

Revised

**Vegetation Cover Type Mapping Study Plan
for
Energy Northwest's
Packwood Lake Hydroelectric Project
FERC No. 2244
Lewis County, Washington**

Submitted to



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August 22, 2005

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1.0 INTRODUCTION

Energy Northwest's Packwood Lake Hydroelectric Project, FERC No. 2244, received its initial license in 1960. The majority of the Project is located within the Gifford Pinchot National Forest and consists of an intake canal, a concrete drop structure (dam) and intake building on Lake Creek located about 424 feet downstream from the outlet of Packwood Lake, a 21,691-foot system of concrete pipe and tunnels, a 5,621-foot penstock, a surge tank, and powerhouse with a 26,125 kW turbine generator.

The source of water for the Project, Packwood Lake, is a natural lake situated at an elevation of approximately 2,857 feet above mean sea level (MSL), about 1,800 feet above the powerhouse. Water discharged from the Project is released to the Cowlitz River via a tailrace channel. Power from the Project is delivered over an 8,009-foot 69 kV transmission line to the Packwood substation.

1.1 Study Plan Goals and Objectives

The objectives of the Vegetation Cover Type Mapping study are: 1) to identify and classify the vegetation cover types in the Project area; 2) collect additional information on the species composition and structural attributes of each cover type and 3) create a detailed GIS cover type map of the Project area showing the locations of these cover types, their distribution and total extent (acreage), and the locations of habitats that are of special concern. The study will provide the baseline map for recording occurrences of rare plants, noxious weeds, and wildlife, including amphibians and will also provide descriptions of existing habitat conditions in the Project area and in riparian areas along Lake Creek.

2.0 AGENCY AND TRIBE RESOURCE MANAGEMENT GOALS AND OBJECTIVES

The Washington Department of Fish and Wildlife (WDFW) and the USDA Forest Service requested this study. Their resource management goals are provided below.

2.1 WDFW Management Goals

WDFW management goals that may be pertinent to this study include the following:

- Maintain or enhance the structural and functional integrity of riparian habitat and associated aquatic systems needed to support fish and wildlife populations on both site and landscape scales.
- No net loss of wetland acreage, value, or function.
- Preserve existing wetland habitat.
- Maintain and enhance special wildlife features in wetlands such as standing water, snags, and down logs and overlapping priority habitats and species.
- Enhance degraded wetland habitat.
- Mitigate the loss of wetland through acquisition and enhancement.
- Preserve all remaining old-growth habitat.

- Encourage low impact activities in old-growth stands.
- Snags adjacent to and within wetlands and riparian areas are of high value to many species and should be retained.
- Manage or eradicate non-native plants.
- Facilitate recover of species proposed or listed under the federal Endangered Species Act.
- Facilitate recovery of state listed endangered and threatened species, and state and federally proposed, candidate, sensitive or monitor species.
- Retain snags and large live trees in shallow areas and along shorelines of created reservoirs provide a valuable source of resting, perching, and nesting habitat adjacent to foraging habitat.
- Utilize current techniques to restore riparian areas to create habitat features important to fish and wildlife.

2.2 USDA Forest Service

The USDA Forest Service Gifford Pinchot Land and Resource Management Plan (1990) contains the following directives that may be pertinent to this study:

- Manage representative areas to maintain sensitive and unique plant communities (page IV-4).
- Maintain and enhance the diversity and viability of native plant and animal species and communities by providing for their ecologically sound distribution at the stand, basin, and Forest levels (page IV-4).
- Emphasis must be on prevention and early treatment of unwanted vegetation and public involvement in all aspects of project planning and implementation (page IV-34).
- Management activities will be reviewed to make sure that Sensitive, Threatened, or Endangered plants are being protected (page IV-37).

The 1995 Amended Land and Resource Management Plan (USDA Forest Service 1995) contains an additional directive:

Aquatic Conservation Strategy 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 distribution of coarse woody debris sufficient to sustain physical complexity and stability (page 2-3).

3.0 EXISTING INFORMATION AND NEED FOR ADDITIONAL INFORMATION

3.1 Existing Information

The Forest Service maintains GIS datasets that include detailed geo-referenced information describing cover type, ecotype, age class, snag density, and other metrics for forested and non-forested areas. Vegetation information is at the association level in these datasets. In addition, U.S. Fish and Wildlife Service National Wetland Inventory data (NWI) are available for the study area.

3.2 Need for Additional Information

Existing USFS GIS maps depict broad-scale cover types, but may require revision to reflect current conditions and depiction of small habitat polygons. Available information concerning riparian vegetation along Lake Creek is limited, as are site-specific descriptions of wetlands in the Project vicinity. NWI wetland classifications are based on high level infra-red imagery and often require field examination to accurately depict wetland extent, confirm classification, and describe current conditions.

4.0 NEXUS BETWEEN PROJECT OPERATIONS AND EFFECTS ON RESOURCES

This study will provide baseline information on existing conditions in the Project area; these data are required in order to assess potential Project effects. Information gathered during the field phase of the study may help determine whether there are Project effects on vegetation resources that require protection, mitigation, and enhancement (PM&E) measures, and if so, help identify suitable locations for these measures.

5.0 STUDY AREA AND METHODS

5.1 Study Area

The study area will include all lands within the Project Boundary, all lands within 100 meters of the Project Boundary, and all lands within 100 meters of the centerline of Project-affected roads, trails, and streams (see Figure 5-1). The Project boundary includes Packwood Lake below elevation 2860 MSL, an intake building, drop structure, tailrace channel, powerhouse (and associated facilities), buried pipeline, penstock, tunnels, and transmission line. Project-affected roads and trails include Pipeline Road (FSR 1260-066), Latch Road (FSR 1262), and Trail #74. Project-affected streams include lower Lake Creek, Upper Lake Creek, Crawford Creek, Osprey Creek, Trap Creek, Muller Creek, and Baker Creek. The study area also includes the entire wetland associated with Hall Creek, even if this wetland extends more than 100 meters beyond the Project Boundary.

In areas where aerial photos lack sufficient resolution to show riparian areas along Lake Creek the width of these areas will be mapped based on field observations at ground-truthing sites.

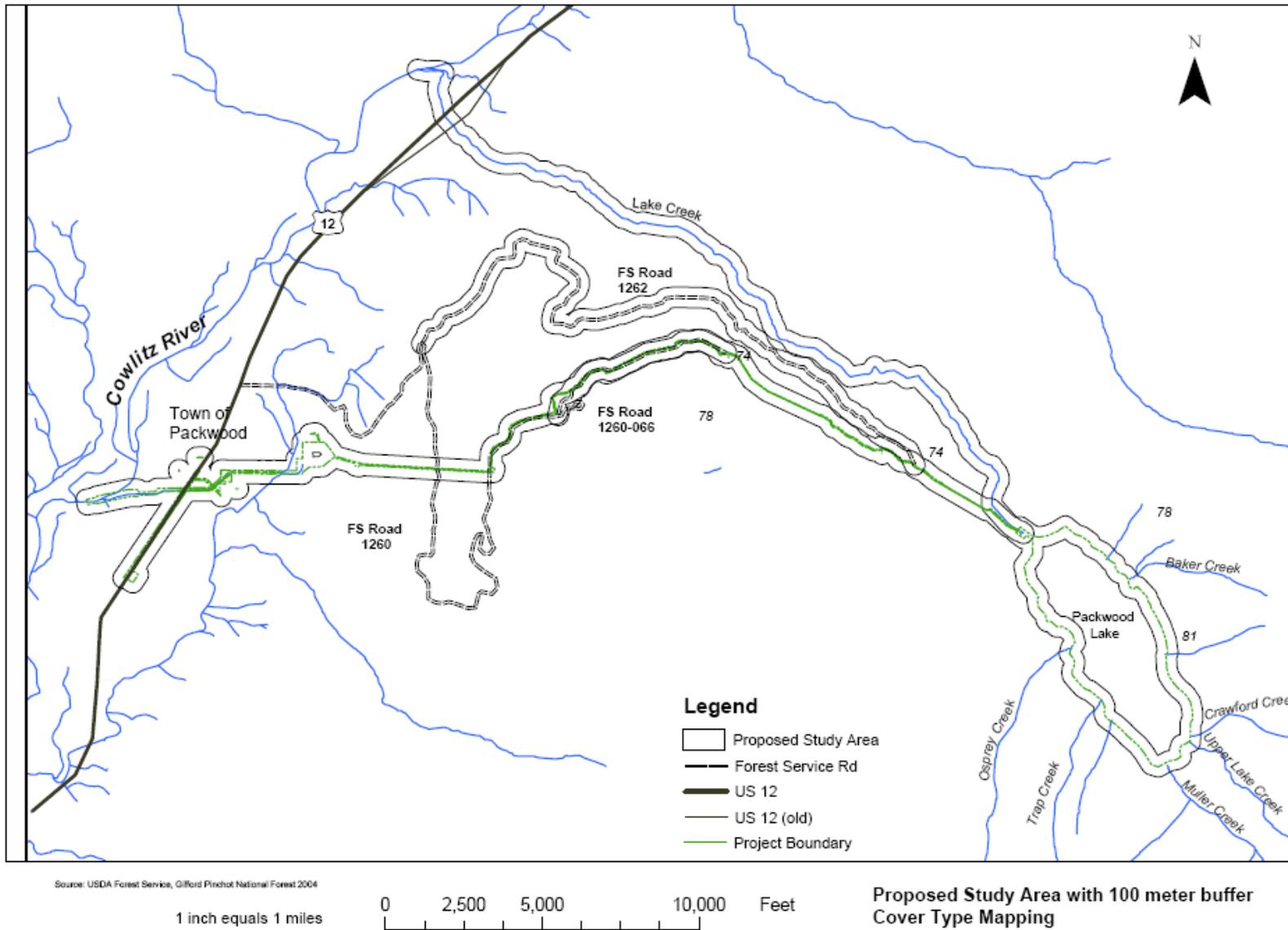


Figure 5-1 Proposed Vegetation Cover Type Mapping Study Area

5.2 Methods

Step 1: Develop Base Maps – The most recent digital orthophotos will be combined with existing Forest Service GIS vegetation data to create base maps of the study area. The available orthophotography was collected during summer months, during which time the elevation of Packwood Lake is held relatively constant. Thus, the drawdown area is not exposed on the orthophotos; this area will be described during Step 3.

Step 2: Conduct Photo-Interpretation and Map Vegetation – The existing Forest Service cover type polygons will be revised and refined to reflect current forest conditions. Designated cover types will match those currently used by the Forest Service in its `gpv_stand_view` database table (available at <http://www.fs.fed.us/gpnr/forest-research/gis/>).

Step 3: Select and Sample Ground-Truthing Sites – The base map will be reviewed and field sampling points will be selected. Each major cover type will be sampled; however, sampling will emphasize wetlands, riparian zones, drawdown areas, and other specialized habitats where existing information may be limited. The general location for each sample point will be assigned prior to fieldwork; exact locations will be determined in the field based on reconnaissance to ensure that sample points are representative of the cover type polygon. Major vegetative and structural characteristics will be documented using a plotless, rapid vegetation assessment technique. The following data will be collected at each point:

- Universal Transverse Mercator (UTM) coordinates;
- Representative photograph(s);
- Species and estimated cover for dominant and subdominant trees and shrubs;
- Estimated diameter at breast height (DBH) of dominant trees, or height of dominants in non-forested areas;
- Plant community type;
- Plant association, if defined for the habitat;
- Estimated local density of snags and coarse woody debris;
- Potential for or occurrence of special-status species;
- At wetland sites, observed source(s) of wetland hydrology;
- At wetland sites, hydrogeomorphic classification (Brinson 1993); and
- At wetland sites, classification of dominant wetland types (Cowardin et al. 1979).

WDFW Priority habitats, unusual habitats, or habitat features will also be noted. During field efforts, mapped cover type polygons will be corrected as required on hard-copy base maps. Corrections to mapped wetland boundaries will be based on vegetation composition and hydric indicators, but will not entail formal wetland delineation. The drawdown zone at Packwood Lake will be documented and described during the seasonal drawdown.

Step 4: Revise Map and Create GIS Vegetation Coverage – Revisions to the draft map will be digitized and final GIS vegetation coverage will be prepared, with all sampling information included in the metadata associated with the GIS layer. The total acreage of each cover type will be calculated.

Step 5: Prepare Report – The draft Vegetation Cover Type Mapping report will be prepared for review and a final report will be prepared taking into consideration comments from interested parties. The report will include study objectives; study area; methods; maps; narrative descriptions; and total acreage of cover-type mapping units.

WDFW and Forest Service have requested that the vegetation cover type map show Packwood Lake under drawdown conditions, which normally occur after mid-September, and that the following areas be differentiated:

- “intermittent” (seasonally flooded) - seasonally inundated/exposed areas within the drawdown zone that do not support standing water during the drawdown period.
- “upper perennial” (permanently flooded) - areas within the drawdown zone that support standing water during the drawdown period.
- “lower perennial” (permanently flooded) - the portion of the lake below the normal drawdown zone that is permanently flooded.

Because the available aerial imagery depicts Packwood Lake in June and does not show areas exposed during seasonal drawdown, it may not be feasible to accurately distinguish the normal drawdown zone or differentiate pools within the drawdown zone that permanently hold water. However, if practicable, existing bathymetry, aerial photographs, or field observations will be used to show the drawdown zone.

5.3 Products

Products will include a draft and final study report. The report will include study objectives; study area; methods; tabulated results; descriptions of habitats; and electronic GIS files of vegetation cover types and sample points. Draft copies of the products will be provided to the agencies and tribes for review and comment for 30 days, after which Energy Northwest and its consultant will take review comments into consideration when making revisions and producing final reports.

5.4 Consistency with Generally Accepted Scientific Practice

The study methods discussed above are consistent with the methods followed in other recent relicensings, as well with as the Gifford Pinchot National Forest’s own GIS mapping efforts.

5.5 Relationship to Other Studies

The results of the vegetation cover type mapping study will include a GIS base map, which will be used to depict occurrences documented by rare plant, noxious weed, and amphibian studies.

6.0 CONSULTATION WITH AGENCIES, TRIBES, AND OTHER STAKEHOLDERS

Energy Northwest initiated consultation meetings with the Forest Service in December 2003, and with agencies and tribes in March 2004. Meetings with the agencies, tribes, and interested stakeholder representatives will continue periodically. The agencies, tribes, and stakeholder

representatives will be invited to provide information for the study and technical reviews of draft Vegetation Cover Type Mapping report.

7.0 PROGRESS REPORTS, INFORMATION SHARING, AND TECHNICAL REVIEW

Energy Northwest and its consultant will periodically report on the methods, progress, and results of the study in meetings with Project stakeholders and tribal and agency representatives. Energy Northwest will provide copies of the draft Vegetation Cover Type Mapping report to agency and tribal representatives for review. Review periods will be 30 days, after which Energy Northwest and its consultant will take review comments into consideration when making revisions and producing the final report.

8.0 SCHEDULE

Initial data review and assessment is scheduled for Summer 2005. Fieldwork is scheduled to be completed prior to August 2006. A draft report, including maps, will be issued by November 15, 2006.

9.0 LEVEL OF EFFORT AND COST

A total of 300 hours of effort are estimated for this study and includes fieldwork, surveys, reports and GIS tasks. It is anticipated that the Vegetation Cover Type Mapping Study will cost approximately \$27,653. If this study were to be conducted with the amphibian study, costs may be reduced.

10.0 LITERATURE CITED

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