Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

23 June 2025

Maryalice Fischer
Certification Program Director
Low Impact Hydropower Institute
68 Harrison Ave Ste 605 PMB
Boston, Massachusetts 02111-1929

RE: Opposition to LIHI Certification for the Wells Hydroelectric Project

Dear Ms. Fischer,

I write on behalf of the Confederated Tribes and Bands of the Yakama Nation ("Yakama Nation"), an inherently sovereign Native Nation that is federally recognized pursuant to the Treaty of 1855 ("Treaty")[1]. We formally oppose Low Impact Hydropower Certification for the Wells Dam Hydroelectric Project and urge LIHI to deny this application.

The Yakama Nation's Treaty reserves, among other rights, the right to fish at all usual and accustomed places, including the Columbia River. The Wells Hydropower Project, has had and continues to have, direct and ongoing impacts on the Yakama Nation's Treaty-reserved rights and resources, including access to salmon, Steelhead, and Lamprey, and other aquatic species vital to our culture, economy, and health.

The Wells Project fails to meet LIHI's certification criteria, particularly Criteria C, D, and F (see Attachment A). Certification would disregard both the historic and ongoing harms hydropower has caused the Yakama Nation and all Columbia River Treaty Tribes.

Disproportionate Impacts and Ongoing Harm

The Yakama Nation, like many other Tribes, has not shared equitably in the economic benefits of the Columbia River hydropower system. Instead, our people have borne disproportionate environmental and cultural losses. The decline in salmon populations have impaired Treaty-reserved resources that are essential to the Yakama way of life. Salmon are central to our cultural identity, health, and economy. Their loss is linked to increased poverty, reduced access to traditional foods, diminished health outcomes, and the erosion of cultural knowledge[2].

Wells Dam continues to inundate 46.5 miles of mainstem and tributary habitat which are essential for spawning, rearing, and migration. Despite mitigation for inundation and passage related mortality, the impacts caused by Wells Dam and its operations remain unresolved. Mitigation has not, and cannot, replace what is lost. It is worth asking whether any dam on the Columbia River can truly be considered "low impact" given the deep and ongoing harm to Tribal communities. LIHI certification should be reserved for projects that are advancing ecological and cultural restoration, not perpetuating long-standing inequalities.

ESA-Listed Species Continue to Decline

[1] *See* Treaty with the Yakamas, U.S.—Yakama Nation, June 9 1855, 12 Stat. 951.
[2] *See* Meyer Resources (1999) and U.S. Department of Interior (2024)

Upper Columbia (UCR) Spring Chinook salmon were listed as Endangered under the Endangered Species Act on March 24, 1999 (64 FR 14308); UCR Steelhead were first listed at Threatened on August 18, 1997 (62 FR 43937). The most recent 5-year status review issued by the National Marine Fisheries Service ("NMFS") concluded:

"Upper Columbia River Spring Chinook and Steelhead remain at high overall risk for extinction, with abundance levels that are roughly half of those reported in the prior 5-year review"

Despite more than two decades of implementation of the Wells Project's Anadromous Fish Agreement and Habitat Conservation Plan (HCP), populations are declining. Clearly, the measures have failed to support recovery. This is not a low-impact outcome.

Temperature Considerations and Exceedances

In 2020, the U.S. Environmental Protection Agency (EPA) issued the Columbia and Lower Snake River Temperature Total Maximum Daily Load (TMDL)[3], identifying dams and reservoirs as significant contributors to elevated river temperatures due to reduced flow and increased solar heating. The presence of impoundments increases the river's surface area, which in turn raises the thermal load on the Columbia River.

The EPA's technical documents identified that Wells Dam exceeded the water quality temperature criteria in 23% of days between June and October from 2011 to 2016. The lack of tailrace temperature data and limitations to prior modeling efforts hinder a comprehensive understanding of the impacts of Wells Dam and its operations on the thermal loading of the Columbia-Snake River System.

Regulatory Compliance Is Not Low Impact

The purpose of the Wells HCP was to obtain an incidental take permit, in accordance with Section 10 (a)(1)(B) of the Endangered Species Act of 1973 for the continued operation and relicensing of Wells Dam[4]. The HCP conditions used to demonstrate achievement of LIHI's standard represent basic regulatory compliance, not exemplary stewardship. Merely avoiding "jeopardy" under the ESA is insufficient, and meeting permit and license requirements does not justify LIHI certification. All FERC-licensed projects should meet these minimum requirements. A project seeking "low impact" status must go beyond the minimum required and actively advance species recovery and Tribal resource protection.

Moreover, the HCP's adaptive management provisions have failed to address known shortcomings in salmon and Steelhead protections, as detailed in Attachment A. LIHI should not reward the status quo when the outcomes have been so clearly inadequate for listed fish and Treaty rights. The Yakama Nation raised this issue in comments to FERC[5] as early as 2004, expressing our concern that the HCP would continue unchanged even if it fails to achieve its purpose.

Dangerous Precedent for the Columbia River

Certifying Wells Dam for low impact status would set a dangerous precedent for the Columbia Basin. Four other mid-Columbia dams downstream of Wells (Rocky Reach, Rock Island, Wanapum, and Priest Rapids) operate under very similar HCPs or settlement agreements. Granting certification to Wells Dam would open the door to further certification based on inadequate compliance-driven, not outcome-driven, standards.

The Yakama Nation has provided clear evidence in Attachment A that Wells HCP requirements are insufficient to meet ESA species recovery goals or the Tribes' goal of healthy and harvestable populations[6] [7].

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[3] *See* EPA 2020
[4] *See* NMFS 2002
[5] *See* FERC 2004
[6] *See* FERC 2004
[7] *See* CRITFC 2014

A Better Path Forward

The Yakama Nation, as partners in the development of the Six Sovereign's Columbia Basin Restoration Initiative (CBRI)[8] has articulated a clear vision and urgent, comprehensive strategy to restore salmon and Steelhead, and other native fish to healthy and abundant levels based on collaboratively-defined regional abundance goals. The regional goals were set by the Columbia Basin Partnership (CBP)[9], which brought together Tribes, states, federal agencies, conservation groups, and industry representatives to define shared goals for Salmon and Steelhead.

The CRBI emphasizes abundant and harvestable populations, support Tribal sovereignty and Treaty rights, clean and affordable energy solutions as part of a transition away from hydro-operations, and to address infrastructure and economic transition planning.

While the CRBI focuses largely on federal dams, the recommendations to achieve healthy and abundant salmon populations go far beyond what is required of Douglas County PUD under the HCPs. The goals of the CRBI are consistent with the goals and objectives of the Tribal Restoration Plan, *Wy-Kan-Ush-Mi Wa-Kish-Wit*[10].

The Wells HCP requirements may help avoid jeopardy under the Endangered Species Act and delay extinction, but they have not, and will not, achieve the broader recovery goals envisioned by the *Wy-Kan-Ush-Mi Wa-Kish-Wit*, the CRBI, or the CBP. LIHI certification should support forward looking rebuilding objectives and Tribal recommendations, not simply reward regulatory compliance.

Conclusion

Systemic shortcomings in the implementation of the Wells HCP and Aquatic Settlement Agreement undermine compliance with LIHI certification standards. The Project falls short in meeting criteria related to upstream passage and downstream fish passage, ESA-listed species, and culturally important resources. As detailed in *Attachment A: Assessment of Wells Dam Compliance with LIHI Certification Criteria,* these issues are ongoing and well documented. Wells Dam continues to harm to ESA-listed species and obstructs access to Treaty-reserved and culturally important resources. For these reasons, the Yakama Nation strongly urges LIHI to deny certification of the Wells Project.

We thank you for opening this second comment period,

Respectfully,

Gerald Lewis

Gerald Lewis, Chairman
Yakama Nation Tribal Council

Enclosure(s): (1) Attachment A – Assessment of Wells Dam Compliance with LIHI Certification Criteria
(2) Attachment B – Literature Cited
(3) Attachment C – Fish Passage Center Overshoot Spill Memorandum

[8] *See* Confederated Tribes and Bands of the Yakama Nation et al. 2023
[9] *See* MAFAC 2020
[10] *See* CRITFC (2014)

Technical Attachment A: Assessment of Wells Dam Compliance with LIHI Certification Criteria

Contents

Executive Summary:

This technical attachment provides a detailed assessment of Wells Dam's compliance with the Low Impact Hydropower Institute (LIHI) Certification Criteria (version 2.06). Drawing from empirical survival data, regulatory documents, and tribal knowledge, the analysis demonstrates that the Wells Hydroelectric Project does not meet several core LIHI standards, particularly those related to water quality protection (Standard B-2), upstream fish passage (Standard C-2), downstream fish passage (Standard D-2), endangered species protection (Standard F-3) and support for tribal resource restoration objectives.

Despite more than two decades of operation under the Anadromous Fish Agreement and Habitat Conservation Plan for the Wells Project (FERC No. 20149), long-term survival and abundance trends for ESA-listed Spring Chinook and Steelhead have failed to improve and, in some cases, continue to decline. In addition, water temperature exceedances in the Wells Project area, documented by the U.S. Environmental Protection Agency, conflict with the applicant's claims of minimal thermal impact and reflect noncompliance with Section 303(d) of the Clean Water Act.

Douglas PUD's exclusion of key information related to overshoot Steelhead, kelts, Pacific Lamprey, White Sturgeon, and impaired water quality conditions further undermines compliance with both the sprit and the letter of LIHI's ecological and cultural protection criteria. This document supplements the Yakama Nation's formal comment letter and outlines the scientific, legal, and regulatory basis for recommending denial of LIHI certification for the Wells Project.

Water Quality

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

STANDARD B-2 (*Selected by applicant)* Resource Agency and Tribal Government Recommendations: The facility complies with all water quality conditions contained in a recent Water Quality Certification or in compliance with facility-specific science-based resource agency and, if applicable, science-based or indigenous knowledge-based tribal government recommendations, that provide reasonable assurance that water quality standards will be met for all waterbodies that are directly affected by the facility. Such recommendations, whether based on a generally applicable water quality standard or one that was developed on a site-specific basis, must include consideration of all water quality components necessary to preserve healthy fish and wildlife populations, human uses, and recreation.

Water Quality Exceedances

Douglas PUD asserts that the run-of-river operation of Wells Dam results in "minimal effect on water temperatures" and relies on pre-2012 modeling (developed for the last FERC relicensing) and the absence of thermal stratification in the forebay to support that conclusion (WEST Consultants 2008). However, this reliance on outdated modeling does not reflect significant regulatory and scientific advances that have occurred since that time. In 2020, the U.S. Environmental Protection Agency (EPA) issued the Columbia and Lower Snake River Temperature Total Maximum Daily Load (TMDL; EPA 2020), which marked a major shift in how thermal effects from dams are evaluated under the Clean Water Act.

The TMDL moved beyond point-based compliance assessments and adopted a system-wide, reach-scale approach to understanding cumulative thermal loading. It concluded that dams and reservoirs, including Wells Dam, contribute to temperature exceedances through increased surface area, solar radiation absorption, and reduced flow velocities (EPA 2020). Stratification is not a prerequisite for thermal impact; dams that increase impoundment surface area, even if classified as "run-of-river", can elevate water temperatures.

FERC's pre-2012 technical analysis of water temperature impacts from Wells Dam relied on a 2008 model developed by WEST Consultants, Inc, a model which Douglas County PUD continues to rely on. However, upon review, it appears that the 2008 model's pre- and post-project conditions only varied the dynamic shading factor and failed to incorporate increased thermal loading caused by the impoundment's expanded surface area. This incomplete modeling does not meet current standards (see above) for assessing cumulative warming effects on river temperatures. Any conclusions regarding thermal loading (or absence of) based on this model are incomplete and require updated analysis.

The EPA's analysis directly contradicts Douglas PUD's claim of minimal impact and explicitly identified Wells Dam as contributing to temperature exceedances in a reach where waterbodies are listed as impaired for temperature under Section 303(d) of the Clean Water Act.

Between 2011and 2016, EPA documented exceedances of Washington's 17.5°C numeric temperature criterion in the Wells forebay on 23% of all monitoring days between June and October, critical periods for salmon migration and rearing (EPA 2020). Despite these exceedances and its location in an impaired reach, Douglas PUD has not undertaken any site-specific analysis or mitigation measures to address its thermal contributions. Continued reliance on pre-2012 modeling that fails to account for impoundment-driven thermal loading is inconsistent with current regulatory expectations and fails to meet LIHI Standard B-2, which requires science–based measures to ensure water quality protection in all affected water bodies.

Recommendation:
Douglas PUD does not meet the requirements of LIHI Water Quality Standard B-2. Temperature exceedances documented in the Wells forebay by EPA, occurring on 23% of monitored days during critical summer and fall migration periods, demonstrate that the facility does not consistently meet water quality standards in water bodies directly affected by Wells Dam. Additionally, the water temperature modeling relied upon by Douglas PUD and FERC is outdated and incomplete. It does not account for thermal loading due to increased surface area from the impoundment, a key mechanism identified in EPA's Columbia River Temperature TMDL.

Given these exceedances and modeling limitations, Douglas PUD should update its water temperature assessments using current data, best available modeling approaches, and account for changes in thermal regime attributed to the impoundment. This reassessment must be guided by science-based recommendations from EPA and other regulatory agencies, as well as tribal governments and site specific expertise. Without this reassessment and demonstrated progress toward compliance, LIHI certification criteria are not met under Standard B-2.

Upstream Passage

LIHI Goal: The facility allows for the safe, timely and effective upstream passage of migratory fish to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

LIHI Introduction to Standards: The applicant must demonstrate that the upstream passage provision are sufficient to support healthy populations of migratory species through compliance with one of the following standards (C-1 through C-4)

STANDARD C-2 *(selected by applicant)* Resource Agency and Tribal Government Recommendations: The facility is in compliance with science-based resource agency and, if applicable, science-based or indigenous knowledge-based tribal government recommendations, for the applicable Zone of Effect and which may include provisions for appropriate monitoring and effectiveness determinations.

Adult Salmon and Steelhead

Adult HCP Survival Standard - Inadequate Measurement and Interpretation: Douglas County PUD is required to achieve a combined adult and juvenile survival standard of 91%, based on a 93% juvenile survival multiplied by 98% adult survival. This means that "*91% of each Plan Species (adult and juvenile) must survive Project effects when migrating through the Projects' reservoir, forebay, dam, and tailrace, including direct, indirect, and delayed mortality whenever it may occur and can be measured (as it relates to the Project), using available mark-recapture technology*".

At the time the Wells HCP was signed, it was acknowledged that the technology to directly measure adult survival through the Project area did not yet exist. As a workaround Douglas PUD and its HCP partners began using PIT-tag-based conversion rates from Rocky Reach to Wells Dam as a surrogate metric to infer adult survival. For some projects, such as Rocky Reach Dam (downstream) a conversion rate would be inclusive of the entire project area, but for Wells Dam, it is not. Nonetheless, the conversion rates cannot be considered a scientifically valid substitute for measuring adult survival through the entire Wells Project area.

The adult survival standard under the HCP is meant to apply across the *entire* Project area, from the tailrace, through the dam, forebay, and 46.5 miles of reservoir habitat. This includes 29.5 miles of the Columbia River, 15.5 miles of the Okanogan River, and 1.5 miles of the Methow River. The Rocky Reach-to-Wells conversion rate, presented in Table 4 of Douglas County PUD's LIHI application, only includes a small portion of the Wells Project, namely the tailrace and part of the fishway. The conversion rate metric is primarily influenced by conditions in the Rocky Reach Project's forebay and reservoir, not the Wells Project.

Furthermore, the conversion rate data includes only fish originating from upstream of Wells Dam. This is problematic, especially for Steelhead, which are known to overshoot Wells Dam at high rates and later fall back in an attempt to return to their natal tributaries (see discussion of Overshoot Steelhead under Downstream Passage Criteria, below). Both voluntary fall backs (from overshooting) and involuntary fall backs can result in substantial mortality. Mortality rates ranging from 14% to 57% have been observed through turbine units and up to 8% through spillways (NMFS 2002). Such mortality events would be included in the definition of adult project survival under the HCP but are not captured in the conversion rate metric reported by Douglas County PUD for Wells Dam.

By relying on this limited conversion metric, Douglas County PUD fails to meet the full intent of the HCP's adult survival requirement and LIHI's Upstream Passage Standard. The conversion rate excludes potential impacts from the Wells forebay and reservoir, and does not account for indirect and delayed mortality (DCPUD and Anchor QEA 2025), which may be particularly high for Steelhead that overshoot their natal tributaries in search of thermal refuge (e.g. from the Entiat, Wenatchee, Yakima, and Snake Rivers).

Recommendations: Under LIHI's Standard C-2 certified facilities must be in compliance with *science-based resource agency and indigenous knowledge-based tribal government* recommendations. This includes provisions for appropriate monitoring and effectiveness determinations across the entire Zone of Effect.

Douglas PUD's reliance on a limited surrogate metric falls short of this standard. The Yakama Nation recommends that adult survival be directly studied across the full Wells Project Area using representative, randomly selected samples of adult migrants that interact with the Project. Surrogate conversion metrics based only on upstream-origin fish are insufficient. They do not reflect actual survival through the full Project area, nor do they capture indirect or delayed mortality. These deficiencies represent a failure to meet both the technical intent of the HCP's adult survival standard (DCPUD and Anchor QEA 2025), and the recommendations required under LIHI's C-2 Standard.

Pacific Lamprey Upstream Passage

Upstream passage for adult Pacific Lamprey at Wells Dam remains ineffective and inconsistent with best available science and Tribal recommendations. A primary impediment is associated with the fishway entrance and related structures, which continue to limit successful entry of Lamprey into the adult ladder and subsequent passage (DCPUD 2024). Although some adult Lamprey successfully enter and

ascend the Wells fish ladder, entrance and lower-fishway passage efficiency appears to be very low, ranging from 14% to 33% across multiple studies at Wells Dam (Nass et al. 2005; LGL and DCPUD 2008; Robichaud et al. 2009; Johnson et al. 2011; Robichaud and Kyger 2014; Robichaud and Kyger 2018; Robichaud et al. 2024). Wells Dam ladder counts remain anomalously low relative to downstream dams and the broader regional trend of adult returns.

Douglas PUD has conducted many studies over the last 20 years, all of which have highlighted chronic problems (Nass et al. 2005; LGL and DCPUD 2008; Robichaud et al. 2009; Johnson et al. 2011; Robichaud and Kyger 2014; Robichaud and Kyger 2018; Robichaud et al. 2024). The current 2025 Lamprey Approach and Passage Study Plan acknowledges these legacy issues and proposes further evaluation of changes in fishway entrance head differentials and the effectiveness of the fish counting window at detecting Lamprey. However, the plan falls short of committing to implement known effective measures, particularly those related to structural changes and/or replacing unsuitable surfaces.

The 2025 Tribal Pacific Lamprey Restoration Plan (TPLRP), developed by the four Columbia River treaty tribes, sets forth clear and science-based guidance for improving Lamprey passage at mainstem dams (CRITFC 2025a, 2025b). Among these are:

- Achieve regional adult Lamprey passage standards of 95% or higher for mainstem dams including those operated by the Public Utility Districts.
- Obtain accurate annual passage estimates for adult Lamprey at all mainstem dams including Wells Dam. This will allow for precise reach-to-reach conversion estimates based on reliable enumeration data.
- Install wetted walls, and Lamprey passage systems at structural bottlenecks, with a specific call for near-term action at PUD dams, including Wells Dam.
- Eliminate sharp edges and gratings and gaps greater than ¾" in passage routes, including trash racks, crowders, and transitional structures that could impede and injure Lamprey (this has not been completed in the Wells Dam fishway).

These recommendations are not new and align with agency and tribal consensus that Lamprey require different passage designs than salmonids. Yet Wells Dam continues to rely on salmon-centric passage systems that do not meet the physical and behavioral needs of Pacific Lamprey.

The proposed 2025 study by Douglas PUD reiterates known limitations but lacks the urgency and scope of implementation needed to resolve these issues. For example, it does not commit to retrofitting fishway entrance structures to meet the ¾ inch gap standard, or installing continuous wetted ramps or vertical wall plating to assist Lamprey climbing. Without these measures, passage efficiency will remain below acceptable thresholds and inconsistent with LIHI upstream passage criteria and Standard C-2 Agency and Tribal Recommendations.

Recommendation:

The Yakama Nation urges LIHI to recognize these deficiencies and consider the lack of effective Lamprey passage at Wells Dam as a failure to meet minimum standards for upstream passage. Until Douglas County PUD commits to implementing structural retrofits consistent with TPLRP and tribal guidance, certification should be denied.

White Sturgeon Upstream Passage

Douglas County PUD does not sufficiently address potamodromous White Sturgeon upstream passage in its application for LIHI certification, incorrectly stating that there is no documentation of White Sturgeon successfully passing upstream through fishways. This is false. Examples of Sturgeon using fishways and fish passage structures include: Bonneville Dam which passed 22 to 133 White Sturgeon annually between 1998 and 2012, and farther upstream at the Dalles Dam where more than 1,000 White Sturgeon have ascended two fishways (Parsley et al. 2007; Jager et al. 2016). Additionally, White Sturgeon are known to use and ascend the fishways at Priest Rapids Dam (Mike Clement, Grant County PUD, pers. comm. April 30, 2025).

It may be true that White Sturgeon have never been documented using the Wells Dam Fishway, but it is unknown if Sturgeon approach the Wells Dam Fish Ladders with intent to pass, since this has never been studied.

The examples listed above do not represent unimpeded fish passage, but there is a growing body of research and action to provide Sturgeon passage. Researchers at the USGS Columbia River Research Laboratory, along with the U.S. Army Corps of Engineers have studied Sturgeon Passage at the Dalles Dam comparing the two fishways (USGS 2008; Parsley et al. 2007). Parlsey et al. (2007) found that the north fish ladder did not pass any fish during the study period; however, six fish entered and occupied that fish ladder for variable amounts of time ranging from one minute to six months. However, in the east fish ladder, seven upstream passage events made by six individuals were detected (Parsley et al. 2007). This study found that the width of the ladder and orifices in the weirs are likely culprits for the difference in passage efficiency. In this study, Sturgeon were also detected passing the dam structure in the downstream direction, by way of the spillway, powerhouse, and sluiceway. Locks and lifts have worked to pass Sturgeon. Bonneville Dam used fish lifts to pass approximately 1500 White Sturgeon (Warren and Beckman 1993). On the Atlantic Coast a lift at the Holyoke Dam on the Connecticut River is used to pass Sturgeon (Jager et al. 2016). Similarly, nature-like fishways and nature-like bypass reaches are a promising approach that is used to pass Lake Sturgeon in several locations. Jager et al. (2016) provides a comprehensive summary of Sturgeon passage including fishways, locks and lifts, and guidance systems in many locations throughout the United States.

Additionally, swimming performance data for White Sturgeon can be used to help infer passage suitability, already exists and includes: 1) Sturgeon prefer depths of more than 1.0 m, due to their large size (Anderson et al. 2007; Webber et al. 2007); 2) young of the year and juvenile White Sturgeon critical swimming velocities (Ucrit) ranged 25.22-69.2 cm/s for 4.5-38 cm FL White Sturgeon (Verhille et al. 2014); and adult White Sturgeon critical station-holding speed (Ssch) is estimated at 115.0±3.5 cm/s (Nguyen et al. 2016).

The Wells Settlement Agreement Aquatic Resource Management Plan for White Sturgeon includes a provision, Objective 5, which calls for an evaluation of whether there is biological merit to providing safe and efficient adult upstream passage at Wells Dam. However, this evaluation is explicitly contingent upon achieving consensus among all mid-Columbia dam operators (Douglas, Chelan, and Grant County PUDs) to implement upstream passage measures at Rocky Reach, Rock Island, Wanapum, and Priest Rapids Dams.

As written, this approach effectively creates a "mutual veto" mechanism in which no action will be taken at Wells Dam unless all other operators agree to act in unison. Consequently, upstream passage for

Sturgeon at Wells Dam is unlikely to occur, regardless of local biological, ecological, or cultural justifications.

This management approach is deeply problematic given the well-documented role of large dams in the fragmentation of Sturgeon populations in the Columbia River and across North America. According to Jager et al. (2016), dams disrupt genetic connectivity, truncate migratory corridors, and often result in isolated subpopulations with reduced viability, especially when downstream passage comes with high mortality and upstream passage is entirely blocked, as it is at Wells Dam. In the Columbia River Basin, White Sturgeon populations have become increasingly demographically and genetically fragmented due to barriers created by hydroelectric dams.

Without upstream connectivity, population segments are denied access to a full range of habitats, which may compromise population resilience, genetic diversity and long term recovery potential. Moreover, the conditional language in the Settlement Agreement runs counter to the intent of the Low Impact Hydropower Institutes goals, which emphasizes site-specific restoration, ecological connectivity and responsiveness to Tribal and agency recommendations. By tying passage at Wells to decisions made by other operators, Douglas County PUD avoids meaningful, independent progress on a recognized ecological barrier, continuing to impact species of Tribal and cultural significance.

Recommendation:

Given these biological concerns and governance limitations, the Wells Project cannot be considered "low impact" with respect to White Sturgeon. The Yakama Nation recommends an evaluation of upstream passage alternatives independent of regional consensus, and recognition that the status quo perpetuates fragmentation and violates core principles of ecosystem connectivity and restoration.

Downstream Fish Passage

LIHI Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the area affected by the facility.

Introduction to Standards: The applicant shall list all fish species (for example, riverine, anadromous, catadromous, and potamodromous) that occur now or have occurred historically in the area affected by the Facility. To pass the downstream fish passage and protection criterion for LIHI certification, the applicant shall demonstrate compliance with at least one of the following standards (STANDARD D-1 through STANDARD D-4)

STANDARD D-2 *(selected by applicant):* Agency Recommendation or Tribal Government Recommendations: The Facility is in compliance with a science-based resource agency and, if applicable, science-based or indigenous knowledge-based tribal government recommendations for downstream fish passage and/or fish protection recommendations, which may include provision for ongoing monitoring and effectiveness determinations that have been issued for the Facility.

Adult Downstream Passage

Adult Pre-Spawn Steelhead (Overshoot Steelhead)

Douglas County PUD's LIHI application fails to address downstream passage of overshoot Steelhead from downriver populations.

A substantial number of adult Steelhead from ESA-listed downstream populations, particularly the Snake and Yakima Rivers, overshoot their natal tributaries and migrate upstream into the Upper Columbia, often passing upstream of Wells Dam. This 'overshoot behavior' has been documented for nearly two decades (Richens and Skalski 2018), but only recently has the full scope and magnitude been quantified. Murdoch et al. (2022) estimated that 426 to 3,048 wild overshoot Steelhead enter the Upper Columbia every year, with Wells Dam being the second most common final detection point (after Priest Rapids Dam). Figure 1 illustrates the scale of overshoot behavior relative to dam counts and local population estimates.

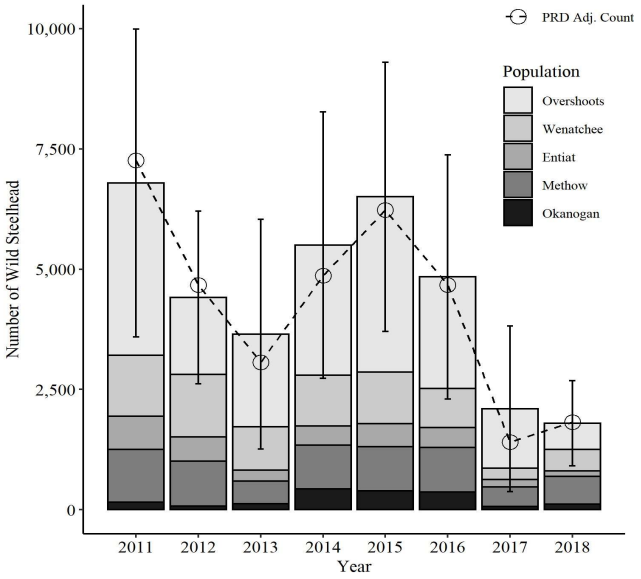

Figure 1: Comparison between adjusted dam counts at Priest Rapids Dam (circles) and summed estimates of the four Upper Columbia Steelheads populations plus estimates of Steelheads overshoots at Priest Rapids Dam. Whiskers represent 95% confidence intervals of those sums (Murdoch et al. 2022).

Wells Dam presents a substantial hazard to these overshoot fish because no downstream surface passage route is provided to support their return migration. Overshoot Steelhead attempting to return downstream do so in the fall or early spring, periods (Figure 2) when juvenile spill operations are no longer in effect and turbine passage is the only downstream route available.

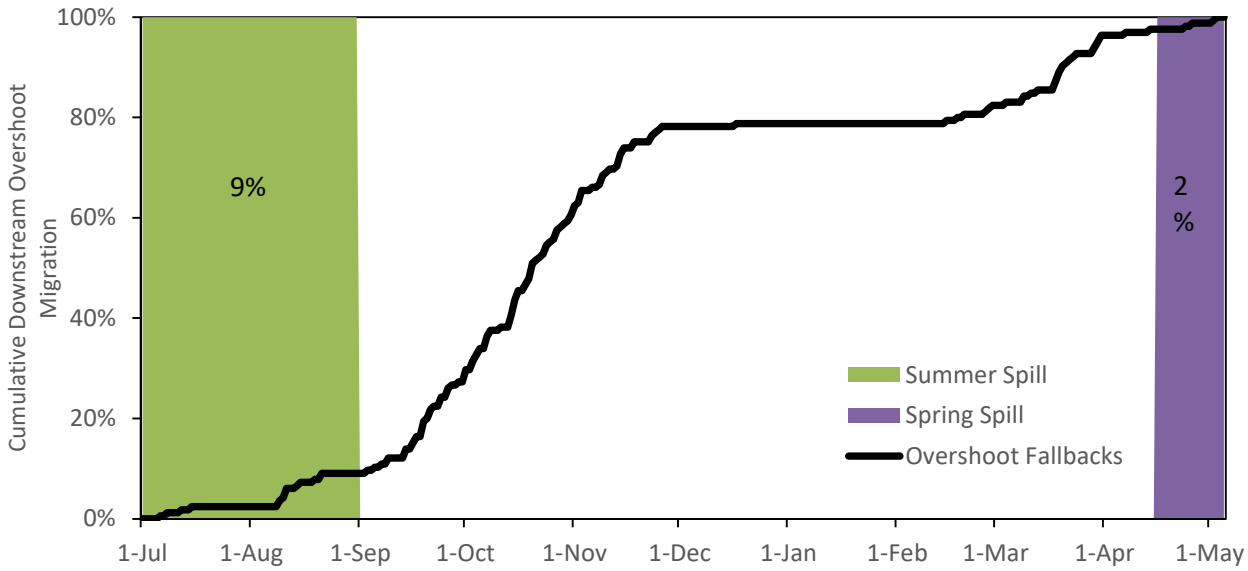

Figure 2: Downstream migration of radio-tagged overshoot Steelhead (n=165) (Fuchs et al. 2021) and the percentage that migrated during juvenile spill periods , 2015-2016 (note: The Priest Rapids Project provides steelhead fallback spill through mid-November).

Steelhead from the Yakima River prove a clear example of the risks. Overshoot individuals from this Major Population Group (MPG) experience fallback failures ranging from 1.9% to 16.4% (average 7.3%) of the total MPG in any given year (Table 1). These losses undermine ESA recovery objectives. PIT tag data show that overshoot Steelhead are rarely detected entering upper Columbia tributaries to spawn, therefore those that fail to return to their natal tributary are presumed to die.

Table 1: Total Yakima River overshoots into the Upper Columbia, fall back success rate and impact (%) of unsuccessful overshoots to the Yakima MPG (Murdoch 2023a).

Year	Wild Steelhead (7/1-6/30)	Overshoot Fallback	Fallback Success	Estimated Total Overshoot	Unsuccessful overshoots	% of Yakima MPG
2010	6065	914	0.626	1460	546	**8.3%**
2011	6188	403	0.729	553	150	**2.4%**
2012	4522	213	0.464	459	246	**5.2%**
2013	4085	346	0.600	577	231	**5.3%**
2014	5183	548	0.743	738	190	**3.5%**
2015	3938	434	0.588	738	304	**7.2%**
2016	1604	140	0.308	455	315	**16.4%**
2017	1369	127	0.667	190	63	**4.4%**
2018	1113	153	0.550	278	125	**10.1%**

2019	1650	245	0.430	570	325	**16.4%**
2020	1507	196	0.650	302	106	**6.5%**
2021	544	65	0.860	76	11	**1.9%**
Mean	**3147**	**315**	**0.601**	**533**	**218**	**7.3%**

Radio-telemetry studies confirm that most overshoot fish attempt to fallback between September and late November (Fuchs et al. 2021; Figure 2). While the Priest Rapids Project (Priest Rapids and Wanapum Dams) provides 24/7 fallback spill through mid-November, enabling high rates of return, Wells Dam does not. At Wells, fallback success drops steeply. Fewer than 25% of overshoot Steelhead that migrate above Wells successfully return to their natal tributaries (Murdoch et al. 2022; Figure 3).

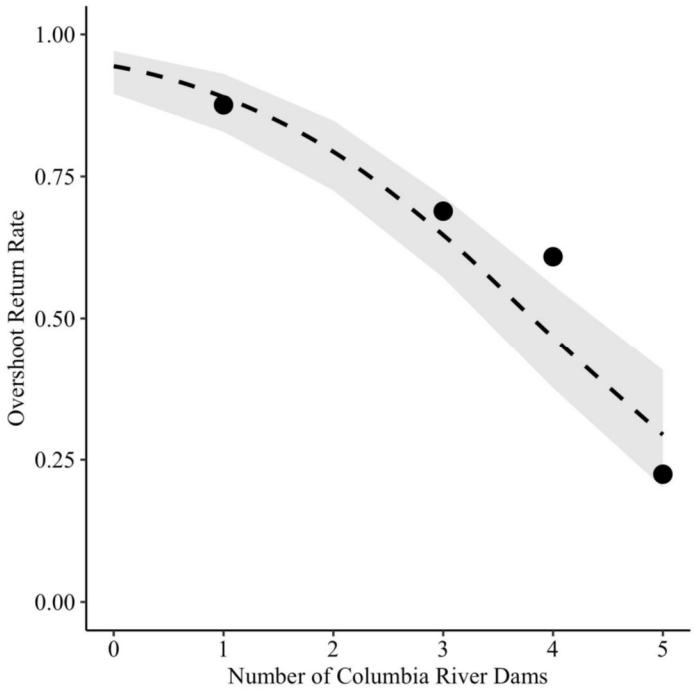

Figure 3: Points depict the percentage of overshoot Steelhead into the Upper Columbia which successfully returned to natal tributaries; Dams 1 & 2 = Priest Rapids Project, 3= Rock Island Dam, 4=Rocky Reach Dam, and 5=Wells Dam (Murdoch et al. 2022).

To further isolate the effects of Wells Dam, WDFW evaluated the fate of overshooting Entiat River Steelhead, a natal stream that enters the Columbia River below Wells Dam. From 2010-2022 51% of PIT tagged wild Entiat River adult Steelhead migrated upstream of Wells Dam, but only 65% of those successfully returned (Table 2), a 35% loss attributable to the lack of a viable downstream surface passage route. These data were presented to Douglas County PUD and the HCP-Coordinating Committee on August 11, 2023 (Murdoch 2023a). These results are consistent with observed mortality rates for adult Steelhead that pass through turbines. For instance, at McNary Dam, Ham et al. (2022) documented a 57% survival rate for powerhouse-passed adult Steelhead, compared to 91% for those passing via spill, clearly demonstrating elevated mortality associated with turbine routes.

Table 2: Number and proportion of wild PIT tagged Entiat River detected at Wells Dam (overshoots) with subsequent detection in the Entiat River (successful overshoots) (Murdoch 2023a).

Run Year	# at Rocky Reach Dam	# at Wells Dam	Overshoot Proportion	Number Detected in Entiat River	Proportion Successful
2010	54	15	0.28	8	0.53
2011	46	18	0.39	12	0.67
2012	21	9	0.43	5	0.56
2013	32	15	0.47	14	0.93
2014	52	24	0.46	14	0.58
2015	44	25	0.57	17	0.68
2016	27	16	0.59	11	0.69
2017	5	3	0.60	2	0.67
2018	6	4	0.67	2	0.50
2019	13	7	0.54	5	0.71
2020	9	8	0.89	7	0.88
2021	2	1	0.50	1	1.0
2022	4	1	0.25	0	0.0
Pooled	315	146	0.46	98	0.67
Mean			0.51		0.65

Research consistently supports the importance of surface passage for adult downstream migrants (Khan et al. 2013; Wertheimer 2007; Wertheimer and Evans 2005; Ham et al. 2015; 2022). Providing surface spill for fallback, particularly between August and November, is essential for improving survival of ESA-listed overshoot Steelhead, many of which must navigate many miles and multiple dams to return to natal streams.

The Yakama Nation has been clear in our recommendation that Douglas County PUD operate at least one surface bypass bay from the end of juvenile spill through November, each year. A 20-year analysis of Columbia River flows at Wells Dam indicates that this action would require only 2.5%-3.1% of total river flow (Table 3; Attachment C), yet would meaningfully improve adult survival and return rates for overshoot Steelhead from multiple threatened populations.

Table 3: Analysis of mean Columbia River flow at Wells Dam during the proposed overshoot spill period relative to the recommended overshoot spill. Data provided by the Fish Passage Center (Attachment C).

Year	First Full Day Without Any Summer Spill	Recommended # of days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Recommended Average 2.2 kcfs Overshoot Spill Proportion
2015	August 20	103	82.17	0.0268
2016	August 20	103	84.24	0.0261
2017	August 20	103	72.75	0.0302
2018	August 20	103	77.29	0.0285
2019	August 20	103	72.44	0.0304
2020	August 20	103	86.15	0.0255
2021	August 20	103	74.00	0.0297
2022	August 20	103	86.39	0.0255
2023	August 20	103	70.68	0.0311
2024	August 20	103	72.28	0.0304

This topic was first brought forward in 2020, since then the Yakama Nation and WDFW have both formally raised this issue and requested adaptive management within the Wells HCP Coordinating Committee and Policy Committees where it has been an active topic of discussion, with little progress.

It is also important to note that Douglas County PUD has no ESA take coverage for Mid-Columbia or Snake River DPS Steelhead, and has not reinitiated consultation with NMFS, despite acknowledging their passage over Wells Dam. In fact, Douglas County PUD denies overshoot Steelhead are a Plan Species under the HCP, a point the Yakama Nation disputes.

Recommendation:

Wells Dam does not meet the requirements of Standard D-2: Downstream Fish Passage and Protection. The Project lacks safe, timely and effective downstream passage for adult Steelhead from ESA-listed populations that overshoot their natal tributaries and migrate above Wells Dam. These fish require a surface passage route outside of juvenile spill periods, yet the Project offers none relying instead on turbine passage, a route associated with elevated mortality. The failure to provide adequate downstream passage for adult Steelhead, despite long-standing awareness of the issue, violates both the ESA and the intent of LIHI's Downstream Fish Passage Standard D-2.

Post-Spawn Steelhead Kelts

Douglas County PUD's LIHI application fails to address downstream passage and survival of Steelhead kelts. This omission is inconsistent with the LIHI Standard D-2 which requires certified projects to follow science-based resource agency and indigenous knowledge-based tribal government recommendations, including provisions for appropriate monitoring and effectiveness evaluations.

Steelhead kelts represent a critical but frequently overlooked life stage in the Upper Columbia River. Research shows that a majority of Upper Columbia Steelhead attempt to return to the ocean after spawning, a process known as kelting. Fuchs et al. (2021) found that 56% of Steelhead spawners in the Upper Columbia attempted downstream migration as kelts, with the proportion varying by tributary, fish origin, and gender. Female Steelhead exhibit particularly high kelting rates, up to 75%, according to Fuchs and Caudill (2018).

Repeat spawning contributes substantially to genetic diversity, lifetime reproductive success, and population resilience, factors that are especially critical for ESA-listed Steelhead populations. Despite this, the adult survival rate, as it is currently estimated under the Wells HCP does not account for survival of any adult Salmon or Steelhead migrating downstream, whether these are pre-spawn overshoots, or downstream migrating kelts. Downstream survival of overshoots or kelts has never been measured and is not included in the estimate of adult Project mortality. However downstream survival of kelts (or overshoots) can indeed be measured with acoustic tag technology and has been measured at Snake and Columbia River federal hydro-electric projects (Colotelo et al. 2014, Wertheimer and Evans 2005; Wertheimer 2007; Ham et al. 2015).

Wells HCP section 4.4.5 provides that by the end of Phase I the District shall identify adult fall-back rates at the dam and further if 'adult fallback and Steelhead kelt loss are determined to make a significant difference in meeting the relevant survival standard, then the Coordinating Committee shall determine the most cost-effective method to protect adult fall backs and Steelhead kelts at the Dam and the District shall immediately implement agreed upon measures'.

Based on radio telemetry studies in 1999-2000 (English et al. 2001) and 2001-2002 (English et al. 2003) the HCP CC agreed in early 2005 that the conditions of 4.4.5 were met. This agreement occurred prior to the Yakama Nation signing the HCP, and does not reflect on the Yakama Nation's position regarding fulfillment of 4.4.5 conditions. We have reviewed the studies that led to the approval of this provision (English et al 2001; English et al 2002) where very high rates of kelting were reported. The minimum kelting rates estimated for tributary stocks in 2001-2002 ranged from 52% to 100% and were generally higher and more reliable than those estimated in 1999-2000 (13% to 75%; English et al. 2003). Yet despite estimating high kelting rates, survival from tributary to downstream of Priest Rapids Dam was only 18% (English et al 2003). The study did not report any Project specific kelt survival rates. But given the high rate of kelting combined with the low reported survival through the mid-Columbia PUD projects. It is very possible that kelt mortality attributed to the Wells Project is high enough to make a significant difference in meeting the HCP's adult survival standard.

Because kelt survival is high from tributary spawning to Columbia River entry (Fuchs et al 2021; English et al 2003), and because most kelts are female (74% Fuchs et al 2021). Improvements to kelt survival represent great potential for repeat spawners to contribute to abundance and productivity in future brood years.

Importantly, the National Marine Fisheries Service's Biological Opinion on the Wells Hydroelectric Project, issued August 12, 2003, clearly states that:

> *NOAA Fisheries expects that compared to current survival rates, implementing HCP measures at the Project will substantially improve kelt survival through the Project in future years.*

If kelt survival has indeed improved as a result of HCP measures at the Wells Project, we would expect an increase in the proportion of repeat spawners in the Upper Columbia. Trends of repeat spawning based on fish scale pattern analysis of wild Steelhead sampled at Priest Rapids Dam indicate the

opposite, a downward trend in iteroparity during the 23 years of HCP implementation relative to first time spawners (Figure 4).

Figure 4: Annual rates of iteroparity in wild Upper Columbia Steelhead sampled at Priest Rapids Dam during HCP implementation, 2000-2021 (data provided by WDFW).

Although the data we present on declining rates of iteroparity encompass the entire Upper Columbia region, including Wells, Rocky Reach, Rock Island, Wanapum and Priest Rapids dams, this broader geographic scope should not dilute the accountability of individual projects. These facilities operate under very similar HCP and Settlement Agreements, affect the same ESA-listed Steelhead populations, and impose cumulative impacts on downstream-migrating adult fish. The lack of measurable improvement in kelt survival and iteroparity trends across two decades of HCP implementation underscore a systemic failure that extends beyond a single project. Certifying the Wells Project as low impact under these conditions would not only ignore those biological realities but would also set a damaging precedent for other PUD projects that have similarly neglected adult downstream passage (for both overshooting steelhead and kelts). Such a precedent would signal that failure to monitor or improve conditions for adult Steelhead, even when feasible, remains compatible with a "low impact" designation. The Yakama Nation urges LIHI to reject that interpretation and instead uphold its criteria by requiring project-specific accountability for downstream adult Steelhead survival.

Importance of kelt survival is recognized in Tribal Restoration Frameworks:

The survival of post-spawn Steelhead kelts is not only a biological concern but a critical component of tribal restoration strategies as outlined in *Wy-Kan-Ush-Mi Wa-Kish-Wit* document (CRITFC 2014). This plan explicitly recognized the importance of iteroparity in Steelhead.

Downstream adult fish passage at Columbia River hydroelectric dams pose serious risk to out-migrating kelts. The concerns are particularly acute in the Upper Columbia where Steelhead abundance is already low and kelts must migrate over 9 dams (including Wells Dam) to return to the ocean.

In response to this concern, the Yakama Nation operates a Kelt Reconditioning program in the Methow River Basin (funded by the Bonneville Power Administration) for the purpose of increasing abundance and iteroparity. The reconditioned kelts are released back to the river prior to repeat spawning, thus

avoiding downstream migration though Wells Dam and the hydrosystem altogether. These efforts directly support the goals of *Wy-Kan-Ush-Mi Wa- Kish-Wit* (CRITFC 2014) and demonstrate the value of recognizing and managing for this life stage.

Recommendations:

To meet LIHI's Standard D-2 (Downstream Passage – Resource Agency and Tribal Recommendation), Douglas PUD should assess and address the impacts of the Wells Project on downstream passage and survival of Steelhead kelts. Project operations should be adaptively managed to reduce mortality, and project-related impacts should be mitigated. Wells Dam cannot be considered compliant with Standard D-2 until monitoring and management actions address the unmeasured impacts on this biologically important life stage.

Juvenile Yearling Salmon and Steelhead Downstream Passage:

Douglas County PUD states that they meet Standard D-2 for juvenile salmonid downstream passage based on the implementation of the Wells HCP Agreement. However, the Wells HCP fails to protect ESA-listed wild Spring Chinook salmon and Steelhead, and other provisions have not yet been adequately addressed or measured, such as subyearling summer Chinook survival (see below)

Limitations in Representativeness of Survival Study Fish

Douglas County PUD conducted yearling Chinook survival studies in 1998, 2010, and 2020. The 1998 pilot survival study at Wells Dam provided early insights into differences between study fish based on their collection source. It compared survival of Wells Fish Hatchery yearling summer Chinook, taken directly from the hatchery, with actively migrating run-of-the river hatchery-origin Spring Chinook captured at a smolt trap on the Methow River (Bickford et al. 1999). Wells Fish Hatchery yearling summer Chinook were substantially larger (135 mm vs 116 mm), heavier (30.6 g vs 21.5 g), exhibited lower ATPase levels, and showed no detectable BKD. The higher ATPase levels observed in the actively migrating fish indicate more advanced smoltification, meaning those fish were actively migrating and physiologically preparing for seawater entry. The actively migrating run-of-river hatchery fish were more representative of the run at large but exhibited significantly lower survival to Rocky Reach Dam (0.704 vs 0.957). In addition to smaller size which contributes to higher mortality rates (see continued discussion below), this later stage of smoltification can result in greater vulnerability to hydrosystem injury (e.g. descaling) and latent mortality. Despite this, Douglas PUD has based all subsequent yearling Chinook survival estimates solely on Wells Fish Hatchery yearling summer Chinook reared and released under optimal conditions for study purposes. This biases survival estimates upwards and fails to represent survival rates of the broader population migrating through the Wells Project, which is the intended purpose of the of the HCP survival standard.

The 2010 and 2020 survival verification studies continued this trend, using only Wells Hatchery summer Chinook reared specifically for survival estimation. These fish achieved high survival estimates, 0.922 and 0.935, respectively (Bickford et al., 2011, Gingerich et al., 2020), but were larger (mean lengths: 130-136 mm) and released later than naturally produced Spring Chinook. Wild Spring Chinook smolts migrate earlier in the season and at significantly smaller sizes (mean fork length of 102.7 mm and 98.9 mm for the Methow and Twisp smolt traps, respectively; Snow et al., 2022) when lack of spill and bypass operation results in 100% turbine passage.

This discrepancy violates a core assumption of paired-release survival studies: that test fish are representative of the population of interest (Peven et al. 2005). Because the test fish from Wells Fish Hatchery do not reflect the biological characteristics or migration behavior of the run-at-large, nor do

they represent the size or migration timing of ESA-listed wild Spring Chinook, the resulting survival estimates generated by Douglas County PUD are not valid indicators of project-wide effects.

Migration Timing and Exposure Risk for Wild Spring Chinook

Unlike hatchery fish, wild Spring Chinook smolts lack a fixed release date and begin downstream migration in late winter and early Spring, over a broad timeframe. Wild smolt run timing from the Wenatchee and Entiat Rivers indicates that a significant portion of wild Spring Chinook smolts (up to 60%) are migrating before the start of spill in the Upper Columbia River (Figure 5). Unfortunately monitoring infrastructure to provide similar information for Methow Spring Chinook migrating into the Wells Project Area does not exist, however, we have no reason to believe the migration timing of Methow Spring Chinook would be any different from than that of Wenatchee or Entiat River Spring Chinook.

Douglas PUD does not currently monitor wild fish run timing into or through the Wells Project. Present day migration timing estimates are generated indirectly based on sampling downstream at Rocky Reach Dam and the Program RealTime forecaster (DCPUD 2025). These methods only provide a retrospective approximation, of primarily hatchery fish run-timing and have limited utility for real-time protective measures for wild migrants.

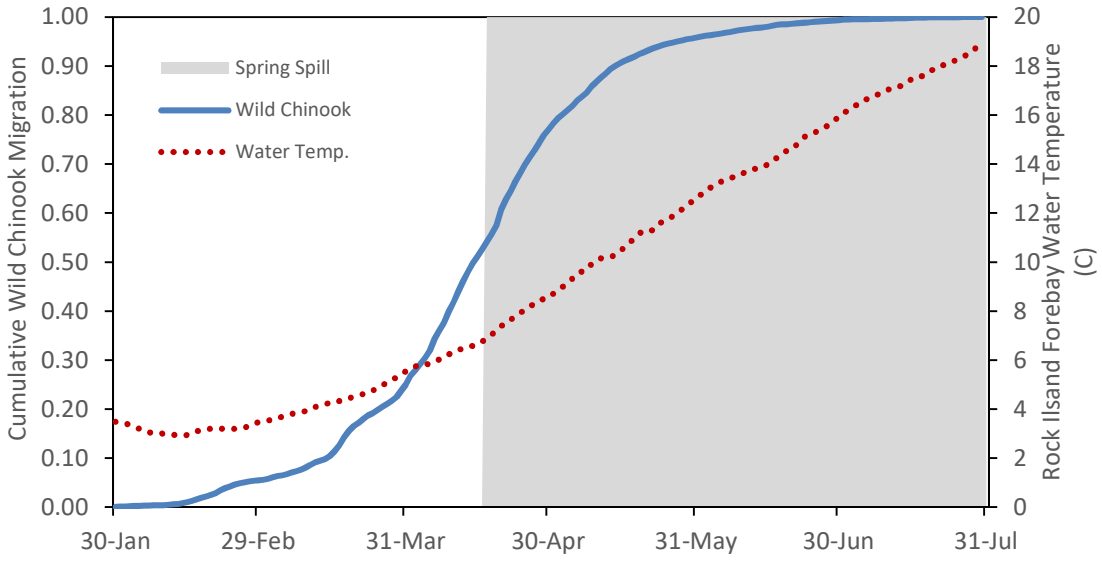

Figure 5: Mean migration timing of Wenatchee wild Spring Chinook at the lower Wenatchee smolt trap and mean Columbia River water temperatures, 2013-2022. Gray shaded area denotes Spring spill at Rock Island Dam (ISAB 2018).

While we don't have empirical data from Wells Dam due to lack of monitoring infrastructure and PIT tag detection. We do have some information from the Rocky Reach surface collector and bypass. In 2024, Chelan PUD implemented an early bypass evaluation at Rocky Reach Dam starting March 1, to fulfill their HCPs run timing evaluation requirement (Douglas PUD has a similar yet currently unfulfilled requirement). From March 1 to July 1, 931 wild Spring Chinook PIT tags were detected at Rocky Reach Dam: 39% from the Entiat and 61% from the Methow population. Fish migrating from the Methow River already passed through Wells Dam before detection further downstream at Rocky Reach Dam. Given the 148-161 km distance from upstream tagging sites, cold temperatures, coupled with low March river flows, fish travel time was likely lengthy; even so, 30% of all PIT tagged wild Spring Chinook from the

Methow River still passed Rocky Reach prior to April 15th (Figure 6). This indicates that a significant portion of the wild Spring Chinook population also migrate past Wells Dam in advance of spill and bypass operations.

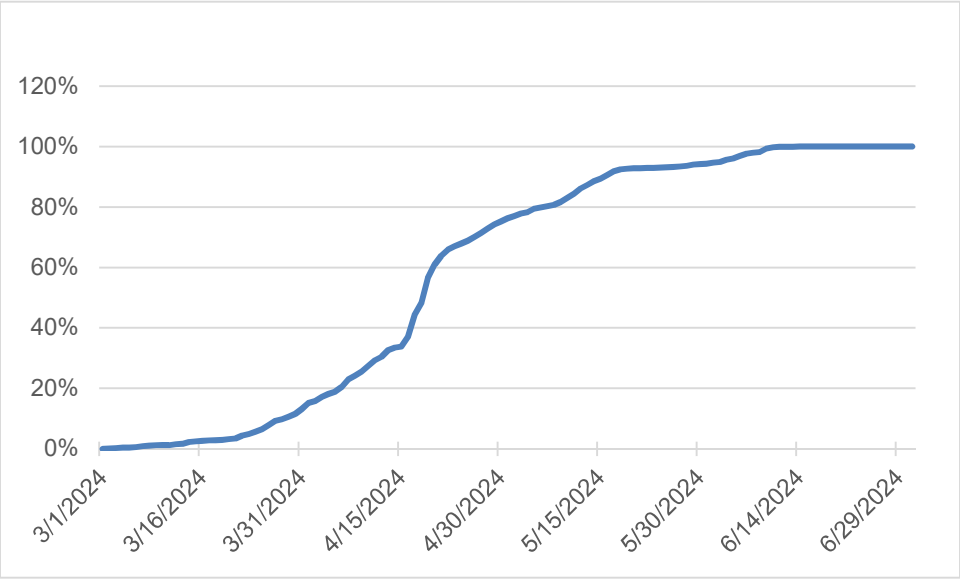

Figure 6: Cumulative run timing curve based on wild Spring Chinook PIT tag detections at Rocky reach Dam in 2024.

The Wells HCP purports to protect 95% of the yearling Chinook run, but this percentage is defined using run timing curves generated from the millions of hatchery fish released upstream of Rocky Reach Dam. In reality the wild component of the run, the segment most critical for species recovery, receives disproportionally less protection as demonstrated in Figures 5 & 6. The Yakama Nation raised this issue before the HCP was finalized and permits issued:

1. Letter dated July 29, 2002 from the Yakama Nation to Mr. Ritchie Graves, National Marine Fisheries Service, Re: Comments on Proposed Incidental Take Permits 13291, 1392, and 1393 with Habitat Conservation Plans.
   "The HCPs continue to provide for the No Net Impact concept, implying that the concept applies to 100% of the Plan Species. In fact, the measurements and protection measures include only 95% of the run. The permits sacrifice 5% of what NMFS itself has designated as the most critically depressed stocks in the entire basin"

2. 107 FERC ¶ 61,280 United States of America Federal Energy Regulatory Commission Order Granting Interventions; Approving Anadromous Fish Agreements, Settlement Agreement, and Applications to Amend Licenses; and Terminating Proceeding. Issued June 21, 2004.
   "101. CRITFC and Yakama state that the No-Net-Impact concept is flawed because the measurement and protection of only 95% of the run for each plan species, instead of 100 percent assumed in their Draft EIS. They assert that the failure to provide full protection for the beginning and end portions of each run could select against important genetic diversity and fitness necessary for species recovery"

In practice, Douglas County PUD is not protecting the middle 95% of the run at Wells Dam, rather they protect the tail 95% of the yearling Chinook run distribution (Buchanan and Townsend 2024) and we

now know that the 5% of unprotected early migrants represent a significant portion (≈30-60%; Figures 5 & 6) of the wild Spring Chinook population, necessary for recovery of the species. Concerns about earlier migration timing and lack of bypass and spill at Wells Dam during this time period have been raised repeatedly by the Yakama Nation and other signatories to the HCP. Today wild Spring Chinook are so diminished in number that even if 100% of them migrated before spill and bypass operations began, their passage would have little influence on the cumulative run timing curve, based on the release of millions of hatchery fish, used to define the protected 95%.

Empirical data indicates wild fish have higher mortality rates through the Wells Project

Empirical data confirm that wild fish experience lower survival through the hydrosystem than hatchery fish. Across all Upper Columbia hatchery release sites and wild smolt trap tagging sites, PIT tag data indicate that wild Spring Chinook have lower migratory survival to McNary Dam than hatchery fish (Table 4). For Methow origin fish, wild smolts survival averaged 0.5928 compared to 0.7278 for hatchery fish, a relative survival of 81%. Similar or larger deficits exist in other basins.

These differences are consistent with the findings from Harnish et al. (2023) who analyzed over 87,000 smolt passage events at federal Columbia River dams. Their study found that smaller fish, and fish that migrate when water temperatures are colder, were more likely to pass through turbines, and that turbine passage resulted in lower survival. Wild Spring Chinook are significantly smaller at migration and migrate earlier when the water is colder. These factors increase their exposure to turbine-related mortality at Wells Dam. Wild Spring Chinook survival has never been measured at Wells Dam.

Recent modeling by Chasco and Murdoch (2024) further shows that survival estimates generated from larger, later migrating hatchery fish can overestimate survival (Figure 7). Their PIT tag based analysis of Wenatchee Chinook demonstrates that both fish size and fish travel time had substantial effects on survival, reinforcing the need for studies that reflect the full range of migration conditions.

Recommendation:

Douglas County PUD cannot claim compliance with LIHI's Downstream Fish Passage Standard D-2 based solely on survival estimates from larger, later migrating hatchery-origin fish reared under study-optimized conditions. These fish are not representative of ESA-listed wild Spring Chinook, which migrate earlier, at smaller sizes, and are more vulnerable to turbine-related mortality, especially in the absence of early-season spill or bypass at Wells Dam.

To meet the intent of the HCP and the requirements of LIHI's D-2 standard, which calls for the protection of all migratory species using best available science, Douglas PUD must conduct a survival study for wild Spring Chinook that reflects the full migration window and range of biological conditions experienced by the wild population. Without direct measurement of survival for wild-origin fish, current survival estimates are incomplete and fail to support LIHI certification.

This recommendation is consistent with the objectives of the Tribal Restoration Plan (CRITFC 2014), the Columbia Basin Partnership (MAFAC 2020) and specifically, prior written recommendations from the Yakama Nation (above) calling for the protection of the entire migratory run, not just the last 95% defined by hatchery releases and hatchery fish run timing.

Table 4: Comparisons of mean hatchery and wild yearling Chinook Salmon smolt survival for various locations and Columbia River reaches. No estimates of wild Entiat fish were made for 2020 and 2021 due to small sample size. W/H is the migratory survival of wild fish divided by hatchery fish (Murdoch 2023). [1]For Methow and Entiat = RR to McNary; Wenatchee=Smolt trap to McNary. [2]Comprised of both Spring and summer yearling Chinook

	Stocks	Origin	Years	to Rocky Reach	Years	to McNary[1]
Methow	WNFH/MSH	Hatchery	2010 - 22	0.7130	2010 - 17	0.7278
	Methow	Wild	2010 - 22	0.6434	2010 - 17	0.5925
	W/H			90%		81%
Twisp	Twisp	Hatchery	2010 - 22	0.6645	--	--
	Twisp	Wild	2010 - 22	0.5935	--	--
				89%		
Entiat	ENFH	Hatchery[2]	2011 - 22	0.8859	2011 - 22	0.6573
	Entiat	Wild	2011 - 22	0.6853	2011 - 22	0.5397
	W/H			77%		82%
Wenatchee	LNFH	Hatchery	--	--	2006 - 23	0.5540
	Wenatchee	Wild	--	--	2006 - 23	0.3760
	W/H					68%
Chiwawa	Chiwawa	Hatchery	--	--	2007 - 21	0.5571
	Chiwawa	Wild	--	--	2007 - 21	0.3820
	W/H					69%

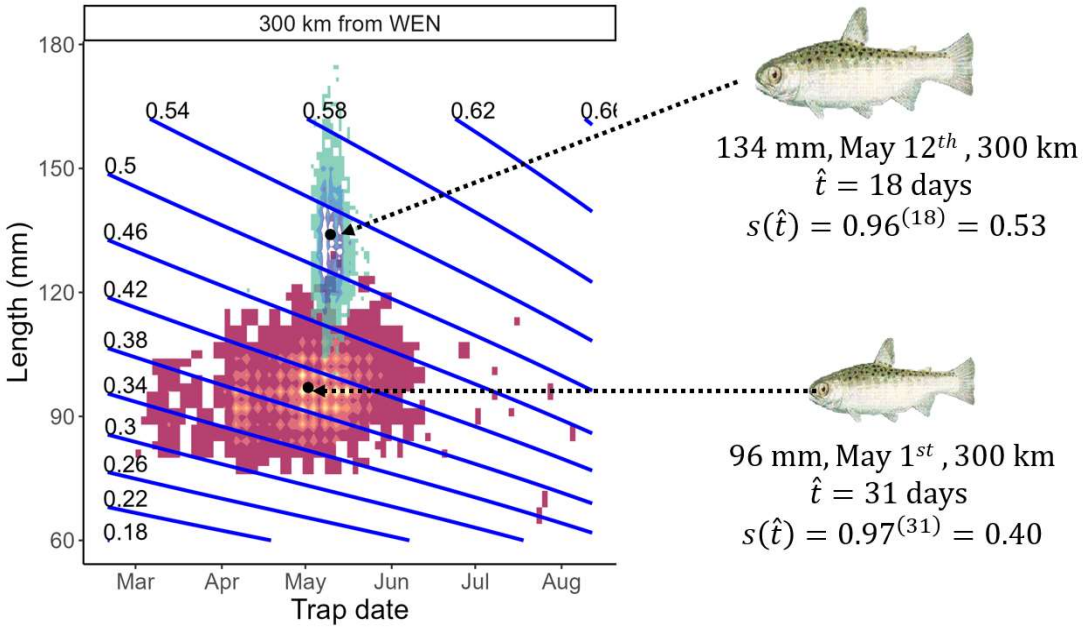

Figure 7. Estimates of survival from release to McNary Dam for wild (red) and hatchery (green) Chinook salmon smolts from the Wenatchee Basin as presented at the 2024 Upper Columbia Science Conference (Chasco and Murdoch 2024)

Juvenile Subyearling Chinook Salmon

Douglas County PUD has not yet measured subyearling Chinook survival even though the technology to do so already exists and it is a requirement under the Wells HCP agreement. Subyearling Chinook survival has been measured at several federal hydropower projects (Hughes et al. 2013; Ogden et al. 2005; Ogden et al. 2007; Muir et al. 2004; Skalski et al. 2019). A study could be completed with the new generation smaller acoustic tags (ELATS or SS400) or with the PIT tags Douglas County PUD uses for yearling Chinook studies. This issue currently remains unresolved in the Wells, Rocky Reach, and Rock Island HCP-Coordinating Committees, and in the Priest Rapids Coordinating Committee, where the combined lack of consensus is resulting in continued delays and indecision.

Recommendations

To meet the requirements of LIHI's Downstream Fish Passage and Protection Standard (D-2), the Wells Project must complete a scientifically rigorous survival study for subyearling Chinook salmon using available and proven technologies (e.g. PIT or acoustic tags). Despite being required under the Wells HCP, Douglas County PUD has delayed implementation of such a study. This lack of action is inconsistent with the precautionary principle and best available science, both of which are embedded in LIHI certification standards. Until a survival study for subyearling Chinook is conducted and demonstrates that survival meets or exceeds HCP standards, the Wells Project should not be eligible for LIHI certification.

Juvenile Lamprey Downstream Passage

Douglas County PUD only briefly mentions juvenile Pacific Lamprey in their LIHI application where they state that:

"Downstream passage and survival rates for juvenile Pacific Lamprey are unknown, but the PLMP [Pacific Lamprey Management Plan] requires a study to be conducted once appropriate technology and study methodologies are developed (Douglas PUD 2008)".

The effect of the Wells Dam Hydroelectric Project operations and impoundment on downstream migrating juvenile and larval lamprey is a significant data gap. Impediments to passage and passage related mortality at mainstem dams are the greatest factors limiting recovery of Pacific Lamprey in the Columbia River (CRITFC 2025a; 2025b). Juvenile passage information, including route specific passage and individual and cumulative impacts of juvenile passage through Wells Dam (and other hydroelectric projects) is considered a critical uncertainty and high priority data need (CRITFC 2025a; 2025b).

Pacific Lamprey are a culturally important species to the Yakama Nation and other Tribes in the Columbia River Basin. The abundance and distribution of Pacific Lamprey in the Columbia River Basin has declined precipitously, bringing the species dangerously close to regional extinction (CRITFC 2025a; 2025b, USFWS 2024). Conservation Status Rank range from S1 (Critically Imperiled) to SH (Possibly Extirpated) for three key watersheds upstream of Wells Dam (Okanogan, Similkameen, and Methow) based on the most recent Pacific Lamprey Regional Implementation Plan (Grote and Lampman 2023).

The Yakama Nation has a goal to restore natural production of Pacific Lamprey to a level that will provide robust species abundance, significant ecological contributions, and meaningful harvest throughout the Yakama Nation's treaty territories and in the usual and accustomed areas. The Yakama Nation along with collaborative efforts from CRITFC, Confederated Tribes and Bands of the Colville Reservation, Grant County PUD, Chelan County PUD, and Douglas County PUD have conducted extensive translocations of adult Pacific Lamprey within the Upper Columbia, totaling close to 10,000 adults between 2016 and 2023.

Unfortunately, none of these collaborative efforts at restoring Lamprey populations in the Upper Columbia can be successful if downstream passage survival at Wells Dam (and other dams) is low. We need to understand what downstream passage survival is under current project operations and collect information, such as passage route selection that would allow for adaptive management of Project operations to increase Lamprey survival where necessary.

Identifying and addressing any project related impacts on downstream passage survival and rearing of juvenile Lamprey is a requirement of the Wells Aquatic Settlement Agreement's Pacific Lamprey Management Plan. A survival study design presented by the Yakama Nation to the Aquatic Settlement Work Group (ASWG) earlier this year, has been an active topic of discussion. Unfortunately, similar to the discussions of measuring subyearling Chinook survival (described above), lack of consensus on the study design is resulting in continued delays and indecisions.

Methods clearly exist to measure Lamprey passage survival and behavior as demonstrated by the U.S. Army Corp of Engineers (USACOE) and Pacific Northwest National Laboratory (PNNL) studies in the Snake and Columbia rivers (Deng et al. 2023; 2025a; 2025b). The results have provided robust estimates of passage survival of juvenile Lamprey along with needed information on passage routes and migration behavior relative to project operations. Developments in acoustic tag technology resulting in reduction in both tag size (Fisher et al. 2019) and sample size requirements (Harnish et al. 2020) make juvenile Lamprey project survival studies now feasible.

Nevertheless, as discussed in the ASWG meetings, Douglas PUD continues to insist, without scientific justification, that study fish must be sourced exclusively from upstream of Wells Dam. This insistence appears to be a strategic limitation, as it would severely constrain the available sample size and

effectively preclude the implementation of a meaningful study. The assertion also reflects a misapplication of salmonid population structure to Lamprey. In contrast, Lamprey exhibit genetic homogeneity across the Upper Columbia River Basin and beyond (CRITFC 2025a; 2025b), rendering such restrictions on study fish biologically unwarranted. Moreover, USACOE and PNNL have successfully conducted passage studies using a variety of Lamprey sources, including hatchery-reared juveniles and wild-capture Lamprey held in hatcheries for extended periods. These fish have demonstrated comparable behavior in survival studies (Deng et al. 2023; 2025a; 2025b). Douglas County PUD's continued mischaracterization of study design requirements serves as yet another example of the ongoing delays in initiating required juvenile lamprey passage studies, despite the availability of appropriate methods, technology, and fish sources.

LIHI Standard D-2 requires that applicants provide and follow agency- or tribal-recommended measures that ensure safe, timely, and effective downstream fish passage, and that they may provide evidence of monitoring, effectiveness evaluations, and adaptive management. Douglas County PUD's application acknowledges that:

"Downstream passage and survival rates for juvenile Pacific Lamprey are unknown"

This admission underscores the lack of fundamental information necessary to support a finding that downstream passage at Wells Dam is "safe, timely, and effective". While the Pacific Lamprey Management Plan (PLMP), developed under the Aquatic Settlement Agreement, requires a survival study once methods become available, Douglas County PUD has not initiated such a study.

Given (1) the imperiled status of Pacific Lamprey upstream of Wells Dam (Grote and Lampman 2023; USFWS 2024; CRITFC 2025a; 2025b), (2) the essential role of downstream passage in any credible restoration or reintroduction effort, and (3) the absence of monitoring, adaptive management, or any substantive collaboration with tribal or agency experts to resolve this data gap, the Project fails to meet the requirements of LIHI Standard D-2.

Recommendation:

Douglas County PUD does not meet the Low Impact Hydropower Institutes' Downstream Fish Passage Standard D-2 for juvenile and larval Pacific Lamprey. The Yakama Nation recommends that LIHI deny certification due to the PUD's failure to implement study commitments under the PLMP, and to address this critical gap for a culturally and ecologically significant species.

Threatened and Endangered Species

LIHI Goal: The facility does not negatively impact federal or state listed species, or tribal trust species.

Introduction to Standards: To pass the threatened and endangered species criterion the applicant must demonstrate compliance with one of the following standards (F1 through F4). Facilities shall not have caused or contributed in a demonstrable way to the extirpation of listed or tribal trust species. However, a facility that is making significant efforts to reintroduce and extirpated species may still pass this criterion.

STANDARD F-3 *(selected by applicant):* Recovery Planning and Action: The facility is in compliance with relevant conditions in a species recovery plan, a habitat conservation plan, conservation recommendations in a biological opinion, or in similar local state, federal or tribal documents that are designed to be a long term solution for protection of the listed species.

Lack of ESA Coverage for Mid-Columbia and Snake River DPS Steelhead

Douglas County PUD does not meet LIHI Standard F-3 for Threatened and Endangered Species Protection, due to its failure to obtain ESA take permits for Mid-Columbia River DPS and Snake River DPS Steelhead that are known to overshoot and interact with the Wells Project (see Downstream Passage: Overshoot Steelhead). These ESA-listed Steelhead pass Wells Dam during upstream migration, likely seeking thermal refuge, but are not provided a safe or effective means of returning to their natal tributaries downstream. Despite this, Douglas PUD has taken no steps to monitor, minimize or mitigate downstream passage impacts to adult pre-spawn Steelhead and have denied they fall under the scope of the Wells Habitat Conservation Plan (HCP).

This position is legally flawed. The Yakama Nation's Office of Legal Council (June 2025) analyzed the HCP and concluded that the term "Plan Species" includes all Steelhead migrating through the Wells Project regardless of place or origin. Nothing in the HCP limits the definition to only Upper Columbia DPS steelhead.

Critically, the Wells Dam interim Biological Opinion (dated June 19, 2000), issued during development of the HCP, did consult on Mid-Columbia DPS Steelhead, but concluded they did not interact with the Wells Project[1]. This is significant because it establishes that NMFS did not recognize at the time that Mid-Columbia DPS and Snake River DPS Steelhead were overshooting into the Upper Columbia. As a result, NMFS excluded the Mid-Columbia DPS from the current Biological Opinion (dated August 12, 2003) and Incidental Take Statement, based on the incorrect conclusion that these fish are not found in the Wells Project area. This conclusion is now demonstrably false.

Under Section 11 of the Wells HCP Biological Opinion (F/NWR/2002/01896), Reinitiation of Consultation is required when:

> *1) any action is modified in a way that causes and adverse effect on the species that is new or significantly different from those analyzed in connection with the HCP, 2) new information or project monitoring reveals adverse effects of the action in a way not previously considered or that involves additional take not analyzed in connection with the original HCP, or 3) a new species is listed or critical habitat is designated that may be effected by the action.*

Both consultation triggers 2 & 3 are clearly met and Reinitiation of Consultation is required under the ESA. Douglas County PUD continues to assert that overshoot Steelhead are not covered under the HCP, in doing so, they are also conceding that these ESA-listed populations are being harmed by the project **without take coverage,** which is a clear violation of the ESA.

Further, Douglas County PUD has provided no measures to avoid take of overshoot Steelhead from the Upper Columbia DPS, Mid-Columbia DPS and Snake River DPS. There is no surface passage route for fish needing to return downstream. These fish are subject to passage related stress and mortality due to lack of adaptive management under the HCP and lack of ESA consultation and take coverage.

[1] No data on steelhead overshoots was available at the time the Wells Interim BiOp was issued in 2000. The first installation of PIT-tag detection in the Upper Columbia occurred at Wells Dam in 2002. Despite very low tagging rates of wild fish, four Snake River steelhead (three wild, one hatchery) were detected at Wells Dam; none of which were subsequently detected elsewhere, indicating that Wells Dam was their last known location.

Recommendation:

Douglas County PUD is not in compliance with the ESA requirements regarding Mid-Columbia and Snake River Steelhead that migrate upstream and downstream of Wells Dam. By refusing to acknowledge or address this reality, Douglas County PUD fails to meet the intent and requirement of Standard F-3, which requires compliance with their Biological Opinion, species recovery goals, implementation of protective measures, and agency consultation, or in this case reinitiation of consultation.

LIHI should deny certification on the basis of Douglas PUD's failure to address known and unauthorized take of listed species, maintain valid take coverage under the ESA, and re-initiate consultation as required under the Wells HCP Biological Opinion.

Lack of Recovery Progress under the Wells HCP:

Despite the implementation of the Wells Habitat Conservation Plan (HCP), empirical data do not demonstrate the improvements in ESA listed Spring Chinook or Steelhead survival that the HCP was intended to deliver (Cooney et al. 2002). Trends in both hatchery-origin Spring Chinook smolt survival (Figure 5) and wild Spring Chinook spawner abundance (Figure 6) have remained largely unchanged, and in some cases have declined, since Spring Chinook were listed under the ESA in 1999. These patterns along with the data presented for upstream and downstream survival above, suggest that the HCP measures, as currently implemented, are insufficient to improve conditions for listed populations.

In contrast, over the same time period, smolt survival in the Snake River, has shown a gradual upward trend (Figure 5), demonstrating system wide improvements are possible when meaningful actions are taken.

Figure 5 shows downstream migratory survival of Upper Columbia hatchery Spring Chinook from the Wenatchee (Leavenworth NFH) and Methow (Winthrop NFH & Methow Salmon Hatchery), and the Snake River for comparison (Dworshak NFH; Clearwater River). Despite year-to-year variability, migratory downstream survival from Upper Columbia hatchery programs has remained flat or declined, while survival through the Snake River has improved.

Figure 6 shows a similar long term stagnation in wild Spring Chinook spawner abundance in the Methow River from 1998 to 2023.

Moreover, NMFS' most recent five-year status review for Upper Columbia Spring Chinook and Steelhead concluded that natural-origin Spring Chinook abundance has declined since the previous review across all populations in the ESU (Wenatchee, Entiat, Methow), with sharp declines in many cases (NMFS 2022).

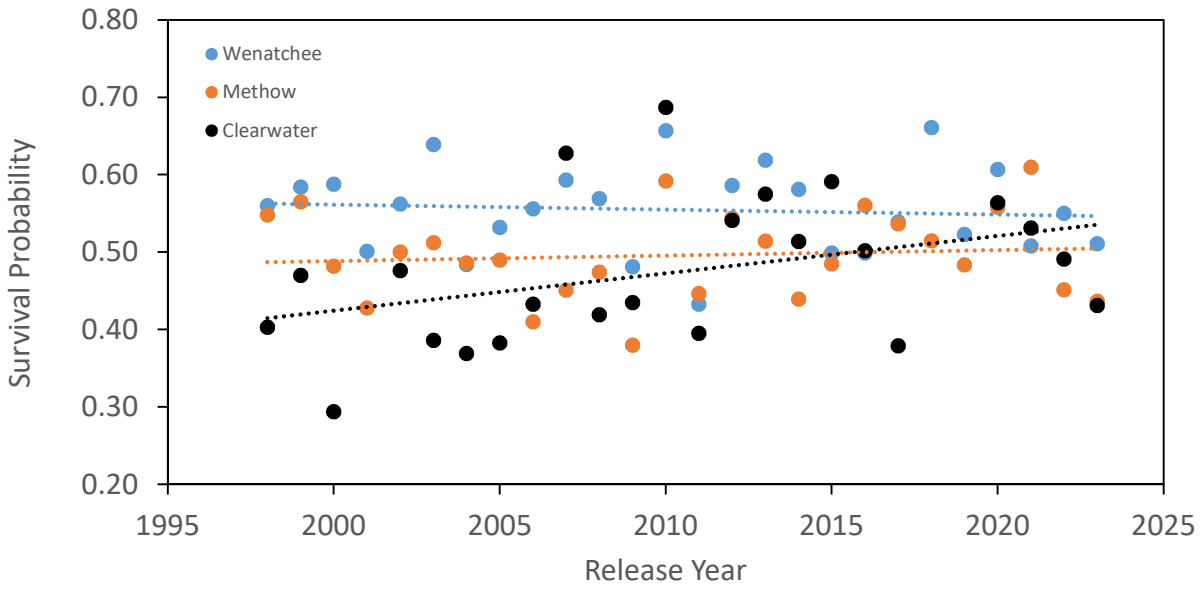

Figure 8: Trends in hatchery Spring Chinook survival (release to McNary Dam) for Upper Columbia populations, Wenatchee (Leavenworth NFH), and Methow (Winthrop NFH & Methow Salmon Hatchery), and a Snake River population, Clearwater (Dworshak NFH) in Idaho, for comparison from 1998 to 2023. Dotted lines denote linear trends.

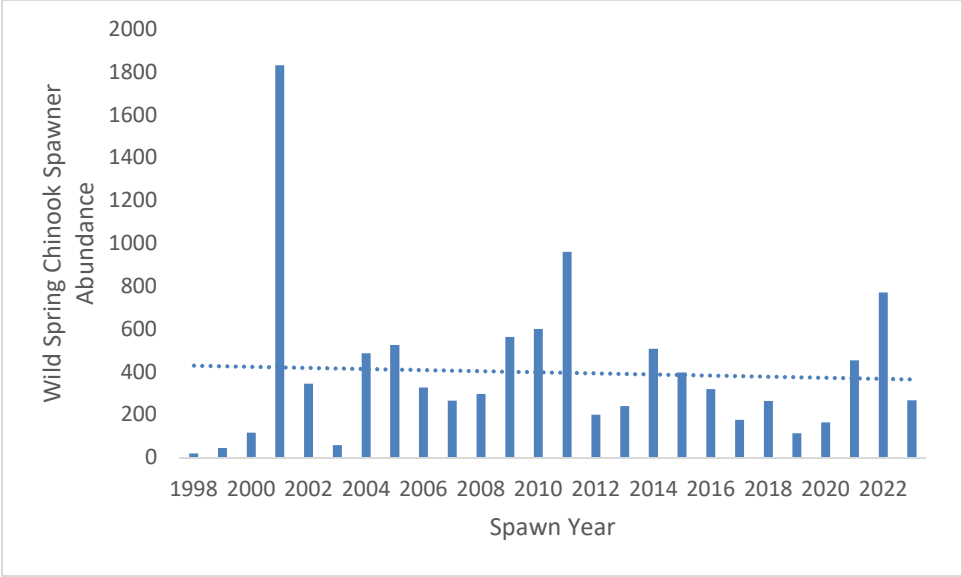

Figure 9: Trends in Methow wild Spring Chinook Salmon spawner abundance from 1997 to 2023. Dotted line denote linear trend. Data from Snow et al. (2024). 1999 = ESA listing; 2002 = start of Wells HCP agreement.

Although the figures presented (Figures 5 & 6) reflect regional survival and abundance patterns, they are directly relevant to the Wells Project. The survival challenges experienced by Spring Chinook and Steelhead are cumulative and reflect the collective effects of Wells, Rocky Reach, and Rock Island Dams all of which operate under similar HCPs and share responsibility for listed populations. A lack of measurable recovery progress at both the ESU and population scale underscore a broader failure of the three HCP agreements to deliver intended biological outcomes. Certifying Wells Dam as low impact in

isolation, without accounting for this shared responsibility, risks validating ineffective mitigation actions and setting a dangerous precedent for the Columbia River.

Recommendation:

To meet the requirements of LIHI Standard F-3, a facility must demonstrate that it is implementing a long-term recovery strategy consistent with relevant species recovery plans and other conservation documents. However empirical trends in smolt survival and wild Spring Chinook abundance in the Upper Columbia Basin demonstrate that the Wells HCP (and the other downstream projects with similar HCPs) have failed to improve conditions for ESA-listed species since its implementation.

This lack of biological response indicates that the Wells Project is not contributing meaningfully to species recovery and is therefore not in compliance with the purpose of Standard F-3. Moreover, it conflicts with the goals of the Tribal Restoration Plan *Wy-Kan-Ush-Mi Wa-Kish-Wit* (CRITFC 2014), which emphasizes full life-cycle protection and measurable improvements in wild fish abundance and survival.

Until Wells Project operations, along with improved monitoring and evaluation (see sections on upstream and downstream passage), are adaptively managed to meaningfully to contribute to recovery of ESA-listed populations and culturally important species, it should not be deemed compliant with LIHI's Threatened and Endangered Species criterion.

Conclusion

This assessment documents multiple biological, technical, and regulatory deficiencies in the operation of the Wells Hydroelectric Project that are incompatible with the standards set forth by the Low Impact Hydropower Institute. Across several criteria, including water quality, upstream passage, downstream passage, protection of threatened and endangered species, and the consideration of Tribal resource concerns, the Wells Project has failed to demonstrate the performance and accountability expected of a truly low-impact facility. Data presented here reflect stagnant or declining biological trends for ESA-listed Spring Chinook and Steelhead, ongoing passage barriers for adult life stages such as overshoot Steelhead, and kelts, and exclusion of culturally significant species like Pacific Lamprey and White Sturgeon from core mitigation commitments.

These deficiencies are not minor or incidental; they speak to a pattern of regulatory compliance that has prioritized minimum thresholds over ecological restoration. The Yakama Nation urges LIHI to uphold the integrity of its certification program by denying Low Impact Certification for the Wells Project unless, and until, these deficiencies are meaningfully addressed through improved monitoring, species coverage, and operational changes.

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Attachment C: Fish Passage Center Overshoot Spill Memorandum

FISH PASSAGE CENTER

847 NE 19th Avenue, #250, Portland, OR 97232
Phone: (503) 833-3900 Fax: (503) 232-1259
www.fpc.org/
e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: Keely Murdoch
Michele DeHart

FROM: Noah Campbell

DATE: June 20, 2025

SUBJECT: Overshoot Spill

In response to your request, the following discussion addresses the proposed fall overshoot spill at Rock Island, Rocky Reach, and Wells Dams. It compares this proposed operation to existing Upper Columbia fall overshoot spill at Priest Rapids and Wanapum Dams, as well as to existing Lower Snake fall overshoot spill at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor Dams.

At Rocky Reach, the proposed 1.85 kcfs overshoot spill would have represented 2.13 – 2.57% of total flow for each of the last ten years over the period of days between the end of summer spill and November 30th. At Rocky Reach, 240 cfs would have represented 0.43 – 0.51% of total flow. At Wells, 2.2 kcfs would have represented 2.61 – 3.12% of total flow. Across these three projects, proposed fall overshoot spill would have lasted between 76 and 115 days for each fall season over the last ten years.

Existing 2.5 kcfs spill operations at Priest Rapids and Wanapum are higher in volume and proportion of water as spill compared to the proposed added spill at each of the three projects in question. Additionally, spill at these projects is often higher than 2.5 kcfs due to Hanford Reach operations in the fall.

Compared to existing operations in the Lower Snake, when averaged across all hours rather than just hours of spill operations, total spill proportion is lower for the Upper Columbia proposed overshoot spill operations. When comparing only hours with spill greater than zero, the Lower Snake projects' proportion of the overall flow that is used as spill is higher, but the Lower Snake projects only spill four hours per day.

Summary

The Yakama Nation (YN) has proposed to introduce overshoot spill (or a similar mechanism) at Rock Island, Rocky Reach, and Wells Dams. This operation would begin at the end of each project's summer spill period and end on November 30. The added overshoot spill would complement the existing overshoot spill at Priest Rapids and Wanapum Dams that currently occurs from the end of summer spill until November 15.

This proposed operation may be compared to current fall overshoot spill operations at Priest Rapids and Wanapum, which appear to have occurred in some form since 1998, and to operations in the Lower Snake River, which have occurred in various forms since 2020.

The average proportion of spill volume in the Lower Snake, when applied to all hours of the day, is similar to the spill volume proportion of the proposed Upper Columbia operation. While the total proposed spill proportions would be similar, the proportion of spill across only the hours that include spill are much higher in the Lower Snake, with higher proportions of volume for fewer hours per day. The Upper Columbia proposal could be different in that it would cause spill in all hours of the day, or it could follow a different pattern of spill in parts of the days and/or parts of the week.

Additionally, flow volumes in the Upper Columbia are generally much higher than flow volumes in the Lower Snake during the date range of the proposed operation. Thus, while the proportion of Upper Columbia water as spill would be lower than the proportion of Lower Snake water as spill in many cases, the cumulative volume of water passed as spill in the Upper Columbia would be higher.

Proposed Operation

Overshoot spill after the end of summer spill does not currently occur in any form at Rock Island, Rocky Reach, or Wells Dams. The proposed overshoot spill operations at these three projects would complement the overshoot spill at the Grant County Public Utility District (PUD) projects, which spill 2.5 kcfs throughout the time frame. While overshoot start dates would be different based on the project, each proposed overshoot spill operation would last until November 30. The proposed spill would be 1.85 kcfs in one notched spill gate at Rock Island, 240 cfs flows through the Surface Collector at Rocky Reach, and flows of 2.2 kcfs at Wells.

The start date for fall overshoot spill would be the end date of summer spill. This date is variable at Rock Island and Rocky Reach, ending as early as August 1st and as late as September 1st in the last ten years. Summer spill ends on August 19th every year at Wells.

Proposed Spill as a Proportion of Recent Fall Upper Columbia Flows

Flows in the Upper Columbia can vary in the time frame of the proposed operation, but seasonal averages have been no less than 65 kcfs and no more than 85 kcfs in the last ten years. Thus, unless operations were to change significantly or an unusual water year were to occur, it is unlikely that 1.85 kcfs would represent more than 2.85% or less than 2.17% of the total flow past Rock Island within this time frame. Actual proportions in the last ten years would have ranged between 2.18% and 2.58% (Table 1). The number of days between the end of summer spill and November 30th ranged between 100 and 111 days over the last ten years.

Table 1. Average flow at Rock Island during proposed overshoot spill period and the proportion of that flow that would have been used as overshoot spill.

Year	First Full Day Without Any Summer Spill	Estimated Days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Average 1.85 kcfs Overshoot Spill Proportion
2015	August 12	111	84.82	0.0218
2016	August 12	111	86.97	0.0213
2017	August 21	102	74.23	0.0249
2018	August 15	108	78.90	0.0234
2019	August 20	103	72.80	0.0254
2020	August 26	103	84.18	0.0220
2021	August 20	106	74.75	0.0247
2022	August 23	100	81.47	0.0227
2023	August 12	111	71.86	0.0257
2024	August 16	107	71.58	0.0258

Flow through the surface collector at Rocky Reach is 240 cfs. Thus, overshoot spill through Rocky Reach would represent just 0.44 – 0.52% of all discharge through the project between the end of summer spill and November 30 (Table 2).

Table 2. Average flow at Rocky Reach during proposed overshoot spill period and the proportion of that flow that would have been used as overshoot spill.

Year	First Full Day Without Any Summer Spill	Estimated Days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Average 240 cfs Overshoot Spill Proportion
2015	August 8	115	82.05	0.0045
2016	August 16	107	76.35	0.0044
2017	August 29	97	69.21	0.0052
2018	August 7	116	82.77	0.0046
2019	August 13	110	78.49	0.0051
2020	September 1	94	67.07	0.0046
2021	August 14	109	77.77	0.0050
2022	August 14	109	77.77	0.0043
2023	August 1	122	87.05	0.0050
2024	August 13	110	78.49	0.0051

Using seasonal average flows at Wells, 2.2 kcfs would have represented between 2.61% and 3.31% of the total flow volume from the end of summer spill until November 30th (Table 3). In each of the last ten years, summer spill at Wells Dam ended on August 19, resulting in 103 days without spill between the end of summer spill operations and November 30.

Table 3. Average flow at Wells during proposed Overshoot Spill period and the proportion of that flow that would have been used as Overshoot Spill.

Year	First Full Day Without Any Summer Spill	Days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Average 2.2 kcfs Overshoot Spill Proportion
2015	August 20	103	82.17	0.0268
2016	August 20	103	84.24	0.0261
2017	August 20	103	72.75	0.0302
2018	August 20	103	77.29	0.0285
2019	August 20	103	72.44	0.0304
2020	August 20	103	86.15	0.0255
2021	August 20	103	74.00	0.0297
2022	August 20	103	86.39	0.0255
2023	August 20	103	70.68	0.0311
2024	August 20	103	72.28	0.0304

Comparison to Fall Overshoot Spill at Grant County PUD Projects

At Priest Rapids and Wanapum Dams, the current overshoot spill operation is a consistent 2.5 kcfs for each project from the end of summer spill until November 15th. At Priest Rapids, this volume would represent 2.93 – 3.82% of the total flow in this duration in the last ten years, although recorded spill volumes were between 3.21 – 8.92% of flows, likely due to Hanford Reach operations designed to keep redds below a specific elevation by spilling excess water at night (Table 3). If expanded to November 30th, the proportion of total flow represented by 2.5 kcfs would be reduced to between 2.83 – 3.51% of total discharge.

Table 3. Average flow at Priest Rapids during the overshoot spill period, the proportion of that flow that would have been used as 2.5 kcfs overshoot spill, and the actual spill proportion.

Year	Estimated Days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Average 2.5 kcfs Overshoot Spill Proportion	Actual Recorded Seasonal Spill Proportion

2015	93	85.32	0.0293	0.0321
2016	90	85.39	0.0293	0.0750
2017	76	73.30	0.0341	0.0704
2018	89	77.01	0.0325	0.0505
2019	80	68.62	0.0364	0.0672
2020	85	83.35	0.0300	0.0892
2021	84	71.84	0.0348	0.0624
2022	83	77.83	0.0321	0.0892
2023	89	65.51	0.0382	0.0497
2024	91	71.36	0.0350	0.0620

At Wanapum, this 2.5 kcfs would amount to 2.87 – 3.72% of total discharge in this time frame, although recorded average spill ranged from 1.91 – 6.09% of total discharge, possibly due to a combination of lack of load and balancing Wanapum operations with Priest Rapids/Hanford Reach operations (Table 4). If expanded to November 30th, the proportion of total flow represented by 2.5 kcfs would be reduced to 2.75 – 3.43% of total discharge.

Table 4. Average flow at Wanapum during the overshoot spill period, the proportion of that flow that would have been used as 2.5 kcfs overshoot spill, and the actual spill proportion.

Year	Estimated Days of Overshoot Spill	Average Flow during Overshoot Spill Period (kcfs)	Average 2.5 kcfs Overshoot Spill Proportion	Actual Recorded Seasonal Spill Proportion
2015	94	85.88	0.0291	0.0191
2016	92	87.24	0.0287	0.0452
2017	76	75.70	0.0330	0.0277
2018	90	80.29	0.0311	0.0203
2019	85	71.36	0.0350	0.0214
2020	85	85.14	0.0294	0.0609
2021	87	74.38	0.0336	0.0350
2022	84	79.90	0.0313	0.0538
2023	93	67.24	0.0372	0.0382
2024	91	72.15	0.0347	0.0374

While the overshoot spill operation has changed since it was first implemented, spill has made up at least 1% of discharge at Priest Rapids and Wanapum Dams for every year since 1998. Since 1998, fall spill out of Priest Rapids has ranged from 1.12 – 8.92% of total discharge. Similarly, since 1998, fall spill out of Wanapum has ranged from 1.70 – 6.09% of total discharge. Spill as a proportion of flow has been higher at Priest Rapids since 2012, and higher at Wanapum since 2014, compared with previous years starting in 1998.

At Priest Rapids, for all years since 2012, the actual proportion of spill has been higher than the total spill volume would be if 2.5 kcfs were spilled continuously (Table 5). The opposite

is true of all years from 1998 – 2011. This difference may be a result of changes to Hanford Reach protection flows in the late fall.

Table 5. Changes to fall spill patterns at Priest Rapids Dam since 1998.

Years	Average Spill Proportion	Average 2.5 kcfs Spill Proportion
1998 - 2011	0.0141	0.0319
2012 - 2024	0.0663	0.0329

At Wanapum, for all years since 2014, the actual proportion of spill has been higher than the total spill volume would have been if 2.5 kcfs were spilled continuously (Table 6). The opposite is true of all years from 1998 – 2013 with the exception of 2011 (see Table 4).

Table 6. Changes to fall spill patterns at Wanapum Dam since 1998.

Years	Average Spill Proportion	Average 2.5 kcfs Spill Proportion
1998 – 2013	0.0204	0.0309
2014 - 2024	0.0383	0.0324

The yearly volume and proportion of spill at Priest Rapids since 2012 and Wanapum since 2014 are higher than the volume and proportion of proposed overshoot spill operations that would have occurred those years at Rocky Reach, Rock Island, and Wells Dams.

Comparison to Fall Overshoot Spill in the Snake River

Background

In the Snake River, steelhead overshoot spill in the fall has occurred since 2020 but has been variable over the last five years (Table 7). In 2020 and 2021, fall overshoot spill in the Snake River consisted of 4 hours of surface spill at each project per day, three non-consecutive days per week from October 1st through November 15th. In 2022 and 2023, this operation was extended to September 1st through November 15th. Per the December 2023 Stay of Litigation Agreement, fall overshoot spill in the Snake River was modified to 4 hours of surface spill per day, seven days a week from September 1st through November 15th. Fall surface spill at Snake River projects is generally in the 5-8 kcfs range.

Table 7. Lower Snake River overshoot spill operations from 2020 – 2024.

Year	Overshoot spill date range	Days of overshoot spill	Overshoot spill operation
2020	10/1 – 11/15	46	4 hours/day, three non-consecutive days per week
2021	10/1 – 11/15	46	4 hours/day, three non-consecutive days per week
2022	9/1 – 11/15	76	4 hours/day, three non-consecutive days per week

2023	9/1 – 11/15	76	4 hours/day, three non-consecutive days per week
2024	9/1 – 11/15	76	4 hours/day, seven days per week

The fall overshoot spill operation at Snake River projects is very different from what is being proposed in the Upper Columbia, in frequency, duration, and volume. This makes comparisons between the two regions difficult. The 2024 operations are the most comparable to what is being proposed in the Upper Columbia, since overshoot spill in 2024 occurred daily, albeit for only four hours per day and at higher volumes.

Methods

For this comparison, FPC staff summarized fall overshoot spill at each of the four Lower Snake River projects over the last five years (2020-2024) using two methods.

The first method focused solely on the hours when spill was provided (hourly spill volume > 0 kcfs) over the planned period of overshoot spill. For each project, we summarized the total number of hours that overshoot spill occurred, estimated the average flow and spill volume during those hours, and estimated the average spill proportion for the overshoot spill hours.

The second method estimated the average flow and spill volume over the entire overshoot spill period, as well as the average spill proportion over this period. Using this method, all hours of the day included in the estimates of average flow, spill, and spill proportion, regardless of the presence of spill in each specific hour.

Results

When focusing on only the hours that overshoot spill occurred, spill proportions across the four Lower Snake River projects ranged between 22.9% and 36.5%, with an overall average of 30.0% over the last five years (Table 8). These spill proportions are much higher than the estimated spill proportions for the proposed fall overshoot operations at Rock Island and Wells dams because Lower Snake overshoot spill represented a higher spill volume across a much lower number of hours per day. The higher spill proportions in the Snake River can also be attributed in part to lower Snake River flows compared to Upper Columbia River flows.

Table 8. Summary of Snake River fall overshoot spill operations, 2020-2024. Summaries presented here are limited to hours spill was > 0 kcfs and do not include hours when overshoot spill was not provided. Different shading corresponds to different regimes of planned fall overshoot operations (e.g., different time frames and/or frequencies).

Year	Dates	Operation	Project	Total Hours of Spill	Average Flow (kcfs)	Average Spill (kcfs)	Average Spill Prop.
2020	10/1-11/15	4 hours/day, three non-consecutive days per week	LGR	92	26.0	6.1	0.235
			LGS	108	24.5	5.6	0.229
			LMN	95	24.7	7.0	0.283
			IHR	99	24.2	7.2	0.298
2021	10/1-11/15	4 hours/day, three non-consecutive days per week	LGR	129	22.1	6.4	0.290
			LGS	95	21.6	6.0	0.278
			LMN	129	19.3	5.0	0.259
			IHR	110	20.7	6.8	0.329
2022	9/1-11/15	4 hours/day, three non-consecutive days per week	LGR	225	19.7	7.0	0.355
			LGS	256	18.1	6.6	0.365
			LMN	296	18.0	5.8	0.322
			IHR	188	19.1	6.7	0.351
2023	9/1-11/15	4 hours/day, three non-consecutive days per week	LGR	182	22.5	6.8	0.302
			LGS	168	21.5	5.7	0.265
			LMN	193	21.4	6.1	0.285
			IHR	176	21.5	6.8	0.316
2024	9/1-11/15	4 hours/day, seven days per week	LGR	393	21.5	7.5	0.349
			LGS	395	20.2	5.5	0.272
			LMN	413	20.5	6.0	0.293
			IHR	402	21.2	6.9	0.325

When considering the entire fall overshoot spill period (i.e., including hours when overshoot spill did not occur), spill proportions across the four Lower Snake River projects were in the 0.024 to 0.090 range, with an overall average of 0.045, over the last five years (Table 7). The spill proportions for 2024 were notably higher than the other four years (Range: 0.067-0.090, Average: 0.08). This is because there was a change to daily overshoot spill in 2024, compared to non-consecutive days in earlier years.

The average spill proportions in 2020-2023 are similar to the estimated spill proportions for the proposed fall overshoot operations at Rock Island and Wells dams (Table 1, Table 2), even though fall overshoot spill in the Snake River lasted for only four hours per day. The average spill proportions in 2024 are higher than the estimated spill proportions for the proposed fall overshoot operations at Rock Island and Wells dams, even though fall overshoot spill in the Snake River lasted for only four hours per day. Again, this is a combination of the fact that

overshoot spill volumes in the Snake River are higher (5-8 kcfs when provided) and Snake River flows in the fall are lower, compared to the Upper Columbia River.

Table 7. Summary of Snake River flow and spill during the fall overshoot spill period, 2020-2024. Summaries presented here include all hours over the operational period. Different shading corresponds to different regimes of planned fall overshoot operations (e.g., different time frames and/or frequencies).

Year	Dates	Operation	Project	Average Flow (kcfs)	Average Spill (kcfs)	Average Spill Prop.
2020	10/1-11/15	4 hours/day, three non-consecutive days per week	LGR	20.6	0.5	0.024
			LGS	19.4	0.5	0.026
			LMN	19.9	0.6	0.030
			IHR	20.2	0.6	0.030
2021	10/1-11/15	4 hours/day, three non-consecutive days per week	LGR	17.6	0.8	0.045
			LGS	16.8	0.5	0.030
			LMN	17.1	0.6	0.035
			IHR	17.2	0.7	0.041
2022	9/1-11/15	4 hours/day, three non-consecutive days per week	LGR	18.2	0.9	0.049
			LGS	17.9	0.9	0.050
			LMN	18.2	0.9	0.049
			IHR	18.1	0.7	0.039
2023	9/1-11/15	4 hours/day, three non-consecutive days per week	LGR	20.6	0.7	0.034
			LGS	20.3	0.5	0.025
			LMN	20.4	0.6	0.029
			IHR	20.5	0.7	0.034
2024	9/1-11/15	4 hours/day, seven days per week	LGR	17.7	1.6	0.090
			LGS	17.8	1.2	0.067
			LMN	17.8	1.4	0.079
			IHR	17.8	1.5	0.084

Conclusion

The proposed overshoot spill operations at Rocky Reach, Rock Island, and Wells Dams may be compared to existing overshoot spill in the Lower Snake, which has occurred in some form since 2020; and to existing overshoot spill at Priest Rapids and Wanapum Dams, which appears to have occurred in some form since 1998. When comparing only hours with spill greater than zero, the Lower Snake projects' proportion of the overall flow that is used as spill is higher, but the Lower Snake projects only spill four hours per day.

When comparing the proportions of total discharge that is or would be used as spill, the results are comparable. 2024, the year with the most similar Lower Snake overshoot spill operations compared to the proposed Upper Columbia spill operations, passed a total proportion

of water higher than the proportion caused by proposed operations that would have occurred in any of the last ten years in the Upper Columbia. Actual occurring Priest Rapids and Wanapum overshoot spill since 2012 (Priest Rapids) and 2014 (Wanapum) is higher than the proposed spill that would have occurred at Rocky Reach, Rock Island, and Wells Dams in those years.

References

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