

Kootenay Lake Recovery Update



Public Meeting – Balfour Community Hall
February 21st, 2023

Eva Schindler (Resource Manager)
Matt Neufeld (Fisheries Section Head)
Will Warnock (Aquatic Specialist)
Molly Teather (Fish Biologist)
Marley Bassett (Fish Restoration Biologist)

Kootenay Lake First Nations Acknowledgement



- Territory of the Ktunaxa Nation and people as well as the Salishan speaking peoples
- Salishan refers to the language grouping that includes Okanagan (Syilx), Sinixt and Secwepemc

Kootenay Lake



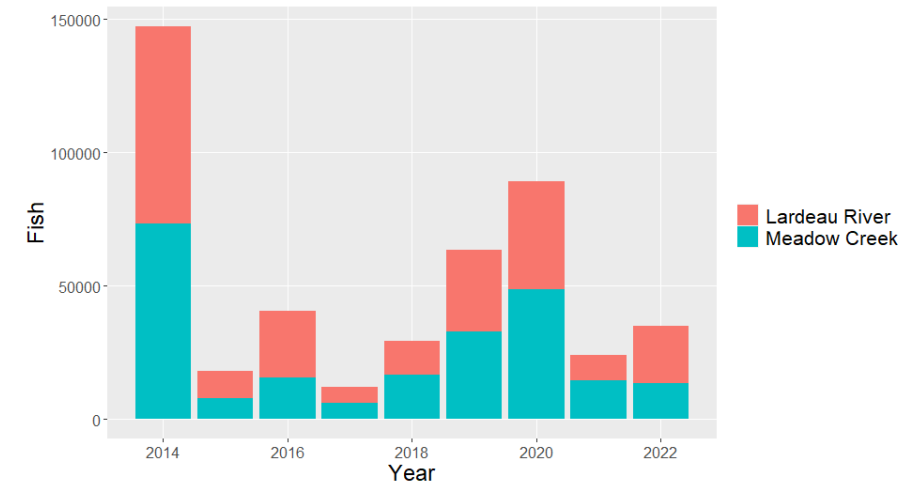
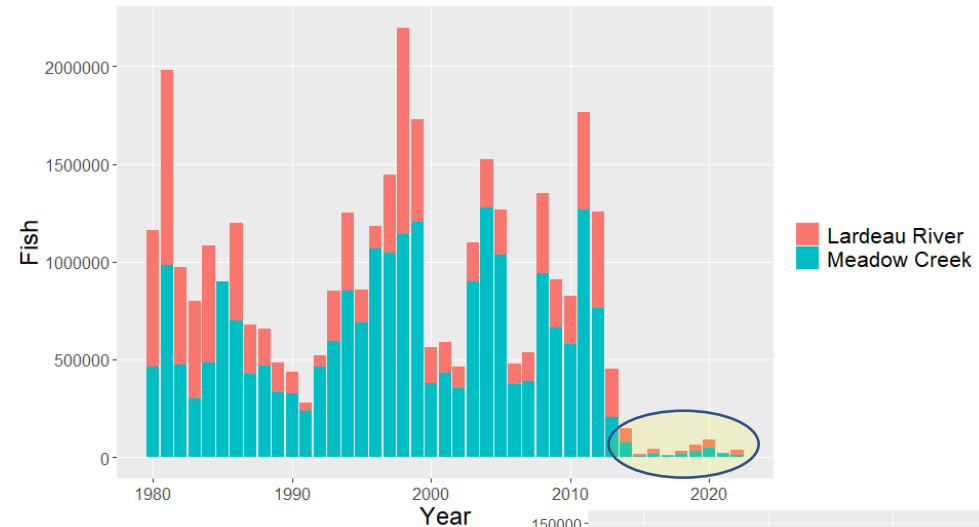
- Large sized rainbows and bull trout
- Rely on kokanee to attain size
- >40,000 angler days
- Regional and Provincially significant fishery
- \$6 Million in direct annual expenditures when performing
- Priority – Region and Branch/Province



The Issue



- Low kokanee survival has reduced spawner numbers since 2014 from 1 million or more, to average ~38,000
- 2022 north arm escapement: ~35,000 spawners
- Fishery Effects – angling effort ½ of prior peak, and \$3 million annually lost to direct regional expenditure
- New, likely stable state without intervention



Cause of Kootenay Lake Kokanee Collapse



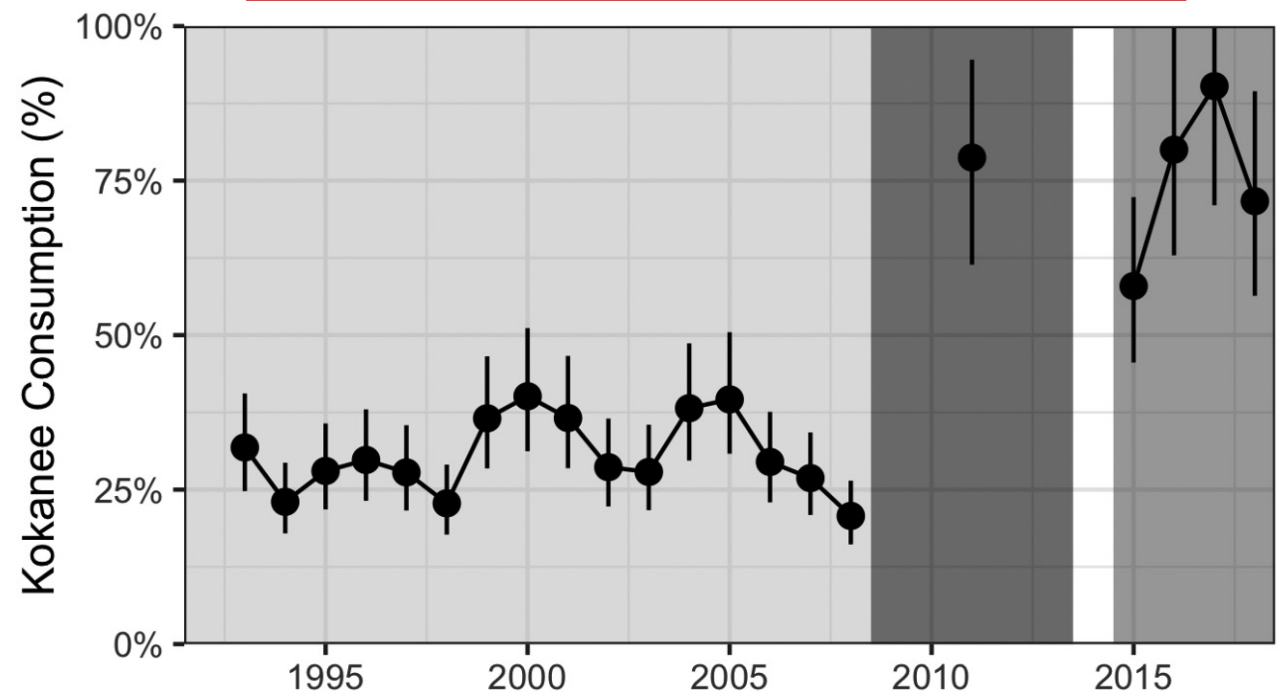
- Predators (Gerrards and Bull Trout) drove the initial collapse of kokanee in 2012-2014.
- Predators are holding kokanee in a “predator pit” they cannot escape from. – Kootenay lake is now in an “alternative stable state”
- There is scientific consensus on this, and the evidence has been peer reviewed.
 - Paper is free access here: <https://cdnsiencepub.com/doi/full/10.1139/cjfas-2020-0410>
- How do we know?
 - Predator diets, growth and population abundance can be used to calculate consumption and compared to prey supply.
- What was the underlying cause of too many predators/too few prey?
 - Not fully understood
 - Perfect storm of climate events, high kokanee and Gerrard abundance
 - Some interacting factors cannot be ruled out (e.g., IHN)



ARTICLE

Kootenay Lake kokanee (*Oncorhynchus nerka*) collapse into a predator pit

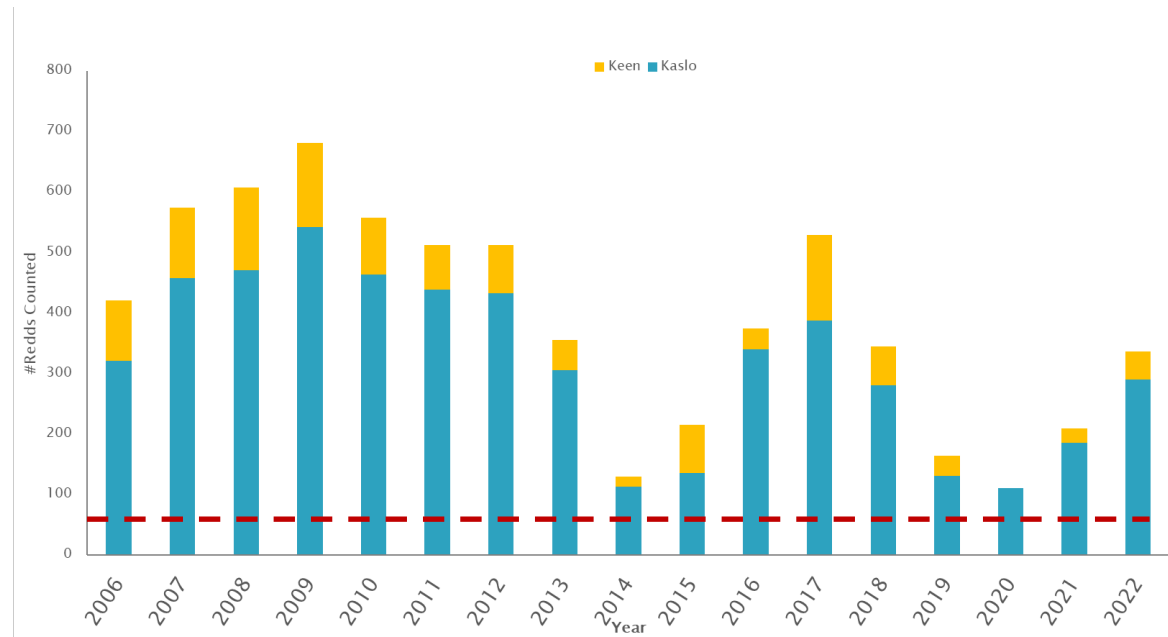
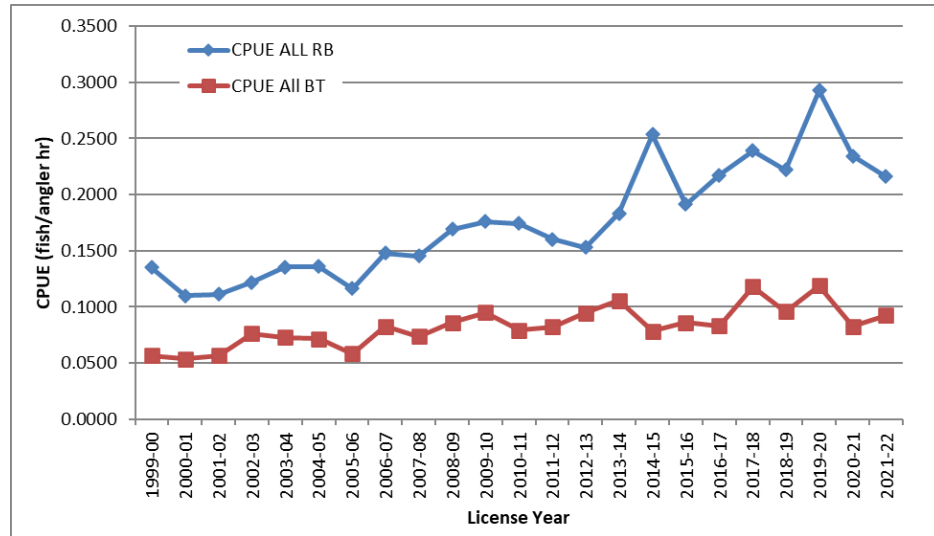
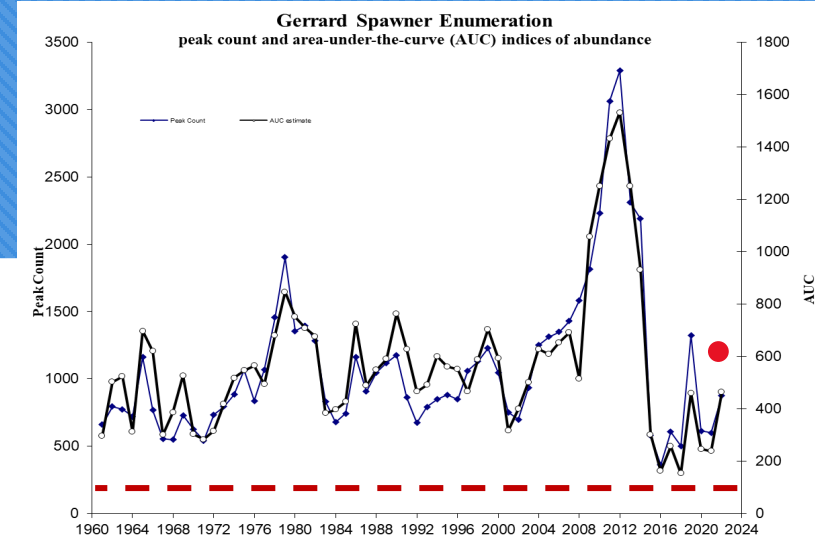
Will G. Warnock, Joseph L. Thorley, Steven K. Arndt, Tyler J. Weir, Matthew D. Neufeld, Jeff A. Burrows, and Greg F. Andrusak



Predator Populations



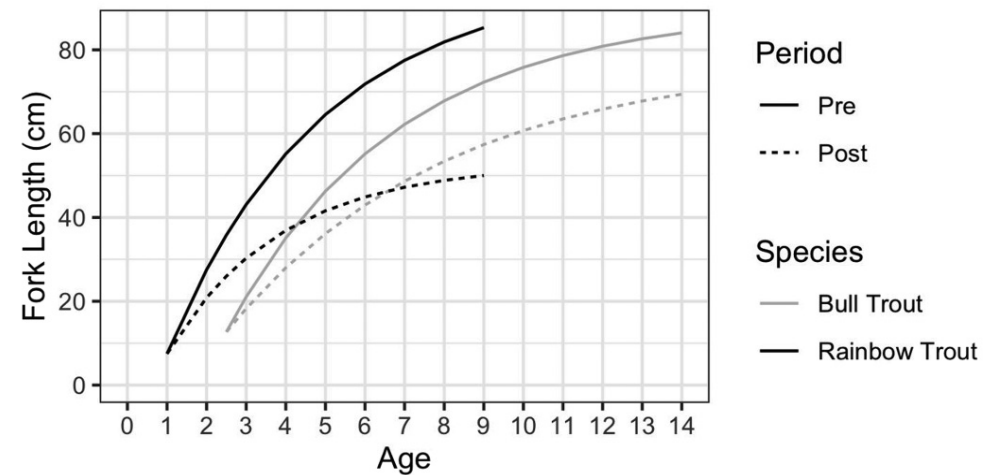
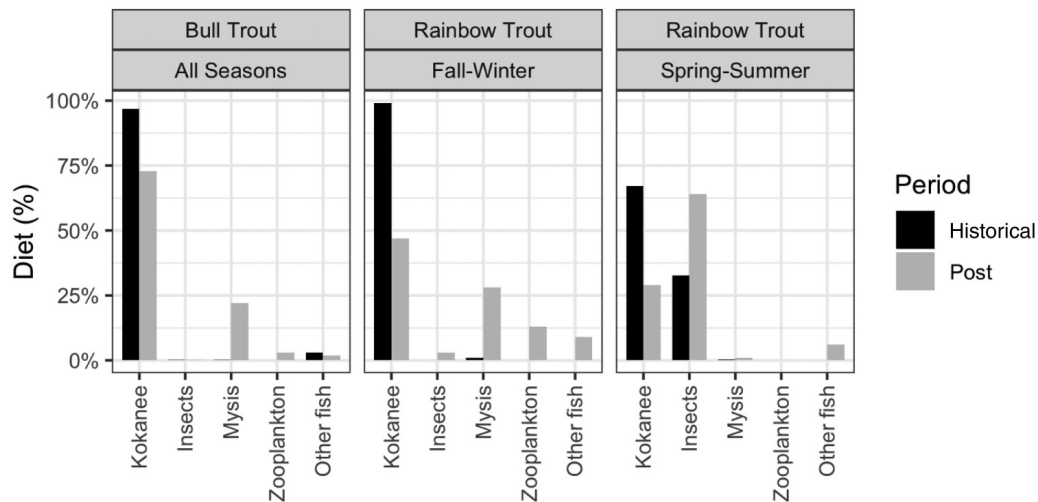
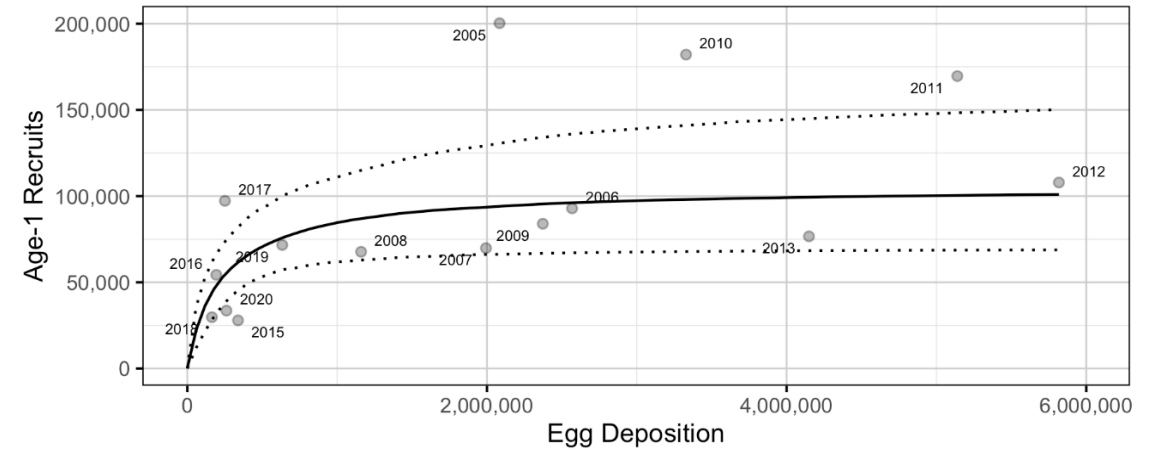
- Predator spawner abundance declined, but remain well above conservation triggers (50 Kaslo River BT and 50-100 Gerrards)
- In-lake abundance (catch rates) has increased





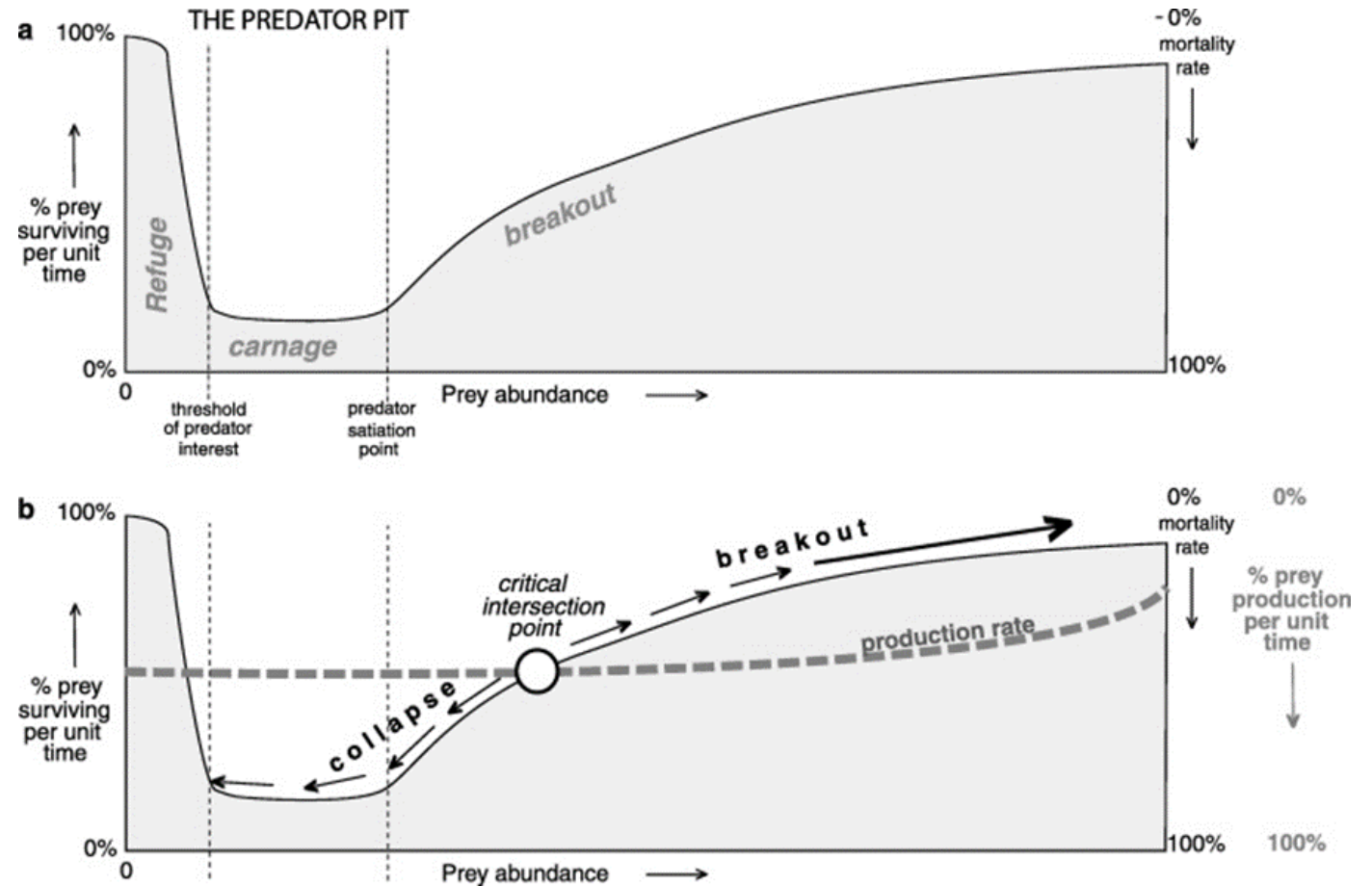
Predator Populations

- How do predators remain abundant if their prey collapses and their spawner abundance declines?
 - Switch diets
 - Grow slower
 - Spawning is sufficient to produce many juveniles (high stock productivity)
 - Juvenile survival in the lake increases



How do we recover kokanee?

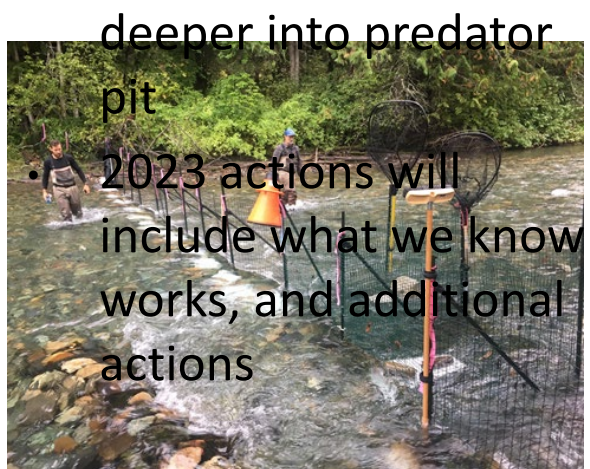
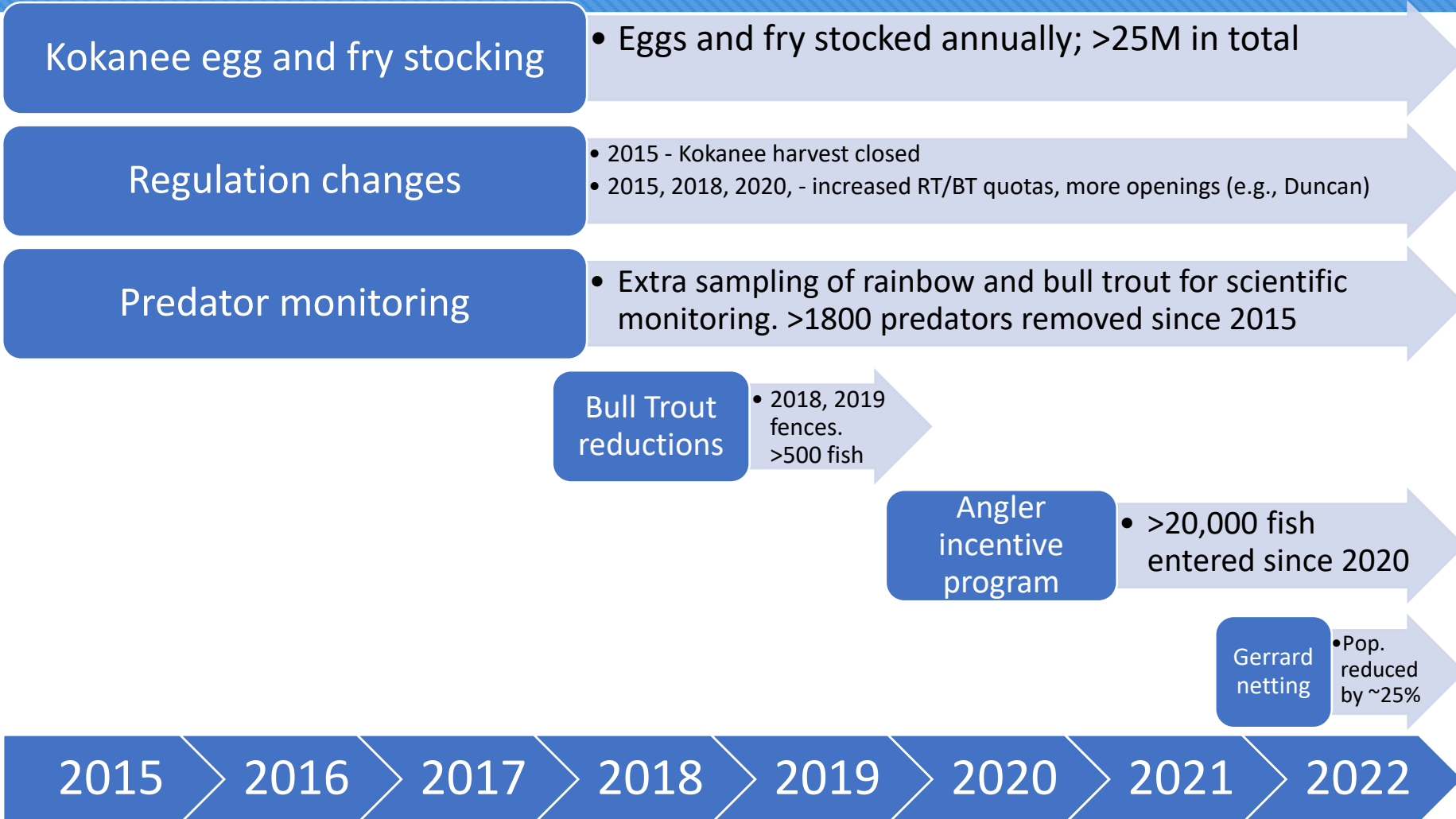
- The predator pit is overcome at a threshold of predator abundance relative to their prey
- To re-balance predator prey ratios, you can increase kokanee supply, growth and survival, and reduce predator abundance or survival



The "predator pit" - From Bakun and Weeks 2006



Timeline of Kootenay Lake Recovery Actions



- Data suggests we are moving in the right direction to recovery
- Must maintain and increase actions to re-balance predator-prey ratio or risk falling deeper into predator pit
- 2023 actions will include what we know works, and additional actions

Kootenay Lake Angler Incentive Program



- A partnership between: MoF, West Arm Outdoors Club, BCWF, FFSBC and HCTF
- Launched in 2020, running annually since, >20,000 removed
- Year 1 of the program was very successful
 - Doubled fishing mortality from 2017-2019 baseline
- Year 2 of the program less successful?
 - Less than half the entries relative to Year 1, why?
- Year 3 of the program (ongoing until end of May 2023)
 - Somewhere in between the two programs (~75% more entries compared to Year 2, but 30% less than Year 1), why?
- Variable effect annually, but generally performing well
- Thank you for all of your help!



Gerrard Reduction Spring 2022

- Predator Management– Recruitment Actions:
 - Tanglenetting at north end of Kootenay Lake
 - Work conducted by KNC/ONA community members and Nation staff
 - Nightly sampling March 18th- April 22nd 2022
 - 136 fish captured (62F/72M)
 - Angling in the Lardeau River
 - 4 angling days, 38 rod hours
 - 9 fish captured (4F/5M)
 - Tanglenetting at Gerrard
 - 2 sampling days, 6 sets
 - 22 fish captured (3F/19M), only 1 green female
- What we know now: actions are working, but will not result in kokanee recovery until a threshold is reached.





Next Steps: Continued and Additional Actions Required

- Expert Advice- Monitoring suggests now is the time to take additional and coordinated actions to maximize potential for kokanee recovery
- Alignment on support for these actions at the Regional and Provincial level as well as stakeholders (BCWF, local clubs)
- Ongoing work to collaborate on action delivery with First Nations and expect support and collaboration on delivery of these enhanced measures again in the coming year

Next Steps: Proposed 2023-2024 Program



Proposed 2023-2024 program – **nearly \$1 million** over 14 months

Gerrard spawner recruitment reductions (March/April 2023 and 2024):

- Netting at the north end of Kootenay Lake prior to river entrance (~40 days)
- Netting in the Duncan River; focus near the Duncan River tailrace (~33 days)
- Wingfences in Lardeau River (~17 days)
- Angling in Lardeau and Duncan Rivers (shore/raft/jetboat ~45 days, 20+ crew during peak times)

In-lake reductions:

- Continued Kootenay Lake Angler Incentive Program
- Lake netting – open water and stream mouth focus
- Proposed regulation changes: RB daily quota 5->10, RB >50cm annual quota 10->20

Other:

- Kaslo BT pre-spawn fence
- Targeted BT angling in tributaries to reduce spawners
- Kokanee egg stocking (when triggered)
- Continued enhanced monitoring program

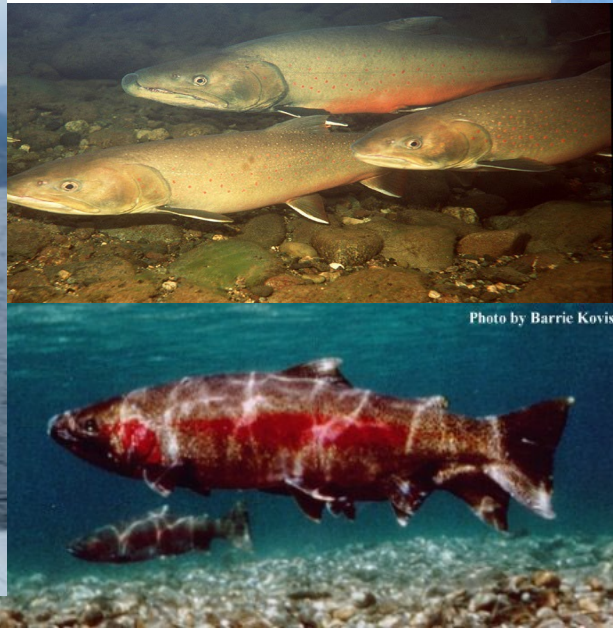


How can you help?

- Success of incentive program attributed to angler participation– thank you!
- Continue to harvest all rainbow trout and bull trout that you catch
- Data suggests 30% of anglers are releasing fish – why?
- Lots of room for improvements... What are the barriers to participation in the KLAIP?



Thank you



If you're looking for more information, and would like to see updates: google "Kootenay Fisheries" to see our Regional Fisheries website