CHEHALIS BASIN STRATEGY

SKOOKUMCHUCK DAM NEXT STEPS

Date: April 26, 2023
To: Chehalis Basin Board
From: Nat Kale, OCB Planner and Merri Martz, Anchor QEA Project Manager
cc: Andrea McNamara Doyle, OCB and Sam Imperati, CBB Facilitator
Re: Skookumchuck Dam 2023-2025 Biennium Staff Options & Recommendations

Requested Direction

At the May 4, Board meeting, OCB staff will be seeking direction from the Board on next steps related to the Skookumchuck Dam. Staff recommends the Board request a scope of work from Anchor QEA that fits within the Board's previously approved $575,000 allocation for Skookumchuck Dam work in the 2023-25 biennium that best addresses the values and interests expressed by Board members and public comments received on the Phase 2 report. Specifically, staff recommends the scope of work for the 2023-25 biennium should include the following:

- Continue facilitating stakeholder dialog with OCB staff
- Perform additional water rights accounting
- Assess the habitat and water temperature upstream of the reservoir, and revise the EDT model with the new information
- Analyze the feasibility and rough cost of off-channel storage and direct piping of water
- Begin geotechnical work to assess the stability of the dam and surrounding area

These analyses will improve the Board's understanding of the impact of three alternative futures for the dam on water rights and on anadromous fish – a fish-focused alternative that keeps the dam and augments fish passage; a fish/flood alternative that augments fish passage and increases discharge capacity to enhance flood management; and an off channel storage alternative that removes the dam and constructs an alternative reservoir to maintain the water right.

Background and Board Direction

At the February, March, and April Chehalis Basin Board meetings, OCB staff presented the results of the Skookumchuck Dam Phase 2 analysis, and described the four options that emerged from that work:

1. Fish Only
2. Flood Only
3. Fish-Flood
4. Dam Removal

From the discussion at those meetings two additional options were described as modifications of options 3 and 4:

5. Fish-Flood with Direct Piping
6. Dam Removal with Off-Channel Storage

OCB staff also heard a number of values and interests emerge from those discussions and from public comments on the Phase 2 document. Among those values and interests are:

- Improving the productivity and abundance of salmonids in general, and spring chinook specifically, in the Skookumchuck River.
- No increase in flood risk or damages downstream of the dam.
- Guaranteeing the long-term viability of the TransAlta Water Bank.
- Evaluating the Skookumchuck Dam as an element of the entire Chehalis Basin Strategy.

Staff believe that options 1, 5, and 6 best meet the values and interests expressed by the Board and others.

Option 1 would seek to improve downstream passage of juvenile fish through the dam by redesigning the existing "fish sluice" and fine-tuning dam operations. It would also seek to improve upstream passage by redesigning the existing "trap and haul" facility at the base of the dam.

Option 5 would include all the elements of Option 1, plus add approximately 2,000 cfs discharge capacity through the dam, which would make it possible to actively manage the reservoir water elevations to reduce downstream flood risk. Option 5 may also include directly piping water to rights holders, reducing or eliminating the need for augmented flow in the Skookumchuck.

Option 6 would remove the dam, eliminating the need for fish passage (though increasing downstream flood risk), and construct a reservoir in the Skookumchuck basin off of the main channel to capture sufficient water to maintain the TransAlta water bank.

The Board agreed to set aside $575,000 for Skookumchuck Dam work in the 2023-2025 biennium as part of its $73,000,000 budget request to the legislature. The Skookumchuck Dam Phase 2 report includes a list of future needs (chapter 10). The Board discussions and public feedback have also highlighted some additional needs to consider.

Prioritized Actions

OCB recommends the Board authorize OCB to contract with Anchor QEA and other consultants as needed to carry out the following tasks, in an amount not to exceed $575,000 from the 2023-2025 budget. This list is prioritized by staff's assessment of the greatest information needs. The options listed in the top blue section are tasks most likely to fit within the budget and available

timeframe of July 1, 2023 to June 30, 2025 (unless they prove impossible to carry out for other reasons). Tasks listed lower, in the gray and orange sections, are ones that staff has determined are less likely to be able to be completed within the time and budget available.

If the "likely" actions are completed in the 23-25 biennium, the Board should be well situated to initiate design on a preferred alternative with well-informed partners in the 25-27 biennium. If the "possible" actions are able to be completed, and the Board is able to make decisions on a preferred alternative, design could be underway by the 25-27 biennium, potentially improving prospects for grant applications.

	ACTION	DESCRIPTION	LEVEL OF EFFORT
Likely 23-24 Actions	Reporting	A final report and presentations to the Board with findings	Low
	Stakeholder Dialog	Facilitate discussions between stakeholders about future operations of the dam and surface issues around different options.	Mid to High
	Water Rights Accounting	Determine estimated water rights withdrawals and timing by month to develop detailed accounting of potential effects on water rights by alternatives.	Low to Mid
	Upstream Habitat Assessment	Conduct an on-the-ground habitat assessment of the upper watershed and identification of fish passage barriers.	Mid
	Upstream Temperature Sensor	Install two temperature gages upstream of the reservoir to characterize upper basin instream temperatures and habitat suitability. Run EDT using new temperature and habitat data.	Low to Mid
	Off-Channel Feasibility	Investigate siting, sizing, and overall feasibility of an off-channel storage reservoir.	Low to Mid
	Direct Piping Costs	Create a rough cost estimate for piping 51.6 cfs of water to the Chehalis River and to downstream users from three points: the current withdrawal point, the existing reservoir, or a potential off-channel storage location.	Low
	Geotech (Dam Stability)	Conduct a geotechnical investigation to determine fish sluice tunneling and/or low level outlet *feasibility*.	Mid to High
Possible 23-25 Actions	Geotech (Methodology & Cost)	Conduct a geotechnical investigation to determine *method and cost estimates* for a low-level outlet for flood storage and/or fish sluice.	Mid to High
	Reservoir Predation	Investigate the biota of the Skookumchuck Dam reservoir, to determine the likelihood of successful downstream migration of juvenile salmonids, especially coho and chinook.	Mid
	Fish Sluice Design	Develop further detailed structural and hydraulic design of the fish sluice.	Mid to High

	ACTION	DESCRIPTION	LEVEL OF EFFORT
Unlikely 23-25 Actions	New Outlet Design	Develop further detailed structural and hydraulic design of the low-level outlet.	High
	Out-migration Timing	Conduct further investigation of chinook and coho outmigration in the lower Skookumchuck.	Mid to High
	Out-migration Survival	Conduct further investigation of steelhead out-migration survival through reservoir and dam.	Mid to High
	Low Flow Monitoring	Collect low-flow observations in multiple reaches of the Skookumchuck River to inform groundwater recharge and discharge (e.g., gaining reaches) and refine computed local inflows.	Low to Mid
	Flow Timing Analysis*	Analyze existing gage data for timing of peak flows on tributaries, including the Skookumchuck.	Low to Mid
	Big Hanaford Flow Monitoring*	Conduct gaging of flows on Big Hanaford Creek to more accurately predict both low and peak flows downstream of Big Hanaford Creek.	Low to Mid
	Downstream Geomorphology	Assess the downstream area for geomorphology with respect to wood and sediment under current conditions.	Low to Mid
	Structures Database*	Develop structure finished floor elevation data using the methods described by WSE (2016) to more accurately predict flood depths and damages (and/or avoidance of damages) downstream of the dam.	Mid
	Turbidity Tracing**	Track down the source of high turbidity in the Skookumchuck River downstream of the dam.	Low to Mid
	Control Upgrades	Create a preliminary design of an improved control system for the dam operational systems - intakes, fish sluice, spillway gaging, etc.	Low to Mid

The recommended actions will primarily accomplish three things:

- Further and broaden discussions with key stakeholders to better refining the range of acceptable outcomes.
- Collect information in important areas identified during Board discussion, including the two additional proposed alternatives (off channel storage and direct piping) and habitat/temperature conditions upstream of the reservoir.

- Begin assessing the technical feasibility of options that involve significant reconstruction of the dam.

The recommended actions include collecting additional data regarding fish habitat and water rights because there are outstanding questions that could substantially influence the proposed alternatives. Specifically, the habitat upstream of the reservoir needs further study to determine how effectively anadromous fish, and chinook in particular, could utilize those reaches. Understanding potential chinook utilization of the upstream reaches will influence the assessment of the fish-related benefits of alternatives that include upstream and downstream passage, like the fish-flood alternative.

Better characterizing water rights will help to refine the parameters within which the dam can be legally operated. This is important for all of the proposed alternatives, but especially vital for the direct piping and dam removal + off channel storage option.

While further refinement of flooding scenarios would provide additional beneficial information, it is unlikely to significantly alter the costs or benefits of the various alternatives. Some modeling work is implicit in the proposed off channel feasibility action. In general, the modeling completed thus far summarizes downstream flooding impacts about as well as possible, at this level of assessment. If one of these alternatives advances to design, additional modeling of potential flooding impacts will likely be required.

If the "likely" actions are completed in the 23-25 biennium, the Board should be well placed to initiate design on a preferred alternative with well-informed partners in the 25-27 biennium. If the "possible" actions are able to be completed, and the Board is able to agree on a preferred alternative, design could be underway by the 25-27 biennium, potentially improving prospects for grant applications.