

Kootenay Lake Recovery Update

Public Meeting – Balfour Community Hall

February 26th, 2024

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B.C. Ministry of Water, Land and Resource Stewardship

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
- Significant Indigenous Cultural Values
- Priority – Region and Branch/Province
- Kokanee Collapse



Outline

- Recovery action implementation review (2015-present)
- 2023 action updates – what we did
- Where are we now? – update on Kokanee, Bull Trout and Rainbow Trout
- Review of recommendations for 2024 from recent advisory team meeting
- How can you help?

Timeline of Kootenay Lake Recovery Actions

Kokanee egg and fry stocking

- Eggs and fry stocked annually; >27M in total – range 400k to 8M

Regulation changes

- 2015 - Kokanee harvest closed
- 2015, 2018, 2020, - increased RT/BT quotas, more openings (e.g., Duncan)
- 2022 – further increases RT/BT daily quotas, RT annual quota
- 2023 – further increases RT/BT daily quotas, RT annual quota

Predator monitoring

- Extra sampling of rainbow and bull trout for scientific monitoring. >1800 predators removed since 2015

Bull Trout reductions

- 2018, 2019 fences >500 fish
- 2023 Kaslo fence ~380 fish

Angler incentives

- Angler Incentive Program - >23,000 fish entered between 2020-2023
- Angler Incentive Events - >2500 fish entered in July-October 2023

Gerrard netting

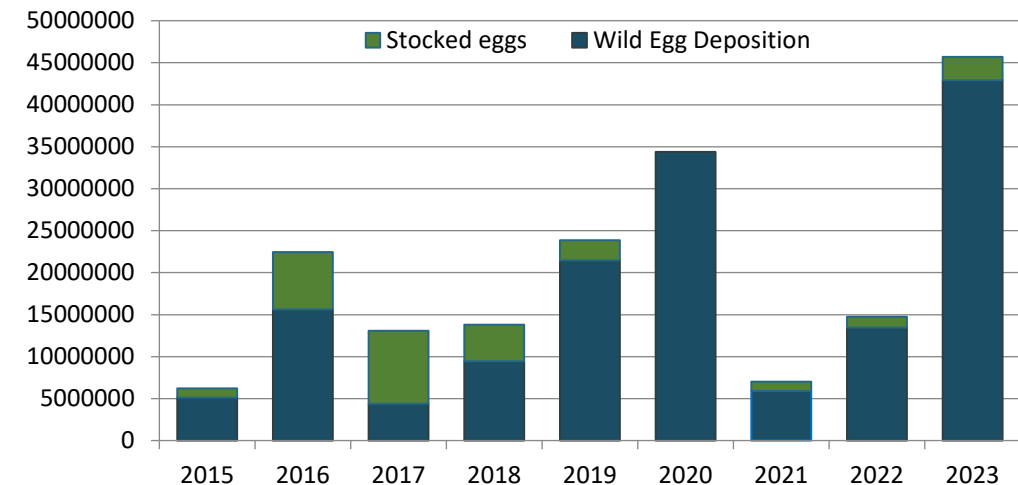
- Pop. reduced by ~25% in 2022, 60% in 2023

2015 > 2016 > 2017 > 2018 > 2019 > 2020 > 2021 > 2022 > 2023



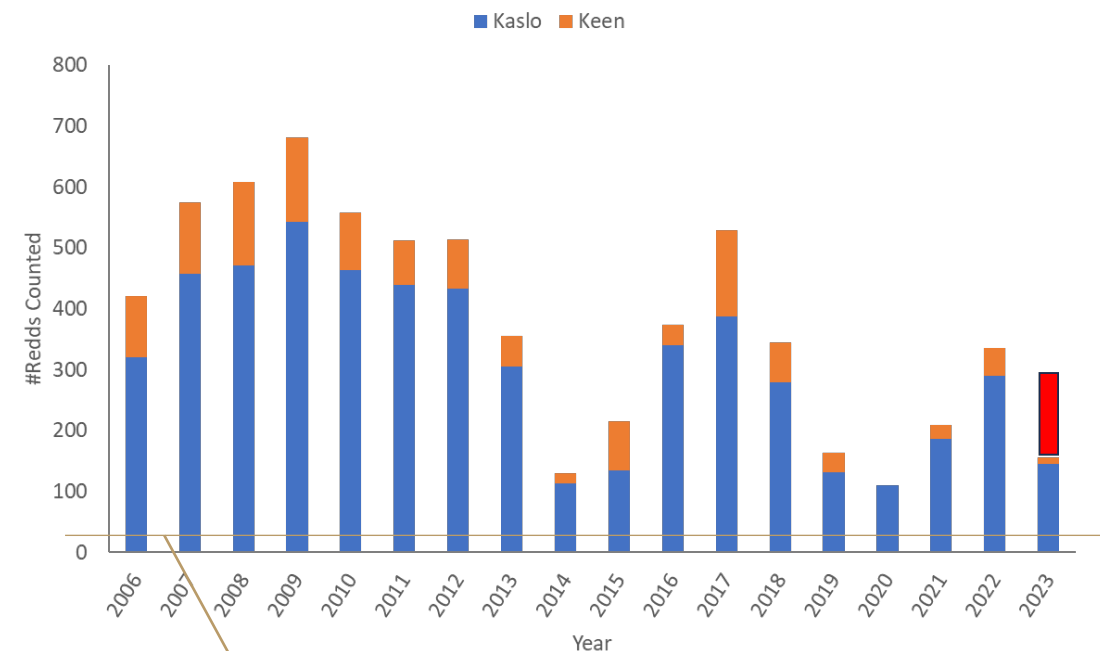
Action Update: 2023 Kokanee Stocking

- Fall 2023:
 - 2,531,565 eggs stocked into the Meadow Creek Spawning Channel
 - 255,850 eggs stocked into Summit Creek
 - A partnership between the Creston Rod and Gun Club, Lower Kootenay Band and the Ministry – thank you!
- Sources: Hill Creek and Columbia River @ Fairmont
- Funding available for continued stocking in fall 2024



Action Update: 2023 Kaslo River Bull Trout Reduction Program

- 384 bull trout spawners removed
- Possible future recruitment effect, immediate reduction in lake consumption of kokanee
- Strong return in 2023, reduced significantly
- Remain well above conservation trigger (25 redds)



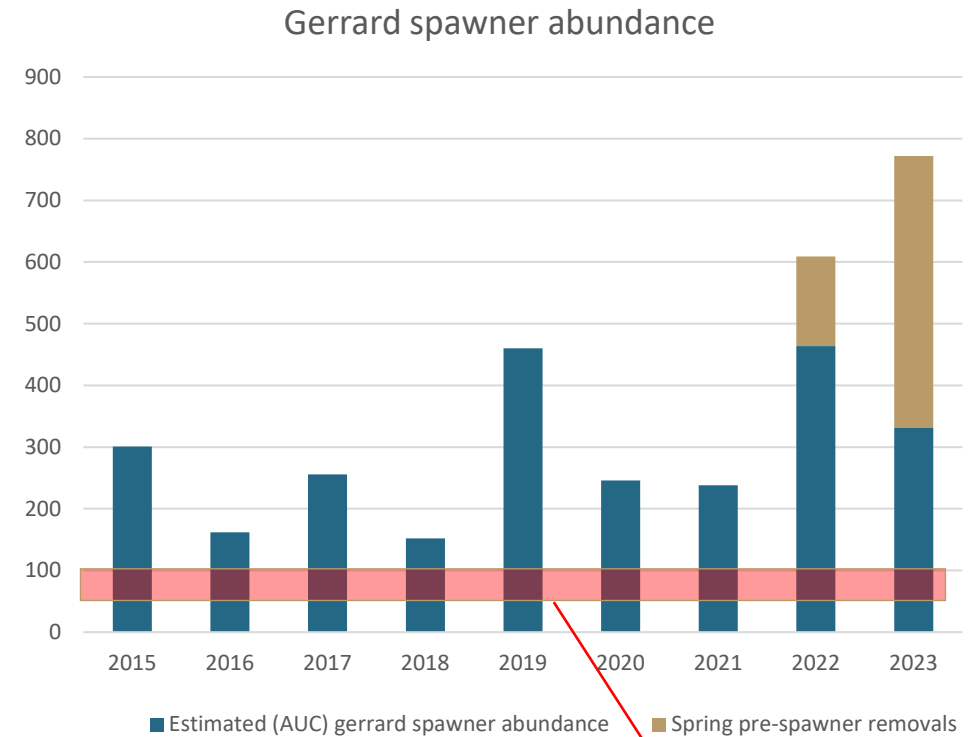
Action Update: Spring 2023 Gerrard Reduction Program

- Goal: to reduce Gerrard recruitment by 50%
- Collaborative approach involving First Nations, Government, Private Consultants and Angling Guide volunteers
- Multi-tiered, daily effort over a 6-week period with overlapping crews
 - Netting at the north arm of Kootenay Lake (Indigenous community members over 6 weeks)
 - Netting at the Duncan and Lardeau River (Mountain Water Research over 5 weeks)
 - Angling in the Duncan and Lardeau River (jetboat, rafts– up to three daily, >290 rod hours)
 - Netting at Mobbs Creek (Ministry- pilot)
 - Targets Gerrards at every step of migration



Action Update: Spring 2023 Gerrard Reduction Program

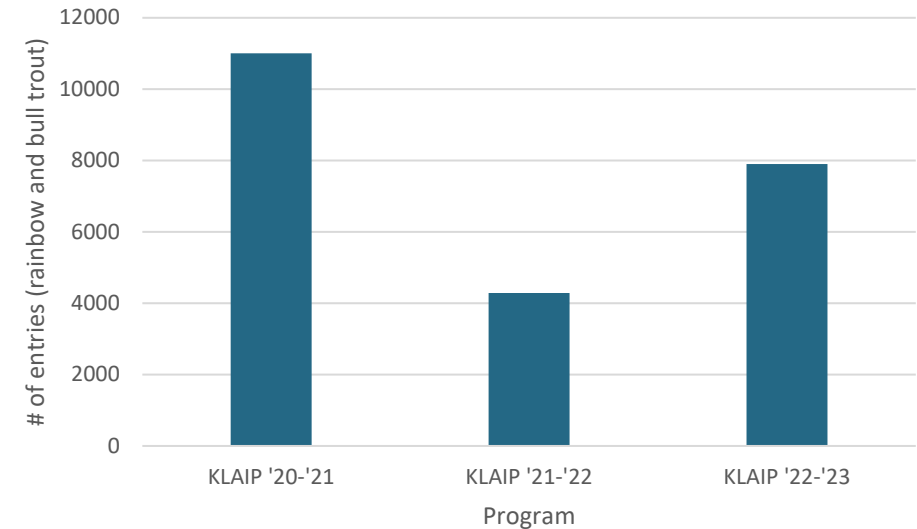
- Results:
 - Removed 441 Gerrard spawners
 - Incidentally removed an additional 259 bull trout
 - Final Gerrard AUC=331 (772 spawners absent removals)
- Recruitment reduction of up to 50% (requires future assessment with juvenile data)
- Lessons learned for improved 2024 program
 - Refinement based on learnings:
 - Additional nets and better placement in Duncan – fish fence not feasible
 - Longer lake net sets (more effort)



Conservation trigger 50-100 spawners

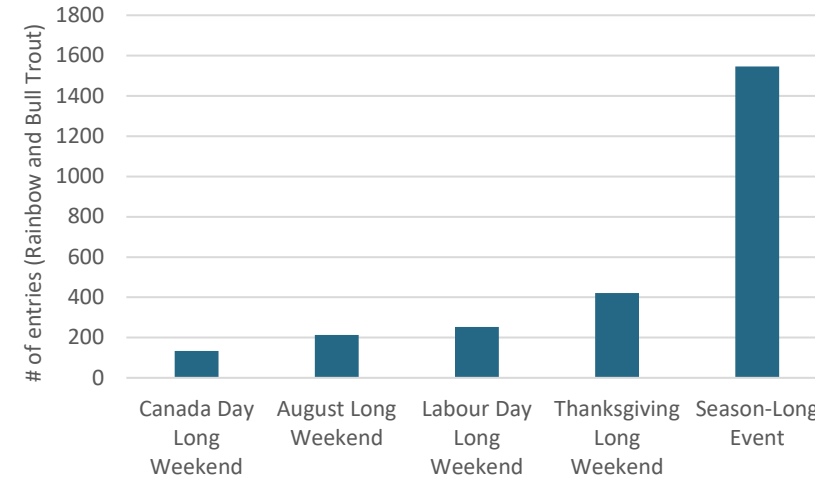
Action Update: Angler Incentives

- Kootenay Lake Angler Incentive Program (KLAIP) launched in 2020 (ran annually for three years June to June)
- Led by the West Arm Outdoors Club/BCWF, with support from the Ministry – thank you!
- Goal: to incentivize anglers to harvest all of their catch
- Head return program to four depots
- Very successful program: 23,179 heads removed in three years

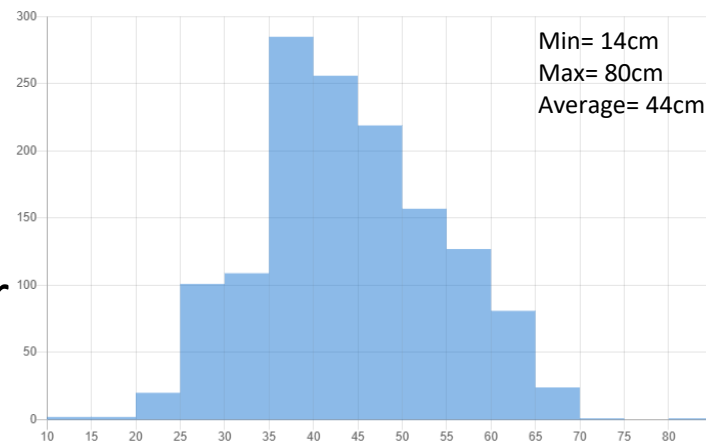


Action Update: Angler Incentives

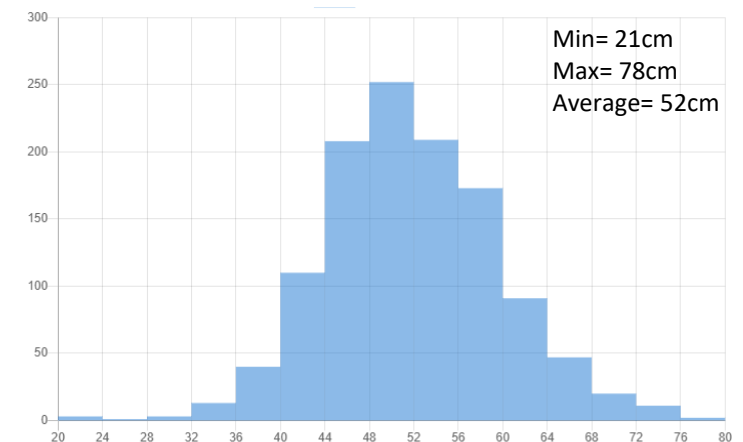
- Kootenay Lake Angler Incentive Events (KLAIE) launched July 1, 2023
- New derby-style program
 - Angler's Atlas and the MyCatch app
 - Four long-weekend events and one season-long event (July 1-October 31, 2023)
 - 2568 entries (doesn't include 'rejected' entries) RB=1385 and BT=1183 *preliminary
 - Length distribution from program suggests in-lake predator size may be increasing



RB length (cm) distribution:



BT length (cm) distribution:



Nutrient Restoration Program

Program

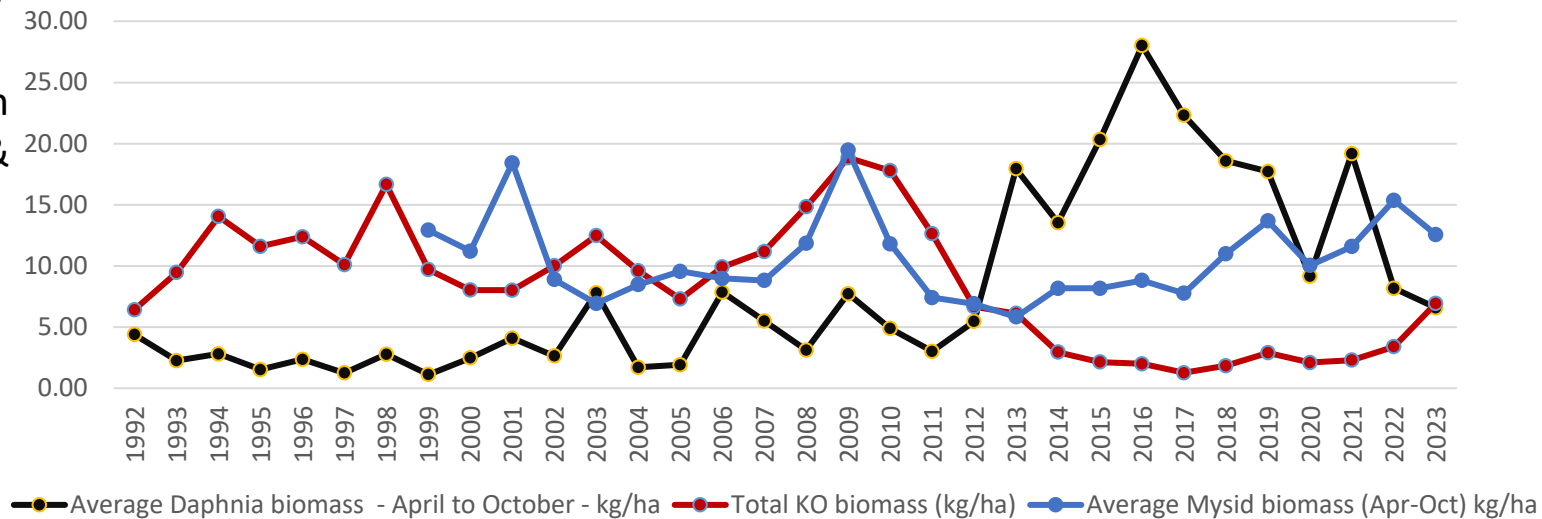
- 2023 Nutrient additions on North Arm approximately at 8-year average
- FWCP External Review completed – stated North Arm NRP is working to restore productivity (Hecky, R. E., & Guilford, S. J. (2022). *Kootenay Lake (North) & Arrow Lakes Reservoir Nutrient Restoration Program (NRP) Review.*)

• Recording of Feb 2023 Presentation on NRP
<https://fwcp.ca/nutrient-restoration-program/>

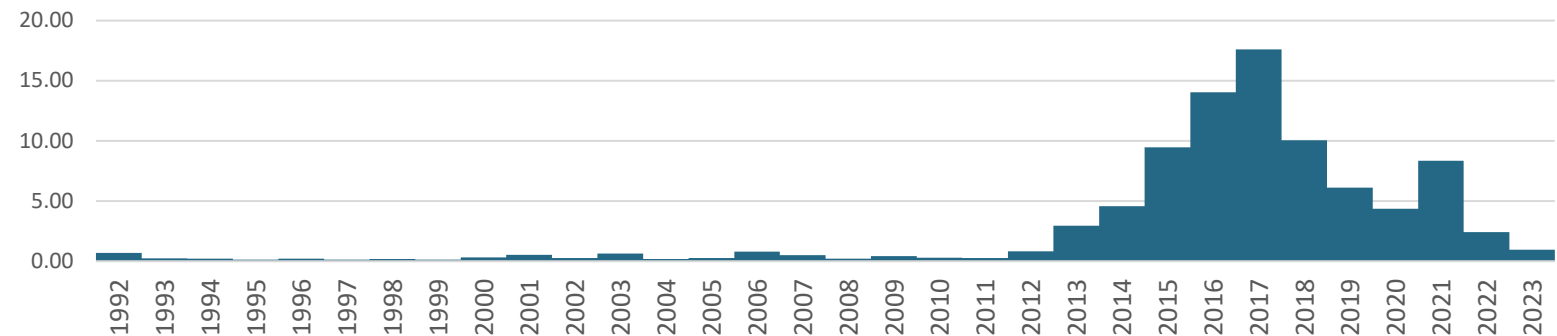
Results

- Daphnia biomass in 2023 were below kokanee collapse era mean (black line)
- Kokanee in-lake biomass increase (red line)
- Mysid metrics above average, in range of historic results (blue line)
- Ratio of daphnia to kokanee biomass approaching pre kokanee collapse range

Annual Biomass - Daphnia, Kokanee and Mysids

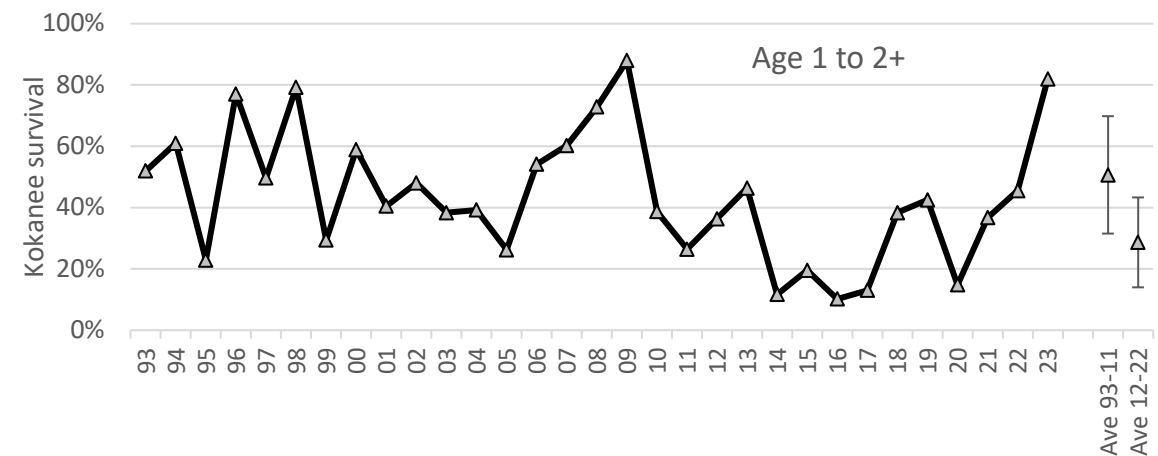
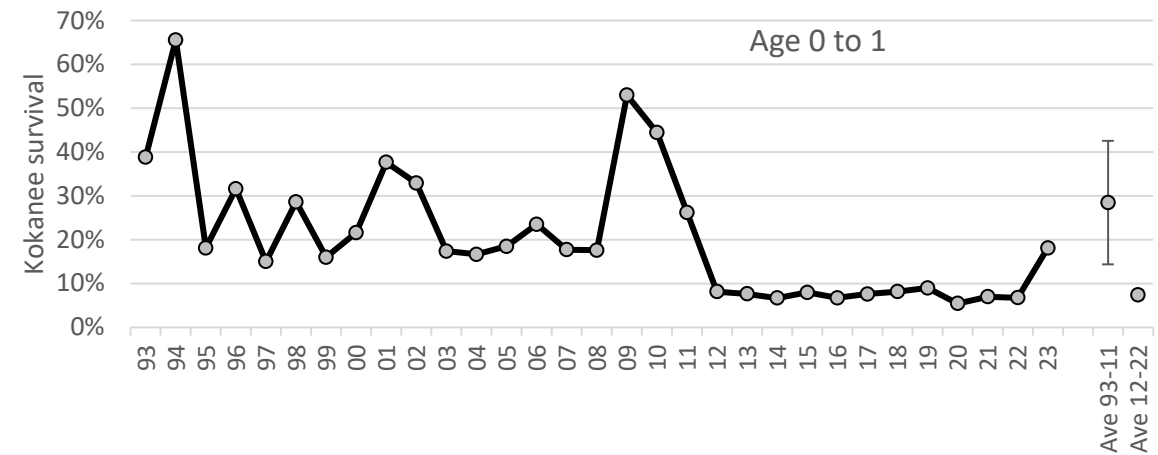
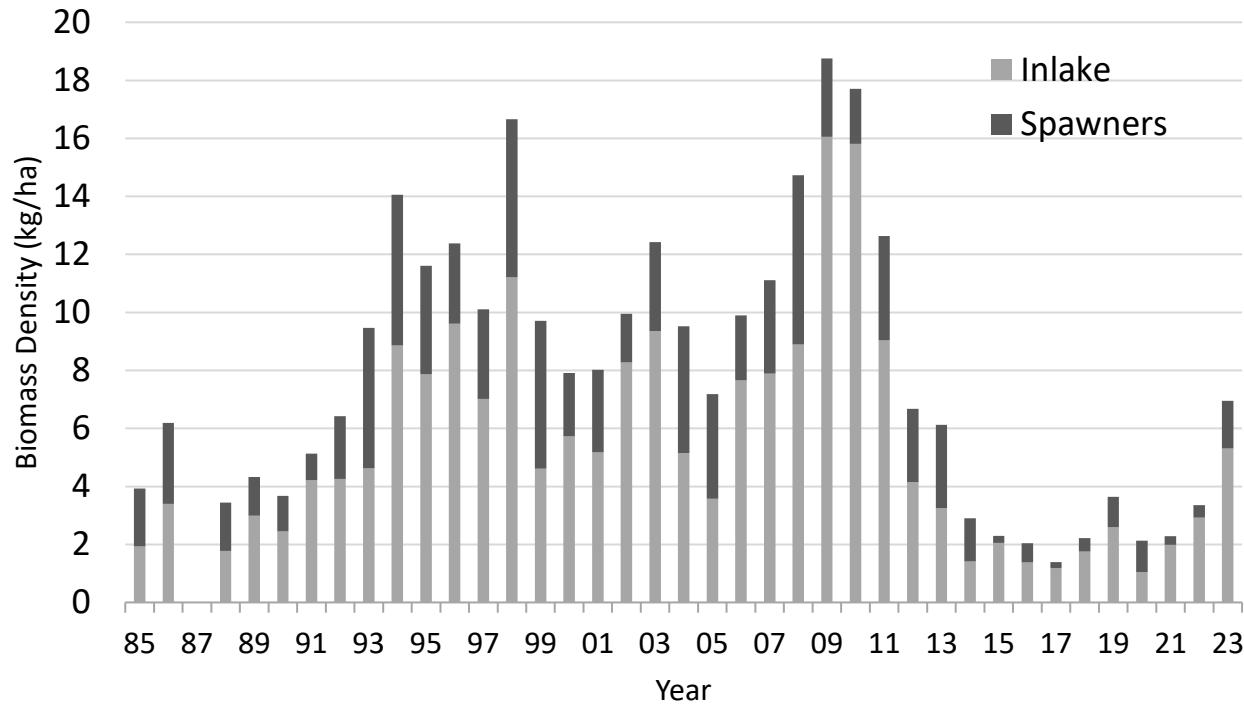


Ratio Daphnia/Kokanee biomass



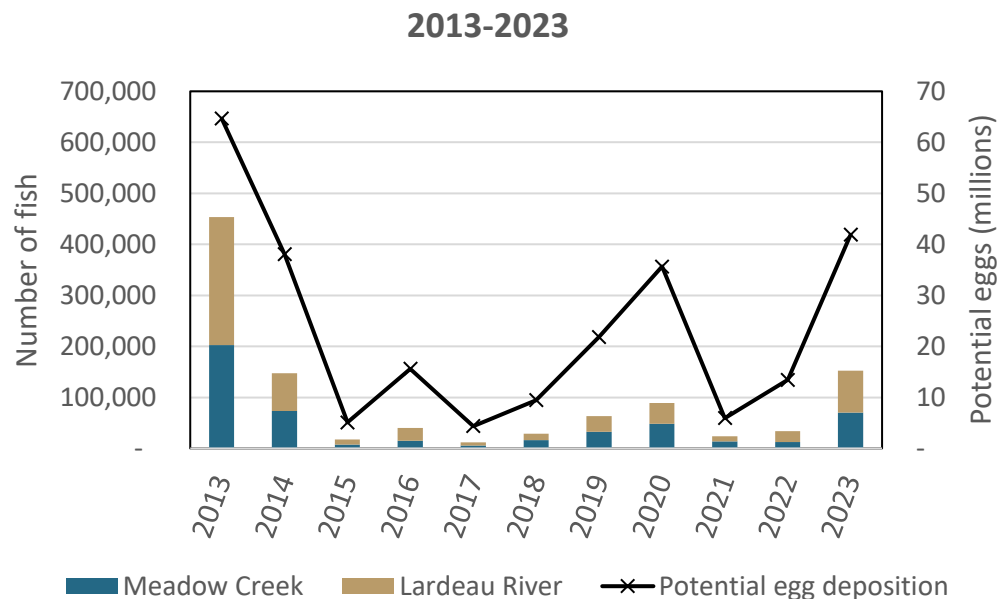
Kokanee Update

- Increased in-lake kokanee biomass in 2023
- In-lake survival up for all age classes

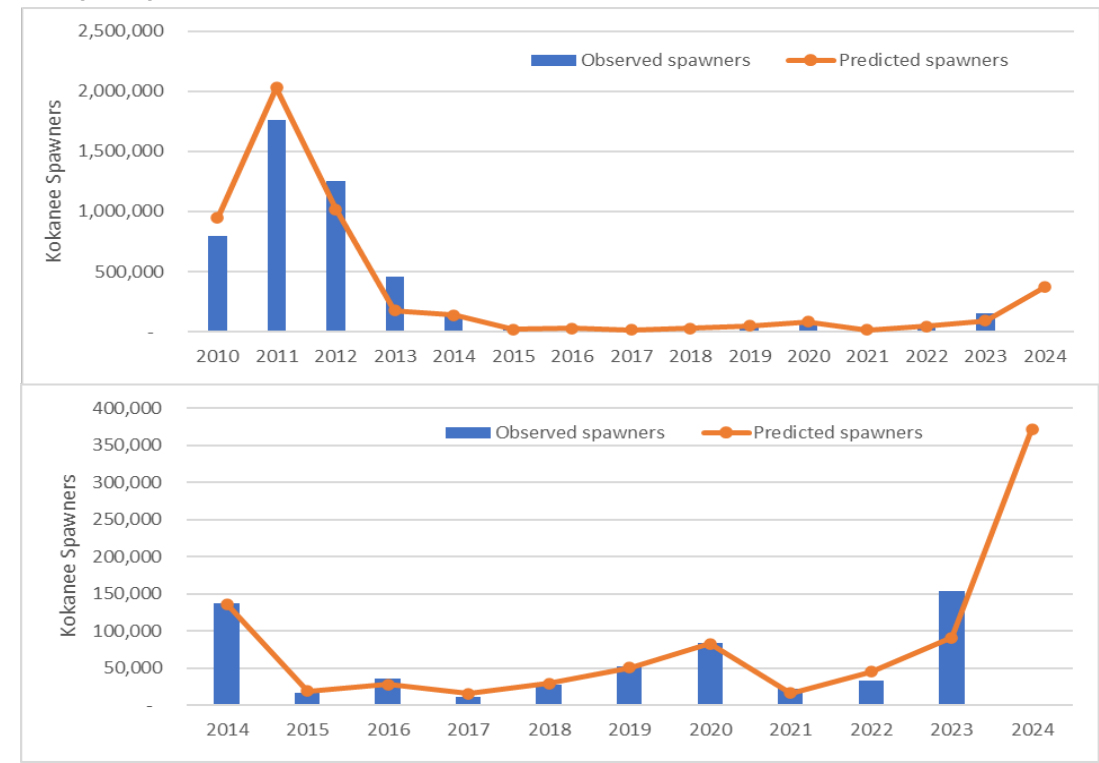


Kokanee Update cont'd

- Spawners ~156,000 in fall 2023
- 43 million eggs



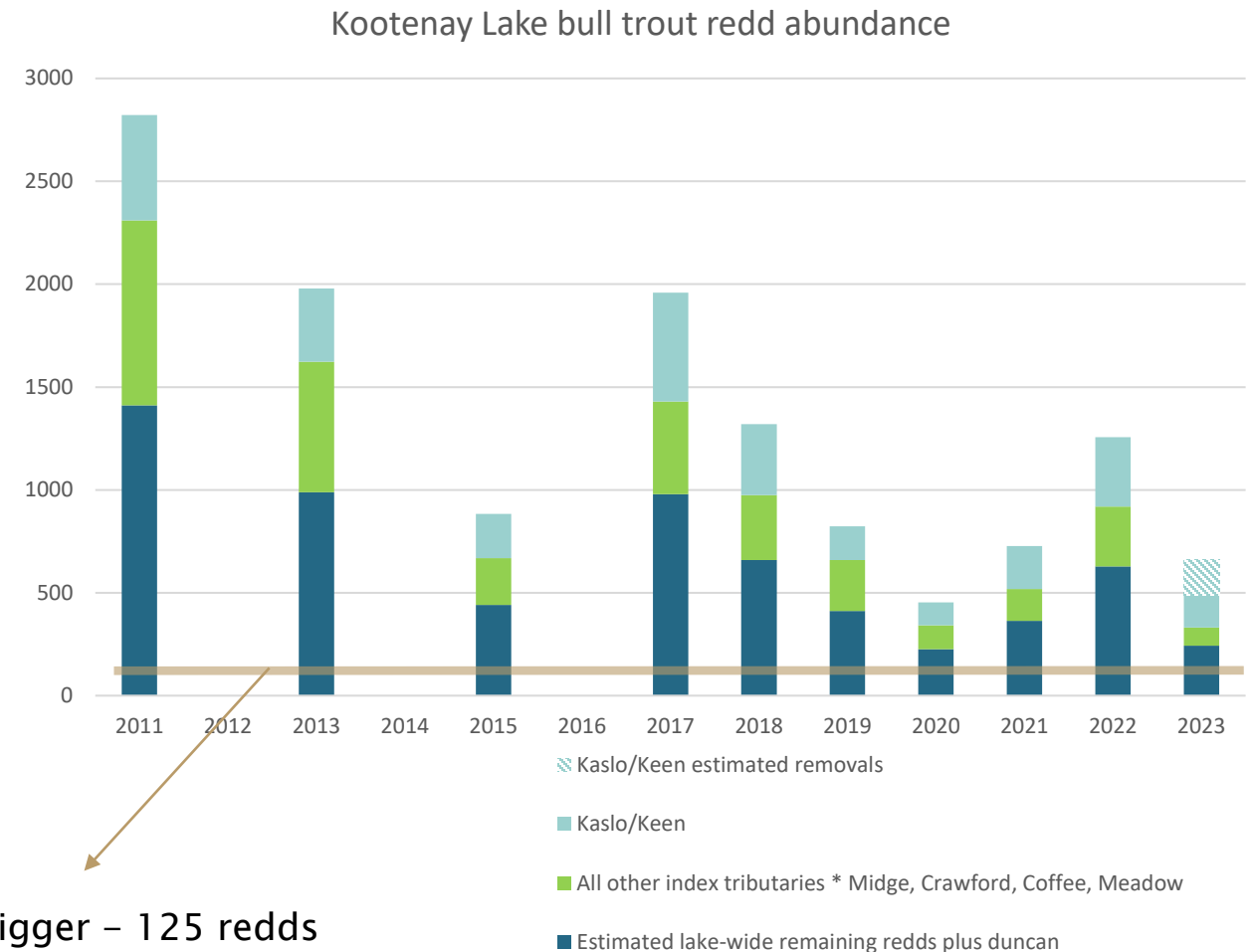
- Forecasted ~370,000 spawners in fall 2024
- Based on fall 2023 in-lake kokanee population



Bull Trout Update

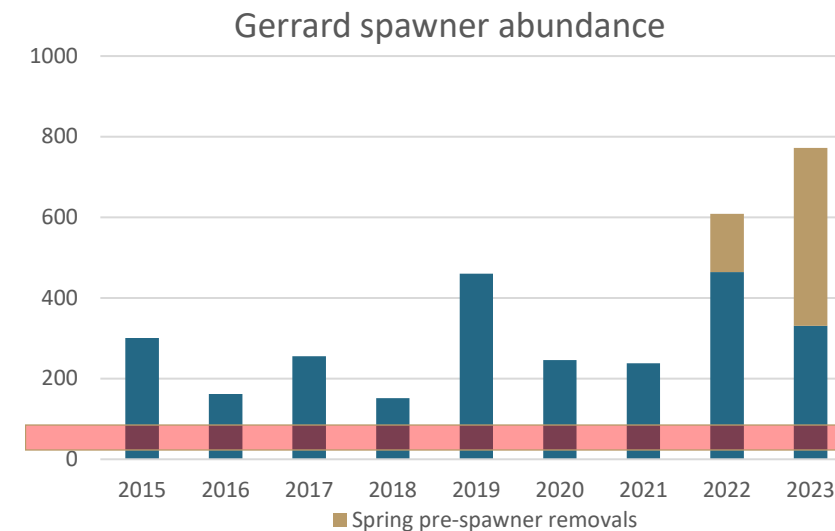
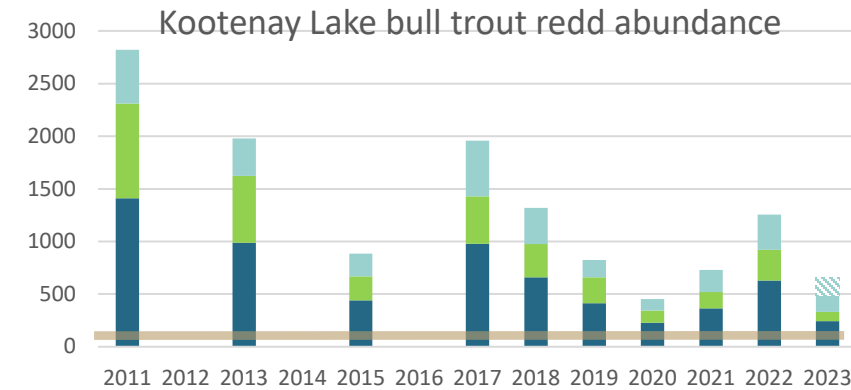
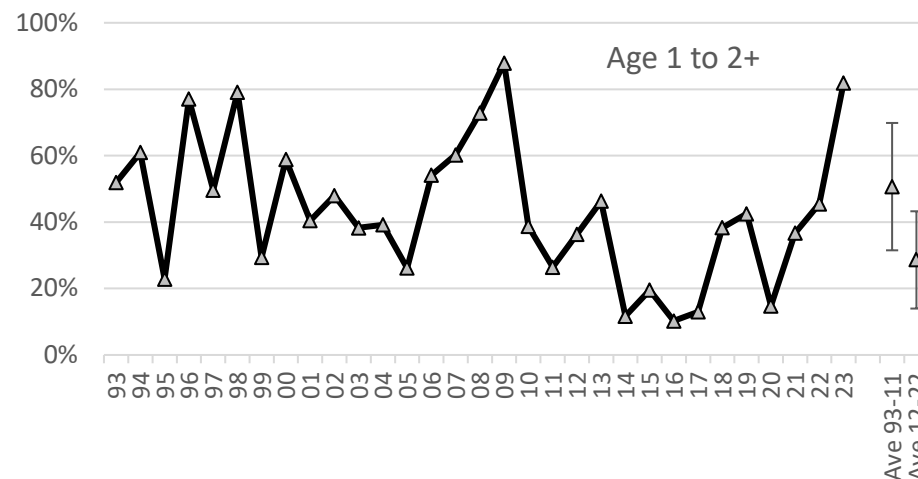
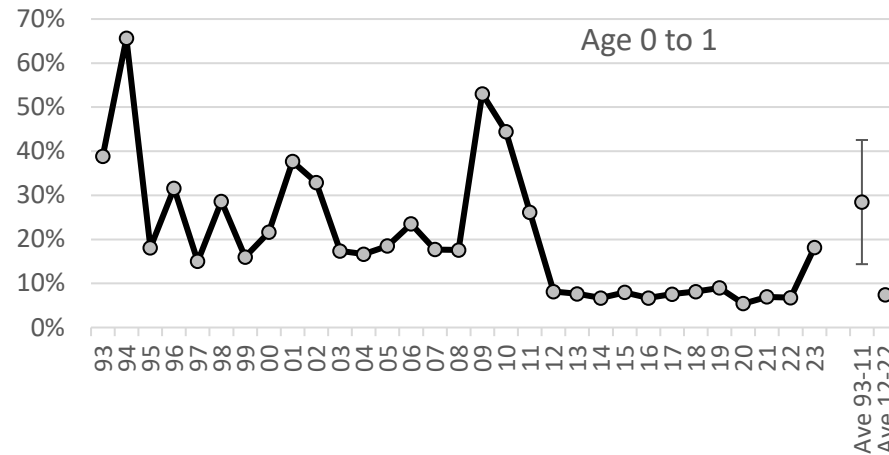
- Conservation trigger <25/125 redds in Kaslo River and lake-wide index respectively ** revised in 2021
- 2023 redd count in index tributaries (~50-70% of lake-wide spawners) was 244, so lake total could likely be ~500 redds ~3-4X the conservation trigger
- **BUT**- southern stocks at all time lows (Coffee, Crawford, Midge; 95% reduction since 2011)

Conservation trigger – 125 redds
~ 250 spawners lake-wide



Results Summary

- **Kokanee:**
 - Increased spawner returns in 2023, and forecasted again in 2024
 - Increased juvenile survival in 2023 (0-1 and 1-2)
- **Bull trout:**
 - Spawner returns in 2023 above conservation triggers
 - Spawners trending downwards through time
 - Kaslo spawners reduced significantly in 2023
 - North arm stocks remain high, South Arm stocks at record lows
- **Gerrard rainbow trout:**
 - Increased spawner returns in 2023
 - Spawners reduced to less than half of return, remains above conservation trigger



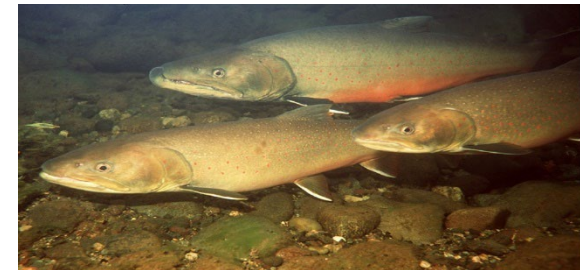
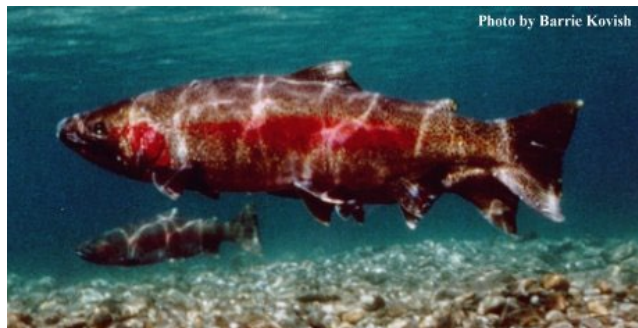
Next Steps

- Kootenay Lake Advisory Team Advice – fall 2023:
 - Data shows progress towards recovery, but must continue previously implemented coordinated actions to reinforce positive trends
 - If not, we risk possible predator overabundance as kokanee recover
- Specific recommendations from Kootenay Lake Advisory Team on action delivery in 2024/25:
 - Gerrard spawner reduction actions in spring 2024 and 2025 with improvements
 - Continued Kootenay Lake Angler Incentive Events program
 - Maintain daily/annual quota for rainbow trout
 - Consider changes to bull trout daily quota to reduce harvest of weaker South Arm stocks; maintain pressure on stronger north arm stocks
 - Kaslo River bull trout spawner reductions in fall 2024
 - Continued enhanced monitoring program
 - Kokanee stocking – possible room for increased South Arm stocking based on North Arm forecasts?
- Recommended approach, funding requested and awaiting approval
- Continue ongoing collaboration with Indigenous Nations on action delivery in 2024

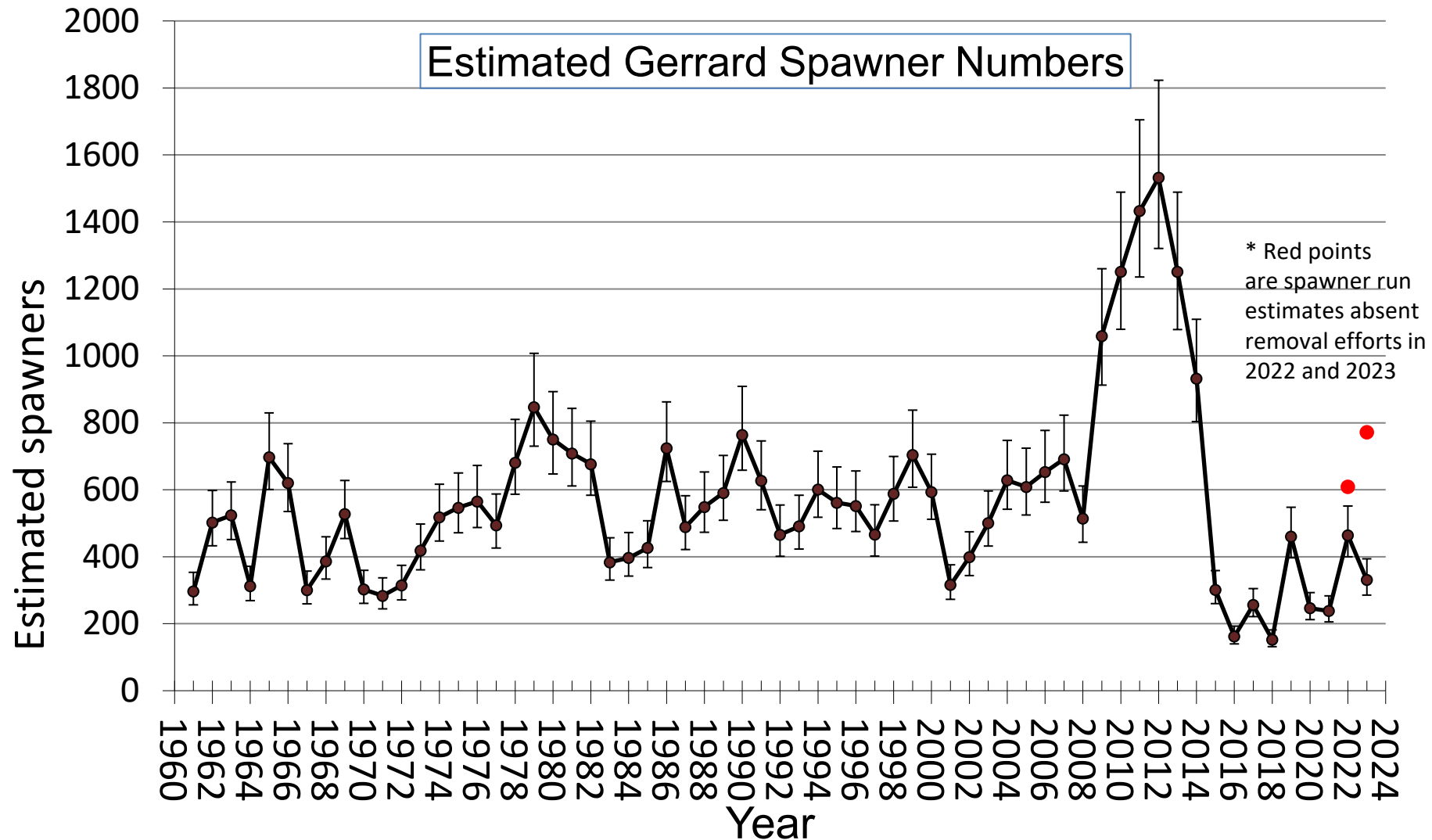
How Can You Help?

- Thank you to anglers and local fish and game clubs for your ongoing help with in-lake predator reductions!
- Please continue to fish and harvest up to your catch quota
 - Rainbow trout abundance is still very high, bull trout remains above conservation triggers

Thank you!



Supplementary material – Gerrard spawner abundance



Supplementary material – Kokanee spawner and egg abundance

North Arm Kootenay Lake Kokanee Spawner and Egg Deposition Estimates

