



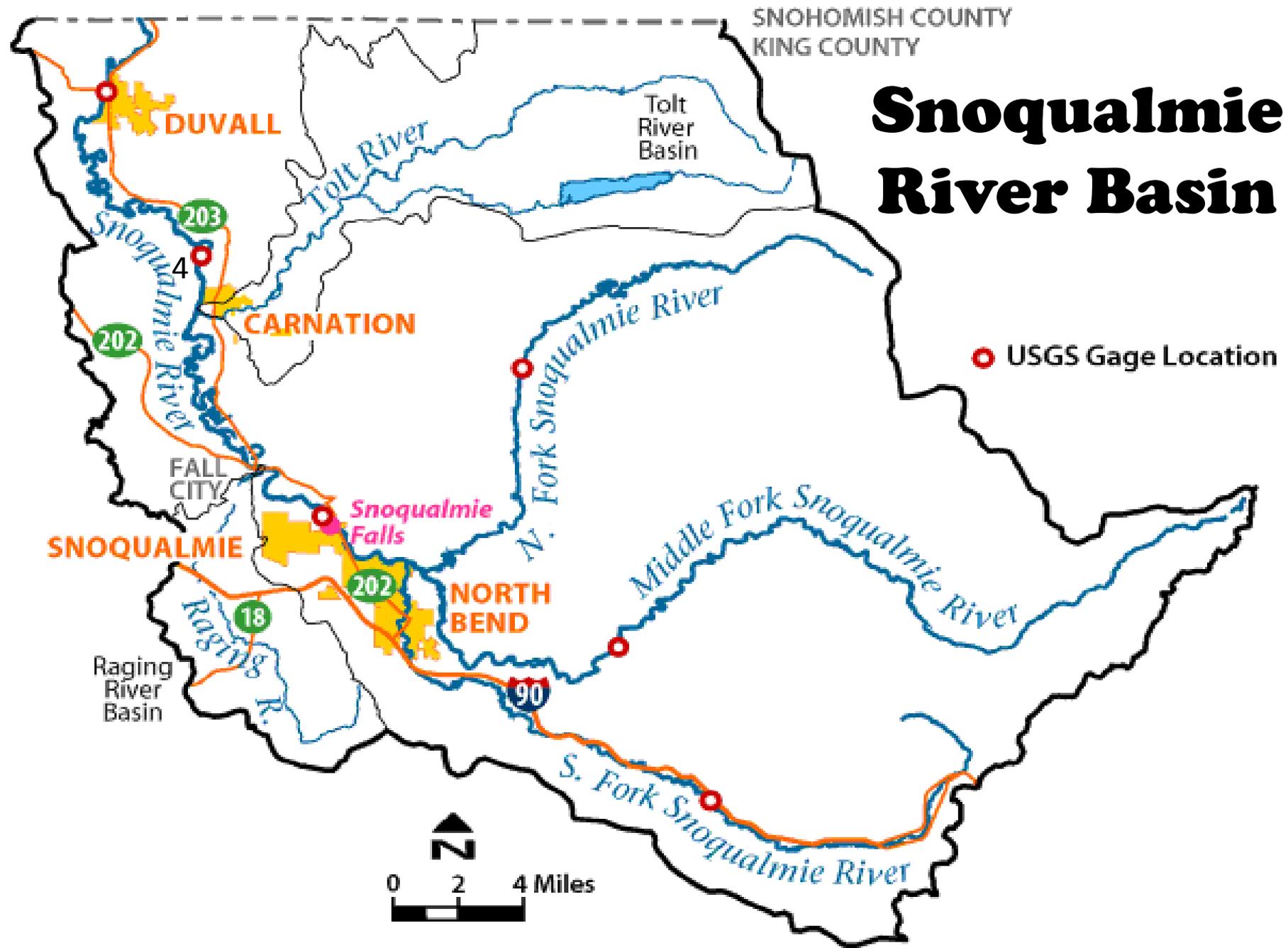
Upper Carlson Floodplain Restoration Project

Introduction, Sally King

Upper Carlson Project, Dan Eastman

SNOHOMISH COUNTY
KING COUNTY

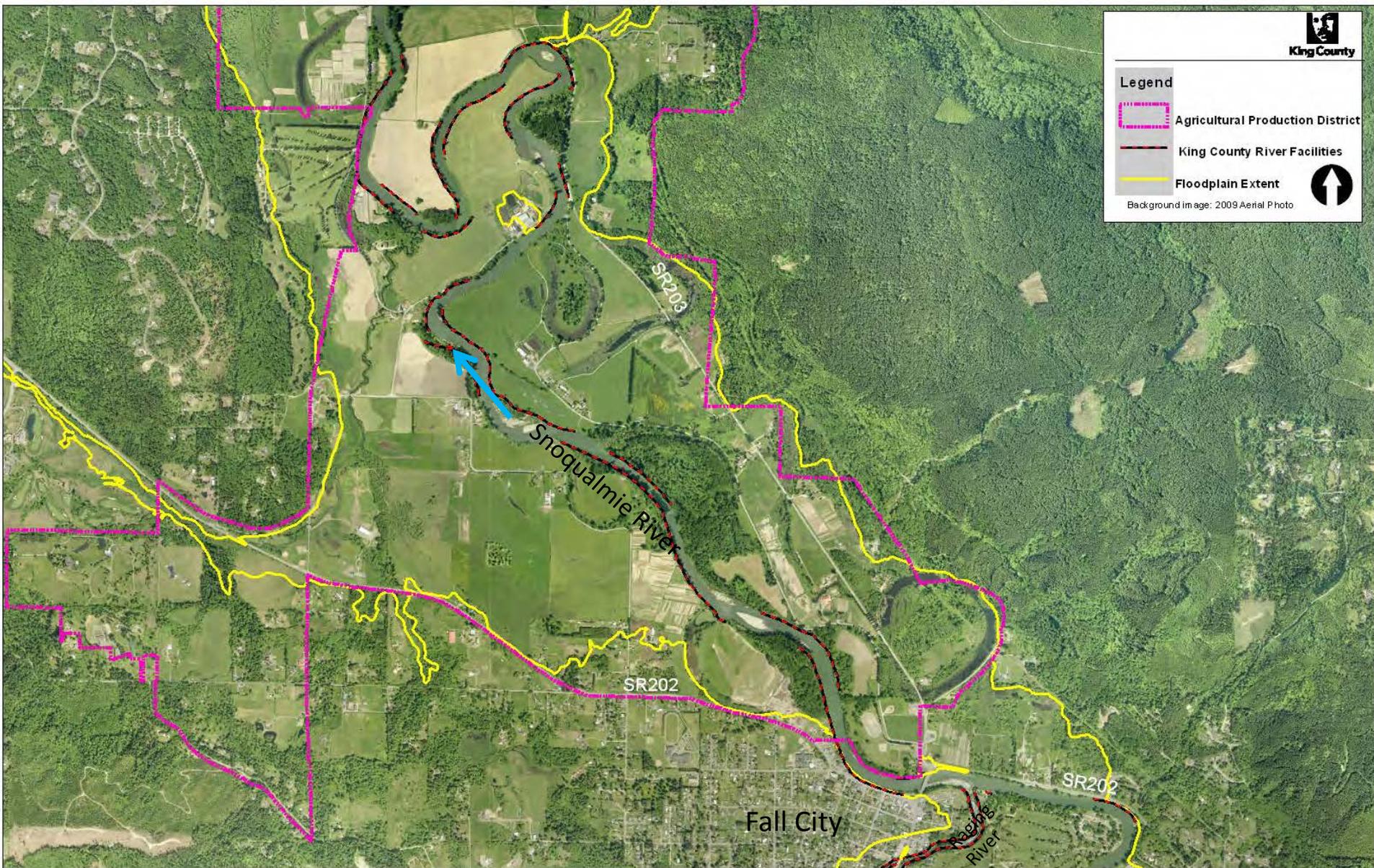
Snoqualmie River Basin



● USGS Gage Location



Snoqualmie at Fall City Reach



Context for the Snoqualmie at Fall City Reach

- Deep, broad floodplain – impacts farms, roads, homes
- Raging River: sediment and steeper gradient increase channel migration and erosive flows
- Sediment and diverse habitat – important for salmon spawning/rearing
- Levees built in 1930s; do not contain floods
- Agricultural Production District - higher ground for farming



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 to homes/farms; increase storage capacity for flood waters and sediment through levee setbacks

Snoqualmie at Fall City Reach Restoration Assessment



Prepared by

Dan Ertman, Fish Biologist and Project Manager
Todd Harley, L.E.G. Geologist
Will Mansfield, P.E., Supervising Engineer
Jodi Luttrell, Ph.D., Floodplain Ecologist
Clare Blunck, P.E., L.G., Senior Engineer and Geologist
Tina Hinkle, P.E., Project Engineer
Mary Mason, Basin Steward

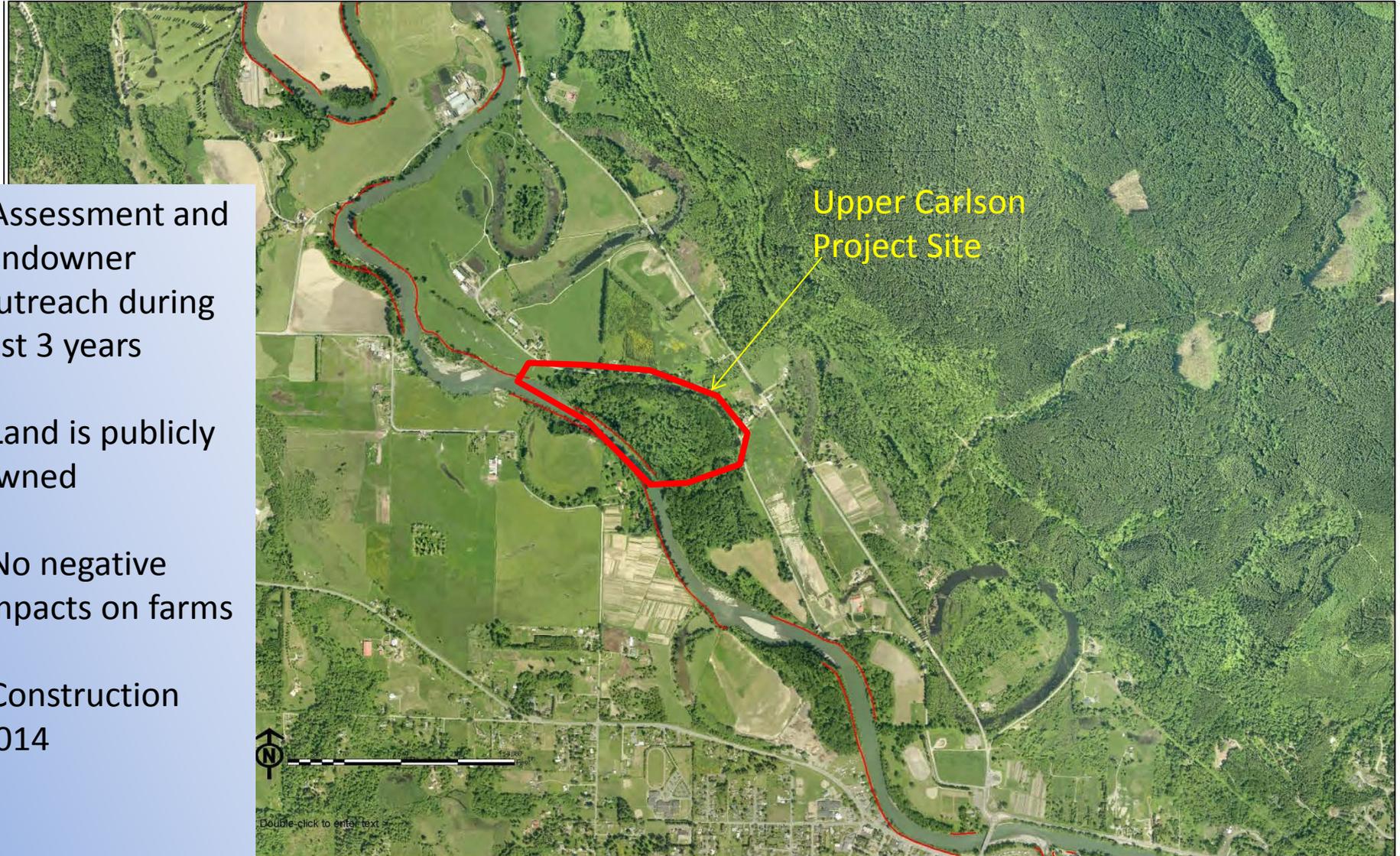
Water and Land Resources Division
Department of Natural Resources
King County

May 2011

Related Goals and Efforts

- Fish/farm/flood collaborative watershed process (R-650) involving farmers, stakeholders, etc – kicks off this fall – to “lift all boats”
- Recreational safety – countywide river safety campaign, and local work group to meet mid-September and *advise* county on local river use, project design and options to manage risks

Selection of Upper Carlson Project

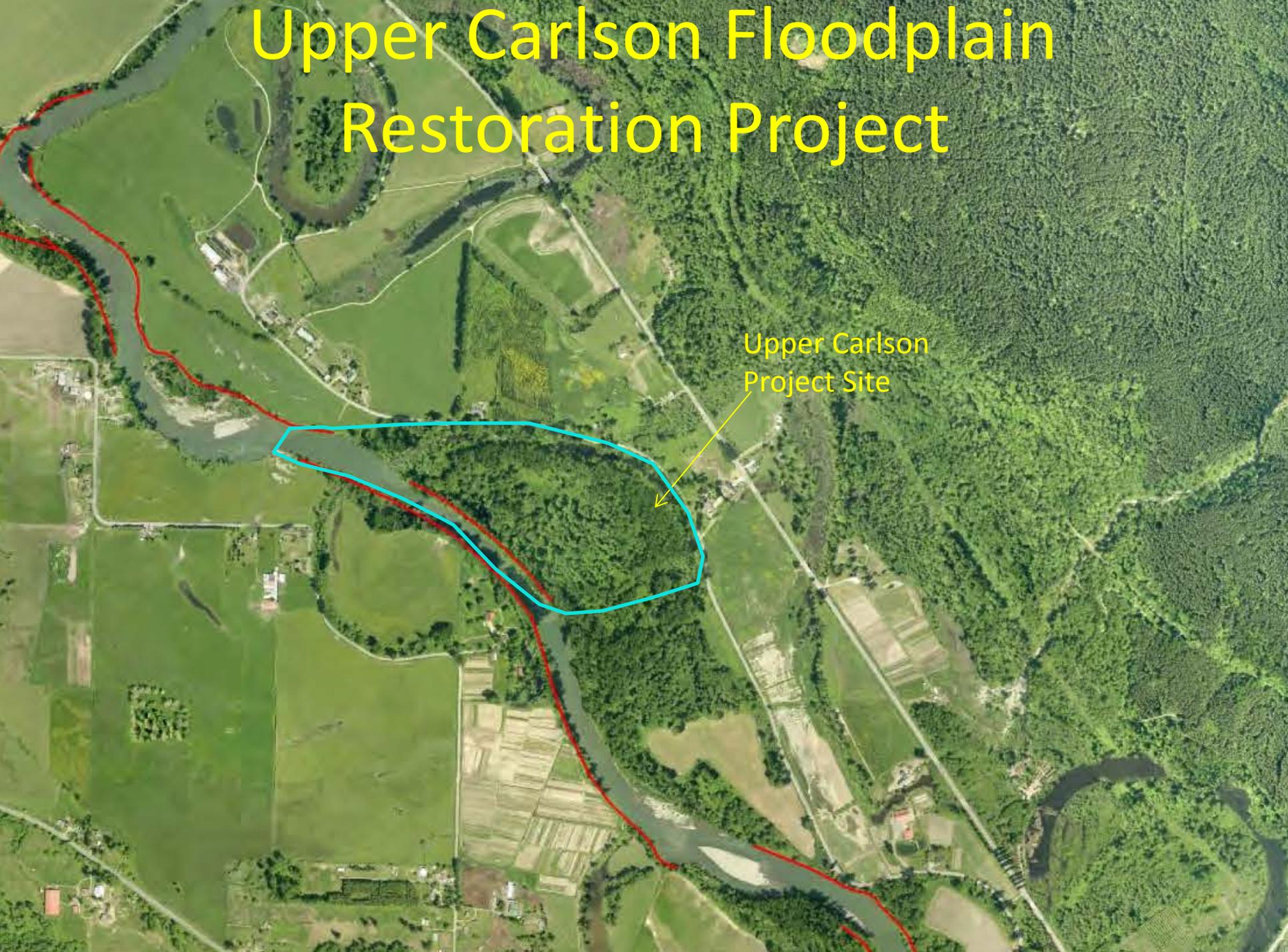


- Assessment and landowner outreach during last 3 years
- Land is publicly owned
- No negative impacts on farms
- Construction 2014

Double-click to enter text

Upper Carlson Floodplain Restoration Project

Upper Carlson
Project Site



Upper Carlson Floodplain Restoration Project Presentation Overview

- Project Schedule
- Snoqualmie at Fall City (SAFC) Reach Feasibility
- Why are we proposing to remove levees? What is good habitat?
- Project Purpose and Objectives
- Existing Conditions
- Proposed Actions
- Expected Response
- Effects on people, farms and fish
- Questions and Discussion
- Open house at tables

Upper Carlson Floodplain Restoration Project

Schedule Overview

with upcoming opportunities for public input shown in yellow

- Draft 30% design Complete
- Solicit expert opinion on 30% Complete
- Public Input via LWD meetings Complete
- Public input via Public Meeting **Tonight!!**
- 30% plans/LWD checklist comment period **August 26- End Sept**
- SEPA Comment Period **September**
- Local work-group meetings **Mid September, Oct. Nov.**
- 60% plans/lwd checklist posted **October**
- Final Plans Complete Feb. 2014
- Construction Summer 2014

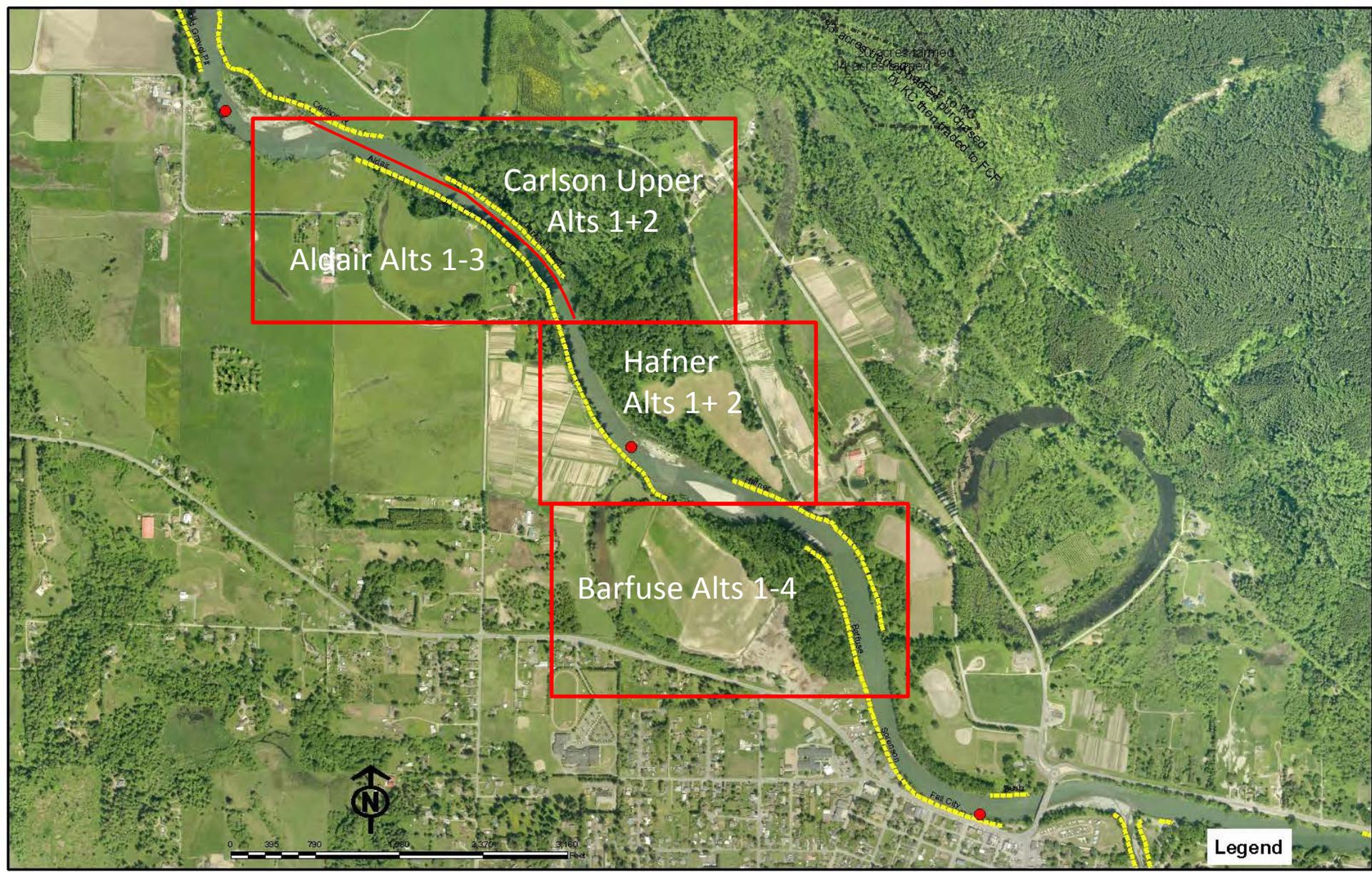
50 year Restoration Goals and Progress to Date with Snohomish Basin Chinook Recovery Efforts

- Current population is 5.7% of historic abundance – not sustainable

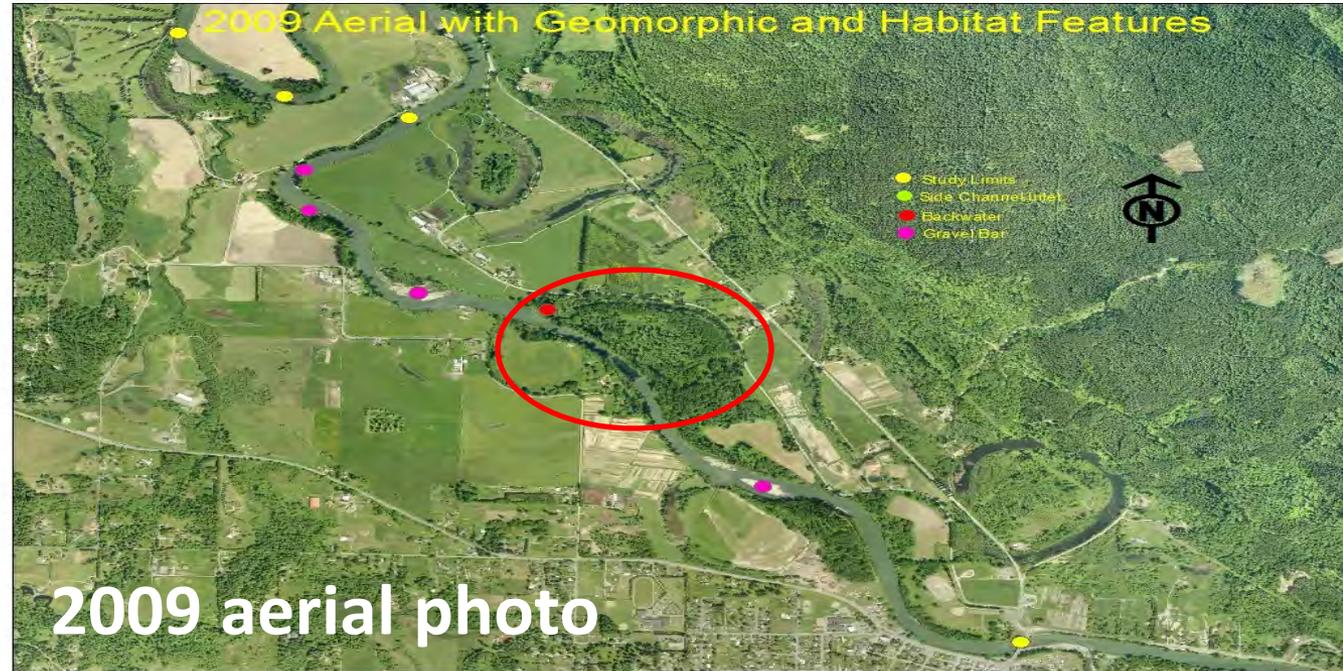
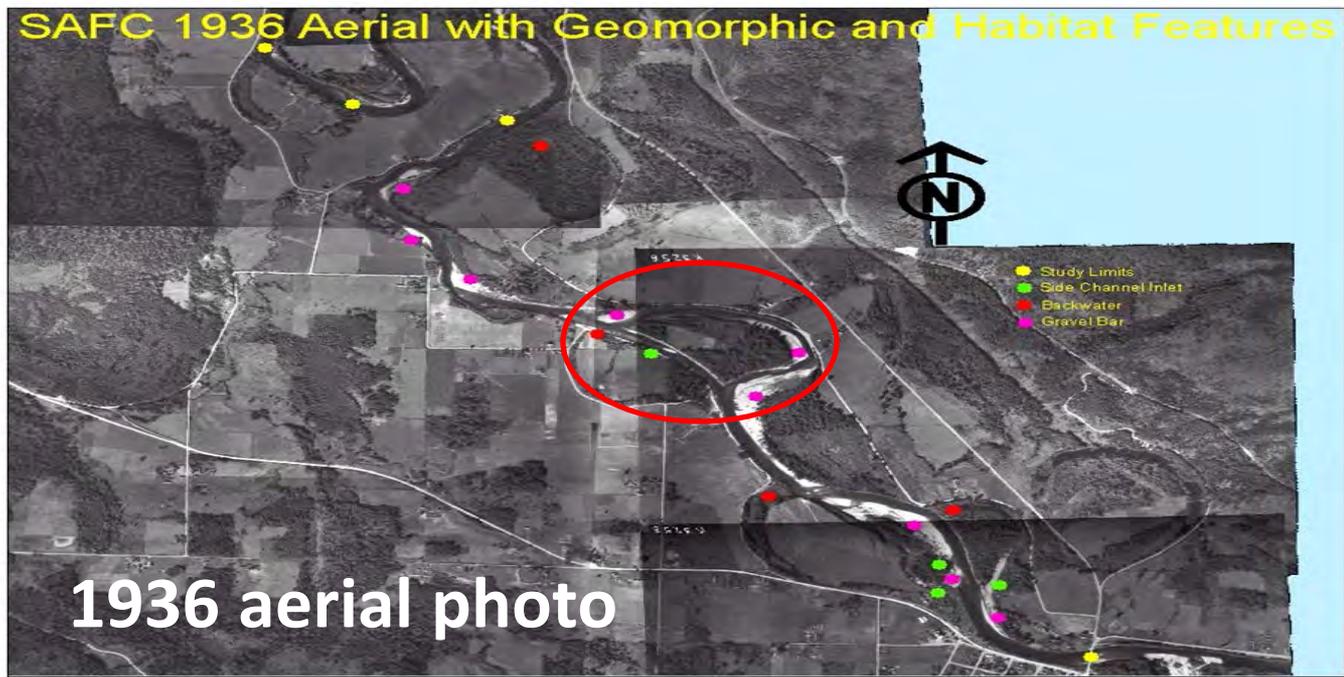
TARGETS:

– 26 miles	Mainstem Edge Habitat	PTD 1 mile = 4%
– 420 Acres	Mainstem Off-Channel Habitat	PTD 21 acres = 5%
– 640 Acres	Riparian Habitat	PTD = 81 acres = 13%
– 100	Mainstem Log Jams	PTD = 9 jams = 8%

Snoqualmie at Fall City (SAFC) Feasibility Study Focus Reach



SAFC
REACH
Historic
VS.
Current
Conditions



Existing Conditions - Channel migration and sediment



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

Dec 2010 ~ 28,000 CFS

What's wrong with the way it is?



- Small fish need refuge during small and large floods
- Wood, vegetation and connected floodplains provide that refuge
- Gravel bars are also productive habitat that provide some low velocity refuge year-round

Targeted Habitat Types

Mainstem Edge Habitat
Gravel bars and complex flow patterns around them



Mainstem Edge Habitat
Complex Steeper Bank habitat



Mainstem
Log Jams

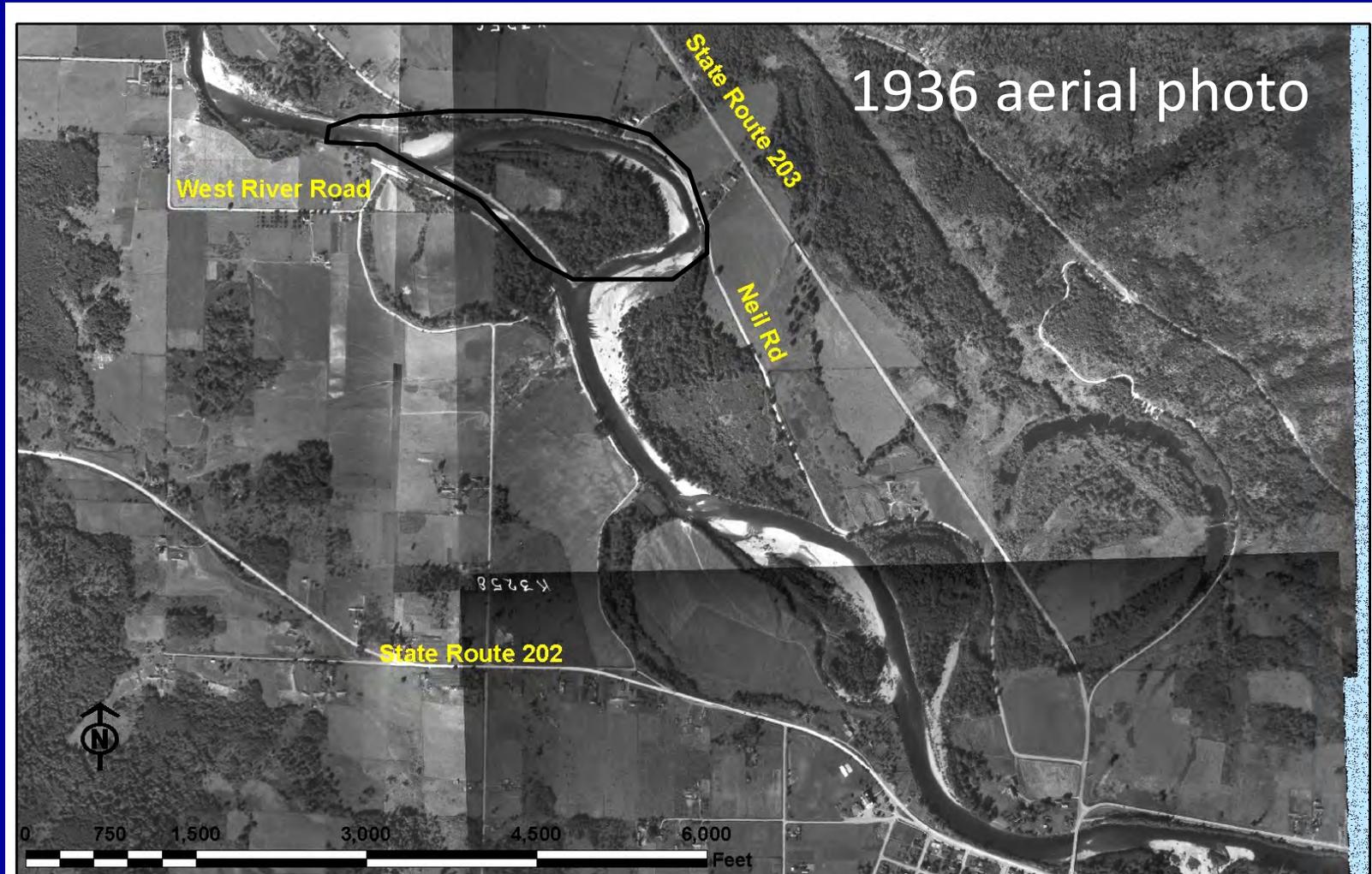


Gravel Retention

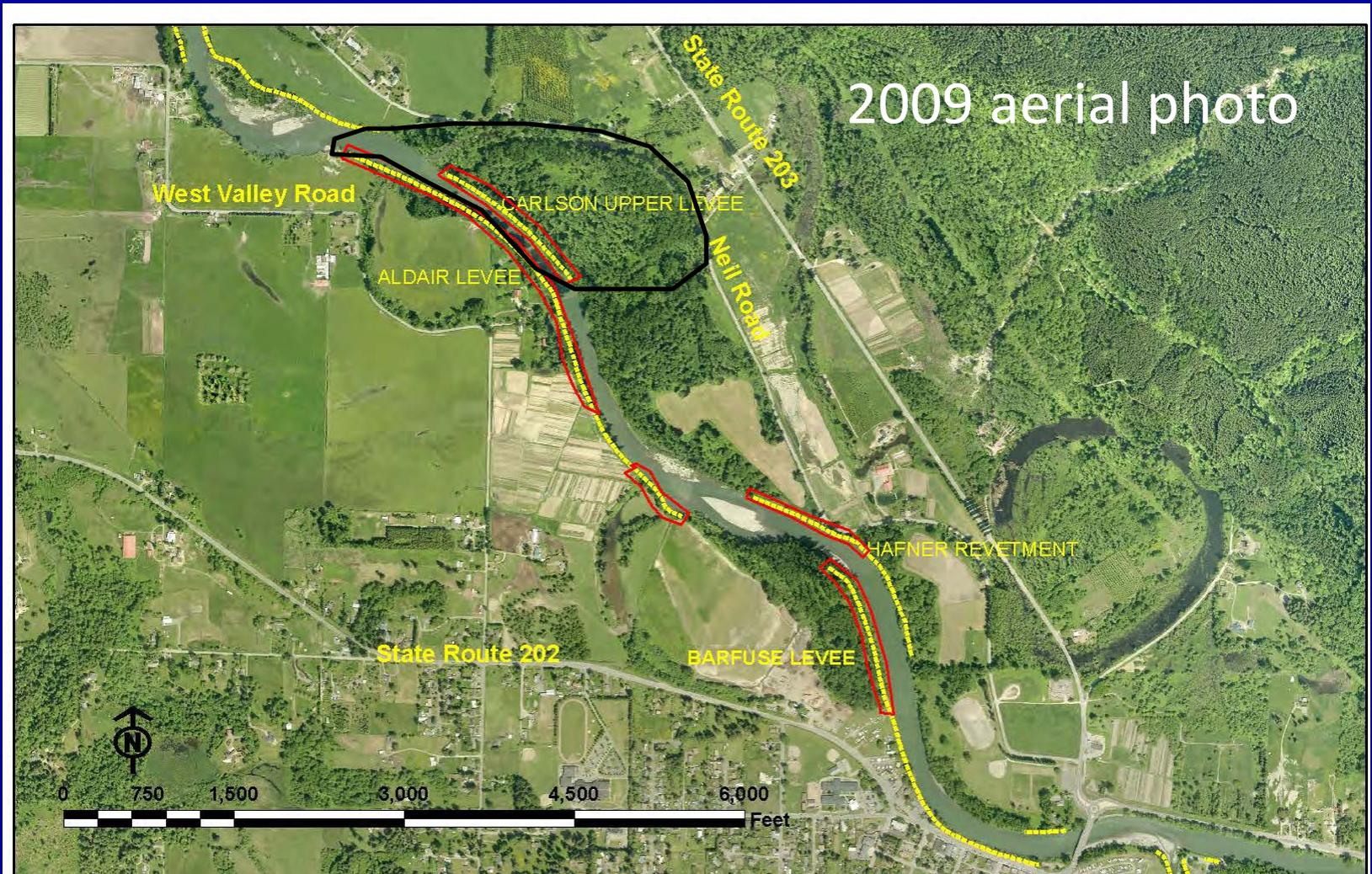
Off-Channel Habitat
Close to mainstem



Historic Conditions - Channel migration and sediment



Existing Conditions - Channel migration and sediment



Upper Carlson Project Description

Problem Statement

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

Project Objectives

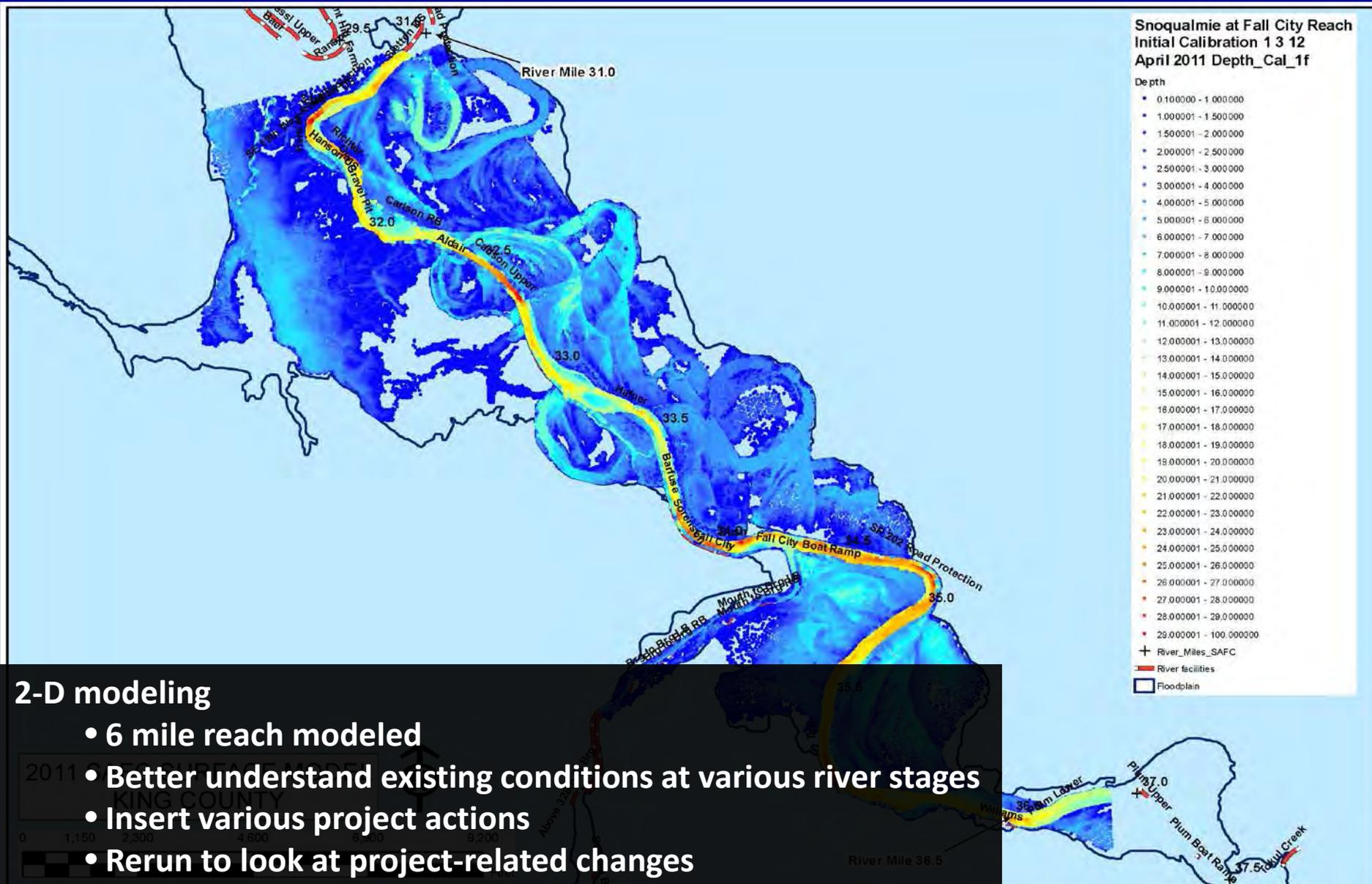
- To promote natural rate/frequency of channel & floodplain processes
- Improve salmon/steelhead spawning and rearing habitat
- Enhance and maintain native vegetation communities

While also:

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

Challenge – Natural Process is inherently unpredictable

Existing Conditions – Flooding and Hydraulics





DEEPEST(30')

Deep 15'

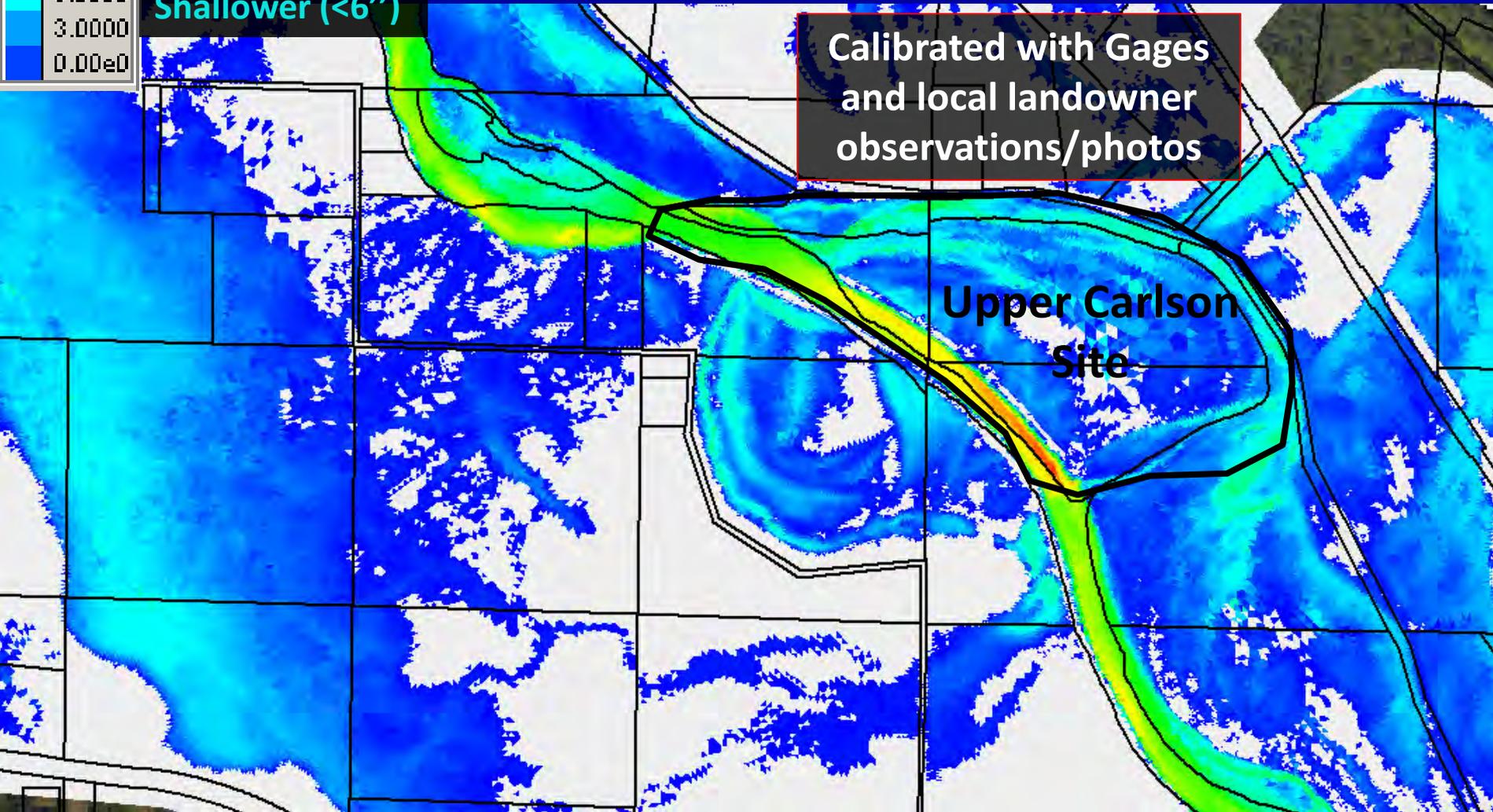
Shallower (<6")

Small Flood

Water Depth – 1.25yr (21,000cfs)

Calibrated with Gages
and local landowner
observations/photos

Upper Carlson
Site



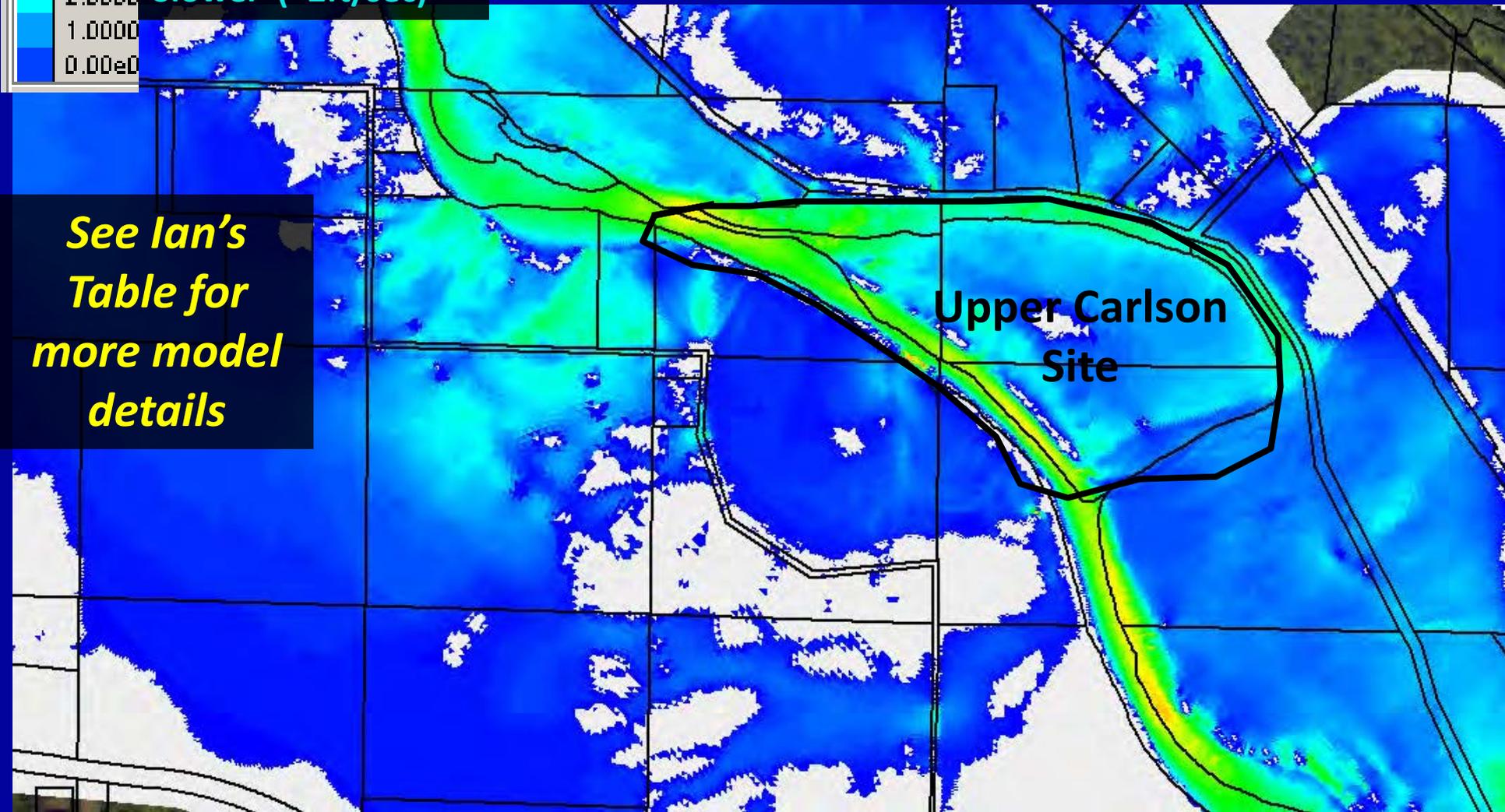


Moderate Flood

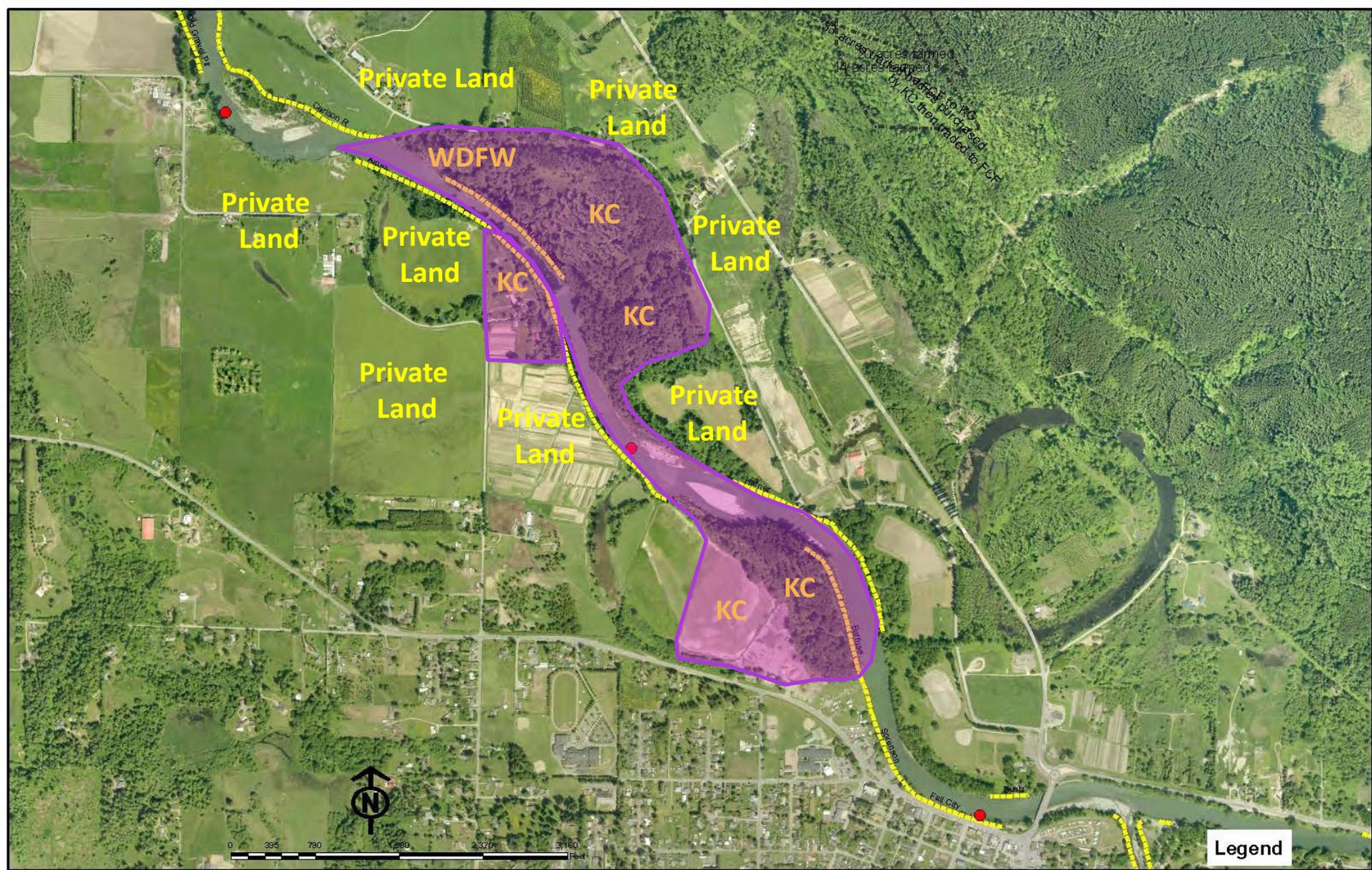
Velocity – December 2010

See Ian's Table for more model details

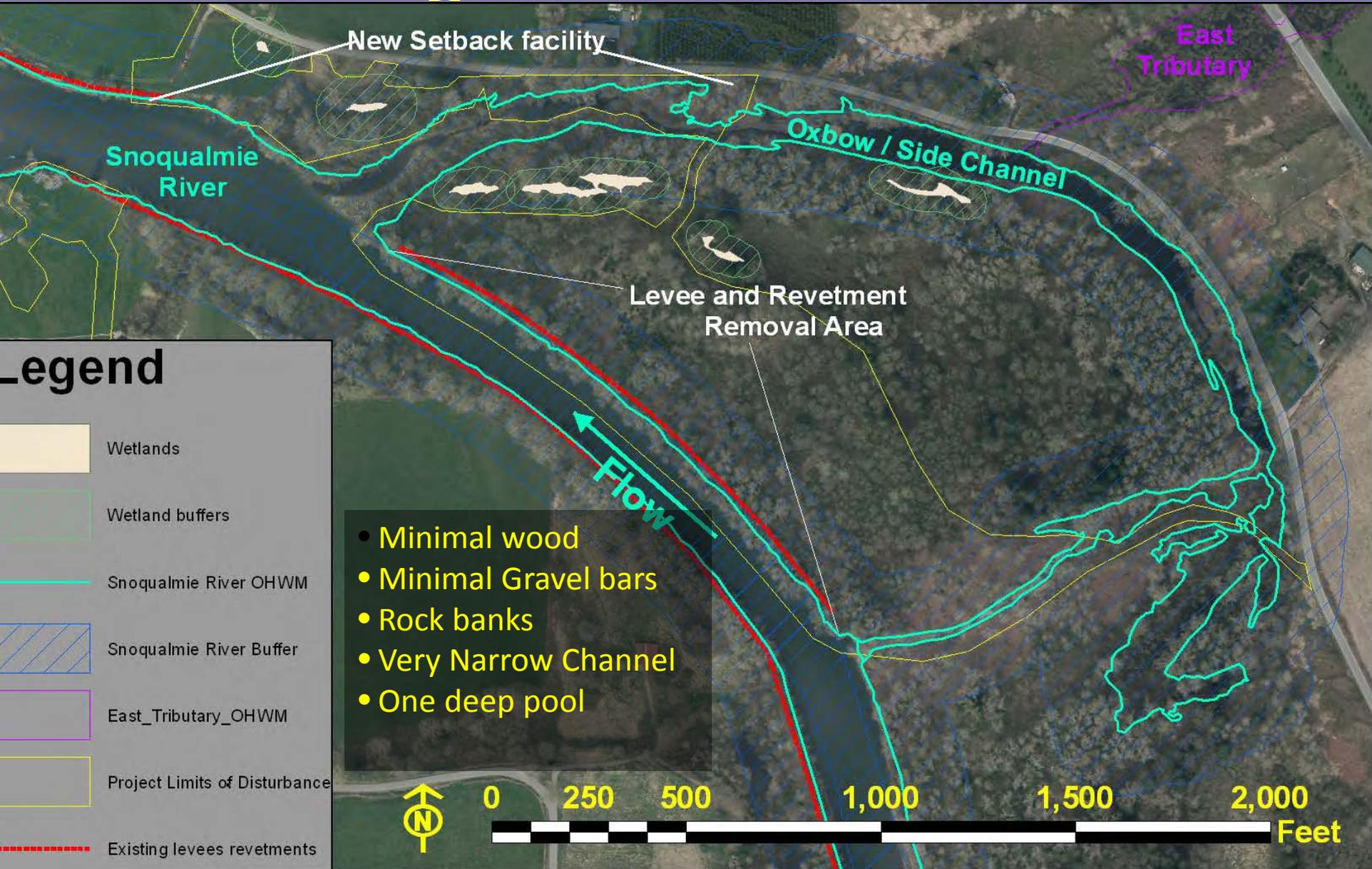
Upper Carlson Site



Existing Conditions – Farms

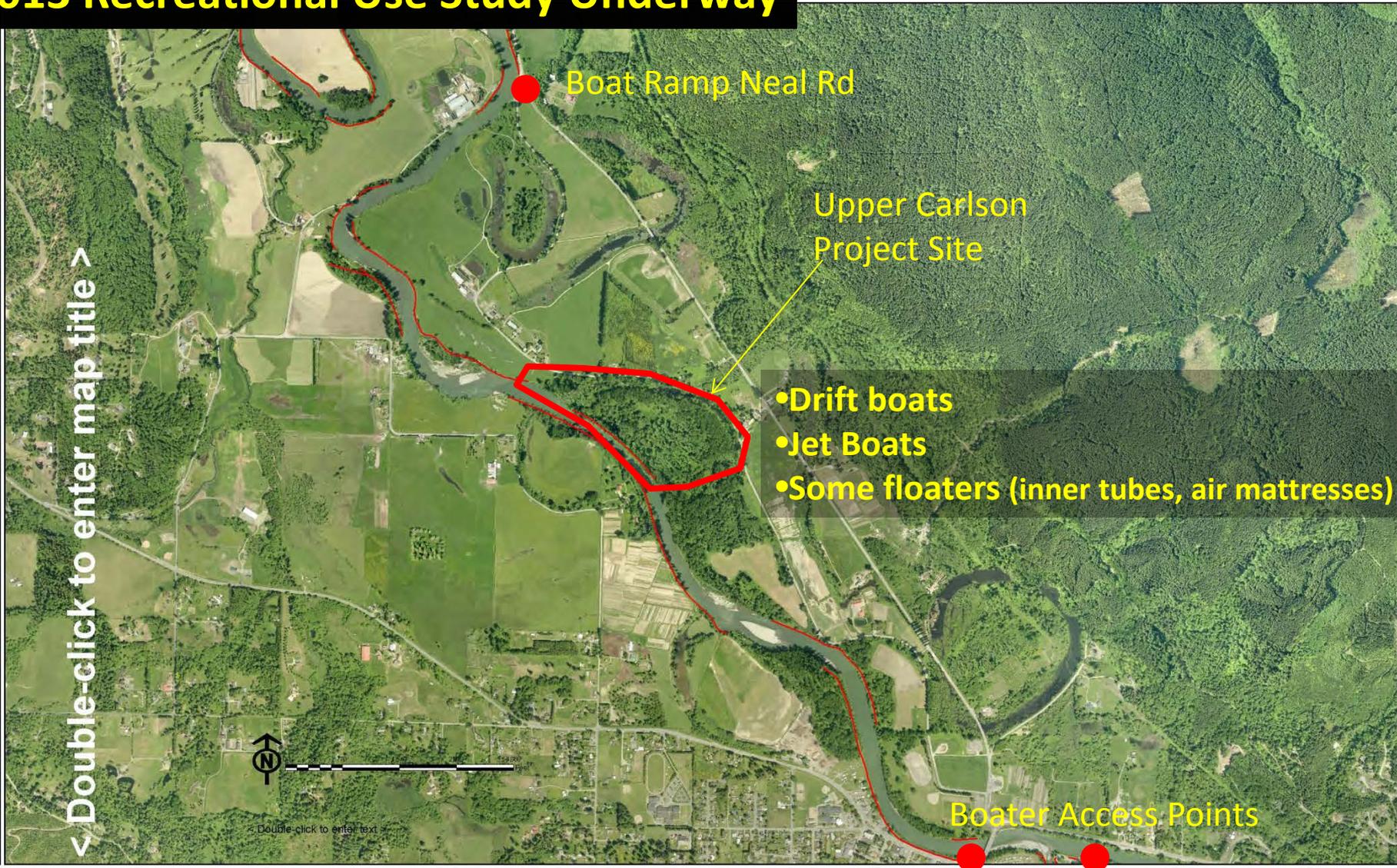


Existing Conditions – Habitat and Fish



Existing Conditions – Recreational Boating

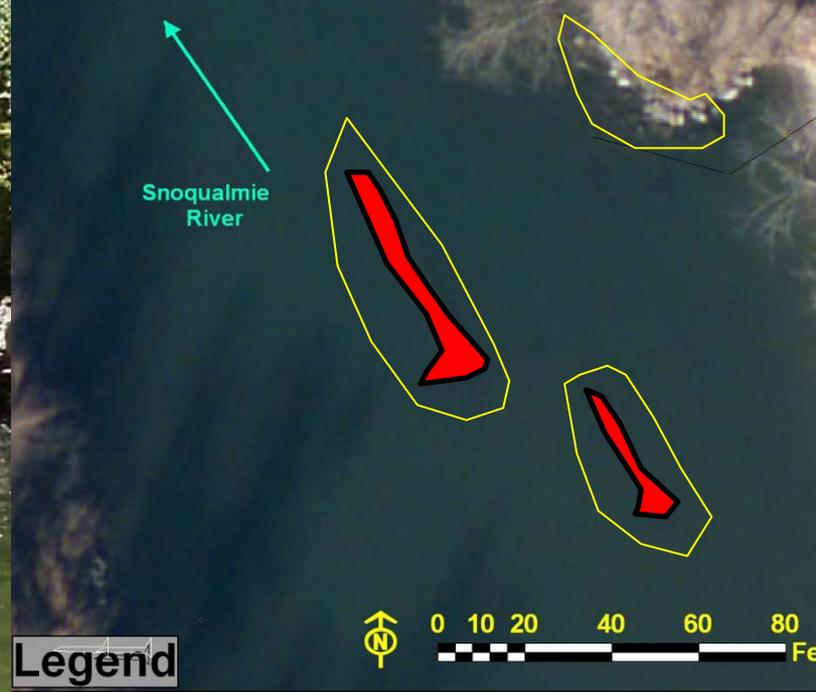
2013 Recreational Use Study Underway



Upper Carlson Site

Upstream 300' @ ~1000 CFS

Flow 3-4 ft/sec



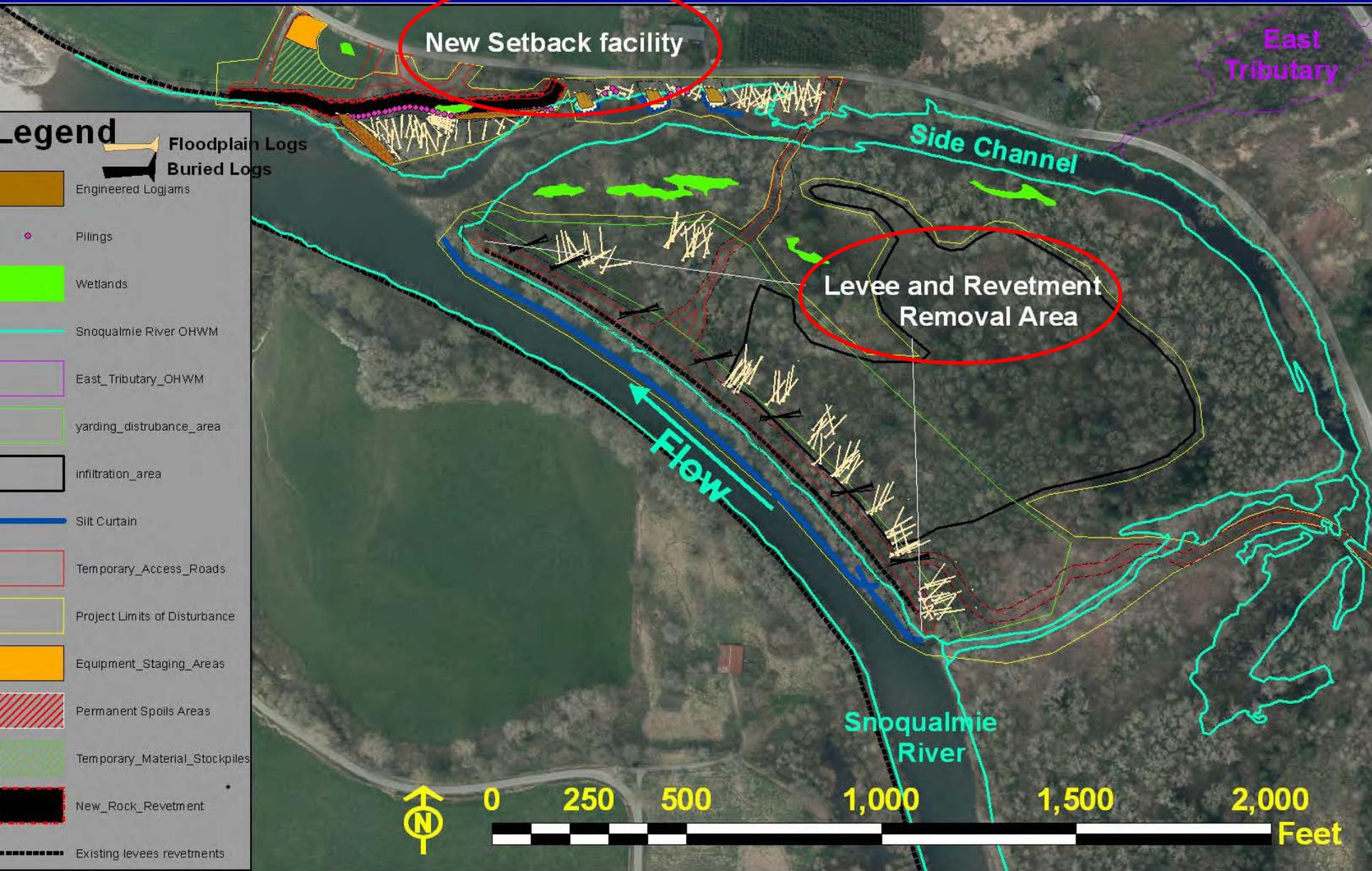
Upper Carlson Site

Remaining 1200' @ ~1000 CFS

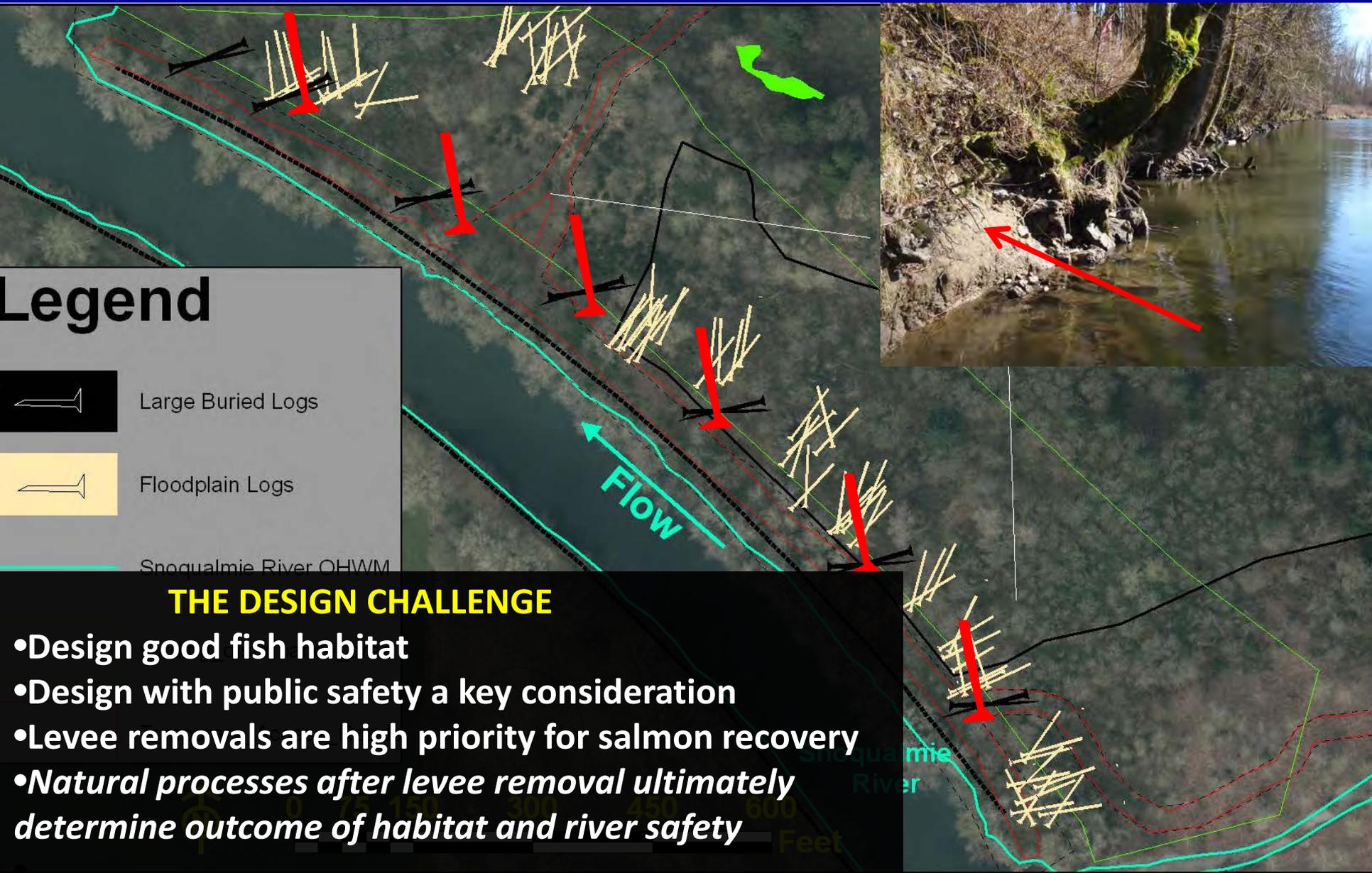
Flow 0.5-1.5 ft/sec



Proposed Actions – Overview



Proposed Actions – Tree Removal and Placement



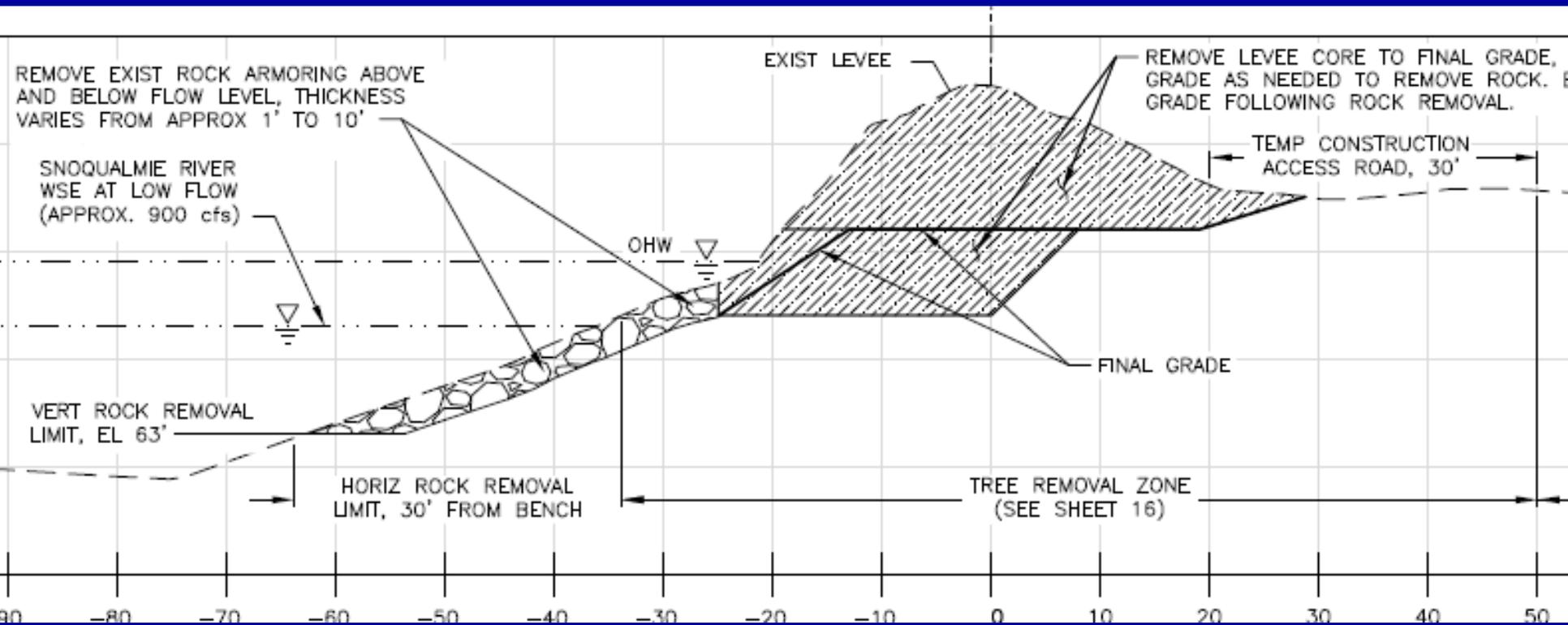
Reducing Risks from wood (to boaters)

Wood Design

- **Extensive tree removal**
Rather than allowing for immediate, rapid recruitment
- **Placement back** from initial migration area
- Design objective to **mimic natural systems** in terms of the rate/orientation of wood
- **Design modifications** to reduce immediate hazards



Proposed Actions – Levee & Revetment Removal



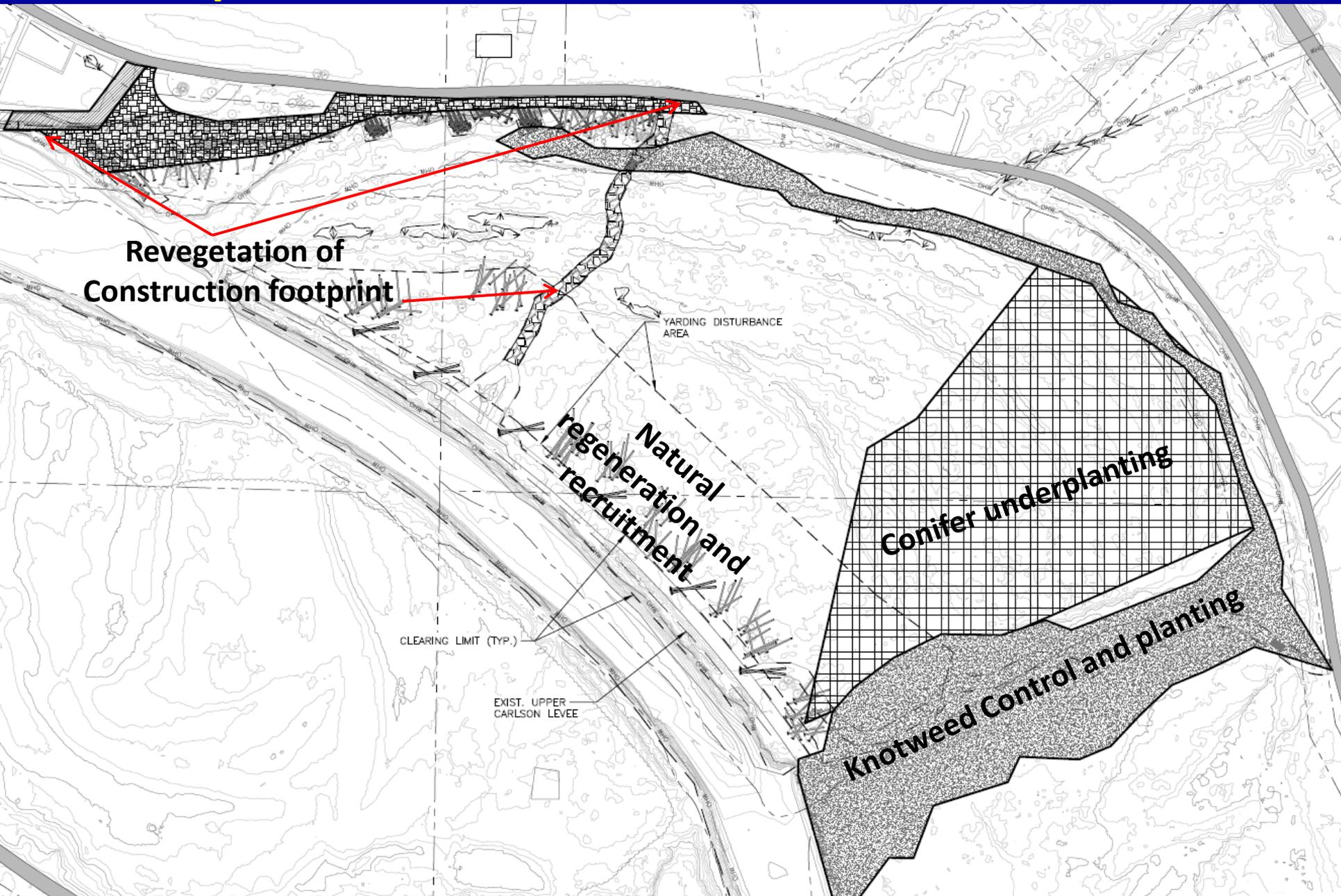
Proposed Actions

New Setback facility

plain Logs
Logs

- Original design good for bank protection and fish
- Concern from LWD/Boater meetings over boater safety
- Modified design to be shorter w/ minimal flow-thru
- Current design good for protection, fish and better for boaters

Proposed Actions – Invasive Plant Control and Planting



**Revegetation of
Construction footprint**

YARDING DISTURBANCE
AREA

**Natural
regeneration and
recruitment**

CLEARING LIMIT (TYP.)

EXIST. UPPER
CARLSON LEVEE

Conifer underplanting

Knotweed Control and planting

Direct Effects of Construction

June –Sept Oct 2014

- **Need dirt? - We've got it!!!**
 - Looking for permitted places to take it next summer
 - Call Dan ASAP @ (206) 263 -6319 or dan.eastman@kingcounty.gov
- **Noise and dust**
 - Heavy equipment, pile driving, trucks
- **Truck Traffic**
 - limited periods, mostly local
- **Temporary Road Closure or limited access**
 - Neal Rd. around project site. Alternate access under consideration
- **Possible Temporary River Closure**
 - No or limited boating , except for critical uses, during rock removal phase

Questions & Discussion

re:

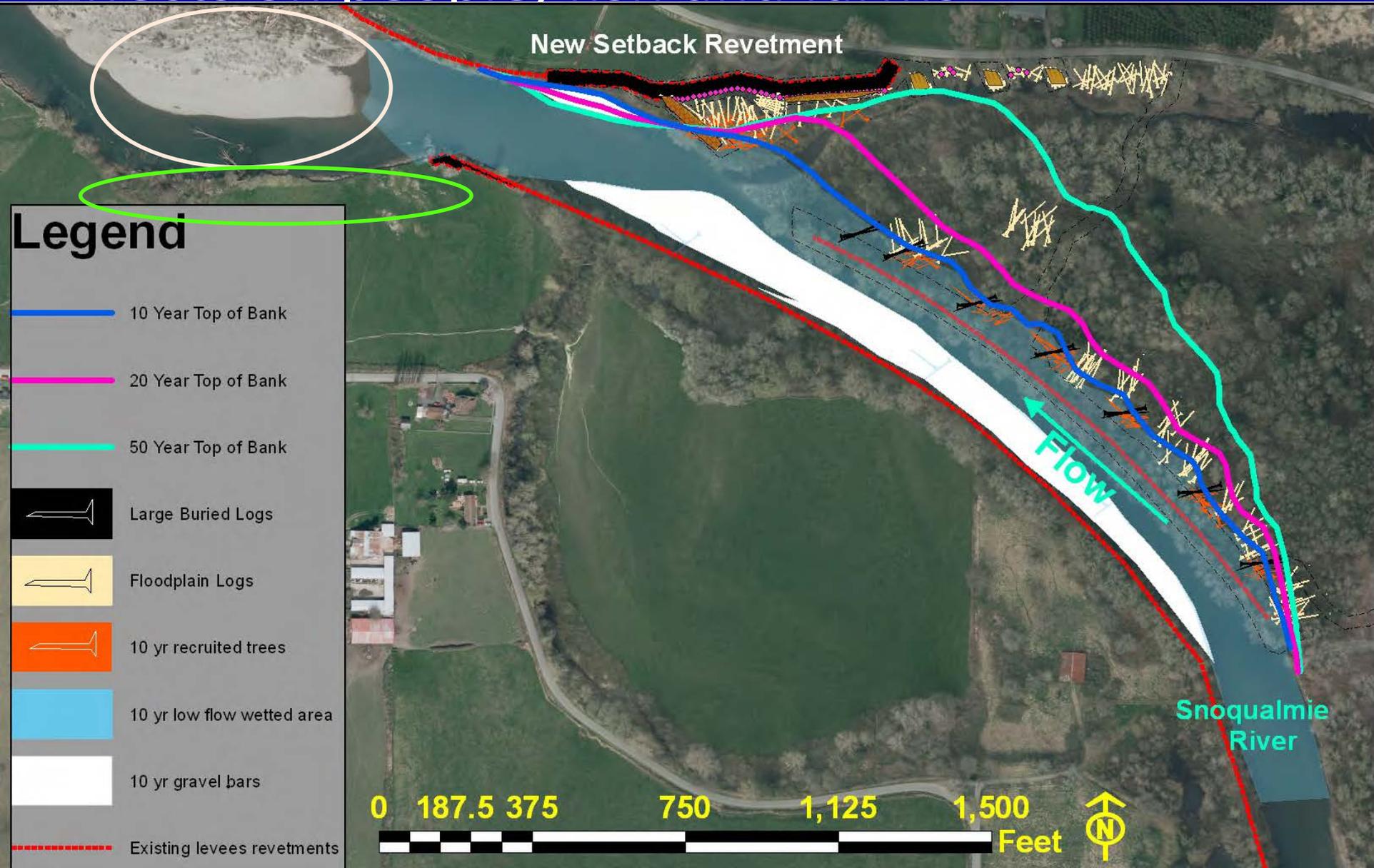
Existing Conditions
and
Proposed Actions

(10 minutes)

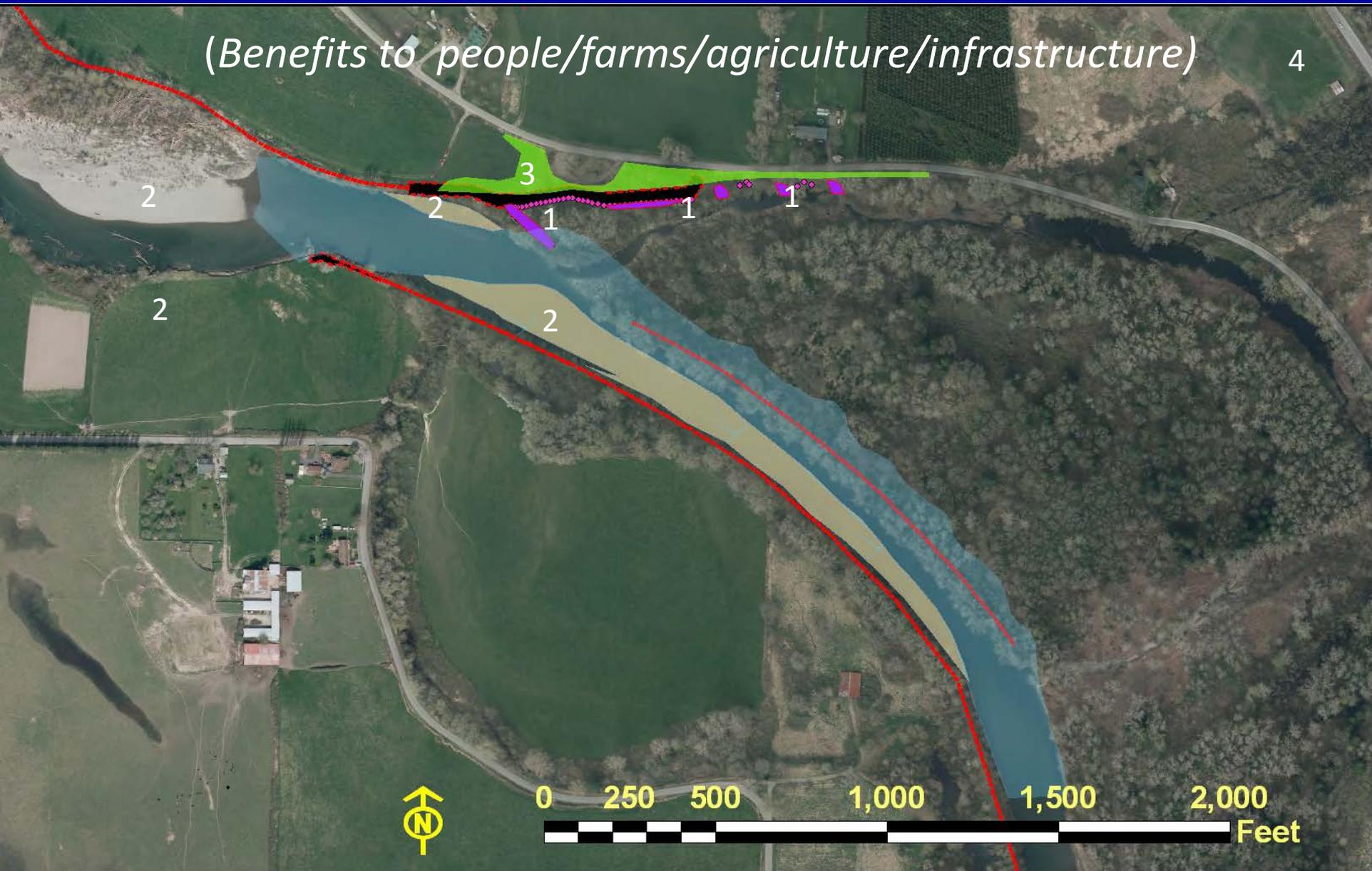
*Please hold questions on
Expected Response and Effects on
people fish and farms for
15 more minutes*

Expected Response and Effects on people, fish and farms

Channel migration & sediment



Effects on people, fish and farms

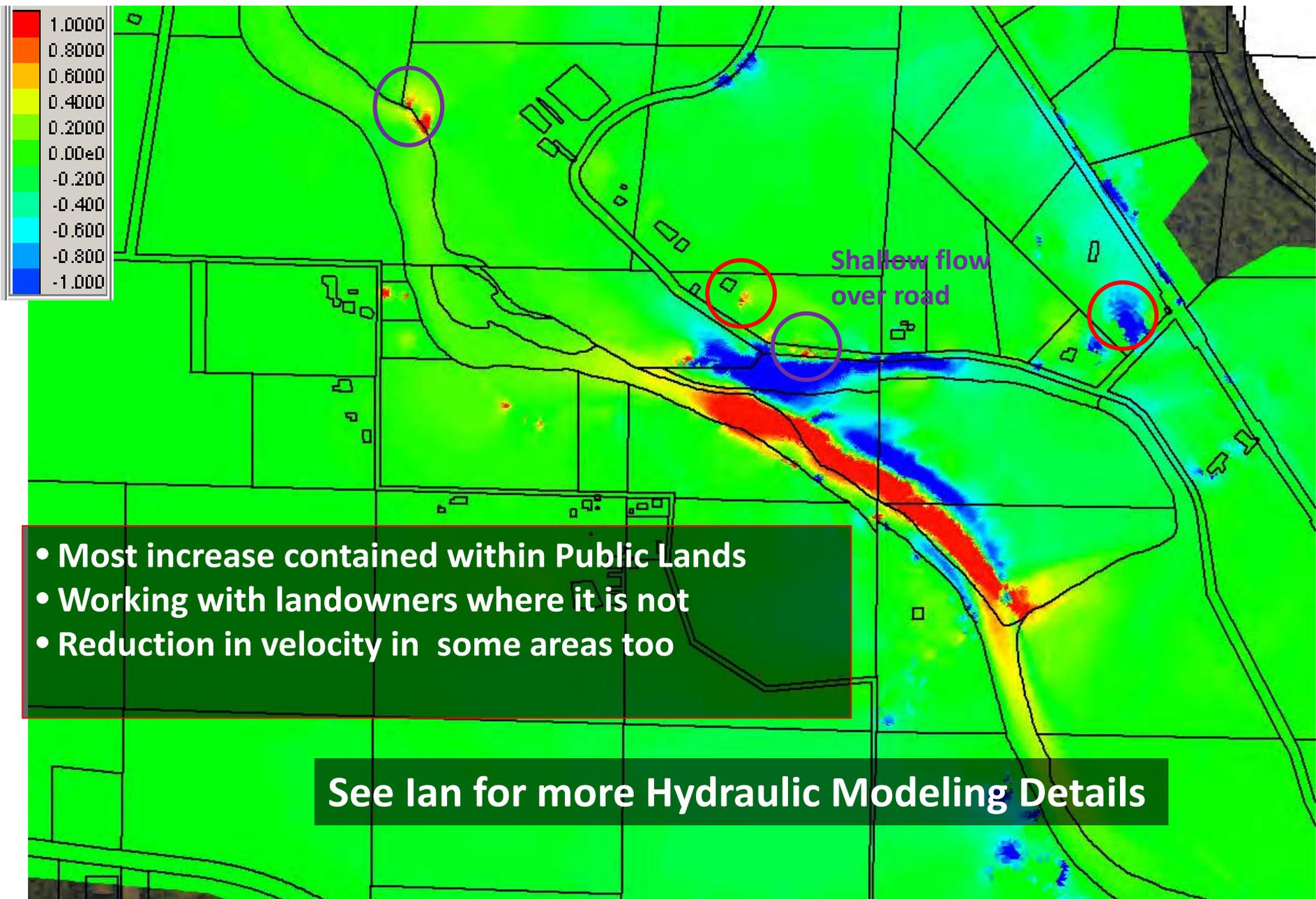


Expected Responses and Effects on people, fish and farms

Hydraulic Changes predicted after levee removal

1. Water Velocity Changes

25-year Velocity Differences (~65,000 cfs = ~Jan 2009 flood)



Expected Responses and Effects on people, fish and farms

Hydraulic Changes predicted after levee removal

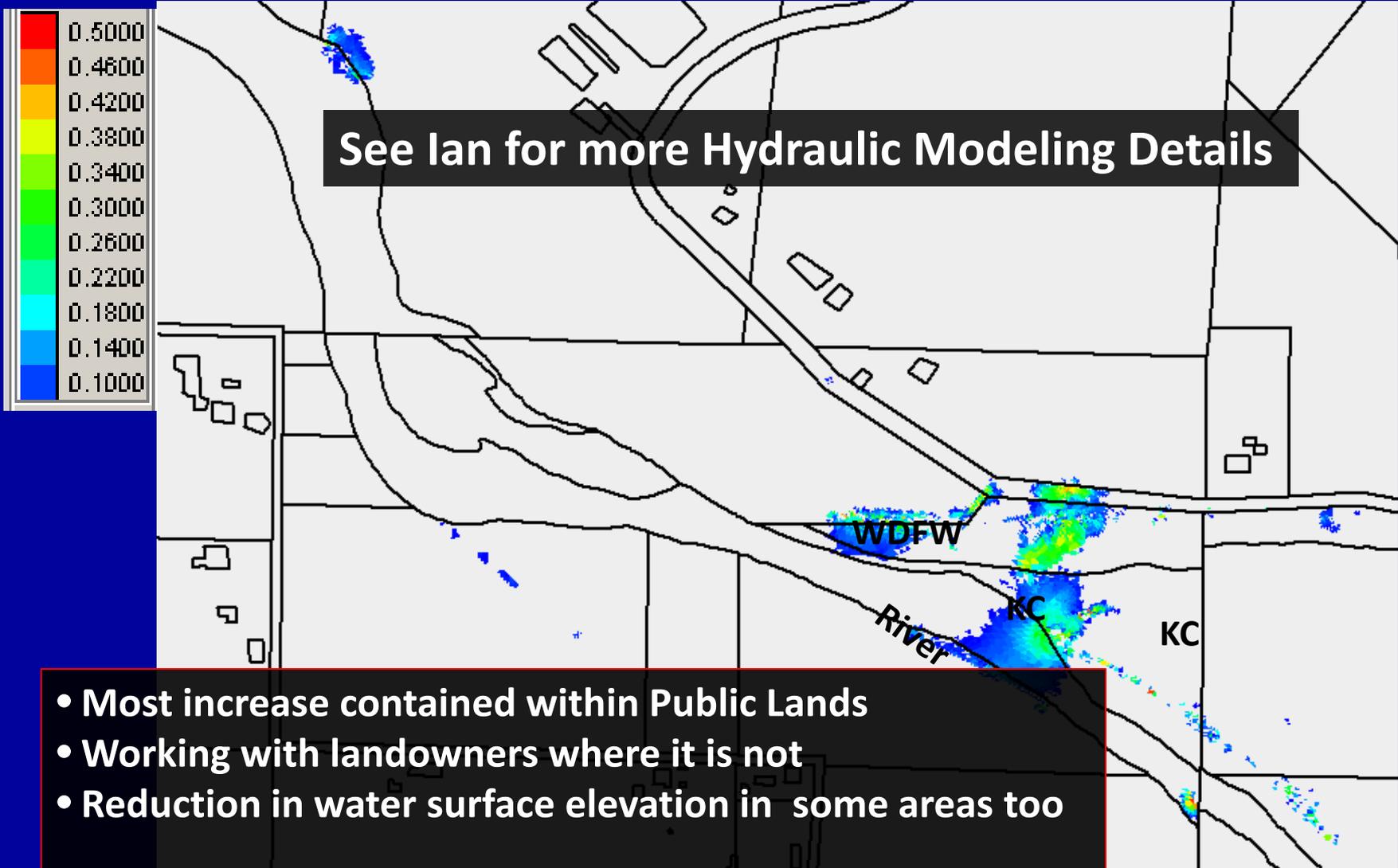
2. Water Surface Elevation Changes

Effects on people, fish and farms

Farms, Infrastructure and Private Property

(Flooding and overbank flow depth and velocity)

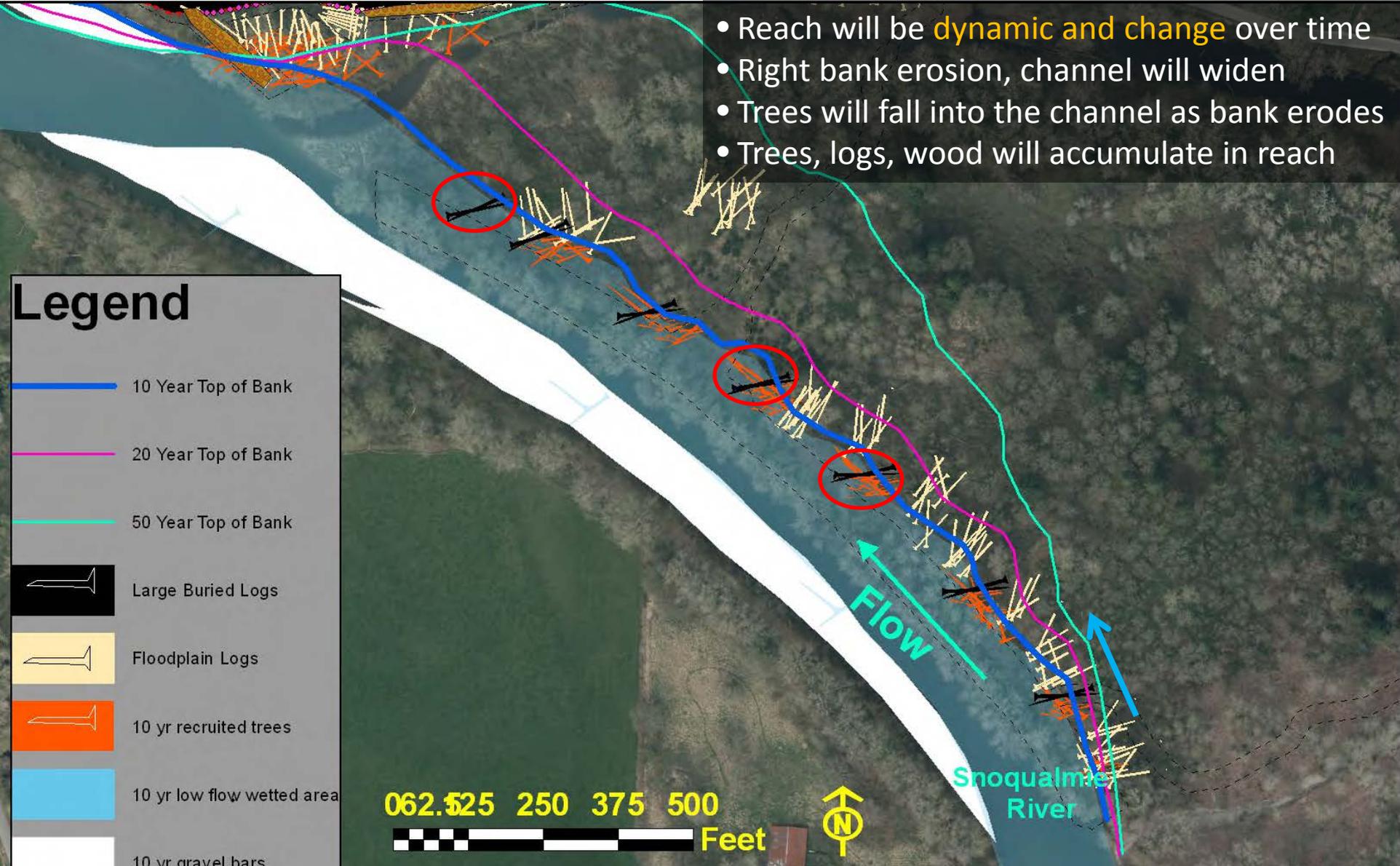
25-year "Observable" Differences in Water Surface Elevation (~65,000 cfs)



Expected Response and Effects on People

Wood Recruitment and Recreational Boaters

- Reach will be **dynamic and change** over time
- Right bank erosion, channel will widen
- Trees will fall into the channel as bank erodes
- Trees, logs, wood will accumulate in reach



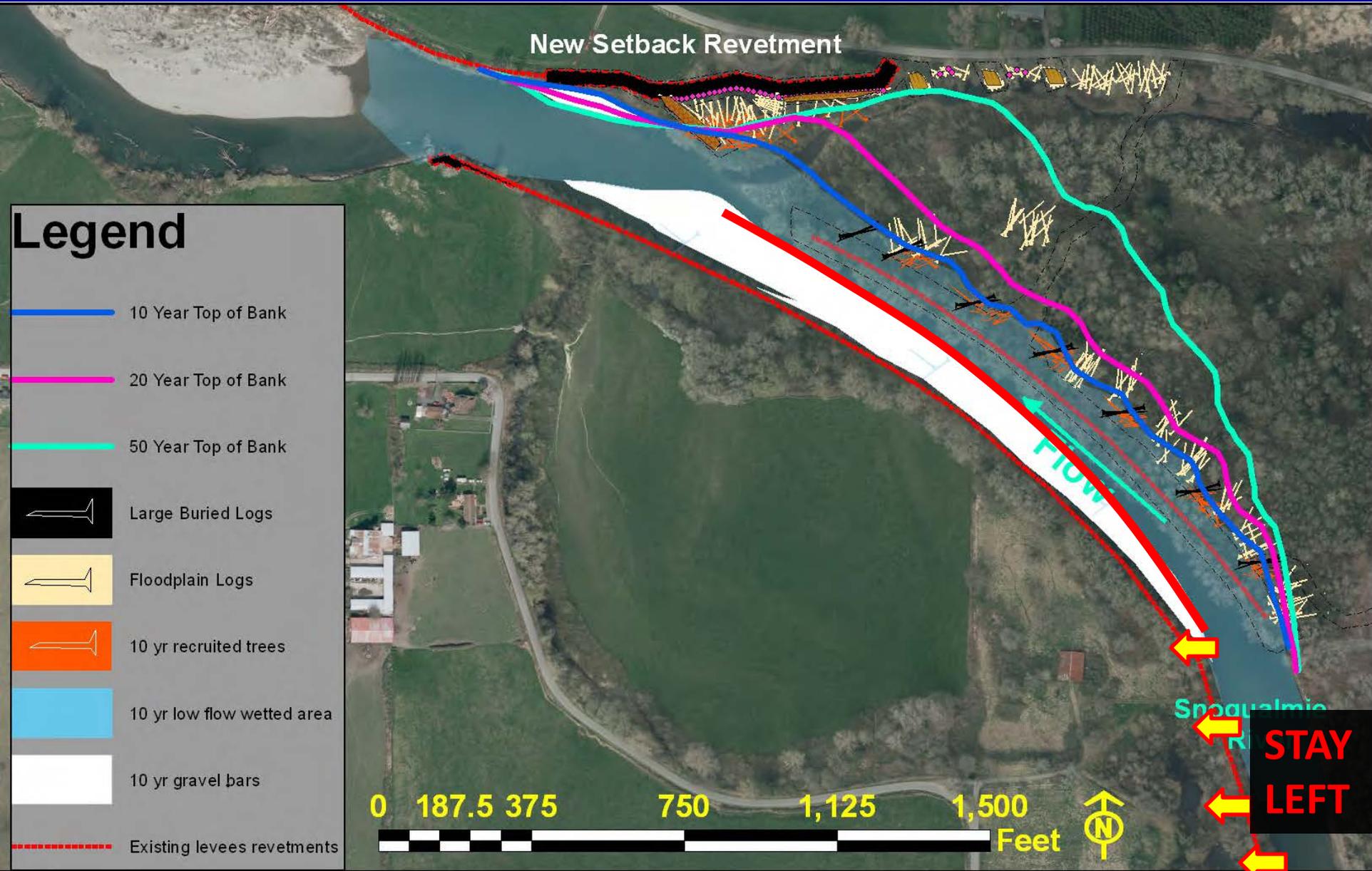
How Will Changes Affect Use

- Additional wood obstacles will likely be present
- Floating/boating may not be advisable under certain flows or conditions
- Reach access may need to be restricted at times based on conditions and skill level of users.
- Signage, education and outreach will be important to manage recreational use.

Best methods TBD by local workgroup

Upper Carlson Floodplain Restoration Project

Signage and Boater access Management – Site Scale



Reducing Risks from wood Site Management

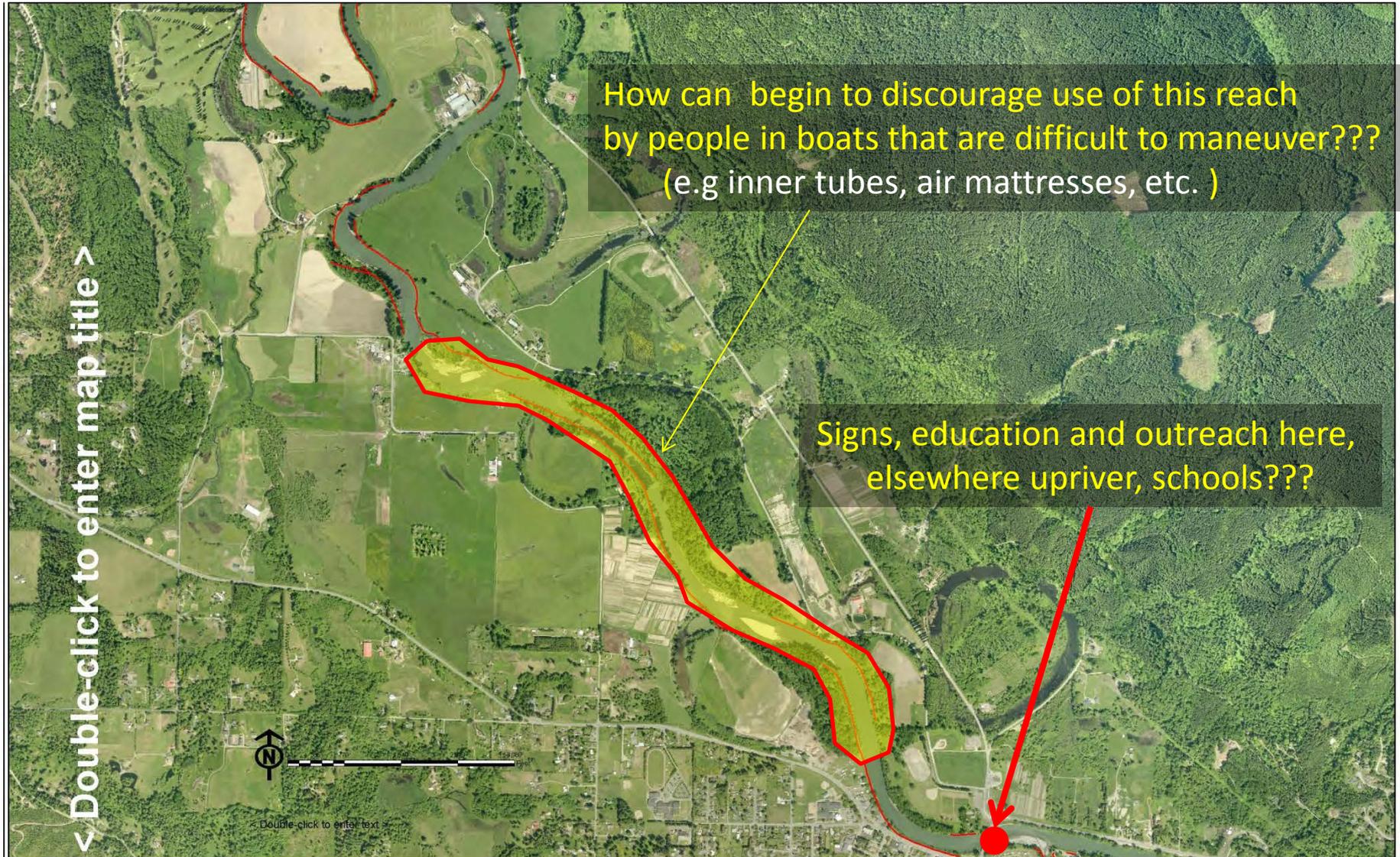
- Warning/Advisory Signs Best methods/locations???
- Improvement and signage towards left bank portage Best methods/location ???
- Extensive public outreach and education Best methods/location ???
- Modification of unacceptable hazards When/how much/sustainable strategy???

Post-Project Adaptive Management plan

- Developed and implemented with extensive input from local workgroup in 2013 and beyond.
- 3 to 4 meetings planned for Sept-Nov. 2013

Snoqualmie at Fall City Corridor Reach

Signage, education, outreach is VERY important



Recreational Boaters – Opportunities for Input

- 2013 recreation use survey – underway
- Input from KC Sheriff and Wave Trek - June
- 2 public meetings - June
- Current Public meeting - **Now**
- 30% checklist and plans online for comment **Now thru Sept**
- Convening recreational workgroup to get further input - **Sept**
- 60% checklist and plans online in October

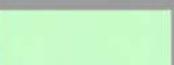


<http://www.kingcounty.gov/environment/watersheds/general-information/large-wood/project-list.aspx>

Effects on people, fish and farms

Habitat and Fish

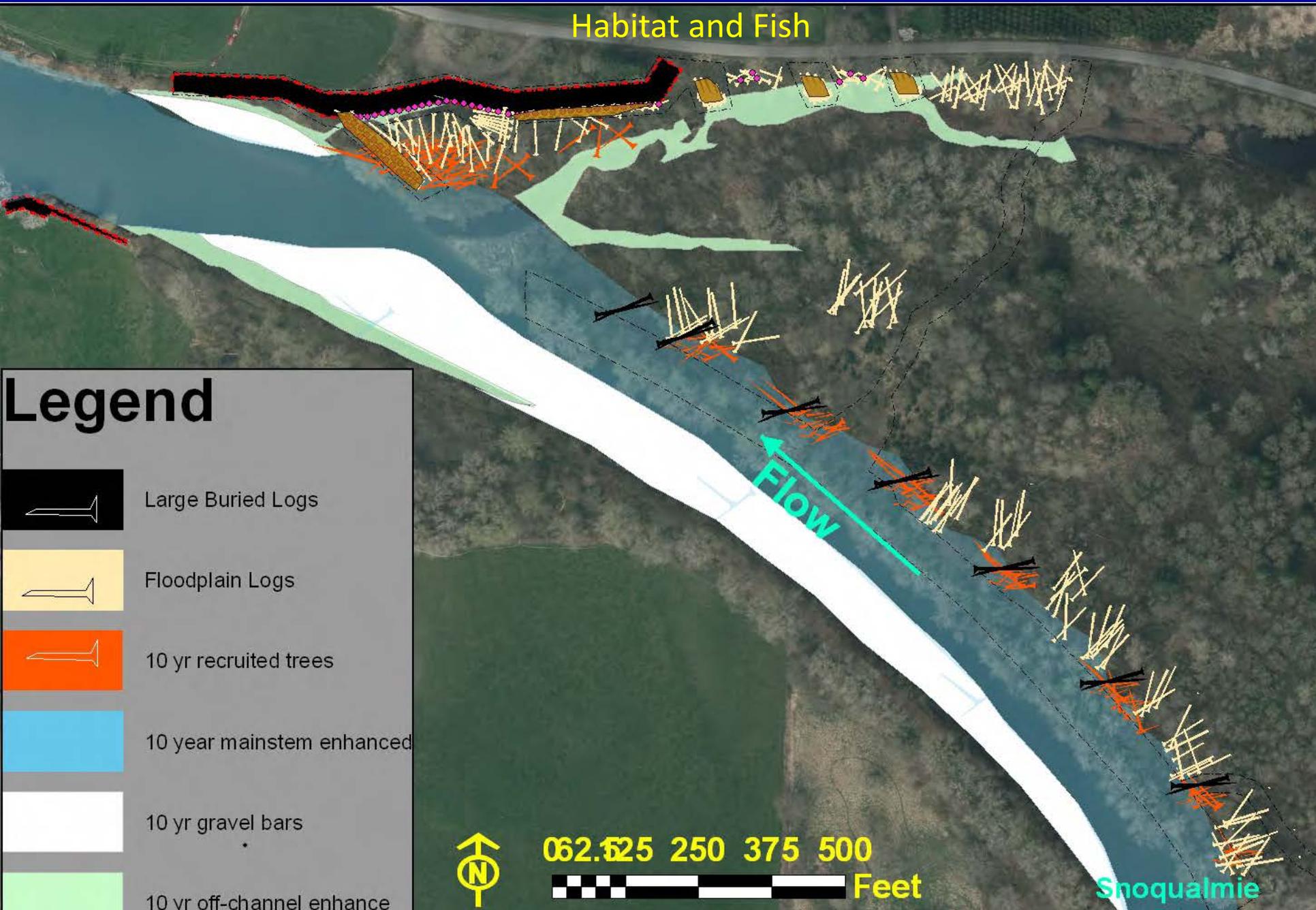
Legend

-  Large Buried Logs
-  Floodplain Logs
-  10 yr recruited trees
-  10 year mainstem enhanced
-  10 yr gravel bars
-  10 yr off-channel enhance



0 62.5 125 250 375 500
Feet

Snoqualmie



And many thanks to our funders who make this all possible....

The Upper Carlson Floodplain Reconnection Project is funded by:

- Cooperative Watershed Management Grant from the King County Flood Control District.
- Washington State Salmon Recovery Funding Board
- Puget Sound Acquisition and Restoration
- The Nature Conservancy from a National Oceanic and Atmospheric Administration (NOAA) grant
- Snoqualmie Tribe grant from the Environmental Protection Agency (EPA)
- Coordinated Investment in Floodplains grant from the WA Department of Ecology (DOE)
- Washington Resource Conservation Office
- King County Department of Natural Resources and Parks

Questions Discussion

Expected Response

and

Effects on People, Farms and fish



The Project Team

King County Design Team

- Diane Concannon – Project Sup.
- Dan Eastman – PM and Fish Bio
- Will Mansfield – Sup engineer
- Todd Hurley – Geologist
- Cindy Young– Landscape ecologist
- Kay Kitamura - CAD

Herrera Consultant Design Team

- Ian Mostrenko – senior engineer
- Brian Scott – PM and engineer
- Todd Prescott – CAD

Other Team Members

- Mary Maier – Basin Steward
- Sally King – RFMS representative
- Claire Dyckman- Agriculture rep.
- Rick Reinlasoder - Agriculture rep.

Thank you for your time !!!

Table Discussions

