

**REVIEW OF APPLICATION
OF THE NISQUALLY HYDROELECTRIC FACILITY
FOR RECERTIFICATION
BY THE LOW IMPACT HYDROPOWER INSTITUTE**



Nisqually Hydroelectric Project

LIHI Certificate No. 8

FERC No. 1862

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April 4, 2019

I. INTRODUCTION

This report summarizes the review and findings of an application submitted by Tacoma Power to The Low Impact Hydropower Institute (LIHI) for recertification of the Nisqually Hydroelectric Project (Project), FERC No. 1862. The Project is owned and operated by the City of Tacoma, Department of Public Power Utilities, Light Division (dba Tacoma Power). The original license for the Nisqually Project expired December 31, 1993 and FERC issued a new 40-year license to the Project on March 7, 1997.

In 2003, the Project gained certification as LIHI No. 8. The Project qualified for recertification in 2008 and 2014. This re-certification review is being conducted in compliance with LIHI's Handbook, 2nd edition (updated 7/20/16). The previous reviews of the Nisqually Project are available on the Project's page of the LIHI website.

II. RECERTIFICATION PROCESS AND INITIAL ASSESSMENT

The LIHI recertification process addresses three questions during the Stage I review:

1. Is there any information missing from the Application?
2. Have there been any material changes to the facility during the term of the previous certification, i.e. any issues of noncompliance, or any new, or renewed, issues of concern, relevant to project operation?
3. Have there been any material changes in the LIHI criteria or certification process since the facilities was last certified?

In compliance with 2016 Recertification Standards and Initial Assessment Standards, reviews have two phases: the initial assessment (Stage 1) as outlined above and a comparison of Project facilities and operation with LIHI's criteria (Stage 2). The recertification application prepared by Tacoma Power was received on July 30, 2018. A review of the initial application resulted in a Stage 1 intake report dated 9/17/2018. The response to the Stage I report was submittal of requested information provided in an email on October 31, 2018. The application was posted for the 60-day public comment period on December 10, 2018.

Relative to Question 2 above, there have been no material changes or compliance concerns since the 2014 recertification. Relative to Question 3, there have been changes to LIHI criteria for certification in 2016. Since the answer to Question 3 above is yes, applicants are required to undergo a Stage II review for the new criteria.

The Stage II assessment included a review of the application package, supplemental information, the annual compliance statements received by LIHI during the past term of Certification, and public records in FERC's eLibrary.

III. PROJECT'S GEOGRAPHIC LOCATION

The Project is located on the Nisqually River in southwestern Washington and operates across lands in three counties: Pierce, Thurston and Lewis. The Nisqually River originates from the Nisqually Glacier on Mount Rainer and flows approximately 80 miles west to Puget Sound (Figure 1). The Project facilities are located between river mile (RM) 40.8 and RM 51.6. The Project is partially located on the Mount Baker-Snoqualmie National Forest.

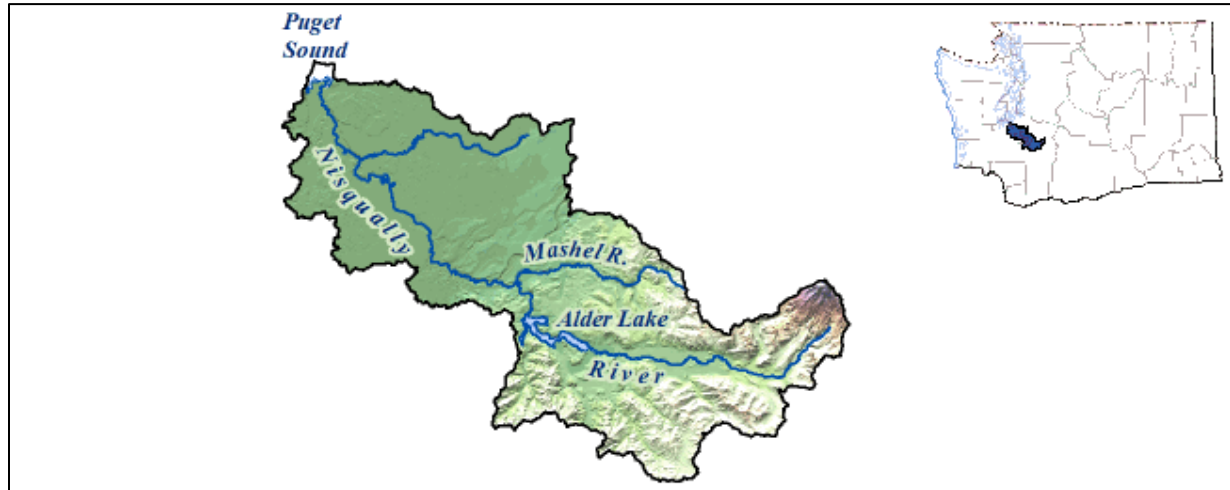


Figure 1. Nisqually watershed in Southwestern Washington.

A second hydroelectric project on the Nisqually River, the Yelm Project (FERC No. 10703), is operated by the City of Centralia Washington. It is located about 30 miles downstream of the Nisqually Project. The Yelm Project is a 12 MW facility constructed in 1997, that consists of a single diversion dam, canal, powerhouse, and a fishway.

IV. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Nisqually Project is comprised of two hydroelectric facilities: the 50 MW LaGrande facility and the 64 MW Alder facility. Each facility includes a dam, impoundment, flowline, powerhouse, and an associated power transmission switchyard. Both switchyards lead to a single transmission system that extends 26.2 miles to the City of Tacoma. The Alder facility is operated in a peaking mode and LaGrande is operated as a run-of-river facility (FERC 1997, Tacoma 2018).

The Alder facility (RM 44.2) includes a 285-foot-high concrete arch dam which forms Alder Lake; a 7.4-mile-long impoundment with an operational storage capacity of 161,457 acre-feet at an elevation of 1,207 ft msl. The impoundment has a maximum surface area of 3,065 acres. Alder dam has a reinforced concrete spillway with a capacity of 80,000 cubic feet per second (cfs). The Alder powerhouse, which contains two generating units, is located at the base of the dam.

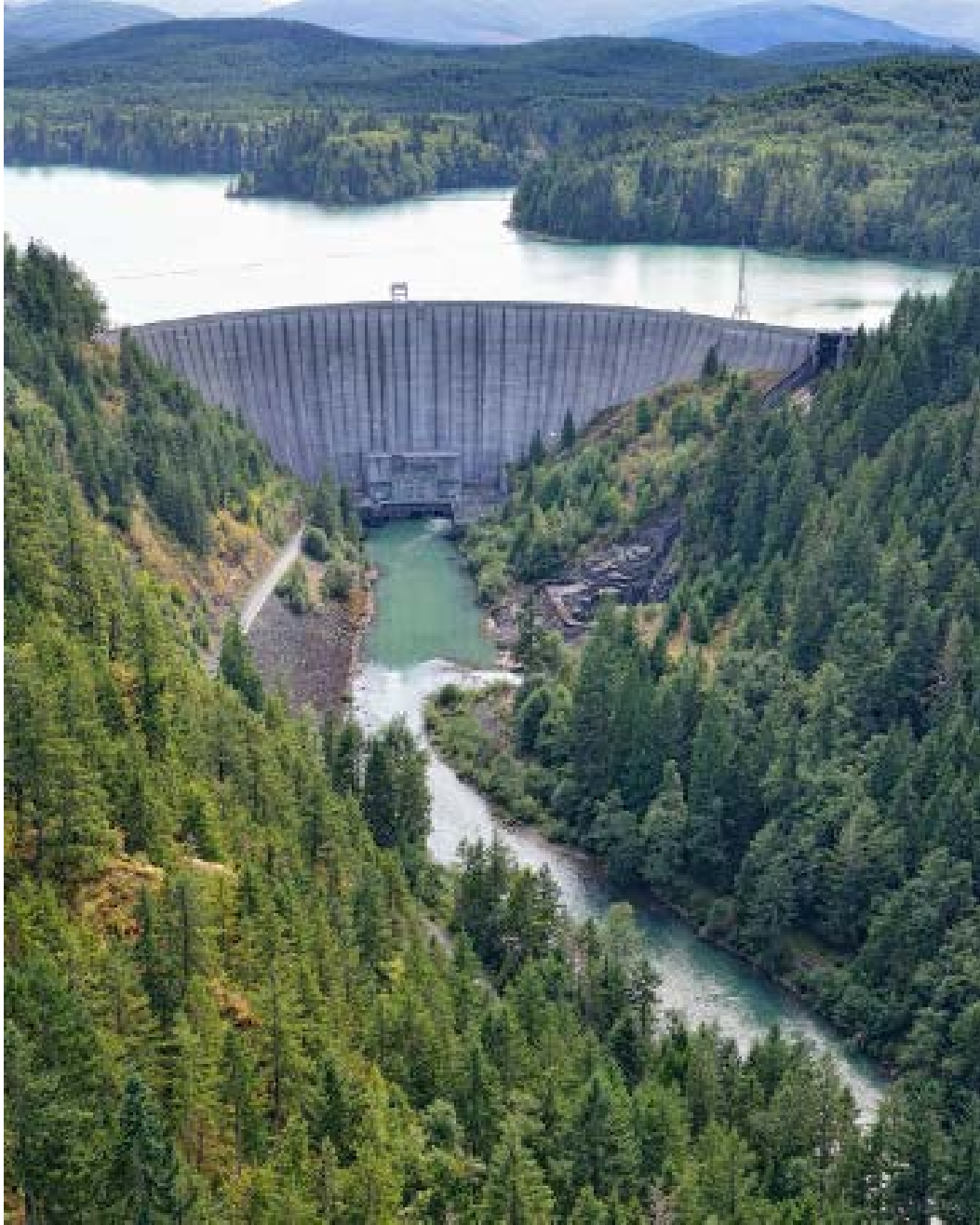


Figure 2. Alder Dam and Impoundment

The second facility, the LaGrande Development (Figure 3) is 1.5 miles downstream of Alder dam. It includes a 192-foot-high concrete gravity dam and an impoundment with a surface area of 45 acres and storage of 2,700 acre-feet. LaGrande dam also has a large reinforced concrete spillway with a capacity of 80,000 cfs. The LaGrande impoundment is located in a deep steep-walled canyon extending upstream a distance of 1.5 miles to the base of Alder dam. The LaGrande dam diverts flows into a 6,400-foot-long underground tunnel, which leads to a steel penstock with a manifold structure serving five individual penstocks for each of the five generating units.



Figure 3. LaGrande Dam and Impoundment.

The Nisqually Project also includes approximately 1,113 acres of land around Alder and LaGrande impoundments. This land is used for Project operations, Project recreation facilities, and wildlife habitat (Stillwater2003). The Project lands are managed under a wildlife management program. Most of Alder Lake's shoreline is contiguous with lands of the Mt. Baker-Snoqualmie National Forest, the Washington Department of Natural Resources (WDNR), and Weyerhaeuser Timber Company. About 177 acres of Project lands support developed recreation.

V. ZONES OF EFFECT

Four Zones of Effect were designated by Tacoma Power which were determined to be appropriate. They are identified below and in Figure 4; Zone 1 being the most downstream.

- Zone 1 – Downstream Regulated River Reach
- Zone 2 - Bypassed Reach
- Zone 3 - LaGrande Impoundment
- Zone 4 - Alder Impoundment

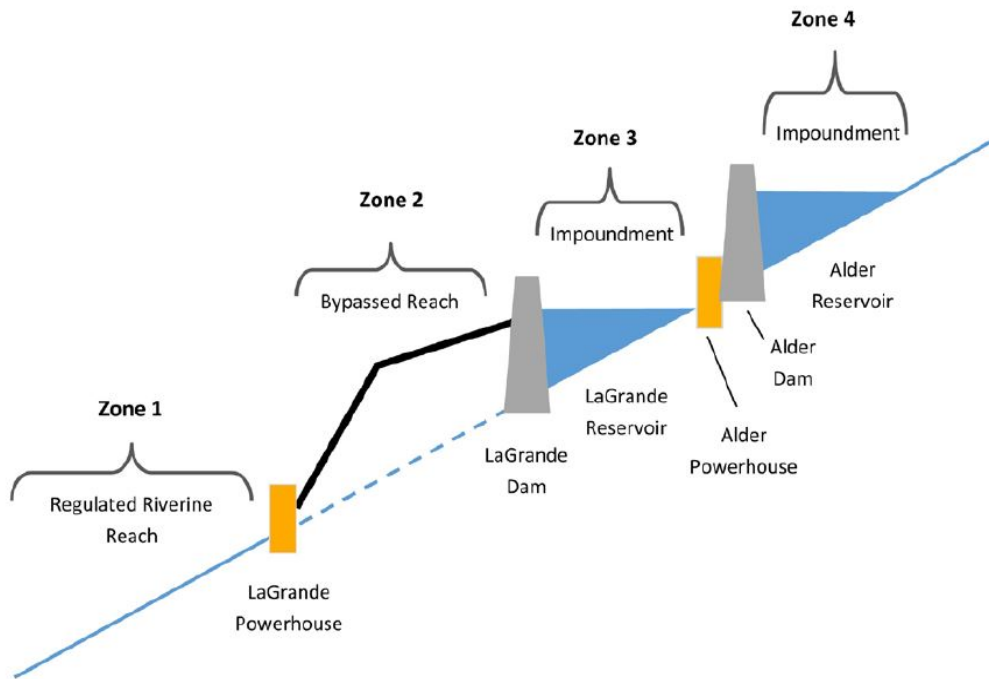


Figure 4. Zones of Effects for the Alder and LaGrande developments of the Project

VI. REGULATORY COMPLIANCE

As evident from previous LIHI reviews of the Nisqually Project for initial certification in 2003, and recertification in 2008 and 2013, Tacoma Power maintains active engagement with State and federal agencies and the Nisqually Tribe (Tribe) in the management of the Nisqually River. In 1978, Tacoma Power formed the Nisqually River Coordinating Committee (NRCC). This committee is composed of the City of Centralia, the Tribe, Washington Dept. of Fish and Wildlife (WDFW), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS). Tacoma Power consults regularly with the NRCC, as they continue to implement their current 40-year FERC license.

There has been an ongoing dialog over implementation of several FERC license Articles. Article 418 requires Tacoma Power to file a plan to study gravel augmentation in the Nisqually River from the LaGrande powerhouse downstream to the confluence of the Mashel River (Zone of Effect 1). In addition, Article 419 requires Tacoma Power to develop and implement a gravel augmentation plan in the bypassed reach from LaGrande dam to the LaGrande powerhouse (Zone of Effect 2).

On January 31, 2017¹, Tacoma Power filed a progress report on the gravel studies conducted under article 418 and 419 in 2015, after being granted an extension of time by FERC to consult

¹ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14479089>

with WDFW and file the report. The studies showed that the gravel substrate in the bypassed reach is coarsening. This can adversely affect the quality of salmon spawning habitat. The January 31, 2017 report also included a finding from the NRCC, particularly WDFW, that the bypass reach was deemed unsuitable habitat and that anadromous fish should be discouraged from utilizing this reach.

On August 18, 2017², FERC requested additional information and recommended that Tacoma Power consult with resource agencies and NRCC on limitations of available gravel, whether gravel augmentation is warranted, and to determine criteria or a trigger point at which gravel would be augmented. FERC also recommended submittal of a formal license application for amendment of one or more license articles that could be affected by NRCC's decision and recommendation to discourage use of the bypass reach by anadromous salmonids. On November 15, 2017³ Tacoma Power requested an extension of time to respond to FERC's letter and on May 16, 2018⁴, Tacoma Power filed a report for the reach from the powerhouse to Mashel River (Zone 1), where salmonids are currently spawning. That report recommended determining when gravel augmentation should be initiated to improve spawning conditions and proposed conducting more frequent monitoring of gravel in this reach, under article 418.

Tacoma Power also proposed deleting license articles 416 and 419, which pertain to improving fish habitat and removing barriers in the in the bypassed reach. The requested license modification also included an explicit goal, agreed upon by the NRCC, of not attracting anadromous fish into the bypassed reach because of the high streamflow velocities and volatile hydraulic conditions that exist throughout in this area during high flow events. With the May 16, 2018 letter, Tacoma Power requested another six-month extension of time to submit additional information and a license article amendment application to delete articles 416 and 419. On August 1, 2018⁵, FERC approved the extension.

In an October 30, 2018 letter, Tacoma Power with NCRR agreement, requested another six-month extension to complete a geotechnical analysis and an assessment of the material from a major slide that had occurred in January 2018, and its implications on spawning habitat in the bypassed reach, and to allow additional time for agency consultation. FERC granted the extension on December 11, 2018⁶ in order for these studies to be completed prior to Tacoma Power submitting its report on gravel augmentation in the bypassed reach. The additional information is to be filed with FERC by May 18, 2019.

Despite the repeated extension of time requests to FERC, the record shows that Tacoma Power has continued to work in consultation with resource agencies and NRCC to address anadromous fish spawning habitat matters (see Section IX below for more detail). It is also clear from the record that Tacoma Power actively engages with stakeholders to manage the Project and meet Terms and Conditions of the License and of the Water Quality Certification. The NRCC meets

² <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14662016>

³ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14757536>

⁴ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14922275>

⁵ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14990839>

⁶ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15114684>

regularly to address and adaptively manage water quality and other fish/wildlife concerns within the basin. Consultation frequency increases if issues arise and may occur as often as weekly depending on the issue and strategy recommended by the NRCC.

VII. PUBLIC COMMENTS RECEIVED OR SOLICITED BY LIHI

At the close of the application's public comment period on February 8, 2019, no comments had been received.

Washington State Department of Ecology (Ecology) provided a letter included in the recertification application. The letter indicates that Ecology believes that the Project complies with all conditions in the Water Quality Certification (WQC), which includes adherence to state water quality standards. The letter further states that no other data collected within the Project area has resulted in a water quality limited determination (Appendix A in Application).

VIII. SUMMARY OF COMPLIANCE WITH LIHI CRITERIA

The following tables show the standards selected by Tacoma Power for each LIHI Criterion in the four Zones of Effects. Note that the application and this report Identify and discuss Zones of Effect from downstream to upstream in accordance with the 2nd edition LIHI handbook (prior to the latest revision 2.03, December 2018). The reviewer found these standards to be appropriate with one exception for upstream passage in Zone 1 as discussed in Section IX below. Details of the Project's compliance with each of the LIHI criterion are presented in Section IX.

Zone 1 Regulated Riverine Reach

Criterion	Alternative Standards				
	1	2	3	4	Plus
A Ecological Flow Regimes		X			
B Water Quality		X			
C Upstream Fish Passage	X				
D Downstream Fish Passage	X				
E Watershed and Shoreline Protection		X			
F Threatened and Endangered Species Protection			X		
G Cultural and Historic Resources Protection	X				
H Recreational Resources		X			

Note: The reviewer determined that Standard C2 is more appropriate in this zone.

Zone 2 Bypassed Reach

Criterion		Alternative Standards				
		1	2	3	4	Plus
A	Ecological Flow Regimes		X			
B	Water Quality		X			
C	Upstream Fish Passage		X			
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection		X			
F	Threatened and Endangered Species Protection			X		
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

Zone 3 LaGrande Impoundment

Criterion		Alternative Standards				
		1	2	3	4	Plus
A	Ecological Flow Regimes	X				
B	Water Quality		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection		X			
F	Threatened and Endangered Species Protection			X		
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

Zone 4 Alder Impoundment

Criterion		Alternative Standards				
		1	2	3	4	Plus
A	Ecological Flow Regimes	X				
B	Water Quality		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection		X			
F	Threatened and Endangered Species Protection			X		
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources		X			

IX. DETAILED CRITERIA REVIEW

Criterion A - Ecological Flow Regimes

LIHI Goal: The flow regime within reaches affected by the facility, support habitat and other conditions suitable for healthy fish and wildlife resources.

Standards Applied:

Zone 1 and 2: A2 - in Compliance with Agency Recommendations

Zone 3 and 4: A1- De Minimis Effect

Flow levels in Zone 1 are managed as suggested in 1986 by NRCC (FERC License Article 402). These flows benefit the Nisqually River fish community by increasing summer flows above historical flow levels. Flows in Zone 1 are augmented by water from deep in the LaGrande impoundment (Zone 3), which decreases instream temperature during summer months benefiting salmonids (Page 17 Application). In addition, down-ramping rules for Zones 1 and 2 in License Article 405 (as amended) are based on science specific to the Northwest (Hunter 1992).

Instream flows of 30 cfs (Article 402) are released continuously into Zone 2 to provide salmonid access to the bypassed reach and enhance rearing and spawning habitat. In addition, seasonally high flows and spills from LaGrande dam provide higher flows in the bypassed reach and support habitat forming processes, such as the recruitment transportation and redeposition of sediment and streambed materials. This results in the reshaping or relocation of gravel bars and woody debris.

A hydrograph of flows from the powerhouse and in the bypassed reach is shown in Figure 5 below. The flow in the bypassed reach (typically 30 cfs) is insignificant in comparison to the total discharge below the powerhouse. The flow in the bypassed reach is only significant during spills. Tacoma Power noted that the USGS gauge for the bypassed reach is only accurate in flows less than 200 cfs. Once flows are greater than 200 cfs, flows show under actual value. The flow spike in January of 2018 was more than 6,000 cfs of spill rather than 1,400 cfs as shown.

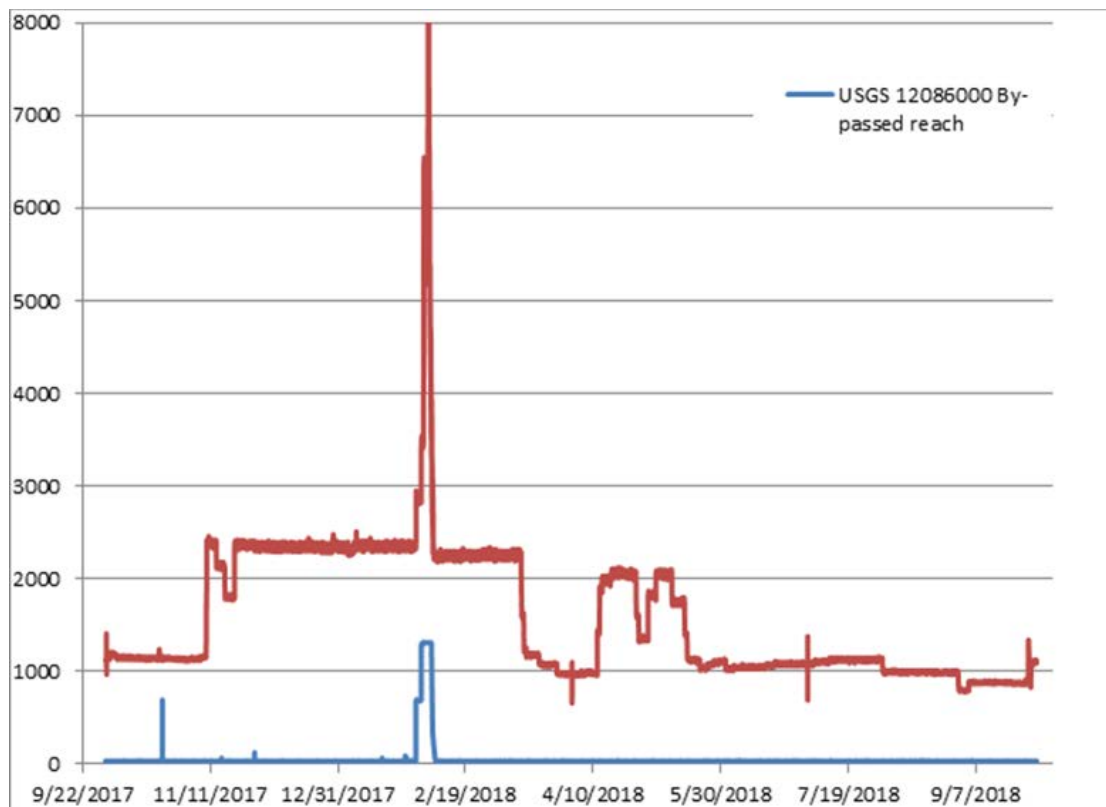


Figure 5. Hydrograph of flows from LaGrande powerhouse (red) and in the bypassed reach (blue).

In Zone 3, LaGrande impoundment is considered run of the river, passing all inflow from the Alder impoundment which helps maintain instream flows in Zones 1 and 2. The Alder impoundment, Zone 4, provides storage to support late summer critical flows in downstream areas.

Finding: Ecological flows in Zones 1 and 2 are in compliance with standard A2 Agency Recommendations and in Zones 3 and 4, the two impoundments, the flows meet standard A1 - Not Applicable since they are impoundment zones. Therefore, this review finds that the Project continues to satisfy the LIHI ecological flows criterion.

Criterion B - Water Quality Standards

LIHI Goal: Water quality is protected in waterbodies directly affected by the facility including downstream reaches, bypass reaches and impoundments above dams and diversion.

Standards applied:

All Zones: B2 - in compliance with Agency Recommendations

The Nisqually River is 303(d) listed for a water temperature impairment in its first four miles upstream from the mouth. This four-mile reach is about 37 miles downstream of the Project.

The increased water temperatures are not caused by the Project. WA. Dept. of Ecology provided a letter stating the Nisqually Project is in compliance with its 401 WQC. Both impoundments are deep, resulting in cool water being released into Zone 2. This cool water suppresses warm temperatures in downstream habitats, both within and beyond the Project area.

Tacoma Power engages with NRCC to address, and adaptively manage, water quality within the basin. An example of the successful engagement of the NRCC occurred in 2015 and 2016 when limited snowpack and pending summer drought conditions were of concern. The NRCC met frequently to address low inflow and potential discharge temperature concerns. The NRCC adaptively managed the issues by balancing inflow conditions, in-stream flow requirements, discharge temperature criteria, and the availability of cool deep-water reserves remaining in the Alder impoundment.

The cooler water released from LaGrande and Alder impoundments continued to provide a cool-water thermal refuge in Zones 1 and 2 for salmonids and other aquatic species (Application page 28) during that time period. Although in 2015 water temperatures rose above the state water quality criterion for core salmonid habitat (16 degrees C), the increased temperature was related to low snow pack conditions. The rise in water temperatures in the Nisqually River was less than other basins without a cool water source (Application page 28).

Finding: All water quality values, within all reaches, are in compliance with standard B2 - Agency Recommendations. Therefore, this review finds that the Project continues to satisfy the LIHI water quality criterion.

Criterion C - Upstream Fish Passage Standards

LIHI Goal: For upstream passage, the facility allows for safe timely and effective passage of migratory fish.

Standards Applied:

- Zone 1: C1 - in compliance with Agency Recommendations
- Zone 2: C2 - in compliance with Agency Recommendations
- Zone 3 and 4: C1 - Not applicable /De Minimis Effect.

The application selected standard C-1 for Zone 1 and stated that upstream passage is essentially unimpeded in Zone 1, which includes the Nisqually River, from the mouth up to the LaGrande powerhouse and tailrace. Migratory fish observed in Zone 1 include Chinook, coho, and chum salmon; steelhead/rainbow trout; cutthroat trout; sturgeon; and lamprey. Chum salmon, sturgeon and lamprey are more commonly found near the mouth of the Nisqually River, which is 41 river miles downstream of the La Grande Powerhouse.

This review finds that standard C2 – Agency Recommendation is more appropriate in Zone 1. Upstream passage concerns in the tailrace area are addressed through License Article 417, which required a plan to evaluate tailrace attraction and injury or mortality at the LaGrande powerhouse to determine if a tailrace barrier is needed to prevent anadromous fish migration delay and injury or mortality. Tacoma Power filed an evaluation report on August 24, 2016⁷ after having requested first a five-year, and then a ten-year delay in conducting the study due to lack of evidence of any issue and low numbers of anadromous fish below the powerhouse. The study delays were approved by FERC and were supported by resource agencies so that additional fisheries information could be collected under article 416 and so that additional consultation could occur in the interim.

The report was a desktop analysis intended to determine the most likely areas of risk to returning adult salmon in the tailrace and bypassed reach. Two areas of potential risk were identified: delay associated with stranding in the upper tailrace of the “old powerhouse” and mechanical injuries associated with turbine outages, during minimum unit operations, and within the draft tube at the “new powerhouse” (Figure 6).



Figure 6. LaGrande New Powerhouse (at left) and Old Powerhouse (at right)

Study recommendations that could be evaluated in the future if populations increase included installing a bar rack to exclude fish from the upper tailrace; developing a barrier net installation plan for outages to prevent fish from entering the draft tube when there is no discharge; and a

⁷ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14338362>

three-step adaptive management process to: 1) explore modifying the operations schedule, 2) conduct a population growth assessment for steelhead presence during spawning periods, and 3) consider additional assessments with acoustics or optics for quantitative evaluation of delay associated with the draft tube discharge. All recommendations are to be implemented if warranted, following a decision matrix in the report, and in consultation with resource agencies and NRCC.

On November 29, 2018⁸, Tacoma Power filed a final report for license articles 416 and 417. That report noted that FERC has yet to approve the August 24, 2016 report and plan even after a May 11, 2017 inquiry wherein FERC responded that a review and response would occur in the future. As such, Tacoma Power has conducted no further tailrace related work pending FERC's response.

Zone 2, the bypassed reach, has poor quality habitat. Tacoma Power, in collaboration with the NRCC, monitors spawning activity in the reach. These studies are conducted under Article 416, which required a plan to modify the La Grande bypassed channel to provide fish passage through the entire reach to enhance anadromous fish production.

Fish are able to access the lower $\frac{1}{4}$ (~ 0.5 miles) of the bypassed reach below the natural cascades at Boulder Garden Falls. The cascades create a partial barrier to upstream passage even with bypassed reach flows. Above the falls are several other natural barriers that are also barriers to passage. Under high spill conditions, a small number of salmonids may access the upper $\frac{3}{4}$ of the reach; however, the habitat above the cascade is a confined channel with limited riparian habitat and coarse substrate unsuitable for spawning.

In 2016, WDFW surveyed the habitat upstream of the Boulder Garden Falls and found that it does not provide suitable salmonid habitat (WDFW 2016). The Nisqually Tribe also found the habitat in this reach to be marginal. Prior spawner surveys in this area have not recorded any spawning in this reach, and annual spawner surveys in the upper portion of the reach are no longer conducted, unless spill flows in winter exceed 2,500 cfs. However, the NRCC determined that since habitat in the bypassed reach is unsuitable for salmonids, they did not conduct spawner surveys in 2017 or 2018 despite winter spills flows higher than the trigger (see NRCC Decision Document 16-3 in Appendix A). Tacoma Power and the NRCC are evaluating alternative management scenarios for this reach, that would de-emphasize or eliminate requirements for habitat enhancement, including a proposed license article amendment application (Application, Page 42, and Section VI. above).

In Zone 3 (the LaGrande impoundment) upstream passage is not applicable, since it is an impoundment and natural barriers existed prior to construction of the Project (Application page 43). The pre-inundation surveys for the LaGrande impoundment recorded a passage barrier (25-ft falls) $\frac{1}{2}$ mile upstream from the location of LaGrande dam. These falls formed an absolute

⁸ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=15106306>

barrier to upstream salmonid migration in this reach. In addition, there are no fish-bearing tributaries to the impoundment (Application Page 43).

In Zone 4, there are no Project facilities that impede upstream migration from the Alder impoundment to the upper Nisqually River or its tributaries. The Alder impoundment is upstream of the historical and current extent of anadromous fish. Creel surveys have identified a number of resident species in the Alder impoundment including kokanee, rainbow trout and cutthroat trout. The surveys have also identified largemouth and smallmouth bass, yellow perch, black and white crappie, and channel catfish as being present in the impoundment (Application Page 44).

Finding: Potential Project effects on upstream migration in Zone 1 and Zone 2 are currently in compliance with Agency Recommendations. In Zone 3 and Zone 4, passage is not applicable as natural barriers precluded upstream passage historically. Based on this information, this review finds that the Project continues to satisfy the LIHI criterion for Upstream Passage in all zones.

Criterion D - Downstream Fish Passage

[LIHI Goal: For downstream passage, the facility allows for safe, timely, and effective downstream passage of migratory fish and minimizes loss of fish from upstream river reaches affected by the facility.](#)

Standards Applied:

All Zones: D1 - Not Applicable/De Minimis

The application noted that fish passing over LaGrande dam, or through the penstock, may not survive. LIHI requested additional supporting information to support standard D-1 in Zones 2, 3 and 4, and Tacoma Power submitted the NRCC's Issue Consideration and Decision Recommendation #18-5 dated October 19, 2018 (see Appendix A) addressed this circumstance. They found that the upstream and downstream populations of resident fish species are managed as separate populations at this time, and the health of these two populations does not depend on safe passage through the Project.

Downstream passage is unobstructed in the Nisqually River in Zone 1 (downstream of the powerhouse). Fish moving downstream in this reach do not pass through any Project facilities or natural impediments. Flow releases from the powerhouse during summer are higher in this reach than pre-project natural stream flows and have cooler water temperatures. These two characteristics are more beneficial to salmonids than historical flows and temperatures. The minimum instream flows in this reach were based on rearing requirements for all juvenile salmonids present in the Nisqually River (Application Page 46). The higher flows passing through the powerhouse in the summer months improve habitat from the powerhouse all the way to the mouth of the river, 41 miles downstream. Based on annual salmon population monitoring in Zones 1 and 2, conducted by the Nisqually Tribe and WDFW, there is general use

by salmon and trout species in close proximity to the powerhouse tailrace. Annual monitoring in Zone 1 includes counting steelhead redds and Chinook salmon carcasses.

Instream flows in the bypassed reach (Zone 2) of 30 cfs are dictated by License Article 403. The bypass flows were determined using site-specific studies to improve salmonid access and to provide rearing and spawning habitat. In addition, an old constructed dam was partially removed as required by License Article 416 to facilitate fish passage. Since this reach is located downstream of LaGrande dam, downstream passage primarily benefits juvenile fish produced in this reach. Anadromous fish are found in the lower ½ mile of the bypassed reach and typically include Chinook, coho, pink salmon and steelhead/rainbow trout and cutthroat trout.

LaGrande dam and Alder dam functionally block downstream passage for resident fish in Zone 3 (LaGrande impoundment) and Zone 4 (Alder impoundment). LaGrande dam was constructed only ½ mile downstream of a 25-ft waterfall that would have precluded upstream passage to the remainder of the river. The waterfall may have also caused harm or injury to downstream migrants. Resident fish in the LaGrande and Alder impoundments are not affected by the lack of downstream passage and can complete their life histories within these impoundments.

There is a potential loss of some fish passing through the turbines or over the crest of these dams. LaGrande impoundment has not been managed for fishery resources and there are no plans to do so in the future (Tacoma 1991). The loss of these fish is likely a small percentage of the population and is consistent with the WQC and NRCC management goals (See NRRC Decision Document 18-5 in Appendix A).

Finding: Downstream passage is unobstructed in Zone 1 and the lower portion of Zone 2. A historical waterfall, now inundated by the LaGrande impoundment, prevented anadromous fish from using all but ½ mile of habitat now covered by the LaGrande impoundment and all of the Alder impoundment. Resident fish are found in the both LaGrande and Alder impoundments. Some of these fish may be lost passing through the turbines or over these dams. These losses appear to be inconsequential to the fish populations in the two impoundments and are consistent with the WQC and NRCC Decision Document 18-5. Therefore, this review finds that the Project continues to satisfy the LIHI criterion for downstream passage for all zones.

Criterion E - Watershed and Shoreline Protection

Goal: The Facility has demonstrated that sufficient action has been taken to protect, mitigate, or enhance the condition of soils, vegetation, and ecosystem function on shoreline and watershed lands associated with the Facility.

Standards Applied:

All Zones E2 - in compliance with Agency Recommendations.

Although there is not a specific shoreline management plan for the Nisqually Project. The Wildlife Management Plan required under license Article 423, applies to all zones, including Zone 1, the Nisqually River downstream of the Project. The Wildlife Management Plan was developed in consultation with WDFW, USFWS, and the Nisqually Tribe. The Plan protects, mitigates, and enhances the shoreline around the Project. As part of the Plan, Tacoma Power acquired and reserved more than 3,350 acres of land near the Project. This land was designated as the Nisqually Wildlife Management Area which includes shoreline habitat on both sides of the Nisqually River in Zones 1 and 2 and shoreline buffers in Zone 3 and 4 around the Grande and Alder impoundments.

The Plan includes: descriptions of land parcels in the management area, prescriptions for management of wildlife habitat, monitoring and evaluating the effectiveness of the measures, and a schedule for revising the Plan and implementing its measures. Each year Tacoma Power prepares an annual report which contains the status of the Plan measures and activities that occurred during the previous year.

In the name of habitat restoration, Tacoma has partnered with the South Puget Sound Salmon Enhancement Group and the Nisqually Indian Tribe to provide Large Woody Debris (LWD) from reservoir clean-out operations free of charge for restoration projects on the Mashel River and Ohop Creek, two important salmon-bearing tributaries to the lower Nisqually downstream of the Project. Tacoma Power has allowed these entities to complete their Ohop Restoration project on Project lands near the mouth of Ohop Creek. In the future, the gravel augmentation project in the reach below LaGrande powerhouse to the Mashel River will be implemented. The plan for that project is being finalized with the Nisqually River Coordinating Committee at this time and is expected to be implemented in the next two to five years.

Tacoma Power is also partnering with the Nisqually Indian Tribe by funding conifer plantings on 87 acres of riparian habitat on Tacoma Power's wildlife lands that would benefit (photo attached). Plantings will cover approximately 15 acres per year for six years. The plantings are intended to be a future source of LWD recruitment into the Nisqually River to help maintain and improve fish habitat. While they grow and mature, these conifer understory plantings also increase habitat diversity that provides a long-term benefit to a variety of terrestrial species.

Figure 7 below shows Project lands protected as part of the FERC license, which includes 12 miles of river shoreline.

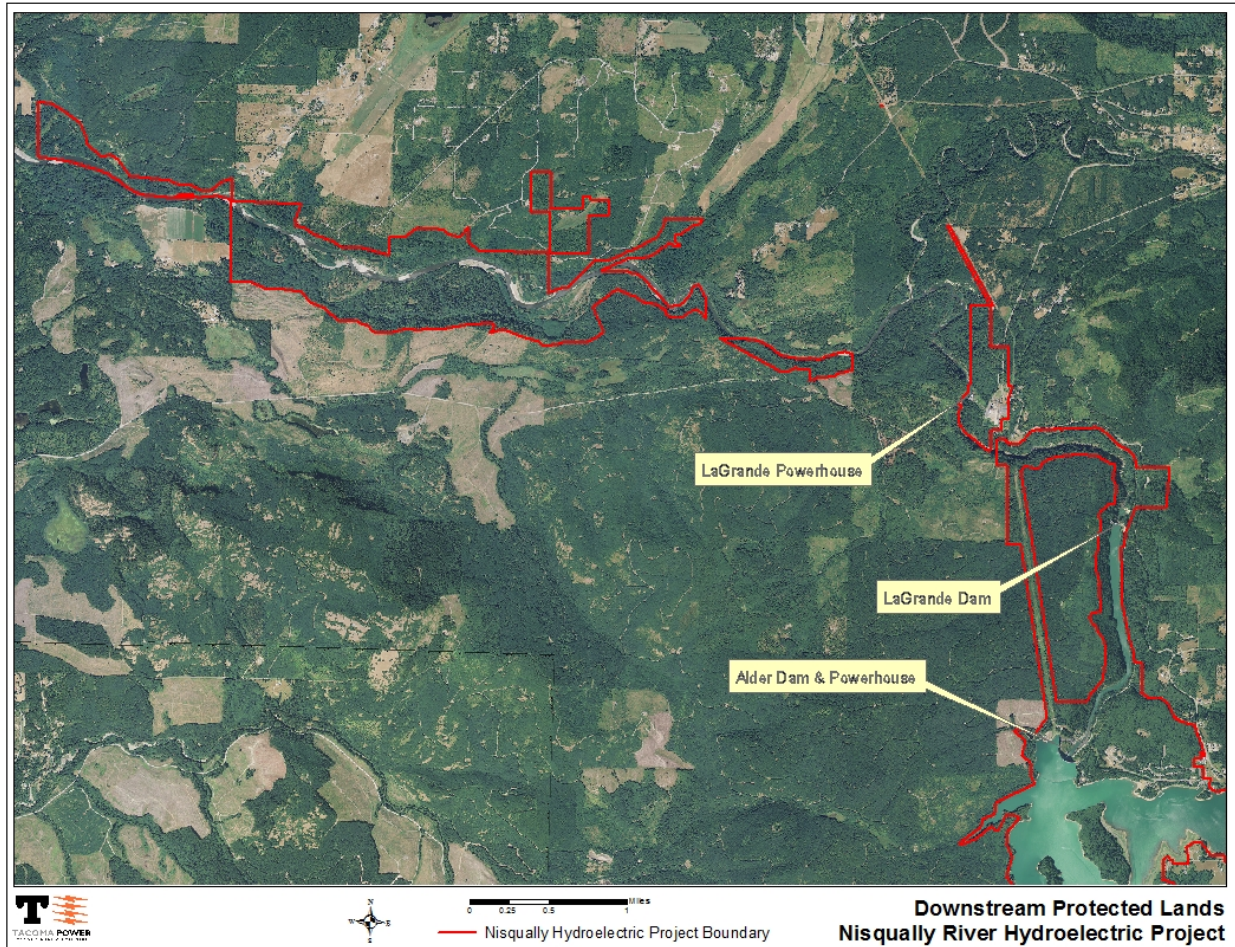


Figure 7: Nisqually Project Protected Lands.

Finding: Although a Shoreline Management Plan was not prepared for the Nisqually Project, the Wildlife Management Plan addresses the management of shoreline habitat associated with the Project. This Plan satisfies the requirement for shoreline management and protection and this action meets an E2 standard of Agency Recommendation. Therefore, this review finds that the Project continues to satisfy the LIHI criterion for shoreline management for all zones.

Criterion F – Threatened and Endangered Species

Goal: The Facility does not negatively affect any federal- or state-listed species.

Standards Applied:

All Zones: F3 - Recovery Planning and Action

The Project is located within the historic range of six listed species including:

1. Puget Sound Chinook salmon, Federal Threatened, State candidate
2. Puget Sound Steelhead Trout, Federal Threatened, State candidate

3. Gray wolf, Federal Threatened, State Endangered,
4. Grizzly bear - Federal Threatened, State Endangered,
5. Northern spotted owl – Federal Threatened State Endangered, and
6. Marbled murrelet - Federal Threatened, State candidate

Both Chinook and steelhead are present in the Project area. Bull trout are not found in the vicinity of the Project but are found much further downstream near the mouth of the Nisqually River. None of the other listed species have been found in, or near, the Project area (Application Page 64). All suitable terrestrial habitat is protected under the Project's Wildlife Management Plan.

The Chinook salmon population in the Nisqually River is supported by the Nisqually Tribal hatchery. Hatchery fish are not considered critical to recovery of Chinook salmon. FERC license Article 425, Threatened and Endangered Species Protection Plan, directs Tacoma Power to protect federally-listed species and their habitat from land-disturbing actions that could affect listed species. No actions have been conducted that would require implementing protective measures during the current LIHI certification term (issued in 2013), and the Project is in compliance with Article 425.

The steelhead and Chinook recovery plans⁹ contain two specific recommendations applicable to the Project. Both stipulate the minimum flows in place at the Project. The Chinook recovery plan also calls for the investigation of potential for transporting logs from Alder/LaGrande dams to downstream areas of the Nisqually River. Tacoma Power has supplied large woody debris from the Alder impoundment for use in restoration projects in tributaries to the Nisqually River in the lower basin (Application Page 63). In addition, the Chinook recovery plan also seeks commitments from Tacoma Power under the FERC license to provide protection and maintenance of 12 miles of the lower river shoreline for the benefit of fish and wildfire (Figure 7 above).

The Nisqually Project has not received incidental take authority and NMFS does not consider the Project to be a high priority for Section 7 Consultation for Chinook salmon or Steelhead (Application Page 67).

Finding. The Project supports the recovery of listed populations of Chinook and steelhead in the Nisqually River and satisfies LIHI criterion F3 - Recovery Planning and Action in all zones.

⁹ Draft steelhead recovery plan - <https://www.slideshare.net/Nisqually/nisqually-river-steelhead-recovery-plan>; and Chinook recovery plan - https://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/puget_sound/puget_sound_chinook_recovery_plan.html.

Criterion G – Cultural and Historic Resources Protection

Goal: The Facility does not impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

Standards Applied:

All Zones: G1 - Not Applicable/De Minimis

To date no prehistoric cultural resource sites, historic buildings, or structures have been recorded on Nisqually Project lands. Tacoma Power has consulted with the State Historic Preservation Office (SPHO) on numerous ground disturbing activities in areas that were previously surveyed for cultural resources. To date, there have been no unanticipated discoveries on Project lands.

Finding. The Facility has not been found to impact cultural or historic resources as no cultural or historic sites have been identified. Therefore, this review finds that the Project continues to satisfy the LIHI criterion G1 for cultural and historic resources protection.

Criterion H – Recreational Resources

Goal: The facility accommodates recreation activities on land and waters controlled by the Facility and provides recreational access to it associated lands and water without fee or charge.

Standards Applied:

All Zones: H2 - in compliance with Agency Recommendations

The Recreation Plan (Article 427 of the FERC license) directs recreational access and facilities for the entire Project. No recreational developments are located within Zone 1 – Nisqually River or Zone 3 – LaGrande impoundment. The lands in these zones are accessible to the public and classified as wildlife lands. However, these lands are not easily accessed by the public due to their relative isolation and steep terrain. No requests have been received from the public or agencies to provide recreational access within either Zone 1 or Zone 3.

Likewise, no developed recreational facilities occur in Zone 2 – bypassed reach. Cliffs and steep, rocky terrain limits public access here. It is not feasible to provide recreational access within Zone 2. Tacoma Power evaluated whitewater boating in Zone 2 and found there were multiple safety hazards, and test runs for whitewater rafting resulted in one death. A final report recommended that the spills for boating be discontinued. FERC concurred and agreed to not require further recreational releases in the bypassed reach.

In Zone 4, Alder impoundment, the Recreation Management Plan requires public non-motorized recreation access to the wildlife lands for the entire project. Article 413 – Kokanee

Stocking at Alder Impoundment directs kokanee stocking for recreational purposes in Zone 4. All of the developed recreational facilities occur in Zone 4 (Figure 5).

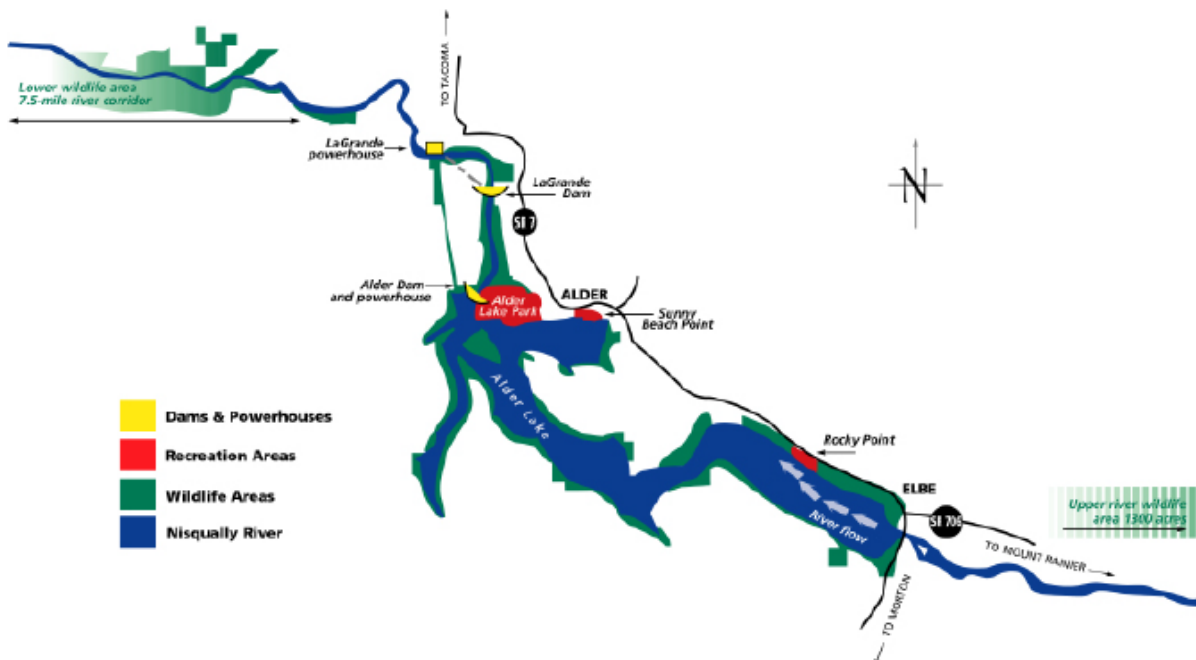


Figure 5. Nisqually Hydroelectric Project map showing recreational areas in red.

Finding: Recreation, in all reaches, complies with H-2 standard - Agency Recommendations. Therefore, this review finds that the Project continues to satisfy the LIHI criteria for recreational resources protection.

X. CONCLUSION AND RECOMMENDATION

A review of the application, supplemental information, and the FERC docket finds that Tacoma Power has been proactive and collaborative as environmental, cultural, historic, and recreational issues emerge in the normal course of Project operations. No major non-compliance issues were found in the docket search. Tacoma Power continues to engage and collaborate with the NRCC, the Nisqually Tribe, and resource agencies regarding reducing or avoiding Project effects on natural resources.

Based on this review, the Nisqually Project continues to meet the LIHI criteria for certification as a Low Impact Hydroelectric Facility, and it is recommended that the Project be recertified for a 5-year term with no conditions.

APPENDIX A

NRCC Decision Document 16-3
De-emphasis of LaGrande Bypassed Reach

Appendix A. NRCC Decision Document #16-3

Project Name	Nisqually Hydroelectric Project FERC No. 1862 De-emphasis of LaGrande By-pass Reach
Date Proposal Summited	06/17/2016
Date of Requested Decision	06/20/2016
Requested By	Tacoma Power and WA State Department of Fish and Wildlife
Date of Decision	6/29/2016

Committee Decision and Justification

Nisqually River Coordinating Committee members present: Nisqually Indian Tribe (George Walter), WDFW (Peggy Miller, Darric Lowery, and James Losee), Tacoma Power (Matt Bleich, Leah Marquez-Glynn, Ram Veeraraghavan, Florian Leischner), Centralia City Light (Micah Goo, Jerry Blue, ML Norton). In addition, Dept. of Ecology (Carol Serdar) was present.

The committee agreed with this recommendation during the 6/20/2016 meeting.

This committee decision was sent to the entire committee including NOAA and US Fish and Wildlife Service on June 22, 2016 for a one week review. Committee members responded that they agree with the decision as captured in this document, or did not respond.

Proposed Decision for Consideration

WDFW and Tacoma Power recommend that the LaGrande By-pass Reach be considered habitat which is not suitable for salmonids. Under current condition and function, usage of the entire reach by salmonids should be discouraged rather than encouraged.

Background

Several FERC license articles, guide the operation of the Nisqually Project with regards to the By-Pass Reach, the section of the Nisqually River downstream of LaGrande dam to the LaGrande powerhouse. The river water is by-passed, diverted around this 1.7-mile long canyon reach, from the dam to the powerhouse through an underground tunnel. Article 403 directs Tacoma Power to release a minimum flow of 30 cfs into this reach for "the protection and enhancement of fish and wildlife resources". In addition, all project releases that exceed the LaGrande powerhouse capacity, i.e. spills, are being conveyed through this reach.

The license has and, in the past, members of the Nisqually River Coordinating Committee have placed high value on this reach. Several other articles and provisions

of the license have required Tacoma Power to assess, monitor and enhance the fishery resources and habitat in the By-pass Reach. Over the years, Tacoma Power has expressed its understanding of the reach as low value to salmon and expressed its disagreement to calls for enhancing the fishery resources through habitat improvements in this reach.

Tacoma Power and WA State Department of Fish and Wildlife recently re-evaluated the suitability of the By-pass Reach for native salmonids for guidance of the Tailrace Attraction Study under Article 417. After a fish and habitat field assessment on May 5, 2016, both parties agreed that the reach does not represent suitable habitat for native salmonids. It includes multiple sites with fish passage concerns, is of low habitat quality, and is highly limited in spawning habitat. It was determined by WDFW that no further emphasis should be placed on this reach for salmonid habitat, and salmonid should be discouraged rather than encouraged to utilize this reach.

Coordination Need

Active implementation of license articles 416, 417, and 419 will be affected by this decision. Further discussion on the future of Article 416 and 419 which requires monitoring of fish passage and barrier conditions as well as enhancing spawning habitat through the artificial placement of gravels, will be needed. Existing efforts for the Article 417: Tailrace barrier will take this habitat suitability into account when evaluating potential for injury, delay and mortality.

Summary of Potential Changes

Statement of de-emphasis of the By-pass Reach due to lack of habitat suitability for native salmonids.

Appendix B. NRCC Decision Document #16-9

Project Name	Adjustment of flow triggers for conducting LaGrande By-pass Reach Barrier surveys
Date Proposal Summited	10/21/2016
Date of Requested Decision	10/26/2016
Requested By	Florian Leischner, Tacoma Power
Date of Decision	11/7/2016

Committee Decision and Justification

On October 26, 2016 the NRCC held a conference call with these members in attendance: Nisqually Indian Tribe (George Walter), WA State Fish and Wildlife (Peggy Miller), and NOAA (Curtis McFeron) and Tacoma Power (Florian Leischner, Leah Marquez-Glynn, Travis Nelson). In addition, WA Dept. of Ecology (Carol Serdar) participated.

The committee not only agreed that the barrier surveys are of low value, but went further than the proposal and agreed that the barrier surveys are not needed anymore. Therefore the decision is to suspend the barrier surveys indefinitely. The committee does want to retain the ability to reinstate if conditions change in the future.

This decision was drafted during the 10/26/2016 NRCC conference call meeting, and sent out to the entire committee for review on 10/27/2016. WDFW recommended a wording change, but no other comments were received by 11/4/2016. It was finalized 11/7/2016.

Proposed Decision for Consideration

Increase trigger for future barrier surveys to a combined discharge (powerhouse and spill) of 22,500 cfs. The lower emphasis placed on the reach by the committee (Decision Document #16-3) and the fact that no past changes have occurred after smaller and medium-sized spills, warrant this request.

Background

Article 416 of the license directs Tacoma to monitor fish passage conditions and implement channel modifications as needed. A plan to improve fish passage in the LaGrande bypass reach was developed in cooperation with the natural resources agencies. Tacoma Power and the agencies agreed that a phased approach would be implemented to improve fish passage in the bypass reach. The first action identified was modification of the construction dam to allow fish passage upstream of the site. Tacoma Power worked in cooperation with the Seattle District Office of the U.S. Army Corps of Engineers (USACE) to demolish the construction dam. The USACE was the contractor who conducted the actual demolition work. The second action would be to inspect the bypass reach annually to assess the presence of fish passage barriers.

If fish passage barriers were identified during these surveys, corrective actions could be developed in cooperation with the natural resources agencies and the Nisqually Tribe (Tribe). The results of the annual surveys and any proposed corrective actions to improve fish passage would then be reported to the Commission in an annual report.

In 2005, Tacoma proposed forgoing the full bypass barrier survey each spring unless spills released from LaGrande Dam the previous winter and bypass flows are greater than 2,500 cfs. Past surveys have indicated channel morphology is not modified in this reach unless substantial flows in addition to the constant 30 cfs are released. By FERC order dated January 27, 2006, this modification to the survey schedule was approved (FERC, 2006).

No changes to the barriers have been observed during by-pass surveys triggered by spills larger than 10,000 cfs. It appears much larger flows are required to adjust those barrier locations substantially and change passage conditions.

In June 2016, WDFW and Tacoma Power recommended, and the NRCC agreed (Decision Document #16-3), that the LaGrande By-pass Reach be considered habitat which is not suitable for salmonids. Under current condition and function, usage of the entire reach by salmonids should be discouraged rather than encouraged.

Federal Energy Regulatory Commission (FERC). 2006. Letter order accepting Tacoma Public Utilities' 2005 annual report on maintenance of fish passage in the Nisqually River Project's LaGrande bypass reach, dated 11/22/05 pursuant to Article 416 under P-1862. Docket # P-1862-149

Coordination Need

Annual reports will still be filed with FERC.

Summary of Potential Changes

The full by-pass reach will be surveyed for barriers statuses after 22,500 cfs flow events rather than 2,500 cfs flow events.

NRCC Decision Document 18-5

Resident Fish Passage

**Nisqually FERC license #1862 _ Nisqually River Coordinating Committee
Issue Consideration and Decision Recommendation #18-5**

Project Name	Nisqually Hydroelectric Project FERC No. 1862 Support for LIHI application
Date Proposal Summited	10/11/2018
Date of Requested Decision	10/19/2018
Requested By	Florian Leischner
Date of Decision	10/19/2018

Committee Decision and Justification

Present: WA State Dept. of Ecology (Carol Serdar), WA Department of Fish and Wildlife (Peggy Miller), Nisqually Indian Tribe (George Walter), Centralia City Light (Micah Goo, Jerry Blue), Tacoma Power (Travis Nelson, Melora Shelton, Pam Hefley, Bret Forrester, Florian Leischner).

After clarification, the Nisqually Indian Tribe and WDFW, members of the NRCC, agree that upstream and downstream resident fish populations are managed as separate populations at this time. Health of these two populations does not depend on the safe passage through the hydro project.

This decision will be forwarded to NOAA Fisheries and USFWS for 7-day review for comments/approval.

Proposed Decision for Consideration

Tacoma Power seeks Nisqually River Coordinating Committee (NRCC) concurrence with Tacoma Power's assertion that downstream fish passage for resident fish through the dams is not required.

Background

Tacoma Power's Nisqually Hydroelectric Project has been certified as a Low Impact Hydroelectric Project through the Low Impact Hydropower Institute (LIHI) since 2003. Tacoma Power recently completed the first stage of two stages in the recertification process. Our application states that resident fish would likely not survive downstream passage through dam. Natural impediments to upstream migration existed in the inundated reach prior to dam construction and resident fish can complete their life cycle without upstream passage. During the application review process, a question was raised about assumed high mortality of resident fish migrating downstream through the project. LIHI has requested agency concurrence that safe downstream fish passage through LaGrande and Alder dams is not required for the health of Nisqually basin resident fish populations.

**Nisqually FERC license #1862 _ Nisqually River Coordinating Committee
Issue Consideration and Decision Recommendation #18-5**

Coordination Need
<ul style="list-style-type: none">• Tacoma Power will provide LIHI with the NRCC response for the application.

Summary of Potential Changes
None.