

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Snoqualmie River Hydro

Project No. 10359-014
Washington

ORDER APPROVING RESIDENT TROUT MONITORING PLAN
(Issued June 8, 1995)

On November 12, 1993, Snoqualmie River Hydro (licensee) filed a resident trout monitoring plan pursuant to article 408 of the license for the Youngs Creek Project. The project is located on Youngs Creek in Snohomish County, Washington.

Article 408 requires the licensee to file for Commission approval a monitoring plan to determine changes in the resident trout population in Youngs Creek with the minimum flow required by Article 411 in effect.¹

Licensee's plan

The licensee proposes to evaluate trends in the trout population in the reach of Youngs Creek affected by the project. Monitoring efforts would consist of annual counts via snorkeling of the number of resident trout (>60 mm) in ten pools in the affected reach of Youngs Creek.

The plan would not determine the total trout population in the affected reach, but would use the number of trout observed in a series of pools as an index of trout abundance, on which decisions concerning instream flows would be made. Adjustments would be made to the flow requirements if the population gradually declines or a catastrophic decline is not followed by a population increase. If trout abundance does not significantly decline during project operation, the instream flow regime required by article 411 will be considered adequate to protect the fish resources below the diversion structure.

Three years of snorkel surveys would be collected after the project begins operation. If a statistically significant positive trend in the trout population is found after three years of operational monitoring, the article 411 flow schedule would be

¹ Article 411 requires the following minimum flow schedule below the project's diversion structure:

Month	Minimum flow (cfs)
October 1 - April 30	3
May 1 - May 15	8
May 16 - July 15	40
July 16 - September 30	22

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deemed adequate and monitoring would stop. If no significant positive trend is observed monitoring would continue. With continued monitoring, if after the fourth year of operation monitoring a statistically significant positive trend in the trout population is observed, the project would be assumed to have no impact on fish resources and the monitoring would stop.

After the fifth year of operation monitoring, the population would be tested for a statistically negative trend. If such is shown, the licensee, after consultation with the Washington Department of Wildlife (WDW) and the U.S. Fish and Wildlife Service (FWS), would petition the Commission to increase the instream flow. If after five years of operation monitoring, the trend is not significantly negative, the flow schedule in effect would be considered adequate and monitoring would stop. If the instream flow regime is increased due to a significant decline in the trout population over the five-year period, the monitoring plan would begin anew, with the three and five year periods reinitiated.

The licensee's plan also has provisions for any catastrophic population decline should one or a series occur during the monitoring. If a catastrophic decline occurs, however, during the initial year of project operation (average number of fish per pool decreases by 75 percent or more), the pre-project density of trout would serve as the standard to which post project surveys are compared, as opposed to trends considered in subsequent years should a catastrophic decline occur. Pre-project surveys have been conducted since 1991.

The licensee proposes that the monitoring would continue until the Commission concludes that the instream flows required under article 411 are adequate to protect the existing fish resources of Youngs Creek. The initiation of the post-project monitoring would begin upon completion of construction of the project; the project is currently under construction, with operation scheduled to begin May 4, 1996.

The licensee proposes to conduct each annual survey in early August, with the results, agency comments, and licensee's response to those comments filed with the Commission by November 30 of each year. If monitoring results show the need to increase the minimum flows, the licensee would submit a proposal for such and, upon approval by the Commission, implement the flow modifications by February 28 of the following year.

Agency comments

By letter dated September 9, 1993, the WDW stated that its concerns were addressed in the plan and requested minor editorial changes be made to one of the plan's appendices for clarification. The Washington Department of Ecology, in a letter dated September 23, 1993, also found the plan sound.

The FWS, by letter dated September 29, 1993, concurred with the plan except the FWS recommended location mapping be conducted to augment the field procedure for identifying and selecting pools for surveying. The FWS also recommend that other habitat features such as riffles, runs, and large organic debris be mapped and that photographic documentation be undertaken as a component of the plan.

The FWS questioned a proposal in a draft of the plan that provides for the resource agencies to petition the Commission for additional flow releases should there be a statistically significant decrease or negative change in the trout populations over a five year period. The FWS stated that this would not constitute mitigation since the instream flow increase may not be realized as an outcome of the petition process. The FWS recommended that the plan be modified such that a guaranteed prescribed incremental flow augmentation be tied to levels or ranges of trout population declines as an outcome of the petition process. The FWS believes that any flow augmentation would result in incremental benefits (though difficult to quantify) to the aquatic resources of Youngs Creek and that augmentation of flows via a preset flow schedule in the final monitoring plan would guarantee mitigation and reduce future conflict.

Licensee's response to agency comments

In its final plan filed with the Commission, the licensee included minor editorial changes at the request of the WDW to clarify Exhibit C of appendix A. The licensee also included the FWS recommendations concerning habitat mapping and photographic documentation.

With respect to incorporating a preset flow schedule in the final monitoring plan, the licensee noted that an instream flow schedule with incremental adjustments had been agreed upon in the event the fishery surveys found significant or catastrophic declines in the trout populations. However, the Commission did not agree with the schedule and declined to include it in the May 5, 1992 Order Issuing License.

Conclusions and recommendations

As noted by the resource agencies, the licensee's proposed resident trout monitoring plan is innovative and detailed. The plan is adequate to evaluate changes to the trout populations to permit appropriate mitigation, if needed, and should be approved.

With respect to the FWS concern with the proposal that resource agencies would have to petition the Commission for additional flow releases, should there be a statistically significant decrease or negative change in the trout populations over the study period, the final plan, as filed, states that if results of the monitoring determine that flow increases are warranted then the licensee would submit to the Commission a proposal to increase the minimum flows. Further, license article 408 provides for review and comment on all monitoring results and licensee conclusions by the resource agencies; Article 408 also reserves to the Commission the right to require changes to the plan, when and if necessary.

The Director orders:

(A) The Youngs Creek resident trout monitoring plan filed on November 12, 1993, pursuant to article 408 of the license for the Youngs Creek Project, is approved.

(B) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. §385.713.


J. Mark Robinson
Director, division of Project
Compliance and Administration

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Snoqualmie River Hydro

Project No. 10359-004
Washington

ORDER APPROVING AND MODIFYING WILDLIFE HABITAT MITIGATION PLAN
(Issued May 6, 1993)

On December 17, 1992, and supplemented by letter dated April 7, 1993, Snoqualmie River Hydro, licensee for the Youngs Creek Project, filed a Wildlife Habitat Mitigation Plan. This plan was filed pursuant to article 403 of the Order Issuing License dated May 5, 1992. This license is for the construction and operation of a new project with a generating capacity of 7.5 megawatts. The project will be located on Youngs Creek, about 4 miles south of the town of Sultan, in Snohomish County, Washington.

Construction of the project will impact approximately 20.4 acres of terrestrial habitat. Revegetation will be performed, however, a permanent loss of 4.8 acres will occur. Vegetation will be cleared for the intake structure (0.4 acre), powerhouse (0.7 acre), access road, and penstock (19.3 acres). The project is located within an area managed for commercial timber. Most clearing will be in areas of coniferous forest where mature trees will be removed. A small area of riparian and mixed forest, approximately 1.5 acres, will also be cleared.

To compensate for a loss of wildlife habitat, the licensee proposes to take the following measures: (1) replant all portions of the penstock right-of-way (outside of the access road right-of-way) with Douglas-fir, (2) seed the margins of the access road right-of-way with plants palatable to wildlife, (3) install a gate on the new access road, (4) install and maintain nesting boxes and perch poles along the access road, (5) acquire 5.3 acres of forest along Youngs Creek, and (6) continue to replant areas until established criteria have been satisfied.

Monitoring will be performed with reports due annually for the first 2 years and a final report due year 5. The plan did not state a specific due date, therefore, this order will establish December 31 as the due date for filing reports with the Commission. The last report should be for Commission approval, and should contain recommendations for further mitigation and/or monitoring.

As required by article 403, the licensee solicited comments from the U.S. Fish and Wildlife Service and the Washington Department of Wildlife. Both agencies generally agree with the plan.

DC-A-4

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Approval of the plan will require the licensee to obtain a 5.3-acre parcel of land outside of the project's boundaries. By letter dated January 26, 1993, the Commission requested that the licensee notify all property owners that may be affected by this acquisition. In a letter dated April 21, 1993, Weyehaeuser Company, the sole owner of the parcel, stated that they are aware of the proposed Wildlife Habitat Mitigation Plan and do not object to the licensee acquiring the land.

Since this parcel will be acquired for mitigation purposes, it should be included within the project's boundaries. This order will require a revised exhibit G reflecting the addition of this land.

The licensee's plan satisfies the requirements of article 403, this plan should be approved as modified below.

The Director orders:

(A) The wildlife habitat mitigation plan filed December 17, 1992, is approved as modified in paragraph (B) below.

(B) Monitoring reports shall be filed by December 31 for the years 1994, 1995 and 1998. The final report shall be for Commission approval and shall include recommendations for further mitigation and monitoring if necessary. The licensee shall include in reports documentation of consultation with the U.S. Fish and Wildlife Service and the Washington Department of Wildlife. Copies of agency comments shall also be provided. The licensee shall allow a minimum of 30 days for the agencies to comment prior to filing reports with the Commission. If the licensee does not agree with a recommendation the report shall include the licensee's reasons, based on project-specific information. The Commission reserves the right to make changes to the plan or to require further mitigation or monitoring.

(C) Within 1 year from the date of this order, the licensee shall file a revised exhibit G, for Commission approval, showing the acquired 5.3-acre mitigation parcel within the project's boundaries.

(D) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. §385.713.

Joseph A. Morgan
J. Mark Robinson
Director, Division of Project
Compliance and Administration

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

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PENALTY FOR PRIVATE USE, \$300

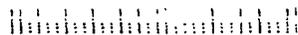


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FROM: [Illegible]





HYDRAULIC PROJECT

APPROVAL

(R.C.W. 75.20.100)
(R.C.W. 75.20.103)

DEPARTMENT OF WILDLIFE
600 CAPITOL WAY N.
OLYMPIA WASHINGTON 98501-1091
(206) 753-5897

4 May 21, 1993

(applicant should refer to this date in all correspondence)

PAGE 1 OF 2 PAGES

Form with fields for Applicant Name (Snoqualmie River Hydro), Contact Phone (206) 455-0234, Control Number 01-86819-01, Street (1422 - 130th Avenue NE), City (Bellevue), State (WA), ZIP (98005), Water (Youngs Creek), and Project Type (Install Outfall for Powerhouse).

TIME LIMITATIONS: 5 THIS PROJECT MAY BEGIN July 1, 1993 6 AND MUST BE COMPLETED BY September 30, 1994

THIS APPROVAL IS TO BE AVAILABLE ON THE JOB SITE AT ALL TIMES AND ITS PROVISIONS FOLLOWED BY THE PERMITTEE AND OPERATOR PERFORMING THE WORK.

SEE IMPORTANT GENERAL PROVISIONS ON REVERSE SIDE THAT ARE ALSO PART OF THIS APPROVAL.

Project Description: Construction of an outfall structure for a small hydro project.

- 1. Equipment shall operate from the bank.
2. All work shall be done in the dry or shall be isolated from the flowing watercourse by the installation of a cofferdam, culvert or other approved method.
3. All earth areas adjacent to the watercourse which are exposed or disturbed by this project are to be planted to suitable vegetative cover to prevent erosion and to protect fish life.
4. Extreme care shall be taken to assure no deleterious material such as fresh cement, concrete, lime, petroleum products, chemicals, etc., be allowed to enter the water.
5. All concrete structures shall be cured prior to water encroachment.
6. Water that has seeped into the work site shall be pumped to an area to allow settling of fines before entering the stream, or otherwise contained so as to prevent any siltation from entering the stream.
7. The outfall structure shall be designed and constructed to prevent the entry of fish.

SEPA: DNS, Snohomish County, March 1993
HABITAT BIOLOGIST: Tony Oppermann (206) 775-1311, ext. 109
AGENT: Terry Abrams P3
APPLICANT - FISHERIES - AGENT - INVESTIGATOR - REGION - OLYMPIA:

DEPARTMENT OF WILDLIFE

Anna Concedor DIRECTOR

HYDRAULIC PROJECT

APPROVAL

4 May 21, 1993

(applicant should refer to this date in all correspondence)

PAGE 2 OF 2 PAGES

10 APPLICANT NAME
Snoqualmie River Hydro

1 CONTROL NUMBER
01-86819-01

8. The watercourse bank and bed at the point of discharge shall be armored to prevent scouring.
9. All bank protection material shall be placed from the bank and shall be of large enough size to prevent its being washed away during high water.
10. Trees shall not be felled into or across a watercourse.
11. At least five days prior to starting this project, contact Tony Oppermann at (206) 775-1311, ext. 109.

LOCATION: Approximatey 1/2 mile east of Youngs River Truck Trail on Cedar Pond road. Approximately 1/4 mile south of Cedar Pond road past the Weyerhaeuser gate.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

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Snoqualmie River Hydro

Project No. 10359-003
Washington

ORDER ISSUING LICENSE
(Major Project)
(Issued May 5, 1992)

Snoqualmie River Hydro (SRH) filed a license application under Part I of the Federal Power Act (Act) to construct, operate, and maintain the Youngs Creek Project, located on the Youngs Creek, in Snohomish County, Washington. The project would affect the interests of interstate commerce.

The run-of-river project would consist of a 12-foot-high diversion dam, an intake structure, a 51-inch-diameter, 14,500-foot-long penstock, a powerhouse with an installed capacity of 7.5 megawatts (MW), a short tailrace, and a 6.1-mile-long transmission line. A detailed project description is contained in ordering paragraph B(2).

Notice of the application has been published. No protests were filed in this proceeding, and no agency objected to issuance of this license.

Weyerhaeuser Company filed a motion to intervene to protect its rights as owner of portions of land where the project would be located. The Tulalip Tribes, the Washington Department of Fisheries (WDF), and the Washington Department of Wildlife (WDW) filed motions to intervene indicating areas of concern that the Commission should consider in the licensing proceeding.

The staff completed an environmental assessment (EA) for this project on December 23, 1991, which is attached to this order, and recommended issuance of a license. Comments and motions to intervene received from interested agencies and individuals have been fully considered in determining whether to issue this license.

Comprehensive Development

Sections 4(e) and 10(a)(1) of the Act require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a proposed project, the recreational, fish and wildlife, and other nondevelopmental values of the involved waterway are considered equally with power and other developmental values. In determining whether, and under what conditions, a hydropower license should be issued, the Commission must weigh the various economics and environmental trade-offs involved in the decision.

This order issues a license for the Youngs Creek Project with the mitigative measures proposed by SRH in its original proposal, with three exceptions:

(1) SRH proposed a draft monitoring plan to assess project impacts during operation. The plan would require increases in minimum flows during the winter and transition periods should proposed minimum flows fail to adequately protect the resident fish population. Minimum flows for October 1 to May 15 would be subject to adjustment in 3 cubic feet per second (cfs) increments each 5 years during the first 15 years of project operations, up to a predetermined limit. See section V(B)(5)(a), page 18, of the EA. This order does not adopt SRH's proposed flow-increase schedule. The staff concluded that this measure lacks biological justification and would be a financial risk for SRH.

(2) SRH proposed ramping rates of 1 to 4 inches per hour. To ensure that resident and downstream anadromous fish are protected during project operation, this order requires ramping rates in accordance with the WDF's standards, of 1 to 2 inches per hour, section 5(B)(5)(c), page 24 of the EA. This measure would not affect the power benefits of the project.

(3) This order requires SRH to install a mechanical cleaning system on its proposed fish screens to prevent clogging of the screens and the resultant increases in approach velocities, section V(B)(5)(d), page 26 of the EA. This measure would not significantly reduce the power benefits of the project. It would add \$80,000 to the total capital cost of the project, as estimated by SRH, reducing the annual net benefits by \$6,000, but could save on maintenance costs.

The staff estimates that, with the mitigative measures required in this order, the project would be potentially economically feasible, producing net annual benefits of \$121,000, levelized over the 50-year period of the license.

SRH hasn't made an agreement to sell project power, but expects to sell power to a utility in the Northwest. Using our estimated alternative energy cost for the Northwest, the staff finds the 100-percent-equity internal rate of return (ROR) for the project would be about 9.9 percent. With this ROR, the project would be a risky investment and financing entities would find it marginally attractive.

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. Federal and state agencies have filed 65 comprehensive plans that address various resources in Washington. Of these, 6 plans are

relevant to this project. ¹ No conflicts were found.

Based on the staff's review under sections 4(e) and 10(a), and their independent analysis, I find that the Youngs Creek Project, with the mitigative and enhancement measures required by this license, is best adapted to a comprehensive plan for the Youngs Creek drainage basin.

Water Quality Certification

On October 25, 1991, SRH applied for water quality certification for the project with the Washington Department of Ecology (WDOE). On February 24, 1992, WDOE issued water quality certification.

Coastal Zone Management Program

Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA) of 1972, as amended requires that license applicants for projects "...in or outside the coastal zone, affecting any land or water use or natural resource of the coastal zone of that state shall provide ..." a [self] certification that the project complies with the state's approved (by the U.S. Department of Commerce) Coastal Zone Management Program (CZMP) and that the project would be consistent with the program. "At the same time, the applicant shall furnish to the state or its designated agency a copy of the certification..." It also states that no license shall be granted "...until the state or its designated agency has concurred with the applicant's certification or until, by the state's failure to act, the concurrence is conclusively presumed..."

Because the project is located in Snohomish County, a coastal county, WDOE must review the proposed project for consistency with the state's CZMP. By letter dated April 15, 1992, WDOE concurred with SRH's certification of project consistency with the CZMP.

¹ Washington's statewide comprehensive outdoor recreation plan, Interagency Committee for Outdoor Recreation, 1985, Olympia, Washington; Northwest conservation and electric power plan, Power Planning Council, 1986, Portland, Oregon; 1987 strategies for Washington's wildlife, Washington State Department of Game, 1986, Olympia Washington; Hydroelectric project assessment guidelines, Washington State Department of Fisheries, 1987, Olympia Washington; Shorelands and coastal zone management program, Washington State Department of Ecology, 1986, Olympia Washington; State of Washington natural heritage plan, Washington State Department of Natural Resources, 1987, Olympia, Washington.

Compliance with the Endangered Species Act

The bald eagle, which is federally listed as threatened in the state of Washington, perches, forages, and roosts in the vicinity of the proposed project during the winter. Our EA addresses the project's potential effects on the bald eagle. The staff concludes that the construction, operation, and maintenance of the proposed project, with the mitigative measures recommended by the staff in the EA, wouldn't be likely to adversely affect the bald eagle. By letter dated March 23, 1992, the U.S. Fish and Wildlife Service (FWS) concurred that the project wouldn't be likely to affect the bald eagle if the measures the staff recommended are fully implemented.

SRH, however, believes that two of the mitigative measures recommended in the EA are unnecessary.

SRH disagrees with the EA's conclusion that project construction traffic and transmission line construction might displace eagles feeding on fish, roosting, and perching along Elwell and Youngs Creeks and the Skykomish River. SRH says that winter construction would cause a minor increase in traffic, indiscernible to eagles in the area. SRH proposes to monitor bald eagle use of the night roost area during winter construction and, if SRH determines that heavy truck traffic is causing eagles to leave the roost early or to avoid the roost in the evening, SRH would restrict project construction traffic to the period between 1 hour after sunrise and 1 hour before sunset.

SRH thus proposes to take this measure after an adverse effect has already occurred.

SRH's analysis doesn't address project construction, which would occur in eagle use areas, and which would be the cause of increased traffic. Further, SRH's proposed mitigation would be implemented only after an adverse effect has been observed. The staff continues to believe that SRH should suspend all construction activities from November 1 to March 31, to protect wintering bald eagles.

SRH also disagrees with the EA's conclusion that the transmission line should be buried or routed to an existing bridge to avoid the potential for bald eagle collisions at the Skykomish River crossing. SRH says that the utility that would construct and maintain the transmission line owns about 2,000 miles of transmission line and has never received a report of a bald eagle collision with a powerline.

SRH proposes to install an aerial transmission line across the river that incorporates two mitigative measures: (1) installing spiral vibration dampeners on all conductors across the Skykomish River; and (2) arranging conductors at the river

crossing in a horizontal pattern to minimize the potential area for collision.

As stated in the EA, increasing the visibility of aerial transmission lines with aviation markers and other devices has not been shown to minimize eagle collisions. Further, FWS says that vibration dampeners are a less effective way of marking powerlines than aviation balls.² Burying the transmission line or attaching the line to an existing bridge would eliminate collision hazard entirely. Therefore, SRH should bury the section of the transmission line that crosses the Skykomish River or should attach the line to an existing bridge.

Articles 404 and 405 require the licensee to implement the measures recommended by the staff to protect bald eagles.

Recommendations of Federal and State Fish and Wildlife Agencies

Section 10(j)(1) of the Act, 16 U.S.C. §803(j)(1), 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, mitigation, and enhancement of fish and wildlife. The EA and this order, address these concerns. This license provides conditions consistent with these recommendations, with one exception.

In the EA, the staff did not recommend adopting WDW's recommendation that SRH adopt a preset flow increase schedule. Since the staff concluded that a preset schedule to increase minimum flows lacked any biological justification as to benefits that would be provided to the aquatic resource, the staff found that the recommendation was inconsistent with the substantial evidence standard of section 313(b) of the Act. Staff agreed with WDW's recommended base flow and monitoring, but concluded that any subsequent increase in minimum flows should be based on the results of monitoring, not predetermined according to the preset schedule.

Under section 10(j)(2) of the Act, whenever the Commission believes that any recommendations of federal and state fish and wildlife agencies may be inconsistent with the Act or other applicable law, the Commission shall attempt to resolve such inconsistencies.

By letter dated January 3, 1992, the staff requested WDW to consider other options that would be agreeable to WDW and would

² Personal communication, Mike Tehan, U.S. Fish and Wildlife Service, Olympia, Washington, March 30, 1992.

adequately protect resident trout habitat consistent with other project purposes. The staff requested that WDW submit these options to the Commission within 45 days of the date of our letter.

WDW responded by letter dated February 4, 1992, and offered no alternatives, but further stated their reasons for recommending a preset flow increase schedule.

In a further attempt to resolve the issue, staff held a teleconference with WDW on March 11, 1992. An agreement was reached between staff and WDW whereby the licensee would be required to submit the results of monitoring to the Commission, including any minimum flow increases proposed if monitoring results indicate the need for increased flows.

WDW concurred with the requirement specified in Article 408, which requires SRH to monitor the resident trout population to assess reductions in the population as a result of project operations.

Subsequent to the EA and teleconference, the FWS, by letter dated March 23, 1992, provided 10 recommendations for the project. Our EA, and this order, address their concerns and the conditions included in the license order are consistent with FWS's recommendations, as discussed below.

FWS recommended fish population monitoring, run-of-the-river mode of operation, development of an erosion and sediment control plan, installation of an automatic shutoff valve, installation of fish screens and fish bypass, flow continuation for project shutdown, and ramping rates below the project. These measures are required by Articles 408 through 413. All of these measures except run-of-river operation and the emergency bypass valve were discussed in the EA.

Run-of-river operation and installation of an emergency bypass valve to be activated in the event of penstock rupture, were measures proposed by SRH in their application for license after consultation with agencies, including FWS.

Run-of-river operation would maintain riverine conditions in Youngs Creek and would minimize water level fluctuations below the project. Installation of the emergency bypass valve is an appropriate measure to prevent mass erosion and soil movement in the event of a rupture along the 2.7-mile-long penstock route. The costs for these measures are included in SRH's project costs.

FWS also recommends monitoring of gas supersaturation conditions at the project. The terms and the conditions of the water quality certificate, referenced as part of the project

license, require the licensee to monitor supersaturation in the project area.

I conclude that the fish and wildlife measures required in this license are consistent with the recommendations of the fish and wildlife agencies.

Section 18-Fishway Prescription

FWS requested that the Commission reserve FWS authority to, in the future, prescribe fishways and fish passage for resident rainbow trout in Youngs Creek. The Commission reserves this authority in Article 415.

Summary of Findings

The EA gives background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment. Issuing 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.

Based on the staff analysis I conclude that the Youngs Creek Project does not conflict with any planned or authorized development, and is best adapted to comprehensive development of the waterway for beneficial public uses.

The Director orders:

(A) This license is issued to Snoqualmie River Hydro (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 Youngs Creek Project. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and to the regulations the Commission issues under the provisions of the Act.

(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 G-</u>	<u>FERC No. 10359-</u>	<u>Showing</u>
1	8	Project Boundary Map
2	9	Project Boundary Map

(2) Project works consisting of: (a) a 12-foot-high, 65-foot-long diversion weir with a crest elevation of 1,530 feet mean sea level; (b) an intake structure; (c) a 51-inch-diameter, 14,500-foot-long penstock; (d) a powerhouse with a turbine generator unit with a generating capacity of 7.5 MW; (e) a short tailrace; (f) a 12.5-kilovolt, 6.1-mile-long overhead transmission line; and (g) other appurtenances.

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 F-</u>	<u>FERC No. 10359-</u>	<u>Showing</u>
1	1	Location map
2	2	General plan
3	3	Diversion weir and intake structure, plans and sections
4	4	Penstock profile and details
5	5	Bridge plan and section
6	6	Powerhouse site plan and sections
7	7	Powerhouse floor plans

(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 exhibits 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 Act, as

determined by the Commission. The authorized installed capacity for that purpose is 10,000 horsepower.

Article 202. Pursuant to Section 10(d) of the Act, 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 includible 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 begin construction of the project works within 2 years from the issuance date of the license and shall complete construction of the project within 4 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 the cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of the cofferdam, the licensee shall submit to the Commission's Regional Director and to the Director, Division of Dam Safety and Inspections, one copy of the approved cofferdam construction drawings and specifications and a copy of the letters of approval.

Article 303. The licensee shall, at least 60 days prior to the start of construction, 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 must 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 as built.

Article 401. The licensee shall implement all of the visual resource mitigative measures contained in section 8.4 of the application for license filed August 28, 1990, which includes exterior surface treatments of structures, revegetation and other landscape plantings, clearing and grading standards, and lighting.

Article 402. The licensee shall implement the Erosion Control Plan filed on December 3, 1990, as pages 1 through 76 and drawings 5-1 through 5-18 to minimize soil erosion and slope instability as a result of construction activities. The plan includes scheduling of land disturbing activities during the dry season and in-stream work to be performed during low flow periods. Diversions will be utilized to reduce velocities, intercept water, and divert runoff away from construction areas. Permanent and temporary filter and sediment traps will be constructed to control runoff and sediment during construction. Only areas which can be graded and stabilized in the current season will be disturbed.

Article 403. At least 90 days before the start of any land-disturbing or land-clearing activities, the licensee shall file with the Commission for approval, a wildlife mitigation plan.

The plan shall provide for, at a minimum:

- (a) revegetating all portions of the penstock right-of-way not contained within an access road right-of-way with sufficient densities of trees;
- (b) revegetating the margins of the project access road right-of-ways with herbaceous plants and shrubs that are palatable to black-tailed deer and other species common in the vicinity;
- (c) installing and maintaining gates at the entrances to the project access roads;
- (d) installing and maintaining nest boxes and perch poles along the project access roads;
- (e) enhancing at least 3.3 acres of existing riparian areas in the project vicinity to replace the wildlife values lost as the result of project construction;
- (f) acquiring and preserving a stand of at least 2 acres of mature coniferous forest in the project vicinity;
- (g) monitoring the effectiveness of the measures described in (a), (b), and (e) above, including steps to be taken in the event these measures are not effective, such as, but not necessarily limited to, modifying the measures or establishing or enhancing additional riparian forest areas;
- (h) providing recommendations to the agencies and the Commission for alternative wildlife mitigation measures, if monitoring indicates that the revegetation measures or the riparian forest establishment or enhancement is not successful; and

(1) schedules for implementing the measures proposed in (a) through (f) above, for filing the results of the monitoring program, and for filing recommendations for alternative wildlife mitigation.

The licensee shall prepare the plan after consultation with the Washington Department of Wildlife and the U.S. Fish and Wildlife Service. The licensee shall include with the plan documentation of consultation with the agencies before preparing the plan, copies of agency comments or recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how all the agency comments were 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 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 plan. No land-disturbing or land-clearing activities shall begin until the licensee is notified by the Commission that the plan is acceptable. 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 construction, the licensee shall file with the Commission for approval a transmission line design plan, prepared in accordance with the 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 plan shall consider, at a minimum, the following: (a) adequate separation of energized conductors, groundwires, and other metal hardware; (b) adequate insulation; and (3) and any other measures necessary to protect raptors from electrocution hazards. The plan shall include detailed design drawings of the transmission line clearly showing phase spacing, configuration, and grounding practices, and a construction schedule. The plan shall also show the means by which the transmission line crosses the Skykomish River, i.e., buried in the river bed or attached to an existing bridge.

The licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service and the Washington Department of Wildlife. 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 any

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 transmission line construction 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. As-built drawings of the transmission line shall be filed in accordance with the requirements of article 304 of this license.

Article 405. At least 90 days before the start of any land disturbing or land-clearing activities, the licensee shall file with the Commission for approval a plan to protect the federally listed threatened bald eagle (*Haliaeetus leucocephalus*). The plan shall include, but not be limited to, the following: (a) a project construction schedule, including transmission line construction, to avoid disturbances to wintering bald eagles by suspending project construction between November 1 and March 31; (b) preserving potential eagle perching and roosting trees, to the extent possible; and (c) burying the sections of the transmission line crossing the Skykomish River or attaching the transmission line under an existing bridge.

The licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service and the Washington Department of Wildlife. 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 and recommendations 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 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 406. The licensee, before starting any land-clearing or land-disturbing activities along the transmission corridor route, shall conduct a cultural resources survey of portions of the transmission corridor route where landowner access was denied prior to licensing and surveys not conducted, and additional survey of the areas which the National Park Service-Interagency Archeological Services (NPS) indicated by letter dated September 10, 1990, may need more detailed inventory. If additional survey of the previously surveyed areas

is not necessary, the licensee shall provide a detailed explanation about why the previous survey adequately inventoried these areas. Survey shall be based on the recommendations of the Washington State Historic Preservation Officer (SHPO) and the NPS.

A report shall be filed with the Commission for approval within 2 years from the date of this license documenting survey results, any justification of previous survey methods, and procedures necessary to avoid or mitigate impacts to any sites identified as eligible for inclusion in the National Register of Historic Places, together with letters from the SHPO and the NPS documenting presurvey consultation and commenting on the report.

The Commission reserves the right to require the licensee to conduct additional survey and file revised reports as necessary to complete an inventory of cultural resources of the transmission line route. The licensee shall not begin any land-clearing or land-disturbing activities until informed by the Commission that the requirements of this article have been fulfilled.

Article 407. The licensee, before starting any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in this license, including recreation developments at the project, shall consult with the Washington State Historic Preservation Officer (SHPO).

If the licensee discovers previously unidentified archeological or historic properties during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties and consult with the SHPO.

In either instance, the licensee shall file for Commission approval a cultural resource management plan (plan) prepared by a qualified cultural resource specialist after having consulted with the SHPO. The plan shall include the following items: (1) a description of each discovered property indicating whether it is listed on or eligible to be listed on the National Register of Historic Places; (2) proposed measures for avoiding or mitigating effects; (3) documentation of the nature and extent of consultation; and (4) a schedule for mitigating effects and conducting additional studies. The Commission may require changes to the plan.

The licensee shall not begin land-clearing or land-disturbing activities, other than those specifically authorized in this license, or resume such activities in the vicinity of a

property, discovered during construction, until informed that the requirements of this article have been fulfilled.

Article 408. At least 90 days before the start of project operation, the licensee shall file with the Commission for approval a monitoring plan to determine changes in the resident trout population in Youngs Creek with the minimum flows in effect required by Article 411.

The licensee shall prepare the plan after consultation with the Washington Department of Wildlife and the U.S. Fish and Wildlife Service. 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 plan shall include: (a) monitoring of pre-project trout populations until the project becomes operational; (b) monitoring of project effects on trout populations for 5 years after commencement of project operations, and subsequently thereafter should minimum flow increases be deemed necessary to protect the trout resource; (c) a schedule for providing the monitoring results to Washington Department of Wildlife and U.S. Fish and Wildlife Service; and (d) schedules for: (1) implementation of the monitoring program; (2) consultation with the Washington Department of Wildlife and U.S. Fish and Wildlife Service concerning the results of the monitoring; and (3) filing the results, agency comments, and licensee's response to agency comments with the Commission. If results of the monitoring determine that increases in flows are warranted (according to criteria defined in this monitoring plan), then SRH shall submit to the Commission for approval a proposal to increase minimum flows in the bypass reach of Youngs Creek to protect aquatic resources.

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 409. The licensee shall operate the project in a run-of-river mode for the protection of aquatic resources in Youngs 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 WDW. 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 410. 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 conduit or penstock failure and immediately shut off flow in the conduit or penstock at the headworks in the event of such a failure.

The plan, at a minimum, shall include: (a) design drawings; (b) a schedule for installation and testing of the system prior to operation of the project; (c) a schedule for annual testing of the system for the life of the project; and (d) a description of a plan to manually close off the conduit or penstock until the system is operational if any malfunction is revealed during testing.

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 411. The licensee shall release from the Youngs Creek Project into Youngs Creek minimum flows according to the following table, as measured at the flow recording gage required by Article 414, or inflow to the project reservoir, whichever is less, to protect the resident fish population in the bypassed reach of Youngs Creek.

Staff's recommended minimum flow releases to the bypass reach of Youngs Creek.

Month	Minimum Flow (cfs)
October 1 - April 30	3
May 1 - May 15	8
May 16 - July 15	40
July 16 - September 30	22

These flows may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for

short periods upon agreement between the licensee and the Washington Departments of Wildlife and Fisheries. 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 412. 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 Youngs Creek Project

Season	Daylight	Night	Rationale
February 16 - June 15 Salmon Emergence	No Ramping	2 in/hr	Chinook fry in gravel during day
June 15 - October 31 Steelhead Emergence and rearing	2 in/hr	1 in/hr	Steelhead fry show opposite behavior
November 1 - February 15 Winter-refuge activity	2 in/hr	2 in/hr	Low fish activity

* Daylight is defined as 1 hour before dawn and 1 hour after sunset

The location at which to measure ramping rate compliance shall be mutually determined by the licensee, the Washington Department of Wildlife and the U.S. Fish and Wildlife Service prior to project operation. The location of this site should be identified in the as-built drawings as required by Article 304.

Article 413. The licensee shall design, construct and install the intake screening structure and fish bypass according to the functional design as shown in drawings 1 and 2 of the additional information dated April 19, 1991, to protect fish resources. The screen shall be installed and operational before commercial operation of the project. Within 90 days after the installation of the screen, the licensee shall file, with the Commission, as-built drawings of the self-cleaning screen system, electrically operated gates and sensors, and bypass.

Article 414. The licensee shall design, construct, and install a continuous recording gage (Geological Survey standard), within 100 yards downstream of the project diversion in the bypass reach. Within 90 days after the installation of the gage 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 gage has been

accurately calibrated prior to operation, annually, and after repair. The project diversion and gage installations shall be shown on the as-built drawings as required by article 303.

The licensee shall make available flow information from the gage required by this article to the Commission and appropriate agencies 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 415. 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. The Commission also reserves authority to require the licensee to permit the Interior to inspect project records pertinent to fishways, and to investigate and prepare a report documenting the effectiveness of such fishways.

(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 issued under authority delegated to the Director and constitutes final agency action. Request for rehearing by the Commission may be filed within 30 days of the date of this order, pursuant to 18 C.F.R. § 385.713.


Fred E. Springer
Director, Office of
Hydropower Licensing

**ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE**

Youngs Creek Hydroelectric Project

FERC Project No. 10359-003

Washington

**Federal Energy Regulatory Commission
Office of Hydropower Licensing
Division of Project Review
825 North Capital Street, NE
Washington, DC**

December 23, 1991

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SUMMARY

SRH proposes to construct and operate a hydroelectric project on private lands on Youngs Creek, about 4 miles south of the town of Sultan, in Snohomish County (figure 1). As proposed, the project would generate an installed capacity of 7.5 megawatts (MW), producing about 27.7 gigawatt-hours (GWh) of power annually.

In addition to SRH's proposal, we (the staff) considered two alternative actions: (1) SRH's proposal with our environmental recommendations and (2) no action.

Under our alternative, in addition to SRH's original proposal, we recommend two measures to better protect the fishery resources: (1) maintaining ramping rates in accordance with WDF interim standards and (2) installing mechanically cleaned fish screens.

Under the no-action alternative, no license would be issued. There would be no change to the existing environment.

Under Section 10(a)(2) of the Federal Power Act (Act), federal and state agencies filed 85 plans that address various resources in Washington. Of these, 6 plans are relevant to this project. The proposed project would not conflict with any of these plans and is consistent with these federal or state comprehensive plans, for improving, developing, or conserving Youngs Creek.

Under Section 10(j) of the Act, we have made a preliminary determination that the minimum flow recommendation of the Washington Department of Wildlife is not based on substantial evidence as required by Section 313(b) of the Act. Therefore, we do not recommend including this flow recommendation in any license.

Based on our review of the proposed action and the alternatives under section 4(e) and 10(a) of the Federal Power Act (Act), we recommend the proposed action with our environmental measures. If SRH follows our environmental measures, the project would not have significant effects on the environment, would be economically feasible to build, and would be best adapted to a comprehensive plan for the Youngs Creek Basin.

Based on our independent analysis, issuance of an order approving the proposed action, with our environmental recommendations, is not a major federal action significantly affecting the quality of the human environment.

ENVIRONMENTAL ASSESSMENT

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

Youngs Creek Hydroelectric Project
FERC No. 10359-003-Washington
December 23, 1991

I. APPLICATION

On August 28, 1990, Snoqualmie River Hydro (SRH) filed an application for major license, greater than 5 megawatts (MW), for the Youngs Creek Hydroelectric Project.

II. PURPOSE AND NEED FOR ACTION

A. Purpose

The purpose of the project is to make electric power from a renewable resource available to electric utilities.

B. Need for Power

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

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

The Northwest Power Planning 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 is impossible to forecast electrical energy needs accurately. The Council therefore developed 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.

While the Council developed the forecast levels cooperatively with the Bonneville Power Administration (BPA), BPA places a somewhat higher probability on the medium forecast than does the Council.

The Council's forecasts focus on firm energy needs for power planning purposes because: (1) hydroelectric power predominates in the Pacific Northwest and (2) the power system is energy limited instead of capacity limited, .

Regional firm sales of electrical energy are forecast to change from 15,618 average megawatts (MWe) in 1987 to a level between 15,442 and 29,223 MWe by 2010. The medium forecast is 21,344 MWe in 2010, an average annual growth rate of 1.4 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 would not 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 does not necessarily represent any particular power supply sector or individual utility. For example, the Council's load and resource analysis for the region's investor-owned utilities shows the need for more resources about 3 years earlier than for the region as a whole.

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 the Pacific Northwest Utilities Conference Committee (PNUCC). PNUCC's March 1990 projections of regional firm energy loads and resources show a need for more resources beginning in 1992; PNUCC predicts a

deficit of over 1,000 MWe by 1997, based on existing and assured resources.

III. PROPOSED PROJECT AND ALTERNATIVES

A. Proposed Project

1. Project Description

SRH's proposed facilities include: (1) a 12-foot-high, 65-foot-long reinforced concrete dam with a crest elevation of 1,530 feet mean sea level, at 5 miles upstream from the junction with Elwell Creek; (2) an intake structure; (3) a 51-inch-diameter, 14,500-foot-long steel penstock; (4) a 46-foot-wide by 48-foot-long reinforced concrete powerhouse with a turbine-generator unit with a generating capacity of 7.5 MW; (5) a short tailrace; (6) a 13.5-kilovolt (kV), 6.1-mile-long overhead transmission line; and (7) other appurtenances (figure 2).

The diversion dam would create a small impoundment with a surface area of 0.21 acres at normal pool elevation of 1,530 feet. SRH proposes to operate the project as a run-of-river facility (flow below the powerhouse would be about equal to inflow to the impoundment).

2. SRH's Proposed Mitigative Measures

Geology and Soils

To control soil erosion and sedimentation and maintain slope stability in the project area during construction and operation of the proposed project, SRH proposes to implement an erosion control plan including, but not limited to the following:

- Schedule major land disturbing activities during the dry season and instream activities during low flow
- Provide temporary and permanent drainage facilities to control runoff from natural areas and construction site areas
- Trap and filter sediment before it enters the streams
- Limit clearing to areas where construction will be completed in one season and revegetate disturbed areas as quickly as possible after construction is completed
- Stabilize and protect spoils pile

Visual Resources

Landscape preplanting would be used to create and maintain screening and natural transitions between project facilities and the natural landscape. Natural native vegetation would be planted to screen structures, and existing vegetation that provides screening would be left untouched.

The clearing and grading edges required would be finished by use of natural materials and would be designed to minimize any straightline effect.

All access roads would be constructed to be as visually unobtrusive as possible and would be only as wide as needed to accommodate slow-moving traffic. Turnouts would be sited in less visually sensitive areas, and road cuts would follow existing topography as much as possible.

Building materials and coloring compounds would be visually compatible with the site, natural-appearing, and nonreflective.

Lighting would be time-phased to operate only as needed for maintenance and security, discretely sited to illuminate the site only, and mounted on low-profile wooden structures.

Water Quality

SRH proposes that project operations would maintain water quality at the Class A standard (excellent) of the Washington Department of Ecology (WDOE). This would be accomplished by the use of prudent construction methods to reduce erosion of sediments into the stream (see geology and soils mitigative measures).

Streamflow

SRH proposes a flow regime for the bypass reach of Youngs Creek that would consist of a 3 cfs minimum flow release from October to April, with increased minimum flows during spring and summer. The project's minimum flows would be increased at 5-year increments, if warranted, to further mitigate the flow-related impacts to aquatic resources, water quality, riparian vegetation, and wildlife.

Fisheries

To protect resident populations of rainbow trout, SRH would remove all salmonids from the immediate dam (weir) area during construction. To protect downstream salmonids during construction, SRH proposes to do instream work between July and October, when instream flows are low.

During project operation, SRH would minimize adverse impacts to fish habitat and water quality by releasing specific minimum flows in the bypass reach. Self-cleaning, 0.125-inch, welded bar or mesh screen would be installed to prevent fish entrapment, with an approach velocity not to exceed 0.4 foot per second (fps). SRH says it would make downstream passage of resident fish easier by putting a slotted exit orifice in the sluiceway, which would be maintained with a 5 fps attractant velocity.

SRH proposes to prevent stranding of salmonids in the bypass reach and downstream by providing for flow continuation for 48 hours during project shutdown. Should ramping be necessary, SRH would maintain interim ramping standards of 2 to 4 inches per hour. SRH would construct the intake to ensure that air entrapment does not occur.

Vegetation and Wildlife

SRH proposes the following:

- Retaining topsoil during construction to facilitate revegetation
- Minimizing clearing for penstock burial and equipment lay-down
- Placing all but 0.35 mile of the transmission line adjacent to new and existing roads
- Returning 11.6 acres (out of the total 20.4 affected), to upland commercial forest by planting with Douglas-fir seedlings and monitoring the success of the plantings
- Seeding 4.0 acres of access road right-of-way with grasses and shrubs palatable to wildlife and maintaining the right-of-way thereafter in non-woody vegetation
- Completing large-scale construction before the rainy season of November through April and before bald eagles are present in the Skykomish River Basin
- Burying approximately 13,680 feet of the penstock to eliminate barriers to animal movement
- Gating the new project roads to restrict vehicular access
- Installing nest boxes and bird perch poles within the access road right-of-way to provide habitat features

- not readily available to birds within the intensely managed forest
- Scheduling routine project maintenance and repair so sensitive wildlife would not be disturbed
- Acquiring from 5.4 to 10.0 acres for habitat replacement
- Designing and constructing the transmission line in conformance with the 1981 guidelines of the Raptor Research Foundation, Inc.

We discuss each of these recommendations in the individual environmental resource sections.

B. Proposed Project with Staff's Mitigative Measures

Under our alternative, the license would include the following mitigative measures we recommend:

- Make minimum releases to the bypass reach of 3 cfs from October 1 - April 30; 8 cfs from May 1 - May 15; 40 cfs from May 16 - July 15; and 22 cfs from July 16 - September 30
- File a detailed plan developed with agency (WDW) consultation, to monitor the resident fish population during project operation
- Employ interim ramping rate standards in the bypass reach and downstream of the project according to Washington Department of Fisheries interim standards
- Install a flow-recording gage at the diversion weir to record instream flow releases to the bypass reach
- Conduct a cultural resources survey of portions of the transmission line route where landowners denied access and conduct additional survey of areas along the route that the National Park Service (NPS) stated that survey methods may not have been adequate, or justify previous methods
- Establish replacement riparian forest or enhance existing riparian areas to replace the values lost as a result of project construction
- Suspend project soil-disturbing construction activities from November 1 through March 31

- Retain potential eagle perching and roosting trees to the extent possible
- Bury the transmission line or attach it to bridges at the crossings of Youngs Creek and the Skykomish River

C. No-Action Alternative

Under this alternative, the proposed project would not be built, there would be no changes to the existing environment, and the region would need to develop other resources to meet the projected energy deficits.

With the present and potential future role of coal-fired generation in the Pacific Northwest, hydroelectric generation provides an opportunity to cut the quantity of atmospheric pollutants that burning fossil fuels produces.

Coal-fired powerplants account for about 6,300 MW, or 15 percent, of the region's installed capacity. Burning fossil fuels--especially coal--emits air pollutants that may contribute to several adverse environmental effects: acid rain, global warming (the greenhouse effect), and depletion of the ozone layer.

In 1989, the United States part of the Northwest Power Pool generated 70,714 GWh with coal-fired powerplants; at least 4,200 GWh were generated from coal plants in every month.

Besides the existing coal plant resources, the Council recognizes the need for as many as 3,425 MW of new coal generation in its planning horizon, but does so with reservations about the adverse effects of new coal development. The extent and timing of the need for new coal resources vary according to the load forecast.

The power from this project would be useful in meeting a small part of the need for power projected by the Northwest Power Planning Council for the northwest region.

From the time the project goes into commercial operation, it would be available to displace fossil-fueled power generation in the Western Systems Coordinating Council region, conserving nonrenewable fossil-fuel and reducing air pollution.

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 constitutes an initial 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 to the record and are considered during the review of the proposed project. After the Commission issued a public notice of the Youngs Creek Project on October 24, 1990, the following entities commented on the application or filed motions to intervene:

<u>Commenting entity</u>	<u>Date of letter</u>
Weyerhaeuser Company	November 15, 1990 * December 28, 1990
Washington Department of Fisheries and Washington Department of Wildlife	December 19, 1990 *
Tulalip Tribes (supplement)	December 27, 1990 * January 8, 1991 *
Washington Department of Fisheries	January 11, 1991 April 29, 1991
Department of the Interior	January 31, 1991
Department of the Army	February 11, 1991

* denotes a motion to intervene

B. Water Quality Certification

On August 23, 1990, WDOE accepted SRH's request for water quality certification for the proposed project. By letter dated August 20, 1991, WDOE denied certification, stating that although the water quality related information supplied in the license application is important in assisting WDOE to reach a decision on the water quality certification, WDOE is unable to complete its evaluation of the merits of the request until a final agreement on the interim minimum instream flow is achieved between SRH and the state resource agencies. WDOE is currently reviewing a new request for water quality certification submitted by SRH on October 25, 1991.

C. Coastal Zone Management Program

Because the project is located in a coastal county WDOE must review the proposed project for consistency with the state's Coastal Zone Management Program (CZMP). Under the Coastal Zone Management Act of 1972, before a license can be issued, WDOE must: (1) find the project consistent with the CZMP or (2) waive the requirements. WDOE is reviewing the project for consistency.

V. ENVIRONMENTAL ANALYSIS

A. General Description of the Locale

1. Snohomish River Basin.

The Snohomish River Basin is a large, sparsely populated area northeast of Seattle. Much of the eastern portion of the basin is forested and is rimmed by the scenic Cascade Mountains. The western basin borders the Puget Sound. Much of the local economy is based on forestry, agriculture, commercial fisheries, tourism, and recreation. The basin is noted for its natural runs of anadromous fish.

In addition to providing a place to live, work, and take part in recreational activities for local residents, the basin attracts increasing numbers of people who live in the growing Seattle-Bellevue area. Because of abundant rain and snowfall and numerous high-gradient streams, the basin has a high potential for hydroelectric development.

2. Proposed and Existing Hydropower Development

(a). Existing licensed projects and exempted projects (indicated by an "*" after the FERC Project No.) in the river basin, as of 11/25/91 (figure 2).

<u>Project No.</u>	<u>Project name</u>	<u>Water body</u>
2157	Lake Champlain	Champlain R.
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.

(b). Pending license applications and exemption applications in the river basin, as of 11/00/01 (figure 2).

Project No.	Project name	Water body
8864	Calligan Creek	Calligan Creek
9025	Hancock Creek	Hancock Creek
10359	Youngs Creek	Youngs Creek

3. Target Resources

A target resource is an important resource that may be cumulatively affected by multiple hydropower development within the basin. Based on public and agency comments, we identified six target resources--black-tailed deer, bald eagle, salmon, steelhead trout (sea-run rainbow trout), resident trout, and cultural resources--which could be adversely affected in a cumulative manner by proposed hydropower projects in the Snohomish 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 Snohomish River Basin.

The proposed project would be located on Youngs Creek, a tributary to the Elwell Creek, which is a tributary to the Skykomish River, which runs into the Snohomish 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 Basin, documenting our analysis in an environmental impact statement (EIS) in June 1987.

In the EIS we identified five target resources--the black-tailed deer, bald eagle, salmon, steelhead trout (sea-run rainbow trout), and resident trout; we now believe there is a sixth target resource--cultural resources--because of the numerous archeological and historic sites and sites of religious and other cultural concerns to Native American tribes.

The project would not contribute to any cumulative impacts to cultural resources because the likelihood of impacting sites in the project area is low. No sites eligible for inclusion in

the National Register of Historic Places were inventoried in the SRH's survey of the project. SRH did not survey a small portion of the proposed transmission line route where landowners denied access, and one highly disturbed area of forest clearcut along the route was not surveyed in detail. If this project is licensed, any sites discovered in surveys of these areas after licensing would likely be avoided by adjusting the location of the transmission line corridor and other procedures for avoiding impacts.

Youngs Creek supports a sizeable population of resident rainbow trout. SRH's preliminary water quality monitoring shows that Youngs Creek possesses class A water quality, as defined by WDOE. In addition to the resident rainbow trout populations, anadromous steelhead trout and coho salmon occur downstream of the project site, below a natural barrier at RM 1.0.

No significant adverse cumulative impacts to target resources in the Youngs Creek drainage would occur as a result of project operations, if the project is constructed and operated with our proposed mitigative measures.

B. Proposed Project

1. Geology and Soils

Affected Environment: The powerhouse and much of the 14,500 feet of penstock would be located on glacial deposits and volcanic rock. The glacial deposits consist of sand and gravel with silty sand and silty clays. The gravel is moderately to poorly graded. The overall load-bearing strength is good for these types of deposits. The volcanic rock at the intake location is: (1) soft to moderately hard; (2) fine to coarse grained; (3) reddish brown to black; and (4) displays joint sets and bedding planes. The slopes along the construction area are gentle to steep with flat plateaus; and while there is no evidence of slope instability, there are two areas of significant bank erosion along the creek banks. This erosion is caused by lateral water movement through the silty sands and gravel layers below the surface.

Environmental Impacts and Recommendations: The project area is generally stable and well vegetated. During construction of the powerhouse, access roads, bridge, penstock, diversion weir and intake structure, localized erosion, sedimentation, and slope instability would occur. A penstock rupture during operation would cause erosion.

SRH included an erosion and sediment control plan with the application. The plan states that construction will take place during periods of low flow and in the dry season.

A cofferdam would be utilized during construction of the concrete intake structure. The cofferdam would have an impervious liner to reduce seepage. Sump pumps would be installed in the upper portion of the area to pump clean water away from the construction and back into the stream; dirty water would be trapped and pumped to a straw bale sediment barrier, where it would be filtered before draining back into the stream. Water contaminated with concrete would be trapped and pumped to a holding tank so that it would be properly disposed of off-site.

The soil overburden in all disturbed areas would be removed from above the rock and placed in a spoils pile. The pile would have a plastic cover, with a silt fence around the outside, to prevent silt run-off. After construction, the pile would be spread to provide a base for revegetation. Blast mats would be used on all blasted rock to prevent rock from being thrown into the river.

After construction is completed, or in between working seasons, SRH would complete revegetating all disturbed areas with recommended seed mixes with Forest Service (FS) guidance. SRH has provided for an erosion control inspector to monitor construction activities to ensure compliance with the plan and to provide guidance for the contractor on any necessary control measures. The measures proposed SRH's erosion control plan are appropriate and would control erosion from the site. We recommend the plan be implemented.

Unavoidable Adverse Impacts: During construction activities, there will be minor erosion until disturbed areas are reestablished with permanent vegetative cover.

2. Visual Resources

Affected Environment: Nearly the entire Youngs Creek drainage has been logged in the past 75 years, leaving timber stands of varying ages, sizes, and plant species; this has produced a visually diverse landscape. The rugged landforms are softened in appearance by the forested slopes.

The proposed project area cannot be seen from local highways, but may be seen from some of the area logging roads.

Environmental Impacts and Recommendations: At the powerhouse location, Youngs Creek is relatively level. Slopes within the immediate area are moderate, while the powerhouse would be built on a stream bank with a 7 percent slope. SRH proposes to bury most of the powerhouse. Due to this partial burial and to the existing relatively dense and maturing vegetation, the structure would not be visually obtrusive even when viewed from the site. After SRH revegetates and uses such

design techniques as color wash and free-form cobble or talus facing, the structure would blend into the natural site.

SRH proposes to bury approximately 13,100 feet of the 14,500-foot-long penstock. The aboveground section of the penstock traverses areas of mature coniferous forest, young coniferous and mixed forest, and a small clearcut area. The major portion of the buried penstock section would be located in a penstock-only right-of-way, with a parallel, short-term light access road needed for construction. After revegetation, the penstock would present a lower visual profile than the existing logging road system within the area.

The first 1,400 feet of penstock below the diversion would not be buried but would be anchored to a bedrock bench because of excessive slope and bedrock conditions. This section would be revegetated to the extent possible and painted to blend with the surrounding landscape. Views of this section are limited by the steep topography, resulting in a minor visual impact.

The proposed project transmission line would be located within the rights-of-way of the proposed powerhouse access road, existing private logging road, and a county road. The 12.5 kv circuit would be constructed on 40- to 50-foot-tall, single wood poles, spaced about 300 feet apart. Because of the prevailing dense vegetation, the transmission line would blend with the roadside landscape.

SRH proposes visual resource mitigation in section 8.4 of the application for license. All of the proposed mitigation described above is essential to reduce adverse visual impacts and should be required in any license issued.

Unavoidable Adverse Impacts: The proposed project facilities would have a minor adverse visual impact.

3. Recreation and Land Use

Affected Environment: Within the project site and immediate vicinity, no recreational facilities exist and few recreational activities take place. Fishing is a low level opportunity; access is limited along the bypass reach by steep and rugged terrain. Restricted hunting and other dispersed activities such as berry picking and plant collecting occur.

The project site--and large tracts of forestland surrounding it--is privately owned by the Weyerhaeuser Company. Commercial timber management is the major land use in the 14.6-square-mile Youngs Creek Drainage Basin. Throughout the entire basin, there is an extensive logging road system.

Environmental Impacts and Recommendations:**a. Recreation**

The proposed project would have negligible impacts on recreation because: (1) very little recreational use occurs in the project vicinity and (2) no recreational facilities exist on the project site. The project would also create no new recreational opportunities: the proposed project would create no reservoir, is of small size and scope, and is located on private lands managed primarily as commercial timberland.

The Washington State Parks and Recreation Commission recommends SRH provide \$150,000 to \$180,000 for off-site recreational improvements (letter from William Bush, Chief, Research and Long Range Planning, Washington State Parks and Recreation Commission, Olympia, Washington, February 11, 1991). Because the proposed project would not affect recreational resources and would provide no opportunities for recreational development, we believe no recreational mitigation is warranted.

SRH stated that since the project would be operated as an unattended facility, the potential for vandalism is a major concern. Further, prohibiting public vehicular access to the project area would minimize disturbance to deer, bald eagles, and other wildlife. They propose locking gates across both access roads and posting no information or directional signs.

Since the project would have little effect on recreational resources and vehicle access control would protect wildlife resources, we believe restricting public vehicular access to the project site is justified. Therefore, SRH should maintain locked gates across both access roads.

b. Land Use

The project would require the clearing of approximately 19.3 acres of mixed and coniferous forest (Snoqualmie River Hydro, 1991). SRH proposes to reforest approximately 11.6 acres of the penstock right-of-way. (See Section V.4.) The remaining 7.7 acres would be converted to a new land use, hydroelectric development.

About 94 percent of the project's 6.1 mile transmission line would be located within the right-of-way of the powerhouse access road and private and county road rights-of-way. Weyerhaeuser says the proposed transmission line design and route could adversely affect forestry operations by causing safety and fire hazards and allowing aerial silvicultural operations. They believe SRH can make changes in the transmission line location and design to minimize adverse impacts.

We believe designing the transmission line route to follow the proposed access roads minimizes transmission line impacts to forestry operations. In designing the transmission line route, SRH also considered impacts to wildlife (specifically bald eagles), cultural, and visual resources. We believe the proposed route is environmentally sound.

Unavoidable Adverse Impacts: None.

4. Water Resources

Affected Environment: No streamflow data existed for Youngs Creek before SRH's studies. Streamflow gages installed in 1989 provide direct flow data, and by extrapolating from nearby streams, SRH estimates the mean annual flow is 74 cfs at the proposed diversion site (table 1).

Table 1. Monthly average stream flows at proposed Diversion site of Youngs Creek Project (SRH 1990)

Month	Flow in cfs
October	61.6
November	100.0
December	109.6
January	93.2
February	76.7
March	68.0
April	85.6
May	105.8
June	92.7
July	44.4
August	20.5
September	33.2
Mean annual flow =	74.3

WDOE classifies the water quality of both the Skykomish River and its tributary, Youngs Creek, as excellent. Results of SRH's monthly and seasonal water quality sampling show water quality in Youngs Creek meets the basin-wide standard. Mean monthly temperatures range from 2.0 Centigrade (°C) in January to 14.5°C measured in August; pH ranges from 5.3 to 7.0; dissolved

oxygen was measured between 9.5 milligrams per liter (mg/l) in August and 14.2 mg/l in March; and turbidity ranged from 0.34 nephelometric turbidity units (NTU) in July to 1.80 NTU in January.

Environmental Impacts and Recommendations:

a. Instream Construction

Construction of the diversion structure and associated project facilities would disturb the streambed, increase turbidity levels, and affect resident fish populations. SRH proposes to construct a cofferdam and a 250 foot-long temporary pipeline to divert water around the dam construction site before it returns to the natural river bed. During project construction, SRH anticipates a temporary increase of 75 percent in sediment load. This increase in sediment load and the increase in instream activity could affect resident fish by silting existing habitat.

SRH proposes to mitigate construction activity by hiring fishery crews to remove resident trout populations from the intake-area of the project site during construction. This would only be effective if resident fish were prevented from entering the area for the duration of instream construction. Cofferdams and diversion pipes would be sized for 25 year period peak storms. Scheduling instream work during the low runoff months from July to October would reduce the effect of construction.

Activities during construction have the most potential for depositing sediment into Youngs Creek.

A comprehensive barrier, settling pond, and pump arrangement, as proposed by SRH, would reduce downstream sediment load. We believe the preventative and mitigative measures proposed by SRH would reduce the anticipated impact of instream construction. SRH should design, construct, and use the sediment barrier devices they specify in their erosion and sediment control plan described in the geology and soils section.

b. Gas Supersaturation

Hydro project operation can entrain air in water entering the intake, if vortexing at the intake occurs. 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 Kats 1980; Bouck 1980; Nebeker et al. 1980).

To maintain state Class A water quality standards, dissolved gases cannot exceed 110 percent air saturation. SRH proposes to

reduce the potential for gas supersaturation by designing and locating the intake structure so as to prevent vortices, air entrainment, and consequent supersaturation of dissolved gases. These methods include:

- Maintaining adequate submergence of the penstock intake (greater than 5 feet)
- Constructing a shallow, rapid tailrace to facilitate gas equilibria

We do not anticipate significant supersaturation problems at the proposed project. SRH's proposed plan would ensure that no supersaturation of gases above the 110 percent threshold would occur downstream of the project. SRH should design the project intake as illustrated in figure 1 of their April 1991 response for additional information.

Unavoidable Adverse Impacts: Some short-term increases in sedimentation would occur during project construction.

5. Fishery Resources

Affected Environment: Fish found in Youngs Creek include rainbow trout, steelhead trout (sea-run rainbow trout), and coho salmon. The resident trout population extends throughout the entire proposed site. SRH's surveys of Youngs Creek estimate an abundance of 1,192 trout in the 2.7-mile bypass reach and immediately upstream of the proposed project. These fish are primarily associated with pool habitat. The population is bounded by a series of cascades, approximately 300 feet upstream from the proposed intake site, effectively prohibiting resident fish from migrating further upstream.

Below the proposed powerhouse site at river mile 1.0, a high velocity 15-foot "falls" acts as a natural barrier to upstream movement of anadromous fish, which occur below this barrier. The predominant species is coho salmon, with moderate use by steelhead trout. SRH, using Washington Department of Wildlife (WDF) guidelines, states that salmon habitat below the barrier is fair for spawning and good for rearing (Washington Department of Wildlife, 1988).

An additional 1825 resident rainbow trout are estimated to also occur in this reach below the proposed powerhouse site. Their movement upstream is also prevented by the natural barrier, though resident trout in the proposed project area have passage downstream.

Environmental Impacts and Recommendations:**a. Minimum Flows**

During project operation, reduced flows in the 2.7-mile-long bypass reach of Youngs Creek would decrease available aquatic habitat below the diversion dam.

The existing flow regime in Youngs Creek allows for the presence of a moderate, self-sustaining, resident rainbow trout population in the proposed bypass reach. Most of the bypass reach has moderate gradients (5 percent to 7 percent) and is exposed to relatively high variability in seasonal flows. Peak monthly mean flows occur in winter (November to January) and late spring (April to June), with dry, low-flow periods during the summer (table 1).

The proposed project would divert between 12 and 120 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, or approximately 72 percent of the time.

SRR has proposed a seasonal minimum instream flow regime, as a result of roundtable discussions and consultation with state resources agencies (WDF and WDW) and the Tulalip tribes (table 2). Final agency agreement on appropriate project operations (i.e. minimum flows, ramping rates, and monitoring plan) has not been reached, but SRR and WDW have agreed on minimum instream flow releases for the bypass reach of Youngs Creek. The minimum releases are based around WDW's standard of providing at least 100 percent of the historical (existing) habitat, and would under most conditions protect the rainbow trout life-stage(s) of concern.

The flow schedule proposed would decrease existing bypass reach flows in Youngs Creek by up to 97 percent during high flow months (December). The project would not operate during low flow conditions in August and September, and therefore all natural streamflow would be released to the bypass. Computer simulation using HADDUR (Kruger 1988) produced monthly habitat duration curves for each rainbow trout life-stage of concern. SRR states that when compared with "historic" (existing) flows, results of the habitat analysis show that, except for the mid-May to June spawning period, project flows would provide habitat exceeding existing conditions. At the lowest and highest project flows, SRR states that slight reductions in existing habitat could be expected to occur.

Table 2. Minimum instream flow schedule for Youngs Creek Project as proposed by SRR (Source: the Staff, modified from SRR 1991).

Years of Project Operation	1-5yrs	6-10 yrs	10-15 yrs	16 + yrs		
		Flow Schedule Adjustment ¹			95% Flow ²	POC ³
Month	Start-up Flows	1st	2nd	3rd		
October	3	6	8	8	8	8
November	3	6	9	12	18	8
December	3	6	9	12	27	4
January	3	6	9	12	20	4
February	3	6	9	12	21	4
March	3	6	9	12	24	4
April	3	6	9	12	37	4
May 1-15	8	8	9	12	47	8
May 16-31	40	40	40	40	42	>150
June	40	40	40	40	36	>150
July 1-15	40	40	40	40	13	>150
July 16-31	22	22	22	22	8	22
August	22	22	22	22	6	22
September	22	22	22	22	6	22

¹Flow increase to be adjusted only if approved monitoring plan determines decrease in resident trout population

²95% flow exceedence

³POC (Peak-of-the-curve) Flow at which maximum weighted usable area for the lifestage of concern would result

Proposed project operation from mid-May to June would reduce rainbow trout spawning habitat to 35 to 40 percent of existing levels. Habitat indices for spawning increased directly with flow, and flows necessary to maintain 100 percent of existing conditions were estimated to be 65 to 75 cfs, or greater. WDW has agreed to a spawning period flow of 40 cfs, based on the assumption that higher spawning period flows would increase the possibility of dewatered redds during the incubation period in July.

SRH's proposed flows could potentially affect the population viability of the resident fish. Reduction in flows could result in spawning gravel substrate becoming a limited resource, increasing competition and decreasing reproductive success. WDW has stated that in steep cascade streams, however, rainbow trout do not extensively use riffles for spawning, but utilize tailouts from pool areas instead. Decreased flows may also impact aquatic invertebrates, an important food supply for fry developing downstream.

WDW recommended and SRH has agreed to release a 22 cfs minimum flow during the summer season (July 16 to September 30). This is based on the peak of the WUA curve for the fry life stage, in order to maintain at least 100 percent of existing habitat for rainbow trout fry. Since July to September is the lowest flow period of the year, natural flows during the fry development period may represent the limiting factor on the existing population of resident fish.

We believe that SRH's proposed 22 cfs minimum bypass flow for July to September would provide sufficient habitat for developing rainbow trout fry. Proposed flows of 40 cfs during the spawning period would result in a loss of up to 60 percent of spawning habitat for resident trout. Increasing minimum instream flows beyond 40 cfs would result in less direct loss of spawning habitat, but would potentially strand eggs and fry during the extended incubation period, when flows decrease.

WDW and WDOE agreed with SRH that a minimum flow of 3 cfs should provide adequate refuge habitat for resident trout during winter and spring/fall transition periods (personal communication, Hal Beecher, Fisheries Biologist, WDW, October 2, 1991). WDW accepted SRH's biological justification for the flows as being adequate during rainbow trout low-activity winter periods, where fish prefer to bury in gravels during the day and lay on the bottom in shallows at night.

This behavior results in preference curves for Youngs Creek which favor low flows (shallow depth and low velocity of pools) to provide habitat and protect resident fish. WDW views the Youngs Creek project as a pilot venture to determine if small hydropower operations are compatible with steep cascade streams. The project would have the potential to moderate the high flows that periodically occur during the winter, which can radically alter the stream channel and structure.

IFIM studies show that a winter/transition period minimum flow of 3 cfs should provide at least 100% of the existing habitat in the bypass reach (table 3). We are concerned about other stream sections and habitat that may be subject to operational impacts at these low flows, specifically habitat not addressed in the IFIM analysis (riffle and run habitat). Flow

exceedence curves developed by SRH for the project show that the 3-cfs minimum flow requirement is approximately equal to the 100 year, 1-day minimum flow of record.

Table 3. Instream flows (cfs) required to provide 100 % or more of historic natural habitat levels for rainbow trout lifestage of concern, based on HADDUR (SRH 1990).

Month	20-80% Exceedence Level Integration				
	Winter	Summer	Transition	Spawning	Fry
Jan	3				
Feb	3				
Mar	3				
April			3		
May			3	>60	
June		4		>60	3
July		8			3
Aug		12			4
Sept		9			3
Oct			4		
Nov			3		
Dec	3				

Decreased instream flows could result in loss of riffle habitat during the period from October to April. Damage to this habitat could affect lower trophic levels, the macroinvertebrate food base for resident trout and downstream salmonids. Instream temperature data recorded by SRH shows that water temperatures at the proposed intake site can be as low as 0°C from December to January. Concurrent with seasonally low water temperatures during winter and transitional periods, reduced flows could increase the potential for sheet ice formation over small pools. Lower flows would result in decreased surface area, depth and volume of pools in the bypass reach. Resident fish overwintering in pool habitat could be killed if the pools completely freeze from top to bottom.

SRH has proposed a draft monitoring plan to assess project impacts during operation. The plan would require increases in minimum flows during the winter and transition periods should proposed minimum flows fail to adequately protect the resident fish population. Minimum flows for October 1 to May 15 would be

subject to adjustment in 3 cfs increments each 5 years during the first 15 years of project operations, up to a predetermined limit (table 2). The upper limit proposed by SRH is based upon maintaining the economic viability of the project.

SRH and WDW have attempted to develop a monitoring plan that would provide for subsequent flow adjustments should reductions in the population of resident trout occur after the project commences operation. This plan would dictate changes, if necessary, to the flow schedule without the participation of the Commission in any changes to the project license. The potential increases in minimum flow releases do not account for unforeseen or projected events (such as logging operations in the near future). Impacts from these events may directly affect the resident fish population, even in the absence of project related impacts.

SRH and WDW have failed to provide evidence or the biological justification that any subsequent increase in transition and winter period flows would mitigate fishery related impacts that may occur. The stepped increases proposed at 5-year intervals were agreed upon by the parties involved without any specific biological basis. Regular intervals of potential stepped-flow increases were created between start-up flows and an upper limit which was derived based on project economics.

Without direct evidence as to the benefits to the resident fish population from increasing flows, it would be premature to develop a pre-set flow increase schedule based on the size of the resident trout population. It is our opinion that SRH should develop a monitoring plan, in cooperation with WDW, that would assess annual fluctuation in the resident trout population.

Should monitoring determine that minimum flows for the Youngs Creek project are not sufficient to protect the fish resource, then WDW could petition the Commission to re-open the license according to Article 15. At that time, Staff would determine if increases in minimum flows were warranted for any months of the year, not only the transition and winter periods.

Therefore, we conclude that the flow schedule derived by SRH should not be implemented. While an adjustable instream flow agreement allegedly "provides an added measure of protection and ensures meeting criteria of no net loss of the fisheries resources, while controlling the applicant's financial risk" (SRH, 1991a), it lacks biological justification.

We believe that SRH and agencies (specifically WDW) have provided biological justification that the proposed "start-up" flow regime would result in "no net loss" of habitat for resident rainbow trout, except during the spawning period. Based on the results of SRH's instream flow study, the proposed flow regime

(table 2) (SRH, 1991a), and Staff's independent analysis, we recommend that SRH make the following releases to the bypass reach of Youngs Creek (table 4).

Table 4. Staff's recommended minimum flow releases to the bypass reach of Youngs Creek.

Month	Minimum Flow (cfs)
October 1 - April 30	3
May 1 - May 15	8
May 16 - July 15	40
July 16 - September 30	22

b. Flow Continuation during Project Shutdown

During emergency or periodic maintenance shutdown, flow through the powerhouse tailrace could abruptly stop. Sudden decreases in flow can affect all life stages of downstream fish within the project reach. Salmon redds with eggs or alevins can be dewatered and juvenile salmon can be stranded. In the bypass reach, sudden shutdown of the penstock diversion could result in rapid increases in flows. These high flows could increase turbidity and erosion while removing important substrate for resident trout populations.

To minimize impacts and frequency of project shutdown, WDF recommends that projects should be able to: (1) provide at least 24 hours minimum and 48 hours preferred of continuous flow by use of turbine deflectors and/or an energy dissipating flow-bypass valve, and (2) provide for immediate ramping to begin should long-term (>48 hours) shutdown be necessary.

SRH would maintain the flow past the turbine that WDF specified by the use of deflectors. WDF has stated that the use of deflectors on Pelton turbines is not always effective in providing for flow continuation (letter from Mark Hunter, Fisheries Biologist, Habitat Management Division, WDF, Olympia, Washington, July 24, 1991).

While recommending the use of a flow bypass valve, WDF conceded that they have also experienced problems with poorly constructed valve systems (personal communication with Mark Hunter, August 15, 1991). Of primary concern to WDF is a functional flow continuation system that would maintain the established criteria.

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) is unwarranted when the Pelton unit would adequately meet the recommended ramping flows. Therefore, SRH should ensure that the Pelton turbine is designed and built to specifications to allow these continuous releases.

c. Ramping Rates

Project start-up could suddenly decrease the amount of water in the bypass reach and alter flows downstream of the powerhouse. This could result in stranding of fish, especially juveniles, 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.

Due to the large size of the penstock (51 inch diameter; 2.7 miles long), during sudden project start-up there would be a time delay of between 30 minutes to more than 3 hours while the penstock filled with water. Reduced flows in the bypass reach and downstream of the powerhouse during this time would create the potential for extensive dewatering of aquatic habitat, except for habitat provided by the minimum flows. During project shut-down, a time-lag would occur before increased flows in the bypass were observed downstream of the powerhouse.

To prevent stranding, WDF has established three levels of ramping rate criteria. Interim criteria of 1 to 2 inches per hour (in/hr) can be implemented in lieu of or until agreement is reached upon site-specific ramping rates (table 5). In response to state-recommended design criteria, SRH agreed during preliminary meetings to install mechanical equipment to facilitate downramping as low as 1 in/hr.

During preliminary site-specific studies, SRH found that interim ramping criteria could be met in the downstream anadromous reach without restricting project operations. Maintenance of a 2 in/hr rate in the bypass reach, however, required up to 23 hours of ramping under winter flow conditions. SRH states that ramping rate criteria of the state is not suitable for small-scale hydroelectric facilities, and has proposed modified interim ramping rates of 2 to 4 in/hr (table 6). In addition, SRH, WDF, and WDW have agreed that site-specific studies are required when the project begins operation.

Table 5. WDF interim ramping rate standards (SRH, 1991b)

Season	Daylight	Night	Rationale
February 16 - June 15 Salmon Emergence	No Ramping	2 in/hr	Chinook fry in gravel during day
June 15 - October 31 Steelhead Emergence and rearing	2 in/hr	1 in/hr	Steelhead fry show opposite behavior
November 1 - February 15 Winter-refuge activity	2 in/hr	2 in/hr	Low fish activity

* Daylight is defined as 1 hour before dawn and 1 hour after sunset

Table 6. Alternate interim ramping standards proposed by SRH (SRH, 1991b)

Season	Daylight	Night	Rationale
June 16 - September 30 resident trout emergence and rearing	2 in/hr	1 in/hr	Resident trout fry activity
October 1 - June 15 Winter-refuge activity	4 in/hr	4 in/hr	Low fish activity

* Daylight is defined as 1 hour before dawn and 1 hour after sunset

SRH's proposed ramping rates are identical to the WDF standards for June 16 to September 31, the period designed to protect eggs and emergent fry. This would also overlap the July low-flow period when SRH would regularly shut-down project operations for greater than 48 hours, and thus need to ramp flows. WDF has recently reached concurrence on extending WDF's existing standards to stream reaches under their jurisdiction. As such, SRH's proposed interim rates would exceed the WDF standards from October 1 to June 15.

WDF (personal communication, Mark Hunter, Biologist, WDF, October 29, 1991) stated that accretion, broadening of the channel, and the steep cascades that exist would moderate much of the ramping effect by the time flow alterations reached the anadromous section (below RM 1.0) of the proposed project. WDF maintains that ramping rates of 4 in/hr in the bypass reach could have significant impacts during the period when state ramping standards are 1 inch or less. WDF has stated their opposition to SRH's proposed 4 in/hr interim standard.

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. In order to ensure that both the resident and downstream anadromous fish populations are protected during project operation, we are recommending that SRH employ conservative ramping rates according to state ramping standards in table 5. While complying with the state standards may present an operational burden to SRH, Staff believes that this would occur infrequently enough that protection of the resource would be of greater benefit in comparison to brief generating losses.

d. Fish Screens / Bypass

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

SRH would construct a stationary vertical screen to meet agency design criteria. SRH has set state standards for screen opening dimensions (0.1 inches in width) and maximum approach velocities (0.5 fps). The screen would be constructed of flat perforated bars or mesh, and sized so that at maximum diversion approach velocity would not exceed 0.4 fps. SRH would also install a mechanical brush cleaning system to prevent clogging of the intake screens and resultant increases in approach velocity. The initial cost of designing and installing this screen would be \$80,000.

The proposed project diversion structure could alter up and downstream movement of resident trout in Youngs Creek, potentially altering access to spawning, feeding, and resting habitats up and downstream of the proposed diversion. After consultation with WDW, SRH proposes to design and construct a fish bypass in conjunction with the sluiceway design, that would facilitate downstream passage of trout. In addition to passing resident trout downstream of the project, the proposed gated sluiceway would serve the purpose of releasing the minimum bypass flow, and allow natural bedload transport downstream. Bypass flows would be controlled by an electrically operated, sensor controlled gate as proposed by SRH.

Mortality of trout from turbine passage with the proposed intake screens should be negligible, but some mortality may occur as a result of impingement. To ensure that project operation has minimal impact on the resident trout in Youngs Creek, SRH should construct the intake screens and combined sluiceway/fish passage

in accordance with agency criteria and as proposed in the filing dated April 1991.

Unavoidable adverse impacts: Loss of spawning habitat for rainbow trout would be unavoidable with any of the proposed flow schedules. Maintaining bypass reach minimum flows at levels below the existing 95 percent exceedence flow level could result in long-term impacts to the resident trout population. Some resident trout could be impinged on the fish screen at the intake.

6. Cultural Resources

Affected Environment: SRH conducted a cultural resources survey of the project area (Buck et al. 1990). Certain private lands along the route of the proposed transmission corridor were not surveyed because landowners refused access to their property. SRH attempted several times to secure permission for survey of these areas without success (letter from Lon Covin, Vice President, Hydro West Group, Inc., Bellevue, Washington, June 3, 1991). The survey did not inventory any archeological or historic sites eligible for inclusion in the National Register of Historic Places.

The Washington State Historic Preservation Officer (SHPO) and the FS-Mt. Baker-Snoqualmie National Forest state that with the exception of the unsurveyed lands, the project would not affect any archeological or historic sites eligible for inclusion in the National Register (letters from Dr. Robert Whitlam, State Archeologist, Washington Office of Archeology and Historic Preservation, Olympia, Washington, September 11, 1990; and James McDonald, Forest Archeologist, Mt. Baker-Snoqualmie National Forest, Seattle, Washington, September 17, 1990).

The NPS stated that no National Register eligible sites would be affected with the exception of the unsurveyed lands and another portion of the proposed transmission line route where the NPS concluded survey methodology was not adequate (letter from Mark Rudo, Acting Chief, Interagency Archeological Services Branch, NPS, San Francisco, California, September 10, 1990).

In its review of the survey report, the Tulalip Tribes (Tribes) did not comment on whether any National Register eligible sites would be affected in surveyed areas. The Tribes did express concern about how the unsurveyed portions of the proposed transmission line route would be surveyed, and stated that if any cultural resources of Native American origin are discovered, the Tribes should be notified (letter from Kurt Nelson, Field Projects Coordinator, The Tulalip Tribes, Marysville, Washington, September 27, 1991).

We agree with the SHPO, NPS, and FS that no National Register eligible sites would be affected at the project with the exception of the unsurveyed areas along the proposed transmission line corridor and, in the case of NPS, the area where survey methods may not be appropriate.

Environmental Impacts and Recommendations: The SHPO, NPS, and FS recommend SRH that complete the survey of the unsurveyed portions of the proposed transmission line corridor (letters from Dr. Robert Whitlam, State Archeologist, Washington Office of Archeology and Historic Preservation, Olympia, Washington, September 11, 1990, and James McDonald, Forest Archeologist, Mt. Baker-Snoqualmie National Forest, Seattle, Washington, September 17, 1990). NPS stated that SRH needs to justify the survey methodology of the part of the corridor where NPS questions if it is adequate (letter from Mark Rude, Acting Chief, Interagency Archeological Services Branch, NPS, San Francisco, California, September 10, 1990).

Because access has been denied, the unsurveyed portions should be inventoried as a condition of any license issued for the project when access could be obtained. A survey should also be conducted of the areas which the NPS identified as possibly requiring additional survey or justification of survey methods should be provided. Any sites discovered in surveys of these areas would likely be avoided by adjusting the location of the transmission line corridor and other procedures for avoiding impacts.

SRH should file a report for Commission approval documenting the results of the survey and procedures for avoiding or mitigating impacts to any sites identified as eligible for inclusion in the National Register. The report should include a detailed explanation of why portions of the corridor were not surveyed more intensively as noted by NPS, or the results of a more detailed survey of these areas. The survey should be based on the recommendations of the SHPO, NPS, and the Tribes. Letters from the SHPO and the NPS should be filed with the report documenting pre-survey consultation and comments on the report.

The SHPO's, NPS's, and FS's comments on the proposed project are based on the premise that the project would be constructed as described in the application without significant changes. Changes to the project, especially changes in the proposed location and design of a project, are occasionally found to be necessary after a license has been issued, and may require an applicant to amend a license.

Under these circumstances, whether or not an application for amendment of license is required, the SHPO's, the NPS's, and the FS's comments would no longer reliably depict the cultural resources impacts that would result from developing the project.

Therefore, before beginning land-clearing, land-disturbing, or spoil-disturbing activities within the project boundaries, other than those specifically authorized in the license and previously commented on by the SHPO, the licensee should consult with the SHPO about the need to conduct a cultural resources survey and to implement avoidance or mitigative measures.

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 the licensee encounters such sites during the development of project works or related facilities, the licensee should stop land-clearing, land-disturbing, or spoil-disturbing activities in the vicinity of the sites, should consult with the SHPO on the eligibility of the sites, and should carry out any necessary measures to avoid or to mitigate impacts to the sites.

Either before starting land-clearing, land-disturbing, or spoil-disturbing activities associated with any changes to the project, both proposed and necessitated, or before resuming land-clearing, land-disturbing, or spoil-producing activities in the vicinity of any previously undiscovered sites, the licensee should file with the Commission a plan and a schedule for conducting the appropriate studies, along with copies of the SHPO's written comments on the plan and the schedule.

The licensee should not start or resume land-clearing, land-disturbing, or spoil-producing activities, other than those specifically authorized in this license and commented on by the SHPO, or resume such activities in the vicinity of an archeological or historic site discovered during construction, until informed by the Commission that the requirements discussed above have been fulfilled.

Unavoidable Adverse Impacts: None.

7. Vegetation

Affected Environment: The project area is occupied mainly by a conifer forest, dominated by western hemlock, Douglas-fir, and western redcedar. The upper Youngs Creek Project area was logged 80 to 100 years ago. The forest has regrown since then and is now what is known as mature. Trees have a diameter at breast height (dbh) of 15 to 18 inches. Canopy closure is about 75 percent. The understory is made up of salal wintergreen, western swordfern, red whortleberry, and deerfern blechnum. SRH says this area of mature forest will be logged in 1993 (Beak Consultants Incorporated, 1991b).

In contrast to the mature forest, young coniferous forest in the project area is made up of western hemlock, Douglas-fir, and

western redcedar with a dbh of 3 to 10 inches. Canopy closure in the young forest is 80 to 85 percent. Understory plants are western swordfern, deerfern, bigleaf maple, bedstraw, bunchberry, dogwood, and cutleaf blackberry.

A forest type of mixed coniferous and deciduous trees also occurs in parts of the project area. Trees found in mixed forest are western hemlock, Douglas-fir, red alder, and bigleaf maple. This type is the result of natural forest regeneration after logging 20 to 80 years ago. The dbh of trees ranges from 4 inches to 16 inches. The understory consists of western swordfern, salal wintergreen, common bracken fern, vine maple, common snowberry, and red whortleberry.

An area near the proposed powerhouse site has been clearcut. Part of the area was logged about 8 years ago, then replanted with Douglas-fir seedlings. The rest of the clearcut area was logged within the past several years and has not been replanted yet. Common plants in the clearcuts are red alder, vine maple, cutleaf blackberry, western thimbleberry, fireweed willow-herb, common bracken fern, red whortleberry, and common pearlyeverlasting.

Riparian forest grows along Youngs Creek. Typical overstory species at the proposed diversion site are black cottonwood, red alder, western redcedar, western hemlock, and Douglas-fir. Old-growth conifers, with a dbh of 21 inches or greater, are scattered through the riparian zone, especially in steep, inaccessible areas.

The understory is sparse, and consists of vine maple, salmonberry, and American devilclub in moist areas, and red whortleberry, salal wintergreen, and western swordfern in drier areas. The proposed powerhouse site is dominated by red alder, bigleaf maple, and black cottonwood, with scattered Douglas-fir and western redcedar. Salmonberry and vine maple are the most common understory species at the powerhouse site.

SRH surveyed the project area for federal- and state-listed threatened, endangered, and sensitive plants (Beak Consultants, 1991a). SRH did not find any such plants.

Environmental Impacts and Recommendations:

a. Revegetation

Constructing the project would require the temporary removal of about 18.9 acres of conifer forest and 1.5 acres of riparian and mixed forest. Burying the transmission line at the Youngs Creek and Snoqualmie River crossings, as recommended in the section on threatened and endangered species, would disturb riparian vegetation growing within strips of right-of-way

totalling a little over 1,000 feet in length. About 3.7 acres of conifer forest and 1.1 acres of riparian and mixed forest would be permanently displaced by project structures.

SRH details its program for revegetation following construction in section 5.6 of its Erosion and Sediment Control Plan and in its Wildlife Mitigative Plan. SRH would seed the 4.0 acres of access road right-of-way with grasses and shrubs palatable to wildlife and maintain the right-of-way thereafter in non-woody vegetation (Beak Consultants, 1991b). SRH would inspect all seeded areas the following spring to see if replanting is necessary to achieve 80-percent coverage of grass, and would continue to monitor seeded areas for at least 2 years (Snoqualmie River Hydro, 1990, application, erosion and sediment control plan).

SRH proposes to replant 11.6 acres (out of the total 20.4 affected), cleared to bury the penstock, to upland commercial forest by planting with Douglas-fir seedlings (Beak Consultants, 1991b).

SRH notes that restoring the riparian area disturbed by the construction of the diversion would be an area of special revegetation concern. The laydown area would be located along the left bank, within the riparian zone. SRH proposes to revegetate this area to its present condition. To do this, SRH would plant tree and shrub whips or bare-rooted seedlings in the late fall, and would monitor the reestablishment of vegetation (Snoqualmie River Hydro, 1990, application, erosion and sediment control plan).

Restoring disturbed areas after project construction would speed the restoration of the vegetative cover of the area, minimizing soil erosion and wildlife habitat loss. As discussed in the section on geology and soils, SRH should implement its Erosion and Sediment Control Plan, including its proposed revegetation measures. We discuss the revegetation measures contained in the Wildlife Mitigative Plan further in the section on wildlife.

Unavoidable Adverse Impacts: Clearing vegetation to construct the project would result in the temporary loss of about 18.9 acres of conifer forest and about 1.5 acres of riparian forest. Project structures would permanently displace about 3.7 acres of conifer forest and 1.1 acres of riparian forest.

b. Wildlife Resources

Affected Environment: Big game in the project area are black-tailed deer, Roosevelt elk, mountain goat, and black bear. We have identified the black-tailed deer as a target resource in the Snohomish River Basin.

Smaller mammals include Douglas squirrel, northern flying squirrel, beaver, raccoon, snowshoe hare, and bobcat. Typical bird species are ruffed grouse, hairy woodpecker, belted kingfisher, great horned owl, red-tailed hawk, raven, chickadee, and golden-crowned kinglet.

Environmental Impacts and Recommendations: SRH's application says that constructing the project would require clearing 25.1 acres of forest habitat; however, the wildlife habitat mitigation plan filed August 8, 1991, identifies a total initial impact of 20.4 acres. Based on a review of the site plan maps included in the erosion and sediment control plan, we accept the acreages reported in the wildlife mitigation plan as more accurate.

The 20.4 acres cleared for project construction would include 1.1 acres of riparian forest and 19.3 acres of upland forest types. The intake structure and powerhouse would permanently displace the 1.1 acres of riparian forest. SRH proposes to plant Douglas fir seedlings in 11.6 acres cleared for the penstock right-of-way, which would return this area to upland forest. The access road to the diversion site would permanently displace the remaining 7.7 acres of upland forest, of which SRH would revegetate 4.0 acres with herbaceous plants and shrubs palatable to wildlife and maintain clear of trees.

To minimize the impacts of the project's access roads to wildlife, SRH proposes to restrict public access with gates. SRH also proposes to install nest boxes and perch poles along the access roads.

The revegetation measures contained in the wildlife habitat mitigation plan would substantially reduce the project's impacts to wildlife if properly implemented. SRH specifies the species and densities of tree seedlings for planting in the penstock right-of-way, but not of the grasses and shrubs for planting along the intake access road. The proposed nest boxes and perch poles could also benefit wildlife, if appropriate types and quantities are used. SRH should incorporate these measures into a more detailed plan.

Also included in SRH's wildlife mitigation plan is a proposal to acquire and preserve at least 5.4 acres at one or more sites in the project vicinity as compensation for the permanent loss of riparian and upland forest. The 5.4 acres is based on replacement ratios of 1.5:1 for riparian forest and 1:1 for upland forest. The project would permanently displace 1.1 acres of riparian forest and 7.7 acres of upland forest; however, SRH defines the permanent upland impact as 3.7 acres, since SRH would plant grasses and shrubs on 4.0 of the 7.7 acres $\{[1.5 \times 1.1] + [1 \times 3.7] = 5.4\}$.

SRH has not identified sites in the project vicinity for acquisition. SRH would accord highest priority to sites with special value to wildlife, such as forested wetlands, emergent wetlands, riparian areas, bald eagle foraging or roosting areas, and big game winter habitat.

The wildlife agencies did not comment on the project's effect terrestrial resources.

The proposed access road to the intake structure would pass through about 1,700 feet of mature coniferous forest. Based on the average clearing width of 45 feet reported in the wildlife mitigation plan, we estimate that the road would permanently displace about 1.8 acres of this forest type. Mature and old-growth coniferous forest provides winter cover for black-tailed deer, which are identified as a target resource in the Snohomish River Basin. Black-tailed deer require stands of 2 to 5 acres for effective winter cover (Thomas et al. 1979). The scarcity of winter cover is probably the single most limiting factor for deer populations in the Youngs Creek drainage. SRH says the block of mature coniferous forest through which the intake access road would pass is scheduled for logging in 1993.

If SRH acquires and preserves an existing site of special value to wildlife to mitigate for project-caused losses to riparian and upland forest, a net loss of 1.1 acres of riparian forest and 7.7 acres of upland forest, including 1.8 acres of mature coniferous forest, would still occur. Acquiring and preserving a tract of a desired type of habitat is an acceptable form of mitigation when no other means of mitigation is possible, as with old-growth or mature coniferous forest. SRH has identified a threat to mature coniferous forest in the project area that would justify acquisition as mitigation, but not to riparian forest.

Riparian forest stabilizes streambanks and provides important fish and wildlife habitat and is relatively scarce in the project vicinity. SRH should replace the wildlife habitat value of the riparian areas lost to construction of the project, rather than acquiring and preserving an existing riparian area. SRH could replace the lost habitat value by either establishing new riparian areas or enhancing existing areas. Because new or enhanced riparian areas would not provide habitat of equivalent value to the lost habitat until the replacement vegetation matures, SRH should establish at least 1.5 times the acreage lost $(1.1 \times 1.5 = 1.65 \text{ acres})$ or enhance at least 3 times the acreage lost $(1.1 \times 3 = 3.3 \text{ acres})$. These ratios are the staff's judgement of the relative net benefits per acre of establishing new riparian areas versus enhancing existing ones.

Mature coniferous forest provides winter cover for the recreationally important black-tailed deer, and is also scarce in

the project vicinity. The project would bisect the second largest of the few remaining stands of the mature coniferous forest in the drainage. This stand is scheduled for logging in 1993. To mitigate the project's impacts to black-tailed deer habitat (loss of 7.7 acres of upland forest habitat, including 1.8 acres of mature coniferous forest) and preserve an important wildlife resource, SRH should acquire and preserve a stand of at least 2 acres of mature coniferous forest in the project vicinity.

In its wildlife mitigation plan, SRH says it may transfer ownership of sites it acquires to sponsor organizations. Since this lands would be for mitigation of project impacts and therefore subject to Commission licensing requirements, SRH should retain the ownership of such lands.

We recommend that, after consultation with the wildlife agencies and prior to construction, SRH should develop a detailed wildlife habitat mitigation plan. At a minimum the plan should provide for:

- a. Revegetating all portions of the penstock right-of-way not contained within an access road right-of-way with sufficient densities of trees
- b. Revegetating the margins of the project access road right-of-ways with herbaceous plants and shrubs that are palatable to black-tailed deer and other species common in the vicinity
- c. Installing and maintaining gates at the entrances to the project access roads
- d. Installing and maintaining nest boxes and perch poles along the project access roads
- e. Establishing at least 1.65 acres of riparian forest or enhancing at least 3.3 acres of existing riparian areas in the project vicinity to replace the wildlife values lost as the result of project construction
- f. Acquiring and preserving a stand of at least 2 acres of mature coniferous forest in the project vicinity
- g. Monitoring the effectiveness of the measures described in (a), (b), and (e) above, including steps to be taken in the event these measures are not effective, such as, but not necessarily limited to, modifying the measures or establishing or enhancing additional riparian forest areas
- h. Providing recommendations to the agencies and the Commission for alternative wildlife mitigation measures, if

monitoring indicates that the revegetation measures or the riparian forest establishment or enhancement is not successful

1. Schedules for implementing the measures proposed in (a) through (f) above, for filing the results of the monitoring program, and for filing recommendations for alternative wildlife mitigation.

Unavoidable Adverse Impacts: Constructing the project would result in the short-term loss of about 20.4 acres of wildlife habitat. Project structures would permanently displace about 4.8 acres of deer and elk winter range.

9. Threatened and Endangered Species

Affected Environment: The bald eagle, which is federally listed as threatened in the state of Washington, is present in the project area.

Bald eagles feed on salmon in the Skykomish River drainage in the fall and winter. SRH conducted bald eagle surveys of Elwell and Youngs Creeks in the proposed project area during the winters of 1989-1990 and 1990-1991.

SRH's surveys show that the mixed-forest habitat near the confluence of Youngs and Elwell Creeks is an important winter roost location for bald eagles (Beak Consultants, 1991c). SRH saw 40 eagles in the course of 13 late-afternoon roosting surveys. As many as six eagles were seen on one survey. SRH believes eagles use the area for overnight roosting because in many cases, the birds had not left their perches by the time fog or darkness made continued observation impossible.

Eagles flew up the Elwell Creek corridor from the Skykomish River to roost locations in the vicinity of the Youngs and Elwell Creek confluence. SRH also observed eagles flying up Elwell Creek past the mouth of Youngs Creek. Whitewash on tree trunks and around the base of trees indicated repeated use of the area in the vicinity of the confluence of Youngs and Elwell Creeks, 2.4 miles downstream from the powerhouse site, and of the lower 4,000 feet of Youngs Creek (Snoqualmie River Hydro, 1990, application, exhibit E). SRH did not see any eagles using the Youngs Creek drainage above the barrier to anadromous fish at RM 1.0.

Another bald eagle communal night roost is located approximately 3 miles northeast of the proposed project.

There are no known eagle nests within the project area.

Suitable old-growth coniferous forest habitat for the northern spotted owl, which is federally listed as threatened,

occurs in the upper Youngs Creek drainage above the project area. The spotted owl is unlikely to inhabit the project area, however, because timber harvesting has removed old-growth forest.

The project area provides habitat that may be suitable to grizzly bears, which are federally listed as threatened. No grizzly bears have been documented in the Youngs Creek area.

SRH surveyed the project area for threatened or endangered plant species. SRH found no threatened or endangered plants (Beak Consultants 1991a).

Environmental Impacts and Recommendations: Bald eagles feed on salmon in the Skykomish River drainage in the fall and winter. In response to the Commission's request for formal consultation, FWS issued a biological opinion on the potential effects of proposed hydroelectric projects in the Snohomish River Basin on bald eagles.

In its biological opinion, FWS says hydroelectric development can lead to harassment of eagles from the following: (1) disturbance from construction activities during the winter (November 1 to March 31); (2) loss of food supply by direct impacts to anadromous fish and indirect effects of sedimentation on spawning; and (3) potential loss of perching or roosting habitat (letter from Charles A. Dunn, Field Supervisor, FWS, Olympia, Washington, March 2, 1987).

a. Disturbance of Eagles During Project Construction

FWS says that in general, bald eagles winter in the Snohomish River Basin from November 1 to March 31, and that hydropower construction activities should be suspended during that period to avoid disturbing eagles.

SRH says that the construction activities it proposes would probably not affect eagles, because: (1) eagles do not appear to use the portion of Youngs Creek affected by the project and (2) eagles are not present in the summer when most project construction activity would occur.

SRH's surveys did not identify any eagle use of the project reach of Youngs Creek, between RM 2.4 and RM 5.0. The barrier to anadromous fish, located at RM 1.0, appears to be the approximate upper limit of eagle foraging, although on occasion eagles may fly up Youngs Creek beyond the barrier.

SRH would build the transmission line, however, near reaches of Youngs and Elwell Creeks and the Skykomish River that bald eagles are known to use.

The proposed transmission line alignment crosses Youngs Creek twice downstream from the powerhouse, then comes within about 250 feet of the anadromous fish barrier and about 0.5 mile from the roosting areas before veering away from Youngs and Elwell Creeks. (See exhibit G-1.) The transmission line would come less than 500 feet from Elwell Creek just upstream of the creek's confluence with the Skykomish River, and would cross the river (see exhibit G-2).

The transmission line thus would be constructed partly in areas used by bald eagles, and transmission line construction during the winter would disturb bald eagles.

SRH proposes to complete large-scale construction before the rainy season of November through April (Beak Consultants 1991b). SRH does not define what it considers large-scale construction to be. SRH says, however, that transmission line construction could coincide in time and place with the presence of bald eagles. SRH believes that this construction would have a negligible effect on eagles, because SRH believes the low level and short duration of activity associated with transmission line installation would be unlikely to affect wintering bald eagles.

SRH says that peak eagle concentrations usually occur in the area from December through February (Beak Consultants 1991c). FWS says eagles may arrive earlier and stay longer, and recommends that construction be suspended from November 1 through March 31. Because SRH conducted its earliest eagle survey on December 15 and its latest survey on March 7, SRH has no site-specific data to refute FWS.

Eagles often respond strongly to disturbance (Stalmaster and Newman 1978; Skagen 1980). They may abandon an area as the level or frequency of disturbance increases.

Therefore, the noise and activity of project construction, including increased traffic and transmission line construction, might displace eagles feeding on fish, roosting, and perching along Elwell and Youngs Creeks and the Skykomish River.

To prevent this adverse effect, SRH should suspend project construction activities, including transmission line construction, from November 1 to March 31.

b. Disturbance of Eagles During Project Operation

SRH proposes to restrict public access to the project area by gating the project access roads. Prohibiting public vehicular use of project access roads would prevent the disturbance of any eagles and would enhance the value of the rights-of-way as wildlife habitat. Therefore, SRH should implement this measure.

c. Loss of Food Supply for Eagles

Spawned-out salmon carcasses are the primary food of bald eagles wintering in the Snohomish River Basin. As discussed in the section on fishery resources, the proposed project, located 1.4 miles upstream of a barrier to anadromous fish, would not have an adverse effect on the salmon that constitute the major food of wintering bald eagles.

d. Loss of Eagle Perching or Roosting Habitat.

Bald eagles perch and roost in tall cottonwoods, hemlocks, and Douglas-firs near Youngs and Elwell Creeks and the Skykomish River. Constructing the 6.1-mile-long transmission line would entail the removal of some trees along the right-of-way that may provide potential perch or roost sites for eagles. During SRH's surveys, however, no eagles were seen on trees that would be cut down to build the transmission line. Therefore, constructing the project would probably not cause the loss of trees in which bald eagles nest, perch or roost. SRH, however, should not remove potential eagle perching and roosting trees, to the extent possible. These measures would ensure that adverse effects on bald eagle habitat are minimized.

e. Eagle Electrocution

SRH proposes to design the 12.5-kV, 6.1-mile-long project transmission line according to the 1981 guidelines of the Raptor Research Foundation, Inc. By designing the poles, crossarms, and conductor placements to ensure a separation of 60 inches of energized hardware, SRH would protect bald eagles and other large birds from electrocution. Therefore, SRH should raptor-proof the transmission line.

f. Eagle Collision

FWS is concerned that transmission lines pose a collision hazard to bald eagles, particularly where the lines cross rivers and streams. In its biological opinion on proposed hydroelectric development in the Snohomish River Basin, FWS recommends burying transmission lines crossing rivers and streams that have bald eagle use (letter from Charles A. Dunn, Field Supervisor, U.S. Fish and Wildlife Service, Olympia, Washington, March 2, 1987).

The project transmission line would extend across the Skykomish River. Raptors, such as eagles, have keen eyesight, soar, or use relatively slow flapping flight, are maneuverable while in flight, and become conditioned to the presence of transmission lines (Olenderff and Lehman 1986; Kroodsma 1978). Eagles could collide with the transmission line, however, when they are distracted or during high wind, low light, or fog. SRH

has not proposed any measures to prevent eagles from colliding with the transmission line.

Burying the section of the transmission line that crosses the Skykomish River would be an effective means of preventing bald eagle mortality from collision.

SRH could also achieve the same level of protection by extending the transmission line about 3 miles further, to cross the river attached to the J. Mann Road bridge. Other methods, such as using aviation markers and other methods to increase the visibility of aerial transmission lines, have not been shown to minimize eagle collisions. Burying the transmission line or attaching the line to the existing bridge would eliminate collision hazard entirely.

Therefore, SRH should bury the section of the project transmission line that crosses the Skykomish River or should attach the line to the existing bridge.

In the Pacific States Bald Eagle Recovery Plan, FWS recommends that powerline construction within identified flight lanes near winter roosts be restricted (Steenhof et al. 1984). SRH proposes to install the project transmission line next to Cedar Ponds Road in the vicinity of the roosting area. The transmission line would be about 0.5 miles at its closest point from the roosting areas. A transmission line paralleling the edge of a linear opening in the forest is not likely to be a collision hazard for eagles.

As recommended in the section on recreation, SRH should meet with Weyerhaeuser Company, the principal landowner the project would affect, to discuss possible changes in transmission line design and alignment. SRH would have to obtain the Commission's approval to change the transmission line's design or alignment. The Commission would determine the effect of any such changes on bald eagles then.

Unavoidable Adverse Impacts: We do not expect the project, with the mitigative measures we recommend, to affect bald eagle use of the project area.

C. Alternative of No Action

Carrying out the no-action alternative would not change the existing physical or biological components of the area. However, it would preclude the opportunity to use the renewable water resource of the Youngs Creek.

D. Comprehensive Development

We have considered the proposed project and the alternatives under 4(e) and 10(a) of the Act. From our evaluation of the environmental and the economic effects of the project and the alternatives, we conclude that the proposed project, with the environmental measures we recommend, would make the best use of the waterway.

With our recommended measures, the project would not have significant effects on the environment and would be potentially economically feasible to build: the project would have annual net benefits of \$121,000 over the 50-year period we analyzed and a rate of return of 9.9 percent.

The measures we recommend differ from those proposed by SRH's original proposal in three ways: (1) we recommend not adopting SRH's proposed flow-increase schedule; (2) we recommend mechanically cleaned fish screens; and (3) we recommend ramping rates in accordance with WDF's standards.

We think these measures would better protect the fishery resource than the measures SRH proposes--and would not significantly reduce the power benefits of the project:

- The mechanically cleaned fish screens we recommend, which SRH estimates would add \$80,000 to the total capital cost, reduce the annual net benefits by \$6,000 but could save on maintenance costs.

VI. FINDING OF NO SIGNIFICANT IMPACT

Project construction would cause: (1) temporary minor erosion and sedimentation; (2) minor adverse visual impact; (3) temporary loss of about 18.9 acres of conifer forest and about 1.5 acres of riparian forest; (4) permanent displacement of about 3.7 acres of conifer forest and 1.1 acres of riparian forest; (5) temporary loss of about 20.4 acres of wildlife habitat; and (6) permanent displacement of about 4.8 acres of deer and elk winter range. Project operation would cause loss of spawning habitat for rainbow trout and some resident trout impingement.

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

Pursuant to Section 10(j) of the Act, we are making a preliminary determination that certain of the recommendations of the federal and state fish and wildlife agencies are inconsistent with the purpose and requirements of Part 1 of the Act or other applicable law.

As we discussed in section V.B.3.a., we did not recommend adopting the flow schedule developed by WDW and SRH (table 2). WDW wanted to implement a condition of the license that would "include fish population monitoring, a protocol to increase winter (October - April) minimum flows if fish populations decline, and a legally binding agreement that is independent of FERC" (letter from Hal Beecher, Fisheries Biologist, WDW to Rod Sakrison, Hydropower Coordinator, Water Resources Program, WDOE, September 27, 1991).

We believe that the recommendation is not based on substantial evidence as required by section 313(b) of the Act. The proposal would not provide the intended protection for resident trout in Youngs Creek. SRH and WDW have failed to provide evidence or the biological justification that any subsequent increase in transition and winter period flows would mitigate fishery related impacts that may occur. Without direct evidence as to the benefits to the resident fish population from increasing flows, it would be premature to develop a pre-set flow increase schedule based on the size of the resident trout population.

In summary, staff recommends that SRH not incorporate the flow-increase schedule developed with WDW into the project, because it is not consistent with public interest and comprehensive development standards of the Act, nor is it supported by substantial evidence.

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X. LIST OF PREPARERS

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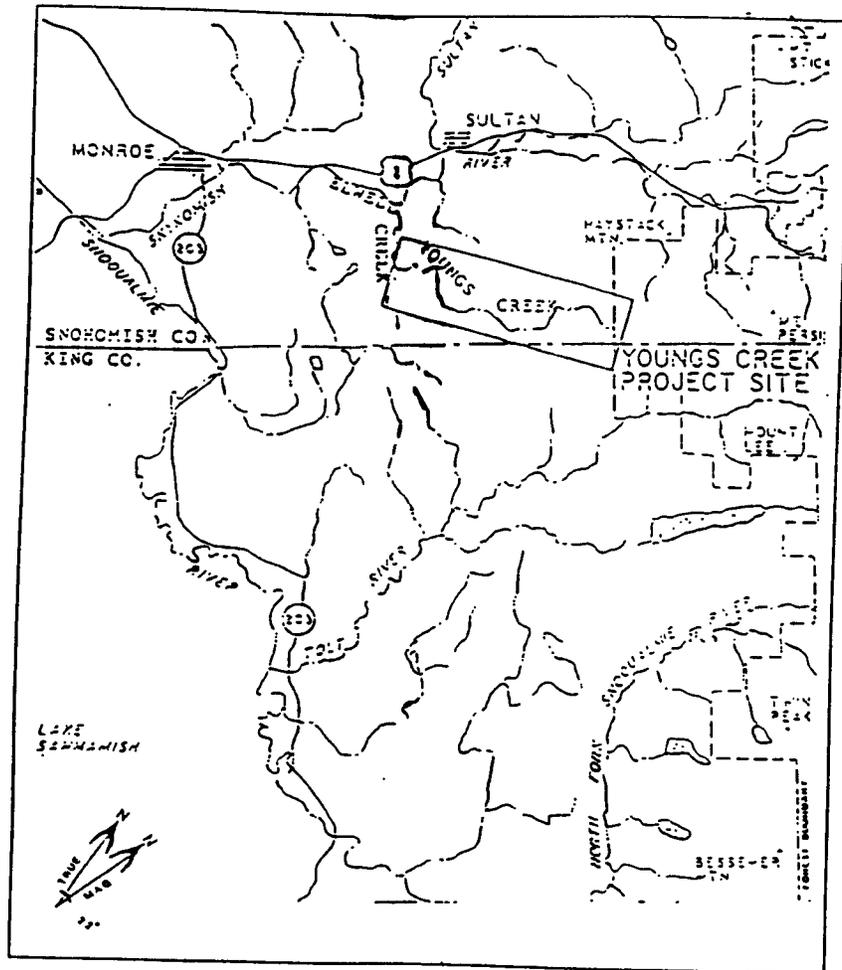


Figure 1. Location of the proposed Youngs Creek Hydroelectric Project, FERC No. 10359, Washington (source: Snoqualmie River Hydro, Exhibit G, August 1990)

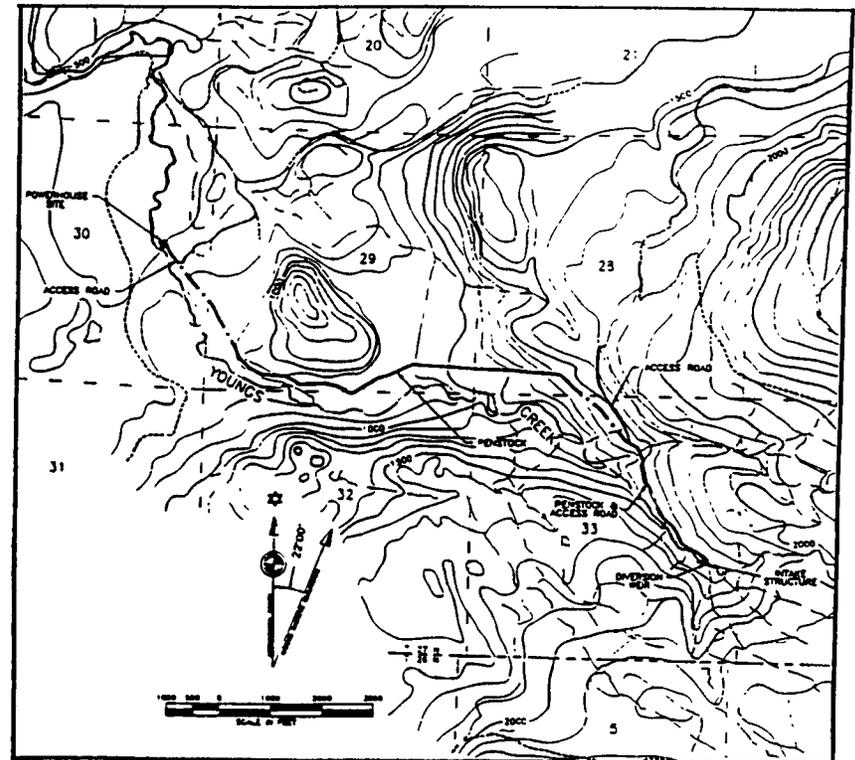
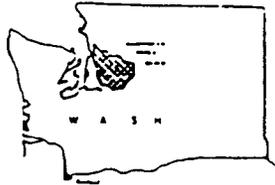


Figure 2. Major project features of the proposed Youngs Creek Project, FERC No. 10359 (source: staff)



Form L-11
(October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED
MAJOR PROJECT AFFECTING THE INTERESTS
OF INTERSTATE OR FOREIGN COMMERCE

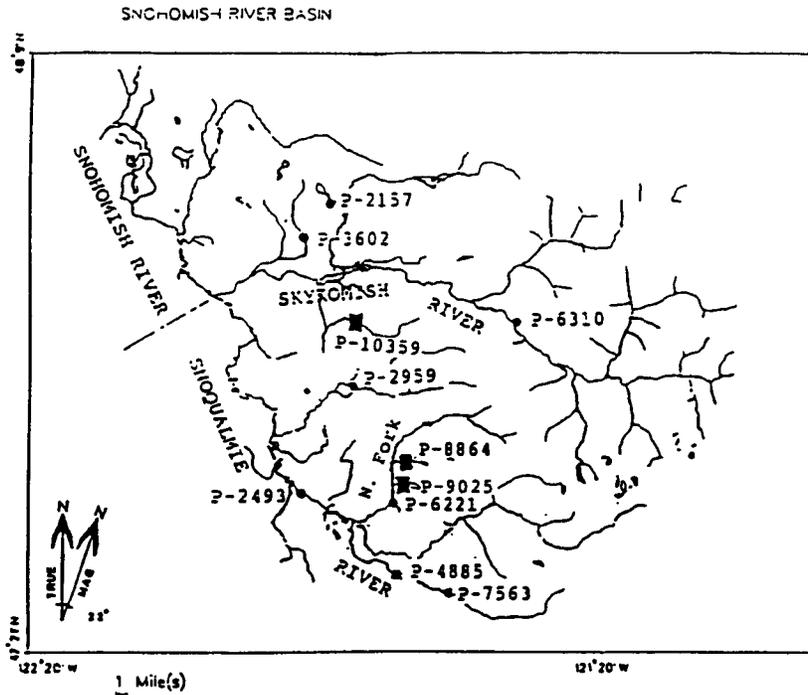


Figure 3. Location of existing and proposed hydropower projects in the Snohomish River Basin (source: staff)

- Existing Projects
- Proposed Projects

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised exhibits insofar as necessary to show any divergence from or variations in the project area and

project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the exhibits approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variation in or divergence from the approved exhibits. Such revised exhibits shall, if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4. The construction, operation, and maintenance of the project and any work incidental to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Energy Regulatory Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any features or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose

of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the state and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character and locations of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said

stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Commission may prescribe for the purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal Agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

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Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall consult with the appropriate State and Federal agencies and, within one year of the date of issuance of this license, shall submit for Commission approval a

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plan for clearing the reservoir area. Further, the Licensee shall clear and keep clear to an adequate width 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 results from the clearing of lands or from the maintenance 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. Upon approval of the clearing plan all clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 22. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 23. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.