

ELWHA NATURAL RESOURCES

Who are we & what do we do?



OUR MISSION

- Assist the Tribe to protect, enhance, & restore land, air, and water resources, and environmental health for generations to come.
- Promote the protection of cultural resources, unique tribal interests and treaty rights.
- Serve the tribal community and promote sustainable community development.

WILDLIFE

Research
Monitoring
Management

FISHERIES

Research
Monitoring
Harvest Management
Enforcement

HOUSE OF SALMON HATCHERY

Coho
Steelhead
Chinook

RESTORATION

Habitat Monitoring
Revegetation

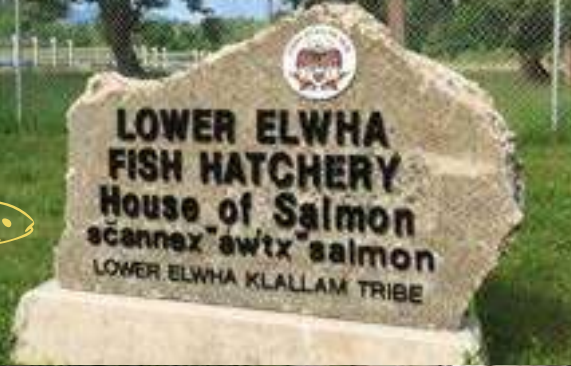
GIS MAPPING

Watershed analysis
Tribal lands

OUTREACH

Science updates
Volunteer opportunities

HOUSE OF SALMON



700 Stratton Rd
M-F | 8am-4pm

You are always
welcome!

Stop by for a tour or contact
robert.blankenship@elwha.org
(360)-565-7270, Ext. 7526



COHO
CHUM
STEELHEAD



& now ... **CHINOOK**



In 2022, we began raising Chinook salmon to support continued recovery efforts on the Elwha River in cooperation with Washington Department of Fish and Wildlife (WDFW). Eggs will be fertilized, incubated, reared to fry or smolts, & released into the Elwha River.



Revegetation Restoration

Riparian vegetation provides:

- fish habitat- water quality protection, large woody debris, , food web contribution
- ecosystem function:-contribution to nutrient cycling
- climate change resiliency- bank stabilization stream temperature& flow regulation

Cultural resources- native, traditional culturally important plants



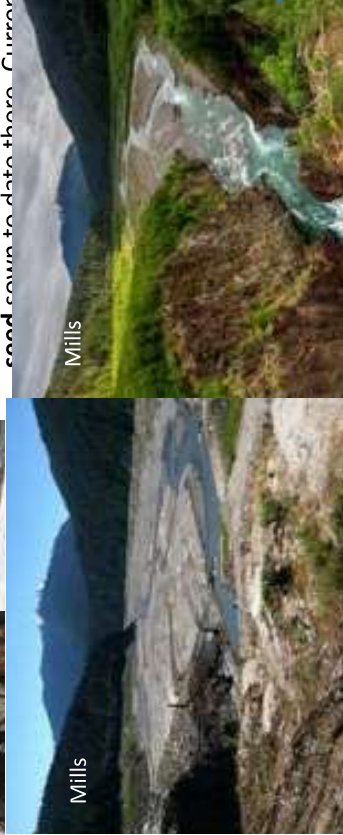
Elwha River revegetation efforts
(not including reservation, tributary and U&A projects)

LEKT reservation efforts
Removal of 36 acres of Himalayan Blackberry and Scotch Broom this year

the **U&A**. Dam removal created 764 acres of exposed lakebed in former Aldwell and Mills reservoirs. **425,000 rooted plants** planted and **7,150 lbs of seed** sown to date there. Currently planting with later successional species-

conifers and culturally important shrubs.
Let us know if you'd ever like to come plant with us or discuss Elwha plants.

THEN NOW



Credit: Jamie Valdez

Credit: John Gusman

Spot
Shrimp



Geoduck



Chinook



Sockeye



Crab



Halibut



Sea
Cucumber



Harvest Management

Chum



Clam & Oysters



Urchins



Steelhead



Bottom Fish



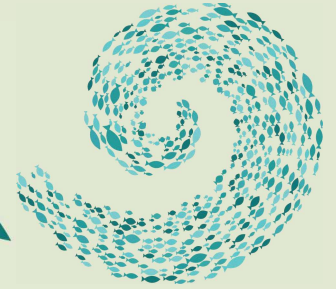
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YOUNG, SILVERY, OUTMIGRATING SALMONIDS

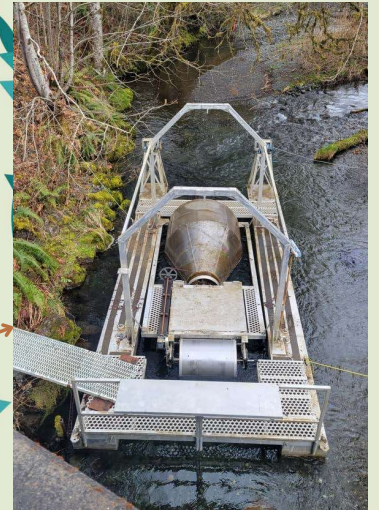
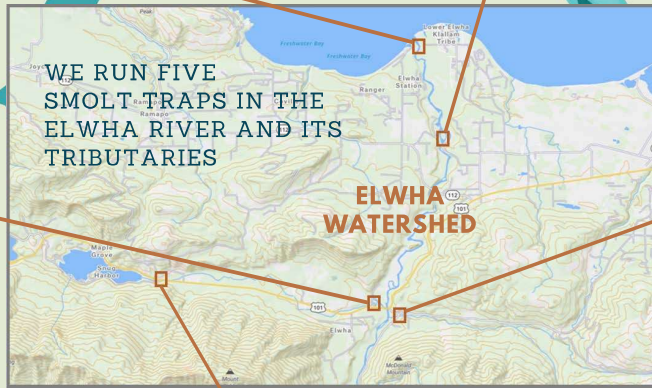
LOWER ELWHA



UPPER ELWHA



LOWER INDIAN CREEK



LITTLE RIVER



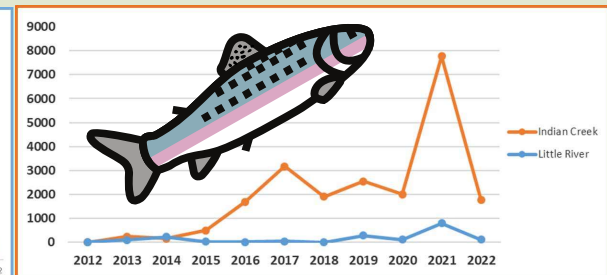
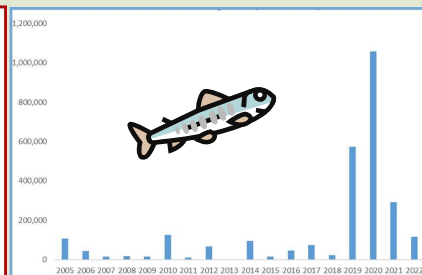
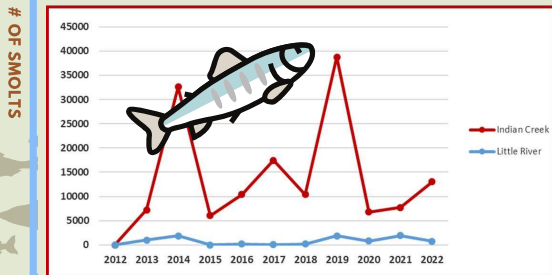
UPPER INDIAN CREEK



tributary coho

elwha chinook

tributary steelhead



YEAR

Re-colonization of Pacific lamprey in the Elwha watershed

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Introduction

Anadromous lampreys (river, *Lampetra ayresii* and Pacific *Entosphenus tridentatus*) were potentially blocked by the Elwha River dams (Figure 1). The historic population was never documented; however, anecdotal observations suggest that Elwha lamprey populations were large. Lamprey contribute vital marine-derived nutrients to areas where they spawn, filter water, and provide food for native fish and wildlife and potentially buffer predation during critical salmonid migration periods. However, the ability of native lampreys to recolonize lost habitats, like those in the upper Elwha drainage, is unknown.

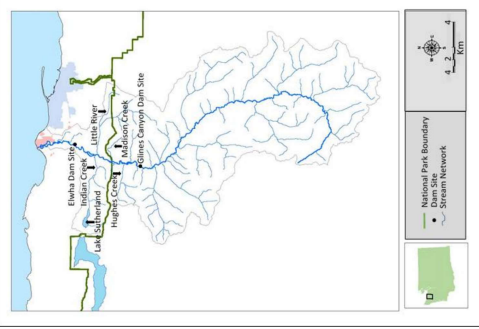


Figure 1. Map of study area.

In 2017-18 we intend to intensively study the recolonization of Pacific lamprey in the Elwha watershed following dam removals.

Life History Stages

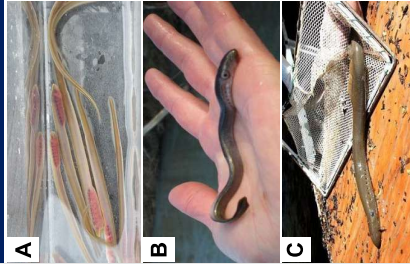


Figure 2. Examples of different life history stages of Pacific lamprey captured in Elwha watershed.

- Ammocoele (larval, 80-100 mm, Panel A).
- Macrophthalmia (130-180 mm, Panel B).
- Adult (500-900 mm, Panel C).

Fish Capture

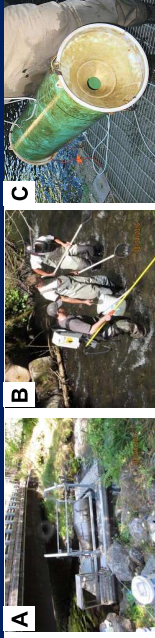


Figure 3. Rotary screw trap (Panel A), lamprey specific electrofisher (Panel B), and lamprey pot (Panel C).

Lamprey will be captured for tagging and tissue collection objectives using different methods.

- Rotary screw traps (Figure 3, Panel A) operated in the lower mainstem, Little River, and Indian Creek (Figure 1).
- Lamprey specific backpack electrofisher (slow burst-pulse ABP-2) (Figure 3, Panel B).
- PVC pots (12"x36") fitted with a fyked entrance (Figure 3, Panel C).

Adult Migration

To further document migration behavior and re-colonization we intend to tag adult Pacific lamprey (N=40) with both a 23-mm passive integrated transponder (PIT) and an individually coded radio transmitter (Lofek NTC-3-1, NTC-4-2L). The movements of tagged lamprey will be tracked using an existing array of PIT antennas and radio receivers. Fixed telemetry site detections will be complemented by mobile telemetry surveys (walking, boat, fixed wing aircraft) conducted throughout the basin.

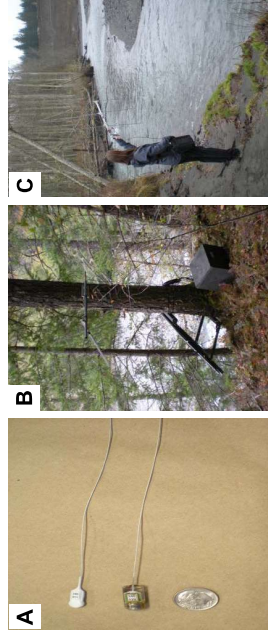
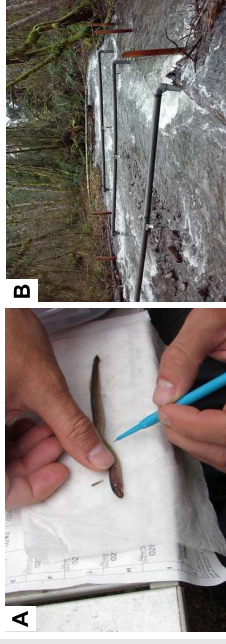


Figure 4. Radio transmitters (Panel A), fixed telemetry site (Panel B), and mobile telemetry (Panel C).

Juvenile Migration

To monitor juvenile outmigration, we intend to surgically implant larval (N=200) Pacific lamprey with 8.4-mm PIT tags at mainstem and tributary locations. Tagged individuals will be detected at PIT antennas, or upon recapture using handheld PIT scanners. This work will be coupled with genetic sampling for both species identification and parentage analysis.

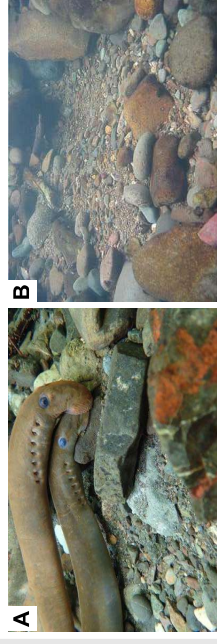
Figure 5. Larval lamprey being tagged with PIT (Panel A), PIT antenna array at Indian Creek (Panel B).



Spawner Surveys

During steelhead spawning surveys in 2016, adult Pacific lamprey were also observed spawning in tributaries downstream from the former Glines canyon dam site (Figure 1). In 2017, we plan to conduct lamprey nest surveys and mapping throughout the watershed during the known spawning period (Feb.-Apr.).

Figure 6. Pair of spawning Pacific lamprey (Panel A), and visible nest (Panel B).



Acknowledgements

M. Beirne, R. Moses, M. Elofson, S. Sampson (LEKT), J. Geffre, S. Brenkman (NPS), G. Pess (NOAA), J. Duda (USGS), and R. Peters (USFWS).

Elwha Estuary Work



Sediment grabs— food availability for salmonids



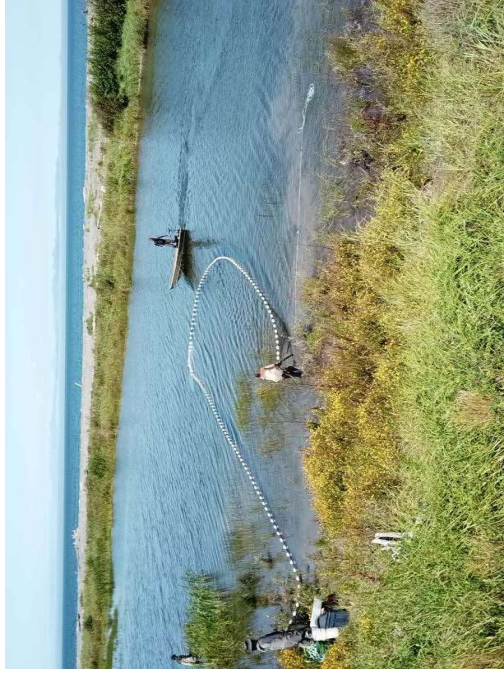
Diet studies— what are salmon eating



Sediment elevation— how much sediment has been deposited

Bathymetry— how has the depth changed

Vegetation surveys— which plant species come back



Beach seine— species composition of fish in estuary



Water quality— is it good enough for fish



Using SONAR to Monitor Adult Steelhead, Chinook & Coho Populations on the Elwha River

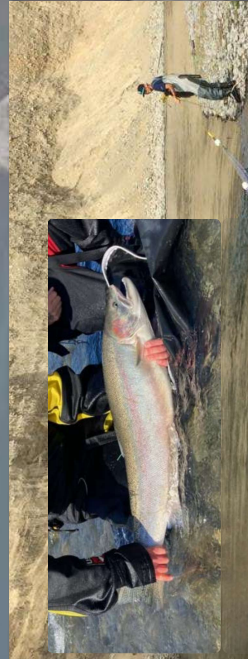
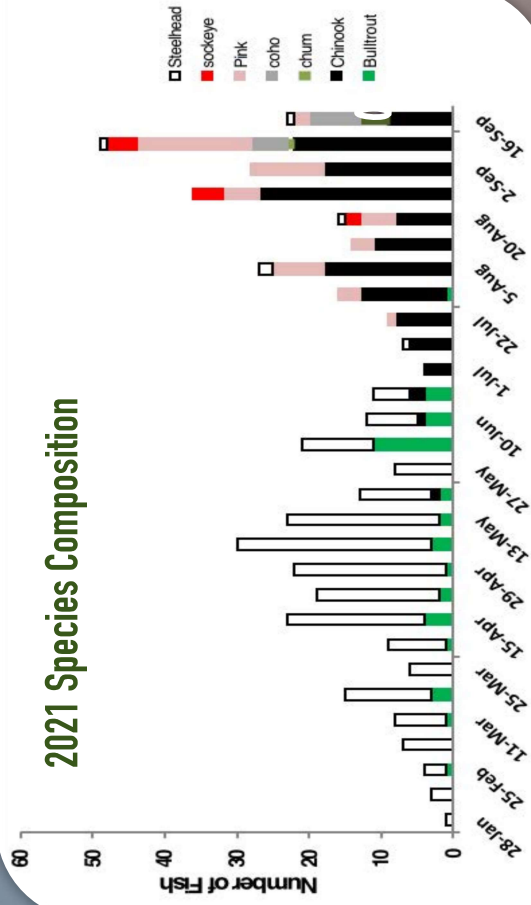
Started in 2008 as a pilot project on returning Chinook, this technique is used by LEKT Natural Resources biologists to help estimate multiple populations of salmonids each year.



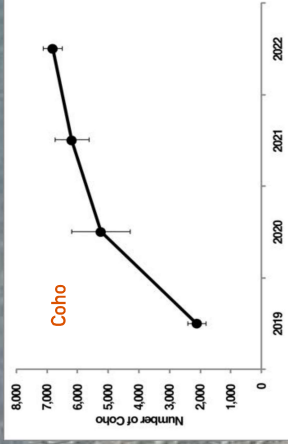
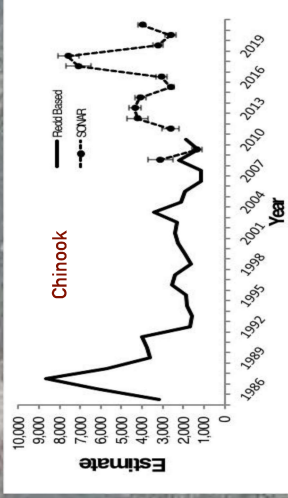
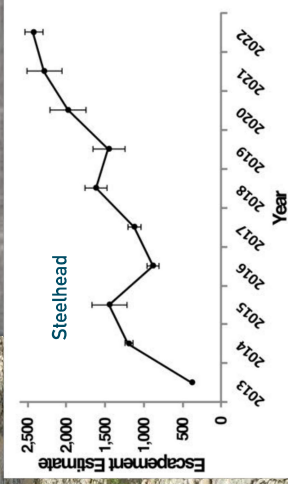
Sound navigating and ranging (SONAR) camera deployed just below the river surface sends out sound beams to detect fish.



2021 Species Composition



Weekly Net Sampling for species composition





Mayflies



Stoneflies



Caddisflies



Beetles



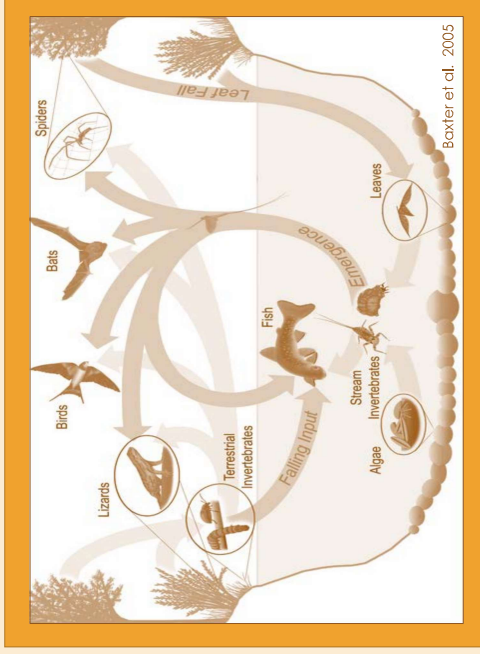
True Flies



Non-Insects

Benthic Macroinvertebrates — Before, During, and After Dam Removal

A healthy salmon river is a healthy bug river



Benthic = bottom dwelling

Macro = visible w/out microscope

Invertebrate = lacks a backbone

Benthic macroinvertebrates are:

- Key food web components
- Abundant and diverse
- Sensitive to disturbance
- Often long lived
- Easy to sample

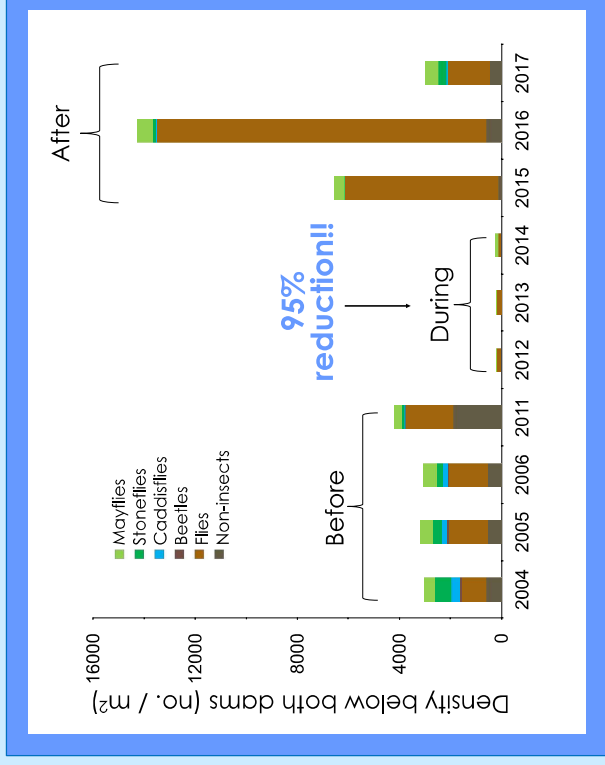


Response was rapid and severe

Some groups rebounded quickly

Recovery is still underway

Total benthic macroinvertebrate abundance decreased greatly during dam removal. Immediately afterwards, invertebrates most able to tolerate disturbance (midges and other flies) quickly repopulated. As of 2017, more sensitive groups (Stoneflies and Caddisflies), were still recovering. Samples have been collected through 2021, but not yet analyzed.



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