Salmon Habitat Protection and Restoration Strategy WRIA 12

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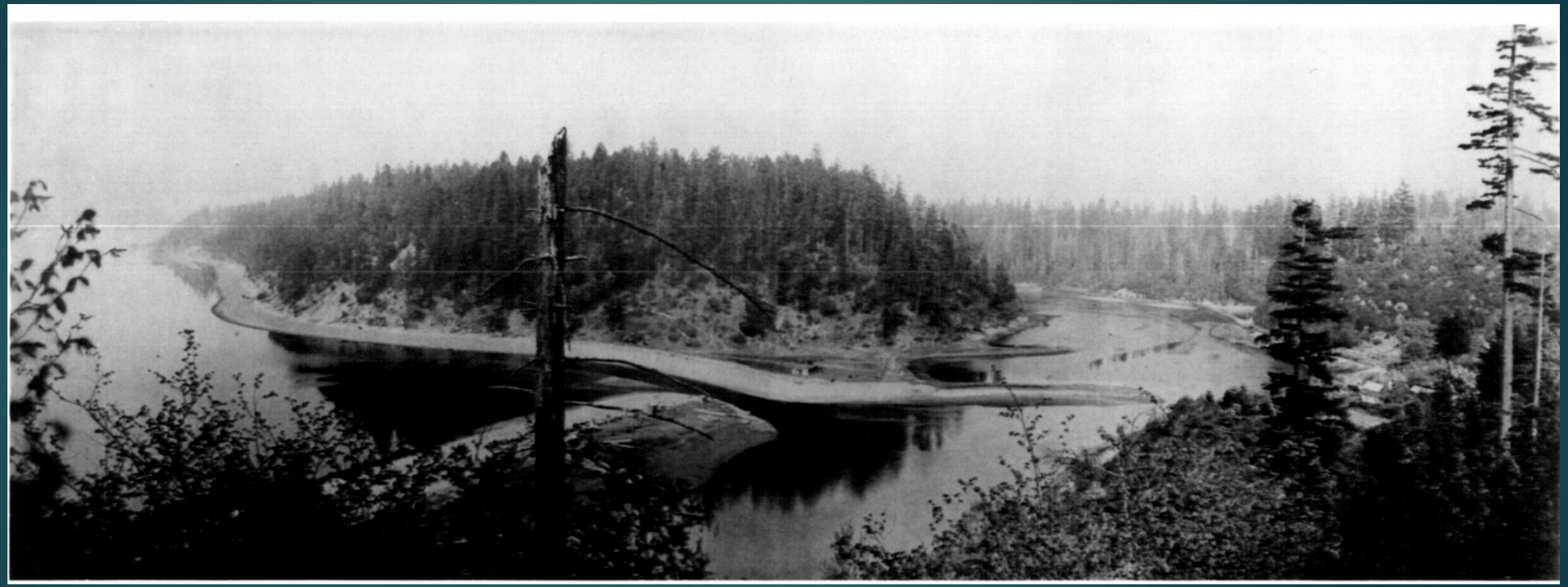
Overview

- WRIA 12 Historic events
- Tribally important fish species and existing fish distribution
- Intro to Chambers Salmon Habitat Protection and Restoration Strategy
- Chambers Watershed Habitat and Implementation Goals
- Projects

Some of WRIA 12's History

Chambers Bay circa 1910



Photos courtesy of Pierce County Public Works

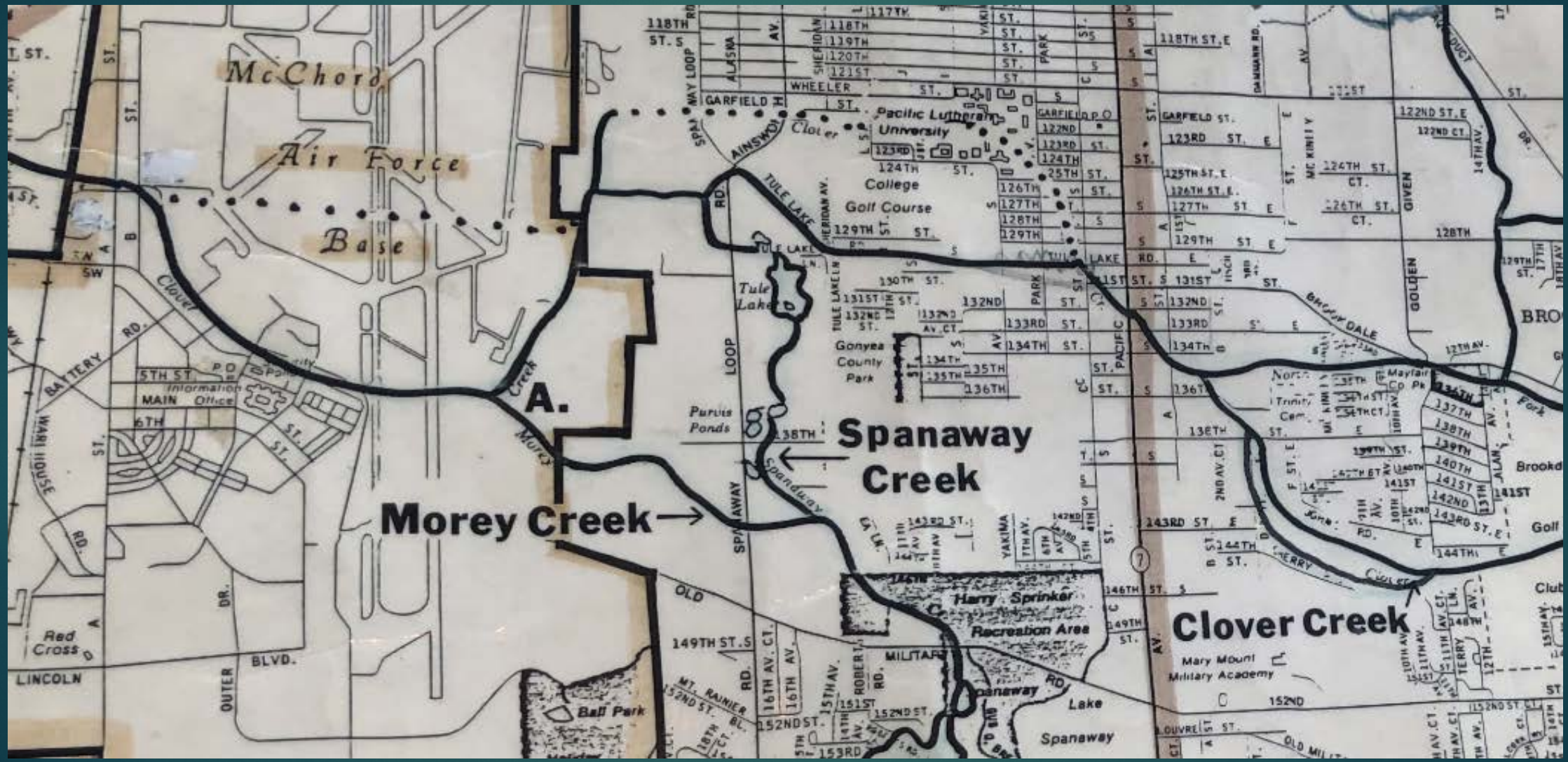
1800's Settlement of Chambers Bay

Cascade Paper Company Mill, 1920 (Abitibi Site)

Cascade Paper Company Mill, 1926 (Abitibi Site)

1853 Andrew Byrd built a dam impounding waters of a low-laying marsh to power his sawmill – this formed Steilacoom lake at the headwaters of Chambers Creek

1880- Ainsworth decided to reroute the stream and move it off his property- much of which was floodplain



1895- one mile of Clover Creek between Golden Given and 138th street was rechanneled into 2 large irrigation canals to provide water for an extensive hop farming operation

Aerial 1. A view of the Clover Creek Reserve looking toward 138th St S and Pacific Ave. Note the two channels of the creek probably created around 1895 for hop farm irrigation. This is the split in the original Clover Creek referred to in the report. Also note the two ponds along the creek in the lower right corner. Photograph by Fred L. Tobiason, April 2002.

- 1940's McChord air force base officially dedicated by federal government- sections of clover creek were extensively dredged, channelized and diked

- 1938-1940- McChord Airfield- sections of clover creek on the base were relocated to allow for construction of runways and other facilities. Rechanneled creek now flows through two 12' diameter culverts under runway for 0.6 miles

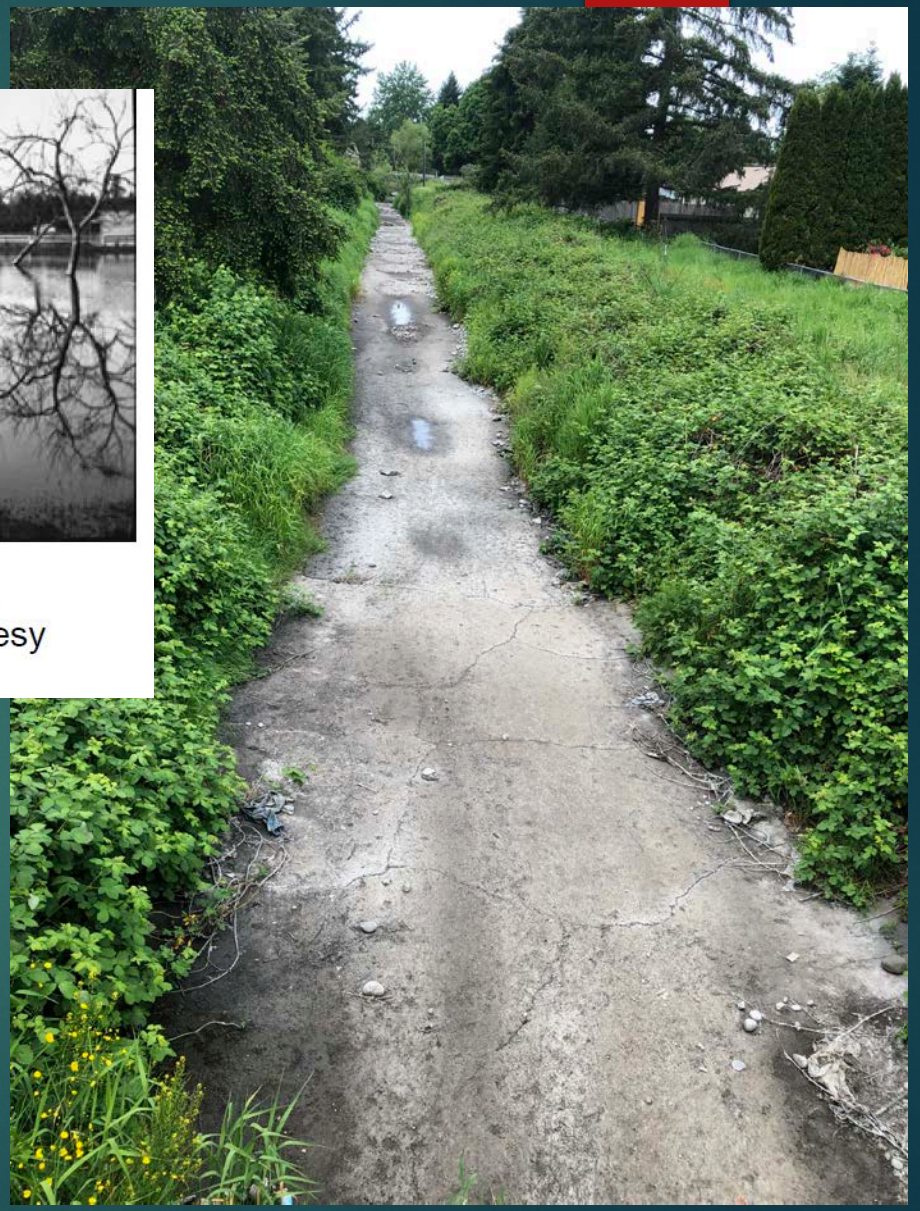
Figure 14. The McChord Airbase channel dredged in 1938 with one of the **two 12-ft diameter culvert pipes, 1400 ft long, rolled into place, courtesy of theTacoma public Library**

Photo credit: Tobiason, 2003

Late 1960's Clover creek was diverted to the overflow channel that had (still has) an asphalt bottom

Figure 1 and Figure 2. Flooding pictures taken near Pacific Lutheran University during the1930's. Clover creek at that time flowed through a riparian line of apple trees planted around 1892. Courtesy of PLU Archives.

Photo credit: Tobiason, 2003



1969- Pierce County increased the width and depth of the Clover Creek Channel and asphalted the streambed from Pacfic Ave S to B St. S

West view along Clover Creek in Parkland, WA near C St S during a Pierce County cleanup, late summer 1973 (photograph by Fred L Tobiason).

Photo credit: Tobiason, 2003

WRIA 12

- Tribally important Fish
- Existing fish distribution in watershed

Figure 13. Ralph Reinke in the fall of 1944 or 1945 holding a 20-inch steelhead and some nice trout caught in Clover Creek between 136th and 138th St S. The last steelhead they remember seeing. Courtesy of Ralph Reinke.

Tobiason, 2003

Tribally Important Fish Species

- Coho

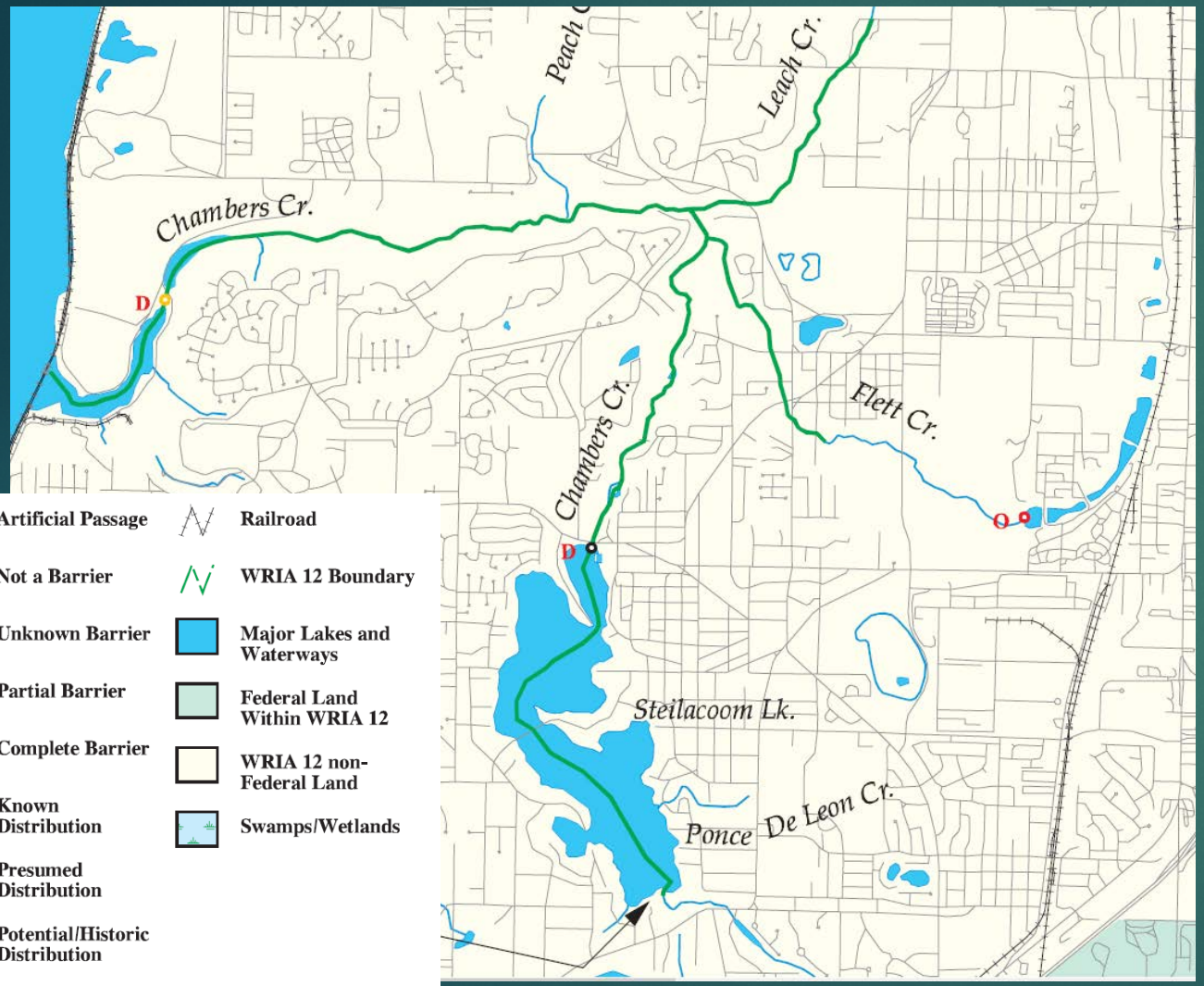
- Chum

The Puyallup Tribe of Indians

Squaxin Island Tribe • People of the Water •

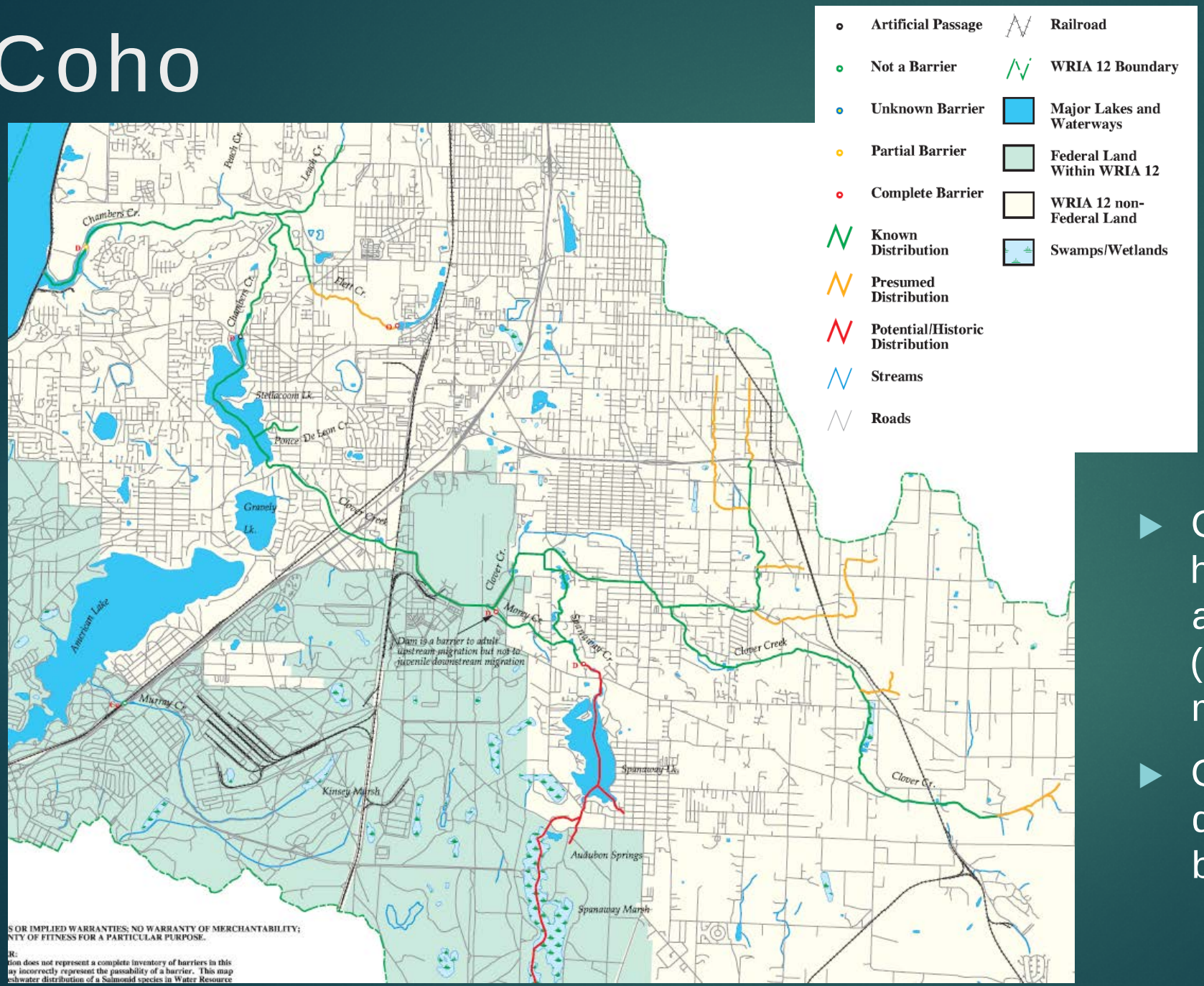
Nisqually Indian Tribe

Chum



- Historically 2 native Chum runs (winter and summer)
- Winter Chum (healthy, 2002)
- Summer Chum fit criteria for extinct stock – last observation was October 1983.
- Most spawning takes place in limited parts of Chambers Creek, Leach Creek and Flett Creek

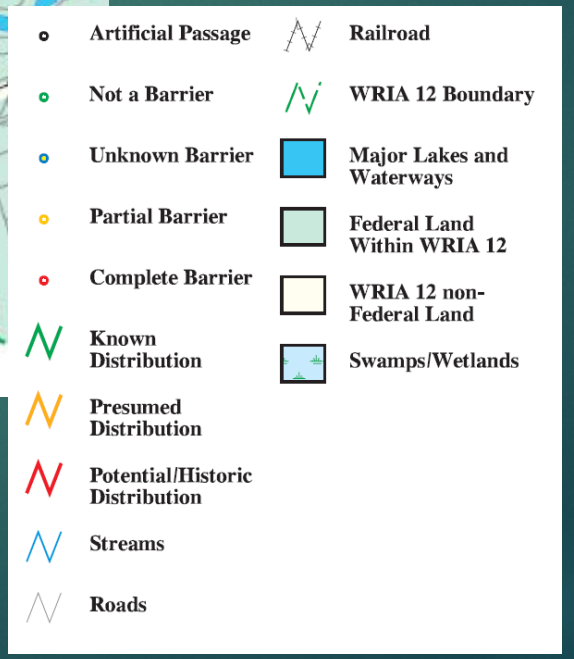
Coho



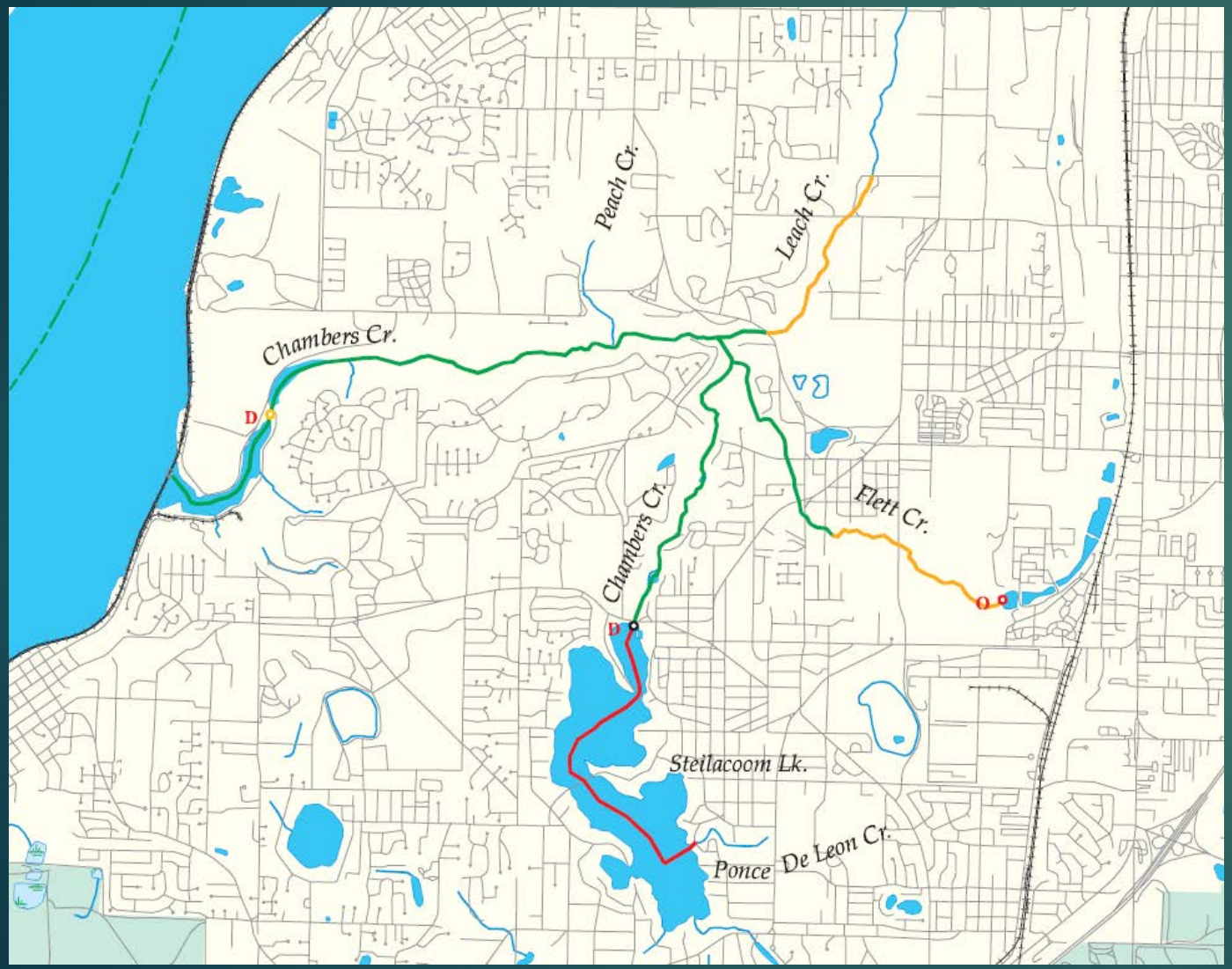
- Coho- considered to be healthy in 90's, then listed as depressed in 2002 (hatchery program ended mid 1990's)
- Observed a severe decline in escapement between 1999-2001

Sequalitchew Creek

- Coho? Spawning and rearing?
- Chum? Use is not determined. 1971 juvenile chum were observed in lower several hundred feet of creek



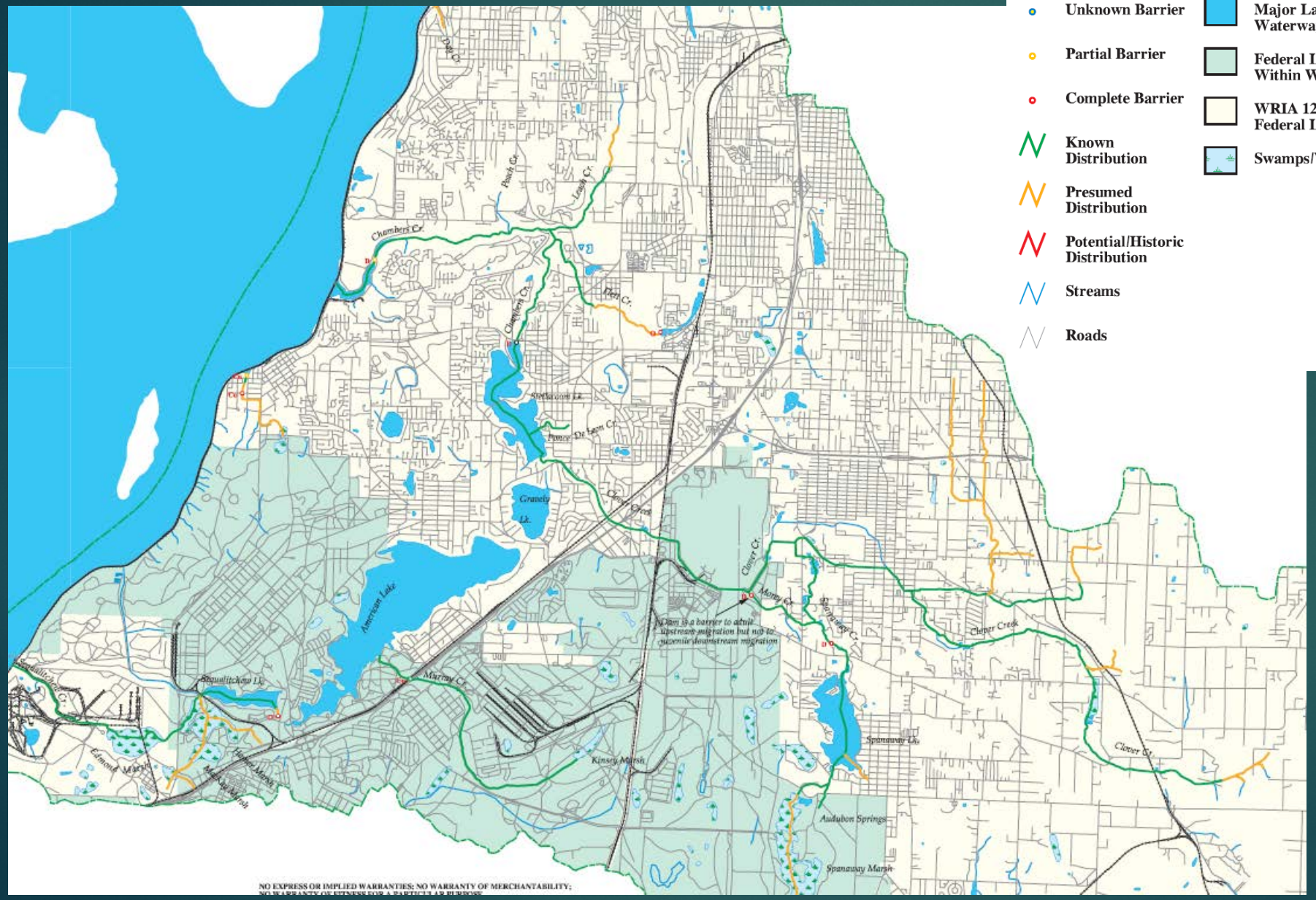
Steelhead



- Winter Steelhead (threatened)- only a handful of steelhead have been observed over the last few years

Artificial Passage	Railroad
Not a Barrier	WRIA 12 Boundary
Unknown Barrier	Major Lakes and Waterways
Partial Barrier	Federal Land Within WRIA 12
Complete Barrier	WRIA 12 non-Federal Land
Known Distribution	Swamps/Wetlands
Presumed Distribution	
Potential/Historic Distribution	
Streams	
Roads	

Cutthroat Trout



- Status?

Puyallup and Chambers Watersheds Salmon Recovery Lead Entity

Established by RCW Chapter 77.85.050 –Salmon Recovery- Effective date—1999

RCW Chapter 77.85.050-sp.s. c 13: "This act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing public institutions, and takes effect July 1, 1999."

(1)(a) **Counties, cities, and tribal governments must jointly designate, by resolution or by letters of support, the area for which a habitat project list is to be developed and the lead entity that is to be responsible for submitting the habitat project list.** No project included on a habitat project list shall be considered mandatory in nature and no private landowner may be forced or coerced into participation in any respect. The lead entity may be a county, city, conservation district, special district, tribal government, regional recovery organization, or other entity.

- **WRIA 10 & 12 Lead Entity = Pierce County**
- WRIA 11 Lead Entity = Nisqually Tribe
- WRIA 15 Lead Entity = Kitsap County

Puyallup and Chambers Watersheds Salmon Recovery Lead Entity

77.85.050 b)

The lead entity shall establish a committee (Citizens Advisory Committee – CAC) that consists of representative interests of counties, cities, conservation districts, tribes, environmental groups, business interests, landowners, citizens, volunteer groups, regional fish enhancement groups, and other habitat interests.

Lead Entity Core Functions

- Administer Grant Rounds for:
  - Salmon Recovery Funding Board (RCO)
  - State and Federal (PCSRF) funds;
  - Puget Sound Acquisition and Restoration (RCO and PSP) State funding ;
  - King County Cooperative Watershed Management (King County Flood Control Zone District);
  - PSAR Capacity Funds -Small grants –future project development.
- Salmon Habitat Protection & Restoration **Strategy**
- Monitoring and Adaptive Management of PS Chinook Recovery Plan Chapters(Next Steps are EDT Update and Monitoring Plan)
- Four Year Work Plans - to implement the Strategy
- Technical Support
- Habitat Work Schedule

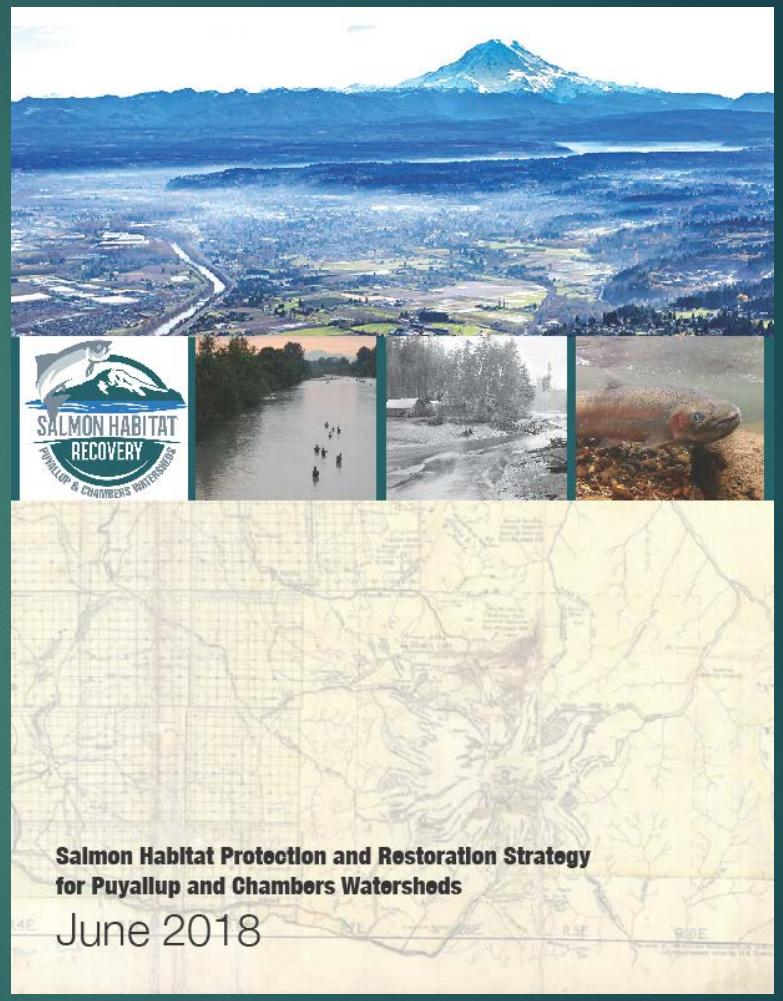
Recovery Plan Legislation

- ESHB 2496 – 1998 established GSRO; State of the Salmon reporting; Regional Councils; HWS; science panel.
- 1999 –Puget Sound Chinook salmon listed as threatened
- 2005, Shared Strategy for Puget Sound presented the Puget Sound Chinook Recovery Plan to NMFS.
    - collaborative initiative that began in 1999- included reps from Federal, state, Tribal, and local governments, business, the agriculture and forestry industries, conservation and environmental groups, and local watershed planning groups.
    - "(B)uild a scientifically robust, practical, cost-effective recovery plan by June 2005 that defines the strategies and actions necessary to recover naturally spawning Chinook salmon, bull trout and Hood Canal summer chum to self-sustaining and harvestable levels within the context of a prosperous economy and sustainable growth (Volume I, Chapter 1)."
    - Puget Sound Chinook Recovery Plan also has Watershed Chapters – Tom Kantz was originally hired by PC to do the EDT modeling that provides the basis for ours in WRIA's 10/12. Model update underway now.

What is the Strategy?

The Salmon Habitat Protection and Restoration Strategy helps guide the ranking of projects for the SRFB/PSAR grant rounds. These projects must benefit ESA-listed species or result in a benefit to tribally important species and have a high cost-benefit.

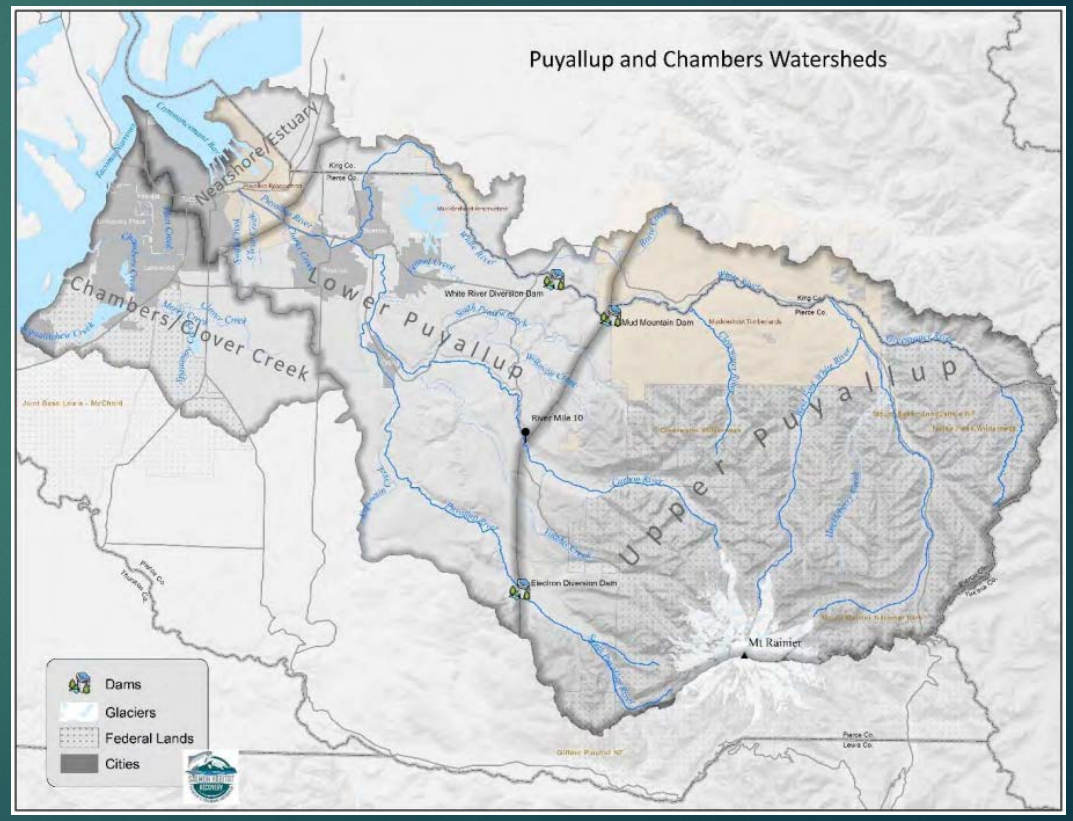
Our work covers just one of the 4 “H” ’s of salmon recovery, Habitat. Two other “H”’s , harvest and hatchery are managed by the tribes and Washington State Department of Fish and Wildlife, the third “H” being hydropower.



What is the Strategy?

- Identify priorities and strategies for protection & restoration of salmon habitat in the watershed.
- Developed by the Puyallup and Chambers Watersheds Salmon Recovery Lead Entity
  - Citizens Advisory Committee
  - Technical Advisory Group

- Information Sources included the following:
  - Limiting Factors Analysis for WRIAs 10 & 12
  - Puyallup Tribe Habitat Surveys
  - Ecosystem Diagnosis and Treatment (EDT) Modeling
  - PCD/WDFW Barrier Inventories
  - Commencement Bay habitat studies
  - WRIA 12 Nearshore Habitat Assessment
  - All “H” Analyzer (AHA) Modeling
  - Puget Sound Chinook Monitoring and Adaptive Management Phase I



Habitat Goals –Chamber's Watershed

Established as part of our adaptive management in 2017

50-Year Habitat Goals
2,553 acres (including estuary and nearshore areas) is protected from development within the Core Salmon Habitat and Flood Zone Protection Corridor by 2067.
1,880 acres of functioning riparian buffer, with a width equal to or greater than one site-potential tree height, is protected in the Riparian Buffer Zone by 2067.
30 stream miles open to fish movement and passage by 2067.
Hydrologic regime is restored in Clover Creek by 2067.
10-Year Implementation Goals
A major physical barrier to fish movement and migration removed by 2027.
182 acres of estuary and nearshore habitat is restored by 2027.
Ten percent increase in functioning riparian buffer habitat by 2027.

How will we achieve our goals?

Through implementing the following strategies:

- Reconnect mainstem river channels to their floodplains
- **Restore habitat in highly productive tributaries and mainstem areas**
- **Restore and maintain hydrologic regime**

Photo credit: NSD

- **Protect Highly Productive Tributary and Mainstem Areas**
- **Remove Physical Barriers to Fish Movement and Migration**
- **Restore Estuarine Habitats**
- **Restore Nearshore Areas**
- Improve Water Quality
- Coordinate Regulatory and Incentive Programs
- Develop and Implement Salmon-Safe Farming Practices
- Conduct Outreach and Education

Projects

What is going on in the watershed?

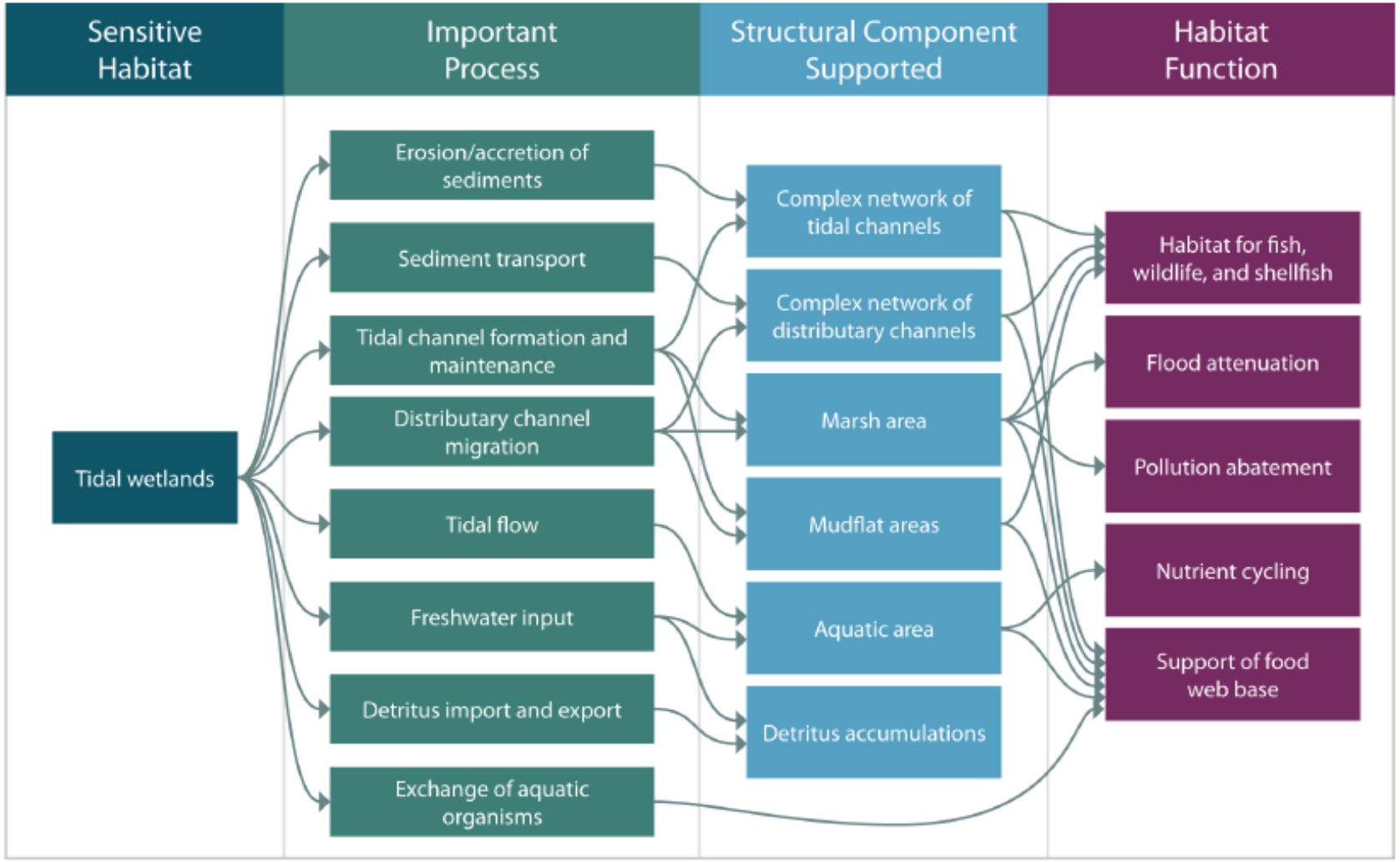
Chambers Bay Dam Removal

Chambers Dam: Fish Passage

Delayed upstream adult fish migration, increased predation, poor juvenile downstream passage and reduced survival

Fish ladder not functioning properly

Conceptual Model of the Nearshore Processes, Structure, and Habitat Functions Associated with Coastal Embayments



Source: Schlenger et al. 2011

Coastal embayment's support several nearshore processes that create and sustain multiple habitat structural features, which in turn provide several habitat functions

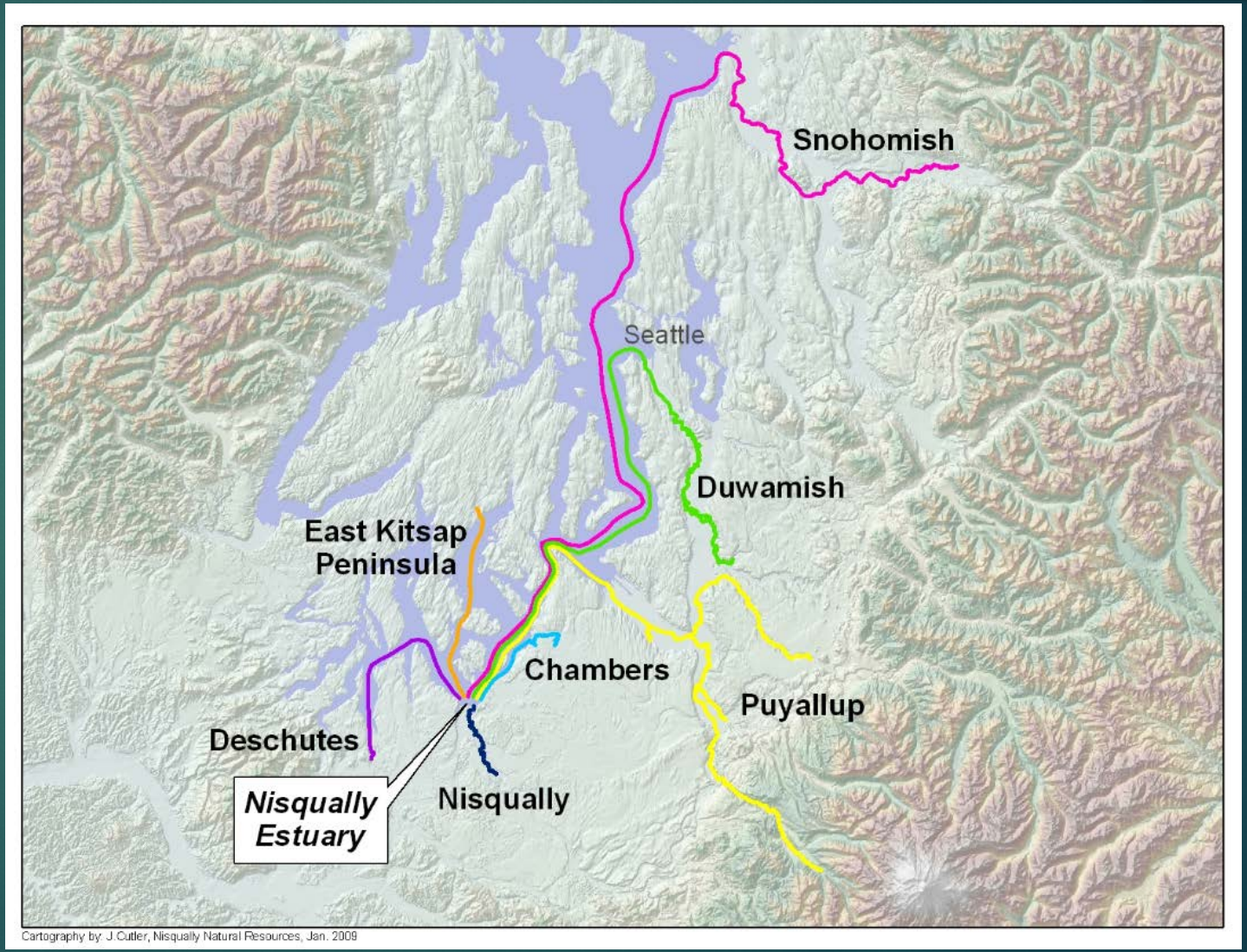
Removal of the dam and restoration of the estuary will restore tidal and estuarine processes, providing approximately a 40% increase in habitat, more diversity of habitat, and more prey for priority salmon species

Chambers Creek Dam Removal and Estuary Restoration – Benefits to Fish

Chambers Bay provides important rearing habitat for all Puget Sound Salmon

Chambers bay is the largest coastal embayment along the ~40 miles of shoreline between Nisqually River and Puyallup River

Restoring nearshore habitat has been identified as a critical component in the recovery of Puget Sound ecosystem



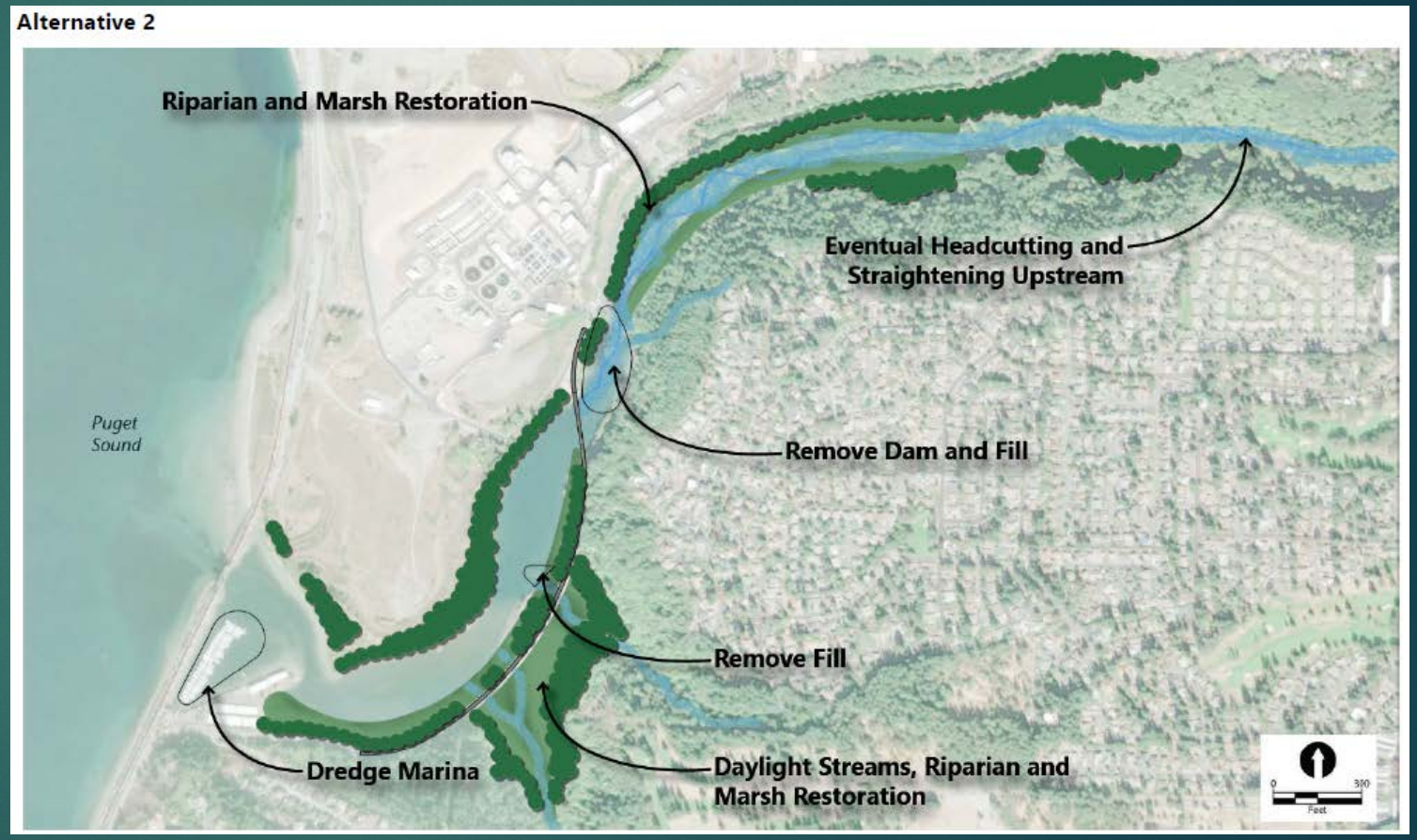
Estimated migration routes of juvenile salmon based upon coded wire tag studies.

Chambers Creek Dam Removal Feasibility Study

The feasibility study was completed in March 2019.

Many project elements still need to be resolved.

The project remains a high priority and project partners plan to continue to work through additional feasibility and conceptual design efforts.



Additional information can be found at:
https://forterra.org/subpage/chambers-creek-dam

Restoring nearshore areas- Titlow

The Titlow Estuary Restoration project embodies a location where natural processes have been degraded by a myriad of management actions, yet the site offers a suite of ecological services that are rare on the local landscape.

Tacoma Public Library

Google Earth

Historically, Titlow Lagoon was a productive estuary surrounded by salt marsh and forested wetlands. Over the years, people have dramatically altered the lagoon and its surroundings in the name of development. The outlet to the lagoon has been blocked by a tide gate beneath the railroad tracks that limits fish passage, sediment transport, and tidal flow. Much of the wetland area has been filled, and most of the shoreline vegetation has been removed.

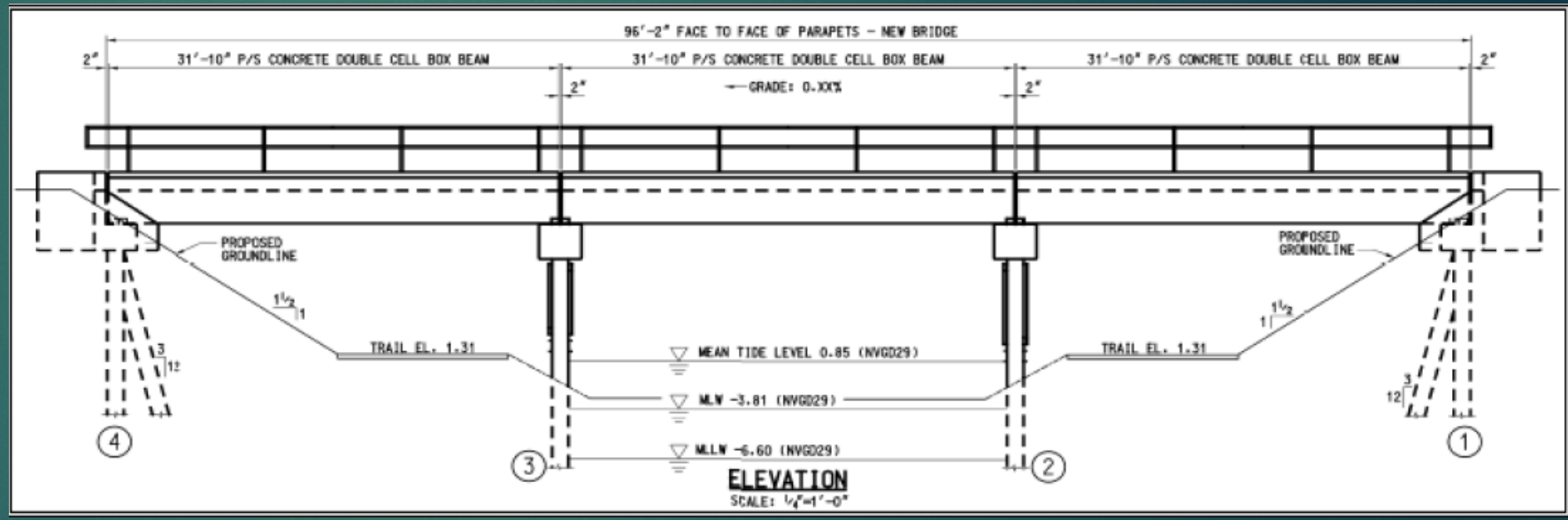
Fish


Marked and Unmarked Chinook and
Coho up against the rail prism at the
Titlow Lagoon culvert May 24, 2018

High velocity water through the culvert limits fish passage at high tide

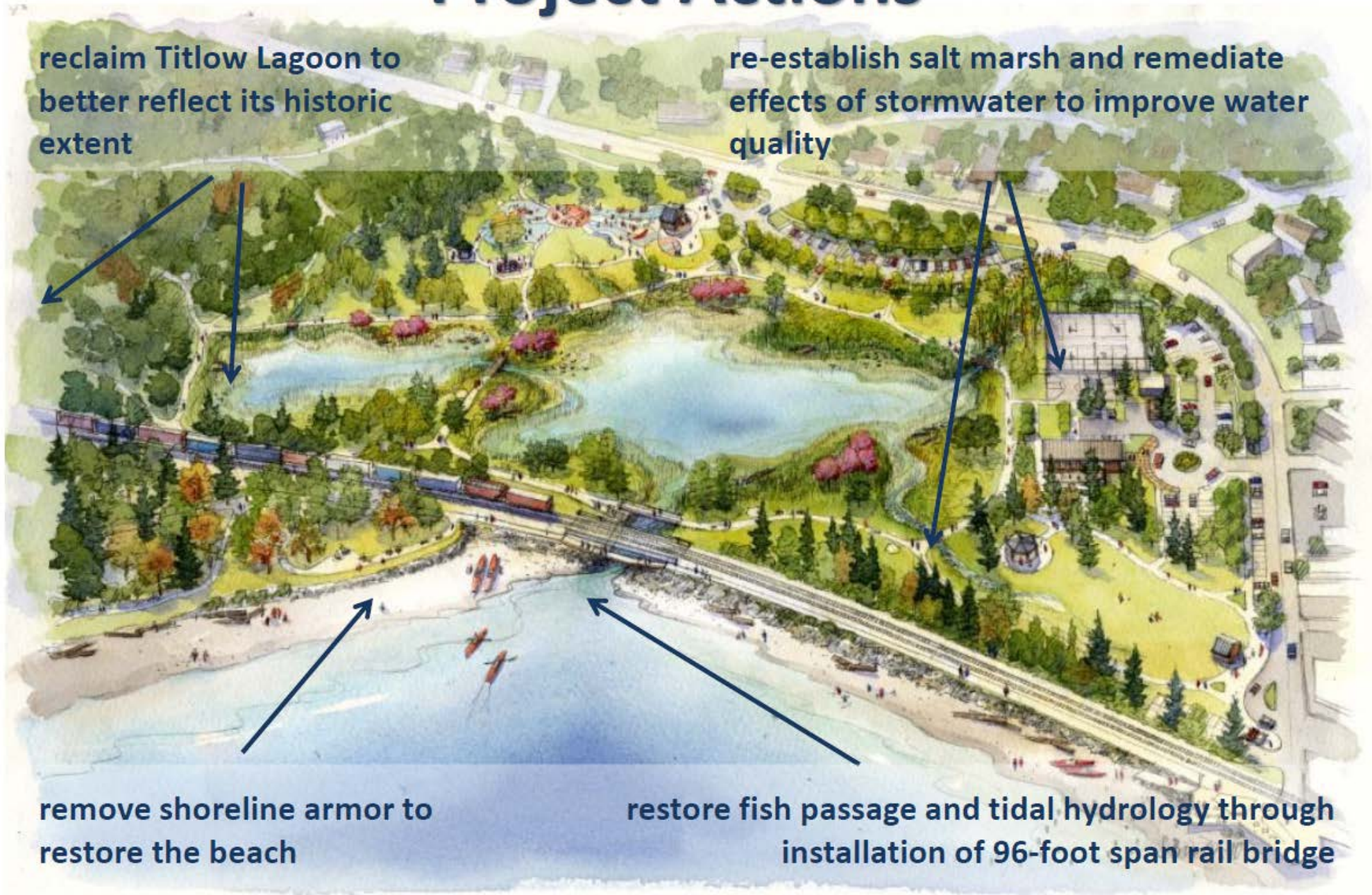
A hydraulic head (whirlpool effect) limits fish passage at high tides

A 3-foot wide by 100-foot long culvert under the railroad limits fish passage into Titlow Lagoon, bisects the park and disconnects the uplands from the shoreline



To restore fish passage and tidal flow- project partners are proposing installation of a 96-foot span rail bridges and associated improvements to pedestrian bridges

Project Actions



Titlow Lagoon Restoration- Timeline

Progress and Projections

Task	Cost	Funding	Timing
Feasibility Study	$92K	SRFB, ESRP, NFWF, NOAA	2010
BNSF Rail Bridge TS&L Study	$60K	ESRP-NEP	2015
Shoreline (Kay's House) Restoration Design and Construction	$627K	ESRP-NEP- Metro Parks	2015
Titlow Lagoon Restoration Design	$35K	ESRP-NEP	2015
Shoreline (Kay's House) Restoration Design and Construction	$627K	ESRP-NEP- Metro Parks	2017
Rail Geotechnical Investigation	$129K	ESRP	2018
Coastal Flooding Analysis and Lagoon Design Alternatives	$38K	BNSF Foundation and Metro Parks	2019
Lagoon Final Design and Permits	$150K	SRFB	2020-21
Bridge Final Deign and Permits	$700K	Transportation Request	2020-21
Coastal Resiliency Final Design and Permits	$300k	Transportation Request	2020-21
Bridge Construction	$5.5M	Future	2022-25
Lagoon Restoration	$2.3M	Future	2022-25

For more information contact:

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360.561.1715
Kristinw@spsseg.org

Protect and Restore Habitat in Highly Productive Tributary and Mainstem Areas

An evaluation of physical habitat within Chambers Creek to identify potential habitat deficiencies and guide restoration recommendations.

A combination of field surveys and remote sensing data (LiDAR) were used to evaluate habitat conditions.

Topobathymetric LiDAR was flown December 2018 by Quantum Geospatial, and field surveys were conducted in fall and early winter 2018/2019

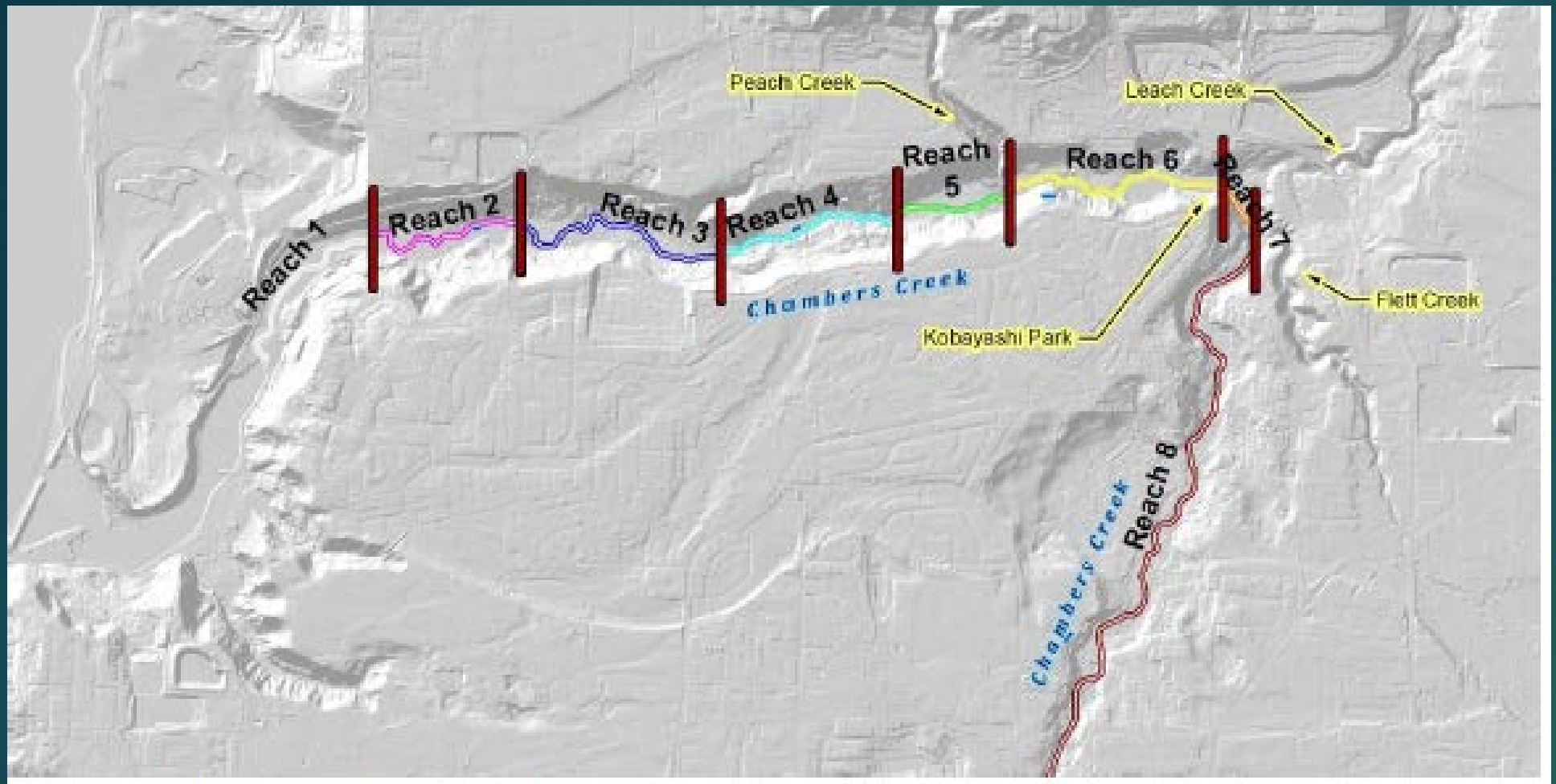


Figure 7 Map of Chambers Creek geomorphic reaches.

Habitat unit typing

Pools
Depths
Formation
Fish cover
Embeddedness
Side channels
Large wood and log jams
Substrate
Riparian vegetation
Invasive species
Adult spawning activity

Field work for Chambers Creek Habitat Assessment conducted on reaches 1-6 (3 miles of the stream, floodplain and riparian habitat behind the Chambers Bay Dam)

Survey conducted over 3.5 days (October 2018 and January 2019)

Habitat Conditions Summary

REACH	DIRECT CHANNEL ALTERATIONS	INSTREAM POOLS	INSTREAM WOOD	RIPARIAN CONDITION
1	Sediment impounded by dam	Pool quality and frequency below targets	Instream wood well below desired target, long term wood recruitment threatened by invasive vegetation	Lack of trees, reed canary grass prevalent
2	Sediment impounded by dam	Pool quality and frequency below targets	Instream wood well below desired target, long term wood recruitment threatened by invasive vegetation	Lack of trees, reed canary grass prevalent
6	Riprap armoring on both sides of the channel in upper half of reach	Pool quality and frequency below targets	Instream wood moderately below target, long term wood recruitment threatened by invasive vegetation	Intact riparian vegetation and good canopy cover, long term health threatened by invasive vegetation

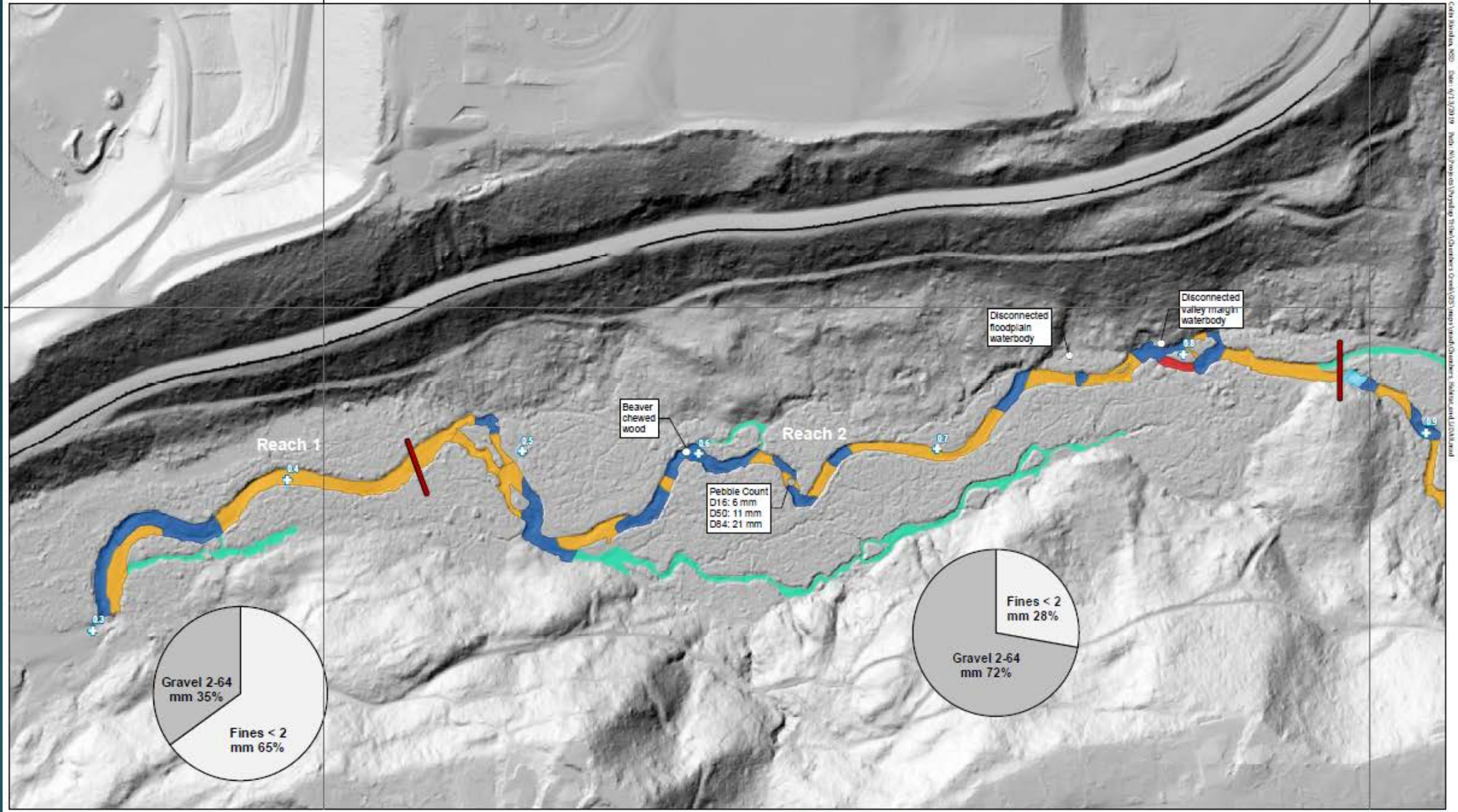
Habitat conditions were evaluated using the Matrix of Pathways indicators published by the National Marine Fisheries Service to determine if they are properly functioning or not.

REACH	DIRECT CHANNEL ALTERATIONS	INSTREAM POOLS	INSTREAM WOOD	RIPARIAN CONDITION
3	None	Pool frequency slightly below target, existing pools are high quality	Instream wood moderately below target, long term wood recruitment threatened by invasive vegetation	Intact riparian vegetation and good canopy cover, long term health threatened by invasive vegetation
4	None	Pool frequency and quality at target, but at risk due to long term threat to wood loading	Instream wood moderately below target, long term wood recruitment threatened by invasive vegetation	Intact riparian vegetation and good canopy cover, long term health threatened by invasive vegetation
5	None	Pool frequency slightly below target, existing pools are high quality	Instream wood above target, but long term recruitment threatened by invasive vegetation	Intact riparian vegetation and good canopy cover, long term health threatened by invasive vegetation

Limiting factors identified focused on:

- Direct channel alterations
- Significantly reduced wood presence and density and negative trajectory for future loading
- Loss of riparian forest and weed infestation
- Blockage to fish passage at the dam

Results: Reach 1 &2



Chambers Creek Evaluation

Existing Conditions Habitat - Reaches 1 and 2

Habitat survey conducted on 10/29-10/30/2018 and 1/15-1/16/2019.
Seep observations only collected from RM 1.75 to 2.75
Aerial Imagery Source: 2018 Google Earth
River miles calculated from centerline field verified by NSD (2018).
Topographic data: 2018 LIDAR

0 200 400 Feet

Lambert conformal conic projection, NAD 1983
State Plane Coordinate System (WA South Zone)

Channel Unit Type

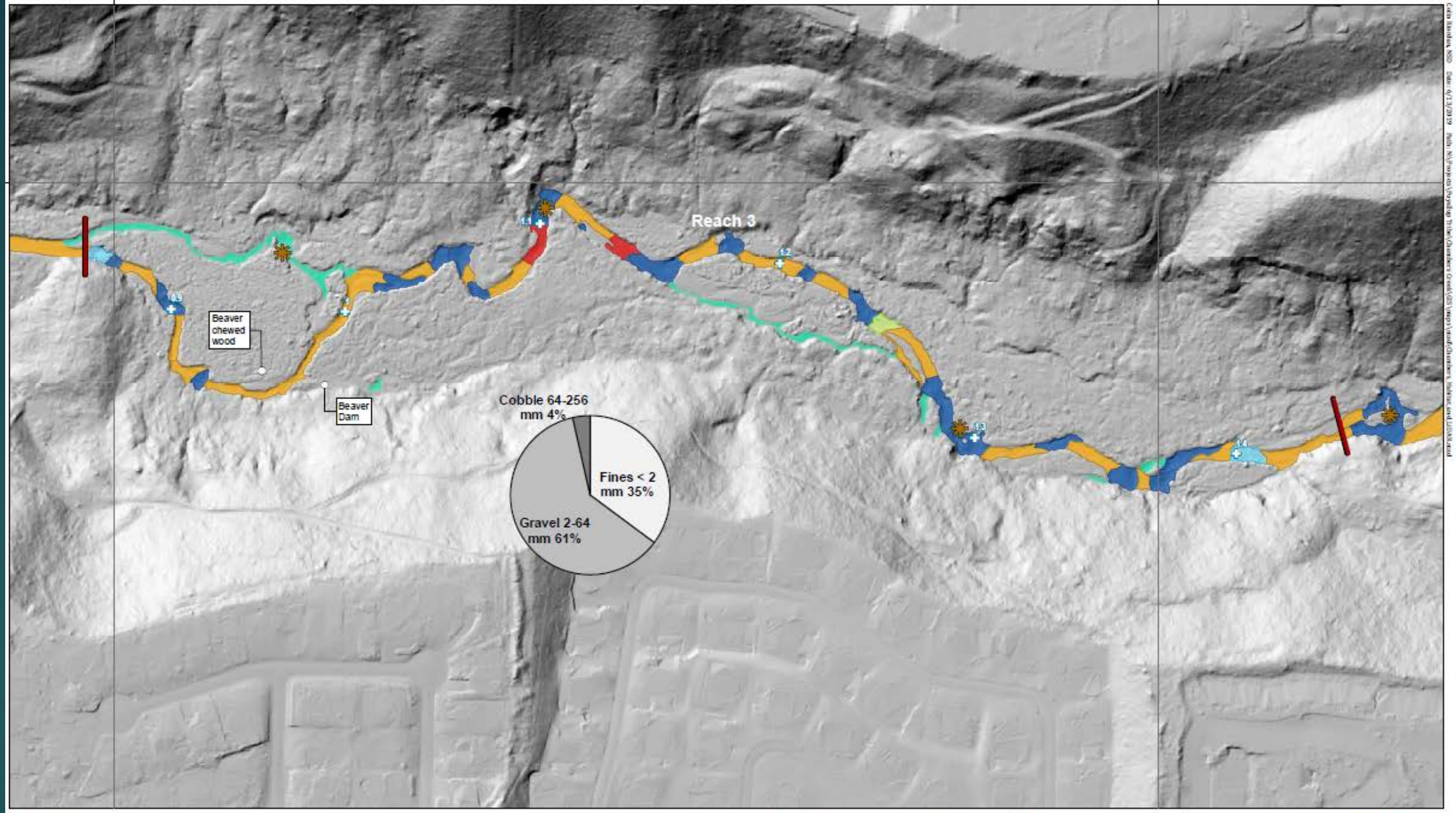
- Riffle
- Glide
- Scour Pool
- Plunge Pool
- Dam Pool
- Slow Side Channel
- Fast Side Channel

- River Mile
- Log Jam
- Seep
- Pebble Counts
- Other Feature
- Reach Break
- Peach Cr

PUYALLUP TRIBE OF INDIANS

Natural Systems Design

Results Reach 3



Chambers Creek Evaluation

Existing Conditions Habitat - Reach 3

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N

0 200 400 Feet

Lambert conformal conic projection, NAD 1983
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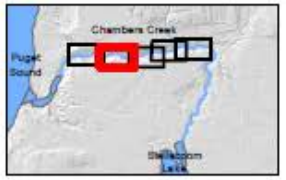
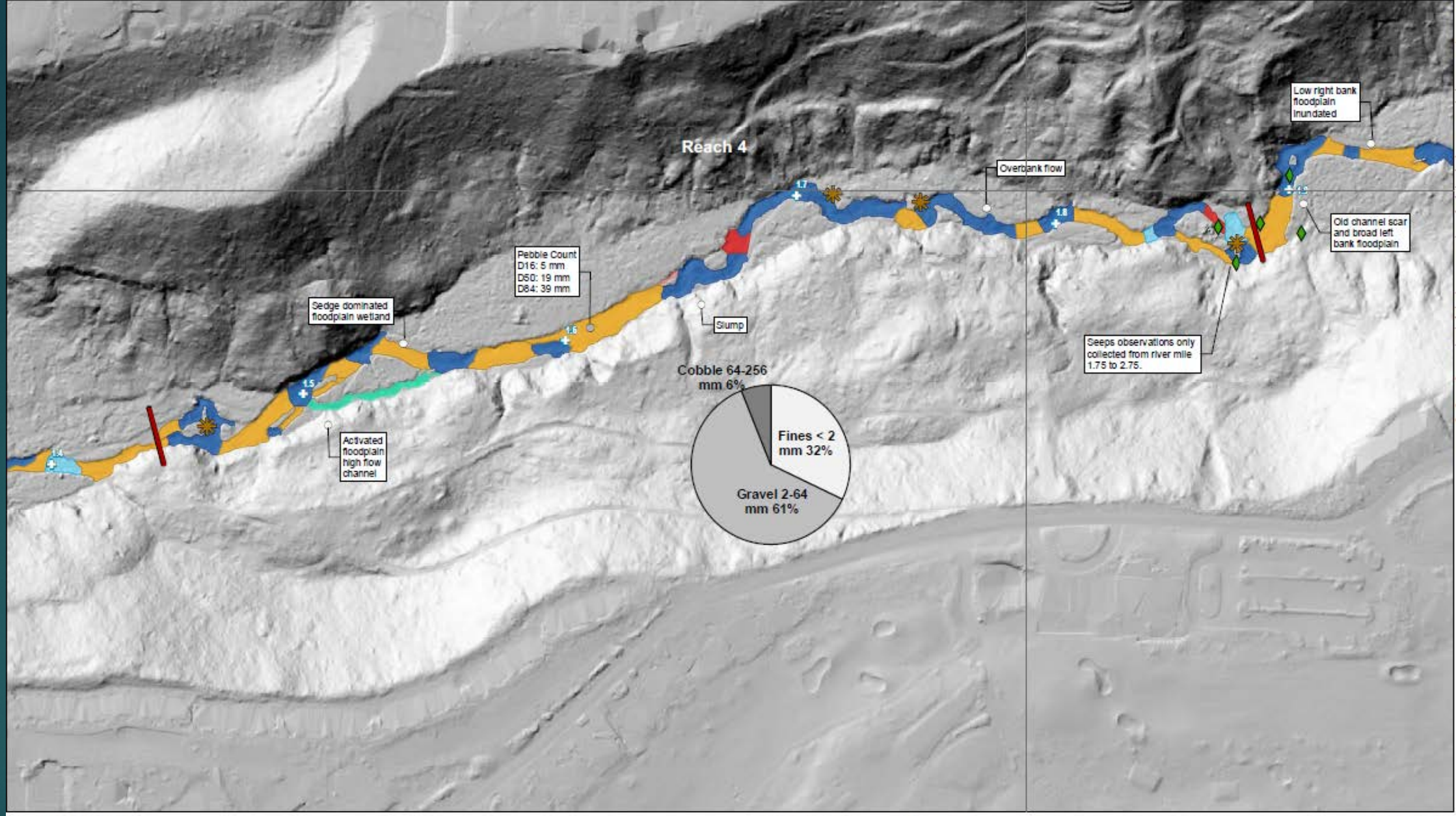


PUYALLUP TRIBE OF INDIANS

Natural Systems Design

Results Reach 4



Chambers Creek Evaluation

Existing Conditions Habitat - Reach 4

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Topographic data: 2018 LiDAR

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0 200 400 Feet

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State Plane Coordinate System (WA South Zone)

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- Fast Side Channel

- River Mile
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- Seep
- Pebble Counts
- Other Feature
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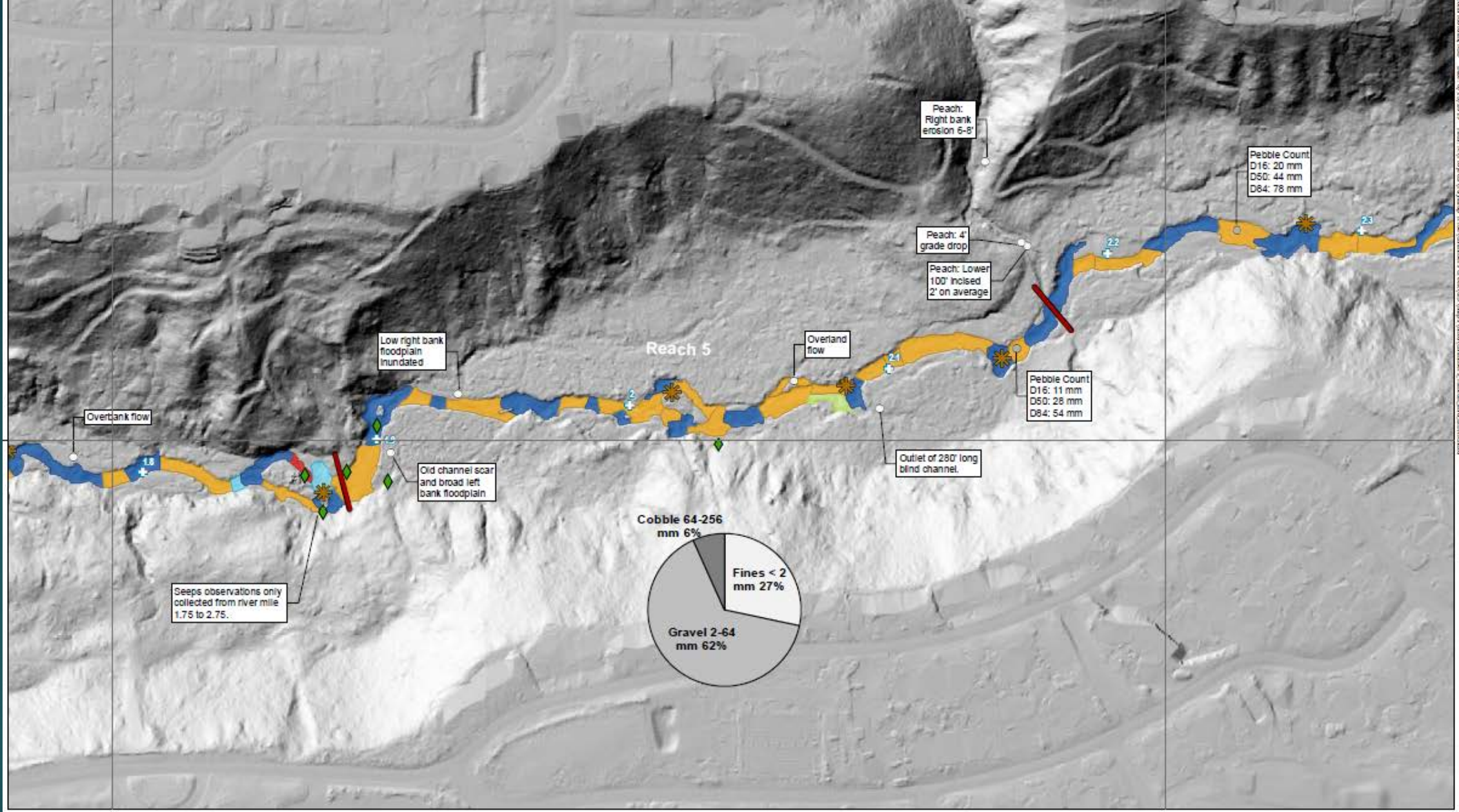
PUYALLUP TRIBE OF INDIANS

Natural Systems Design

Results Reach 5



Chambers Creek Evaluation

Existing Conditions Habitat - Reach 5

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0 200 400 Feet

Lambert conformal conic projection, NAD 1983
State Plane Coordinate System (WA South Zone)

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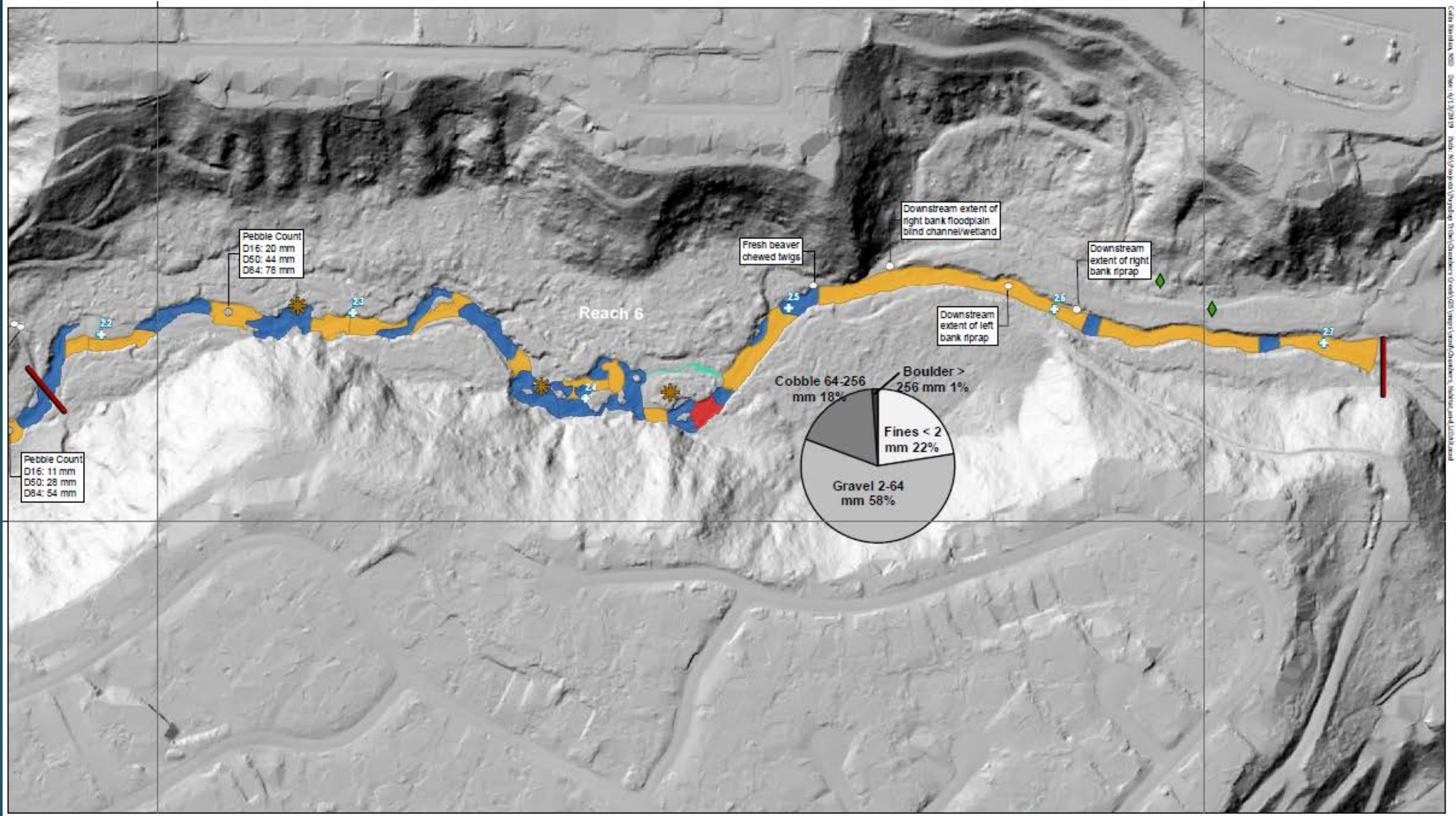
PUYALLUP TRIBE OF INDIANS

Natural Systems Design

Results Reach 6



Chambers Creek Evaluation

Existing Conditions Habitat - Reach 6

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Aerial Imagery Source: 2018 Google Earth
River miles calculated from centerline field verified by NSD (2018).
Topographic data: 2018 LIDAR

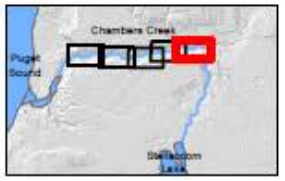
0 200 400 Feet

Lambert conformal conic projection, NAD 1983
State Plane Coordinate System (WA South Zone)

Channel Unit Type

- Riffle
- Glide
- Scour Pool
- Plunge Pool
- Dam Pool
- Slow Side Channel
- Fast Side Channel

- River Mile
- Log Jam
- Seep
- Pebble Counts
- Other Feature
- Reach Break
- Peach Cr



PUYALLUP TRIBE OF INDIANS

Natural Systems Design

Chambers Creek

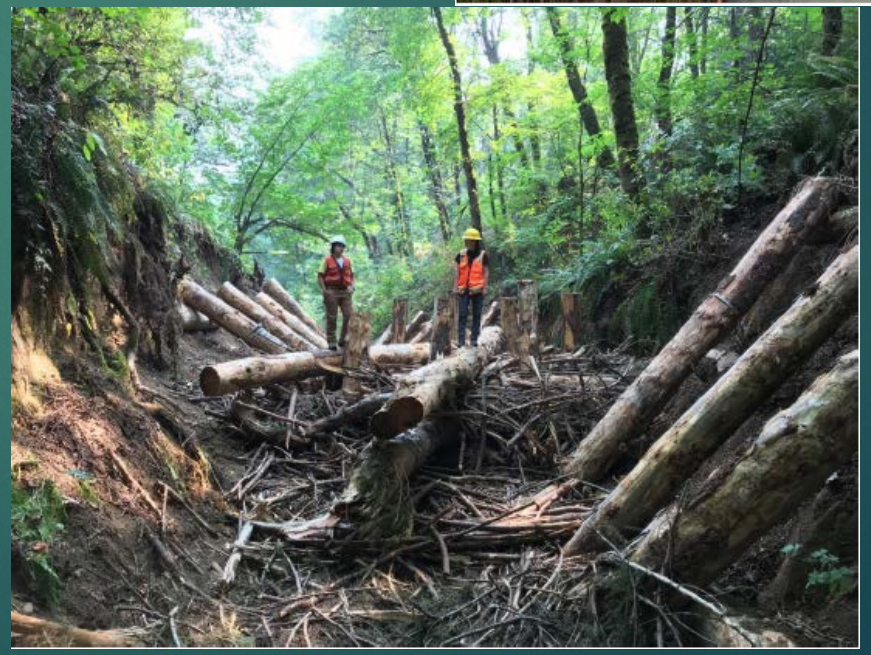
Restoration goals:

1. **Address specific alterations**
- Rip-rap banks
- Accelerated erosion in Peach Creek

2. **Increase Short Term Wood Loading**
- Install large wood jams to maintain quality habitat and enhance existing instream habitat

3. **Promote Long Term Forest Recovery**
- Weed control
- Active revegetation

Helicopter ELJs



Ex. Clarks Creek ravine treatment

Ravine treatment in Peach Creek to stabilize stream banks and bed to retain sediment

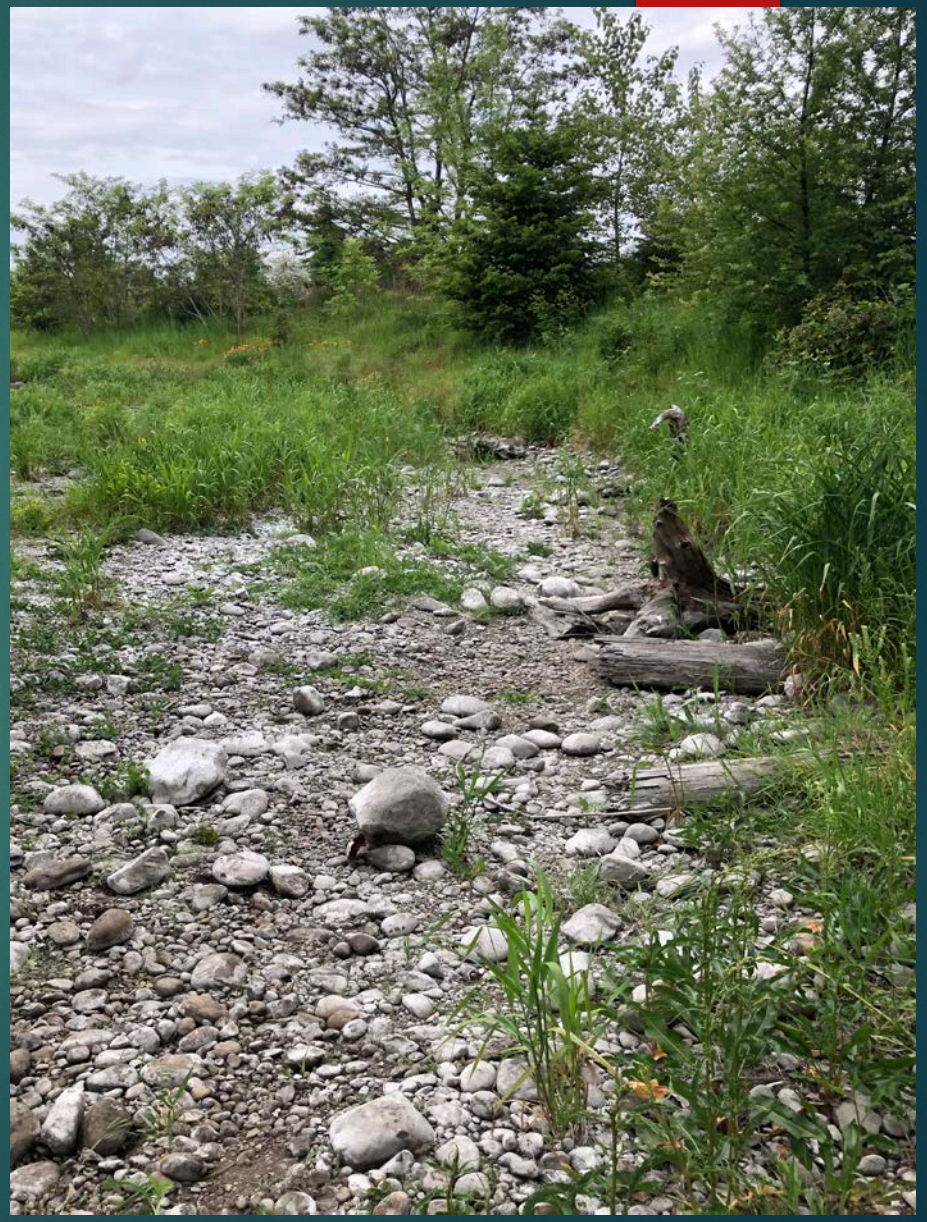
Riparian Buffer Enhancement or Restoration: Chambers Creek

- Reaches 1 and 2- **RCG impairs riparian functions**- including shading, LWD recruitment and inputs of organic matter
- Reaches 3-6 -trees are present along the stream throughout almost the entirety of the reaches, but **invasive species threaten the long term health and degrade the overall riparian vegetation condition**. Invasive species are present at considerable levels in every reach, to the extent that invasive species were found at every riparian sampling plot except one during study.

RCG most common
Himalayan blackberry, Japanese Knotweed, butterfly bush, english ivy

Figure 12 Field photo of Chambers Creek geomorphic reach 3, looking upstream (10/2018).

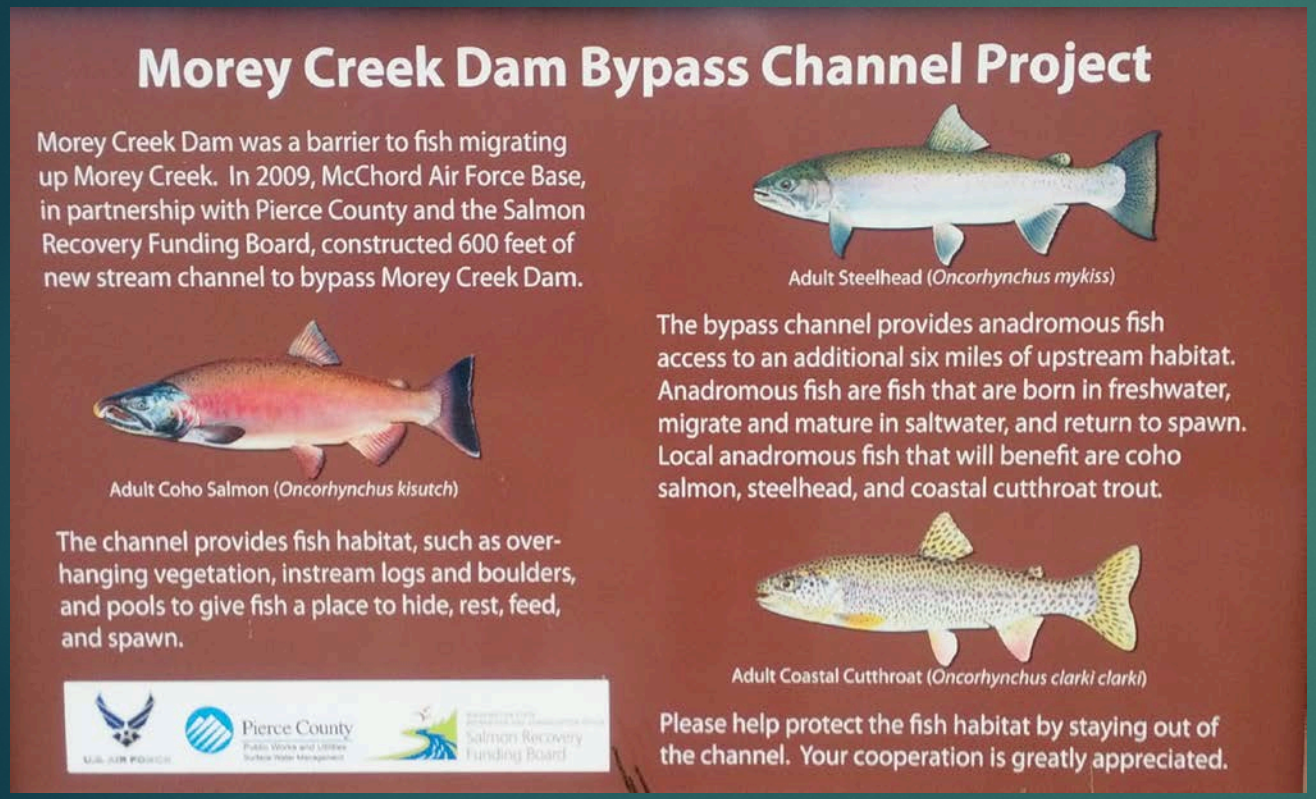
Riparian Buffer Enhancement or Restoration: Clover Creek



Parkland Prairie Reserve

Pierce County, CWC

Improving Fish Passage: Morey Creek bypass channel



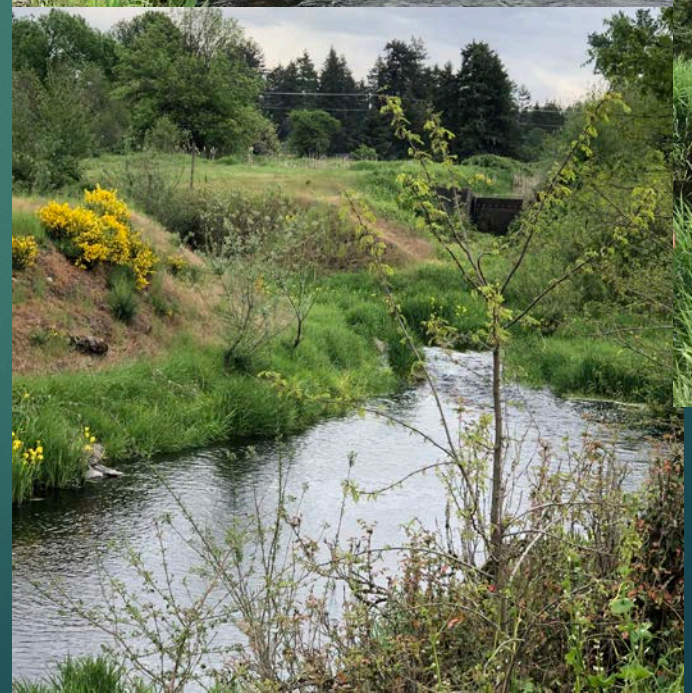
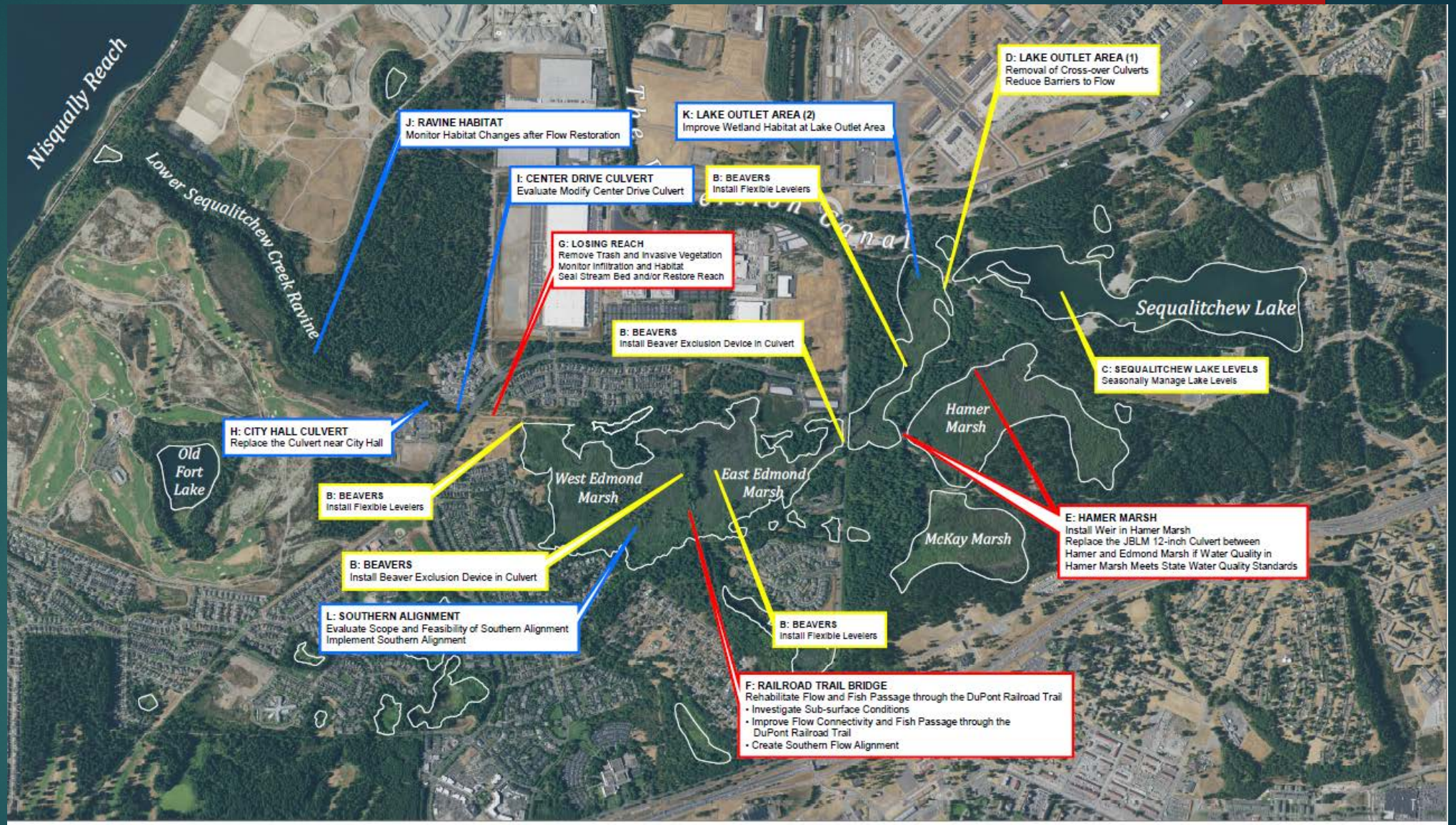


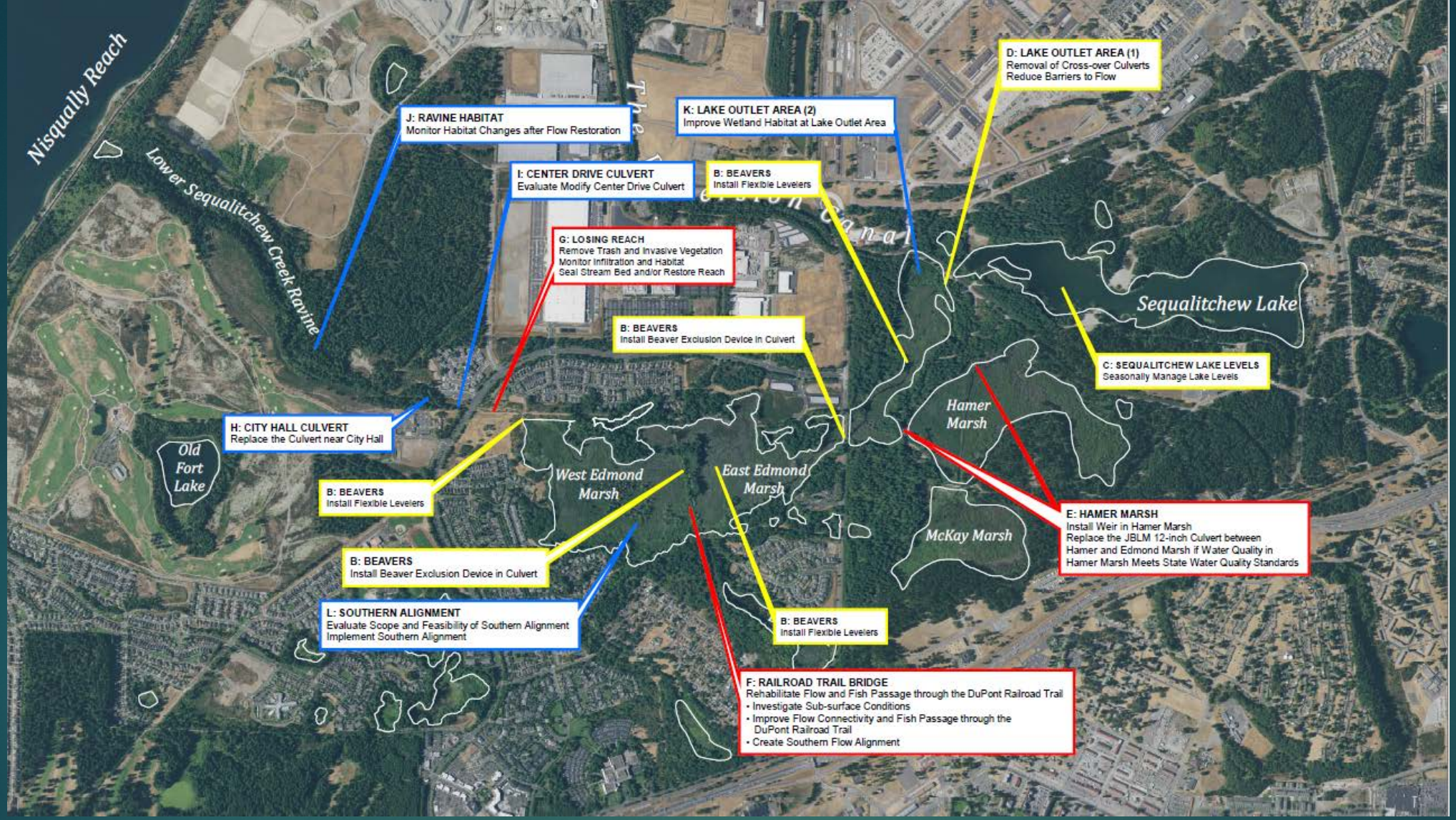
Photo credit: Kelly Still

Restore and maintain hydrologic regime: Sequalitchew Creek

The restoration plan arose from a process defined in a settlement agreement for the Dupont Mine

Parties involved:
CalPortland
City of Dupont
WDOE
Coalition of environmental groups collectively known as the environmental caucus





The restoration plan is designed to restore ecological function to the Sequalitchew Creek Watershed. Today, portions of Sequalitchew Creek are dry, and the majority of what would be the natural flow in the creek is diverted out of the system, either for water supply or to reduce the risk of flooding.

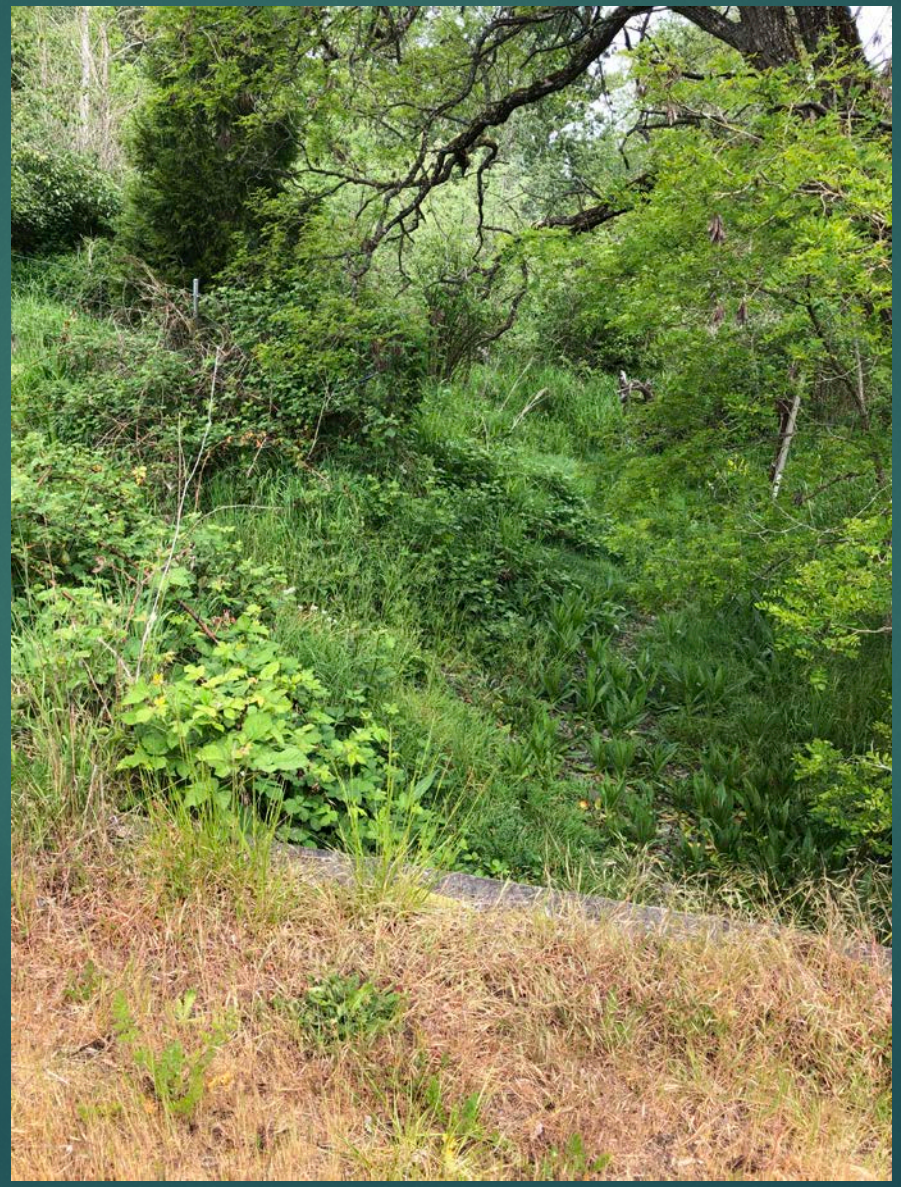
For more information contact:

Lance Winecka

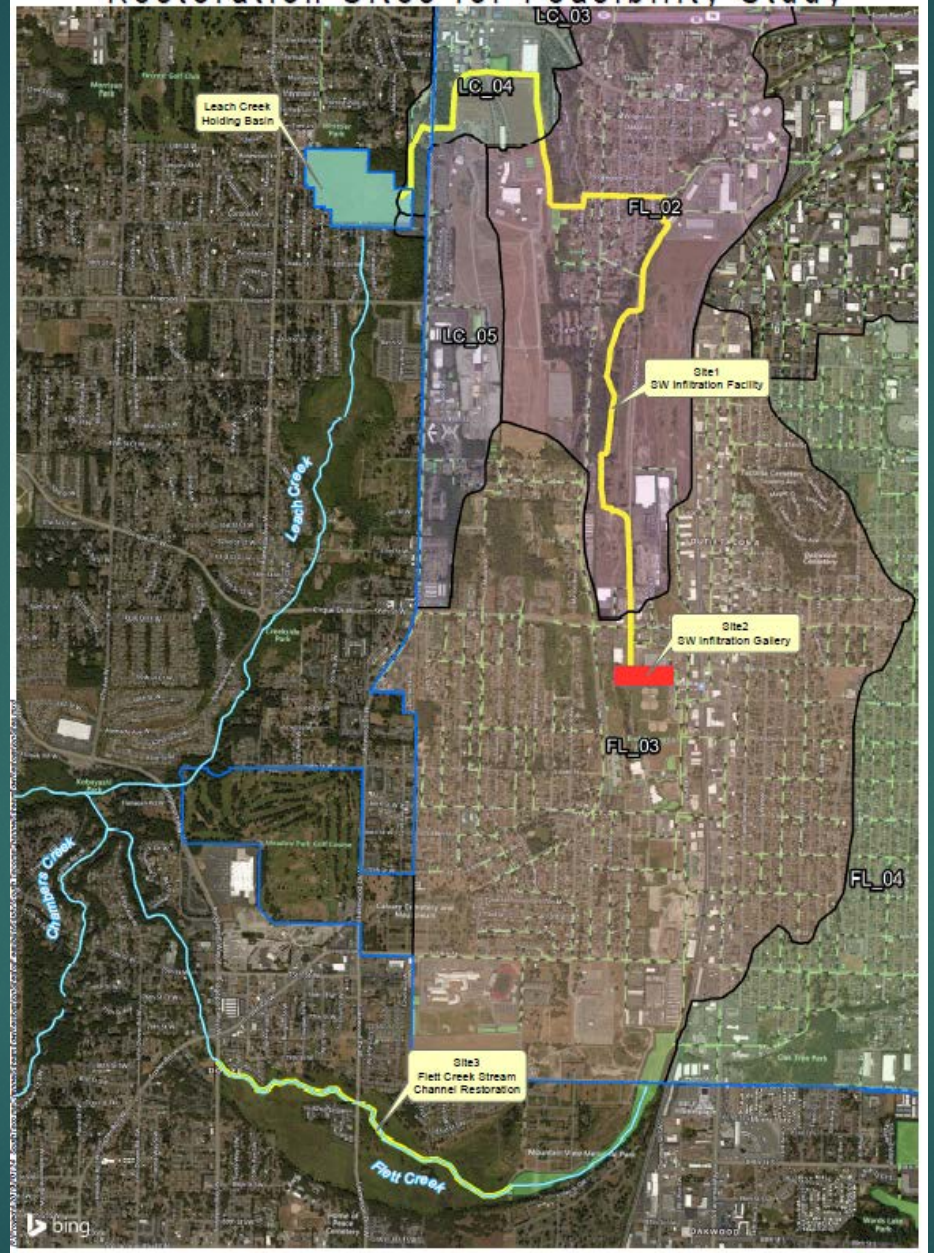
SPSSEG

Restore and maintain hydrologic regime: Clover Creek

- What does this look like?



South Tacoma Channel Streamflow Restoration Sites for Feasibility Study



Questions ?

Flett Creek wetland complex

photo credit: Kelly