Estimating Aggregate Salmon Escapements and Returns for Coho Salmon Returning to the East Coast of Vancouver Island and Mainland Inlets.

…using a Bayesian Model that Combines Data on Coded Wire Tag Recoveries, Genetic Stock Identification Identification in Fisheries

Proposal July 2021

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Objective. Estimate aggregate escapement of wild coho returning to ECVI.

Why? Lack of information on the status of Georgia Basin coho. How much production is coming from the ECVI? Or from the Mainland Inlets?

Objective. Estimate aggregate escapement to a major area of the ECVI instead of 1 wild indicator stock at Black Creek. This aggregate would include a broader range of productivity from more populations.

Application of these tools is proposed using September fishery data from the northern Strait of Georgia area and escapement information from ECVI hatcheries.

Examine the utility of doing the same with the mainland inlets.

Tools:

New Parental Based Tagging **(PBT)** along with regular DNA **(GSI)** allow accurate determination of *hatchery origin* coho *from natural origin* coho within a management or assessment unit.

Fishery Sampling   **PBT** to determine stock ID for every marked coho. **GSI** to estimate regional composition of unmarked coho (ECVI, ML Inlets, USA etc.)

High quality **escapement estimates** to hatchery systems contributing to catch (Big Qualicum, Puntledge, Quinsam) with **known number** of **PBT** returns.

Canada

Mainland Inlets aggregate escapement?

Fishery Sample

ECVI aggregate escapement
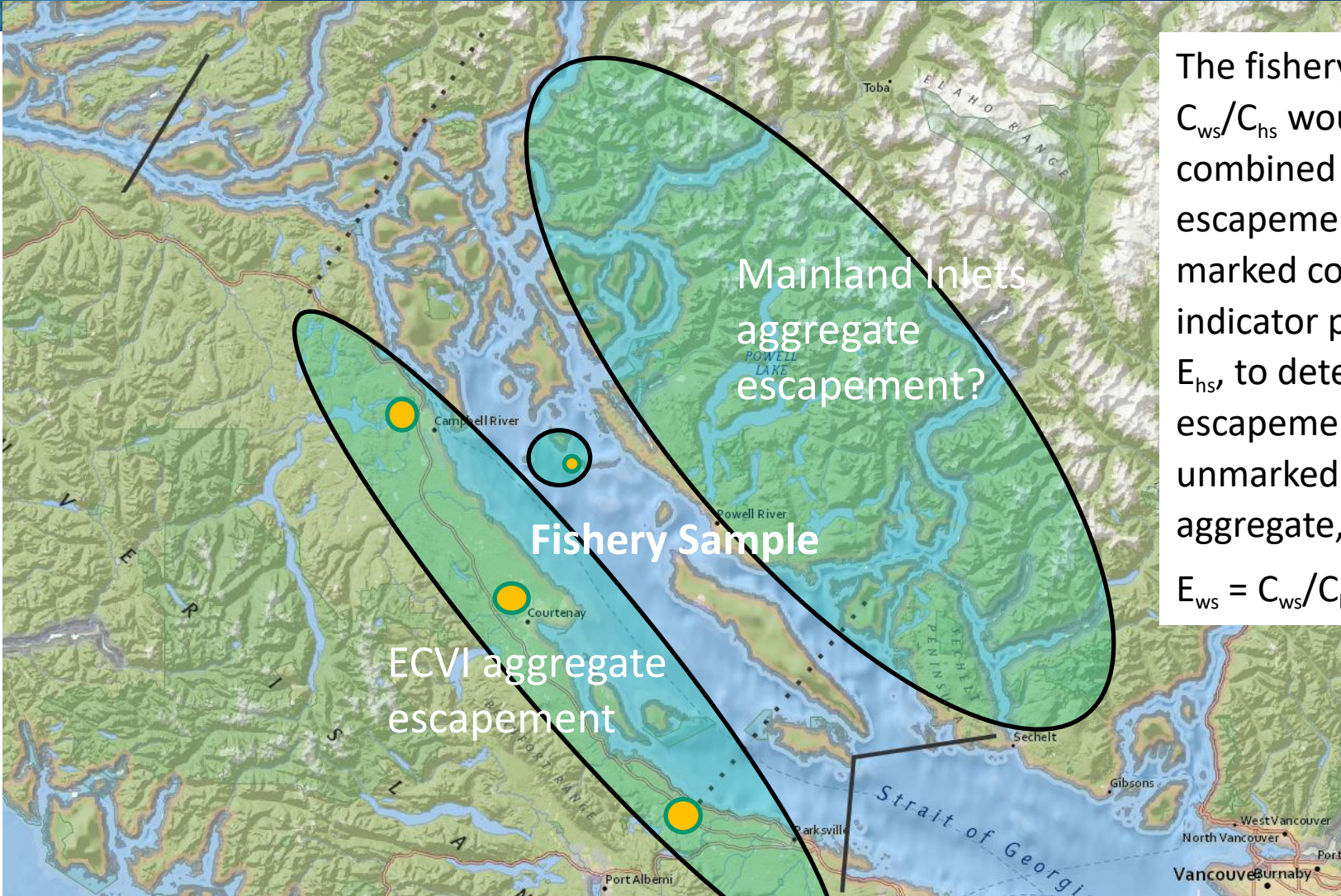
The fishery sample ratio C_{ws}/C_{hs} would be combined with known escapement of hatchery marked coho into the indicator population, E_{hs}, to determine the escapement of the wild unmarked coho stock aggregate, Ews:

$E_{ws} = C_{ws}/C_{hs} * E_{hs}$

FISHERY SAMPLING PLAN

First Nations FSC

Recreational wild retention fishery in September

Minimum 1000 ECVI samples

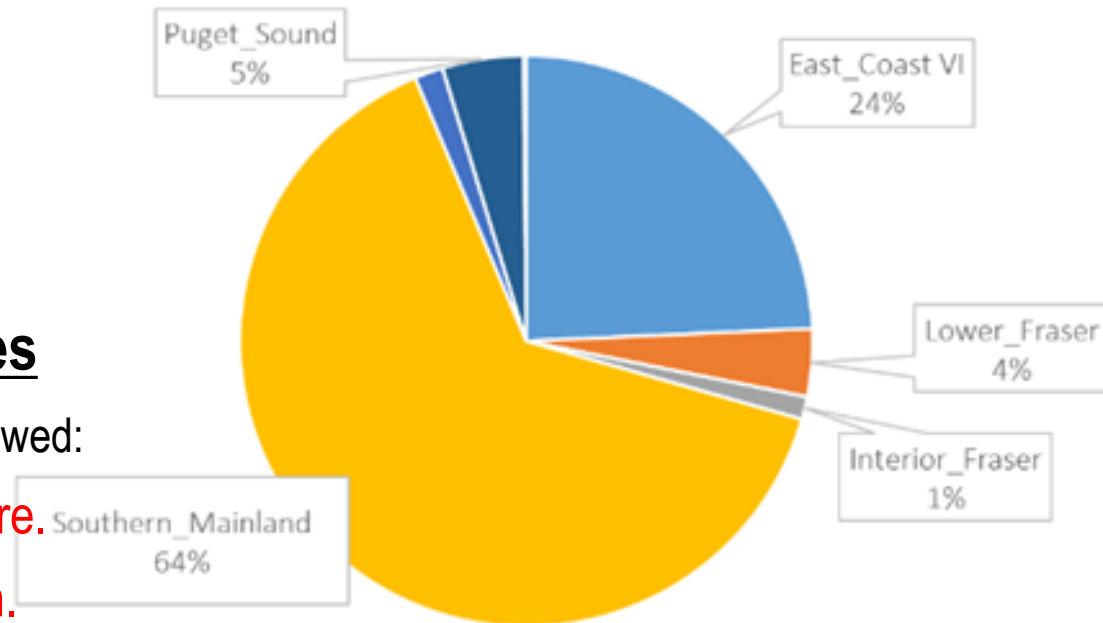Requires sampling protocols being followed:

Log the date, location of capture.

Identify the mark status, length.

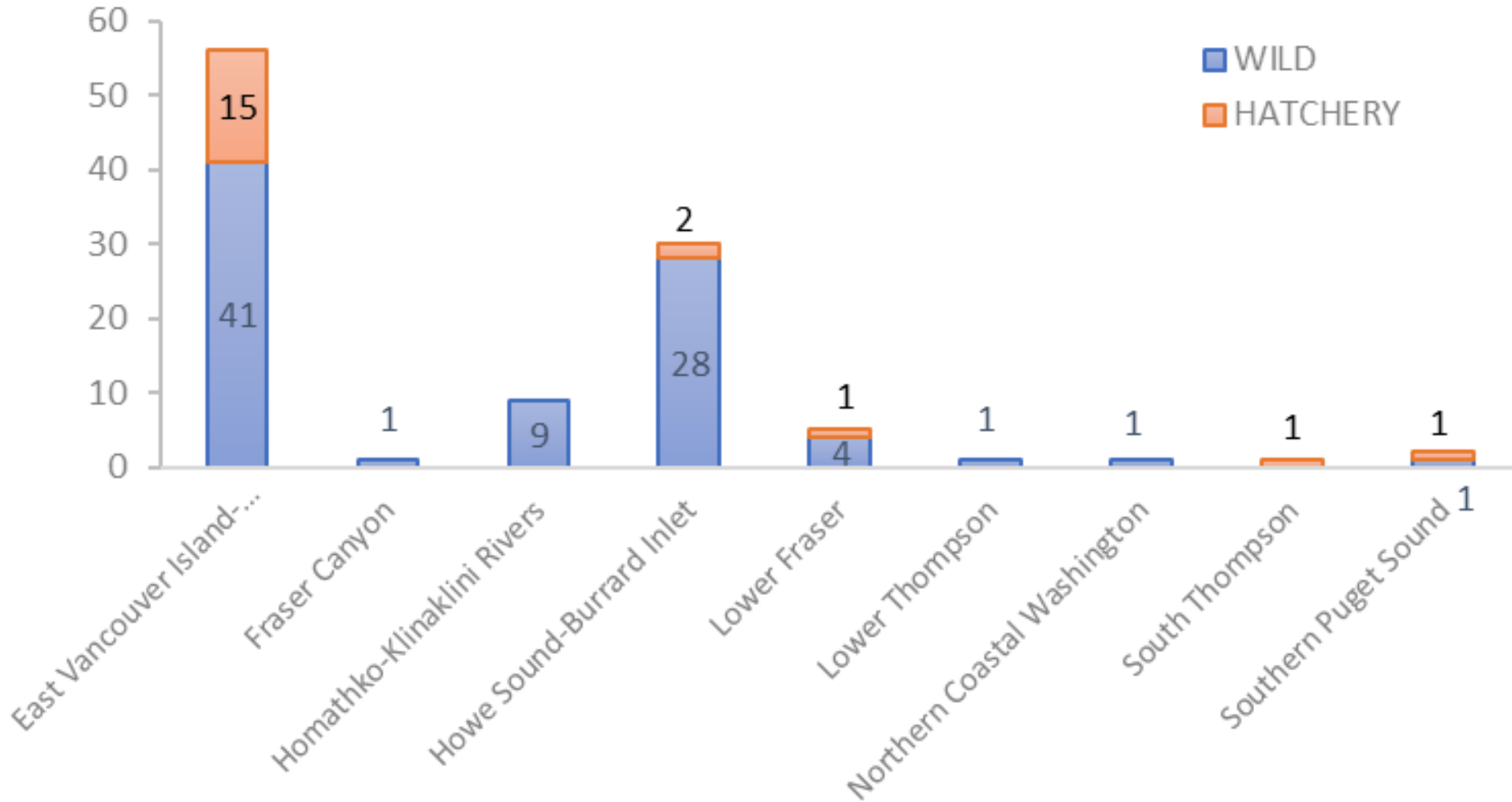Take a DNA sample.

UNBIASED SAMPLING **– wild and hatchery fish sampled at random**

Recreational Fishery Catch Stock Composition, September 2014 Area 13, n=156

- Puget_Sound 5%
- East_Coast VI 24%
- Lower_Fraser 4%
- Interior_Fraser 1%
- Southern_Mainland 64%

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PRELIMINARY RESULTS   n=106

2021 Coho DNA - ASSESSMENT FISHERY

PRELIMINARY RESULTS n=314
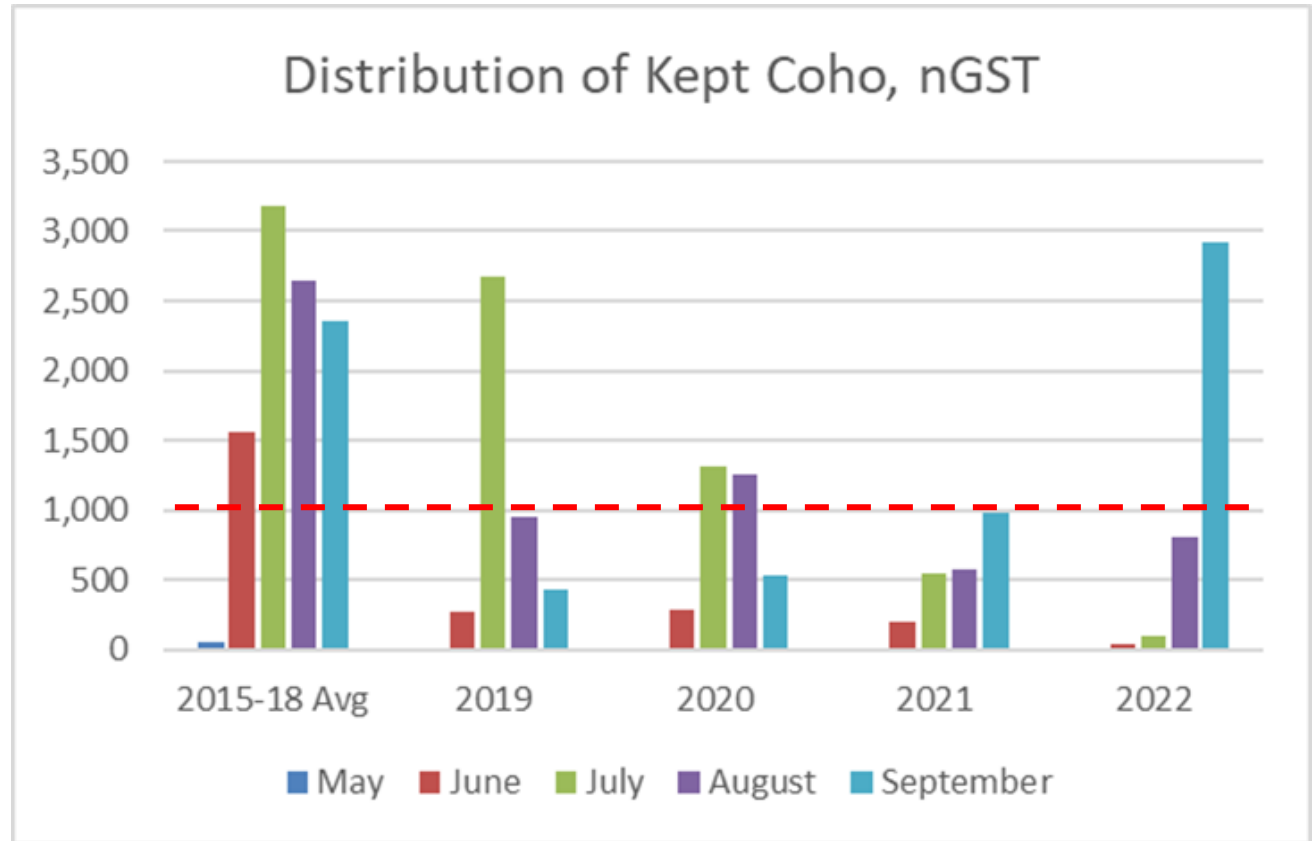

2022 Coho DNA - ASSESSMENT FISHERY

Fisheries and Oceans Canada   Pêches et Océans Canada
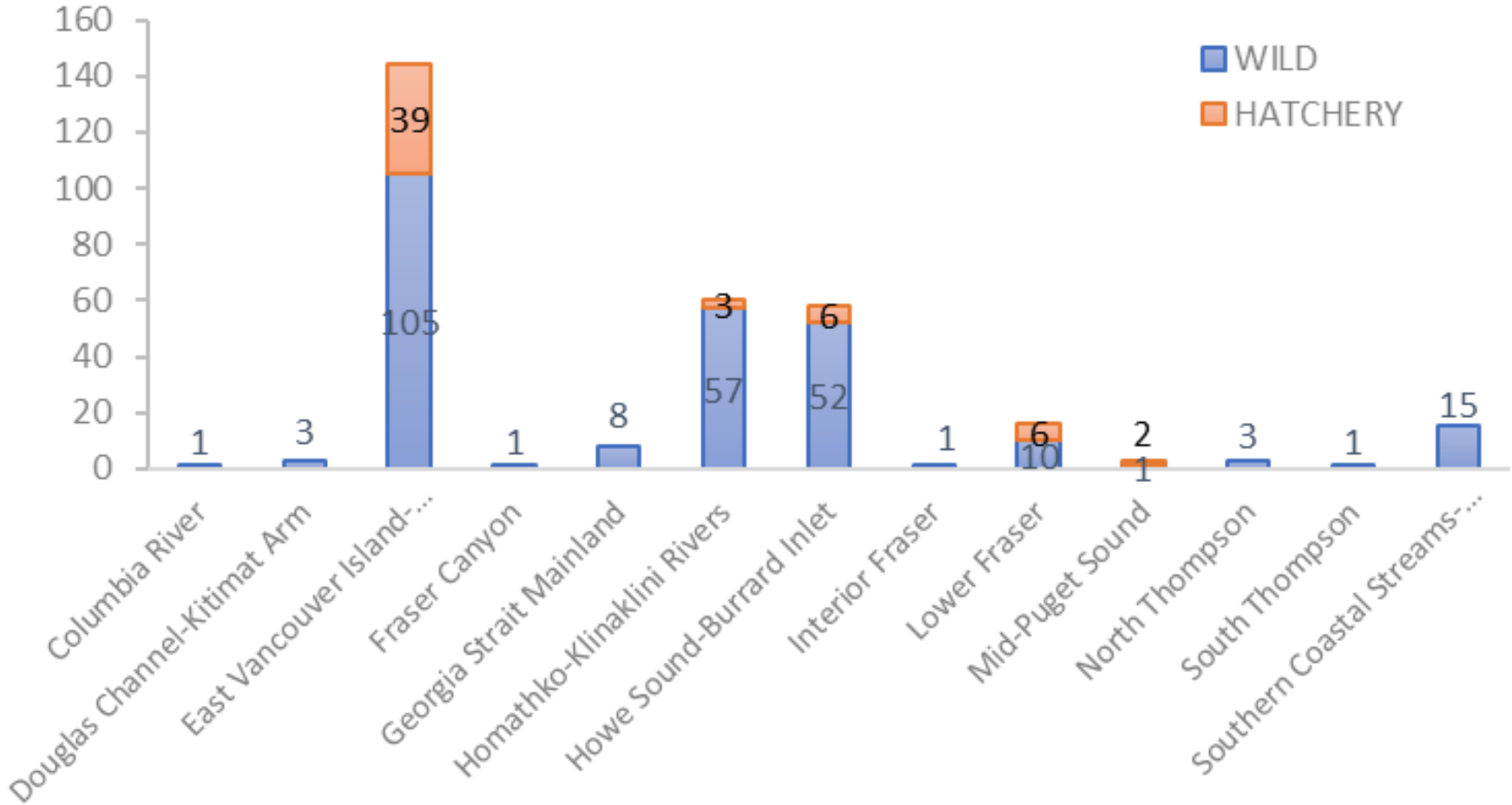
PRELIMINARY RESULTS

- Catch sample rates estimated at ~10% in both 2021 and 2020.

- Required sample proportion ~ 30%

- Sample Requirements = 1000

Distribution of Kept Coho, nGST

■ May ■ June ■ July ■ August ■ September

nGST = 13,14,15,16

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PRELIMINARY RESULTS

2022 Estimate				Peterson Pop Estimator	Pop	Var.	SD	CV
Adults				Hypergeometric	**240709**	1304737730	36121	15.0%
Marks	29037		marked hatchery escapement					
Captures	**314**		all fishery DNA samples	All stocks estimate				
Recoveries	37		marked hatchery DNA samples					
R/C	11.783%		% marks in DNA					

2021 Estimate				Peterson Pop Estimator	Pop	Var.	SD	CV
Adults				Hypergeometric	**197013**	1940733198	44054	22.4%
Marks	29459							
Captures	**106**							
Recoveries	15							
R/C	14.151%							

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