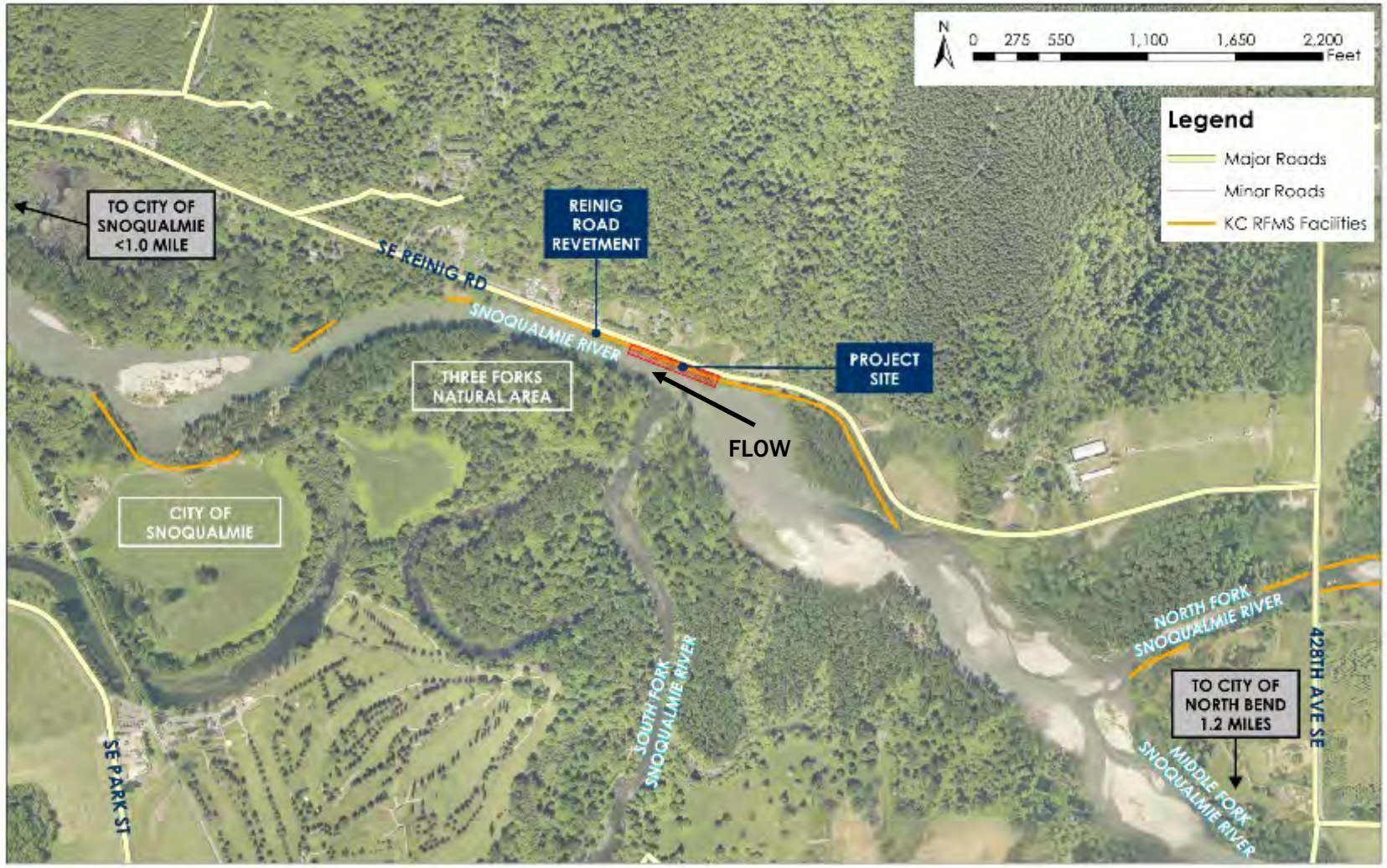
Reinig Road Revetment 2020 Repair



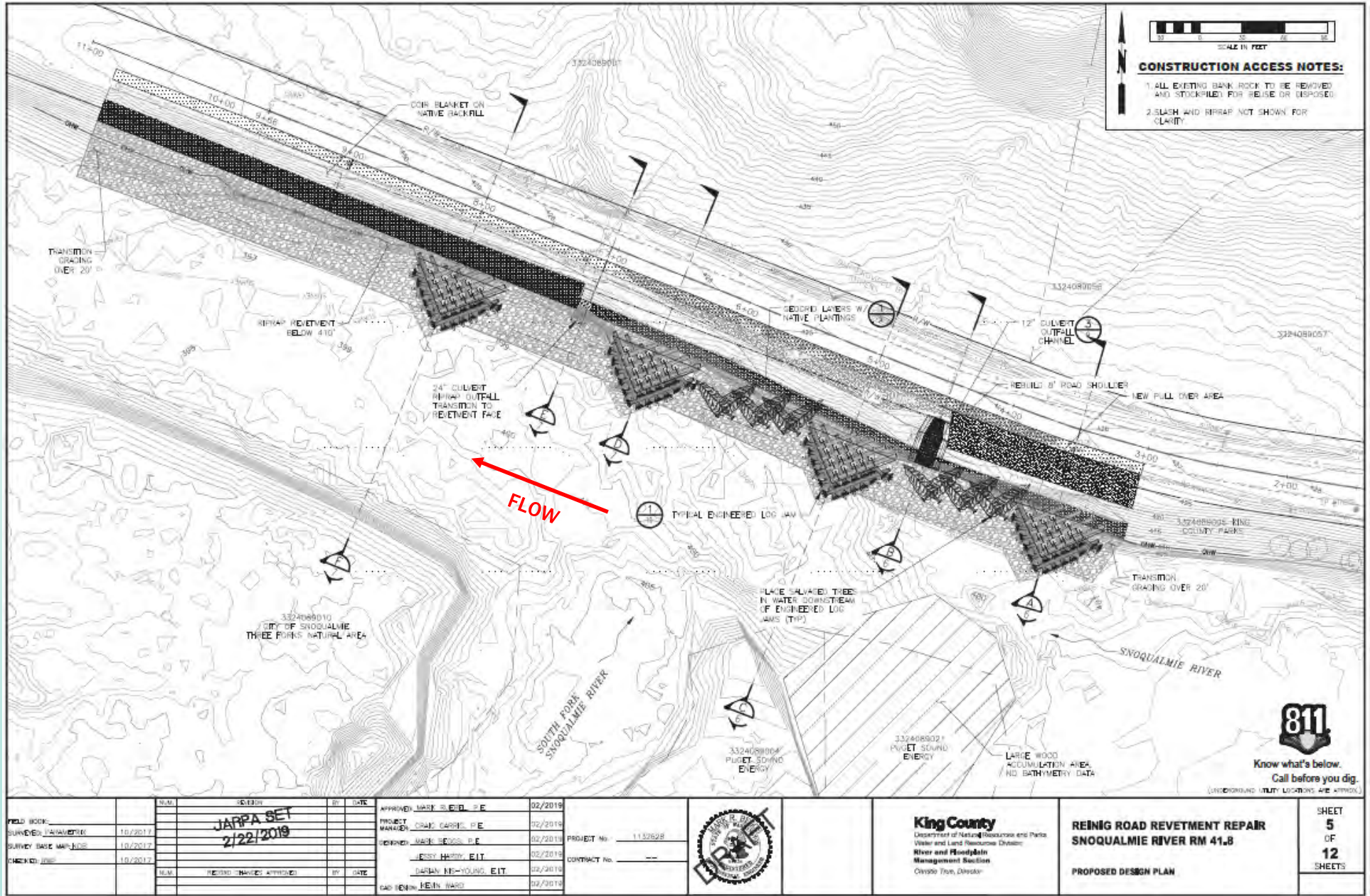
Vicinity Map

Snoqualmie River

Reinig Road Revetment 2020 Repair



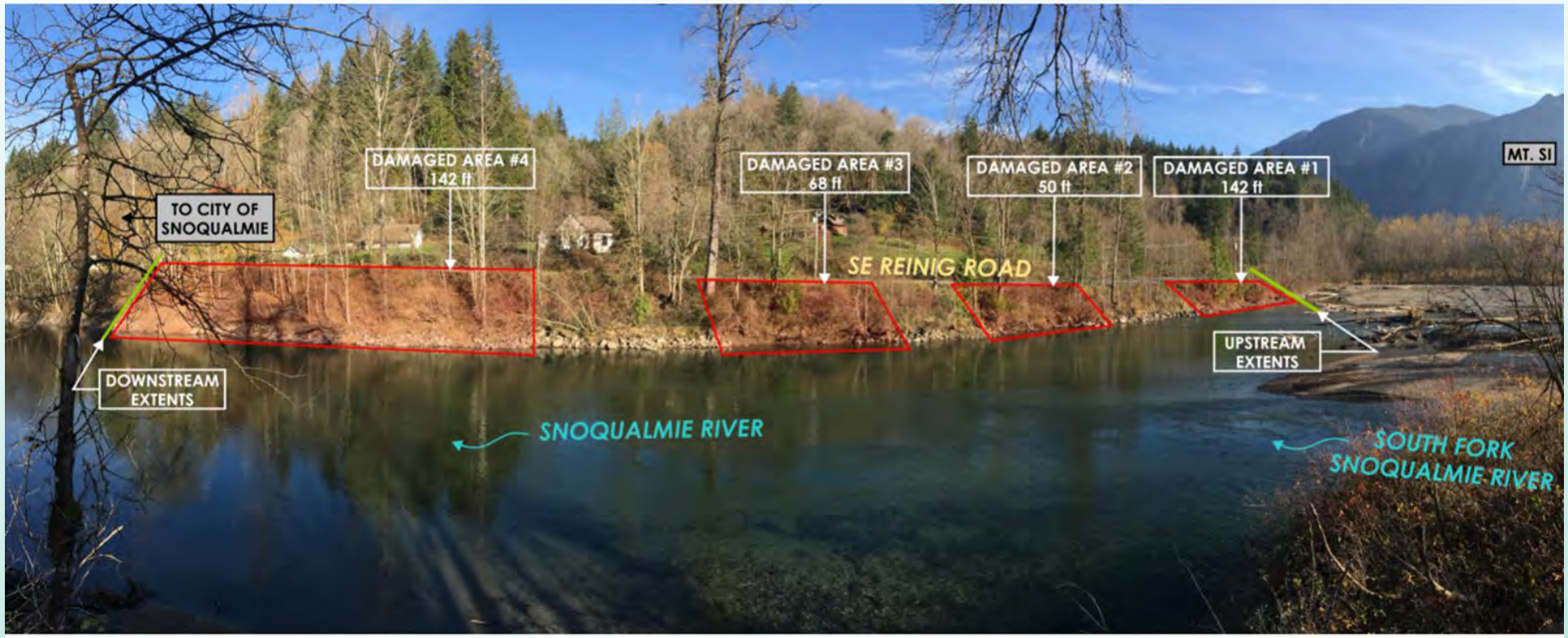
Project Overview



Existing Accumulation

Natural Large Wood at Project Site

Area Wood Placement



2013 recreational study findings:

- Fewer than 2% of all Snoqualmie River inner tubers were observed in this study reach (main stem above Snoqualmie Falls)
- Moderate use by swimmers in side channel - not much use by swimmers in main stem

Project Schedule

- Preliminary 30% Design Complete - Design Drawings posted on webpage
- Final 60%-100% Design - October 2019
- Construction - Summer 2020

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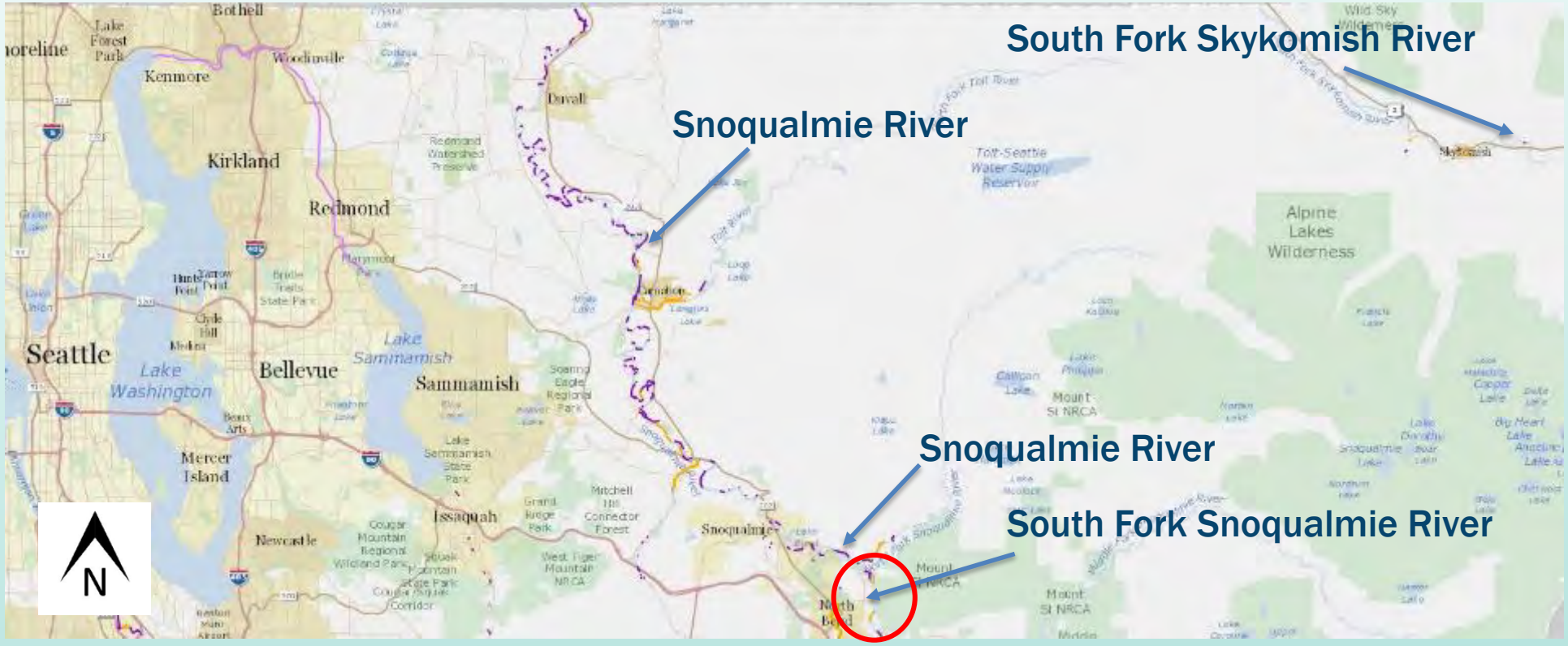
South Fork Snoqualmie River

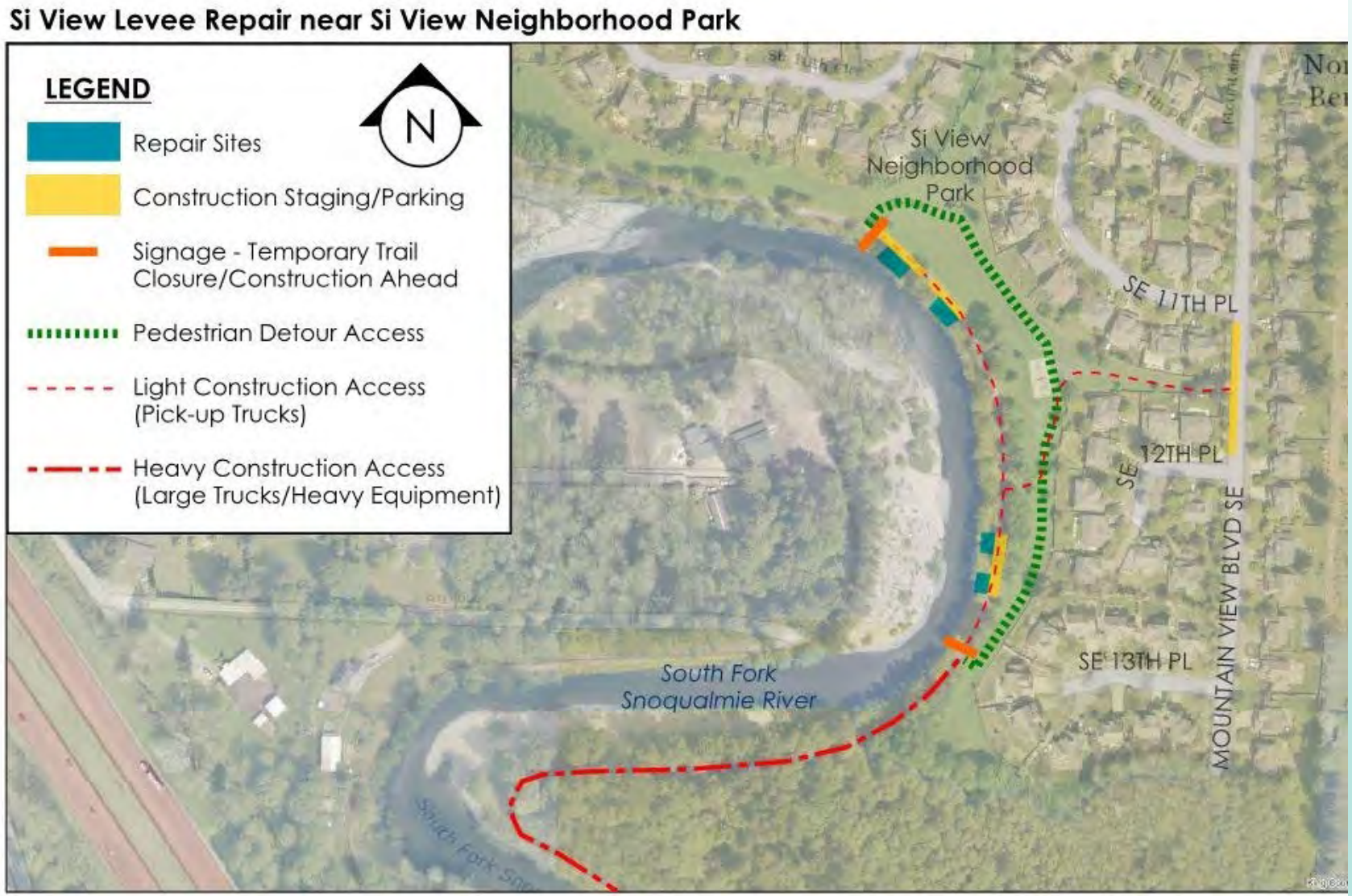
Si View Levee Repair



Vicinity Map

South Fork Snoqualmie River

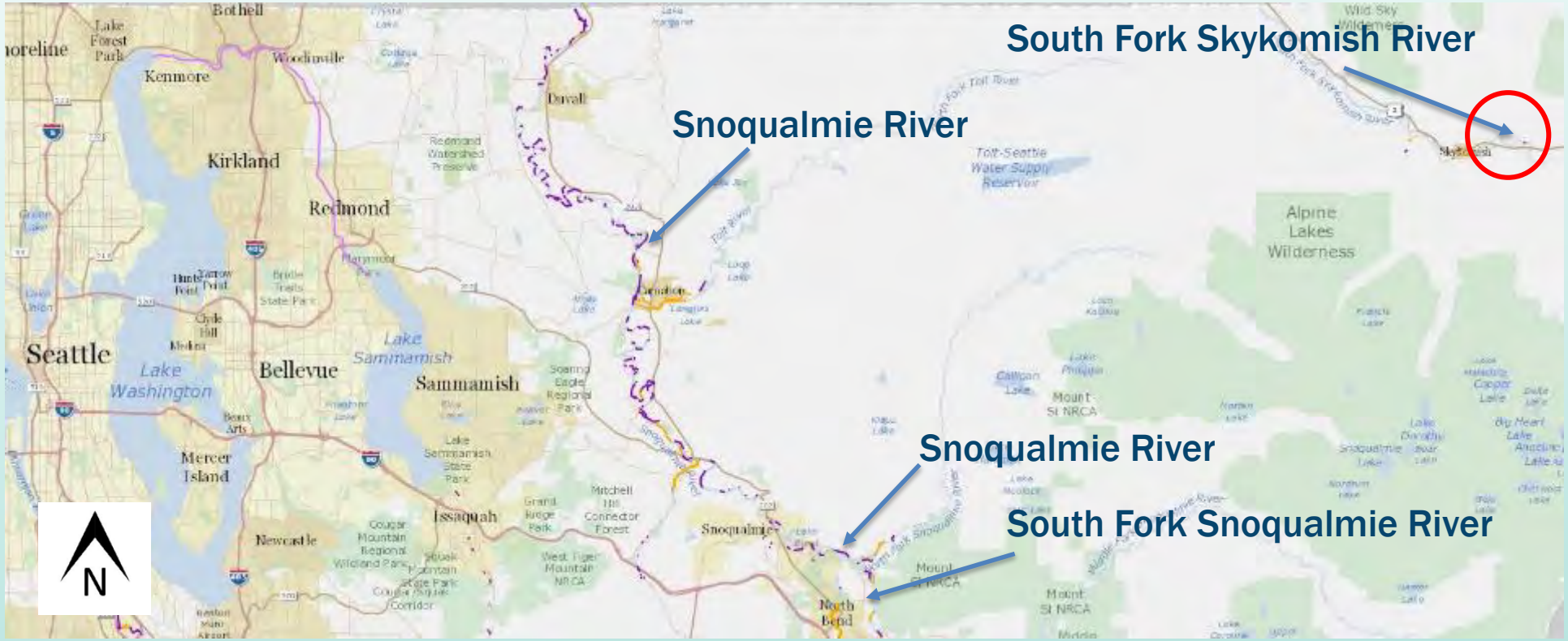
Si View Levee Repair



Some of the trees to be removed

South Fork Skykomish River

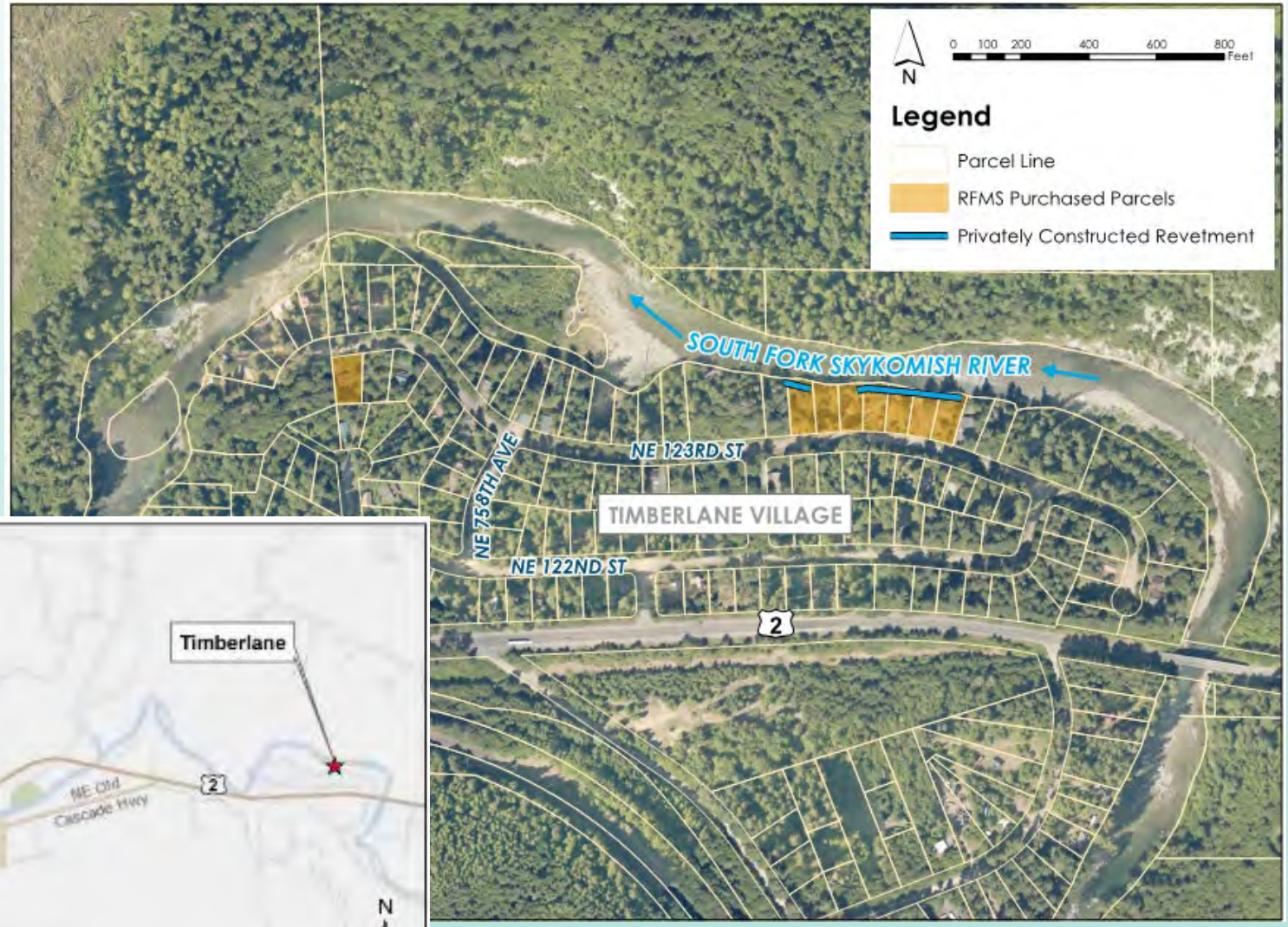
Timberlane Revetment Repair



Vicinity Map

South Fork Skykomish River

Timberlane Revetment Repair



Existing Condition

- Vertical rock wall sections
- Unstable due to over-steepened construction
- Exposure to deep, fast moving water may compromise toe rock
- High risk of rock wall eroding into river

Up to 12 trees to be potentially removed

Project Schedule

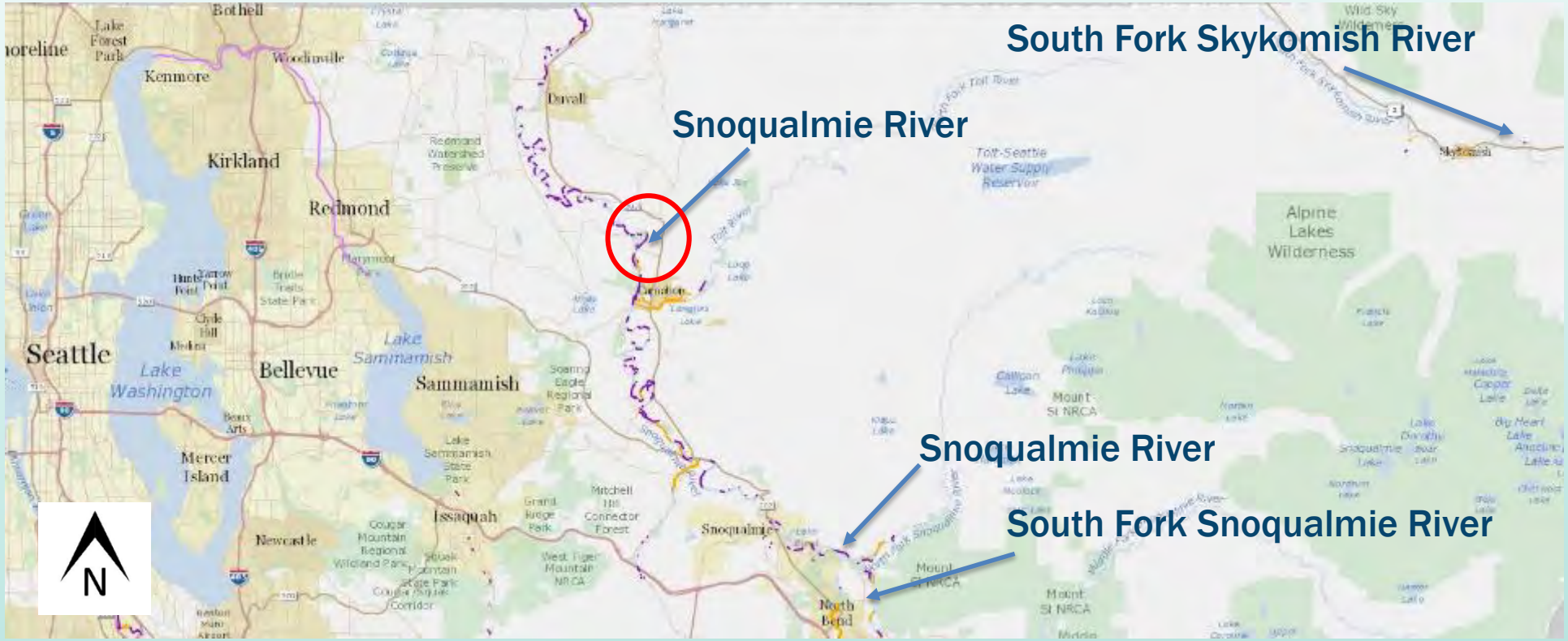
High Level Schedule

- Alternative Selected & Approved – May 2019
- Submit for Permits – June 2019
- Final design complete – August 2019
- All permits Issued – September 2019
- Construction – October 2019

###

Snoqualmie River

Stossel Bridge RB 2019 Mitigation



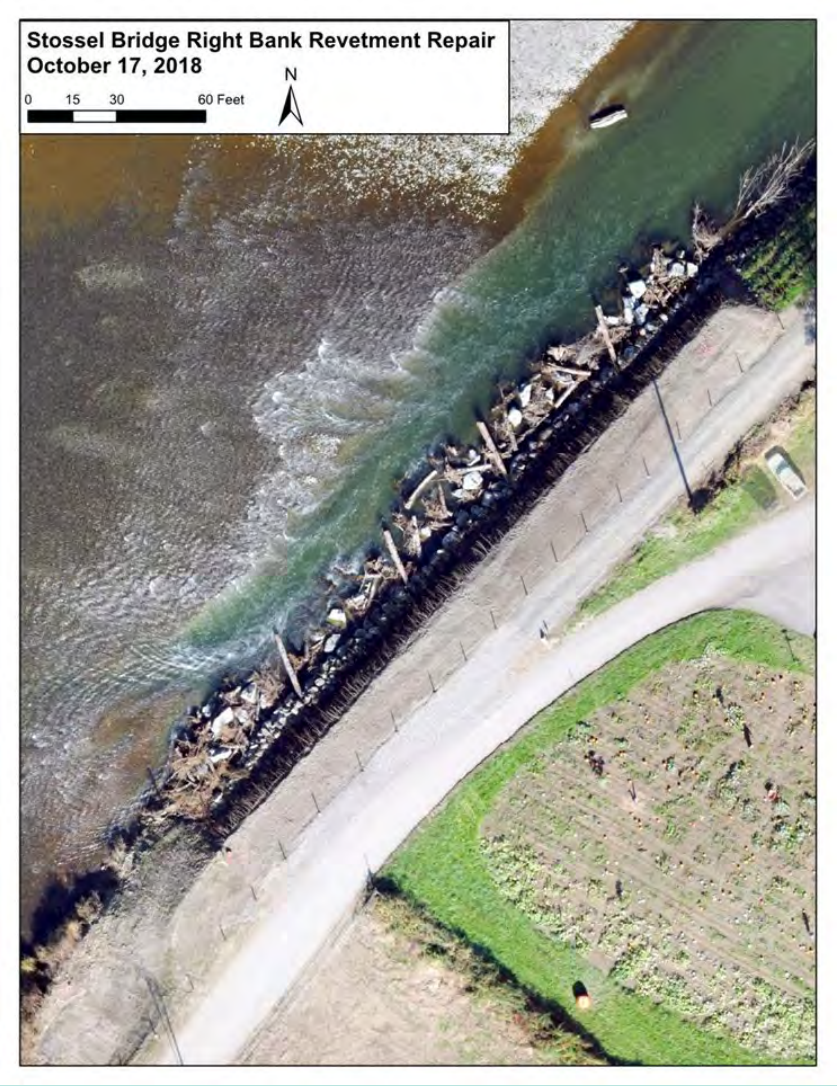
Vicinity Map

Snoqualmie River

Stossel Bridge RB 2019 Mitigation

Before

After



Area Wood Placement

Questions?

Stella Torres, Capital Project Manager
storres@kingcounty.gov
206-263-0969

Tom Bloxton, Environmental Scientist
tbloxton@kingcounty.gov
(206) 263-6870

River and Floodplain Management Section
www.kingcounty.gov/rivers

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Fall City River Mile 36.1 Logjam Alteration Mitigation

John Koon, Maintenance Supervisor

Large Wood Public Meeting
Issaquah Hatchery - June 12, 2019
Mercer Island Community Center - June 13, 2019

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Water and Land Resources Division
River and Floodplain Management Section

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Logjam Assessment Protocol

- King County Sheriff's Office (KCSO) evaluates the level of risk associated with each logjam and determines whether action is needed.
  - Monitor
  - Signage
  - Alteration
- KCSO requests support from the King County River and Floodplain Management Section (RFMS)

Logjam Assessment Protocol

- RFMS evaluates the feasibility of the action requested by the Sheriff's office.
- RFMS consults with Washington Department of Fish and Wildlife (WDFW) and affected tribes.
- If alteration is needed and feasible, RFMS obtains a hydraulic project approval from WDFW.
- RFMS carries out alteration
- RFMS Implements mitigation

Fall City River Mile 36.1 Logjam Site

- Steady bank erosion has resulted in new sweepers in 2016, 2017, and 2018.
- KCSO has recommended alteration each year.
- Site access is poor. All work is being done using chain saw, portable winch and boat.
- KCSO has participated in these alterations and determines when the level of risk has been reduced to an acceptable level.

River Mile 36.1 Tubes Caught in Sweeper - 2017

River Mile 36.1 After Alteration - 2017

Branches trimmed, floaters pass safely

River Mile 36.1 Before Alteration - 2018

River Mile 36.1 After Alteration - 2018

Upstream log cut

River Mile 36.1 After Alternation - 2018

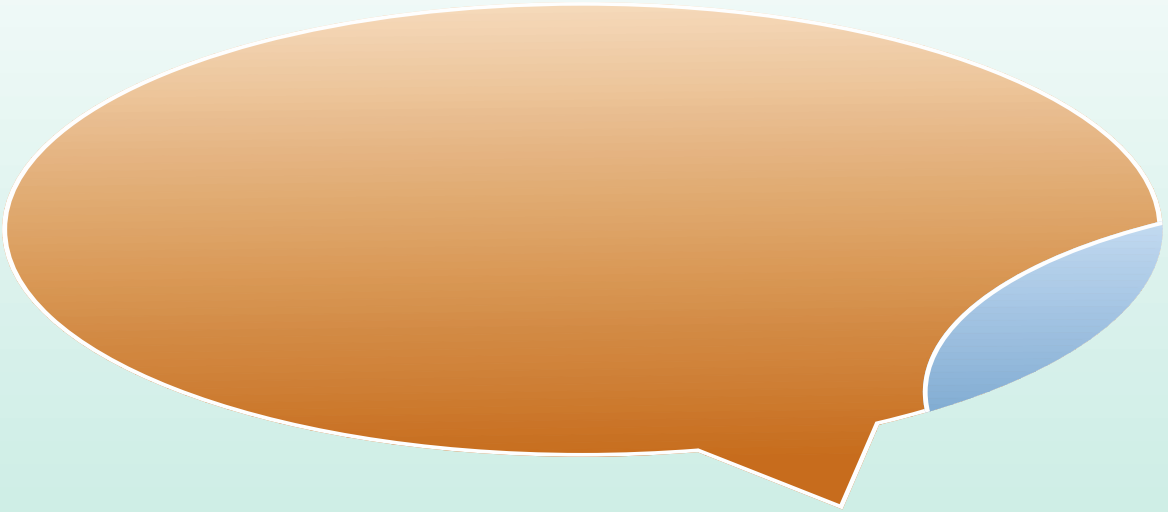
Upstream branches trimmed

River Mile 36.1 Warning Sign - 2018

Fall City River Mile 36.1 Mitigation

- Washington State Department of Fish and Wildlife is requiring 10 logs to mitigate the 2017 and 2018 alterations.
- Additional alteration work that may be needed in 2019 will require additional mitigation.
- The preferred approach is to place up to fifteen 15 to 20 foot long logs with rootwads in the river upstream of River Mile 36.1.
- Several possible locations are being considered.
- A new Hydraulic Project Approval permit will be required.
- Mitigation logs should be placed during the summer 2019.

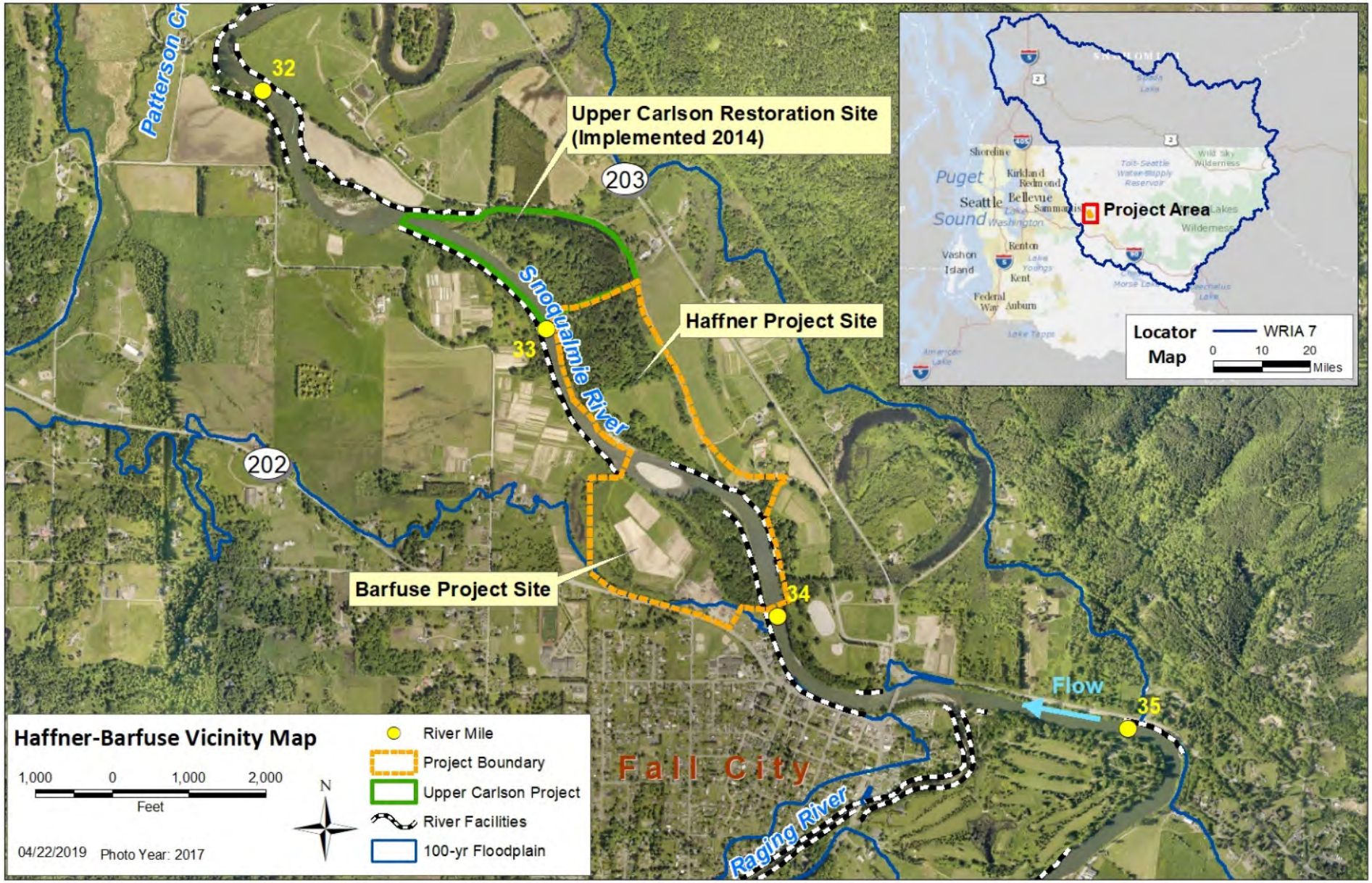
Questions?



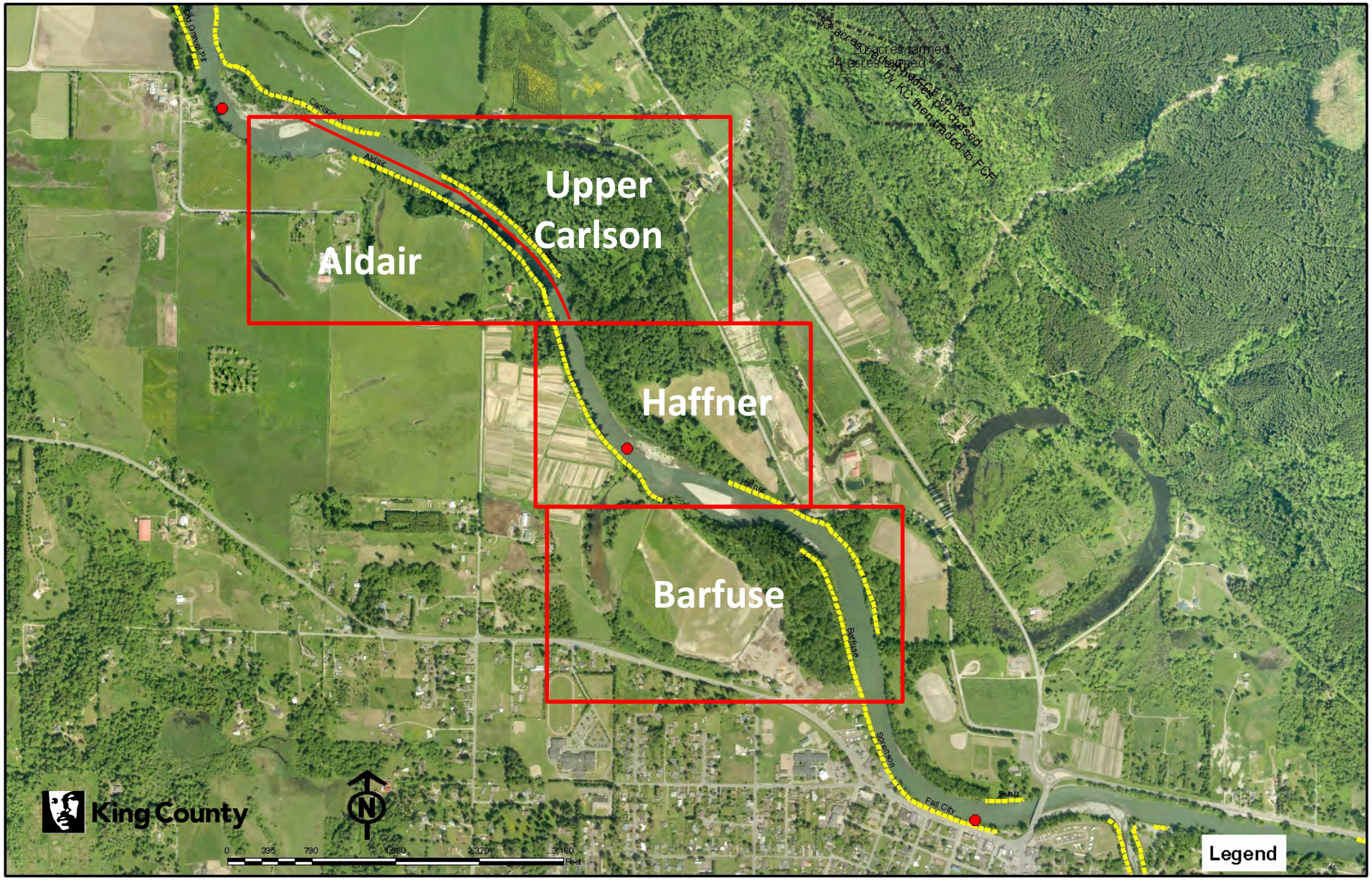
John Koon, Maintenance Supervisor
206-890-2562
John.koon@Kingcounty.gov
www.kingcounty.gov/rivers

Haffner-Barfuse Floodplain Restoration Project

Project Location



Snoqualmie at Fall City Corridor Projects



Haffner-Barfuse Project Objectives

- Restore river and floodplain processes (including channel migration & wood recruitment/retention).
- Restore a corridor of diverse riparian vegetation.
- Increase quality and quantity of salmon and steelhead spawning and rearing habitat.

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Flood damage to Fall City Farms

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Damage to Haffner revetment and Neal Road

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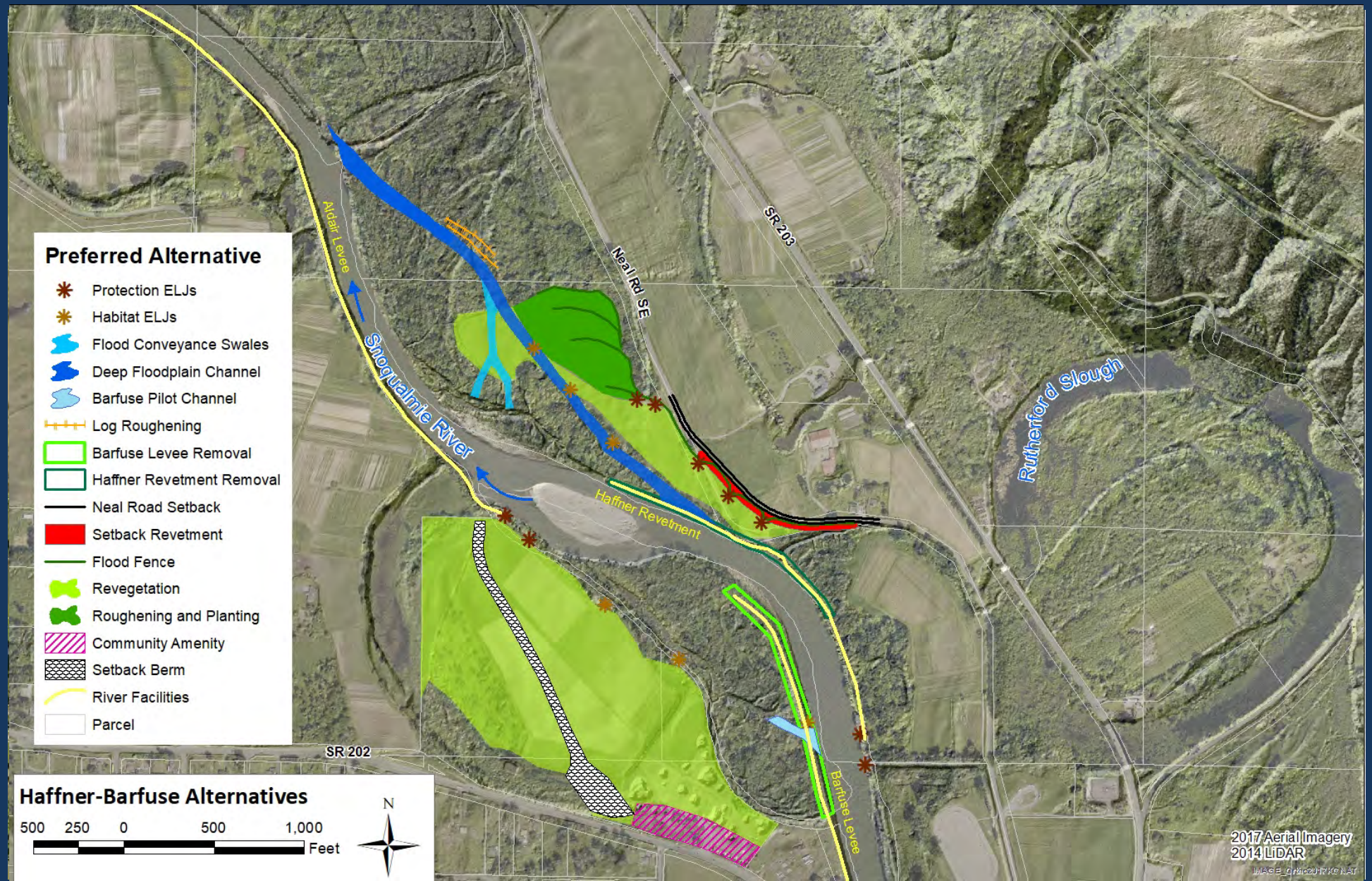
Concept Design

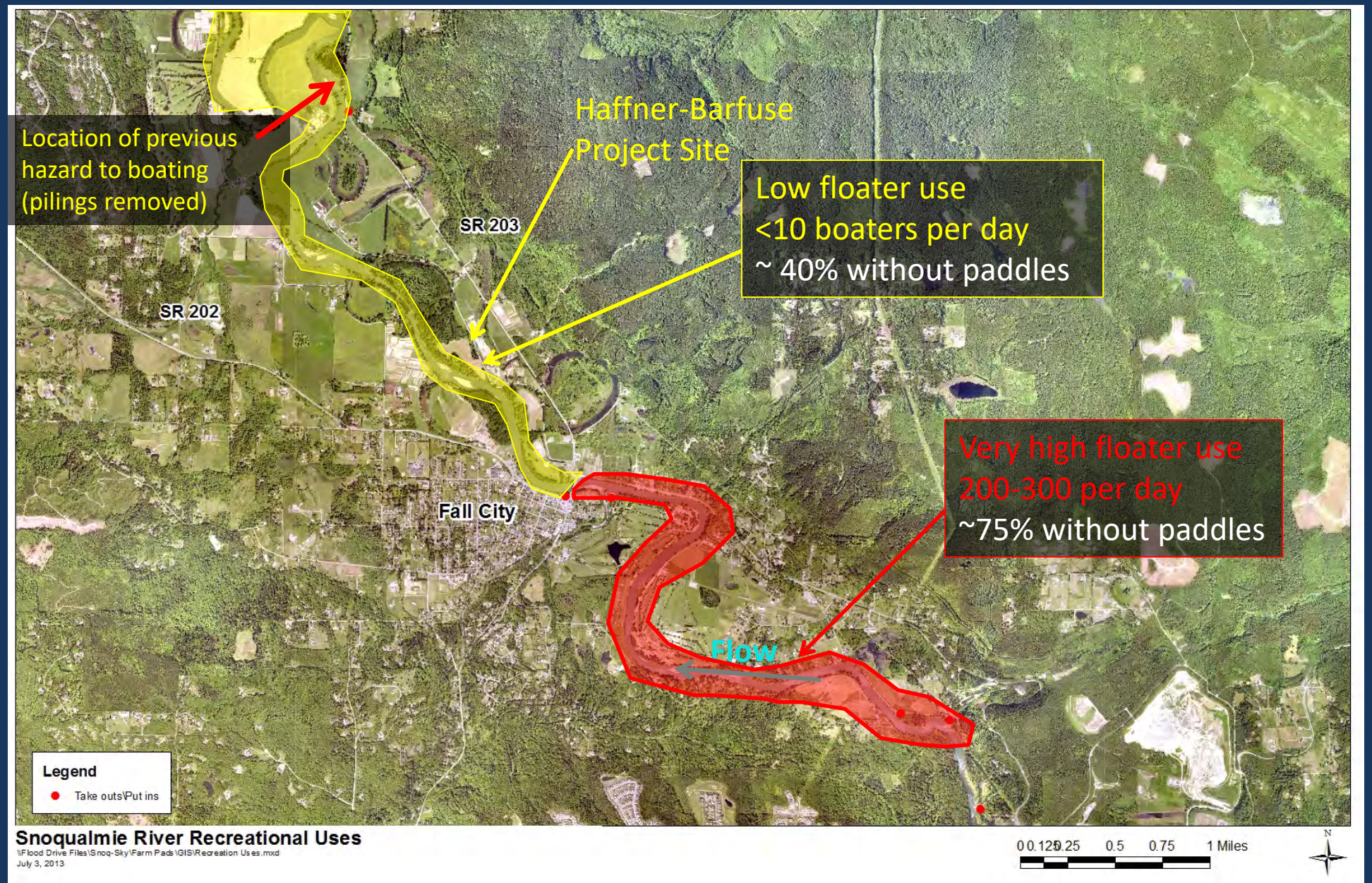


Wood Design

Mitigation of Risk:

- Active channel wood: anchored, pointing downstream, water pillow (minimize porosity), bumper logs
- Floodplain wood: ballasted, partially buried, pinned between existing trees
- Minimize cables & chains
- Determine flows during recreation use to be applied to wood design (possibly 320 cfs to 5,000 cfs)

Recreational Use Study



SAFC Corridor Reach

Signage and Boater Access Management

HAVE FUN. BE SAFE!

Call 911 in case of emergency

Follow these tips for a safe and fun time on the river!

- Always wear a life vest — No lifeguard
- Go with experienced friends
- The river is cold – be prepared
- Know your take-out location
- Avoid rocks and logs
- Leave the river cleaner than you found it — No glass — Pack it out

Search the Web for "King County river safety" for more information.

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SHERIFF KING COUNTY

Reducing Risks from Wood

- Continued application of large wood protocols
- Wood design w/boaters in mind
- Warning/advisory Signs
- Public outreach and education
- Monitor for unacceptable hazards
- Anticipated gravel bar growth as portage route
- Revise/update Upper Carlson Site Management Plan

Project Schedule

2019	Preliminary Design
2020	60% Design Permitting
2021	100% Design Construction Contract Award
2022	Construction

King County

Contact Information

Fauna Nopp, Project Manager

206-477-4787

fauna.nopp@kingcounty.gov

Jo Wilhelm, Project Ecologist

206-477-4849

jo.wilhelm@kingcounty.gov

Project Website

http://www.kingcounty.gov/services/environment/animals-and-plants/restoration-projects/projects/haffner-barfuse-floodplain-restoration.aspx

Riverbend Levee Setback and Floodplain Restoration

Jon Hansen, Project Manager

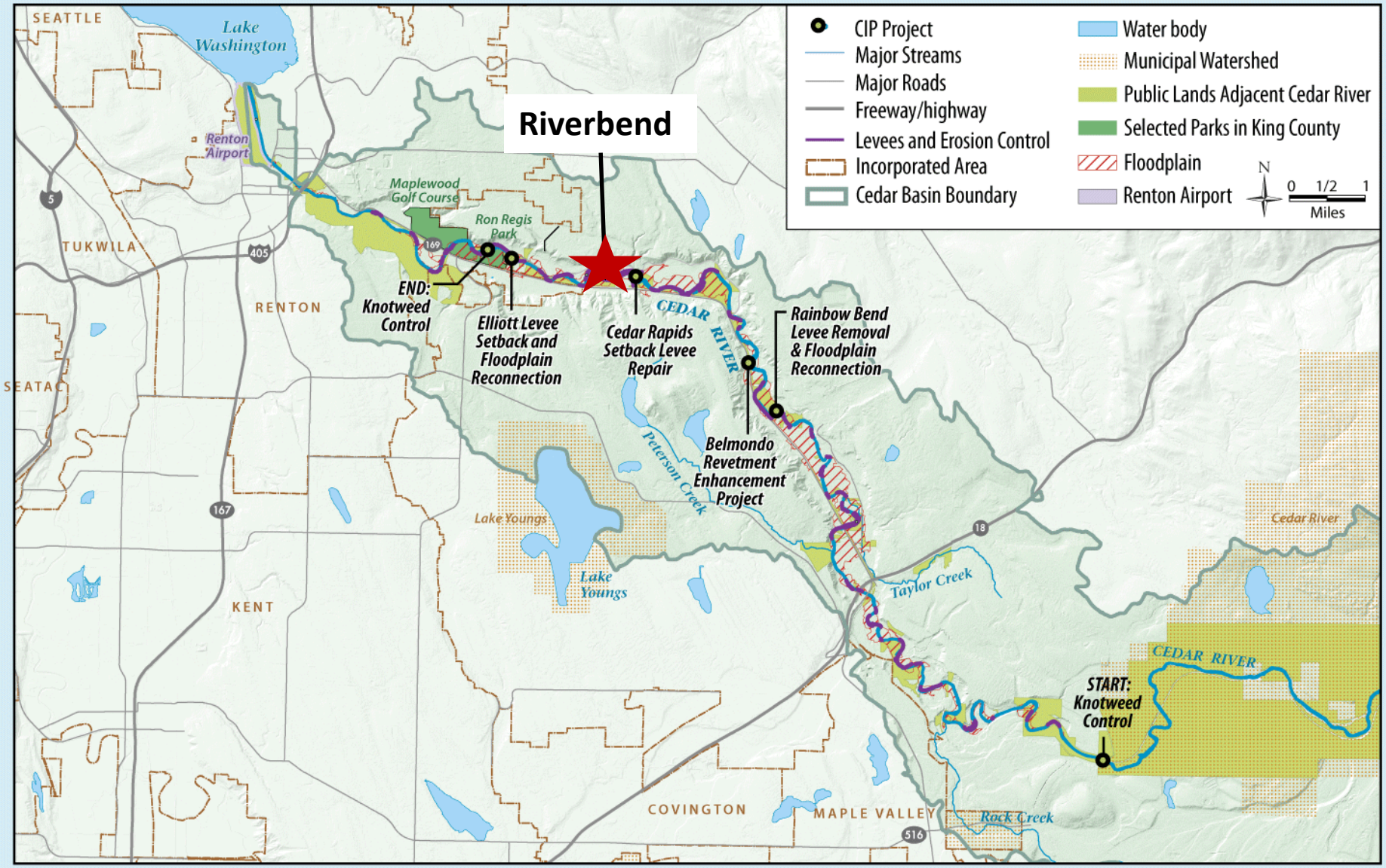
June 12/13, 2019

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

King County

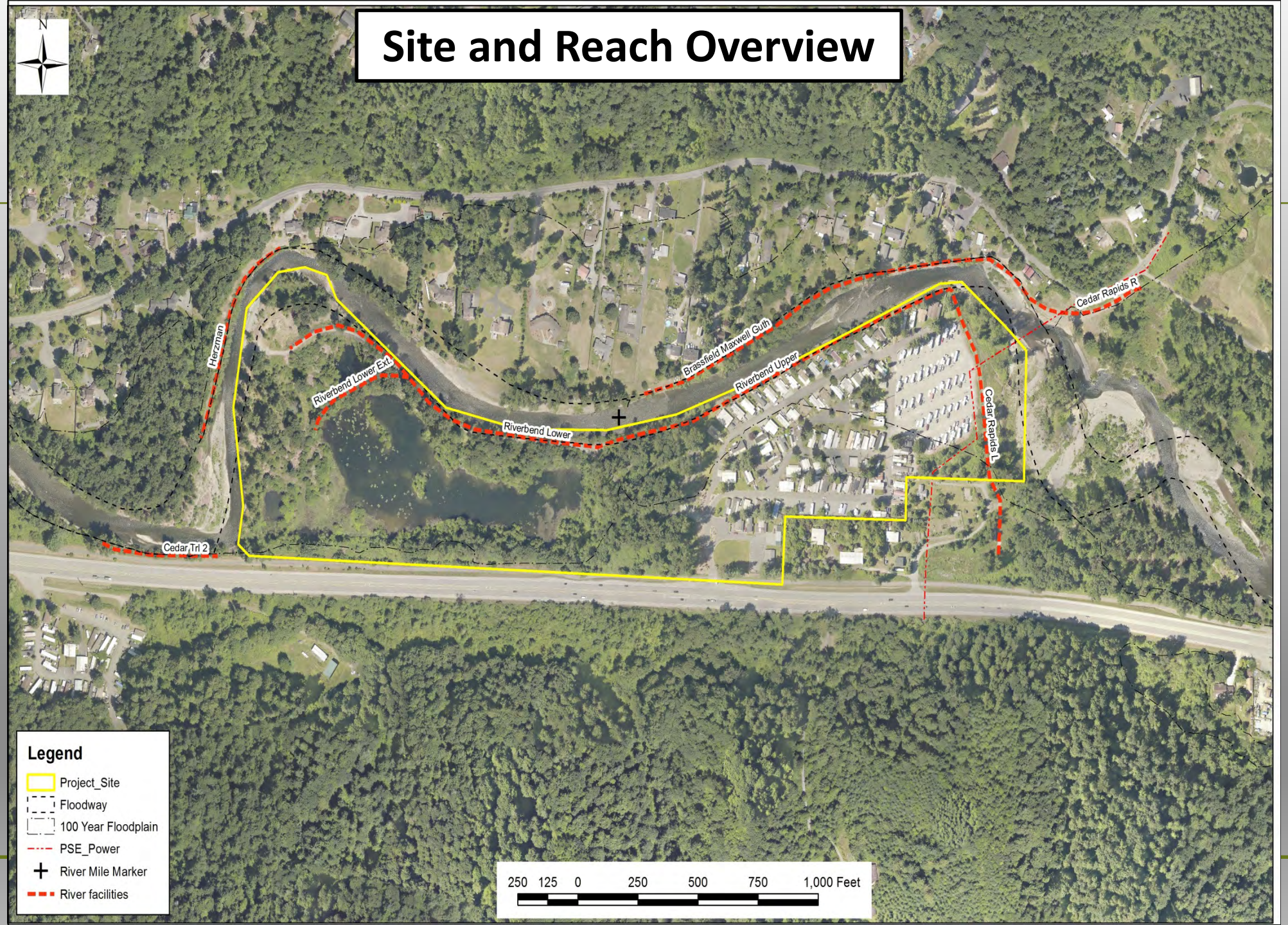
Riverbend Levee Setback and Floodplain Restoration

King County



VC File: 1210_2923L_CedarCIPprojsMapPPT.ai Ipre

Site and Reach Overview



Recreational Use

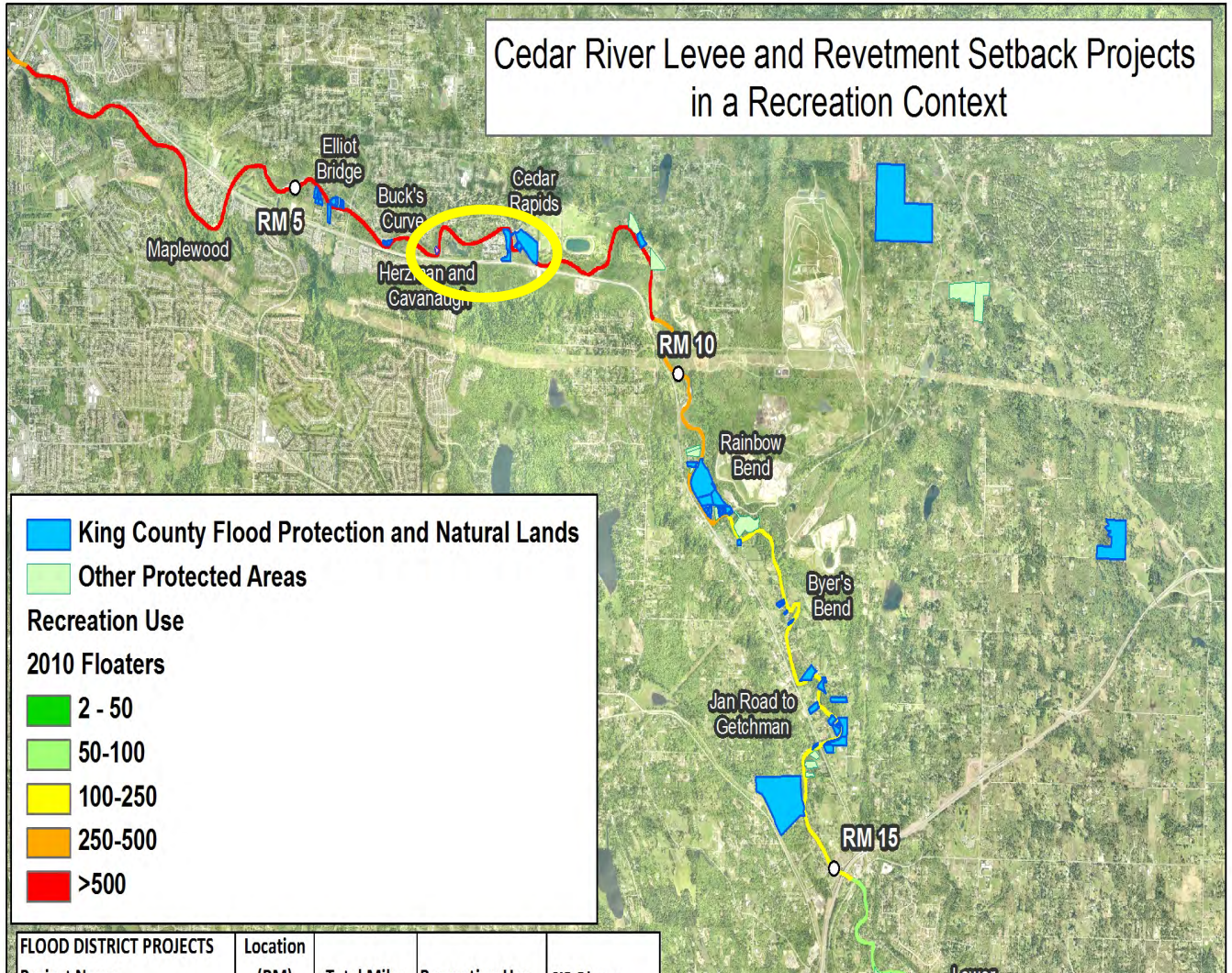
2013 Data

~3,700 Cedar River floaters

~1,900 in Ricardi Reach

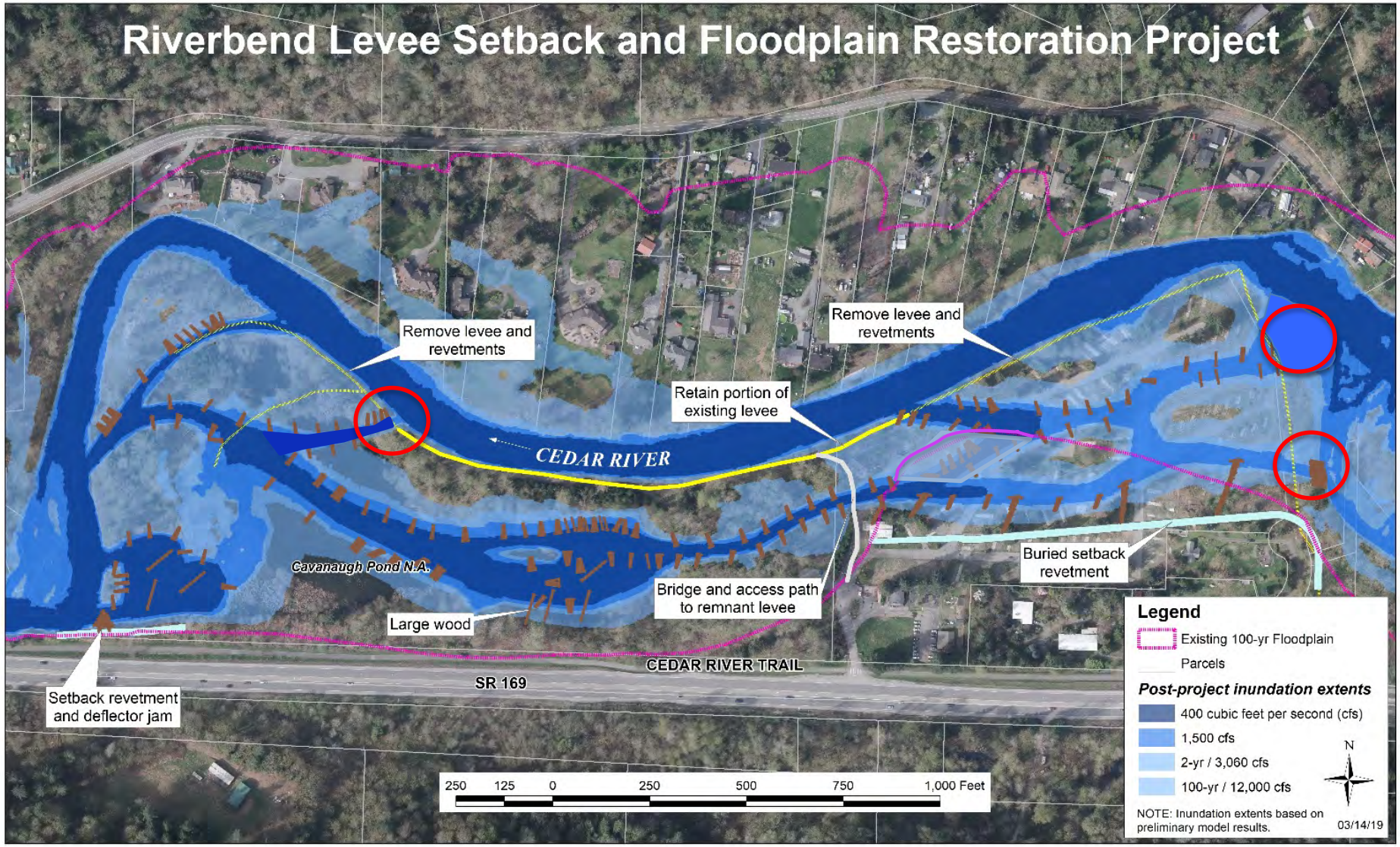
- 78% Inner tubes
- 15% Rafts
- 5% Kayaks

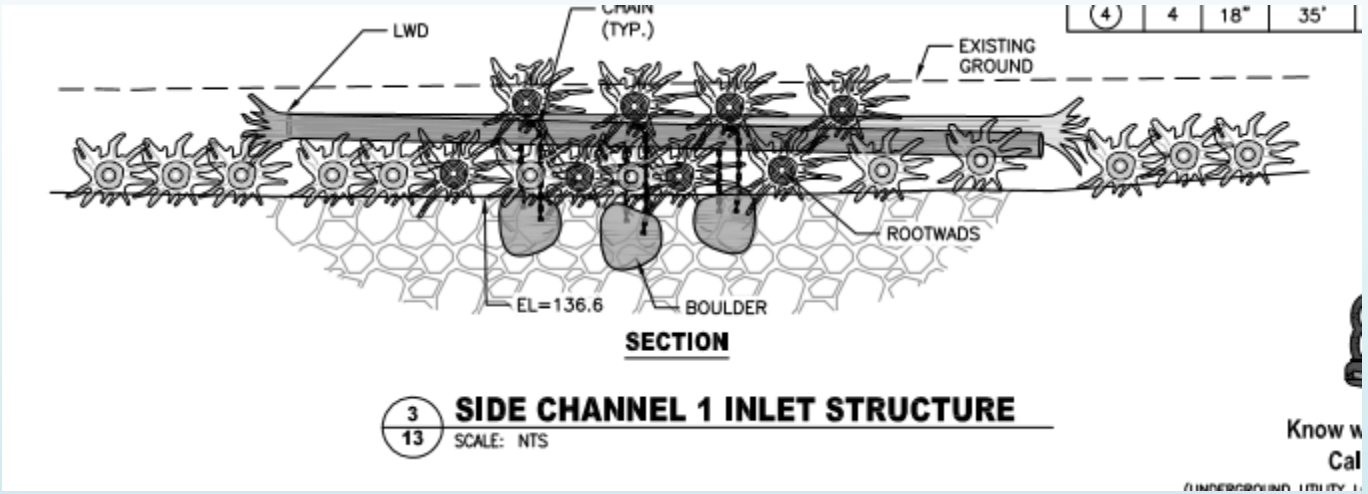
~13% Wearing Life vests

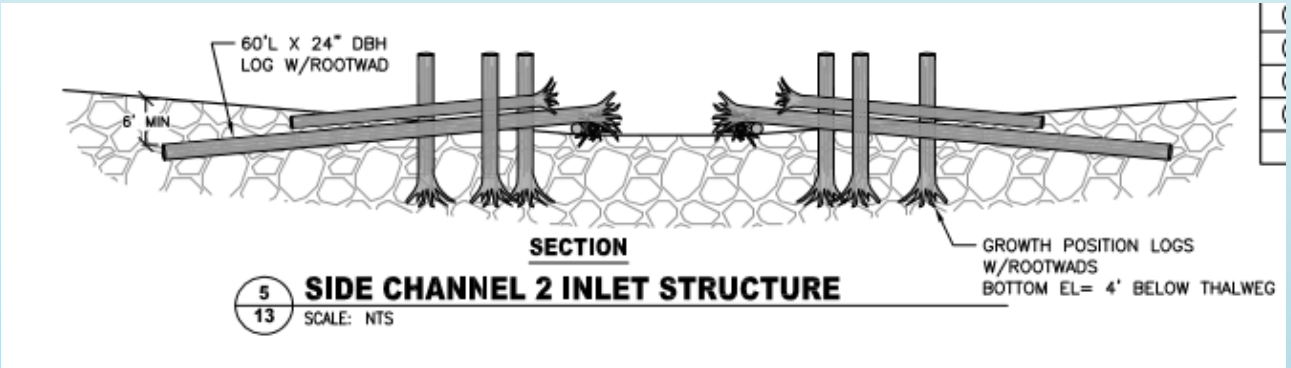


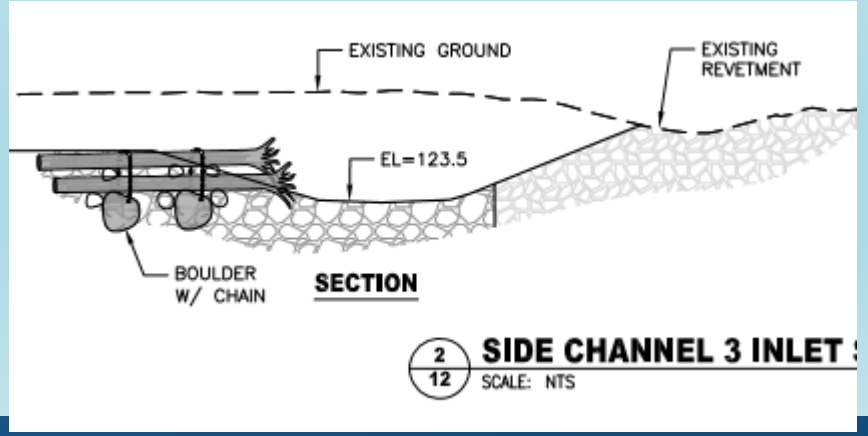
Project Goals

- ***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***


Riverbend Levee Setback and Floodplain Restoration Project
Remove levee and revetments
Remove levee and revetments
Retain portion of existing levee
CEDAR RIVER
Cavanaugh Pond N.A.
Large wood
Bridge and access path to remnant levee
Buried setback revetment
CEDAR RIVER TRAIL
SR 169
Setback revetment and deflector jam
250 125 0 250 500 750 1,000 Feet
Legend
Existing 100-yr Floodplain
Parcels
Post-project inundation extents
400 cubic feet per second (cfs)
1,500 cfs
2-yr / 3,060 cfs
100-yr / 12,000 cfs
N
NOTE: Inundation extents based on preliminary model results.
03/14/19


LWD
CHAIN (TYP.)
EXISTING GROUND
4
4
18"
35'
ROOTWADS
EL=136.6
BOULDER
SECTION
3
13
SIDE CHANNEL 1 INLET STRUCTURE
SCALE: NTS


60'L X 24" DBH LOG W/ROOTWAD
6' MIN
SECTION
GROWTH POSITION LOGS W/ROOTWADS
BOTTOM EL= 4' BELOW THALWEG
5
13
SIDE CHANNEL 2 INLET STRUCTURE
SCALE: NTS


EXISTING GROUND
EXISTING REVETMENT
EL=123.5
BOULDER W/ CHAIN
SECTION
2
12
SIDE CHANNEL 3 INLET
SCALE: NTS

Large Wood Proposed

- **Current design estimate ~ 1,500 pieces**
  - 660 logs + 700-800 tops, large branches, etc
  - All located in the floodplain
  - Majority placed in jams/clusters
  - Anchoring still being refined, but most stabilized with rock and soil ballast
- **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

- 2015 -2016 – Planning and Data Collection
- 2017-2018 - Preliminary design
  - Large Wood Checklist - October 2018
- December 2019 – Final Plan complete
  - Pre-Construction Checklist - Fall 2019
- Summer 2020 – Construction

Contact Information

Jon Hansen, Project Manager

jon.hansen@kingcounty.gov

206-477-4706

Project webpage:

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

King County

Herzman Levee Setback and Trail Stabilization

Nancy Sandford, Project Manager
Monica Walker, Project Manager

Large Wood Public Meeting
Issaquah Hatchery - June 12, 2019
Mercer Island Community Center - June 13, 2019

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

KING COUNTY FLOOD CONTROL DISTRICT

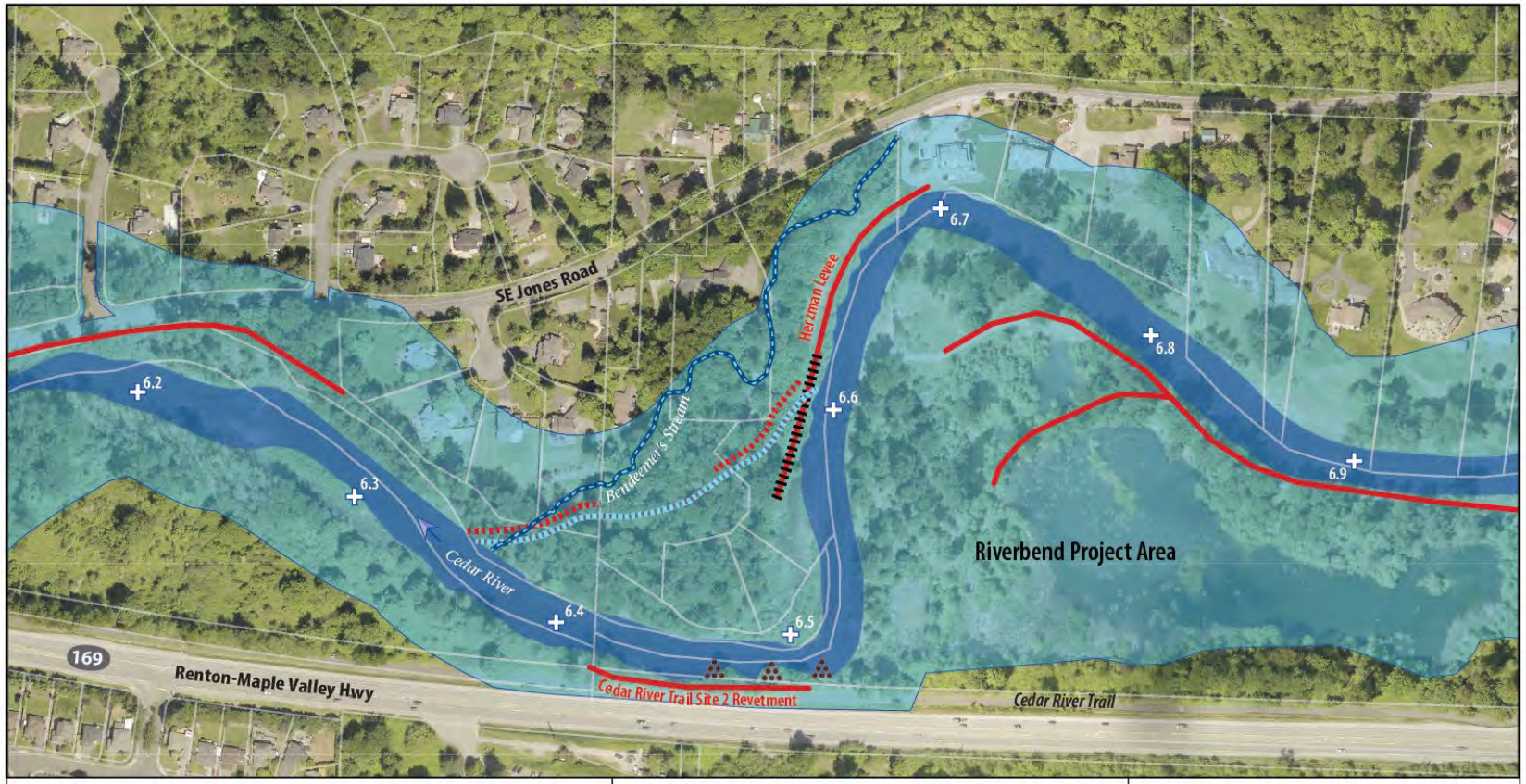
King County

Project Location

Herzman Levee Setback and Bank Stabilization Project Goal

Enhance overall level of flood protection within project reach for neighboring homes and critical infrastructure.

Project Concepts



LEGEND

- Stream (King County)
- Cedar River 1/10th River Mile (RM)
- King County Flood Protection Facility (Levee or Revetment)
- River Channel Migration Zone (Severe)
- Parcel

PRELIMINARY DESIGN FEATURES

- Levee Removal
- Side Channel (conceptual)
- Flow Deflectors
- Setback Levee or Revetment

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Data Sources: King County Datasets
File: 1905_9346m_revise8988m_HerzmanCedarRiverMap.ai
Prepared by: KCIT Design & Civic Engagement

N

0 100 200 FEET

Approved by FCD on 12/28/2018.

KING COUNTY FLOOD CONTROL DISTRICT

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

Herzman Levee Setback and Trail Stabilization Project
Preliminary Design Concept

Known Recreational Use

- High recreational use in the project vicinity.
- Draw upon elements used successfully in previous projects.

Belmondo Revetment Repair, Cedar River, 2013 and 2015

Anticipated Project Schedule

- Alternative Selected in 2018
- 30% Design – Feedback – Fall 2019
- Final Design – Winter 2019/2020
- Permitting – 2020
- Construction – 2021

Questions?

Nancy Sandford, Project Manager
nancy.sandford@kingcounty.gov
206-477-4688

Monica Walker, Project Manager
monica.walker@kingcounty.gov
206-477-4843

River and Floodplain Management Section
www.kingcounty.gov/rivers

Jan Road Neighborhood Improvements

Dan Heckendorf, PE, Senior Engineer

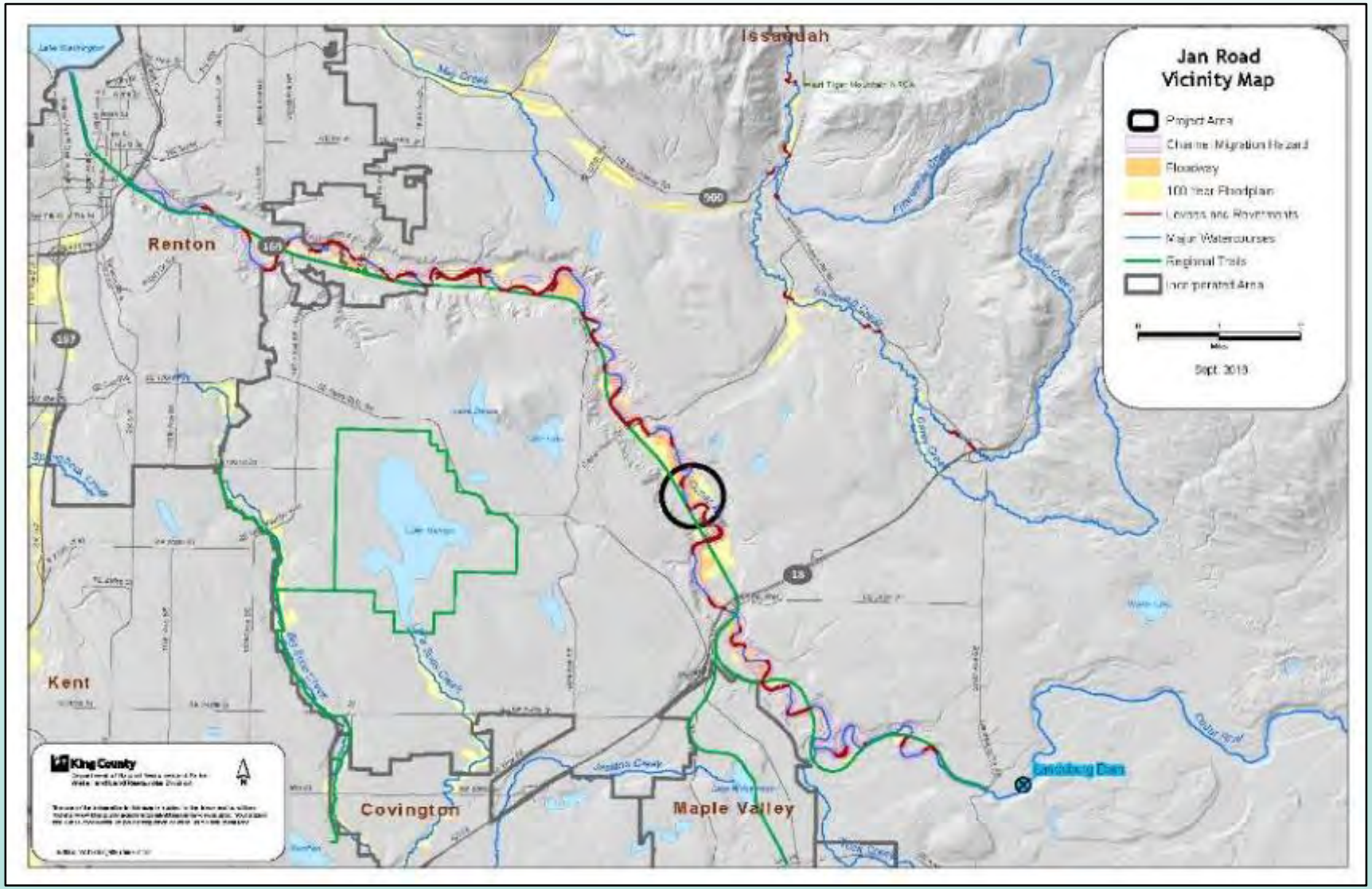
Large Wood Public Meeting
Issaquah Hatchery - June 12, 2019
Mercer Island Community Center - June 13, 2019

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

KING COUNTY FLOOD CONTROL DISTRICT

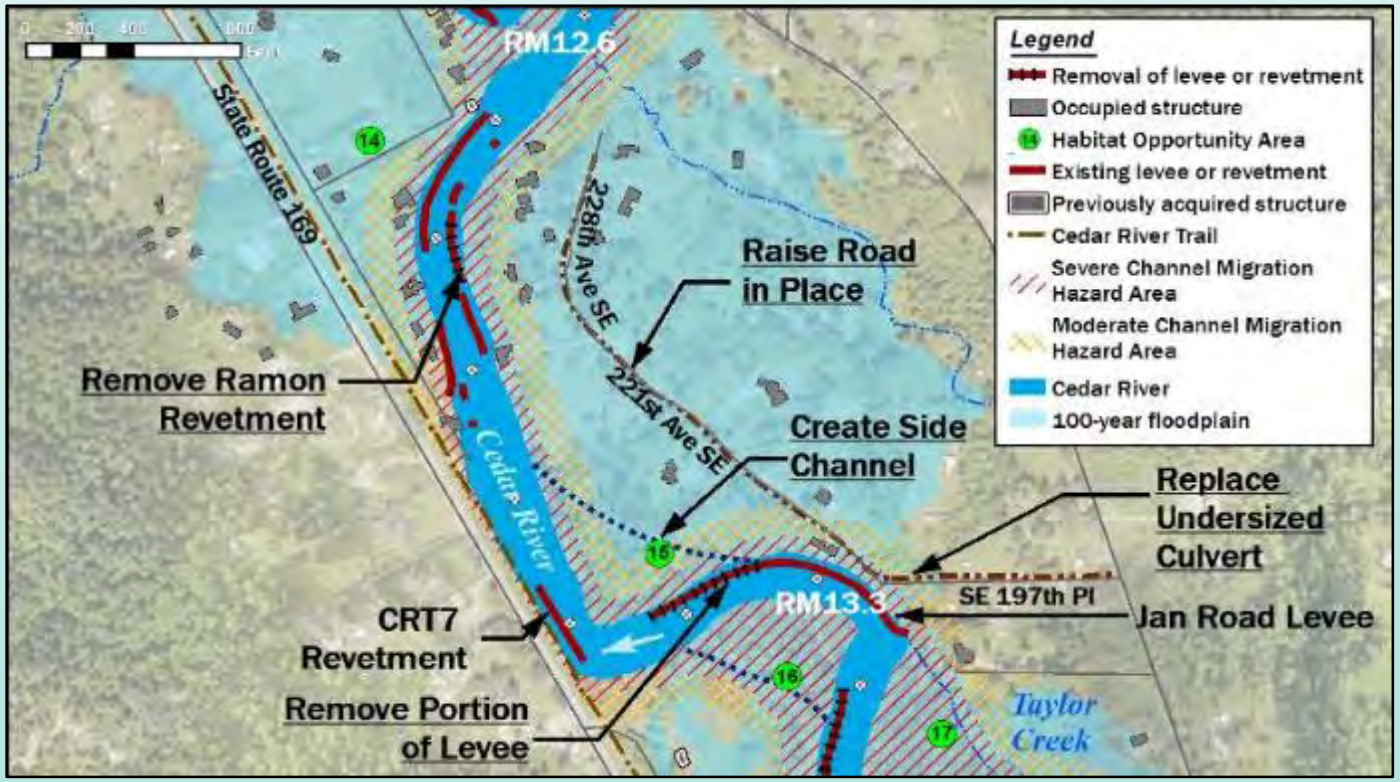
King County

Project Location

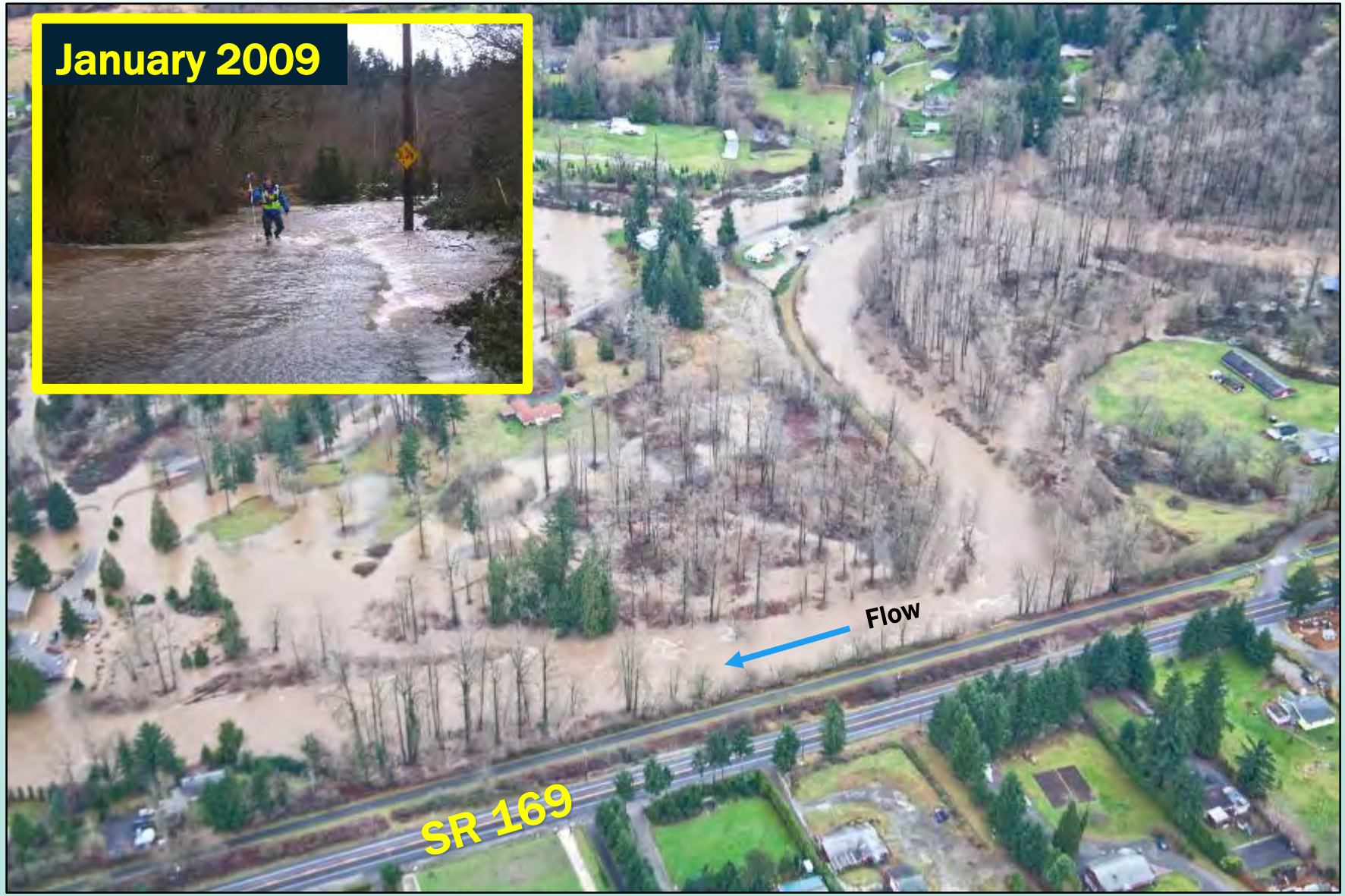


Project Goals

- Improved flood flow conveyance to reduce risk
- 2017 Cedar River Large Wood Relocation Mitigation
    - **Count:** 120 Pieces
    - **Placement:** Side Channel and Floodplain

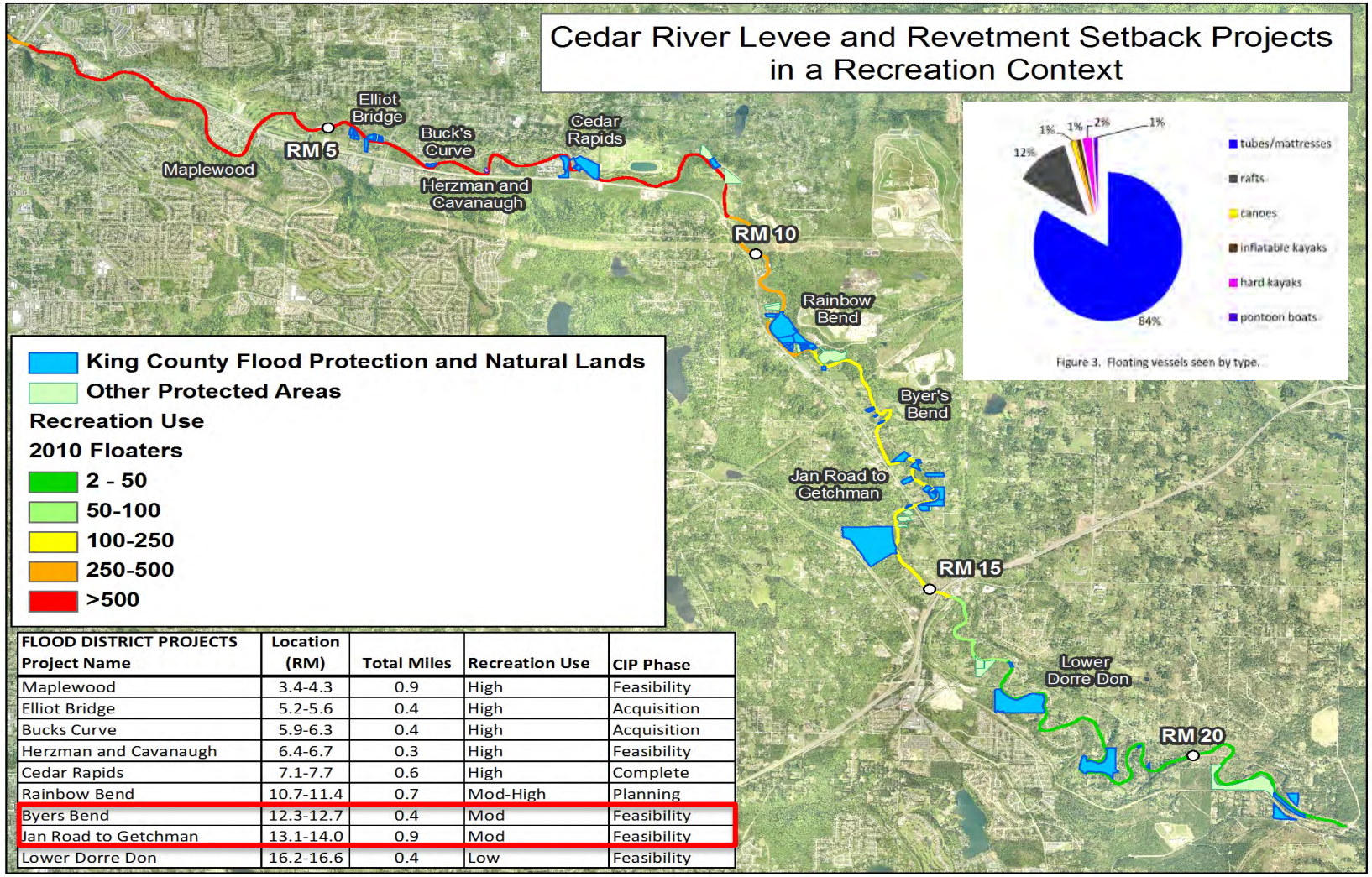


Existing Site Conditions



River Recreational Use

– Cedar River Recreational Study (Biedenweg and Akyuz, 2011).



FLOOD DISTRICT PROJECTS Project Name	Location (RM)	Total Miles	Recreation Use	CIP Phase
Maplewood	3.4-4.3	0.9	High	Feasibility
Elliot Bridge	5.2-5.6	0.4	High	Acquisition
Bucks Curve	5.9-6.3	0.4	High	Acquisition
Herzman and Cavanaugh	6.4-6.7	0.3	High	Feasibility
Cedar Rapids	7.1-7.7	0.6	High	Complete
Rainbow Bend	10.7-11.4	0.7	Mod-High	Planning
Byers Bend	12.3-12.7	0.4	Mod	Feasibility
Jan Road to Getchman	13.1-14.0	0.9	Mod	Feasibility
Lower Dorre Don	16.2-16.6	0.4	Low	Feasibility

Large Wood – Intended Functions

- **Functions**
  - 2017 Cedar River Large Wood Relocation Mitigation
  - Floodplain Roughening
  - Aquatic Habitat Enhancement
- **Goal Consistency**
  - Minimizes long-term maintenance needs/costs.
  - Improve riverine and riparian processes, functions, and habitat.
  - Satisfy Requirements of Cedar River 2017 Large Wood Modifications Mitigation Plan.

Design Input Opportunities/Project Schedule

- **Design Input Opportunities**
  - Large Wood Meeting (2020, 30% Design)
  - I Love the Cedar (2020, 90% Design)
- **Construction** (2021)

Questions?

Dan Heckendorf, PE, Senior Engineer
River and Floodplain Management Section
206-477-8459
dan.heckendorf@kingcounty.gov
www.kingcounty.gov/rivers

Lones Levee Setback and Floodplain Restoration Project

Dan Eastman, Project Manager

June 12, 2019 – Issaquah Fish Hatchery
June 13, 2019 – Mercer Is. Community Center

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

King County

LONES LEVEE: Vicinity Map

Project Location
King County Parks
Other Open Space
City Area
River

N

0 1 2 Miles

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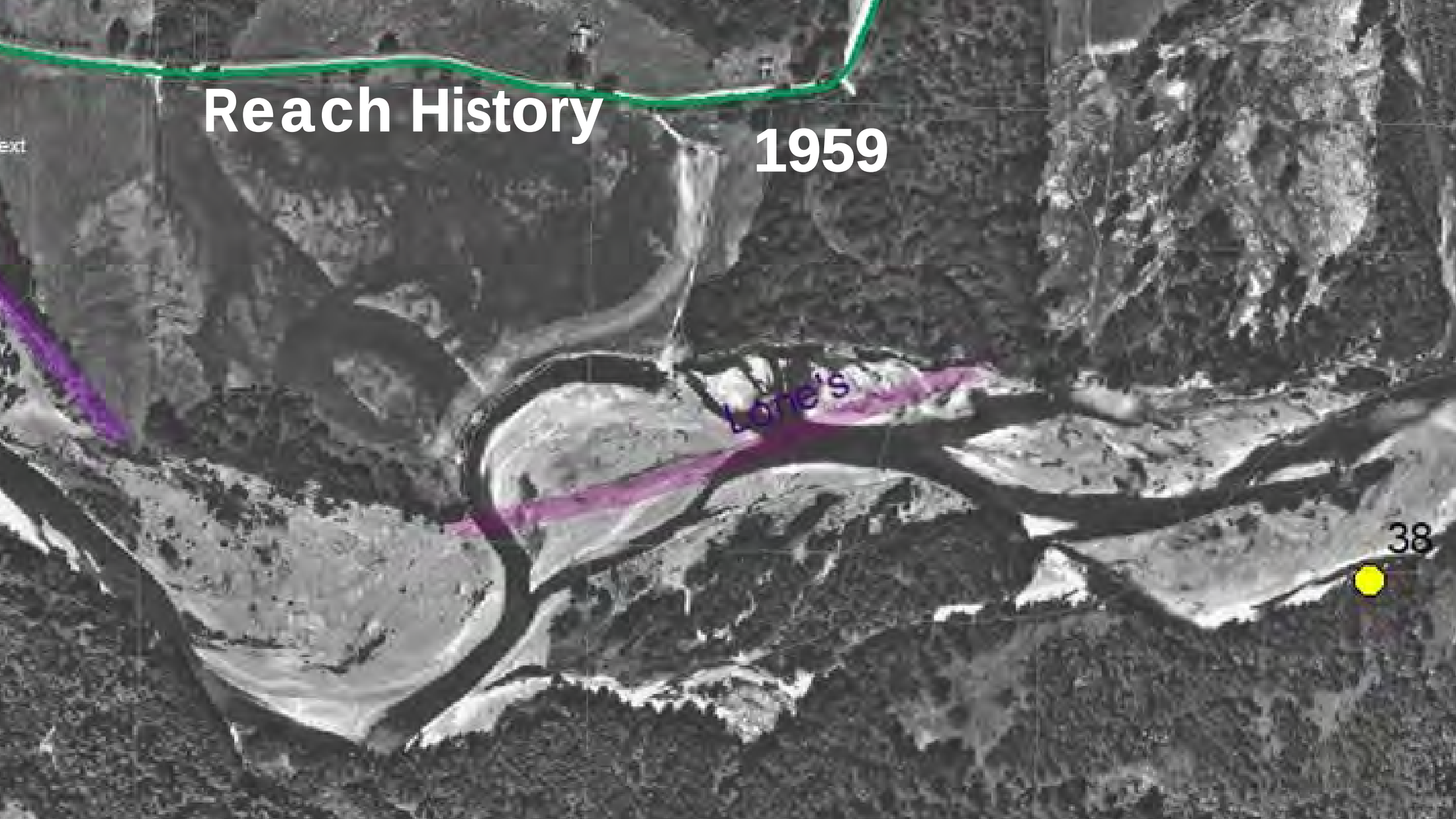
1802_8866w_lones_levee_vicinitymap.ai

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

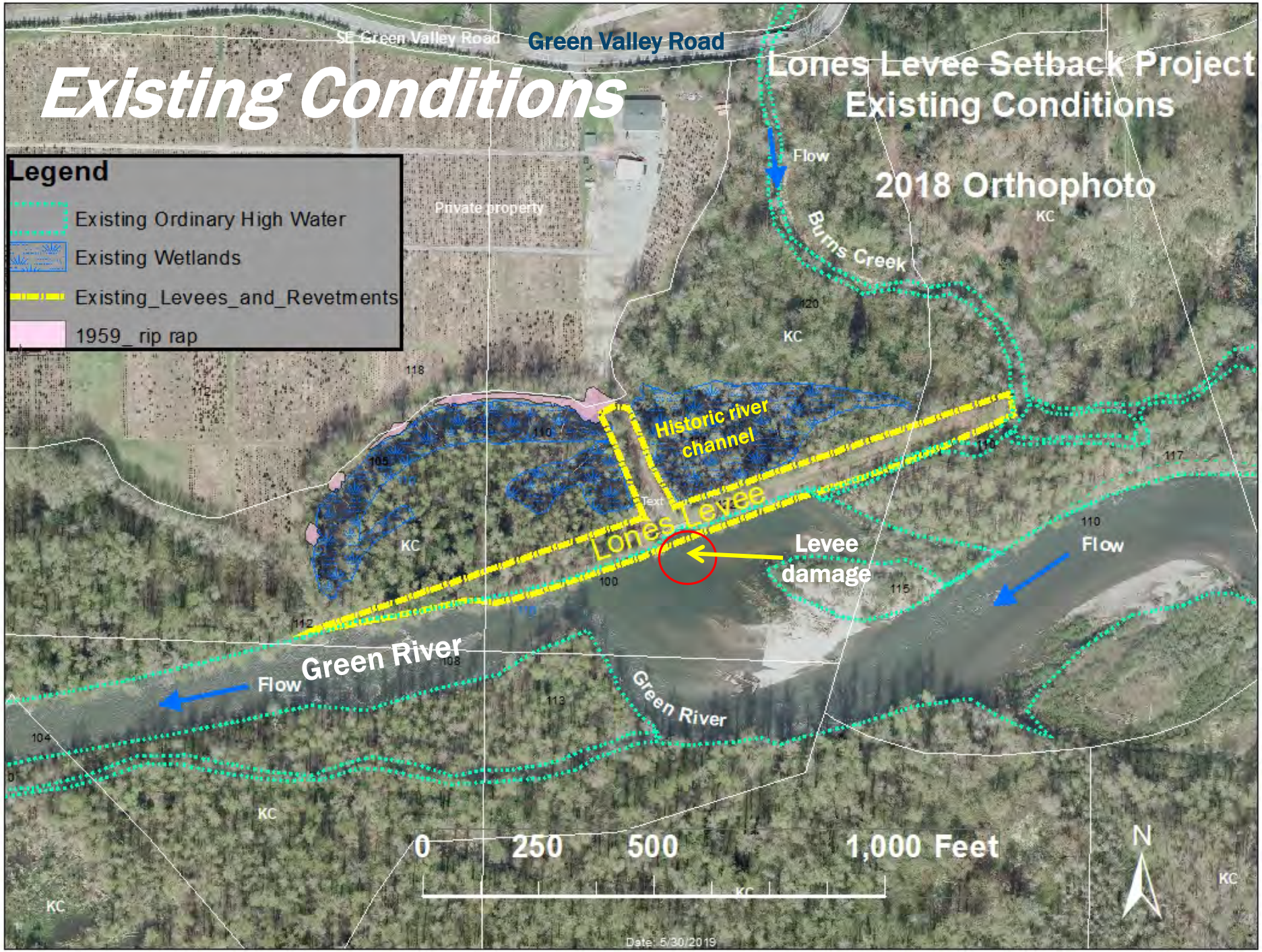
Reach History

1959



Reach History

1960-61


Existing Conditions
Green Valley Road
SE Green Valley Road
Lones Levee Setback Project
Existing Conditions
2018 Orthophoto
Legend
Existing Ordinary High Water
Existing Wetlands
Existing_Levees_and_Revetments
1959_ rip rap
Private property
Flow
Burns Creek
KC
Historic river channel
Lones Levee
Levee damage
Green River
0 250 500 1,000 Feet
N
Date: 5/30/2019

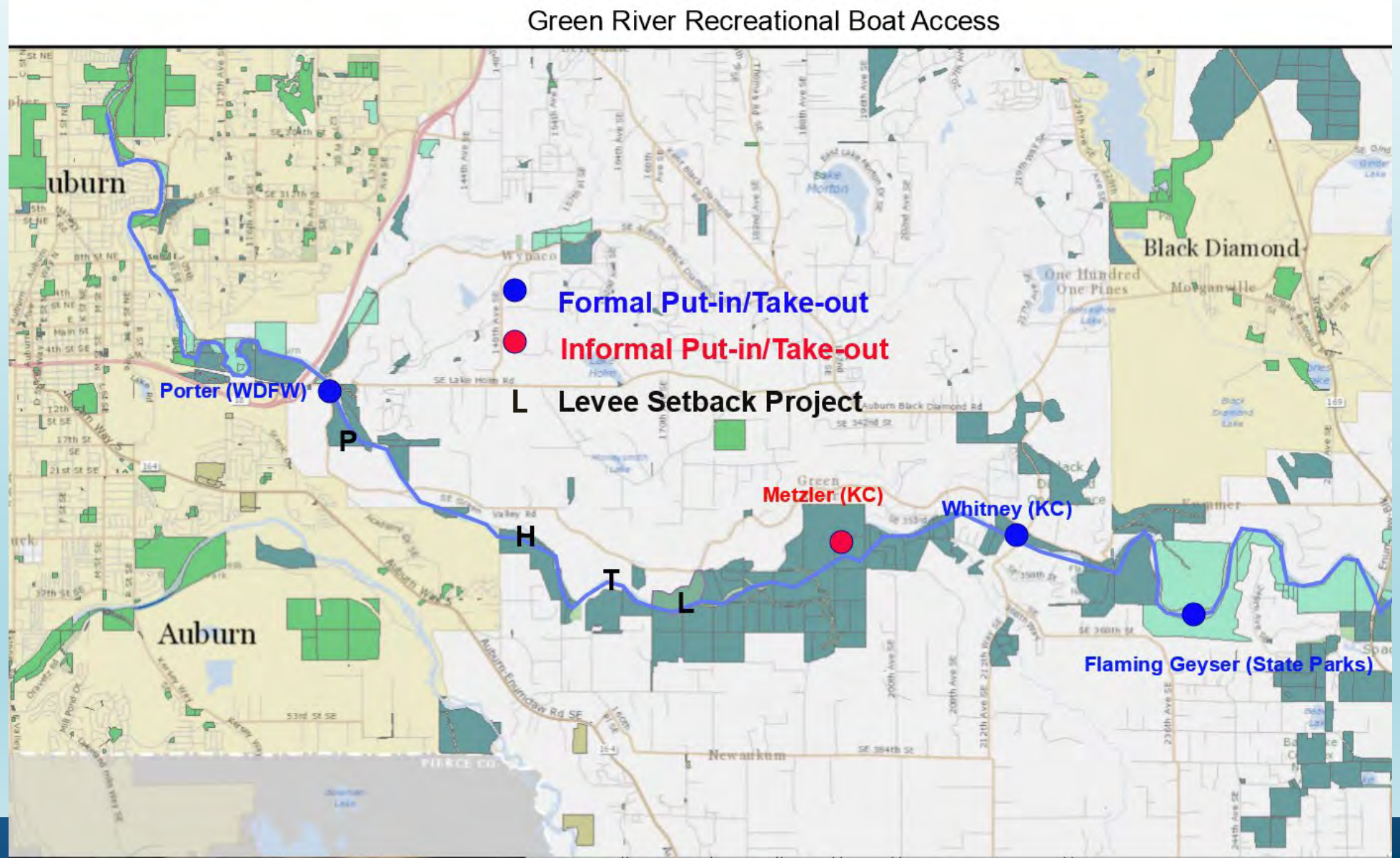
Project Purpose

Baseline Conditions

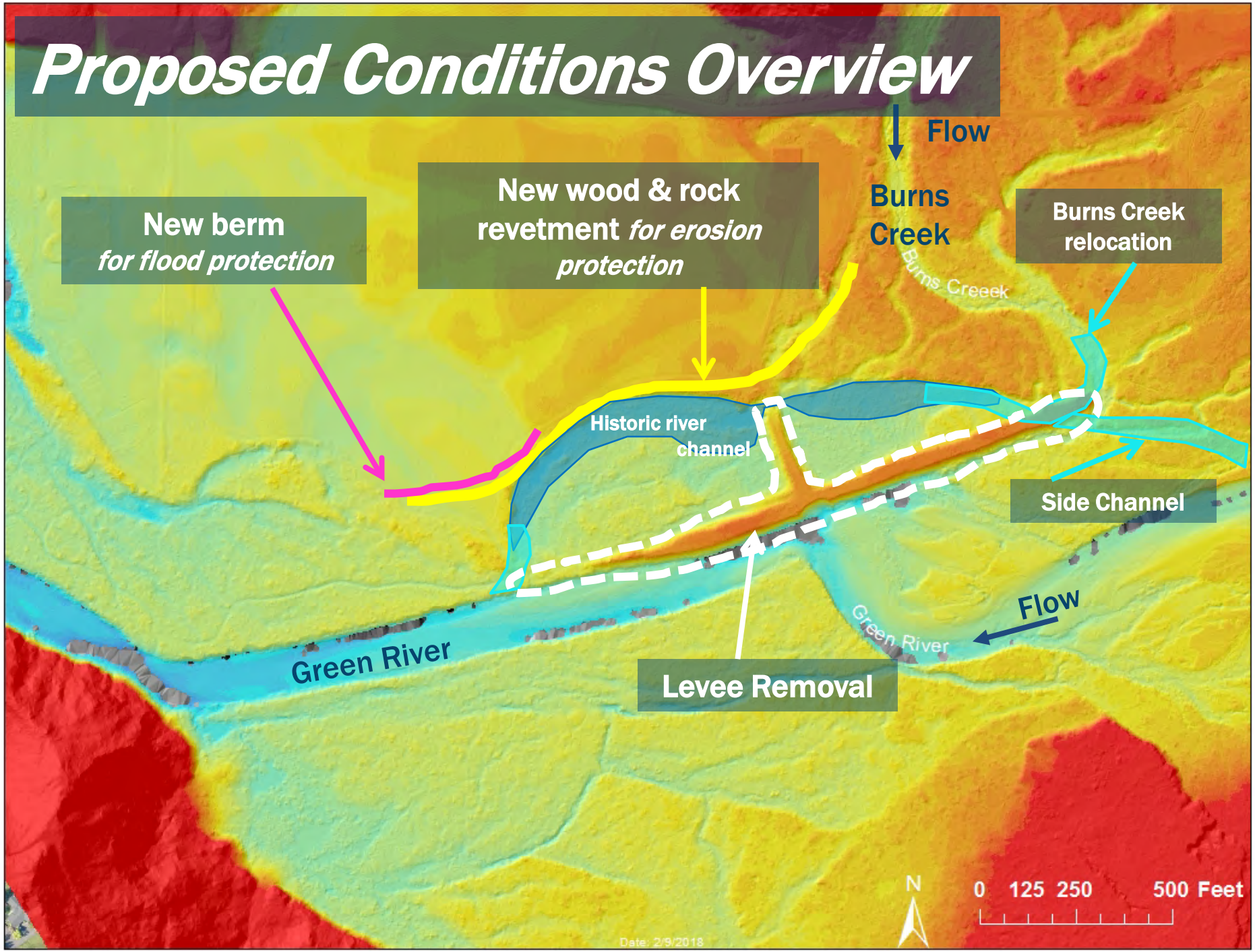
Existing Hazards & Recreational Boating Use

- High use buy fishermen/kayakers year round
- Moderate use by unskilled floaters in summer
  - 1100 people from July 27 - Sept 17 2013
  - ~ 800 on inner-tubes
- Reach has substantial existing hazards

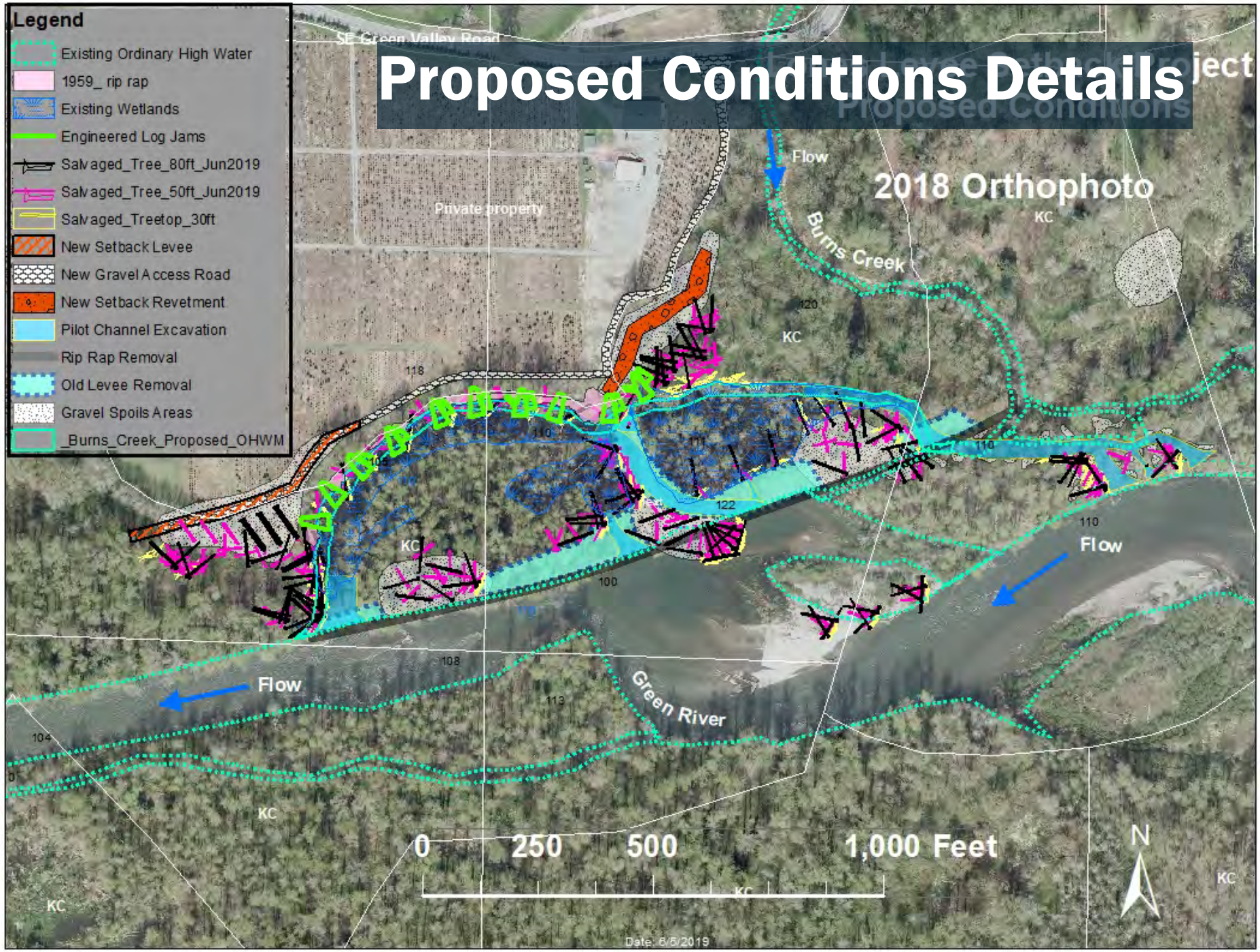
Recreational Boater Access and Use



Proposed Conditions Overview



Proposed Conditions Details



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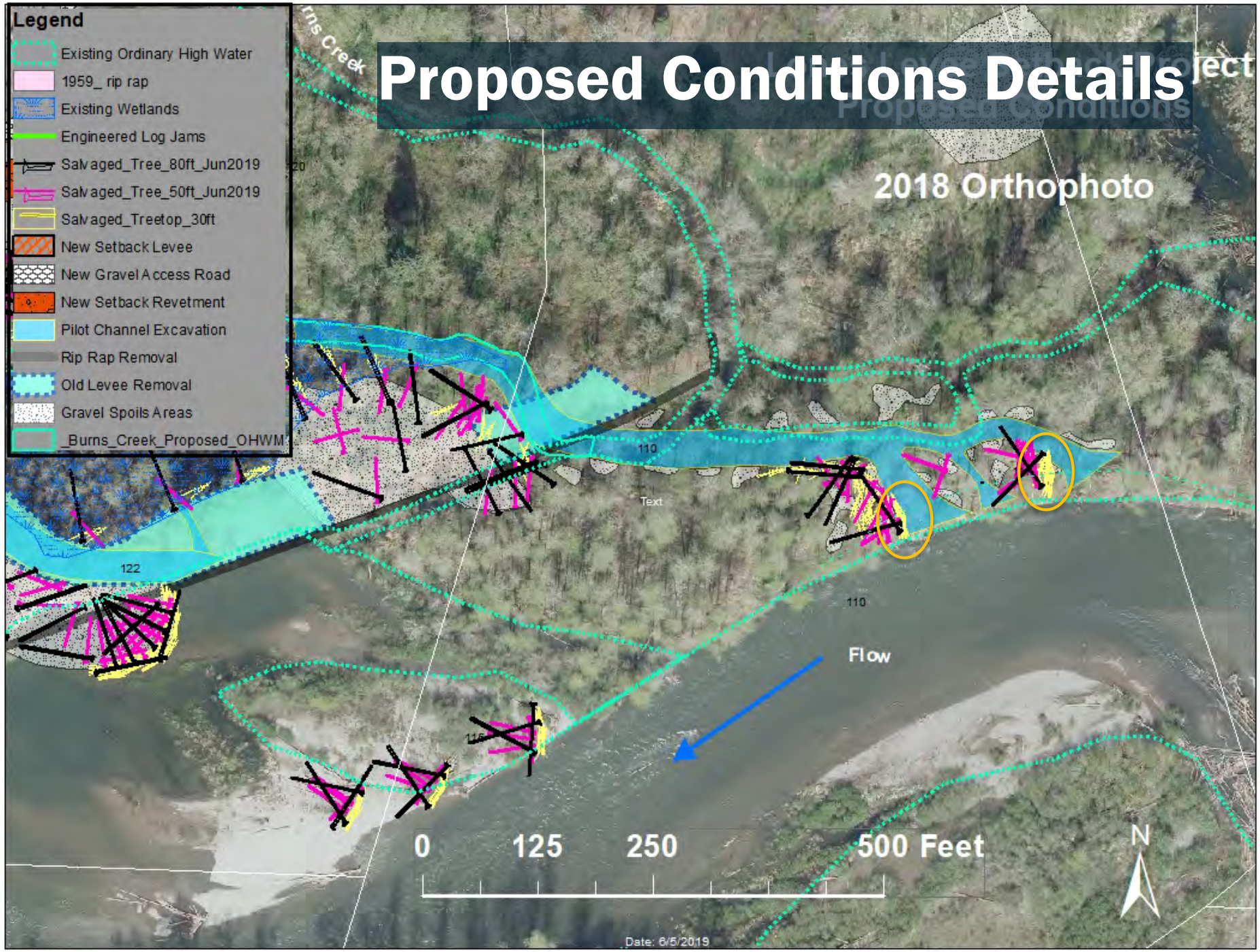
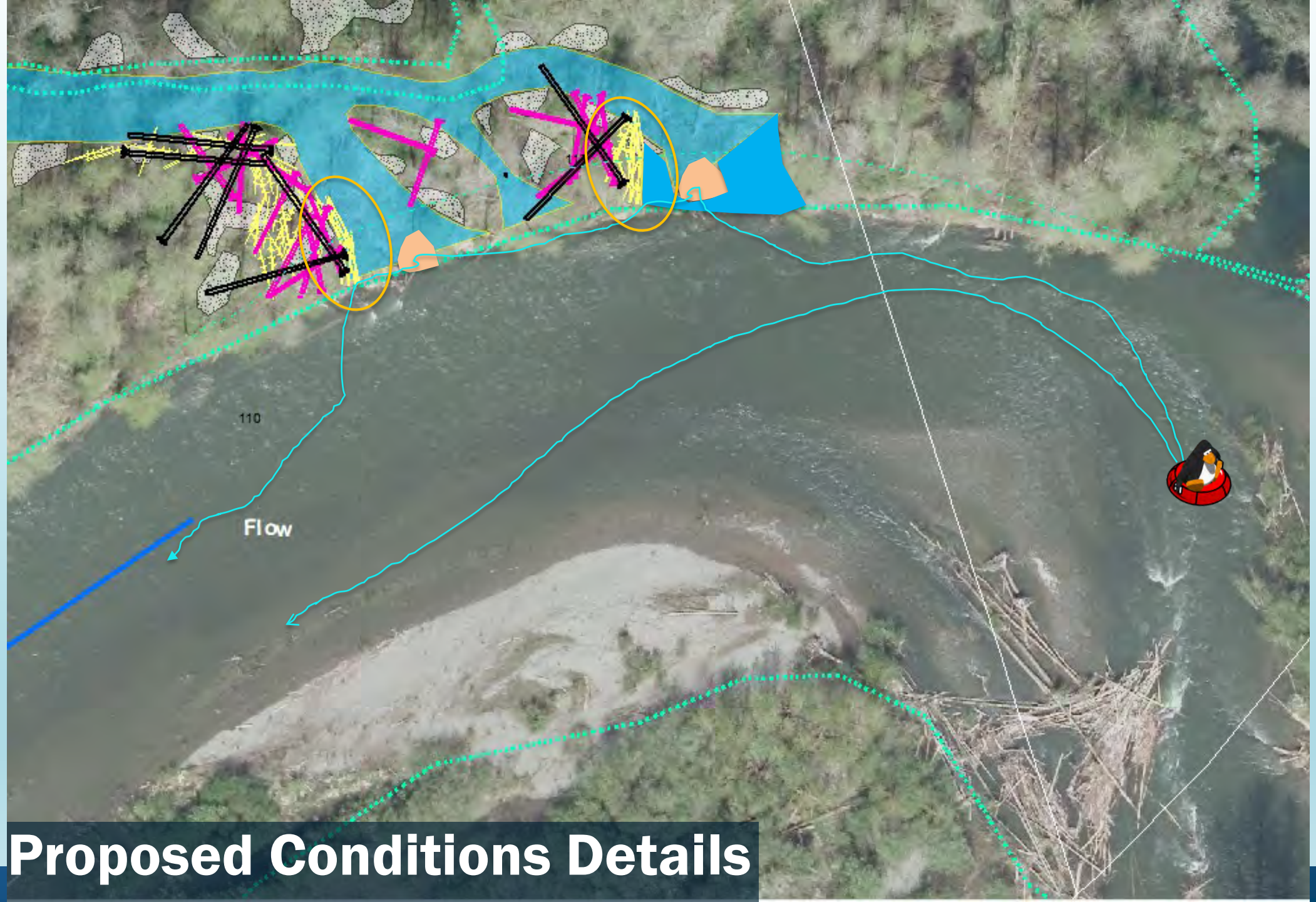
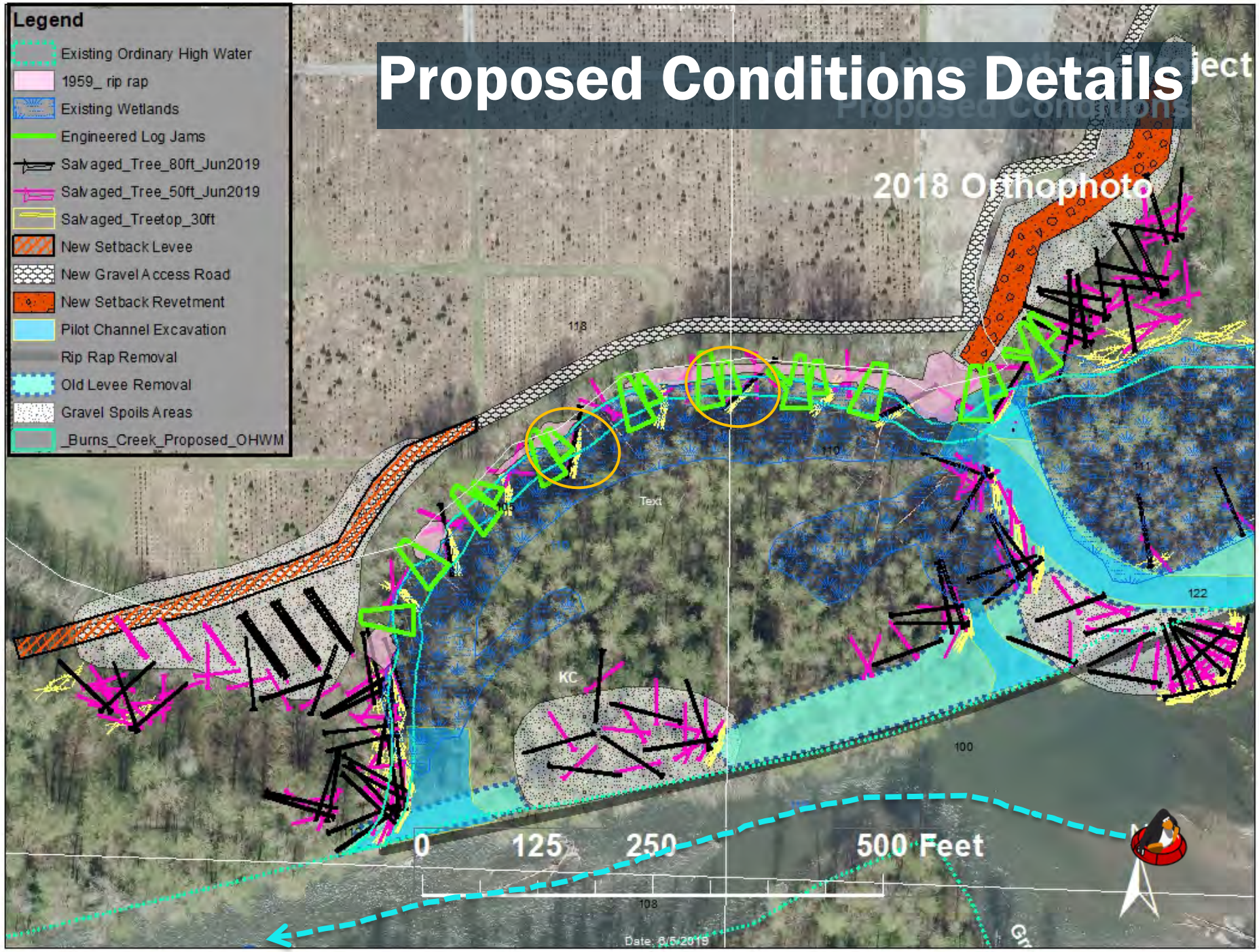




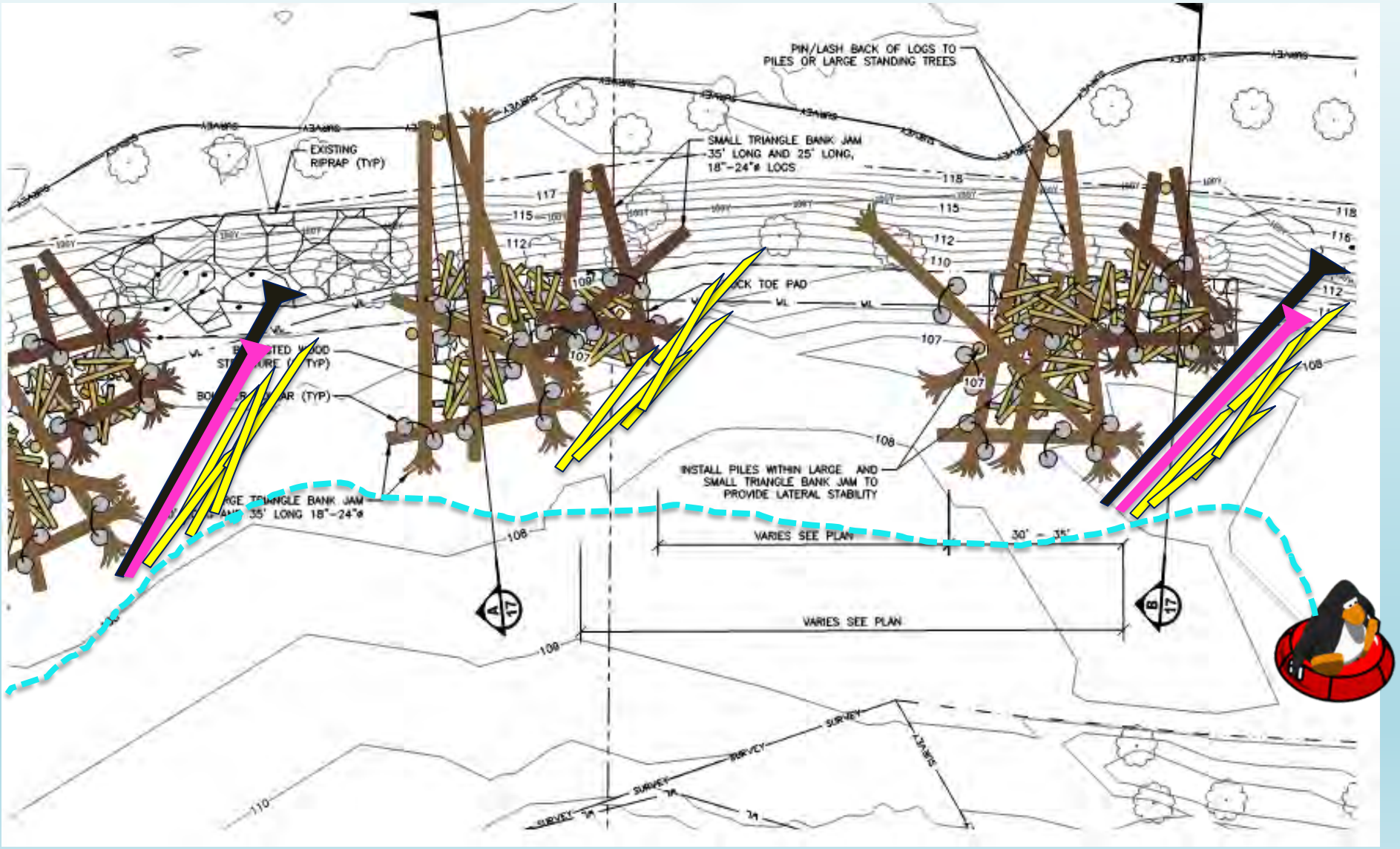
Proposed Conditions Details

Rainbow Bend Side Channel Inlet

Proposed Conditions Details



Proposed Conditions Details



Proposed Conditions Summary

- **Design will have less influence than post-project natural processes**
- **Hazards will continue to develop in project reach**
- **Design adjustments to potentially reduce risk**
- **KC site management plan will include:**
  - Annual monitoring of project site for hazards
  - Continued signage of natural wood hazards in the reach
  - Signage at boat ramps
    - Monitoring and alerts regarding conditions
    - Use advisories especially for less experienced users
  - Potential improvement of upstream haul-out signage
  - Potential PFD hand-out & increase KCSO patrols @ ramps

Lones Levee Setback Project

Schedule Overview

• Stakeholder outreach	Ongoing
• 30% wood checklist published	Late June 2019
• 30% design plans complete	July 2019
• 60% plans Complete	August 2019
• Final Plans Complete	January 2020
• Construction	Summer 2020 or 2021

Contact Information

Dan Eastman, Project Manager

Dan.Eastman@kingcounty.gov

206-477-4684

King County

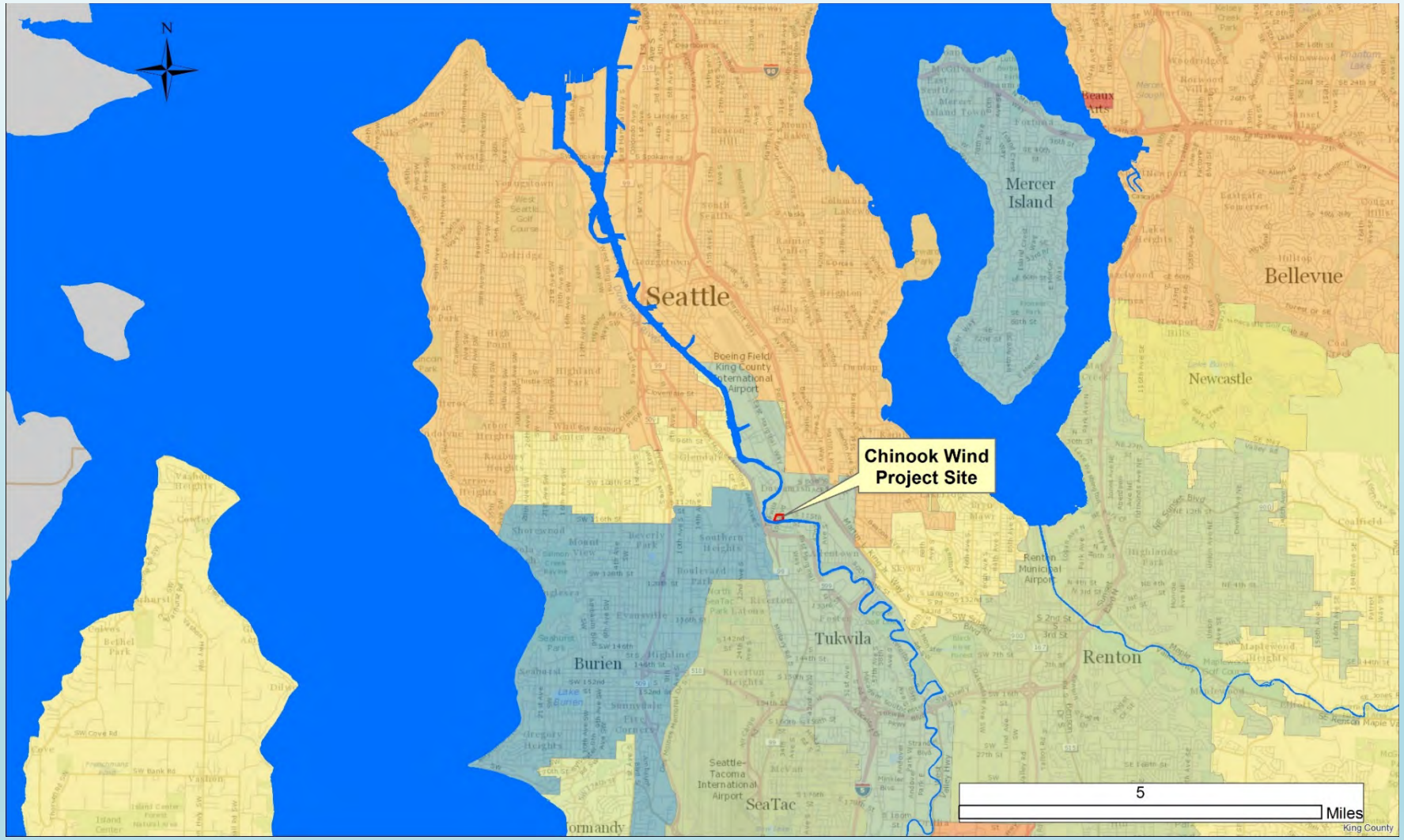
Chinook Wind Mitigation Project

Ecological Restoration & Engineering Services (ERES)/ Mitigation Reserves Program (MRP)

Laird O'Rollins, Project Manager

King County

Project Location

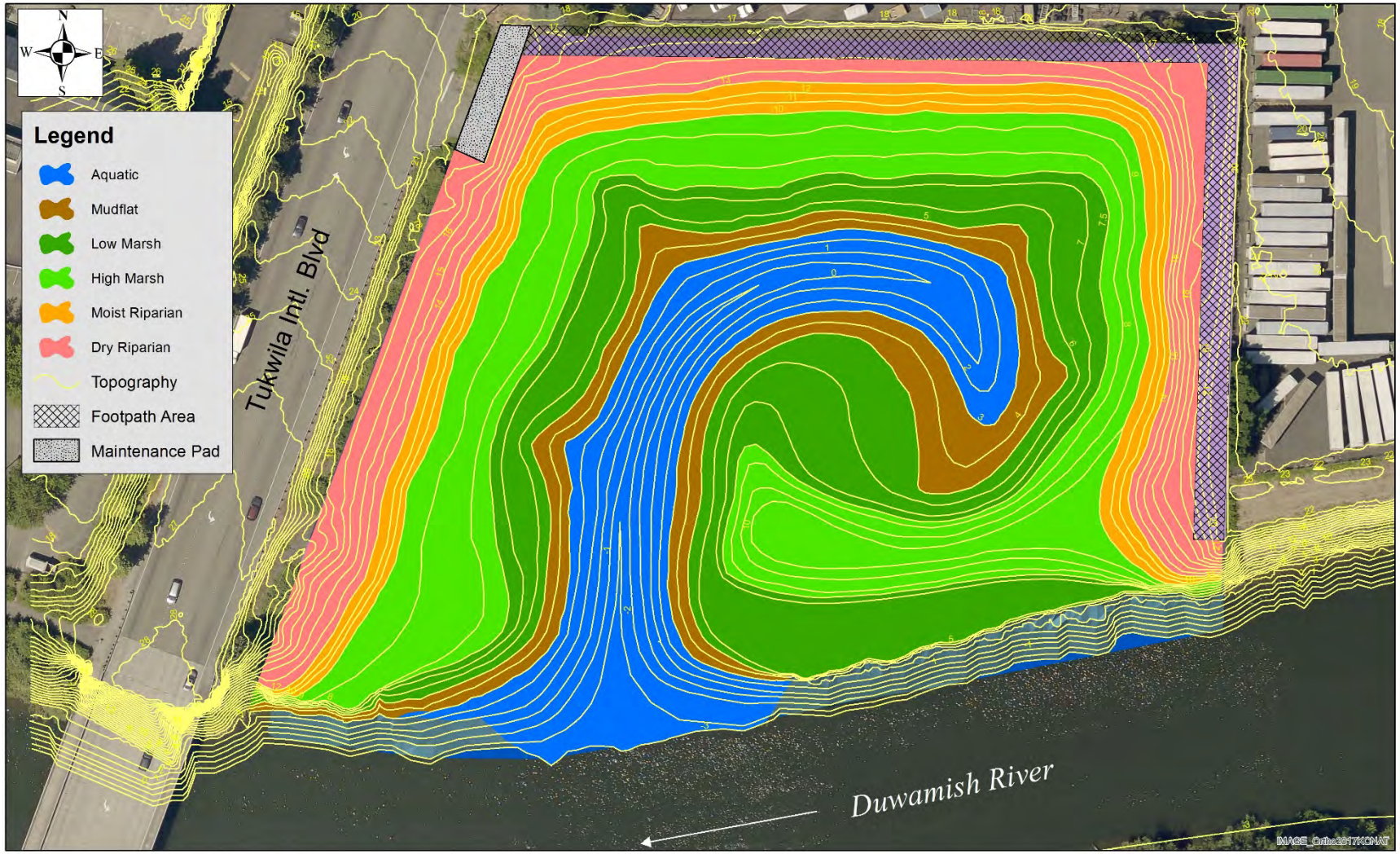


- ~5.8 acres;
- Tidally influenced (changing water levels every day);
- Upstream of turning basins/commercial water traffic;

Recreational Use

- Low levels of recreational use;
- Mostly motorboats, some kayaks and canoes. (Launching area just upstream);
- Very low water velocities—sometimes flowing upstream at high/flood tides;
- Highly visible from upstream (~1/2 mile)

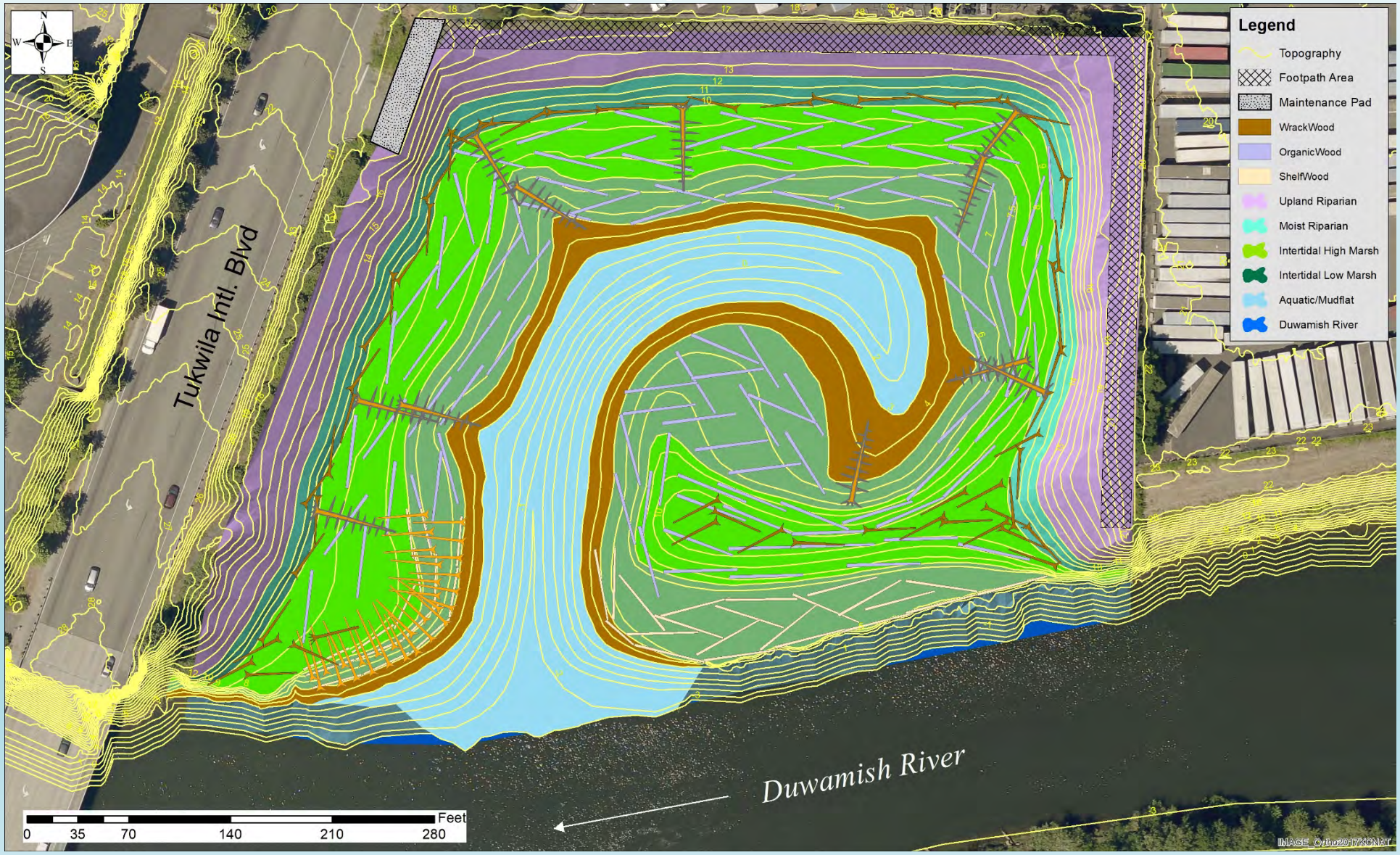
Creating ~4-acres of new wetland and aquatic habitat to mitigate for impacts throughout the Green/Duwamish Watershed



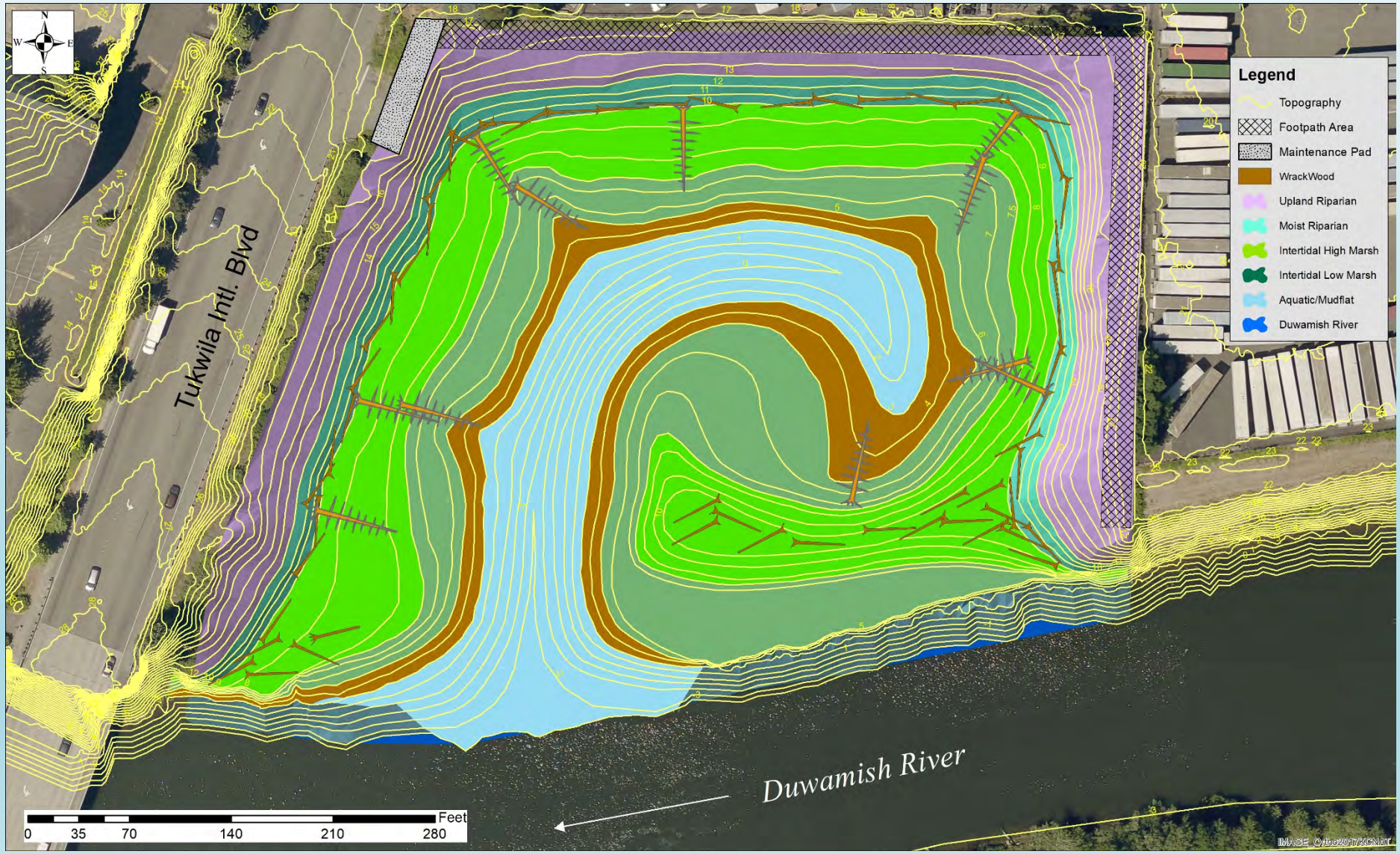
Objectives:

- Create ~ 4 acres of wetland and fish habitat;
- Emphasis on rearing habitat for juvenile Chinook salmon
- Excavate 80,000 CY to lower the site by 8’ to 20’;
- Extensive planting and woody debris installation.

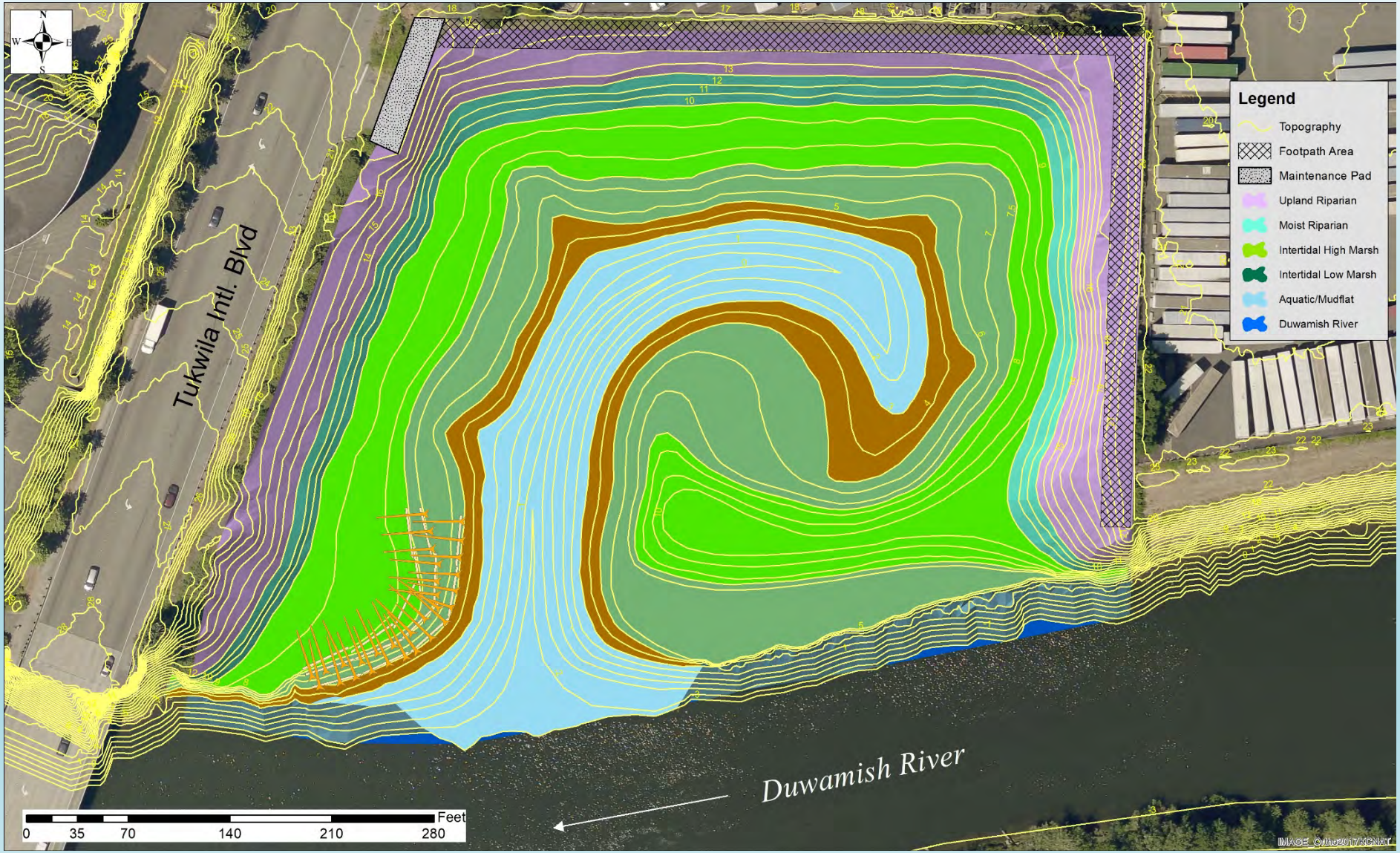
Woody debris (230 pieces) used for several purposes



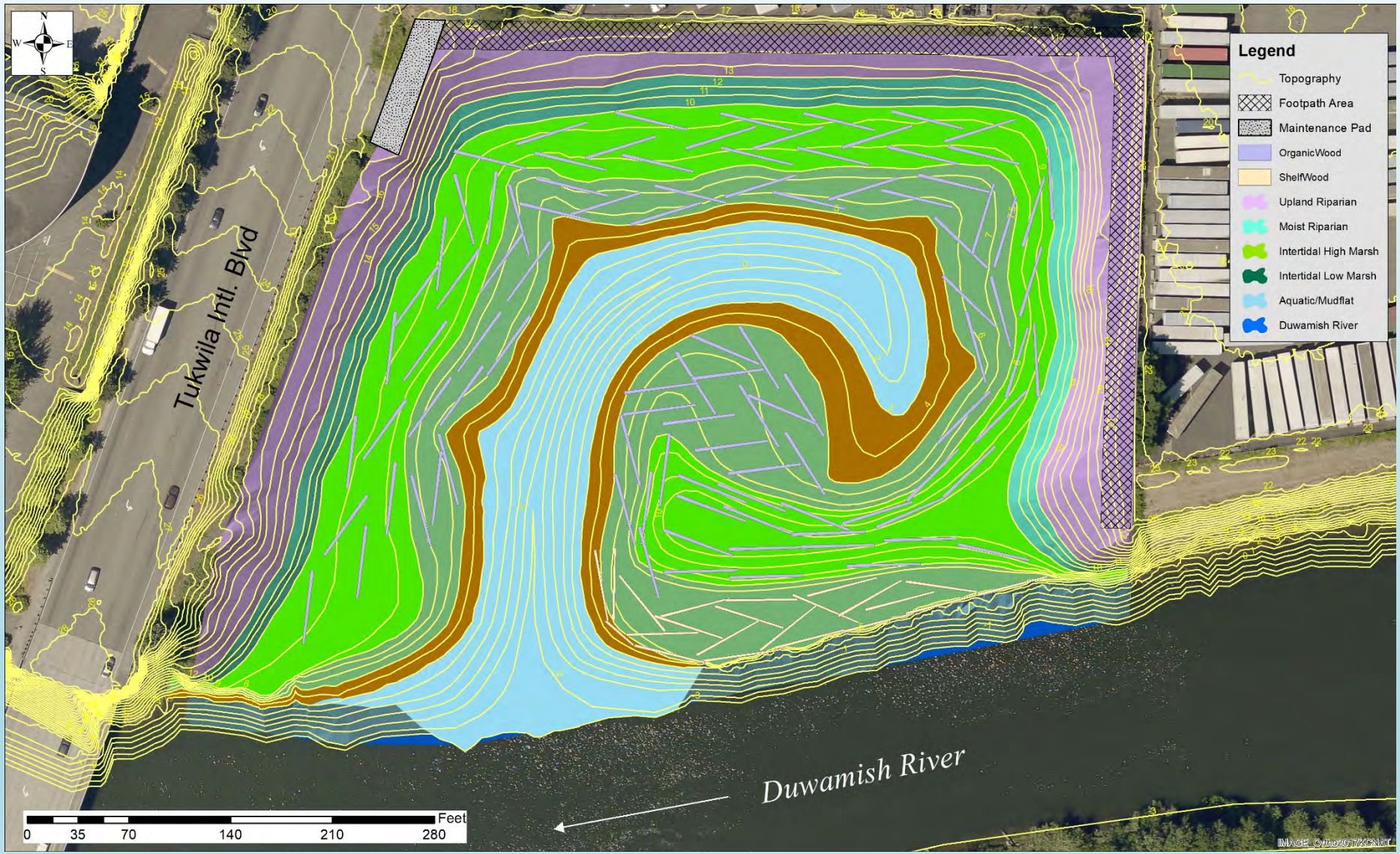
Wrack wood (64 pieces)



Bank Stabilization Structure (45 pieces)



Substrate Wood (121 pieces)



Project Schedule

Design: Jan 2018-Jan 2020

- 30% design complete: January 2019
- Instream Project Design Checklist posted for public comment
- 60% design late summer/fall
- Final Design early 2020

Construction: August - December 2020

King County

Questions?

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

https://www.kingcounty.gov/services/environment/water-and-land/wetlands/mitigation-credit-program/mitigation-sites/project-chinook-wind.aspx

King County

OPEN HOUSE!

Informal conversation and questions with Project Managers

King County