

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Elizabeth Anne Moler, Chair;
Jerry J. Langdon and Branko Terzic.

Weyerhaeuser Company) Project No. 8864-007

ORDER ISSUING LICENSE (MAJOR)

(Issued May 13, 1993)

The Weyerhaeuser Company (Weyerhaeuser) filed an application under Part I of the Federal Power Act (FPA) to construct, operate, and maintain the 5.4 megawatt (MW) Calligan Creek Project No. 8864, to be located on the Calligan Creek in King County, Washington. 1/

Notice of the application has been published. Timely interventions were filed by King County, Washington, the Tulalip Tribes (Tulalip), 2/ and the Washington State Departments of Ecology (Washington Ecology), of Fisheries (Washington

1/ Calligan Creek is a tributary of the North Fork of the Snoqualmie River, which, after joining the main stem of the Snoqualmie River, flows northwesterly and joins with the Skykomish River to form the Snohomish River, a navigable waterway which empties into the Puget Sound. As a tributary to a navigable water, Calligan Creek is subject to Congress' Commerce Clause authority. See Metropolitan District Commission and Massachusetts Water Resources Authority, 54 FERC ¶ 61,330 (1991). Weyerhaeuser intends to construct the project and sell power to Puget Sound Power and Light Company, a utility in the area which is connected to an interstate grid. Since the project is located on a stream over which Congress has jurisdiction under the Commerce Clause, will affect interstate commerce through its connection to an interstate power grid, and will be constructed after 1935, it is required to be licensed pursuant to Section 23(b)(1) of the FPA, 16 U.S.C. § 817(1).

2/ On May 22, 1992, Tulalip filed a supplement to its intervention, and on September 21, 1992, it filed a withdrawal conditioned upon inclusion in the license of the terms and conditions recommended by Washington Wildlife and the Department of the Interior, and upon the review and acceptance by Washington Wildlife of any modifications to the terms and conditions. Since, as discussed *infra*, the conditions for the Tulalip's withdrawal have not been met, we do not consider Tulalip's intervention to be withdrawn.

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Fisheries), and of Wildlife (Washington Wildlife). The Bureau of Indian Affairs, Department of the Interior (BIA); Washington Ecology, Washington Fisheries; Washington Wildlife; King County and the Department of the Interior (Interior) 3/ filed comments on the application. Weyerhaeuser filed a reply to the comments of Washington Wildlife. Comments of intervenors, agencies, and individuals have been fully considered in determining whether, or under what conditions, to issue this license.

An Environmental Assessment (EA) was prepared and issued on July 17, 1992, and is attached to and is made a part of the license. A Safety and Design Assessment was also prepared, and is available in the Commission's public file associated with this project.

PROJECT DESCRIPTION

The proposed project would consist of an 8-foot-high, 60-foot-long diversion dam; an impoundment with a surface area of 0.4 acre at the normal pool elevation of 2,221 feet mean sea level (msl), containing 1.2 acre-feet of water; a 40-inch-diameter, 4,925-foot-long steel penstock; a 42-by-44-foot powerhouse containing a generating unit with a rated capacity of 5.4 MW; a 148-foot-long tailrace; and a 4.25-mile-long, 35 kilovolt transmission line. Weyerhaeuser proposed to operate the project in a run-of-river mode and to maintain a minimum flow in the upper reach of the 1.3-mile-long bypass of two cubic feet per second (cfs) year round, and minimum flows of six cfs between September 15 and May 14, and of 15 cfs between May 15 and September 15 at a downstream spring site located in the lower portion of the bypass reach. The proposed project would produce about 21.7 gigawatt hours (GWh) of energy annually. 4/

WATER QUALITY CERTIFICATION

On February 19, 1991, Weyerhaeuser filed a request with Washington Ecology for water quality certification under Section 401(a)(1) of the Clean Water Act (CWA) 5/ for the proposed Calligan Creek Project. On January 28, 1992, in anticipation of the deadline for state action on the request, and in order to avoid a waiver of water quality certification, Washington Ecology denied Weyerhaeuser's application. Weyerhaeuser reapplied for

- 3/ Interior's comments discussed the concerns of the U.S. Fish and Wildlife Service.
- 4/ This annual generation of 21.7 GWh is mistakenly stated as "4.7 gigawatt hours" in Section II.A. of the EA, but is correctly stated in Section V.B.8. of the EA.
- 5/ 33 U.S.C. § 1341(a)(1) (1988).

certification on January 31, 1992, and Washington Ecology issued water quality certification on May 19, 1992. 6/

COASTAL ZONE MANAGEMENT PROGRAM

Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act, 7/ a license applicant for a hydroelectric project affecting land or water uses in the coastal zone of a state must provide in the license application a certification that the proposed construction and operation of the project comply with the state's approved coastal management program and will be conducted in a manner consistent with the program. A copy of the certification must be furnished to the state, and the state must, within six months, notify the Commission that it concurs or objects to the applicant's certification. If the state fails to furnish the required notification within six months after receipt of its copy of the applicant's certification, the state's concurrence with the certification is conclusively presumed. Washington Ecology and King County state that the license should not be issued until a certification has been submitted to, reviewed by, and concurred in by the state.

Weyerhaeuser submitted its certification to the Commission on June 23, 1992, and submitted a copy of the certification to Washington Ecology on June 29, 1992. By letter dated December 29, 1992, Washington Ecology submitted its concurrence in the certification. 8/

6/ The water quality certification places a number of conditions upon the certification. Only one of them appears inconsistent with the Commission's determinations. While the EA for the project determined that the project's run-of-river mode of operation would make monitoring of temperature in the project area unnecessary, Washington's water quality certification requires such monitoring. Since Section 401(d) of the CWA provides that any certification provided under Section 401 shall become a condition on any federal license for the activity in question, Weyerhaeuser must comply with the water quality certification's condition. See Noah Corporation, 57 FERC ¶ 61,170 (1991).

7/ 16 U.S.C. § 1456(3)(A).

8/ The concurrence was filed with the Commission on January 4, 1993. In its concurrence, Washington Ecology noted that its concurrence was based upon Weyerhaeuser's receipt of a shoreline substantial development permit from King County, and that if no appeal of the permit was filed by December 30, 1992, the concurrence would stand. Since Washington Ecology has not filed any subsequent statement, we assume that it intends its concurrence to stand.

ECONOMIC EVALUATION

In determining whether a proposed project will be best adapted to a comprehensive plan for developing a waterway for beneficial public purposes, pursuant to Section 10(a)(1) of the FPA, 16 U.S.C. § 803(a)(1), the Commission considers, among other things, whether the project will provide economic benefits and whether it will be financially feasible. In determining whether this project will provide economic benefits and be financially feasible, the Commission considered the project with both the applicant's mitigative proposal, and the Commission's mitigative proposal. 9/

As a general rule, a proposed project is economically beneficial so long as its projected levelized cost is less than its long-term levelized cost of alternative energy to any utility in the region that can be served by the project. The cost of the Calligan Creek Project would be 75.1 mills per kilowatt hour (mills/kWh) with Weyerhaeuser's proposed mitigation, and 75.3 mills/kWh with the Commission's proposed mitigation. The long-term levelized cost of alternative energy would be 96.7 mills/kWh. 10/ The levelized cost of the project under either proposal is less than the levelized cost of alternative energy, and thus the project is economically beneficial under either proposal.

2/ Weyerhaeuser proposed, and Interior and Washington Wildlife recommended, that Weyerhaeuser mitigate the effect of the project on the bypass reach by providing a minimum flow in the bypass reach at the diversion site of 2 cfs year-round, 6 cfs from September 15 through May 14 at the downstream spring site, and 15 cfs from May 15 through September 14 at the downstream spring site. The Commission adopts this minimum flow proposal, but also requires that Weyerhaeuser mechanically clean screens to keep fish out of the intake and install a flow control system using continuous recording gages to control the minimum flow releases at the diversion and downstream spring site. See also fish and wildlife discussion, *infra*.

10/ Based on the Northwest Power Planning Council's projection of regional power resource needs under the medium-high load forecast stated in the 1989 supplement to the Council's Northwest Conservation and Electric Power plan of 1986, the Commission's estimate for the cost of alternative energy assumes as the alternative a coal-fueled steam electric plant and assumes that the region, when treated collectively, would need a new coal-fueled steam electric plant by 1999.

Based on the levelized cost of alternative power of 96.7 mills/kWh, the project would have a net annual benefit of 21.7 mills/kWh or \$470,000 under Weyerhaeuser's mitigation plans over the 50-year analysis period and an annual benefit of about 21.4 mills/kWh or \$464,000 per year under the Commission's proposal over the 50-year term of the license.

To determine if a project is financially feasible, we generally compare the cost of a project's power with the revenues that can be obtained pursuant to a power sales contract for the project. When a power sales contract is not available at the time of licensing, we use the projected levelized alternative energy cost as the maximum potential revenue stream for the sale of project power in determining the project's potential financial feasibility. ^{11/} Although Weyerhaeuser expects to sell the power to a utility in the Northwest, it does not have a power sales contract, and therefore we have, in this instance, used the projected levelized alternative energy cost as the revenue stream for the sale of project power. As discussed above, the levelized cost of the project is lower than the levelized cost of the alternative, and under this analysis, Weyerhaeuser's revenues can be expected to exceed its costs.

Furthermore, assuming 100-percent equity financing, we find that the internal rate of return for the proposed project would be about 11.81 percent with Weyerhaeuser's proposed mitigation, and would be about 11.75 percent with the Commission's proposed mitigation. Under either proposal, the internal rate of return would be fairly secure for investors.

COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. ^{12/} Under Section 10(a)(2)(A), federal and state agencies filed 63 plans that address various

^{11/} In our analysis, we assume that the project will be 100-percent equity financed. Assuming 100-percent equity financing results in a more stable internal rate of return than assuming that a portion of project costs would be financed by debt. The rate of return based upon 100-percent equity financing can be compared to other investments such as bank deposits or bonds.

^{12/} Comprehensive plans for this purpose are defined at 18 C.F.R. § 2.19 (1992).

resources in Washington. Of these, seven plans are relevant to this project. ^{13/} No conflicts were found.

RECOMMENDATIONS OF FEDERAL AND STATE FISH AND WILDLIFE AGENCIES

Section 10(j) of the FPA requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act, for the protection of, mitigation of adverse impacts to, and enhancement of fish and wildlife. However, pursuant to Section 4.34(b) of the Commission's regulations, ^{14/} if an agency responsible for submitting mandatory terms and conditions or prescriptions to the Commission pursuant to Section 10(j) fails to do so by the deadlines specified by the Commission, the terms and conditions or prescriptions are not subject to the determination, consultation, and finding requirements of Section 10(j) but, if they will not delay or disrupt the proceeding, they are considered under Section 10(a)(1) of the FPA.

^{13/} (1) Snohomish River Basin Instream Resources Protection Program, 1979, Washington State Department of Ecology; (2) Washington's Statewide Comprehensive Outdoor Recreation Plan, 1985, Interagency Committee for Outdoor Recreation; (3) Washington Outdoors: Assessment and Policy Plan, 1990-1995, 1990, Interagency Committee for Outdoor Recreation; (4) Northwest Conservation and Electric Power Plan, 1986, Power Planning Council; (5) 1987 Strategies for Washington's Wildlife, 1986, Washington State Department of Game; (6) Hydroelectric Project Assessment Guidelines, 1987, Washington State Department of Fisheries; (7) Hydroelectric Project Assessment Guidelines, 1987, Washington State Department of Fisheries; (8) Shorelands and Coastal Zone Management Program, 1986, Washington State Department of Ecology; and (9) Washington State Hydropower Development/Resource Protection Plan, 1992, Washington State Energy Office. This last plan became effective on January 1, 1993, and does not apply to facilities or projects which, on the date the plan became effective, were generating power (including facilities undergoing relicensing), or for which an applicant had completed, at a minimum, the first stage of the Commission's consultation requirements as defined at 18 C.F.R. Parts 4, 16, 375, and 380, or subsequent amendments. Although the plan would ordinarily be considered relevant to this project, it does not apply in this instance, because Weyerhaeuser was well beyond the first stage of consultation on the plan's effective date.

^{14/} 18 C.F.R. § 4.34(b) (1992).

In this proceeding the deadline for filing fish and wildlife terms and conditions pursuant to Section 10(j) was April 28, 1992. Washington Wildlife did not file its recommendations until May 12, 1992, and Interior did not file its recommendations until June 19, 1992. Therefore the recommendations have not been considered pursuant to the determination, consultation, and finding requirements of Section 10(j). But, since their consideration would not delay or disrupt the proceeding, the recommendations have been considered pursuant Section 10(a)(1).

The EA for the Calligan Creek Project addresses the concerns of the federal and state fish and wildlife agencies in detail, and the license includes conditions consistent with the agencies' recommendations that Weyerhaeuser: (1) install filtration fences and sediment retention ponds where Weyerhaeuser proposes to pump sediment-laden water from excavation onto adjacent sloping dense forest land; (2) develop a gas supersaturation monitoring plan to prevent air entrainment and resulting fish mortality; (3) develop operational rules for sluicing in consultation with the agencies and Tulalip; (4) implement the minimum flow regime proposed by Weyerhaeuser and recommended by Interior and Washington Wildlife to protect spawning and rearing habitat; (5) provide gauges immediately below the diversion and at the downstream spring site, the gauges to be electronically linked in order to ensure minimum flow release compliance at both sites; (6) develop a spawning mitigation plan to improve spawning conditions in the project area and a trout population monitoring plan; (7) construct a self-cleaning fish screen; (8) revegetate the penstock right-of-way with non-woody vegetation rather than trees to benefit wildlife and protect soil stability; (9) develop a plan to monitor the tailrace stage in order to ensure compliance with the ramping rates, and install a gauge which will record the tailrace stage every 15 minutes; 15/ and (10) develop a wildlife management plan that will compensate for wildlife habitat lost as a result of project construction. 16/

15/ Washington Wildlife also recommended that Weyerhaeuser record penstock flows hourly for the duration of the project license. However, these records are not deemed necessary since Weyerhaeuser's minimum flow compliance record will be provided by the tailrace gauging. See Article 412 of the license.

16/ Noting that Weyerhaeuser's application stated that the penstock would cross a "wet area," Interior states that if the "wet area" is a wetland or represents a unique wildlife habitat type or vegetative association, the licensee should develop measures to mitigate the effect of the penstock installation. However, because of its small size (20 feet by 50 feet), and because of the type of area involved, the
(continued...)

In addition, the license adopts Washington's Fisheries' recommendation for a 24-hour flow continuation period to protect emergent fry and juvenile salmonids from the adverse effects of flow fluctuations, 17/ and Interior's recommendation that Weyerhaeuser design the project to permit the retrofitting of an energy-dissipating bypass valve in case such a valve is later needed to provide the recommended flow continuation. The license also reserves for Interior the authority pursuant to Section 18 of the FPA to prescribe fishways, 18/ and allows representatives of the agencies access to the project lands and project works to inspect the site during construction and operation.

Certain of the agencies' recommendations have not been incorporated in the license conditions. First, the agencies recommended that construction activities be limited to the period between March 1 and September 30, and that construction of the penstock take place between July 1 and September 30 in order to avoid construction during periods when erosion and sedimentation are likely to occur. Article 401 of the license provides generally for construction between March 1 and September 30 (including construction of the penstock), and states that construction scheduling should be adjustable according to prevailing weather conditions. The agencies' recommendation has not been adopted, because the agencies have not shown that their proposed restricted construction dates relate to actual conditions at this site, and because the control measures adopted are sufficient to control erosion and sedimentation during construction.

The license does not incorporate the agencies' recommendation that Weyerhaeuser equip the project with an emergency shut-off to prevent erosion in the event of penstock failure, because the proposed penstock design already includes an

16/ (...continued)
area is unlikely to provide any discernible wildlife habitat value and does not represent a unique wildlife habitat or vegetative association.

17/ Interior's recommendation for a 48-hour flow continuation period is not adopted, since no biological evidence was provided that this additional time-period is needed. The license also does not adopt Washington Wildlife's requested maintenance of flows during daylight hours from February 16 to June 15 to protect salmon fry, since there are no salmon in Calligan Creek, and the State of Washington recently determined not to pass anadromous fish into the area.

18/ See, e.g., Lynchburg Hydro Associates, 39 FERC ¶ 61,216 (1987).

air inlet valve which will act as an emergency shut-off valve, and a velocity sensor which will stop the flow of water to the pipeline if the penstock ruptures or fails.

The license does not incorporate Interior's recommendation that water temperature be monitored, because the project will be operated run-of-river, the impoundment is small, and temperature increases due to impounding water or from reduced flows in the bypass reach will therefore be negligible. Nor does the license incorporate the agencies' recommended ramping rates, since these rates were proposed to protect salmon fry emergence, and there are neither salmon, nor plans to establish salmon, in Calligan Creek.

Interior recommended construction of a tailrace barrier, arguing that the project could attract resident fish to the tailrace discharge, and fish could enter the draft tubes and become trapped or stranded in the tailrace area during project shut-down. However, as discussed in the EA, the attraction of resident fish to the tailrace area would not result in injury to the fish, since the project design does not include draft tubes, and the tailrace elevation will prevent fish from coming into contact with the turbine blades.

Washington Wildlife recommended that Weyerhaeuser provide flow continuation and not ramp flows during daylight hours from February 16 to June 15. As discussed in the EA and set out in the license articles, the license establishes restrictive flow continuation and ramping rate terms. ^{19/} Since there are no salmon in Calligan Creek, the more restrictive flows and ramping rates recommended by Washington Wildlife are not necessary.

Finally, Washington Wildlife stated that Weyerhaeuser must obtain a Hydraulic Project Approval from the state and requested that obtaining such approval be made a condition of the license. Such approval has also been made one of the terms of the water quality certification which Washington Ecology issued. Weyerhaeuser has agreed to apply for such approval after receipt of the license. The licenses issued by this Commission set out federal requirements and do not incorporate specific state requirements, many of which, particularly those dealing with project design and construction, are preempted. ^{20/}

^{19/} See Articles 408 through 411.

^{20/} See First Iowa Hydro-Electric Corp. v. FPC, 328 U.S. 152 (1946), California v. FERC, 877 F.2d 743 (9th Cir. 1989), *aff'd*, 110 S.Ct. 2024 (1990).

Weyerhaeuser must, however, obtain such approval in order to satisfy the terms of its water quality certification. ^{21/}

TULALIP'S CONCERNS

Tulalip is a present day successor to the Snoqualmie, Snohomish, and Skykomish tribes which were signatories to the Treaty of Point Elliott. ^{22/} That treaty reserved to the treaty signatories the right of taking fish in their usual and accustomed fishing areas. ^{23/} The site for the proposed Calligan Creek project is located in one of the Tulalip's usual and accustomed fishing areas, ^{24/} and Tulalip argues that the project could, potentially, adversely affect its treaty rights.

^{21/} The agencies recommend that the license require that Weyerhaeuser's plans and studies and functional design drawings be reviewed, accepted, and approved by the agencies. While the license requires Weyerhaeuser to consult with the agencies, it does not provide that they must approve the licensee's plans and designs. The Commission cannot relinquish its responsibility to assess plans and designs, but must retain final approval authority over project structures and operations. See First Iowa Hydro-Electric Corp. v. FERC, *supra*; see also Northern Wasco County People's Utility District, 57 FERC ¶ 61,214 at p. 61,706 (1991), 60 FERC ¶ 61,087 at p. 61,281(1992); Eugene Water and Electric Board, 49 FERC ¶ 61,211 at p. 61,743 (1989); and Commonwealth of Pennsylvania v. FERC, 868 F.2d 592 (3rd Cir. 1989).

^{22/} See 12 Stat. 927 (1855); and United States v. Washington, 459 F. Supp. 1020, 1039 (W.D. Wash. 1978).

^{23/} Article V of the treaty states:

The right of taking fish at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting and gathering roots and berries on open and unclaimed lands.

See 12 Stat. at p. 928.

^{24/} See United States v. Washington, *supra*, at pp. 1058-60, and United States v. Washington, 626 F. Supp. 1405, 1482, 1530, and 1532 (W.D. Wash. 1985), where the court determined that the Snohomish River System, including tributaries and fresh water lakes and the Snoqualmie and Skykomish River Systems, are usual and accustomed fishing places of the Tulalip.

It maintains that the Commission has a fiduciary duty to protect those rights. 25/

Tulalip also maintains that it is a government with responsibilities for fisheries management in affected waters, 26/ and therefore is entitled to be included in the study and review process in the same manner as a federal agency.

Tulalip states that it relies on anadromous fish runs supported by the Snohomish River System in exercising its protected treaty fishing rights, and it maintains that construction and operation of the proposed project, alone and cumulatively with other projects proposed to be located in Tulalip's usual and accustomed fishing areas, poses a serious threat to the anadromous fishery, fish habitat, and the aquatic resources of the Snohomish River Basin in which the project is located. In support of this position, it states without elaboration that: (1) construction of parts of the project and access-related roads and rights of way could alter forest and riparian habitat; (2) increased turbidity from erosion and

25/ BIA filed a comment in support of Tulalip's position, maintaining that the federal fiduciary responsibility mandates an obligation to sustain both resident and anadromous fisheries, habitat to produce those fish, and access to the fishery. BIA requests that the license only be issued with measures adequate to protect Tulalip's interests.

26/ In particular, it argues that it is a co-manager of the treaty fishery along with federal and state agencies pursuant to the Salmon and Steelhead Conservation and Enhancement Act, 16 U.S.C. 3301, 3311(d), and 3321(b). Section 3301 establishes a cooperative program among the United States, the States of Washington and Oregon, and the treaty tribes, acting through tribal coordinating bodies, to encourage stability in and promote the economic well-being of treaty and non-treaty commercial fishing and charter fishing industries. Section 3311 establishes a Salmon and Steelhead Advisory Commission, of which the Washington tribal coordinating body is designated a member. Section 3311(d) states that no report of the Advisory Commission can be submitted to the Secretary of the Interior for approval unless it is approved by all the members. Finally, Section 3321 provides for grants for projects for the enhancement of salmon and steelhead resources, and Section 3321(b) states that any such enhancement project must be in accordance with a comprehensive enhancement plan developed and agreed to among the states and the tribal coordinating bodies, and approved by the Secretary of the Interior in consultation with the Secretary of Commerce.

siltation could result in decreased water quality and sedimentation of spawning beds; (3) construction of the powerhouse and related facilities may destroy or degrade fish habitat; (4) operation of the project may dewater fish habitat; (5) flow fluctuations will result in reduced spawning habitat and in egg and fry mortality; and (6) powerhouse discharge may attract spawners due to water velocity.

Tulalip requests that all potential impacts of the project, including cumulative impacts, be addressed by the applicant, subject to consultation with, comment on, and approval by Tulalip. Tulalip argues that the studies should also address potential impacts on tribal hunting, gathering, religious and cultural rights and interests.

Finally, Tulalip requests that the Commission complete a consolidated review of this and all other Snohomish River Basin projects, 27/ prepare an environmental impact statement, deny

27/ Tulalip states that the Commission has pending before it a joint petition filed on February 23, 1983, by Tulalip and the National Marine Fisheries Service, requesting consolidated review for all projects proposed in the Snohomish River Basin. This petition was rendered moot by the Commission's subsequent adoption of the cluster impact assessment procedures (CIAP). See Commission Directive to Staff, 29 FERC ¶ 61,402 (1984) (Directive), and Procedures for Assessing Hydropower Projects Clustered in River Basins, 31 FERC ¶ 61,095 (1985) (Procedures). The CIAP constituted a process, culminating in a cumulative environmental impact statement (CEIS), to analyze the potential cumulative impacts of multiple license applications in a river basin. The Commission undertook such a process with respect to the license applications then pending in the Snohomish River Basin. See the CEIS issued June 1987, in Docket No. EL85-19-101, and subsequent orders disposing of the license applications for those projects: City of Seattle, et al., 44 FERC ¶ 61,181 (1988); Weyerhaeuser Company, 44 FERC ¶ 61,182 (1988); and Gull Industries, Inc., 55 FERC ¶ 61,040 (1991). The EA for Project No. 8864 (Section V.A.2.) also considered the projects in the basin which have been licensed. Of the proceedings which the 1983 submission requested be consolidated for review, 53 were preliminary permits or permit applications. The Commission has held that preliminary permit applications should not be considered in cumulative analyses, because they do not provide for the construction of projects, but rather only the study of projects, and do not constitute sufficient action to warrant inclusion in a cumulative assessment. See Directives at p. 61,844, and Procedures at p. 61,178. See (continued...)

the license if the need for additional power is not demonstrated, and hold an oral hearing if the license is not denied outright. 28/

Pursuant to Sections 10(a)(2)(B) and 10(a)(3) of the FPA, the Commission is required to solicit and consider recommendations, including fish and wildlife recommendations, of

27/ (...continued)

also Cowlitz Basin 1 Limited Partnership, et al., 62 FERC ¶ 62,128 (1993).

28/ We conclude that an oral hearing is not necessary for the adequate disposition of this proceeding. As discussed in the EA, a need for power is expected to exist in the Pacific Northwest during the 1990s. Also, the Commission has considered the cumulative impact of this project and the other projects located in the Snohomish River Basin. First, in 1987 a cumulative environmental impact statement (CEIS) was issued for a number of proposed projects (including the Calligan Creek Project) to be located in the Snohomish River Basin. (See n. 27, supra.) That CEIS determined that the Calligan Creek Project had the potential to contribute to cumulative impacts on two resources -- resident trout and black-tailed deer -- but that such impact could be reduced to low levels with staff-recommended mitigation.

The cumulative impacts are further addressed in the EA for this project. The EA notes that there are seven existing licensed projects, one exempted project, and one other pending license application for a project in the Snohomish River Basin. The EA determined that there could be cumulative adverse effects on resident fish and black-tailed deer. However, the EA states that, with the mitigation adopted in the license, resident trout habitat would be protected for all life stages, therefore eliminating any contribution by this project to an adverse cumulative effect on resident trout in the Snohomish River Basin. See EA, Section V.A.4. The EA further notes that the powerhouse, access roads, and other project facilities would supplant about 1.1 acres of coniferous and riparian forest that deer use as habitat, and thus contribute to a cumulative adverse effect on black-tailed deer in the basin. The license requires Weyerhaeuser to develop a plan to fully compensate for habitat lost as the result of project construction. The implementation of this plan will prevent a cumulative adverse effect on deer.

Indian tribes affected by the project. 29/ The Commission has stated that these sections of the FPA give such Indian tribes a "special status of their own" in the licensing process parallel to that of resource agencies. 30/ As explained above, Tulalip has legal rights pursuant to the Treaty of Point Elliott which could be affected by the project, and accordingly, the Commission has given its comments and recommendations consideration similar to that given those of resource agencies under Section 10(a) of the FPA.

Tulalip's concern that the project will adversely affect anadromous fish appears to be unfounded, since there are no anadromous fish in the area of the project. 31/ However, the particular possible adverse effects Tulalip raises, which could also affect resident fish, are addressed in the EA, and appropriate conditions have been incorporated in the license to mitigate those possible effects. Specifically, the license mitigates the effects of the project by requiring Weyerhaeuser to implement an erosion and sediment control plan (Article 401) and to install filtration fences (Article 402) and a sluice gate (Article 405). Fish and riparian habitat are further protected by Article 406, which sets minimum flows for the bypass reach. Control of flow fluctuations is provided for by Articles 408 through 413, which provide for a run-of-river operation, maintenance of a continuation of flow in the event of flow disruption, ramping rates, an electronically connected flow control system, turbine deflectors for flow continuation, and a plan to install a stage discharge gauge to monitor ramping rates. Also, Article 418 requires Weyerhaeuser to file with the Commission a wildlife mitigation plan which will provide for

29/ "Affected" tribes are those whose legal rights as a tribe may be affected by the project. See 18 C.F.R. § 4.30 (1992).

30/ III FERC Stats. & Regs., Regs. Preambles ¶ 30,921 at p. 30,107 (Order No. 533) (May 8, 1991). (56 Fed. Reg. 23,108, May 20, 1991.)

31/ Washington Fisheries initially had intervened in anticipation of passing anadromous salmon above Snoqualmie Falls, which is located downstream of the project, and which currently is a barrier to anadromous fish. However, on May 1, 1992, the Washington Fisheries filed a comment noting that the state recently has decided not to establish anadromous fish above the falls, but to continue resident fish production. The license nevertheless incorporates an article reserving authority for Interior to prescribe fishways. See Article 415. Thus, if anadromous fish are introduced above the falls at some future date, the license will protect such fish.

revegetation and replacement of habitat. In addition, the license requires Weyerhaeuser to conduct its studies and develop its plans concerning fish resources in consultation with Tulalip as well as with federal agencies. ^{32/}

Although Tulalip argues that the studies should also address impacts on tribal hunting, gathering, religious and cultural rights and interests, it does not specify how these rights may be affected or request any specific mitigation. Nevertheless, Article 420 of the license requires the licensee to consult with Tulalip and other native American tribes before starting any land-clearing or land-disturbing activities associated with the project, and to conduct a cultural resources survey of the affected areas. Further, if the licensee discovers any previously unidentified archeological or historic sites during the course of construction or development, it must stop all land-clearing and land-disturbing activities and consult with Tulalip and other tribes. ^{33/}

SECTION 18 FISHWAY PRESCRIPTION

Interior requested that the Commission reserve for it the authority to prescribe, in the future, the construction, operation, and maintenance of downstream fishways at the project. This authority is reserved in Article 416 of the license.

SUMMARY OF FINDINGS

Background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment are contained in the EA, which is attached to and a part of this order. Issuance of this license is not a major federal action significantly affecting the quality of the human environment.

The project will be safe if constructed, operated, and maintained in accordance with the requirements of this license. Analysis of related issues is provided in the Safety and Design

^{32/} See Articles 404(2), 405(4), 407, 408, 409, 412, 413, 414, 415, 417, and 420. As noted above, Tulalip also requests that the license require its approval of Weyerhaeuser's plans and designs. While the license requires Weyerhaeuser to consult with Tulalip, it does not provide that they must approve the licensee's plans and designs. The Commission cannot relinquish its responsibility to assess plans and designs, but must retain final approval authority over project structures and operations. See n. 21, *supra*.

^{33/} Archeological, historic, and cultural sites would include Indian religious sites.

Assessment, which is available in the Commission's public file associated with this project.

We conclude that the Calligan Creek Project does not conflict with any planned or authorized development and is best adapted to comprehensive development of the waterway for beneficial public use.

The Commission orders:

(A) This license is issued to Weyerhaeuser Company (licensee) for a period of 50 years, effective the first day of the month in which this order is issued, to construct, operate, and maintain the Calligan Creek Project. This license is subject to the terms and conditions of the Federal Power Act (FPA), which is incorporated by reference as part of this license, and to the regulations the Commission issues under the provisions of the FPA.

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown by exhibit G:

<u>Exhibit No.</u>	<u>FERC No. 8864-</u>	<u>Showing</u>
G-1	8	Project Boundary

(2) Project works consisting of: (1) an eight-foot-high, 60-foot-long diversion dam with crest elevation at 2,221.0 feet above mean sea level (msl); (2) a 23-foot-wide, 8-foot-long intake structure with fish screens; (3) a 42-inch diameter, 1,400-foot-long steel siphon that is filled with water at start-up times by an 18-inch-diameter, 1,400-foot-long force main; (4) a 40-inch-diameter, 4,925-foot-long steel penstock; (5) a 42-foot-wide by 44-foot-long powerhouse containing a generating unit with a rated capacity of 5.4 MW; (6) a 148-foot-long tailrace returning the discharge into the creek; (7) a 4.25-mile-long, 35-kilovolt transmission line tying into the substation of the Black Creek Project No. 6221; and (8) related facilities.

The project works generally described above are more specifically described in Section 3, Project Structures, of exhibit A of the application and shown by exhibit F:

<u>Exhibit No.</u>	<u>FERC No. 8864-</u>	<u>Showing</u>
F-1	1	Location map
F-2	2	General plan

F-3	3	Diversion weir and intake structure plans and sections
F-4	4	Penstock profile and details
F-5	5	Powerhouse plans and sections

(3) All of the structures, fixtures, equipment, or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) Those sections of exhibit A and the exhibits F and G described above are approved and made part of the license.

(D) This license is subject to the articles set forth in Form L-11, (October 1975), entitled "TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED MAJOR PROJECT AFFECTING THE INTERESTS OF INTERSTATE OR FOREIGN COMMERCE", except article 20.

Article 201. The licensee shall pay the United States an annual charge, effective the first day of the month in which this license is issued, for the purpose of reimbursing the United States for the cost of administration of Part I of the FPA, as determined by the Commission. The authorized installed capacity for that purpose is 7,200 horsepower.

Article 202. Pursuant to Section 10(d) of the FPA, after the first 20 years of operation of the project under license, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. The licensee shall set aside in a project amortization reserve account at the end of each fiscal year one half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of the specified rate of return per annum on the net investment. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year after the first 20 years of operation under the license, the licensee shall deduct the amount of that deficiency from the amount of any surplus earnings subsequently accumulated, until absorbed. The licensee shall set aside one-half of the remaining surplus earnings, if any, cumulatively computed, in the project amortization reserve account. The licensee shall maintain the amounts established in the project amortization reserved account until further order of the Commission.

The specified reasonable rate of return used in computing amortization reserves shall be calculated annually based on current capital ratios developed from an average of 13 monthly balances of amounts properly to be included in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rate for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 203. The licensee shall clear and keep clear to an adequate width all lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which result from maintenance, operation, or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of lands and disposal of unnecessary material shall be done with due diligence to the satisfaction of the authorized representative of the Commission and in accordance with appropriate federal, state, and local statutes and regulations.

Article 204. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and water for which the licensee may grant permission without prior

Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d) (7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Hydropower Licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to insure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee shall not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

Article 301. The licensee shall commence construction of the project works within two years from the issuance date of the license and shall complete construction of the project within four years from the issuance date of the license.

Article 302. Before starting construction, the licensee shall review and approve the design of contractor-designed cofferdams and deep excavations and shall make sure construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit one copy to the Commission's Regional Director and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, Division of Dam Safety and Inspections), of the

approved cofferdam construction drawings and specifications and the letters of approval.

Article 303. At least 60 days before the start of construction, the licensee shall submit one copy to the Commission's Regional Director and two copies to the Commission (one of these shall be a courtesy copy to the Director, Division of Dam Safety and Inspections) of the final contract drawings and specifications along with an accompanying supporting design report for pertinent features of the project, such as water-retention structures, powerhouse, and water conveyance structures.

The supporting design report should be consistent with the Commission's Engineering Guidelines. The Commission may require changes in the plans and specifications to assure a safe and adequate project.

If the licensee plans substantial changes to location, size, type, or purpose of the water-retention structures, powerhouse, or water conveyance structures, the plans and specifications shall be accompanied by revised Exhibit F and G drawings, as necessary.

Article 304. Within 90 days after finishing construction, the licensee shall file for Commission approval revised Exhibits A, F, and G to describe and show the project facilities as-built. The licensee shall submit six copies to the Commission, one copy to the Commission's Regional Director, and one to the Director, Division of Project Compliance and Administration.

Article 401. The licensee shall implement the Erosion and Sediment Control Plan dated June 10, 1991, filed as part of the application, with the following modifications. All soil disturbing activities, including penstock construction, shall occur between March 1 and September 30. However, the construction scheduling should be flexible enough to be adjustable according to prevailing weather conditions. The staff concludes that the plan with the modifications will minimize soil erosion, sedimentation, and slope instability resulting from construction activities. The Commission may require changes to the plan to ensure adequate protection of the environmental, scenic, and cultural values of the project.

Article 402. The licensee shall not apply water to forest land at a rate that will saturate the soil or cause sheet and rill erosion. Filtration fences shall be installed down slope of all water dispersing areas.

Article 403. At least 90 days before the start of construction, the licensee shall file with the Commission for approval, a plan for the design and construction of a system that

will automatically detect a penstock failure and immediately shut-off flow in the penstock.

The plan, at a minimum, shall include: (1) final design drawings; (2) a schedule for installing and testing the system prior to operation of the project; (3) a schedule for annual testing of the system for the life of the project; and (4) a description of a plan to manually close off the penstock when the system is not operational.

The Commission reserves the right to require changes to the plan. Construction shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 404. At least 90 days before the start of project operation, the licensee shall file with the Commission, for approval, a plan to monitor gas supersaturation at and immediately below the project tailrace downstream for the first year of project operation.

The monitoring plan shall include a schedule for:

- (1) implementation of the program, including details of methods to be used and frequency and location of sampling;
- (2) consultation with the U.S. Fish and Wildlife Service, the Washington Department of Ecology, the Washington Department of Wildlife (collectively, agencies), and affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe) concerning the results of the monitoring; and
- (3) filing the results, agency and Tribes comments, and licensee's response to agency comments with the Commission.

The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Project operation shall not begin until the licensee is notified by the Commission that the plan is approved. Upon

Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 405. At least 90 days before the start of construction, the licensee shall file with the Commission for approval, detailed plans and design drawings for a sluice gate to be incorporated into the diversion/intake.

The plan and design, at a minimum, shall include:

- (1) details of the final design of the sluice gate;
- (2) a schedule for completion of the sluice gate before commercial operation of the project;
- (3) an operational plan for sluicing of sediment during low flow periods; and
- (4) documentation of consultation with the U.S. Fish and Wildlife Service, the Washington Department of Wildlife, and affected Native American Tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe) to determine the appropriate design and operational plan of the sluice gate, including copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Project construction shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 406. The licensee shall release from the diversion dam into Calligan Creek a minimum flow of two cubic feet per second, as measured at the diversion dam, or inflow to the project reservoir, whichever is less, for the protection and enhancement of fish and wildlife resources and riparian vegetation in the bypassed reach of Calligan Creek. The licensee shall additionally ensure that a minimum flow of 15 cubic feet per second from May 15 through September 14, and 6 cubic feet per second from September 15 through May 14, or the combined inflow from Calligan Lake and the spring site, whichever is less, is maintained at the downstream spring site located in the lower portion of the bypass reach (downstream spring site).

This flow may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon agreement between the licensee, the Washington Department of Fisheries, the Washington Department of Wildlife, and Tribes. If the flow is so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

Article 407. The licensee, at least 90 days before the start of any land-clearing or land-disturbing activities at the project site, shall file, for Commission approval, design drawings of the licensee's proposed downstream fish passage. Downstream fish passage shall be provided via an orifice contiguous with the minimum flow release facilities.

This filing shall include, but not be limited to, functional design drawings illustrating the dimensions and operational details of the downstream fish passage.

The licensee shall prepare the aforementioned drawings after consultation with the Washington Department of Wildlife, the U.S. Fish and Wildlife Service (collectively, agencies), and affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe). The licensee shall include with the drawings documentation of consultation and copies of comments and recommendations on the completed drawings after they have been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the licensee's facilities. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the drawings with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the proposed facilities. Land-clearing and land-disturbing activities shall not begin until the licensee is notified by the Commission that the filing is approved. Upon Commission approval, the licensee shall implement the proposal, including any changes required by the Commission.

Article 408. At least 90 days before the start of construction, the licensee shall file with the Commission, for approval, detailed plans and design drawings for an electronically connected flow control system. The licensee shall install, operate, and maintain an automatic flow-release gate at the diversion, a continuous recording streamflow gauge (Geological Survey standard) in the bypass reach immediately below the diversion, and a continuous recording streamflow gauge (Geological Survey standard) in the bypass reach diversion immediately below the downstream spring site.

The plan and design, at a minimum, shall include:

(1) details of the automatic flow release device to be incorporated at the diversion;

(2) a schedule for completion of the electronically interconnected flow release system at least 90 days before the start of project operation. Within 90 days after the installation of the gauge and annually thereafter, the licensee shall file with the Commission, the Washington Department of Wildlife, the Washington Department of Fisheries, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey, records that show the gauge has been accurately calibrated prior to operation, annually, and after repair. The project diversion and gauge installations shall be shown on the as-built drawings as required by Article 304.

(3) documentation of consultation with the U.S. Fish and Wildlife Service, the Washington Department of Wildlife (collectively, agencies), and affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe) to determine the appropriate design and location of the gauge system, including copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Project operation shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

The licensee shall provide the flow information from the gauge required by this article to the Commission and appropriate agencies and Tribes within 30 days from a request for the information. The Commission reserves the right to require additional gaging if determined necessary in the future.

Article 409. The licensee, at least 90 days before the start of any land-clearing or land-disturbing activities at the project site, shall file, for Commission approval, design drawings of the licensee's proposed turbine deflectors. Deflectors shall be designed and built to specifications to allow flow continuation in the event of a project shutdown.

This filing shall include, but not be limited to, functional design drawings illustrating the dimensions and operational details of the Pelton turbine deflectors.

The licensee shall design the project to facilitate retrofitting of an energy-dissipating bypass valve, should the deflectors fail to provide the recommended flow continuation.

The licensee shall prepare the aforementioned drawings after consultation with the Washington Department of Wildlife, the U.S. Fish and Wildlife Service (collectively, agencies), and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe). The licensee shall include with the drawings documentation of consultation and copies of comments and recommendations on the completed drawings after they have been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the licensee's facilities. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the drawings with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the proposed facilities. Land-clearing and land-disturbing activities shall not begin until the licensee is notified by the Commission that the filing is approved. Upon Commission approval, the licensee shall implement the proposal, including any changes required by the Commission.

Article 410. The licensee shall, whenever possible, maintain a continuation of flow in the event of flow disruption resulting from a short term shut-down of turbine operation, according to the following criteria:

- (a) When flows exceed the annual 10 percent exceedence flow, no flow continuation is required;
- (b) When flows are less than the critical flow (the flow above which there is no risk of stranding) flow continuation shall be maintained for a minimum of 24 hours. The licensee shall coordinate with the appropriate agencies to determine the critical flow; and
- (c) At all other times, a minimum of six hours of flow continuation shall be provided.

In situations where project shut-down will occur for greater than 24 hours, flow continuation requirements should be disregarded, and ramping started immediately. If any disruption

of flow occurs such that the intake structure is unable to divert water, than the licensee shall disregard the flow continuation criteria, and gradually ramp flows.

Article 411. The licensee shall maintain maximum rates of change in river flow (ramping rates) during project start-up and shut-down according to the following table.

Ramping rates to be maintained for the Calligan Creek Project.

Day of the Year	Daylight ramping rates (inches/hr)	Nighttime ramping rates (inches/hr)
February 16 to June 15	2	2
June 16 to October 31	2	1
November 1 to February 15	2	2

* Daylight is defined as one hour before sunrise to one hour after sunset.

The location at which to measure ramping rate compliance shall be mutually determined by the licensee, the U.S. Fish and Wildlife Service, the Washington Department of Wildlife, and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe) prior to project operation. The location of this site should be identified in the as-built drawings as required by Article 304.

Article 412. The licensee, after consultation with the Washington Department of Wildlife, the U.S. Fish and Wildlife Service (collectively, agencies), and the Tribes (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, and Duwamish Tribe), and at least 90 days before beginning any project related land-clearing, land-disturbing, or spoil-producing activities, shall file for Commission approval, a plan to install a stage discharge gauge in Calligan Creek, to monitor ramping rates required in Article 411.

The plan shall include a schedule for installing the staff gauge, determination of the location and design of the gauge, a provision that the gauge record the tailrace stage every 15 minutes for the first three years of the project's operation, and then hourly for the duration of the project license, and a provision for providing the stage data to the agencies and Tribes within 30 days after the date of the agencies or Tribes' request for the data.

The filing shall include comments from the consulted agencies and Tribes on the plan. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the drawings with the Commission. The Commission reserves the right to require changes to the plan. No project related land-clearing, land-disturbing, or spoil-producing activities shall begin until the licensee is notified by the Commission that the plan complies with the requirements of this article. Upon Commission approval, the licensee shall implement the proposal, including any changes required by the Commission.

Article 413. The licensee shall operate the project in a run-of-river mode for the protection of aquatic resources in Calligan Creek. The licensee shall at all times act to minimize the fluctuation of the forebay surface elevation by maintaining a discharge from the project so that, at any point in time, flows as measured downstream from the project tailrace approximate the sum of inflows to the project forebay. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement between the licensee and the U.S. Fish and Wildlife Service, the Washington Department of Wildlife, and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe). If the flow is so modified, the licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

Article 414. The licensee, at least 90 days before the start of any land-clearing or land-disturbing activities at the project site, shall file, for Commission approval, detailed plans and design drawings for a self-cleaning fish screen system to reduce the entrainment of resident fish.

The plan should include a schedule for completion of the screen before commercial operation of the project. The licensee should consult with the U.S. Fish and Wildlife Service, the Washington Department of Wildlife, and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe), and should design the screen to conform with Washington Department of Wildlife standards. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the drawings with the Commission. An operation and maintenance plan for the system should be included in the filing.

The licensee shall file, with the Commission, as-built drawings of the screen system as required by Article 304.

The Commission reserves the right to require changes to the plan. No land-disturbing activities shall begin until the

licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

Article 415. At least 90 days before the start of land-disturbing or land-clearing activities, the licensee shall file, for Commission approval, a plan for monitoring trout spawning habitat. The plan shall include measures to monitor the effects the project impoundment would have on spawning habitat, and if this habitat is affected, a requirement to provide a mitigative plan, to be filed for Commission approval.

Additionally, the licensee should complete their proposed trout population monitoring plan (referenced in Summary of Consultation, dated November 1, 1991) and file it for Commission approval.

The licensee shall prepare both plans after consultation with the U.S. Fish and Wildlife Service, the Washington Department of Wildlife (collectively, agencies), and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe). The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plans after they have been prepared and provided to the agencies and Tribes, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the plans. The licensee shall allow a minimum of 30 days for the agencies and Tribes to comment and to make recommendations prior to filing the plans with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plans. No land-clearing or land-disturbing activities shall begin until the licensee is notified by the Commission that the plans are approved. Upon Commission approval, the licensee shall implement the plans, including any changes required by the Commission.

If the results of monitoring indicates that changes in project structures or operations are necessary to protect the trout populations in Calligan Creek, the Commission may direct the licensee to modify project structures or operations.

Article 416. Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or provide for the construction, operation, and maintenance of, such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce.

Article 417. The licensee shall design and construct the transmission line in accordance with guidelines set forth in "Suggested Practices for Raptor Protection on Power Lines--the State of the Art in 1981," by Raptor Research Foundation, Inc.

The licensee shall consult with the U.S. Fish and Wildlife Service, the Washington Department of Wildlife, and the affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe) in adopting these guidelines and shall develop and implement a design that will provide adequate separation of energized conductors, groundwires, and other metal hardware, adequate insulation, and any other measures necessary to protect raptors from electrocution hazards.

The licensee shall file as-built drawings of the transmission line design with the Commission as required by Article 304.

Article 418. At least 90 days before the start of any land-clearing or land-disturbing activities, the licensee shall file with the Commission for approval, a wildlife mitigation plan.

The plan shall provide for, but not be limited to:

- (1) clearing, revegetating, and maintaining the pipeline right-of-way in shrubs, forbs, and grasses for the benefit of wildlife resources;
- (2) mitigating any losses of coniferous and riparian forest habitat and shall include, but not be limited to, (a) identification of the type of habitat to be used for replacement; (b) a map showing the location and number of acres of habitat to be used for replacement; (c) a plan to manage the habitat to optimize its value to wildlife; (d) a monitoring program to determine the effectiveness of the plan; and (e) a schedule for filing the monitoring results with the Commission; and
- (3) an implementation schedule with provisions for periodic review and revision.

The licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service, Washington Department of Wildlife, and King County. The licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified that the plan is approved. Upon

Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Article 419. At least 90 days before the start of any land-disturbing or land-clearing activities, the licensee shall file for Commission approval a plan to avoid or minimize disturbances to the quality of the visual resources of the project area. At a minimum, the plan shall include:

- (1) The licensee's strategy for blending the project works into the existing landscape character, including
 - (a) Using natural materials to finish, clear, and grade edges to minimize any straight-line effects,
 - (b) Making all access roads as visually unobtrusive as possible and making them only wide enough to accommodate slow-moving traffic,
 - (c) Putting site turnouts in the least visually sensitive areas and making road cuts follow the existing topography as much as possible,
 - (d) Using natural looking, nonreflective building materials and coloring compounds that would be visually compatible with the site,
 - (e) Burying the transmission lines where possible, and
 - (f) Removing spoil materials after construction and promptly revegetating affected areas;
- (2) Ways to revegetate, stabilize, and landscape new construction areas and areas next to the project site that affect the visual resources of the area;
- (3) Ways to grade, plant, and repair slopes damaged by erosion and ways to prevent future erosion;
- (4) A schedule for carrying out the plan;
- (5) Programs for maintaining and monitoring the project's construction and operation; and
- (6) Provisions for periodically reviewing and revising the plan.

The licensee shall prepare the plan after consultation with the King County Planning Office. Before filing the plan with the Commission, the licensee shall allow a minimum of 30 days for the agency to comment and to make recommendations on the completed plan, and include documentation of consultation and agency

comments on the completed plan with the filing. For any of the recommendations not adopted, the filing shall include the licensee's reasons, based on visual and landscape conditions at the site.

The Commission reserves the right to require changes to the plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified that the plan is approved. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Article 420. The licensee, before starting any future land-clearing or land-disturbing activities associated with the project, other than those activities authorized in this license, shall consult with the Washington State Historic Preservation Officer (SHPO) and affected Native American tribes (Tribes) (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, Duwamish Tribe), and shall conduct a cultural resources survey of the affected areas. Further, the licensee shall file the following: (1) a report containing the survey results; (2) a cultural resources management plan, approved by the Commission, to avoid or mitigate impacts to any significant archeological or historic sites identified during the survey; and, (3) the written comments of the SHPO and the Tribes on the report and the plan.

If the licensee discovers any previously unidentified archeological or historic sites during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all land-clearing or land-disturbing activities in the vicinity of the sites, shall consult with the SHPO and the Tribes, and shall file for Commission approval a cultural resources management plan to avoid or mitigate impacts to significant resources, together with the written comments of the SHPO and the Tribes on the plan.

Upon Commission approval the licensee shall implement the plan. The survey and the plan shall be based on the recommendations of the SHPO and the Tribes, shall be conducted and prepared by a qualified cultural resources specialist, and shall adhere to the Secretary of the Interior's Guidelines for Archeology and Historic Preservation.

The report and plan shall contain the following: (1) a description of each discovered site, indicating whether it is listed or eligible to be listed on the National Register of Historic Places; (2) a description of the potential effect of each discovered site; (3) proposed measures for avoiding or mitigating the effects; (4) documentation of the nature and extent of consultation with the SHPO and the Tribes; and (5) a schedule for mitigating effects and conducting additional studies. The Commission may require changes to the plan.

The licensee shall not implement a cultural resources management plan or begin any land-clearing or land-disturbing activities until informed by the Commission that the requirements of this article have been fulfilled.

Article 421. The licensee shall allow representatives of the U.S. Fish and Wildlife Service, and the Washington Departments of Fisheries and of Wildlife who show proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties.

Article 422. The Tribes (Tulalip Tribes, Snoqualmie Tribe, Muckleshoot Tribe, and Duwamish Tribe) shall have access to their usual and accustomed fishing areas located within the project boundaries.

(E) The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to the Commission filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order is final unless a request for rehearing is filed within 30 days of the date of its issuance, pursuant to 18 C.F.R. § 385.713. The filing of a request for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order, except as specifically ordered by the Commission. The licensee's failure to file a request for rehearing of this order shall constitute acceptance of the license.

By the Commission. Commissioner Terzic dissented in part with a separate statement attached.

(S E A L)

Lois D. Cashell

Lois D. Cashell,
Secretary.

ENVIRONMENTAL ASSESSMENT
FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF HYDROPOWER LICENSING
DIVISION OF PROJECT REVIEW

Calligan Creek Hydroelectric Project
FERC No. 8864-007-Washington
July 17, 1992

I. APPLICATION

On June 10, 1991, Weyerhaeuser filed an application for major license, greater than 5 megawatts (MW), for the Calligan Creek Hydroelectric Project. The 5.4 MW project would be located on Calligan Creek in King County, on private lands approximately 9 miles northeast of the City of North Bend, Washington (figure 1).

II. PURPOSE AND NEED FOR ACTION

A. Purpose

The purpose of this project is to make electric power from a renewable resource available to electric utilities. The proposed project would produce about 4.7 gigawatthours of energy annually.

B. Need For Power

A need for more power is likely to exist in the Pacific Northwest sometime during the 1990's. Firm energy provided by the project would, depending on cost, be useful in meeting a part of the projected need.

The combined effect of (1) electrical load growth and (2) a fixed or declining level of existing generation makes adding conservation, or generating resources, or both necessary if adequacy and reliability levels are to be maintained. Four aspects affect the timing for adding more resources: the rate of load growth, load characteristics, the age and condition of existing resources, and system reliability criteria.

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Act), established the Northwest Power Planning Council (Council). The Council adopted a Northwest Conservation and Electric Power Plan in 1983, amended the plan in 1986, and added to the plan in May 1989. The plan includes a 20-year demand forecast and estimates of resources available to meet future demand.

In the plan, the Council recognizes that the future is uncertain and that it's impossible to forecast electrical energy needs accurately. To deal with this uncertainty, the Plan develops a range of high, medium-high, medium, medium-low, and low electrical load growth scenarios.

For resource planning purposes, the Council assumes a probability distribution to describe the likelihood that any given level of future electricity demand will occur. The demand levels between the medium-low and medium-high forecasts are most likely and are considered equally probable. The Council considers demand levels outside the low and high forecasts to be of sufficiently low probability that they're not formally considered in resource planning. The probability of future demand being equal to or above the medium-low forecast is about 76 percent; the probability of future demand being equal to or above the medium-high forecast is about 23 percent.

To forecast the need for more resources, the Council subtracted existing resources (adjusted for any known additions or reductions) from the range of future electricity demands. The Council predicts that if high load growth occurs, the region will need new resources as early as 1992. At the opposite extreme, the region wouldn't need any new resources during the planning period if growth follows the low load path.

In the more likely medium-high and medium-low scenarios, the region will need new resources sometime between 1995 and 2004. The regional load and resource analysis is for average conditions and doesn't necessarily represent any particular power supply sector or individual utility.

To find how other planning bodies in the region view load projections and the need for more resources, we looked at the latest load projections and needs analyses of Bonneville Power Administration (BPA) and the Pacific Northwest Utilities Conference Committee (PNUCC). BPA places a somewhat higher probability on the medium forecast than does the Plan and shows that additional resources would be needed by 1994. The PNUCC projections of regional firm energy loads and resources, which they published in March 1992 show a need for more resources beginning in 1993 (Pacific Northwest Utilities Conference Committee 1992).

Power from the project would be useful in meeting some regional power needs or in meeting a portion of the current and future displacement potential identified for the energy deficient area by the Council. From the time the project comes on line, it would be available to displace fossil-fueled electric power generation normally used to satisfy energy requirements. Such uses could conserve fossil fuels and reduce noxious by-product emissions.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

The proposed project (figure 2) would consist of: (1) a 8-foot-high, 60-foot-long diversion dam with crest elevation at 2,221.0 feet above mean sea level (msl); (2) a 23-foot-wide, 48-foot-long intake structure with fish screens; (3) a 42-inch diameter, 1,400-foot-long steel siphon that is filled with water at start-up times by an 18-inch-diameter, 1,400-foot-long force main; (4) a 40-inch-diameter, 4,925-foot-long steel penstock; (5) a 42-foot-wide by 44-foot-long powerhouse containing a generating unit with a rated capacity of 5.4 MW; (6) a 148-foot-long tailrace returning the discharge into the creek; (7) a 4.25-mile-long, 35-kilovolt transmission line tying into the substation of the Black Creek Project No. 6221; and (8) related facilities.

The diversion dam would create a small impoundment with a surface area of 0.4 acre at normal pool elevation of 2,221 feet msl, containing 1.2 acre-feet of water. Weyerhaeuser would operate the project as a run-of-river facility (flow below the powerhouse would be about equal to inflow to the impoundment).

2. Weyerhaeuser's Proposed Mitigative Measures

Weyerhaeuser proposes the following measures to enhance and mitigate impacts to environmental resources of the project area.

Geology and Soils

- Adhere to the erosion and sediment control plan filed with the application
- Use properly sized, smooth-wide-tracked equipment to limit soil compaction
- Schedule clearing and construction activities during low rainfall and flow periods
- Have an erosion control monitor present during all construction activities

Water Resources

- Design and locate the intake structure with adequate submergence to prevent vortices, air entrainment, and consequent gas supersaturation
- Provide shallow, rapid tailrace flows to attain gas equilibria

- Provide a control mechanism to measure and record flows and to operate the bypass gate to maintain the proposed minimum instream flow
- Install a siphon operated system to stop the flow of water if a penstock rupture occurs upstream of the high point of the penstock
- Design and construct a sluice gate to be included in the diversion weir
- Install mechanical deflectors in front of the Pelton turbine to provide for flow continuation for a minimum of 24-hours in the event of a low-flow shutdown and powerhouse or intake failures
- Install a turbine shut-off valve upstream of the turbine to serve as a back-up to shut off flow should the turbine deflectors fail

Fishery Resources

- Utilize electroshocking and netting to collect and remove fish prior to rerouting streamflow for construction of the project intake
- Provide a minimum instream flow at two sites in the bypass reach of Calligan Creek according to the following schedule:

	<u>Diversion</u>	<u>Spring Site</u>
May 15 to September 14	2 cfs*	15 cfs
September 15 to May 14	2 cfs	6 cfs

*cubic feet per second
- Install fish screens with a maximum approach velocity and screen opening dimensions according to criteria specified by the Washington Department of Wildlife (WDW)
- Conduct daily inspection, maintenance and manual cleaning of the fish screens, in addition to remotely monitoring water elevations to detect clogged screen conditions
- Provide for downstream fish passage via an orifice contiguous with the minimum flow release facilities
- Ramp flows according to interim project guidelines as recommended by WDW

Terrestrial Resources

- Revegetate areas disturbed during construction
- Mitigate wildlife disturbance by installing gates at all new access roads to restrict human activity
- Prevent raptor electrocution by designing and constructing the transmission line in conformance with the 1981 guidelines of the Raptor Research Foundation, Inc.

We discuss each of these proposals in the individual resource sections.

B. Proposed Project with Staff's Mitigative Measures

Under our alternative, the project would include, in addition to the measures proposed by Weyerhaeuser, the following additional mitigative measures:

- Automatic self-cleaning fish screens at the project intake
- A flow control system utilizing continuous recording gauges to control the minimum flow release at the diversion weir and the downstream spring site (see figure 2)
- A wildlife mitigation plan
- Mitigation, if necessary, for any project effects on a boggy area that the penstock would cross
- A visual resources management plan prior to construction to minimize impacts on visual resources
- Using filtration fences at locations where accumulated water would be pumped onto forest land.

C. No-Action Alternative

Under the no-action alternative, the Commission would deny the proposed action. The proposed Calligan Creek Project would not be built, and the power that would have been developed from a renewable resource, would have to be replaced from nonrenewable fuels. There would be no changes to the physical, biological, or cultural resources of the area.

IV. CONSULTATION AND COMPLIANCE

A. Agency Consultation

Commission regulations require prospective applicants to consult with the appropriate resource agencies before filing an application for license. This consultation is the first step in compliance with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, and other federal statutes. Pre-filing consultation must be complete and documented in accordance with the Commission's regulations.

After the Commission accepts an application, formal comments may be submitted by concerned entities during a public notice period. In addition, organizations and individuals may petition to intervene and to become a party to any subsequent proceedings. The comments provided by concerned entities are made part of the record and are considered during the review of the proposed project. After the Commission issued public notices of the Calligan Creek Project on July 26, 1991, and February 28, 1992, the following entities commented on the application or filed motions to intervene:

<u>Commenting entity</u>	<u>Date of letter</u>
Washington Department of Ecology	September 5, 1991* April 22, 1992* March 3, 1992
Washington Department of Fisheries & Washington Department of Wildlife	September 19, 1991*
Tulalip Tribes of Washington	September 20, 1991* April 21, 1992*
Bureau of Indian Affairs	April 16, 1992
Washington Department of Fisheries	April 27, 1992
King County, Washington	April 28, 1992*
Department of the Interior	June 18, 1992**

* denotes a motion to intervene
** denotes late filing

Note: After the public notice period, the Washington Department of Wildlife faxed recommendations on May 6, 1992, but did not officially file them with the Commission.

B. Water Quality Certification

On February 19, 1991, Weyerhaeuser applied to the Washington Department of Ecology (WDOE) for water quality certification for the proposed project. By letter dated January 28, 1992, WDOE denied certification, stating that WDOE was unable to complete an evaluation of the merits of the request until a final agreement on the minimum instream flow was achieved between Weyerhaeuser and the state resource agencies. On January 31, 1992, Weyerhaeuser re-applied for certification, providing documentation of the proposed minimum flow agreement reached with WDW. WDOE accepted Weyerhaeuser's request for water quality certification for the proposed project on February 4, 1992. Pursuant to Commission Order 533, WDOE must act within 1 year from the date of receipt of the request or the certificate is considered waived.

C. Washington Coastal Management Program

Because the project is located in a coastal zone and may affect coastal resources, WDOE must review the proposed project for consistency with the state's Coastal Management Program (CMP). Under the Coastal Zone Management Act of 1972, before a license can be issued, WDOE must: (1) find the project consistent with the CMP or (2) waive the requirements by failing to act in a timely manner. Weyerhaeuser filed a consistency certification with WDOE on June 22, 1992.

WDOE has yet to concur on consistency for the proposed project. Coastal resources that may be affected by hydroelectric development in Washington include anadromous fish and water quality. In this EA, we analyze the expected impacts from the proposed project. In total, the project would result in short-term increases in sedimentation that would have a minor temporary adverse impact on water quality. Based on our analysis, we don't think the project would have a significant impact on coastal resources.

V. ENVIRONMENTAL ANALYSIS

A. General Description of the Locale

1. Snoqualmie River Basin.

The proposed project would be located within the Snoqualmie River Basin of King County, Washington, about 9 miles northeast of the city of North Bend. The Snoqualmie River Basin has a drainage area of about 1,800 square miles, draining the western slopes of the Cascade Mountains. The project site covers 7 acres of privately-owned land along Calligan Creek. Calligan Creek is about 4.8 miles long and meets the North Fork of the Snoqualmie

River at about river mile (RM) 7.5. The creek originates at approximately 3,500 feet msl and drains a total area of about 8.9 square miles of timbered land.

The project area is dominated by 20- to 40-year-old second growth forest of Douglas-fir and western hemlock, with occasional western red cedar and sparse hardwoods. Some riparian forest cover and shrubby thickets exist along the shorelines of the creek.

Climate in the vicinity is strongly influenced by landforms. On the western slopes of the Cascades, winters are wet and mild, while summers are cool and comparatively dry. Mean annual precipitation in the Snoqualmie River Basin ranges from approximately 80 inches at 1,000 feet to 130 inches at higher elevations. Seventy-five percent of yearly precipitation occurs from October through March, with much of the winter precipitation falling as snow at higher elevations. August and September are typically the driest months.

Much of the basin is in private land ownership primarily by Weyerhaeuser. Access to the project area is good due to the existence of numerous private logging roads. The major use of the land is timber production and management. Other uses of the Calligan Creek area include recreational use (hunting and fishing).

2. Proposed and Existing Hydropower Development

(a). The existing licensed projects and exempted projects (indicated by an " * " after the FERC Project No.) in the river basin, as of 6/4/92, are as follows:

<u>Project No.</u>	<u>Project name</u>	<u>Water body</u>
2493	Snoqualmie Falls	Snoqualmie R.
2959	Tolt	SF Tolt R.
3602*	Woods Creek	Woods Creek
4885	Twin Falls	SF Snoqualmie R.
6221	Black Creek	Black Creek
6310	Barclay Creek	Barclay Creek
7563	Weeks Falls	SF Snoqualmie R.
10359	Youngs Creek	Youngs Creek

(b). The pending license applications and exemption applications in the river basin, as of 5/2/92 (figure 2), are as follows:

<u>Project No.</u>	<u>Project name</u>	<u>Water body</u>
8864	Calligan Creek	Calligan Creek
9025	Hancock Creek	Hancock Creek

3. Target Resources

A target resource is an important resource that may be cumulatively affected by multiple resource developments within the basin. Based on public and agency comments, we identified two target resources--resident fish (rainbow trout, coastal cutthroat trout, and brook trout) and black-tailed deer--which could be adversely affected in a cumulative manner by proposed hydropower projects in the Snoqualmie River Basin.

4. Cumulative Impacts

The Council on Environmental Quality defines cumulative impacts as impacts on the environment that result from the impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The Council says cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR, Part 1508.7). The geographical area included in this cumulative impact analysis is limited to the Snoqualmie River Basin.

The proposed project would be located on Calligan Creek, a tributary to the North Fork Snoqualmie River, in the Snohomish River Basin. We first identified target resources in the Snohomish River Basin when we analyzed the potential cumulative impacts of proposed hydropower development in the Snohomish River Basin (Federal Energy Regulatory Commission 1987).

The bypass reach section of Calligan Creek supports populations of natural and planted rainbow and cutthroat trout. Rainbow trout densities in the bypass reach are most likely low to moderate. Numbers of cutthroat trout are less than rainbow trout. With our mitigative measures, resident trout habitat would be protected for all lifestages. Therefore, there would be no cumulative adverse effect on resident trout in the Snohomish River Basin.

Black-tailed deer use the project area as winter range. The powerhouse, access roads, and other project facilities would supplant about 1.1 acres of coniferous and riparian forest that deer use as habitat. This long-term loss of habitat would contribute to a cumulative adverse effect on black-tailed deer in the Snohomish River Basin. In the section on terrestrial resources, we recommend that Weyerhaeuser develop a plan to fully compensate for habitat lost as the result of project construction. Implementing such a plan would prevent a cumulative adverse effect on deer.

No significant adverse cumulative impacts to target resources in the Calligan Creek drainage would occur as a result

of project construction or operation, if the project is constructed and operated with our proposed mitigative measures (see sections V.B.3 and V.B.4).

B. Proposed Project

1. Geology and Soils

Affected Environment: The geologic materials underlying the project area range from Mesozoic to Quaternary in age. Exposed bedrock in the project area consists of metamorphosed sedimentary rocks. These rocks are primarily graywacke-sandstone and argillite. This bedrock is part of a Mesozoic melange belt and contains lenticular inclusions of sandstone and lesser amounts of greenstone, metagabbro, chert, and other lithologies in a sheared matrix of argillite. The project lies in two seismotectonic provinces: the Cascade Mountains and the Puget Lowland. Calligan Lake is on a plateau at the edge of a mountain front. The stream flows out of Calligan Lake and then immediately drops down through a bedrock-walled gorge with slopes that range from 25 to 90 percent. The steep slopes give way to moderately sloping lands and flat valley bottoms.

The bedrock is commonly covered with a thin veneer of colluvial or glacial drifts and forest soil. The sedimentary rocks are primarily hard, competent rocks which have been weakly metamorphosed and deformed by folding and shearing. The glacial drift includes kame terrace deposits, recessional outwash, and till. The kame deposits consist of a heterogeneous fluvial deposit. The fluvial outwash deposits are clean to silty sands and gravels, with thin beds of silt and fine sand. There is also a mixture of silty sandy gravels with boulders and cobbles. These soils are permeable and highly erodible.

Environmental Impacts and Recommendations: The construction of Calligan Creek Hydroelectric Project includes a powerhouse, a reinforced concrete diversion weir, a penstock and intake structure, new access roads, improvements on old access roads, and new transmission lines. These construction activities and the possibility of penstock failure during project operation have the potential for causing soil creep, landslides, and erosion by surface water run-off, which would contribute sediment to Calligan Creek.

The project area has been subjected to landsliding. Slides were observed primarily in colluvium or road sidecast and fill materials on very steep bedrock slopes. The slides are caused by steep slopes, poor drainage and a lack of water run-off control measures. The colluvial soils that cover most of the basin slopes are subject to soil creeping (areas of soil - top layer or underground - slowly moving down slope - so slowly it can not be seen with the eye), however the soil creep rate rarely exceeds

0.1 inch/year, therefore it is not a major threat to the project.

Due to the heavy vegetative cover, soil erosion is held at a minimum in the project area. However, after removing the vegetative cover for the construction of the penstock, powerhouse and other project features, erosion would occur.

Weyerhaeuser's Erosion and Sediment Control Plan (ESCP), states that major land disturbing activities would be scheduled during the dry season, bare soil would be revegetated as soon as possible, and only areas that can be stabilized in the same season would be cleared. Further measures to control erosion and sedimentation outlined in the ESCP include the use of diversions, rock rip-rap, and cofferdams to trap and filter out sediment before it leaves the construction site.

The U.S. Fish and Wildlife Service (DOI), Washington Department of Fisheries (WDF) and WDW are concerned about Weyerhaeuser's proposal to pump sediment-laden water from excavation onto adjacent gently sloping dense forest lands. The agencies suggest the use of sediment retention ponds and the use of filtration fences at locations where water is applied to the land.

We share the same concerns as the agencies. Therefore, when Weyerhaeuser applies water to the forest land it should be done in a manner that would prevent sheet and rill erosion from occurring and the soil from becoming saturated. Filtration fences should be installed down slope from the areas where the water is spread over the forest land.

DOI and WDW recommend that construction activities be limited to the period between March 1 and September 30, and that construction of the penstock take place between July 1 and September 30. While these dates define the average construction season and would be good guidelines, construction within these dates could still cause erosion and sedimentation. DOI and WDW have not provided any information to substantiate the date restrictions. The construction periods should be determined by actual site conditions.

We believe that the control measures Weyerhaeuser has proposed in the ESCP are sufficient and would be effective in controlling erosion and sedimentation during construction of the project.

Weyerhaeuser proposes in the ESCP to have an environmental inspector monitor construction and direct the contractor to take actions to prevent erosion and sedimentation. Weyerhaeuser further proposes to have their own engineering and environmental representative reviewing the project regularly to ensure the ESCP is functioning as designed. We conclude that Weyerhaeuser's

proposal for a project monitor would be sufficient to ensure proper implementation of the ESCP.

DOI, WDF and WDW recommend that Weyerhaeuser equip the project with an emergency shutoff to prevent erosion in the event of penstock failure. As part of the design of the penstock, Weyerhaeuser proposes an air inlet valve (vacuum breaker) to act as an emergency shutoff valve. Because the penstock is a siphon, any break in the penstock before the crown (high point of the penstock) would cause the flow of water to automatically stop. The penstock would also be equipped with a velocity (or pressure) sensor that would automatically open the air inlet valve so that air can be admitted to break the siphon action if the velocity or pressure changes due to a penstock rupture or failure, and stop the flow of water to the pipeline.

We conclude that Weyerhaeuser's automatic shutoff proposal would be sufficient in preventing erosion due to a penstock failure and would also meet the agencies' recommendations for an emergency shut-off valve.

The measures provided for in the ESCP would be appropriate and effective in controlling erosion, sedimentation, and possible slope instability, and we recommend that it be approved. In addition, we also recommend the use of filtration fences where water is applied to the land, and that Weyerhaeuser develop a plan of procedures to follow if high runoff conditions should occur during project construction.

Unavoidable Adverse Impact: Minor temporary localized erosion would be unavoidable during construction activities and until disturbed land surfaces are stabilized.

2. Water Resources

Affected Environment: Only limited gauge records were directly available for the Calligan Creek Basin, so Weyerhaeuser synthesized long term daily flow estimates from local data sources and correlated them to the site of the proposed diversion. The data consisted of daily records for gauges on Calligan Creek (No. 12142300), Hancock Creek (No. 12142200), the North Fork of the Snoqualmie River (Nos. 12142000 & 12143000), the North Fork of the Tolt River (No. 12147500) and daily precipitation records from the weather station at Snoqualmie Falls (No. 7773). Calligan Creek has an estimated average annual flow of 45.7 cfs at the proposed diversion site.

Calligan Creek is typical of steep gradient mountain streams in the local area. October to March are the peak precipitation months. Snowmelt runoff from April to June contributes 36 percent of the annual discharge. Flows in Calligan Creek are seasonally variable (table 1). Data from 5 years of summer

stream flows in the upper reach of Calligan Creek shows that from July through September, streamflow in the first 3,000 feet of stream below Calligan Lake were often less than 1 cfs, and this part of Calligan Creek dried up entirely during 2 of the years.

Table 1. Monthly average streamflow estimates in cubic feet per second (cfs) at the proposed diversion site of the Calligan Creek Project (Source: Weyerhaeuser 1991a).

Month	Mean Flow	Month	Mean Flow
January	63.6	July	23.2
February	50.7	August	7.2
March	37.8	September	14.4
April	52.3	October	27.8
May	78.6	November	53.4
June	67.8	December	71.8

Significant inflow occurs further along in the proposed bypass reach of Calligan Creek from groundwater springs. Water found at the downstream spring site (see figure 2), approximately 4,800 feet downstream from the proposed project intake site, is primarily spring-fed from numerous groundwater springs in the hillsides. These sources occur primarily at the base of the steep slopes. Temperatures of the spring water remains nearly constant year round, usually not exceeding 8° Celsius (C).

Calligan Creek has been assigned class AA (extraordinary) water quality designation by WDOE, which means that the water quality exceeds the requirements for all or substantially all uses. Limited seasonal sampling done by Weyerhaeuser shows that water quality meets the state designation (table 2).

Water Rights

Currently, no other water rights have been granted on Calligan Creek. Weyerhaeuser has applied for a 75-cfs water right for hydroelectric usage, which is now pending. Flows used for generation would be returned to the waterway. We, therefore, believe that the proposed project would not affect any existing water rights.

Table 2. Seasonal water quality results from Calligan Creek near the proposed diversion site of the Calligan Creek Project (Source: Weyerhaeuser 1991a).

Parameter	Date			
	6/26/89	9/22/89	2/15/90	7/26/90
Water Temperature (°C)	12.3	8.9	2.9	13.4
Dissolved Oxygen (ppm)	10.3	10.7	12.8	9.8
Conductivity (µmhos)	28	41	20	0.13
pH	7.5	7.4	7.1	7.1
Turbidity (NTU)	.38	.06	.25	0.13

*C= celsius; ppm= parts per million; µmhos= microsiemens; NTU= nephelometric turbidity units.

Environmental Impacts and Recommendations:

a. Water Quality Monitoring

Gas supersaturation

If vortexing at the intake occurs, hydro project operation can entrain air in water entering the intake. Gas supersaturation can result if entrained air is subjected to pressure greater than 1 atmosphere; fish mortality can result from circulatory and neurological damage as dissolved gases that enter the fish's bloodstream through respiration form bubbles (Weitkamp and Katz 1980; Bouck 1980).

Diverted water re-entering Calligan Creek from below the powerhouse may be supersaturated. Weyerhaeuser states that the intake would be designed to prevent air entrainment and gas supersaturation and the tailrace would be constructed to be broad and shallow to allow for equilibration of gases. Weyerhaeuser believes that this design would rapidly eliminate any supersaturation, if it occurs.

WDOE requires that Class AA water bodies shall not exceed dissolved oxygen levels greater than 110 percent saturation, and expressed concern that the project be properly designed to prevent supersaturation conditions. DOI and WDW recommend that Weyerhaeuser develop a plan to monitor gas saturation during the first year of operation.

We agree that a properly designed intake would reduce the risk of air being entrained at the diversion/intake structure. We do not anticipate significant supersaturation problems at the proposed project. However, we believe that a monitoring plan to

ensure that the design of the project does not cause supersaturation conditions is warranted. Therefore, Weyerhaeuser should design the intake to prevent air entrainment, and submit final design drawings for Commission approval before construction. Concurrently, Weyerhaeuser should file a gas supersaturation monitoring plan for Commission approval. This filing should be accompanied by agency and Tribe comments.

Water temperature

Preliminary monitoring of water quality in the project area shows that parameters are well within the range as required for Class AA waters, as well as within range of tolerable temperatures for rainbow and cutthroat trout (Bell 1986). DOI recommends that Weyerhaeuser design a plan to monitor water quality impacts in the project area, including gas supersaturation, as discussed above.

Since Weyerhaeuser proposes to operate the project as run-of-river, temperature increases due to impounding water or from reduced flow in the 1.3-mile-long bypass reach would be negligible. Temperature effects from the 0.4 acre diversion pool and solar insolation in the bypass reach should be minimal. Warming of the bypass waters could occur if the project were to operate during the warm summer months, but the combined effects of high minimum flows and/or no project operation due to insufficient flows would alleviate much of this effect.

We believe that Weyerhaeuser's proposed project would have minimal impacts on water temperature in the project area. We do not believe that the additional expense of installing and maintaining temperature gauges as recommended by DOI is warranted given the design and operation plans for the proposed project. Therefore, we do not recommend that Weyerhaeuser monitor water temperatures in the project area.

b. Sedimentation

Fine sediments from construction and operation of the proposed Calligan Creek project could accumulate on the upstream side of the diversion, and the increased siltation could impact aquatic resources above and below the diversion. Increasing turbidity could impair respiration in fish and can cause suffocation, disrupt spawning, smother eggs and reduce visibility for sight feeding fish (Rochester et al. 1984). Additionally, the diversion structure could disrupt bedload transport, altering downstream spawning and rearing habitat.

Weyerhaeuser has proposed to incorporate a sluice gate into the design of the diversion/intake, to periodically pass accumulated gravels and sediment. No agency has specifically

requested Weyerhaeuser to install a sluice gate, or commented on the potential sediment related impacts of the proposed project. Weyerhaeuser has not provided details as to what criteria they would use to determine when to sluice sediment deposits through the project.

Sluicing could increase sedimentation and cause turbidity to rise above the state standard of less than 5 nephelometric turbidity units (NTU) over background when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU. Dependent upon resultant turbidity levels, aquatic resources could be affected by a sluicing operation. DOI recommends that no sluicing occur from May 15 through September 15, in order to protect spawning and early lifestages of rainbow trout. Sluicing operations would need to consider background water quality parameters, and incorporate ways to reduce or eliminate effects.

We agree that a device such as the proposed sluice gate, to periodically flush accumulated sediments, would eliminate most project sediment/bedload impacts. We also recommend that Weyerhaeuser, in consultation with WDOE, WDW, DOI, and the Tribes^{1/}, submit to the Commission for approval, operational rules for sluicing of sediment during low flow periods. Therefore, Weyerhaeuser should construct the sluice gate as proposed, and submit final as-built drawings for the sluice gate at the project intake.

Unavoidable Adverse Impacts: None.

3. Fishery Resources

Affected Environment: No anadromous fish are found in the project area due to natural barriers. Upstream movement of anadromous fish is blocked by Snoqualmie Falls, a vertical drop of 268 feet, located approximately 11.5 RM downstream from the mouth of Calligan Creek. WDF plants salmon fry in the Snoqualmie River upstream of the falls, but available records indicate that neither the North Fork of the Snoqualmie River nor Calligan Creek have been planted in recent years.

Resident fish found in the Calligan Creek drainage include rainbow trout, coastal cutthroat, and brook trout. Native strains of rainbow and cutthroat have been largely supplemented and replaced with hatchery reared stocks via plants by WDW in Calligan Lake. WDW planted eastern brook trout between 1955 and

^{1/} Tulalip Tribes, the Snoqualmie Tribe, the Muckleshoot Tribe, and the Duwamish Tribe

1969, and cutthroat trout between 1967 and 1982. Only rainbow trout have been planted since 1983.

The bypass reach fishery population sampling conducted by Weyerhaeuser was qualitative, and did not estimate population size or densities. The fishery consists predominantly of rainbow trout, with lesser numbers of cutthroat and brook trout.

Environmental Impacts and Recommendations:

a. Minimum Flows

During project operation, reduced flows in the 1.3-mile-long bypass reach of Calligan Creek would decrease available aquatic habitat below the diversion dam. The existing flow regime in Calligan Creek allows for the presence of a low to moderate, self-sustaining, resident rainbow trout population in the proposed bypass reach. Additionally, a few cutthroat trout are likely to occur in this reach.

The proposed project would divert between 7 and 75 cfs from the bypass reach for generation purposes. The project would only operate when streamflow exceeds the combined instream flow release and the minimum flow required for operation of the turbine (approximately 7 cfs). Based on these operational parameters, the minimum streamflow required for project operation (turbine flow plus the minimum flow) would be 9 cfs, which would allow the plant to operate about 79.5 percent of the time.

Weyerhaeuser completed an instream flow study using the Instream Flow Incremental Methodology (IFIM), in which the bypass reach was divided into transects based on stream character and gradients. Site-specific rainbow trout preference curves were utilized for the target species and lifestages: rainbow trout adult, juvenile and spawning stages. Although cutthroat and brook trout had been planted in Calligan Lake in the past, few occur in Calligan Creek.

PHABSIM (Physical Habitat Simulation System) and a "three-flow" IFG4 hydraulic model were used, utilizing HABTAT for the habitat modeling run. The output from HABTAT is expressed as Weighted Usable Area (WUA) versus Flow (Q), which is an index of available habitat per 1,000 feet of stream for each species and life stage modeled. To aid the analysis of these results, staff adjusted the outcome to represent a percentage of maximum WUA versus flow (figure 3).

Weyerhaeuser and WDW agreed that since low numbers of rainbow trout were found in the stream reach between the mouth of Calligan Lake and the spring site, that poor habitat was probably always a factor, and seasonally limited flows contributed also. Because of this, it was visually determined that a year-round

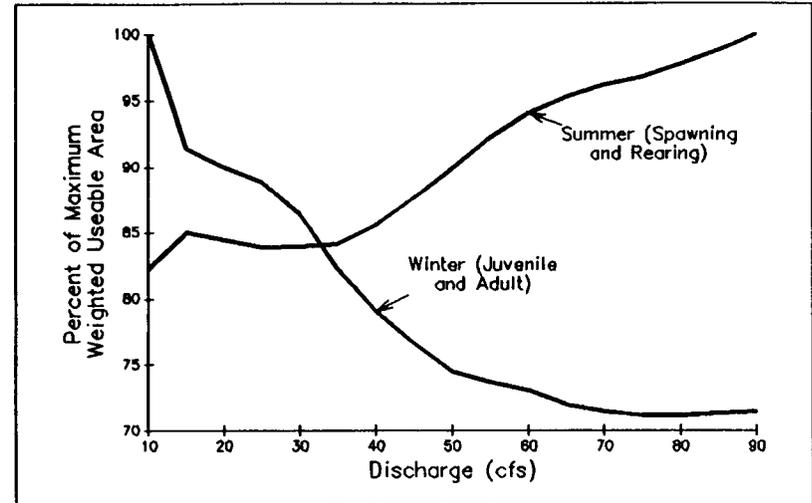


Figure 3. Percentage of maximum weighted usable area versus discharge in cubic feet per second (cfs) for winter (juvenile & adult) and summer (spawning & rearing) resident trout in Calligan Creek bypass reach below the spring site (Source: Weyerhaeuser 1991a).

maintenance flow of 2 cfs in the upper reach of the bypass would be adequate to maintain stream characteristics, since this stream reach periodically dries up.

Beginning approximately 4,800 feet downstream from the mouth of Calligan Lake, the significant spring-fed inflow to Calligan Creek provides flow that greatly increase rainbow trout habitat. WDW and Weyerhaeuser agreed that a separate minimum flow should be determined at the downstream spring site to protect aquatic resources.

The range of flows modelled using the "three flow" IFG4 model was 10 to 90 cfs. At the downstream spring site, habitat availability for juveniles and adults in the summer (spawning & rearing) period was directly related to increased flows. During the winter periods, near maximum habitat for over-wintering trout was provided by the lowest modelled flow of 10 cfs (figure 3). A further analysis of the flow-habitat relationship at low flows was conducted using a one-flow model (Milhous et al. 1989). This extrapolated from the lowest measured flow of 10 cfs to determine

the relationship of flow and habitat at flows lower than measured. The results indicated that 6 cfs at the downstream spring site would provide maximum winter habitat in Calligan Creek. WDW concurred with this finding.

Due to the steep slopes of the stream and the questionable ability of IFIM to model spawning WUA in this type of stream, Weyerhaeuser analyzed spawning habitat based on areas of individual transects where adequate spawning substrate was present. Results were primarily limited by the scarcity of adequate spawning gravels in the bypass reach of Calligan Creek. The results as presented in figure 3 imply that 15 cfs would provide slightly more summer (spawning and rearing) habitat than any higher flow up to 40 cfs. Mean flows in Calligan Creek in the summer are rarely greater than 15 cfs. Additionally, the distribution of suitable spawning gravels at high flows shows that much of this habitat would be dewatered as flows decreased, resulting in desiccation of eggs.

To complete the instream flow analysis for the different life stages, Weyerhaeuser performed a spawn timing and fry emergence study in Calligan Creek. This determined when flow increases would be needed to provide adequate spawning and rearing habitat for resident fish. The majority of rainbow trout spawning in the bypass reach occurred from May 22 to July 7. Weyerhaeuser and WDW agreed that spawning and summer rearing flows should be provided from May 15 to September 14 (table 3).

Table 3. Minimum flows (in cubic feet per second) to be provided to the bypass reach of Calligan Creek at the diversion site and at the downstream spring site, as proposed by Weyerhaeuser (Source: Weyerhaeuser 1991b).

Time Period	Diversion Site	Downstream Spring Site
May 15 - September 14	2 cfs	15 cfs
September 15 - May 14	2 cfs	6 cfs

*note: all flows are minimum flow or inflow, whichever is less

We agree that the minimum flow regime proposed by Weyerhaeuser, and recommended by WDW and DOI, would adequately protect the fishery resource in the bypass reach (table 3). Winter flows of 6 cfs would provide optimum protection for the fish resource, while summer spawning/rearing flows would maximize available habitat, given the physical (scarcity of spawning gravels) and hydrologic (low summertime flows) restrictions present in Calligan Creek. Therefore, we recommend that Weyerhaeuser implement their proposed minimum flow regime.

b. Flow gauge and auto release mechanism

Due to the intermittent flow in the uppermost reach of Calligan Creek between the lake and the spring site, habitat for fish is limiting in this area. Weyerhaeuser has proposed to maintain two separate minimum flows in the bypass reach. One minimum flow release would be maintained at the diversion weir, and a second minimum flow would be maintained at the downstream spring site, located 4,800 feet downstream of the intake.

In order to ensure compliance with any minimum flow recommendation, gauging is necessary at both sites within the bypass reach. Weyerhaeuser would need to monitor both gauge locations, and make adjustments accordingly to the gated release located at the diversion weir. If the minimum required flow at the downstream spring site could not be adequately maintained from spring-fed inflow, then additional flows would need to be released at the diversion in order to meet both minimum flow requirements.

Weyerhaeuser has installed streamflow gauges at the outlet of Calligan Lake and in Calligan Creek at the downstream spring site. Additionally, Weyerhaeuser proposes to provide a continuous recording streamflow gauge and control mechanism to operate the bypass gate and maintain minimum flows.

WDW and DOI recommend that Weyerhaeuser provide gauging immediately below the diversion and at the downstream spring site, and DOI additionally recommends that the gauges be linked to an automatic flow release mechanism at the diversion.

We agree with the agencies that both of the proposed flow gauges should be electronically interconnected to ensure minimum flow release compliance at both sites. Weyerhaeuser has not provided specific design details as to what types of gauges would be installed, but we believe that the two flow recording devices could be interconnected for less than \$30,000. This cost, along with periodic operational and maintenance expenses, would be a minimal expenditure that would subsequently allow Weyerhaeuser to make maximum use of the available flows while ensuring compliance. Therefore, after consulting with WDW, DOI, and the Tribes, Weyerhaeuser should submit for approval to the Commission, plans for an electronically connected flow control system to provide the minimum flow releases at the diversion and at the downstream spring site.

c. Flow fluctuations

Flow fluctuations caused by intermittent powerhouse operations result in unnaturally rapid flow changes over short time-periods (minutes, hours, or days). These events can strand

emergent rainbow trout fry, disrupt spawning, desiccate redds, and disrupt the aquatic invertebrate community, thus directly and indirectly impacting fish production. Flow fluctuations could also increase turbidity and erosion, and remove substrate that is important for resident trout populations.

During emergency or periodic maintenance shutdown, flow downstream of the powerhouse would drop as water is diverted at the intake back into the stream channel. After the water passes through the bypass reach, flows would increase in the downstream reach. When a project comes on line, the flow below the powerhouse increases because the penstock passes flow downstream considerably faster than the same water would flow through the bypass reach. Simultaneously a drop in flow occurs in the bypass reach at the diversion dam. This drop in flow would pass through the bypass reach and then into the downstream reach where it would cause another fluctuation in flow downstream of the powerhouse.

The means of mitigating for project-related flow fluctuations depends on the cause of the fluctuation. WDW and DOI recommend two methods of mitigation, flow continuation and ramping rates. Flow continuation is a short-term (≤ 48 hours) method of preventing flow fluctuations by providing stable habitat for aquatic resources. The advantage of flow continuation is that for short-term interruptions, power generation can be shut off and on without ramping flows, allowing utilities to bring the project back on-line more rapidly.

For long-term (> 48 hours) flow changes, ramping provides protection for aquatic resources by gradually increasing or decreasing flows. When long-term penstock flow disruption is inevitable, WDW states that flow continuation requirements can be disregarded, and ramping can start immediately. This is the case with low flow shut-downs, or mechanical failures that would clearly take more time than 48 hours to repair, or repairs that require dewatering of the penstock.

Flow continuation

Weyerhaeuser wants to install mechanical deflectors in front of the Pelton turbine, which would provide flow continuation past the turbine for 48 hours. Additionally, Weyerhaeuser would install a turbine shut-off valve upstream of the turbine to serve as a back-up to shut-off flow, if the turbine deflectors fail.

WDW and DOI recommend that new projects have the mechanical ability to provide up to 48 hours of continuous flow under conditions such as: low-flow shut-downs; powerhouse failures; or intake failures. Depending on the instream flow, the agencies flow continuation criteria is presented in three stages:

- (1) Under high flow conditions, which are defined as flows in excess of the annual 10 percent flow, no flow continuation is required.
- (2) A minimum of 6 hours of flow continuation should be required when instream flow is between the high flow and the critical flow. The critical flow is defined as the flow above which the risk of stranding or redd dewatering is negligible.
- (3) At or below the critical flow, flow continuation should be maintained for a minimum of 24 hours. From February 16 to June 15, when salmon fry emerge, flow stability must be maintained during daylight hours.

WDW and DOI additionally recommend that Weyerhaeuser design the project to allow retrofitting of an energy-dissipating flow bypass valve if the nozzle deflectors fail to perform as required.

Turbidity and sediment increase under high flow conditions, causing the highest wear on flow continuation equipment. Because the project would not provide flow continuation at higher flows under the agencies' proposal, the equipment wear would be reduced. Under average flows, a 6 hour flow continuation period would provide adequate protection for fisheries resources. The crucial flow period is when flows are at or below the critical flow. This represents the time when the stream is most sensitive to flow fluctuations. Reflecting the importance of protecting emergent fry and juvenile salmonids, the flow continuation is extended to 24 hours. The Washington Department of Fisheries has found that flow continuation for 24 hours provides adequate protection for the fisheries resources (Hunter 1992). DOI recommended that at or below critical flow, flow continuation should be maintained for 48 hours. No biological evidence was provided that this additional time-period is needed.

We do not agree with WDW's additional request to protect salmon fry by maintaining stable flows during daylight hours from February 16 to June 15. There are no salmon in Calligan Creek or the Snoqualmie River for 11.5 river miles downstream of the project. Washington State recently changed its goals of passing anadromous fish above Snoqualmie Falls in favor of continued resident fish production. Therefore, there is no risk of salmon fry stranding or redd dewatering due to flow fluctuations during this February to June time period.

We believe the use of deflectors on the Pelton turbine would be sufficient to provide flow continuation in the event of a project shutdown. It is our experience that the Pelton turbine can be used for this type of bypass system. The additional cost of structural requirements, equipment, control, and installation

of a flow bypass valve system (\$100,000) can be avoided by a properly functioning nozzle deflector system. We recommend, however, that Weyerhaeuser design the project to facilitate retrofitting of an energy-dissipating bypass valve, should the deflectors fail to provide the recommended flow continuation.

Therefore, Weyerhaeuser should ensure that the project is designed and built to specifications to allow these continuous releases, and the potential for future retrofitting if needed, and provide final design drawings to WDW, WDF, DOI, the Tribes, and the Commission prior to project construction. Weyerhaeuser should coordinate with the resource agencies to identify the critical flow once the project is on line.

Ramping rates

Project start-up could suddenly decrease the amount of water in the bypass reach, alter flows downstream of the powerhouse, strand fish, especially fry, in the bypass reach and increase scouring to substrate below the project. Rapid shut-down could suddenly decrease the amount of water below the powerhouse, while rapidly increasing bypass reach flows.

Weyerhaeuser proposes to operate the project run-of-river. Weyerhaeuser has not proposed a specific ramping rate for the bypass reach. WDW recommends interim standards of 1 to 2 inches per hour (in/hr) in lieu of or until agreement is reached upon site-specific ramping rates (table 4). In response to state-recommended design criteria, Weyerhaeuser has agreed to install mechanical equipment with the ability to downramp as low as 1 in/hr. DOI proposes a more restrictive ramping rate of 1 in/hr from May 15 through September 14.

It is generally difficult to develop appropriate ramping rates until a project is capable of providing flow control in order to determine empirically the operational and biological effects of different rates.

We do not agree with WDW's daylight ramping restrictions from February 16 to June 15. These rates are set to protect salmon fry emergence^{2/}. Since there are no salmon in Calligan Creek, we believe that the recommended ramping rates for the bypass reach, modified by a 2-inch daylight stage change from February 16 to June 15, would protect aquatic habitat and fishery resources (table 4).

^{2/} Personal communication, Dr. Hal Beecher, Hydropower Project Coordinator, Habitat Management Division, Washington Department of Wildlife, Olympia, Washington, June 25, 1992.

Table 4. Washington Department of Wildlife interim ramping rate standards, applicable to the proposed Calligan Creek Project (Source: Washington Department of Wildlife 1992).

Day of the year	Daylight ramping rates (inches/hr)	Nighttime ramping rates (inches/hr)
February 16 to June 15	n/a	2
June 16 to October 31	2	1
November 1 to February 15	2	2

n/a - ramping not allowed

WDW recommends that Weyerhaeuser install a gauge and record the tailrace stage every 15 minutes for the first 3 years of project operation, and then hourly for the duration of the project license. To ensure compliance with the ramping rates, we recommend Weyerhaeuser develop a plan to monitor the tailrace stage.

d. Fish monitoring and mitigation plans

Reduced flows in the project reach, even with mitigation provided by minimum flow requirements, could result in some habitat loss for resident trout populations. The scarce spawning gravels in the project area could become further limited. Since most available spawning habitat (gravels) exists in the 0.3 mile (≈1,600 feet) stretch of Calligan Creek between the proposed diversion and Calligan Lake, the existing habitat limitation could be compounded by the barrier the proposed diversion structure would create.

DOI and WDW recommend that Weyerhaeuser develop a plan to assess the effects of proposed project flows on resident trout habitat in the bypass reach. DOI additionally recommends that Weyerhaeuser develop a plan for mitigating project impacts to trout spawning habitat in Calligan Creek between the outlet of Calligan Lake and the diversion dam.

As a corollary to their minimum flow proposal, Weyerhaeuser proposes to develop a long-term monitoring program to evaluate the resident trout populations in the bypass reach to determine any impacts due to project operations. Additionally, Weyerhaeuser proposes to develop a spawning habitat mitigation plan, which would include identifying potential sites within the

bypass reach which could be improved by importing spawning-sized gravels to the sites.

The scarcity of spawning gravels in the project area, both in the bypass reach and between the lake outlet and the proposed diversion site, may represent the limiting factor to the resident trout populations in the project area. The proposed diversion would create an impoundment that would extend approximately 360 feet upstream from the diversion. This could further reduce the naturally limited spawning habitat in Calligan Creek.

We conclude that Weyerhaeuser should explore all options for increasing spawning habitat in the project area, including both above the diversion and in the bypass reach. Therefore, Weyerhaeuser should develop a spawning mitigation plan to improve spawning conditions in the project area. This plan should be filed with the Commission and should include a discussion of the adequacy of present spawning habitat, and the incremental increases that enhancement options would provide. Additionally, Weyerhaeuser should complete its trout population monitoring plan, and file it for Commission approval.

e. Fish screens

During project operation there would be some entrainment of trout and turbine related injury or mortality. The diversion of flows from Calligan Creek through the proposed penstock would remove some portion of the resident trout from upstream of the diversion and pass them through the proposed horizontal Pelton turbine. High mortality (>70%) of fish has been noted during passage through similar Pelton turbine designs (Gloss et al. 1982).

Weyerhaeuser proposes to construct stationary, removable, vertical screens to conform to the requirements of the WDW and DOI to reduce turbine-related fish mortality. WDW has set state standards for screen opening dimensions (0.125 inches in width) and maximum approach velocities (0.4 feet per second).

Mortality of trout from turbine passage with the proposed intake screens should be negligible, but some mortality may occur as a result of impingement. Weyerhaeuser has not proposed to install an automatic cleaning system to prevent clogging of the intake screens and resultant increases in approach velocity. DOI recommends that the screen design include provisions for automatic screen cleaning. WDW recommends that if manually-cleaned screens result in flow fluctuations, then the intake be retrofitted with automatically cleaned screens.

The proposed project would be in a remote area, with only limited seasonal accessibility. Dependence on manual operation to clean the fish screen would not adequately protect the fishery

resource from extended periods of increased approach velocities should debris restrict the project intake.

A self-cleaning screen system would ensure that the potential for fish mortality from entrainment and impingement is reduced. Pressure level sensors would monitor screen blockage, and in conjunction would activate self-cleaning screens to allow natural passage of bedload materials and ensure minimum flow requirements without having to depend on manual control of these structures. Designing automatic screen cleaning into the proposed screen design would result in an additional cost to Weyerhaeuser that would probably not exceed \$30,000. Incorporating this measure now would result in considerable savings over WDW's recommendation that Weyerhaeuser retrofit the screens in the future.

Therefore, to prevent impingement mortality from the proposed screen, we recommend that Weyerhaeuser, in consultation with DOI, WDW, and the Tribes, design and construct a self-cleaning fish screen. Weyerhaeuser should file design drawings-- including operation and maintenance plans-- for Commission approval.

f. Tailrace barrier

DOI states that the proposed project could result in false attraction of resident fish to the tailrace discharge, entry of fish into the draft tubes, and trap or strand fish in the tailrace area during project shutdown. DOI recommends that Weyerhaeuser design and install a tailrace barrier to prevent these impacts.

Attraction of resident fish to the tailrace area of the proposed project would not result in any deleterious effect to rainbow trout. If resident trout were to reside in the tailrace, the design of the project would prevent contact with the turbines and other mechanical portions of the powerhouse. Additionally, the design of the project does not include draft tubes, so there is no physical means for the rainbow trout to contact the turbine blades. Tailrace flows would be approximately 6 feet below the bottom of the horizontal Pelton turbine. Even at the 100 year flood high water mark, the tailrace elevation would be 4 feet below the turbine.

We recommend that Weyerhaeuser operate the project according to WDW standards for flow continuation and ramping, with our modifications. Because of this, flows in the tailrace area would not decrease rapidly enough for stranding to become a factor.

Therefore, we believe that there would be no impacts to resident fish from tailrace flows if Weyerhaeuser constructs and

operates the project as proposed. We do not recommend that Weyerhaeuser design or install a tailrace barrier.

g. Section 18 of the Federal Power Act- Fishway Prescriptions

DOI requested reservation of authority to prescribe the construction, operation and maintenance of fishways for downstream fish passage following section 18 of the Federal Power Act. We recommend that authority be reserved to the Commission to require fishways as may be prescribed by DOI.

Unavoidable Adverse Impacts: Minor losses to habitat that is intermittently available in the upper reaches of Calligan Creek could occur with the 2-cfs minimum flow.

4. Terrestrial Resources

Existing Environment: The project area is occupied mainly by a second-growth conifer forest, dominated by Douglas-fir and western hemlock 20 to 40 years old. The forest is of the closed-canopy type, in which canopy gaps are uncommon and small, and understory vegetation is sparse.

The second most common type of vegetation in the project area is mixed forest, made up of a mixture of conifers and hardwoods. Conifer species are Douglas-fir, western hemlock, and occasional western red cedar. Hardwood species are red alder and big-leaf maple. Understory trees, shrubs, and groundcover vegetation are common in mixed forest areas. Mixed forest grows on moist sites in upland areas and borders the riparian forest along lower Calligan Creek.

Riparian forest grows along Calligan Creek. Typical trees are red alder, big-leaf maple, vine maple, and black cottonwood. Dominant shrubs and small understory trees include willow, Pacific ninebark, spiraea, salmonberry, thimbleberry, and devil's club. Groundcover vegetation includes ferns and forbs.

Two wetland areas, amounting to 5 to 10 acres, are located north of the proposed powerhouse site (see exhibit E, figure E3.1-3). These wetlands occur in a series of ponds and connecting creeks fed by springs. The wetlands are dominated by shrubby willows, spiraea, and red-osier dogwood. Emergent and submerged aquatic vegetation grows in the ponds. Surrounding the wetlands is a forest dominated by alder. The wetlands provide valuable habitat for deer and other wildlife, and the creeks associated with them may be nursery areas for resident trout.

The project area provides winter range for black-tailed deer. Weyerhaeuser found no sign of Roosevelt elk in the project area, but believes that elk may use the area, particularly during

the winter. Black bear is another big game animal likely to use the project area. Smaller mammals include coyote, bobcat, snowshoe hare, raccoon, and Douglas squirrel. Birds include red-tailed hawk, turkey vulture, belted kingfisher, hairy woodpecker, and Swainson's thrush.

Weyerhaeuser conducted a botanical survey of the project area. The survey showed that no plants federally listed as threatened or endangered or listed by the Washington Natural Heritage Program grow in the area. No threatened or endangered animal species are known to occur in the project area. 3/

Environmental Impacts and Recommendations:

a. Raptor protection

Birds found in the project area include raptors such as red-tailed hawks. Transmission lines may constitute an electrocution hazard for raptors and other birds large enough to simultaneously touch two energized wires or other hardware. Weyerhaeuser proposes to install a new, 4.25-mile-long, 35-kV transmission line. To prevent raptor electrocution, Weyerhaeuser would design and construct the transmission line in conformance with the 1981 guidelines of the Raptor Research Foundation, Inc. This measure would adequately protect red-tailed hawks and other raptors using the project area. Therefore, Weyerhaeuser should construct the new, 4.25-mile-long transmission line according to the guidelines of the Raptor Research Foundation, Inc.

b. Revegetation

Project construction would disturb about 3.7 acres of mixed forest and closed-canopy coniferous forest habitat. Less than 0.1 acre of riparian habitat would be disturbed. Weyerhaeuser estimates that about 30 percent of the disturbed area, or 1.1 acres, would be occupied by project structures, representing a long-term loss of wildlife habitat.

Weyerhaeuser has modified the revegetation proposals in the Erosion and Sediment Control Plan (Weyerhaeuser, additional information, 1991). Weyerhaeuser would revegetate disturbed areas initially with a mixture of grass and forb seeds. Once the ground surface has stabilized, Weyerhaeuser would plant Douglas-fir for continued timber production. Weyerhaeuser proposes to stabilize riparian areas disturbed by construction with grass and forb seeding or with riprap, planted with willows, as needed. Weyerhaeuser would landscape project facilities along Calligan

3/ Personal communication, Mike Tehan, U.S. Fish and Wildlife Service, Olympia, Washington, May 5, 1992.

Creek with riparian plants that provide benefits to wildlife, e.g., willow, elderberry, serviceberry, and hazelnut.

DOI recommends that, rather than Douglas-fir, Weyerhaeuser plant shrubs, forbs, and grasses with high wildlife value within the penstock right-of-way. DOI believes that maintaining the right-of-way in nonwoody vegetation would prevent problems such as windthrow, root invasion of subsurface drains, and disturbance from timber harvesting.

We agree with DOI that Weyerhaeuser should revegetate the penstock right-of-way with nonwoody vegetation rather than trees. This measure would benefit wildlife and protect soil stability, the penstock, and drainage structures. Therefore, Weyerhaeuser should revise its revegetation proposals to provide for the planting and maintenance of the penstock right-of-way with shrubs, forbs, and grasses.

c. Wet area

DOI is concerned about a "wet area" mentioned in the application that the penstock would cross. The application doesn't describe the botanical and wildlife resources associated with this area. DOI recommends that if the area is a wetland or represents a unique wildlife habitat type or vegetative association, Weyerhaeuser develop measures to mitigate the effect of penstock installation.

Weyerhaeuser estimates that the wet area is 20 feet by 50 feet^{4/}. It occurs at the transition between a kame terrace and bedrock overlain with shallow glacial and colluvial soils (Erosion and Sediment Control Plan). The area dries out during the summer. The area has a slope of about 8 percent (Erosion and Sediment Control Plan, sheet 5-5). Weyerhaeuser proposes to install a drain in the trench below the penstock to redirect the water feeding the wet area down a slope north of the penstock alignment. Therefore, the existing wet area would be dewatered. As a result, any vegetation requiring high moisture levels would be eliminated.

Weyerhaeuser's botanical survey included the penstock alignment, and therefore the wet area. The survey showed that no plants federally listed as threatened or endangered or listed by the Washington Natural Heritage Program grow in the project area. Further, the survey didn't identify any unique vegetative associations. The wet area is unlikely to provide any discernible wildlife habitat value because of its small size (20

^{4/} Personal Communication, Toby Freeman, Environmental Specialist, Permit Engineering, Bellevue, Washington, June 25, 1992.

feet by 50 feet). Therefore, we don't think that the wet area represents a unique wildlife habitat type or vegetative association. We don't recommend that Weyerhaeuser take any further action regarding the wet area.

d. Long-term loss of wildlife habitat

King County recommends that Weyerhaeuser enhance areas off the project site to mitigate the permanent loss of about 1.1 acres of coniferous and riparian forest.

DOI recommends that Weyerhaeuser develop a wildlife management plan that would fully compensate for the long-term loss of about 1.1 acres of wildlife habitat supplanted by the powerhouse, access roads, and other project facilities. DOI says this long-term loss may contribute to a cumulative impact on wildlife resources in the Snohomish River Basin. DOI suggests that Weyerhaeuser investigate whether acquiring and preserving the wetlands near the powerhouse is a feasible way of mitigating the long-term loss of habitat.

Two wetland areas are located near the proposed powerhouse site. The edge of the closer wetland would be about 200 feet from the powerhouse, so project construction wouldn't affect these wetlands. The agencies, however, suggest that protecting the wetlands would be an appropriate means of mitigating the project's adverse effects on fish and wildlife resources. WDF and WDW recommend that Weyerhaeuser acquire the timber harvest rights to the wetlands to preserve their fish and wildlife habitat value. WDF and WDW point out that since the forest around the wetlands is composed mainly of alder, the forest has little timber value. Therefore, acquiring the rights wouldn't have an adverse effect on timber harvesting.

Constructing the project would result in the loss of about 1.1 acres of forest. This loss would represent a cumulative effect on black-tailed deer, which are a target resource in the Snoqualmie River Basin and which use the forest in the project area as winter range. Weyerhaeuser should develop a plan to fully compensate for wildlife habitat lost as a result of project construction. The filing should include a discussion of the adequacy of wetland acquisition as a means to ensure no net loss of existing wildlife habitat values. The filing should also include a provision for the planting and long-term maintenance of the penstock right-of-way with shrubs, forbs, and grasses of high wildlife value.

Unavoidable Adverse Impacts: Constructing the project would result in the short-term loss of about 3.7 acres of wildlife habitat. Project structures would permanently displace about 1.1 acres of deer winter range.

5. Recreation and Other Land and Water Uses

Affected Environment: Recreational activities in the Calligan drainage area are limited to dispersed fishing, hiking, camping, sightseeing, and hunting. This is due mostly to private ownership and timber management operations and access restrictions caused by the steep and rugged nature of the terrain along most of Calligan Creek.

Calligan Lake, about 2,000 feet upstream of the proposed intake, is accessible to the public during the late spring, summer, and fall months. The major activity is fishing at the 310-surface-acre lake. WDW stocks the lake with fish.

Some limited recreational fishing also takes place in the lake outlet reach above the proposed intake, and in the short stretch of stream between the proposed powerhouse site and the mouth of Calligan Creek. Very low levels of fishing or other recreational use occur along the proposed bypass reach. This is due to the steep grades and general inaccessibility of the stream course and banks.

Land within the project site is owned by Weyerhaeuser. Timber harvesting is the dominant land use within the Calligan Basin. An area including the project site was logged between 1945 and 1970, with most of the basin being clearcut by 1964. King County classifies the project area as a forestry and recreation zone. An extensive logging road system exists in the Calligan Basin which also provides access to Calligan Lake and other dispersed recreational areas.

Environmental Impacts and Recommendations: The project site is located in an area of steep, brushy land with few if any recreational attributes. Currently the site experiences little or no recreational use. The proposed impoundment at the weir location is of a small size--0.4 acre--and provides no recreational potential. For these reasons, Weyerhaeuser proposes no recreational development.

Weyerhaeuser also believes the project site's isolation creates a potential for vandalism. They propose to control access to the powerhouse and intake sites by installing gates across the project's access roads. Since Weyerhaeuser assures that the project wouldn't affect public access to Lake Calligan and surrounding areas currently used for dispersed recreational activities^{5/}, we think controlled access to the project facilities is appropriate. However, this shouldn't preclude

^{5/} Personal communication, Toby Freeman, Environmental Specialist, Permit Engineering Inc., Bellevue, Washington, June 19, 1992.

dispersed recreation from occurring at the project, as described in our public access standard article 18.

Unavoidable Adverse Impacts: None.

6. Visual Resources

Affected Environment: Calligan Lake is naturally created by the damming effect of a broad glacial embankment at the edge of the mountain front in the Cascade Mountain Range. The natural lake is 1.4-miles long with a surface area of 310 acres. The proposed 0.4-acre impoundment area downstream of Calligan Lake is characterized by a flat alluvial plain. The proposed bypass reach is characterized by a steep sloping gorge along Calligan Creek. The project primarily lies within a coniferous forest with a visual patchwork of different aged clearcut blocks of forest.

Environmental Impacts and Recommendations: The diversion weir and intake structures would be located downstream of Calligan Lake. The weir would be 8 feet high and 60 feet long. The applicant discusses the possibility of using riprap close to the weir and adjacent stream bank that would be visually compatible with existing streambed deposits. We recommend that the applicant implement these measures.

The applicant discusses burying the penstock, where possible. The proposed penstock route would initially disturb 1.8 acres of land, forest, and vegetation. We recommend the applicant implement this mitigative measure.

The powerhouse will be located on the north side of the confluence of Calligan Creek and the North Fork of the Snoqualmie River. The concrete structure would be 42 feet by 44 feet and the structure would be buried into the ground with approximately 15 feet above ground. Because the stream substrate of cobble and medium to small boulders is the natural look of the site, the applicant discusses design techniques for the powerhouse structure that would incorporate random stone and cobble application together with existing natural vegetative cover to obscure views of the structure and the riprap bank protection. We recommend that the applicant implement these mitigative measures. Also the applicant discusses coloring the built structures to be similar to the terrain to lessen the visual effects of man-made structures. We recommend that the applicant implement this mitigative measure.

Approximately 170 feet of new access road would be constructed to the powerhouse and approximately 200 feet of new access road would connect to a small parking area adjacent to the intake structure. The applicant discusses constructing access roads only as wide as needed to accommodate slow moving traffic

and follow existing topography, when possible. We recommend that the applicant implement these mitigative measures.

The proposed 35-kV transmission line would be located along the 170 feet of new access road from the powerhouse and continue along 4.25 miles of existing logging road. The applicant discusses transmission lines that would be located primarily within existing road right-of-way and that all these transmission lines would be placed on wooden poles 40 to 60-feet high and approximately 300 feet apart. We recommend that the applicant implement these mitigative measures.

The drainage area and project site attract dispersed use by hikers, campers, sightseers, hunters, picnickers, and 4-wheel drive users. Several logging roads provide access to Calligan Creek and Calligan Lake.

Since dispersed recreation occurs in the project area, we recommend that Weyerhaeuser prepare and file a visual resources management plan that would discuss the visual effects prior to, during, and after construction for the project. The visual resources management plan should be designed to lessen the visual effects resulting from the immediate and long range visual impacts caused by development of this project. This plan should be compatible with the wildlife mitigation plan we recommend in the section on terrestrial resources.

Unavoidable Adverse Impacts: Because the project area is experiencing dispersed recreational use, if Weyerhaeuser carries out our recommended visual resources management plan, the project facilities would have a minor adverse effect on visual resources.

7. Cultural Resources

Affected Environment: Weyerhaeuser conducted a cultural resources survey of the project area. Weyerhaeuser found no cultural resources that would be affected by the project (King et al. 1991).

The Washington State Historic Preservation Officer (SHPO) has reviewed a draft survey report and concluded that no historic or archeological sites listed or eligible for inclusion in the National Register of Historic Places would be affected by the project (Garfield 1991). We concur.

Weyerhaeuser consulted the Tulalip Tribes, the Snoqualmie Tribe, the Muckleshoot Tribe, and the Duwamish Tribe (Tribes) by letter and telephone to determine whether any sites of cultural concern to these tribes would be affected. The Snoqualmie Tribe indicated that it had no concerns. The other tribes did not respond (King et al. 1991).

Environmental Impacts and Recommendations: The SHPO's and the Tribes' comments on the proposed project are based on the premise that the project would be constructed and operated as described in the application without significant changes. Changes to the project are occasionally found to be necessary after a license has been issued. Under these circumstances, whether or not an application for amendment of license is required, the SHPO's and the Tribes' comments would no longer reliably depict the cultural resources impacts that would result from operating the project.

Also, land-clearing, land-disturbing, or spoil-producing activities could adversely affect archeological and historic sites, such as buried sites, not previously identified in the vicinity of the proposed project. Therefore, if Weyerhaeuser encounters such sites during the development of project works or related facilities, Weyerhaeuser should stop land-clearing, land-disturbing, or spoil-disturbing activities in the vicinity of the sites, should consult with the SHPO and the Tribes on the eligibility of the sites, and should carry out any necessary measures to inventory and to avoid or to mitigate impacts to the sites.

Therefore, before starting any future land-clearing, land-disturbing, or spoil-producing activities associated with the project, other than those authorized in this license, or before resuming land-clearing, land-disturbing, or spoil-producing activities in the vicinity of any previously undiscovered sites, Weyerhaeuser should consult with the SHPO and the Tribes about the need to conduct a cultural resources survey and to implement avoidance or mitigative measures, and conduct any necessary survey. Weyerhaeuser should file for Commission approval a report containing the results of any survey work and a cultural resources management plan for avoiding or mitigating impacts to inventoried cultural resources, along with copies of the SHPO's and the Tribes' written comments on the report. The survey and the report should be based on the recommendations of the SHPO and the Tribes, and adhere to the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservations. Weyerhaeuser should not implement any cultural resources management plan or begin any land-clearing, land-disturbing, or spoil-producing activities until informed by the Commission that the requirements discussed above have been fulfilled.

Unavoidable Adverse Impacts: None.

8. Developmental Resources

As we've said, the proposed 5.4-MW, run-of-river project would provide Weyerhaeuser with about 21.7 GWh of energy annually.

To determine the developmental benefits of the project, we looked at the economic and financial feasibility of the project with two mitigative proposals: Weyerhaeuser's proposal and our proposal.

In Section V.3.a of the EA, we discuss what instream flow the Commission should set in the bypass reach. Weyerhaeuser proposes to provide a minimum flow in the bypass reach of 2 cfs year-round, 6 cfs from September 15 through May 14 at the downstream spring site, and 15 cfs from May 15 through September 14 at the downstream spring site.

Though we agree with Weyerhaeuser's minimum flow proposal, in Section V.3.a. we recommend Weyerhaeuser do the following:

1. Mechanically clean screens to keep fish out of the intake.
2. Install a flow control system using continuous recording gauges to control the minimum flow release at the diversion and the downstream spring site.

These recommendations, which would cost about \$60,000, wouldn't significantly affect the project's economic feasibility, as we show in table 5.

Table 5. Summary of the developmental benefits of the alternatives (Source: the Staff).

Proposal	Annual generation (GWh)	Project cost (mills/kWh)	Power value (mills/kWh)	Net annual benefits (mills/kWh)
Weyerhaeuser's	21.7	75.1	96.7	21.7
Staff's	21.7	75.3	96.7	21.4

Since the levelized cost of the project is less than the levelized cost of alternative energy, we consider the project to be economically beneficial under either proposal.

Using our estimate of the levelized cost of alternative power of about 97 mills per kilowatt hour (mills/kWh), table 5 shows the project would have a net annual benefit of 21.7 mills/kWh or \$470,000 under Weyerhaeuser's mitigation plans over the 50-year analysis period.

With our proposal, the project would have an annual benefit of about 21.4 mills/kWh or \$464,000 per year levelized over the 50-year term of the license.

Weyerhaeuser hasn't made an agreement to sell the project's power, but expects to sell the power to a utility in the Northwest. Using our estimated alternative energy cost for the Northwest, we find the 100-percent-equity internal rate of return (ROR) for the project would be about 11.81 percent under Weyerhaeuser's proposal. Under our proposal, the ROR is 11.75 percent.

With either ROR, we think financing entities would find the project fairly attractive.

C. Alternative of No Action

Under the no-action alternative, the Commission would deny the proposed action. The proposed Calligan Creek Project would not be built, and the power that would have been developed from a renewable resource, would have to be replaced from nonrenewable fuels. There would be no changes to the physical, biological, or cultural resources of the area.

D. Consistency with Comprehensive Plans

Section 10(a)(2) of the Act requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project.

Under Section 10(a)(2), federal and state agencies filed 63 plans that address various resources in Washington. Of these, we identified seven plans relevant to this project.^{6/} No conflicts were found.

^{6/} (1) Snohomish River Basin instream resources protection program, Washington State Department of Ecology, 1979, Olympia, Washington; (2) Washington's statewide comprehensive outdoor recreation plan, Interagency Committee for Outdoor Recreation, 1985, Olympia, Washington; (3) Washington outdoors: assessment and policy plan 1990-1995, Interagency Committee for Outdoor Recreation, 1990, Tumwater, Washington; (4) Northwest conservation and electric power plan, Power Planning Council, 1986, Portland, Oregon; (5) 1987 strategies for Washington's wildlife, Washington State Department of Game, 1986, Olympia Washington; (6) Hydroelectric project assessment guidelines, Washington State Department of Fisheries, 1987, Olympia Washington; and (7) Shorelands and coastal zone management program, Washington State Department of Ecology, 1986, Olympia Washington.

E. Comprehensive Development

No reasonable action alternatives to the proposed project has been identified for assessment. Based on our independent review and evaluation of the proposed project and the no-action alternative under Sections 4(e) and 10(a) of the Act, we have selected the proposed project, with our recommended mitigative measures, as the preferred option. We recommend this option because the net benefits of the project outweigh the consequences associated with taking the no-action alternative.

We choose our alternative over the proposed project and no-action alternative for these reasons:

- Mechanically cleaned fish screens at the intake would provide better protection to the resident rainbow trout population and downstream migrants. The cost of providing the automatic screen cleaning (estimated at no greater than \$30,000) would provide a significant increase in protection at a minimum of cost.
- A flow control system using electronically connected continuous recording gauges to control the minimum flow release at the diversion weir and the downstream spring site would ensure compliance with the required minimum flow regime. The additional cost would be in the range of \$30,000, though with the system Weyerhaeuser could take maximum advantage of available flows at the project intake.

We have considered the proposed project and the alternatives under 4(e) and 10(a) of the Federal Power Act (Act). From our evaluation of the environmental and the economic effects of the project and the alternatives, we conclude that licensing the project with our environmental recommendations would best adapt the project to a comprehensive plan for developing the Snoqualmie River drainage basin.

VI. FINDING OF NO SIGNIFICANT IMPACT

Project construction would cause: minor temporary localized erosion until disturbed land surfaces are stabilized and a short-term loss of about 3.7 acres of wildlife habitat.

Project operation would cause: minor losses to habitat that is periodically available in the upper reaches of Calligan Creek, permanent displacement of about 1.1 acres of deer winter range, and a minor adverse visual impact.

In accordance with the National Environmental Policy Act of 1969, we prepared this environmental assessment for the Calligan

Creek Hydroelectric Project. On the basis of the record and this environmental analysis, issuance of a license for the proposed project, with the mitigative measures we recommend, would not constitute a major federal action significantly affecting the quality of the human environment.

VII. DETERMINATION OF CONSISTENCY OF FISH AND WILDLIFE RECOMMENDATIONS WITH THE FEDERAL POWER ACT AND APPLICABLE LAW

Under the provisions of the Federal Power Act (Act), as amended by the Electric Consumers Protection Act of 1986, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of such resources affected by the project.

Section 10(j) of the Act states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the Act or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, given due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Since the terms and conditions provided by DOI were filed after the end of the 60-day notice period, and WDW's recommendations were provided late (and never officially filed), they are not subject to the 10(j) process [18 CFR 4.34(b)]. We, however, considered their recommendations under section 10(a) of the Act in the water resources, fishery resources, and terrestrial resources sections of this document.

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Weyerhaeuser Company

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Project No. 8864-007

(Issued May 13, 1993)

TERZIC, Commissioner, dissenting in part:

I am dissenting in part for the reasons I stated in my prior dissent in Wisconsin Public Service Corporation, 62 FERC ¶ 61,095 at 61,690. I question the majority's cite to Lynchburg Hydro Associates, 39 FERC ¶ 61,079 (1987) as the basis for upholding the Commission's practice of reserving the right to require fishways merely upon the request of the Department of Interior. Furthermore, I find nothing in section 18 of the Federal Power Act that requires the Commission to reserve such authority. This practice is flatly unreasonable where, as here, the Department of Interior has not even provided a factual basis for its request.


Branko Terzic
Commissioner