

The Columbia Basin Collaborative

Revised Recommendation 1-24-24

Introduction

The Columbia Basin Collaborative (CBC) charter aims to achieve the quantitative and qualitative goals for salmon and steelhead documented in the Columbia Basin Partnership Task Force (CBPTF) Phase 1 and 2 Reports, as adopted by the Marine Fisheries Advisory Committee (MAFAC). The CBPTF “explored the various limiting factors that impact salmon and steelhead across their life cycles. The results of the analyses show that no single strategy (e.g., reducing predation, increasing habitat, reducing harvest) will achieve the Goals on its own. Instead, improvements in multiple factors will be needed to increase abundance to desired levels for most stocks. Together, these improvements create synergies that compound benefits greater than those achievable through single actions.”

The CBPTF also identified that, “reliable and predictable funding is essential. Funding must be targeted to achieve the Partnership’s Quantitative and Qualitative Goals. New funding sources should be identified. Funding must come from multiple sources, consider the burden across communities, and account for past, present, and potential impacts.”

The CBC agrees with these MAFAC-adopted objectives and hence the recommendations below are aimed to help achieve those CBPTF Goals. No one recommendation can meet these goals alone.

The parties of the CBC have come to consensus that this recommendation is valid for implementer consideration. As stated in the Charter “sovereigns with management decision-making authority will review recommendations and make independent decisions to implement or support actions. The CBC itself is not a management decision-making body, but will strive to support its recommendations through to implementation.”

Recommendation: Maintain and Improve Mainstem Reach Survival Estimates and Smolt to Adult Return (SAR) Data

Summary of Action:

Maintain and improve mainstem reach survival estimates and Smolt to Adult Return (SAR) data by installing PIT tag detection systems at key mainstem hydro-projects so that reach-based juvenile salmon and steelhead survival and SAR estimates can be generated throughout the Columbia and Snake River basins. Maintaining and improving reach-based survival estimates will allow for changes in reach survival to be identified, investigated, and addressed. Improving juvenile detections at key projects (and downstream of Bonneville Dam) will allow for more accurate estimates of SARs from different ESUs/DPSs and populations within the Columbia River Basin. Recommended key projects and structures include: Wanapum Dam juvenile bypass; Wanapum Dam adult fishway; one McNary Dam surface spillbay; Bonneville Dam spillway¹; and the Columbia River estuary (where these “downstream” detections are needed to make survival estimates to Bonneville Dam and could serve as the basis for generating SAR information for ESUs/DPSs and populations within the Columbia River Basin – including the Willamette River basin).

Existing or New Program:

Both. Several mainstem Columbia and Snake River dams have juvenile PIT tag detection systems while many others do not. There is generally a lack of juvenile PIT tag detection at the five mid-Columbia Public Utility District owned dams. Detection capabilities at many federally owned dams in the lower Snake and lower Columbia rivers have been substantially reduced by recent (higher spring spill) operations and improvements are needed in order to maintain and enhance detection capabilities. Enhancing PIT tag detection capabilities in the Columbia River estuary will increase the accuracy of reach survival estimate to Bonneville Dam and will allow lower river ESUs/DPSs to be detected (which could support reach survival or SAR estimates for these stocks).

Benefit Provided by Action:

Both reach survival and SAR estimates include confounding factors which can complicate their interpretation and use as management tools, but each of these metrics are widely used to describe survival and productivity of salmon and steelhead stocks in the Columbia River Basin.

These data would maintain or enhance the means by which regional managers and dam operators identify reaches where juvenile and adult survival rates are changing unexpectedly. Coupled with increased PIT tagging of underrepresented natural origin juveniles (in many basins) we can potentially increase our understanding of stock specific survival through these same reaches. These data would also inform whether reach-based survival studies conducted entirely or predominantly with hatchery fish are a reasonable approximation of natural origin smolt survival. Increasing detections in the spillways at mainstem dams could also provide adult fallback and fallback/reascension estimates at these projects.

Currently, SAR estimates for Upper Columbia stocks are limited to release locations or McNary Dam (juvenile detections). The NPCC F&W Program relies on SAR data as a performance metric for the hydro system and overall stock performance. Improved SAR data for upper Columbia Stocks (via increased PIT tag detection) is needed to assess stock performance, improve assessments of delayed mortality, and help evaluate in-river survival bottlenecks.

Stocks Benefited by the Action:

All stocks entering the Snake and Columbia rivers upstream of targeted reaches, especially Upper Columbia River (UCR spring Chinook, steelhead and Okanogan River and Lake Wenatchee sockeye) and lower Columbia River stocks to the extent they would be detected at Wanapum Dam or in the Columbia River estuary.

Data Supporting Benefits:

CSS Annual Report(s); NOAA Annual Report on Survival Estimates for the Passage of Spring-migrating Juvenile Salmonids Through Snake and Columbia River Dams and Reservoirs; NOAA Life Cycle Models.

Implementing Entities:

Federal and non-federal dam operators (key mainstem detection sites) at mainstem dams; multiple agencies might be capable of contributing to Columbia River estuary PIT tag detectors.

Time Needed to Implement:

Development of new PIT tag detection systems at key locations (Wanapum juvenile bypass, Wanapum adult fishway, McNary surface spillbay, Bonneville spillway, and Columbia River estuary – needed as a required downstream detection site and a detection site for lower Columbia River ESUs/DPSs) could take several years to develop and implement after funding is approved and systems are designed. Responses to the information provided by these enhancements could occur quickly – as early as the following migration season – using adaptive management; other responsive actions may require modification of existing agreements or requirements.

Time Needed to Benefit Fish Populations:

Data can be used to adaptively manage responsive actions – potentially in the outmigration season following identification of an issue. Longer time periods will be needed to build data sets (reach survival and SAR estimates) for many UCR, LCR, and Willamette River ESUs/DPSs.

Estimated Cost:

Unknown, likely many millions of dollars for each key location to develop, design, and implement.

Uncertainties:

Locating PIT tag detection systems that are effective and durable could be challenging (though the Lower Granite surface weir PIT tag detector and estuary pile dyke detectors demonstrate that success is possible). Bonneville Dam might be especially challenging because detectors will likely need to occur in either the forebay (prior to passage through one of the many spillbays) or in the tailrace (after passage through a spillbay) rather than in each of the spillbays themselves as this would likely be cost prohibitive and detection in a single spillbay would likely be very inefficient.

Associated Regulatory Processes or Policies:

NOAA 2020 CRS Biological Opinion; FERC licenses and BiOps, and potentially NOAA's Willamette River BiOp.

Potential Challenges:

Designing the spillway PIT tag detector at the Lower Granite Dam surface spillbay took many years. Future systems should take less effort to design as they can build upon the knowledge gathered from this

earlier effort. Wanapum Dam's juvenile bypass system is unique as is the Bonneville spillway (located in a separate channel). NOAA has been investigating technologies (alternatives to the towed array and detections at bird colonies) to obtain PIT tag detections in the Columbia River estuary – these efforts should be useful to this effort.

Adaptive Management:

Data informing reach-based juvenile survival estimates can be used to identify survival issues within each reach. This information can alert managers to investigate potential causative factors and use adaptive management (i.e., alternative dam operations or predator management actions) to improve survival. This data could also be used to monitor adult fallback and fallback/reascension at the key mainstem locations. Lastly, SAR data is a basic metric used to assess ESU/DPS level (and potentially population level) survival across the smolt to adult life stages (from all factors); it might also be used to evaluate delayed mortality (comparisons between stocks with different treatments – hydro operations, etc.).

SIWG Narrative Feedback & Stock Benefits Report Card:

SIWG Feedback:

- Fishery managers have faced challenges acquiring funding for full SAR monitoring of wild populations in upper rivers. Most mitigation systems are set up for hatchery fish since tagging technology previously did not support tagging wild fish.
- This recommended action is highly integrated with other efforts and limiting factors in the Columbia River Basin. This is an overarching monitoring effort that would allow fishery managers to improve precision for population estimates for SAR and in-river survival rates. This information would help gauge progress towards the Columbia Basin Task Force (CBPTF) goals on a stock-by-stock basis. This action is primarily about addressing data gaps which will support adaptive management of several limiting factors, including hydropower operations, habitat, and predation.
- Some SIWG members expressed that they would like to see more specificity in the recommendation about where estimates are possible now with reasonable certainty, how much those return estimates could be improved by this action, and how those estimates will lead to improvements in the hydro system or management actions. It is always beneficial to have better data, yet this effort will take significant money and time and it is already possible to estimate SAR in some reaches.
 - The Northwest Fisheries Science Center (NWFSC) has a 20-year database for estimating reach survivals throughout the system. Since 2018 when maximum spill started being implemented, the precision around these estimates has gone down and estimates for the last three years are very low.
- SIWG members also noted that the recommendation is not specific about who should pay for and install the PIT detection technology. The recommendation would be strengthened by clarifying who the recommendation is directed to and who is being asked to support this action.
- This monitoring depends on the ability both to tag fish and to detect them. A lot of juvenile traps have already been placed in the system, and this action would leverage infrastructure investment that has already been put into the system.
- This action would more precisely define where mortality happens and help focus on bottlenecks.
- This action would address several major data gaps, such as, data for survival estimates in the Upper Columbia and the contrast between the Snake and the Upper Columbia reaches. This would significantly benefit the whole basin. It would also improve data sensitivities for each of the basins, including climate change effects.
- The benefits to individual stocks are project specific. For the Lower Granite Dam, the Snake River stocks are most likely to benefit. Improved detection at McNary Dam is very important for the Upper Snake stocks. Improvements at Bonneville Dam and in the estuary would benefit all stocks. More generally, the overall recommendation would benefit all listed stocks.

Stock Benefits Report Card:

Sub-Region	Stock	Status	Abundance			MAFAC Phase II Impact Priority									
			Current	MAFAC Medium goal	Current as % of Medium Goal	Tributary Habitat	Estuary Habitat	Hydro (Mainstem)	Hydro (Latent)	Hydro (Blocked)	Predation	Fishery	Hatchery	Harvest	
Low-C	L Col R Spring Chinook	Threatened	2,240	21,550	10%	1	3	3	3	2	3	3	2	3	
Low-C	L Col R Winter Steelhead	Threatened	5,989	27,900	21%	1	2	3	3	3	3	3	3	3	
Low-C	L Col R Fall (tule) Chinook	Threatened	12,329	54,100	23%	1	2	3	3	3	3	1	2	1	
Low-C	L Col R Coho	Threatened	31,524	129,550	24%	1	3	3	3	3	3	3	2	3	
Low-C	L Col R Summer Steelhead	Threatened	10,594	29,800	36%	2	4	4	4	2	4	4	4	4	
Low-C	Col R Chum	Threatened	11,762	33,000	36%	2	2	4	4	4	4	4	4		
Low-C	SW WA Winter Steelhead	Threatened	3,252	5,850	56%	2	4	5	5	5	5	5	5	5	
Low-C	L Col R Late Fall (bright) Chinook		10,800	16,700	65%										
Low-C	L Col R Fall (bright) Chinook	Threatened	11,000	11,000	100%	5	5	5	5	4	5	4	5	4	
Mid-C	M Col Sockeye	Not Listed	1,036	45,000	2%	3	3	3	2	1	3	3		3	
Mid-C	M Col R Spring Chinook	Not Listed	11,600	40,425	29%	2	4	4	4	4	4	4	4	4	
Mid-C	M Col R Summer Steelhead	Threatened	18,155	43,850	41%	2	4	4	4	4	2	4	4	4	
Mid-C	M Col R Coho	Not Listed	6,324	11,600	55%		5	4	5	5	5	4		4	
Mid-C	M Col R Summer/Fall Chinook	Not Listed	11,500	13,000	88%	5	5	5	5	5	5	4	5	4	
Up-C	U Col R Coho	Not Listed	392	15,000	3%										
Up-C	U Col R Summer Steelhead	Threatened	1480	31,000	5%	1	1	2	1	1	1	1	3	2	3
Up-C	U Col R Sockeye	Not Listed	40,850	580,000	7%	1	3	1	1	1	1	2	3	3	3
Up-C	U Col R Spring Chinook	Endangered	1430	19,840	7%	1	3	1	1	1	1	2	3	1	3
Up-C	U Col R Summer Chinook	Not Listed	16920	78,350	22%	1	2	1	1	1	1	3	1	2	1
Up-C	U Col R Fall Chinook	Not Listed	92,400	62,215	149%	5	5	4	5	5	5	4	5	4	
Snake	Snake R Coho	Not Listed	100	26,600	0%										
Snake	Snake R Sockeye	Endangered	100	15,750	1%	3	3	1	1	1	1	2	3		3
Snake	Snake R Spring/Summer Chinook	Threatened	6,988	98,750	7%	1	3	1	1	1	2	2	3	3	3
Snake	Snake R Summer Steelhead	Threatened	28,000	75,000	37%	2	4	4	2	2	2	2	4	4	4
Snake	Snake R Fall Chinook	Threatened	8,360	10,780	78%	5	5	4	4	4	4	5	4		3
Willam	U Will R Spring Chinook	Threatened	4,278	47,850	9%	1	2	3	3	1	3	3	3	2	3
Willam	U Will R Winter Steelhead	Threatened	2,816	27,805	10%	1	2	3	3	3	1	3	3	3	3

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■ Stocks most benefited
⋯ Stocks receiving secondary benefit

Note that the stock benefits are project specific. The Snake River stocks would be most benefited by improvements at Lower Granite Dam and the Upper Columbia River Stocks would be most benefited by improvements at McNary Dam.