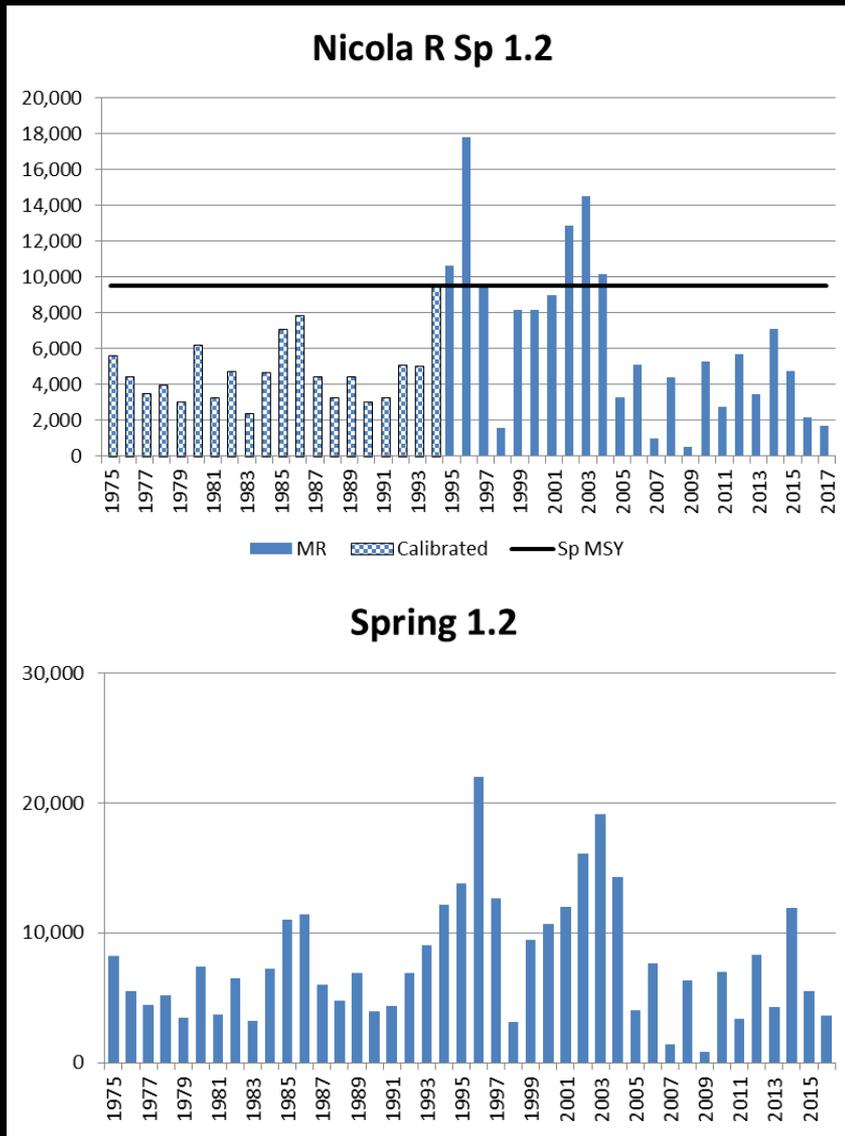


Nicola Research Collaborative: State of the Nicola Stocks

Nicola Basin is home to two indicator programs on Pacific Salmon and Provincial studies on Steelhead.

- Nicola River Chinook indicator program was initiated in 1995. The program provides annual estimates of spawning escapements by age, sex and CWT code, estimates of marine survival and fishery specific exploitation by age. Partnership between NTA, DFO Science, DFO SEP (Spilus Cr. Hatchery) and recreational sector. Nicola is the Chinook Technical Committee indicator stock for Fraser 4₂ springs.
- Annual mark-recapture study
- CWT smolts produced by Spilus Cr. Hatchery.

Nicola Chinook Status



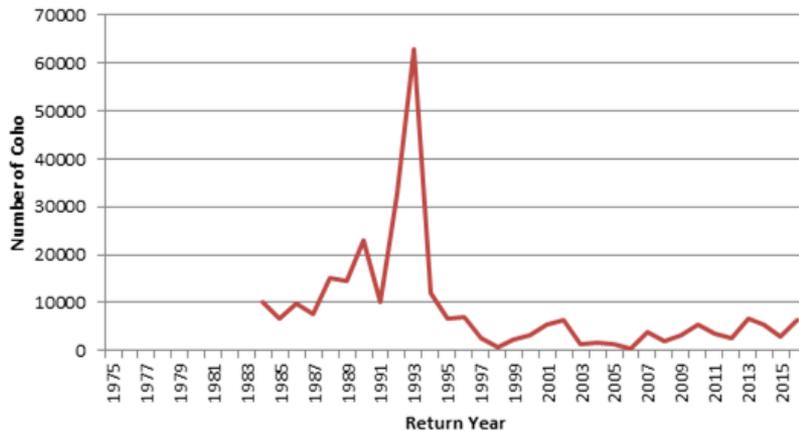
- We are currently in a period of depressed productivity, that started in the early 2000's.
- Recent escapements have been really depressed, likely due to marine and FW influences of the "warm blob".
- Recent escapements to Nicola and to aggregate as a whole are well below target levels.
- Evidence of stressful rearing conditions in ocean; decreased fecundity, increase in proportions of males in escapement.

Nicola Research Collaborative: State of the Nicola Stocks

- Coldwater River Coho indicator program was initiated in 1999, and involves generating annual estimates of spawning escapements by age, sex and CWT code, estimates of marine survival and fishery specific exploitation. Partnership led by NTA, with, DFO Science, and DFO SEP (Spilus Cr. Hatchery). Coldwater is one of two Coho Technical Committee indicators stock for Interior Fraser Coho.
- NTA operates a counting fence and additional studies to enumerate upstream migrating Coho.
- Spilus Cr. Hatchery produces CWT Coho smolts.

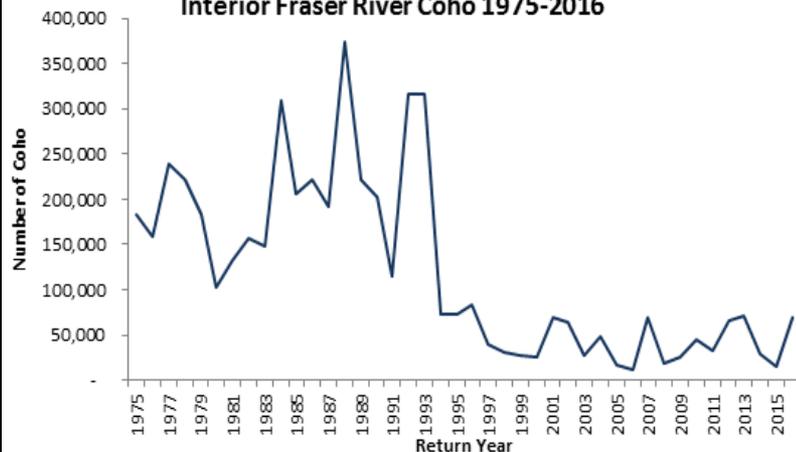
Coldwater Coho Status

Total Abundance of Coldwater Coho 1984-2016



- We are currently in a period of depressed productivity, that started in the late 1980's.
- Recent escapements have been really depressed, likely due to marine and FW influences of the "warm blob".
- Recent escapements to Nicola and to aggregate as a whole are well below target levels.
- Evidence of stressful rearing conditions in ocean; decreased fecundity, increase in proportions of males in escapement.

Total Abundance of Interior Fraser River Coho 1975-2016



Prognosis: Where to from here

- Coho re-assessed by COSEWIC in 2016
- "Threatened" status was assigned
- Continued modest exploitation
- Looking for upturns in productivity.
- Chinook currently being assessed by COSEWIC.
- Many CU's in red including Lower Thompson Spring 1.2
- Many CU's likely to be designated as "Endangered"
- FW and marine prod. fluctuating.

The Big Question: What's on the Horizon for the Interior Fraser?

- Pressure in Southern Interior related to influx of folks from Lower Mainland.
- Limited water resources throughout southern interior, which will be further pressured by influxes.
- Groundwater is critical ingredient for producing stream-resident fish in BCI:
 - Critical for up to 9 months of year; in-migration, incubation, instream residence.
 - Pressure on groundwater resources due to development.



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- We can look at Nicola watershed as "a canary in the coal mine". Flow- and temperature-sensitive stream, being pressured by development.
- Similar pressures on Salmon River, Bessette / Duteau system, and more.
- Increasing pressure on water resources including groundwater.
- Climate change impacts on water resources.
- Groundwater is critical in maintaining productive stream habitats for stream resident salmonids.
- What is the best way forward?



Nicola Research Collaborative

- In this section today, we will hear about ongoing work to investigate the groundwater resources within the basin, the tool to help manage the dam, and about understanding pressures and impacts within the watershed.
 - Mapping groundwater, and determining the groundwater budgets.
 - The fish-water management tool.
 - Sensitive habitats.
 - Cumulative effects.
 - Drought planning, and
 - Aquatic habitat work at HVC



Nicola Research Collaborative

- Those studies are all part and parcel of setting the table to do work to quantify the relationship between water management and the aquatic resources that depend on that water.
- Nicola watershed is home to Nicola Chinook indicator stock (since 1995) and Coldwater Coho indicator since 1999. Also, FLNRO steelhead work on Coldwater and Spius.
 - Provide long term data sets to assess population responses against
- Infrastructure is in place to support graduate students and associated researchers. Options for accommodation, partnering in delivery with NTA field staff etc.



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- Studies underway to understand how gw influences river habitats and how much gw is needed in each aquifer to provide those services to the river.
- Can we manipulate river temperatures to get the best outcomes?
- GW influence areas being mapped by drone and forward looking thermal imaging.
- Fish use of gw areas being investigated
 - Incubation studies, fish behaviour studies, otolith studies
- These studies may provide critical information to inform more fish-friendly water management.