SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

1802 - 75th Street S.W. • Everett, WA • 98204 • (206) 347-4300
Mailing Address: P. O. Box 1107 • Everett, WA • 98206-1107

May 25, 1995
PUD 20217

Ms. Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street NE
Washington, D.C. 20426

Dear Ms. Cashell:

RE: Henry M. Jackson Project - FERC No. 2157
Project License Article 53 - Annual Report
Wildlife Habitat Management Program

The 1994 Annual Report for the Jackson Project Wildlife Habitat Management Program is enclosed. This report fulfills the requirement of the "Order Approving with Modification Revised Wildlife Habitat Management Plan" (issued May 19, 1989, revised June 27, 1990), which stated "The Licensees shall file with the Commission their annual reports on Phase I. . . ." The Commission extended the deadline to file this annual report to May 31, 1995.

This annual report describes activities conducted during 1994, and activities planned for 1995. A comparison of all activities completed since implementation of the program began in 1989 with activities planned during this period is also included. The activities, procedures and schedules described in this report are based on the Wildlife Habitat Management Plan submitted to the Federal Energy Regulatory Commission on May 25, 1988.

The draft annual report was submitted to the U.S. Fish and Wildlife Service (USFWS), the Washington Department of Wildlife (WDW), and the Tulalip Tribes for comment. The Washington Department of Natural Resources was also sent a copy. A meeting was held with agency representatives on March 9, 1995, to request comments and discussion on progress to date and planned activities for 1995. An attendance list and meeting minutes are attached to the Annual Report. Copies of all comments received from the agencies at the time of this submittal are attached to the Annual Report. If others are received subsequently from them, they will be forwarded promptly to the Commission.

Please call Bernice Tannenbaum (206)347-4319, if you have any questions on the 1994 Annual Report.

Sincerely,

N. Craig Thompson
Assistant General Manager
Water Resources

Clair Olivers
Director of Public Works
City of Everett

Enclosures
BRT:dkw
cc: G. Engman, Washington Department of Wildlife
G. Ging, U.S. Fish and Wildlife Service
A. McGuire, Washington Department of Natural Resources
J. Stofel, Tulalip Tribes
A. Martin, FERC, Portland
bcc: C. Thompson - E1
B. Meaker - O1
R. Metzgar, City of Everett
M. Schutt - O1
B. Tannenbaum - O1
K. Bedrossian - O1
C. Olivers, City of Everett
D. Farwell, City of Everett
D. Lowell, City of Everett

1994 ANNUAL PROGRESS REPORT

WILDLIFE HABITAT MANAGEMENT PROGRAM

for the

HENRY M. JACKSON HYDROELECTRIC PROJECTS

FEDERAL ENERGY REGULATORY COMMISSION
Project Number 2157 - License Article 53

Submitted by

PUBLIC UTILITY DISTRICT NO. 1 OF SNOHOMISH COUNTY

and

THE CITY OF EVERETT, WASHINGTON

March 1995

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1.0 SUMMARY

1.1 MAJOR TASKS ACCOMPLISHED DURING 1994 INCLUDE:

- Sale of two final harvest units at Lake Chaplain (Diversion Sale)
- Layout of road system on west side of Lake Chaplain
- Supplemental plantings of tree seedlings in previously-harvested units (Chaplain Sale, salvage sale, and Horseshoe Sale final harvest unit)
- Snag management program at Lake Chaplain
- Test plantings in the Spada Lake drawdown zone
- Seeding of the entire power pipeline right of way
- Approval of a contract for work by professional foresters in support of management prescriptions for the Spada Lake Tract Supplement to the WHMP
- Monitoring activities

A cumulative summary of tasks accomplished since the initiation of the Wildlife Habitat Management Plan (WHMP) in 1989 is presented in this report.

1.2 TASKS SCHEDULED FOR 1995 INCLUDE:

- Harvest of two units in the Diversion Sale at Lake Chaplain
- Setup and sale of the harvest units and road system on the west side of Lake Chaplain
- Snag management program at Lake Chaplain, Lost Lake, and Spada Lake Tracts
- Planting of shrubs in selected locations on the power pipeline right of way
- Monitoring activities
- Installation of new duck nest boxes at Lost Lake or Chaplain Marsh
- Submittal of the Spada Lake Tract Supplement to the WHMP to District Commissioners for approval

Problems or changes needed during the course of implementing the WHMP are discussed in this report, and updated schedules are presented. A draft of this report was submitted for comments to the U.S. Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDFW), and the Tulalip Tribes. The Washington Department of Natural Resources (DNR) was also consulted.

2.0 INTRODUCTION

The 1994 Annual Progress Report on the Wildlife Habitat Management Plan (WHMP) for the Henry M. Jackson Hydroelectric Project is submitted in response to the Federal Energy Regulatory Commission (FERC) Order Approving With Modification Revised Wildlife Habitat Management Plan (issued May 19, 1989). Public Utility District No. 1 of Snohomish County (District) and the City of Everett (City) are co-licensees in the Project. The WHMP project area and management tracts are shown in Figure 1.

This annual report describes activities conducted during calendar year 1994 and summarizes activities anticipated for calendar year 1995. As requested by agency reviewers, this report also includes a summary of all activities since implementation started. Activities, procedures and schedules described in this report are based on the WHMP submitted to FERC on May 25, 1988 in accordance with Project License Article 53 and subsequent related orders from the FERC.

3.0 WORK COMPLETED DURING 1994

3.1 FOREST VEGETATION MANAGEMENT

3.1.1 Timber Sale - 1994 Units (Diversion Sale)

The two units of the Diversion Sale, shown in Figure 2, were sold on August 31, 1994. Layout of these units was completed in 1993, as described in the 1993 Annual Report. Under the terms of the contract, the buyer must complete road construction and harvest by October 31, 1995.

3.1.2 Road System Layout

Reconnaissance work began in 1994 to lay out a road system that will serve future harvest units on the west side of Lake Chaplain. The property line for the Lake Chaplain Tract was identified and marked, and drainages and mixed forest stands were mapped as part of the reconnaissance process. Several options for the road system were evaluated in the field, with the objective of minimizing the amount of road to be constructed, while avoiding permanent mixed forest stands and stream crossings. Four of the 1995 harvest units will be located in the area served by this road system.

3.1.3 Management of Lake Chaplain Harvest Units

Four hundred western red cedar seedlings were planted in the 1993 (Horseshoe) final harvest unit, which had been replanted with Douglas fir following harvest. This addition will diversify the unit. The severe windstorm of January 1992 caused a large number of trees to fall on the edges of the 1991 (Chaplain) units, some of which were salvaged in 1993 as described in the 1993 Annual Report. In 1994, one thousand Douglas fir seedlings were planted in the salvage areas. Also in the Chaplain Sale, eighteen cottonwood cuttings were planted in Units 1 and 2.

The 1992 windstorm also caused blowdown of a large number of trees in the green tree area (GTA) of Unit 1 of the 1991 (Chaplain) sale. GTA trees are intended to be the source of future created snags that will replace older snags in the harvest unit as they fall down over time. All of the downed trees were left in the GTA, and 76 Douglas fir seedlings were planted among them in 1994. The Department of Natural Resources' growth model for Douglas fir was used to predict when these seedlings would reach an adequate size to replace Units 1's snags as they are lost. Results indicate that the remaining large trees in the GTA, plus the seedlings planted in 1994, will be sufficient to satisfy future snag requirements for this unit.

The City installed a gate on the access road leading to Unit 1 of the 1991 (Chaplain) Sale and adjacent units. The gate will restrict vehicular access to units in the vicinity and should reduce theft of firewood and harassment of wildlife, while not restricting public access on foot.

3.2 SNAG MANAGEMENT

Snags were created in 1994 in the Lake Chaplain Tract in the areas shown in Figure 3. Characteristics of created snags are summarized in Table 1. As in the past, snags were created by topping live trees and leaving a few branch stubs, but several new features were incorporated this year by the contractor:

- Bat roosting flanges -- Angled vertical cuts into the side of the snag to provide an overhang simulating sloughing bark.
- Sap wells -- Nicks into the bark to induce sap flow with the aim of attracting boring insects and thereby woodpeckers; simulates the rows of holes created by sapsuckers.
- Cavity starts -- Cuts into the heartwood about 3 inches x3 inches and 8 inches deep to allow decay organisms into the heartwood.

Snags created in previous years were mapped and marked with numbered metal tags and a painted stripe 4 feet above the ground.

3.3 REVEGETATION

3.3.1 Spada Lake Shoreline

The WHMP calls for testing the potential for revegetating the drawdown zone of Spada Lake, and provides a list of herbaceous and woody plants that may respond favorably to conditions there. Some of the species on the list are not available from commercial growers and, therefore, other potentially suitable species that are not on the list were given consideration. The City expressed concern that planting woody species on the list could attract beaver to the lake, and therefore only herbaceous plants were considered. Also, proposed species were evaluated for potential drinking water treatment (disinfection by-products) problems caused by future organic debris accumulations in the reservoir.

Two test plots were selected for revegetation at the east end of Spada Lake (Figure 4). Test plot 1 is a small bay near the mouth of Willliamson Creek, and Test plot 2 is adjacent to the mouth of the North Fork Sultan River. These sites appear to be the most shallow portions of the reservoir and therefore are exposed to less extreme water level fluctuations than other areas of the shoreline. Five commercially-available emergent species that may tolerate the widely fluctuating water levels of Spada Lake were planted in October 1994 (Table 2). Plants were installed in rows perpendicular to the shoreline between approximately 1435 and 1445 feet elevation, as estimated by the location of the current water levels on the planting days. Each row consists of a single species, and is marked at each end by wooden stakes to which floating wooden markers have been attached. One additional bulrush species (Scirpus cyperinus) was broadcast seeded in September 1994 near Test Plot 2 (Figure 4), using seed obtained from a bulrush stand located adjacent to Recreation Site 3 (South Shore).

TABLE 1 SNAG CREATION IN 1994

UNIT	SIZE RANGE (INCHES DBH)	AVG DBH (INCHES)	ESTIMATED AVG HT (FEET)	NUMBER
1991-1				
	11.0 -14.9	14.0	20.0	2
	15.0-16.9	15.5	21.9	16
	17.0-24.9	18.9	21.0	15
	25.0+	0.0	0.0	0
	TOTAL	17.0	21.4	33
1991-2				
	11.0 -14.9	14.3	30.0	2
	15.0-16.9	15.4	25.0	6
	17.0-24.9	17.4	30.8	6
	25.0+	25.0	40.0	1
	TOTAL	16.7	29.0	15
1991-3				
	11.0 -14.9	14.2	30.0	5
	15.0-16.9	15.7	25.9	11
	17.0-24.9	18.1	22.2	9
	25.0+	0.0	0.0	0
	TOTAL	16.3	25.4	25
EAST SIDE OMA				
	11.0 -14.9	13.5	—	2
	15.0-16.9	15.6	67.5	5
	17.0-24.9	18.5	—	4
	25.0+	28.0	70.0	1
	TOTAL	17.3	68.3	12
LOST LAKE (PUD)				
	11.0 -14.9	12.9	49.2	7
	15.0-16.9	15.4	46.3	8
	17.0-24.9	18.1	54.4	8
	25.0+	35.0	—	1
	TOTAL	16.0	50.0	24
HORSESHOE PMF				
	11.0 -14.9	13.4	42.0	6
	15.0-16.9	15.9	55.8	6
	17.0-24.9	19.6	67.5	10
	25.0+	0.0	0.0	0
	TOTAL	16.9	58.1	22

TABLE 1 (cont.)

UNIT	SIZE RANGE (INCHES DBH)	AVG DBH (INCHES)	AVG HT (FEET)	NUMBER
CHAPLAIN MARSH PMF				
	11.0 -14.9	14.0	40.0	1
	15.0-16.9	15.2	36.0	5
	17.0-24.9	19.5	41.3	4
	25.0+	0.0	0.0	0
	TOTAL	16.8	38.5	10
BUFFER ZONE 1				
	11.0 -14.9	13.3	50.0	4
	15.0-16.9	15.4	53.1	8
	17.0-24.9	16.1	54.2	7
	25.0+	0.0	0.0	0
	TOTAL	16.3	52.8	19
BUFFER ZONE 2				
	11.0 -14.9	13.0	40.0	1
	15.0-16.9	15.8	50.8	6
	17.0-24.9	17.0	50.0	3
	25.0+	0.0	0.0	0
	TOTAL	15.9	49.5	10

TABLE 2. REVEGETATION TEST PLOTS AT SPADA LAKE

SPECIES	COMMON NAME	NUMBER PLANTED
Carex obnupta	Slough sedge	200 - 2-1/4" pot
Carex rostrata	Beaked sedge	130 - 8" plug
Scirpus acutus	Hardstem bulrush	200 - divisions
Scirpus cyperinus	Woolly bulrush	Unknown quantity of seed
Scirpus microcarpus	Small-fruited bulrush	200 - 2-1/4" pot
Sparganium eurycarpus	Burreed	200 - bare root

3.3.2 Power Pipeline Right of Way

The power pipeline right of way (ROW) was mowed within fifteen feet on either side of the centerline, and seeded with a grass/forb mix in 1994, including for the first time the upper ROW from the Marsh Creek gate to the tunnel portal. The upper portion germinated well this year, supporting healthy communities of grasses and clovers. Few shrubs exist here, and a few areas of very sandy soil will be slower to revegetate. The lower portion of the ROW also showed improvements in the coverage of grasses, forbs and growth of small shrubs.

Gating of the Marsh Creek road in July 1993 substantially reduced illegal off-road vehicle use and garbage dumping. However, motorcycles and occasionally four-wheel drive trucks go around the gates and through the creeks along the ROW. To prevent this, we have placed large boulders and ecology blocks along the gates, in addition to removing materials along the walls which were used to build ramps over them. Also, we have placed rocks along all of the creeks to eliminate motorcycle and ORV traffic through these areas, some of which are trout rearing habitat.

3.4 FLOATING NEST PLATFORMS

One of the floating nest platforms in Lake Chaplain was moved from the east shore to the west shore in March 1994, following recommendations of Jean Cross, a Department of Fish and Wildlife volunteer who conducts weekly bird surveys there (Figure 5). The remaining platform on the east shore appeared too close to shore in shallow water (±5 feet). It was moved approximately thirty feet west to deeper water (±15 feet). The two platforms in Lost Lake were left in the same positions occupied in 1993.

3.5 WHMP SUPPLEMENT FOR SPADA LAKE

The District retained forestry consulting services of Harza Northwest, Inc. in 1994 to assist in developing detailed forest management options for the Spada Lake supplemental plan. Their scope of work includes performing forest stand inventories, preparing a management program that includes short-term and long-term management activities, and preparing an estimated cost budget. As of the date of this annual report, the consultants have performed field reconnaissance of most of the second-growth timber stands on the Spada Lake Tract, identified and described timber stand types for which generic management options can be identified, and selected certain stands for detailed inventory.

3.6 MONITORING

3.6.1 Revegetation Monitoring

Shrubs were planted along the edge of Chaplain Marsh, including red huckleberry, Nootka rose, serviceberry, western red cedar, English holly, red osier dogwood and red-flowering currant, in February 1993 in order to create a vegetative screen between Chaplain Road and the marsh. The plantings were monitored in January, May and September 1994. Mortality on this site was negligible, and growth of most species, especially holly, was good.

Shrubs and trees were planted at the powerhouse site, in February 1993, including Oregon ash, western crabapple, black hawthorn, red-flowering currant, serviceberry, Nootka rose, and red huckleberry. These plantings were monitored on the same occasions as the planting along Chaplain Marsh in 1994. In contrast to the plantings along Chaplain Marsh, thirty of the shrubs (23 percent) and one tree died during the summer. These were replaced in October 1994 with 10 red huckleberry, 20 serviceberry and one Oregon ash. The remaining shrubs and trees survived the summer in fair condition.

Plantings of Douglas fir and western red cedar seedlings at the north end of Lake Chaplain were monitored in February 1995. Approximately ten (22 percent) of the original 45 western red cedar have died since they were planted in 1992, possibly because they were planted in very wet sites, and the remainder are in fair to good condition. One hundred fifty-four Douglas fir seedlings were planted in drier areas, and most are in excellent condition, with only five percent mortality since planting.

3.6.2 Floating Nest Platforms

All four platforms were monitored by District staff at least three times per month from late March to the end of May, following monitoring procedures attached to the 1991 Annual Report. Additional monitoring was performed by Jean Cross, on a weekly basis.

There was no observed use of any of the platforms, but abundant remains of feathers, bones, mussel shells, tracks, and scat indicate that they are used by otters. Waterfowl, including loons, grebes, Canada geese, marbled murrelets, and several duck species were observed on Lake Chaplain throughout the spring, summer and fall of 1994. Loons, including one bird in 2nd year plumage, appeared in the majority of Jean Cross's surveys of Lake Chaplain between late March and late November 1994. Loons were regularly observed on Spada Lake during the same period, and Cross suspects that the same individuals may be moving between the two lakes. Lost Lake is used by duck species, geese and pied-billed grebes, but loons have not appeared in surveys there since 1989. For this reason, the two floating platforms may be moved from Lost Lake in 1996, if suitable sites can be found for them in Spada Lake in 1995, and if there is no use of the platforms at Lost Lake in 1995. The platforms in Lake Chaplain will be relocated out into more open water in 1995.

3.6.3 Nest Boxes

The six nest boxes at the southern end of Chaplain Marsh and the two boxes at Lost Lake were monitored by District staff following procedures reported in the 1991 Annual Report. Four of the Chaplain Marsh boxes were used by wood ducks in 1994. We did not obtain complete counts of eggs prior to fledging in order to avoid disturbance to the brooding adult. Therefore, production was estimated by examining eggshell remains in the boxes and observations of newly-hatched broods near the nest. Two nest boxes fledged five chicks each, one box fledged at least two, and the fourth box contained three dead newly-hatched chicks. Three of the boxes had intact eggs in them in addition to the remains of hatched eggs, and it was assumed that these eggs were inviable.

3.6.4 Osprey Nest Platforms

The osprey nest platform at Lost Lake was monitored by District staff and Jean Cross from the opposite side of the lake during Spring-Summer 1994, following procedures reported in the 1991 Annual Report. The platform was occupied in 1994 by a pair of osprey, who successfully reared one young through fledging in August 1994. The adults and juvenile osprey were seen at the nest platform, flying in the vicinity of Lost Lake, or perched in trees on the east side of the lake through mid-September, after which it is assumed they migrated from the area. Osprey were not observed at Lake Chaplain during the same period.

Osprey were observed regularly at Spada Lake from May to September 1994. From May through July, Jean Cross observed a pair of osprey displaying and constructing a nest on the platform installed two years previously near the shoreline east of the South Fork Sultan River. Osprey had been seen perched on this platform in 1993 as well. In August a new nest was constructed in a tree near Culmback Dam, and the South Fork nest was apparently abandoned. No young were produced in 1994, and observations will focus on the new nest site in 1995. The nest platform installed on the hillside south of the dam has had no obvious use to date.

3.6.5 Deer Forage Monitoring

The availability and utilization of the most palatable shrub and herbaceous species were sampled, using methods described in the WHMP, on previously monitored units (1991 Chaplain sale final harvest units 1 and 3, and 1993 Horseshoe sale commercial thinning unit 2.). The species sampled include clovers, all Rubus species, fireweed, grasses, trefoils, and vine maple. Few of these species were present on the units prior to harvest. Using the WHMP's line-intercept method, we found that the pooled coverage of these species in the two final harvest units has increased from three percent prior to harvest in 1991 to about twenty percent, and the number of species has increased from one or two to twelve or more. The actual coverage of all shrub and herbaceous species on these units is between 75 and 80 percent. With regard to utilization, the WHMP's method of estimating browsing intensity was used in 1994. Prior to harvest, no evidence of deer foraging was found in these units, and slight increases in browsing on Rubus species were observed post-harvest on the sampled transects. However, it is our impression that moderate browsing is actually taking place along skid trails and game trails in the units.

In the thinned 1993 unit, three species were present prior to harvest, and six post-harvest. It should be noted that only one year elapsed between the harvest and the second sample. Browsing in this unit has not changed detectably post-harvest.

3.6.6 Coarse Woody Debris

The District and City recently developed a new prescription for CWD management on harvest units: A minimum of six logs per acre of decay class 1 or 2, length of 20 feet, with minimum diameter of sixteen inches (large end) and will be provided within each unit. Diameters should average 20 inches, and the average number should be eight (8) logs per acre. Procedures for ensuring that the targets are met, are set forth in Appendix A and are generally discussed in Section 4.7.6 of this report.

3.6.7 Precommercial Thinning Unit at Lost Lake

Photo-documentation stations were re-visited in October 1994, approximately three years after the thinning was completed. The slash resulting from the thinning remains thick, although all leaves and most fine branches have dropped. All of the large alders that were girdled during the thinning operation have fallen to the ground, and some are host to shelf fungi. A shrub layer dominated by salmonberry and salal has developed in trails that were cleared during the thinning, and in areas that were formerly dominated by an alder canopy. There was evidence of deer-browse on salmonberry twigs growing in the trails.

4.0 CUMULATIVE SUMMARY

At the request of agency representatives at the review of 1992 activities, a summary of all activities completed, from the earliest implementation in 1989 through the end of December 1994, is presented here. Accomplishments since the earliest implementation of the plan in 1989 are compared in Table 3 to the targets stated in the WHMP schedule (WHMP, Section 5.0), and in the detailed prescriptions for each management tract.

4.1 FOREST VEGETATION MANAGEMENT

4.1.1 Final Harvest

Five units were scheduled in the WHMP for final harvest approximately in 1990 (Figure 6). Three of these have been harvested. Harvest of a fourth 1990 unit has been delayed pending road construction, but it is expected to be completed within the time period permitted by the WHMP (ten years on either side of the target date). Harvest of the remaining 1990 unit was deferred, and another unit was substituted in the 1994 (Diversion) sale, which will be harvested in 1995. The 1990 unit, on close examination, was found to already provide many of the habitat features that the WHMP seeks to achieve through management of second growth stands, such as large snag trees and a well-developed shrub layer. Additionally, this unit has forested wetland areas. Substitution of the other unit will not compromise the WHMP requirement for a 15-year green-up period between the harvest of adjacent units.

In addition to the three 1990 units mentioned above, a 1995 unit has been harvested. Thus four units have been harvested compared to the target of five for 1990 in the WHMP schedule. The WHMP provides flexibility in scheduling final harvest - actual harvest may occur within ten years before or after the target year. Given that two additional units were sold in 1994, accomplishments to date are within the acceptable range.

Some units that have been harvested are smaller than the acreages listed in the WHMP, due to the reconfiguration of roads, unit boundaries, GTA allocations, buffer zones, etc. All harvest units to date have boundaries that are different from those depicted in the WHMP. These changes have been made to work within site constraints, to reduce the amount of road construction needed to serve the units, and to take advantage of opportunities to preserve or enhance habitat value.

Harvested units have been seeded with a grass/forb mix and replanted with fir and cedar seedlings. In addition, cottonwood cuttings were planted in moist areas of two units.

TABLE 3. COMPARISON OF SCHEDULED AND COMPLETED ACTIVITIES, 1989-1994

ACTIVITY	SCHEDULED		COMPLETED	
	Stand No. or Location	Quantity	Stand or Location	Quantity
FOREST VEGETATION MANAGEMENT				
Final Harvest	1-3, 1-9, 1-15, 3-1, 4-5, 5-8	116 ac.	1-3, 1-9, 1-15, 4-5, 5-4	79 ac.
			4-5, 5-4, 5-5 (b)	35 ac.
Commercial Thinning	1-9, 1-15, 2-13, 3-1, 4-5, 2-9	106 ac.	5-4, 5-5	36 ac.
Precommercial Thinning	7-4	54 ac.	7-4	46 ac.
Salvage Harvest	--	--	1991 FH Units	5 ac.
SNAG MANAGEMENT				
Snag Creation	See Figure 3	2,594 snags		460 snags
Inventory Snags		1,000 acres		460 acres
NEST STRUCTURES				
Nest Boxes	7-5	2 boxes	7-5	2 boxes
			5-14	6 boxes
Nesting Islands	7-5	3 platforms	7-5	2 platforms
			Lake Chaplain	2 platforms
Osprey Platforms	7-5	1 platform	7-5	1 platform
	9-11	2 platforms	9-4	1 platform
			Spada L. Tract	1 platform
DEBRIS REMOVAL (Spada L. Shoreline)	9-1 thru 9-10		Not considered necessary	
COARSE WOODY DEBRIS MANAGEMENT				
Retain CWD	FH and CT units	Class 3, 4, 5, logs 6-10 Class 1, 2 logs per acre	FH and CT units	Class 3, 4, 5 logs Snag tops and cull logs retained as CWD
		Mark logs w/unique habitat value		Logs not marked in FH and CT units
			Salvage Areas	Marked Class 1 logs for retention

(a) WHMP schedule (WHMP p. 5-1) indicates activity in 5 other units (4-3, 404, 2-9, 2-11, 4-2) totaling 72 ac. in 1993. However, WHMP Figure 3.5 shows activity in these units in 1995, and detailed prescriptions (Sec. 2.1) allow completion of work 10 yrs before or after this date.

(b) Units sold, to be harvested in 1995.

ACTIVITY	SCHEDULED		COMPLETED	
	Stand No. or Location	Quantity	Stand or Location	Quantity
MONITORING				
CWD Pre-harvest Inventory	--	--	1993 Sale Unit 3, 1994 Sale Unit 1	2 FH Units
CWD Monitoring During Harvest	FH and CT units	--		Post-harvest inventory: All 1991 units and 1993 Unit 3
Nest Boxes	1 maint. visit annually 2 visits/breeding season			Done Done
Nesting Islands	Annually for 3 yrs. post-installation			Done
Osprey Platforms	Observe each spring			Done
Revegetation Sites	1-17, 4-8, 8-3, 8-4 9-10			Done Done
Buffer Zones	All FH and CT Units			Done
GTA's	All FH and CT Units			Done
Deer Forage	2 FH & 2 CT units/5-yr. pd.		1991 FH Units 1 and 3, 1993 CT Unit 2	Done
REVEGETATION				
Replant, Seed FH Units	1-3, 1-9, 1-15, 3-1, 4-5	79 + ac.	1-3, 1-9, 1-15, 4-5, 5-4	Done
Seed CT and Roads			5-4, 5-5	Done
Test Plantings	9-10 (Spada L. drawdown zone)		9-10	Done
Tree/Shrub Plantings	1-17, 4-8, 8-3, 8-4	73 ac.	1-17, 4-8, 8-4	47 ac.
Grass Seeding	8-3	40 ac.	8-3, 8-5	40 ac.
Fertilization	8-3, 8-4	65 ac.	8-3, 8-5	15 ac.
LAND EXCHANGE	Acquire additional land at Spada Lake; Williamson Creek City/DNR land exchange			Done
REPORTING	Annual reports, agency meetings			Done

4.1.2 Road System Layout and Construction

The main road systems for the northeast side of Lake Chaplain and the area south of the Diversion Dam Road have been constructed, as shown in Figure 2. Some spur roads will be constructed to service individual harvest units in the future, but the major construction in these areas has been completed. Following road construction, rights-of-way have been seeded with a grass/forb mix designed to provide forage in-addition to erosion control.

Progress has been made on planning the location of the main road system for the west side of Lake Chaplain, and construction is expected to occur in 1996.

4.1.3 Property Line/Cutting Line Locations

Property lines and cutting lines have been located on the Lake Chaplain tract and the majority of them marked in cooperation with the adjacent landowner (Department of Natural Resources) as a necessary step in locating the road system and harvest units.

4.1.4 Commercial Thinning

Two units (36 acres) were commercially thinned in 1993 (Figure 2 and Figure 6). These units were not specified in the WHMP schedule, but were thinned because it appeared that the understory vegetation would respond favorably, and because the thinning operation was feasible with little impact to the stand or soils.

Five other units (totaling approximately 106 acres) that were scheduled for thinning in the WHMP through 1994 have been deferred pending road construction (Figure 6). It is likely that some of these units may not be thinned due to unsuitable site conditions, such as soil, timber type, or slope. Scheduled units that are suitable will be thinned as the major road system reaches completion, and other unscheduled units will be evaluated as possible candidates for thinning. Criteria for thinning will include water quality protection, wildlife habitat benefits and operational feasibility.

4.1.5 Precommercial Thinning

Precommercial thinning of approximately 46 acres at Lost Lake was completed as scheduled, and photo-documentation stations were established to monitor the results over time.

4.2 SNAG MANAGEMENT

The 1993 Annual Report described the problems that have slowed progress on performing inventories and snag creation as scheduled in the WHMP. The WHMP schedule for snag creation assumed that there would be few constraints during the first five to six years of implementation, and therefore planned for satisfying virtually all snag needs on the Lake Chaplain and Lost Lake Tracts during this period. In reality the effort has been hampered by the need to complete the City/DNR land exchange, survey property boundaries, and identify the boundaries of units, OMA's, etc.

We have developed more workable approach over the past few years. Snag trees are inventoried in harvest units as the units are prepared for sale. We identify snags that can be preserved during harvest, and select live trees to be made into snags after harvest. The result is at least three snag trees per acre for the unit. A similar approach will be used for buffer zones, old growth management areas (OMA) and permanent mixed forest stands (PMF), provided there is reasonable access from the existing road system, and the boundaries are reasonably well identified . Snag trees will also be sampled and created, as needed, in harvest units scheduled for final harvest 20 or more years in the future; provided that the boundaries of these units are reasonably well identified and there is reasonable access.

Areas that meet these criteria at present include several units on the east side of Lake Chaplain, units south of the Diversion Dam Road, and units at the southern end of the Lake Chaplain Tract (Figure 7). Under this approach, units scheduled for harvest or thinning within the next 20 years would be the last ones sampled. The areas shown in Figure 7 represent the target for snag management over the next four years.

The revised procedure will satisfy each harvest unit's snag requirements promptly after harvest. In addition, as boundaries are identified for buffer zones, wetlands, OMA's and PMF's, and distant-future harvest units, the target number of snags will be created in these areas.

To date, snag creation has been completed in the three units of the 1991 sale, and the single final harvest unit of the 1993 sale. These units now have the target density and size distribution prescribed by the WHMP. Hemlock and Douglas fir are the preferred species for snag creation, but cedar, alder and cottonwood are also used in stands where they are abundant. Snags have been created in several stream buffer zones, OMA's, PMF's, but it is not known whether the target density has been achieved because inventories have not been completed for them. Under the revised procedure, such areas will be given high priority for inventory in the future, and additional snags created, if needed, to reach the target density.

4.3 REVEGETATION

Tree/shrub plantings at the north end of Lake Chaplain (Stand 1-17), Chaplain Marsh (Stand 4-8), and the powerhouse (Stand 8-4) have been completed as described in the 1992 and 1993 Annual Reports. The plantings are consistent with the objectives of the WHMP, to provide screening between the Lake Chaplain Road and the lake and marsh, and to provide forage and shelter at all three sites. Test plots of five herbaceous wetland species were established in two locations in the Spada Lake drawdown zone to evaluate the feasibility of revegetating the zone.

Trees and shrubs were not planted on the power pipeline right of way, based on the consultant's recommendation that a sod layer should be developed first to help improve the soil. Seeding of the pipeline ROW from the powerhouse to the Marsh Creek gate over the past 4 years has proven effective in most areas. This portion now supports a good cover of grasses and clovers in many areas. It will still be necessary to mow alders every few years. Some shrubs (mostly salal) are coming in and will be protected from mowing in the future. Small piles of tree stumps have been placed at intervals on the right of way to encourage wildlife use and shrub growth. Other improvements, such as gates over access roads, boulders and ecology blocks, have reduced the damage caused by off-road vehicle traffic and garbage dumping on the upper portion of the pipeline north of the Marsh Creek gate. This area is expected to respond well to seeding and fertilizing over the next few years.

4.4 NEST STRUCTURES

All of the required nest structures have been installed and monitored annually thereafter. In 1990, two floating nest platforms were placed in Lost Lake and two duck nest boxes were installed on the shoreline. One osprey platform was installed at Lost Lake in 1990, and two at Spada Lake in 1992. In addition to these required nest structures, we placed two floating platforms, (one of these in place of the third platform required at Lost Lake), in Lake Chaplain in 1990 in hopes of recruiting loons. In addition, we placed six nest boxes in Chaplain Marsh in 1993.

4.5 DEBRIS REMOVAL ON SPADA LAKE SHORELINE

The WHMP called for removal of logs and other woody debris on the Spada Lake shoreline if they hampered wildlife movement. Surveys have been conducted since the implementation of the WHMP began, and the amount of material has decreased. Shoreline debris no longer appears to be a significant problem for wildlife movement to and from the lake. Annual monitoring will continue, however, and problem areas will be cleared to make the lake accessible.

4.6 LAND EXCHANGE

The District/USFS/DNR land exchange was completed in 1991. The District acquired 2,295 acres of upland and wetland habitat at Spada Lake and Williamson Creek. With the exception of existing recreation sites and areas used for hydroelectric operations, the land in the Spada Lake Tract will be incorporated into the wildlife habitat management program as prescribed by the WHMP and the Spada Supplemental Plan (in preparation). The City/DNR land exchange was completed in late 1991. All of the land specified in the WHMP in the Lake Chaplain tract was acquired by the City and dedicated to management under the WHMP.

4.7 MONITORING PROGRAM

All of the required monitoring has been performed on schedule after specific activities/programs have been established. Some variations have been made on the methods described in the WHMP, as follows:

4.7.1 Snags

The WHMP called for sampling existing snags initially on a stand (timber type) basis in conjunction with snag creation, timber cruises, habitat surveys, or independently. As described in Section 4.2, snag inventory goals have been linked with snag creation in cutting units as they are scheduled for final harvest, in addition to buffer zones, OMA's, PMF's, and harvest units scheduled for harvest after 2020. The transect sampling method described in the WHMP has been modified based on advice from other investigators, who recommend randomly-located transects rather than parallel transects. Sampling intensity is at least ten percent of the unit. The WHMP calls for re-sampling at ten year intervals. Independent of this monitoring, we will revisit a subset of approximately ten percent of created snags at three to four year intervals to record wildlife use and rates of decay. Created snags have been marked and mapped for this purpose.

4.7.2 Revegetation at Lake Chaplain

Plantings have been monitored at least once each season at the north end of the lake, and adjacent to Chaplain Marsh since planting (in 1992 and 1993, respectively). Mortality of all species, with the exception of western red cedar at the north end, has been negligible. In 1995, 75 percent survival of shrubs will be considered satisfactory, and replacement will be required only if mortality is higher than 25 percent.

4.7.3 Revegetation at Project Facility Lands

Shrub and tree plantings have been monitored at least once each season since planting (in 1993). Seventy-five percent survival of shrubs and trees will be considered satisfactory in the future. Seeding and fertilizing of the pipeline right-of-way has been qualitatively evaluated each year. Limited success prior to 1994 made it unnecessary to sample percent grass/forb ground cover. If seeding in the next few years shows improved coverage, quantitative measurements will be made.

4.7.4 Nest Structures

All of the nest structures have been monitored every year since installation. Half of the duck nest boxes have been used by wood ducks and/or hooded mergansers each year. The osprey platform at Lost Lake produced one fledgling in 1994, and a nest was partially constructed at one of the two platforms at Spada Lake during the same year. The floating platforms have been used as a resting and feeding spot by waterfowl and otters, but no breeding attempts have been noted.

4.7.5 Deer Forage Monitoring

Monitoring has departed from the WHMP's method in several respects. The WHMP called for comparisons of Lake Chaplain harvest units with units under typical commercial management. As discussed in the 1991 Annual Report, comparisons between Lake Chaplain units before and after harvest should provide a better evaluation of the benefits of the WHMP. Monitoring will continue over a 20-year period post-harvest to help fine-tune the WHMP's forest succession model, and to modify the harvest schedule if necessary.

We have used two methods to monitor forage availability and utilization, including the methods described in the WHMP. Forage availability was sampled from 1991 and 1992 on 5 meter^2 circular plots along fifteen 100-meter transects in each unit. Height and percent cover for shrub and herbaceous species were measured. In 1993 and 1994, a subset of the most palatable species was sampled using the WHMP's line-intercept method along fifteen 100-meter transects, as described in the WHMP. It is our impression that this method produces under-estimates of many of the species, such as fireweed, and we will use circular plots or another similar plot-based method in the future.

Two methods have also been used to evaluate deer utilization of units. During 1992 and 1993, pellet group counts were sampled in order to avoid the subjectivity of the estimation method described in the WHMP. However, as the density of the shrub layer has increased on the units, finding pellet groups has become very difficult, and the WHMP's method was used in 1994. Although there is some uncertainty whether the results obtained reflected actual browsing activity, we are satisfied that the method is appropriate for this management program and that some refinements can be made to control subjectivity. We are planning to develop definitions of the different levels of browsing intensity on the principal browse species, and expect that future results will be more reliable.

4.7.6 Coarse Woody Debris

The WHMP called for marking logs with unique habitat value within one year prior to harvest, monitoring harvest operations and monitoring subsequently at 20-year intervals. Considerable effort has been devoted to developing a management program to achieve WHMP prescriptions for CWD. In the 1991 (Chaplain) sale, the harvest contract required that existing CWD be left on the ground. Post-harvest inventories were performed on the three units of this sale. We reported in the 1993 Annual Report that most logs of the preferred size stated in the WHMP (at least 24 inches diameter and 20 feet long) were remnants of earlier stands, and were in soft decay classes. The average length and diameter of class 1 and 2 logs, consisting of tree tops from snag creation, cull logs, and slash, were below the preferred size (Table 4).

The CWD prescription for the 1993 (Horseshoe) final harvest unit was modified from the 1991 harvest in order to provide a better distribution of CWD. Logging techniques were changed so that slash piles, snag pockets and individual snag trees could be retained throughout the harvest unit. In 1991, snag trees were left on the unit perimeter, whereas in the 1993 harvest, pockets of snags along with individual snags were dispersed throughout the harvest unit. The 1993 CWD prescription resulted in more than six logs/acre with an average diameter of 14 inches and 8 to 12 slash piles per acre.

The CWD prescription for future timber harvests is intended to provide at least eight (8) logs per acre with an average diameter of 20 inches; with a minimum diameter of 16 inches and minimum length of 20 feet. The procedures for implementing the prescription are described in detail in Appendix A. The prescribed quantity of CWD will be provided at the time of harvest using a number of inputs, including: pre-harvest CWD, created snag tree tops, and additional live trees distributed throughout the unit. The procedure calls for performing pre-harvest CWD inventories in order to identify and quantify logs and snags that will contribute to meeting the targets. Pre-harvest inventories of CWD have been performed on 1993 harvest units, and one unit of the upcoming 1995 (Diversion) harvest. The CWD procedures will be re-evaluated after five (5) years of implementation to determine whether results are satisfactory and what modifications, if any, are needed.

TABLE 4. POST-HARVEST COARSE WOODY DEBRIS SURVEY

DECAY CLASS 1-2

Unit No.	Avg. Diam.,[1] inches (range)	Avg. Length,[1] feet (range)	#/acre	# acceptable[2] logs/acre
1991-1	11.8 (10-16)	14.5 (10-25)	8.2	0.4
1991-2	15.5 (11-25)	10.0 (10)	3.1	0.0
1991-3	14.6 (12-17)	16.0 (10-20)	1.9	0.4
1993-3	12.9 (10-16)	12.2 (10-15)	6.9	0.0

DECAY CLASS 3-5

Avg. Diam.,[1] inches, (range)	Avg. Length, feet, (range)	#/acre
14.4 (10-52)	16 (10-30)	12.6
21.6 (10-46)	18.6 (10-45)	28.1
23.2 (10-53)	17.7 (10-53)	24.6
13.0 (12-28)	13.3 (10-25)	11.5

CWD INPUTS FROM CREATED SNAGS

	Avg. Diam.,[3] inches (range)	Length[3]	#/acre	# acceptable[2] logs/acre
1991-1	12.7 (12-16)	20.0	1.9	0.0
1991-2	13.0 (12-18)	20.0	2.9	0.3
1991-3	14.2 (12-26)	20.0	4.2	0.9

[1]Inventories include logs ≥ 10 in. diameter, large end, and ≥ 10ft. long.

[2]Minimum acceptable size is ≥ 16 in. diameter, large end, and ≥ 20 ft. long, in decay classes 1-2.

[3]Log diameters estimated from stand tables for logs 20 ft. long, based on snag tree diameter and finished height, and defining log length as 20 ft. long. Only logs > 12 in.diameter, large end, were included.

In addition, we will be developing methods for long-term monitoring of CWD that will quantify decay rates and wildlife use patterns of logs.

4.7.7 Buffer Zones and Green Tree Areas

Once established buffer zones and green tree areas have been monitored in a "walk-through" annually. One GTA had significant blowdown and was replanted, as described in Section 3.1.4. The remainder of GTA's are in good condition. We will develop management plans for GTA's which may include thinnings or other treatments to maintain or improve their habitat value.

4.8 REPORTING

An annual report has been prepared, reviewed by the agencies, and submitted to the FERC each year since implementation began in 1990.

5.0 WORK PLANNED FOR 1995

5.1 FOREST VEGETATION MANAGEMENT

5.1.1 Harvest Units and Road System

Road construction and final harvest of the two units in the Diversion Sale will be completed prior to November 1995 (Figure 2). Rights of way will be reseeded immediately after harvest has been completed, and the units will be replanted in early 1996. On the west side of Lake Chaplain, planning of the road system and layout of four harvest units scheduled in the WHMP for 1995, will be completed in 1995. Layout of a 1990 unit east of the filtration plant may be included in the 1995 sale.

5.2 SNAG MANAGEMENT

Inventory of existing natural snags in the Lake Chaplain Tract will continue in 1995 in conjunction with planning harvest units, and in buffer zones, OMA's and PMF's. Planned inventory areas for 1995 are shown in Figure 7. Snag inventory and creation will be completed on the Lost Lake Tract, although snag creation opportunities may be limited in this area by the scarcity of large trees. As snags are created, they will be tagged and mapped for future monitoring. A sample of snags created in 1990 through 1993 will be monitored to evaluate wildlife use and evidence of decay.

5.3 REVEGETATION

Small piles of three to four tree root wads and/or logs will be placed on the ROW from the microwave tower near the powerhouse to the Marsh Creek gate area. They are expected to provide visual screening, foraging areas, cover for small mammals, and protected areas which will enhance plant growth. Selected areas of the pipeline ROW will be seeded and fertilized prior to June or after rainy weather begins in Fall 1995. Trees in the bufferstrip between the pipeline ROW and access road on the lower pipeline will be thinned as needed. Test plantings in the drawdown zone of Spada Lake will be monitored.

5.4 WHMP SUPPLEMENT FOR SPADA LAKE

The forestry consultant is expected to submit a report in July 1995, including detailed inventories of selected stands, long- and short-term management options. District and City staff will incorporate these data and the recommendations into the draft Supplemental Plan for Spada Lake, and submit the completed plan to the District's Commissioners during 1995.

5.5 MONITORING

5.5.1 Revegetation Monitoring

The areas that were previously planted (powerhouse site, Chaplain Marsh, north end of Lake Chaplain, pipeline ROW) will be monitored. Shrubs and trees will be replaced if there is significant mortality (i.e. greater than 25 percent).

5.5.2 Floating Nest Platforms

Floating nest platforms in Lake Chaplain and Lost Lake will be checked to make sure they are in good condition for nesting in March 1995. All of the platforms will be monitored from March at least through the end of June. If there is any use of the platforms, monitoring will continue through the entire breeding season.

5.5.3 Nest Boxes And Osprey Nest Platforms

Nest boxes will be cleaned and repaired, as needed, prior to the breeding season. All of the boxes and osprey platforms, plus the new osprey nest at Spada Lake, will be monitored following the procedures described in the 1991 Annual Report.

5.5.4 Other Monitoring

Monitoring of deer forage, snags, green tree areas, buffer zones and coarse woody debris will continue as described in this report (see Sections 4.2 - Snag Management, and 4.7 - Monitoring Program) and the WHMP.

6.0 SCHEDULE OF ACTIVITIES FOR 1995

Activities scheduled for 1995 are reported, by management unit, in Table 5.

TABLE 5. HABITAT MANAGEMENT ACTIVITY SCHEDULE FOR 1995

ACTIVITY	STAND NO. OR LOCATION	QUANTITY
Final Harvest		
Layout and sale	2-9, 2-11, 4-2, 4-3,4-4.	4 units (approx. 72 ac.).
Timber harvest	4-5, 5-4 (Diversion sale)	2 units (35 ac.).
Snag Creation	1992 CT units; Diversion sale units, other areas shown in Fig. 7.	Diversion sale Units: 96 snags Others: TBD
Snag Inventory	Areas shown in Fig.7.	TBD
Revegetation		
Grass seeding and fertilizer	8-3	Selected areas TBD
Thin buffer strip on ROW	8-3	TBD
Monitoring		
Deer forage	1-9. 1-15, 4-5, 5-4, 5-5.	2 FH and 2CT units
Revegetation sites	1-17, 4-8, 8-3, 8-4.	All planted/seeded areas
Spada Lake test plantings	9-10.	All planted/seeded areas
Coarse woody debris	FH units laid out in 1995.	Acreage TBD
Nesting structures	Lost L., Spada L., L. Chaplain.	All structures
GTA's, buffer zones	All established areas.	All established areas
Draft Spada Supplemental Plan	Spada Lake Tract	Approx. 1800 ac.

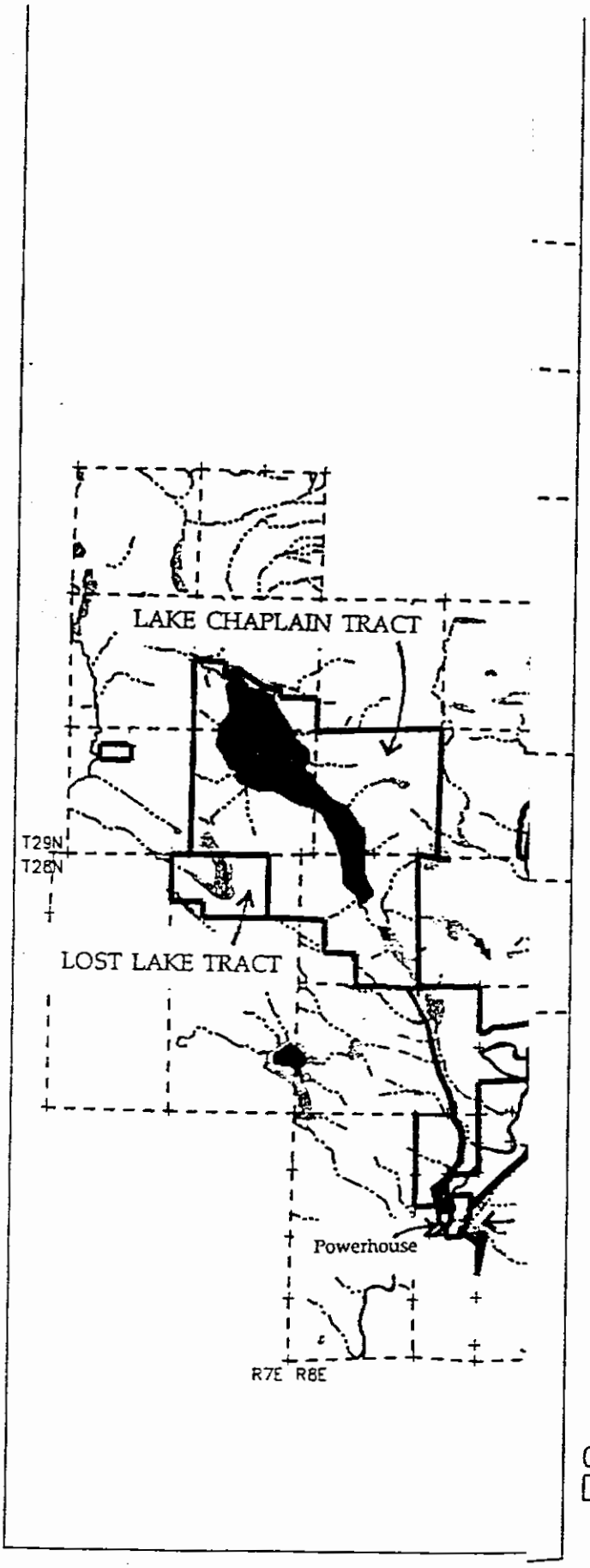
7.0 AGENCY COORDINATION

The co-licensees submitted a draft version of this report to the following reviewing agencies: U.S. Fish and Wildlife Service, Washington Department of Wildlife, and the Tulalip Tribes. A copy was also sent to the Washington Department of Natural Resources. A meeting was held on March 9, 1995, to discuss progress to date and future plans for WHMP activities.

Minutes of the meeting are attached in Appendix B, with copies of letters exchanged by the District and agencies regarding the draft report and meeting.

HENRY M. JACKSON PROJECT
WILDLIFE HABITAT MANAGEMENT PLAN

FIGURE 1 MANAGEMENT TRACTS LOCATIONS



Land Survey
Land Survey Sections
Land Survey Monuments
Ownership
Ownership Boundaries
Hydrography
Open Water
Wetlands
DNR Class 1
DNR Class 2
DNR Class 3
DNR Class 4
DNR Class 5

North

0 5000 10000 15000 20000
FEET

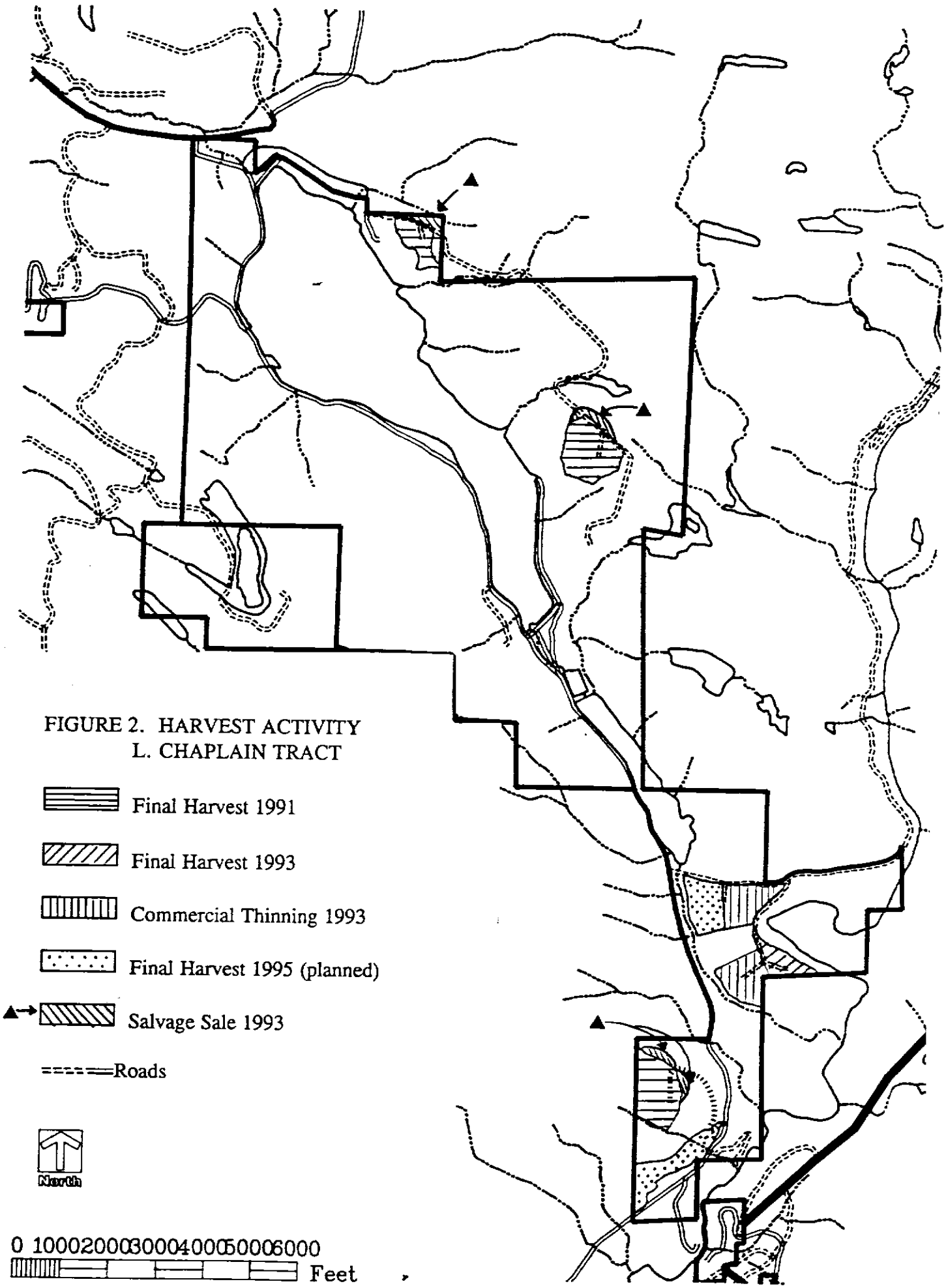


FIGURE 2. HARVEST ACTIVITY
L. CHAPLAIN TRACT

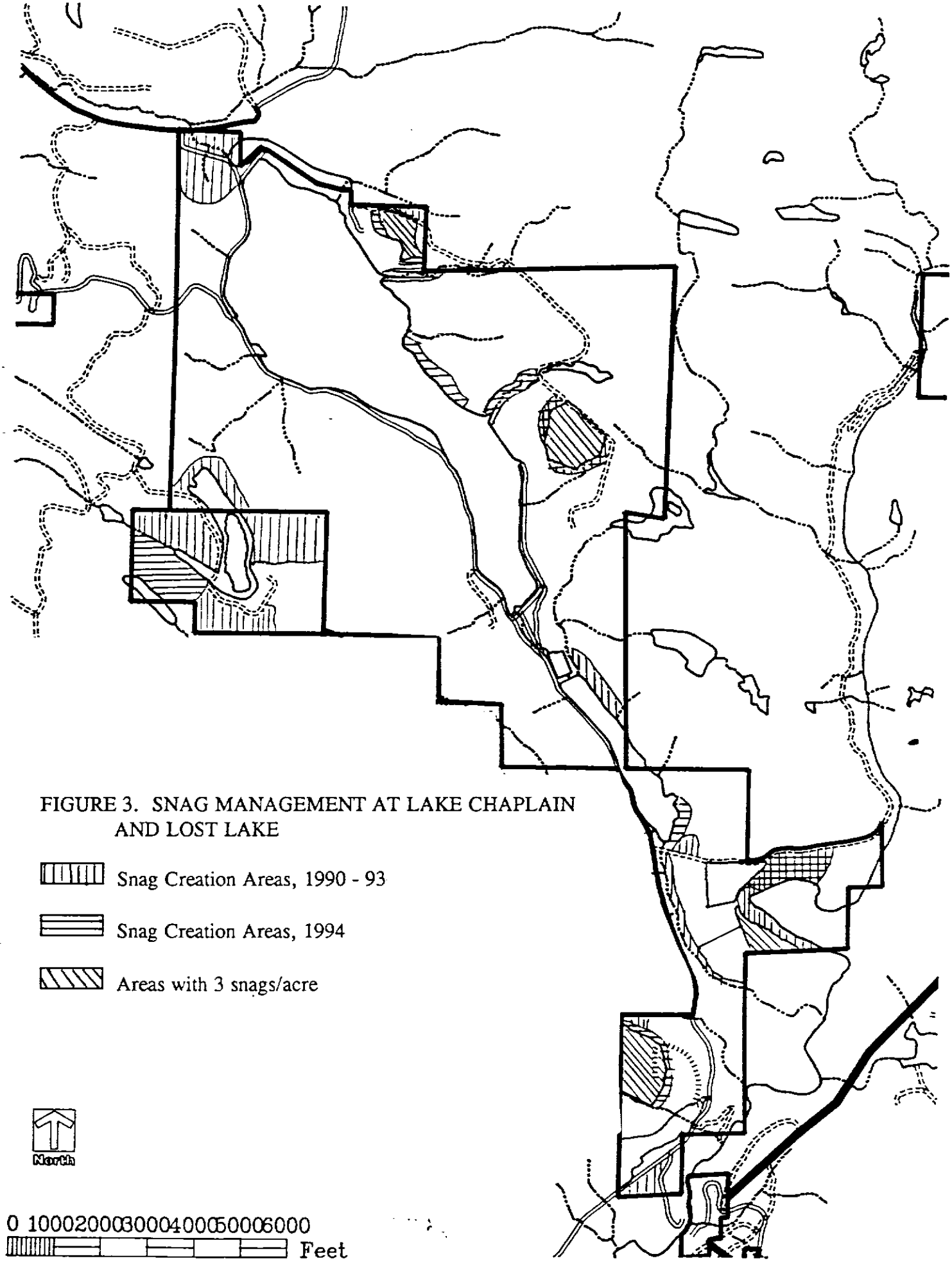
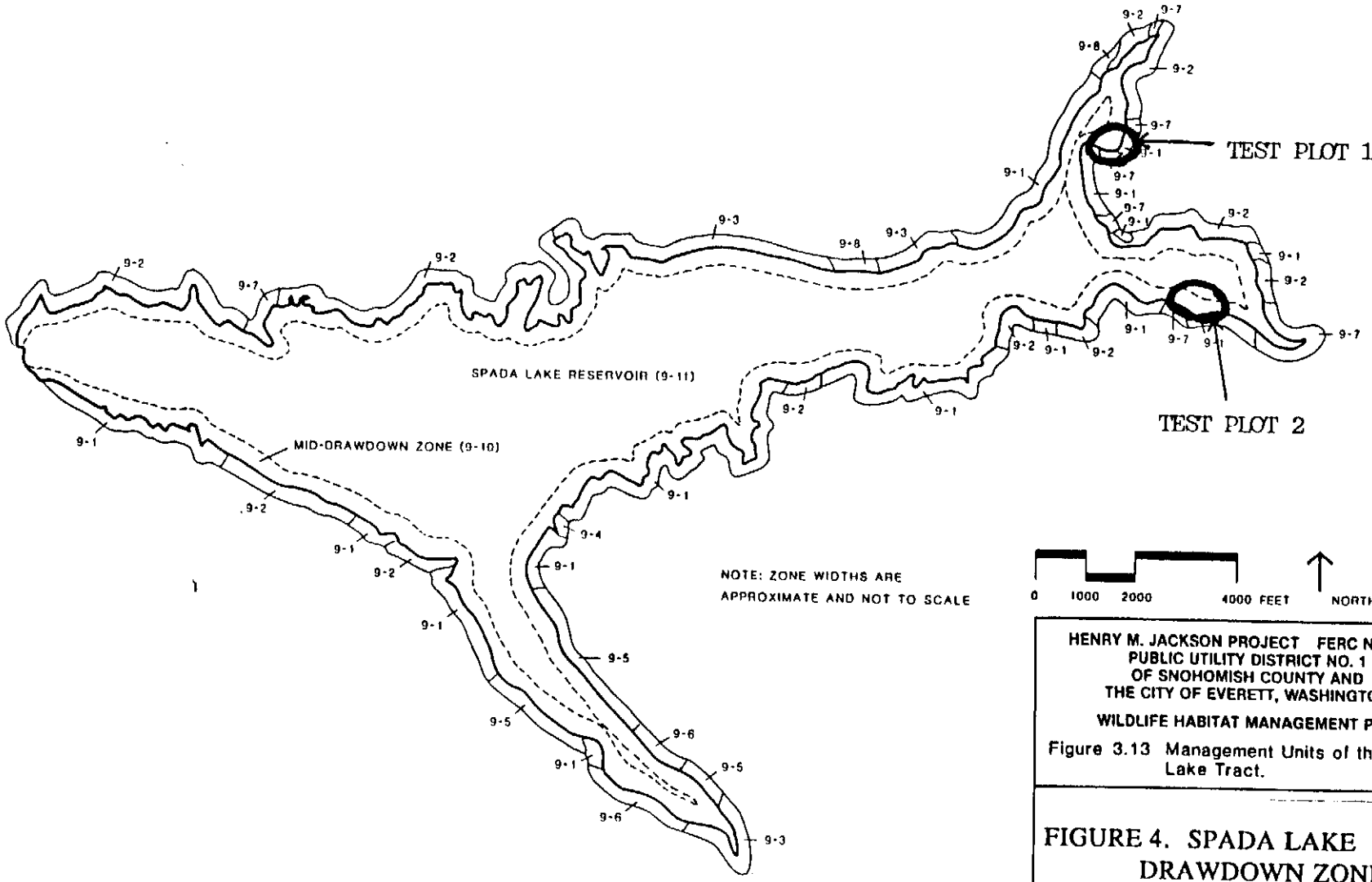


FIGURE 3. SNAG MANAGEMENT AT LAKE CHAPLAIN AND LOST LAKE



HENRY M. JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO. 1
OF SNOHOMISH COUNTY AND
THE CITY OF EVERETT, WASHINGTON

WILDLIFE HABITAT MANAGEMENT PLAN

Figure 3.13 Management Units of the Spada Lake Tract.

FIGURE 4. SPADA LAKE DRAWDOWN ZONE-REVEGETATION SITES

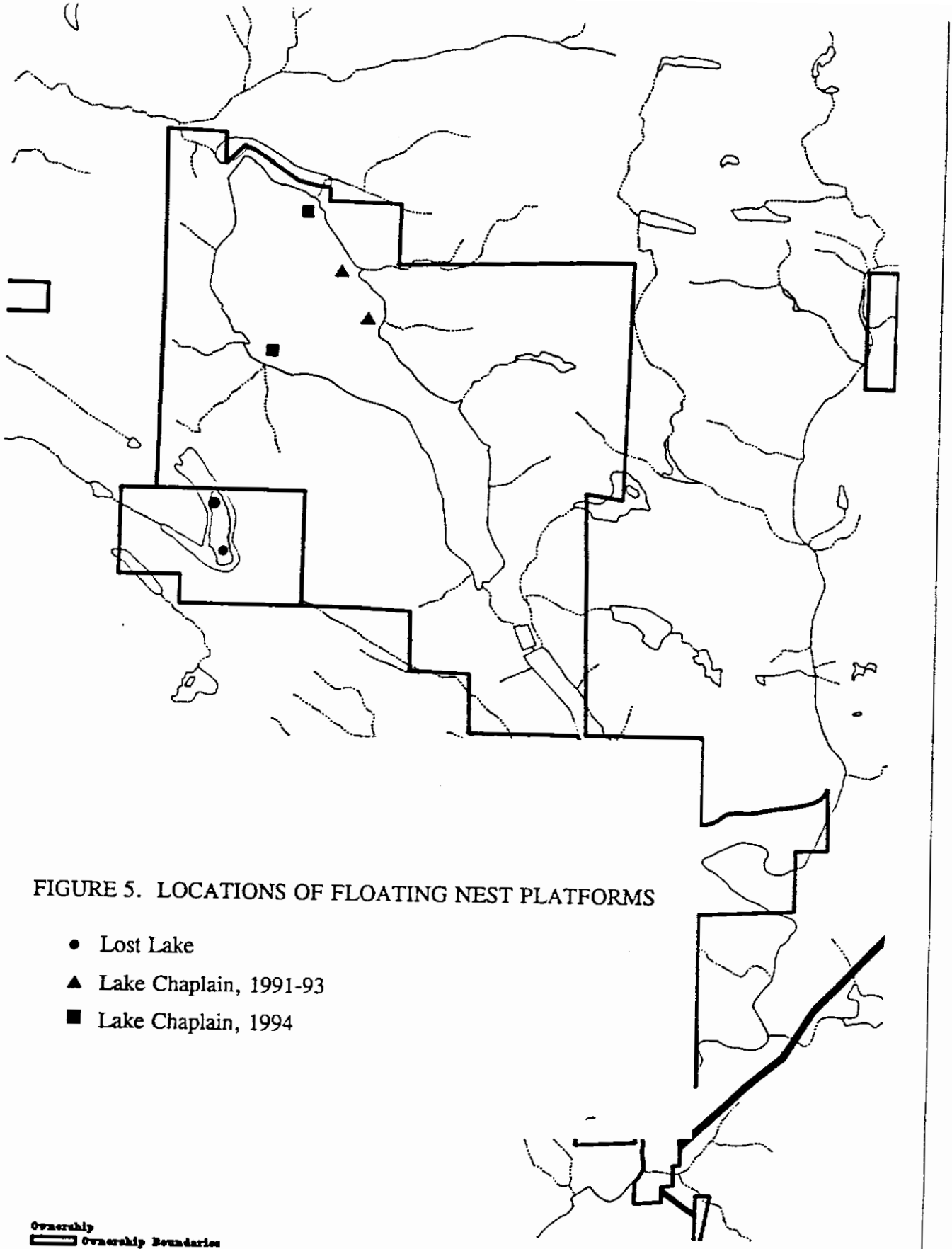


FIGURE 5. LOCATIONS OF FLOATING NEST PLATFORMS

- ● Lost Lake
- ▲ Lake Chaplain, 1991-93
- ■ Lake Chaplain, 1994

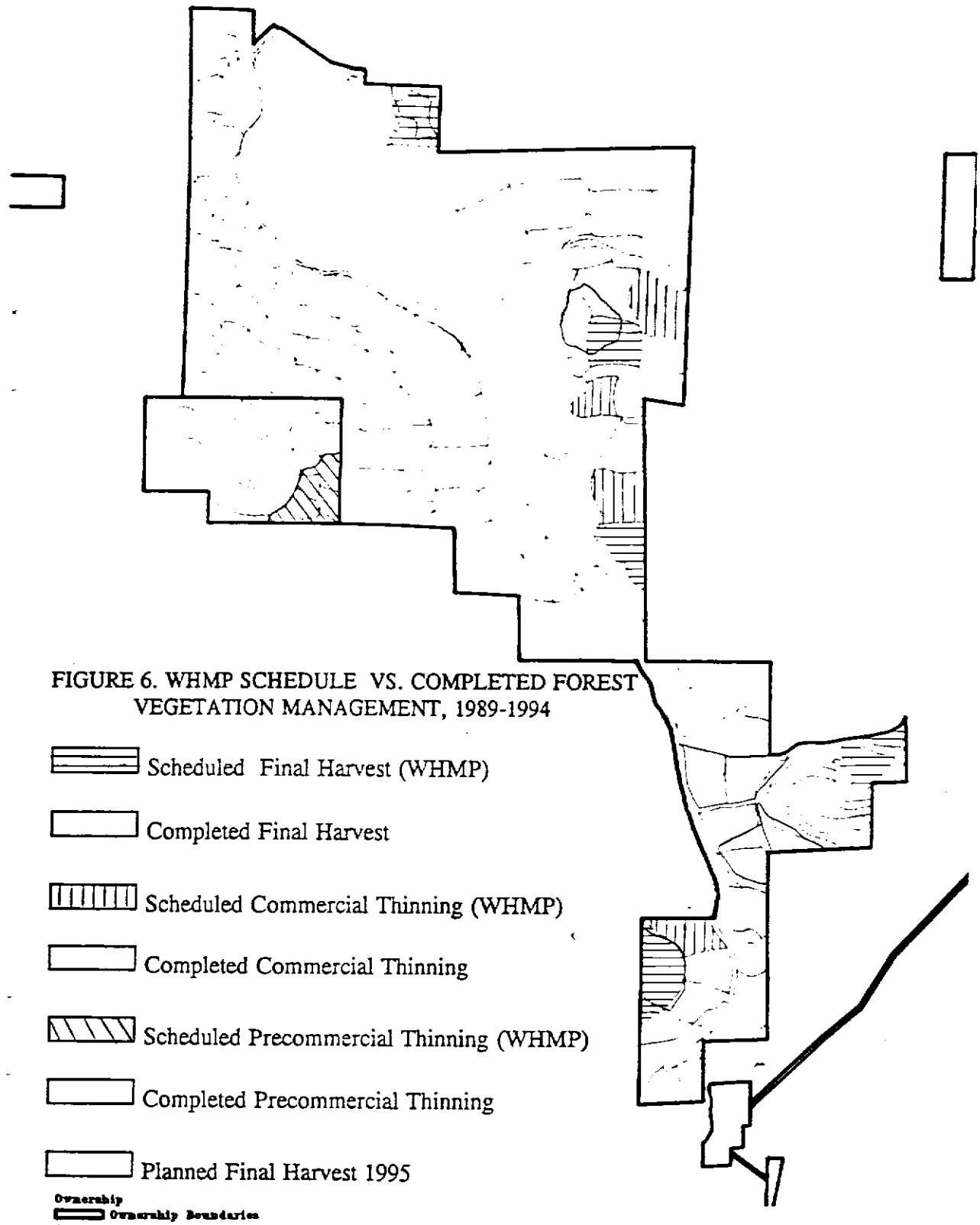


FIGURE 6. WHMP SCHEDULE VS. COMPLETED FOREST VEGETATION MANAGEMENT, 1989-1994

Scheduled Final Harvest (WHMP)

Completed Final Harvest

Scheduled Commercial Thinning (WHMP)

Completed Commercial Thinning

Scheduled Precommercial Thinning (WHMP)

Completed Precommercial Thinning

Planned Final Harvest 1995

Ownership

Ownership Boundaries

Activity Units

WHMP Activity Units

N

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

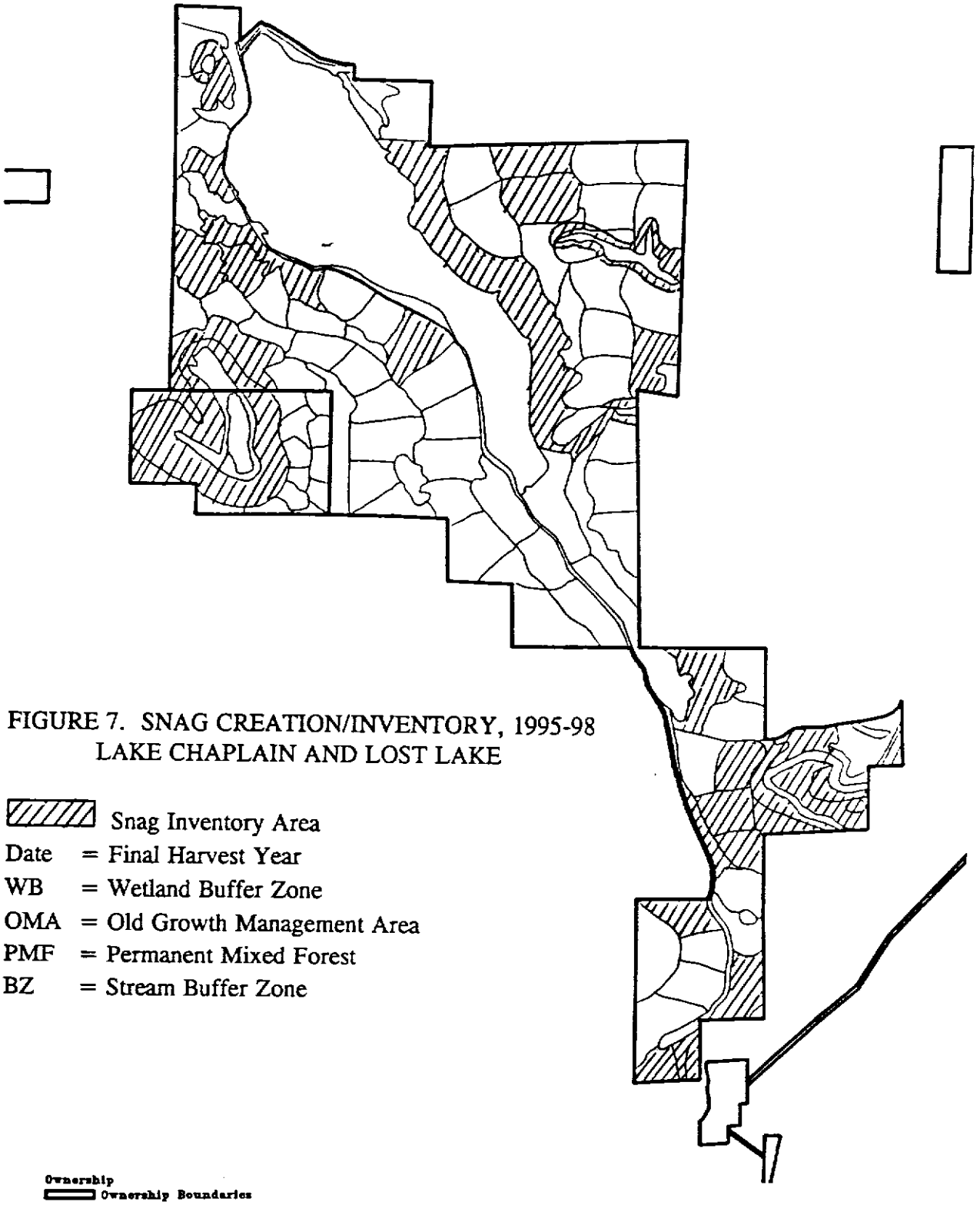


FIGURE 7. SNAG CREATION/INVENTORY, 1995-98
LAKE CHAPLAIN AND LOST LAKE

Snag Inventory Area
Date = Final Harvest Year
WB = Wetland Buffer Zone
OMA = Old Growth Management Area
PMF = Permanent Mixed Forest
BZ = Stream Buffer Zone

Ownership
Ownership Boundaries
Activity Units
WBMP Activity Units

N

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
Feet

APPENDIX A

GENERAL PROCEDURES FOR MANAGING COARSE WOODY DEBRIS ON HARVEST UNITS

GENERAL PROCEDURES FOR MANAGING COARSE WOODY DEBRIS ON HARVEST UNITS

The following general procedures for managing coarse woody debris (CWD) are intended to refine the prescriptions of the Wildlife Habitat Management Plan. These procedures pertain to final harvest units.

Logs of decay classes 3, 4, and 5 will be managed at the time of harvest as described in the WHMP, Section 2.4. These logs will be left on the units, and those logs with unique habitat value and old-growth cedar and Douglas fir stumps will be protected during harvest.

Logs in decay class 1 and 2 with minimum length of 20 feet will also be left on final harvest units at the time of harvest. Diameters of these logs will average 20 inches (large end), and the average number will be eight per acre. Since the distribution of logs and trees of adequate size on harvest units is usually uneven, an average of 40 logs per five acres will be an acceptable density. A minimum of six logs per acre with minimum diameter of 16 inches (large end) will be provided. Logs of decay class 1 and 2 will be recruited from several sources, as follows:

1. **Existing CWD.** A pre-harvest inventory of logs will be performed to estimate the number of logs on each unit that meet the minimum criteria. Diameter, length, species, decay class and evidence of wildlife use will be recorded, using the sampling method described in WHMP Section 4.2.3. The system used to identify decay classes of logs (Maser et al., 1979) will be field-reviewed.

2. **Created Snag Tree Tops.** Prior to harvest, trees will be selected and marked for snag tree creation. The diameter and planned final height of each snag will be recorded, and this information will be used in conjunction with timber cruise data to project the input of acceptable logs from the snag tree tops. Final heights of snags will be decided on the basis of the tree's location and tendency to lean, and year of next stand entry (not including precommercial thinning). Final snag height will not be subject to the need to generate logs for CWD.

3. **Existing Snag Trees.** Large snag trees which appear to contain merchantable logs will be marked for retention, and the harvest contract will specify that they must be left on the unit. If loggers must fell these snags to ensure safe harvest operations, the entire snag will remain in the unit and it will be applied toward the CWD requirement.

4. **Live Trees.** If existing CWD and snag top inputs of acceptable size do not provide the target density of class 1 and 2 logs, they will be supplemented at the time of harvest. Additional live trees will be marked for retention prior to harvest as CWD. These trees will be well distributed throughout the unit as the logging system and natural distribution of trees of appropriate size permit. If available, trees that will produce three or four logs greater than or equal to 16

inches in diameter, large end will be selected. The sizes of these trees will also depend on producing an average of eight logs per acre with an average diameter of 20 inches, as stated above. Douglas fir and western red cedar will be selected, if available; if not available, western hemlock will be selected. Western hemlock may be selected over Douglas fir and western red cedar in order to achieve better distribution of logs over the unit..

5. Post-harvest inventory will be performed to determine the number, sizes and decay classes of CWD on each unit. The effects on site conditions of leaving this CWD will be evaluated: soil disturbance, the amount and distribution of slash, disturbance to soft logs and shrubs, and the ease of replanting the unit will be considered.

6. Details of how these sources will be utilized on future units will be prescribed at the time of setup; we do not anticipate developing a formula that will apply to all units. These general procedures will be reviewed after five years of implementation, and procedures may be modified as appropriate.

4/14/95

APPENDIX B

AGENCY COORDINATION - ANNUAL MEETING MINUTES AND CORRESPONDENCE

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

JACKSON HYDROELECTRIC PROJECT - FERC 2157
WILDLIFE HABITAT MANAGEMENT PLAN

AGENCY MEETING - MARCH 9, 1995 AT 10:00 AM
CITY OF EVERETT FILTRATION PLANT

AGENDA

1. INTRODUCTIONS

2. PROGRESS SINCE BEGINNING OF WHMP IMPLEMENTATION

Forest Vegetation Management
- Road System Layout and Construction
- Final Harvest
- Commercial Thinning
- Precommercial Thinning

Snag Management
- Snag Creation
- Inventory of Existing Snags

Nest Structures
- Boxes
- Floating Platforms
- Osprey Platforms

Debris Removal

Coarse Woody Debris
- Marking and Retention of CWD

Revegetation

Monitoring
- Snags
- Coarse Woody Debris
- Nest Structures
- Revegetation Sites
- Buffer Zones and Green Tree Areas
- Deer Forage
- Lost Lake -

Land Exchange

3. WORKED PLANNED IN 1995

Forest Vegetation Management

Snag Management

Revegetation

Nest Structures

Monitoring

4. SPADA LAKE TRACT SUPPLEMENTAL PLAN

5. PROBLEMS AND CONCERNS

6. SUMMARY

Sign-Up Sheet
WHMP Annual Meeting
March 9, 1995

Name	Organization	Phone #
Bernice Tannenbaum	PUD	
MIKE SCHUTT	PUD	
Bruce Meaker	PUD	
Ron Farwell	City	
Mark Wogo	PUD	
Karen Bedrossian	PUD	347-4374
Dan Landl	Everett	259-8823
ERIC ERIC	USFWS	360-753-9440
GARY ENGMAN	WDFW	775-1311
Kathie Gayner	Everett PW	259-8949
Dan C. Thompson	Everett PW	259-8860
Jim Miller	" "	259-8880
Julie Stopfel	Tulalip	653-0220

PUD, City of Everett, and Joint Agency
Wildlife Habitat Management Plan
1994 Annual Report Meeting
March 9, 1995

In Attendance: (PUD) Karen Bedrossian, Mike Schutt, Bernice Tannenbaum, Bruce Meaker, and Diana Woge; (City) Don Farwell, Kathie Joyner, Dan Thompson, Jim Miller, Roy Metzgar and Dan Lowell; (Tulalip Tribes) Julie Stofel; (US Fish and Wildlife) Gwill Ging; (WA Dept of Fish and Wildlife) Gary Engman

Bernice Tannenbaum of the PUD opened the meeting at 10:00 a.m. by passing out the agenda and going through introductions of those present. Bernice also apologized for the draft 1994 Annual Report being delivered late, allowing no time for agency review.

PROGRESS SINCE BEGINNING OF WHMP IMPLEMENTATION

FOREST VEGETATION MANAGEMENT (Presentation by Don Farwell - City of Everett)

Don reviewed all of the areas that have been harvested and briefly discussed the DNR's plans for thinning 200 acres adjacent to the Lake Chaplain Tract. The DNR is also planning a final harvest within the next 3-5 years south of Lost Lake but has no definite plans yet. Other final harvests in the area are currently being planned or having roads built.

- Road System Layout and Construction

  The City has reconfigured the units in the northeast corner to incorporate the planned road system and streams. During reconfiguration, the unit's harvest size was kept similar to the WHMP, but the amount of roads to serve them has been reduced. The south end has also been reconfigured in a similar manner.

(Don Farwell) We are accomplishing what the WHMP prescribes, but have done some fine tuning.
(Gwill Ging) Is there a revised figure reflecting changes?
(Don Farwell) A revised figure was done last year. The west side will be revised next year to fit the ground, streams and logging systems.

- Final Harvest / Commercial Thinning

  The 1991 Chaplain sale, a three (3) unit timber sale, sold in September of 1991 (refer to figure 2). This sale was logged in fall of 1991/spring of 1992 and replanted in 1992. Three (3) miles of road were constructed for the timber sale. On completion of harvest, units were reforested with Douglas fir and Cedar. Follow-up plantings with cottonwood were done by the PUD. The first cottonwood planting did not do well. Units were also seeded with a grass forb mix. Grasses survived and trefoil only survives in rocky ground in the sun. Right-of-ways were also seeded, and breaks in right-of-way slash were created about every 75-100 feet to allow for passage of wildlife. Unit one was 26 acres, Unit two was 15 acres and Unit 3 was 24 acres.

1992 Horseshoe sale - Two (2) thinning units and one (1) final harvest. Final harvest unit harvested in April 1993; commercial thinning units completed in September 1993, and 3,000 feet of road built. All of the spur roads will be reused again. Final harvest planted in May of 1993 with Douglas fir at about 300 stems per acre; higher than WHMP prescription. However, planting in May with dry sandy-gravel soil caused survival to drop below 250 per acre. The next year 25 cedar per acre were planted. They have not survived well because the site is too dry for cedar.

1994 Diversion Sale - Two final harvests, totalling 35 acres. A 1990 scheduled unit was traded for another unit originally scheduled for 2005 because the 1990 unit already had snags and other features that we were trying to accomplish. All units were reconfigured and will still meet the 15 year adjacent green up requirement. Harvest of the 1990 unit will be delayed unit 2005.

Salvage Sale

The (1992) Inaugural Day stormblew down timber in several areas. The timber in these areas was salvaged in September and replanted in 1994 with Douglas Fir. (See Figure 2)

Reconfiguration of Units

Units in the northeast and south ends of the Chaplain property have been reconfigured to accommodate streams and terrain. The same number of units and size restrictions have been retained, and the amount of road construction has been reduced. The west side will be reconfigured also.

- Plantation Maintenance/Enhancement

The plantations are on target for composition. Due to natural inseeding, certain units have too many stems per acre and will require precommercial thinning.

(Gwill Ging) How large is the planned harvest for 1995.
(Don Farwell) One unit is 15 acres and one is 20 acres.
(Gwill Ging) How did those turn out with regards to pre-harvest and surveys for snags and coarse woody debris?
(Bernice Tannenbaum) The surveys have been done. We will discuss results later when these topics come up.

- Precommercial Thinning (presented by Bernice Tannenbaum)

The WHMP required pre-commercial thinning at Lost Lake. This was done in 1991 and has been monitored annually. There was a large amount of slash generated although the thinning was fairly light. Trails were cut through the slash to allow for wildlife passage. These trails are filled with salmonberry and other shrubs, and are being browsed by deer.

(Gwill Ging) Are there other measures you suggest to improve things for wildlife?

(Bernice Tannenbaum) The best opportunity for pre-commercial thinning was at least ten (10) years ago. However, the land was not purchased by the PUD until 1989.

(Karen Bedrossian) Many of the stands on the Spada Lake Tract are in similar condition and should have been thinned sooner. We can apply what we learn at Lost Lake to the management of the stands around Spada Lake.

- Corner Monuments (Presented by Don Farwell)

  Substantial land surveying has been accomplished over the past five (5) years, and some corners and DNR concrete monuments have been set and recorded. Property lines and boundaries have been located in cooperation with DNR and other adjacent land owners.

(Gwill Ging) When you talk about located, are there markings between the corners on the ground?

(Don Farwell) Yes, there are blazed and painted trees marking property lines.

SNAG MANAGEMENT (Presented by Mike Schutt)

- Snag Creation

  Mike reviewed where snags were created in 1994 (see figure 3). All snags were created by topping the tree and leaving as many branch stubs and dead branches as possible. This past year, our contractor Tim Brown, worked with us to create additional features on our snags. He created, free of charge, bat roosting flanges, sap wells, and cavity starts, especially bordering wetlands and streams.

  The created snags are mapped and marked with a numbered metal tag as well as paint stripes around the trees. This will allow for future monitoring.

- Inventory of Existing Snags

  The District has deviated from the plan in terms of inventory of snags. The snags are inventoried as harvest units are set up. This allows us to know the number of snags prior to harvest. By grouping lives tree that will be made into snags around existing snag trees, we are able to preserve some existing snags. This results in three (3) snags per acre within a year or so after harvest.

  In addition to creating snags in harvest units, snags will be sampled and created as needed in units to be harvested in more than 20 years in the future, and areas where there won't be any management activity (i.e. OMA's, PMF's, buffers, etc.)

  Mike feels that this process will give us a better, more widespread, snag creation pattern across the entire tract rather than large blocks of land containing a majority of the snags. The three (3) 1991 units and the one (1) 1993 harvest unit in the Horseshoe bend area have three (3) snags per acre. Inventories have not been completed for the other stands. There have been 450 snags created to date. We will be creating more each year.

(Gwill Ging) Are there areas where inventories have been conducted and we are lacking three (3) snags per acre?

(Mike Schutt) Prior to harvest there was less than three (3) per acre on all units that have been set up to date. Those inventories were done on a timber stand basis. After harvest, inventorying will be done on units. During sale setup, we select and preserve trees to top post-harvest to yield three (3) snags per acre.

(Gwill Ging) Do you map the snags on a GIS database?

(Bernice Tannenbaum) We intend to do this for all created snags, and this data has been entered in a spreadsheet but not in GIS format yet.

REVEGETATION (presented by Mike Schutt)

- Spada Lake Shoreline

  We installed revegetation test plots in October 1994 in two locations in the Spada lake drawdown zone. Mike described the test plantings program. Test plot 1 is located at the mouth of Williamson Creek and test plot 2 is at the mouth of the North Fork, Sultan River at the east end of Spada Lake. These areas were chosen because they are the shallowest portions of the reservoir with less water level fluctuation. Plants were installed in rows perpendicular to the shoreline between approximately 1435 and 1445 feet elevation. Each row consists of a single species and is marked by wooden stakes. They will be monitored in the future.

  The City expressed some concerns with planting woody species due to concerns of attracting beaver. As a result we have planted only herbaceous plant species. We also omitted potentially invasive species such as cattails. Table 2 lists the different species planted.

  (Gwill Ging) Can you explain how a certain area of the drawdown experiences less fluctuation than the others?

  (Mike Schutt) Actually these areas have the lowest shoreline gradient that exists in Spada Lake. They're subject to the same water level fluctuation as the rest of the shoreline, but with the low gradient, more plants can be put in the rows between 1435-1445.

  (Gwill Ging) Gwill asked if we had any preliminary results.

  (Mike Schutt) No, the water level rose and the south shore road washed out, so we have not been able to get back out there.

- Pipeline Right of Way

  The Pipeline right of way was mowed 15 feet on each side of the centerline and seeded with a grass/forb mix similar to that used in the past. The lower pipeline was seeded, and for the first time, the area from the March Creek gate to the tunnel portal was seeded. We had not done this area in the past because there was no gate at the Sultan Basin road and garbage dumping and off-road vehicle traffic were problems. The DNR and PUD put in a gate across the Marsh Creek road in July 1993.

On the lower pipeline there are some shrubs (salal) coming in naturally. This area has been seeded for the past few years and the grass layer is doing well. As we presented in the 1991 Annual Report, our horticultural consultant recommended seeding with a grass/forb mix to establish a good organic layer for several year prior to planting shrubs. Alders must be moved to prevent their taking over.

No quantitative measurements have been made of the ground cover. Transects will be set up in the future to obtain quantitative measurements.

Mike explained that motorcycles and four-wheel drives are tearing up the area from Marsh Creek to the Tunnel Portal. He has been working with the Snohomish County Road Department and installed large boulders and ecology blocks along the gates to cut down on the damage. He has also placed rocks along the creeks to eliminate ORV traffic thru these areas.

- Chaplain Marsh

Shrubs were planted in two (2) rows between the road and the marsh in February 1993. This area has been monitored each season. Mortality is negligible, and overall growth is good.

- North End of Lake Chaplain

In 1992, cedar and fir trees were planted to create a protective screen between the access road and the lake. Here, a quarter of the cedar died because of the high water table. The remaining trees, including planted Douglas fir and naturally growing alders are doing well. This area is monitored once a season.

(Gwill Ging) What was the reason for the cedar not surviving?
(Mike/Don/Bernice) The maximum fluctuation of the lake is 5 feet; therefore, the water table is always quite high.

- Powerhouse Site

The powerhouse site was planted with shrubs and trees at the same time as Chaplain Marsh. Due to the poor soil and drought, a quarter of the shrubs died in 1994, the second summer following planting. The dead shrubs and trees were replaced in October 1994.

It will not be necessary to replace anymore that die if overall survival is better than 75%.

(Gwill Ging) Regarding the 75% survival of shrubs, is that 75% of all shrubs or of each species.
(Mike Schutt) It is 75% of all shrubs. If certain species are dying out completely, they will be replaced with species that are surviving better.

NEST STRUCTURES (Presented by Bernice Tannenbaum)

- Nest Boxes

  The Wildlife plan called for two (2) duck next boxes which were placed at Lost Lake in 1990. Six additional wood duck boxes were installed at the south end of Chaplain Marsh in 1993. We service and monitor them every year. Half of the boxes were used in any given year. Hooded mergansers are the most common inhabitants of the boxes at Lost Lake and wood ducks at Chaplain Marsh. Observations of nest abandonment have been made. In one case it was probably due to our monitoring activities.

  For this reason we have reduced our visits. We do repairs and cleanup prior to egg laying in early March, a visit to determine whether the boxes are in use in mid-April, and a productivity visit in early June after egg hatching. This does not allow for counting of the actual number of the eggs that hatched, but to avoid causing abandonment we feel the trade off is acceptable.

(Gwill Ging) Briefly describe monitoring in previous years.
(Bernice Tannenbaum) We wanted the actual size of clutches in previous years, but now we would much rather provide the resource in good condition and reduce monitoring than cause additional abandonment.
(Gary Engman) Are you still able to establish species use by observation?
(Bernice Tannenbaum) Yes.
(Julie Stofel) Are you planning on expanding the number of boxes?
(Bernice Tannenbaum) We have five boxes ready to be installed at Chaplain Marsh and Lost Lake this spring.
(Julie Stofel) What do you think is a reasonable number to service?
(Mike/Bernice) We don't feel there is a lot of natural habitat available because of the small tree sizes near our wetlands. So reaching a point with too many boxes is not foreseen in the near future.
(Gwill Ging) How many total boxes would be at Lost Lake?
(Bernice Tannenbaum) Two boxes now and hopefully more this year.
(Gwill Ging) What kind of fish population is in there now?
(Bernice Tannenbaum) The lake is stocked each year by the Sportsman's Club in conjunction with WDFW. Rainbow, cutthroat and brown trout have been planted in previous years.
(Gwill Ging) Is agreeable to the change of not disturbing the nest during the incubation period. (Gary Engman agreed also)

- Floating Platforms

  Three floating platforms were required by the WHMP at Lost Lake for nesting waterfowl. Two were installed in Lost Lake and two in Lake Chaplain in 1990. These platforms have not been very successful for providing breeding habitat; however, they have been used by wildlife as feeding and resting platforms.

  The Lake Chaplain platforms have been tried in several locations on the east side near over-hanging branches but have not been successful. In 1994, we moved one 15 feet farther out in the open of the lake and the other across to the west side of the lake. This

year we will move the platforms to more open water. Other species such as mallards and grebes, will possibly use them, but there is natural habitat available in Chaplain Marsh. We are also looking for suitable sites at Spada Lake. If there is no use of Lost Lake platforms this year, we will move them to Spada Lake, where loons are seen every summer.

- Osprey Platforms

  There is one osprey platform at Lost Lake and two (2) at Spada Lake. At Lost Lake the platform was used in 1994 by a pair of osprey and they successfully raised one (1) offspring. Osprey began constructing a nest on one Spada Lake platform in 1994 but did not nest there. However, the Osprey built a nest in a tree near Culmback Dam. This nest was not used for breeding in 1994.

DEBRIS REMOVAL ON SPADA LAKE SHORELINE (presented by Bernice Tannenbaum)

The WHMP calls for removing material on the shores of Spada Lake if it impedes access by wildlife. This has not been a problem for the past five years, and no debris has been removed for this reason. Some debris has been removed inside the log boom at the dam to assist hydro project management.

COARSE WOODY DEBRIS (Presented by Bernice Tannenbaum)

- Management Prescription

  Bernice briefly went over WHMP requirements for coarse woody debris, data collected on harvest units, and then explained the agreement reached between the PUD and City of Everett. This issue has been under discussion for the last few years.

  The new target prescription will include a minimum of six logs per acre of decay class 1 or 2, minimum length of 20 feet, with minimum diameter of sixteen inches (large end) and will be provided within each unit harvested in the future. Diameters should average 20 inches, and the average number should be eight (8) logs per acre. Monitoring and sampling will occur at 20 year intervals.

(Gwill Ging) The new prescription does not meet my expectation. The six (6) to ten (10) logs per acre figure was to provide the City/PUD flexibility. With that flexibility it might come down to averaging eight (8) logs per acre but targeting 24" diameters. Twenty-four inches (24") was the target. If large logs are there, I expect the logs to be left behind. The new prescription appears to lower the goal and purposely look for smaller logs by stating a minimum diameter of 16 inches rather than 24 inches. It seems like the focus would be 16". You should start with the 24" size, and go down from there.

(Bernice Tannenbaum) The minimum size will not be the target. The targeted average diameter of 20" is a reflection of the type of timber we are looking at. On some units it tends to be smaller. We may be hard-pressed to find ten (10), or even six (6), 24" logs per acre. Even if we can find that many, they maybe clumped and not evenly distributed. It is our understanding that the WHMP seeks to obtain a fairly even distribution and this would allow a workable solution.

(Julie Stofel) Describe the size distribution.

(Don Farwell) There are some areas that have good sized timber and other stands average 18". The 1991 Chaplain Unit 1 is the only unit that had good probability of getting enough 24 inch logs. Another problem of meeting this goal is, how to do it? Writing contact specifications and getting it logged will be difficult. We feel we can accomplish this with our methods and get 100% assurance that we will meet the stated goals.

(Karen Bedrossian) It is easier to use one tree as a source of several logs and with the average 20" diameter we feel we can do that more easily.

(Julie Stofel) Do you move those logs to other acres?

(Don Farwell) If we were to go with two (2) live trees per acre, 24" diameter, we would select the trees throughout the unit, log it, then fall the trees. They would be pretty well scattered, but not six (6) logs on every acre. If we move logs around, it might create soil compaction and erosion problems during logging. Don is not sure how to do it.

(Mike Schutt) There is a possibility of looking at this on a 40 logs per five (5) acre basis, similar to the 15 snags per 5 acre allowed for snag distribution. It would allow us to group logs and get around the problems of the logging system.

(Gwill Ging) I do not disagree with that.

(Gary Engman) I am concerned with the clumping problem. It requires some judgement. How do you select logs?

(Don Farwell) Snags are selected and marked prior to sale, making sure all requirements are met.

(Gwill Ging) Do you go out with the contractor or has he been a part of this yet?

(Don Farwell) No contractor is on site yet because it has not been sold. It is written in the contract that all trees marked for snags must be left on the unit, and they are.

(Gwill Ging) What flexibility do you give the harvesting contractor in the regard of operations. If there is a hinderance, does he have the ability to make the judgement himself if something is knocked over during harvest?

(Don Farwell) During the Horseshoe sale, a tree marked for snag creation was knocked over during logging. The Contractor immediately replaced it with the same (i.e. did not harvest a different tree of the same size) and informed the City.

(Gwill Ging) Do you have a mechanism in place to survey the snag trees after harvest?

(Don Farwell) Yes, the PUD contracts out to top the trees. The contractor is paid by the number topped and if the number topped does not match number stated, then we know something is wrong and we can add some trees from the edges.

(Gwill Ging) If a marked snag gets knocked over and nobody tells you about it, how do you find it?

(Bernice Tannenbaum) If it is an existing snag we assume it will be knocked over. If it's a tree marked to be made into a snag, we have a list of their locations marked within harvest units, and we know if we've lost one.

(Gwill Ging) Do snags within the harvest area, not on edges, automatically come down?

(Don Farwell) No, it's up to the contractor to determine whether it's safe to leave it. But we assume they will all be knocked down. In order to meet our goal, we create three per acre.

(Bernice Tannenbaum) We look at options to try to preserve existing snags, but it's usually difficult.

(Gwill/Gary) How do we get to the process of declaring what is going to be on the ground?

(Bernice Tannenbaum) Pre-harvest inventories are done to give us an idea of the density of Class 1-5 logs. We attempt to preserve existing CWD but we recognize the higher decay classes are often broken up during harvest. Prior to harvest, we haven't found many Class 1-2 logs. Large logs on stands are remnants of previous rotation. For future contracts, snags that exist prior to harvest must be left on site. If these snags come down for safety reasons they will be left as CWD. We will calculate inputs from snag tree tops. In addition we have agreed to leave live trees distributed throughout the unit for the purpose of providing CWD. Here, each tree will be the source of three (3) or more 20 foot long logs.

(Julie Stofel) What is the advantage of a single tree cut into 20" pieces?

(Bernice Tannenbaum) Probably will not cut it into pieces. The distribution of logs will be worked out on a case-by-case basis.

(Gwill Ging) The statement of 20 inches, 8 logs per acre, is it for every acre on harvest units or averaged over the entire harvest unit?

(Don Farwell) That is per harvest unit. If the unit is 10 acres, there will be 80 logs on it.

(Gwill Ging) Is this going to be three (3) years after harvest? How does that affect the density per unit during time of harvest or immediately after?

(Bernice Tannenbaum) It will be done immediately after harvest. Post-harvest inventories are conducted because we expect to pick up cull logs, blowdown into the units and death of adjacent trees due to exposure. We have no data on quantities of blowdown but will monitor inputs for the creation of a database.

(Gwill Ging) Can you clarify which area that covers and also a reflection of when that would be?

(Don Farwell) Blowdown can occur over a period of years. We are incremental in meeting the goal. We can leave the full eight (8) per acre at the time of harvest, or we could leave fewer, if experience tells us that more inputs will happen via blowdown. If the expected blowdown doesn't happen, we can fell some trees into the unit to reach the target. Experience will show us that over 5 years we will retain more than original number.

(Mike Schutt) Can we clarify it more in the report?

(Gary Engman) The report says "detailed procedures are in preparation". This is the detail I want to see.

(Bernice Tannenbaum) Please let us know if you have more questions and want clarification because we know it is not very detailed.

(Gary Engman) Because of the time frame, he feels clarification on the meaning of the prescription is needed. He needs to see the per acre or harvest unit question clarified immediately post harvest or not. He also needs to see when CWD will be provided.

(Don Farwell) Detail will vary from unit to unit.

(Karen Bedrossian) Do you want this prior to commenting on the report?

(Gary/Gwill) Yes, especially this part of it.

(Karen Bedrossian) Do you want this section expanded?

(Gary Engman) Yes, give more details.

MONITORING

- Snags - Covered in the section regarding Snag Management.
- Coarse Woody Debris - Covered in the section regarding CWD.
- Revegetation Sites - Covered in the section regarding Revegetation.

- Buffer Zones and Green Tree Areas

  The PUD has been monitoring the buffer zones and green tree areas periodically for blowdown problems. The trees that fell in the 1991 harvest unit green tree area were left, and Douglas Fir was replanted around them. Our goal is to replace whatever falls down so our green tree source is good for future snag creation needs. Projections of growth of the seedlings, using the DNR tree growth model, plus remaining trees in the GTA predict that we will have enough future snag trees.

- Deer Forage (presented by Mike Schutt)

  The availability of all shrubs and herbaceous species on harvest units was sampled using circular plots in 1991 and 1992, and line-intercept methods, just involving a subset of the most palatable species in 1993-1994. We feel this method produces underestimates of actual coverage and will return to a circular plot method. Units 1 and 3 of the Lake Chaplain sale and Unit 2 of Horseshoe sale are sampled. Few of the sampled species were present prior to harvest, but now good numbers of these species are seen on the two final harvest units. A 20% increase has been seen using the WHMP's line-intercept method for the final harvest units. Actual coverage of all shrubs and herbaceous species is closer to 80%. Forage utilization survey methods included pellet counts in 1992 and 1993 and estimates of browse intensity in 1994. We will use the latter method in the future. Prior to harvest there was little evidence of utilization by deer. Rubus species are showing slight browsing, post-harvest. Our impression is that moderate browsing is occurring on skid trails and game trails in the units. The method currently used is subjective. It records low, medium, and high browsing; we need to review this method in the field. There appears to be more browsing going on than the data shows.

- Lost Lake (presented by Bernice Tannenbaum)

  There is only a small amount of use by fisherman who access the lake on foot. One small bog area is being trampled by fishermen but otherwise the tract is in good condition.

LAND EXCHANGE

The PUD/DNR/USFS land exchange around Spada Lake was completed in 1991, as was the City/DNR land exchange at Lake Chaplain. Additional land has been acquired around Lake Chaplain by the City. The additional land acquired is not subject to the WHMP but will allow for future opportunities.

WORKED PLANNED IN 1995

Forest Vegetation Management (presented by Don Farwell)

Four (4) units will be sold on the west side of Lake Chaplain. The road system has been laid out but it may change due to the new CWD procedures. Quite a few of the units in the area are over 30 acres. These units will be reconfigured to meet the maximum acreage allowed by the WHMP. A 1990 unit may also be included in the 1995 harvest units.

Snag Management (presented by Mike Schutt)

Figure 7 shows the inventory and creation that will be done within the next four years. These areas are PMF, old growth and units scheduled for harvest 20 years or more into the future. These areas are easily accessible by contractors and will be relatively easy to locate in the field.

Revegetation (presented by Mike Schutt)

Placement of stumps and log piles on the pipeline ROW has been completed this year (1995), from the microwave tower near the Powerhouse to the Marsh Creek gate area. We will also be seeding and fertilizing the pipeline and leaving a bufferstrip of trees along the pipeline right-of-way next to the access road for more visual screening. This buffer strip will be thinned to increase growth on the trees.

Nest Structures (presented by Bernice Tannenbaum)

PUD will be looking for new floating platform sites at Spada Lake and will put up more duck boxes at Lost Lake and Chaplain Marsh.

Monitoring (presented by Bernice Tannenbaum)

Most of the monitoring will continue as in previous years. However, this year we will be monitoring the CWD inputs from tree fall into harvest units, condition of snags created in the past, the new osprey nest, and revegetation along Spada Shoreline. We will also be improving our monitoring techniques for deer forage.

SPADA LAKE TRACT SUPPLEMENTAL PLAN (presented by Karen Bedrossian)

In 1991 we obtained additional land around Spada Lake. Last March, at the annual agency meeting, a preliminary draft was handed out of the supplemental plan totalling approximately 1745 acres. No formal comments were received from the Agencies. We then hired forestry consultant, Harza Northwest, to assist in developing detailed management options. Their scope of work includes performing forest stand inventories, preparing management plans for short and long term activities and preparing an estimated cost budget. To date, they have completed reconnaissance surveys on the second growth timber stands, defined timber stand types and selected stands for detailed inventory. PUD hopes to have Harza's report by July and then incorporate the study results into our draft supplemental plan. We will then run it by our commissioners by the end of 1995.

(Gwill Ging) You expect it July of this year?
(Karen Bedrossian) Yes, the Consultant will be done by July. Then we will add their recommendations to the draft plan.
(Gwill Ging) At what point do you expect the resource agencies to get the report?
(Karen Bedrossian) It will first go through PUD and City management review. Then it will be submitted to the agencies. We do not know exactly when this will happen, but plan to have it to the agencies prior to the end of the year. If there are any significant changes we will let you now, but we hope to have it done by the end of the year.

PROBLEMS AND CONCERNS

Gwill Ging - Because of the time frame, I'm not sure about all my questions. I need to review the new CWD prescription to see if it meets my expectations. At this time it deviates from what I expected.

Karen - We are required by FERC to have the report to them by the 31st of March. We may need to submit the report without review comments.

Bruce Meaker - We could ask for a 30 day extension.

Gary Engman -March is totally out of the question for me and it will require a conscious effort to get this done by the end of April.

Gwill Ging - Agrees that this needs to be moved as fast as it can.

Dan Lowell - For review, it would be ideal to get it to the Agencies February 9th, and change the reporting date to May.

Bruce Meaker - The reporting date was set up along with the WHMP. We can petition for the report process to be changed. However, this will have to be for next year's report.

Gwill Ging - He would support it. It makes sense to have more time to review the report before meeting for review.

Roy Metzgar - The original reporting date was December and then it was moved to March. It is obvious it still presents a time crunch.

Bruce Meaker - We will ask FERC for a 60 day extension, then petition for the reporting date to be changed.

Karen Bedrossian - Is the end of May agreeable?

Don Farwell - Just remember that next year is the last year before reporting every five years.

Bernice Tannenbaum - According to Bruce it will be fairly easy to get a 30 day extension for this year; however, it places a burden on us to get the details to the agencies quicker.

Gary Engman - The earlier we get the details the better.

Karen Bedrossian - Will this hinder Don's work in any way.

Don Farwell - Harvesting is planned for June and this new prescription will change how things will be done. However, there is no control over when the contractor will start the work. The contractor has to be done by October 28.

Bernice Tannenbaum - Would you be willing to let us implement the prescription as described if the loggers were to start today?

Gwill Ging - I can live with 8 per acre, it is the size I'm not ready to comment on at this time.

Karen Bedrossian - For the purposes of the upcoming sale, would it be acceptable?

Gwill Ging - You asked whether section 3.6.6 description is agreeable if contractor starts prior to our comments?

Don Farwell - Whatever has to be done needs to be done soon for changes to be written in the contract.

Roy Metzgar - Let's try to work it through. No action will be reached today.

Gwill Ging - I am not ready to say yea or nay because it is the first time I've seen it.

Gary Engman - If you could get the detailed procedures out, we could respond to this issue ahead of the actual report.

Don Farwell - What are you asking for in detailed procedures?

Don Lowell - Are you asking for detailed procedures as far as Don's work is concerned? He has to figure out how to do this.

Gary Engman - No, it's more general. What does it mean by "detailed procedures"?

Karen Bedrossian - Can you give us specific questions?

Gary Engman - Just tell us the meaning of the words.

Gwill Ging - We want clarification on criteria: 8 logs per acre - or is that per harvest unit or just units?

Bruce Meaker - Spell it out in writing.

Gwill Ging - On the issue of log diameters: Will logs average less than the preferred 24"? This needs to be spelled out and we (agencies) can respond to this issue earlier than the rest of the report. We can address the CWD earlier to facilitate work if needed.

Lowell or Metzgar - We intended to do this - CWD could be a stand-alone issue that we get to you as quickly as possible.

Dan Lowell - Agreed that agencies had reasonable questions and concerns. For example, what do we mean by details.

Bernice Tannenbaum - Did not want to introduce a lot of discussion items. We have not had enough time internally to discuss the matter either and would be able to answer agencies questions better after that time. For example, the number of trees dedicated to CWD needs to be amplified.

Gwill Ging - In the description the "should" regarding diameters is unclear in meaning. Does it mean that if larger size trees are available, then they would be the focus, or loggers' choice of taking the smaller size logs? I am concerned with the focus and intent. We may have a problem with always getting the smaller sizes.

Bruce Meaker - For assurance, the "should" can be changed to "shall".

Don Farwell - The snags are predetermined and the logger has no choice on what's left. It is between the biologist and myself what logs will be kept.

Gwill Ging -Wording needs be clarified whether it's the logger or the City/District. He is afraid that the minimum will become maximums.

Gary Engman - I can understand the situation if enough large trees simply aren't there, but it's what happens when they are there that concerns me.

Dan Lowell - This can be fixed.

Roy Metzgar - On page 7, the reference to "salmon rearing habitat" is not correct. I do not believe anadromous fish are in Marsh Creek.

Mike Schutt - Will check on this.

Schedule for Review:

The Agencies will have questions regarding the coarse woody debris to the PUD/CITY by the March 17th.

The PUD/CITY will comment and clarify the new coarse woody debris description by March 24th.

2014

March 16, 1995

To: **Don Farwell, City of Everett**
Bernice Tannenbaum, Snohomish PUD

From: Gwill Ging

Subject: Annual Report Clarification on Coarse Woody Debris

The following responds to your request for my input on what issues pertaining to the Coarse Woody Debris section in the annual report need to be presented in greater detail. The following represents only those elements that I've been able to identify up to this point.

FWS expectations: The FWS and WDFW had certain expectations with regard to coarse woody debris and snags which was negotiated with the Licensees during the development of the Wildlife Habitat Management Plan (1988) which was submitted and approved by the FERC. Wording in the plan was intended to provide flexibility and to make compliance with the plan more reasonable. From our perspective, it appears that wildlife objectives are being jeopardized by the Licensee's interpretation of the prescriptions, i.e., the Licensee's focus on the minimums (CWD log length, CWD log diameter, snag height), as the targets to be met. For example, the WHMP (p 2-17) specifies that "Logs with a minimum diameter of 24 inches and a minimum length of 20 feet are preferred." We note that the proposed prescription calls for the logs to be 20 feet long, and as indicated at the March 9, 1995 meeting, a single green tree felled for CWD purposes would be counted as several logs, if the size criteria was met. This interpretation needs further discussion. Dead wood (logs and snags when felled) regardless of their height or length cannot be counted as more than one log. We also note that most of the snags on the harvested units are at the minimum height of 20 feet. At the March 9, 1995 field trip, the rationale given for restricting the snag height was to reduce conflicts with the need for future thinning (Labor and Industry safety requirements). Lower density planting around snag trees should be implemented in lieu of limiting snag height to 20 feet. From our reading of the WHMP, our expectation is that 6 to 10 logs per acre with an average of 8 per acre per harvest unit would be left during harvest.

Elements of the proposed plan that need to be addressed before a meaningful review by the resource agencies and tribe can occur:

Section 3.6.6 *Coarse Woody* Debris This section needs to be modified to describe all instances where the new prescription would be in conflict with the existing prescription of the WHMP, and from the perspective of the effect on wildlife, whether the change would be adverse, beneficial or benign.

Describe your preharvest survey of CWD, and how that information is collected and used in determining how many and which live trees will be used to meet the post harvest criteria of CWD. Are post harvest surveys conducted to determine if the timber harvest operation eliminated preharvest CWD that the Licensee's were counting on?.

Describe in detail your method for selecting CWD to meet the prescription criteria. The WHMP emphasis is on the larger logs/trees when they exist on the unit. What will be your order of

priority for selecting live trees to produce CWD? Will size still be the top priority? How does the location of existing class 1 & 2 CWD logs and Class 1-5 wildlife logs (marked for protection prior to harvest) affect the selection of green trees to make up the CWD deficiencies? We would like to see maps depicting the size class, decay class, and protected logs and stumps that were inventoried in the past four harvest units and the two units scheduled for harvested in 1995.

The WHMP indicates that the prescription for CWD would be met during harvest. Discussions during the March 9, 1995 meeting indicate the Licensees are proposing an alternative time of measurement. Please clarify.

Call me if you have question at 360-412-5435.

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

1802 - 75th Street S.W. • Everett, WA • 98204 • (206) 347-4300
Mailing Address: P.O. Box 1107 • Everett, WA • 98206-1107

April 21, 1995
PUD 20201

Mr. Gwill Ging
U.S. Fish and Wildlife Service
3704 Griffen Lane SE, Suite 102
Olympia, WA 98501-2192

RE: Jackson Hydroelectric Project (FERC 2157) Wildlife Habitat Management Plan Annual Report - Clarification on Coarse Woody Debris (CWD)

Your memo to us dated March 16, 1995, identifies information on coarse woody debris (CWD) that you would like to see presented in greater detail in the 1994 Annual Report on the WHMP. The following information responds to your questions regarding implementation of CWD prescriptions. We also have included a copy of the procedures that we will be using to implement CWD management on harvest units (Attachment 1).

You requested that "Section 3.6.6 *Coarse Woody Debris* describe all instances where the **new prescription** would be in conflict with the existing prescription of the WHMP and from the perspective of the effect on wildlife, whether the change would be adverse, beneficial or benign." We are calling what you refer to as the "new prescription" our general procedures (see Attachment 1). We do not believe that the general procedures are in conflict with what is presented in the WHMP. We think that the CWD that would be left on harvest units under our procedure will be consistent with the preferred quantities and sizes, as stated in the WHMP. The general procedure for CWD states that a minimum of six (6) and an average of eight (8) class 1 and 2 logs will be left per acre at the time of harvest. The general procedure also states that an average of 40 logs per five (5) acres will be left. This is consistent with your expectation of an average of eight (8) acre per harvest unit, and it also ensures that the logs will be well distributed through the unit.

The WHMP states that "Logs with a minimum diameter of 24 inches and a minimum length of 20 feet are preferred". The general procedure states that logs will have a minimum length of 20 feet. The general procedure states that logs will average 20 inches in diameter, and that the minimum acceptable size will be 16 inches. The minimum size is derived from results of research on decay rates of CWD in the Pacific Northwest. Decay rates of Douglas fir logs have been summarized by Spies *et al.* in an article published in *Ecology* in 1988, and unpublished results have been shared with us by Dave Hays, of the Washington Department of Wildlife, and Mark Harmon, of the Oregon State University. These results indicate that green logs greater than or equal to 16 inches diameter that are left at the time of harvest will reach decay class III or IV

by the end of a 60-year rotation, and still be of use to wildlife on the site. We do not intend to manage for the minimum diameter, however, and will target 20 inches on the average.

With regard to the effects on wildlife, we recognize that larger logs would be more beneficial for many wildlife species. However, we had to keep in mind the operational consequences of our procedure. We will be designating live trees for CWD prior to harvest, and would like to reduce the potential for losing track of these logs during harvest. Therefore, we plan to dedicate entire trees for CWD rather than selecting just one log from each tree. For example, it is possible to obtain three 20-foot logs with diameters greater than 16 inches from one tree that measures 24 inches dbh. Larger trees may generate more logs. Most harvest units appear to have sufficient trees of this size available. Two of these trees would yield six acceptable logs. If we took only one log per tree, we would need to mark (and keep track of) logs from eight trees. The 20 inch average guarantees that there will be logs larger than the minimum size required to last through the rotation, and improves the ease of compliance during harvest.

You requested that we describe the pre-harvest survey of CWD, and how the information is used in determining live trees that will be used to meet the CWD criteria. The survey method is similar to the method described in the WHMP (p. 4-4). We count logs on 1/10th acre circular plots, laid out at random and covering at least ten percent of the unit. Under the general procedure this information will be used to identify the number of existing logs that meet the criteria. Inputs from existing snag trees and created snag tree tops, all of which are identified prior to harvest, will be added to the total. The additional input from live trees that will be needed to achieve the averages (20 inches in diameter, 8 logs per acre) will then be calculated. Please note that logs from live trees will be calculated on the basis of 20 foot lengths, although we probably will not actually cut the trees into logs. With regard to which live trees are selected for CWD, the distribution of large trees on the unit and the logging system have to be taken into consideration, and size alone will not be the determining criterion. Decisions will be made on a case-by-case basis, with due regard to tree size, distribution, and operational feasibility. The criteria for judging success under the general procedure are to retain 40 logs per five (5) acres harvested, with logs meeting the average sizes described above, and no logs below the acceptable size.

Post-harvest inventories are conducted, using the same sampling method (Attachment 2). Results to date indicate that some pre-harvest CWD, especially in advanced decay classes, is lost during harvest, and that additional CWD is added to the site. Under the general procedure, we will not rely on CWD inputs due to harvest operations as a source of CWD, with the exception of existing snag trees that must be felled. The required CWD inventory will be achieved at the time of harvest, as specified in the WHMP.

As we discussed at the March 9th meeting, we have not marked logs to protect them. Also, we haven't mapped their locations. We do intend to monitor a selected set of logs over time to evaluate decay rates and wildlife use patterns, and these, of course, will be mapped. With regard to protecting pre-harvest CWD, the timber harvest contracts require the following measures:

- All old growth stumps and logs shall be left undisturbed, as much as possible.
- Skid roads shall be located to avoid brushy areas and old down logs.

- In shovel-logging operations, no slash shall be piled on old growth stumps or logs.

We hope that this information provides the detail you need for your review of our work. Please call Bernice Tannenbaum (206-347-4319) or Don Farwell (206-259-8817) if you need additional information or clarification.

Sincerely,

Bernice Tannenbaum

Don Farwell

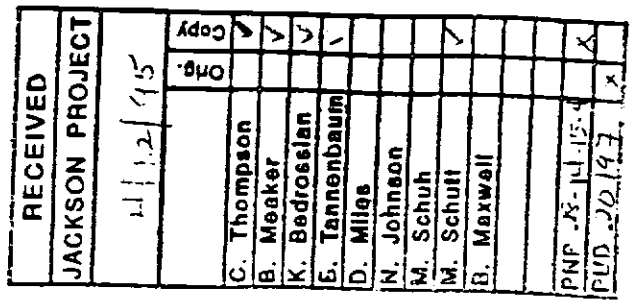
Bernice Tannenbaum
Environmental Coordinator

Don Farwell
Management Forester
City of Everett

Enclosure

cc: Gary Engman, Washington Department of Fish and Wildlife
Julie Stofel, Tulalip Tribes

bcc: K. Bedrossian - O1
D. Farwell - City of Everett
D. Lowell - City of Everett
B. Meaker - O1
R. Metzgar - City of Everett
B. Tannenbaum - O1
M. Schutt - O1



To: Bernice Tannenbaum, PUD
Karen Bedrossian, PUD
Mike Schutt, PUD

From: Julie Stofel, Tulalip Tribes

Re: Henry M. Jackson Wildlife Management Plan Review

April 6, 1995

Here are my comments on the 1994 Progress Report on the Henry M. Jackson Wildlife Management Plan. I focused primarily on snag and log recruitment, and compliance with the original Plan. I have still not received the modification of the log recruitment protocol that was discussed at the March 9 meeting. Some of my comments may already be addressed in that modification.

My main point is that the continued lack of compliance with the Plan specifications for logs and snags indicates that something needs to be changed. I feel that any one of three options would be acceptable:

1. Prove that compliance is possible, by producing pre-harvest timber inventories and a timber inventory projection that shows that trees of sufficient size to comply with the Plan are and will be present throughout the life of the Plan

-- OR --

2. Ensure that larger trees are produced and specified objectives can be met by changing the timber harvest schedule to accommodate a longer rotation

-- OR --

3. Perform a new HEP assessment to reflect the actual conditions and the actual extent of mitigation; use the new assessment as the basis for a renegotiation of the Plan

The justifications for my comments, plus some other suggestions, are included in the attached memo. I look forward to your response.

Sincerely,

Julie Stofel

Henry M. Jackson Review : March 27 1995

Summary of 1994 Annual Progress Report Comments and Recommendations

1.0 Background

The Henry M. Jackson Wildlife Habitat Plan was developed as a means of mitigating negative impacts on wildlife habitat created by the enlargement of the Spada Lake reservoir. The reservoir was built in 1964 (Stage I). It was expanded in 1984 (Stage II). As part of the Stage II development process, mitigation plans for aquatic and terrestrial resources were developed. Impacts to terrestrial wildlife habitat were assessed in 1982 by the Washington Department of Fish and Wildlife (Department of Game) using the U.S. Fish and Wildlife Service Habitat Evaluation Procedures (HEP). In 1984 the Federal Energy Regulatory Commission found that the Terrestrial Resource Mitigation Plan was not sufficient. The HEP assessments were revised in 1986. The revised Wildlife Habitat Management Plan was approved in 1988.

The Wildlife Habitat Management Plan covers the years 1988-2060. It covers 5223 acres, comprising Spada Lake, Williamson Creek (the inlet to Spada Lake), Lake Chaplain, and the lands surrounding Lake Chaplain. There are 2690 acres of land within the Plan area, primarily around lake Chaplain. The Wildlife Habitat Management Plan is primarily a timber management plan for the lands surrounding Lake Chaplain. The plan covers harvest scheduling, harvest unit sizes, and the retention and creation of snags and down logs. It also calls for the addition of nesting structures and the revegetation of disturbed areas and the Spada Lake shoreline.

The Wildlife Habitat Management Plan is to be reviewed annually through 1995 and every 5 years thereafter. This paper is a review of the 1994 Annual Progress Report.

2.0 Comments

Several aspects of the plan have been quite successful. Nesting structures are being used by Wood Duck, Hooded Merganser, and Osprey, but not Common Loon. Revegetation has been successful in many areas. Revegetation trials at the Spada Lake shoreline were begun Fall 1994 and will be evaluated in 1995.

There are several aspects that have not been successful. The log recruitment objectives have not been met in any year (see attached Appendix for a more detailed review of the results of log and snag recruitment). Some but not all of the snag recruitment objectives have been met. The main reason that objectives have not been met is attributed to the overall small size of the trees available for log and snag recruitment. This also raises questions about the assumptions and predictions of the HEP models. In particular, the models predicted that 280 Average Animal Habitat Units of "old growth" cover type (i.e., Pine Marten priority habitat) would be produced as a result of the mitigation measures. However, the production of Pine Marten habitat depends on the recruitment of large snags and logs. The results of the first 5 years suggest that the HEP assessment exaggerates the amount of habitat mitigation for Pine Marten, Pileated Woodpecker, Douglas Squirrel, and other species that are dependent on large woody debris and snags.

Direct assessment of the success of mitigation measures was included in the plan with respect to use of artificial nesting structures by birds, but not for other aspects of the plan. In particular, there is no assessment of the effect of habitat mitigation measures on the abundance or habitat use of Black-tailed Deer, Pileated Woodpecker, or Ruffed Grouse. These species are important to the overall objectives and assumptions of the plan. It is relatively easy to obtain information on abundance for these species.

3.0 Recommendations

3.1 Woody Debris Retention in General

The 60 year rotation does not appear to be able to provide the range of tree sizes necessary to meet the objectives of log recruitment, snag recruitment, or habitat mitigation for at least 3 of the 10 evaluator species. This suggests one of three possible responses

1. Produce a stand development projection that demonstrates that trees of adequate size will be produced that can meet the Plan objectives in the future, even though they have not been met to date; mark trees for snag and log recruitment prior to harvest to ensure that trees of appropriate size are retained.

-- OR --

2. Change the timber harvest schedule to accommodate a longer rotation that will allow larger trees to develop so that specified objectives can be met; mark trees for snag and log recruitment prior to harvest to ensure that trees of appropriate size are retained.

-- OR --

3. Perform a new HEP assessment to reflect the actual conditions and the actual extent of mitigation; renegotiate the Plan and habitat mitigation objectives to reflect the actual current and projected conditions

3.2 Logs

- The choice of trees for log recruitment should be made carefully, so that the distribution is not skewed toward the smallest logs. It would be beneficial if trees were larger in general so that the choice of trees is less limited.

- Log recruitment trees should be marked by wildlife biologists before harvest to ensure that sufficient trees of adequate size are left.

- The assumption that a single 80' log can "count" as four 20' "logs" for the purposes of fulfilling the log recruitment objectives violates the general meaning of "down log" as used in wildlife literature. However, even with this relaxed definition of "log", the objectives have not been met.

3.3 Snags

- The choice of trees for snag recruitment should be made carefully, so that the distribution is not skewed toward the smallest snags. It would be beneficial if trees were larger in general so that the choice of trees is less limited.

- Snag recruitment trees should be marked by wildlife biologists before harvest to ensure that sufficient trees of adequate size are left.

- The average height of snag recruits must be higher than the snag recruits produced to date (10'-20').

- Replanting requirements should be relaxed around snags if they pose a safety risk to workers engaged in replanting and pre-commercial thinning. The small size of harvested stands (3-27 acres) makes it very likely that adequate regeneration will occur without planting.

3.4 Assessment of Mitigation Measures for Terrestrial Wildlife

3.4.1 Relative Abundance of Selected Evaluator Species

The relative abundance Ruffed Grouse, and Pileated Woodpecker should be assessed annually. This project has the potential of producing 70 years of abundance data, which would be an invaluable addition to regional knowledge of these species, as well as allowing assessment of the success of the project. These species are the easiest and least expensive to survey of the non-aquatic evaluator species.

Ruffed Grouse: Drumming counts along roads can be used as indices of abundance for the purposes of assessing population changes over time.

Pileated Woodpecker: Playback transects along logging roads and within stands that are not accessible by roads can be used

as indices of abundance for the purposes of assessing population changes over time.

It is also important that Black-tailed Deer populations be monitored over time. The least expensive way to monitor deer populations is through hunter catch-effort indices obtained at hunter check-points. However, this method becomes difficult or impossible to interpret if the area in question is closed to hunting, since the catch-effort index would refer to the region as a whole and would not be limited to the area of interest. In that case, more intensive and expensive methods would have to be employed.

3.4.2 Winter Use of Slash Piles and Logs

Winter use of coarse woody debris can be easily assessed with track transects in snow. The best distribution of slash piles -- a single large pile or several smaller piles -- is not currently known. This information is inexpensive to obtain and valuable for designing optimal wildlife habitat within the context of timber harvest.

5. Changes in Assessment Methodology

Nest structures

Nest boxes will no longer be opened during the breeding season to assess productivity. This change was made in an effort to reduce nest failure rates, which were perceived to have been exacerbated by nest checking. I agree that productivity assessment is not necessary for the purposes of the mitigation plan and can be counter-productive. Evidence of occupancy of nest boxes and platforms is adequate to assess project success.

Snag Assessment

Pre-harvest snag abundance will be assessed along randomly oriented transect lines rather than parallel transect lines. This is probably adequate. The results of pre-harvest snag abundance assessment should be included in annual progress reports.

Shrub/Deer Forage Assessment

It was suggested that the shrub assessment protocol be changed from a quantitative line intercept method to a qualitative visual assessment method. I strongly disagree with the proposed change. Qualitative visual assessment introduces systematic bias (one observer may consistently overestimate or underestimate cover) and random error (variability between observers). Since this project will be maintained

over a very long time, it is crucial that methods be repeatable and unbiased.

The browse intensity assessment is subjective: "high", "medium", or "low" hedging. The amount of hedging or browsing that coincides with each category must be quantified: for example, 0-9 leaders out of 25 total = "low", 10-15 = "medium", etc.

Appendix: Evaluation of Coarse Woody Debris Prescriptions and Compliance

Logs

Prescription:

Decay class: hard (class 1 and 2); minimum diameter: 16"; minimum length: 20'; minimum number per acre: 6; average diameter: 20"; average number per acre: 8. It should be noted that this is a significant decrease from the original prescription of 6-10 hard logs per acre, 24" diameter and 20' long ("preferred" -- p. 2-17 of the 1988 Wildlife Habitat Management Plan: Henry M. Jackson Hydroelectric Project, FERC Project No. 2157)

Prescribed Mitigation Measures:

Existing logs (particularly large diameter logs) are marked and protected during logging. During the logging operation, trees selected to provide additional logs are bucked and left on site. Logs may be left where felled or may be dispersed (dragged) across the site. If a single tree can produce more than one 20' length with a diameter of 20', it may be counted as more than one log.

Compliance:

The minimum requirements have not been met on any harvest unit to date (1994 Draft Annual Progress Report, p. 18 and table 4)

Comments:

"Harvest prescriptions will be developed to improve compliance with CWD prescriptions"(1994 Draft Annual Progress Report, p. 18). However, those prescriptions have not yet been developed (or, if they have been developed, they have not been sent to me as of March 27, 1995).

The most significant barrier to compliance appears to be the existing stand conditions. The current timber inventory is composed primarily of relatively small (<20") second-growth trees. A 60-year rotation makes it appear unlikely that the average diameter of trees will increase significantly over the current inventory. If that is the case, non-compliance will be a significant problem over the life of the project (through 2060).

If the above statements are true, the rotation age must be lengthened in order to produce logs that meet the minimum

requirements. An evaluation of the current and projected timber inventory (diameter distributions) can be used to disprove the assertion that the current and projected timber inventory is inadequate to meet the objectives of this project.

Changing the rotation age would significantly impact harvest scheduling and the total extractable timber over the life of the project. This possibility is acknowledged and allowed, since "wildlife considerations will take precedent over timber revenues during harvest" (page 2-6 of the 1988 Wildlife Habitat Management Plan: Henry M. Jackson Hydroelectric Project, FERC Project No. 2157). Moreover, "it is assumed...that the detailed schedule of overstory harvest will be adjusted during the next 73 years to accommodate site conditions, natural perturbations, management conflicts and economics" (page 1-13 of the Plan).

The 60 year rotation conflicts with the management goals of the Plan (as demonstrated by lack of compliance for 1991-1994) unless it can be demonstrated that this rotation schedule is sufficient to produce trees of adequate size to meet the prescriptions.

Snags:

Prescription:

Desired condition:

No./100 ac	Decay	DBH	Height
45	Hard	15-24"	20'+
6	Hard	25"+	40'+
192	Soft	15-16"	20'+
16	Soft	11-15"	10'+
48	Soft	17"+	10'+
307			

From Table 2.2 on page 2-13 of the 1988 Plan

If all snags are produced (rather than preserved from earlier stands):

%	No./100 ac	Decay	DBH	Height
5	16	Hard	11.0-14.9	10'+
77	237	Hard	15-16.9	20'+
16	48	Hard	17-24.9	10'+
2	6	Hard	25.0+	40'+
100	307			

A reconfiguration of Table 2.2 on page 2-13 of the 1988 plan to make it relatively comparable with Table 1 in the 1994 Annual Progress Report.

Prescribed Mitigation Measures:

Existing snags are generally removed during logging to comply with safety regulations. Existing snags are left if they lean away from areas where logging, planting, and other activities may occur. Snags are created by topping live trees at least 40' above the ground. Some additional features, such as "cavity starts", "bat flanges", and "lighting strikes" have been created on some snag recruitment trees.

Compliance:

Nearly all snags that have been created conform to the minimum height only. It is difficult to assess compliance based on the 1994 Progress Report (Table 1) because harvest unit areas are not given. However, the size distribution of all snags created is shown below.

%	No. produced	Decay	DBH	Height
17	30	Hard	11.0-14.9	10'+
41	71	Hard	15-16.9	20'+
40	69	Hard	17-24.9	10'+
2	3	Hard	25.0+	40'+
100	173			

Table produced by summarizing Table 1 in the 1994 Annual Progress Report.

The distribution generally conforms to the prescribed size distribution. However, there are proportionately fewer snags in the 15-17" class and proportionately more in the 11-15" size class and the 17-25" size class. The current distribution exceeds the minimum prescription in some ways since larger snags (17-24.9") can be used by more species than smaller snags (15-16.9").

A disproportionately large number of the smallest snags (11-14.9") were created. This is specifically allowed by the Plan ("smaller snags will be substituted if trees of the appropriate size are not available" page 2-14). However, if this trend is allowed to continue, it will further skew the habitat toward species such as the Black-capped Chickadee, a common and widespread species which is not known to be declining anywhere in its range, and away from Pileated Woodpeckers and Pine Martens which are uncommon and are declining or are suspected of declining in many parts of their range.

Comments: See above, regarding logs

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

2320 California Street • Everett, WA • 98201 • (206) 258-8211
Mailing Address: P.O. Box 1107 • Everett, WA • 98206-1107

May 25, 1995
PUD 20220

Julie Stofel
Tulalip Tribes
6700 Totem Beach Road
Marysville, WA 98270

Dear Ms. Stofel:

We have received your letter on your review of the Jackson Project Wildlife Habitat Management Plan. Your letter focuses on coarse woody debris and snags, and makes recommendations for monitoring evaluation species to assess the effects of mitigation measures on wildlife populations. Your comments are very clearly and logically presented, and we appreciate the attention you have given our project.

COARSE WOODY DEBRIS. By now you should have received a copy of our response to Gwill Ging's comments, which included our procedure for implementing coarse woody debris prescriptions. We believe this procedure will respond to many of your questions and concerns. From data obtained on Lake Chaplain harvest units to date, we have found that pre-harvest CWD and CWD generated during harvest operations have not produced the sizes and quantities of logs preferred by the WHMP. Our General Procedure for CWD should correct the problem, as it specifies the sizes, species, quantities and distribution of logs over individual harvest units that will be provided in the future, beginning with the Diversion Sale, which was sold in 1994. The General Procedure further states that live trees and existing snags will be allocated for CWD production prior to harvest, and that these trees will be felled at the time of harvest. In our letter to Gwill Ging, we stated that we believe this prescription is within the range of what is stated in the WHMP, is biologically justified, and can reasonably be implemented in harvest operations.

Timber inventories on the Lake Chaplain tract demonstrate that the majority of harvest units will have sufficient trees of the sizes we state in our General Procedures to produce the targets at the time of harvest. In a minority of units the inventory indicates that timber is smaller - we intend to remain on schedule with harvests and will commit to leaving the largest available logs consistent with the General Procedure on these units to achieve the targets. For these reasons, we do not believe that a change in the harvest schedule or a new Habitat Evaluation Procedure are necessary to achieve compliance with the WHMP specifications for CWD.

The co-licensees' forester and biologist have marked live trees for CWD retention on the two units of the Diversion Sale following the General Procedure. The trees will be felled at the time of harvest, and the required quantities and sizes of logs, well-distributed across the units, will be retained.

SNAGS. Trees selected for snag recruitment have been selected on all units to date exceed the range of diameters and heights specified in WHMP Table 2.1. We are compiling data on snag tree heights in harvested units and will present cumulative results in a follow-up letter.

ASSESSMENT OF MITIGATION MEASURES FOR TERRESTRIAL WILDLIFE. The WHMP does not require assessment of the abundance of evaluation species, and we recognize that assessment of the success of many of the mitigation measures is not addressed in the Plan.

We are considering whether such assessments would yield information that would be useful in future implementation of the WHMP, and which species would be best suited for this purpose. We will advise you of our conclusions later in the year.

CHANGES IN ASSESSMENT METHODOLOGY. With regard to assessment of deer forage availability, we do not intend to switch from a quantitative method to a qualitative method. The change we have proposed is to eliminate the line-intercept method used in 1993 and 1994, and reinstate a circular-plot-based method used in 1991-92. The latter method is not subjective, and observer bias should not be problem. We do still intend to continue using a visual assessment method for evaluating browse intensity, for the reasons described in the 1994 Annual Report. Although results obtained in 1994 were not entirely satisfactory, we believe that we can control subjectivity by creating definitions for different levels of browse intensity observed in the field. We have investigated other quantitative methods that do not rely on observer assessments, but have found that they are exceedingly labor-intensive.

Since you have recently become involved in reviewing the wildlife mitigation for the Jackson Project, we would like to invite you to join us in another field trip to the project lands. This time we would like to show you project lands at Spada Lake and spend additional time with you to discuss management goals and objectives, and monitoring methods. I think the field trip would be mutually beneficial - we would like to explore some of your recommendations further, and most likely some of your questions could be answered in greater detail than in this letter or our Annual Report. We will follow up with a call to you in the near future to try to arrange this field trip.

Again, we appreciate your review of the Annual Report and look forward to meeting with you on this in the future.

Sincerely,

Bernice Tannenbaum

Bernice Tannenbaum
Environmental Coordinator

BT:dkw

cc: Gary Engman, Washington Department of Fish and Wildlife
Gwill Ging, U.S. Fish and Wildlife Service

March 18, 1994

Mr. Gary Engman
Washington Department of Wildlife
16018 Mill Creek Blvd.
Mill Creek, WA 98012

Mr. Gwill Ging
U.S. Fish & Wildlife Service
3704 Griffin Lane SE, Suite 102
Olympia, WA 98501-2192

Re: Jackson Project (FERC #2157-WA)
License Article 53 - Wildlife Habitat Management Plan
Dead and Down Woody Material (Coarse Woody Debris)

Dear Gary and Gwill:

This is in follow-up to the recent annual meeting on the Jackson Project's Wildlife Habitat Management Plan (WHMP). In particular, meeting discussion was inconclusive as to dead and down woody material which is now being referred to as coarse woody debris (CWD). My staff could not comment further pending our receipt and review of a biological consultant's report on the subject.

We received the report (copy attached) concurrent with the meeting on March 8th. Because the report is relatively short I won't attempt a summary here except to say that WHMP prescriptions and recommendations on CWD are not supported by the references. Those references provide subjectively developed numbers as regards CWD.

Meanwhile, we will be attempting to resolve our differences with the Snohomish County PUD over CWD. Our proposal will be based on the consultant's report recommendations. After discussion with them we will report the outcome to you.

The City will initiate two other actions in the interim until we confer with you again on CWD. First, our consultant will conduct an inventory of CWD on previously harvested Lake Chaplain Tract units. We have reason to believe monitoring has under-reported the actual situation. Results will be provided to all parties, if interested. Second, we are commencing work on the next final harvest contract. No irrevocable action such as felled trees would occur until late this year or sometime in 1995. Contract specifications, including those for CWD, should be final by about mid-June. Hopefully, the CWD issue will be resolved to mutual satisfaction by then.

We regret that this issue has not yet been resolved. Unfortunately, the biological consultant's work and subsequent follow-through with the PUD couldn't be completed

prior to the annual meeting on March 8th. Both Everett and PUD staff are committed to the earliest possible resolution of the CWD issue.

Looking ahead, you are invited to visit the Lake Chaplain Tract at anytime. Pre-arranged visits would be preferred, but a drop-in tour can usually be accommodated, provided that the City's Forester, Don Farwell, is available then. Also, if you have any questions or concerns about the situation as reported to you herein, please contact Roy Metzgar at 259-8884.

We look forward to working with you on resolving the CWD matter as soon as practicable and as efficiently as possible.

Sincerely yours,

Clair Olivers
Public Works Director

Attachment

cc: Richard Johnson, PUD (w/o attachment)
Bruce Meaker, PUD (w/o attachment)
Kurt Nelson, Tulalip Tribes

RM:DEA227LT (YJ 03/18/94 2:15 PM)

PUBLIC WORKS

EVERETT

July 8, 1994

Mr. Gary Engman
Washington Department of Wildlife
16018 Mill Creek Blvd.
Mill Creek, WA 98012

Mr. Gwill Ging
U.S. Fish & Wildlife Service
3704 Griffin Lane SE, Suite 102
Olympia, WA 98501-2192

Re: Jackson Project (FERC #2157-WA)
License Article 53 - Wildlife Habitat Management Plan
Dead and Down Woody Material (Coarse Woody Debris)

Dear Gary and Gwill:

On March 18th we provided you with information about the status of the dead and down woody material issue. The purpose of this letter is to report on the outcome of the subsequent process as outlined previously.

Regarding the proposed actions in the process, the City and PUD have exchanged correspondence on the matter (copies attached). We will discuss the outcome later in this letter. Next, the City did not conduct an inventory of coarse woody debris (CWD). After further consideration, we felt that present and future implementing actions are more important than the past actions and outcomes. Also, resolution of the issue does not require that inventory information. Consequently, we are no longer considering an inventory. Finally, harvest contract specifications have been prepared and the City Council has authorized the next sale (the actual schedule to be determined by staff).

The City's next timber harvest will provide CWD as proposed on pp 3-4 in our March 18th letter to the PUD. This means that twice the amount of Classes 1 and 2 of CWD will be provided as specified in the technical literature (Maser and Bartels) on which the Wildlife Habitat Management Plan (WHMP) is based, or the City's biological consultants suggestions. (See p. 7 in the Raedeke report - copy attached.) Our reasoning is presented on page 4 of the attached letter of March 18th to the PUD on CWD. Also, the PUD has agreed to defer to the agencies.

Accordingly, the City, as a Jackson Project co-licensee, will proceed with WHMP implementation as proposed regarding coarse woody debris. Should you wish to differ with our proposal, please notify the City within 30 days of your receipt of this letter. Should you wish to meet with us on this issue, please call Roy Metzgar (259-8884) by July 15, 1994 to schedule a meeting.

Very truly yours,

Clair Olivers
Public Works Director

Attachments (3)

cc: Richard Johnson, PUD (w/o att)
Bruce Meaker, PUD (w/o att)
Kurt Nelson, Tulalip Tribes
Craig Thompson, PUD (w/o att)

RM:YJ298LTR (Rev DEM 7/8/94)

RECEIVED JACKSON PROJECT

R. Johnson | B. Meaker | K. Bachelder | R. Tandingdum | D. Miller | N. Johnson | M. Schuh | M. Schutt | B. Maxwell | PNP | PUD

CITY OF EVERETT • 3200 Cedar Street • Everett, WA 98201 • (206) 259-8800 • Fax (206) 259-8882

State of Washington
DEPARTMENT OF FISH AND WILDLIFE

16018 Mill Creek Blvd., Mill Creek, WA 98012-1296 Tel. (206) 775-1311 / Fax (206) 338-1066

August 4, 1994

Clair Olivers, Public Works Director
City of Everett, Public Works
3200 Cedar Street
Everett, WA 98201

Re: Jackson Project Wildlife Habitat Management Plan, FERC 2157-WA

Dear Mr. Olivers:

This responds to your July 8, 1994 letter to us and U. S. Fish and Wildlife Service regarding modifications you propose to make to the existing wildlife mitigation plan for the Jackson Hydroelectric Project. You propose to reduce the requirements regarding course woody debris (CWD) to be left or provided following timber harvest. We understand your interest in this regard is to further enhance economic return to the City.

As you know, the Jackson Project Wildlife Habitat Management Plan (WHMP) was the product of intensive negotiations, over a span of several years, involving many parties including the joint licensees, Tulalip Tribes, U. S. Fish and Wildlife Service and Department of Wildlife (now Department of Fish and Wildlife). While the scientific literature was an important factor in setting specific criteria, it was not the sole basis or determining factor for each and every provision. The plan was, after all, negotiated and is a combination of carefully balanced elements assembled to accomplish a range of purposes. Even if the WHMP criteria are above minimum literature values, this is entirely appropriate given the purpose for which the plan was developed.

It is important to recall that the first priority and primary purpose of the WHMP is mitigation of wildlife habitat impacts of the Jackson Project. As is clearly stated throughout the WHMP, benefits to wildlife are the first priority and all other considerations, including timber revenue, are secondary (see WHMP at page 2-6 and elsewhere). This combination of specific criteria and hierarchy of objectives and purposes were fundamental to our agreement to allow the city to incorporate timber management and use lands it already owned to satisfy part of the mitigation obligation.

Accordingly, there is a duty to demonstrate that any modification of the WHMP will, first and foremost, benefit wildlife and contribute to offsetting project impacts. Absent a showing of benefits, the modification would be inconsistent with fundamental plan objectives and could upset the balance that was negotiated. Benefits to wildlife have not been demonstrated in this case. Reducing CWD requirements from the current specification of 6 to 10 class 1 or class 2 logs per acre will not improve the plan for wildlife. To the contrary, it may result in less wildlife value. According to your consultants, Raedeke and Associates, review of the literature, there is even some question as to whether the existing WHMP CWD criteria achieve a minimum or threshold level to meet wildlife needs.

For the record, we would like to clear up any ambiguity that may have arisen from the inadvertent omission of "per acre" from one reference to CWD criteria in the WHMP. The intended and correct value is 6 to 10 class 1 or 2 logs per acre, not per harvest unit, and is correctly referenced elsewhere in the WHMP. Raedeke and Associates properly point out that a rate of 6 - 10 logs per harvest unit would be clearly deficient.

In conclusion, we find that the proposed modification is inconsistent with WHMP purposes and goals and we do not agree with your proposal for its implementation. We expect the joint licensees to follow existing WHMP criteria as agreed.

Sincerely,

R. Gary Engman
Habitat Program Manager

cc: Arthur C. Martin, FERC, Portland Regional Office
Gwill Ging, U. S. Fish and Wildlife Service
Kurt Nelson, Tulalip Tribes
Bruce Meaker, Snohomish County PUD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501-2192
(206) 753-9440 FAX: (206) 753-9008

August 5, 1994

Mr. Clair Olivers
Public Works Director
City of Everett
3200 Cedar Street
Everett, Washington 98201

Re: Jackson Project (FERC #2157)
License Article 53 - Wildlife Habitat Management Plan
Dead and Down Woody Material (Coarse Woody Debris)

Dear Mr Olivers:

This letter responds to your July 8, 1994, letter requesting concurrence from the U.S. Fish and Wildlife Service (FWS) to modify the criteria in the Wildlife Habitat Management Plan (WHMP) with regard to Coarse Woody Debris (CWD).

As you are aware, the development of WHMP took several years of negotiations to reach agreement between the joint licensees, the resource agencies, and the affected Indian Tribe. The CWD criteria was debated at length before agreement was reached. The City's current proposal, which is based on a literature review conducted by the City's consultant, is biased toward the low end of the CWD density range. The FWS maintains that the 6 to 10 logs per acre is justified because of the need to provide habitat above the minimum values found in the literature, and because CWD available for use on the mitigation lands is relatively small.

We do not agree with the City of Everett's comment that the WHMP is ambiguous with regard to the CWD density criteria. While the "per acre" unit of measure may have been inadvertently omitted in some instances within the WHMP, such reference occurs elsewhere in the document. The WHMP does not include any reference of 6 to 10 logs per harvest unit (20 to 25 acres; which would result in a CWD density of less than 0.5 per acre).

A City of Everett representative, at the March 8, 1994, annual meeting, stated that the main reason for City's proposal to modify the CWD criteria is the large increase in

timber prices, and the resultant "loss" of revenue from leaving the WHMP required density of logs. We wish to point out that the WHMP (page 2-6) addresses this potential conflict by the statement, "wildlife considerations will take precedent over timber revenues during harvests."

For the above reasons, the FWS does not concur with the City of Everett's proposal to reduce the quantity of CWD (4 logs per acre) from the present criteria contained in the WHMP (6 to 10 logs per acre).

Please contact Mr. Gwill Ging at the letterhead phone/address if you have questions regarding our response to your July 8, 1994, letter.

Sincerely,

For David C. Frederick
State Supervisor

gg/jmc
FERC 2157
c: WDFW, Mill Creek (Gary Engman)
FERC, Portland (Arthur Martin)
FERC, Washington, D.C.
Snohomish PUD, Everett (Bruce Meeker)
Tulalip Tribe, Marysville (Dave Somers)

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

1802 - 75th Street S.W. • Everett, WA • 98204 • (206) 347-4300
Mailing Address: P. O. Box 1107 • Everett, WA • 98206-1107

February 23, 1995
PUD 20173

Mr. Gary Engman
Washington Department of Wildlife
Region 4
16018 Mill Creek Boulevard
Mill Creek, WA 98012

Mr. Gwill Ging
U.S. Fish & Wildlife Service
2625 Parkmont Lane SW
Olympia, WA 98502

Mr. Al McGuire, DNR
919 Township Street
Sedro Woolley, WA 98282

Mr. Richard Young
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Gentlemen:

RE: Jackson Hydroelectric Project - FERC #2157
Wildlife Habitat Management Plan
Annual Report

We request your attendance at the annual agency review of activities conducted by the District and City of Everett on the Jackson Project Wildlife Habitat Management Program. The meeting has been scheduled for 10 a.m. on March 9, 1995, in the conference room of the City's filtration plant near Monroe, Washington. The filtration plant phone number is 259-8817. A meeting agenda and a map showing the location are attached. We expect that the presentation and discussion will last approximately two hours, after which we will provide a box lunch and a tour of the Lake Chaplain management area.

If you are unable to attend the meeting please contact Bernice Tannenbaum at 347-4319.

Sincerely,

Bruce

Bruce F. Meaker
Jackson Project Manager

Enclosure

BT:dkw

cc: Clair Olivers, City of Everett
Don Farwell, City of Everett
Roy Metzgar, City of Everett
Kathie Joyner, City of Everett
Greg Arris, DNR

bcc: Craig Thompson
Bruce Meaker
Bernice Tannenbaum