

MEMORANDUM

Date: March 2, 2021
To: Chehalis Basin Board
From: Andrea McNamara Doyle, OCB Director
Nat Kale, OCB ASRP Project Manager
Re: DRAFT outline of potential Skookumchuck Dam analysis

Summary

This memorandum proposes a two-phased study of the Skookumchuck Dam. It suggests a faster initial scoping phase to roughly estimate the potential benefits of various physical and structural modifications to the dam, and a longer second phase with a detailed analysis of alternatives.

Background

At the February 18, 2021 Chehalis Basin Board meeting, the board received a presentation on the potential opportunities associated with the Skookumchuck Dam for advancing both aquatic species habitat and flood damage reduction objectives of the Chehalis Basin Strategy. Board members expressed interest in understanding more about what could be learned through a more detailed analysis of the dam and potential operational or structural changes. This memorandum summarizes the potential purpose of such an analysis, along with the range of potential alternatives that could be evaluated, and some of the key questions board members would like to see answered.

Purpose of Possible Skookumchuck Dam Analysis

The purpose of this analysis would be to identify the potential benefits, costs, and trade-offs of different alternatives for the Skookumchuck Dam as its current purpose of water supply for the Centralia Steam Plant has recently changed and will no longer be necessary after 2025.

The analysis would help inform the Board of options to consider as part of the Chehalis Basin Strategy for both flood damage reduction and aquatic species habitat restoration. For example, the analysis could help determine if additional storage can provide measurable flood reduction in Bucoda, Centralia, and downstream to Grand Mound. It could also help determine how different fish species, including steelhead, coho, spring and fall Chinook, and Pacific lamprey, might benefit from gaining access

upstream of the dam¹. Additionally, it could help determine the potential of approaches to reduce genetic interbreeding between spring-run and fall-run Chinook, which has been identified through recent studies as contributing to the decline of true spring-run Chinook within the Skookumchuck sub-basin. This area is currently the best remaining spring Chinook stronghold within the Chehalis Basin.

The range of potential alternatives to be initially evaluated could include:

1. Existing Dam + Operational Modifications. This analysis would look at options for retaining the existing facility infrastructure in its current configuration while modifying operations to improve benefits for fisheries and flood storage. Options include:
 - a. Continued operation of the existing dam facility primarily for flow augmentation.
 - b. Modified operation of the dam to improve flood storage at a low end (11,000 acre-feet) and high end (30,000 acre-feet) of storage.
 - c. Modified operation of the dam to combine and optimize flood storage and downstream flow and temperature benefits for fish.
2. Modified Dam + Operational Modifications. This analysis would look at options for modifying the existing facility infrastructure (e.g., providing and improving fish passage, modifying spillway for more storage) and operations to improve benefits for fisheries and flood storage. Options include:
 - a. Reconfiguration of the facility's infrastructure and modification of dam operation to prioritize both upstream and downstream benefits to fish (flow augmentation, trap/haul, and downstream passage of fish).
 - b. Modifying the facility's infrastructure to provide more storage (modifying spillway to increase potential flood storage by approximately 10,000 acre-feet above minimum and maximum considered in Option 1).
 - c. Reconfiguration of the facility's infrastructure and modification of dam operation to combine and optimize flood storage and upstream/downstream benefits for fish.

¹ Previous assessment by Weyerhaeuser (1996) indicated up to 38.6 miles of fish-bearing waterbodies are present upstream of the dam (including resident cutthroat trout streams); however, 4 miles of this habitat is within the current reservoir, which is believed to have provided the majority of potentially suitable Chinook salmon habitat.

3. Dam Removal. This analysis would look at the potential effects and implications for both fisheries and flood management from potential removal of the existing dam.

Study Phases

Dam modification or removal is a complex process, and a comprehensive study of the alternatives would be expensive and take a longer time (many months). Breaking the study into two phases would give the Board an opportunity to evaluate the potential benefits of modification or removal and decide whether to proceed, before investing in costlier and more time-consuming analyses, like field work or comprehensive modeling.

Scoping

Most of the work in this focused initial evaluation would be an initial assessment of the range of possible benefits and impacts for fish and flooding of the alternatives listed above. It would also address permitting needs, water rights impacts, partner willingness (e.g., TransAlta, state agencies, Thurston County, local municipalities), and other potential constraints. Additionally, this phase would develop a separate scope for a more detailed study that could quantify costs and benefits, and develop 5-10% designs that could identify a preferred alternative for further design and/or implementation.

To get actionable information in front of the Board quickly, the scoping phase would not involve any design or new modeling. Rather, it would be the best professional judgment of experts, informed by a literature and data review, meetings with key parties, some limited field visits as necessary, limited modeling using existing hydrologic models and data, simple calculations, and updating previously prepared cost estimates.

The deliverables of this phase would be a short (10-20 page) report to the Board summarizing the estimated benefits and impacts of Options 1 - 3 above, and a separate document with scope options for the second phase of the study. The Board would select some (or no) alternatives to advance to a more detailed study.

Feasibility

If the Board decided to move forward with at least one alternative, the completed scoping study from the first phase would inform a longer, comprehensive investigation of the selected alternatives. This analysis would include more in-depth analysis tools, such as hydrologic + hydraulic and habitat models, as well as field visits for collecting additional data where necessary (e.g., surveying, habitat or geologic assessment). It would develop a conceptual design for each of the selected alternatives to refine cost and benefit estimates.

Some of the key questions for each selected scenario that could be addressed by the feasibility study are:

- What would be the potential estimated costs of dam modification or removal?
- What would be the potential estimated costs of dam operations, with the existing or a modified structure?
- What would be the benefits and costs of operational or physical changes to support native fish populations, including spring and fall Chinook, coho, steelhead, and Pacific Lamprey?
- What is the relative quantity and quality of fish habitat upstream of the dam and reservoir and what species could it support?
- What flood damage reduction benefits could be provided by the dam at the low and high ends of storage?
- What potential effects could the existing or modified flood storage have on flow augmentation, fish habitat and populations, and water rights downstream?
- How can physical or operational changes be structured to minimize hybridization between spring and fall Chinook?
- How does the existing dam affect downstream water temperature, and how could dam removal affect water temperature?
- What potential effects would dam removal have on existing spring Chinook habitat below the dam, and what would be the net effect on spring Chinook of restoring upstream habitat?
- What potential effects would dam removal have on the loss of incidental flood damage reduction benefits of currently available flood storage?
- How would modification or removal of the dam affect the existing water rights that are associated with the reservoir storage and consumptive use of water for operation of the steam plant?

Next Steps

The Board could choose to direct staff to develop a scope of work and work with existing Office of Chehalis Basin consultants for the Scoping phase of the Skookumchuck Dam study. Staff would work with consultants to return a report in approximately 3-4 months. Once the Scoping Report is completed, the Board would have the opportunity to direct staff to move forward with one or more design alternatives to the Feasibility phase. Staff would develop a new scope of work for the feasibility phase and execute a contract with a consultant. This phase would be anticipated to take 6-12 months and require a larger investment of resources to complete. The total time to complete and resources required would depend on the alternatives the Board selected for further study.

References

Weyerhaeuser Company, 1996. Upper Skookumchuck Watershed Analysis. Appendix F, Fish Habitat Assessment. Prepared by Lillian Herger, March 1996.

U.S. Army Corps of Engineers, 2003. Centralia Flood Damage Reduction Project, Chehalis River, Washington. Seattle District.