



What's happening with Coho salmon in the Strait of Georgia?

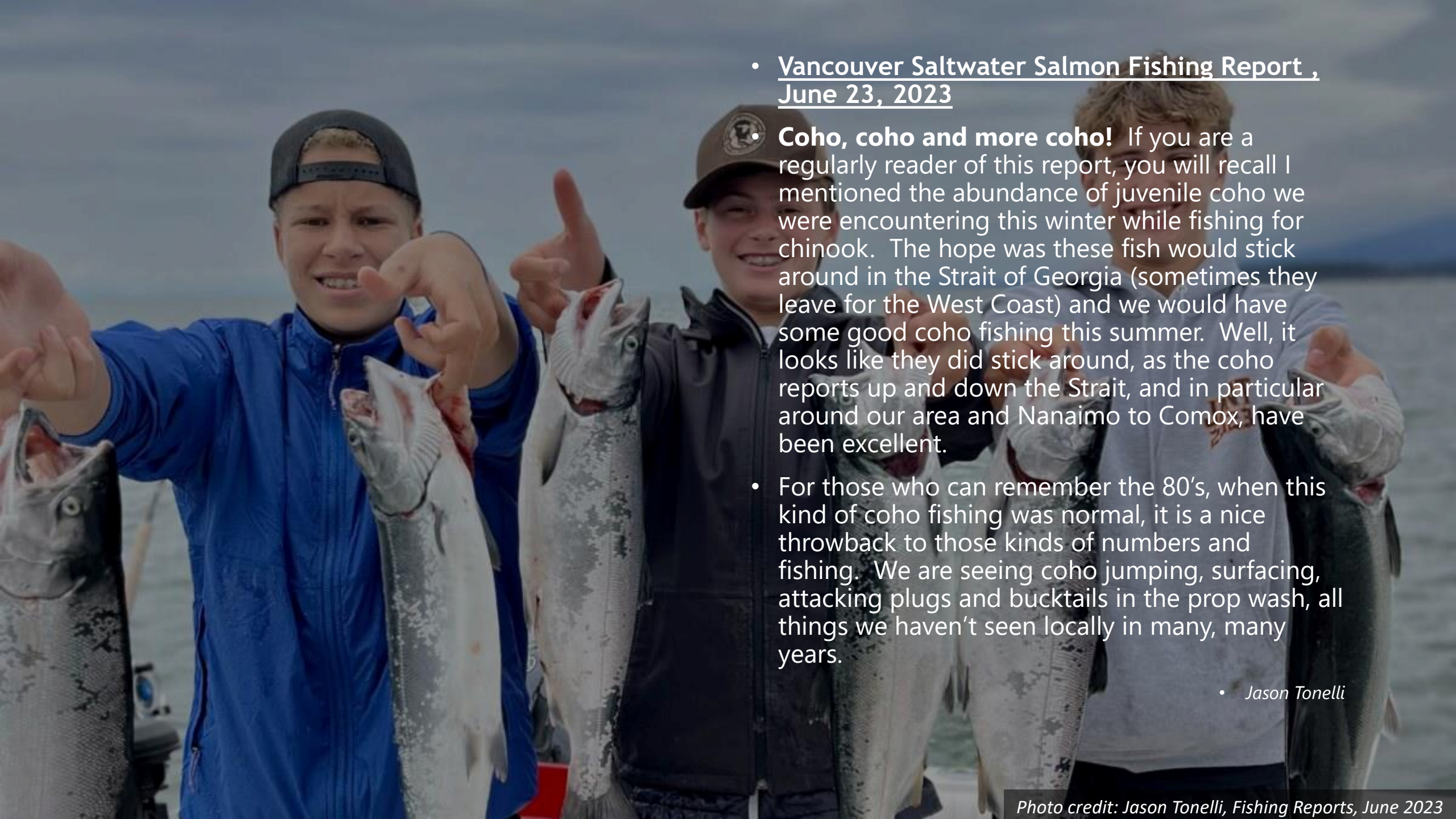
Chrys Neville

Salmon Marine Interactions

REEF/ESD, Pacific Biological Station

Fisheries and Ocean Canada

Photo credit: Jason Tonelli, Fishing Reports, June 2023



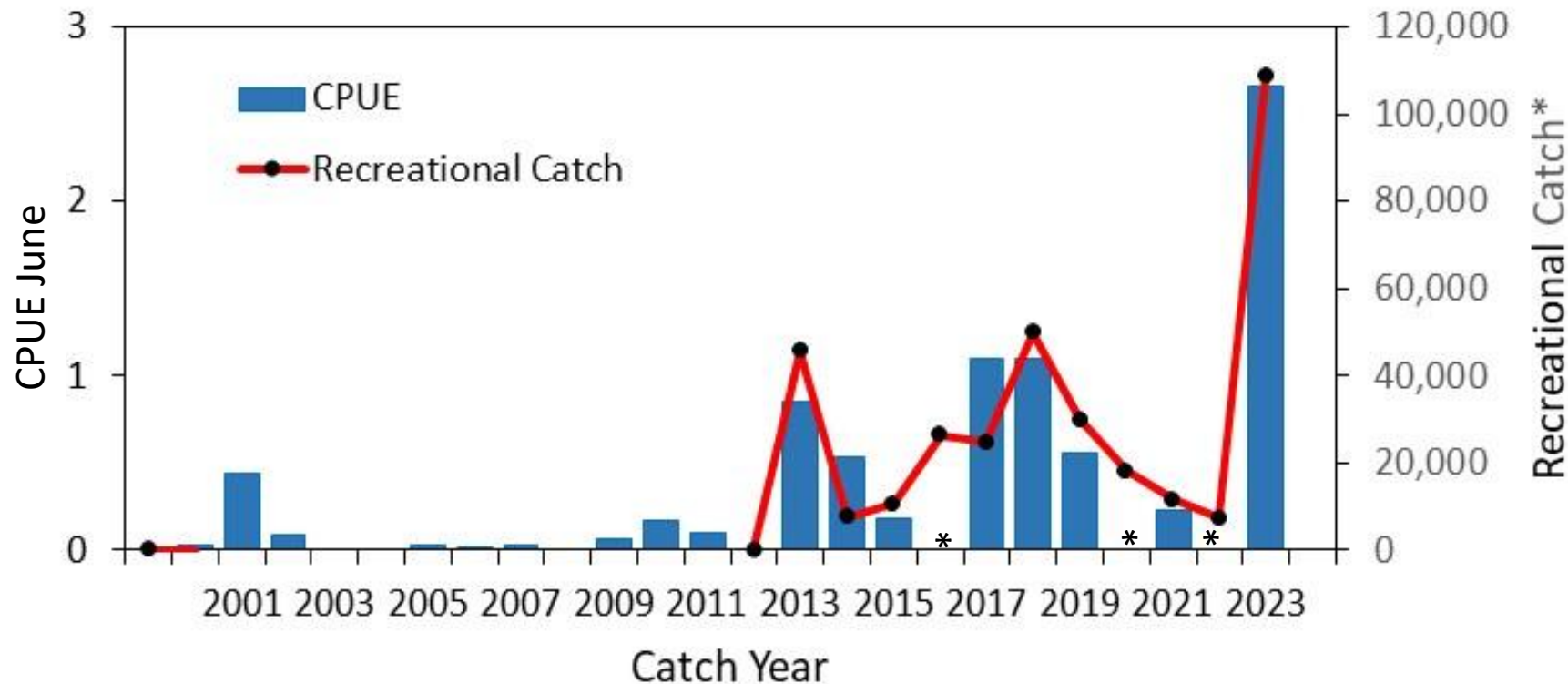
- [Vancouver Saltwater Salmon Fishing Report , June 23, 2023](#)

- **Coho, coho and more coho!** If you are a regularly reader of this report, you will recall I mentioned the abundance of juvenile coho we were encountering this winter while fishing for chinook. The hope was these fish would stick around in the Strait of Georgia (sometimes they leave for the West Coast) and we would have some good coho fishing this summer. Well, it looks like they did stick around, as the coho reports up and down the Strait, and in particular around our area and Nanaimo to Comox, have been excellent.

- For those who can remember the 80's, when this kind of coho fishing was normal, it is a nice throwback to those kinds of numbers and fishing. We are seeing coho jumping, surfacing, attacking plugs and bucktails in the prop wash, all things we haven't seen locally in many, many years.

- *Jason Tonelli*

Catch of ocean age 1+ Coho salmon in 2023

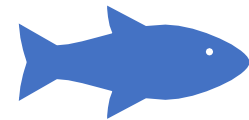


- Our surveys intercept age 1+ Coho in low numbers
- June 2023 survey catch of age 1+ Coho largest in 25 years
- The total recreational catch (to end of August) has similar trend

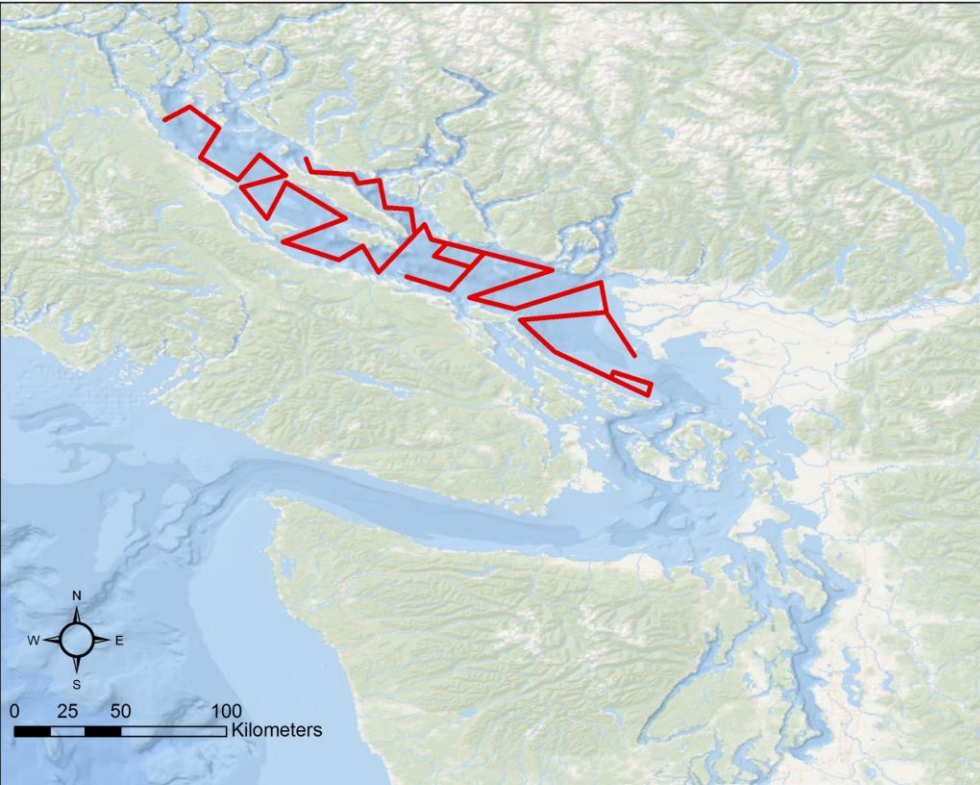
* No surveys

Recreational catch to August of both retained and released fish

Juvenile salmon surveys in
the Strait of Georgia 1998-
2023



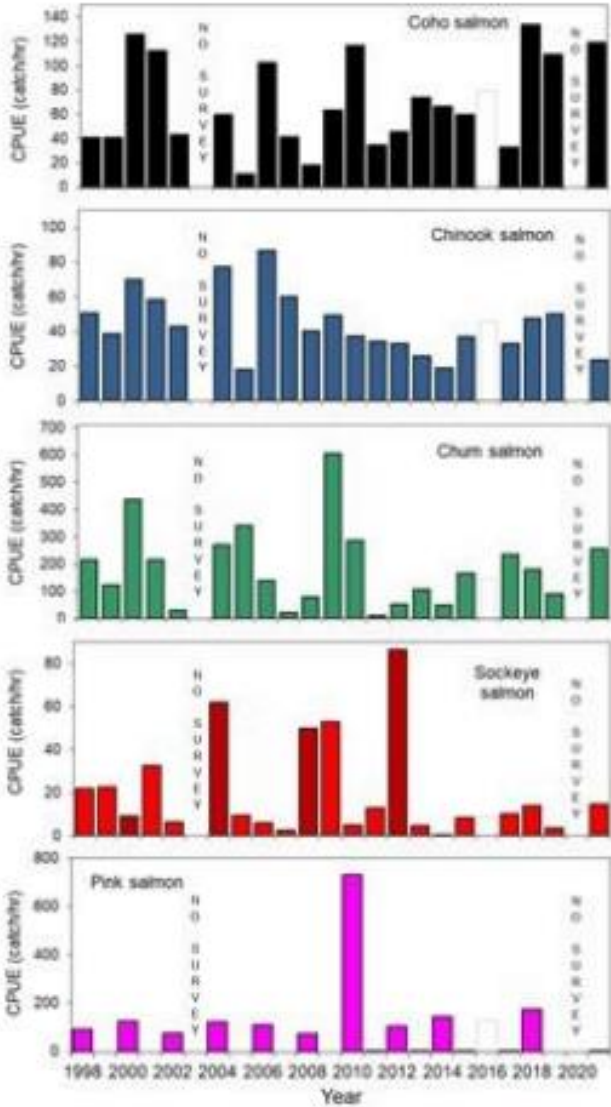
Salmon Marine Interactions Program



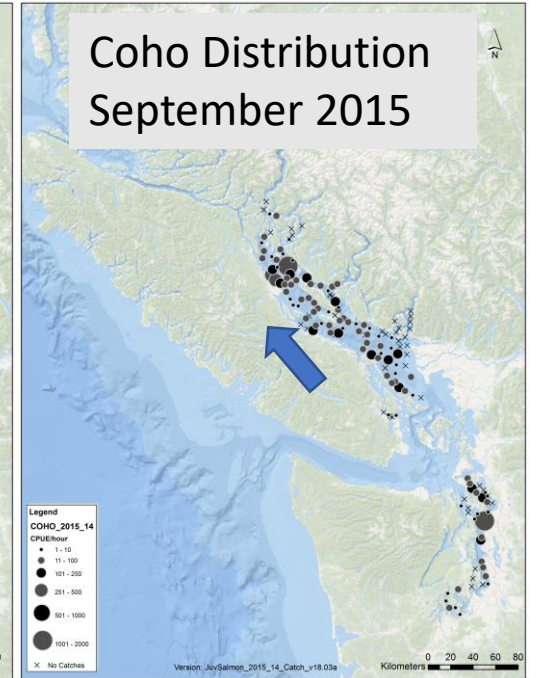
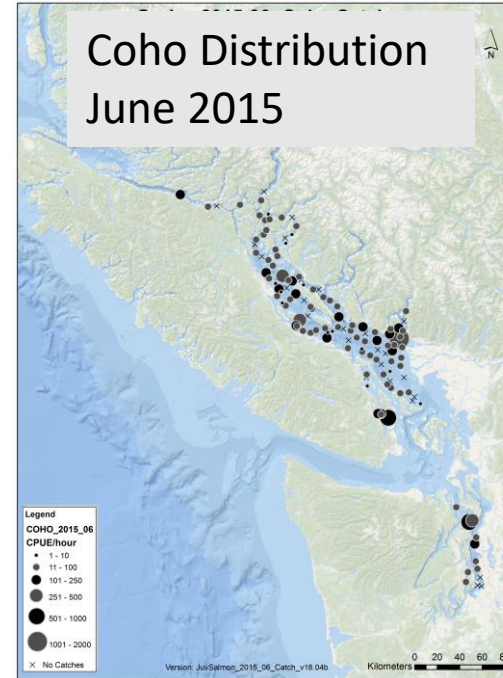
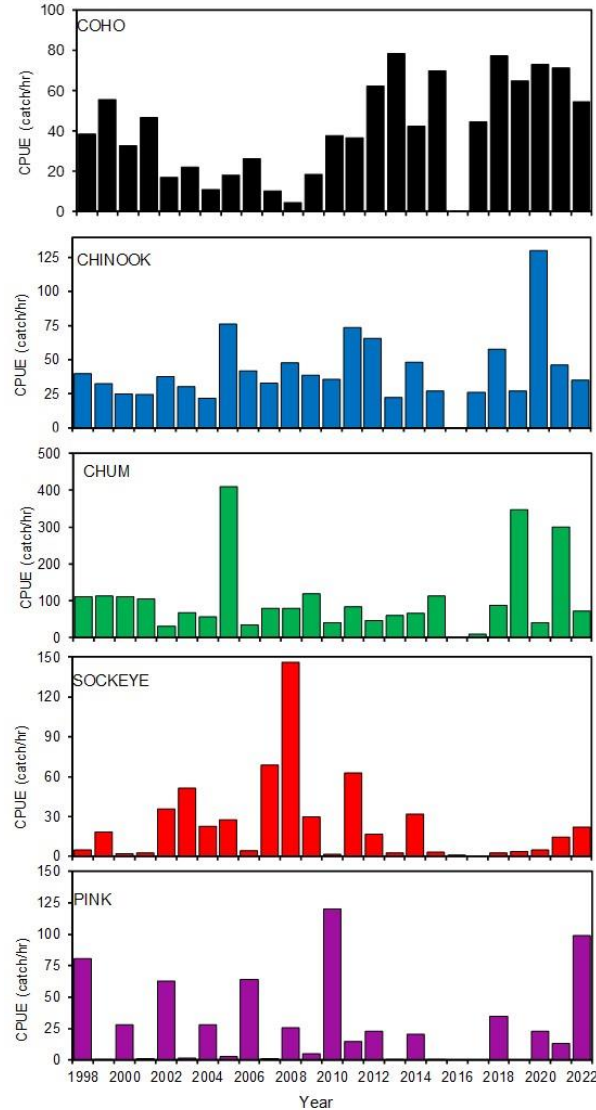
- 1998-present trawl surveys on standardized track line in the Strait of Georgia to sample juvenile Pacific salmon.
- Conducted 2 times/year – late June and September
- Surface to 75m
- ~80-100 sets/survey + extra regions

Information from surveys

CPUE June



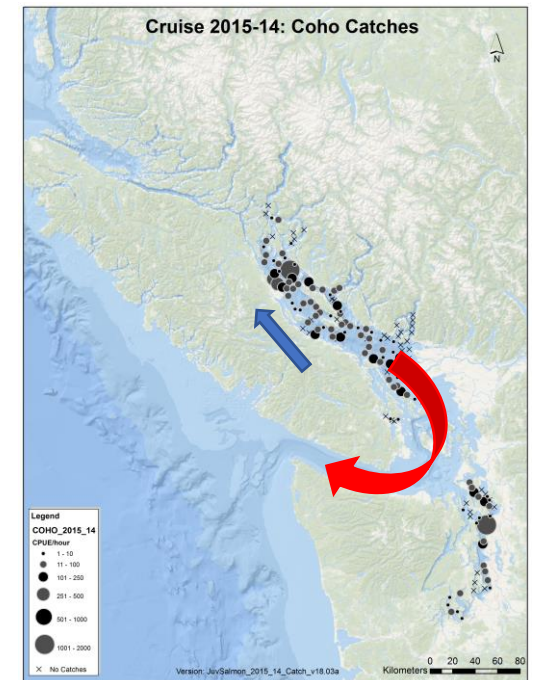
CPUE September



- Surveys provide information changes in CPUE between seasons and years for juvenile salmon.

Extended residency of juvenile Coho salmon

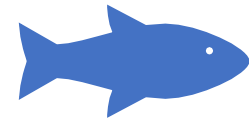
- A combination of late fall surveys acoustic tagging studies demonstrated MOST Coho salmon originating from southern BC rivers and streams and entering the SOG, remain and rear within the SOG through September.
- Most movement out of the SOG in November with only about 4% of tagged fish remaining in the SOG by December.
- This knowledge allows studies to be developed for specific stocks or groups over their first four months in the ocean.



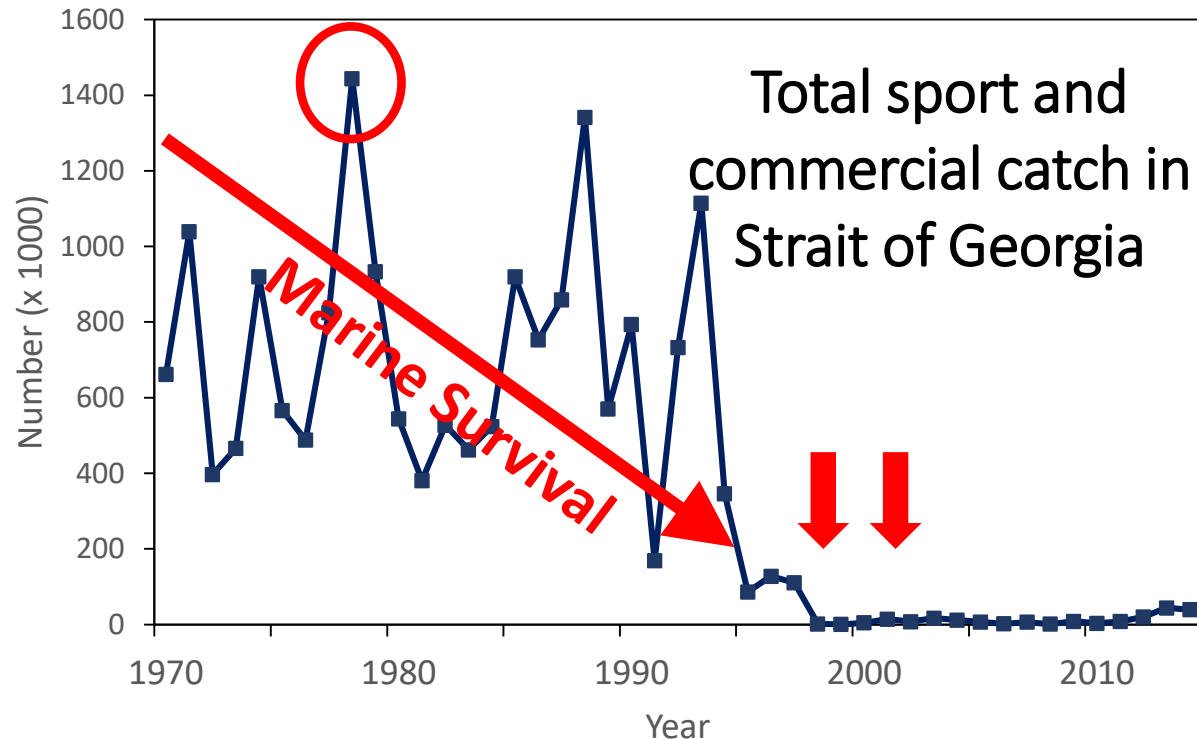
Early marine period important– Farley et al. (2020); Graham et al. (2019); Duffy and Beauchamp (2011)

A Brief History

- * Fishery in the Strait of Georgia
- * Distribution changes



Sport and Commercial Catch



Historically, the Coho fishery was important in BC with peak sport and commercial catches in 1978 **1,444,000** Coho.

However, by the end of the 1990s fisheries had been closed and there was great concern for these stocks

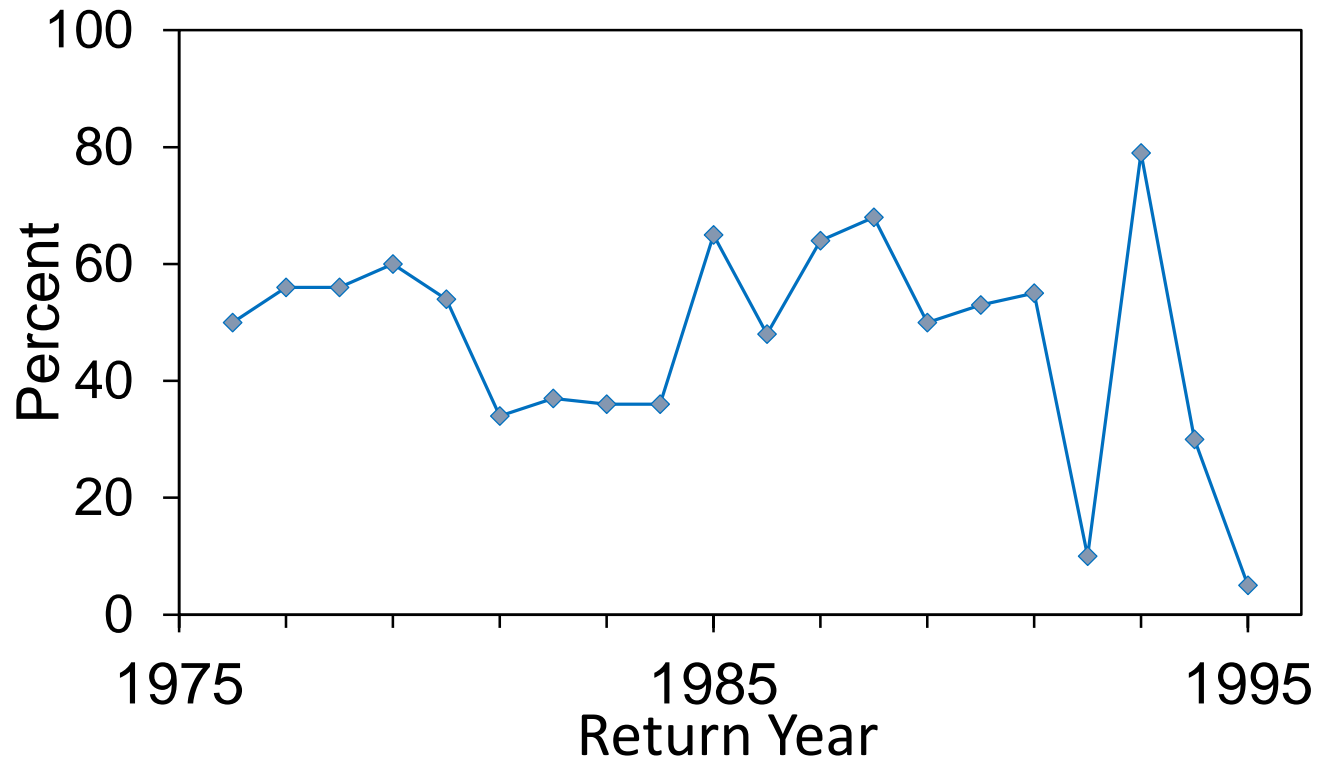
Interior Fraser River Coho salmon listed as endangered in 2002 (2016 threatened).

We know two important factors

1. Decline in marine survival from $\sim 10\%$ in the 1980s to less than 2% by late 1990s

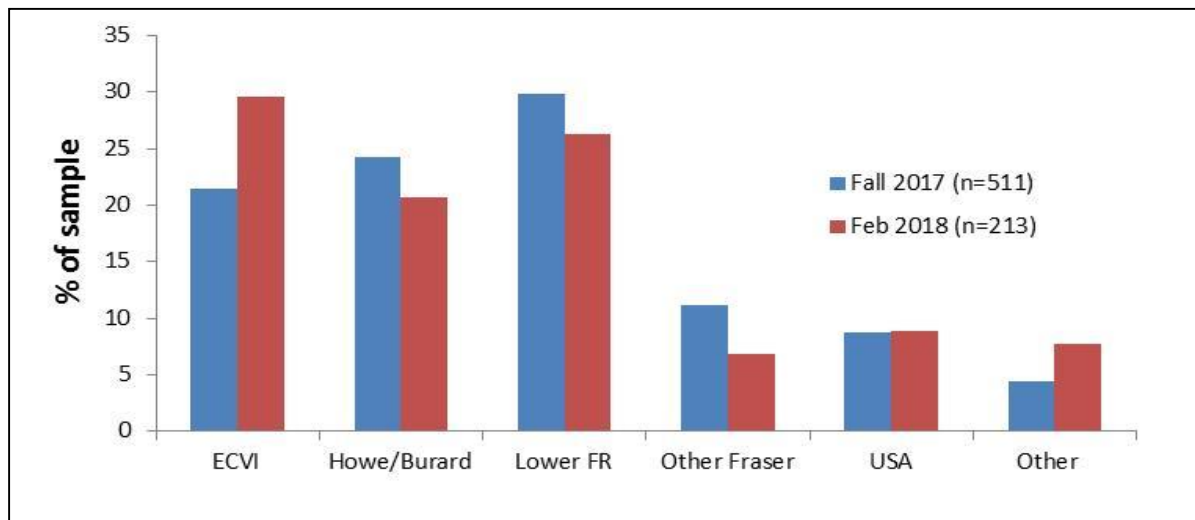
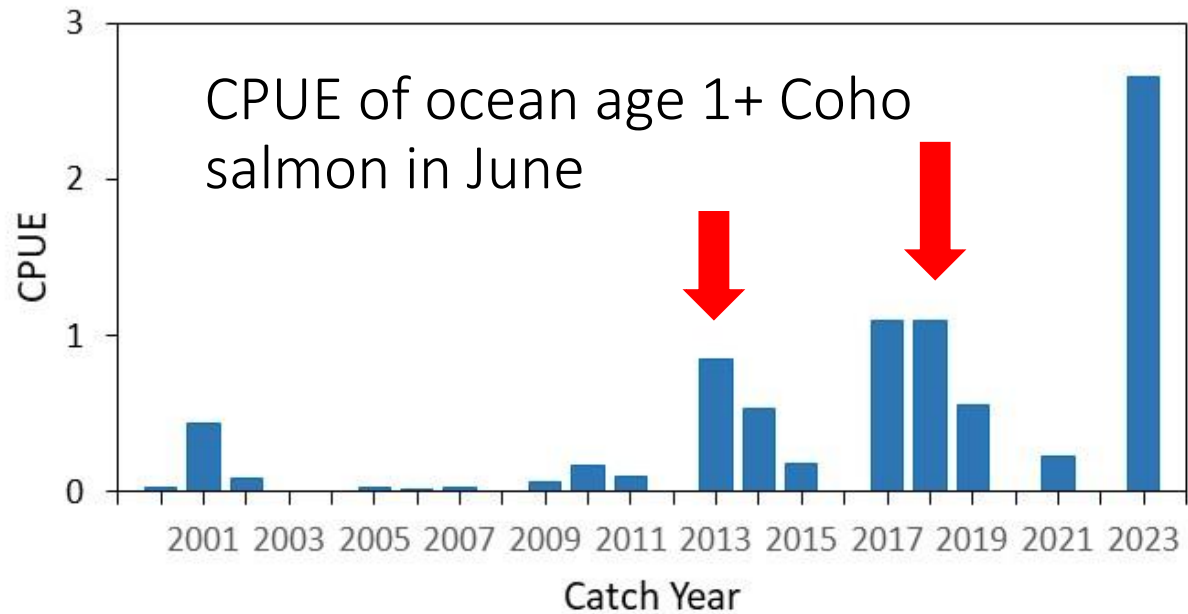
Inside Outside Distribution

(% of SOG Coho in SOG troll and sport fisheries)



- ***Beginning*** in 1995 virtually all Coho salmon left the Strait of Georgia and did not return until late summer the following year.
- The ***change in behaviour*** resulted in the collapse of the sport fishery for Coho salmon in the Strait of Georgia.

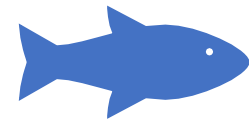
Another change in distribution



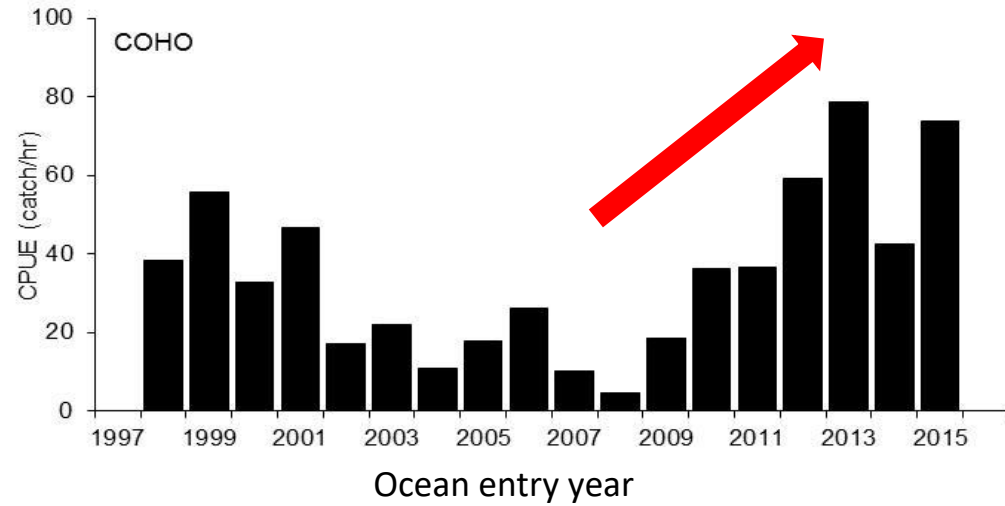
- In 2013, Coho salmon begin to return to the Strait of Georgia in the spring/early summer.
- Large numbers of Coho salmon observed in February 2018 in the Strait of Georgia by the 'Avid Anglers'.
- First evidence that they were overwintering since distribution change in 1990s.
- Stock mixture in February 2018 similar to September 2017 survey.
- Proposed change in behaviour was due to increased growth and metabolic shift.

'Avid angler' is a hook and line sampling program.

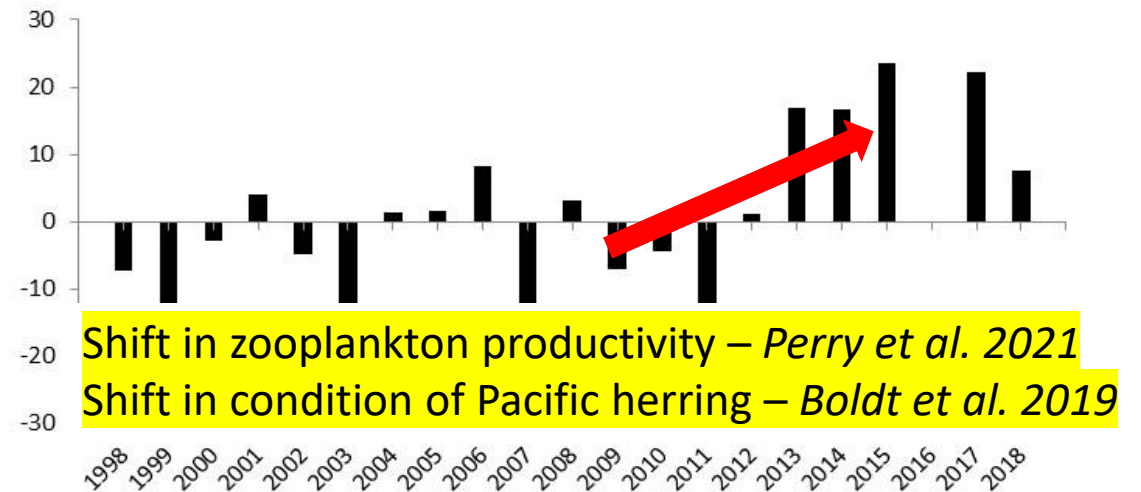
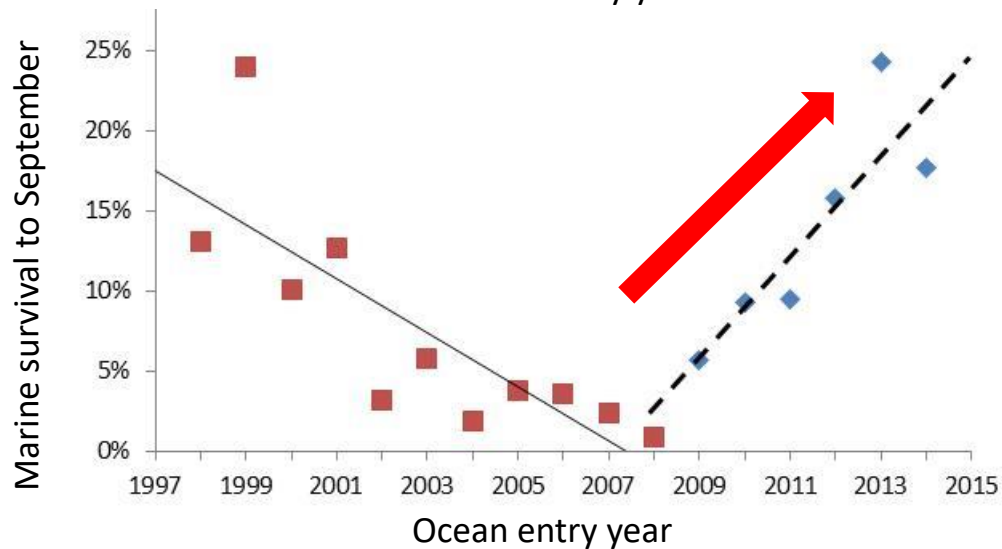
Changes in Ocean Productivity



Importance of identifying changes in ocean productivity

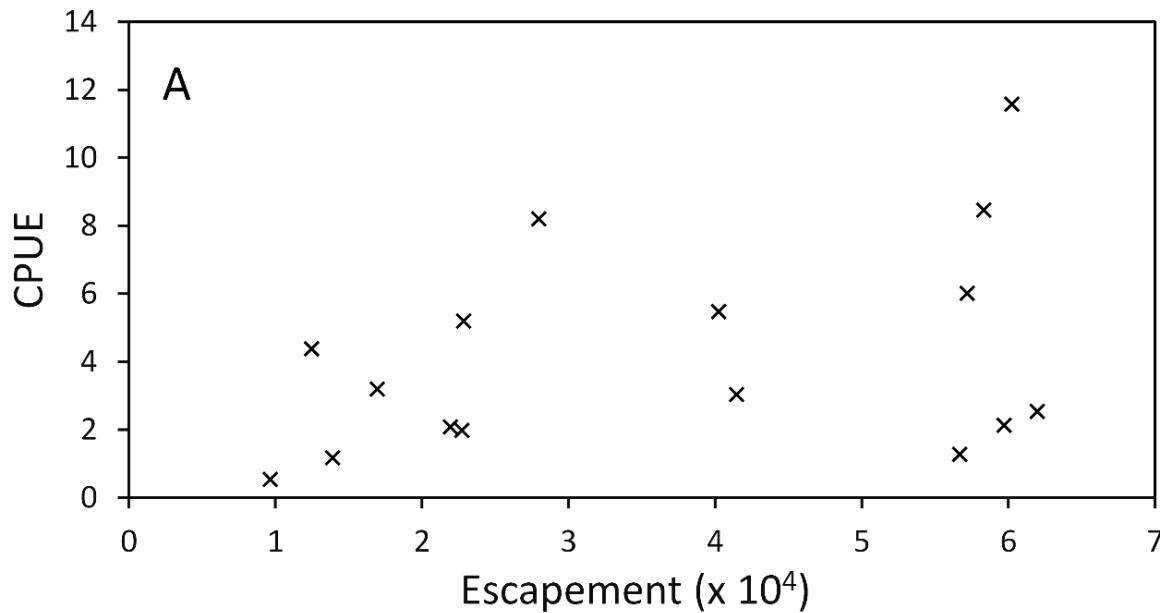


- Beginning in 2008/2009 the abundance of Coho salmon in the fall in the Strait of Georgia increased.



Thresholds to marine survival

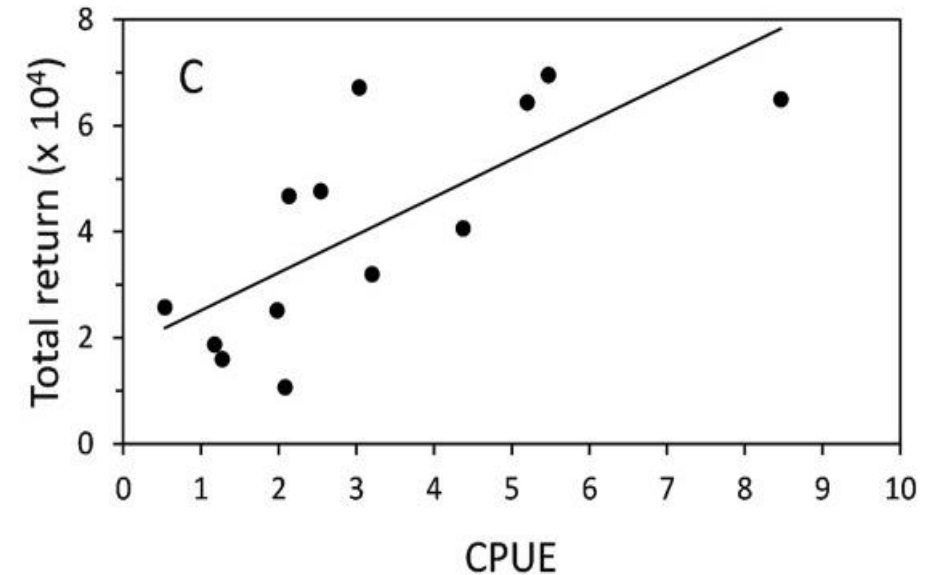
Interior Fraser River Coho Salmon



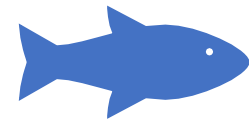
- We suggested that the capacity of the strait to support juvenile Coho salmon changes.
- Above a threshold, the strait could be considered fully seeded and more juveniles would therefore not result in more Coho salmon
- > 4x change at abundance for escapements between 55-65K Coho salmon.
- ***Higher carrying capacity directly associated with increased abundance and growth of juvenile Coho salmon.***

September abundance indicator of final returns

- Beamish et al 2010 first demonstrated a strong relationship between abundance of juvenile Coho salmon in September and returns one year later .
- During the new productivity period that relationship exists but is noisier.
- Our interpretation is that a secondary factor – ocean warming – is resulting in increased mortality after their ocean winter.

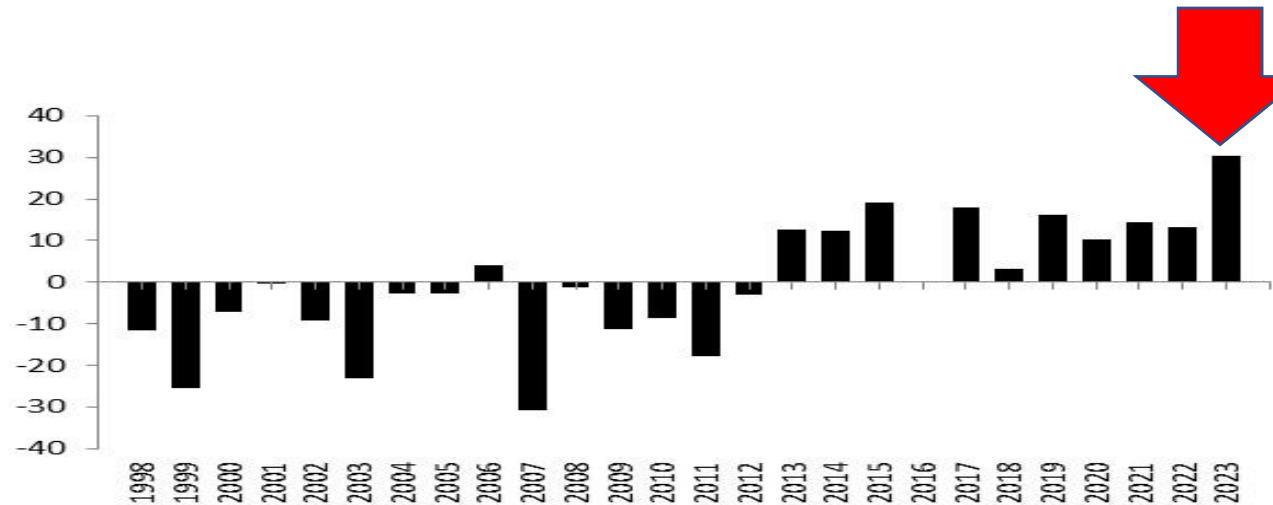
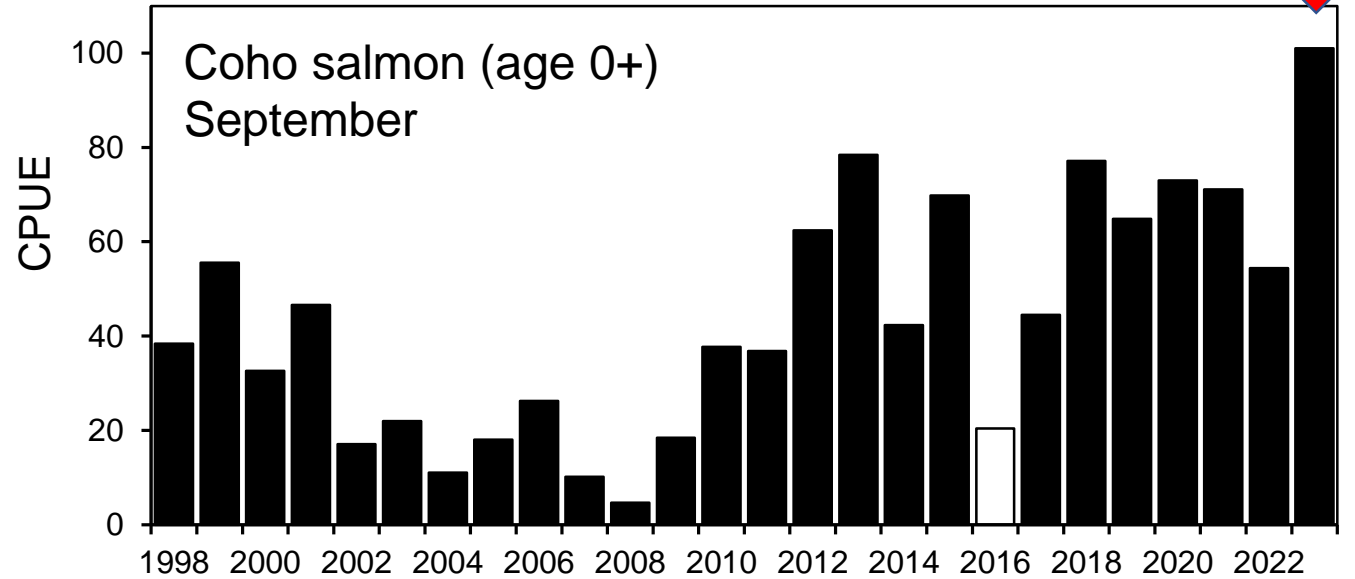


Hatcheries and Large Scale Ocean Warming



What about 2024?

- September survey 2023 had the highest CPUE of juvenile Coho salmon in the 25 year record.
- The size of the Coho salmon largest in the time series.
- Suggest good conditions for 2024.
- However, we have work to do and we need to remember



Summary

- Coho salmon production appears to be regulated by the carrying capacity of the Strait of Georgia which occurs in states/periods that can shift quickly.
- “Rebuilding” efforts will be dependent on limits during a carrying capacity period.
- We need to test our hypothesis on physiological conditions regulating the migration of Coho salmon.
- The residency of coho salmon for extended periods in the Strait of Georgia may be one of the best opportunities to test mechanisms regulating ocean survival.

Thank you to all that have helped
on surveys over the past 25 years!

