

Yakima Basin Coho Reintroduction

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Abstract:

The Yakima-Klickitat Fisheries Project (YKFP) is a joint project of the Yakama Nation (lead entity) and the Washington State Department of Fish and Wildlife (WDFW) and is sponsored in large part by the Bonneville Power Administration. The program has finished its Master Plan and completed two of the three phases. The final stage (Phase III) moves away from traditional, large, smolt releases in off channel ponds, to more variable release strategies. Phase III, incorporates adult releases, summer Parr releases and strategic small smolt releases. Over the past 20 years a localized brood stock has been developed. This brood stock will now be used to initiate our integrated recovery program in the Yakima Basin.

Phases I and II showed, smolt survival is higher during outmigration, however, smolt to adult survival in smolts lower than coho released as Parr. Additionally, spawning fidelity is higher in Parr, giving recolonization in tributaries a head start, and adult out plants have been used with high success (Temple et.al 2017). Redd counts have been monitored since 1997 and there has been increases in tributary spawning since 2007.

Temple, G. M., T. Newsome, T. D. Webster, and S. W. Coil. 2017. Evaluation of Rainbow Trout abundance, biomass, and condition following Coho Salmon reintroduction in Taneum Creek, Washington. Northwest Science 91:54-68.



2021 Yakima Basin Coho Reintroduction



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The Yakima Coho Feasibility project is now in its 25th year. This project has shown that reintroduction of Coho in the Yakima Basin is feasible and it has shown the likelihood of achieving stable and abundant returns of Coho to the Yakima Basin which may enhance the stability and resiliency of the population against potential environmental changes. Currently, the project is in Phase III, and will begin using variable release strategies and incorporating an integrated hatchery program using the new, state of the art, Melvin R. Sampson (MRS) Coho Facility.

Acknowledgements

YN:

Coho/Fall Chinook Crew

Quincy Wallahee

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Brady Carl

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Nate Pinkham

Conan Northwind

YN: Hatchery Managers

Michael Fiander and Crew

DJ Brownlee and Crew

BPA

WDFW:

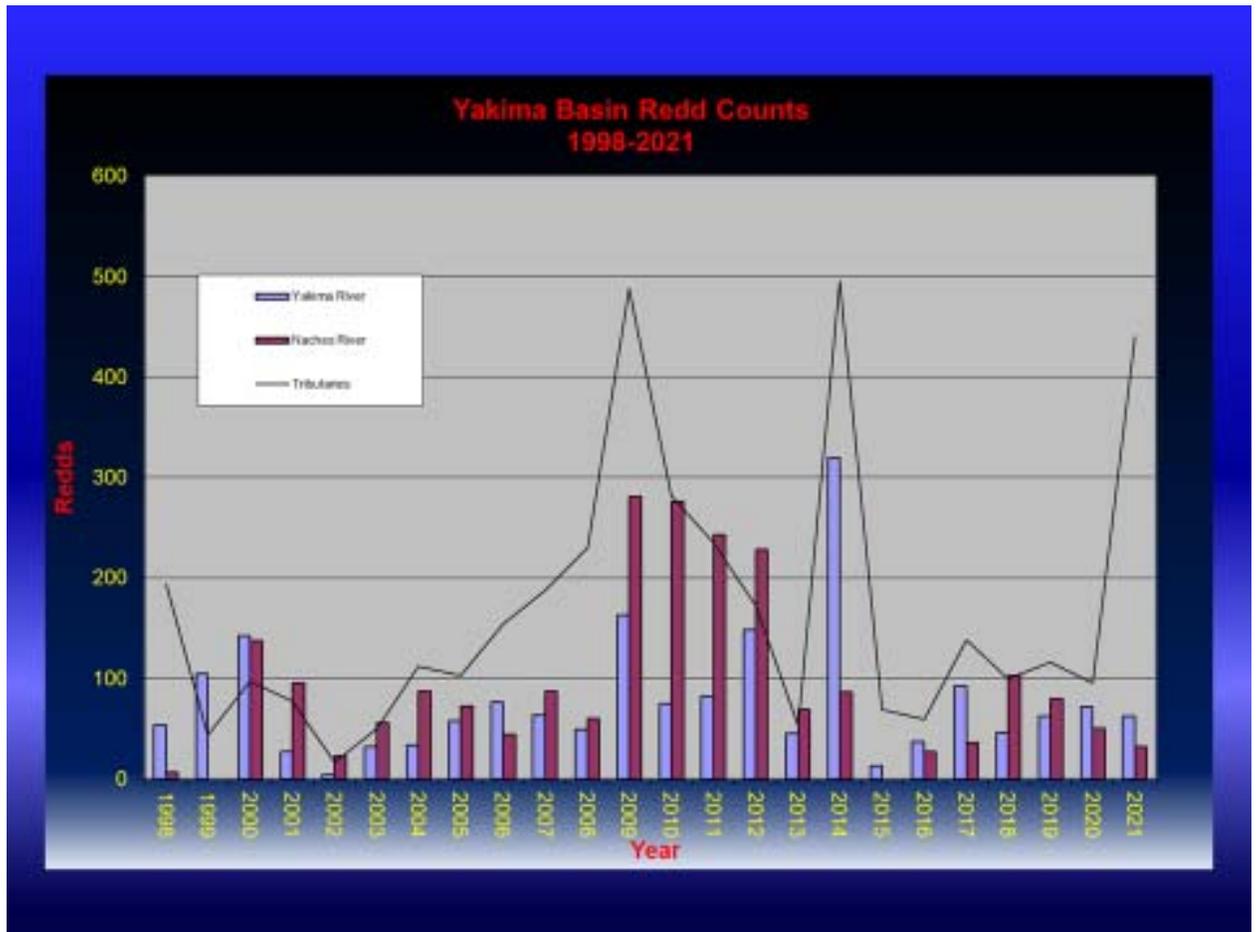
Gabe Temple

WDFW Interactions Team

I would like to extend my gratitude to the Coho and Fall Chinook M@E technicians, culturists who spend many long hours collecting data, in sometimes difficult conditions. These technicians collect redd data, pit tag tens of thousands of salmonids, and catch, trap and haul fish. All of this work is crucial to YKFP monitoring and evaluation activities. I would also like thank Gabe Temple and the WDFW interactions team, other colleagues from various agencies in the Yakima Basin.



Yakima Basin Coho were extirpated in 1985. Soon after 1985, small numbers of smolts were brought in from lower Columbia River hatcheries and directly released in the Yakima River for tribal fisheries. Beginning in 1997, the Coho program was initiated as part of the YKFP and the smolts began being acclimated. Acclimation was the first key in adult returns. Since 1997, adult Coho escapement into the Yakima Basin has averaged nearly 4,500 coho, with a modern day record in 2014 with nearly 25,000 adults. The adult escapement in 2021, approached 12,500 adults. Now, with the new MRS facility, and variable releases strategies we are optimistic to bring an average adult return closer our yearly goal of 10,000 every year or higher.

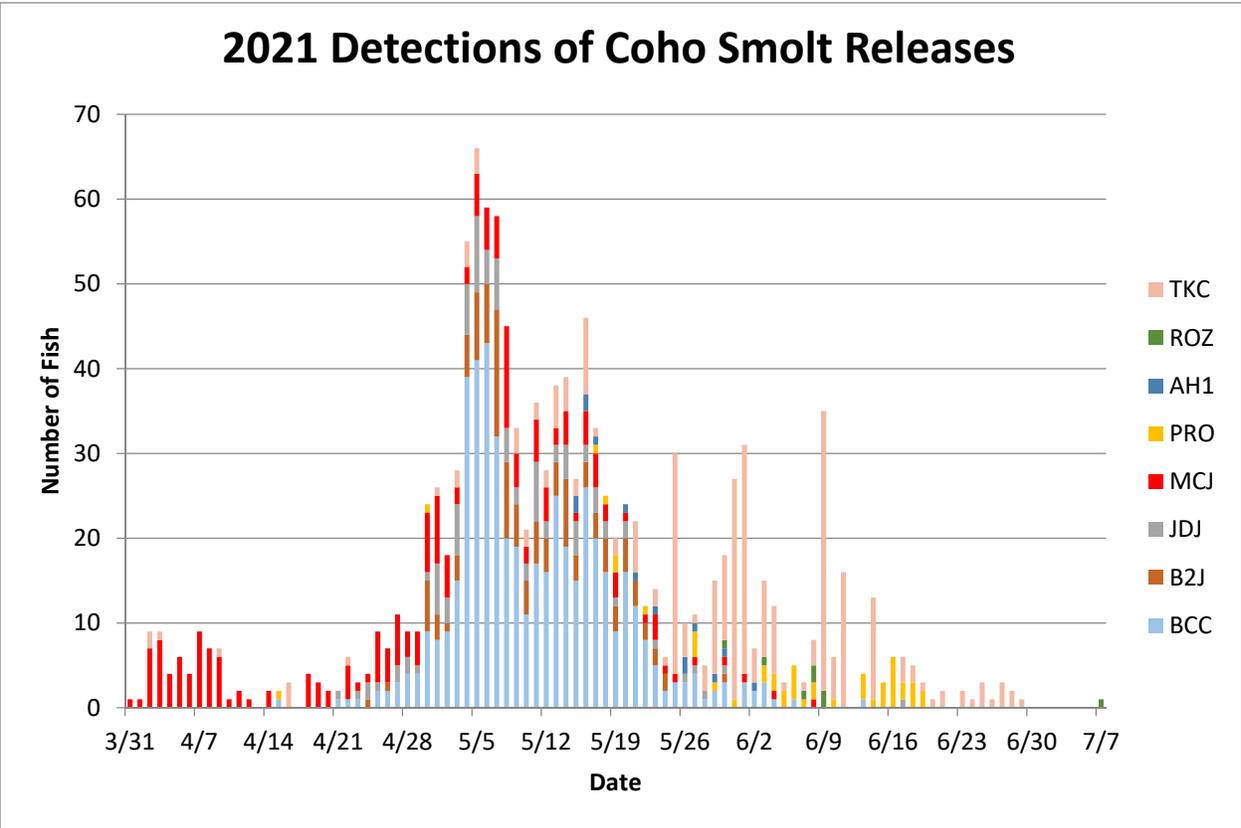


Redd counts have been monitored every year since 1998. Other than 2002 and 2015, redd counts have been stable, with a record in 2014, of over 1,000 redds. The Naches River has consistently shown large numbers of redds, however, the majority of Coho spawn in the lower portions of the river so juvenile survival is low. In contrast, the Upper Yakima River has been shown to offer the best chances for Coho recolonization because of lower elevation tributaries offering higher juvenile survival. Redd counts in tributaries has shown dramatic increases in large run years.

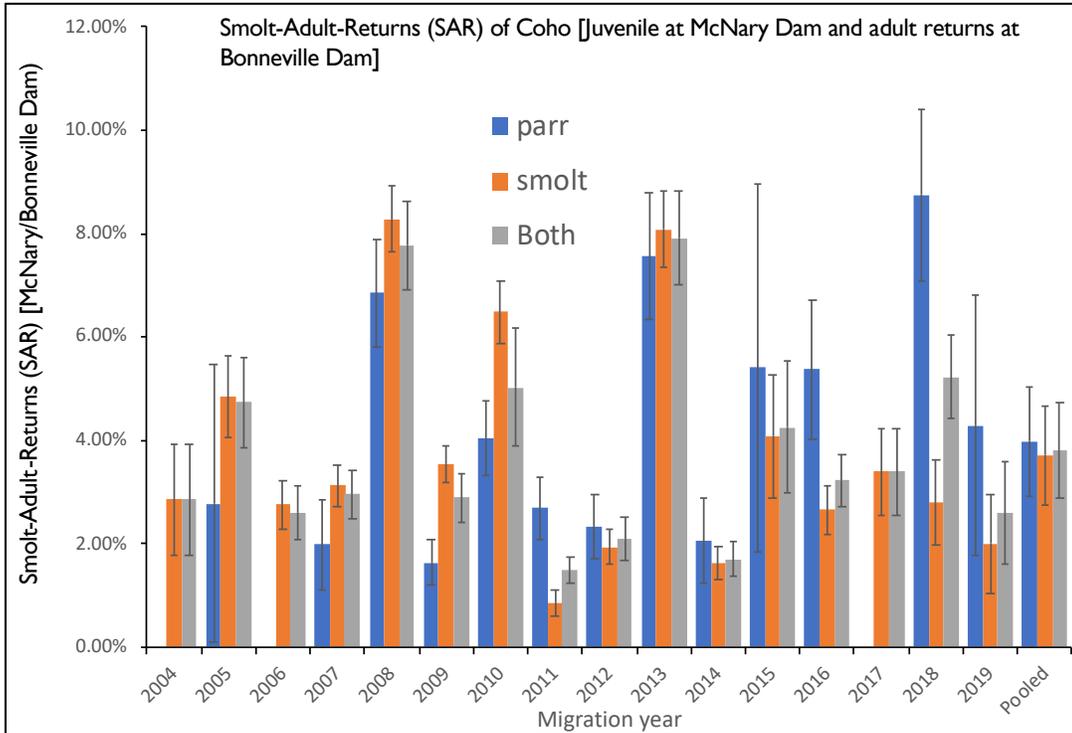
Coho Smolt and Parr Survival and Predation Analysis

Produced By. Shubha
Pandit

I would like to thank Shubha for the following analysis. Several alternative release strategies have been utilized in the reintroduction program over time in response to observations in long-term monitoring. Smolts were initially released in the mainstem of the Yakima River, but subsequent releases have explored a range of different locations to understand how geographically and hydrologically diverse habitats within the Yakima Basin affect outmigration survival and adult returns. Each year approximately 60,000 coho smolts and parr are Pit tagged and released in determining the post-release fish performances (survival rate, travel time, predation rate, SAR etc) and overall habitat conditions in areas Coho occupy. Analyzing the data is very important task for reintroduction. Adaptive management requires quality monitoring data

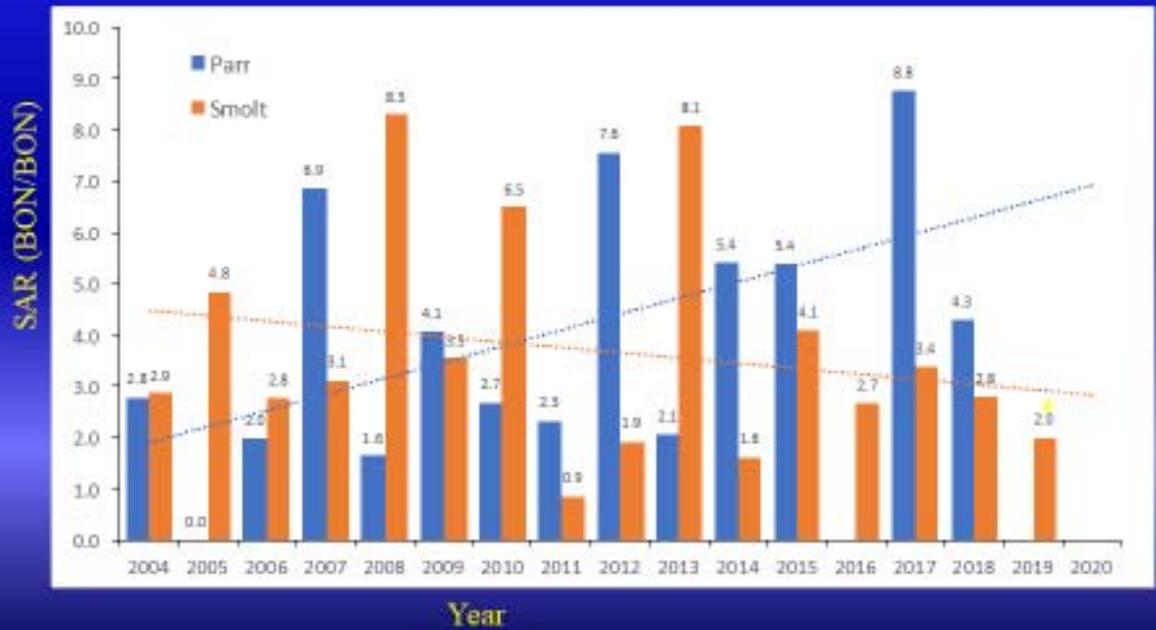


This graph shows the daily smolt detections out of the Yakima River beginning in late March at McNary and ending in late June at Roza Dam. Each Color represents detections from different Dam locations. Generally, fish migrating out of the Yakima River will most likely not survive the lower Yakima after early to mid- June due to water temperatures. Prosser detections increase later due to the fact water flows decrease and there is a higher amount of water and fish being entrained into the canal.



The above graph is solely based on Pit-tagged juveniles detected at McNary Dam and adult returns detected at Bonneville Dam. The smolt to adult survival of fish released as summer Parr is generally higher than that of smolts. Although the role of smolts is important it is also important to use variable release strategies and include the summer parr. We hypothesize that because the Parr are released in the summer and must survive the rigors and bottleneck of the winter they become more resilient to out migration challenges.

Smolt-Adult Return



* means data is incomplete

The graph shows the parr and smolt-adult returns survivals percentage from Bonneville to Bonneville.

Again, summer coho parr generally show higher smolt to adult returns than smolts.

Predation



Recently there has been a renewed focus on bird predation. Bird predation in the Yakima River and throughout the Columbia has seemed to increase with the increase in bird numbers. Using Pit tag scanners in breeding colonies tags can be recovered to reveal the extent of predation on out-migrating salmonids.

Recovered Pit tags in Bird Islands

Smolt

Mig Year	Detection at Dams				Recapture in Islands (AVIAN predation)										Total
	N	MCN	JO	SON	RICHIS	FOUNDI	BADGEI	CRESIS	CELABI	MUSINI	LMILLI	ASMEERI	ESSANIS	POTHI	
2015	18795	234	117	410											
2016	24778	1028	433	786											
2017	14412	474	602	355											
2018	19266	428	472	498											
2019	20305	192	201	338											
2020	13865	282	338	1011	15	39	45	1			12	11	24		147
2021	9443	208	111	634	10	15	50	2			14	13	13		117

Parr

Mig Year	Detection at Dams				Recapture in Islands (AVIAN predation)										Total
	N	MCN	JO	SON	RICHIS	FOUNDI	BADGEI	CRESIS	CELABI	MUSINI	LMILLI	ASMEERI	ESSANIS	POTHI	
2014															
2015	26612	46	17	34											
2016	26815	201	102	58											
2017															
2018	21244	297	314	85											
2019	41275	70	90	21											
2020	2528	2	1	4			5								5
2021	1989	1	0	2	1	6									7



The above slide shows Coho Pit tag detections on the different islands in the Columbia River for the migration year 2020 and 2021. It is difficult to quantify the predation however, there is some level that is impacting smolts. For example, in the migration year 2020, approximately 282 smolts were detected at McNary, but in the Islands, 147 smolts were recovered from the Islands, indicating that predation has a big impact on the fish. Historically, before the dams breeding colonies and populations of birds were kept in check by floods, and predation. Now, with static flow elevations in the Columbia, the colonies are impacted little by natural events. There has been some focus on treating some certain islands. Crescent island for example was planted with vegetation (managed Island). Very few pit tags were found on Crescent island compared to the others non-managed Islands.

Summary

- The variable release strategy (adult out-plants, summer parr, and smolts) is demonstrating effectiveness in advancing project goals.
- Summer parr releases show impressive smolt-to-adult return rates (from McNary to Bonneville Dams) in many years when compared to smolt releases.
- Release strategies that result in earlier juvenile migration is critical in the Yakima River Basin; June migrants tend to have very poor survival.
- The number of coho spawning in tributaries is encouraging, and especially so in large return years.
- Avian predation in the lower Yakima River is impacting juvenile survival; strategies to address this need to be a high priority.