

Project Name	2023 CFNSC Evaluation Recommendations
Requested By	Matt Bleich
Date Proposal Submitted	2/7/2023
Date of Requested Decision	2/15/2023
Date of Decision	2/16/2023

¹Decision will become final if committee members who were not present at this meeting do not oppose this proposed decision within 7 days.

FTC Decision and Justification
<p>Members Present: FTC members present represented WDFW and Ecology. This Decision document will be circulated to FTC members not present and become final on February 15 if no objections are received.</p> <p>The FTC supports the recommendations from the TWG to evaluate the four topics defined in the 2023 plan.</p>

Proposed Decision or Consideration
<p>As part of the 2023 evaluation year at the Cowlitz Falls North Shore Collector (CFNSC), Tacoma proposes implementing four actions intended to improve operations and/or test hypotheses regarding salmon and steelhead collection efficiency. Specifically, Tacoma will:</p> <ol style="list-style-type: none"> 1. Test the hypothesis that debris build up in 2022 contributed to low collection efficiency. 2. To inform future directed studies, conduct a post hoc analysis of available data for conditions near Lewis’ debris barrier and spillway flume entrances that may influence fish collection and/or entrainment into Cowlitz Falls Dam. 3. Optimize spillway flume flow when Lewis is in single-unit operation by increasing flow into flumes above operating turbine. 4. Conduct a temperature and flow modeling exercise of various Pumpback Diffuser Structure (PDS) configurations to enhance hydraulic conditions in the zone of influence for Chinook Salmon entrance efficiency.

Background

As part of the Cowlitz Hydroelectric Project Federal Energy Regulatory Commission operating license requirements, Tacoma Power is engaged in restoration efforts of anadromous salmonid populations in the Upper Cowlitz River basin. These efforts include ensuring the effective passage of juvenile salmonids during their migration downstream from the Upper Cowlitz and Cispus rivers, through collection in the Cowlitz Falls Fish Facility, and transport around Tacoma hydroelectric facilities, where they are subsequently returned to the Cowlitz River.

The CFNSC was added to the existing fish collection system at Cowlitz Falls Dam in 2017 and has been subject to annual performance evaluations since commissioning. Annual evaluations of the fish collection system include estimates of fish collection efficiency (FCE), defined as the percentage of marked fish released at the head of Lake Scanewa that are subsequently collected alive at the Cowlitz Falls Fish Facility. Fish passage survival (FPS) is the percentage of smolts entering the upstream end of Scanewa reservoir, and adjusted for natural mortality, that are collected at Cowlitz Falls Dam and Riffe Lake and Mossyrock Dam, that are transported downstream to the stress relief ponds, and subsequently leave the stress relief ponds at Barrier Dam as healthy migrants. FPS has a performance requirement of 95%, with a minimum of 75%, after the best available technology has been deployed. Since the completion of Cowlitz Falls Dam in the late 1990's, FPS performance goals have yet to be met for Coho Salmon, steelhead, or Chinook Salmon, although estimates have improved significantly with the commissioning of the CFNSC.

Historically, the annual fish collection operations at Cowlitz Falls Dam spanned from April 15 through August 31. Subyearling spring Chinook salmon outmigration typically peaked in July and subsided as the water temperature increased in mid-to-late August. However, based on the migration timing observed at the CFNSC during extended operations in 2019 through 2022, a later component of the subyearling outmigration occurs when the water begins to cool in September and into early fall. Additionally, yearling Chinook Salmon smolts have been collected prior to April 15. Therefore, in 2023 the CFNSC will be operated mid-March through September, followed by 3-day continuously operated weekly blocks through the end of October, pending maintenance and flood related drawdowns by Lewis.

The CFNSC tailrace discharge structure allows water to be discharged directly into the tailrace, while maintaining fish collection activities. During spring over-capacity spill events at the Cowlitz Falls Dam, the CFNSC will be configured to operate at 750 cfs, providing an opportunity to reduce the overall amount of spill through Cowlitz Falls Dam.

Spill through Cowlitz Falls Dam has been identified as a mechanism that contributes to lower FCE. When debris accumulates in front of Lewis' units and trash racks, generation capacity is reduced, thereby increasing the frequency and duration of spill events. Further, trash rack occlusion may lead to unfavorable hydraulic conditions that could entrain fish

into Cowlitz Falls Dam. In 2023, a partnership between Tacoma and Lewis will be established to clean out debris on and in front of Lewis' trash racks at an increased standard frequency to minimize potential entrainment and the need to spill excess inflow. A post hoc analysis of operations and conditions near Lewis' debris barrier and the spillway flumes may elucidate how these conditions influence fish collection efficiency. This analysis will be included in the 2023 CFNSC Fish Passage Evaluations annual report.

Lewis may conduct maintenance in 2023 that could impact the use of the spillway flumes. During this time, 2 of the 4 flumes may be offline. Under normal conditions, each spillway flume conveys 20 cfs of flow (for a total of 80 cfs) into the fish collection facility. Although overall flow capacity is limited to approximately 80 cfs, the amount of water entering each individual spillway flume is adjustable. In 2023, the spillway flumes will be optimized to increase flow above the unit in operation when in single-unit generation, while maintaining or decreasing flow above the unit that is offline. If spillway flumes are offline because of maintenance, flow will be increased to the available flumes.

The PDS can be operated in three configurations: entrance directed, uniform (no eddy), and eddy. From 2017 through 2020, the PDS was operated in the no eddy configuration. During 2021 and 2022, block studies were performed in no eddy and entrance directed configuration to evaluate Chinook Salmon entrance efficiency. Preliminarily, no significant difference in FCE has been detected between configurations, though a robust analysis of the 2022 season is in production. In 2023, a modeling exercise will be performed on each of the three configurations. Temperature and flow patterns will be evaluated and used to inform future operations.

Coordination Need

Develop an agreement with Lewis County PUD (Lewis) and Ecology to address debris accumulation in front of Lewis' unit intakes and trash racks. The agreement will consider timing, frequency, water quality, BMPs, and cost-sharing of the activity. Identify the roles of who will be responsible for which monitoring components as a result of the agreement. The FTC will receive updates on the progress of new debris removal criteria developed between Tacoma Power, Lewis County PUD, and Ecology.

Significant LCPUD debris cleaning activities can be communicated to the FTC during LCPUD Dam Operation Updates.

Summary of Potential Impacts

Spring Chinook Salmon, Coho Salmon, and steelhead smolt abundance is expected to be sufficient for FCE evaluation. Annual performance evaluations involving tagging and releasing of smolts upstream of Cowlitz Falls Dam are not expected to be impacted by failure to reach minimum sample sizes for statistically valid results.