



United States
Department of
Agriculture

Forest
Service

Pacific
Northwest
Region

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PKWD-08-050

File Code: 2770

Date: August 14, 2008

Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 Federal Street NE
Washington, DC 20426

RE: USDA Forest Service **COMMENTS** on the April 2008 Final License Application - Packwood Lake Hydroelectric Project - FERC Project No. 2244; **PRELIMINARY FPA § 4(e) TERMS AND CONDITIONS**; Justification Statements for the Terms and Conditions; and the Schedule for Finalization of the 4(e) Terms and Conditions.

Dear Secretary Bose:

The Federal Energy Regulatory Commission (Commission) issued the Packwood Lake Hydroelectric Project (Project) Notice of Application Ready for Environmental Analysis on June 19, 2008. At that time, the Commission requested comments on the Final License Application (FLA) and agency terms and conditions. In response to the Commission's request, the USDA Forest Service is filing the following documents:

1. Enclosure I	USDA Forest Service Preliminary FPA § 4(e) Terms and Conditions
2. Enclosure II	USDA Forest Service Justification Statements for the Terms and Conditions
3. Enclosure III	USDA Forest Service Comments on the FLA
4. Enclosure IV	USDA Forest Service Schedule for Finalization of the § 4(e) Terms and Conditions

The Project occupies 512 acres of National Forest System (NFS) lands and waters administered by the Gifford-Pinchot National Forest. In the view of the US Department of Agriculture (USDA) Forest Service, the protection, mitigation and enhancement measures contained in the Federal Power Act (FPA) 4(e) terms and conditions submitted with this letter are necessary for the protection and utilization of the federal reservations managed by the USDA Forest Service and to ensure consistency with Gifford-Pinchot National Forest Land and Resource Management Plan (1990) as amended.

If you have any questions regarding this filing or require any additional information, please contact Walt Dortch, Region 6 Hydropower Coordinator, at 360-436-1155 or Mike Gerdes, Gifford-Pinchot National Forest Hydropower Coordinator, at 541-416-6521.

Sincerely,

/s/ Lisa Freedman (for)

CALVIN N. JOYNER
Acting Regional Forester

Enclosures



cc: Walt Dortch
Service List

Enclosure I
USDA Forest Service
Gifford Pinchot National Forest
Federal Power Act
Preliminary Section 4(e) Terms & Conditions
Packwood Lake Hydroelectric Project
FERC Project No. 2244

August 2008

License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 issued by Order No. 540, dated October 31, 1975, cover those general requirements that the Secretary of Agriculture, acting by and through the USDA Forest Service, considers necessary for adequate protection and utilization of the land and related resources of the Gifford Pinchot National Forest. Under authority of section 4(e) of the Federal Power Act (16 U.S.C. 797(e)), the following terms and conditions are deemed necessary for adequate protection and utilization of National Forest System (NFS) lands and resources of the Gifford Pinchot National Forest. These terms and conditions are based on those resources enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof, as such laws may be amended from time to time, and as implemented by regulations and approved Land and Resources Management Plans prepared in accordance with the National Forest Management Act. Therefore, pursuant to section 4(e) of the Federal Power Act, the following conditions covering specific requirements for protection and utilization of the NFS lands shall also be included in any License issued for the Packwood Lake Hydroelectric Project (Project).

Condition No. 1 - Implementation of Activities on National Forest System Lands, Site-Specific Plans and Cost Reimbursement

The Licensee shall not commence implementation of habitat or ground-disturbing activities on National Forest System (NFS) lands until the USDA Forest Service has approved site-specific project designs and issued a notice to proceed.

Additional NFS Lands. If additional NFS lands are included within the Project boundary, the Licensee shall obtain a special-use authorization for occupancy and use of NFS lands added to the Project boundary from the USDA Forest Service. Within six months of License issuance and before any habitat or ground-disturbing activities, the Licensee shall obtain from the USDA Forest Service and file with the Commission a special-use authorization for occupancy and use of NFS lands added to the Project boundary in the License.

Additional lands authorized for use by the Licensee in a new special-use authorization shall be subject to laws, rules, and regulations applicable to the NFS. The terms and conditions of the USDA Forest Service special-use authorization are enforceable by the USDA Forest Service under the laws, rules, and regulations applicable to the NFS. The special-use authorization shall also be subject to applicable sanctions and enforcement procedures of the Commission at the request of the USDA Forest Service. Should additional NFS lands be needed for this Project over the License term, the special-use authorization shall be amended to include any additional NFS lands.

Approval of Changes on NFS Lands after License Issuance. Notwithstanding any License authorization to make changes to the Project, the Licensee shall receive written approval from the USDA Forest Service prior to making changes in the location of any constructed Project features or facilities on NFS lands, or in the uses of Project land and waters on NFS lands, or any departure from the requirements of any approved exhibits for Project facilities located on NFS lands filed by the Licensee with the Commission. Following receipt of such approval from the USDA Forest Service, and at least 60 days prior to initiating any such changes or departure, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the USDA Forest Service for such changes. The Licensee shall file an exact copy of the report with the USDA Forest Service at the time it is filed with the Commission.

Coordination with Other Authorized Uses on NFS Lands. In the event that portions of the Project area are under federal authorization for other activities and permitted uses, the Licensee shall consult with the USDA Forest Service to coordinate such activity with authorized uses before starting any activity on NFS land that the USDA Forest Service determines may affect another authorized activity.

Site-Specific Plans. The Licensee shall prepare site-specific plans subject to review and approval by the USDA Forest Service for habitat and ground-disturbing activities on NFS lands affected by the Project required by the License, including activities contained within resource management plans required by the License prepared subsequent to License issuance. The Licensee shall prepare site-specific plans for planned activities one year in advance of implementation dates required by the License, except for those activities planned in the first year after license issuance where the Licensee shall prepare site-specific plans for activities timely to allow USDA Forest Service review in advance of implementation. For emergency situations, where corrective or mitigation actions must be implemented immediately, the Licensee will coordinate with the USDA Forest Service to expedite approvals and/or permits.

Site-specific plans shall include:

1. A map depicting the location of the proposed activity and GPS coordinates.
2. A description of the USDA Forest Service land management area designation for the location of the proposed activity and applicable standards and guidelines.
3. A description of alternative locations, designs and mitigation measures considered including erosion control and implementation and effectiveness monitoring designed to meet applicable standards and guidelines.

4. Draft biological evaluations or assessments including survey data as required by regulations applicable to habitat or ground-disturbing activities on NFS lands in existence at the time the plan is prepared.
5. An environmental analysis of the proposed action consistent with the USDA Forest Service policy and regulations for implementation of the National Environmental Policy Act (NEPA) in existence at the time the plan is prepared for FERC Licensed projects on NFS lands.

Cost Reimbursement. The Licensee shall provide funding to the USDA Forest Service for all costs associated with the analysis, review, inspection, and monitoring required for implementing habitat and ground-disturbing activities on NFS lands required by the License, including activities contained within resource management plans required by the License prepared subsequent to License issuance. Funding for the analysis, review, inspection, and monitoring of site-specific projects on NFS lands required by the License shall be through the use of a Collection Agreement or other instrument consistent with USDA Forest Service regulations in effect at the time the Project is proposed.

Condition No. 2 - Resource Coordination

Within one year of License issuance, the Licensee shall, in coordination and consultation with the USDA Forest Service and the U.S. Fish and Wildlife Service, National Marine Fisheries Service and the Washington Department of Fish and Wildlife, Washington Department of Ecology, and Tribes, here-in-after referred to as the Parties, and approval by the USDA Forest Service, prepare a Resource Coordination Plan (RCP) and file the plan with the Commission for approval. The RCP shall establish a process for information exchange and coordinate efforts for implementation of License conditions and ongoing Project operations and maintenance (O&M) activities impacting NFS lands affected by the Project. The RCP shall provide for coordination of the implementation of the various management plans required under the License to the extent they impact NFS lands affected by the Project, such as but not limited to: recreation resource management; cultural resource management; integrated weed management; road management; Threatened, Endangered and sensitive species management; facilities monitoring; erosion control and other resource protection plans. The RCP shall require the Licensee to:

1. Provide for coordination and consultation with the USDA Forest Service and other Parties in the form of an Annual Resource Coordination meeting each year at least 60 days preceding the anniversary of the License.
2. Provide each year to the USDA Forest Service and other Parties a Rolling 3-Year Annual Report/Work Plan.
 - a. The Rolling 3-Year Annual Report/Work Plan consists of the following elements:
 - i. A Final Annual Report which documents the previous calendar year's management activities, monitoring results, and compliance with the License terms and conditions;
 - ii. A Final Current Year Work Plan which describes planned activities underway or to be implemented in the current year;
 - iii. A Draft Out-Year Work Plan which describes the activities planned for the following year; and

- iv. A Consultation Summary which documents annual consultation with the USDA Forest Service and other Parties. The consultation summary will include any recommendations made by the USDA Forest Service and an explanation of why any such recommendations were not accepted.
 - b. A draft of the Rolling 3-Year Annual Report/Work Plan will be completed by the Licensee and be submitted to the USDA Forest Service and other Parties at least 30 days prior to the planned Annual Resource Coordination meeting. The USDA Forest Service and other Parties will review the draft Rolling 3-Year Annual Report/Work Plan, with the objectives of:
 - i. Providing comments to clarify material in the Annual Report;
 - ii. Discuss and approve any revisions to the Current Year Work Plan, as suggested by the Licensee based on monitoring results; and
 - iii. Discuss and tentatively approving the Out-Year Work Plan.
 - c. The Licensee will produce the Final Rolling 3-Year Report/Work Plan and provide the USDA Forest Service and other Parties a 30 day review of the Final Rolling 3-Year Report/Work Plan. The Licensee will send copies to the Commission, the USDA Forest Service and other Parties within 60 days following the Annual Resource Coordination meeting.
3. Document the requirements, tasks and methods and reports related to monitoring the effects of Project operations and facilities on natural and/or social resources and effectiveness of protection, mitigation, and enhancement (PME) measures where the monitoring is required by the USDA Forest Service terms and conditions.
4. Provide a mechanism for revising implementation strategies and methods to reflect improvement in sampling procedures and/or changes in regulations or environmental conditions.
5. For each resource plan developed for the Project provide a mechanism to adapt Project PME measures when resources objectives are not achieved as identified through collaborative coordination, plan development and implementation, implementation and effectiveness monitoring. Adaptive management shall mean the adoption of the following strategic actions: measures shall be implemented, effectiveness monitoring shall take place, and alternative fallback options shall be employed if proposed control measures fail to protect and enhance fish and wildlife resources as anticipated.
6. Identify practices for record keeping.
7. Include provisions for documenting and reporting any deviations from the approved plans or terms and conditions. Deviations will be reported to the USDA Forest Service within 14 days of the change date, including specific details and reasons for the change. Deviations will be documented in the Annual Report.
8. Include provisions for the routine updating of the RCP, including incorporation of monitoring measures identified in site-specific plans prepared under the requirements of USDA Forest Service Condition No. 1 (Implementation of Activities on NFS lands).
9. Develop a field manual or Project procedures that identify standard operating protocols, including cultural resource identification and reporting methods that the Licensee and its contractors shall follow while conducting activities on NFS lands.
10. Develop a process to resolve disagreements regarding the implementation of the RCP.
11. Designate an Environmental Coordinator to coordinate the implementation of the RCP and Licensee activities with the USDA Forest Service.

Condition No. 3 - Fire Prevention Plan

Within one year of License issuance, the Licensee shall, in consultation with and approval by the USDA Forest Service and in consultation with appropriate State and local fire agencies, prepare a Fire Prevention Plan for NFS lands within the Project boundary and NFS lands adjacent to the Project boundary that are impacted by the Project and file the plan with the Commission for approval. The Fire Prevention Plan shall require the Licensee to:

1. Analyze fire prevention needs to ensure that prevention equipment and personnel are available.
2. Identify fire hazard reduction measures (e.g., eliminating ladder fuels, reducing fuel loading).
3. Provide the USDA Forest Service a list of the location of available fire prevention equipment and the availability of Project personnel.

Condition No. 4 - Packwood Lake Elevations and Annual Project Maintenance

The Licensee shall maintain a minimum Packwood Lake elevation of 2856.5 feet MSL between May 1 and September 15 of each year. The goal of the lake elevation is to ensure tributary stream connectivity with Packwood Lake for spawning adult rainbow trout and fry out-migration from Packwood Lake tributaries into Packwood Lake, provide stable water levels for wetland and amphibian productivity, to keep recreational activity on the west shore of Packwood Lake at a minimum, and to maintain Packwood Lake elevations that reflect the natural hydrology.

The Licensee shall perform annual Project equipment maintenance (outage) starting on August 15 of each year and shall eliminate the pre-outage lake drawdown. The intent of the outage period is to complete all major maintenance, inspections and testing within one month. Project operations are anticipated to resume by September 15 when all necessary work has been completed.

Between September 16 and April 30 of each year, the minimum operating water surface elevation shall be 2849 MSL feet. The goal of the minimum winter elevation is to provide sufficient water for increased instream flows into Lower Lake Creek, for uninterrupted tailrace flows after the Project maintenance outage, and continuous flows for Project generation. The Licensee shall not decrease lake elevation by more than 1 ft. per day. The rate of project reservoir drawdown may be temporarily modified if required by operating emergencies beyond the control of the Licensee, and upon mutual agreement between the Licensee and the USDA Forest Service.

The Licensee shall measure and record Packwood Lake elevations by utilizing accurate reliable measuring equipment. The measurements shall be recorded and retained as part of the permanent plant records. The lake levels will also be recorded by the Licensee staff in the daily plant logs. The electronic lake level readings will be validated, by comparison to the physical

reading taken from a staff gauge located at the intake building each week or as access allows. The Licensee shall make available lake level data upon request by the USDA Forest Service and provide an annual report of the daily lake levels at the Annual Resource Coordination meeting (Condition No. 2).

Condition No. 5 - Lower Lake Creek Instream Flows

Upon license issuance and for the term of the License, the Licensee shall implement and maintain the minimum instream flow regimes for Lower Lake Creek as set forth in Table 1 and the Washington Department of Ecology 401 Water Quality certification. The goal of minimum Lower Lake Creek instream flows is for the protection, mitigation, and enhancement of fish and wildlife resources and to sustain well-connected functional riparian and aquatic habitats to which the native aquatic and riparian community is adapted.

Table 1. Instream Flows (cfs) for Lower Lake Creek as measured at the drop structure.

Month	Instream Flow (cfs)
January	4
February	4
March	4
April	7
May	15
June	10
July	15
August 1 - 15	15
August 16 – September 15	20
September 16 – 30	15
October	10
November	7
December	4

The Licensee shall verify and adjust bypass flow readings to meet the minimum instream flow at least twice each day from the powerhouse control room. The bypass flow into Lower Lake Creek is to be measured at the bypass pipe discharge point in the stilling basin immediately below the drop structure. The Licensee shall make available instream flow data upon request by the USDA Forest Service and provide an annual report of daily instream flow at the Annual Resource Coordination meeting (Condition No. 2).

Condition No. 6 - Aquatic Habitat Forming Flows

The Licensee shall provide aquatic habitat forming flows in Lower Lake Creek greater than or equal to 285 cfs for a target of 24 hours, or as long as lake inflows can sustain that flow, every other water year¹ or 3 out of 6 water years, starting in the first water year after issuance of the new license and continuing for the life of the new License. The Licensee shall take the necessary

¹ Water year is defined as an annual precipitation cycle, October 1 through September 30.

measures to adjust Packwood Lake elevation and power generation to ensure that aquatic habitat forming flows are achieved and maintained for up to a maximum 24 hours. If the desired flow can not be achieved and maintained for the target period, the Licensee shall file with the Commission the reasons for not meeting the stated objective, based on Project-specific information. The Licensee shall be given credit for flow events that occur outside of the Licensee control that meet the flow and duration criteria describe above. If the desired frequencies of the aquatic habitat forming flows cannot be achieved, the USDA Forest Service will be consulted to discuss alternative operational means to achieve the stated objective.

The objective of aquatic habitat forming flows is to provide flows of sufficient magnitude, duration, and frequency in order to sustain habitat forming and maintenance processes in Lower Lake Creek during the operation and maintenance of the Packwood Lake Hydroelectric Project. Some of these processes include the recruitment, mobilization, and deposition of sediment, wood and other organic material.

The Licensee shall monitor aquatic habitat forming flows at the drop structure and record the bypass flow and spill flow over the drop structure at appropriate time intervals. The magnitude of flows will be calculated by adding the measured bypass flows to the spill flows over the drop structure, as calculated from lake elevation, using the stage/discharge relationship established for the drop structure. The Licensee shall record the spill flow at the start of the event and every two hours while the station is manned. The lake level and time will be marked on the chart recorder as well as recorded in the daily plant log. The recoding will resume at the start of each subsequent shift and continue until the event is over.

The Licensee shall provide the USDA Forest Service an annual report on aquatic habitat forming flow attempts and activities including the magnitude, duration, and frequency of these flows and associated power generation throughout the past year, 30 days prior to the Annual Resource Coordination meeting. The annual report shall also provide details for the out-year planned activities. The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations prior to filing the final report with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Condition No. 7 - Lower Lake Creek Stream Restoration and Monitoring

Within two years of License issuance, the Licensee shall, in coordination and consultation with the USDA Forest Service, U.S. Fish and Wildlife Service, National Marine Fisheries Service and the Washington Department of Fish and Wildlife, Washington Department of Ecology, and Tribes, and with approval by the USDA Forest Service, prepare a Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan for the portion of the Anadromous reach up to RM 1.0 and the upper reach of Lower Lake Creek extending from drop structure to about 1,464 ft downstream (RM 5.1 - 5.3), and file the plan with the Commission for approval. The primary goal of the plan is to restore and enhance anadromous and resident salmonid habitat in Lower Lake Creek by increasing rearing and spawning habitats. The primary objective for the Anadromous reach is to convert the existing plan-bed/step-pool channel into a wood and boulder

forced step-pool system that more accurately reflects the natural channel form, function and processes appropriate for this reach. The primary objective for the isolated reach of Lower Lake Creek 1,464 ft below the drop structure is to increase small woody structure and spawning gravels for resident rainbow trout.

The Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan shall use the following objectives and design criteria as the basis for Plan development. However, if reach-specific assessment data indicate adjustments that will maximize the primary objectives, the objectives and design criteria may be modified. Any modifications to the objectives and design criteria will be determined in coordination and consultation with the natural Resource Agencies and Tribes.

Anadromous Reach

Rearing Habitat Objectives:

- Increase the number of pools in lower Lake Creek to represent approximately 30% of the available stream habitat.
- Improve the rearing habitat found in the remaining runs and glides by approximately 15,300 ft²
 - Increase salmonid rearing habitat in the Reach from RM 0.0 – 0.3 by approximately 2,700 ft², and
 - Increase salmonid rearing habitat in the Reach from RM 0.3 – 1.0 by approximately 12,600 ft²

Spawning Habitat Objectives:

- Increase the number of pool and pool tail-outs.
- Place gravel into the pool tail-outs of appropriate size for salmon and trout spawning.
- Increase spawning habitat in the reach by approximately 1,700 ft² (+/- 10%).
 - Increase salmonid spawning habitat in the Reach from RM 0.0 – 0.3 by approximately 300 ft² and
 - Increase salmonid spawning habitat in the Reach from RM 0.3 – 1.0 by approximately 1,400 ft²

Phased approach to restoring geomorphic functionality:

- Shaping the channel to ensure that the 1.5 year recurrence interval flows (285 cfs) fill the channel to its morphological bankfull stage,
- Restore channel complexity and roughness factors (e.g., boulders and large wood), and
- Add bed material that can be partially mobilized at bankfull flow.

Geomorphic Objectives, Design Elements and Structural Criteria:

- Convert a degraded plane-bed/step-pool system into a wood forced step-pool system; construct pool-forming bedforms (steps) using boulder and wood complexes; and increase instream habitat cover and complexity. All placed wood should be conifer species native to the area.
 - Within RM 0.3 – 1.0, increase wood quantities from an existing 30 pieces/mile to 90-130 pieces/mile. Use the Large Wood Report (Watershed Geodynamics 2007)

to determine size class distribution (small, medium and large). Target areas for wood placements will be in existing pools or in glides/runs where pool habitat can be created by wood placement. In areas targeted for pool formation, large 'key' pieces of wood will be incorporated into the channel bed to create stable pool-forming bedforms (i.e. steps).

- Within RM 0.0 – 0.3, place boulders to help develop step-pool units and complexity. Boulder target densities and distribution will be determined during plan development.
- Within RM 0.3 – 1.0, place large wood structures approximately every 250 feet, or about 15 structures in the target reach. Place boulders into the large wood structures to increase complexity, help to develop step-pool channel units and to provide ballast for large wood placements.
- Wood accumulations will be installed within channels and along channel margins to create and enhance pool habitat and to provide cover. Wood quantities and jam spacing will be based on reference conditions within Lake Creek and other similar streams. Wood will be placed to create plunge pool and lateral scour pool habitat as appropriate depending on site conditions.
- Anchoring of boulders, logs and log structures and recurrence interval event (flow event large enough to move the structures) will be determined during plan development and based on site-specific analysis. Use of cables, re-bar, and similar anchoring devices must be approved by the Agencies, based upon the goals of restoring geomorphic functionality, complexity and roughness factors, and included during plan development.
- Convert current glide habitat into high quality pool habitat
 - Decrease glide/run habitat to <40% and increase pool habitat to >30%
- Increase residual pool depths to increase habitat capacity during low flow periods
 - Decrease channel width-to-depth ratios to below 15:1 and where feasible below 10:1 (current width-to-depth ratios regularly exceed 30:1) by reshaping selected channel unit areas.
- Increase available spawning habitat through gravel augmentation
 - Lower Lake Creek Reaches 2 – 4 will provide targets for gravel quantities in surface area, which are on the order of 10,000 ft² per mile. This corresponds to approximately 7,000 ft² of gravel in surface area to be maintained for the life of the License for the target anadromous reach. The amount of gravel in cu. yds will need to be determined during Plan development and be based on the required spawning substrate depth.
 - Increase spawning area by increasing availability of pool tail-outs and through spawning gravel augmentation.
 - Spawning gravel placement should occur at key channel access points and be associated with placed logs, log jams or boulders to ensure they are not readily transported out of the reach. Placement guidelines may include pool tail-outs where water depths and velocities meet spawning criteria.
 - Gravels will be placed upstream of bed control elements (i.e. riffles, steps) to enhance spawning capacity and quality.
 - Specific size and distribution of bed material will be determined through hydraulic analysis, reference conditions, and species requirements for spawning.

- Continue a long-term gravel supplementation program that match post-restoration transport capacity and maintain habitat features consistent with restoration goals and objectives (maintain long term recruitment stations which work with the stream and naturally transports gravels to suitable locations).

Riverine Riparian Habitat – Currently, the riparian areas are mostly composed of native deciduous or mixed deciduous / conifer stands. There are a few cases of invasive species that would be expected to interfere with natural succession to climax forest types. A vegetation monitoring and management program will be put in place to ensure invasive species do not colonize the site and that native riparian habitats provide the form, function and natural processes. Impacts to existing riparian vegetation will be minimized during construction activities. Revegetation will be conducted in disturbed areas using native and site-appropriate species.

Implementation and Effectiveness Monitoring – The Licensee shall in coordination and consultation with the USDA Forest Service, develop protocols and determine the temporal expectation for change for each monitoring element and identify other implementation and effectiveness monitoring elements, as needed, to track the status of resource objectives. The Licensee shall provide the USDA Forest Service a report of the Anadromous Reach monitoring findings each year at the Annual Resource Coordination meeting (Condition No. 2) and very year thereafter. Monitoring conducted by the Licensee shall address:

- Select monitoring parameters, or indicators, that best display the current condition and dynamics of the system being managed (Gibbs et al. 1999). Give preference to indicators that not only demonstrate the existence of change, but which can also be linked to the cause of change.
- Determine the monitoring intensities needed to obtain sufficient data to have a reasonable chance of detecting change in habitats or populations.
- Prior to initiating site-specific monitoring establish baseline biological conditions for the resources that will be monitored by using existing data and information, and/or collecting new data through appropriately designed field surveys.
- Where appropriate, use monitoring to test specific hypotheses related to resource objectives or implementation measures. Define site-specific resource objectives that are both realistic and measurable and that include the following components (Elzinga et al. 1998):
 - What will be monitored,
 - The geographic scope of the monitoring,
 - The specific metric of the indicator that will be measured,
 - The anticipated response to the management action,
 - The magnitude of change anticipated, and
 - The anticipated time frame over which the response should occur.
- Establish and maintain a staff and gauging station at the Lake Creek Old Highway Bridge to monitor flows in the reach. The Licensee shall check the gauge and download data to website and provide a report at Annual Resource Coordination meeting (Condition No.2).

The Upper Reach of Lower Lake Creek, extending from the drop structure to about 1,464 ft downstream

Spawning and Rearing Habitat Objective:

- Increase the amount of small woody structure and spawning gravels for resident rainbow trout in reach.

Within one year of License issuance, the Licensee shall conduct baseline surveys of spawning and rearing habitat in reach. Beginning within the first year after License issuance and after the baseline survey, the Licensee shall collect wood from the Project intake and wind-throw along USDA Forest Service Trail 74 that can be handled safely by two Energy Northwest employees, and that are in excess of six feet in length and 4 inches in diameter, and shall place the collected wood in the reach for the term of the new License.

The Licensee shall deposit 10 cubic yards of variable diameter gravel (between 0.5 and 3.0 inches diameter) onto an exposed bank within the bankfull channel in the first year of the new License. The specific amount of gravel and duration of augmentation will be determined in consultation and coordination with the Resource Agencies and Tribes, and incorporated into the Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan. The Licensee shall deposit the next gravel amount within 6 months after the gravel has been dispersed by the aquatic habitat forming flow or flows that move the gravel. The Licensee shall provide annual documentation to the USDA Forest Service of the following specific elements:

- Length of wood deposited into Lake Creek (cumulative linear feet)
- Diameter of wood deposited
- Number of pieces of wood deposited
- Type of wood deposited
- Dates of gravel and wood deposits

The Licensee shall monitor the amount of spawning and rearing habitat present (in square meters) once every two years for ten years after issuance of the new License. The monitoring shall be conducted concurrently with the monitoring outlined in Condition No. 8. During each monitoring period, the Licensee shall quantify the amount of spawning and rearing habitat present in the upper reach of Lower Lake Creek. The Licensee shall provide the USDA Forest Service with a report of monitoring findings at the Annual Resource Coordination meeting (Condition No. 2) the year after the monitoring is conducted. The report will discuss the quantity of rearing and spawning habitat for resident rainbow trout in the reach, and trends that become apparent over time.

Upon completion of the ten year monitoring period, the Licensee shall meet with the USDA Forest Service to discuss monitoring results. If significant habitat improvement is documented, a collective decision will be made as to the quantity and duration of gravel and wood placement into the reach for future years and whether further monitoring is warranted. Conversely, if anticipated improvements to instream habitat are not occurring, increases in the amount of gravel and wood placement or other gravel trapping structures will be discussed.

Required Elements for both Reaches

Adaptive Management - The Licensee shall in coordination and consultation with the USDA Forest Service, modify the PME measures, as needed, to meet resource-specific objectives and/or desired conditions.

- Analyze the data generated from monitoring and evaluate changes in condition and progress toward meeting resource management objectives. As needed, obtain outside peer review of the monitoring results to assist in developing and evaluating adaptive management actions.
- Adaptive management shall mean the adoption of the following strategic actions: measures shall be implemented, effectiveness monitoring shall take place, and alternative fallback options shall be employed if proposed control measures fail to protect and enhance fish and wildlife resources as anticipated.

USDA Forest Service consultation requirements - The Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan shall be prepared in coordination and consultation with the USDA Forest Service. The Licensee shall include with the plan documentation of coordination/consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the plan. The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations prior to filing the plan with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Future plan review –The Licensee shall in coordination and consultation with the USDA Forest Service review, update, and/or revise as needed the Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan every 5 years. The initial 5-year update to the plan will be completed the tenth year after issuance of the new License and will be filed in 2020. The updated or revised plan will document the consultation process. The Licensees will submit 5-year plan updates to FERC by the end of each calendar year (December 31) in which the review and updates occur, with copies sent to the USDA Forest Service. Changes or revisions to the plan would be expected if aquatic and/or terrestrial resource conditions change as a result of unforeseen effects from new or existing Project-related activities or from natural events. Changes may also be implemented if monitoring feedback indicates that resource objectives are not being met and/or it is determined that a specific PME is not providing the intended result and needs to be revised or replaced.

Condition No. 8 - Rainbow Trout Surveys and Supplementation in the Upper reach of Lower Lake Creek extending 1,464 ft below the Drop Structure

Within one year after License issuance and before the first aquatic habitat forming flow event, the Licensee shall provide baseline information on the rainbow trout population density in this reach. The Licensee shall conduct the survey in the reach to provide the baseline information and once every two years for eight years. The goal of the surveys is to obtain adult rainbow trout population density in the reach. If 30 adult rainbow trout are not observed, the Licensee shall collect and move 30 healthy, adult rainbow trout from Packwood Lake to the reach during the

year following each survey. If 30 or more adult rainbow trout are observed during the survey, the Licensee does not need to collect or move any trout.

Upon completion of the surveys during the first eight years after License issuance, the Licensee shall meet with the USDA Forest Service to discuss and collaboratively decide whether to continue fish supplementation and monitoring. The following criteria will be used to determine whether supplementation and monitoring be continued as is, modified or will be discontinued.

- If three consecutive bi-annual surveys of the reach have confirmed the presence of 30 adult rainbow trout, and a subsequent survey of Study Reaches 3 and 4 documents a self sustaining resident population in these two reaches then monitoring and supplementation in the reach will be discontinued for the remainder of the License period.
- If three consecutive surveys have not confirmed the presence of 30 adult rainbow trout then the Licensee shall continue to monitor the reach at a reduced frequency of once every four years and supplement the trout annually, or until 3 consecutive surveys document the presence of 30 adult rainbow trout.

The Licensee shall collect scale samples during the surveys to monitor trends of fish age class variability within the reach.

The Licensee shall provide the USDA Forest Service a report every two years documenting the adult rainbow trout population supplementation and monitoring efforts in the reach. The report shall discuss the existing population characteristics of the resident adult rainbow trout in the reach. The report shall be provided to the USDA Forest Service 30 days prior to the Annual Resource Coordination meeting (Condition No.2). The report shall also provide details for the out-years planned activities. The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations prior to filing the final report with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Condition No. 9 - Entrainment in Project Intake

The Licensee shall, in consultation and coordination with the USDA Forest Service and the Washington Department of Fish and Wildlife (WDFW), and other interested stakeholders, provide for test and verification of existing traveling fish screens to meet current State of Washington approach velocity criteria. The current measurable objective for fish screen approach velocities are the State of Washington criteria of ≤ 0.80 ft/second over 95% of the screen area, and ≤ 0.88 ft/sec over 99% of the screen area for all intake flows and lake elevations. If testing and verification data indicate the traveling fish screens do not meet State criteria then the Licensee shall modify the existing fish screens and/or evaluate whether administrative controls (restricting operational flows) can provide a means of complying with the criteria or install new fish screens at the Project intake as described below.

The Licensee shall in consultation with and subject to review and approval by the USDA Forest Service and the WDFW describe the testing and verification process to be used to implement this

license article. At a minimum the process will include the following test and verification procedures, include a schedule for implementation, and if necessary as described below, provide for the modification or redesign procedures for the traveling fish screens;

1. Evaluate the condition and sealing of the existing traveling fish screen with Resource Agency personnel. Screen evaluation techniques may include a remote camera, by direct inspection or some other means, to be determined in consultation with the Resource Agencies. If screen condition or sealing problems are found, the Licensee in consultation with the Resource Agencies shall determine whether to modify the existing traveling screens and/or evaluate the use of administrative controls, or pursue a major screen redesign. Go to No. 5 if a major redesign of the traveling fish screens is determined.

2. If the current traveling screens are adequately sealed, or, after modifying the screens to be adequately sealed, test and verify the screen approach velocity over a range of lake elevations and intake flows. Testing of the traveling fish screens approach velocities will be done with the trash rack screens removed. Specific dates will be determined in consultation with the Resource Agencies.

3. If the State screen approach velocity criteria are satisfied then Licensee will retain the existing traveling screen as the primary fish exclusion device. Go to No. 6 for the development of an intake structure operation manual.

4. If the State screen approach velocity criteria are not satisfied then the Licensee in consultation with the Resource Agencies will determine whether to experiment with a baffling system and other minor modifications (including limiting inflow at certain lake elevations), or pursue a major screen redesign (See No. 5). The baffling system and other screen or operation modifications, and approach velocity standard testing will be completed by the end of the second year of the new license. If the State screen approach velocity criteria is satisfied then go to No. 6 for the development of an intake structure operation manual. If the State screen approach velocity criteria is not satisfied then go to No. 5 for a major redesign of the traveling fish screens.

5. Major Fish Screen Redesign: A major screen redesign may mean significant changes to the existing screens or replacement of the existing screens. The point of fish exclusion can either be the trash rack or inside the intake structure. The Licensee shall consult with qualified engineers to explore options for screening that will satisfy State approach velocity criteria, and then in consultation with the resource agencies, determine the new screen design. The timeline for the redesign process is as follows:

- Proposed conceptual designs will be made available to Resource Agencies by the end of the third year of the new license.
- Final design decision will be made by the end of the fourth year of the new license.
- Construction to be completed by the end of the seventh year of the new license.

6. The Licensee shall prepare an intake structure operation manual for Resource Agency approval. The manual will specify screen monitoring intervals, maintenance intervals, and the actions that will be taken given significant events, including load rejection, overtopping inflows

over the drop structure, bypass flow failures, penstock leaks, landslides, earthquakes and fires. The manual shall be provided to the Resource Agencies within two years of time the final intake structure configuration is completed.

The Licensee shall provide the USDA Forest Service an annual report on the six steps described above at least 30 days prior to the Annual Resource Coordination meeting (Condition No. 2). The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations prior to filing the final report with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Condition No. 10 - Fish Passage at Snyder Creek

Within two years of License issuance, the Licensee shall, in coordination and consultation with the USDA Forest Service, U.S. Fish and Wildlife Service, National Marine Fisheries Service and the Washington Department of Fish and Wildlife, Washington Department of Ecology, and Tribes, and approval by the USDA Forest Service survey, engineer, and prepare a Snyder Creek Restoration, Enhancement and Monitoring Plan for the re-routing of Snyder Creek and file the plan with the Commission for approval. The Licensee shall in coordination and consultation with the USDA Forest Service and other agencies as appropriate, develop the Snyder Creek Restoration, Enhancement and Monitoring Plan to include at a minimum the following elements: restoration and enhancement objectives; project design criteria; and implementation and effectiveness monitoring.

The Licensee shall apply for and secure permits by the end of the fourth year after License issuance. Within five years of License issuance, the Licensee shall re-route Snyder Creek to join Hall Creek immediately downstream of the Project tailrace flume. Snyder Creek will be re-routed to Hall Creek via an existing drainage path that runs parallel and adjacent to the tailrace. This reach is approximately 800 feet in length.

The Licensee shall retain stream restoration specialists to design the re-route and restoration for Snyder Creek. The point at which Snyder Creek will be diverted into this drainage will be determined in consultation with the USDA Forest Service and other agencies as appropriate however, it is anticipated that the stream will be diverted within 500 feet upstream of where the current Snyder Creek crossing occurs. Until Snyder Creek is redirected, the Licensee shall keep the existing culvert under the tailrace maintained and in operating condition to allow existing fish passage.

The Licensee shall monitor the re-route of Snyder Creek for two years following the restoration to determine whether Snyder Creek allows for volitional passage of anadromous and resident trout species. Upon the completion of the second year of monitoring, the Licensee shall meet with the USDA Forest Service and other agencies as appropriate, to discuss monitoring results. If volitional passage of anadromous and resident trout species is documented then a collective decision will be made whether further monitoring is warranted. Conversely, if volitional passage

is not occurring then a collective decision will be made as to what measures are required to restore volitional passage the Snyder Creek re-route.

The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations on the restoration plan prior to filing the final plan with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Condition No. 11 - Amphibian Monitoring at Site B

Within in the first year after License issuance, the Licensee shall monitor the lacustrine fringe wetland habitat at the head of Packwood Lake known as Site B for northwestern salamander larvae presence and to determine whether the larvae are able to move into the lake after the annual September 16 change in minimum lake elevation or if there is a physical barrier to their movement.

The Licensee shall monitor Site B as follows:

1. Monitoring for larvae shall begin prior to September 16 when winter operating lake levels are in effect,
 - a. Detection methods shall include the use of dip-net and/or aquatic funnel traps to record the number and size (snout-vent length) of larvae found.
2. Following the annual drawdown, Site B will be re-visited:
 - a. If Site B is not dewatered, the site will again be sampled for larvae using the above detection methods;
 - b. The topography of the site will be documented by field notes and photographs, and the depth of any remaining water within Site B will be measured; and
 - c. The outlet of Site B to the lake will be examined to determine whether there is a barrier to larval movement into the lake (i.e., do logs screening Site B from the lake and a sill of accumulated sediments block movement).

The Licensee shall in coordination and consultation with the USDA Forest Service, review the monitoring results at the forthcoming Annual Resource Coordination meeting (Condition No. 2). If the results show that there is not a physical barrier to northwestern salamander larval movement into Packwood Lake, the next phase of monitoring would not be required.

If the first year monitoring demonstrates that northwestern salamander larvae are unable to move into the lake to survive winter operating levels, the Licensee shall conduct a second year of monitoring to determine the relative importance of Site B to the local population of the species. A post-breeding (probably late May) survey for northwestern salamander egg masses will be conducted in Site B and in the wetland complex southeast of the lake. Because northwestern salamander egg masses are large and conspicuous, a survey at this time would have the highest probability of detection. Two biologists will systematically survey wetlands up to 0.5 miles from the Packwood Lake and will record the number and location of egg masses. If the survey indicates that the number of northwestern salamander egg masses at Site B is 10% or less than

the number of egg masses found elsewhere, no further action will be required. If Site B is found to be relatively more important, then Licensee shall consult with the USDA Forest Service regarding appropriate habitat improvements (e.g., reconfiguring Site B to improve connectivity to the lake).

Condition No. 12 - Threatened, Endangered and Sensitive Species

Within one year of License issuance, the Licensee shall, in coordination and consultation with the USDA Forest Service prepare a Threatened, Endangered (Federal listed) and USDA Forest Service Regional Forester Special Status Species Management Plan (Plan) that shall be filed with the Commission for approval. The goal of the plan is to provide PME and monitoring of threatened, endangered, and sensitive species and their habitats that may be affected by Project operation or Project-related activities over the life of the License. The TES Plan shall include the Licensees filed Rare Plant Management Plan filed with the Commission on June 6, 2008. The Plan at a minimum shall require the Licensee to:

1. Initial species list - The initial list should include threatened, endangered and sensitive species that occur within the project boundary or on lands affected by project operation or project-related activities. For each species, the list should reference the relicensing studies that documented occurrence and/or evaluated project effects.
2. Updating the species list - The plan should provide for annual consultation, review, and updating of the list. Species would be added or removed according to changes in their status or changes in the potential for project effects (e.g., construction of new facilities).
3. Conducting baseline surveys - The plan should provide for baseline surveys of species currently on the list if no surveys have been completed at sites where project operations or project-related activities could affect them. Baseline surveys should also be conducted for species that may be added to the list if they occur at sites where the project could affect them.
4. Preparing biological evaluations - Where USDA Forest Service Regional Forester Special Status Species may be affected, the Licensee shall consult with the USDA Forest Service to prepare a draft biological evaluation, in accordance with the Condition No. 1 - Implementation of Activities on National Forest System Lands.
5. Monitoring project effects - For USDA Forest Service Regional Forester Special Status Species, the plan should include monitoring to identify project effects at confirmed sensitive species sites every 2 years for 6 years following License issuance and at 3-year intervals thereafter, unless a determination can be made at year 6 that no additional monitoring is necessary. For other threatened, endangered, and sensitive species, the Licensee shall consult with the USDA Forest Service to determine an appropriate monitoring frequency, based on site-specific conditions.
6. Implementing protective measures - The plan should provide for designing and implementing PME or restoration measures if monitoring results show project-related effects.
7. Effectiveness monitoring and adaptive management - The plan should include follow-up monitoring to measure the effectiveness of any protective measures that are implemented, and use of this information to modify and improve the Threatened, Endangered, and

Sensitive Species Management Plan. Adaptive management shall mean the adoption of the following strategic actions: measures shall be implemented, effectiveness monitoring shall take place, and alternative fallback options shall be employed if proposed control measures fail to protect and enhance fish and wildlife resources as anticipated.

8. Consultation, reporting, and updating the Threatened, Endangered, and Sensitive Species Management Plan - The plan should provide for annual reporting and consultation, with updates to the plan as needed. The report shall be provided to the USDA Forest Service 30 days prior to the Annual Resource Coordination meeting. The report shall also provide details for the out-years planned activities. The Licensee shall allow a minimum of 60 days for the USDA Forest Service to comment and to make recommendations prior to filing the final report with the Commission for approval. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information.

Condition No. 13 - Packwood Lake Tributary Headcutting Monitoring

Within five years of License issuance, the Licensee shall develop in consultation with the USDA Forest Service, a Packwood Lake Tributary Headcutting Monitoring program. The monitoring program will focus on two tributaries to Packwood Lake: Mueller and Upper Lake Creeks. The initial monitoring will occur at year 10 of the new license (2020) and every 10 years thereafter. The monitoring program shall employ the same data collection methods as implemented in the Stream Connectivity in Packwood Lake Tributaries Study Plan (Energy Northwest 2005). Monitoring data will be analyzed to determine whether headcutting and/or bed profile incision in Mueller and Upper Lake Creeks are occurring and whether headcutting/incision is Project related. Monitoring results will be provided to the USDA Forest Service at the Annual Resource Coordination meeting (Condition No. 2) the year following the monitoring.

If headcutting and/or bed profile incision is occurring and is Project related then the Licensee in consultation with the USDA Forest Service shall determine appropriate mitigation measures, and monitoring and adaptive management strategies.

Adaptive management shall mean the adoption of the following strategic actions: measures shall be implemented, effectiveness monitoring shall take place, and alternative fallback options shall be employed if proposed control measures fail to protect and enhance fish and wildlife resources as anticipated.

Condition No. 14 - Recreation Management

The Licensee shall completely and fully comply with all provisions of the Recreation Management Plan as filed with the Commission on June 6, 2008 and any approved revisions of that Plan throughout the length of the new License.

The Recreation Plan addresses Project-related recreation resources located on NFS lands within the existing Project boundary and other lands affected by the Project or as otherwise ordered by the Commission. The Recreation Plan includes provisions for adaptive management to address

changing recreation needs and preferences, and shall be updated as appropriate every six years in conjunction with filing the Commission Form 80. The Licensee shall implement the Recreation Plan.

Condition No. 15 - Pipeline, Surge Tank and Penstock Monitoring

Within one year of License issuance, the Licensee shall, in consultation with and approved by the USDA Forest Service prepare a Pipeline, Surge Tank and Penstock Monitoring Plan and file the plan with the Commission for approval. The goal of the plan is to provide protection to NFS lands from Project waterway system leakage or failure. The plan shall:

1. Document the requirements, tasks, methods and reports related to monitoring the Project waterway system.
2. Document detailed technical descriptions of monitoring methods and data analysis and techniques necessary for the Licensee to conduct specific monitoring tasks.
3. Provide a mechanism for revising monitoring strategies and methods to reflect improvement in sampling procedures and/or changes in regulations or environmental conditions.
4. Identify practices for record keeping and reporting.
5. Include provisions for the routine updating of the monitoring plan, in consultation with and approved by the USDA Forest Service, and subsequent filing with the Commission.

Condition No. 16 - Exotic and Invasive Vegetative Management

The Licensee shall completely and fully comply with all provisions of the Integrated Weed Management Plan (IWMP) as filed with the Commission on June 6, 2008 and any approved revisions of that Plan throughout the length of the new License. The intent of the IWMP is to enhance and promote the coordinated management of noxious weeds with the entities responsible for weed management in the Project vicinity. The goal of the IWMP is for the prevention, suppression, containment, eradication, and/or control, according to goals by species and location, for exotic invasive non-native plant species, including noxious weeds on National Forest System (NFS) lands affected by the Project and/or related to compliance activities under the Project License in and adjacent to the Project area.

Condition No. 17 - Raptor Protection - Primary Distribution Line

The Licensee shall completely and fully comply with all provisions of the Avian Protection Plan file with the Commission on June 6, 2008 and any approved revisions of that Plan throughout the length of the License. The plan provides for surveys that determine system configuration and monitors the effects on avian species, including potential fatalities. Annual surveys of non-compliant structures will continue until the upgrade or replacement occurs consistent with current Avian Power Line Interaction Committee configuration standards.

Condition No. 18 - Cultural Resources

The Licensee shall completely and fully comply with all provisions of the August 30, 2007, Historic Properties Management Plan (HPMP) as filed with the Commission and any approved revision of that Plan throughout the length of the new License. The HPMP provides for the protection, management, and interpretation of historic properties within the area of potential effect (APE) for the Project and for mitigation of Project-related impacts to historic properties.

Condition No. 19 - Reservation of Authority

The Licensee shall implement, upon order of the Commission, such additional conditions as may be identified by the Secretary of Agriculture, pursuant to the authority provided in Section 4(e) of the Federal Power Act, as necessary for the adequate protection and utilization of the public land reservations under the authority of the USDA Forest Service.

Enclosure II
USDA Forest Service
Gifford Pinchot National Forest
Justification Statements
For
FPA § 4(e) Terms and Conditions
Packwood Lake Hydroelectric Project
FERC Project No. 2244

August 2008

Condition No. 1- Implementation of Activities on National Forest System (NFS) Lands

Condition No. 2 - Resource Coordination

Condition No. 3 - Fire Prevention Plan

I. Existing Situation

The USDA Forest Service administers lands within and adjacent to approximately 18 miles of Hells Canyon Reservoir, and administers lands downstream of the HCD. These lands are managed for multiple uses including; recreation use, wildlife habitat, livestock grazing, cultural resource protection and facilities maintenance. Project operation and/or mitigation for impacts of the Project on USDA Forest Service administered resources must insure that actions are in compliance with laws and regulations, policies and land use plan decisions necessitating consultation with the USDA Forest Service prior to implementation of any action on federal lands to ensure the continued protection and utilization of USDA Forest Service administered resources and consistent USDA Forest Service management.

II. Forest Plan Direction

Forest Plan direction mandates that USDA Forest Service actions are in compliance with laws, rules, regulations, etc. See justification/rationale section for additional details.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

The Federal Land Policy and Management Act (FLPMA) of October 21, 1976, as amended authorizes the Secretary of Agriculture to issue, renew, or grant authorizations to occupy, use, or traverse NFS lands for the generation, transmission, and distribution of electric power. The Energy Policy Act of October 24, 1992 amends section 501 of FLPMA by providing that USDA Forest Service authorizations are not required for the continued operation of projects licensed or exempted by FERC as of October 24, 1992, unless prior to that time, all or part of the project had

been under a FLPMA act authorization or additional NFS lands were proposed to be added to the licensed or exempted project area.

USDA Forest Service Manual (FSM) 2774 provides direction for coordination of activities on NFS lands to prevent effecting project operations and to facilitate management of those lands for other non-power generating purposes.

USDA Forest Service Handbook (FSH) 2709.15 provides guidance on USDA Forest Service involvement and management of hydropower projects licensed by the Federal Energy Regulatory Commission on NFS lands.

The USDA Forest Service must maintain a reasonable level of control over project operations that affect NFS lands, resources and programs. The above conditions, which specify administration, coordination, scheduling and monitoring, are intended to provide for integration of the project operations and activities with other land management activities and programs occurring within and adjacent to the project area.

IV. References Cited

USDA Forest Service. Forest Service Manual 2700. FSM 2774 – Coordination

USDA Forest Service Handbook 2709.15.

Condition No. 4 - Packwood Lake Elevations and Annual Project Maintenance

I. Existing Situation

Pre-Project Packwood Lake elevations were collected by the USGS from September 1959 through early July 1963 and generally fluctuated between 2856.5 and 2857.5 MSL. Minimum lake elevations were generally between 2856.0 and 2856.5 feet MSL. The lowest lake elevation recorded between September 1959 and July 1963 (Pre-project) was 2855.94 ft. MSL (ENW E.5.2-25, FLA 2008). Royce (1965) also reported lake elevations fluctuating between 2586 and 2587.

Currently, the Commission license for the Project requires that the lake be held at 2857.0 ft MSL \pm 0.5 ft in the summer months until September 15. The Project performs scheduled equipment maintenance beginning October 1 and the lake is drawdown to 2849 ft. MSL prior to the outage beginning September 15.

Packwood Lake elevations are held between 2857.0 ft MSL \pm 0.5 ft from May 1 to September 15 of each year. The relatively stable lake elevation provides for successful rainbow trout spawning and fry outmigration in the lake tributaries of Muller, Crawford, Osprey, Upper Lake and Trapp Creeks. Generally, spawning occurs during June and most adult fish have moved back into the lake by early July. Fry outmigration is generally completed by late August (EES Consulting 2007a). EES Consulting suggests that the juvenile rainbow trout have adopted a strategy of emigrating to the deeper waters of the lake during August before the flows decrease or dry up completely in the tributaries.

Conducting the Project maintenance outage in October allows for maintenance of relatively stable lake levels during the prime recreation season (July - September 15). Recreationists primarily use the north and east shoreline areas for swimming, picnicking and camping.

The current FERC license requires bypass release flows of 3cfs into Lower Lake Creek. Release flow requirements were met, although during some years, low natural inflow levels became problematic to keeping power generation continuous. Interrupted power generation created discontinuous tailrace flows which may have created discontinuous attraction flows to fish where tailrace flow enters the Cowlitz River.

The wetland complex at the head of Packwood Lake (includes Upper Lake Creek and Muller Creek) is characteristic of a low gradient alluvial floodplain wetland fed by seasonal surface drainage, precipitation and groundwater seepage. The hydrodynamics include bidirectional flow, as flow from the upper watershed and the lake level influences the wetland hydrology (ENW E.5.2-18, FLA 2008).

The effect of Lake Drawdown on the hydrology of the wetland complex at the upper end of the lake was most pronounced adjacent to the lake at the outlet of Muller Creek. The groundwater level of the wetland around Muller Creek is primarily a function of lake level during the drier portion of the year (July through October) until the onset of the first large fall storms. The groundwater levels of the wetland area around Upper Lake Creek are similarly affected by lake

levels although the fall drawdown (decrease 7.5 feet of lake level) had muted effect to the groundwater level decrease (about 1 foot). The lake level defines the minimum water table elevation throughout the near shore area of this wetland complex. The wetland soils remained saturated in July and August even though the ground water level drops below the ground surface and throughout the drawdown period due to the high clay content of the soil (EES Consulting 2007b).

Currently the drawdown to 2849 ft. MSL prior to outage affects one wetland near Mueller Creek from mid September to the end of October. Stranding of the northwestern salamander is one affect to the wetland from the drawdown. “The northwestern salamander larvae, which over winter before metamorphosing in their second year, may be stranded if wetland soils do not retain sufficient water in depressions to sustain larvae until wetland pools refill (EES Consulting 2007c). The lake drawdown effect to soil moisture and vegetation is minimal as the clay soils remain saturated even though the groundwater level (and associated lake level) decreases and plants are entering dormancy during this period.

Evidence of minor incision exists influenced either by Project induced fluctuations in lake levels or the streams cutting down into their alluvial fans to join the lake. Evidence of past alternate channels on these fans exists although permanent grade control features are located at the points where the small tributaries flow through the higher gradient steep valley wall. These processes have resulted in little effect on terrestrial and riparian habitat or wetlands with the exception of stream connectivity of Upper Lake Creek and Mueller Creek (Watershed Geodynamics and EES Consulting 2007).

Upper Lake and Muller Creeks are located in a broad, low-gradient valley and deeply incised about 400-500 feet upstream from full pool. This incision is the result of Packwood Lake drawdown during the fall and winter and results in deep pools existing when the lake levels are high. The process of cutting through stream delta deposits occurs during low lake levels. The headcutting has changed aquatic habitat in these streams at high lake levels to pool habitat (Watershed Geodynamics and EES Consulting 2007).

The process of future headcutting in Muller and Upper Lake Creek channels upstream of Packwood Lake exists. Abundant large wood and large wood complexes cause headcutting to occur at relatively slower rate than without the wood, while the wood also allows the counteracting process of sediment deposition to occur. The physical effects of the drawdown (incision and headcutting of Upper Lake Creek and Mueller Creek) are considered to have had little consequence to the aquatic, riparian and terrestrial habitat in Upper Lake and Mueller Creeks and are considered minor to the physical effects to the stream from the large sediment load that is moving down from the upper watershed (Watershed Geodynamics and EES Consulting 2007).

II. Forest Plan Direction

The Gifford Pinchot National Forest Land and Resource Management Plan Amendment 11 (1995) provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake

Hydroelectric Project in the Lake Creek Sub-watershed. Amendment 11 is a compilation of the current direction as expressed in the standards and guidelines from the Record of Decision for the Northwest Forest Plan and the Gifford Pinchot National Forest Management Plan (1990).

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds (defined as HUC 5th field) and the aquatic ecosystems contained within them. Lake Creek drainage area is one sub-watershed (defined as a HUC 6th field) of the Upper Cowlitz River Watershed. Specifically, ACS Objectives 6-9 pertain to the Packwood Lake Hydroelectric Project. These objectives are stated as follows:

Objective 6 - Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Objective 7 - Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

Objective 8 - Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Objective 9 - Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

The Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the USDA Forest Service shall) provide written and timely license conditions to FERC that emphasize in-stream flows and habitat conditions that maintain or restore riparian resources and channel integrity.”

The federally managed lands within the Lake Creek Watershed are designated as a Tier 1 Key Watershed. Tier 1 Key Watersheds were selected for directly contributing to anadromous salmonid and bull trout conservation. Key watersheds are highest priority for watershed restoration.

In order to meet Aquatic Conservation Strategy and particularly the ACS Objectives 6-9, USDA Forest Service will require actions that strive to maintain species composition and structural diversity of plant communities in wetlands, so that native aquatic species in the Lake Creek Sub-watershed can utilize all available habitats with sustainable productivity levels. The USDA Forest Service goal is for the protection and mitigation of aquatic species and the connectivity of functional riparian and aquatic habitats to which the native aquatic and riparian community is adapted. Specifically, lake fluctuations need to minimize disturbances to the fauna and flora of the wetlands at the head of Lake Creek so that native species can utilize all available habitats and

sustain viable productivity. Lake Creek stream flows need to be adequate for the physical and biological habitat needs and for the sustainability and viable productivity of the present array of native species.

The USDA Forest Service adheres to Executive Order No. 11990. Protection of Wetlands “to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands”. In carrying out the activities of this executive order, factors to consider include ‘maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber and food and fiber resources.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Energy Northwest proposes to maintain a minimum lake elevation of 2856.5 ft MSL between May 1 and September 15, and proposes to eliminate the pre-outage drawdown of the lake prior to the annual Project maintenance by moving the outage from October to August 15, resuming operations by September 15 or earlier if all necessary work has been completed.

The USDA Forest Service fully supports Energy Northwest’s proposal of Packwood Lake elevations, elimination of the pre-outage drawdown and timing change of the annual Project maintenance given the following reasons:

- Maintaining a minimum lake elevation of 2856.5 ft MSL between May 1 and September 15 maintains connectivity of Packwood Lake and its tributaries allowing spawning adult rainbow trout and fry emigration from Packwood Lake tributaries into Packwood Lake. After spawning, adult rainbow trout emigrate from the tributaries and return to the lake by early July (EES Consulting 2007a). Fry outmigration is generally completed by late August. Maintaining lake elevations minimize disturbances to spawning rainbow trout so that this native species can utilize all available tributary habitats and sustain viable productivity.
- Conducting the annual Project maintenance outage in mid-August to mid-September without a pre-outage drawdown allows for maintenance of relatively stable lake elevations during the prime recreation season (July – September 15). This allows recreationists opportunity and access to the north and east shorelines for day and extended use without impacting the western shoreline thereby follows the policy of non-degradation of the Wilderness character.
- Changing the annual Project maintenance outage to mid- August to mid-September is to assure adequate water is available from August 15 through October for release into the bypass reach of Lower Lake Creek and minimizes the risk of uncontrolled release flows (overtopping events) to Lower Lake Creek. Uncontrolled release flows create the potential for fish in the anadromous reaches of lower Lake Creek to spawn in areas that would become dewatered once the flow rates drop down to the license specified flow levels. Changing the annual outage also allows adequate flows to be available to keep continuous flows in the tailrace both before and after the outage, thus eliminating

intermittent attraction flows to the tailrace. Fall/Winter drawdown will continue to be needed in order to provide sufficient water for the following: 1) recommended flow releases into the bypassed sections of Lake Creek, 2) continuous (uninterrupted) flows in the tailrace after the maintenance outage in late September and October (until the fall rains begin) and 3) power generation.

- Eliminating the pre-outage drawdown to 2849 ft MSL minimizes the extent of drawdown zone and reduces the impact to littoral habitat used by juvenile rainbow trout. Eliminating the drawdown reduces the present reduction of littoral habitat (30 acres) used by juvenile rainbow trout and reduces the risk of stranding the northwestern salamander in the wetland around Mueller Creek. Elimination of the pre-outage drawdown meets the USDA Forest Service ACS Objective 7 to “maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.”
- The proposed change in annual maintenance and associated minimal lake drawdown in September and October will affect one wetland (Site B) at the head of Packwood Lake with the potential to strand any present northwestern salamanders. The mid-September drawdown would be more gradual than the current pre-outage drawdown and more gradual than the historical fall drawdowns, as the lake level would be maintained at a higher level through September 15 and normal flows in late September and October will bring the lake up at a similar rate to natural conditions. USDA Forest Service FPA Preliminary § 4(e) Term and Condition No. 11 to monitor the wetland area to determine if northwestern salamander are stranded in the affected area during the drawdown will allow the determination of extent of presence and allow the determination of future protection measures.
- The incision and headcutting in Upper Lake Creek will continue as fall and winter drawdowns will continue to be part of the Project operations. These effects are considered to have had little consequence to the aquatic, riparian and terrestrial habitat in Upper Lake and Mueller Creeks and considered minor compared to the physical effects to the stream from the large sediment load that is moving down from the upper watershed. However, USDA Forest Service FPA § 4(e) Term and Condition No. 13 provides for a long-term monitoring program to determine whether headcutting and/or bed profile incision in Mueller and Upper Lake Creeks are occurring and whether headcutting/incision is Project related.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008

containing the PME measures agreed to in principle, including the measure for Packwood Lake Elevation.

In order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require the Packwood Lake elevations described in USDA Forest Service Condition No. 4. Condition No. 4 reflects Energy Northwest proposal in their FLA. Requiring ENW under this condition to implement Packwood Lake elevations is consistent with USDA Forest Service management direction. The USDA Forest Service fully supports Energy Northwest's proposal for maintaining the proposed lake elevations and the annual Project maintenance period.

IV. References Cited

EES Consulting. 2007a. Final Supplement to Fish Distribution and Species Composition (Outmigration and Hydroacoustics) for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

EES Consulting. 2007b. Final Packwood Lake Drawdown Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

EES Consulting. 2007c. Final Amphibian Survey Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Royce, William F. 1965. Effect of changes in lake level on fishing in Packwood Lake. University of Washington, Seattle, WA.

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Condition No. 5 - Lower Lake Creek Instream Flows

I. Existing Situation

Currently the Commission license for the Project requires a minimum instream flow of 3 cfs at the drop structure immediately downstream of the outlet of Packwood Lake (License Article 14, as amended February 17, 1976) throughout the year. The Project alters the instream flow regime by diverting flow out of Lake Creek, bypassing it approximately five miles of the stream and returning the flow via the tailrace from the powerhouse to the Cowlitz River. The license also requires a flow of 15 cfs at the confluence of Lake Creek with the Cowlitz River. Base flow in the bypass reach also includes groundwater accretion and tributary flows. The current minimum flow released into Lake Creek is small and affects the quantity and quality of aquatic habitat in Lake Creek below Packwood Lake. The reduction of instream flows alters habitat conditions by reducing depth and wetted streambed areas, thereby reducing habitat for fish, amphibians, benthic invertebrates and other species.

The constant release of one flow rate into Lake Creek does not reflect the natural variation of base flow. Mean monthly flows measured at the drop structure USGS gage prior to the Project varied from a mean monthly flow of 151.1 cfs in July to 89.0 cfs in November but post-Project only varied slightly with mean monthly flow in July of 16.3 cfs and mean monthly flow in November of 10.1 cfs. This results in flows with less variation among years than the normal range of flows that occurred under pre-Project conditions. Designating one flow for minimum flows during the low flow period decreases the variation in which riparian and aquatic species habitat evolved.

Subsurface aquatic habitats (hyporheic zones) are reduced as a result of decreases in wetted streambed area. These well oxygenated aquifer layers extend out from the margins of the stream, are sites for nutrient cycling, and support species contributing to the food chain. Biological connectivity within the riparian area for riparian dependent species is disrupted by this reduction in hydrological connectivity in this reach.

Energy Northwest proposes to increase instream flows in lower Lake Creek as prescribed in Table E.5.2-32 of the Final License Application and reproduced below in Table 1 (ENW FLA 2008).

Table 1. Proposed instream flows (cfs) for Lake Creek, as measured at the drop structure.

Month	Instream Flow (cfs)
Jan	4
Feb	4
March	4
April	7
May	15
June	10
July	15
August 1-15	15
August 16-September 15	20
September 16-30	15
October	10
November	7
December	4

II. Forest Plan Direction

The Gifford Pinchot National Forest Land and Resource Management Plan Amendment 11 (1995) provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric project in the Lake Creek Sub-watershed. Amendment 11 is a compilation of the current direction as expressed in the standards and guidelines from the Record of Decision for the Northwest Forest Plan and the Gifford Pinchot National Forest Management Plan (1990).

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds (defined as HUC 5th field) and the aquatic ecosystems contained within them. Lake Creek drainage area is one sub-watershed (defined as a HUC 6th field) of the Upper Cowlitz River Watershed. Specifically, objectives 5, 6 and 9 pertain the most to this Existing Information Analysis. These objectives are stated as follows:

Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

The Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that emphasize in-stream flows and habitat conditions that maintain or restore riparian resources and channel integrity.”

The federally managed lands within the Lake Creek Watershed are designated as a Tier 1 Key Watershed. Tier 1 Key Watersheds were selected for directly contributing to anadromous salmonid and bull trout conservation. Key watersheds are highest priority for watershed restoration.

In order to meet Aquatic Conservation Strategy and particularly the ACS Objectives 5, 6, and 9, Forest Service will require actions that strive to re-establish and maintain the connectivity of the river system, including physical and biological processes, so that native aquatic species in the Lake Creek Sub-watershed can utilize all available habitats with sustainable productivity levels. The Forest Service goal is for the protection and mitigation of aquatic species and the connectivity of functional riparian and aquatic habitats to which the native aquatic and riparian community is adapted. Specifically, flows are needed to re-establish and maintain the connectivity of lower Lake Creek including physical and biological processes so that native aquatic species in lower Lake Creek can utilize all available habitats and sustain viable productivity.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

The USDA contends that the proposed flow releases that Energy Northwest proposes in its FLA is a minimal flow release to meet the habitat needs of the aquatic species downstream of the drop structure. The flow levels were attained from modeled habitat information estimating monthly flow rates necessary for providing preferred habitat for each fish species that uses lower Lake Creek. These flow levels are the lowest flows for each month that provide only 50% or greater of “natural flow” weighted useable area (WUA) for primary spawning of present species, only 50% or greater of “natural flow” WUA for steelhead and rainbow trout rearing in April-October, and 100% of incubation flows needed for eggs in gravel. “Natural flow” was estimated from measured USGS flows at the outlet of Packwood Lake (14225500) for 1911-1960 and used median flows as an indication of the amount of flow that would naturally occur. Incubation flows were not less than 2/3 spawning flows. Monthly flow recommendations for January, February and December were increased to provide adequate flow to the first downstream reach below the drop structure (Reach 5) which has minimal inflows and to accommodate for adverse effect of freezing during artificially low flows in the winter months. These flow recommendations assume that a 3 foot wide and 1 foot deep travel corridor will exist from the mouth of lower Lake Creek to above the Highway Bridge.

This flow regime is considered a minimal flow release and associated increases to spawning and rearing habitat as modeled by WUAs indicate only slight increases to rearing habitat for Chinook, Steelhead, Cutthroat and Rainbow Trout from current Project flows to Proposed Flows and about 6-7% increase in spawning habitat for Chinook and 3% increase in spawning habitat for Steelhead, see Table 5.5-1, page 112 (EES Consulting 2007). For example, during April and May, the heaviest use months for Steelhead spawning, Steelhead spawning WUA increased only 3% with the additional release of flows (3 cfs increased to 7 cfs in April and 15 cfs in May).

Steelhead rearing WUA highest increase occurred during the months of August (7%) and September (9%) when flows increased from 3 cfs to 15-20 cfs.

Increasing the minimum base flow release to Lake Creek would increase habitat for fish, amphibians, benthic invertebrates and other species native to Lake Creek and increase subsurface aquatic habitats where nutrient cycling and aquatic species contribute to the food chain. Habitat restoration and enhancements are required to further increase spawning and rearing habitat for anadromous species in the lowest mile of lower Lake Creek.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands and resources. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its FLA with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Lower Lake Creek Instream Flows (ENW E.5.2.3 FLA 2008).

In order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require the instream flows for Lower Lake Creek described in USDA Forest Service Condition No. 5. Condition No. 5 prescribes the same instream flows as Energy Northwest's proposal in their FLA. Requiring ENW under this condition to implement the prescribed instream flows is consistent with USDA Forest Service management direction. The USDA Forest Service fully supports Energy Northwest's proposal for Lower Lake Creek instream flows.

IV. References Cited

EES Consulting. 2007. Final Lake Creek Instream Flow Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

USDA Forest Service 1995. Land and Resource Management Plan Gifford Pinchot National Forest.

Condition No. 6 - Aquatic Habitat Forming Flows

I. Existing Situation

Currently the Commission license for the Project requires a minimum instream flow of 3 cfs at the drop structure immediately downstream of the outlet of Packwood Lake (License Article 14, as amended February 17, 1976). Overtopping of the drop structure has occurred during the past license period. These overtopping events provided additional flows over the 3 cfs instream flow release, some of which were of a large enough magnitude to allow the ecological processes that occur during natural bankfull or peak flow events such as sediment transport and floodplain maintenance.

Peak Flows are altered by operation of the Project. The occurrence of these overtopping events at a flow magnitude similar to a bankfull event or greater was less than what would be experienced without the Project. Bankfull flow can be considered a flow with a recurrence interval of approximately 1.5 years. USGS data does not give statistics for a 1.5 Year peak flow event but does for a 1.2 peak flow event. The 1.2 peak flow at the Lake Creek USGS site 14225500 (located at the drop structure) estimated from 34 non-consecutive pre-Project years between 1912 and 1963 is 285.1 cfs (USGS, 1985). Spill events with the magnitude of 285.1 cfs occurred at least 25 out of the 38 years (66%) during the pre-Project period while only 17 out of 40 years (42%) during the post Project period 1964-2003.

The highest annual mean daily flow near the mouth of Lake Creek from the pre- and post-Project periods comparison indicated that fewer highest annual mean daily flows in the 200-300, 300-400, 400-500 and 500-600 cfs categories occurred during the Post Project (ENW E.5.3.1-52, FLA 2008).

The lack of bankfull events and associated channel forming processes is evident in part as the lack of habitat complexity in the lowest mile of lower Lake Creek. The lowest 1 mile was simplified, as indicated by a high width to depth ratio (widened and shallowed), infrequent shallow pools and absence of side channels. Limited gravels suitable for spawning were present and partially attributable to the infrequent occurrence of bankfull or peak flow events. The current lack of large wood in the channel further limits the persistence and depth of pools in this reach.

The changes that occurred in lower Lake Creek during the November 2006 peak flow of record in Lake Creek are evidence of the benefits high flows can create within channels and floodplains. Following this event, dramatic changes were evident such as fresh channel scour and deposition, movement of wood and gavel, newly formed high flow side channels and scattered woody material 3-5 feet above the low flow water elevations (ENW E.5.3-91, FLA 2008). Previously buried or vegetated gravels were exposed from channel scour and introduced into the active channel.

A power point presentation by EES Consulting and Interfluve, Inc. January 10-11, 2008 provided a comparison of the current and pre-Project rearing habitat (50% exceedance value) for Chinook

and Steelhead in the months of August and September which indicated that the current amount of rearing habitat was 33-65% less than the pre-Project condition.

II. Forest Plan Direction

The Gifford Pinchot National Forest Land and Resource Management Plan Amendment 11 (1995) provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric project in the Lake Creek Sub-watershed. Amendment 11 is a compilation of the current direction as expressed in the standards and guidelines from the Record of Decision for the Northwest Forest Plan and the Gifford Pinchot National Forest Management Plan (1990).

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds (defined as HUC 5th field) and the aquatic ecosystems contained within them. Lake Creek drainage area is one sub-watershed (defined as a HUC 6th field) of the Upper Cowlitz River Watershed. Specifically, objectives 5, 6 and 9 pertain the most to this analysis. These objectives are stated as follows:

- *Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*
- *Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*
- *Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

The Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that emphasize in-stream flows and habitat conditions that maintain or restore riparian resources and channel integrity.”

The federally managed lands within the Lake Creek Watershed are designated as a Tier 1 Key Watershed. Tier 1 Key Watersheds were selected for directly contributing to anadromous salmonid and bull trout conservation. Key watersheds are highest priority for watershed restoration.

In order to meet Aquatic Conservation Strategy objectives 5, 6, and 9, Forest Service will require actions that strive to re-establish and maintain the connectivity of the river system, including physical and biological processes, so that native aquatic species in the Lake Creek Sub-watershed can utilize all available habitats with sustainable productivity levels. The Forest Service would support efforts to mimic as closely as technically feasible, the flow and sediment

regimes, which provide for the maintenance and enhancement of channel structure and habitat for aquatic and riparian dependent species.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

The Packwood Lake Hydroelectric Project alters flow and sediment regimes within the Lake Creek Sub-watershed, which results in changes to the physical structure, form and function of the aquatic and riparian ecosystem and the distribution and abundance of aquatic and riparian species.

Changes in the flow and associated changes in sediment regime and biological processes resulting from the Project has affected the aquatic and riparian habitat, and habitat connectivity of lower Lake Creek.

Specifically one change is the reduced frequency of flows that can move spawning size gravels through Lake Creek. Gravel is an important component of aquatic habitat because it provides spawning substrate for fish and habitat for other aquatic organisms. The primary source of gravel to lower Lake Creek is from tributaries, landslides and erosion in the watershed below Packwood Lake. These gravels are transported during higher flow events. Higher flow events also expose and redistribute stored gravels in the lower gradient reaches with wide floodplains. During the Pre-Application study period, the November 2006 high flow event caused fresh channel scour and deposition, movement of wood and gravel, fresh high flow side channels and deposited organic material on the flood plain. The occurrence of these channel maintenance flows needs to be similar to the pre-Project occurrence frequency to maintain these ecological processes.

During December 2007 and February 2008, Energy Northwest and interested stakeholders, including the USDA Forest Service negotiated protection, mitigation and enhancement measures to mitigate continuing Project impacts to National Forest System lands and resources. Flows that provide the magnitude and frequency to mimic bankfull events were agreed to concept then collaboratively designed to meet all stakeholders' needs.

Energy Northwest in the FLA 2008 proposes to provide an aquatic habitat forming flow. Specifically Energy Northwest will provide a spill event of greater than or equal to 285 cfs for as long as lake inflows can sustain that for, or a maximum of 24 hours. Energy Northwest proposed to take the necessary measures to adjust lake elevation and power generation to ensure that the spill event is achieved and maintained for up to 24 hours. The spill event, as described above, is recommended to be achieved every other year or 3 out of 6 water years.

Aquatic habitat forming flows will meet the flow requirements needed to provide flows with a magnitude and frequency to mimic bankfull flow events and the associated ecological processes. Processes include sediment, wood, and organic material recruitment, mobilization, and deposition. Transporting spawning gravels and maintaining floodplain characteristics such as side channels and refuge areas are necessary for the anadromous fish using the lowest reach of Lake Creek.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands and resources. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures fully described. Energy Northwest filed its FLA with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Aquatic Habitat Forming Flows (ENW E.5.3.1.3 FLA 2008).

In order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require aquatic habitat forming flows for Lower Lake Creek as detailed in USDA Forest Service Condition No. 6. Condition No. 6 reflects Energy Northwest proposal in their FLA.

As summarized above, the USDA Forest Service is statutorily obligated to maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing and restore the sediment regime under which aquatic ecosystems evolved. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected. Requiring ENW under this condition to implement the prescribed aquatic habitat forming flows is consistent with USDA Forest Service management direction.

IV. References Cited

Energy Northwest 2008. Final Application for New License. Packwood Lake Hydroelectric Project FERC No. 2244, Energy Northwest (ENW) Richland, Washington.

USDA Forest Service 1995. Land and Resource Management Plan Gifford Pinchot National Forest.

U.S. Geological Survey 1985. Streamflow and Statistics and Drainage-Basin Characteristics for the Southwestern and Eastern Regions, Washington Volume 1 Southwestern Washington. U.S. Geological Survey Open-File Report 84-145-A.

Condition No. 7 - Lower Lake Creek Stream Restoration and Monitoring

I. Existing Situation

The fundamental aquatic habitat features in Lake Creek below Packwood Lake were surveyed and described by the USDA Forest Service (1993) and subsequent EES Physical Habitat Assessment Survey (EES Consulting 2007a). The results of these surveys are shown in Table 1 and Table 2.

Two reaches are defined by barriers to the fish passages. The lowest barrier to anadromous fish is located at RM 1.03 (EES Consulting 2007b), thus this area is referred to as the “Anadromous Reach”. The uppermost part of Reach 5 (EES Consulting 2007a) is defined by a barrier falls located 1,464 ft below the drop structure. The barrier was surveyed as a vertical falls of 11.80 ft as measured at a baseflow release of 3.5 cfs at the drop structure. This falls exceeds the leaping capability for rainbow trout and other resident fish found in Lake Creek. Immediately downstream of this falls is another barrier that exceeds 4 ft in height.

As implied, anadromous fish access the lowermost one mile. Resident rainbow trout have been observed in Lake Creek between the mouth and the dam (USDA Forest Service 1995 and ENW FLA 2008). Adult and juvenile age classes were observed suggesting there may be a population with natural reproduction (USDA Forest Service 2004).

Table 1. Lake Creek physical stream survey summary results from USFS survey 1993.

Reach No.	River Mile	Channel Type		Bankfull Width (ft)	Pools/Mi. (# pools)	LWD/Mi. (# pieces)	Substrate	Riparian Veg
		Rosgen	Grade (%)					
1	0.0 – 0.7	B	3	10	37.1	0.0	SB/C	ST
2	0.7-1.3	A	10	15.6	40	6.3	SB/LB	ST
3	1.3—2.2	B	8	17.6	28.9	9.2	SB/G	ST
4	2.2 – 3.1	A	8	28.9	41.4	18.1	LB/C	ST
5	3.1 – 4.9	B	5	10.9	31.7	16.5	C/G	ST
6	4.9– 5.4	B	8	23.6	44.0	7.4	C/G	LT

Key:
 Substrate: SB = small boulders, LB= large boulders, G= gravel, C= cobble
 Riparian vegetation: ST= small trees (21- 32 in. dbh), , LT = Large Trees (>32 in. dbh),

Table 2. Habitat Percentages for the Five Reaches Surveyed on Lower Lake Creek (FLA 2008)

Reach (RM)	Pools	Glides	Runs	Riffles	HGR*	Plunge Pools	Falls	Cascades
1 (0-0.7)	0	53	33	8	0	7	0	0
2 (0.7-1.3)	0	9	39	0	0	35	0	0
3 (1.3-3.5)	1	27	37	0	15	5	0.5	13
4 (3.5-4.9)	6	34	39	1	13	2	0	5
5 (4.9-5.3)	29	31	32	0	0	0	0	8

*HGR- High Gradient Riffle.

Pool habitat is underrepresented in the lower reaches of Lake Creek. Stream survey conducted by EES Consulting 2004 inventoried no pools in the anadromous reach of Lake Creek (RM 0.0-1.9). Regional standards displayed in Table 3 indicate that Lake Creek pool frequency is well below the properly functioning condition of the aquatic ecosystem (USDA Forest Service 1994a). Project operations have altered Lake Creek function so it is typically depleted of three major components necessary to promote channel scour including: gravel accumulation, high energy flow and flow deflectors (i.e. large wood and boulders). Lacking wood, gravel and sustained flow contribute to a simplified channel form typically consisting of runs and glides which dominate Lake Creek. Large pools provide hiding and holding habitat for both adult and juvenile salmonids and are an important habitat feature for maintaining healthy fish populations.

Table 3. Pool frequency (pools / mile) based on channel width in a properly functioning stream. From PACFISH (1994)

Wetted Width	10	20	25	50
Pools / mi	96	56	47	26

Lower Lake Creek Large Wood

Large wood was inventoried in Lake Creek between the Cowlitz River and the drop structure in 2005. Wood was counted in three different size classes (small, medium, large) and classified based on whether it had at least one end in the wetted channel (“wetted channel”), in the bankfull channel (“bankfull channel”) or had the potential to fall into the channel (either spanning or leaning over the channel – “potential wood”). In addition, the decay class (alive, fresh, old, very old) and source of each piece (mortality/windthrow, mass wasting, bank erosion, fluvial transport, or unknown) was recorded to provide information on where wood in the stream is coming from. Log jams were noted; many log jams had only one or two pieces of wood that was large enough to be counted, with many other smaller pieces of wood associated with the jam.

In the 2005 inventory of the entire length of lower Lake Creek, a total of 212 pieces of wood were inventoried in the wetted channel, 247 within the bankfull channel, and 208 potential pieces of wood (Table 4).

Table 4. Pieces of Wood in Lower Lake Creek, 2005 (RM 0 – drop structure)

Reach	Wetted Channel			Bankfull Channel			Potential Wood		
	Large	Medium	Small	Large	Medium	Small	Large	Medium	Small
1	1	0	6	0	0	3	0	0	5
2	2	2	1	2	3	8	1	0	3
3	18	32	50	12	26	83	21	31	18
4	23	21	30	14	28	54	28	28	40
5	7	2	17	2	5	7	8	10	15

In 2007, following the large flood in November 2006, wood in the wetted and bankfull channel was re-inventoried between the mouth (RM 0) and the RM 2 falls (Table 5). There was a net increase in wood pieces in the inventoried reach as a result of recruitment from near the stream and transport of wood from Reach 3.

Table 5 – Pieces of Wood in Lower Lake Creek, 2007 (RM 0-2)

Reach	Wetted Channel			Bankfull Channel		
	Large	Medium	Small	Large	Medium	Small
1	0	1	4	1	0	12
2	3	2	6	0	2	9
3 (partial)	3	5	24	8	20	21

The majority of the wood in lower Lake Creek is located upstream of River Mile (RM) 2.1. Log jams were prevalent in these same areas, with several major jams around RM 3 and near the upper end of Reach 4. The major jams were generally associated with large streambank slides that brought in many pieces of wood and locally affected stream geomorphology. The 2007 inventory included RM 0-2. There were more log jams as well as more individual pieces of wood in the lower 2 miles of stream during the 2007 inventory.

Pieces of wood per mile were calculated in each size class (small, medium, large) in each stream reach based on the complete 2005 inventory. Reaches 1 and 2 had less than 10 pieces of wood per mile in the wetted channel or in the potential category, and most of the wood was in the small category. Reach 3 had 40-50 pieces of wood per mile in the wetted and bankfull channel. Reaches 4 and 5 had the most wood per mile in the wetted channel (60-70 pieces) and potential pieces of wood (nearly 80-90 pieces per mile). Reach 4 had almost 80 pieces per mile in the bankfull channel and Reach 5 had about 35 pieces per mile in the bankfull channel. Many of the potential pieces of wood in Reaches 3, 4, and 5 spanned the channel due to the fact that the channel is fairly confined through much of these reaches.

The decay class of wood provides information about how frequently wood is supplied to the stream. Approximately 70% of the wood of all sizes was very old; 15% was old, and 15% was fresh. This suggests that there is a fairly constant supply of wood into the stream; logs are transported out of the stream infrequently. During the 2007 inventory, there was approximately

the same percentage of very old wood, but a slightly higher percentage (20%) of fresh wood, reflecting the influx of wood from the channel margins during the flood.

In Packwood Lake, pieces of floating wood that reached the log boom were measured and tagged starting on September 8, 2005. During 2005 and 2006, wood was checked during visits to the intake structure, usually weekly or bi-weekly between late spring and fall and less often during the winter when access is more restricted. Wood was only checked twice between late November 2006 and July 2007. A total of 18 pieces of wood were tagged at the log boom over the two year study period. One piece of wood was tagged in September 2005, two pieces in early February 2006, eight pieces in late May 2006, two pieces in May 2007 and five pieces in July 2007.

Wood movement in the lake is primarily dependent upon lake levels and wind direction. When lake levels are high, wood that is grounded along the shoreline can float and be moved around the lake. Water currents have only a minor effect on wood movement in the main part of the lake. Currents from flow out of the lake likely exert some influence on floating logs near the outlet. In order for wood to accumulate at the log boom at the outlet of the lake, the wind needs to be blowing down the lake (from the southeast). Based on data collected for the Packwood Lake Drawdown Study, dominant wind direction is up the lake (from the North, Northeast and Northwest) which would tend to blow floating wood away from the lake outlet (EES Consulting 2007c). The wind blows toward the outlet only 15% of the time. Observations in the lake support this data; there appear to be more wood accumulations along the southern and western shorelines than along the northern and eastern shores.

Based on the above data, the majority of wood in Lower Lake Creek comes from mortality/windthrow from trees near the channel. In many areas of Lower Lake Creek, the narrow confined valley and small stream size causes most of the wood that falls into the creek to either span the channel or to fall with one end in the channel and the other end on the hillside. Wood movement in Lower Lake Creek is determined by the magnitude of flows. The November 2006 flows of approximately 1,000 cfs at the drop structure moved wood in Reaches 1, 2, and 3, including seven small-sized pieces of wood and 2 medium-sized pieces of wood. No movement of tagged wood occurred at Study Site 4, and only two of the small logs at Study Site 5 had broken and twisted downstream (Watershed Geodynamics and EES Consulting 2007a).

Lower Lake Creek Substrate

Lake Creek downstream from Packwood Lake is a cobble/boulder bedded stream with a dominantly step-pool structure and has relatively little gravel, a condition that is the result of the natural low sediment input rates from the confined bedrock valley, and high stream gradient. Channel characteristics and features that favor retention of gravel in the areas of Lower Lake Creek that contain spawning-sized gravel include:

- Relatively low gradient in the habitat unit (less than 2%)
- Large-scale roughness elements such as large boulders, large woody debris, or log jams to provide hydraulic conditions that retain gravel (lower velocity zones)
- Low gradient unconfined reaches downstream of higher gradient confined reaches.

Most of the areas in the lower 0.8 miles of Lower Lake Creek are low gradient, but do not contain the large-scale roughness elements to help retain gravel.

A 2005 inventory of spawning-sized gravel between the drop structure and the confluence with the Cowlitz River found a total of 42,660 sq ft of gravel, with the highest concentrations in Reaches 2, 3, and 4 between RM 0.8-RM 4.9. Survey reaches 1 and 5 showed substantially less gravel substrate on a per mile basis. These results are shown in Table 6.

Reach	River Mile	Average Gradient	Gravel in wetted channel		Gravel in bankfull channel*	
			Area (sq ft)	Sq ft/mile	Area (sq ft)	Sq ft/mile
1	0-0.7	2.9%	2,775	4,070	2,700	3,960
2	0.7-1.3	7.3%	6,175	11,644	2,375	4,479
3	1.3-3.5	8.0%	22,025	8,946	7,550	3,066
4	3.5-4.9	4.3%	11,635	9,599	7,925	6,538
5	4.9-5.3	8.4%	50	132	0	0
Total	0-5.3	6.3%	42,660	8,102	20,550	3,903

*Not including wetted channel

Based on visual observations during the 2005 inventory, the majority of gravel in Lower Lake Creek was stored along the margins of the channel, behind large scale roughness elements such as boulders or logs, or upstream of log jams.

Anadromous Fish Reach River Mile RM 0.0 – 1.03

Suitable anadromous fish habitat is confirmed in Lower Lake Creek in 1993. Distribution of anadromous fish extends from the mouth to river mile 1.95 where the first natural permanent fish migration barrier (25 ft fall) is assessed to preclude passage to all anadromous species (USDA Forest Service, 1995). Lucas (WDFW 1992) also identified RM 1.95 as the probable end of anadromous fish distribution and cited three independent surveys to support his conclusions including WDFW foot survey (1992), Bryant (1949) and Kray – WDFW (1957). Barriers lower in the reach block passage to Coho salmon.

Results of the Lower Lake Creek anadromous barrier surveys (at RM 1.03 and 1.95) (EES Consulting 2007b) determined the barrier at RM 1.03 is a chute/falls complex, and would be classified as a chute. The barrier at RM 1.95 consists of falls of approximately 25 ft in height coupled with a high gradient chute. The results are dependent upon the condition of the fish that could enter Lake Creek prior to spawning. Pat Powers (personal communication with John Blum, September 20, 2006), indicates that under most circumstances, a condition factor (Cf) of 1.00 is used to analyze barriers; this indicates fish in excellent condition that are bright: fresh out of salt water or still a long distance from spawning grounds; spawning colors not yet developed. However, in certain situations, such as when fish are trapped and then trucked upstream to

spawn, the use of a condition factor of 0.5 (Poor: in the river for a long time; full spawning colors developed and fully mature; very close to spawning grounds) may be applicable.

If Cf 1.00 is used, the chute at RM 1.03 could be negotiated at certain flows by steelhead; if a Cf 0.50 is used, this chute is a barrier to all anadromous species that are being trucked above the Cowlitz projects. The falls/chute complex at RM 1.95 is a barrier to all anadromous species being trapped and hauled up the Cowlitz River, regardless of condition factor.

Anadromous species documented as present in Lake Creek include, Chinook salmon, Coho salmon, and steelhead trout. The National Marine Fisheries (NMFS) has listed these fish as threatened based on their Evolutionary Significant Units (ESUs) including: Lower Columbia River steelhead trout (*Onchorhynchus mykiss*), Lower Columbia River Chinook salmon (*O. tshawytscha*) and Lower Columbia River/Southwest Washington Coho salmon (*O. kisutch*) as threatened under the Endangered Species Act. Steelhead trout, Chinook and Coho salmon are transported (trucked) around the three dams on the Cowlitz River making the upper Cowlitz River and its tributaries accessible to these species.

Habitat conditions in Lower Lake Creek vary from poor to fair in the anadromous reach. Factors contributing to the low rating include: habitat types primarily comprised of runs, cascades, glides and plunge pools; lack of large-scale roughness elements; and deficient spawning substrate.

With the help of historic inventory and survey data, as well as current research, anadromous fish habitat conditions have been defined by PACFISH (USDA Forest Service 1994a) and the Policy Implantation Guide (USDA Forest Service 1994b). Riparian conditions were evaluated by comparing quantitative habitat surveys, completed between 1989 and 1992, with surveys done by the Bureau of Fisheries, now NOAA Fisheries, between 1934 and 1941 on 116 watersheds in Alaska, Idaho, Oregon and Washington. Habitat condition rating has been defined using physical features as surrogates for the processes that form salmonid habitat. One key feature (pool frequency) and four supporting features (water temperature, amount of large woody debris interacting with stream channels, streambank stability and bank angle, and width to depth ratio of stream channels) are used to describe habitat quality.

Habitat - Pool habitat is lacking in the anadromous reach of Lower Lake Creek. EES Consulting 2007 found no pools in Reach 1 and only 9.5% pool habitat in reach 2. Pools provide habitat for spawning fish to hold in before and during spawning. Reach 1 were comprised of 40% runs, 24% cascades, 16% glides and 12% plunge pools. Reach 2 were comprised of 28.6% runs, 23.8% cascades, 9.5% glides, 19% plunge pools and 9.5% pools.

Large-Scale Roughness - In 2005, 10 pieces of wood were found in Reach 1 in the wetted and bankfull channel. Of this, only 1 is large and 9 were small pieces. 18 pieces of wood were found in the wetted and bankfull channel of Reach 2; were 4 are large, 5 are medium and 9 are small. Boulder and cobble were the primary substrate types identified throughout both reaches. EES Consulting (2007d) observed gravel as the subdominant substrate type at only 5 of the 37 sites characterized in the lowest mile of Lake Creek.

There are few local sources of future large wood in Reach 1. These reaches are less confined than upstream reaches, and appear to have been affected by past harvest of mature trees from the riparian zone in at least some locations. It is likely that mature conifer stands will not be available to provide local sources of instream wood in these reaches over the term of the new license. The Project has no control over, and continued operation of the Project has no effect on, the past or future harvest of riparian areas along Lake Creek.

Spawning Habitat –There is relatively little large wood in the lower 0.8 miles of lower Lake Creek that would provide gravel retention areas. As a result, the anadromous reach of lower Lake Creek contains very little adequate spawning gravel. The lack of large wood is likely the result of past forest practices and human disturbance that are not Project related. The low amount of spawning-sized gravel in the anadromous zone of lower Lake Creek is likely the combined result of a lack of structure to hold gravel (not Project related), few sediment sources downstream of the drop structure (not Project related), and reduced transport from upstream sources (the prehistoric landslide area inundated by the Project) below the drop structure (Project related). All gravel associated with spawning habitat is currently being utilized in the anadromous reach of lower Lake Creek.

The Upper Reach of Lower Lake Creek, extending from the drop structure to about 1,464 ft downstream

The Packwood Lake dam is positioned at the downstream end of the prehistoric earthen landslide which formed the original lake. The dam or drop structure blocks movement of large woody material but allows passage small woody material, fine sediments, and resident fish from the lake when the inflows exceed the top of the dam. Packwood Lake is large and deep enough (452 acres and over 100 ft deep) that it traps all sand, gravel and larger material that are transported into it from upstream sources (ENW E. 5.3-90, FLA 2008).

Lower Lake Creek has a small resident population of fish downstream of Packwood Lake. The 5.4 miles of lower Lake Creek is segmented into a number of isolated reaches by small barrier falls. Eighty one percent (n=319), of the rainbow trout documented on lower Lake Creek were observed in reaches 3 and 4 (RM 1.3-4.9). The lack of rainbow trout in the lower two reaches may be explained by their ability to access the Cowlitz River. Resident rainbow trout that rear or are displaced below the barrier at RM 1.03 likely continue an out migration to the Cowlitz River where forage and quality habitat is at a much higher level.

The lack of quality spawning habitat in the upper reach of lower Lake Creek near the drop structure may cue rainbow trout to migrate downstream over a barrier in search of higher quality habitat downstream and become displaced from the upper reach. While habitat quality in Reaches 3 and 4 is not at an extremely high level, enough habitat, forage, and area exists in the middle section of lower Lake Creek to accommodate a healthy population of rainbow trout.

The location of a fish passage barrier was determined to be at approximately 1464 ft (446 m) downstream of the drop structure. The upper 328 ft (100 m) of the isolated reach produced 35 of the 59 fish captures in this reach. The high percentage of fish appears to be a result of a significant habitat break, which occurs approximately 350 ft (107 m) downstream from the drop

structure. Gradient increases at this break from between approximately 1.5% to over 6%. Habitat types transition from primarily deep, slow moving runs, glides and pools to mainly cascades and plunge pools. Substrates become coarse and the overall available quality habitat for rainbow trout is significantly diminished.

Gravel for rainbow trout spawning is scarce in the reach below the drop structure. Surveys indicated that only 6% of the entire reach as having spawning gravels with 5% the gravels being located in the area immediately below the drop structure. This condition likely existed before the Project and would be expected as a result of Packwood Lake absorbing the gravel deposited from the tributaries upstream. However, as the drop structure reduces the magnitude of peak flows between 200 and 600 cfs, it may be assumed that scouring of the stream banks immediately below the drop structure that once provided local recruitment of limited spawning gravels is also reduced.

The large wood study report (Watershed Geodynamics and EES Consulting 2007a) indicated that Reach 5 contained 7 pieces of large, 2 pieces of medium and 17 pieces of small wood within the wetted channel. The report also showed that within the bankfull channel there were an additional 2 large, 5 medium and 7 small pieces of wood. The wood is distributed as single logs and in log jams.

No spawning activity was documented during surveys in May and June, 2007. The upper half of Reach 5 below the dam has the channel structure to provide spawning habitat for resident fish, but is lacking spawning gravels. Lack of suitable spawning habitat in this reach has likely resulted in fish seeking more suitable habitat downstream for these purposes, since access to Packwood Lake and its tributaries is precluded by the drop structure.

During the 2006 and 2007 fisheries studies on lower Lake Creek, many rainbow (up to 20 at one time) approximately 200 to 300 mm in size, were observed in the basin immediately below the drop structure orienting themselves directly into the current from the outflow pipe. It is likely that these large fish observed immediately below the drop structure moved downstream as a result of overtopping events in May and June, 2006 and the large flood in November, 2006. These rainbow trout were observed directly in front of the outflow pipe, likely attempting to return to Packwood Lake (FLA E.5.3-71 ENW 2008).

Fish populations above the existing Packwood Lake dam are believed to have evolved in the Upper Lake Creek basin and have maintained a self sustaining population (USDA Forest Service 2004). Licensing study results conclude that there is a healthy rainbow trout population in Packwood Lake and that the occasional relocation of a small number of fish from the lake to lower Lake Creek has no negative effect on Packwood Lake trout populations and may benefit lower Lake Creek by supplementing existing populations.

Packwood rainbow trout are genetically unique. Genetic comparisons indicate that Packwood rainbow are more similar to inland rainbow stocks or redband trout (Benhke 1992) than they were to coastal rainbow stocks (Lucas and Chilcote, 1982). Furthermore, electrophoretic data from hatchery stock supports that lacustrine populations of Packwood Lake trout have not integrated with hatchery stocks introduced between 1954-1965. Given the channel connectivity limitations

created by the dam, there is a considerable constraint to genetic flow between lower Lake Creek and Packwood Lake.

II. Forest Plan Direction

Management direction for aquatic resources is contained in a variety of laws, policy and management plans. Following is a summary of specific rules and regulation providing direction to the Packwood Lake relicensing.

The Gifford Pinchot National Forest Land and Resource Management Plan (1990), as amended by the Northwest Forest Plan in 1994, provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric system. This plan was developed and enacted consistent with the requirements of the Forest and Rangeland Renewable Planning Act, as amended by the National Forest Management Act.

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds and the aquatic ecosystems contained within them.

ACS objectives that apply most to this issue are:

- Objective 1 – Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
- Objective 2 – Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
- *Objective 3 – Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*
- *Objective 4 – Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*
- *Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*
- *Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*
- *Objective 7 – Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

- *Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.*
- *Additionally, Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that require flows and habitat conditions that maintain or restore riparian resources and channel integrity.”*

Forest Service Manual (FSM) 2670.12 directs the Forest Service to:

- Manage habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species,
- Conduct activities and programs to assist in the identification and recovery of threatened and endangered plant and animal species, and
- Avoid actions that may cause a species to become threatened or endangered.

Forest Service Manual (FSM) 2670.22 directs the Forest Service to:

Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands. A viable population is further defined by FSM 2670.5 as one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area.

Section 4(e) of the FPA provides the USDA Forest Service, as administrators of reserved lands affected within the project area, authority to attach mandatory terms and conditions to Project licenses. This section of the FPA states, “that licenses shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.” Section 4(e) also states that “§the Commission (FERC), in addition to the equal power and development purposes for which licenses are issued, shall give equal consideration to the purposes of enhancement of, fish and wildlife (including related spawning gro

Service terms and conditions are based upon management direction contained in amended Forest Plans. If the project being relicensed is not located on NFS land but affects resources managed by the agency (i.e. migratory fish that historically used NFSL), Section 10(a) provides authority by which the Forest Service can make recommendations regarding management of those resources to FERC.

Under the Recreational Fisheries Executive Order (Executive Order 12962 of June 7, 1995, Federal Register Notice 60(111): 30769-30770), the President of the United States directs federal agencies to cooperate with state and tribal governments to improve aquatic resources for increased recreational fishing opportunities by:

- Identifying recreational fishing opportunities limited by degraded habitat and water quality,
- Restoring habitat and water quality,
- Providing access and promote awareness of recreational fishing opportunities,
- Stimulating angler participation in conservation and restoration,

- Using cost-share programs and implementing laws to conserve, restore, and enhance aquatic systems to support recreational fisheries,
- Evaluate effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order, and
- Assisting private landowners to conserve and enhance aquatic resources.

Master Memorandum of Understanding Washington Department of Fish and Wildlife and USDA Forest Service Region Six

Signatory parties agreed under this MOU to consult on fish and wildlife actions that occur or may affect USDA Forest Service Region Six Forests. Listed below are four key elements of this MOU.

- Section A #2. The Forest Service agrees to recognize WDFW as being responsible for the protection, perpetuation, and management of all game fish and wildlife in the State of Washington.
- Section B #2. WDFW agrees to solicit Forest Service participation in establishing the desired level of fish and wildlife populations on the
- Section B #4. WDFW agrees to consider Forest Service's goals and objectives in the development of Fish and Wildlife plans.
- Section B #6. WDFW agrees to cooperate with the Forest Service in preparation and conduct of research plans of mutual interest.

The Gifford Pinchot National Forest has memoranda of understanding with the Cowlitz Tribe and the Yakima Indian Nation. These agreements provide that the Forest Service shall consult and cooperate with the tribes in the management and protection of natural and cultural resources on the National Forest.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Packwood Lake dam has blocked upstream and limited downstream passage of resident rainbow trout, blocked downstream movement of large and medium woody material, and has reduced the magnitude and duration of peak flow events between Lower Lake Creek and Packwood Lake. These impacts will continue to effect the change in physical structure and function of the aquatic and riparian ecosystem, specifically by diminishing the prospective quality and quantity of spawning substrate, and hiding habitat associated with woody material in Lake Creek (USDA Forest Service 1993, Bjornn and Reiser 1991). The changes in habitat will result in changes the distribution and abundance of aquatic and riparian species.

USDA Forest Service Condition No. 7 requires the Licensee to conduct a program directed at restoring the physical and biological integrity of the anadromous stream reach (RM 0.0 - 1.03, and in the upper 1464 feet of Reach 5 (RM 4.9 to 5.3) immediately below the dam.

Anadromous Reach

The restoration program will increase spawning and rearing habitat in the reach by increasing the amount of wood, boulders and gravel. Specifically, pool habitat in the anadromous reach will be

increased to represent 30% of available habitat. Rearing habitat will be improved by approximately 15,300 ft²; and spawning habitat will be increased by approximately 1700 ft² to a total of 7000 ft². Woody material will be increased to 90 to 130 pieces per mile. The restoration of this reach will be phased in after Plan development and will be integrated with channel forming flows specified in USDA Forest Service Condition No. 6. Boulders will be added in the lowest 0.3 mile to help develop step pool units. Addition of woody material and boulders between RM 0.3 and 1.0 will create additional aquatic habitat complexity.

The Upper Reach of Lower Lake Creek, extending from the drop structure to about 1,464 ft downstream

The restoration program will increase spawning habitat in the reach by increasing the amount of available spawning gravels and small woody material. Appropriately sized gravels will be placed in the bankfull channel near the base of the dam in the first year of the new license and additional amounts added annually or periodically as determined in the Lower Lake Creek Stream Restoration, Enhancement and Monitoring Plan. Small wood from the Project intake and wind-throw along USDA Forest Service Trail 74 in excess of six feet in length and 4 inches in diameter will be placed in the reach for the term of the new License.

The improvements to both reaches will mitigate for the ongoing reduction in habitat resulting from continued water diversion, continued interruption of habitat connectivity between Packwood Lake and Lake Creek, and the continued reduction in the magnitude and duration of peak flow events in the system.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands and resources. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Lower Lake Creek Restoration, Enhancement and Monitoring (ENW E.5.3.1.3.4 and E.5.3.1.3.5 FLA 2008).

In order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require the restoration elements described in USDA Forest Service Condition No.7 for Lower Lake Creek. These restoration elements reflect Energy Northwest proposal in their FLA. Requiring ENW under this condition to implement the prescribed restoration of lower Lake Creek is consistent with USDA Forest Service management direction. The USDA Forest Service fully supports Energy Northwest's proposal for Lower Lake Creek Fish Habitat Restoration.

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Condition No. 8 - Rainbow Trout Surveys and Supplementation in the Upper reach of Lower Lake Creek extending 1,464 ft below the Drop Structure

I. Existing Situation

Packwood Lake is bound by mountain ridges with elevations ranging to 5,300 ft. The natural water elevation of Packwood Lake lies near 2,857 ft, approximately 1,800 ft above the Project powerhouse. The upper segments of Lake Creek provide most of the flow into Packwood Lake originating glacial snowmelt in the Goat Rocks Wilderness Area. A dam impounds water in the existing lake with a surface area of 452 acres.

Fish populations above the existing Packwood Lake dam are believed to have evolved in the Upper Lake Creek basin and have maintained a self sustaining population whose life cycle depends on the river tributaries for spawning and rearing habitat (USDA 2005). Packwood rainbow trout are genetically unique. Genetic comparisons indicate that Packwood rainbow are more similar to inland rainbow stocks or redband trout (Benhke 1992) than they were to coastal rainbow stocks (Lucas and Chilcote, 1982). Furthermore, electrophoretic data from hatchery stock supports that lacustrine populations of Packwood Lake trout have not integrated with hatchery stocks introduced between 1954-1965.

EES Consulting 2007 using hydroacoustic sampling techniques extrapolated transect data to encompass the entire Packwood Lake area, found a total of 21,127 rainbow trout to inhabit lake in May, 2007. The August 2007 hydroacoustic sampling occurred after the adult rainbow spawners had returned to the lake and juvenile outmigration had begun, and estimated 31,278 rainbow trout to be in the lake. Average rainbow trout size increased a small amount from the May to the August survey period. The largest number of rainbow observed during the May survey fell within the 10.1 cm to 18.2 cm range. The largest number of fish during the August survey was between 18.3 and 33.3 cm.

The 5.4 miles of lower Lake Creek is segmented into a number of isolated reaches by small barrier falls. Eighty one percent of the rainbow trout documented on lower Lake Creek were observed in reaches 3 and 4 (RM 1.3-4.9) (EES Consulting 2007). The lack of rainbow trout in the lower two reaches may be explained by their ability to access the Cowlitz River. Resident rainbow trout that rear or are displaced below the partial barrier at RM 1.03 likely continue an out migration to the Cowlitz River where forage and quality habitat may be at a much higher level. The lack of quality spawning habitat in the upper 0.5 miles of lower Lake Creek near the drop structure may cue rainbow trout to migrate downstream over a barrier falls in search of higher quality habitat downstream and become displaced from the upper reach. While habitat quality in Reaches 3 and 4 is not at an extremely high level, enough habitat, forage, and area exists in the middle section of lower Lake Creek to accommodate a healthy population of rainbow trout which may be dependent upon the contribution of Packwood Lake fish (USDA 1993).

The dam or drop structure is located on the downstream end of the prehistoric earthen landslide which formed the original lake. The dam on Packwood Lake precludes downstream fish passage

except during extreme overtopping events and does not allow any upstream passage. The dam has limited the genetic transfer between lake and lower Lake Creek fish populations.

The population of resident rainbow in the upper reach of lower Lake Creek immediately below the drop structure appears to be quite small. Sixty four rainbow trout were captured during electro-shocking efforts in the reach below the drop structure. Ninety five percent of the rainbow trout were 160 mm or smaller. Approximately, 70% of the trout were captured above the habitat break 340 ft below the drop structure. Stream gradients ranged from 1.37% immediately below the drop structure to 6.23%, the habitat break 340 ft downstream then to 3.63% just above the barrier falls.

Another 47 rainbow were collected in gill netting efforts immediately below the drop structure. A large portion of the fish collected during netting immediately below the drop structure were much larger in size than the fish collected further downstream in the reach and were observed to be oriented directly into the fish flow. Ninety eight percent of the fish collected at the drop structure were over 200 mm. It is hypothesized that many of these fish may be residents of Packwood Lake that were directed over the drop structure during overtopping events.

There is a distinct age difference between fish captured in the lower 1,464 ft of lower Lake Creek and those immediately below the drop structure and at the intake. All of the rainbow trout captured during electro-shocking efforts in lower Lake Creek were 1 or 2 year old fish. Eighty five percent of the fish collected immediately below the drop structure and at the Packwood intake were 3 or 4 year old fish. These age classifications indicate the likelihood that a majority of the fish collected immediately below the drop structure were actually Packwood Lake resident rainbow trout that had been relocated as a result of high flows.

II. Forest Plan Direction

Management direction for aquatic resources is contained in a variety of laws, policy and management plans. Following is a summary of specific rules and regulation providing direction to the Packwood Lake relicensing.

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Section 4(e) of the FPA provides the USDA Forest Service, as administrators of reserved lands affected within the project area, authority to attach mandatory terms and conditions to Project licenses. This section of the FPA states, “that licenses shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.” Section

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Master Memorandum of Understanding Washington Department of Fish and Wildlife and USDA Forest Service Region Six

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- Section A #2. The Forest Service agrees to recognize WDFW as being responsible for the protection, perpetuation, and management of all game fish and wildlife in the State of Washington.
- Section B #2. WDFW agrees to solicit Forest Service participation in establishing the desired level of fish and
- Section B #4. WDFW agrees to consider Forest Service’s goals and objectives in the development of Fish and Wildlife plans.
- Section B #6. WDFW agrees to cooperate with the Forest Service in preparation and conduct of research plans of mutual interest.

The Gifford Pinchot National Forest has memoranda of understanding with the Cowlitz Tribe and the Yakima Indian Nation. These agreements provide that the Forest Service shall consult and cooperate with the tribes in the management and protection of natural and cultural resources on the National Forest.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

There is no installed fish passage system for up or downstream migrants at the dam on Packwood Lake. The structure is a complete migration barrier for all upstream migrants and is a barrier to downstream migrants at all but the highest overtopping flows where fish may be directed over the dam.

A Licensee study provides data that confirm low fish densities immediately below the dam. Further, the study indicates that following an overtopping flow event, fish density increases immediately below the dam. These fish are found to be of an older age and larger size class, suggesting that they were directed over the dam during the spill event.

The USDA Forest Service is concerned with the sustainability and genetic integrity of the resident fish population in lower Lake Creek below Packwood Lake dam. As the dam only provides partial downstream passage, there is a lack of free interchange between the lake and creek populations. The USDA Forest Service is mandated to maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands, and maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands and resources. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Rainbow Trout Surveys and Supplementation in the Upper reach of Lower Lake Creek extending 1,464 ft below the Drop Structure (ENW E.5.3.1.3.3 FLA 2008).

In order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require the monitoring elements and fish supplementation as described in USDA Forest Service Condition No.8 for Lower Lake Creek. The USDA Forest Service condition reflects Energy Northwest proposal in their FLA. Requiring ENW under this condition to implement the monitoring and supplementation is consistent with USDA Forest Service management direction. The USDA Forest Service fully supports Energy Northwest's proposal for Rainbow Trout Surveys and Supplementation in the Upper reach of Lower Lake Creek extending 1,464 ft below the Drop Structure.

IV. References Cited

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society Monograph 6. Bethesda, Maryland.

EES Consulting 2007. Final Fish Population Characterization Near the Drop Structure Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Lucas, R.E., Chilcote, M.W. 1982. Life history and possible genetic origins of rainbow trout from Packwood Lake, Washington. Washington Department of Fish and Wildlife. Vancouver, WA.

USDA, Forest Service. 1993. R-6 Stream survey level II. Lake Creek. Gifford Pinchot National Forest. Randle/Packwood Ranger Districts.

USDA Forest Service 2005. Unpublished data. Packwood Lake spawning surveys. Gifford Pinchot National Forest. Randle/Packwood Ranger Districts.

Condition No. 9 - Entrainment in Project Intake

I. Existing Situation

The dam on Packwood Lake is a complete fish migration barrier to upstream passage and is expected to preclude downstream passage during all but extreme overtopping flow conditions, based on anecdotal information of multiple fish age class (EES Consulting 2007a).

All of the controlled water release from Packwood Lake passes through travelling fish screens in the intake building including water entering the pipeline and penstock (e.g. water used for energy production), and the bypass flows (water contributed to lower Lake Creek). The volume of water passing through the screen is estimated through a back calculation derived from forebay water surface elevation. The estimated volume of water ranges from 44 cfs to 190 cfs depending upon energy production level.

The entrainment study results (ENW Consulting 2007b) identified exceedence of Washington State standards for maximum approach velocities at the screen intake surface. Study results documented impingement, entrainment and entrapment at the Packwood Lake Project intake facility (ENW Consulting 2008b). The study cited improper debris screen alignment, poor water quality and high Project flows that combined with the previous two factors as contributing to higher fish entrainment.

II. Forest Plan Direction

Management direction for aquatic resources is contained in a variety of laws, policy and management plans. Following is a summary of specific rules and regulation providing direction to the Packwood Lake relicensing.

The Gifford Pinchot National Forest Land and Resource Management Plan (1990), as amended by the Northwest Forest Plan in 1994, provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric system. This plan was developed and enacted consistent with the requirements of the Forest and Rangeland Renewable Planning Act, as amended by the National Forest Management Act.

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds and the aquatic ecosystems contained within them.

ACS objectives that apply most to this issue are:

- Objective 1 – Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
- Objective 2 – Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network

connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

- *Objective 3 – Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*
- *Objective 4 – Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*
- *Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*
- *Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*
- *Objective 7 – Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*
- *Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.*
- *Additionally, Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that require flows and habitat conditions that maintain or restore riparian resources and channel integrity.”*

Forest Service Manual (FSM) 2670.12 directs the Forest Service to:

- Manage habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species,
- Conduct activities and programs to assist in the identification and recovery of threatened and endangered plant and animal species, and
- Avoid actions that may cause a species to become threatened or endangered.

Forest Service Manual (FSM) 2670.22 directs the Forest Service to:

Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands. A viable population is further defined by FSM 2670.5 as one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area.

Section 4(e) of the FPA provides the USDA Forest Service, as administrators of reserved lands affected within the project area, authority to attach mandatory terms and conditions to Project licenses. This section of the FPA states, “that licenses shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.” Section

purposes for which licenses are issued, shall give equal consideration to the purposes of

Service terms and conditions are based upon management direction contained in amended Forest Plans. If the project being relicensed is not located on Forest Service land but affects resources managed by the agency (i.e. migratory fish that historically used NFSL), Section 10(a) provides authority by which the Forest Service can make recommendations regarding management of those resources to FERC.

Under the Recreational Fisheries Executive Order (Executive Order 12962 of June 7, 1995, Federal Register Notice 60(111): 30769-30770), the President of the United States directs federal agencies to cooperate with state and tribal governments to improve aquatic resources for increased recreational fishing opportunities by:

- Identifying recreational fishing opportunities limited by degraded habitat and water quality,
- Restoring habitat and water quality,
- Providing access and promote awareness of recreational fishing opportunities,
- Stimulating angler participation in conservation and restoration,
- Using cost-share programs and implementing laws to conserve, restore, and enhance aquatic systems to support recreational fisheries,
- Evaluate effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order, and
- Assisting private landowners to conserve and enhance aquatic resources.

Master Memorandum of Understanding Washington Department of Fish and Wildlife and USDA Forest Service Region Six

Signatory parties agreed under this MOU to consult on fish and wildlife actions that occur or may affect USDA Forest Service Region Six Forests. Listed below are four key elements of this MOU.

- Section A #2. The Forest Service agrees to recognize WDFW as being responsible for the protection, perpetuation, and management of all game fish and wildlife in the State of Washington.
- Section B #2. WDFW agrees to solicit Forest Service participation in establishing the
- Section B #4. WDFW agrees to consider Forest Service's goals and objectives in the development of Fish and Wildlife plans.
- Section B #6. WDFW agrees to cooperate with the Forest Service in preparation and conduct of research plans of mutual interest.

The Gifford Pinchot National Forest has memoranda of understanding with the Cowlitz Tribe and the Yakima Indian Nation. These agreements provide that the Forest Service shall consult and cooperate with the tribes in the management and protection of natural and cultural resources on the National Forest.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Project intake travelling screens do not comply with Washington State laws contained in the Revised Code of Washington (RCW) titles 75 and 77 which specify design criteria and operation and maintenance procedure pertaining to fish passage and screening standards (RCW 77.16.220, RCW 77.16.210, RCW 77.020.060, RCW 75.020.061, RCW 75.20.060, RCW 75.02.061). Direct result of non-compliant water diversion includes has lead to harmful and fatal conditions which entrap, impinge and entrain fish. Approximately 357 known fish mortalities were a result of project operations during the eight month monitoring period in 2007 (ENW Consulting 2007b). As many as 69 fish motilities were recovered in a single weekly observation (March 15, 2007). These estimates may under represent the actual impact to fish as the surveys were conducted only once per week.

The USDA Forest Service is concerned with the sustainability and genetic integrity of the resident fish population in lower Lake Creek below Packwood Lake dam. As the dam only provides partial downstream passage, there is a lack of free interchange between the lake and creek populations. EES Consulting 2007b validates that fish are further blocked from free migration downstream. The travelling screens are shown to cause harm to fish via entrainment and impingement.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle including the measure for Entrainment of Fish at the Project Intake (ENW E.5.3.1.3.2 FLA 2008).

Subsequent to the filing of the FLA, Energy Northwest, WDFW and the USDA Forest Service meet with WDFW fish screening engineers to discuss specific components of the entrainment measure. Parties agreed to a step-wise process to solve the travelling screen approach velocities that differ from the PME filed in the FLA. The solution solely focuses on meeting Washington State screen approach velocity criteria. Requiring Energy Northwest to study and fix as appropriate the Project intake screens is consistent with the USDA Forest Service meeting its' management direction, particularly ACS Objectives 6-9.

IV. References Cited

EES Consulting 2007a. Final Fish Population Characterization Near the Drop Structure Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

EES Consulting 2007b. Final Entrainment Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Condition No. 10 - Fish Passage at Snyder Creek

I. Existing Situation

Snyder Creek originates from Snyder Lake and stream flows are sustained by lake outflows. USDA Forest Service records (2006) indicate that Snyder Creek has cutthroat trout present from Snyder Lake to the mouth.

Surveys were conducted Snyder Creek (USDA Forest Service 1983, EES Consulting 2006) indicated that anadromous distribution extends upstream of the Hall Creek confluence to approximately RM 0.36 at Forest Road 1260.013.

Anadromous species documented as present in Snyder Creek include Coho salmon, and steelhead trout (USDA Forest Service 1983). The National Marine Fisheries Service (NMFS) has listed these fish as threatened based on their Evolutionary Significant Units (ESUs) including: Lower Columbia River steelhead trout (*Onchorhynchus mykiss*), Lower Columbia River and Lower Columbia River/Southwest Washington Coho salmon (*O. kisutch*) as threatened under the Endangered Species Act. Steelhead trout and Coho salmon are transported (trucked) around the three dams on the Cowlitz River making the upper Cowlitz River and its tributaries accessible to these species.

The tailrace channel crosses over Snyder Creek approximately 0.3 miles below the powerhouse and stilling basin. The crossing of Snyder Creek under the tailrace is partially passable but does not meet WDFW and state codes for passing debris and bedload. The culvert was cleared of debris in August 2007 after the November 2006 high flow event.

Energy Northwest and all Parties including the USDA Forest Service agreed to study the feasibility of abandoning the culvert and diverting Snyder Creek to a drainage path which runs parallel to the tailrace, entering Hall Creek just downstream of the tailrace flume. The drainage path is approximately 800 ft in length. The 300 ft closest to Snyder Creek is dry, but has a bankfull width of about 10 ft. The next 300 ft is a backwater (no discernable flow - bankfull width of approximately 20 ft), which then connects to a dry reach as it enters Hall Creek (bankfull width at this location is approximately 2 ft). There are no barriers to upstream anadromous migration within this 800 ft reach.

II. Forest Plan Direction

Management direction for aquatic resources is contained in a variety of laws, policy and management plans. Following is a summary of specific rules and regulation providing direction to the Packwood Lake relicensing.

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the requirements of the Forest and Rangeland Renewable Planning Act, as amended by the National Forest Management Act.

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds and the aquatic ecosystems contained within them.

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- *Objective 3 – Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*
- *Objective 4 – Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*
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Section 4(e) of the FPA provides the USDA Forest Service, as administrators of reserved lands affected within the project area, authority to attach mandatory terms and conditions to Project licenses. This section of the FPA states, “that licenses shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.” Section 4(e) of the FPA states, “The Commission (FERC), in addition to the equal power and development purposes for which licenses are issued, shall give equal consideration to the purposes of

Service terms and conditions are based upon management direction contained in amended Forest Plans. If the project being relicensed is not located on Forest Service land but affects resources managed by the agency (i.e. migratory fish that historically used NFSL), Section 10(a) provides authority by which the Forest Service can make recommendations regarding management of those resources to FERC.

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- Identifying recreational fishing opportunities limited by degraded habitat and water quality,
- Restoring habitat and water quality,
- Providing access and promote awareness of recreational fishing opportunities,
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- Using cost-share programs and implementing laws to conserve, restore, and enhance aquatic systems to support recreational fisheries,
- Evaluate effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order, and
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- Section B #2. WDFW agrees to solicit Forest Service participation in establishing the
- Section B #4. WDFW agrees to consider Forest Service's goals and objectives in the development of Fish and Wildlife plans.
- Section B #6. WDFW agrees to cooperate with the Forest Service in preparation and conduct of research plans of mutual interest.

The Gifford Pinchot National Forest has memoranda of understanding with the Cowlitz Tribe and the Yakima Indian Nation. These agreements provide that the Forest Service shall consult and cooperate with the tribes in the management and protection of natural and cultural resources on the National Forest.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Snyder Creek contains valuable fish habitat and provides a relatively constant instream flow. As the current culvert under the tailrace only provides partial passage, the USDA Forest Service and all Parties to this licensing process agreed that an opportunity exists to restore proper form and function to the creek and full passage for resident and anadromous fish species. Fish passage at Snyder Creek should be restored to reroute the Snyder Creek into Hall Creek above the tailrace, and abandon the Snyder Creek culvert.

Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Fish Passage at Snyder Creek Tailrace Crossing. The measure details re-routing Snyder Creek into Hall Creek downstream of the tailrace and abandoning the culvert crossing. Requiring Energy Northwest to re-route Snyder Creek and monitor the effectiveness of the re-route is consistent with the USDA Forest Service meeting its' management direction, particularly ACS Objectives 6-9. Requiring ENW under this condition to implement the prescribed passage restoration for Snyder Creek is consistent with USDA Forest Service management direction. The USDA Forest Service condition reflects Energy Northwest proposal in their FLA. The USDA Forest Service fully supports Energy Northwest's proposal for Fish Passage at Snyder Creek Tailrace Crossing (ENW E.5.3.1.3.6 FLA 2008).

IV. References Cited

EES Consulting 2007. Final Fish Passage Barriers Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

USDA, Forest Service. 2006. Gifford Pinchot National Forest Fish Distribution Database. Gifford Pinchot National Forest.

Condition No. 11 - Amphibian Monitoring at Site B

I. Existing Situation

This document will focus upon the Northwestern salamander (*Ambystoma gracile*). The existing situation for this species is displayed below, as described in the FLA document submitted by Energy Northwest:

“The lacustrine habitats of Packwood Lake are not suitable for amphibians except where relatively shallow, vegetated areas occur. Isolated depressions not accessible by fish and protected from wave action have the greatest potential to support larval amphibians on the lacustrine fringe. Wetlands of this kind were observed on Packwood Lake in only two locations at the southeast end of Packwood Lake between the mouths of Upper Lake Creek and Muller Creek.

During a survey on July 18, 2006, in one of these areas (ENW Figure E.5.4-1 FLA 2008) larvae of three species (northwestern salamander [*Ambystoma gracile*], Pacific treefrog [*Pseudacris regilla*], and Cascades frog [*Rana cascadae*]) were found. Water depth here was mostly less than three feet, and the area was vegetated by emergent small-fruited bulrush (*Scirpus microcarpus*), bur-reed (*Sparganium* sp.), common scouring-rush (*Equisetum hyemale*), sedge (*Carex* sp.), and skunk cabbage (*Lysichitum americanum*). Although contiguous with Packwood Lake, large logs situated between the main body of the lake and the site appeared to pose a barrier to fish movement and protection from wave action.

The second location with larvae consisted of a small, isolated depression, which was sparsely vegetated and not connected to the lake by surface water when observed; larval Cascades frogs were found here. At these sites, Cascades frog and Pacific treefrog larvae were in advanced stages of development (some individuals of both species had hind limbs) and would likely have reached metamorphosis before the end of August. The northwestern salamanders were small, first-year larvae that would require at least an additional year to reach metamorphosis.

Amphibian larvae were not found in other parts of the extensive wetland complex southeast of Packwood Lake where deep mud, but only very shallow standing water (usually no more than 1-3 inches deep) was present. With few exceptions, the tributary streams entering Packwood Lake are not evidently used by amphibians. These streams are generally unsuitable for species that breed in lotic (flowing water) habitats because substrates are dominated by fine particles (gravels and smaller), or species associated with lentic (stillwater) habitats because of cold, fast flowing water and generally scarce hiding cover. During the amphibian survey, only one species was found in Upper Lake Creek: a few small Cascades frog larvae in an isolated, shallow pool of a muddy tributary approximately 1,000 feet upstream from Packwood Lake. A swampy area near Osprey Creek may also be used by Cascades frogs. Habitats suitable for giant salamanders (*Dicamptodon* spp.), coastal tailed frog (*Ascaphus truei*), or other species associated with lotic habitats were not observed at Upper Lake Creek, Muller Creek, or Osprey Creek near Packwood Lake.

Amphibians in Lacustrine Fringe Wetlands

Amphibian species that breed in wetlands adjacent to Packwood Lake may be affected by Project-induced lake level fluctuations. However, the chronology of amphibian activity relative to Project operations suggests that effects are likely to be limited in extent. Amphibians using these wetlands are potentially exposed to three different operational regimes annually: 1) between November-April lake water surface elevation fluctuates as needed; 2) from May to mid-September lake water surface elevation is held within a narrow range (2857 ft MSL + 0.5 ft); and 3) from mid-September-October the annual drawdown occurs and the lake subsequently refills. Amphibian activity patterns during these three operational phases are summarized in Table below.

Potential effects of Project operations on amphibians breeding in Packwood Lake lacustrine fringe wetlands.

Operational Period	Amphibian Activity	Potential Project Effects
November-April	Amphibian breeding is initiated by warming conditions, which can occur in late April, but often not until May.	If eggs are deposited during this period, they may be temporarily exposed or stranded.
May to mid-September	Amphibians breed, eggs hatch, and most complete metamorphosis and exit wetlands during this period.	Conditions favor growth and development; stranding unlikely
Mid-September to October	Larvae of only one species (Northwestern salamander) are present.	Northwestern salamander larvae are likely to be stranded by drawdown, unless they can escape into the lake.

Amphibian eggs deposited in the lacustrine fringe wetlands prior to May could be subject to water level fluctuations sufficient to cause temporary exposure or stranding, and result in desiccation, freezing, or predation of embryos. Cascades frog egg masses are most at risk of stranding because this species oviposits in very shallow water. However, Cascades frog egg masses are also somewhat tolerant of temporary or partial stranding (Corkran and Thoms 1996). Beginning in May, effects on developing eggs and larvae are unlikely to occur because lake water surface elevation is held relatively constant. Cascades frogs and Pacific treefrog larvae grow and develop during this period, and should have completed metamorphosis well in advance of mid-September.

In contrast, the remaining species, northwestern salamander, develops more slowly and larvae require additional months before metamorphosing. This species may be adversely affected by

dewatering of lacustrine fringe wetlands during the annual drawdown unless larvae can escape from the pools into the lake, or can survive in moist substrates.

The significance of any drawdown-related mortality to northwestern salamander at the population level is not known. However, it is clear that this species would not be present if a sustainable population did not exist here or somewhere in the vicinity. Larvae either survive in drawdown zone wetlands at least occasionally, or the salamanders breed and survive elsewhere within dispersal distance of the Packwood Lake wetlands.

There is only very limited information on seasonal lake level fluctuations prior to construction of the Project. U.S. Geological Survey data from 1960 to 1963 reportedly show an annual fluctuation in lake level ranging from 2.3 to 3.4 feet, and Royce (1965a) surmised that lake elevation in summer probably was between 2856 ft to 2857 ft MSL. The Forest Service (February 12, 1961) noted that the outlet of Packwood Lake was characterized by an alluvial deposit with continuous seepage flows of 10-15 cfs. Maintaining the Lake level at 2857. +0.5 ft MSL may have the effect of supporting a slightly higher groundwater table within the nearshore portion of the wetland complex at the head of Packwood Lake during late summer than would naturally occur. The groundwater level monitored by the Packwood Lake Drawdown Study followed a downward trend in summer, but reached an equilibrium elevation relative to lake level by mid-August and remained at that elevation until drawdown (EES Consulting 2007).

Upon drawdown, the groundwater level declined, reaching an elevation comparable to that which would have occurred had the seasonal downward trend continued. The duration of the drawdown effect is currently limited to two to four weeks in September and October with the wetlands being quickly recharged with the onset of fall precipitation.

Under the proposed license, the maintenance outage will be moved from October to mid-August and the late September pre-outage drawdown will be eliminated. Following Project shutdown in August, the lake will begin to rise with natural inflow and the resulting lake levels will be higher than those previously experienced. The effect of the new license will be higher lake levels in the late summer (August 15 – September 14) with a longer and slower fall drawdown beginning September 15.”

II. Forest Plan Direction

National Forest Management Act

Department of Agriculture Regulation 9500-4 directs the USDA Forest Service to manage “habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species.”

USDA Forest Service policy implementing the National Forest Management Act establishes objectives and direction to ensure that actions on NFS lands do not contribute to trends toward Federal listing or loss of viability of any native or desired non-native species (FSM 2672.41).

36 CFR 219 covers the planning process for development of National Forest Land and Resource Management Plans. The Code of Federal Regulations provides the implementing direction for the National Forest Management Act (1976).

In the 1982 edition of the regulations at 36 CFR 219.19, paragraph 1 states, *Fish and Wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.*

-219.19 (2) *Planning alternatives shall be stated and evaluated in terms of both amount and quality of habitat and of animal population trends of the management indicator species. For the Gifford Pinchot NF, cutthroat trout, steelhead trout and bull trout were selected as management indicator species.*

-219.19 (3) *Biologists from State fish and wildlife agencies and other Federal agencies shall be consulted in order to coordinate planning for fish and wildlife, including opportunities for the reintroduction of extirpated species.*

Section 219.27(g) Diversity states in part, *Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species.*

Gifford Pinchot National Forest Land and Resource Management Plan

The LRMP as amended by the Northwest Forest Plan (1995), provides management direction for all National Forest system lands and their associated resources directly affected, or in the vicinity of, the Packwood Lake Hydroelectric Project. Forest-wide standards and guidelines for wildlife also apply to projects that are permitted, but not performed by the Forest Service. The following pertain to this hydro-electric project:

- 1) All project areas affected by management activities will be reviewed for Sensitive, Threatened, or Endangered plant and animal species. (p. 2-71)
- 2) A biological evaluation will be conducted before any ground disturbing activities occur which may adversely affect Sensitive species. (p. 2-71)
- 3) Plant and wildlife Conservation Strategies will be prepared for each sensitive species, guild or habitat. (p. 2-71)
- 4) When eagles are found, a survey and habitat inventory will be conducted in the Cowlitz, Nisqually, and Lewis Rivers, and other drainages, to identify active bald eagle nests and potential habitat. (p. 2-71)

5) Consultation with the U.S. Fish and Wildlife Service will be required for each program activity or project that the Fish and Wildlife Service determines may affect Threatened or Endangered species and will be completed before any decision is made on the proposed project. Management activities must be conducted in such a manner that they will not impair recovery of any Threatened or Endangered species. (p. 2-71)

Northwest Forest Plan/Aquatic Conservation Strategy (NWFP).

A key element of NWFP is the ACS. The ACS is intended to restore and maintain the ecological health of watersheds and aquatic ecosystems within them on public lands (ROD B-9, FEMAT V-29). The approach is aimed at preventing further degradation and restoring habitat over broad landscapes as opposed to individual projects or small watersheds. The ACS requires maintaining or restoring biological and physical processes within their ranges of natural variability. The S&G of the NWFP focus on meeting and/or not preventing attainment of the nine ACS Objectives (ROD B-11). Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not meet the intent of the ACS and should not be implemented (ROD B-10).

One of the 4 key components of the ACS and the NWFP in general is Riparian Reserves. Riparian Reserves include reservoirs, and the habitat they occupy. The ACS directs to restore aquatic and riparian structures and functions of these areas including conferring benefits to riparian-dependent and associated species other than fish (ROD 1994 B-9, B-10, B-13). “Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide greater connectivity of the watershed” (ROD 1994 B-13). The interim widths for Riparian Reserves were designed to provide a high level of fish habitat and riparian protection until watershed and site analysis can be completed.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

The Licensee is required to conduct northwestern salamander monitoring because the Project may, potentially, impact this salamander species which is present in the Project area. The purpose of this monitoring is to determine whether the Northwestern salamander has adequate passage into Packwood Lake during Project drawdown periods. This is important because the value of this site to the local population of Northwestern salamander is presently not known. If the first year monitoring demonstrates that northwestern salamander larvae are unable to move into the lake to survive drawdown, the Licensee shall conduct a second year of monitoring to determine the relative importance of Site B to the local population of the species. If the survey indicates that the number of northwestern salamander egg masses at Site B is 10% or less than the number of egg masses found elsewhere, no further action will be required. If Site B is found to be relatively more important, then Licensee shall consult with the USDA Forest Service regarding appropriate habitat improvements (e.g., reconfiguring Site B to improve connectivity to the lake).

The evaluation must document the potential impacts to these species from the activity and, if appropriate, recommend measures needed to reduce those impacts the extent that the action does not contribute towards the loss of viability for the species or cause a trend towards the federal listing of the species.

As summarized above, the USDA Forest Service is statutorily obligated to preserve, protect, perpetuate, and manage wildlife resources for use and enjoyment by present and future generations. Consequently, the USDA Forest Service must maintain a reasonable level of control over continuing Project operations and Project-related activities that may affect wildlife species NFS lands.

To ensure the fulfillment of its obligations, it is necessary for the USDA Forest Service to be consulted for monitoring and adaptive management of mitigation measures employed on NFS lands.

IV. References Cited

Corkran and Thoms 1996. Amphibians of Oregon, Washington, and British Columbia. Line Star Publishing, Renton, WA 175 pp.

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Condition No. 12 - Threatened, Endangered and Sensitive Species

I. Existing Situation

No bald eagles were documented during either aerial survey at Packwood Lake. Bald eagles are known to forage along the Cowlitz River near the confluence with Lake Creek. However observations of this species at Packwood Lake have been reported infrequently. On two occasions: once on 24 June, 2004 and on 24 June, 2005 a single bald eagle was observed foraging and roosting at Packwood Lake near Crawford Creek according to Energy Northwest and USFWS; nests have never been reported to occur (EES Consulting 2007a).

Results of osprey nest surveys at Packwood Lake have been recorded since at least 1981. From 1981 to 1989, periodic osprey nest surveys have recorded nesting activity at two nests and at least five young were documented during this period. Typically, ospreys nest immediately adjacent to foraging habitats such as lakes, reservoirs, and rivers. The results of this survey and the long period of recorded nest occupancy at Packwood Lake strongly suggest that Packwood Lake has been and continues to afford both suitable nesting and foraging habitat for osprey (EES Consulting 2007a).

Field surveys for rare plant species were conducted in the Packwood Lake study area. No federally listed species were observed in the study area. However, two USDA Forest Service Special Status lichen species and one population of the state Threatened plant species Oregon goldenaster were located (Beck 2007).

A population of each of two USDA Forest Service Sensitive lichen species (*Peltigera pacifica* and *Nephroma bellum*) were located on NFS lands in the study area. The *Nephroma* was collected from the trunks of hardwood trees in the large riparian area at the upper end of Packwood Lake. The *Peltigera* was collected from mossy substrates in the talus area on the uphill side of the road between the surge tank and the parking area to the northeast (Beck 2007).

Chinook salmon, coho salmon, and steelhead trout have all been documented in lower Lake Creek. Aside from supporting anadromous species during spawning and rearing periods, Lake Creek also supports resident populations of rainbow and cutthroat trout (USDA Forest Service 1993).

Two smaller creeks within the Packwood Project boundaries are Hall and Snyder creeks. Hall Creek has 2.0 miles of accessible steelhead spawning grounds. Snyder Creek also provides Coho salmon and cutthroat trout habitat in its lower reaches (EES Consulting 2007b).

II. Forest Plan Direction

Department of Agriculture Regulation 9500-4 directs the USDA Forest Service to manage “habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species.”

USDA Forest Service policy implementing the National Forest Management Act establishes objectives and direction to ensure that actions on NFS lands do not contribute to trends toward Federal listing or loss of viability of any native or desired non-native species (FSM 2672.41).

36 CFR 219 covers the planning process for development of National Forest Land and Resource Management Plans. The Code of Federal Regulations provides the implementing direction for the National Forest Management Act (1976).

In the 1982 edition of the regulations at 36 CFR 219.19, paragraph 1 states, Fish and Wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

-219.19 (2) Planning alternatives shall be stated and evaluated in terms of both amount and quality of habitat and of animal population trends of the management indicator species. For the Gifford Pinchot NF, cutthroat trout, steelhead trout and bull trout were selected as management indicator species.

-219.19 (3) Biologists from State fish and wildlife agencies and other Federal agencies shall be consulted in order to coordinate planning for fish and wildlife, including opportunities for the reintroduction of extirpated species.

Section 219.27(g) Diversity states in part, Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species.

The Gifford Pinchot National Forest Land and Resource Management Plan (LRMP) as amended by the Northwest Forest Plan (1995), provides management direction for all National Forest system lands and their associated resources directly affected, or in the vicinity of, the Packwood Lake Hydroelectric Project. Forest-wide standards and guidelines for wildlife also apply to projects that are permitted, but not performed by the Forest Service. The following pertain to this hydro-electric project:

- 1) All project areas affected by management activities will be reviewed for Sensitive, Threatened, or Endangered plant and animal species. (p. 2-71)
- 2) A biological evaluation will be conducted before any ground disturbing activities occur which may adversely affect Sensitive species. (p. 2-71)
- 3) Plant and wildlife Conservation Strategies will be prepared for each sensitive species, guild or habitat. (p. 2-71)

4) When eagles are found, a survey and habitat inventory will be conducted in the Cowlitz, Nisqually, and Lewis Rivers, and other drainages, to identify active bald eagle nests and potential habitat. (p. 2-71)

5) Consultation with the U.S. Fish and Wildlife Service will be required for each program activity or project that the Fish and Wildlife Service determines may affect Threatened or Endangered species and will be completed before any decision is made on the proposed project. Management activities must be conducted in such a manner that they will not impair recovery of any Threatened or Endangered species. (p. 2-71)

A key element of Northwest Forest Plan (NWFP) is the Aquatic Conservation Strategy (ACS). The ACS is intended to restore and maintain the ecological health of watersheds and aquatic ecosystems within them on public lands (ROD B-9, FEMAT V-29). The approach is aimed at preventing further degradation and restoring habitat over broad landscapes as opposed to individual projects or small watersheds. The ACS requires maintaining or restoring biological and physical processes within their ranges of natural variability. The S&G of the NWFP focus on meeting and/or not preventing attainment of the nine ACS Objectives (ROD B-11). Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not meet the intent of the ACS and should not be implemented (ROD B-10).

One of the 4 key components of the ACS and the NWFP in general is Riparian Reserves. Riparian Reserves include reservoirs, and the habitat they occupy. The ACS directs to restore aquatic and riparian structures and functions of these areas including conferring benefits to riparian-dependent and associated species other than fish (ROD 1994 B-9, B-10, B-13). “Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide greater connectivity of the watershed” (ROD 1994 B-13). The interim widths for Riparian Reserves were designed to provide a high level of fish habitat and riparian protection until watershed and site analysis can be completed.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Energy Northwest is required to prepare a Threatened, Endangered and USDA Forest Service Regional Forester Special Status Species Management Plan because the Project may affect Regional Forester Special Status Species wildlife, fish and plant species that are present or may occur in the Project area over the new license period. The purpose of this Plan is to ensure protection, management, enhancement, and monitoring of these species, and provide for surveys for new species added to the Regional Forester’s Special Status Species lists in fulfillment of USDA Forest Service management direction.

The Regional Forester Special Status Species list contains species considered Sensitive by the USDA Forest Service. USDA Forest Service policy requires evaluation of proposed actions on or affecting NFS lands for Sensitive species present in the area of the proposed project to ensure

that proposed actions are consistent with management direction. The evaluation must document the potential impacts to these species from the activity and, if appropriate, recommend measures needed to reduce those impacts to the extent that the action does not contribute towards the loss of viability for the species or cause a trend towards the federal listing of the species. The plan will also include provisions for continued coordination between Energy Northwest and the USDA Forest Service through the new license term regarding threatened and endangered species and their habitat.

Energy Northwest, filed with the Commission its Final License Application (FLA) in February 2008 containing the PME measures agreed to in principle, including the measure for a rare plant management plan and inclusive of the USDA Forest Service Preliminary Terms and Conditions (ENW Appendix C, FLA 2008). Requiring Energy Northwest to prepare a TES management plan is consistent with the USDA Forest Service meeting its' management direction. The USDA Forest Service condition reflects Energy Northwest proposal in their FLA (ENW E.5.6.5.2.3 FLA 2008).

The USDA Forest Service must maintain a reasonable level of control over project operations that affect NFS lands, resources and programs. The above condition, which specify coordination and monitoring are intended to provide for integration of the Project operations and activities occurring within and adjacent to the Project area.

IV. References Cited

Beck Botanical Services 2007. Final Rare Plant Survey Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

EES Consulting 2007a. Final Bald Eagle and Osprey Nest Survey Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

EES Consulting 2007b. Final Fish Distribution and Species Composition Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

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Condition No. 13 - Packwood Lake Tributary Headcutting Monitoring

I. Existing Situation

Packwood Lake - Fish life history

Packwood Lake is fed by six fish bearing tributaries which total an approximate three miles of fish accessible habitat important for reproduction and rearing for a native strain of uniquely adapted Packwood rainbow trout (*Oncorhynchus mykiss*). Fish populations above the existing Packwood Lake dam are believed to have evolved in the Upper Lake Creek basin and have maintained a self sustaining population whose life cycle depends on the lake environment for adult holding and foraging and the river tributaries for spawning and rearing habitat (USDA Forest Service 2005). Packwood rainbow trout are genetically unique. Genetic comparisons indicate that Packwood rainbow are more similar to inland rainbow stocks (redband trout) than they were to costal rainbow stocks (Lucas and Chilcote, 1982). Furthermore, eletrophoretic data from hatchery stock supports that lacustrian populations of Packwood Lake trout have not integrated with hatchery stocks introduced between 1954-1965. Given the limited tributary habitat entering to the lake, there is vital need to maintain connectivity between spawning channels and reservoir.

Packwood Lake tributaries which support spawning fish include: Upper Lake Creek, Beaver Bill Creek, Mueller Creek, Crawford Creek and Osprey Creek. Rearing habit in Packwood tributaries fluctuates with either the forebay elevation or other natural hydrologic conditions such as rainfall and snow melt.

Lake drawdown results in the potential loss of stream depth and cover, and increased risk of stranding due to loss of channel connectivity. There is a relatively narrow window of opportunity for adfluvial fish to complete their life history before natal tributaries loose base flow and dry up. Peak spawning is approximately June 18 (USDA Forest Service 2004) and it takes and estimated 45 days for rainbow trout to emerge from the gravel; therefore, there is minimal time before sac fry (approximately 20 mm fish) are forced to follow the declining flows and move from the streams to the lake (EES Consulting 2007b). The fish distribution study (EES Consulting 2007b) found fry outmigration extends to at least August 30 at which time fish enter Packwood Lake to rear. Physical surveys (Watershed GeoDynamics and EES Consulting 2007) revealed that flows do not meet criteria standards for fish passage in most tributaries during the drawdown period.

Consequently, Lake Shoreline rearing habitat plays a vitally important role in the early developmental stages of Packwood Lake rainbow trout. It appears that reducing the lake water surface elevation from 2857 to 2848 impacts approximately 30 acres of the lake shoreline habitat (EES Consulting 2007a). The average distance of exposed lake shoreline at spawning tributaries is approximately 138 feet and ranges from 40-250 feet. (Osprey 100 ft, Trapp 150 ft; SE Trapp 40 ft, Crawford 150 ft; and Muller 250 ft.).

Packwood Lake -Tributary hydrology

Upper Lake Creek is a glacial-fed system which provides most of the lake inflow. Beaver Bill, Mueller, Crawford Creek and Osprey Creek are small, spring and ground water fed drainages (400-700 acres) that descend in steep mountain headwall channels. The lower 0.25 - 0.5 miles of these creeks transition to a moderate gradient (< 4%) and are accessible to fish. These small streams have a bankfull width typically < 10 ft wide and a highly variable flow depending on season (USDA Forest Service 2005). There appears to be three mechanisms for maintaining base flow within the Packwood Lake tributaries. The Packwood Lake Drawdown study (EES Consulting 2007a) indicated that base flow is tied to groundwater in Trap Creek, Crawford Creek and Osprey Creeks. Muller Creek, however, demonstrates a close relationship with lake surface water including. Hydrologic connectivity to the lake a surface elevation leaves this system susceptible during periods of drawdown. Lake Creek is driven by glacial melt water and sustains flow throughout the year.

The Stream Connectivity study (Watershed GeoDynamics and EES Consulting 2007) found that Mueller Creek will continue to cut down through its delta deposits in the drawdown zone during low lake levels. During low lake levels there is also potential for instream habitat loss of pools, riffles, and runs in the lower 500 feet of Mueller Creek.

The study also found that Upper Lake Creek will continue to cut down through its delta deposits in the drawdown zone during low lake levels. Downcutting will result in sediment transport from the upper delta area into the lower delta in the lake. There is a low to moderate risk of future headcutting in the lower 400 feet of the Upper Lake Creek channel upstream of Packwood Lake. The channel substrate consists of sand, silt, and gravel. These substrate sizes could be eroded during peak flows.

Both creeks exhibited several indicators of channel incision related to low lake levels. The longitudinal profile of Upper Lake Creek shows that the thalweg meets the high lake level approximately 400-500 feet upstream from the mouth and Mueller Creek shows that the thalweg meets the high lake level approximately 400-500 feet upstream from the mouth. This suggests that these channels have incised at least this far upstream.

II. Forest Plan Direction

Management direction for aquatic resources is contained in a variety of laws, policy and management plans. Following is a summary of specific rules and regulation providing direction to the Packwood Lake relicensing.

The Gifford Pinchot National Forest Land and Resource Management Plan (1990), as amended by the Northwest Forest Plan in 1994, provides the management direction for all National Forest System lands and their associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric system. This plan was developed and enacted consistent with the requirements of the Forest and Rangeland Renewable Planning Act, as amended by the National Forest Management Act.

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds and the aquatic ecosystems contained within them.

ACS objectives that apply most to this issue are:

- Objective 1 – Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
- Objective 2 – Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
- *Objective 3 – Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*
- *Objective 4 – Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*
- *Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*
- *Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*
- *Objective 7 – Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*
- *Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.*
- *Additionally, Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that require flows and habitat conditions that maintain or restore riparian resources and channel integrity.”*

Forest Service Manual (FSM) 2670.12 directs the Forest Service to:

- Manage habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species,
- Conduct activities and programs to assist in the identification and recovery of threatened and endangered plant and animal species, and
- Avoid actions that may cause a species to become threatened or endangered.

Forest Service Manual (FSM) 2670.22 directs the Forest Service to:

Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest

System lands. A viable population is further defined by FSM 2670.5 as one that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range (or range required to meet recovery for listed species) within the planning area.

Section 4(e) of the FPA provides the USDA Forest Service, as administrators of reserved lands affected within the project area, authority to attach mandatory terms and conditions to Project licenses. This section of the FPA states, “that licenses shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation.” Section

purposes for which licenses are issued, shall give equal consideration to the purposes of

Service terms and conditions are based upon management direction contained in amended Forest Plans. If the project being relicensed is not located on Forest Service land but affects resources managed by the agency (i.e. migratory fish that historically used NFSL), Section 10(a) provides authority by which the Forest Service can make recommendations regarding management of those resources to FERC.

Under the Recreational Fisheries Executive Order (Executive Order 12962 of June 7, 1995, Federal Register Notice 60(111): 30769-30770), the President of the United States directs federal agencies to cooperate with state and tribal governments to improve aquatic resources for increased recreational fishing opportunities by:

- Identifying recreational fishing opportunities limited by degraded habitat and water quality,
- Restoring habitat and water quality,
- Providing access and promote awareness of recreational fishing opportunities,
- Stimulating angler participation in conservation and restoration,
- Using cost-share programs and implementing laws to conserve, restore, and enhance aquatic systems to support recreational fisheries,
- Evaluate effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order, and
- Assisting private landowners to conserve and enhance aquatic resources.

Master Memorandum of Understanding Washington Department of Fish and Wildlife and USDA Forest Service Region Six

Signatory parties agreed under this MOU to consult on fish and wildlife actions that occur or may affect USDA Forest Service Region Six Forests. Listed below are four key elements of this MOU.

- Section A #2. The Forest Service agrees to recognize WDFW as being responsible for the protection, perpetuation, and management of all game fish and wildlife in the State of Washington.
- Section B #2. WDFW agrees to solicit Forest Service participation in establishing the

- Section B #4. WDFW agrees to consider Forest Service's goals and objectives in the development of Fish and Wildlife plans.
- Section B #6. WDFW agrees to cooperate with the Forest Service in preparation and conduct of research plans of mutual interest.

The Gifford Pinchot National Forest has memoranda of understanding with the Cowlitz Tribe and the Yakima Indian Nation. These agreements provide that the Forest Service shall consult and cooperate with the tribes in the management and protection of natural and cultural resources on the National Forest.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Regular drop in lake elevation due to hydroelectric operations and maintenance promotes headcutting which has the potential to degrade fish habitat and restrict fish distribution (Simon and Rainaldi 2000, Castro 2003). Lowered lake levels prompt channel incision, excessive scour and decreases bank stability (Watershed GeoDynamics and EES Consulting 2007). Channel surveys conducted in Packwood Lake tributaries indicate that all tributaries are at increased risk of to headcut as there are no permanent grade control features to restrain headward erosion (Watershed GeoDynamics and EES Consulting 2007). Log jams in these creeks had shifted in 2006 flow event (ENW FLA 2008) leading to visible headcutting in Packwood Lake tributaries and confirming fallibility of wood as long-term grade controls. Furthermore, there is low to moderate risk of increased headcutting in most tributaries because winter drawdown may coincide with increased stream flows from winter storms.

The three primary effects of regular drawdown of Packwood Lake due to Project operations and maintenance include 1) loss of water depth and velocity within tributaries which are hydrologically connected to lake elevations 2) loss of critical shoreline rearing habitat within the drawdown zone 3) increased risk of headcutting erosional processes during periods of drawdown coupled with lowered lake levels.

The intent of the USDA Forest Service condition is to monitor and determine whether headcutting and/or bed profile incision in Mueller and Upper Lake Creeks are occurring and whether headcutting/incision is Project related. Given Energy Northwest proposal for shifting the annual maintenance outage to mid-August through mid- September and maintaining higher lake levels during the winter drawdown period, the 10 year headcutting monitoring frequency should provide adequate data to determine any additional incision and/or headcutting.

USDA Forest Service management direction identifies riparian reserves as particular sensitivity areas to include riparian corridors along permanent fish-bearing streams, and also include areas of unstable soils, wetlands, intermittent headwater streams, and other areas where proper ecologic function is crucial to maintenance of the stream's water, sediment, woody debris and nutrient delivery systems. Riparian reserves are not "buffers" in the traditional sense where management activities are prohibited. They are areas where special care is taken to assure protection of watershed and riparian processes and functions. Land use activities that are compatible with attainment of riparian goals and objectives are permitted within riparian reserves.

Requiring Energy Northwest to monitor Packwood Lake tributary headcutting addresses the USDA Forest Service management direction, particularly ACS Objectives 6-9. The monitoring plan is to ensure the intent of channel connectivity, instream flow and floodplain inundation are met.

The USDA Forest Service must maintain a reasonable level of control over project operations that affect NFS lands, resources and programs. The above condition, which specify coordination and monitoring are intended to provide for integration of the Project operations and activities occurring within and adjacent to the Project area.

IV. References Cited

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Washington Department of Fish and Wildlife. 2006. Letter dated November 20, 2006, Charlene Andrade (WDFW) to Magalie R. Salas (FERC), Comments on Initial Darft Study Reports for FERC Docket No. P-2244, Packwood Lake Hydroelectric Project, Energy Northwest.

Condition No. 14 - Recreation Management

I. Existing Situation

Recreation resources within the Packwood Lake Hydroelectric Project offer a variety of backcountry and wilderness opportunities. Access to the lake is relatively easy and can be on foot, horseback, mountain bike, or motorcycle/ORV via one of two trails. Both trails are approximately 4.5 miles long, making it a 9 mile round trip from the trailhead to the lake.

The motorized trail (#74, Pipeline Trail.) is maintained by Energy Northwest and is under Special Use Permit to allow Energy Northwest to access, operate and maintain the hydroelectric dam at the lake's outlet. The motorized trail serves as the Licensee's primary access for administration and maintenance. Some recreationists tow small trailers and boats or bring inflatable boats in on ATV's via the Pipeline Trail. Only human-powered boats are allowed on Packwood Lake. The non-motorized trail (#78, Packwood Lake Trail) is maintained by the Cowlitz Valley Ranger District Wilderness trails crew. The trail system (#78, Packwood Lake Trail, and # 81, Upper Lake Creek Trail) continues along the lakeshore and enters the Goat Rocks Wilderness approximately ¼ of a mile beyond the lake outlet on the east shoreline of the lake. This trail is managed for hikers and equestrians only.

FS Road 1260 is known as the Snyder Road. It currently is classed as a maintenance level-2 (ML2) road. The first 1.2 miles is County jurisdiction, the last 4.6 miles is USDA Forest Service jurisdiction. The entire length is a double lane asphalt road. FS 1260 is used to access the Power House Road, the Pipeline Road, and the Latch Road.

At the end of FS Road 1260 is the public access trailhead for both the #74 Pipeline and #78 Packwood Lake trails. The parking lot provides parking for 25 – 30 vehicles and is of adequate size for the level of use the two trails receive. A well maintained single vault CXT toilet is located at the parking lot in addition to a loading ramp for stock and a trailhead bulletin board. A routed wood trail map is also located at the trailhead near the beginning of the #78 Packwood Lake trail. The beginning of the #74 Pipeline trail is located approximately 100 yards back down FS Road 1260, which necessitates ATV's riding back to the trail on the road and then going around a gate that prohibits access to larger vehicles.

FS Road 1260-013 (ML2) is known as the Power House Road. This road is gated at the beginning, just off the end of the county road, and extends 2.5 miles in length. Energy Northwest uses less than ½ mile of this road to access the Project pipeline where it descends the mountain from the surge tank. This road is native surface and is in fair condition. A short, approximately 10 to 12 foot in length and no more than 4 foot off the ground, "bridge" crosses the pipeline at this approximate ½ mile point.

FS Road 1260-066 (ML2) is known as the Pipeline Road. This road provides several access points for Energy Northwest to the pipeline and allows monitoring and maintenance of the pipeline. Safety issues need to be addressed for ATV users.

FS Road 1262 (ML2) is known as the Latch Road. The road is a single lane gravel road with few turnouts. The turnoff to the Latch road is located 1.66 miles up the Snyder road. The Latch road is gated and locked approximately 2.4 miles in from its junction with Snyder road and continues another 2.2 miles from the gate to where the road ends and an ATV trail begins. There is a large turnaround at this point. Approximately 3 miles of the road lies within the lower Lake Creek drainage.

In the spring of 2007 Energy Northwest performed minor reconstruction due to a slide that came down from the pipeline trail. It covered 300 to 400 feet of road surface. To avoid resource damage on the lower section of road below the slide, Energy Northwest did minor blading to eliminate the rilling caused from excessive rain fall.

Non-Wilderness area

Historically Packwood Lake has been popular for fishing, boating and dispersed camping. Limited motorized trails on the District, as well as a destination lake, make this a popular, although short, motorized trail route. Prior to 1992, the availability of Special Use Permittee services, which included boat rental, a small store, and primitive lodging, attracted heavier recreational use to the area. The Special Use Permit was terminated in December of 1991 due to failure to meet the terms and conditions of the permit. Remaining permit holder facilities were removed in 1992 after analysis showed that continued services at the lake were contrary to recreation and resource management objectives.

Based on surveys conducted in 2006, nearly 30 people per day visited Packwood Lake during the peak-season, with an estimated 50 people per day on weekends (Howe and EES Consulting 2007). The estimated number of Recreation Days at Packwood Lake is 5080 during the peak-season, 134 during the spring off-season, and 1024 during the fall off-season. Very few people are known to visit Packwood Lake during the winter season. A Recreation Day (or Person Days per Year) is defined as [(party size x overnights) + (1 x party size)]. The 2006 survey data indicated that the majority of this use is occurring in the non-wilderness area, and most visitors come from Western Washington (Lewis, Pierce and King Counties).

There are two administrative use cabins near the lake outlet. A log cabin, built in 1910, was recently (2004) the site of a Passport in Time project, where several cedar logs were replaced and a new cedar shake roof was installed. This cabin is the second oldest structure on the Forest, and one of six remaining log structures in the USDA Forest Service's Pacific Northwest Region 6, and as such has significant historical and interpretive values. This cabin was originally built by the Valley Development Company as an administrative site for the initial stages of hydroelectric development. The second building, a Forest Service Guard Station circa 1960's, is occasionally used by Wilderness trails and patrol personnel. Energy Northwest provides electricity to this newer guard station for year-around heating. Both of these structures have been considered for inclusion into a cabin rental program, although neither facility is included in the rental program at this time. Due to the remote location, these structures are regularly vandalized.

A total of 18 dispersed camp sites and 2 dispersed day-use sites were identified in 2006 along the non-wilderness shoreline of Packwood Lake (Howe and EES Consulting 2007). There are 3

outhouses that are unusable and/or in poor condition are located within the Forest Service non-wilderness area along Packwood Lake. A well was drilled to provide potable water to both the Guard Station and for the Special Use Permittee in the early 1990's, however water from the well never tested as acceptable for potable use and the handpump has been partially disassembled to prevent public use.

User developed fire pits and social trails are abundant throughout this area. Vandalism, soil compaction, vegetation impacts, accumulations of trash, enlarging of campsites, and sanitation have been identified as problems at some of these sites.

Packwood Lake contains a population of native trout and is not stocked with hatchery raised fish by the Washington Department of Fish and Wildlife in order to maintain the integrity of the native trout population.

There is a control (Project intake) building associated with the drop structure, owned and maintained by the Licensee. Though painted in earth tones, it is a very utilitarian structure with no architectural style.

Wilderness

While Packwood Lake itself is outside of the Goat Rocks Wilderness boundary, over three quarters of the Lake's "ordinary high water line" is the designated Wilderness boundary (USDA 1987). At this time the ordinary high water line would be considered 2858.5' given the top of the Eneyg Northwest drop structure. The proposed project boundary is identified as 2860' which includes 9.79 acres of the Goat Rocks Wilderness Area within the project boundary.

Packwood Lake offers a popular access point for entry into the Goat Rocks Wilderness. Mandatory wilderness permits indicate that an average of 900 people enter the Goat Rocks Wilderness along Trail # 81 (Upper Lake Creek) and # 78 Packwood Lake. Combined, these are the third most popular entry point into the Goat Rocks Wilderness on the Cowlitz Valley Ranger District. Approximately one third of this use is day use, which is opposite to the use pattern identified for the non-wilderness area of the lake.

There are 23 camp sites monitored within wilderness along the shoreline, three of these sites are new since 1993. Of these 23 sites, 16 exceed the Gifford Pinchot National Forest Land and Resource Management Plan (as amended by the Wilderness Protection Environmental Assessment, 1998) standards for vegetative loss. The standard for this Wilderness Resource Spectrum (WRS) Transition classification is for sites not to exceed 600 sq ft of barren core. Four sites within this area exceed 2,000 sq ft of barren core including one site of 3,865 sq.ft. In addition, 20 of the sites are within 100' of the lakeshore. It is currently a violation of wilderness regulations to camp within 100' of lakeshores, though few alternatives exist due to the steep nature of the shoreline.

The western shoreline of the lake, within wilderness, is classified as Pristine in the Gifford Pinchot National Forest Land and Resource Management Plan (as amended by the Wilderness Protection Environmental Assessment, 1998). There are no maintained access trails along the

western shoreline, and only three of the documented dispersed camp locations are found along this shoreline. It is essentially undeveloped and the impact of man is largely unnoticeable.

II. Forest Plan Direction

Land and Resource Management Plan

Amendment 11 of the Gifford Pinchot National Forest Land and Resource Management Plan (Northwest Forest Plan) establishes the management direction for the Gifford Pinchot National Forest. The area surrounding Packwood Lake is classified as Unroaded Recreation without Timber Harvest (UH) and Wilderness (WW) through Amendment 11. It is also identified as a late-successional reserve (LSR) and a Tier 1 Watershed.

The goal of Wilderness is to preserve the wilderness character, allowing for natural processes and providing opportunities for solitude, challenge and inspiration. Within these objectives, and following a policy of non-degradation, it is the intent to provide for appropriate levels of recreation, scenic, education, scientific and in some cases historical uses (Forest Plan Amendment: Wilderness Protection Environmental Assessment, GPNF 1998). Through the Wilderness Protection Environmental Assessment, the Wilderness Resource Spectrum (WRS) is further defined along a spectrum from Transition to Pristine. The Goat Rocks Wilderness Area near Packwood Lake includes Transition, Primitive and Pristine classifications. Nearly all visitation within Wilderness at Packwood Lake occurs within the WRS of Primitive (along Trail # 78 accessing the lake) and Transition (along the eastern shoreline). Standards and guidelines established for Transition are that the average number of people encountered each day should be 24 or less. All campsites should be located at least 100' from the shoreline. No more than two campsites should be visible from a given site (Wilderness Protection Environmental Assessment, GPNF, 1998). That portion of the western shoreline that falls within the Wilderness is classified as Pristine in the Gifford Pinchot National Forest Land and Resource Management Plan (as amended by the Wilderness Protection Environmental Assessment, 1998). There are no maintained access trails along the western shoreline, and only three of the documented dispersed camp locations are found here. It is essentially undeveloped and the impact of man is largely unnoticeable.

In general, the goal of Management Area Category (MAC) UH is to provide high quality dispersed recreation in a predominately natural setting. Within the Unroaded Recreation without Timber Harvest (UH) management area category, Packwood Lake has the Recreation Opportunity Spectrum (ROS) management prescription of "Semi-primitive Motorized." According to the ROS guidelines identified in the Forest Plan for Semi-primitive Motorized, off road vehicle use is limited to designated trails. This area is managed for dispersed recreation and should produce no more than 15 encounters between groups of visitors per day. Groups should be no larger than 25 persons (encounter no more than 400 individuals each day). Campsites should be located away from lakeshores, streamsides, and trails. No more than three other campsites should be visible from a given site. Current camping use is marginal or unacceptable by these standards.

The Visual Quality Objective (VQO) is Retention and the Recreation Opportunity Spectrum (ROS) is Semi-primitive Motorized. Cultural sites or other features of interest may be interpreted if they can be adequately protected. (Amendment 11 of the Gifford Pinchot National Forest LRMP, 1995).

The Northwest Forest Plan outlines nine Aquatic Conservation Strategy (ACS) Objectives that were developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The following four ACS objectives address effects that may occur with the existing recreation use at Packwood Lake:

- *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*
- *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*
- *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration.*
- *Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species*

Desired Future Condition

The desired future condition of Wilderness follows the policy of non-degradation of the Wilderness character. Management direction is guided by the Wilderness Act of 1964. It is anticipated that measures will be taken to keep Wilderness use within carrying capacities, including a permit system that may limit use or designate campsites.

The desired future condition of MAC UH is that the natural-appearing environment has been maintained and changes are largely the result of natural succession. The area should afford visitors an experience that is usually free from the sight and sound of other people.

The following Northwest Forest Plan standards and guidelines apply to recreation developments within riparian reserves. Riparian reserves are one site-potential tree height or 150 feet, whichever is greater, in width:

RM-1. New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.

RM-2. Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where adjustment measures such as user education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

While the Project did not create the dispersed recreation opportunities found at Packwood Lake, the Project has greatly influenced the access by which visitors reach the lake. Without the Pipeline Trail #74, which is the primary access used by Energy Northwest, access to the lake be limited to Trail # 78, a non-motorized trail. In addition to motorized access, the Project has also increased the accessibility of the lake through improvements to the non-motorized trail. Prior to the Project, the trailhead to Packwood Lake was located approximately five miles from the lake. Project developed Public Relations materials from the early 1960's states "The original five mile trail from the old parking lot to the lake has been replaced by a new four mile trail which will furnish improved and easier access to the lake for hikers, campers, and fishermen." That same pamphlet goes on to state, "Public access to the recreation area has been greatly improved by the extension of the present USDA Forest Service road from the existing parking lot at elevation 1400 feet, approximately 3.5 miles to a new parking lot at 2800 feet." Not only did the Project shorten the access route to Packwood Lake, the Project also eliminated a segment of trail that gained 1400 feet of elevation in one mile, making it significantly easier for the average hiker to reach the lake.

On FS Road 1260, brushing and drainage maintenance has been accomplished in the past by the Forest Service and is in fair condition. FS Road 1260-013 has a bridge that needs to be removed because it serves no known purpose. It is thought that it was installed to cross the pipeline, however, the pipeline is at a depth of approximately 30 feet, and traffic over the pipeline could not cause damage to it (ENW personal communication). FS Road 1260-066 is in fair condition with little to no surface rock but contains a few areas that are in need of repair, mostly because of drainage problems. Currently, the FS Road 1262 prism is partially wheel rutted with several drivable water bars that are semi functional (meaning in heavy rains they would not function properly). Much of the ditch lines are full of debris and non-functional, and many of the culverts are partially blocked, both inlet and outlet. Other road conditions include; brush encroaching into the roadway and a few springs in the ditch line that corrode the traveled way or otherwise filling ditch lines with unsuitable material.

More than 3000 people utilize over 6000 recreation days each year at Packwood Lake, concentrating use in a relatively small area constrained by steep slopes. There is a need to provide adequate sanitation facilities for visitors to Packwood Lake. Evidence of human waste exists along tributary streams and in dispersed camping areas. Existing toilet facilities are unserviceable and should be removed. Due to a number of resource concerns and area limitations, a properly maintained composting toilet is the most effective way to accommodate this need.

A kiosk, located near the existing CXT vault toilet at the trailhead would provide an additional opportunity to educate the public on regulations and appropriate behavior. This should include information about the Recreation Pass and “Pack-it-in Pack-it-out.” messages.

There is continued expansion of dispersed campsites that are located directly on the shoreline and that are in conflict with existing standards and guidelines. A recreation guard assigned to address the impacts of dispersed recreation would improve visitors’ sense of security, reduce user conflicts, improve site cleanliness, and would improve implementation of USDA Forest Service standards and guidelines, in particular, standards that relate to dispersed recreation (Meaningful Measures). The level of use should be that which is appropriate for the site (non-wilderness and wilderness). A recreation guard would also assist in managing motorized use to protect resources; and managing overnight use in such a manner, which may include prohibition, as to provide for resource protection within and outside wilderness.

Continued supply of power to the Guard Station would allow the recreation guard to stay at Packwood Lake and improve visitors’ sense of security.

Energy Northwest should maintain the existing Pipeline Road and Trail according to USDA Forest Service standards to reduce the potential for mass wasting events and sedimentation into Lake Creek. Energy Northwest accesses the Project area approximately once a week via the Pipeline Road and Trail, including the Pipeline Trail bypass (Dyson Pass cutoff). Ongoing maintenance would also ensure continued access to the public via the Pipeline Trail # 74.

With continued public access to the Control Structure area, the design of the structure should be brought up to standards consistent with the visual quality objective of the area. The USDA Forest Service guide book, The Built Environment Image Guide, provides examples of various architectural styles that fit into a regional context. This area is called the “North Pacific Province. As repairs and maintenance are performed to the building over time, some of these features should be incorporated into the design. By doing so, over time, the character of the building would be modified to more closely conform to the visual quality objective.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. The Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Packwood Lake Recreation Plan (ENW E.5.7.4 FLA 2008) and USDA Forest Service PME measures agreed to in concept in Appendix C (ENW FLA 2008).

On April 8, 2008, the Commission issued an Additional Information Request (AIR) to Energy Northwest. Among other items, the AIR specified completion of a Recreation Plan inclusive of the elements in Energy Northwest FLA and other elements the Commission required. On June

6, 2008, ENW filed the Packwood Lake Recreation Plan (PLRP) which was collaboratively developed between the USDA Forest Service and ENW. The PLRP is inclusive of the Road Management elements.

USDA Forest Service management direction provides that all access routes are to sustain a stable road / trail condition, by providing proper road / trail maintenance, particularly drainage maintenance, to avoid sub grade failures and resource damage. Further, in order for the USDA Forest Service to meet its' management direction, particularly ACS Objectives 6-9 the USDA Forest Service will require the restoration elements described in the PLRP. The USDA Forest Service must maintain a reasonable level of control over project operations that affect NFS lands, resources and programs. As detailed in the Packwood Lake Recreation Plan filed with the Commission on June 6, 2008, the USDA Forest Service requires the provisions described in the Plan to be implemented over the new Project license period.

IV. References Cited

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

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USDA Forest Service. 2001. The Built Environment Image Guide For the National Forests and Grasslands. FS-710. U.S. Department of Agriculture Washington, DC. September 2001.

Watershed Geodynamics 2007. Final Engineering Needs for Access Routes Study Report for Energy Northwest's Packwood Lake Hydroelectric Project, FERC No. 2244, Lewis County, Washington.

Condition No. 15 - Pipeline, Surge Tank and Penstock Monitoring

I. Existing Situation

Pipeline and Tunnels

Approximately 16,759 feet of 72-inch pipe and two tunnels convey water from Packwood Lake to the surge tank. Additionally, two tunnels carry Project waters in areas where the steep terrain or unstable material made construction of a pipeline undesirable. The first tunnel (Tunnel No. 1), located approximately 1,299 feet downstream from the outlet of Packwood Lake, is approximately 1,730 feet long and is lined in a circular configuration with a 6-foot diameter. The second tunnel (Tunnel No. 2), located approximately 4,741 feet below the downstream outlet of Tunnel No. 1, is roughly 3,202 feet in length and is partly lined with concrete in a configuration with rectangular walls and an arched ceiling. In total, Project pipeline and tunnels carry Packwood Lake water 21,690 ft down to the surge tank (ENW FLA 2008).

Surge Tank and Penstock Isolation Valve

The Project's surge tank is 14 feet in diameter and rises approximately 191 feet above the pipeline invert and is approximately 135 feet above ground level. The inner chamber of the tank is 5.5 feet in diameter. The surge tank is painted green and is visible from the community of Packwood. The penstock isolation (butterfly) valve is located at the base of the surge tank and is used to isolate the 21,690-foot pipeline from Packwood Lake from the steel penstock that transports water to the powerhouse. The surge tank also serves as a location for radio antennas and transmitters for state and county agencies, the nearby national park, and a local community radio service (ENW FLA 2008).

Penstock

The steel penstock connecting the pipeline to the powerhouse is approximately 5,621 feet long, and is secured along the route by concrete anchors located at numerous points where the contour of the mountain requires changes in alignment or grade. The penstock is buried throughout its length from the surge tank to the powerhouse. There are nine manholes providing access to the pipe. The nominal design discharge of the pipeline and penstock system is 236 cfs (ENW FLA 2008).

ENW has performed annual monitoring since the Project began operation to verify the integrity of the water conveyance system. Monitoring includes visual inspections of penstock, pipeline, and control piping, both internally and externally where possible. External inspections include the condition of the surrounding terrain, with particular attention to land movement, wet spots, changes in drainage patterns, and erosion.

II. Forest Plan Direction

The Gifford Pinchot National Forest Land and Resource Management Plan Amendment 11 (1995) provides the management direction for all National Forest System lands and their

associated resources directly affected by or within the project vicinity of the Packwood Lake hydroelectric project in the Lake Creek Sub-watershed. Amendment 11 is a compilation of the current direction as expressed in the standards and guidelines from the Record of Decision for the Northwest Forest Plan and the Gifford Pinchot National Forest Management Plan (1990).

The Aquatic Conservation Strategy (ACS), a core component of the Northwest Forest Plan, provides management direction aimed at maintaining or restoring the ecological health and functioning of watersheds (defined as HUC 5th field) and the aquatic ecosystems contained within them. Lake Creek drainage area is one sub-watershed (defined as a HUC 6th field) of the Upper Cowlitz River Watershed. Specifically, objectives 5, 6 and 9 pertain the most to this analysis. These objectives are stated as follows:

- *Objective 5 – Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*
- *Objective 6 – Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*
- *Objective 9 – Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

The Northwest Forest Plan Standard and Guideline LH-2 states: “During the relicensing of hydroelectric projects, (the Forest Service shall) provide written and timely license conditions to FERC that emphasize in-stream flows and habitat conditions that maintain or restore riparian resources and channel integrity.”

The federally managed lands within the Lake Creek Watershed are designated as a Tier 1 Key Watershed. Tier 1 Key Watersheds were selected for directly contributing to anadromous salmonid and bull trout conservation. Key watersheds are highest priority for watershed restoration.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008

containing the PME measures agreed to in principle, including the measure for Pipeline, Surge Tank and Penstock Monitoring located in ENW Appendix C, FLA 2008.

Even though ENW annually monitors the Projects' conveyance system, the USDA Forest Service must maintain a reasonable level of control over Project operations that affect NFS lands and resources. The condition for Project water conveyance system monitoring is intended to provide for a safeguard against any damaging spills that could affect NFS lands and resources.

IV. References Cited

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

USDA Forest Service. 1995. Land and Resource Management Plan Gifford Pinchot National Forest.

Condition No. 16 - Exotic and Invasive Vegetative Management

I. Existing Situation

Information on the existing situation comes from the Noxious Weed Survey Final Report for Energy Northwest's Packwood Lake Hydroelectric Project FERC No. 2244 Lewis County, Washington, Beck Botanical Services, 2007, and from observations by North Zone Gifford Pinchot NF botanist L. Swartz.

A total of seventeen noxious weed species were located in the Packwood Lake study area (Table 1). No Class A noxious weeds were located. General information on each of the target species, i.e., Class B designate, Class B select and Class C select weed species, located in the study area is provided below (Figure 1). Observations of Class B (non-designate) and Class C weeds are given for a more complete picture of the presence of noxious weed species in the study area. More information can be found on all noxious weed species at the Washington Noxious Weed Control Board website: <http://www.nwcb.wa.gov/>.

Common Name	Scientific Name	Class *
Butterfly bush	<i>Buddleja davidii</i>	C select
Diffuse knapweed	<i>Centaurea diffusa</i>	B designate
Meadow knapweed	<i>Centaurea jacea</i> x <i>nigra</i> (<i>moncktonii</i>)	B designate
Canada thistle	<i>Cirsium arvense</i>	C select at Wilderness trailheads
Bull thistle	<i>Cirsium vulgare</i>	C
Scotch broom	<i>Cytisus scoparius</i>	B non-select
Wild carrot	<i>Daucus carota</i>	B
Herb Robert	<i>Geranium robertianum</i>	B
Common St. John's-wort	<i>Hypericum perforatum</i>	C
Common catsear	<i>Hypochaeris radicata</i>	B
Oxeye daisy	<i>Leucanthemum vulgare</i>	B
Reed canary-grass	<i>Phalaris arundinacea</i>	C select at Wilderness trailheads
Japanese knotweed	<i>Polygonum cuspidatum</i>	B select
Sulfur cinquefoil	<i>Potentilla recta</i>	B non-select
Tansy ragwort	<i>Senecio jacobaea</i>	B non-select
Common groundsel	<i>Senecio vulgaris</i>	C
Common tansy	<i>Tanacetum vulgare</i>	C

* Refer to text for noxious weed Class definitions.

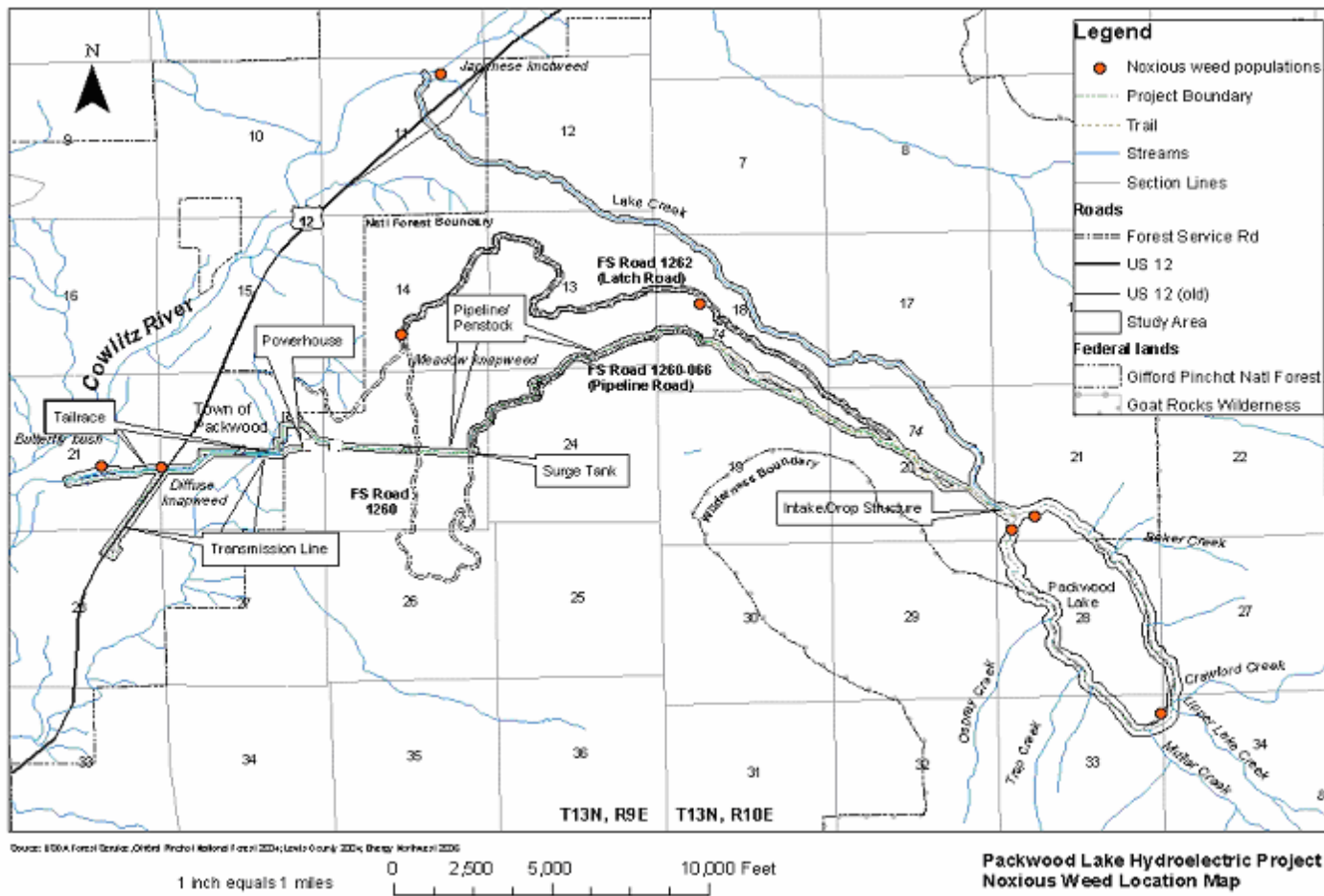


Figure 1 Class B designate, Class B select and Class C select weed species populations located in the Packwood Lake study area, 2005-2006, 2008. There is scattered Canada thistle on the shore of Packwood Lake, and reed canary grass at the inlet and outlet of Packwood Lake and on the Latch Road above the gate.

Class B Designate Weeds

Diffuse knapweed (*Centaurea diffusa*) is an aggressive biennial or short-lived perennial in the sunflower family with a long taproot and generally white, to sometimes pink to lavender flowers (NWCB 2006). It spreads primarily by seed. It is capable of forming dense colonies in a variety of disturbed habitats including roadsides, sandy or gravelly ground, sandy river shores, vacant lots, trails, and gravel pits. It is not tolerant of flooding or shade (NWCB 2006).

In the study area, a small population of diffuse knapweed was located on private land along the tailrace west of Highway 12. Approximately ten to 15 scattered plants were observed between the gravel road and the fence along the tailrace. Its roadside habitat is disturbed and plant associates include many other non-native species. In the late-1990's, a very dense population of diffuse knapweed along the tailrace was treated with herbicides and largely eliminated (R. Crawford Energy Northwest personal communication). The tailrace knapweed population is near the Lewis County-owned solid waste and transfer station where there is a large known population of diffuse knapweed (B. Wamsley LCWCB personal communication). This larger population may act as a local seed source for surrounding areas. The LCWCB has been treating plants at that site on an on-going basis. Diffuse knapweed can be controlled by hand pulling, herbicides, and biocontrol methods.

Meadow knapweed (*Centaurea jacea* x *nigra*) is a perennial plant in the sunflower family, which grows from a woody root crown. It spreads primarily by seed. It blooms from July to September producing rose-purple flowers and eventually ivory-white to light brown seeds (NWCB 2006). Meadow knapweed is a self-proliferating cross between two other knapweed species: brown knapweed (*Centaurea jacea*) and black knapweed (*Centaurea nigra*). A recent treatment of *Centaurea* species in the Flora of North America refers to it as *C. x moncktonii* (Barkley et al. 2006). In some references, it is known as *Centaurea pratensis*, although this is not considered a legitimate name.

There is a large, previously known population of meadow knapweed on Forest Service land along FSR 1260 in the vicinity of FSR 1262 that the Forest Service and the LCWCB have treated by hand pulling in the last few years (B. Wamsley LCWCB personal communication). It is also present on the roadside of the first tenth of a mile of FSR 1262 (Latch Road). The plants growing along FSR 1262 (Latch Road) are only portion of this population that is in the study area. Although co-dominant with other species along roadsides, it has not invaded adjacent forested areas. Meadow knapweed can be controlled by hand pulling, herbicides and biocontrol methods.

Class B Select Weeds

Japanese knotweed (*Polygonum cuspidatum*) is a perennial species with spreading rhizomes and numerous reddish-brown freely branched stems that can reach eight feet in height. The species forms dense stands that crowd out all other vegetation, degrading native plant and animal habitat (NWCB 2006). Its habitat includes waste places, roadsides and along streambanks (NWCB 2006).

Near the study area, a small population of Japanese knotweed was observed on private land along a forested, muddy side channel on the Cowlitz River approximately 100 feet upstream of Lake Creek. It is a previously known population that the LCWCB has been treating for several years with glyphosate (B. Wamsley LCWCB personal communication). At the time of the observation, it had six non-reproductive stems, which were approximately 1.5 feet tall. In addition, there were several clumps of plants at the gravelly area at the Lewis County-owned and operated solid waste and transfer station near the tailrace that have been successfully treated and eliminated (B. Wamsley LCWCB personal communication). Japanese knotweed is most effectively controlled by herbicide application (NWCB 2006).

Class C Select Weeds

Butterfly bush (*Buddleja davidii*) Butterfly bush is a deciduous shrub with opposite leaves that can reach 15 feet in height. It is superficially similar looking to ornamental lilacs in that it has showy spikes of purple flowers. It is often planted in yards and gardens as an ornamental, but then colonizes disturbed areas, including roadsides, pastures, riverbanks, and recently logged forests (NWCB 2006). It can form dense thickets, especially along riparian areas and gravel bars that crowd out native vegetation and may alter soil nutrient concentrations. It can reproduce by seed or vegetatively as cut stems can sprout roots and grow into new plants (NWCB 2006). The LCNWCP has a policy of requiring control of plants obviously escaped from cultivation as opposed to plants that are ornamental yard plantings (B. Wamsley LCWCB personal communication).

Several butterfly bush plants (2 to 3 individuals) were located on private land near where the tailrace enters the Cowlitz River. It was growing in semi-stabilized cobbles and gravels. The plants looked as though they might have originally have been plant fragments that washed downriver during a flood event and then took root. When not blooming, butterfly bush is difficult to spot amongst willows and other riverine vegetation. Butterfly bush can be controlled by herbicides and mechanical methods.

Canada thistle (*Cirsium arvense*) is a common and aggressive weed in moist, disturbed areas where it forms large rhizomatous patches. In the study area, a large patch was observed on the shore of the southeast end of Packwood Lake in the vicinity of Upper Lake Creek. Other large patches of Canada thistle were observed in moist areas in and around the Packwood Lake powerplant, Snyder Creek and Hall Creek. Smaller patches were observed along the Latch Road, Lake Creek/Cowlitz River confluence, and the shores of Packwood Lake. Although not required, there has been some effort on the part of Energy Northwest to control Canada thistle populations in the vicinity of the powerplant in the past (R. Crawford Energy Northwest personal communication). Canada thistle is designated for control in Lewis County at wilderness trailheads, including Packwood Lake. Information about Canada thistle summarized in the Element Stewardship Abstract produced by The Nature Conservancy (Nuzzo, 1997) includes the following: Despite its common name, Canada thistle is native to Europe and was apparently introduced to North America in the early 17th century (Hansen 1918). *Cirsium arvense* has numerous ecotypes that respond differently to management activities. Some infestations may be completely controlled by one technique, while others will only be partially controlled because two or more ecotypes are present within the population. Additionally, *Cirsium arvense* responds

differently to management under different weather conditions. Therefore it is often necessary to implement several control techniques, and to continuously monitor their impacts. *Cirsium arvense* threatens natural communities by directly competing with and displacing native vegetation, decreasing species diversity, and changing the structure and composition of some habitats. Species diversity in an "undisturbed" Colorado grassland was inversely proportional to the relative frequency of Canada thistle (Stachion and Zimdahl 1980). Canada thistle invades natural communities primarily through vegetative expansion, and secondarily through seedling establishment. Both roots and leaves may be mildly allelopathic [inhibit growth of other plants].

Reed canary grass (*Phalaris arundinacea*) forms dense swards in moist, often disturbed areas such as at the Hall Creek wetland, Snyder Creek and in moist areas around the Packwood Lake powerhouse. There were scattered small patches of reed canary grass along the shores of Packwood Lake. Reed canary grass is designated for control in Lewis County at wilderness trailheads, including Packwood Lake. Reed canary grass, once established, tends to exclude development of herbaceous communities and limits species richness (Perkins and Wilson, 2004). It grows vigorously, beginning early in the spring, and expands laterally via tough rhizomes to form a dense sod. Later in the summer the culms tend to fall over (lodge), effectively shading out and smothering any competing vegetation. This characteristic also prevents dense stands of reed canary grass from being useful for perching sites, nesting sites, or cover for wildlife (Dobrowolski, 2001). It reproduces via abundant seed or rhizome fragments, which can be spread by water or by people. Some strains of reed canary grass are considered native to North America, but more aggressive European strains have been introduced, and currently reed canary grass behaves like an invasive in Pacific Northwest wetlands (Perkins and Wilson, 2004).

Other Class B and Class C Weeds

Class B weeds are established in some regions of Washington, but are of limited distribution or not present in other regions of the state. In regions where Class B weeds are already abundant control is decided at the local level. Class C weeds are non-native species that are already widely distributed in Washington or are of special interest to the state's agricultural industry. Placement on the state Class C noxious weed list allows counties to enforce control if locally desired.

Class B Noxious Weeds

Scotch broom (*Cytisus scoparius*) is a common and widespread shrubby weed in the general Packwood area. In the study area, it ranges from common to uncommon along: Latch Road (FSR 1262), Pipeline Road (FSR 1260-066), penstock, tailrace, powerhouse, Cowlitz River gravel bar, Lake Creek/Cowlitz River confluence, and Trail 78 parking lot. Although not required, Energy Northwest has done some control of Scotch broom along the tailrace over the last few years (R. Crawford Energy Northwest personal communication). Although common in disturbed areas, it was not observed growing in undisturbed forested areas. Scotch broom has a long-lived seed bank – up to 80 years (Hoshovsky 1986). Therefore any open area where Scotch broom is allowed to set seed is primed to produce a new crop of seedlings when the next disturbance occurs, even if trees overtop and shade out the population.

Wild carrot (*Daucus carota*) is common on roadsides and other disturbed areas in the study area, including the Latch Road (FSR 1262), Lake Creek/Cowlitz River confluence, and the tailrace. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Herb Robert (*Geranium robertianum*) is a mesic upland annual to short-lived perennial species with pink flowers. It is common to co-dominant along all of Lake Creek from Packwood Lake down to its confluence with the Cowlitz River. The lower one-mile reach of Lake Creek has a particularly high density of plants, sometimes almost entirely replacing other herbaceous plant species. Scattered plants were observed along the penstock upslope of the powerhouse and on the Cowlitz River gravel bar near the tailrace slough. Unlike many weed species, herb Robert readily invades undisturbed habitats including forests. The Gifford Pinchot NF is concerned about possible effects to habitat for mollusks and other rare species from habitat dominance by herb Robert, but currently no effective means of control that would spare the desired native vegetation are known.

Common catsear (*Hypochaeris radicata*) is common along roadsides and other disturbed areas in the study area, including the penstock, Latch Road, Lake Creek/Cowlitz River confluence, Trail 78 parking lot, tailrace, tailrace/Cowlitz River confluence, and FSR 1260-066. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Oxeye daisy (*Leucanthemum vulgare*) is common along roadsides and other disturbed areas in the study area, including the Latch Road, penstock, Lake Creek, Trail 78 parking lot, and FSR 1260-066. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Sulfur cinquefoil (*Potentilla recta*) An infestation of sulfur cinquefoil was observed growing west of Highway 12 along the tailrace on disturbed ground.

Tansy ragwort (*Senecio jacobaea*) Small patches of plants were observed along the Latch Road (FSR 1262), the junction with FSR 1260, FSR 1260-066, and occasionally at the lakeshore area.

Class C Noxious Weeds

Bull thistle (*Cirsium vulgare*) is occasional along roadsides and other disturbed areas, including the Latch Road, Lake Creek/Cowlitz River confluence, FSR 1260-066, and the lakeshore area. It was not observed growing in undisturbed forested areas.

Common St. John's-wort (*Hypericum perforatum*) is common along roadsides and other disturbed areas, including the Latch Road, penstock, tailrace, Cowlitz River gravel bar, FSR 1260-066, and the lakeshore area. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Common groundsel (*Senecio vulgaris*) is uncommon in disturbed areas in the study area, with small groups of plants at the powerhouse, FSR 1260-066, and at Packwood Lake.

Common tansy (*Tanacetum vulgare*) is occasional in disturbed areas in the study area. A few small patches of plants were observed at the tailrace.

II. Forest Plan Direction

Preventing and Managing Invasive Plants Record of Decision 2005, Appendix 1-1, added to Gifford Pinchot Forest Plan:

Goals and Objectives	
Goal 1 - Protect ecosystems from the impacts of invasive plants through an integrated approach that emphasizes prevention, early detection, and early treatment. All employees and users of the National Forest recognize that they play an important role in preventing and detecting invasive plants.	
<u>Objective 1.1</u>	Implement appropriate invasive plant prevention practices to help reduce the introduction, establishment and spread of invasive plants associated with management actions and land use activities.
<u>Objective 1.2</u>	Educate the workforce and the public to help identify, report, and prevent invasive plants
<u>Objective 1.3</u>	Detect new infestations of invasive plants promptly by creating and maintaining complete, up-to-date inventories of infested areas, and proactively identifying and inspecting susceptible areas not infested with invasive plants.
<u>Objective 1.4</u>	Use an integrated approach to treating areas infested with invasive plants. Utilize a combination of available tools including manual, cultural, mechanical, herbicides, biological control.
<u>Objective 1.5</u>	Control new invasive plant infestations promptly, suppress or contain expansion of infestations where control is not practical, conduct follow up inspection of treated sites to prevent reestablishment.
Goal 2 - Minimize the creation of conditions that favor invasive plant introduction, establishment and spread during land management actions and land use activities. Continually review and adjust land management practices to help reduce the creation of conditions that favor invasive plant communities.	
<u>Objective 2.1</u>	Reduce soil disturbance while achieving project objectives through timber harvest, fuel treatments, and other activities that potentially produce large amounts of bare ground
<u>Objective 2.2</u>	Retain native vegetation consistent with site capability and integrated resource management objectives to suppress invasive plants and prevent their establishment and growth
<u>Objective 2.3</u>	Reduce the introduction, establishment and spread of invasive plants during fire suppression and fire rehabilitation activities by minimizing the conditions that promote invasive plant germination and establishment.

Goals and Objectives	
<u>Objective 2.4</u>	Incorporate invasive plant prevention as an important consideration in all recreational land use and access decisions. Use Forest-level Access and Travel Management planning to manage both on-highway and off-highway travel and travel routes to reduce the introduction, establishment and spread of invasive plants.
<u>Objective 2.5</u>	Place greater emphasis on managing previously “unmanaged recreation” (OHVs, dispersed recreation, etc.) to help reduce creation of soil conditions that favor invasive plants, and reduce transport of invasive plant seeds and propagules.
Goal 3 - Protect the health of people who work, visit, or live in or near National Forests, while effectively treating invasive plants. Identify, avoid, or mitigate potential human health effects from invasive plants and treatments.	
<u>Objective 3.1</u>	Avoid or minimize public exposure to herbicides, fertilizer, and smoke
<u>Objective 3.2</u>	Reduce reliance on herbicide use over time in Region Six
Goal 4 – Implement invasive plant treatment strategies that protect sensitive ecosystem components, and maintain biological diversity and function within ecosystems. Reduce loss or degradation of native habitat from invasive plants while minimizing adverse effects from treatment projects.	
<u>Objective 4.1</u>	Maintain water quality while implementing invasive plant treatments.
<u>Objective 4.2</u>	Protect non-target plants and animals from negative effects of both invasive plants and applied herbicides. Where herbicide treatment of invasive plants is necessary within the riparian zone, select treatment methods and chemicals so that herbicide application is consistent with riparian management direction, contained in Pacfish, Infish, and the Aquatic Conservation Strategies of the Northwest Forest Plan.
<u>Objective 4.3</u>	Protect threatened, endangered, and sensitive species habitat threatened by invasive plants. Design treatment projects to protect threatened, endangered, and sensitive species and maintain species viability.
Goal 5 – Expand collaborative efforts between the Forest Service, our partners, and the public to share learning experiences regarding the prevention and control of invasive plants, and the protection and restoration of native plant communities.	
<u>Objective 5.1</u>	Use an adaptive management approach to invasive plant management that emphasizes monitoring, learning, and adjusting management techniques. Evaluate treatment effectiveness and adjust future treatment actions based on the results of these evaluations.
<u>Objective 5.2</u>	Collaborate with tribal, other federal, state, local and private land managers to increase availability and use of appropriate native plants for all land ownerships.
<u>Objective 5.3</u>	Work effectively with neighbors in all aspects of invasive plant management: share information and resources, support cooperative weed management, and work together to reduce the inappropriate use of invasive plants (landscaping, erosion control, etc.).

Standard #	Text of Standard	Implementation Schedule
1	Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis; fire and fuels management plans, Burned Area Emergency Recovery Plans; emergency wildland fire situation analysis; wildland fire implementation plans; grazing allotment management plans, recreation management plans, vegetation management plans, and other land management assessments.	This standard will apply to all assessments and analysis documents started or underway as of March 1, 2006; this standard does not apply to assessments and analysis documents signed or completed by February 28, 2006.
2	Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands. This standard does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time.	This standard will apply to permits and contracts issued after March 1, 2006. Ongoing permits/contracts issued before this date may be amended, but are not required to be amended, to meet this standard. This standard will apply to Forest Service force account operations starting March 1, 2006.
3	Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands. If State certified straw and/or mulch is not available, individual Forests should require sources certified to be weed free using the North American Weed Free Forage Program standards (see Appendix O) or a similar certification process.	Forests are already applying this standard on an informal basis; weed-free straw and mulch will be required as available, starting March 1, 2006.
4	Use only pelletized or certified weed free feed on all National Forest System lands. If state certified weed free feed is not available, individual Forests should require feed certified to be weed free using North American Weed Free Forage Program standards or a similar certification process. This standard may need to be phased in as a certification processes are established.	National Forest managers will encourage the use of weed-free feed across the National Forests in the Region. Pelletized feed or certified weed-free feed will be required in all Wilderness areas and Wilderness trailheads starting January 1, 2007. Pelletized or certified weed-free feed will be required on all National Forest System lands when certified feed is available (expected by January 1, 2009). Weed-free (or pelletized) feed requirements will be listed in individual Forest Closure orders.
5	No standard.	N/A

Standard #	Text of Standard	Implementation Schedule
6	Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder.	This standard will apply to grazing permits beginning March 1, 2006.
7	Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.	This standard will apply to rock source management beginning March 1, 2006.
8	Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate.	This standard will apply to all road blading, brushing and ditch cleaning projects beginning March 1, 2006.
9	No standard.	N/A
10	No standard.	N/A
11	Prioritize infestations of invasive plants for treatment at the landscape, watershed or larger multiple forest/multiple owner scale.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
12	Develop a long-term site strategy for restoring/revegetating invasive plant sites prior to treatment.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
13	Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species), 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, 3) if native plant materials are not available, or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation.	This standard will apply to restoration and rehabilitation projects beginning March 1, 2006.
14	Use only APHIS and State-approved biological control agents. Agents demonstrated to have direct negative impacts on non-target organisms would not be released.	This standard will apply to biological control projects beginning March 1, 2006.

Standard #	Text of Standard	Implementation Schedule
15	<p>Application of any herbicides to treat invasive plants will be performed or directly supervised by a State or Federally licensed applicator.</p> <p>All treatment projects that involve the use of herbicides will develop and implement herbicide transportation and handling safety plan.</p>	This standard will apply to herbicide treatment projects as of March 1, 2006.
16	<p>Select from herbicide formulations containing one or more of the following 10 active ingredients: chlorsulfuron, clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, picloram, sethoxydim, sulfometuron methyl, and triclopyr. Mixtures of herbicide formulations containing 3 or less of these active ingredients may be applied where the sum of all individual Hazard Quotients for the relevant application scenarios is less than 1.0.¹</p> <p>All herbicide application methods are allowed including wicking, wiping, injection, spot, broadcast and aerial, as permitted by the product label. Chlorsulfuron, metsulfuron methyl, and sulfometuron methyl will not be applied aerially. The use of triclopyr is limited to selective application techniques only (e.g., spot spraying, wiping, basal bark, cut stump, injection).</p> <p>Additional herbicides and herbicide mixtures may be added in the future at either the Forest Plan or project level through appropriate risk analysis and NEPA/ESA procedures.</p>	This standard will be applied to invasive plant projects with NEPA decisions signed after March 1, 2006.
17	No standard.	N/A
18	Use only adjuvants (e.g. surfactants, dyes) and inert ingredients reviewed in Forest Service hazard and risk assessment documents such as SERA, 1997a, 1997b; Bakke, 2003.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
19	To minimize or eliminate direct or indirect negative effects to non-target plants, terrestrial animals, water quality and aquatic biota (including amphibians) from the application of herbicide, use site-specific soil characteristics, proximity to surface water and local water table depth to determine herbicide formulation, size of buffers needed, if any, and application method and timing. Consider herbicides registered for aquatic use where herbicide is likely to be delivered to surface waters.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.

Standard #	Text of Standard	Implementation Schedule
20	Design invasive plant treatments to minimize or eliminate adverse effects to species and critical habitats proposed and/or listed under the Endangered Species Act. This may involve surveying for listed or proposed plants prior to implementing actions within unsurveyed habitat if the action has a reasonable potential to adversely affect the plant species. Use site-specific project design (e.g. application rate and method, timing, wind speed and direction, nozzle type and size, buffers, etc.) to mitigate the potential for adverse disturbance and/or contaminant exposure.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
21	Provide a minimum buffer of 300 feet for aerial application of herbicides near developed campgrounds, recreation residences and private land (unless otherwise authorized by adjacent private landowners).	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
22	Prohibit aerial application of herbicides within legally designated municipal watersheds.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
23	Prior to implementation of herbicide treatment projects, National Forest system staff will ensure timely public notification. Treatment areas will be posted to inform the public and forest workers of herbicide application dates and herbicides used. If requested, individuals may be notified in advance of spray dates.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.

1. ATSDR, 2004. Guidance Manual for the Assessment of Joint Toxic Action of Chemical Mixtures. U.S. Department Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry.

Inventory and Monitoring Framework - Appendix M from the Invasive Plant Final EIS 2005

It is assumed every Forest in Region Six has an invasive plants coordinator and is maintaining an up-to-date invasive plant inventory using NRIS/Terra, the nationally accepted protocol. The inventory will be the primary means to plan and prioritize treatments. The inventory will be used as the main vehicle for tracking treatment effectiveness both regionally and on a site specific basis. In addition to the monitoring that is already required under various Forest Plans, this inventory and monitoring plan framework is part of all action alternatives in this Environmental Impact Statement (EIS).

The framework would guide the development of detailed monitoring plans at the site-specific project scale. Invasive plant treatment and restoration actions are likely to be complex, involve multiple land ownerships and will take years to implement, due to the nature of invasive plant problems. It is likely that a site will be treated multiple times over the years. Tracking these efforts and subsequent progress will be crucial to determining success. A good monitoring program will be well thought out and have a high probability of detecting change in the resource being monitored (NPS, 2002).

The Field Guide to Invasive Plant Inventory, Monitoring and Mapping (USDA Forest Service 2002) has been developed to guide monitoring efforts in conjunction with NRIS/Terra. It suggests a monitoring regime may start with annual monitoring for the first 3-5 years, decreasing

in frequency to every other year for the next 5-10 years and further decreasing monitoring frequency to every 3 years for the next ten years until the seed source has been exhausted (i.e. no new germination taking place). Monitoring regimes may vary in time and space depending on the species; for example, those that reproduce vegetatively may require a longer span of annual monitoring. The monitoring categories described in this framework (implementation/compliance, and effectiveness (of treatments in meeting project objectives, and effectiveness of protection measures) can be used to implement a long-term adaptive management strategy. By implementing an adaptive management approach, managers will identify and respond to changing conditions and new information on an ongoing basis, and assess the need to make changes to treatment and restoration strategies.

Implementation/Compliance Monitoring Appendix 1-8 Preventing and Managing Invasive Plants Record of Decision October 2005

Implementation/compliance monitoring answers the question, “Did we do what we said we would do?” This question needs to be answered on a Regional scale, because adaptive management strategies require determination that actions are taking place as described in the Invasive Plants EIS. If an action alternative is selected, each Forest Supervisor will be directed to assess compliance with the Invasive Plant Program EIS Record of Decision as a part of Forest Plan Implementation monitoring. Regional Office staff will periodically aggregate this information as a part of program oversight. An implementation/compliance checklist database, such as the Pacfish/Infish Biological Opinion Implementation Monitoring module database for the eastside, could be used as a template to input and analyze implementation/compliance monitoring data. The use of a consistent reporting format will allow for aggregation of information at various scales. Such as system will be used to determine patterns of compliance.

Listed Species

An implementation/compliance monitoring database would track invasive plant treatment projects that are the subject of Section 7 consultations under the Endangered Species Act (ESA), generate annual reporting of compliance for use by the Services (NOAA Fisheries, U.S. Fish and Wildlife) and Forest Service (FS), and allow for common reporting of data on individual projects. As a minimum, on each project requiring consultation, reporting will be required on compliance with Standards 16, 18, 19, and 20 in the Invasive Plant EIS. Additional standards could be included, as appropriate, for the individual ecoregions, Forests, or projects. For example, Northwest Forest Plan (NWFP) riparian standards relevant to herbicide use or invasive plant control projects could be included in the database for those Forests in the NWFP-covered areas.

Effectiveness Monitoring

Effectiveness monitoring, relative to project objectives, answers the question, “Were treatment and restoration projects effective?” This question could be answered on either a regional or a project-level scale. Invasive plant infestations require pre-project inventories to determine how, when, and where treatments are to be applied, and post-treatment monitoring to assess the effectiveness (treatment) in meeting project objectives (e.g. restoring structure and composition

of native vegetation). A goal of the Effectiveness Monitoring component in the Regional Invasive Plant Program is to answer the following questions:

- Have the number of new invasive plant infestations increased or decreased in the Region or at the project level?
- What changes in distribution, amount and proportion of invasive plant infestations have resulted due to treatment activities in the region or at the project level?
- Has the infestation size for a targeted invasive plant species been reduced regionally or at the project level?
- Which treatment methods, separate or in combination, are most successful for specific invasive species?
- Which treatment methods have not been successful for specific invasive species?

The nation-wide NRIS/Terra database and the upcoming FACTS database provide common reporting formats to input information and provide a mechanism for addressing the above questions. In addition, current long-term ecological monitoring networks will assist the FS in determining trends of invasive plant infestations at the Regional level.

The NRIS/Terra database could be sorted to answer the above questions because it tracks size and species of infestations as well as treatment methods. The Forest Inventory and Analysis Network (FIA) or the Forest Health Monitoring plots associated with the FIA network could be used to follow invasion trends. Such networks could be used to track trends in the spread or reduction in spread of the more dominant invasive plants in the region. Monitoring programs developed at the Forest level would answer more project specific questions.

Listed Species

Monitoring that addresses the effectiveness of various measures designed to reduce potential adverse effects from the project, including standards in the EIS, “project design criteria”, “design features”, and “protection measures” may also need to be conducted. This type of monitoring will only be required for a **representative sample of** invasive plant treatment projects that pose a “high risk” to federally listed species. “High risk” projects are defined as projects with the potential to affect listed species, in the following situations:

- Any project involving aerial application of herbicide.
- Projects involving the use of heavy equipment or broadcast application of herbicide (e.g. boom spray or backpack spraying that is not limited to spot sprays) that occur in 1) riparian areas (as defined in NWFP, Pacfish, or Infish, as applicable), ditches or water corridors connected to habitat for listed fish; or, 2) proximity to federally listed plants or butterfly habitat.
- For the purposes of determining the need for protection measure effectiveness monitoring, invasive plant treatment methods that are **not** considered “high risk” can include, but are not limited to, the following:

- Broadcast application of herbicide and use of heavy equipment that occurs **outside** of, riparian areas, ditches or water corridors connected to water bodies, or, 2) areas in proximity to federally listed plants or butterfly habitat.
- Manual methods including hand-pulling, grubbing, stabbing, pruning, cutting, etc.
- Mechanical methods using small equipment like chainsaws, or equipment rarely used and not often in proximity to listed fish habitat, like flamers, foamers, hot steam, etc.
- Prescribed fire used expressly for invasive plant control and which occurs outside of riparian areas or habitat for federally listed plants or butterflies.
- Herbicide applications using spot spray (used with a shield near listed plant locations) with a backpack sprayer, cut stump, injection, wicking wiping, basal bark applications, or other highly selective methods.
- Minor uses of fertilizer to encourage native plant competition or growth.
- Biological controls used in habitat areas for terrestrial wildlife or fish. Use in proximity to listed plants or butterflies should be evaluated on a case-by-case basis.
- Broadcast applications (except aerial) using clopyralid, imazapic, and metsulfuron methyl in proximity to habitat for listed fish or listed terrestrial wildlife.

A collection of several of these low risk projects in close proximity to each other and in proximity to habitat for listed species may constitute a “high risk” project, but this should be evaluated on a case-by-case basis.

Monitoring for “high risk” invasive plant treatments that may affect ESA-listed species or designated critical habitat should determine if standards and/or protection measures were effective at reducing potential effect pathways (e.g. disturbance, sedimentation, exposure to herbicides) and results should be applicable elsewhere. Unique, individual monitoring efforts and protocols have not provided information that is applicable to other areas or projects. Therefore, a Regional approach is outlined in this framework that will help address the needs for protection measure effectiveness at a broader scale. The regional approach will be developed in consultation with other agencies, including but not limited to National Marine Fisheries Service and U.S. Fish and Wildlife Service.

For example, Japanese knotweed is a serious invader of riparian areas and has the potential to alter ecosystems upon which listed salmon depend. The Region may have several Japanese knotweed treatment projects over the next several years and each one may have the potential to adversely affect listed salmon or designated critical habitat if adequate measures are not part of the treatment plan or are not complied with during implementation. Designing consistent monitoring protocol will allow a more efficient and effective evaluation of the project protection measures.

To meet the objective of being able to evaluate standards and measures applied at the Regional, sub-Regional, and project level for protection of ESA-listed species and/or designated critical habitat in “high risk” projects, an interagency monitoring protocol *and reporting schedule* will be developed by 2007. The expectation being that this protocol would be applied to high risk projects to determine the effectiveness of Regional EIS standards, and additional standards or protection measures applied at finer scales, in reducing potential effect pathways (e.g. disturbance, sedimentation, exposure to herbicides, etc.) for listed species.

In the interim, information obtained from implementation/compliance monitoring reports for “high risk” projects will be reviewed in 2005 and 2006 to inform the development of a consistent monitoring protocol for ensuring that standards and protection measures were effective. This 2-3 year lag time before the protocol is developed and effectiveness monitoring is implemented does not apply to aerial application of herbicides. All projects with aerial applied herbicide will include a monitoring plan to assess the effectiveness of measures in protecting ESA-listed species and/or designated critical habitat.

Until a Regional, interagency effectiveness monitoring protocol for ESA-listed species and/or designated critical habitat is developed (2007), the need for effectiveness monitoring on “high risk” projects will be evaluated by Level 1 or other interagency technical teams during Section 7 consultation.

Recommendations for additional effectiveness monitoring beyond that described in this framework will require that Level 2 or other appropriate interagency management team agree to the recommendations of the technical or Level 1 team for the project. This process will help lead the Region toward efficient and reliable data collection and allow statistical analysis of the data gathered.

Gifford Pinchot National Forest Plan

The Project area on NFS lands is within the Packwood Late-Successional Reserve. The objective of late-successional reserves is to protect and enhance conditions of late-successional and old-growth related species, including the northern spotted owl. (Gifford Pinchot Forest Plan 1995 p. 5-1.) The Gifford Pinchot Late-Successional Reserve Assessment (p. 3-3) describes the desired condition for riparian associated species. “Healthy, functioning riparian habitats will occur across the landscape. These areas will provide protected microclimates, large coarse woody debris, and cold, clear water for fish, amphibians, and other riparian dependent species.”

Amendment #20 (from Record of Decision, Site-specific Invasive Plant Treatment Project Final Environmental Impact Statement, 2008)

Our decision authorizes two changes to the Gifford Pinchot National Forest Plan:

1. Current Standard: Herbicides and other pesticides will not be applied in riparian reserves.

Amendment: Herbicides and other pesticides will not be applied in riparian reserves, except to treat invasive plants according to standards listed in the *Pacific Northwest Region 2005 Record of Decision for Managing and Preventing Invasive Plants*.

*The existing wording would be retained for **native** vegetation management.*

2. Current Standard: Vegetation adjacent to the designated travel route or recreation site [in visual emphasis area V] should be controlled in a visually inconspicuous manner, primarily by hand or machine methods. Any use of chemicals should be timed to avoid vegetative brownout (e.g., a dormant spray used in the fall).

Amendment: This standard would be deleted in its entirety.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

Excerpts from the 2005 FEIS for the Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Plants p 1-1 – 1-2:

- Invasive plants are currently damaging biological diversity and ecosystem integrity of lands within and outside the National Forest system in the Pacific Northwest. Invasive plants create a host of adverse environmental effects, including: displacement of native plants; reduction in habitat and forage for wildlife and livestock; loss of threatened, endangered, and sensitive species; increased soil erosion and reduced water quality; and reduced soil productivity. Invasive plants spread between National Forest system lands to neighboring areas, affecting all land ownerships.
- The economic impact of invasive plants is substantial. A study conducted for the Oregon Department of Agriculture estimated that invasive plants are costing Oregon citizens about \$100 million per year (2000).
- Despite current management efforts, invasive plants continue to increase and occupy previously uninfested areas, such as Wilderness areas.
- Invasive plants are spreading at an estimated rate of 4,600 acres per day on all federal lands in the West, outside of Alaska (Asher, 2001). This equates to adding approximately 1.7 million acres (an area the size of the Willamette National Forest), of new invasive plants every year.
- Collectively, these invasive plant species disrupt natural ecosystems, and increase the potential loss of native plant communities, wildlife, and ecosystem functions. Invasive plants can have adverse effects on rare or endemic species, which could result in listing under state or federal endangered species laws. Invasive plants threaten all land ownerships (private, corporate, tribal, and government), they have the potential to spread from one piece of property to the next.

Packwood Lake Project activities can contribute to this trend in several ways. The disturbance required to maintain Packwood Lake project facilities and access routes creates or maintains conditions favorable for invasive plants, such as open, sunny conditions, soil disturbance and compaction, and loss of native plant cover. Project vehicles and equipment can act as vectors by carrying weed seed or parts (Von der Lippe and Kowarik, 2007). Weed seeds or parts can be moved in gravel or soil whenever it is moved from one place to another, such as during maintenance activities.

The increased ease of access to Packwood Lake, created by roads constructed for the project, also increases the likelihood that recreationists will unintentionally carry weed seeds or parts into previously uninfested or rehabilitated areas. Prior to the development of the Project, access was by a 6 mile foot trail. Currently the area may be accessed by either a 4.5 mile non-motorized trail or a 4.5 mile motorized trail open to both motorcycles and ATV's. Motorized use increases total use.

In addition to the presence of vectors to carry seed or plant parts, and creation of suitable conditions, the access corridors created for project use serve as “pipelines” connecting previously isolated weed habitats, facilitating continued natural or assisted weed spread. Recreation foot trails are typically shaded by tall trees, inhibiting most weed spread. Motorized corridors are typically wider, and thus provide longer and more continuous sunny areas susceptible to weeds.

Both reed canary grass and Canada thistle can be moved by project activities or recreation.

The annual drawdown of Packwood Lake for penstock maintenance may create conditions suitable for reed canary grass (Hoffman and Kearns, in Lyons, K. E., 1998 p 4). The fluctuating water level creates a zone of reduced competition from other plants where weeds that prefer moist conditions have facilitated establishment.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Weed Management (ENW E.5.5.3 FLA 2008) and Exotic and Invasive Vegetative Management located in ENW Appendix C, FLA 2008.

The USDA Forest Service must maintain a reasonable level of control over Project operations that affect NFS lands and resources. Project activities have created a need for continuous and consistent implementation of an invasive plant prevention and control plan.

IV. References Cited

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Beck, K. 2007. Noxious Weed Survey Final Report for Energy Northwest's Packwood Lake Hydroelectric Project FERC No. 2244 Lewis County, Washington.

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USDA Forest Service. 2001. Invasive Plant Management Decisions and Environmental Analysis. USDA Forest Service

USDA Forest Service. 2002. Field Guide – Invasive Plant Inventory, Monitoring and Mapping Protocol. USDA Forest Service.

USDA Forest Service. 2005. Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants: Final Environmental Impact Statement.

USDA Forest Service. 2008. Record of Decision and Final Environmental Impact Statement and Forest Plan Amendment #20: Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area (Washington Portion) Site-Specific Invasive Plant Treatment Project and Forest Plan Amendment.

Von Der Lippe, M., and I. Kowarik. 2007. Long distance dispersal of plants by vehicles as a driver of plant invasions. *Conservation Biology*, 21.4: 986-996.

Condition No. 17 - Raptor Protection - Primary Distribution Line

I. Existing Situation

The Project transmission line begins at the powerhouse and terminates at the Packwood substation, spanning a distance of about 8,009 feet (about 1.5 miles). Three conductors transmit electricity at 69 kV and are supported by a total of 31 poles. Between the powerhouse and Highway 12, the line follows the Project tailrace canal; the conductor arrangement on eight poles in this span is in the wishbone design, whereas the other five poles have a vertical conductor arrangement. Along Highway 12 to the Packwood substation, all of the 18 poles have a vertical conductor arrangement. The span along Highway 12, which also carries other lines and services not associated with the Project, was recently upgraded by Lewis County Public Utility District (PUD). Maintenance of the transmission line is performed by Lewis County PUD.

The wishbone and vertical, phase opposite designs appear to conform to accepted standards for electrocution risk avoidance (i.e., adequate distance between phase conductors and between the phase conductors and a grounding source line), and are not equipped with overhead ground wires. The conductor arrangements on the Project transmission line are not known to be hazardous to birds. Lewis County PUD has not experienced bird-related outages or known avian electrocutions with these designs, and the Project operators have not documented any bird collisions or problems.

Raptors (birds-of-prey) are the focus of most electrocution avoidance protection measures. Raptors that may occur in the vicinity of the Project transmission line include bald eagle, osprey, turkey vulture, red-tailed hawk, northern harrier, Cooper's hawk, sharp-shinned hawk, American kestrel, great horned owl, barn owl, barred owl, and western screech owl. Eagles and buteos (such as red-tailed hawk) are more commonly electrocuted than other raptors.

II. Forest Plan Direction

Department of Agriculture Regulation 9500-4 directs the USDA Forest Service to manage "habitats for all existing native and desired nonnative plants, fish, and wildlife species in order to maintain at least viable populations of such species."

USDA Forest Service policy implementing the National Forest Management Act establishes objectives and direction to ensure that actions on NFS lands do not contribute to trends toward Federal listing or loss of viability of any native or desired non-native species (FSM 2672.41).

36 CFR 219 covers the planning process for development of National Forest Land and Resource Management Plans. The Code of Federal Regulations provides the implementing direction for the National Forest Management Act (1976).

In the 1982 edition of the regulations at 36 CFR 219.19, paragraph 1 states, *Fish and Wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals*

to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

-219.19 (2) Planning alternatives shall be stated and evaluated in terms of both amount and quality of habitat and of animal population trends of the management indicator species. For the Gifford Pinchot NF, cutthroat trout, steelhead trout and bull trout were selected as management indicator species.

-219.19 (3) Biologists from State fish and wildlife agencies and other Federal agencies shall be consulted in order to coordinate planning for fish and wildlife, including opportunities for the reintroduction of extirpated species.

Section 219.27(g) Diversity states in part, *Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species.*

The Gifford Pinchot National Forest Land and Resource Management Plan (LRMP) as amended by the Northwest Forest Plan (1995), provides management direction for all National Forest system lands and their associated resources directly affected, or in the vicinity of, the Packwood Lake Hydroelectric Project. Forest-wide standards and guidelines for wildlife also apply to projects that are permitted, but not performed by the Forest Service. The following pertain to this hydro-electric project:

- 1) All project areas affected by management activities will be reviewed for Sensitive, Threatened, or Endangered plant and animal species. (p. 2-71)
- 2) A biological evaluation will be conducted before any ground disturbing activities occur which may adversely affect Sensitive species. (p. 2-71)
- 3) Plant and wildlife Conservation Strategies will be prepared for each sensitive species, guild or habitat. (p. 2-71)
- 4) When eagles are found, a survey and habitat inventory will be conducted in the Cowlitz, Nisqually, and Lewis Rivers, and other drainages, to identify active bald eagle nests and potential habitat. (p. 2-71)
- 5) Consultation with the U.S. Fish and Wildlife Service will be required for each program activity or project that the Fish and Wildlife Service determines may affect Threatened or Endangered species and will be completed before any decision is made on the proposed project. Management activities must be conducted in such a manner that they will not impair recovery of any Threatened or Endangered species. (p. 2-71)

A key element of Northwest Forest Plan (NWFP) is the Aquatic Conservation Strategy (ACS). The ACS is intended to restore and maintain the ecological health of watersheds and aquatic

ecosystems within them on public lands (ROD B-9, FEMAT V-29). The approach is aimed at preventing further degradation and restoring habitat over broad landscapes as opposed to individual projects or small watersheds. The ACS requires maintaining or restoring biological and physical processes within their ranges of natural variability. The S&G of the NWFP focus on meeting and/or not preventing attainment of the nine ACS Objectives (ROD B-11). Management actions that do not maintain the existing condition or lead to improved conditions in the long term would not meet the intent of the ACS and should not be implemented (ROD B-10).

III. Justification/Rationale for Support of the Modified Terms and Conditions

The Forest Service is charged with managing habitat for all native species and desired non-native species to ensure viable populations and the widespread distribution over the landscape of these species. Species in decline receive greater emphasis in evaluating habitat requirements and the potential effects to the species. Often, these species are considered sensitive species by the Forest Service; or when there is even greater concern for the viability of the species, they may be listed as threatened or endangered under the ESA. The USDA Forest Service evaluates power line collision in terms of the significance of this mortality to the overall populations of these species.

At present, the USDA Forest Service has not identified specific instances of avian species of concern collision due to transmission lines or distribution lines associated with the Project. However, there is the potential that this issue could arise in the future, through the next license period, based on monitoring and/or changes in bird populations over time.

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for Raptor Protection - Primary Distribution Line (ENW E.5.4.3.2 FLA 2008).

The USDA Forest Service must maintain a reasonable level of control over Project operations that affect NFS lands and resources. Requiring ENW under this condition to implement the avian protection plan for the transmission lines occupying NFS lands is consistent with USDA Forest Service management direction.

IV. References Cited

Avian Power line Interaction Committee (APLIC). 1994. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Institute. Washington, D.C., USA.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

Condition No. 18 - Cultural Resources

I. Existing Situation

The cultural context for the Packwood Lake Hydroelectric Project along with the methods used and results of efforts to identify historic properties at the Project is contained in the Gifford Pinchot National Forest (GPNF) existing information analysis (McClure 2004), the inventory report (Dampf and Thompson 2006), and the Historic Properties Management Plan (HPMP) (Thompson 2007).

An Area of Potential Effect (APE) is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties if any such properties exist" (36 CFR 800.16d). For the Packwood Lake Hydroelectric Project, the APE consists of the land within the Project boundary. At Packwood Lake, the Project boundary is at elevation 2860 feet MSL, which encompasses 3 vertical feet above the lake's usual summer water level. Additional areas included the water conveyance system that extends from Packwood Lake to the town of Packwood, and the sites of the powerhouse, tailrace, and transmission line.

A Cultural Resource Committee (CRC) for the Project's relicensing was established in 2005 and included representatives of Energy Northwest, Cowlitz Indian Tribe (CIT), Yakama Nation (YN), GPNF, Department of Archaeology and Historic Preservation (DAHP), FERC, and consultant firm Historic Research Associates (HRA). The CRC reviewed and commented on study plan methods and schedules, the draft inventory report, the confidential nature of traditional cultural property (TCP) and archaeological site information, and the curation of collected artifacts. On July 10, 2007 a draft version of the HPMP was issued to the USDA Forest Service, FERC, Washington State Office of Archaeology and Historic Preservation, Cowlitz Tribe, and the Yakama Nation for comment. No comments were received.

On August 30, 2007, the final HPMP was submitted to the Commission. Both general and specific protection, mitigation, and enhancement measures are identified and discussed in the Historic Properties Management Plan (Thompson 2007).

II. Forest Plan Direction

Law, regulation, and policy are the framework of the land and resource management plan. Each is summarized below as they pertain to heritage resources.

Federal Law

The National Historic Preservation Act (NHPA) of 1966 established the federal government's policy and programs on historic preservation. Section 106 of the Act requires federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted or permitted undertaking, to take into account the effects an undertaking may have on historic properties listed on or eligible for the National Register of Historic Places.

Besides the NHPA, a number of additional legislative and executive orders direct consideration of the cultural environment on National Forest System lands and are relevant to the current project, including the American Indian Religious Freedom Act of 1978 (AIRFA), Executive Order 11593 (1971), Executive Order 13007 (1996), and the Native American Graves Protection and Repatriation Act of 1990. Each of these laws and E.O.s are briefly discussed below.

AIRFA (P.L. 95-341) states that it is the policy of the United States to protect American Indians' right to believe, express and exercise their traditional religions, including but not limited to "access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites". AIRFA reaffirms the responsibility of federal agencies to evaluate their policies and procedures with the aim of avoiding infringements on Indian religious freedom, and to make a good faith effort to consult with Indian people about protecting Indian religious cultural rites and practices.

Executive Order 11593 requires agency heads to locate, inventory, and nominate all eligible cultural resources to the NRHP and exercise caution until these inventories and evaluations are complete to ensure that no eligible federally owned property is transferred, sold, demolished or substantially altered. The order outlines procedures for meeting the inventory requirements of NHPA and NEPA and established the principal of "interim protection" which states that, until a resource has been evaluated, it must be treated as if it were eligible for the National Register of Historic Places.

Executive Order 13007 mandates that federal agencies protect and accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners. The order also mandates that agencies avoid adverse physical effects to such sites to the extent practicable and that they maintain the confidentiality of sacred sites. The executive order affirms that federal agencies should give reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of, or may adversely affect the physical integrity of, sacred sites.

The Native American Graves Protection and Repatriation Act [NAGPRA] (P.L. 101-601, implementing regulations at 43 CFR 10) addresses the rights of lineal descendants and members of Indian tribes, Alaska Native, and Native Hawaiian organizations to retain certain human remains and precisely defined cultural items. It covers items currently in federal repositories as well as future discoveries. Federal agencies must consult with the most likely direct descendant or a culturally affiliated tribe or organization where an undertaking may affect an Indian grave site.

Regulation

The principal Federal regulations governing protection of historic and cultural properties are embodied in 36 CFR Part 800, the implementing regulations of the National Historic Preservation Act. The regulations provide requirements for the inventory and evaluation of cultural resources, evaluation of project effects, and resolution of adverse effects. Requirements for consultation are also included in the regulations, including revisions of 1999 and 2004.

Federal Energy Regulatory Commission responsibilities regarding compliance with federal cultural resource law are set forth in 18 CFR 4.51(f)(4).

Policy

USDA Forest Service policy regarding heritage resource management is set forth in the Forest Service Manual, Chapter 2360, Part 2361. Policy calls for the management of cultural resources as a nonrenewable resource to maintain their scientific, historical, and social integrity, following the requirements of NHPA. Forest Service policy also calls for the use of cultural resources for educational, scientific, recreational, and other public purposes consistent with management requirements. Section 2361.21 outlines steps to ensure that cultural resources are preserved in place whenever possible. Policy under this section also includes direction to complete management plans for significant historic properties.

Operational policies and direction are set forth in a 1997 Programmatic Agreement among the USDA Forest Service, Washington SHPO, and the Advisory Council on Historic Preservation regarding management of heritage programs on National Forests in Washington.

Forest Plan

The Gifford Pinchot National Forest Land and Resource Management Plan Amendment 11 (1995:2-25 to 2-27) provides management direction for all National Forest System lands and their associated resources directly affected by or within the vicinity of the Packwood Lake Hydroelectric Project. Forest-wide standards and guidelines for heritage resources also apply to projects that are permitted, but not performed by the Forest Service. The following pertain to this Existing Information Analysis:

1. Project areas will be examined for heritage resources by a qualified specialist. The inventory will be conducted as early as feasible in the project planning stage.
2. Heritage resource inventory work will be coordinated with the State Historic Preservation Officer.
3. All heritage resources, including sites and structures, will be evaluated to determine eligibility for the National Register of Historic Places.
4. Potential effects of project activities on heritage resources will be assessed.
5. Heritage resources eligible for the National Register will be protected from potential effects of project activities or their historic values conserved through appropriate mitigation.
6. Heritage resources eligible for the National Register will be protected from depredation resulting from public use and natural deterioration.

7. Measures to avoid or mitigate project effects and to protect heritage sites and structures will be developed in consultation with the State Historic Preservation Officer.
8. Suitable heritage resources should be developed and interpreted for recreational use when adequate provisions are available to protect the resource.
9. Specific heritage resource site locations are exempt from disclosure to the general public.
10. Development of heritage resource management plans should be coordinated with local tribes where appropriate.
11. Traditional food and plant material gathering sites used by Native Americans may be managed for continued production of native roots, berries, nuts, herbs, beargrass, and other plant materials typically gathered from the land.
12. Consultation with affected tribes will be conducted early in the planning process and will occur on a government-to-government basis. Conflicts will be resolved collaboratively, with affected tribes involved in the planning process.

III. Justification/Rationale for Support of the Preliminary Terms and Conditions

On September 17, 2007, Energy Northwest filed its Preliminary Licensing Proposal (PLP) for the Project and filed it with the Commission. Upon filing, Energy Northwest and interested stakeholders, including the USDA Forest Service, met frequently and informally to reach agreement in principle on all PME measures outlined in the PLP and additional measures the USDA Forest Service deemed necessary to mitigate continuing Project impacts to NFS lands. By February 2008, Energy Northwest and the USDA Forest Service reached agreement in principle on all PME measures, with several of the PME measures being fully described. Energy Northwest filed its Final License Application (FLA) with the Commission in February 2008 containing the PME measures agreed to in principle, including the measure for implementing the HPMP (ENW E.5.9.3 FLA 2008) and the Cultural Resources condition located in ENW Appendix C, FLA 2008.

The USDA Forest Service must maintain a reasonable level of control over Project operations that affect NFS lands and resources. Requiring ENW under this condition to implement the HPMP is consistent with USDA Forest Service management direction.

IV. References Cited

Dampf, Steven, and Gail Thompson. 2006. Cultural Resources Inventory for Energy Northwest's Packwood Lake Hydroelectric Project (FERC No. 2244) Lewis County, Washington. Confidential report produced by Historical Research Associates, Inc. for Energy Northwest.

Energy Northwest 2008. Final License Application for New License. Packwood Lake Hydroelectric Project, FERC Project No. 2244. Energy Northwest (ENW) Richland, Washington.

McClure, Richard H., Jr. 2004. Heritage Resource Survey Report, Packwood Lake Guard Cabin Rehabilitation. USDA Forest Service, Gifford Pinchot National Forest. Report on file, Heritage Program, Gifford Pinchot National Forest, Trout Lake, Washington. OAHF Log. No. 042804-03-USFS-GP.

Thompson, Gail. 2007. Draft Final Historic Properties Management Plan for Packwood Lake Hydroelectric Project (FERC No. 2244), Lewis County, Washington. Confidential report produced by Historical Research Associates, Inc. for Energy Northwest. On file, State Department of Archaeology and Historic Preservation, Olympia, WA.

Condition No. 19 - Reservation of Authority

Justification/Rationale for Support of the Preliminary Terms and Conditions

The USDA Forest Service has prepared Preliminary FPA § 4(e) Terms and Conditions in response to the Commissions REA notice and based on the proposals contained in the Final License Application. If any proposal is modified as a result of the licensing proceeding or after licensing, then the Department of Agriculture, acting through the USDA Forest Service, will require adequate opportunity to reconsider each term and condition and make modifications it deems appropriate and necessary for the protection and utilization of the federal reservations managed by the USDA Forest Service, and to ensure consistency with the Gifford Pinchot National Forest Land and Resource Management Plans, as amended.

Enclosure III
USDA Forest Service
Gifford Pinchot National Forest
Comments on
Final License Application
Packwood Lake Hydroelectric Project
FERC Project No. 2244
August 2008

Introduction

The Packwood Lake Hydroelectric Project is located on the Gifford Pinchot National Forest and occupies and potentially affects 512 acres of National Forest System (NFS) lands and resources, including a portion of the Goat Rock Wilderness Area.

On June 19, 2008, the Federal Energy Regulatory Commission (Commission) issued the Notice of Application Ready for Environmental Analysis (REA) and Soliciting Comments, Recommendations, Terms and Conditions, and Prescriptions. The deadline for responding to the REA notice is August 18, 2008. A USDA Forest Service interdisciplinary team (IDT) comprised of resource professionals from the Gifford Pinchot National Forest have worked with Pacific Northwest Regional Office Staff to prepare the response document and supporting information contained in this document.

The USDA Forest Service objectives in hydropower project licensing or relicensing are:

- “To encourage hydroelectric production where it is compatible with National Forest purposes” and
- “To ensure that planning, construction, and operation of hydroelectric projects are performed in such a manner to protect or effectively utilize National Forest System lands and resources.”²

The USDA Forest Service achieves these objectives by ensuring that USDA Forest Service terms and conditions submitted to the Commission under the Federal Power Act³ are:

- Reasonably related to the protection and utilization of National Forest System lands and resources;

² See Forest Service Manual 2770.

³ P.L. 66-

the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the

- Will make the Project consistent with the Land and Resource Management Plan of the Gifford Pinchot National Forest; and
- Are supported by substantial evidence.

On February 22, 2008, Energy Northwest (ENW) filed its Final License Application (FLA) for the Packwood Lake Hydroelectric Project (Project) with the Commission. Between December 3, 2007 and January 30, 2008, ENW, interested stakeholders and the USDA Forest Service, hereinafter referred to as the Parties frequently meet and collaboratively reached agreement in principle on all protection, mitigation and enhancement (PME) measures. During this period, many of the PME measures were drafted containing site-specific implementation elements, and specific objectives and criteria in which to prepare resource management plans. ENW included and filed these agreed upon PME measure in the FLA. There were, however several PME measures that were not drafted. On April 14 & 15, 2008, the Parties met again and completed drafting all but two of the PME measures. Subsequently, the Parties finished drafting the remaining measures.

The Parties mutually agreed not to enter into a formal settlement negotiation rather the Parties defined an open process based on mutual collaboration to identify all potential Project impacts and to collectively agree on the PME measures to mitigate those continuing Project impacts. ENW filing of the FLA with the inclusive PME recommendations and the USDA Forest Service submittal of its preliminary FPA § 4(e) terms and conditions is the culmination of these multi-party discussions.

On April 8, 2008, the Commission issued an Additional Information Request (AIR) from ENW. The AIR requested specific clarification regarding the Project boundary, supporting design report, single-line electric diagram, Exhibit F drawings, debris screen conceptual drawings, and the completion of five resource-specific management plans. ENW provided a collaborative environment in which to draft and finalize the resource management plans. The USDA Forest Service greatly appreciates ENW openness to collaboratively develop the plans. On June 6, 2008, ENW filed its response to Commission's AIR.

Findings of USDA Forest Service Review of the FLA

The primary focus of the USDA Forest Service independent review of the FLA is to evaluate the adequacy of any new information provided relative to comments submitted by the Parties on the Preliminary Licensing Proposal (PLP), information provided by ENW as directed by the Commission's AIR and the FLA conclusions relative to Project impacts to NFS lands and resources.

USDA Forest Service review has determined that damming of lower Lake Creek by the Project drop structure, located on the downstream end of the prehistoric earthen landslide which formed the original lake, and the operation of the Project has resulted in numerous effects and impacts to NFS lands and resources. These effects and impacts include but are not limited to:

- Fluctuation of Packwood Lake water surface elevations

- Reduced instream flows
- Reduction in magnitude and duration of large flow events
- Reduction of nutrient cycling and transport processes of sediment and woody material delivery within lower Lake Creek
- No upstream and limited downstream migration of resident rainbow trout from the lake to lower Lake Creek
- Entrainment of resident rainbow trout in the Project intake
- Restricted anadromous and trout passage into Snyder Creek
- Potential limited amphibian access to Packwood Lake
- Increased incision and potential headcutting of the tributaries to Packwood Lake
- Potential Project operation and maintenance threats to Threatened, Endangered and Pacific Northwest Regional Forester Special Status Species over the new license period
- Project induced recreation
- Expansion of exotic and invasive plant species
- Avian collision and electrocution with primary distribution lines
- Project induced cultural resources concerns

As acknowledged in the Introduction, the Parties collectively identified the above and other potential Project impacts.

The USDA Forest Service independent review of the FLA has determined that ENW produced a complete application package that identify all continuing Project impacts to NFS lands and resources, and propose appropriate PME measures to mitigate the continuing Project impacts. ENW included in their FLA the mutually agreed upon PME measures by resource area in Exhibit E and the PME measures agreed to in concept by ENW and the USDA Forest Service in Appendix C.

Based on these PME measures that mitigate the continuing Project impacts to NFS lands and resources, the USDA Forest Service has determined that its' objectives in a hydropower project licensing have been successfully addressed in ENWs' FLA and proposed PME measures, and the USDA Forest Service filing of its' FPA preliminary § 4(e) terms and conditions.

The USDA Forest Service respectfully submits the following FLA Exhibit and Appendix specific comments, designed to add value and completeness to the FLA and Biological Assessment (BA). The intent is to provide the Commission all necessary information in which to conduct the environmental analysis and formal consultation with the Services.

Section E.4 - Project Facilities and Operation

Section E.4.1.1 – FERC Project Boundary

The proposed FERC Project boundary does not include USDA Forest Service roads, trails, parking lot/trailheads, and the recreation site at Packwood Lake identified in the Packwood Lake Recreation Plan. As agreed to in the Plan, ENW is providing funding for improvements, maintenance and other elements over the new license term. As such, the Commission should consider including the specific roads, trails and associated parking lots and trailheads, and the recreation site at Packwood Lake for inclusion into the FERC Project boundary.

Section E.5.1 - Geology and Soils

Section E.5.1.2.2 - Packwood Lake Shoreline Erosion Study Results, pg E.5.1-11

The statement “*Little additional erosion is expected to occur as a result of the proposed mid-summer drawdown since the drawdown will last for only 7-10 days.*” is not accurate. Based the proposed Project operation (E.4.3.2), a minimum lake elevation of 2856.5 ft MSL will be maintained between May 1 and September 15.

Section E.5.4 - Wildlife Resources

This section does an excellent job of summarizing wildlife species diversity and occurrence in the Packwood Lake area, and the summary of Project-specific surveys are detailed and well done. The USDA Forest Service concurs with the conclusions related to amphibian effects, particularly related to potential drawdown effects to northwestern salamander and the proposed mitigation measures.

Section E.5.6.4.1.2 Wildlife RTE Wildlife Study Results

Section should be re-titled “Wildlife Effects Determinations: Federally-listed Species”, as the study results are detailed elsewhere, so the actual effects determinations, which are important to highlight, become “embedded” in this section and not easy for the reader to locate, given the confusing section title.

Although the gray wolf, grizzly bear, and northern spotted owl are discussed in this section, no actual determinations are provided per the Sensitive Species section below. These need to be clearly displayed using the appropriate, standardized language. Choices include “no effect”; “may affect, but not likely to adversely affect”; or (unlikely) “may affect, and likely to adversely affect” for each species, as well as designated northern spotted owl Critical Habitat, which is referenced in the northern spotted owl discussion in Section 5.6.2.1.1.

Section E.5.6.4.2.2 Wildlife Study Results

See above comment- this section should be re-titled “Wildlife Effects Determinations: Sensitive Species” per the above to make it clear exactly what is displayed in this section.

Paragraph 2 states that the common loon “... *does not breed in the area; naturally steep shorelines may be unsuitable for nesting*”. While it is true that there is no evidence that common loon have nested at Packwood Lake, the small island on the lake appears to be a suitable nesting location for common loons, and typical of loon nesting sites throughout its range. The absence of loon nesting at Packwood Lake is more likely related to the fact that it is a) presently a rare nester in Washington state in general, with nesting confirmed in only six counties (Richardson et al. 2000), with no recent nesting records in Lewis County or adjacent counties, and b) the depth and prey species (mainly trout) at Packwood Lake may make it unsuitable for loon nesting. The final sentence, “*the Project has not potential to affect the habitat or viability of the common loon*” should be reworded to state that “the Project will have no impact to the common loon”.

Section E.5.6.4.3.2 Wildlife Study Results

Same comment as above, reword section title to “Wildlife Effects Determinations: Washington State-listed Wildlife Species”.

Section E.5.7 - Recreation and Land Use

Exhibit E.5.7.3 - Paragraph 4, pp E-5-7-4:

The Project access road (Pipeline Road) provides ATV access from Snyder Road (Forest Service Road 1260) to a point approximately two miles from the lake. Energy Northwest use of the road and connecting Trail #74 is generally one to two times per week, to check on intake facilities and perform needed maintenance. Energy Northwest maintains this road and connecting trail. Public access on foot, horseback, or by ATV is provided around Energy Northwest’s vehicle gate to the Pipeline Road and connecting Trail #74. Energy Northwest also allows public access to the powerhouse area and portions of the tailrace, near the Cowlitz River.

Comment: There is no mention of the "Dyson Pass" trail / bypass of the Pipeline Trail #74. ENW is solely responsible for maintaining this Project developed bypass trail.

Exhibit E.5.7.2.7 - Paragraph 1:

*The Wild and Scenic Rivers Act was passed by Congress in 1968 (P.L. 90-542) to ensure that some of the nation’s most spectacular rivers remain in a natural, freeflowing state for future generations to enjoy. To be eligible, a river system must possess one or more “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.” **Currently, there are no congressionally designated Wild, Scenic, or recreational rivers on the Gifford Pinchot National Forest.***

Comment: There are 2 congressionally designated Wild & Scenic Rivers on the Forest: Klickitat and the White Salmon: <http://www.rivers.gov/wildriverslist.html#wa>

Exhibit E.5.8.1 - Paragraph 1:

*The Project is mostly located in the Gifford Pinchot National Forest (GPNF) within the Lake Creek drainage. The Project area is characterized by forested slopes and rugged and glaciated peaks in the upper elevations. Packwood Lake is approximately 1.5 miles long and 0.5 miles wide and is located at the end of a long glacially carved valley. **Its main source of water is glacier-fed Upper Lake Creek, which descends from Gilbert Peak (also known as Old Snowy Mountain).***

Comment: Gilbert Peak is south of Old Snowy Mountain, they are not the same feature.

Appendix D - Biological Assessment and Essential Fish Habitat Assessment

Section 2.0, pg 2

Proposed action should include a summary of the proposed restoration projects described to mitigate the effects of continued operation of the Project. Lake Creek instream restoration and Snyder Creek fish passage restoration are of particular interest for consultation.

Section 3.5.2, pg 20-23

Add quantitative description of restoration projects where applicable. Recommend including the detail provided by Inter-Fluve Inc. presentation (12/04 and 1/10-11) and written proposal (10/30) including the following example:

Restoration Objectives Summary (from Inter-Fluve Dec 4 2007 presentation to Aquatic caucus)

1. Increase wood quantities from 30 pieces/mi to 90-130 pieces/mi (this is within range of upstream reaches and exceeds NOAA PFC criteria)
2. Create 15 large wood / boulder complexes between RM 0.3 and 1.0 (>20 jams/mi, approx 1 jam every 250 ft)
3. Install boulder complexes to enhance pool habitat between RM 0 and 0.3
4. Decrease glide/run habitat to <40% and increase pool habitat to >30%
5. Reduce pool width-to-depth ratios to below 15:1 and possibly below 10:1 (they currently regularly exceed 30:1)
6. Increase spawning area by increasing availability of pool tailouts and through spawning gravel augmentation

Section 5.1.2, pg. 41

Analysis should show how Lake Creek instream flow conditions correlate to coho spawning survey results for the two years of available data. Instream flow is a major variable in bypass reach management and there appears to be a strong relationship between flow and fish observations as per EES Consulting data.

Section 6.0 – Effects of the “Proposed” Action on Listed Species

It is recommended that the proposed action (e.g. all species/habitat PME measures and proposed operational changes) be again clearly articulated and displayed. Then for each species and location (Packwood Lake, upper and lower Lake Creek, etc), describe how the “proposed action” may or may not affect the individual species or its’ habitat. This section sets the biological foundation and rationale to make the species determinations described in Section 8.0.

Section 6.1.2, pg. 58, 2nd paragraph

“No threatened or endangered fish are found in the 1464 ft – long reach immediately below the drop structure.” This section should identify that the anadromous barrier is approximately 3.5 miles below the dam or state that passage to all anadromous fish species is blocked at RM 1.95. Hence, no threatened or endangered fish are found above the fish barrier located at RM 1.95. This includes the upper portion of reach 3 and all of reaches 4 and 5.

Section 6.1.2, pg. 58, 3rd paragraph

The discussion on large wood should include some description of adjacent forest seral stage that is then tied to the “past forest practices and human disturbance.”

Section 6.1.5, pg. 62

The effects of unplanned outage impacts to the tailrace slough needs further quantitative analysis. As suggested in the BA, the report should calculate and fully disclose the stilling basin’s capacity to maintain flows during the range of historic unplanned outage periods. Using an estimated stilling basin maximum usable water storage are of 5 acre feet (approx 218,000 cu ft) (pg. 4-12) it appear to have far less capacity than necessary to maintain adequate incubation flows ($0.66 * \text{spawning flow} = \text{incubation flow}$) over the course of the tailrace slough throughout a “normal” period of unplanned outage. Project related adverse impacts to incubating salmonids appear to not only be possible but highly probable under most tailrace slough configurations. As discussed in the Final License Application (pg E 5.3-126) Project shutdown (planned or unplanned) has potential to affect spring Chinook salmon incubating eggs.

Section 8.1, pg. 67

The BA references proposed action in section 3.4.1. This is a typographical error the correct citation is Section 3.5.1.

Although there may be long-term beneficial results, the instream restoration projects proposed as mitigation typically are likely to adversely affect (LAA) threatened species within the Project area. See the USDA Forest Service regional programmatic restoration document for the latest BO on PNW Region 6 restoration projects.

The BA should disclose that the proposed mitigation/ restoration project are highly speculative because nearly all projects are located on private land on in the lower 1.0 RM of Lake Creek, there is no public access and implementation is contingent upon landowner agreement. The

proposed action should include a contingency plan for developing similar restoration plans on NFS lands where access will not be constrained by private landowners.

Literature Cited

Richardson, Scott, D. Hays, R. Spencer, and J. Stofel. 2000. Washington Status Report for the Common Loon. Wash. Dept. Fish and Wildlife, Olympia, WA. 52 pp.

Enclosure IV
USDA Forest Service
Gifford Pinchot National Forest
Schedule for Finalization of
FPA § 4(e) Terms & Conditions
Packwood Lake Hydroelectric Project
FERC Project No. 2244

August 2008

Document	Date To Be Submitted To FERC
Preliminary 4(e) Terms and Conditions	Submitted August 16, 2008
Modified 4(e) Terms and Conditions	Within 60 days of publication in the Federal Register that the Draft Environmental Assessment or Draft Environmental Impact Statement is available for public comment
Final 4(e) Terms and Conditions	Within 60 days of publication in the Federal Register that the Final Environmental Assessment or Final Environmental Impact Statement is available for public comment

**UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION**

IN THE MATTER OF THE)
FINAL LICENSE APPLICATION)
PACKWOOD LAKE)
HYDROELECTRIC PROJECT)
_____)

Project No. P-2244

DEPARTMENT OF AGRICULTURE

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I have made service of the foregoing USDA FOREST SERVICE NOTICE OF INTERVENTION – *Packwood Lake Hydroelectric Project - Oregon - FERC Project No. 2244* upon the parties designated on the official service list compiled by the Secretary in this proceeding:

DATED: August 18, 2008

SERVICE LIST for FERC P-2244

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