

FEDERAL ENERGY REGULATORY COMMISSION  
WASHINGTON, DC 20426  
February 13, 2025

OFFICE OF ENERGY PROJECTS

Project No. 2959-148 – Washington  
South Fork Tolt River Hydroelectric Project  
City of Seattle

**VIA Electronic Mail**

Ingrid Wertz  
Project Co-Manager  
Seattle Public Utilities  
[Ingrid.Wertz@seattle.gov](mailto:Ingrid.Wertz@seattle.gov)

Elizabeth Ablow  
Project Co-Manager  
Seattle City Light  
[Elizabeth.Ablow@seattle.gov](mailto:Elizabeth.Ablow@seattle.gov)

**Reference: Study Plan Determination for the South Fork Tolt River Hydroelectric Project, P-2959**

Dear Mses. Wertz and Ablow:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for the South Fork Tolt Hydroelectric Project No. 2959 (Tolt Project). The project is located on the South Fork Tolt River, in King County, Washington. The determination is based on the study criteria set forth in section 5.9(b) of the Commission's regulations, applicable law, Commission policy and practice, and the record of information for the project.

Background

On September 20, 2024, the City of Seattle filed a proposed study plan (PSP) that includes 22 studies in support of its intent to relicense the project. The PSP includes studies on aquatic resources, terrestrial resources, recreation, and cultural and tribal resources.

The City of Seattle held study plan meetings on the PSP on October 8, 16, and 24, 2024 and on December 3, 10, and 12, 2024. Comments on the PSP were filed by the Washington Department of Ecology (Ecology), King County, the Snoqualmie Tribe,

Tulalip Tribes, Snoqualmie Watershed Forum (SWF), Washington Department of Fish and Wildlife (Washington DFW), U.S. Fish and Wildlife Service (FWS), Snoqualmie Valley Watershed Improvement District (SVWID), and Commission staff.

On January 17, 2025, the City of Seattle filed a revised study plan (RSP) that includes the 22 studies from the PSP and an additional study on juvenile salmonid distribution in the lower South Fork Tolt River. Comments on the RSP were filed by the Snoqualmie Watershed Forum, Washington Department of Fish and Wildlife, Snoqualmie Tribe, Tulalip Tribes, and FWS.<sup>1</sup>

### General Comments

Some comments do not directly address study plans. For example, some comments recommend protection, mitigation, and enhancement (PME) measures. This determination does not address such comments, but only addresses comments specific to the merits of the proposed studies submitted pursuant to section 5.13 of the Commission's regulations and received thereon.

### Study Plan Determination

Of the 23 studies proposed by the City of Seattle, 13 are approved as proposed by City of Seattle, 8 are approved with staff recommended modifications (Appendix A), and two are not required. One additional study (*Water Volume Reduction Study*) requested by the Snoqualmie Tribe is approved with modifications. The specific modifications to the study plan and the basis for modifying City of Seattle's study plan are discussed in Appendix B. Commission staff reviewed all comments and considered all study plan criteria in section 5.9 of the Commission's regulations. However, only the specific study criteria particularly relevant to the determination are referenced in Appendix B.

Studies for which no issues were raised in comments on the RSP are not discussed in this determination. Unless otherwise indicated, all components of the approved studies not modified in this determination must be completed as described in the City of Seattle's

---

<sup>1</sup> Comments on the RSP were due February 2, 2025. The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2). Because the 15-day filing deadline fell on a Sunday (i.e., February 2, 2025), the filing deadline was extended until the close of business (5:00 p.m. ET) on Monday, February 3, 2025. The Tulalip Tribes and FWS filed comments on the RSP on February 4, 2025, one day late. This determination considers those comments to the extent they are helpful at informing staff's recommendations for certain studies.

RSP. Pursuant to section 5.15(c)(1) of the Commission's regulations, the initial study report (ISR) for all studies in the approved study plan must be filed by February 17, 2026.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. The City of Seattle may choose to conduct any study not specifically required herein that it believes would add pertinent information to the record of this proceeding.

If you have any questions, please contact John Matkowski at (202) 502-8576 or email at [john.matkowski@ferc.gov](mailto:john.matkowski@ferc.gov).

Sincerely,

for  
Terry L. Turpin  
Director  
Office of Energy Projects

Enclosure: Appendix A – Summary of Determinations on Proposed Studies  
Appendix B – Staff's Recommendations on Proposed and Requested Studies

## APPENDIX A

## SUMMARY OF DETERMINATIONS ON PROPOSED STUDIES

Study	Proposed or Requested By	Approved	Approved with Modifications	Not Required
1. South Fork Tolt (SFT) Reservoir Geomorphic Processes Study (AQ-01)	City of Seattle	X		
2. SFT Reservoir Water Quality Study (AQ-02)	City of Seattle		X	
3. SFT Reservoir Aquatic Species Community Study (AQ-03)	City of Seattle		X	
4. SFT Reservoir Fish Entrainment Study (AQ-04)	City of Seattle	X		
5. Lower SFT and Mainstem (MST) River Water Quality Study (AQ-05)	City of Seattle	X		
6. Lower SFT and MST River Hydraulic Model Development Study (AQ-06)	City of Seattle	X		
7. Lower SFT and MST Geomorphic Characterization Study (AQ-07)	City of Seattle	X		
8. Lower SFT and MST River Geomorphic Process Flows Study (AQ-08)	City of Seattle		X	
9. Lower SFT and MST River Instream Flow Study (AQ-09)	City of Seattle	X		

Study	Proposed or Requested By	Approved	Approved with Modifications	Not Required
10. Water Volume Reduction Study	Snoqualmie Tribe		X	
11. Lower SFT River Critical Flow Study (AQ-10)	City of Seattle	X		
12. Lower SFT River Juvenile Salmonid Distribution Study (AQ-11)	City of Seattle			X
13. Archaeological Resources Study (CR-01)	City of Seattle		X	
14. Historic Built Environment Study (CR-02)	City of Seattle		X	
15. Properties of Traditional, Religious, and Cultural Importance Study (CR-03)	City of Seattle		X	
16. Environmental Justice Study (EJ-01)	City of Seattle			X
17. Recreation Study (RR-01)	City of Seattle	X		
18. Rare, Threatened, Endangered, and Special Status (RTE&S) Plants Study (TR-01)	City of Seattle	X		
19. Noxious and Invasive Plants Study (TR-02)	City of Seattle	X		
20. Wetland Study (TR-03)	City of Seattle		X	
21. RTE&S Amphibian Study (TR-04)	City of Seattle	X		

<b>Study</b>	<b>Proposed or Requested By</b>	<b>Approved</b>	<b>Approved with Modifications</b>	<b>Not Required</b>
22. RTE&S Avian Study (TR-05)	City of Seattle	X		
23. RTE&S Bat Study (TR-06)	City of Seattle	X		
24. Botanical and Wildlife Resources of Tribal Importance Study (TR-07)	City of Seattle		X	

## APPENDIX B

### STAFF'S RECOMMENDATION ON PROPOSED AND REQUESTED STUDIES

The following discussion includes staff's recommendations on studies proposed by the City of Seattle, requests for study modifications, and requests for additional studies. We base our recommendations on the study criteria located in the Commission's regulations at 18 C.F.R. § 5.9(b)(1)-(7).

As an initial matter, the Snoqualmie Tribe states that its expertise and knowledge should be included in the "defining and refining" of the following study plans: Amphibians (TR-04); Botanical and Wildlife Resources of Tribal Importance (TR-07); Avians (TR-05); Entrainment (AQ-01 and AQ-04); Geomorphic Flows, Large Wood and Sediment (AQ-01, AQ-07 and AQ-08); Instream Flows (AQ-09); Vegetation and Land Cover (TR-01, TR-02 and TR-03); and Fish Communities (AQ-03 and AQ-11). The Snoqualmie Tribe states that the assurances that the City of Seattle proposes in the RSP regarding commitments to developing information, sharing protocols and operating principles, funding, and ensuring protection of confidential and sensitive information do not suffice and "must be adopted as integral components of the final study plan itself."

The Snoqualmie Tribe has been an active participant in the pre-filing study planning process and has filed comments and recommendations on the proposed and revised plans. The Tribe's comments and recommendations have been considered in this study plan determination. In 2026, the Tribe and other relicensing participants will have opportunities to comment on the initial study report and request study plan modifications.

#### I. Required Studies

##### **AQ-01: SFT Reservoir Geomorphic Processes Study**

###### Applicant's Proposed Study

Reservoir fluctuations may cause erosion around the reservoir shoreline, but the extent of this erosion is unknown. In addition, the South Fork Tolt (SFT) Dam prevents sediment and woody debris from moving downstream, which may impact fish habitat, but the current rate of sediment and wood supply to the SFT Reservoir is unknown. The City of Seattle proposes to characterize geomorphic processes influenced by SFT Reservoir operations including shoreline and drawdown-zone erosion and deposition, supply and retention of sediment from upstream sources, supply and retention of large wood from upstream sources, and effects of reservoir water levels on tributary connectivity. To achieve these goals, the City of Seattle would map locations of erosion along the reservoir shoreline; characterize and map areas within the drawdown zone with similar substrate size; identify types of erosion and factors contributing to erosion and classify

areas of the reservoir shoreline and drawdown zone as primarily erosional, primarily depositional, stable, or dominated by transient storage (e.g., river deltas that alternately deposit/erode material); estimate reservoir shoreline erosion rates to the extent possible based on review of aerial photographs and Light Detection and Ranging (LiDAR); conduct a geomorphic change detection analysis of available topo-bathymetric data to characterize the magnitude of vertical change (erosion or deposition) within the drawdown zone and around the shoreline; and estimate the change in storage volume and grain size of sediment supplied to the SFT Reservoir.

To estimate reservoir shoreline retreat rates, the shoreline would be digitized in geospatial information systems (GIS) from historic aerial images that have appropriate resolution and overlain to track bank retreat. The revised study plan (RSP) states that due to potential issues with resolution and georeferencing of shorelines on some of the historic images, it is likely that accuracy of digitized shorelines will be insufficient to detect change in areas with little bank retreat and this will be evaluated for each photo series.

#### Comments on the Study

The Tulalip Tribes noted that while the City of Seattle acknowledged potential inaccuracies in shoreline retreat rate measurements, an alternative method was not clearly presented. The Tribe suggested using sedimentation calculations based on hydrological data and exploring alternative methods, such as those proposed by Morris and Fan (2009), Moragoda et al. (2023), and Yao et al. (2023), to improve reliability.

The City of Seattle states that high-quality topo-bathymetric data are available to characterize sediment volume changes within the reservoir, asserting that uncertainty in shoreline retreat rates due to aerial photo resolution and canopy cover will not impact these calculations. The City of Seattle maintains that using bathymetric change analysis will provide the highest confidence estimate of sediment accumulation in the reservoir. The City of Seattle rejects the suggested watershed-source-based approaches recommended by the Tulalip Tribes because they would require greater effort while yielding lower-confidence results.

#### Discussion and Staff Recommendation

The City of Seattle's proposed study utilizes a combination of historical aerial imagery, LiDAR datasets, bathymetric surveys, and field observations to analyze shoreline erosion and sedimentation trends. The methods are commonly accepted and have been used in multiple relicensing studies [Skagit Hydroelectric Project (City Light 2023a and 2023 b), Boundary Hydroelectric Project (City Light 2009), the Pelton Round Butte Hydroelectric Project (Dubé 2005), and the Cowlitz Hydroelectric Project (Harza Engineering Company 2000)].

Access to each of the studies referenced by the Tulalip Tribes was not available to staff. From what could be gleaned from available summaries, the suggested studies likely require high-resolution Sentinel-2 satellite and long-term historical sedimentation and water level records, some of which may not be available. The summaries also suggest that the data would provide more generalized sedimentation estimates, in contrast to the City of Seattle's proposed methods which would provide site-specific data. The acquisition of this specific data as proposed by the City of Seattle would be sufficient to describe erosional sites, probable causes of erosion, and to develop measures to address erosion if needed.

For the reasons discussed above, no modifications to the proposed study are required.

## **AQ-02: SFT Reservoir Water Quality Study**

### Applicant's Proposed Study

The City of Seattle proposes to conduct a study to characterize existing water quality conditions in the SFT Reservoir and inform the evaluation of potential adverse effects on water quality in the SFT Reservoir from continued project operation and maintenance.

The objectives of the study are to: (1) characterize and summarize spatial and temporal trends for relevant water quality parameters within the SFT Reservoir and contributing tributaries using existing data from 2001 to 2024; (2) collect temperature, dissolved oxygen, pH, turbidity and *E. coli* data in the reservoir and contributing tributaries during the 2025 through 2026 study seasons to supplement data from the City of Seattle's existing water quality monitoring program; and (3) characterize and summarize water quality data reviewed and collected during the study.

### Comments on Study

Snoqualmie Watershed Forum (SWF) and the Snoqualmie Tribe request that the City of Seattle include nitrate/nitrites in the study's list of water quality parameters. SWF and the Snoqualmie Tribe contend that reservoirs are known to be nutrient sinks and that measuring only dissolved oxygen is not an acceptable proxy for nutrient impacts of the reservoir.

In the RSP, the City of Seattle states that water quality parameters for this study were selected based on those requested by the Washington Department of Ecology for the water quality certification under section 401 of the Clean Water Act. The City of Seattle

also contends that understanding the flux of nutrients through the SFT Reservoir is not needed for this certification or for determination of project effects on water quality.

### Discussion and Staff Recommendation

The City of Seattle's pre-application document (PAD) indicates that water quality parameters are measured within the SFT Reservoir as part of a regular reservoir monitoring program, which focuses on drinking water. As part of the program, the City of Seattle has been collecting monthly nitrate/nitrite grab samples in the reservoir near the dam since 1992 and at the regulating basin inlet since 2010. However, none of the data, except for nitrate and nitrite data for the mainstem Tolt River and tributaries, are presented in the PAD. Therefore, there is no way to evaluate the data to determine whether they are sufficient to characterize nitrate and nitrite concentrations in the reservoir. Therefore, it would be premature to require any additional sampling for nitrate and nitrite until staff review the available data. We recommend that Study AQ-02 be modified to require the City of Seattle to provide the available nitrate/nitrite data in the ISR in its reporting of Study AQ-02[section 5.9(b)(4)].

### **AQ-03: SFT Reservoir Aquatic Species Community Study**

#### Applicant's Proposed Study

The City of Seattle proposes to collect new data about the fish and freshwater mussel community assemblage and distribution in the SFT Reservoir, focusing efforts on the cutthroat trout population occurring within the SFT Reservoir and the lower reaches of its tributaries. The objectives of the study are to: (1) document fish and freshwater mussel species occurrence using environmental deoxyribonucleic acid (eDNA) analyses; and (2) characterize the status of the Cutthroat Trout population and compare the results to a previous status assessment by Tappel and Tappel (1995).

The City of Seattle proposes to conduct a series of electrofishing surveys in tributaries, deploy gillnets and minnow traps and conduct hook-and-line sampling within the SFT Reservoir, and collect eDNA samples from the SFT Reservoir and tributaries.

Fish sampling in the reservoir and tributaries using electrofishing, gillnets, minnow traps, and hook and line sampling would occur during two seasonal sampling periods: spring (April or May) and fall (September or October). Electrofishing would be conducted within Crystal Creek, Horseshoe Creek, Upper SFT River, Skookum Creek, Siwash Creek, and Dorothy Creek. Reservoir sampling would focus on deployment of gillnets and minnow traps, set at depths of 2 to 6 meters at each site, supplemented with hook and line sampling to sample deeper waters. To minimize mortality, nets would soak for one hour. Gillnetting would conclude after a maximum of 35 unique cutthroat trout are captured per site in each sampling period, similar to the total number captured by

Tappel and Tappel (1995). While gill nets are soaking, hook-and-line sampling would be conducted nearby to access deeper strata of the lake. In addition, five minnow traps would be deployed in the vicinity of each gillnet site to target smaller size classes of cutthroat trout.

The City of Seattle proposes to conduct eDNA sampling for fish and mussel species in spring, summer, and fall, to document any seasonal variability in species detection. A total of five replicates of eDNA samples would be collected at three transects located in the lower, middle, and upper sections of the SFT Reservoir. In addition, a total of five replicates of eDNA samples in one grab sample would be collected at the mouths of Crystal Creek, Horseshoe Creek, Upper SFT River, Skookum Creek, Siwash Creek, and Dorothy Creek.

### *Sampling Seasons*

#### Comments on Study

Washington Department of Fish and Wildlife (DFW) recommends the City of Seattle add a winter sampling session to the eDNA sampling schedule. Washington DFW contends that low DNA concentrations can lead to false negatives any time of the year and sampling in the winter would provide the full seasonal assessment, possibly detecting a rarely occurring species of fish that sheds more DNA into the environment during the winter (e.g., mountain whitefish spawn in winter).

Washington DFW recommends that the City of Seattle also conduct physical sampling in summer, instead of just spring and fall. Washington DFW contends that omitting summer sampling of the aquatic community leaves a data gap during a time when the project is potentially having its greatest effect on the fish community (i.e., during drawdown and when the reservoir water column is thermally stratified).

#### Discussion and Staff Recommendations

The RSP indicates the study's sampling seasons (spring, summer, and fall) for eDNA were selected "to focus on periods of mixis<sup>2</sup> to maximize the likelihood of detecting rare species." Mountain whitefish, for example, may occur in lakes any time of the year and their spawning period typically occurs from late fall to early winter (October – December). Thus, if mountain whitefish utilize the reservoir from late fall to early winter, there is likely to be some overlap between the fall sampling season and their occurrence, especially since eDNA may persist in aquatic environments for days to

---

<sup>2</sup> Mixis refers to the process by which wind and temperature cause water in the reservoir to circulate.

weeks. Further, the City of Seattle’s proposal to collect 5 replicates of eDNA samples at each of the three sampling transects should reduce the instances of false negatives. Therefore, eDNA sampling in spring, summer, and fall should be sufficient to help describe the community composition of fish in the reservoir, and assess project effects on fish, if necessary [section 5.9(b)(4)]. For these reasons, we do not recommend additional eDNA sampling in the winter.

Regarding the request to conduct additional physical fish sampling in the summer, the City of Seattle’s proposal to collect eDNA samples from each of the three proposed transects situated across the reservoir during spring, summer, and fall sampling events should be sufficient to detect species, including rare species, that may be missed by the selection-bias of physical fish sampling gear. In addition, summer eDNA sampling would include sampling below the thermocline to account for seasonal stratification. Results from the three seasons of eDNA sampling combined with the two seasons of physical fish sampling should provide sufficient information for staff to describe the existing fish assemblage in the reservoir and assess project effects on fish communities [section 5.9(b)(4)]. For these reasons, we do not recommend additional physical fish sampling in the summer.

### *Gillnet Sampling*

#### Comments on Study

Washington DFW states that the City of Seattle’s proposal to conduct six gillnet sets at pre-determined locations and repeated soaks for 1 hour at a time is insufficient to provide a meaningful representation of distribution or density of the fish population in the reservoir for each season of sampling. However, Washington DFW does not state what would be sufficient.

#### Discussion and Staff Recommendations

Sufficient information exists from prior surveys to indicate that the SFT Reservoir and its tributaries, including the upper SFT River, supports a relatively low number of species and is primarily composed of cutthroat trout and sculpin (Barnett et al. 2007; Tappel and Tappel 1995; Thompson and Unrein 2024). The goal of the gillnetting component of the study is to determine age and size structure of cutthroat trout, and to determine if changes have occurred since previous monitoring efforts conducted 30 years ago (Tappel and Tappel 1995). The purpose of repeated 1-hour gillnet soaks is to reduce fish mortality and has no bearing on determining distribution and density of the fish population. The use of multiple sampling methods over two seasons should provide sufficient information to describe the existing fish assemblage in the reservoir, assess project effects on fish resources, and identify any license conditions for protecting fish

resources [section 5.9(b)(4) and section 5.9(b)(5)]. We therefore do not recommend modifying the study to include additional gillnet sampling in the reservoir.

### *Stratified Random Sampling*

#### Comments on the Study

Washington DFW recommends that the City of Seattle design and conduct a randomly stratified whole reservoir fish community study.

#### Discussion and Staff Recommendation

Use of non-random selected sampling locations, as proposed, is a scientifically accepted method for sampling and characterizing fish populations, particularly when it is used to compare results of studies conducted within the same reservoir [section 5.9(b)(6)]. While use of stratified random sampling approaches to fish sampling may reduce sample bias compared to use of non-random sampling location, such an approach typically requires additional sampling effort and cost. Further, as discussed above, the proposed sampling location for the gillnets were selected to correspond with the sample locations used in Tappel and Tappel (1995) with the purpose of determining if changes have occurred to the cutthroat trout population since previous monitoring efforts conducted 30 years ago. The City of Seattle's proposed study methods, including use of non-random sampling location to compare the status of fish population as well to sample various habitats, should be adequate to ensure a representative sample of the species composition in the reservoir. While the level of sampling effort sought by Washington DFW could provide more robust estimates of abundance for each species and habitat type, we do not need that that level of statistical precision to describe the existing environment, assess the effects of continued project operation on the reservoir fish community, and develop license requirements (section 5.9(b)(4)). We therefore do not recommend modifying the study to include a stratified random sample design.

### *Fish Measurements*

#### Comments on Study

Washington DFW requests that the City of Seattle, at a minimum, report abundance, length, and weight measurements for fish captured in the minnow traps as it proposes to do for fish captured using gillnets and electrofishing. In cases where a substantial number of fish are collected, Washington DFW recommends measuring a subsample. Washington DFW contends that this information will be more consistent with the fish data collected from the gillnet sampling and will provide a more complete description of the fish information collected from the reservoir.

### Discussion and Staff Recommendation

Washington DFW's request to conduct fish counts and measure the length and weight of each individual fish from minnow trap sampling would better describe the overall fish community and affected environment at the project (section 5.9(b)(4)). Further, these counts and measurements are similar to the fish data that would be collected from fish captured in the gillnets and the electrofishing effort. The additional cost and level of effort required to enumerate fish and collect length and weight measurements from fish captured in the minnow traps is minimal, and, therefore, we recommend the data be collected and included in the ISR (section 5.9(b)(7)).

#### **AQ-04: SFT Reservoir Fish Entrainment Study**

##### Applicant's Proposed Study

The City of Seattle proposes to conduct a desktop evaluation of fish entrainment, impingement, injury, and mortality using fish community information, hydrology and water quality data, and structural and operational characteristics of the project facilities to determine the risk of fish entrainment and impingement at the SFT Dam and the potential effects on fish populations in the SFT Reservoir.

The study would: (1) describe the physical characteristics of the project structures, including locations, dimensions, turbine specifications, trash rack spacing, water velocity and flow rates at the intake structures, and operational characteristics of the SFT Dam and SFT Reservoir; (2) summarize water quality characteristics near the project intake structures using existing data and data collected as part of the *AQ-02 SFT Reservoir Water Quality Study*; (3) describe the SFT Reservoir fish community using existing data and data collected as part of the *AQ-03 SFT Reservoir Aquatic Species Community Study* and compile a target species list for entrainment and impingement risk analyses; (4) characterize the risk of trash rack impingement to target species based on trash rack bar spacing and target species life history information and estimated swim speeds; (5) characterize the risk of entrainment to target species based on body size, life stage, periodicity, habitat requirements, intake flow rates and velocities, and project operations; (6) characterize probability of passage and survival for target species at the project facilities using site-specific physical and operational parameters, estimated entrainment mortality rates, and the U.S Fish and Wildlife Service (FWS) Turbine Blade Strike Analysis Model (FWS 2020) or other relevant literature; and, (7) provide a qualitative summary of impingement and entrainment potential for target species based on physical and operational information, turbine and non-turbine entrainment and mortality rates, comparison of burst swim speeds to intake velocity, body size exclusion, and species and life stage periodicity.

### Comments on Study

In comments on the RSP, FWS reiterates its early concerns that the City of Seattle's desk top analysis would not be sufficient to accurately assess fish entrainment at the SFT Reservoir and again requests that it include a field component. By a field component, we assume FWS is referring to its original request for a study using a combination of PIT tags and/or smaller short-term acoustic tags to track fish movements and outcomes that may require multiple years of study at a cost up to \$700,000 per year.

FWS states that because entrainment involves complex, dynamic interactions between fish and the hydropower infrastructure, which can vary across different environmental conditions and operational scenarios, field analysis is a crucial component for an entrainment study. FWS further states that a desktop analysis using pre-existing data may overlook critical factors such as real-time fish behavior, environmental changes within the reservoir, and the potential for spatial and temporal variability in entrainment events.

Washington DFW is also concerned that the determination of habitat preference based on inferences will not consider potential unique behaviors that the different life stages fish of the SFT Reservoir may exhibit. Washington DFW contends that fish in this reservoir may have adapted to varied life histories and habitat preferences that could be missed by literature reviews and inferences. Washington DFW recommends the City of Seattle's study include a random stratified sampling approach and hydroacoustic sampling.

In the RSP, the City of Seattle states that the desktop entrainment analysis will use specific data gathered from the AQ-03 study, peer reviewed literature, and past desktop entrainment studies performed for other Federal Energy Regulatory Commission (FERC) licensing efforts. The City of Seattle also states that if fish species are found to be at a high risk of entrainment, additional efforts including field surveys may be considered in the second year of the study.

### Discussion and Staff Recommendation

Expanding the proposed entrainment study to include a field component involving the use PIT tags and/or acoustic tags, or hydroacoustics on reservoir fish species could potentially provide more detailed information on the rates of entrainment and injury or mortality sources during turbine, spillway, or other passage routes. However, a field study using the methods recommended by the FWS or Washington DFW would be more difficult and costly to implement. For example, to conduct a fish tagging study, the City of Seattle would need to collect and tag a minimum of several hundred individuals of each life stage of each target species in the project reservoir in order to ensure that some of the tagged fish pass downstream through the project, especially considering that most

of the reservoir fish species would likely exhibit a resident life history type and not be inclined to migrate downstream in large numbers.

The City of Seattle's proposed desktop study would estimate fish entrainment under existing conditions and provide a reasonable estimate of the likely entrainment and mortality rates for fish under proposed operation. Using existing data to perform a desktop analysis of entrainment is consistent with generally accepted practices and is similar to a number of entrainment studies performed in support of other hydroelectric licensing proceedings (section 5.9(b)(6)). The results of the proposed desktop entrainment study coupled with City of Seattle's proposed *AQ-03 SFT Reservoir Aquatic Species Community Study* would provide the necessary information to conduct staff's analysis of fish entrainment and spillway passage at the project [(section 5.9(b)(4)], at a lower cost than the study recommended by FWS [section 5.9(b)(7)]. Therefore, we do not recommend that the City of Seattle be required to conduct field-based entrainment studies during the first study season.

### **AQ-08: Lower SFT and MST River Geomorphic Process Flows Study**

#### Applicant's Proposed Study

The City of Seattle proposes to evaluate the magnitude of flows that form and maintain the channel of the Lower SFT and mainstem Tolt (MST) Rivers and how the variability of these flows influences channel characteristics such as the channel shape and hydraulics across a range of flow conditions. The study area would consist of the Lower SFT River from the SFT Dam stilling basin to the confluence with the North Fork Tolt (NFT) River. The study would use a combination of empirical observation, process geomorphology interpretation, and modeling to understand the magnitude and frequency of channel forming flows and the relationship to project operations. To achieve this goal, the City of Seattle would, in part, conduct a flood frequency analysis of the historic (pre-regulation) and existing conditions using data from the following gages listed in table 2-1 of the RSP: Lower SFT (U.S. Geological Survey (USGS) gage 12148000), MST River (USGS gage 12148500), Snoqualmie River near Carnation (USGS gage 12149000), and NFT River (USGS gage 1214750). A peaks-over-threshold approach with a three-day search window (determined based on results of analysis by Baily 2023) would be used in the flood frequency analysis to ensure the analysis captures all geomorphically important flows. The duration of channel-forming flows would be characterized for each of the identified gages. Because the gage record for the historic (pre-regulation) condition on the Lower SFT River is relatively short (approximately 1 decade), regression analysis relating this discharge to flows on the MST, NFT, Upper SFT Rivers (USGS Gage 12147600) or some combination of these gages would be completed. If a statistically robust relation exists, this relation may be used to generate a longer duration synthetic flow record estimating unregulated conditions on the Lower SFT River.

### Comments on the Study

SWF, the Snoqualmie Tribe, and the Tulalip Tribes request that the City of Seattle include USGS Gage 12147600 (SFT River near Index) in the channel-forming flow regression analysis to document the difference between regulated and unregulated flows because of the gage's long-term record (since 1988) and its location in the unregulated portion of the SFT River. They state that it is unclear whether the City of Seattle intends to use the gage because "the RSP references this gage in section 2.6.2 along with gages in the mainstem Tolt River and North Fork Tolt River but states they will use "some combination of these gages" to help identify how magnitude and duration of flow are affected by regulation."

The City of Seattle states that information from USGS Gage 12147600 "may be used to help estimate unregulated flood discharge in the SFT River."

### Discussion and Staff Recommendation

The language in the RSP makes it unclear whether and how the City of Seattle would use the data from USGS gage 12147600. USGS gage 12147600 is located 4.8 miles upstream of the project in the unregulated portion on the upper SFT River. Including this data in the regression analysis would help define historical flow inputs given its long record, provide a comparison of natural and regulated hydrologic conditions, and help to achieve the study objectives. Therefore, staff recommends that the data from USGS Gage 12147600 be used in the channel-forming flow regression analysis and the study report explain how data from this gage was incorporated into the analysis.

## **AQ-10: Lower SFT River Critical Flow Study**

### Applicant's Proposed Study

The City of Seattle proposes to determine the river flow threshold (i.e., "critical flow") above which the risk of fish stranding is negligible and ramping rates would not apply and below which the required ramping rates would apply to protect vulnerable salmonid life history stages (i.e., recently emerged and early rearing juveniles) from becoming stranded in the Lower SFT River.

The objectives of the study are: (1) identify "stranding-risk habitat features" within the Lower SFT River; (2) define the critical flow threshold for the Lower SFT River using a two-dimensional (2D) Hydrologic Engineering Center-River Analysis System (HEC-RAS) model developed as part of the *AQ-06 Lower SFT and MST River Hydraulic Model Development Study*; and, (3) field-verify that the modeled critical flow

threshold continues to be protective of stranding-risk habitat features in the Lower SFT River.

To achieve the objectives, the City of Seattle would: (1) compile available topographic data, aerial imagery, and spawning ground data, including redd data and other sources of life-history data to assist with the identification of stranding-risk habitat features; (2) convene a critical flow resource working group composed of Tribes and other licensing participants to identify the location and spatial extent of areas of stranding risks in the Lower SFT River; (3) determine the elevations of stranding risk habitat feature; and (4) monitor habitat conditions using photographic and water level instrumentation.

### Comments on the Study

The Tulalip Tribes asserts that redd locations are not a suitable proxy for juvenile fish stranding. The Tulalip Tribes states that without data on juvenile abundance, habitat utilization, and periodicity, the critical flows study is lacking important information. Further, the Tulalip Tribes states that off-channel and floodplain features occupied by salmon are at greater risk and recommend these areas be used to determine critical flows.

In response to comments on the RSP, the City of Seattle stated that the primary data source for identifying stranding features would be a digital elevation model (DEM) of topography and bathymetry, developed from a LiDAR flight to be conducted in early 2025.

### Discussion and Staff Recommendation

As discussed above, the City of Seattle would use multiple information sources (e.g., topographic data, aerial imagery, spawning ground data, and life-history data) to assist with the identification of stranding-risk habitat features in the Lower SFT River with a focus on recently emerged or early rearing salmonid life stages. These data, including existing information on redd locations, should provide sufficient information to assess the effects of project operations, including ramping, on juvenile salmonid stranding, and to determine a critical flow threshold. Additionally, City of Seattle's *AQ-09 Lower SFT and MST River Instream Flow Study*, proposes to use hydraulic model outputs from the *AQ-06 Lower SFT and MST River Hydraulic Model Development Study* to evaluate flow connectivity at side- and off-channel areas. As defined in the RSP, these will be areas in the floodplain that have potential intermittent connectivity to the mainstem Lower SFT River and potential continuous or seasonal habitat for target fish species and life stages (e.g., juvenile rearing, etc.). These studies together should provide sufficient information to identify areas where stranding could occur, assess project effects on juvenile salmonids in the Lower SFT River, and identify when ramping rates would be

needed [section 5.9(b)(4)]. Therefore, we do not recommend requiring any modification to the critical flow study.

**CR-01: Archaeological Resources Study; CR-02: Historic Built Environment Study; and CR-03: Properties of Traditional, Religious, and Cultural Importance Study**

Applicant's Proposed Study

The City of Seattle proposes to identify archaeological (CR-01) and architectural (CR-02) resources through archival research and field surveys (both pedestrian surveys and subsurface testing), evaluate the National Register of Historic Places (NRHP) eligibility, and assess the potential effects of continued project operation and maintenance on the identified resources. The survey and analysis would be conducted within the proposed Area of Potential Effect (APE). The proposed APE includes the entire South Fork Tolt watershed, City of Seattle-owned lands near the confluence of the North Fork Tolt and South Fork Tolt rivers, and a one-quarter mile buffer around the remaining project boundary, including the transmission line corridor (see Figures 2-1 – 2-3 in CR-01 of the RSP). The proposed APE also includes areas downstream of the dam that are outside the current project boundary but according to the City of Seattle may be affected by ongoing project operations and maintenance activities. The City of Seattle states that some of the proposed APE includes geographic areas that the City of Seattle does not believe would be affected by project operation but were included at the request of some consulting Tribes. The City of Seattle states that if project effects on historic properties are demonstrated to occur outside the approved APE then they will consult with Tribes, the Washington Department of Archaeology and Historic Preservation (DAHP),<sup>3</sup> and other license participants to adjust the APE to encompass newly identified areas of effect and seek concurrence from DAHP and approval from the Commission. The assessment of potential adverse project-related effects would include direct effects to resources caused by the project, as well as visual, atmospheric, and auditory effects as they apply to each resource.

The City of Seattle would identify Properties of Traditional, Religious, and Cultural Importance (PTRCI) resources (CR-03) through literature review, ethnographic study conducted in collaboration with Tribes,<sup>4</sup> and fieldwork consisting of interviews

---

<sup>3</sup> The Department of Archaeology and Historic Preservation serves as Washington's State Historic Preservation Office.

<sup>4</sup> Collaboration could involve Tribes choosing to work directly with the City of Seattle's professional ethnographer to achieve study completion, or each consulting Tribe hiring a qualified ethnographer of its choice to achieve study completion, with optional City of Seattle provided funding.

with knowledgeable Tribal members and community members, and site visits. The study would evaluate NRHP eligibility of identified PTRCI resources and evaluate the effects of continued project operation and maintenance on the identified resources. The study area would be conducted within the same proposed APE as described above.

### Comments on the Study

In comments on the RSP, the Tulalip Tribes state that the effects of the Tolt Water Supply Project cannot be easily distinguished from the hydroelectric project, and that the management of the water supply project results in both direct and indirect effects that need to be part of a National Environmental Policy Act (NEPA) review. The Tulalip Tribes assert that project operation and maintenance activities have a significant effect on tribal treaty reserved resources and fishing rights to harvest fish in their usual and accustomed fishing areas and that these significant impacts extend to traditional cultural landscapes, and their ability to access and exercise traditional practices (such as hunting and gathering). They state that the Tolt River represents an area of traditional cultural practices, "or beliefs of a living community that are both rooted in that community's history and important in maintaining the continuing cultural identity of the community (Parker and King 1998)". Therefore, the Tulalip Tribes state that the APE should include the entire SF Tolt Watershed and mainstem Tolt River.

The City of Seattle asserts that most of the City-owned land in the Upper SFT Watershed is outside the FERC project boundary, and that public access to that land has been closed to protect the water quality of the public water supply; therefore, the City of Seattle believes that effects on access to lands outside of the FERC project boundary are an effect of the water supply project, not the hydroelectric project. Thus, the City of Seattle proposes to discuss the issue further with the Tulalip Tribes outside of relicensing.

### Discussion and Staff Recommendation

The APE should evaluate a geographic area(s) within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist [36 C.F.R. § 800.16(d)]. Similarly, there should be a nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource proposed for study [18 C.F.R. § 5.11(d)(4)].

Both the APE proposed by the City of Seattle and the Tulalip Tribes extends well beyond the licensed project boundary and includes lands that are not needed for project operation and maintenance. The City of Seattle does not explain why it thinks there would be project effects in this larger area, except, perhaps regarding flows downstream of the project. The project boundary encloses the SFT reservoir, penstock, dam, powerhouse, regulating basin outlet, the transmission line corridor, and some of the project access roads. These lands are needed for project purposes. Figure 3-15 of the

PAD depicts the ‘access road’ leading to the project reservoir but not all of the access roads<sup>5</sup> are included in the project boundary. All roads that are used to access and maintain project facilities, despite if they serve as the primary or secondary road access or their relationship to the water supply system, serve a project purpose. Therefore, we recommend the City of Seattle extend the APE and corresponding study efforts to include these access roads.

Based on available information, there are no actions being proposed that would affect lands outside the project boundary. Although the City of Seattle’s water supply operation dictates how much flow is diverted for consumptive use and thus used to generate power, land management outside of the project boundary to protect water quality and thus access to those lands is not affected by hydroelectric operation and are not needed for project purposes; therefore, there is no nexus between project operation and effects to potential historic resources [section 5.9(b)(5)]. Therefore, we recommend defining the APE for all three studies as those lands within the FERC-licensed project boundary. The APE may be modified if study results demonstrate that there may be project effects outside the APE as it is defined here.

### **TR-03: Wetland Study**

#### Applicant’s Proposed Study

The City of Seattle proposes to identify and map wetlands in the project area. The objectives of the study are to (1) establish a baseline characterization of wetland resources and assess their condition and function; and (2) identify wetlands that may be directly or indirectly affected by continued project operation and maintenance.

The study would consist of a desktop assessment and field surveys of selected wetlands where direct impacts from project operations and maintenance are most likely to occur. The desktop assessment would consist of compiling existing wetland information, creating a vegetation map, and identifying wetlands that are most likely to be affected by continued operation. The study area includes (1) lands within the project boundary, and (2) the mapped floodplain surrounding the Lower SFT River and Mainstem Tolt River from the SFT dam to the confluence with the Snoqualmie River.<sup>6</sup> Wetlands identified in

---

<sup>5</sup> An access road (Tolt Reservoir Road) forks off the penstock and water supply pipeline road, starting in township T26N R8E S36 and provides access north of the Lower SFT River to the reservoir. Another access road (NF-6270) forks off the penstock and water supply pipeline road in township T26N R9E S31 and provides access south of the Lower SFT River to the project.

<sup>6</sup> The boundaries of the floodplain will be mapped as part of the Lower SFT and MST River Hydraulic Model Development Study (AQ-06).

areas of project-related disturbance would be evaluated using a wetland functional assessment rating tool, such as the Washington Wetland Rating System for Western Washington (WWRS), to assess wetland functions and values.

#### Comments on the Study

The Tulalip Tribes state that instead of using the WWRS as proposed by the City of Seattle, the City of Seattle should consider using an alternative tool such as the Wetland Ecosystem Services Protocol (WESP). They state that the WWRS may underestimate the value of wetlands in the project area because the WWRS “tends to rate wetlands in more developed watersheds higher than wetlands in more pristine areas (due to higher value of functions in those areas).”

#### Discussion and Staff Recommendation

The City of Seattle is unclear as to which wetland functional assessment rating tool it proposes to use for this study. The methodology described in section 2.6.4 of the Wetland Study and the comment/response table in Appendix B of the RSP indicate that the City of Seattle proposes to use the WWRS. However, the City of Seattle also states in the RSP that it proposes to use the WESP instead of the WWRS.<sup>7</sup>

A wetland functional assessment rating tool is a means to provide consistency when describing and comparing the function and value of one wetland to another. Different models use different weighting criteria to assign function and value to a wetland. As the Tulalip Tribes noted, the WWRS more heavily weighs the value of wetlands that are present in developed areas versus those in undeveloped areas. However, because land within the study area is largely undeveloped, it is not clear that the relative value of one wetland to another in the project area would be substantively affected by use of the WWRS as compared to the WESP.

The use of either the WWRS or the WESP would provide a suitable means for evaluating the relative functions and values of wetlands within the proposed study area. Because the Tribes have requested use of the WESP, and the City of Seattle appears to have agreed to use WESP in this study, staff recommends the City of Seattle incorporate the WESP tool into its study methodology.

---

<sup>7</sup> See page 66 of the RSP and page 2 of the Wetland Study.

## **TR-07: Botanical and Wildlife Resources of Tribal Importance Study**

### Applicant's Proposed Study

In consultation with the Snoqualmie Tribe and the Tulalip Tribes, the City of Seattle proposes to conduct a study to determine the presence and general distribution of wildlife and botanical resources of Tribal importance in the project area. To conduct the study, the City would: (1) finalize a list of botanical and wildlife resources of Tribal importance to be included in study efforts; (2) create a vegetation map to support identification of potential habitats for the targeted species; (3) identify field survey areas and refine survey methods for the targeted species; and (4) conduct focused field surveys to determine the presence and general distribution of targeted botanical and wildlife species in the study area.

The proposed study area includes (1) lands within the project boundary; (2) additional City-owned lands within the Upper SFT Watershed;<sup>8</sup> and (3) the mapped floodplain surrounding the Lower SFT River and Mainstem Tolt River from the SFT dam to the confluence with the Snoqualmie River. The City of Seattle states that it “has included the City-owned lands within the Upper SFT Watershed that are outside the project boundary in the study area to accommodate the Tribes’ request, not because there are established connections between the operation of the project and any potential project effects on those lands.”

The City of Seattle would develop a list of botanical species of Tribal importance as part of study objective 1. The initial list of wildlife species for this study includes mountain goat, elk, black-tailed deer, black bear, grouse, harlequin duck, cougar, beaver, western toad, Cascades frog, and American bullfrog. Survey methods for wildlife species include camera traps, passive acoustic monitoring, and eDNA analysis.

### Comments on the Study

In comments on the RSP, the Snoqualmie Tribe states that the study area must be sufficient in scope “for the Tribe to make the required analyses and for the City to meet its compliance obligations under NEPA and NHPA [National Historic Preservation Act].” The Snoqualmie Tribe and the Tulalip Tribes stated throughout the study plan process that the study area should include the entire SFT Watershed. Therefore, we assume that this is the area that the Snoqualmie Tribe is referring to here.

---

<sup>8</sup> Approximately 8,400 acres of the Upper SFT Watershed are City-owned and managed.

### Discussion and Staff Recommendation

Generally, the geographic scope (or study area) of a required study is established based on the anticipated extent of project-related effects. The City of Seattle's land management and maintenance practices within the project boundary have the potential to affect botanical and wildlife resources of Tribal importance. In addition, project operations may influence littoral habitat around the SFT Reservoir and wetland and riparian habitat within the floodplain from the SFT dam to the confluence with the Snoqualmie River. However, there is no apparent relationship between project effects and botanical and wildlife species on City-owned lands or other lands within the Upper SFT Watershed that are located outside of the influence of project operation (section 5.9(b)(5)).

Therefore, we recommend that the geographic scope of the study area be limited to (1) lands within the project boundary and (2) the mapped floodplain surrounding the Lower SFT River and Mainstem Tolt River from the SFT dam to the confluence with the Snoqualmie River. The City of Seattle may elect to gather additional data on City-owned lands in cooperation with the Tribes; however, this information is not needed for staff to conduct an environmental analysis of project-related effects to botanical and wildlife species of Tribal importance.

## **II. Required Additional Study**

### **Water Volume Reduction Study**

#### Requested Study

The Snoqualmie Tribe requested a water volume reduction study to assess the impact of water diverted from the Tolt River due to the project and associated facilities. The goal of the study is to better understand how much water is exported out of the Tolt River watershed due to the project and its related water supply operations, to compare that volume to the remaining instream flows in the SFT River and the MST River, and to identify possible protection, mitigation, and enhancement (PME) measures related to that volume of exported water.

The requested study would compile the monthly and annual volumes of water exported out of the Tolt River Watershed for the years 1984 (the year that the original license was issued) to present. It would compare this volume with the non-diverted volumes of water allowed to flow in the SFT River and the MST River. The study would also compile and discuss the legal status of all the City of Seattle's water right claims, permits, and certificates located in or with hydrologic connections to the Snoqualmie watershed.

Comments on the study

The Snoqualmie Tribe argues that understanding the consumptive use of water is essential to analyzing the effects on its cultural and traditional resources, as well as for developing necessary PME measures. The Snoqualmie Tribe states that the RSP includes a study of instream flows, but it does not separately consider the impact of water exports from the watershed as part of a comprehensive consideration of the impacts of the project on the Tribe's cultural and traditional resources. They argue the flows released into the SFT River below the dam are responsible for supporting many critical instream resources such as salmon and other aquatic species, groundwater which is driven by and connected to instream flows, and these resources are important to the public for economic and cultural reasons, and specifically are critical resources for the Snoqualmie and other tribes.

The City of Seattle declined to adopt this study request, stating that water volume reduction is not an effect of the hydroelectric project and is therefore not relevant to relicensing. Additionally, the City of Seattle asserts that this information is already collected and reported as part of ongoing water supply operations and states that it will follow up with the Snoqualmie Tribe to provide this information to the Snoqualmie Tribe directly and discuss further if desired. The City of Seattle states that FERC does not have the authority to alter the City of Seattle's existing water rights. It adds that the hydroelectric project is operated as a run-of-release baseload facility, generating power from water already diverted for municipal and industrial water supply needs, as well as excess water that might otherwise be spilled.

Discussion and Staff Recommendation

While the Commission does not have jurisdiction over municipal water rights, it does have the responsibility under NEPA to evaluate the environmental and cultural impacts of the project. Although the City of Seattle's water supply operation dictates how much flow is diverted for consumptive use, water supply and hydroelectric operations are intricately linked, and water supply is a designated purpose of the project. Therefore, there is a nexus between the requested study and the project.

Staff need to understand how hydropower operations in tandem with water supply operations would affect downstream flows and aquatic resources in the SFT River over the next potential license term. Summarizing water supply withdrawals and releases downstream of the project would help staff and others better understand how the project operates and the potential effects of any future changes in project operation or water demands. If the City of Seattle already collects and reports relevant water balance and diversion data as part of ongoing water supply operations, it should provide this information to all parties in the ISR. Therefore, we recommend that the City of Seattle

provide a summary of water supply withdrawals and downstream releases from the project as recommended by the Snoqualmie Tribe.

Regarding the request for City of Seattle to compile and discuss all the water rights, permits, and certificates in or connected to the Snoqualmie watershed, the PAD already summarizes the existing and future water uses in the project area, including water rights. The PAD also indicates that water rights information is available on Ecology's Water Rights Search online database. Therefore, we find sufficient information already exists to characterize water rights and other uses, if desired (section 5.9(b)(4)). Accordingly, there is no need to compile this information. For these reasons, we do not recommend requiring City of Seattle to conduct this component of the requested study.

### **III. Studies Not Required**

#### **AQ-11: Lower SFT River Juvenile Salmonid Distribution Study**

##### Study Request

In their August 2024 study requests, the Tulalip Tribes and King County requested that the City of Seattle assess juvenile salmonid life histories, habitat use, somatic condition, early life-history productivity, and survival within the SFT River. Specifically, the Tulalip Tribes and King County recommend that the City of Seattle: (1) evaluate juvenile salmonid life history patterns, somatic body condition, early life history productivity, and survival using a rotary outmigrant screw trap (smolt trap); and (2) evaluate juvenile salmonid habitat use, relative abundance, and distribution through aquatic habitat snorkel/electrofishing surveys. In addition to using the data for management purposes, the Tulalip Tribes and King County assert that this information will aid in evaluating potential hydroelectric project impacts to juvenile salmonid species and life histories.

##### Applicant's Proposal

In the RSP, the City of Seattle agreed to include a study to characterize the seasonal distribution of juvenile salmonids in an 8-mile reach of the lower SFT River among discrete geomorphic habitat units (e.g., pool, riffle, run), focusing on Chinook salmon, coho salmon, and steelhead. The objective of the study is to evaluate juvenile salmonid relative abundance, habitat use, and longitudinal distribution within the lower SFT River, through fish surveys. The goal of the study is to inform the evaluation of potential effects on aquatic species in the lower SFT River from continued project operation and maintenance.

Specifically, the City of Seattle proposes to: (1) survey habitat units in coordination with efforts planned as part of the *AQ-07 Lower SFT and MST River*

*Geomorphic Characterization Study*, following the “fluvial taxonomy” approach of Wheaton et al. (2015); (2) survey habitat areas for juvenile salmonids using a snorkel team during spring, summer, and fall months; (3) enumerate approximate densities of juvenile salmonids, grouped by species and length class; and, (4) to the extent possible, document the presence of other species encountered during surveys.

### Comments on the Study

In comments on the RSP, SWF, Snoqualmie Tribe, Washington DFW, Tulalip Tribes, and FWS state that little is known about the life histories of Chinook, coho and other salmon in the mainstem Tolt and SFT rivers, and request that the proposed study be modified to include the use of a smolt trap.

FWS states that use of smolt trap, such as a rotary screw trap, would increase sample sizes and shed light on migration timing and juvenile size classes at outmigration, especially for Chinook salmon.

FWS and Washington DFW contend that the information gathered in this study should be used to further validate and inform *AQ-10 Lower SFT River Critical Flow Study* as well as provide juvenile fish habitat use timing and preference related to fish habitat and flow relationships necessary to inform *AQ-09 Lower SFT River Instream Flow Study*.

SWF contends that a smolt trap would provide a much more robust picture of outmigration timing, juvenile size classes at outmigration, and salmonid productivity in the impacted project area than existing data provides. Further, SWF contends a Tolt River smolt trap is necessary to determine PME actions.

The Snoqualmie Tribe contends that the use of survey and smolt trap results would inform the habitat suitability curves in the City of Seattle’s proposed instream flow study, in part by validating fish-habitat assumptions and relationships. They assert that it would also inform the timing and use preference of side-channel and off-channel habitat and would provide updated fish-habitat and habitat-flow associations necessary to evaluate predicted and realized project impacts. In addition, the Snoqualmie Tribe states that the results of the study could be used to inform the *AQ-10 Lower SFT River Critical Flow Study* by verifying standing risk.

The Tulalip Tribes state that the City of Seattle’s proposed study provides juvenile salmonid identification and habitat utilization of a few salmon species but is inadequate to support the proposed instream flow and critical flow studies. The Tulalip Tribes further contend that City of Seattle’s proposed study may overlook life histories of summer steelhead and Chinook salmon and that the periodicity of species, life stage

presence, and habitat utilization may not be represented without a full year of data collection.

Washington DFW recommends extending the study into the MST River, below the confluence with the NFT River to the confluence with the Snoqualmie River.

### Discussion and Staff Recommendation

The primary objective City of Seattle’s proposed study is to evaluate juvenile salmonid distribution in the Lower SFT River to determine the spatial extent and timing of use of the river and habitat. However, it is already known that the Lower SFT River provides important habitat for five native anadromous salmonids (Chinook, chum, coho, pink, and sockeye) and the PAD and RSP already provides sufficient information to generalize the periodicity and life history of salmonids in the SFT watershed. While the life history information, including outmigration timing, juvenile size classes, and egg to fry survival rates that could be gathered from the proposed study may be useful for agency management purposes and for developing habitat suitability criteria of salmon in the Lower SFT River, this information is not needed to assess project effects on fish habitat or inform license conditions, and therefore, it would not provide a project-related benefit [sections 5.9(b)(4) and (5)]. Existing data on salmonid life histories, including periodicity and migration timing, as well existing habitat suitability criteria from literature sources or nearby river systems, coupled with other recommended studies (*AQ-07 Lower SFT and MST River Geomorphic Characterization Study*, *AQ-08 Lower SFT and MST River Geomorphic Process Flows Study*, the *AQ-09 Lower SFT and MST River Instream Flow Study*, and *AQ-10 Lower SFT River Critical Flow Study*) should be sufficient to assess the effects of continued project operation on different salmonid life stages within the Lower SFT River and inform whether changes in operation or other measures are needed [section 5.9(b)(4)]. For these reasons, we do not recommend requiring the City of Seattle to conduct its proposed juvenile salmonid study or the study modifications requested by the agencies, tribes, or SWF.

### **EJ-01: Environmental Justice Study**

#### Applicant’s Proposal

The City of Seattle proposes to determine if and how continued project operations could disproportionately and adversely affect identified environmental justice communities and if and how continued project operations could affect highly impacted communities in an inequitable manner. To achieve this goal, the City of Seattle would: (1) conduct outreach efforts, (2) synthesize statistical census data for census block groups, (3) compile community health and environmental exposure data from the Council on Environmental Quality in its Climate and Environmental Justice Screening Tool, and

(4) evaluate the potential for disproportionate and adverse impacts on EJ communities and highly impacted communities.

Comments on the Study

The City of Seattle proposed the study in response to comments filed by the U.S. Environmental Protection Agency and the Snoqualmie Tribe. No comments on the proposed study were filed.

Discussion and Staff Recommendation

President Trump's Executive Order 14148, titled 'Initial Rescissions of Harmful Executive Orders and Actions' rescinds Executive Order 14096 (Revitalizing Our Nation's Commitment to Environmental Justice for All). For this reason, the study is not needed for staff's environmental analysis, which will examine impacts to all potentially affected communities and, where appropriate, will consider measures to mitigate those impacts.

## Literature Cited

- Adamus, P.R. 2016. Manual for the Wetland Ecosystem Services Protocol (WESP).  
people.oregonstate.edu/~adamusp.  
[https://www.researchgate.net/publication/352383733 Manual for the Wetland Ecosystem Services Protocol WESP version 13](https://www.researchgate.net/publication/352383733_Manual_for_the_Wetland_Ecosystem_Services_Protocol_WESP_version_13)
- Barnett, H., D. Paige, B. Richards, D. Chapin, and S. Nickelson. 2007. Fish Surveys in the South Fork Tolt River Upstream of the Tolt Reservoir 2007. Seattle Public Utilities Watershed Management Division.
- Bailey, David. 2023. "Geomorphic Response of Large Woody Debris on the South Fork Tolt River, Washington, U.S.A." Master's thesis, Seattle, WA: University of Washington.
- Dubé, K. 2005. Initial Study Results, Reservoir Shoreline Erosion Study, Pelton Round Butte Hydroelectric Project, Oregon. Report prepared for Portland General Electric, the Warm Springs Power Enterprises, and the Pelton Round Butte Project Shoreline Management Group.
- FWS (U.S. Fish and Wildlife Service). 2020. TBSA Model: A Desktop Tool for Estimating Mortality of Fish Entrained in Hydroelectric Turbines.
- Harza Engineering Company. 2000. Mayfield and Riffe Lakes – Erosion/Deposition Areas within Normal Reservoir Drawdown Zones. Report prepared for Tacoma Power by Harza Engineering Company, Bellevue, WA.
- Hruby, T. and A. Yahnke. 2023. Washington State Wetland Rating System for Western Washington: 2014 Update (Version 2). Publication #23-06-009. Washington Department of Ecology.
- Moragoda, N., S. Cohen, J. Gardner, D. Muñoz, A. Narayanan, H. Moftakhari, and T.M. Pavelsky. 2023. Modeling and analysis of sediment trapping efficiency of large dams using remote sensing. *Water Resources Research*, 59, e2022WR033296.
- Morris, Gregory L., and Jiahua Fan. 2009. Reservoir Sedimentation Handbook, McGraw-Hill Book Co., New York. Electronic version of the original 1998 publication.
- Parker, P.L. and T.F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, National Register, History and Education. Washington D.C., 1990. Revised 1998.

Seattle City Light (City Light). 2023a. FA-02 Instream Flow Model Development Study Report for the Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Northwest Hydraulic Consultants, Inc. and HDR Engineering, Inc. March 2023.

City Light. 2023b. FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Report for the Skagit River Hydroelectric Project, FERC Project No.553. Prepared by Northwest Hydraulic Consultants, Inc. and HDR Engineering, Inc. March 2023.

City Light. 2009. Study No. 1 – Erosion Study Final Report for the Boundary Hydroelectric Project (FERC No. 2144). Prepared by Watershed GeoDynamics. March 2009.

Tappel, Paul, and Kerry Tappel. 1995. *South Fork Tolt Reservoir and Tributaries 1994 Fisheries Survey*. Prepared for: Seattle Water Department (North Bend, WA). Prepared by: Paul and Kerry Tappel, Fisheries Consultants (Brier, WA).

Thompson, J., and J. Unrein. 2024. Results of Vertebrate Exclusion and Trout Tissue Collection for Genetic Analysis in Trouble Creek (Siwash) in the Upper South Fork Tolt Watershed, WA. Seattle Public Utilities, Seattle, WA.

Wheaton, Joseph M., Kirstie A. Fryirs, Gary Brierley, Sara G. Bangen, Nicolaas Bouwes, and Gary O'Brien. 2015. "Geomorphic Mapping and Taxonomy of Fluvial Landforms." *Geomorphology* 248 (November):273–95. <https://doi.org/10.1016/j.geomorph.2015.07.010>.

Yao, F., J. T. Minear, B. Rajagopalan, C. Wang, K. Yang, and B. Livneh. 2023. Estimating Reservoir Sedimentation Rates and Storage Capacity Losses Using High-Resolution Sentinel-2 Satellite and Water Level Data. *Geophysical Research Letters*, 50(16), e2023GL103524.