Reintroducing Salmon to the Upper Columbia River

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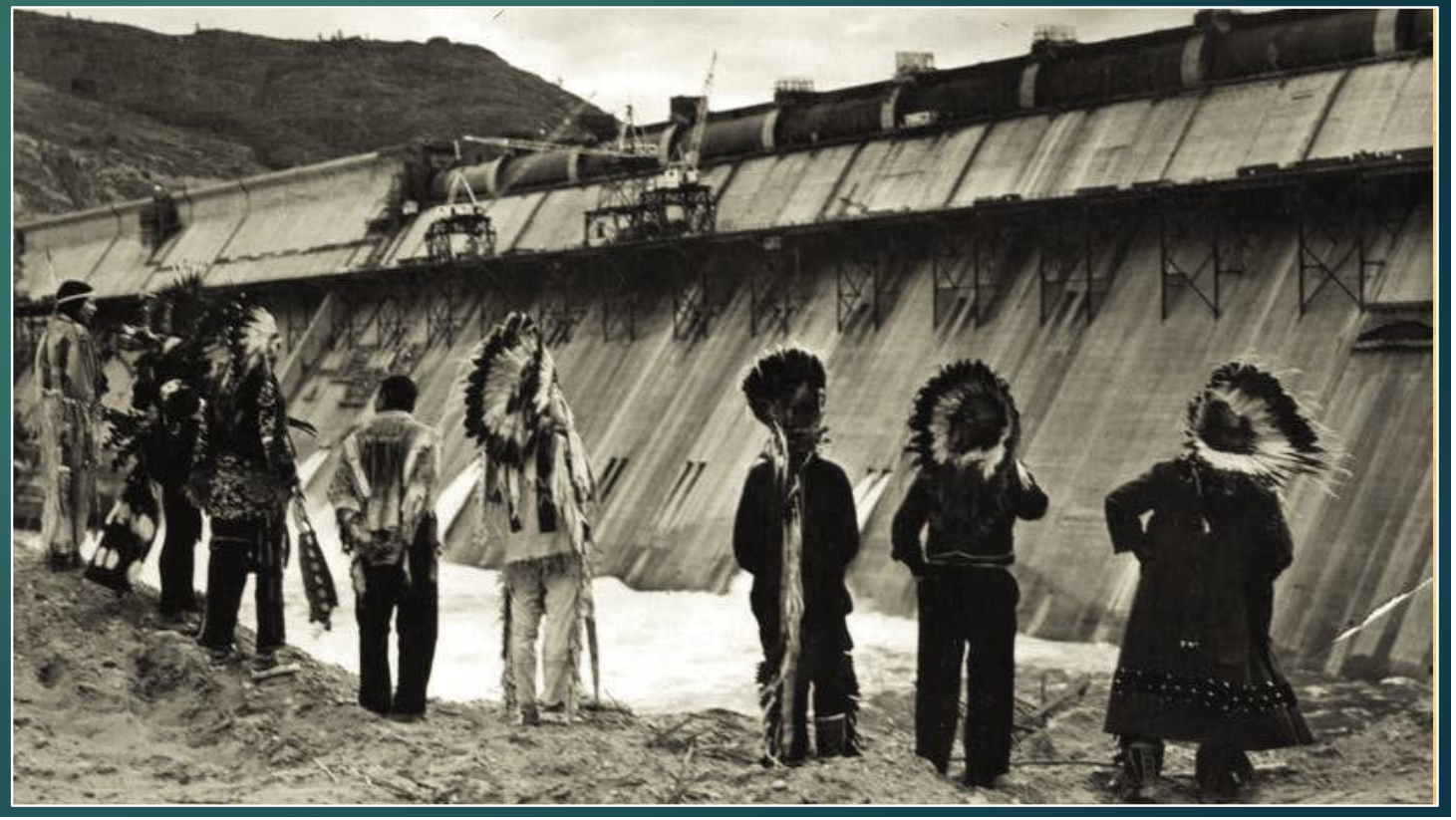
Conor Giorgi (Spokane Tribe), Laura Robinson (UCUT)

Presentation to the PFMC Salmon Advisory Subpanel, Sept 8, 2023

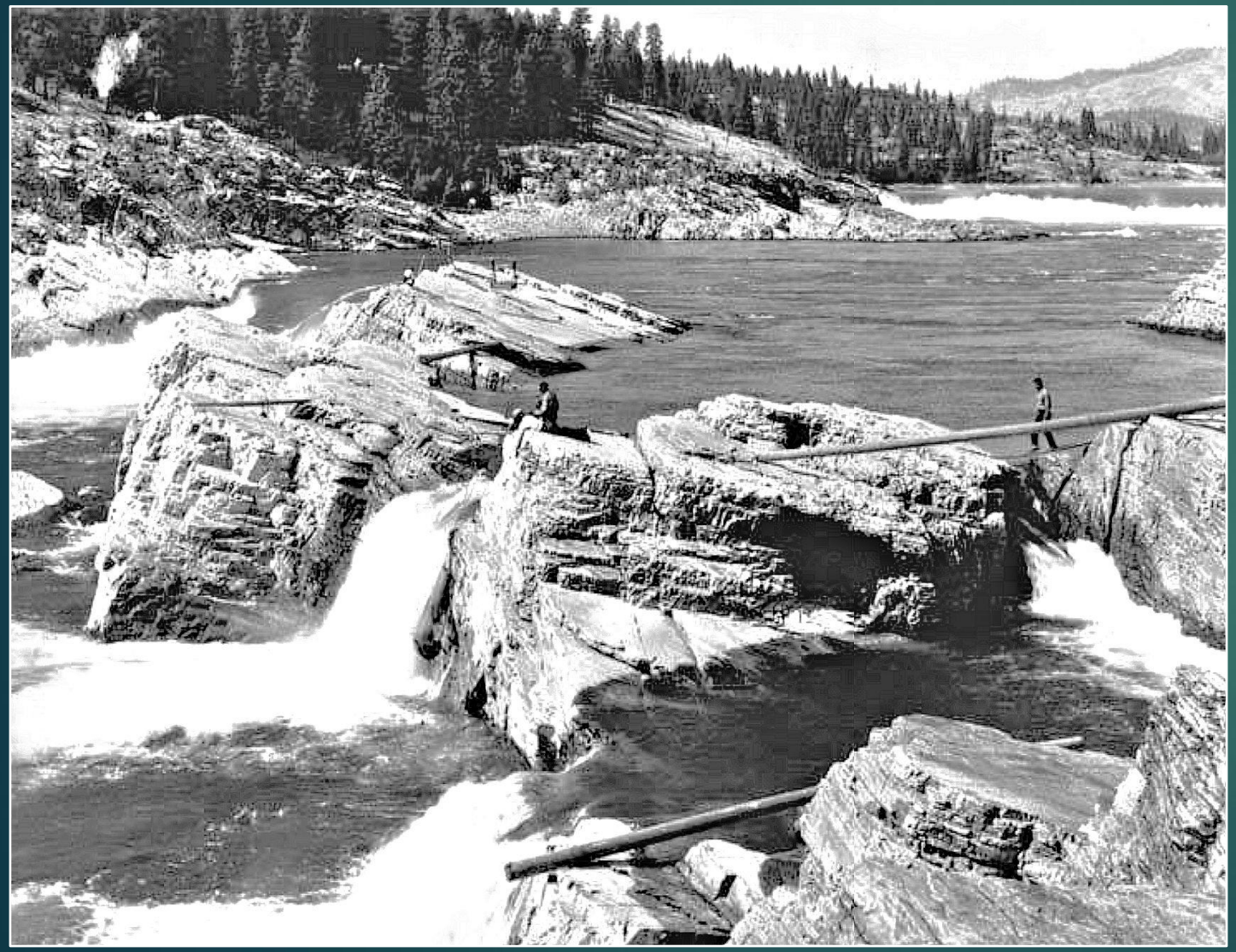


Input, funding and participation from:
WDFW, USGS, PNNL, Kevin Malone Consulting, State of Washington, Office Columbia River, US Fish & Wildlife Service, NOAA Fisheries, Army Corps of Engineers, Bureau of Reclamation, Avista Corporation, Douglas County PUD.

- The Problem
  - Salmon have been blocked from the Upper Columbia for 70-110 years
- What UCUT Is Doing About It
  - Scientific Phased Approach
    - Phase 1 – Completed 2019
    - Phase 2 Implementation Plan
- It's working!
  - Cultural and Educational Releases

Chinook released in the Little Spokane River, 2021

Kettle Falls: Upper Columbia River



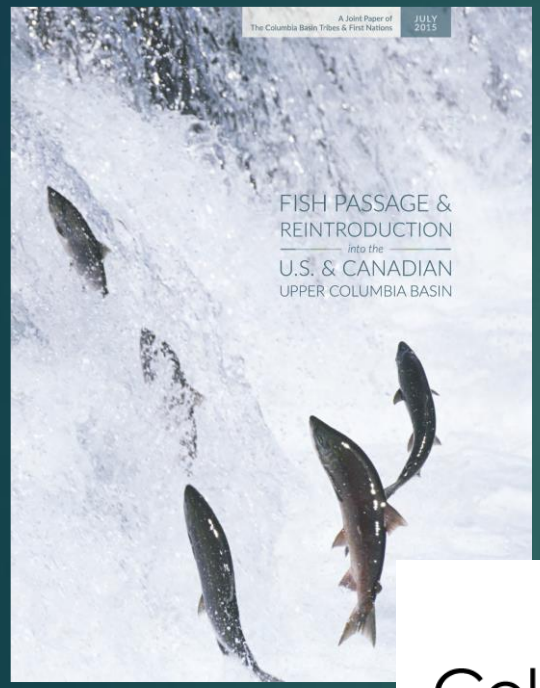
Historic Salmon Runs

- 10 million – 16 million adults returned to Columbia Basin (pre-1850)
- Upper Columbia natural-origin fish (Columbia Basin Partnership Taskforce):

Adult Returns	Historical	Current
Spring Chinook	~ 260,000	0
Summer Chinook	~ 695,000	0
Fall Chinook	~ 680,000	0
Sockeye	> 800,000	0

Map Source: Seattle Times

How? – *Phased Approach*



Columbia River Basin Fish and Wildlife Program 2014

Phase 1: Completed in 2019

- Evaluate passage studies at hydroelectric projects, including CJD & GCD
- Investigate habitat availability, suitability and salmon survival potential in habitats above GCD
- Investigate possible cost of upstream and downstream passage options

Phase 2: Underway

- **Design and test reintroduction strategies and fish passage facilities**
- **Reintroduction pilot projects**
- **Monitoring, evaluation, and adaptive management**

Phase 3:

- Review results to determine implementation and permanent inclusion to the Program

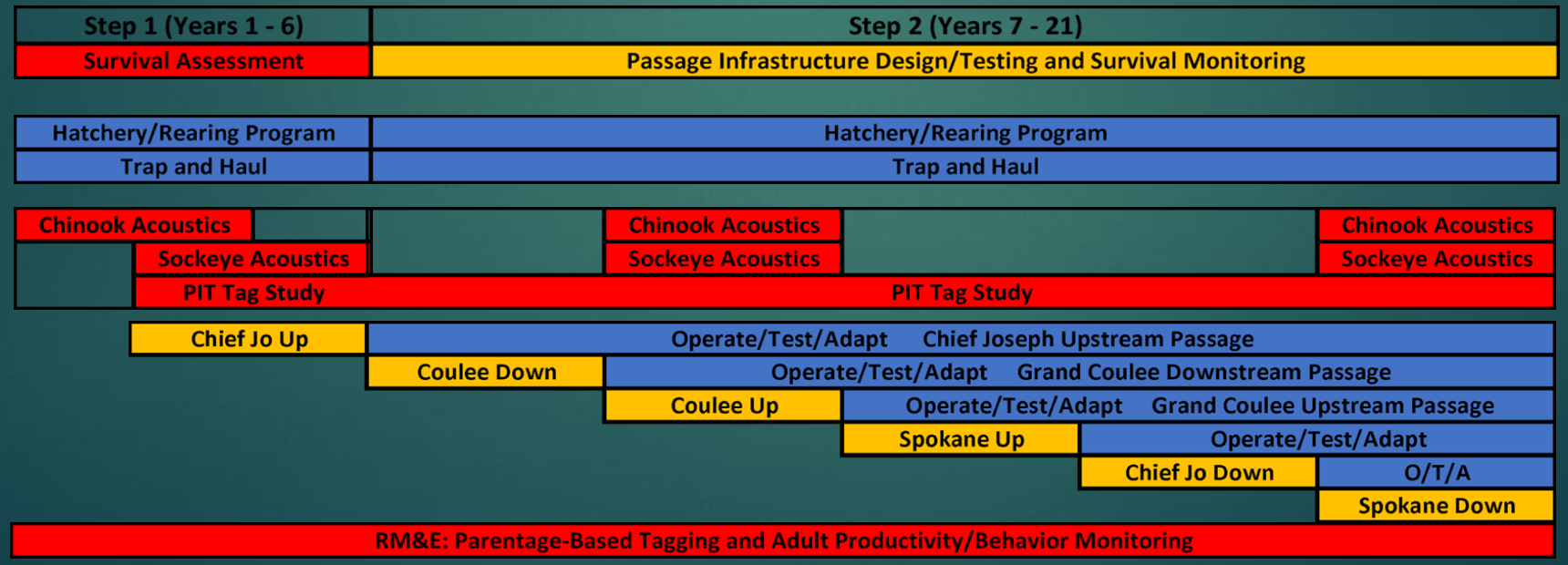
Fish Passage and Reintroduction:

The Phase 2 Implementation Plan "P2IP"

A stepwise and scientifically adaptive approach to test the feasibility of restoring salmon to the Upper Columbia River basin that is focused on collaboration, cost effectiveness and benefits for the entire region.

P2IP: Objectives and Timeline

- Establish access to sources of non-ESA Chinook and Sockeye salmon donor stocks
- Develop interim hatchery facilities to produce fish for feasibility studies
- Test the key assumptions used in the Phase 1 Life Cycle Model
  - Fish behavior and survival
- Develop and test up and downstream interim passage facilities under current operations
- Provide the data necessary for full-scale reintroduction and permanent passage



Fish Production & Rearing Facilities

- Necessary to support Phase 2 Studies
  - 150k+ Chinook and 50k+ sockeye annually
- Preferred donor stocks identified in Phase 1
- Egg to Sub-yearling rearing
  - Finding space and options in existing facilities
- Sub-Yearling to Yearling rearing
  - Acclimation Facilities
    - Net pen rearing
    - Land-based acclimation

Juvenile Salmon Acoustic Survival Study

JSATS Telemetry (small #'s, detailed info)

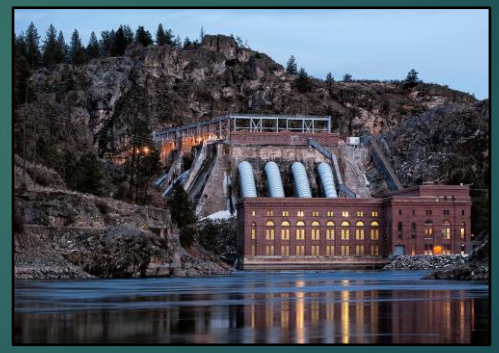
- Passage survival across 5 dams
- Passage routing at GCD and CJD
- Reach survival throughout the blocked area
- Travel time from multiple release locations

Photo courtesy of USGS

Chief Joseph Dam, ACOE

Grand Coulee Dam, BOR

Little Falls Dam, Avista Corp



Long Lake Dam, Avista Corp

Nine Mile Dam, Avista Corp

PIT Tag Releases

Juvenile Chinook and Sockeye Survival

- 50k – 160k total of each species
  - Sample sizes refined with data from previous studies
  - Ensure sufficient adults return to meet research needs
- Release site to RRD/McNary Dam
- Smolt-to-Adult Return Rates

Adult Chinook and Sockeye Survival

- Bonneville Dam to Wells Dam Survival
- Evaluate Collection Efficiency of Returning Adults

Adult Chinook and Sockeye Behavior – Acoustic

- Evaluate Blocked Area Adult Migration and Homing
- Tailrace Behavior for Upstream Passage Planning

Trap and Haul from Downstream of Chief Joseph Dam

Initial Upstream Passage Option

- Trap-and-Haul from Chief Joseph Hatchery Ladder
- Release in Reservoirs Upstream

Jetco Manufacturing

Step 2 – Interim Passage & Testing

Step 1 Continued Activities:

- Operation of interim rearing facilities
- PIT tag releases of Chinook and Sockeye
- Trap-and-Haul from CJD to upstream reservoirs

Incremental Installation of Interim Passage Facilities

Sequence will be informed by Step 1 survival studies

- Design & Installation
- Effectiveness Testing
- Operation

Research, Monitoring, & Evaluation

- Parentage-based Tagging (PBT), Adult Recruits per Spawner (AR/S), limiting factors & adaptive management

Step 2: Interim Downstream Passage Facilities

Juvenile Passage Options

- Spill and Turbines to Provide Initial Passage
- Minimize Impacts to Dam Operations
- Ability to Collect Juvenile Salmon Efficiently

Potential Collection Location @ GCD

Step 2: Interim Upstream Passage Facilities

Adult Passage Options

- *Minimize Impacts to Dam Operations, Leverage Existing Infrastructure*
- Trap-and-Haul Program from Chief Joseph Hatchery Ladder
- Adult Collection Considerations
  - Volitional vs Assisted Passage
  - Adult Sampling and Sorting

Photo Courtesy of Whooshh Innovations

Phase 2 is underway

- Funding or in-kind support provided by Upper Columbia Tribes, State of WA, USBR, PCSRF (NOAA), USGS, USFWS, Dept. of Energy & PNNL, congressionally directed spending.

-Support is growing but all the pieces and commitments are not yet in place.

A Pilot Study to Evaluate Downstream Migration Behavior and Survival in the Blocked Area of the Upper Columbia River

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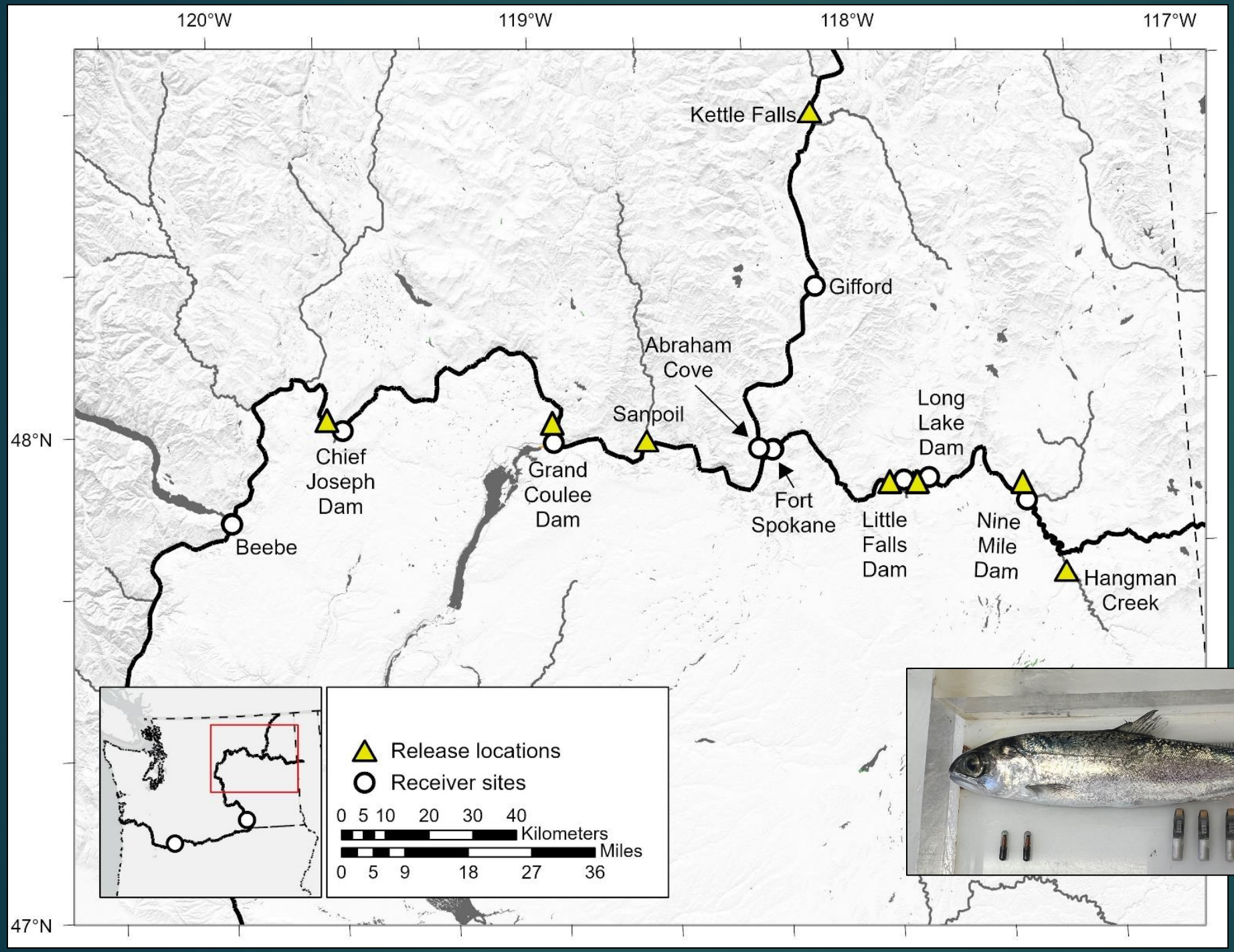
Rick Raymondi[4], Laura Robinson[5], and Scott Evans[1]

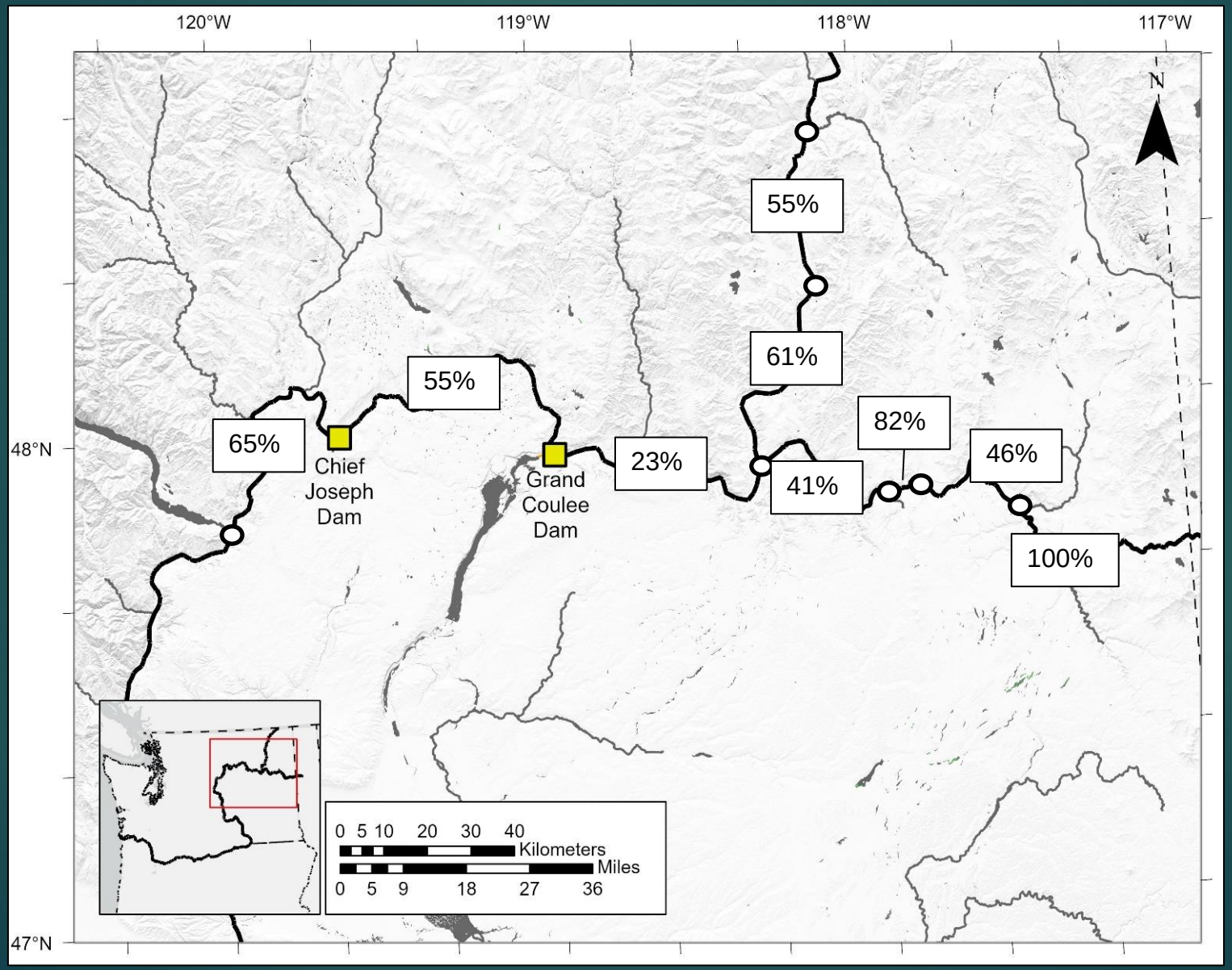
August 23, 2022

[1]U.S.Geological Survey
[2]Confederated Tribes of the Colville Reservation
[3]Coeur d'Alene Tribe
[4]Spokane Tribe of Indians
[5]Upper Columbia United Tribes

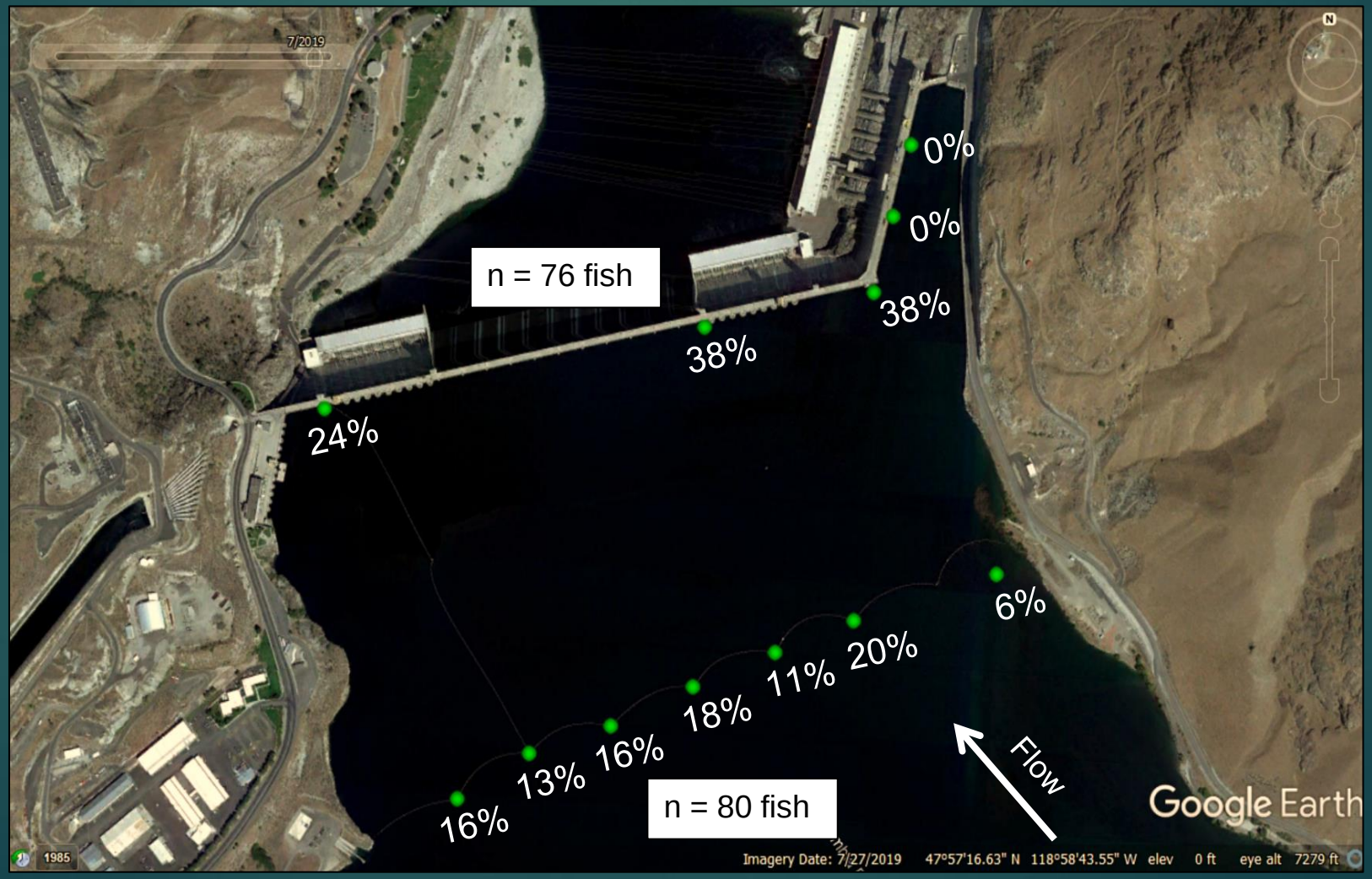
753 Acoustic tagged fish released at 8 locations March-May 2022



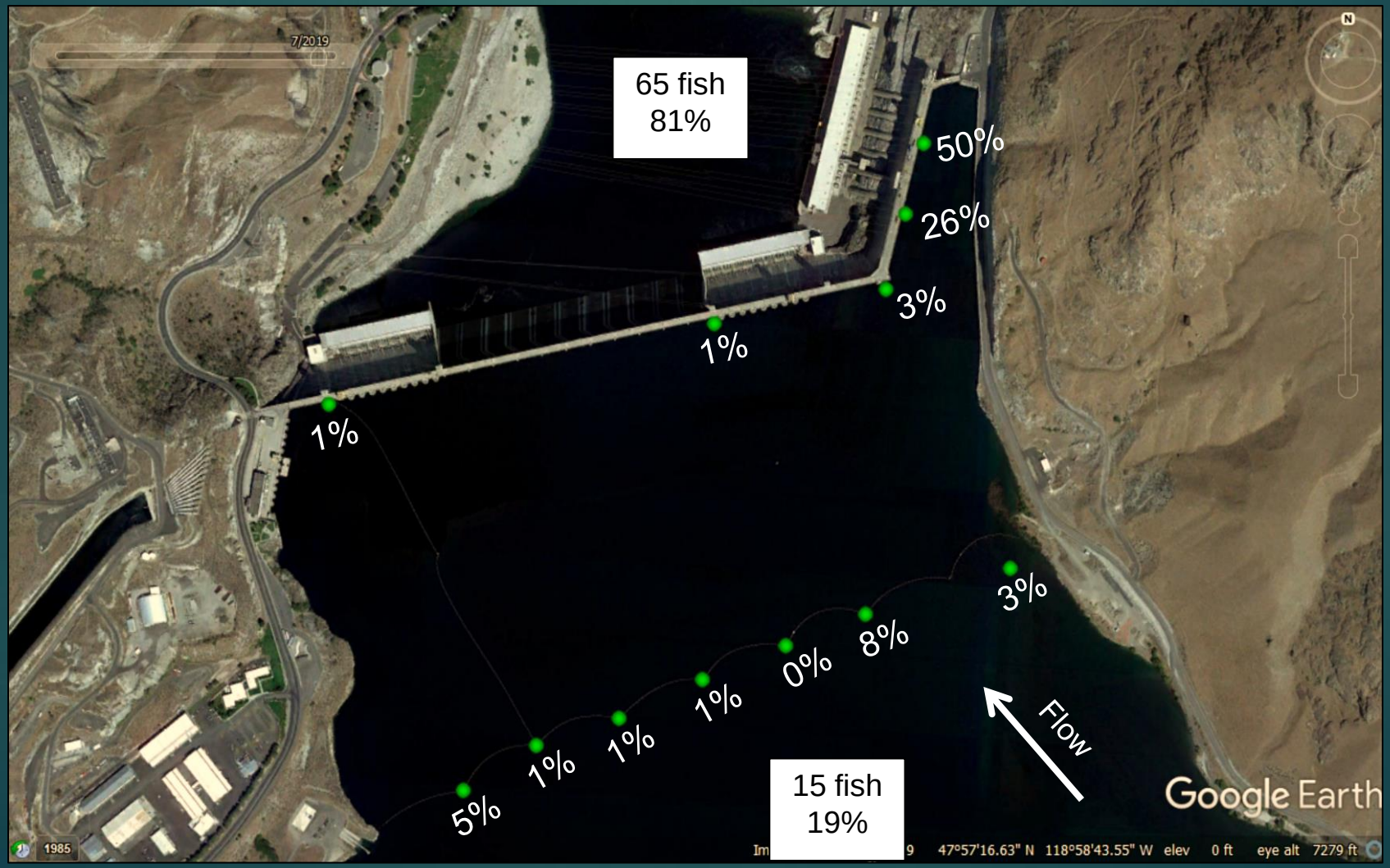
Reach Survival



Arrival Distributions at Grand Coulee Dam



Last Detections at Grand Coulee Dam



Juvenile Outmigration Studies:

- Much more from 2022….
- 2023 is underway, with modifications
- Ramping up PIT tag groups from overwinter net pen acclimation
- 53k released spring 2023
- 170k being reared for spring 2024
- Working on funds and donor stocks for Sockeye studies
- PIT tagging wild emigrants from spawning tributaries

Cultural and Educational Releases

Beginning to address short-term tribal goals for: ceremonies, education and outreach harvest in areas deprived of salmon for 60-110 years; ecological restoration, data to inform the phased approach, proof of concept

Cultural and Educational Releases
UCUT Tribes, 2017-2022

>1500, adult Chinook

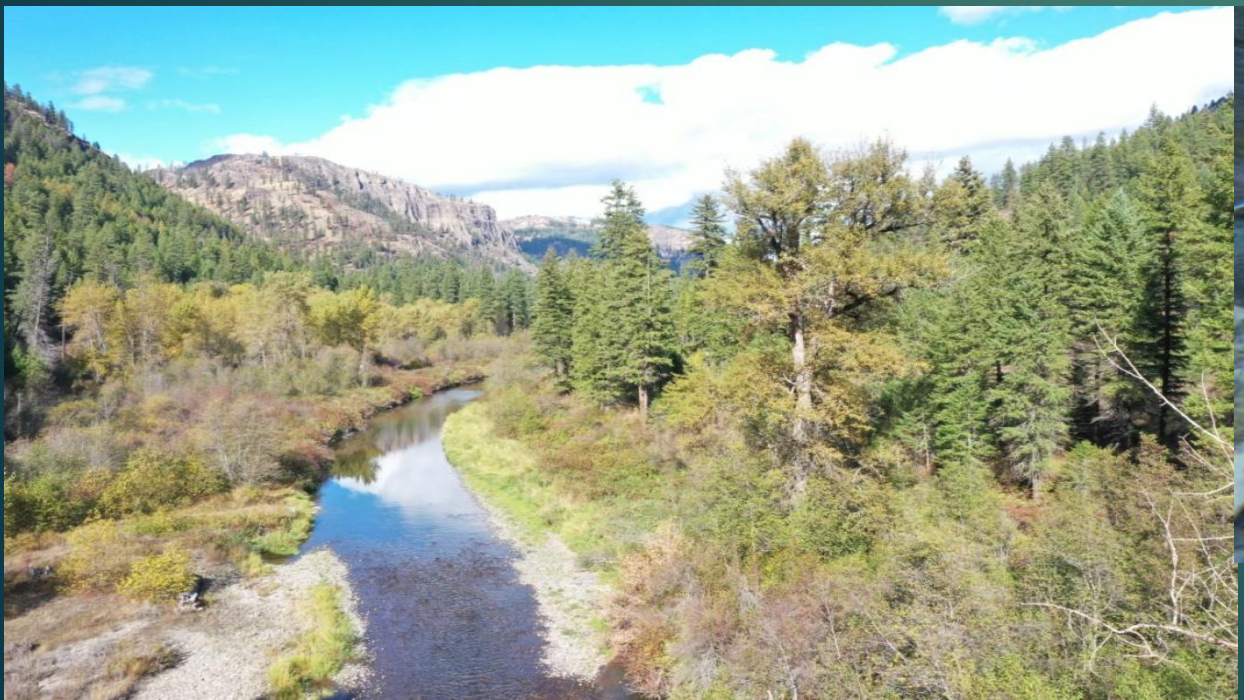
>16,000 Juveniles

**Tribally-funded effort*

Salmon Reintroduction Upstream of Grand Coulee Dam: Chinook Spawning Success in the Sanpoil River 2020-2022.

Casey Baldwin, Colville Tribes F&W, Research Scientist
Aspen Nelson, Colville Tribes, Biologist

RCO Salmon Recovery Conference
Vancouver, WA April 19, 2023



Sanpoil River Adult Salmon Releases, 2020

- Collected adult summer Chinook salmon at Wells Fish Hatchery (Late July – Mid-Aug).
  - 2020 = 100 fish sampled for pathogens, genetics and PIT tagged

Sanpoil River Salmon Releases

Sanpoil Spawning

- 2020 = 100 released, counted 36 redds (~5 mi surveyed)
- Generally spawning was observed within 2 miles of release
- Did not survey the West Fork or ~ 30 mi of Sanpoil R. downstream

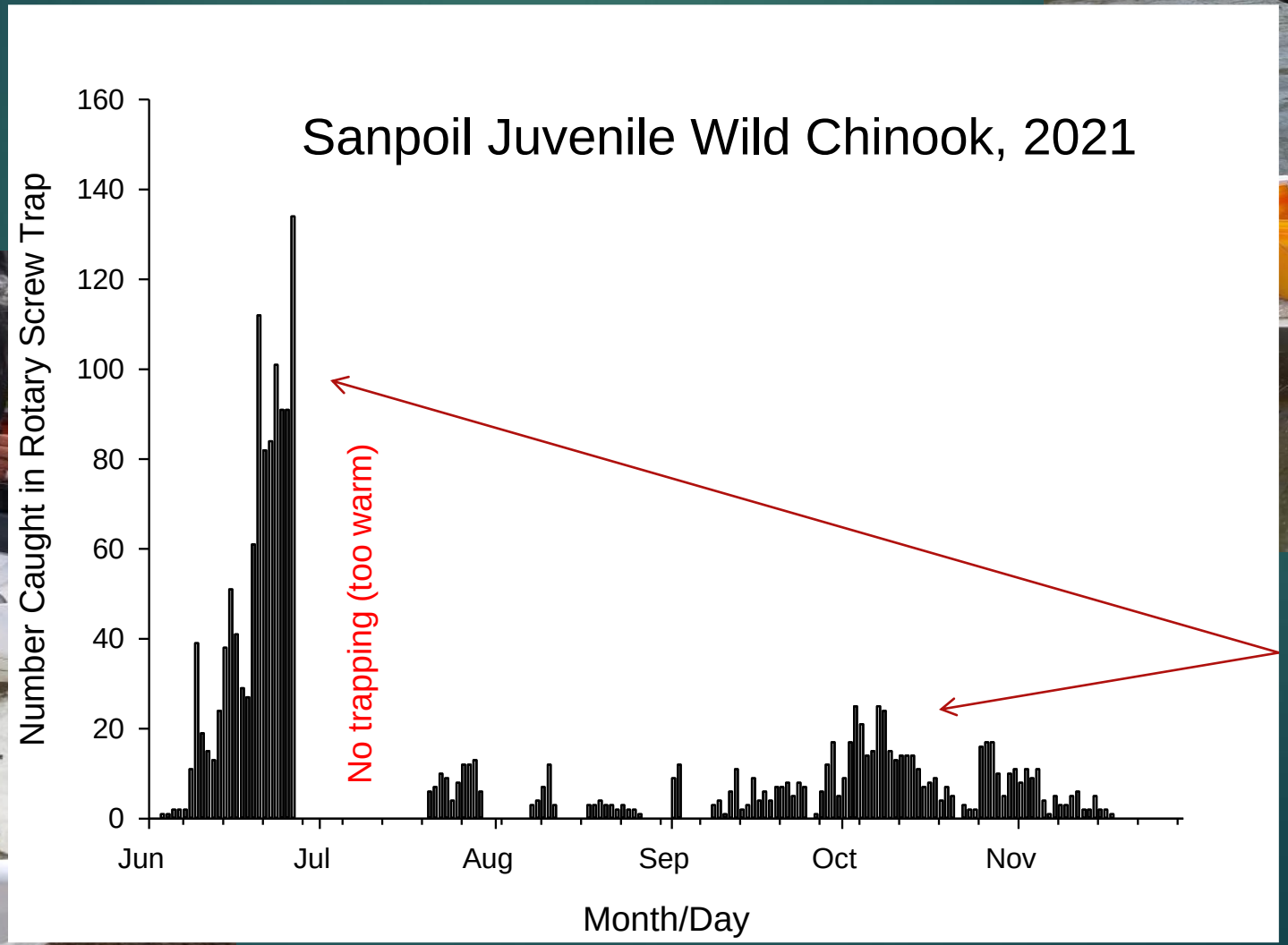
Sanpoil River Salmon 2020-2021

Resident Fish Program Rotary Screw Trap, 2021

- No trapping Apr&May
- Began catching juvenile Chinook June 2, 2021
- Trap efficiency (June-Nov) (avg. = 15.7%)

Resident Fish Program Rotary Screw Trap, 2021

- Caught 1,071 juvenile Chinook between June 3-26, 2021
- Caught another 743 between July 20 and Nov 18



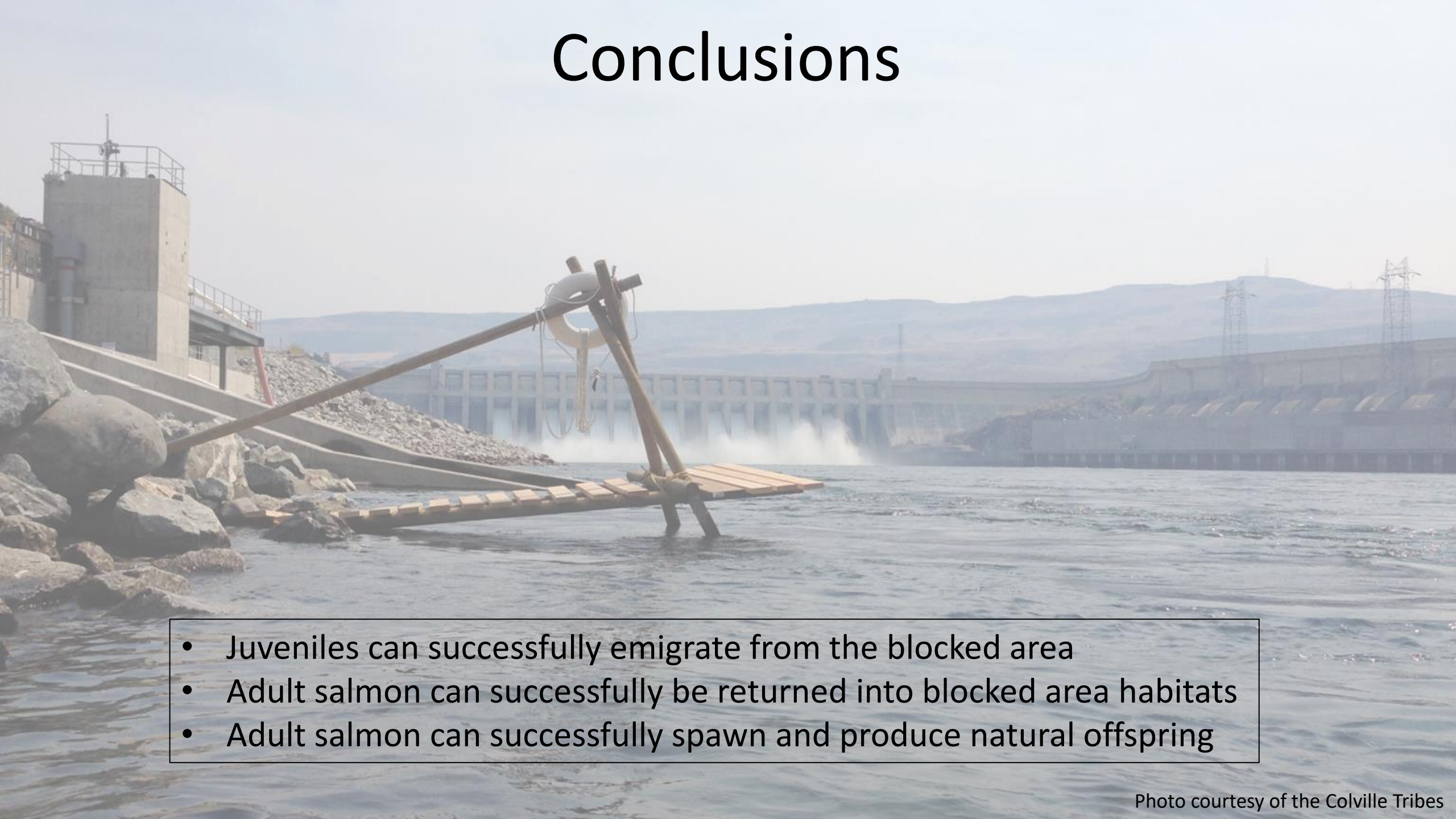
Diverse outmigration timing!

sye’us’uslsh

“she who repeatedly (swims) dives”

Hangman Creek
July 12, 2022

Conclusions



- Juveniles can successfully emigrate from the blocked area
- Adult salmon can successfully be returned into blocked area habitats
- Adult salmon can successfully spawn and produce natural offspring

Photo courtesy of the Colville Tribes