Project Name	2022 CFNSC Evaluation Recommendations
Date Proposal Submitted	February 1, 2022
Date of Requested Decision	March 1, 2022
Date of Decision[1]	March 8, 2022
Requested By	Matt Bleich

[1] Final decision will be held for 7 days to allow FHC members who were not present at this meeting to consider proposal and provide input.

FTC Decision and Justification

FTC supports the proposed decision herein. FTC members in attendance at the March 1, 2022 meeting in support of this proposed decision were Washington Department of Ecology, Washington Department of Fish and Wildlife, and Tacoma Power. .

Proposed Decision or Consideration

As part of the 2022 evaluation year at the Cowlitz Falls North Shore Collector (CFNSC), Tacoma proposes implementing four actions intended to test hypotheses regarding salmon and steelhead collection efficiency in relation to collector configuration, dam operations, and life history strategies. Specifically, Tacoma will:

1. Opportunistically evaluate increasing flow within the collector from 500 cfs to 750 cfs during spring freshets during the spring migration period (April 15 through June 30) and any resultant effect on steelhead and Coho Salmon collection efficiency.

2. Evaluate the effect on steelhead retention efficiency of modified floor geometry in the Capture Zone region of the CFNSC using new experimental settings.

3. Design and implement a block study to evaluate Chinook Salmon Entrance Efficiency in response to the configuration of the Pumpback Diffuser System (PDS) during pumpback operations. The proposed study will be implemented using PIT tags in 2022.

4. Continue the extended collection season initiated in 2020 at Cowlitz Falls by operating the CFNSC beginning in mid-March and continuing through October (barring any October drawdowns that would preclude CFNSC operations), outside of the historic April through August timeframe, to allow for a deeper understanding of life history expressions in Upper Cowlitz River basin spring Chinook Salmon. Operations during October will be similar to previous years, using a block-style approach.

Background

As part of the Cowlitz Hydroelectric Project Federal Energy Regulatory Commission operating license requirements, Tacoma Power is engaged in recovery 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 collection system, and transport around Tacoma hydroelectric facilities, where they are returned to the Cowlitz River.

The Cowlitz Falls North Shore Collector 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 derived from FCE, adjusted for natural and transportation mortality, and includes a term for survival of collected fish to the stress relief ponds at the Cowlitz Salmon Hatchery, and subsequently exit into the Cowlitz River downstream of Barrier Dam. FPS has a performance goal of 95%, with a minimum of 75%, using the best available technology. 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, fish collection operations at Cowlitz Falls span from April 15 through August 31. Spring Chinook salmon outmigration at Cowlitz Falls typically peaks in July and August. However, based on migration timing observed in similar systems, it is suspected that there is a second component of the outmigration with more typical run timing in early spring or fall. Tacoma proposes operating the CFNSC beginning in mid-March and continuing through October (barring any October drawdowns that would preclude CFNSC operations). Operations during October will be similar to previous years, using a block-style approach. The CFNSC is capable of operating during these periods, and offers the potential of detecting these outmigration signals.

The CFNSC tailrace discharge structure allows water to be discharged directly into the tailrace, while still maintaining fish collection activities. During spring spill events, the CFNSC can be configured to operate at 750 cfs, providing an opportunity to test fish collection performance at higher than normal flows. Tacoma proposes to opportunistically evaluate increasing flow within the collector from 500 cfs to 750 cfs during spring freshets during the spring migration period (April 15 through June 30).

Preliminary results from the 2019 telemetry evaluations suggest that steelhead smolts are able to exit against the high velocity flow of the capture zone, resulting in low Capture Zone Efficiency (39 – 78%) and overall Retention Efficiency (48 – 77%) across weekly release groups. The floor of the Capture Zone was designed to be adjustable and can be modified to improve hydraulic conditions and increase Retention Efficiency in the CFNSC. As part of

the adaptive management process, experimental capture zone settings were tested within block-study parameters during the steelhead migration in both 2020 and 2021. No detectible differences between capture zone settings were observed in either of these two years. Tacoma proposes to continue to modify floor geometry using new experimental settings to evaluate the effect on steelhead retention efficiency of in the Capture Zone region of the CFNSC.

Preliminary results from the 2019 telemetry evaluations revealed that weekly estimates of Chinook smolt Entrance Efficiency varied widely by release group (30 – 85%), and the season-wide value was lower than desired (71%). The PDS has been set to operate in the "no eddy" configuration since the collector was commissioned, but was designed with alternate configurations to address low Entrance Efficiency. One configuration, "Entrance Directed Flow", allows the PDS baffles to be set in such a way as to direct discharge towards the CFNSC entrance, encouraging fish to find and enter the collector. In 2021, a qualitative analysis of Chinook smolt behavior and overall collection during pumpback operation was conducted to inform future actions. This block-style study compared the Entrance Directed Flow (treatment) to the no eddy (baseline) configuration within each six-day block (i.e. three consecutive days of each configuration within one block). No detectable difference was observed between configurations. Tacoma proposes to design and implement a block study using PIT tags to evaluate Chinook Salmon Entrance Efficiency in response to the configuration of the Pumpback Diffuser System (PDS) during pumpback operations.

Coordination Need
Coordinate with LCPUD to operate facility as planned.

Summary of Potential Impacts
Spring Chinook Salmon, Coho Salmon, and steelhead smolt abundance is expected to be sufficient for FCE evaluation.